

SASKATCHEWAN INSTITUTE OF PEDOLOGY

GEOLOGY OF THE CONSUL PROJECT

Report 0083-012 January 28, 1987

Les Henry



*E. A. Christiansen Consulting Ltd.*

CONSULTING GEOLOGIST

BOX 3087  
SASKATOON, SASKATCHEWAN, CANADA  
S7K 3S9

PHONE 374-6700

January 28th, 1987

Saskatchewan Institute of Pedology  
University of Saskatchewan  
Saskatoon, Saskatchewan  
S7N 0W0

Attention: Dr. J. L. Henry

Dear Dr. Henry:

Enclosed are six copies of Report 0083-012 on the "Geology of the Consul Project". The report includes two information sheets (Drawings 0083-012-01,02) showing the locations of cross sections A-A' and B-B' (Drawing 0083-012-03,04) and the Consul Valley. An index of testholes logs and wells used in the cross sections appears in Appendix 1, and geologic and electric logs from the two testholes drilled in this project appear in Appendix 2.

Prior to conducting field work, it was determined from existing information that the head in the Judith River Formation was too low to cause the soil salinity in the Battle Creek Valley. As a consequence of this, the bedrock surface was taken as the base of exploration for the drilling of testholes SIP Consul 101 and 102 (Appendix 2).

The sediments in the Consul Valley fill include in ascending order 16 feet of Empress Group sand and gravel, 184 feet of till, eight feet of glacio-lacustrine silt and clay, and 34 feet of alluvial clay, sand, and silt (Appendix 2). The chert and quartzite nature of the gravels in the Empress Group suggests a preglacial origin for the Consul Valley. Both testhole logs (Appendix 2) show a lower till overlain by more clayey till. Whether these units represent tills deposited during more than one glaciation is uncertain. The varved nature of the silts and clays overlying till suggests that a glacio-lacustrine environment existed before the overlying alluvial deposits were laid down.

Dr. J. L. HENRY  
SASKATCHEWAN INSTITUTE OF PEDOLOGY  
January 28th, 1987

Numerous flowing wells, flowing testhole SIP Consul 86-101 (Appendix 2), and the high head in piezometer SIP Consul 86-102 suggest upward flow from the Consul Valley fill deposits is the cause of soil salinity in the Battle Creek Valley.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "E. A. Christiansen".

E. A. Christiansen

EAC/wan  
Enclosures

APPENDIX 1.

INDEX OF CROSS SECTION LOSS, WELLS, AND WATER ANALYSES IN THE CONSUL AREA.

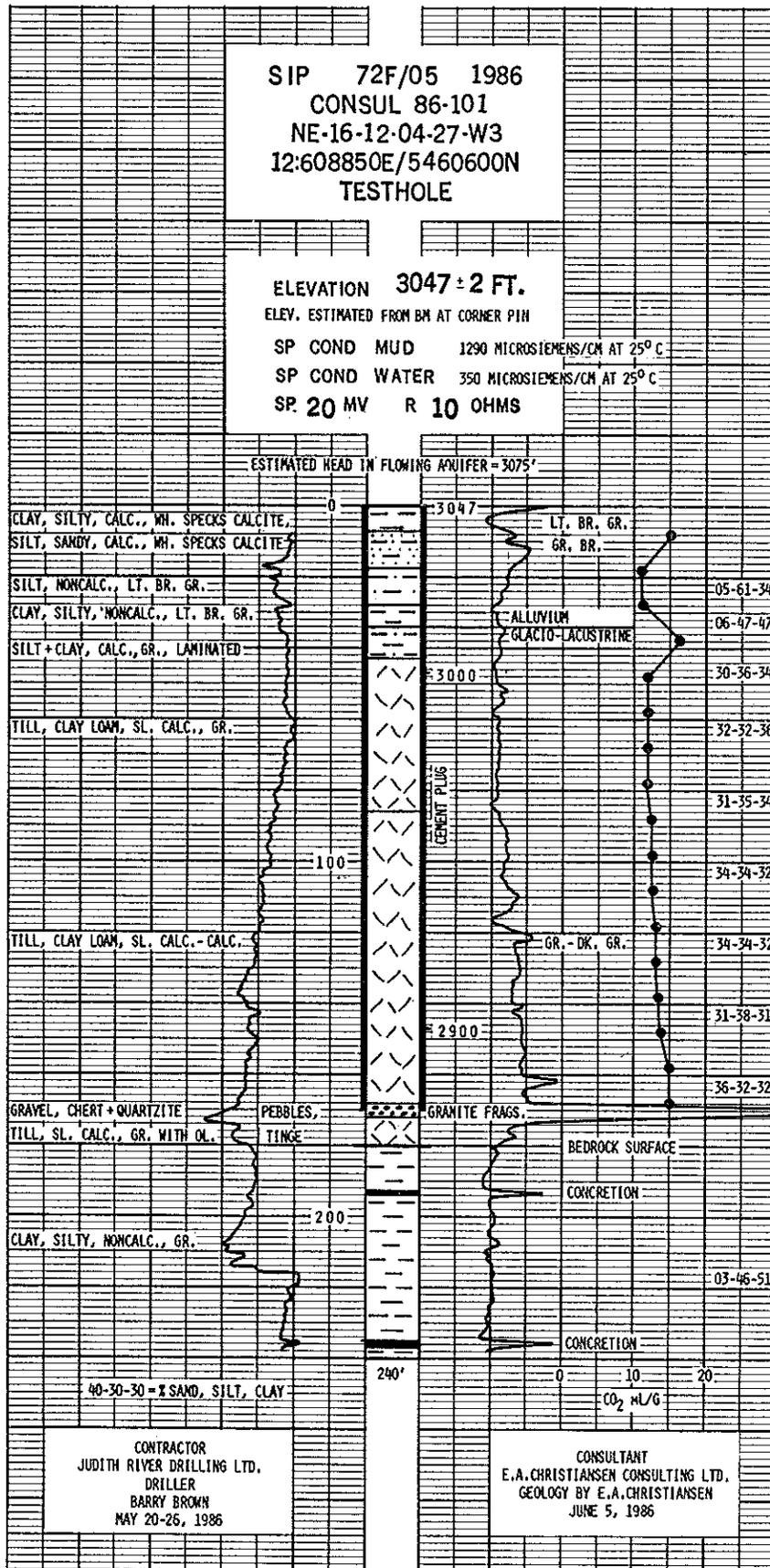
NO.	NAME	LOCATION	WELL DEPTH	STATIC FEET	BC	SMR	SCREEN LENGTH	GEOLOGY	AQUIFER
1	SRC RCA Altawan	NW 12-23-3-30-W3	-	-	-	-	-	-	-
2	UBR Arco Governlock	10-19-3-29-W3	-	-	-	-	-	-	-
3	FFIB Trumper, P.	SW 13-24-3-29-W3	-	-	-	-	-	-	-
4	FFIB Pierce, A.	SW 14-20-3-28-W3	940	540	1.8	86.6	20	B*	Judith River
5	Zotner, L.	NW 11-21-3-28-W3	33	7	0.8	2.9	4	-	-
6	Weisgerber, C.	SE 11-27-3-28-W3	35	10	2.8	2.8	12	-	-
7	Texaco Consul	6-30-3-27-W3	-	-	-	-	-	-	-
8	SIP Consul 86-102	SE 2-22-3-27-W3	210	12	2.2	29.9	8	E	Consul Valley
9	FFIB Reamer, G.	NE 16-16-3-26-W3	990	440	2.9	80.1	20	B	Judith River
10	Chapman, R.	SW 2-22-3-26-W3	-	-	3.0	146.1	-	B	Judith River
11	Bonanza et al Battle Creek	10-23-3-26-W3	1,020	-	-	-	-	-	-
12	FFIB Lewis, G.	SW 14-21-3-25-W3	-	-	4.0	61.0	30	B	Judith River
13	SRC Rangeview	NW 13-12-3-25-W3	-	-	-	-	-	-	-
14	Canadian Southern Shell Katherine	6-05-3-23-W3	-	-	-	-	-	-	-
15	Union Oil Williamson Divide	9-28-2-23-W3	-	-	-	-	-	-	-
16	UBR Noel Woodpile	10-32-1-27-W3	-	-	-	-	-	-	-
17	SPC Noel Senate	11-12-2-28-W3	-	-	-	-	-	-	-
18	Suffolk et al Supreme	12-19-2-27-W3	-	-	-	-	-	-	-
19	Frank, J.	NE 8-03-3-27-W3	220	+ 15	2.3	35.8	-	E	Consul Valley
20	Frank, R.	SW 2-10-3-27-W3	330	F	2.3	40.0	-	?	-
21	SRC Nashlyn	NE 13-11-3-27-W3	-	-	-	-	-	-	-
22	Earl, E.	NE 16-28-3-27-W3	100	30	2.1	20.4	-	G	-
23	SRC Notukeu	NW 13-35-3-27-W3	-	-	-	-	-	-	-
24	Canadian Southern Co-op Calvin Consul 1	1-02-4-27-W3	-	-	-	-	-	-	-
25	SIP Consul 86-101	NE 16-12-4-27-W3	-	-	-	-	-	-	-
26	Schmidt, A.	NE 13-20-4-26-W3	160	F + 13	1.6	12.5	2	G	Consul Valley
27	UBR Amoco Consul	6-29-4-26-W3	-	-	-	-	-	-	-
28	Ager, R.	NW 13-33-4-26-W3	117	+ 2	2.0	4.5	-	-	-
29	B.A. Co-op Calvin Cypress Lake	12-10-5-26-W3	-	-	-	-	-	-	-
30	SRC Cypress Lake	NE 8-02-6-26-W3	-	-	-	-	-	-	-
31	SRC Cypress Lake	SE 9-10-6-26-W3	-	-	-	-	-	-	-
32	B.A. Reno Westrig	3-15-6-26-W3	-	-	-	-	-	-	-
33	I.O.E. Clear Valley	5-32-7-25-W3	-	-	-	-	-	-	-
34	OOCN Lonepine	11-11-8-26-W3	-	-	-	-	-	-	-

APPENDIX 1.  
 INDEX OF CROSS SECTION LOGS, WELLS, AND WATER ANALYSES IN THE CONSUL AREA.

NO.	NAME	LOCATION	WELL DEPTH	STATIC FEET	EC	SAR	SCREEN LENGTH	GEOLOGY	AQUIFER
35	Calvin Can. Dev. Imp. Jackpot Lake	11-23-8-26-W3	-	-	-	-	-	-	-
36	SRC Jackpot Lake	NE 16-27-8-26-W3	-	-	-	-	-	-	-
37	SIP Consul 86-1-5	SW 10-23-3-27-W3	-	-	-	-	-	-	-

\*B = Bedrock  
 G = Glacial  
 E = Empress  
 F = Flowing

APPENDIX 2. GEOLOGICAL LOGS.



SIP 72F/04 1986  
 CONSUL 86-102  
 SE-02-22-03-27-W3  
 12:605400E/5452600N  
 TESTHOLE

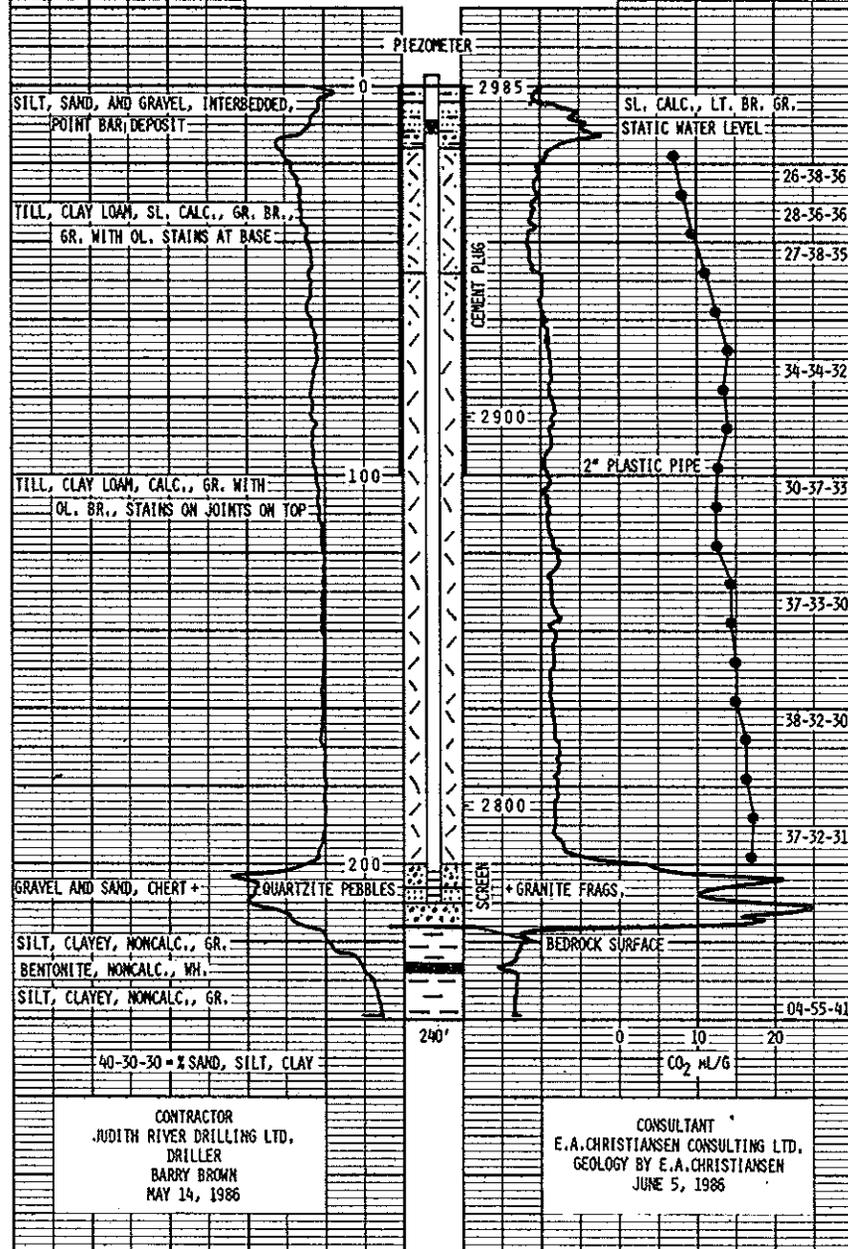
ELEVATION 2985 FT.

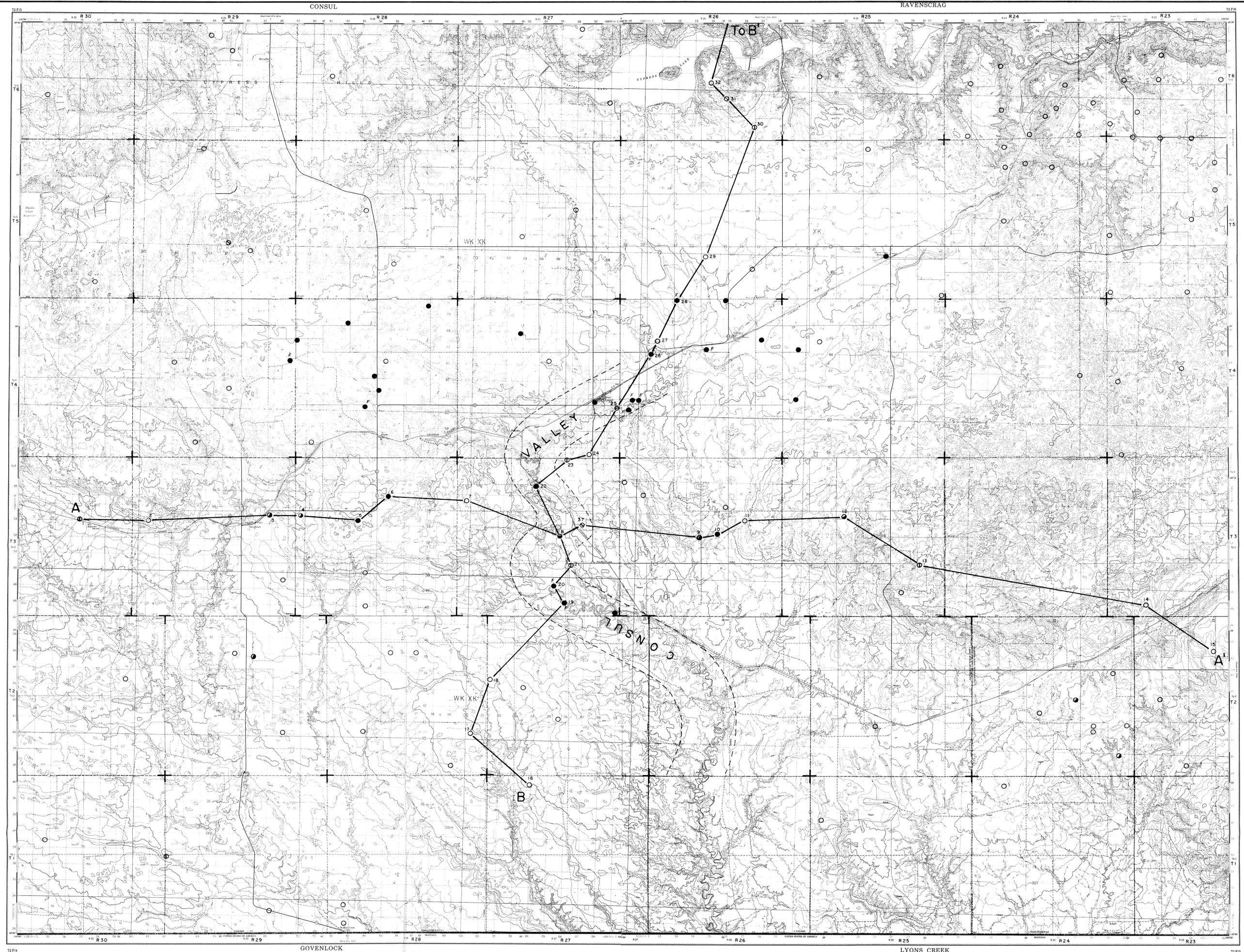
TOP. MAP 25 FT. C.I.

SP COND MUD 1420 MICROSIEMENS/CM AT 25° C

SP COND WATER 700 MICROSIEMENS/CM AT 25° C

SP 10 MV R 10 OHMS





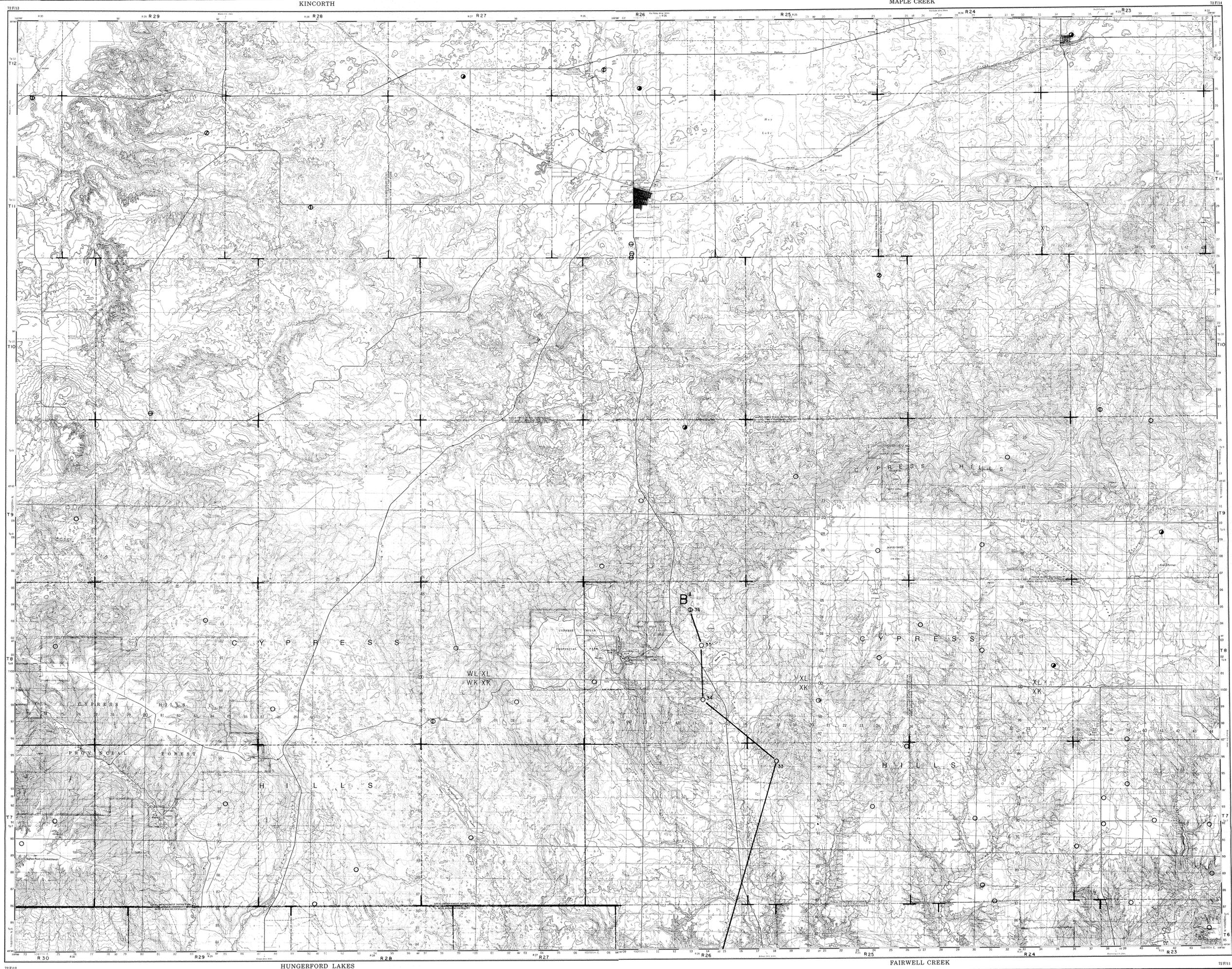
**INFORMATION SHEET NO. 01 ON THE CONSUL SALINITY PROJECT,  
SASKATCHEWAN**



Contour interval=25 Feet  
Base map by Energy, Mines and Resources, Ottawa

- |   |  |
|---|--|
| <p><b>TESTHOLES</b></p> <ul style="list-style-type: none"> <li>○ Electric logs, cutting samples, and cores</li> <li>⊖ Electric logs and cutting samples</li> <li>⊙ Electric and driller's logs</li> <li>○ Electric and/or gamma-ray logs</li> <li>⊙ Augerhole logs</li> <li>⊙ Cutting samples</li> <li>A—A  Cross section</li> <li>⊖2 Cross section log number</li> </ul> | <p><b>WELLS AND PIEZOMETERS</b></p> <ul style="list-style-type: none"> <li>● Electric logs, cutting samples, and cores</li> <li>● Electric logs and cutting samples</li> <li>● Electric and driller's logs</li> <li>○ Electric and/or gamma-ray logs</li> <li>● Augerhole logs</li> <li>● Cutting samples</li> <li>● Well inventories</li> <li>F Flowing artesian wells</li> </ul> |
|---|--|

**E. A. CHRISTIANSEN**  
 CONSULTING LTD.  
 CONSULTING GEOSCIENTISTS  
 Drawing No. 0083-012-01  
 Drawn By E. A. Christiansen  
 Date January 28, 1987



INFORMATION SHEET NO. 02 ON THE CONSUL SALINITY PROJECT,  
SASKATCHEWAN

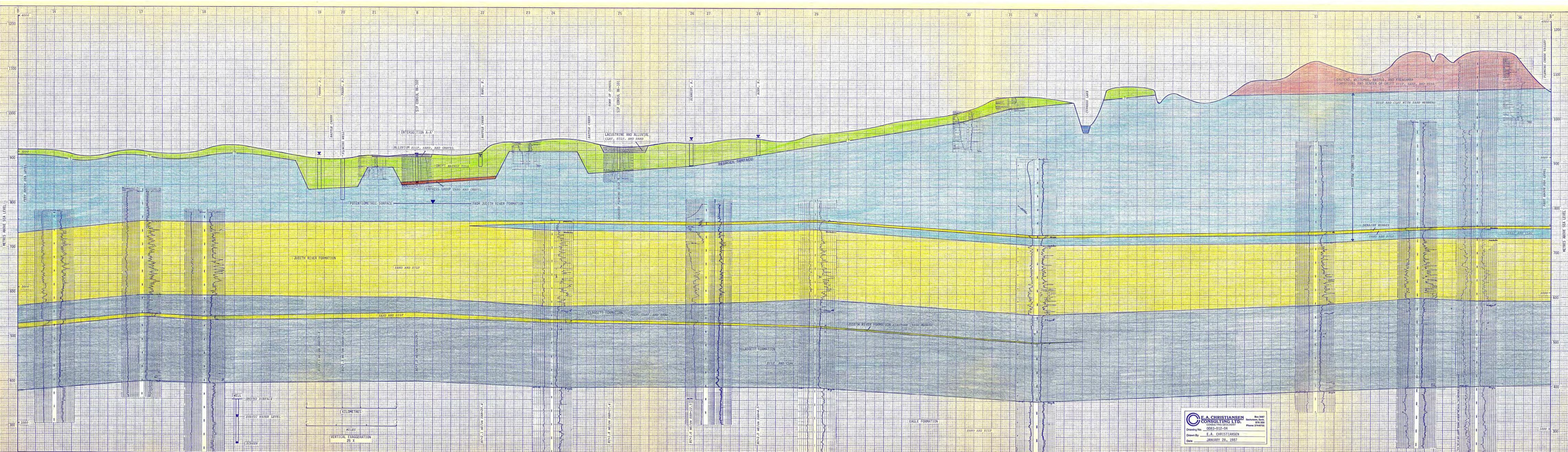


Contour interval = 25 Feet  
Base map by Energy, Mines and Resources, Ottawa

- |   |   |
|---|---|
| <b>TESTHOLES</b>                            | <b>WELLS AND PIEZOMETERS</b>                |
| ○ Electric logs, cutting samples, and cores | ● Electric logs, cutting samples, and cores |
| ⊖ Electric logs and cutting samples         | ● Electric logs and cutting samples         |
| ⊗ Electric and driller's logs               | ● Electric and driller's logs               |
| ○ Electric and/or gamma-ray logs            | ○ Electric and/or gamma-ray logs            |
| ⊙ Augerhole logs                            | ● Augerhole logs                            |
| ⊕ Cutting samples                           | ● Cutting sample                            |
| A—A' Cross section                          | ● Well inventories                          |
| ⊕ <sup>33</sup> Cross section log number    |   |

**E. A. CHRISTIANSEN** Saskatoon, Sask. Box 5007  
**CONSULTING LTD.** Regina, Sask. Box 550  
 CONSULTING GEOLOGIST Phone 374-9700  
 Drawing No. 0083-012-02  
 Drawn By E. A. Christiansen  
 Date January 28, 1987





DRAWING 0083-012-04. CROSS SECTION B-B', CONSUL PROJECT, SASKATCHEWAN.


 E.A. CHRISTIANSEN CONSULTING LTD.  
 CONSULTING GEOLOGIST  
 Drawn By: E.A. CHRISTIANSEN  
 Date: JANUARY 28, 1987  
 Saskatoon, Sask. S7N 3B9  
 Phone: 274-6700