

**Albany Project - Block 4E**  
**Porcupine Mining District, Ontario**  
**2015 Assessment Drilling Report**  
*Nagagami River Area*  
*NTS: 42K/01*



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## 1.0 SUMMARY

This report summarizes Zenyatta's 2015 Albany Project drilling program on the **Block 4E** claims, located in the James Bay Lowlands area (see Figures 1 and 2) of Northern Ontario, Canada. This program was initiated to explore for copper (Cu), nickel (Ni), platinum group elements (PGEs), graphite (C) mineralization and possibly kimberlite. One hole was drilled to investigate a moderate electromagnetic (EM) conductor which was initially identified by a 2010 helicopter-borne Electromagnetic (VTEM) and Magnetic Geophysical Survey, flown by Geotech Ltd. (Geotech).

The Albany 4E claim block (Figure 3) is located within in the Porcupine Mining District and is presently held by Zenyatta Ventures, with Cliffs Natural Resources Exploration Canada Incorporated (CNRECI) as a partner. The claims are part of Zenyatta's larger non-contiguous group of Albany Project claim blocks, all located in the James Bay Lowlands, under an agreement with CNRECI and Zenyatta Ventures.

In the James Bay Lowlands region, the geology consists of Paleozoic limestones and sediments overlying the Precambrian basement rocks, which could host massive sulphide (Cu, Ni, PGMs) mineralization. The region's Precambrian geology has been interpreted by Ontario Geological Survey (OGS) geologist Greg Stott (Stott et. al., 2007). Stott interpreted the geology based on government airborne geophysical surveys and geology intersected from a small number of exploratory drill holes in the area. Stott grouped the Precambrian basement rocks into separate terranes and basins. Other government surveys include regional airborne geophysical surveys covering the James Bay Lowlands area. In Block 4E area, previous exploration activity has been limited over the years. A few documented assessment files available from the Ministry of Northern Development and Mines (MNDM) include airborne and ground magnetometer surveys which were followed up with diamond drilling in the 1960s by Algoma Ore Properties Limited.

In 2010, Zenyatta contracted Geotech to conduct an airborne magnetic and electromagnetic (VTEM) geophysical survey on 28 non-contiguous Albany Project claim blocks. Results of the airborne survey outlined several magnetic and EM geophysical anomalies that prompted Zenyatta's Phase I (2011) reconnaissance drilling program totaling 26 diamond drill holes on eight claim blocks. In 2012, the Phase II program included nine drill holes all targeting the Albany graphite deposit within Zenyatta's 100% owned Block 4F. A follow-up detailed drilling program in 2013 included drilling 47 diamond drill holes on the Albany Graphite Deposit and the results of this program are described in a NI43-101 technical report (Ross and Masun, 2014). Also in 2013, Zenyatta contracted Geotech Limited to perform a higher powered VTEM Max survey over newly staked claims (Block 4F Extension) to the north of Albany Block 4F.

Zenyatta's 2015 drilling program in Block 4E included drilling one hole, Z15-4E1, which was planned to target a circular, moderately conductive electromagnetic (EM) anomaly. The target is briefly described Section 2.0. The total metreage drilled was 624.8 metres. Results from the drill program were disappointing as it failed to define any significant mineralization. Consequently, no core samples were collected for geochemical assaying and further exploration work on Block 4E claim group is not warranted.

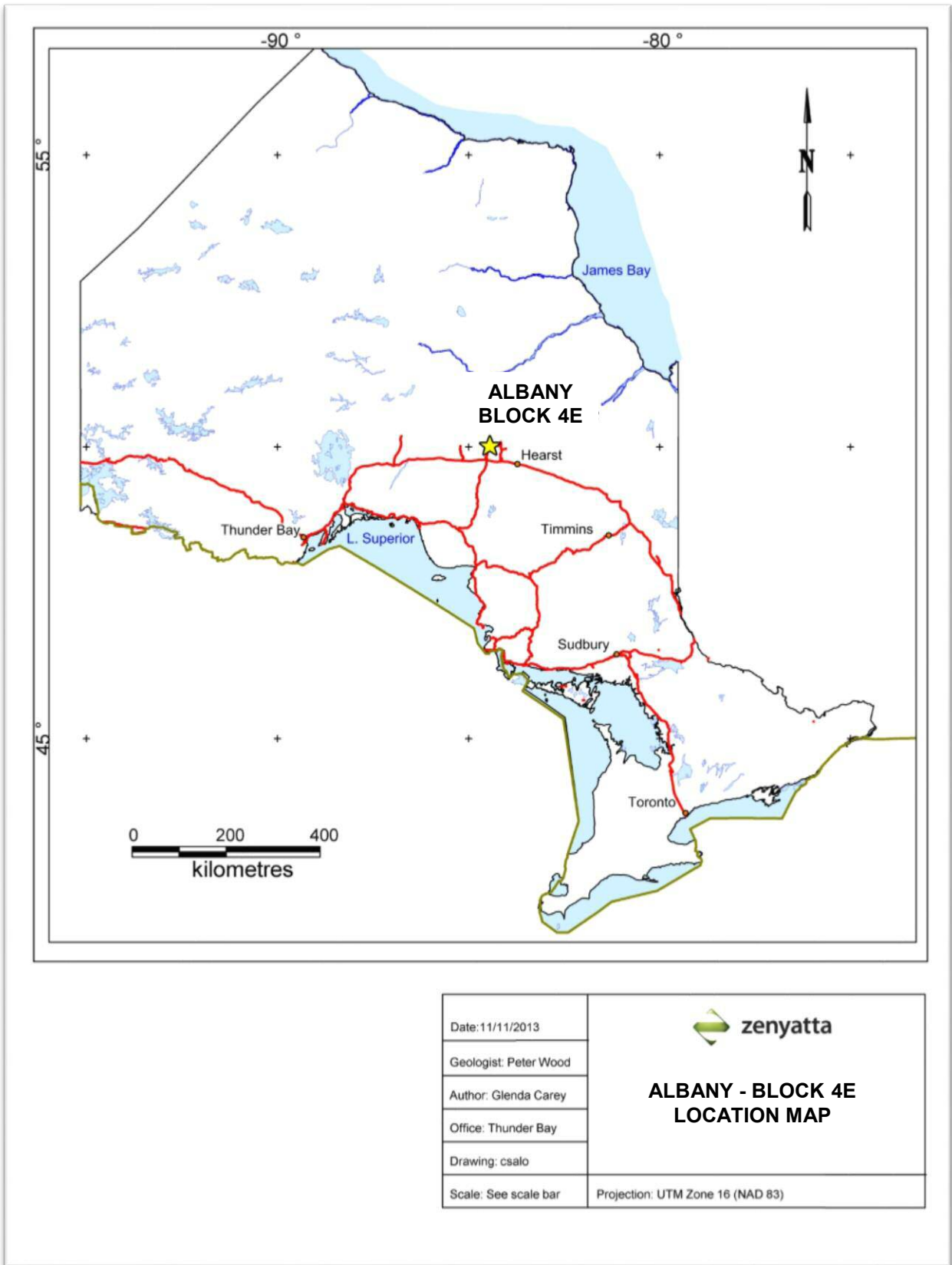


Figure 1: Albany Project Location Map

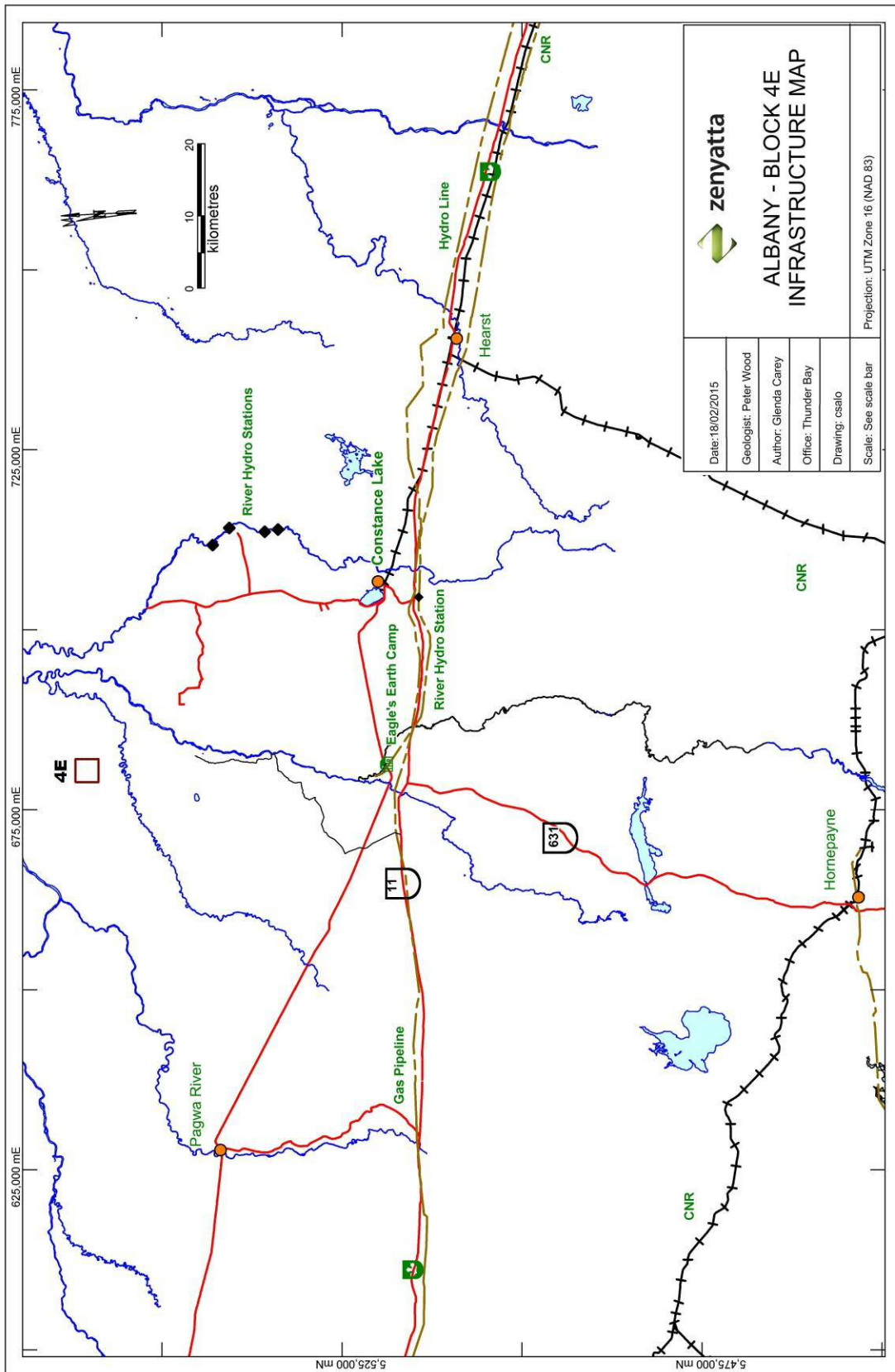


Figure 2: Albany Project - Block 4E Location and Local Infrastructure Map

## 2.0 INTRODUCTION

The 2015 reconnaissance drilling program was initiated to test an airborne electromagnetic (VTEM) geophysical anomaly on Albany Project Block 4E. The Block 4E claims are located in the James Bay Lowlands Region of Northern Ontario (see Figure 3), approximately 45 km north of Highway 11 and 75 km northwest of the town of Hearst. Zenyatta's Albany Block 4E claims are approximately 8 km north of Block 4F.

### **Target 4E-01:**

The purpose of the drilling was to test a VTEM Max anomaly first identified in a 2010 Geotech survey (837,450 NIA dipole moment and 218 A peak current) and better defined in a subsequent 2013 airborne VTEM Max survey which utilized a much higher powered system (1,600,000 NIA dipole moment and 420 A peak current). Maxwell modelling suggested that the conductive target was located at approximately 310 m downhole with a shallow dip to the north (see Appendix 1) and located within claim #4262509.

The drilling commenced on January 31, 2015 and was completed on February 8, 2015. A total of 624.8 m were drilled, but no significant sulphide (Cu, Ni, Pt-Pd) mineralized zones, significant graphitic (C) breccia zones or kimberlite were intersected or observed. It was decided by Zenyatta geologists not to collect any core samples for geochemical assaying for DDH Z15-4E1.

The VTEM anomaly was explained, most likely by the discrete hairline fracture-filling graphite veinlets. The first fracture-filling veinlet was intersected at 175.95 m. From 312.75 m to 313.00 m the drill hole intersected three subparallel hairline fracture-filling veinlets (conductivity values up to 1500 s/m), oriented at 25° to 30° to core axis. Additional hairline fracture-filling graphite veinlets were intersected further downhole from 329.00 m to 343.10 m. These graphitic veinlets, if laterally extensive, could likely explain the conductor detected by both VTEM Max surveys.

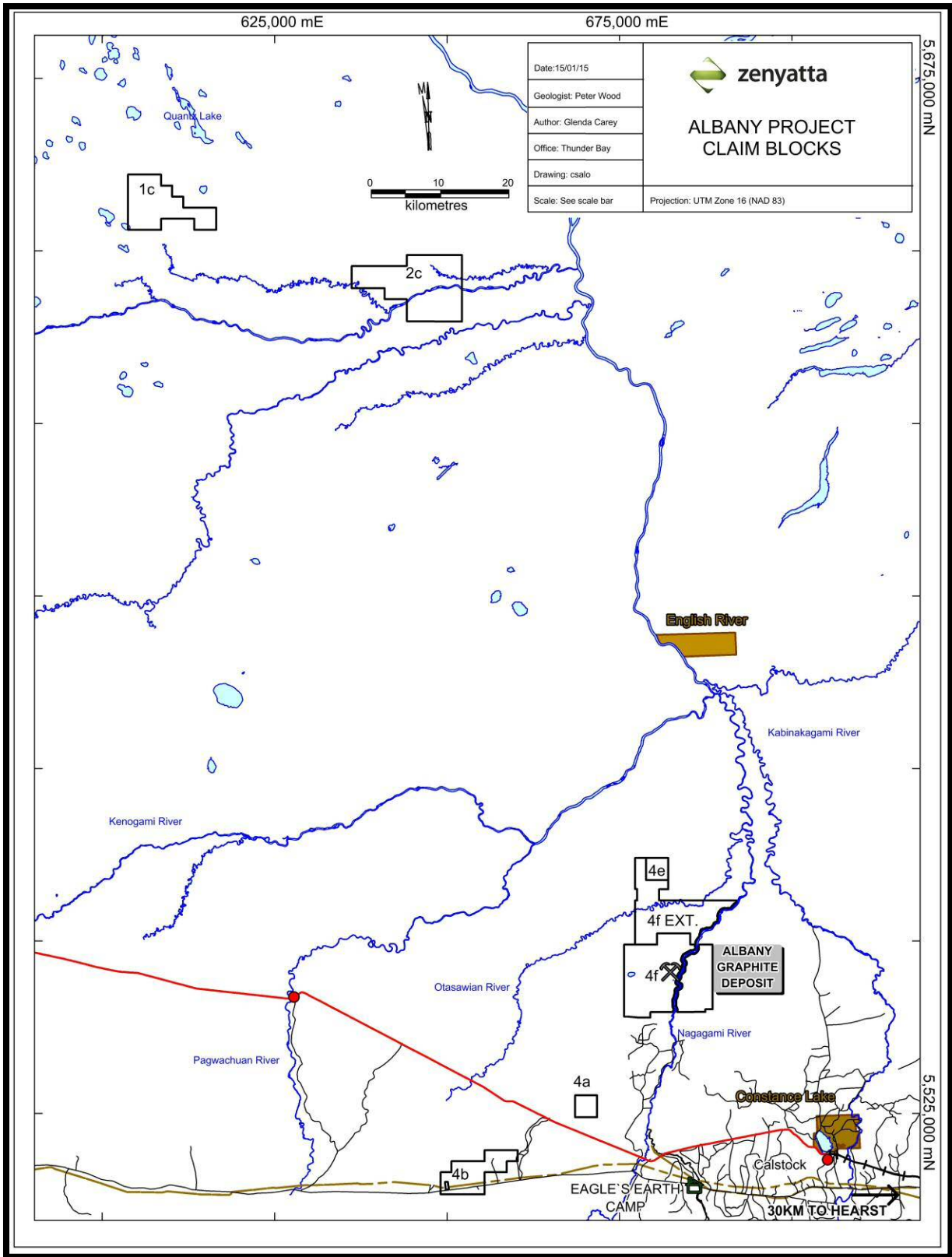


Figure 3: Albany Project - Claim Blocks Map



### 3.0 PROPERTY DESCRIPTION – BLOCK 4E

The Albany Project **Block 4E** claim group is located north of Lake Superior and southwest of James Bay in northwestern Ontario, Canada. All of the Block 4E claims are located in the Nagagami River Area Township and within NTS block 42K/01. From 2009 to February 2013, the claim blocks were part of a larger group (28 blocks) of claims that made up the Albany Project, but most of these original Albany blocks have been dropped. Presently, the Albany project includes **Block 4E** and five other claim blocks: **1C, 2C, 4A, 4B and 4F**, totaling 6 claim blocks in the James Bay area.

Albany Block 4E (Figure 4) has a total of **4 claims, 64 claim units**, and covers **1024 hectares**. The yearly work required costs to keep the entire claim group in good standing amounts to **\$25,600**. All of the claims were staked during the late summer of 2013. The Block 4E property is not subject to any known environmental issues and no abandoned mine workings or tailings are present on the property. The surface rights are owned by the crown. Table 2 lists the entire Block 4E claims and claim status.

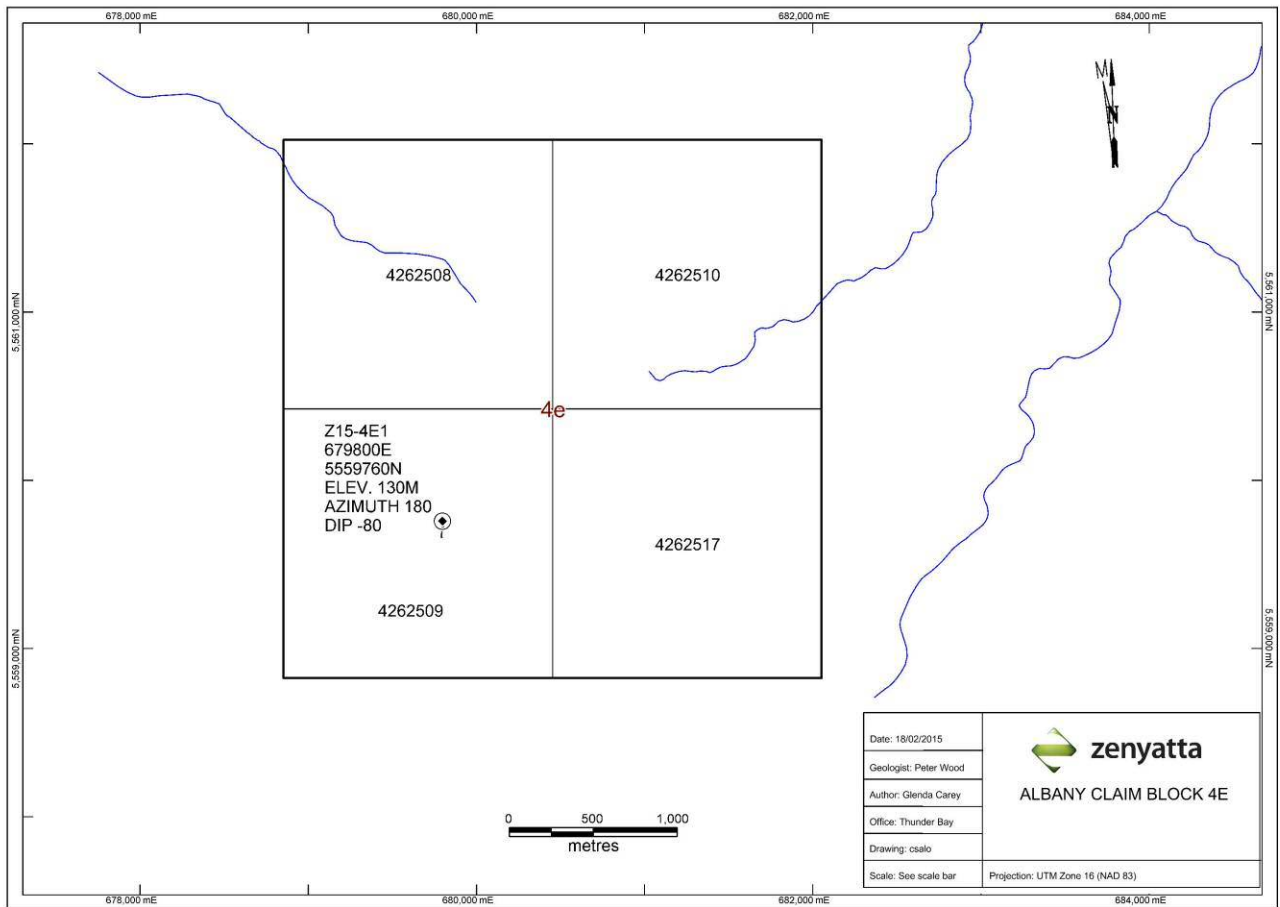
At the time of Zenyatta's Initial Public Offering (IPO) in December 2010, the Albany claims were 25% owned by Zenyatta and 75% owned by CNRECI, an affiliate of Cliffs Natural Resources Inc. (Cliffs), as defined by the 2010 Amended Albany Option and Joint Venture Agreement. The majority of these claims were staked during the summer and fall of 2009, followed by additional staking in the winter and spring of 2010. The original Block 4E claims were allowed to lapse in February 2013, but four claims on the west end were re-staked in August 2013.

In November 2012, Zenyatta reached an agreement with CNRECI and acquired 100% ownership of Claim Block 4F. Prior to this date and according to the agreement, Zenyatta had already exercised its right and acquired an 80% interest in Claim Block 4F by having spent a total of \$10 million on exploration on the larger group of Albany Project claims. After acquiring Cliffs' remaining 20% interest in the Claim Block 4F, Zenyatta now holds a 100% interest. Additionally, in order to exercise the Second Option and earn an 80% interest on the remaining Albany Property claims Zenyatta must drill not less than 3,000 m on the other claims (blocks 3A, 3B and 4E; 3A & 3B have since been dropped) by December 31, 2014. A total of 2384.23 metres were drilled on 3A and 3B in November and December, 2013 leaving a minimum of approximately 616 m remaining to be drilled on Block 4E. It should be noted that Cliffs granted Zenyatta a three month extension beyond the December 31, 2014 deadline in order to complete the required drilling.

The Block 4E claim group is located in Constance Lake First Nations' (CLFN) Traditional Territory. On July 18, 2012, Zenyatta and CLFN announced that they had signed an Exploration Agreement for a mutually beneficial and co-operative relationship regarding exploration and pre-feasibility activities on the Albany Project. Among other things, CLFN will participate in an implementation committee and receive, along with certain other First Nation communities, preferential opportunities for employment and contracting. Zenyatta also agreed to contribute to a social fund for the benefit of CLFN children, youth, and elders.

**Table 1: Zenyatta/CNRECI Block 4E Claim Status**

<b>ALBANY CLAIM STATUS - BLOCK 4E - 2015</b>							
<b>Claim #</b>	<b>Block #</b>	<b># Units</b>	<b>Hectares</b>	<b>Recorded Date</b>	<b>Due Date</b>	<b>Work Required</b>	<b>Ownership</b>
4262508	4E	16	256	Aug. 21, 2013	Aug. 21, 2015	\$6,400	Zen/CNRECI
4262509	4E	16	256	Aug. 21, 2013	Aug. 21, 2015	\$6,400	Zen/CNRECI
4262510	4E	16	256	Aug. 21, 2013	Aug. 21, 2015	\$6,400	Zen/CNRECI
4262517	4E	16	256	Aug. 21, 2013	Aug. 21, 2015	\$6,400	Zen/CNRECI
<b>4</b>		<b>64</b>	<b>1024</b>			<b>\$25,600</b>	



**Figure 4: Albany Project - Block 4E Claim Map**

#### **4.0 LOCATION, ACCESS, & TOPOGRAPHY**

Zenyatta's Albany Block 4E claims are situated within the Porcupine Mining District of northeastern Ontario, Canada. All of the Block 4E claims are located in the Nagagami River Township area. The claims are unpatented and contiguous, and are situated within NTS block 42K/01. The approximate central area of the 4E claim block is located at UTM coordinates: 680457E, 5560435N, Zone 16, NAD 83.

The Block 4E claims are situated approximately 44 km north of Highway 11 and 78 km northwest of the town of Hearst, population of 5825 (see Figure 2). Access to the 4E claim block is best gained by helicopter, but boat or canoe may be used in along the Nagagami River and then via Otasawian River which comes within 1.5 km of the southern boundary of the property. The town of Hearst has many facilities to keep an exploration camp well supplied. These include hotels, restaurants, a hospital, hardware stores, gas stations, and a mining supply store. Float plane and helicopter services are also available in Hearst. Mining personnel, equipment, and supplies can also be accessed from Timmins, a major mining and exploration centre. There is currently no permanent infrastructure on the Property. The nearest airport is in Hearst, approximately a one hour drive by car. The Timmins airport with scheduled flights is approximately four hours away by road.

The claims are situated within the Hudson Bay-James Bay Lowlands area where the topography is essentially flat, low-lying and swampy. Previous drilling indicates that overburden ranges from 143 m up to 200 m thick in the area with no outcrop exposure. There are many creeks flowing between peat bogs throughout the area. Vegetation is dominated by wetlands with some areas of spruce and alder trees, and cedar swamps. Spruce and alder trees are also abundant along the banks of the Nagagami River and other smaller rivers.

Various climates and weather extremes occur in this region of northern Ontario. Most of the region has a continental climate with warm to hot summers (June, July and August; 25°C to 35°C) and cold winters (December to March, 10°C to -30°C with lows down to -45°C). Spring and autumn tend to be short seasons and have some of the weather of winter and summer. Annual precipitation ranges from 600 mm to 900 mm. Generally, surface exploration work can be carried out during the months of May to November, possibly later if there is no snow accumulation. Airborne or ground geophysical surveys and diamond drill programs can be conducted year round.

## 5.0 HISTORICAL WORK

Zenyatta's current Albany Project includes a total of six claim blocks. The ground was selected based on geophysical information from OGS airborne magnetic maps, the geological interpretation of these maps (Stott, 2007-2008), and additional geological and geophysical data from historical exploration reports provided by the MNDM office in Timmins. Historical exploration work has been limited in this area and mostly consists of geophysical surveys and a few drilling projects. The following is a brief summary of the reported historical exploration work carried out in the area of Block 4E:

**1961: Algoma Ore Properties Limited** flew an airborne magnetic survey in the Nagagami River and Pitopiko Townships area. The survey outlined a horseshoe-shaped anomaly which was confirmed on the ground in the same year. This led to further exploration in 1963.

**1963: Algoma Ore Properties Limited** flew an airborne magnetometer survey in the Nagagami River area. The survey was flown by Hunting Survey Corporation and results indicated two large low intensity circular shaped anomalies (Anomalies #1 and #2) underlying the Paleozoic limestones. Interpretation of the anomalies inferred that they were caused by a complex syenitic to gabbroic intrusion. It was reported that Anomaly #1 could be associated with a basic intrusion hosting magnetite, and was thought to be mildly interesting for iron ore, niobium and sulphides. Anomaly #2 was interpreted to be associated with an alkaline and carbonatite complex and could contain columbium and other rare earth elements (REEs). Algoma recommended follow-up work to include a ground magnetometer survey over the anomalies and a diamond drill program (Venn, 1964).

**1964 - 1967: Algoma Ore Properties Limited** continued exploration in the Nagagami River area. Ground work involved grid cutting followed by a ground magnetometer survey and claim staking. Algoma drilled nine holes for a total of 4,868 feet (264.6 m). Holes 1-64 to 7-64 were drilled to the northeast of Block 4F. Two holes were drilled in Anomaly #2 (DDH's: 8-64 and 9-64) and reported to be located just north of Zenyatta's Block 4F. The drill core was sampled, and petrographic studies were also conducted. The core was tested with a scintillometer, and samples were taken where radioactive responses occurred; assay results indicated columbium ( $Cb_2O_5$ ) content to be 0.02% to 0.04%. Drilling on Anomaly #2 intersected coarse syenite rock with 3-5% magnetite. It was concluded that the ground magnetometer survey and the diamond drilling verified the airborne survey fairly well, and although drilling did not intersect any ore minerals, the structure was still geologically interesting. Algoma reported that minerals of economic potential could possibly be associated with other parts of the structure and they recommended that the property be referred to other companies interested in intrusive structures (Venn, 1964).

**1999:** The **Ontario Geological Survey (OGS)** released aeromagnetic geophysical maps for the Hudson Bay and James Bay Lowlands areas, *Geophysical Data Set 1036* (see Figure 5 for Block 4E area).

**2008:** The **Ontario Geological Survey (OGS)** Precambrian Geology Map P.3599 was published: *Hudson Bay and James Bay Lowlands Region Interpreted from Aeromagnetic Data*, G.M. Stott, 2007–2008 (see Figure 6 for Block 4E area).

**2010 to 2012:** Exploration work conducted by **Zenyatta Ventures Limited** includes the initial 2010 helicopter-borne geophysical survey (VTEM Max and magnetometer) which identified airborne EM and magnetic anomalies. Follow-up drilling in Block 4F during the fall of 2011 included one drill hole (Z11-4F1) which intersected several mineralized zones of graphitic breccia. In 2012, Zenyatta continued with a Phase II diamond drill program and drilled eight more holes (Z12-4F2 to Z12-4F9) on the graphite deposit and intersected additional graphite mineralized zones.

**2013:** Exploration work in Block 4F conducted by **Zenyatta Ventures Limited** included a large loop surface DPEM survey by Crone Geophysics and Exploration Ltd. The survey confirmed the presence of two discrete breccia pipes and was used to plan the resource drill program. Between March and November 2013, Zenyatta drilled a total of 54 holes totalling 22,463 m (Z13-4F10 to Z13-4F57 and Z13-4FM01 to Z13-4FM06) in the graphite deposit area which is located approximately 14 km to the southeast of the 4E block. Also in 2013, Geotech performed a higher powered VTEM Max survey over the newly staked claims to the north of 4F which included the block 4E claims.

## 6.0 GEOLOGICAL SETTING

### 6.1 Regional Geology

The following are excerpts from Stott's (2007-2008) "Marginal Notes", Map P3599, describing the interpreted Precambrian Geology of the Hudson Bay and James Bay Lowlands Region:

"The relatively flat-lying Hudson Bay and James Bay Lowlands, consist mostly of carbonates of Paleozoic to Mesozoic age. These sediments cover a significant portion of the Precambrian rocks of Northern Ontario and therefore, have impeded the understanding of the Precambrian geology and the tectonic framework across this region of Ontario. The region's Precambrian geology is based mainly on available reprocessed aeromagnetic data and limited drill hole information. The results provide a general framework of interpreted supracrustal belts, plutonic subdivisions, major faults and Proterozoic mafic dikes" (see Figure 5).

"In the James Bay Lowland area, the most significant feature is the aeromagnetic expression of the Uchi domain greenstone belts, along the southern flank of the Sachigo superterrane trending northeast under the James Bay Lowland and wrapping around the eastern end of the Island Lake domain, a portion of the Sachigo superterrane. This greenstone trend merges with the Oxford–Stull domain near the western margin of the James Bay Lowland just east of the McFaulds Lake massive sulphide deposits. This combined array of Neoproterozoic greenstone belts continues east, narrowing under the James Bay Lowland, towards the Eastmain greenstone–granite domain in Quebec."

"The Northern Superior superterrane forms a 1000 km long band of distinctively strong magnetic intensity. A marked magnetic discontinuity can be traced eastward roughly midway under the Hudson Bay Lowland between a region of high magnetic relief and complexity that characterizes the Northern Superior superterrane to the south and a region of relatively flat magnetic character that more closely resembles the magnetic signature of the Trans-Hudson Orogen. However, a significant portion of the interpreted Trans-Hudson Orogen resembles an extension of the Northern Superior superterrane and is interpreted as an area of Archean crust that was overprinted by the Trans-Hudson Orogen. The Sutton Inliers have been reinterpreted by comparing the aeromagnetic data and the outcrops mapped by Bostock. Current regional geology maps of Ontario portray the Sutton Inlier as a single large mass. This new interpretation recognizes a set of ridges forming several crescent-shaped inliers that dip shallowly northward. They appear to be discontinuously related to similar narrow, folded magnetic anomalies within the Trans-Hudson Orogen under the Paleozoic rocks closer to the Hudson Bay coast."

"The Island Lake domain is largely plutonic with some Mesoproterozoic to Neoproterozoic volcanic belts with geophysical characteristics that show some relationship to the belts within the North Caribou Terrane. The boundaries of the Island Lake domain are probably the least understood and remain the most contentious. At the northern margin of the Sachigo superterrane, the narrower, ribbon-like Oxford–Stull domain (OSD) stretches from Manitoba to the James Bay Lowland (see Figure 4). The OSD displays some evidence of Mesoproterozoic mid-ocean ridge basalt (MORB)-like sequences concurrent with continental magmatic growth within Northern Superior superterrane and NCT margins to the north and south, respectively. At the edge of the

James Bay Lowland in Ontario, the Oxford-Stull Domain includes a calc-alkaline metavolcanic sequence containing volcanic-hosted massive sulphide deposits at McFaulds Lake.”

“The Uchi domain forms the southern part of the North Caribou terrane within the Uchi Subprovince. The Uchi domain was constructed largely by autochthonous, episodic additions of volcanic assemblages and accompanying plutons during the Neoproterozoic era (Stott and Corfu, 1991). The eastern extent of the Uchi domain underlies the James Bay Lowland where, from high-resolution aeromagnetic images, it appears to merge with the OSD. The resulting merged greenstone–granite domain continues eastward under the James Bay Lowland on strike with the Eastmain greenstone–granite domain of Quebec.”

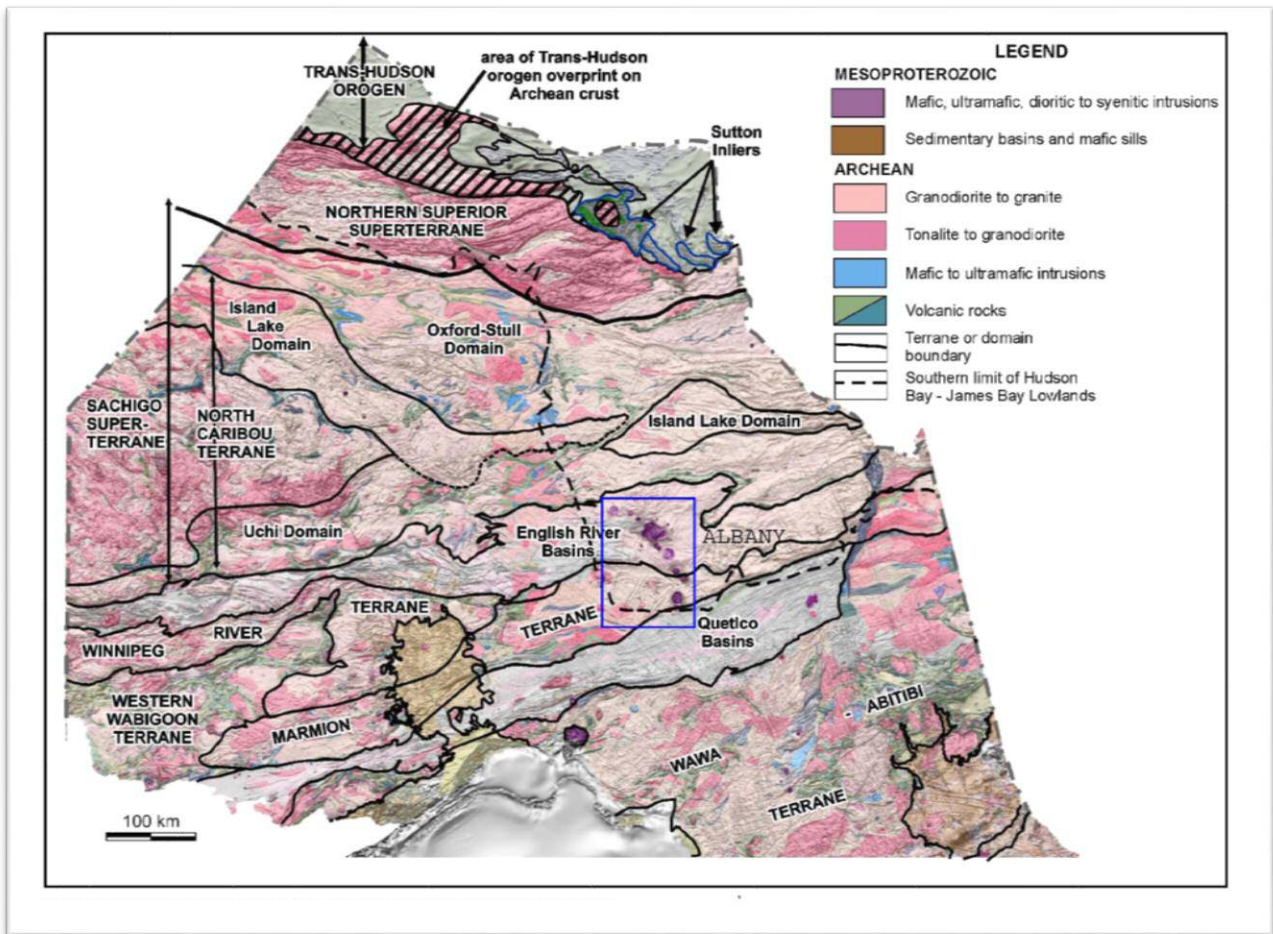


Figure 5: Regional Tectonic Subdivisions of Northern Ontario and Location of the “Arc of Fire” (after Stott et al. 2007)

## 6.2 Local Geology

According to Stott's (2007) regional tectonic subdivisions map, Zenyatta's **Block 4E** covers parts of the **Marmion Terrane** of the Superior Province of the Canadian Shield. The Marmion Terrane/Subprovince is described by Stott: "This terrane consists predominately of metamorphosed felsic intrusive rocks. The 3.0 to 2.7 billion year old rocks are interpreted as an assemblage of continental fragments. These rocks were once also interpreted as part of the Western Wabigoon and Winnipeg River terranes" (MNDM, Government of Ontario). These rocks have been intruded by the Nagagami Alkalic Rock Complex which underlies most of the block 4E claims (Figure 6).

Sage (1988) reports that the complex is unexposed and all descriptive data concerning this complex came from the limited number of samples available from diamond drilling (Figures 5 and 6). Aeromagnetic data indicate that the complex consists of two ring-shaped subcomplexes (Figure 7). The aeromagnetic pattern of the southern subcomplex cuts that of the northern subcomplex, suggesting that the southern subcomplex is younger. Linear northwest-trending aeromagnetic patterns attributed to diabase dikes do not cross the aeromagnetic pattern of the alkali rock complex, suggesting that these dikes are cut by the alkalic rocks and thus are older. This observation, combined with the fresh unmetamorphosed nature of the rock, suggests to Sage that the complex is likely of Late Precambrian age, equivalent to the dominant period of alkali magmatism in Ontario. Regional structures that control the emplacement of the subcomplexes have not been clearly identified but the complex lies on trend with the extension of the northeast-striking Gravel River Fault.

The dominant rock type is an amphibole-pyroxene syenite which varies from fine- to coarse-grained, and locally displays a trachytoidal texture. A coarse-grained nepheline-bearing phase appears restricted to the southern subcomplex. A very coarse-grained pegmatitic phase and a minor granite phase have also been identified. Sage (1988) reports that petrographically, the Nagagami River Alkalic Rock Complex has strong similarities to the pyroxene-bearing syenites of the Port Coldwell Alkalic Rock Complex.

Historically, the intrusion has been unsuccessfully explored for iron and niobium in 1964 by the Algoma Ore Properties Division of Algoma Steel Corporation. Sage (1988) recommends that future exploration of the complex should be directed towards the type of mineralization found in equivalent syenitic rocks of the Port Coldwell Alkalic Rock Complex (i.e. Cu-PGM mineralization).



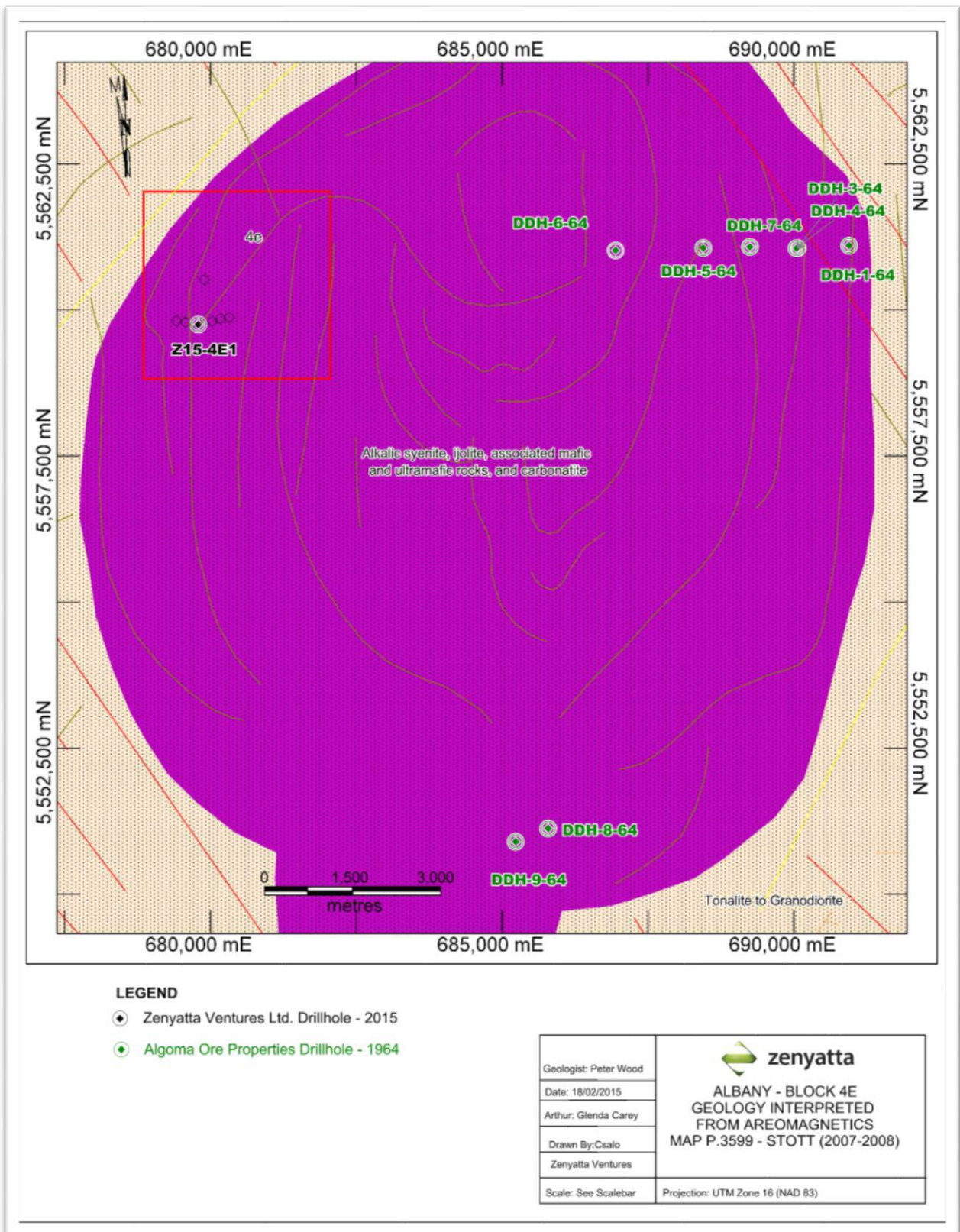


Figure 6: Block 4E OGS Interpreted Geology with Historic and Zenyatta Drill Holes

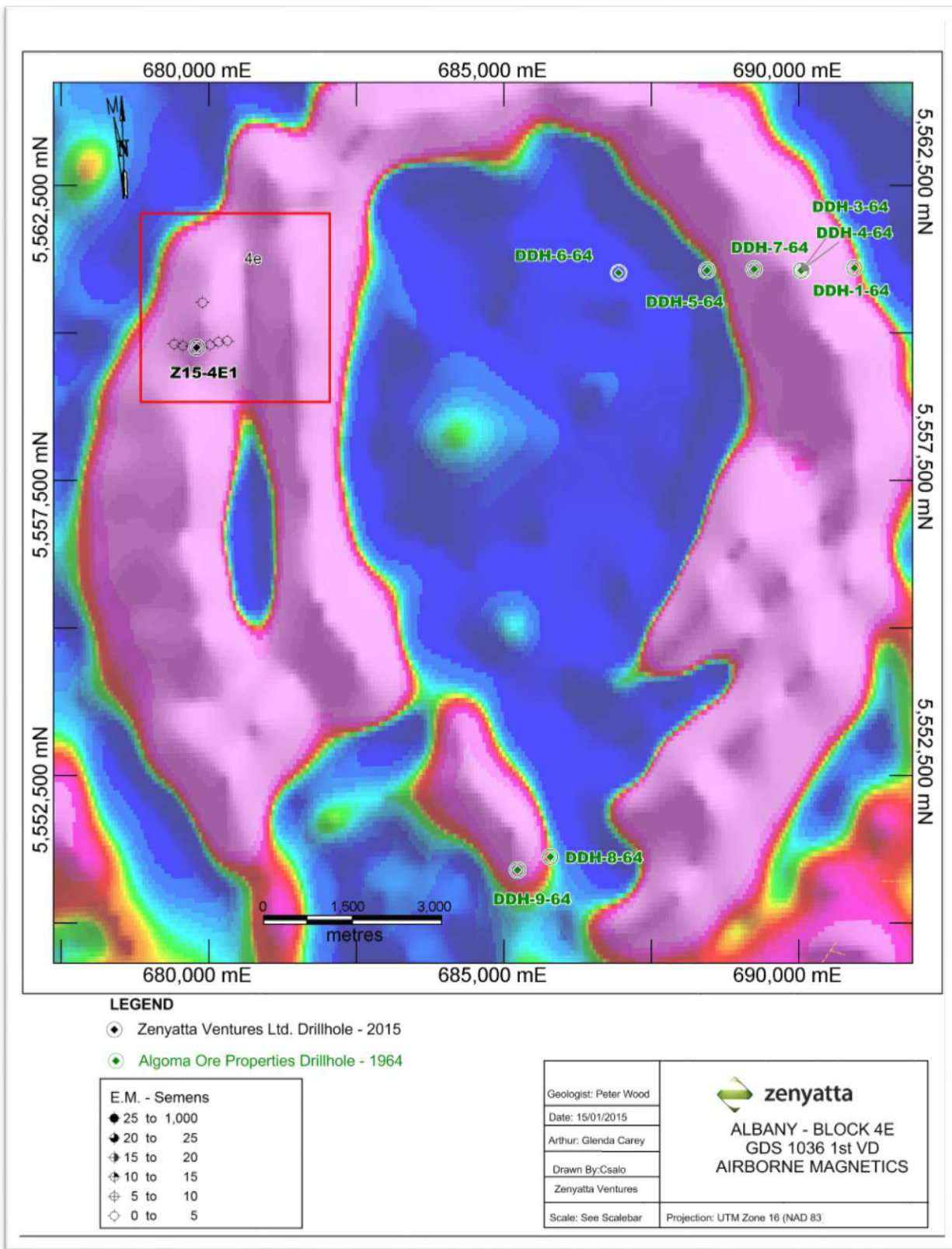


Figure 7: Block 4E CVG Airborne Magnetic Data with VTEM Anomalies and Historic and Zenyatta Drill Holes

## 7.0 DEPOSIT MODELS - Albany Project

### 7.1 Mafic-Ultramafic Intrusion Hosted Cu-Ni-PGM

Mafic-ultramafic intrusion hosted Cu-Ni-PGM deposits range in age from Archean to Tertiary (mainly Archean and Proterozoic in Ontario), are stratabound, and host copper, nickel and/or platinum-group sulphides. These deposits generally occur in two types of cratonic settings: (1) as complexes related to flood basalts in an intracontinental rift environment; and (2), as large strataform complexes either sheet-like or dike-like. Host rocks include (commonly layered) norite, gabbro, quartz diorite, pyroxenite, amphibolite, diabase, peridotite, anorthosite, dunite, troctolite and harzburgite.

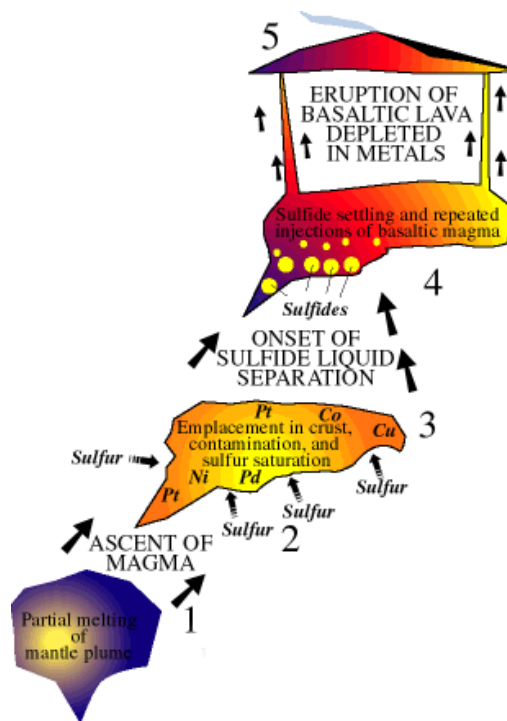


Figure 8: Generalized Model for the Formation of Sulphide Deposits Rich in Nickel, Copper and Platinum Group Elements (USGS, 1997 and modified from Naldrett, 1989)

The basic requirements for the formation of Ni-Cu sulphide deposits, as determined by recent studies at Noril'sk, Voisey Bay, and other deposits, are outlined in Figure 7 (USGS, 1997). Formation of these deposits begins with the melting of hot mantle rising as a plume from deep in the Earth (1). The melting produces basaltic magma that is relatively rich in metals but may be poor in sulphur, which then rises upward and intrudes into the crust (2) forming magma chambers. In these chambers, basaltic magma may interact with the crust and become contaminated. Sulphur from surrounding rocks may be incorporated into the magma. This contamination reduces the ability of the magma to keep sulphur in solution (3), and the magma may become sulphur saturated. When sulphur saturation occurs, droplets of sulphide liquid form and because the droplets are more dense than basaltic magma, they tend to settle into the lower part of the magma chamber (4). As the sulphide droplets segregate, they scavenge metals such as

nickel, copper, platinum (Pt), and palladium (Pd) from the magma. If these sulphide droplets become sufficiently concentrated, a magmatic sulphide deposit is formed. The largest concentrations of sulphides appear to form in channels or conduits through which new magma flows into the magma chamber. Basaltic lavas (5) erupted from chambers undergoing sulphide segregation will be depleted in those elements enriched in the sulphide deposits. Recognition of such depleted basalts can therefore provide important evidence that sulphide separation has occurred at depth.

The principle mineralogy includes pentlandite, chalcopyrite, pyrrhotite, cubanite, and millerite; other minerals may include pyrite, marcasite, valleriite, bornite, cobalt sulphides and sphalerite. Platinum group minerals may include sulphides, tellurides, arsenides, antimonides and alloys. Generally, the more mafic the composition, the higher the Ni/Cu ratio. The texture and style of the mineralization is disseminated, net-textured, sulphide matrix breccia and massive sulphides that occur as stratabound to stratiform, tabular layers or lenses. The ore minerals are commonly located at or near the base of the host intrusion and sulphide veins and disseminations usually occur in the footwall rocks. PGM rich horizons generally occur at a significant distance above the base of the intrusion.

A geophysical anomaly for massive sulphides should be produced by an airborne or ground electromagnetic survey (EM). Airborne and ground magnetic (mag) surveys may produce anomalies for pyrrhotite-rich mineralization.

The “Arc of Fire” consists of several large multi-phased, mafic-ultramafic-alkalic complexes forming an arc line approximately 150 km long. One of these complexes, called the Nagagami River Alkaline Ring Complex, shows similarities to the Mid-Continent Rift related Coldwell Complex on the north shore of Lake Superior. The “Arc of Fire” is believed to also represent a deep-seated Proterozoic structure that may be related to the 1.1 Billion year old Mid-Continent Rifting. The Mid-Continent Rift is a known deep-seated structural environment that hosts a number of significant mineral deposits around Lake Superior, including the recently discovered Rio Tinto’s Eagle and Tamarack Cu-Ni deposits and Magma’s TBN PGM deposit. Rifting environments around the world are host to many large mineral deposits due to a tapping of the copper-nickel rich mantle by way of the structural conduits and traps for metal transport and deposit.

## **7.2 Epigenetic Graphite Deposit**

Most economic geologists and geophysicists are familiar with graphite as a nuisance in geophysical exploration due to its excellent electric conductivity that produces an identical geophysical response to that of massive sulphide mineralization. Graphite commonly occurs in metasedimentary rocks as a result of the conversion of organic matter through regional or contact metamorphism. Graphitization of organic matter is well understood; however, the heating and compression of organic matter in situ is only one of the ways in which graphite is produced in nature. Another is the precipitation of solid carbon (i.e., graphite) from natural carbon-fluids such as those containing CO<sub>2</sub>, CO, and/or CH<sub>4</sub>.

Somewhat simplified, there are three different processes leading to the formation of economic graphite deposits (Harben and Kuzvart, 1996):

1. Contact metamorphism of coal deposits - Graphite formed under these conditions is characterized by incomplete structural ordering and crystallization, resulting in low value “amorphous” graphite with its main market in foundry applications.
2. Syngenetic flake graphite deposits - The formation of these deposits involves the alteration of carbonaceous organic matter to graphite during regional metamorphism.
3. Epigenetic graphite deposits - The formation of these deposits is associated with migrating supercritical carbon-bearing (C-O-H) fluids or fluid-rich magmas. The formation of the carbon-bearing fluids is most often a consequence of high temperature (granulite facies) metamorphism, but magmatic degassing can also produce graphite. Fluid precipitated graphite is well-ordered and can be a source of highly valued crystalline lump or vein-type graphite.

The Albany deposit is a unique example of an epigenetic graphite deposit in which a large volume of highly crystalline, fluid-deposited graphite occurs within an igneous host. The deposit is interpreted as a vent pipe breccia that formed from CO<sub>2</sub>-rich fluids that evolved due to pressure-related degassing of syenites of the Albany Alkalic Complex (Figure 9) and is described below (Conly, 2014):

#### **STAGE 1 – Emplacement of Host Syenites Forming the Albany Alkalic Complex:**

Emplacement of the Albany breccia pipes is estimated to be Mesoproterozoic to Neoproterozoic based on cross-cutting relationship with the Paleoproterozoic Matachewan and Hearst quartz diabase dike swarms and Mesoproterozoic Sudbury olivine tholeiite dike swarm. Magma emplacement may also be structurally controlled by the Gravel River Fault, which in part defines the southern margin Albany Alkalic Complex and separates the Marmion Terrane (to the north) and the Quetico Subprovince (to the south).

#### **STAGE 2 – Fluid Generation and Breccia Pipe Development:**

The two breccia pipes formed as a result of a degassing magma, resulting in segregation of a CO<sub>2</sub>-bearing fluid, which occurred in response to depressurization of the magma at mid to shallow crustal levels, and accumulation of CO<sub>2</sub> at the top of the ascending dike. Possible sources for the carbon include: i) generation of primary CO<sub>2</sub>-rich syenite; and ii) assimilation of carbonaceous Quetico metasedimentary rock by syenitic magmas. The co-existence of angular to rounded breccia fragments is evidence of mixing of juvenile fragments with earlier entrained material which has been subject to a greater extent of mechanical erosion due to rapid and turbulent upflow of the CO<sub>2</sub>-fluid.

#### **STAGE 3 – Graphite Deposition:**

Graphite deposition likely occurred rapidly due to the sudden depressurization and quenching (from supercritical fluid to gas) of the CO<sub>2</sub>-fluid which, in turn, is due to the dike head breaking the surface and venting CO<sub>2</sub> gas (Figure 9). Surface venting is evidenced from the extent of the graphite breccias to the unconformity with the overlying Paleozoic rock. Such rapid depressurization would have also imploded the walls of the vent complex; it is consistent with the higher proportion of angular syenite fragments

relative to rounded syenite fragments and fragments of Archean country rock, and with localized production of xenoliths with minimal transport. Rapid deposition of graphite inferred from its fine-crystal size (laths typically 100  $\mu\text{m}$  to 300  $\mu\text{m}$  long) and high abundances of discrete crystals and fine crystal aggregates. Coinciding with the changes in pressure, a rapid decrease in temperature would have inhibited growth of coarser-crystalline graphite and led to the crystallizing of the degassing syenite magma at depth.

**STAGE 4 –Post Mineralization Magmatic and Erosional Events:**

Post-mineralization events include the following (listed in temporal succession):

- Emplacement of late-stage, barren olivine-aegirine syenite sills;
- Intrusion of aplite and other felsic dikes'
- Erosion of upper levels of the Albany Alkalic Complex and supergene alteration; and
- Deposition of Paleozoic carbonate rocks and Quaternary glacial sediments.

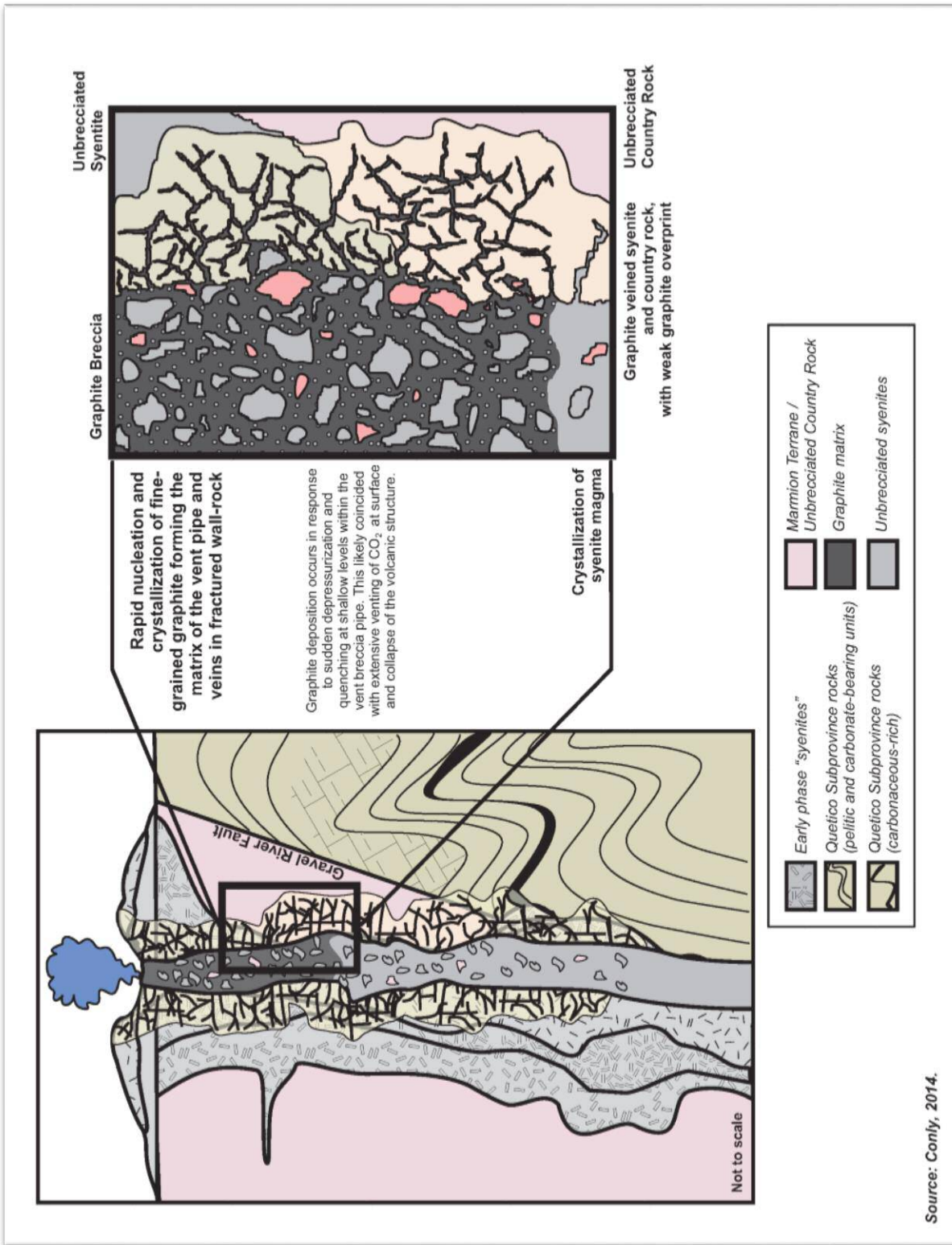


Figure 9: Albany Graphite Deposit Model

### 7.3 Kimberlite Pipe

Kimberlite is a rock type first categorized over a 100 years ago based on descriptions of the diamond-bearing pipes of Kimberley, South Africa. Kimberlite is characterized as a hybrid, volatile-rich, potassic, ultrabasic igneous rock. Although volumetrically insignificant on a global scale, kimberlite commonly occurs in fields, or clusters, comprising up to 100 individual, steep-sided, pipe-like intrusions (Figure 10) (Kjarsgaard, 2007; Alberta Geological Survey, 2012).

Kimberlites are only the mechanism by which diamonds are transported to the surface. Diamonds form much earlier than the kimberlite at depths of 110 km to 150 km and temperatures of 900°C to 1200°C at which diamonds are stable. Because kimberlites are derived from deep within the earth (>150 km below the surface), they are able to transport mantle material and occasionally diamonds to the surface.

Kimberlitic rocks are the most important primary source of diamonds and the main rock type in which significant, economically viable diamond deposits capable of sustained profitable mining have been found so far. Economic concentrations of diamonds only occur in about one per cent of known kimberlites worldwide.

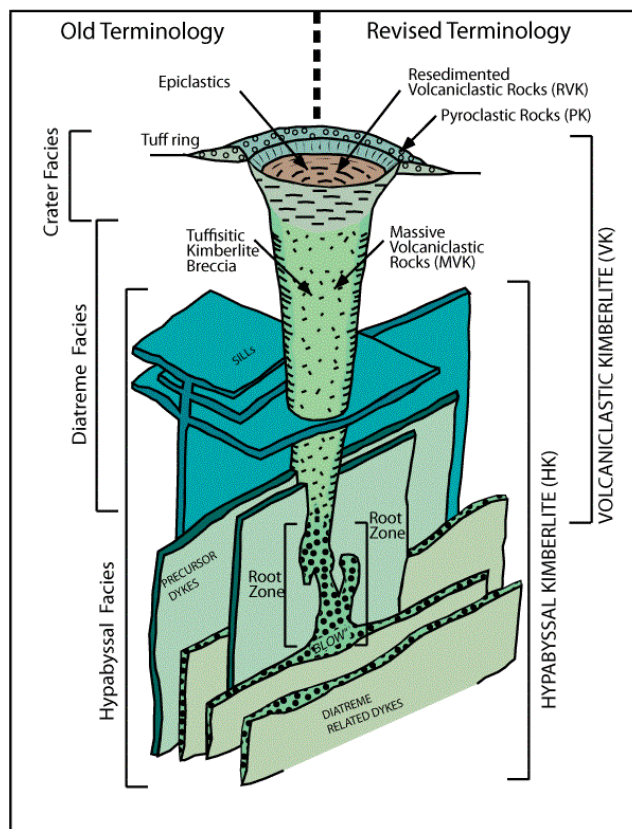


Figure 10: The classic South African model of a kimberlite pipe with old nomenclature (left side of figure) and a simpler, revised two-fold nomenclature system (right side of figure) to describe rocks from kimberlite magmatic systems (Kjarsgaard, 2007).

PK = pyroclastic kimberlite; RVK = resedimented volcaniclastic kimberlite; MVK = massive volcaniclastic kimberlite; HK = hypabyssal kimberlite.



## 8.0 2015 DIAMOND DRILL PROGRAM

The diamond drilling program conducted by Zenyatta Ventures in 2015 consisted of one NQ-sized drill hole to explore for nickel (Ni), copper (Cu), platinum group metals (PGMs), graphite (C) or possibly kimberlite. Based on the circular shape of the conductive zone and its moderately low conductivity, it was thought that the latter two targets were more likely possibilities (Figure 11). The drilling commenced on January 31, 2015 and completed on February 8, 2015. The hole **Z15-4E1** totaled 624.8 metres of drilling. Core logging was completed at a core shack that is located at the Eagles Earth camp site using a laptop computer and X-Logger (MS Access based) drill hole logging program to enter geological information and sampling data. Magnetic susceptibility (SI Units) and conductivity (S/m) measurements were recorded using a Terraplus KT-10 S/C instrument.

Drill hole Z15-4E1 was collared at the western edge of northern Nagagami Subcomplex at UTM: 679800E; 5559760N (NAD83, Zone 16) and an approximate elevation of 130 m above sea level and was spotted using Garmin GPSmap 76S, with an accuracy of 3 m to 5 m. The purpose of this hole was to test a circular conductive target; Maxwell modelling suggested the top of the conductive zone is located at approximately 310 m downhole with a shallow dip to the north (Appendix 1). Chibougamau Drilling Ltd. of Chibougamau, Quebec was contracted to perform the drilling operation. Expedition Helicopters Inc. of Cochrane, Ontario was contracted to provide helicopter support for the drill program.

The location, azimuth, dip, and length of drill hole Z15-4E1 is listed in Table 2 below. The location of the drill hole on claim #4262509 is illustrated in Figure 4. Also included with this report is the drill section (Map 1) showing the drill hole in cross-section, rock types, and any sulphide mineralization that was intersected.

**Table 2: Block 4E - 2015 Drill Hole Location**

Drill Hole #	UTM's (NAD 83, Zone 16)		Azimuth	Dip	Length	# of Samples
	Easting	Northing			(m)	
Z15-4E1	679800	5559760	180°	-80°	624.8	0

**Drill hole Z15-4E1:** At the top of the hole, 141 m of overburden and a relatively thin (~20 m thick) Paleozoic sediment unit were intersected. Below the Paleozoic sediments, the hole intersected massive, medium- to coarse-grained syenite with a moderate magnetic overprint (Figure 12). The first fracture-filling graphite veinlet was intersected at 175.95 m. From 265.0 m to 292.7 m downhole the drill hole intersected a pegmatitic unit with similar composition to the syenite but with very large, subhedral orthoclase, amphibole and magnetite crystals. Magnetite content increases up to 20% locally within this unit. Interestingly, another pegmatitic section from approximately 567 m to 574 m contained coarse-grained plagioclase crystals that displayed a blue-yellow schiller which suggests a labradorite composition (Figure 13). Pegmatite was also intersected from 610.94 m to 617.50 m. From 312.75 m to 313.00 m the drill hole intersected three subparallel hairline fracture-filling graphite veinlets with conductivity values up to 1500

s/m and oriented at 25° to 30° to core axis (Figure 14). Several hairline fracture-filling graphite veinlets were intersected further downhole from 329.00 m to 343.10 m. The drill hole was stopped at 624.8 m in massive syenite.

Refer to the accompanying drill log for DDH Z15-4E1 in Appendix 2 (back of report) for detailed descriptions of rock types and mineralization observed in drill core. The Zenyatta drill hole (Z15-4E1) is also plotted superimposed over the OGS interpreted geology (Figure 6) and the OGS calculated vertical gradient (CVG) magnetic data (Figure 7).

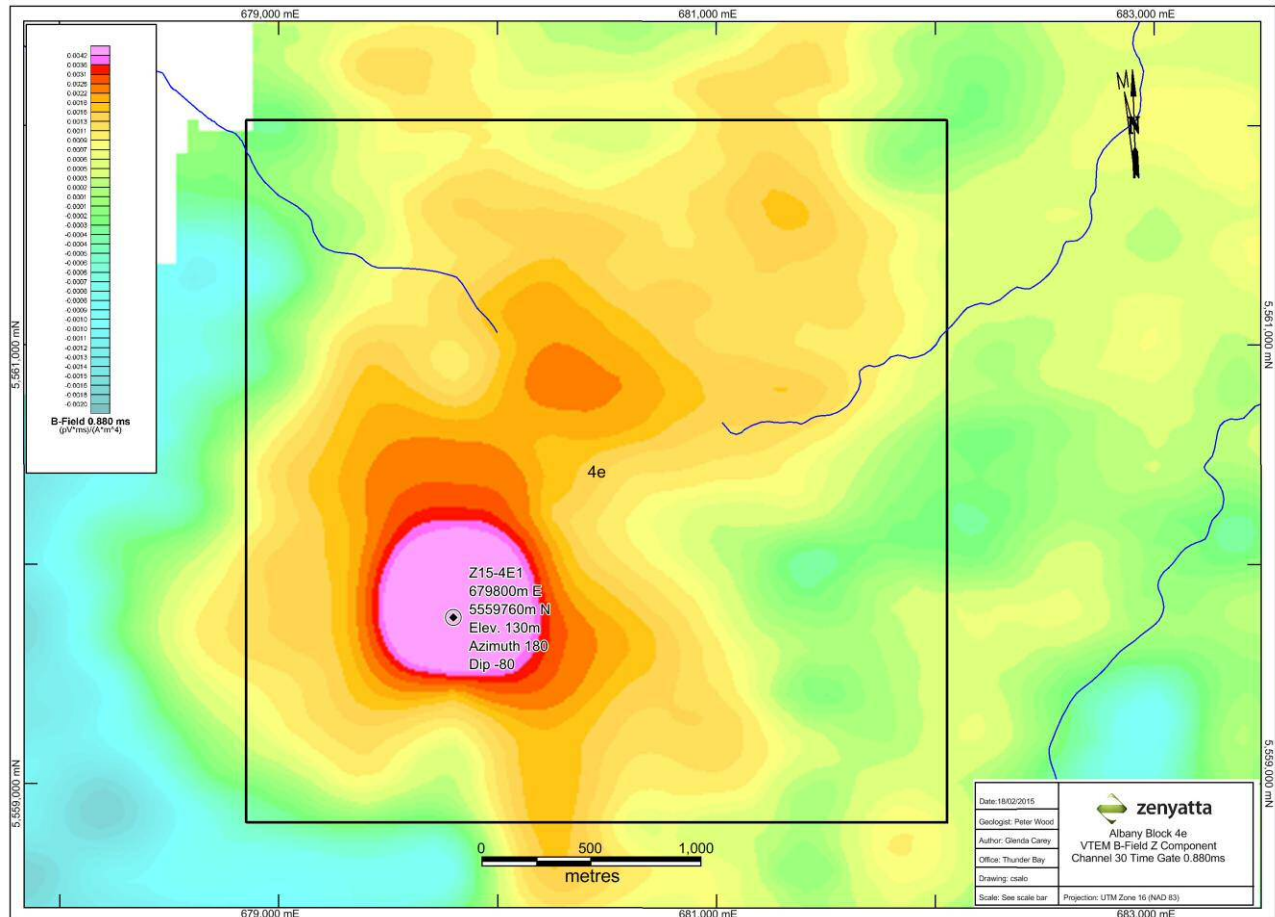


Figure 11: VTEM B-Field Z Component Channel 30 Time Gate 0.880 ms showing the circular shape of the conductive zone which suggests a possible pipe-like feature (Geotech, 2013).



Figure 12: Typical medium- to coarse-grained amphibole syenite with pink granitic dike from approximately 156 m to 173 m.

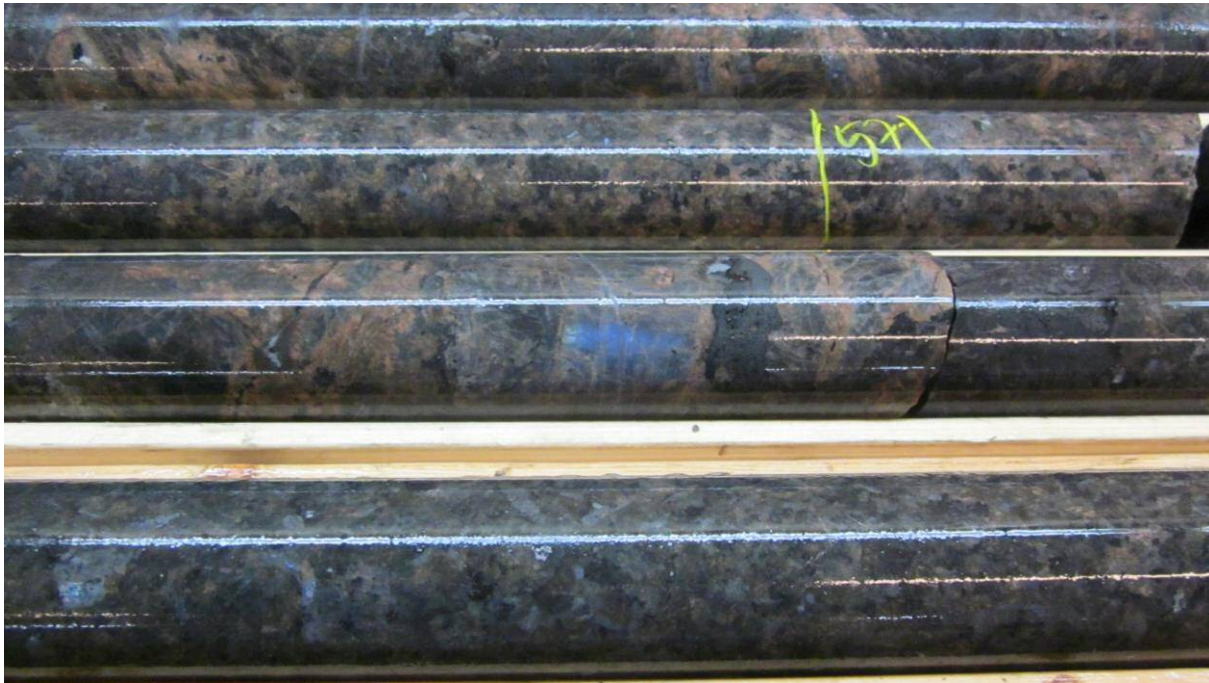


Figure 13: Pegmatitic syenite section at ~572.5 m showing schiller in coarse labradorite crystals.



Figure 14: Graphite-filled hairline veinlet at 312.75 m in syenite

## **9.0 INTERPRETATIONS & CONCLUSIONS**

Zenyatta drilled one reconnaissance exploration hole within the Block 4E claim group in order to investigate a circular conductive zone which was defined by a 2010 and 2013 VTEM Max survey and was set-up using a Maxwell model. In drill hole Z15-4E1 the conductor was likely explained by discrete hairline fracture-filling graphite veinlets which were intersected at 175.95 m, from 312.75 m to 313.00 m, and further downhole from 329.00 m to 343.10 m. These graphitic veinlets, if laterally extensive could likely explain the conductor detected by the VTEM Max airborne survey.

Zenyatta geologists did not observe any significant nickel, copper, platinum, palladium or precious metal mineralization during logging of the core, and therefore did not select any core samples for geochemical assaying. The only graphite (C) intersected was in the form of hairline fractured-filled veinlets, as described above, which is not of economic interest. These disappointing results do not justify any further exploration in the Block 4E claims at this time.

## **10.0 RECOMMENDATIONS**

The 2015 exploration drilling program in Albany Block 4E did not reveal any economically significant mineralized zones in drill hole Z15-4E1. The results were disappointing and presently Zenyatta does not recommend any follow-up drilling in this area.

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## 12.0 CERTIFICATE OF QUALIFICATIONS

I, **Glenda Carey**, of 218 London Drive, Thunder Bay, Ontario, do hereby certify that:

1. I hold a **Bachelor of Science Degree in Earth Science (1989)** from Memorial University of Newfoundland, St. Johns, Newfoundland and Labrador;
2. I have practiced my profession in Newfoundland and Labrador, NWT, Alberta, Nunavut and Ontario since 1989 and have been employed directly by mining and exploration companies, d the Government of Nunavut, and Government of Newfoundland and Labrador; and,
3. I am presently an employee of Zenyatta Ventures Limited based in Thunder Bay, Ontario as a Geologist for the company.

Date: March 20, 2015 at Thunder Bay, Ontario

Glenda Carey, Geologist  
Zenyatta Ventures Limited  
1224 Amber Drive, Thunder Bay, Ontario P7B 6M5  
Tel: (807) 346-1664 Fax: (807) 345-4412



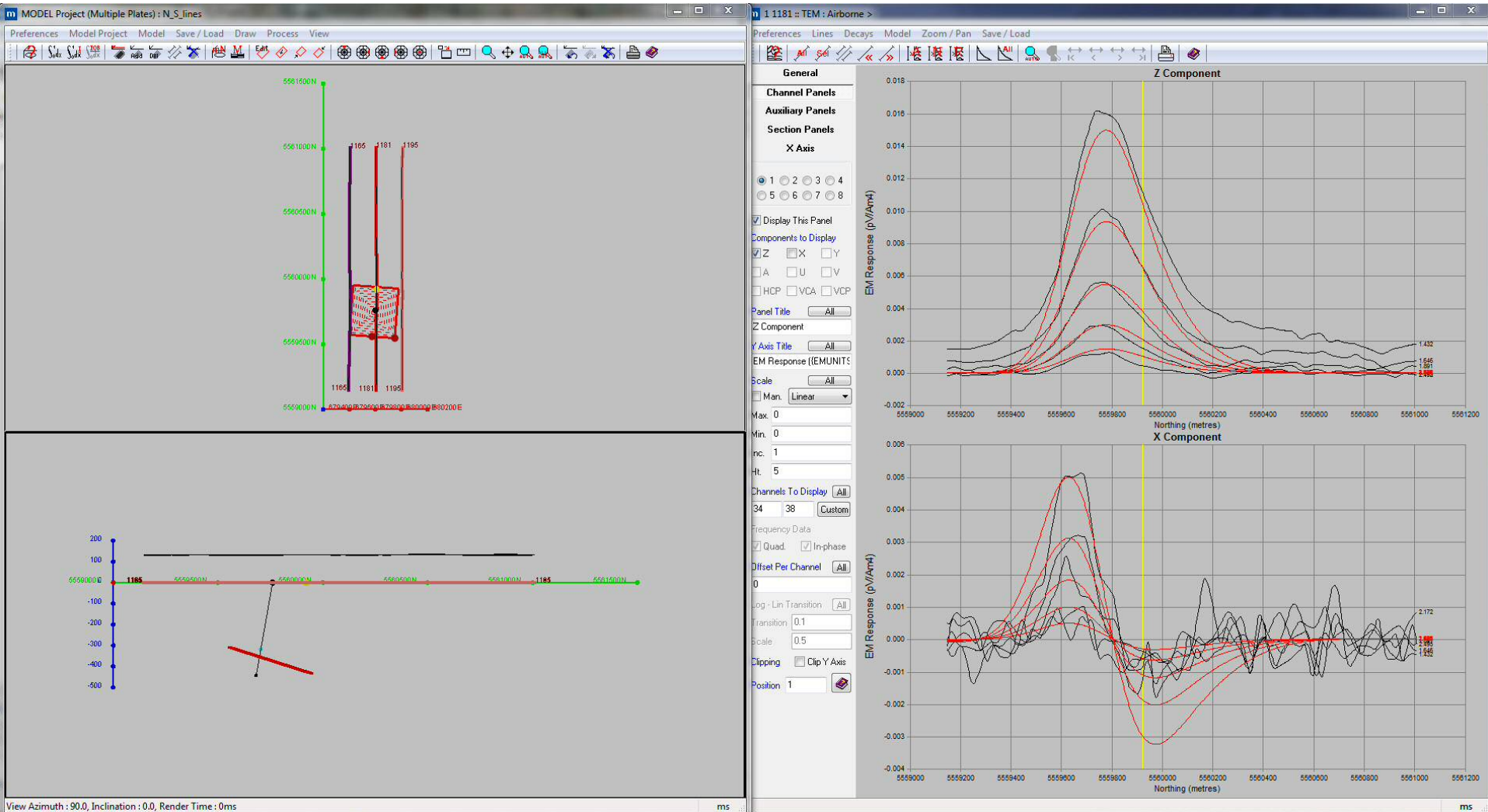
## **APPENDIX 1**

### **Maxwell Model**

# 4E Re-Staked Claim Block Maxwell Modelling

VTEM max Target

# 4E VTEM Target - Maxwell Model Line 1181



# 4E VTEM Target - Maxwell Model Line 1181

- Overview

- The VTEM max target was reviewed with both line directions N-S and E-W. After a review the best modeling direction was determined to be N-S. It appears to be most conductive on Line 1181. This conductive response was modeled as a shallow Dipping plate to the North. This conductive response is located over several lines and extend over 400m. This appears as a flat lying tabular body that would be best tested with a steeply dipping hole. In the event one would want to drill from the Airborne the proposed hole would intersect the plate.

- Plate parameters

- Plate
  - Size: (LengthXDepth) 350mX400m
  - Conductance: 12 S/m
  - Depth below surface: ~310m

- Proposed DDH

- 4FNW-1
  - Location : 679800mE/5559760mN
  - Azimuth/Dip: 180/-80
  - Length 450m

**APPENDIX 2**

**Diamond Drill Log  
Z15-4E1**



## Drillhole Log

Units Metres

Zenyatta Ventures Ltd.

<b>Province/State</b>		<b>Co-ordinate System</b>			<b>Grid/Property</b>			<b>Hole Type</b>	<b>Length</b>	<b>Date Started</b>		
Ontario		UTM NAD83 Canada Zone 16			None			Exploration hole	624.80	29/01/2015		
<b>District</b>		<b>UTM North</b>	<b>UTM East</b>		<b>Local Grid E</b>	<b>Local Grid N</b>		<b>Collar Survey Method</b>		<b>Date Completed</b>		
Porcupine		5559760	679800					Hand-held GPS		08/02/2015		
<b>Project</b>		<b>UTM Elevation</b>	<b>Azimuth Astro. (°)</b>		<b>Azimuth Grid (°)</b>	<b>Dip (°)</b>		<b>Drill Contractor</b>		<b>Date Logged</b>		
Albany Block 4E		130.00	180.00			-80.00		Chibougamau Diamond Drilling		09/02/2015		
<b>Area</b>		<b>Claim No.</b>	<b>NTS Sheet</b>		<b>Supervised By</b>			<b>Logged By</b>		<b>Verified</b>		
Albany Project Area		P4262509	42K01		Ardian Peshkepia			Ardian Peshkepia		<input checked="" type="checkbox"/>		
<b>Zone/Prospect</b>		<b>Assessment Rpt. No.</b>	<b>Core Storage</b>			<b>Plug Depth</b>		<b>Makes Water</b>	<b>Capped</b>	<b>Environmental Inspection</b>		
4E Block			Eagle's Earth, Ontario					<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<b>Core Size (1)</b>		NQ	483.8	<b>Casing Pulled</b>		<b>Casing (1)</b>	141.00	Steel	<b>Plugged</b>	<b>Pulsed</b>	<b>Geophysics Contractor</b>	<b>Date Pulsed</b>
(2)				<input checked="" type="checkbox"/>		(2)			<input type="checkbox"/>	<input type="checkbox"/>	Geotech Ltd.	
<b>Purpose</b>				<b>Results</b>				<b>Comments</b>				
Test circular conductive zone (VTEM Max target) which was identified as a likely bedrock source. The target is located on the northwest margin of the north Nagagami Alkalic Subcomplex.				This drill hole intersected discrete hairline fracture filling graphite veinlets at 175.90m, 280.55m and from 312.75m to 313.00m. As well at 329.10m, 333.95m, 336.45m and 343.17m. Conductivity ranges from 75 S/m at 329.10m to 1500 S/m at 312.75m. If these graphite mineralized fractures are extensive enough they could likely be the cause of the VTEM Max anomaly.				Apart from the fine, graphite-filled fractures the core was unmineralized. No samples were sent for assay.				

Distance	Grid Azimuth (°)		Astro. Azimuth (°)		Dip (°)		Use Test	Survey Method	Mag. Field (nT)	Comments
	Original	Final	Original	Final	Original	Final				
192.00			198.6	189.6	-80.5	-80.5	<input checked="" type="checkbox"/>	Reflex EZ	54655	
243.00			194.9	185.9	-80.6	-80.6	<input checked="" type="checkbox"/>	Reflex EZ	54633	
318.00			195.8	186.8	-80.6	-80.6	<input checked="" type="checkbox"/>	Reflex EZ	54804	
369.00			198	189	-80.9	-80.9	<input checked="" type="checkbox"/>	Reflex EZ	54862	
420.00			189.7	180.7	-81	-81	<input checked="" type="checkbox"/>	Reflex EZ	54944	
471.00			192.5	183.5	-81.2	-81.2	<input checked="" type="checkbox"/>	Reflex EZ	56135	
525.00			193	184	-81.1	-81.1	<input checked="" type="checkbox"/>	Reflex EZ	54886	

<i>Distance</i>	<i>Grid Azimuth (°)</i>		<i>Astro. Azimuth (°)</i>		<i>Dip (°)</i>		<i>Use Test</i>	<i>Survey Method</i>	<i>Mag. Field (nT)</i>	<i>Comments</i>
	<i>Original</i>	<i>Final</i>	<i>Original</i>	<i>Final</i>	<i>Original</i>	<i>Final</i>				
558.00			191.1	182.1	-81.1	-81.1	<input checked="" type="checkbox"/>	Reflex EZ	54348	
609.00			193	184	-80.9	-80.9	<input checked="" type="checkbox"/>	Reflex EZ	55055	

<b>Lithology</b>				
<b>From</b>	<b>To</b>		<b>Sample #</b>	<b>From To Len.</b>
0.00	- 123.00	<p><b>OB Overburden</b></p> <p>From 0.0m to 122.0m unknown overburden that is likely a mixture of lowlands muskeg and glacial sediment, pebbles of glacially rounded rocks and boulders. HW casing from 0.0m to 69.0m.</p> <p>From ~122m to 123m granitic bolder at the top of the hole plus dark grey pebbles, rubbly core mixture of limestone and siltstone.</p>		
123.00	- 132.90	<p><b>LST Limestone</b></p> <p>Paleozoic limestone. Light beige to whitish colour, vuggy in places with sections of siltstone. NW casing to 141.0m.</p>		
132.90	- 141.50	<p><b>SLST Siltstone</b></p> <p>Brownish-grey siltstone with thin &lt;20cm, sandstone sections. Greenish-grey from 140.0m to 141.5m.</p>		
141.50	- 141.60	<p><b>UNCON Unconformity</b></p> <p>10cm of greenish-grey mud. Plus angular pebble size fragments.</p>		
141.60	- 157.50	<p><b>SYEN Syenite</b></p> <p>Light pink to greyish-pink, coarse-grained, massive syenite. Sub cm dark green amphibole, interstitial to pinkish-grey feldspar. Minor black mica. Weak to moderately magnetic. 2-4mm magnetite grains. No visible fabric.</p>		



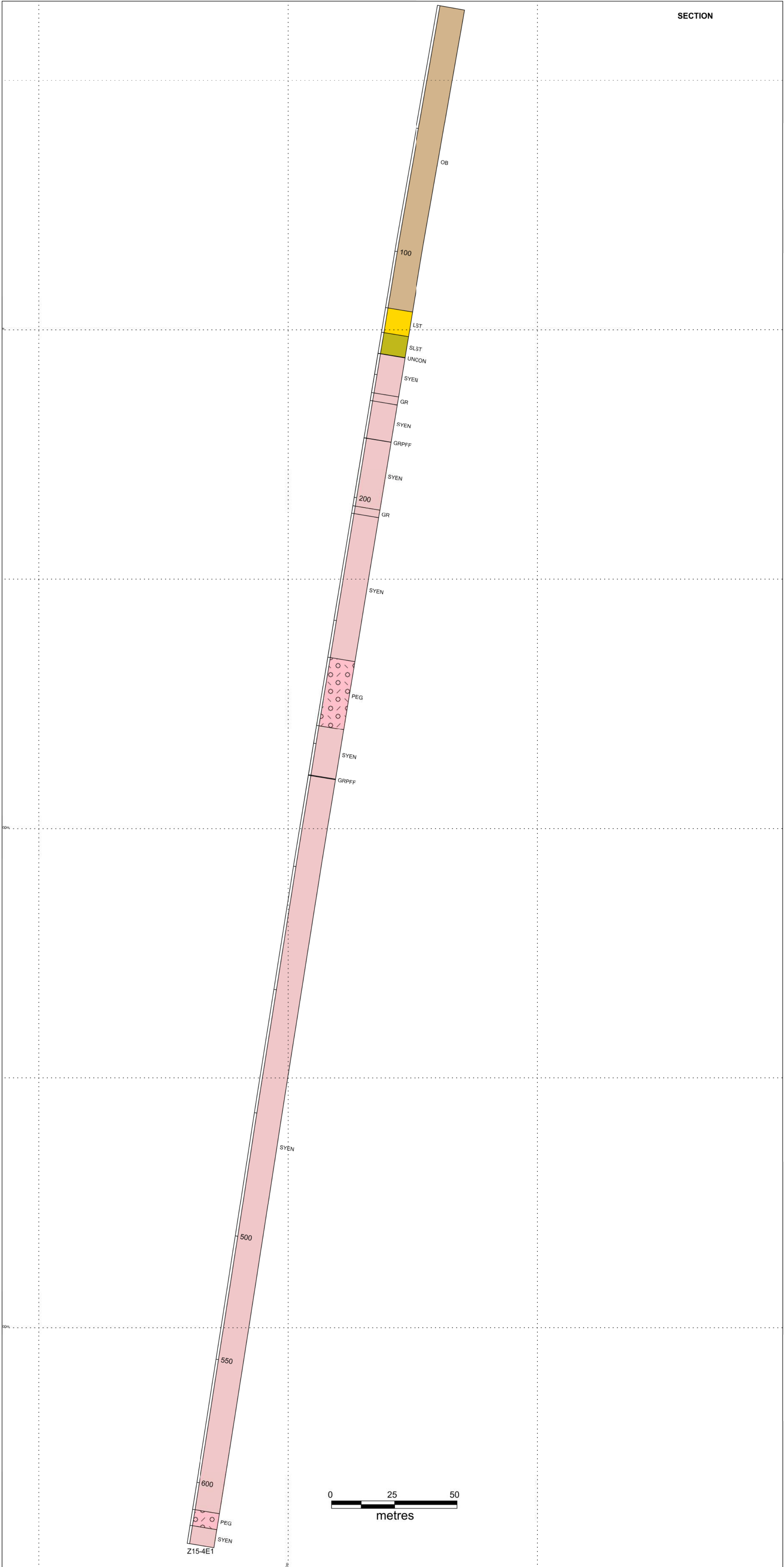
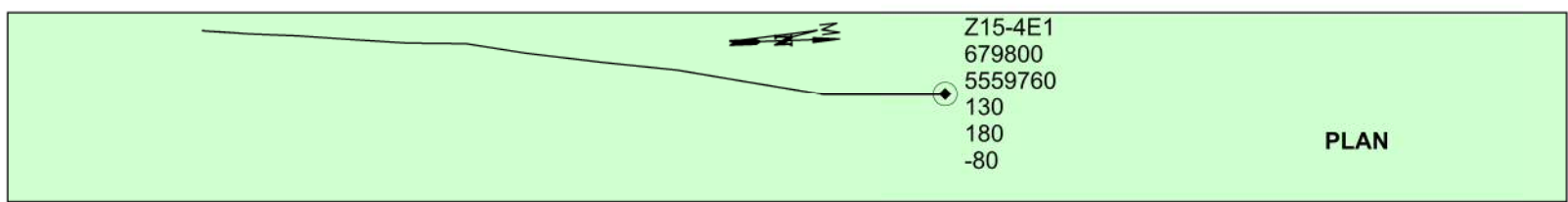







**Map 1**

**Drill Section Z15-4E1**



- Legends**
- OB - Overburden
  - GRPFF - Graphite Fracture Filling
  - LST - Limestone
  - SLST - Siltstone
  - SYEN - Syenite
  - GR - Granite
  - PEG - Pegmatite

Geologist: Peter Wood	 <b>ALBANY</b> <b>BLOCK 4E</b> <b>SECTION DDH Z15-4E1</b> <b>MAP 1</b>
Date: 18/02/2015	
Author: Glenda Carey	
Drawn By: Csalo	
Zenyatta Ventures	
Scale: 1: 1000	Projection: UTM Zone 16 (NAD 83)