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Ontario

2015 GEOLOGICAL ASSESSMENT REPORT
ON THE
JANES AND JANES SOUTH PROPERTIES
Carried Out By
NORTH AMERICAN PALLADIUM

JANES TOWNSHIP
SUDBURY MINING DIVISION, ONTARIO, CANADA

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EXECUTIVE SUMMARY

This is a technical report for assessment purposes on the 2015 reconnaissance geological mapping, prospecting and sampling program on the Janes and Janes South properties in Janes Township by North American Palladium Ltd.

The claims are located 80 km east of Sudbury, Ontario within Janes Township in the Sudbury Mining Division. The property is bounded by UTM NAD 83 coordinates 17U 544708E to 550644E, and 5165413N to 5172605N. The property consists of 12 contiguous staked mining claims containing 169 units and covers an area of approximately 2,704 Ha.

The Main showing on claim 1220221 contains notable Palladium- dominated PGE mineralization associated with *the contact zone* of a large Nipissing gabbroic sheet. This contact type of Ni-Cu-PGE mineralization has the most potential for tonnage and may be structurally controlled by unmapped footwall structures (small-scale faults and micro- faults associated with regional structures) (Butler, 2008).

During 2015, North American Palladium performed a program of reconnaissance geological mapping, prospecting and sampling on the Janes and Janes South properties. The 19-day program occurred between September and December, 2015. The focus of the program was the ground truthing of HELITEM EM anomalies outlined from the 2015 airborne geophysical survey performed for North American Palladium Ltd. A total of 21 samples were collected. The analytical results for these samples will be reported in a separate assessment report.

1.0 INTRODUCTION

The Janes and Janes South properties are located 80 km east of Sudbury, Ontario within Janes Township in the Sudbury Mining Division. The properties are bounded by UTM NAD 83 coordinates 17U 544708E to 550644E, and 5165413N to 5172605N. They consist of 12 contiguous staked mining claims containing 169 units and cover an area of approximately 2,704 Ha.

From September to December, 2015, a 19-day program of reconnaissance mapping, prospecting and sampling was completed on the properties. This program forms the basis of this report.

2.0 PROPERTY DETAILS

2.1 Location and Access

The properties are located 80 km east of the City of Sudbury within Janes Township in the Sudbury Mining Division (Figure 1). The properties are bounded by UTM NAD 83 coordinates 17U 544708E to 550644E, and 5165413N to 5172605N.

Excellent all year access to the property can be gained along a series of bush roads branching off Highway 535 that originates from the town of Hagar, Ontario. In the summer, the property can be accessed using a pick-up truck. During the winter months, access to the property would require the use of a snow machine.

A full range of services and supplies are provided in the city of Sudbury located 50 km to the west of Hagar. Accommodations, food, and limited supplies can be found in the towns of Hagar and Warren.

2.2 Topography and Vegetation

The local terrain is typical of the Precambrian Shield, with low rolling hills and marshy areas. Vegetation on higher ground consists of a variety of hardwoods such as poplar and

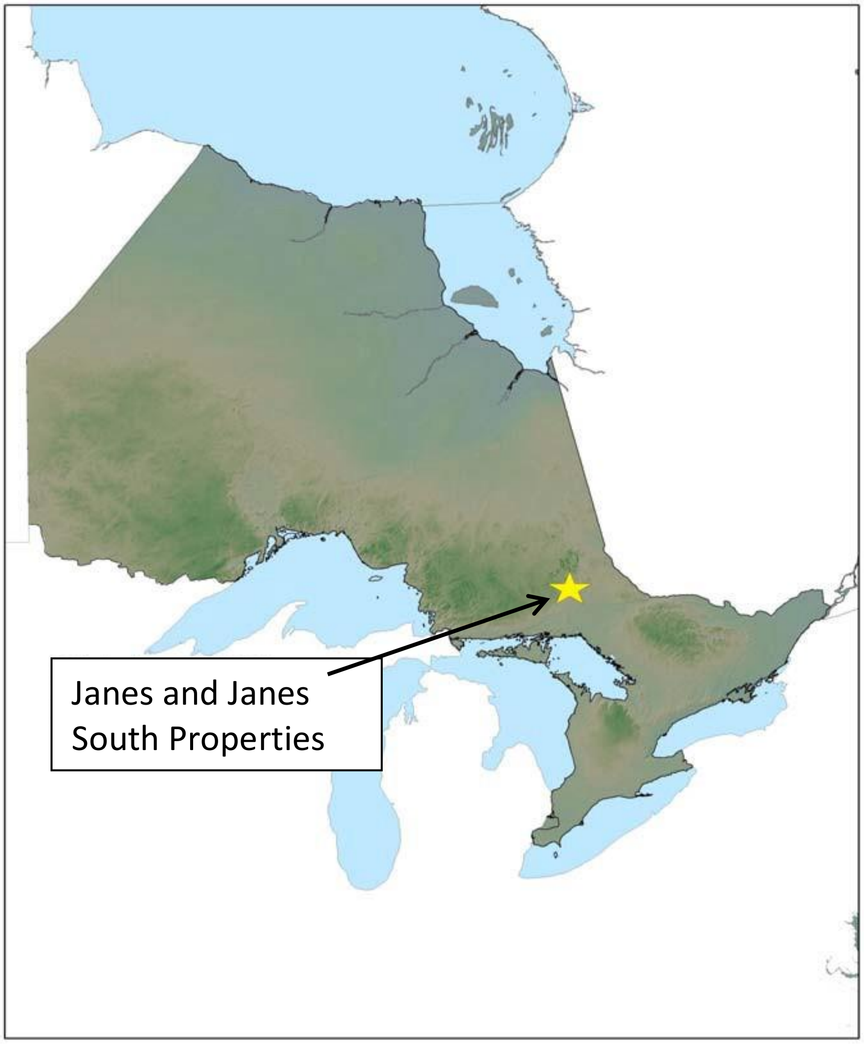

Figure 1: Location of the Properties in Ontario, Canada

birch, with coniferous trees that include spruce and balsam, and minor amounts of pine. In the lower ground, typically more wet in character, black spruce, tamarack, alder and cedar predominate. Water for exploration purposes is available from beaver ponds, marshes small streams and lakes. Snowfall generally begins in November and extends into late March, early April. Lakes are usually passable with adequate ice thickness from late December through to late March. Between 50 and 100 mm of monthly rainfall is normal from April to October. The mean temperature is –13°C in January and 19°C in July.

2.3 Claims

The properties are located within Janes Township in the Sudbury Mining Division. They consist of 12 contiguous staked mining claims containing 169 units and covers an area of approximately 2,704 Ha (Table 1, Figure 2).

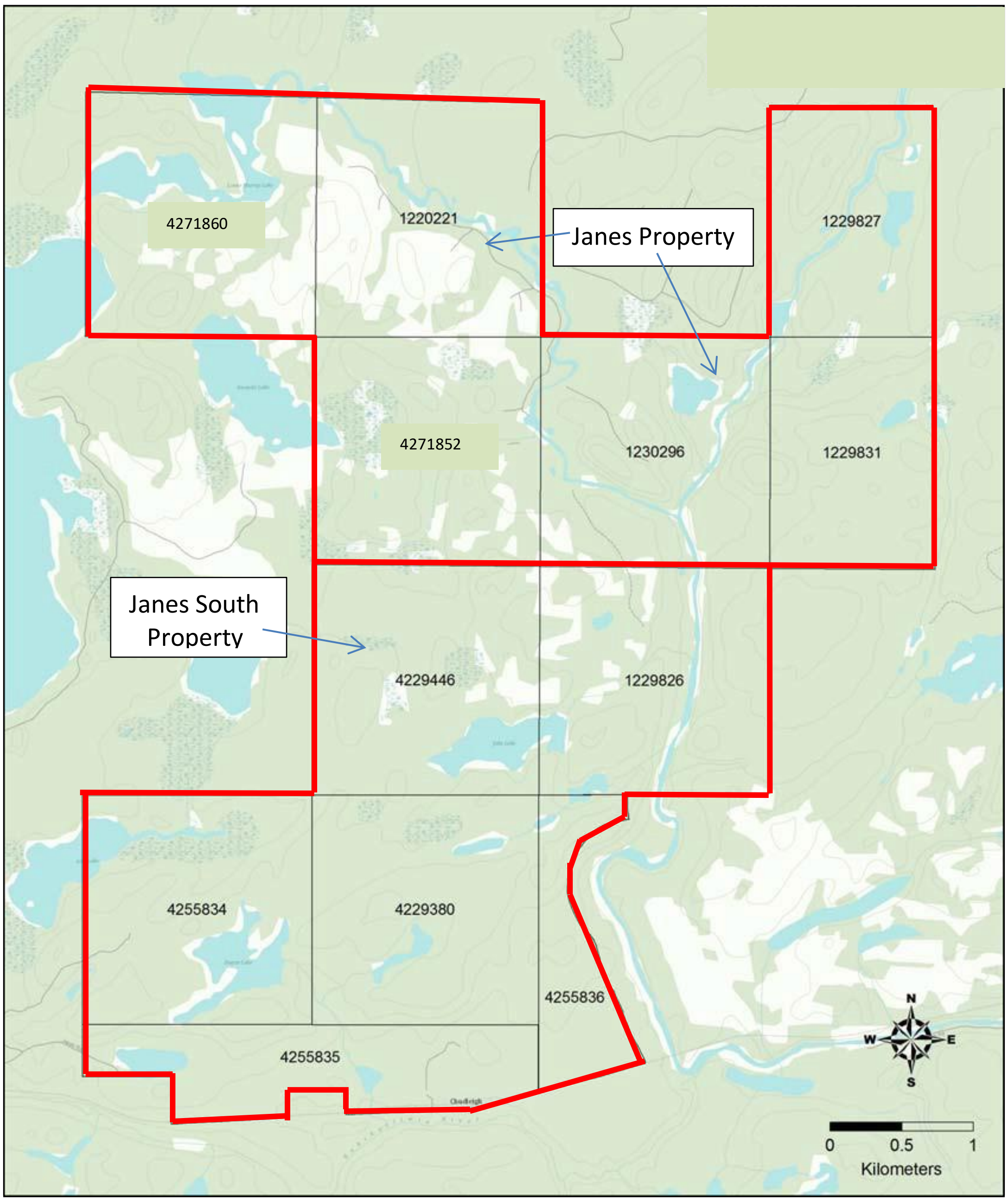

Figure 2: Claim Tenure of the Properties, Janes Township, Ontario.

Table 1: Claim Summary of the Janes and Janes South Property, Janes Township

Claim Number	Recording Date	Claim Due Date	Work Required	Total Applied	Total Reserve
1220221	1996-Dec-16	2016-Dec-20	$6,400	$89,600	$714
1229826	1997-Nov-28	2016-Nov-28	$6,400	$83,200	$0
1229827	1997-Nov-28	2016-Nov-28	$4,800	$62,400	$0
1229831	1997-Nov-28	2016-Nov-28	$4,800	$62,400	$0
1230296	1997-Nov-28	2016-Nov-28	$6,400	$83,200	$0
4229380	2010-Jun-07	2016-Jun-07	$6,400	$25,600	$0
4229446	2010-Mar-31	2016-Mar-31	$6,400	$25,600	$0
4255834	2010-Jun-07	2016-Jun-07	$6,400	$25,600	$0
4255835	2010-Jun-07	2016-Jun-07	$4,400	$17,600	$0
4255836	2010-Jun-07	2016-Jun-07	$2,400	$9,600	$0
4271852	2013-Aug-07	2017-Aug-07	$6,400	$12,800	$0
4271860	2016-Jan-08	2018-Jan-08	$6,400	$0	$0

3.0 PREVIOUS WORK

1958: Norseman Nickel Corp. completed diamond drilling and reported results for Ni, Cu and some Au assays. No PGE assays were reported.

1968: Kirkland Townsite Gold Mines Ltd. performed Cu-Ni exploration on the north-west area of the Janes South property. Work included trenching over a 54m x 1O5m area that exposed mineralized gabbro, returning assay values of <0.39% Cu. This area is now known as the Kirkland Townsite showing (claim 4229446).

1969-1970: Kennco Explorations (Canada) Ltd. completed airborne magnetometer-EM with follow-up ground work that included geological mapping, ground geophysics (Induced Polarization), trenching and diamond drilling. The drilling (69-01 to 69-09, 70-02, and PS-1 to PS-5) was performed around the Main Trench area (claim 1220221). The drill results yielded minor sulphide mineralization consisting of disseminated chalcopyrite and pyrrhotite in Nipissing gabbro. The most significant intersection was from hole 69-08 that intersected 10.70 m of 1.27% Ni and 1.59% Cu and PS-1 (packsack hole) that intersected 1.0 m of 4.60% Ni and 5.32% Cu. No PGE or gold assay data were reported. In 1970, Kennco drilled one vertical hole (70-1) on the Kirkland Townsite showing (claim 4229446).to depth of 2551 ft. The hole encountered chalcopyrite and pyrrhotite mineralized gabbro but no assay values were filed.

1968-69: Ossington Exploration Ltd. concentrated on the area between the Sturgeon and Chiniguchi Rivers on claim 1230296. A grab sample from a surface showing of chalcopyrite returned an assay of 2.45% Cu and 0.13% Ni. A follow-up diamond drill hole returned assays of 0.09% Cu and 0.19% Ni and intersected a >50 m wide granitic dyke which cut through the gabbroic rocks. 5 diamond drill holes were also completed to test several east-trending EM anomalies. No base metal or PGE-Au assay data were reported. This area is now known as the Ossington showing.

1988: BP Resources Canada had Aerodat perform a helicopter borne Magnetic and VLF/EM survey that covered claims 1229826, 1230296, 4229446 and 4271852.

1988-89: Falconbridge Ltd. completed limited exploration consisting of ground geophysics (IP, Mag) and re-assaying of the historical Kennco’s core for PGM’s. Results for the mineralized section from 69-08 returned a weighted average of 1.51% Ni, 1.86% Cu, 0.27% g/t Pt, 1.30 g/t Pd, and 0.21 g/t Au, and 5.33 g/t Ag over a 7.90 m interval (172.80 – 180.70m). This interval was described as massive to semi-massive sulphide mineralization consisting of chalcopyrite, pyrrhotite, and pentlandite hosted in a pyroxenite gabbro.

1991: Todd Kampman completed an OPAP program of prospecting and soil sampling over the area of the Kirkland Townsite showing. Anomalous values were reported but not recognized and no further work was performed.

1998 - 1999: Jobin-Bevans, L.S. completed an OPAP program (line-cutting, geological mapping, soil sampling, bedrock stripping and VLF-EM) on the Ossington showing area on claim 1230296. Cu-Ni values were significant but precious metals were lacking. No new areas of mineralization were uncovered.

1999 – 2001: **Pacific North West Capital Corp. and Anglo Platinum (Goldwright option)** completed line-cutting, geophysics (IP and Mag), and diamond drilling on claim 1220221 near the Main Trench. A total of 2535.6 m was completed in 26 holes. Results were encouraging with some significant PGE and base metal intersections being obtained.

2007: Goldwright Explorations/GoldTrain Resources completed 9 diamond drill holes totaling 826.0 m near the previous drilling by Pacific North West Capital Corp. and Anglo Platinum. JVX Ltd. was also contracted to complete down hole IP surveys on two drill holes.

2011: GoldTrain Resources completed outcrop stripping and four diamond drill holes totaling 570.7 m. The drilling targeted downhole IP anomalies and the western extent of the Main Showing. The outcrop stripping expanded the Main Showing and has yet to be mapped or channel sampled.

2014: Randy Stewart and Brian Wright performed a program of reconnaissance geological mapping, prospecting and sampling. A total of 44 samples were collected. The program focused on three previously known mineralized Nipissing Gabbro showings and two newly discovered mineralized and altered Nipissing Gabbro zones:

1) The Kirkland Townsite Showing (claim 4229446)

In the 2014 program 7 samples (WP83, WP85, WP86, WP89, WP90, WP95 and WP96) were taken to encircle the known mineralized area in hope of finding the strike extension. Assays are still pending.

2) The Swamp Showing (claim 4271852).

This area was previously worked by Kennco and, in the 2014 program, several trenched and stripped areas were located. Three mineralized Nipissing Gabbro samples were collected.

Table 2: The Swamp Showing Samples

Sample	Easting	Northing	Cu(ppm)	Ni(ppm)	Pd(ppb)	Pt(ppb)
E5251561	547215	5169578	3190	960	6.3	5.4
E5251562	547221	5169584	2440	783	4.6	5.6
E5251563	547233	5169685	4810	1440	10.2	7.7

3) Ossington (Triller) Showing (claim 1230296)

In the 2014 program one mineralized Nipissing Gabbro trench sample was collected.

Table 3: Ossington Showing Samples

Sample	Easting	Northing	Cu(ppm)	Ni(ppm)	Pd(ppb)	Pt(ppb)
E5251570	549102	5169971	9330	3220	25.1	21.7

4) Two previously unrecognized zones of mineralized and altered Nipissing Gabbro were mapped and sampled.

a) On claim 4255835 2 samples were collected. The rock is a sheared and altered Nipissing gabbro. It is medium grained with deep green/grey and pinkish hues. The rock contains pervasive epidote (possibly chlorite), carbonate and potassium feldspar alteration and localized calcite filled fractures and shears. Mineralization consists of trace blebby cpy.

Table 4: Altered Nipissing Gabbro Samples

Sample	Easting	Northing	Cu(ppm)	Ni(ppm)	Pd(ppb)	Pt(ppb)
E5251565 (WP20)	547861	5165815	334.0	190.5	73.8	13.8
E5251566 (WP21)	545835	5165807	199.5	174.0	12.6	3.4

b) On claim 4229446 samples WP113 (547469E-5168692N) and WP117 (547481E-5168763N) were collected. The rock is most likely a quartz (silica) and iron carbonate altered Nipissing gabbro with trace disseminated sulphides occurring proximal to the contact with the Huronian sediments. Assays are still pending.

2015: Randy Stewart and Brian Wright focused on outlining the relationship between the Nipissing gabbro, Huronian sediments and sulphide mineralization on claims 1230296 and 4271852. The 2015 program was designed to map and sample the possible strike extent of the area outlined in 2014 on claim 4271852 known as the Swamp showing. In the 2015 program the areas east, west and north of the Swamp Showing were mapped and sampled. 10 samples were collected. Assays are still pending.

2015: North American Palladium. CGG performed a HELITEM electromagnetic and magnetic airborne geophysical survey over several claim blocks which included the Janes and Janes South Properties. Several significant HELITEM EM anomalies were recognized and recommended for future follow-up.

4.0 GEOLOGY

4.1 Regional Geology

(Most of this section was taken and adapted from Easton (1998))

The Janes and Janes South properties are in the Southern Province near the southern margin of the Cobalt Embayment. The properties are underlain by rocks of the Nipissing gabbro and Huronian Supergroup (Fig 3).

The Southern Province in Ontario stretches from Lake Superior east to Sudbury and northeast to the Ottawa River and Cobalt (Bennett et al. 1991). In the east, it consists of Paleoproterozoic metasedimentary and metavolcanic rocks of the Huronian Supergroup and gabbroic intrusions of the Nipissing diabase suite. In the west, in addition to the Huronian Supergroup and the Nipissing Suite, it contains rocks of the Sudbury Igneous Complex and the Whitewater Group. Also, included in the Southern Province are Mesoproterozoic plutonic and minor volcanic rocks of the Killarney Magmatic Belt. The latter belt is transected by the Grenville Front, so that Killarney Magmatic Belt rocks occur in both the Southern and Grenville Provinces. Also, present in the Southern Province are anorogenic plutonic rocks emplaced between 1.5 and 1.45 Ga. The Southern Province is also cut by the 1.24 Ga Sudbury diabase dyke swarm (Krogh et al., 1988).

The Huronian Supergroup was deposited unconformably on 2.8-2.5 Ga Archean plutonic and supracrustal rocks of the Superior Province. Locally, a paleoweathering surface is preserved at the unconformity, particularly in the Thessalon and Elliot Lake areas (Bennett et al. 1991). The maximum age of Huronian deposition is constrained between 2.45 Ga, the minimum age of the Copper Cliff rhyolite and the 2.477 Ga Murray granite (Krogh et al. 1984, 1996) and was complete by 2.22-2.21 Ga, the age of the Nipissing diabase suite (Corfu and Andrews 1986, Noble and Lightfoot 1992).

The Huronian Supergroup is subdivided into four groups, the Elliot Lake, Hough Lake, Quirke Lake and Cobalt Groups. The lowest unit, the Elliot Lake Group consists of both metavolcanic and metasedimentary rocks. In the Sault Ste. Marie area, the lowest unit is the arkosic Livingstone Creek Formation, which is overlain by mafic and felsic volcanic rocks of the Thessalon Formation. Mafic rocks of the Thessalon Formation are continental tholeiites (Jolly, 1987). In contrast, in the Sudbury area, the volcanic units are thicker, contain more felsic members, and lie beneath the sedimentary rocks (Bennett et al. 1991). Three main volcanic units are present in the Sudbury area: 1) tholeiitic basalts of the Elsie

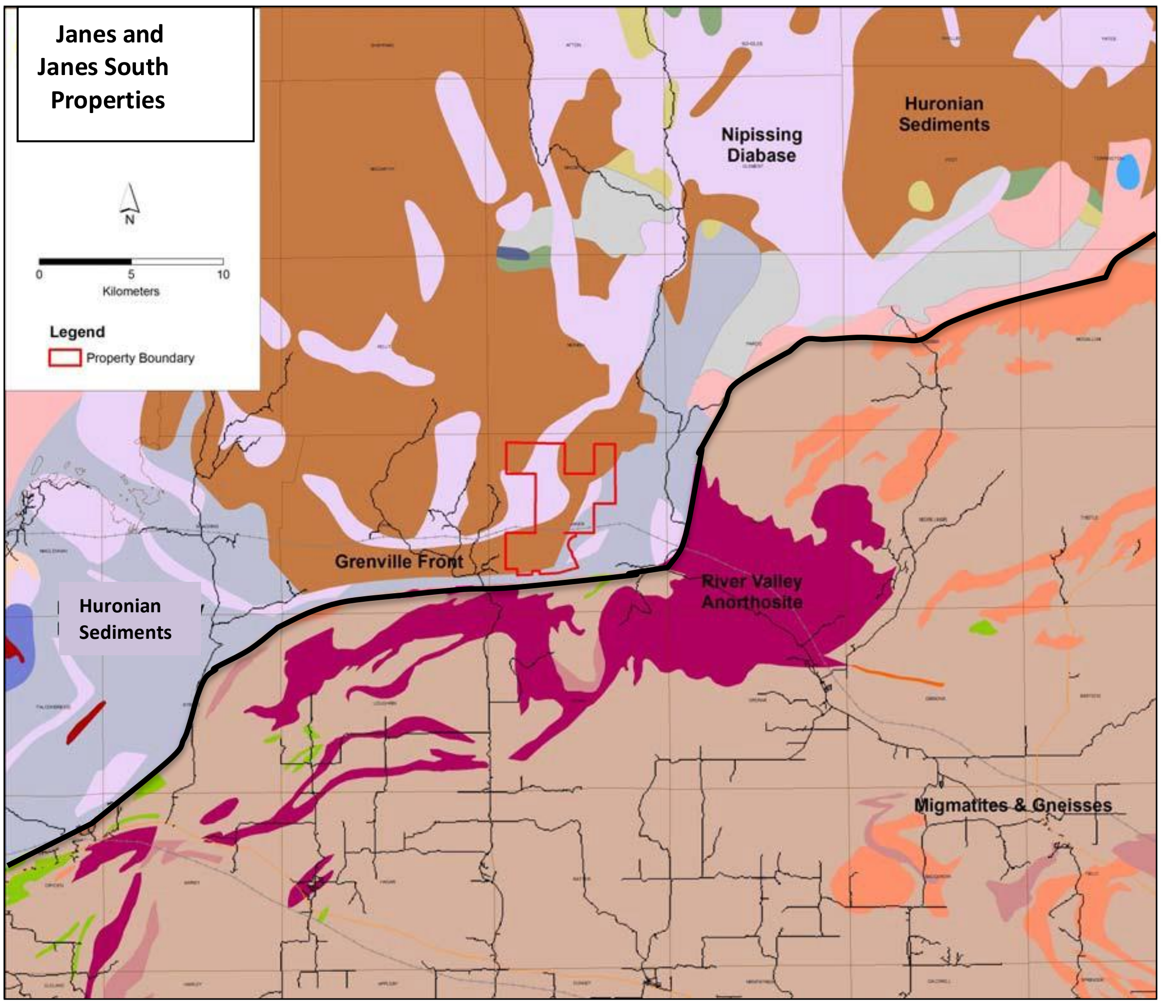

Figure 3: Regional Geology

Mountain Formation, 2) evolved tholeiitic basalts, dacites, and metasediments of the Stobie Formation, and 3) dacites and rhyolites of the ca. 2.45 Ga Copper Cliff Formation, which may be coeval with the Murray and Creighton granites. These volcanic units interfinger with, and are overlain by the Matinenda Formation in the west and the McKim

Formation in the east (Bennett et al. 1991). Volcanic rocks of the Thessalon Formation have received greater study, particularly their geochemistry, than have the volcanic rocks of the Sudbury area. Huronian-age felsic volcanic rocks have not been previously reported east of Sudbury, although Lumbers (1973) assigned deformed mafic volcanic rocks near Crerar to the Mississagi Formation. The presence of these mafic volcanic rocks, in addition to some possible felsic volcanic rocks, was verified by Easton et al. (1996), who assigned them to the Stobie Formation. Huronian-age felsic plutonism, represented by the Murray and Creighton granites, has only been reported from the Sudbury area.

At the base of the Huronian Supergroup in the Elliot Lake, Agnew Lake and Sudbury area occur several layered mafic intrusions (gabbro to anorthosite) referred to as the East Bull Lake intrusive (EBLI) suite (Peck et al. 1993). These bodies have been dated at 2.491-2.475 Ga (Krogh et al. 1984, Heaman 1995), and appear to be slightly older than the rocks of the Elliot Lake Group.

The three groups overlying the Elliot Lake Group consist of three sedimentary cycles of conglomerate, mudstone, siltstone or carbonate, capped by cross-bedded sandstone (Bennett et al. 1991). These three sedimentary groups have been best studied in the Elliot Lake-Espanola area (see references in Bennett et al. 1991). Conglomerate units (Ramsey Lake, Bruce and Gowganda Formations) in each of the cycles have been interpreted as being glaciogenic in origin (e.g. Junnila and Young 1995, Fralick and Miall 1989), likely deposited in a marine environment adjacent to an ice shelf. The siltstone and sandstone units are interpreted to represent deposition during warmer intraglacial or post-glacial

periods in either fluvial or marine environments (e.g. Junnila and Young 1995, Fralick and Miall 1989). Part of the evidence for climatic regimes is geochemically-based (e.g. Nesbitt and Young 1982, Fedo et al. 1997b), with the glaciogenic units having a higher percentage of unweathered rock debris compared to the units deposited in the post-glacial intervals.

The Huronian Supergroup is interpreted to represent a Wilson cycle, starting from a rifting phase represented by the Elliot Lake, Hough Lake and Quirke Lake groups, followed by a passive margin sequence (Cobalt group), and finally, a continent-arc collision between the Superior–Southern Province and the Wisconsin Magmatic Arc Terrane (e.g. Young 1983, Hoffman, 1989, Bennett et al. 1991). This collision event at ca. 1.89-1.85 Ga, termed the Penokean orogeny, is believed to be responsible for most of the metamorphism and deformation present within the Huronian Supergroup. The scale and intensity of the Penokean orogeny has been the subject of recent debate (Davidson et al. 1992, Card 1992), in part because the Penokean orogeny has no associated plutonism in Ontario. The tectonic event/setting responsible for intrusion of the Nipissing suite intrusions at ca. 2.22 Ga is currently poorly understood.

The Sudbury Igneous Complex (SIC) was emplaced at 1.85 Ga (Krogh et al. 1984). The SIC is of major economic importance, as it hosts the Ni-Cu ores mined at Sudbury since the turn of the century. The SIC consists of a lower, ore-bearing sublayer, a main mass of norite, and an upper granophyre (e.g. Dressler et al. 1991). These rock units outline a synformal basin, the Sudbury structure, occupied by clastic rocks of the Onaping Formation, which are in turn overlain by shales and greywackes of the Whitewater Group (e.g. Dressler et al. 1991). The Sudbury structure has been variously interpreted as originating from impact, impact-induced plutonism and volcanism, and volcanism (see reviews in Pye et al. 1984). Associated with the Sudbury structure are a series of brecciated rocks, termed the Sudbury breccias (e.g. Dressler et al. 1991). These breccias consist of randomly oriented blocks of country rock in a fine-grained, pseudotachylite matrix. The breccias occur up to 200 km from Sudbury, but are most abundant near the Sudbury structure. To date, metamorphosed equivalents these breccias have not been identified within the Grenville Province. Reflection seismic imaging (Wu et al. 1995) reveals that the Sudbury structure is asymmetrical at depth, and in the north, it appears to represent a little-

deformed, shallow-dipping slab. In contrast, structure of the SIC in the southern part of the Sudbury structure is more complex, probably reflecting increased deformation and structural imbrication (Wu et al. 1995). Card and Jackson (1995) provide an alternate interpretation of the seismic data, suggesting a synformal structure cut by faults in the south. In both interpretations, a major NE-striking imbricated fault zone is defined by the reflection seismic imaging, establishing that thrust faulting played an important role in NW-SE shortening of the Sudbury structure.

Following the Sudbury event at 1.85 Ga, the southern part of the Sudbury structure was weakly metamorphosed, an event which also retrograded previously metamorphosed rocks of the Huronian Supergroup. In the Southern Province, a regional Na + K metasomatism and silicification event at ca. 1.7 Ga locally intensely alters rocks of the Huronian Supergroup (Meyer et al. 1990, Gates 1991, Fedo et al. 1997a). This metasomatic event may also be responsible for the retrograde metamorphism in the area, although this has yet to be demonstrated conclusively. The 1.7 Ga metasomatic event is commonly associated with faults cutting Huronian strata (e.g. Gates 1991; Easton et al. 1996). It is not known if this metasomatic event is linked to events in the Killarney Magmatic Belt, which was formed at 1.75-1.73 Ga, or results from a separate tectonic or orogenic event.

Felsic plutonism occurred at 1.5-1.45 Ga in the Southern Province and the Killarney Magmatic Belt. In the latter area, and in the Grenville Province, this event is associated with deformation and metamorphism (e.g. Ketchum et al. 1994). In contrast, this event appears to be anorogenic within the Southern Province.

The last major magmatic activity in the Southern Province occurred at 1.24 Ga, namely emplacement of the northwest-trending Sudbury diabase dike swarm. This event is noteworthy, as rocks of this dike swarm can be traced across the Grenville Front into the GFTZ, providing an important marker horizon (e.g. Bethune 1997). Osmani (1991) states the Sudbury dike swarm (1238+/-4 Ma) lithotectonic trends in Archean and early Paleoproterozoic rocks, but are displaced by faults of the Grenville Front Tectonic Zone; hence they are younger than orogenic events in the Southern Province, but older than terminal stage docking of the Grenville Province against the Superior Province. The dike swarm appears to converge in trend towards a common point to the southeast; therefore, it is suggested that the swarm may be ascribed to a zone of spreading related to a hypothetical “Sudbury ocean” to the southeast. In an alternate explanation, the swarm may be related to the Grenville collision (Osmani, 1991).

In summary, the main tectonic events affecting the Southern Province in Ontario are:

1) mafic magmatism, rifting, volcanism and felsic magmatism, and continental margin sedimentation between 2.5 and 2.22 Ga,

2) mafic magmatism at 2.2 Ga,

3) Penokean orogeny at 1.89-1.85 Ga,

4) the Sudbury event at 1.85 Ga,

5) 1.75 Ga plutonism related to the Killarney Magmatic Belt,

6) regional K+Na metasomatism at 1.7 Ga,

7) felsic plutonism (and possible localized deformation) at 1.45 Ga,

8) continental extension and dike emplacement at 1.24 Ga

9) and localized effects of the Grenville orogeny at 1.0 Ga.

Grenville Front Tectonic Zone (taken from Murphy, 2001)

The Grenville Front tectonic zone forms the northernmost domain of the Grenville Province. It is a zone as much as 30 km wide and 2000 km long (in Canada); its boundaries (the Grenville Front and the Grenville Front Boundary Fault) are gradational and are defined by visible cataclastic zones, which extend into the adjacent Southern and Superior provinces.

Easton (1992) recognized three main zones within the Grenville Front tectonic zone in Ontario. In Segment 1, in the Killarney.Sudbury area, the dominant rock types are orthogneisses and minor paragneisses most likely derived from the Killarney Magmatic Belt. In Segment 2, which stretches from Sudbury to River Valley, the predominant rock types are para- and orthogneisses, as well as metagabbroic and meta-anorthositic bodies. Rocks in Segment 2 (which includes the Janes Properties) were most likely derived from the Superior and Southern provinces. Finally, Segment 3, which stretches from River Valley to the Ottawa River, consists mainly of ortho- and paragneisses most likely derived from the Superior Province.

All the rocks within the Grenville Front tectonic zone south and east of Sudbury have been subjected to high-grade regional metamorphism between about 1.3 and 1.0 billion years ago (Lumbers 1971, 1975) and, thus, were converted into coarsely recrystallized schists and gneisses.

The Grenville Front (Ess Creek Fault) and The Grenville Front Boundary Fault

The Grenville Front (Ess Creek fault) crosses the most southern claims on the Janes South Property. The Front, in the area south and east of Sudbury, has been defined as either a metamorphic transition or a discrete fault. Easton et al. (1996) suggested that in northeastern Street Township (west of Janes Township), the Grenville Front-Wanapitei fault is coincident with the Ess Creek fault located about 1 km to the north of the Grenville Front boundary fault. The Grenville Front boundary fault separates recrystallized and migmatized gneissic rocks of the Grenville Province from recrystallized schistose rocks of the Transitional Zone (Murphy, 2001). Alternatively, the Ess Creek fault may be the eastward extension of the Murray fault; in this interpretation, the Murray–Wanapitei fault and the Grenville Front have diverged. (Easton and Murphy, 2002)

Nipissing Gabbro (taken from Jobin-Bevans, 2009)

Regionally, although many of the Nipissing Gabbro intrusions have been somewhat metamorphosed and deformed, some of the intrusions are thought to have retained their primary morphologies, as reflected by the current outcrop patterns. These patterns include tabular intrusions, open-ring structures, and massive, irregular shaped bodies, and are interpreted to represent four main morphologies (Jambor 1971; Buchan et al. 1989): 1) undulating sills and dikes; 2) concordant homogeneous sills; 3) cone sheets or ring dikes; and 4) lopolith-like or thick, stock-like bodies. Horst-and-graben structures (block-faulting) also appear to play a major role in determining the stratigraphic level of a gabbro body, particularly in the areas southwest, south and east of Sudbury.

Many of the Nipissing Gabbro intrusions are less than 1000 m thick and occur as roughly horizontal sheets, as undulating sills (basins and arches) or as subvertical dikes (Hriskevich

1968; Jambor 1971; Conrod 1988, 1989). Disseminated to massive Cu-Ni-PGE sulphide mineralization, in these types of intrusions, is concentrated within the basin or limb portions, whereas pods of dominantly massive pyrrhotite occur within the arches. Much of the mineralization is associated with an orthopyroxene gabbro unit which is, in general, greater than 100 m in thickness (Lightfoot and Naldrett 1996; Jobin-Bevans et al. 1998, 1999). Arcuate and open-ring exposures of Nipissing Gabbro, described by Buchan et al. (1989) as cone sheets, comprise a third form of intrusion. These forms are distinguished by structural features in surrounding sedimentary rocks that suggest the gabbro intrusions were emplaced as shallow (< 50°), inward-dipping, cone-shaped bodies that are tens of metres to several hundred metres thick (Jambor 1971; Lovell and Caine 1970; Jobin-Bevans et al. 1998).

These types of intrusions contain disseminated and blebby sulphides hosted in orthopyroxene gabbro, occurring within a few hundred metres of the basal contact of the intrusions. The fourth type of intrusion, the lopolithic-like form (i.e., saucer-shaped), is rare and is interpreted to represent deeper "feeder" systems to the stratigraphically higher sill, dike and cone-sheet type of intrusions. These deeper exposures, which are fault bound on a regional scale, are thought to have been exposed through uplift along the bounding fault lines (Dressler 1979; Innes and Colvine 1984; Jobin-Bevans et al. 1998). In the lopolithic-like form, disseminated, semi-massive and massive sulphide mineralization is hosted by orthopyroxene gabbro within tens of metres of the footwall sedimentary rocks, and within topographic irregularities along the footwall contact.

Geochemical characteristics of Nipissing Gabbro intrusions have been described by several authors including Jambor (1971), Card and Pattison (1973), Conrod (1989), Rowell and Edgar (1986) and Lightfoot and Naldrett (1996). Rocks from the intrusions are dominantly tholeiitic and sub-alkalic, with evolved rock types and differentiated intrusions trending toward calc-alkalic affinities (Lightfoot and Naldrett 1996).

Based on the geochemical characteristics outlined above, and on outcrop patterns, the Nipissing Gabbro supposedly represents the intrusive portion of an eroded continental flood basalt. Magmas apparently cut through Archean basement rocks and sedimentary rocks of the Huronian Supergroup as dikes, then spread laterally through the Huronian rocks as sills (Lightfoot et al. 1986, 1987; Lightfoot and Naldrett 1996).

4.2 Property Geology (after Jobin-Bevans (1998), Easton (1998) and Butler (2009))

The Janes and Janes South properties are underlain by Nipissing Gabbro and sediments of the Huronian Supergroup (Fig. 4).

The Nipissing gabbro has inward-dipping lower contacts that might define an original lopolith. Called the Chiniguchi River intrusion, this Nipissing body hosts Ni-Cu- PGE mineralization at the Main Showing. Irregularities in an undulating footwall contact may be of consequence in the localization of mineralization. Previous mapping has shown a crude change from fine-grained gabbro to the west to a medium-grained hypersthene gabbro, medium-to coarse-grained leucocratic gabbro and coarse-grained to pegmatitic and vari-textured gabbro in the east. Gabbro units to the east contain more modal quartz. Furthermore, hypersthene gabbro, the host rock to much of the known mineralization is recognized in outcrop to occur within ~150 m of the basal contact with Gowganda Formation sediments and the hypersthene gabbro occurs within ~75 to100 m of the basal contact. All units show the effects of greenschist facies regional metamorphism. Metamorphic mineral assemblages in Nipissing gabbro on the properties include chlorite, albite, epidote and saussurite after plagioclase as well as chlorite and actinolite after pyroxene - these effects are more obvious in leucocratic phases. Minor biotite occurs in some gabbro but it is uncertain whether the mineral is a primary magmatic or a secondary metamorphic phase. The Nipissing gabbro rocks are massive to locally deformed and altered near the Grenville Front.

A large portion of the property is underlain by Cobalt Group rocks. The Group is divided into two major units: the Gowganda Formation (the most prominent rock type on the properties), and the Lorrain Formation (occurs to the west of the properties). These rest unconformably on (and locally truncate) earlier strata of the Hough Lake Group, and can

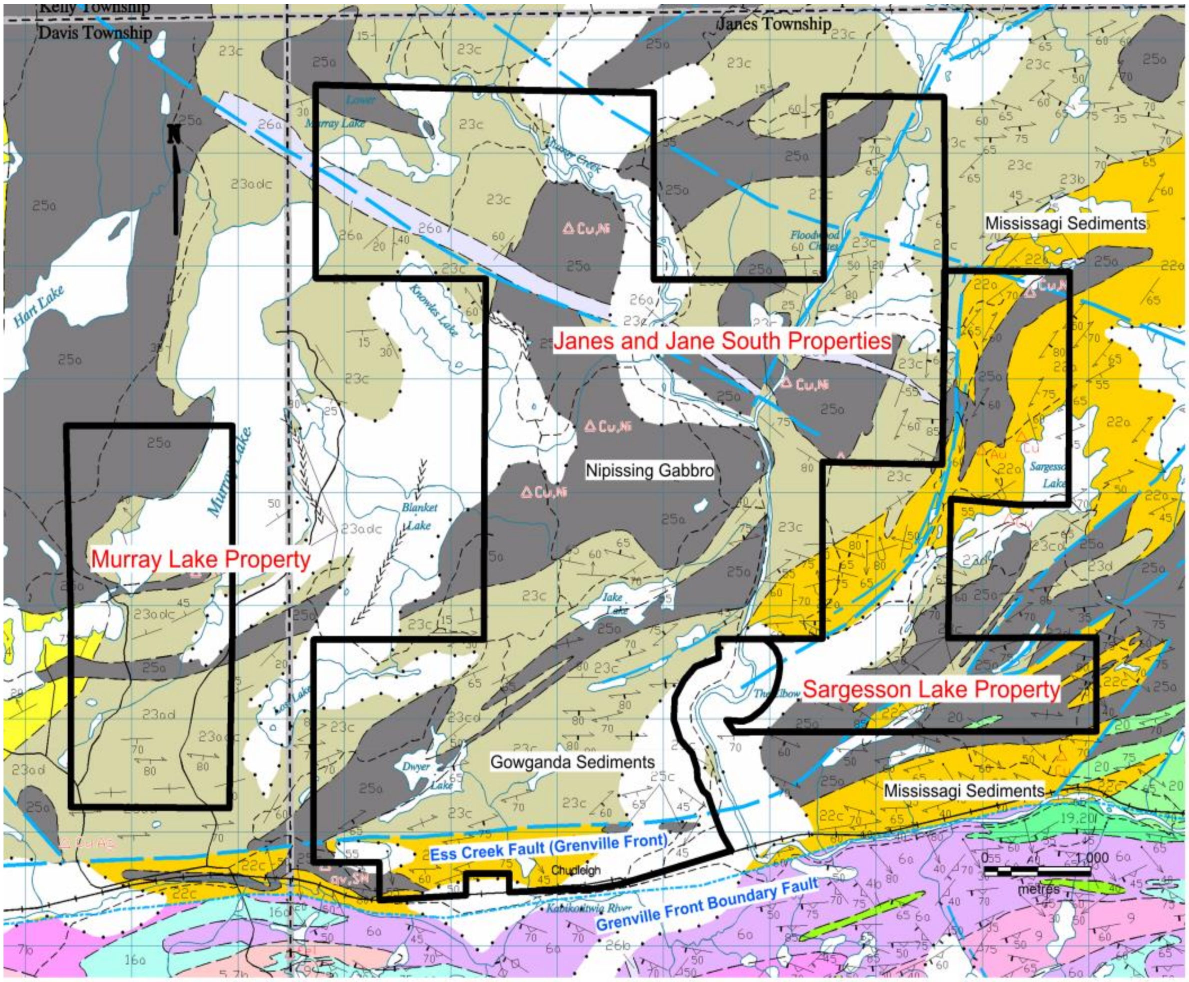

Figure 4: Property Geology

be found directly overlying Archean basement north of the Sudbury Basin. The Gowganda Formation is characterized by a heterogeneous sequence of framework- and matrix

supported conglomerate (including diamictites), sandstone, siltstone and mudstone with marked vertical and lateral facies changes. Regionally, matrix-supported conglomerates and laminated mudstones with dropstones are more abundant at the base of the sequence. Interbedded sandstone and mudstones are more common in the upper parts of the formation. Conglomerate units (Ramsey Lake, Bruce and Gowganda Formations) in each of the cycles have been interpreted as being glaciogenic in origin (e.g. Junnila and Young 1995, Fralick and Miall 1989), likely deposited in a marine environment adjacent to an ice shelf. The siltstone and sandstone units are interpreted to represent deposition during warmer intraglacial or post-glacial periods in either fluvial or marine environments (e.g. Junnila and Young 1995, Fralick and Miall1989). Part of the evidence for climatic regimes is geochemically-based (e.g. Nesbitt and Young 1982, Fedo et al. 1997b), with the glaciogenic units having a higher percentage of unweathered rock debris compared to the units deposited in the post-glacial intervals. The basal sequence (Coleman member) was deposited beneath a continental ice sheet, while the upper sequence (Firstbrook member) represents a prodeltaic facies equivalent of the Lorrain Formation (Long and Leslie 1986).

Only minor portions of the properties are underlain by Mississagi formation rocks of the Hough Lake Group. The Hough Lake Group basal contact is an erosional discontinuity that can be traced throughout the region and may represent a major sequence boundary. The Mississagi Formation is between 1600 and 3400 m thick and has a patchy distribution in the southern Cobalt Embayment due to erosion beneath younger formations, and significant relief at the base of the formation (Long 1987). It is characterized by medium- to coarse-grained sandstone of arkosic to subarkosic composition. Conglomeratic and argillitic strata are present locally near the base of the formation north of Lake Wanapitei, where the formation can be divided into an upper (sandstone dominated) and lower (conglomerate bearing) member (Long 1976, 1978, 1987). The formation is predominantly fluvial in origin, and was deposited from shallow braided rivers that flowed from a series of tributary basins in the Cobalt Embayment (Long 1987). These rocks consist mostly of quartz sandstone and arkose. Rocks on the southern two claims just north of the Grenville Front are highly deformed and have been interpreted by Dressler (1979) to be Mississagi formation.

Late NW-striking olivine diabase dike, part of the Sudbury dike swarm, crosses the Janes and Janes South properties. The dikes are generally 15 to 30 m thick and are most abundant in the Sudbury area. They dip vertically, weather recessively, and are generally marked by narrow linear valleys. Most of the dikes are olivine tholeiites, and composed of plagioclase (60%), olivine (15%), titaniferous augite (12%), magnetite-ilmenite (5 to

10%); with minor amounts of chlorite and biotite. The dikes are medium to coarse grained, with ophitic to subophitic textures. (Osmani, 1991). These dikes are thought to follow major regional structures.

5.0 2016 PROGRAM

5.1 Methods

In 2015 a reconnaissance geological mapping, prospecting and sampling program on the Janes and Janes South properties was completed. The 19-day program occurred between September and December, 2015 and was performed by North American Palladium Ltd.

The focus of the program was the ground truthing of HELITEM EM anomalies outlined from a previous airborne geophysical survey performed for North American Palladium Ltd. in 2015. A total of 21 samples were collected. The analytical results will be presented in a separate report.

6.0 RESULTS and CONCLUSIONS

The main rock types mapped and sampled during the 2015 program were Nipissing gabbro, Gowganda conglomerate/greywacke and Olivine Diabase. A total of 21 samples were collected and are described in Table 4.

Table 5: 2015 Sample Locations and Descriptions

Sample	Easting	Northing	Anom	Description
NAP001	545478	5172397	P16	Gabbro, medium to coarse grained
NAP002	545436	5172301	P16	Olivine Diabase, medium grained, weak to moderately magnetic
NAP003	545338	5172307	P16	Gabbro, fine to medium grained, 25% plagioclase, locally magnetic
NAP004	545343	5172298	P16	Gabbro, non-magnetic
NAP005	545591	5172179	P16	Gabbro, medium grained, moderately magnetic, contact zone with fine grained gabbro to NW
NAP006	545593	5172166	P16	Gabbro, fine grained, 1-2mm epidote veinlets, tr py
NAP007	545605	5172163	P16	Gabbro, fine grained, non-magnetic
NAP008	545616	5172170	P16	Gabbro, fine grained, melanocratic, multiple joints, tr to minor py, cpy?
NAP009	545624	5172185	P16	Gabbro, fine grained, melanocratic, locally weakly magnetic
NAP010	546632	5171140	P18	Gabbro, non-magnetic
NAP011	546602	5171123	P18	Gabbro, medium grained, magnetic
NAP012	546459	5171106	P18	Gabbro, medium grained, magnetic, possibly Olivine Diabase dike
NAP013	546435	5171154	P18	Wacke, coarse grained, possibly cooked
NAP014	546434	5171161	P18	Greywacke, fine grained, tr to minor py
NAP015	547099	5170578	P21	Gabbro, weakly sheared
NAP016	547089	5170551	P21	Gabbro, fine to medium grained, massive
NAP017	547128	5170567	P21	Gabbro, near sediment contact trending 140/70
NAP018	546289	5166041	P17	Greywacke, siliceous, fine grained, rounded felsic clasts 2-5mm
NAP019	546529	5166038	P17	Greywacke, clasts up to to 2cm
NAP020	547059	5166081	P20	Greywacke, fine grained, siliceous. 10% angular to sub-rounded mixed clasts
NAP021	546989	5166239	P20	Greywacke/sandstone, siliceous, rounded clasts 0.5-1.0mm, tr py

7.0 RECOMMENDATIONS

The following recommendations can be made based on the 2015 program on the Janes and Janes South Properties:

- More follow-up reconnaissance mapping and sampling are required on all HELITEM EM anomalies followed by diamond drilling of select anomalies

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Appendix I

Statement of Qualifications

I, Randy I. Stewart, B.Sc. of 213 Kingsmount Boulevard, Sudbury, Ontario, P3E 1L1, do hereby certify that:

I graduated from the Mining Engineering Technician program at Cambrian College of Applied Arts and Technology, Sudbury, Ontario, in 2002.

I graduated with a Bachelor of Science Degree (Honours) in geology in 1991 from the University of Waterloo, Waterloo, Ontario.

Randy Irwin Stewart

November 20, 2016
Sudbury, Ontario

Statement of Qualifications

I, Brian James Wright, of 92 Main Street, Markstay, Ontario, P0M 2G0, do hereby certify that:

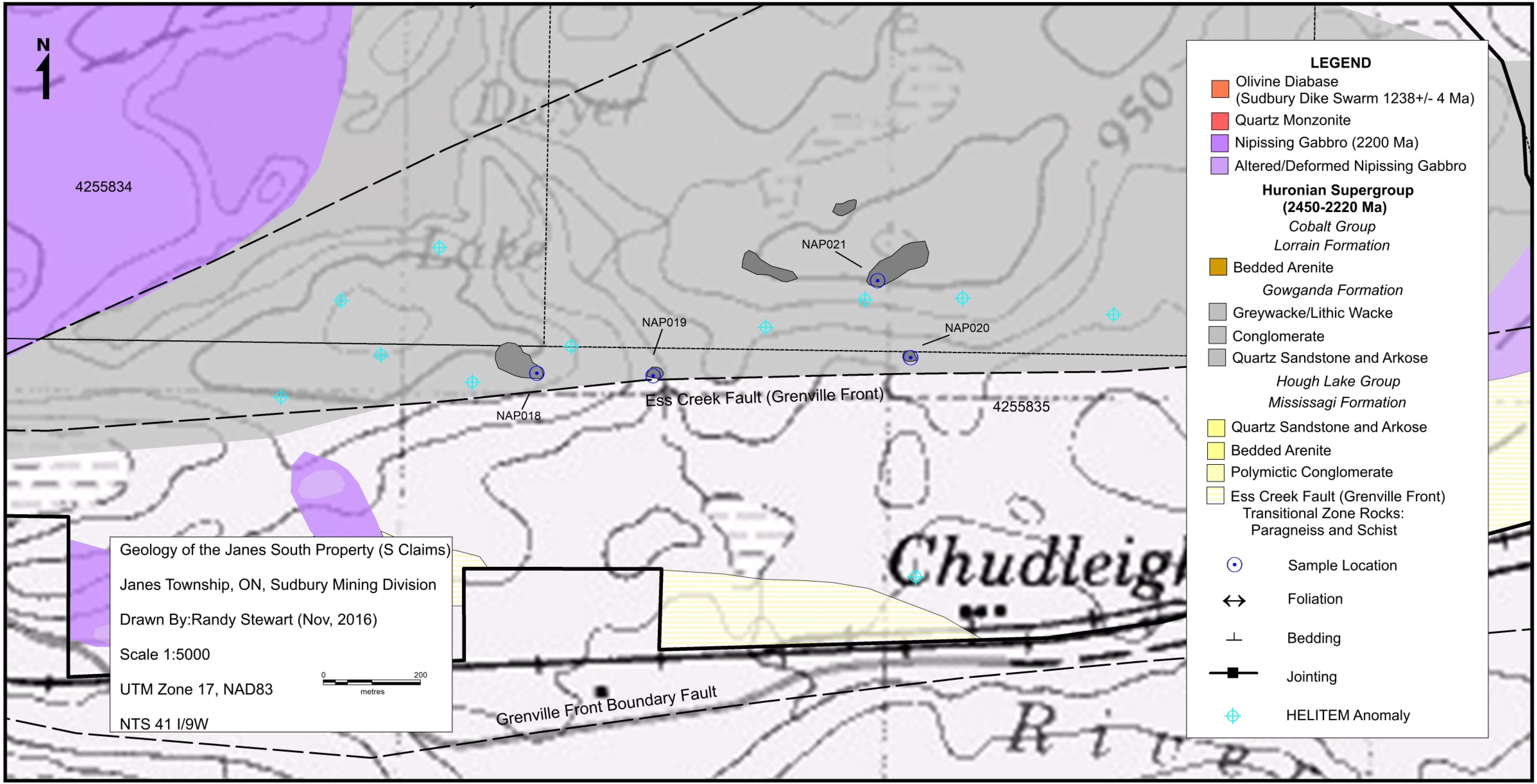
I am a Geological Technologist receiving my education from Haileybury School of Mines.

I have been actively involved in Mining and Exploration for 28 years.

Brian James Wright

November 20, 2016
Markstay, Ontario

LEGEND
Olivine Diabase (Sudbury Dike Swarm 1238+/- 4 Ma)
Quartz Monzonite
Nipissing Gabbro (2200 Ma)
Altered/Deformed Nipissing Gabbro
Huronian Supergroup (2450-2220 Ma)
Cobalt Group
Lorrain Formation
Bedded Arenite
Gowganda Formation
Greywacke/Lithic Wacke
Conglomerate
Quartz Sandstone and Arkose
Hough Lake Group
Mississagi Formation
Quartz Sandstone and Arkose
Bedded Arenite
Polymictic Conglomerate
Ess Creek Fault (Grenville Front) Transitional Zone Rocks: Paragneiss and Schist
Sample Location
Foliation
Bedding
Jointing
HELITEM Anomaly
N
NAP001
NAP002
NAP003
NAP004
NAP005
NAP006
NAP007
NAP008
NAP009
NAP010
NAP011
NAP012
NAP013
NAP014
NAP015
NAP016
NAP017
4271860
4271852
1220221
1230296
900
Geology of the Janes Property (NW Claims)
Janes Township, ON, Sudbury Mining Division
Geology By:Richard Kowalski and David Benson
Drawn By:Randy Stewart (Nov, 2016)
Scale 1:5000
UTM Zone 17, NAD83
NTS 41 I/9W
0
200
metres
Scale: 1:5,000



N
4255834
4255835
NAP018
NAP019
NAP020
NAP021
Ess Creek Fault (Grenville Front)
Grenville Front Boundary Fault
Chudleigh
950
Geology of the Janes South Property (S Claims)
Janes Township, ON, Sudbury Mining Division
Drawn By:Randy Stewart (Nov, 2016)
Scale 1:5000
UTM Zone 17, NAD83
NTS 41 I/9W
0
200
metres
LEGEND
Olivine Diabase (Sudbury Dike Swarm 1238+/- 4 Ma)
Quartz Monzonite
Nipissing Gabbro (2200 Ma)
Altered/Deformed Nipissing Gabbro
Huronian Supergroup (2450-2220 Ma)
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Gowganda Formation
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Hough Lake Group
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Quartz Sandstone and Arkose
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Polymictic Conglomerate
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Foliation
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Jointing
HELITEM Anomaly