

GOLDER ASSOCIATES LTD.

CROSS SECTION A-A' AND B-B' THROUGH  
THE PCS LANIGAN MINE SITE

Report 0159-004 September 30, 1996

*E. A. Christiansen Consulting Ltd.*

CONSULTING GEOLOGIST

BOX 3087  
SASKATOON, SASKATCHEWAN, CANADA  
S7K 3S9

PHONE 374-6700

September 25, 1996

Golder Associates Ltd.  
202 - 2174 Airport Drive  
Saskatoon, Saskatchewan  
Canada S7L 6M6

Re: Cross sections through the PCS Lanigan mine site

Attention: Mr. Neil Anderson

Dear Mr. Anderson:

Enclosed please find the following information on the PCS Lanigan mine site.

- (1) a map of the Wynyard area (Fig. 1) showing the location of the Hatfield valley, cross sections A-A' and B-B', and the location of Drawing 0159-004-01,
- (2) a map of 72P-14 (Drawing 0159-004-01) showing the PCS Lanigan mine site and a partial location of cross sections A-A' and B-B',
- (3) cross sections A-A' and B-B' (Drawings 0159-004-02, 03) and
- (4) index of logs used in cross sections (Table 1).

The bedrock in the western part of the study-area (Drawing 0159-004-02) is composed of clay of the Lea Park Formation and Upper Colorado Group and sand of the Judith River Formation. East of the pinch-out of the Judith River Formation (Drawing 0159-004-02), the lateral equivalent of the bedrock is the Pierre Shale.

Above the bedrock surface, in ascending order, are the Empress, Sutherland, and Saskatoon groups. The Empress Group is composed of less than 1 to 55 m of sand and silt interbeds which are free of till. Prior to the deposition of till of the Sutherland Group, the Empress Group was eroded at site 11 (Drawing 0159-004-03) and replaced by sand and till, probably in the form of

TABLE 1. INDEX OF LOGS USED IN CROSS SECTIONS A-A' AND B-B'.

SITE	WELL DEPTH	SCREEN LENGTH	WATER LEVEL	GRD. ELEV.
1 SRC Plunkett 81-01	SW-13-03-33-25-W2	13:5739375N/467300E		552
2 FFIB Dyck, Jacob	SE-06-04-33-24-W2	13:5738450N/476150E		530
3 ALWINSAL Guernsey	01-12-33-24-W2	13:5739700N/481800E		532
4 HAYTER Guernsey	SW-02-18-33-23-W2	13:5741300N/482800E		532
5 PCS Lanigan 95-02	NW-04-16-33-23-W2	13:5741325N/485109E	69	528
6 PCS Lanigan 95-01	NE-08-28-33-23-W2	13:5745124N/486680E		534
7 DTRR Lanigan	SW-05-29-33-22-W2	13:5744900N/493300E	101	536
8 FFIB Mann, L.	NW-09-24-33-22-W2	13:5743950N/500950E	76	532
9 FFIB Funk, William	SW-01-30-33-21-W2	13:5744500N/502600E	88	532
10 FFIB Wiens, Jerry	NW-02-17-31-22-W2	13:5722000N/494000E	127	521
11 SRC Drake	SE-02-06-32-22-W2	13:5728300N/492700E		530
12 FFIB Blair, Dale	SW-05-23-32-23-W2	13:5733700N/488400E	99	524
13 FFIB King, Bryan	NW-13-14-33-23-W2	13:5742650N/488450E	96	531
14 FFIB Langner, Robert	CSW 21-34-23-W2	13:5752900N/485600E	53	540
15 SRC Burr	SW-04-03-35-23-W2	13:5757450N/485100E		544

fluvial "till balls". The contact between the Empress Group and Pierre Shale is an erosional unconformity.

The Sutherland Group, in ascending order, is composed of the Mennon, Dundurn, and Warman formations. The tills in sites 2 and 5 (Drawing 0159-004-02) have not been divided into formations. The Mennon Formation is composed of less than 1 to 16 m of till which has a carbonate content of about 15 mL CO<sub>2</sub>/g (Drawing 0159-004-03; sites 11, 15).

The Dundurn Formation is composed of a lower unit of less than 1 to 75 m of till and sand, the till of which has a carbonate content of 30 to 65 mL CO<sub>2</sub>/g and an upper unit of less than 1 to 26 m of till which has a carbonate content of about 30 mL CO<sub>2</sub>/g. The contact between the Mennon and Dundurn formations is nonconformable.

The Warman Formation is restricted to site 11 (Drawing 0159-004-03) where it is composed of 3 m of till which has a carbonate content of 20 to 25 mL CO<sub>2</sub>/g.

The contact between the Dundurn and Warman formations is nonconformable.

The Saskatoon Group is composed of a lower unit of sandy till and sand and an upper unit of till which includes the upper part of the Floral Formation and the Battleford Formation. Prior to deposition of the sandy till and sand unit of the Floral Formation, all of the Empress and Sutherland groups was removed locally by glacial erosion (Drawing 0159-004-02, 03). These glacially eroded depressions were filled with sandy till and sand of the Floral Formation which extends as a blanket over most of the study-area. The carbonate content of these sandy tills range from about 40 to 60 mL CO<sub>2</sub>/g.

The lower contact of the sandy till and sand unit of the Floral Formation is a major erosional unconformity.

Overlying the sandy till and sand unit of the Floral Formation is a 30 to 40 m thick blanket of tills of the upper Floral Formation and the Battleford Formation which cover the entire study-area. Locally, this blanket of tills

is known to be covered with thin deposits of stratified drift (Drawing 0159-004-02, sites 4, 5) which are not shown in the cross sections.

Sincerely yours,

  
E.A. Christiansen, P. Eng., P. Geol.



ASSOCIATION OF PROFESSIONAL ENGINEERS OF SASKATCHEWAN		
<b>CERTIFICATE OF AUTHORIZATION</b>		
E.A. CHRISTIANSEN CONSULTING LTD.		
NUMBER <b>505</b>		
PERMISSION TO CONSULT HELD BY:		
DISCIPLINE	SASK. REG. No.	SIGNATURE
<i>Geol</i>	<i>2912</i>	<i>EAC</i>

*E. A. Christiansen Consulting Ltd.*

CONSULTING GEOLOGIST

BOX 3087  
SASKATOON, SASKATCHEWAN, CANADA  
S7K 3S9

PHONE 374-6700

October 12, 1996

Golder Associates Ltd.  
201 - 2174 Airport Drive  
Saskatoon, Saskatchewan  
Canada S7L 6M6

Re: Cross section C-C' through the PCS Lanigan mine site

Attention: Mr. Neil Anderson

Dear Mr. Anderson:

Enclosed please find an addendum to Table 1 and a copy of cross section C-C'. I constructed cross section C-C' (Drawing 0159-004-04) to interpret the stratigraphy of logs 16-20 (Table 1) referred to by Bill Kanter in his memo to you October 9, 1996. I have difficulty with the stratigraphic interpretation of log 17 (Drawing 0159-004-04). I hesitate to include these higher resistance values in the sandy till and sand unit because of the anomolous structure that would entail. As I pointed out to you on the telephone, I am of the opinion that the geological investigation conducted in the PCS Lanigan mine site is inadequate.

If you have any queries about the cross sections of the PCS Lanigan mine site, please contact me.

Sincerely yours,

E.A. Christiansen, P. Eng., P. Geol.

TABLE 1. INDEX OF LOGS USED IN CROSS SECTIONS A-A' AND B-B'.

SITE				WELL DEPTH	SCREEN LENGTH	WATER LEVEL	GRD. ELEV.
1	SRC Plunkett 81-01	SW-13-03-33-25-W2	13:5739375N/467300E				552
2	FFIB Dyck, Jacob	SE-06-04-33-24-W2	13:5738450N/476150E				530
3	ALWINSAL Guernsey	01-12-33-24-W2	13:5739700N/481800E				532
4	HAYTER Guernsey	SW-02-18-33-23-W2	13:5741300N/482800E				532
5	PCS Lanigan 95-02	NW-04-16-33-23-W2	13:5741325N/485109E	69	2	Flowing	528
6	PCS Lanigan 95-01	NE-08-28-33-23-W2	13:5745124N/486680E				534
7	DTRR Lanigan	SW-05-29-33-22-W2	13:5744900N/493300E	101	4.6	5.5	536
8	FFIB Mann, L.	NW-09-24-33-22-W2	13:5743950N/500950E	76	3.0		532
9	FFIB Funk, William	SW-01-30-33-21-W2	13:5744500N/502600E	88	3.0	Flowing	532
10	FFIB Wiens, Jerry	NW-02-17-31-22-W2	13:5722000N/494000E	127	2.7		521
11	SRC Drake	SE-02-06-32-22-W2	13:5728500N/492700E				530
12	FFIB Blair, Dale	SW-05-23-32-23-W2	13:5733700N/488400E	99	6.1	4.6	524
13	FFIB King, Bryan	NW-13-14-33-23-W2	13:5742650N/488450E	96	3.0	+0.6	531
14	FFIB Langner, Robert	CSW 21-34-23-W2	13:5752900N/485600E	53	1.5	10.4	540
15	SRC Burr	SW-04-03-35-23-W2	13:5757450N/485100E				544

TABLE 1. CONTINUED FOR CROSS SECTION C-C'

16	VILLAGE OF DRAKE	SE-10-14-32-22-W2	13:5732500N/499200E	152.	6.1	7.5	533
17	FFIB Friesen, W.	13-32-32-22-W2	13:5737900N/493200E	38	3.0	4.6	530
18	FFIB Hayter, D.	14-09-34-24-W2	13:5751200N/476000E				546
19	PFRA Wolverine	SE-01-28-34-24-W2	13:5754500N/476900E	69	2.4		543
20	FFIB Senko, J.	SE-01-32-34-22-W2	13:5756000N/494700E	53	3.0	7.3	550

**Golder Associates Ltd.**

2180 Meadowvale Boulevard  
Mississauga, Ontario, Canada L5N 5S3  
Telephone (905) 567-4444  
Fax (905) 567-6561

**FACSIMILE TRANSMISSION**

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**DATE :** October 9, 1996

**TO :** Golder Associates - Saskatoon

**FAX NO. :** (306) 665-3342

**ATTENTION :** Neil Anderson

**FROM :** Bill Kanters

**RE :** **BOREHOLES THAT WOULD PROVIDE IMPORTANT  
INFORMATION ABOUT THE FLORAL FORMATION SAND  
AND TILL.**

**PROJECT NO. :** 962-6469

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**Total number of pages including cover page : 7**

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Neil

Further to our phone conversation on Monday, October 7, I feel that the following boreholes would provide valuable information about the location of the Floral Formation Sand and Till. The boreholes are, by location:

- SE-10-14-32-22-W2M
- SW-13-32-32-22-W2M ✓
- SE-1-32-34-22-W2M ✓
- SE-1-28-34-24-W2 (or, if this is not available 14-9-34-24)

These boreholes do not have any carbonate data with them in the logs I have reviewed from the AGRA report. I was only able to find five boreholes that did, two of which are used in Earl's cross sections, two more bunched together near Earl's cross section, and the last is out of our model boundary.)

October 9, 1996

Neil Anderson

- 2 -

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The boreholes I have selected are based on their location. If Earl can suggest a better selection of boreholes that provide the same coverage he is welcome to use them. I have provided a sketch to show where the boreholes are located.

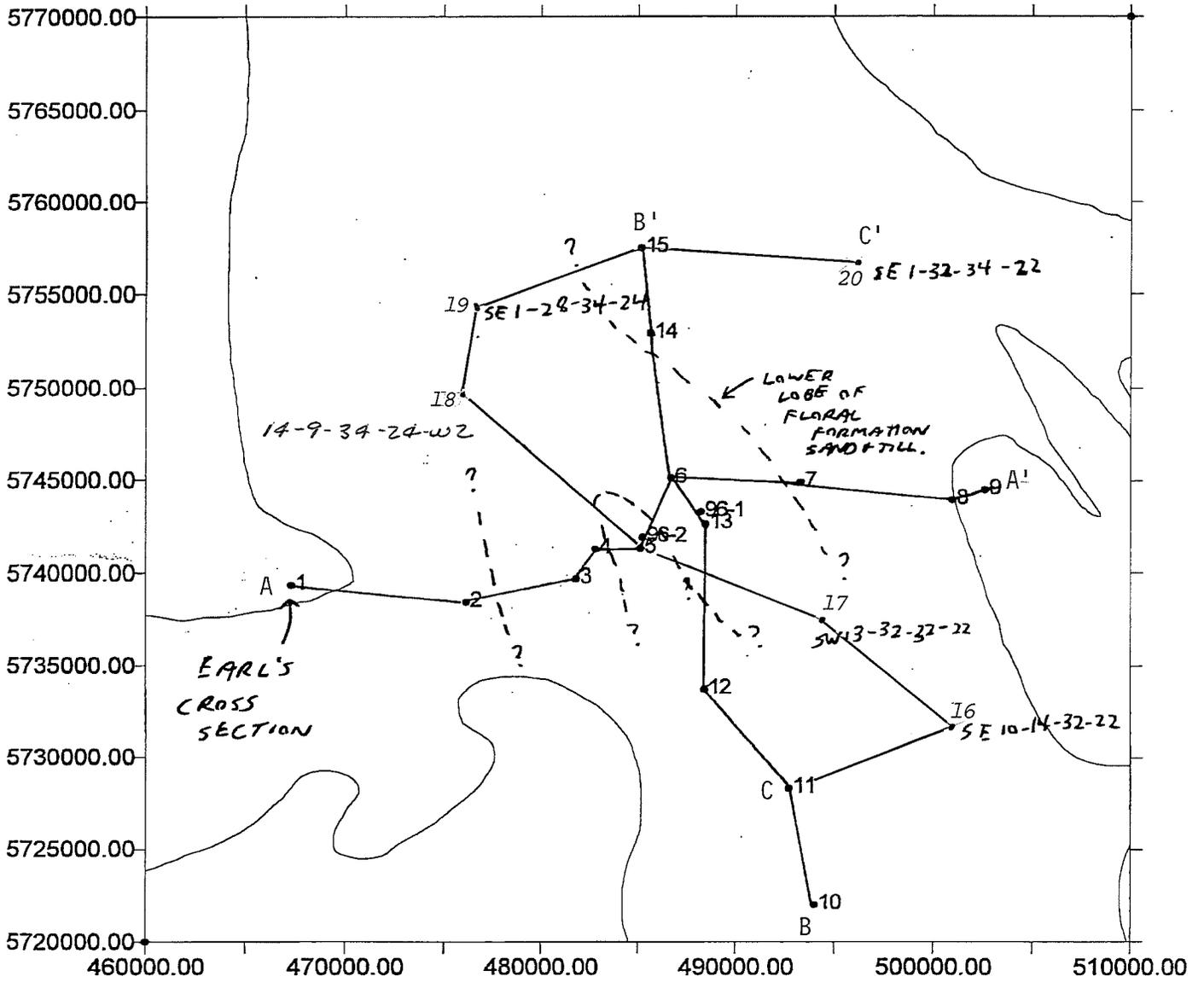
If you have any questions please give me a call. The sooner we can get this resolved the better.

Thanks,

Bill Kanters

**Golder Associates**

Borehole Locations









Saskatchewan Research Council  
GEOLOGY DIVISION  
ACQ # 8752

31-10-11-13-15-17-19-21-23-25-27-29-31

14-9-34-24-W2

ELECTRIC LOG

72-P

PROPERTY OWNERS INFORMATION: SASKATCHEWAN DEPARTMENT OF HIGHWAYS, 1210 UNIVERSITY STREET, REGINA, S4S 0A8

DRILLING CONTRACTOR: COMPANY NAME: Hayter Drilling Ltd.

CONTRACTOR'S ADDRESS: Box 604

CONTRACTOR'S PHONE: Watrous Sask

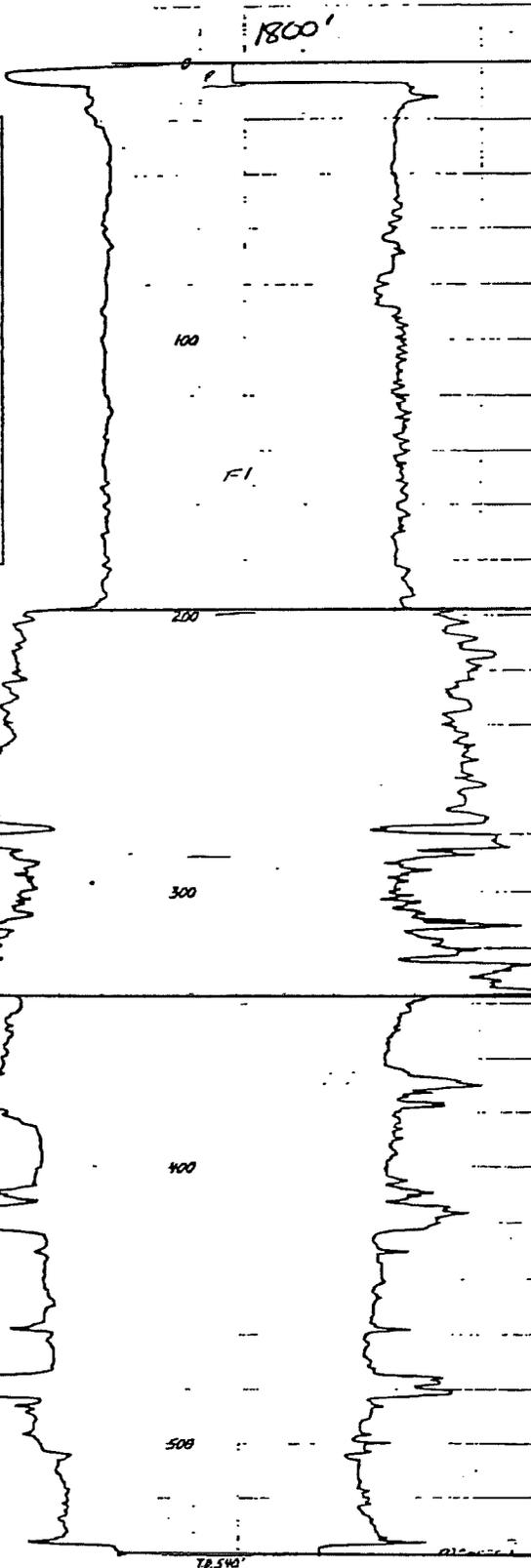
DRILLER'S NAME: Carl Higgins

DRILLER'S ADDRESS: Watrous Sask

DRILLER'S PHONE: Watrous Sask

DATE OF LOG: 20-9-78

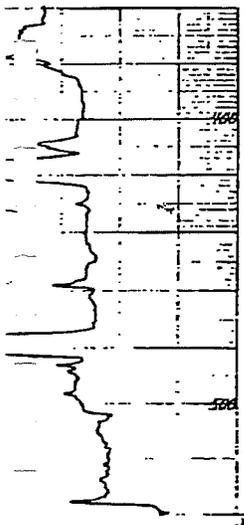
LOG SCALES: 10 (feet) 10 (meters)



SASKATOON GROUP  
FLORAL AND BATTLEFORD FORMATIONS  
TILL

FLORAL FORMATION  
SANDY TILL + SAND

SUTHERLAND GROUP  
DUNDURN FORMATION  
TILL AND SAND



DEPTH (FEET)	RESISTIVITY	DESCRIPTION
1		Till, brown
4		Gravel
9		Till, brown, soft
12		Till, silty, grey
21		Till, brownish grey
152		Till, grey
173		Rock
178		Till, grey
258		Sand
257		Till, grey
277		Sand
280		Silt, grey
286		Gravel
313		Silt, grey, with sand layers
314		Rock
325		Silt, grey & sand layers
328		Gravel
328		Sand, dirty
335		Gravel
336		Rock
337		Till, grey
370		Rock
372		Till, grey, with sand layers
380		Till, grey
408		Sand, grey
424		Till, grey
473		Sand
482		Till, grey with sand layers
487		Till, grey
533		Sand
536		Till, grey

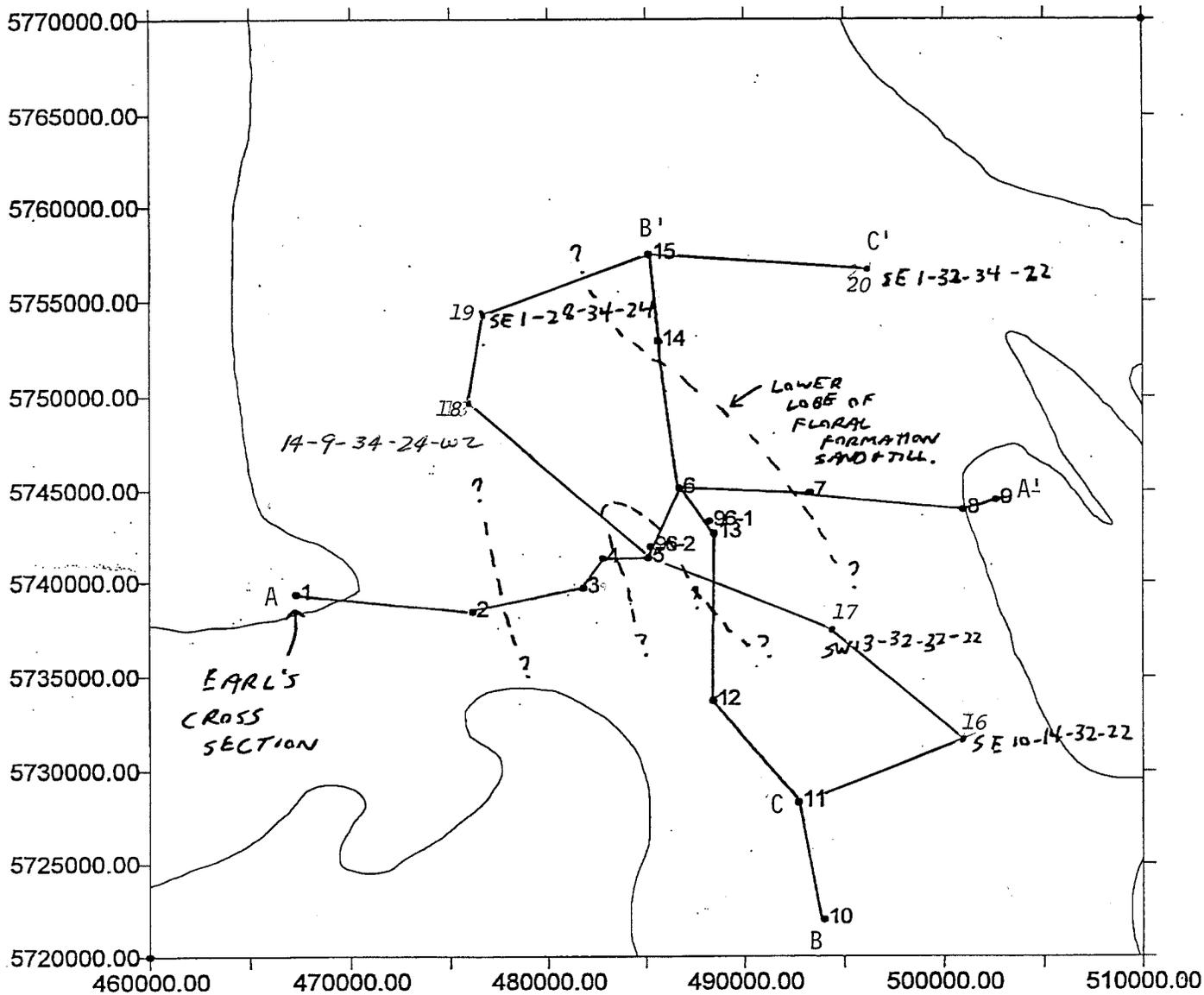
DATE TESTS COMPLETED: 20-9-78

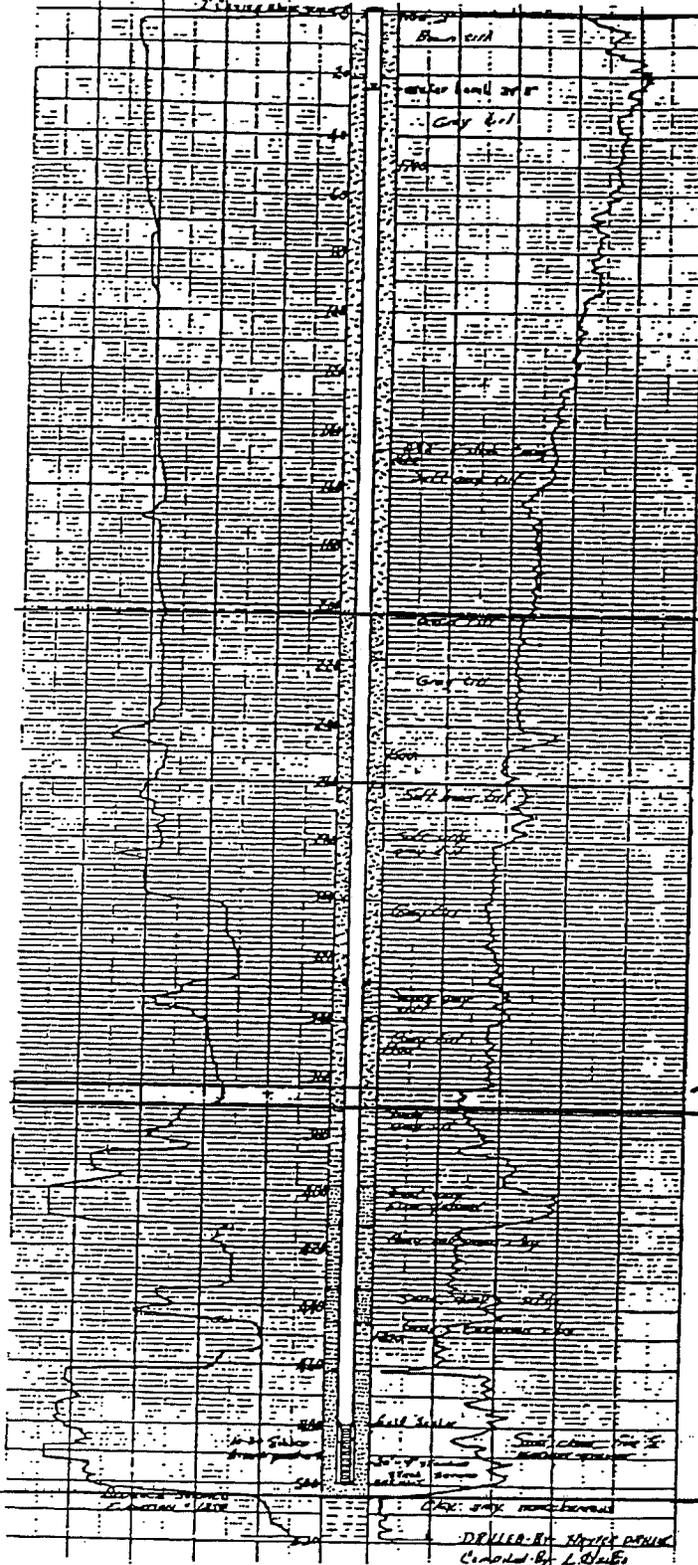
LOG NO: 14-9-34-24-W2

DEPTH (FEET)	RESISTIVITY	DESCRIPTION
1		Till, brown
4		Gravel
9		Till, brown, soft
12		Till, silty, grey
21		Till, brownish grey
152		Till, grey
173		Rock
178		Till, grey
258		Sand
257		Till, grey
277		Sand
280		Silt, grey
286		Gravel
313		Silt, grey, with sand layers
314		Rock
325		Silt, grey & sand layers
328		Gravel
328		Sand, dirty
335		Gravel
336		Rock
337		Till, grey
370		Rock
372		Till, grey, with sand layers
380		Till, grey
408		Sand, grey
424		Till, grey
473		Sand
482		Till, grey with sand layers
487		Till, grey
533		Sand
536		Till, grey

No Well Recorded  
Hayter Drilling Ltd.  
Carl Higgins

Borehole Locations





2264

DRAKE SE-10-14-32-22-W2

2264	WELL NO.
FRANK DEEP	WELL NO.
SE 10-14-32-22-W2	
TESTHOLE & WELL	

SASKATOON GROUP

FLORAL AND BATTLEFORD FMS. *TILL*

SUTHERLAND GROUP

DUNDURN FORMATION *TILL*

DUNDURN FORMATION *TILL AND SAND*

MENNON FORMATION *TILL*

EMPRESS GROUP

SAND AND SILT

PIERRE SHALE

DRILLER: R. H. HARRIS  
 COMPANY: L. B. H. Co.



21 -

12/14

ES 32-34-22 W2

**ELECTRIC LOG**  
TEST DRILLING ASSISTANCE PROGRAM

72-P

PROPERTY FROM IMPROVED SOURCE  
ESTABLISHED IN PROGRESS OR ADEQUATE  
1200 HUNTERS STREET, WEGAN, ON M7W 0K6

AC 8433

01 Hayter Drilling Ltd  
 CONTRACTOR'S NAME: Hayter Drilling Ltd  
 CONTRACTOR'S ADDRESS: Box 2  
 CONTRACTOR'S PHONE: 347-2173

02 John Senko  
 OWNER'S NAME: John Senko  
 OWNER'S ADDRESS: 1411111  
 OWNER'S PHONE: 347-2173

03 Gale Hayter  
 TESTER'S NAME: Gale Hayter  
 TESTER'S ADDRESS: 1200  
 TESTER'S PHONE: 347-2173

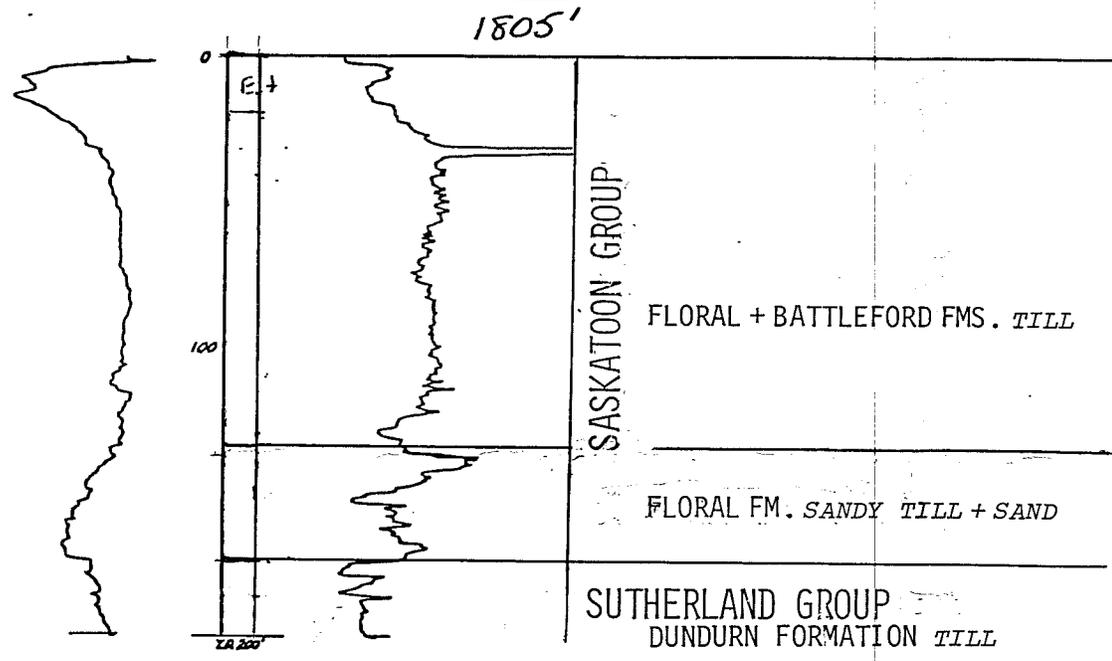
04 1200  
 WELL NUMBER: 1200  
 DATE OF LOGGING: 12/14

05 200  
 WELL DEPTH: 200  
 DATE OF LOGGING: 12/14

06 H-7A  
 WELL IDENTIFICATION: H-7A

LOG SCALES: 12

Water Council



ES 32-34-22-W2 AC 8433

DEPTH	LOG	DESCRIPTION
0	2	Topsoil
2	8	Clay brown
8	19	Till, brown
19	28	Till, grey
28	30.5	Rock
30.5	57	Till, grey
57	58	Gravel
58	87	Till, grey
87	120	Till, grey, hard
120	136	Till, brown
136	145	Sand, brown
145	150	Till, brown
150	165	Till, grey
165	174	Sand, fine
174	187	Till, grey
187	200	Till, Brown cont.

Well description  
 Fiberglass casing - dia 5" length 184'  
 Screen - dia 4" length 87' to 167'  
 Well bottom 174'  
 Water level 24'  
 Drawdown 35' after 1 hr at 35' to 200'  
 Recommended 35' to 200' from 150'

Hayter Drilling 212  
 Date: 12/14

Saskatchewan Research Council  
GEOLOGY DIVISION  
ACQ # 8752

31-10-1993 12:00

14-9-34-24-W2

ELECTRIC LOG

72-P

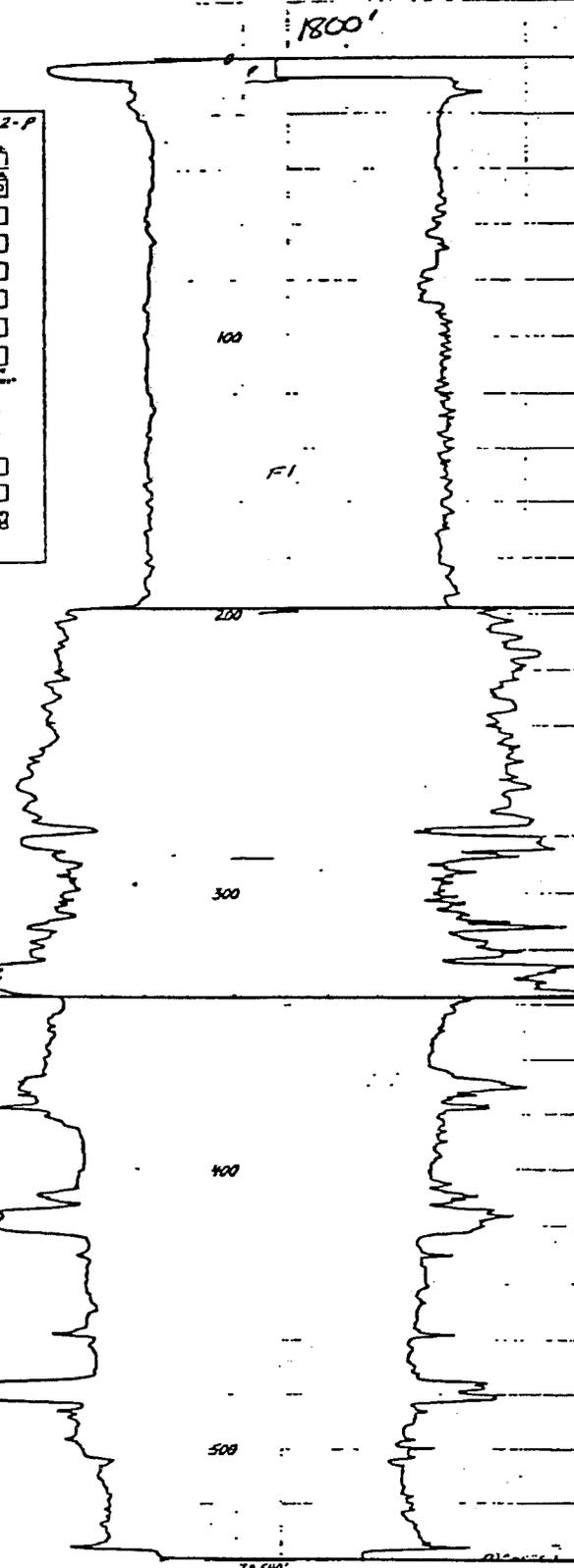
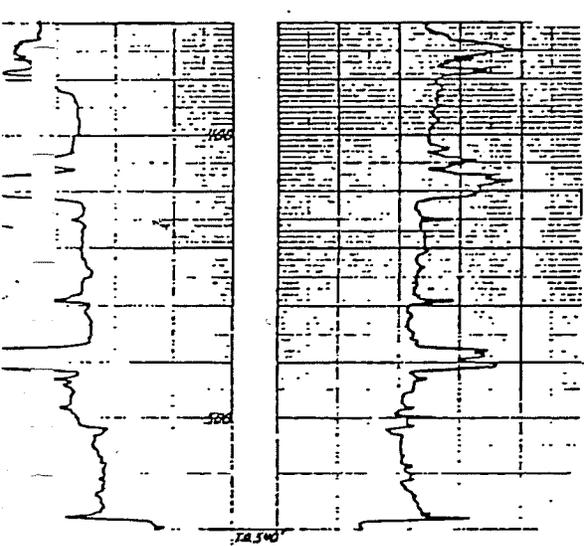
PROPERTY NAME: \_\_\_\_\_  
 OPERATOR: \_\_\_\_\_  
 CONTRACTOR: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 WELL NO.: \_\_\_\_\_  
 LOG SCALE: \_\_\_\_\_

1800'

SASKATOON GROUP  
FLORAL AND BATTLEFORD FORMATIONS  
TILL

FLORAL FORMATION  
SANDY TILL + SAND

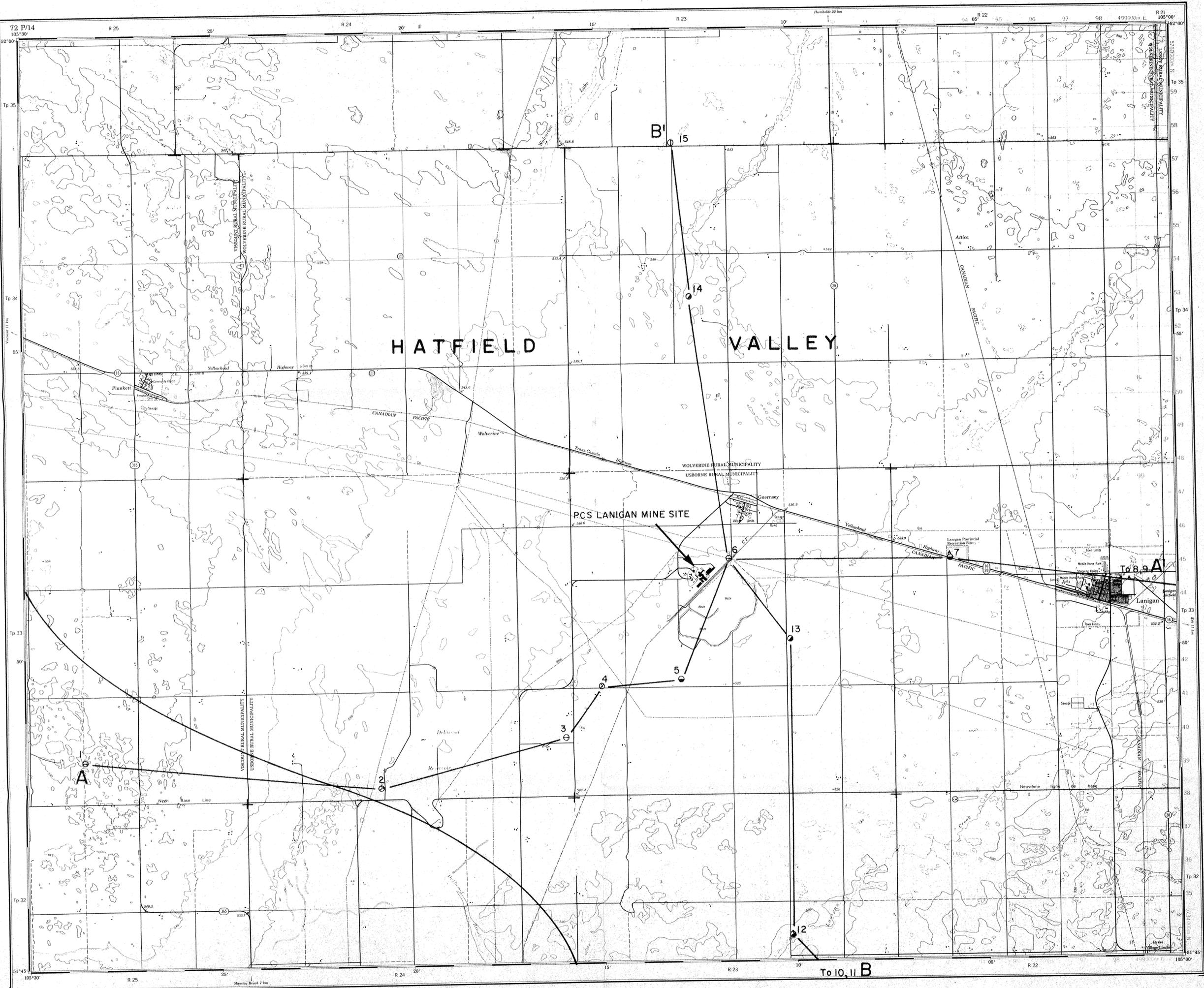
SUTHERLAND GROUP  
DUNDURN FORMATION  
TILL AND SAND



DEPTH (FEET)	DESCRIPTION
1	Till, brown
4	Gravel
9	Till, brown, soft
12	Till, silty, grey
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175	Rock
198	Till, grey
258	Sand
257	Till, grey
277	Sand
280	Silt, grey
286	Gravel
315	Silt, grey, with sand layers
314	Rock
325	Silt, grey, sand layers
328	Gravel
335	Sand, silty
336	Gravel
337	Rock
370	Till, grey
372	Rock
372	Till, grey, with sand layers
380	408 Till, grey
408	424 Sand
424	473 Till, grey
473	482 Sand
482	487 Till, grey with sand layers
487	533 Till, grey
533	536 Sand
536	540 Till, grey

No Well Recorded  
 Hayter Drilling Ltd.  
 Carl Higgins





LANIGAN



CONTOUR INTERVAL 10m

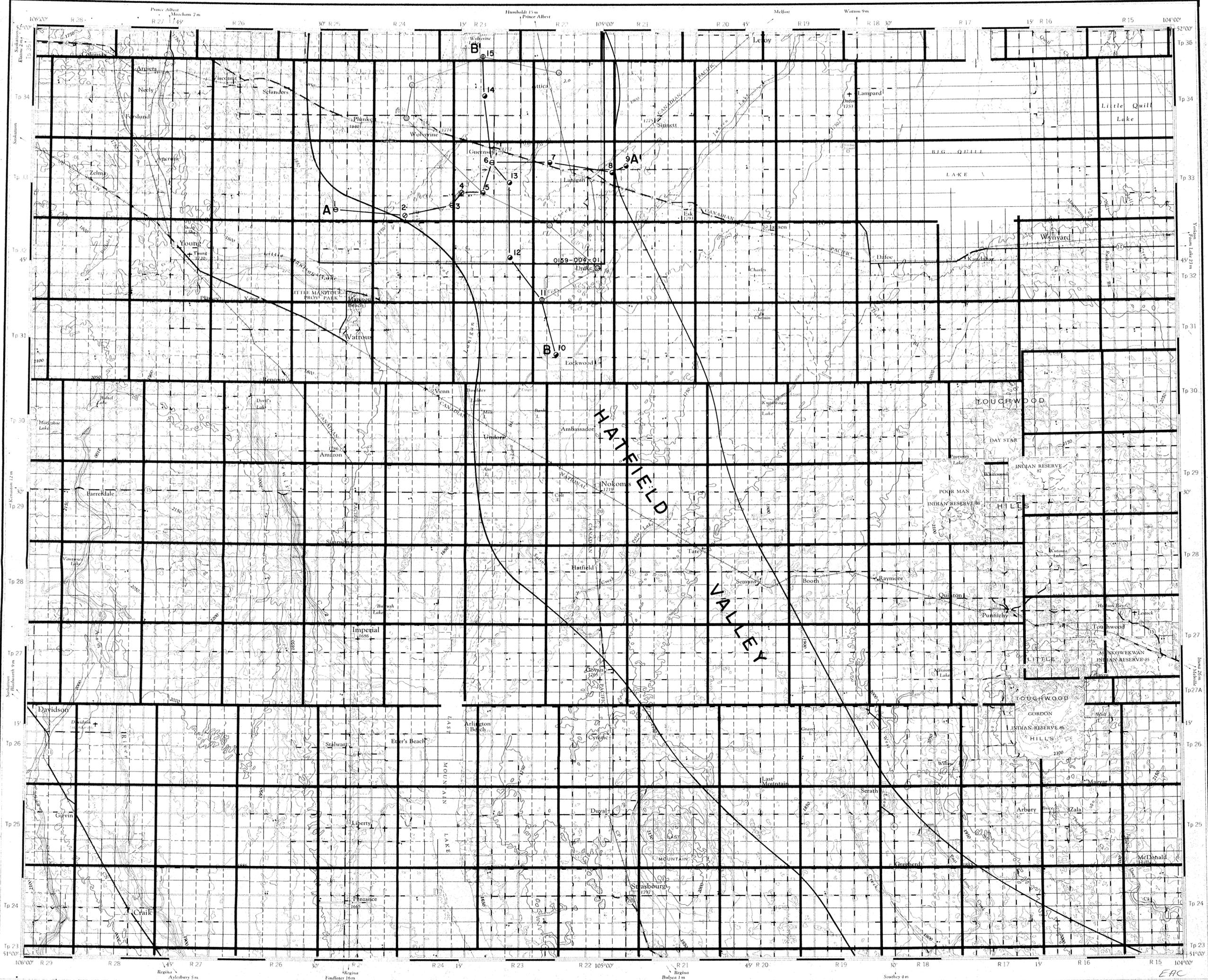
BASE MAP FROM ENERGY, MINES AND RESOURCES, OTTAWA

- TESTHOLES**
- ① ELECTRIC LOGS, CUTTING SAMPLES, AND CORES
  - ⊖ ELECTRIC LOGS AND CUTTING SAMPLES
  - ⊙ ELECTRIC LOGS AND DRILLER'S LOGS
- WELLS AND PIEZOMETERS**
- - 
  -
- A—A' CROSS SECTION
- 2 ⊖ CROSS SECTION LOG NUMBER

DRAWING 0159-004-01. MAP OF THE LANIGAN AREA (72-P/14) SHOWING PCS LANIGAN MINE SITE, MOST OF CROSS SECTIONS A-A' AND B-B', AND THE WESTERN BOUNDARY OF THE HATFIELD VALLEY.

**E.A. CHRISTIANSEN CONSULTING LTD.**  
 CONSULTING GEOLOGISTS  
 Box 3047 Saskatoon, Sask. S7N 3S6 Phone: 374-9700  
 Drawing No. 0159-004-01  
 Drawn By E.A. CHRISTIANSEN  
 Date SEPTEMBER 25, 1996

EAC



- TESTHOLES**
- ⊙ ELECTRIC LOGS, CUTTING SAMPLES, AND CORES
  - ⊖ ELECTRIC LOGS AND CUTTING SAMPLES
  - ⊗ ELECTRIC LOGS AND DRILLER'S LOGS
- WELLS AND PIEZOMETERS**
- - 
  -
- A—A' CROSS SECTION
- 2 ⊖ CROSS SECTION LOG NUMBER

## WYNYARD



FIGURE 1. MAP OF THE WYNYARD AREA (72-P) SHOWING THE LOCATION OF DRAWING 0159-004-01 (72-P/14), CROSS SECTIONS A-A' AND B-B' (DRAWINGS 0159-004-02, 03), AND THE HATFIELD VALLEY\*.

BASE MAP FROM ENERGY, MINES AND RESOURCES, OTTAWA

Box 3087  
Saskatoon, Sask.  
S7N 3S8  
Phone: 374-8700

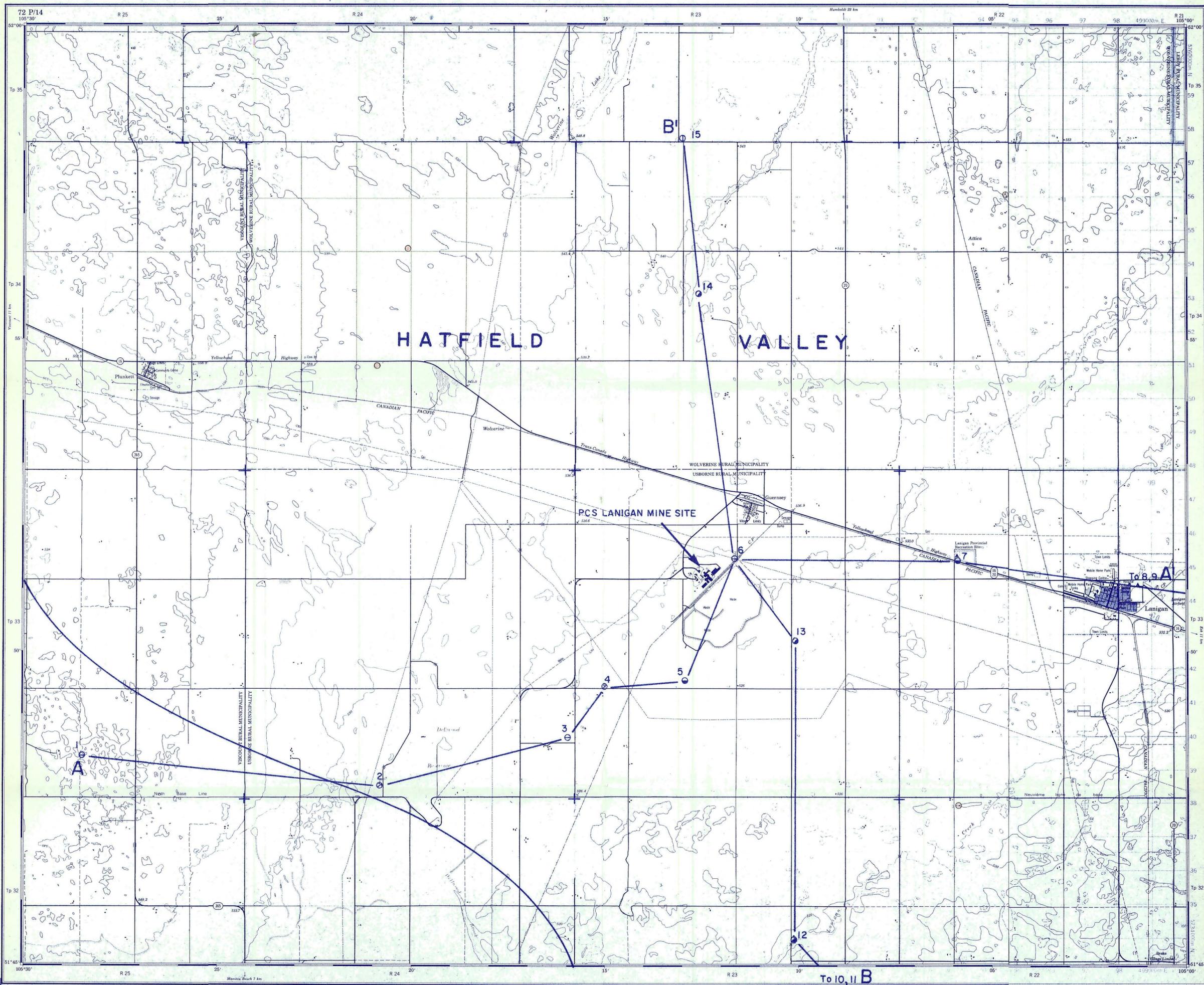
**E.A. CHRISTIANSEN**  
CONSULTING GEOLOGIST

Drawing No. **FIGURE 1**

Drawn By **E.A. CHRISTIANSEN**

Date **SEPTEMBER 25, 1996**

\*CHRISTIANSEN, E.A. 1987. GEOLOGY OF THE JANSEN SOIL SALINITY PROJECT, SASKATCHEWAN. E.A. CHRISTIANSEN CONSULTING LTD. REPORT 0083-017.



- TESTHOLES**
- ⊙ ELECTRIC LOGS, CUTTING SAMPLES, AND CORES
  - ⊖ ELECTRIC LOGS AND CUTTING SAMPLES
  - ⊗ ELECTRIC LOGS AND DRILLER'S LOGS
- WELLS AND PIEZOMETERS**
- - 
  -
- A—A' CROSS SECTION
- ② CROSS SECTION LOG NUMBER

CONTOUR INTERVAL 10m

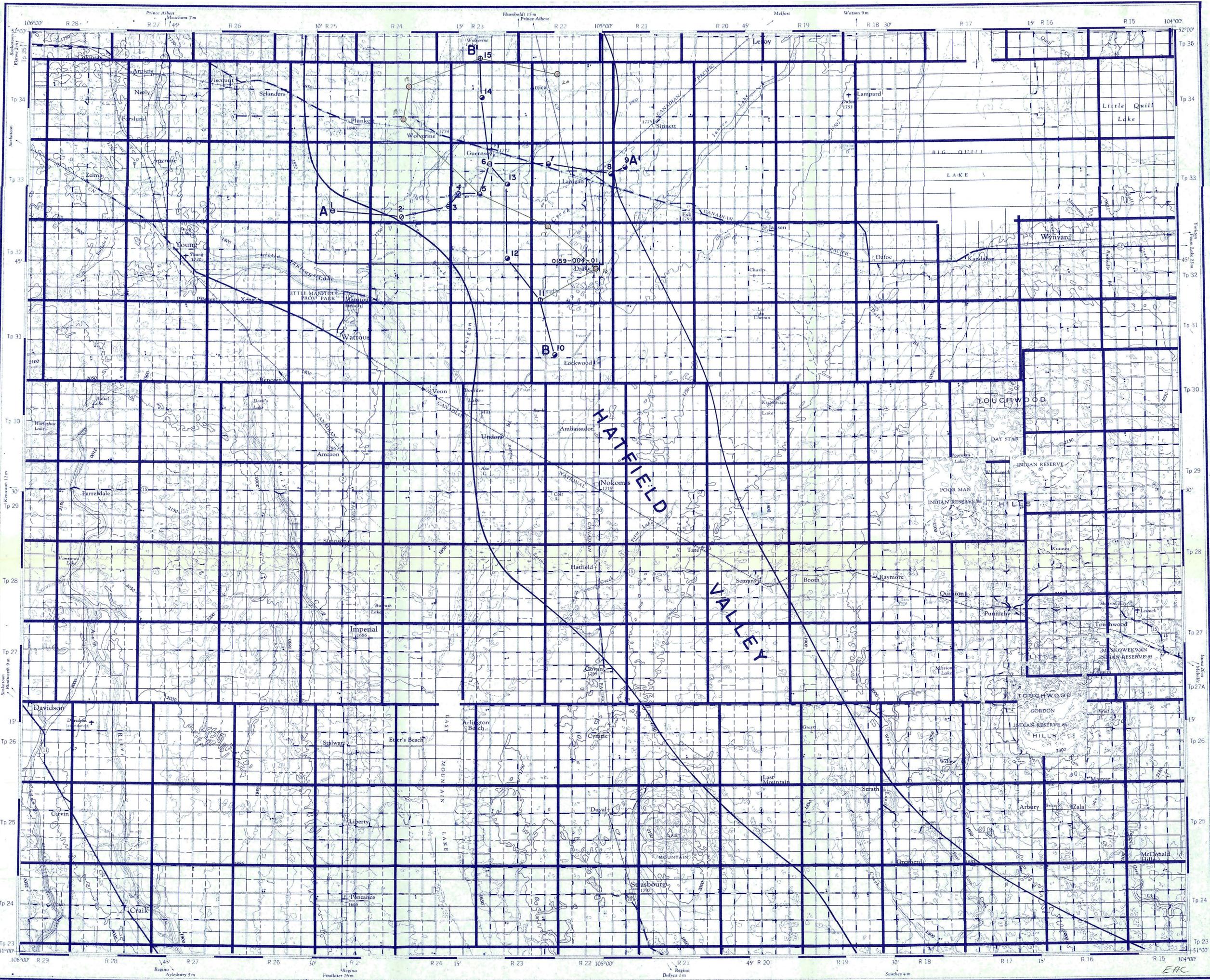
BASE MAP FROM ENERGY, MINES AND RESOURCES, OTTAWA

DRAWING 0159-004-01. MAP OF THE LANIGAN AREA (72-P/14) SHOWING PCS LANIGAN MINE SITE, MOST OF CROSS SECTIONS A-A' AND B-B', AND THE WESTERN BOUNDARY OF THE HATFIELD VALLEY.

**E.A. CHRISTIANSEN CONSULTING LTD.**  
 CONSULTING GEOLOGIST  
 Drawing No. 0159-004-01  
 Drawn By E.A. CHRISTIANSEN  
 Date SEPTEMBER 25, 1996

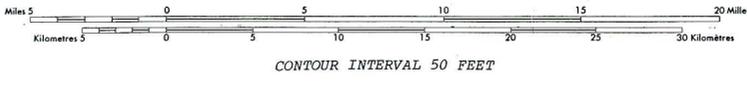
Box 2087  
 Saskatoon, Sask.  
 S7N 1S0  
 Phone: 374-4700

EAC



- TESTHOLES**
- ① ELECTRIC LOGS, CUTTING SAMPLES, AND CORES
  - ② ELECTRIC LOGS AND CUTTING SAMPLES
  - ③ ELECTRIC LOGS AND DRILLER'S LOGS
- WELLS AND PIEZOMETERS**
- - 
  -
- A—A' CROSS SECTION  
 2 ● CROSS SECTION LOG NUMBER

**WYNYARD**

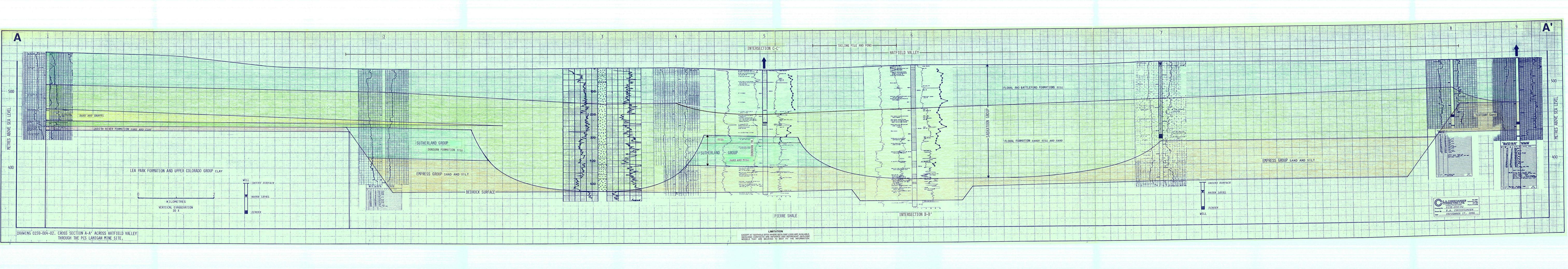


BASE MAP FROM ENERGY, MINES AND RESOURCES, OTTAWA

FIGURE 1. MAP OF THE WYNYARD AREA (72-P) SHOWING THE LOCATION OF DRAWING 0159-004-01 (72-P/14), CROSS SECTIONS A-A' AND B-B' (DRAWINGS 0159-004-02, 03), AND THE HATFIELD VALLEY\*.

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 Date **SEPTEMBER 25, 1996**

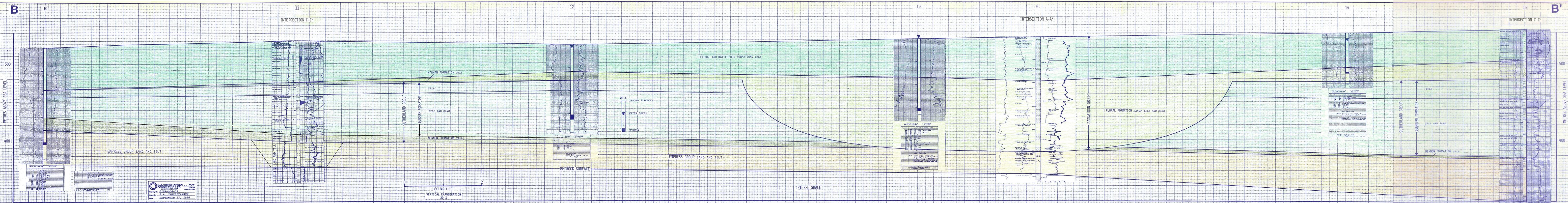
\*CHRISTIANSEN, E.A. 1987. GEOLOGY OF THE JANSEN SOIL SALINITY PROJECT, SASKATCHEWAN. E.A. CHRISTIANSEN CONSULTING LTD. REPORT 0083-017.



DRAWING 0159-004-02. CROSS SECTION A-A' ACROSS HATFIELD VALLEY THROUGH THE PCS LANIGAN MINE SITE.

**LIMITATION**  
 EXCEPT AT TESTHOLE SITES WHERE GEOLOGIC LOGS ARE AVAILABLE, GEOLOGIC CONTACTS ARE INFERRED AND REPRESENT GEOLOGIC MODELS THAT ARE BELIEVED TO BEST FIT THE INFORMATION.

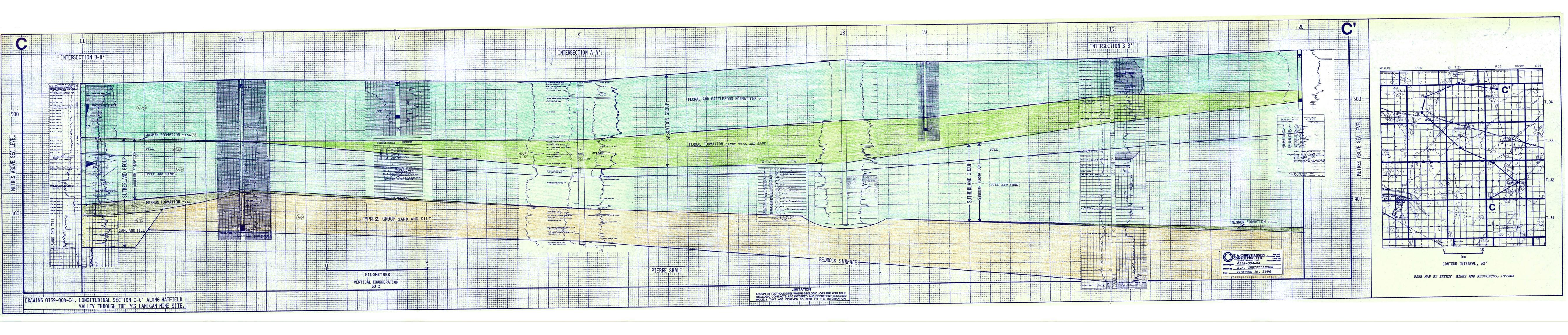
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DRAWING 0159-004-03. LONGITUDINAL SECTION B-B' ALONG HATFIELD VALLEY THROUGH THE PCS LANIGAN MINE SITE.

**LIMITATION**  
 EXCEPT AT TESTHOLE SITES WHERE GEOLOGIC LOGS ARE AVAILABLE, GEOLOGIC CONTACTS ARE INFERRED AND REPRESENT GEOLOGIC MODELS THAT ARE BELIEVED TO BEST FIT THE INFORMATION.



DRAWING 0159-004-04. LONGITUDINAL SECTION C-C' ALONG HATFIELD VALLEY THROUGH THE PCS LANIGAN MINE SITE.

**LIMITATION**  
EXCEPT AT TESTHOLE SITES WHERE GEOLOGIC LOGS ARE AVAILABLE, GEOLOGIC CONTACTS ARE INFERRED AND REPRESENT GEOLOGIC MODELS THAT ARE BELIEVED TO BEST FIT THE INFORMATION.

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