NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT: HASAGA PROJECT RED LAKE MINING DISTRICT, ONTARIO, CANADA NTS MAP SHEETS 52K/13 AND 52N/04

Prepared for

PREMIER Gold Mines Limited

by

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of

MRB & associates
Geological Consultants

February 24th, 2017

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This report is effective as at the 30th day of December, 2016.
The date of issue of the report is the 24th day of February, 2017.

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Vincent Jourdain P.Eng.
MRB & Associates
Signed and Sealed this 24th day of February, 2017

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John Langton P.Geo.
MRB & Associates
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1.0 EXECUTIVE SUMMARY

1.1 Overview

In September 2016, Premier Gold Mines NWO Limited ("Premier Gold" or the "Company") retained MRB & Associates ("MRB"), a geological consulting firm based in Val-d'Or, Quebec, to prepare a National Instrument (NI) 43-101 Technical Report for the Hasaga Project, located in the Red Lake Mining district of western Ontario. The purpose of this document (the "Report") is to provide an independent Mineral Resource Estimate (MRE) of the Hasaga Project for Premier Gold's Board of Directors, and to provide recommendations for further exploration.

This Report has been prepared in accordance with NI 43-101 standards by Vincent Jourdain (Ph.D., P.Eng.), John Langton (M.Sc., P.Geo.) and Abderrazak Ladidi (P.Geo.), (the "Authors"), all of whom are Qualified Persons (QP) under the terms of NI 43-101, and are independent of Premier Gold. The Report will be filed on the System for Electronic Document Analysis and Retrieval (SEDAR), as required under applicable securities regulations.

All of the information held by Premier Gold regarding the Hasaga Project was made available for use in this Report, including confidential results and details pertaining to the 2015 and 2016 exploration programs carried out by the Company. A list of the principal material reviewed and used in the preparation of this document is included in the References section of this document.

Mr. Langton, conducted a site visit to the Hasaga Project on October 20th and 21st of 2016, accompanied by Jim Rogers, Exploration Manager for Premier Gold. The on-site property visit, explored the general landscape and surface features of the Project. In addition, a number of drill-sites (inactive) and outcrops were visited. Mr. Langton also visited Premier Gold's drill-core storage facility and field office/core shack, in Red Lake.

There has no geological exploration, nor significant new data generated on the Project, since Mr. Langton's site visit.

1.2 Property Description and Ownership

The Hasaga Property currently comprises 4 unpatented claims, 14 mining leases and 58 patented mining claims covering a total of 1166.72 hectares.

On Feb 11, 2015, Premier Gold Mines NWO Ltd., a Canadian-based, publicly-held company trading on the Toronto Stock Exchange (TSX) under the symbol "PR", announced that it had acquired a 100% interest in the Hasaga Property from Goldcorp Inc. (TSX:G, NYSE:GG), in a land-swap deal. The acquired land holdings comprised 4 unpatented claims, 30 patented mining licences and 14 mining leases, totalling 653.72 hectares. This property was formerly owned by Barrick Gold Corporation, and prior to that by Lac Minerals, and hosts the formerly producing Hasaga and Red Lake Goldshore mines.

On December 2nd, 2015, Premier Gold, announced that it had acquired a 100% interest in a contiguous land package located south of the Hasaga Property, from Pure Gold Mining Inc. (TSX.V:PGM) for a total of $2.5 million in cash, and delivery of Premier Shares having a market value of $2.5 million. In addition, Pure Gold Mining Inc. will be granted a 1.0% net smelter return NSR) royalty on the acquired claims (excluding claims K1444 and K1476). The acquired land holdings comprised 28 patented mineral claims totalling 513 hectares, previously held by Laurentian Gold Field (now Pure Gold) (2013-2014), Claude Resources (1998-2013), Snib Resources (1986-1998?), Consolidated Buffalo Red Lake Mines (1982-1986), Wilanour Resources Limited (1980-1982), Consolidated Buffalo Red Lake Mines Ltd. (1969-1977) and Buffalo Red Lake Mines Limited (1928-1948). This acquired ground hosts the short-lived Buffalo Mine (1981-1982).

1.3 Geology

The Hasaga Property lies within the central part of the Red Lake Greenstone Belt (RLGB) in western Ontario. The RLGB records a long history of volcanic, sedimentary and intrusive activity from 3.0 to 2.7 Ga, along with extensive tectonic deformation, hydrothermal alteration, and gold mineralization. Regional metamorphic assemblages range from greenschist to amphibolite facies.

The central and northern parts of the Property are dominated by the Dome Stock, a roughly circular, 2.72 Ga, granodiorite intrusion considered to be contemporaneous with the major gold mineralization events in the immediate vicinity.

The Laverty Dyke, which has a maximum width of about 10 m, is intermittently traceable for approximately 3.0 km across the southeastern part of the Dome Stock, striking approximately north-northwest. The dyke consists of massive, medium grained, amphibole and plagioclase in a dark grey fine grained matrix of mafic minerals and biotite. The Laverty Dyke is associated with, and hosts, post-emplacement gold mineralization.

The southern part of the Property is underlain by mafic to intermediate volcanic rocks that include massive to pillowed andesite, andesitic to mafic tuffs, and tholeiitic basalts. These volcanic sequences are intruded by the Hasaga Porphyry and Howey Diorite.

The Hasaga Porphyry is a quartz-feldspar porphyry dyke unit with contacts sub-parallel to the regional volcanic trend (i.e., northeast). At surface, the width of the Hasaga porphyry ranges from 20 m to 125 m. Drill core shows it to have sub-vertical, steeply north dipping contacts within the host volcanic rocks.

The Howey Diorite is a medium to coarse grained, grey-green, massive tholeiitic subvolcanic intrusion host to several past-producing gold mines and numerous gold occurrences. It is a rock made up of principally andesine-labradorite and hornblende.

1.4 Mineralization

Two major episodes of gold mineralization are important in the Red Lake Mining Camp, both believed to be related to the late plutonic activity (i.e. intrusion of the Dome Stock and other contemporary plutons). The first, and most significant episode, is associated with gold mineralization within sheared and carbonate-altered tholeiitic basalts and komatiites of the Balmer Assemblage. This is the characteristic gold-mineralization type extracted from the Red Lake/Campbell Mine complex owned and operated by Goldcorp Inc., located north of the Hasaga Project.

The second (later) gold mineralization episode, more characteristic of the deposits in the vicinity of the Hasaga Project, is characterized by association with quartz±tourmaline veins in felsic intrusions. These are characteristically small, narrow, laterally extensive, fault-fill and extensional veins, within and proximal to felsic and intermediate intrusions and dykes. The Hasaga, Red Lake Gold Shore, Howey, Skookum, and Buffalo mines extracted gold of this style.

Two styles of gold mineralization are recognized in the immediate vicinity of the Property. Both styles of gold mineralization have the attributes of Archean lode-gold quartz-carbonate vein deposits (Robert, 1995) associated with deformation and folding in metamorphosed volcanic, sedimentary and granitoid rocks. Virtually all gold mineralization has an epigenetic aspect and is structurally controlled in detail, occurring in veins, lenses and fractures particularly between rock units with high competency contrast (i.e. rheologically distinct)(Dubé et al., 2002).

The first style of gold mineralization is represented by the Central Zone, which hosts the Laverty Dyke, and is characterized by wide-spread gold mineralization. The Central Zone is in the southern part of the Dome Stock where a series of conjugate structures occur within a roughly circular, silicic-altered, pseudo-breccia zone that is enveloped by a broader calcitic-altered zone. The conjugate structures and their subordinate fracture system are occupied by gold-bearing quartz+-tourmaline veins and veinlets.

The Laverty Dyke is characterized by widespread persistent mineralization associated with silicification, weakly disseminated sulphides and variably distributed quartz veinlets.

The second style of gold mineralization is represented by steeply dipping mineralized zones, associated with a structurally competent intermediate to felsic, quartz-feldspar porphyry (the “Hasaga Porphyry”) that intrudes mainly mafic volcanic host rocks along a high-strain corridor bordering the southeast part of the Dome Stock, close to the suture between the Confederation and Balmer assemblages. This zone of high strain is part of the Flat Lake-Howey Bay Deformation Zone, which includes the formerly producing Howey, Hasaga and Buffalo mine deposits. The Flat Lake-Howey Bay Deformation Zone is in turn part of a network of regional deformation zones that cross-cut the RLGB.

1.5 Exploration

The recent exploration activities conducted on the Hasaga Project comprise channel sampling and diamond-drilling campaigns. For exploration purposes, the Hasaga Project is divided into three (3) sectors; the Central Sector, the Hasaga Sector and the Buffalo Sector.

Prior to the completion of the channel sampling program, mechanized overburden-stripping totalling 6,488 m^2 exposed bedrock in four (4) key areas of the Central Sector.

Forty-five (45) bedrock channels, with an aggregate length of 439.70 m, were cut at the three principal exploration sectors on the Property. A total of 455 lithic samples were collected from these channels for geochemical analysis.

The 2015 and 2016 diamond-drilling programs carried out by Premier Gold on the Hasaga Project comprised 259 holes, totalling 110,166.20 metres. As the Property partly covers the community of Red Lake, diamond-drilling was restricted to areas without residential and commercial developments. All the drilling was ground-supported, i.e., no helicopter support was required.

Chibougamau Drilling Limited of Chibougamau, Québec were commissioned to carry out the diamond drilling within the project area. The utilized drill-rigs were fully hydraulic HC-150 models, modified by the owners to drill shallow holes.

The first campaign commenced on May 1st, 2015 with one drill-rig; a second “rig” was added in June, followed by a third in July 2015. The 2015 campaign ended on December 15, 2015. Phase 2 drilling began with 3 rigs on January 29th, 2016. One of the rigs was de-mobilized in May, and Phase 2 drilling was completed with the two remaining rigs on October 12^{h}, 2016.

Ninety-six (96) holes, totalling 45,881.20 m were drilled on the Central Sector; 112 holes, totalling 45,193.30 m were drilled on the Hasaga Sector, and; 38 holes totalling 12,231.20 m were drilled on the Buffalo Sector. A recent area of interest northwest of the Central Sector, known as the North Gate Sector, has been targeted by 13 drill-holes, but is not part of the resource estimate.

1.6 Resource Estimate

The Hasaga Project hosts NI 43-101 Mineral Resources in three principal sectors underlying the Property (***Table 1.1***): the Central Sector, which hosts Indicated and Inferred resources within in a single modelled pit-shell; the Hasaga Sector, which hosts Indicated and Inferred resources in three (3) individual modelled pit-shells, and; the Buffalo Sector, which hosts Indicated and Inferred resources in a modelled pit-shell. These are the only recognized NI 43-101 resources on the Hasaga Project.

The 2017 Mineral Resource Estimates calculations were based on data from 257 ddh totalling 109,194 m, completed by Premier Gold in 2015 and 2016. Gold grades were determined using an inverse distanced-squared algorithm into a 3-D (Gemcom) block model with X-Y-Z (i.e., east-west, north-south, vertical) block dimensions of 5.0 m x 5.0 m x 5.0 m.

Table 1.1: Mineral Resource estimate at 0.5 gpt Au cut-off

Sector	Indicated			Inferred		
	Tonnes ('000t)	Grade (Au g/t)	Gold (Oz)	Tonnes ('000t)	Grade (Au g/t)	Gold (Oz)
Central	31,613	0.79	803,900	23,733	0.76	582,700
Hasaga	9,050	0.89	258,100	806	1.00	26,000
Buffalo	1,632	1.18	61,900	604	1.12	21,800
TOTAL	42,294	0.83	1,123,900	25,143	0.78	630,500

- Independent Qualified Persons for the Hasaga Mineral Resources Estimate (MRE) are Abderrazak Ladidi P.Geo and Vincent Jourdain, P. Eng., Ph.D of MRB & Associates. The effective date of the estimate is December 30th, 2016;
- CIM definitions were followed for calculations of mineral resources;
- mineral resources that are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues;
- the MRE includes 13 mineralized zones (4 in Central Sector, 6 in Hasaga Sector and 3 in Buffalo Sector), and 2 lithological (rock-type) envelopes;
- high gold assays were capped at 15 gpt Au;
- bulk density data were averaged on a per zone basis: zones 1220, 1230 and 1320 at 2.71 t/m3; zones 1330, 1510, 1540 and 2399 at 2.72 t/m3; zones 1520 and 1525 at 2.74 t/m3; zones 1210 and 1340 at 2.75 t/m3; zones 1515 and 2599 at 2.77 t/m3; zone 1530 at 2.79 t/m3, and; zone 1310 at 2.83 t/m3);
- resources were evaluated from drill-hole and channel samples using a 5-pass ID2 interpolation in a block model (block size = 5 x 5 x 5 metres);
- open pit resources are constrained to the property limit in an optimized pit-shell at a cut-off grade of 0.5 gpt Au;
- pit shell optimization parameters: Mining cost = 2.5 $CAD/t; milling cost = 12.0 $CAD/t; G&A = 3.0 $CAD/t; Gold price =1,400 $US/oz (exchange rate 1.3 $CAD = 1 $US); milling recovery = 94%; mining recovery = 100%; mining dilution = 0.0%; pit slope = 55°
  Totals may not add correctly due to rounding

1.7 Conclusions

The objective of Premier Gold's recent drilling program was to define Mineral Resources (as defined under NI 43-101) at three well-known mineralized sectors on the Property: the Central, Hasaga and Buffalo, considered to be favourable areas for exploration and to potentially host significant gold mineralization.

The 2015-16 Hasaga drilling program tested all three of the sectors with a total of 259 drill holes; 96 on the Central Sector, 112 on the Hasaga Sector and 38 on the Buffalo Sector, and was successful in demonstrating widespread shallow mineralization at the Central and Hasaga sector targets.

The 2015-16 Hasaga drilling program was successful in intersecting substantial intervals of economic-grade gold mineralization and in delineating a sizable aggregate potential resource on the Property.

More detailed 3D modelling and interpretation of the Project, combined with infill drilling could lead to an upgrade in the Resource Category, which would have a positive impact on the economic value of the deposit.

The below-pit resource potential, i.e., those potential resources that may exist down-dip of the defined resources and which would have to be accessed using underground mining techniques, have not been evaluated in the current Mineral Resource Estimate. An investigation of these deeper exploration targets and the modelling of these prospective mineralized zones could also have positive impacts on the economic value of the deposit.

Based on the information available and the degree of development of the Project, as at the effective date of this Report, MRB is of the opinion that the Project is sufficiently robust to warrant proceeding to the next phase of project development.

1.8 Recommendations

On the basis of the current Mineral Resource Estimate, MRB recommends diamond-drilling programs to: 1) enhance drill-hole density within the optimized pit outlines; 2) explore the areas immediate surrounding the pit-outlines, and; 3) investigate the potential for deep (i.e. below-pit) underground high-grade narrow vein mineralization.

Definition drilling is recommended to upgrade Inferred Resources to the Indicated category, which is required for a Preliminary Economic Assessment of the Project, whereas additional drilling in the vicinity of the known mineralized zones could increase the overall Mineral Resources. The objective of these programs being to provide an updated Mineral Resource Estimate, in the near future.

Surface stripping, mapping and channel sampling should be conducted to better understand the gold distribution and its relationship to other geological elements, and to corroborate mineralization- and grade-continuity.

MRB recommends that a comprehensive geological compilation and litho-structural modelling be completed, in a timely fashion, in order to identify discovery opportunities:

A budget for the recommended work is summarized in ***Table 1.2***.

Table 1.2: Proposed Budget For Phase 1 and Phase 2 Recommended Exploration Work

Phase 1	Drilling (metres)	Cost / metre	Budget
Data compilation and integration, generation of 3D model			$100,000
Surface stripping, mapping and sampling on priority targets			$200,000
Drilling to expand existing mineralized zones	6,000	$130	$780,000
Drilling to infill zones and re-categorize resources	6,000	$130	$780,000
Contingency 15%			$279,000
Subtotal Phase 1			**$2,139,000**
Phase 2	**Drilling (metres)**	**Cost / metre**	**Budget**
Drilling of deep targets contingent on success of Phase 1 work	10,000	$130	$1,300,000
Contingency 15%			$195,000
Subtotal Phase 2			**$1,495,000**
Overall Total			**$3,634,000**

2.0 INTRODUCTION

In August 2014, Mr. Kenneth Williamson, Technical Services Manager for Premier Gold Mines NWO Limited (“Premier Gold”) retained MRB & Associates (“MRB”), to complete a National Instrument 43-101 (“NI 43-101”) Technical Report on their 100% owned Hasaga Project, located in the Red Lake Mining District of western Ontario.

Premier Gold is a publicly held company listed on the Toronto Stock Exchange (TSX) under the symbol “PG”, and headquartered at 200-1100 Russell Street, Thunder Bay, Ontario P7B 5N2.

The purpose of this document (the “Report”) is to provide an independent Mineral Resource Estimate of the Hasaga Project for Premier Gold’s Board of Directors, and to provide recommendations for further exploration. It is understood that the Report will be used to support the subsequent public disclosure of the mineral resources at the Hasaga Project by filing on SEDAR* (www.sedar.com), as required by NI 43-101.
**System for Electronic Document Analysis and Retrieval: the principal filing system of the Canadian Securities Commission.*

The Report, prepared by Vincent Jourdain, John Langton and Abderrazak Ladidi (the “Authors”) (***Table 2.1***) is in accordance with NI 43-101 standards and is considered current as at February 24th, 2017. The effective date of the Report is December 30th, 2016.

The Hasaga Property currently comprises 4 unpatented claims, 14 mining leases and 58 patented mining claims covering a total of 1166.72 hectares (***Table 2.2***) in the Heyson and Dome townships, in the immediate vicinity of the Municipality of Red Lake Ontario (***Figure 2.1*** and ***Figure 2.2***).

On Feb 11, 2015, Premier Gold Mines NWO Ltd., a Canadian-based, publicly-held company trading on the Toronto Stock Exchange (TSX) under the symbol “PR”, announced that it had acquired a 100% interest in the Hasaga Property from Goldcorp Inc. (TSX:G, NYSE:GG), in a land-swap deal. The acquired land holdings comprised 4 unpatented claims, 30 patented mining claims and 14 mining leases, totalling 653.72 hectares (***Figure 2.3***). This property was formerly owned by Barrick Gold Corporation, and prior to that by Lac Minerals, and hosts the formerly producing Hasaga and Gold Shore mines.

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This document reports on the recent activity at the Hasaga Project, which is being actively explored for economic concentrations of gold (Au) mineralization. Exploration work carried out in the Project area intermittently since the mid-1930’s, has identified gold mineralization in extensional quartz-veins mineralized with gold-bearing sulphides and free gold. Historical exploration activities have included prospecting, soil sampling, trenching, diamond-drilling and ground geophysical surveys. There are several past-producing mines on the Property, which are summarized in ***Table 2.3***; however, there is presently no commercial production on the Property.

Table 2.1: Summary of Author Responsibilities

Section	Heading	Responsibility
1	Summary	Jourdain & Langton
2	Introduction	Jourdain & Langton
3	Reliance on other Experts	Langton
4	Property Description and Location	Langton
5	Accessibility, Climate, Local Resource, Infrastructure and Physiography	Langton
6	History	Langton
7	Geological Setting and Mineralization	Langton
8	Deposit Types	Langton
9	Exploration	Langton
10	Drilling	Langton
11	Sample Preparation, Analyses and Security	Langton
12	Data Verification	Jourdain & Langton
13	Mineral Processing/Metallurgical Testing	Langton
14	Mineral Resource Estimate	Jourdain, Ladidi & Langton
15	Adjacent Properties	Langton
16	Other Relevant Data and Information	Langton
17	Interpretation and Conclusions	Jourdain & Langton
18	Recommendations	Jourdain & Langton
19	References	Langton

Table 2.2: Summary of Mineral Concessions Comprising the Hasaga Property

Claim Number	Tenure	Area (ha)	Recorded Date	Due Date	Recorded Owner	NSR (Y / N)
4212632	Unpatented Claim	13.80	Jun-11, 2009	Jan-26, 2022	Premier Gold Mines NWO Inc. (100%)	N
4214574	Unpatented Claim	16.80	Sep-02, 2008	Sep-02, 2022	Premier Gold Mines NWO Inc. (100%)	N
4248103	Unpatented Claim	5.00	Jun-26, 2009	Feb-10, 2022	Premier Gold Mines NWO Inc. (100%)	N
4248104	Unpatented Claim	11.40	Jun-26, 2009	Feb-10, 2022	Premier Gold Mines NWO Inc. (100%)	N
K1373	Patent (Surface and Mineral)	18.21			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1374	Patent (Surface and Mineral)	17.28			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1375	Patent (Mineral)	18.01			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1376	Patent (Surface and Mineral)	17.00			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1377	Patent (Surface and Mineral)	13.52			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1378	Patent (Surface and Mineral)	25.17			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]

Claim Number	Tenure	Area (ha)	Recorded Date	Due Date	Recorded Owner	NSR (Y / N)
K1379	Patent (Surface and Mineral)	15.30			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1380	Patent (Surface and Mineral)	18.21			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1381	Patent (Surface and Mineral)	15.14			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
K1423	Patent (Surface and Mineral)	17.00			Premier Gold Mines NWO Inc. (100%)	N
K1424	Patent (Surface and Mineral)	17.00			Premier Gold Mines NWO Inc. (100%)	N
K1425	Patent (Surface and Mineral)	20.00			Premier Gold Mines NWO Inc. (100%)	N
K1426	Patent (Surface and Mineral)	22.00			Premier Gold Mines NWO Inc. (100%)	N
K1427	Patent (Surface and Mineral)	17.00			Premier Gold Mines NWO Inc. (100%)	N
K1428	Patent (Surface and Mineral)	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1429	Patent (Surface and Mineral)	15.00			Premier Gold Mines NWO Inc. (100%)	N
K1430	Patent (Surface and Mineral)	19.00			Premier Gold Mines NWO Inc. (100%)	N
K1431	Patent (Surface and Mineral)	13.00			Premier Gold Mines NWO Inc. (100%)	N
K1432	Patent (Surface and Mineral)	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1433	Patent (Surface and Mineral)	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1434	Patent (Surface and Mineral)	26.00			Premier Gold Mines NWO Inc. (100%)	N
K1435	Patent (Surface and Mineral)	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1436	Patent (Surface and Mineral)	29.00			Premier Gold Mines NWO Inc. (100%)	N
K1437	Patent (Surface and Mineral)	22.00			Premier Gold Mines NWO Inc. (100%)	N
K1438	Patent (Surface and Mineral)	20.00			Premier Gold Mines NWO Inc. (100%)	N
K1439	Patent (Surface and Mineral)	31.00			Premier Gold Mines NWO Inc. (100%)	N
K1440	Patent (Surface and Mineral)	21.00			Premier Gold Mines NWO Inc. (100%)	N
K1441	Patent (Surface and Mineral)	12.00			Premier Gold Mines NWO Inc. (100%)	N
K1444	Patent (Surface and Mineral)	20.00			Premier Gold Mines NWO Inc. (100%)	Y[2]
K1474	Patent (Mineral)	36.00			Premier Gold Mines NWO Inc. (100%)	N

Claim Number	Tenure	Area (ha)	Recorded Date	Due Date	Recorded Owner	NSR (Y / N)
K1475	Patent (Surface and Mineral)	28.00			Premier Gold Mines NWO Inc. (100%)	N
K1476	Patent (Surface and Mineral)	23.00			Premier Gold Mines NWO Inc. (100%)	Y[2]
K1585	Patent (Surface and Mineral)	13.00			Premier Gold Mines NWO Inc. (100%)	N
K1586	Patent (Surface and Mineral)	5.00			Premier Gold Mines NWO Inc. (100%)	N
K1587	Patent (Surface and Mineral)	11.00			Premier Gold Mines NWO Inc. (100%)	N
K1588	Patent (Surface and Mineral)	9.00			Premier Gold Mines NWO Inc. (100%)	N
K1589	Patent (Surface and Mineral)	3.00			Premier Gold Mines NWO Inc. (100%)	N
KRL1347	Patent (Surface and Mineral)	11.78			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL1348	Patent (Surface and Mineral)	39.58			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL1741	Patent (Surface and Mineral)	14.89			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL1741	Mining Licence of Occupation	6.48			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2134	Patent (Surface and Mineral)	17.73			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N
KRL2134	Mining Licence of Occupation	3.32			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2135	Patent (Surface and Mineral)	16.75			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N
KRL2136	Patent (Surface and Mineral)	34.68			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N
KRL2137	Patent (Surface and Mineral)	7.89			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N
KRL2137	Mining Licence of Occupation	11.78			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2138	Patent (Surface and Mineral)	9.79			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N
KRL2138	Mining Licence of Occupation	2.19			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2139	Patent (Surface and Mineral)	13.07			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N
KRL2140	Patent (Surface and Mineral)	18.47			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	N

Claim Number	Tenure	Area (ha)	Recorded Date	Due Date	Recorded Owner	NSR (Y / N)
KRL5888	Patent (Surface and Mineral)	28.57			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL5889	Patent (Surface and Mineral)	12.55			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL5889	Mining Licence of Occupation	7.41			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5890	Patent (Surface and Mineral)	8.38			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL5890	Mining Licence of Occupation	12.14			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5944	Mining Licence of Occupation	13.84			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5945	Mining Licence of Occupation	16.19			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5946	Mining Licence of Occupation	13.31			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL6005	Mining Licence of Occupation	11.61			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL8081 (rec. as KRL13257)	Mining Licence of Occupation	11.66			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL8082 (rec. as KRL13258)	Mining Licence of Occupation	18.90			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL818	Patent (Surface and Mineral)	12.67			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL819	Patent (Surface and Mineral)	16.47			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL819	Mining Licence of Occupation	3.93			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL820	Patent (Surface and Mineral)	14.25			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL821	Patent (Surface and Mineral)	15.18			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
KRL821	Mining Licence of Occupation	2.27			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL822	Patent (Surface and Mineral)	21.21			Goldcorp Inc. (72%), Goldcorp Canada Ltd (28%)	Y[1]
	Total area:	**1166.72**				

[1] 3% to Lac Minerals (April 30, 2010 Agreement between Red Lake Gold Mines Partnership and Lac Properties Inc.); [2] 3% Camp McMann 0.5% Premier Royalty (Sandstorm)

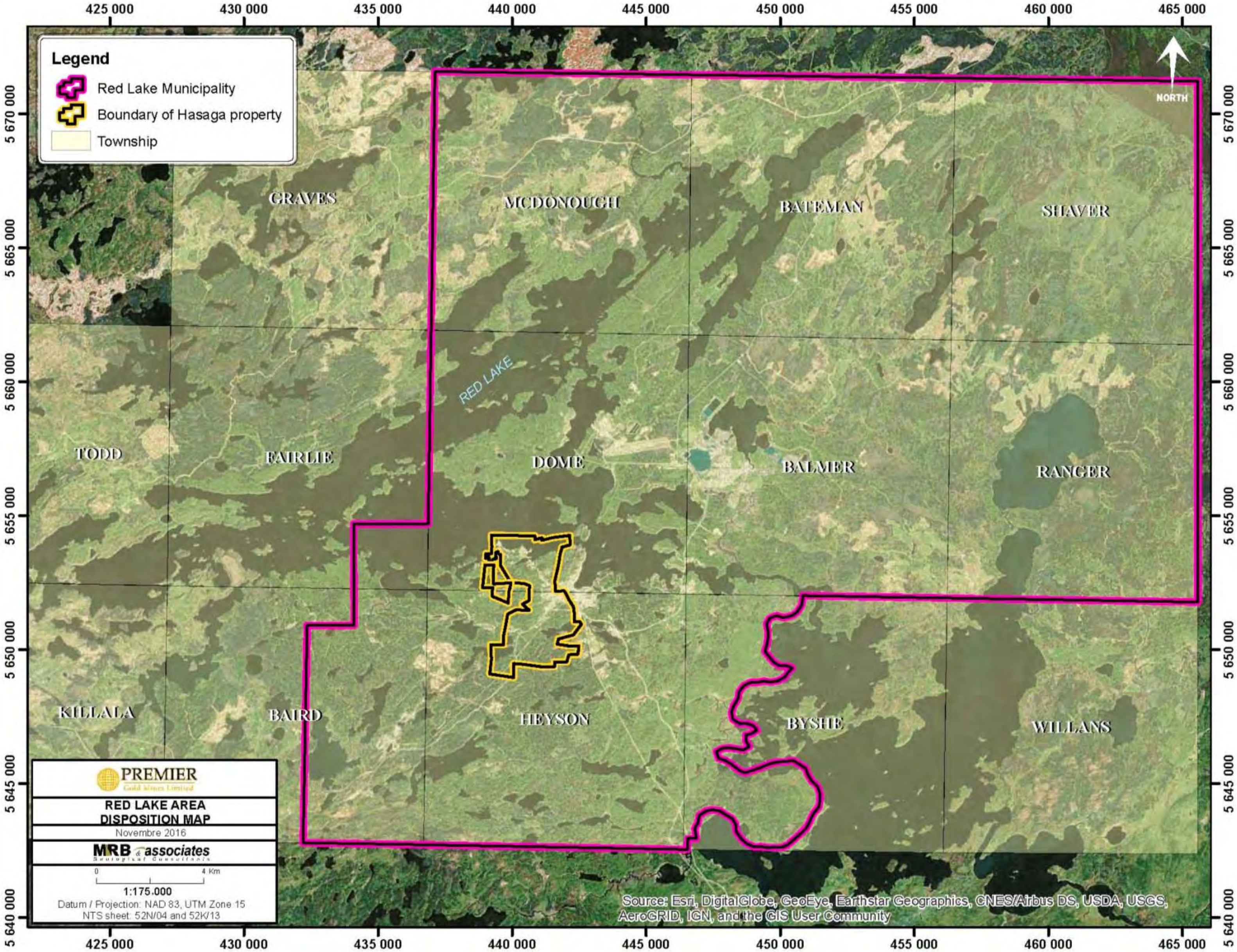

Figure 2.1: Location map showing boundaries of Red Lake Municipality and local townships

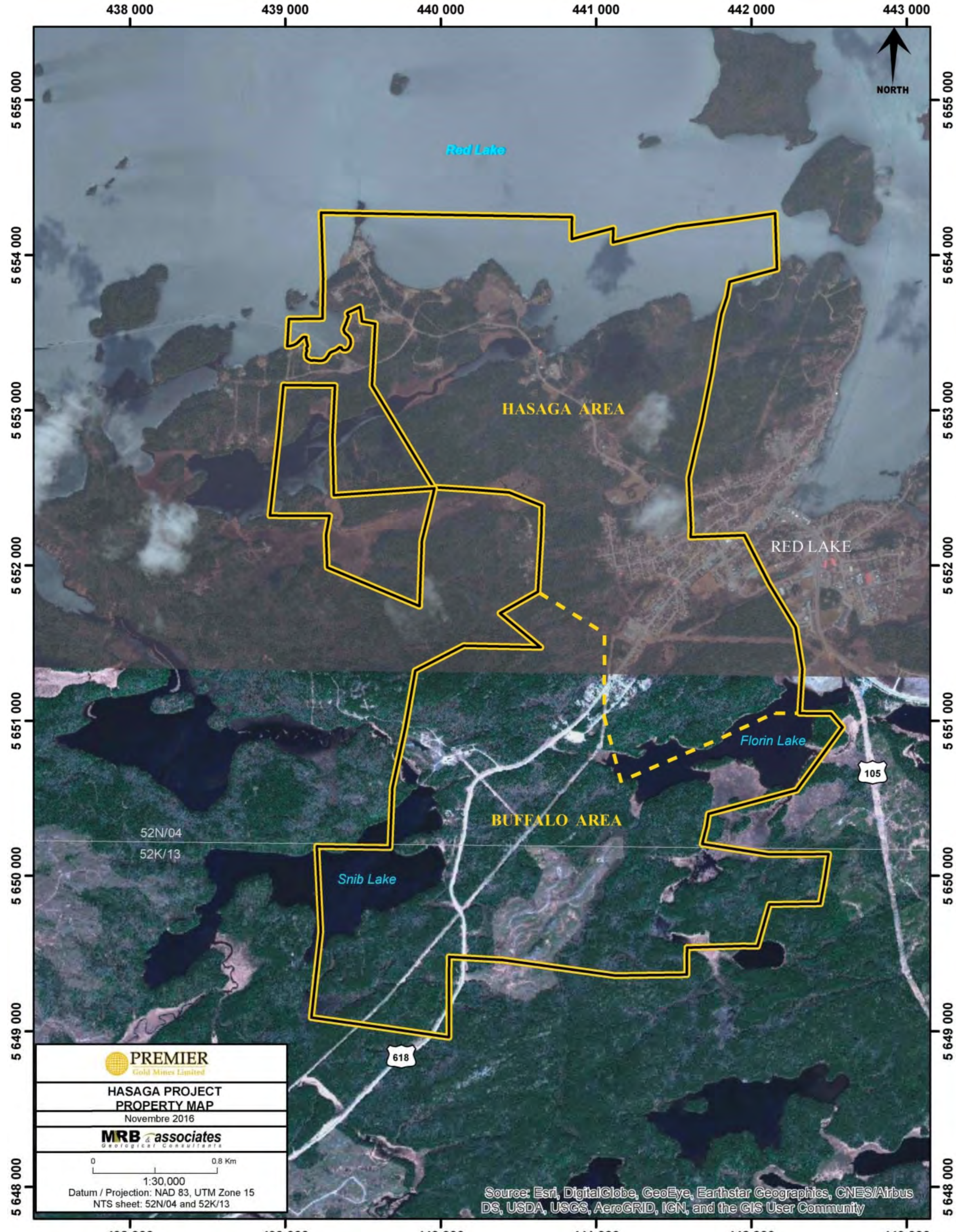

Figure 2.2 : Outline of Hasaga Property showing property acquired from Goldcorp Inc. (Hasaga Area), and expanded land acquired from Pure Gold Mining Inc. (Buffalo Area)

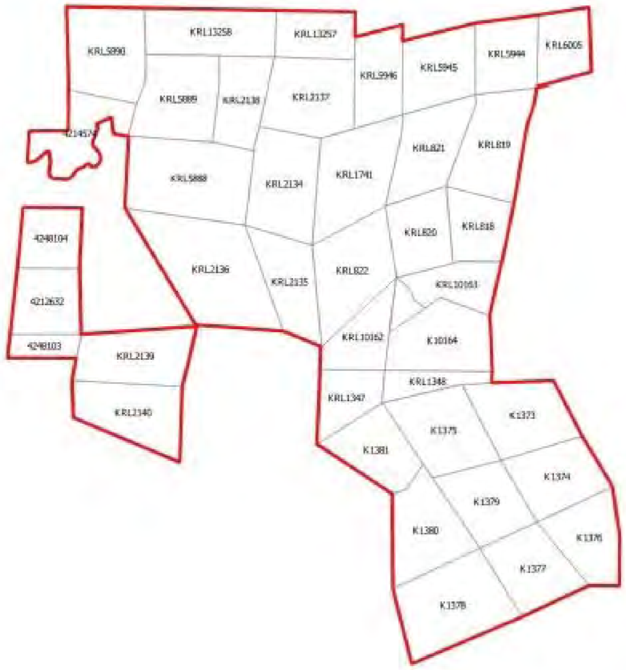

Figure 2.3 : Claims acquired from Goldcorp Inc.

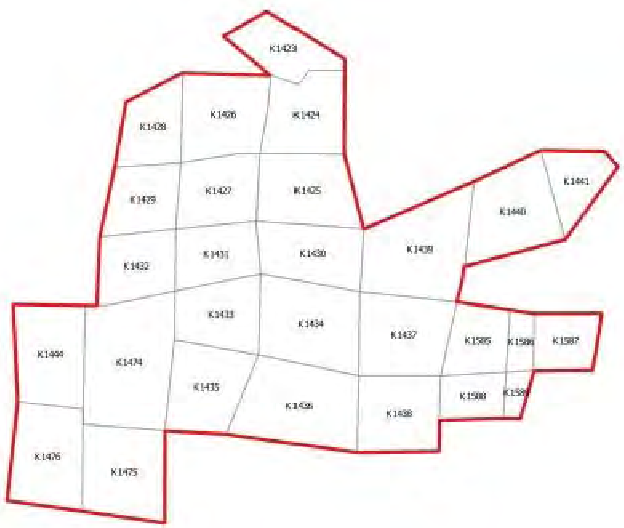

Figure 2.4 : Claims acquired from Pure Gold Mining Inc.

Table 2.3: Summary of past producers on the Hasaga Property

Producer	Years of Operation	Sort tons Milled	Troy Ounces Produced	Ounces per ton	Grams per Tonne
Gold Shore	1936-1938	86,333	21,100	0.244	8.38
Hasaga	1938-1952	1,515,282	218,213	0.144	4.94
Buffalo (open pit)	1981-1982	31,986	1,656	0.052	1.78

2.1 Sources of Information

All of the information held by Premier Gold, pertinent to the Hasaga Project, was made available for use in this Report, including confidential results and details pertaining to the 2015 and 2016 exploration programs completed by Premier Gold.

Other information contained in the Report was obtained from publications of the Geological Survey of Canada, and scientific papers from various earth science journals. A list of material reviewed and used in the preparation of this Report is included in the References section of this document.

The results of known past activities in the immediate vicinity of the Hasaga Project have been summarized in this report. Some of this historical work (i.e., geological and technical reports), used to compile information on the Project area, were prepared before the 2001 implementation of National Instrument 43-101 and the 2005 Regulations of 43-101. It is the Authors' opinion that these reports appear to have been completed by "qualified professional geological personnel" under the definition of NI 43-101, and that the information was prepared according to standards acceptable to the exploration community at the time.

2.2 Site Visit

Mr. Langton of MRB, conducted a site visit of the Hasaga Project on October 20-21, 2016, accompanied by Jim Rogers, Premier Gold's Exploration Manager. The site visit, explored the general landscape and surface features of the Project recorded on geological maps and figures published by Premier Gold. In addition, a number of drill-sites (inactive) and stripped outcrops were visited. It was noted that all the observed drill collars were correctly labelled and accurately reflected the azimuth and dip recorded on the logs. Mr. Langton also checked for and confirmed evidence of lithological channel sampling at the examined outcrops, and documented mineral occurrences.

During his visit, Mr. Langton also reviewed Premier Gold's drill-core storage facility in Red Lake, noting that the drill-core is in good order, stored in a secure facility, and can be properly identified by metal tags secured to the core boxes. Observations indicate that the core cutting was well done, sample tags were noted as being in place, and the tags and sampled sections correspond to those indicated in the core logs.

Since Mr. Langton's site visit, there has not been any further surface exploration, nor significant new data generated, on the Project.

In conclusion, Mr. Langton confirms that the exploration activity reported by Premier Gold is accurate and reliable.

2.3 Units of Reference

Currency amounts ($) are reported in Canadian Dollars ($ or CAD$) or "American" dollars (US$).

Grid coordinates on maps and figures are based on the UTM NAD 83 Zone 15 projection.

Quantities are stated in metric units, as per standard Canadian and international practice, including metric tons (tonnes, t) and kilograms (kg) for mass, kilometres (km) or metres (m) for distance, hectares (ha) for area, and grams (g) or grams per metric ton (gpt) for gold grades. Where applicable, imperial units have been converted to the International System of Units (SI units) for consistency.

3.0 RELIANCE ON OTHER EXPERTS

Premier Gold provided professional discussion and opinions regarding effective future exploration methods, and provided information regarding the property agreements, drill-core logs, cross-sections, figures and analytical data pertaining to the Project.

P.J. Lafleur Geoconsultants Inc. (P.J. Lafleur Géo-Conseil Inc.) of Sainte-Thérèse, QC provided Whittle calculations and pit-shell outlines used in the Mineral Resource Estimate calculations.

The statements and opinions expressed in this document are given in good faith implementing generally accepted scientific judgement, principles and practices, based on information provided at the time of writing, and with the belief that such statements and opinions are not false and misleading at the date of this Report. Because of the inherent uncertainty in this process, no guarantee of conclusion is intended or can be given. MRB accepts no responsibility for damages, if any, suffered by any other party as a result of decisions made or actions based on this report.

This Report was prepared in full accordance with NI 43-101 standards; however, as the scope of the services performed may not be appropriate to satisfy the needs of other parties, it is understood that any use that another party makes of this report, or any reliance or decisions made based upon it, except for the purposes legislated under provincial securities laws, are the sole responsibility of the other party.

The Authors believe that the information used to prepare this Report, and to formulate its conclusions and recommendations, is valid and appropriate considering the status of the Project and the purpose for which the Report has been prepared.

4.0 PROPERTY LOCATION AND DESCRIPTION

4.1 Location

The Hasaga Property is in the Red Lake Mining District in western Ontario, approximately 440 km northwest of Thunder Bay (Ontario), and 270 km northeast of Winnipeg, Manitoba (***Figure 4.1***). The Property covers parts of Dome and Heyson townships, within and adjacent to the Municipality of Red Lake (see ***Figure 2.1***).

The centre of the project's exploration focus is approximately at Universal Transverse Mercator (UTM) coordinates 440580, 5652250 in Zone 15 of the 1983 North American Datum projected coordinate system (NAD83-Z15)"; or, 51º 01' 08" North / 93º 50' 50" West (Latitude /Longitude).

4.2 Property Disposition

The Property consists of 4 unpatented mining claims, 14 mining leases and 58 mining patents, covering a total of 1166.72 hectares, on NTS Map Sheets 52K/13 and 52N/04 (***Figure 4.2***). Neither the Property, nor the claims it comprises, have been legally surveyed. The denoted boundaries were obtained from the Ontario MNDM on-line CLAIMaps IV application (http://www.mndm.gov.on.ca/en/mines-and-minerals/applications/claimapsiv).

A summary of the title, surface rights, work obligations and expiration dates for the claims comprising the Property, along with a detailed claim map, are included in ***Table 2.1*** and ***Appendix I***. The Hasaga claims are all in good standing. The assessment work credits required for the renewal of the unpatented claims upon the next anniversary date total $8,000. No expenditures are necessary to maintain the patented mining claims and mining licences.

4.3 Tenure Rights

Details on mineral exploration, such as: reporting requirements; land access and use; fees and charges; permitting, and; environmental requirements are summarized on the Government of Ontario's MNDM website (http://www.mndm.gov.on.ca/en/mines-and-minerals). The type and designation number of the mineral tenures comprising the Property are shown in ***Table 2.1*** and ***Appendix I***.

4.4 Property Agreement and Royalties

There are 2 separate Net Smelter Return (NSR) agreements that were in place and carried forward upon Premier Gold's acquisition of the Property:

1) As per an agreement dated April 30, 2010 between Red Lake Gold Mines Partnership and Lac Properties Inc., there is a 3% NSR payable to Lac Minerals on all minerals mined, produced or otherwise recovered from claims K1373-K1381, KRL1347, KRL1348, KRL1741, KRL2134, KRL2137, KRL2138 KRL5888, KRL5889, KRL5889, KRL5890, KRL5890, KRL5944, KRL5945, KRL5946, KRL6005, KRL8081, KRL8082, KRL818, KRL819, KRL819, KRL820, KRL821, KRL821, KRL822;

2) Claims K1444 and K1476 are subject to a previously established royalty agreement with Premier Royalty Corporation, under which it is entitled a 0.5 % NSR. Claims K1444 and K1476 are subject to an additional royalty agreement with Camp McMann Red Lake Gold Mine Ltd., under which it is entitled to a three percent NSR.

Figure 4.1: Simplified map of western Ontario showing the location of Red Lake

MRB & Associates has not verified the legal titles to the Property or any underlying agreement(s) that may exist concerning the licenses or other agreement(s) between third parties; however, MRB understands that Premier Gold is responsible to have conducted the proper legal due diligence.

4.5 Environmental Liabilities

No environmental permits are currently assigned to the Property for exploitation purposes. Environmental permit(s) may be required at a later date to fulfil environmental requirements with the goal of returning the land to a use whose value is at least equal to its previous value and to ensure the long term ecological and environmental stability of the land and its watershed; however, no environmental liabilities were inherited with any of the claims on the Property, and there are no environmental requirements to maintain any of the claims in good standing at this time.

4.6 Permits

Exploration work permits will only be required for future work on the four (4) unpatented claims on the Property. The appropriate Permit Applications for potential forthcoming work on these claims was submitted by Premier Gold to Ontario MNDM on Nov. 4th 2016, with an expected processing period of 30 to 50 days. The future work recommendations suggested by the Authors of this Report do not involve any exploration work on these claims.

4.7 Other Relevant Factors

To the Authors' knowledge there are no significant factors and risks that may affect access, title, or the right or ability to perform work on the Property throughout the year.

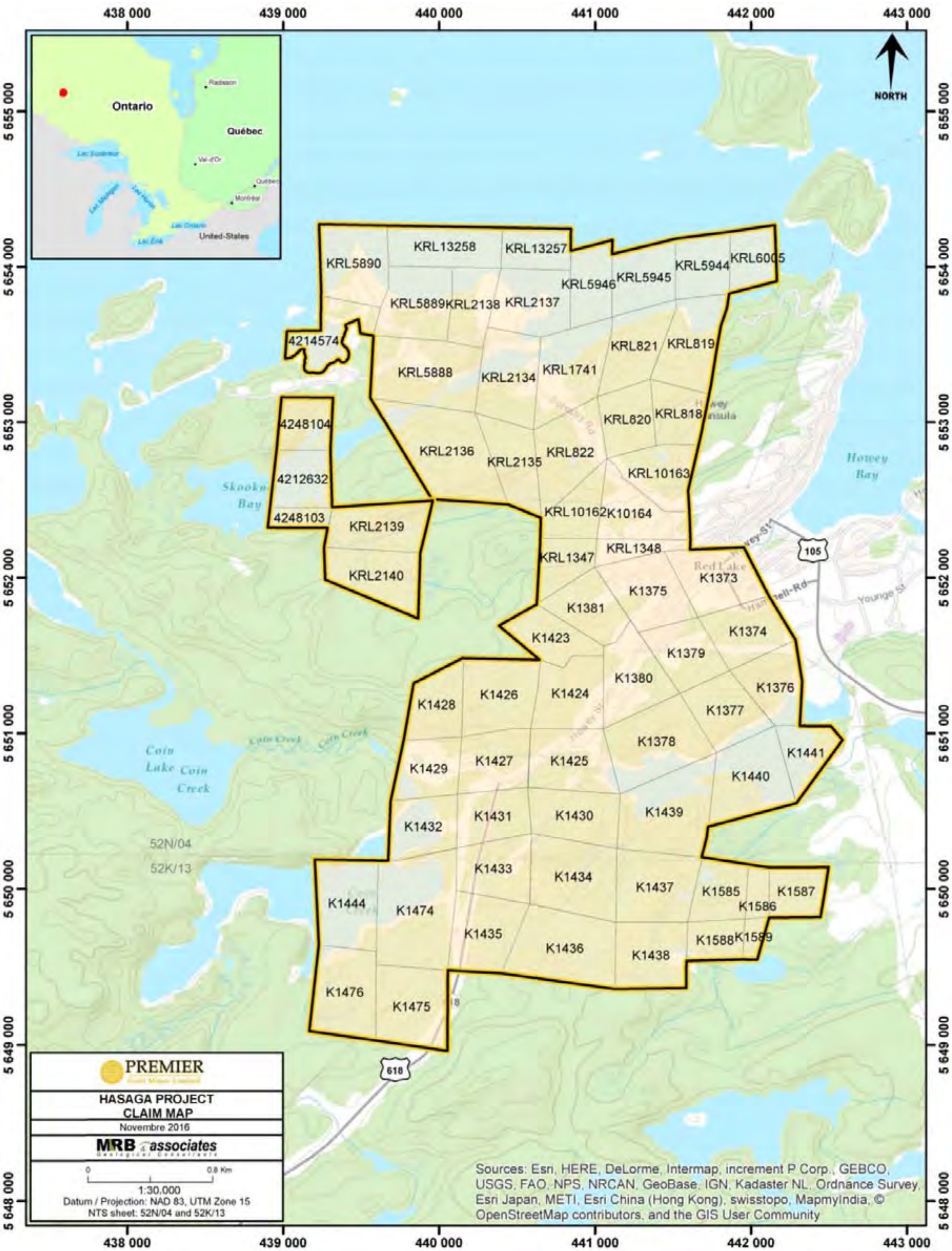

Figure 4.2 : Physiographic map of the area around the community of Red Lake, showing the claims comprising the Hasaga Property

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES & INFRASTRUCTURE, PHYSIOGRAPHY

5.1 Accessibility

The Property partly covers the community of Red Lake and is easily accessed, year round via provincial Highway 105 and Highway 618, which transects the southern part of the Property (see **Figure 4.2**). Various secondary dirt roads and trails provide access to the remainder of the property.

5.2 Climate

The Hasaga Work Area is in western Ontario, an area considered “humid continental”, typified by large seasonal temperature differences, with warm to hot and often humid summers, and cold, sometimes severely cold winters. Seasonal temperature and precipitation amounts, as recorded by Environment Canada are summarized in ***Figure 5.1*** Snow cover and cold temperatures can be expected from December to April, but exploration programs (e.g., diamond-drilling, ground geophysical surveys) can typically be carried out year-round.

Figure 5.1 : Temperature and Precipitation Graph for 1981 to 2010 Red Lake, ON (http://climate.weather.gc.ca/climate_normals/index_e.html)

5.3 Local Resources and Infrastructure

The Municipality of Red Lake has a population of over 4,000. The local economy and infrastructure is strongly focused on mineral exploration and the mining industry. Nearby communities readily provide supports services, equipment and skilled labour for both the mineral exploration and mining industry.

Red Lake Airport, (IATA: YRL, ICAO: CYRL), is located 5.6 km north of Red Lake, and 1 km south of the community of Cochenour. The airport serves as a point of call for air carriers offering scheduled passenger service; is an operating base for the Ontario Ministry of Natural Resources & Forestry; and services both private and commercial fixed-wing aircraft and helicopter operators located on site. The airport is classified in the Regional/Local category according to the National Airports Policy. Local air services connect to major airports in Winnipeg, Manitoba and Thunder Bay, Ontario. Vehicle rentals are available at the airport.

The City of Thunder Bay has government offices serving the Natural Resources and Mining sectors, and sources for exploration and mining machinery, supplies and expertise.

As the Property is partly within the community of Red Lake itself, hydroelectric, transportation, and water supply infrastructure are readily accessible.

5.4 Physiography

The topography of the project area is flat to gently rolling hills with local relief on the property ranging up to 20 metres. This relief is attributed to glacial deposits which drape the underlying bedrock. Distinct topographic features that stand out in relief are attributed to post-glacial drainage patters, with low lying areas consisting of ponds, swamps and streams.

The property lies within the northern coniferous section of the boreal forest. Predominant tree species is black spruce but also includes tamarack, and cedar and birch with local stands of white birch, jack pine, red pine and poplar.

6.0 EXPLORATION HISTORY

The Red Lake/Hasaga area has been explored for its precious metal potential since the early 1900's. The following summaries highlight the exploration history of the Project area, compiled from digital and analogue data obtained from the provincial office of the Ministry of Northern Development and Mines (MNDM), in Red Lake, Ontario. The land concessions that constitute the Hasaga Property per se, comprise an assortment of Mining Patents and Mining Leases. Assessment-work credits are not required to retain these types of tenured land concessions, so most of the exploration work that has been carried out on the Property has not been filed with MNDM. Assessment Reports submitted to MNDM are available online at http://www.geologyontario.mndmf.gov.on.ca/SearchAFRI/ the Geology Ontario website.

6.1 Historic Exploration

1936-1938 21,100 ounces of gold was reportedly produced from the Red Lake Goldshore Mine;

1938-1953 218,213 ounces of was gold produced from the combined Hasaga Mine projects. An estimated 50,000 ounces remains in a high-grade zone at depth;

1977 An induced polarization and resistivity survey conducted by McPhar Geophysics on behalf of Cochenour-Willans Gold Mines Ltd., covered claims 2139p and 2140p;

1987-1988 Lac Minerals (now Barrick Gold Corp.), conducted a property-wide exploration program that included detailed geologic outcrop mapping, ground geophysical surveys and a nine hole diamond-drill program totalling approximately 5,000 m. Highlights include: 0.75 gpt Au over the entire 218 m of hole HRL87-05, including 1.5 gpt Au over 49.0 m (163.0 m - 212.0 m); 8.0 gpt Au over 16.1 m (hole HRL88-02; 929.9 m - 946.0 m), and 4.4 gpt Au over 10.1 m in the Hasaga Sector (hole HRL88-03; 1,209.4 m - 1219.5 m) (Gauthier, 1996);

1996 Barrick Gold Corp. compiled historic mining data and conducted a four-hole, 2,898 m diamond-drilling program, targeting the down-plunge extension of gold bearing stock-work veins in the Hasaga Mine. Results included 14.0 gpt Au over 2.1 m (hole HRL96-02; 1004.9 m - 1007.0 m), and 2.6 gpt over 4.2 m (hole HRL96-02; 989.6 m - 993.8 m)(Gauthier, 1996);

2013-2014 Goldcorp Inc. conducted a property-wide geochemical study that comprised 70 lithological samples, collected at roughly 200 m centres. Analyses included gold and trace-element assays. Several 060° to 070° dipping structures were identified as potentially significant mineralization target structures, as they are compatible with structures exploited by historic mining projects.

6.2 Historic Development

Although there is presently no commercial production on the Property, there are several past-producing mines on the Property. The summary that follows is taken from Epp (2013):

Skookum Mine - Initial exploration on this property began in 1936 with a short shaft being sunk to 170 feet in the summer of 1937; however, no lateral development was extended from this shaft. Structures of interest were the moderately well-developed sub-vertical shears trending 070º that are frequently intruded by granodiorite and mafic dykes, and narrow, sub-vertical quartz veins that trend towards 150º (Horwood, 1945). The southeasterly trending quartz vein (white to bluish grey with a glassy texture), carried most of the noted gold and tended to be less than six inches wide. The veins contain only minor pyrite and chalcopyrite with local visible free gold.

Red Lake Goldshore Mine - Hosted in granodiorite, in the central part of the Dome Stock, and in production from 1936 to 1938, this mine produced 21,100 ounces at 0.244 ounces per ton (oz/t). The main mineralization zone was pipe-shaped, with the strongest mineralization occurring at the intersection of two different generations of shear zones (Horwood, 1945 and Ferguson, 1966). The older shear dips 75º towards 045º whereas the younger shear dips 80º towards 130º. The main mineralized zone consisted of 5 to 30 foot wide quartz veins having strike lengths of 50 to 150 feet. The veins themselves comprised quartz with minor pyrite and chalcopyrite, with even rarer sphalerite, tetrahedrite, altaite and free gold. Underground development consisted of a 700 foot shaft with five developed levels and an internal winze down to 1000 feet, with two additional developed levels. A 125 ton/day mill was constructed to support production. Ore grades were enriched on surface by hand sorting of the ore material, removing approximately 20% waste material from the mill feed. Once the ore resource on this property was depleted in 1938, the Hasaga Mine purchased the patented ground and all assets specifically to obtain ownership of the Gold Shore milling facilities.

Hasaga Mine -Originally staked in 1928, the Hasaga Mine was in production from 1938 to 1952, producing 218,213 ounces at an average grade of 0.144 oz/t. Ore being skipped to surface was also “hand cobbed” removing about 20% waste tonnage from the mill feed, and was then trucked to the milling facilities located at the old Red Lake Goldshore Mine. Production came from two closely situated shafts in the northeast of the property; however, a third exploration shaft was driven to explore the potential for ore to the southwest. Underground excavations were quite extensive with the deepest shaft (No. 3 Shaft) reaching a depth of 2,450 feet with 14 established levels and stope panels of 500 to 600 feet in strike length. Mineralization at the Hasaga Mine was nearly identical to that at the Howey Mine situated immediately to the east, and consisted of a fractured and mineralized quartz porphyry dyke that intruded intensely sheared, intermediate, calc-alkaline volcanic rock. This mineralized porphyry dyke generally dips 85º towards 155º, and can vary in widths from 10 to 150 feet. The highest grades occurred within the narrower (10 to 40 feet wide) parts of the dyke. Gold occurred within fracture veins consisting of bluish white quartz, black tourmaline, coarse pyrite and minor amounts of other sulphides including sphalerite, galena, chalcopyrite and tellurides. Visible gold is generally not apparent.

Buffalo Red Lake Mine -The Buffalo Deposit occurs along the southern edge of the Dome Stock, immediately west of the former patented Hasaga Mine property. The deposit was initially staking in 1925, with sufficient drilling and striping work being done up to 1931 to patent the claims. Initial underground exploration work started in 1947 to 1948 and focused on narrow quartz-tourmaline (+/-coarse pyrite) veins in tectonized quartz porphyry dykes intruding sheared greenstones, similar to mineralization found at the Howey and Hasaga mines located to the east. Though these veins often had high gold content, the volume of vein material was not high enough to be economic at the time. Later, in the early 1980's and late 1990's work shifted to quartz-tourmaline veining contained within granodiorite of the southern Dome Stock. These veins were also narrow quartz, tourmaline and pyrite dominated, frequently occurring with pinkish carbonate alteration halos within grey granodiorite. A decline was driven from surface to access small tonnage stopes; however, due to narrow vein widths and excessive mining dilution, this mineralization was found to be uneconomic as well. Ore from this phase of mining was trucked and processed at the nearby Madsen Mine.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The following description of the regional and Property geology, though modified and edited, derives from Premier Gold's "Assessment Report on the 2015 Drilling Program" (Premier, 2015), which in turn relied heavily on field and drill core observations, as well as earlier mapping and property reports by Harwood (1940), Gauthier (1996), Dubé et al. (2004), Sanborn-Barrie et al. (2004), and Epp (2013), and references therein.

The Hasaga Property lies within the central part of the Red Lake Greenstone Belt (RLGB) in western Ontario (***Figure 7.1***). The RLGB evolved on the southern margin of the North Caribou Terrane and records a long history of volcanic, sedimentary and intrusive activity from 3.0 to 2.7 Ga*, along with extensive tectonic deformation, hydrothermal alteration, and gold mineralization. Regional metamorphic assemblages range from greenschist to amphibolite facies.
**Note: All ages quoted in this section are derived from U-Pb radiometric dating; see Sanborn et al., 2004 and references therein (Ga = billion years, Ma = million years)*.

The Mesoarchean Balmer Assemblage (3.0 to 2.98 Ga), hosts the region's oldest rocks, and most of its gold deposits. This dominantly mafic volcanic sequence comprises mainly tholeiitic to komatiitic basalts interpreted as shallow subaqueous flows. The Ball Assemblage (2.94 to 2.92 Ga), which consists of a sequence of felsic to intermediate calc-alkaline extrusive and pyroclastic units, followed deposition of the Balmer Assemblage and is found exclusively in the north-western part of the RLGB. The Slate Bay Assemblage (2.90 to 2.85 Ga) is a clastic sedimentary sequence including conglomerate, quartz arenite and wacke, and mudstones that occurs throughout the RLGB. The Slate Bay Assemblage is in contact with the older Balmer and Ball assemblages as a minor unconformity. The youngest rock sequence, the Bruce Channel Assemblage, is a thin succession of intermediate, calc-alkaline, rhyodacitic pyroclastic rocks.

A regional unconformity, representing a 100 million year gap in volcanic activity exists between the Mesoarchean assemblages (described above) and the Neoarchean Confederation Assemblage (2.748 - 2.739 Ga), which comprises a predominantly calc-alkaline volcanic sequence. The lower Confederation Assemblage, known as the McNeely Group, includes intermediate to mafic volcanic rock, overlain by felsic to intermediate tuff, lapilli tuff, and massive to pillowed andesite, with minor interbedded sedimentary units. The McNeely Group is overlain by the Heyson Group, a tholeiitic volcanic sequence that includes a range of basalts (tholeiitic, pillowed and porphyritic), porphyritic andesite flows, and dacitic tuffs. It is widespread across the RLGB, and underlies the southern part of the Hasaga Property.

Three phases of primarily granitoid plutonism are recognized in the Red Lake area. The oldest include the syn-volcanic Graves Plutonic Suite (2.736 +3/-2 Ga to 2.731 +3/-2 Ga) of granodiorite, tonalite and quartz monzonite intrusions. The Graves Plutonic Suite is widespread in the western and northern parts of the RLGB. The second plutonic phase includes the major plutons that are in close proximity to the Red Lake town-site, including the Mackenzie Island Stock (2.720 ± 3 Ga), the Dome Stock (2.718.2 ± 1.1 Ga), and the Albino (granodiorite) Plutons. Included in the second plutonic phase is a syn-tectonic quartz/feldspar porphyry dyke swarm (herein referred to as the Hasaga Porphyry), dated 2.714 ± 4 Ga, that intruded Confederation Assemblage rocks southeast of the Red Lake town-site. A third phase of late- to post-tectonic intrusions aged approximately 2.7 Ga resulted in megacrystic granodiorite batholiths located the western part of the RLGB, and include the Killala Baird Batholith and Para Lake Stock.

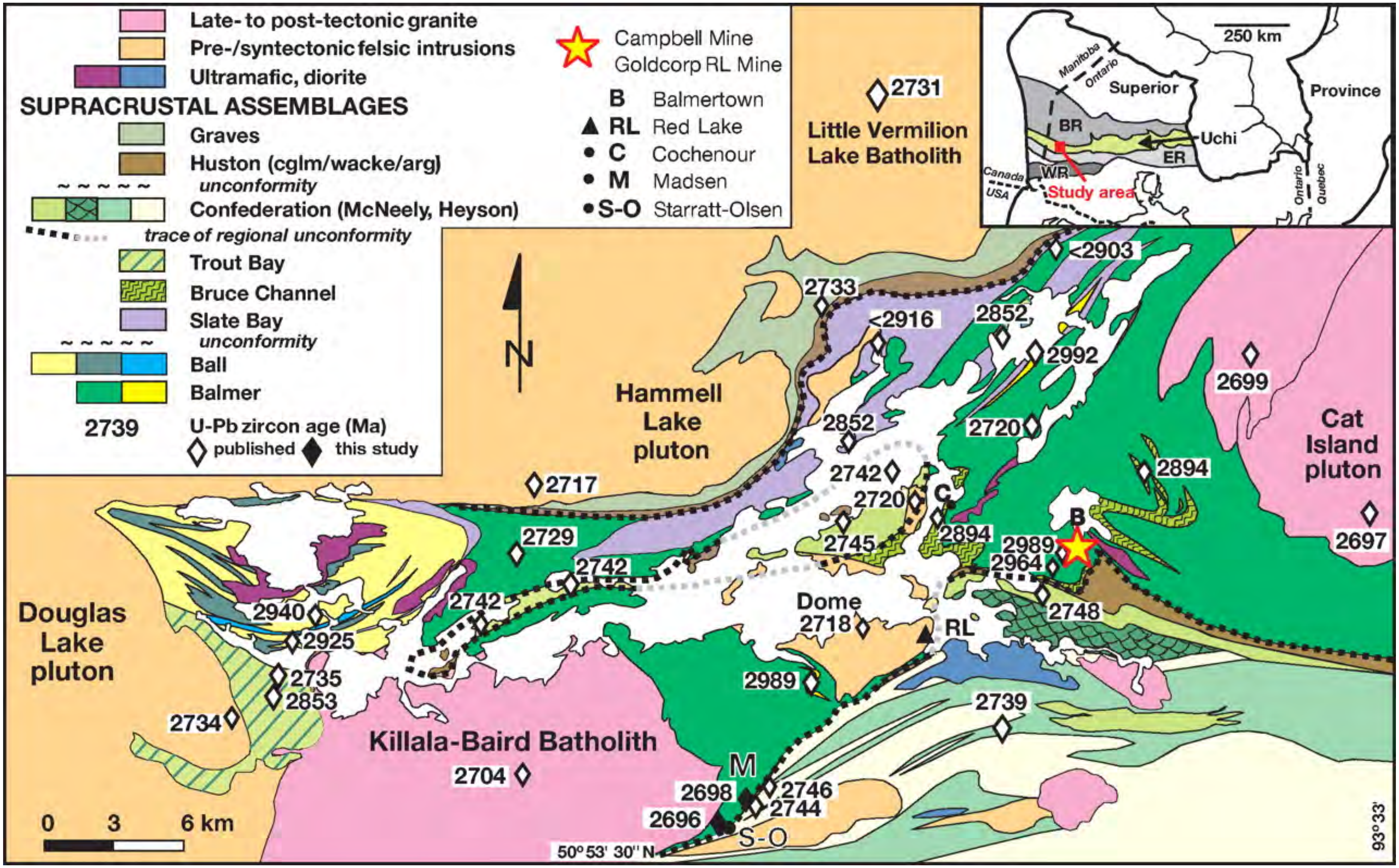

Figure 7.1 : Geology of the Red lake Greenstone Belt (from Dubé et al., 2004)

7.2 Local Geology

The central and northern parts of the Property are dominated by the Dome Stock, a roughly circular, 2.72 Ga, granodiorite intrusion that has a generally east-west trending southern contact with the Balmer Assemblage (***Figure 7.2***).

The southern part of the Property is underlain by mafic to intermediate volcanic rocks of the Confederation Assemblage that are separated from the Balmer Assemblage by a regional unconformity (***Figure 7.2***). The 050º trending Confederation Assemblage volcanic sequences dip sub-vertically and are affected by an east-northeast trending regional deformation zone that broadly coincides with the intrusive and volcanic contacts. The majority of the volcanic rocks underlying the Property belong to the Heyson Group (Confederation Assemblage), and include massive to pillowed andesite, andesitic to mafic tuffs, and tholeiitic basalts.

The Balmer Assemblage consists of interlayered basaltic and komatiitic flows and mafic to ultramafic intrusive rocks, with minor felsic volcanic rocks, clastic sedimentary rocks and iron formation. Gold mineralization in the vicinity of the Property is generally localized along discreet structures and in association with felsic intrusions within Balmer Assemblage rocks, typically in close proximity to the northeast-trending regional unconformity that separates the Balmer and Confederation assemblages. The Balmer Assemblage is intruded by both the Hasaga Porphyry and Howey Diorite.

The Hasaga Porphyry is a quartz-feldspar porphyry dyke unit that intrudes the Balmer Assemblage in the east-central part of the Property, sub-parallel to the regional volcanic trend (i.e., northeast). At surface, the width of the Hasaga porphyry ranges from 20 m to 125 m. Drill core shows it to have sub-vertical, steeply north dipping contacts within the host Balmer Assemblage volcanic rocks.

The Howey Diorite, which underlies the east-central boundary of the Property, is a tholeiitic subvolcanic intrusion. The nature of its contact at depth is unknown.

The Laverty Dyke is intermittently traceable for approximately 3.0 km through the southeastern part of the Dome Stock (***Figure 7.3***), striking approximately north-northwest (340°), with a maximum width of about 10 m. The dyke consists of massive, medium grained, amphibole and plagioclase in a dark grey fine grained matrix of mafic minerals and biotite. It has a strong positive magnetic signature due to its pyrrhotite and magnetite content, and minor to trace amounts of other sulphide minerals.

7.3 Structural Geology

The structural setting of the Red Lake Greenstone Belt (RLGB) is comprised primarily of generally east-trending, steeply dipping volcanic and metasedimentary rock sequences that record several phases of deformation. The earliest, non-penetrative deformation phase (D0) overturned rocks of the 2.99 Ga Balmer Assemblage, prior to Neoarchean volcanism. The first penetrative deformation (D1) occurred after 2.74 Ga volcanism, and resulted in north trending, south plunging folds (F1) and related fabrics (S1/L1). Folds are best developed in clastic rocks, whereas S1 and L1 fabrics are well preserved in all of the regional volcanic assemblages.

Superimposed over D1 are D2 structures, which vary in strike across the RLGB. In the western and central belt, they manifest as east to northeast trending structures (F2/S2/L2), whereas in the eastern RLGB they are generally trend southeast (***Figure 7.4***). This part of the RLGB includes the Campbell/Red Lake Mine and vicinity (see ***Figure 7.2***).

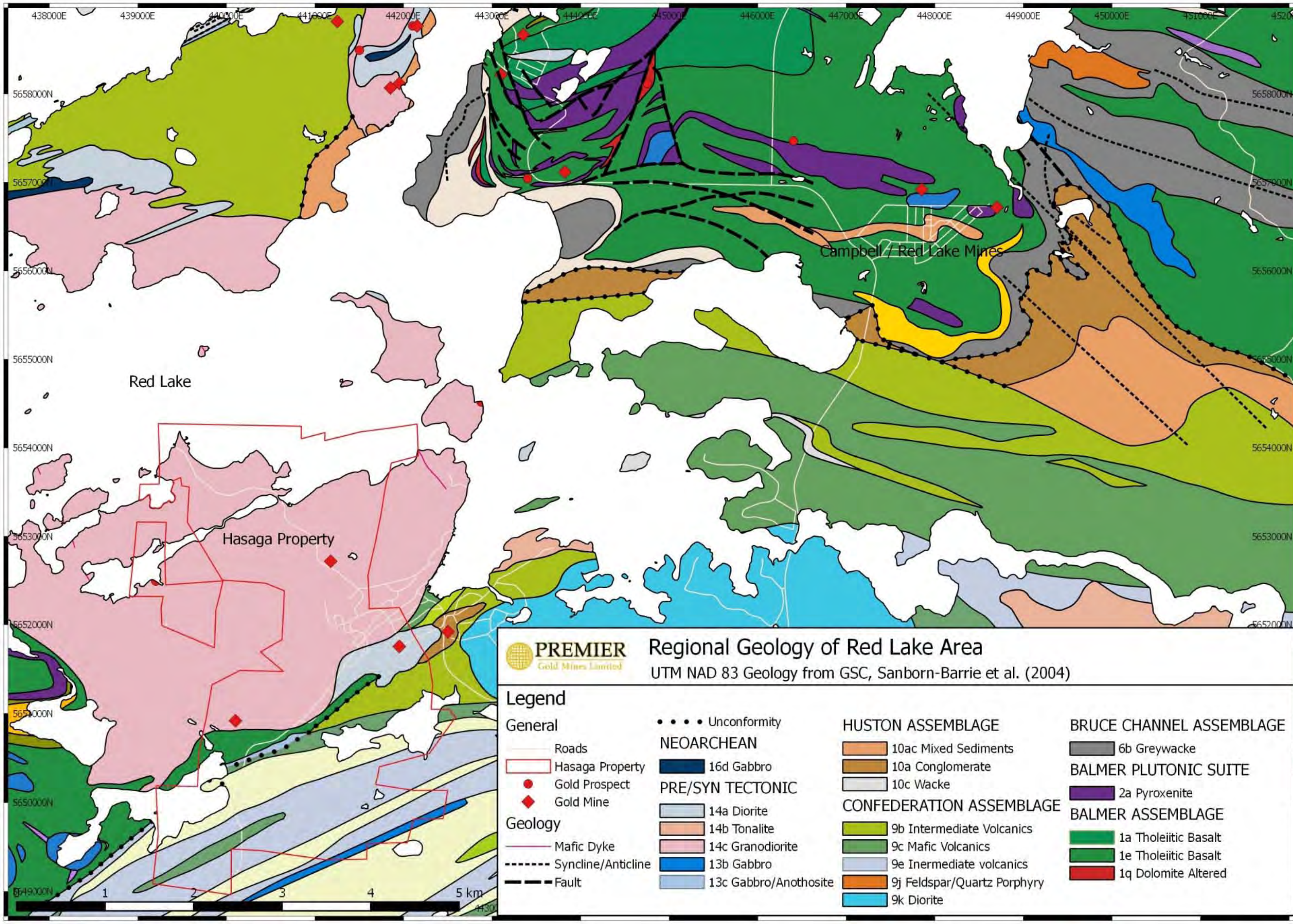

Figure 7.2 : Regional Geology Map of the Central Red Lake belt. Modified from Sanborn et al. (2004)

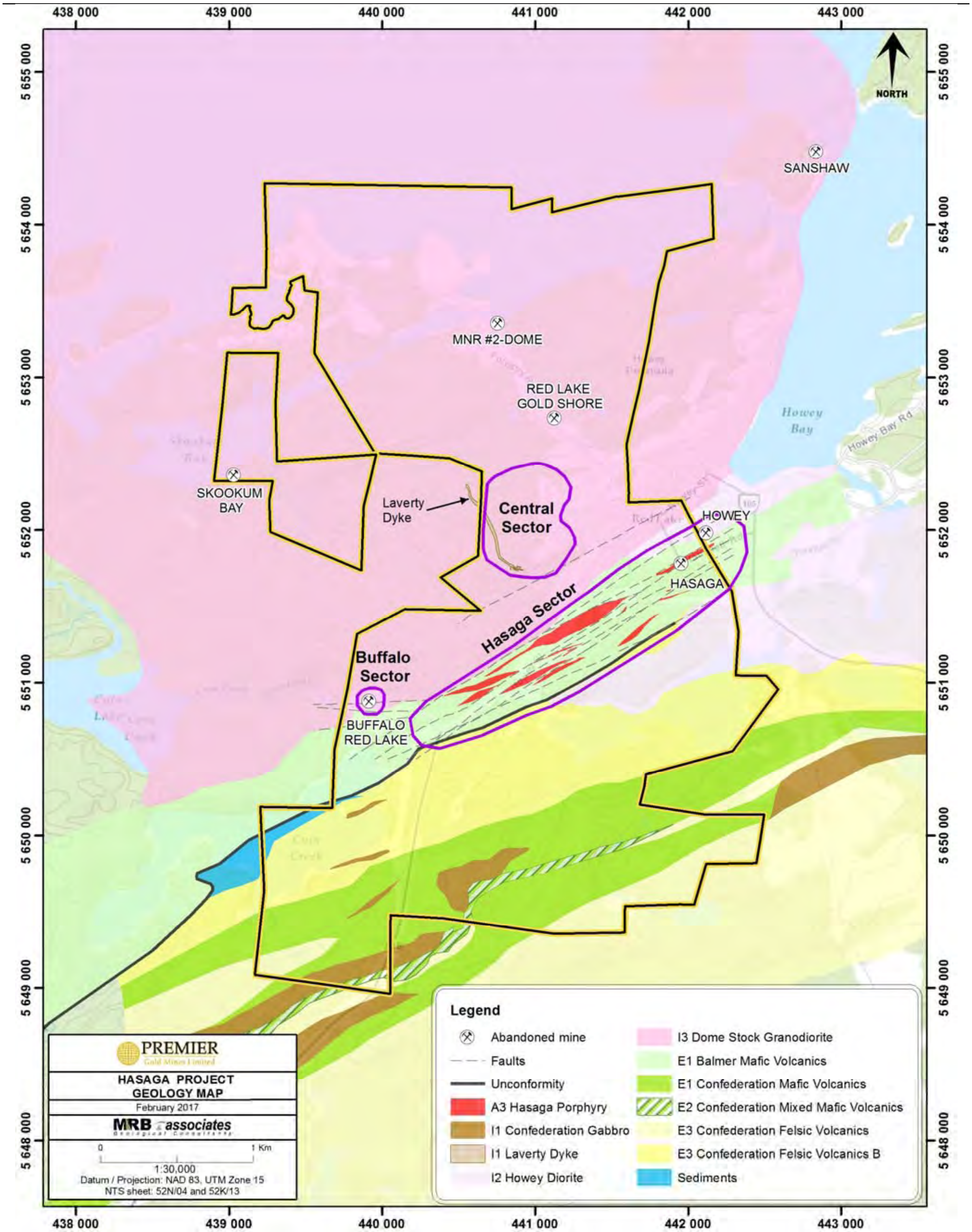

Figure 7.3 : Geology of the Project area (modified from Sanborn-Barrie et al., 2004)

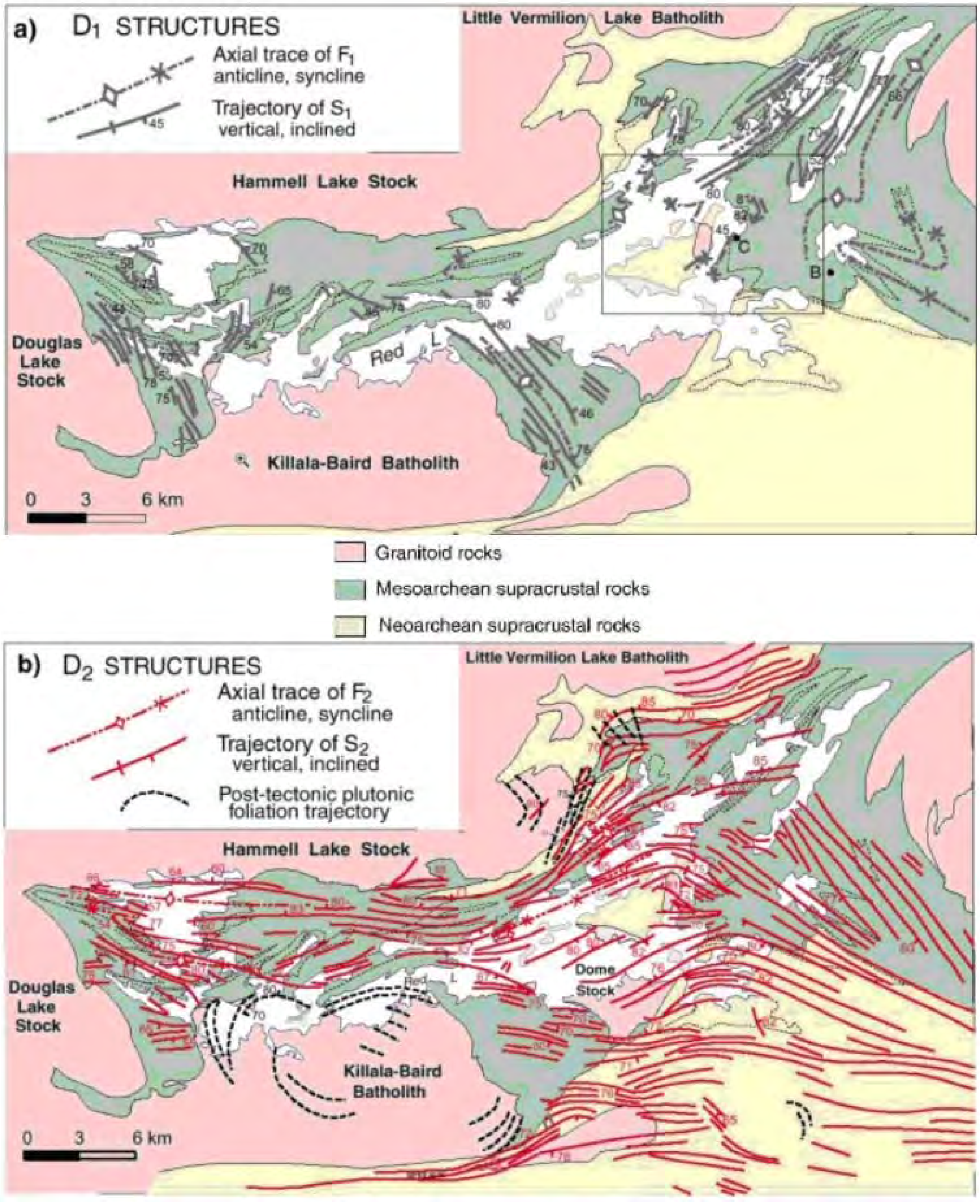

Figure 7.4 : Trace of D1 and D2 regional fabrics (from Sanborn-Barrie and Skulski , western Superior NATMAP program 1997-2002)

The Dome Stock (2,718.2±1.1 Ma) provides important constraints on the timing of D2 deformation. It cross cuts rocks that contain strong S2 fabrics, but features only a weak northeast-striking foliation (co-planar to S2). These observations have led to the interpretation that the emplacement of the Dome Stock is syn-tectonic with D2 deformation, recording only late episodes of shortening. The D2 event has been interpreted as a collision between the North Caribou Terrane and the Winnipeg River Sub-province, to the south. Regional metamorphic grade increases from greenschist in the central RLGB to amphibolite facies in the peripheries. Contact metamorphism is evident on the local scale, with isograds parallel to many of the regions large intrusions.

7.4 Mineralization

Two major episodes of gold mineralization are important in the Red Lake mining camp, both believed to be related to the late plutonic activity (i.e. intrusion of the Dome and Mackenzie stocks). The first, and most significant episode, is related to gold mineralization within sheared and carbonate-altered tholeiitic basalts and komatiites of the Balmer Assemblage. This is the characteristic gold-mineralization type extracted from the Campbell/Red Lake Mine complex (see ***Figure 7.1*** and ***Figure 7.2***). A second (later) gold mineralization episode is characterized by narrow, laterally extensive, shear-related quartz (± tourmaline) veins within and proximal to felsic to intermediate intrusions and mafic dykes. The Hasaga, Red Lake Goldshore and Howey mines extracted gold of this style, starting in the 1930's.

Within the second episode of gold mineralization, two styles of gold mineralization are recognized in the immediate vicinity of the Property. Both styles of gold mineralization have the attributes of Archean lode-gold quartz-carbonate vein deposits (Robert, 1995) associated with deformation and folding in metamorphosed volcanic, sedimentary and granitoid rocks. Virtually all gold mineralization has an epigenetic aspect and is structurally controlled in detail, occurring in veins, lenses and fractures particularly between two rheologically distinct units (Dubé et al., 2002).

The first style of gold mineralization is represented by the Central Sector, which hosts the Laverty Dyke. The Central Sector is in the southern part of the Dome Stock where a series of conjugate structures occur within a roughly circular, silicic-altered, pseudo-breccia zone that is enveloped by a broader calcitic-altered zone. The sub-vertical Laverty Dyke strikes north-northwest across the Central Sector, which is characterized by wide-spread gold mineralization. The conjugate structures and their subordinate fracture system are occupied by gold-bearing quartz+-tourmaline veins and veinlets, typically less than 2 cm wide.

According to Harron and Puritch (2010), the mineralization in the Central Sector is characterized by very fine grained native gold encapsulated in silica and silicate minerals (rarely in sulphide minerals) and is occasionally accompanied by trace amounts of base-metal sulphide minerals. Gold is present as anhedral to rounded discrete grains ranging in size from <1 micron to 20 microns. Gold grains are a trace accessory phase, heterogeneously distributed, and commonly occurring in patches of disseminated small grains. A similar style of mineralization is seen associated with the Laverty Dyke (Central Sector), where the gold mineralization is accompanied by very low quantities of fine-grained sulphide minerals and quartz veinlets.

The second style of gold mineralization is represented by steeply dipping mineralized zones, associated with a structurally competent intermediate to felsic, quartz-feldspar porphyry (the “Hasaga Porphyry”) that intrudes mainly Balmer Assemblage mafic volcanic host rocks along a high-strain corridor bordering the southeast part of the Dome Stock, close to the suture between the Confederation Lake and Balmertown Lake assemblages. This zone of high strain is part of the Flat Lake-Howey Bay Deformation Zone, and includes the formerly producing Howey, Hasaga and Buffalo mine deposits. The Flat Lake-Howey Bay Deformation Zone is in turn part of a network of regional deformation zones that cross-cuts the RLGB (***Figure 7.5***).

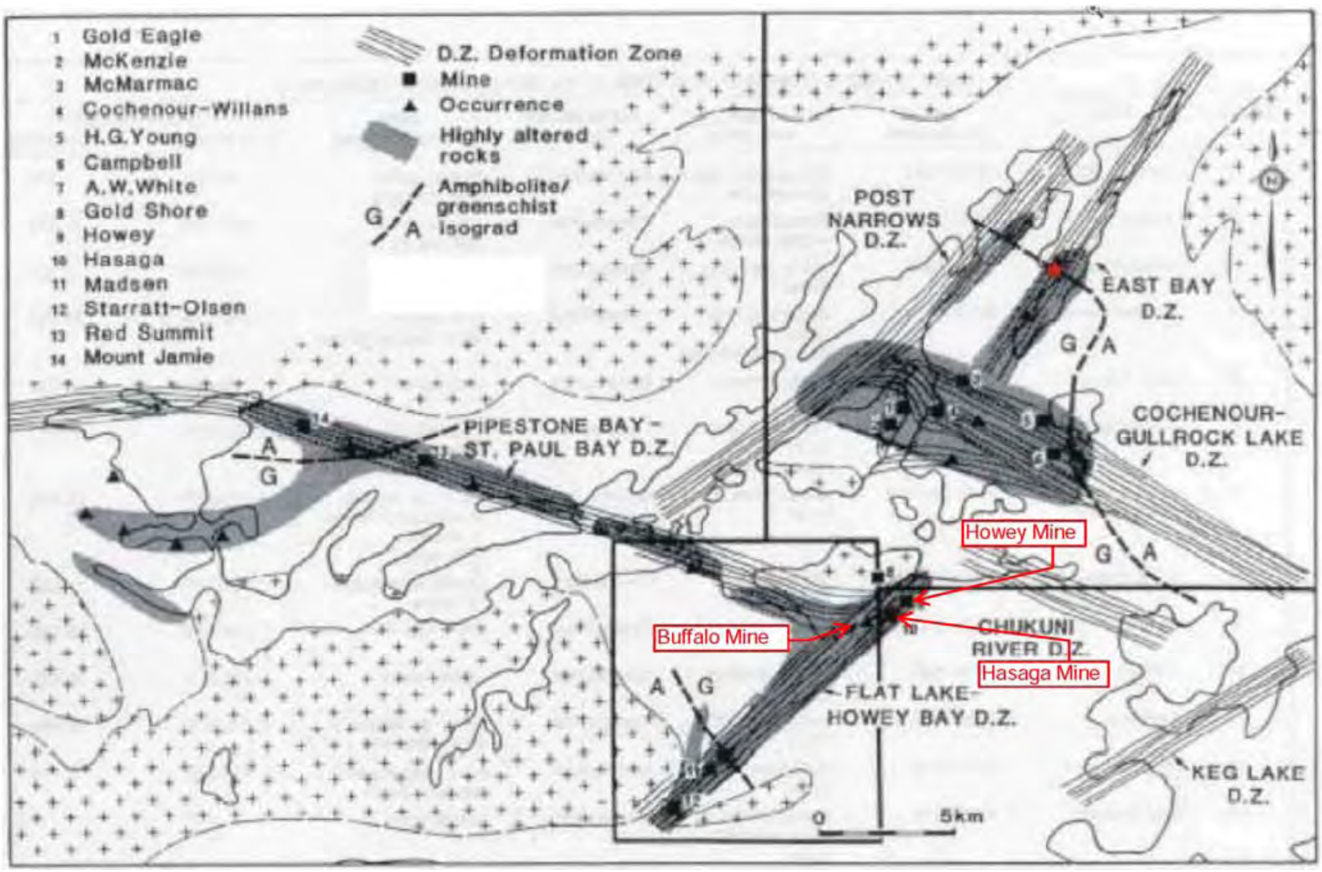

Figure 7.5 : Regional deformation zones affecting the RLGB (Andrews et al., 1986)

The Hasaga Porphyry was intruded into Balmer Assemblage mafic volcanic and clastic sedimentary rocks that now underlie a narrow corridor along the southeastern contact of the Dome Stock (see ***Figure 7.3***). Younger mafic dykes cross-cut and are present along the margins of the Hasaga Porphyry, which is generally 30 m to 50 m across with a sub-vertical dip.

During later (i.e., post-emplacement) deformation events, the Hasaga Porphyry acted has a competent body relative to the surrounding rocks, resulting in a concentration of strain along its borders and brittle fracturing of the porphyry itself; a prominent set of fractures that developed in the porphyry are oriented 020° and 080°. Gold-bearing siliceous fluids subsequently infilled these fractures forming the network of quartz-veins that comprise the gold mineralization zones along the Howey-Hasaga-Buffalo trend.

The mineralized veins consist of white and bluish quartz with some carbonate and a small amount of orthoclase. Pyrite and sphalerite are the most abundant metallic minerals, with small amounts of other sulphides and tellurides present locally. Gold is mainly restricted to the veins and the contained sulphide minerals (mainly sphalerite) - the wall rocks are essentially barren (Ferguson, 1968; Gauthier, 1996).

Sericitic alteration has transformed the normally grey Hasaga Porphyry to a waxy, buff-colour. This alteration is most intense along the contacts of the quartz veins, where silicification is also commonly observed, and chloritic quartz latite is occasionally seen. A later, localized, carbonate alteration event, which is present in mafic dykes that cross-cut sericitic- and silicic-altered rocks, is manifested by a high density of quartz tourmaline veins containing fine and coarse pyrite, minor chalcopyrite and occasional visible gold.

Near-surface, the quartz-veins in the Hasaga Porphyry are narrow (0.1 to 1.0 cm) and more abundant, but have lower grades, whereas at depth the veins are wider (10-50 cm) and have higher grades. The gold occurs mostly as “course” gold, generally in sulphide poor veins, and as "fine" gold associated with sulphide minerals (Gauthier, 1996).

8.0 DEPOSIT TYPES

The Property hosts Archean, epigenetic lode-gold style mineralization, occurring in fault-fill and extensional quartz vein system, lenses and fractures, particularly between units with high competency contrast.

Archean lode-gold deposits occur in a broad range of structural settings, and at different crustal levels, but they share a similarity in ore fluid characteristics. Mineralization is typically late-tectonic, occurring after the main phases of regional thrusting and folding, and generally late-syn to post-peak metamorphism - most significant deposits are in areas of greenschist facies. Many deposits are related to the reactivation of earlier structures.

<u>Regional Metallogeny and Mineral Deposit Model</u>
The Red Lake greenstone belt is one of the most prolific and highest-grade gold camps in Canada, with historical production of over 20 million ounces of gold. The majority of production has come from four mines, Campbell (>10 million ounces), Red Lake (>3 million ounces), Cochenour-Willans (1.2 million ounces), and Madsen (2.4 million ounces). Ten smaller mines have also contributed a combined production of 1.5 million ounces (Andrews et al., 1986; Dubé et al., 2001).

The majority of gold occurrences, including the four major gold mine deposits, underlie the central and eastern parts of the RLGB and are hosted by Balmer Assemblage rocks at or near to the angular unconformity with overlying Huston and Confederation assemblage rocks. Intra-belt felsic plutons and quartz porphyry dykes are also important hosts for gold mineralization, and account for production at the McKenzie, Gold Eagle, Gold Shore, Howey, and Hasaga mines.

According to Sanborn-Barrie et al. (2000), the gold deposits of the RLGB are somewhat atypical of Archean, greenstone, shear-zone-hosted vein-type deposits. They are classified into three groups by Pirie (1982) according to their stratigraphic or lithologic associations.

<u>Group 1 Deposits — mafic volcanic hosted (this type does not underlie the Hasaga Project area)</u>
These occur within zones of alteration several square kilometres in extent. Gold mineralization in Group 1 deposits occurs in quartz-carbonate veins, quartz veins, sulphide lenses, stringers and disseminations, and in impregnations in vein wall rock. Most of the high-grade mineralization comes from quartz +/-arsenopyrite replacement of early (barren), banded carbonate veins (Horwood, 1945; Dubé et al. 2002), which are typically small targets on the horizontal, but are remarkably continuous down plunge. Tholeiitic basalt, basaltic-komatiite, and iron-formation are the dominant host rocks.

A well-established relationship exists between ultramafic rocks and gold mineralization, with the majority of gold mineralization at Cochenour-Willans and Campbell/Red Lake mines occurring within a few hundred metres of ultramafic bodies. Dubé et al.(2001) suggest that the competency contrast between basalt and ultramafic units during folding is important in the formation of extensional carbonate veins in hinge zones, which are then later replaced by gold-rich siliceous hydrothermal fluids.

<u>Group 2 Deposits - felsic intrusion hosted (Hasaga Project types)</u>
The majority of Group 2 deposits occur as shallow to steeply dipping, sulphide-poor, quartz veins and lenses hosted in sheared diorite and granodiorite of the Dome and McKenzie stocks (Central Sector), and as quartz vein stockwork in quartz porphyry dykes and small felsic plugs (Hasaga Sector and Buffalo Sector).

Group 3 Deposits - stratabound (this type does not underlie the Hasaga Project area)

These are only known to occur in the southern part of the RLGB and include the ore zones at the Madsen and Starratt-Olsen mines. Ore is of disseminated replacement style, located at the deformed unconformity between Balmer and Confederation assemblages. Gold mineralization is hosted by mafic volcaniclastic rocks and basalt flows, and consists of heavily disseminated sulphide within a potassic alteration zone, which grades outward into an aluminous, sodium depleted zone (Dubé et al., 2000).

9.0 EXPLORATION

The recent exploration activities conducted on the Hasaga Project comprise channel sampling and diamond-drilling campaigns. The diamond-drilling programs are covered in ***Section 10.0*** of this Report.

Prior to the completion of the channel sampling program, mechanized overburden-stripping was carried out on four (4) key areas of the Central Sector (***Figure 9.1***). These outcrops were subsequently hosed off using water under high-pressure. The overburden material, which was typically between 0.2 m and 1.0 m deep, has been retained beside the stripped areas that total 6,488 m^2.

Forty-five (45) bedrock channels, with an aggregate length of 439.70 m, were cut at the Central, Hasaga and Buffalo sectors (***Table 9.1***). A total of 455 lithic samples were collected from these channels for geochemical analysis. A summary of the channel sampling details and results is presented in ***Appendix II***.

Besides Premier Gold's ground exploration programs, two additional remote surveys were completed on the project: 1) a high-definition LiDAR (Light Detection And Ranging) survey that was flown during the summer of 2016 by Sumac Geomatics Incorporated of Thunder Bay, and; 2) a low-definition bathymetric survey of the flooded Buffalo Sector open pit.

The LiDAR data was used to create a digital elevation map (DEM) or "topo surface" of the Project.

The bathymetric survey utilized a canoe for conveyance, and was carried out by Premier Gold employees. A hand-held GPS was used to record station coordinates and a generic fish-finder for water depth determinations. The maximum water depth recorded was 9 ft (2.75 m).

Figure 9.1 : Areas (m2 denoted) of stripped outcrops: Central Sector, Hasaga Project

Table 9.1: Summary of 2016 Bedrock Channels - Hasaga Project.

Sector	Channel ID	UTM-X	UTM-Y	Azimuth	Length (m)	Sample ID's	Total number of Samples
CENTRAL	DSC001	440692.00	5651934.00	53.00	29.50	B00304015 to B00304051	32
CENTRAL	DSC002	440695.00	5651943.00	39.00	1.00	B00304052	1
CENTRAL	DSC003	440701.00	5651948.00	42.00	1.00	B00304053	1
CENTRAL	DSC004	440698.00	5651960.00	38.00	6.75	B00304054 to B00304061	7
CENTRAL	DSC005	440707.00	5651937.00	25.00	0.70	B00304062	1
CENTRAL	DSC006	440709.00	5651951.00	58.00	1.00	B00304063	1
CENTRAL	DSC007	440716.00	5651940.00	55.00	0.50	B00304065	1
CENTRAL	DSC008	440719.00	5651953.00	33.00	0.75	B00304066	1
CENTRAL	DSC009	440716.00	5651936.00	37.00	26.90	B00304067 to B00304098	28
CENTRAL	DSC010	440737.00	5651950.00	96.00	7.50	B00304099 to B00304107	8
CENTRAL	DSC011	440743.00	5651947.00	87.00	0.50	B00304108	1
CENTRAL	DSC012	440744.00	5651944.00	32.00	1.00	B00304109	1
CENTRAL	DSC013	440748.00	5651948.00	34.00	0.50	B00304110	1
CENTRAL	DSC014	440746.00	5651951.00	67.00	1.00	B00304111	1
CENTRAL	DSC015	440747.00	5651961.00	35.00	1.00	B00304113	1
CENTRAL	DSC016a	440943.00	5652240.00	82.00	4.30	B00304259 to B00304263	5
CENTRAL	DSC016b	440943.00	5652240.00	90.00	10.70	B00304265 to B00304277	12
CENTRAL	DSC018	440950.00	5652238.00	35.00	11.00	B00304287 to B00304300	12
CENTRAL	DSC020	440949.00	5652263.00	64.00	0.50	B00304302	1
CENTRAL	DSC021	440848.37	5652160.59	39.00	40.00	B00304303 to B00304349	41
CENTRAL	DSC022	440826.21	5652166.45	39.00	40.00	B00304350 to B00304396	41
CENTRAL	DSC023	440863.34	5652159.91	122.00	6.50	B00304397 to B00304409	11
CENTRAL	DSC024	440865.33	5652163.02	59.00	1.50	B00304410 to B00304411	2
CENTRAL	FTC001a	440993.00	5651814.00	23.50	5.50	B00304114 to B00304119	6
CENTRAL	FTC001b	440993.00	5651819.20	39.00	7.70	B00304121 to B00304129	8
CENTRAL	FTC001c	441001.00	5651824.00	37.10	15.80	B00304130 to B00304147	16
CENTRAL	FTC002	440968.00	5651827.00	40.10	11.00	B00304148 to B00304159	11
CENTRAL	FTC003	440921.00	5651801.00	35.30	29.50	B00304161 to B00304194	30
CENTRAL	FTC004	440884.00	5651804.00	33.40	7.20	B00304195 to B00304202	7
CENTRAL	FTC005	440837.00	5651787.00	31.60	23.00	B00304203 to B00304230	25
CENTRAL	FTC006	440805.00	5651774.00	32.10	21.20	B00304231 to B00304258	24
HASAGA	HSC001	441583.40	5651552.40	328.00	12.80	356958 to 356950	8
HASAGA	HSC009	441590.60	5651552.40	328.10	23.20	356922 to 356944	25
HASAGA	HSC012	441596.40	5651554.00	329.20	27.10	356916 to 356891	27
HASAGA	HSC013	441599.00	5651571.60	327.50	20.60	356876 to 356889	13
HASAGA	HSC014	441598.90	5651562.40	329.70	8.00	356867 to 356875	8
HASAGA	HSC015	441663.03	5651590.16	329.20	4.50	356851 to 356855	5
HASAGA	HSC016	441666.80	5651595.20	327.00	9.00	356856 to 356865	9
BUFFALO	BFC001	441048.40	5651067.60	83.38	0.50	B00304001	1
BUFFALO	BFC002	441049.80	5651064.40	82.88	0.50	B00304002	1
BUFFALO	BFC003	441054.10	5651064.40	333.02	5.00	B00304003 to B00304007	5
BUFFALO	BFC004	441057.50	5651068.40	77.79	0.50	B00304009	1
BUFFALO	BFC005	441063.40	5651076.40	332.37	4.50	B00304010 to B00304014	5
BUFFALO	DSC017	440952.00	5652252.00	33.00	8.00	B00304278 to B00304286	8
BUFFALO	DSC019	440952.00	5652234.00	64.00	0.50	B00304301	1
				Totals	**439.70**		**455**

10.0 DRILLING

10.1 Introduction

The 2015 and 2016 diamond-drilling programs carried out by Premier Gold on the Hasaga Project comprised 259 holes, totalling 110,166.20 metres. As the Property partly covers the community of Red Lake, diamond-drilling was restricted to areas without residential and commercial developments. All the drilling was ground-supported, i.e., no helicopter support was required.

Chibougamau Drilling Limited of Chibougamau, Québec were commissioned to carry out the diamond drilling within the project area. The utilized drill-rigs were fully hydraulic HC-150 models, modified by the owners to drill shallow holes. All of the holes were drilled with NQ-core barrels (47.6 mm/1⅞ inch internal diameter).

The first campaign commenced on May 1st, 2015 with one drill-rig; a second "rig" was added in June, followed by a third in July 2015. The 2015 campaign ended on December 15, 2015.

Phase 2 drilling began with 3 rigs on January 29th, 2016. One of the rigs was de-mobilized in May, and Phase 2 drilling was completed with the two remaining rigs on October 12th, 2016.

All hole locations were initially flagged using a hand-held global positioning system (GPS) unit; however, holes were collared using a Reflex™ North Finder Azimuth Pointing System (Reflex™ APS). In addition to having sub-metre coordinate accuracy, the Reflex™ APS is unaffected by magnetic-field interference. Azimuths for the holes were established using the same Reflex™ APS tool (accuracy <± 1.0° to < ± 0.2°).

Down-hole orientation surveys were carried out by Chibougamau Drilling Ltd. using a Reflex™ EZ-TRAC digital down-hole survey instrument, while the drill-site was active. Once a hole was completed, a Reflex™ EZ-GYRO tool and a Reflex™ APS tool were used in combination to obtain accurate down-hole attitude data.

All of Premier Gold's drill-holes were surveyed down-hole with the Reflex™ EZ-TRAC, and most were also surveyed with the Reflex™ EZ-GYRO tool. Holes HLD044, HLD080, HLD086, HMP065, HMP096, HMP120, HMP142, HMP143, and HMP146 were not "GYRO"-tested, either because the hole was blocked or because there was a risk of losing the instrument down-hole in a fault-zone or in historic underground mine workings.

After drilling was completed, absolute drill-collar locations were surveyed using a Reflex™ APS. For quality control purposes, a subset of holes selected by MRB & Associates were subsequently re-surveyed to centimetre accuracy by Rugged Geomatics, Ontario Land Surveyors of Kenora, Ontario, in October, 2016 (see ***Section 12.0***). The ground hole-survey elevation was found to be comparable to the digital elevation determined from the airborne LiDAR survey for that same X-Y coordinate point, so all the drill-collar positions were draped onto the LiDAR generated digital elevation map (DEM).

For exploration purposes, the Hasaga Project is divided into the Central Sector, the Hasaga Sector, and the Buffalo Sector. A recent area of interest northwest of the Central Sector, known as the North Gate Sector, was targeted by 13 drill holes but is not part of the resource estimate (***Figure 10.1*** and ***Map 1***). The drill-holes completed by Premier Gold are summarized in ***Appendix III***.

Ninety-six (96) holes, totalling 45,881.20 m were drilled on the Central Sector (***Map 2***); 112 holes, totalling 45,193.30 m were drilled on the Hasaga Sector (***Map 3***), and; 38 holes totalling 12,231.20 m were drilled on the Buffalo Sector (***Map 4***).

10.2 Central Sector Drilling

A total of ninety-six (96) holes, with an aggregate total of 45,881.20 m, were drilled on the Central Sector (see ***Map 2*** and ***Appendix III***). A summary of selected "best" results in shown in ***Table 10.1.***

10.3 Hasaga Sector Drilling

A total of one hundred and twelve (112) holes, with an aggregate total of 45,193.30 m, were drilled on the Hasaga Sector (see ***Map 3*** and ***Appendix III***). A summary of selected "best" results in shown in ***Table 10.2***.

10.4 Buffalo Sector Drilling

Thirty-eight (38) holes, with an aggregate total of 12,231.20 m, were drilled on the Buffalo Sector (see ***Map 4*** and ***Appendix III***). A summary of selected "best" results in shown in ***Table 10.3***.

Table 10.1: Selected "Best" Results from Central Sector Drill-Holes

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HLD001		110.00	117.00	7.00	4.57
HLD001		332.00	333.00	1.00	10.65
HLD003		91.00	93.00	2.00	4.50
HLD003		211.00	219.00	8.00	4.57
HLD004		24.00	27.00	3.00	3.35
HLD004		103.00	105.50	2.50	21.35
HLD004		113.00	115.00	2.00	16.70
HLD006		58.00	64.00	6.00	4.51
HLD006		361.00	363.00	2.00	8.10
HLD008		346.00	347.00	1.00	10.65
HLD009		77.00	84.00	7.00	8.14
HLD010		73.00	74.00	1.00	15.24
HLD010		218.00	219.00	1.00	9.76
HLD011		15.00	18.00	3.00	3.79
HLD014		687.00	689.00	2.00	5.35
HLD014		714.00	715.00	1.00	10.70
HLD014		730.00	731.00	1.00	23.90
HLD016		152.00	154.00	2.00	8.28
HLD020		326.00	328.00	2.00	18.40
HLD023		552.00	553.00	1.00	13.30
HLD024		226.00	227.00	1.00	14.80
HLD025		138.00	139.00	1.00	13.90
HLD027		279.00	284.00	5.00	3.90
HLD027		385.00	386.00	1.00	9.61
HLD027		396.00	399.00	3.00	4.86
HLD029		327.00	330.00	3.00	3.60
HLD031		474.00	475.00	1.00	20.40
HLD032		305.00	307.00	2.00	10.07

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HLD035		161.00	163.00	2.00	5.70
HLD036		384.00	385.00	1.00	11.80
HLD037		167.00	168.00	1.00	18.00
HLD038		148.00	156.00	8.00	5.82
HLD043		192.00	193.00	1.00	13.20
HLD043		305.00	306.00	1.00	12.50
HLD045		238.00	241.00	3.00	4.57
HLD045		299.00	302.00	3.00	3.41
HLD048		239.00	241.00	2.00	12.22
HLD052		79.00	81.00	2.00	37.95
HLD053		68.00	73.00	5.00	1.03
HLD053		201.00	215.00	14.00	0.64
HLD054		5.00	9.00	4.00	1.08
HLD054		20.00	32.00	12.00	0.96
HLD054		75.00	88.00	13.00	0.65
HLD054		144.00	177.00	33.00	0.61
HLD054		206.00	222.00	16.00	0.90
HLD054		232.00	244.00	12.00	0.75
HLD054		275.00	305.00	30.00	0.67
HLD055		2.80	116.00	113.20	0.94
HLD055	including	4.00	56.00	52.00	1.26
HLD056	and	21.00	55.00	34.00	0.93
HLD056	and	99.00	135.00	36.00	0.93
HLD056		161.00	179.00	18.00	0.66
HLD056		228.00	233.00	5.00	0.97
HLD056		316.00	320.00	4.00	1.15
HLD057		10.00	19.00	9.00	1.71
HLD057		56.00	353.00	297.00	0.69
HLD057	including	99.00	133.00	34.00	0.84
HLD057		149.00	306.00	157.00	0.93
HLD057	including	236.00	306.00	70.00	1.15
HLD057		375.00	398.00	23.00	1.23
HLD057	including	381.00	384.00	3.00	4.45
HLD058		13.00	153.00	140.00	0.73
HLD058	including	37.00	78.00	41.00	1.06
HLD058	and	85.00	97.00	12.00	1.02
HLD058	and	110.00	118.00	8.00	0.89
HLD058	and	129.00	148.00	19.00	0.87
HLD059		5.00	11.00	6.00	0.79
HLD059		113.00	139.00	26.00	0.65
HLD059	including	130.00	133.00	3.00	3.34
HLD059		159.00	181.00	22.00	0.63
HLD059		276.00	362.00	86.00	1.15
HLD059	including	298.00	320.00	22.00	1.42
HLD059		370.00	404.00	34.00	0.78
HLD059	including	383.00	386.00	3.00	3.42
HLD059		413.00	432.00	19.00	0.77
HLD059	including	425.00	432.00	7.00	1.65

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HLD059		453.00	459.00	6.00	1.07
HLD060		26.00	219.00	193.00	1.04
HLD060	including	26.00	38.00	12.00	1.71
HLD060	and	43.00	61.00	18.00	0.83
HLD060	and	67.00	89.00	22.00	1.18
HLD060		182.00	194.00	12.00	4.56
HLD061		40.00	57.00	17.00	1.29
HLD061	including	42.00	44.00	2.00	4.86
HLD061		127.00	136.00	9.00	1.15
HLD061		163.00	197.00	34.00	0.70
HLD061		221.00	260.00	39.00	1.03
HLD061		298.00	337.00	39.00	0.72
HLD061		353.00	394.00	41.00	0.60
HLD061		433.00	434.00	1.00	15.10
HLD061		505.00	518.00	13.00	1.68
HLD061	including	512.00	513.00	1.00	16.20
HLD062		66.00	80.00	14.00	0.65
HLD062		100.00	111.00	11.00	0.66
HLD062		134.00	149.00	15.00	0.86
HLD062		164.00	184.00	20.00	0.66
HLD062		192.00	204.00	12.00	0.65
HLD062		315.00	317.00	2.00	5.19
HLD062		397.00	409.00	12.00	0.63
HLD063		11.00	17.00	6.00	0.88
HLD063		24.00	34.00	10.00	0.74
HLD063		44.00	82.00	38.00	0.71
HLD063		206.00	211.00	5.00	0.71
HLD063		256.00	266.00	10.00	0.62
HLD063		292.00	294.00	2.00	2.54
HLD063		345.00	356.00	11.00	1.08
HLD063		366.00	384.00	18.00	2.90
HLD063	including	367.00	368.00	1.00	44.40
HLD063		423.00	425.00	2.00	17.45
HLD064		11.00	18.00	7.00	3.04
HLD064		45.00	67.00	22.00	0.61
HLD064		189.00	197.00	8.00	2.24
HLD064	including	189.00	190.00	1.00	13.60
HLD064		253.00	307.00	54.00	0.66
HLD065		121.00	131.00	10.00	0.78
HLD065		181.00	210.00	29.00	0.64
HLD065		311.00	320.00	9.00	8.77
HLD065	including	316.00	317.00	1.00	76.30
HLD066		12.30	140.00	127.70	0.63
HLD066	including	90.00	140.00	50.00	0.76
HLD066		258.00	271.00	13.00	0.95
HLD066		281.00	296.00	15.00	0.85
HLD066		326.00	340.00	14.00	0.65
HLD066		441.00	449.00	8.00	0.95

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HLD066		461.00	500.00	39.00	0.62
HLD066	including	461.00	475.00	14.00	0.87
HLD067		31.00	123.00	92.00	1.13
HLD067	including	31.00	33.00	2.00	5.96
HLD067	and	46.00	60.00	14.00	2.36
HLD067		46.00	47.00	1.00	11.40
HLD067		341.00	349.00	8.00	3.39
HLD067		384.00	390.00	6.00	0.66
HLD068		27.00	192.00	165.00	0.69
HLD068	including	34.00	55.00	21.00	1.02
HLD068	and	73.00	125.00	52.00	1.09
HLD068	and	159.00	169.00	10.00	1.01
HLD068		574.00	580.00	6.00	4.68
HLD068	including	578.00	579.00	1.00	25.90
HLD069		46.0	52.0	6.0	0.98
HLD069		109.0	161.0	52.0	0.93
HLD069	including	124.0	127.0	3.0	7.57
HLD070		59.0	161.0	102.0	0.69
HLD070	including	119.0	149.0	30.0	1.01
HLD070	and	147.0	149.0	2.0	6.99
HLD070		228.0	238.0	10.0	1.07
HLD071		53.0	136.0	83.0	0.79
HLD071	including	65.0	80.0	15.0	1.05
HLD071	and	102.0	126.0	24.0	1.39
HLD071	and	106.0	109.0	3.0	7.94
HLD071		182.0	240.0	58.0	0.61
HLD071	including	202.0	227.0	25.0	0.76
HLD071		274.0	287.0	13.0	0.65
HLD072		221.0	409.0	188.0	0.71
HLD072	including	227.0	309.0	82.0	0.94
HLD072	and	228.0	231.0	3.0	5.32
HLD072	and	326.0	355.0	29.0	0.91
HLD073		308.0	340.0	32.0	3.88
HLD073	including	317.0	324.0	7.0	16.42
HLD073	and	318.0	320.0	2.0	55.70
HLD074		223.0	235.0	12.0	0.71
HLD074		316.0	372.0	56.0	1.14
HLD074	including	318.0	341.0	23.0	2.26
HLD074	and	321.0	324.0	3.0	9.37
HLD074		435.0	441.0	6.0	1.03
HLD075		122.0	131.0	9.0	2.17
HLD075		196.0	202.0	6.0	0.65
HLD075		416.0	473.0	57.0	0.67
HLD075	including	428.0	440.0	12.0	1.25
HLD075	and	461.0	468.0	7.0	0.97
HLD075		491.0	564.0	73.0	1.25
HLD075	including	528.0	531.0	3.0	11.99
HLD075	and	558.0	564.0	6.0	1.84

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HLD076		6.6	66.0	59.4	0.88
HLD076	including	23.0	26.0	3.0	7.30
HLD076		132.0	145.0	13.0	1.14
HLD076		233.0	241.0	8.0	1.41
HLD078		57.0	64.0	7.0	0.60
HLD078		129.0	146.0	17.0	0.62
HLD078		315.0	321.0	6.0	0.70
HLD078		437.0	445.0	8.0	0.67
HLD079		361.0	364.0	3.0	1.89
HLD080		148.0	196.0	48.0	0.84
HLD080	including	180.0	186.0	6.0	2.37
HLD080		235.0	238.0	3.0	3.00
HLD080		348.0	360.0	12.0	0.67
HLD081		62.0	63.0	1.0	5.97
HLD082		150.0	188.0	38.0	1.22
HLD082	including	158.0	181.0	23.0	1.61
HLD082		200.0	308.0	108.0	0.80
HLD082	including	203.0	207.0	4.0	4.29
HLD082		224.0	252.0	28.0	1.22
HLD082		346.0	400.0	54.0	1.01
HLD084		31.0	47.0	16.0	0.98
HLD084	including	31.0	32.0	1.0	10.70
HLD084		60.0	68.0	8.0	1.31
HLD084		101.0	122.0	21.0	0.80
HLD084	including	101.0	104.0	3.0	4.01
HLD084		348.0	353.0	5.0	0.97
HLD085		42.0	45.0	3.0	6.94
HLD085		443.0	448.0	5.0	0.66
HLD086		20.0	25.0	5.0	0.90
HLD086		133.0	136.0	3.0	4.52
HLD086		248.0	249.0	1.0	10.20
HLD086		406.0	433.0	27.0	0.51
HLD086		453.0	469.0	16.0	0.70
HLD086	including	463.0	467.0	4.0	1.95
HLD087		26.0	50.0	24.0	2.66
HLD087	including	26.0	35.0	9.0	0.74
HLD087	and	48.0	50.0	2.0	27.53
HLD087		232.0	242.0	10.0	0.61
HLD088		7.0	14.0	7.0	0.69
HLD088		233.0	238.0	5.0	4.04
HLD089		294.0	302.0	8.0	0.81
HLD089		335.0	348.0	13.0	0.57
HLD090		360.0	376.0	16.0	0.62
HLD090		384.0	418.0	34.0	1.18
HLD090	including	387.0	393.0	6.0	2.85
HLD090	and	408.0	418.0	10.0	1.85
HLD091		186.0	196.0	10.0	1.27
HLD091		383.0	390.0	7.0	0.69

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HLD091		553.0	569.0	16.0	0.55
HLD091		598.0	616.0	18.0	0.62
HLD092		256.0	260.0	4.0	2.60
HLD092		366.0	374.0	8.0	0.99
HLD092		588.0	593.0	5.0	0.87
HLD092		606.0	609.0	3.0	3.83
HLD093		81.0	85.0	4.0	0.78
HLD093		147.0	166.0	19.0	2.64
HLD093	including	158.0	160.0	2.0	18.49
HLD093		187.0	240.0	53.0	1.13
HLD093	including	187.0	212.0	25.0	1.24
HLD093	and	220.0	240.0	20.0	1.38
HLD093		313.0	325.0	12.0	3.03
HLD093		352.0	368.0	16.0	0.51
HLD093		397.0	424.0	27.0	0.82
HLD093		434.0	449.0	15.0	0.53
HLD094		198.0	201.0	3.0	1.45
HLD094		287.0	290.0	3.0	18.71
HLD095		18.0	30.0	12.0	0.58
HLD095		206.0	212.0	6.0	1.68
HLD095		307.0	312.0	5.0	1.43
HLD095		473.0	474.0	1.0	2.12
HLD096		268.0	285.0	17.0	0.97
HLD096		297.0	306.0	9.0	0.77

Table 10.2: Selected "Best" Results from Hasaga Sector Drill-Holes

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HMP002		222.00	224.00	2.00	3.02
HMP002		231.00	232.00	1.00	14.60
HMP005		159.00	163.50	4.50	7.95
HMP013		172.80	175.40	2.60	3.97
HMP017		282.00	283.10	1.10	17.37
HMP017		308.40	311.80	3.40	3.83
HMP018		486.00	489.00	3.00	6.19
HMP020		337.00	339.10	2.10	6.00
HMP020		442.00	444.00	2.00	16.44
HMP021		370.30	376.00	5.70	13.34
HMP023		270.00	271.00	1.00	11.66
HMP024		304.00	307.00	3.00	23.34
HMP025		281.00	282.00	1.00	5.75
HMP025		294.00	297.00	3.00	4.49
HMP028		331.00	333.00	2.00	6.23
HMP028		342.00	344.00	2.00	5.43
HMP029		336.00	338.00	2.00	9.70
HMP029		418.00	419.00	1.00	12.00
HMP033		367.00	371.00	4.00	3.27
HMP035		202.00	203.00	1.00	14.27
HMP037		418.00	418.70	0.70	60.26
HMP037		556.00	559.00	3.00	8.80
HMP039		429.00	430.00	1.00	15.94
HMP039		438.00	439.10	1.10	17.71
HMP039		451.00	452.00	1.00	11.83
HMP039		523.00	524.00	1.00	15.62
HMP041		459.00	462.00	3.00	3.35
HMP046		214.00	215.00	1.00	26.65
HMP048		228.00	230.00	2.00	4.87
HMP048		385.00	386.00	1.00	10.98
HMP050		226.00	227.00	1.00	16.71
HMP053		156.00	159.00	3.00	28.03
HMP053		184.00	185.00	1.00	17.48
HMP057		103.00	104.00	1.00	35.66
HMP059		257.00	258.00	1.00	11.90
HMP062		247.00	248.00	1.00	41.54
HMP067		212.00	214.00	2.00	12.00
HMP067		229.00	230.00	1.00	11.11
HMP069		354.00	357.00	3.00	4.64
HMP069		398.00	399.00	1.00	17.87
HMP070		221.00	225.00	4.00	3.16
HMP070		297.00	298.00	1.00	11.30
HMP070		304.00	305.00	1.00	9.46
HMP071		246.00	249.00	3.00	9.74
HMP071		254.00	258.00	4.00	7.59
HMP073		253.00	257.00	4.00	3.75
HMP073		271.00	272.00	1.00	10.53

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HMP074		254.00	257.00	3.00	13.73
HMP076		37.50	43.00	5.50	3.32
HMP081		63.00	66.00	3.00	5.78
HMP082		225.00	228.00	3.00	3.77
HMP084		399.00	402.00	3.00	4.00
HMP084		428.00	431.00	3.00	3.97
HMP087		29.00	32.00	3.00	3.24
HMP089		29.00	31.00	2.00	145.13
HMP090		68.00	69.00	1.00	10.30
HMP094		102.00	103.00	1.00	11.30
HMP095		78.00	79.50	1.50	14.30
HMP095		103.00	106.00	3.00	5.19
HMP095		164.00	165.00	1.00	23.40
HMP096		154.00	155.00	1.00	30.90
HMP096		175.00	178.00	3.00	4.67
HMP096		211.00	212.00	1.00	97.00
HMP097		117.00	120.00	3.00	4.52
HMP100		46.00	49.00	3.00	5.29
HMP101		85.00	88.00	3.00	3.97
HMP101		93.00	97.00	4.00	4.43
HMP104		79.00	82.00	3.00	8.58
HMP105		26.00	28.00	2.00	14.85
HMP105		58.00	59.00	1.00	25.60
HMP105		98.00	100.00	2.00	7.89
HMP106		125.00	127.00	2.00	15.44
HMP107		78.00	82.00	4.00	3.61
HMP107		109.00	112.00	3.00	4.07
HMP107		129.00	140.00	11.00	1.38
HMP107		161.00	164.00	3.00	3.46
HMP107		210.00	213.00	3.00	3.57
HMP108		21.00	22.00	1.00	14.40
HMP108		140.00	142.00	2.00	14.33
HMP108		165.00	167.00	2.00	8.65
HMP110		15.00	17.00	2.00	6.52
HMP110		112.00	115.00	3.00	5.07
HMP117		219.00	233.00	14.00	1.36
HMP117	including	219.00	220.00	1.00	12.10
HMP117		403.00	407.00	4.00	3.34
HMP117		499.00	524.00	25.00	0.66

Table 10.3: Selected "Best" Results from Buffalo Sector Drill-Holes

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HMP103		404.00	407.00	3.00	7.52
HMP103		467.00	468.00	1.00	17.50
HMP110		15.00	43.00	28.00	0.84
HMP110	including	15.00	17.00	2.00	6.52
HMP110		71.00	128.00	57.00	0.74
HMP110	including	112.00	115.00	3.00	5.07
HMP110		160.00	204.00	44.00	0.70
HMP110	including	165.00	177.00	12.00	1.31
HMP113		167.00	171.00	4.00	0.58
HMP113		178.00	187.00	9.00	0.93
HMP114		120.00	129.00	9.00	0.63
HMP114		178.00	187.00	9.00	0.57
HMP116		276.00	292.00	16.00	1.81
HMP118		285.00	295.50	10.50	0.99
HMP119		335.00	347.00	12.00	0.95
HMP124		325.00	329.00	8.00	2.67
HMP126		42.00	47.00	5.00	2.32
HMP127		32.00	34.00	2.00	17.23
HMP127		126.00	195.00	69.00	1.80
HMP127	including	141.00	143.00	2.00	5.69
HMP127	and	192.00	195.00	3.00	25.59
HMP127		211.00	218.00	7.00	1.50
HMP128		77.00	114.00	37.00	2.29
HMP128	including	90.00	93.00	3.00	11.46
HMP128	and	104.00	114.00	10.00	3.16
HMP128		141.00	151.00	10.00	1.91
HMP128		163.00	169.00	6.00	1.19
HMP129		14.00	21.00	7.00	1.55
HMP129		49.00	62.00	13.00	0.87
HMP130		23.00	26.00	3.00	4.51
HMP130		35.00	52.00	17.00	0.52
HMP131		93.00	103.00	10.00	0.59
HMP131		123.00	125.00	2.00	2.23
HMP131		153.00	158.00	5.00	6.38
HMP132		120.00	137.00	17.00	0.56
HMP132		156.00	187.00	31.00	2.99
HMP132	including	158.00	162.00	4.00	7.98
HMP132	and	173.00	177.00	4.00	7.18
HMP133		16.00	23.00	7.00	0.67
HMP133		61.00	84.00	23.00	0.66
HMP136		73.00	80.00	7.00	2.90
HMP136		170.00	237.00	67.00	3.66
HMP136	including	186.00	191.00	5.00	6.19
HMP136	and	199.00	219.00	20.00	7.38
HMP136		255.00	262.00	7.00	1.24
HMP137		60.00	72.00	12.00	1.65

Hole ID		From (m)	To (m)	Interval (m)	Au (gpt)
HMP137	including	70.00	72.00	2.00	5.28
HMP141		185.00	231.00	46.00	2.87
HMP141	including	192.00	220.00	28.00	4.28
HMP141		468.00	470.00	2.00	1.86
HMP142		43.00	86.00	43.00	1.20
HMP142	including	59.00	85.00	26.00	1.76
HMP142	and	64.00	66.00	2.00	12.60
HMP142	and	71.00	76.00	5.00	2.33
HMP143		45.00	74.00	29.00	2.23
HMP144		152.00	162.00	10.00	1.02
HMP144		169.00	174.00	5.00	1.35
HMP145		89.00	159.00	70.00	1.67
HMP145	including	124.00	158.00	34.00	2.48
HMP146		106.00	154.00	48.00	1.44
HMP146	including	120.00	153.00	33.00	1.97
HMP146		167.00	178.00	11.00	5.05
HMP146		196.00	204.00	8.00	0.81
HMP147		142.00	184.00	42.00	2.22
HMP147	including	166.00	170.00	4.00	10.26
HMP149		13.00	25.00	12.00	0.83
HMP149		39.00	50.00	11.00	0.99
HMP149		63.00	67.00	4.00	1.41
HMP149		142.00	159.00	17.00	1.21
HMP150		178.00	179.00	1.00	3.09

11.0 SAMPLING PREPARATION, ANALYSES AND SECURITY

The Authors have reviewed the publicly available technical data covering historical exploration work on the Property with special emphasis on the Quality Assurance and Quality Control ("QAQC") procedures employed by Premier Gold.

According to Premier Gold, drill core was placed sequentially in wooden core boxes at the drill. The core boxes were transported by Premier Gold personnel on a daily basis to the core logging facility in Red Lake, where geo-technicians checked depth markers, box numbers and carefully reconstructed the core. The core recovery (CR) and rock quality designation (RQD) were then calculated and magnetic susceptibility readings taken. The RQD observations were collected on 3 metre core-intervals, equivalent to the length of a single core-barrel, whereas magnetic susceptibility measurements were done at the mid-point of 1 metre intervals.

Specific Gravity determinations were also made on sample sections of core using a Model MS802S/03 Mettler-Toledo AG scale. Core sample intervals for Specific Gravity measurement were collected approximately every 20 m - 25 m regardless of rock types or bias toward mineralized zones. Occasionally, additional samples were included to ensure that every rock type was represented. The procedure involved recording the dry mass of an approximately 10 cm section of core, then recording its mass while fully submerged in water and calculating the sample's Specific Gravity using the following formula:

$$\frac{\text{Dry Mass}}{\text{Dry mass} - \text{Wet Mass}}$$

The core was logged and marked for sampling by Premier Gold's geologists, who employed Geotic© logging software to log the Hasaga Project drill-core, noting lithologies, structure, alteration and mineralization. Logging and sampling information was entered into a spreadsheet-based template that could be easily integrated into the project digital database.

Prior to sampling, all drill core was photographed using a standardized format and digital camera to provide a permanent pre-sampling record of each hole. All the core from Premier Gold's drilling is cross-piled and secured at their core storage facility in Red Lake.

Core sample intervals were selected based on visible mineralization and geological contacts. Sample lengths of mineralized intervals varied from 1.0 m to 1.5 m. Core marked for sampling was cut in half by an on-site technician using a stationary rock saw. Half the sampled core was returned to the original core box and retained for reference purposes, whereas the half to be assayed was placed in a plastic sample bag with a sample tag, and stapled shut. Core samples were tracked using three-part ticket books. One tag was stapled into the core box at the beginning of the assay interval, one tag was placed in the sample bag along with the sample, and the last tag was secured at Premier Gold's Red Lake office. Core trays were identified with aluminium tags, as well as with felt marker. The plastic bags containing the sample material were placed in larger rice bags (8-10 samples per bag), which were then secured with plastic tie wraps, prior to shipping.

Lithological grab samples collected in the field were placed in plastic bags. Grab samples were also tracked using sample tag booklets. One tag was placed in the plastic bag with the sample and the number of the tag was recorded on the bag and in the collector's notes. Details of the sample were also recorded in the sample-tag booklet. Grab samples to be submitted for analysis were also placed and sealed in large rice bags and stored in a secure area prior to shipping.

The core shack was either locked or under the direct supervision of Premier Gold staff at all times. Samples were shipped directly to one of three (3) analytical laboratories: Activation Laboratories in Dryden, Ontario (“ActLabs”); Accurassay in Thunder Bay, Ontario (“Accurasssay”); or SGS Canada Laboratories in Red Lake, Ontario (“SGS”) for analysis. All three of these laboratories are accredited to ISO/TECH 17025 standards.

All sampled core intervals were assayed for Au by fire assay, with a gravimetric finish for samples returned with grades above 3.0 gpt Au.

11.1 Quality Assurance and Quality Control

Quality control samples were inserted into the sampling stream: for every batch of 24 samples, one blank, one duplicate and one certified reference material were used.

Table 11.1 presents a summary of the statistical comparison of assay results of the 4,392 blanks that were sent for assay to the three laboratories: 2,695 duplicate samples were assayed by ActLabs; 1,531 by Accurassay; and 166 by SGS. A general industry guideline is that a blank sample should not return a result greater than 5 times the detection limit. In total, about 0.6 % of the blanks returned assays greater than 5 times the detection limit.

Table 11.1: Statistical Comparison of Results of Assayed Blank Samples

Laboratory	Detection limit (gpt)	Number of Analyses	Number of results greater than 5 times the detection limit	Proportion of results greater than 5 times the detection limit
Accurassay	0.005	1512	6	0.4%
ActLabs	0.005	2787	17	0.6%
SGS	0.01	93	3	3.2%
Total		4392	26	0.6%

The Relative Difference between the grades of the original and duplicates assays is expressed by the following formula:

$$\frac{\text{Duplicate grade} - \text{Original grade}}{\text{Average of Original and Duplicate grades}}$$

Figure 11.1, ***Figure 11.2*** and ***Figure 11.3*** show that there is no bias toward greater or lower grade for the duplicate assays, and also show that the greater relative differences are mainly restricted to the lower grades, near the detection limit of the assay method.

Figure 11.4 shows that 50 to 60% of the pairs of assays show an Absolute Relative Difference of less than 20%, which represents a typical precision for gold assays.

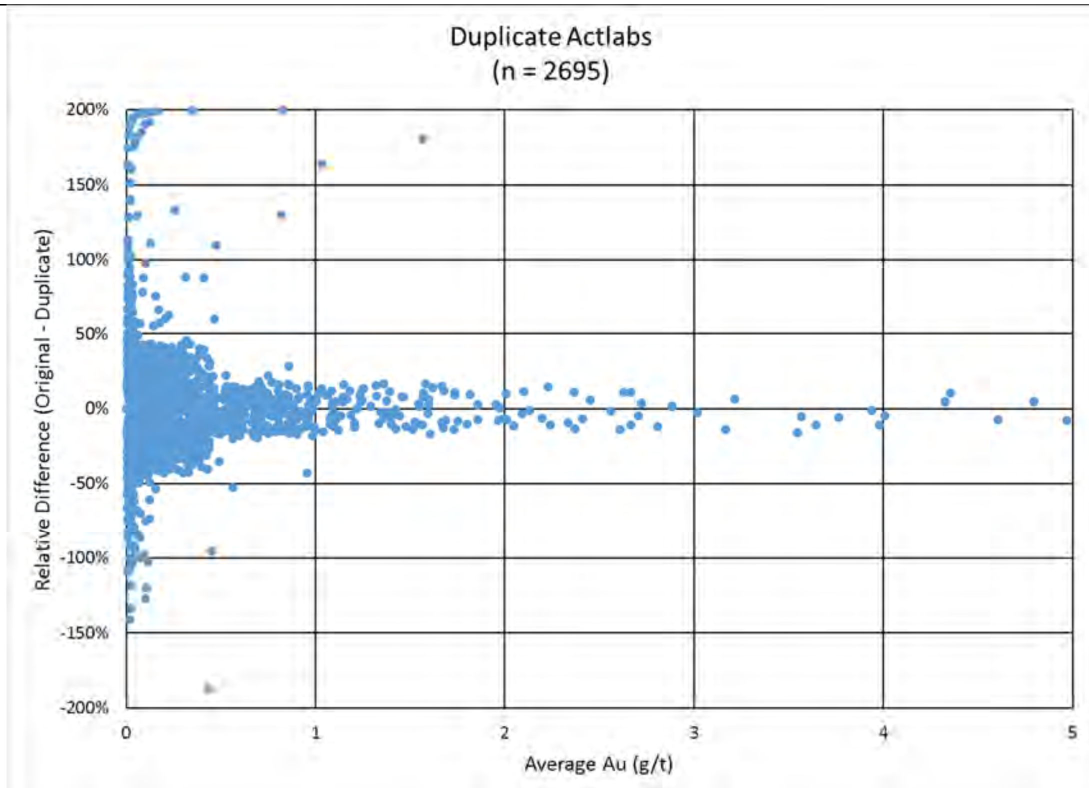

Figure 11.1 :Relative Difference vs Average grade of duplicates assayed by ActLabs

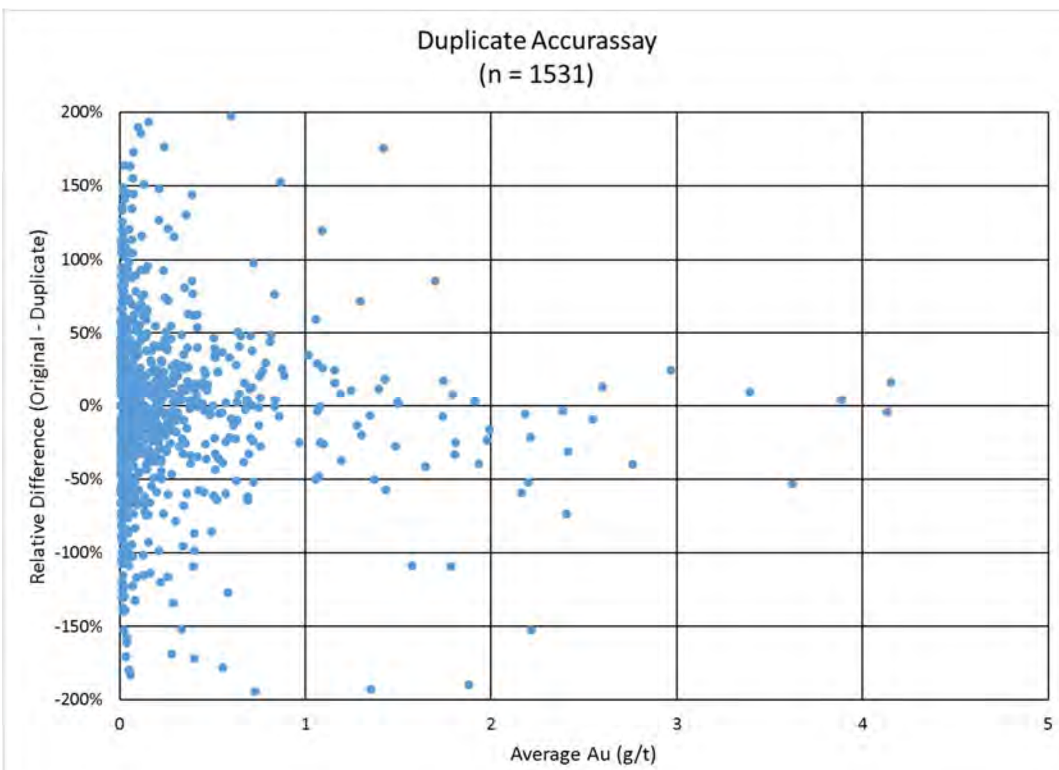

Figure 11.2 : Relative Difference vs Average grade of duplicates assayed by Accurassay

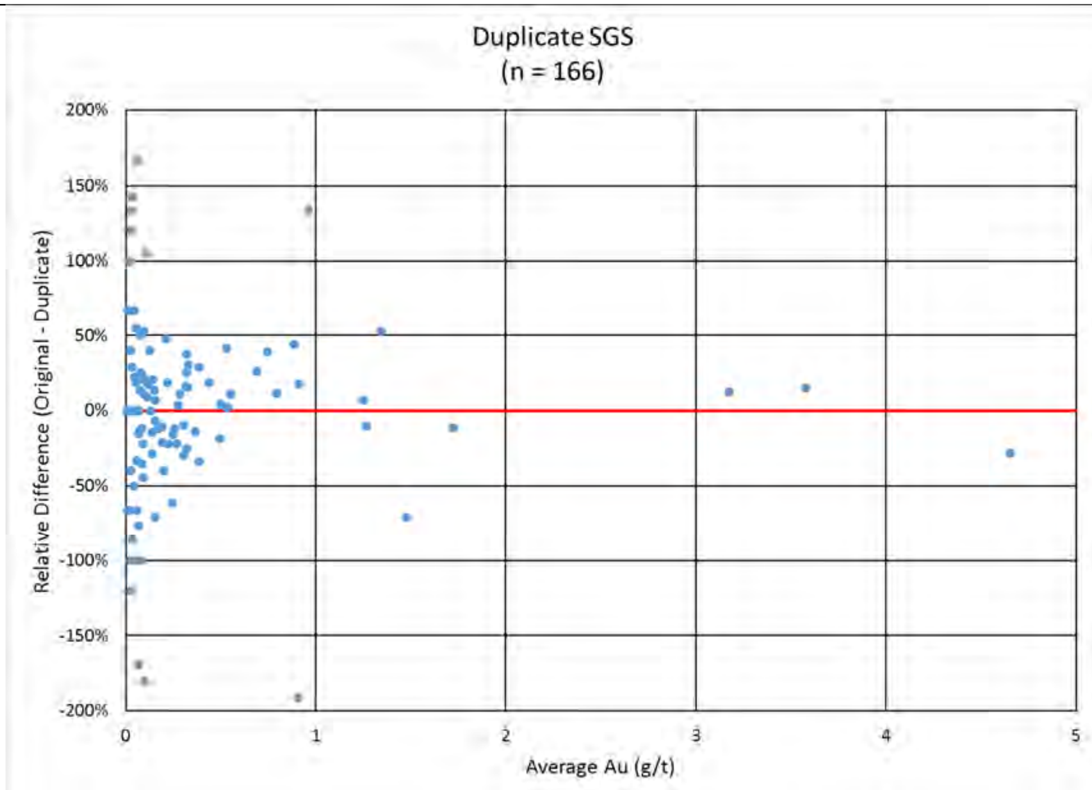

Figure 11.3 : Relative Difference vs Average grade of duplicates assayed by SGS

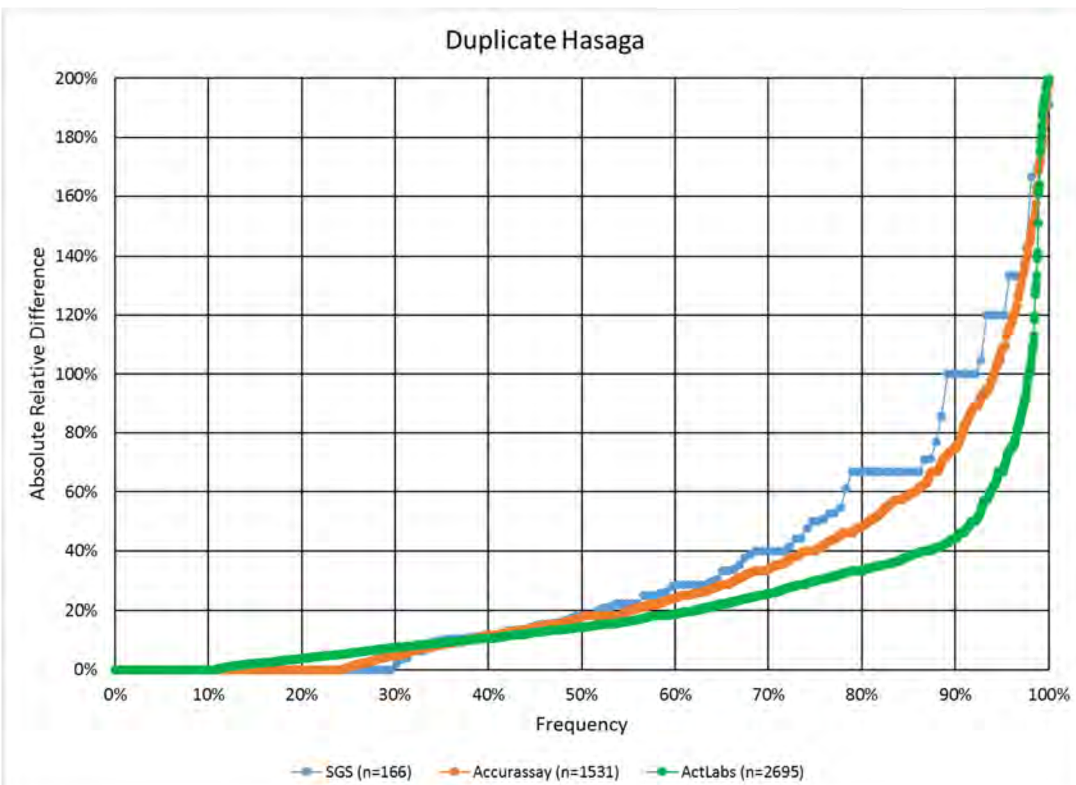

Figure 11.4 : Absolute Relative Difference vs Frequency of duplicate assay results

Certified Reference Material (CRM) assay data were processed by MRB using one of two different methods, depending on the number of assays performed on a given CRM. For those CRM's with less than 25 assays performed, a relative difference (RD) of ± 10%, from the assigned value, was used to determine if the CRM assay was acceptable. In the cases where more than 25 assays were performed on any given CRM, the method developed by Rocklabs (supplied to MRB as an Excel file), was utilized.

The following parameters are calculated by the Rocklabs method: 1) the average of the assay results; 2) the accuracy as the relative difference of the average from the assigned value of the CRM express as a percentage; 3) the precision as the relative standard deviation (RSD), and; 4) the process limits defined as the average ± 3 times the RSD. This method identifies gross outliers, i.e., those that plot >40% removed from the median, and also identifies outliers outside of the process limit. ***Table 11.2*** presents the comments helping to evaluate the RSD and the percentage of outliers, whereas ***Figure 11.5*** shows an example of the process performance chart.

Table 11.2: Comments on the Relative Standard Deviation and Percentage of Outliers

Comments are based on the following			
Relative Standard Deviation (Robust)			
Gold Concentration	**Good**	**Typical**	**Improvement Needed**
0.02 - 0.1	<7%	7% - 9%	>9%
0.1 - 0.2	<6%	6% - 8%	>8%
0.2 - 0.5	<5%	5% - 7%	>7%
0.5 - 1.0	<4%	4% - 6%	>6%
>1.0	<3%	3% - 5%	>5%
Percentage of Outlyers (Gross and user defined)			
under 1%	Good		
1 - 5%	Industry Typical		
5 - 7 %	Room for improvement		
>7%	Something seriously wrong		

The results of the twenty-one (21) CRM's evaluated by the Rocklabs method, i.e., those assayed more than 25 times, shows that: 1) for Accurassay, all the accuracies are better than ±5% and the majority of precisions are greater than 5%; 2) for ActLabs the majority of the accuracies are better than ±1% and the majority of precisions are better than 5%; 3) for SGS, all the accuracies are better than ±5% and the majority of precisions are greater than 5% (***Table 11.3***). In general, the results are considered "Good" or "Industry-Typical" by the standards as defined in ***Table 11.2***.

For the results of the eight (8) CRM's evaluated by the Relative Difference method, i.e., those assayed 25 times or less, a relative difference (RD) of ± 10%, from the assigned value, was used to determine if the CRM assay was acceptable. The results, presented in ***Table 11.4***, show that only 9.6% (11/115) of assays are considered outliers. Most of the outliers comes from CRM "HGS2" and "HGS3.CRM".

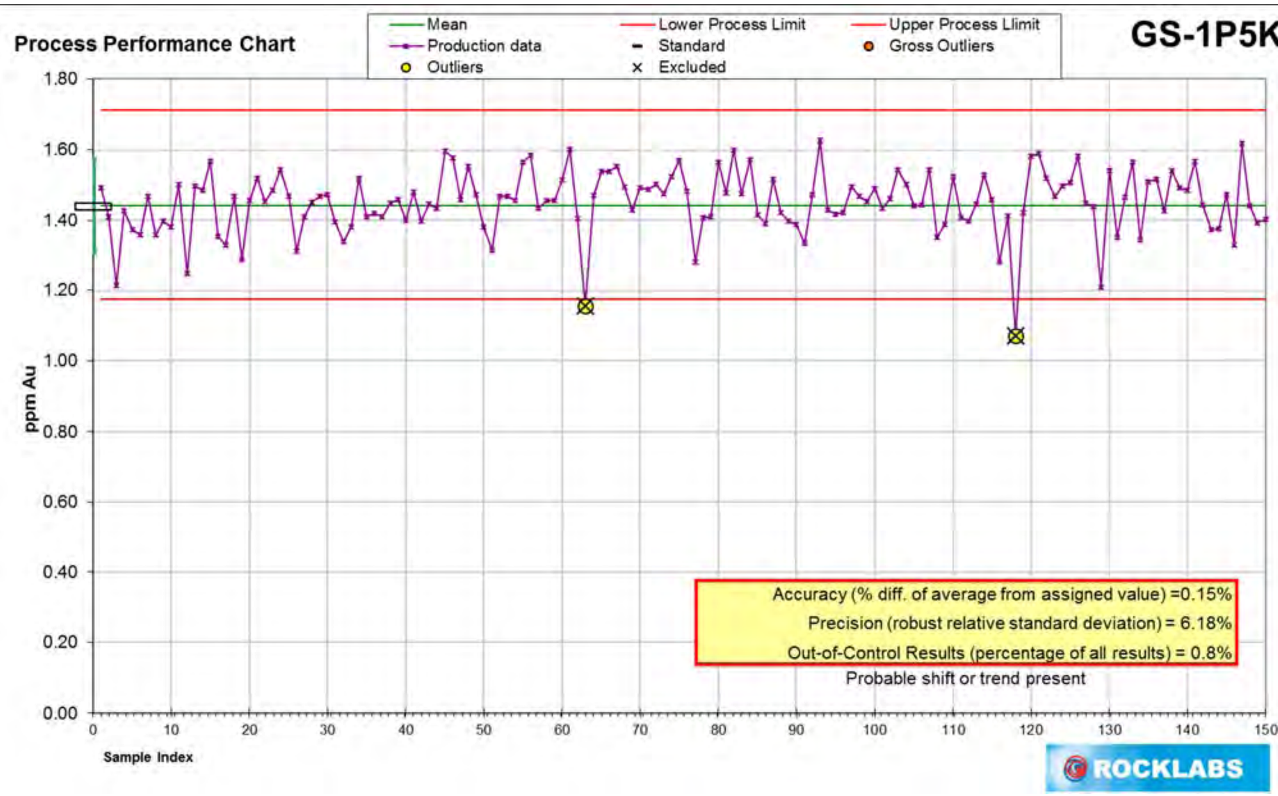

Figure 11.5 : Example Graph describing parameters used by the Rocklabs method.

Table 11.3: Summary Results of CRM Assays - Rocklabs Method

Laboratory	CRM name	Assigned value (g/t)	Number of results	Accuracy	Precision	Number of outlying results	Percentage of outlying results
Accurassay	GS-10D	9.500	185	-1.30%	3.7%	6	3.2%
	GS-1P5K	1.440	239	0.20%	6.2%	2	0.8%
	GS-1P5L	1.530	109	-3.30%	4.9%	2	1.8%
	GS-5L	4.740	310	-2.40%	3.6%	8	2.6%
	GS-9A	9.310	101	-2.40%	5.1%	4	4.0%
	GS-P4B	0.417	363	-0.40%	8.3%	5	1.4%
	VMS2	0.479	36	-4.30%	12.4%	2	5.6%
Actlabs	12A	12.310	490	0.30%	2.3%	2	0.4%
	1P5P	1.590	501	0.50%	5.0%	0	0.0%
	5R	5.290	494	-0.20%	3.5%	3	0.6%
	GS-10D	9.500	48	0.90%	2.8%	1	2.1%
	GS-1P5K	1.440	64	0.10%	4.4%	1	1.6%
	GS-1P5L	1.530	110	0.70%	4.7%	0	0.0%
	GS-5L	4.740	184	-0.40%	2.7%	1	0.5%
	GS-9A	9.310	123	1.30%	3.4%	0	0.0%
	GS-P4B	0.417	165	0.50%	6.5%	0	0.0%
	P5C	0.571	501	0.90%	5.7%	2	0.4%
SGS	12A	12.310	38	4.10%	3.3%	2	5.3%
	1P5P	1.590	39	0.50%	7.1%	1	2.6%
	5R	5.290	41	3.50%	6.4%	0	0.0%
	P5C	0.571	45	0.30%	8.1%	0	0.0%
TOTAL			4186			42	1.0%

Table 11.4: Summary Results of CRM Assays – Relative Difference Method

CRM name	Assigned value (g/t)	Number of analysis	Number of Absolute Relative Difference greater than 10%	Proportion of Absolute Relative Difference greater than 10%
12A	12.31	3	0	0.0%
1P5P	1.590	22	0	0.0%
5R	5.290	2	0	0.0%
GS04	1.899	12	1	8.3%
GS09	1.984	25	1	4.0%
HGS2	3.729	14	4	28.6%
HGS3	4.009	18	4	22.2%
P5C	0.571	19	1	5.3%
Total		115	11	9.6%

11.2 Comments

The analysis of QAQC procedures and results provided by Premier Gold did not reveal any significant issues. The Authors believe that the sampling method, preparation and analysis used at the Hasaga Project meet or exceed generally accepted industry standards. The gold assays contained in the database are considered to be reliable for the purpose of Mineral Resource and Mineral Reserve Estimates.

12.0 DATA VERIFICATION

A review of all the pertinent and available geological information from the Ontario Ministry of Northern Development and Mines (MNDM) and Ontario Department of Energy and Mines, as well as those made available by Premier Gold, was completed. The Authors reviewed the reports containing information on the Hasaga Property and its immediate surroundings, and believe the information to be accurate. It is the Authors' opinion that the data used in the Report is adequate for the purposes of the Report.

MRB & Associates validated the drill hole and channel databases by performing the following checks: searching the header table for duplicate hole IDs and for incorrect collar position; searching the survey table for hole IDs not matching the header table, for survey points past the hole length and for excessive deviation in azimuth and dip; searching the principal lithology table for hole IDs not matching the header table, for intervals past the hole length, for overlapping intervals, for abnormal interval length, missing intervals and missing logging codes; searching the remaining tables for hole IDs not matching the header table, for intervals past the hole length, for overlapping intervals, for abnormal interval length and missing logging codes.

A total of 28 holes (12 from the Hasaga Sector, 12 from the Central Sector and 4 from the Buffalo Sector), representing about 10 % of the holes drilled by Premier Gold as at the effective date of this Report, were selected for verification of collar location by Rugged Geomatics, an independent land surveyor based in Kenora, Ontario (***Table 12.1***).

Table 12.1: List of Drill-Holes Re-Surveyed for Quality Control Purposes

HLD001	HLD048	HLD082	HMP053	HMP103	HMP131
HLD006	HLD061	HMP001	HMP062	HMP106	HMP132
HLD016	HLD065	HMP021	HMP071	HMP117	HNG010WB
HLD024	HLD070	HMP024	HMP081	HMP123	
HLD037	HLD073	HMP035	HMP094	HMP128	

Technicians for Rugged Geomatics used a Trimble RTK System consisting of two R8 receivers and high powered radio coupled to a TS2 data collector to position the drill collars. A three-point control network consisting of post-processed baselines was first created. Each Base Station setup for drill collar positioning was confirmed by sending the first RTK "shot" to a control point on the three point control network whose elevation, northing and easting were previously determined. This "check shot" confirmed that the GPS base receiver was positioned directly plumb over the control point, and that the measured height of the base receiver was correctly measured and entered into the data collector. In no instance did the check shot differ by more than 0.02 metres both horizontally and vertically.

With the set-up of the GPS base station confirmed, the measuring device was inserted into the drill collar and aligned with all "play" eliminated. A precise GPS RTK shot was made, and averaged to where the collar exited the ground surface. The technicians then measured 2 precise RTK shots to the bottom post mount, with each measurement separated by 5 minutes of degree (azimuth) on the device. The GPS receiver was then relocated to the top post mount and 2 precise RTK shots were measured, again separated by 5 minutes. Results were then averaged prior to computing inverses for azimuth and calculating dip.

For all GPS measurements a fixed integer RTK solution was achieved which results in the relative accuracy between bottom and top mount shots being approximately 0.02 metres; 0.01 metres per shot both horizontally and vertically. These mounting points are relatively close together (1.3 metres) given the device length constraint; therefore, the resulting angular accuracy of the azimuth and dip equates to 0º 52'.

The maximum difference in horizontal distance between the original location recorded in the database and the location determined by the surveyor is 3.9 metres - with most (82%) of the horizontal distance difference being less than 2.5 metres. The maximum elevation difference noted was 0.51 metres - with most (82%) of the elevation differences being less than 0.3 metres.

The same 28 holes, from which 10,583 samples were collected and assayed, along with 20 of the 45 channel samples, from which 99 samples were collected and assayed, were selected for verification by comparison of assay results supplied to MRB by Premier Gold with those listed in copies of original assay certificates obtained directly from ActLabs, Accurassay, and SGS (litho-geochemical analytical results). The assay results contained in the database were found to be identical to those supplied by the analytical laboratories for the Hasaga Project.

The authors are not aware of any sampling problems that would impact the accuracy and reliability of the original assay results.

12.1 Site Visit

Mr. Langton of MRB, conducted a site visit of the Hasaga Project on October 20-21, 2016, accompanied by Jim Rogers, Premier Gold's Exploration Manager. During the site-visit, Mr. Langton explored the general landscape and surface features of the Project recorded on geological maps and figures published by Premier Gold and visited a number of drill-sites (inactive) and stripped outcrops. It was noted that all the observed drill collars were correctly labelled and accurately reflected the azimuth and dip recorded on the logs. Mr. Langton also checked for and confirmed evidence of lithological channel sampling at the examined outcrops and documented mineral occurrences.

During his visit, Mr. Langton also reviewed Premier Gold's drill-core storage facility in Red Lake, noting that the drill-core was in good order, stored in a secure facility, and was properly identified by metal tags secured to the core boxes. Observations indicate that the core cutting was well done, sample tags were noted as being in place, and the tags and sampled sections correspond to those indicated in the core logs.

Since Mr. Langton's site visit, there has not been any further surface exploration, nor significant new data generated, on the Project.

Mr Langton returned to Premier Gold's Red Lake field office facilities on November 17-18 to complete a re-sampling program of gold assays and density determinations. 140 sample intervals were selected for gold grade re-assays. A quarter of the original core was collected and tagged and sent to SGS to be assayed by the same methods employed in the original analytical procedure. The core-intervals to be check-assayed were selected by MRB as representative of the Project's three principal areas of exploration (i.e., the Central, Hasaga and Buffalo sectors), and also to incorporate the full range of original gold grades.

Drill-core re-sampling:
The results of the drill-core re-sampling program (***Figure 12.1***) show that the relative difference between the original and duplicate assay values varies greatly but are independent of the gold grades, indicating that no bias is present in the assays.

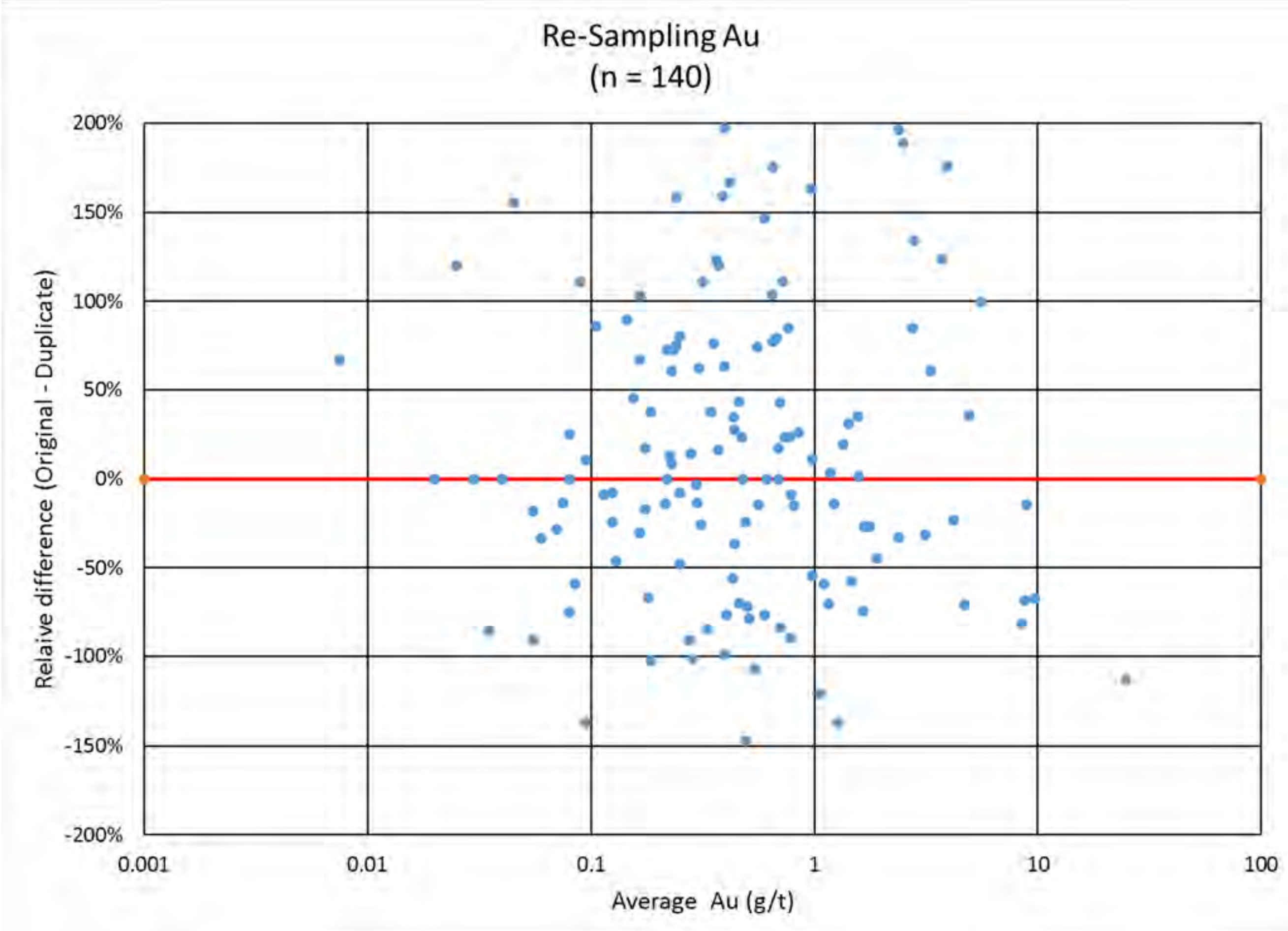

Figure 12.1 : Drill-core gold-assay re-sampling results

Specific Gravity Corroboration:
A total of 35 sample intervals were selected for Specific Gravity (SG) re-determination. An approximately 10 cm section of whole or half core was sent to SGS for bulk density determination using a basic water-immersion method (SGS code v G_PHY04V) of the core. These tested intervals were selected by MRB to encompass the complete range of originally determined SG values.

The results of the SG determination re-sampling program (***Figure 12.2***) show that the relative difference between the original and duplicate results are all less than 2%, indicating an excellent reproducibility of the SG determination.

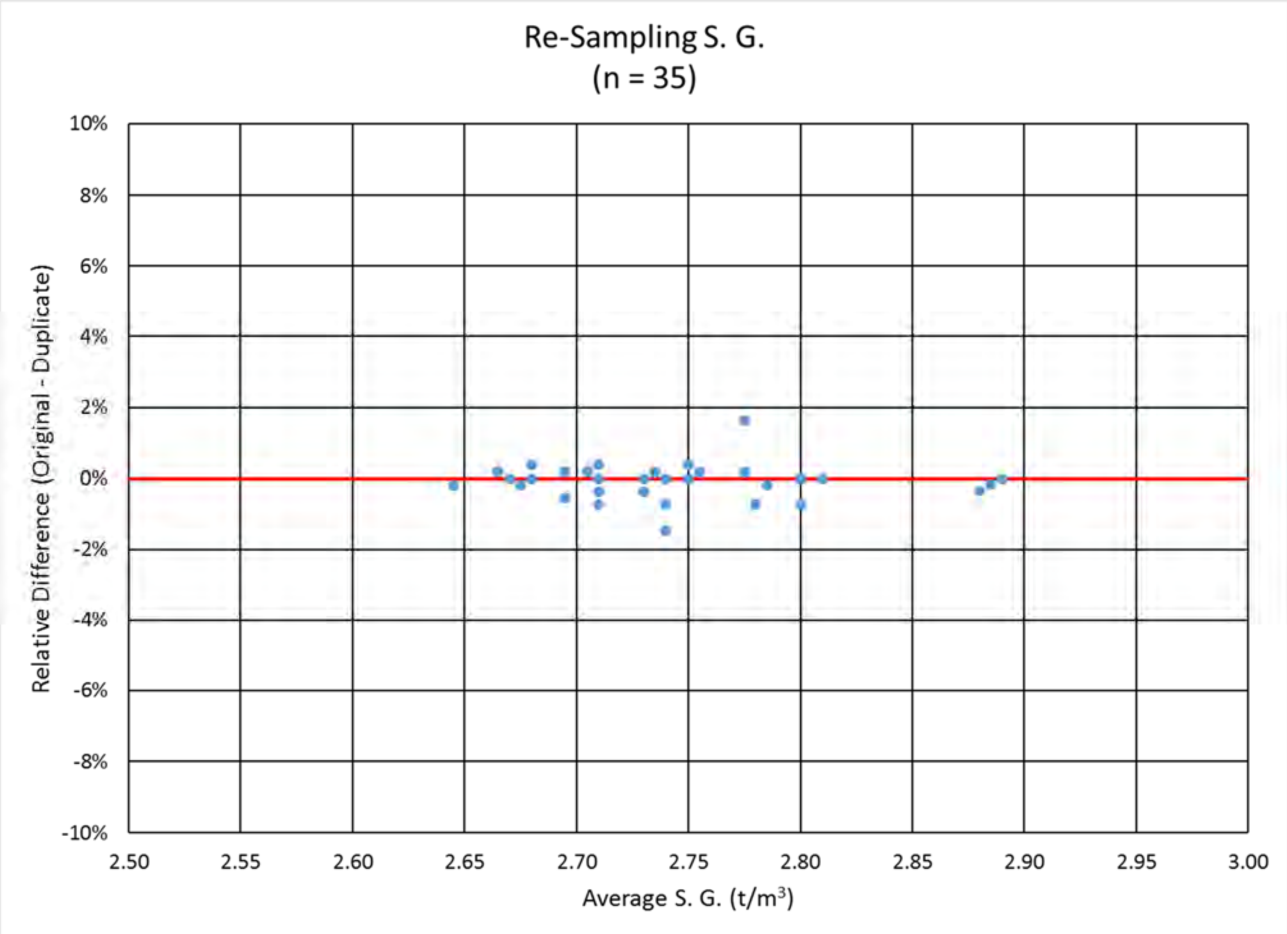

Figure 12.2 : Specific Gravity re-sampling results

MRB concludes that the exploration activity reported by Premier Gold is accurate and reliable.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Metallurgical Testwork (Phase 1)

Phase 1 of a metallurgical scoping testwork program on five composites from the Hasaga Sector and six composite samples from the Central Sector was completed. A report dated September 28, 2016 was issued by Jacobs Engineering Group Limited ("Jacobs"), of Denver, Colorado, that contains a summary and analysis of the program and testwork results and is included in ***Appendix IV***.

Gold extraction by whole ore cyanidation for both zones was good for all grade ranges with the five Hasaga Sector composites yielding an average extraction of 94.7% and the six Central Sector composites having an average extraction of 96.1%

The major conclusions and data summaries from the test work are as follows:

- the metallurgical scoping tests indicate that the Hasaga and Central Sector composite samples are not refractory and should be amenable to conventional whole-ore cyanidation, and yield gold extractions above 90%;
- the scoping tests indicate that there is a "nugget" effect in gold mineralization that should be investigated by further metallurgical testing and drill-core interval assaying;
- the limited metallurgical tests indicate that a significant portion of the gold in both the Central and Hasaga sectors is likely recoverable using gravity concentration; however, additional testing will be required to determine if this will be beneficial in a process flow-sheet;
- results of the metallurgical tests indicate that the geochemistry and precious metal occurrence and association have significant effects on metal extractions, leach kinetics, and slurry properties that will need further investigation in order to fully understand and incorporate into these parameters into a resource model, as the project advances;
- based on the limited testing, there do not appear to be unusual or significant deleterious factors that would seriously impact processing of the resources, or impair the project; however, additional testing, particularly pre-feasibility level metallurgical testing, and environmental testing, will be needed to fully determine and assess factors that could have significant or deleterious effects on the project.
- Gold extraction by whole ore cyanidation for both sectors was good for all grade ranges with the five Hasaga Sector composites yielding an average extraction of 94.7% and the six Central Sector composites having an average extraction of 96.1% (***Table 13.1***).

13.2 Metallurgical Testwork (Phase 2)

Phase 2 metallurgical scoping program was conducted to test low-grade gold samples, one from the Hasaga Sector, and four from the Central Sector with the following objectives:

1. to test the amenability of the samples to heap leaching using cyanidation;
2. to add to the initial baseline metallurgical database to evaluate resource targets at the project site.

The Phase 2 scoping program also included initial baseline testing on a sample from the Buffalo Sector with the objective to develop the initial baseline metallurgical data for the Buffalo Sector.

The report on the testwork and results of the Phase 2 program was issued by Jacobs on December 15, 2016, and is included in ***Appendix V***.

The scoping tests performed on the samples included:

- Head Assaying;
- Whole ore bottle roll cyanidation;
- Knelson Gravity Test;
- Bottle roll cyanidation of Gravity Tailings;
- Comminution tests- Bond BWI and Abrasion, and SMC

The following are the key conclusions from the Phase 2 testwork:

- the Phase 2 baseline metallurgical scoping tests indicate that the Hasaga, Central and Buffalo Sector composite samples are not refractory and should be amenable to conventional milling using whole ore cyanidation, and should yield gold extractions at or above 90% when ground to an 80% passing size of 200 mesh (74 microns);

- the bottle roll heap leach amenability tests on the low-grade single Hasaga Sector composite sample and on the four Central Sector composite samples, indicate that heap leaching of the low-grade material does not appear to be feasible at this point, as maximum gold extractions were only 40%, with a fine crush size of -1/4 inch. Typically gold-heap-leach extractions need to be in range of 60% to 70% for positive economics;

- test results for the single Buffalo Sector composite sample indicates that a significant portion of the gold in the sample may be recoverable using gravity concentration; however, additional testing will be required to determine if this will be beneficial in a process flow-sheet;

- as was noted in the Phase 1 test results, the geochemistry and precious metal form and associations appear to have significant impacts on metal extractions, leaching rates, and reagent consumptions, and will need to be investigated further as the project advances;

- based on the limited testing, there do not appear to be unusual or significant deleterious factors that would seriously impact processing the resources or impair the project; however, additional testing, particularly pre-feasibility level metallurgical testing and environmental testing will be needed to fully determine and assess factors that could have significant or deleterious effects on the project.

- gold extraction evaluations by whole ore bottle-roll-cyanidation using an 80% minus 200 mesh (74 micron) grind for the Phase 2 composites from all three sectors were good. The Hasaga Sector low-grade composite yielded an extraction of 89.5%, slightly lower than the reported Phase 1 response. The four Central Sector composite samples resulted in an average extraction of 93.2%, whereas the Buffalo Sector composite sample returned a 96.2% extraction (***Table 13.2***).

For more details of the Phase 1 and Phase 2 metallurgical studies, the reader is referred to the original reports by Jacobs Engineering Group Limited that are included as ***Appendix IV*** and ***Appendix V***.

Table 13.1: Summary of Gold Bottle-Roll-Cyanidation Tests - Phase 1

Comp	Zone	Feed Size P_{80}, µm	Head Au, g/t		Residue g/t Au	Au % Recovery CN (Unit)					Reag. Consumption kg/t of CN Feed	
			Calc	Direct		2 h	6 h	10 h	24 h	48 h	NaCN	CaO
1	Hasaga	72.0	0.90	0.76	0.07	8	83	85	87	92.8	0.64	0.28
2	Hasaga	76.0	1.38	1.42	0.06	3	85	87	94	95.8	0.64	0.29
3	Hasaga	72.0	0.65	0.96	0.04	2	77	86	89	93.8	0.63	0.24
4	Hasaga	80.0	1.54	1.45	0.11	10	83	84	88	93.2	0.55	0.28
5	Hasaga	70.0	1.07	1.19	0.03	1	55	68	92	97.7	0.68	0.27
Averages	Hasaga	74.0	1.11	1.16	0.06	5	77	82	90	94.7	0.63	0.27
6	Central	71.0	4.59	2.95	0.05	1	48	70	89	98.9	0.68	0.21
7	Central	72.0	1.86	1.66	0.06	5	58	73	91	96.8	0.71	0.25
8	Central	76.0	3.03	3.13	0.20	70	90	87	93	93.4	0.09	0.32
9	Central	72.0	0.49	0.60	0.02	3	65	83	89	95.9	0.62	0.21
10	Central	71.0	1.48	2.31	0.07	1	30	48	81	95.3	0.70	0.19
11	Central	74.0	0.55	0.61	0.02	3	38	54	83	96.4	0.55	0.19
Averages	Central	72.7	2.00	1.88	0.07	14	55	69	88	96.1	0.56	0.23
Averages	Hasaga & Central	73.3	1.59	1.55	0.07	10	65	75	89	95.5	0.59	0.25

Table 13.2: Summary of Gold Bottle-Roll-Cyanidation Tests - Phase 2

Comp #	Drill Hole	Zone	Feed Size P_{80}, µm	Head Au, g/t			Residue, g/t Au	Au % Recovery CN (Unit)					Reag. Consumption kg/t	
				Calc	SM Direct	FA Direct		2 h	8 h	24 h	32 h	48 h	NaCN	CaO
12	HMP 107	Hasaga	75	0.99	1.12	1.08	0.10	4.5	79.3	85.3	90.0	**89.5**	0.72	0.30
13	HLD 050	Central	79	1.10	1.20	1.54	0.05	1.4	61.9	88.6	78.4	**95.8**	0.64	0.27
14	HLD 052	Central	74	1.08	1.07	1.05	0.06	1.4	71.7	93.7	88.7	**94.8**	0.61	0.41
15	HLD 071	Central	77	0.31	0.69	0.25	0.04	4.9	53.3	77.3	68.2	**87.5**	0.58	0.24
16	HLD 072	Central	78	1.02	0.69	0.97	0.05	1.5	40.8	81.1	78.6	**94.7**	0.69	0.27
17	HMP 147	Buffalo	73	2.51	4.06	2.16	0.09	35.5	82.4	92.5	92.6	**96.2**	0.38	0.39

14.0 MINERAL RESOURCE ESTIMATES

14.1 Database

Premier Gold supplied their rock-channel and diamond-drill hole ("ddh") data to MRB as GeoticLog databases. Their compiled historical diamond-drilling data was supplied in Microsoft Excel® format. Data pertaining to the existing mining operation infrastructure (mine openings), both underground and open pit, were supplied as AutoCAD files. MRB imported these data into a GEMS software project. Premier Gold's 2016 exploration activities at the Hasaga Project were adjourned for the year in November of 2016, and the GEMS project database was finalized on November, 28th 2016.

The GEMS database comprises 99,563 assay results and 2,183 specific gravity determinations from 387 ddh (totalling 123,389 m), along with spatial data and 455 assay records from 45 surface rock-channels (totalling 440 metres). These entries comprise both the historic underground development at the Hasaga Sector, and the Buffalo Sector open pit operations, as well as Premier Gold's exploration work. MRB validated the DDH and channel samples databases as described in ***Section 12***.

Premier Gold's drill-hole, channel, and sample data were extracted from the GEMS project database, creating a subordinate relational database (the "Database") that was used for the 2017 Mineral Resource Estimate. These data comprised 257 ddh totalling 109,194 m, 91,291 assay results and 2,183 specific gravity determinations, along with the channel sampling records (45 channels totalling 440 metres and 455 assay results). Data from the 128 historical drill-holes recorded in the GEMS project database (mostly from the Buffalo Sector) were used to guide the geological interpretation but were not used for grade interpolation.

14.2 Geological Interpretation

The mineralized zones underlying the Project have been modelled utilizing geologic plan views and cross-sections orientated perpendicular to the general trend of the mineralization. On each section, polyline interpretations were digitized from drill-hole to drill-hole, but were not typically extended more than 50 metres from down-hole mineralized intervals.

The mineralization was extended deeper where mineralized intersections were encountered in neighbouring sections. All polyline vertices were snapped directly to drill-hole assay intervals and were joined together in 3D using tie lines, in order to generate three-dimensional representations of individual mineralization lenses or "zones".

The various lens interpretations accounted for wall-rock lithology, vein thickness, dip, grade-trend and fault offsets, and were created using GEMS software.

Thirteen mineralized zones (***Table 14.1***) within the three principal exploration sectors (i.e., Central, Hasaga and Buffalo)(***Figure 14.1***),were interpreted for the Hasaga Project.

Table 14.1: Summary Statistics for Diamond-Drill Hole Raw Assays

Sector	Zone	Number of assays	Maximum	Average	Std. Dev.	Coefficient of variation	Number of capped assays	Capped assays %	Capped metal %	Capped coefficient of variation
Buffalo	1210	711	68.70	1.44	4.52	3.14	10	1.4%	15.8%	2.11
	1220	213	46.11	1.29	4.73	3.67	4	1.9%	22.9%	2.72
	1230	197	30.73	0.53	2.32	4.37	1	0.5%	15.1%	2.98
Central	1310	459	7.75	1.04	1.31	1.26	0	0.0%	0.0%	1.26
	1320	292	48.60	0.73	3.20	4.41	2	0.7%	18.0%	2.68
	1330	17292	59.90	0.54	1.23	2.29	24	0.1%	2.0%	1.88
	1340	608	15.10	0.42	0.89	2.11	1	0.2%	0.0%	2.11
Hasaga	1510	6393	285.00	0.72	4.09	5.69	26	0.4%	11.5%	2.22
	1515	463	97.00	0.91	4.85	5.31	3	0.6%	19.5%	2.51
	1520	1034	54.13	0.69	2.55	3.69	4	0.4%	8.6%	2.47
	1525	72	35.66	1.09	4.46	4.09	1	1.4%	22.2%	3.03
	1530	299	12.15	0.85	1.32	1.56	0	0.0%	0.0%	1.56
	1540	55	8.13	0.84	1.31	1.55	0	0.0%	0.0%	1.55
Envelope	2399	29827	91.10	0.16	1.18	7.30	19	0.1%	8.4%	3.75
	2599	28176	60.26	0.06	0.43	7.71	2	0.0%	1.9%	4.74
	2699	1216	1.53	0.02	0.07	4.41	0	0.0%	0.0%	4.41
	2799	218	1.23	0.04	0.13	3.32	0	0.0%	0.0%	3.32

Central Sector:

The Central Sector lies entirely within the Dome Stock (***Figure 14.1***). The main mineralized zone (zone 1330; ***Figure 14.2***; ***Table 14.1***) is delineated by 73 drill-holes. It is roughly oblate-spherical, approximately 700 m in diameter. It is present at surface and remains open at depth. This zone is intersected by the Laverty Dyke, which strikes 340º, and is characterized by widespread persistent mineralization associated with silicification, weakly disseminated sulphides and variably distributed quartz veinlets.

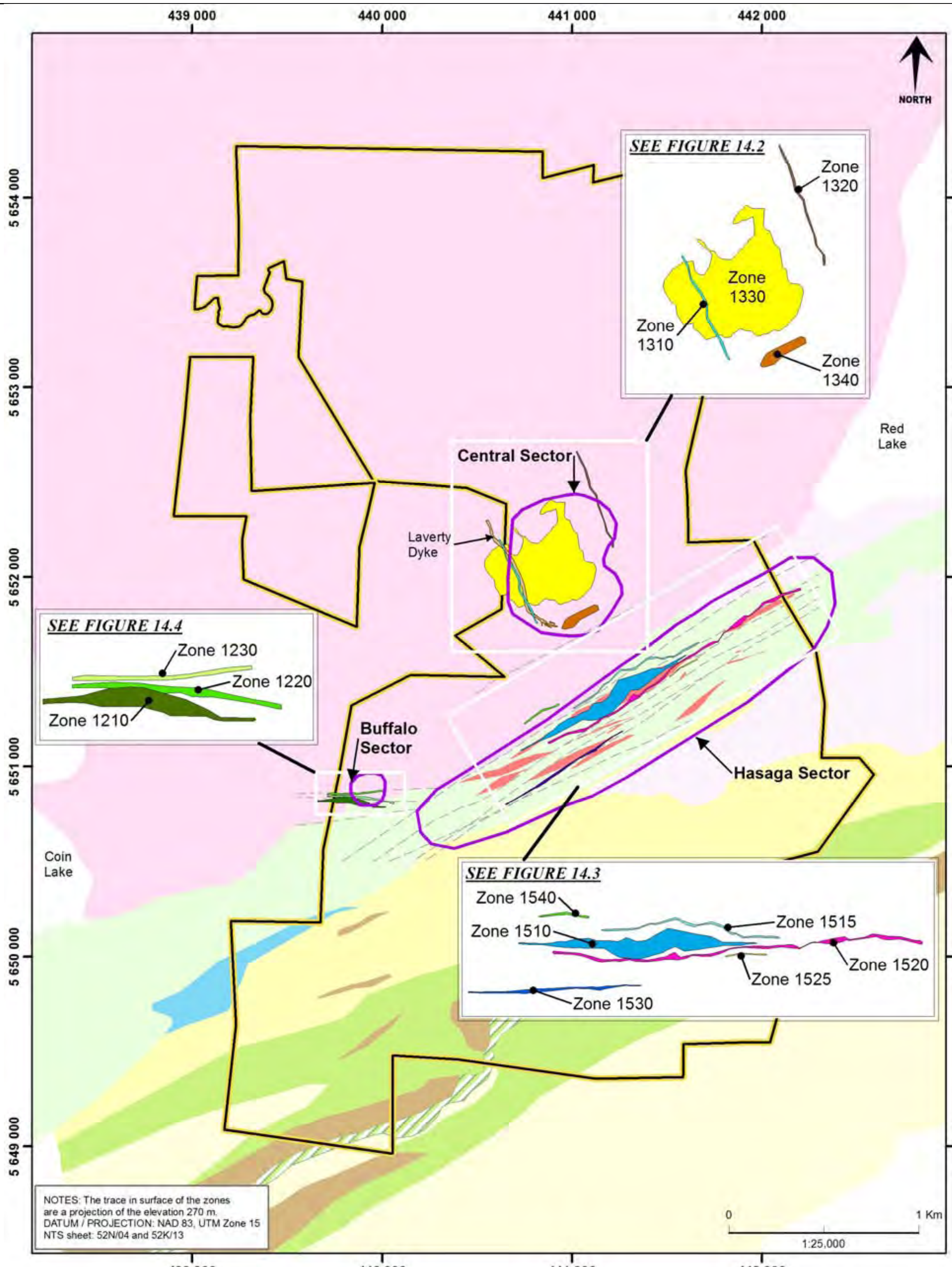

Figure 14.1: Geological map showing the three principal exploration sectors and surface traces of the modelled Mineralized Zones (see Figure 7.3 for Legend).

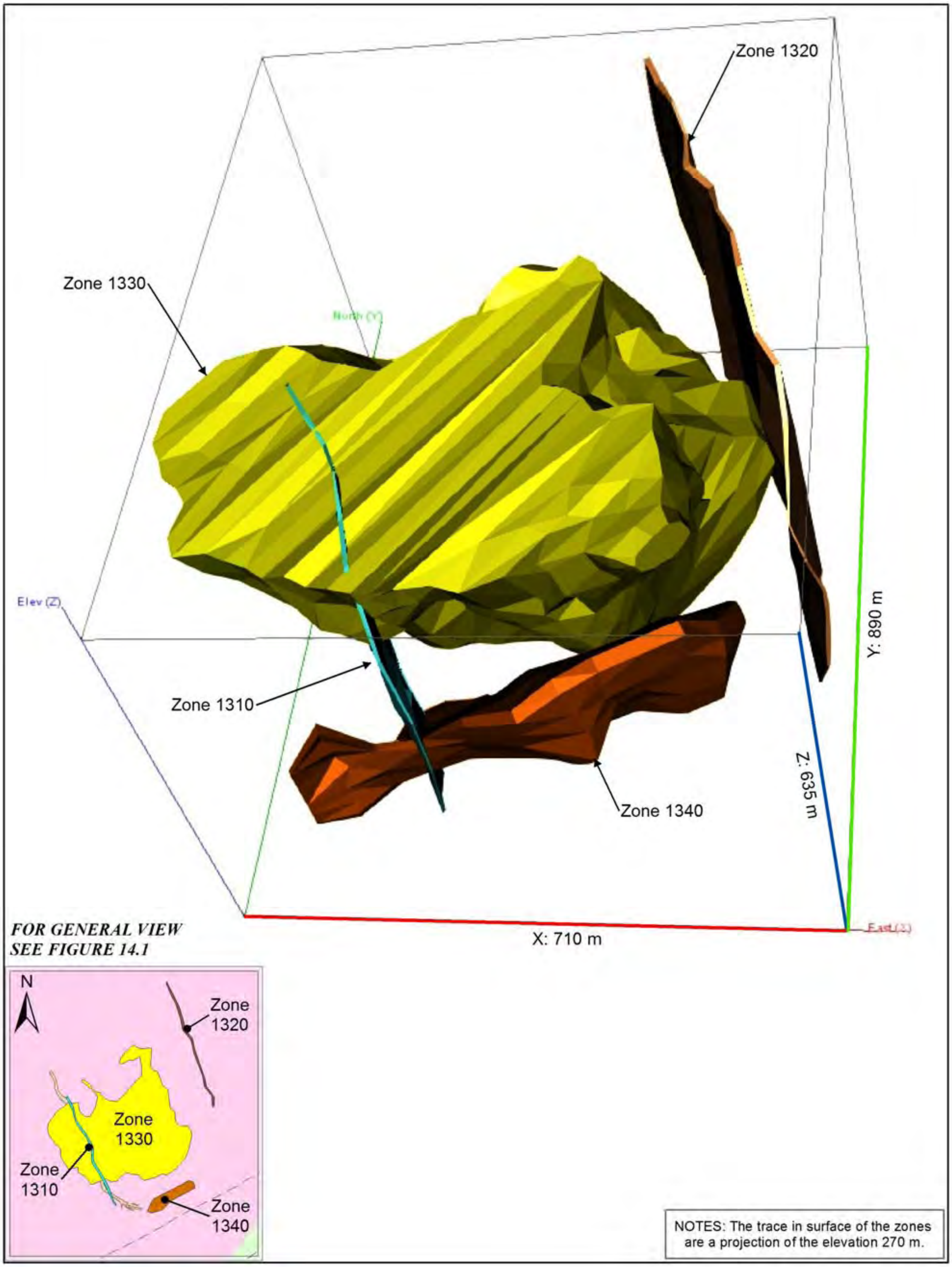

Figure 14.2: Mineralized Zones underlying the Central Sector

Hasaga Sector:

The Hasaga Sector hosts a structurally competent, steeply dipping, generally tabular, intermediate-to-felsic, quartz-feldspar porphyry (the "Hasaga Porphyry") that intrudes mainly mafic volcanic host rocks along a high-strain corridor bordering the southeast part of the Dome Stock. During post-emplacement deformation, this Porphyry acted has a competent body relative to its volcanic host rocks, resulting in a strain contrast at its borders and the development of brittle fractures within the porphyry that were subsequently in-filled with mineralized quartz veins. The Hasaga Sector is host to six parallel, northeast-trending, closely spaced mineralized zones (zones 1510, 1515, 1520, 1525, 1530, 1540; ***Figure 14.3***; ***Table 14.1***), delineated by 120 drill holes.

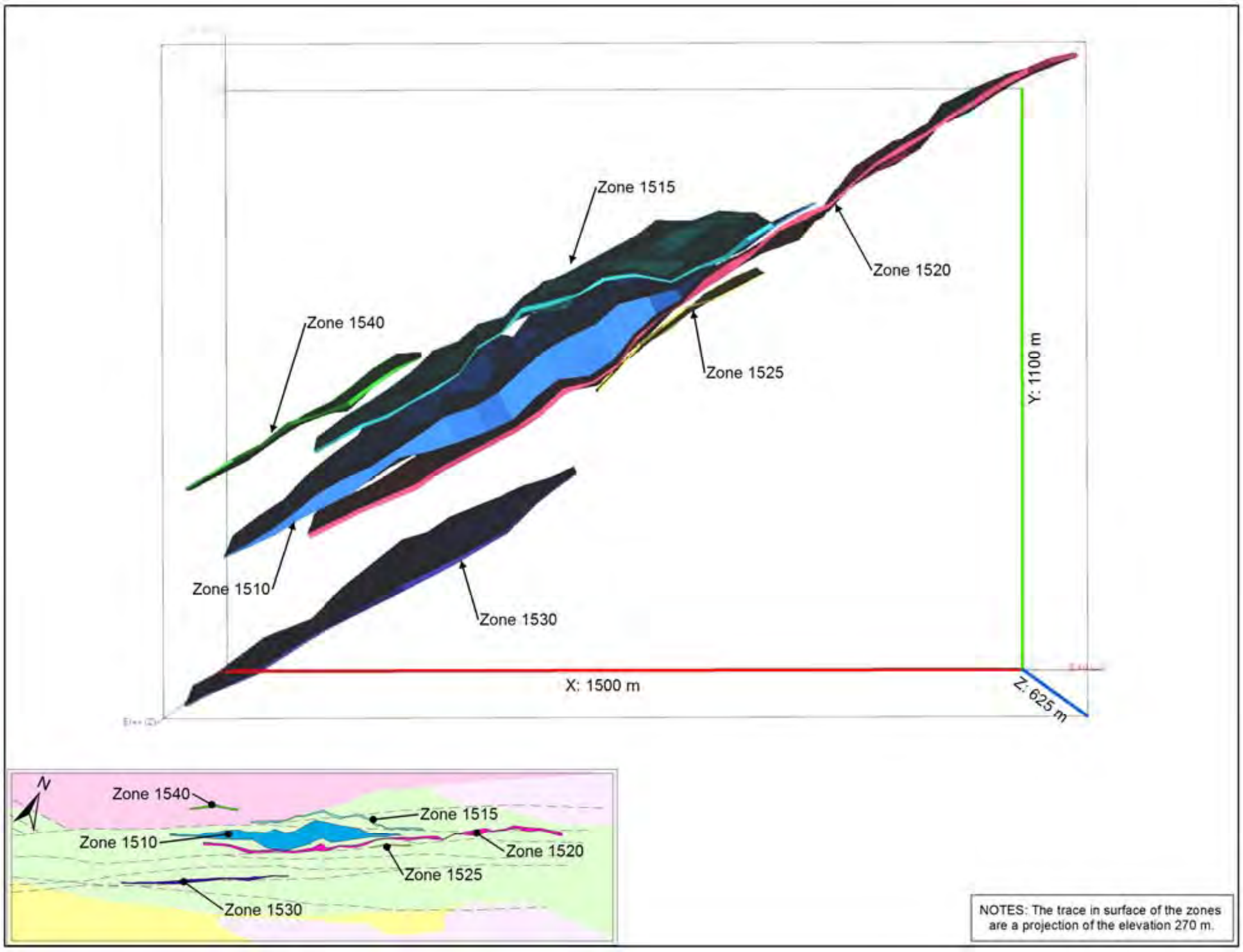

Figure 14.3: Mineralized Zones underlying the Hasaga Sector

Buffalo Sector:

Gold mineralization at the Buffalo Sector is associated with quartz–tourmaline–sulphide veins, hosting local free gold, within granodiorite of the Dome Stock and local mafic volcanic rock.

The latest drilling by Premier Gold validated historic results and helped provide better understanding of the geology. Three parallel mineralized zones have been modelled using data from the latest drilling by Premier Gold, comprising 20 holes, spaced from 50 m to 100 m apart. The mineralized zones (zones 1210, 1220 and 1230; ***Figure 14.4***; ***Table 14.1***), have dimensions between 300 m and 364 m along strike, 300 m to 430 m down-dip, and a thickness of three metres, oriented generally east-west. The mineralization is open at depth, exceeding 200 metres down plunge.

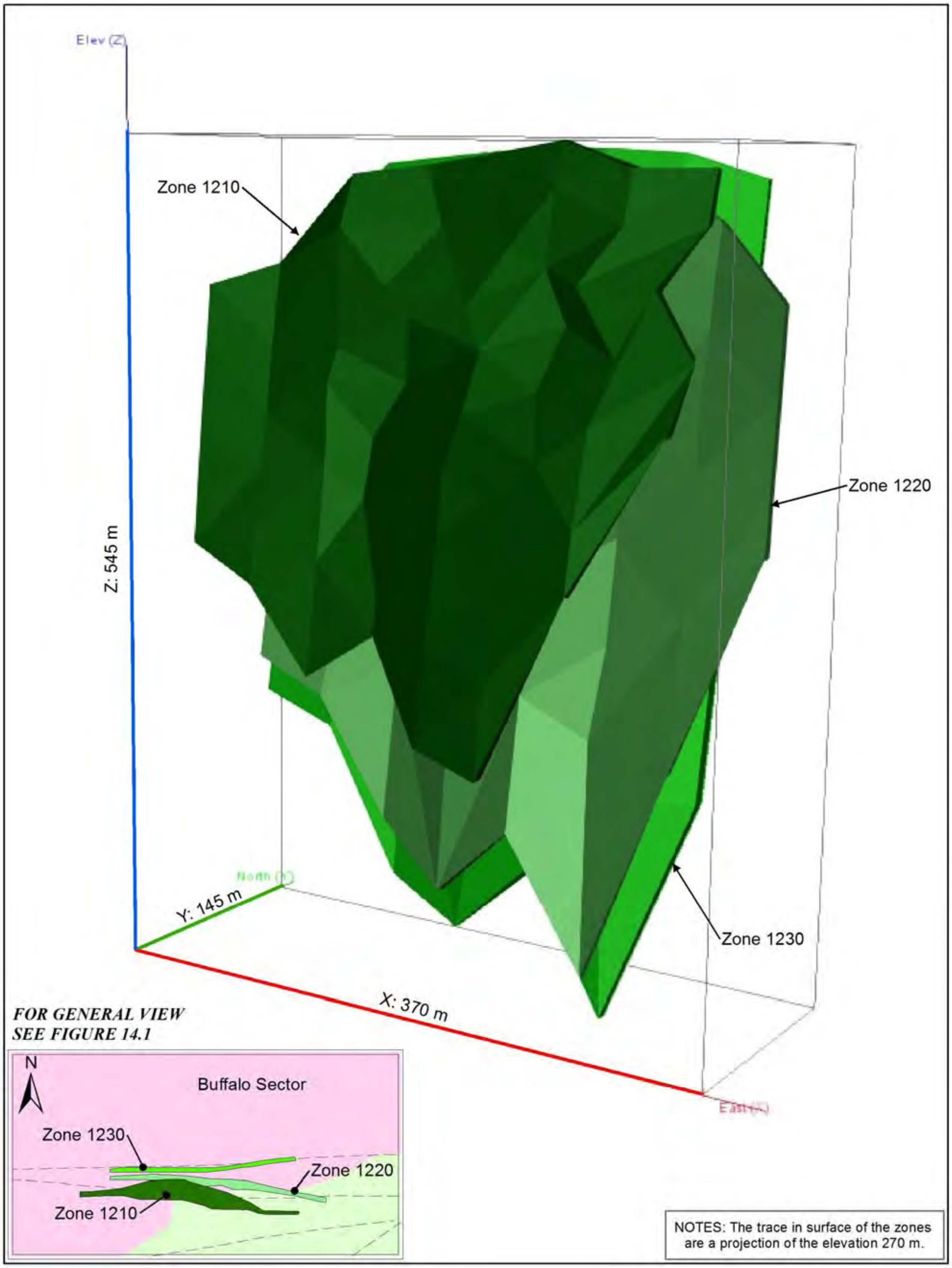

Figure 14.4: Mineralized Zones underlying the Buffalo Sector

Four (4) wireframes representing the “lithological envelopes” for the various property-scale geological host-rock domains (Dome, Balmer, Howey and Confederation), were also created. “Overburden” and “air” wireframes were also created using the LiDAR topography surface that was devised and coded using the precedence system in GEMS (***Figure 14.5***).

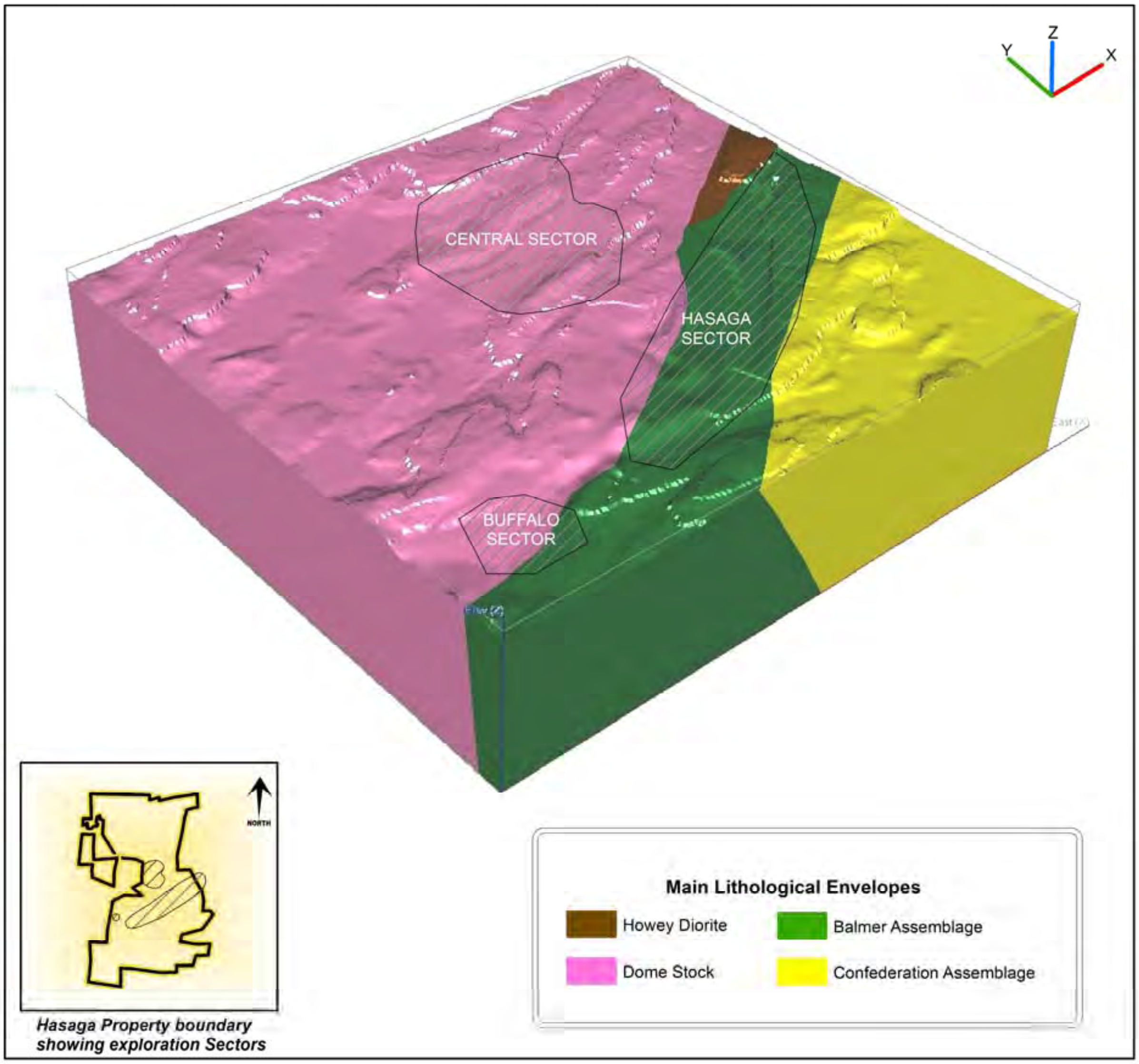

Figure 14.5: 3D block showing the “lithological envelopes” for the various geological host-rock domains.

14.3 Capping

For diamond-drill holes and channels, intervals of intercept with each of the thirteen (13) mineralized zones and four (4) envelopes 3D solids were determined and used to extract raw assays. Basic statistics, decile analysis, gold-grade histograms and cumulative probability plots for each mineralized zone were studied. A global capping value of 15 gpt Au was selected for diamond-drill hole assays and channel sample assays. ***Table 14.1*** and ***Table 14.2*** present a summary of statistics for the different solids, whereas ***Figure 14.6 to Figure 14.9*** present examples of the different plots used to determine the capping value. The plots show that even if the probability plot indicates that a capping at 15 gpt Au seems severe, it is not sufficient to obtain a capped coefficient-of-variation of less than 2, and less than 10% of the capped metal in the highest 1% of assays. A restrictive search approach was therefore used in the interpolation to control high-grade assays.

Table 14.2: Summary Statistics for Channel Sample Raw Assays

Sector	Zone	Number of assays	Maximum	Average	Std. Dev.	Coefficient of variation	Number of capped assays	Capped assays %	Capped metal %	Capped coefficient of variation
Central	1310	9	34.130	5.823	10.153	1.744	1	11.1%	27.1%	1.18
	1330	233	10.450	0.799	1.128	1.411	0	0.0%	0.0%	1.41
Hasaga	1515	6	0.570	0.425	0.134	0.315	0	0.0%	0.0%	0.32
	1520	63	2.330	0.386	0.390	1.009	0	0.0%	0.0%	1.01
Envelope	2399	105	2.780	0.353	0.450	1.275	0	0.0%	0.0%	1.28
	2599	39	0.550	0.172	0.151	0.879	0	0.0%	0.0%	0.88

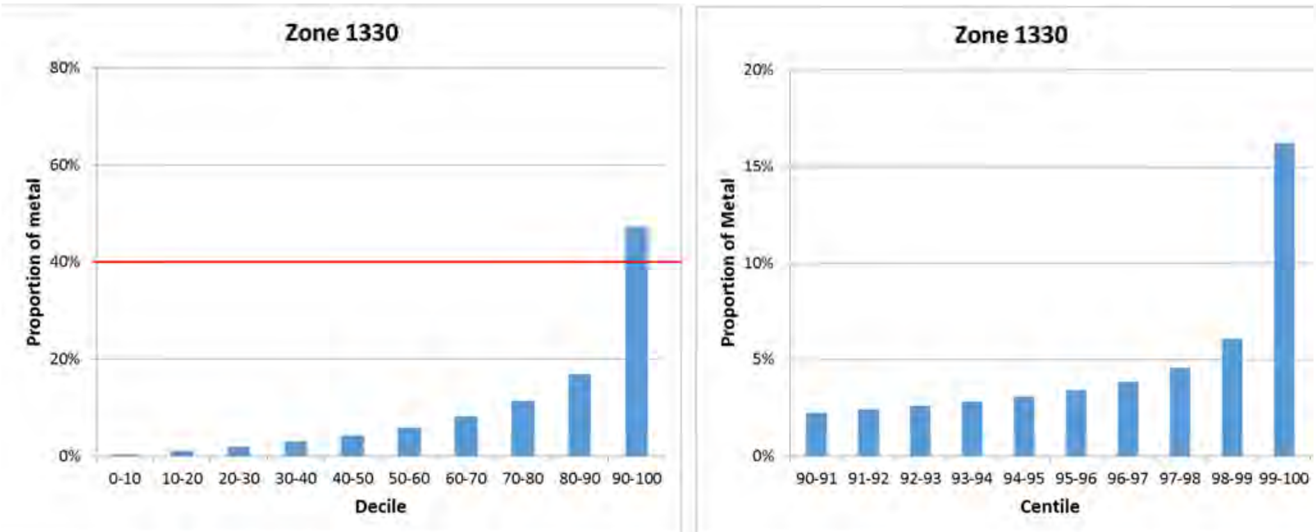

Figure 14.6: Decile analysis - Zone 1330

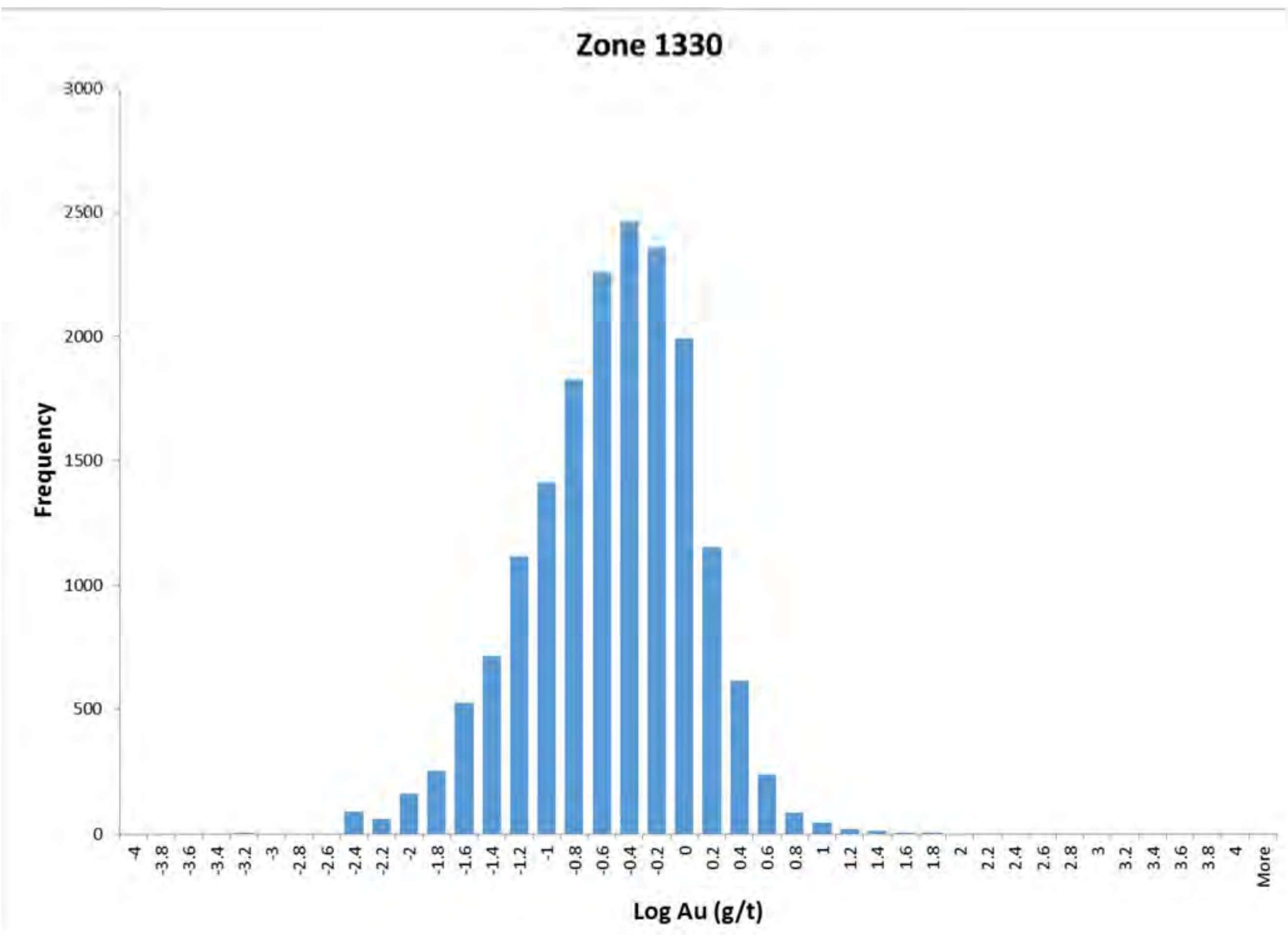

Figure 14.7: Grade histogram - Zone 1330

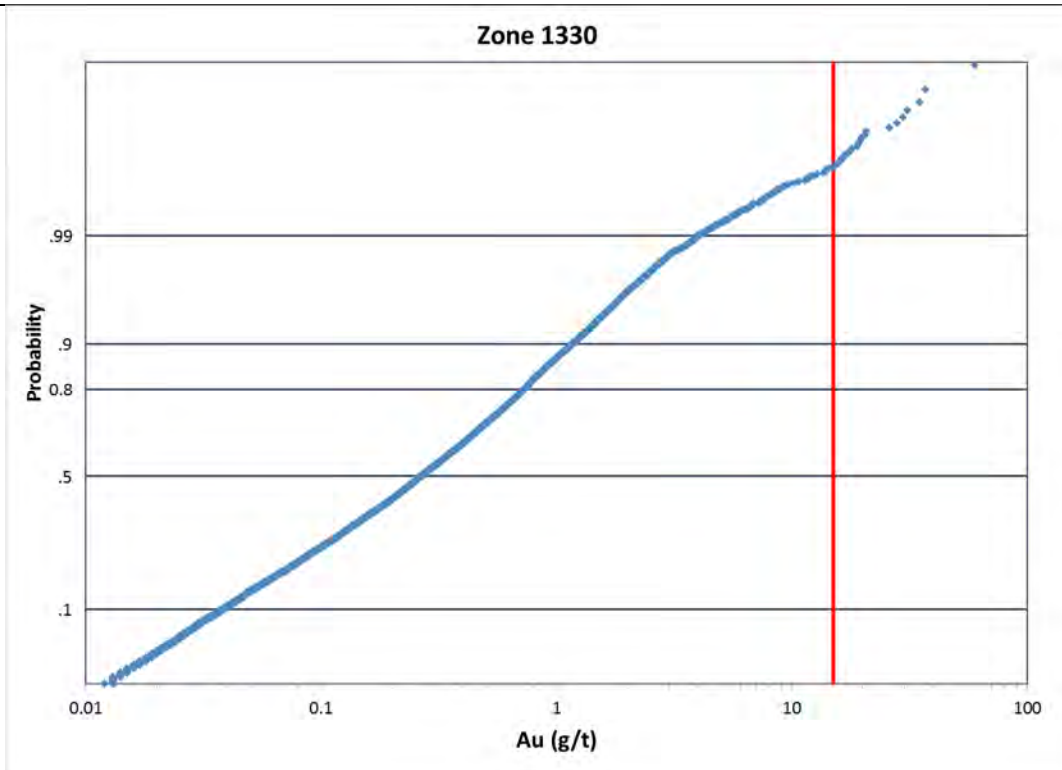

Figure 14.8: Cumulative probability plot - Zone 1330

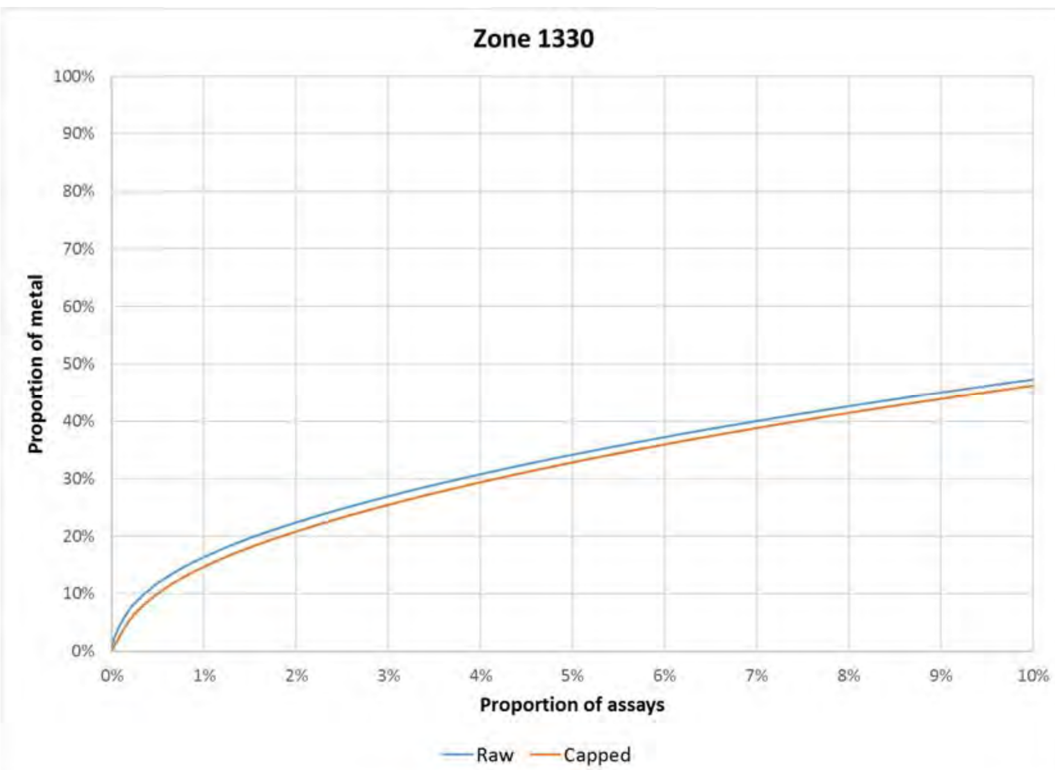

Figure 14.9: Cumulative metal content plot - Zone 1330

14.4 Compositing

MRB examined statistics on the intercept- and sample-length for diamond-drill hole assays. ***Figure 14.10*** presents a histogram of sample length for the mineralized zones and lithological envelopes, and shows that most of the sample lengths are close to 1.0 metre.

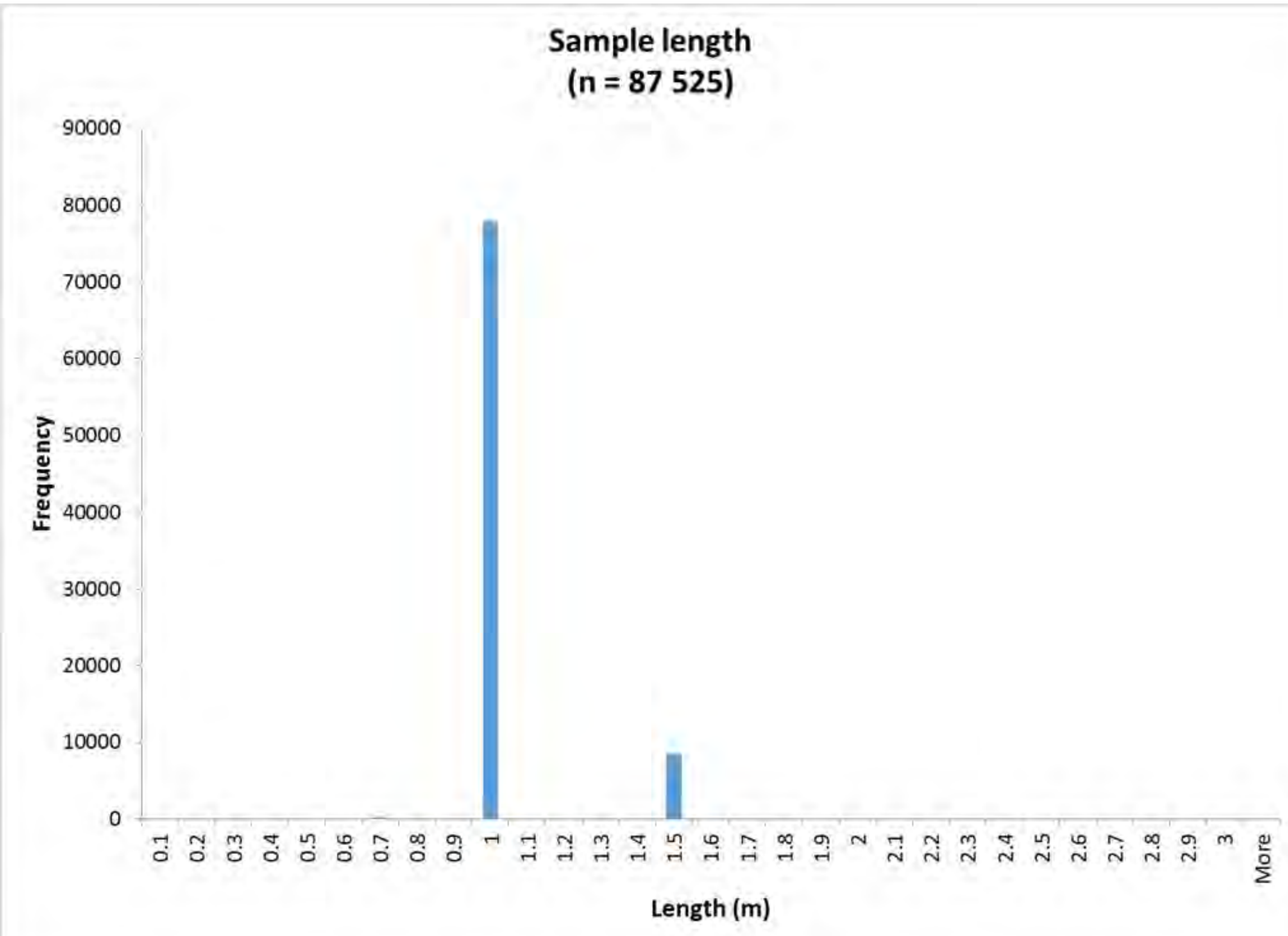

Figure 14.10: Sample length histogram

Table 14.3 presents a summary of the intercept length statistics that led to the selection of a 3 metres composite length for the Central and Buffalo sectors. A 2 metres composite length was used for the Hasaga sector, as two of the zones (zones 1515 and 1525) show an average intercept length of less than 10 metres.

Compositing was applied to both ddh samples and channel samples, ensuring equal sample support for variography and grade interpolation.

Table 14.3: Summary statistics for intercepts length

Sector	Zone	Number of intercepts	Average Length (m)
Buffalo	1210	19	37.60
	1220	16	13.31
	1230	18	11.01
Central	1310	35	13.13
	1320	16	19.13
	1330	91	197.82
	1340	13	53.23
Hasaga	1510	91	72.58
	1515	78	7.80
	1520	96	11.71
	1525	19	5.59
	1530	23	13.63
	1540	5	11.00
Envelope	2399	257	124.22
	2599	437	95.31
	2699	16	121.33
	2799	4	55.67

For each of the thirteen (13) mineralized zones and four (4) lithological envelopes, length-weighted composites were calculated from the beginning of the respective intercepts. A 0.0 gpt Au grade was used to populate un-sampled intervals within drill-hole and channel-sample intercepts. After compositing, residual composites less than 1.5 m for Central and Buffalo sectors, and less than 1.0 m for the Hasaga Sector, were discarded to prevent short-sample bias.

14.5 Specific Gravity

Table 14.4 presents a summary of the specific gravity (S.G.) measurements conducted on drill-core from the mineralized zones and their lithological envelopes. The average specific gravity for each zone was used in the block model. As there are no S.G. values recorded for Zone 1525, a specific gravity of 2.74 t/m^3, representing the average of the closest neighbouring zone (i.e., zone 1520), was used.

Table 14.4: Summary Statistics for Specific Gravity Determinations

Sector	Zone	Number of S.G.	Average S.G. (t/m^3)
Buffalo	1210	31	2.75
	1220	7	2.71
	1230	9	2.71
Central	1310	11	2.83
	1320	10	2.71
	1330	311	2.72
	1340	5	2.75
Hasaga	1510	82	2.72
	1515	6	2.77
	1520	16	2.74
	1525	0	-----
	1530	4	2.79
	1540	2	2.72
Envelope	2399	723	2.72
	2599	792	2.77
	2699	19	2.76
	2799	8	2.72

14.6 Variography

MRB studied the spatial distribution of diamond-drill hole composite capped grades for the thirteen (13) mineralized zones. Variograms of the capped composite assays were plotted in order to determine the direction of maximum continuity within the constraining solid. For eight (8) of the mineralized zones, the variograms were conclusive, and were modelled with a nugget effect and one (1) spherical structure to provide information for the determination of search ellipsoid parameters (***Figure 14.11***).

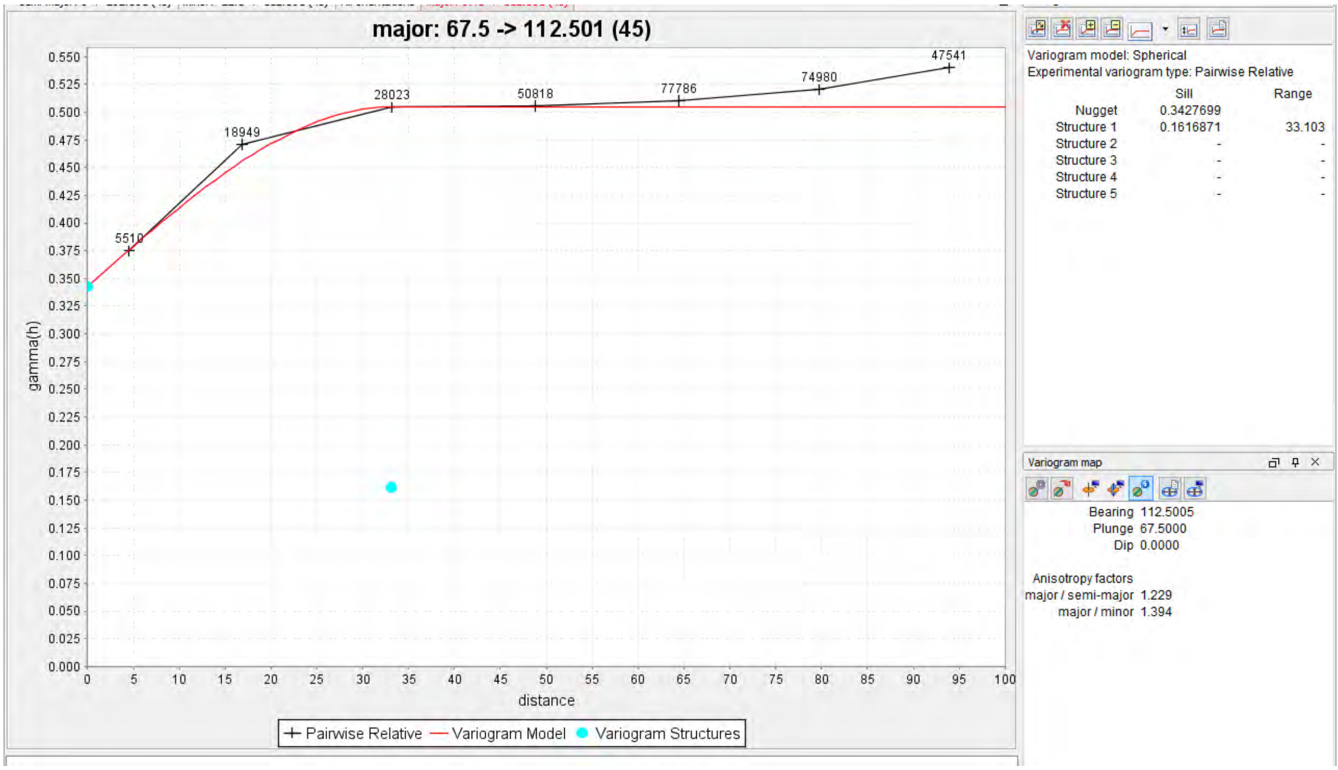

Figure 14.11: Variogram for the major axis - Zone 1330

Table 14.5 presents a summary of the variographic study.

Table 14.5: Summary of Variographic Study

Domain	Zones	Orientation of elipsoid			Dimension of elipsoid(m)			Modelization	
		A	D	A	Major	Semi Major	Minor	Nugget (C0)	Sill total
Buffalo	1210	68	63	286	18.4	18.4	8.0	1.28	2.51
	1220	90	44	290	27.7	27.7	4.1	1.79	4.79
	1230	---	---	---	---	---	---	---	---
Central	1310	155	11	335	43.2	23.7	12.3	0.47	0.90
	1320	160	-34	340	37.3	7.9	4.8	0.30	0.70
	1330	113	68	203	33.1	26.9	23.7	0.34	0.50
	1340	---	---	---	---	---	---	---	---
Hasaga	1510	250	-32	39	35.9	21.4	17.2	0.47	0.70
	1515	205	75	67	54.0	19.6	13.2	0.37	1.17
	1520	240	11	60	49.7	14.4	14.4	0.42	0.79
	1525	---	---	---	---	---	---	---	---
	1530	---	---	---	---	---	---	---	---
	1540	---	---	---	---	---	---	---	---

14.7 Block Modelling

A block model was constructed using parameters that encompassed all mineralized zones and representative open pit shells (***Table 14.6***). The selected block dimensions (5 m x 5 m x 5 m) were based on: 1) the size of the mineralized zone; 2) the drilling pattern, and; 3) the proposed mining method. The model is parallel to the coordinate system (i.e., no rotation).

Table 14.6: Block model parameters

	UTM-X (Easting)	UTM-Y (Northing)	Z (Elevation)
Origin	439570	5650570	450
Block dimensions	5 m	5 m	5 m
Number of blocks	544	450	130

A multi-folder volume percent was established that reflected the proportion of each block within every constraining solid (i.e., mineralized zones, lithological envelopes, overburden). A rock code of “200” was assigned to the overburden solid, whereas a rock code matching the zone-designation was attributed to the other solids. The blocks were coded using the solid rock code as precedence.

A specific gravity equal to the average S.G. within each solid was attributed to each block.

The block model was manually adjusted to take into account the presence of underground openings (i.e., developed levels and stopes), by coding these void areas as "depleted blocks", fixing the grade of these areas at 0.0 g/t Au, and assigning a specific gravity of 2.0 t/m^3. Any block that fully or partly intersected an underground void was coded as “depleted”.

For the Hasaga Sector, a bounding “envelope” was designed to encompass the stope openings, and any block within the area where this “envelope” intersected the Zone 1520 solid, was also classified as “depleted”.

14.8 Grade Interpolation

The interpolation parameters used for the mineralized zones of the Hasaga Project are summarized in ***Table 14.7***. The interpolation profiles estimate gold grades separately for each mineralized zone using five passes informed by core- and channel-sample capped composites. A hard boundary was used between the constraining solids. The ID^2 method of interpolation was selected for the Mineral Resource Estimate.

The first pass uses an ellipsoid with its dimension and orientation defined by the variography. The dimension and orientation of the Zone 1230 ellipsoid corresponds to Zone 1210. For zones 1525, 1520 and 1540, the orientation of the ellipsoid corresponds to Zone 1525, and the dimensions of their ellipsoids to Zone 1520. The interpolation uses an octant search with a minimum of 3 octants, each containing between one and four composites. A search ellipse restricted to half of the dimension defined by the variography is also used. The interpolation uses a minimum of 10 and a maximum of 30 composites, with a maximum of 4 composites per hole.

The second pass uses the same ellipsoid, octant, and restricted search parameters as the first pass. This interpolation uses a minimum of 5 and a maximum of 16 composites with a maximum of 2 composites per hole.

The third pass uses the same ellipsoid orientation as the two first passes, but the ellipsoid dimensions are doubled. This interpolation uses the same restricted search parameters as the first pass, and an octant search with a minimum of 2 octants, each containing between one and four composites. This interpolation uses a minimum of 10 and a maximum of 30 composites, with a maximum of 5 composites per hole.

The fourth pass uses the same ellipsoid as the third pass, and the same restricted search parameters as the first pass. This interpolation uses a minimum of 10 and a maximum of 30 composites, with a maximum of 5 composites per hole.

The fifth pass uses the same ellipsoid as the third pass, and the same restricted search parameters as the first pass. This interpolation uses a minimum of 1 and a maximum of 16 composites, with a maximum of 2 composites per hole.

Table 14.7: Interpolation Parameters for Mineralized Zones

Sector	Zone	Pass	Orientation of ellipsoid			Dimension of ellipsoid (m)			High grade restriction
			Z	X	Z	Major	Semi Major	Minor	Au (gpt)
Buffalo	1210	1	-10	75	68	30	22	15	4.8
		2	-10	75	68	30	22	15	4.8
		3	-10	75	68	60	45	30	4.8
		4	-10	75	68	60	45	30	4.8
		5	-10	75	68	60	45	30	4.8
	1220	1	-10	80	45	30	22	15	4.5
		2	-10	80	45	30	22	15	4.5
		3	-10	80	45	60	45	30	4.5
		4	-10	80	45	60	45	30	4.5
		5	-10	80	45	60	45	30	4.5
	1230	1	-10	75	68	30	22	15	1.5
		2	-10	75	68	30	22	15	1.5
		3	-10	75	68	60	45	30	1.5
		4	-10	75	68	60	45	30	1.5
		5	-10	75	68	60	45	30	1.5
Central	1310	1	-65	90	10	68	38	22	3.0
		2	-65	90	10	68	38	22	3.0
		3	-65	90	10	135	75	45	3.0
		4	-65	90	10	135	75	45	3.0
		5	-65	90	10	135	75	45	3.0
	1320	1	-65	90	10	68	38	22	3.0
		2	-65	90	10	68	38	22	3.0
		3	-65	90	10	135	75	45	3.0
		4	-65	90	10	135	75	45	3.0
		5	-65	90	10	135	75	45	3.0
	1330	1	-20	90	70	52	38	38	5.5
		2	-20	90	70	52	38	38	5.5
		3	-20	90	70	105	75	75	5.5
		4	-20	90	70	105	75	75	5.5
		5	-20	90	70	105	75	75	5.5
	1340	1	30	38	-22	52	38	38	4.0
		2	30	38	-22	52	38	38	4.0
		3	30	38	-22	105	75	75	4.0
		4	30	38	-22	105	75	75	4.0
		5	30	38	-22	105	75	75	4.0

Sector	Zone	Pass	Orientation of ellipsoid			Dimension of ellipsoid (m)			High grade restriction
			Z	X	Z	Major	Semi Major	Minor	Au (gpt)
Hasaga	1510	1	30	-75	-35	52	30	22	7.0
		2	30	-75	-35	52	30	22	7.0
		3	30	-75	-35	105	60	45	7.0
		4	30	-75	-35	105	60	45	7.0
		5	30	-75	-35	105	60	45	7.0
	1515	1	25	-80	-80	75	22	22	6.0
		2	25	-80	-80	75	22	22	6.0
		3	25	-80	-80	150	45	45	6.0
		4	25	-80	-80	150	45	45	6.0
		5	25	-80	-80	150	45	45	6.0
	1520	1	30	90	-15	75	22	22	4.5
		2	30	90	-15	75	22	22	4.5
		3	30	90	-15	150	45	45	4.5
		4	30	90	-15	150	45	45	4.5
		5	30	90	-15	150	45	45	4.5
	1525	1	35	90	-15	75	22	22	6.0
		2	35	90	-15	75	22	22	6.0
		3	35	90	-15	150	45	45	6.0
		4	35	90	-15	150	45	45	6.0
		5	35	90	-15	150	45	45	6.0
	1530	1	35	90	-15	75	22	22	5.0
		2	35	90	-15	75	22	22	5.0
		3	35	90	-15	150	45	45	5.0
		4	35	90	-15	150	45	45	5.0
		5	35	90	-15	150	45	45	5.0
	1540	1	30	90	-15	75	22	22	2.0
		2	30	90	-15	75	22	22	2.0
		3	30	90	-15	150	45	45	2.0
		4	30	90	-15	150	45	45	2.0
		5	30	90	-15	150	45	45	2.0

For the Dome lithological envelope, the interpolation uses only one pass, with the restricted search parameters of Zone 1330, and the dimension and orientation of the largest ellipsoid used for Zone 1330. This interpolation uses a minimum of 10 and a maximum of 30 composites, with a maximum of 5 composites per hole. The other envelopes (ie. Hasaga, Howey and Confederation) were not interpolated due to the absence of any high-grade Au intercepts.

14.9 Validation

The resulting block model was validated by visually comparing the estimated block grades with the capped-composite grades in cross-section and plan views. In general, a good correlation was observed between block grades and neighbouring composites.

A comparison of the average composite grade with the average of the interpolated blocks, at a 0.0 g/t Au cut-off, within each mineralized zone (***Table 14.8***), shows that the average block grade is typically comparable to, or lower than, the average composite grade.

Table 14.8: Interpolation Parameters

Sector	Zone	Number of composites	Composite average	Number of blocks	Block average
Buffalo	1210	242	1.195	11469	0.942
	1220	69	0.908	3287	0.539
	1230	67	0.431	3945	0.323
Central	1310	151	1.032	14880	0.838
	1320	116	0.511	5166	0.428
	1330	5816	0.524	497088	0.501
	1340	231	0.430	34599	0.390
Hasaga	1510	3241	0.630	138585	0.549
	1515	316	0.638	26281	0.564
	1520	576	0.580	38904	0.586
	1525	54	0.610	1984	0.396
	1530	160	0.839	10965	0.719
	1540	29	0.857	4955	0.767

East-west and vertically oriented swath plots were generated to compare the average composite grade with the average block grades, within the resource pit shell. The results of the east-west swath plot for the Central Sector pit (***Figure 14.12***), shows that the average block grade is close to the average composite, and shows the smoothing effect of the interpolation process.

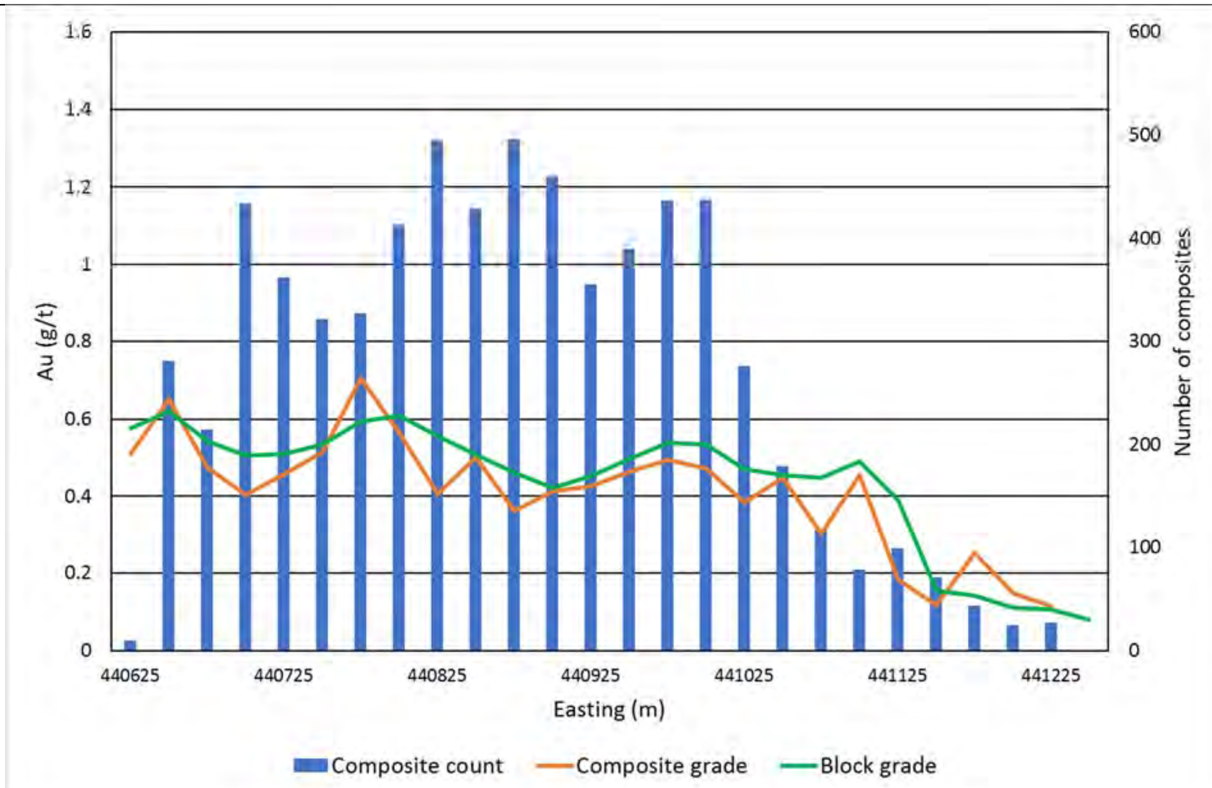

Figure 14.12: East-west swath plot of the Central Sector pit

14.10 Classification

Mineral resource in this report are classified in compliance with definitions published by the Canadian Institute of Mining, Metallurgy and Petroleum in their document "*CIM Definition Standards for Mineral Resources and Reserves*" published in 2014 (www.cim.org).

> *A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction.*
>
> *The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.*
>
> *An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.*
>
> *An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.*
>
> *A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.*

Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

By default, all the interpolated blocs were assigned to the Inferred Mineral Resource category during the creation of the block model. The reclassification to Indicated Mineral Resource category was executed by the method described below:

For zones 1210, 1220, 1230, 1310, 1340, 1510, 1520, 1525 and 1540, an area containing a majority of blocs interpolated during the first three passes was created in longitudinal section. Blocks within that area were re-coded as Indicated Resources, whereas blocs outside that area were re-coded as Inferred Resources.

For zone 1330, an area containing a majority of blocs interpolated during the first three passes was created on a series of level plans. These areas were used to build a 3D solid, and blocks within that solid were re-coded as Indicated Mineral Resources, whereas blocs outside that solid were re-coded as Inferred Mineral Resources, based on the 50/50 rule.

For zones 1320 and 1530, the density of information was not considered sufficient to re-classify any parts of these zones as Indicated Mineral Resources, so the category of all the blocks was maintained as Inferred.

For the Dome lithological envelope, the density of information was not considered sufficient to categorize any part as an Indicated Mineral Resource. Only those blocks interpolated in the first pass, and informed by at least six (6) diamond-drill holes, were coded as Inferred Mineral Resources.

14.11 Mineral Resources Estimate

Pit shells were generated using GEOVIA Whittle™ software to constrain the mineral resources that have a prospect of economic extraction, as defined by the CIM Definition Standards on Mineral Resources and Reserves. The parameters used to generate the hypothetical pits using the 3D block model were:

- pit slope of 55° in rock, and 30° in overburden;
- mining costs of $2.50 per tonne of rock or overburden, including:
  - mining recovery 100%;
  - mining dilution 0%;
- processing costs of $15.00 per tonne of ore processed, including:
  - $12.00 for processing and
  - $3.00 for G&A
  - 94% gold recovery
- long term price of gold at $1820 ($1,400 USD; 1.30 exchange rate) per troy ounce refined;
- selling costs of $43.00 CAD per troy ounce refined.
- processing limits of 15,000 tonnes of ore per day;

MRB considers it appropriate to report the mineral resources at a cut-off grade of 0.5 gpt Au.

The reader is cautioned that the results from the pit optimization are used solely for the purpose of testing the “reasonable prospects for economic extraction” by an open pit and do not represent an attempt to estimate mineral reserves. There are no defined mineral reserves on the Hasaga Project.

The modelled pit shells were not constrained by the Property boundaries; however, the resource calculations were constrained by the Property boundary limits (***Figure 14.13***).

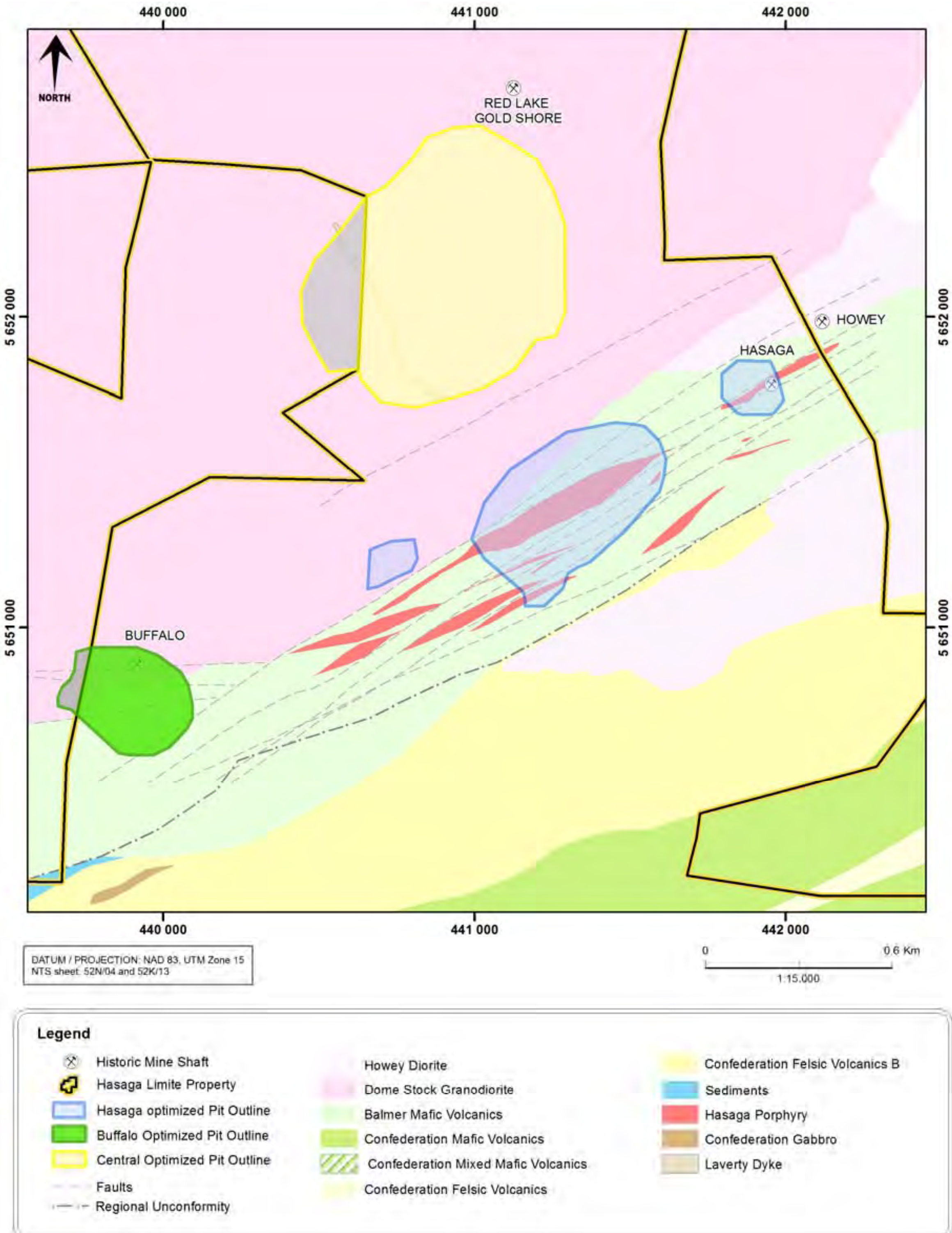

Figure 14.13: Hasaga Project showing modelled pit-shell outlines for Central, Hasaga and Buffalo sectors

Table 14.8 presents the Mineral Resource Estimates for the Hasaga Project that were calculated using a cut-off grade of 0.5 gpt Au.

MRB is not aware of any known environmental, permitting, legal, title-related, taxation, socio-political, marketing or other relevant issue that could materially affect this Mineral Resource Estimate.

Table 14.9: Mineral Resource estimate at 0.5 gpt Au cut-off

Sector	Indicated			Inferred		
	Tonnes ('000t)	Grade (Au g/t)	Gold (Oz)	Tonnes ('000t)	Grade (Au g/t)	Gold (Oz)
Central	31,613	0.79	803,900	23,733	0.76	582,700
Hasaga	9,050	0.89	258,100	806	1.00	26,000
Buffalo	1,632	1.18	61,900	604	1.12	21,800
TOTAL	42,294	0.83	1,123,900	25,143	0.78	630,500

- Independent Qualified Persons for the Hasaga Mineral Resources Estimate (MRE) are Abderrazak Ladidi P.Geo and Vincent Jourdain, P. Eng., Ph.D of MRB & Associates. The effective date of the estimate is December 30th, 2016;
- CIM definitions were followed for calculations of mineral resources;
- mineral resources that are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues;
- the MRE includes 13 mineralized zones (4 in Central Sector, 6 in Hasaga Sector and 3 in Buffalo Sector), and 2 lithological (rock-type) envelopes;
- high gold assays were capped at 15 gpt Au;
- bulk density data were averaged on a per zone basis: zones 1220, 1230 and 1320 at 2.71 t/m3; zones 1330, 1510, 1540 and 2399 at 2.72 t/m3; zones 1520 and 1525 at 2.74 t/m3; zones 1210 and 1340 at 2.75 t/m3; zones 1515 and 2599 at 2.77 t/m3; zone 1530 at 2.79 t/m3, and; zone 1310 at 2.83 t/m3);
- resources were evaluated from drill-hole and channel samples using a 5-pass ID2 interpolation in a block model (block size = 5 x 5 x 5 metres);
- open pit resources are constrained to the property limit in an optimized pit-shell at a cut-off grade of 0.5 gpt Au;
- pit shell optimization parameters: Mining cost = 2.5 $CAD/t; milling cost = 12.0 $CAD/t; G&A = 3.0 $CAD/t; Gold price =1,400 $US/oz (exchange rate 1.3 $CAD = 1 $US); milling recovery = 94%; mining recovery = 100%; mining dilution = 0.0%; pit slope = 55°
- Totals may not add correctly due to rounding

Section and plan views showing the modelled Indicated and Inferred category resource blocks in the Central, Hasaga and Buffalo pits are shown in of ***Figures 14.14 through 14.20***.

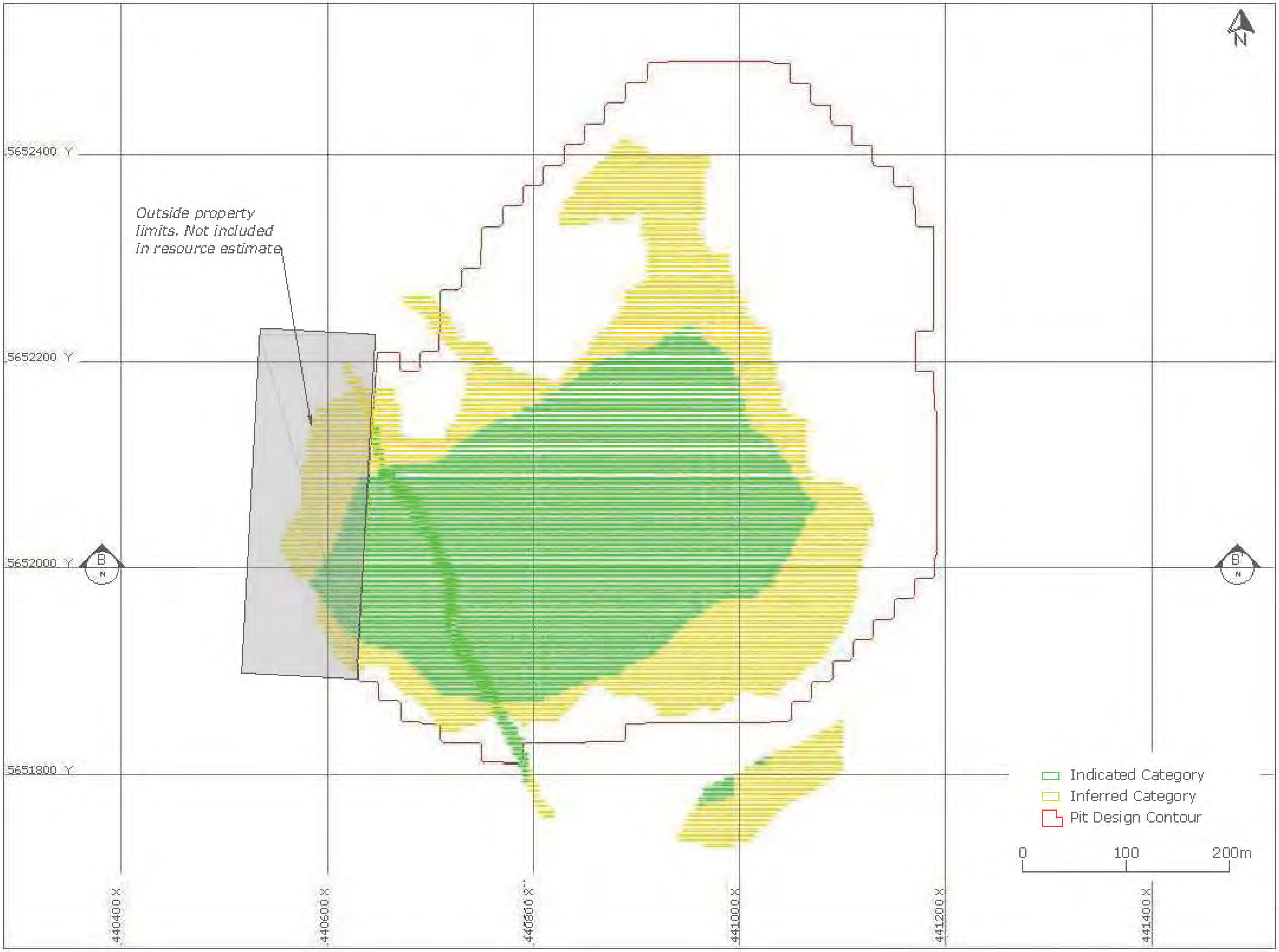

Figure 14.14: Plan view (elevation 270 m) showing categorized Mineral Resources and pit-shell outline - Central Sector

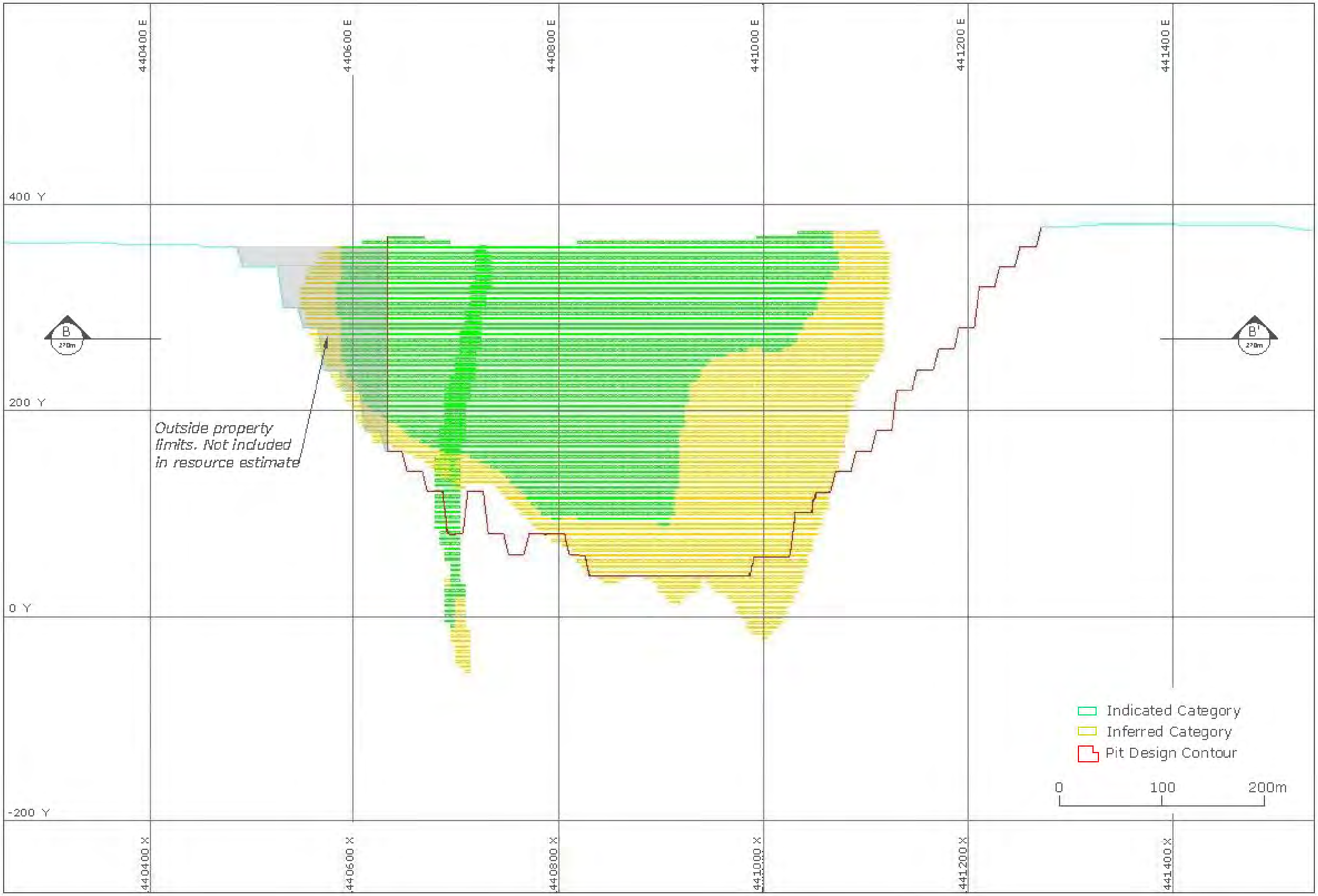

Figure 14.15: Section view (B-B' in Figure 14.13; 5,652,000 N) showing categorized Mineral Resources and pit-shell outline - Central Sector

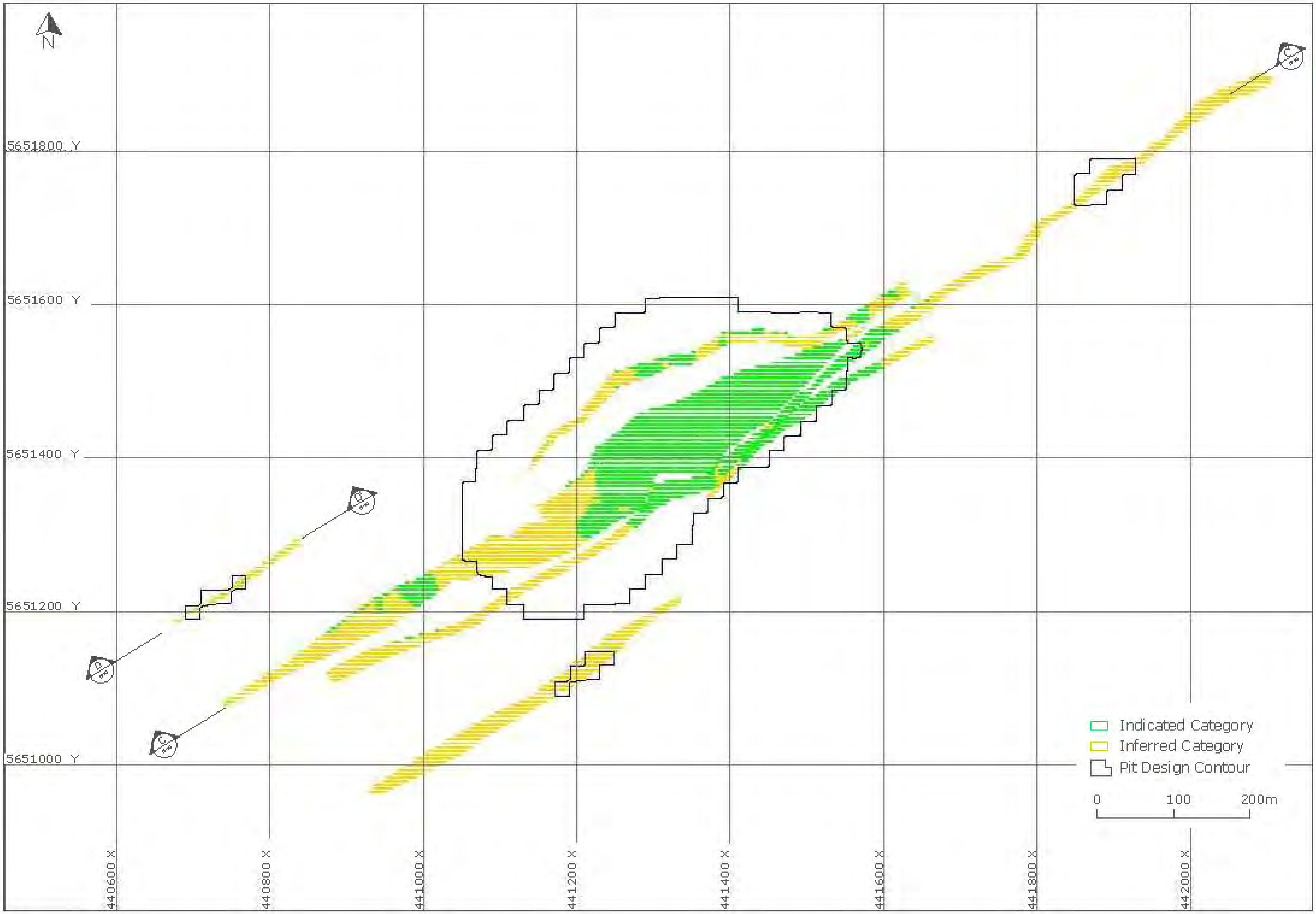

Figure 14.16: Plan view (elevation 330 m) showing categorized Mineral Resources and pit-shell outline - Hasaga Sector

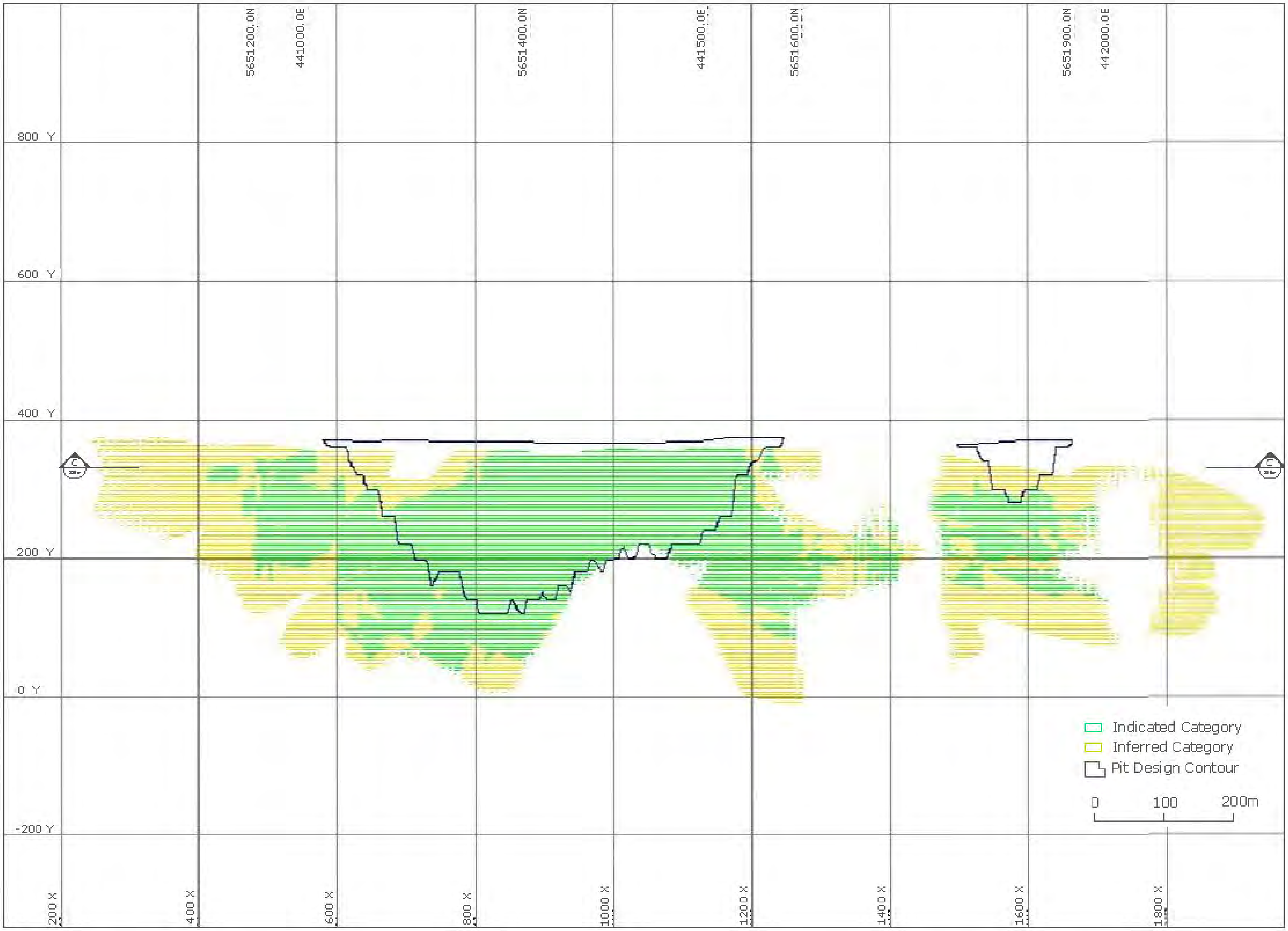

Figure 14.17: Section view (C-C' on Figure 14.15) showing categorized Mineral Resources and pit-shell outline - Hasaga Sector

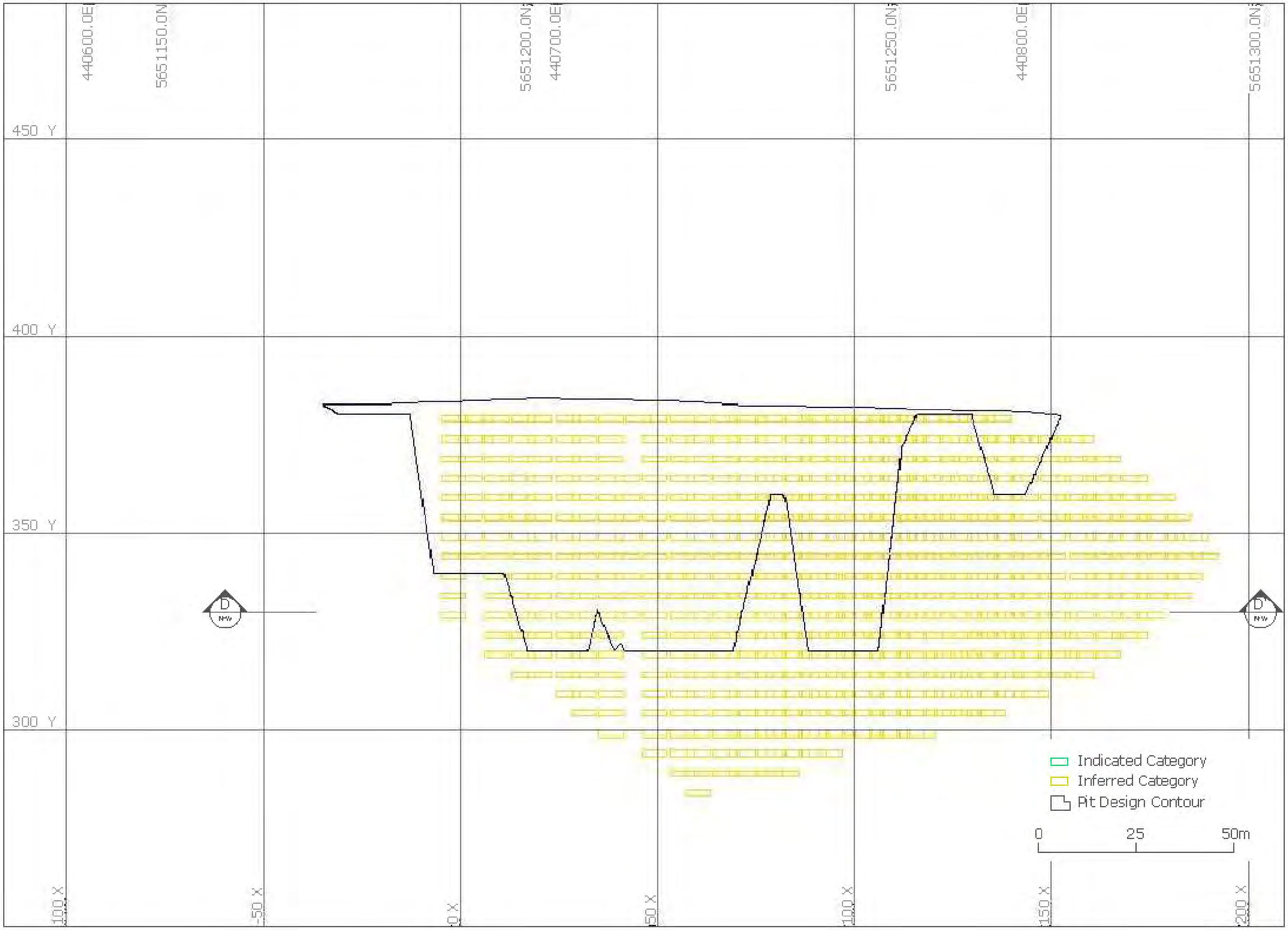

Figure 14.18: Section view (D-D' on Figure 14.15) showing categorized Mineral Resources and pit-shell outline - Hasaga Sector

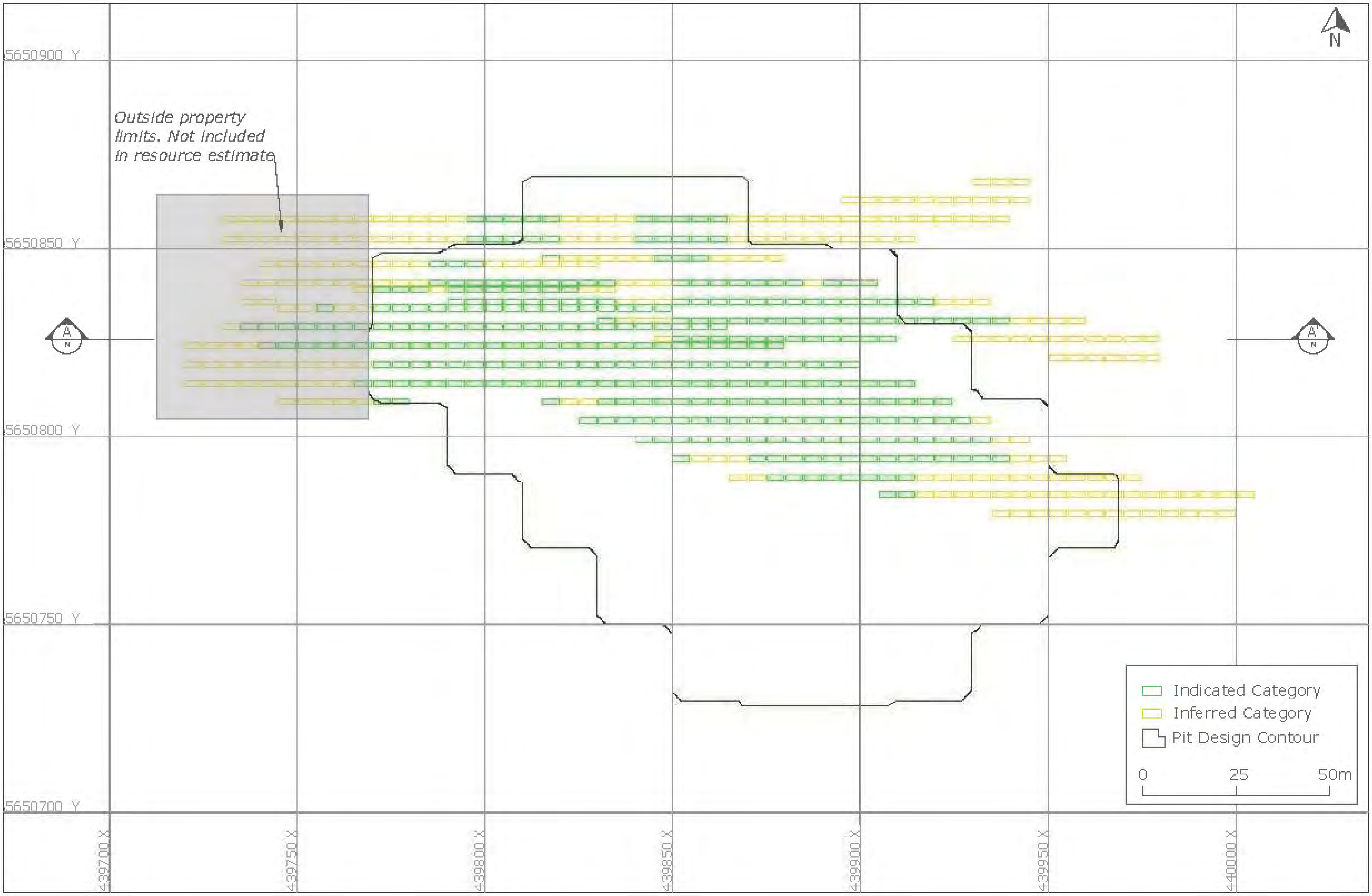

Figure 14.19: Plan view (elevation 250 m) showing categorized Mineral Resources and pit-shell outline - Buffalo Sector

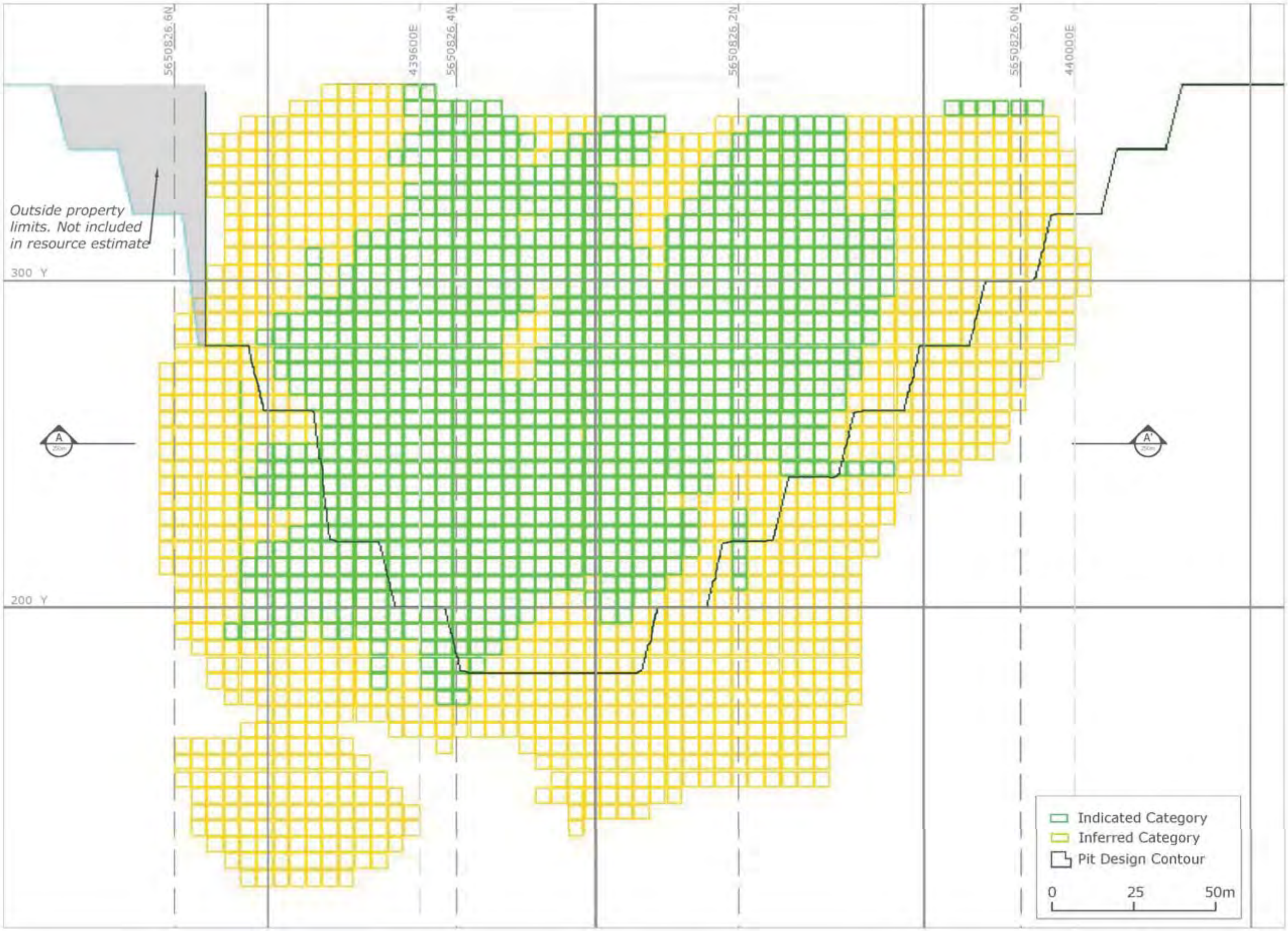

Figure 14.20: Section view (A-A' in Figure 14.18; 5,650,827 N) showing categorized Mineral Resources and pit-shell outline - Buffalo Sector

A sensitivity analysis of the in-pit resources was completed for different gold cut-off grades. ***Table 14.10*** presents the block model quantities and grade estimates at different cut-off grades for Indicated and Inferred resources respectively. The reader is cautioned that the numbers presented in ***Table 14.10*** should not be misconstrued as a statement of mineral resources.

Table 14.10: Sensitivity of Mineral Resource to Cut-off Grade

Cut-off (Au g/t)	Indicated			Inferred		
	Tonnes ('000t)	Grade (Au g/t)	Gold (Oz)	Tonnes ('000t)	Grade (Au g/t)	Gold (Oz)
>1.0	8,367	1.37	369,500	4,045	1.39	180,500
>0.9	11,687	1.25	470,600	5,383	1.28	221,200
>0.8	16,398	1.14	598,800	7,644	1.15	282,700
>0.7	22,853	1.03	754,000	11,177	1.02	367,700
>0.6	31,334	0.92	930,800	16,326	0.90	474,500
>0.5	42,294	0.83	1,123,900	25,143	0.78	630,500
>0.4	56,366	0.73	1,327,000	36,320	0.68	791,500
>0.3	70,821	0.65	1,490,000	49,589	0.59	940,100
>0.20	81,969	0.60	1,581,000	60,177	0.53	1,026,300

15.0 ADJACENT PROPERTIES

Two properties of note (North Madsen and Madsen) are adjacent to the Hasaga Project, though neither are owned by Premier Gold (***Figure 15.1***). Both have current or recently active exploration programs for similar styles of gold mineralization as the Hasaga Project.

As at the date of this Report, the Authors are not aware of any other significant exploration activities underway on other properties adjacent to the Hasaga Project.

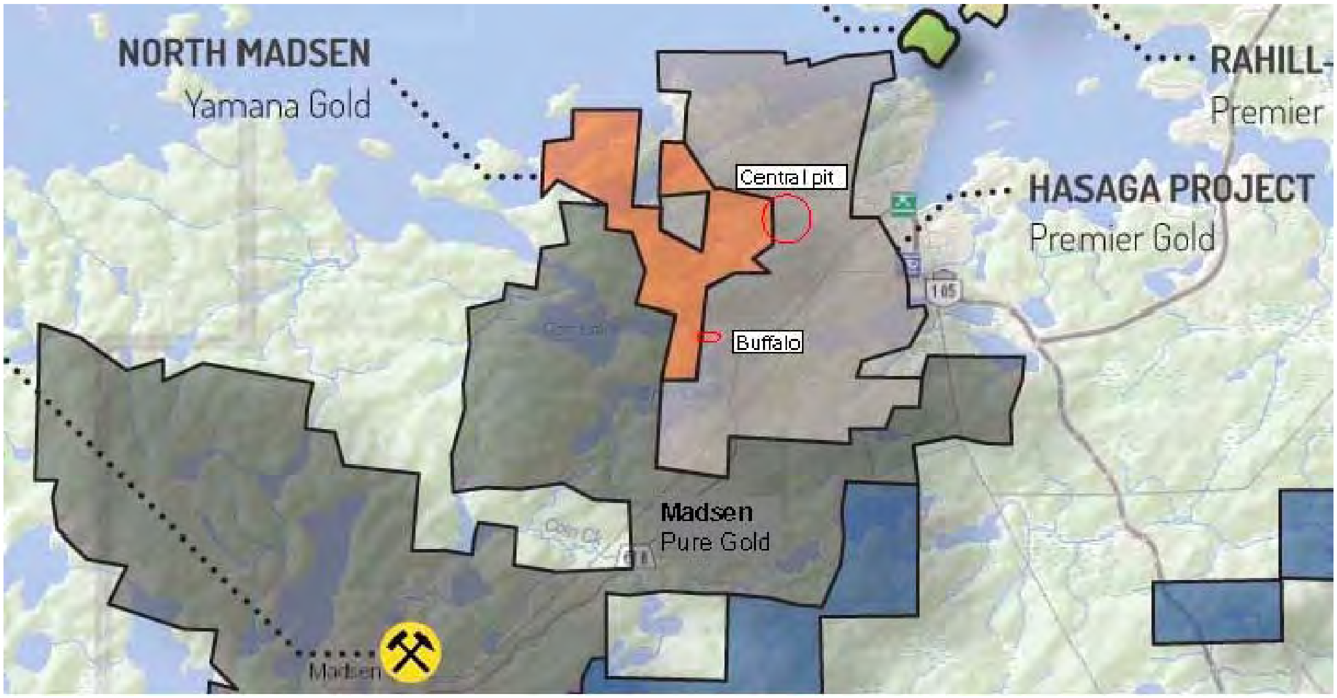

Figure 15.1: Overview of Hasaga Project area showing adjacent land holdings of Yamana Gold Inc. (North Madsen property) and Pure Gold Mining Inc. (Madsen property). Modified from Abitibi Royalties Inc. http://abitibiroyalties.com/maps/rzz-madsen.jpg

North Madsen Property

Yamana Gold Inc. owns the North Madsen property directly west of the Hasaga Project. The optimized pit outlines for Premier Gold's Central and Buffalo pits extend onto the North Madsen property.

Mega Precious Metals (former owners of the property) carried out exploration programs on three zones in the two areas adjacent to Premier Gold's Central and Buffalo sectors. The area adjacent to the Central Sector comprises the Laverty Main Zone and the Laverty Dyke Zone - located surrounding and southeast of the Laverty Dyke. The area adjacent to Premier Gold's Buffalo Sector comprises the Buffalo Extension Zone - located west of the former Buffalo Mine (see ***Figure 15.1***).

Mineralization in the Laverty Main Zone is the same as in the Central Sector, occurring in two distinct forms: 1) structurally hosted within sheared granodiorite (the Dome Stock), and; 2) in quartz-tourmaline veins. Mineralization hosted by the sheared granodiorite is present throughout the Laverty Main Zone, whereas mineralized quartz-tourmaline veins are only locally common in the eastern half of the Laverty Main Zone.

Similar to the mineralization around that part of the Laverty Dyke underlying Premier Gold's ground (***Figure 15.2***), the mineralization in the Laverty Dyke Zone is characterized by very fine grained native gold residing in silicate minerals, and occasionally in trace base metal sulphide minerals. The majority of the gold is located near the contact between the dyke and the granodiorite, as well as locally in the granodiorite near the dyke.

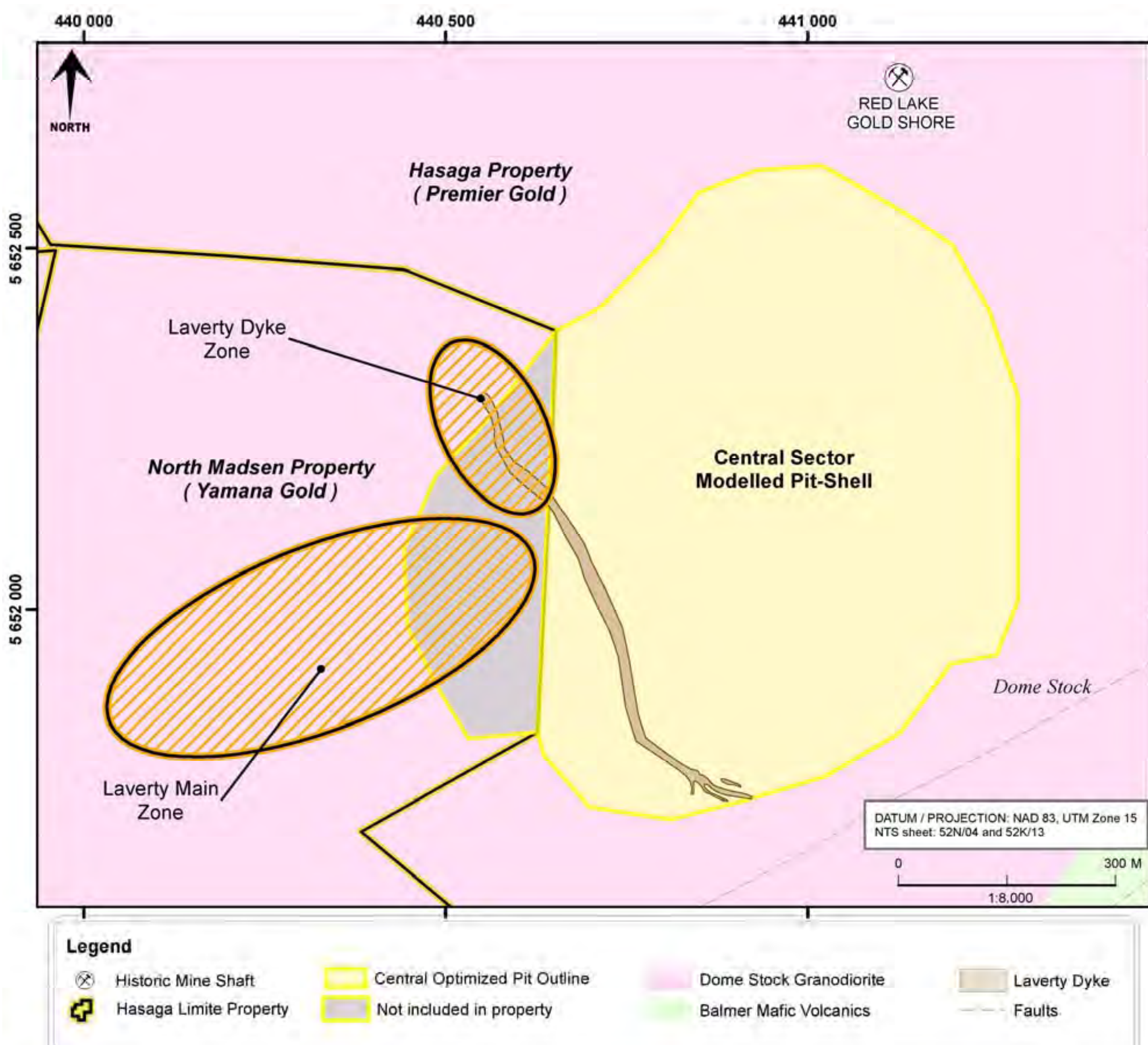

Figure 15.2: Approximate extent of delineated mineralized zones underlying Yamana Gold's North Madsen property, and the limit of Premier Gold's Central Sector modelled pit-shell

Mineralization underlying the Buffalo Extension Zone (***Figure 15.3***) is found disseminated throughout the granodiorite, and within quartz-tourmaline veins that are locally common in the granodiorite. Mineralization is restricted to the granodiorite and is not observed in the Balmer Assemblage rocks to the south of the zone.

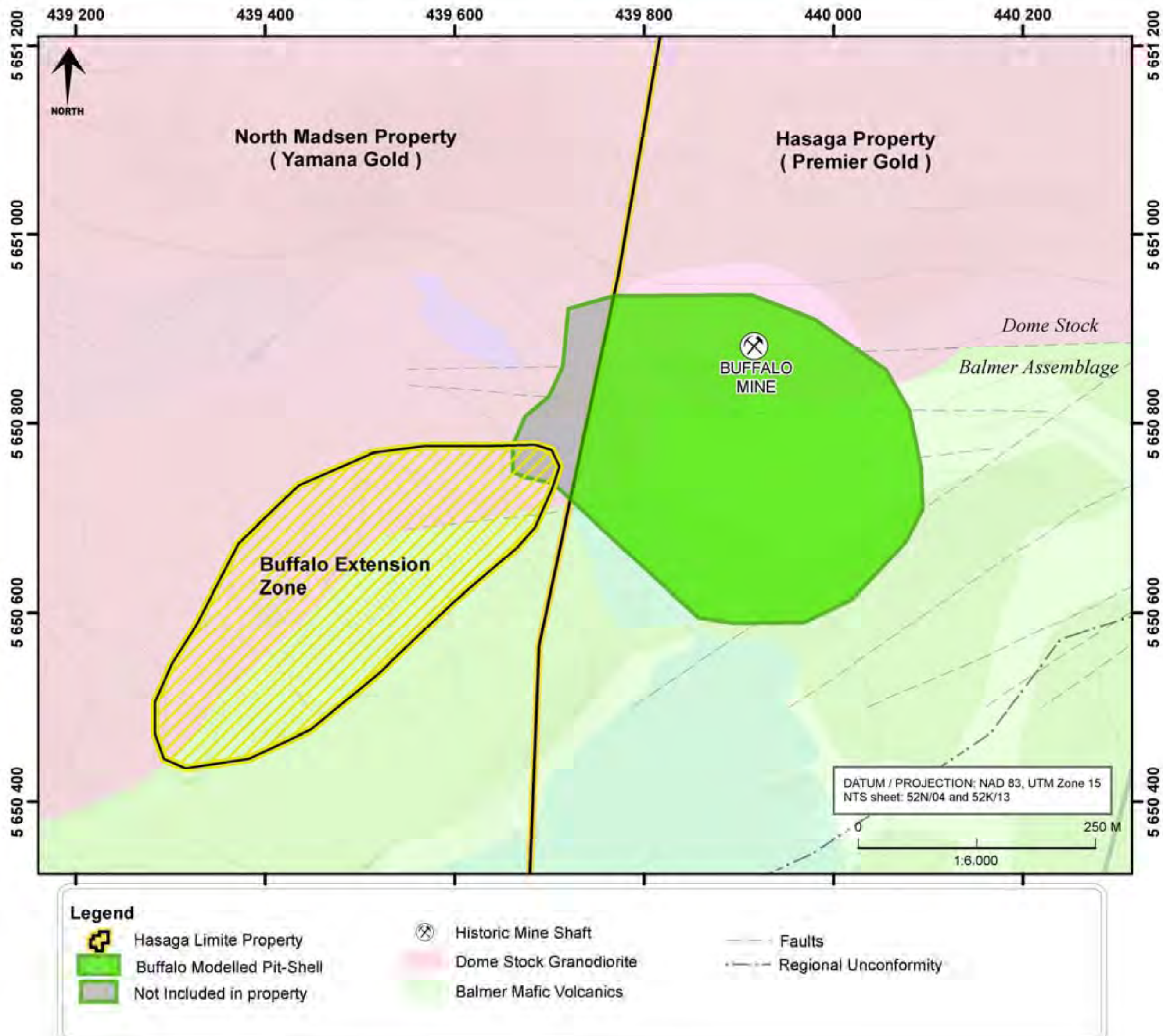

Figure 15.3: Approximate extent of mineralized Buffalo Extension zone underlying Yamana Gold's North Madsen property, and the limit of Premier Gold's Buffalo Sector modelled pit-shell

Combined NI 43-101 mineral resource estimates from the three mineral zones (Laverty Main Zone, Laverty Dyke Zone and Buffalo Extension Zone) using a cut-off grade of 0.5 gpt Au, are presented in ***Table 15.1*** (McCracken and Harder, 2011).

Table 15.1: Mineral Resources* - Madsen North Property (McCracken & Harder, 2011).

Category	Tonnage	Au (gpt)	Au (oz)
Inferred	11,487,000	1.03	380,396
Measured	19,638,140	1.27	801,855
Indicated	3,837,900	1.08	133,263
Measured + Indicated	23,476,040	1.24	935,118

**** The Authors (Qualified Persons) have not verified the accuracy of the resource information and this information is not necessarily indicative of the mineralization on the Hasaga Project.***

Madsen Property

Pure Gold Mining Inc. owns the Madsen Gold Project directly south of the Hasaga Project and host to the Madsen Mine (closed), some 5 km southwest of the closed Buffalo Mine (see ***Figure 15.1***), which operated for over 36 years with historic production of 2.5 million ounces at an average grade of 9.9 gpt gold.

The Madsen Gold Project has NI 43-101 published resources* that comprise an Indicated Resource of 928,000 ounces gold at 8.93 gpt gold in 3.24 million tonnes, and an Inferred Resource of 297,000 ounces gold at 11.74 gpt gold in 0.79 million tonnes (Cole et al., 2016). The Madsen Gold Project hosts a permitted mill and tailings facility, and access to power, water and labour.

**** The Authors (Qualified Persons) have not verified the accuracy of this resource information, and this information is not necessarily indicative of the mineralization on the Hasaga Project.***

16.0 OTHER RELEVANT DATA AND INFORMATION

The authors are not aware of any additional technical data that might lead an accredited investor to a conclusion contrary to that set forth in this report.

17.0 INTERPRETATION AND CONCLUSIONS

Prior to Premier Gold's 2015-16 drilling campaign at Hasaga, there had not been any comprehensive mineral exploration carried out on the Property for at least 30 years. Despite previous exploration companies being aware of the potential, and the existence of several former gold-producers on the Project, the presence of other large, nearby active deposits made Hasaga a lower priority target that remained essentially inactive until recently.

The objective of Premier Gold's recent drilling program was to define Mineral Resources (as defined under NI 43-101) at three well-known mineralized sectors on the Property: the Central, Hasaga and Buffalo, considered to be favourable areas for exploration and to potentially host significant gold mineralization.

The 2015-16 Hasaga drilling program tested all three of the sectors with a total of 259 drill holes; 96 on the Central Sector, 112 on the Hasaga Sector and 38 on the Buffalo Sector, and was successful in demonstrating widespread shallow mineralization at the Central and Hasaga sector targets.

The 2015-16 Hasaga drilling program was successful in intersecting substantial intervals of economic-grade gold mineralization and in delineating a sizable aggregate potential resource on the Property.

MRB & Associates have prepared a Mineral Resource Estimate in accordance with NI 43-101. Resources were assessed in conformity with generally accepted CIM "Estimation of Mineral Resource and Mineral Reserves Best Practices" guidelines. The effective date of this mineral resource estimate was December 30th, 2016.

Following a detailed review of all relevant information and the completion of the current Mineral Resource Estimate, MRB concludes that the Hasaga Project hosts a total estimated mineral resource of 42.3 Mt grading 0.83 gpt Au (1,123,900 oz) in the Indicated category, and 25.1 Mt grading 0.78 gpt Au (630,500 oz) in the Inferred category. A 0.5 gpt Au cut-off grade was used for the Mineral Resource Estimate calculation.

Mineral resources, which are not mineral reserves, do not have demonstrated economic viability. The mineral resource estimate may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues. Furthermore, the quantity and grade of the estimated Indicated and Inferred Resources reported herein are inexact.

MRB recognizes the strong likelihood of converting Inferred Resources to the Indicated category by additional drilling. Further exploration in the vicinity of the interpreted ore zones could, but would not necessarily, lead to an increase in the overall Mineral Resource Estimate provided that drilling results were successful. There is also a potential for converting Indicated Resource to Measured "open pit" Resource with tighter-spaced infill drilling, geological mapping and channel sampling.

Some risks are recognized at the Hasaga Project. The main risks identified are potential impacts owing to the proximity of: the town of Red Lake itself; Highway 618, which leads to the Madsen area, and; an electrical transmission line. The possibility of Red Lake residents resisting development of the project, and that permitting required to move Highway 618 and the power line could be delayed, can be viewed as potential negative impacts to the Project.

More detailed 3D modelling and interpretation of the Project, combined with infill drilling could lead to an upgrade in the Resource Category, which would have a positive impact on the economic value of the deposit.

The below-pit resource potential, i.e., those potential resources that may exist down-dip of the defined resources and which would have to be accessed using underground mining techniques, have not been evaluated in the current Mineral Resource Estimate. An investigation of these deeper exploration targets and the modelling of these prospective mineralized zones could also have positive impacts on the economic value of the deposit.

Based on the information available and the degree of development of the Project, as at the effective date of this Report, MRB is of the opinion that the Project is sufficiently robust to warrant proceeding to the next phase of project development.

18.0 RECOMMENDATIONS

Phase 1:
On the basis of the current Mineral Resource Estimate, MRB recommends diamond-drilling programs to: 1) enhance drill-hole density within the optimized pit outlines (i.e., definition drilling) and; 2) explore the areas immediate surrounding the pit-outlines. Definition drilling is recommended to upgrade Inferred Resources to an Indicated category, which is required to truly assess the Economic Potential of the project. Near surface exploration drilling in the vicinity of the optimized pit outlines could lead to an increase of the overall Mineral Resource Estimate. The objective of these programs being to provide an updated Mineral Resource Estimate, in the near future.

Surface stripping, mapping and channel sampling should be conducted on areas where known mineralization is expected to outcrop. A better understanding of the gold distribution and its relationship to other geological elements would help demonstrate mineralization and grade continuity.

Integration of the acquired geological data and information into a regional context would help to improve the overall understanding of the Hasaga Property deposits, and also help target other areas of good potential for gold at the property scale. MRB recommends that a comprehensive geological compilation and litho-structural modelling be completed, in a timely fashion, in order to identify discovery opportunities:

Phase2:
Contingent on the positive results of Phase I, MRB recommends that the Phase 2 program investigate the potential for deep (i.e. below-pit) underground high-grade narrow vein mineralization by diamond-drilling. MRB recommends that follow-up exploration drilling be conducted around known, moderately deep, high-grade intercepts in order to assist 3D modelling.

A budget for the recommended work is summarized in ***Table 18.1***.

Table 18.1: Proposed Budget For Phase 1 and Phase 2 Recommended Exploration Work

Phase 1	**Drilling (metres)**	**Cost / metre**	**Budget**
Data compilation and integration, generation of 3D model			$100,000
Surface stripping, mapping and sampling on priority targets			$200,000
Drilling to expand existing mineralized zones	6,000	$130	$780,000
Drilling to infill zones and re-categorize resources	6,000	$130	$780,000
Contingency 15%			$279,000
Subtotal Phase 1			**$2,139,000**
Phase 2	**Drilling (metres)**	**Cost / metre**	**Budget**
Drilling of deep targets contingent on success of Phase 1 work	10,000	$130	$1,300,000
Contingency 15%			$195,000
Subtotal Phase 2			**$1,495,000**
Overall Total			**$3,634,000**

19.0 REFERENCES

Andrews, A.J., Hugon, H., Durocher, M., Corfu, F., and Lavigne, M., 1986. The anatomy of a gold-bearing greenstone belt: Red Lake, northwestern Ontario; *in* Proceedings of GOLD '86, an International Symposium on the Geology of Gold Deposits, (ed.) A.J. MacDonald; Konsult International Inc., Toronto, Ontario, pp. 3-22

Cole, G., Niemela, K., and Folinsbee, J., 2016. Technical Report on the Preliminary Economic Assessment For the Madsen Gold Project, prepared by Nordmin Engineering Ltd. of Thunder Bay, Ontario, for Pure Gold Inc.

Dubé, B., Williamson, K, and Malo, M., 2001. Preliminary report on the geology and controlling parameters of the Goldcorp Inc. High Grade zone, Red Lake mine, Ontario; Geological Survey of Canada, Current Research 2001-C18.

Dubé, B., Williamson, K., McNicoll, V., Malo, M., Skulski, T., Twomey ,T. and Sanborn-Barrie, M., 2004. Timing of Gold Mineralization at Red Lake, Northwestern Ontario, Canada: New Constraints from U-Pb Geochronology at the Goldcorp High-Grade Zone, Red Lake Mine, and at the Madsen Mine: Economic Geology, v.99, pp.1611-1641.

Dubé, B., Williamson, K, and Malo, M., 2002. Geology of the Goldcorp Inc. High grade zone, Red Lake mine, Ontario: an update; Geological Survey of Canada, Current Research 2002-C26.

Dubé, B., Balmer, W., Sanborn-Barrie, M., Skulski, T., and Parker, J., 2000. A preliminary report on amphibolite-facies, disseminated-replacement-style mineralization at the Madsen gold mine, Red Lake, Ontario; Geological Survey of Canada, Current Research 2000-C17.

Dubé, B. and Gosselin, P., 2007. Greenstone-hosted Quartz-Carbonate Vein Deposits, *in* Goodfellow, W.D., ed., Mineral Deposits of Canada: A Synthesis of Major Deposit-Types, District Metallogeny, the Evolution of Geological Provinces, and Exploration Methods: Geological Association of Canada, Mineral Deposits Division, Special Publication N0. 5, pp. 49-73.

Epp, M., 2013. Technical Report for the Red Lake Town Site Property, Gold Geochemistry Project.

Gauthier, L., 1996. Hasaga Project (813): 1996 Drilling and compilation report, Heyson and Dome Townships NTS 52N/04, Barrick Gold Corporation. Copy obtained from the Office of Resident Geologist, Red Lake Mining Division, Red Lake Ontario.

Harron, G.A. and Puritch, E., 2010. Technical Report on North Madsen Properties, Dome and Heyson Townships, Red Lake , Ontario Canada for Mega Precious Metals Inc.

Horwood, H.C., 1940. Geology and Mineral Deposits of the Red Lake Area. Map number 49e. Annual report of the Ontario Department of Mines (ODM), vol. 49 Part II, 1940, pp. 1-97

McCracken, T. and Harder, M., 2011. Technical Report and Resources Estimate on the North Madsen Property, Red Lake, Ontario, by Tetra Tech WEI Inc. of Sudbury Ontario, for Mega Precious Metals Inc.

Pirie, J., 1982. Regional Geological Setting of Gold Deposits, Eastern Red Lake Area, northwestern Ontario; *in* Proceedings of the CIM Gold Symposium, September 1980, The Canadian Institute of Mining and Metallurgy, Special Volume 24, pp. 171-183.

Postle, J., Haystead, B., Clow, G., Hora, D., Vallée, M. and Jensen, M., 2000. Canadian Institute of Mining, Metallurgy and Petroleum. CIM Standards on Mineral Resources and Reserves: Definitions and Guidelines. Prepared by the CIM Standing Committee on Reserve Definitions – Adopted by CIM Council November 27, 2010.

Robert, F., 1995. Quartz-Carbonate Vein Gold, *in* Eckstrand, O.R., Sinclair, W.D.T., and Thorpe, R.I., eds., Geology of Canadian Mineral Deposit Types: Geological Survey of Canada, Geology of Canada No.8, pp. 350-366.

Sanborn-Barrie, M., Skulski, T., Parker, J., and Dube, B., 2000. Integrated regional analysis of the Red Lake greenstone belt and its mineral deposits, western Superior Province, Ontario; Geological Survey of Canada, Current Research 2000-C18.

Sanborn-Barrie, M., Skulski, T., and Parker, J., 2001. Three hundred million years of tectonic history recorded by the Red Lake greenstone belt, Ontario; Geological Survey of Canada, Current Research 2001-C19.

Sanborn-Barrie, M., Skulski, T., and Parker, J. 2004: Geology, Red Lake Greenstone Belt, Western Superior Province, Ontario; Geological Survey of Canada, Open File 4594, scale 1:50,000.

CERTIFICATE OF QUALIFICATION
VINCENT JOURDAIN

I, **Vincent Jourdain, Eng., Ph.D.**, of 1740 Sullivan Rd, Val-d'Or, Québec do hereby certify that:

1. This Certificate applies to "NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT: HASAGA PROJECT, RED LAKE MINING DISTRICT, ONTARIO, CANADA NTS MAP SHEETS 52K/13 AND 52N/04" dated February 24th, 2017;
2. I hold a B.Sc.A. in geological engineering from Université Laval, Québec, having graduated in 1984. I hold an M.Sc.A. in Earth Sciences from Université du Québec à Chicoutimi, having graduated in 1987. I hold a Ph.D. in Mineral Resources from Université du Québec à Montréal, having graduated in 1993;
3. I am currently working and living in Quebec and I am currently licensed by the *Ordre des Ingénieurs du Québec* (License 40485); and a Member of the Association of Professional Engineer of Ontario (Licence 100199119);
4. I am employed as General Manager of MRB & Associates, a Val-d'Or Quebec-based Geological Consulting firm;
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101;
6. Since 1984, I worked at the conception and execution of exploration programs for base- and precious-metals in the Appalachians, the Grenville and Superior Provinces. I was actively involved in the development of the Nugget Pond, Sleeping Giant and Vezza gold projects. From 2011 to 2016, I was Technical Director Geology for a consulting firm of Val-d'Or;
7. I have no prior involvement with Premier Gold Mines NWO Limited, nor with the Property that is the subject of this Report;
8. I am co-author of Sections 1, 2, 12, 14, 17 and 18 of this Report, entitled "NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT: HASAGA PROJECT, RED LAKE MINING DISTRICT, ONTARIO, CANADA NTS MAP SHEETS 52K/13 AND 52N/04" dated February 24th, 2017;
9. I did not visit the Hasaga Project;
10. I have no personal knowledge, as of the date of this certificate, of any material fact or change, which is not reflected in this report;
11. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101;
12. I have read NI 43-101 and Form 43-101F1 and have prepared the technical report in compliance with them and in conformity with generally accepted Canadian mining industry practice. As of the date of the certificate, to the best of my knowledge, information and belief, this report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

DATED this 24th Day of February, 2017

____

(SIGNED) VINCENT JOURDAIN, ENG., PH.D.

CERTIFICATE OF QUALIFICATION
JOHN LANGTON

I, **John Langton, M.Sc., P. Geo.**, of 1740 Sullivan Rd, Val-d'Or, Québec do hereby certify that:

1. This Certificate applies to "NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT: HASAGA PROJECT, RED LAKE MINING DISTRICT, ONTARIO, CANADA NTS MAP SHEETS 52K/13 AND 52N/04" dated February 24th, 2017;
2. I graduated from the University of New Brunswick in 1985 with a B.Sc. in Geology and from Queen's University, Kingston in 1993 with a M.Sc. in Geology, and I have practised my profession continuously since that time;
3. I am currently working and living in Quebec and I am a Professional Geologist currently licensed by the *Ordre des géologues du Québec* (License 1231); the Association of Professional Engineers and Geoscientists of New Brunswick (Licence M5467); and a Temporary Member of the Association of Professional Geoscientists of Ontario (Licence 1716);
4. I am part-owner of MRB & Associates, a Val-d'Or Quebec-based Geological Consulting firm;
5. I hold a position on the Board of Directors of Cartier Iron Corp. and Hinterland Metals Inc., and am a minority share-holder of Cartier Iron Corp.;
6. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101;
7. I have worked as an exploration and field geologist since 1985. I have knowledge and experience with regard to a various mineral deposit types, including the procedures involved in exploring for gold and base-metals, and with the preparation of reports relating to them;
8. I have been retained by Premier Gold Mines NWO Limited, a body corporate having a registered office at 200-1100 Russell Street, Thunder Bay, Ontario Canada P7B 5N2, as a contract/consulting geologist, and not as an employee;
9. I have no prior involvement with Premier Gold Mines NWO Limited, nor with the Property that is the subject of this Report;
10. I have prepared and take responsibility for Sections 2.0 through 10.0, 13.0, 15.0 and 16.0 of this Report; and co-authored Sections 1.0, 11.0, 12.0, 14.0, 17.0, 18.0 and 19.0 of this Report, entitled "NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT: HASAGA PROJECT, RED LAKE MINING DISTRICT, ONTARIO, CANADA NTS MAP SHEETS 52K/13 AND 52N/04" dated February 24th, 2016;
11. I visited the Hasaga Project on October 20th-21st, and November 17th-18th of 2016;
12. I have no personal knowledge, as of the date of this certificate, of any material fact or change, which is not reflected in this report;
13. I am "independent" of Premier Gold Mines NWO Limited with respect to the conditions described in Section 1.5 of NI 43-101;
14. Neither I, nor any affiliated entity of mine, is at present under an agreement, arrangement or understanding, nor expects to become an insider, associate, affiliated entity or employee of Premier Gold Mines NWO Limited, nor any of its associated or affiliated entities;
15. Neither I, nor any affiliated entity of mine, have earned the majority of our income during the preceding three years from Premier Gold Mines NWO Limited, nor any of its associates or affiliates;

16. I have read NI 43-101 and Form 43-101F1 and have prepared the technical report in compliance with them and in conformity with generally accepted Canadian mining industry practice. As of the date of the certificate, to the best of my knowledge, information and belief, this report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

DATED this 24th Day of February, 2017

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(Signed) John P. Langton, M.Sc., P. Geo.

CERTIFICATE OF QUALIFICATION
ABDERRAZAK LADIDI

I, **Abderrazak Ladidi, P. Geo.** of 105 rue des Sapins, Val-d'Or (Québec) J9P 4R4 do hereby certify that:

1. This Certificate applies to NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT, HASAGA PROJECT RED LAKE MINING DISTRICT,ONTARIO,CANADA NTS MAP SHEETS 52 K /13 AND 52 N/04" dated February 24th, 2017;
2. I graduated from the University of Morocco in 1999 with a B.Sc. in Geology and from Abtibi Témiscamingue's University, Rouyn Noranda in 2011 with a Masters Degree in Engineering, and I have practised my profession continuously since that time;
3. I am currently working and living in Quebec and I am a Professional Geologist currently licensed by the *Ordre des géologues du Québec* (License 1265);
4. I have read the definition of "qualified person" (QP) set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101;
5. I have worked as resource and field geologist since 2006. I have knowledge and experience with regard to a number of mineral deposit types including the procedures involved in exploring for gold and base-metals, and with the preparation of reports relating to them;
6. I have been retained by Premier Gold Mines NWO Limited. (a corporate having a registered office at 200-1100 Russell Street, Thunder Bay, Ontario P7B 5N2, as a contract/consulting geologist, and not as an employee;
7. I have no prior involvement with Premier Gold Mines NWO Limited, other than as a QP, nor with the Property that is the subject of this Report;
8. I Participated in the preparation of Section 14 of this Report entitled "NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT, HASAGA PROJECT RED LAKE MINING DISTRICT,ONTARIO,CANADA NTS MAP SHEETS 52 K /13 AND 52 N/04" dated February 24th, 2017;
9. I have not visited the Hasaga Property
10. I have no personal knowledge, as of the date of this certificate, of any material fact or change, which is not reflected in this report;
11. I am "independent" of Premier Gold Mines NWO Limited with respect to the conditions described in Section 1.5 of NI 43-101;
12. I have read NI 43-101 and Form 43-101F1 and have prepared the technical report in compliance with them and in conformity with generally accepted Canadian mining industry practice. As of the date of the certificate, to the best of my knowledge, information and belief, this report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

DATED this 24th Day of February, 2017

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Abderrazak Ladidi, P. Geo.

APPENDIX I

Summary of Claims Comprising the Hasaga Property

(all claims listed are 100% owned by Premier Gold)

Claim No.	Tenure Type	Area (ha)
K1373	Patent	19.3
K1374	Patent	16.7
K1375	Patent	19.9
K1376	Patent	15.6
K1377	Patent	17
K1378	Patent	26.3
K1379	Patent	15.6
K1380	Patent	19.2
K1381	Patent	15.2
KRL10162	Patent	11.6
KRL13257	Mining License Occupation	11.8
KRL13258	Mining License Occupation	18.8
KRL1347	Patent	11
KRL1348	Patent	39.8
KRL1741	Patent	23.3
KRL1741	Mining License Occupation	23.3
KRL2134	Patent	21.4
KRL2135	Patent	15.7
KRL2136	Patent	33.9
KRL2137	Patent	19.9
KRL2138	Patent	13.2
KRL5888	Patent (Surface and Mineral)	28.9
KRL5889	Patent (Surface and Mineral)	20.1
KRL5889	Mining License Occupation	20.1
KRL5890	Patent (Surface and Mineral)	21.4
KRL5890	Mining Licence Occupation	21.4
KRL5944	Mining Licence Occupation	13.5
KRL5945	Mining Licence Occupation	16
KRL5946	Mining Licence Occupation	13.4
KRL6005	Mining Licence Occupation	11.6
KRL818	Patent (Surface and Mineral)	12.4
KRL819	Patent (Surface and Mineral)	20.6
KRL820	Patent (Surface and Mineral)	14.1
KRL821	Mining Licence Occupation	17.6
KRL821	Patent (Surface and Mineral)	17.6
KRL822	Patent (Surface and Mineral)	21.7
KRL2139	Patent (Surface and Mineral)	18.5
KRL2140	Patent (Surface)	18.8
	Total area	**716.2**

Unpatented Claim No.	Date Recorded	Date Due	Units	Area (ha)	Work Required	Total Applied	Total Reserve
4212632	2006-Oct-06	2016-Oct-06	1	13.8	$3,600	$28,800	$243
4214574	2008-Sep-02	2022-Sep-02	2	16.8	$800	$9,600	$0
4248103	2009-Jun-26	2022-Feb-10	1	5.0	$400	$3,600	$75
4248104	2006-Oct-06	2016-Oct-06	1	11.4	$3,200	$25,600	$121
		Totals	**20**	**47.0**	**$8,000**	**$67,600**	**$439**

Claim Number	Tenure	Claim Units	Hectares	Recorded Date	Due Date	Recorded Owner	NSR (Y/N)
4212632	Unpatented Claim	1	13.80	Jun-11, 2009	Jan-26, 2022	Premier Gold Mines NWO Inc. (100%)	N
4214574	Unpatented Claim	2	16.80	Sep-02, 2008	Sep-02, 2022	Premier Gold Mines NWO Inc. (100%)	N
4248103	Unpatented Claim	1	5.00	Jun-26, 2009	Feb-10, 2022	Premier Gold Mines NWO Inc. (100%)	N
4248104	Unpatented Claim	1	11.40	Jun-26, 2009	Feb-10, 2022	Premier Gold Mines NWO Inc. (100%)	N
K1373	Patent (Surface and Mineral)	N/A	18.21			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1374	Patent (Surface and Mineral)	N/A	17.28			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1375	Patent (Mineral)	N/A	18.01			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1376	Patent (Surface and Mineral)	N/A	17.00			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1377	Patent (Surface and Mineral)	N/A	13.52			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1378	Patent (Surface and Mineral)	N/A	25.17			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1379	Patent (Surface and Mineral)	N/A	15.30			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1380	Patent (Surface and Mineral)	N/A	18.21			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1381	Patent (Surface and Mineral)	N/A	15.14			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
K1423	Patent (Surface and Mineral)	N/A	17.00			Premier Gold Mines NWO Inc. (100%)	N
K1424	Patent (Surface and Mineral)	N/A	17.00			Premier Gold Mines NWO Inc. (100%)	N
K1425	Patent (Surface and Mineral)	N/A	20.00			Premier Gold Mines NWO Inc. (100%)	N
K1426	Patent (Surface and Mineral)	N/A	22.00			Premier Gold Mines NWO Inc. (100%)	N
K1427	Patent (Surface and Mineral)	N/A	17.00			Premier Gold Mines NWO Inc. (100%)	N
K1428	Patent (Surface and Mineral)	N/A	16.00			Premier Gold Mines NWO Inc. (100%)	N

Claim Number	Tenure	Claim Units	Hectares	Recorded Date	Due Date	Recorded Owner	NSR (Y/N)
K1429	Patent (Surface and Mineral)	N/A	15.00			Premier Gold Mines NWO Inc. (100%)	N
K1430	Patent (Surface and Mineral)	N/A	19.00			Premier Gold Mines NWO Inc. (100%)	N
K1431	Patent (Surface and Mineral)	N/A	13.00			Premier Gold Mines NWO Inc. (100%)	N
K1432	Patent (Surface and Mineral)	N/A	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1433	Patent (Surface and Mineral)	N/A	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1434	Patent (Surface and Mineral)	N/A	26.00			Premier Gold Mines NWO Inc. (100%)	N
K1435	Patent (Surface and Mineral)	N/A	16.00			Premier Gold Mines NWO Inc. (100%)	N
K1436	Patent (Surface and Mineral)	N/A	29.00			Premier Gold Mines NWO Inc. (100%)	N
K1437	Patent (Surface and Mineral)	N/A	22.00			Premier Gold Mines NWO Inc. (100%)	N
K1438	Patent (Surface and Mineral)	N/A	20.00			Premier Gold Mines NWO Inc. (100%)	N
K1439	Patent (Surface and Mineral)	N/A	31.00			Premier Gold Mines NWO Inc. (100%)	N
K1440	Patent (Surface and Mineral)	N/A	21.00			Premier Gold Mines NWO Inc. (100%)	N
K1441	Patent (Surface and Mineral)	N/A	12.00			Premier Gold Mines NWO Inc. (100%)	N
K1444	Patent (Surface and Mineral)	N/A	20.00			Premier Gold Mines NWO Inc. (100%)	Y[2]
K1474	Patent (Mineral)	N/A	36.00			Premier Gold Mines NWO Inc. (100%)	N
K1475	Patent (Surface and Mineral)	N/A	28.00			Premier Gold Mines NWO Inc. (100%)	N
K1476	Patent (Surface and Mineral)	N/A	23.00			Premier Gold Mines NWO Inc. (100%)	Y[2]
K1585	Patent (Surface and Mineral)	N/A	13.00			Premier Gold Mines NWO Inc. (100%)	N
K1586	Patent (Surface and Mineral)	N/A	5.00			Premier Gold Mines NWO Inc. (100%)	N

Claim Number	Tenure	Claim Units	Hectares	Recorded Date	Due Date	Recorded Owner	NSR (Y/N)
K1587	Patent (Surface and Mineral)	N/A	11.00			Premier Gold Mines NWO Inc. (100%)	N
K1588	Patent (Surface and Mineral)	N/A	9.00			Premier Gold Mines NWO Inc. (100%)	N
K1589	Patent (Surface and Mineral)	N/A	3.00			Premier Gold Mines NWO Inc. (100%)	N
KRL1347	Patent (Surface and Mineral)	N/A	11.78			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL1348	Patent (Surface and Mineral)	N/A	39.58			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL1741	Patent (Surface and Mineral)	N/A	14.89			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL1741	Mining Licence of Occupation	N/A	6.48			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2134	Patent (Surface and Mineral)	N/A	17.73			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL2134	Mining Licence of Occupation	N/A	3.32			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2135	Patent (Surface and Mineral)	N/A	16.75			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL2136	Patent (Surface and Mineral)	N/A	34.68			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL2137	Patent (Surface and Mineral)	N/A	7.89			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL2137	Mining Licence of Occupation	N/A	11.78			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2138	Patent (Surface and Mineral)	N/A	9.79			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL2138	Mining Licence of Occupation	N/A	2.19			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL2139	Patent (Surface and Mineral)	N/A	13.07			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL2140	Patent (Surface and Mineral)	N/A	18.47			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	N
KRL5888	Patent (Surface and Mineral)	N/A	28.57			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL5889	Patent (Surface and Mineral)	N/A	12.55			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]

Claim Number	Tenure	Claim Units	Hectares	Recorded Date	Due Date	Recorded Owner	NSR (Y/N)
KRL5889	Mining Licence of Occupation	N/A	7.41			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5890	Patent (Surface and Mineral)	N/A	8.38			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL5890	Mining Licence of Occupation	N/A	12.14			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5944	Mining Licence of Occupation	N/A	13.84			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5945	Mining Licence of Occupation	N/A	16.19			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL5946	Mining Licence of Occupation	N/A	13.31			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL6005	Mining Licence of Occupation	N/A	11.61			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL8081 (rec. as KRL13257)	Mining Licence of Occupation	N/A	11.66			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL8082 (rec. as KRL13258)	Mining Licence of Occupation	N/A	18.90			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL818	Patent (Surface and Mineral)	N/A	12.67			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL819	Patent (Surface and Mineral)	N/A	16.47			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL819	Mining Licence of Occupation	N/A	3.93			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL820	Patent (Surface and Mineral)	N/A	14.25			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL821	Patent (Surface and Mineral)	N/A	15.18			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
KRL821	Mining Licence of Occupation	N/A	2.27			Premier Gold Mines NWO Inc. (100%)	Y[1]
KRL822	Patent (Surface and Mineral)	N/A	21.21			Goldcorp Inc. (72.00%), Goldcorp Canada Ltd	Y[1]
		Total area:	**1166.72**				

[1] ***3% to Lac Minerals (April 30, 2010 Agreement between Red Lake Gold Mines Partnership and Lac Properties Inc.)***

[2] ***3% Camp McMann 0.5% Premier Royalty (Sandstorm)***

APPENDIX II
Summary of Channel Sampling Details and Results

Zone	Channel ID	UTM-X	UTM-Y	Azimuth (ºTrue N)	Length (m)	Sample ID's	Total number of Samples
CENTRAL	DSC001	440692.00	5651934.00	53.00	29.50	B00304015 to B00304051	32
CENTRAL	DSC002	440695.00	5651943.00	39.00	1.00	B00304052	1
CENTRAL	DSC003	440701.00	5651948.00	42.00	1.00	B00304053	1
CENTRAL	DSC004	440698.00	5651960.00	38.00	6.75	B00304054 to B00304061	7
CENTRAL	DSC005	440707.00	5651937.00	25.00	0.70	B00304062	1
CENTRAL	DSC006	440709.00	5651951.00	58.00	1.00	B00304063	1
CENTRAL	DSC007	440716.00	5651940.00	55.00	0.50	B00304065	1
CENTRAL	DSC008	440719.00	5651953.00	33.00	0.75	B00304066	1
CENTRAL	DSC009	440716.00	5651936.00	37.00	26.90	B00304067 to B00304098	28
CENTRAL	DSC010	440737.00	5651950.00	96.00	7.50	B00304099 to B00304107	8
CENTRAL	DSC011	440743.00	5651947.00	87.00	0.50	B00304108	1
CENTRAL	DSC012	440744.00	5651944.00	32.00	1.00	B00304109	1
CENTRAL	DSC013	440748.00	5651948.00	34.00	0.50	B00304110	1
CENTRAL	DSC014	440746.00	5651951.00	67.00	1.00	B00304111	1
CENTRAL	DSC015	440747.00	5651961.00	35.00	1.00	B00304113	1
CENTRAL	DSC016a	440943.00	5652240.00	82.00	4.30	B00304259 to B00304263	5
CENTRAL	DSC016b	440943.00	5652240.00	90.00	10.70	B00304265 to B00304277	12
CENTRAL	DSC018	440950.00	5652238.00	35.00	11.00	B00304287 to B00304300	12
CENTRAL	DSC020	440949.00	5652263.00	64.00	0.50	B00304302	1
CENTRAL	DSC021	440848.37	5652160.59	39.00	40.00	B00304303 to B00304349	41
CENTRAL	DSC022	440826.21	5652166.45	39.00	40.00	B00304350 to B00304396	41
CENTRAL	DSC023	440863.34	5652159.91	122.00	6.50	B00304397 to B00304409	11
CENTRAL	DSC024	440865.33	5652163.02	59.00	1.50	B00304410 to B00304411	2
CENTRAL	FTC001a	440993.00	5651814.00	23.50	5.50	B00304114 to B00304119	6
CENTRAL	FTC001b	440993.00	5651819.20	39.00	7.70	B00304121 to B00304129	8
CENTRAL	FTC001c	441001.00	5651824.00	37.10	15.80	B00304130 to B00304147	16
CENTRAL	FTC002	440968.00	5651827.00	40.10	11.00	B00304148 to B00304159	11
CENTRAL	FTC003	440921.00	5651801.00	35.30	29.50	B00304161 to B00304194	30
CENTRAL	FTC004	440884.00	5651804.00	33.40	7.20	B00304195 to B00304202	7
CENTRAL	FTC005	440837.00	5651787.00	31.60	23.00	B00304203 to B00304230	25
CENTRAL	FTC006	440805.00	5651774.00	32.10	21.20	B00304231 to B00304258	24
HASAGA	HSC001	441583.40	5651552.40	328.00	12.80	356958 to 356950	8
HASAGA	HSC009	441590.60	5651552.40	328.10	23.20	356922 to 356944	25
HASAGA	HSC012	441596.40	5651554.00	329.20	27.10	356916 to 356891	27
HASAGA	HSC013	441599.00	5651571.60	327.50	20.60	356876 to 356889	13
HASAGA	HSC014	441598.90	5651562.40	329.70	8.00	356867 to 356875	8
HASAGA	HSC015	441663.03	5651590.16	329.20	4.50	356851 to 356855	5
HASAGA	HSC016	441666.80	5651595.20	327.00	9.00	356856 to 356865	9
BUFFALO	BFC001	441048.40	5651067.60	83.38	0.50	B00304001	1
BUFFALO	BFC002	441049.80	5651064.40	82.88	0.50	B00304002	1
BUFFALO	BFC003	441054.10	5651064.40	333.02	5.00	B00304003 to B00304007	5
BUFFALO	BFC004	441057.50	5651068.40	77.79	0.50	B00304009	1
BUFFALO	BFC005	441063.40	5651076.40	332.37	4.50	B00304010 to B00304014	5
BUFFALO	DSC017	440952.00	5652252.00	33.00	8.00	B00304278 to B00304286	8
BUFFALO	DSC019	440952.00	5652234.00	64.00	0.50	B00304301	1
				Totals	**439.70**		**455**

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
DSC001	CENTRAL	B00304015	0.00	1.00	1.00	0.20
DSC001	CENTRAL	B00304017	1.00	1.75	0.75	0.49
DSC001	CENTRAL	B00304018	1.75	2.75	1.00	0.85
DSC001	CENTRAL	B00304019	2.75	3.75	1.00	0.71
DSC001	CENTRAL	B00304020	3.75	4.75	1.00	2.63
DSC001	CENTRAL	B00304021	4.75	5.35	0.60	0.86
DSC001	CENTRAL	B00304022	5.35	6.10	0.75	1.08
DSC001	CENTRAL	B00304023	6.10	7.10	1.00	0.51
DSC001	CENTRAL	B00304025	7.10	8.10	1.00	0.17
DSC001	CENTRAL	B00304026	8.10	9.10	1.00	1.28
DSC001	CENTRAL	B00304027	9.10	10.10	1.00	0.60
DSC001	CENTRAL	B00304028	10.10	11.10	1.00	2.37
DSC001	CENTRAL	B00304029	11.10	11.60	0.50	0.61
DSC001	CENTRAL	B00304030	11.60	12.60	1.00	1.96
DSC001	CENTRAL	B00304031	12.60	13.60	1.00	0.41
DSC001	CENTRAL	B00304033	13.60	14.60	1.00	1.37
DSC001	CENTRAL	B00304034	14.60	15.60	1.00	0.91
DSC001	CENTRAL	B00304035	15.60	16.60	1.00	0.86
DSC001	CENTRAL	B00304036	16.60	17.80	1.20	1.13
DSC001	CENTRAL	B00304037	17.80	18.80	1.00	0.88
DSC001	CENTRAL	B00304038	18.80	19.30	0.50	0.16
DSC001	CENTRAL	B00304039	19.30	20.00	0.70	0.15
DSC001	CENTRAL	B00304041	20.00	20.80	0.80	0.93
DSC001	CENTRAL	B00304042	20.80	21.80	1.00	0.89
DSC001	CENTRAL	B00304043	21.80	22.80	1.00	1.45
DSC001	CENTRAL	B00304044	22.80	23.80	1.00	1.23
DSC001	CENTRAL	B00304045	23.80	24.50	0.70	0.05
DSC001	CENTRAL	B00304046	24.50	25.50	1.00	0.55
DSC001	CENTRAL	B00304047	25.50	26.50	1.00	1.40
DSC001	CENTRAL	B00304049	26.50	27.50	1.00	0.74
DSC001	CENTRAL	B00304050	27.50	28.50	1.00	1.86
DSC001	CENTRAL	B00304051	28.50	29.50	1.00	1.46
DSC002	CENTRAL	B00304052	0.00	1.00	1.00	2.44
DSC003	CENTRAL	B00304053	0.00	1.00	1.00	1.12
DSC004	CENTRAL	B00304054	0.00	0.75	0.75	0.20
DSC004	CENTRAL	B00304055	0.75	1.75	1.00	0.63
DSC004	CENTRAL	B00304057	1.75	2.75	1.00	0.85
DSC004	CENTRAL	B00304058	2.75	3.75	1.00	2.50
DSC004	CENTRAL	B00304059	3.75	4.75	1.00	0.97
DSC004	CENTRAL	B00304060	4.75	5.75	1.00	0.42
DSC004	CENTRAL	B00304061	5.75	6.75	1.00	0.49
DSC005	CENTRAL	B00304062	0.00	0.70	0.70	0.66
DSC006	CENTRAL	B00304063	0.00	1.00	1.00	0.04
DSC007	CENTRAL	B00304065	0.00	0.50	0.50	2.23
DSC008	CENTRAL	B00304066	0.00	0.75	0.75	0.17
DSC009	CENTRAL	B00304067	0.00	1.00	1.00	0.86

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
DSC009	CENTRAL	B00304068	1.00	2.00	1.00	0.67
DSC009	CENTRAL	B00304069	2.00	3.00	1.00	1.25
DSC009	CENTRAL	B00304070	3.00	4.00	1.00	1.39
DSC009	CENTRAL	B00304071	4.00	5.00	1.00	0.71
DSC009	CENTRAL	B00304073	5.00	5.30	0.30	0.67
DSC009	CENTRAL	B00304074	5.30	6.30	1.00	0.73
DSC009	CENTRAL	B00304075	6.30	7.30	1.00	1.15
DSC009	CENTRAL	B00304076	7.30	8.30	1.00	0.82
DSC009	CENTRAL	B00304077	8.30	9.30	1.00	1.12
DSC009	CENTRAL	B00304078	9.30	10.30	1.00	0.43
DSC009	CENTRAL	B00304079	10.30	10.80	0.50	0.81
DSC009	CENTRAL	B00304081	11.60	12.60	1.00	0.69
DSC009	CENTRAL	B00304082	12.60	13.35	0.75	0.72
DSC009	CENTRAL	B00304083	13.35	14.35	1.00	1.08
DSC009	CENTRAL	B00304084	14.35	15.35	1.00	0.66
DSC009	CENTRAL	B00304085	15.35	16.35	1.00	0.84
DSC009	CENTRAL	B00304086	16.35	17.35	1.00	1.15
DSC009	CENTRAL	B00304087	17.35	18.35	1.00	3.85
DSC009	CENTRAL	B00304089	18.35	19.15	0.80	1.38
DSC009	CENTRAL	B00304090	19.15	20.15	1.00	0.89
DSC009	CENTRAL	B00304091	20.15	21.15	1.00	0.70
DSC009	CENTRAL	B00304092	21.15	22.15	1.00	0.40
DSC009	CENTRAL	B00304093	22.15	23.15	1.00	0.56
DSC009	CENTRAL	B00304094	23.15	24.15	1.00	0.92
DSC009	CENTRAL	B00304095	24.15	25.15	1.00	0.91
DSC009	CENTRAL	B00304097	25.15	26.15	1.00	0.81
DSC009	CENTRAL	B00304098	26.15	26.90	0.75	0.67
DSC010	CENTRAL	B00304099	0.00	1.00	1.00	1.54
DSC010	CENTRAL	B00304100	1.00	2.00	1.00	5.09
DSC010	CENTRAL	B00304101	2.00	3.00	1.00	3.65
DSC010	CENTRAL	B00304102	3.00	4.00	1.00	4.39
DSC010	CENTRAL	B00304103	4.00	5.00	1.00	2.64
DSC010	CENTRAL	B00304105	5.00	6.00	1.00	0.36
DSC010	CENTRAL	B00304106	6.00	7.00	1.00	0.25
DSC010	CENTRAL	B00304107	7.00	7.50	0.50	0.59
DSC011	CENTRAL	B00304108	0.00	0.50	0.50	34.13
DSC012	CENTRAL	B00304109	0.00	1.00	1.00	0.36
DSC013	CENTRAL	B00304110	0.00	0.50	0.50	0.56
DSC014	CENTRAL	B00304111	0.00	1.00	1.00	0.34
DSC015	CENTRAL	B00304113	0.00	1.00	1.00	0.20
DSC016a	CENTRAL	B00304259	0.00	0.50	0.50	0.23
DSC016a	CENTRAL	B00304260	0.50	1.50	1.00	0.31
DSC016a	CENTRAL	B00304261	1.50	2.50	1.00	0.06
DSC016a	CENTRAL	B00304262	2.50	3.30	0.80	0.36
DSC016a	CENTRAL	B00304263	3.30	4.30	1.00	0.34
DSC016b	CENTRAL	B00304265	0.00	0.45	0.45	0.13

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
DSC016b	CENTRAL	B00304266	0.45	1.20	0.75	0.21
DSC016b	CENTRAL	B00304267	1.20	1.70	0.50	0.10
DSC016b	CENTRAL	B00304268	1.70	2.70	1.00	0.18
DSC016b	CENTRAL	B00304269	2.70	3.70	1.00	0.02
DSC016b	CENTRAL	B00304270	3.70	4.70	1.00	0.13
DSC016b	CENTRAL	B00304271	4.70	5.70	1.00	0.04
DSC016b	CENTRAL	B00304273	5.70	6.70	1.00	0.04
DSC016b	CENTRAL	B00304274	6.70	7.70	1.00	0.03
DSC016b	CENTRAL	B00304275	7.70	8.70	1.00	1.87
DSC016b	CENTRAL	B00304276	8.70	9.70	1.00	0.41
DSC016b	CENTRAL	B00304277	9.70	10.70	1.00	0.57
DSC018	CENTRAL	B00304287	0.00	1.00	1.00	0.99
DSC018	CENTRAL	B00304289	1.00	1.75	0.75	1.35
DSC018	CENTRAL	B00304290	1.75	2.50	0.75	0.14
DSC018	CENTRAL	B00304291	2.50	3.25	0.75	0.02
DSC018	CENTRAL	B00304292	3.25	4.00	0.75	0.12
DSC018	CENTRAL	B00304293	4.00	5.00	1.00	0.08
DSC018	CENTRAL	B00304294	5.00	6.00	1.00	0.22
DSC018	CENTRAL	B00304295	6.00	7.00	1.00	0.05
DSC018	CENTRAL	B00304297	7.00	8.00	1.00	0.03
DSC018	CENTRAL	B00304298	8.00	9.00	1.00	0.47
DSC018	CENTRAL	B00304299	9.00	10.00	1.00	0.35
DSC018	CENTRAL	B00304300	10.00	11.00	1.00	0.88
DSC020	CENTRAL	B00304302	0.00	0.50	0.50	4.93
DSC021	CENTRAL	B00304303	0.00	1.00	1.00	0.07
DSC021	CENTRAL	B00304305	1.00	2.00	1.00	0.22
DSC021	CENTRAL	B00304306	2.00	3.00	1.00	1.78
DSC021	CENTRAL	B00304307	3.00	4.00	1.00	1.42
DSC021	CENTRAL	B00304308	4.00	5.00	1.00	0.17
DSC021	CENTRAL	B00304309	5.00	6.00	1.00	0.21
DSC021	CENTRAL	B00304310	6.00	6.50	0.50	0.18
DSC021	CENTRAL	B00304311	6.50	7.50	1.00	0.15
DSC021	CENTRAL	B00304313	7.50	8.50	1.00	0.17
DSC021	CENTRAL	B00304314	8.50	9.50	1.00	0.09
DSC021	CENTRAL	B00304315	9.50	10.50	1.00	0.59
DSC021	CENTRAL	B00304316	10.50	11.50	1.00	2.65
DSC021	CENTRAL	B00304317	11.50	12.50	1.00	1.05
DSC021	CENTRAL	B00304318	12.50	13.50	1.00	0.93
DSC021	CENTRAL	B00304319	13.50	14.00	0.50	1.87
DSC021	CENTRAL	B00304321	14.00	15.00	1.00	0.71
DSC021	CENTRAL	B00304322	15.00	16.00	1.00	0.29
DSC021	CENTRAL	B00304323	16.00	17.00	1.00	0.01
DSC021	CENTRAL	B00304324	17.00	18.00	1.00	0.03
DSC021	CENTRAL	B00304325	18.00	19.00	1.00	0.63
DSC021	CENTRAL	B00304326	19.00	20.00	1.00	0.12
DSC021	CENTRAL	B00304327	20.00	21.00	1.00	0.04

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
DSC021	CENTRAL	B00304329	21.00	22.00	1.00	0.30
DSC021	CENTRAL	B00304330	22.00	23.00	1.00	0.07
DSC021	CENTRAL	B00304331	23.00	24.00	1.00	0.06
DSC021	CENTRAL	B00304332	24.00	25.00	1.00	0.33
DSC021	CENTRAL	B00304333	25.00	26.00	1.00	0.12
DSC021	CENTRAL	B00304334	26.00	27.00	1.00	0.11
DSC021	CENTRAL	B00304335	27.00	28.00	1.00	0.95
DSC021	CENTRAL	B00304337	28.00	29.00	1.00	1.44
DSC021	CENTRAL	B00304338	29.00	30.00	1.00	0.95
DSC021	CENTRAL	B00304339	30.00	31.00	1.00	4.67
DSC021	CENTRAL	B00304340	31.00	32.00	1.00	1.68
DSC021	CENTRAL	B00304341	32.00	33.00	1.00	1.21
DSC021	CENTRAL	B00304342	33.00	34.00	1.00	1.75
DSC021	CENTRAL	B00304343	34.00	35.00	1.00	0.04
DSC021	CENTRAL	B00304345	35.00	36.00	1.00	1.10
DSC021	CENTRAL	B00304346	36.00	37.00	1.00	0.32
DSC021	CENTRAL	B00304347	37.00	38.00	1.00	0.31
DSC021	CENTRAL	B00304348	38.00	39.00	1.00	0.52
DSC021	CENTRAL	B00304349	39.00	40.00	1.00	0.35
DSC022	CENTRAL	B00304350	0.00	1.00	1.00	0.49
DSC022	CENTRAL	B00304351	1.00	2.00	1.00	0.03
DSC022	CENTRAL	B00304353	2.00	3.00	1.00	0.06
DSC022	CENTRAL	B00304354	3.00	4.00	1.00	0.37
DSC022	CENTRAL	B00304355	4.00	5.00	1.00	0.51
DSC022	CENTRAL	B00304356	5.00	6.00	1.00	0.17
DSC022	CENTRAL	B00304357	6.00	6.50	0.50	0.10
DSC022	CENTRAL	B00304358	6.50	7.50	1.00	0.48
DSC022	CENTRAL	B00304359	7.50	8.50	1.00	0.11
DSC022	CENTRAL	B00304361	8.50	9.50	1.00	0.12
DSC022	CENTRAL	B00304362	9.50	10.50	1.00	0.45
DSC022	CENTRAL	B00304363	10.50	11.50	1.00	2.37
DSC022	CENTRAL	B00304364	11.50	12.50	1.00	0.73
DSC022	CENTRAL	B00304365	12.50	13.50	1.00	0.21
DSC022	CENTRAL	B00304366	13.50	14.50	1.00	0.92
DSC022	CENTRAL	B00304367	14.50	15.50	1.00	0.29
DSC022	CENTRAL	B00304369	15.50	16.50	1.00	0.18
DSC022	CENTRAL	B00304370	16.50	17.50	1.00	0.23
DSC022	CENTRAL	B00304371	17.50	18.25	0.75	0.23
DSC022	CENTRAL	B00304372	18.25	19.25	1.00	0.21
DSC022	CENTRAL	B00304373	19.25	20.25	1.00	0.21
DSC022	CENTRAL	B00304374	20.25	21.50	1.25	0.35
DSC022	CENTRAL	B00304375	21.50	22.50	1.00	1.80
DSC022	CENTRAL	B00304377	22.50	23.50	1.00	0.08
DSC022	CENTRAL	B00304378	23.50	24.50	1.00	0.53
DSC022	CENTRAL	B00304379	24.50	25.50	1.00	0.24
DSC022	CENTRAL	B00304380	25.50	26.50	1.00	0.12

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
DSC022	CENTRAL	B00304381	26.50	27.25	0.75	0.19
DSC022	CENTRAL	B00304382	27.25	28.25	1.00	0.45
DSC022	CENTRAL	B00304383	28.25	29.25	1.00	0.64
DSC022	CENTRAL	B00304385	29.25	30.25	1.00	0.17
DSC022	CENTRAL	B00304386	30.25	31.25	1.00	0.70
DSC022	CENTRAL	B00304387	31.25	32.25	1.00	0.29
DSC022	CENTRAL	B00304388	32.25	33.25	1.00	0.05
DSC022	CENTRAL	B00304389	33.25	34.25	1.00	0.06
DSC022	CENTRAL	B00304390	34.25	35.25	1.00	0.92
DSC022	CENTRAL	B00304391	35.25	36.00	0.75	0.31
DSC022	CENTRAL	B00304393	36.00	37.00	1.00	0.18
DSC022	CENTRAL	B00304394	37.00	38.00	1.00	0.05
DSC022	CENTRAL	B00304395	38.00	39.00	1.00	0.30
DSC022	CENTRAL	B00304396	39.00	40.00	1.00	0.13
DSC023	CENTRAL	B00304397	0.00	0.50	0.50	4.96
DSC023	CENTRAL	B00304398	0.50	1.00	0.50	10.45
DSC023	CENTRAL	B00304399	1.00	1.50	0.50	1.87
DSC023	CENTRAL	B00304401	1.50	2.50	1.00	2.79
DSC023	CENTRAL	B00304402	2.50	3.00	0.50	5.91
DSC023	CENTRAL	B00304403	3.00	4.00	1.00	3.38
DSC023	CENTRAL	B00304404	4.00	4.50	0.50	1.17
DSC023	CENTRAL	B00304405	4.50	5.00	0.50	0.64
DSC023	CENTRAL	B00304406	5.00	5.50	0.50	4.57
DSC023	CENTRAL	B00304407	5.50	6.00	0.50	1.70
DSC023	CENTRAL	B00304409	6.00	6.50	0.50	1.65
DSC024	CENTRAL	B00304410	0.00	0.75	0.75	3.26
DSC024	CENTRAL	B00304411	0.75	1.50	0.75	2.90
FTC001a	CENTRAL	B00304114	0.00	1.00	1.00	0.13
FTC001a	CENTRAL	B00304115	1.00	2.00	1.00	0.08
FTC001a	CENTRAL	B00304116	2.00	3.00	1.00	0.26
FTC001a	CENTRAL	B00304117	3.00	4.00	1.00	0.23
FTC001a	CENTRAL	B00304118	4.00	5.00	1.00	0.16
FTC001a	CENTRAL	B00304119	5.00	5.50	0.50	0.21
FTC001b	CENTRAL	B00304121	0.00	1.00	1.00	0.13
FTC001b	CENTRAL	B00304122	1.00	2.00	1.00	1.02
FTC001b	CENTRAL	B00304123	2.00	3.00	1.00	0.10
FTC001b	CENTRAL	B00304124	3.00	4.00	1.00	0.23
FTC001b	CENTRAL	B00304125	4.00	5.00	1.00	0.09
FTC001b	CENTRAL	B00304126	5.00	6.00	1.00	0.04
FTC001b	CENTRAL	B00304127	6.00	7.00	1.00	0.07
FTC001b	CENTRAL	B00304129	7.00	7.70	0.70	0.06
FTC001c	CENTRAL	B00304130	0.00	0.80	0.80	1.14
FTC001c	CENTRAL	B00304131	0.80	1.80	1.00	2.78
FTC001c	CENTRAL	B00304132	1.80	2.80	1.00	0.80
FTC001c	CENTRAL	B00304133	2.80	3.80	1.00	0.31
FTC001c	CENTRAL	B00304134	3.80	4.80	1.00	0.14

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
FTC001c	CENTRAL	B00304135	4.80	5.80	1.00	0.13
FTC001c	CENTRAL	B00304137	5.80	6.80	1.00	0.28
FTC001c	CENTRAL	B00304138	6.80	7.80	1.00	0.27
FTC001c	CENTRAL	B00304139	7.80	8.80	1.00	1.25
FTC001c	CENTRAL	B00304140	8.80	9.80	1.00	1.58
FTC001c	CENTRAL	B00304141	9.80	10.80	1.00	1.00
FTC001c	CENTRAL	B00304142	10.80	11.80	1.00	0.23
FTC001c	CENTRAL	B00304143	11.80	12.80	1.00	0.85
FTC001c	CENTRAL	B00304145	12.80	13.80	1.00	0.38
FTC001c	CENTRAL	B00304146	13.80	14.80	1.00	0.28
FTC001c	CENTRAL	B00304147	14.80	15.80	1.00	0.60
FTC002	CENTRAL	B00304148	0.00	0.75	0.75	0.62
FTC002	CENTRAL	B00304149	0.75	1.50	0.75	0.23
FTC002	CENTRAL	B00304150	1.50	2.50	1.00	0.57
FTC002	CENTRAL	B00304151	2.50	3.90	1.40	0.21
FTC002	CENTRAL	B00304153	3.90	4.70	0.80	0.29
FTC002	CENTRAL	B00304154	4.70	6.00	1.30	0.24
FTC002	CENTRAL	B00304155	6.00	6.60	0.60	0.24
FTC002	CENTRAL	B00304156	6.60	8.00	1.40	0.07
FTC002	CENTRAL	B00304157	8.00	9.00	1.00	0.01
FTC002	CENTRAL	B00304158	9.00	10.00	1.00	0.01
FTC002	CENTRAL	B00304159	10.00	11.00	1.00	0.01
FTC003	CENTRAL	B00304161	0.00	1.30	1.30	2.31
FTC003	CENTRAL	B00304162	1.30	2.30	1.00	0.22
FTC003	CENTRAL	B00304163	2.30	3.00	0.70	0.19
FTC003	CENTRAL	B00304164	3.00	4.20	1.20	0.06
FTC003	CENTRAL	B00304165	4.20	5.20	1.00	0.44
FTC003	CENTRAL	B00304166	5.20	6.00	0.80	0.14
FTC003	CENTRAL	B00304167	6.00	6.80	0.80	0.26
FTC003	CENTRAL	B00304169	6.80	8.00	1.20	1.73
FTC003	CENTRAL	B00304170	8.00	9.30	1.30	0.22
FTC003	CENTRAL	B00304171	9.30	10.30	1.00	0.18
FTC003	CENTRAL	B00304172	10.30	11.30	1.00	0.21
FTC003	CENTRAL	B00304173	11.30	12.30	1.00	0.13
FTC003	CENTRAL	B00304174	12.30	12.80	0.50	0.46
FTC003	CENTRAL	B00304175	12.80	13.80	1.00	0.70
FTC003	CENTRAL	B00304177	13.80	14.80	1.00	0.37
FTC003	CENTRAL	B00304178	14.80	15.80	1.00	0.12
FTC003	CENTRAL	B00304179	15.80	16.80	1.00	0.24
FTC003	CENTRAL	B00304180	16.80	17.80	1.00	0.20
FTC003	CENTRAL	B00304181	17.80	19.00	1.20	0.15
FTC003	CENTRAL	B00304182	19.00	20.00	1.00	0.18
FTC003	CENTRAL	B00304183	20.00	21.00	1.00	0.29
FTC003	CENTRAL	B00304185	21.00	22.00	1.00	0.28
FTC003	CENTRAL	B00304186	22.00	23.00	1.00	0.15
FTC003	CENTRAL	B00304187	23.00	24.00	1.00	0.22

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
FTC003	CENTRAL	B00304188	24.00	25.00	1.00	0.21
FTC003	CENTRAL	B00304189	25.00	26.00	1.00	0.08
FTC003	CENTRAL	B00304190	26.00	26.60	0.60	0.07
FTC003	CENTRAL	B00304191	26.60	27.60	1.00	0.44
FTC003	CENTRAL	B00304193	27.60	28.60	1.00	0.80
FTC003	CENTRAL	B00304194	28.60	29.50	0.90	0.95
FTC004	CENTRAL	B00304195	0.00	1.00	1.00	1.25
FTC004	CENTRAL	B00304196	1.00	2.00	1.00	0.55
FTC004	CENTRAL	B00304197	2.00	3.00	1.00	0.28
FTC004	CENTRAL	B00304198	3.00	4.00	1.00	0.38
FTC004	CENTRAL	B00304199	4.00	5.00	1.00	0.29
FTC004	CENTRAL	B00304201	5.00	6.00	1.00	0.35
FTC004	CENTRAL	B00304202	6.00	7.20	1.20	0.34
FTC005	CENTRAL	B00304203	0.00	1.00	1.00	0.05
FTC005	CENTRAL	B00304204	1.00	1.70	0.70	0.04
FTC005	CENTRAL	B00304205	1.70	2.40	0.70	0.02
FTC005	CENTRAL	B00304206	2.40	3.20	0.80	0.01
FTC005	CENTRAL	B00304207	3.20	4.20	1.00	0.06
FTC005	CENTRAL	B00304209	4.20	5.20	1.00	0.07
FTC005	CENTRAL	B00304210	5.20	6.20	1.00	0.13
FTC005	CENTRAL	B00304211	6.20	7.20	1.00	0.18
FTC005	CENTRAL	B00304212	7.20	8.20	1.00	0.48
FTC005	CENTRAL	B00304213	8.20	9.30	1.10	0.02
FTC005	CENTRAL	B00304214	9.30	10.00	0.70	0.01
FTC005	CENTRAL	B00304215	10.00	10.60	0.60	0.01
FTC005	CENTRAL	B00304217	10.60	11.60	1.00	0.01
FTC005	CENTRAL	B00304218	11.60	12.70	1.10	0.05
FTC005	CENTRAL	B00304219	12.70	13.70	1.00	0.03
FTC005	CENTRAL	B00304220	13.70	14.30	0.60	0.39
FTC005	CENTRAL	B00304221	14.30	15.00	0.70	0.26
FTC005	CENTRAL	B00304222	15.00	16.00	1.00	0.23
FTC005	CENTRAL	B00304223	16.00	17.00	1.00	0.18
FTC005	CENTRAL	B00304225	17.00	18.00	1.00	0.41
FTC005	CENTRAL	B00304226	18.00	18.80	0.80	0.13
FTC005	CENTRAL	B00304227	18.80	19.80	1.00	0.26
FTC005	CENTRAL	B00304228	19.80	20.80	1.00	0.37
FTC005	CENTRAL	B00304229	20.80	22.00	1.20	1.15
FTC005	CENTRAL	B00304230	22.00	23.00	1.00	0.07
FTC006	CENTRAL	B00304231	0.00	0.80	0.80	0.30
FTC006	CENTRAL	B00304233	0.80	1.80	1.00	0.29
FTC006	CENTRAL	B00304234	1.80	2.20	0.40	0.12
FTC006	CENTRAL	B00304235	2.20	3.20	1.00	0.12
FTC006	CENTRAL	B00304236	3.20	4.20	1.00	0.31
FTC006	CENTRAL	B00304237	4.20	5.00	0.80	0.20
FTC006	CENTRAL	B00304238	5.00	6.00	1.00	0.10
FTC006	CENTRAL	B00304239	6.00	7.00	1.00	0.26

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
FTC006	CENTRAL	B00304241	7.00	7.70	0.70	0.79
FTC006	CENTRAL	B00304242	7.70	8.50	0.80	0.12
FTC006	CENTRAL	B00304243	8.50	9.50	1.00	0.26
FTC006	CENTRAL	B00304244	9.50	10.30	0.80	0.05
FTC006	CENTRAL	B00304245	10.30	11.00	0.70	0.38
FTC006	CENTRAL	B00304246	11.00	12.40	1.40	0.43
FTC006	CENTRAL	B00304247	12.40	13.40	1.00	0.11
FTC006	CENTRAL	B00304249	13.40	14.00	0.60	0.06
FTC006	CENTRAL	B00304250	14.00	15.00	1.00	0.07
FTC006	CENTRAL	B00304251	15.00	16.00	1.00	0.13
FTC006	CENTRAL	B00304252	16.00	16.60	0.60	0.23
FTC006	CENTRAL	B00304253	16.60	17.20	0.60	0.02
FTC006	CENTRAL	B00304254	17.20	18.20	1.00	0.45
FTC006	CENTRAL	B00304255	18.20	19.20	1.00	0.23
FTC006	CENTRAL	B00304257	19.20	20.20	1.00	0.77
FTC006	CENTRAL	B00304258	20.20	21.20	1.00	0.02
HSC001	HASAGA	356958	0.00	1.00	1.00	0.09
HSC001	HASAGA	356957	1.00	2.00	1.00	0.68
HSC001	HASAGA	356955	2.00	3.00	1.00	0.39
HSC001	HASAGA	356954	3.00	4.00	1.00	0.28
HSC001	HASAGA	356953	4.00	5.00	1.00	1.09
HSC001	HASAGA	356952	5.00	6.00	1.00	0.60
HSC001	HASAGA	356951	10.80	11.80	1.00	0.35
HSC001	HASAGA	356950	11.80	12.80	1.00	0.21
HSC009	HASAGA	356922	0.00	0.45	0.45	0.26
HSC009	HASAGA	356923	0.45	1.45	1.00	0.31
HSC009	HASAGA	356924	1.45	1.95	0.50	0.24
HSC009	HASAGA	356925	1.95	2.89	0.94	0.43
HSC009	HASAGA	356926	2.89	3.61	0.72	0.50
HSC009	HASAGA	356927	3.61	4.61	1.00	0.64
HSC009	HASAGA	356929	4.61	5.61	1.00	0.36
HSC009	HASAGA	356930	5.61	6.61	1.00	0.32
HSC009	HASAGA	356931	6.61	7.61	1.00	0.23
HSC009	HASAGA	356932	7.61	9.31	1.70	0.45
HSC009	HASAGA	356933	9.31	11.10	1.79	0.72
HSC009	HASAGA	356934	11.10	12.20	1.10	0.68
HSC009	HASAGA	356935	12.20	13.30	1.10	0.65
HSC009	HASAGA	356937	13.30	14.40	1.10	0.06
HSC009	HASAGA	356938	14.40	15.50	1.10	0.39
HSC009	HASAGA	356939	15.50	16.60	1.10	0.06
HSC009	HASAGA	356946	16.60	16.70	0.10	0.54
HSC009	HASAGA	356940	16.70	17.00	0.30	0.22
HSC009	HASAGA	356947	17.00	18.00	1.00	0.12
HSC009	HASAGA	356941	18.00	18.90	0.90	0.32
HSC009	HASAGA	356942	18.90	19.90	1.00	0.22
HSC009	HASAGA	356943	19.90	20.90	1.00	0.09

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
HSC009	HASAGA	356949	20.90	21.65	0.75	0.04
HSC009	HASAGA	356948	21.65	22.35	0.70	0.23
HSC009	HASAGA	356944	22.35	23.20	0.85	0.46
HSC012	HASAGA	356916	0.00	1.00	1.00	0.35
HSC012	HASAGA	356915	1.00	2.00	1.00	0.30
HSC012	HASAGA	356914	2.00	3.00	1.00	0.88
HSC012	HASAGA	356913	3.00	4.00	1.00	0.74
HSC012	HASAGA	356911	4.00	5.00	1.00	0.28
HSC012	HASAGA	356921	5.00	6.00	1.00	0.30
HSC012	HASAGA	356919	6.00	7.00	1.00	0.99
HSC012	HASAGA	356918	7.00	8.00	1.00	0.18
HSC012	HASAGA	356917	8.00	9.00	1.00	0.43
HSC012	HASAGA	356910	9.00	10.00	1.00	0.82
HSC012	HASAGA	356909	10.00	11.00	1.00	0.46
HSC012	HASAGA	356908	11.00	12.00	1.00	0.36
HSC012	HASAGA	356907	12.00	13.00	1.00	0.46
HSC012	HASAGA	356906	13.00	14.00	1.00	0.16
HSC012	HASAGA	356905	14.00	15.00	1.00	0.10
HSC012	HASAGA	356903	15.00	16.00	1.00	0.55
HSC012	HASAGA	356902	16.00	17.10	1.10	0.58
HSC012	HASAGA	356901	17.10	18.10	1.00	0.03
HSC012	HASAGA	356900	18.10	19.10	1.00	0.56
HSC012	HASAGA	356899	19.10	20.10	1.00	2.33
HSC012	HASAGA	356897	20.10	21.10	1.00	0.13
HSC012	HASAGA	356896	21.10	22.10	1.00	0.07
HSC012	HASAGA	356895	22.10	23.10	1.00	0.33
HSC012	HASAGA	356894	23.10	24.10	1.00	0.55
HSC012	HASAGA	356893	24.10	25.10	1.00	0.34
HSC012	HASAGA	356892	25.10	26.10	1.00	0.08
HSC012	HASAGA	356891	26.10	27.10	1.00	0.05
HSC013	HASAGA	356876	0.00	1.00	1.00	0.14
HSC013	HASAGA	356877	1.00	2.00	1.00	0.15
HSC013	HASAGA	356878	2.00	3.00	1.00	0.03
HSC013	HASAGA	356879	3.00	4.00	1.00	0.09
HSC013	HASAGA	356880	4.00	5.00	1.00	0.07
HSC013	HASAGA	356881	13.00	14.00	1.00	0.57
HSC013	HASAGA	356883	14.00	15.00	1.00	0.46
HSC013	HASAGA	356884	15.00	16.00	1.00	0.38
HSC013	HASAGA	356885	16.00	17.00	1.00	0.41
HSC013	HASAGA	356886	17.00	18.00	1.00	0.17
HSC013	HASAGA	356887	18.00	19.00	1.00	0.56
HSC013	HASAGA	356888	19.00	20.00	1.00	0.16
HSC013	HASAGA	356889	20.00	20.60	0.60	0.27
HSC014	HASAGA	356867	0.00	1.00	1.00	0.02
HSC014	HASAGA	356868	1.00	2.00	1.00	0.10
HSC014	HASAGA	356869	2.00	3.00	1.00	0.13

Channel ID	Zone	Sample ID	From (m)	To (m)	Interval (m)	Au (ppm)
HSC014	HASAGA	356870	3.00	4.00	1.00	0.31
HSC014	HASAGA	356871	4.00	5.00	1.00	0.03
HSC014	HASAGA	356872	5.00	6.00	1.00	0.06
HSC014	HASAGA	356873	6.00	7.00	1.00	0.05
HSC014	HASAGA	356875	7.00	8.00	1.00	0.33
HSC015	HASAGA	356851	0.00	1.00	1.00	0.14
HSC015	HASAGA	356852	1.00	2.00	1.00	0.34
HSC015	HASAGA	356853	2.00	3.00	1.00	1.04
HSC015	HASAGA	356854	3.00	4.00	1.00	1.33
HSC015	HASAGA	356855	4.00	4.50	0.50	0.03
HSC016	HASAGA	356856	0.00	1.00	1.00	0.01
HSC016	HASAGA	356857	1.00	2.00	1.00	0.20
HSC016	HASAGA	356859	2.00	3.00	1.00	0.06
HSC016	HASAGA	356860	3.00	4.00	1.00	0.03
HSC016	HASAGA	356861	4.00	5.00	1.00	0.04
HSC016	HASAGA	356862	5.00	6.00	1.00	0.03
HSC016	HASAGA	356863	6.00	7.00	1.00	0.08
HSC016	HASAGA	356864	7.00	8.00	1.00	0.13
HSC016	HASAGA	356865	8.00	9.00	1.00	0.22
BFC001	BUFFALO	B00304001	0.00	0.50	0.50	0.15
BFC002	BUFFALO	B00304002	0.00	0.50	0.50	0.01
BFC003	BUFFALO	B00304003	0.00	1.00	1.00	0.22
BFC003	BUFFALO	B00304004	1.00	2.00	1.00	0.14
BFC003	BUFFALO	B00304005	2.00	3.00	1.00	0.14
BFC003	BUFFALO	B00304006	3.00	4.00	1.00	0.03
BFC003	BUFFALO	B00304007	4.00	5.00	1.00	0.03
BFC004	BUFFALO	B00304009	0.00	0.50	0.50	0.02
BFC005	BUFFALO	B00304010	0.00	1.00	1.00	0.01
BFC005	BUFFALO	B00304011	1.00	2.00	1.00	0.01
BFC005	BUFFALO	B00304012	2.00	3.00	1.00	0.01
BFC005	BUFFALO	B00304013	3.00	4.00	1.00	0.01
BFC005	BUFFALO	B00304014	4.00	4.50	0.50	0.01
DSC017	BUFFALO	B00304278	0.00	1.00	1.00	0.10
DSC017	BUFFALO	B00304279	1.00	2.00	1.00	0.20
DSC017	BUFFALO	B00304281	2.00	3.00	1.00	0.19
DSC017	BUFFALO	B00304282	3.00	4.00	1.00	0.11
DSC017	BUFFALO	B00304283	4.00	5.00	1.00	0.24
DSC017	BUFFALO	B00304284	5.00	6.00	1.00	0.82
DSC017	BUFFALO	B00304285	6.00	7.00	1.00	0.50
DSC017	BUFFALO	B00304286	7.00	8.00	1.00	0.23
DSC019	BUFFALO	B00304301	0.00	0.50	0.50	0.07

APPENDIX III
Summary of drill-holes completed by Premier Gold

HOLE-ID	ZONE	UTM -X	UTM-Y	UTM-Z	AZIMUTH	DIP	LENGTH
HLD001	CENTRAL	440647.60	5651973.60	376.38	33.64	-45.04	465.00
HLD002	CENTRAL	440653.40	5651976.40	376.38	180.03	-44.28	129.00
HLD003	CENTRAL	440654.40	5651982.40	376.23	0.00	-44.56	411.00
HLD004	CENTRAL	440728.80	5651950.00	378.40	28.60	-46.06	474.00
HLD005	CENTRAL	440727.00	5651946.00	378.45	185.00	-45.87	528.00
HLD006	CENTRAL	440807.20	5651934.40	376.46	30.10	-45.53	561.00
HLD007	CENTRAL	440804.80	5651932.40	376.38	205.40	-44.12	222.00
HLD008	CENTRAL	440798.90	5651920.00	376.67	304.80	-43.76	414.00
HLD009	CENTRAL	440800.80	5651917.60	376.81	120.50	-44.81	624.00
HLD010	CENTRAL	440798.80	5651911.20	376.94	168.10	-45.64	321.00
HLD011	CENTRAL	440932.90	5651953.60	376.59	32.40	-47.34	654.00
HLD012	CENTRAL	440932.00	5651952.40	376.60	212.60	-45.27	330.00
HLD013	CENTRAL	440931.90	5651944.40	376.74	305.18	-45.58	435.00
HLD014	CENTRAL	440934.20	5651941.60	376.79	154.38	-43.32	852.00
HLD015	CENTRAL	441033.00	5651944.40	378.39	347.03	-44.34	513.00
HLD016	CENTRAL	441037.60	5651927.20	379.41	36.80	-45.16	501.00
HLD017	CENTRAL	441034.70	5651925.60	379.52	216.49	-45.50	350.00
HLD018	CENTRAL	441145.50	5651852.00	381.54	36.09	-45.75	720.00
HLD019	CENTRAL	441145.50	5651851.60	381.53	38.49	-54.58	576.00
HLD020	CENTRAL	441145.50	5651851.60	381.53	67.85	-44.45	735.00
HLD021	CENTRAL	441142.60	5651848.40	381.65	152.13	-44.65	693.00
HLD022	CENTRAL	441145.50	5651850.40	381.51	110.65	-45.22	576.00
HLD023	CENTRAL	441145.50	5651850.40	381.51	112.49	-60.47	702.00
HLD024	CENTRAL	441142.60	5651850.40	381.68	154.15	-53.75	597.00
HLD025	CENTRAL	440849.30	5652014.00	368.12	35.14	-46.73	560.00
HLD026	CENTRAL	440846.90	5652011.60	368.29	214.13	-45.06	441.00
HLD027	CENTRAL	440846.90	5652014.00	368.09	212.77	-54.47	552.00
HLD028	CENTRAL	440846.90	5652012.00	368.25	211.93	-64.22	534.00
HLD029	CENTRAL	440916.90	5652140.80	372.43	215.30	-44.61	600.00
HLD030	CENTRAL	440918.40	5652143.20	372.56	216.25	-60.75	525.00
HLD031	CENTRAL	440920.30	5652146.40	372.72	37.71	-64.33	507.00
HLD032	CENTRAL	440921.20	5652145.60	372.63	38.15	-44.04	333.00
HLD033	CENTRAL	440879.50	5652096.80	368.38	214.45	-45.09	552.00
HLD034	CENTRAL	440880.40	5652097.60	368.44	216.01	-62.20	444.00
HLD035	CENTRAL	440883.30	5652097.60	368.52	35.13	-63.66	450.00
HLD036	CENTRAL	440884.30	5652098.40	368.59	34.44	-45.93	491.40
HLD037	CENTRAL	440851.20	5652180.80	377.51	219.85	-56.85	495.00
HLD038	CENTRAL	440851.20	5652180.00	377.54	219.21	-45.77	540.00
HLD039	CENTRAL	440755.40	5652185.60	373.78	217.13	-59.47	411.00
HLD040	CENTRAL	440669.10	5652048.40	367.25	216.74	-45.75	165.00
HLD041	CENTRAL	440755.40	5652184.80	373.83	216.24	-47.63	324.30
HLD042	CENTRAL	440755.60	5652032.80	367.54	214.56	-44.68	321.00
HLD043	CENTRAL	440701.90	5652239.60	369.00	2.49	-45.83	567.00
HLD044	CENTRAL	440790.70	5652086.00	367.18	213.31	-45.00	402.00
HLD045	CENTRAL	440699.90	5652233.60	369.38	178.39	-45.22	552.00
HLD046	CENTRAL	440695.80	5652086.40	367.06	217.09	-44.60	243.00

HOLE-ID	ZONE	UTM -X	UTM-Y	UTM-Z	AZIMUTH	DIP	LENGTH
HLD047	CENTRAL	440706.90	5652048.00	367.11	215.63	-44.52	225.00
HLD048	CENTRAL	440749.50	5652088.00	367.14	214.32	-44.66	312.00
HLD049	CENTRAL	440699.90	5652234.40	369.31	180.80	-58.12	549.00
HLD050	CENTRAL	440837.20	5652088.00	367.89	214.68	-46.63	495.00
HLD051	CENTRAL	440729.50	5652219.20	371.07	213.81	-44.32	261.00
HLD052	CENTRAL	440941.70	5652004.80	370.36	212.68	-44.96	525.00
HLD053	CENTRAL	440730.40	5652219.60	371.07	209.12	-59.43	378.00
HLD054	CENTRAL	440788.30	5652165.60	376.76	218.70	-45.01	414.00
HLD055	CENTRAL	440702.40	5651950.00	377.14	214.53	-46.52	135.00
HLD056	CENTRAL	440765.80	5651924.40	375.74	212.64	-46.30	375.00
HLD057	CENTRAL	440879.20	5652160.40	375.23	214.41	-45.02	468.00
HLD058	CENTRAL	440885.10	5651960.80	376.85	214.89	-45.28	510.00
HLD059	CENTRAL	440941.50	5652242.00	376.80	214.54	-45.13	528.00
HLD060	CENTRAL	440801.10	5652027.20	367.23	217.96	-45.85	453.00
HLD061	CENTRAL	440941.50	5652243.20	376.75	156.56	-44.88	567.00
HLD062	CENTRAL	440892.50	5652017.60	368.47	215.58	-44.77	450.00
HLD063	CENTRAL	440943.20	5652243.20	376.76	92.03	-46.35	598.00
HLD064	CENTRAL	440892.50	5652017.60	368.47	190.40	-81.60	402.00
HLD065	CENTRAL	440939.60	5652240.80	376.82	33.90	-45.28	600.00
HLD066	CENTRAL	440940.70	5652004.00	370.38	40.63	-45.42	594.00
HLD067	CENTRAL	440941.60	5652000.40	370.60	150.84	-44.05	561.00
HLD068	CENTRAL	440942.60	5652000.40	370.62	89.47	-44.96	600.00
HLD069	CENTRAL	440930.50	5652078.00	368.97	216.95	-46.22	600.00
HLD070	CENTRAL	440930.50	5652078.00	368.97	217.40	-80.72	420.00
HLD071	CENTRAL	441001.40	5652156.00	375.11	215.62	-81.82	288.00
HLD072	CENTRAL	441146.40	5652356.80	365.71	206.60	-75.06	420.00
HLD073	CENTRAL	441137.30	5652356.40	365.53	90.58	-46.12	537.20
HLD074	CENTRAL	441215.90	5652360.00	366.81	178.95	-53.59	528.00
HLD075	CENTRAL	441215.90	5652360.00	366.81	209.05	-46.16	564.00
HLD076	CENTRAL	441035.70	5651931.20	379.00	55.22	-51.52	501.00
HLD077	CENTRAL	440986.10	5651995.20	375.20	34.30	-37.07	496.00
HLD078	CENTRAL	440809.60	5652524.80	360.16	150.07	-64.41	450.00
HLD079	CENTRAL	440721.30	5652300.00	366.96	152.49	-65.58	450.00
HLD080	CENTRAL	440816.60	5652337.60	359.00	152.99	-60.00	420.00
HLD081	CENTRAL	441173.10	5651796.00	377.71	28.86	-36.26	78.00
HLD082	CENTRAL	440932.50	5652418.40	365.97	152.35	-66.40	402.00
HLD083	CENTRAL	441267.90	5651871.20	372.51	27.31	-36.95	570.60
HLD084	CENTRAL	441044.20	5652504.80	362.33	346.70	-37.28	579.00
HLD085	CENTRAL	441268.80	5651870.00	372.49	47.95	-38.07	465.00
HLD086	CENTRAL	441039.40	5652502.00	361.92	89.46	-35.00	607.70
HLD087	CENTRAL	441254.40	5651817.60	378.65	90.60	-34.85	381.00
HLD088	CENTRAL	440810.60	5652524.80	360.17	273.78	-35.23	591.00
HLD089	CENTRAL	441220.80	5652365.60	366.51	48.15	-35.74	504.00
HLD090	CENTRAL	440856.80	5652421.00	361.83	153.62	-65.81	450.00
HLD091	CENTRAL	441218.90	5652363.20	366.60	137.28	-36.00	621.00
HLD092	CENTRAL	441143.10	5652354.00	365.91	42.09	-37.05	627.00

HOLE-ID	ZONE	UTM -X	UTM-Y	UTM-Z	AZIMUTH	DIP	LENGTH
HLD093	CENTRAL	440800.90	5652262.40	368.23	151.70	-60.01	465.00
HLD094	CENTRAL	440933.50	5652418.40	365.97	333.31	-34.80	501.00
HLD095	CENTRAL	440933.40	5652416.80	365.87	2.97	-35.37	549.00
HLD096	CENTRAL	441262.80	5651847.60	373.83	79.77	-35.47	423.00
HMP001	HASAGA	442090.00	5651684.80	385.28	330.80	-44.31	402.00
HMP002	HASAGA	441991.20	5651636.40	390.31	328.70	-45.61	495.00
HMP003	HASAGA	441991.20	5651636.40	390.31	330.00	-45.65	324.00
HMP004	HASAGA	442113.40	5651640.00	384.67	330.70	-44.87	396.00
HMP005	HASAGA	441964.40	5651683.20	387.48	329.90	-45.80	243.00
HMP006	HASAGA	441913.10	5651595.60	391.91	331.78	-44.82	483.00
HMP007	HASAGA	442127.80	5651600.00	383.95	334.33	-44.78	444.00
HMP008	HASAGA	442030.50	5651592.40	387.00	332.75	-44.75	375.00
HMP009	HASAGA	441887.00	5651631.00	387.23	332.00	-45.00	228.00
HMP010	HASAGA	441932.20	5651546.40	388.90	330.47	-45.15	378.00
HMP011	HASAGA	442046.30	5651545.00	384.75	332.00	-45.00	444.00
HMP012	HASAGA	441884.00	5651639.00	386.62	305.00	-45.50	255.00
HMP013	HASAGA	442126.00	5651776.00	383.67	329.42	-45.48	282.00
HMP014	HASAGA	441826.40	5651550.00	389.28	330.06	-44.51	360.00
HMP015	HASAGA	441753.10	5651683.20	363.90	337.05	-44.80	150.00
HMP016	HASAGA	441834.80	5651748.80	364.86	330.37	-44.69	150.00
HMP017	HASAGA	441646.10	5651374.40	382.84	330.09	-46.01	429.00
HMP018	HASAGA	441679.30	5651302.00	381.61	332.30	-44.64	542.00
HMP019	HASAGA	441554.10	5651331.20	377.76	333.21	-45.97	431.00
HMP020	HASAGA	441676.80	5651339.60	382.72	331.32	-45.19	525.00
HMP021	HASAGA	441492.30	5651247.00	380.16	330.08	-46.01	435.00
HMP022	HASAGA	441734.40	5651426.40	384.53	331.46	-45.04	621.00
HMP023	HASAGA	441445.90	5651312.00	368.00	332.38	-45.33	393.00
HMP024	HASAGA	441388.60	5651237.60	371.53	331.89	-45.42	384.00
HMP025	HASAGA	441826.40	5651464.80	387.77	335.79	-44.68	357.00
HMP026	HASAGA	441384.00	5651238.00	371.46	300.00	-45.00	450.00
HMP027	HASAGA	441773.80	5651483.20	386.26	328.10	-47.70	345.00
HMP028	HASAGA	441844.20	5651432.10	387.96	332.00	-45.00	504.00
HMP029	HASAGA	441303.80	5651148.80	376.86	332.00	-45.00	516.00
HMP030	HASAGA	441761.20	5651380.00	383.04	332.00	-45.00	612.00
HMP031	HASAGA	441302.80	5651148.80	376.80	300.00	-45.00	403.70
HMP032	HASAGA	441782.30	5651340.00	377.73	332.00	-45.00	625.00
HMP033	HASAGA	441350.60	5651098.40	385.67	332.00	-45.00	582.00
HMP034	HASAGA	441871.90	5651386.40	381.68	332.00	-45.00	573.00
HMP035	HASAGA	441274.00	5651016.00	386.04	332.00	-45.00	534.00
HMP036	HASAGA	441887.20	5651340.40	379.78	332.00	-45.00	714.00
HMP037	HASAGA	441379.50	5651062.00	381.28	332.00	-45.00	615.00
HMP038	HASAGA	441817.50	5651314.40	375.18	332.00	-45.00	681.00
HMP039	HASAGA	441427.40	5651148.80	386.54	333.60	-44.98	582.00
HMP040	HASAGA	441724.20	5651244.80	384.73	336.50	-45.28	690.00
HMP041	HASAGA	441450.80	5651092.80	381.80	332.95	-45.30	562.30
HMP042	HASAGA	441513.70	5651191.60	383.00	336.46	-43.90	573.00

HOLE-ID	ZONE	UTM -X	UTM-Y	UTM-Z	AZIMUTH	DIP	LENGTH
HMP043	HASAGA	441607.60	5651442.40	369.22	331.70	-32.82	216.00
HMP044	HASAGA	441607.60	5651442.40	369.22	330.70	-46.27	417.00
HMP045	HASAGA	441544.80	5651148.00	384.03	332.22	-44.47	660.00
HMP046	HASAGA	441607.60	5651441.60	369.26	330.87	-53.88	351.00
HMP047	HASAGA	441605.60	5651442.40	369.09	310.80	-33.00	351.00
HMP048	HASAGA	441578.60	5651290.40	381.26	333.26	-46.38	504.00
HMP049	HASAGA	441606.20	5651441.90	369.15	310.48	-41.61	357.00
HMP050	HASAGA	441606.60	5651441.40	369.20	310.46	-50.43	282.00
HMP051	HASAGA	441601.00	5651245.60	382.75	333.68	-44.72	582.00
HMP052	HASAGA	441608.60	5651441.00	369.35	351.68	-32.54	333.00
HMP053	HASAGA	441607.60	5651440.40	369.32	351.70	-42.01	414.00
HMP054	HASAGA	441624.10	5651206.00	383.00	333.18	-45.00	684.00
HMP055	HASAGA	441608.50	5651441.40	369.33	351.93	-51.24	408.00
HMP057	HASAGA	441537.40	5651382.40	368.71	334.69	-32.85	420.00
HMP058	HASAGA	441540.50	5651146.00	384.10	334.05	-48.26	726.00
HMP059	HASAGA	441537.40	5651380.80	368.87	333.05	-52.92	378.00
HMP060	HASAGA	441535.00	5651382.00	368.17	306.19	-31.65	267.00
HMP061	HASAGA	441449.30	5651091.00	381.77	338.08	-48.72	678.90
HMP062	HASAGA	441536.40	5651380.80	368.79	309.88	-49.14	375.00
HMP063	HASAGA	441536.40	5651380.80	368.79	309.10	-60.70	378.00
HMP064	HASAGA	441541.50	5651148.00	384.07	158.44	-45.47	558.00
HMP065	HASAGA	441467.00	5651314.00	368.62	332.40	-30.00	306.00
HMP066	HASAGA	441541.50	5651148.80	384.06	157.26	-52.77	534.00
HMP067	HASAGA	441464.80	5651315.20	368.52	320.52	-32.44	306.00
HMP068	HASAGA	441464.80	5651315.20	368.52	319.65	-42.46	363.00
HMP069	HASAGA	441405.00	5651202.40	377.44	333.84	-45.19	534.00
HMP070	HASAGA	441464.80	5651314.00	368.56	320.75	-50.85	381.00
HMP071	HASAGA	441383.90	5651240.40	371.28	334.68	-32.17	363.00
HMP072	HASAGA	441737.20	5651424.00	384.34	151.26	-44.87	600.00
HMP073	HASAGA	441381.50	5651240.40	371.16	327.25	-31.27	324.00
HMP074	HASAGA	441381.50	5651240.40	371.16	319.00	-41.01	384.70
HMP075	HASAGA	441381.50	5651240.40	371.16	319.00	-51.75	516.00
HMP076	HASAGA	441242.80	5651096.80	377.81	334.61	-34.57	417.00
HMP077	HASAGA	441242.80	5651096.80	377.81	334.20	-42.80	441.00
HMP078	HASAGA	441243.80	5651094.40	377.99	332.00	-55.00	619.00
HMP079	HASAGA	441242.80	5651096.80	377.81	322.68	-34.15	381.00
HMP080	HASAGA	441243.80	5651096.80	377.84	322.37	-40.47	150.00
HMP081	HASAGA	441242.80	5651096.80	377.81	320.82	-48.48	459.00
HMP082	HASAGA	441243.80	5651096.80	377.84	345.07	-34.05	351.00
HMP083	HASAGA	441243.80	5651096.80	377.84	347.98	-39.73	513.00
HMP084	HASAGA	441245.20	5651096.80	377.88	346.17	-49.66	480.00
HMP085	HASAGA	441391.20	5651460.40	366.99	332.67	-38.99	310.50
HMP086	HASAGA	441349.60	5651428.00	367.06	334.09	-37.04	245.00
HMP087	HASAGA	441323.50	5651364.40	368.29	332.58	-35.06	270.00
HMP088	HASAGA	441424.10	5651362.40	368.09	331.94	-36.79	228.00
HMP089	HASAGA	441407.30	5651406.00	367.78	331.80	-35.97	369.00

HOLE-ID	ZONE	UTM -X	UTM-Y	UTM-Z	AZIMUTH	DIP	LENGTH
HMP090	HASAGA	441421.40	5651468.00	367.47	343.65	-37.10	132.00
HMP091	HASAGA	441461.30	5651430.40	367.91	330.72	-36.38	333.00
HMP092	HASAGA	441484.80	5651394.00	367.91	331.48	-35.00	318.00
HMP093	HASAGA	441481.10	5651488.00	368.00	333.17	-36.14	141.00
HMP094	HASAGA	441512.70	5651444.40	368.38	331.35	-31.52	201.00
HMP095	HASAGA	441527.80	5651416.80	368.23	332.13	-46.74	249.00
HMP096	HASAGA	441392.70	5651344.00	368.01	331.62	-35.00	282.00
HMP097	HASAGA	441372.10	5651384.00	367.86	331.14	-36.50	291.00
HMP098	HASAGA	441310.50	5651400.40	367.80	332.92	-35.52	210.00
HMP099	HASAGA	441526.20	5651489.60	368.72	333.40	-35.65	204.00
HMP100	HASAGA	441567.80	5651443.20	368.63	334.17	-34.63	234.00
HMP101	HASAGA	441303.90	5651326.40	368.04	332.88	-37.18	300.00
HMP102	HASAGA	441140.50	5651032.00	378.37	332.18	-35.00	483.00
HMP103	HASAGA	441071.20	5650970.40	381.53	335.43	-35.81	471.00
HMP104	HASAGA	441303.90	5651326.40	368.04	315.79	-32.95	219.00
HMP105	HASAGA	441303.90	5651324.80	368.05	290.24	-35.22	270.00
HMP106	HASAGA	441303.90	5651324.80	368.05	250.52	-34.70	240.00
HMP107	HASAGA	441304.80	5651326.00	368.04	257.85	-46.32	216.00
HMP108	HASAGA	441304.80	5651326.00	368.04	287.68	-46.86	261.00
HMP109	BUFFALO	440924.80	5651238.40	372.94	151.24	-32.23	150.00
HMP110	HASAGA	441304.80	5651324.80	368.06	308.56	-47.23	306.00
HMP111	BUFFALO	440908.40	5651274.00	374.87	151.65	-35.36	345.00
HMP112	HASAGA	441169.60	5650981.60	388.05	334.82	-32.10	525.00
HMP113	BUFFALO	440888.80	5651316.00	374.58	155.22	-50.38	246.00
HMP114	BUFFALO	440605.80	5651005.60	382.37	153.54	-33.17	342.00
HMP115	HASAGA	441190.80	5650952.80	388.31	331.21	-30.61	469.40
HMP116	BUFFALO	440746.90	5651150.00	379.44	152.30	-32.59	405.00
HMP117	HASAGA	441191.80	5650951.60	388.34	331.36	-44.59	552.00
HMP118	BUFFALO	440990.50	5651325.60	377.54	151.08	-32.00	480.00
HMP119	BUFFALO	441092.90	5650936.80	383.30	332.45	-36.65	472.50
HMP120	BUFFALO	440364.80	5651010.00	380.99	152.49	-35.00	585.70
HMP121	BUFFALO	440131.40	5651004.40	379.07	149.91	-34.92	600.00
HMP122	BUFFALO	440248.30	5651005.60	379.58	150.67	-35.27	513.00
HMP123	BUFFALO	440499.20	5650983.60	381.31	152.90	-34.85	489.00
HMP124	BUFFALO	440651.90	5651134.40	380.83	153.86	-35.18	480.00
HMP125	BUFFALO	440771.10	5651254.00	382.29	149.52	-34.23	441.00
HMP126	BUFFALO	440712.60	5651248.80	384.61	150.70	-35.46	443.70
HMP127	BUFFALO	439759.40	5650916.80	364.28	162.34	-60.73	255.00
HMP128	BUFFALO	439751.40	5650887.60	362.34	150.77	-60.69	234.00
HMP129	BUFFALO	439781.50	5650838.40	361.00	151.00	-60.85	252.00
HMP130	BUFFALO	439796.40	5650807.60	364.02	153.48	-60.56	200.00
HMP131	BUFFALO	439847.70	5650928.40	368.39	148.88	-50.71	249.00
HMP132	BUFFALO	439866.90	5650888.00	364.55	149.37	-51.46	252.00
HMP133	BUFFALO	439898.10	5650857.20	362.33	149.53	-49.35	231.00
HMP134	BUFFALO	439945.10	5650772.40	362.57	152.33	-59.39	135.00
HMP135	BUFFALO	439955.00	5650921.60	372.25	150.81	-45.39	186.00

HOLE-ID	ZONE	UTM -X	UTM-Y	UTM-Z	AZIMUTH	DIP	LENGTH
HMP136	BUFFALO	439789.80	5650932.80	366.48	152.36	-51.07	429.00
HMP137	BUFFALO	439809.60	5650908.40	362.21	154.96	-37.39	75.00
HMP138	BUFFALO	439910.20	5650907.20	368.52	152.60	-51.36	63.00
HMP139	BUFFALO	439910.20	5650906.00	368.32	152.45	-36.41	261.00
HMP140	BUFFALO	439784.10	5650936.00	366.57	13.90	-35.91	536.40
HMP141	BUFFALO	439925.20	5650714.40	366.87	330.30	-70.49	489.00
HMP142	BUFFALO	439882.80	5650769.60	363.99	0.57	-35.00	165.00
HMP143	BUFFALO	439830.40	5650798.00	364.27	0.22	-35.00	141.00
HMP144	BUFFALO	439798.70	5650754.00	360.21	16.28	-62.33	388.00
HMP145	BUFFALO	439798.70	5650754.00	360.21	20.89	-51.10	222.00
HMP146	BUFFALO	439839.50	5650718.40	360.16	25.38	-45.00	234.00
HMP147	BUFFALO	439839.50	5650718.40	360.16	25.88	-60.09	306.00
HMP148	BUFFALO	439916.50	5650744.40	363.85	18.73	-39.48	141.00
HMP149	BUFFALO	439761.70	5650784.00	362.88	12.01	-76.07	399.00
HMP150	BUFFALO	439925.20	5650712.80	366.91	17.77	-75.99	394.90
HNG002	NORTH GATE	440230.20	5653092.80	367.61	215.77	-44.53	537.00
HNG003	NORTH GATE	440370.80	5652984.00	367.67	217.78	-44.56	543.00
HNG004	NORTH GATE	440449.50	5652703.20	371.51	216.03	-44.85	558.00
HNG005	NORTH GATE	440448.00	5652703.20	371.53	125.33	-46.52	561.00
HNG006	NORTH GATE	440496.40	5653116.80	371.80	35.45	-44.56	504.00
HNG007	NORTH GATE	440627.40	5653053.60	374.68	36.25	-46.00	527.50
HNG008	NORTH GATE	440785.80	5652868.00	384.93	37.77	-44.28	552.00
HNG009	NORTH GATE	440884.30	5652769.60	370.00	36.95	-45.15	456.00
HNG010	NORTH GATE	441017.16	5652557.64	370.27	34.23	-43.89	564.00
HNG010WA	NORTH GATE	441017.16	5652557.64	370.27	34.23	-43.89	426.00
HNG010WB	NORTH GATE	441017.16	5652557.64	370.27	34.23	-43.89	531.00
HNG010WC	NORTH GATE	441017.16	5652557.64	370.27	34.23	-43.89	564.00
HNG010WD	NORTH GATE	441017.16	5652557.64	370.27	34.23	-43.89	537.00
HSC001	HASAGA	441583.40	5651552.40	372.93	328.00	0.00	12.80
						Total (m)=	**110166.20**

APPENDIX IV
Summary of Phase 1 Metallurgical Testwork and Results

HASAGA

Metallurgical Scoping Study

Red Lake, Ontario

Jacobs Project Number: 09RR8500

Rev. No.	Issue Date	Rev Description	Prepared By	Dept. Approval	PM Approval
A	9/28/16	Issued For Review	R. Bohling		J. Taylor

Prepared By:

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1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

Premier Gold Mines Limited (Premier) is currently performing exploration work on their Hasaga Project property near Red Lake, Ontario. Premier retained Jacobs Minerals Inc., to develop a metallurgical scoping program and analyze the results from the program to support Premier Gold in their evaluation and development of the Hasaga resource.

Premier has conducted a drill program targeting two potential resource zones at the Hasaga Project site, the Hasaga Zone and the Central Zone. NQ size core was collected by the diamond drilling program for interval assaying and for use in a scoping metallurgical test program.

This report summarizes the objectives of the program, the samples selected for the program, the tests results, and conclusions and recommendations developed based on the test results.

1.2 EXECUTIVE SUMMARY

A metallurgical program was developed by Jacobs to test representative samples from the Hasaga Zone and the Central Zone with the following objectives:

- To develop the initial metallurgical data to evaluate resource targets at the project site.
- Testing to project process precious metal extractions by cyanidation and influences on metal extractions by cyanidation.
- Testing to develop preliminary reagent consumptions for the resource targets.

The following are key conclusions from the study:

- The metallurgical scoping tests indicate that the Hasaga and Central zone composites with the mineralogy tested are not refractory and should be amenable to conventional whole ore cyanidation and yield gold extractions above 90%.
- The scoping tests indicate that there is a “nugget” effect in gold assaying that needs further investigation in metallurgical testing and drill interval assaying.
- The limited tests indicate that a significant portion of the gold in both zones is likely recoverable using gravity concentration, however, additional testing will be required to determine if this will be beneficial in a process flowsheet.
- The tests indicate that the geochemistry, precious metal occurrence and association have significant effects on metal extractions, leach kinetics, and slurry properties and that will need further investigation to fully understand and incorporate into a resource model as the project advances.
- Based on the limited testing, there do not appear to be unusual or significant deleterious factors that would seriously impact processing the resources or impair the project, however, additional testing, particularly pre-feasibility level metallurgical testing and environmental testing, will be needed to fully determine and assess factors that could have significant or deleterious effects on the project.

The following are the major recommendations for the project:

Resource Geologic Domains

- It is recommended that the geology, geochemistry, and initial metallurgy in the Hasaga and Central zones be reviewed to determine if delineation of specific geologic domains or sub-zones within each zone is needed in building the resource model and to guide future test programs.

Investigation of Assaying "Nugget" Effect

- Since the metallurgical program revealed a gold "nugget" effect between the various assays it is recommended that a program to examine drill hole gold assays for variability due to nugget or large particle free gold be conducted. This would include examination of typical fire assaying versus screen metallic fire assaying.
- It is recommended that all future metallurgical programs include screen metallic fire assaying and triplicate fire assaying on all test head samples to broaden the statistical data base regarding the "nugget" effect.

Additional Scoping Tests on Initial Metallurgical Composites

- It is recommended that QEMSCAN – RMS tests be run on composites 2, 5, 6, and 8 as these cover a range of geochemistry and gold occurrence and associations and would develop initial information on gangue and sulfide mineralogy and metal associations to aid in understanding the metallurgy of the portions of the resources these composite represent.
- Acid/Base accounting and Net-Acid Generation tests should be considered to start building an environmental data again with composites 2, 5, 6, and 8.

Next Phase Metallurgical Test program

The next recommendations assume that the project will be advancing and require building the metallurgical database to support a Preliminary Economic Assessment and Pre-Feasibility phases.

- To support a Pre-Feasibility Study the following is recommended:
    - Based on updated definitions of the geologic domains in the Hasaga and Central Zones delineate and select intervals for metallurgical samples that are representative of the various types of mineralization and the metal grade range within the respective mineralization types. The number of discrete samples could range from 30 to 50.
    - The preliminary list of metallurgical and environmental tests is as follows:
        - Head Characterization
        - Comminution Tests – Based on positive results from tests in progress.
        - Cyanidation Leaching & Gravity Concentration
        - Column Leaching
        - Solid / Liquid Separation
        - Mineralogy
        - Environmental Tests

2.0 DISCUSSION

2.1 PROJECT & SCOPING STUDY DESCRIPTIONS

Hasaga Project

Premier holds a 100% interest in the historic Hasaga Property, which is located just south of Rahill-Bonanza in the heart of the Red Lake gold mining district in Northwestern Ontario.

The Hasaga property is host to the past producing Hasaga and Gold Shore mines. It is located near the Balmer-Confederation regional unconformity which is recognized as an important geologic feature for the historic and currently operating mine in the Red Lake area. (1)

Area History

The Hasaga Project is located in the historic Red Lake Ontario gold mining district.

The region has produced more than 20 million ounces of gold as reported by various sources. (2) Gold production has been relatively continuous since 1930 when the Howey Gold Mine first entered into production. Principal mines in the Red Lake area include the Campbell Mine, the Red Lake Mine, the Cochenour-Willans Mine, and the Madsen Mine.

The majority of gold deposits in the Red Lake belt are quartz and arsenopyrite rich selective replacement zones of colloform-crustiform ferroan-dolomite veins and breccia. (2) Gold occurrence in the region is variable by geologic domain. Gold may be found as free or native gold or closely associated with sulfides, particularly arsenopyrite. Gold grades are variable and may range up over 2.0 ounces/ton (opt). (2)

The historical literature indicates that gold milling circuits were either based on standard free milling or non-refractory processing or refractory sulfide ore processes. The following table 2.1.1 shows a short summary of processes employed at the documented mills:

Table 2.1.1 – Historical Metallurgical Processes in Red Lake Area Mills

Mill	McKenzie Red Lake (3)	Red Lake Gold Shore (4)	Madsen Mill (5)	Campbell Red Lakes (6)	Campbell Red Lakes (7) (8)
Year	1937	1936	1950	1975	1994/1997
Type Ore	Non-Refractory	Non-Refractory	Non-Refractory	Refractory	Refractory
Gravity Circuit	--	X	X	X	X
Amalgamation of Gravity Conc.	--	X	X	X	--
Whole Ore Cyanidation	X	X	X	--	--
Flotation	--	--	--	X	X
Cyanidation of Flot Tailings	--	--	--	X	X
Roasting Of Flot Conc	--	--	--	X	--
Cyanidation of Calcine	--	--	--	X	--
Pressure Oxidation	--	--	--	--	X
Cyanidation of POX Discharge	--	--	--	--	X

It is important to note that a gravity gold recovery circuit was included in most of the mills in the area including those treating refractory ores.

Resource Targets

Premier has conducted a drill program targeting two potential resource zones, the Hasaga Zone, and the Central Zone. NQ size core was collected by the diamond drilling program for interval assaying and for use in the metallurgical scoping program.

Metallurgical Composite Selection

Premier and Jacobs personnel reviewed the drill hole data and selected a total of eight (8) drill holes, four from the Hasaga Zone and four from the Central Zone from which eleven composites were constructed for metallurgical scoping tests. The selection of composites considered the following in regard to metallurgical programs for resource target advancement:

- Test samples should be representative of the various types and styles of mineralization and the mineral deposit as a whole.
- Testing should examine processing factors or deleterious elements that could have a significant effect on potential economic evaluation.
- Samples should be constructed to quantify and design for the variable nature of the deposit, particularly for the first four to five years of operation when cash flow is critical for financing requirements.
- Samples should be taken to represent the resource spatially (length, breadth, and depth), the lithologies, rock types, oxidation zones, and the grade variation associated within the resource.

Metallurgical Program Objectives

A metallurgical program was developed by Jacobs with the following objectives:

- To develop the initial metallurgical data to evaluate resource targets at the project site.
- Testing to project process precious metal extractions by cyanidation and influences on metal extractions by cyanidation.
- Testing to develop preliminary reagent consumptions for the resource targets.

Metallurgical Scoping Test Program

SGS Canada in Lakefield, Ontario was selected to perform the following scope of work:

- o Perform a suite of head assay tests to understand precious metal content and association with other elements and compounds.
- o Perform metallic screen fire assay on selected samples to develop an initial understanding of precious metal size potential head assay variability due to native metal content.
- o Perform a program of bottle roll cyanidation tests to evaluate cyanide soluble precious metals on composites.
- o Perform Bond Ball Mill Work Index determinations on selected composites to develop an initial understanding of the resource hardness for comminution design and economics.
- o Perform Knelson gravity concentration tests to assess potential for precious metal recovery by gravity concentration.

- o Based on bottle roll results, perform additional testing which may include:
    - QEMSCAN (TMS PMA) mineralogy on poor responding samples with significant precious metal head grades.
    - Perform gold diagnostic leach tests to assess gold deportment in selected composites.

2.2 COMPOSITES

The following Table 2.2.1 shows a summary of the composites selected for the metallurgical scoping program:

Table 2.2.1 – Metallurgical Scoping Test Composite Summary

Comp #	Drill Hole	From - m	To - m	Total Length - m	Zone	Rock type	Wt Received at SGS - kg	Estimated sample Au gpt	Estimated sample Au opt
1	**HMP022**	349	370	21	Hasaga	Porphyry / Mafic Vol	49.4	0.71	0.021
2	**HMP021**	327	333	6	Hasaga	Porphyry	13.0	1.49	0.043
3	**HMP021**	333	352	19	Hasaga	Porphyry	39.8	0.72	0.021
4	**HMP092**	70	99	29	Hasaga	Felsic Vol / Porphyry	64.1	0.69	0.020
5	**HMP094**	93	107	14	Hasaga	Porphyry / Felsic Vol	27.1	1.74	0.051
6	**HLD004**	94	109	15	Central	Granodiorite / Mafic Dyke	28.4	4.38	0.128
7	**HLD004**	109	125	16	Central	Granodiorite	33.9	2.90	0.085
8	**HLD005**	53	70	17	Central	Laverty Dyke / Granodiorite	41.7	2.79	0.081
9	**HLD006**	10	26	16	Central	Granodiorite / Mafic Dyke	31.4	0.55	0.016
10	**HLD042**	141	171	30	Central	Granodiorite	68.1	1.40	0.041
11	**HLD042**	171	194	23	Central	Granodiorite	53.1	0.43	0.012

Note: gpt = grams per metric ton, opt = troy ounce per short ton

Details of the composite construction showing the individual interval information for each composite are shown in Appendix B.

2.3 MET TEST PROGRAM - SAMPLE PREP & TESTS SPECIFIED

The basic content of the metallurgical scoping test program is described in Section 2.1 of this report.

The testwork was performed at SGS Lakefield, Ontario laboratory.

A flowsheet showing the specifics for sample preparation and tests to be performed on the composites was prepared by Jacobs and provided to SGS. The sample preparation flowsheet is shown as the following diagram 2.3.1. A larger version of the flowsheet is attached in Appendix C.

Additionally, a spreadsheet was prepared and provided to SGS specifying the tests to be performed on each composite. The spreadsheet showing the worked performed on each composite is shown in Table 2.3.1.

Diagram 2.3.1 – Composite Preparation Flowsheet

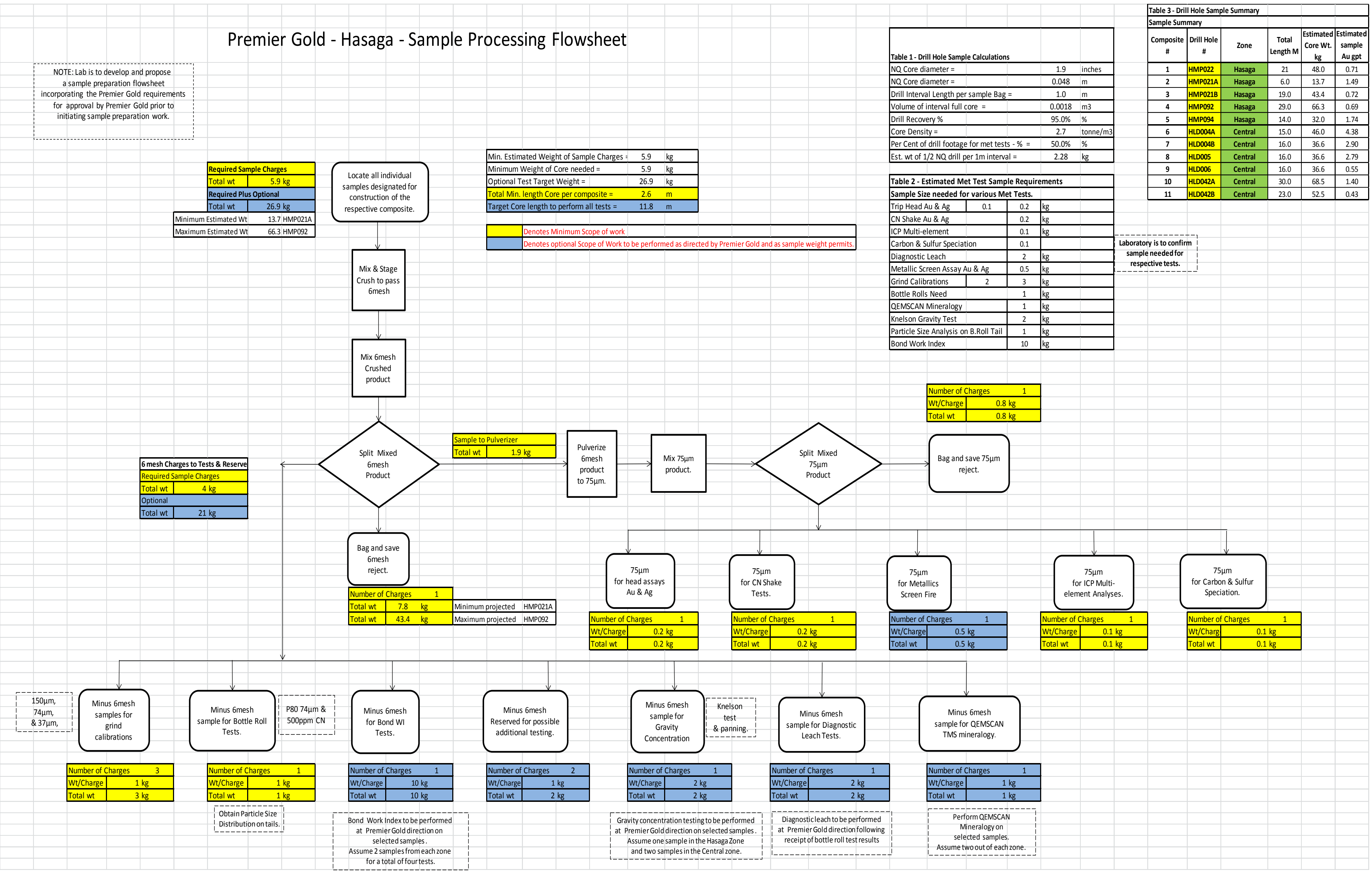


Table 1 - Drill Hole Sample Calculations

NQ Core diameter =	1.9	inches
NQ Core diameter =	0.048	m
Drill Interval Length per sample Bag =	1.0	m
Volume of interval full core =	0.0018	m3
Drill Recovery %	95.0%	%
Core Density =	2.7	tonne/m3
Per Cent of drill footage for met tests - % =	50.0%	%
Est. wt of 1/2 NQ drill per 1m interval =	2.28	kg

Table 2 - Estimated Met Test Sample Requirements

Sample Size needed for various Met Tests.

Trip Head Au & Ag	0.1	0.2	kg
CN Shake Au & Ag		0.2	kg
ICP Multi-element		0.1	kg
Carbon & Sulfur Speciation		0.1	
Diagnostic Leach		2	kg
Metallic Screen Assay Au & Ag		0.5	kg
Grind Calibrations	2	3	kg
Bottle Rolls Need		1	kg
QEMSCAN Mineralogy		1	kg
Knelson Gravity Test		2	kg
Particle Size Analysis on B.Roll Tail		1	kg
Bond Work Index		10	kg

Table 3 - Drill Hole Sample Summary

Sample Summary

Composite #	Drill Hole #	Zone	Total Length M	Estimated Core Wt. kg	Estimated sample Au gpt
1	HMP022	Hasaga	21	48.0	0.71
2	HMP021A	Hasaga	6.0	13.7	1.49
3	HMP021B	Hasaga	19.0	43.4	0.72
4	HMP092	Hasaga	29.0	66.3	0.69
5	HMP094	Hasaga	14.0	32.0	1.74
6	HLD004A	Central	15.0	46.0	4.38
7	HLD004B	Central	16.0	36.6	2.90
8	HLD005	Central	16.0	36.6	2.79
9	HLD006	Central	16.0	36.6	0.55
10	HLD042A	Central	30.0	68.5	1.40
11	HLD042B	Central	23.0	52.5	0.43

Table 2.3.1 – Summary of Tests Specified by Composite

Sample Summary			Schedule of Tests for each drill hole Composite												
Composite #	Drill Hole #	Zone	Basic Prep	Triplicate Head Fire Assays Au & Ag	CN Shake Tests	ICP Multi-element	Carbon & Sulfur Speciation	Screen Fire Metallics	Grind Calibrations	Bottle Roll @ 200mesh grind	Bond BM WI	Knelson Gravity Test	Diagnostic Leach	Mineralogy - QEMSCAN TMS
1	HMP022	Hasaga	1	1	1	1	1	0	1	1	0	0	0	0
2	HMP021	Hasaga	1	1	1	1	1	1	1	1	0	1	1	0
3	HMP021	Hasaga	1	1	1	1	1	0	1	1	1	0	0	1
4	HMP092	Hasaga	1	1	1	1	1	0	1	1	0	0	1	0
5	HMP094	Hasaga	1	1	1	1	1	1	1	1	1	1	0	1
6	HLD004	Central	1	1	1	1	1	1	1	1	1	1	1	1
7	HLD004	Central	1	1	1	1	1	1	1	1	0	1	0	0
8	HLD005	Central	1	1	1	1	1	1	1	1	1	1	1	0
9	HLD006	Central	1	1	1	1	1	0	1	1	0	0	0	1
10	HLD042	Central	1	1	1	1	1	0	1	1	0	0	0	0
11	HLD042	Central	1	1	1	1	1	0	1	1	0	0	0	0
Totals			**11.0**	**11.0**	**11.0**	**11.0**	**11.0**	**5.0**	**11.0**	**11.0**	**4.0**	**5.0**	**4.0**	**4.0**

2.4 METALLURGICAL TEST RESULTS

The following sections summarize the metallurgical test results. The SGS report for the program is attached as Appendix D.

Composite Head Assays

The following assays were performed on splits from each composite:

- Triplicate Fire Assay for Gold
- Screen Metallics Fire Assay for Gold
- Cyanide Soluble Shake Tests for Gold and Silver
- Arsenic
- Sulfur Speciation (Total Sulfur, Sulfide Sulfur, Sulfate Sulfur, Elemental Sulfur)
- Carbon Speciation (Total Carbon, Total Organic Carbon)
- Carbonate
- ICP Multi-element scan for twenty-nine elements

Gold Head Assays

The following table 2.4.1 shows a summary of the various gold head assays on each composite in comparison to the predicted gold head (the weighted average of drill intervals from which the composite was constructed) and the calculated bottle test head assay. .

Table 2.4.1 – Summary of Composite Gold Head Assays

	Unit	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Comp 9	Comp 10	Comp 11
Zone		Hasaga	Hasaga	Hasaga	Hasaga	Hasaga	Central	Central	Central	Central	Central	Central
Composite Gold Head Assays												
Predicted Head Au	g/t	**0.71**	**1.49**	**0.72**	**0.69**	**1.74**	**4.38**	**2.9**	**2.79**	**0.55**	**1.4**	**0.43**
Bottle Roll Calc. Head	g/t	0.90	1.38	0.65	1.54	1.07	4.59	1.86	3.03	0.49	1.48	0.55
Triplicate Fire Assays												
Au (FA) cut 1	g/t	0.73	1.62	0.61	1.40	1.06	2.13	1.43	3.27	0.81	3.33	0.76
Au (FA) cut 2	g/t	0.76	1.20	1.64	1.42	0.94	4.90	2.20	3.14	0.39	1.78	0.68
Au (FA) cut 3	g/t	0.79	1.44	0.64	1.52	1.56	1.82	1.34	2.99	0.59	1.83	0.38
Au (FA) Avg.	g/t	**0.76**	**1.42**	**0.96**	**1.45**	**1.19**	**2.95**	**1.66**	**3.13**	**0.60**	**2.31**	**0.61**
Au (Screen Metallics)	g/t	-	**1.26**	-	-	**4.72**	**5.58**	**1.87**	**2.97**	-	-	-
Au CN Soluble (Shake)	g/t	0.7	1.4	1.3	1.3	**1.0**	**1.7**	1.5	2.8	0.5	1.8	0.6

The composite gold head assay comparisons indicate the following:

- A comparison of the various assayed heads with the predicted heads indicates significant variability and is likely due to a gold “nugget” effect.
- The “nugget” effect is readily apparent in composites 4, 5, 6, 7, and 10 and to a lesser extent in the other composites.
- The screened metallic assays for composites 5 and 6 indicate that the “nugget” effect could be fairly large.
    - For composite 5 the screened metallic assay indicated a gold assay of 4.72 g/t whereas the other assays were significantly lower ranging from 0.94 to 1.74 g/t.
    - For composite 6 the screened metallic assay indicated a gold assay of 5.58 g/t whereas the other assays were highly variable ranging from 1.82 to 4.92 g/t.
- The cyanide shake tests which are performed on pulverized samples that have a particle size of approximately 80% minus 20 microns indicated that a significant portion of the gold in the composites, when finely ground should be amenable to cyanidation.

The following table 2.4.2 shows the summary of the silver assays on each composite.

Table 2.4.2 – Summary of Composite Silver Head Assays

	Unit	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Comp 9	Comp 10	Comp 11
Zone		Hasaga	Hasaga	Hasaga	Hasaga	Hasaga	Central	Central	Central	Central	Central	Central
Silver Assays												
Ag (FA)	g/t	< 0.5	1.3	< 0.5	< 0.5	0.8	0.7	1.40	< 0.5	< 0.5	< 0.5	< 0.5
Ag CN Soluble	g/t	0.09	0.79	0.23	0.29	0.61	0.72	1.19	0.18	0.16	0.30	0.25

The composite silver head assays show that there is a relatively low amount of silver in the composites with 7 of the 11 composites assaying lower than 0.5 g/t. The highest silver assay was 1.40 g/t for composite 7.

The cyanide shake tests showed that the silver present was generally cyanide soluble in the pulverized samples.

The following table 2.4.3 shows the summary of the arsenic and the sulfur and carbon speciation assays on each composite.

Table 2.4.3 – Summary of Composite Arsenic, Sulfur and Carbon Speciation Head Assays

Element	Unit	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Comp 9	Comp 10	Comp 11
Zone		Hasaga	Hasaga	Hasaga	Hasaga	Hasaga	Central	Central	Central	Central	Central	Central
As	%	0.002	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
S	%	0.35	0.30	0.46	0.82	0.38	0.09	0.19	**0.02**	**0.05**	**0.03**	**0.02**
$S^{=}$	%	0.34	0.28	0.44	0.79	0.34	0.07	0.18	**< 0.05**	**< 0.05**	**< 0.05**	**< 0.05**
SO_4	%	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
S°	%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
C(t)	%	0.55	1.32	0.18	0.94	0.67	0.58	0.62	0.89	0.71	0.32	0.28
C(g)	%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TOC leco	%	**0.08**	**0.06**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
CO_3	%	2.62	6.33	0.94	4.52	3.21	2.84	3.10	4.43	3.56	1.63	1.40

The low arsenic assays probably indicate that the areas represented by the eleven composites in the Hasaga and Central zones are likely low in arsenopyrite which if present and containing gold values would likely be refractory to cyanidation based on historical information for arsenopyritic ore in the Red Lake area

The sulfur speciation indicates the following:

- The Hasaga zone has higher sulfur content than the Central zone with total sulfur values ranging from 0.30% to 0.82% versus the Central zone range of less than 0.05% to 0.18%.
- The sulfur in both zones is almost entirely present as sulfide sulfur.

The carbon speciation indicates the following:

- The total carbon content in the Hasaga zone ranges from 0.18% to 1.32% while the Central zone ranges from 0.28% to 0.89%.

- The graphitic carbon content for both zones is below the detection limit of 0.05%.
- Composites 1 and 2 in the Hasaga zone had respective total organic carbon contents of 0.08% and 0.06%. None of the other composites had detectable total organic carbon.
- Both zones had significant carbonate content with the Hasaga zone ranging from 0.94% to 6.33% carbonate as compared to the Central zone which ranged from 1.40% to 4.43% carbonate.

The following table 2.4.4 shows the summary of the ICP multi-element assays on each composite.

Table 2.4.4 – Summary of Composite ICP Multi-Element Head Assays

Element	Unit	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Comp 9	Comp 10	Comp 11
Zone		Hasaga	Hasaga	Hasaga	Hasaga	Hasaga	Central	Central	Central	Central	Central	Central
ICP Multi-Element Scan												
Al	g/t	68300	65500	63600	70200	66500	76100	76500	74500	75900	77700	78700
Ba	g/t	596	686	753	808	582	591	599	633	580	604	581
Be	g/t	1.72	1.30	1.40	1.80	1.56	1.18	1.16	1.36	1.20	1.14	1.18
Bi	g/t	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Ca	g/t	11900	24800	5900	18100	13800	23300	21300	46000	23100	22000	21800
Cd	g/t	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Co	g/t	< 20	< 20	< 20	< 20	< 20	< 20	< 20	28	< 20	< 20	< 20
Cr	g/t	29	65	13	21	23	22	17	35	35	27	24
Cu	g/t	16.1	48.5	15.7	22.8	**122**	**460**	**465**	74.4	**114**	**167**	**178**
Fe	g/t	20000	27100	12000	24900	19800	22400	21300	**62600**	24600	21100	20600
K	g/t	23000	26700	27900	27400	24900	19700	23300	20300	19300	20700	19100
Li	g/t	15	16	8	16	12	14	13	31	12	16	13
Mg	g/t	4480	17400	1440	7510	5420	7670	5930	**30300**	10900	7180	6320
Mn	g/t	529	547	338	593	508	392	422	929	401	326	340
Mo	g/t	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Na	g/t	20500	18400	25400	22900	20200	32500	30000	25200	31900	34700	35800
Ni	g/t	< 20	61	< 20	< 20	< 20	< 20	< 20	40	30	< 20	< 20
P	g/t	375	525	< 80	401	317	393	340	2670	450	375	379
Pb	g/t	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Sb	g/t	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Se	g/t	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Sn	g/t	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Sr	g/t	152	385	126	233	176	439	344	1040	475	423	437
Ti	g/t	2230	1630	1100	1740	1650	1620	1750	**4920**	1590	1810	1850
Tl	g/t	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
U	g/t	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
V	g/t	21	61	7	40	24	35	31	150	41	33	32
Y	g/t	13.0	11.7	12.3	12.5	14.2	11.0	9.5	19.7	10.7	15.1	15.6
Zn	g/t	39	106	34	59	63	46	87	55	31	23	22

The ICP multi-element analyses indicate the following:

- The Hasaga zone aluminum content is somewhat lower than the Central zone ranging from 63,600g/t to 70,200 g/t versus the Central zone range of 74,500 g/t 78,700g/t.

- The Central zone has generally higher calcium content than the Hasaga zone ranging from 21,300 g/t to 46,000 g/t versus the Hasaga zone range of 5,900 g/t to 18,100 g/t.
- The central zone has somewhat higher copper content than the Hasaga zone ranging from 74 to 465 g/t versus 16.1 g/t to 122 g/t for the Hasaga zone.
- The Hasaga and Central zones iron contents were similar with the exception of Composite 8 which had an iron content of 62,600 g/t or about three times higher than the any other composite.
- The Hasaga and Central zones magnesium contents were similar again the exception being Composite 8 which had a magnesium content of 30,300 g/t or about three times higher than the any other composite.
- Composite 8 was also anomalously higher in manganese, phosphorous, strontium, and vanadium.

Bond Ball Mill Work Index Determinations

Bond ball mill work index determinations were performed on composites 3, 5, 6, and 8.
The work index data is summarized in the following table 2.4.5.

Table 2.4.5 – Summary of Bond Ball Mill Work Index Determinations

	Unit	Comp 3	Comp 5	Comp 6	Comp 8
Zone		Hasaga	Hasaga	Central	Central
BWI - Metric	kWh/tonne	17.0	19.0	18.0	17.6
BWI - Imperial	kWh/ton	15.4	17.2	16.3	16.0

The Bond work index determinations indicate that the Hasaga and Central samples are similar in hardness. The work indices for both zones indicate the material is medium hard to hard and would not likely present a problem for a grinding circuit.

As the project progresses additional testing to determine the variability of the comminution properties for process design across the two resources will be needed.

Grind Calibrations

The historical literature (3)5)(6) indicates that the mills typically ground the mill feed to about 70% to 80% passing 200 mesh.

Based on the historical literature and SGS's experience in testing samples from other deposits in the Red Lake area, a target grind of 80% passing 200mesh was selected for the bottle roll cyanidation tests.

SGS developed grind calibration curves for each composite by grinding splits of each composite for various times. The calibration curves were then used to determine a time to obtain the required grinding time for the bottle roll tests.

Bottle Roll Cyanidation Tests

Bottle roll cyanidation tests were performed on each of the composites. The test conditions are summarized in Table 2.4.6.:

Table 2.4.6 - Bottle Roll Tests Conditions

Parameter	Value
Slurry Density	40% solids w/w
Slurry pH	10.5 to 11.0
NaCN concentration	0.5 g/l
Total Leach Duration	48 hours
Sampling Periods	2, 6, 10, 24, & 48 hours

The following table 2.4.7 shows the summary of the gold extraction data from bottle roll cyanidation tests for each composite.

Table 2.4.7 – Summary Gold Bottle Roll Cyanidation Tests

Comp	Zone	Feed Size P_{80}, µm	Head Au, g/t		Residue g/t Au	Au % Recovery CN (Unit)					Reag. Consumption kg/t of CN Feed	
			Calc	Direct		2 h	6 h	10 h	24 h	48 h	NaCN	CaO
1	Hasaga	72.0	0.90	0.76	0.07	8	83	85	87	**92.8**	0.64	0.28
2	Hasaga	76.0	1.38	1.42	0.06	3	85	87	94	**95.8**	0.64	0.29
3	Hasaga	72.0	0.65	0.96	0.04	2	77	86	89	**93.8**	0.63	0.24
4	Hasaga	80.0	1.54	1.45	0.11	10	83	84	88	**93.2**	0.55	0.28
5	Hasaga	70.0	1.07	1.19	0.03	1	55	68	92	**97.7**	0.68	0.27
Averages	**Hasaga**	**74.0**	**1.11**	**1.16**	**0.06**	**5**	**77**	**82**	**90**	**94.7**	**0.63**	**0.27**
6	Central	71.0	4.59	2.95	0.05	1	48	70	89	**98.9**	0.68	0.21
7	Central	72.0	1.86	1.66	0.06	5	58	73	91	**96.8**	0.71	0.25
8	Central	76.0	3.03	3.13	0.20	70	90	87	93	**93.4**	0.09	0.32
9	Central	72.0	0.49	0.60	0.02	3	65	83	89	**95.9**	0.62	0.21
10	Central	71.0	1.48	2.31	0.07	1	30	48	81	**95.3**	0.70	0.19
11	Central	74.0	0.55	0.61	0.02	3	38	54	83	**96.4**	0.55	0.19
Averages	**Central**	**72.7**	**2.00**	**1.88**	**0.07**	**14**	**55**	**69**	**88**	**96.1**	**0.56**	**0.23**
Averages	**Hasaga & Central**	**73.3**	**1.59**	**1.55**	**0.07**	**10**	**65**	**75**	**89**	**95.5**	**0.59**	**0.25**

Table 2.4.8 shows the summary of the silver extraction data from bottle roll cyanidation tests for each composite. Additionally, Table 2.4.8 shows the gold to silver ratios for the composites based on the calculated bottle roll heads for gold and silver.

Table 2.4.8 – Summary Silver Bottle Roll Cyanidation Tests

Comp	Zone	Feed Size P_{80}, µm	Head Ag, g/t	Ag % Recovery CN (Unit)					Head Au to Ag Ratio
			Calc	2 h	6 h	10 h	24 h	48 h	
1	Hasaga	72.0	<0.61	7.5	14.9	17.4	19.8	**17.7**	1.48
2	Hasaga	76.0	<1.30	3.5	38.2	46.2	57.6	**61.5**	1.06
3	Hasaga	72.0	<0.65	7.0	18.6	23.2	23.2	**23.4**	1.00
4	Hasaga	80.0	<0.80	5.6	33.7	35.6	37.5	**37.7**	1.92
5	Hasaga	70.0	<0.94	4.8	30.5	36.9	44.8	**46.6**	1.14
Averages	**Hasaga**	**74.0**	**<0.86**	**5.7**	**27.2**	**31.9**	**36.6**	**37.4**	**1.32**
6	Central	71.0	<1.29	3.6	28.5	39.0	52.9	**61.3**	3.55
7	Central	72.0	<1.63	2.8	37.6	45.7	63.7	**69.4**	1.14
8	Central	76.0	<0.67	16.0	22.9	22.9	23.0	**25.3**	4.53
9	Central	72.0	<0.64	7.1	16.7	19.0	19.1	**21.5**	0.77
10	Central	71.0	<0.69	6.6	13.1	17.4	23.7	**28.0**	2.13
11	Central	74.0	<0.68	6.6	17.7	22.0	24.2	**26.4**	0.81
Averages	**Central**	**72.7**	<0.93	**7.1**	**22.7**	**27.7**	**34.4**	**38.7**	**2.15**
Averages	**Hasaga & Central**	**73.3**	**<0.90**	**6.6**	**24.2**	**28.8**	**34.5**	**37.2**	**--**

The bottle roll test data in Tables 2.4.7 and 2.4.8 indicates the following:

- **Hasaga Zone**
  - Gold extractions for all five samples were good ranging from 92.8% to 97.7% with an average extraction of 94.7%.
  - The gold leaching rate for composites 1 to 4 were similar and fairly rapid achieving extractions in the 85% range in the first 10 hours.
  - The composite 5 leaching rate was the exception and had a slower leach rate than the other 4 composites through the first 10 hours. Composite 5 had a 68% extraction at the 10 hours mark but had caught up to the other composites at the 24 hour mark and yielded the highest extraction of 97.7% at the 48 hour mark.
  - The slower leaching rate of Composite 5 could be due to several reasons including:
    - Higher soluble copper content than other composites leading to slower gold leaching.
    - Coarser grind.
    - Coarser or larger gold particles requiring more time to leach.
    - The presence of oxygen consumers such as pyrrhotite resulting in slower initial leach rates.
  - Bottle roll calculated heads compared well to the direct assayed gold head grade
  - The reagent consumptions were in reasonable ranges and typical of non-refractory ores in the Red Lake area.
  - Sodium cyanide consumptions ranged from 0.55 to 0.68 kg/t and averaged 0.63kg/t.
  - Lime consumption ranged from 0.24 to 0.29 kg/t.
  - Silver Extraction is highly variable in the Hasaga zone ranging from 17.7% to 61.5% and average for the five composites of 37.4%.
  - The variable silver extraction probably is due to the form or mineralogy of the silver and the association of the silver minerals.

- **Central Zone**
  - Gold extractions for all five samples were good ranging from 93.4% to 98.9% with an average extraction of 96.1%.
  - The gold leaching rate for composites 6, 7, 9, 10, and 11 were similar and somewhat slow and comparable to the rate noted for composite 5 in the Hasaga zone.
  - The composite 8 leaching rate was the exception and had the fastest leach rate of any of Central zone and Hasaga zone composites with a 70% extraction in the first 2 hours and a 90% extraction in 6 hours. Composite 8 however gave the lowest extraction of the Central zone at 93.4% or almost 3% lower than the other Central zone composites.
  - As noted previously Composite 8 has substantially different geochemistry than the other Central zone composites and probably has different gold mineralogy which affects the gold leaching rate and extent.
  - Bottle roll calculated heads for composites 6 and 10 again illustrated the gold “nugget” effect previously discussed.
  - The reagent consumptions were in reasonable ranges and typical of non-refractory ores in the Red Lake area.
  - Sodium cyanide consumptions ranged from 0.09 to 0.71 kg/t and averaged 0.56kg/t.
  - Composite 8 had the lowest cyanide consumption of 0.09 kg/t again reflecting a different mineralogy than the other composites in the Central zone.
  - Lime consumption ranged from 0.19 to 0.32 kg/t with an average of 0.23 kg/t.
  - Composite 8 had the highest lime consumption of 0.32 kg/t again reflecting a different mineralogy than the other composites in the Central zone.
  - Silver Extraction is highly variable in the Central zone ranging from 21.5% to 69.4% and average for the five composites of 38.7%.
  - The variable silver extraction probably is due to the form or mineralogy of the silver and the association of the silver minerals.

- **Comparison of Hasaga to Central Zone**
  - Gold extraction in the Hasaga zone was slightly lower than the Central zone.
  - With the exception of Composite 8, there was no indication of pregnant (preg) solution robbing.
  - Composite 8 may have exhibited some minor preg robbing between the 6 hour and 10 hour sampling periods. It would be prudent to perform additional tests on composite 8 or samples with similar geochemistry to investigate if preg robbing is present or not.
  - SGS noted that the bottle roll dissolved oxygen levels were very low for the first two hours on all composites except Composite 8, indicating there are some oxygen consumers. This may indicate that a pre-aeration step may be needed as was noted in the historical literature. (5) Note again that Composite 8 responded differently than the other composites.
  - Reagent consumptions in both zones were comparable particularly when discounting the anomalous low cyanide consumption for Composite 8.
  - Silver extractions for both zones were very similar.
  - The gold to silver ratio for the Hasaga zone composites range from 1.00 to 1.92 and averaged 1.32.
  - The gold to silver ratio for the Central zone composites range from 0.77 to 4.53 and averaged 2.15. Note that Composite 8 had the highest gold to silver ratio.
  - The gold to silver ratios indicate that there is typically more gold than silver in the composites.

Gold Recovery Prediction

A preliminary examination of the limited scoping test data was made to determine if the gold leaching followed typical gold head and leach tailing relationships.

For a given gold resource the mineralogy and gold associations within mineral assemblages dictates the liberation of gold and the recovery of gold that can be expected. It has been found that for a given resource that the leached tailing grade almost invariably increases with the gold head grade but not in direct proportion to the head grade.[(8)] Mike Brittan, formerly of Gold Fields developed a statistically-based technique for estimating head grade-tail grade relationship from laboratory test data or gold plant operating data. This technique is described in bibliography reference 8 and is attached in Appendix A.

Brittan found that the gold head and tail grade relation could be expressed in an equation with the following generalized form:

$$\textbf{Tail Grade, g/t} = \alpha^*\{\ln[HG + 1] + [HG]/25\}$$

In the equation, HG = gold Head Grade, g/t and α is a parameter whose value depends primarily on the mineralogy and grind of the ore.

The value of α for a particular resource test data set can be determined by setting up a spreadsheet with the test head and tails. A third column is added to calculate an estimated tailings grade. The α value is varied until the calculated tailings grades reasonably matches the tails grades obtained from the tests.

This methodology was applied to the limited Hasaga and Central zones bottle roll test data sets.

The following Table 2.4.9 shows the Hasaga and Central zone test data in comparison to the calculated values.

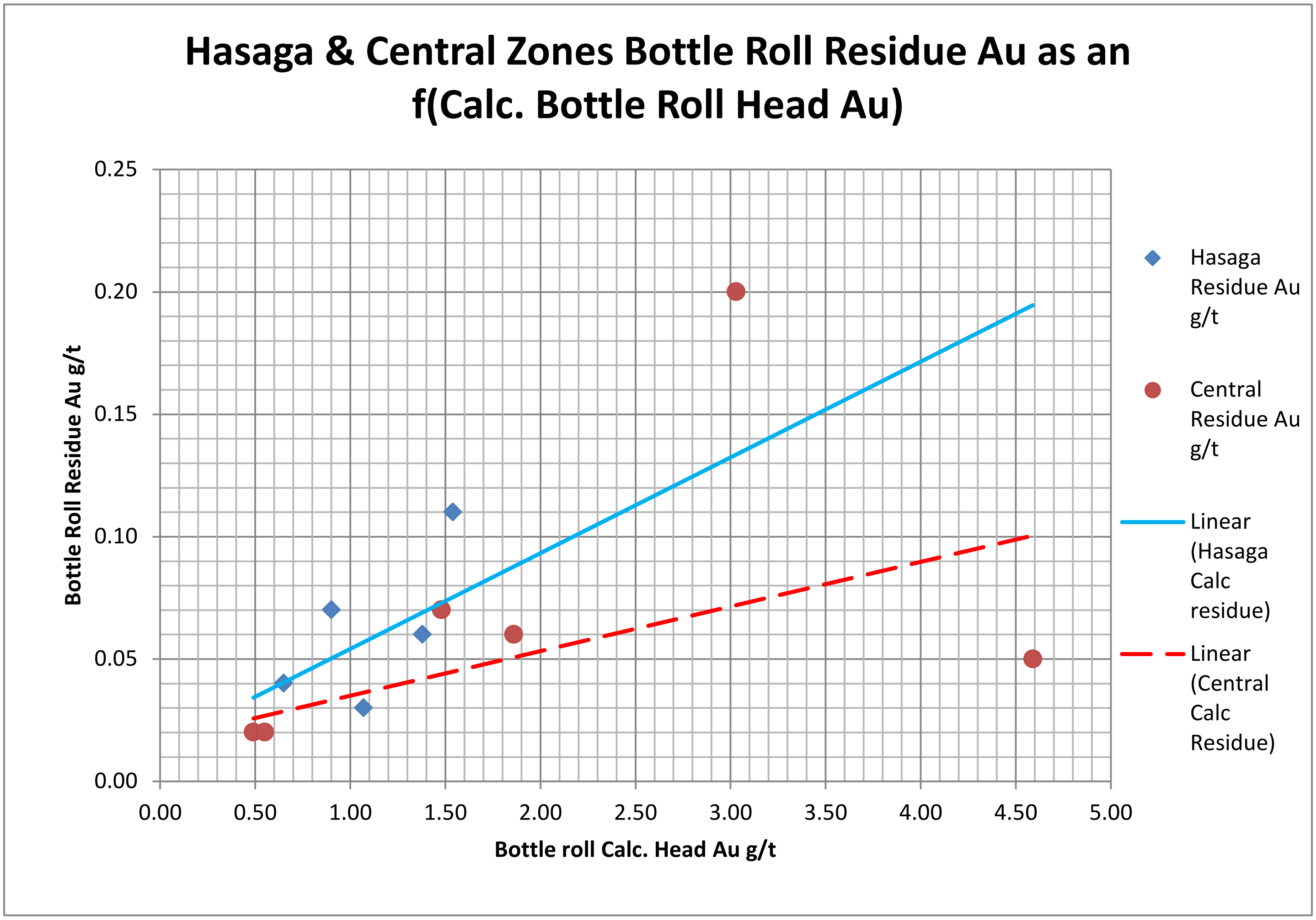
Table 2.4.9 – Comparison of Gold Bottle Roll Tests Tails to Calculated Tails

Comp #	Zone	Calc Head Au g/t	Test Residue Au g/t	Calculated residue Au g/t
1	Hasaga	0.90	0.07	0.05
2	Hasaga	1.38	0.06	0.07
3	Hasaga	0.65	0.04	0.04
4	Hasaga	1.54	0.11	0.07
5	Hasaga	1.07	0.03	0.06
6	Central	**4.59**	0.05	0.10
7	Central	1.86	0.06	0.06
8	Central	3.03	**0.20**	**0.08**
9	Central	0.49	0.02	0.02
10	Central	**1.48**	0.07	0.05
11	Central	0.55	0.02	0.02

The alpha factor for the Hasaga zone was determined to be 0.075 and the alpha factor for the Central zone was determined to be 0.05. Note that these are first attempts at defining a head and tail relation for gold recovery estimation. A much larger data set and analysis will be needed as the project progresses to firmly establish a head and tail grade relation for resource modelling.

The following chart 2.4.1 shows the bottle roll gold residue as a function of bottle roll calculated gold head grade.

Chart 2.4.1



The chart shows that the test data, as shown by the individual data points, reasonably matches the calculated data as represented by the line for each zone.

One should note that the Composite 8 tail grade of 0.20 g/t is a significant outlier on the chart and is not unexpected as Composite 8 seems to represent a different geochemistry and mineralogy than the other Central zone composites.

Again, as the project progresses, it will be important to understand the geochemical and mineralogical differences in the two zones which will dictate gold extraction from the resources.

Gravity Testwork

Knelson gravity recovery tests were performed on composites 2, 5, 6, 7, and 8. The following table 2.4.8 summarizes the results from the gravity testwork.

Table 2.4.8 – Summary Knelson Gravity Tests

Composite	Zone	Head Grade		Tailing	Conc.		Recovery	Tailing
		Au Calc	Au Direct	k80	wt.	Au	Au	Au *
		(g/t)	(g/t)	(micron)	(%)	(g/t)	(%)	(g/t)
2	**Hasaga**	1.66	1.42	85	0.14	408	**35.4**	1.08
5	**Hasaga**	1.19	1.19	80	0.14	596	**71.3**	0.34
6	**Central**	4.50	2.95	82	0.11	2,370	**57.3**	1.92
7	**Central**	1.99	1.66	86	0.12	1,097	**66.1**	0.67
8	**Central**	3.08	3.13	84	0.17	397	**21.7**	2.42

The composites from both the Hasaga and Central zones responded well to gravity concentration of gold.

Gold recovery into the gravity concentrate for the two Hasaga composites ranged from 35.4% to 71.3% with a weight recovery of 0.14%

Central zone composites 6 and 7 had gold recoveries of 57.3% and 66.1% into the gravity concentrate with concentrate weight recoveries of 0.11% and 0.12%.

Central zone composite 8 gave a significantly lower gold recovery of 21.7% into the gravity concentrate with a weight recovery of 0.17%. The different response of composite 8 to gravity separation versus the other two Central zone composites further illustrates that the geochemistry and gold association in the resource interval which composite 8 represents is substantially different than the other Central zone composites. Further work to understand the metallurgy of the portion of the Central zone resource represented by Composite 8 will be needed. Additionally, other areas in the Central zone with similar geochemistry should be noted and considered for testing as the project advances.

Gravity Recovery and Gravity Tailings Cyanidation versus Whole Ore Leach

Bottle roll cyanidation tests were performed on the gravity tailings on composites 2, 5, 6, 7, and 8 to compare the combined gold recovery of gold via gravity concentration and gravity tails cyanidation versus whole ore cyanidation. Table 2.4.9 shows a comparison of the whole ore bottle roll cyanidation of the composites versus the combined recovery from gravity concentration and cyanidation of the gravity tailings.

Table 2.4.9 – Gravity Recovery & Gravity Tails Leach vs. Whole Ore Cyanidation

Comp	Test Type	Zone	Feed Size P_{80}, µm	Head Au, g/t			Bottle Roll Residue, g/t	Au % Recovery							Reag. Consumption kg/t of CN Feed	
				Bottle Roll Calc	Gravity Test	Direct		Bottle Roll CN (Unit)					Grav (Unit)	Total	NaCN	CaO
								2 h	6 h	10 h	24 h	48 h				
2	WO BR	Hasaga	76.0	1.39		1.42	0.06	3	85	87	93	**95.3**		**95.3**	0.64	0.29
	Grav. + Tail BR	Hasaga	85.0	0.99	1.66	1.42	0.07	22	82	89	92	**93.4**	35.4	**95.7**	0.38	0.33
5	WO BR	Hasaga	70.0	1.08		1.19	0.03	1	54	68	91	**97.2**		**97.2**	0.68	0.27
	Grav. + Tail BR	Hasaga	80.0	0.35	1.19	1.19	0.04	4	72	81	85	**90.0**	71.3	**97.1**	0.63	0.27
6	WO BR	Central	71.0	4.59		2.95	0.06	1	48	69	89	**98.8**		**98.8**	0.68	0.21
	Grav. + Tail BR	Central	82.0	1.84	4.50	2.95	0.07	3	64	86	86	**96.5**	57.3	**98.5**	0.60	0.22
7	WO BR	Central	72.0	1.86		1.66	0.06	5	58	73	92	**96.8**		**96.8**	0.71	0.25
	Grav. + Tail BR	Central	86.0	0.74	1.99	1.66	0.06	10	69	81	85	**91.9**	66.1	**97.3**	0.65	0.27
8	WO BR	Central	76.0	3.02		3.13	0.19	70	90	88	94	**93.7**		**93.7**	0.09	0.32
	Grav. + Tail BR	Central	84.0	2.49	3.08	3.13	0.23	68	84	86	90	**91.0**	21.7	**93.0**	0.11	0.35

The data in Table 2.4.9 indicates the following:

- There was no discernable benefit of gravity concentration coupled with cyanidation of the gravity tailings versus whole ore cyanidation on overall gold extraction. Nearly the same overall gold recoveries were obtained by both processes.
- There may be a slight cyanide consumption reduction using gravity recovery probably due to gravity concentration removing some of the sulfides that could consume cyanide in the leach step.
- There may be benefit on gold leach kinetics following gravity gold removal which could possibly lead to a shorter leach time and possibly smaller leach tanks.

As the project advances, additional testwork should be considered to investigate if there are benefits by including a gravity concentration step in the gold recovery process. Testing should include a detailed examination of gold leaching kinetics with and without gravity recovery.

SGS Test Observations

Thickening or slurry rheology testing were not included in this first phase of scoping tests, however, SGS made the following observations regarding slurry behavior during the bottle roll testing.

- All ground slurries at their natural pH (data sheets show natural pH ranged from 8.5 to 9.1) settled easily except for Composite 3. (A check of the ICP multi-element data shows composite 3 was the lowest in calcium and magnesium which typically promote slurry settling.

- After lime addition some settled better than the others. Composites 5, 6, 7, 9, 10, 11 had to be syringe filtered when samples were taken in order to obtain a solution sample within a reasonable amount of time for testing.
- Composite 8 settled the best and filtered the fastest. (The ICP data shows Composite 8 had the highest calcium and magnesium content, almost three times higher than other composites.)
- All bottle roll residues filtered acceptably time wise with composites 5, 6, 7, 9, 10, and 11 filtering a little slower than the others.

The SGS observations do not indicate any severe settling or rheological problems, however, there are indications of varying slurry properties depending on geochemistry. As the project advances settling tests and slurry rheology tests should be conducted to investigate slurry properties and build a design data base for equipment sizing and pipeline design.

Diagnostic Leach and QEMSCAN Mineralogy

These tests were deferred to a later date due to the good bottle roll cyanidation extractions, the low arsenopyrite content inferred based on arsenic assays and sulfur speciation tests, and the general lack of refractory gold indications.

It will be prudent to perform these tests in the future to confirm and develop a higher understanding of gold associations and gangue mineralogy.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The following are the conclusions and recommendations developed from the metallurgical program on the five Hasaga composites and six Central zone composites.

3.1 CONCLUSIONS

Major Conclusions

- The metallurgical scoping tests indicate that the Hasaga and Central zone composites with the mineralogy tested are not refractory and should be amenable to conventional whole ore cyanidation and yield gold extractions above 90%.
- The scoping tests indicate that there is a “nugget” effect in gold assaying that needs further investigation in metallurgical testing and drill interval assaying.
- The limited tests indicate that a significant portion of the gold in both zones is likely recoverable using gravity concentration, however, additional testing will be required to determine if this will be beneficial in a process flowsheet.
- The tests indicate that the geochemistry, precious metal occurrence and association have significant effects on metal extractions, leach kinetics, and slurry properties that will need further investigation to fully understand and incorporate into a resource model as the project advances.
- Based on the limited testing, there do not appear to be unusual or significant deleterious factors that would seriously impact processing the resources or impair the project, however, additional testing, particularly pre-feasibility level metallurgical testing and environmental testing, will be needed to fully determine and assess factors that could have significant or deleterious effects on the project.

Gold Assays

- There is significant variance in the various assayed heads and the calculated test heads with the predicted heads likely due to a gold “nugget” effect.
- Based on the screened metallic assays for composites 5 and 6 the “nugget” effect could be fairly large and present some difficulties in determining a mean gold assay for a given composite or interval sample.

Silver Assays

- The composite silver head assays show that there is a relatively low amount of silver in the composites from both zones with 7 of the 11 composites assaying lower than 0.5 g/t. The highest silver assay was 1.40 g/t for composite 7.
- The gold to silver ratios (Hasaga average 1.32 and Central average 2.15) indicate that there is typically more gold than silver in the composites.

Geochemistry

- Low arsenic assays likely indicates that the areas represented by the eleven composites in the Hasaga and Central zones have a low in arsenopyrite content, which if present and containing gold values, would likely be refractory to cyanidation based on historical information for arsenopyritic ore in the Red Lake area.
- The Hasaga zone composites has a total sulfur content of 0.30% to 0.82% while the Central zone appears to have a lower sulfur content with composite assays ranging from 0.05% to 0.18%.
- The sulfur in both zones is almost entirely present as sulfide sulfur
- The total carbon content in the Hasaga zone ranges from 0.18% to 1.32% while the Central zone ranges from 0.28% to 0.89%.
- Most of the carbon appears to present as carbonate as the graphitic carbon content for both zones is below the detection limit of 0.05% and total organic carbon was very low or below detection limits.
- Both zones had significant carbonate content with the Hasaga zone ranging from 0.94% to 6.33% carbonate as compared to the Central zone which ranged from 1.40% to 4.43% carbonate.
- The Hasaga zone aluminum content is somewhat lower than the Central zone ranging from 63,600g/t to 70,200 g/t versus the Central zone range of 74,500 g/t 78,700g/t.
- The Central zone has generally higher calcium content than the Hasaga zone ranging from 21,300 g/t to 46,000 g/t versus the Hasaga zone range of 5,900 g/t to 18,100 g/t.
- The central zone has somewhat higher copper content than the Hasaga zone ranging from 74 to 465 g/t versus 16.1 g/t to 122 g/t for the Hasaga zone.

- The Hasaga and Central zones iron contents were similar with the exception of Composite 8 which had an iron content of 62,600 g/t or about three times higher than the any other composite.

- The Hasaga and Central zones magnesium contents were similar again the exception being Composite 8 which had a magnesium content of 30,300 g/t or about three times higher than the any other composite.

- Composite 8 is an anomaly as compared to the other Central zone composites as well as the Hasaga zone, containing higher amounts of calcium, iron, magnesium, manganese, phosphorous, strontium, titanium, and vanadium and may indicate a different geochemistry and mineralogy than the other composites tested.

Bond Ball Mill Work Indices

- The Bond work index determinations indicate that the Hasaga and Central samples are similar in hardness.

- The work indices for both zones (Hasaga 17.0 to 19.0 kWh/tonne and Central 17.6 to 18.0 kWh/tonne) indicate that the material is medium hard to hard and would not likely present a problem for a grinding circuit.

Bottle Roll Cyanidation

- Gold extraction by whole ore cyanidation for both zones was good for all grade ranges with the five Hasaga zone composites yielding an average extraction of 94.7% and the six Central zone composites having an average extraction of 96.1%.

- Gold leaching rates in the Hasaga were generally faster than for the Central zone but each zone had a composite that exhibited different leaching rates than the others in the zones and is likely a reflection of differing geochemistry and gold occurrence and association within the zones.

- Silver extractions are highly variable in the Hasaga and Central zones and yielded similar extractions ranging from 17.7% to 69.4%.
- The highly variable silver extraction probably is due to the form or mineralogy of the silver and the association of the silver minerals in the various parts of the resources.
- With the exception of Composite 8 in the Central zone, there was no indication of preg robbing.

- The dissolved oxygen levels for most tests with the exception of composite 8 in the Central zone were very low for the first two hour of leaching indicating that oxygen consumers are present and that a pre-aeration step may be needed and as historically practiced in the Red Lake area.

- The sodium cyanide and lime consumptions for both zones were in reasonable ranges and typical of non-refractory ores in the Red Lake area.

- The geochemistry and precious metal form and associations appear to have significant impacts on metal extractions, leaching rates, and reagent consumptions and will need to be investigated further as the project advances.

Gold Recovery Prediction

- The analyses of the limited data sets from the scoping tests for the Hasaga and Central zones indicates that the gold leach extraction follows the typical gold head and tailing relation and that a gold recovery equation based on head to predict tailings grade can be developed for use in resource modelling as the project advances.

Gold Recovery by Gravity Concentration

- Gold in both the Hasaga and Central zones appears to be amenable to recovery using gravity concentration based on tests on five composites.

- Gravity gold recovery in both zones appears to be highly variable ranging from 21.7% to 77.3% which is likely due to variability in geochemistry, gold occurrence, and gold association.

- Further tests will be needed to fully understand gravity gold recovery by geologic domains.

Gravity Recovery and Gravity Tailings Cyanidation versus Whole Ore Leach

- From the limited test data set there was no discernable benefit of gravity concentration coupled with cyanidation of the gravity tailings versus whole ore cyanidation on overall gold extraction as nearly the same overall gold recoveries were obtained by both processes.

- There may be a slight cyanide consumption reduction using gravity recovery probably due to gravity concentration removing some of the sulfides that could consume cyanide in the leach step.

- There may be benefit on gold leach kinetics following gravity gold removal which could possibly lead to a shorter leach time and possibly smaller leach tanks

- Further testing will be required to fully assess if gold recovery using gravity concentration would be of value in a processing circuit for the Hasaga project.

Slurry Thickening and Rheology

- Observation of slurry behavior by SGS during testing indicated no serious problems in slurry settling or rheology however, the observations did indicate that there will be differences in slurry thickening and rheological properties based on resource geochemistry that could affect process plant design.

- As the project advances it will be important to test and fully understand slurry settling and slurry rheology to build a design data base for equipment sizing and pipeline design.

3.2 RECOMMENDATIONS

The following are recommendations based on the analysis of the metallurgical scoping tests.

Resource Geologic Domains

- It is recommended that the geology, geochemistry, and initial metallurgy in the Hasaga and Central zones be reviewed to determine if delineation of specific geologic domains or sub-zones within each zone is needed in building the resource model and to guide future test programs.

Investigation of Assaying "Nugget" Effect

- Since the metallurgical program revealed a gold "nugget" effect between the various assays it is recommended that the a program to examine drill hole gold assays for variability due to nugget or large particle free gold be conducted. This would include examination of typical fire assaying versus screen metallic fire assaying.
- It is recommended that all future metallurgical programs include screen metallic fire assaying and triplicate fire assaying on all test head samples to broaden the statistical data base regarding the "nugget" effect.

Additional Scoping Tests on Initial Metallurgical Composites

- It is recommended that QEMSCAN – RMS tests be run on composites 2, 5, 6, and 8 as these cover a range of geochemistry and gold occurrence and associations and would develop initial information on gangue and sulfide mineralogy and metal associations.
- Acid/Base accounting and Net-Acid Generation tests should be considered to start building an environmental data again with composites 2, 5, 6, and 8.

Next Phase Metallurgical Test program

The next recommendations assume that the project will be advancing and require building the metallurgical database to support a Preliminary Economic Assessment and Pre-Feasibility phases.

- To support a Pre-Feasibility Study the following is recommended:
  - Based on updated definitions of the geologic domains in the Hasaga and Central Zones delineate and select intervals for metallurgical samples that are representative of the various types of mineralization and the metal grade range within the respective mineralization types. The number of discrete samples could range from 30 to 50.
  - The preliminary list of metallurgical and environmental tests is as follows:
    - **Head Assaying – 30 to 50 Samples**
      - Fire Assaying – Triplicate
      - Screen Metallic Fire assaying
      - Cyanide Shake Test
      - Arsenic
      - Sulfur Speciation
      - Carbon Speciation
      - ICP-Multi-element analyses
    - **Comminution – on 15 to 20 samples**
      - Bond Ball Mill Work Index
      - Bond Abrasion

- SAG Power Index (SPI/ MacPherson / or JK tech)

- **Leaching & Gravity Concentration – 30 to 50 Samples**
  - Whole Ore Bottle Roll Cyanidation
    - Determine Optimum Grind size – 15 to 20 samples
    - Leach Kinetics
    - CIL versus CIP – 10 to 15 samples
    - Carbon Adsorption Tests
    - Examine effect of Pre-aeration
    - Preg Robbing Tests - 5 to 10 samples
  - **Gravity and Cyanidation of Gravity Tails – 10 to 20 Samples**
    - Knelson tests
    - Bottle Roll of Gravity Tails
  - **Column Testing on Low Grade – 10 to 20 samples**
    - Depends on current SGS Test Program results

- **Solid / Liquid Separation – 15 to 20 samples**
  - Thickener Settling Tests
    - Grinding Circuit at Natural pH
    - Leached Tails
  - Filtration
    - Thickened Tails
  - Slurry Rheology
    - Grinding Circuit at Natural pH
    - Leached Tails

- **Mineralogy – 10 to 15 samples**
  - QEMSCAN
  - Diagnostic Leaching

- **Environmental Tests – 20 to 30 samples**
  - Cyanide Detoxification Tests of Bottle Roll Tails – 15 to 20
  - Cyanide Detoxification of Column Leach Tails – 5 to 10
  - Acid Base Accounting of Bottle roll tails – 20 to 30
  - Net Acid Generating potential bottle roll tails – 20 to 30
  - Acid Base Accounting of Mine Waste -5 to 10
  - Net Acid Generating potential Mine Waste – 5 to 10
  - TCLP on Bottle Roll Tails – 5 to 10
  - TCLP on Mine Waste – 5 to 10

3.3 BIBLIOGRAPHY

~~Copies of each reference are attached in Appendix~~

1. Premier Gold, Press Release May 3, 2016, “Premier Continues Success at Hasaga Red Lake”
2. Proceedings of the 61st ILSG Annual Meeting - Part 2 – Field Trip Guidebook, 61st Annual Meeting Institute on Lake Superior Geology, Dryden, Ontario - May 20-24, 2015, Field Trip 1 - The Central Red Lake Gold Belt, page 8
3. McKenzie Red Lake Gold Mines, Limited, The Canadian Institute of Mining and Metallurgy, Transactions, Volume XLI, 1938, pp. 343-357
4. Red Lake Gold Shore Mine, Ontario Exploration Website Article
5. Madsen Milling Practice, The Canadian Mining and Metallurgical Bulletin for February, 1951. Montreal, pages 105 to 113
6. Campbell Red Lake Mines Process, SME Preprint, February, 1975
7. Start-up and Operation of Placer Dome’s Campbell Mine Gold Pressure Oxidation Plant, Mining Engineering, SME, 1992?
8. Head Grade Effects on Gold Recovery, SME Preprint, 2008, Michael Brittan, Gold Fields

APPENDIX V
Summary of Phase 2 Metallurgical Testwork and Results

HASAGA

Metallurgical Scoping Study – Phase 2

Red Lake, Ontario

Jacobs Project Number: 09RR8500

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1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

Premier Gold Mines Limited (Premier) is currently performing exploration work on their Hasaga Project property near Red Lake, Ontario. Premier retained Jacobs Minerals Canada, to develop a metallurgical scoping program and analyze the results from the program to support Premier Gold in their evaluation and development of the Hasaga resource.

Premier requested that a second phase of scoping studies be conducted on lower grade samples from the Hasaga and Central Zones plus an initial sample from the Buffalo Zone. The intent of the scoping studies on the lower grade samples was to investigate potential amenability to heap leaching. The intent of the tests on the Buffalo Zone sample was to develop initial baseline data for the Buffalo Zone. NQ size core collected by the diamond drilling program for interval assaying was used in a scoping metallurgical test program.

This report summarizes the objectives of the program, the samples selected for the program, the tests results, and conclusions and recommendations developed based on the test results.

1.2 EXECUTIVE SUMMARY

A Phase 2 metallurgical scoping program was conducted to test low grade gold samples, one from the Hasaga Zone, and four from the Central Zone with the following objectives:

- To test the amenability of the samples to heap leaching using cyanidation.
- To add to the initial baseline metallurgical data base to evaluate resource targets at the project site.

The Phase 2 scoping program also included initial baseline testing on a sample from the Buffalo Zone with the objective to develop the initial baseline metallurgical data to for the Buffalo Zone.

The following are the key conclusions from the study:

- The Phase 2 baseline metallurgical scoping tests indicate that the Hasaga, Central, and Buffalo zone composites with the mineralogy tested are not refractory and should be amenable to conventional milling using whole ore cyanidation and yield gold extractions at or above 90% when ground to an 80% passing size of 200mesh.
- The bottle roll heap leach amenability tests on the low grade single Hasaga composite and four Central zone composites indicate that heap leaching of the low grade material does not appear to be feasible at this point as maximum gold extractions were only 40% with a fine crush size of -1/4”. Typically gold heap leach extractions need to be in range of 60% to 70% for positive economics.
- The single test on the Buffalo zone composite indicates that a significant portion of the gold in the composite may be recoverable using gravity concentration, however, additional testing will be required to determine if this will be beneficial in a process flowsheet.
- As was noted in Phase 1, the geochemistry and precious metal form and associations appear to have significant impacts on metal extractions, leaching rates, and reagent consumptions and will need to be investigated further as the project advances.

- Based on the limited testing, there do not appear to be unusual or significant deleterious factors that would seriously impact processing the resources or impair the project, however, additional testing, particularly pre-feasibility level metallurgical testing and environmental testing, will be needed to fully determine and assess factors that could have significant or deleterious effects on the project.

The following are the major recommendations for the project:

Resource Geologic Domains

- It is recommended that the geology, geochemistry, and initial metallurgy from the Phase 1 and Phase 2 tests on the Hasaga, Central, and Buffalo zone composites be reviewed to determine if delineation of specific geologic domains or sub-zones within each zone is needed in building the resource model and to guide future test programs.
- The similarities of the Central Zone composite 8 with the Buffalo Zone Composite 17 should be investigated as both composites displayed similar geochemistry and metallurgical responses.

Investigation of Assaying "Nugget" Effect

- The Phase 2 tests again showed a gold nugget effect on assays as which supports the Phase 1 recommendation that the a program to examine drill hole gold assays for variability due to nugget or large particle free gold be conducted. This would include examination of typical fire assaying versus screen metallic fire assaying.
- It is recommended that all future metallurgical programs include screen metallic fire assaying and triplicate fire assaying on all test head samples to broaden the statistical data base regarding the "nugget" effect.

Additional Scoping Tests on Initial Phase 2 Metallurgical Composites

- A QEMSCAN – RMS test should be considered on the Buffalo Zone composite 17 to further explore the geochemistry and gold occurrence and associations and similarities to Central Zone Composite 8.

Additional Heap Leach Amenability Tests

- Additional heap leach bottle roll tests using a minus 10 mesh crush (preferably produced using an HPGR) may be considered as a 10 mesh crush represents the likely minimum practical heap leach crush size and that there was some indication that gold extractions may increase with a finer crush size.

2.0 DISCUSSION

2.1 PROJECT & SCOPING STUDY DESCRIPTIONS

Hasaga Project

Premier holds a 100% interest in the historic Hasaga Property, which is located just south of Rahill-Bonanza in the heart of the Red Lake gold mining district in Northwestern Ontario.

The Hasaga property is host to the past producing Hasaga and Gold Shore mines. It is located near the Balmer-Confederation regional unconformity which is recognized as an important geologic feature for the historic and currently operating mine in the Red Lake area. (1)

Resource Targets

Premier has conducted a drill program targeting three potential resource zones, the Hasaga Zone, the Central Zone, and the Buffalo Zone. NQ size core was collected by the diamond drilling program for interval assaying and for use in the metallurgical scoping program.

Metallurgical Composite Selection

Premier selected a total of six (6) drill holes, one from the Hasaga Zone, four from the Central Zone, and one from the Buffalo zone from which six composites were constructed for metallurgical scoping tests. Details of the drill holes and intervals are attached in Appendix B.

Metallurgical Program Objectives and Test Program

A second phase of metallurgical scoping tests was initiated to develop further baseline metallurgical data for the Hasaga and Central Zones with an added objective of determining the initial amenability of low grade Hasaga and Central zones samples to heap leaching.

The testing on one composite from the Hasaga Zone and four from the Central Zone included the following:

- **Composite Head Assays**
  - Triplicate Fire Assay for Gold
  - Screen Metallics Fire Assay for Gold
  - Cyanide Soluble Shake Tests for Gold and Silver
  - Arsenic
  - Sulfur Speciation (Total Sulfur, Sulfide Sulfur, Sulfate Sulfur, Elemental Sulfur)
  - Carbon Speciation (Total Carbon, Total Organic Carbon)
  - Carbonate
  - ICP Multi-element scan for twenty-nine elements
- **Comminution Tests**
  - Bond Abrasion (AI) Test
  - SAG Mill Comminution (SMC) Test
  - Bond Ball Mill Grindability (BWI) Test
- **Whole Ore Cyanidation - P80 grind size of 74 µm (Baseline test)**

- **Heap Leach Amenability Tests**
    - **Coarse ore bottle roll (COBR) cyanidation tests**
        - 2.0kg samples of each composite evaluating crush sizes of -3/4 inch, -1/2 inch and -1/4 inch.
        - The leach vessels rolled intermittently (1 minute every hour) for a period of 14 days.
        - Solution subsamples taken and assayed intermittently to monitor the gold and silver dissolution rate, at 1, 2, 4, 7, 10 and 14 days.
        - After 14 days, filter, wash, and dry each leach residue. Crush each residue to pass 10 mesh and sample for duplicate for gold and silver assays.
    - **Column Tests**
        - Pending positive results from the Coarse Bottle roll tests perform column tests using 15 cm (ID) x ~2 m columns on 30-50kgs of each composite.

The Phase 2 program scope of work was expanded to include initial scoping testwork on a sample from the Buffalo Zone. The tests conducted on the Buffalo Zone composite included the following:

- **Composite Head Assays**
    - Triplicate Fire Assay for Gold
    - Screen Metallics Fire Assay for Gold
    - Cyanide Soluble Shake Tests for Gold and Silver
    - Arsenic
    - Sulfur Speciation (Total Sulfur, Sulfide Sulfur, Sulfate Sulfur, Elemental Sulfur)
    - Carbon Speciation (Total Carbon, Total Organic Carbon)
    - Carbonate
    - ICP Multi-element scan for twenty-nine elements
- **Comminution Tests**
    - Bond Abrasion (AI) Test
    - SAG Mill Comminution (SMC) Test
    - Bond Ball Mill Grindability (BWI) Test

- **Baseline Cyanidation and Gravity Tests**
    - Whole Ore Cyanidation - P80 grind size of 74 µm
    - Knelson gravity concentration tests P80 grind size of 74 µm
    - Cyanidation of Gravity Tails - P80 grind size of 74 µm

SGS Canada in Lakefield, Ontario who conducted the Phase 1 was used to perform the Phase 2 work. The SGS Phase 2 proposal is attached as Appendix C.

2.2 COMPOSITES

The following Table 2.2.1 shows a summary of the composites selected for the metallurgical scoping program:

Table 2.2.1 – Metallurgical Scoping Test Composite Summary

Composite #	Drill Hole #	From - m	To - m	Total Length m	Zone	Rock Type	Wt Received at SGS - kg	Estimated sample Au gpt	Estimated sample Au opt
12	HMP107	116	155	39.0	Hasaga	Hasaga Porphyry +- some mafic vol	86.128	0.89	0.026
13	HLD050	142	179	37.0	Central	Granodiorite	80.421	1.03	0.030
14	HLD052	9	42	33.0	Central	Granodiorite	73.936	0.99	0.029
15	HLD071	205	237	32.0	Central	Granodiorite	60.99	0.43	0.013
16	HLD072	274	309	35.0	Central	Granodiorite	81.898	0.91	0.027
17	HMP147	155	184	29.0	Buffalo	Quartz-Tourmaline veined Granodiorite	131.6	2.67	0.078

Note: gpt = grams per metric ton, opt = troy ounce per short ton

Details of the composite construction showing the individual interval information for each composite are shown in Appendix B.

2.3 MET TEST PROGRAM - SAMPLE PREP & TESTS SPECIFIED

The basic content of the metallurgical scoping test program is described in Section 2.1 of this report.

The testwork was performed at SGS Lakefield, Ontario laboratory.

The following Table 2.3.1 shows the tests performed by SGS each composite.

Table 2.3.1 – Summary of Tests Specified by Composite

Composite #	Drill Hole #	Zone	Basic Prep	Triplicate Head Fire Assays Au & Ag	CN Shake Tests	ICP Multi-element	Carbon & Sulfur Speciation	Screen Fire Metallics	Grind Calibrations	Bottle Roll @ 200mesh grind	Bottle Roll Heap Ammenability Tests	Bond BM WI & Abrasion Index	SMC Comminution Tests	Knelson Gravity Test & BR of Grav. Tails
12	HMP107	Hasaga	1	1	1	1	1	1	1	1	1	1	1	0
13	HLD050	Central	1	1	1	1	1	1	1	1	1	1	1	0
14	HLD052	Central	1	1	1	1	1	1	1	1	1	1	1	0
15	HLD071	Central	1	1	1	1	1	1	1	1	1	1	1	0
16	HLD072	Central	1	1	1	1	1	1	1	1	1	1	1	0
17	HMP147	Buffalo	1	1	1	1	1	1	1	1	0	1	1	1

2.4 METALLURGICAL TEST RESULTS

The following sections summarize the metallurgical test results. The SGS report for the program is attached as Appendix D (As of the date of this report the final SGS report had not been received. The items in Appendix D are the interim data reporting by SGS as emails and spreadsheets.)

Composite Head Assays
The following assays were performed on splits from each composite:

- Triplicate Fire Assay for Gold
- Screen Metallics Fire Assay for Gold
- Cyanide Soluble Shake Tests for Gold and Silver
- Arsenic
- Sulfur Speciation (Total Sulfur, Sulfide Sulfur, Sulfate Sulfur, Elemental Sulfur)
- Carbon Speciation (Total Carbon, Total Organic Carbon)
- Carbonate
- ICP Multi-element scan for twenty-nine elements

Gold Head Assays

The following table 2.4.1 shows a summary of the various gold head assays on each composite in comparison to the predicted gold head (the weighted average of drill intervals from which the composite was constructed) and the calculated bottle test head assay.

Table 2.4.1 – Summary of Composite Gold Head Assays

Parameter	Comp #	12	13	14	15	16	17
	D. Hole #	HMP107	HLD050	HLD052	HLD071	HLD072	HMP 147
	Zone	Hasaga	Central	Central	Central	Central	Buffalo
Composite Gold Head Assays							
Predicted Head Au	g/t	0.89	1.03	0.99	0.43	0.91	2.67
B.Roll Calc Heads							
- 200M grind	g/t	0.99	1.10	1.08	0.31	1.02	2.51
-1/4"	g/t	0.85	1.42	0.99	0.29	1.07	--
-1/-2"	g/t	0.86	1.01	0.93	0.57	0.94	--
-3/4"	g/t	0.85	0.93	1.48	0.74	0.85	--
B. Roll Head Avg.	**g/t**	**0.89**	**1.12**	**1.12**	**0.48**	**0.97**	**2.51**
Triplicate Fire Assays							
Au (FA) cut 1	g/t	1.27	1.43	1.11	0.29	1.19	2.02
Au (FA) cut 2	g/t	0.97	1.28	1.03	0.21	0.78	1.92
Au (FA) cut 3	g/t	1.01	1.92	1.00	0.25	0.94	2.55
Au (FA) Avg.	**g/t**	**1.08**	**1.54**	**1.05**	**0.25**	**0.97**	**2.16**
Au (Screened Metallics)	g/t	**1.12**	**1.20**	**1.07**	**0.69**	**0.69**	**4.06**
Au CN Soluble	g/t	0.7	1.8	0.8	0.2	0.7	2.6

The composite gold head assay comparisons indicate the following:

- A comparison of the various assayed heads with the predicted heads indicates some variability which is likely due to a gold “nugget” effect.
- The “nugget” effect is readily apparent in composites 13, 15, 16, 7, and 17 and to a lesser extent in the other composites particularly when comparing the gold screened metallic assays to the other assays.
- The cyanide shake tests which are performed on pulverized samples that have a particle size of approximately 80% minus 20 microns indicated that a significant portion of the gold in the composites, when finely ground should be amenable to cyanidation.

The following table 2.4.2 shows the summary of the silver assays on each composite.

Table 2.4.2 – Summary of Composite Silver Head Assays

Parameter	**Comp #**	**12**	**13**	**14**	**15**	**16**	**17**
	D. Hole #	**HMP107**	**HLD050**	**HLD052**	**HLD071**	**HLD072**	**HMP 147**
	Zone	**Hasaga**	**Central**	**Central**	**Central**	**Central**	**Buffalo**
Composite Silver Head Assays							
B.Roll Calc Heads							
- 200M grind	g/t	0.80	0.89	0.80	0.64	0.86	1.01
-1/4"	g/t	0.67	0.68	0.70	0.58	0.82	--
-1/-2"	g/t	0.62	0.67	0.62	0.56	0.78	--
-3/4"	g/t	0.59	0.65	0.61	0.56	0.70	--
B. Roll Head Avg.	**g/t**	**0.67**	**0.72**	**0.68**	**0.59**	**0.79**	**1.01**
Ag (FA)	g/t	< 10	< 10	< 10	< 10	< 10	< 2
Ag CN Soluble	g/t	0.28	0.64	0.37	0.18	0.58	0.58

The composite silver head assays show that there is a relatively low amount of silver in the composites ranging from 0.59g/t to 0.79 g/t for the low grade composites 12 to 16 and 1.01 g/t for the higher grade composite 17 from the Buffalo Zone.

The cyanide shake tests showed that the silver cyanide solubility was highly variable on the pulverized samples ranging from about 31% to about 89%.

The following table 2.4.3 shows the summary of the arsenic and the sulfur and carbon speciation assays on each composite.

Table 2.4.3 – Summary of Composite Arsenic, Sulfur and Carbon Speciation Head Assays

Parameter	**Comp #**	**12**	**13**	**14**	**15**	**16**	**17**
	D. Hole #	**HMP107**	**HLD050**	**HLD052**	**HLD071**	**HLD072**	**HMP 147**
	Zone	**Hasaga**	**Central**	**Central**	**Central**	**Central**	**Buffalo**
As	g/t	< 30	< 30	< 30	< 30	< 30	< 30
S	%	0.32	0.08	0.07	0.04	0.12	0.27
$S^=$	%	0.24	0.08	< 0.05	< 0.05	0.10	0.26
SO_4	%	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
S°	%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
C(t)	%	0.52	0.48	0.54	0.40	0.28	0.98
C(g)	%	< 0.05	< 0.05	< 0.05	0.15	< 0.05	< 0.05
TOC leco	%	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.11
CO_3	%	2.62	2.41	2.70	1.97	1.41	3.41

The low arsenic assays probably indicate that the areas represented by the six composites in the Hasaga, Central, and Buffalo zones are likely low in arsenopyrite which if present and containing gold values would likely be refractory to cyanidation based on historical information for arsenopyritic ore in the Red Lake area

The sulfur speciation indicates the following:

- The Hasaga zone composite has higher sulfur content than the Central zone composites and is consistent with the sulfur content noted on the six Hasaga composites assayed in the Phase 1 work.
- The total sulfur content in the four Central zone composites ranged from 0.04% to 0.12% and is consistent with the sulfur content noted in the six Central zone composites assayed in the Phase 1 work.
- The Buffalo Zone composite contained sulfur in approximately the same range as the Hasaga zone composites.
- The sulfur in all three zones is almost entirely present as sulfide sulfur.

The carbon speciation indicates the following:

- The total carbon content in the Hasaga zone composite of 0.52% was consistent with the total carbon assays on the five Phase 1 Hasaga composites.
- The Central zone Phase 2 composites total carbon assays were slightly lower than the on the six Phase 1 Central Zone composites.
- The graphitic carbon content for all the composites is below the detection limit of 0.05%.
- The Buffalo zone composite 17 had a total organic carbon of 0.11%. The total organic carbon content in the Phase 2 Hasaga and Central zone composites were below the detection limit of 0.05%.
- The Buffalo Zone composite carbon content and speciation is similar to the previously analyzed Phase 1 Hasaga Zone composites.

The following table 2.4.4 shows the summary of the ICP multi-element assays on each composite.

Table 2.4.4 – Summary of Composite ICP Multi-Element Head Assays

Parameter	Comp #	12	13	14	15	16	17
	D. Hole #	HMP107	HLD050	HLD052	HLD071	HLD072	HMP 147
	Zone	Hasaga	Central	Central	Central	Central	Buffalo
ICP Multi-Element Scan							
Al	g/t	65400	77400	78700	80100	79600	75800
Ba	g/t	702	575	579	599	593	553
Be	g/t	1.8	1.3	1.3	1.4	1.3	1.3
Bi	g/t	< 20	< 20	< 20	< 20	< 20	< 20
Ca	g/t	10600	23100	23000	23100	23600	34300
Cd	g/t	< 2	< 2	< 2	< 2	< 2	< 2
Co	g/t	< 20	< 20	< 20	< 20	< 20	23
Cr	g/t	49	51	32	33	37	34
Cu	g/t	41	168	319	95	495	66.7
Fe	g/t	16400	23500	22200	20900	21000	44900
K	g/t	31900	20600	20800	20100	20300	24300
Li	g/t	9	15	12	18	21	13
Mg	g/t	4530	9490	6850	6410	7190	14500
Mn	g/t	463	422	347	327	358	1050
Mo	g/t	< 20	< 20	< 20	< 20	< 20	< 6
Na	g/t	20400	34300	34700	36500	36100	28100
Ni	g/t	< 20	33	< 20	< 20	< 20	32
P	g/t	225	400	404	410	405	786
Pb	g/t	< 20	< 20	< 20	< 20	< 20	< 30
Sb	g/t	< 30	< 30	< 30	< 30	< 30	< 50
Se	g/t	< 30	< 30	< 30	< 30	< 30	< 30
Sn	g/t	< 20	< 20	< 20	< 20	< 20	< 20
Sr	g/t	169	431	434	437	432	379
Ti	g/t	1350	1940	1820	2000	2040	4330
Tl	g/t	< 30	< 30	< 30	< 30	< 30	< 30
U	g/t	< 20	< 20	< 20	< 20	< 20	< 20
V	g/t	22	35	35	33	35	77
Y	g/t	14	14	12	14	16	19
Zn	g/t	64	37	35	31	36	78

The ICP multi-element analyses indicate the following:

- The Hasaga zone composite was similar to the previously analyzed composites in Phase 1 with the exception of iron which at 31,900 ppm Fe was about 10,000ppm higher than the previous five analyzed composites..
- The Central zone composites were in ranges consistent with the ranges in the Phase 1 composites..
- The Buffalo zone Composite 17 was very similar to the geochemistry of the Phase 1 Central Zone Composite 8, displaying higher calcium, iron, magnesium, manganese, and titanium than the Hasaga zone composites and most of the Central zone composites.

Comminution Data

The comminution data for the six composites is summarized in the following table 2.4.5.

Table 2.4.5 – Summary of Comminution Data

Composite #	Zone	Drill Hole #	Rel. Density	JK Parameters			BWI (kWh/t)	AI (g)
				A x b	t_a[1]	DWI		
12	Hasaga	HMP107	2.69	28.5	0.28	9.3	17.0	0.650
13	Central	HLD050	2.71	29.8	0.29	9.0	17.1	0.463
14	Central	HLD052	2.71	31.0	0.30	8.8	17.4	0.407
15	Central	HLD071	2.71	32.3	0.31	8.4	17.0	0.440
16	Central	HLD072	2.71	31.0	0.30	8.7	17.5	0.632
17	Buffalo	HMP 147	2.75	25.8	0.24	10.8	18.1	0.453

The detailed comminution test report is attached as Appendix E.

The JK parameters (Axb) and the Bond work index determinations indicate that the samples are medium hard to hard and are consistent with the data obtained on the Phase 1 composites.

The abrasion index determinations indicate that Hasaga composite 12 and Central zone composite 16 with respective AI's of 0.650 and 0.6321 are abrasive, displaying similar to values for taconite. The other three Central zone composites and the Buffalo zone composite are moderately abrasive with value ranging from 0.407 to 0.463 gram which would be similar for granite.

As the project progresses additional testing to determine the variability of the comminution properties for process design across the three resources will be needed.

Baseline Bottle Roll Cyanidation Tests – 200Mesh Grinds

The baseline bottle roll tests were performed using a grind of 80% passing 200mesh. These tests would indicate projected gold and silver extractions for a mill and not heap leach extractions. Baseline bottle roll cyanidation tests were performed on each of the composites. The test conditions are summarized in Table 2.4.6.

Table 2.4.6 - Bottle Roll Tests Conditions

Parameter	Value
Target Grind – P_{80}	74µm
Slurry Density	40% solids w/w
Slurry pH	10.5 to 11.0
NaCN concentration	0.5 g/l
Total Leach Duration	48 hours
Sampling Periods	2, 8, 24, 32, & 48 hours

The following table 2.4.7 shows the summary of the gold extraction data from the baseline bottle roll cyanidation tests for each composite.

Table 2.4.7 – Summary Gold Baseline Bottle Roll Cyanidation Tests

Comp #	Drill Hole	Zone	Feed Size P_{80}, µm	Head Au, g/t			Residue, g/t	Au % Recovery CN (Unit)					Reag. Consumption kg/t	
				Calc	SM Direct	FA Direct	Au	2 h	8 h	24 h	32 h	48 h	NaCN	CaO
12	HMP 107	Hasaga	75	0.99	1.12	1.08	0.10	4.5	79.3	85.3	90.0	**89.5**	0.72	0.30
13	HLD 050	Central	79	1.10	1.20	1.54	0.05	1.4	61.9	88.6	78.4	**95.8**	0.64	0.27
14	HLD 052	Central	74	1.08	1.07	1.05	0.06	1.4	71.7	93.7	88.7	**94.8**	0.61	0.41
15	HLD 071	Central	77	0.31	0.69	0.25	0.04	4.9	53.3	77.3	68.2	**87.5**	0.58	0.24
16	HLD 072	Central	78	1.02	0.69	0.97	0.05	1.5	40.8	81.1	78.6	**94.7**	0.69	0.27
17	HMP 147	Buffalo	73	2.51	4.06	2.16	0.09	35.5	82.4	92.5	92.6	**96.2**	0.38	0.39

Table 2.4.8 shows the summary of the silver extraction data from the baseline bottle roll cyanidation tests for each composite. Additionally, Table 2.4.8 shows the gold to silver ratios for the composites based on the calculated bottle roll heads for gold and silver.

Table 2.4.8 – Summary Silver Baseline Bottle Roll Cyanidation Tests

Comp #	Drill Hole	Zone	Feed Size P_{80}, µm	Head Ag, g/t		Residue, g/t	Ag % Recovery CN (Unit)					Head Au to Ag Ratio
				Calc	Direct	Ag	2 h	8 h	24 h	32 h	48 h	
12	HMP 107	Hasaga	75	0.80	0.28	<0.5	5.6	29.6	35.2	37.1	**37.5**	1.24
13	HLD 050	Central	79	0.89	0.64	<0.5	5.0	30.1	41.6	41.7	**43.6**	1.24
14	HLD 052	Central	74	0.80	0.37	<0.5	5.6	22.4	31.6	33.6	**37.5**	1.35
15	HLD 071	Central	77	0.64	0.18	<0.5	7.1	14.2	18.9	21.2	**21.4**	0.48
16	HLD 072	Central	78	0.86	0.58	<0.5	5.2	22.6	36.2	36.4	**41.7**	1.19
17	HMP 147	Buffalo	73	1.01	0.63	<0.5	19.3	40.0	48.7	50.2	**50.6**	2.49

The bottle roll test data in Tables 2.4.7 and 2.4.8 indicates the following:

- **Hasaga Zone**
  - Gold extraction for composite 12 was good at 89.5%, slightly lower than the responses by the Phase 1 Hasaga composites which averaged 94.7%.
  - The gold leaching rate for the composite was fairly rapid and similar to the rates demonstrated by the Phase 1 Hasaga composites.
  - The composite 12 bottle roll calculated head compared well to the screened metallic head and direct assayed gold head grade
  - The reagent consumptions were comparable to the consumptions of the Phase 1 Hasaga zone composites.
  - The silver extraction of 37.5% for composite 12 fell within the range of 17.7% to 61.5% for the Phase 1 Hasaga composites and was at the average of 37.4% for the Phase 1 composites.
  - The gold to silver ratio of 1.24 was comparable and in the range noted for the Phase 1 Hasaga composites.

- **Central Zone**
  - Gold extractions for composites 13 to 16 were good, ranging from 87.5% to 95.8% and comparable to the extractions exhibited by the Phase 1 composites.
  - The low gold extraction of 87.5% on composite 15 most likely reflects the lower head grade of 0.31g/t versus the higher grade of the other composites which were near 1.0g/t.

- The gold leaching rate for the Phase 2 Central zone composites were similar to the rates of the Phase 1 composites and were slower in comparison to the Hasaga and Buffalo Zone composites.
- All four of the Central Zone composites displayed some potential preg robbing between the 24 hour and 32 hour samples.
- The various gold head grades demonstrated some variability due to the gold "nugget" effect noted previously in Phase 1 testing although due to the low and relatively uniform head grades the variance was not large.
- The reagent consumptions for the Phase 2 Central zone composites were comparable to the consumptions of the Phase 1 composites.
- Silver extractions for the Phase 2 Central zone composites ranged from 21.4% to 41.7% and were near the average extraction of 38.7% for the Phase 1 composites.
- The gold to silver ratios for the Phase 2 Central zone composites ranged from 0.48 to 1.35 and were comparable to the ratios noted for the Phase 1 composites.

- **Buffalo Zone**
  - Composite 17 gave a good gold extraction of 96.2%.
  - The leaching rate for the Buffalo zone composite 17 was rapid and comparable to the rates for Hasaga zone composites.
  - The comparison of the bottle roll calculated head grade with the screened metallic head grade and direct assayed head grade shows a significant variance likely due to a nugget effect.
  - Composite 17 gave a sodium cyanide consumption of 0.38kg/t the second lowest consumption of any of the composites in both Phase 1 and 2 which could be due to similar geochemistry as Composite 8 which gave the lowest cyanide consumption of 0.09kg/t in phase 1 testing.
  - The silver extraction for composite 17 was 50.6% and was within the range of silver extractions obtained on the Hasaga and Central zone composites in in Phases 1 and 2 of the scoping testwork.
  - The gold to silver ratio of 2.49 was reasonably high and again somewhat comparable to the Composite 8 of Phase 1 testing.

Heap Leach Amenability Testing

Bottle roll testing at three different crush sizes (-1/4", -1/2", and -3/4") were performed on Composites 12 to 16 to investigate if the low grade composites may be amenable to heap leaching. The following table 2.4.9 summarizes the bottle roll heap leach amenability test results.

Table 2.4.9 – Summary Bottle Roll Heap Leach Amenability Test Results

Composite #	Drill Hole	Zone	Feed Size, inch	Head Au, g/t Calc	Head Au, g/t SM Direct	Head Au, g/t FA Direct	Au % Recovery CN (Unit) 1 d	2 d	5 d	8 d	12 d	14 d	Reag. Consumption kg/t NaCN	CaO
12	HMP 107 Comp	Hasaga	3/4	1.08	1.12	1.08	3	8	12	14	16	**17**	0.09	0.38
			1/2	0.86			11	16	23	27	30	**30**	0.11	0.38
			1/4	0.85			14	20	29	34	40	**40**	0.11	0.39
13	HLD 050 Comp	Central	3/4	0.93	1.20	1.54	7	11	19	23	26	**28**	0.11	0.39
			1/2	1.01			6	12	16	21	23	**24**	0.13	0.37
			1/4	1.42			6	12	18	22	25	**26**	0.12	0.41
14	HLD 052 Comp	Central	3/4	1.48	1.07	1.05	2	5	8	9	10	**11**	0.12	0.39
			1/2	0.93			7	11	19	21	23	**23**	0.12	0.47
			1/4	0.99			14	20	29	34	40	**40**	0.11	0.41
15	HLD 071 Comp	Central	3/4	0.74	0.69	0.25	2	4	8	10	12	**10**	0.12	0.39
			1/2	0.51			3	9	12	18	18	**18**	0.10	0.38
			1/4	0.29			5	15	26	36	42	**37**	0.11	0.40
16	HLD 072 Comp	Central	3/4	0.85	0.69	0.97	2	9	11	14	16	**14**	0.10	0.37
			1/2	0.94			6	13	18	23	24	**26**	0.12	0.39
			1/4	1.07			8	14	24	29	31	**34**	0.11	0.37

The test data shows relatively low gold extractions for all the crush sizes evaluated. The best extractions were on the minus ¼" crush size where gold extractions ranged from 26% to 40%.

These tests indicate that heap leaching of the low grade does not appear feasible at this point. Typically gold heap leach extractions should be in range of 60% to 70% for positive economics.

As a result of the poor coarse ore bottle roll results, column testing was not performed.

Buffalo Zone Gravity Testwork

A Knelson gravity recovery test was performed on Buffalo zone composite 17. The test was coupled with a bottle roll cyanidation of the gravity tailings for comparison to the extraction achieved by direct cyanidation.

The following table 2.4.10 summarizes the results from the gravity testwork on composite 17.

Table 2.4.10 – Summary Knelson Gravity Tests

Product	Weight %	Au Assay – g/t	Au Distribution %
Gravity Concentrate	0.082	1,372	52.0
Gravity Tailing	99.9	1.04	48.0
Calculated Head	100	2.16	100

Table 2.4.10 shows that the Buffalo Zone composite 17 was amenable to gravity concentration. 52.0% of the gold was recovered into a concentrate with a weight recovery of 0.082%. These results were similar to the results obtained on the three Central zone composites tested in Phase 1.

The following Table 2.4.11 shows a comparison of the gold recovery by gravity concentration and cyanidation of the gravity tailings to the recovery achieved by direct cyanidation.

Table 2.4.11 – Gravity Recovery & Gravity Tails CN Leach versus Direct CN Leach

Comp #	Comp	Zone	Feed Size P_{80}, µm	Head Au, g/t				Residue, g/t Au	Au % Recovery						Reag. Consumption kg/t	
				B. Roll Calc	CN + Gravity	SM Direct	FA Direct		CN (Unit) 2 h	8 h	24 h	32 h	48 h	CN + Gravity	NaCN	CaO
17	Whole Ore	Buffalo	73	2.51		4.06	2.16	0.09	35.5	82.4	92.5	92.6	**96.2**		0.38	0.39
17	Gravity & Tails Leach	Buffalo	76	1.15	2.16	4.06	2.16	0.09	59.0	87.5	91.5	91.7	**92.5**	**96.4**	0.25	0.56

The whole ore or direct cyanidation of composite 17 gave a gold extraction of 96.2% as compared to a combined 96.4% gold recovery by gravity concentration and cyanidation of the gravity tailings.

The data in Table 2.4.11 indicates the following:

- There was no discernable benefit of gravity concentration coupled with cyanidation of the gravity tailings versus whole ore cyanidation on overall gold extraction. Nearly the same overall gold recoveries were obtained by both processes.
- There may be a slight cyanide consumption reduction using gravity recovery probably due to gravity concentration removing some of the sulfides that could consume cyanide in the leach step.
- There may be benefit on gold leach kinetics following gravity gold removal which could possibly lead to a shorter leach time and possibly smaller leach tanks.
- These were same observations from the Phase 1 testing on the Hasaga and Central zone composites.

As the project advances, additional testwork should be considered to investigate if there are benefits by including a gravity concentration step in the gold recovery process. Testing should include a detailed examination of gold leaching kinetics with and without gravity recovery.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The following are the conclusions and recommendations developed from the Phase 2 metallurgical program on the one Hasaga composite, the four Central zone composites, and the one Buffalo zone composite.

3.1 CONCLUSIONS

Major Conclusions

- The Phase 2 baseline metallurgical scoping tests indicate that the Hasaga, Central, and Buffalo zone composites with the mineralogy tested are not refractory and should be amenable to conventional milling using whole ore cyanidation and yield gold extractions at or above 90% when ground to an 80% passing size of 200mesh.
- The bottle roll heap leach amenability tests on the low grade single Hasaga composite and four Central zone composites indicate that heap leaching of the low grade material does not appear to be feasible at this point as maximum gold extractions were only 40% with a fine crush size of -1/4". Typically gold heap leach extractions need to be in range of 60% to 70% for positive economics.
- The single test on the Buffalo zone composite indicates that a significant portion of the gold in the zone may be recoverable using gravity concentration, however, additional testing will be required to determine if this will be beneficial in a process flowsheet.
- As was noted in Phase 1, the geochemistry and precious metal form and associations appear to have significant impacts on metal extractions, leaching rates, and reagent consumptions and will need to be investigated further as the project advances.
- Based on the limited testing, there do not appear to be unusual or significant deleterious factors that would seriously impact processing the resources or impair the project, however, additional testing, particularly pre-feasibility level metallurgical testing and environmental testing, will be needed to fully determine and assess factors that could have significant or deleterious effects on the project.

Gold Assays

- The Phase 2 scoping tests again indicated that there is a "nugget" effect in gold assaying that needs further investigation in metallurgical testing and drill interval assaying.
- The nugget effect on the lower grade was not large but still evident in the variation between the various head assays. The higher grade Buffalo zone composite 17 displayed a large variance between the screened metallic assay of 4.06g/t and the other assays which ranged from 1.92g/t to 2.60g/t.

Silver Assays

- The Phase 2 composite silver head assays were consistent with the Phase 1 findings which indicate that there is a relatively low amount of silver in the composites from all the zones, typically assaying below 1g/t. The highest silver assay was 1.01 g/t for the Buffalo zone composite 17.
- The Phase 2 gold to silver ratios continued indicate that there is typically more gold than silver in the composites.

Geochemistry

- The Phase 2 geochemistry appears to be consistent with the Phase 1 geochemistry which indicates the following:

    - Arsenic assays are low likely indicating a low in arsenopyrite content in the composites.
    - The Hasaga zone has a higher total sulfur content (0.30% to 0.82%) than the Central zone (0.05% to 0.18%).
    - The single Buffalo Zone composite sulfur content appears to be about the same as the Hasaga zone.
    - The sulfur in all three zones is almost entirely present as sulfide sulfur.
    - The total carbon content in the Hasaga zone ranges (0.18% to 1.32%) higher than the Central zone (0.28% to 0.89%).
    - The single Buffalo zone composite total carbon of 0.98% appears similar to the Hasaga zone range of total carbon content.
    - Most of the carbon in all three zones appears to present as carbonate.
    - The four Central zone composites continued to show a higher calcium content than the Hasaga zone ranging from 23,100 g/t to 23,600 g/t versus the Hasaga composite 12 with a calcium content of 10,600 g/t.
    - The single Buffalo zone composite 17 had a calcium content of 34,300g/t which is similar to the anomalous Phase 1 Central Zone composite 8 which had a calcium content of 46,000g/t.
    - The Phase 2 Central zone composites continued to have higher copper content than the Hasaga zone ranging from 95g/t to 495 g/t versus 41.0g/t for Composite 12.
    - The Buffalo Composite 17 had a copper content of 66.7g/t.
    - The Hasaga and Central zones iron contents were similar and comparable to the Phase1 composites iron content.
    - The Buffalo Composite 17 had an iron content of 44,900tg/t which was similar to the Phase 1 Composite 8 which had an iron content of 62,600g/t.
    - The Phase 2 Hasaga and Central zones magnesium contents were again similar.
    - The Buffalo zone composite 17 had a magnesium content of 14,500g/t.

- The geochemistry of the single Buffalo Zone composite 17 seems to approximate the geochemistry of the Phase 1 Central zone Composite 8 which was an anomaly as compared to the other Central zone composites.

Comminution Properties

- The JK comminution parameters (Axb) and the Bond work index determinations indicate that the samples from all three zones are medium hard to hard and are consistent with the data obtained on the Phase 1 composites.

- The abrasion index determinations indicate that Hasaga composite 12 and Central zone composite 16 with respective AI's of 0.650 and 0.6321 are abrasive, displaying similar to values for taconite. The other three Central zone composites and the Buffalo zone composite are moderately abrasive with value ranging from 0.407 to 0.463 gram which would be similar for granite.

Baseline Bottle Roll Cyanidation – 200mesh Grind

- Gold extractions by whole ore cyanidation using an 80% minus 200mesh grind for the Phase 2 composites from all three zones were good with the Hasaga low grade composite yielding an extraction of 89.5%, the four Central zone composites having an average extraction of 93.2%, and the Buffalo zone composite giving a 96.2% extraction.

- The gold leaching rate for the Hasaga composite was faster than for the Central zone composites and was consistent with the rates observed in the Phase 1 tests. The leaching rate of the Buffalo zone composite was similar to the rates for the Hasaga zone composites.

- The Phase 2 silver extractions were variable and relatively low as were the Phase 1 extractions. The Hasaga composite gave a37.5% silver extraction, the four Central zone composite extractions ranged from 21.4% to 43.6%, and the Buffalo zone composite gave a 50.6% extraction.
- The highly variable silver extraction probably is due to the form or mineralogy of the silver and the association of the silver minerals in the various parts of the resources.
- The four Central zone composites exhibited some potential preg robbing between the 24 hour and 32 hour sampling period. Additional testing will be needed to determine the reasons for the trend observed on these four Central zone samples.

- The dissolved oxygen (DO) levels for Phase 2 tests on the Hasaga and Central zone composites were very low for the first two hours of leaching indicating that oxygen consumers are present and were consistent with the low DO levels noted in the Phase 1 tests.

- The Buffalo Zone composite bottle roll DO level was reasonably high after the first two hours of leaching indicating that oxygen consumers were not present in the composite and again similar to the response noted for Central Zone Composite 8 in phase 1 testing.

- The sodium cyanide and lime consumptions for the Phase 2 Hasaga and Central zone composites were in reasonable ranges and comparable to the consumptions of the Phase 1 composites.

- The sodium cyanide consumption of 0.38 kg/t on the Buffalo zone composite was about half of the consumptions for the Hasaga and Central zone composites but not as low as the Phase 1 Central zone composite 8. The lime consumption on the Buffalo zone composite was higher than most of the Hasaga and Central zone composites but was again comparable to the lime consumption noted for the Phase 1 Composite 8.

- As was noted in Phase 1, the geochemistry and precious metal form and associations appear to have significant impacts on metal extractions, leaching rates, and reagent consumptions and will need to be investigated further as the project advances.

Heap Leach Amenability Testing

- The heap leach amenability bottle roll tests showed that the low grade Hasaga and Central zones do not appear to be suitable for heap leaching as gold extractions on the -3/4” crush ranged from 10% to 17%, on the -1/2” crush 18 to 30%, and on the -1/4” crush 34% to 40% as typical economic heap leach gold extractions run from 60 to 70%.

- The -1/4” crush is approaching the practical limit for heap leaching although some projects have tested crushing to 10mesh. Crushing to 10mesh could be a future testing option but it should be noted that crushing to 10mesh would have to likely be performed using high pressure grinding roll (HPGR) technology and would require feed with little or no clay minerals.

Buffalo Zone Gold Recovery by Gravity Concentration

- The lone gravity concentration test on the Buffalo Zone Composite 17 showed that a significant portion of the gold in the composite was amenable to recovery using gravity concentration.

- Gravity gold recovery on the Buffalo Zone composite was comparable to some of the higher gravity recoveries noted in the Phase 1 Hasaga and Central zone composites.

- Further gravity concentration tests will be needed to fully understand gravity gold recovery in the Buffalo zone.

Buffalo Zone Gravity Recovery and Gravity Tailings Cyanidation versus Whole Ore Leach

- The single test on the Buffalo Zone composite 17 displayed no discernable benefit of gravity concentration coupled with cyanidation of the gravity tailings versus whole ore cyanidation on overall gold extraction as nearly the same overall gold recoveries were obtained by both processes and was consistent with the testing conducted on the Hasaga and Central zone composites in the Phase 1 tests.

- The tests on Buffalo zone composite indicated that there may be a slight cyanide consumption reduction using gravity recovery probably due to gravity concentration removing some of the sulfides that could consume cyanide in the leach step. The slight cyanide consumption reduction was similar to the results on the Phase 1 Hasaga and Central zone composites.

- Also, there may be benefit on gold leach kinetics following gravity gold removal which could possibly lead to a shorter leach time and possibly smaller leach tanks, again this was similar to the trend noted on the Phase 1 Hasaga and Central zone composites.

- Further testing will be required to fully assess if gold recovery using gravity concentration would be of value in a processing circuit for the Hasaga project.

3.2 RECOMMENDATIONS

The following are recommendations based on the analysis of the metallurgical scoping tests.

Resource Geologic Domains

- It is recommended that the geology, geochemistry, and initial metallurgy from the Phase 1 and Phase 2 tests on the Hasaga, Central, and Buffalo zone composites be reviewed to determine if delineation of specific geologic domains or sub-zones within each zone is needed in building the resource model and to guide future test programs.
- The similarities of the Central Zone composite 8 with the Buffalo Zone Composite 17 should be investigated as both composites displayed similar geochemistry and metallurgical responses.

Investigation of Assaying “Nugget” Effect

- The Phase 2 tests again showed a gold nugget effect on assays as which supports the Phase 1 recommendation that the a program to examine drill hole gold assays for variability due to nugget or large particle free gold be conducted. This would include examination of typical fire assaying versus screen metallic fire assaying.
- It is recommended that all future metallurgical programs include screen metallic fire assaying and triplicate fire assaying on all test head samples to broaden the statistical data base regarding the “nugget” effect.

Additional Scoping Tests on Initial Phase 2 Metallurgical Composites

- A QEMSCAN – RMS test should be considered on the Buffalo Zone composite 17 to further explore the geochemistry and gold occurrence and associations and similarities to Central Zone Composite 8.

Additional Heap Leach Amenability Tests

- Additional heap leach bottle roll tests using a minus 10 mesh crush (preferably produced using an HPGR) may be considered as a 10 mesh crush represents the likely minimum practical heap leach crush size and that there was some indication that gold extractions may increase with a finer crush size.

3.3 BIBLIOGRAPHY

~~Copies of each reference are attached in Appendix~~

1. Premier Gold, Press Release May 3, 2016, “Premier Continues Success at Hasaga Red Lake”

Appendix B – Composite Details

Phase 2 Hasaga Zone

HMP Low grade comp Aug 2016

HMP107	116	117	0.804	203599	1		
HMP107	117	118	0.767	203601	1		
HMP107	118	119	0.169	203602	1		
HMP107	119	120	**1.46**	203603	1		
HMP107	120	121	0.011	203604	1		
HMP107	121	122	0.228	203605	1		
HMP107	122	123	0.443	203606	1		
HMP107	123	124	0.357	203607	1		
HMP107	124	125	0.499	203609	1		
HMP107	125	126	0.323	203610	1		
HMP107	126	127	0.164	203611	1		
HMP107	127	128	0.779	203612	1		
HMP107	128	129	0.91	203613	1		
HMP107	129	130	**3.16**	203614	1		
HMP107	130	131	0.659	203615	1		
HMP107	131	132	**2**	203617	1		
HMP107	132	133	**2.06**	203618	1		
HMP107	133	134	0.696	203619	1		
HMP107	134	135	**1.39**	203620	1		
HMP107	135	136	0.26	203621	1		
HMP107	136	137	**1.16**	203622	1		
HMP107	137	138	0.729	203623	1		
HMP107	138	139	**1.42**	203625	1		
HMP107	139	140	**1.63**	203626	1		
HMP107	140	141	0.634	203627	1		
HMP107	141	142	0.901	203628	1		
HMP107	142	143	0.618	203629	1		
HMP107	143	144	0.86	203630	1		
HMP107	144	145	0.517	203631	1		
HMP107	145	146	0.767	203633	1		
HMP107	146	147	**1.99**	203634	1		
HMP107	147	148	0.158	203635	1		
HMP107	148	149	**1.04**	203636	1		
HMP107	149	150	**1.49**	203637	1		
HMP107	150	151	0.711	203638	1		
HMP107	151	152	0.436	203639	1		
HMP107	152	153	0.263	203641	1		
HMP107	153	154	**1.6**	203642	1		
HMP107	154	155	0.686	203643	1		0.89
							39

Phase 2 Central Zone Comp

Met comps HLD

HLD050	142	143	1.33	272152	0		
HLD050	143	144	0.087	272153	1		
HLD050	144	145	2.13	272154	1		
HLD050	145	146	0.269	272155	1		
HLD050	146	147	0.428	272156	1		
HLD050	147	148	1.43	272157	1		
HLD050	148	149	1.2	272159	1		
HLD050	149	150	0.127	272160	1		
HLD050	150	151	0.252	272161	1		
HLD050	151	152	0.872	272162	1		
HLD050	152	153	0.129	272163	1		
HLD050	153	154	0.47	272164	1		
HLD050	154	155	2.11	272165	1		
HLD050	155	156	0.23	272167	1		
HLD050	156	157	0.922	272168	1		
HLD050	157	158	1.22	272169	1		
HLD050	158	159	0.155	272170	1		
HLD050	159	160	0.404	272171	1		
HLD050	160	161	1.64	272172	1		
HLD050	161	162	1.41	272173	1		
HLD050	162	163	1.16	272175	1		
HLD050	163	164	2.02	272176	1		
HLD050	164	165	0.778	272177	1		
HLD050	165	166	0.633	272178	1		
HLD050	166	167	0.416	272179	1		
HLD050	167	168	0.336	272180	1		
HLD050	168	169	0.799	272181	1		
HLD050	169	170	1.17	272183	1		
HLD050	170	171	1.34	272184	1		
HLD050	171	172	1.22	272185	1		
HLD050	172	173	5.95	272186	1		
HLD050	173	174	0.613	272187	1		
HLD050	174	175	0.281	272188	1		
HLD050	175	176	0.324	272189	1		
HLD050	176	177	2.85	272191	1		
HLD050	177	178	0.758	272192	1		
HLD050	178	179	0.52	272193	1		1.03
							37

HLD052	9	10	0.421	272555	1		
HLD052	10	11	0.85	272556	1		
HLD052	11	12	1.35	272557	1		
HLD052	12	13	0.929	272558	1		
HLD052	13	14	2.47	272559	1		
HLD052	14	15	1.68	272561	1		
HLD052	15	16	1.15	272562	1		
HLD052	16	17	1.51	272563	1		
HLD052	17	18	0.911	272564	1		
HLD052	18	19	0.223	272565	1		
HLD052	19	20	0.313	272566	1		
HLD052	20	21	2.24	272567	1		
HLD052	21	22	3.17	272569	1		
HLD052	22	23	1.75	272570	1		
HLD052	23	24	0.903	272571	1		
HLD052	24	25	1.44	272572	1		
HLD052	25	26	1.72	272573	1		
HLD052	26	27	1.15	272574	1		
HLD052	27	28	0.582	272575	1		
HLD052	28	29	0.517	272577	1		
HLD052	29	30	0.097	272578	1		
HLD052	30	31	0.356	272579	1		
HLD052	31	32	0.296	272580	1		
HLD052	32	33	1.39	272581	1		
HLD052	33	34	1.22	272582	1		
HLD052	34	35	0.877	272583	1		
HLD052	35	36	0.205	272585	1		
HLD052	36	37	0.169	272586	1		
HLD052	37	38	0.385	272587	1		
HLD052	38	39	0.204	272588	1		
HLD052	39	40	0.245	272589	1		
HLD052	40	41	0.325	272590	1		
HLD052	41	42	0.722	272591	1		0.99
							32

HLD071	205	206	1.91	241206	0		
HLD071	206	207	0.214	241207	1		
HLD071	207	208	0.171	241209	1		
HLD071	208	209	0.164	241210	1		
HLD071	209	210	0.704	241211	1		
HLD071	210	211	0.192	241212	1		
HLD071	211	212	0.316	241213	1		
HLD071	212	213	0.35	241214	1		
HLD071	213	214	0.224	241215	1		
HLD071	214	215	0.201	241217	1		
HLD071	215	216	0.306	241218	1		
HLD071	216	217	1.16	241219	1		
HLD071	217	218	0.256	241220	1		
HLD071	218	219	0.407	241221	1		
HLD071	219	220	0.383	241222	1		
HLD071	220	221	0.886	241223	1		
HLD071	221	222	0.978	241225	1		
HLD071	222	223	0.079	241226	1		
HLD071	223	224	0.639	241227	1		
HLD071	224	225	0.447	241228	1		
HLD071	225	226	1.04	241229	1		
HLD071	226	227	0.514	241230	1		
HLD071	227	228	0.251	241231	1		
HLD071	228	229	0.451	241233	1		
HLD071	229	230	0.451	241234	1		
HLD071	230	231	0.124	241235	1		
HLD071	231	232	0.061	241236	1		
HLD071	232	233	0.53	241237	1		
HLD071	233	234	0.485	241238	1		
HLD071	234	235	0.138	241239	1		
HLD071	235	236	0.874	241241	1		
HLD071	236	237	0.43	241242	1		0.43
							31

HLD072	274	275	0.281	241609	0		
HLD072	275	276	0.263	241610	1		
HLD072	276	277	0.505	241611	1		
HLD072	277	278	0.663	241612	1		
HLD072	278	279	0.733	241613	1		
HLD072	279	280	0.368	241614	1		
HLD072	280	281	0.341	241615	1		
HLD072	281	282	2.13	241617	1		
HLD072	282	283	0.478	241618	1		
HLD072	283	284	0.021	241619	1		
HLD072	284	285	0.251	241620	1		
HLD072	285	286	0.099	241621	1		
HLD072	286	287	0.195	241622	1		
HLD072	287	288	0.372	241623	1		
HLD072	288	289	0.785	241625	1		
HLD072	289	290	0.779	241626	1		
HLD072	290	291	1.5	241627	1		
HLD072	291	292	0.826	241628	1		
HLD072	292	293	0.88	241629	1		
HLD072	293	294	1	241630	1		
HLD072	294	295	0.801	241631	1		
HLD072	295	296	3	241633	1		
HLD072	296	297	1.1	241634	1		
HLD072	297	298	0.763	241635	1		
HLD072	298	299	0.586	241636	1		
HLD072	299	300	1.28	241637	1		
HLD072	300	301	0.471	241638	1		
HLD072	301	302	1.13	241639	1		
HLD072	302	303	0.573	241641	1		
HLD072	303	304	1.76	241642	1		
HLD072	304	305	1.16	241643	1		
HLD072	305	306	1.62	241644	1		
HLD072	306	307	0.989	241645	1		
HLD072	307	308	2.07	241646	1		
HLD072	308	309	1.46	241647	1		0.91
							34

Phase 2

Buffalo HMP147 Met Sample

HMP147	155	156	9.42	A00337899	1				
HMP147	156	157	2.75	A00337900	1				
HMP147	157	158	0.06	A00337901	1				
HMP147	158	159	0.02	A00337902	1			B1	8
HMP147	159	160	0.16	A00337903	1				
HMP147	160	161	0.09	A00337905	1				
HMP147	161	162	0.05	A00337906	1				
HMP147	162	163	0.72	A00337907	1				
HMP147	163	164	1.14	A00337908	1				
HMP147	164	165	0.92	A00337909	1				
HMP147	165	166	0.11	A00337910	1				
HMP147	166	167	2.901	A00337911	1			B2	8
HMP147	167	168	33.62	A00337913	1				
HMP147	168	169	2.2	A00337914	1				
HMP147	169	170	2.3	A00337915	1		10.26		
HMP147	170	171	0.47	A00337916	1		4		
HMP147	171	172	1	A00337917	1				
HMP147	172	173	1.54	A00337918	1				
HMP147	173	174	1.63	A00337919	1				
HMP147	174	175	1.82	A00337920	1				
HMP147	175	176	0.12	A00337922	1			B3	8
HMP147	176	177	2.81	A00337923	1				
HMP147	177	178	3.015	A00337924	1				
HMP147	178	179	1.52	A00337925	1				
HMP147	179	180	0.18	A00337926	1				
HMP147	180	181	0.03	A00337927	1				
HMP147	181	182	0.02	A00337929	1			B4	5
HMP147	182	183	1.53	A00337930	1				
HMP147	183	184	5.338	A00337931	1	2.67			
						29			29

Appendix D – SGS Metallurgical Scoping Test Report

Head Analysis

Element	Unit	HLD050	HLD052	HLD071	HLD072	HMP107	HMP 147
Au (FA) cut 1	g/t	1.43	1.11	0.29	1.19	1.27	2.02
Au (FA) cut 2	g/t	1.28	1.03	0.21	0.78	0.97	1.92
Au (FA) cut 3	g/t	1.92	1.00	0.25	0.94	1.01	2.55
Au (FA) Avg.	g/t	**1.54**	**1.05**	**0.25**	**0.97**	**1.08**	**2.16**
Au (SM)	g/t	**1.20**	**1.07**	**0.69**	**0.69**	**1.12**	**4.06**
Au CN Soluble	g/t	1.8	0.8	0.2	0.7	0.7	2.6
Ag (FA)	g/t	< 10	< 10	< 10	< 10	< 10	< 2
Ag (SM)	g/t	-	-	-	-	-	**0.67**
Ag CN Soluble	g/t	0.64	0.37	0.18	0.58	0.28	0.58
As	g/t	< 30	< 30	< 30	< 30	< 30	< 30
S	%	0.08	0.07	0.04	0.12	0.32	0.27
$S^=$	%	0.08	< 0.05	< 0.05	0.10	0.24	0.26
SO_4	%	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
S°	%	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
C(t)	%	0.48	0.54	0.40	0.28	0.52	0.98
C(g)	%	< 0.05	< 0.05	0.15	< 0.05	< 0.05	< 0.05
TOC leco	%	< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.11
CO_3	%	2.41	2.70	1.97	1.41	2.62	3.41
ICP Scan							
Al	g/t	77400	78700	80100	79600	65400	75800
Ba	g/t	575	579	599	593	702	553
Be	g/t	1.3	1.3	1.4	1.3	1.8	1.3
Bi	g/t	< 20	< 20	< 20	< 20	< 20	< 20
Ca	g/t	23100	23000	23100	23600	10600	34300
Cd	g/t	< 2	< 2	< 2	< 2	< 2	< 2
Co	g/t	< 20	< 20	< 20	< 20	< 20	23
Cr	g/t	51	32	33	37	49	34
Cu	g/t	168	319	95	495	41	66.7
Fe	g/t	23500	22200	20900	21000	16400	44900
K	g/t	20600	20800	20100	20300	31900	24300
Li	g/t	15	12	18	21	9	13
Mg	g/t	9490	6850	6410	7190	4530	14500
Mn	g/t	422	347	327	358	463	1050
Mo	g/t	< 20	< 20	< 20	< 20	< 20	< 6
Na	g/t	34300	34700	36500	36100	20400	28100
Ni	g/t	33	< 20	< 20	< 20	< 20	32
P	g/t	400	404	410	405	225	786
Pb	g/t	< 20	< 20	< 20	< 20	< 20	< 30
Sb	g/t	< 30	< 30	< 30	< 30	< 30	< 50
Se	g/t	< 30	< 30	< 30	< 30	< 30	< 30
Sn	g/t	< 20	< 20	< 20	< 20	< 20	< 20
Sr	g/t	431	434	437	432	169	379
Ti	g/t	1940	1820	2000	2040	1350	4330
Tl	g/t	< 30	< 30	< 30	< 30	< 30	< 30
U	g/t	< 20	< 20	< 20	< 20	< 20	< 20
V	g/t	35	35	33	35	22	77
Y	g/t	14	12	14	16	14	19
Zn	g/t	37	35	31	36	64	78

15673-002 **Premier - Hasaga**

Au Head Analysis by Screened Metallics

Sample	Calc Head Grade Au, g/t	Total Weight, g	+150 Mesh			-150 Mesh			% Au Distribution	
			% Mass	g Mass	Au, g/t	% Mass	Au, g/t a	Au, g/t b	+150 Mesh	-150 Mesh
HLD050	**1.20**	498.2	6.04	30.1	1.06	94.0	1.46	0.96	5.3	94.7
HLD071	**0.69**	525.0	5.68	29.8	0.20	94.3	0.43	1.01	1.6	98.4
HLD052	**1.07**	501.8	5.26	26.4	1.32	94.7	1.03	1.08	6.5	93.5
HLD072	**0.69**	508.1	2.96	15.1	0.40	97.0	0.71	0.68	1.7	98.3
HMP107	**1.12**	525.4	5.44	28.6	1.12	94.6	1.20	1.03	5.5	94.5

MASS, g

+150 Mesh	-150 Mesh	Total			
30.10	468.1	498.2	0.06	1.14	1.2
29.80	495.2	525.0	0.01	0.68	0.7
26.40	475.4	501.8	0.07	1.00	1.1
15.06	493.0	508.1	0.01	0.67	0.7
28.57	496.83	525.4	0.06	1.05	1.1

Sample	Calc Head Grade Au, g/t	Total Weight, g	+200 Mesh			-200 Mesh			% Au Distribution	
			% Mass	g Mass	Au, g/t	% Mass	Au, g/t a	Au, g/t b	+200 Mesh	-200 Mesh
Buffalo HMP 147	**4.06**	519.5	5.96	31.0	15.38	94.0	3.07	3.62	22.6	77.4

MASS, g

+200 Mesh	-200 Mesh	Total			
30.95	488.55	519.5	0.92	3.15	4.1

Sample	Calc Head Grade Ag, g/t	Total Weight, g	+200 Mesh			-200 Mesh			% Ag Distribution	
			% Mass	g Mass	Ag, g/t	% Mass	Ag, g/t a	Ag, g/t b	+200 Mesh	-200 Mesh
Buffalo HMP 147	**0.67**	519.5	5.96	31.0	1.81	94.0	0.60	0.60	16.0	84.0

MASS, g

+200 Mesh	-200 Mesh	Total			
30.95	488.55	519.5	0.11	0.56	0.7

Project Number: 15673-002
Project Name: Hasaga

Overall Grindability Summary

Sample Name	Rel. Density	JK Parameters A x b	JK Parameters t_a[1]	JK Parameters DWI	BWI (kWh/t)	AI (g)
HLD050	2.71	29.8	0.29	9.0	17.1	0.463
HLD052	2.71	31.0	0.30	8.8	17.4	0.407
HLD071	2.71	32.3	0.31	8.4	17.0	0.440
HLD072	2.71	31.0	0.30	8.7	17.5	0.632
HMP107	2.69	28.5	0.28	9.3	17.0	0.650
Buffalo HMP 147	2.75	25.8	0.24	10.8	18.1	0.453

[1]t_a value reported as part of the SMC procedure is an estimate

SGS Minerals Services

STANDARD BOND ABRASION TEST

Project No.: 15673-002 Date (mm/dd/yy): 14-Nov-16
Sample: Buffalo HMP 147 SGS Laboratory: Lakefield (Canada)

Purpose: To determine the Abrasion Index of the sample

Procedure: The equipment and procedure duplicate the Bond method for determining an abrasion index.

Feed: 1,600 grams minus 3/4 inch plus 1/2 inch fraction

Number of cycles of 15 minutes: 4 Cycles

Results:

Reading:	#1	#2	Average
Original paddle weight, grams:	94.1757	94.1757	94.1757
Final paddle weight, grams:	93.7227	93.7228	93.7228

Abrasion Index, Ai: 0.453

Predicted Wear Rates:

		lb/kwh	kg/kwh
Wet rod mill, rods:	0.35*(Ai-0.020)^0.20	0.30	0.13
Wet rod mill, liners:	0.035*(Ai-0.015)^0.30	0.027	0.012
Ball Mill (overflow and grate discharge types)			
Wet ball mill, balls:	0.35*(Ai-0.015)^0.33	0.27	0.121
Wet ball mill, liners:	0.026*(Ai-0.015)^0.30	0.020	0.0092
Ball Mill (grate discharge type)			
Dry ball mill, balls:	0.05*(Ai)^0.5	0.034	0.015
Dry ball mill, liners:	0.005*(Ai)^0.5	0.0034	0.0015
Crushers (gyratory, jaw, cone)			
Crusher, liners:	(Ai+0.22)/11	0.061	0.028
Roll crusher, shells:	(Ai/10)^0.67	0.126	0.057

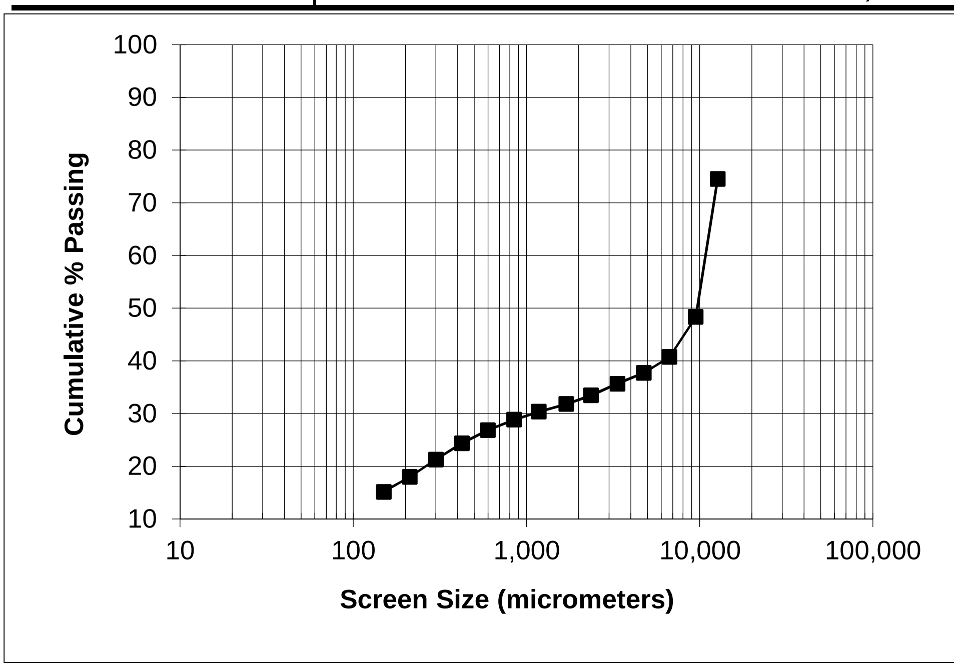
SGS Minerals Services

STANDARD BOND ABRASION TEST

Project No.:	15673-002	Date:	14-Nov-16
Sample:	Buffalo HMP 147	SGS Laboratory:	Lakefield (Canada)

Product Particle Size Analysis

Size		Weight	% Retained		% Passing
Mesh	µm	grams	Individual	Cumulative	Cumulative
1/2 in	12,700	205.1	25.5	25.5	74.5
3/8 in	9,500	210.2	26.1	51.6	48.4
3	6,700	61.1	7.60	59.2	40.8
4	4,750	24.5	3.05	62.3	37.7
6	3,350	16.4	2.04	64.3	35.7
8	2,360	17.6	2.19	66.5	33.5
10	1,700	13.3	1.65	68.2	31.8
14	1,180	11.8	1.47	69.6	30.4
20	850	12.2	1.52	71.2	28.8
28	600	15.7	1.95	73.1	26.9
35	425	20.1	2.50	75.6	24.4
48	300	24.8	3.08	78.7	21.3
65	212	26.6	3.31	82.0	18.0
100	150	22.8	2.84	84.8	15.2
-100	-150	121.9	15.2	100.0	-
	Total	804.1	100.0	**K80**	**14,002**



SGS Minerals Services

Standard Bond Ball Mill Grindability Test

Project No.:	15673-002	Date:	8-Nov-16
Sample:	Buffalo HMP 147	Laboratory:	Lakefield (Canada)

Purpose: The equipment and procedure duplicate the Bond method for determining ball mill work indices.

Procedure: The equipment and procedure duplicate the Bond method for determining ball mill work indices.

Test Conditions:
Feed 100% Passing 6 mesh
Mesh of grind: 100 mesh
Test feed weight (700 mL): 1,307 grams
Equivalent to : 1,868 kg/m³ at Minus 6 mesh
Weight % of the undersize material in the ball mill feed: 11.7%
Weight of undersize product for 250% circulating load: 374 grams

Results: Gram per Rev Average for the Last Three Stages = **1.22 g**
Circulation load = **245%**

CALCULATION OF A BOND WORK INDEX

$$BWI = \frac{44.5}{P1^{0.23} \times Grp^{0.82} \times \left\{\frac{10}{\sqrt{P}} - \frac{10}{\sqrt{F}}\right\}}$$

P1 = 100% passing size of the product	150	microns
Grp = Grams per revolution	1.22	grams
P_{80} = 80% passing size of product	115	microns
F_{80} = 80% passing size of the feed	2,359	microns

BWI = **16.4** kWh/ton (Imperial)

BWI = **18.1** kWh/tonne (metric)

Comments:

Stage No.	# of Revs	New Feed (grams)	Product in Feed (grams)	Material to Be Ground (grams)	Material Passing 100 mesh in Product (grams)	Net Ground Material (grams)	Material Ground Per Mill Rev (grams)
1	100	1,307	153	220	267	114	1.14
2	300	267	31	342	348	317	1.06
3	315	348	41	333	388	347	1.10
4	297	388	46	328	390	345	1.16
5	282	390	46	328	388	343	1.21
6	270	388	46	328	375	330	1.22
7	270	375	44	329	372	328	1.22
		Average for Last Three Stages =			379 g		1.22 g

SGS Minerals Services

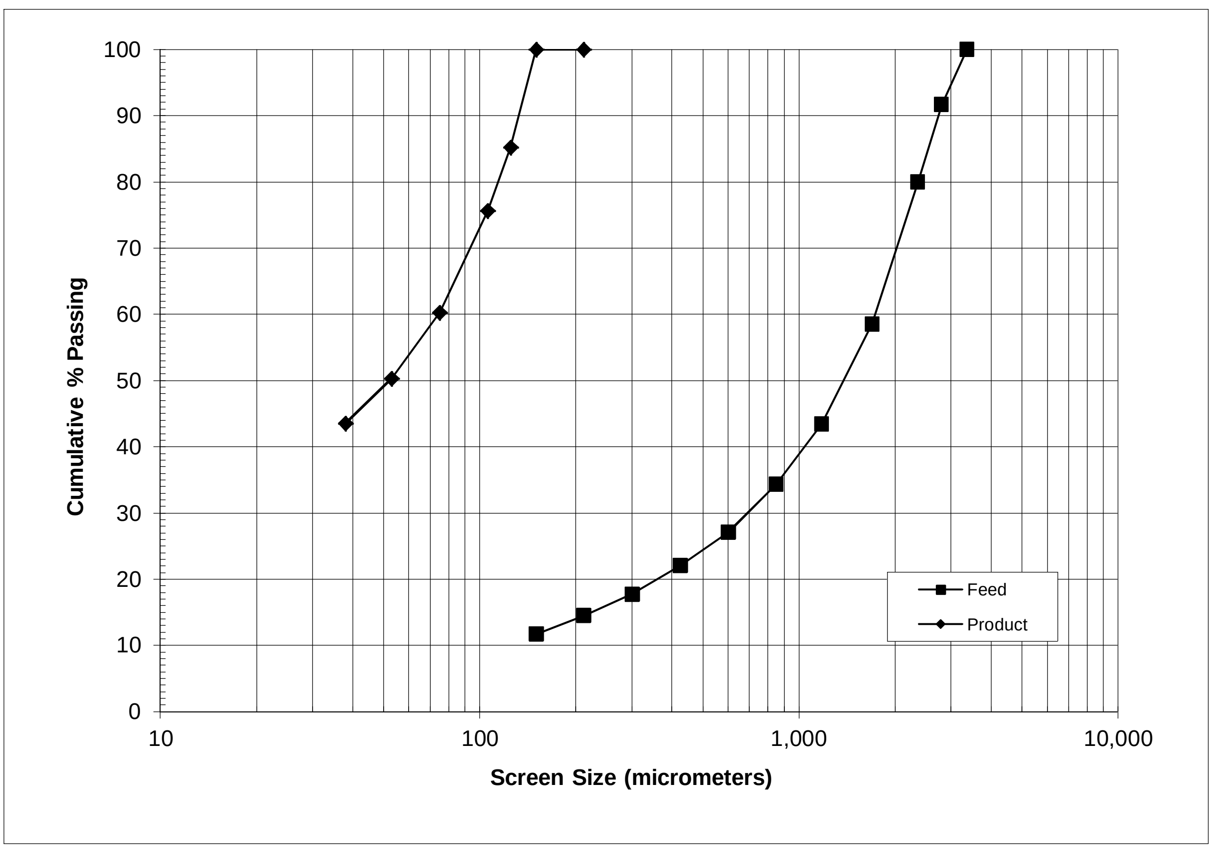
Standard Bond Ball Mill Grindability Test

Project No.:	15673-002	Date:	8-Nov-16
Sample:	Buffalo HMP 147	Laboratory:	Lakefield (Canada)

Feed Particle Size Analysis / **Product Particle Size Analysis**

Size		Feed Weight	Feed % Retained		Feed % Passing	Product Weight	Product % Retained		Product % Passing
Mesh	μm	grams	Individual	Cumulative	Cumulative	grams	Individual	Cumulative	Cumulative
6	3,360	0.0	0.0	0.0	100.0				
7	2,800	58.6	8.3	8.3	91.7				
8	2,360	82.1	11.6	20.0	80.0				
10	1,700	151.3	21.5	41.4	58.6				
14	1,180	106.7	15.1	56.6	43.4				
20	850	64.1	9.1	65.7	34.3				
28	600	51.3	7.3	72.9	27.1				
35	425	35.3	5.0	77.9	22.1				
48	300	30.3	4.3	82.2	17.8				
65	212	22.8	3.2	85.5	14.5	0.0	0.0	0.0	100.0
100	150	19.7	2.8	88.3	11.7	0.0	0.0	0.0	100.0
115	125	-	-	*89.4*	*10.6*	22.3	14.8	14.8	85.2
150	106	14.5	2.1	90.3	9.7	14.3	9.5	24.3	75.7
200	75					23.1	15.4	39.7	60.3
270	53					15.0	10.0	49.7	50.3
400	38					10.2	6.8	56.4	43.6
Pan	-	68.2	9.7	100.0	-	65.5	43.6	100.0	-
Total	**-**	**704.9**	**100.0**	**F_{80}:**	**2,359**	**150.4**	**100.0**	**P_{80}:**	**115**

Values in italics were interpolated



Appendix E – Comminution Test Report

SMC TEST® REPORT

Premier Gold Mines

Tested by: SGS Minerals Services

Ontario, Canada

Prepared by: Matt Weier

JKTech Job No: 16007/P27
Testing Date: September 2016

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1 INTRODUCTION

SMC data for five samples from Hasaga Project were received from SGS Minerals Services on September 20, 2016, by JKTech for SMC test analysis. The samples were identified as HLD050, HLD052, HLD071, HLD072 and HMP107. The data were analysed to determine the JKSimMet and SMC Test comminution parameters. SMC Test results were forwarded to SMC Testing Pty Ltd for the analysis of the SMC Test data. Analysis and reporting were completed on September 21, 2016.

2 THE SMC TEST®

2.1 Introduction

The standard JK Drop-Weight test provides ore specific parameters for use in the JKSimMet Mineral Processing Simulator software. In JKSimMet, these parameters are combined with equipment details and operating conditions to analyse and/or predict SAG/autogenous mill performance. The same test procedure also provides ore type characterisation for the JKSimMet crusher model.

The SMC Test was developed by Steve Morrell of SMC Testing Pty Ltd (SMCT). The test provides a cost effective means of obtaining these parameters, in addition to a range of other power-based comminution parameters, from drill core or in situations where limited quantities of material are available. The ore specific parameters have been calculated from the test results and are supplied to Premier Gold Mines in this report as part of the standard procedure

2.2 General Description and Test Background

The SMC Test® was originally designed for the breakage characterisation of drill core and it generates a relationship between input energy (kWh/t) and the percent of broken product passing a specified sieve size. The results are used to determine the so-called JK Drop-Weight index (DWi), which is a measure of the strength of the rock when broken under impact conditions and has the units kWh/m^3. The DWi is directly related to the JK rock breakage parameters A and b and hence can be used to estimate the values of these parameters as well as being correlated with the JK abrasion parameter - t_a. For crusher modelling the t_{10}-E_{cs} matrix can also be derived. This is done by using the size-by-size $A*b$ values that are used in the SMC Test® data analysis (see below) to estimate the t_{10}-E_{cs} values for each of the relevant size fractions in the crusher model matrix.

For power-based calculations, (see APPENDIX B), the SMC Test® provides the comminution parameters M_{ia}, M_{ih} and M_{ic}. M_{ia} is the work index for the grinding of coarser particles (> 750 µm) in tumbling mills such as autogenous (AG), semi-autogenous (SAG), rod and ball mills. M_{ih} is the work index for the grinding in High Pressure Grinding Rolls (HPGR) and M_{ic} for size reduction in conventional crushers.

The SMC Test® is a precision test, which uses particles that are either cut from drill core using a diamond saw to achieve close size replication or else selected from crushed material so that particle mass variation is controlled within a prescribed range. The particles are then broken at a number of prescribed impact energies. The high degree of control imposed on both the size of particles and the breakage energies used, means that the test is largely free of the repeatability problems associated with tumbling-mill based tests. Such tests usually suffer from variations in feed size (which is not closely controlled) and energy input, often assumed to be constant when in reality it can be highly variable (Levin, 1989).

The relationship between the DWi and the JK rock breakage parameters makes use of the size-by-size nature of rock strength that is often apparent from the results of full JK Drop-Weight tests. The effect is illustrated in Figure 1, which plots the normalized values of A*b against particle size. This figure also shows how the gradient of these plots varies across the full range of rock types tested. In the case of a conventional JK Drop-Weight test, these values are effectively averaged and a mean value of A and b is reported. The SMC Test® uses a single size and makes use of relationships such as that shown in Figure 1 to predict the A and b of the particle size that has the same value as the mean for a JK full Drop-Weight test.

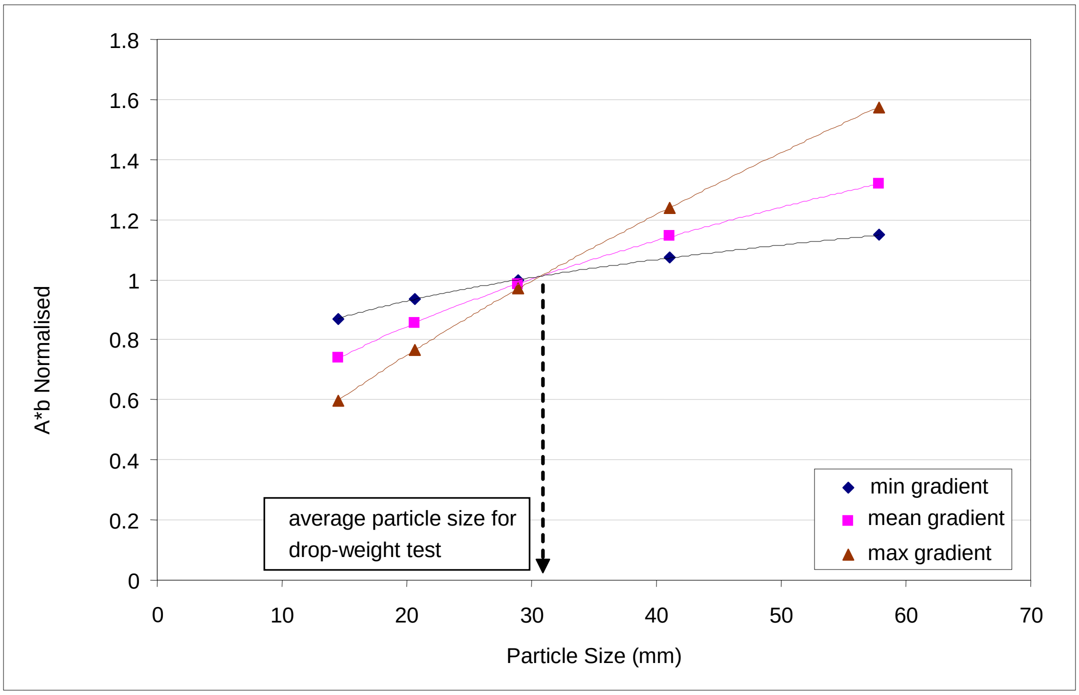

Figure 1 – Relationship between Particle Size and *A*b*

2.3 The Test Procedure

In the SMC Test®, five sets of 20 particles are broken, each set at a different specific energy level, using a JK Drop-Weight tester. The breakage products are screened at a sieve size selected to provide a direct measurement of the t_{10} value.

The test calls for a prescribed target average volume for the particles, with the target being chosen to be equivalent to the mean volume of particles in one of the standard JK Drop-Weight test size fractions.

The rest height of the drop-head (gap) is recorded after breakage of each particle to allow for a correction to the drop energy. After breaking all 20 particles in a set, the broken product is sieved at an aperture size, one tenth of the original particle size. Thus, the percent passing mass gives a direct reading of the t_{10} value for breakage at that energy level.

There are two alternative methods of preparing the particle sets for breakage testing: the particle selection method and the cut core method. The particle selection method is the most commonly used as it is generally less time consuming. The cut core method requires less material, so tends to be used as a fallback method, only when necessary to cope with restricted sample availability.

2.3.1 Particle Selection Method

For the particle selection method, the test is carried out on material in one of three alternative size fractions: -31.5+26.5, -22.4+19 or -16+13.2 mm. The largest size fraction is preferred but requires more material.

In the particle selection method, particles are chosen so that their individual masses lie within ±30% of the target mass and the mean mass for each set of 20 lies within ±10% of the target mass. A typical set of particles is shown in Figure 2.

Figure 2 – A Typical Set of Particles for Breakage (Particle Selection Method)

Before commencing breakage tests on the particles, the ore density is determined by first weighing a representative sample of particles in air and then in water.

2.3.2 Cut Core Method

The cut core method uses cut pieces of quartered (slivered) drill core. Whole core or half core can be used, but when received in this form it needs to be first quartered as a preliminary step in the procedure. Once quartered, any broken or tapered ends of the quartered lengths are cut, to square them off. Before the lengths of quartered core are cut to produce the pieces for testing, each one is weighed in air and then in water, to obtain a density measurement and a measure of its mass per unit length.

The size fraction targeted when the cut core method is used depends on the original core diameter. The target size fraction is selected to ensure that pieces of the correct volume will have “chunky” rather than “slabby” proportions.

Having measured the density of the core, the target volume can be translated into a target mass and with the average mass per unit length also known, an average cutting interval can be determined for the core.

Sufficient pieces of the quartered core are cut to generate 100 particles. These are then divided into the five sets of 20 and broken in the JK Drop-Weight tester at the five different energy levels. Within each set, the three possible orientations of the particles are equally represented (as far as possible, given that there are 20 particles). The orientations prescribed for testing are shown in Figure 3.

Figure 3 – Orientations of Pieces for Breakage (Cut Core Method)

The cut core method cannot be used for cores with diameters exceeding 70 mm, where the particle masses would be too large to achieve the highest prescribed energy level.

2.4 SMC Test® Results

The SMC Test® results for the HLD050, HLD052, HLD071, HLD072 and HMP107 samples from Hasaga Project are given in Table 1. This table includes the average rock density and the DWi (Drop-Weight index) that is the direct result of the test procedure. The values determined for the M_{ia}, M_{ih} and M_{ic} parameters developed by SMCT are also presented in this table. The M_{ia} parameter represents the coarse particle component (down to 750 µm), of the overall comminution energy and can be used together with the M_{ib} (fine particle component) to estimate the total energy requirements of a conventional comminution circuit. The use of these parameters is explained further in APPENDIX B. The derived estimates of parameters A, b and t_a that are required for JKSimMet comminution modelling are given in Table 2.

Also included in the derived results are the SAG Circuit Specific Energy (SCSE) values. The SCSE value is derived from simulations of a “standard” circuit comprising a SAG mill in closed circuit with a pebble crusher. This allows $A*b$ values to be described in a more meaningful form. SCSE is described in detail in APPENDIX A.

In the case of the HLD050, HLD052, HLD071, HLD072 and HMP107 samples from Hasaga Project, the A and b estimates are based on a correlation using the database of all results so far accumulated by SMCT.

Table 1 - SMC Test® Results

Sample Designation	*DWi* (kWh/m^3)	*DWi* (%)	*Mi* Parameters (kWh/t)			SG
			Mia	*Mih*	*Mic*	
HLD050	8.96	80	24.5	19.2	9.9	2.7
HLD052	8.77	78	24.1	18.8	9.7	2.7
HLD071	8.35	73	23.1	17.9	9.3	2.7
HLD072	8.69	77	23.9	18.6	9.6	2.7
HMP107	9.34	83	25.5	20.2	10.4	2.7

For more details on how the M_{ia}, M_{ih} and M_{ic} parameters are derived and used, see APPENDIX B or go to the SMC Testing website at http://www.smctesting.com/about and click on the link to download Steve Morrell's paper on this subject.

Table 2 – Parameters derived from the SMC Test® Results

Sample Designation	*A*	*b*	t_a
HLD050	90.2	0.33	0.29
HLD052	73.7	0.42	0.30
HLD071	73.4	0.44	0.31
HLD072	91.3	0.34	0.30
HMP107	89.1	0.32	0.28

The influence of particle size on the specific comminution energy needed to achieve a particular t_{10} value can also be inferred from the SMC Test® results. The energy requirements for three particle sizes, each crushed to three different t_{10} values, are presented in Table 3.

Table 3 – Crusher Simulation Model Specific Energy Matrix

Sample Designation	Particle Size (mm)														
	14.5			20.6			28.9			41.1			57.8		
	t_{10} Values (%) for Given Specific Energies in kWh/t														
	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30
HLD050	0.45	0.96	1.54	0.39	0.84	1.34	0.34	0.73	1.17	0.30	0.63	1.01	0.26	0.55	0.88
HLD052	0.44	0.94	1.50	0.39	0.82	1.31	0.34	0.71	1.14	0.29	0.62	0.99	0.26	0.54	0.87
HLD071	0.42	0.90	1.43	0.37	0.78	1.24	0.32	0.68	1.09	0.28	0.59	0.94	0.24	0.51	0.82
HLD072	0.44	0.93	1.49	0.38	0.81	1.29	0.33	0.71	1.13	0.29	0.61	0.98	0.25	0.54	0.86
HMP107	0.48	1.01	1.61	0.41	0.88	1.40	0.36	0.77	1.22	0.31	0.66	1.06	0.27	0.58	0.93

The SMC Test® database now contains over 35,000 test results on samples representing more than 1300 different deposits worldwide.

Around 99% of the DWi values lie in the range 0.5 to14.0 kWh/m^3, with soft ores being at the low end of this range and hard ores at the high end.

A cumulative graph of DWi values from the SMC Test® Database is shown in Figure 4 below. This graph can be used to compare the DWi of the material from Hasaga Project, with the entire population of ores in the SMCT database. The figures on the y-axis of the graph represent the percentages of all ores tested that are softer than the x-axis (DWi) value selected.

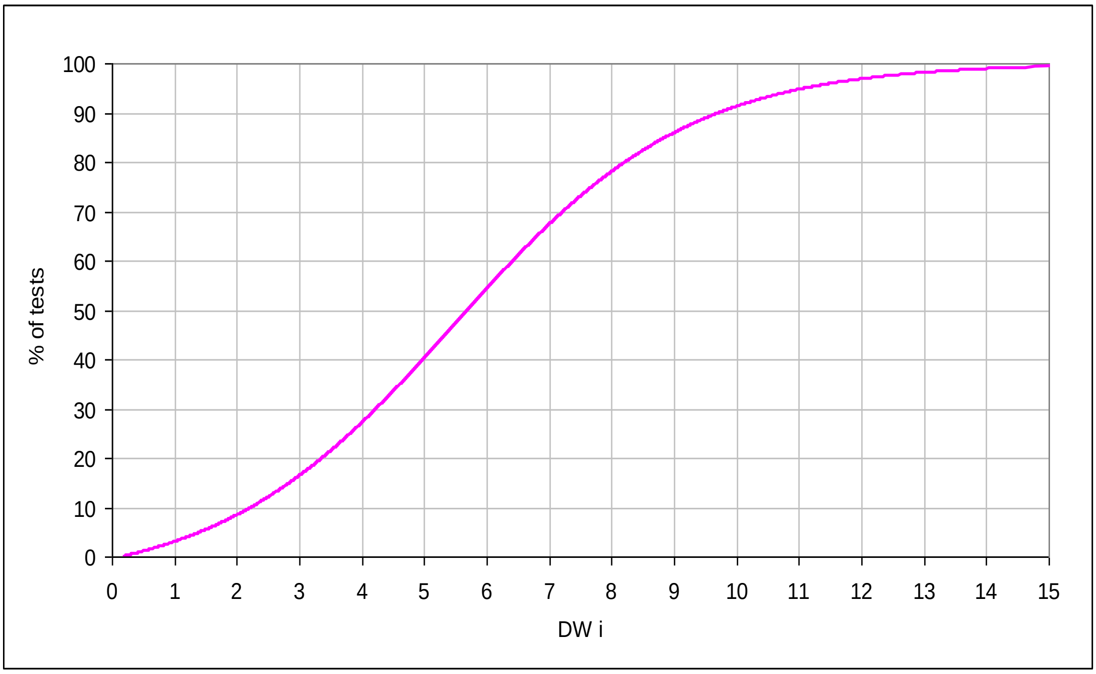

Figure 4 – Cumulative Distribution of DWi Values in SMCT Database

A further cumulative distribution graph is provided in Figure 5 to allow a comparison of the M_{ia}, M_{ih} and M_{ic} values obtained for the Hasaga Project material, with the entire population of values for these parameters contained in the SMCT database.

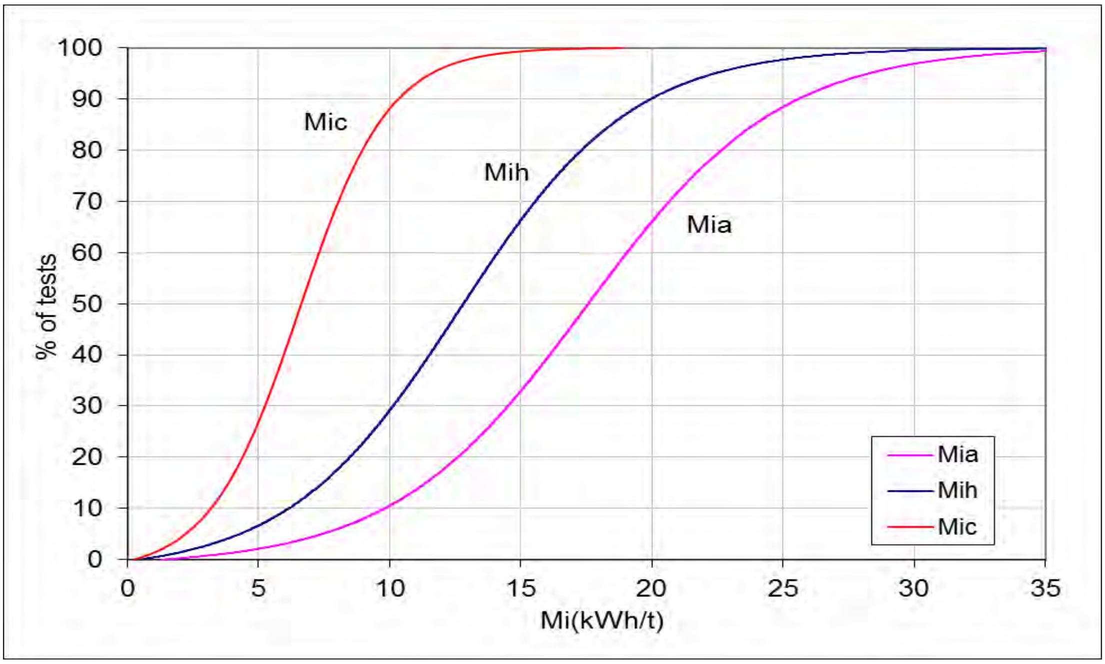

Figure 5 - Cumulative Distribution of M_{ia}, M_{ih} and M_{ic} Values in the SMCT Database

The value of *A*b*, which is also a measure of resistance to impact breakage, is calculated and presented in Table 4, which also gives a comparison to the population of samples in the JKTech database, with the percent of samples present in the JKTech database that are softer. Note that in contrast to the DWi, a high value of *A*b* means that an ore is soft whilst a low value means that it is hard.

Table 4 – Derived Values for $A*b$, t_a and SCSE

Sample Designation	*A*b*		t_a		*SCSE (kWh/t)*	
	Value	**%**	**Value**	**%**	**Value**	**%**
HLD050	29.8	85.1	0.29	80.0	11.40	82.8
HLD052	31.0	82.3	0.30	78.1	11.18	80.2
HLD071	32.3	79.1	0.31	76.0	10.95	76.7
HLD072	31.0	81.9	0.30	78.1	11.16	79.8
HMP107	28.5	88.0	0.28	81.6	11.59	84.8

In Figure 6 and Figure 7 below, histogram style frequency distributions for the $A*b$ values and for the SCSE values in the JKTech DW database are shown respectively.

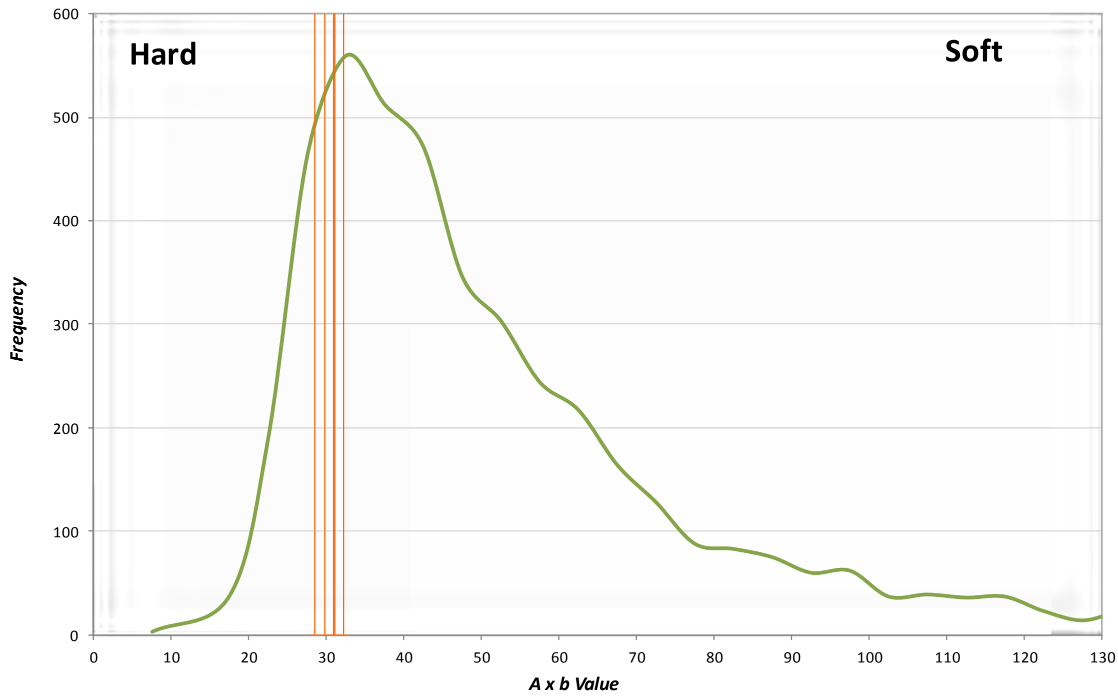

Figure 6 - Frequency Distribution of *A*b* in the JKTech Database

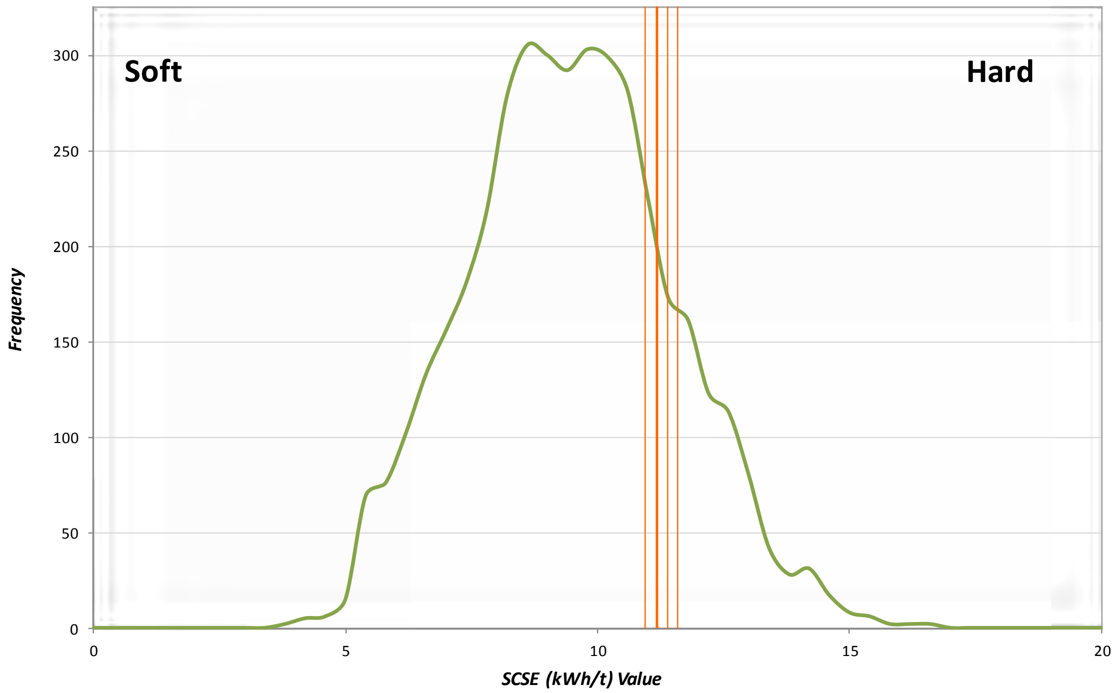

Figure 7 - Frequency Distribution of SCSE in the JKTech Database

3 REFERENCES

Andersen, J. and Napier-Munn, T.J., 1988, “Power Prediction for Cone Crushers", Third Mill Operators' Conference, Aus.I.M.M (Cobar, NSW), May 1988, pp 103 - 106

Bailey, C., *et al*, 2009. “What Can Go Wrong in Comminution Circuit Design?”, Proceedings of the Tenth Mill Operators’ Conference, (Adelaide, SA), pp. 143–149

Bond, F.C., 1961. "Crushing and Grinding Calculations Parts I and II", British *Chemical Engineering*, Vol 6, Nos 6 and 8

Leung, K. 1987. "An Energy-Based Ore Specific Model for Autogenous and Semi-Autogenous Grinding Mills." Ph.D. Thesis. University of Queensland (unpublished)

Leung, K., Morrison, R.D. and Whiten, W.J., 1987. "An Energy Based Ore Specific Model for Autogenous and Semi-autogenous Grinding", Copper *87*, Vina del Mar, Vol. 2, pp 71 - 86

Levin, J., 1989. Observation on the bond standard grindability test, and a proposal for a standard grindability test for fine materials. SAIMM 89 (1), 13-21.

Morrell, S. 1996. "Power Draw of Wet Tumbling Mills and Its Relationship to Charge Dynamics - Parts I and II", *Transaction Inst. Min. Metall.* (Sect C: Mineral Process Extr. Metall.), 105, 1996, pp C43-C62

Morrell, S., 2004[a]. *Predicting the Specific Energy of Autogenous and Semi-autogenous Mills from Small Diameter Drill Core Samples*. Minerals Engineering, Vol 17/3 pp 447-451

Morrell, S., 2004[b]. *An Alternative Energy-Size Relationship To That Proposed By Bond For The Design and Optimisation Of Grinding Circuits*. International Journal of Mineral Processing, 74, 133-141.

Morrell, S., 2006. *Rock Characterisation for High Pressure Grinding Rolls Circuit Design*, Proc International Autogenous and Semi Autogenous Grinding Technology,Vancouver, vol IV pp 267-278.

Morrell,S., 2008, *A method for predicting the specific energy requirement of comminution circuits and assessing their energy utilisation efficiency*, *Minerals Engineering*, Vol. 21, No. 3.

Shi, F. and Kojovic, T., 2007. Validation of a model for impact breakage incorporating particle size effect. Int. Journal of Mineral Processing, 82, 156-163.

Veillette, G., and Parker, B., 2005. Boddington Expansion Project Comminution Circuit Features and Testwork, Randol Gold Forum Proceedings.

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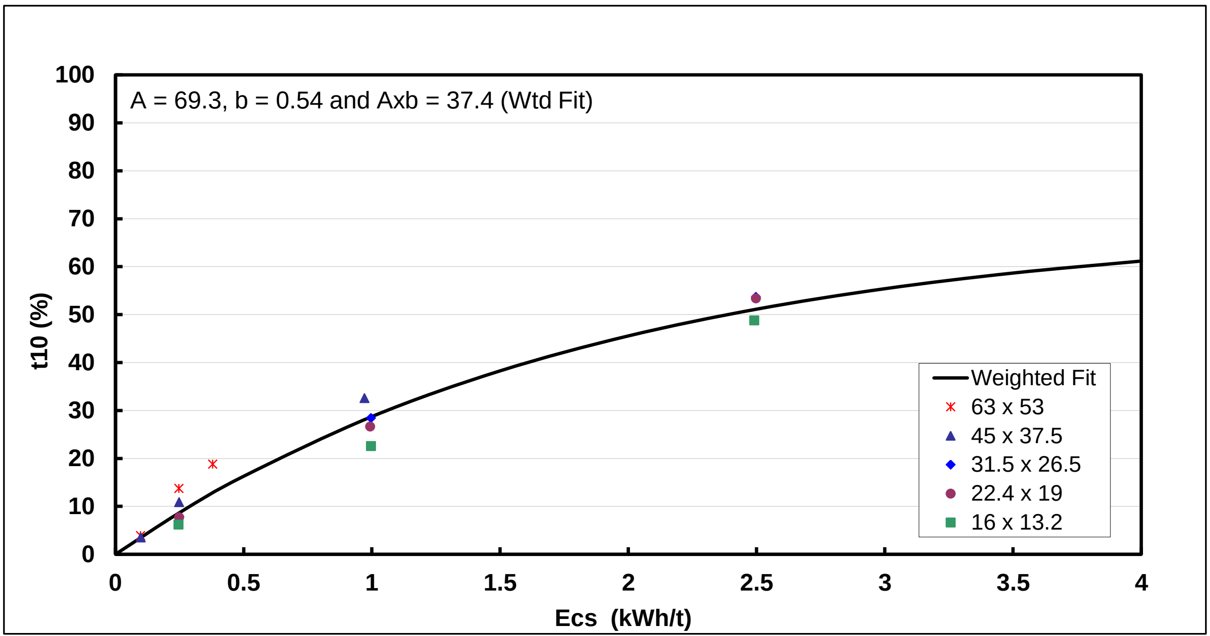
APPENDICES

APPENDIX A. SAG CIRCUIT SPECIFIC ENERGY (SCSE)

For a little over 20 years, the results of JK Drop Weight tests and SMC tests have been reported in part as A, b and t_a parameters. A and b are parameters which describe the response of the ore under test to increasing levels of input energy in single impact breakage. A typical t_{10} v Ecs curve resulting from a Drop Weight test is shown in App Figure 1.



App Figure 1 – Typical t_{10} v Ecs curve

The curve shown in App Figure 1 is represented by an equation which is given in Equation 1.

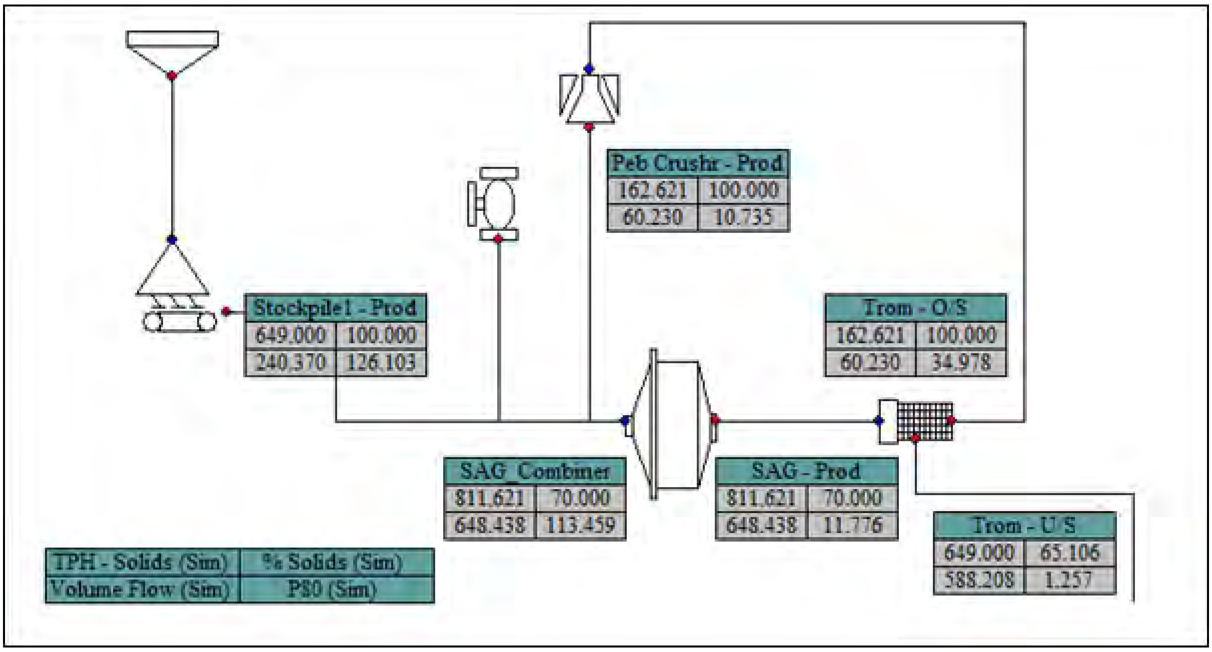
$$t_{10} = A(1 - e^{-b.Ecs}) \qquad \text{Equation 1}$$

The parameters A and b are generated by least squares fitting Equation 1 to the JK Drop Weight test data. The parameter t_a is generated from a tumbling test.

Both A and b vary with ore type but having two parameters describing a single ore property makes comparison difficult. For that reason the product of A and b, referred to as A*b, which is related to the slope of the t_{10} – E_{cs} curve at the origin, has been universally accepted as the parameter which represents an ore's resistance to impact breakage.

The parameters A, b and t_a have no physical meaning in their own right. They are ore hardness parameters used by the AG/SAG mill model in JKSimMet which permits prediction of the product size distribution and the power draw of the AG/SAG mill for a given feed size distribution and feed rate. In a design situation, the dimensions of the mill are adjusted until the load in the mill reaches 25 % by volume when fed at the required feed rate. The model predicts the power draw under these conditions and from the power draw and throughput the specific energy is determined. The specific energy is mainly a function of the ore hardness (A and b values), the feed size and the dimensions of the mill (specifically the aspect ratio) as well as to a lesser extent the operating conditions such as ball load, mill speed, grate/pebble port size and pebble crusher activity.

There are two drawbacks to the approach of using A*b as the single parameter to describe the impact resistance of a particular ore. The first is that A*b is inversely related to impact resistance, which adds unnecessary complication. The second is that A*b is related to impact resistance in a non-linear manner. As mentioned earlier this relationship and how it affects comminution machine performance can only be predicted via simulation modelling. Hence to give more meaning to the A and b values and to overcome these shortcomings, JKTech Pty Ltd and SMC Testing Pty Ltd have developed a “standard” simulation methodology to predict the specific energy required for a particular tested ore when treated in a “Standard” circuit comprising a SAG mill in closed circuit with a pebble crusher. The flowsheet is shown in App Figure 2 .



App Figure 2 – Flowsheet used for “Standard” AG/SAG circuit simulations

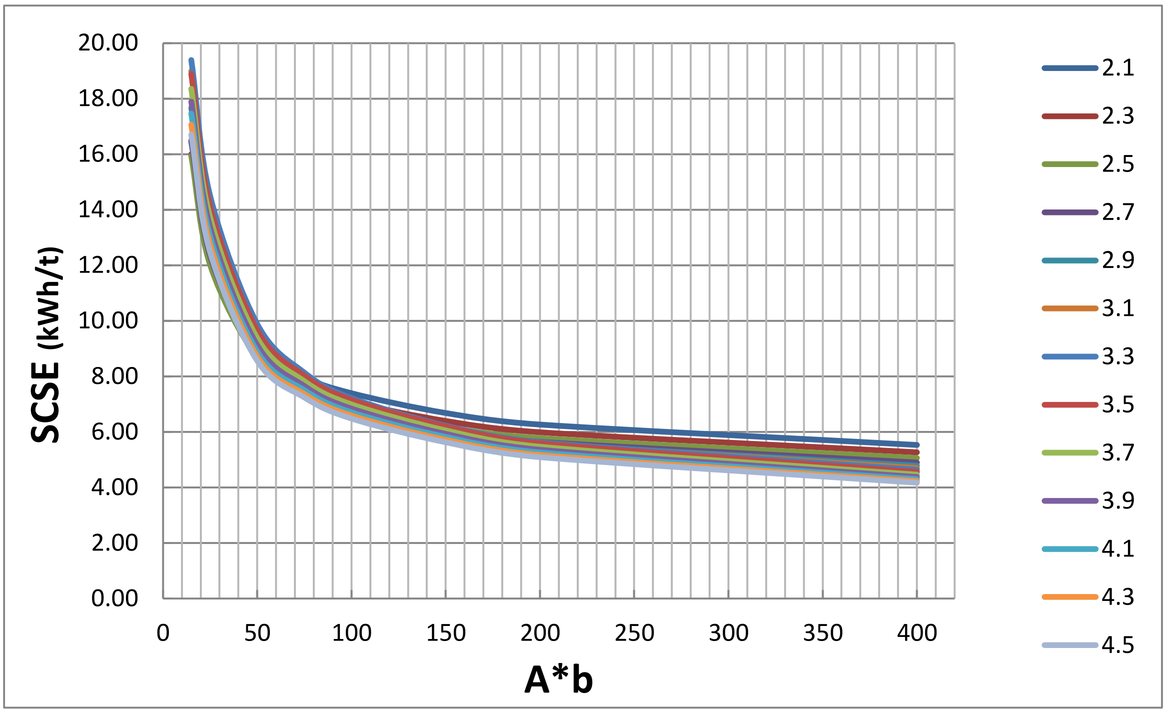
The specifications for the “standard” circuit are:

- SAG Mill
    - inside shell diameter to length ratio of 2:1 with 15 ° cone angles
    - ball charge of 15 %, 125 mm in diameter
    - total charge of 25 %
    - grate open area of 7 %
    - apertures in the grate are 100 % pebble ports with a nominal aperture of 56 mm
- Trommel
    - Cut Size of 12 mm
- Pebble Crusher
    - Closed Side Setting of 10 mm
- Feed Size Distribution
    - F_{80} from the t_a relationship given in Equation 2

The feed size distribution is taken from the JKTech library of typical feed size distributions and is adjusted to meet the ore specific 80 % passing size predicted using the Morrell and Morrison (1996) F_{80} – t_a relationship for primary crushers with a closed side setting of 150 mm given in Equation 2.

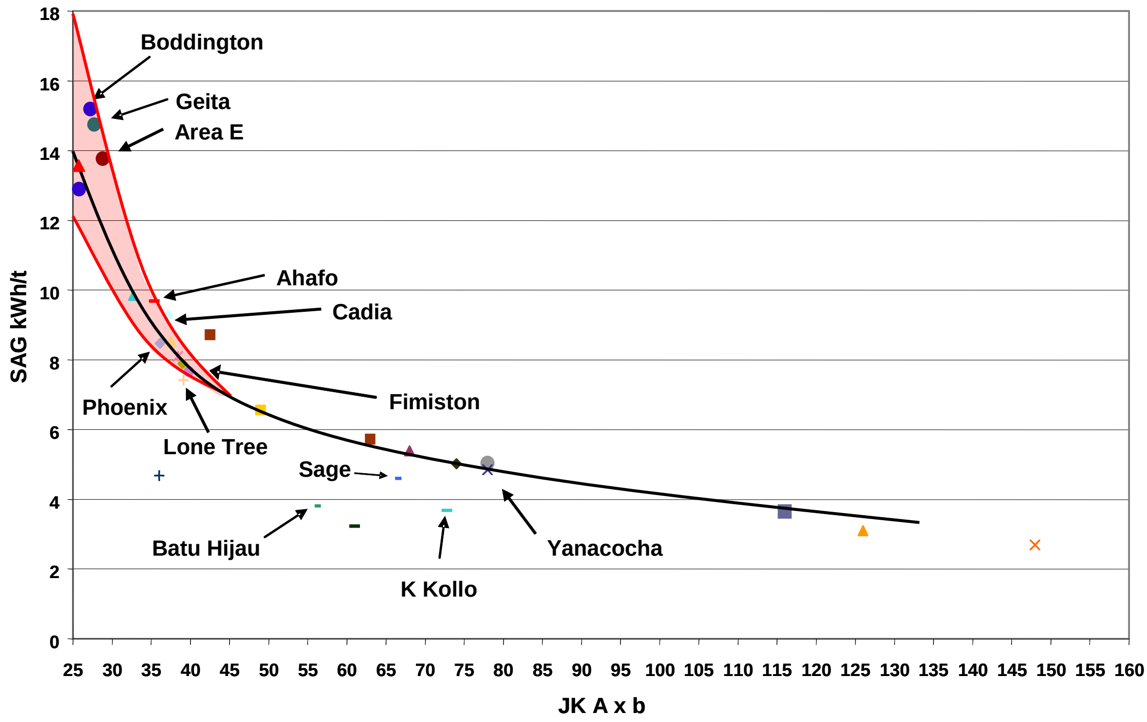
$$F_{80} = 71.3 - 28.4 * \ln(t_a) \qquad \text{Equation 2}$$

Simulations were conducted with A*b values ranging from 15 to 400, t_a values ranging from 0.145 to 3.866 and solids SG values ranging from 2.1 to 4.2. For each simulation, the feed rate was adjusted until the total load volume in the SAG mill was 25 %. The predicted mill power draw and crusher power draw were combined and divided by the feed rate to provide the specific energy consumption. The results are shown in App Figure 3.



App Figure 3 – The relationship between A*b and specific energy at varying SG for the “Standard” circuit.

It is of note that the family of curves representing the relationship between Specific energy and A*b for the “standard” circuit is very similar to the specific energy – A*b relationship for operating mills published in Veillette and Parker, 2005 and reproduced here in App Figure 4.



App Figure 4 – A*b vs SAG kWh/t for operating AG/SAG mills (after Veillette and Parker, 2005).

Of course, the SCSE quoted value will not necessarily match the specific energy required for an existing or a planned AG/SAG mill due to differences in the many operating and design variables such as feed size distribution, mill dimensions, ball load and size and grate, trommel and pebble crusher configuration. The SCSE is an effective tool to compare in a relative manner the expected behaviour of different ores in AG/SAG milling in exactly the same way as the Bond laboratory ball mill work index can be used to compare the relative grindability of different ores in ball milling (Bond, 1961 and Rowland and Kjos, 1980). However the originally reported A and b parameters which match the SCSE will be still be required in JKSimMet simulations of a proposed circuit to determine the AG/SAG mill specific energy required for that particular grinding task. Guidelines for the use of JKSimMet for such simulations were given in Bailey *et al*, 2009.

APPENDIX B. BACKGROUND AND USE OF THE SMC TEST®

B 1 Introduction

The SMC Test® was developed to provide a range of useful comminution parameters through highly controlled breakage of rock samples. Drill core, even quartered small diameter core is suitable. Only relatively small quantities of sample are required and can be re-used to conduct Bond ball work index tests.

The results from conducting the SMC Test® are used to determine the so-called drop-weight index (DW_i), which is a measure of the strength of the rock, as well as the comminution indices M_{ia}, M_{ih} and M_{ic} . The SMC Test® also estimates the JK rock breakage parameters A, b and t_a as well as the JK crusher model's $t10\text{-}Ecs$ matrix, all of which are generated as part of the standard report output from the test.

In conjunction with the Bond ball mill work index the DW_i and the M_i suite of parameters can be used to accurately predict the overall specific energy requirements of circuits containing:

- AG and SAG mills.
- Ball mills
- Rod mills
- Crushers
- High Pressure Grinding Rolls (HPGR)

The JK rock breakage parameters can be used to simulate crushing and grinding circuits using JKTech's simulator – JKSimMet.

B 2 Simulation Modelling and Impact Comminution Theory

When a rock fragment is broken, the degree of breakage can be characterised by the "t_{10}" parameter. The t_{10} value is the percentage of the original rock mass that passes a screen aperture one tenth of the original rock fragment size. This parameter allows the degree of breakage to be compared across different starting sizes.

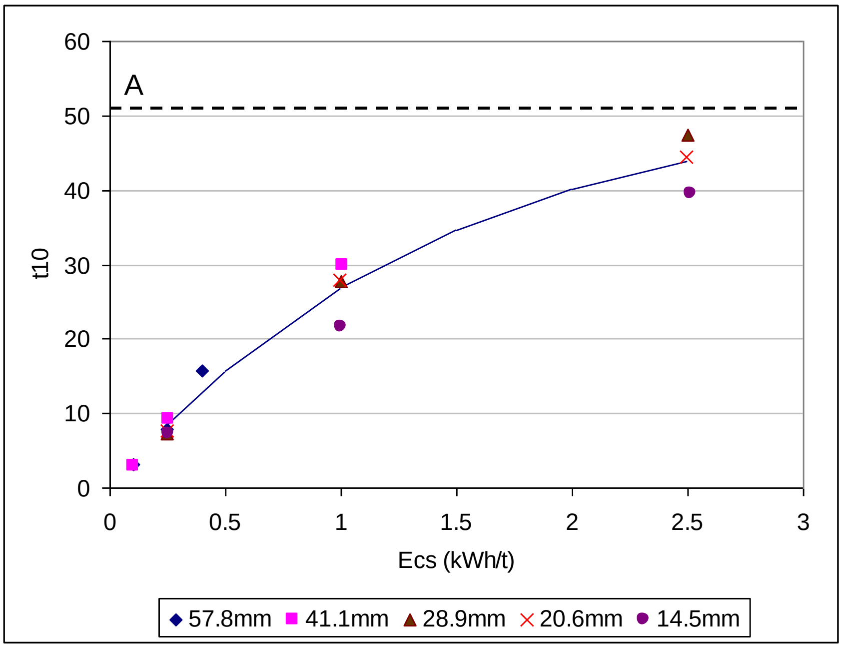
The specific comminution energy (Ecs) has the units kWh/t and is the energy applied during impact breakage. As the impact energy is varied, so does the t_{10} value vary in response. Higher impact energies produce higher values of t_{10}, which of course means products with finer size distributions.

The equation describing the relationship between the t_{10} and Ecs is given below.

$$t_{10} = A(1 - e^{-b.Ecs}) \qquad \text{Equation 1}$$

As can be seen from this equation, there are two rock breakage parameters A and b that relate the t_{10} (size distribution index) to the applied specific energy (Ecs). These parameters are ore specific and are normally determined from a full JK Drop-Weight test.

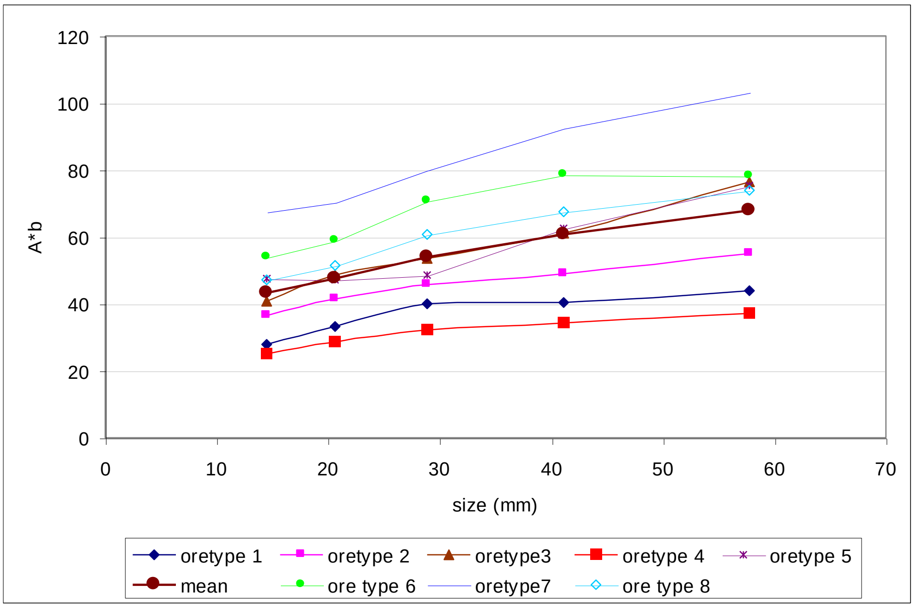
A typical plot of t_{10} vs Ecs from a JK Drop-Weight test is shown in App Figure 5. The relationship is characterised by the two-parameter equation above, where t_{10} is the dependent variable.



App Figure 5 - Typical t_{10} v Ecs Plot

The t_{10} can be thought of as a "fineness index" with larger values of t_{10} indicating a finer product size distribution. The value of parameter A is the limiting value of t_{10}. This limit indicates that at higher energies, little additional size reduction occurs as the Ecs is increased beyond a certain value. $A*b$ is the slope of the curve at 'zero' input energy and is generally regarded as an indication of the strength of the rock, lower values indicating a higher strength.

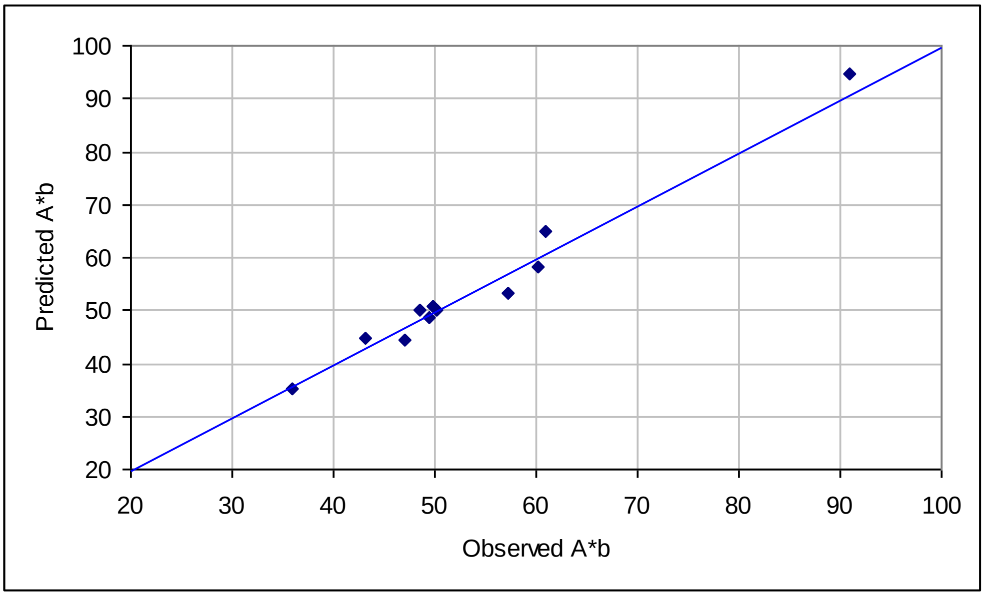
The SMC Test® is used to estimate the JK rock breakage parameters A and b by utilizing the fact that there is usually a pronounced (and ore specific) trend to decreasing rock strength with increasing particle size. This trend is illustrated in App Figure 6 which shows a plot of $A*b$ versus particle size for a number of different rock types.



App Figure 6 - Size Dependence of A*b for a Range of Ore Types

In the case of a conventional JK Drop-Weight test these values are effectively averaged and a mean value of A and b is reported. The SMC Test® uses a single size and makes use of relationships such as that shown in App Figure 6 to predict the A and b of the particle size that has the same value as the mean for a full JK Drop-Weight test.

An example of this is illustrated in App Figure 7, where the observed values of the product $A*b$ are plotted against those predicted using the DWi. Each of the data points in App Figure 7 is a result from a different ore type within an orebody.



App Figure 7 - Predicted v Observed A*b

The A and b parameters are used with Equation 1 and relationships such as illustrated in App Figure 6 to generate a matrix of Ecs values for a specific range of

t_{10} values and particle sizes. This matrix is used in crusher modelling to predict the power requirement of the crusher given a feed and a product size specification (Napier-Munn et al (1996)).

The A and b parameters are also used in AG/SAG mill models, such as those in JKSimMet, for predicting how the rock will break inside the mill. From this description the models can predict what the throughput, power draw and product size distribution will be (Napier-Munn et al (1996)). Modelling also enables a detailed flowsheet to be built up of the comminution circuit response to changes in ore type. It also allows optimisation strategies to be developed to overcome any deleterious changes in circuit performance predicted from differences in ore type. These strategies can include both changes to how mills are operated (eg ball load, speed etc) and changes to feed size distribution through modification of blasting practices and primary crusher operation (mine-to-mill).

B 3 Power-Based Equations

B 3.1 General

The DW_i, M_{ia}, M_{ih} and M_{ic} parameters are used in so-called power-based equations which predict the specific energy of the associated comminution machines. The approach divides comminution equipment into three categories:

- Tumbling mills, eg AG, SAG, rod and ball mills
- Conventional reciprocating crushers, eg jaw, gyratory and cone
- HPGRs

Tumbling mills are described using 2 indices: M_{ia} and M_{ib}
Crushers have one index: M_{ic}
HPGRs have one index: M_{ih}

For tumbling mills the 2 indices relate to "coarse" and "fine" ore properties plus an efficiency factor which represents the influence of a pebble crusher in AG/SAG mill circuits. "Coarse" in this case is defined as spanning the size range from a P80 of 750 microns up to the P80 of the product of the last stage of crushing or HPGR size reduction prior to grinding. "Fine" covers the size range from a P80 of 750 microns down to P80 sizes typically reached by conventional ball milling, ie about 45 microns. The choice of 750 microns as the division between "coarse" and "fine" particle sizes was determined during the development of the technique and was found to give the best overall results across the range of plants in SMCT's data base. Implicit in the approach is that distributions are parallel and linear in log-log space.

The work index covering grinding in tumbling mills of coarse sizes is labelled M_{ia}. The work index covering grinding of fine particles is labelled Mib (Morrell, 2008). M_{ia} values are provided as a standard output from a SMC Test® (Morrell, 2004a) whilst M_{ib} values can be determined using the data generated by a conventional Bond ball mill work index test (M_{ib} is NOT the Bond ball work index). M_{ic} and M_{ih} values are also provided as a standard output from a SMC Test® (Morrell, 2009).

The general size reduction equation is as follows (Morrell, 2004b):

$$W_i = M_i . 4(x_2^{f(x_2)} - x_1^{f(x_1)})$$ Equation 3

where
M_i = Work index related to the breakage property of an ore (kWh/tonne); for grinding from the product of the final stage of crushing to a P80 of 750 microns (coarse particles) the index is labelled Mia and for size reduction from 750 microns to the final product P80 normally reached by conventional ball mills (fine particles) it is labelled M_{ib}. For conventional crushing M_{ic} is used and for HPGRs Mih is used.
Wi = Specific comminution (kWh/tonne)
x_2 = 80% passing size for the product (microns)
x_1 = 80% passing size for the feed (microns)
$f(x_j)$ = -(0.295 + x_j/1000000) (Morrell, 2006) Equation 4

For tumbling mills the specific comminution energy (Wi) relates to the power at the pinion or for gearless drives - the motor output. For HPGRs it is the energy inputted to the rolls, whilst for conventional crushers Wi relates to the specific energy as determined using the motor input power less the no-load power.

B 3.2 Specific Energy Determination for Comminution Circuits

The total specific energy (W_T) to reduce primary crusher product to final product size is given by:

$$W_T = W_a + W_b + W_c + W_h + W_s$$ Equation 5

where
W_a = specific energy to grind coarser particles in tumbling mills
W_b = specific energy to grind finer particles in tumbling mills
W_c = specific energy for conventional crushing
W_h = specific energy for HPGRs
W_s = specific energy correction for size distribution

Clearly only the W values associated with the relevant equipment in the circuit being studied are included in Equation 5.

B 3.2.1 Tumbling mills

For coarse particle grinding in tumbling mills Equation 3 is written as:

$$W_a = K_1 M_{ia} . 4(x_2^{f(x_2)} - x_1^{f(x_1)})$$ Equation 6

where
K_1 = 1.0 for all circuits that do not contain a recycle pebble crusher and 0.95 where circuits do have a pebble crusher
x_1 = P_{80} in microns of the product of the last stage of crushing before grinding
x_2 = 750 microns
M_{ia} = Coarse ore work index and is provided directly by SMC Test®

For fine particle grinding Equation 3 is written as:

$$W_b = M_{ib}.4(x_3{}^{f(x_3)} - x_2{}^{f(x_2)}) \qquad \text{Equation 7}$$

where

x_2 = 750 microns

x_3 = P_{80} of final grind in microns

M_{ib} = Provided by data from the standard Bond ball work index test using the following equation (Morrell, 2006):

$$M_{ib} = 18.18 \Big/ P_1{}^{0.295}(Gbp)(p_{80}{}^{f(p_{80})} - f_{80}{}^{f(f_{80})}) \qquad \text{Equation 8}$$

where

Mib = fine ore work index (kWh/tonne)

P_1 = closing screen size in microns

Gbp = net grams of screen undersize per mill revolution

p_{80} = 80% passing size of the product in microns

f_{80} = 80% passing size of the feed in microns

Note that the Bond ball work index test should be carried out with a closing screen size which gives a final product P80 similar to that intended for the full scale circuit.

B 3.2.2 Conventional Crushers and HPGR

Equation 3 for conventional crushers is written as:

$$W_c = S_c K_2 M_{ic}.4(x_2{}^{f(x_2)} - x_1{}^{f(x_1)}) \qquad \text{Equation 9}$$

where

S_c = coarse ore hardness parameter which is used in primary and secondary crushing situations. It is defined by Equation 10 with K_s set to 55.

K_2 = 1.0 for all crushers operating in closed circuit with a classifying screen. If the crusher is in open circuit, eg pebble crusher in a AG/SAG circuit, K_2 takes the value of 1.19.

x_1 = P_{80} in microns of the circuit feed

x_2 = P_{80} in microns of the circuit product

M_{ic} = Crushing ore work index and is provided directly by SMC Test®

The coarse ore hardness parameter (S) makes allowance for the decrease in ore hardness that becomes significant in relatively coarse crushing applications such as primary and secondary cone/gyratory circuits. In tertiary and pebble crushing circuits it is normally not necessary and takes the value of unity. In full scale HPGR circuits where feed sizes tend to be higher than used in laboratory and pilot scale machines the parameter has also been found to improve predictive accuracy. The parameter is defined by Equation 10.

$$S = K_s(x_1.x_2)^{-0.2} \qquad \text{Equation 10}$$

where

K_s = machine-specific constant that takes the value of 55 for conventional crushers and 35 in the case of HPGRs

x_1 = P_{80} in microns of the circuit feed
x_2 = P_{80} in microns of the circuit product

Equation 3 for HPGR's crushers is written as:

$$W_h = S_h K_3 M_{ih}.4(x_2{}^{f(x_2)} - x_1{}^{f(x_1)}) \qquad \text{Equation 11}$$

where
S_h = coarse ore harness parameter as defined by Equation 10 and with K_s set to 35
K_3 = 1.0 for all HPGRs operating in closed circuit with a classifying screen. If the HPGR is in open circuit, K3 takes the value of 1.19.
x_1 = P_{80} in microns of the circuit feed
x_2 = P_{80} in microns of the circuit product
M_{ih} = HPGR ore work index and is provided directly by SMC Test®

B 3.2.3 Specific Energy Correction for Size Distribution (Ws)

Implicit in the approach described in this appendix is that the feed and product size distributions are parallel and linear in log-log space. Where they are not, allowances (corrections) need to be made. By and large, such corrections are most likely to be necessary (or are large enough to be warranted) when evaluating circuits in which closed circuit secondary/tertiary crushing is followed by ball milling. This is because such crushing circuits tend to produce a product size distribution which is relatively steep when compared to the ball mill circuit cyclone overflow. This is illustrated in App Figure 8, which shows measured distributions from an open and closed crusher circuit as well as a ball mill cyclone overflow. The closed circuit crusher distribution can be seen to be relatively steep compared with the open circuit crusher distribution and ball mill cyclone overflow. Also the open circuit distribution more closely follows the gradient of the cyclone overflow. If a ball mill circuit were to be fed two distributions, each with same P80 but with the open and closed circuit gradients in App Figure 8, the closed circuit distribution would require more energy to grind to the final P80. How much more energy is required is difficult to determine. However, for the purposes of this approach it has been assumed that the additional specific energy for ball milling is the same as the difference in specific energy between open and closed crushing to reach the nominated ball mill feed size. This assumes that a crusher would provide this energy. However, in this situation the ball mill has to supply this energy and it has a different (higher) work index than the crusher (ie the ball mill is less energy efficient than a crusher and has to input more energy to do the same amount of size reduction). Hence from Equation 9, to crush to the ball mill circuit feed size (x_2) in open circuit requires specific energy equivalent to:

$$W_c = 1.19 * M_{ic}.4(x_2{}^{f(x_2)} - x_1{}^{f(x_1)}) \qquad \text{Equation 12}$$

For closed circuit crushing the specific energy is:

$$W_c = 1 * M_{ic}.4(x_2{}^{f(x_2)} - x_1{}^{f(x_1)}) \qquad \text{Equation 13}$$

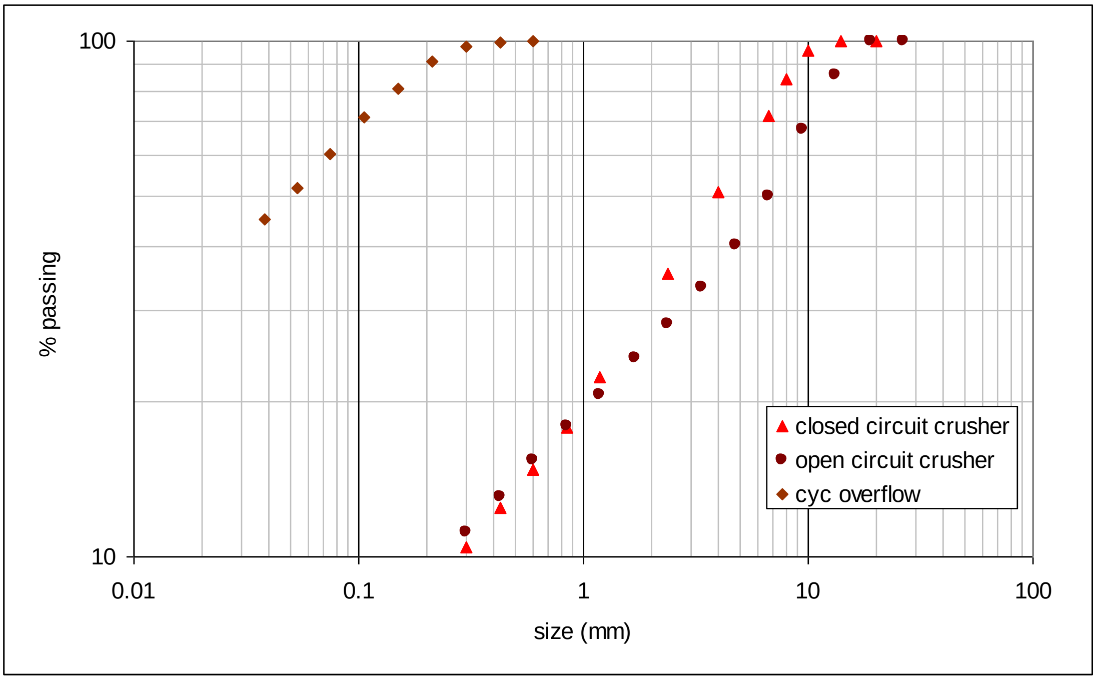
The difference between the two (Equation 12 and Equation 13) has to be provided by the milling circuit with an allowance for the fact that the ball mill, with its lower energy efficiency, has to provide it and not the crusher. This is what is referred to in Equation 5 as W_s and for the above example is therefore represented by:

$$W_s = 0.19 * M_{ia}.4(x_2{}^{f(x_2)} - x_1{}^{f(x_1)}) \qquad \text{Equation 14}$$

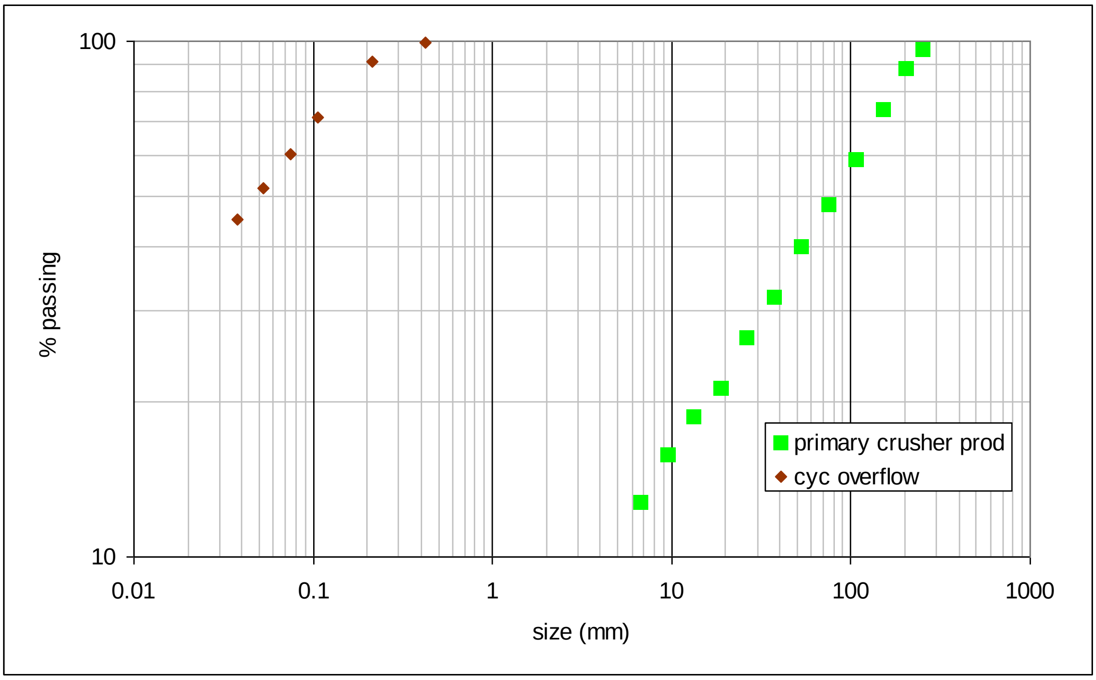
Note that in Equation 14 M_{ic} has been replaced with M_{ia}, the coarse particle tumbling mill grinding work index.

In AG/SAG based circuits the need for W_S appears to be unnecessary as App Figure 9 illustrates. Primary crusher feeds often have the shape shown in App Figure 9and this has a very similar gradient to typical ball mill cyclone overflows. A similar situation appears to apply with HPGR product size distributions, as illustrated in App Figure 10. Interestingly SMCT's data show that for HPGRs, closed circuit operation appears to require a lower specific energy to reach the same P80 as in open circuit, even though the distributions for open and closed circuit look to have almost identical gradients. Closer examination of the distributions in fact shows that in closed circuit the final product tends to have slightly less very fine material, which may account for the different energy requirements between the two modes of operation. It is also possible that recycled material in closed circuit is inherently weaker than new feed, as it has already passed through the HPGR previously and may have sustained micro-cracking. A reduction in the Bond ball mill work index as measured by testing HPGR products compared it to the Bond ball mill work index of HPGR feed has been noticed in many cases in the laboratory (see next section) and hence there is no reason to expect the same phenomenon would not affect the recycled HPGR screen oversize.

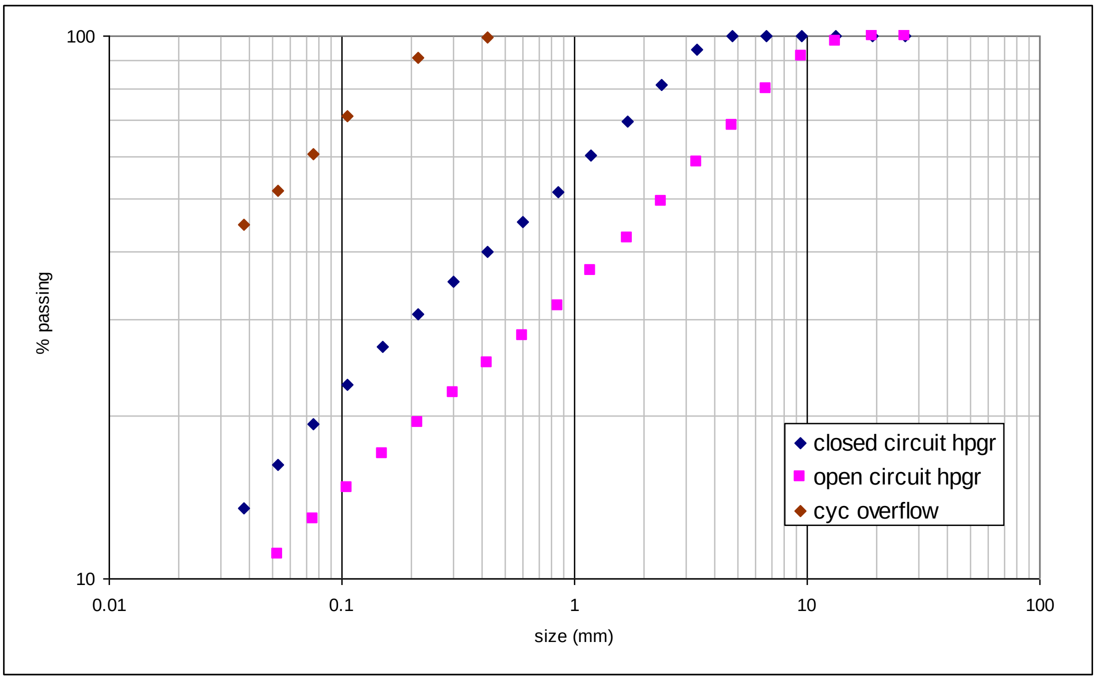
It follows from the above arguments that in HPGR circuits, which are typically fed with material from closed circuit secondary crushers, a similar feed size distribution correction should also be applied. However, as the secondary crushing circuit uses such a relatively small amount of energy compared to the rest of the circuit (as it crushes to a relatively coarse size) the magnitude of size distribution correction is very small indeed – much smaller than the error associated with the technique - and hence may be omitted in calculations.



App Figure 8 – Examples of Open and Closed Circuit Crushing Distributions Compared with a Typical Ball Mill Cyclone Overflow Distribution



App Figure 9 – Example of a Typical Primary Crusher (Open and Circuit) Product Distribution Compared with a Typical Ball Mill Cyclone Overflow Distribution



App Figure 10 – Examples of Open and Closed Circuit HPGR Distributions Compared with a Typical Ball Mill Cyclone Overflow Distribution

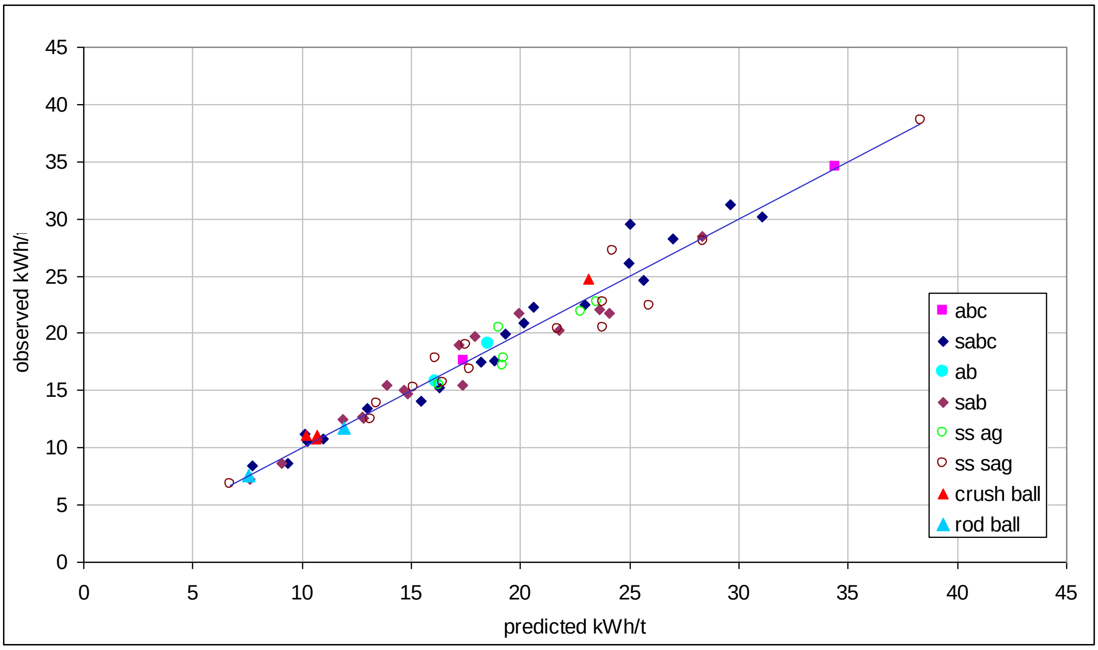
B 3.2.4 Weakening of HPGR Products

As mentioned in the previous section, laboratory experiments have been reported by various researchers in which the Bond ball work index of HPGR products is less than that of the feed. The amount of this reduction appears to vary with both material type and the pressing force used. Observed reductions in the Bond ball work index have typically been in the range 0-10%. In the approach described in this appendix no allowance has been made for such weakening. However, if HPGR products are available which can be used to conduct Bond ball work index tests on then M_{ib} values obtained from such tests can be used in Equation 7. Alternatively the M_{ib} values from Bond ball mill work index tests on HPGR feed material can be reduced by an amount that the user thinks is appropriate. Until more data become available from full scale HPGR/ball mill circuits it is suggested that, in the absence of Bond ball mill work index data on HPGR products, the M_{ib} results from HPGR feed material are reduced by no more than 5% to allow for the effects of micro-cracking.

B 3.3 Validation

B 3.3.1 Tumbling Mill Circuits

The approach described in the previous section was applied to over 120 industrial data sets. The results are shown in App Figure 11. In all cases, the specific energy relates to the tumbling mills contributing to size reduction from the product of the final stage of crushing to the final grind. Data are presented in terms of equivalent specific energy at the pinion. In determining what these values were on each of the plants in the data base it was assumed that power at the pinion was 93.5% of the measured gross (motor input) power, this figure being typical of what is normally accepted as being reasonable to represent losses across the motor and gearbox. For gearless drives (so-called wrap-around motors) a figure of 97% was used.



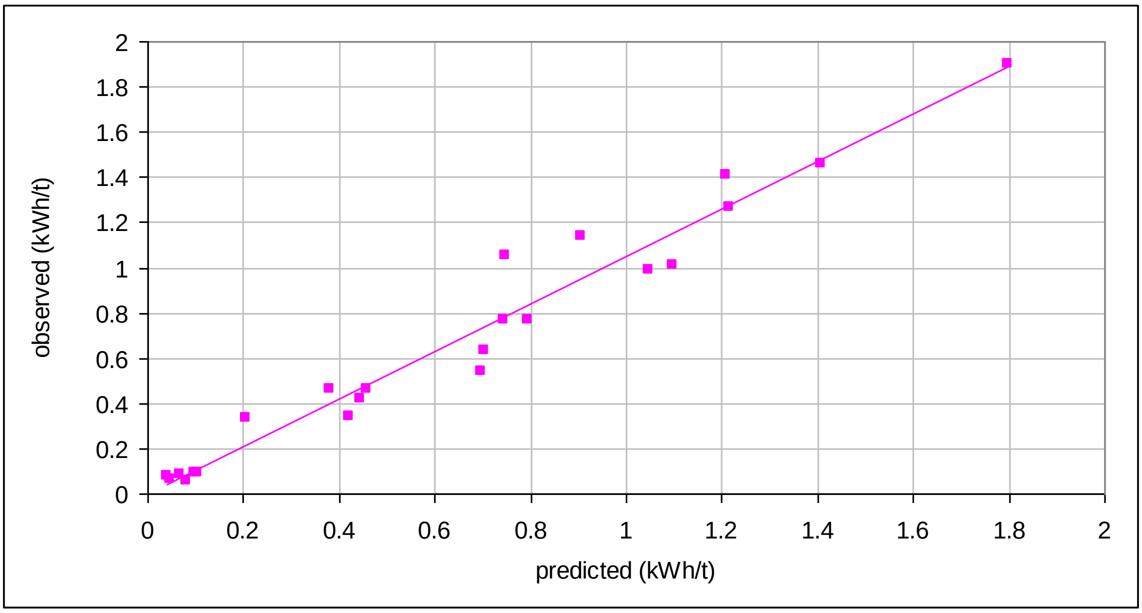
App Figure 11 – Observed vs Predicted Tumbling Mill Specific Energy

B 3.3.2 Conventional Crushers

Validation used 12 different crushing circuits (25 data sets), including secondary, tertiary and pebble crushers in AG/SAG circuits. Observed vs predicted specific energies are given in App Figure 12. The observed specific energies were calculated from the crusher throughput and the net power draw of the crusher as defined by:

Net Power = Motor Input Power – No Load Power Equation 15

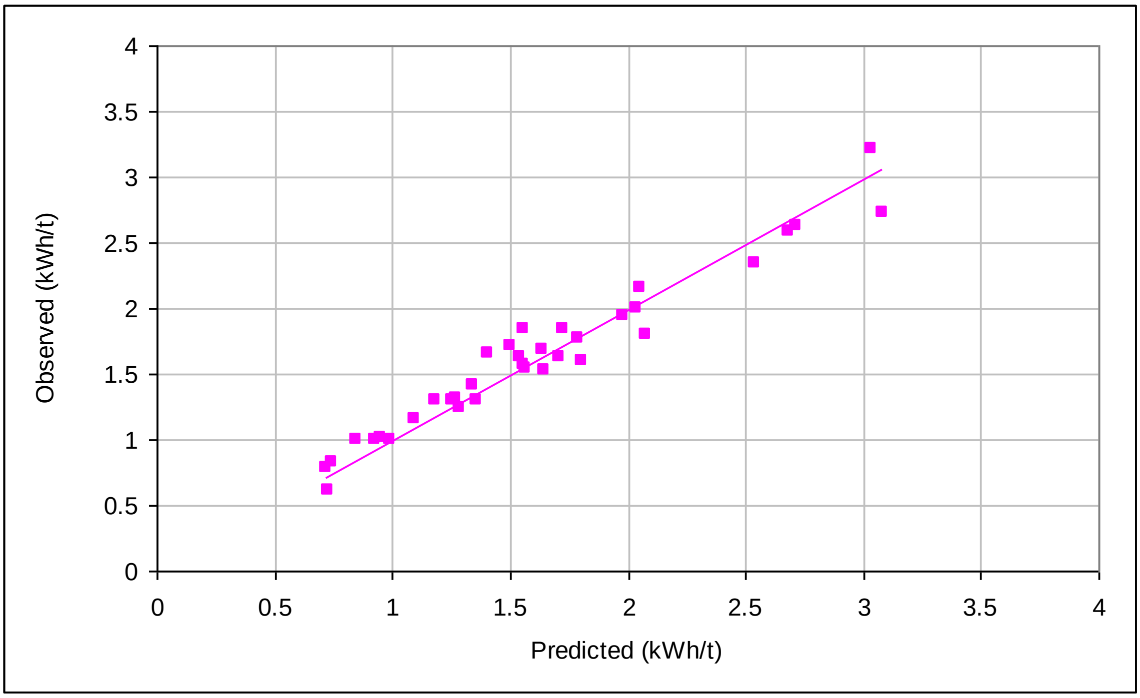
No-load power tends to be relatively high in conventional crushers and hence net power is significantly lower than the motor input power. From examination of the 25 crusher data sets the motor input power was found to be on average 20% higher than the net power.



App Figure 12 – Observed vs Predicted Conventional Crusher Specific Energy

B 3.3.3 HPGRs

Validation for HPGRs used data from 19 different circuits (36 data sets) including laboratory, pilot and industrial scale equipment. Observed vs predicted specific energies are given in App Figure 13. The data relate to HPGRs operating with specific grinding forces typically in the range 2.5-3.5 N/mm^2. The observed specific energies relate to power delivered by the roll drive shafts. Motor input power for full scale machines is expected to be 8-10% higher.



App Figure 13 – Observed vs Predicted HPGR Specific Energy

B 4 WORKED EXAMPLES

A SMC Test® and Bond ball work index test were carried out on a representative ore sample. The following results were obtained:

SMC Test®:
M_{ia} = 19.4 kWh/t
M_{ic} = 7.2 kWh/t
M_{ih} = 13.9 kWh/t
Bond test carried out with a 150 micron closing screen:
M_{ib} = 18.8 kWh/t

Three circuits are to be evaluated:

- SABC
- HPGR/ball mill
- Conventional crushing/ball mill

The overall specific grinding energy to reduce a primary crusher product with a P_{80} of 100 mm to a final product P_{80} of 106 µm needs to be estimated.

B 4.1 SABC Circuit

Coarse particle tumbling mill specific energy:

$$W_a = 0.95 * 19.4 * 4 * \left(750^{-(0.295+750/1000000)} - 100000^{-(0.295+100000/1000000)}\right)$$
= 9.6 kWh/t

Fine particle tumbling mill specific energy:

$$W_b = 18.8 * 4 * \left(106^{-(0.295+106/1000000)} - 750^{-(0.295+750/1000000)}\right)$$
= 8.4 kWh/t

Pebble crusher specific energy:

In this circuit, it is assumed that the pebble crusher feed P_{80} is 52.5mm. As a rule of thumb this value can be estimated by assuming that it is 0.75 of the nominal pebble port aperture (in this case the pebble port aperture is 70mm). The pebble crusher is set to give a product P_{80} of 12mm. The pebble crusher feed rate is expected to be 25% of new feed tph.

$$W_c = 1.19 * 7.2 * 4 * \left(12000^{-(0.295+12000/1000000)} - 52500^{-(0.295+52500/1000000)}\right)$$
= 1.12 kWh/t when expressed in terms of the crusher feed rate
= 1.12 * 0.25 kWh/t when expressed in terms of the SABC circuit new feed rate
= 0.3 kWh/t of SAG mill circuit new feed

Total net comminution specific energy:

W_T = 9.6 + 8.4 + 0.3 kWh/t
= 18.3 kWh/t

B 4.2 HPGR/Ball Milling Circuit

In this circuit primary crusher product is reduced to a HPGR circuit feed P_{80} of 35 mm by closed circuit secondary crushing. The HPGR is also in closed circuit and reduces the 35 mm feed to a circuit product P_{80} of 4 mm. This is then fed to a closed circuit ball mill which takes the grind down to a P_{80} of 106 µm.

Secondary crushing specific energy:

$$W_c = 1*55*(35000 \; *100000 \;)^{-0.2}*7.2*4*\left(35000^{-(0.295+35000/1000000)} - 100000^{-(0.295+100000/1000000)}\right)$$
= 0.4 kWh/t

HPGR specific energy:

$$W_h = 1*35*(4000 \; *35000 \;)^{-.2}*13.9*4*\left(4000^{-(0.295+4000/1000000)} - 35000^{-(0.295+35000/1000000)}\right)$$
= 2.4 kWh/t

Coarse particle tumbling mill specific energy:

$$W_a = 1*19.4*4*\left(750^{-(0.295+750/1000000)} - 4000^{-(0.295+4000/1000000)}\right)$$
= 4.5 kWh/t

Fine particle tumbling mill specific energy:

$$W_b = 18.8*4*\left(106^{-(0.295+106/1000000)} - 750^{-(0.295+750/1000000)}\right)$$
= 8.4 kWh/t

Total net comminution specific energy:

W_T = 4.5 + 8.4 + 0.4 + 2.4 kWh/t
= 15.7 kWh/t

B 4.3 Conventional Crushing/Ball Milling Circuit

In this circuit primary crusher product is reduced in size to P_{80} of 6.5 mm via a secondary/tertiary crushing circuit (closed). This is then fed to a closed circuit ball mill which grinds to a P80 of 106 µm.

Secondary/tertiary crushing specific energy:

$$W_c = 1*7.2*4*\left(6500^{-(0.295+6500/1000000)} - 100000^{-(0.295+100000/1000000)}\right)$$
= 1.7 kWh/t

Coarse particle tumbling mill specific energy :

$$W_a = 1 * 19.4 * 4 * \left(750^{-(0.295+750/1000000)} - 6500^{-(0.295+6500/1000000)}\right)$$

= 5.5 kWh/t

Fine particle tumbling mill specific energy:

$$W_b = 18.8 * 4 * \left(106^{-(0.295+106/1000000)} - 750^{-(0.295+750/1000000)}\right)$$

= 8.4 kWh/t

Size distribution correction;

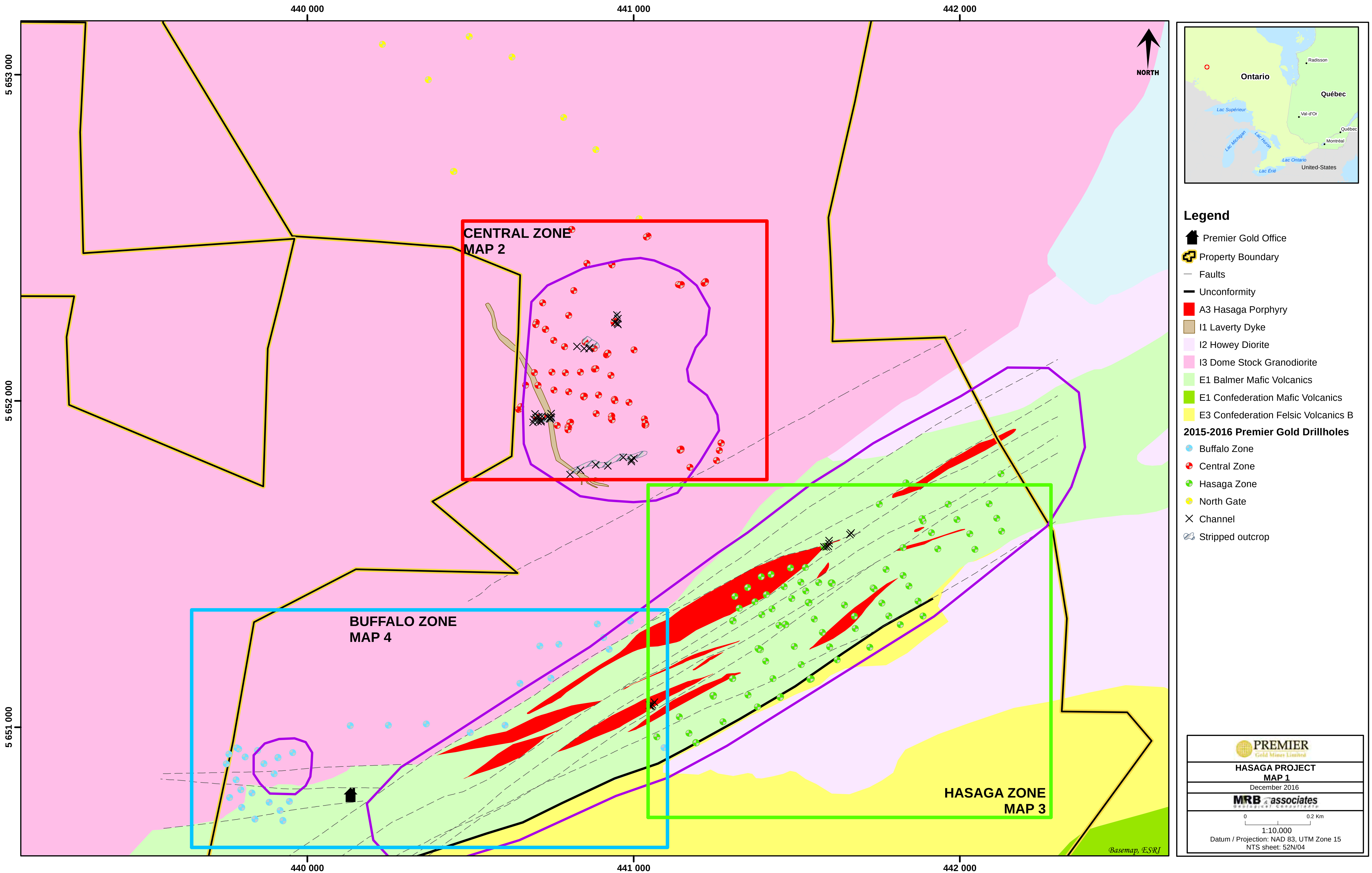
$$W_s = 0.19 * 19.4 * 4 * \left(6500^{-(0.295+6500/1000000)} - 100000^{-(0.295+100000/1000000)}\right)$$

= 0.9 kWh/t

Total net comminution specific energy:

W_T = 5.5 + 8.4 + 1.7 + 0.9kWh/t

= 16.5 kWh/t



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Montréal
Lac Supérieur
Lac Michigan
Lac Huron
Lac Ontario
Lac Érié
United-States
Legend
Premier Gold Office
Property Boundary
Faults
Unconformity
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I1 Laverty Dyke
I2 Howey Diorite
I3 Dome Stock Granodiorite
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Hasaga Zone
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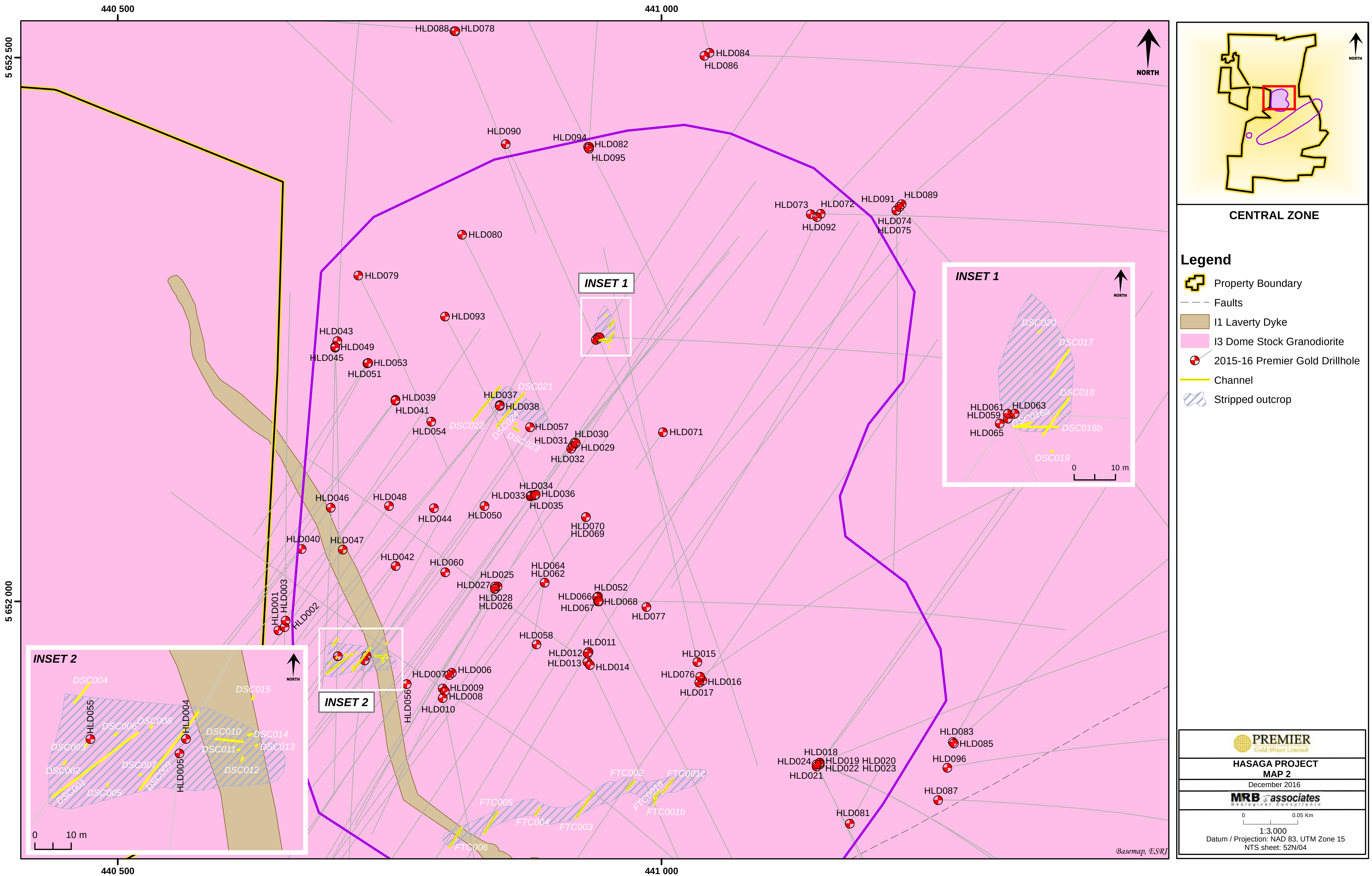
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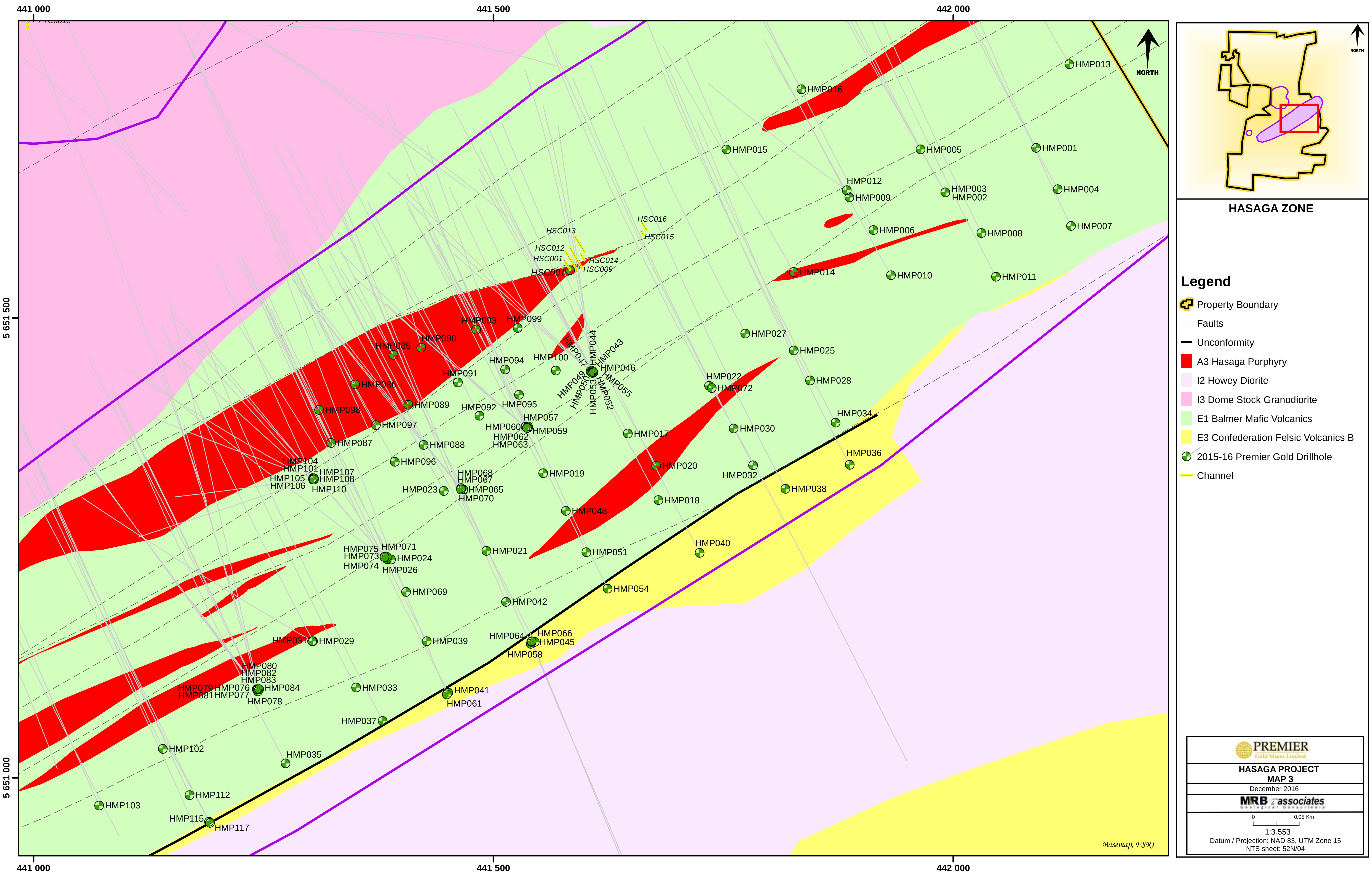

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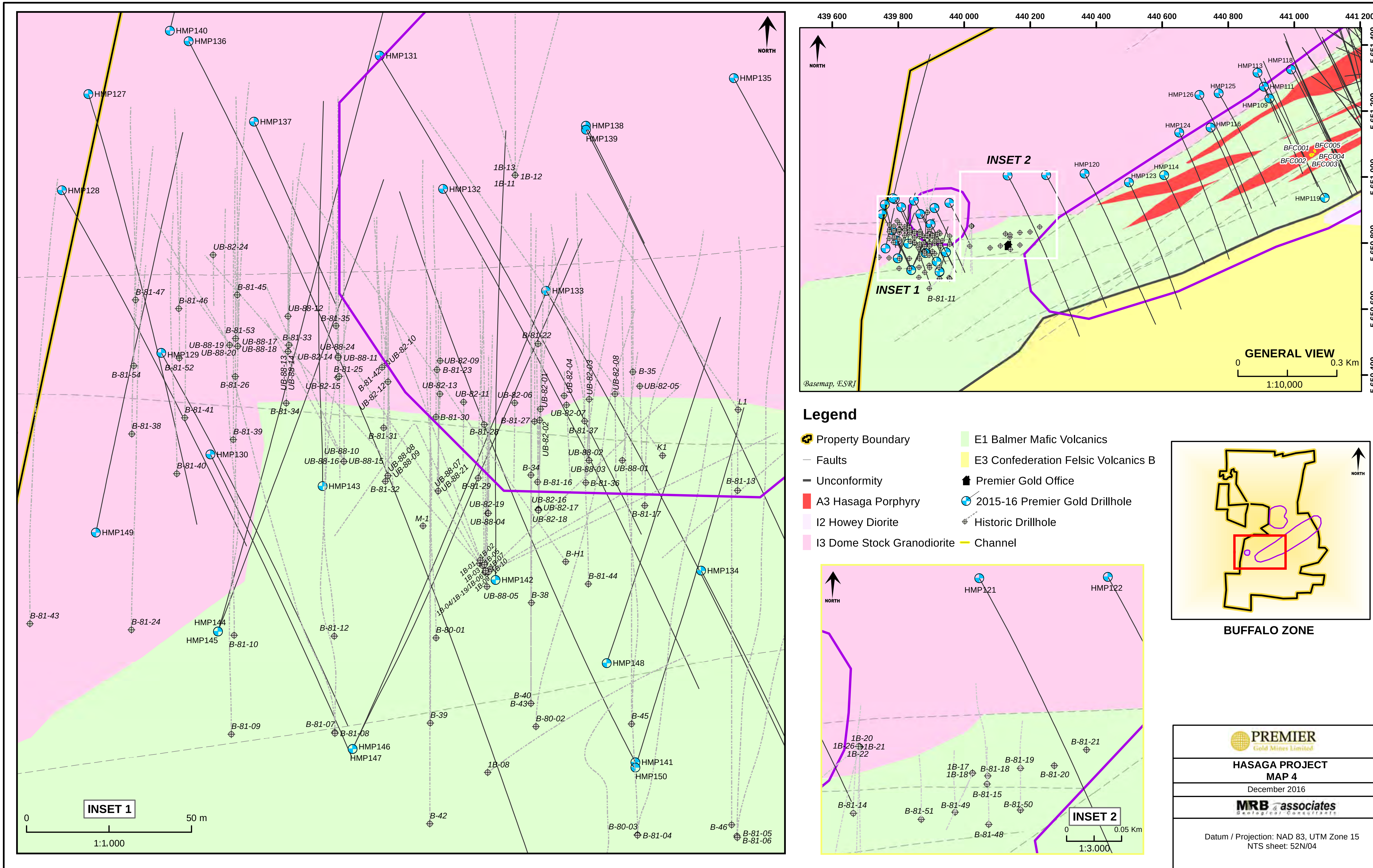
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