UNIVERSITY OF MINNESOTA

MINNESOTA GEOLOGICAL SURVEY
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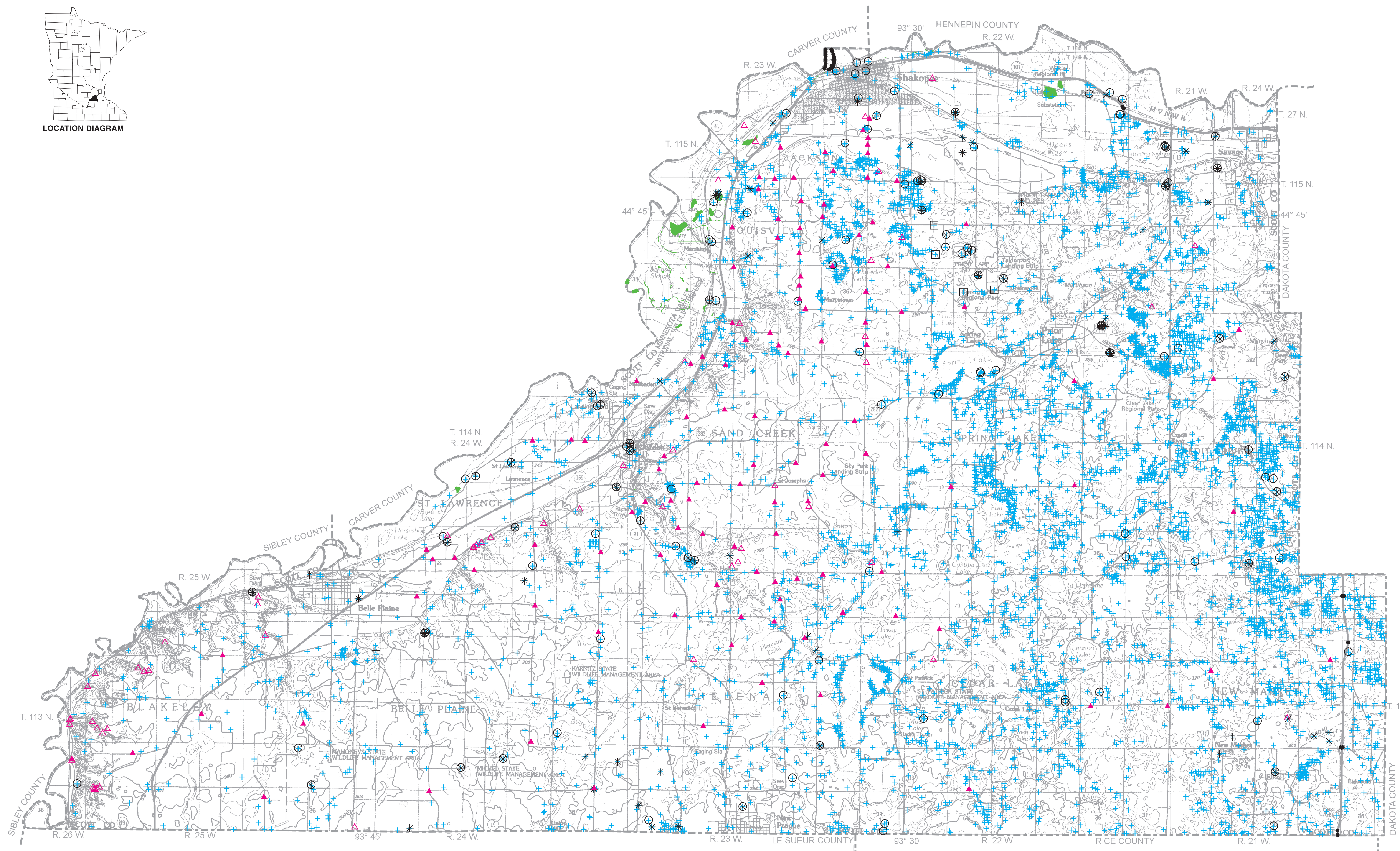
COUNTY ATLAS SERIES
ATLAS C-17
Plate 1—Data Base

LOCATION DIAGRAM



Base from U.S. Geological Survey St. Paul 1:100,000 quadrangle, 1985.

Universal Transverse Mercator Projection, grid zone 15
1983 North American Datum

SCALE 1:100 000

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 6 7 8 KILOMETERS

CONTOUR INTERVAL 10 METERS

GIS compilation by Emily Bauer
Edited by Lori Robinson

DATA-BASE MAP

By

Emily J. Bauer

2006

THE DATA-BASE MAP

The types, locations, and density of information used to prepare the Scott County atlas are shown on this map. The data are described below to aid the user in assessing which types may be useful for a particular information need. The Data-Base Map serves as a guide to the precision of the other maps in the atlas. It shows where data are sparse or lacking and interpretation and extrapolation were required to prepare the maps.

DRILL-HOLE INFORMATION

A **record of water-well construction (well driller's log)** is a water-well contractor's description of the geologic materials penetrated during drilling and the construction materials used to complete the well (Fig. 1). Not all wells extend to bedrock. In areas of thick, unconsolidated Quaternary deposits, drillers usually do not have to drill through the entire thickness of overburden to find sufficient ground water. Hydrologic data, such as the static water level and test-pumping results, are commonly included. Before any driller's log can be used, the location of the well must be verified, and a geologist must interpret the log (Fig. 2). Driller's logs are the primary source of subsurface geologic and hydrologic data for Scott County; about 6,200 logs were used for this atlas.

Cutting samples collected during drilling and exploration provide physical evidence of subsurface geologic materials. They are the principal means of establishing the nature of the subsurface materials and are used to interpret and verify driller's logs. They are logged and stored at the Minnesota Geological Survey.

Borehole geophysical logs are created by lowering instruments down a well or drill hole and measuring the physical and chemical properties of the geologic materials through which the hole passes. Different logging techniques measure naturally occurring gamma radiation, spontaneous potential, and resistivity. Gamma logs characterize in graphic form the geologic formations penetrated. Spontaneous potential and resistivity are mainly used to locate water levels in wells and the depth of the well casing. An interpretive log is prepared from the geophysical log and correlated with drilling samples from the same hole, information obtained from nearby outcrops, or a geophysical log from a nearby drill hole. Geophysical logs can provide high-quality subsurface geologic and hydrologic information from wells for which little or no other information is available. The information obtained from a geophysical log is added to the County Well Index (CWI) and the paper log is on file at the Minnesota Geological Survey.

Soil borings are test holes drilled to obtain information about the physical properties of subsurface materials for engineering, mapping, or exploration purposes. Most terminate at very shallow depths or where bedrock is encountered. They are logged by an engineer or a geologist using a variety of classification schemes based on particle sizes, penetration rate, moisture content, and color. Soil-boring data are limited in distribution; they generally follow highway corridors. These data are most useful in determining the composition of unconsolidated deposits.

OTHER INFORMATION

Rotary-sonic cores were collected from four sites in the Shakopee Mdewaketon Sioux Community by a private consultant and later turned over to the Minnesota Geological Survey for study. The coring technique enables recovery of a continuous core, 3.5 inches (8.9 centimeters) in diameter, from the glacial deposits and bedrock (if penetrated). It provides excellent subsurface samples for detailed study and comparison with cuttings, geophysical logs, and driller's logs from surrounding sites. The core is available for inspection at the Minnesota Department of Natural Resources, Division of Lands and Minerals offices.

Giddings probe holes allow description and sampling of continuous glacial materials in a 2-inch (5.1-centimeter) diameter hole, collected by a truck-mounted hydraulic auger. Samples were generally taken about every 5 feet (1.5 meters), at unit contacts, or where the geologist believed it was important. The average depth of the borings is 18.8 feet (5.7 meters) and the deepest is 42.5 feet (13 meters).

Hand samples were collected at natural and artificial exposures for later analyses and description of the Quaternary glacial deposits.

Textural analyses express the proportion of sand-, silt-, and clay-size particles that make up a sample. They are helpful in identifying and mapping unconsolidated materials like Quaternary glacial deposits. The samples analyzed were taken at the giddings probe hole and hand sample sites.

Outcrops are natural and artificial exposures of bedrock within the county.

Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information; sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to sound geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering-scale decisions without site-specific verification.

INTRODUCTION

The public health and economic development of Scott County are directly dependent on the wise use and management of its land and water resources. Accurate geologic and hydrologic information are essential before decisions are made that affect natural resources. Although the amount of geologic information required for making specific decisions can vary, the information will not be used if it is unavailable when needed, or if it is available only in a highly technical form, or scattered in many different maps and reports.

County atlases present detailed geologic and hydrologic information in an interpretive as well as descriptive form. Maps and texts either summarize basic geologic and hydrologic conditions at a county scale, or interpret these conditions in terms of the impacts of possible land- and water-use decisions. Site-specific information is also available at a greater level of technical detail than shown on the maps of this atlas. The data are too voluminous to present in the atlas, but have been incorporated into readily accessible files housed at the Minnesota Geological Survey.

Several sources commonly provide information about an area or an individual property, but they may use different classification schemes to describe the same geologic materials. As a result, discrepancies in interpreting the data may arise or the different sources may appear to contradict each other. For example, water-well drillers may describe glacial till as "clay," but engineering records will describe it as "clayey sand." Both descriptions are acceptable for their original purpose of describing the physical attributes of the material. "Clay," the term used by well drillers, defines the general inability of the till to yield ground water to a well. "Clayey sand," the term from the engineering record, defines the physical composition of the till relative to particle size and engineering properties. The geologist must take the analysis one step further and define the material in terms of how it formed rather than how it is to be used. In this example, till consists of an unsorted mixture of rock fragments ranging in size from clay to cobbles and boulders, and it is interpreted by the geologist as having been deposited directly by glacial ice.

All of the types of data described on this plate had to be interpreted by geologists or hydrogeologists before they were meaningful for mapping purposes. The 1:100,000 and 1:200,000 scales of the maps in this atlas were chosen because they can show the geologic and topical studies of the county while keeping the physical size of each plate to a manageable level. As a result, some detailed information that was gained by data interpretation and mapping cannot be shown on these maps or discussed in the texts.

Whether to use the atlas alone, or in combination with the data bases, depends on the amount of detail needed. Generally, data-base information must be used to evaluate site-specific conditions.

DATA-BASE MANAGEMENT

All of the data shown on the map were plotted on 7.5-minute topographic quadrangle maps or highway alignment maps. Inventory numbers were assigned to all data sources. Automated data bases and a few manual files were developed to provide easy access and rapid retrieval of these site-specific data. The data may be obtained from the Minnesota Geological Survey.

Computer storage and retrieval systems are better than manual files for manipulating large amounts of data because automated geologic data bases can be designed to interact with other computer files, such as land-use data. Such interaction permits more efficient assessment of cause-and-effect relationships concerning natural resources than is commonly possible with manual files.

SCOTT COUNTY DATA BASES

Computerized files were developed for point-source data such as wells and borings in Scott County. They use Public Land Survey descriptions, Universal Transverse Mercator (UTM), and latitude-longitude coordinates as location criteria; thus, they are compatible with the natural-resource data bases housed at the Minnesota Land Management Information Center (LMIC). The computerized data bases developed for Scott County by the Minnesota Geological Survey are the County Well Index (CWI) and Quaternary Data Index (QDI).

County Well Index (CWI)—Information from water-well records was entered into this statewide data base. Each well log is assigned a six-digit unique number. These reference numbers are also used by state agencies and the Water Resources Division of the U.S. Geological Survey. Elevations, expressed in feet above sea level, were determined from topographic maps (see the index to 7.5-minute quadrangles or the Scott County Digital Elevation Model 2-foot contours) and are generally accurate to plus or minus five feet. The street address of each well is also included wherever possible to provide data users with a well-location system that is compatible with local regulatory programs. Software at the Minnesota Geological Survey is used to display and tabulate many of the data elements contained on the original well log.

The County Well Index is currently stored in a data base that consists of nine related tables. These tables contain information such as well depths, well construction, addresses, aquifers, dates drilled, static water levels, and pumping test data. They also contain alternate well identifiers such as permit numbers or emergency-service numbers, and the well stratigraphy (the geologic materials encountered during drilling).

CWI application software developed by the Minnesota Department of Health provides two types of reports:

- WELL LOG contains all the information about the well as it was reported by the contractor (Fig. 1). There may also be additional location information, land-surface elevation, aquifer designation, and remarks about the drill holes.
- WELL STRATIGRAPHY contains the geologic log with a geologist's stratigraphic interpretations, which are based on her or his knowledge and understanding of the geology of Scott County (Fig. 2). Only those drill holes with verified locations have stratigraphic interpretations assigned to them.

Quaternary Data Index (QDI)—Information from Quaternary sites, either descriptions and/or samples collected and analyzed, is entered into this data base. QDI contains locations, the name of the person who collected the sample, land surface elevations, sample elevations, lithologic descriptions, proportions of sand, silt, and clay, and proportions of crystalline, carbonate, and shale clast types.

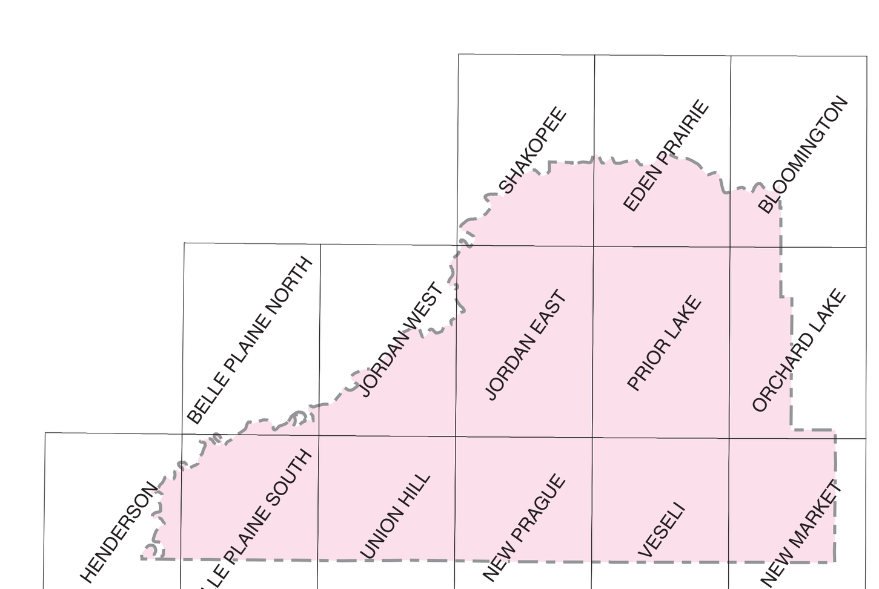
FUTURE DATA COLLECTION

A data-base map is out of date even before it is printed because additional information is continually generated as new water wells are drilled, construction activities expose more bedrock, or additional wells are tested for water quality. The library of geologic information prepared for Scott County is flexible so that old data can be reevaluated in light of new information, and new forms of data can be added if required. The need to manage ground water and other natural resources wisely will never become outdated. Future demands on these resources will require current data to assess the impacts.

MAP SYMBOLS

+ Record of water-well construction (well driller's log)
✳ Cuttings sample
○ Borehole geophysical log
• Soil boring
□ Rotary-sonic core
▲ Giddings probe hole
△ Hand sample
Outcrop location

Note: More than one symbol can occur at the same location



INDEX TO 7.5-MINUTE QUADRANGLES

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Unique No. 00118807 — County Name Scott — Update Date 2006/02/03 — Entry Date 1989/02/23

Township Name	Township	Range	Dir	Section	Subsection
	114	24	W	28	ACBADC

Well Depth 170 ft. — Depth Completed 170 ft. — Date Well Completed 1975/11/09

Well Name LAWRENCE WAYSIDE REST

Contact's Name LAWRENCE WAYSIDE REST
20250 PARK BL
JORDAN MN 55352

Drilling Method Non-specified Rotary

Drilling Fluid — Well Hydrofractured? ☐ Yes ☐ No — From ft. to ft.

Use Public Supply/non-comm.-transient

Casing — Drive Shoe? ☐ Yes ☑ N — Hole Diameter

Casing Diameter 6 in. to 52 ft. — Weight(lbs/ft) 19.45

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
TOP SOIL	BLACK	SOFT	0	3
CLAY + SAND	YELLO	SOFT	3	7
LIMESTONE	DK. GR	HARD	7	12
SHALE	GREEN	SOFT	12	35
LIMESTONE	GRAY	HARD	35	42
SHALE	GREEN	SOFT	42	70
LIMESTONE + SANDSTONE	GREEN	SOFT	70	95
SANDSTONE + SHALE SEA	WHT/G	SOFT	95	170

Screen N — Open Hole From 52 ft. to 170 ft.
Make — Type

Static Water Level -3 ft. from Land surface — Date 1978/08/11

PUMPING LEVEL (below land surface)
12 ft. after 4 hrs. pumping 150 g.p.m.

Well Head Completion
Pitless adapter mfr — Model
Casing Protection ☐ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information — Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	7	52	0.5	Y

Nearest Known Source of Contamination
1250 ft. direction N type BOW
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed — Date Installed Y
Mfr name MONITOR
Model 1HF — HP 0 — Volts
Drop Pipe Length 10 ft. — Capacity 6 g.p.m
Type H

Any not in use and not sealed well(s) on property? ☐ Yes ☐ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

Well CONTRACTOR CERTIFICATION — Lic. Or Reg. No. 27014
License Business Name
Name of Driller ROGERS, B.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
WELL #2

USGS Quad: Jordan West — Elevation: 718
Aquifer: CFRN — Alt Id: 5700176S01

Report Copy

HE-01205-06 (Rev. 9/96)

Figure 1. An example of a WELL LOG record, showing all the information about the well as reported by the well driller.

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Unique No. 00118807 — County Name Scott — Update Date 2006/02/03 — Entry Date 1989/02/23

Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	114	24	W	28	ACBADC	170 ft.	170 ft.	1975/11/09

Well Name LAWRENCE WAYSIDE REST — Lic. Or Reg. No. 27014 — Name of Driller ROGERS, B.

USGS Quad Jordan We — Elevation 718 — Aquifer CFRN — Alternative Id 5700176S01

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
TOP SOIL	BLACK	SOFT	0	3	RUUK	SOIL	ORGD	
RUUK = Recent Deposit	SOIL = Soil		ORGD = Organic Deposits					
CLAY + SAND	YELLOW	SOFT	3	7	QLUY	CLAY	SAND	
QLUY = Clay & sand	CLAY = Clay		SAND = Sand					
LIMESTONE	DK. GRY	HARD	7	12	CSTL	DLMT		
CSTL = St.Lawrence	DLMT = Dolomite							
SHALE	GREEN	SOFT	12	35	CSLF	SHLE		
CSLF = St.Lawrence-Franconia	SHLE = Shale							
LIMESTONE	GRAY	HARD	35	42	CSLF	DLMT		
CSLF = St.Lawrence-Franconia	DLMT = Dolomite							
SHALE	GREEN	SOFT	42	70	CFRN	SHLE		
CFRN = Franconia	SHLE = Shale							
LIMESTONE + SANDSTONE + SHALE	GREEN	SOFT	70	95	CFRN	DLMT	SNDS	SHLE
CFRN = Franconia	DLMT = Dolomite		SNDS = Sandstone			SHLE = Shale		
SANDSTONE + SHALE SEAMS	WHT/GRY	SOFT	95	170	CFRN	SNDS	SHLE	
CFRN = Franconia	SNDS = Sandstone		SHLE = Shale					

Figure 2. Example of a WELL STRATIGRAPHY record, which contains a geologist's interpretation of the geologic materials listed by the driller in the WELL LOG record (Fig. 1). The headings (such as GEOLOGICAL MATERIAL, COLOR, and HARDNESS) pertain to information in the first line of each entry; the second line contains explanations of most of the four-letter codes used in the first line. The first word (in capital letters) in each entry is the well driller's original description for that interval. All depths are measured in feet. Heading abbreviations: STRAT, stratigraphy (the name of the stratigraphic unit; note, all abbreviations starting with Q are Quaternary glacial deposits); LITH PRIM, primary lithology (material type); LITH SEC, secondary lithology; LITH MINOR, minor lithology.