THE WEST FARGO AQUIFER SYSTEM, CASS and RICHLAND COUNTIES, NORTH DAKOTA & CLAY, NORMAN and WILKIN COUNTIES, MINNESOTA: GROUND-WATER DATA: VOLUME A

By

David P. Ripley,
Michael H. Hove,
and
Christopher D. Bader

North Dakota Ground-Water Studies
Number 106 - Part I
North Dakota State Water Commission
David Sprynczynatyk, State Engineer

Prepared by the
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In cooperation with the
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INTRODUCTION

The West Fargo aquifer system (WFAS) is located predominantly in eastern Cass County and northeast Richland County. The WFAS is comprised of three aquifers that underlie an area of 10 square miles or more, and numerous, smaller subaquifers. The three aquifers of 10 square miles or more are called the West Fargo North aquifer, the West Fargo South aquifer, and the Horace aquifer. These aquifers are indirectly connected, as are many of the numerous, smaller subaquifers. The nature of the indirect connections between the aquifers and the subaquifers vary, both in nature and in degree. The total area underlain by all of the aquifers or subaquifers in the WFAS is estimated to be about 90 square miles.

Across the river in Minnesota there are additional small subaquifers, and the Buffalo aquifer. In order to ascertain if there are any connections between the WFAS and the aquifers and subaquifers in Minnesota, the study area was expanded to include part of Minnesota. Thus the study area incorporates several townships that lie partly or entirely in Minnesota. The total study area (see Figure 1) incorporates about 1,550 square miles.

The WFAS has been used as a source of water for over 100 years, dating back to the late 1800's. The utilization of the WFAS as a source of water has increased over this same time period, and as a result, the water levels in all known portions the WFAS have continued to go down in elevation. Concern over the long-term viability of the WFAS

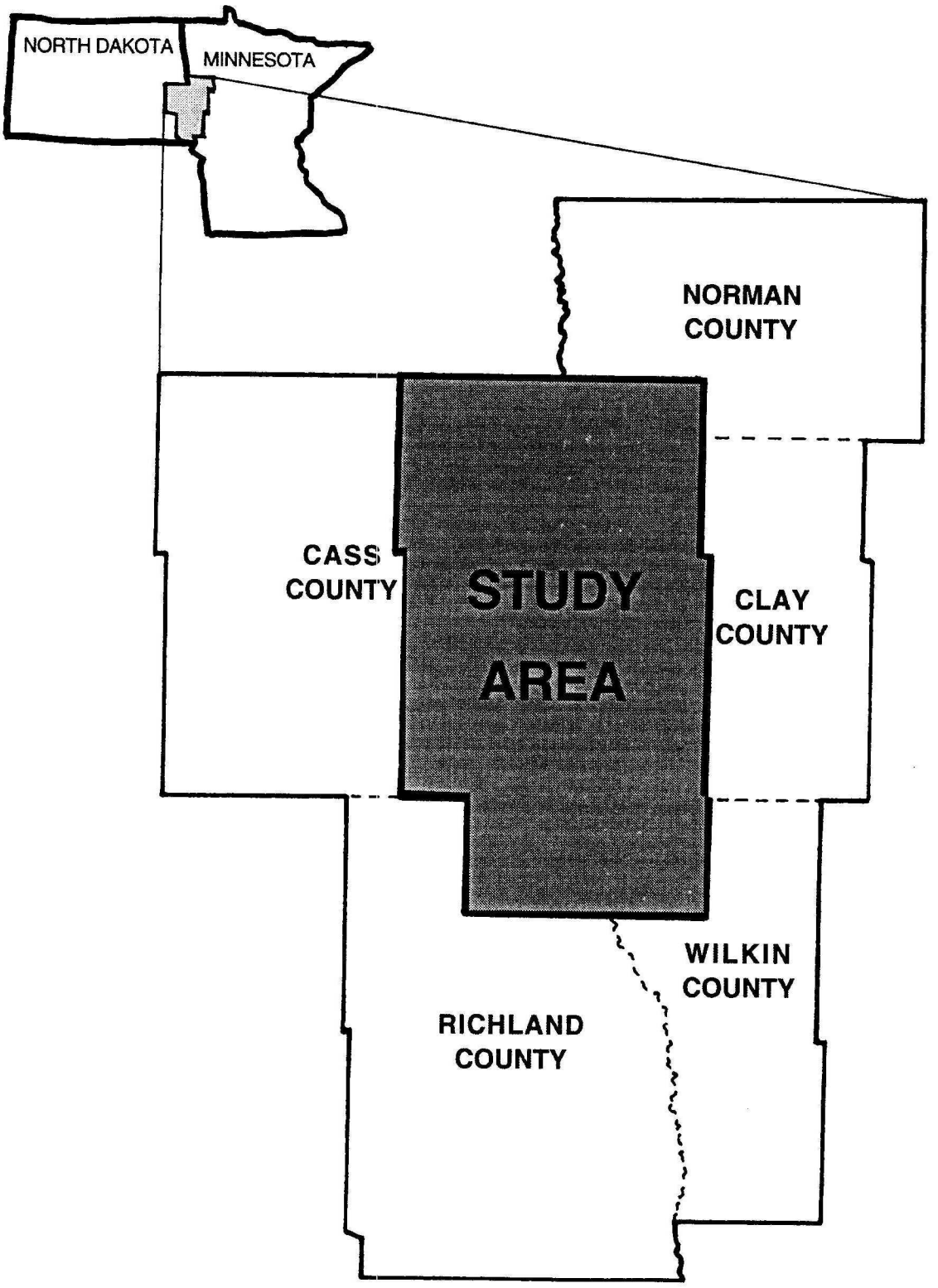

Figure 1. Location diagram of the study area.

led to the Southeast Cass Water Resource District's sponsorship of this study of the West Fargo aquifer system.

The study is divided into two parts. Part I is a compilation of the geologic and hydrologic data collected during this and previous investigations, as well as data that was not associated with any previous study. Part II is a report that discusses the ground-water resources of the study area.

PURPOSE

The purpose of this investigation was to define the nature of the ground-water resources in the vicinity of eastern Cass County, and northeastern Richland County.

LOCATION NUMBERING SYSTEM

The location-numbering system used in this report (fig. 2) is based on the Federal system of rectangular surveys of the public lands. The first numeral denotes the township, the second denotes the range, and the third denotes the section in which the well or test hole is located. The letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter-quarter section (10 acre or 4 hectare tract); thus, well 139-049-04ADD would be located in the

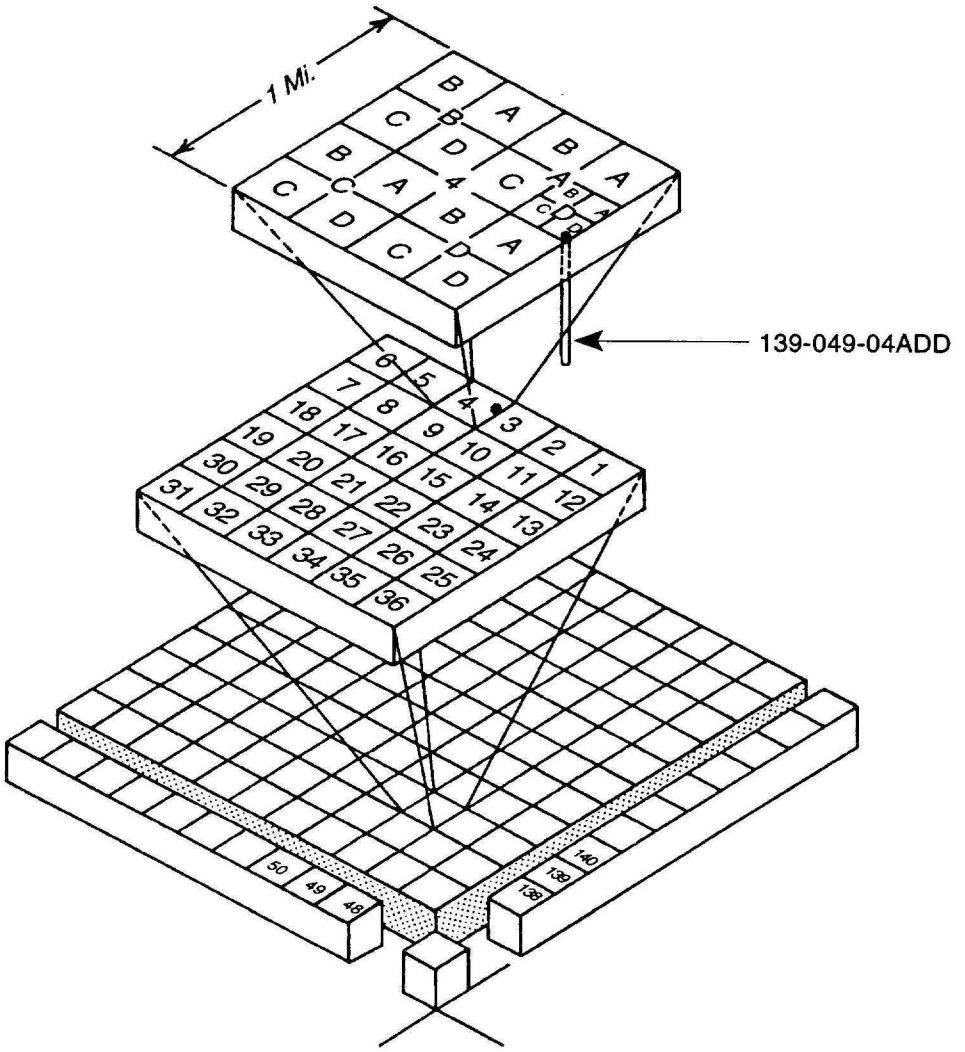

Figure 2. Location-numbering system.

SE1/4 of the SE1/4 of the NE1/4 of Section 4, Township 139 North, Range 49 West. Consecutive terminal numbers are added if more than one well or test hole is recorded within a 10-acre (4-ha) tract. Thus 139-049-04ADD3 would be the third location in the 10-acre area described by 139-049-04ADD.

In this study each 10-acre area sometimes was further divided into 2.5, 0.625, and 0.15625 acre areas in the same manner described above. Thus, well 139-47-08BACADB is located in the NW1/4 of the SE1/4 of the NE 1/4 of the SW1/4 of the NE1/4 of the NW1/4 of Section 8, Township 139 North, Range 47 West.

ACKNOWLEDGEMENTS

Local sponsorship of this study was provided by the Southeast Cass Water Resource District. Additionally, data pertaining to the water resources of the area have been gathered from numerous reports mentioned in the references, and from Cliff McLain (city of Moorhead), Bob Welton (city of Fargo), Sean Hunt (Minnesota DNR), Ken Harris & Tim Wahl (Minnesota Geological Survey), Pat McCollum (Cass Rural Water Users, Inc.), Arlen Kotta (city of Comstock), and Scott Lofgren (city of Glyndon). A special thanks to Florenz Bjorson, former mayor of West Fargo, who was part of many early discussions that led to this study.

EXPLANATION OF TABLES

AND METHODS OF DATA COLLECTION

The data in this report are listed in tables 1-7. The data consist of the following: 1) an inventory of selected locations that have wells, piezometers, and test holes, with associated lithologic logs where they are available; 2) water-levels in selected wells and piezometers (up to 1996); 3) chemical analyses of ground water samples (up to 1996); 4) stable isotopic analyses of ground water samples (up to 1996); 5) historic water use (up to 1995); 6) a list of duplicate names and locations of wells; and 7) a list of community water supplies.

Depths, water quality, lithologies, and water levels of wells and test holes tapping the different aquifers can be determined from the tables. However, use of the data as a guide to conditions at different sites should be made with caution because of the lenticular character of the water-bearing materials and varying water quality in some aquifers. Some of the data listed in this publication has been presented in other reports. Because the data is distributed in so many other reports (about 40 to 50 of the reports listed in "Selected References"), this report makes an effort to list all of the previously reported data. Every effort has been made to amalgamate the data so that all data associated with one physical well is listed under one well descriptor.

Most of the locations associated with the data presented in these tables are shown on the map of the study area presented in Plate 1 found in the back of each volume of the data report.

Lithologic Logs of Wells, Piezometers, and Test Holes

Lithologic logs collected from water-well contractors and other sources and logs of test holes drilled as part of this investigation are included in Table 1. Minor changes in word order have been made on some of the contractor's logs, and logs of some of the test holes drilled during this and prior investigations. Geophysical logs are available for some test holes. These logs are useful for geologic correlation purposes. The geophysical logs are not published in this report but are available for inspection at the North Dakota State Water Commission office in Bismarck, ND. Grain-size determinations refer to the Wentworth (1922) size scale.

SWC observation wells constructed prior to this study were completed with 1 1/4" or 2" diameter ABS (acrylonitrile-Butadiene-Styrene) or PVC (polyvinyl chloride) pipe. The screens in these wells were generally 3 to 10 feet in length and either plastic, galvanized, or stainless steel with an attached check valve joined to the bottom of the pipe. The screens were most commonly 0.018 or 0.012 inch slot size. The components of an observation well were assembled on the ground at the drill site and then placed into the drill hole. The screen was set at the desired depth, the well back-flushed with clear water to clean the aquifer material and bore hole of drilling fluid, and

compressed air pumped into the well to collapse the formation around the screen. The annulus was filled to ground level with drill cuttings. Each new observation well was pumped for several hours to assure a good hydrologic connection between the well and the aquifer. Pumping was accomplished with an airline connected to a small, trailer-mounted air compressor driven by a gasoline engine.

Piezometers were constructed for this study. Construction of the piezometers involved the drilling of a deep test hole to evaluate the lithology to determine the number of piezometers to be installed at a particular site. This deep test hole (in most instances) also served as the hole for the deep piezometer, if the deepest desired screened interval was close to the bottom of the hole. First, the appropriate length of casing and screen were placed into the test hole. Silica sand was then placed around the screen using a tremie pipe with the lower end located a couple of feet above the top of the screen. After the silica sand was installed around the screen the lower end of the tremie pipe was lifted so that the bottom of the tremie pipe was a few feet above the top of the sand pack. Neat cement grout or high-solids bentonite grout was then pumped down the tremie pipe and upward in the annular space. This process continued until the grout filled the entire annulus up to land surface. If the grout settled, additional grout was poured or pumped down the hole until the annular space was filled to land surface.

A day or two passed to allow the grout to "set", and then the piezometers were slugged with a small quantity of fresh water and

pumped with air for development. Each new piezometer was pumped for several hours to assure a good hydrologic connection between the piezometer and the aquifer. Subsequent piezometers, if necessary, were completed at each site by moving the drilling rig ahead 10 to 20 feet, drilling the next hole, and repeating the above described process.

Water Levels in Selected Wells and Piezometers

Table 2 lists the monthly, quarterly, and intermittently measured water levels in selected wells and piezometers, in feet below or above land surface and in elevations. The reference datum for land-surface elevation is the National Geodetic Vertical Datum (NGVD). The elevation of the land surface and/or measuring points at most sites in the database have been determined through the use of the U. S, Geological Survey 7 1/2 minute quadrangle (topographic) maps. The sites were located on the topographic map, and the elevation determined from the map. In most instances this was done in the field, and in some instances this was accomplished in an office environment. The sites determined in this fashion generally are determined to the nearest foot. Most of the observation wells and piezometers that have water level measurements associated with them have had the elevation more accurately determined through the use of differential leveling. The sites determined in this fashion are generally surveyed to the nearest tenth or hundreth of a foot.

Chemical Analyses of Ground Water

The analyses of the chemical composition and physical properties of water are reported in the Table of Chemical Analyses (Table 3). Most of these chemical analyses were done in the SWC chemical laboratory. The SWC chemical analyses were conducted on water samples collected from selected production wells, observation wells, and piezometers. The water sampling procedure involved the collection of 250 or 500 milliliters (ml) of raw water, filtered water, and filtered and acidified (nitric acid) water. Field measurements of specific conductance and water temperature were also made. Water temperature was, however, measured at land surface and does not represent an in-situ temperature. The pH was measured in the lab. Water samples were collected from domestic, industrial, and city supply wells by using the existing pumps. SWC observation wells and piezometers were sampled using several methods: these methods include bladder, gas squeeze, and peristaltic pumps, as well as airlift, and bailing procedures.

Airlift sampling was accomplished with a small diameter rubber hose attached to a portable air compressor. Sampling with a bailer involved the removal of at least two casing volumes of water by airlift and/or bailing techniques to introduce formation water into the well. After evacuating at least two casing volumes of water, a variable-capacity, point-source, bailer (pvc material) was lowered to just above the top of the well screen, except when the water level was close to the screened interval, in which case the bailer was extended into the

screened interval. Bailing continued until enough water was secured for the sample.

Stable Isotope Analyses of Ground Water

Samples from selected wells were analyzed for the stable isotopes ^{18}O (oxygen-18) and ^{2}H (deuterium). The results are listed in Table 4. The samples were filtered with a 0.45 micron filter and collected in 40ml bottles that were sealed with Teflon tape. No preservatives were used. The bottles were completely filled with no air headspace. The samples were refrigerated and kept out of direct sunlight.

Water Use

Historic water use in the study area dates back to the late 1800's; however, the first documented water use dates back to 1903. Documented water use records have been kept and/or reported by a number of different entities over the last 94 years. The result is a patchwork of water use records involving different time periods, with different categories, and different groupings in the amalgamation of reported water use. The water use tables (Tables 5A to 5I) make an effort to capture the recorded water use in as specific a manner as is possible, given the nature of the water use records.

In 1965 the SWC began requiring water use reports for all North Dakota water permit holders. The reporting method was self-reporting on the part of the permit holder in response to a mailing. In 1977 a cooperative effort between the U. S. Geological Survey (USGS) and the SWC was developed for the purpose of gathering more accurate water use data. From 1978 to 1982 the accuracy and the rate of reporting water use records steadily improved. Since 1983 the statewide record is generally about 94% complete, and reasonably accurate, depending on the permit holder.

In 1938 Minnesota began to collect water use data from some large permit holders. In the 1970s they began to collect water use data from all permit holders. Data collected before 1978 is on microfiche. After 1978 the water use data is on paper, and is not easily accessed, however it can be retrieved. Some computerization of the water use data records started in the late 70s, however due to the evolution of the changing computer systems, the record keeping was not stable until 1987. The first water use data considered reliable and accessible starts in 1988. The statewide record is generally about 93% complete, and moderately to fairly accurate, depending on the permit holder.

The city of Fargo has records of its use of water from the Red River that go back to 1946. The city of Moorhead has water use records that go back to 1952. Earlier Moorhead and Fargo water use data is taken from Byers et al (1946), Dennis et al (1949), and Wolf (1981). There are several amalgamations in the Moorhead water use data. The individual sources are listed and a combined total developed from the sum of those individual sources. A more accurate total is

listed in the "METERED TOTAL" column. This discrepancy is predominantly a result of the practice of bypassing the softening basin with the Moorhead East well water from 1952 until 1978. The well water that bypassed the softening basin wasn't metered. The remaining differences are the result of meter accuracy differences (1979-1995).

Well Location Descriptors

In the effort to characterize the historic water levels and the water quality of the different aquifers in the study area, many old records, raw data sheets, and old reports were investigated. Particularly useful for old water levels were the USGS Water Supply Papers that reported water levels and artesian pressures from the 1930s to the 1970s. These reports (and other reports) listed locations that had well descriptors that would sometimes change through time, and sometimes would be called more than one thing at a time. At different times the well would be described with a reference number, or a reference name, or a geographical description. Tables 6A and 6B are the results of an effort to identify the different descriptors that have been used for data sites that have had varying names.

Community Water Supplies

To identify the source of water supply for the many communities in the area, an effort was made to identify all known communities with a listing of their respective sources of water (Table 7). Table 7A lists the Minnesota communities, and table 7B lists the North Dakota communites.

SELECTED REFERENCES

Arndt, B. M., 1977, Stratigraphy of offshore sediment, Lake Agassiz - North Dakota: North Dakota Report of Investigation No. 60, 58 p.

Baker, C. H., Jr., 1966, Geology and ground-water resources of Richland County, North Dakota; part II, basic data: North Dakota Geological Survey Bulletin 46 and North Dakota State Water Commission County Ground Water Study 7, 170 p.

------, 1967, Geology and ground-water resources of Richland County, North Dakota; part I, geology: North Dakota Geological Survey Bulletin 46 and North Dakota State Water Commission County Ground Water Study 7, 45 p.

Baker, C. H., Jr., and Paulson, Q. F., 1967, Geology and ground-water resources of Richland County, North Dakota; part III, ground-water resources: North Dakota Geological Survey Bulletin 46 and North Dakota State Water Commission County Ground Water Study 7, 48 p.

Bingham, J. W., 1960, Basic geologic and ground-water data for Clay County, Minnesota: Minnesota Division of Waters Bulletin 8, 138 p.

Brookhart, J. W., and J. E. Powell, 1961, Reconnaissance of geology and ground water of selected areas in North Dakota: North Dakota Ground Water Studies No. 28, 91 p.

Byers, A. C., Wenzel, L. K., Laird, W. M., and Dennis, P.E., 1946, Ground water in the Fargo-Moorhead area, North Dakota and Minnesota: U.S. Geological Survey Open-File Report, 72 p.

Cragwell, J. S., 1977, Ground-water levels in the United States 1972-74 north-central states: U. S. Geological Survey Water-supply Paper 2163, 89 p.

Dennis, P. E., P. D. Akin, and G. F. Worts, Jr., 1949, Geology and ground-water resources of parts of Cass and Clay counties, North Dakota and Minnesota: North Dakota State Water Commission Ground Water Studies, no. 11, 177 p.

Donohue & Associates, Inc., 1990, Volume II, Supplemental hydrologic investigation, sanitary landfill sites, Fargo, North Dakota: Maple Grove, Minnesota, appendices E-K, 338 p.

Guyton and Associates, Inc., 1957, Report on ground-water conditions in the east Dilworth Aquifer, Moorhead, Minnesota: Report to the City of Moorhead, Minnesota, 23 p.

Hackett, O. M., 1964, Ground-water levels in the United States 1957-61 north-central states: U. S. Geological Survey Water-supply Paper 1781, 148 p.

Hendricks, E. L., 1969, Ground-water levels in the United States 1967-71 north-central states: U. S. Geological Survey Water-supply Paper 2090, 114 p.

Hickok, E. A. & Associates, 1982, Water supply/conservation investigations for the Fargo-Moorhead Area, phase 1, part 1: water demand projections: St. Paul, Minnesota, U.S. Army Corps of Engineers, 47 p.

------, 1984, Water supply/conservation investigations for the Fargo-Moorhead area, Phase 2: alternative source and treatment/distribution systems: U.S. Army Corps of Engineers, 285 p.

Klausing, R. L., 1966, Geology and ground-water resources of Cass County, North Dakota: part II, ground-water basic data: North Dakota Geological Survey Bulletin 47 and North Dakota State Water Commission County Ground Water Studies 8, 158 p.

------, 1968, geology and ground-water resources of Cass County, North Dakota; part I, geology: North Dakota Geological Survey Bulletin 47 and North Dakota State Water Commission County Ground Water Studies 8, 39 p.

------, 1968, geology and ground-water resources of Cass County, North Dakota; part III, hydrology: North Dakota Geological Survey Bulletin 47 and North Dakota State Water Commission County Ground Water Studies 8, 77 p.

LaMoreaux, P. E., 1959, Ground-water levels in the United States 1956 north-central states: U. S. Geological Survey Water-supply Paper 1456, 76 p.

Maclay, R. W., Bidwell, L. E., and Winter, T. C., 1969, Water resources of the Buffalo River watershed west-central Minnesota: U. S. Geological Survey - Hydrologic Investigations Atlas HA-307, 1 sheet.

McGuinness, C. L., 1969, Ground-water levels in the United States 1962-66 north-central states: U. S. Geological Survey Water-supply Paper 1976, 117 p.

Meinzer, O. E., and L. K. Wenzel, 1938, Water levels and artesian pressure in observation wells in the United States in 1937: U. S. Geological Survey Water-supply Paper 840, 657 p.

Meinzer, O. E., L. K. Wenzel, and others, 1939, Water levels and artesian pressure in observation wells in the United States in 1938: U. S. Geological Survey Water-supply Paper 845, 724 p.

------, 1940, Water levels and artesian pressure in observation wells in the United States in 1939: U. S. Geological Survey Water-supply Paper 886, 933 p.

------, 1942, Water levels and artesian pressure in observation wells in the United States in 1940: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 908, 288 p.

------, 1943, Water levels and artesian pressure in observation wells in the United States in 1941: Part 3, north-central states: U. S. Geological Survey Water-supply Paper 938, 232 p.

------, 1944, Water levels and artesian pressure in observation wells in the United States in 1942: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 946, 278 p.

------, 1946, Water levels and artesian pressure in observation wells in the United States in 1943: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 988, 352 p.
Moore Engineering, Inc., 1975, Engineer's report on test hole drilling, city of West Fargo: West Fargo, North Dakota, 17 p.
------, 1981, West Fargo water supply report: 33 p. North Dakota State Engineer and Garrison Diversion Unit Conservancy District, 1990, Red River Valley municipal water supply study: West Fargo, North Dakota, 22 p.
North Dakota Geological Survey and Works Progress Administration, 193?: WPA Project No. 665-73-3-48: 4 Binders.
North Dakota State Engineer and Garrison Diversion Unit Conservancy District, 1990, Red River Valley municipal water supply study: Bismarck, North Dakota, 22 p.
Olson, J., and Greer, P. L., 1995, Site suitability review of the Fargo landfill: North Dakota Landfill Site Investigation No. 47, 62 p.
Paulsen, C. G., 1948, Water levels and artesian pressure in observation wells in the United States in 1945; Part 3, north-central states: U. S. Geological Survey Water-supply Paper 1025, 260 p.
------, 1949, Water levels and artesian pressure in observation wells in the United States in 1946: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1073, 366 p.
------, 1951, Water levels and artesian pressure in observation wells in the United States in 1947: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1098, 351 p.
------, 1951, Water levels and artesian pressure in observation wells in the United States in 1948: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1128, 325 p.
------, 1952, Water levels and artesian pressure in observation wells in the United States in 1949: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1158, 436 p.
------, 1952, Water levels and artesian pressure in observation wells in the United States in 1950: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1167, 198 p.
Sayre, A. N., 1947, Water levels and artesian pressure in observation wells in the United States in 1944: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1018, 276 p.
------, 1954, Water levels and artesian pressure in observation wells in the United States in 1951: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1193, 246 p.
------, 1954, Water levels and artesian pressure in observation wells in the United States in 1952: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1223, 235 p.
------, 1955, Water levels and artesian pressure in observation wells in the United States in 1953: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1267, 254 p.
------, 1956, Water levels and artesian pressure in observation wells in the United States in 1954: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1323, 280 p.

------, 1957, Water levels and artesian pressure in observation wells in the United States in 1955: Part 3, north-central states, U. S. Geological Survey Water-supply Paper 1406, 274 p.
Simpson, H. R., 1929, Geology and groundwater resources of North Dakota: U. S. Geological Survey Water Supply Paper 598, 312 p.
Twin City Testing, 1990, Soil boring and monitoring well installation, Fargo landfill sites, Fargo, North Dakota: Fargo, North Dakota, 7 p.
Ulteig Engineers, Inc., 1979, Ground water investigations for Fargo, North Dakota, volume I - report: Fargo, North Dakota, 46 p.
------, 1979, Ground water investigations for Fargo, North Dakota, volume II - geophysical data, test hole logs, electric logs, water quality data: Fargo, North Dakota, 131 p.
------, 1979, Ground water investigations for Fargo, North Dakota, volume III - existing well logs: Fargo, North Dakota, 188 p.
Wolf, R. J., 1981, Hydrogeology of the Buffalo Aquifer, Clay and Wilkin Counties, west-central Minnesota: U. S. Geological Survey -- Water-Resources Investigations 81-4, 83 p.

TABLE 1A. TABLE OF INVENTORY OF WELLS AND TEST HOLES FOR TOWNSHIPS 135 to 138 (lithologic logs where available)

135-047-07CDCCAD

Date Completed:	11/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	951	Well Type:	4" Stainless Steel
Depth Drilled (ft):	181	Aquifer:	Buffalo
Screened Interval (ft):	166-172	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-18
CLAY	sandy clay, blue, soft	18-46
SAND	fine sand, gray	46-48
CLAY	sandy clay, blue	48-62
CLAY	sandy clay with lenses	62-65
CLAY	sandy clay, blue	65-153
SAND	sand drilled poor, varied color	153-157
CLAY	sandy clay, blue	157-159
SAND	sand, gray	159-161
CLAY	sandy clay with lenses	161-165
SAND	sand, varied color	165-173
CLAY	sandy clay with lenses	173-175
CLAY	sandy clay, blue	175-177
SAND	sand	177-179
CLAY	sandy clay	179-181

135-047-08DCCBCD

Date Completed:	6/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	957	Well Type:	4" Stainless Steel
Depth Drilled (ft):	272	Aquifer:	Dakota Group
Screened Interval (ft):	266-272	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-3
SAND	fine sand, yellow, soft	3-56
CLAY	clay, blue, soft	56-97
CLAY	clay + stones, gray, soft	97-126
BOULDERS	boulder, hard	126-127
CLAY	clay + stones, gray, varied hardness	127-148
SAND	fine sand, gray, soft	148-150
CLAY	clay + stones, gray, varied hardness	150-175
CLAY	clay + stones, gray, varied hardness	175-190

135-047-08DCCBCD (continued)

CLAY	clay + stones, gray, varied hardness	190-210
CLAY	clay + stones, gray, varied hardness	210-225
CLAY	clay + stones, gray, varied hardness	225-250
CLAY	clay + stones, gray, varied hardness	250-260
SANDSTONE	clean very fine sand, white, soft	260-272

135-047-09CDCCBB

Date Completed:	6/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	958	Well Type:	4" Stainless Steel
Depth Drilled (ft):	303	Aquifer:	Undefined
Screened Interval (ft):	269-285	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-3
CLAY	clay, brown	3-10
CLAY	clay, blue	10-30
SAND	fine sand, blue	30-40
SAND	12-slot sand, blue	40-53
CLAY	sandy clay, blue	53-65
SAND	10-12 slot sand, brown	65-78
CLAY	sandy clay, blue	78-209
SAND	lenses sand + clay, blue	209-212
SAND	sand, blue	212-213
CLAY	clay, blue	213-215
SAND	sand, blue	215-216
CLAY	sandy clay, blue	216-222
CLAY	sandy clay + lenses, blue	222-227
SAND	sand, blue	227-231
SAND	lenses sand + clay, blue	231-238
CLAY	sandy clay, blue	238-268
SAND	fine sand, gray	268-273
CLAY	sandy clay, blue	273-275
SAND	fine sand, blue	275-285
CLAY	sandy clay, blue	285-299
SAND	fine dirty sand, blue	299-301
CLAY	sandy clay, blue	301-303

135-047-13CCDCDB

Date Completed:	4/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	976	Well Type:	4" Stainless Steel
Depth Drilled (ft):	95	Aquifer:	Undefined
Screened Interval (ft):	0-0	Log Source:	Robertson

135-047-13CCDCDB (continued)

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, yellow	2-21
CLAY	clay, blue	21-35
CLAY	sandy clay, blue	35-50
CLAY	clay, blue	50-60
SAND	sand, gray	60-62
CLAY	clay, blue	62-77
SAND	sand, gray	77-95

135-047-15AAABCD

Date Completed:	6/1989	Purpose:	Domestic Well
L.S. Elevation (ft):	966	Well Type:	5" Stainless Steel
Depth Drilled (ft):	80	Aquifer:	Undefined
Screened Interval (ft):	0-0	Log Source:	Robertson

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-4
CLAY	clay, yellow	4-16
CLAY	clay, blue	16-62
SAND	sand, gray	62-68
CLAY	clay, blue	68-80

135-047-19CDDCBB

Date Completed:	12/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	968	Well Type:	4" Stainless Steel
Depth Drilled (ft):	327	Aquifer:	Undefined
Screened Interval (ft):	307-320	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
SAND	sand, colored	1-12
CLAY	clay, blue	12-20
CLAY	shale, blue	20-54
CLAY	sandy clay, blue, soft	54-68
SAND	sand	68-70
CLAY	sandy clay, blue, soft	70-203
SAND	fine sand	203-204
CLAY	sandy clay, blue, soft	204-250
SAND	sand + clay lenses 50% clay	250-253

135-047-19CDDCBB (continued)

CLAY	sandy clay, blue	253-265
SAND	fine sand drilled dirty, gray	265-268
CLAY	sandy clay, blue	268-269
CLAY	sandy clay + lenses dirty sand 50, blue	269-272
CLAY	sandy clay, blue	272-291
SAND	fine sand drilled dirty + shale, black-gray	291-300
SHALE	sandy clay + shale, blue	300-305
SANDSTONE	fine sand drilled cleaner, gray	305-309
SANDSTONE	sand + clay lenses, gray	309-310
SANDSTONE	fine sand drilled good, gray	310-320
CLAY	clay + shale pink gray blue black	320-327

135-047-30BCBCDB

Date Completed:	9/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	968	Well Type:	4" Stainless Steel
Depth Drilled (ft):	313	Aquifer:	Undefined
Screened Interval (ft):	300-310	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
SAND	sand, brown	1-11
CLAY	clay, blue, soft	11-23
CLAY	shale, blue, soft	23-61
CLAY	sandy clay, blue	61-102
SAND	sand, blue	102-103
CLAY	sandy clay, blue	103-129
BOULDERS	rock	129-130
CLAY	sandy clay, blue, soft	130-261
SAND	fine sand	261-262
CLAY	sandy clay, blue	262-282
CLAY	sandy clay with shale, black-blue	282-297
SAND	fine sand drilled good water, gray	297-307
SAND	fine sand drilled dirtier, gray	307-310
CLAY	sandy clay, blue	310-313

135-047-35BBBADA

Date Completed:	9/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	972	Well Type:	4" Stainless Steel
Depth Drilled (ft):	261	Aquifer:	Undefined
Screened Interval (ft):	229-237	Log Source:	LTP Enterprises, Inc

Lithologic Log

135-047-35BBBADA (continued)

Unit	Description	Depth (ft)
CLAY	sandy clay, brown	0-1
SAND	fine sand, brown	1-4
CLAY	clay, brown, hard	4-10
CLAY	clay, brown, soft	10-17
CLAY	clay, blue, soft	17-30
CLAY	sandy clay with rock, blue	30-38
SAND	fine sand drilled clean, blue	38-47
CLAY	sandy clay, blue	47-56
SAND	sand with lenses of clay washed, colored	56-57
CLAY	sandy clay, blue	57-69
SAND	fine sand	69-78
BOULDERS	rock	78-79
CLAY	sandy clay, blue	79-80
SAND	sand, blue	80-82
CLAY	sandy clay, blue	82-86
SAND	sand, colored	86-90
SAND	sand with lenses of clay, colored	90-91
CLAY	sandy clay with lenses of sand, blue	91-96
SAND	sand, colored	96-97
CLAY	sandy clay, blue	97-99
SAND	sand, colored	99-100
CLAY	sandy clay, blue	100-101
SAND	sand, colored	101-102
CLAY	sandy clay, blue	102-104
SAND	sand drilled good, colored	104-107
CLAY	sandy clay, blue	107-116
SAND	sand, colored	116-117
CLAY	sandy clay, blue	117-122
SAND	lenses of sand + clay, blue	122-125
SAND	sand drilled good, varied color	125-128
CLAY	sandy clay, blue	128-183
SAND	sand, blue	183-184
CLAY	sandy clay, blue	184-207
CLAY	silty clay, blue, soft	207-219
SAND	sand, gray	219-222
CLAY	sandy clay, blue	222-224
SAND	sand didn't drill good, blue	224-226
SAND	sand drilled good, blue	226-237

135-047-35BBBADA (continued)

SAND	dirty sand, blue	237-239
SAND	sand drilled good, blue	239-243
CLAY	clay, blue	243-244
SAND	sand, blue	244-248
SAND	sand drilled good, blue	248-252
SAND	sand, blue	252-254
SAND	sand drilled good, blue	254-258
SAND	lenses of sand + clay, blue	258-261

135-048-01DDDABC

Date Completed:	8/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	952	Well Type:	5" Stainless Steel
Depth Drilled (ft):	180	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	Robertson

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, yellow	2-25
CLAY	clay, blue	25-62
SAND	sand, gray	62-65
CLAY	clay, blue	65-68
SAND	sand, gray	68-70
CLAY	clay, blue	70-79
SAND	sand, gray	79-80
CLAY	clay, blue	80-156
SAND	sand, gray	156-176
CLAY	clay, blue	176-180

135-048-05BAA1

NDSWC 12902

Date Completed:	10/1/91	Purpose:	Test Hole
L.S. Elevation (ft):	932	Well Type:	
Depth Drilled (ft):	400		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, soft, smooth, very plastic	2-28
CLAY	gray, soft, smooth, plastic, (lake clay)	28-46
CLAY	sandy, silty, pebbly, gray, soft, plastic, (till)	46-63
SAND & GRAVEL	no description	63-64
CLAY	very sandy, silty, some pebbles, gray, soft, slightly plastic, rocks at 71 feet	64-85

135-048-05BAA1 (continued)

SAND	medium to coarse with gravel, fine to medium, to coarse, angular and subangular to subrounded	85-89
CLAY	sandy, silty, pebbly, gray (till)	89-92
ROCKS & GRAVEL	clay layer at 96 feet and 98 feet	92-100
SAND	coarse	100-104
CLAY	sandy, silty, pebbly, gray, very sandy, moderately soft, slightly plastic, rocks at 130 (till)	104-133
SAND & GRAVEL	no description	133-136
CLAY	very sandy, silty, pebbly, gray (till)	136-144
CLAY	sandy, silty, pebbly, firm (till)	144-164
SAND	fine	164-173
CLAY	sandy, silty, pebbly, very sandy (till)	173-178
CLAY	sandy, silty, pebbly, moderately plastic, moderately firm, rocks at 220 feet	178-221
CLAY	silty, sandy, some pebbles, gray sandy clay and sand layers from 230-236 (till), otherwise appears more lacustrine or fluvial, fairly plastic, slightly greasy	221-240
CLAY	very sandy, silty, pebbly, gray, soft, moderately plastic, layers of coarse sand and gravel from 252-256 feet (predominantly shale, some carbonates)	240-262
CLAY	silty, dark gray, soft, fairly plastic (fluvial)	262-272
SAND & GRAVEL	virtually all shale	272-274
SILT	clayey, firm but crumbly, gray to light gray (fluvial)	274-280
CLAY	not much sample return, fluvial silty clay or till, sand layers 305 to 310 feet, some sandy clay after 310 feet	280-324
SAND	clayey, predominantly shale, and some coal fragments, full of clay layers	324-338
CLAY	very little sample return	338-341
SAND	clayey, little sample return	341-351
CLAY	very little sample return, sand layers, rocks at 378 feet, rock at 384 feet (till)	351-385
CLAY	green, soft, gritty (weathered Precambrian)	385-400

135-048-05BAA2

NDSWC 12903

Date Completed:	10/2/91	Purpose:	Test Hole
L.S. Elevation (ft):	933	Well Type:	
Depth Drilled (ft):	180		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, smooth, soft, plastic, (oxidized lake clay)	2-36
CLAY	smooth, soft, very plastic, (lake clay)	36-46
CLAY	sandy, silty, pebbly, gray (till), sand layer at 56 feet	46-61
SAND & GRAVEL	medium to coarse, angular to subrounded	61-65
CLAY	very sandy, silty, pebbly, gray, soft, slightly plastic (till)	65-69
CLAY	sandy, silty, pebbly, dark gray, to brownish gray, firm, moderately plastic, gray after 75 feet rocks at 117 and 123 feet, softer with depth and very sandy (till)	69-144

135-048-05BAA2 (continued)

SAND & GRAVEL	no description	144-146
CLAY	very sandy, silty, pebbly, gray, soft, moderately plastic, rocks at 162 feet (till)	146-180

135-048-06BAA1

Date Completed: 12/2/76
L.S. Elevation (ft): 926
Depth Drilled (ft): 292

Purpose: Test Hole
Well Type:
Log Source: LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown, soft	3-18
CLAY	blue, soft	18-56
CLAY	blue, sandy	56-65
CLAY	blue, sandy, with sand lenses	65-67
SAND	colored	67-73
SAND & CLAY	blue, lenses	73-74
CLAY	blue, sandy	74-109
SAND	dirty, poor	109-116
CLAY	blue, sandy	116-153
ROCK	black	153-154
CLAY	blue, sandy	154-186
SAND	dirty	186-202
CLAY	blue, sandy	202-266
SAND	gray	266-268
CLAY	blue, sandy	268-274
SAND	gray, fine	274-278
CLAY	black, blue, sandy, with shale lenses	278-283
SHALE	black, white, pink, colored	283-292

135-048-06BAA2

Date Completed: 12/11/76
L.S. Elevation (ft): 926
Depth Drilled (ft): 157

Purpose: Test Hole
Well Type:
Log Source: LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown, soft	3-20
CLAY	blue, soft	20-51
CLAY	blue, sandy	51-67

135-048-06BAA2 (continued)

SAND	colored, washed	67-70
ROCK	black	70-71
SAND & GRAVEL	gray, dirty, with washed rock	71-73
SAND & GRAVEL	colored, washed	73-74
CLAY	blue, sandy	74-110
SAND	gray, dirty, with clay lenses	110-116
CLAY	blue, sandy	116-125
SAND	blue	125-127
CLAY	blue, sandy	127-132
ROCK	black	132-133
CLAY	blue, sandy	133-136
SAND	gray, washed	136-137
CLAY	blue, sandy	137-157

135-048-08ACD2

Date Completed:	7/31/90	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Steel
Depth Drilled (ft):	148	Aquifer:	Undefined
Screened Interval (ft):	138-142	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-41
CLAY	gray	41-43
ROCK	white	43-44
CLAY	sandy, gray	44-61
SAND & GRAVEL	brown	61-83
CLAY	sandy, gray	83-114
SAND	gray	114-131
CLAY	small lenses of clay, gray	131-131
SAND	gray	131-143
CLAY	sandy, gray	143-148

135-048-10CDDBDC

Date Completed:	1/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	940	Well Type:	4" Stainless Steel
Depth Drilled (ft):	80	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	75-80	Log Source:	Vorwerk

Lithologic Log

Unit	Description	Depth (ft)
SOIL	soil, black, soft	0-2

135-048-10CDDBDC (continued)

CLAY	clay, yellow, soft	2-9
CLAY	sandy clay, gray, soft	9-12
CLAY	sandy clay, gray, soft	12-20
GRAVEL	rock hardpan, hard	20-55
CLAY	sticky clay, gray, hard	55-65
SAND	sand water, gray	65-80

135-048-11DAABDA

Date Completed:	7/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	941	Well Type:	4" Stainless Steel
Depth Drilled (ft):	80	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	0-0	Log Source:	Robertson

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, yellow	1-44
CLAY	clay, blue	44-48
GRAVEL	silted gravel, gray	48-68
SAND	sand, gray	68-78
CLAY	clay, blue	78-80

135-048-13BBBDBA

Date Completed:	7/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	942	Well Type:	4" Stainless Steel
Depth Drilled (ft):	109	Aquifer:	Undefined
Screened Interval (ft):	95-101	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, brown	1-19
CLAY	clay, blue, soft	19-43
CLAY	sandy clay, blue	43-50
CLAY	sandy clay with small rock, blue	50-54
CLAY	sandy clay, blue, hard	54-58
SAND	sand, blue	58-59
CLAY	sandy clay, blue, hard	59-67
ROCK	rock	67-68
CLAY	sandy clay, hard	68-93
SAND	fine sand	93-101
CLAY	sandy clay	101-105
SAND	sand	105-106

135-048-13BBBDBA (continued)

CLAY	sandy clay	106-109

135-048-17CCC

NDSWC 11659

Date Completed:	9/9/85	Purpose:	Observation Well
L.S. Elevation (ft):	932.7	Well Type:	1.25" PVC
Depth Drilled (ft):	200	Aquifer:	Undefined
Screened Interval (ft):	152-157	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	sandy, silty, yellow-brown, oxidized, stiff, plastic (till)	1-20
CLAY	light gray, soft, very plastic, no silt or sand (lacustrine)	20-46
CLAY	sandy, silty, gray, surprisingly few returns, plastic (till)	46-54
GRAVEL	dirty, coarse	54-55
CLAY	sandy, silty, few returns (till?)	55-58
GRAVEL	coarse, dirty	58-60
SILT	clayey, gray, soft, slightly plastic, gradational	60-63
CLAY	silty, gray, moderately soft, plastic (fluvial)	63-66
CLAY	with some sand, and some silt, almost looks layered, but has occasional sand sized particles, stiff, slightly plastic (till)	66-91
CLAY	very sandy, silty with pebbles, drills easier; more normal till, becomes stiffer at 102 feet, sandier and slightly softer at 125 feet	91-148
SAND	fine to coarse, dirty with some gravel	148-161
CLAY	dark gray, some stiff layers some soft, light gray streaks, bentonitic in places, very soft bedrock	161-200

135-048-19BBC

NDSWC 12332

Date Completed:	6/28/83	Purpose:	Test Hole
L.S. Elevation (ft):	935	Well Type:	
Depth Drilled (ft):	240		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow brown, slightly silty, iron stained, oxidized, (lake clays)	1-24
CLAY	olive gray, slighlty silty, plastic, sticky, cohesive, (lake clays)	24-44
CLAY	olive gray, silty sandy with pebbles, rocky, poorly sorted, occasional lens of sand and gravel (till)	44-53
GRAVEL	with medium to coarse sand, predominantly shale and igneous, well rounded to angular, poorly sorted	53-55
TILL	as above, rocky	55-102
CLAY	olive gray, silty, drills smooth	102-105
TILL	as above	105-113

135-048-19BBC (continued)

CLAY	olive gray, silty, drills smooth	113-121
SAND	medium to very coarse, with gravel, well rounded to subrounded, poorly sorted till, as above	121-123
TILL	as above	123-154
CLAY	black, greasy, carbonaceous, drills smooth and slow, occasional choppy drilling, shale or sandstone lenses? flakes of bentonite in clays, occasional shale and sandstone chunk	154-198
SAND	fine to coarse, washing badly, rain of returns, well rounded, good sorting	198-200
CLAY	black, very poor returns, mostly washing sand from above, layer of fine sand	200-221
CLAY	black, very poor returns, drills slow and smooth	221-240

135-048-19DDD

Date Completed:	1934	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Wahpeton Sand Plain
Screened Interval (ft):	0-75	Log Source:	

Lithologic Log - unavailable

135-048-20ABA

NDSWC 11715

Date Completed:	10/24/85	Purpose:	Test Hole
L.S. Elevation (ft):	933	Well Type:	
Depth Drilled (ft):	210		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	slightly silty to about 10 feet, carbonaceous zones, oxidized at 17 feet (lacustrine) gravel lenses at 44 feet	2-45
TILL	olive gray, very silty, grades into silty clay (fluvial in appearance), gravel lenses at 56 feet, cobbles at 63 feet	45-64
CLAY	dark gray, tight, a few prominent sand grains, waxy	64-73
SILT	very clayey, brownish gray	73-76
CLAY	brownish gray, slightly silty, tight interbedded gravel 80-82 feet	76-82
TILL	dark brownish gray, silty, pebbly, very tight, occasional small sand and gravel lenses, cobble at 126 feet, cobbles at 133 feet, many cobbly zones below 135 feet	82-138
SAND	no description	138-140
TILL	as above, below 160 feet no visible pebbles, lacustrine clay?	140-164
BEDROCK	shale, black, very tight and waxy, some bentonitic zones	164-210

135-048-20BAA

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	933	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-172	Log Source:	

Lithologic Log - unavailable

135-048-21BDCAAD

Date Completed:	8/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Stainless Steel
Depth Drilled (ft):	182	Aquifer:	Undefined
Screened Interval (ft):	170-175	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	silty clay, gray	2-3
CLAY	clay, brown	3-22
CLAY	clay, blue	22-51
CLAY	sandy clay, blue	51-133
SAND	fine sand, colored	133-162
SAND	coarser sand, colored	162-175
CLAY	sandy clay, blue	175-182

135-048-22CCCCCC

Date Completed:	5/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	941	Well Type:	5" Stainless Steel
Depth Drilled (ft):	183	Aquifer:	Undefined
Screened Interval (ft):	0-0	Log Source:	Robertson

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, yellow	2-18
CLAY	clay, blue	18-45
CLAY	clay, blue	45-68
ROCK	rocks + clay, blue	68-145
CLAY	sandy clay, blue	145-160
SAND	sand, gray	160-170
SAND	sand, gray	170-183

135-048-23DDABBB

Date Completed:	7/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	943	Well Type:	4" Stainless Steel
Depth Drilled (ft):	302	Aquifer:	Undefined
Screened Interval (ft):	283-296	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown, soft	2-18
CLAY	clay, blue, soft	18-42
SAND	fine sand, gray	42-80

135-048-23DDABBB (continued)

SAND	sand, colored	80-154
CLAY	sandy clay, blue	154-170
CLAY	shale, blue, soft	170-231
SAND	sand, blue-brown	231-233
CLAY	shale, gray, soft	233-263
SAND	fine sand, blue	263-275
SAND	sand with clay lenses, gray	275-276
SAND	fine sand, blue	276-278
CLAY	sandy clay, gray	278-280
SAND	fine sand drilled good, blue	280-294
NO SAMPLE	lenses, blue-gray	294-296
SAND	fine sand, gray	296-300
CLAY	shale, blue	300-302

135-048-25CDDDAC

Date Completed:	9/1961	Purpose:	Domestic Well
L.S. Elevation (ft):	952	Well Type:	4"
Depth Drilled (ft):	297	Aquifer:	Undefined
Screened Interval (ft):	289-297	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	sticky shale, yellow	2-12
CLAY	shale, blue	12-24
CLAY	clay, blue	24-65
SAND	sand, brown	65-68
CLAY	clay, blue	68-124
CLAY	sticky shale, blue, hard	124-156
CLAY	shale, brown-blue, hard	156-213
CLAY	sticky shale, blue	213-284
SAND	fine sand, blue	284-297
CLAY	shale, blue	297-297

135-048-26CCBCDC

Date Completed:	6/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	943	Well Type:	4"
Depth Drilled (ft):	146	Aquifer:	Undefined
Screened Interval (ft):	138-146	Log Source:	Falk Bros Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1

135-048-26CCBCDC (continued)

CLAY	clay, yellow, soft	1-21
CLAY	clay, blue, soft	21-75
SAND	sand lense, gray, medium hardness	75-138
CLAY	clay, blue, medium hardness	138-146

135-048-28BADCCA

Date Completed:	7/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	4" Stainless Steel
Depth Drilled (ft):	152	Aquifer:	Undefined
Screened Interval (ft):	146-151	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	silty clay, brown	2-6
CLAY	sandy clay, brown	6-16
CLAY	clay, blue, soft	16-52
CLAY	sandy clay, blue	52-55
SAND	sand, colored	55-59
CLAY	sandy clay with small rock, blue	59-124
SAND	sand drilled good, colored	124-126
CLAY	sandy clay, blue	126-137
SAND	sand drilled good, gray	137-151
CLAY	sandy clay, blue	151-152

135-048-28BDBAAC

Date Completed:	12/1966	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Stainless Steel
Depth Drilled (ft):	147	Aquifer:	Undefined
Screened Interval (ft):	124-130	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	shale, yellow	2-15
CLAY	shale, blue	15-47
CLAY	clay, blue	47-99
SAND	coarse sand, brown	99-112
CLAY	clay, blue	112-121
SAND	sand, blue	121-130
CLAY	clay, blue	130-133
SAND	fine sand, blue	133-135
CLAY	clay, blue	135-147

135-048-28CBB

Date Completed:	4/13/74	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Steel
Depth Drilled (ft):	196	Aquifer:	Undefined
Screened Interval (ft):	188-194	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown	3-35
CLAY	blue	35-40
CLAY	blue, sandy	40-146
CLAY	blue, sandy, with rock	146-158
SAND	blue, washed	158-159
CLAY	blue, sandy, with sand lenses	159-176
SAND	blue	176-196

135-048-31DCD

NDSWC 3977

Date Completed:	6/3/70	Purpose:	Observation Well
L.S. Elevation (ft):	936.3	Well Type:	1.25" ABS
Depth Drilled (ft):	180	Aquifer:	Wahpeton Sand Plain
Screened Interval (ft):	138-141	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black, silty loam	0-1
SILT	yellowish brown, soft, slightly cohesive	1-3
CLAY	dusky yellow, soft to moderately soft, cohesive, plastic, smooth, sticky, tight, oxidized	3-26
CLAY	yellowish brown, to light olive gray, soft, smooth cohesive, partially oxidized	26-38
GRAVEL	fine and medium, sandy, dirty, subangular, to subrounded, assorted, mostly granitics and iron-stained carbonates, oxidized(?)	38-49
SHALE	black, hard, brittle, tight, noncalcareous, upper few feet drilled like it was fractured or a gravel, the rest drilled like it was in-place shale	49-82
GRAVEL	fine and medium, brownish or reddish, iron-stained or oxidized, mostly carbonates with granitics	82-87
TILL	clay, silty, with sand grains and pebbles, olive-brownish gray, slightly hard and tightly compacted, partially oxidized	87-98
SAND	fine and medium, with some coarse, brown, moderately sorted, generally subrounded, with some subangular, iron stained	98-107
TILL	clay, silty with sand grains and pebbles, dark brownish gray, slightly hard, chunky, tightly compacted, oxidized spots and streaks	107-120
SAND	fine to coarse, occasional gravel and cobbles, brown, heavily iron-stained, interbedded, mostly subrounded carbonates and granitics	120-162
TILL	clay, silty, with sand grains and pebbles, occasional cobbles or boulders, dark olive gray, medium soft, chunky, tightly compacted	162-180

135-048-32BBB

NDSWC 3978

Date Completed:	6/3/70	Purpose:	Test Hole
L.S. Elevation (ft):	935	Well Type:	
Depth Drilled (ft):	360		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	silty, loam, brownish black	0-1
CLAY	light olive to medium gray, moderately soft, cohesive, slightly plastic to slightly brittle, smooth	1-13
CLAY	silty, dusky yellowish brown, soft, moderately cohesive, slightly plastic, oxidized	13-25
CLAY	olive gray, soft to moderately soft, cohesive, plastic, smooth, sticky, tight	25-36
CLAY	silty to sandy with pebbles, olive gray, moderately soft to slightly hard, cohesive, tight, contains numerous lenses of sand and gravel (till)	36-84
GRAVEL	fine and medium, sandy, assorted, subangular to subrounded, mostly granitics and iron-stained carbonates; fairly rough drilling	84-92
CLAY	silty with sand grains and pebbles (mostly shale) dark olive gray, moderately soft, cohesive, tightly compacted, very few large rocks, drills tight (till)	92-121
CLAY	very sandy (very fine to fine), light olive gray, moderately soft, moderately cohesive but friable, gritty, milky, occasional pebbles but numerous loose fine sand stringers (till)	121-191
CLAY	silty to sandy with pebbles and occasional cobbles, olive gray, moderately soft to slightly hard, cohesive, includes blocks or layers of clay and silty clay, and silty clay and numerous pockets of sand and gravel, very heterogeneous; sporatic (till)	191-276
GRAVEL	fine, medium and some coarse, sandy, assorted, generally subrounded, mostly carbonates and granities; interbedded with till as above	276-307
SHALE	silty, soft, moderately cohesive, brownish black, very oily and carbonaceous, noncalcareous; drills smooth and tight, oily scum on fluid in mud pit	307-327
CLAY	white to pinkish red (feldspar pink), soft, chunky, moderately cohesive, slightly plastic, smears and stains easily, noncalcareous (weathered granite?) contains chunks or boulders of partially decomposed granite in lower 20 feet	327-360

135-048-32DDD

NDSWC 3976

Date Completed:	6/3/70	Purpose:	Test Hole
L.S. Elevation (ft):	930	Well Type:	
Depth Drilled (ft):	160		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	clayey loam, black	0-2
CLAY	dusky yellowish gray, soft, cohesive, plastic, smooth, oxidized	2-28
CLAY	olive gray, soft, cohesive, plastic	28-37
CLAY	silty with sand grains and pebbles, olive gray, moderately soft to slightly hard, cohesive, tightly compacted (till) contains numerous lenses of sand and gravel, limestone in the gravel heavily iron-stained	37-88
SAND	fine and medium, brownish, moderately well-sorted, generally subrounded, mostly quartz and granitics with some carbonates and shale, loose, clean, has tendency to run or wash out, would probably produce a flow	88-96
TILL	as above, silty to sandy with pebbles and stringers of sand	96-101
SAND	as above, some fine gravel, brownish, appears partially oxidized or iron-stained, washes out	101-109
TILL	as above, silty to sandy clay with pebbles and gravel stringers, olive gray, tightly compacted, gravel stringers cave, fairly rough to drill	109-160

135-048-33ABB

Date Completed:	4/17/74	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Steel
Depth Drilled (ft):	126	Aquifer:	Undefined
Screened Interval (ft):	120-126	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-32
CLAY	blue, soft	32-47
CLAY	blue, hard, sandy	47-112
SAND	blue	112-126

135-048-33ACD

Date Completed:	2/24/87	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	4" Steel
Depth Drilled (ft):	174	Aquifer:	Undefined
Screened Interval (ft):	160-168	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-32
CLAY	blue	32-47
CLAY	sandy, gray	47-70
SAND	gray	70-75
CLAY	sandy, gray	75-117
SAND & CLAY	lenses of sand and clay	117-137
CLAY	sandy	137-157
SAND	colored	157-166
SAND	colored	166-174

135-048-34CDCDAB

Date Completed:	2/1972	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Stainless Steel
Depth Drilled (ft):	147	Aquifer:	Undefined
Screened Interval (ft):	139-147	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-22
CLAY	shale, brown	22-27
CLAY	shale, blue	27-41
CLAY	sandy clay lenses, blue	41-45

135-048-34CDCDAB (continued)

SAND	sand, blue	45-72
CLAY	clay, blue, hard	72-80
CLAY	sandy clay, blue	80-104
SAND	sand fine on top, blue	104-147

135-048-36DDCCAB

Date Completed:	7/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	948	Well Type:	4" Stainless Steel
Depth Drilled (ft):	319	Aquifer:	Undefined
Screened Interval (ft):	302-317	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown, soft	2-19
CLAY	clay, blue, soft	19-42
NO SAMPLE	lenses, blue	42-47
SAND	sand + gravel, colored	47-55
CLAY	sandy clay, blue	55-62
SAND	sand, colored	62-72
CLAY	sandy clay with sand lenses, blue	72-90
CLAY	sandy clay, blue	90-162
NO SAMPLE	lenses, blue	162-166
CLAY	sandy clay, blue	166-200
SAND	sand with clay lenses, blue	200-203
SAND	sand, gray	203-207
CLAY	sandy clay, blue	207-212
SAND	sand with clay lenses, gray	212-217
CLAY	sandy clay, blue	217-257
SAND	fine sand with clay lenses, blue	257-262
CLAY	sandy clay, blue	262-282
SAND	fine dirty sand, gray	282-289
SAND	fine sand, gray	289-296
CLAY	sandy clay, blue	296-300
SAND	fine sand drilled good, gray	300-307
SAND	fine sand, gray	307-311
CLAY	clay with sand lenses, blue	311-312
SAND	fine sand drilled good, gray	312-319

135-049-01AAA

NDSWC 12907

Date Completed:	10/3/91	Purpose:	Test Hole
L.S. Elevation (ft):	928	Well Type:	
Depth Drilled (ft):	200		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow-brown, smooth, soft, plastic (oxidized lake clay)	2-36
CLAY	gray, smooth, soft, plastic (lake clay)	36-49
CLAY	sandy, silty, pebbly, gray, moderately soft to slightly firm, moderately plastic (till)	49-60
SAND	fine to very fine	60-61
CLAY	very sandy, silty, pebbly, gray, moderately plastic (till)	61-64
ROCK	big piece of carbonate	64-65
CLAY	sandy, silty, pebbly, gray to dark gray, firm, slightly plastic, micaceous, pebbles (till) infrequent, very little sand, mostly silty clay	65-110
SILT	gray, micaceous	110-114
SAND & GRAVEL	very dirty, poorly sorted, angular to subrounded	114-118
CLAY	very sandy, silty, pebbly, gray, to light gray, soft, moderately, plastic, rocks at 144 feet and 163 feet	118-183
CLAY	dark gray, stiff, shiny, occasional light brown areas, (bedrock)	183-200

135-049-01CDD

NDSWC 3979

Date Completed:	6/4/70	Purpose:	Test Hole
L.S. Elevation (ft):	930	Well Type:	
Depth Drilled (ft):	280		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	silty clay loam, black	0-2
CLAY	silty, yellowish brown, soft, cohesive, plastic, smooth, sticky, oxidized	2-28
CLAY	silty, olive gray, soft, cohesive, plastic, smooth, sticky	28-48
CLAY	silty to sandy with pebbles and thin gravel stringers, olive to dark olive gray, moderately soft, cohesive, slightly to moderately plastic, tightly compacted most pebbles and gravel are carbonates with some granitics and shale (till)	48-72
GRAVEL	fine and medium, sandy, assorted, subangular to subrounded, mostly carbonaceous with granitics, dirty, rocky drilling, taking some water	72-90
CLAY	silty to sandy, with pebbles, olive gray to dark olive gray, moderately soft to slightly hard, cohesive, chunky, tight (till)	90-109
CLAY	very sandy with occasional pebbles and gravel stringers, light olive gray, moderately soft, slightly cohesive, fairly friable but slightly plastic, gritty (till)	109-156
CLAY	silty with sand grains and pebbles, olive gray with dark brownish tint, moderately soft to slightly hard, stiff, tight (till)	156-203
SHALE	silty, brownish black, moderately soft to slightly hard and brittle, stiff and tight, smooth, non-calcareous, laminated and possibly fossiliferous, carbonaceous	203-238
SHALE	as above, with interbedded silty to sandy streaks, drills tight	238-256

135-049-01CDD (continued)

CLAY	silty, white, light greenish and reddish orange, appears chalky but non-calcareous, smears and stains easily, soft (weathered granite)	256-280

135-049-10BAD

Date Completed:	5/17/72	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Steel
Depth Drilled (ft):	262	Aquifer:	Undefined
Screened Interval (ft):	250-260	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	no description	2-26
CLAY	no description	26-39
SHALE	no description	39-53
CLAY	sandy	53-60
CLAY	sandy clay with small rock	60-65
GRAVEL	no description	65-67
CLAY	sandy	67-71
ROCK	no description	71-72
CLAY	sandy	72-82
SAND	no description	82-88
CLAY	sandy	88-116
ROCK	no description	116-117
CLAY	sandy clay with rock	117-145
CLAY	sandy clay, (soft)	145-165
CLAY	sandy clay with rock	165-202
CLAY	soft, sandy	202-227
SAND & ROCK	no description	227-235
SAND	no description	235-260
CLAY	sandy	260-262

135-049-10CAD

Date Completed:	5/23/72	Purpose:	Domestic Well
L.S. Elevation (ft):	931	Well Type:	4" Steel
Depth Drilled (ft):	392	Aquifer:	Undefined
Screened Interval (ft):	375-390	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	brown	2-25
CLAY	blue	25-30

135-049-10CAD (continued)

SHALE	blue	30-51
CLAY	blue, soft, sandy	51-57
CLAY	blue, sandy, with small rock	57-61
SAND	colored	61-62
CLAY	blue, sandy	62-83
SAND	colored	83-84
CLAY	blue, sandy	84-88
SAND	colored	88-89
CLAY	blue, sandy	89-102
SAND	colored	102-103
CLAY	blue, sandy	103-130
ROCK	blue	130-131
CLAY	blue, sandy, with small rock	131-197
CLAY	blue, soft sandy	197-240
CLAY	blue, soft, sandy, with small rock	240-277
CLAY	blue, sandy	277-282
CLAY	blue, soft, sandy	282-336
CLAY	blue, sand lenses	336-338
CLAY	blue, brown, soft, sandy	338-357
SAND	blue	357-358
CLAY	blue, brown, sandy	358-367
CLAY	blue, brown, soft, sandy	367-372
SAND	blue, dirty	372-377
CLAY	blue, sandy	377-381
ROCK	white, hard	381-383
SAND	blue, with clay lenses	383-386
SAND	blue, with rock	386-387
CLAY	blue, white, brown, with rock	387-392

135-049-15ABB

Date Completed:	1928	Purpose:	Domestic Well
L.S. Elevation (ft):	933	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Dakota Group
Screened Interval (ft):	0-386	Log Source:	

Lithologic Log - unavailable

135-049-15BBB

NDSWC 13299

Date Completed:	8/26/93	Purpose:	Observation Well
L.S. Elevation (ft):	935	Well Type:	2" PVC
Depth Drilled (ft):	320	Aquifer:	Colfax
Screened Interval (ft):	258-263	Log Source:	NDSWC

Lithologic Log

135-049-15BBB (continued)

Unit	Description	Depth (ft)
TOPSOIL	Clay loam, black.	0-2
CLAY	Clay, light olive-brown (5Y 5/6), soft, sticky, plastic, calcareous, oxidized (Lacustrine).	2-37
CLAY	Clay, olive-gray (5Y 3/2), soft, sticky, plastic, calcareous, reduced (Lacustrine).	37-55
TILL	Clay, silty, sandy, very pebbly, olive-gray, soft, calcareous; rocks at 61, 68, and 81 feet; sand and gravel at 65 to 66 feet; interbedded sand and gravel (<1 ft beds) from 72 to 76 feet; less sand and pebbles, slightly firm, slightly darker below 72 feet; occasional cobble, firm below 108 feet; sand, fine to coarse from 143 to 145 feet (Till).	55-178
SAND & GRAVEL	Sand, fine to coarse, pebbly, fine and medium, angular to subrounded, mixed mineralogy, pebbles predominantly shale; occasional interbedded clay and silt; less pebbles, predominantly shale sand by 200 feet; pebbly with cobbles from 273 to 274 feet.	178-274
CLAY	Clay, silty, very sandy, pebbly, light olive-gray (5Y 2/1), calcareous; occasional cobbles; rock at 282 feet.	274-292
SHALE	Clay, slightly silty, olive-black (5Y 2/1), firm, noncalcareous; slightly lighter color below 303 feet; silt and sand, very fine lamination below 307 feet (Bedrock).	292-320

135-049-16CDC2

Date Completed:	3/25/75	Purpose:	Domestic Well
L.S. Elevation (ft):	941	Well Type:	4" Steel
Depth Drilled (ft):	397	Aquifer:	Undefined
Screened Interval (ft):	341-356	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-23
CLAY	blue, soft	23-57
CLAY	blue, sandy	57-62
CLAY	blue, sandy, with small sand lenses	62-65
CLAY	blue, sandy, with rock	65-77
CLAY	blue, sandy	77-102
SAND LENSES & CLAY	blue	102-103
CLAY	blue, sandy	103-216
SAND	blue	216-217
CLAY	blue, sandy	217-219
SAND	blue	219-220
CLAY	blue, sandy	220-221
SAND	blue	221-222
CLAY	blue, sandy	222-341
CLAY	blue, sandy, with small sand lenses	341-347
SAND	gray, lenticular	347-352
CLAY	sandy	352-354
SAND	gray	354-356
CLAY	blue, white, colored, sandy, with shale	356-364

135-049-16CDC2 (continued)

CLAY	colored, with shale, very sandy	364-370
SHALE	brown, colored, sandy, with decomposed	370-392
PRECAMBRIAN	green, colored, decomposed	392-397

135-049-18CBD2

Date Completed:	2/25/76	Purpose:	Domestic Well
L.S. Elevation (ft):	958	Well Type:	4" Steel
Depth Drilled (ft):	119	Aquifer:	Undefined
Screened Interval (ft):	112-116	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-2
SAND	brown	2-8
CLAY	brown	8-25
CLAY	blue, soft	25-84
CLAY	blue, sandy	84-94
SAND	blue	94-99
CLAY	blue, sandy	99-111
SAND	no description	111-116
CLAY	blue, sandy	116-119

135-049-20CAB

Date Completed:	6/22/78	Purpose:	Domestic Well
L.S. Elevation (ft):	951	Well Type:	4" Steel
Depth Drilled (ft):	239	Aquifer:	Undefined
Screened Interval (ft):	227-236	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-17
CLAY	softer, brown	17-28
CLAY	softer, blue	28-72
CLAY	sandy, hard, rocky, blue	72-122
CLAY	sandy, blue	122-159
SAND	washes	159-168
CLAY	sandy, clay with lenses of sand and rock, blue	168-172
SAND	no description	172-181
SAND	drilled hard, washes slowly	181-182
CLAY	sandy, blue	182-183
SAND	fine	183-227

135-049-20CAB (continued)

SAND	little coarse	227-236
CLAY	sandy, blue	236-239

135-049-20CAB2

Date Completed:	6/20/82	Purpose:	Domestic Well
L.S. Elevation (ft):	951	Well Type:	4" PVC
Depth Drilled (ft):	231	Aquifer:	Undefined
Screened Interval (ft):	225-229	Log Source:	Falk Bros Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow	1-18
SHALE	no description	18-225
SAND	sand lens	225-229
SHALE	no description	229-231

135-049-20DDC2

Date Completed:	10/20/80	Purpose:	Domestic Well
L.S. Elevation (ft):	948	Well Type:	4" PVC
Depth Drilled (ft):	90	Aquifer:	Undefined
Screened Interval (ft):	83-87	Log Source:	Falk Bros Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
CLAY	yellow	0-12
SHALE	no description	12-78
SAND	sand lens	78-90

135-049-22CBB2

Date Completed:	1/28/83	Purpose:	Domestic Well
L.S. Elevation (ft):	944	Well Type:	4" Steel
Depth Drilled (ft):	256	Aquifer:	Undefined
Screened Interval (ft):	244-254	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	brown	0-3
SAND	silty, brown	3-7
SAND & CLAY	brown	7-22
CLAY	sand, soft, blue	22-55
CLAY	sandy, blue	55-64
CLAY	sandy, rocky, blue	64-85
CLAY	sandy, blue	85-97
CLAY	sandy clay with black lignite, black	97-119

135-049-22CBB2 (continued)

CLAY	sandy, blue	119-211
SAND	washed into very fine, light brown	211-213
CLAY	sandy, blue	213-224
SAND	brown	224-225
CLAY	sandy clay with lenses, blue	225-227
CLAY	sandy, blue	227-235
SAND	with lenses of clay, blue	235-236
CLAY	sandy, blue	236-245
CLAY	sandy clay with lenses, blue	245-247
SAND	very fine, brown	247-252
CLAY	sandy, blue	252-256

135-049-22CBB3

Date Completed:	1/28/83	Purpose:	Test Hole
L.S. Elevation (ft):	944	Well Type:	
Depth Drilled (ft):	365		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY & SAND	silty, brown	1-7
CLAY	sandy, soft, brown	7-21
CLAY	sandy, soft, blue	21-57
CLAY	sandy, blue	57-66
ROCK	no description	66-68
CLAY	sandy, blue	68-203
CLAY	sandy clay, softer, with a few lenses, blue	203-210
SAND	blue	210-211
CLAY	sandy, softer, blue	211-216
SAND	fine washed into, brown	216-218
CLAY	sandy, softer, blue	218-220
CLAY	sandy clay lenses at 222 ft, blue	220-242
ROCK	white	242-243
CLAY	sandy, blue	243-247
CLAY	sandy clay with lenses of sand washed out, blue	247-250
CLAY	sandy, blue	250-284
SAND	washed, brown	284-285
CLAY	sandy, blue	285-292
SAND	washed, blue	292-293
CLAY	sandy, blue	293-295

135-049-22CBB3 (continued)

SAND	washed, brown	295-302
CLAY	sandy, blue	302-359
SHALE	dark gray	359-365

135-049-25CDA1

Date Completed:	6/15/77	Purpose:	Test Hole
L.S. Elevation (ft):	936	Well Type:	
Depth Drilled (ft):	542		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-24
CLAY	blue	24-37
CLAY	sandy, blue	37-79
SAND	no description	79-80
CLAY	sandy, blue	80-82
SAND	no description	82-86
CLAY	sandy, blue	86-88
SAND	no description	88-90
CLAY	sandy, blue	90-107
SAND	with lenses of clay	107-110
SAND	no description	110-114
CLAY	sandy, blue	114-116
SAND	no description	116-118
CLAY	sandy, blue	118-119
SAND	no description	119-120
CLAY	sandy clay with few small lenses, blue	120-137
CLAY	sandy, blue	137-194
SAND	washed into	194-197
CLAY	sandy, blue	197-212
SAND	no description	212-213
CLAY	sandy, blue	213-327
SAND	no description	327-335
CLAY	sandy, blue	335-338
SAND	with lenses of clay	338-341
CLAY	sandy, blue	341-347
SAND	with lenses, dirty	347-356
SAND	no description	356-363
SAND	with lenses of clay	363-367

135-049-25CDA1 (continued)

CLAY	sandy, blue	367-368
SAND	with lenses	368-371
CLAY	sandy, blue	371-377
CLAY	sandy, harder, blue	377-512
CLAY	sandy, harder, and decomposed	512-542

135-049-25CDA2

Date Completed:	6/6/77	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Steel
Depth Drilled (ft):	124	Aquifer:	Undefined
Screened Interval (ft):	107-113	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-27
CLAY	blue	27-42
CLAY	sandy, blue	42-64
SAND	no description	64-68
CLAY	sandy, blue	68-96
SAND	no description	96-98
CLAY	sandy, blue	98-107
SAND	no description	107-113
CLAY	sandy, blue	113-115
CLAY	sandy clay with lenses, blue	115-118
CLAY	sandy, blue	118-119
SAND	no description	119-120
CLAY	sandy, blue	120-121
SAND	no description	121-122
CLAY	sandy, blue	122-124

135-049-30CDD

Date Completed:	1946	Purpose:	Domestic Well
L.S. Elevation (ft):	961	Well Type:	2" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-100	Log Source:	

Lithologic Log - unavailable

135-050-01CCC

NDSWC 13487

Date Completed:	9/28/95	Purpose:	Test Hole
L.S. Elevation (ft):	960	Well Type:	
Depth Drilled (ft):	312		
		Log Source:	NDSWC

Lithologic Log

135-050-01CCC (continued)

Unit	Description	Depth (ft)
TOPSOIL	loamy sand, black.	0-1
SAND	very fine and fine, oxidized.	1-4
CLAY	slightly silty, light olive brown (5Y 5/6), firm, sticky, plastic, slightly reduced.	4-33
CLAY	slightly silty, olive gray (5Y 3/2) firm, sticky, plastic, reduced; sand, very fine, silty from 50 to 51 and 56 to 57 ft (lacustrine).	33-63
CLAY	very silty, olive gray, soft, sticky, plastic; decreasing silt with depth (lacustrine).	63-102
TILL	silty, very sandy, pebbly, dark olive gray, firm; occasional cobble; rocks at 102, 110, 132 and 149 ft; sand and gravel from 122 to 124 ft (till).	102-151
SAND & GRAVEL	fine to coarse, gravel, fine, subangular to subrounded, mixed mineralogy.	151-156
TILL	silty, sandy, pebbly, olive gray, firm; sand and gravel from 183 to 186 ft; rocks at 216, 238 and 247 ft; dark olive gray, very firm by 240 ft (till).	156-302
SHALE	slightly silty, olive black (5Y 2/1), firm, sticky, plastic, noncalcareous (shale).	302-312

135-050-02CDD1

Date Completed:	9/20/89	Purpose:	Test Hole
L.S. Elevation (ft):	965	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-5
CLAY	no description	5-9
SAND	sandy, silty	9-15
CLAY	no description	15-36
CLAY	moderately soft, traces of silt, occasional 1 ft sand lenses	36-155
SANDY	still dirty	155-159
SAND	medium to fine sand, small gravel, clean (did not end at 220 ft)	159-220

135-050-02CDD2

Date Completed:	10/1/90	Purpose:	Municipal Well
L.S. Elevation (ft):	965	Well Type:	6" PVC
Depth Drilled (ft):	227	Aquifer:	Undefined
Screened Interval (ft):	195-220	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-5
CLAY	no description	5-9
SAND	silty sand	9-15
CLAY	with occasional silty sand lenses	15-155
SANDY	sandy and dirty at 155 ft	155-159
SAND	fine to medium sand; occasional drill chatter indicated coarser lenses of sand, fairly fine sands, uniform throughout; returned to clay at 226 ft	159-226

135-050-02CDD2 (continued)

CLAY	no description	226-227

135-050-03CDC

NDSWC 13486

Date Completed:	9/28/95	Purpose:	Test Hole
L.S. Elevation (ft):	1010	Well Type:	
Depth Drilled (ft):	370		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	loamy sand, black.	0-1
SAND	fine and medium, silty, oxidized.	1-6
SILT	clayey, light olive brown (5Y 5/6), soft, slightly sticky, nonplastic, oxidized.	6-9
SILT	clayey, olive gray (5Y 3/2), slightly firm, sticky, plastic, reduced; increasing clay with depth; interbedded silt and clay; sand, very fine, silty from 59 to 62 and 85 to 88 ft (lacustrine).	9-146
TILL	clay, silty, very sandy, pebbly, olive gray, firm; occasional cobble; interbedded sand and gravel, less than 1 ft beds, from 157 to 160 ft; rocks at 165, 171, 232 and 257 ft (till).	146-269
SAND & GRAVEL	mixed mineralogy, predominantly shale.	269-272
TILL	clay, silty, sandy, pebbly, olive gray, firm; very sandy, slightly firm from 282 to 292 ft; rock at 333 ft (till).	272-342
WEATHERED PRECAMBRIAN	clay, light greenish gray (5GY 8/1) soft, sticky, plastic, noncalcareous; drys to a talc-like, smooth consistency; well sorted granular quartz in return probably washed from clay; bit sample taken for x-ray diffraction analysis (wx igneous).	342-370

135-050-05AAA

NDSWC 8491

Date Completed:	9/14/72	Purpose:	Observation Well
L.S. Elevation (ft):	1027	Well Type:	1.25" ABS
Depth Drilled (ft):	120	Aquifer:	Sheyenne Delta
Screened Interval (ft):	72-75	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	silty, sandy, clay loam, dark brown	0-1
SAND	slightly silty, very fine to medium, subangular to rounded, moderately well sorted, oxidized	1-9
SILT	moderately clayey, medium gray, some thin carbonaceous laminae and light gray laminations, slightly cohesive, highly calcareous and becomes more clayey with depth	9-42
SAND	silty, clayey, very fine to fine, subrounded, moderately well sorted, lignitic, dirty	42-52
SILT	clayey, slightly sandy, medium gray, slightly cohesive, calcareous, a few lignite chips	52-70
SAND	very silty, clayey, very fine to fine, subangular to subrounded, fair sorting, dirty	70-80
CLAY	very silty to silty, olive gray, very cohesive, highly plastic, calcareous, some thin sandy silt interbeds	80-120

135-050-06ABB2

Date Completed:	10/18/78	Purpose:	Domestic Well
L.S. Elevation (ft):	1036	Well Type:	4" PVC
Depth Drilled (ft):	305	Aquifer:	Undefined
Screened Interval (ft):	270-300	Log Source:	Adair Drilling

Lithologic Log

135-050-06ABB2 (continued)

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
SAND	fine	1-100
CLAY	(till)	100-267
TILL	gravelly	267-270
SAND	fine to medium	270-273
TILL	gravelly	273-281
SAND	fine to medium	281-284
TILL	gravelly	284-297
GRAVEL	no description	297-300
GRANITE	decomposed	300-305

135-050-11CCC

NDSWC 13485

Date Completed:	9/27/95	Purpose:	Test Hole
L.S. Elevation (ft):	985	Well Type:	
Depth Drilled (ft):	390		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
SAND	very fine and fine, silty, light olive brown (5Y 5/6), oxidized.	0-6
SAND	silty, clayey, light olive brown; increasing clay with depth.	6-13
CLAY	silty, light olive gray (5Y 5/2), sticky, plastic, slightly reduced.	13-16
CLAY	slightly silty, olive gray (5Y 3/2), firm, sticky, plastic, reduced; silty, less firm at 42 ft; soft, sandy from 86 to 90 ft (lacustrine).	16-132
TILL	clay, silty, sandy, pebbly, olive gray, slightly firm; occasional cobble; very sandy and pebbly from 169 to 173 ft; rocks at 173 and 183 ft (till).	132-193
CLAY	silty, dark olive gray, firm, sticky, plastic, calcareous (lacustrine).	193-223
TILL	clay, silty, very sandy, pebbly, olive gray, slightly firm; occasional cobble; rocks at 227, 259, 298 and 383 ft; sand and gravel from 276 to 278 ft (till).	223-388
SHALE	clay, slightly silty, olive black (5Y 2/1), slightly firm, sticky, plastic, noncalcareous; waxy appearance (shale).	388-390

135-050-15DDC

NDSWC 13301

Date Completed:	8/31/93	Purpose:	Observation Well
L.S. Elevation (ft):	1010	Well Type:	1.25" PVC
Depth Drilled (ft):	417	Aquifer:	Undefined
Screened Interval (ft):	238-243	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	clay loam, black.	0-2
CLAY	slightly silty, light olive-brown (5Y 5/6), firm, slightly sticky, plastic, calcareous, oxidized (Lacustrine).	2-23
CLAY	olive-gray (5Y 3/2), soft, sticky, plastic, calcareous, reduced; very silty, very soft below 43 feet; some interbedding of clay and silt (Lacustrine).	23-144

135-050-15DDC (continued)

TILL	clay, silty, sandy, pebbly, olive-gray, soft, sticky, slightly plastic, calcareous; occasional cobbles; very pebbly from 186 to 202 feet; very sandy, firm, slightly darker from 202 to 206 feet (Till).	144-206
SAND & GRAVEL	fine and medium, pebbly, fine, subangular to rounded, mixed mineralogy.	206-208
TILL	clay, silty, very sandy, very pebbly, olive-gray to olive-black (5Y 2/1), firm, nonsticky, nonplastic, calcareous; occasional cobbles; rocks from 229 to 237 feet; occasional white return at bottom of section (Till).	208-237
SAND & GRAVEL	Sand, pebbles, cobbles, subangular and subrounded, mixed mineralogy.	237-257
TILL	clay, silty, very sandy, very pebbly, olive-gray to olive-black, firm, nonsticky, slightly plastic, calcareous (Till).	257-316
SAND	fine to coarse, granular, slightly pebbly, subangular to rounded, mixed mineralogy.	316-320
TILL	clay, silty, very sandy, very pebbly, olive-gray to olive-black, firm, nonsticky, slightly plastic, calcareous; rocks at 360, 363 and 373 feet; some white clay return from 376 to 380 feet (Till).	320-380
SAND & GRAVEL	medium and coarse, pebbly, subangular to rounded, mixed mineralogy; rock at 398 feet.	380-406
SHALE	clay, olive-black, soft, noncalcareous; waxy appearance (Bedrock).	406-417

135-050-18DCD2

Date Completed:	7/26/81	Purpose:	Domestic Well
L.S. Elevation (ft):	1042	Well Type:	4" PVC
Depth Drilled (ft):	100	Aquifer:	Undefined
Screened Interval (ft):	90-98	Log Source:	Falk Bros Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
CLAY	yellow	0-5
SHALE	no description	5-75
SAND	no description	75-100

135-050-19DDD

NDSWC 8490

Date Completed:	9/14/72	Purpose:	Observation Well
L.S. Elevation (ft):	1037	Well Type:	1.25" ABS
Depth Drilled (ft):	120	Aquifer:	Sheyenne Delta
Screened Interval (ft):	57-60	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	silty clay loam, grayish black	0-1
SILT	moderately clayey, slightly sandy, dusky yellow, slightly cohesive, oxidized	1-7
CLAY	very silty, olive gray, very cohesive, highly plastic, sticky, highly calcareous	7-32
SAND	silty, very fine to medium, mostly very fine to fine, subangular to rounded, well sorted, some lignite, occasional thin sandy, clayey silt interbeds, taking some water	32-64
SILT	clayey, sandy, medium gray, slightly cohesive, highly calcareous	64-68
SAND	silty, clayey, very fine to fine, subangular to subrounded, fair sorting, dirty	68-78
SILT	sandy, clayey, medium gray with light olive gray laminae, slightly cohesive, slightly plastic, highly calcareous	78-96
CLAY	very silty to silty, olive gray, very cohesive, highly plastic, highly calcareous	96-120

135-050-24AAA

NDSWC 13300

Date Completed:	8/30/93	Purpose:	Test Hole
L.S. Elevation (ft):	965	Well Type:	
Depth Drilled (ft):	380		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	sandy loam, black.	0-3
SAND	very fine, light olive-brown (5Y 5/6), oxidized (Windblown).	3-6
CLAY	light olive-brown, firm, oxidized (Lacustrine).	6-10
CLAY	olive-gray (5Y 3/2), firm, reduced; soft, sticky, plastic, calcareous below 30 feet (Lacustrine).	10-90
TILL	clay, silty, sandy, pebbly, olive-gray, firm; cobbles from 91 to 96 feet; rock at 97 feet (Till).	90-104
SILT	sandy, very fine, olive-gray, soft, nonsticky, nonplastic, calcareous.	104-106
CLAY	silty, very sandy, olive-gray to olive-black.	106-112
TILL	clay, silty, very sandy, pebbly, olive-gray, slightly firm, nonsticky, slightly plastic, calcareous (Till).	112-123
CLAY	very silty, very sandy, very fine, olive-gray to olive-black, soft, slightly sticky, slightly plastic, calcareous.	123-137
SAND & GRAVEL	fine to coarse, granular, pebbly, subangular to rounded, mixed mineralogy; interbedded with clay and silt.	137-143
TILL	clay, silty, very sandy, pebbly, olive-gray, slightly firm, nonsticky, nonplastic, calcareous; sand from 146 to 149 feet (Till).	143-163
CLAY	very sandy, very pebbly, olive-gray, soft; very silty, less sand, olive-gray to olive-black, calcareous, waxy appearance below 170 feet;	163-172
TILL	clay, slightly silty, slightly sandy, slightly pebbly, olive-gray, soft, clacareous; occasional cobble; waxy appearance; lighter color below 185 feet; interbedded sand and gravel (<1 ft beds) from 192 to 194 feet; numerous cobbles from 194 to 200 feet; rocks at 243, 284, 296, 306 and 313; cobbles from 330 to 340 feet (Till).	172-348
SHALE	clay, silty, sandy, very fine, medium gray (N 5); brownish-gray (5YR 4/1) below 376 feet (Bedrock).	348-380

135-050-26AAA

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	986	Well Type:	5" PVC
Depth Drilled (ft):	330	Aquifer:	Undefined
Screened Interval (ft):	300-310	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-4
CLAY	silty	4-64
SAND	fine, silty	64-85
CLAY & SAND	silty	85-167
TILL	gravelly	167-174
TILL	no description	174-251
GRAVEL	peacock	251-255
TILL	no description	255-300
SAND & GRAVEL	no description	300-330

135-050-29ABA2

Date Completed:	9/1/77	Purpose:	Domestic Well
L.S. Elevation (ft):	1038	Well Type:	4" Steel
Depth Drilled (ft):	306	Aquifer:	Undefined
Screened Interval (ft):	279-294	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SAND	surface sand, brown	0-11
CLAY	blue	11-17
SAND	silty with small amounts of clay, blue	17-137
CLAY	soft, blue	137-218
SAND	no description	218-221
CLAY	sandy, blue	221-234
SAND	with lenses of clay	234-238
CLAY	sandy, blue	238-253
SAND	no description	253-254
SAND	with lenses of clay	254-256
CLAY	sandy	256-262
SAND	no description	262-264
CLAY	sandy, blue	264-274
SAND	no description	274-278
CLAY	sandy, blue	278-279
SAND	with finer lenses	279-294
SAND	with lenses of clay	294-300
CLAY	sandy, blue	300-306

135-050-30CAD2

Date Completed:	4/7/90	Purpose:	Domestic Well
L.S. Elevation (ft):	1042	Well Type:	5" PVC
Depth Drilled (ft):	475	Aquifer:	Undefined
Screened Interval (ft):	455-475	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-3
CLAY	yellow	3-12
CLAY	gray	12-30
SAND	silty	30-130
SAND & CLAY	fine, silty	130-195
TILL		195-240
GRAVEL		240-245
TILL		245-256
GRAVEL	no description	256-259

135-050-30CAD2 (continued)

TILL	no description	259-264
GRAVEL	no description	264-269
TILL	no description	269-365
TILL	sandy	365-451
SAND & GRAVEL	no description	451-475

136-047-01CCCDBC

Date Completed:	6/1980	Purpose:	Domestic Well
L.S. Elevation (ft):	943	Well Type:	4" Stainless Steel
Depth Drilled (ft):	163	Aquifer:	Buffalo
Screened Interval (ft):	150-155	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-3
CLAY	clay, brown	3-15
CLAY	clay, blue, soft	15-61
CLAY	sandy clay, blue	61-81
SAND	sand drilled poorly, blue	81-91
CLAY	sandy clay, blue	91-122
SAND	sand drilled good, colored	122-124
CLAY	sandy clay, blue	124-129
SAND	sand, colored	129-130
CLAY	sandy clay, blue	130-134
SAND	sand, colored	134-135
CLAY	sandy clay, blue	135-141
SAND	sand, colored	141-157
CLAY	sandy clay, blue	157-163

136-047-01CCCDBD

Date Completed:	4/1971	Purpose:	Domestic Well
L.S. Elevation (ft):	946	Well Type:	4" Stainless Steel
Depth Drilled (ft):	163	Aquifer:	Buffalo
Screened Interval (ft):	155-159	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	shale, blue	1-7
CLAY	shale, brown	7-25
CLAY	shale, blue	25-58
CLAY	sandy clay, blue	58-69
CLAY	clay lensed with sand, brown	69-71

136-047-01CCCDBD (continued)

CLAY	sandy clay with rocks, blue	71-88
SAND	sand, brown	88-91
CLAY	clay, brown	91-92
SAND	sand, brown	92-94
CLAY	sandy clay with rocks, brown	94-144
SAND	sand, brown	144-162
CLAY	clay-rock, brown	162-163

136-047-19CCCDBC

Date Completed:	11/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	4" PVC
Depth Drilled (ft):	148	Aquifer:	Buffalo
Screened Interval (ft):	138-148	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, yellow	2-18
CLAY	clay, gray	18-56
TILL	till	56-65
SAND	sand (fine	65-74
TILL	till	74-79
GRAVEL	gravel (coarse)	79-81
TILL	till	81-92
GRAVEL	gravel	92-96
TILL	gravelly till	96-138
SAND	sand	138-148

136-047-22A

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	950	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-22C1

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	954	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-22C2

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	954	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-22C3

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	954	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-23DCDCAD

Date Completed:	5/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	956	Well Type:	4" Stainless Steel
Depth Drilled (ft):	145	Aquifer:	Buffalo
Screened Interval (ft):	141-145	Log Source:	Antonsen

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, yellow, soft	0-22
CLAY	clay, blue, soft	22-60
CLAY	clay, blue, hard	60-70
CLAY	clay-gravel, gray, hard	70-84
CLAY	clay, blue, hard	84-130
SAND	sand-gravel, brown, soft	130-145

136-047-26BD

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	954	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-28AAC

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	957	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-28BAADAC

Date Completed:	8/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	952	Well Type:	4" Stainless Steel
Depth Drilled (ft):	40	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	34-40	Log Source:	Falk Bros Well Drilling

Lithologic Log

136-047-28BAADAC (continued)

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	yellow clay, yellow, soft	1-18
CLAY	shale, blue, soft	18-25
SAND	sand lens, gray, soft	25-40

136-047-31DAD

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	948	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-32BCDCCC

Date Completed:	8/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	951	Well Type:	4" Stainless Steel
Depth Drilled (ft):	65	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	51-55	Log Source:	Robertson

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
SAND	sand, yellow	2-15
SAND	sand, gray	15-65
CLAY	clay, blue	65-65

136-047-32BDBCDD

Date Completed:	3/1977	Purpose:	Irrigation Well
L.S. Elevation (ft):	945	Well Type:	12" Stainless Steel
Depth Drilled (ft):	80	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	35-55	Log Source:	Traut Drilling

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, gray	2-5
SILT	sandy silt, brown	5-10
SAND	clean sand, brown	10-17
SAND	sand, gray	17-55
CLAY	clay, gray	55-59
SAND	sand, gray	59-64
CLAY	clay, gray	64-80

136-047-32BDCCDA

Date Completed:	11/1976	Purpose:	Irrigation Well
L.S. Elevation (ft):	945	Well Type:	0" Stainless Steel
Depth Drilled (ft):	60	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	32-58	Log Source:	Traut Drilling

Lithologic Log

Unit	Description	Depth (ft)
SAND	fine sand, brown	0-28
SAND	sand, gray	28-58
CLAY	clay, gray	58-60

136-047-32DCDCBB

Date Completed:	3/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	951	Well Type:	4" Stainless Steel
Depth Drilled (ft):	46	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	42-46	Log Source:	Robertson

Lithologic Log

Unit	Description	Depth (ft)
SOIL	dirt, black, soft	0-2
SAND	sand-silky, yellow, soft	2-10
SAND	sand-fine, yellow, soft	10-26
SAND	sand-coarse, gray, soft	26-46

136-047-34AAADBC

Date Completed:	10/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	963	Well Type:	5" Stainless Steel
Depth Drilled (ft):	77	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	64-72	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	sandy clay, yellow	1-3
SAND	sand, brown	3-10
CLAY	clay, gray	10-14
SAND	sand, gray	14-22
SAND	sand, gray	22-27
SAND	sand, gray	27-32
SAND	sand, gray	32-37
SAND	sand, gray	37-42
SAND	sand, gray	42-47
SAND	sand, gray	47-52
SAND	sand, gray	52-57
SAND	sand, gray	57-62

136-047-34AAADBC (continued)

SAND	sand, gray	62-67
SAND	sand, gray	67-72
SAND	sand, gray	72-77

136-047-34DAB

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	960	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

136-047-36ABADCB

Date Completed:	12/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	963	Well Type:	4" Stainless Steel
Depth Drilled (ft):	137	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	sandy clay, brown	2-3
CLAY	clay, gray	3-6
CLAY	clay, brown	6-12
CLAY	clay, blue, soft	12-52
CLAY	clay, blue, hard	52-60
CLAY	sandy clay, blue	60-123
SAND	fine sand, mixture	123-129
SAND	fine sand, mixture	129-132
SAND	sand with clay lenses, blue	132-137

136-048-01AADBAA

Date Completed:	11/1986	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	155	Aquifer:	Buffalo
Screened Interval (ft):	150-155	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-26
CLAY	clay, blue	26-61
CLAY	sandy clay, blue	61-66
CLAY	sandy clay, blue	66-79
BOULDERS	rock	79-80
CLAY	sandy clay, blue	80-120

136-048-01AADBAA (continued)

SAND	sand, gray	120-155

136-048-03DCDBCA

Date Completed:	7/1989	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	107	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	88-93	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, brown	1-32
CLAY	clay, blue	32-67
SAND	sand, colored	67-75
CLAY	sandy clay, colored	75-77
SAND	sand, colored	77-79
SAND	lenses of sand	79-82
SAND	sand, colored	82-92
CLAY	sandy clay w-lenses, colored	92-95
CLAY	sandy clay, gray	95-107

136-048-04ABAACB

Date Completed:	5/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	167	Aquifer:	Buffalo
Screened Interval (ft):	151-157	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-30
CLAY	sandy clay, blue, soft	30-57
CLAY	sandy clay, blue	57-120
SAND	sand, colored	120-123
CLAY	sandy clay + sand lenses, blue	123-125
CLAY	sandy clay, blue	125-138
SAND	sand, colored	138-142
SAND	sand drilled fair, colored	142-157
SAND	sand drilled fair, colored	157-167

136-048-07BBD

Date Completed:	10/25/83	Purpose:	Domestic Well
L.S. Elevation (ft):	922	Well Type:	4" PVC
Depth Drilled (ft):	170	Aquifer:	Undefined
Screened Interval (ft):	160-170	Log Source:	Wieber Drilling

136-048-07BBD (continued)

Lithologic Log

Unit	Description	Depth (ft)
SOIL	heavy, black	0-1
CLAY	hard, very clay	1-20
CLAY	soft, spongy, water loss bad	20-40
CLAY	blue	40-60
CLAY	hard	60-150
SAND	nice sand, gravel	150-160
GRAVEL	nice sand	160-170

136-048-07DCCDDB

Date Completed:	7/1985	Purpose:	Domestic Well
L.S. Elevation (ft):	919	Well Type:	4" Stainless Steel
Depth Drilled (ft):	111	Aquifer:	Undefined
Screened Interval (ft):	96-101	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-30
SAND	sand, brown	30-38
CLAY	sandy clay, gray	38-64
GRAVEL	gravel, colored	64-66
CLAY	sandy clay, gray	66-79
SAND	sand, colored	79-111

136-048-10CCCABC

Date Completed:	4/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	227	Aquifer:	Undefined
Screened Interval (ft):	211-221	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, gray	2-3
CLAY	clay, brown	3-47
CLAY	clay, blue	47-52
CLAY	sandy clay, blue	52-132
SAND	sand fine, varied color	132-134
CLAY	sandy clay, blue	134-193
CLAY	sandy clay shale, white-blue	193-204
CLAY	shale, brown -white	204-211

136-048-10CCCABC (continued)

SHALE	shale with sand took water, white	211-225
WEATHERED PRECAMBRIAN	shale decompose granite, green-red	225-227

136-048-12DADDCA

Date Completed:	2/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	931	Well Type:	4" Stainless Steel
Depth Drilled (ft):	59	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	55-59	Log Source:	Antonsen

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, yellow, soft	0-26
CLAY	clay, blue, soft	26-44
GRAVEL	gravel, gray, hard	44-59

136-048-17CABCCD

Date Completed:	12/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	920	Well Type:	4" Stainless Steel
Depth Drilled (ft):	219	Aquifer:	Undefined
Screened Interval (ft):	208-216	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, brown	1-32
CLAY	clay, blue	32-56
CLAY	sandy clay, gray	56-70
SAND	sand, colored	70-77
CLAY	sandy clay, gray	77-120
SAND	sand, gray	120-122
CLAY	sandy clay, gray	122-207
SAND	sand, gray	207-214
BOULDERS	rock, black	214-215
WEATHERED PRECAMBRIAN	decomposed, white	215-219

136-048-18ABBBAA

Date Completed:	5/1985	Purpose:	Domestic Well
L.S. Elevation (ft):	921	Well Type:	4" Stainless Steel
Depth Drilled (ft):	122	Aquifer:	Undefined
Screened Interval (ft):	106-110	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-3

136-048-18ABBBAA (continued)

CLAY	soft clay, brown, soft	3-32
CLAY	soft clay, blue, soft	32-47
GRAVEL	lenses of gravel + clay, colored	47-51
CLAY	sandy clay, blue	51-83
GRAVEL	sand + gravel, colored	83-88
CLAY	sandy clay w-small lenses of sand, blue	88-91
SAND	sand + gravel, colored	91-100
GRAVEL	dirty gravel w-lenses of clay, colored	100-105
SAND	sand + gravel, colored	105-111
SAND	sand + gravel w-lenses of clay, colored	111-122

136-048-19DDD

NDSWC 3108

Date Completed:	6/15/64	Purpose:	Test Hole
L.S. Elevation (ft):	930	Well Type:	
Depth Drilled (ft):	255		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
SILT	grayish orange, clay, cohesive, calcareous, oxidized	1-28
SILT	olive gray, clay, cohesive, calcareous, with a layer of sand up to 1/4 mm, predominantly quartz with shale and limestone	28-57
TILL	light olive gray, clay through gravel, quartz, limestone, granite with some lignite and shale, very sandy, highly calcareous, cohesive, soft, quite gravelly and rocky at 69-97 feet	57-97
TILL	olive gray to olive black, clay through gravel, shale, quartz, limestone and granite, fairly solid, cohesive, calcareous, not rocky	97-112
GRAVEL	up to 22 mm, very angular chips to well rounded, granite, limestone, shale and quartz with lignite and one wood fragment	112-125
TILL	light olive to olive gray, clay through gravel, sandy, quartz, limestone and granite with some shale and lignite, cohesive, highly calcareous, gets lighter and more gravelly with depth	125-184
TILL	olive gray, clay through gravel, quartz, limestone, shale and granite with lignite fragments, cohesive, calcareous	184-220
SILT	light olive and olive gray, brownish and olive black, clayey, laminae, lignitic, organic, non-calcareous	220-225
WEATHERED GRANITE	pale yellowish brown, clay, silt and sand, predominantly silt, with clay and quartz, sand grains, mottled with highly oxidized colors, non-calcareous, grayish yellow green areas appear	225-255

136-048-25DDBCDA

Date Completed:	11/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	942	Well Type:	4" Stainless Steel
Depth Drilled (ft):	155	Aquifer:	Buffalo
Screened Interval (ft):	147-152	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-1

136-048-25DDBCDA (continued)

CLAY	clay, brown	1-10
CLAY	clay, blue	10-28
SAND	sand #8 #10, colored	28-57
SAND	sand drilled coarse #100 took wat	57-64
CLAY	sandy clay, gray, hard	64-135
SAND	sand drilled poor, colored	135-142
SAND	sand drilled better #8, colored	142-152
CLAY	sandy clay, gray	152-155

136-048-26BBABDB

Date Completed:	11/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	931	Well Type:	4" Stainless Steel
Depth Drilled (ft):	134	Aquifer:	Buffalo
Screened Interval (ft):	117-125	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-3
CLAY	clay, brown	3-24
CLAY	clay, gray	24-68
CLAY	sandy clay, gray	68-115
SAND	sand, colored	115-125
SAND	sand very fine, colored	125-134

136-048-27BCABAB

Date Completed:	6/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	930	Well Type:	4" Stainless Steel
Depth Drilled (ft):	60	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	54-60	Log Source:	Falk Bros Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-18
CLAY	clay, blue, medium hardness	18-54
SAND	sand lens, white, medium hardness	54-60

136-048-28CBA

Date Completed:	10/23/81	Purpose:	Municipal Well
L.S. Elevation (ft):	926	Well Type:	8" Steel
Depth Drilled (ft):	182	Aquifer:	Undefined
Screened Interval (ft):	143-173	Log Source:	Wolverton clerk

Lithologic Log

136-048-28CBA (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-42
CLAY	blue	42-55
TILL	no description	55-78
SAND	fine	78-85
TILL	no description	85-132
SAND	fine	132-167
SAND	12 slot	167-173
SAND	with clay	173-177
CLAY	sandy, with shale	177-182

136-048-29CBB2

NDSWC 12911

Date Completed:	10/8/91	Purpose:	Test Hole
L.S. Elevation (ft):	929	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, soft, smooth, very plastic (oxidized lake clay)	2-21
CLAY	gray, soft, smooth, very plastic (lake clay)	21-57
CLAY	very sandy, silty, pebbly, soft, light gray, moderately plastic (till)	57-74
GRAVEL	fine to coarse, angular to subrounded, some sand, predominantly carbonates with some quartz, granitics and shale, some clay layers 84 to 87 feet	74-87
CLAY	very sandy, silty, pebbly, light gray, soft, moderately plastic (till)	87-103
CLAY	dark gray, plastic, moderately soft to moderately firm, plastic with occasional grains of sand and pebbles included (unusual till)	103-120
SAND & GRAVEL	sand medium to coarse gravel, fine, mostly quartz with carbonates and shale, rocks at 123 to 124 feet	120-124
CLAY	very sandy, silty, pebbly, light gray, soft, moderately plastic, firmer with depth (till)	124-201
CLAY	silty, and silt, clayey, dark gray, some light streaks, darker grays, more clayey and firmer, lighter grays, softer and more silt, micaceous, very slightly plastic (bedrock)	201-220

136-048-30BBB

NDSWC 12330

Date Completed:	6/28/83	Purpose:	Observation Well
L.S. Elevation (ft):	925.1	Well Type:	1.25" PVC
Depth Drilled (ft):	185	Aquifer:	Horace
Screened Interval (ft):	178-183	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, oxidized, iron-stained, plastic, sticky	1-23

136-048-30BBB (continued)

CLAY	olive gray, slightly silty, plastic, sticky, cohesive (lake clays)	23-44
CLAY	olive gray, silty, sandy with pebbles, rocky, poorly sorted (till)	44-71
SAND	very fine to medium, some coarse, predominantly quartz, some shales,, limestones, and igneous, 20% lignites, well rounded to subrounded, good sorting, drills clean, taking water	71-103
SAND	fine to coarse, appears layered with clay	103-123
GRAVEL	1/2 pea sized to 1/2 inch, with medium to very coarse gravel, drills choppy, taking water, predominantly igneous with minor amounts of limestone and coal, well rounded to subrounded	123-151
GRAVEL	pea to marble size, well rounded to subrounded, drilling real choppy and rough, taking water, also coarse to very coarse, sand mixed in, extremely rocky from 180 feet on	151-185

136-048-31AAA

Date Completed:	1/1954	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-72	Log Source:	

Lithologic Log - unavailable

136-048-31AAAD1

NDSWC 12904

Date Completed:	10/2/91	Purpose:	Test Hole
L.S. Elevation (ft):	923	Well Type:	
Depth Drilled (ft):	250		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, soft, smooth, very plastic (oxidized lake clay)	2-26
CLAY	gray, soft, smooth, very plastic (lake clay)	26-44
CLAY	very sandy, silty, pebbly, gray, firm, slightly plastic, rocks at 48 feet (till)	44-52
SAND & GRAVEL	sand, fine to coarse, gravel, fine to medium, angular to subrounded, some very coarse gravel	52-69
CLAY	very sandy, silty, pebbly, light gray, soft, slightly plastic, slight brownish tint, rock at 92 feet (till)	69-99
GRAVEL	medium to coarse, angular to subrounded, carbonates and shale	99-101
CLAY	sandy, silty, pebbly, gray, soft, very sandy, rock at 104 feet (till)	101-104
CLAY	silty, occasional pebbles, dark gray, firm, some small mica flakes, some of that unusual till, looks like lacustrine or fluvial clay, but has sand grains in it (till)	104-119
ROCK	granite	119-120
CLAY	very sandy, silty, pebbly, light gray, soft, moderately plastic, firmer and less plastic with depth, very few rocks, only a few at 220 feet (till)	120-223
CLAY	slightly silty, light gray to light brownish gray, soft, smooth, some mica flakes, occasional whitish-gray areas, some layers medium to dark gray, firmer, and shiny, occasional rattle (bedrock)	223-243
CLAY	white, with quartz grains (weathered Precambrian)	243-250

136-048-31DDD

NDSWC 12908

Date Completed:	10/3/91	Purpose:	Observation Well
L.S. Elevation (ft):	930.87	Well Type:	2" PVC
Depth Drilled (ft):	400	Aquifer:	Undefined
Screened Interval (ft):	325-330	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow-brown, soft, smooth, plastic, (oxidized lake clay)	2-26
CLAY	gray, soft, smooth, plastic (lake clay)	26-51
CLAY	sandy, silty, pebbly, not, much sample return (till)	51-53
SAND & GRAVEL	dirty, poorly sorted	53-55
CLAY	silty, sandy, gray, stiff (till)	55-60
CLAY	very sandy, silty, pebbly, gray, to light gray (slight brown color) soft fairly plastic (till)	60-78
CLAY	sandy, silty, lots of pebbles, gray, fairly stiff, rocks and gravel at 101 feet	78-103
SAND & GRAVEL	poorly sorted, dirty, predominanlty shale	103-107
CLAY	sandy, silty, very pebbly, gray, fairly stiff, rock at 112 feet, a lot of very coarse gravel sized material, rocks at 117 and 187 feet	107-290
SAND & GRAVEL	sand, fine to coarse, gravel, fine, predominantly shale with 30-40% carbonates and shale, 10% quartz, dirty, poorly sorted, clay layers, one clay layer 307-309 feet	290-315
CLAY	virtually no sample return, drills like gravelly, sandy till	315-327
SAND & GRAVEL	and clay, fine sand to medium gravel, as above, except there is some green (Precambrian?) material	327-338
CLAY	virtually no sample return, drills like gravelly, sandy, till (many small layers of sand and/or gravel) a few relatively soft clay pieces	338-398
CLAY	green with angular sand particles included (weathered Precambrian)	398-400

136-048-32CDD

NDSWC 12901

Date Completed:	9/25/91	Purpose:	Test Hole
L.S. Elevation (ft):	932	Well Type:	
Depth Drilled (ft):	40		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	soft, smooth, plastic, yellow-brown, (oxidized lake clay)	2-22
CLAY	gray, soft, smooth, plastic	22-40

136-048-36BBABCD

Date Completed:	6/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Stainless Steel
Depth Drilled (ft):	134	Aquifer:	Buffalo
Screened Interval (ft):	128-134	Log Source:	LTP Enterprises, Inc

Lithologic Log

136-048-36BBABCD (continued)

Unit	Description	Depth (ft)
SOIL	top soil, black	0-3
CLAY	sandy clay, brown	3-11
CLAY	clay, brown	11-32
CLAY	clay, gray	32-68
ROCK	rock, colored	68-69
CLAY	sandy clay, gray	69-78
CLAY	clay, gray	78-121
SAND	sand, colored	121-134

136-049-02ABB

NDSWC 12293

Date Completed:	12/7/82	Purpose:	Observation Well
L.S. Elevation (ft):	922	Well Type:	1.25" PVC
Depth Drilled (ft):	240	Aquifer:	Horace
Screened Interval (ft):	138-143	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, oxidized, cohesive, very plastic; becomes silty around 15 feet.	2-26
CLAY	olive-gray, cohesive, plastic; silty to 35 feet and again at 40 feet (lacustrine).	26-57
CLAY	olive-gray, sandy, gravelly; probably till.	57-60
CLAY	as above.	60-67
TILL	olive-gray, silty, pebbly, cohesive, slightly plastic; interbedded gravel.	67-75
TILL	medium gray, sandy, cohesive, slightly brittle; interbedded gravel.	75-107
SAND & GRAVEL	coarse sand to medium gravel, predominantly very coarse sand, angular to rounded, predominantly subangular, quartz with some carbonate; coarser from 112 to 120 feet.	107-190
GRAVEL	fine to coarse, predominantly medium, angular to rounded, predominantly subrounded and rounded, increasing carbonates; rougher below 200 feet.	190-236
BEDROCK	weathered crystalline bedrock, greenish clay and quartz grains.	236-240

136-049-03CCC2

Date Completed:	4/3/84	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Steel
Depth Drilled (ft):	117	Aquifer:	Horace
Screened Interval (ft):	107-112	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-4
CLAY	brown	4-23
CLAY	gray	23-62
CLAY	sandy, gray	62-86
SAND	gray	86-112

136-049-03CCC2 (continued)

CLAY	gray	112-117

136-049-03CCD

NDSWC 12331

Date Completed:	6/28/83	Purpose:	Observation Well
L.S. Elevation (ft):	923.7	Well Type:	1.25" PVC
Depth Drilled (ft):	220	Aquifer:	Horace
Screened Interval (ft):	198-203	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, oxidized, slightly silty, plastic, sticky, cohesive; iron stained (lake clay).	2-21
CLAY	olive-gray, plastic, sticky, cohesive, slightly silty (lake clay).	21-55
CLAY	olive-gray, silty, sandy, with pebbles, rocky, poorly sorted; interbedded shale sand and gravel (till).	55-68
SAND	medium to very coarse, rounded to subrounded, predominantly quartz with minor amounts of carbonate, lignite and igneous, fair sorting; taking water.	68-101
GRAVEL	pea size with medium to coarse sand, some .5 to 1 inch fragments of gravel, rounded to subrounded; probably interbedded gravel and sand; taking water.	101-180
GRAVEL	marble size, extremely rocky; lost circulation, hole collasped.	180-220

136-049-05CBA1

Date Completed:	10/23/72	Purpose:	Test Hole
L.S. Elevation (ft):	921	Well Type:	
Depth Drilled (ft):	236		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	gray	1-5
CLAY	tan, soft	5-17
CLAY	blue, soft	17-41
CLAY	blue, soft	41-71
CLAY	blue, hard, sandy	71-86
CLAY	blue, hard, sandy	86-101
CLAY	blue, hard, sandy	101-115
SAND	brown	115-116
CLAY	blue, hard, sandy	116-127
CLAY	blue, sand lenses	127-136
CLAY	blue, hard, sandy	136-138
CLAY	blue, hard, sandy	138-146
CLAY	blue, hard, sandy	146-161
CLAY	blue, hard, sandy	161-188

136-049-05CBA1 (continued)

CLAY	blue, boulder, hard, sandy	188-191
CLAY	blue, white, hard, sandy	191-221
CLAY	white, green, hard, sandy	221-236

136-049-05CBA2

Date Completed:	10/25/72	Purpose:	Domestic Well
L.S. Elevation (ft):	921	Well Type:	4" Steel
Depth Drilled (ft):	131	Aquifer:	Undefined
Screened Interval (ft):	123-131	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	tan, soft	1-26
CLAY	blue, soft	26-56
CLAY	blue, hard, sandy	56-71
CLAY	blue, hard, sandy	71-86
CLAY	blue, hard, sandy	86-101
CLAY	blue, hard, sandy	101-106
SAND	blue	106-107
CLAY	blue, hard, sandy	107-116
CLAY	blue, hard, sandy	116-120
SAND	brown, lenticular	120-128
CLAY	blue, hard, sandy	128-131

136-049-06BAB

Date Completed:	1910	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	6" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-78.4	Log Source:	

Lithologic Log - unavailable

136-049-08BBB

NDSWC 13298

Date Completed:	8/25/93	Purpose:	Test Hole
L.S. Elevation (ft):	925	Well Type:	
Depth Drilled (ft):	230		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	Clay loam, black.	0-2
CLAY	Clay, light olive-gray (5Y 5/2), firm, slightly sticky, plastic, calcareous, oxidized; iron stained; grayish-olive (10Y 4/2), slightly reduced from 30 to 44 feet (Lacustrine).	2-44
CLAY	Clay, olive-gray (5Y 3/2), firm, slightly sticky, plastic, calcareous, reduced; very fine laminations (Lacustrine).	44-68

136-049-08BBB (continued)

TILL	Clay, silty, sandy, pebbly, olive-gray, firm, calcareous; very sandy, very pebbly from 68 to 71 feet; interbedded sand (<1 ft beds) from 88 to 92 feet; rock at 96 feet; very pebbly from 96 to 99 feet (Till).	68-99
TILL	Clay, silty, very sandy, pebbly, olive-gray, slightly firm, calcareous; occasional cobble; sand, fine and medium from 155 to 158 feet; interbedded sand (<1 ft beds) from 178 to 180 feet; firm below 203 feet (Till).	99-208
SHALE	Clay, slightly silty,, olive-black (5Y 2/1), firm, nonsticky, plastic, noncalcareous; waxy appearance (Shale).	208-230

136-049-12BBB

NDSWC 3980

Date Completed:	6/4/70	Purpose:	Observation Well
L.S. Elevation (ft):	926.2	Well Type:	1.25" ABS
Depth Drilled (ft):	230	Aquifer:	Horace
Screened Interval (ft):	160-180	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	sandy clay loam, black.	0-2
SILT	dusky yellow, soft, slightly cohesive, nonplastic, oxidized.	2-11
CLAY	dusky yellow to yellowish-brown, soft, cohesive, plastic, smooth, oxidized.	11-25
CLAY	silty, moderate olive-brown, soft, moderately cohesive, slightly to moderately plastic, oxidized.	25-34
SAND	fine and medium with some coarse, reddish-yellowish-brown, subrounded, mostly quartz and igneous with carbonate, iron stained, oxidized; interbedded.	34-68
CLAY	very sandy with occasional pebbles, light olive-gray to olive-gray, moderately soft, cohesive, gritty (till).	68-76
SAND	fine, light olive-gray, loose, sorted, subrounded, quartz and carbonate with little shale and occasional lignite flakes.	76-85
CLAY	very sandy, as above, light olive-gray to olive-gray (till).	85-89
SAND	fine sand to fine gravel, predominantly medium and coarse sand, yellowish-gray, loose, angular to subrounded; interbedded; looks partially oxidized or iron stained.	89-208
CLAY	sandy, dark brownish-gray, soft, cohesive, sticky, oily.	208-211
BOULDER	white and green granite, partially decomposed.	211-213
CLAY	clay, greenish-white, soft, chalk like, noncalcareous (weathered granite).	213-217
CLAY	as above with partially decomposed granite boulders.	217-229
GRANITE	pink and white, unaltered.	229-230

136-049-13DDD

NDSWC 12909

Date Completed:	10/7/91	Purpose:	Test Hole
L.S. Elevation (ft):	923	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, soft, smooth, very plastic (oxidized lake clay)	2-23
CLAY	gray, soft, smooth, very plastic (lake clay)	23-45

136-049-13DDD (continued)

SAND	very little sample return	45-47
CLAY	silty, very little sample return	47-50
SAND	fine to medium, some coarse, fairly clean and well sorted	50-61
TILL	clay, very silty, very sandy, some pebbles, gray, moderately firm, very little plasticity	61-68
TILL	clay, very sandy, silty, pebbly, light gray to gray, moderately soft, slightly plastic	68-89
TILL	clay, silty, occasional sand or pebbles, gray to dark gray, slightly micaceous, stiff, slight plasticity	89-98
SILT	clayey, gray, slightly micaceous, soft, slightly plastic, some layers more clayey, some layers have fine sand	98-124
SAND	fine to coarse, dirty, poorly sorted	124-126
TILL	clay, very sandy, silty, pebbly, light gray, soft, slightly plastic, becomes stiffer with depth	126-184
TILL	clay, silty, sandy, pebbly, gray, firm	184-202
TILL	clay, very sandy, silty, pebbly, light gray, moderately firm, slightly plastic	202-208
CLAY	silty, dark gray, firm, moderately plastic (bedrock)	208-216
PRECAMBRIAN	clay, weathered, greenish white, some sand grains	216-220

136-049-19CCA

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	934	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-170	Log Source:	

Lithologic Log - unavailable

136-049-19CCA2

Date Completed:	5/20/90	Purpose:	Domestic Well
L.S. Elevation (ft):	934	Well Type:	4" PVC
Depth Drilled (ft):	180	Aquifer:	Undefined
Screened Interval (ft):	160-175	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-6
CLAY	gray, some small sand lenses	6-44
GRAVEL	lense	44-52
CLAY	soft	52-110
ROCK	hard, lense, rock chips	110-112
CLAY	back into clay	112-120
CLAY	brown, fairly stiff	120-155
SAND	turning sandy	155-160
SAND	clean, coarse, sand, flint size, nice formations	160-180

136-049-21AAA

Date Completed:	6/15/84	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Steel
Depth Drilled (ft):	87	Aquifer:	Undefined
Screened Interval (ft):	82-87	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-4
CLAY	brown	4-41
CLAY	gray	41-63
SAND	colored	63-64
CLAY	sandy, gray	64-69
SAND	colored	69-70
CLAY	sandy, gray	70-77
SAND	colored	77-78
CLAY	sandy, gray	78-81
SAND	colored	81-87

136-049-22DDC

NDSWC 12329

Date Completed:	6/28/83	Purpose:	Test Hole
L.S. Elevation (ft):	930	Well Type:	
Depth Drilled (ft):	230		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, silty, oxidized, iron stained, plastic, cohesive, soft (lake clay).	1-23
CLAY	olive-gray, plastic, soft, cohesive (lake clay).	23-54
CLAY	olive-gray, silty, sandy with pebbles, rocky; interbedded fine quartz sand from 87 to 88 and 210 to 211 feet (till).	54-213
CLAY	gray to black, greasy, soft, plastic, smears, small whitish flakes; white, pink and green clay, shale and weathered granite at 225 feet (bedrock).	213-230

136-049-23DDC2

Date Completed:	12/20/91	Purpose:	Municipal Well
L.S. Elevation (ft):	926	Well Type:	8" PVC
Depth Drilled (ft):	127	Aquifer:	Horace
Screened Interval (ft):	108-123	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	8 inch topsoil, stiff brown clay	0-20
CLAY	brown, stiff	20-28
CLAY	blue	28-40
SHALE	medium to coarse	40-51

136-049-23DDC2 (continued)

GRAVEL	dirty	51-60
ROCKS	hard ledge	60-62
SAND & GRAVEL	medium to coarse	62-82
CLAY	mixed with gravel	82-86
CLAY GRAVEL	dirty clay gravel	86-92
SAND & GRAVEL	clean, medium to coarse	92-127

136-049-24CCC1

NDSWC 12328

Date Completed:	6/23/83	Purpose:	Observation Well
L.S. Elevation (ft):	923.7	Well Type:	1.25" PVC
Depth Drilled (ft):	258	Aquifer:	Horace
Screened Interval (ft):	178-181	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	fill.	0-2
CLAY	yellow-brown, oxidized, iron stained, slightly silty (lake clay).	2-24
CLAY	olive-gray, plastic, cohesive (lake clay).	24-54
CLAY	olive-gray, silty, sandy with pebbles, poorly sorted (till).	54-57
SAND	medium to coarse with gravel, predominantly quartz and carbonate with shale and igneous, subrounded and rounded, fair sorting; taking alot of water.	57-225
GRAVEL	pea size to .5 to 1 inch with coarse and very coarse sand, rounded, composition as above; taking alot of water.	225-257
CLAY	no return.	257-258

136-049-26BAA

NDSWC 12327

Date Completed:	6/22/83	Purpose:	Observation Well
L.S. Elevation (ft):	927	Well Type:	1.25" PVC
Depth Drilled (ft):	240	Aquifer:	Horace
Screened Interval (ft):	93-98	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, oxidized, iron stained (lake clay).	1-31
CLAY	olive-gray, plastic, cohesive (lake clay).	31-53
CLAY	silty, sandy with pebbles, olive-gray, poorly sorted (till).	53-61
GRAVEL	fine to .5 inch grains with medium to coarse sand, subrounded and rounded, poor sorting, predominantly quartz with carbonate, shale and igneous.	61-73
TILL	as above.	73-75
GRAVEL	as above; taking water.	75-101
TILL	as above; interbedded gravel from 107 to 131 feet.	101-158
SILT	olive-gray, clayey; poor return.	158-164
TILL	olive-gray, rocky.	164-222

136-049-26BAA (continued)

CLAY	black, greasy, occasional bentonite flake, some greenish shaley clay (bedrock).	222-240

136-049-28ABA

NDSWC 3112

Date Completed:	6/18/64	Purpose:	Test Hole
L.S. Elevation (ft):	925	Well Type:	
Depth Drilled (ft):	320		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black.	0-1
SILT	moderate yellowish-brown, clayey, cohesive, gypsum crystals, calcareous, oxidized; laminae.	1-25
SILT	olive-gray, clayey, cohesive, calcareous; occasional light colored laminae.	25-54
TILL	olive-gray, clay through gravel, silty, very soft, cohesive, highly calcareous, shale, quartz, carbonate and lignite; less silty and firm by 60 feet; shale gravel more abundant with depth; shaley after 72 feet.	54-100
TILL	light olive-gray, clay through gravel, sandy, quartz, carbonate and igneous, highly calcareous with gravel, up to 15 mm, angular to rounded, carbonate, igneous, quartz, shale and lignite.	100-125
TILL	light olive-gray, clay through gravel, sandy, quartz, carbonate, igneous with occasional shale and lignite, highly calcareous, slightly cohesive.	125-140
TILL	light olive-gray to olive-gray, clay through gravel, occasionally very sandy, quartz, carbonate, shale (in darker till), igneous with some lignite, cohesive, highly calcareous.	140-157
TILL	olive-gray, clay through gravel, silty, sandy, quartz, shale, carbonate, igneous some lignite, cohesive, tough, highly calcareous	157-170
SILT	olive-gray, clayey, sandy, very soft, calcareous; poor return.	170-193
TILL	olive-gray, clay through gravel, quartz, shale, carbonate, igneous and lignite fragments, highly calcareous, tough, solid.	193-283
NO RETURN	probably till, as above, soft.	283-310
WEATHERED GRANITE	pale blue-green, sandy clay, abundant quartz to grayish-blue-green, sandy clay with abundant angular igneous fragments and quartz sand.	310-320

136-049-29ADD1

Date Completed:	4/28/87	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" PVC
Depth Drilled (ft):	171	Aquifer:	Undefined
Screened Interval (ft):	154-162	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	sandy, brown	1-38
CLAY	sandy, blue	38-59
CLAY	sandy, blue	59-80
SAND	brown	80-82
CLAY	sandy, blue	82-134
SAND	gray	134-139
CLAY	sandy, blue	139-154

136-049-29ADD1 (continued)

SAND	gray	154-162
CLAY	sandy, blue	162-171

136-049-29ADD2

Date Completed:	4/29/87	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" PVC
Depth Drilled (ft):	167	Aquifer:	Undefined
Screened Interval (ft):	152-161	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	sandy, brown	1-32
CLAY	sandy, blue	32-60
CLAY	sandy, blue	60-66
ROCK	no description	66-68
CLAY	sandy, blue	68-132
SAND	no description	132-134
CLAY	sandy, blue	134-148
SAND	gray	148-150
CLAY	sandy clay with small rocks, blue	150-152
SAND	green and colored	152-161
CLAY	sandy, blue	161-167

136-049-30BBB

NDSWC 3109

Date Completed:	6/16/64	Purpose:	Test Hole
L.S. Elevation (ft):	934	Well Type:	
Depth Drilled (ft):	295		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
SILT	moderate yellowish-brown, clayey, cohesive, calcareous, oxidized; laminae.	1-14
SAND	up to .5 mm, clayey, unsorted, varied composition, abundant quartz and carbonate, oxidized; very dirty.	14-15
SILT	as above, oxidized.	15-17
SAND	as above, oxidized.	17-20
SILT	as above, oxidized; less clay with depth.	20-37
SILT	olive-gray, clayey below 45 feet, cohesive, calcareous; occasional laminae.	37-60
TILL	olive-gray, clay through gravel, soft, cohesive, shale, carbonate, quartz and igneous, calcareous.	60-77
TILL	olive-gray, clay through gravel, solid, tough, shale, carbonate, quartz, igneous, calcareous; rocky and gravelly from 107 to 114 feet.	77-144

136-049-30BBB (continued)

TILL	olive-gray to light olive-gray, clay through gravel, sandy, predominantly quartz and carbonate some igneous, shale, and lignite, highly calcareous.	144-157
TILL	olive-gray, clay through gravel, sandy, shale, carbonate, quartz, and igneous, calcareous, solid, cohesive.	157-258
SILT	olive and brownish-gray, with clay and very fine sand, lignite fragments and black organic material, cohesive, noncalcareous; laminae.	258-278
CLAY	yellowish-gray, sandy, abundant quartz grains, noncalcareous; white by 290 feet with pyritized veins (weathered granite).	278-295

136-049-31CCC2

Date Completed:	6/27/84	Purpose:	Domestic Well
L.S. Elevation (ft):	939	Well Type:	4" PVC
Depth Drilled (ft):	99	Aquifer:	Undefined
Screened Interval (ft):	80-86	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	soft, brown	1-33
CLAY	soft, blue	33-79
CLAY	sandy, blue	79-81
SAND	coarse, colored	81-86
CLAY	sandy, blue	86-99

136-049-34DCB

Date Completed:	5/24/83	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Steel
Depth Drilled (ft):	97	Aquifer:	Undefined
Screened Interval (ft):	87-92	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown	3-14
CLAY	sandy, brown	14-27
CLAY	blue	27-55
CLAY	sandy, blue	55-57
SAND	colored	57-58
CLAY	sandy, blue	58-66
SAND	fine to coarse, colored	66-97

136-050-05CCA2

Date Completed:	12/16/86	Purpose:	Test Hole
L.S. Elevation (ft):	951	Well Type:	
Depth Drilled (ft):	203		
		Log Source:	Lako Drilling

Lithologic Log

136-050-05CCA2 (continued)

Unit	Description	Depth (ft)
SAND	brown	0-24
SAND	fine, dirty, gray	24-38
CLAY	soft, gray	38-112
TILL	soft	112-179
SAND & CLAY	layers of sand and clay	179-203

136-050-07CAC2

Date Completed:	1/8/93	Purpose:	Domestic Well
L.S. Elevation (ft):	953	Well Type:	4" PVC
Depth Drilled (ft):	216	Aquifer:	Undefined
Screened Interval (ft):	204-212	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-33
CLAY	blue	33-101
CLAY	blue, sandy, hard	101-147
CLAY	colored, blue, sandy, with lenses	147-196
SAND	colored	196-212
SHALE	no description	212-216

136-050-10BBC

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	942	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-150	Log Source:	

Lithologic Log - unavailable

136-050-15CBB2

Date Completed:	10/23/85	Purpose:	Domestic Well
L.S. Elevation (ft):	944	Well Type:	4" PVC
Depth Drilled (ft):	153	Aquifer:	Undefined
Screened Interval (ft):	143-153	Log Source:	Wieber Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow, mixed small stones	2-65
CLAY	blue, soft	65-108
CLAY	hard	108-135
SAND	strips of sand mixed with clay	135-153

136-050-16CDD

Date Completed:	6/25/79	Purpose:	Domestic Well
L.S. Elevation (ft):	953	Well Type:	4" Steel
Depth Drilled (ft):	209	Aquifer:	Undefined
Screened Interval (ft):	196-202	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	sandy, black	0-2
SAND	brown	2-8
CLAY	brown	8-26
CLAY	soft, blue	26-94
CLAY	sandy, blue	94-98
CLAY	soft, blue	98-105
CLAY	sandy, blue	105-160
SAND	colored	160-161
CLAY	sandy, blue	161-162
SAND	colored	162-165
CLAY	sandy, blue	165-166
SAND	colored	166-168
CLAY	sandy, blue	168-175
SAND	colored	175-176
CLAY	sandy, blue	176-191
SAND	colored	191-203
SAND	with lenses of clay, blue	203-204
SAND	colored	204-205
CLAY	sandy, blue	205-209

136-050-18DDB2

Date Completed:	7/11/88	Purpose:	Domestic Well
L.S. Elevation (ft):	1014	Well Type:	4" PVC
Depth Drilled (ft):	287	Aquifer:	Undefined
Screened Interval (ft):	276-286	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
SAND	brown	2-10
CLAY	brown	10-20
CLAY	gray	20-174
ROCKS	no description	174-176
CLAY	gray	176-274
GRAVEL	medium	274-286
CLAY	gray	286-287

136-050-19CCC

NDSWC 2179

Date Completed:	9/10/63	Purpose:	Observation Well
L.S. Elevation (ft):	1035	Well Type:	1.25" ABS
Depth Drilled (ft):	434	Aquifer:	Sheyenne Delta
Screened Interval (ft):	20-40	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
SAND	very fine to fine, predominantly subangular and subrounded quartz with carbonate and dark grains.	0-7
SILT	moderate yellowish-brown, clayey with very fine sand, cohesive, oxidized, calcareous; laminated; apparent very pale orange carbonate cemented sand, may have been in sand above.	7-9
SILT	olive-gray, clayey and cohesive to sandy and noncohesive, very fine sand predominantly angular quartz some mica, lignite, shale and carbonate; clayey silt more predominant around 100 feet.	9-172
TILL	olive-gray, clay through gravel, cohesive, shale, carbonate and quartz, calcareous, seems to contain numerous rocks; some cuttings predominantly silty clay with few sand grains.	172-203
TILL	light olive-gray, silt through gravel, very sandy, crumbly, highly calcareous, abundant carbonate some shale and quartz with sand to medium gravel, angular to rounded, abundant carbonate, with shale, quartz, igneous some lignite fragments.	203-245
GRAVEL	fine and medium, composition varied, predominantly carbonate and igneous some shale, quartz, lignite and pyrite, rounded with many angular fragments of boulders.	245-267
TILL	olive-gray, clay through gravel, quite sandy, hard, numerous rocks, shale and carbonate, calcareous, cohesive; some cuttings very silty.	267-387
SILT	dusky yellowish-brown, with very fine and fine sand, hard, crumbly, highly calcareous, seems to contain a few rocks; probably till.	387-410
TILL	olive-gray, clay through gravel, tough, shale, carbonate and igneous, highly calcareous.	410-424
BEDROCK	altered weathered granite, light greenish-gray to white, calcareous, clear quartz grains, greenish particles, slightly cohesive, fragile.	424-434

136-050-21AAD

NDSWC 3110

Date Completed:	6/16/64	Purpose:	Test Hole
L.S. Elevation (ft):	954	Well Type:	
Depth Drilled (ft):	105		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
SAND	dusky yellowish-brown, very fine to .75 mm, predominantly .25 mm, rounded, quartz with carbonate and igneous, oxidized, very loose.	0-7
SILT	dark yellowish-brown, clayey, sandy, noncalcareous; few samples; possible buried soil horizon.	7-8
SILT	moderate to dark yellowish-orange, clayey, sandy, calcareous, oxidized; similar to above.	8-10
SILT	grayish to dark yellowish-orange, cohesive, calcareous, oxidized; drier with depth; silty clay at 20 feet; clay at 25 feet.	10-32
CLAY AND SILT	silty clay, olive-gray, cohesive, calcareous to clayey silt, light olive-gray, cohesive, calcareous, partially oxidized to clayey silt, olive-gray, cohesive, calcareous.	32-60
SILT	as above, quite sandy; poor return.	60-72
SILT	olive-gray, very clayey, cohesive, calcareous.	72-88
TILL	olive-gray, clay through sand, cohesive, shale, carbonate, quartz and igneous, calcareous, soft.	88-105

136-050-35BBD1

Date Completed:	10/21/80	Purpose:	Test Hole
L.S. Elevation (ft):	953	Well Type:	
Depth Drilled (ft):	412		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, brown	2-12
SAND	fine, brown	12-15
CLAY	sandy, soft, blue	15-97
CLAY	sandy, blue	97-142
GRAVEL	lenses gravel, clay and rock, colored and gray	142-148
CLAY	sandy, gray	148-203
SAND	no description	203-204
CLAY	sandy, gray	204-247
CLAY	sandy, very sandy, soft, gray	247-380
CLAY	sandy clay, small lenses, gray	380-382
CLAY	sandy clay, very sandy, soft, gray	382-412

136-050-35BBD2

Date Completed:	10/23/80	Purpose:	Domestic Well
L.S. Elevation (ft):	953	Well Type:	4" PVC
Depth Drilled (ft):	109	Aquifer:	Undefined
Screened Interval (ft):	104-109	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
SAND	silty	2-12
SAND	no description	12-15
CLAY	soft, blue	15-99
CLAY	sandy, gray	99-103
SAND	no description	103-109

136-050-35CCB

Date Completed:	8/25/72	Purpose:	Municipal Well
L.S. Elevation (ft):	963	Well Type:	8" Steel
Depth Drilled (ft):	223	Aquifer:	Undefined
Screened Interval (ft):	207-217	Log Source:	Layne Minnesota Co

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-16

136-050-35CCB (continued)

CLAY	gray, silty	16-101
CLAY	gray, rock seams	101-111
CLAY	gray, rock seams and pebbles	111-128
SAND	muddy, fine	128-132
CLAY	sandy, hard, rock seams	132-173
CLAY	sandy, softer, boulders	173-193
SAND	coarse to medium rocks	193-207
SAND & GRAVEL	rocks	207-217
CLAY	gray, boulders	217-223

136-050-35DBC1

Date Completed:	12/1985	Purpose:	Domestic Well
L.S. Elevation (ft):	955	Well Type:	4" PVC
Depth Drilled (ft):	110	Aquifer:	Undefined
Screened Interval (ft):	100-110	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	silty, sand	1-50
CLAY	no description	50-95
GRAVEL	coarse, (small boulders)	95-110

136-050-35DBC2

Date Completed:	12/1985	Purpose:	Domestic Well
L.S. Elevation (ft):	955	Well Type:	4" PVC
Depth Drilled (ft):	108	Aquifer:	Undefined
Screened Interval (ft):	98-108	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-10
CLAY	silty, sand	10-43
CLAY	no description	43-96
GRAVEL	coarse, (small boulders)	96-108

137-047-01ABCADD

Date Completed:	10/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Stainless Steel
Depth Drilled (ft):	119	Aquifer:	Undefined
Screened Interval (ft):	113-119	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1

137-047-01ABCADD (continued)

CLAY	clay, yellow, soft	1-16
CLAY	clay, blue, soft	16-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-63
CLAY	clay + stones, gray, varied hardness	63-80
CLAY	clay + stones, gray, varied hardness	80-100
SAND	sand, gray, soft	100-111
SAND	water sand, gray, soft	111-119

137-047-01ADBCCA

Date Completed:	5/1922	Purpose:	Industrial Well
L.S. Elevation (ft):	936	Well Type:	6"
Depth Drilled (ft):	120	Aquifer:	Undefined
Screened Interval (ft):	0-0	Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil + sand	0-8
CLAY	clay, yellow	8-20
CLAY	shale, blue	20-60
GRAVEL	gravel	60-67
SAND	sand rock + hard shale	67-115
SAND	water bearing sand	115-120

137-047-01ADCBBC

Date Completed:	11/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	4" Stainless Steel
Depth Drilled (ft):	109	Aquifer:	Undefined
Screened Interval (ft):	103-109	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TILL	no description	0-109

137-047-03BAAAAC

Date Completed:	6/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	930	Well Type:	5" Stainless Steel
Depth Drilled (ft):	181	Aquifer:	Buffalo
Screened Interval (ft):	171-180	Log Source:	Olson Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, blue, soft	0-90
CLAY	clay + stones, blue, hard	90-155
SAND	silty sand, gray, soft	155-160

137-047-03BAAAAC (continued)

SAND	sand, gray, soft	160-180
CLAY	clay, blue, soft	180-181

137-047-05ACDDCA

Date Completed:	12/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	922	Well Type:	4" Stainless Steel
Depth Drilled (ft):	173	Aquifer:	Buffalo
Screened Interval (ft):	161-173	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-3
CLAY	clay, brown, soft	3-12
CLAY	clay, blue, soft	12-93
CLAY	clay + rocks, gray, medium hardness	93-111
SAND	sand	111-130
CLAY	clay + stones, gray, medium hardness	130-161
GRAVEL	gravel + shale, gray, soft	161-162
SAND	sand	162-173

137-047-06AAAADD

Date Completed:	10/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	4" Stainless Steel
Depth Drilled (ft):	170	Aquifer:	Buffalo
Screened Interval (ft):	164-170	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-38
SAND	silty fine sand, gray, soft	38-98
CLAY	clay + boulders, gray, medium hardness	98-130
SAND	silty fine sand, gray, soft	130-140
CLAY	clay + boulders, gray, medium hardness	140-158
SAND	clean coarse sand, gray, soft	158-170

137-047-06CDDDAA

Date Completed:	4/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	198	Aquifer:	Undefined
Screened Interval (ft):	192-198	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1

137-047-06CDDDAA (continued)

CLAY	clay, yellow, soft	1-19
CLAY	clay, blue, soft	19-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-90
CLAY	clay, blue, soft	90-116
CLAY	clay + stones, gray, varied hardness	116-130
CLAY	clay + stones, gray, varied hardness	130-150
CLAY	clay + stones, gray, varied hardness	150-180
CLAY	clay + stones, gray, varied hardness	180-191
SAND	fine to medium sand, gray, soft	191-198

137-047-06CDDDAB

Date Completed:	10/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	186	Aquifer:	Buffalo
Screened Interval (ft):	176-182	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown, soft	2-21
CLAY	clay, blue, soft	21-87
CLAY	sandy clay, blue	87-94
SAND	sand drilled dirty	94-99
CLAY	sandy clay, blue	99-163
SAND	sand	163-182
WEATHERED PRECAMBRIAN	sandy clay with some decomposed, blue	182-186

137-047-08DCDDCA

Date Completed:	4/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	167	Aquifer:	Buffalo
Screened Interval (ft):	153-157	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown	2-22
CLAY	clay, blue	22-57
SAND	sand, gray	57-77
CLAY	silty clay, gray	77-90
CLAY	sandy clay, gray	90-106

137-047-08DCDDCA (continued)

SAND	sand with clay lenses, gray	106-110
CLAY	sandy clay, gray	110-115
SAND	sand, colored	115-117
CLAY	sandy clay, gray	117-123
SAND	sand, colored	123-127
CLAY	sandy clay with sand lenses, gray colored	127-130
SAND	sand, colored	130-137
CLAY	sandy clay, gray	137-139
SAND	sand, brown	139-142
CLAY	sandy clay, gray	142-144
SAND	sand, brown	144-145
CLAY	sandy clay, gray	145-146
SAND	sand, brown	146-162
SAND	sand, brown	162-167

137-047-10DBDCBC

Date Completed:	12/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	127	Aquifer:	Buffalo
Screened Interval (ft):	121-127	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-11
CLAY	clay, blue, soft	11-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-78
CLAY	clay + stones, gray, medium hardness	78-100
CLAY	clay + stones, gray, medium hardness	100-119
SAND	sand + gravel, gray, soft	119-127

137-047-12CBABCD

Date Completed:	5/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Stainless Steel
Depth Drilled (ft):	162	Aquifer:	Undefined
Screened Interval (ft):	156-162	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-9
CLAY	clay, gray, soft	9-18

137-047-12CBABCD (continued)

CLAY	clay, blue, soft	18-64
CLAY	clay and stones, gray, medium hardness	64-155
SAND	sand + gravel, gray, soft	155-162

137-047-14BAAADB

Date Completed:	8/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Stainless Steel
Depth Drilled (ft):	176	Aquifer:	Buffalo
Screened Interval (ft):	170-176	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, dark yellow, soft	1-15
CLAY	clay, blue, soft	15-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-90
CLAY	clay & stones, gray, medium hardness	90-116
BOULDERS	boulder, hard	116-118
CLAY	clay & stones, gray, medium hardness	118-135
SAND	silty fine sand, gray, soft	135-147
SAND	fine sand, gray, soft	147-163
SAND	fine to coarse sand, gray, soft	163-176

137-047-15AAADAD

Date Completed:	8/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	929	Well Type:	4" Stainless Steel
Depth Drilled (ft):	121	Aquifer:	Buffalo
Screened Interval (ft):	109-121	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-14
CLAY	clay, blue, soft	14-73
CLAY	clay + stones, gray, medium hardness	73-99
GRAVEL	gravel, varied color, medium hardness	99-100
CLAY	clay + stones, medium hardness	100-102
BOULDERS	boulders, varied color, hard	102-104
CLAY	clay stones, medium hardness	104-106
SAND	medium water sand clean, gray, soft	106-121

137-047-16AABDBA

Date Completed:	11/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	80	Aquifer:	Buffalo (shallow)
Screened Interval (ft):	72-80	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, yellow, soft	2-19
CLAY	clay, gray, soft	19-48
BOULDERS	rock, hard	48-50
CLAY	clay + stone, gray, medium hardness	50-70
SAND	sand + gravel, gray, soft	70-80

137-047-16BAACBD

Date Completed:	9/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" Stainless Steel
Depth Drilled (ft):	199	Aquifer:	Undefined
Screened Interval (ft):	194-199	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-14
CLAY	clay, blue, soft	14-45
SAND	quick sand, gray, soft	45-60
CLAY	clay + stones, gray, medium hardness	60-104
SAND	sand, black, soft	104-109
CLAY	clay + stones, gray, medium hardness	109-117
SAND	medium sand, gray, soft	117-119
CLAY	clay + stones, gray, medium hardness	119-130
SAND	medium sand, gray, medium hardness	130-132
CLAY	clay + stones, gray, medium hardness	132-183
SAND	dirty sand, gray, soft	183-187
CLAY	clay + stones, gray, medium hardness	187-194
SAND	sand medium clean, gray, soft	194-199

137-047-17BCD

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	934	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

137-047-18BAAAAC

Date Completed:	5/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" Stainless Steel
Depth Drilled (ft):	190	Aquifer:	Buffalo
Screened Interval (ft):	184-190	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, brown, soft	2-12
CLAY	clay, yellow, soft	12-21
CLAY	clay, blue, soft	21-45
SAND	dirty silty sand, gray, soft	45-91
CLAY	clay, gray, medium hardness	91-135
CLAY	clay	135-179
SAND	clean coarse sand, gray, soft	179-190

137-047-18DADDBC

Date Completed:	7/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Stainless Steel
Depth Drilled (ft):	177	Aquifer:	Buffalo
Screened Interval (ft):	168-172	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown, soft	2-20
CLAY	clay, blue, soft	20-50
SAND	silty fine sand, gray	50-87
CLAY	sandy clay, gray	87-145
SAND	lenses of sand and clay, gray	145-147
SAND	sand with small lenses, varied color	147-152
SAND	#8 sand drilled fair, varied color	152-177

137-047-20BABBDB

Date Completed:	9/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	935	Well Type:	4" Stainless Steel
Depth Drilled (ft):	150	Aquifer:	Buffalo
Screened Interval (ft):	144-150	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-7
SAND	sand, yellow, soft	7-10
CLAY	clay, yellow, hard	10-16

137-047-20BABBDB (continued)

CLAY	clay, blue, soft	16-20
SAND	silty fine sand, blue, soft	20-90
CLAY	clay + stones, gray, medium hard	90-130
SAND	fine to coarse sand, gray, soft	130-150

137-047-21CCBCAC

Date Completed:	12/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	157	Aquifer:	Buffalo
Screened Interval (ft):	146-151	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown, soft	2-27
CLAY	clay, blue, soft	27-77
CLAY	sandy clay, blue	77-100
SAND	sand drilled poor, blue	100-102
CLAY	sandy clay, blue	102-112
SAND	sand, blue	112-114
CLAY	sandy clay, blue	114-116
SAND	sand, blue	116-117
CLAY	sandy clay, blue	117-120
SAND	sand, blue	120-121
CLAY	sandy clay, blue	121-122
SAND	sand with lenses of clay, gray	122-125
SAND	sand drilled good, varied color	125-157

137-047-23DAACCC

Date Completed:	5/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	931	Well Type:	4" Stainless Steel
Depth Drilled (ft):	209	Aquifer:	Undefined
Screened Interval (ft):	203-209	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, yellow, soft	2-12
CLAY	clay, blue, soft	12-93
CLAY	clay + stones, gray, medium hard	93-139
BOULDERS	boulder, very hard	139-140
CLAY	clay + stones, gray, medium hard	140-198
SAND	medium coarse water sand, gray, soft	198-209

137-047-24BDCCDB

Date Completed:	4/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" Stainless Steel
Depth Drilled (ft):	177	Aquifer:	Buffalo
Screened Interval (ft):	171-177	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-14
CLAY	clay, blue, soft	14-30
CLAY	clay, blue, soft	30-55
CLAY	clay, gray, varied hardness	55-75
CLAY	clay, gray, varied hardness	75-95
CLAY	clay, gray, soft	95-120
CLAY	clay, gray, medium hardness	120-140
SAND	silty fine sand, gray, soft	140-150
SAND	silty fine sand, gray, soft	150-165
BOULDERS	boulder, hard	165-166
SAND	fine to coarse sand, gray, soft	166-177

137-047-30BAABAC

Date Completed:	6/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	145	Aquifer:	Buffalo
Screened Interval (ft):	139-145	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-4
CLAY	clay, yellow, soft	4-21
CLAY	clay, blue, soft	21-88
CLAY	clay + boulders, gray, medium hardness	88-130
SAND	clean white sand, white, soft	130-145

137-047-31BAABAC

Date Completed:	11/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" Stainless Steel
Depth Drilled (ft):	152	Aquifer:	Buffalo
Screened Interval (ft):	146-152	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, yellow, soft	2-19

137-047-31BAABAC (continued)

CLAY	clay, gray, soft	19-92
CLAY	clay, gray, medium hardness	92-128
SAND	quick sand, gray, soft	128-137
CLAY	clay, gray, medium hardness	137-148
SAND	clean coarse sand, gray, soft	148-152

137-047-32BAAABC

Date Completed:	10/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	144	Aquifer:	Buffalo
Screened Interval (ft):	139-144	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-11
CLAY	clay, blue, soft	11-77
CLAY	clay + boulders, gray, medium hardness	77-125
SAND	clean coarse sand, gray, soft	125-144

137-047-35ABBCAD

Date Completed:	6/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	940	Well Type:	4" Stainless Steel
Depth Drilled (ft):	100	Aquifer:	Buffalo
Screened Interval (ft):	91-100	Log Source:	Olson Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, blue, soft	0-70
CLAY	clay, blue, hard	70-75
SAND	sand, gray, soft	75-77
CLAY	clay, blue, soft	77-85
SAND	sand, gray, soft	85-100
SAND	sand, gray, soft	100-100

137-048-02CBBDDA

Date Completed:	2/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	916	Well Type:	4" Stainless Steel
Depth Drilled (ft):	162	Aquifer:	Buffalo
Screened Interval (ft):	148-154	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown	2-23

137-048-02CBBDDA (continued)

CLAY	clay, blue, soft	23-72
CLAY	sandy clay, blue	72-82
CLAY	sandy clay with lenses of sand, blue	82-85
CLAY	sandy clay, blue	85-88
SAND	sand	88-91
CLAY	sandy clay, blue	91-99
CLAY	sandy clay with gravel, blue	99-117
CLAY	sandy clay with gravel, blue, very hard	117-118
SAND	sand	118-120
BOULDERS	rock	120-121
CLAY	sandy clay, blue	121-122
SAND	dirty sand	122-125
CLAY	sandy clay, blue	125-126
SAND	sand	126-127
CLAY	sandy clay, blue	127-128
SAND	sand	128-162

137-048-06AAACDA

Date Completed:	6/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	4" Stainless Steel
Depth Drilled (ft):	87	Aquifer:	Undefined
Screened Interval (ft):	79-84	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, gray	2-4
CLAY	clay, brown	4-25
CLAY	clay, blue	25-72
CLAY	sandy clay, blue	72-77
SAND	sand, colored	77-84
CLAY	clay, blue	84-87

137-048-06BCB

Date Completed:	4/8/87	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" PVC
Depth Drilled (ft):	167	Aquifer:	Undefined
Screened Interval (ft):	159-164	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
CLAY	sandy, brown	0-28
CLAY	sandy, blue	28-75

137-048-06BCB (continued)

SAND	gray	75-76
CLAY	sandy, blue	76-93
SAND	gray	93-95
CLAY	sand clay, blue	95-127
SAND	gray	127-132
CLAY	sandy, blue	132-153
SAND	gray	153-156
CLAY	sandy, blue	156-157
SAND	gray	157-164
CLAY	sandy, blue	164-167

137-048-06DBA2

Date Completed:	9/10/73	Purpose:	Test Hole
L.S. Elevation (ft):	898	Well Type:	
Depth Drilled (ft):	165		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-37
CLAY	blue	37-62
CLAY	sandy, gray	62-146
SAND	colored	146-156
DECOMPOSED	green/white	156-165

137-048-06DBC

Date Completed:	4/27/72	Purpose:	Domestic Well
L.S. Elevation (ft):	899	Well Type:	4" Steel
Depth Drilled (ft):	163	Aquifer:	Undefined
Screened Interval (ft):	78-82	Log Source:	

Lithologic Log - unavailable

137-048-06DBCD

Date Completed:	9/10/74	Purpose:	Test Hole
L.S. Elevation (ft):	898	Well Type:	
Depth Drilled (ft):	147		
		Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-32
CLAY	soft, blue	32-50
CLAY	sandy, blue	50-52

137-048-06DBCD (continued)

SAND	with gravel and rock, colored	52-54
CLAY	sandy, rock, lenses of sand, blue	54-70
CLAY	sandy, hard, boulders, blue	70-109
SAND	blue	109-113
SHALE	blue, black	113-115
SHALE	blue	115-142
DECOMPOSED	with shale, blue, black, brown, green	142-147

137-048-06DCBA

Date Completed:	9/10/74	Purpose:	Test Hole
L.S. Elevation (ft):	898	Well Type:	
Depth Drilled (ft):	172		
		Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	dark brown	3-10
CLAY	soft, brown	10-25
SHALE	soft, blue	25-53
CLAY	sandy, with small rocks, blue	53-68
CLAY	sandy, with thin lenses of sand, blue	68-74
SAND	blue	74-77
CLAY	sandy, blue	77-132
SHALE	sticky, blue	132-146
GRANITE	weathered, white, green	146-158
GRANITE	black	158-172

137-048-08BCBBDD

Date Completed:	11/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	914	Well Type:	4" Stainless Steel
Depth Drilled (ft):	155	Aquifer:	Buffalo
Screened Interval (ft):	147-152	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-5
CLAY	clay, brown	5-25
CLAY	clay, gray	25-57
SAND	sand, varied color	57-60
CLAY	sandy clay, gray	60-119
SAND	sand, varied color	119-120
CLAY	sandy clay, gray	120-136

137-048-08BCBBDD (continued)

SAND	sand, varied color	136-152
WEATHERED PRECAMBRIAN	decomposed, green	152-155

137-048-12CCCCCA

Date Completed:	9/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	920	Well Type:	4" Stainless Steel
Depth Drilled (ft):	150	Aquifer:	Buffalo
Screened Interval (ft):	137-141	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown	2-5
CLAY	clay, brown	5-9
CLAY	clay, blue	9-75
CLAY	sandy clay, gray	75-126
SAND	sand, colored	126-133
SAND	sand with rock, colored	133-135
SAND	sand, colored	135-141
BOULDERS	rock, black	141-142
SAND	sand, colored	142-146
SAND	lenses of sand	146-150

137-048-14BCBBAC

Date Completed:	6/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	921	Well Type:	4" Stainless Steel
Depth Drilled (ft):	158	Aquifer:	Buffalo
Screened Interval (ft):	152-158	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-29
CLAY	clay, gray, soft	29-64
CLAY	clay and stones, gray, soft	64-117
SAND	fine clean sand, gray, soft	117-139
SAND	coarse clean sand, gray, soft	139-158

137-048-14CDCDBA

Date Completed:	10/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	921	Well Type:	4" Stainless Steel
Depth Drilled (ft):	152	Aquifer:	Buffalo
Screened Interval (ft):	146-152	Log Source:	Paasch

Lithologic Log

137-048-14CDCDBA (continued)

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, light gray, soft	2-9
CLAY	clay, yellow, soft	9-31
CLAY	clay, blue, soft	31-65
CLAY	clay + stones, gray, medium hardness	65-75
SAND	silty fine sand, gray, soft	75-79
CLAY	clay + stones, gray, medium hardness	79-83
SAND	clean medium sand, gray, soft	83-85
CLAY	clay + stones, gray, medium hardness	85-122
SAND	clean medium sand, gray, soft	122-152

137-048-17ABBCCD

Date Completed:	8/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	915	Well Type:	4" Stainless Steel
Depth Drilled (ft):	95	Aquifer:	Buffalo
Screened Interval (ft):	86-95	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, dark brown , soft	1-6
CLAY	lighter brown clay, light brown, soft	6-30
CLAY	clay, gray, soft	30-58
CLAY	clay and stones, gray, soft	58-84
SAND	clean medium to coarse sand, gray, soft	84-95

137-048-21CDCAAA

Date Completed:	8/1968	Purpose:	Municipal Well
L.S. Elevation (ft):	921	Well Type:	10" Steel
Depth Drilled (ft):	147	Aquifer:	Buffalo
Screened Interval (ft):	101-137	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-3
CLAY	shale, yellow	3-24
CLAY	shale, gray	24-32
CLAY	shale, blue	32-61
CLAY	clay, blue	61-67
SAND	sand, brown	67-68
CLAY	clay, blue	68-73
CLAY	clay with 3 sand lenses, brown	73-77

137-048-21CDCAAA (continued)

CLAY	clay, blue	77-88
CLAY	sandy clay, blue	88-99
GRAVEL	dirty gravel, brown	99-101
SAND	sand + gravel, varied color	101-107
CLAY	clay, blue	107-114
SAND	sand, blue	114-120
CLAY	clay, blue	120-125
SAND	sand	125-126
CLAY	clay, blue	126-129
SAND	sand, blue	129-137
WEATHERED PRECAMBRIAN	decomposed granite, green	137-147

137-048-21CDDAAA

Date Completed:	4/1951	Purpose:	Industrial Well
L.S. Elevation (ft):	920	Well Type:	6" Other
Depth Drilled (ft):	139	Aquifer:	Buffalo
Screened Interval (ft):	134-139	Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, black	0-6
CLAY	clay, yellow	6-10
CLAY	clay, light blue	10-65
CLAY	hardpan	65-126
SAND	sand, white	126-139

137-048-21DCB

Date Completed:	1973	Purpose:	Municipal Well
L.S. Elevation (ft):	920	Well Type:	4" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-137	Log Source:	

Lithologic Log - unavailable

137-048-23DDCCCB

Date Completed:	5/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	136	Aquifer:	Buffalo
Screened Interval (ft):	130-136	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-23
CLAY	clay, gray, soft	23-50

137-048-23DDCCCB (continued)

CLAY	sandy clay, gray, soft	50-52
CLAY	clay and stones, gray, soft	52-100
CLAY	clay and stones, gray, soft	100-114
BOULDERS	boulder, hard	114-116
SAND	sand, gray, soft	116-136

137-048-25BBBBDB

Date Completed:	11/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	152	Aquifer:	Buffalo
Screened Interval (ft):	144-150	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, brown, soft	1-26
CLAY	clay, gray, soft	26-104
CLAY	clay and stones, gray, soft	104-121
CLAY	clay and sand, gray, soft	121-137
SAND	clean coarse sand, gray, soft	137-150
CLAY	clay, gray, soft	150-152

137-048-27ABACBB

Date Completed:	6/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	923	Well Type:	4" Stainless Steel
Depth Drilled (ft):	122	Aquifer:	Buffalo
Screened Interval (ft):	103-107	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown	2-33
CLAY	clay, blue	33-64
SAND	sand, gray	64-66
CLAY	sandy clay, blue	66-89
SAND	sand, gray	89-122

137-048-34AABBAC

Date Completed:	11/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	137	Aquifer:	Buffalo
Screened Interval (ft):	125-129	Log Source:	LTP Enterprises, Inc

Lithologic Log

137-048-34AABBAC (continued)

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-2
CLAY	clay, brown	2-14
CLAY	clay, gray	14-26
CLAY	clay, blue	26-60
CLAY	sandy clay with small lenses sand, blue	60-63
CLAY	sandy clay, gray	63-100
BOULDERS	rock	100-102
CLAY	sandy clay, gray	102-112
SAND	sand, gray	112-113
CLAY	sandy clay, gray	113-119
SAND	sand, gray	119-120
SAND	sand, gray	120-129
CLAY	sandy clay, gray	129-137

137-049-01BBC

Date Completed:	3/3/93	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" PVC
Depth Drilled (ft):	255	Aquifer:	Undefined
Screened Interval (ft):	233-251	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	gray	2-9
CLAY	brown	9-20
CLAY	soft, blue	20-71
CLAY	with gravel and a trace of shale, blue	71-93
ROCK	black	93-94
CLAY	with gravel, blue	94-200
CLAY	sandy, with lenses, blue	200-212
SAND	dirty, fine, gray	212-215
CLAY	blue	215-222
SAND	gray	222-224
SAND	dirty, with lenses, gray	224-231
SAND	gray	231-250
GRANITE	weathered with clay, green	250-255

137-049-02ADB

Date Completed:	1950	Purpose:	Domestic Well
L.S. Elevation (ft):	908	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-190	Log Source:	

Lithologic Log - unavailable

137-049-03BAA1

Date Completed:	0/0	Purpose:	Test Hole
L.S. Elevation (ft):	909	Well Type:	
Depth Drilled (ft):	247		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	gray	1-6
CLAY	brown	6-17
CLAY	blue, soft	17-69
CLAY	blue, sandy, with gravel	69-100
SAND	dirty, fine	100-107
CLAY	blue, sandy	107-116
SAND	no description	116-117
CLAY	blue, sandy, with sand lenses	117-127
SAND	colored, coarse	127-128
CLAY	blue, sandy, with rock	128-129
CLAY	blue, sandy, with gravel	129-130
GRAVEL	no description	130-131
CLAY	blue, sandy	131-132
SAND & GRAVEL	with small clay lenses	132-152
SAND	finer	152-187
SAND	coarser, dirtier	187-192
SAND	with dirty sand lenses	192-198
SAND	no description	198-209
CLAY	blue, sandy	209-212
SAND	dirty, with clay lenses	212-219
SAND	no description	219-221
SAND	dirty	221-224
SAND	no description	224-227
SAND	dirty	227-228
SAND	no description	228-232
CLAY	blue, sandy	232-233
SAND	no description	233-247

137-049-03BAA2

Date Completed:	9/3/75	Purpose:	Municipal Well
L.S. Elevation (ft):	909	Well Type:	10" Steel
Depth Drilled (ft):	262	Aquifer:	West Fargo South
Screened Interval (ft):	168-182	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	gray	1-3
CLAY	brown	3-16
SHALE	blue	16-21
CLAY	blue, sandy, with rock	21-71
CLAY	blue, sandy	71-75
SAND	no description	75-77
CLAY	blue, sandy, with gravel	77-79
SAND	no description	79-81
CLAY	blue, sand, with gravel	81-83
SAND	no description	83-85
CLAY	blue, sandy, with gravel	85-92
SAND	with clay lenses	92-102
CLAY	blue, sandy, with gravel	102-104
SAND	no description	104-105
CLAY	blue, sandy, with gravel	105-109
CLAY	blue, sandy, sand lenses	109-112
CLAY	blue, sandy	112-113
SAND	dirty	113-117
CLAY	blue, sandy	117-144
SAND	coarse	144-151
CLAY	blue	151-152
SAND	dirty	152-157
CLAY	blue, sandy	157-160
SAND	fine	160-216
SAND	with clay lenses	216-217
SAND	dirty, coarser	217-222
SAND	dirtier	222-230
SAND	dirty	230-239
SAND	dirty	239-255
SAND	dirty, with clay lenses	255-256
SAND	no description	256-257
CLAY	blue, sandy, hard	257-262

137-049-03BAD2

Date Completed:	9/5/75	Purpose:	Municipal Well
L.S. Elevation (ft):	909	Well Type:	10" Steel
Depth Drilled (ft):	272	Aquifer:	West Fargo South
Screened Interval (ft):	217-257	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	gray	1-6
CLAY	brown, soft	6-14
CLAY	blue, soft	14-21
CLAY	brown, soft	21-36
CLAY	blue, soft	36-69
SAND	colored, coarse	69-71
CLAY	blue, sandy, with gravel	71-97
CLAY	blue, sandy, with sand lenses	97-103
SAND	with small clay lenses	103-104
SAND	with clay lenses	104-112
CLAY	blue, sandy	112-115
SAND	no description	115-116
CLAY	blue, sandy	116-121
SAND	dirty, with clay lenses	121-127
SAND	no description	127-134
CLAY	blue, very sandy	134-160
SAND	no description	160-167
CLAY	sandy, with rock	167-169
SAND	coarse	169-182
SAND	no description	182-192
SAND	blue, with clay lenses	192-201
SAND	blue, fine	201-240
SAND	with clay lenses	240-251
CLAY	blue, sandy	251-252
SAND	blue, with clay lenses	252-265
SAND	blue	265-272

137-049-03BCB

Date Completed:	6/10/77	Purpose:	Test Hole
L.S. Elevation (ft):	910	Well Type:	
Depth Drilled (ft):	252		
		Log Source:	Hickok & Associates

Lithologic Log

137-049-03BCB

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, brown	2-66
CLAY	silty, dark black brown	66-88
SAND & GRAVEL	brown gray, fine to medium, subangular to subrounded	88-94
CLAY	silty, dark black brown, silty clay interbedded	94-243
GRANITE	weathered, greenish-white	243-252

137-049-03BDA

Date Completed:	9/24/75	Purpose:	Test Hole
L.S. Elevation (ft):	910	Well Type:	
Depth Drilled (ft):	237		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-16
CLAY	blue, soft	16-70
CLAY	blue, sandy, with rock & sand lenses	70-77
CLAY	blue, sandy, with rock	77-100
SAND	blue	100-103
CLAY	blue, sandy	103-106
SAND	blue	106-112
CLAY	blue, sandy	112-113
SAND	blue, fine, silty	113-209
SAND	blue	209-237

137-049-03BDD

Date Completed:	6/5/78	Purpose:	Observation Well
L.S. Elevation (ft):	910	Well Type:	4" PVC
Depth Drilled (ft):	224	Aquifer:	West Fargo South
Screened Interval (ft):	0-224	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-24
CLAY	blue, soft	24-27
CLAY	brown, soft	27-33
CLAY	blue, soft	33-68
CLAY	blue, hard, sandy, rocky	68-74
CLAY	blue, hard, sandy	74-78

137-049-03BDD (continued)

BOULDER	red, granite	78-79
CLAY	blue, hard, sandy, rocky	79-90
SAND	gray	90-93
CLAY	blue, sandy	93-95
SAND	gray	95-113
CLAY	blue, sandy	113-114
SAND	gray	114-152
SAND	gray, coarser	152-167
SAND	gray, with clay layers	167-197
SAND	gray, clean	197-212
CLAY	blue, hard, sandy	212-215
SAND	gray	215-217
BOULDER	red	217-219
CLAY	blue, hard, sandy, boulders	219-224

137-049-03BDD2

Date Completed:	10/12/78	Purpose:	Municipal Well
L.S. Elevation (ft):	910	Well Type:	10" Steel
Depth Drilled (ft):	262	Aquifer:	West Fargo South
Screened Interval (ft):	212-252	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-24
CLAY	blue, soft	24-68
CLAY	blue, sandy	68-79
CLAY	blue, hard, sandy, rocky	79-88
SAND	gray, with clay rock layers	88-97
CLAY	gray, gravel & boulders	97-101
SAND	gray	101-104
CLAY	blue, sandy	104-106
SAND	gray, fine, with clay layers	106-111
CLAY	blue, sandy, rocky	111-132
SAND	gray, fine, with clay layers	132-162
CLAY	blue, hard, sandy	162-164
SAND	gray, fine	164-167
CLAY	blue, hard, sandy, with sand lenses	167-182
BOULDER	blue	182-183
CLAY	blue, dirty, fine, sand layers	183-198
SAND	gray, clay layers	198-215

137-049-03BDD2 (continued)

CLAY	blue, sandy, with sand lenses	215-222
SAND	gray	222-229
SAND	gray, clay layers	229-251
CLAY	blue, dirty, sand layers	251-257
CLAY	blue, hard, sandy	257-262

137-049-04BAA2

Date Completed:	11/22/71	Purpose:	Test Hole
L.S. Elevation (ft):	909	Well Type:	
Depth Drilled (ft):	370		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-24
CLAY	blue, soft	24-51
CLAY	blue, sandy	51-69
SAND	colored	69-70
CLAY	blue, hard, sandy	70-75
CLAY	blue, hard, sandy, boulders	75-101
SAND	blue	101-103
CLAY	blue, sandy	103-105
SAND	blue	105-106
CLAY	blue, sandy, hard	106-198
SHALE	black	198-231
SHALE	white	231-256
SHALE	red	256-301
SHALE	white, with sand lenses	301-307
SHALE	colored	307-325
SHALE	red	325-328
GRANITE	colored, weathered	328-370

137-049-04BAA3

Date Completed:	2/16/72	Purpose:	Domestic Well
L.S. Elevation (ft):	909	Well Type:	4" Steel
Depth Drilled (ft):	93	Aquifer:	Undefined
Screened Interval (ft):	77-87	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-33

137-049-04BAA3 (continued)

CLAY	blue, soft	33-61
CLAY	blue, sandy	61-80
SAND	blue, dirty	80-82
CLAY	blue, sandy	82-84
SAND	blue, dirty	84-87
CLAY	blue, sandy	87-93

137-049-05ADD

Date Completed:	10/17/91	Purpose:	Test Hole
L.S. Elevation (ft):	911	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, soft, smooth, very plastic (oxidized lake clay)	2-33
CLAY	gray, soft, smooth, very plastic (lake clay)	33-66
TILL	clay, sandy, silty, pebbly, brownish gray, soft, moderately plastic	66-72
SAND	fine to medium, well sorted, clean, predominantly quartz	72-78
TILL	sandy, silty, pebbly, gray, moderately firm, plastic	78-91
TILL	clay, very sandy, silty, pebbly, light gray, soft, moderatley plastic, rock at 100 feet, becoming firmer and less plastic with depth at about 130 feet, sand layer at 167-169, sand & gravel at 192-195 feet	91-209
CLAY	gray to dark gray, soft, very plastic, some layers silty, some layers have occasional specks of mica, shiny, some layers lighter gray and softer (bedrock)	209-220

137-049-05CDD

Date Completed:	8/24/77	Purpose:	Test Hole
L.S. Elevation (ft):	918	Well Type:	
Depth Drilled (ft):	255		
		Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	some silty clay, dark yellow brown, with some interbedded dark gray brown	2-24
CLAY	dark black gray, interbedded with dark yellow brown	24-69
TILL	clay, sandy, gravelly, dark black gray, some sand and gravel seams	69-79
SAND	very fine to medium, dark brown gray, subrounded to rounded with some clay and gravel	79-85
TILL	clay, sandy, gravelly, dark black gray, varies in density	85-177
CLAY	shale, black to brown, interbedded	177-222
SANDSTONE	fine to medium, dark yellow brown	222-224
GRANITE	weathered, white to reddish clay	224-255

137-049-06BCB

Date Completed:	1925	Purpose:	Domestic Well
L.S. Elevation (ft):	922	Well Type:	6" Steel
Depth Drilled (ft):	0	Aquifer:	West Pleasant
Screened Interval (ft):	0-150	Log Source:	

Lithologic Log - unavailable

137-049-06CCD

Date Completed:	8/29/77	Purpose:	Observation Well
L.S. Elevation (ft):	918	Well Type:	2" Steel
Depth Drilled (ft):	252	Aquifer:	West Pleasant
Screened Interval (ft):	95-100	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black, silty clay	0-5
CLAY	silty, medium brown	5-35
CLAY	silty, medium gray brown	35-70
TILL	clay, silty, gravelly, medium gray brown, with seams of gravel	70-85
SAND & GRAVEL	fine sand, gravel up to 1/2 inch diameter, light brown, well rounded, many calcareous pebbles	85-100
TILL	clay, silty, gravelly, light gray, seams of gravel, calcareous	100-135
TILL	clay, silty, sandy, light gray brown	135-145
TILL	clay, sandy, pebbly, gray brown, calcareous pebbles	145-185
SHALE	dark gray to black	185-246
SHALE	black	246-252

137-049-06DBC

Date Completed:	4/27/72	Purpose:	Domestic Well
L.S. Elevation (ft):	899	Well Type:	4" Steel
Depth Drilled (ft):	163	Aquifer:	West Pleasant
Screened Interval (ft):	72-82	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown	3-28
SHALE	brown	28-52
SHALE	blue	52-61
CLAY	sandy, blue	61-73
SAND	colored	73-78
CLAY	sandy, with lenses of sand, colored	78-82
CLAY	sandy, blue	82-132
CLAY	sticky, blue	132-152
CLAY	sandy, weathered granite, blue, green	152-163

137-049-07AAA

Date Completed:	9/17/77	Purpose:	Observation Well
L.S. Elevation (ft):	919	Well Type:	2" Steel
Depth Drilled (ft):	312	Aquifer:	Horace
Screened Interval (ft):	300-306	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	some silty layers, dark yellow brown	2-24
CLAY	silty, dark black gray	24-67
TILL	sandy, medium brown to medium gray	67-81
SAND	very fine to coarse, silty, light brown, subangular to subrounded, 5% ferro-magnesium minerals	81-95
CLAY	silty, medium gray, lenses of interbedded sand	95-169
CLAY	silty, medium gray, with black shale interbedded, and some sand	169-221
CLAY	silty, medium gray, with interbedded sand	221-259
SAND	fine to medium, medium gray	259-303
GRANITE	weathered, green	303-312

137-049-08CCC

Date Completed:	8/23/77	Purpose:	Observation Well
L.S. Elevation (ft):	918.8	Well Type:	2" Steel
Depth Drilled (ft):	272	Aquifer:	Horace
Screened Interval (ft):	258-264	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, dark yellow brown	2-19
CLAY	silty, dark black gray, mottled from 20 to 30 feet	19-66
TILL	clay, sandy, dark black gray	66-77
SAND	very fine to medium, dark black gray, subangular to subrounded	77-85
TILL	clay, sandy, gravelly, dark black gray, sparse gravel	85-134
TILL	clay, sandy, some cobbles, dark black gray with some yellow brown clay, some fine sand	134-197
TILL	clay, sandy, dark brown, interbedded sand and clay, very fine to fine	197-212
SAND	fine to medium, silty, brown gray, subrounded to rounded, with some fine gravel	212-247
SAND	medium to coarse, some fine to medium gravel, brown gray	247-259
GRAVEL	fine to medium, brown, rounded to subrounded, poorly sorted	259-262
GRANITE	weathered, white clay	262-272

137-049-09DCD

Date Completed:	1952	Purpose:	Domestic Well
L.S. Elevation (ft):	912	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-75	Log Source:	

Lithologic Log - unavailable

137-049-09DDC

NDSWC 12917

Date Completed:	10/14/91	Purpose:	Test Hole
L.S. Elevation (ft):	911	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, soft, smooth, plastic (oxidized lake clay)	2-24
CLAY	gray, soft, smooth, very plastic (lake clay)	24-64
TILL	clay, very sandy, silty, pebbly, gray, moderately firm, layer of gravel at 70 feet	64-73
SAND	fine to coarse, some gravel, dirty	73-76
TILL	clay, sandy, silty, pebbly, gray to dark gray, moderately firm, moderately plastic, rock at 83 feet	76-84
TILL	clay, very sandy, silty, pebbly, light gray, soft, not very plastic, becoming firmer with depth after 90 feet, rocks at 169, 183, and 188 feet	84-202
CLAY	dark gray, firm, layered some small mica specks, stiff, smooth (bedrock)	202-220

137-049-12AAA2

NDSWC 13345

Date Completed:	10/21/93	Purpose:	Observation Well
L.S. Elevation (ft):	910.82	Well Type:	2" PVC
Depth Drilled (ft):	200	Aquifer:	Undefined
Screened Interval (ft):	178-183	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow brown, smooth, soft, very plastic, (oxidized lake clay)	1-38
CLAY	gray, smooth, soft, very plastic, (lake clay)	38-63
CLAY	gray, very silty, sandy, pebbly, stiff, moderately crumbly, (till)	63-76
CLAY	brownish gray, silty, sandy, some firm, some not firm, little plasticity, (till)	76-91
GRAVEL & ROCKS	no description	91-93
CLAY	light gray with brownish tint, sandy, silty, moderately soft, little plasticity, (till)	93-106
CLAY	dark gray, sandy, silty, some pebbles, stiff crumbly, little plasticity, (till)	106-111
CLAY	gray, sandy, silty, stiff, little plasticity, rock at 116, (till)	111-122
CLAY	brownish gray, silty, sandy, soft, moderately plastic, (till)	122-126
CLAY	gray, sand silty, pebbly, firm to stiff, slight plasticity, (till)	126-129
SAND & GRAVEL	medium to coarse sand, fine gravel, angular to subrounded	129-133
CLAY	brownish gray, sandy, silty, pebbly, (till)	133-139

137-049-12AAA2 (continued)

CLAY	brownish gray, silty, some light tan streaks, very silty clay, with occasional reddish brown zones (oxidized?), slightly plastic	139-173
SAND & GRAVEL	fine, medium, to coarse sand, and fine gravel, predominantly carbonates and quartz	173-187
CLAY	brownish, silty, soft, slight plasticity	187-195
CLAY	greenish white, very soft, sandy, (weathered Precambrian)	195-200

137-049-12CCC

NDSWC 12918

Date Completed:	10/15/91	Purpose:	Observation Well
L.S. Elevation (ft):	913.61	Well Type:	2" PVC
Depth Drilled (ft):	220	Aquifer:	Horace
Screened Interval (ft):	190-195	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, soft, smooth, very plastic (oxidized lake clay)	2-24
CLAY	gray, soft, smooth, very plastic (lake clay)	24-58
TILL	clay, sandy, silty, pebbly, gray, some mica flecks, very silty in places, soft	58-88
TILL	clay, very sandy, silty, pebbly, light gray, moderately soft	88-112
CLAY	silty, gray, soft, plastic (lacustrine)	112-127
SAND & GRAVEL	with clay layers	127-131
SAND	fine to coarse, predominantly carbonates with lots of quartz, some igneous and a little shale, very angular to subrounded	131-149
SAND	fine to medium, quartz, shales, and some carbonates, fairly well sorted	149-188
SAND	fine to coarse, some gravel	188-199
CLAY	greenish white, and green, soft, moderately plastic, some silt and some fine sand, mostly green, dark green to yellow green	199-220

137-049-12CDD

Date Completed:	1/1951	Purpose:	Domestic Well
L.S. Elevation (ft):	912	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-98	Log Source:	

Lithologic Log - unavailable

137-049-12CDD2

NDSWC 12921

Date Completed:	10/17/91	Purpose:	Test Hole
L.S. Elevation (ft):	912	Well Type:	
Depth Drilled (ft):	209		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow brown, soft, smooth, very plastic (oxidized lake clay)	2-28
CLAY	gray, soft, smooth, very plastic (lake clay)	28-69

137-049-12CDD2 (continued)

TILL	clay, sandy, silty, pebbly, gray, (not much sample return seen because drilling mud was so thick in order to get through the severe circulation problems)	69-122
CLAY	gray, very plastic, moderately soft, some sand layers (lacustrine or fluvial)	122-136
TILL	clay, very sandy, silty, pebbly, light gray, soft to moderately firm, little plasticity	136-144
ROCK	weathered Precambrian, green silty, sandy, clayey	144-145
SAND & GRAVEL	coarse, angular to subrounded, carbonates, and igneous	145-151
TILL	clay, sandy, silty, pebbly, light gray	151-154
SAND & GRAVEL	fine to coarse sand, fine to medium gravel	154-158
TILL	clay, sandy, silty, pebbly, light gray	158-161
SAND & GRAVEL	angular to subrounded, interbedded with clay layers, mostly igneous material	161-166
ROCKS	no description	166-169
TILL	clay, very sandy, silty, pebbly, sand layers interspersed	169-176
TILL	clay, sandy, silty, pebbly	176-184
ROCKS	no description	184-186
TILL	clay, sandy, silty, pebbly	186-190
SAND	no description	190-191
TILL	clayey	191-193
SAND & GRAVEL	not much sample return, drills rough, probably very dirty	193-199
ROCK	very hard from 199-200 feet, then varying hardness from 200 to 209 feet, some soft green material, and some tiny green flakes that probably are missed because of being bound up in the softer clays	199-209

137-049-14BAA

NDSWC 12913

Date Completed:	10/9/91	Purpose:	Observation Well
L.S. Elevation (ft):	909.74	Well Type:	2" PVC
Depth Drilled (ft):	190	Aquifer:	Horace
Screened Interval (ft):	178-183	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow brown, soft, smooth, very plastic (oxidized lake clay)	2-26
CLAY	gray, soft, smooth, very plastic (lake clay)	26-64
TILL	clay, sandy, silty, pebbly, gray to light gray, some gravelly and rocky layers, soft, returns are minimal	64-100
SAND	fine to coarse, some gravel, angular to subrounded	100-129
SAND & GRAVEL	clean, angular to subrounded	129-134
GRAVEL	fine to coarse, some sand, angular to subrounded, predominantly quartz, with carbonates, shale and igneous material, some rocky layers, rock at 187 feet	134-187
ROCK	some soft white material, predominantly quartz, and some green, weathered with occasional green talc-like material (weathered Precambrian)	187-190

137-049-14BBB1

NDSWC 12914

Date Completed:	10/10/91	Purpose:	Observation Well
L.S. Elevation (ft):	913.59	Well Type:	2" PVC
Depth Drilled (ft):	197	Aquifer:	Horace
Screened Interval (ft):	178-183	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, soft, smooth, very plastic (oxidized lake clay)	2-26
CLAY	gray, soft, smooth, very plastic (lake clay)	26-70
CLAY	sandy, silty, pebbly, gray, moderately firm (till)	70-79
CLAY	very sandy, silty, pebbly, light gray, soft, moderately plastic (till)	79-82
SAND	fine to coarse, with 2 feet of till from 86 to 88 feet	82-91
CLAY	very sandy, silty, pebbly, light gray, soft, moderatley plastic (till)	91-102
SAND	fine to coarse, some gravel, quartz and shales predominant	102-121
SAND	fine to medium, predominantly fine, becoming very fine to fine from 140 feet and below	121-172
SAND	fine to coarse, with some gravel	172-186
ROCK	green, some soft, some brittle, very dark green to light green, some weathered to whitish green	186-193
ROCK	green, very hard, small flakes as sample return, with only occasional small gravel sized pieces, drills very slowly with rock bit	193-197

137-049-14BBB2

NDSWC 12915

Date Completed:	10/10/91	Purpose:	Test Hole
L.S. Elevation (ft):	913	Well Type:	
Depth Drilled (ft):	194		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow-brown, smooth, soft, very plastic (oxidized lake clay)	2-26
CLAY	gray, smooth, soft, very plastic (lake clay)	26-70
CLAY	sandy, silty, pebbly (till)	70-78
ROCKS	no description	78-79
CLAY	sandy, silty, pebbly (till)	79-80
ROCKS	no description	80-83
CLAY	sandy, silty, pebbly (till)	83-84
SAND	no description	84-85
CLAY	sandy, silty, pebbly (till)	85-87
SAND	no description	87-91
CLAY	very sandy, silty, pebbly, light gray, soft (till)	91-103
SAND & GRAVEL	fine to coarse sand, fine gravel	103-140
GRAVEL and ROCKS	no description	140-142

137-049-14BBB2 (continued)

SAND	medium to coarse, some fine gravel	142-185
CLAY	silty, green, moderately well indurated to soft	185-188
CLAY	as above, only darker and well indurated	188-194
ROCK	green and hard	194-194

137-049-15BAA

NDSWC 12255

Date Completed:	10/19/82	Purpose:	Observation Well
L.S. Elevation (ft):	912.8	Well Type:	1.25" PVC
Depth Drilled (ft):	270	Aquifer:	West Fargo South
Screened Interval (ft):	198-203	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-3
CLAY	yellowish orange, oxidized, very cohesive, plastic, lacustrine, below 15' becomes yellowish gray.	3-23
CLAY	olive gray, very cohesive, very plastic, unoxidized, lacustrine	23-43
SILT	olive gray, clayey, very cohesive and plastic	43-49
CLAY	as above	49-62
SILT	olive gray, very clayey, small gravel lens	62-73
TILL	brownish gray, sandy and clayey, brittle	73-79
SAND	very fine to very coarse, predominantly coarse, subangular to rounded, predominantly subrounded to rounded, predominantly quartz approximately 20% shale carbonate, a few interbedded gravel lenses, below 100' shows increase in carbonate content	79-143
SAND and GRAVEL	very coarse sand to medium gravel , predominantly very coarse sand angular to rounded, predominantly subrounded to rounded, predominantly quartz alot of carbonate, below 180' predominantly fine gravel	143-222
GRAVEL	fine to coarse, predominantly subrounded carbonates interbedded, medium gray sandy clay (till?), very coarse and rough drilling 230'-236', below 236' intermittent smoth and rough drilling sample contains coarse silicate gravel - some green chloritized pebbles	222-257
GRANITE	weathered granite composed of light green chloritic or kaolinitic clay and quartz	257-270

137-049-17AAA

NDSWC 2347

Date Completed:	6/10/65	Purpose:	Test Hole
L.S. Elevation (ft):	914	Well Type:	
Depth Drilled (ft):	210		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	slightly silty, dusky yellow to light olive gray, holds together, moderately soft, sticky, lignite flakes, iron stained in places, with snad-sized concretions, calcareous, oxidized	1-17
CLAY	as above, except unoxidized, olive gray to dark greenish gray, softer than above	17-52
TILL	olive gray with a shade of dark greenish gray, clay, holds together, soft, laminated, sand fragments are mostly shale and dolomite, some igneous crystalline and quartz, calcareous, unoxidized	52-61

137-049-17AAA (continued)

SAND	gravelly, poorly sorted, subrounded to rounded, unoxidized, size varies between 1/2 to 5 mm., quartz, dolomite shale, igneous crystalline, sedimentary rocks, pyrite, interbedded with till as above	61-97
TILL	silty, olive gray with ashade of dark greenish gray, holds together, moderately soft, gravelly, clayey, sand size fragments mostly dolomite and shale, some quartz, igneous and crystalline material, very calcareous	97-167
BOULDERS	consolidated clay, silty, highly calcareous, light olive gray	167-168
CLAY	dark greenish gray to olive gray, holds together, hard compact, plastic, slightly sandy in places, sand is almost silt size and white in color, non-calcareous, laminated, granite boulder	168-190
CLAY	brownish gray to black, holds together soft, plastic, sticky, silty lignite flakes, non-calcareous in places, olive gray to dark greenish gray to brownish gray, color varies greatly, granite boulder	190-200
CLAY	grayish orange pink, fractured, holds together, moderately soft, non-calcareous	200-210

137-049-17DAA1

Date Completed:	5/1960	Purpose:	Domestic Well
L.S. Elevation (ft):	913	Well Type:	4" Unknown
Depth Drilled (ft):	0	Aquifer:	Horace
Screened Interval (ft):	0-102	Log Source:	

Lithologic Log - unavailable

137-049-18BBB

Date Completed:	9/15/77	Purpose:	Observation Well
L.S. Elevation (ft):	922.6	Well Type:	2" Steel
Depth Drilled (ft):	292	Aquifer:	West Pleasant
Screened Interval (ft):	128-132	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, dark yellow brown	2-21
CLAY	silty, medium gray to dark black gray	21-63
TILL	clay, sandy, gravelly, medium gray, sand and gravel more prevalent with depth	63-89
SAND & GRAVEL	fine to coarse sand, fine to medium gravel, dark brown, some clay, subangular to subrounded, 5% ferro-magnesium minerals	89-128
TILL	clay, sandy, gravelly, dark gray, dense, with gravel seams, and some shale interbedded	128-242
SHALE	black, with interbedded sandstone	242-250
SANDSTONE	well sorted, light gray to white, uniformly fine grained, predominantly quartz	250-276
GRANITE	weathered, light green	276-292

137-049-18BBD

Date Completed:	1/1950	Purpose:	Domestic Well
L.S. Elevation (ft):	922	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-105	Log Source:	

Lithologic Log - unavailable

137-049-19AAAB

Date Completed:	9/12/77	Purpose:	Observation Well
L.S. Elevation (ft):	923	Well Type:	2" Steel
Depth Drilled (ft):	252	Aquifer:	West Pleasant
Screened Interval (ft):	152-157	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, dark yellow brown	2-24
CLAY	silty, medium gray	24-56
TILL	clay, sandy, gravelly, medium gray, calcareous	56-70
SAND	fine to medium, silty, light gray, subrounded, well-sorted, calcareous with some clay lenses	70-117
SAND & GRAVEL	gravel fine to coarse, sand fine to medium, subrounded to rounded, poorly sorted, trace of pyrite	117-145
SAND & GRAVEL	with interbedded clay layers	145-152
TILL	clay, sandy, gravelly, medium brown to gray brown, with some gravel lenses	152-203
TILL	clay, with black shale and some medium gravel, calcareous	203-242
GRANITE	weathered, light green	242-252

137-049-19BBB

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	6" Steel
Depth Drilled (ft):	0	Aquifer:	West Pleasant
Screened Interval (ft):	0-83	Log Source:	

Lithologic Log - unavailable

137-049-19BBB2

Date Completed:	9/7/77	Purpose:	Observation Well
L.S. Elevation (ft):	922	Well Type:	4" PVC
Depth Drilled (ft):	260	Aquifer:	West Pleasant
Screened Interval (ft):	120-128	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	gray brown clay and silty clay	2-4
CLAY	dark yellow brown	4-24
CLAY	medium gray clay and silty clay interbedded with some dark yellow brown clay	24-72
CLAY	dark gray clay and sandy clay with sparse gravel, (till)	72-83
SAND & GRAVEL	medium gray sand and gravel, very fine to coarse sand, medium gravel, calcareous with some clay, silty, subangular to subrounded	83-96
CLAY	dark gray clay, very dense, with sparse sand and black shale layers	96-109
SAND	medium gray sand, fine to medium, silty, subrounded, with clay seams, with some gravel, slightly calcareous	109-122
CLAY	dark gray to dark yellow brown sandy clay, with some sand and gravel lenses, dense, calcareous, with some black shale interbedded from 196-220 ft	122-251
GRANITE	weathered, green	251-260

137-049-20DAA

Date Completed:	7/28/77	Purpose:	Observation Well
L.S. Elevation (ft):	919.5	Well Type:	2" Steel
Depth Drilled (ft):	273	Aquifer:	Horace
Screened Interval (ft):	250-255	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, medium brown	2-20
CLAY	silty, medium gray to blue gray	20-55
TILL	clay, silty, sandy, gravelly, blue-gray	55-80
SAND	fine to medium, light brown to medium brown, subangular to rounded, 5% ferro-magnesium minerals	80-100
SAND	fine to coarse, with pebbles of white chert, light gray-brown, subangular to rounded, 5% ferro-magnesium minerals	100-220
SAND & GRAVEL	sand coarse, gravel predominantly fine with some coarse (up to 3/4 inch), light gray, 20% ferro-magnesium minerals, some pyrite	220-260
GRANITE	weathered	260-273

137-049-21BBA2

Date Completed:	7/29/77	Purpose:	Observation Well
L.S. Elevation (ft):	915	Well Type:	2" Steel
Depth Drilled (ft):	258	Aquifer:	Horace
Screened Interval (ft):	140-145	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-4
CLAY	brown, soft	4-33
CLAY	blue, soft	33-77
TILL	clay, sandy, with lenses of sand	77-82
SAND	gray, dirty	82-85
SAND	blue	85-86
SAND AND CLAY	gray, lenses	86-88
SAND	gray	88-95
SAND AND CLAY	blue, lenses	95-98
SAND AND CLAY	gray, small lenses	98-113
SAND	gray, with small lenses of coarser sand	113-133
SAND	finer, gray, #12	133-143
SAND	gray, #10-12	143-156
SAND	gray, with small lenses of clay	156-174
TILL	clay, sandy, blue	174-224
TILL	clay, sandy, shale, blue-black	224-238
CLAY	shale, blue-black	238-243

137-049-21BBA2 (continued)

GRANITE	decomposed, grayish white	243-253
GRANITE	decomposed, orange	253-258

137-049-21CCC

Date Completed:	10/17/75	Purpose:	Domestic Well
L.S. Elevation (ft):	919	Well Type:	4" Steel
Depth Drilled (ft):	97	Aquifer:	Horace
Screened Interval (ft):	82-88	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-21
CLAY	blue	21-26
CLAY	blue, soft	26-58
CLAY	blue, soft sandy	58-67
CLAY	blue, sandy	67-72
SAND	coarse	72-77
SAND		77-97

137-049-21DDA

Date Completed:	6/29/77	Purpose:	Observation Well
L.S. Elevation (ft):	919	Well Type:	2" Steel
Depth Drilled (ft):	257	Aquifer:	Horace
Screened Interval (ft):	221-227	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, fat, medium brown	2-25
CLAY	silty, fat, medium gray	25-60
TILL	clay, silty, sandy, gravelly, medium gray, interbedded, gravel more prevalent with depth	60-105
SAND	fine to coarse, fine gravel from 105 to 110 feet, and 125 to 145 feet, gray to gray-brown, subangular to subrounded, 5% ferro-magnesium minerals with a trac of pyrite	105-175
TILL	clay, sandy, gravelly, gray	175-185
SAND	fine to medium, gray-brown, subangular to rounded, 5% ferro-magnesium minerals	185-205
SAND	fine to coarse, medium gray-brown, subangular to rounded, with some fine gravel, 5% ferro-magnesium minerals	205-225
TILL	clay, silty, sandy, dark gray	225-250
GRANITE	weathered, dark gray green	250-257

137-049-23BAA

NDSWC 12912

Date Completed:	10/8/91	Purpose:	Observation Well
L.S. Elevation (ft):	915.06	Well Type:	2" PVC
Depth Drilled (ft):	260	Aquifer:	Horace
Screened Interval (ft):	198-203	Log Source:	NDSWC

137-049-23BAA (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, soft, smooth, very plastic (oxidized lake clay)	2-17
CLAY	gray, soft, smooth, plastic (lake clay)	17-60
CLAY	very sandy, silty, pebbly, light gray, soft, moderately plastic (till)	60-96
SAND	medium to coarse, with some gravel, clean, angular to subrounded, quartz, carbonates, igneous, and shale material	96-156
GRAVEL and SAND	clean, angular to subrounded, quartz, igneous, carbonates, and shale material	156-253
CLAY	green and white, soft with quartz fragments (weathered Precambrian)	253-260

137-049-23BBB1

NDSWC 12898

Date Completed:	9/23/91	Purpose:	Test Hole
L.S. Elevation (ft):	914	Well Type:	
Depth Drilled (ft):	200		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, soft, plastic, smooth (oxidized lake clay)	1-36
CLAY	gray, soft, smooth, plastic (lake clay)	36-64
CLAY	sandy, silty, pebbly, gray, moderately soft, not very plastic, very sandy (till)	64-72
ROCK	no description	72-73
CLAY	very sandy, silty, pebbly, gray, moderately plastic, moderately firm, rocks at 75 and 90 feet (till)	73-96
CLAY	very sandy, silty, pebbly, light gray, soft, mostly sand and light gray clay, moderately plastic (till)	96-134
SAND & GRAVEL	lignitic, subangular to subrounded	134-144
CLAY	dark gray, moderately soft to moderately firm, plastic, very shiny (bedrock)	144-158
CLAY	silty, light gray, fairly stiff, not very plastic (bedrock)	158-160
CLAY	dark gray, fairly plastic, slightly micaceous (tiny mica flakes) some soft tan-gray, bentonitic-looking layers, very shiny (bedrock)	160-200

137-049-23BBB2

NDSWC 12899

Date Completed:	9/24/91	Purpose:	Observation Well
L.S. Elevation (ft):	912.91	Well Type:	2" PVC
Depth Drilled (ft):	150	Aquifer:	Undefined
Screened Interval (ft):	135-140	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, soft, smooth, plastic (oxidized lake clay)	1-36

137-049-23BBB2 (continued)

CLAY	gray, soft, smooth, plastic (lake clay)	36-61
CLAY	sandy, silty, pebbly, gray, soft, not very plastic (till)	61-72
ROCKS	no description	72-73
CLAY	sandy, silty, pebbly, light gray, very sandy (till)	73-76
SAND	fine to coarse	76-77
CLAY	sandy, silty, pebbly, light gray, very sandy, moderately soft (till)	77-82
CLAY	sandy, silty, pebbly, gray to dark gray, moderately stiff, fairly plastic (till)	82-96
CLAY	very sandy, silty, pebbly, light gray, moderately soft (till)	96-130
SAND & GRAVEL	fine to coarse sand, fine gravel, subangular to subrounded, shales, carbonates, and quartz	130-140
CLAY	dark gray, soft to moderately firm, shiny, plastic (bedrock)	140-150

137-049-23DDD

NDSWC 12900

Date Completed:	9/24/91	Purpose:	Observation Well
L.S. Elevation (ft):	917.91	Well Type:	2" PVC
Depth Drilled (ft):	280	Aquifer:	Horace
Screened Interval (ft):	238-243	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, soft, smooth, plastic (oxidized lake clay)	1-16
CLAY	gray, soft, smooth, plastic (lake clay)	16-23
CLAY	yellow-brown, soft, smooth, plastic (oxidized lake clay)	23-29
CLAY	gray, soft, smooth, plastic (lake clay)	29-70
CLAY	sandy, silty, pebbly, gray (till)	70-75
SAND & GRAVEL	fine to coarse sand, fine to medium gravel	75-76
CLAY	sandy, silty, pebbly, gray, very sandy (till)	76-82
CLAY	very sandy, silty, pebbly, soft, moderately plastic, light brownish-gray (till)	82-98
SAND	fine to coarse, poorly sorted	98-102
GRAVEL	coarse, with layers of clay	102-108
SAND & GRAVEL	coarse sand, fine to medium gravel, shale, carbonates, and quartz material	108-122
SAND	medium to coarse	122-156
GRAVEL	fine to coarse, with some coarse sand, subangular to rounded, shale, carbonate, and quartz material	156-212
LIGNITE	layer of fragments	212-213
SAND & GRAVEL	fine to coarse	213-249
CLAY	no returns	249-250
SAND & GRAVEL	coarse	250-256
GRAVEL	coarse to very coarse with rocks	256-257
CLAY	greenish-white, sandy, (weathered Precambrian)	257-280

137-049-24AAA2

Date Completed:	4/8/75	Purpose:	Test Hole
L.S. Elevation (ft):	911	Well Type:	
Depth Drilled (ft):	167		
		Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown, soft	2-32
CLAY	blue, soft	32-67
SAND	no description	67-69
CLAY	sandy, blue	69-76
SAND	no description	76-78
CLAY	sandy, blue	78-107
CLAY	sandy, with rock, hard, blue	107-152
ROCK	no description	152-154
CLAY	sandy, with rock, hard	154-157
ROCK	no description	157-159
CLAY	sandy, with rock, blue	159-165
CLAY	sandy, with rock, green	165-167

137-049-24AAB

Date Completed:	4/9/75	Purpose:	Test Hole
L.S. Elevation (ft):	914	Well Type:	
Depth Drilled (ft):	156		
		Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	soft, brown	2-36
CLAY	soft, blue	36-71
CLAY	sandy, blue	71-86
CLAY	sandy, with rock, blue	86-112
ROCK	no description	112-113
CLAY	sandy, with rock, blue	113-127
CLAY	sandy, hard, blue	127-144
SAND	blue	144-148
GRANITE	weathered	148-152
GRANITE	black	152-156

137-049-24ABBA

Date Completed:	4/15/75	Purpose:	Municipal Well
L.S. Elevation (ft):	914	Well Type:	6" Steel
Depth Drilled (ft):	139	Aquifer:	Undefined
Screened Interval (ft):	130-138	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-32
CLAY	soft, blue	32-64
CLAY	sandy, blue	64-115
SAND	dirty	115-117
CLAY	sandy, blue	117-127
SAND	very dirty, with lenses of clay	127-129
SAND	colored	129-137
GRANITE	colored	137-139

137-049-24BDA

Date Completed:	1962	Purpose:	Domestic Well
L.S. Elevation (ft):	913	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Horace
Screened Interval (ft):	0-107	Log Source:	

Lithologic Log - unavailable

137-049-24BDA2

Date Completed:	5/3/88	Purpose:	Domestic Well
L.S. Elevation (ft):	914	Well Type:	4" PVC
Depth Drilled (ft):	176	Aquifer:	Horace
Screened Interval (ft):	160-165	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-22
CLAY	blue	22-56
CLAY	hard, sandy, clay, rocky, blue	56-85
CLAY	hard, sandy, blue	85-145
SAND	gray	145-176

137-049-24CBB

Date Completed:	12/20/74	Purpose:	Test Hole
L.S. Elevation (ft):	915	Well Type:	
Depth Drilled (ft):	210		
		Log Source:	Layne Minnesota Co

137-049-24CBB (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow	2-5
CLAY	yellow	5-10
CLAY	yellow	10-15
CLAY	yellow	15-20
CLAY	blue	20-25
CLAY	blue	25-30
CLAY	blue	30-35
CLAY	blue	35-40
CLAY	blue	40-45
CLAY	blue	45-50
CLAY	blue	50-55
CLAY	blue	55-60
TILL	no description	60-65
TILL	no description	65-70
TILL	no description	70-75
TILL	no description	75-80
TILL	no description	80-85
TILL	no description	85-90
TILL	no description	90-95
SAND	fine	95-100
SAND	fine	100-105
SAND	fine	105-110
SAND	fine	110-115
SAND	fine	115-120
SAND	fine	120-125
SAND	fine	125-130
SAND	fine	130-135
SAND	fine	135-140
SAND	fine	140-145
SAND	fine	145-150
SAND	coarse	150-155
SAND	coarse	155-160
SAND	coarse	160-165
SAND	coarse	165-170
SAND	coarse	170-175
SAND	coarse	175-180

137-049-24CBB (continued)

SAND	coarse	180-185
SAND	coarse	185-190
SAND	coarse	190-195
SAND	fine	195-200
SAND	finer	200-205
SAND	finer	205-210

137-049-25CCC

NDSWC 3158

Date Completed:	8/19/64	Purpose:	Observation Well
L.S. Elevation (ft):	916.7	Well Type:	1.25" ABS
Depth Drilled (ft):	257	Aquifer:	Horace
Screened Interval (ft):	228-238	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
SILT	moderately yellowish brown, clay with occasional sand grains, cohesive, highly calcareous, oxidized	2-29
CLAY	olive gray, silty, very cohesive, sticky, calcareous	29-71
TILL	olive gray	71-73
GRAVEL	some sand but predominantly granules and small gravel; very angular fragments of boulders, generally subrounded, abundant carbonates with shale, granite and/or crystalline rocks and abundant pyrite	73-78
TILL	olive/light olive gray, clay through boulders, carbonates, quartz, crystalline rocks and shale, highly calcareous	78-93
TILL	olive gray/black to olive black, slay though gravel, cohesive, solid, quartz, shale, carbonates, crystalline, highly calcareous	93-118
CLAY	olive gray, silty, cohesive very tiny black flecks (lignite and biotite?), shalelike cuttings, highly calcareous, occasional inclusions of a very fine white sand or silt	118-138
SAND	fine to granules, predominantly quartz, crystalline rocks with carbonates, lignite and pyrite, subangular to rounded, 155' becoming generally finer, predominantly medium snad, 230' coarser as at beginning with rock and boulders	138-247
WEATHERED GRANITE	pale blue green to grayish blue green, sandy	247-257

137-049-27AAD

Date Completed:	6/21/77	Purpose:	Observation Well
L.S. Elevation (ft):	919	Well Type:	2" Steel
Depth Drilled (ft):	222	Aquifer:	Undefined
Screened Interval (ft):	97-102	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	sandy, medium brown	2-25
CLAY	silty, medium gray	25-75
SAND	medium, with some fine to coarse, gray, subrounded to rounded with some fine gravel	75-80

137-049-27AAD (continued)

SAND	fine to medium, light gray, subangular to subrounded, with sparse gravel	80-95
TILL	clay, sandy, medium gray, transitional or interbedded	95-115
SAND	fine to coarse, light gray-brown, slightly arkosic	115-130
TILL	clay, sandy, light gray, sand and clay interbedded	130-150
TILL	clay, sandy, light gray	150-195
GRANITE	weathered, clay, dark green	195-222

137-049-27BBC

Date Completed:	6/14/78	Purpose:	Observation Well
L.S. Elevation (ft):	918.6	Well Type:	12" Steel
Depth Drilled (ft):	378	Aquifer:	Horace
Screened Interval (ft):	249-300	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-27
CLAY	blue	27-63
CLAY	blue, hard, sandy, rocky	63-68
SAND	gray, fine	68-72
CLAY	blue, sandy	72-74
SAND	gray, fine	74-86
SAND	gray, fine, with clay layers	86-92
CLAY	blue, sandy	92-100
SAND	blue, fine, with clay layers	100-116
CLAY	blue, sandy	116-123
CLAY	blue, sandy, with sand lenses	123-136
SAND	gray, fine, with clay layers	136-156
CLAY	blue, sandy, with sand lenses	156-164
CLAY	blue, sandy	164-168
SAND	gray	168-170
CLAY	blue, sandy	170-188
SAND	colored, with clay layers	188-196
BOULDER	red	196-197
SAND	colored, with gravel, rocks	197-222
SAND	colored	222-253
SAND	colored, with rocks	253-267
SAND	colored	267-278
SAND	colored, rocky	278-289
SAND	colored	289-302
SAND	colored, clay layers	302-322

137-049-27BBC (continued)

CLAY	blue, sandy, with sand lenses	322-328
SAND	colored	328-336
CLAY	blue, sandy, with sand lenses	336-341
CLAY	blue, sandy	341-348
SAND	colored	348-356
SAND	colored, with clay layers	356-371
GRANITE	green, weathered	371-378

137-049-28ADD

Date Completed:	6/17/77	Purpose:	Observation Well
L.S. Elevation (ft):	920	Well Type:	4" Steel
Depth Drilled (ft):	360	Aquifer:	Horace
Screened Interval (ft):	255-261	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	silty, medium brown	1-17
CLAY	silty, dark gray to black	17-67
TILL	clay, sandy, dark gray	67-82
SAND	very fine to fine, dark gray brown, subangular to subrounded	82-122
TILL	clay, sandy, dark gray brown, with lignite fragments	122-142
SAND	very fine to fine, silty, light brown, subangular to rounded	142-202
SAND & GRAVEL	coarse sand, fine gravel, brown, subangular to subrounded	202-207
GRAVEL	medium to coarse, brown, poorly sorted, rounded 1 inch diameter with sparse sand	207-267
SAND & GRAVEL	coarse sand, fine to medium gravel, dark gray brown, subrounded to rounded, silty	267-356
GRANITE	weathered, greenish white clay, some red	356-360

137-049-28BAA

Date Completed:	7/27/77	Purpose:	Observation Well
L.S. Elevation (ft):	917	Well Type:	2" Steel
Depth Drilled (ft):	275	Aquifer:	Horace
Screened Interval (ft):	140-145	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, medium brown	2-22
CLAY	silty, medium gray to gray-green	22-60
TILL	clay, silty, sandy, gravelly, medium gray-green with light gray-brown sand and gravel	60-80
SAND	fine to medium, light gray-brown, subangular to rounded, 5% ferro-magnesium minerals, trace of pyrite, clay seams below 150 feet	80-170
SAND & GRAVEL	interbedded clayey sand and fine gravel, brown to gray-brown with blue sandy clay	170-195

137-049-28BAA (continued)

CLAY	black shale	195-265
GRANITE	weathered	265-275

137-049-28CDD

Date Completed:	6/1960	Purpose:	Domestic Well
L.S. Elevation (ft):	916	Well Type:	4" Steel
Depth Drilled (ft):	192	Aquifer:	Horace
Screened Interval (ft):	0-190	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-28
CLAY	blue	28-67
CLAY	sandy, boulders, blue	67-75
CLAY	sandy, hard, blue	75-98
CLAY	blue	98-121
CLAY	sandy, blue	121-127
SAND	fine, dirty, gray	127-132
SAND	fine, gray	132-141
CLAY	soft, blue	141-144
SAND	fine, gray	144-149
CLAY	sandy, soft, blue	149-174
SAND	gray	174-192

137-049-28DDA

Date Completed:	6/27/77	Purpose:	Observation Well
L.S. Elevation (ft):	920	Well Type:	2" Steel
Depth Drilled (ft):	272	Aquifer:	Horace
Screened Interval (ft):	212-218	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	silty, fat, medium brown	2-25
CLAY	silty, fat, medium gray	25-90
TILL	clay, sandy, gravelly, medium gray, sparse sand and gravel seams	90-100
TILL	clay, sandy, gravelly, medium gray to gray-brown, interbedded sand and gravel	100-165
SAND	fine to medium, clayey, medium gray to gray-brown,	165-185
SAND & GRAVEL	sand, fine to medium, gravel up to 3/8 inch diameter, light gray-brown, 5% ferro-magnesium minerals, trace of pyrite	185-215
SAND & GRAVEL	sand and gravel as above, some clay interbeds, light gray-brown	215-260
GRANITE	weathered, dark green	260-272

137-049-29ADD

Date Completed:	6/23/77	Purpose:	Observation Well
L.S. Elevation (ft):	924	Well Type:	2" PVC
Depth Drilled (ft):	287	Aquifer:	Horace
Screened Interval (ft):	255-260	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	fat, medium brown	2-30
CLAY	fat, medium gray	30-65
TILL	clay, sandy, gravelly, medium gray, sand and gravel seams	65-110
SAND	medium to coarse, light gray to gray-brown, subangular to subrounded, well sorted, slightly arkosic	110-265
SAND	medium to coarse, light gray to gray-brown	265-275
GRANITE	weathered, dark gray-green clay	275-287

137-049-30AAA

NDSWC 3138

Date Completed:	7/31/64	Purpose:	Observation Well
L.S. Elevation (ft):	921.1	Well Type:	1.25" ABS
Depth Drilled (ft):	257	Aquifer:	West Pleasant
Screened Interval (ft):	158-178	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
TILL	silty, sandy, clay, olive gray, cohesive, soft, plastic, highly calcareous, carbonates, paches of limestone are found	1-2
CLAY	grayish orange, dusky yellow, cohesive soft plastic, highly calcareous, oxidized paches of brown material, changes to a slightly darker at 12 feet	2-24
CLAY	olive gray, cohesive, soft, plastic, highly calcareous, fine lignite flashes,	24-64
TILL	very silty in places, dark greenish gray, with a shade of olive gray, cohesive, hard, plastic to brittle, shale, quartz, pyrite, dolomite, lignite, grain size predominantly 1\2 mm, some larger , maximum 5mm	64-83
SAND	gravel lenses, quartz, lignite, limestone, pyrite, igneous, crystalline, angular to rounded, predominantly subrounded to subangular, mostly good spericity, size from 1\2 mm to 20mm, highly calcareous	83-152
GRAVEL	up to large pebble, rounded and very subangular chips of larger rocks, limestone, dolomite, crystalline, sediment, pyrite, lignite, ect. very rough drilling, quite thick mud	152-179
TILL	dark greenish to olive gray, predominantly quartz with abundant crystalline rocks, highly calcareous, additional samples show limestone and dolomite and some pyrite, boulders	179-200
CLAY	olive black silty with small pockets of very fine white sand, solid slightly calcareous, samples getting poorer and harder to find, samples indicate a very fine sandy clay or silt, noncalcareous and very soft	200-236
WEATHERED GRANITE	greenish gray drilled after sunset but looks as described under the scope light, non-calcareous which could account for the non-calcareous clay or silt above	236-257

137-049-30AAD

Date Completed:	6/25/77	Purpose:	Test Hole
L.S. Elevation (ft):	925	Well Type:	
Depth Drilled (ft):	232		
		Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, medium brown	2-22
CLAY	silty, medium gray to gray-brown	22-62
TILL	clay, silty, sandy, gravelly, medium gray to gray-brown, with sand and gravel seams (more prevalent with depth)	62-104
SAND & GRAVEL	sand fine to coarse, gravel up to 1/2 inch diameter, gray to gray-brown, subangular to subrounded 20% ferro-magnesium minerals	104-125
TILL	clay, pebbly, gray-brown, some cobbles	125-147
TILL	clay, sandy, gravelly, medium gray, some gravel seams	147-221
GRANITE	weathered, gray-green	221-232

137-049-34DCC

NDSWC 12291

Date Completed:	12/1/82	Purpose:	Observation Well
L.S. Elevation (ft):	920	Well Type:	1.25" PVC
Depth Drilled (ft):	220	Aquifer:	Horace
Screened Interval (ft):	158-163	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, oxidized, slightly cohesive, very plastic, lacustrine, below 15 feet mottled yellowish green	2-30
CLAY	olive gray, slightly cohesive, very plastic, lacustrine, gravel 62 to 63 feet	30-63
TILL	olive gray, clayey, sandy to very snady, non-cohesive, brittle, many small interbedded gravel lenses	63-82
SAND	fine to very coarse, predominantly course, subrounded, predominantly quartz, below 100 feet predominantly fine grain, below 120 feet predoninantly coarse and very coarse, increased amounts of carbonates and shale	82-146
SAND & GRAVEL	very coarse sand and medium gravel, predominantly fine gravel angular to rounded, predoninantly subangular, equal proportions of quartz, carbonates and shale	146-184
CLAY	very silty, olive gray, slightly brittle	184-196
BEDROCK	weathered, crystalline bedrock, greenish clay	196-220

137-049-34DDD

NDSWC 12292

Date Completed:	12/1/82	Purpose:	Test Hole
L.S. Elevation (ft):	925	Well Type:	
Depth Drilled (ft):	210		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1

137-049-34DDD (continued)

CLAY	yellow brown, oxidized, slightly cohesive, very plastic, lacustrine	1-30
CLAY	yellowish olive gray, silty, very plastic, color becomes darker around 35 feet	30-41
CLAY	olive gray, silty, plastic	41-63
TILL	olive gray, silty, pebbly, slightly brittle, many gravel lenses	63-80
SILT	olive gray, slightly clayey, slightly cohesive	80-93
SAND & GRAVEL	coarse sand to fine gravel, predominantly fine gravel, angular	93-96
SILT	no sample	96-101
GRAVEL AND COBBLES	no description	101-102
TILL	medium gray, sandy, slightly pebbly, slightly cohesive, brittle, cobbles at110 feet, gravel at 161-162 feet	102-196
SHALE	dark gray, poorly indurated but tight, waxy appearance	196-210

137-049-36BCC

Date Completed:	12/21/74	Purpose:	Test Hole
L.S. Elevation (ft):	918	Well Type:	
Depth Drilled (ft):	210		
		Log Source:	Layne Minnesota Co

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-5
CLAY	yellow	5-10
CLAY	yellow	10-15
CLAY	yellow	15-20
CLAY	blue	20-25
CLAY	blue	25-30
CLAY	blue	30-35
CLAY	blue	35-40
CLAY	blue	40-45
CLAY	blue	45-50
CLAY	blue	50-55
CLAY	blue	55-60
CLAY	blue	60-65
TILL	no description	65-70
TILL	no description	70-75
TILL	no description	75-80
TILL	no description	80-85
TILL	no description	85-90
SAND	dirty, fine to medium	90-95
SAND	dirty, fine to medium	95-100

137-049-36BCC (continued)

SAND	dirty, fine to medium	100-105
SAND	dirty, fine to medium	105-110
SAND	medium to coarse, dirty	110-115
SAND	medium to coarse, dirty	115-120
SAND	medium to coarse, dirty	120-125
SAND	medium to coarse, dirty	125-130
TILL & CLAY	sandy	130-135
TILL & CLAY	sandy	135-140
TILL & CLAY	sandy	140-145
TILL & CLAY	sandy	145-150
TILL & CLAY	sandy	150-155
TILL & CLAY	sandy	155-160
TILL & CLAY	sandy	160-165
TILL & CLAY	sandy	165-170
TILL & CLAY	sandy	170-175
TILL & CLAY	sandy	175-180
TILL & CLAY	sandy	180-185
TILL & CLAY	sandy	185-190
TILL & CLAY	sandy	190-195
TILL & CLAY	sandy	195-200
TILL & CLAY	sandy	200-205
TILL & CLAY	sandy	205-210

137-050-02ACD

Date Completed:	4/16/74	Purpose:	Domestic Well
L.S. Elevation (ft):	922	Well Type:	4" Steel
Depth Drilled (ft):	257	Aquifer:	Undefined
Screened Interval (ft):	241-247	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	dark brown	2-17
SAND	brown, fine, silty	17-24
CLAY	blue, sandy	24-30
SHALE	blue	30-74
CLAY	blue, sandy	74-77
SAND	colored	77-81
CLAY	blue, sandy, with rock	81-85
CLAY	blue, sandy, sitty	85-137
CLAY	blue, black, sandy, with shale	137-230

137-050-02ACD (continued)

SAND	blue, fine	230-231
CLAY	blue, black, sandy, with shale	231-239
SAND	colored	239-247
CLAY	blue, sandy, with sand lenses	247-249
SAND	colored	249-252
CLAY	blue, sandy	252-254
CLAY	blue, colored, sandy, with sand & gravel lenses	254-257

137-050-07DAA3

Date Completed:	6/26/79	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" Steel
Depth Drilled (ft):	230	Aquifer:	Undefined
Screened Interval (ft):	205-215	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-17
CLAY	gray	17-80
TILL	no description	80-108
SAND	no description	108-152
TILL	with sand layers	152-205
GRAVEL & SAND	with lines of till	205-215
TILL	gravelly	215-230

137-050-08AAB

Date Completed:	5/4/77	Purpose:	Test Hole
L.S. Elevation (ft):	923	Well Type:	
Depth Drilled (ft):	162		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-29
CLAY	blue, soft	29-70
CLAY	blue, sandy, with rock	70-133
SAND	colored	133-152
CLAY	blue, sandy	152-162

137-050-08CAA

Date Completed:	7/1960	Purpose:	Domestic Well
L.S. Elevation (ft):	928	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-142	Log Source:	

Lithologic Log - unavailable

137-050-08CAAC

Date Completed:	5/11/77	Purpose:	Test Hole
L.S. Elevation (ft):	928	Well Type:	
Depth Drilled (ft):	252		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
SAND	brown, fine	1-8
CLAY	brown	8-26
CLAY	blue, soft	26-72
CLAY	sandy	72-125
SAND	blue	125-161
CLAY	blue, sandy	161-225
SAND	colored	225-247
CLAY	blue, sandy	247-252

137-050-08CBB

Date Completed:	5/11/77	Purpose:	Municipal Well
L.S. Elevation (ft):	928	Well Type:	10" Steel
Depth Drilled (ft):	224	Aquifer:	Undefined
Screened Interval (ft):	203-223	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-29
CLAY	blue	29-73
CLAY	blue	73-99
SAND	colored	99-103
CLAY	blue, sandy	103-112
SAND	colored, fine	112-117
CLAY	blue, sandy	117-127
SAND	colored, fine, with clay lenses	127-172
CLAY	blue, sandy, with rock	172-182
SAND	colored	182-222
CLAY	blue, sandy, with rock	222-224

137-050-08CDD

Date Completed:	5/3/77	Purpose:	Test Hole
L.S. Elevation (ft):	931	Well Type:	
Depth Drilled (ft):	162		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-32
CLAY	blue, soft	32-73
CLAY	blue, sandy	73-91
SAND	colored	91-92
CLAY	blue, sandy, with rock	92-115
SAND	colored, with clay lenses	115-122
SAND	colored	122-127
CLAY	blue, sandy	127-133
SAND	colored	133-136
CLAY	blue, sandy	136-162

137-050-11DDD

NDSWC 3137

Date Completed:	7/31/64	Purpose:	Test Hole
L.S. Elevation (ft):	928	Well Type:	
Depth Drilled (ft):	212		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black.	0-1
SILT	slightly sandy, olive-gray, cohesive, hard, highly calcareous, oxidized, dolomite, possibly oxidized pyrite and lignite; laminated.	1-2
CLAY	sandy, light olive-gray, laminated with white clay, possibly weathered pyrite, lignite flakes and carbonate, highly calcareous.	2-5
CLAY	sandy, pale yellowish-brown to grayish-orange, cohesive, soft, plastic, quartz fragments, lignite, possibly oxidized pyrite, tiny white flakes, possibly muscovite, highly calcareous; laminated.	5-17
CLAY	olive-gray, same as above except sand absent.	17-29
CLAY	dark greenish-gray with a shade of olive-gray, very fine sand, cohesive, soft, brittle, lignite, possibly muscovite and dolomite; becomes silty and plastic around 57 feet.	29-63
TILL	dark greenish-gray with some olive-gray, shale, quartz, lignite, dolomite and limestone, cohesive, soft, plastic, very sandy, predominantly .5 mm or less, subrounded and rounded, highly calcareous; contains boulders.	63-82
TILL	slightly darker than above, grains larger, .75 mm, harder, some angular fragments, otherwise similar to above.	82-87
TILL	sandy, dark greenish-gray with some olive-gray, cohesive, hard, brittle, quartz, dolomite, limestone, igneous, little shale, highly calcareous, predominant size .5 mm, maximum 3 mm; interbedded with sand, quartz, shale, pyrite, lignite, predominantly subangular and subrounded, .25 to 1 mm, possible tourmaline crystals; occasional darker till with pyrite; tiny pockets fine white sand below 127 feet; little specks of oxidized material; one cutting of silt at 147 feet, cohesive, hard, very brittle, quartz, lignite, highly calcareous.	87-162

137-050-11DDD (continued)

SHALE	silty, olive-black, cohesive, hard, plastic, pockets of fine white sand, lignite flakes, slightly calcareous; gradational contact, nonsilty with depth, white fine sand occasionally contains relative large lignite fragments.	162-208
CLAY	sandy, grayish-green to pale green, noncalcareous, quartz, cohesive, very soft, plastic, numerous angular quartz fragments, predominantly 1 mm (weathered granite).	208-212

137-050-12BBB

Date Completed:	9/29/77	Purpose:	Test Hole
L.S. Elevation (ft):	925	Well Type:	
Depth Drilled (ft):	222	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	gray	2-9
SAND	silty, clayey, fine, brown	9-21
SAND	silty, clayey, fine, blue	21-31
SAND	clean, blue, with clay layers	31-48
CLAY	soft, blue	48-72
TILL	clay, sandy, bouldery, blue	72-103
SAND	gravelly, colored, with boulders	103-115
TILL	clay, sandy, blue, hard	115-124
TILL	clay, sandy, blue, hard, with sand lenses	124-131
TILL	clay, sandy, blue, hard	131-182
TILL	clay, sandy, black, hard, with shale	182-212
GRANITE	weathered, white	212-222

137-050-16ADD2

Date Completed:	9/15/78	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Steel
Depth Drilled (ft):	193	Aquifer:	Undefined
Screened Interval (ft):	167-187	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-25
CLAY	blue, sandy, soft	25-78
CLAY	blue, sandy	78-110
SAND	gray, fine	110-114
CLAY	blue, sandy	114-115
SAND	gray, little dirty, fine	115-123
SAND	gray, blue, with small clay lenses	123-126

137-050-16ADD2 (continued)

CLAY	blue, sandy	126-129
SAND	drilled poor	129-136
CLAY	blue, sandy	136-137
SAND	gray	137-140
CLAY	blue, sandy	140-147
SAND	gray	147-149
CLAY	blue, gray, sandy, with sand lenses	149-151
SAND	gray	151-157
SAND	gray	157-166
CLAY	blue, sandy	166-167
SAND	colored	167-172
SAND	colored	172-177
SAND	colored	177-187
CLAY	sandy, with sand lenses	187-191
CLAY	sandy	191-193

137-050-16BCC1

Date Completed:	7/15/75	Purpose:	Test Hole
L.S. Elevation (ft):	933	Well Type:	
Depth Drilled (ft):	252	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-17
CLAY	brown, soft	17-25
CLAY	blue, soft	25-76
CLAY	blue, sandy	76-87
ROCK	no description	87-88
CLAY	blue, colored, sandy, with rock	88-93
CLAY	blue, sandy	93-114
SAND	colored	114-118
CLAY	blue, sandy	118-150
ROCK	no description	150-151
SAND	colored	151-153
CLAY	blue, sandy	153-163
ROCK	no description	163-164
CLAY	blue, sandy	164-172
SAND	colored	172-178
CLAY	blue, sandy	178-181

137-050-16BCC1 (continued)

SAND	no description	181-182
CLAY	blue, sandy	182-183
SAND	colored	183-188
CLAY	blue, sandy	188-190
SAND	colored	190-204
CLAY	blue, brown, sandy, with shale	204-222
ROCK	no description	222-223
CLAY	blue, green, sandy, with decomposed	223-252

137-050-16BCC2

Date Completed:	5/3/76	Purpose:	Test Hole
L.S. Elevation (ft):	933	Well Type:	
Depth Drilled (ft):	337		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown, soft	3-38
CLAY	blue, soft	38-75
CLAY	blue, sandy	75-80
SAND	colored	80-82
CLAY	blue, sandy	82-117
SAND	colored	117-122
CLAY	blue, sandy	122-135
CLAY	blue, sandy	135-139
CLAY	blue, sandy	139-171
SAND	blue	171-172
CLAY	blue, sandy	172-173
SAND	blue	173-175
CLAY	blue, sandy	175-191
SAND	blue	191-207
CLAY	blue, sandy	207-225
PRECAMBRIAN & CLAY	blue, green	225-232
PRECAMBRIAN	white, green, very sandy	232-265
PRECAMBRIAN	white, green, very sandy	265-272
PRECAMBRIAN	white, green, very sandy	272-284
PRECAMBRIAN	colored, with shale	284-317
PRECAMBRIAN	green, hard	317-337

137-050-19DDC

Date Completed:	1936	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-246	Log Source:	

Lithologic Log - unavailable

137-050-20DDB

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	4" PVC
Depth Drilled (ft):	197	Aquifer:	Undefined
Screened Interval (ft):	177-192	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-5
CLAY	yellow	5-24
CLAY	green	24-94
TILL	no description	94-127
SAND	fine	127-134
CLAY	no description	134-137
SAND	fine	137-138
CLAY	no description	138-147
SAND	no description	147-162
GRAVEL	coarse	162-180
GRAVEL	no description	180-190
GRAVEL	coarse	190-197

137-050-21DBC

Date Completed:	3/4/94	Purpose:	Industrial Well
L.S. Elevation (ft):	940	Well Type:	8" Steel
Depth Drilled (ft):	166	Aquifer:	Undefined
Screened Interval (ft):	130-150	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	silty	2-5
SAND	fine	5-10
CLAY	no description	10-15
CLAY	soft	15-86
CLAY	sandy	86-97
SAND	fine	97-116
SAND	no description	116-123
SAND	coarse	123-128
SAND & GRAVEL	no description	128-150

137-050-21DBC (continued)

CLAY	no description	150-151
SAND & GRAVEL	no description	151-153
GRAVEL	with lenses of clay	153-157
GRAVEL	no description	157-161
CLAY	no description	161-166

137-050-26DAA

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-108	Log Source:	

Lithologic Log - unavailable

137-050-28BCC

Date Completed:	6/24/74	Purpose:	Test Hole
L.S. Elevation (ft):	944	Well Type:	
Depth Drilled (ft):	203		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-22
CLAY	blue, soft	22-85
CLAY	blue, hard, sandy	85-96
BOULDER	blue	96-97
CLAY	blue, hard, sandy, rocky	97-138
SAND	blue, washed	138-140
CLAY	blue, hard, sandy	140-144
SAND	blue, washed	144-147
CLAY	blue, hard, sandy	147-188
CLAY	black, hard, sandy, shale	188-203

137-050-28CBC

Date Completed:	7/28/48	Purpose:	Test Hole
L.S. Elevation (ft):	940	Well Type:	
Depth Drilled (ft):	62		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	sandy clay, black, calcareous.	0-2
CLAY	silty, sandy, light grayish-brown, calcareous; shell and lignite fragments below 12 feet.	2-17
CLAY	silty, sandy, light brownish-gray, calcareous; lignite and shell fragments.	17-32
SAND	silty, light gray, dirty, calcareous; snail fragments.	32-42

137-050-28CBC (continued)

CLAY	silty, sandy, slightly pebbly, light gray, shale, calcareous; lignite and shell fragments.	42-47
CLAY	silty, sandy, light gray, calcareous; decreasing sand and lignite with depth; shell fragments.	47-57
CLAY	silty, light gray, calcareous; no shell fragments; some lignite.	57-62

137-050-29CAD

Date Completed:	9/26/74	Purpose:	Test Hole
L.S. Elevation (ft):	941	Well Type:	
Depth Drilled (ft):	270	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-29
CLAY	blue, soft	29-86
CLAY	blue, sandy	86-101
CLAY BOULDERS	blue, hard, sandy	101-115
SAND	blue	115-118
CLAY BOULDERS	no description	118-125
SAND	blue	125-132
CLAY BOULDERS	blue, hard, sandy	132-173
CLAY	blue, sandy, with sand lenses	173-190
SAND	blue	190-193
SAND	blue, with clay layers	193-223
CLAY	blue, softer, sandy	223-241
SAND	blue	241-254
SAND	blue, with clay layers	254-259
CLAY	blue, very soft, sandy	259-270

137-050-29DAB

Date Completed:	10/18/47	Purpose:	Test Hole
L.S. Elevation (ft):	940	Well Type:	
Depth Drilled (ft):	290	Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	sandy, gray.	0-5
SAND	coarse, clayey, light brown.	5-10
CLAY	silty, buff; shell fragments.	10-32
CLAY	silty, gray.	32-86
TILL	clay, sandy, fine gravel, shale pebbles, gray.	86-146
GRAVEL	clayey, gray.	146-148

137-050-29DAB (continued)

TILL	clay, sandy, fine gravel, shale pebbles, gray.	148-220
GRAVEL	clayey, gray.	220-225
TILL	clay, sandy, fine gravel, gray.	225-277
DECAYED GRANITE	clay, very light gray.	277-290

137-050-29DAD

Date Completed: 10/13/47
L.S. Elevation (ft): 940
Depth Drilled (ft): 286
Purpose: Test Hole
Well Type:
Log Source: unknown

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	clay, silty, sandy, black.	0-2
CLAY	silty, sandy, few shale pebbles, gray, occasional gypsum crystals.	2-5
CLAY	silty, sandy, buff, occasional gypsum crystals; laminated.	5-40
CLAY	silty, sandy, light gray, occasional gypsum crystals.	40-45
CLAY	silty, sandy, buff, iron concretions, occasional gypsum crystals.	45-50
CLAY	silty, sandy, light gray.	50-83
TILL	clay, sandy, fine and medium gravel, shale pebbles, gray.	83-92
GRAVEL	fine and medium, clayey, sandy, shale pebbles, gray.	92-94
TILL	clay, sandy, fine and medium gravel, shale pebbles, gray.	94-110
CLAY	sandy, a little fine and medium gravel, shale pebbles, gray.	110-145
TILL	clay, sandy, a lot of fine and medium gravel, shale pebbles, gray, some lignite.	145-190
TILL	clay, sandy, a lot of fine shale pebbles, quite a little fine gravel, gray, some lignite.	190-223
GRAVEL	fine and medium, clayey, coarse sand, a lot of shale pebbles, gray, some lignite.	223-237
SAND	coarse, clayey, fine gravel, a lot of shale pebbles, gray.	237-244
GRAVEL	fine, clayey, sandy, shale pebbles, gray.	244-250
GRAVEL	fine, clayey, a little medium sand, few fine shale pebbles; rock at 273 feet.	250-273
DECAYED GRANITE	clay, sandy, white.	273-286

137-050-29DBB

Date Completed: 0
L.S. Elevation (ft): 940
Depth Drilled (ft): 175
Purpose: Test Hole
Well Type:
Log Source: unknown

Lithologic Log

Unit	Description	Depth (ft)
CLAY	very little silt, light gray.	0-5
CLAY	light gray; limonite nodules.	5-15
CLAY	buff, little selenite.	15-22

137-050-29DBB (continued)

CLAY	light olive-gray, selenite, occasional shell fragment	22-45
SAND	gravelly, quartz, shale, carbonate.	45-50
CLAY	light olive-gray, few selenite crystals and shell fragments.	50-65
CLAY	slightly sandy, slightly pebbly, light olive-gray.	65-70
NO RETURN	no description	70-75
CLAY	slightly sandy, slightly pebbly, light olive-gray.	75-80
TILL	clay, silty, sandy, gravelly, light gray; lignite from 85 to 90 feet.	80-100
SAND	fine to very coarse, predominantly medium, quartz with shale gravel.	100-105
CLAY	silty, sandy, gravelly, gray, some lignite.	105-130
CLAY	silty, sandy, gray; lignite from 130 to 140 feet.	130-155
SAND	clayey, gravelly, shale, carbonate, gray; contains wood and lignite fragments.	155-160
SAND	fine to very coarse, gravelly, light gray, quartz, shale, carbonate, lignite.	160-165
SAND	very fine to very coarse, predominantly fine and medium, slightly clayey, slightly gravelly, tan.	165-168
SAND	fine, slightly gravelly, with lots of shale, tan to gray.	168-170
CLAY	silty, sandy, gravelly, gray.	170-175

137-050-30CAD

Date Completed:	1940	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-183	Log Source:	

Lithologic Log - unavailable

137-050-30DBC

Date Completed:	10/22/47	Purpose:	Test Hole
L.S. Elevation (ft):	937	Well Type:	
Depth Drilled (ft):	255		
		Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
CLAY	sandy, little gravel, dark gray.	0-5
CLAY	silty, sandy, buff, gypsum.	5-33
CLAY	silty, sandy, light gray.	33-84
TILL	clay, sandy, gravelly, gray; possible lake clay from 135 to 150 feet.	84-171
GRAVEL	clayey, sandy, gray, nearly all shale pebbles.	171-173
TILL	clay, sandy, gravelly, bouldery, gray, indurated.	173-248
DECAYED GRANITE	clay, sandy, gravelly, very light gray.	248-255

137-050-33ACA

Date Completed:	8/11/83	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" PVC
Depth Drilled (ft):	150	Aquifer:	Undefined
Screened Interval (ft):	142-150	Log Source:	Water Smith, Inc

137-050-33ACA (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-15
CLAY	brown	15-40
CLAY	small sand lenses	40-138
SAND	gray, clean, medium	138-150

137-050-35CCB

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	933	Well Type:	4" Unknown
Depth Drilled (ft):	378	Aquifer:	Undefined
Screened Interval (ft):	0-138	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-5
SAND	fine, dirty, brown	5-30
CLAY	green	30-49
CLAY	blue	49-81
CLAY	hard, blue	81-159
CLAY	sandy, soft, gray	159-237
SAND	gray	237-238
CLAY	sandy, gray	238-252
SAND	dirty, gray	252-255
CLAY	sandy, gray	255-268
SAND	gray	268-270
CLAY	sandy, gray	270-283
GRANITE	decomposed, white	283-378

137-051-01BBB2

Date Completed:	1957	Purpose:	Municipal Well
L.S. Elevation (ft):	917	Well Type:	6" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-147	Log Source:	

Lithologic Log - unavailable

137-051-02DDD2

Date Completed:	10/2/91	Purpose:	Domestic Well
L.S. Elevation (ft):	923	Well Type:	4" PVC
Depth Drilled (ft):	174	Aquifer:	Undefined
Screened Interval (ft):	155-165	Log Source:	Lako Drilling

Lithologic Log

137-051-02DDD2 (continued)

Unit	Description	Depth (ft)
TOPSOIL	no description	0-3
CLAY	yellow	3-34
CLAY	gray	34-70
GRAVEL	no description	70-72
TILL	no description	72-140
SAND	no description	140-174

137-051-06CBB

Date Completed:	1948	Purpose:	Domestic Well
L.S. Elevation (ft):	936	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-107	Log Source:	

Lithologic Log - unavailable

137-051-11CCC2

Date Completed:	10/3/80	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Steel
Depth Drilled (ft):	227	Aquifer:	Undefined
Screened Interval (ft):	216-222	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-27
CLAY	blue	27-75
CLAY	blue, sandy	75-143
SAND	colored	143-154
CLAY	blue, sandy	154-155
SAND	colored	155-158
CLAY	blue, sandy	158-196
SAND	no description	196-201
CLAY	blue, sandy	201-202
SAND	no description	202-227

137-051-16ADD

Date Completed:	8/4/82	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Steel
Depth Drilled (ft):	267	Aquifer:	Undefined
Screened Interval (ft):	252-265	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1

137-051-16ADD (continued)

CLAY	yellow, soft	1-39
CLAY	blue, soft	39-75
CLAY	blue, sandy	75-77
SAND	colored	77-79
CLAY	blue, sandy	79-83
SAND	colored	83-87
CLAY BOULDERS	blue, hard, sandy	87-118
CLAY	blue, hard, sandy	118-144
CLAY	blue, softer, sandy	144-156
CLAY BOULDERS	blue, hard, sandy	156-198
CLAY	blue, hard, sandy	198-211
CLAY	blue, softer, sandy	211-245
SAND	gray	245-247
CLAY	blue, sandy	247-249
SAND	gray	249-252
CLAY	blue, sandy	252-253
SAND	gray	253-267

137-051-21BCC

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	946	Well Type:	1.25" PVC
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-167	Log Source:	

Lithologic Log - unavailable

137-051-26AAC

Date Completed:	10/5/91	Purpose:	Domestic Well
L.S. Elevation (ft):	937	Well Type:	4" PVC
Depth Drilled (ft):	150	Aquifer:	Undefined
Screened Interval (ft):	140-150	Log Source:	Wieber Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-3
CLAY	yellow, soft	3-46
SAND	strips of fine sand, with blue clay	46-93
ROCKS	two large rocks	93-110
CLAY	hard, blue	110-134
CLAY	small stones with clay	134-140
SAND	coarse, gray, very clean; could not drill through large rock at 150 ft	140-150

137-051-28CDC

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	956	Well Type:	2" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-84	Log Source:	

Lithologic Log - unavailable

137-051-33DCD

Date Completed:	8/5/48	Purpose:	Test Hole
L.S. Elevation (ft):	1023	Well Type:	
Depth Drilled (ft):	42		
		Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
SILT	Silt, clayey, sandy, yellow-brown.	0-7
SILT	Silt, clayey, yellow-brown.	7-12
SAND	Sand, fine, silty, yellow-brown.	12-17
SAND	Sand, fine, silty, yellow-brown; interbedded silt, gray.	17-22
SILT	Silt, clayey, brownish-gray.	22-27
SILT	Silt, clayey, light olive-gray.	27-37
CLAY	Clay, silty, light olive-gray.	37-42

137-051-34CCC

Date Completed:	8/5/48	Purpose:	Test Hole
L.S. Elevation (ft):	980	Well Type:	
Depth Drilled (ft):	52		
		Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
SILT	Silt, sandy, fine, brownish-tan.	0-2
SILT	Silt, clayey, sandy, fine, tannish-brown.	2-7
SAND	Sand, very fine and fine, silty, yellow-brown.	7-12
SILT	Silt, sandy, slightly pebbly, light gray.	12-22
SILT	Silt, clayey, sandy, slightly pebbly, light gray; snail shells.	22-27
SILT	Silt, clayey, light gray; snail shell.	27-42
CLAY	Clay, silty, light olive-gray.	42-52

137-051-34DDD

Date Completed:	8/4/48	Purpose:	Test Hole
L.S. Elevation (ft):	965	Well Type:	
Depth Drilled (ft):	62		
		Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	Topsoil, clay, silty, sandy, black.	0-2

137-051-34DDD (continued)

SAND	Sand, very fine, silty, tannish-brown; shell fragments.	2-7
SAND	Sand, very fine, tannish-brown.	7-12
CLAY	Clay, silty, sandy, yellowish-brown; occasional shell fragment from 12 to 22 feet.	12-32
CLAY	Clay, silty, light brownish-gray; interbedded gray silt.	32-37
CLAY	Clay, silty, light olive-gray.	37-62

137-051-35BBB

Date Completed:	3/14/58	Purpose:	Domestic Well
L.S. Elevation (ft):	946	Well Type:	4" Unknown
Depth Drilled (ft):	343	Aquifer:	Undefined
Screened Interval (ft):	0-330	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-21
CLAY	blue	21-93
CLAY	with boulders, blue	93-104
CLAY	soft, blue	104-115
CLAY	hard, blue	115-121
SAND	brown	121-122
CLAY	hard, blue	122-135
SAND	fine, brown	135-141
CLAY	with boulders, blue	141-155
CLAY	soft, blue	155-178
SAND	brown	178-179
CLAY	sandy, hard, blue	179-247
CLAY	soft, gray	247-265
GRANITE	decomposed, white	265-343

137-051-35CDD2

Date Completed:	6/1959	Purpose:	Domestic Well
L.S. Elevation (ft):	962	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-207	Log Source:	

Lithologic Log - unavailable

138-047-01ABABCD

Date Completed:	11/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	932	Well Type:	4" Stainless Steel
Depth Drilled (ft):	83	Aquifer:	Undefined
Screened Interval (ft):	76-80	Log Source:	LTP Enterprises, Inc

Lithologic Log

138-047-01ABABCD (continued)

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-1
SAND	sand and clay, brown	1-13
CLAY	clay, blue	13-62
SAND	sand, colored	62-66
CLAY	sandy clay, blue	66-72
SAND	sand, colored	72-80
CLAY	sandy clay, blue	80-81
SAND	sand, blue	81-83

138-047-03ADCACC

Date Completed:	5/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	228	Aquifer:	Undefined
Screened Interval (ft):	222-228	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	sandy clay, yellow, soft	1-10
CLAY	clay, blue, soft	10-78
CLAY	clay + stones, gray, medium hardness	78-84
GRAVEL	coarse gravel, gray, soft	84-85
BOULDERS	boulder, varied color, hard	85-86
CLAY	clay + stones, gray, medium hardness	86-122
CLAY	clay + stones, gray, medium hardness	122-153
BOULDERS	boulder, varied color, hard	153-154
CLAY	clay + stones, gray, medium hardness	154-180
SAND	silty fine sand, gray, soft	180-196
CLAY	clay + stones, gray, medium hardness	196-204
SAND	silty fine sand, gray, soft	204-214
CLAY	clay + stones, gray, medium hardness	214-222
SAND	fine to medium sand, gray, soft	222-228

138-047-04CCDDBC

Date Completed:	7/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	917	Well Type:	4" Stainless Steel
Depth Drilled (ft):	134	Aquifer:	Buffalo
Screened Interval (ft):	128-134	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1

138-047-04CCDDBC (continued)

CLAY	clay, yellow, soft	1-16
CLAY	clay, blue, soft	16-105
CLAY	clay + stones, gray, soft	105-122
SAND	fine sand (no water), gray, soft	122-126
CLAY	clay + stones, gray, soft	126-128
SAND	clean medium sand, gray, soft	128-134

138-047-04CDCCCA

Date Completed:	9/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	920	Well Type:	5" Stainless Steel
Depth Drilled (ft):	302	Aquifer:	Undefined
Screened Interval (ft):	292-300	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, brown, soft	2-15
CLAY	clay, gray, soft	15-102
CLAY	clay & rocks, gray, medium hardness	102-113
SAND	dirty sand, gray, soft	113-115
CLAY	clay + stones + rocks, gray, medium soft	115-157
CLAY	sandy clay, gray, medium hardness	157-200
CLAY	clay smeary, gray	200-240
CLAY	clay, gray, medium hardness	240-260
CLAY	clay + sand + stones, gray, medium hardness	260-285
SAND	sand, gray, soft	285-302

138-047-05ABBBCC

Date Completed:	8/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	0" Stainless Steel
Depth Drilled (ft):	100	Aquifer:	Buffalo
Screened Interval (ft):	96-100	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
CLAY	sandy clay, yellow, soft	0-16
CLAY	clay, yellow-blu, soft	16-24
SAND	sand, gray	24-100

138-047-05BABAAC

Date Completed:	2/1986	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	93	Aquifer:	Buffalo
Screened Interval (ft):	88-93	Log Source:	LTP Enterprises, Inc

Lithologic Log

138-047-05BABAAC (continued)

Unit	Description	Depth (ft)
SOIL	top soil, black	0-3
CLAY	clay, brown	3-16
CLAY	clay, gray	16-43
CLAY	sandy clay, gray	43-76
SAND	sand, brown	76-93

138-047-05BABADA

Date Completed:	9/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	90	Aquifer:	Buffalo
Screened Interval (ft):	84-90	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-12
CLAY	clay, blue, soft	12-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-70
CLAY	clay, blue, soft	70-84
SAND	fine to coarse sand, gray, soft	84-90

138-047-05CCBBAC

Date Completed:	9/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	85	Aquifer:	Buffalo
Screened Interval (ft):	79-85	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, blue, soft	1-17
SAND	fine silty sand, gray, soft	17-21
SAND	fine water sand, gray, soft	21-37
SAND	fine water sand, gray, soft	37-65
SAND	medium water sand, gray, soft	65-85

138-047-05CCCCAC

Date Completed:	5/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	92	Aquifer:	Buffalo
Screened Interval (ft):	85-91	Log Source:	LTP Enterprises, Inc

Lithologic Log

138-047-05CCCCAC (continued)

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-5
SAND	sand, brown	5-27
SAND	sand, gray	27-72
SAND	sand, blue	72-92

138-047-05CDDDDA

Date Completed:	9/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	85	Aquifer:	Buffalo
Screened Interval (ft):	79-85	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-7
SAND	silty fine sand, gray, soft	7-38
CLAY	clay, gray, soft	38-39
SAND	fine sand, gray, soft	39-70
SAND	fine to coarse sand, gray, soft	70-85

138-047-07ADDDDC

Date Completed:	12/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" PVC
Depth Drilled (ft):	98	Aquifer:	Buffalo
Screened Interval (ft):	81-98	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-1
CLAY	silty clay, yellow	1-14
SAND	fine sand, yellow	14-25
SAND	fine sand, gray	25-57
CLAY	clay and till	57-62
SAND	sand	62-74
TILL	till	74-81
SAND	sand	81-98

138-047-07DDADA2

Date Completed:	10/27/93	Purpose:	Municipal Well
L.S. Elevation (ft):	927	Well Type:	8" Steel
Depth Drilled (ft):	104	Aquifer:	Buffalo
Screened Interval (ft):	67.5-92.5	Log Source:	LTP Enterprises, Inc

Lithologic Log

138-047-07DDADA2 (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-14
CLAY	gray	14-25
SAND	gray, with lenses of clay	25-35
SAND	silty, gray	35-47
SAND	colored, drilled good, took water	47-92
SAND	silty, with clay, gray	92-104

138-047-07DDADAB

Date Completed:	6/1960	Purpose:	Municipal Well
L.S. Elevation (ft):	926	Well Type:	8" Stainless Steel
Depth Drilled (ft):	98	Aquifer:	Buffalo
Screened Interval (ft):	60-94	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black	0-1
CLAY	clay, yellow	1-5
CLAY	sandy clay, brown	5-15
CLAY	clay, blue	15-38
SAND	dirty sand, gray	38-42
SAND	fine sand, gray	42-61
SAND	coarse sand, gray	61-76
SAND	fine sand, gray	76-81
SAND	fine sand with lenses of coal, gray-black	81-94
CLAY	clay, blue	94-98

138-047-08CDCCDA

Date Completed:	6/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	76	Aquifer:	Buffalo
Screened Interval (ft):	70-76	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-12
CLAY	clay, blue, soft	12-25
SAND	fine sand, gray, soft	25-43
SAND	fine sand, gray, soft	43-61
SAND	medium water sand, gray, soft	61-76

138-047-09CBD

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	916	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

138-047-10BBBCAA

Date Completed:	11/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	922	Well Type:	4" Stainless Steel
Depth Drilled (ft):	259	Aquifer:	Undefined
Screened Interval (ft):	253-259	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-17
CLAY	clay, blue, soft	17-50
CLAY	clay, blue, soft	50-70
CLAY	clay, blue, soft	70-98
GRAVEL	gravel, varied hardness	98-111
CLAY	clay & stones, gray, medium hardness	111-150
CLAY	clay & stones, gray, medium hardness	150-190
CLAY	clay & stones, gray, medium hardness	190-200
CLAY	clay & stones, gray, medium hardness	200-220
CLAY	clay & stones, gray, medium hardness	220-239
SAND	coarse sand, gray, soft	239-259

138-047-10CCBBBD

Date Completed:	11/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	6" Stainless Steel
Depth Drilled (ft):	352	Aquifer:	Undefined
Screened Interval (ft):	337-352	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-2
CLAY	clay, brown, soft	2-4
CLAY	clay + sand, yellow, soft	4-8
CLAY	clay, brown, soft	8-10
CLAY	clay, blue, soft	10-93
CLAY	clay + sand, gray, varied hardness	93-140
CLAY	clay + stones, gray, varied hardness	140-200
CLAY	clay + stones, gray, varied hardness	200-248
SAND	sand, gray, soft	248-250
CLAY	clay + stones, gray, medium hardness	250-260

138-047-10CCBBBD (continued)

SAND	fine sand dirty, gray, soft	260-262
CLAY	clay + stones, gray, medium hardness	262-275
SAND	sand fine clean, gray, soft	275-325
SAND	sand medium clean, gray, soft	325-352

138-047-10CCBBDB

Date Completed:	8/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	6" Stainless Steel
Depth Drilled (ft):	352	Aquifer:	Undefined
Screened Interval (ft):	337-352	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-2
CLAY	clay, brown, soft	2-4
CLAY	clay + sand, yellow, soft	4-8
CLAY	clay, brown, soft	8-10
CLAY	clay, blue, soft	10-93
CLAY	clay + sand, gray, varied hardness	93-140
CLAY	clay + stones, gray, varied hardness	140-148
BOULDERS	boulder, hard	148-150
CLAY	clay, gray, medium hardness	150-200
CLAY	clay + stones, gray, medium hardness	200-212
BOULDERS	boulder, hard	212-213
CLAY	clay + stones, gray, medium hardness	213-262
CLAY	clay + stones, gray, medium hardness	262-275
SANDSTONE	fine clean sand, gray, soft	275-325
SANDSTONE	medium clean sand, gray, soft	325-352

138-047-14BBCCCC

Date Completed:	1/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	194	Aquifer:	Undefined
Screened Interval (ft):	184-189	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-5
CLAY	clay, brown, soft	5-14
CLAY	clay, blue	14-22
CLAY	clay, blue, soft	22-84
CLAY	sandy clay, blue	84-111
CLAY	sandy clay with rock, blue	111-112

138-047-14BBCCCC (continued)

CLAY	sandy clay, blue	112-121
BOULDERS	rock	121-122
SAND	sand	122-123
CLAY	sandy clay, blue	123-137
BOULDERS	rock	137-138
CLAY	sandy clay with rock, blue, hard	138-146
BOULDERS	rock	146-147
CLAY	sandy clay with rock, blue, hard	147-161
CLAY	sandy clay, blue, hard	161-172
CLAY	sandy clay, blue, softer	172-183
SAND	sand	183-189
SAND	sand with dirty lenses	189-191
CLAY	sandy clay, blue	191-194

138-047-14CCCACC

Date Completed:	5/1991	Purpose:	Domestic Well
L.S. Elevation (ft):	930	Well Type:	4" Stainless Steel
Depth Drilled (ft):	287	Aquifer:	Undefined
Screened Interval (ft):	279-283	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, yellow	2-14
CLAY	clay, blue	14-82
CLAY	sandy clay, gray	82-121
SAND	sand, gray	121-123
CLAY	sandy clay with rock, gray	123-141
SAND	sand, varied color	141-145
CLAY	rocky clay with rock and lenses, gray	145-161
SAND	sand, varied color	161-162
CLAY	sandy clay, gray	162-192
CLAY	sandy clay, gray	192-232
CLAY	sandy clay, gray	232-255
SAND	sand, brown	255-266
NO SAMPLE	lenses	266-267
SAND	sand, brown	267-273
SAND	lenses of sand, brown	273-276
SAND	sand, brown	276-283
SAND	sand with lenses of clay, brown	283-287

138-047-16B

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	917	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

138-047-16DABBDB

Date Completed:	6/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Stainless Steel
Depth Drilled (ft):	120	Aquifer:	Undefined
Screened Interval (ft):	114-120	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-14
CLAY	clay, blue, soft	14-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-70
CLAY	clay, blue, soft	70-90
CLAY	clay, blue, soft	90-110
SAND	fine to coarse sand, gray, soft	110-120

138-047-17A

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	920	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

138-047-17BAABBB

Date Completed:	7/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	2" Stainless Steel
Depth Drilled (ft):	77	Aquifer:	Buffalo
Screened Interval (ft):	68-72	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
SAND	sand, brown	1-8
CLAY	sandy clay with lenses of sand, brown	8-15
SAND	sand, colored	15-72
SAND	sand drilled dirty with clay	72-77

138-047-17BBAABB

Date Completed:	11/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	87	Aquifer:	Buffalo
Screened Interval (ft):	81-87	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-13
CLAY	clay, blue, soft	13-24
SAND	fine sand, gray, soft	24-41
SAND	fine sand, gray, soft	41-63
SAND	medium sand, gray, soft	63-87

138-047-17BBAACC

Date Completed:	9/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	55	Aquifer:	Buffalo
Screened Interval (ft):	51-55	Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
SOIL	dirt, black	0-2
CLAY	clay, yellow	2-27
SAND	fine sand	27-28
CLAY	clay, blue	28-49
GRAVEL	couarse gravel	49-55

138-047-17BBABBD

Date Completed:	7/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	95	Aquifer:	Buffalo
Screened Interval (ft):	87-95	Log Source:	Olson Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, gray, soft	0-30
SAND	fine sand, gray, soft	30-85
SAND	sand, gray, soft	85-95
CLAY	clay, blue, soft	95-95

138-047-17BBABCC

Date Completed:	3/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" Stainless Steel
Depth Drilled (ft):	78	Aquifer:	Buffalo
Screened Interval (ft):	70-76	Log Source:	Paasch

Lithologic Log

138-047-17BBABCC (continued)

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-17
SAND	sand, yellow, soft	17-22
CLAY	clay, blue, soft	22-28
SAND	fine sand, gray, soft	28-40
SAND	medium sand, gray, soft	40-50
SAND	coarse sand, gray, soft	50-76
ROCK	rocks, varied color, hard	76-78

138-047-17BBBCAC

Date Completed:	9/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	92	Aquifer:	Buffalo
Screened Interval (ft):	87-92	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
SAND	sand, brown, soft	1-12
CLAY	clay, brown, soft	12-20
SAND	sand, gray, soft	20-72
SAND	sand and rocks, gray, soft	72-92

138-047-17D

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	922	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

138-047-17DBABDD

Date Completed:	5/1973	Purpose:	Domestic Well
L.S. Elevation (ft):	917	Well Type:	4" Stainless Steel
Depth Drilled (ft):	147	Aquifer:	Buffalo
Screened Interval (ft):	140-144	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, brown	1-12
CLAY	clay, blue	12-15
CLAY	shale, blue	15-55
CLAY	silty clay, blue, soft	55-93

138-047-17DBABDD (continued)

CLAY	sandy clay, blue	93-98
SAND	sand, colored	98-99
CLAY	sandy clay, blue	99-122
SAND	sand, colored	122-124
CLAY	sandy clay, blue	124-128
SAND	sand, colored	128-129
CLAY	sandy clay with lenses of sand, blue	129-136
SAND	sand, colored	136-138
CLAY	sandy clay, blue	138-139
SAND	sand, colored	139-144
CLAY	sandy clay, blue	144-147

138-047-17DCCCCC

Date Completed:	5/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	923	Well Type:	4" Stainless Steel
Depth Drilled (ft):	203	Aquifer:	Buffalo
Screened Interval (ft):	192-198	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-13
CLAY	clay, blue	13-22
SAND	silty sand	22-47
SAND	fine sand	47-98
CLAY	sandy clay, blue	98-102
SAND	sand	102-104
CLAY	sandy clay, blue	104-107
SAND	sand	107-112
CLAY	sandy clay, blue	112-120
CLAY	sandy clay with rock, blue, hard	120-124
CLAY	sandy clay with lenses of sand, blue	124-126
CLAY	sandy clay, blue, hard	126-136
SAND	sand	136-138
CLAY	sandy clay, blue	138-141
SAND	sand	141-142
CLAY	sandy clay rocky, blue, hard	142-157
BOULDERS	rock	157-158
CLAY	sandy clay rocky, blue, hard	158-164
BOULDERS	rock	164-165
CLAY	sandy clay rocky, blue, hard	165-177

138-047-17DCCCCC (continued)

SAND	very fine sand	177-187
GRAVEL	gravel + rock	187-203

138-047-18AADDAB

Date Completed:	8/1976	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	96	Aquifer:	Buffalo
Screened Interval (ft):	90-96	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-2
CLAY	clay, yellow-brown, soft	2-24
CLAY	clay, blue, soft	24-43
SAND	sand, gray, soft	43-85
SAND	coarse water sand, gray, soft	85-96

138-047-18AADDAD

Date Completed:	12/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	924	Well Type:	4" Stainless Steel
Depth Drilled (ft):	90	Aquifer:	Buffalo
Screened Interval (ft):	84-90	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-20
CLAY	clay, blue, soft	20-30
CLAY	clay, blue, soft	30-50
CLAY	clay, blue, soft	50-77
SAND	fine to coarse sand, gray, soft	77-90

138-047-19ACDCAC

Date Completed:	11/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	177	Aquifer:	Buffalo
Screened Interval (ft):	169-174	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-17
CLAY	clay, blue, soft	17-22
SAND	silty sand + very dirty	22-70
SAND	sand + clay, blue, very soft	70-81

138-047-19ACDCAC (continued)

CLAY	clay, blue, soft	81-96
CLAY	sandy clay, blue	96-130
BOULDERS	rock	130-131
SAND	sand	131-132
CLAY	sandy clay, blue	132-151
SAND	sand	151-153
CLAY	sandy clay, blue	153-156
SAND	sand	156-157
CLAY	sandy clay, blue	157-158
SAND	sand	158-162
CLAY	sandy clay, blue	162-163
SAND	sand	163-164
CLAY	sandy clay, blue	164-166
SAND	sand	166-174
CLAY	sandy clay, blue	174-177

138-047-20CCBCBC

Date Completed:	10/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	926	Well Type:	4" Stainless Steel
Depth Drilled (ft):	70	Aquifer:	Buffalo
Screened Interval (ft):	63-70	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay + fine sand, yellow, soft	1-12
CLAY	clay, blue, soft	12-19
SAND	fine sand clean, gray, soft	19-45
SAND	fine medium water sand, gray, soft	45-61
SAND	medium water sand, gray, soft	61-70

138-047-22CBACBB

Date Completed:	5/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	921	Well Type:	4" Stainless Steel
Depth Drilled (ft):	240	Aquifer:	Undefined
Screened Interval (ft):	232-236	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-14
CLAY	clay, blue, soft	14-87
CLAY	sandy clay, blue	87-112

138-047-22CBACBB (continued)

SAND	sand	112-113
CLAY	sandy clay, blue	113-115
SAND	coarse sand	115-116
CLAY	sandy clay, blue	116-117
BOULDERS	rock	117-137
CLAY	sandy clay, blue	137-216
CLAY	sandy clay, blue	216-217
SAND	sand + gravel	217-232
SAND	finer sand	232-237
CLAY	sandy clay, blue	237-240

138-047-23ADADCD

Date Completed:	4/1980	Purpose:	Domestic Well
L.S. Elevation (ft):	933	Well Type:	4" Stainless Steel
Depth Drilled (ft):	95	Aquifer:	Undefined
Screened Interval (ft):	80-86	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay soft, brown	2-12
CLAY	sandy clay soft, blue	12-52
SAND	sand drilled good #8 #10	52-90
CLAY	sandy clay, blue	90-91
CLAY	sandy clay/lenses, blue	91-95

138-047-24ABAABA

Date Completed:	5/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	935	Well Type:	0" Stainless Steel
Depth Drilled (ft):	60	Aquifer:	Undefined
Screened Interval (ft):	54-60	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	sandy clay, yellow, soft	1-3
CLAY	clay, gray-brown, soft	3-10
CLAY	clay, gray, soft	10-26
SAND	silty sand, gray, soft	26-42
SAND	fine sand, gray, soft	42-49
SAND	coarse clean sand, gray, soft	49-60

138-047-24CDCDAD

Date Completed:	9/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	933	Well Type:	4" Stainless Steel
Depth Drilled (ft):	84	Aquifer:	Undefined
Screened Interval (ft):	76-84	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-16
CLAY	clay, blue, soft	16-30
CLAY	clay, blue, soft	30-50
CLAY	clay + stones, gray, varied hardness	50-69
CLAY	clay + stones, gray, varied hardness	69-74
SAND	water sand, gray, soft	74-84

138-047-26DBBACB

Date Completed:	5/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	931	Well Type:	4" Stainless Steel
Depth Drilled (ft):	175	Aquifer:	Undefined
Screened Interval (ft):	169-175	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, brown, soft	1-10
CLAY	clay, dark gray, soft	10-40
CLAY	lighter gray clay, gray, soft	40-60
CLAY	clay + small stones, gray, soft	60-79
SAND	quick sand, gray, very soft	79-86
BOULDERS	small boulder, hard	86-94
GRAVEL	gravel + shale, soft	94-98
CLAY	clay, gray, medium hardness	98-102
GRAVEL	gravel	102-105
CLAY	clay + stones, gray, soft	105-120
CLAY	clay + stones, gray, soft	120-165
SAND	coarse clean sand, gray, soft	165-175

138-047-27CDDDDB

Date Completed:	10/1980	Purpose:	Domestic Well
L.S. Elevation (ft):	930	Well Type:	4" Stainless Steel
Depth Drilled (ft):	220	Aquifer:	Undefined
Screened Interval (ft):	216-220	Log Source:	Antonsen

Lithologic Log

138-047-27CDDDDB (continued)

Unit	Description	Depth (ft)
SOIL	dirt, black, soft	0-6
CLAY	clay, yellow, hard	6-29
CLAY	clay, blue, soft	29-180
GRAVEL	gravel + clay, gray, very hard	180-196
GRAVEL	gravel, brown, soft	196-220

138-047-29CBBBBA

Date Completed:	6/1970	Purpose:	Domestic Well
L.S. Elevation (ft):	934	Well Type:	4" Stainless Steel
Depth Drilled (ft):	90	Aquifer:	Buffalo
Screened Interval (ft):	84-90	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	topsoil, black, soft	0-1
CLAY	clay, yellow, soft	1-5
SAND	sand, yellow, soft	5-90

138-047-29D

Date Completed:	00/00/00	Purpose:	Irrigation Well
L.S. Elevation (ft):	923	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Buffalo
Screened Interval (ft):	0-0	Log Source:	

Lithologic Log - unavailable

138-047-30CDDDDB

Date Completed:	8/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	918	Well Type:	5" Stainless Steel
Depth Drilled (ft):	197	Aquifer:	Buffalo
Screened Interval (ft):	192-197	Log Source:	Olson Well Drilling

Lithologic Log

Unit	Description	Depth (ft)
CLAY	clay, yellow, soft	0-10
CLAY	clay, blue, soft	10-110
SAND	sand + clay, blue, soft	110-150
CLAY	clay, blue, soft	150-170
SAND	fine sand, gray, soft	170-185
SAND	sand, gray, soft	185-197

138-047-32BCDDCD

Date Completed:	7/1989	Purpose:	Irrigation Well
L.S. Elevation (ft):	932	Well Type:	12" Stainless Steel
Depth Drilled (ft):	183	Aquifer:	Buffalo
Screened Interval (ft):	118-153	Log Source:	LTP Enterprises, Inc

138-047-32BCDDCD (continued)

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	silty clay, brown	2-6
CLAY	sandy clay with pebbles, brown	6-14
SAND	fine sand, gray	14-83
SAND	fine sand, gray	83-93
SAND	sand, gray	93-138
SAND	sand, gray	138-150
SAND	sand, gray	150-171
SAND	fine sand, gray-brown	171-183

138-048-01ACABAB

Date Completed:	8/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	915	Well Type:	5" Stainless Steel
Depth Drilled (ft):	176	Aquifer:	Undefined
Screened Interval (ft):	168-176	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-3
CLAY	clay, yellow, soft	3-17
CLAY	clay, gray, soft	17-99
CLAY	clay and stones, gray, soft	99-104
BOULDERS	small boulder, gray	104-105
CLAY	clay and stones, gray, medium hardness	105-112
CLAY	clay and rocks, gray, medium hardness	112-165
SAND	sand, gray, soft	165-176

138-048-02AADDBD

Date Completed:	11/1990	Purpose:	Domestic Well
L.S. Elevation (ft):	915	Well Type:	4" PVC
Depth Drilled (ft):	235	Aquifer:	Undefined
Screened Interval (ft):	225-235	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, yellow	1-12
CLAY	clay, gray	12-90
TILL	till	90-130
SAND	coarse sand	130-132
TILL	till	132-137

138-048-02AADDBD (continued)

SAND	sand	137-138
TILL	till	138-170
BOULDERS	rock	170-171
GRAVEL	gravel	171-235

138-048-02BDCACA

Date Completed:	6/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	913	Well Type:	4" Stainless Steel
Depth Drilled (ft):	166	Aquifer:	Undefined
Screened Interval (ft):	160-166	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-15
SAND	quick sand, yellow, soft	15-35
CLAY	clay, gray, soft	35-95
CLAY	clay and stones, gray, soft	95-149
SAND	clean coarse sand, gray, soft	149-166

138-048-04BBCCAD

Date Completed:	8/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	4" Stainless Steel
Depth Drilled (ft):	144	Aquifer:	Undefined
Screened Interval (ft):	135-140	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil + rock, black	0-2
CLAY	clay, brown	2-15
CLAY	clay, blue, soft	15-72
SAND	fine sand, colored	72-81
CLAY	sandy clay, gray, hard	81-130
SAND	sand #8 #10 drilled dirty, colored	130-135
SAND	sand drilled better, colored	135-140
CLAY	sandy clay with lenses sand, gray	140-144

138-048-06BBABAC

Date Completed:	5/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	895	Well Type:	4" Stainless Steel
Depth Drilled (ft):	0	Aquifer:	Dakota Group
Screened Interval (ft):	297-303	Log Source:	

Lithologic Log - unavailable

138-048-06CACCDB

Date Completed:	10/1974	Purpose:	Domestic Well
L.S. Elevation (ft):	905	Well Type:	4" Stainless Steel
Depth Drilled (ft):	302	Aquifer:	Dakota Group
Screened Interval (ft):	287-293	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-3
CLAY	clay, brown	3-15
CLAY	shale, blue	15-85
CLAY	sandy clay, blue	85-111
SAND	sand, blue	111-113
CLAY	sandy clay, blue	113-116
SAND	sand, blue	116-117
CLAY	sandy clay, blue	117-121
SAND	sand	121-122
CLAY	sandy clay, blue	122-123
SAND	sand	123-124
CLAY	sandy clay, blue	124-191
SAND	sand drilled dirty	191-193
CLAY	sandy clay, blue	193-195
SAND	fine sand	195-201
CLAY	sandy clay, blue	201-205
SHALE	shale black blue gray brown	205-219
SHALE	shale, blue-black	219-224
SHALE	shale, colored	224-231
SANDSTONE	sand	231-232
SHALE	shale brown blue black	232-270
SHALE	shale black brown light gray	270-284
SANDSTONE	sandstone, gray	284-293
SHALE	shale	293-302

138-048-06CDDBAA

Date Completed:	9/1972	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" Stainless Steel
Depth Drilled (ft):	202	Aquifer:	Undefined
Screened Interval (ft):	186-197	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-4
CLAY	clay, brown	4-17
CLAY	shale, brown	17-20

138-048-06CDDBAA (continued)

CLAY	shale, blue	20-84
CLAY	sandy clay, blue	84-86
SAND	sand tried, blue	86-92
CLAY	sandy clay, blue	92-117
CLAY	sandy clay, blue, soft	117-120
CLAY	sandy clay, blue	120-135
SAND	sand, colored	135-139
CLAY	clay, blue	139-140
SAND	sand tried, colored	140-148
CLAY	sandy clay, blue	148-164
CLAY	sandy clay + shale, blue-black	164-185
CLAY	sandy clay + shale with lenses, blue-black	185-189
SAND	sand fine, blue	189-197
CLAY	sandy clay + shale, blue-black	197-202

138-048-07BAC

Date Completed:	5/9/72	Purpose:	Test Hole
L.S. Elevation (ft):	903	Well Type:	
Depth Drilled (ft):	331	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
SHALE	brown	1-22
SHALE	blue	22-77
CLAY	brown, sandy	77-120
ROCK	colored, sandy, clay	120-136
CLAY	no description	136-190
SAND	colored	190-197
CLAY	blue, sandy	197-221
SAND	colored	221-222
CLAY	blue	222-228
SHALE	black	228-256
CLAY	white	256-267
CLAY	orange, brown, shale,	267-287
CLAY	orange, brown, white, green, shale	287-295
CLAY	orange, brown, white, green, shale	295-315
CLAY	green, blue, black, shale	315-317
GRANITE	green	317-331

138-048-07BAC2

Date Completed:	10/16/72	Purpose:	Domestic Well
L.S. Elevation (ft):	903	Well Type:	2.4" Steel
Depth Drilled (ft):	199	Aquifer:	Undefined
Screened Interval (ft):	182-193	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-26
CLAY	blue, soft	26-75
CLAY	blue, sandy	75-77
CLAY	blue, sandy, with sand lenses	77-83
CLAY	blue, hard, sandy	83-121
CLAY	blue, sticky, sandy	121-182
CLAY	blue, sticky, sandy	182-185
SANDSTONE	gray, fine	185-193
SHALE	white	193-199

138-048-07BDB2

Date Completed:	8/17/82	Purpose:	Domestic Well
L.S. Elevation (ft):	902	Well Type:	4" Steel
Depth Drilled (ft):	178	Aquifer:	Undefined
Screened Interval (ft):	166-175	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown, soft	2-21
CLAY	blue, soft	21-75
SAND	no description	75-78
CLAY	blue, sandy, little rocky	78-135
ROCK	no description	135-136
CLAY	blue, sandy, hard	136-142
CLAY	blue, sandy	142-151
SAND	blue, fine	151-152
CLAY	blue, sandy	152-165
SAND	blue	165-175
CLAY	blue, sandy	175-178

138-048-07BDB3

Date Completed:	5/14/85	Purpose:	Domestic Well
L.S. Elevation (ft):	902	Well Type:	4" Steel
Depth Drilled (ft):	313	Aquifer:	Dakota Group
Screened Interval (ft):	290-305	Log Source:	LTP Enterprises, Inc

Lithologic Log

138-048-07BDB3 (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-13
CLAY	gray, soft	13-18
CLAY	blue, soft	18-82
CLAY	blue, sandy	82-90
CLAY	blue, sandy, with small rock	90-98
CLAY	blue, colored, sandy, with small gravel lenses	98-101
CLAY	blue, sandy	101-107
GRAVEL	blue, colored, with clay lenses	107-112
CLAY	blue, sandy	112-132
GRAVEL	colored	132-134
ROCK	gray	134-136
CLAY	blue, sandy	136-148
SAND	blue	148-150
SAND	blue	150-152
CLAY	blue, sandy	152-193
SAND	blue, fine	193-194
CLAY	blue, sandy	194-240
CLAY	blue, gray, sandy, with small coal	240-272
CLAY	white, gray, sandy, with small sandstone lenses	272-274
CLAY	colored, white, sandy	274-282
SANDSTONE	white, with very small clay lenses	282-306
SANDSTONE	white, gray, with clay lenses	306-313

138-048-07CBD

Date Completed:	8/29/95	Purpose:	Rural Water Well
L.S. Elevation (ft):	900	Well Type:	5" Steel
Depth Drilled (ft):	177	Aquifer:	Undefined
Screened Interval (ft):	158-170	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	no description	2-34
CLAY	sandy	34-79
SAND	no description	79-82
CLAY	sandy	82-135
SAND	no description	135-172
CLAY	no description	172-177

138-048-07CDD

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	902	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-153	Log Source:	

Lithologic Log - unavailable

138-048-07DC

Date Completed:	11/1/87	Purpose:	Municipal Well
L.S. Elevation (ft):	902	Well Type:	5" Steel
Depth Drilled (ft):	148	Aquifer:	Undefined
Screened Interval (ft):	135-145	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	brown	2-22
CLAY	blue	22-73
TILL	clay, sandy, blue	73-80
SAND	gray	80-84
TILL	clay, sandy, blue	84-102
SAND	gray	102-105
TILL	clay, sandy, blue	105-133
SAND	gray	133-145
TILL	clay, sandy, blue	145-148

138-048-08CCBABA

Date Completed:	5/1970	Purpose:	Domestic Well
L.S. Elevation (ft):	912	Well Type:	4" Stainless Steel
Depth Drilled (ft):	157	Aquifer:	Undefined
Screened Interval (ft):	148-156	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, yellow	1-12
CLAY	clay, blue, soft	12-61
CLAY	sandy clay, blue, soft	61-77
CLAY	sandy clay with sand lenses, blue	77-86
CLAY	sandy clay, blue, hard	86-92
CLAY	sand clay with sand lenses, blue	92-98
CLAY	sandy clay, blue, hard	98-111
SAND	sand, blue	111-114
CLAY	sandy clay, blue	114-140
SAND	sand, blue	140-157

138-048-08DBCCAB

Date Completed:	8/1962	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	4" Other
Depth Drilled (ft):	148	Aquifer:	Undefined
Screened Interval (ft):	139-145	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, yellow	2-17
CLAY	shale, blue	17-79
CLAY	sandy clay, blue, hard	79-90
CLAY	sandy clay, blue, soft	90-96
CLAY	sandy clay, blue, hard	96-119
CLAY	sandy clay + boulder, blue, hard	119-129
CLAY	sandy clay, blue, softer	129-136
SAND	sand, gray	136-145
CLAY	sandy clay, blue	145-148

138-048-15ABADCB

Date Completed:	6/1986	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	4" Stainless Steel
Depth Drilled (ft):	233	Aquifer:	Undefined
Screened Interval (ft):	186-191	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-22
CLAY	clay, blue	22-89
CLAY	sandy clay, gray	89-94
SAND	sand, gray	94-97
CLAY	sandy clay, gray	97-116
SAND	sand with lenses of clay, colored	116-118
SAND	sand, colored	118-120
CLAY	sandy clay, gray	120-137
SAND	sand with clay, gray	137-147
CLAY	sandy clay, colored	147-185
SAND	sand, colored	185-192
CLAY	sandy clay, gray	192-226
WEATHERED PRECAMBRIAN	decomposed, white	226-233

138-048-15DACABB

Date Completed:	10/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	912	Well Type:	4" Stainless Steel
Depth Drilled (ft):	146	Aquifer:	Undefined
Screened Interval (ft):	140-146	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-2
CLAY	clay, brown, soft	2-8
SAND	quick sand, yellow, soft	8-10
CLAY	clay, gray, soft	10-18
CLAY	clay, black, soft	18-19
CLAY	clay, blue, soft	19-87
CLAY	clay + stones, gray, medium hardness	87-130
SAND	fine sand, gray, soft	130-134
CLAY	clay, gray, medium hardness	134-136
CLAY	clay + stones, gray, medium hardness	136-140
SAND	fine dirty sand, gray, soft	140-143
SAND	medium clean sand, gray, soft	143-146

138-048-16BBBDBA

Date Completed:	5/1971	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Stainless Steel
Depth Drilled (ft):	105	Aquifer:	Undefined
Screened Interval (ft):	101-105	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-15
CLAY	shale, blue	15-70
CLAY	sandy clay, blue	70-72
CLAY	clay lensed with sand, blue	72-77
CLAY	sandy clay, blue	77-88
SAND	sand, blue	88-89
CLAY	sandy clay, blue	89-94
SAND	sand, blue	94-96
CLAY	sandy clay, blue	96-100
SAND	sand, blue	100-105

138-048-19DDCAAA

Date Completed:	4/1987	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" Stainless Steel
Depth Drilled (ft):	98	Aquifer:	Undefined
Screened Interval (ft):	89-95	Log Source:	LTP Enterprises, Inc

138-048-19DDCAAA (continued)

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, brown	1-17
CLAY	clay, blue	17-74
CLAY	sandy clay, blue	74-75
SAND	sand, white	75-76
CLAY	sandy clay, blue	76-90
SAND	sand, gray	90-92
CLAY	sandy clay, blue	92-93
SAND	sand, gray	93-95
CLAY	sandy clay, blue	95-98

138-048-23CCCDBC

N

Date Completed:	4/1969	Purpose:	Domestic Well
L.S. Elevation (ft):	913	Well Type:	4" Stainless Steel
Depth Drilled (ft):	151	Aquifer:	Undefined
Screened Interval (ft):	145-150	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, yellow	1-23
CLAY	clay, blue, soft	23-92
CLAY	sandy clay, blue, hard	92-129
CLAY	sandy clay with sand lenses, blue	129-135
CLAY	sandy clay boulder, blue	135-141
SAND	sand, gray	141-151

138-048-23DAAABD

Date Completed:	12/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	916	Well Type:	4" Stainless Steel
Depth Drilled (ft):	126	Aquifer:	Undefined
Screened Interval (ft):	120-126	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-2
CLAY	clay, yellow, soft	2-17
CLAY	clay, blue, soft	17-98
CLAY	clay + stones, gray, medium hard	98-118
SAND	fine watersand, gray, soft	118-121
SAND	medium watersand, gray, soft	121-126

138-048-26CDCDAD

Date Completed:	8/1977	Purpose:	Domestic Well
L.S. Elevation (ft):	913	Well Type:	4" Stainless Steel
Depth Drilled (ft):	167	Aquifer:	Undefined
Screened Interval (ft):	105-110	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, gray	2-4
CLAY	clay, brown	4-23
CLAY	clay, blue	23-82
CLAY	sandy clay, blue	82-104
SAND	sand + lenses clay, varied color	104-110
CLAY	sandy clay, blue	110-157
SAND	sand, varied color	157-163
CLAY	sandy clay, blue	163-167

138-048-28ACCBBD

Date Completed:	8/1970	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" Stainless Steel
Depth Drilled (ft):	129	Aquifer:	Undefined
Screened Interval (ft):	122-127	Log Source:	Frederickson's of ND, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-1
CLAY	clay, yellow	1-16
CLAY	clay, blue, soft	16-69
CLAY	sandy clay, blue	69-79
CLAY	sandy clay with sand lenses, blue	79-112
SAND	sand, varied color	112-116
CLAY	sandy clay, blue	116-121
SAND	sand, varied color	121-127
CLAY	sandy clay, blue	127-129

138-048-28CAACDA

Date Completed:	9/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Stainless Steel
Depth Drilled (ft):	227	Aquifer:	Undefined
Screened Interval (ft):	211-217	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-18

138-048-28CAACDA (continued)

CLAY	clay, blue, soft	18-70
CLAY	sandy clay, blue	70-80
SAND	lenses of sand + clay, blue	80-81
SAND	sand drilled dirty, blue	81-82
CLAY	sandy clay, blue	82-107
CLAY	sandy clay with rock, blue	107-117
SAND	sand drilled good, colored	117-118
CLAY	sandy clay, blue	118-194
SAND	sand, gray	194-195
NO SAMPLE	lenses, gray	195-197
SAND	sand, colored	197-202
SAND	sand with rock + gravel, colored	202-207
SAND	sand, gray	207-212
SAND	sand + gravel, colored	212-227

138-048-28CDABCA

Date Completed:	3/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Stainless Steel
Depth Drilled (ft):	118	Aquifer:	Undefined
Screened Interval (ft):	102-110	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-15
CLAY	clay, blue	15-70
CLAY	sandy clay, blue	70-82
SAND	sand took water, varied color	82-85
CLAY	sandy clay, blue	85-102
SAND	sand took water, varied color	102-112
CLAY	sandy clay, blue	112-118

138-048-28CDACAC

Date Completed:	11/1981	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Stainless Steel
Depth Drilled (ft):	110	Aquifer:	Undefined
Screened Interval (ft):	106-110	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-20
CLAY	clay, blue, soft	20-74

138-048-28CDACAC (continued)

CLAY	sandy clay, gray	74-88
CLAY	lenses of clay + sand, varied color	88-92
CLAY	sandy clay, gray	92-98
SAND	sand, varied color	98-100
CLAY	sandy clay with sand lenses, gray	100-102
CLAY	sandy clay, gray	102-105
SAND	sand + gravel took water, varied color	105-110
CLAY	sandy clay, gray	110-110

138-048-28CDACBB

Date Completed:	2/1979	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	0"
Depth Drilled (ft):	212	Aquifer:	Undefined
Screened Interval (ft):	0-0	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown	2-15
CLAY	clay, blue	15-70
CLAY	sandy clay, blue	70-87
SAND	sand, varied color	87-88
CLAY	sandy clay, blue	88-103
SAND	sand, varied color	103-107
CLAY	sandy clay, blue	107-109
SAND	sand, varied color	109-110
CLAY	sandy clay, blue	110-117
SAND	sand, varied color	117-121
CLAY	sandy clay, blue	121-170
SHALE	shale, varied color	170-212

138-048-28CDDBDD

Date Completed:	9/1975	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	3" Stainless Steel
Depth Drilled (ft):	105	Aquifer:	Undefined
Screened Interval (ft):	99-105	Log Source:	Paasch

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black, soft	0-1
CLAY	clay, yellow, soft	1-11
CLAY	clay, yellow, soft	11-27
CLAY	clay, yellow, soft	27-33

138-048-28CDDBDD (continued)

CLAY	clay, yellow, soft	33-51
SAND	sand & gravel, brown, varied hardness	51-64
SAND	sand & gravel, brown, varied hardness	64-76
SAND	sand & gravel, brown, varied hardness	76-80
BOULDERS	boulder, gray, hard	80-82
GRAVEL	gravel, gray, varied hardness	82-92
SAND	water sand, gray, soft	92-105

138-048-31DADABA

Date Completed:	12/1978	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	4" Stainless Steel
Depth Drilled (ft):	162	Aquifer:	Undefined
Screened Interval (ft):	82-91	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
SOIL	top soil, black	0-2
CLAY	clay, brown, soft	2-34
CLAY	sandy clay, blue, soft	34-53
SAND	sand, varied color	53-55
CLAY	sandy clay, blue	55-56
SAND	sand, varied color	56-58
CLAY	sandy clay with lenses, varied color	58-62
SAND	sand, varied color	62-64
CLAY	sandy clay, blue	64-71
SAND	sand, gray	71-73
CLAY	sandy clay, blue	73-77
SAND	silty sand, gray	77-79
CLAY	sandy clay, blue	79-81
SAND	sand, varied color	81-83
CLAY	sandy clay, blue	83-85
SAND	sand, gray	85-86
CLAY	sandy clay, blue	86-87
SAND	sand, varied color	87-90
CLAY	sandy clay, blue	90-92
SAND	sand, varied color	92-94
CLAY	sandy clay, blue	94-100
SAND	sand, varied color	100-102
CLAY	sandy clay, blue	102-157
WEATHERED PRECAMBRIAN	decomposed, white	157-162

138-049-01ADB

Date Completed:	2/13/80	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" Steel
Depth Drilled (ft):	322	Aquifer:	Undefined
Screened Interval (ft):	313-318	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	gray	2-3
CLAY	brown	3-15
CLAY	blue, soft	15-84
SAND	colored	84-89
CLAY	blue, sandy	89-150
SAND	colored	150-192
SAND	blue, with clay lenses, dirty	192-199
CLAY	black, blue, white, sandy, shale	199-211
SAND	colored	211-213
CLAY	blue	213-227
SAND	colored	227-228
CLAY	blue, sandy	228-264
SAND	colored	264-268
CLAY	blue, sandy	268-279
SAND	colored	279-286
CLAY	blue, sandy	286-294
SAND	blue, with clay lenses, dirty	294-298
SAND	colored	298-303
CLAY	blue, sandy	303-304
SAND	colored, with clay lenses	304-309
SAND	colored	309-318
CLAY	blue, sandy	318-322

138-049-01ADC

Date Completed:	5/16/74	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" Steel
Depth Drilled (ft):	322	Aquifer:	Undefined
Screened Interval (ft):	317-321	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	brown	1-15
SHALE	blue	15-85
CLAY	blue, sandy, with rock	85-152

138-049-01ADC (continued)

SAND	blue, washed	152-154
CLAY & SHALE	blue, black, sandy	154-162
SHALE	black, sandy	162-193
SHALE	black, sandy, with rock	193-198
SAND	gray, fine	198-202
CLAY & SHALE	black, brown, blue, sandy	202-207
CLAY & SHALE	brown, pink, blue, black, sandy	207-218
SAND	blue	218-220
CLAY & SHALE	blue, brown, black, sandy	220-229
SAND	blue	229-230
SHALE	pink, gray, black	230-234
SAND	blue	234-235
SHALE	pink, gray, black	235-265
SHALE	blue, black, white, hard	265-277
SAND	black, white, with sandstone lenses	277-301
SANDSTONE	white, with dirty spots	301-322

138-049-01DAAD

Date Completed:	1985	Purpose:	Municipal Well
L.S. Elevation (ft):	904	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	290-305	Log Source:	

Lithologic Log - unavailable

138-049-02BAA

Date Completed:	9/30/76	Purpose:	Domestic Well
L.S. Elevation (ft):	903	Well Type:	4" Steel
Depth Drilled (ft):	306	Aquifer:	Dakota Group
Screened Interval (ft):	291-301	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-17
CLAY	soft, blue	17-69
SAND	drilled bad	69-71
CLAY	sandy, with small lenses of sand, blue	71-72
CLAY	sandy, rocky, blue	72-82
CLAY	sandy, hard, with rock, blue	82-85
CLAY	sandy, blue	85-88
SAND & GRAVEL	no description	88-89
CLAY	sandy, blue	89-97
CLAY	very sandy, softer, blue	97-98

138-049-02BAA (continued)

CLAY	sandy, blue	98-103
CLAY	sandy, with lenses of dirty sand, blue	103-106
CLAY	sandy, blue	106-112
SAND	no description	112-113
CLAY	sandy, blue	113-208
SAND	fine, drilled dirty, black	208-212
CLAY	sandy, blue black	212-215
SAND	some chatter	215-216
CLAY	sandy, blue black	216-222
SAND	poor, drilled slow	222-226
CLAY	sandy clay shale, black	226-240
CLAY	sandy, black	240-251
SAND	gray	251-253
CLAY	sandy, black gray	253-258
SAND	no description	258-259
CLAY	sandy, black gray	259-276
SANDSTONE	no description	276-278
CLAY	sandy, gray	278-281
SANDSTONE	no description	281-284
CLAY	sandy, gray	284-287
SANDSTONE	no description	287-302
PRECAMBRIAN	decomposed, white	302-306

138-049-02BAB

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	905	Well Type:	4" PVC
Depth Drilled (ft):	310	Aquifer:	Dakota Group
Screened Interval (ft):	290-310	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow	2-71
SAND & GRAVEL	no description	71-78
TILL	no description	78-230
CLAY	gray	230-257
CLAY	brown clay with coal layers	257-294
SAND	no description	294-310

138-049-02BDAC

Date Completed:	8/1991	Purpose:	Domestic Well
L.S. Elevation (ft):	905	Well Type:	4" PVC
Depth Drilled (ft):	334	Aquifer:	Undefined
Screened Interval (ft):	314-334	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	green	2-10
CLAY	gray	10-76
TILL	no description	76-80
TILL	gravelly	80-102
TILL	no description	102-215
CLAY	black	215-265
CLAY	white	265-284
CLAY	gray	284-300
SAND	nice, clean	300-334

138-049-02BDDD1

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" PVC
Depth Drilled (ft):	175	Aquifer:	Undefined
Screened Interval (ft):	145-165	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-18
CLAY	gray	18-84
TILL	no description	84-96
TILL	gravelly	96-103
GRAVEL	no description	103-110
TILL	no description	110-125
GRAVEL	coarse	125-127
SAND	fine, with coal layers	127-170
TILL	no description	170-175

138-049-02BDDD2

Date Completed:	0/0	Purpose:	Test Hole
L.S. Elevation (ft):	906	Well Type:	
Depth Drilled (ft):	308	Log Source:	Lako Drilling

Lithologic Log

138-049-02BDDD2 (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-18
CLAY	gray	18-82
TILL	gravelly	82-109
SAND	no description	109-112
TILL	no description	112-126
SAND	dirty	126-130
TILL	no description	130-141
SAND	no description	141-159
CLAY	sandy	159-166
SAND	no description	166-170
TILL	no description	170-178
SHALE	blue	178-255
CLAY	sandy	255-262
SHALE	no description	262-268
SAND	no description	268-272
GRANITE	white, weathered	272-285
GRANITE	green, weathered	285-296
SAND	no description	296-300
GRANITE	green	300-308

138-049-02CCC

NDSWC 5699

Date Completed:	5/28/80	Purpose:	Test Hole
L.S. Elevation (ft):	909	Well Type:	
Depth Drilled (ft):	155		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	pale grayish brown, oxidized, moderately cohesive, very plastic calcareous	1-12
CLAY	dark greenish gray, unoxidized, moderately to very cohesive, plastic, slightly calcareous	12-71
TILL	dark greenish gray, very sandy and pebbly, calcareous, moderately to very cohesive, gravel from 76-78 feet, 81-82 feet coarse, very angular carbonate gravel	71-101
SAND	fine to coarse gravel, poorly sorted, predominantly medium grain, subangular to rounded	101-108
GRAVEL	medium to coarse gravel, poorly sorted, angular to rounded	108-111
TILL	dark greenish gray to olive gray, very sandy and pebbly, very calcareous, moderately cohesive, numerous small gravel lenses and boulders	111-134
CLAY	brownish black, non-calcareous, very cohesive and plastic	134-141
SHALE	light gray, slightly calcareous, moderately indurated	141-155

138-049-03AAB2

Date Completed:	5/25/77	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" Steel
Depth Drilled (ft):	402	Aquifer:	Undefined
Screened Interval (ft):	382-392	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-14
CLAY	blue	14-81
CLAY	blue, sandy	81-87
SAND	with clay lenses	87-89
CLAY	blue, sandy	89-91
SAND	with clay lenses	91-92
CLAY	blue, sandy	92-257
SAND	no description	257-260
CLAY	blue, sandy, softer	260-297
CLAY	blue, sandy	297-332
CLAY	blue, sandy	332-349
SAND	with clay lenses, fine	349-362
SAND	fine	362-392
SAND	finer	392-401
CLAY & ROCK	blue, green, sandy	401-402

138-049-03DAA

Date Completed:	0/0	Purpose:	Industrial Well
L.S. Elevation (ft):	907	Well Type:	4" PVC
Depth Drilled (ft):	358	Aquifer:	Dakota Group
Screened Interval (ft):	346-358	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TILL	no description	0-2
DIRT	black	2-4
CLAY	yellow	4-22
CLAY	gray	22-95
TILL	no description	95-295
SAND	no description	295-358

138-049-04AAA
NDSWC 3104

Date Completed:	6/4/64	Purpose:	Observation Well
L.S. Elevation (ft):	905	Well Type:	1.25" ABS
Depth Drilled (ft):	355	Aquifer:	West Fargo South
Screened Interval (ft):	148-151	Log Source:	NDSWC

Lithologic Log

138-049-04AAA (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	grayish orange, silty, very cohesive, oxidized, slightly calcareous	2-18
CLAY	olive gray, silty, cohesive, calcareous	18-58
TILL	olive gray, clay through gravel, shale, granite, limestone, quartz, ect., cohesive, highly calcareous, quite rocky, lignite fragments	58-98
TILL	light olive to olive gray, clay through gravel, sandy, limestone, quartz and granite, very highly calcareous, cohesive	98-115
TILL	olive gray, clay through gravel, limestone , shale, granite, quartz and lignite, highly calcareous, cohesive	115-116
SAND & GRAVEL	very fine sand to 15mm, subangular to rounded, predominantly quartz with abundant limestone and granite, with shale, pyrite and miscellaneous rocks, some very angular chips from larger gravel	116-222
SILT	black to brownish gray, soft lignite material with some lignite chips, cohesive, non-calcareous, black and brownish black pieces are greasy black and very soft, gets lighter more olive gray and brownish gray about 250, laminations are present but rare	222-305
SANDY CLAY	light gray to medium gray, clay and medium to coarse sand, up to 3/4mm some black lignitic seams, non-calcareous, subangular, white and clean sand	305-313
LIGNITIC SILT	as above	313-319
CLAY	white, slight greenish tint in places, sand grains, white and clean up to 1mm, non-calcareous	319-340
GRANITE	weathered, clay, pale blue green, sand grains, highly calcareous, to medium yellowish green, to dark yellowish green	340-355

138-049-04CCC

NDSWC 5690

Date Completed:	5/16/80	Purpose:	Observation Well
L.S. Elevation (ft):	902.5	Well Type:	1.25" PVC
Depth Drilled (ft):	220	Aquifer:	West Fargo South
Screened Interval (ft):	178-181	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	grayish orange, oxidized, slightly calcareous, very cohesive and plastic	1-12
CLAY	olive gray, unoxidized, calcareous, very cohesive, plastic	12-64
TILL	dark brownish gray very sandy and pebbly, calcareous, very cohesive, small intercalated gravel lenses	64-81
SILT	brownish gray, clayey, calcareous,	81-85
SAND	fine to medium grain, predominantly medium grain, medium sorting, subrounded to rounded	85-87
TILL	light brownish gray, very sandy and pebbly, very calcareous, moderately to very cohesive, small intercalated gravel lenses	87-155
SAND	gravel, fine grain, well sorted, subrouned to rounded, contains detrital lignite gravel, very clayey, 90% quartz, 5% carbonate, 5% lignite	155-188
BEDROCK	shale, dusky yellowish brown, non-calcareous, gypsiferous, moderately to well indurated, interbedded with carbonaceous very fine grain sand and silt	188-220

138-049-04DDD

NDSWC 5689

Date Completed:	5/15/80	Purpose:	Observation Well
L.S. Elevation (ft):	903.2	Well Type:	1.25" PVC
Depth Drilled (ft):	230	Aquifer:	West Fargo South
Screened Interval (ft):	150-153	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	grayish orange, oxidized, slightly calcareous, very cohesive and plastic, cuts in large ribbons	1-15
CLAY	brownish gray, unoxidized, slightly calcareous, very cohesive and plastic, cuts in large ribbons, gravel at 70 feet	15-71
TILL	brownish gray, very sandy, very calcareous, moderately cohesive, many small gravel lenses, till moderately pebbly with shale pebbles, from 84 to 96 feet interbedded till and gravel lenses	71-98
SILT	brownish gray, clayey, calcareous, grades into clay also brownish gray, calcareous	98-108
SAND & GRAVEL	gravel, medium sand to gravel, predominantly medium and coarse sand, poor sorting, subangular to rounded, from 116 to117 feet was interbedded with clay, from 134 feet were clay lenses	108-134
CLAY	brownish gray, calcareous, very plastic, cuts in ribbons	134-142
SAND & GRAVEL	fine sand to gravel, predominantly fine and coarse sand, approximately 10% gravel, medium sorting, subangular to rounded, fine sand in well rounded quartz	142-161
CLAY	brownish gray, calcareous, contains small gravel and detrital lignite lenses	161-203
CLAY	medium yellowish brown, oxidized, slightly calcareous, soft but breaks at right angles	203-230

138-049-05BBA

NDSWC 12669

Date Completed:	10/10/90	Purpose:	Observation Well
L.S. Elevation (ft):	905.07	Well Type:	2" PVC
Depth Drilled (ft):	320	Aquifer:	Ponderosa
Screened Interval (ft):	258-263	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow-brown, very plastic, stiff, occasional red stains (oxidized lake clay)	1-22
CLAY	gray, very plastic (lake clay)	22-70
TILL	clay, medium gray, sandy, silty, moderately soft	70-83
TILL	clay, light gray, sandy, very soft, (drills slowly, however)	83-86
CLAY	dark gray, stiff, sandy, silty, pebbly	86-91
TILL	clay, light gray, sandy, soft	91-94
TILL	clay, dark gray, stiff, plastic, sandy, silty, pebbly, gravel layers and rocks at 96' and 103'	94-103
TILL	clay, brownish gray, very sandy, silty	103-106
SAND	fine, medium, and coarse, with gravel, coarser with depth, subangular to subrounded, quartz, shale, carbonates, and granitics	106-122
SAND	medium, clean, well sorted, angular to subrounded	122-140
SAND & GRAVEL	medium to coarse sand, fine to medium gravel, clean, subangular to subrounded, not much return of coarser material, very coarse drilling at 266'	140-300
ROCKS	rough drilling	300-301
CLAY	greenish, soft, silty, weathered Precambrian fragments	301-302

138-049-05BBA (continued)

ROCKS	no description	302-303
CLAY	silty, stiff, dark gray, some mica flakes, very little sample return, slightly plastic, softer with even less sample return after 313'	303-320

138-049-05CDD

Date Completed:	1/10/95	Purpose:	Domestic Well
L.S. Elevation (ft):	910	Well Type:	4" PVC
Depth Drilled (ft):	122	Aquifer:	Ponderosa
Screened Interval (ft):	108-112	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
CLAY	no description	0-13
CLAY	soft	13-71
CLAY	sandy	71-85
SAND	coarse, with lenses of clay	85-92
SAND	coarse	92-97
SAND	coarse	97-102
SAND	coarse	102-107
SAND	coarse	107-112
SAND	coarse, with lenses of clay	112-119
CLAY	sandy	119-122

138-049-06ABB3
NDSWC 12677

Date Completed:	10/30/90	Purpose:	Test Hole
L.S. Elevation (ft):	902	Well Type:	
Depth Drilled (ft):	340		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellowish brown, very soft, plastic, smooth (oxidized lake clay)	1-21
CLAY	gray, soft, very plastic, smooth (lake clay)	21-67
TILL	clay, sandy, silty, pebbly, gray	67-75
SAND	fine to medium, fairly well sorted	75-93
TILL	clay, light gray, very sandy, soft, drills slowly, gravelly and rocky from 93' to 95', boulder at 135' (put on rock bit; clay bit replace at 140')	93-164
SAND	very little sample reutrn	164-165
TILL	clay, sandy, silty, rocks and boulders	165-169
SILT	grayish brown, slightly plastic, clayey, layered with CLAY, medium gray, silty, soft, not much sample return	169-177
SAND	fine, silty, clayey, very poorly sorted, not much sample return	177-184
SILT	soft, grayish brown, smooth, clayey, not much sample return	184-188

138-049-06ABB3 (continued)

SAND	fine, silty, clayey, poor sample return	188-197
SILT	silt and clay, brownish gray, soft, slightly plastic	197-200
SAND	fine, some medium sand, some silt, mostly fine, powdery, sugar sand, layered with silt lenses	200-225
SAND	medium to coarse, some fine gravel, subangular to subrounded, predominantly quartz and carbonates, some shale pieces	225-246
GRAVEL	fine to coarse, angular to subrounded, shales, carbonates, igneous, and quartz, rocks at 288'	246-288
SAND	sand, medium, some fine, some coarse, fairly clean	288-303
SAND & GRAVEL	medium to coarse sand, fine gravel	303-308
CLAY	silty, black, soft, slightly plastic, slightly gritty, leaves black stain on fingers (bedrock)	308-323
CLAY	silty, medium to light gray, shiny, moderately soft, slightly plastic (bedrock)	323-337
CLAY	white, very soft, slippery, soapy feel, talc-like (bedrock)	337-340

138-049-06ABB4

NDSWC 12679

Date Completed:	11/6/90	Purpose:	Observation Well
L.S. Elevation (ft):	903.14	Well Type:	2" PVC
Depth Drilled (ft):	260	Aquifer:	Ponderosa
Screened Interval (ft):	248-253	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellowish gray (oxidized lake clay)	2-19
CLAY	gray	19-72
TILL	gray, sandy	72-83
SAND	fine, and gravel	83-106
GRAVEL	rocky	106-107
TILL	gray, sandy	107-126
ROCKS	no description	126-127
TILL	gray, sandy	127-170
ROCKS	(put on rock bit)	170-171
TILL	gray, sandy	171-178
SAND	fine	178-185
TILL	gray, sandy, with layers of sand	185-189
SAND	fine to medium	189-208
TILL	gray, sandy	208-211
SAND	fine to medium	211-223
SAND & GRAVEL	medium to coarse sand, gravel	223-243
SAND & GRAVEL	coarse	243-260

138-049-06ABC

Date Completed:	12/6/88	Purpose:	Domestic Well
L.S. Elevation (ft):	904	Well Type:	4" PVC
Depth Drilled (ft):	278	Aquifer:	Ponderosa
Screened Interval (ft):	238-258	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow	2-20
CLAY	blue	20-80
SAND	mixed with clay	80-97
ROCK	rock shelf	97-100
CLAY	blue clay, mixed rocks	100-217
SAND	mixed with gravel, takes water	217-278

138-049-06ACDB

Date Completed:	7/10/87	Purpose:	Domestic Well
L.S. Elevation (ft):	904	Well Type:	4" PVC
Depth Drilled (ft):	227	Aquifer:	Ponderosa
Screened Interval (ft):	213-217	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-30
CLAY	blue	30-70
CLAY	gray, sandy	70-79
SAND	colored, with gravel	79-99
CLAY	gray, sandy	99-137
SAND	colored	137-140
CLAY	gray, sandy	140-183
CLAY	gray, sandy, with lenses	183-187
SAND	gray	187-189
SAND	colored	189-193
SAND	colored, silty	193-194
SAND	colored	194-199
SAND	colored	199-202
SAND	colored	202-217
SAND	colored	217-227

138-049-06ACDC

Date Completed:	7/8/87	Purpose:	Test Hole
L.S. Elevation (ft):	904	Well Type:	
Depth Drilled (ft):	302		
		Log Source:	LTP Enterprises, Inc

138-049-06ACDC (continued)

Lithologic Log

Unit	Description	Depth (ft)
FILL	gray	0-2
CLAY	brown	2-32
CLAY	blue	32-70
CLAY	sandy clay with rock, gray	70-80
SAND	colored	80-96
CLAY	sandy clay with rock, gray	96-102
CLAY	sandy, gray	102-106
SAND	colored	106-107
CLAY	sandy, gray	107-191
SAND	colored	191-196
CLAY	sandy, gray	196-230
SAND	gray	230-232
CLAY	sandy, gray	232-260
SAND	fine, silty, gray	260-263
CLAY	sandy, brown	263-292
GRANITE	decomposed, white	292-302

138-049-06BBC

NDSWC 12675

Date Completed:	10/30/90	Purpose:	Observation Well
L.S. Elevation (ft):	901.88	Well Type:	1.25" PVC
Depth Drilled (ft):	300	Aquifer:	Horace
Screened Interval (ft):	258-263	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellowish brown, plastic, moderately firm, smooth (oxidized lake clay)	2-17
CLAY	gray, moderately soft, smooth, very plastic (lake clay)	17-63
TILL	clay, gray, slightly brownish, sandy, silty, pebbly, gravelly layers at 66', 72' to 76'	63-77
TILL	clay, light gray, very sandy, silty, moderately soft, sand layer at 88'	77-90
GRAVEL	rocky, angular to subrounded	90-91
TILL	clay, dark gray, moderately sandy, silty, changes back to light gray	91-100
TILL	clay, gray, stiff, slightly silty, slightly plastic	100-106
SAND	fine to medium, dirty, lots of fine material	106-115
SILT	brownish gray, soft	115-117
SAND	not much sample return	117-120
TILL	clay, gray, stiff, silty, sandy, with sand layer at 125'	120-128
SAND	fine to coarse, mostly fine to medium, poorly sorted, subangular to subrounded	128-153
GRAVEL	rocky	153-154

138-049-06BBC (continued)

SAND	medium to coarse, mostly medium, subrounded to rounded, mostly quartz, some coarse layers	154-202
SAND & GRAVEL	coarse sand, fine gravel, some medium gravel, subangular to rounded, mostly carbonates and quartz, some shale grains after 220', rock at 266'	202-269
CLAY	soft, very light gray, and medium slightly brownish gray, brownish gray clay is silty, light gray clay is plastic, very soft, and smooth with coarse silt or fine sand grit, dark gray, soft, and shiny after 285'	269-300

138-049-06DAD1

Date Completed:	7/30/79	Purpose:	Test Hole
L.S. Elevation (ft):	908	Well Type:	
Depth Drilled (ft):	181		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown	3-11
CLAY	soft, blue	11-70
CLAY	sandy, blue	70-79
ROCK	red	79-80
CLAY	sandy, blue	80-94
SAND	with silty lenses of clay	94-99
CLAY	sandy, blue	99-181

138-049-06DAD2

Date Completed:	8/7/79	Purpose:	Municipal Well
L.S. Elevation (ft):	908	Well Type:	4" Steel
Depth Drilled (ft):	141	Aquifer:	Ponderosa
Screened Interval (ft):	125-135	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-13
CLAY	blue	13-69
ROCK	red	69-70
CLAY	sandy, rocks, blue	70-97
SAND	rocks, gravel, colored	97-141

138-049-07BAB

NDSWC 11998A

Date Completed:	9/30/82	Purpose:	Observation Well
L.S. Elevation (ft):	903	Well Type:	1.25" PVC
Depth Drilled (ft):	385	Aquifer:	Horace
Screened Interval (ft):	278-283	Log Source:	NDSWC

Lithologic Log

138-049-07BAB (continued)

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, oxidized, very plastic, some silts and roots, iron stain	2-15
CLAY	olive gray, unoxidized, very plastic, very few silts, drills fast, lake clays	15-62
CLAY	olive gray, slity sandy with pebbles, numerous, cobbles, poorly soiled (till)	62-88
CLAY	olive gray, slightly plastic, some silt, drills smooth	88-96
CLAY	silt, olive gray, drills faster, not as plastic or cohesive, occasional shale sand lense, also picked up wood fragments at 157-160 feet, 166-176 several layers of sand in clayey silt	96-176
SAND	fine to medium, (poor sample return) well rounded and soiled, drills as if there are lots of silts, layers of clay, silts and sand from 186-197 feet	176-197
SAND	fine, formed with several layers of clay and silts (poor sample return)	197-202
SAND	fine to medium, (poor sample return), drills as if clean, may be some coarse material	202-216
SAND	fine to medium, with layers of clay, (poor return)	216-222
SAND	fine to medium, drills clean, (poor return)	222-227
SAND	fine to coarse, well rounded to subrounded, predominantly igneous, some carbonates and shale, fair sorting	227-248
CLAY	olive gray	248-249
SAND	medium to coarse, well rounded to subrounded, fair sorting, return rather poor, drills rough, picking up some pebble gravels about 10%- 20%, carbonates, shale, and igneous, occasional fragments of bedrock clay at 300 feet	249-304
GRAVEL	fine to medium, with medium to coarse sands, well rounded to subrounded, fair sorting,	304-346
SAND & GRAVEL	as above, occasional layer of olive gray to green clay about equal to the percentages of carbonate and shales, 50% igneous and quartz, fair sorting, occasional fragments of green claystone	346-375
CLAY	sandy, greenish, drills smooth, light green to dark	375-385
GRANITE	hard chips, drills slow, stained, green, white and black minerals	385-385

138-049-07BBA

NDSWC 11999

Date Completed:	9/30/82	Purpose:	Observation Well
L.S. Elevation (ft):	903.1	Well Type:	1.25" PVC
Depth Drilled (ft):	206	Aquifer:	Horace
Screened Interval (ft):	183-188	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow brown, oxidized, iron stains, very plastic, drills fast	2-18
CLAY	olive gray, unoxidized, very plastic, cohesive, drills fast	18-56
CLAY	olive gray, silty sandy with pebbles, poorly sorted, occasional rubble (till)	56-76
CLAY	silty, olive gray, drills smooth, (no sand or gravel) plastic but not as cohesive	76-83
SILTY CLAY	more silts than above, driller faster, (olive gray)(poor return) abundant wood fragments at 152 feet	83-152
SAND	very fine to fine, with layers of gray clay, rather poor return, also wood fragments	152-176
SAND	very fine to fine, well rounded to subrounded, well sorted, % difficult to determine, approximately equal amounts of carbonates, shales and igneous grains, drills clean, appears to be no layers of clay	176-206

138-049-07DBA

Date Completed:	1/16/76	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" Steel
Depth Drilled (ft):	444	Aquifer:	Horace
Screened Interval (ft):	245-260	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
CLAY	dark brown	0-7
SAND	silty, dark brown	7-24
CLAY	blue	24-26
CLAY	brown	26-37
CLAY	soft, blue	37-65
CLAY	sandy, with small lenses of sand, blue	65-72
CLAY	sandy, blue	72-98
SAND	no description	98-99
CLAY	sandy, blue	99-102
SAND	coarser in the top 5 feet	102-112
CLAY	sandy, blue	112-151
SAND	dirty	151-153
CLAY	sandy, blue	153-218
CLAY	sandy, with rocks, blue	218-221
CLAY	sandy, blue	221-233
SAND	dirty, fine, drilled slow	233-246
SAND	drilled better	246-250
SAND	dirty, fine	250-252
CLAY	sandy, blue	252-255
SAND	drilled better	255-260
CLAY	sandy, blue	260-269
SAND	dirty	269-272
CLAY	sandy, blue	272-312
CLAY	sandy, with a lense of sand, blue	312-317
CLAY	sandy, little decomposed, blue	317-336
SAND	dirty	336-338
CLAY	sandy, blue, with sand lenses	338-350
SAND	very dirty, drilled slow	350-353
CLAY	sandy, blue	353-360
SAND	no description	360-362
CLAY	sandy, with small lenses of sand, blue	362-366
CLAY	sandy, and decomposed, blue, green	366-444

138-049-07DCC1

Date Completed:	7/12/76	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" Steel
Depth Drilled (ft):	210	Aquifer:	Horace
Screened Interval (ft):	197-207	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
CLAY	brown	0-27
CLAY	blue, soft	27-75
CLAY	blue, sandy	75-97
SAND	no description	97-101
CLAY	blue, sandy	101-126
SAND	no description	126-128
CLAY	blue, sandy	128-191
SAND	no description	191-192
CLAY	blue, sandy	192-193
ROCK	no description	193-194
CLAY	blue, sandy	194-197
SAND	fine, very fine	197-207
CLAY	blue, sandy	207-210

138-049-07DCC2

Date Completed:	5/26/83	Purpose:	Municipal Well
L.S. Elevation (ft):	907	Well Type:	6" PVC
Depth Drilled (ft):	201	Aquifer:	Horace
Screened Interval (ft):	177-191	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	brown	3-17
CLAY	blue, soft	17-45
CLAY	blue, sandy	45-86
SAND	blue,	86-89
CLAY	blue, sandy	89-122
SAND	colored	122-126
CLAY	blue, sandy	126-153
SAND	colored	153-172
SAND	colored	172-187
SAND	colored	187-193
CLAY	blue, sandy	193-201

138-049-07DCD

Date Completed:	9/4/74	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" Steel
Depth Drilled (ft):	370	Aquifer:	Dakota Group
Screened Interval (ft):	360-370	Log Source:	Hicks Bros

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-10
CLAY	blue	10-90
CLAY	gray	90-115
SAND & ROCK	no description	115-165
CLAY	gray, sandy	165-215
CLAY	brown, sandy	215-275
CLAY	gray	275-315
CLAY	black, greasy	315-325
CLAY	white, sandy	325-335
CLAY	black	335-340
CLAY	red	340-345
CLAY	red, white	345-358
SAND	white	358-370

138-049-08BBC
NDSWC 5698

Date Completed:	5/23/80	Purpose:	Test Hole
L.S. Elevation (ft):	906	Well Type:	
Depth Drilled (ft):	240		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	pale yellow brown, calcareous, very cohesive, plastic	1-19
CLAY	dark greenish gray, slightly calcareous, very cohesive and plastic	19-72
TILL	dark greenish gray, very sandy, calcareous, moderately cohesive, gravel lense at 78 feet	72-82
TILL	light brownish gray, very sandy, calcareous, moderately cohesive, many small interbedded gravel lenses, silt from 189-191 feet, gravel lense from 207-210 feet, gravel 228-229 feet	82-229
CLAY	brownish gray, calcareous, moderately to very cohesive, plastic	229-240

138-049-08CCD
NDSWC 2346

Date Completed:	6/8/65	Purpose:	Test Hole
L.S. Elevation (ft):	915	Well Type:	
Depth Drilled (ft):	252		
		Log Source:	NDSWC

Lithologic Log

138-049-08CCD (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	light olive gray to greenish gray, holds together, silty, moderately hard, iron stained in places, calcareous, becomes softer downwards and more plastic, oxidized	1-12
CLAY	same as above but unoxidized, dark greenish gray to medium bluish, contains occasionally sand sized fragments of shale, slightly more plastic than above clay	12-19
SAND	moderately well sorted, angular to rounded, shale, quartz, carbonates, lignite, igneous, crystalline, on top predominantly 1/4 to 1/2 mm, downwards it becomes coarser 1/2 to 3/4 mm	19-39
CLAY	dark greenish gray, holds together, moderately hard, plastic, sticky, slightly silty, calcareous	39-73
TILL	dark greenish gray, silty, holds together, moderately soft, sticky, plastic, mostly dolomite, shale, quartz, and limestone, mostly rounded, fragment size 1 to 2 mm predominantly	73-80
BOULDERS	granite	80-81
TILL	as above boulders, greater variaition in grain size, sandy at places	81-117
GRAVEL	poor sample return, angular to subrounded, about 3 to 5 mm in diameter, granite and dolomite mostly	117-119
TILL	as above gravel, more compact and slightly sandier, occasional boulders	119-215
TILL	interbedded with clay, olive black, holds together in water, hard, plastic, compact, contains little white specks, lignite flakes, non-calcareous	215-223
CLAY	silty, sandy, olive gray, laminated, lignite flakes, quartz, holds together, moderately soft, non-calcareous, interbedded with layers of black to brownish black silty clay, it appears to be a mixture of clay and lignite, it is non-calcareous, moderately soft, holds together	223-252

138-049-09DDD

NDSWC 5700

Date Completed:	5/28/80	Purpose:	Observation Well
L.S. Elevation (ft):	904.6	Well Type:	1.25" PVC
Depth Drilled (ft):	351	Aquifer:	West Fargo South
Screened Interval(ft):	319-322	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	pale grayish brown, calcareous, moderately to very cohesive and plastic, oxidized	1-12
CLAY	dark greenish gray, unoxidized, calcareous, moderately to very cohesive and plastic	12-62
SAND	fine to coarse, medium sorted-predominantly coarse subangular to rounded, taking water, about 50% shale, 25% quartz, 25% carbonates	62-66
TILL	brownish gray, very sandy, pebbly, very calcareous, many small gravel lenses	66-84
SAND & GRAVEL	medium sand to gravel, poorly sorted, angular to rounded, taking water, 92-96 feet interbedded with till (no sample)	84-104
CLAY	brownish gray	104-106
TILL	brownish gray, silty, sandy, slightly, pebbly, calcareous, moderately cohesive	106-116
SAND	fine to coarse, moderately sorted, predominantly fine grain, subrounded to rounded, taking water	116-123
TILL	as above, interbedded with gravel lenses	123-127
SAND	as above, interbedded with clay from 142 to 144 feet	127-144
CLAY	no description	144-152
SAND	fine grain, well sorted, well rounded, 90% quartz, 5% carbonates, 5% lignite, high sphericity, boulders at 302 feet	152-332

138-049-09DDD (continued)

CLAY	no sample	332-342
SANDSTONE	fine to medium grain, medium sorted, rounded, moderately to well indurated	342-351

138-049-10CDC

Date Completed:	9/26/94	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" PVC
Depth Drilled (ft):	148	Aquifer:	West Fargo South
Screened Interval (ft):	138-142	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	no description	2-15
CLAY	no description	15-74
CLAY	sandy, with rocks	74-105
CLAY	no description	105-129
SAND	with rocks, dirty	129-137
SAND	no description	137-142
CLAY	sandy	142-148

138-049-12AAB

Date Completed:	1956	Purpose:	Domestic Well
L.S. Elevation (ft):	908	Well Type:	2" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-320	Log Source:	

Lithologic Log - unavailable

138-049-12AAB2

Date Completed:	7/16/81	Purpose:	Test Hole
L.S. Elevation (ft):	908	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	sandy, brown	2-18
CLAY	sandy, blue	18-76
SAND	no description	76-78
CLAY	sandy, blue	78-81
SAND	no description	81-82
CLAY	sandy, blue	82-84
SAND	no description	84-86
CLAY	sandy, blue	86-91
SAND	no description	91-92

138-049-12AAB2 (continued)

CLAY	sandy, blue	92-107
CLAY	sandy, blue, with lenses of sand	107-112
CLAY	sandy, blue	112-120
SAND	no description	120-122
CLAY	sandy, blue	122-210
CLAY	sandy	210-216
CLAY	sandy, blue	216-220

138-049-12AAB3

Date Completed:	7/17/81	Purpose:	Domestic Well
L.S. Elevation (ft):	908	Well Type:	4" Steel
Depth Drilled (ft):	100	Aquifer:	Undefined
Screened Interval (ft):	92-97	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	sandy, brown	2-18
CLAY	sandy, blue	18-79
SAND	no description	79-80
CLAY	sandy, blue	80-82
SAND	no description	82-83
CLAY	sandy, blue	83-92
SAND	with lenses, brown	92-95
CLAY	sandy, blue	95-96
SAND	brown	96-97
CLAY	sandy, blue	97-100

138-049-13AAA

Date Completed:	6/1962	Purpose:	Domestic Well
L.S. Elevation (ft):	908	Well Type:	4"
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-132	Log Source:	

Lithologic Log - unavailable

138-049-13ACC

Date Completed:	8/8/94	Purpose:	Domestic Well
L.S. Elevation (ft):	908	Well Type:	4" PVC
Depth Drilled (ft):	144	Aquifer:	Undefined
Screened Interval (ft):	134-144	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-3
CLAY	brown, stiff	3-44

138-049-13ACC (continued)

SAND	dirty	44-47
CLAY	blue, stiff	47-79
CLAY	blue, stiff	79-93
SAND	mixed, dirty	93-114
SAND	with small gravel, fairly clean	114-144

138-049-13ADA

Date Completed:	11/3/87	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" PVC
Depth Drilled (ft):	151	Aquifer:	Undefined
Screened Interval (ft):	140-144	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	gray	1-6
CLAY	brown	6-16
CLAY	gray	16-77
SAND	colored	77-79
CLAY	sandy, gray	79-91
SAND	colored	91-92
CLAY	sandy, gray	92-99
SAND	colored	99-101
CLAY	sandy, gray	101-130
SAND	colored	130-148
CLAY	blue	148-151

138-049-13ADD2

Date Completed:	4/23/87	Purpose:	Domestic Well
L.S. Elevation (ft):	908	Well Type:	4" PVC
Depth Drilled (ft):	286	Aquifer:	Undefined
Screened Interval (ft):	98-103	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	soft, brown	3-23
CLAY	soft, blue	23-80
CLAY	sandy clay with small rock, blue	80-83
CLAY & SAND	lenses of clay and sand; blue	83-85
CLAY	sandy clay with small rock, blue	85-96
SAND	blue, colored	96-103
CLAY	sandy clay with small rock, blue	103-128

138-049-13ADD2 (continued)

CLAY	sandy, blue	128-191
CLAY	sandy clay with lenses of sand, blue	191-195
SAND	blue	195-196
CLAY	sandy clay with lenses of sand, blue	196-201
SHALE	blue, black	201-213
SAND	blue	213-215
CLAY	blue	215-226
SHALE	colored	226-236
CLAY	blue	236-248
GRANITE	decomposed, white	248-276
GRANITE	decomposed, green and white	276-286

138-049-13ADD3

Date Completed: 6/6/88
L.S. Elevation (ft): 908
Depth Drilled (ft): 212
Purpose: Test Hole
Well Type:
Log Source: LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
CLAY	brown	0-22
CLAY	blue	22-82
CLAY	sandy, blue	82-83
GRAVEL	colored	83-84
CLAY	blue	84-90
SAND	colored	90-92
CLAY	sandy, blue	92-124
SAND	colored	124-129
CLAY	blue	129-191
SAND	colored	191-194
CLAY	blue	194-212

138-049-13ADD4

Date Completed: 6/8/88
L.S. Elevation (ft): 908
Depth Drilled (ft): 167
Purpose: Test Hole
Well Type:
Log Source: LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-16
CLAY	blue	16-77

138-049-13ADD4 (continued)

SAND	colored	77-78
GRAVEL & CLAY	blue, colored	78-82
CLAY	blue	82-89
CLAY	blue, sandy	89-96
SAND	colored	96-99
CLAY	blue, sandy	99-134
SAND	colored	134-136
CLAY	blue	136-167

138-049-13ADD5

Date Completed:	6/9/88	Purpose:	Domestic Well
L.S. Elevation (ft):	903	Well Type:	4" PVC
Depth Drilled (ft):	101	Aquifer:	Undefined
Screened Interval (ft):	95-99	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-16
CLAY	blue	16-71
CLAY	blue, sandy	71-77
SAND	colored	77-78
CLAY	blue	78-81
SAND	colored	81-82
CLAY	blue, sandy	82-90
SAND	colored	90-91
CLAY	blue, sandy	91-94
SAND	colored	94-99
CLAY	blue	99-101

138-049-13BAA

NDSWC 3114

Date Completed:	7/7/64	Purpose:	Test Hole
L.S. Elevation (ft):	906	Well Type:	
Depth Drilled (ft):	302		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	dark yellowish brown to orange, silty, cohesive, highly calcareous, oxidized	1-15
CLAY	olive gray, silty, cohesive, calcareous	15-82
TILL	olive gray, clay through gravel, quartz, limestone, shale, and granite, cohesive, highly calcareous, some sandy clay about 95 feet, lignite fragments	82-95

138-049-13BAA (continued)

TILL	light olive gray and darker, clay through gravel, very sandy, quartz, limestone, granite with some lignite fragments, very highly calcareous	95-127
SAND	predominantly rounded quartz up to 1mm with some granite, limestone and shale up to gravel size, subrounded	127-134
SHALE	silty, sandy, olive gray to black, hard, slightly calcareous, occasional shell fragments	134-191
CLAY	sandy, white	191-194
CLAY	silty, olive gray, hard, non-calcareous	194-200
BOULDERS	yellowish-gray to bluish-gray, non-calcareous	200-210
CLAY	silty, dark yellowish-brown, abundant lignite fragments, non-calcareous	210-222
CLAY	silty, medium light gray, metallic luster, non-calcareous	222-229
CLAY	silty, variegated (brownish-black, yellowish-brown, light gray) non-calcareous	229-260
CLAY	silty, yellowish-gray, scattered quartz grains, non-calcareous	260-278
CLAY	silty, dark yellowish-brown, abundant lignite fragments, non-calcareous	278-284
CLAY	sandy, yellowish-gray to yellowish-brown, non-calcareous	284-288
GRANITE	decomposed, clay, bluish-white, abundant angular quartz grains, non-calcareous	288-302

138-049-13DCB1

Date Completed:	9/6/79	Purpose:	Test Hole
L.S. Elevation (ft):	907	Well Type:	
Depth Drilled (ft):	268		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-23
CLAY	soft, blue	23-70
CLAY	sandy, blue	70-81
CLAY	sandy, rocky, blue	81-89
SAND	blue	89-90
CLAY	sandy, with lenses of sand, blue	90-97
CLAY	sandy, rocky, hard, blue	97-111
SAND	colored	111-113
BOULDER	red	113-115
CLAY	sandy, hard, boulders, blue	115-129
SHALE	black	129-226
SAND	fine, gray	226-228
SHALE	black	228-230
SAND	fine, gray	230-232
SHALE LIGNITE	black	232-237
SHALE	black	237-263
GRANITE	weathered, white	263-268

138-049-13DCB2

Date Completed:	9/8/79	Purpose:	Domestic Well
L.S. Elevation (ft):	907	Well Type:	4" Steel
Depth Drilled (ft):	141	Aquifer:	Undefined
Screened Interval (ft):	127-137	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-28
CLAY	soft, blue	28-73
CLAY	sandy, with lenses of sand, blue	73-81
BOULDER	red	81-82
CLAY	sandy, hard, blue	82-89
SAND	blue	89-90
CLAY	sandy, hard, blue	90-109
SAND	colored	109-111
CLAY	sandy, blue	111-112
SAND	colored	112-113
CLAY	sandy, hard, blue	113-123
SAND & GRAVEL	colored	123-137
BOULDER	red	137-138
CLAY	sandy, hard, blue	138-141

138-049-15BAB

Date Completed:	1956	Purpose:	Domestic Well
L.S. Elevation (ft):	909	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	West Fargo South
Screened Interval (ft):	0-179	Log Source:	

Lithologic Log - unavailable

138-049-15CDD

NDSWC 11610

Date Completed:	7/13/81	Purpose:	Test Hole
L.S. Elevation (ft):	903	Well Type:	
Depth Drilled (ft):	340		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
CLAY	dark yellowish gray, oxidized, plastic, lacustrine	0-15
CLAY	olive gray, plastic, lacustrine	15-71
CLAY	olive gray, 25% with silt, sand, and gravel, predominantly sand, 75% sand and till	71-77
SAND	medium to very coarse, poorly sorted, subrounded to rounded, quartz, silicates, carbonates, shale (the very coarse fraction)	77-82
CLAY	25% moderately cohesive, with silt, sand and gravel, sand and till as above, around 115 feet gets rocky	82-191

138-049-15CDD (continued)

SAND	medium grained, poorly sorted, argillaceous matrix, quartzose, poor recovery, slightly cemented	191-200
CLAY	20% moderately cohesive, with sand, silt and gravel, 80% sand and till, above seems to be a sandier gradation of the till, at 236 feet sand lens, some silt, lens at 243 sand lens	200-247
SAND	drills like partially or poorly cemented sand, drills at uniform, moderately slow rate, coarse to very coarse, sand, poorly sorted, subrounded, quartz, silicate, carbonates, shale	247-280
GRAVEL	coarse, primarily cobbles, some pebbles and granules, presumably some finer material, subrounded, primarliy carbonates near top, granite by 285 feet, at least one dark green silicate, coarse, finer material is quartz, silicates, carbonates, shale	280-317
MUDSTONE	greenish-gray, silty, pasty, poor samples, also white in color and flakey in parts, towards bottom of interval includes some black carbonaceous mudstone, cavings from above unit abundant	317-340

138-049-16CCC

NDSWC 5691

Date Completed:	5/17/80	Purpose:	Test Hole
L.S. Elevation (ft):	905	Well Type:	
Depth Drilled (ft):	380		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	dark yellowish-brown, very calcareous, moderately cohesive and plastic	1-4
CLAY	moderately yellowish-brown, slightly calcareous, oxidized, very cohesive and plastic	4-17
CLAY	olive gray, unoxidized, slightly calcareous, very cohesive and plastic	17-59
TILL	dark brownish gray, very sandy, pebbly, calcareous, moderately to very cohesive, many small intercalated gravel lenses	59-79
TILL	medium, brownish gray, very sandy, moderately pebbly, very calcareous, moderately cohesive, gravel from 92-94 feet, predominantly medium grain sand, poorly sorted, subrounded to rounded, many small, gravel lenses	79-130
TILL	brownish gray to dark brownish gray, calcareous, very silty and sandy, very moderately cohesive, very pebbly, small gravel lenses, boulders at 155 feet	130-216
CLAY	brownish gray, slightly calcareous, slightly silty with convoluted silt partings	216-245
TILL	brownish gray, very sandy and pebbly, calcareous, very cohesive, boulders at 302 feet	245-302
TILL	olive gray, very clayey and silty, slightly sandy, calcareous, non-cohesive though slow drilling	302-315
CLAY	brownish black, very carbonaceous and much organic material, slightly calcareous, very sandy, pyrite, becomes more red in color with depth	315-351
CLAY	very pale green, non-calcareous, very sandy with medium to coarse and angular sand grains	351-380

138-049-16CDC

Date Completed:	10/7/75	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Steel
Depth Drilled (ft):	266	Aquifer:	Undefined
Screened Interval (ft):	250-256	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-7

138-049-16CDC (continued)

CLAY	brown, soft	7-14
SHALE	blue, soft	14-22
SHALE	blue, sandy	22-65
CLAY	blue, sandy	65-90
SAND	no description	90-91
CLAY	blue, sandy	91-101
SAND	no description	101-112
CLAY	blue, sandy	112-126
CLAY	blue, sandy, with rock	126-130
CLAY	blue, sandy, with hard rock	130-132
CLAY	blue, sandy	132-135
SAND	no description	135-137
CLAY	blue, sandy	137-152
CLAY	blue, sandy, hard	152-182
CLAY	blue, sandy, with hard clay lenses	182-216
SAND	no description	216-231
CLAY	blue, sandy	231-232
SAND	no description	232-262
CLAY	blue, sandy	262-266

138-049-16DDD

NDSWC 3105

Date Completed:	6/5/64	Purpose:	Test Hole
L.S. Elevation (ft):	907	Well Type:	
Depth Drilled (ft):	319		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	light olive gray, clay, silt and sand, abundant calcareous sand grains, very highly calcareous	2-7
CLAY	grayish orange, silty, cohesive, calcareous, oxidized	7-16
CLAY	olive gray, silty, cohesive, calcareous	16-61
TILL	olive gray, slay through gravel, limestone, shale, quartz, granite and lignite, cohesive, highly calcareous, very soft for the first 5 or 6 feet then solid cuttings	61-71
SAND	1/2 to 5mm, predominantly shale, limestone and quartz, with granite and rock types, very angular chips and sub to well rounded, predominantly shale with some limestone, quartz, granite, and lignite up to 15 mm	71-78
TILL	olive gray, clay through gravel, limestone, shale, quartz, granite and lignite, cohesive, highly calcareous, rocky	78-85
TILL	light olive gray, clay through gravel, limestone, quartz, granite with some shale and lignite, cohesive, very highly calcareous, fairly rocky and sandy	85-135
TILL	light olive and olive gray, mottled or varigated till, predominantly quartz in light olive cuttings and predominantly shale and limestone in olive cuttings also, granite and lignite, cohesive, large rather solid dry cuttings, highly calcareous, sandy	135-160

138-049-16DDD (continued)

TILL	olive gray and slightly lighter, clay through gravel, predominantly quartz with shale, limestone, granite and lignite, cohesive, highly calcareous	160-174
SILT	black and brownish black, lignite and organic, many lignite fragments non-calcareous, also olive and light olive gray, calcareous	174-190
CLAY	sandy, dark greenish gray, poor samples, mainly all rounded shale grains with the occasional lignite, limestone and green granite, clay is calcareous	190-283
TILL	olive gray, very silty, clay through gravel, slightly cohesive, difficult to obtain, samples, highly calcareous, predominantly quartz with shale, limestone and granite	283-314
CLAY	light brown and very pale orange sand grains abundant, non-calcareous, probably weathered granite	314-319
GRANITE	chips and flakes, dusky, green, very hard, drilled only a few inches	319-319

138-049-17CCB

NDSWC 11603

Date Completed:	6/22/81	Purpose:	Test Hole
L.S. Elevation (ft):	915	Well Type:	
Depth Drilled (ft):	260		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
CLAY	light yellow brown to brown gray, oxidized, plastic	0-16
CLAY	olive gray, plastic	16-73
CLAY AND SILT	olive gray, with some sand, gravel and boulders (till)	73-85
CLAY	olive gray, plastic, silty	85-87
SAND	very fine to fine-grained, silty, probably poorly sorted	87-89
CLAY AND SILT	olive gray, with some gravel, sand, boulders (till)	89-92
GRAVEL	granule-pebble, with coarse sand, fair sorting, rounded to subrounded	92-96
CLAY AND SILT	olive gray, with some sand, gravel and boulders (till), gravel and sand lens at 141-143	96-206
CLAY	olive gray, silty, gummy-plastic	206-219
MUDSTONE	dark gray, lumpy, silty, moderately hard, interbedded with some sandstone, lignite and decayed wood, poor recovery on sandstone (bedrock)	219-256
MUDSTONE	black, carbonaceous, silty, lumpy, moderately hard	256-259
MUDSTONE	light orange-brown, pasty, soft	259-260

138-049-18ABA

NDSWC 11994

Date Completed:	9/24/82	Purpose:	Observation Well
L.S. Elevation (ft):	909.3	Well Type:	1.25" PVC
Depth Drilled (ft):	240	Aquifer:	Horace
Screened Interval (ft):	85-90	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow tan, oxidized	1-21
CLAY	gray, very plastic (lake clay)	21-68
CLAY	sandy with gravel layers (till)	68-83

138-049-18ABA (continued)

SAND	medium, some gravel	83-92
CLAY	sandy with gravel layers, not much return	92-117
GRAVEL	sandy, dirty, some pebbles, from 1 to 1.5 inches in diameter	117-120
CLAY	sandy, very gravelly, rocks and gravel layers throughout, rough drilling, switched to rock bit at 140 feet, drilled easier but still slow	120-177
SAND	gravelly, not much return	177-180
CLAY	gray to light gray, sandy with gravel layers, rocks at 218	180-219
CLAY	dark gray, silty, no sand, tiny flecks of mica, some light gray-brown layers, one lithified siltstone layer, some reddish brown layers	219-240

138-049-18BAA

NDSWC 11995

Date Completed:	9/28/82	Purpose:	Observation Well
L.S. Elevation (ft):	909.6	Well Type:	1.25" PVC
Depth Drilled (ft):	327	Aquifer:	Horace
Screened Interval (ft):	248-253	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-3
CLAY	yellow brown, silty, not very plastic, white specks in matrix, oxidized	3-6
CLAY	yellow brown, greasy, plastic, oxidized, very little silt	6-18
CLAY	olive gray, greasy, very plastic, unoxidized, drills real fast, large chunks in return, taking water	18-57
CLAY	olive gray, silty sandy with pebbles, drills slower and rough (cobbles), not as plastic (till)	57-101
SILT	olive gray, clay, non plastic	101-150
SILTY CLAY	olive gray, stringers of very fine sand, (shale and igneous) also brownish stringers of clay, drills real fast	150-160
SAND	very fine to coarse, some gravel, 50% shale, 10% lignite, 30% carbonates, 10% igneous sand, drills fast and choppy, probably layered, well rounded to subrounded, fair sorting	160-246
GRAVEL	coarse sand to pebble gravel, well rounded to subrounded, good sorting, 40% igneous 20% carbonates, 10% lignites, 30% shale, drills much rougher, layer of clay from 283 to 285 feet	246-321
BOULDERS	drills slow, return of gravel and sand, occasional chunk of white sandy clay	321-327

138-049-18DC1

Date Completed:	9/23/78	Purpose:	Municipal Well
L.S. Elevation (ft):	912	Well Type:	4" Steel
Depth Drilled (ft):	225	Aquifer:	Horace
Screened Interval (ft):	209-219	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown	2-7
SAND	silty, brown	7-35
CLAY	sandy, soft, blue	35-74
CLAY	sandy, blue	74-98

138-049-18DC1 (continued)

SAND	gray, drilled clean	98-107
CLAY	sandy, blue	107-126
SAND	gray, drilled clean	126-132
SAND	gray, drilled fair	132-162
SAND	dirty, gray, drilled poor	162-182
SAND	gray, drilled poor	182-187
SAND	colored, drilled better	187-207
SAND	colored, drilled good	207-225

138-049-18DC2

Date Completed:	8/1/79	Purpose:	Municipal Well
L.S. Elevation (ft):	912	Well Type:	4" Steel
Depth Drilled (ft):	242	Aquifer:	Horace
Screened Interval (ft):	207-222	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellow	1-21
CLAY	soft, blue	21-73
CLAY	sandy, blue	73-79
BOULDER	red	79-80
CLAY	sandy, rocky, hard, blue	80-88
CLAY	sandy, with lenses of sand	88-95
CLAY	sandy, hard, blue	95-101
BOULDER	red	101-102
CLAY	sandy, hard, blue	102-153
SAND	lime, with layers of clay	153-224
SHALE	black	224-242

138-049-18DCC

NDSWC 11607

Date Completed:	6/25/81	Purpose:	Observation Well
L.S. Elevation (ft):	910.2	Well Type:	1.25" PVC
Depth Drilled (ft):	320	Aquifer:	Horace
Screened Interval (ft):	278-284	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
CLAY	yellow brown, plastic, unoxidized (lacustrine)	0-17
CLAY	olive gray, plastic, (lacustrine)	17-61
CLAY	olive gray, silty (50%), with sand, gravel, and boulders (50%) (till)	61-70
SAND	speckled, coarse to very coarse (60%) with gravel, granule (40%) some pebble, clean, subrounded, carbonate and igneous, composition, coarsens towards base, fair sorting	70-78

138-049-18DCC (continued)

GRAVEL	pebble to coarse gravel, some granule, fair sorting, subrounded	78-83
SAND	as in interval 70 78, does not coarsen towards base	83-96
CLAY	olive gray, silty, gummy with some sand and gravel (till)	96-101
CLAY	brownish, gray, silty, gummy, with very minor gravel	101-118
SILT	gray , slightly sandy, clayey	118-142
SAND	poor returns, probably very fine to fine- grained, silty	142-149
CLAY	gray, sticky, gummy with perhaps some sand lenses (no returns), clay may be somewhat cemented or compacted	149-180
SAND	speckled, medium to coarse grained, fair sorting, subrounded, rounded, some granules, predominantly medium-grained, igneous and carbonate composition, about 60% quartz, slightly cemented or compacted, very coarse at about 255 feet coarser toward base	180-291
GRAVEL	granule with some pebble, 75%, sand very coarse, coarse 25%, fair sorting	291-303
MUDSTONE	white, silty with some sand, lumpy, pasty, (bedrock)	303-320

138-049-19AAA

Date Completed:	1958	Purpose:	Municipal Well
L.S. Elevation (ft):	913	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Horace
Screened Interval (ft):	0-303	Log Source:	

Lithologic Log - unavailable

138-049-19AAC

Date Completed:	2/2/84	Purpose:	Municipal Well
L.S. Elevation (ft):	919	Well Type:	10" Steel
Depth Drilled (ft):	252	Aquifer:	Horace
Screened Interval (ft):	212-237	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	silty, brown	1-18
CLAY	soft, blue	18-39
SAND	fine, gray	39-53
CLAY	soft, blue	53-78
CLAY	sandy, hard, blue	78-85
CLAY	sandy, with lenses of sand, blue	85-92
CLAY	sandy, hard, blue	92-172
SAND	fine, gray	172-187
SAND	medium, gray	187-237
SAND	fine, dirty, gray	237-252

138-049-19ADB

Date Completed:	11/12/91	Purpose:	Municipal Well
L.S. Elevation (ft):	919	Well Type:	8" Steel
Depth Drilled (ft):	270	Aquifer:	Horace
Screened Interval (ft):	225-245	Log Source:	LTP Enterprises, Inc

138-049-19ADB (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	silty, brown	1-6
CLAY	brown	6-16
CLAY	blue	16-32
SAND	with lenses, colored	32-44
CLAY	blue	44-78
CLAY	sandy, hard, blue	78-95
CLAY	soft, blue	95-105
CLAY	hard, blue	105-125
CLAY	sandy, soft, blue	125-171
SAND	fine, colored	171-210
SAND	medium, colored	210-245
SAND	fine, with lenses, colored	245-260
SAND	fine, dirty, blue	260-270

138-049-19ADBB

Date Completed:	2/2/84	Purpose:	Municipal Well
L.S. Elevation (ft):	912	Well Type:	10" Steel
Depth Drilled (ft):	252	Aquifer:	Horace
Screened Interval (ft):	212-237	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	silty, brown	1-18
CLAY	blue, soft	18-39
SAND	fine, gray	39-53
CLAY	blue, soft	53-78
CLAY	sandy, hard, blue	78-85
CLAY	sandy, with lenses of sand, blue	85-92
CLAY	sandy, hard, blue	92-172
SAND	fine, gray	172-187
SAND	medium, gray	187-237
SAND	fine, dirty, gray	237-252

138-049-20BBB

Date Completed:	1955	Purpose:	Municipal Well
L.S. Elevation (ft):	912	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Horace
Screened Interval (ft):	0-110	Log Source:	

138-049-20BBB (continued)

Lithologic Log - unavailable

138-049-20CCC

NDSWC 11997

Date Completed:	9/29/82	Purpose:	Observation Well
L.S. Elevation (ft):	911.1	Well Type:	1.25" PVC
Depth Drilled (ft):	220	Aquifer:	Horace
Screened Interval (ft):	150-155	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow brown, oxidized, very plastic, drills fast	1-15
CLAY	olive gray, unoxidized, very plastic	15-64
CLAY	olive gray, silty, sandy with pebbles, poorly sorted (till), lots of cobbles and boulders	64-97
CLAY	olive gray, plastic, drills smooth, silty	97-113
SAND	very fine to fine, well rounded to subrounded, well sorted, predominantly quartz, shale and carbonates, probably some silt	113-120
CLAY	silty, fairly plastic, olive green	120-136
GRAVEL	pebble to 1/4 inch, some medium to coarse sand, 50% shale, 30% carbonates, 20% igneous, well rounded to subrounded, fair sorting, drills real rough, probably cobbles and boulders	136-155
CLAY	silty, brownish gray, slightly plastic	155-156
GRAVEL	as above	156-160
CLAY	olive gray, silty sandy with pebbles and cobbles (till), occasional whitish clay specks, bedrock clays in till	160-210
CLAY	blackish, greasy, little silt, no sand	210-220

138-049-20DDD

NDSWC 11273

Date Completed:	6/24/80	Purpose:	Test Hole
L.S. Elevation (ft):	907	Well Type:	
Depth Drilled (ft):	200		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow brown, oxidized, slightly silty	1-14
CLAY	olive gray, slightly calcareous, plastic, cohesive	14-64
TILL	olive gray, calcareous, lenses of gravel	64-69
TILL	as above, rock at 88 feet	69-163
CLAY	black, organic material, non-calcareous	163-200

138-049-21ABB

NDSWC 12249

Date Completed:	9/30/82	Purpose:	Test Hole
L.S. Elevation (ft):	905	Well Type:	
Depth Drilled (ft):	240		
		Log Source:	NDSWC

138-049-21ABB (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow brown, oxidized, iron stains, very plastic and cohesive, drills fast (lake clays)	1-16
CLAY	olive gray, unoxidized, very plastic and cohesive (lake clays)	16-68
CLAY	olive gray, silty, sandy, with pebbles and cobbles, poorly sorted, layer of sand and gravel 76-77 feet, predominantly shale, 80-81 feet predominantly shale and carbonates, rock at 82 feet	68-90
CLAY	olive gray, slightly silty, plastic but not as cohesive as clay above	90-91
CLAY	till, as above	91-101
CLAY	olive gray, slightly silty, (lake clays)	101-110
GRAVEL	pebbles with medium to coarse sand, 40% shale, 40% carbonates, 20% igneous, well rounded to subrounded, fair sorting, drills real rough, several cobbles	110-121
CLAY	light gray, silty sandy with pebbles, poorly sorted, (weathered till), becomes darker gray at 176	121-213
CLAY	brownish, slightly silty, drills smooth, nonplastic	213-218
SAND	very silty, very poor sample return, some lignites, only indication of sand is faster drilling rate	218-237
CLAY	blackish, greasy, mica flakes	237-240

138-049-21ADD

NDSWC 11275

Date Completed:	6/25/80	Purpose:	Test Hole
L.S. Elevation (ft):	908	Well Type:	
Depth Drilled (ft):	280		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	slightly silty, yellow-brown, plastic, cohesive, slightly calcareous.	1-14
CLAY	slightly silty, olive-gray, cohesive, plastic, calcareous.	14-67
TILL	gray, some large rocks, calcareous; gravel from 76 to 77 feet.	67-183
CLAY	slightly silty, black, calcareous, greasy.	183-226
CLAY	black, lignite; some laminae.	226-238
CLAY	buff to white grades to greenish-white, angular quartz grains.	238-280

138-049-21DDC2

Date Completed:	10/8/84	Purpose:	Domestic Well
L.S. Elevation (ft):	912	Well Type:	4" Steel
Depth Drilled (ft):	253	Aquifer:	Undefined
Screened Interval (ft):	243-249	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	brown, soft	2-20
CLAY	blue, soft	20-66

138-049-21DDC2 (continued)

CLAY	gray, sandy	66-93
SAND	colored	93-96
CLAY	gray, sandy	96-139
SAND	colored	139-141
CLAY	gray, sandy	141-239
SAND	colored	239-250
CLAY	gray, sandy	250-253

138-049-22BBA1

NDSWC 12290

Date Completed:	11/29/82	Purpose:	Observation Well
L.S. Elevation (ft):	908	Well Type:	1.25" PVC
Depth Drilled (ft):	310	Aquifer:	West Fargo South
Screened Interval (ft):	238-242	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	dark brown, silty	0-2
CLAY	mottled dark to light gray, slightly cohesive, very plastic, lacustrine	2-4
CLAY	yellow brown, oxidized, slightly cohesive, very plastic, lacustrine, becomes mottled with green at 13 feet	4-13
CLAY	olive gray, cohesive, very plastic, lacustrine	13-70
TILL	olive gray, clayey and sandy, slightly cohesive and plastic, interbedded carbonate gravel from 70-75 feete, fine gravel lense 82 to 83 feet	70-85
SAND	fine to coarse, predominantly medium angular to rounded, predominantly subangular, equal proportions of quartz and carbonates	85-89
TILL	olive gray, sandy and clayey, cohesive, slightly brittle, contains many cobbles below 120 feet, becomes softer and more plastic with a lot of interbedded gravel	89-150
TILL	olive gray, clayey and pebbly, slightly sandy moderately cohesive, brittle, no interbedded gravel	150-164
CLAY	olive gray, slightly cohesive, very plastic, appears to be lacustrine	164-176
SAND	very fine to medium, predominantly fine grain, subangular, predominantly quartz, possibly slightly clayey	176-208
SAND & GRAVEL	coarse sand to coarse gravel, predominantly fine and medium gravel, angular to rounded, predominantly subangular below 240 feet, predominantly medium and coarse cobbles 280-282 feet	208-296
BEDROCK	weathered crystalline bedrock composed of green chlorite clay and quartz grains	296-310

138-049-22BBA2

Date Completed:	2/7/83	Purpose:	Observation Well
L.S. Elevation (ft):	907.9	Well Type:	6" PVC
Depth Drilled (ft):	0	Aquifer:	West Fargo South
Screened Interval (ft):	245-250	Log Source:	

Lithologic Log - unavailable

138-049-27BAA

Date Completed:	1/1948	Purpose:	Domestic Well
L.S. Elevation (ft):	909	Well Type:	2" Steel
Depth Drilled (ft):	0	Aquifer:	West Fargo South
Screened Interval (ft):	0-240	Log Source:	

Lithologic Log - unavailable

138-049-27BAB

NDSWC 12297

Date Completed:	12/15/82	Purpose:	Observation Well
L.S. Elevation (ft):	907	Well Type:	1.25" PVC
Depth Drilled (ft):	260	Aquifer:	West Fargo South
Screened Interval (ft):	188-193	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellowish brown, oxidized, cohesive, very plastic, lacustrine	2-18
CLAY	olive gray, cohesive, very plastic, lacustrine	18-67
TILL	olive gray, clayey and silty, slightly pebbly, moderately cohesive and plastic, becomes very gravelly below 83 feet, till becomes very sandy and gravelly at 152 feet	67-157
SAND	fine sand to fine gravel, predominantly fine and medium gravel, subrounded, predominantly quartz and lenses of detrital coal	157-190
SAND & GRAVEL	fine sand to medium gravel, predominantly very coarse sand and fine gravel, angular to rounded, predominantly subrounded, boulders at 197 feet	190-198
SILT	greenish gray, very clayey and tight, some interbedded sand	198-222
SANDSTONE	greenish gray, fine grain, well sorted, subangular, glauconitic, poorly indurated, interbedded with carbonaceous shale	222-260

138-049-27CDC

Date Completed:	0/0	Purpose:	Test Hole
L.S. Elevation (ft):	910	Well Type:	
Depth Drilled (ft):	250		
		Log Source:	Layne Minnesota Co

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-24
CLAY	blue	24-64
TILL	rocks	64-81
GRAVEL	dirty, fine	81-102
TILL	no description	102-190
SAND	fine, very fine	190-218
TILL	no description	218-250

138-049-27DCC

Date Completed:	0/0	Purpose:	Test Hole
L.S. Elevation (ft):	910	Well Type:	
Depth Drilled (ft):	250		
		Log Source:	Layne Minnesota Co

138-049-27DCC (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-19
CLAY	blue	19-62
TILL	gravelly, rocks	62-84
CLAY	with sand & gravel lenses	84-102
TILL	no description	102-182
SAND	dirty	182-190
TILL	no description	190-250

138-049-27DDC

Date Completed: 0/0
L.S. Elevation (ft): 910
Depth Drilled (ft): 242

Purpose: Test Hole
Well Type:
Log Source: Layne Minnesota Co

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-20
CLAY	blue	20-63
TILL	gravelly, rocks	63-90
CLAY	with sand & gravel lenses	90-104
TILL	no description	104-190
SAND	dirty	190-196
TILL	no description	196-242

138-049-28AAA

NDSWC 12298

Date Completed: 12/15/82
L.S. Elevation (ft): 908
Depth Drilled (ft): 233

Purpose: Test Hole
Well Type:
Log Source: NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellowish-brown, oxidized, cohesive, very plastic (lacustrine).	2-16
CLAY	olive-gray, cohesive, very plastic (lacustrine).	16-63
TILL	silty, brownish to olive-gray, brittle; boulder at 71 and 83 feet.	63-84
TILL	very sandy, light brownish-gray, slightly cohesive; gravel from 166 to 167 feet; cobbles at 172 feet.	84-217
SHALE	dark brownish-gray, waxy.	217-233

138-049-28DCC

Date Completed:	1951	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-90	Log Source:	

Lithologic Log - unavailable

138-049-29CCC

NDSWC 3115

Date Completed:	7/7/64	Purpose:	Observation Well
L.S. Elevation (ft):	913.1	Well Type:	1.25" ABS
Depth Drilled (ft):	317	Aquifer:	Horace
Screened Interval (ft):	258-278	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
SILT	moderately yellowish brown, clay, cohesive, calcareous, oxidized	1-14
CLAY	olive gray, silty, cohesive, calcareous	14-64
TILL	olive gray, clay through gravel, cohesive, quartz, limestone, shale, granite, and some lignite, soft highly calcareous	64-74
SAND	fine, generally less than 1/2mm, some up to 1mm, predominantly angular to rounded quartz with some limestone, shale, granite, and lignite, limestone and shale up to small pebbles	74-89
TILL	olive gray, clay through gravel, cohesive, quartz, limestone, and granite, highly calcareous	89-117
TILL	light olive gray, clay through gravel, quartz, limestone, and granite, cohesive, very highly calcareous	117-142
SILT	light olive gray, clay, cohesive, highly calcareous	142-172
SAND	very fine to 1mm, predominantly sub- to well-rounded quartz with limestone, granite, shale, and lignite, also some pyrite, mainly coarse and medium sand, sand in sample seems to be fairly well sorted, light blue green grains of weathered granite abundant	172-210
SAND	coarse, shale granules and even smaller pebbles up to 6mm less quartz than above, limestone, shale, quartz and granite, still is predominantly coarse and medium sand	210-295
WEATHERED GRANITE	pale blue green, clay and quartzsand up to 1/2mm, angular and subangular, slightly calcareous or non-calcareous gets darker and harder with depth, non-calcareous	295-317

138-049-30AAD

Date Completed:	8/30/77	Purpose:	Observation Well
L.S. Elevation (ft):	915	Well Type:	2" Steel
Depth Drilled (ft):	296	Aquifer:	Horace
Screened Interval (ft):	284-289	Log Source:	Hickok & Associates

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	silty, medium brown	2-15
CLAY	silty, medium gray	15-62
TILL	silty, gravelly, pebbly, medium gray, with gravel seams, many limestone pebbles, and some black shale	62-122
CLAY	silty, light gray to light brown, with streaks	122-180
SAND	fine, light gray, subrounded to rounded, 5 to 10% ferro-magnesium minerals	180-288
GRANITE	weathered	288-296

138-049-30AAD2

Date Completed:	1/19/90	Purpose:	Domestic Well
L.S. Elevation (ft):	912	Well Type:	4" PVC
Depth Drilled (ft):	277	Aquifer:	Horace
Screened Interval (ft):	254-266	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-13
CLAY	blue	13-68
CLAY	sandy, gray	68-100
CLAY	silty, blue and gray	100-162
CLAY	with lenses of sand, gray	162-189
SAND	colored	189-207
SAND	colored	207-216
SAND	colored	216-227
SAND	colored	227-237
SAND	gray	237-247
SAND	colored	247-267
SAND	gray	267-277

138-049-31BAB

Date Completed:	1930	Purpose:	Domestic Well
L.S. Elevation (ft):	917	Well Type:	4" Steel
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-243	Log Source:	

Lithologic Log - unavailable

138-049-31BAB2

Date Completed:	3/2/94	Purpose:	Domestic Well
L.S. Elevation (ft):	927	Well Type:	4" PVC
Depth Drilled (ft):	290	Aquifer:	Undefined
Screened Interval (ft):	220-260	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	no description	2-16
CLAY	soft	16-69
CLAY	sandy, with rocks	69-138
CLAY	sandy	138-178
CLAY	no description	178-231
DECOMPOSED	no description	231-236
WEATHERED GRANITE	no description	236-254

138-049-31BAB2 (continued)

WEATHERED GRANITE	no description	254-290

138-049-31DDD

NDSWC 11996

Date Completed:	9/29/82	Purpose:	Observation Well
L.S. Elevation (ft):	913.2	Well Type:	1.25" PVC
Depth Drilled (ft):	320	Aquifer:	Horace
Screened Interval (ft):	270-275	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow brown, oxidized, very plastic,	1-19
CLAY	olive gray, unoxidized, very plastic, drills real fast, peels off in bacon-like slabs	19-73
CLAY	olive gray, silty sandy with pebbles, poorly sorted, some cobbles, drills slower (till), layers of sand and gravel 112-114 feet and 115-117 feet, rock and gravel predominantly shale and carbonates at 120-121 feet	73-127
CLAY	olive gray, plastic	127-132
TILL	as above	132-140
CLAY	olive gray, plastic, drills smooth, very slightly silty	140-153
CLAY	several layers of sand and gravel, poor return (probably silty)	153-168
SAND	very fine to fine, poor returns, well rounded well sorted	168-180
SAND	fine to coarse, well rounded and sorted, 50% quartz and igneous, 30% shale, 20% carbonates, drills choppy	180-192
SAND	as above, picking up gravel predominantly medium sand to pebble gravel, 50% quartz and igneous, 30% shale, 20% carbonates, mix two bags of mud, also taking water, well rounded to subrounded, fair sorting	192-254
GRAVEL	pebble to 1/4 inch grains, percentages as above, well rounded to subrounded, fair sorting, drills real rough, as if cobblely	254-267
GRAVEL	sand and cobbles, tripped out and put rock bit on, extremely rough drilling, also picking up specks of whitish clay and sandstone, lenses of greenish white, silty clay	267-301
CLAY	silty sandy, whitish, specks of green, shimmers in light, some chunks of whitish sandstone, could be some mica	301-320

138-049-32AAA

NDSWC 11274

Date Completed:	6/24/80	Purpose:	Test Hole
L.S. Elevation (ft):	908	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	slightly silty, yellowish-brown, slightly calcareous; dark brown streaks.	1-29
CLAY	olive to brown, slightly calcareous, similar to above.	29-57
TILL	olive-gray; gravelly lenses; sand from 93 to 94 feet.	57-190
CLAY	black, lignite streaks.	190-210

138-049-32AAA (continued)

CLAY	black, lignite, noncalcareous.	210-220

138-049-32ADD

NDSWC 12919

Date Completed:	10/15/91	Purpose:	Test Hole
L.S. Elevation (ft):	910	Well Type:	
Depth Drilled (ft):	220		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, soft, smooth, plastic (oxidized lake clay)	2-16
CLAY	gray, soft, smooth, very plastic (lake clay)	16-67
CLAY	sandy, silty, pebbly, light gray, very sandy, not very plastic, moderately soft to moderately firm (till)	67-124
SAND	with numerous clay layers, drilled easily, then did not, repetitively	124-130
CLAY	very sandy, silty, pebbly, light gray, moderately firm, little plasticity, sand layers from 145 to 150 feet, and a few gravel layers from 160 to 180 feet (till)	130-184
CLAY	dark gray, moderately firm, fairly plastic, occasional softer, lighter gray portions, with a brownish-gray, silty, slightly plastic clay layer at 195 feet (bedrock)	184-220

138-049-33CCC

NDSWC 12916

Date Completed:	10/10/91	Purpose:	Observation Well
L.S. Elevation (ft):	910.31	Well Type:	2" PVC
Depth Drilled (ft):	220	Aquifer:	Undefined
Screened Interval (ft):	157-162	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow-brown, soft, smooth, very plastic (oxidized lake clay)	2-16
CLAY	gray, soft, smooth, very plastic (lake clay)	16-58
CLAY	very silty, sandy, pebbly, gray to dark gray, moderately firm, slight plasticity, gravel layer at 68 feet (till)	58-72
CLAY	very sandy, silty, pebbly, light gray, soft, plastic, rocks at 76 feet and 90 feet (till)	72-131
GRAVEL & SAND	gravel, fine to coarse, and sand, coarse, angular to subrounded, predominantly carbonates, with shale particles, more sand after 146 feet	131-165
CLAY	very sandy, silty, pebbly, light gray, soft, moderately plastic, becoming firmer and a little less plastic with depth (till)	165-202
CLAY	dark gray, shiny, smooth, tiny mica flakes, layers of slightly indurated siltstone after 207 feet (bedrock)	202-211
CLAY	very light gray, soft, some sand grains with depth, slight greenish tint with depth (weathered Precambrian)	211-220

138-049-34ABA

NDSWC 12296

Date Completed:	12/14/82	Purpose:	Test Hole
L.S. Elevation (ft):	907	Well Type:	
Depth Drilled (ft):	320		
		Log Source:	NDSWC

138-049-34ABA (continued)

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow-brown, oxidized, cohesive, very plastic (lacustrine).	2-17
CLAY	olive-gray, cohesive, very plastic; gravel lens at 69 feet (lacustrine).	17-70
TILL	sandy, pebbly, olive-gray, slightly cohesive, slightly brittle; gravelly.	70-105
TILL	clayey, silty, less gravelly than above, olive-gray, cohesive, plastic; slightly brittle from 115 feet; tighter below 130 feet.	105-210
GRAVEL	fine to coarse, predominantly medium and coarse, subrounded and rounded, equal proportions carbonate and silicate.	210-216
SILT	slightly clayey, greenish-gray, slightly cohesive; few small gravel lenses.	216-235
NO RETURN	probably till.	235-247
NO RETURN	drilled easy, probably sand and/or clay.	247-252
SAND & GRAVEL	very coarse sand to very coarse gravel, predominantly fine and medium gravel; clay from 272 to 273 feet and 277 to 278 feet; could be bedrock below 272 feet, drills like sand, great deal of brown clay.	252-320

138-049-34BAA

NDSWC 12295

Date Completed:	12/14/82	Purpose:	Test Hole
L.S. Elevation (ft):	907	Well Type:	
Depth Drilled (ft):	280		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellowish-brown, oxidized, cohesive, very plastic; becomes dusky yellowish-brown at 15 feet (lacustrine).	2-17
CLAY	olive-gray, cohesive, very plastic; slightly silty at 30 feet (lacustrine).	17-68
GRAVEL	fine, angular, predominantly carbonate, some detrital shale.	68-78
TILL	silty, clayey, olive-gray, moderately cohesive, plastic; small gravel lenses of detrital shale; boulder at 92 feet.	78-94
TILL	silty, brownish to olive-gray, moderately cohesive, plastic; many small gravel lenses; sand from 172 to 174 feet.	94-212
SILT	very slightly clayey, greenish-gray, slightly carbonaceous.	212-224
CLAY	light gray to light greenish-gray; poor return (weathered granite).	224-280

138-049-34CBB

NDSWC 12250

Date Completed:	10/1/82	Purpose:	Test Hole
L.S. Elevation (ft):	905	Well Type:	
Depth Drilled (ft):	240		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2

138-049-34CBB (continued)

CLAY	yellow-brown, oxidized, iron stains, very plastic, cohesive (lake clay).	2-14
CLAY	olive-gray, unoxidized, very plastic, cohesive (lake clay).	14-62
CLAY	silty, sandy, pebbly, olive-gray, poorly sorted; numerous cobbles (till).	62-89
CLAY	silty, olive-gray; drills smooth.	89-97
CLAY	silty, sandy, pebbly, contains cobbles, light gray; numerous layers of sand and gravel from 97 to 98 feet and 102 to 103 feet; light gray color may be due to higher bentonite content.	97-230
CLAY	silty; scattered fragments of white-orange claystone to siltstone; some brownish to black greasy clays; some scattered fragments of decomposed granite (bedrock).	230-240

138-049-34CCC

NDSWC 3106

Date Completed:	6/6/64	Purpose:	Observation Well
L.S. Elevation (ft):	910	Well Type:	1.25" ABS
Depth Drilled (ft):	345	Aquifer:	Undefined
Screened Interval (ft):	81-101	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	olive gray, silty, laminated, cohesive, very highly calcareous	1-2
CLAY	dark yellowish brown, to dark yellowish orange, silty, some layering, cohesive, calcareous, oxidized	2-14
CLAY	moderately brown, with areas of greenish gray enclosing white gypsum segregations, clay all calcareous and oxidized	14-18
CLAY	grayish orange to olive gray, silty, cohesive, calcareous, partially oxidized	18-22
SAND	very fine to 1mm, predominatly quartz, mostly rounded to well rounded	22-46
CLAY	olive gray, silty, cohesive, calcareous	46-65
TILL	olive gray, clay through gravel, cohesive, shale, limestone and quartz, highly calcareous, gravelly	65-73
TILL	light olive gray, clay through gravel, very silty, limestone, quartz, granite, and some shale, cohesive, very highly calcareous	73-79
GRAVEL	1 to 25mm, very angular chips and sub to well rounded, limestone, quartz, shale and granite are abundant, very rough drilling, takes considerable water and mud	79-100
TILL	light olive gray, clay through gravel, limestone, quartz, and granite, cohesive, very highly calcareous	100-130
TILL	dark greenish gray, clay through gravel, quartz, shale, limestone, granite, and lignite, cohesive, highly calcareous, quite solid after 178 feet	130-216
SILT	pale brown and brownish black to black, clay with abundant organic or lignitic material, non to slightly calcareous, cohesive, some lignite chips	216-233
CLAY	white, soapy, probably weathered granite, non-calcareous, silty with a few quartz grains, changing to a light greenish gray about 245 feet, changing to a pale blue green about 280 feet	233-345

138-049-34CCD2

Date Completed:	2/11/77	Purpose:	Test Hole
L.S. Elevation (ft):	910	Well Type:	
Depth Drilled (ft):	238		
		Log Source:	Lako Drilling

Lithologic Log

138-049-34CCD2 (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-21
CLAY	gray	21-68
SHALE	gravelly	68-78
TILL	gray	78-218
GRAVEL	no description	218-221
TILL	no description	221-224
SAND	no description	224-238

138-049-34CDC

Date Completed: 0/0
L.S. Elevation (ft): 909
Depth Drilled (ft): 250

Purpose: Test Hole
Well Type:

Log Source: Layne Minnesota Co

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-23
CLAY	blue	23-61
TILL	rocks	61-70
TILL	with sand lenses	70-78
SAND	no description	78-81
TILL	no description	81-85
SAND	no description	85-92
TILL	no description	92-103
SAND	fine, clay streaks	103-150
SAND	fine, medium coarser, with depth	150-180
SAND	coarse	180-195
CLAY	with layers sand, rocks	195-218
GRAVEL	no description	218-220
TILL	no description	220-250

138-049-34DCD

Date Completed: 0/0
L.S. Elevation (ft): 909
Depth Drilled (ft): 240

Purpose: Test Hole
Well Type:

Log Source: Layne Minnesota Co

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2

138-049-34DCD (continued)

CLAY	yellow	2-22
CLAY	blue	22-63
TILL	soft	63-83
SAND	no description	83-90
TILL	no description	90-140
SAND	with clay layers	140-160
GRAVEL	fine, clean	160-169
TILL	no description	169-240

138-049-35BBB

NDSWC 12897

Date Completed:	9/19/91	Purpose:	Observation Well
L.S. Elevation (ft):	907.42	Well Type:	2" PVC
Depth Drilled (ft):	195	Aquifer:	West Fargo South
Screened Interval (ft):	170-180	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	yellow-brown, soft, smooth, plastic (oxidized lake clay)	1-19
CLAY	gray, soft, smooth, plastic (lake clay)	19-68
CLAY	sandy, silty, pebbly, medium to light gray, fairly soft, moderately plastic, very sandy, rocks at 90 and 110 feet (till)	68-115
CLAY	sandy, silty, pebbly, gray, moderately stiff, slightly plastic (till)	115-126
CLAY	sandy, silty, pebbly, light to medium gray, very sandy, moderately soft, not very plastic, almost crumbly (till)	126-170
GRAVEL	medium to coarse, with rocks, predominantly carbonates, subangular to rounded, mostly subrounded	170-182
CLAY	soft, green, with quartz fragments	182-187
ROCK	quartz and feldspar (granite)	187-195

138-049-35CBBB

Date Completed:	10/20/88	Purpose:	Domestic Well
L.S. Elevation (ft):	906	Well Type:	4" PVC
Depth Drilled (ft):	250	Aquifer:	West Fargo South
Screened Interval (ft):	234-244	Log Source:	Water Smith, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	then clay	0-60
CLAY	mixed with sand	60-80
SAND	cleaner sand, some gravel	80-90
SAND & GRAVEL	medium to coarse gravel and sand	90-105
CLAY	blue	105-140
CLAY	with some gravel ledges	140-156
GRAVEL	hard gravelly ledge	156-160

138-049-35CBBB (continued)

CLAY	mixed with sand, not clean	160-180
SHALE	soft	180-226
SAND	hard ledge	226-228
SAND	coarse to fine sand, some gravel ledges	228-244
CLAY	turns back to clay mix	244-250

138-049-35DCC

Date Completed:	00/00/00	Purpose:	Test Hole
L.S. Elevation (ft):	913	Well Type:	
Depth Drilled (ft):	97		
		Log Source:	unknown

Lithologic Log

Unit	Description	Depth (ft)
CLAY	silty, black to yellowish gray, oxidized, granular texture, unbedded (UNIT 10)	0-6
CLAY	gray, unbedded, lean clay, clay stringers (marbled) (Sherack Formation?)	6-14
CLAY	yellowish brown to gray, mostly lean, only thin clay stringers, silty towards base (Brenna Formation)	14-55
CLAY	gray, lean, clay nodules, sand pebbles, silt pebble inclusions, gritty appearance (Argusville Formation)	55-75
CLAY	pebbly, loamy, silty, sandy (Unit A)	75-97

138-050-01BDC3

Date Completed:	7/6/92	Purpose:	Domestic Well
L.S. Elevation (ft):	904	Well Type:	4" PVC
Depth Drilled (ft):	96	Aquifer:	Undefined
Screened Interval (ft):	84-88	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	yellow	2-17
CLAY	soft, blue	17-61
CLAY	sandy, gray	61-68
SAND & GRAVEL	with rocks, colored	68-77
SAND	#10	77-88
CLAY	sandy, gray	88-96

138-050-01DDDC

NDSWC 12673

Date Completed:	10/16/90	Purpose:	Test Hole
L.S. Elevation (ft):	906	Well Type:	
Depth Drilled (ft):	240		
		Log Source:	NDSWC

Lithologic Log

138-050-01DDDC (continued)

Unit	Description	Depth (ft)
TOPSOIL	black	0-1
CLAY	yellowish brown, very plastic, smooth, soft (oxidized lake clay)	1-17
CLAY	gray, plastic, smooth, soft (lake clay)	17-53
TILL	clay, gray, sandy, silty, some pebbles, moderately stiff, moderately plastic, sand lense 58' to 60'	53-71
SAND & GRAVEL	fine to coarse sand, fine to medium gravel, subangular to subrounded, predominantly sand from 80' to 100'	71-100
GRAVEL	sandy, fine to medium, with coarse sand, clean, fairly well sorted	100-123
TILL	clay, sandy, silty, light gray, soft but drills slowly, moderately plastic	123-196
SAND AND CLAY	layered, not much sample return, drills irregularly as it went through the different layers	196-202
TILL	clay, sandy, silty, some pebbles, firm, slightly plastic, gray	202-214
CLAY	dark gray, firm, stiff, smooth, shiny, with layers of smooth soft clay, and occasional layers with lignite, some bentonitic layers, and some dark brownish gray layers with silt (bedrock)	214-240

138-050-05ADD

Date Completed:	1938	Purpose:	Domestic Well
L.S. Elevation (ft):	914	Well Type:	3" Steel
Depth Drilled (ft):	0	Aquifer:	Dakota Group
Screened Interval (ft):	0-455	Log Source:	

Lithologic Log - unavailable

138-050-05ADD2

Date Completed:	10/25/84	Purpose:	Domestic Well
L.S. Elevation (ft):	913	Well Type:	4" Steel
Depth Drilled (ft):	450	Aquifer:	Undefined
Screened Interval (ft):	325-340	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-4
CLAY	brown	4-24
CLAY	gray	24-67
CLAY	gray, sandy	67-73
CLAY	gray	73-100
ROCK	colored	100-101
CLAY	gray, sandy	101-136
SAND	gray	136-138
CLAY	gray, sandy	138-197
SAND	gray	197-207
CLAY	gray	207-236
SAND	gray	236-237
CLAY	gray	237-288
CLAY	gray, sandy	288-323

138-050-05ADD2 (continued)

SAND	gray	323-324
CLAY & SAND	gray	324-335
SAND	gray	335-340
CLAY	sandy	340-378
SAND	gray	378-379
CLAY	gray, sandy	379-410
PRECAMBRIAN	green, white	410-450

138-050-05BBB

NDSWC 3116A

Date Completed:	7/10/64	Purpose:	Observation Well
L.S. Elevation (ft):	913	Well Type:	1.25" ABS
Depth Drilled (ft):	377	Aquifer:	Undefined
Screened Interval (ft):	221-241	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black.	0-2
CLAY	silty, occasional sand grains, olive-gray, highly calcareous.	2-9
CLAY	silty, rare sand grains, moderate yellowish-brown, gypsum crystals, highly calcareous, oxidized.	9-23
CLAY	silty, olive-gray, cohesive, calcareous.	23-54
TILL	clay through gravel, quite silty, olive-gray, cohesive, shale, quartz, carbonate, igneous, some lignite, highly calcareous.	54-77
TILL	clay through gravel, silty, light olive to olive-gray, cohesive, quartz, carbonate, igneous, highly calcareous; shale pebbles, granules, less silty near base.	77-100
TILL	as above, darker with depth, olive-gray by 137 feet, lignite, very few cobbles or boulders; probable silt lens around 170 feet, olive-gray, lignite grains up to .5 mm, solid.	100-225
GRAVEL	small pebbles, granular, sandy, composition varied, carbonate, igneous, shale, quartz, angular to rounded, predominantly subrounded; few small wood fragments; gradational boundary.	225-240
SAND	coarse and very coarse, gravelly, predominantly subangular quartz, with carbonate, shale and igneous, many rounded grains.	240-255
CLAY	silty, dark greenish-gray, solid, highly calcareous, few white specks.	255-265
SAND	granular, predominantly subrounded quartz, with carbonate, shale and igneous, granule shale quite abundant.	265-279
SILT	clayey, very fine sand, light olive-gray, lignite or organic matter, slightly to noncalcareous, cohesive, lignite fragments; varigated light gray, light brownish-gray, light olive-gray, greenish-gray.	279-302
SILT	clayey to sandy, olive-gray, cohesive, noncalcareous, no lignite or organic matter enclosed, lignite chips present, also some yellowish to light olive-gray silty clay with enclosed pyrite crystal.	302-338
SAND	very fine to 4 mm, predominantly coarse sand, all quartz or at least a clear or translucent white sand, some pyrite cementation of grains, angular and subangular.	338-346
WEATHERED GRANITE	clay, included sand as above, light greenish gray to very pale blue, noncalcareous; becomes more solid and pale to grayish-blue-green with depth.	346-362
WEATHERED GRANITE	as above, apple green color.	362-377

138-050-13BCB

Date Completed:	4/1960	Purpose:	Domestic Well
L.S. Elevation (ft):	911	Well Type:	4" Unknown
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-123	Log Source:	

Lithologic Log - unavailable

138-050-14AAD2

Date Completed:	10/6/83	Purpose:	Domestic Well
L.S. Elevation (ft):	909	Well Type:	4" Steel
Depth Drilled (ft):	322	Aquifer:	Undefined
Screened Interval (ft):	312-317	Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-3
CLAY	gray	3-4
CLAY	brown	4-15
CLAY	blue	15-60
CLAY	blue, sandy	60-118
SAND	colored	118-120
CLAY	blue, sandy	120-123
SAND	colored	123-124
CLAY	blue, sandy	124-169
SAND	blue	169-176
CLAY	blue, sandy	176-183
SAND	blue	183-192
SAND	colored	192-195
CLAY	blue, sandy	195-198
SAND	colored, fine	198-208
CLAY	blue, sandy	208-210
SAND	blue	210-232
SAND	with clay lenses	232-248
SAND	colored, fine	248-254
SAND	colored, fine	254-256
SAND	colored, fine	256-261
CLAY	blue, sandy	261-277
SAND	colored	277-287
SAND	colored, fine	287-297
SAND	colored, fine	297-312
SAND	colored, coarse	312-322

138-050-14DDD

NDSWC 11609

Date Completed:	6/25/81	Purpose:	Observation Well
L.S. Elevation (ft):	911.1	Well Type:	1.25" PVC
Depth Drilled (ft):	220	Aquifer:	Undefined
Screened Interval (ft):	155-158	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	clay, brownish-black, organic.	0-2
CLAY	dark yellowish-brown, plastic, oxidized, dark reddish-brown and olive-gray stringers (lacustrine).	2-15
CLAY	olive-gray, plastic; comes out in slabs (lacustrine).	15-53
CLAY	silty, sandy, trace of gravel and rocks, olive-gray, low in cohesion (till).	53-69
GRAVEL	sandy, predominantly granules of gravel and very coarse sand, subangular and subrounded, poorly sorted, tan carbonate, silicate, igneous, quartz, minor shale.	69-76
SILT	olive-gray; poor return.	76-81
CLAY	silty, sandy, gravelly, olive-gray, moderately cohesive (till).	81-109
GRAVEL	sandy, similar to above.	109-113
CLAY	as above (till).	113-120
SAND	possible gravel.	120-122
SAND	very fine, silty.	122-143
SAND & GRAVEL	sandy at top, gravelly at bottom, subangular and subrounded, silicate, carbonate, quartz sand and shale.	143-164
CLAY	silty, sandy, gravelly, olive-gray, cohesive; rock at 167 feet (till).	164-181
CLAY	silty, olive-gray; small stringers of light gray clay, possibly bentonite (bedrock).	181-220

138-050-20CDD

Date Completed:	5/1961	Purpose:	Domestic Well
L.S. Elevation (ft):	919	Well Type:	4" Unknown
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-180	Log Source:	

Lithologic Log - unavailable

138-050-24AAA

NDSWC 11608A

Date Completed:	6/25/81	Purpose:	Test Hole
L.S. Elevation (ft):	912	Well Type:	
Depth Drilled (ft):	240		
		Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
CLAY	yellow-gray, plastic, oxidized (lacustrine).	0-19
CLAY	olive-gray, plastic (lacustrine).	19-61
SAND	clayey, silty, gravelly, gray, poorly sorted, blocky to lumpy (till).	61-82
SAND	medium to very coarse, granular, fair sorting, subrounded and rounded, quartz and lithic.	82-85
SILT	clayey, sandy, gray, lumpy to blocky.	85-93
SAND	clayey, silty, gravelly, gray, poorly sorted, firm, blocky to lumpy; occasional boulder; occasional gravel and sand lenses (till).	93-173

138-050-24AAA (continued)

SILTSTONE	sandy, brownish-gray, moderately hard, blocky (bedrock).	173-227
MUDSTONE	silty, sandy, brown to dark gray, carbonaceous in part, some lignite, moderately hard (bedrock).	227-240

138-050-25AAC

Date Completed:	6/13/95	Purpose:	Domestic Well
L.S. Elevation (ft):	916	Well Type:	4" PVC
Depth Drilled (ft):	147	Aquifer:	Undefined
Screened Interval (ft):	130-147	Log Source:	Lako Drilling

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-2
CLAY	yellow	2-22
CLAY	lake	22-80
SAND	fine, dirty layers	80-90
TILL	no description	90-110
SAND	no description	110-122
TILL	no description	122-124
SAND	no description	124-144
SAND	no description	144-147

138-050-35AAA

NDSWC 3136

Date Completed:	7/30/64	Purpose:	Observation Well
L.S. Elevation (ft):	913	Well Type:	1.25" ABS
Depth Drilled (ft):	227	Aquifer:	Undefined
Screened Interval (ft):	88-98	Log Source:	NDSWC

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	no description	0-1
CLAY	silty, sandy, olive-gray, oxidized, cohesive, soft, highly calcareous, dolomite, limestone, pyrite, quartz, very little lignite; pockets of lighter material.	1-2
CLAY	silty, sandy, olive-black, hard, cohesive, very few sand particles mostly grains, lignite, noncalcareous.	2-8
CLAY	silty, predominantly dusky yellow to light olive-brown, also laminated with olive-gray and dark greenish-gray, cohesive, hard, calcareous, lignite flakes, possible muscovite; pockets fine white sand.	8-30
CLAY	olive-gray, to dark greenish-gray, cohesive, soft, plastic, tiny lignite flakes, slightly calcareous to calcareous.	30-64
TILL	olive-green, quartz, dolomite, lignite, limestone, shale, pyrite, cohesive, soft, highly calcareous, angular to subrounded, two predominant grain sizes, 1.5 and .25 mm, contains boulders, mostly dolomite.	64-71
SAND	predominantly quartz, with dolomite, limestone, igneous, shale, lignite, size .5 mm, angular to rounded, poor to excellent sphericity, boulders.	71-86
CLAY	greenish-gray to light olive-gray, soft, cohesive, highly calcareous; interbedded.	86-106
CLAY	olive-gray, gravel and boulders, otherwise same as above.	106-112

138-050-35AAA (continued)

SAND	as above, with boulders.	112-122
TILL	dark greenish-gray, quartz, dolomite, lignite, cohesive, soft, fragments up to 1.5 mm, predominantly .5 mm, angular to subrounded, highly calcareous; silty clay lens, dark greenish-gray, with shade of olive-gray, cohesive, hard, plastic, few lignite particles, some white sand pockets, highly calcareous; till becomes olive-black, cohesive, very hard with depth.	122-145
CLAY	dark greenish-gray, cohesive, hard, brittle, lignite flakes, highly calcareous, rare quartz and dolomite fragments, boulders scarce; gradual boundary to till below.	145-154
TILL	olive-black, quartz, dolomite, limestone, shale, very little lignite, cohesive, hard, highly calcareous, angular to subrounded, shale rounded, average grain size .5 mm, maximum approximately 1 mm, patch of brown sand.	154-157
SHALE	silty, olive-black, cohesive, hard, brittle, possible muscovite flakes, lignite, pockets of fine to medium white sand, noncalcareous, possible bentonite pockets, pyrite, a grain of quartz found in shale.	157-199
CLAY	sandy, very pale blue, varies to light greenish-gray to greenish-gray, cohesive, soft, plastic, pyrite, quartz, dolomite, angular to rounded, mostly rounded and spherical, grains are from .5 to 1 mm, quantity varies greatly to just about none; laminate with depth, light greenish-gray and greenish-gray, sharp contact between laminae.	199-227

138-051-04BBB

Date Completed:	1943	Purpose:	Stock Well
L.S. Elevation (ft):	918	Well Type:	6" Steel
Depth Drilled (ft):	0	Aquifer:	Dakota Group
Screened Interval (ft):	0-380	Log Source:	

Lithologic Log - unavailable

138-051-09CCD

Date Completed:	1920	Purpose:	Domestic Well
L.S. Elevation (ft):	920	Well Type:	0" Unknown
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-80	Log Source:	

Lithologic Log - unavailable

138-051-17BAA2

Date Completed:	4/2/75	Purpose:	Test Hole
L.S. Elevation (ft):	926	Well Type:	
Depth Drilled (ft):	362		
		Log Source:	LTP Enterprises, Inc

Lithologic Log

Unit	Description	Depth (ft)
TOPSOIL	black	0-2
CLAY	sandy, brown	2-30
CLAY	soft, blue	30-60
CLAY	sandy, blue	60-70
SAND	washed, colored	70-72
CLAY	sandy, blue	72-76
SAND	colored	76-77
CLAY	sandy, blue	77-211
SAND	blue	211-212
CLAY	sandy, with shale, brown blue/black	212-221

138-051-17BAA2 (continued)

LENSES	blue	221-225
SAND	very fine, blue	225-227
SAND	very fine, dirty, blue	227-230
CLAY	sandy, with shale, hard, brown blue/black	230-278
SAND	blue	278-279
CLAY	sandy, with shale, brown black/blue	279-325
SHALE	white blue/brown	325-342
DECOMPOSED	with shale, black brown/white	342-359
DECOMPOSED	with shale, green colored	359-362

138-051-17BAA3

Date Completed:	4/4/75	Purpose:	Test Hole
L.S. Elevation (ft):	924	Well Type:	
Depth Drilled (ft):	360	Log Source:	

Lithologic Log - unavailable

138-051-17BAA4

Date Completed:	4/8/75	Purpose:	Test Hole
L.S. Elevation (ft):	925	Well Type:	
Depth Drilled (ft):	357	Log Source:	

Lithologic Log - unavailable

138-051-17BAA5

Date Completed:	00/00/00	Purpose:	Test Hole
L.S. Elevation (ft):	927	Well Type:	
Depth Drilled (ft):	362	Log Source:	

Lithologic Log - unavailable

138-051-24CCB

Date Completed:	0/0	Purpose:	Domestic Well
L.S. Elevation (ft):	915	Well Type:	24"
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-80	Log Source:	

Lithologic Log - unavailable

138-051-32CBB

Date Completed:	8/5/62	Purpose:	Domestic Well
L.S. Elevation (ft):	925	Well Type:	4" Unknown
Depth Drilled (ft):	0	Aquifer:	Undefined
Screened Interval (ft):	0-69	Log Source:	

Lithologic Log - unavailable