

HEARTLAND LIVESTOCK SERVICES

GEOLOGY OF THE HLS CARLTON TRAIL PROJECTS

Report 0164-004

June 5, 1998

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June 5, 1998

Saskatchewan Wheat Pool
201 - 407 Downey Road
Saskatoon, Saskatchewan

Attention: Mr. Neil Ketilson

Re: Geology of the HLS Carlton Trail projects

Dear Mr. Ketilson:

Enclosed please find two copies of the "Geology of the HLS Carlton Trail projects", one copy for you and one for Les Henry. If you have any queries or require additional copies, please contact me.

Sincerely yours,

E. A. Christiansen

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



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

Table 1. Index of logs in cross section A-A'.

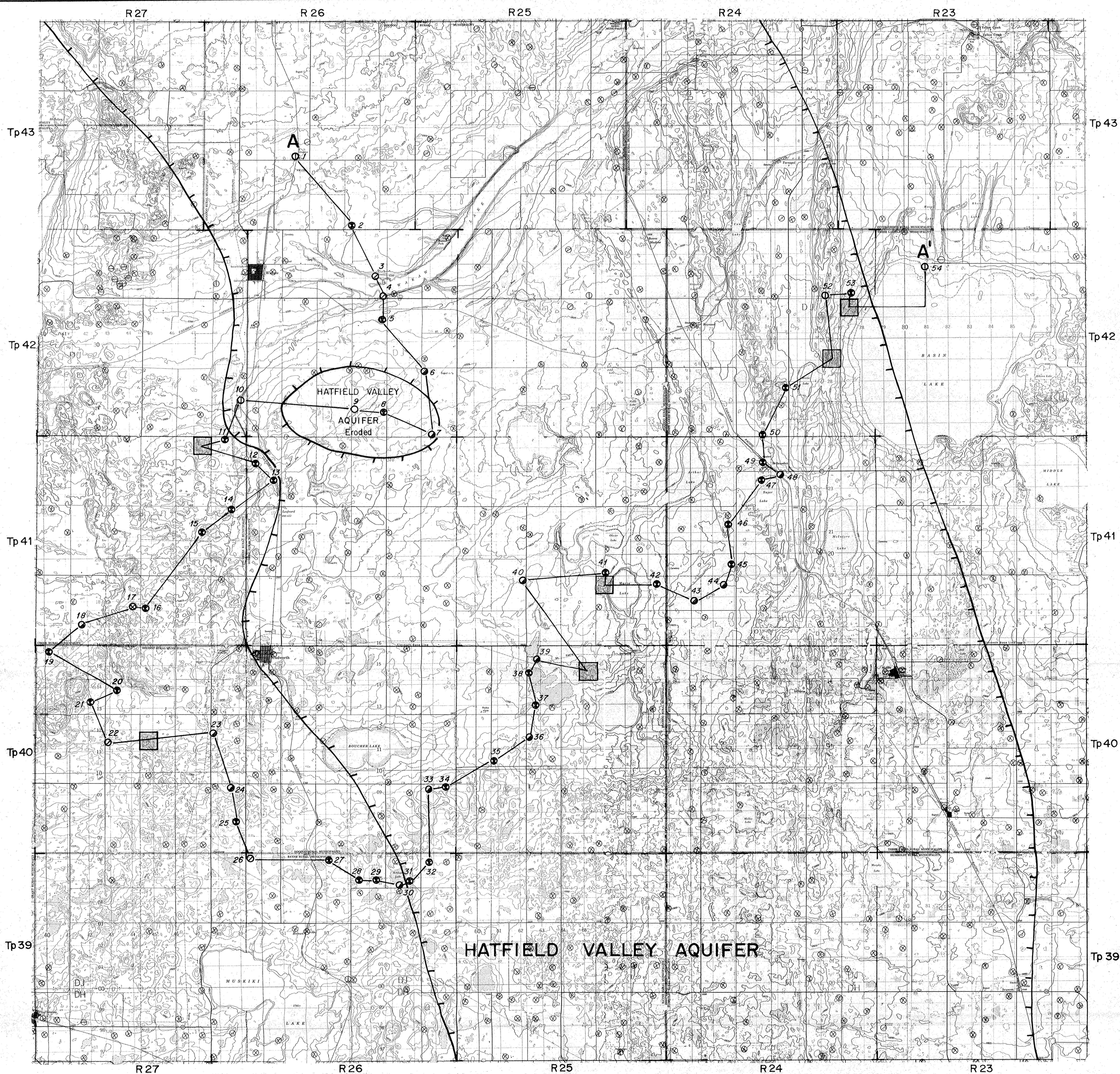
| NO. | NAME | LOCATION | GROUND ELEVATION | | DEPTH OF WELL | | LENGTH OF SCREEN | | WATER LEVEL | |
|-----|-------------------------------|-------------------|------------------|-----|---------------|-------|------------------|-----|-------------|------|
| | | | Feet | m | Feet | m | Feet | m | Feet | m |
| 1 | SRC Ens | SW-02-16-43-26-W2 | 1775 | 541 | | | | | | |
| 2 | DOE Steve Kulrich | SW-02-43-26-W2 | 1750 | 533 | 75 | 22.9 | | | 60 | 18.3 |
| 3 | FFIB George Burechailo | NE-10-27-42-26-W2 | 1685 | 513 | | | | | | |
| 4 | EPD Wakaw Lake | 01-27-42-26-W2 | 1685 | 513 | | | | | | |
| 5 | DOE B. Kostyneuk | SE-22-42-26-W2 | 1745 | 532 | 52 | 15.8 | | | 26 | 7.9 |
| 6 | SWC Damean Luciak | NW-13-12-42-26-W2 | 1795 | 547 | 167 | 50.9 | | | 86 | 26.2 |
| 7 | SWC Melvin Parker | SW-03-01-42-26-W2 | 1830 | 558 | 360 | 109.7 | | | | |
| 8 | DOE Didow Leofnard | NE-03-42-26-W2 | 1825 | 556 | 37 | 11.3 | | | | |
| 9 | CAL. STAN GULF Leofnard | 13-03-42-26-W2 | 1900 | 579 | | | | | | |
| 10 | SRC Wakaw | SW-01-12-42-27-W2 | 1770 | 539 | | | | | | |
| 11 | DOE Metro Kalyniuk | NW-36-41-27-W2 | 1835 | 564 | 84 | 25.6 | | | 30 | 9.1 |
| 12 | DOE Doug Frie | SW-31-41-26-W2 | 1825 | 556 | 119 | 36.3 | | | 35 | 10.7 |
| 13 | DOE Topper Leofnard | NE-30-41-26-W2 | 1830 | 558 | 170 | 51.8 | | | | |
| 14 | DOE Leroy Kolne | NE-24-41-27-W2 | 1875 | 572 | 30 | 9.1 | | | 12 | 3.7 |
| 15 | DOE Ed Kaminecki | SE-23-41-27-W2 | 1900 | 579 | 50 | 15.2 | | | | |
| 16 | DOE Rolland Sakowski | SW-10-41-27-W2 | 1800 | 549 | 82 | 25.0 | | | 40 | 12.2 |
| 17 | DOE August Cutler | SE-09-41-27-W2 | 1775 | 541 | 41 | 12.5 | | | | |
| 18 | SWC Gordon Harasymchuk | SW-11-05-41-27-W2 | 1780 | 543 | 350 | 106.7 | 20 | 6.1 | | |
| 19 | DOE G. Synok | NW-31-40-27-W2 | 1775 | 541 | 65 | 19.5 | | | 25 | 7.6 |
| 20 | DOE P. GUTIW | NW-28-40-27-W2 | 1820 | 555 | 90 | 27.4 | | | 28 | 8.5 |
| 21 | DOE Peter Nonachuk | SE-29-40-27-W2 | 1825 | 556 | 50 | 15.2 | | | | |
| 22 | FFIB James Medernach | NW-04-21-40-27-W2 | 1830 | 558 | | | | | | |
| 23 | SWC Gerald Slobodian | NW-05-24-40-27-W2 | 1830 | 558 | 130 | 39.6 | 11 | 3.4 | 30 | 9.1 |
| 24 | SWC Eugene Jungwirth | NW-15-12-40-27-W2 | 1875 | 572 | 158 | 48.2 | 10 | 3.0 | 86 | 26.2 |
| 25 | DOE Mike Stroham | NE-01-40-27-W2 | 1855 | 565 | 33 | 10.1 | | | | |
| 26 | SWC Cudworth Pork Invest. Gr. | NW-31-39-26-W2 | 1810 | 552 | | | | | | |
| 27 | DOE J. Blaseg | NW-33-39-26-W2 | 1830 | 558 | 96 | 29.3 | | | 52 | 15.8 |
| 28 | DOE Joe Klanatsky | SW-34-39-26-W2 | 1825 | 556 | 39 | 11.9 | | | 12 | 3.7 |
| 29 | DOE A. Hoffman | SE-34-39-26-W2 | 1830 | 558 | 65 | 19.8 | | | 45 | 13.7 |
| 30 | SWC Eugene Schlosser | C-03-35-39-26-W2 | 1850 | 564 | 100 | 30.5 | 10 | 3.0 | 30 | 9.1 |
| 31 | DOE Alphonse Schlosser | SE-35-39-26-W2 | 1860 | 567 | 77 | 23.5 | | | 27 | 8.2 |
| 32 | DOE Clarence Kleiter | NW-36-39-26-W2 | 1900 | 579 | 90 | 27.4 | | | 30 | 9.1 |
| 33 | FFIB Francis Kohle | NE-13-12-40-26-W2 | 1875 | 572 | 87 | 26.5 | 5 | 1.5 | 57 | 17.4 |
| 34 | DOE Ervine Kirtzinger | NE-12-40-26-W2 | 1865 | 568 | 53 | 16.2 | | | 32 | 9.8 |
| 35 | DOE Anton Waldbilling | NW-17-40-25-W2 | 1905 | 581 | 275 | 83.8 | | | 50 | 15.2 |
| 36 | SWC Russell Hauber | SW-05-21-40-25-W2 | 1870 | 570 | 202 | 61.5 | 10 | 3.0 | 49 | 14.9 |
| 37 | DOE Hansen Bros. | SW-28-40-25-W2 | 1780 | 543 | 195 | 59.4 | | | 80 | 24.4 |
| 38 | DOE J. Paquin | SW-33-40-25-W2 | 1780 | 543 | 40 | 12.2 | | | 10 | 3.0 |
| 39 | SWC H+K Diedericks | NW-11-33-40-25-W2 | 1800 | 549 | 56 | 17.1 | 5 | 1.5 | 18 | 5.5 |
| 40 | FFIB Raymond Schriener | NE-16-08-41-25-W2 | 1845 | 562 | 140 | 42.7 | 10 | 3.0 | 55 | 16.8 |

Table 1. Continued

| NO. | NAME | LOCATION | GROUND ELEVATION | | DEPTH OF WELL | | LENGTH OF SCREEN | | WATER LEVEL | |
|-----|----------------------------|-------------------|------------------|-----|---------------|------|------------------|-----|-------------|------|
| | | | Feet | m | Feet | m | Feet | m | Feet | m |
| 41 | DOE Ray Mankey | SW-14-41-25-W2 | 1810 | 552 | 50 | 15.2 | | | | |
| 42 | DOE Peter Blasig | NE-12-41-25-W2 | 1810 | 552 | 25 | 7.6 | | | 18 | 5.5 |
| 43 | SWC Laverne Mantinka | SW-08-07-41-24-W2 | 1885 | 576 | 180 | 54.9 | 5 | 1.5 | 74 | 22.6 |
| 44 | SWC Everard Hessdorfer | SE-15-08-41-24-W2 | 1875 | 572 | 190 | 57.9 | 5 | 1.5 | 58 | 17.7 |
| 45 | DOE George Bauman | SE-17-41-24-W2 | 1880 | 573 | 198 | 60.4 | | | 60 | 18.3 |
| 46 | DOE D.C. Reinhart | NE-20-41-24-W2 | 1880 | 573 | 100 | 30.5 | | | 64 | 19.5 |
| 47 | DOE Delmer Galambos | NE-28-41-24-W2 | 1820 | 555 | 70 | 21.3 | | | 12 | 3.7 |
| 48 | SWC Jhan P. Kurja | NW-14-27-41-24-W2 | 1850 | 564 | 100 | 30.5 | 10 | 3.0 | 30 | 9.1 |
| 49 | DOE Village of ST Benedict | SE-33-41-24-W2 | 1850 | 564 | 274 | 83.5 | | | 35 | 10.7 |
| 50 | DOE Frank Lepsenyi | SE-04-42-24-W2 | 1900 | 579 | 134 | 40.8 | | | 30 | 9.1 |
| 51 | DOE Lloyd Richardson | SW-10-42-24-W2 | 1890 | 576 | 36 | 11.0 | | | 12 | 3.7 |
| 52 | SRC Basin Lake | SW-02-26-42-24-W2 | 1960 | 597 | | | | | | |
| 53 | DOE Pete Balon | SW-25-42-24-W2 | 1810 | 552 | 42 | 12.8 | | | 33 | 10.1 |
| 54 | SRC Hazel Lake | NE-14-29-42-23-W2 | 1735 | 529 | | | | | | |

LITERATURE CITED IN DRAWING 0164-004-01

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- Whitaker, S.H. and Pearson, D.E. 1972. Geological map of Saskatchewan.
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EXPLANATION OF TESTHOLE SYMBOLS IN CROSS SECTION A - A'

- ① ELECTRIC LOGS, CUTTING SAMPLES, AND CORES
- ⊗ ELECTRIC LOGS AND DRILLER'S LOGS
- ELECTRIC LOGS ONLY
- ⊗ DRILLER'S LOGS ONLY

EXPLANATION OF WATER WELL SYMBOLS USED IN CROSS SECTION A - A'

- Electric logs and driller's logs
- ⊗ Driller's logs only

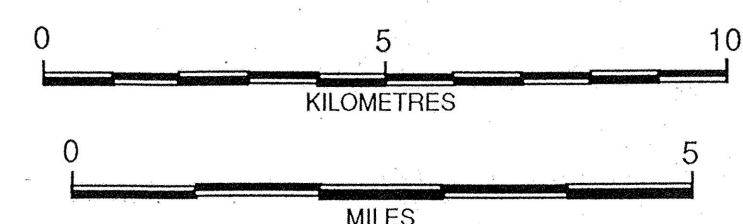
■ PROPOSED HEARTLAND LIVESTOCK SERVICES SITES

MAP SHOWING LOCATION OF CROSS SECTION A - A', HATFIELD VALLEY AQUIFER*, AND SIX PROPOSED HEARTLAND LIVESTOCK SERVICE SITES

A — A' CROSS SECTION

⊗² CROSS SECTION LOG NUMBER.

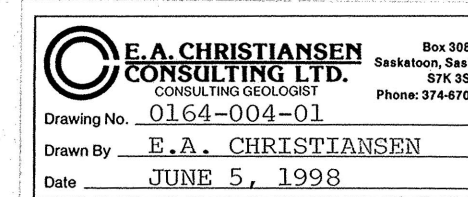
⋈ INFERRRED BOUNDARY OF HATFIELD VALLEY AQUIFER



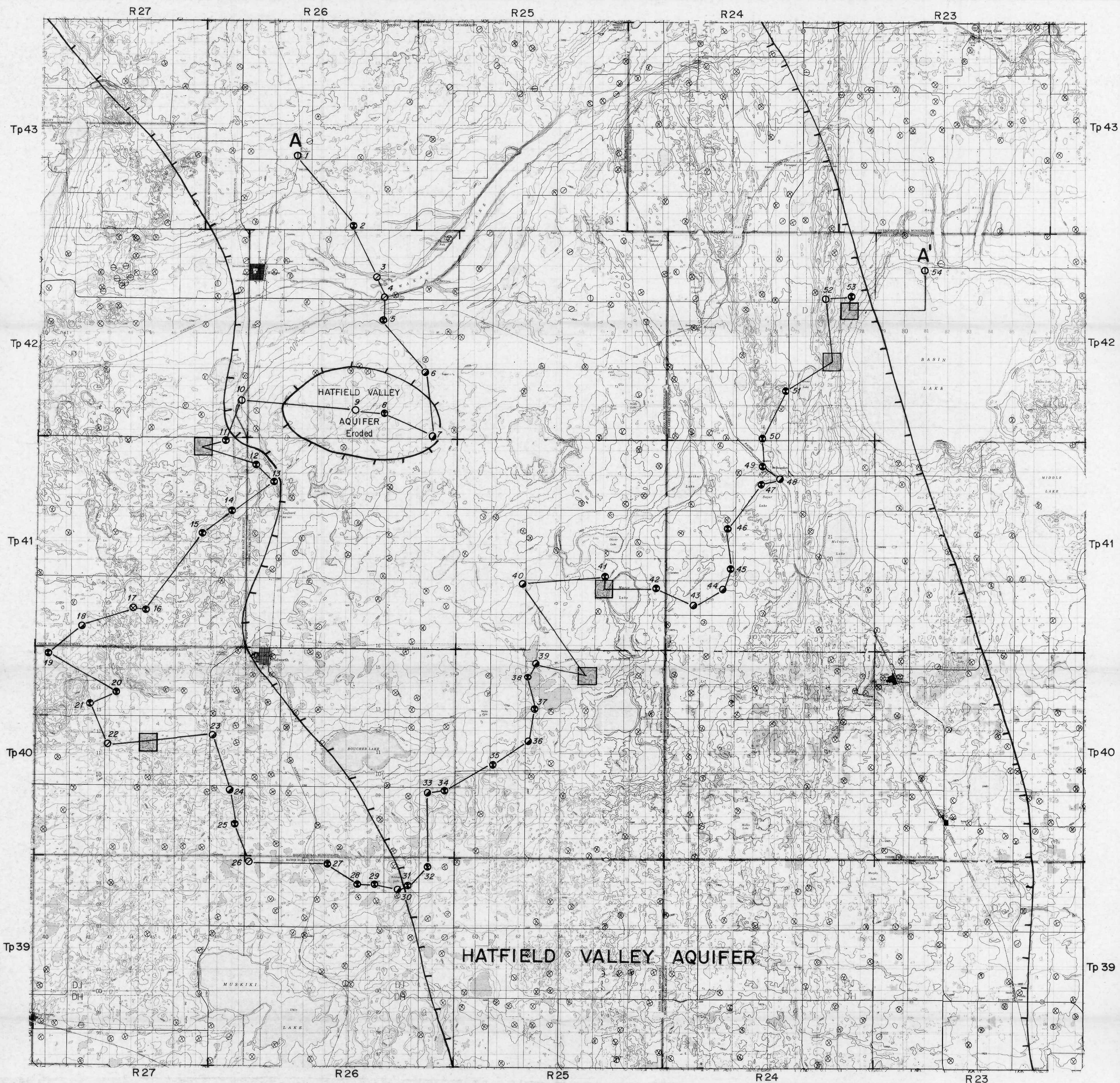
EXPLANATION OF SYMBOLS OUTSIDE OF CROSS SECTION A - A'

(From Saskatchewan Research Council data sheet)

- ⊗ DRILLER'S LOG ONLY
- ⊗ DRILLER'S LOG AND ELECTRIC LOG
- ⊗² ELECTRIC LOG AND GEOLOGISTS DESCRIPTION +/- CUTTING SAMPLES, CARBONATE ANALYSIS, AND CORES
- ELECTRIC LOGS ONLY



*THE BOUNDARIES OF THE HATFIELD VALLEY AQUIFER ARE BASED ON THE WORK OF WHITAKER AND PEARSON (1972) AND CHRISTIANSEN (1979ab, 1987, 1990, AND ON SEVERAL TESTHOLES THAT PENETRATE THE HATFIELD VALLEY AQUIFER. TO PROVE THE PRESENCE OF THIS AQUIFER, TESTHOLES AND GEOPHYSICAL LOGS COMMONLY ARE REQUIRED.



EXPLANATION OF TESTHOLE SYMBOLS IN CROSS SECTION A - A'

- ① ELECTRIC LOGS, CUTTING SAMPLES, AND CORES
- ⊗ ELECTRIC LOGS AND DRILLER'S LOGS
- ELECTRIC LOGS ONLY
- ⊗ DRILLER'S LOGS ONLY

EXPLANATION OF WATER WELL SYMBOLS USED IN CROSS SECTION A - A'

- Electric logs and driller's logs
- ⊗ Driller's logs only

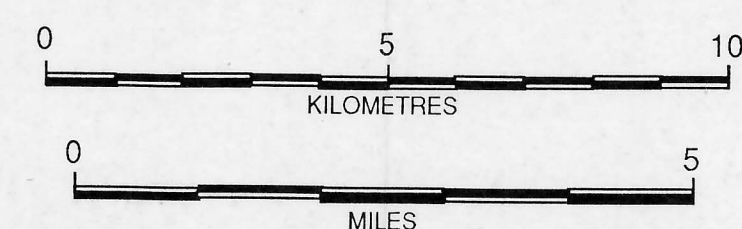
■ PROPOSED HEARTLAND LIVESTOCK SERVICES SITES

A — A' CROSS SECTION

⊗² CROSS SECTION LOG NUMBER.

⋈ INFERRED BOUNDARY OF HATFIELD VALLEY AQUIFER

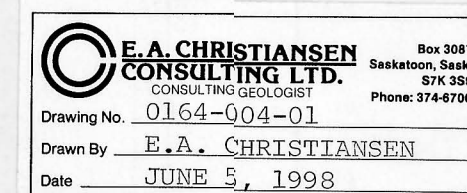
MAP SHOWING LOCATION OF CROSS SECTION A - A', HATFIELD VALLEY AQUIFER*, AND SIX PROPOSED HEARTLAND LIVESTOCK SERVICE SITES



EXPLANATION OF SYMBOLS OUTSIDE OF CROSS SECTION A - A'

(From Saskatchewan Research Council data sheet)

- ⊗ DRILLER'S LOG ONLY
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- ⊗ ELECTRIC LOG AND GEOLOGIST'S DESCRIPTION +/- CUTTING SAMPLES, CARBONATE ANALYSIS, AND CORES
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