Agrium

Kapuskasing Phosphate Operations
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TECHNICAL REPORT ON THE WINTER 2000

EXPLORATION DRILLLING PROGRAM

Cargill Township
District of Cochrane
Ontario
NTS 42 G/7

Kapuskasing, Ontario
August, 2000

Reno Pressacco, M. Sc(A), FGAC
Geologist
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SUMMARY

A program of exploratory drilling was conducted on the site of the Kapuskasing Phosphate Operations during the period between January and April of 2000. The program was designed to search for additional phosphate-bearing material beyond the current limits of the proposed Open Pit Mine, and to attempt to expand the limits of selected ore zones.

A total of 2 483 metres of core were produced from 29 drill holes. For the most part, this method of drilling proved rather effective in the recovery of unconsolidated materials. Recoveries were somewhat variable with the different material types, but on an overall basis the recoveries were on the order of 70 to 80%. With some revisions to our procedures, this drilling technique provides a superior sample for our purposes to the alternatives of Reverse Circulation and Sonic Drilling. Specific advantages include increased depth penetration, ability to traverse hard / cemented sections, and a solid recovered core of unconsolidated material which is an immense aid in identification and analysis of the material.

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STATEMENT OF QUALIFICATIONS

I, Reno Pressacco, currently residing at 33 Clark Street, Kapuskasing, Ontario do hereby certify the following:

1) That I am employed by Agrium General Partnership in the capacity of Geologist at the Kapuskasing Phosphate Operations,
2) That I hold the following degrees:

   Applied Masters Degree in Mineral Exploration, 1986, McGill University
   B. Sc.in Geology, 1984, Lake Superior State College, Sault Ste. Marie, MI
   Geological Technology Certificate, Cambrian College, 1982,
3) That I have been practicing my profession since 1979, and
4) That I am a member of the following Associations:

   Geological Association of Canada
   Porcupine Prospectors and Developers Association
   Prospectors and Developers Association of Canada

R. Pressacco Aug 29/00

Kapuskasing, Ontario
August, 2000

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1.0 INTRODUCTION

A program of exploratory drilling was conducted on the Agrium Kapuskasing Phosphate Operation Mine Site located in Cargill Township during the period between January and April, 2000. This program was designed to search for additional phosphate-bearing material beyond the current limits of the proposed Open Pit mine, and to attempt to expand the limits of selected ore zones.

2.0 LOCATION, ACCESS, AND CLAIMS

The mine site is located in the north western portion of Cargill Township, the southern portion of Cumming Township, and the eastern portion of Ecclestone Township, approximately 30 kilometres south west of the town of Kapuskasing, Ontario (Figure 1). Access to the mine site is provided by all-weather gravel roads departing from the town. The current land holdings are held in the name of Viridian Inc., a predecessor company to Agrium General Partnership, and constitute a series of Mining Leases, unpatented mining claims, and Licenses of Occupation (Figure 2). Table 1 provides the relevant details pertaining to the claims on which the work was done:

Table 1. List of claims and mining leases covered in the Winter 2000 drilling program.

Claim No.	Lease No.	Area (Ha)	Amount Drilled (m)	Total Cost
89918	104714	19.89*	634	$52,646.85
89917	104714	21.63*	933	$84,933.52
78657	104714	16.32*	135	$9,474.34
78658	104714	18.66*	331	$20,099.83
413074	104395	2254.43	176	$11,015.67
413076	104395	2554.43	172	$15,543.22
413708	104395	2554.43	70	$4,332.32
424534	104381	625.68	32	$1,852.58
TOTAL			**2 483**	**$199,898**

*Note: these claims are contained as individual parcels within the mining lease.

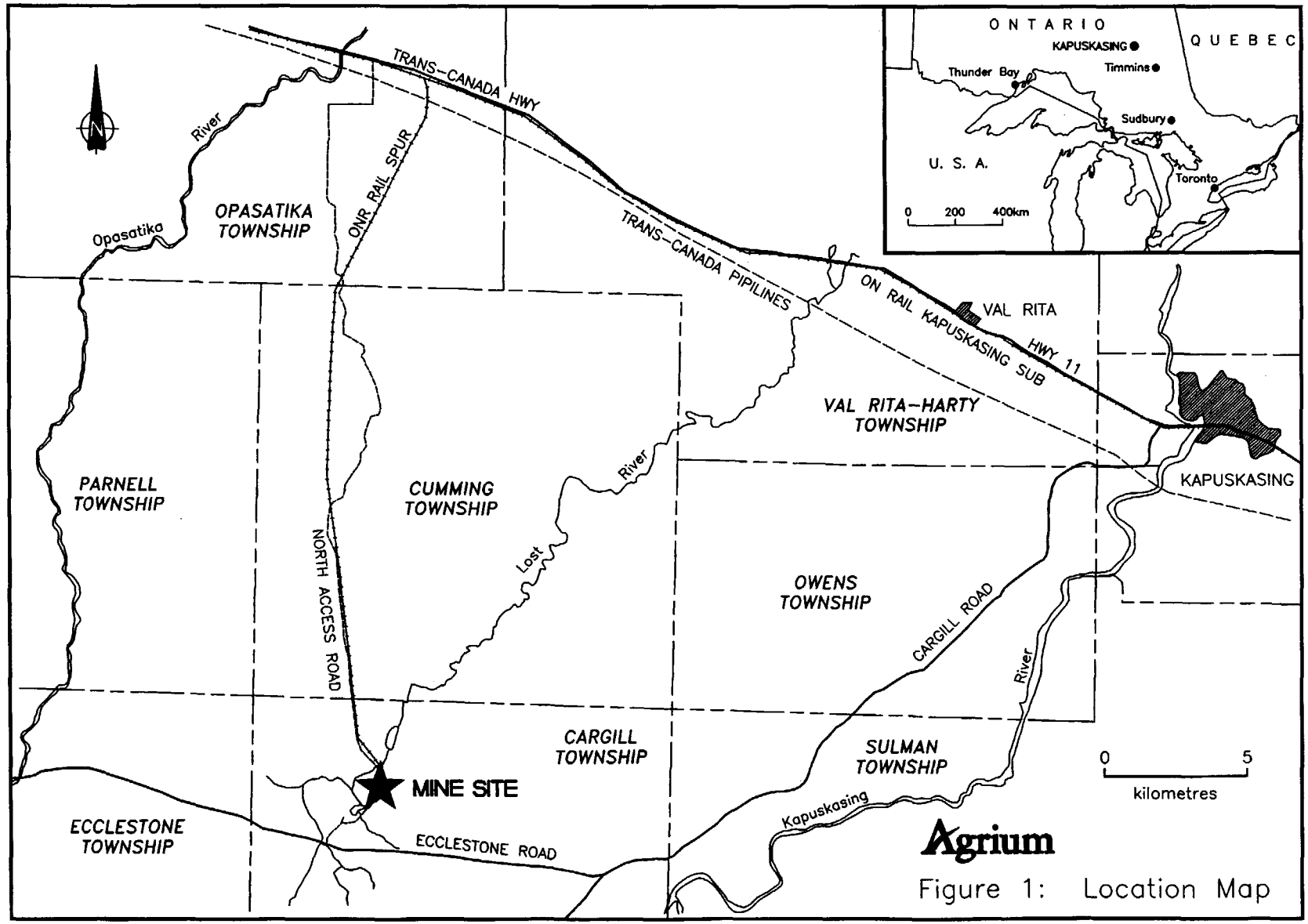


Figure 1: Location Map

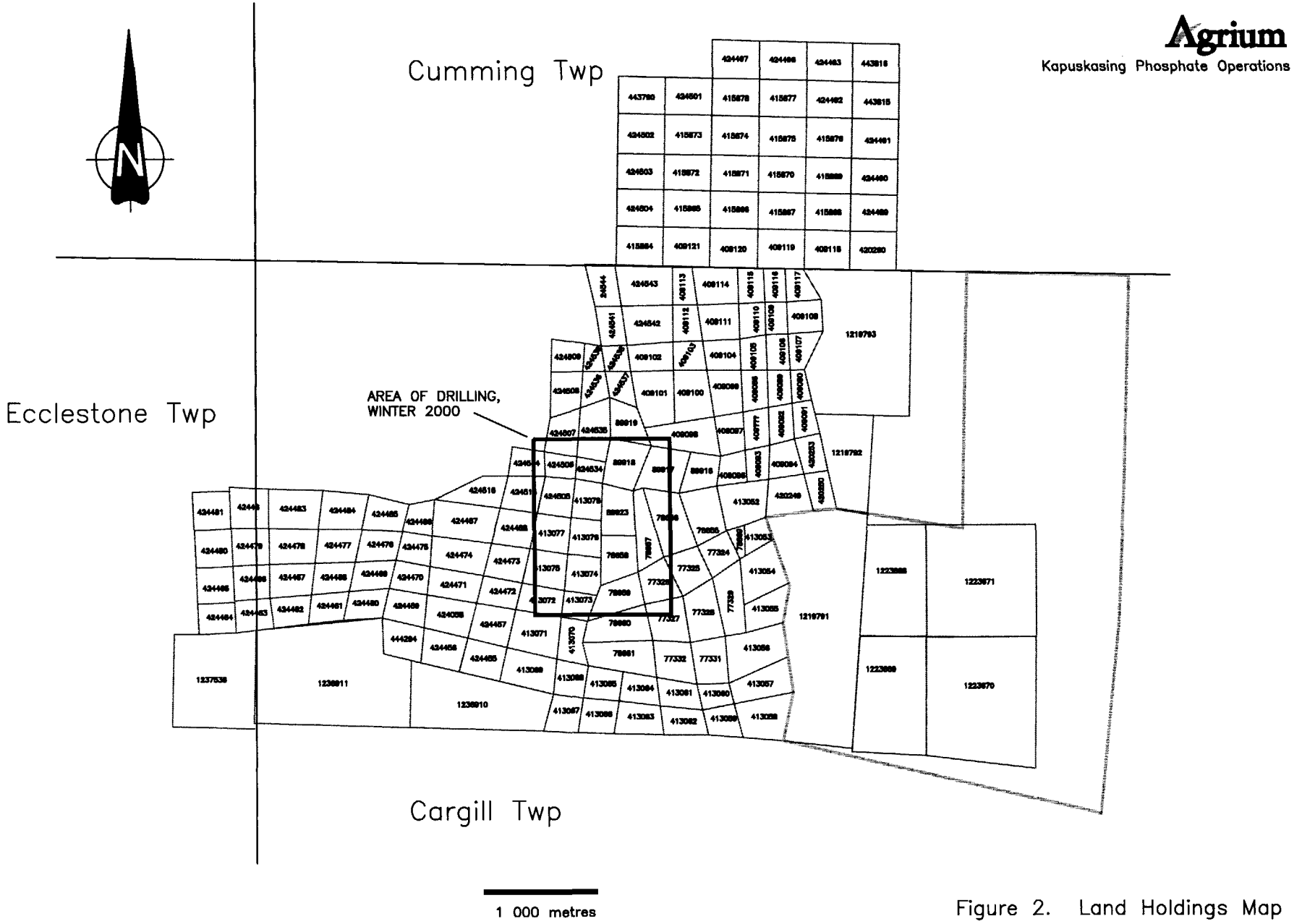


Figure 2. Land Holdings Map

3.0 PREVIOUS WORK

The first record of exploration work on the property was by Continental Copper Mines Limited who conducted a diamond drilling program in 1955 to examine a magnetic anomaly for it's potential of hosting copper-nickel mineralization. The phosphate potential of the property was first discovered in 1974, and subsequent work lead to a commencement of full scale production. A listing of the exploration and development activities on the property is given below:

1955: **Continental Copper Mines Limited**, Diamond drilling (rotary), 7 holes, 945 metres.

1970: **Kennco Exploration (Canada) Limited**, Diamond drilling (rotary), 6 holes, 1 062 metres.

1975: **International Minerals and Chemical Corporation**, Reverse Circulation drilling, 201 holes, 18 515 metres.

1980: **Sherritt Gordon Mines Limited**, Auger and Sonic drilling, 103 holes, 4 862 metres.

1981: **Sherritt Gordon Mines Limited**, Sonic drilling, 11 holes, 162 metres.

1985: **Sherritt Gordon Mines Limited**, Percussion drilling, 22 holes, 78 metres.

1995: **Sherritt Inc.,** Reverse Circulation drilling, 25 holes, 2 315 metres.

1996: **Viridian Inc.,** Reverse Circulation drilling, 78 holes, 7 530 metres.

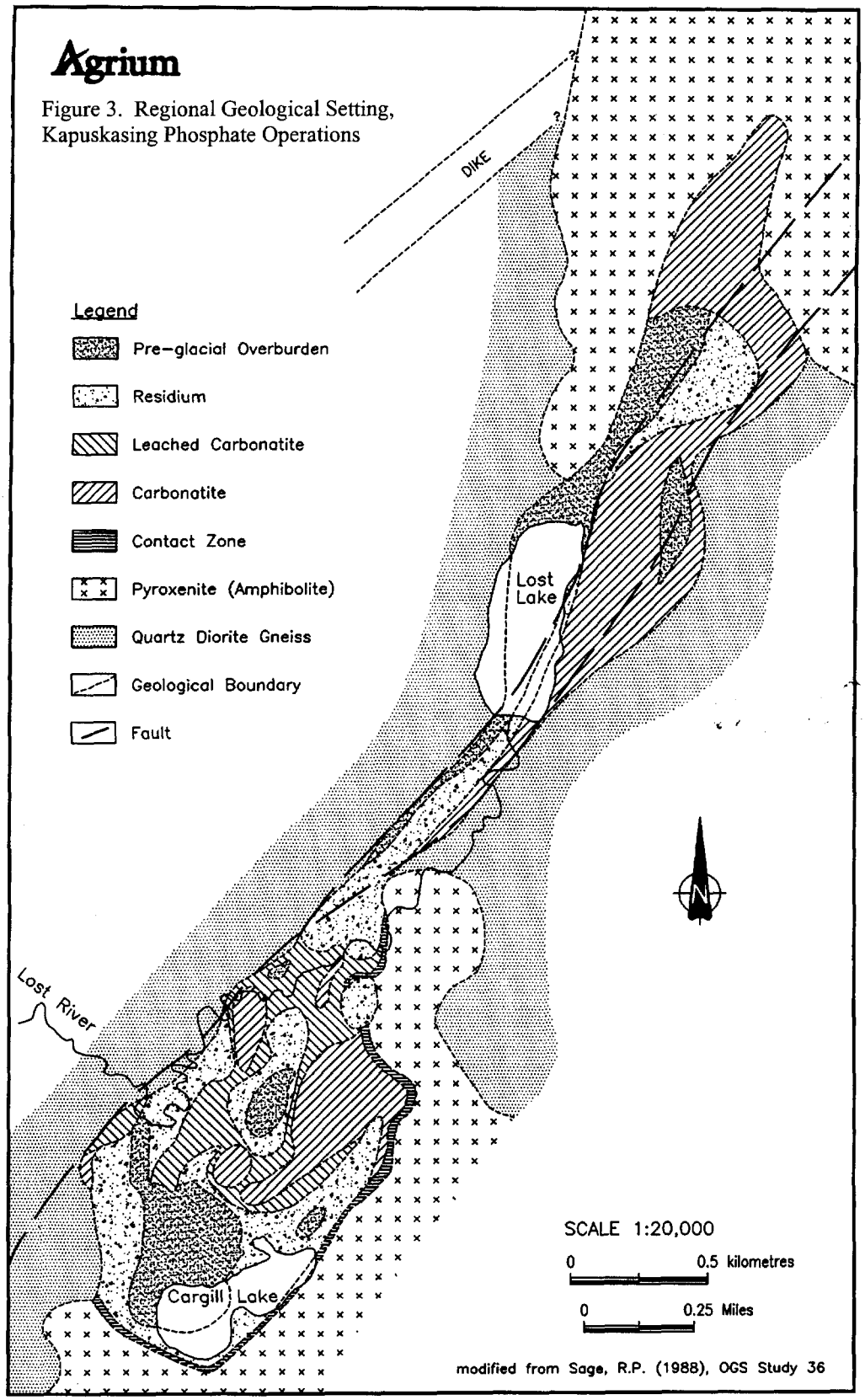
1997: **Agrium Inc.**, Diamond drilling (Rotary), 7 holes, 624 metres.

1998: **Agrium Inc.**, Sonic drilling, 5 holes, 403 metres.

4.0 GEOLOGICAL SETTING

The property overlies rocks situated within the Kapuskasing Structural Zone (KSZ). This is a northeasterly striking, fault-bounded feature which is interpreted be an up-thrusted block of material from the lower portions of the earth's crust. All of the rocks within the KSZ have been metamorphosed to either amphibolite or granulite facies.

The local geology consists of a core complex of multi-phased carbonatite rocks which are surrounded by a ring of pyroxenite, and have provided a U-Pb age date of 1907 Ma +/- 4 (Sage, 1988). These two rock types are in turn situated within quartz diorite gneisses that form a large portion of the Kapuskasing Structural Zone (Figure 3). The carbonatite host rock is sub-divided into two sub-types: sovite and rauhaugite. The sovite


Agrium
Figure 3. Regional Geological Setting,
Kapuskasing Phosphate Operations
DIKE
Legend
Pre-glacial Overburden
Residium
Leached Carbonatite
Carbonatite
Contact Zone
Pyroxenite (Amphibolite)
Quartz Diorite Gneiss
Geological Boundary
Fault
Lost Lake
Lost River
Cargill Lake
N
SCALE 1:20,000
0 0.5 kilometres
0 0.25 Miles
modified from Sage, R.P. (1988), OGS Study 36

is a medium to coarse grained, white, banded rock in which calcite is the dominant carbonate species and it includes accessory minerals such as phlogopite, magnetite, clinohumite, apatite, olivine, pyrrhotite, and amphibole. Apatite can reach 15% abundance in this rock type (Sage, 1988). In sharp contrast to the sovite, the rauhaugite appears as a massive, fine grained, dense, beige to tan coloured rock in which dolomite is the dominant carbonate species. Phosphate values can range to 14% P_2O_5 in the rauhaugite.

The high grade ore at the Kapuskasing Phosphate Operations is derived from the weathering and dissolution of the soluble minerals in the host carbonatite rock (eg. phlogopite). This process has left behind a residue of the insoluble minerals, largely apatite crystals, which is termed residuum. This residuum is formed above the host carbonatite, and is in turn covered by glacial deposits of lacustrine clays, and boulder tills of the Pleistocene age. Limited data suggest that this weathering took place during the late Cretaceous period (Sage, 1988).

In terms of a reference grid, the UTM co-ordinate system has been adopted (NAD 27, Zone 17).

Additional details regarding the mining, milling, and processing at the Kapuskasing Phosphate Operations are given in Pressacco (2000).

5.0 DESCRIPTION OF THE WINTER 2000 DRILLING PROGRAM

A total of 2 483 metres of core were produced from 29 drill holes. All of the holes were spotted by means of a Trimble PRO XRS GPS system with referencing to known survey monuments. The collars of all of the holes were re-surveyed after their completion to determine the as-drilled hole location. The drilling was conducted by Bradley Bros. of Timmins, Ontario under the supervision of Peter Marenghi, (Geologist, Agrium Kapuskasing Phosphate Operation), with assistance from the author. The program began in late January, 2000 and was completed with the termination of hole AGR-00-030 on April 17, 2000. The drilling was conducted with the goal of recovering as much of the unconsolidated materials as possible, and to that end, a triple-tube arrangement using regular NQ-sized drill rods was utilized for those materials lying above the rock surface. Once the rock contact was reached, the drilling method switched over to a normal NQ-sized recovery method. All of the recovered material was logged by Peter Marenghi, and is currently stored at the mine site of the Agrium Kapuskasing Phosphate Operations. Copies of the detailed drill logs are provided in Appendix I, and plans and sections of the drill holes are given in Appendix II.

6.0 CONCLUSIONS

For the most part, this method of drilling proved rather effective in the recovery of unconsolidated materials. Recoveries were somewhat variable with the different material types, but on an overall basis the recoveries were on the order of 70 to 80%. With some revisions to our procedures, this drilling technique provides a superior sample for our

purposes to the alternatives of Reverse Circulation and Sonic Drilling. Specific advantages include increased depth penetration, ability to traverse hard / cemented sections, and a solid recovered core of unconsolidated material which is an immense aid in identification and analysis of the material.

7.0 REFERENCES

Clark, D.R., and Duncan, D., 1999, The Development of Agrium's Phosphate Mine in Kapuskasing, Ontario: *in* CD ROM proceedings volume of the 101st Annual General Meeting of the Canadian Institute of Mining, Metallurgy, and Petroleum.

Pressacco, R., 2000, Overview of the Agrium Kapuskasing Phosphate Operation in CD ROM Proceedings Volume of the Mining Millennium 2000 International Convention and Trade Exhibition.

Sage, R.P., 1988, Geology of Carbonatite-Alkalic Rock Complexes in Ontario: Cargill Township Carbonatite Complex, District of Cochrane: Ontario Geological Survey Study 36, 92 p.

Sandvik, P.O., and Erdosh, G., 1984, Geology of the Cargill phosphate deposit in Northern Ontario: *in* The Geology of Industrial Minerals in Canada, CIMM Special Volume 29, p. 129-13.

R. Pressacco Aug 29/00

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Agrium, Kapuskasing Phosphate Operations

APPENDIX I

DRILL LOGS

PL MJ. Aug 25, 2000

AGR-00-001

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DIVISION: _____ PROJECT: WINTER Exploration 2000 LOGGED BY: P. MARENGHI DATE LOGGED: Feb 9, 00 DRILL HOLE NO: AGR-001

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462 154	367729	242.3	71.0 m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
71.0	0	-90												

START DATE: Feb 2, 2000

FINISH DATE: Feb 5, 2000

TOWNSHIP: Cargill Twp

CLAIM NO.: 89917 (Lease # 104714)

DRILLING CONTRACTOR: BRADLEY BRO's

PURPOSE: _____

RESULTS: _____

WHY HOLE TERMINATED: Normal Termination

CORE SIZE: NQ3 / NQ

CASING: _____

HOLE CEMENTED: NO

NO. OF ASSAYS: 3

NO. OF ICP: _____

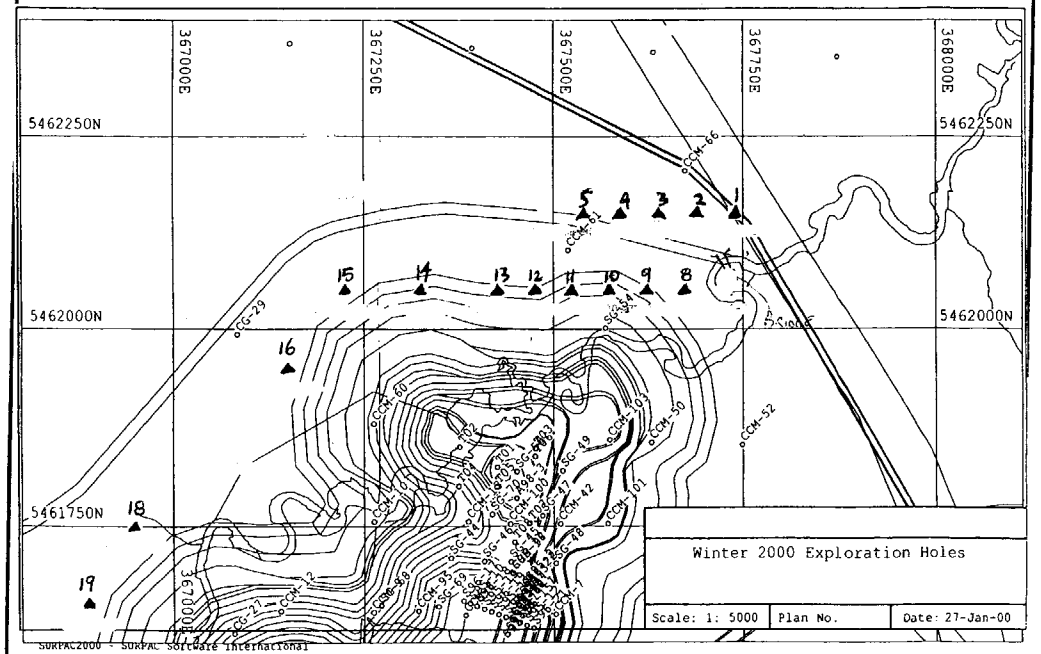
NO. OF WRA: _____

REJECTS/PULPS SAVED: _____

CORE STORED (LOCATION): AGRIUM KPO MINE SITE

☐ ft
☑ m

Location Sketch



Hole Number AGR-001 **Page** 1 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	14.3		Clay: Pleistocene glacial lake clay, medium brown to grey in color. 1st meter is lingite material from swamp deposits. Total recovery is 4m = 28%. No pebbles or boulders present in this section.	4m = 28%
14.3	23.0		Boulder Zone: Very poor recovery 0.7m = 8%. Material lost in front of diamond drilling bit due to variance of hardness between the gravel material and the boulders. Mixed variety of granite/diorite gneiss boulders with minor mafics.	0.7m = 8%

Hole Number A6R 001 **Page** 2 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
23.0	32.5		Sand (quartz): Cretaceous pre-glacial Sand composed of mainly quartz grains with minor lesser amounts of K-feldspar, mica, magnetite. Grainsize is < 1mm. Local granite gneiss boulders. Recovery = 6.5m = 68%. Boulders are mostly located in the lower part of the section. (check Sample A11C001, from 23.0 to 24.0 m) 1m note: Unit classified into Pleistocene due to granite gneiss boulders.	6.5m = 68%

Hole Number AER-001 **Page** 3 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
32.5	47.0		Weathered Pyroxenite : lime to olive green in color, soft brittle texture moderately magnetic. Local large flakes/slabs ≃ 1cm Olivine crystals. Local rust (hematite from breakdown). Total recovery 6.5m = 45%	6.5m = 45%
			- Check sample A110002 from 38.0 to 41.0 (1m) (poor recovery)	
47.0	71.0		Pyroxenite : pine green, badly broken amphibole-olivine pyroxenite, very magnetic, blebs of hematite (red), locally weathered as above. Total recovery 10.5m = 44%	10.5m = 44%
			- Check Sample A110003 from 68.0 to 71.0 (1.3m) (poor recovery)	
71.0			ECH.	

Pat Ng/. Aug 25, 2000

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DIVISION: PROJECT: Winter 2000 LOGGED BY: PETER MARENGA DATE LOGGED: Feb 7/00 DRILL HOLE NO: AGR-00-002

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462155	367680	242.8	107.0 m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
107	0	-90												

START DATE: Feb 5, 2000

FINISH DATE: Feb 7, 2000

TOWNSHIP: Cargill

CLAIM NO.: 83917 (Lease # 104714)

DRILLING CONTRACTOR: Bradley Bros

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ 3/NQ

CASING: All recovered

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

D&P 35361

Hole Number AGR-002 **Page** 1 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
4.40	8.20		Clay: Pleistocene glacial lake clay, medium brown to grey in color. Recovery = 2.2m = 58% No pebbles present in this clay.	2.2m = 58%
8.20	19.70		Quartz sand: Cretaceous pre-glacial sand of <1mm grain size and containing up to 10% 0.5 - 1cm pebbles of varying composition. Composed primarily of quartz, Kaolinite with lesser amounts of feldspar, micas, magnetite... Recovery = 5.5m = 49%	5.5m = 49%
			* note: Unit is classified into the pleistocene based on stratigraphic position and inclusion of polymictic pebbles.	

Hole Number AGR - 002 **Page** 2 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
19.70	35.2		Boulder Till : Pleistocene? Light grey boulder till consisting of 30% 0.5 cm - 0.5 m boulders/pebbles of varying composition contained in a matrix of clay/fine sand. Recovery = 5.7 m = 37%. The boulders are probably the main cause of the low recovery.	5.7 m = 37%
			20 - 23 m = 0.6 m, all rock/boulders	
			23 - 26 m NO recovery	
			26 - 27 m = 0.6 m, all rock/boulders	
			27 - 32 m = 2.6 m, Till/boulders	
			32 - 35.2 m = 1.9 m	
			A110004 From 27.0 to 28.0 m	
			A11005 28.0 - 32.0 m	
			A11006 32.0 - 35.2 m	

Hole Number Agr - 002 **Page** 3 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
35.20	60.45		Red Clay: Brick red to crimson in color, pastey and gritty texture. Gossan appearance, visible chunks of limonite and bedding foliation when core is split. Non magnetic over all. Locally, some sections are more ferrigeneous than the rest of the section. Lower 5 meters grades into the following unit (red to brown). Total recovery= 15.23m = 52.0%. Weathered pyroxenite 5-10% stringers of py/sideite? beige/off white.	15.23m= 52.0%
65.48	107.0		Pyroxenite: First 4m are weathered and broken. Dark green, coarse grained pyroxenite. Strongly magnetic. Total recovery = 19.5m = 47%	19.5m= 47%
	107.0		EOH	

P1 Mg 1. Aug 29, 2000

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DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: Feb 18/00 DRILL HOLE NO: AGR-00-003

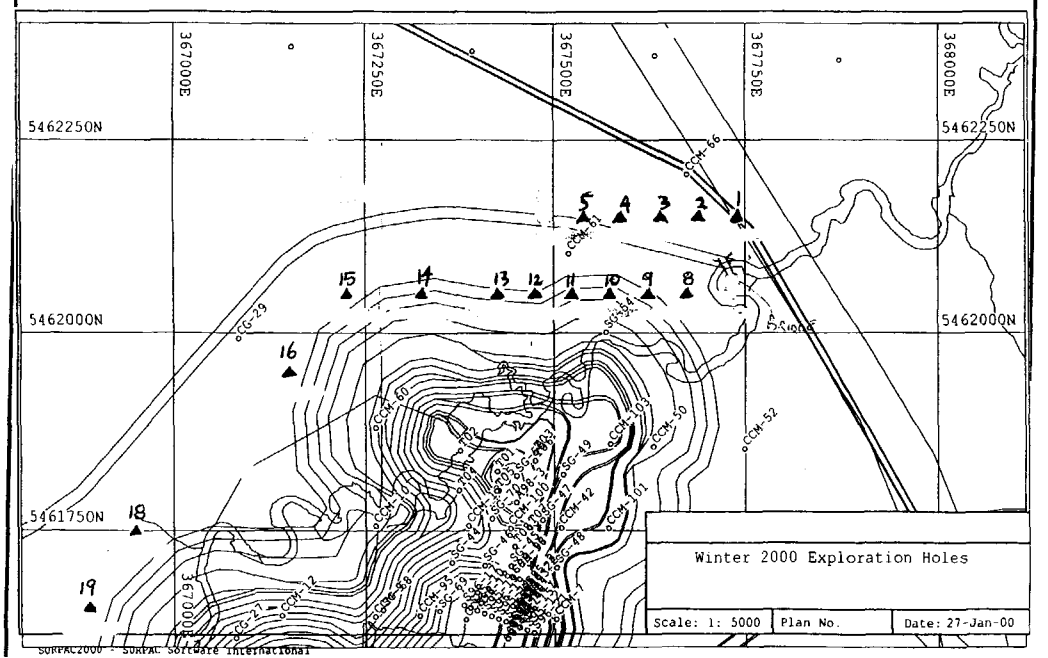
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462157	367633	24.9	301.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
301	0	-90												

START DATE: Feb 7, 2000
FINISH DATE: Feb 18, 2000
TOWNSHIP: Cargill
CLAIM NO.: 89917 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS: Inner tube got stuck in sand. Hole caved in, Rods got stuck.
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 / NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number Agr - 003 **Page** 1 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	22.5		Grey clay: Pleistocene glacial lake clay, grey in color, several 3m boulder zones where recuperation is very poor (<10%) Some sandy sections locally. Total recuperation = 11 m = 49%	11 m = 49%
22.5	26.0		Quartz sand: Pre-glacial quartz sand with minor feldspar, mica, magnetite... Some 1m sections of clay which is probably boulder clay from the following unit. Boulders are mainly granitic gneiss. Total recuperation = 2.5m = 71%	2.5m = 71%
			* note: This unit is classified into the pleistocene due to stratigraphic position and polymictic character.	

Hole Number Agr - 003 **Page** 2 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
26.0	30.0		Boulder Till: Greyish green clay containing about 30% boulders and pebbles of varying size. Boulders are mostly granitic gneiss. Some sandy (quartz) sections. Recuperation = 3.5m = 88%	3.5m = 88%
30.0	92.0		Weathered Intrusive?: Coarse grained (0.5cm) red, non-magnetic intrusive? Rock that weathers to a bleached pink. Black coarse grained mineral that looks like garnet. Progressively weathering to mud down hole. Gradual lower contact. Recovery = 28.5m = 46% * Note: Subsequent examination leads to interpreting this unit as an oolitic unit of the red clay sequence. - Cretaceous age.	28.5m = 46%

Hole Number Agr - 003 **Page** 3 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
92.0	172.00		Red Clay: Brick red homogeneous clay with some sections of the above unit. Some visible textures of protolithe. No visible apatite xtals. Recovery = 76.5 m = 96%	76.5 m = 96%
172.0	218.0		Mixed zone: (check) A110029 Mixture of red clay, sovite, boulders, sand (silica), brown mud and bleached mud. Proportions are about equal but locally the sovite prevails. Recovery = Large magnetite xtals throughout	= 60%
218.0	287.0		Brown B2 ore: Tan to brown cemented, and unconsolidated B2 type ore. Very consistent and homogeneous. ≃ 10 - 12% visible fine grained apatite xtals. Check A110030, A110031	= 60%

Hole Number Agr-003 **Page** 4 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
287.0	301.0		Cemented ore / Rauhaugite: Badly broken, fine grained light grey to light tan rock with minor brown mud.	≈50%
301.0			EOH	

[illegible] Aug 29, 2000

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DIVISION:

PROJECT: Winter 2000

LOGGED BY: P. MARENGHI

DATE LOGGED: 23, Feb, 2000

DRILL HOLE NO: AhR-00-004

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462153	367571	241.7	116.0 m		
Engineering Grid:	-					

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
116	0	-90												

START DATE: Feb 18

FINISH DATE: Feb 21

TOWNSHIP: Cargill

CLAIM NO.: 89918 (Lease # 104714)

DRILLING CONTRACTOR: Bradley Bros.

PURPOSE:

RESULTS:

WHY HOLE TERMINATED: Lost water @ 109m, geologist stopped the hole.

CORE SIZE:

CASING: NQ-3 / NQ

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

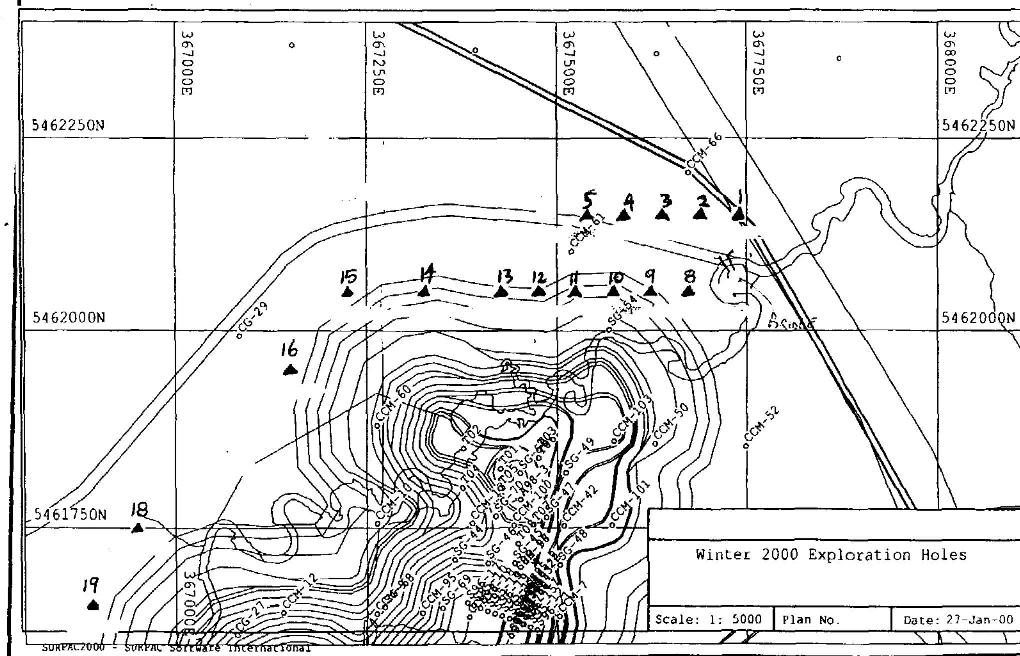
NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Agrium Kapuskasing Phosphate Operation

Hole Number Agr - 004 **Page** 1 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	14.0		Glacial Clay: Grey gumbo clay. Recovery = 12m = 86%	12m = 86%
14.0	32.0		Boulder till: Grey silty till containing up to 30% pebbles and boulders of predominantly granitic gneiss. Recovery = 5m = 28%	5m = 28%
32.0	44.0		Weathered granitic gneiss: Becoming progressively weathered with depth, turning to a brown clay/sand/mud. Characteristic lime green mineral as fracture filling/plating. Recovery = 9.5m = 79%	9.5m = 79%
44.0	77.0		Brown sand/mud: Possibly weathered rauhaugite from the next unit. Dark to medium brown,	19m = 58%

Hole Number Agr-004 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
			mud/sand. Recovery = 19m = 58%	
77.0	116.0		Rauhaugite: Tan brown aphanitic with numerous cavities filled with xtalline calcite/quartz.	= 85%
116.0			EOH	

Pat Wyl Aug 29, 2000

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Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: Feb 22/00 DRILL HOLE NO: AGR-00-005

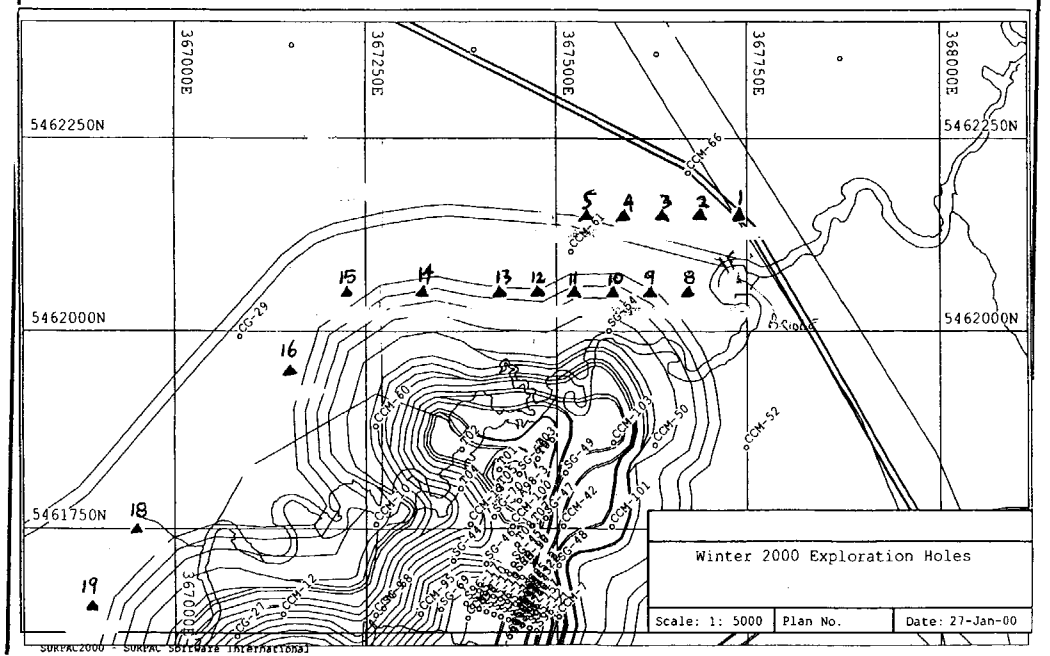
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462154	367527	241.7	37.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
37	0	-90												

START DATE: Feb, 21
FINISH DATE: Feb 22
TOWNSHIP: Cargill
CLAIM NO.: 9991E (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (NQ)
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium minesite

☐ ft
☒ m

Location Sketch



Agrium Kapuskasing Phosphate Operation

Hole Number Agr-005 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	11.0		Glacial clay: Grey gumbo clay, very soft and consistent. Recovery = 3.55m = 32%	3.55m = 32%
11.0	14.0		Pre-glacial Boulder Till: Grey boulder till containing 10-20% various sized boulders and pebbles of granitic gneiss (mainly) Recovery = 3m = 75% * Note: This boulder till unit is classified as pleistocene in age.	3m = 75%
14.0	37.0		Granitic gneiss: Well foliated grey-green granitic gneiss (biotite, quartz, feldspar) Some local weathering turning the rock soft and a lime green color similar to epidote. Recovery = 12m = 52%. Badly broken core overall.	12m = 52%
37.0			EOH	

Exploration Drill Hole Log

PL Mylr Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 22/00 DRILL HOLE NO: AHR-00-006

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461253	367122.6	240.18	63.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
63	0	-90												

START DATE: March 20
FINISH DATE: March 22
TOWNSHIP: Cargill
CLAIM NO.: 413076 (Lease # 10495)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:

RESULTS: Core barrell got full of sand.

WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (NQ)
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

Hole Number AGR-006 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	5.00		VARVE Clay Brown, homogeneous clay	1m =
5.00	17.00		Gumbo clay Grey, homogeneous clay	3m =
17.00	39.00		Cemented ore? Medium to dark grey fragmental rock with some visible apatite xtals. Some residium over the 1st 2m.	9m =
39.00	63.00		Carbonatite Rock (Sovite) Light to medium grey, badly broken, schistosity c 60° to C.A. 1-2% coarse magnetite xtals. Local cemented sections.	18.m =
	63.0	End of Hole.		

Pf Wy 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 22/00 DRILL HOLE NO: AH-00-07

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461250	367180	242.0	44.0 m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
44	0	-90												

START DATE: March 22

FINISH DATE: March 22

TOWNSHIP: Cargill

CLAIM NO.: 78658 (Lease # 104714)

DRILLING CONTRACTOR: Bradley Bros.

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 (NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium mine site

☐ ft
☒ m

Location Sketch

Hole Number AGR-007 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	5.00		Gumbo clay Grey to Brown varve/Gumbo	1m =
5.00	17.00		Boulder Till 40-50% granitic gneiss boulders (some mafics) in grey clay (last m = sand).	1.5m =
17.00	21.00		Cemented ore? Dark grey fragmental rock with traces of visible apatite xtals.	3m = 100%
21.00	44.00		Carbonatite Rock (Gouik) Light to medium grey carbonatite with traces of coarse grained magnetite xtals. Locally cemented (@ 32m). Schistosity @ 20° To C.A.	22.5m =
44.0		EOH		

TK MG 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: Feb 23 /00 DRILL HOLE NO: AHR-00-008

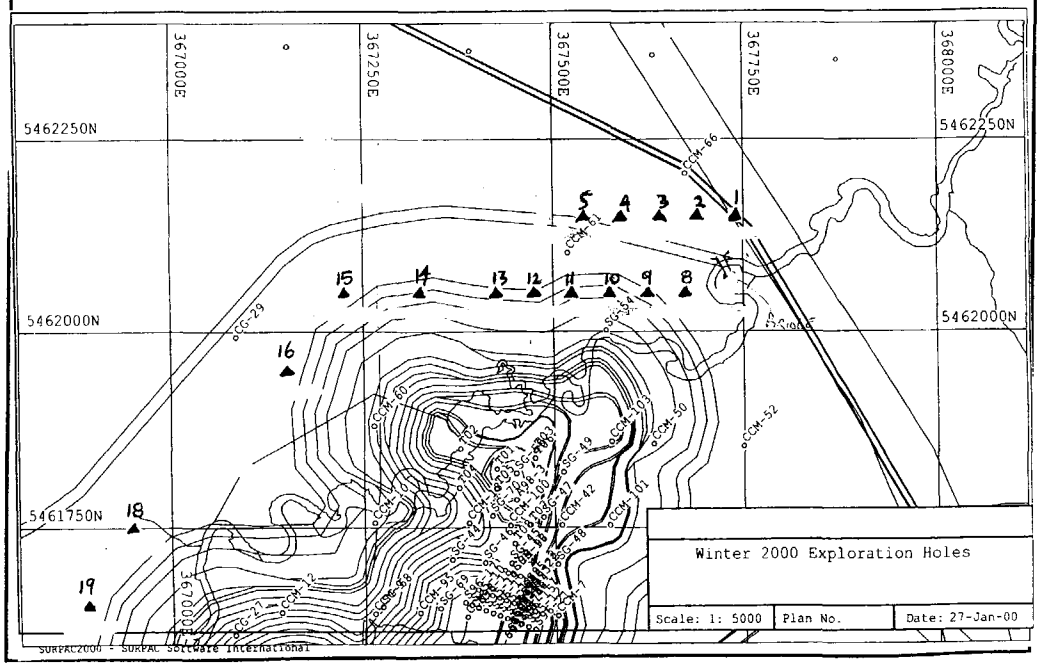
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462063	367669	240.7	110.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
110	0	-90												

START DATE: Feb 22
FINISH DATE: Feb 23
TOWNSHIP: Cargill
CLAIM NO.: 89917 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 / NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Agrium Kapuskasing Phosphate Operation

Hole Number Agr-008 **Page** 1 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	13.6		Glacial clay: Grey gumbo clay, soft + consistent. Recovery = 7.5m = 55%	7.5m=55%
13.6	36.0		Rubble zone: Mostly boulders + pebbles of various sizes of granitic gneiss (mainly). Could be part boulder till and part sand/clay. Very poor recovery. * Note: Unit classified as Meistocene boulder till.	5m=22%

Hole Number Agr-008 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
36.0	44.0		Weathered Rock (?) - Sovite?: Coarse grained (mica, magnetite) in a green (lime)/ white matrix badly broken core. Gradual fazes into brown mud.	6m = 75%
44.0	56.0		Brown fine grained mud: Dark brown weathered? Local patches of lime green and darker brown. Probably weathered above unit.	9m = 75%
56.0	110.0		Pyroxenite: Dark green pyroxenite, broken core and locally very weathered. Large mica "sheds" locally with minor white calcite/quartz stringers, very magnetic rock.	= 100%
110.0			EOH	

DF Mg 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: Feb 25/00 DRILL HOLE NO: AHR-00-009

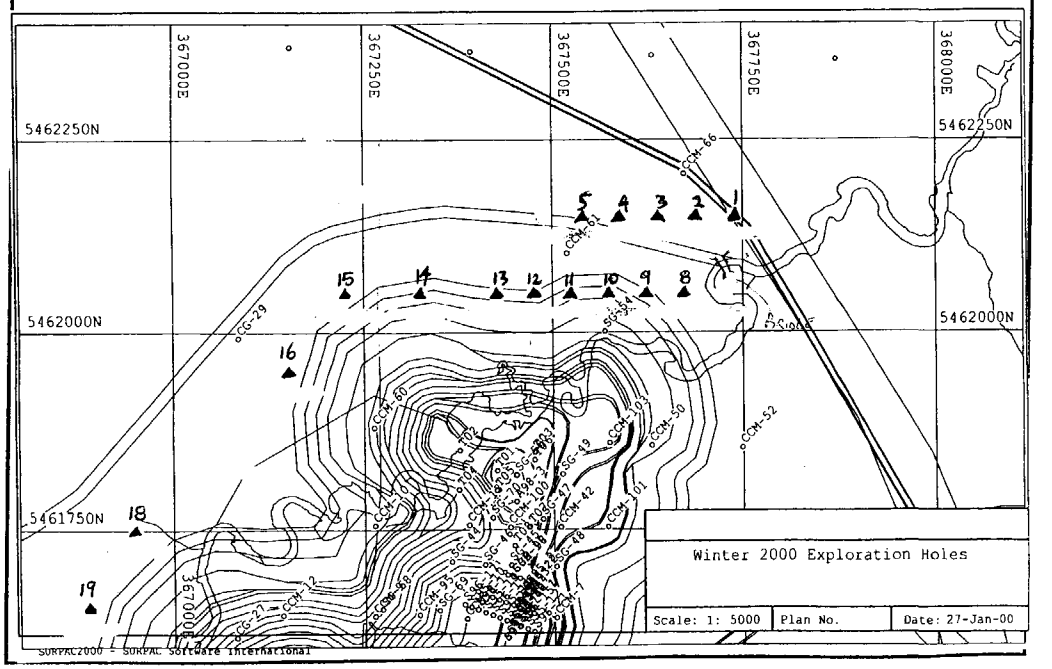
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462057	367614	240.7	62.0		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
62.0	0	-90												

START DATE: Feb. 24
FINISH DATE: Feb 25
TOWNSHIP: Cargill
CLAIM NO.: 89917 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS: Bad seam @ 60 to 62 m, rods tight, had to cut @ 39m.
WHY HOLE TERMINATED: Change hole @ geologist request.
CORE SIZE: NQ-3 INQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number Agr-009 **Page** 1 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	17.0		Glacial clay: Grey gumbo clay. Some peat at the beginning.	1.5m = 9%
17.0	26.0		Boulder Till: Mostly granitic gneiss boulders with very little till.	2.5m = 28%
26.0	47.0		Weathered pyroxenite?: Dark to medium brown weathered rock from 26.0 to 38.0 grading into a dark green chloritic paste to 47.0. Weakly magnetic	6m

Hole Number Agr - 009 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
47.0	62.0		Grey silty clay: Grey silty clay grading into a coarser sandy clay over the last 3m. Hole stopped due to technical problems.	7.5m = 50%
62.0			EOH	

PL Mg 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: Feb 29/00 DRILL HOLE NO: AHR-00-010

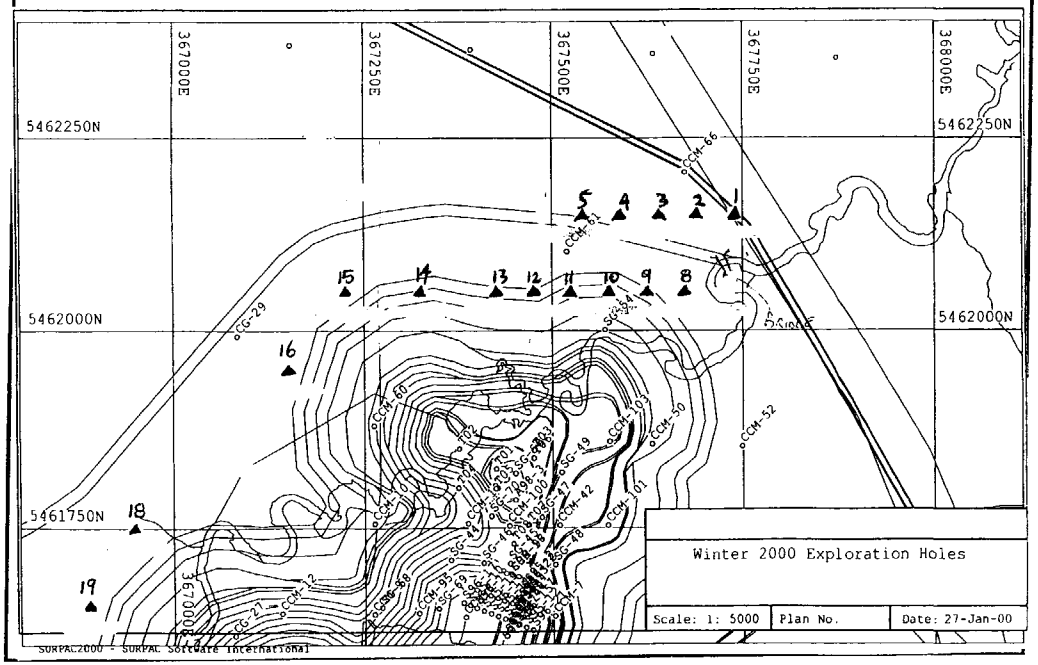
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462054	367562	241.1	216.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
216	0	-90												

START DATE: Feb 25
FINISH DATE: Feb 29
TOWNSHIP: Cargill
CLAIM NO.: 89918 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (NQ)
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number Agr - 010 **Page** 1 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	11.0		Glacial clay: Grey homogeneous gumbo clay	6.2m = 56%
11.0	34.10		Glacial Boulder Till: Grey silty clay containing up to 30% granitic gneiss boulders (up to 0.5m) and pebbles. Grades into a finer pebble till over the last 10m.	13m = 57%
34.10	41.30		Cretaceous green Clay / weathered: Olive green, slightly silty clay / weathered granite? (medium grained white / quartzite?) where the green color comes from weathering of stockwerk veins within the rock.	4m = 56%

Hole Number Agr - 010 **Page** 2 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
41.30	47.0		Silty Clay: Grey silty (quartz/feldspar) clay. Homogeneous with areas locally dark grey.	4.9m = 93%
47.0	56.0		Peat: 75% black, homogeneous peat (organic) which locally grades (interbedded) into a dark grey silty clay.	9.0m = 100%
56.0	80.0		Medium Grained Silty Clay: Locally almost a sand grey silty clay with locally medium grained zones (quartz/feldspar) Locally there are small beds (1m) of peat and sand clay (sandy horizons.)	22m = 92%

Hole Number Agr-010 **Page** 3 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
80.0	110.0		White clay: Talcy white clay (very light) Sometimes silty with local inclusions of the next unit. Gradual lower contact.	18.5m=62%
110.0	197.0		Red Porphyry Clay: Brick red clay with 15%, 0.5mm - 0.2cm dark brown rounded mineral. Above unit could be final weathered product of this unit. The porphyroblasts decrease with depth. Clay Then becomes homogeneous and aphanitic. Grades into aphanitic red clay around 140m. (probably all the same unit) * Note: The round porphyroblasts have since been	87m=100%

Hole Number Agr-010 **Page** 4 **of** 4

From (m)	To (m)	Lithological Code	Description	Recovery
			interpreted as oolites rested within the red hematitic unit.	
197.0	216.0		Weathered Pyroxenite ?: Dark green medium grained broken, weathered (to brown) pyroxenite. Rotted and rusty texture becoming more altered with depth. Brown caking due to drilling and poor water return. Weakly magnetic.	16m = 84%
216.0			EOH	

PL May 1., 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: PROJECT: Winter 2000 LOGGED BY: P. MARENCHI DATE LOGGED: MARCH 02/00 DRILL HOLE NO: AGR-00-011

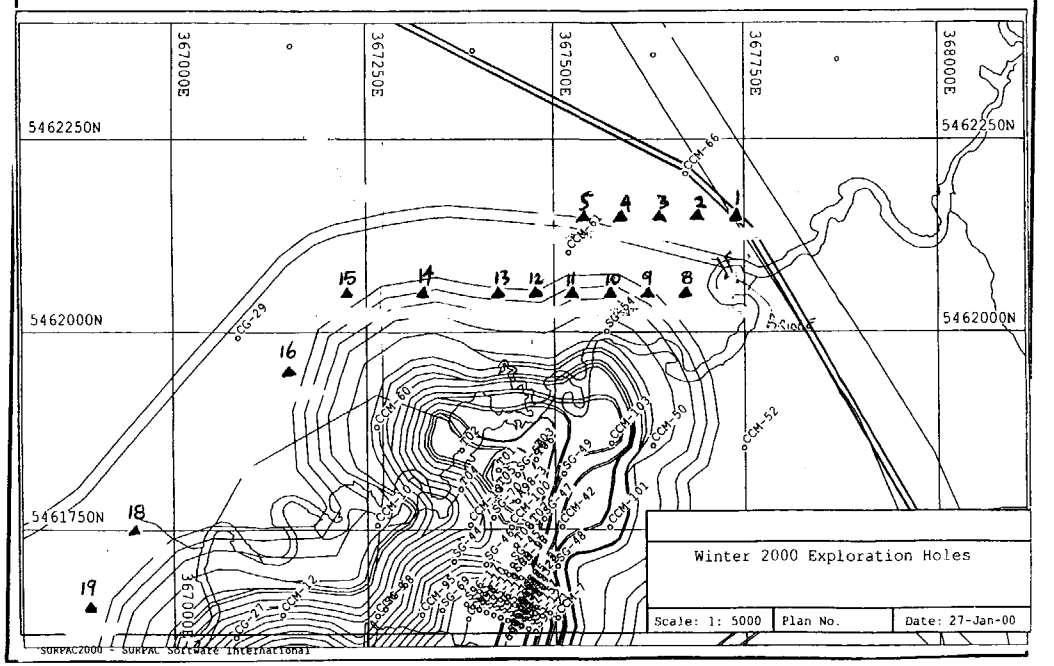
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462052	367514	240.8	69.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
69	0	-90												

START DATE: March 1
FINISH DATE: March 2
TOWNSHIP: Cargill
CLAIM NO.: 8998 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 INQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Mine site

☐ ft
☒ m

Location Sketch



Agrium Kapuskasing Phosphate Operations

Hole Number AGR-011 **Page** 2 **of** _____

From (m)	To (m)	Lithologic Code	Description	Recovery
0.0	11.0		GLACIAL Gumbo clay GREY/RED GLACIAL gumbo clay.	26m = 24%
11.0	32.0		BOULDER TILL 60-70% boulders of mainly granitic gneiss and mafics, HARDLY ANY clay.	4.3m = 20%
32.0	43.0		WEATHERED RAUHAUGITE Rusty BROWN STRONGLY WEATHERED RAUHAUGITE (20% Rock). BZ ore APPEARANCE. Local rusty yellow (Geothite) staining. No visible Apatite xTALs (intermittent Rock/Residuum).	7m = 64%
43.0	69.0		RAUHAUGITE TAN BROWN, aphanitic, badly BROKEN, foliation = 70→80° to C.A. LOCAL SECTIONS of BROWN weathered RESIDUUM (Rock) but Rock consists of 90%	9.0 = 35%
69.0			EOH	

PK Log 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 04/00 DRILL HOLE NO: AHR-00-012

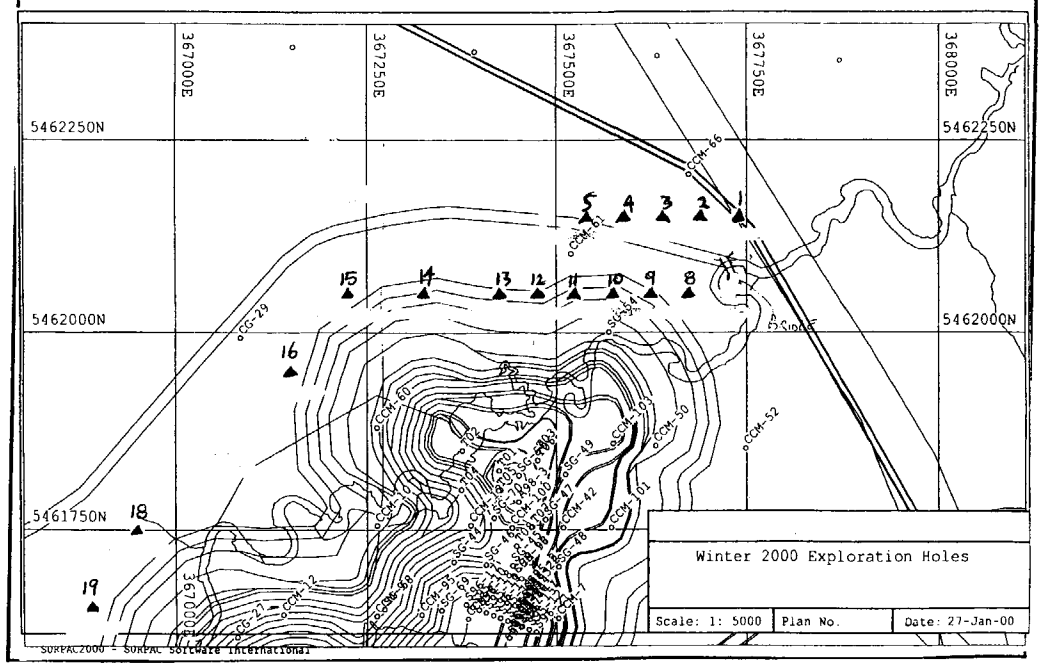
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462057	367462	241.2	74.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
74	0	-90															

START DATE: March 2
FINISH DATE: March 4
TOWNSHIP: Cargill
CLAIM NO.: 89918 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 / NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number AGR-012 **Page** 1 **of** 7

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	11.0		Glacial Clay: Grey gumbo clay.	9.2m = 84%
11.0	29.0		Boulder Till: Mainly granitic gneiss with minor mafic boulders and pebbles of varying sizes.	4.3m = 24%
29.0	74.0		Weathered Granitic Gneiss: Badly weathered, coarse grained granitic gneiss. Weathering gives greenish brown gritty/sandy texture. Badly broken core	15m = 33%
74.0			EOH	

P & M 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 06/00 DRILL HOLE NO: AHR-00-013

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462056	367414	240.2	50.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
50	0	-90												

START DATE: March 4

FINISH DATE: March 5

TOWNSHIP: Cargill

CLAIM NO.: 99918 (Lease # 104714)

DRILLING CONTRACTOR: Bradley Bros.

PURPOSE: _____

RESULTS: _____

WHY HOLE TERMINATED: _____

CORE SIZE: NQ-3 INQ

CASING: _____

HOLE CEMENTED: _____

NO. OF ASSAYS: _____

NO. OF ICP: _____

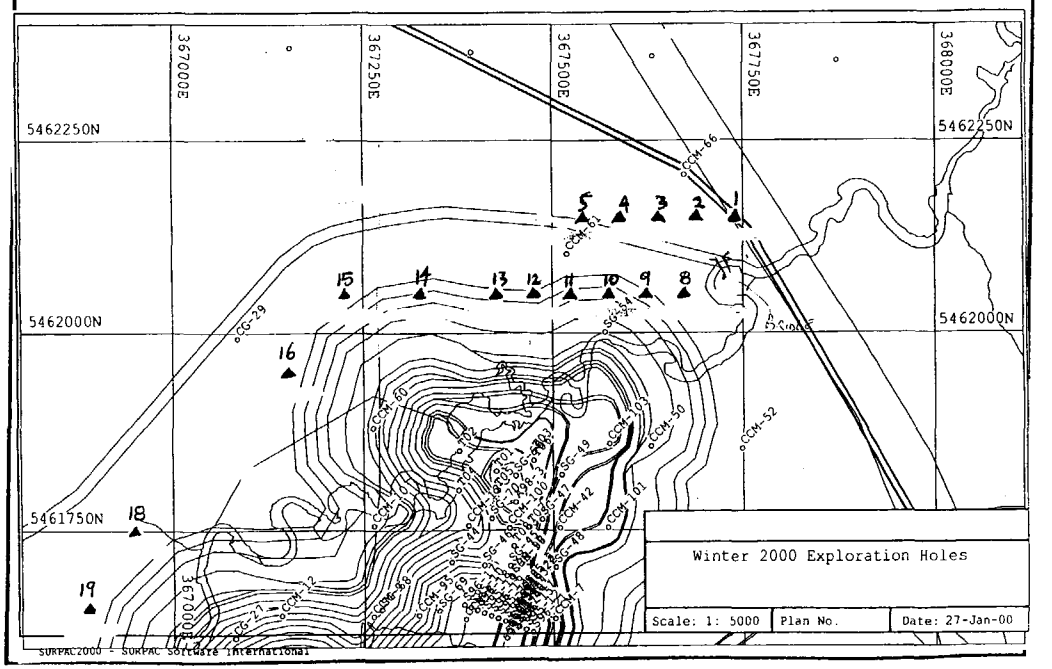
NO. OF WRA: _____

REJECTS/PULPS SAVED: _____

CORE STORED (LOCATION): Agrium Minsite

☐ ft
☒ m

Location Sketch



Agrium Kapuskasing Phosphate Operation

Hole Number Agr - 013 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	11.0		Glacial Clay: Grey gumbo clay.	7.5m = 68%
11.0	29.0		Boulder Till: Mainly granitic gneiss and mafic boulders + pebbles of varying sizes. No mud or sand.	3.2m = 18%
29.0	50.0		Granitic gneiss: Badly weathered lime green to reddish grey granitic gneiss	11m = 52%
50.0			EOH	

Exploration Drill Hole Log

PL Mg/. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 05/00 DRILL HOLE NO: AGR-00-014

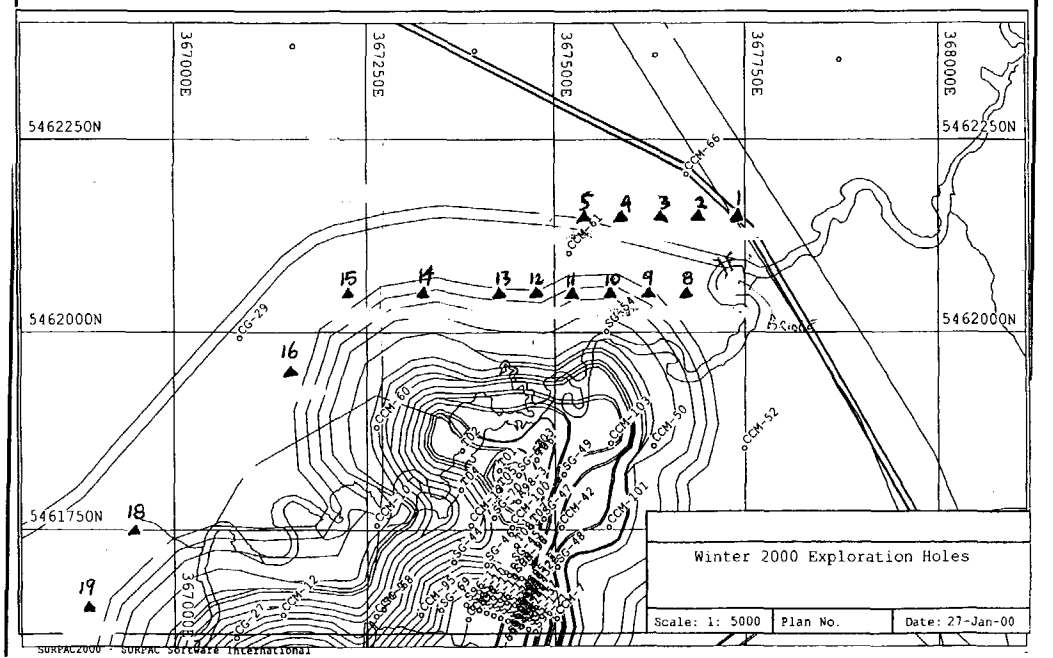
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462053	367313	240.8	44.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
44	0	-90												

START DATE: March 5
FINISH DATE: March 5
TOWNSHIP: Cargill
CLAIM NO.: 89918 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 / NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number Agr - 014 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	12.0		Glacial Clay: Grey gumbo clay, homogeneous and consistent.	3.5m = 29%
12.0	20.0		Boulder Till: Mostly only boulders and pebbles of granitic gneiss and mafics. No visible till (mud).	1.8m = 23%
20.0	44.0		Granitic gneiss: Banded / foliated granitic (quartz, feldspar, mica) gneiss. Local weathering (Rotted aspect). Badly broken core. Foliation at 45° to core axis.	11m = 46%
44.0			EOH	

Pt Mz/. Aug 29, 2000

Agrium

Kapuskasing Phosphate Operations

DIVISION: ______ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 06/00 DRILL HOLE NO: AHR-00-015

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5462056	367196	243.7	29.0 m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
29	0	-90												

START DATE: March 5

FINISH DATE: March 6

TOWNSHIP: Cargill

CLAIM NO.: 99918 (Lease # 104714)

DRILLING CONTRACTOR: Bradley Bros

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 /NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

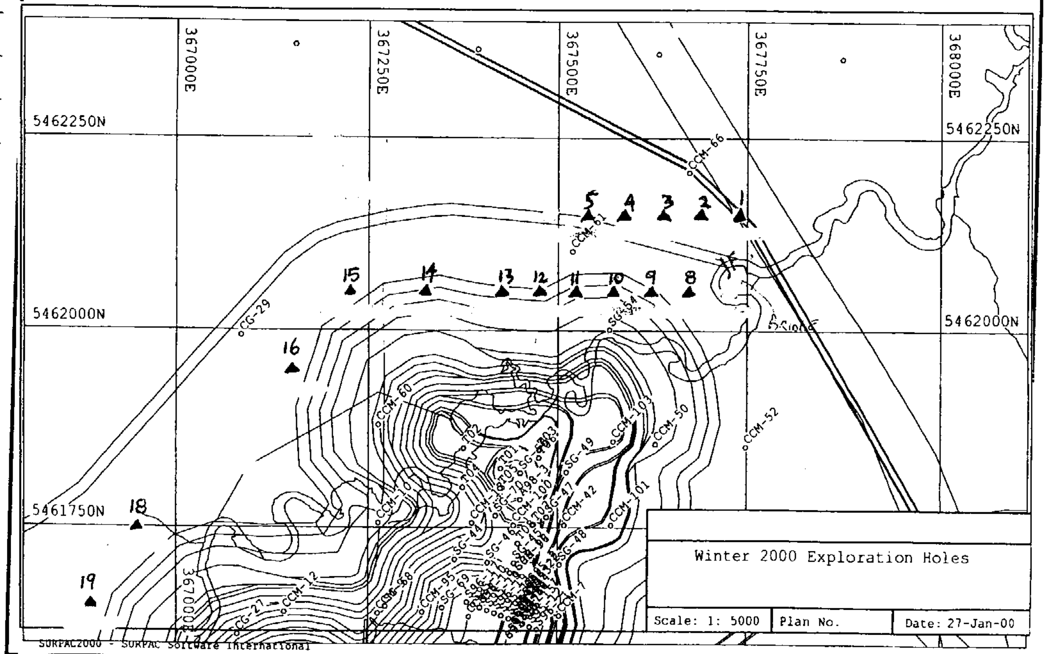
NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number Agr - 015 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	12.0		Glacial Clay: Organic Matter over 1st 5m. Grey, homogeneous gumbo clay	5.5m = 46%
12.0	18.0		Boulder Till: All boulders and pebbles (no mud) of granitic gneiss and mafics of varying sizes.	1m = 17%
18.0	29.0		Granitic Gneiss: Redish grey, foliated granitic gneiss. Badly broken core. Local weathering. RQD = 30%. Recovery = 8.7m = 79% Could be spread out.	8.7m = 79%
29.0			EOH	

TC Wgl. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 06/00 DRILL HOLE NO: AGR-00-016

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461970	367143	242.2	32.0 m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
32	0	-90												

START DATE: March 6

FINISH DATE: March 6

TOWNSHIP: Cargill

CLAIM NO.: 424534 (Lease # 104381)

DRILLING CONTRACTOR: Bradley bros

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 / NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

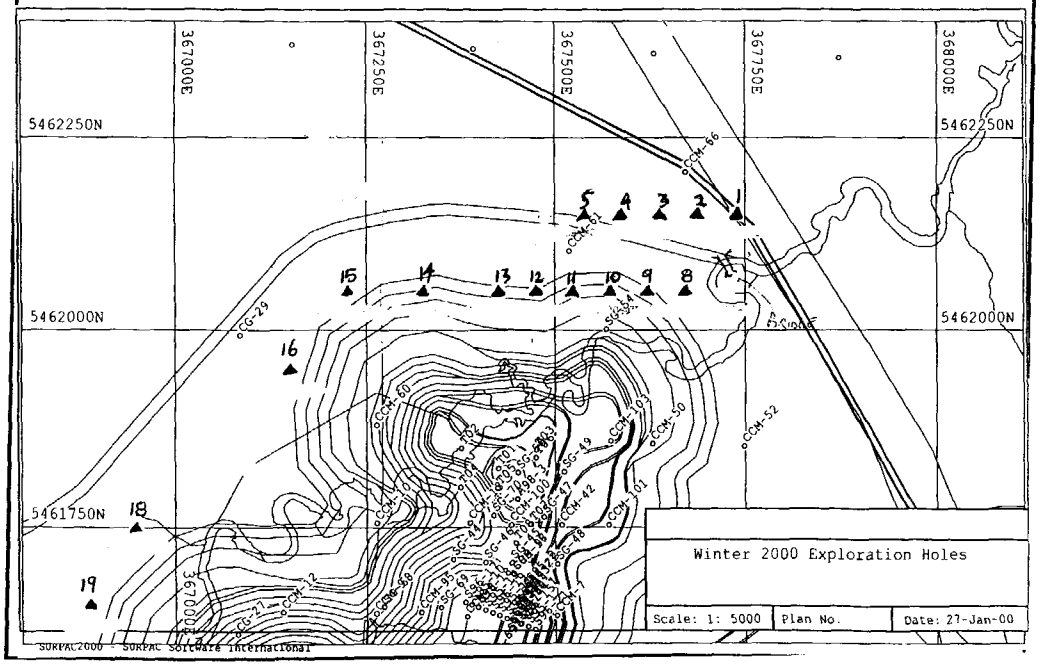
NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Mine site

☐ ft
☒ m

Location Sketch



Agrium Kapuskasing Phosphate Operation

Hole Number Agr-016 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	11.0		Glacial Clay: Grey gumbo clay, some (0.5m) organic material at the begining	6.4m=58%
11.0	32.0		Granitic gneiss: Reddish grey, white, green granite (feldspar, quartz, mica) gneiss. Well foliated (at 90° to core axis). Badly broken core. Some local weathering. Could be boulder till at the beginning (1st and 2nd meter) but unsure.	12.5m=60%
32.0			EOH	

Exploration Drill Hole Log

TC WJ. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 23/00 DRILL HOLE NO: AHR-00-017

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461252.3	367216.2	242.1	59.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
59	0	-90												

START DATE: March 22
FINISH DATE: March 22
TOWNSHIP: Cargill
CLAIM NO.: 78658 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (WQ)
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

Hole Number AGR-017 **Page** 2 **of** _____

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	8.00		Gumbo Clay	
			GREY homogenous (some brown = varve clay)	2m =
8.00	17.00		Boulder Till	6m =
			30% large (0.4m) granitic gneiss + pebbles (some mafics) in a GREY clay.	
17.00	35.00		RESIDUUM (ORE)	3m =
			BLACK APATITE Rock (25%) SANDY ORE.	
35.00	59.00		CARBONATITE Rock (Sovite)	
			Light to medium GREY CARBONATITE. FIRST 10m VERY SOFT and BRITTLE. 5% COARSE GRAINED magnetite XTALS	23m =
			Schistosity well developed locally @ 70-80° to C.A.	
59.0			E.O.H.	

Tk My (Aug 29, 2000

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Kapuskasing Phosphate Operations

DIVISION: ______ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 07/00 DRILL HOLE NO: AGR-00-018

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461793	366940	238.9	29.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP

START DATE: March 6

FINISH DATE: March 7

TOWNSHIP: Cargill

CLAIM NO.: 413078 (Lease # 104395)

DRILLING CONTRACTOR: Bradley Bros

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 / NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

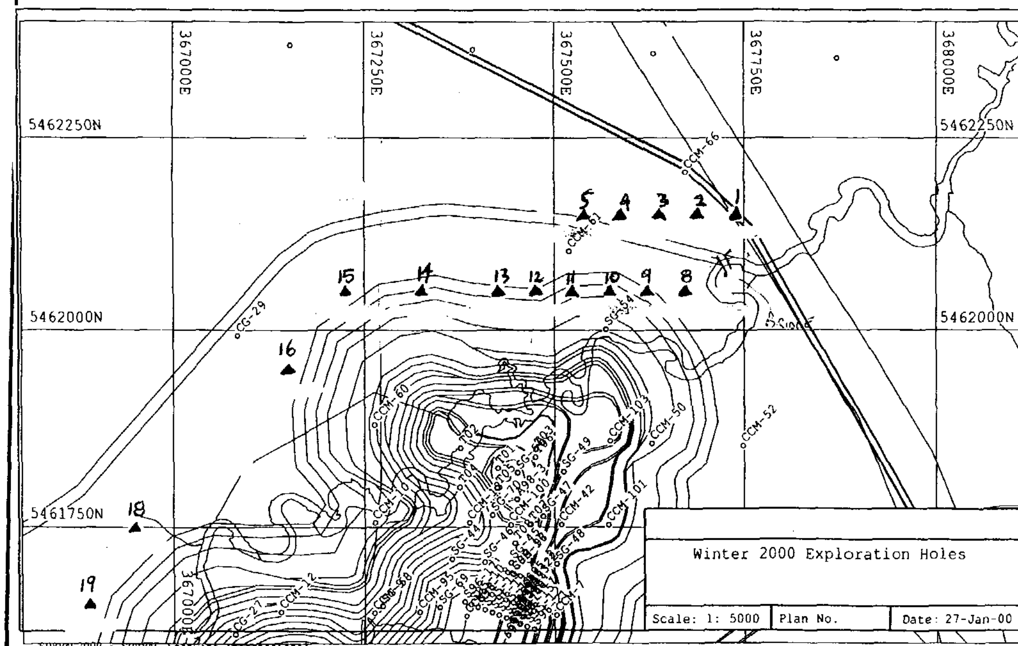
NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch



Hole Number Agr-018 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	5.5		Glacial Clay: Brown varve clay with local organics and grey gumbo clay.	4m=73%
5.5	29.0		Mafic Unit (Rock): Medium to coarse grained pyroxene, amphibole magnetite unit. Very homogeneous, no veining. Specks of pyrite. Weakly to med. magnetic. Massive granular texture.	100%
29.0			EOH	

TL 4 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 07/00 DRILL HOLE NO: AHR-00-019

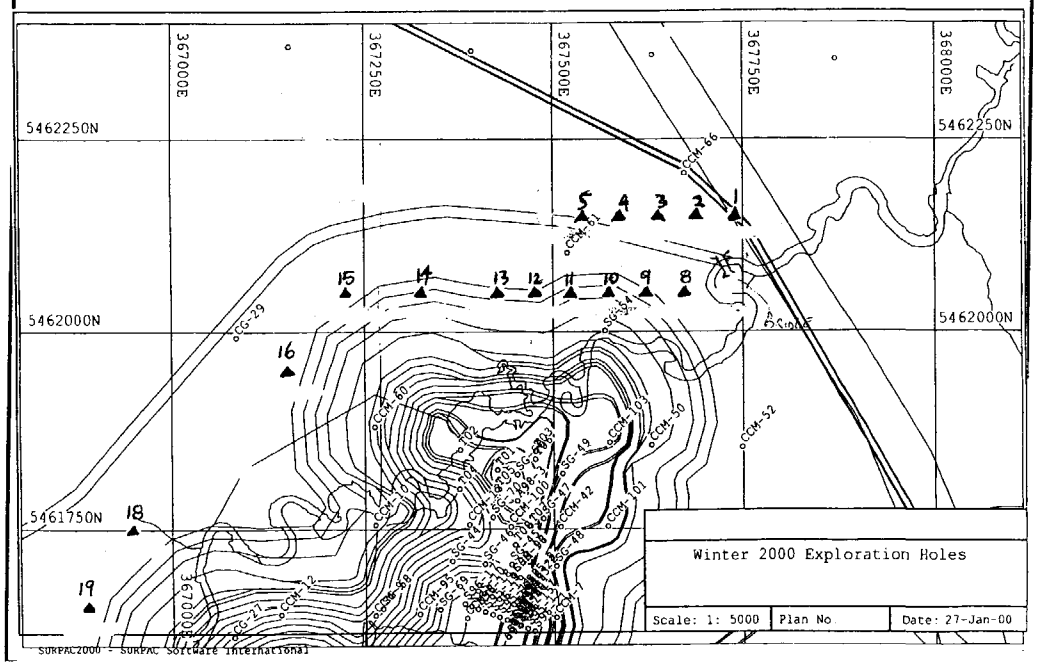
	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461655	366888	237.0	41.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
41	0	-90												

START DATE: March 7
FINISH DATE: March 7
TOWNSHIP: Carqill
CLAIM NO.: 413078 (Lease # 104395)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 / NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium mine site

☐ ft
☒ m

Location Sketch



Hole Number Agr-019 **Page** 1 **of** 1

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	8.0		Glacial Clay + Organics.	4 inches
8.0	17.0		Boulder Till: Very well formed boulder till. Grey mud with small sized (20 cm to 5mm) pebbles.	3.5m=39%
17.0	41.0		Weathered Granitic gneiss: Badly broken, moderately weathered, coarse grained, reddish grey granitic gneiss. with local more mafic green sections which could be banding whithin The gneiss.	14m=58%
41.0			EOH	

TF Wg 1. Aug 29, 2000

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Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 26/00 DRILL HOLE NO: AHR-00-020

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461250	367 310	238.8	105.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
105	0	-90												

START DATE: March 25
FINISH DATE: March 26
TOWNSHIP: Corgill
CLAIM NO.: 78658 (Lease # 104 714)
DRILLING CONTRACTOR: Bradley Bros
PURPOSE:
RESULTS:
WHY HOLE TERMINATED: No water return, geologist stopped the hole.
CORE SIZE: NQ-3 / NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

Hole Number AGR-020 **Page** 2 **of** 3

From (m)	To (m)	Code	Description	Recovery
0.0	20.0		Boulder Till 60% Granitic gneiss + mafic pebbles (0.2-0.3cm) and Boulders >0.5cm in a grey clay	5.5m =
20.0	50.00		Siliceous Sandy Clay medium grained sandy clay, colors ranging from white to grey to Brown. Local intervals of PEAT material (2-3m) and locally clay becomes fine grained. No results from sludges indicating good P_2O_5 grades.	20m =
50.00	54.5		RED clay Red homogeneous clay (Brick Red)	4.5m = 100%

Hole Number AGR-020 **Page** 3 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
54.50	60.0		Silty clay	6m =
			white to medium grey silty clay, warping in bedding / layering visible locally. Sharp lower contact with Sovite.	
60.0	65.0		WEATHERED CARBONATITE?	
			GREENISH RED (oolithic?) CARBONATITE? Rusty / green in color.	1.5m =
65.0	95.0		High GRADE RESIDUUM (A ORE)	10m =
			A ORE, black sandy residuum containing up to 30% fine apatite xTALS. Very homogeneous section.	
95.0	105.0		CARBONATITE (Sovite)	10m =
			Rock, light grey carbonatite containing up to 15% VERY COARSE grained magnetite xTALS (up to 3cm). Sharp upper contact. Schistosity ± 30° to C.A.	
105.0			E.O.H.	

DH Ul 1. Aug 29, 2000

Agrium

Kapuskasing Phosphate Operations

DIVISION: ______ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 24/00 DRILL HOLE NO: AGR-00-021

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461200	367 170	242.0	35.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
35	0	-90												

START DATE: March 23

FINISH DATE: March 24

TOWNSHIP: Cargill

CLAIM NO.: 78658 (Lease # 104714)

DRILLING CONTRACTOR: Bradley Bros

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 / NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Minesite

☐ ft

☒ m

Location Sketch

Hole Number A6R-021 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	8.00		Boulder Till	6.0m = 13%
8.00	35.00		CARBONATITE Rock (Sovite)	26m = 96%
			Light to medium grey carbonatite with local sections (<1m) of fragmental Rock (cemented?) and up to 5% medium grained (0.2-0.3cm) magnetite xtals. Schistosity at about 30° to C.A.	
35.0			E.O.H.	

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 25/00 DRILL HOLE NO: AGR-00-022

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461200	367 270	242.0	56.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
56	0	-90												

START DATE: March 24
FINISH DATE: March 25
TOWNSHIP: Corgill
CLAIM NO.: 78658 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Mine site

☐ ft
☒ m

Location Sketch

Aug 29, 2000

Hole Number AGR-022 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	8.00		Gumbo Clay Grey homogeneous clay.	5.5m =
8.00	17.00		Boulder Till 40% Large 0.8m granite gneiss + mafic boulders + pebbles mixed in a grey clay.	4.5m =
17.00	50.00		CARBONATITE Rock (Sovite) Light to medium grey to light green carbonatite containing up to 20% COARSE grained (0.2-0.5cm) well formed magnetite xtals schistosity = 70-85° to C.A. up to 10% mica xtals of various sizes. Very blocky ground.	25m =
	56.00		E.O.H.	

PF My 1. Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 26/00 DRILL HOLE NO: AKR-00-023

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461218	367 378	239.5	38.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
38	0	-90												

START DATE: March 26
FINISH DATE: March 26
TOWNSHIP: Cargill
CLAIM NO.: 78658 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (NQ
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

Agrium Kapuskasing Phosphate Operation

Hole Number AGR-023 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	8.00		Boulder Till	1.5m =
			40% granitic gneiss boulders (0.3-0.5m) in grey clay	
8.00	38.00		CARBONATITIC rock (Sovite)	
			Light to medium grey CARBONATITE with up to 15% well developed magnetite XTALS. schistosite = 0° to C.A.	23m =
			well (5%) developed po XTALs. Locally.	
38.0			E.O.H.	

Exploration Drill Hole Log

TK ML Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: APRIL 13/00 DRILL HOLE NO: AHR-00-024

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461 855.7	367 543.2	240.9	135.0		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
135	0	-90												

START DATE: April 12

FINISH DATE: April 13

TOWNSHIP: Cargill

CLAIM NO.: 78657 (Lease # 024714)

DRILLING CONTRACTOR: Bradley Bros

PURPOSE: _____

RESULTS: Lost of water return @ 41m. Rods Stuck in Sand.

WHY HOLE TERMINATED: _____

CORE SIZE: NQ-3 / NQ

CASING: _____

HOLE CEMENTED: _____

NO. OF ASSAYS: _____

NO. OF ICP: _____

NO. OF WRA: _____

REJECTS/PULPS SAVED: _____

CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

Agrium Kapuskasing Phosphate Operations

Hole Number AGR-024 **Page** 2 **of** 2

From (m)	To (m)	Code	Description	Recovery
0.00	10.0		Gumbo Clay Dark grey, homogenous.	7.5m = 75%
10.00	135.00		Sovite COARSE GRAINED CARBONATITE. Colors VARY From greenish white, purple, reddish Brown to greyish white. About 10-15% COARSE GRAINED (0.3cm - 0.5cm) MAGNETITE, 10-15% BIOTITE (dark green Flakey) (0.3 - 0.4 cm). Local weathering displayed by RESIDUAL looking material. Some magnetite XTALS reaching to 3cm. Numerous XTALLIZED CAVITIES. Schistosity (where visible) is ≈ 70-80° to C.A. 1ST 30 m Looks FRAGMENTAL (cemented ore) but is probably JUST sovite AS some sections within this 30 m HAS the same TEXTURE AS the sovite below. FRAGMENTS ARE homogenous.	106.5 = 85%
135.0			E.O.H.	

PF ✓ Aug 29, 2000

Agrium
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DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: APR, 1 13/00 DRILL HOLE NO: AKR-00-025

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461 900.3	367 584.7	241.3	158.0		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
158	0	-90												

START DATE: March 29
FINISH DATE: April 12
TOWNSHIP: Cargill
CLAIM NO.: 89917 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:
RESULTS:
WHY HOLE TERMINATED: Lost water return @ 13 m, geologist stopped hole @ 138m because casing too tight.
CORE SIZE: NQ-3 (NQ)
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium mine site

☐ ft
☒ m

Location Sketch

Agrium Kapuskasing Phosphate Operations

Hole Number AGR-025 **Page** 2 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	8.00		ORGANIC PEAT	0.6m = @1%
8.00	20.00		Boulder Till ONLY boulders of granitic gneiss + mafics with no mud. Traces locally of weathered rust coloured rock.	2m = @17%
20.00	77.00		CEMENTED ORE? FRAGMENTAL CONSOLIDATED grey/brown/tan/green rock (HARD) with local 0.5m sections of rusty brown soft weathered rock and local sections of carbonatite (rauhaugite) 0.2-0.3m. Very few visible apatite xtals. Grades into the adjacent green micaceous unit. Very blocky section.	14.3m = 25%
77.00	85.50		WEATHERED MAFIC? Very micaceous residuum, medium green, very soft, grades locally into a grey. No visible apatite.	5.3m = 62%

Hole Number AGR-25 **Page** 3 **of** 3

From (m)	To (m)	Code	Description	Recovery
85.50	101.00		WEATHERED matic? TAN to DARK BROWN weathered micaceous unit Local spots of GREEN RESEMBLING the NEXT UNIT. REMANENT STRUCTURE (schistosity) STILL VISIBLE.	7.3m = 47%
101.00	131.00		MAFIC UNIT MEDIUM to DARK GREEN, WEAKLY magnetic, fine grained mafic. FIRST 7m, the rock is very soft (weathered) but progressively becomes harder with depth. Very micaceous / chlorite + looks slightly like a pyroxenite.	14.7m = 49%
131.00	158.00		RAUHAUGITE TAN to DARK BROWN, Locally STRONGLY weathered, patchy white very badly broken, schistosity @ 70-80° to C.A. 10% small blebs of magnetite. LAST 6m very weathered.	15.3m = 57%
158.0			E.O.H.	

PL Mg 1. Aug 29, 2000

Agrium
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DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: MARCH 29/00 DRILL HOLE NO: AGR-00-026

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461 902.3	367 635.8	241.5	124.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
124	0	-90												

START DATE: March 27
FINISH DATE: March 29
TOWNSHIP: Cargill
CLAIM NO.: 89917 (Lease # 104714)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE: _____
RESULTS: Hole caved in, rods tight, no water return.
WHY HOLE TERMINATED: _____
CORE SIZE: NQ-3 / NQ
CASING: _____
HOLE CEMENTED: _____
NO. OF ASSAYS: _____
NO. OF ICP: _____
NO. OF WRA: _____
REJECTS/PULPS SAVED: _____
CORE STORED (LOCATION): Agrium Mine site

☐ ft
☒ m

Location Sketch

Agrium Kapuskasing Phosphate Operation

Hole Number A6R-026 **Page** 2 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	14.0		Gumbo clay GREY homogenous clay	11m =
14.0	17.0		Boulder Till Rubble of granitic gneiss	0.4m =
17.0	83.0		WEATHERED pyroxenite DARK green, micaceous, Locally rust colored, soft with Locale sections (<1m) of pyroxenite rock. 50% of this section completely disintegrated.	32m =
83.0	110.0		BROWN RESIDUUM (WEATHERED RAUHAUGITE) TAN to DARK BROWN mud/(sand) (gravel. visible apatite xtals =5-10% Local sections of RAUHAUGITE (<1m). GRADUALLY TURNS to Rock.	11m =

Exploration Drill Hole Log

Hole Number AGR-026 **Page** 3 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
110.0	124.0		Ankerite Tan brown carbonatite, displaying fractured iron rust throughout. Schistosity close to 0° to C.A. Locally looks cemented.	
124.0			E.O.H.	

Pf Mg 1.

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: APRIL 15/00 DRILL HOLE NO: AGR-00-028

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461 163.7	366990.5	239.4	101.0 m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
101	0	-20												

START DATE: April 14

FINISH DATE: April 15

TOWNSHIP: Cargill

CLAIM NO.: 413076 (Lease # 104395)

DRILLING CONTRACTOR: Bradley Bros

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 (NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Moosonee

☐ ft
☒ m

Location Sketch

Hole Number AGR-028 **Page** 2 **of** 2

From (m)	To (m)	Code	Description	Recovery
0.0	5.0		ORGANIC MATTER / TOPSOIL	0.5m =
5.0	11.0		Boulder Till 70% GRANITIC GNEISS + MAFIC BOULDERS OF VARYING SIZES 30% GREY CLAY.	2.3m =
11.0	32.0		WEATHERED CARBONATITE (SOVITE) 70% TAN TO MEDIUM BROWN SANDY RESIDUUM (WEATHERED SOVITE) MIXED WITH 30% TAN COLORED SOVITE (INTERMITTENT 0.2 - 1m INTERVALS). SOVITE CHARACTERISED BY BLEBBED TO WELL FORMED 0.1 - 1cm MAGNETITE XTALS. SOVITE GRADUALLY BECOMES PALER WITH DEPTH.	17m =
32.0	109.00		Sovite LIGHT TAN GRADING INTO WHITE, 10-15% COARSE GRAINED MAGNETITE XTALS (0.2 - 1cm). SOME WELL FORMED XTALS. SCHISTOSITY = 2 70° TO C.A. BADLY BROKEN CORE. FROM 48m ON ROCK BECOMES WHITE + FRESH + BLOCKY	67m =
109.0			E.O.H.	

TL MJ Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: APRIL 16/00 DRILL HOLE NO: AHP-00-029

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461 149.6	367 041.5	240.0	50.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
50	0	-90												

START DATE: April 15

FINISH DATE: April 16

TOWNSHIP: Cargill

CLAIM NO.: 413074 (Lease # 104395)

DRILLING CONTRACTOR: Bradley Bros.

PURPOSE:

RESULTS:

WHY HOLE TERMINATED:

CORE SIZE: NQ-3 / NQ

CASING:

HOLE CEMENTED:

NO. OF ASSAYS:

NO. OF ICP:

NO. OF WRA:

REJECTS/PULPS SAVED:

CORE STORED (LOCATION): Agrium Minesite

☐ ft
☒ m

Location Sketch

Hole Number AKR-0029 **Page** 2 **of** 2

From (m)	To (m)	Lithological Code	Description	Recovery
0.00	8.50		Gumbo clay	1.3m -
			LAST 0.6m = boulder Till	
8.50	50.00		CARBONATITE Rock (Sovite)	41.5m = 100%
			Light grey to white CARBONATITE containing upto 20% COARSE grained (0.2 - 0.4cm, locally 1-2cm) magnetite xtals. Schistosity around 30° to C.A.	
50.0			E.O.H.	

TH MG / Aug 29, 2000

Agrium
Kapuskasing Phosphate Operations

DIVISION: _____ PROJECT: Winter 2000 LOGGED BY: P. MARENGHI DATE LOGGED: APRIL 17/00 DRILL HOLE NO: AGR-00-030

	NORTHING	EASTING	ELEVATION	LENGTH	SECTION	LEVEL
Surface Grid:	5461 098	366 938.3	238.8	126.0m		
Engineering Grid:						

DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP	DIST	AZIM	DIP
126	0	-90												

START DATE: April 16
FINISH DATE: April 17
TOWNSHIP: Cargill
CLAIM NO.: 413074 (Lease # 104395)
DRILLING CONTRACTOR: Bradley Bros.
PURPOSE:
RESULTS:
WHY HOLE TERMINATED:
CORE SIZE: NQ-3 (NQ)
CASING:
HOLE CEMENTED:
NO. OF ASSAYS:
NO. OF ICP:
NO. OF WRA:
REJECTS/PULPS SAVED:
CORE STORED (LOCATION): Agrium Mine site

☐ ft
☒ m

Location Sketch

Hole Number AGR-30 **Page** 2 **of** 3

From (m)	To (m)	Lithological Code	Description	Recovery
0.0	10.0		Gumbo Clay Grey homogenous clay.	6m =
10.0	23.50		Boulder Till 40% pebble size to 0.6m boulders of granitic gneiss and mafics in a grey clay	12.2m =
23.50	50.0		Clay + ORGANIC MATERIAL mixture of sandy clay (GREY), black organic units (PEAT) with visible wood, fine light grey clays and pinkish clays Some visible apatite xtals in the more sandy units colors vary throughout over every 2-3 m. Sludge samples returned some good P_2O_5 values so this complete section will be sampled. All contacts are GRADUAL.	15m =

Agrium Kapuskasing Phosphate Operations

Hole Number A6R-030 **Page** 3 **of** 3

From (m)	To (m)	Code	Description	Recovery
50.0	95.0		RED CLAY Light RED clay (grading from grey to pink to Brown) with intervals (59-68m) of grey sandy clay. RED clay contains pieces of unknown COARSE grained (oolithic?) Rock from which it is the weathered product. RED clay has spotted texture.	18m =
95.0	126.0		CEMENTED ORE/CARBONATITE GREY FRAGMENTAL, cemented ORE/CARBONATITE. VERY BADLY BROKEN SECTION with intervals of RESIDUUM RANGING FROM 1-2m. FINE GRAINED visible apatite (10-15%). About 60% of this section is Rock material.	22.5m =
126.0			E.O.H.	

APPENDIX II

MAPS AND SECTIONS

Ontario Ministry of Northern Development and Mines

Declaration of Assessment Work Performed on Mining Land

Transaction Number (office use)
W0060.00368
Assessment Files Research Imaging

42G07SW2010 2.20527 CARGILL 900

...ion 65(2) and 66(3), R.S.O. 1990

...sections 65(2) and 66(3) of the Mining Act. Under section 8 of the Mining Act, this ...ent work and correspond with the mining land holder. Questions about this collection ...ent and Mines, 3rd Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

Instructions: - For work performed on Crown Lands before recording a claim, use form 0240.
- Please type or print in ink.

2.

1. Recorded holder(s) (Attach a list if necessary)

Name	Client Number
Viridian Inc. (Agrium-Kapuskasing Phosphate)	193876
Address: % P.O. Box 92	Telephone Number: (705) 337-4213
Kapuskasing, Ont P5N 2Y1	Fax Number: (705) 335-3404
Name	Client Number
Address	Telephone Number
	Fax Number

2. Type of work performed: Check (✓) and report on only ONE of the following groups for this declaration.

☐ Geotechnical: prospecting, surveys, assays and work under section 18 (regs)
☑ Physical: drilling stripping, trenching and associated assays
☐ Rehabilitation

Work Type	Office Use
Diamond Drilling ✓	Commodity
	Total $ Value of Work Claimed 199,879
Dates Work Performed From 21 (Day) 01 (Month) 00 (Year) To 17 (Day) 04 (Month) 00 (Year)	NTS Reference
Global Positioning System Data (if available) — Township/Area: Cargill	Mining Division: Timiskaming
M or G-Plan Number: G-860	Resident Geologist District: Timmins

Please remember to: - obtain a work permit from the Ministry of Natural Resources as required;
- provide proper notice to surface rights holders before starting work;
- complete and attach a Statement of Costs, form 0212;
- provide a map showing contiguous mining lands that are linked for assigning work;
- include two copies of your technical report.

3. Person or companies who prepared the technical report (Attach a list if necessary)

Name	Telephone Number
Reno Pressacco	(705) 337-4213
Address: % P.O. Box 92 Kapuskasing, Ont P5N 2Y1	Fax Number: (705) 335-3404
Name	Telephone Number
Address	Fax Number
Name	Telephone Number
Address	Fax Number

RECORDED
AUG 31 2000

4. Certification by Recorded Holder or Agent

I, Reno Pressacco (Print Name), do hereby certify that I have personal knowledge of the facts set forth in this Declaration of Assessment Work having caused the work to be performed or witnessed the same during or after its completion and, to the best of my knowledge, the annexed report is true.

Signature of Recorded Holder or Agent: R. Pressacco	Date: Aug 29/00
Agent's Address: % P.O. Box 92 Kapuskasing, Ont P5N 2Y1 — Telephone Number: (705) 337-4213	Fax Number: 335-3404

0241 (03/97)

RECEIVED
AUG 31 2000
GEOSCIENCE ASSESSMENT OFFICE

land where work was performed, at the time work was performed. A map showing the contiguous link must accompany this form.

W0060.00368

Mining Claim Number. Or if work was done on other eligible mining land, show in this column the location number indicated on the claim map.		Number of Claim Units. For other mining land, list hectares.	Value of work performed on this claim or other mining land.	Value of work applied to this claim.	Value of work assigned to other mining claims. 2.2527	Bank. Value of work to be distributed at a future date
eg	TB 7827	16 ha	$26,825	N/A	$24,000	$2,825
eg	1234567	12	0	$24,000	0	0
eg	1234568 Loc#	2	$ 8,892	$ 4,000	0	$4,892
1	6000408) 89918 (104748)	19.89 Ha	$52,647	0	$29,835	$22,912
2	6000404) 89917 (104747)	21.63 Ha	$84,934	0	$32,445	$52,499
3	6000410 78657 (~~104714~~)	16.32 Ha	9,474	0	—	$9,474
4	6000409 78658 (~~104714~~)	18.66 Ha	20,100	0	$20,100	0
5	413074 (104395)	2254.43	11,016	0	$8,077	$2939
6	413076 (104395)	2257.43	15,543	0	$15,543	0
7	~~413700~~ 413078 (104395)	2554.43	4,332	0	—	$4,332
8	6000412 424534 (104381)	625.68	1,853	0	—	$1,853
9	1219791	13 units	0	$26,000		
10	1219792	4 units	0	$8,000		
11	1219793	11 units	0	$22,000		
12	1236910	6 units	0	$12,000		
13	1236911	10 units	0	$20,000		
14	1236912	9 units	0	$18,000		
15						
	Column Totals		$199,899	$106,000	106,000	93,899

I, Reno Pressacco (Print Full Name), do hereby certify that the above work credits are eligible under subsection 7 (1) of the Assessment Work Regulation 6/96 for assignment to contiguous claims or for application to the claim where the work was done.

Signature of Recorded Holder or Agent Authorized in Writing	Date
R. Pressacco	Aug 29/00

6. Instructions for cutting back credits that are not approved.

Some of the credits claimed in this declaration may be cut back. Please check (✓) in the boxes below to show how you wish to prioritize the deletion of credits:

- ☐ 1. Credits are to be cut back from the Bank first, followed by option 2 or 3 or 4 as indicated.
- ☐ 2. Credits are to be cut back starting with the claims listed last, working backwards; or
- ☒ 3. Credits are to be cut back equally over all claims listed in this declaration; or
- ☐ 4. Credits are to be cut back as prioritized on the attached appendix or as follows (describe):

Note: If you have not indicated how your credits are to be deleted, credits will be cut back from the Bank first, followed by option number 2 if necessary.

For Office Use Only

Received Stamp	Deemed Approved Date	Date Notification Sent
	Date Approved	Total Value of Credit Approved
	Approved for Recording by Mining Recorder (Signature)	

0241 (03/97)

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AUG 3 1 2000
GEOSCIENCE ASSESSMENT OFFICE

Ontario Ministry of Northern Development and Mines

Statement of Costs for Assessment Credit

Transaction Number (office use)
W0660.00308

Personal information collected on this form is obtained under the authority of subsection 6 (1) of the Assessment Work Regulation 6/96. Under section 8 of the Mining Act, this information is a public record. This information will be used to review the assessment work and correspond with the mining land holder. Questions about this collection should be directed to a Provincial Mining Recorder, Ministry of Northern Development and Mines, 3rd Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

Work Type	Units of work Depending on the type of work, list the number of hours/day worked, metres of drilling, kilometres of grid line, number of samples, etc.	Cost Per Unit of work	Total Cost
Diamond Drilling	2,483 metres	$80.51	$199,898
Associated Costs (e.g. supplies, mobilization and demobilization).			
Transportation Costs			
Food and Lodging Costs			
		Total Value of Assessment Work	$199,898

RECORDED
AUG 31 2000

Calculations of Filing Discounts:

1. Work filed within two years of performance is claimed at 100% of the above Total Value of Assessment Work.
2. If work is filed after two years and up to five years after performance, it can only be claimed at 50% of the Total Value of Assessment Work. If this situation applies to your claims, use the calculation below:

TOTAL VALUE OF ASSESSMENT WORK x 0.50 = Total $ value of worked claimed.

Note:
- Work older than 5 years is not eligible for credit.
- A recorded holder may be required to verify expenditures claimed in this statement of costs within 45 days of a request for verification and/or correction/clarification. If verification and/or correction/clarification is not made, the Minister may reject all or part of the assessment work submitted.

Certification verifying costs:

I, Rene Pressacco (please print full name), do hereby certify, that the amounts shown are as accurate as may reasonably be determined and the costs were incurred while conducting assessment work on the lands indicated on the accompanying Declaration of Work form as Geologist-KPO (Agent) (recorded holder, agent, or state company position with signing authority) I am authorized to make this certification.

0212 (03/97)

RECEIVED
AUG 31 2000
GEOSCIENCE ASSESSMENT OFFICE

Signature R. Pressacco Date Aug 29/00

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Ontario

Geoscience Assessment Office
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (888) 415-9845
Fax: (877) 670-1555

Visit our website at:
www.gov.on.ca/MNDM/MINES/LANDS/mlsmnpge.htm

October 3, 2000

VIRIDIAN INC.
3500, 10180 - 101 STREET
EDMONTON, ALBERTA
T5J-3S4

Dear Sir or Madam:

Submission Number: 2.20527

Subject: Transaction Number(s):	W0060.00368	**Status** Approval

We have reviewed your Assessment Work submission with the above noted Transaction Number(s). The attached summary page(s) indicate the results of the review. WE RECOMMEND YOU READ THIS SUMMARY FOR THE DETAILS PERTAINING TO YOUR ASSESSMENT WORK.

If the status for a transaction is a 45 Day Notice, the summary will outline the reasons for the notice, and any steps you can take to remedy deficiencies. The 90-day deemed approval provision, subsection 6(7) of the Assessment Work Regulation, will no longer be in effect for assessment work which has received a 45 Day Notice. Allowable changes to your credit distribution can be made by contacting the Geoscience Assessment Office within this 45 Day period, otherwise assessment credit will be cut back and distributed as outlined in Section #6 of the Declaration of Assessment work form.

Please note any revisions must be submitted in DUPLICATE to the Geoscience Assessment Office, by the response date on the summary.

If you have any questions regarding this correspondence, please contact LUCILLE JEROME by e-mail at lucille.jerome@ndm.gov.on.ca or by telephone at (705) 670-5858.

Yours sincerely,

Steven B. Beneteau

ORIGINAL SIGNED BY
Steve B. Beneteau
Acting Supervisor, Geoscience Assessment Office
Mining Lands Section

Correspondence ID: 15288
Copy for: Assessment Library

Work Report Assessment Results

Submission Number: 2.20527

Date Correspondence Sent: October 03, 2000 **Assessor:** LUCILLE JEROME

Transaction Number	First Claim Number	Township(s) / Area(s)	Status	Approval Date
W0060.00368	6000408	CARGILL	Approval	October 02, 2000

Section:
16 Drilling PDRILL

All future assessment work submissions must be accompanied with a breakdown of costs on the statement of cost form.

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

Correspondence to:

Resident Geologist
South Porcupine, ON

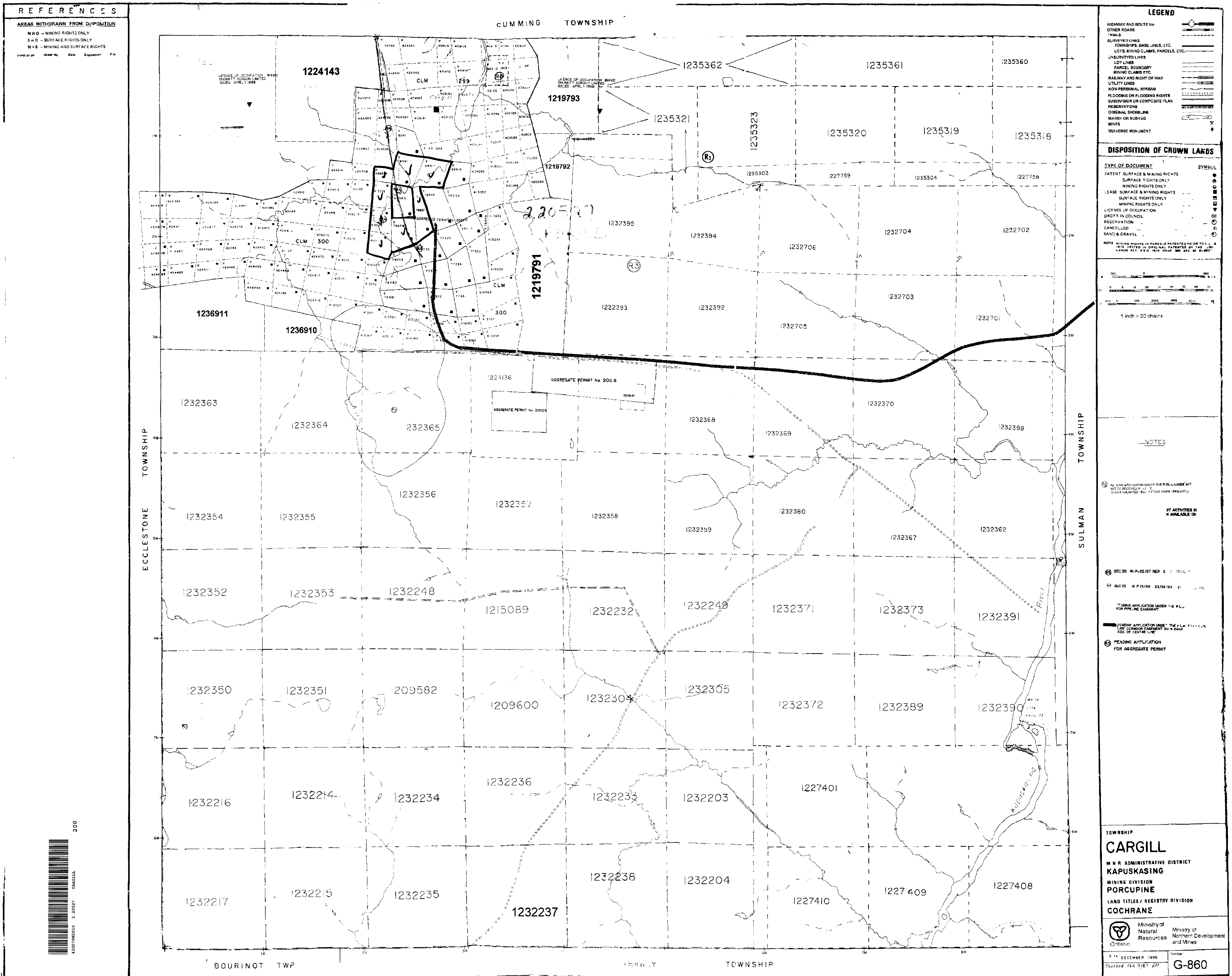
Assessment Files Library
Sudbury, ON

Recorded Holder(s) and/or Agent(s):

Reno Pressacco
KASPUSKASING, ONTARIO

VIRIDIAN INC.
EDMONTON, ALBERTA

Correspondence ID: 15288


REFERENCES
AREAS WITHDRAWN FROM DISPOSITION
M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M+S – MINING AND SURFACE RIGHTS
CUMMING TOWNSHIP
ECCLESTONE TOWNSHIP
SULMAN TOWNSHIP
BOURINOT TWP
TOWNSHIP
1224143
1219793
1219792
1219791
1235362
1235361
1235360
1235321
1235323
1235320
1235319
1235318
1232395
1232394
1232706
1232704
1232702
1232393
1232392
1232705
1232703
1232701
1236911
1236910
CLM 300
CLM
299
300
AGGREGATE PERMIT No 20018
1224136
1232363
1232364
232365
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1209600
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1232203
1227401
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1232215
1232235
1232237
1232238
1232204
1227410
1227409
1227408
LEGEND
DISPOSITION OF CROWN LANDS
TYPE OF DOCUMENT
SYMBOL
1 inch = 20 chains
NOTES
PENDING APPLICATION FOR AGGREGATE PERMIT
TOWNSHIP
CARGILL
M.N.R. ADMINISTRATIVE DISTRICT
KAPUSKASING
MINING DIVISION
PORCUPINE
LAND TITLES / REGISTRY DIVISION
COCHRANE
Ministry of Natural Resources
Ministry of Northern Development and Mines
Ontario
DECEMBER 1986
G-860
200
CARGILL

366750E
367000E
367250E
367500E
367750E
368000E
368250E
368500E
5462250N
5462000N
5461750N
5461500N
5461250N
5461000N
424506
424534
424505
413078
89918
89917
89916
89923
413076
78658
78657
78656
78655
413074
77326
77325
77324
78669
413052
409096
North Astronomic
Mine Gate
250 metres
aGR-00-015
aGR-00-014
aGR-00-013
aGR-00-012
aGR-00-011
aGR-00-010
aGR-00-009
aGR-00-008
aGR-00-005
aGR-00-004
aGR-00-003
aGR-00-002
aGR-00-001
aGR-00-016
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aGR-00-024
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aGR-00-026
aGR-00-030
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aGR-00-028
aGR-00-027
aGR-00-021
aGR-00-022
aGR-00-023
aGR-00-017
aGR-00-020
42907BW2010 2.20527 CARGILL 210
Winter 2000 Drilling
Scale: 1: 2000
Plan No.
Date: 01-Aug-00
SURPAC2000 - SURPAC Software International

AGRIUM
KAPUSKASING PHOSPHATE OPERATIONS
LITHOLOGIC LEGEND

LITHOLOGIC CODE	MATERIAL TYPE
CRETACEOUS:	
701	A ORE
702	A (GREY) ORE
703	B1 ORE
704	B2 ORE / GREEN MICA CLAY
705	WASTE (SILICA SANDS)
706	WASTE (PEAT & ORGANICS)
707	WASTE (ALL CLAYS)
708	WASTE (UNDIFFERENTIATED / OTHER)
720	RESIDUUM (UNDIFFERENTIATED)
PROTEROZOIC:	
709	ROCK - GNEISS
710	ROCK - RAUHAUGITE
711	ROCK - SOVITE
712	ROCK - PYROXENITE
713	ROCK - MISC. / UNDIFFERENTIATED
PLEISTOCENE:	
714	BROWN, VARVED CLAY
715	GREY GUMBO (LEDDA) CLAY
716	QUARTZ-RICH SANDS
717	BROWN BOULDER TILL
718	OTHER / UNDIFFERENTIATED
GENERAL CODES:	
799	LOST CORE / NO RECOVERY / NO SAMPLE

366950E 366900E 366950E 367000E 367050E 367100E 367150E 367200E 367250E 367300E

350N 300N 250N 200N 150N 100N 50N 0N

West

Surface

East

715

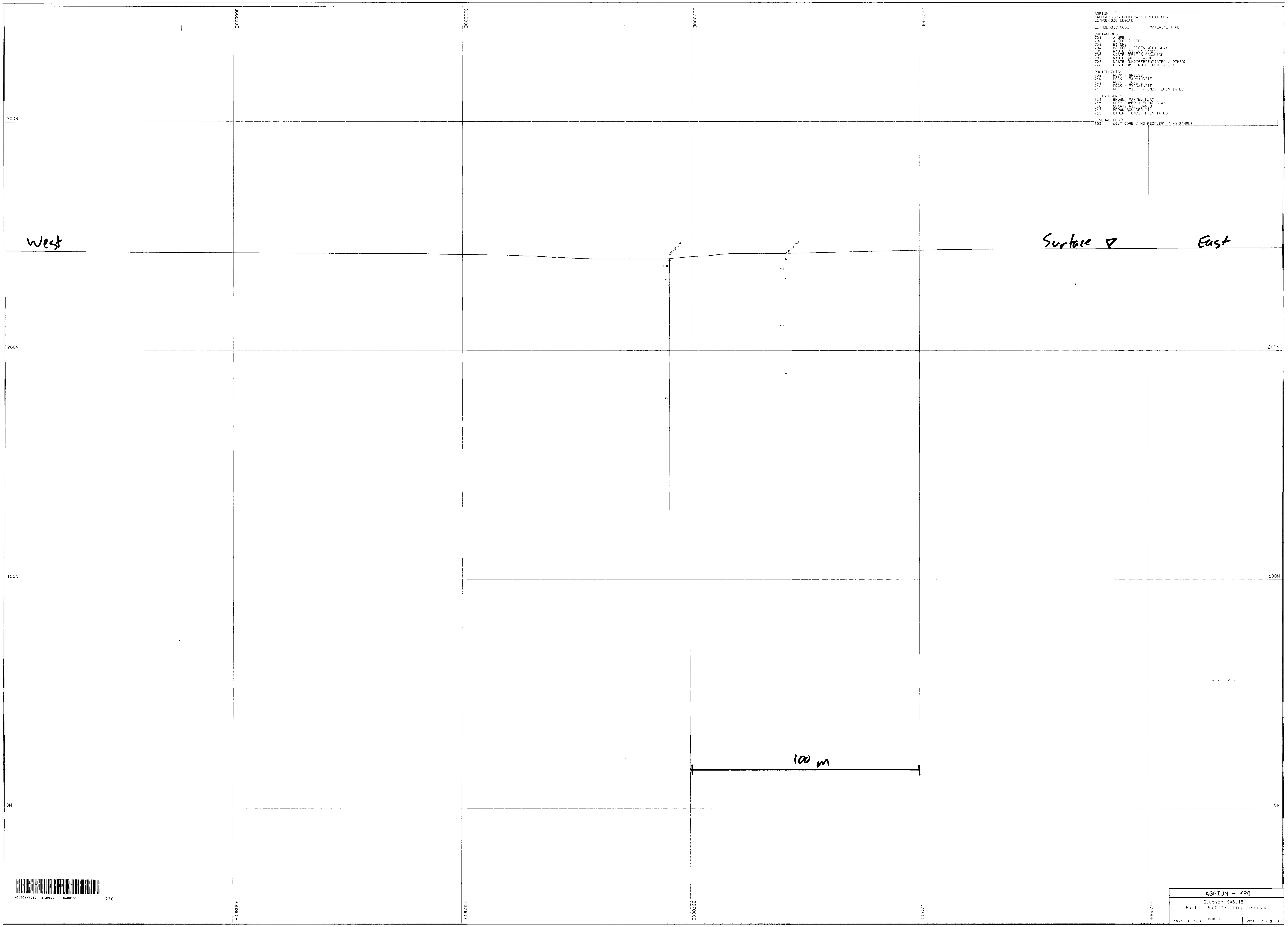
717

707

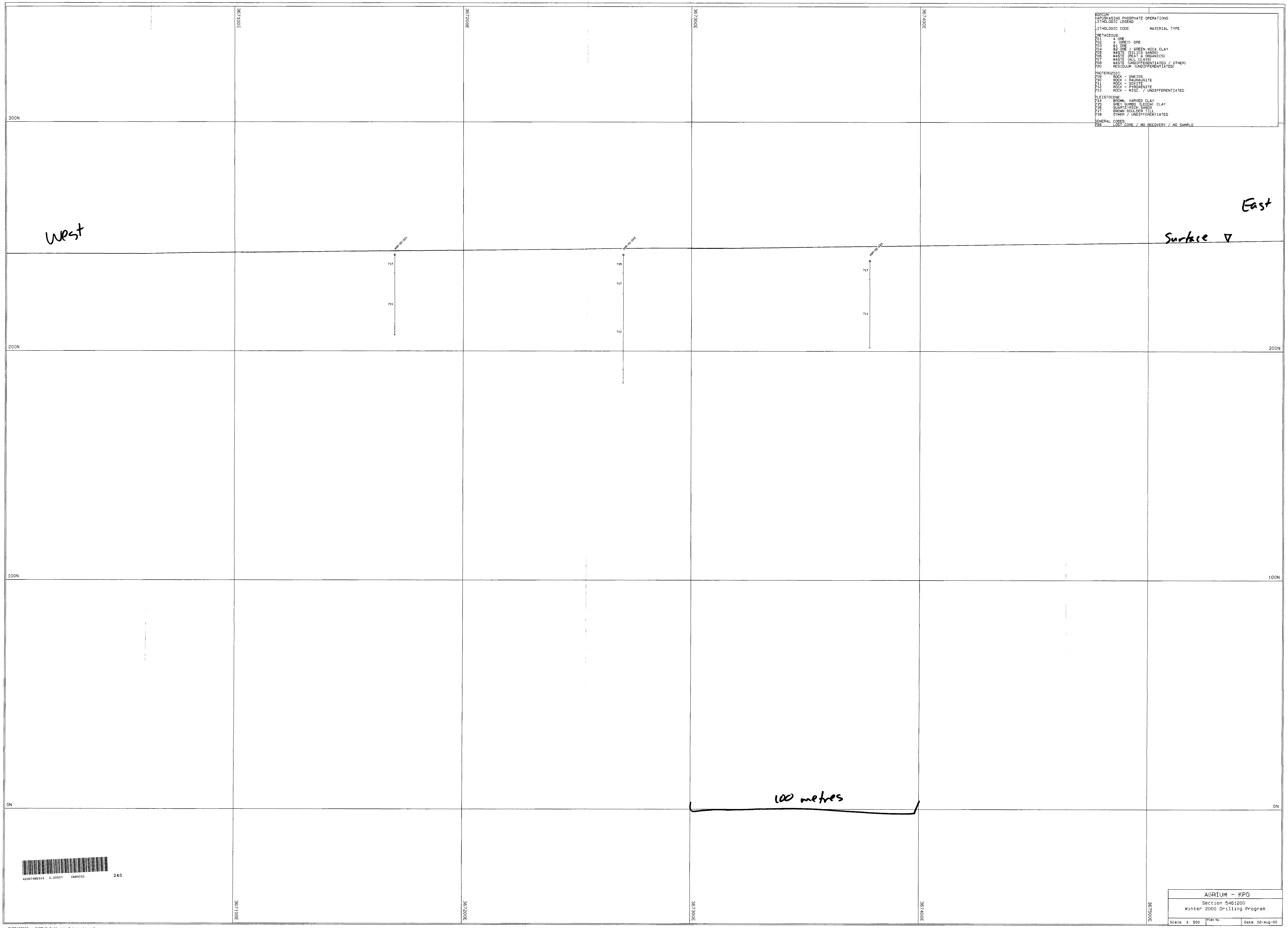
720

50 metres

AGRIUM - KPO
Section 5461100N
Winter 2000 Drilling Program
Scale: 1: 500 | Plan No | Date: 21-Aug-00



SURPAC2000 - SURPAC Software International



AGRIUM
KAPUSKASING PHOSPHATE OPERATIONS
LITHOLOGIC LEGEND

LITHOLOGIC CODE	MATERIAL TYPE
CRETACEOUS:	
701	A ORE
702	A (GREY) ORE
703	B1 ORE
704	B2 ORE / GREEN MICA CLAY
705	WASTE (SILICA SANDS)
706	WASTE (PEAT & ORGANICS)
707	WASTE (ALL CLAYS)
708	WASTE (UNDIFFERENTIATED / OTHER)
720	RESIDUUM (UNDIFFERENTIATED)
PROTEROZOIC:	
709	ROCK - GNEISS
710	ROCK - RAUHAUGITE
711	ROCK - SOVITE
712	ROCK - PYROXENITE
713	ROCK - MISC. / UNDIFFERENTIATED
PLEISTOCENE:	
714	BROWN, VARVED CLAY
715	GREY GUMBO (LEDA) CLAY
716	QUARTZ-RICH SANDS
717	BROWN BOULDER TILL
718	OTHER / UNDIFFERENTIATED
GENERAL CODES:	
799	LOST CORE / NO RECOVERY / NO SAMPLE

367010E
367020E
367030E
367040E
367050E

300N
200N
100N
0N

west

ABR-00-006
714
705
704
711

ABR-00-007
715
717
704
711

ABR-00-017
715
717
702
711

ABR-00-026
717
703
704
711

Surface ▽

East

100 metres

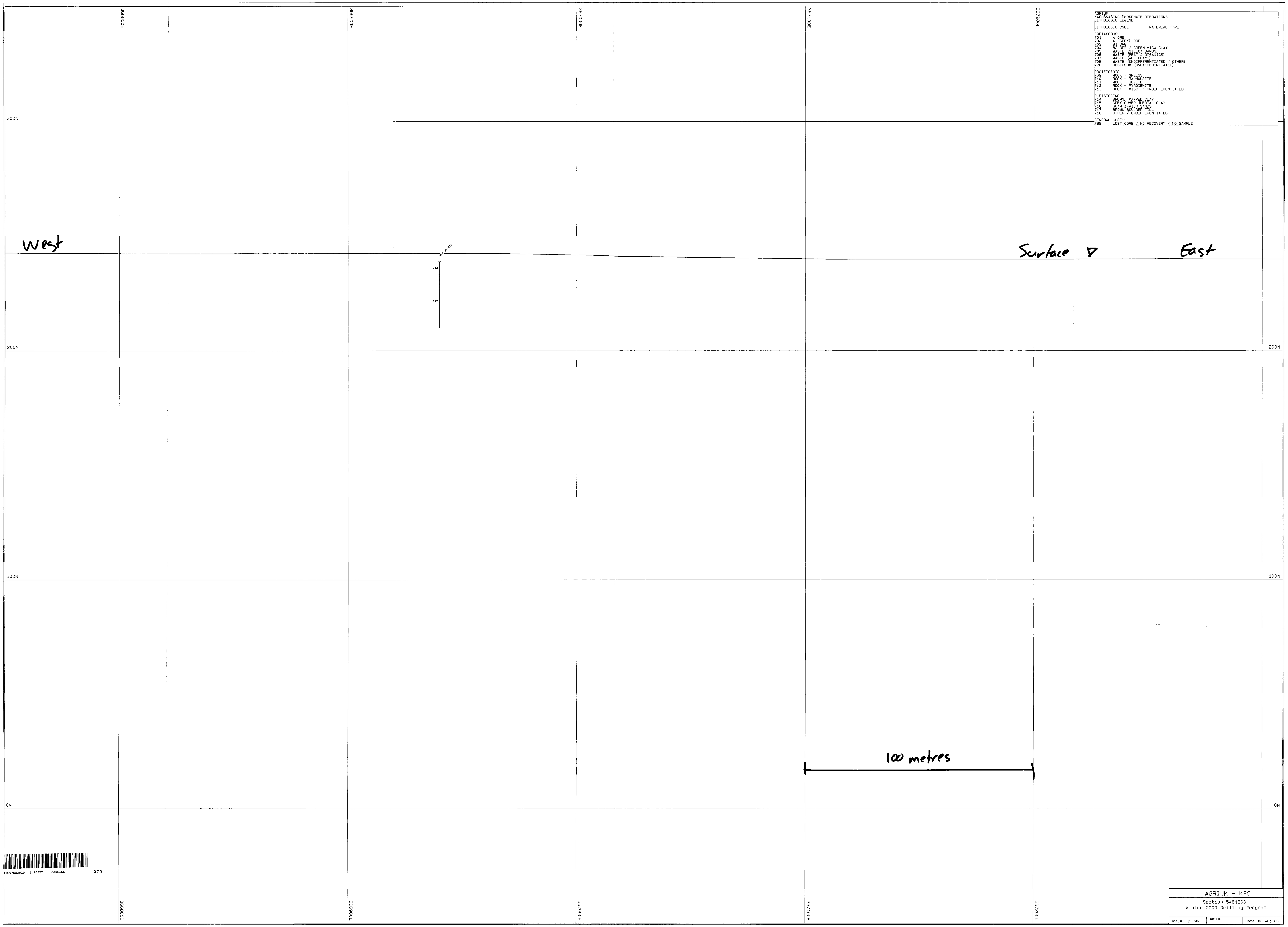
42G078W2010 2.20527 CARGILL 250

explotech pf

SURPAC2000 - SURPAC Software International

AGRIUM - KPO
Section 5461250
Winter 2000 Drilling Program

Scale: 1: 500 | Plan No. | Date: 02-Aug-00



SURPAC2000 - SURPAC Software International

AGRIUM
KAPUSKASING PHOSPHATE OPERATIONS
LITHOLOGIC LEGEND

LITHOLOGIC CODE	MATERIAL TYPE
CRETACEOUS:	
701	A ORE
703	A1 (GREY) ORE
704	A1 ORE
705	B2 ORE / GREEN MICA CLAY
706	WASTE (SILICA SANDS)
707	WASTE (PEAT & ORGANICS)
708	WASTE (ALL CLAYS)
709	WASTE (UNDIFFERENTIATED / OTHER)
720	RESIDUUM (UNDIFFERENTIATED)
PROTEROZOIC:	
709	ROCK - GNEISS
710	ROCK - RAUHAUGITE
711	ROCK - SOVITE
712	ROCK - PYROXENITE
713	ROCK - MISC. / UNDIFFERENTIATED
PLEISTOCENE:	
714	BROWN, VARVED CLAY
715	GREY GUMBO (LEDA) CLAY
716	QUARTZ-RICH SANDS
717	BROWN BOULDER TILL
718	OTHER / UNDIFFERENTIATED
GENERAL CODES:	
798	LOST CORE / NO RECOVERY / NO SAMPLE

365750E
365760E
365770E
365780E
365790E

300N
200N
100N
0N

West

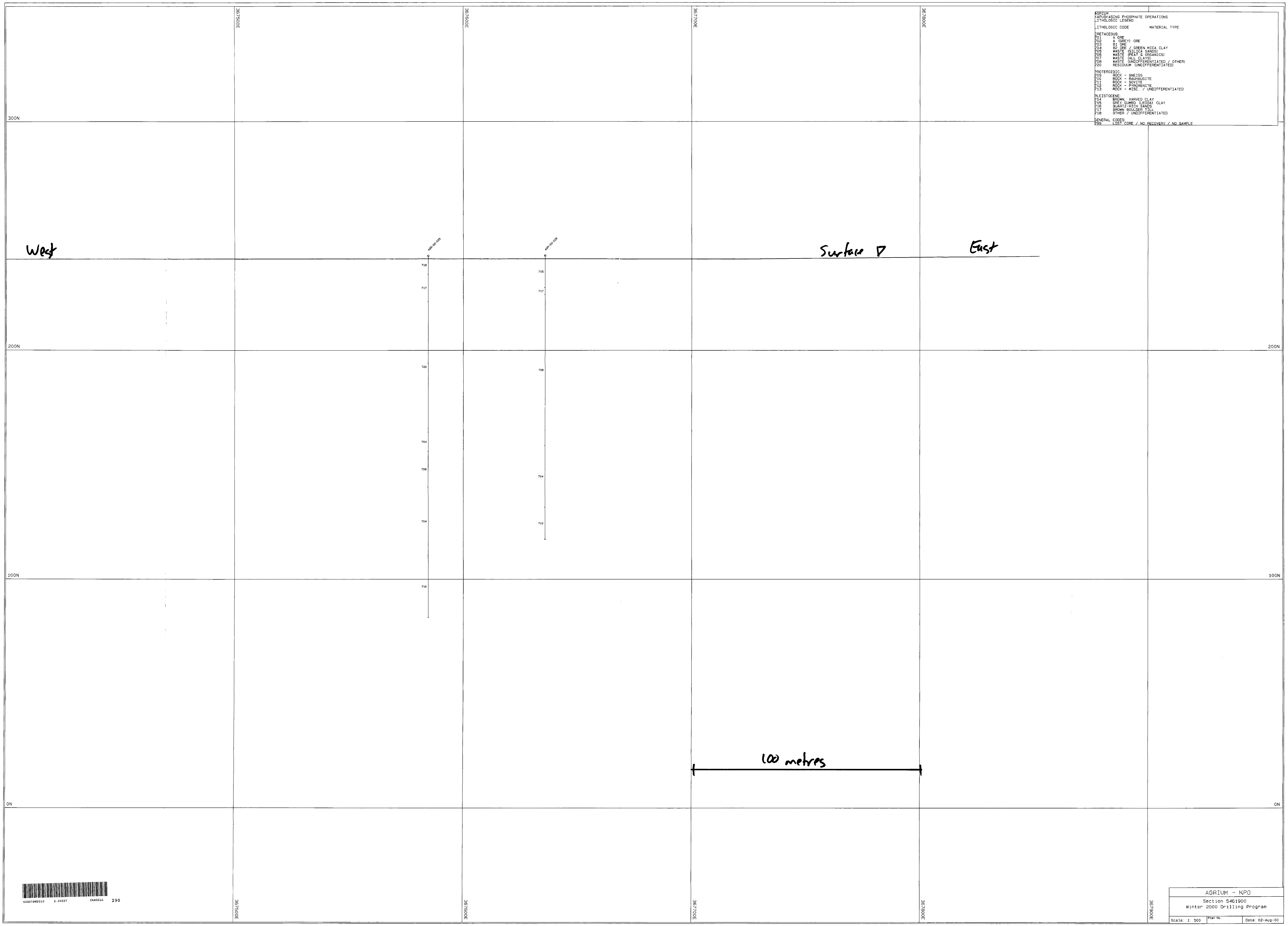
ABH-00-004
715
711

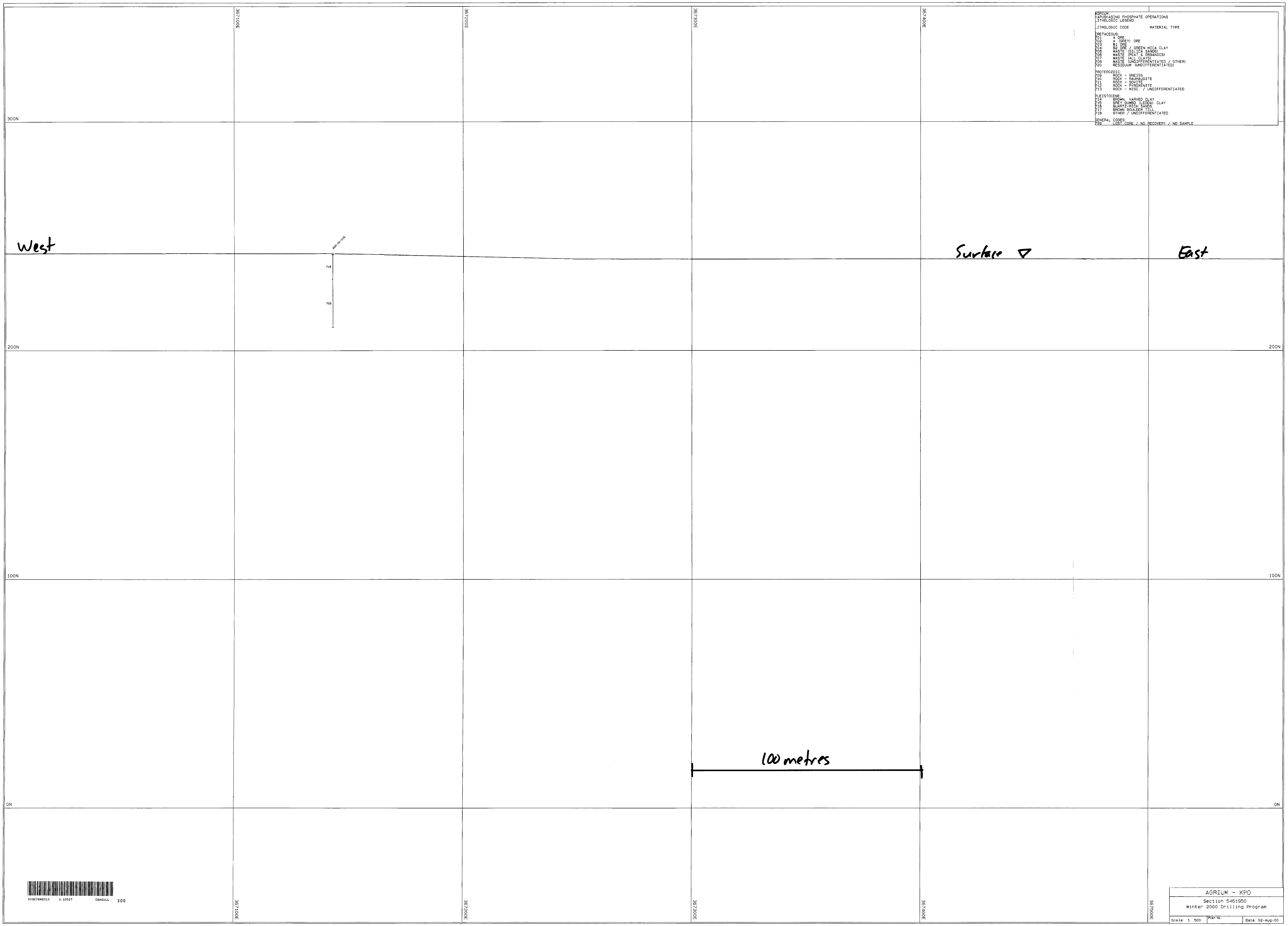
Surface

East

100m

AGRIUM - KPO
Section 5461850
Winter 2000 Drilling Program
Scale: 1: 500 | Plan No. | Date: 02-Aug-00





SURPAC2000 - SURPAC Software International

367200E | 367300E | 367400E | 367500E | 367600E

AGRIUM
KAPUSKASING PHOSPHATE OPERATIONS
LITHOLOGIC LEGEND

LITHOLOGIC CODE	MATERIAL TYPE
CRETACEOUS:	
701	A ORE
702	A (GREY) ORE
703	B1 ORE
704	B2 ORE / GREEN MICA CLAY
705	WASTE (SILICA SANDS)
706	WASTE (PEAT & ORGANICS)
707	WASTE (ALL CLAYS)
708	WASTE (UNDIFFERENTIATED / OTHER)
720	RESIDUUM (UNDIFFERENTIATED)
PROTEROZOIC:	
709	ROCK - GNEISS
710	ROCK - RAUMAUGITE
711	ROCK - SOVITE
712	ROCK - PYROXENITE
713	ROCK - MISC. / UNDIFFERENTIATED
PLEISTOCENE:	
714	BROWN VARVED CLAY
715	GREY DUMBO (LEDA) CLAY
716	QUARTZ-RICH SANDS
717	BROWN BOULDER TILL
718	OTHER / UNDIFFERENTIATED
GENERAL CODES:	
799	LOST CORE / NO RECOVERY / NO SAMPLE

300N

West

Surface

East

ASR-00-015 ASR-00-014 ASR-00-013 ASR-00-012 ASR-00-011 ASR-00-010 ASR-00-009 ASR-00-008

715 717 709 | 715 717 709 | 715 717 709 | 715 717 709 | 715 717 710 | 715 717 707 708 706 708 | 715 717 713 708 | 715 717 708 732

200N

100N

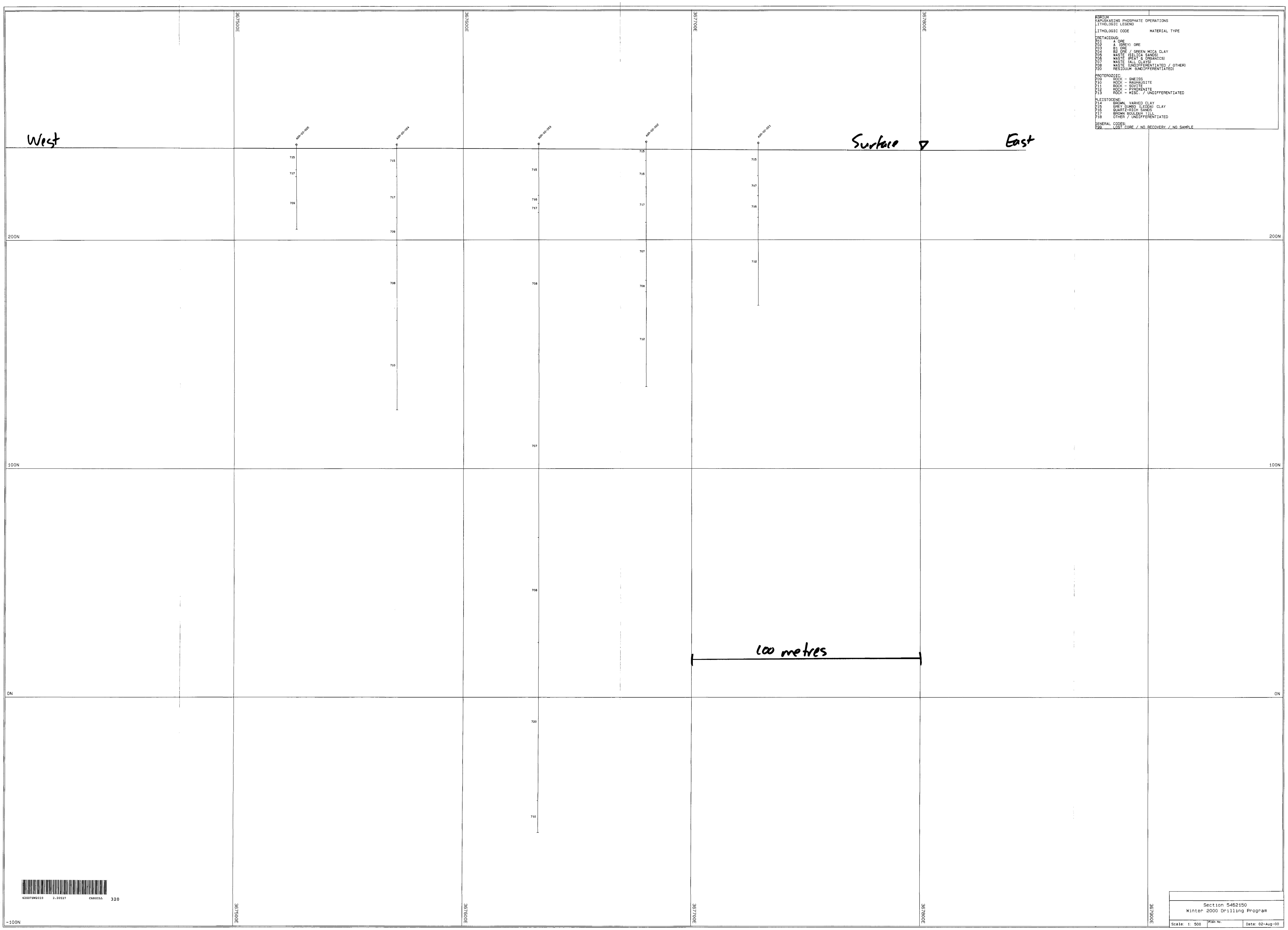
707

712

100 metres

0N

AGRIUM - KPO
Section 5462050
Winter 2000 Drilling Program
Scale: 1: 500 | Plan no. | Date: 02-Aug-00


West
Surface
East
100 metres
367500E
367600E
367700E
367800E
367900E
200N
100N
0N
-100N
AGRIUM
KAPUSKASING PHOSPHATE OPERATIONS
LITHOLOGIC LEGEND
LITHOLOGIC CODE MATERIAL TYPE
CRETACEOUS:
701 A ORE
702 A (GREY) ORE
703 B1 ORE
704 B2 ORE / GREEN MICA CLAY
705 WASTE (SILICA SANDS)
706 WASTE (PEAT & ORGANICS)
707 WASTE (ALL CLAYS)
708 WASTE (UNDIFFERENTIATED / OTHER)
720 RESIDUUM (UNDIFFERENTIATED)
PROTEROZOIC:
709 ROCK - GNEISS
710 ROCK - RAUHAUGITE
711 ROCK - SOVITE
712 ROCK - PYROXENITE
713 ROCK - MISC. / UNDIFFERENTIATED
PLEISTOCENE:
714 BROWN, VARVED CLAY
715 GREY GUMBO (LEDDA) CLAY
716 QUARTZ-RICH SANDS
717 BROWN BOULDER TILL
718 OTHER / UNDIFFERENTIATED
GENERAL CODES:
799 LOST CORE / NO RECOVERY / NO SAMPLE
Section 5462150
Winter 2000 Drilling Program
Scale: 1: 500
Plan No.
Date: 02-Aug-00