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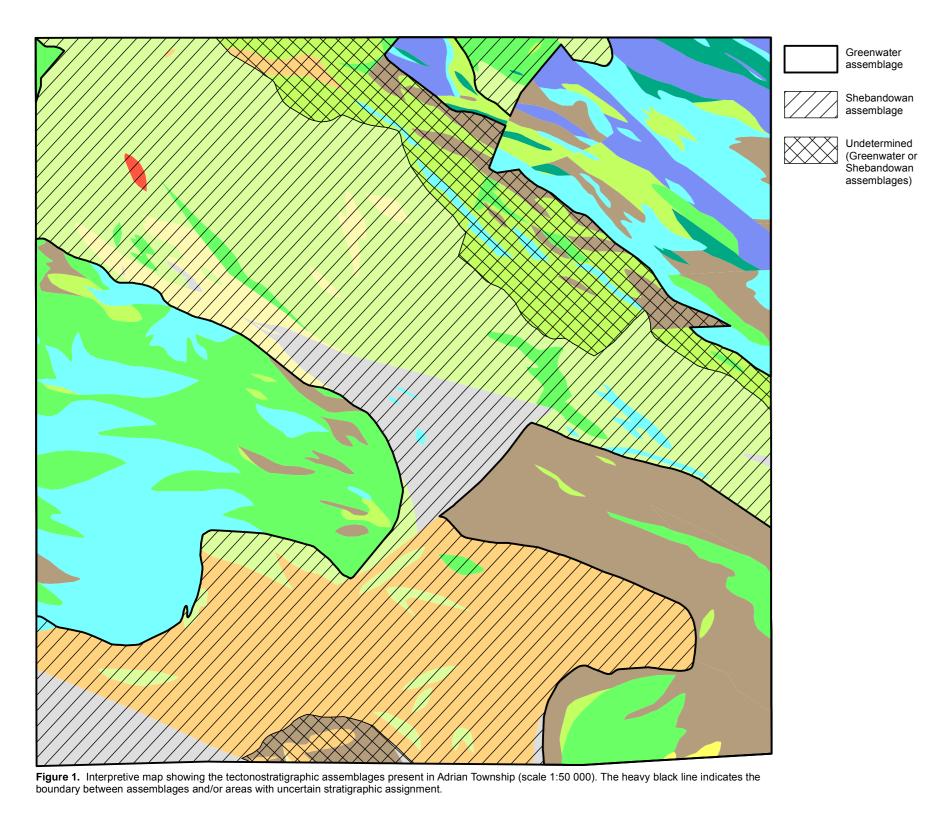
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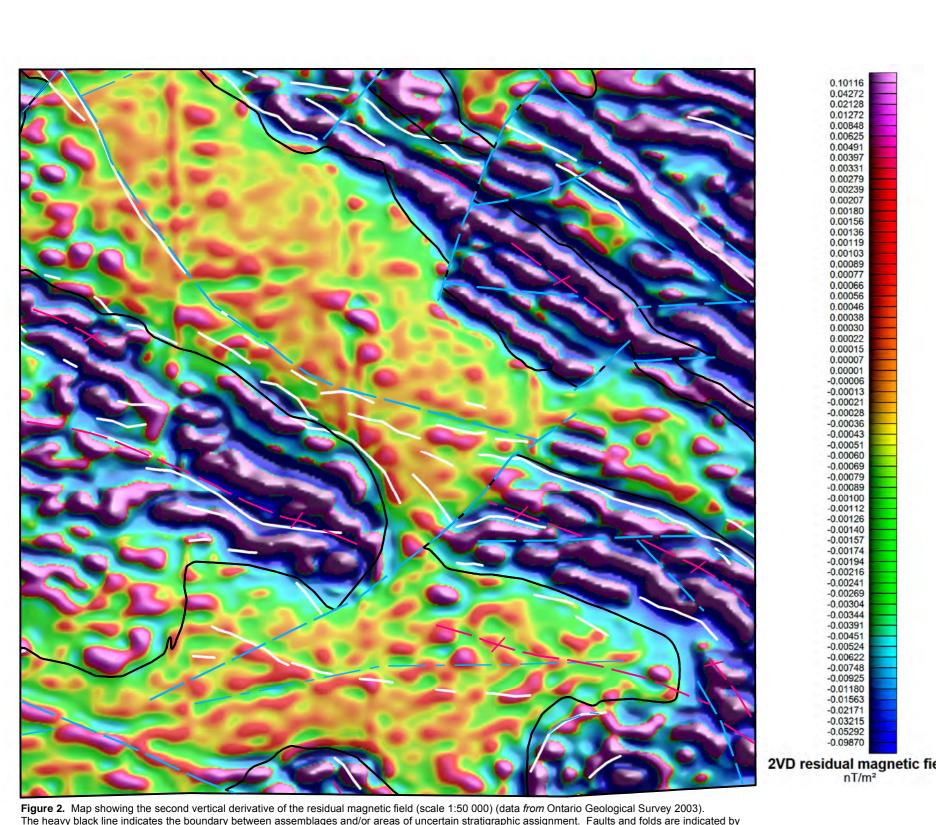
Ratcliffe, L.M. 2017. Precambrian geology of Adrian Township, Shebandowan greenstone belt, Wawa–Abitibi terrane; Ontario Geological Survey, Preliminary Map P.3813, scale 1:20 000.

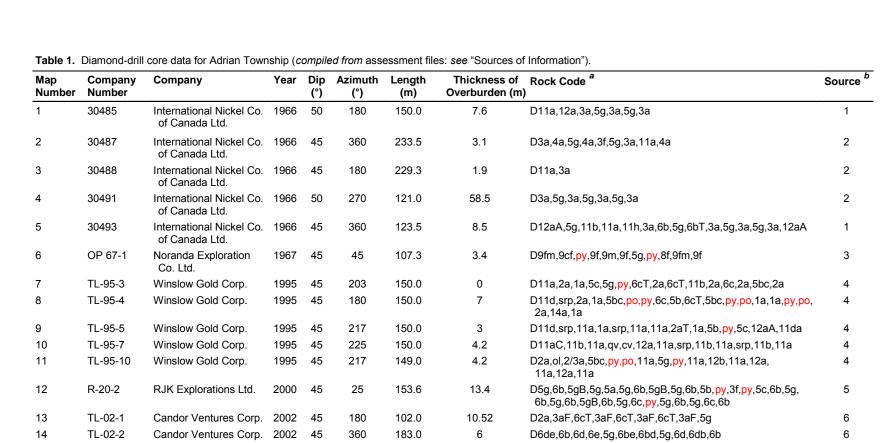
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<sup>a</sup> The rock unit codes are an approximation of the original stratigraphic logs, and cores were not examined; users should refer to the original logs

192.0

D2a/8fgk,gr,py,po,cp

blue and red lines, respectively: see also "Symbols" list. White lines are electromagnetic conductors (data from Ontario Geological Survey 2003).

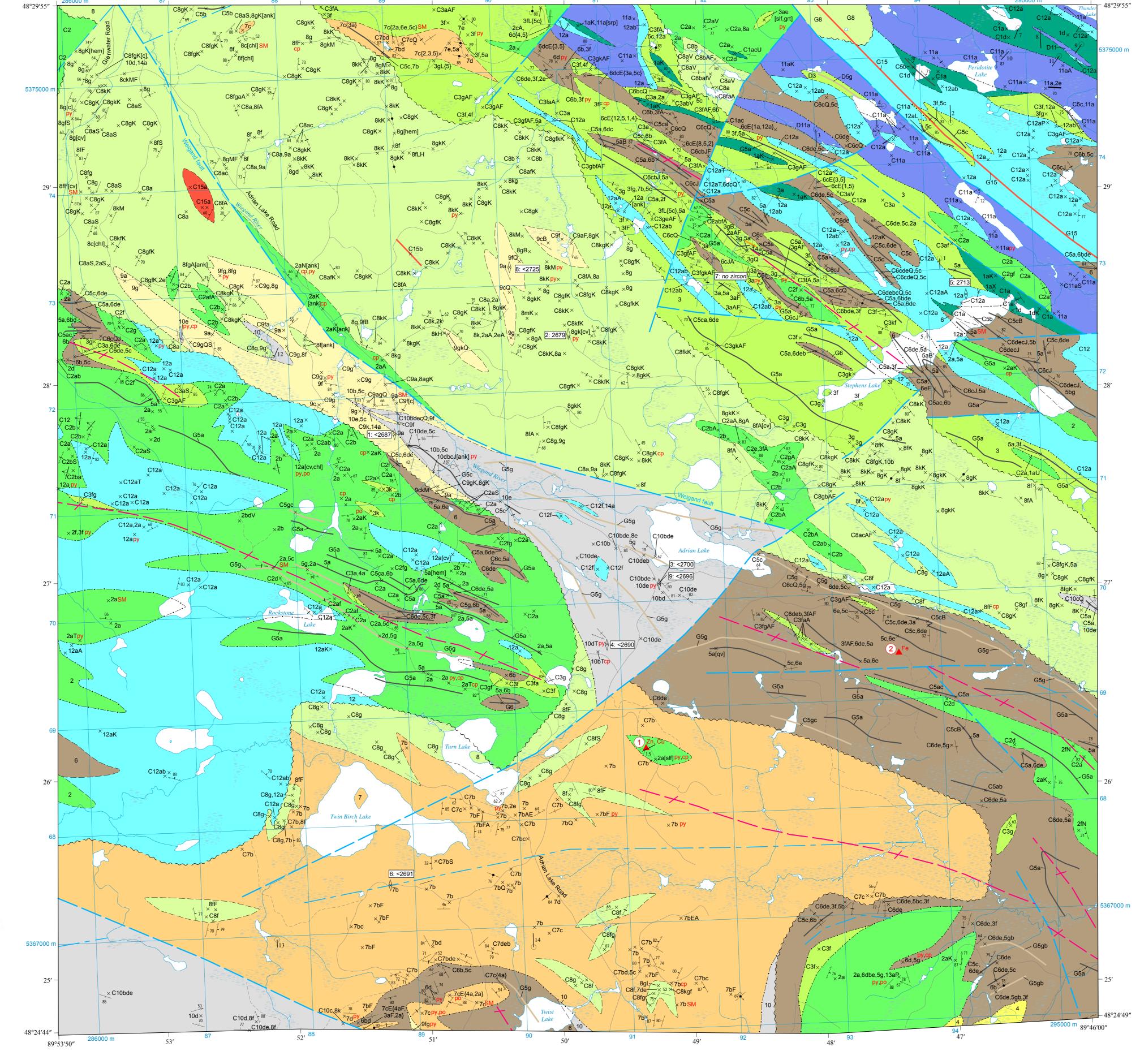
for complete details. <sup>b</sup> Sources: 1 = International Nickel Co. of Canada Ltd. (1966a); 2 = International Nickel Co. of Canada Ltd. (1966b); 3 = Noranda Exploration Inc. (1967); 4 = Salat (1996); 5 = Maclean (2000); 6 = Chamois (2002); 7 = Siemieniuk (2012).

GC-12-03

Number on Map	Mineral	Method <sup>a</sup>	Age (Ma)	Interpretation	Rock Type	Sample Number	Easting <sup>b</sup> (m)	Northing <sup>b</sup> (m)	Source c
1	Zircon	CA-ID-TIMS	<2687±3	Maximum age of deposition. Three distinct ages were obtained from the sample: 2722.7±1.5 Ma, 2693.1±2.9 Ma and 2686.8±2.8 Ma. Deposition occurred during or after 2686.8±2.8 Ma and is likely related to Shebandowan assemblage volcanism.	Felsic tuff	15NS004	288966	5371653	Kamo (2016)
2	Zircon	ID-TIMS	2679±12	The data give an imprecise age, but indicate deposition after Greenwater assemblage volcanism, with deposition likely during Shebandowan assemblage volcanism.	Volcanic breccia	St	290626	5372528	Corfu and Stott (1998)
3	Zircon	ID-TIMS	<2700±4	Maximum age of deposition. These data indicate deposition was after Greenwater assemblage volcanism, but does allow for deposition to have occurred before Shebandowan assemblage deposition.	Wacke	Ad	291386	5370158	Corfu and Stott (1998)
4	Zircon	LA-ICP-MS	<2690	Maximum age of deposition. The detrital zircon data have an age maxima at <i>circa</i> 2690 Ma, which reflects a dominantly Shebandowan assemblage sediment source. This age indicates deposition was during or after Shebandowan assemblage volcanism, but the low precision of the data does not allow further interpretation.	Conglomerate	RL-10-360	290877	5369614	Lodge (2012, 2013)
5	Baddeleyite	CA-ID-TIMS	2713±2	The data indicate the age of emplacement of the gabbro. These data also suggest that Greenwater assemblage volcanism and intrusive activity continued to <i>circa</i> 2713 Ma.	Gabbro	15LMR115	294356	5372761	Kamo (2016)
6	Zircon	LA-ICP-MS	<2691±3	Maximum age of deposition. Unit appears to have been derived from a nearly uniform source and is likely volcanic sandstone deposited during or slightly after volcanism.	Volcanic sandstone	15NS012-1	288769	5367438	Davis (2016)
7		LA-ICP-MS	no zircon		Intermediate to felsic flow	16LRM064	292332	5373040	Davis and Sutcliffe (2017)
8	Zircon	LA-ICP-MS	<2725±3	A selected cluster of zircon from this population scatters within error with an average age of 2725±3 Ma. One interpretation is that the flow was extruded after 2725±3 Ma; however, further interpretation of this age and its relationship to the regional stratigraphy is ongoing.	Felsic flow	16LMR022	290098	5373173	Davis and Sutcliffe (2017)
9	Zircon	LA-ICP-MS	<2696±5	The zircon population from this sample has younger and older groups. The zircons in the older group are zoned, with a combined age of 2725±2 Ma. Zircon in the younger group are not zoned and have a combined age of 2696±5 Ma. The presence of 2 populations indicates a mixed sediment source that was deposited after 2696±5 Ma and, thus, is likely part of the Shebandowan assemblage.	Mudstone to wacke	15NS026	291386	5370158	Davis and Sutcliffe (2017)
10 <sup>d</sup>	Zircon	LA-ICP-MS	<2690	Maximum age of deposition. Largest zircon population is at 2710 to 2720 Ma, which reflects a dominantly Greenwater assemblage sediment source. The presence of younger grains indicates the maximum depositional age is younger than 2690 Ma, suggesting deposition occurred during or after Shebandowan assemblage volcanism.	Wacke	RL-10-019	291133	5364950	Lodge (2012, 2013)
11 <sup>d</sup>	Zircon	ID-TIMS	2721±2	The data indicate there was felsic volcanism at <i>circa</i> 2720 Ma; thus, this unit is likely part of the Greenwater assemblage.	Felsic fragmental volcanic rock	Mr	292056	5364238	Corfu and Stott (1998)

LA-ICP-MS = laser ablation inductively coupled plasma mass spectrometry; U/Pb = uranium-lead. Locations provided as UTM co-ordinates in North American Datum 1983 (NAD83), Zone 16.

<sup>c</sup> Listed under "Sources of Information". <sup>a</sup> Not shown on this map: sample location is in Marks Township.



# **Marginal Notes**

INTRODUCTION This map shows the Precambrian bedrock geology of Adrian Township. It is the third map of a multi-year project focussed on understanding the geology and mineral potential of the eastern Shebandowan greenstone belt. This updated bedrock geology map integrates new field-based lithological and structural data, whole-rock geochemical data and zircon U/Pb ages with previous work completed by exploration companies and the Ontario Geological Survey. Previous bedrock mapping of Adrian Township was completed by Berger (1993, 1995) and provided substantial insight and geological data compiled in the production of this

map. The interpreted structural framework and regional stratigraphy of the Shebandowan greenstone builds on the work of Shegelski (1980), Williams et al. (1991), Corfu and Stott (1998) and Berger (1993). The map portrays 15 rock units shown in the legend. Supracrustal rock units 1 to 6 are generally thought to lie beneath a regional unconformity, whereas supracrustal units 7 to 10 are considered to have been deposited above the unconformity. The similarity of some rock units above and below the unconformity, and the chronostratigraphic resolution afforded by the currently available geochronological data, makes assignment of the position of some outcrops and rock units above and below the unconformity and, locally, the exact position of the unconformity uncertain. Consequently, the coding on the map face may only approximate the stratigraphic age relationships amongst all of the units shown on the map face. Figure 1 displays the interpreted distribution of tectonostratigraphic assemblages in the map area and highlights areas where uncertainty in the relative ages of rocks exists. Intrusive units 11 to 13 have no specific relative timing relationship with respect to the supracrustal units. In particular, rocks of unit 12 were intruded into supracrustal rock units before and after formation of the unconformity. Only intrusive units 14 and 15 are interpreted to have

characteristics of the rocks observed in Adrian Township. Airborne magnetic and electromagnetic surveys (Ontario Geological Survey 2003: Toews and Hunt 2008) were used extensively to map the positions of unconformities, faults and lineaments. Whole-rock geochemical analyses were completed for a suite of representative samples from each map unit to aid in classification and characterization of the rock types and tectonostratigraphic assemblages presented on this map. Diamond-drill hole logs compiled from assessment files were consulted to provide additional geological information for the map area. A simplified representation of these logs is presented in Table 1.

used for clastic rocks in the legend is outlined in Ratcliffe (2016, see

'Terminology") and is intended to highlight the distinguishing

BEDROCK GEOLOGY OF ADRIAN TOWNSHIP The western and northeastern parts of Adrian Township are underlain by massive to pillowed aphyric tholeiitic mafic metavolcanic flows (unit 2) and massive to spinifex-bearing komatiitic basalt to komatiitic ultramafic metavolcanic flows (unit 1). They are interbedded with chemical metasedimentary rocks, such as oxide-facies ironstone, chert,

jasper and graphitic mudstone (unit 5), thin lenses of intermediate metavolcanic rocks (unit 3) and terrigenous clastic metasedimentary rocks (unit 6). The supracrustal rocks are intruded by gabbro (unit 12) and peridotite (unit 11) thought to be the syn-eruptive intrusive equivalents to the mafic and ultramafic metavolcanic rocks. The southeastern part of Adrian Township is underlain predominantly by siltstone and mudstone (unit 6), abundant chemical metasedimentary rocks (unit 5), and a lens in the terrigenous clastic unit (unit 6) of mafic metavolcanic flows and tuffs (unit 2) that have calcalkalic and tholeiitic geochemical signatures. Along the southern boundary in the eastern part of the map area, the terrigenous clastic metasedimentary unit is interpreted to be intercalated with tholeiitic

south into Marks Township. A package of predominantly heterolithic hornblende-phyric and plagioclase-phyric intermediate volcaniclastic metavolcanic rocks (unit 8) trends northwest across the northern two-thirds of the township and consists of tuff, lapilli tuffs, tuff breccia and coarse tuff breccia. Quartz and plagioclase-phyric felsic metavolcanic rocks (unit 9), including flows, auto-brecciated flows, and bilithic lapilli tuffs and tuffs, were observed as thin lenses in the centre of the intermediate volcaniclastic package (unit 8), as well as a larger unit that extends over 2 km along the southwest boundary of intermediate volcaniclastic

amphibolite (unit 2) and felsic metavolcanic rocks (unit 4) that extend

A laterally extensive, 500 to 1000 m thick, unit of intermediate metavolcanic tuff and flows (unit 3), epiclastic volcanic sandstone and conglomerate (unit 7) and terrigenous clastic wacke and siltstone (unit 6) occurs northeast of the northwest-trending intermediate volcaniclastic package (unit 8). These intermediate metavolcanic rocks (unit 3) can be differentiated from the intermediate volcanic rocks (unit 8) to the southwest because 1) the volcaniclastic rocks are much finer grained and flows are present: 2) they are interbedded with thin to medium thick beds of jasper, chert and oxide-facies ironstone; 3) they are intruded by abundant gabbro sills or dikes; and 4) they have different airborne magnetic geophysical signatures.

A large package (approximately 8.5 by 2.5 km) of epiclastic metasedimentary rocks characterized by biotite-bearing volcanic sandstone (unit 7) and lenses of intermediate tuffs and lapilli tuffs (unit 8) trends west along the southern boundary of Adrian Township. This unit is interpreted to have a gradational contact with terrigenous clastic wackes and siltstone (units 6 and 10) to the south and fault-bounded contacts with finer grained terrigenous clastic rocks (unit 10), including mudstone, siltstone and wacke, to the southwest and north. A terrigenous clastic unit of siltstone (unit 6) with a high magnetic signature, and beds of volcanic conglomerate (unit 7) and oxide-facies ironstone (unit 5), is located at the southern map boundary in the southcentral part of the map area.

Lastly, a unit of terrigenous clastic metasedimentary rocks (unit 10) is located in the centre of the map area. It is characterized by thin to medium beds of graphitic mudstone, siltstone and wacke, with some outcrops of mudstone or chert-bearing conglomerate, and is intruded by thin sills and dikes of gabbro (unit 12). This unit is distinguished from the terrigenous clastic metasedimentary package to the southeast (unit 6) by the absence of interbedded ironstone, which is reflected in its magnetic signature (see Figure 2).

# GEOCHRONOLOGY AND STRATIGRAPHY

Two tectonostratigraphic assemblages have been described in Adrian Township (Berger 1993): 1) the Greenwater assemblage deposited at circa 2720 to 2713 Ma (see Table 1) and 2) the unconformably overlying Shebandowan assemblage (circa 2690 Ma: Corfu and Stott 1998). The Shebandowan assemblage was previously defined by a set of field-based lithological criteria (Rogers and Berger 1995, p.10); however, for purpose of this project, it includes all supracrustal rocks deposited at or after circa 2690 Ma. The unconformity between units 1 to 6 and units 7 to 10 has not been observed in outcrop and its existence is based mainly on geochronological and geophysical

There is a generally strong correlation between areas of high magnetic signature in the airborne geophysical data (see Figure 2) and rocks containing interbeds of oxide-facies ironstone; this signature is associated commonly with the older Greenwater assemblage. Rocks with a low magnetic signature tend to be the clastic rocks associated with the younger Shebandowan assemblage. These relationships are illustrated by comparing the bedrock geology map with the image of the second derivative of the total magnetic field shown in Figure 2 and the stratigraphic unit map shown in Figure 1.

The Greenwater assemblage is located in the northeastern and western parts of Adrian Township (see Figure 1). In Marks Township (to the south of the map area), the timing of volcanism for the Greenwater assemblage is constrained to circa 2720 Ma by sample Mr (see Table 2: location 11), but, in northeastern Adrian Township, there is evidence of plutonism (gabbroic intrusions) as young as 2713 Ma (see Table 2: location 5). The Shebandowan assemblage extends northwest across the northern part of Adrian Township and also west across the southern part of Adrian Township (see Figure 1) The maximum depositional ages based on U/Pb zircon geochronology for the Shebandowan assemblage are constrained by samples collected at locations 1, 2, 3, 4 and 9 (see Table 2), and suggest volcanism at circa 2690 Ma and subsequent deposition of terrigenous clastic

metasedimentary rocks.

Rocks of undetermined age in the northeastern part of Adrian Township (see Figure 1) consist of intermediate flows, volcaniclastic rocks and metasedimentary rocks interbedded with chemical metasedimentary rocks that could belong to the Greenwater or Shebandowan assemblages. They appear to be interlayered with gabbroic dikes and sills that belong to the Greenwater assemblage (e.g. see Table 2: location 5). A sample submitted for U/Pb analysis from an intermediate flow unit did not yield any minerals suitable for geochronological analysis and so it remains unclear as to whether the package of intermediate flows and volcaniclastic rocks and chemical metasedimentary rocks was intruded by the gabbroic dikes and sills and is, therefore, part of the Greenwater assemblage or whether the contact between the supracrustal and intrusive rock units is tectonic, with its complexity resulting from folding and faulting.

The terrigenous clastic metasedimentary rocks of undetermined age along the southern boundary of Adrian Township are shown on the map face as unit 6 solely because of the high magnetic signature and the presence of chemical metasedimentary rocks in this unit (see Figure 2). STRUCTURAL FRAMEWORK The interpreted structural framework of the area builds from previous work by Berger (1993) and is based on analysis of bedrock structural

Geological Survey 2003: Toews and Hunt 2008). Three phases of deformation appear to be present in this map area. Bedding measurements in the Greenwater assemblage (see Figure 1) are generally parallel to the magnetic lineaments (see Figure 2), trend northwest and are vertically dipping. Foliations in the Greenwater assemblage are generally steep and typically trend northwest or northeast (particularly in the northwestern part of Adrian Township) Younging directions to the northeast and southwest indicate tight to isoclinal folding of the Greenwater assemblage.

measurements and the airborne magnetic geophysical data (Ontario

In the Shebandowan assemblage, structural observations differ between the west-trending clastic package in the south of Adrian Township and the northwest-trending clastic package in the northern part of the township. Bedding measurements in the southern epiclastic package (unit 7) are subvertical and have a variety of orientations throughout the package. Foliation directions typically trend northnorthwest to north-northeast, except along the southern margin of the unit where they typically trend east-southeast to east-northeast. The bedding orientations in the northern volcaniclastic package (unit 8) are subvertical and generally trend northwest. The foliations in the northern volcaniclastic package have varied trends, but in the northwestern part of the map area are also strongly affected by the northeast fabric that deformed the Greenwater assemblage. The lack of abundant structural fabrics in rocks overlying the unconformity prevents a detailed analysis of the structural history of these clastic packages. The variety of trends related to bedding measurement suggest both clastic packages have undergone folding and northeast-trending foliations suggest a later faulting. It is also noted that these packages do appear to be less deformed than the underlying units of the Greenwater assemblage. Both bedding and foliation measurements in the Greenwater assemblage and interpreted fold patterns in the airborne geophysical data likely reflect folding associated with an early (D<sub>1</sub>) deformation event. Analysis of airborne magnetic and electromagnetic geophysical data also suggests a second deformation event (D<sub>2</sub>) with regional folding that affected both the Greenwater and Shebandowan assemblages. The axial surface traces of these folds trend northwest and likely refolded earlier D₁ fabrics and folds in the Greenwater assemblage. The Weigand fault, previously described by Berger (1993).

trends northwest across the northern part of the township. The location

abundant alteration near the fault, and the presence of electromagnetic

conductors (see Figure 2). It is likely that this fault formed at the same

Greenwater assemblage and refolded earlier Greenwater assemblage

(F<sub>2</sub>) folds. The geophysical data, along with the strong northeast fabric

in the northwestern part of the map area, also suggest the presence of

represent a third stage of deformation (D<sub>3</sub>) that affected the map area.

several northeast-trending faults that offset map units and which

of this fault is based on structural measurements, the location of

time as the northwest fabric deformed the Shebandowan and

MINERALIZATION There are 2 Mineral Deposit Inventory (MDI) occurrences in the township (see "Occurrences"). The iron occurrence in the southeastern portion of the township is associated with a terrigenous clastic unit with abundant beds of oxide-facies ironstone and chert and jasper. A recently identified discretionary occurrence of zinc and copper is based on assay results from compiled diamond-drill logs (Siemieniuk 2012). This mineralization is found in graphitic intermediate to mafic pyroclastic rocks, according to Siemieniuk (2012).

In Adrian Township, some anomalous gold values were reported by Berger (1993) along the Weigand fault. Mafic and ultramafic intrusive rocks and ultramafic metavolcanic rocks in northeastern Adrian Township have the potential to host magmatic nickel-copper-platinum group element (PGF) mineralization, although no significant occurrences are currently identified. New observations in 2016 indicate that ultramafic flows are adjacent to the interpreted Shebandowan-Greenwater assemblages unconformity. Rocks similar to these have been described at the Bateman property in Conmee Township, which has nickel-copper-PGE mineralization in the ultramafic flows and intrusive rocks, and anomalous gold in nearby conglomerate (Lodge, Ratcliffe and Walker 2014; Ratcliffe 2016); these should be examined in

Of the 60 samples submitted for assay analysis during the course of this mapping project, 4 samples contained gold above the lower detection limit, but only in trace amounts ranging from 4 to 59 ppb Au (Ratcliffe 2017). The highest gold value was in a graphitic mudstone with pyrite nodules in southern Adrian Township, whereas the other samples with trace gold were located in a volcanic conglomerate (unit 7) in southern Adrian Township and altered mafic metavolcanic rocks (unit 2) along the Weigand fault. Palladium results were above the detection limit for 9 samples, with contents ranging from 1.6 to 123 ppb Pd. The highest value is in komatiitic basalt south of Stephens Lake whereas the majority of the remaining samples with trace amounts of palladium are from ultramafic intrusive rocks in northeastern Adrian Township. Platinum assay results had 20 analyses above detection limit; contents ranged from 3 to 44 ppb Pt. Again, the majority of these results also came from the ultramafic intrusive rocks in northeastern Adrian Township, in addition to an altered basalt in proximity to the Weigand fault. Complete results are available in Ratcliffe (2017).

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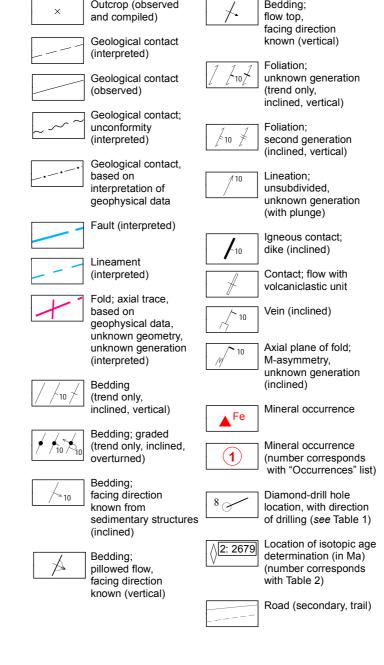
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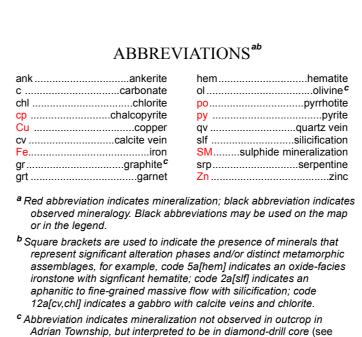
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**SYMBOLS** 



# OCCURRENCES<sup>a</sup>

Number	Name and MDI Number	Deposit Type	Primary Commodity	Original Source
1	Rockstone GC-12-03 MDI000000001816	Discretionary occurrence	Zinc, copper	Siemieniuk (2012)
2	New Fortune 1979 MDI52A05NW00003	Occurrence	Iron	Winston and Hanna Mining Co. (1962)

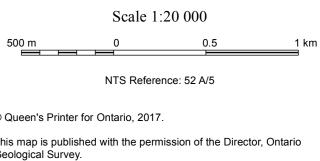


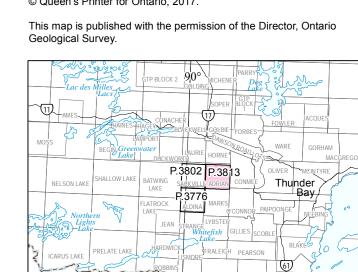
Ontario Geological Survey

PRECAMBRIAN GEOLOGY ADRIAN TOWNSHIP, SHEBANDOWAN GREENSTONE BELT.

WAWA-ABITIBI TERRANE

MAP P.3813





INTRUSIVE CONTACT **Terrigenous Clastic Metasedimentary Rocks** Based on geochronological evidence (see Table 2: samples 3, 4, 9 and 10), this unit is interpreted to overlie the unconformity indicated on the map, and occurs in a package of rocks with a distinctly lower aeromagnetic signature (see Figure 2). 10b Wacke (muddy sandstone) 10c Conglomerate 10d Mudstone

10J Contains clasts of chemical metasedimentary rocks 10Q Contains quartz fragments 10T Brecciated Felsic Metavolcanic Rocks

LEGEND abcde

Sand and gravel, dominantly glaciofluvial deposits

till, dominantly ground moraine; organic deposits

UNCONFORMITY

PLEISTOCENE AND RECENT

**PHANEROZOIC** 

CENOZOIC

**PRECAMBRIAN** 

**PROTEROZOIC** 

**ARCHEAN** 

NEOARCHEAN

14 Mafic Intrusive Rocks

13 Felsic Intrusive Rocks 13a Mica-bearing granite

13P Pegmatitic

Mafic Intrusive Rocks<sup>g</sup>

volcanic flow)

2L Glomeroporphyritic 12P Pegmatitic 12T Brecciated

**Ultramafic Intrusive Rocks** 

ultramafic volcanic flow)

11K Magnesium content (12 to 18% MgO)

11C Cumulate texture h

11b Pyroxenite<sup>h</sup> 11h Hornblendite<sup>h</sup>

11S Schistose

10e Siltstone

9k Tuff breccia

9m Coarse tuff breccia<sup>h</sup>

12b Leucogabbro to anorthositic gabbro 12f Mafic and ultramafic dikes and sills

12K Magnesium content (12 to 18% MgO)

INTRUSIVE CONTACT

11A Fine grained (≤1 mm crystal size; may be, in part,

12A Fine-grained (≤1 mm crystal size; may be, in part, mafic

Mafic Intrusive Rocks 15a Diabase

15b Dike and/or sill

14a Lamprophyre dike or sill

**OUATERNARY** 

Based on geochronological evidence (see Table 2: sample 1 this unit is interpreted to overlie the unconformity indicated on the map, and occurs in a package of rocks with a distinctly lower aeromagnetic signature (see Figure 2). 9a Massive flow; aphanitic to fine grained (<1 mm crysta 9c Autobrecciated flow 9f Tuff and/or crystal tuff

9B Bilithic 9F Feldspar phyric 9K Heterolithic, commonly hornblende phyric ± plagioclase 9M Monolithic 9Q Quartz phyric 9S Schistose

Intermediate Metavolcanic Rocks Based on the presence of heterolithic hornblende- and plagioclase-phyric volcaniclastic rocks that were described as typical of the Shebandowan assemblage (Rogers and Berger 1995, p.10), this unit is interpreted to overlie the unconformity indicated on the map, and occurs in a package of rocks with a distinctly lower aeromagnetic signature (see 8a Massive flow; aphanitic to fine grained (<1 mm crystal

8b Pillowed flow Bc Autobrecciated flow 8d Medium-grained massive flow (1 to 5 mm crystal 8e Synvolcanic dike and/or sill 3f Tuff and/or crystal tuff

8q Lapilli tuff and/or crystal lapilli

3k Tuff breccia

3M Monolithic

7F Feldspar phyric

8m Coarse tuff breccia

8A Amphibole phyric 8B Bilithic 8F Feldspar phyric 8H Heterolithic 8K Heterolithic, commonly hornblende phyric ± plagioclase 8L Lithic fragments

8S Schistose 8V Variolitic Epiclastic Metasedimentary Rocks<sup>i</sup> Based on geochronological evidence (see Table 2: sample 6) this unit is interpreted to overlie the unconformity indicated on the map, and occurs in a package of rocks with a distinctly

lower aeromagnetic signature (see Figure 2). 7b Volcanic sandstone Volcanic conglomerate d Volcanic siltstone 7e Volcanic mudstone 7A Amphibole phyric 7E Contains clasts of volcanic rocks

7Q Contains quartz fragments 7S Schistose UNCONFORMITY

Units 7 to 10 are interpreted to occur above the unconformity. In contrast, rocks of units 1 to 6 either occur beneath the unconformity, or represent rock units where the relationship to the unconformity is uncertain or unknown. The interpreted stratigraphic units present in the map area are shown in Figure 1. **Terrigenous Clastic Metasedimentary Rocks** Wacke (muddy sandstone)

6c Conglomerate 6d Mudstone 6e Siltstone 6A Contains clasts of intrusive rocks 6F Contains clasts of volcanic rocks (epiclastic) 6F Feldspar phyric 6J Contains clasts of chemical metasedimentary rocks GQ Contains quartz fragments

6T Brecciated <sup>h</sup> 5 Chemical Metasedimentary Rocks 5a Oxide-facies ironstone ± chert ± jasper 5b Sulphide-facies ironstone 5g Graphitic mudstone

5B Brecciated or chemical sedimentary rock-rich conglomerate Felsic Metavolcanic Rocks 4a Massive flow; aphanitic to fine grained (<1 mm crystal

4f Tuff and/or crystal tuff 4B Bilithic 4F Feldspar phyric Intermediate Metavolcanic Rocks 3a Massive flow; aphanitic to fine grained (<1 mm crystal 3b Pillowed flow

3e Synvolcanic dike and/or sill 3f Tuff and/or crystal tuff Bg Lapilli tuff and/or crystal lapilli 3k Tuff breccia 3A Amphibole phyric 3F Feldspar phyric L Lithic fragments 3Q Quartz phyric 3S Schistose 3V Variolitic

Mafic Metavolcanic Rocks 2a Massive flow; aphanitic to fine grained (<1 mm crystal 2h Pillowed flow. pillow breccia 2c Autobrecciated flow 2d Medium-grained massive flow (1 to 5 mm crystal size) 2e Synvolcanic dike and/or sill Tuff and/or crystal tuff

2g Lapilli tuff and/or crystal lapilli 2A Amphibole phyric 2F Feldspar phyric 2K Komatiitic basalt (12 to 18% MgO) 2N Calc-alkalic geochemical signature 2S Schistose 2T Brecciated 2V Variolitic

Ultramafic Metavolcanic Rocks Massive flow; aphanitic to fine grained (<1 mm crystal 1c Autobrecciated flow 1d Medium-grained massive flow (1 to 5 mm crystal size) 1K Komatiitic basalt (12 to 18% MgO)

1U Calc-alkalic geochemical signature

1X Spinifex texture <sup>a</sup> This legend is a field legend that incorporates the results of laboratory investigations, including petrography and geochemistry. All Precambrian rocks have been subjected to regional metamorphism many non-metamorphic terms are used for the sake of brevity and where the protolith is established. <sup>b</sup> The Precambrian legend is a lithologic one, and stratigraphic order is not implied by numerical order, unless otherwise noted.

<sup>c</sup> The letter "C" preceding a code refers to data compiled from previous geological maps, particularly from Berger (1995a, 1995b), listed under "Sources of Information". d The letter "D" preceding a rock code refers to data interpreted from logs of diamond-drill core obtained from the AFRI files. See Table 1

for further information. <sup>e</sup> The letter "G" preceding a code refers to data interpreted from

aeromagnetic geophysical surveys listed under "Sources of Information". f Units shown in brackets indicate the rock types of the clasts identified in a clastic rock, for example 6cE{3,5} is a conglomerate with volcanic clasts derived from unit 3, as well as chemical sedimentary rocks g The majority of mafic intrusive rocks (unit 12) in the map area are synvolcanic mafic dikes and/or sills in the Greenwater assemblage;

dikes and/or sills of mafic intrusive rocks (unit 12) that occur in units 8 and 10 are interpreted to be younger and are considered to be part of the Shebandowan assemblage <sup>h</sup> Unit not observed in outcrop in Adrian Township, but interpreted to be in diamond-drill core (see Table 1). This unit is characterized as a package of clastic rocks that contains a significant volcanic component, as well as non-volcanic components, and was likely deposited by sedimentary processes (e.g., reworked

tuff in this nomenclature would be called a volcanic sandstone).

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SOURCES OF INFORMATION Digital base map information derived from the Land Information Ontario Warehouse, Land Information Ontario, Ministry of Natural Resources and Forestry, scale 1:20 000, with modifications by staff of the Ministry of Northern Development and Mines. Mapping conducted using UTM co-ordinates in North American Datum 1983 (NAD83), Zone 16. Compiled geology, geochronology and geophysical interpretation Berger, B.R. 1993. Geology of Adrian and Marks townships; Ontario Geological Survey, Open File Report 5862, 90p.

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Geology is not tied to survey lines. Magnetic declination, for centre of map area, is approximately 3°16.3' W

Metric conversion factor 1 foot = 0.3048 m.

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Survey publication. Ratcliffe, L.M. 2017. Geological, geochemical and geophysical data from Adrian Township, Shebandowan greenstone belt, Wawa-Abitibi terrane; Ontario Geological Survey, Miscellaneous Release—Data 346.

Every possible effort has been made to ensure the accuracy of the information presented on this map; however, the Ontario Ministry of Northern Development and Mines does not assume liability for errors that may occur. Users should verify critical information. Issued 2017

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form. Ratcliffe, L.M. 2017. Precambrian geology of Adrian Township, Shebandowan greenstone belt, Wawa-Abitibi terrane; Ontario Geological Survey, Preliminary Map P.3813, scale 1:20 000.

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.