

SASKATCHEWAN WATER CORPORATION
GEOLOGY OF THE MORTLACH IRRIGATION
PROJECT

Report 0114-003 December 6, 1986

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E. A. Christiansen Consulting Ltd.

CONSULTING GEOLOGIST

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S7K 3S9

PHONE 374-6700

December 5th, 1986

Saskatchewan Water Corporation
Attention: Dr. W.A. Meneley
W.A. Meneley Consultants Ltd.
Box 7167
Saskatoon, Saskatchewan
S7K 4J1

Dear Dr. Meneley:

Enclosed are two copies of Report 0114-003 on the "Geology of the Mortlach irrigation project". The report includes one map (Drawing 0114-003-01), three cross sections (Drawing 0114-003-02 to 04), and an index of logs and wells. Available wells were drawn on the cross sections to illustrate the general subsurface drainage. The contact between the Claggett and Judith River Formations was selected as the base of exploration (Drawings 0114-003-02 to 04). Because of the paucity of subsurface information, two nests of piezometers are proposed with the deepest piezometers in aquifers in the Demaine and Ardkenneth Members (Drawings 0114-003-01 to 04).

In the study area, sediments above the base of exploration included bedrock and glacial deposits. Bedrock is composed of Judith River and Bearpaw Formations. Although the Judith River Formation is considered to be an aquifer, wells have not penetrated this formation. Wells have penetrated, however, the Demaine and Ardkenneth Members of the Bearpaw

Formation (Drawings 0114-003-02, 03). One well in the Demaine Member has a head of about 200 feet below surface (Drawing 0114-003-01, well 6), and two of three wells in the Ardkenneth Member show heads of more than 100 feet below surface (Drawing 0114-003-03, wells 16, 18, 19). The large discrepancy between heads in wells 16 and 18 and the head in well 19 is anomalous. It appears, however, that the heads in the Demaine and Ardkenneth Members are too low to cause soil salinity in the Mortlach area.

Overlying bedrock in ascending order are Empress Group and tills, undifferentiated. The Empress Group includes both preglacial and glacial gravels, sands, and silts occurring between bedrock and till. The flowing condition in well 15 (Drawing 0114-003-03) and the large areal extent of the aquifer in the Empress Group suggest this aquifer is the main cause of soil salinity in the Mortlach area.

Sincerely yours,



E.A. Christiansen, P.Eng.

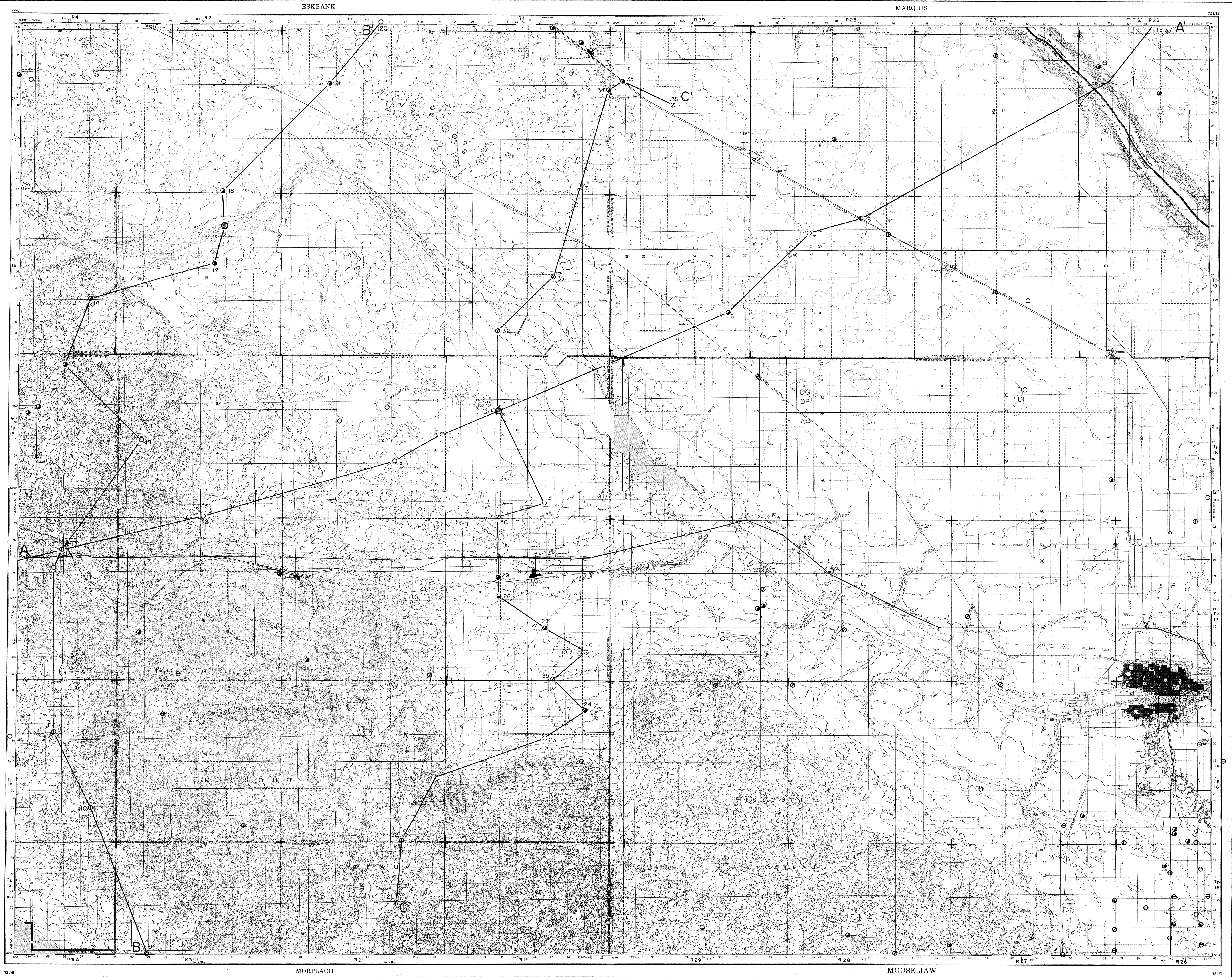
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Enclosures

INDEX OF LOGS AND WELLS IN THE MORTLACH AREA

NO.	NAME	LOCATION	WELL DEPTH (ft)	STATIC WATER LEVEL (ft)	SCREEN LENGTH (ft)	GEOLOGY	AQUIFER
1	SRC Secretan	SE-16-27-17-04-W3					
2	SPRIG PURE Parkbeg	04-03-18-03-W3					
3	BOSSORT Parkbeg	04-14-18-02-W3					
4	BOSSORT Rowletta	01-24-18-02-W3					
5	BOSSORT Rowletta	09-36-18-01-W3					
6	FFIB Hennenfent, M.	NE-12-12-19-29-W2	500	200	15	Bedrock	Demaine
7	SOONY SOHIO West Marquis 1	12-28-19-28-W2					
8	SRC Marquis	NW-04-35-19-28-W2					
9	TW Parkbeg Cr. 2	13-08-15-03-W3					
10	SRC Thistledown	SW-05-12-16-04-W3					
11	SRC Secretan	SE-02-27-16-04-W3					
12	IMP Secretan	02-27-17-04-W3					
13	FFIB Wagner, R.	04-35-17-04-W3	215	104	10	Empress	Swift Current Valley
14	TW Parkbeg Cr. 4	16-18-18-03-W3					
15	FFIB Christmann, B.	W-12-35-18-04-W3	155	+10	5	Empress	
16	FFIB Schaffer, J.	SW-04-13-19-04-W3	675	360	15	Bedrock	Ardkenneth
17	FFIB Drake, L.J.	NW-07-22-19-03-W3	127		5	Empress	
18	FFIB Mattus, J.	SE-01-03-20-03-W3	490	172	10	Bedrock	Ardkenneth
19	FFIB Martin, J.A.	SW-01-29-20-02-W3	500	2	15	Bedrock	Ardkenneth
20	TW Eyebrow Cr. 3	07-03-21-02-W3					
21	FFIB Hicks, G.	SE-13-23-15-02-W3					
22	SRC Eastleigh	SE-03-02-16-02-W3					
23	SEABORAD TW Old Wives Cr.	15-22-16-01-W3					
24	FFIB Gregains, W.	NW-13-25-16-01-W3					
25	FFIB Altman, T.	SE-01-03-17-01-W3					
26	PENZOIL PURE Mortlach	04-12-17-01-W3					
27	FFIB Langton, L.H.	NW-15-10-17-01-W3	64	20	5	Glacial	
28	SWC Golder Chaplin & Sand Hills	SE-20-17-01-W3	145				
29	FFIB Dean, R.	SE-16-20-17-01-W3	71	13	6	Glacial	
30	FFIB Ellard, P.	SE-01-05-18-01-W3		20	5	Glacial	
31	BOSSORT, Mortlach	10-03-18-01-W3					
32	FFIB Back, F.	NE-16-05-19-01-W3					
33	FFIB Pottruff, R.	NE-16-15-19-01-W3	96	65	5	Glacial	
34	FFIB Chick, R.	16-24-20-01-W3	363				
35	FFIB Lindell, D.E.	NE-03-29-20-29-W2	350	270	10	Empress	

INDEX OF LOGS & WELLS IN THE MORTLACH AREA

NO.	NAME	LOCATION	WELL DEPTH (ft)	STATIC WATER LEVEL (ft)	SCREEN LENGTH (ft)	GEOLOGY	AQUIFER
36	FFIB Smith, G.T.	SE-05-22-20-29-W2					
37	U of S Findlater	NE-13-32-21-25-W2					

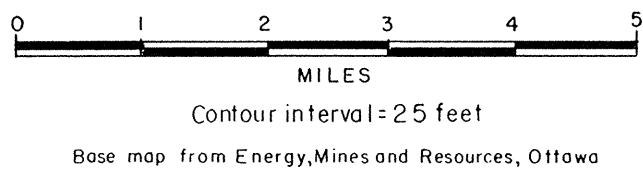


- TESTHOLES

 - ① Electric logs, cutting samples, and cores
 - ② Electric logs and cutting samples
 - ③ Electric and driller's logs
 - Electric and/or gamma-ray logs
 - ⊙ Augerhole logs
 - ⊕ Cutting samples
- WELLS AND PIEZOMETERS

 - Electric logs, cutting samples, and cores
 - Electric logs and cutting samples
 - Electric and driller's logs
 - Electric and/or gamma-ray logs
 - Augerhole logs
 - 3③ Log number
 - A—A' Cross section

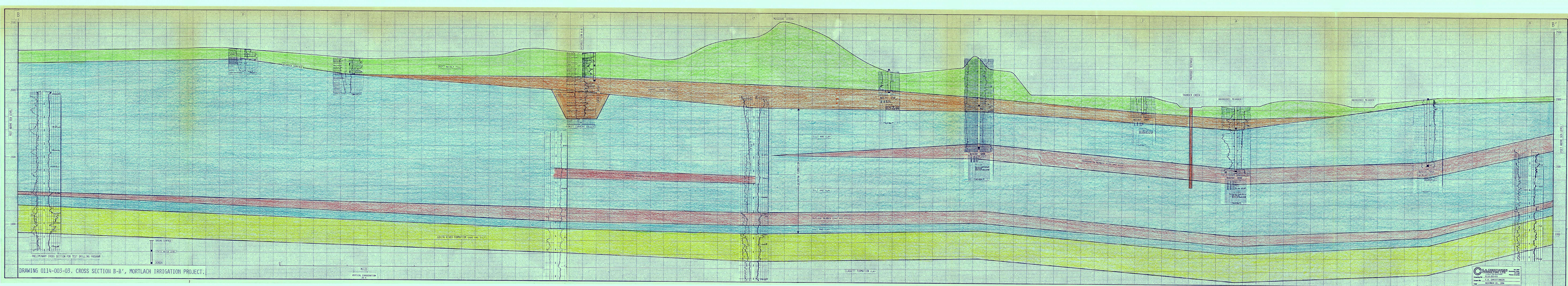
INFORMATION SHEET ON THE
MORTLACH IRRIGATION PROJECT

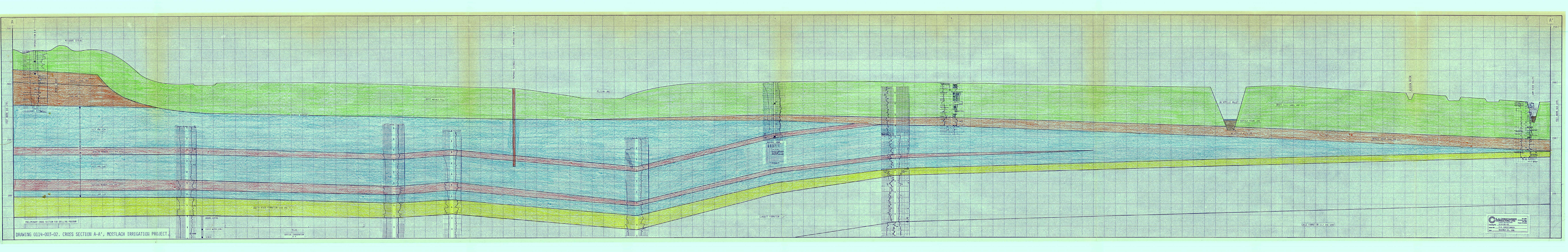


⊙ Proposed testholes and piezometers

**E.A. CHRISTIANSEN
CONSULTING LTD.**
CONSULTING GEOLOGIST
Drawing No. 0114-003-01
Drawn By: E.A. Christiansen
Date: November 29, 1986

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DRAWING 0114-003-02. CROSS SECTION A-A', MORTLACH IRRIGATION PROJECT.

