

STATE OF SOUTH DAKOTA
William J. Janklow, Governor

DEPARTMENT OF WATER AND NATURAL RESOURCES
Warren R. Neufeld, Secretary

GEOLOGICAL SURVEY
Merlin J. Tipton, State Geologist

Information Pamphlet No. 24

SAND AND GRAVEL RESOURCES IN
DAVISON COUNTY, SOUTH DAKOTA

by

Richard H. Hammond

Prepared in cooperation with the
United States Geological Survey,
Lower James Conservancy Sub-District,
South Dakota Department of Transportation,
and Davison County

Science Center
University of South Dakota
Vermillion, South Dakota
1982

CONTENTS

	Page
INTRODUCTION.	1
GEOLOGIC OVERVIEW	1
Till	1
Outwash.	2
Alluvium	2
Bedrock.	2
EXPLANATION OF TABLES	3
EXPLANATION OF MAP.	3

TABLES

1. List of test holes in Davison County, South Dakota, which contain sand or gravel in the upper 25 feet.	6
2. List of sand and gravel pits in Davison County on file at the District Office, South Dakota Department of Transportation, Division of Highways, Mitchell, South Dakota	42

ILLUSTRATION

Map showing test holes, gravel pits, and sand and gravel deposits in Davison County, South Dakota	Following 50
---	--------------

INTRODUCTION

This pamphlet is the first of a series of reports describing the geology and hydrology of Davison County. It is designed to be a tool in the search for sand and gravel deposits by focusing the reader's attention upon the most promising areas.

Other reports in the series include:

- a. Major aquifers in Davison and Hanson Counties, South Dakota: South Dakota Geological Survey, Information Pamphlet 26, Hanson, D. S. (in preparation)
- b. Geology and water resources of Davison and Hanson Counties, South Dakota: South Dakota Geological Survey, Bulletin 33, Christensen C. M., and Hanson, D. S. (in preparation).

The first report describes the yield, quality, and location of major aquifers (water-bearing deposits) in a short, easy-to-read pamphlet. The second report is a more technical and exhaustive investigation of the geology and hydrology of the Counties. All basic data used to compile these reports are available from the South Dakota Geological Survey's open file.

Another South Dakota Geological Survey report which may be useful to the reader is:

Evaluation of exploration methods for coarse aggregate in eastern South Dakota: South Dakota Geological Survey, Report of Investigations 95, Bruce, R. L., and Lundberg, B. E., 1964.

It explains how aggregate-bearing landforms may be recognized by a variety of methods and may further simplify a prospector's search for this mineral.

GEOLOGIC OVERVIEW

Most sand and gravel deposits in Davison County are the product of glaciers which covered the region several thousand years ago. Others have been deposited by streams since the glaciers retreated. A short description of the types of earth materials found in Davison County follows.

Till

The glaciers that once covered this region were full of debris picked up by the ice earlier in its route. Some of this mixture of boulders, sand, gravel, clay and silt were deposited directly from the ice. Till, the term used to describe this mixture, is

often called "blue clay" or boulder clay" and covers much of Davison County. Though till is not considered a source of sand and gravel, small isolated gravel hills or lenses may occur within till deposits. Gravel pits in the northwest quarter of section 16, Township 102 N., Range 62 West and in section 32, Township 101 North, Range 62 West are examples of these random deposits.

Outwash

Glacial outwash is the term geologists use to describe any deposit of glacial debris which has been washed and sorted by flowing glacial meltwater. Outwash grain size depends upon the velocity of the water depositing it and the type of materials being carried by the water. A lake or slowly flowing stream usually deposits silts and clay. Faster water may leave streambeds composed entirely of boulders. Most outwash, however, is made up of an assortment of sand and gravel with minor amounts of finer and coarser materials. Most of the shaded areas of this publication map represent outwash deposits.

Alluvium

Alluvium is the term used to describe the material deposited by streams since the retreat of the glaciers. Grain size of alluvial deposits is governed by the same factors as outwash. Alluvium occurs in the valleys of present day streams and can often be a good sand and gravel source.

Bedrock

Bedrock is the older, consolidated rocks beneath the glacial deposits. In Davison County the bedrock consists of shale, sandstone, and chalk. Bedrock is exposed along portions of North Twelve Mile Creek, Enemy Creek, Firesteel Creek, and the James River. Chalk is the most abundant bedrock exposed at the surface. Although the chalk is used locally as building stone, none of the bedrock types are suitable for use as an aggregate source. When bedrock units are found at the surface or in a test hole, no sand and gravel can exist below that point.

Sand and gravel can exist within small hills in the valley or as natural terraces along the valley walls above the bedrock. A good example of a gravel hill within a bedrock-floored valley occurs in the southwest quarter of section 19, Township 102 N., Range 60 West. In the northwest quarter of section 4, Township 101 N., Range 61 West, a terrace deposit of sand and gravel is revealed in a gravel pit overlooking a chalk-floored valley.

EXPLANATION OF TABLES

Table 1 is a compilation of test holes which encountered sand or gravel in the upper 25 feet. This table lists: (a) location of the test hole, (b) depth, and (c) description of sand and gravel intervals. The complete set of drill logs are on file at the office of the South Dakota Geological Survey in Vermillion. The South Dakota Geological Survey, United States Geological Survey, South Dakota Division of Water Rights, United States Bureau of Reclamation, and private drillers contributed to this list.

Table 2 is a list of gravel pits on file in 1978 with the South Dakota Division of Highways. The owner, thickness of overburden, thickness of sand and gravel being mined, and material type have been listed. The actual thickness of a deposit may be greater than that mined, because depth to the water table, changing material characteristics, or available mining equipment may limit excavation.

EXPLANATION OF MAP

The map shows the location of gravel pits (active and inactive), test holes, and a few landmarks. Test holes are represented by three types of symbols. A dot (●) represents a test which indicated sand or gravel within 25 feet of the land surface with 0 to 5 feet of overburden. A square (■) indicates that sand or gravel was encountered within 25 feet of land surface with 5 or more feet of overburden. These symbols are numbered and referred to in table 1. An open circle (○) indicates that no sand or gravel was found in the upper 25 feet. Gravel pits are labeled with a crossed pick and shovel (⌘). Those that are numbered are listed in table 2. Additional information is on file at the Division of Highways District Office in Mitchell.

To help illustrate the most promising locations, the map has been divided into three area types indicating "good," "fair," or "poor" probability of finding economic deposits of sand or gravel. These areas have been delineated by use of test drilling, gravel pit locations, topographic map and aerial photo interpretation, and field observations. Areas labeled as "good" and "fair" have been assigned a letter on the map corresponding to their identification in the following text.

Sand and gravel deposits in areas labeled "good" are comparatively thick with thin overburden and underlie large tracts of land. "Fair" areas, on the other hand, lack one or more of these advantages.

Area "A" (labeled "good") is a very large outwash deposit which parallels Firesteel Creek across the entire County. Deposits in area "A" range to over 40 feet thick but average about 11 feet with 1 foot of overburden in Survey tests. The outwash underlies much of the valley and occurs as narrow terraces on the

valley walls. Thinner aggregate deposits also follow a few of the tributary valleys to Firesteel Creek such as the one terminated in area "C". Area "C" (labeled "fair") is characterized by relatively thin valley bottom deposits, the best prospects being in the southern part.

Area "B" (labeled "good") is a thick, very uniform outwash body at the confluence of two glacial valleys which enter the County from the west. Deposits up to 30 feet thick occur near the northwest corner of section 30, Township 103 N., R. 62 West and thin gradually to the southeast. Existing pits expose a very uniformly sorted coarse gravel throughout the developed portion of this outwash body.

Area "D" is designated as "fair" because of its discontinuous, relatively thin (average thickness of 4 feet) deposits. In the valleys, however, the alluvium and outwash occasionally totals 5 to 20 feet thick. A few terraces along the valley walls in area "D" have already been partially mined.

Area "E" is the edge of a large, extensively developed deposit in Douglas and Aurora Counties. Since a till highland occupies the southwest quarter of Davison County, this outwash is a significant local source of aggregate. The reader is referred to:

- a. Sand and gravel resources in Charles Mix and Douglas Counties, South Dakota: South Dakota Geological Survey, Circular 42, Hedge, L. S., 1972.
- b. Sand and gravel resources in Aurora County, South Dakota: South Dakota Geological Survey, Information Pamphlet 22, Blaze, D. A. and Hammond, R. H., 1980.

Both papers are available from the Geological Survey office in Vermillion.

Area "F" (labeled "good") represents sand and gravel deposits averaging 10 feet thick over an area of several square miles. Overburden is less than 6 feet over most of this unit. Aggregate deposits blanket the lowlands with occasional till hummocks scattered throughout the southern half of the area. A few discontinuous outwash terraces bracket the valley of Enemy Creek west of State Highway 37.

Area "H" (labeled "fair") is a thin (averaging 5 feet) discontinuous sheet of outwash northwest of Mitchell. Ten feet or more of aggregate with only about 1 foot of overburden was found in some of the test holes drilled by the Survey. Further exploration near those tests may reveal economic deposits.

Area "G" (labeled "fair") is a wedge of coarse gravel deposits on the east wall of the James River Valley. This area contains

some thick deposits of excellent quality but only covers an area of about 1 square mile. Over half of this tract was occupied by active or inactive pits during the summer of 1979. The pits in operation had unearthed up to 25 feet of coarse gravel before bottoming out at the water table.

The remainder of the James River Valley has been mapped as "poor" on the basis of 17 power auger and rotary drill tests as well as 25 hand auger tests in areas inaccessible to heavier equipment.

The areas designated as poor do contain sand and gravel deposits. However, because these deposits are widely scattered and generally small, exploration efforts should first be concentrated in the "good" and "fair" areas.

TABLE 1. List of test holes in Davison County, South Dakota, which contain sand or gravel in the upper 25 feet.

Lithologic descriptions, as listed, have been condensed from data contained in driller's logs on file at the South Dakota Geological Survey Office, Vermillion, South Dakota, and contain only information which has been deemed most useful for this study. Numbered test holes with a letter following them (i.e. 17a) designate additional holes at approximately the same location as the numbered test hole (i.e. 17). They are plotted on the map as a single test hole.

Test Hole 1

Location: NW NW NE NE sec. 13, T. 104 N., R. 63 W.

0-6 Sand, brown, coarse, pebbly, silty; dry, moist at 3 feet

Test Hole 2

Location: SE SE SE NE sec. 13, T. 104 N., R. 63 W.

18-23 Gravel, gray, silty; saturated

Test Hole 3

Location: NE NE SE SE sec. 13, T. 104 N., R. 63 W.

0- 4 Sand, brown, medium to coarse; dry, moist at 3 feet

Test Hole 4

Location: SE SE SE SE sec. 13, T. 104 N., R. 63 W.

0- 6 Sand, brown, coarse, pebbly; dry
6-26 Gravel, brown, fine, moist

Test Hole 5

Location: SW SW SW SW sec. 18, T. 104 N., R. 62 W.

0- 3 Sand and gravel

Test Hole 6

Location: NW NW NW NW sec. 19, T. 104 N., R. 62 W.

4- 9 Gravel, coarse, sandy; moist
10-16 Gravel, medium, clayey; saturated

Test Hole 7

Location: NW NW NW NE sec. 19, T. 104 N., R. 62 W.

4-14 Sand, yellow-brown, coarse, pebbly; dry

Test Hole 8

Location: NE NE SE NE sec. 24, T. 104 N., R. 63 W.

0- 3 Sand, light-brown, medium; dry

3- 9 Sand, brown, medium, pebbly; moist

Test Hole 9

Location: NE NE NE SE sec. 24, T. 104 N., R. 63 W.

0- 4 Sand, brown, coarse to very coarse; moist

Test Hole 10

Location: NW SE SE NW sec. 19, T. 104 N., R. 62 W.

1-16 Sand, brown, medium to coarse, pebbly

Test Hole 11

Location: NW SW NW NW sec. 30, T. 104 N., R. 62 W.

5-21 Sand, gray, coarse to medium, silty; moist,
saturated at 8 feet

Test Hole 12

Location: NE SE NE NE sec. 25, T. 104 N., R. 63 W.

0- 2 Sand, brown, medium; dry

Test Hole 13

Location: SE SE SE NE sec. 25, T. 104 N., R. 63 W.

0- 4 Sand, brown, coarse, pebbly; moist

Test Hole 14

Location: SE NE SE SE sec. 25, T. 104 N., R. 63 W.

0-41 Sand, brown, medium, pebbly, silty; dry, moist
at 4 feet

Test Hole 15

Location: SE SE SW SW sec. 30, T. 104 N., R. 62 W.

Test Hole 15 -- continued.

4-11 Gravel, sandy, calcareous, silty
11-17 Sand, brown, medium to coarse

Test Hole 16

Location: NW SW SW SW sec. 29, T. 104 N., R. 62 W.

6-10 Sand, red-brown, coarse to medium, clayey, silty;
saturated
10-12 Sand, red-brown, medium to fine, clayey, silty;
saturated

Test Hole 17

Location: NE NE SE SE sec. 32, T. 104 N., R. 62 W.

0-18 Sand, brown, fine to medium, pebbly

Test Hole 18

Location: SW NW SW NW sec. 33, T. 104 N., R. 62 W.

3- 5 Sand, gray, coarse, clayey; dirty
5-10 Sand, brown, coarse, pebbly; saturated at 9 feet

Test Hole 19

Location: SW SW NW NW sec. 33, T. 104 N., R. 62 W.

4- 5 Sand, yellow-brown, coarse, clayey; moist
7- 9 Gravel, medium to coarse, some clay; moist
9-11 Sand, coarse, some clay; saturated

Test Hole 20

Location: NW SW SW SW sec. 27, T. 104 N., R. 62 W.

0- 6 Gravel, brown, coarse, some pebbles; dry
6- 8 Gravel, light-brown, sandy

Test Hole 21

Location: SE NE NE NE sec. 34, T. 104 N., R. 62 W.

22-23 Sand, black, very fine, clayey; saturated

Test Hole 22

Location: SW SW SW NW sec. 35, T. 104 N., R. 62 W.

6-11 Gravel, yellow-brown, medium to coarse, clayey;
moist, saturated at 8 feet

Test Hole 22 -- continued.

11-12 Gravel, coarse, clayey

Test Hole 23

Location: SW SW SW SW sec. 25, T. 104 N., R. 62 W.

8- 9 Sand, reddish-brown, clayey; moist
15-25 Sand, fine; moist

Test Hole 24

Location: SW SW SW NW sec. 26, T. 104 N., R. 62 W.

14-23 Sand, medium to fine, clayey; saturated

Test Hole 25

Location: SW SW SW SW sec. 13, T. 104 N., R. 62 W.

13-15 Gravel, fine

Test Hole 26

Location: NW NW NE NW sec. 14, T. 104 N., R. 62 W.

12-16 Sand, coarse, and gravel, medium to fine

Test Hole 27

Location: NW NW NW NW sec. 6, T. 104 N., R. 61 W.

13-19 Gravel, medium to coarse, poorly-sorted, clayey
25-30 Gravel, medium to coarse, sandy

Test Hole 28

Location: NE NE NE NE sec. 7, T. 104 N., R. 61 W.

1- 3 Sand, gray-brown, medium, clayey; moist

Test Hole 29

Location: NE NE NE SE sec. 5, T. 104 N., R. 61 W.

0- 3 Sand, black, fine to very fine, silty; moist

Test Hole 30

Location: SE SW SE SW sec. 4, T. 104 N., R. 61 W.

4- 9 Sand, gray, medium, pebbly, clayey; moist
9-11 Sand, and gravel, brown, silty; saturated

Test Hole 31

Location: NW NW NW NW sec. 16, T. 104 N., R. 61 W.

11-18 Sand, yellow-brown, fine, clayey; moist

Test Hole 32

Location: NW NW NW SW sec. 16, T. 104 N., R. 61 W.

23-25 Gravel, fine

Test Hole 33

Location: NW NW NW NW sec. 20, T. 104 N., R. 61 W.

21-26 Sand, yellow-brown, medium, silty, clayey;
saturated

Test Hole 34

Location: NE NE NE NE sec. 30, T. 104 N., R. 61 W.

2- 4 Sand, brown, clayey; moist
10-11 Sand, brown, pebbly; moist
11-14 Gravel, brown; moist
14-19 Gravel, brown, medium, silty, sandy; moist

Test Hole 35

Location: NW NW NW NW sec. 32, T. 104 N., R. 61 W.

3- 6 Sand, brown, medium to fine, clayey; moist
6-10 Sand, yellow-brown, fine; moist, clean
10-17 Sand, yellow-brown, medium to fine, clayey, saturated at 16 feet

Test Hole 36

Location: NW SW SW SW sec. 28, T. 104 N., R. 61 W.

9-13 Sand, red-brown, medium to fine; moist, saturated at 12 feet, clean
13-15 Sand, gray, medium to fine, silty

Test Hole 37

Location: SE SE NE SE sec. 31, T. 104 N., R. 61 W.

3- 6 Gravel, brown, medium to coarse; dry

Test Hole 38

Location: SE SE SE SE sec. 31, T. 104 N., R. 61 W.

Test Hole 38 -- continued.

- 0- 2 Sand and gravel, some clay and silt
- 2- 3 Sand, yellow-brown, coarse, pebbly; moist
- 3- 4 Gravel, yellow-brown, medium; moist
- 4- 6 Sand, yellow-brown, very coarse, granules;
saturated

Test Hole 39

Location: NW SW SW NW sec. 33, T. 104 N., R. 61 W.

- 0- 5 Sand, dark-brown, medium with gravel; moist
- 5-11 Sand, light-brown, fine to medium, some gravel;
moist

Test Hole 40

Location: SW SW SW SW sec. 33, T. 104 N., R. 61 W.

- 1- 4 Sand, fine, oxidized

Test Hole 41

Location: SE SE SE SE sec. 33, T. 104 N., R. 61 W.

- 1-10 Sand, yellow-brown, coarse to medium, silty, clayey,
pebbly; moist, saturated at 6 feet

Test Hole 42

Location: SW SW SW NW sec. 34, T. 104 N., R. 61 W.

- 0- 8 Sand, brown, coarse to fine, pebbly, silty; moist
- 8-14 Sand, brownish-gray, medium to coarse, clayey;
moist, saturated at 12 feet

Test Hole 43

Location: NW NW NW NW sec. 35, T. 104 N., R. 61 W.

- 1- 4 Sand, red-brown, silty, clayey; dry
- 6-11 Sand, red, medium to coarse, clayey, silty,
pebbly; dry
- 11-15 Sand, orange, medium, clayey; moist

Test Hole 44

Location: NE NE NE NE sec. 35, T. 104 N., R. 61 W.

- 2- 4 Sand and gravel, brown; dry
- 6- 8 Sand, red-brown, coarse, gravelly; dry
- 10-15 Sand, brown, very fine, silty, clayey; moist

Test Hole 45

Location: SE NE NE SE sec. 36, T. 104 N., R. 61 W.

0- 5 Sand, red-brown, gravelly; dry, clean

Test Hole 46

Location: NE NE NE NE sec. 36, T. 104 N., R. 61 W.

1- 6 Sand, red-brown, coarse to medium, gravelly

Test Hole 47

Location: SW SW SW NW sec. 25, T. 104 N., R. 61 W.

0- 1 Sand, brown, clayey, pebbly; dry

1- 5 Sand, red-brown, fine to coarse; dry

Test Hole 48

Location: SE SE SE NE sec. 26, T. 104 N., R. 61 W.

0- 7 Sand, red-brown, gravelly; dry

Test Hole 49

Location: NW NW NW SW sec. 26, T. 104 N., R. 61 W.

1- 6 Sand, yellow-brown, fine, clayey; dry

24-28 Sand, red, medium, clayey; moist

Test Hole 50

Location: NW NW NW NW sec. 26, T. 104 N., R. 61 W.

3- 8 Sand, brown, fine, very silty

Test Hole 51

Location: NW NE NE NE sec. 26, T. 104 N., R. 61 W.

0-11 Sand, brown, medium to coarse

Test Hole 52

Location: NE NE NE NE sec. 25, T. 104 N., R. 61 W.

1- 4 Sand, yellow-brown, medium to fine, clayey; moist

Test Hole 53

Location: NE NE NE SE sec. 24, T. 104 N., R. 61 W.

0-11 Sand, fine

Test Hole 54

Location: SW SW SW NW sec. 24, T. 104 N., R. 61 W.

2- 5 Sand, brown, coarse, silty

Test Hole 55

Location: SE SE SE SE sec. 13, T. 104 N., R. 61 W.

21-25 Sand, coarse, gravelly, fine

Test Hole 56

Location: SE SE SW SW sec. 13, T. 104 N., R. 61 W.

6- 8 Sand, fine

10-16 Sand, fine

Test Hole 57

Location: SE SE SE SE sec. 14, T. 104 N., R. 61 W.

20-23 Sand, medium

Test Hole 58

Location: SE NE NE NE sec. 22, T. 104 N., R. 61 W.

21-26 Sand, coarse, and gravel, fine

Test Hole 59

Location: NE NE NE NE sec. 16, T. 104 N., R. 61 W.

16-21 Sand, yellow-brown, clayey; saturated

Test Hole 60

Location: SE SE SE SE sec. 10, T. 104 N., R. 61 W.

2- 4 Sand, red-brown, clayey, pebbly

15-18 Sand, black, very fine, silty; saturated

Test Hole 61

Location: NW NW NE NE sec. 14, T. 104 N., R. 61 W.

1- 4 Sand, very fine, silty

17-24 Gravel, fine, sandy

Test Hole 62

Location: SE SE SW SW sec. 2, T. 104 N., R. 61 W.

Test Hole 62 -- continued.

15-17 Gravel, fine to medium

Test Hole 63

Location: NE NE SE NE sec. 4, T. 104 N., R. 61 W.

2- 5 Sand, medium to coarse

Test Hole 64

Location: NW NW NW NE sec. 2, T. 104 N., R. 61 W.

0- 2 Sand, brown, silty

Test Hole 65

Location: NW NW NE NE sec. 2, T. 104 N., R. 61 W.

8-10 Gravel

Test Hole 66

Location: SE SW SW SW sec. 8, T. 104 N., R. 60 W.

0- 2 Sand, brown, silty

Test Hole 67

Location: NW NW NW NE sec. 19, T. 104 N., R. 60 W.

2- 9 Sand, fine to coarse
23-34 Gravel, fine to medium

Test Hole 68

Location: SE SE SW SW sec. 17, T. 104 N., R. 60 W.

4- 8 Gravel

Test Hole 69

Location: SE SE SW SW sec. 17, T. 104 N., R. 60 W.

23-28 Sand, dark-brown, medium, pebbly

Test Hole 70

Location: NW SW NW NW sec. 20, T. 104 N., R. 60 W.

4-10 Sand, gray, coarse, silty, pebbly; saturated

Test Hole 71

Location: SW NW NW SW sec. 21, T. 104 N., R. 60 W.

4-17 Gravel, medium, with clay layers

Test Hole 72

Location: SW SW SW SW sec. 20, T. 104 N., R. 60 W.

17-35 Sand, gray, medium to fine, clayey; saturated

Test Hole 73

Location: SW SW SE SE sec. 19, T. 104 N., R. 60 W.

0- 9 Sand, medium to fine
9-10 Gravel, fine
21-26 Sand

Test Hole 74

Location: NW SW SW NW sec. 30, T. 104 N., R. 60 W.

23-26 Sand, fine to medium

Test Hole 75

Location: SE SW SE SW sec. 30, T. 104 N., R. 60 W.

0-11 Sand, brown, medium, well-sorted

Test Hole 76

Location: SW NW SW SW sec. 31, T. 104 N., R. 60 W.

0- 3 Sand, dark-brown, medium, pebbly; dry
3- 6 Gravel, light-brown, sandy

Test Hole 77

Location: SE NW SE SE sec. 31, T. 104 N., R. 60 W.

1-13 Gravel, coarse, very sandy, clayey

Test Hole 78

Location: SE SE SE NE sec. 31, T. 104 N., R. 60 W.

1- 4 Sand, light-brown, silty, pebbly, calcareous
4- 6 Gravel, brown, sandy, silty

Test Hole 79

Location: SE SE SE SE sec. 30, T. 104 N., R. 60 W.

Test Hole 79 -- continued.

1- 5 Sand, red-brown, coarse to medium, pebbly; moist

Test Hole 79a

Location: NW NW NW NW sec. 32, T. 104 N., R. 60 W.

4- 7 Sand, buff

Test Hole 80

Location: SE SW SE NE sec. 32, T. 104 N., R. 60 W.

1- 4 Sand, buff, fine, with silt

4-14 Sand and gravel

Test Hole 80a

Location: SE SE SE SE sec. 33, T. 104 N., R. 60 W.

0- 4 Sand, yellow, medium to coarse

Test Hole 81

Location: SW SE SE SW sec. 34, T. 104 N., R. 60 W.

0-12 Sand, brown, silty, well-sorted

Test Hole 81a

Location: SW NE NW SW sec. 36, T. 104 N., R. 60 W.

2- 7 Sand, medium to fine, silty

Test Hole 82

Location: SW SW SW NW sec. 23, T. 104 N., R. 60 W.

3-16 Gravel, coarse, sandy, medium at 8 to 16 feet

Test Hole 83

Location: NW NW NW NW sec. 23, T. 104 N., R. 60 W.

1- 6 Gravel, brown, sandy

Test Hole 84

Location: NW NW NW NE sec. 12, T. 104 N., R. 60 W.

17-19 Sand, coarse, and fine gravel

Test Hole 85

Location: NW SW SW NW sec. 9, T. 103 N., R. 62 W.

0- 3 Sand, brown, medium, pebbly; moist

Test Hole 86

Location: NW NW SW SW sec. 10, T. 103 N., R. 62 W.

0- 6 Gravel, sandy, large rocks from 3 to 4 feet; dry

Test Hole 87

Location: SE NE NE SE sec. 18, T. 103 N., R. 62 W.

0-15 Sand, light-brown, fine, clayey; moist

Test Hole 88

Location: SW SW SW SW sec. 18, T. 103 N., R. 62 W.

15-20 Sand, brown, silty; saturated
20-35 Sand, gray, coarse, silty, some coal; saturated

Test Hole 89

Location: SE SE SE NE sec. 19, T. 103 N., R. 62 W.

6-11 Sand, reddish-brown, fine, clayey; moist
13-20 Sand, black, fine, very silty; saturated
20-31 Sand, black, coarse, silty; saturated

Test Hole 90

Location: NW SW SW SW sec. 19, T. 103 N., R. 62 W.

1- 5 Sand, gray, medium to fine, silty; saturated
5-16 Sand, gray, coarse, silty, pebbly; saturated

Test Hole 91

Location: SW SW SW SW sec. 19, T. 103 N., R. 62 W.

2- 5 Sand, red-brown, coarse, clayey; saturated at
4 feet
24-41 Sand, gray, medium, silty, calcareous

Test Hole 92

Location: NE NE NE NE sec. 25, T. 103 N., R. 63 W.

1- 3 Sand, tan, fine to medium, some pebbles, clayey;
dry

Test Hole 92 -- continued.

3-13 Sand, brown, coarse, pebbles, clayey, saturated
at 9 feet

Test Hole 93

Location: SW SE SW SE sec. 19, T. 103 N., R. 62 W.

4-10 Sand, brown, coarse, silty; saturated

Test Hole 94

Location: SE SE SE SE sec. 19, T. 103 N., R. 62 W.

0- 3 Sand, yellow-brown, very fine, clayey

Test Hole 95

Location: SW SW NW SW sec. 30, T. 103 N., R. 62 W.

0-14 Sand, brown, medium, very silty, clayey

Test Hole 96

Location: SW NW NW SW sec. 29, T. 103 N., R. 62 W.

4- 6 Gravel, coarse, abundant chalk and shale pebbles
6-29 Sand, medium to coarse, pebbly; moist

Test Hole 97

Location: NW NW NW NW sec. 32, T. 103 N., R. 62 W.

6- 9 Sand, yellow-brown, coarse, pebbly; saturated

Test Hole 98

Location: SW SE SE SE sec. 32, T. 103 N., R. 62 W.

5-13 Sand, light-brown, medium, pebbly, silty; dry

Test Hole 99

Location: NW NE NE NW sec. 24, T. 103 N., R. 62 W.

0- 4 Sand, black, medium, pebbly; moist
4- 7 Sand, light-brown, medium, pebbly; moist

Test Hole 100

Location: SE SE NE SE sec. 3, T. 103 N., R. 62 W.

Test Hole 100 -- continued.

1- 6 Sand, gray-brown, coarse, pebbly, clayey;
saturated

Test Hole 101

Location: SE NE SE NE sec. 2, T. 103 N., R. 62 W.

0-10 Sand, fine to coarse, gravelly

Test Hole 102

Location: NW NW NW NW sec. 6, T. 103 N., R. 61 W.

1-20 Gravel, medium

Test Hole 103

Location: NW NW NW NW sec. 6, T. 103 N., R. 61 W.

1- 3 Gravel, brown, silty; dry
4- 5 Gravel, brown; dry
11-19 Sand, brown, coarse; moist, saturated at 16 feet

Test Hole 104

Location: SW SW SW NW sec. 6, T. 103 N., R. 61 W.

0- 1 Sand, black, medium; dry
1- 4 Sand, brown, medium, pebbly; dry
4- 9 Gravel, brown, sandy; moist

Test Hole 105

Location: NE NE NE SE sec. 6, T. 103 N., R. 61 W.

1- 3 Sand, yellow-brown, medium, clayey; moist
3- 9 Sand, black, medium; saturated

Test Hole 106

Location: NW NW NW SW sec. 7, T. 103 N., R. 61 W.

1- 5 Gravel, brown, coarse; dry

Test Hole 107

Location: NE SE SE SE sec. 5, T. 103 N., R. 61 W.

2- 8 Sand, brown, coarse, pebbly; moist

Test Hole 108

Location: NE NW NW NW sec. 9, T. 103 N., R. 61 W.

- 1- 3 Sand, light-gray, coarse to medium, silty; moist
- 3- 9 Sand, yellow-brown, coarse to medium, silty; saturated

Test Hole 109

Location: NE NE NE SE sec. 9, T. 103 N., R. 61 W.

- 1- 3 Sand, brown, medium; moist
- 3- 5 Sand, brown, medium, pebbly; moist

Test Hole 110

Location: NE NW NE NW sec. 15, T. 103 N., R. 61 W.

- 3- 9 Sand, brown, medium; moist
- 13-26 Sand, gray, fine; saturated

Test Hole 111

Location: NW NW NW SW sec. 20, T. 103 N., R. 61 W.

- 9-15 Gravel, brown, medium, sandy; saturated

Test Hole 112

Location: SW SW SW SE sec. 20, T. 103 N., R. 61 W.

- 0- 2 Gravel, brown, medium, sandy; moist

Test Hole 113

Location: SE NE NE NE sec. 22, T. 103 N., R. 61 W.

- 0- 1 Sand, brown, pebbly; moist
- 11-14 Sand, light-brown, fine, pebbly; moist
- 14-17 Sand, dark-brown, fine, pebbly; moist

Test Hole 114

Location: SE SE SE NE sec. 22, T. 103 N., R. 61 W.

- 0- 2 Gravel, brown, medium, sandy; moist

Test Hole 115

Location: NW SW SW NW sec. 24, T. 103 N., R. 61 W.

- 0- 3 Sand, dark-brown, medium; moist
- 3- 6 Gravel, coarse, poorly-sorted

Test Hole 115 -- continued.

15-20 Gravel, light-brown, coarse; saturated

Test Hole 116

Location: SW SW SW NE sec. 24, T. 103 N., R. 61 W.

2-10 Gravel, light-brown, sandy, poorly-sorted;
moist
10-13 Gravel, white, coarse, sandy
13-15 Gravel, brown, medium, sandy; moist
15-17 Gravel, dark-brown, sandy; saturated

Test Hole 117

Location: NW NE NW NE sec. 25, T. 103 N., R. 61 W.

5-11 Gravel, brown, sandy; saturated

Test Hole 118

Location: SE SW SW SE sec. 13, T. 103 N., R. 61 W.

0- 6 Gravel, brown, medium, sandy; moist

Test Hole 119

Location: SE SE SE SE sec. 13, T. 103 N., R. 61 W.

18-26 Sand, medium to coarse

Test Hole 120

Location: SE SE SE NE sec. 13, T. 103 N., R. 61 W.

4- 6 Sand, red-brown, medium to fine; saturated, clean
6-10 Sand, brown, coarse to medium; saturated, clean
10-15 Sand, brown, medium, pebbly; saturated, clean
15-20 Sand, gray, silty

Test Hole 121

Location: SW NW SW SW sec. 2, T. 103 N., R. 61 W.

2-10 Sand, brown, pebbly; moist

Test Hole 122

Location: SE SE NE NE sec. 3, T. 103 N., R. 61 W.

4- 7 Sand, brown, medium, pebbly; moist

Test Hole 123

Location: SE SW SW SE sec. 1, T. 103 N., R. 61 W.

1- 3 Sand, yellow-brown, medium; dry

Test Hole 124

Location: SE SE NE NE sec. 6, T. 103 N., R. 60 W.

0- 1 Sand, red-brown; moist
1- 7 Gravel, red-brown, coarse; moist
7- 8 Sand, red-brown, coarse; pebbly, calcareous
8- 9 Sand, red-brown, coarse, clayey; moist
15-17 Sand, gray, clayey; saturated

Test Hole 125

Location: NE SW SW NE sec. 5, T. 103 N., R. 60 W.

3-13 Gravel, brown, medium to coarse, sandy, clayey
13-16 Gravel, very fine, sandy
16-22 Gravel, medium, sandy, clayey

Test Hole 126

Location: SW SW NW NE sec. 9, T. 103 N., R. 60 W.

1-14 Gravel, brown, medium to coarse, very sandy

Test Hole 127

Location: SE SE NE NE sec. 8, T. 103 N., R. 60 W.

10-17 Gravel, brown, medium, sandy; moist

Test Hole 128

Location: SW SW NW NW sec. 8, T. 103 N., R. 60 W.

0-11 Sand, red-brown, coarse, gravelly; dry
11-18 Sand and cobbles, red-brown; saturated

Test Hole 129

Location: SW SW SW SW sec. 31, T. 103 N., R. 60 W.

21-25 Gravel, coarse, sandy, poorly-sorted, abundant
chalk fragments

Test Hole 130

Location: SE SE SE SE sec. 31, T. 103 N., R. 60 W.

1- 8 Gravel, coarse, some shale pebbles

Test Hole 130 -- continued.

16-37 Gravel, medium, some shale pebbles, clayey at
22 to 37 feet

Test Hole 131

Location: NW NW NW SW sec. 32, T. 103 N., R. 60 W.

5- 8 Sand, brown, clayey; very moist

Test Hole 132

Location: SW SW SW SW sec. 32, T. 103 N., R. 60 W.

1- 4 Gravel, brown, silty, sandy; dry

4-10 Sand, brown, pebbly; saturated

Test Hole 133

Location: NE NE SE SE sec. 32, T. 103 N., R. 60 W.

0- 1 Sand, brown, fine, pebbles (topsoil)

1-11 Sand, brown, coarse, pebbly, silty; moist

Test Hole 133a

Location: NE NE NE NE sec. 5, T. 102 N., R. 60 W.

6-10 Sand, brown, medium; saturated

13-14 Gravel, brown; saturated

Test Hole 134

Location: SW SW SW SE sec. 33, T. 103 N., R. 60 W.

0-12 Sand, brown, medium; dry, moist at 3 feet

12-22 Sand, dark-brown, medium, pebbly; moist

Test Hole 135

Location: SW NW NW SW sec. 34, T. 103 N., R. 60 W.

9-20 Gravel, brown, coarse, sandy

Test Hole 136

Location: SW SW SW SW sec. 34, T. 103 N., R. 60 W.

0-22 Sand, gray, fine to medium, silty

Test Hole 136a

Location: NE NW NW NE sec. 35, T. 103 N., R. 60 W.

Test Hole 136a -- continued.

0- 3 Sand, brown, medium, clayey; moist
3-10 Gravel, brown, medium, sandy; saturated

Test Hole 137

Location: NW NW NW SW sec. 36, T. 103 N., R. 60 W.

0- 8 Sand, brown, medium, clayey; moist

Test Hole 138

Location: SE SE SW NE sec. 36, T. 103 N., R. 60 W.

0- 7 Gravel, light-brown, fine, sandy; moist

Test Hole 139

Location: NW NE NE NE sec. 25, T. 103 N., R. 60 W.

1- 3 Sand, fine to medium, round to subround

Test Hole 140

Location: NW SW NW NW sec. 25, T. 103 N., R. 60 W.

1- 5 Sand, white, gravelly; dry
7-16 Sand, reddish-brown, well-sorted; moist

Test Hole 141

Location: NW NW NW NW sec. 26, T. 103 N., R. 60 W.

0- 5 Sand, medium, clayey; moist
5-16 Sand, dark-brown, medium

Test Hole 142

Location: SE SW SW SE sec. 23, T. 103 N., R. 60 W.

0- 1 Sand, brown, fine, pebbly; dry
1- 6 Gravel, coarse, well-sorted

Test Hole 143

Location: NW NW SW SW sec. 24, T. 103 N., R. 60 W.

0- 8 Sand, light-tan, fine; dry

Test Hole 144

Location: SW SW SW NW sec. 24, T. 103 N., R. 60 W.

Test Hole 144 -- continued.

1- 7 Gravel, brown, coarse, sandy, pebbly; moist

Test Hole 145

Location: SE SE NE SE sec. 13, T. 103 N., R. 60 W.

1- 4 Sand, brown, fine to medium, rounded

Test Hole 146

Location: NW NE NW SW sec. 13, T. 103 N., R. 60 W.

0- 2 Sand, brown, fine; moist
2- 7 Sand, black, fine, clayey; moist
7-12 Sand, light-brown, clayey; moist
12-28 Gravel, gray-brown, fine, sandy; saturated

Test Hole 147

Location: NE NE NW SE sec. 14, T. 103 N., R. 60 W.

0-20 Sand, brown, fine, pebbly; moist

Test Hole 148

Location: SW SW NW NW sec. 13, T. 103 N., R. 60 W.

0- 4 Sand, black, fine, clayey; moist
4- 9 Sand, brown, fine, pebbly; moist
9-24 Gravel, brown, medium, sandy; saturated

Test Hole 149

Location: NW NW NW NW sec. 13, T. 103 N., R. 60 W.

0- 6 Sand, light-brown, fine; moist
18-27 Gravel, medium, sandy, clayey; moist

Test Hole 150

Location: NE NW SE NW sec. 14, T. 103 N., R. 60 W.

0- 6 Sand, brown, fine, pebbly; moist
6-11 Gravel, brown, sandy; moist

Test Hole 151

Location: NE SE SE SE sec. 10, T. 103 N., R. 60 W.

2-16 Gravel, brown, medium, sandy; moist

Test Hole 152

Location: SE SE SE NE sec. 10, T. 103 N., R. 60 W.

- 1- 7 Sand, brown, medium, clayey; moist
- 7-18 Sand, dark-brown, medium, pebbly, clayey;
saturated

Test Hole 153

Location: SE SE SE SW sec. 3, T. 103 N., R. 60 W.

- 0- 3 Sand, black, fine, pebbly; dry
- 3-15 Gravel, light-brown, medium, sandy; moist

Test Hole 154

Location: NE NE SE NW sec. 3, T. 103 N., R. 60 W.

- 0-11 Sand, brown, fine to medium

Test Hole 155

Location: SE SE NE NE sec. 14, T. 102 N., R. 62 W.

- 9-11 Gravel, fine

Test Hole 156

Location: SE SE NE SE sec. 14, T. 102 N., R. 62 W.

- 4-14 Gravel, medium to coarse, silty, clayey

Test Hole 157

Location: NE NW NW NW sec. 23, T. 102 N., R. 62 W.

- 1- 2 Gravel, brown, fine to medium, sandy, clayey;
moist

Test Hole 158

Location: NE NE NE NE sec. 22, T. 102 N., R. 62 W.

- 1-11 Sand, red-brown, medium to coarse, pebbly;
clayey at 6 to 11 feet; moist

Test Hole 159

Location: SW NW NW NW sec. 24, T. 102 N., R. 62 W.

- 3- 4 Sand, brown, medium to fine, pebbly, clayey;
moist
- 6- 8 Sand, brown, medium, clayey, pebbly; moist

Test Hole 160

Location: NW SW SW NW sec. 24, T. 102 N., R. 62 W.

0- 5 Sand, brown, medium, pebbly; moist

Test Hole 161

Location: SW SW SW SE sec. 30, T. 102 N., R. 62 W.

10-12 Sand, brown, silty, clayey; moist

Test Hole 162

Location: NW SW NW SW sec. 25, T. 102 N., R. 62 W.

0- 3 Gravel, medium

4- 6 Sand, brown, medium, pebbly; moist

Test Hole 163

Location: SW SE SW SE sec. 18, T. 102 N., R. 61 W.

4- 6 Sand, red-brown, medium, pebbly, silty; dry

Test Hole 164

Location: SE SE NE SE sec. 20, T. 102 N., R. 61 W.

6-10 Sand, brown, fine to coarse, silty; dry

Test Hole 165

Location: NW NW NW NW sec. 29, T. 102 N., R. 61 W.

20-24 Gravel, fine to medium

Test Hole 166

Location: SE SE SE SE sec. 30, T. 102 N., R. 61 W.

0- 2 Sand, red-brown; clean

Test Hole 167

Location: SE SE SW SW sec. 33, T. 102 N., R. 61 W.

2- 4 Gravel, brown, coarse, silty, sandy

4- 6 Sand, brown, coarse, silty

6-16 Gravel, brown, coarse, sandy, silty; moist

Test Hole 168

Location: NW NW NW SW sec. 34, T. 102 N., R. 61 W.

Test Hole 168 -- continued.

8-13 Sand, gray-brown, medium, clayey, silty; moist

Test Hole 169

Location: NW NE NE NE sec. 23, T. 102 N., R. 61 W.

0- 6 Gravel, brown, coarse, sandy; moist

Test Hole 170

Location: NE SE SE NE sec. 14, T. 102 N., R. 61 W.

0- 1 Sand, pebbly; moist

Test Hole 171

Location: NW SE SE SE sec. 11, T. 102 N., R. 61 W.

2- 3 Sand, brown, medium, clayey; moist

Test Hole 172

Location: SE NW NE SE sec. 11, T. 102 N., R. 61 W.

3- 5 Sand, reddish-brown, medium to coarse, silty, few granules; moist

5- 8 Sand, tan, medium to coarse, silty, pebbly; dry

12-13 Sand, light-brown, fine to medium, silty, pebbly; moist

Test Hole 173

Location: NW SW NW NW sec. 10, T. 102 N., R. 61 W.

0- 4 Gravel, light-brown, sandy, clayey

Test Hole 174

Location: NW NW NW NW sec. 11, T. 102 N., R. 61 W.

0- 2 Sand, red-brown, medium, pebbly, clayey; moist

3- 6 Sand, red-brown, medium, clayey, pebbly; moist

Test Hole 175

Location: NE NE NE NW sec. 11, T. 102 N., R. 61 W.

6- 9 Sand, red-brown, medium to coarse, pebbly; moist

Test Hole 176

Location: NE NE SE NE sec. 18, T. 102 N., R. 60 W.

3-12 Sand, medium to coarse, with some clay

Test Hole 177

Location: NW NE NW NE sec. 17, T. 102 N., R. 60 W.

0- 7 Sand, red-brown, medium, pebbly; moist

9-22 Sand, red-brown, medium, some pebbles; moist,
saturated at 19 feet

Test Hole 178

Location: SW SW SW SW sec. 9, T. 102 N., R. 60 W.

0- 3 Gravel, coarse

3- 7 Sand, brown, clayey, pebbly, calcareous

Test Hole 179

Location: NW NW SW SW sec. 17, T. 102 N., R. 60 W.

15-30 Gravel, gray, clayey; saturated

Test Hole 180

Location: NE NE NW NE sec. 19, T. 102 N., R. 60 W.

1- 4 Sand, brown, medium to coarse, gravelly; moist

Test Hole 181

Location: SW SW NW NW sec. 20, T. 102 N., R. 60 W.

0- 6 Gravel, brown, silty, sandy; dry

6-13 Gravel, brown, coarse; dry, moist at 10 feet

13-17 Sand, yellow-brown, clayey, pebbly; moist

Test Hole 182

Location: NE SE NE SE sec. 19, T. 102 N., R. 60 W.

0- 3 Sand, yellow-brown, coarse, pebbly, clayey; dry

3-25 Gravel, yellow-brown, medium, sandy; moist

25-30 Gravel, brown, sandy, pebbly; moist

Test Hole 183

Location: NW NW NW SW sec. 19, T. 102 N., R. 60 W.

0- 5 Gravel, light-tan, sandy, poorly-sorted; dry

5-10 Gravel, brown, sandy, poorly-sorted; dry

Test Hole 184

Location: SW NW SW SW sec. 19, T. 102 N., R. 60 W.

0- 6 Gravel, brown, medium, sandy; moist

Test Hole 185

Location: SW SW SW SW sec. 20, T. 102 N., R. 60 W.

0- 5 Gravel, yellow-brown, coarse to medium, clayey;
moist

5-25 Gravel, brown, medium to coarse, clayey; moist

25-40 Gravel, white, medium, shale and limestone
pebbles, medium; moist to saturated

Test Hole 186

Location: SW SW SW SE sec. 20, T. 102 N., R. 60 W.

0- 2 Gravel, light-brown, sandy; moist

Test Hole 187

Location: NE NE NE NE sec. 20, T. 102 N., R. 60 W.

5- 7 Sand, red-brown, medium to coarse, pebbly; moist

Test Hole 188

Location: NE NW NW NW sec. 21, T. 102 N., R. 60 W.

10-16 Gravel, gray

20-23 Sand, gray, medium to coarse, clayey

Test Hole 189

Location: NW SW NW SW sec. 21, T. 102 N., R. 60 W.

1- 4 Sand, red-brown, medium to coarse, pebbly; moist

Test Hole 190

Location: SE SW SW SE sec. 21, T. 102 N., R. 60 W.

1- 2 Gravel, red-brown, medium, sandy, pebbly; moist

2- 5 Sand, red-brown, medium, pebbly; moist

5-20 Sand, light brown, fine to coarse, clayey, pebbly

Test Hole 191

Location: SE NE NE NE sec. 28, T. 102 N., R. 60 W.

4- 6 Sand, brown, medium; moist

6- 8 Gravel, sandy, rocky; moist

Test Hole 192

Location: SE SE SE NE sec. 28, T. 102 N., R. 60 W.

0-13 Sand, light-brown, medium to coarse, pebbly;
dry, saturated at 11 feet

Test Hole 193

Location: NW NW NW SW sec. 28, T. 102 N., R. 60 W.

1- 8 Gravel, coarse
23-31 Gravel, fine to medium, shaley

Test Hole 194

Location: NW SW NW SW sec. 28, T. 102 N., R. 60 W.

1- 2 Gravel, brown, silty; moist
2- 4 Sand, light-brown, very fine, clayey; moist

Test Hole 195

Location: SW SE SE SW sec. 29, T. 102 N., R. 60 W.

4- 6 Gravel, brown, sandy, clayey; moist

Test Hole 196

Location: NW SW SW SW sec. 30, T. 102 N., R. 60 W.

0- 1 Sand, brown, fine; moist
1- 8 Gravel, brown, coarse, sandy; moist
10-19 Gravel, brown, coarse, pebbly; saturated

Test Hole 197

Location: SE SE SE NE sec. 31, T. 102 N., R. 60 W.

0- 4 Sand, light-brown, medium, pebbly; moist

Test Hole 198

Location: SW SW SW SE sec. 32, T. 102 N., R. 60 W.

8-10 Sand, gray-green, silty; saturated
10-17 Sand, gray, silty, clayey; saturated

Test Hole 199

Location: SE SE SW SW sec. 33, T. 102 N., R. 60 W.

0- 3 Sand, brown, medium to coarse, pebbly, clayey;
dry

Test Hole 199 -- continued.

3- 4 Sand, brown, coarse, pebbly; moist
4-12 Gravel, brown; saturated at 7 feet

Test Hole 200

Location: NW NW NE NE sec. 33, T. 102 N., R. 60 W.

0- 5 Gravel, brown, coarse; moist

Test Hole 201

Location: NW NW SW SW sec. 34, T. 102 N., R. 60 W.

2- 7 Gravel, coarse
11-22 Sand, gray, medium to coarse

Test Hole 202

Location: SW SW NW SW sec. 35, T. 102 N., R. 60 W.

0- 2 Sand, light-brown, fine; moist

Test Hole 203

Location: SW SW SW SE sec. 25, T. 102 N., R. 60 W.

4- 6 Sand, brown, silty; moist
9-10 Sand, gray-brown, medium; moist

Test Hole 204

Location: NW NW NW NE sec. 35, T. 102 N., R. 60 W.

1- 2 Gravel, buff, silty, calcareous
2- 9 Sand, brown, coarse, gravelly

Test Hole 205

Location: SW SW SE SE sec. 27, T. 102 N., R. 60 W.

5-15 Sand, red-brown, medium to coarse, pebbly; moist

Test Hole 206

Location: NE SE SE NE sec. 26, T. 102 N., R. 60 W.

10-12 Sand, brown, medium to fine, clayey; moist

Test Hole 207

Location: NW NW SW NW sec. 26, T. 102 N., R. 60 W.

Test Hole 207 -- continued.

1- 4 Sand, brown, fine to medium, clayey, pebbly;
moist

Test Hole 208

Location: NE NE NE NW sec. 27, T. 102 N., R. 60 W.

0- 4 Sand, brown, coarse, pebbly; dry
4-15 Gravel, brown; moist, saturated at 12 feet

Test Hole 209

Location: SW SW SE SW sec. 23, T. 102 N., R. 60 W.

1- 7 Sand, brown, medium to coarse, pebbly; moist

Test Hole 210

Location: SW SW SW NW sec. 22, T. 102 N., R. 60 W.

2-10 Sand, brown, medium to fine, calcareous
10-13 Sand, brown, medium to coarse, clayey; gravelly;
saturated

Test Hole 211

Location: NE NE NE NE sec. 21, T. 102 N., R. 60 W.

4-33 Sand, coarse and fine to medium gravel

Test Hole 212

Location: NW NW NW NW sec. 23, T. 102 N., R. 60 W.

0- 6 Sand, light-brown, medium to fine; moist
6-12 Sand, brown, medium, pebbly; moist

Test Hole 213

Location: SW SW SW SW sec. 18, T. 102 N., R. 59 W.

1- 6 Sand, medium

Test Hole 214

Location: NE SE SE SE sec. 14, T. 102 N., R. 60 W.

9-10 Sand, brown, fine, clayey; saturated

Test Hole 215

Location: SW SW SW NW sec. 14, T. 102 N., R. 60 W.

- 0- 3 Sand, yellow-brown, medium, pebbly, with sandstone aggregates; dry
- 3- 5 Sand, red-brown, pebbly; dry
- 5-45 Sand, yellow-brown and brown, medium; moist

Test Hole 216

Location: SE SE NE NE sec. 14, T. 102 N., R. 60 W.

- 2- 3 Gravel, brown, medium to coarse; moist
- 3-12 Sand, gray, fine to medium, clayey; very fine at 5 feet

Test Hole 217

Location: NE SW NE NE sec. 15, T. 102 N., R. 60 W.

- 1- 4 Sand, brown, medium to coarse, pebbly, clayey
- 4- 7 Sand, dark reddish-brown, medium, clayey
- 7-11 Sand, brown, medium to coarse, gravelly, clayey; moist

Test Hole 218

Location: SW SW SW SW sec. 10, T. 102 N., R. 60 W.

- 12-21 Gravel, sandy, clayey; poorly-sorted

Test Hole 219

Location: SW NW NW SW sec. 10, T. 102 N., R. 60 W.

- 0-10 Sand, light-brown, fine to medium; dry

Test Hole 220

Location: SW SW SE SE sec. 3, T. 102 N., R. 60 W.

- 4-15 Sand, brown, clayey; saturated
- 15-30 Gravel, black, sandy, clayey; saturated

Test Hole 221

Location: NW NW NW SE sec. 3, T. 102 N., R. 60 W.

- 1-15 Sand, dark-brown, medium, pebbly; saturated at 8 feet

Test Hole 222

Location: NW SW NW NW sec. 3, T. 102 N., R. 60 W.

11-13 Sand, brown, medium, clayey; moist

Test Hole 223

Location: NW NW NE NW sec. 3, T. 102 N., R. 60 W.

2-20 Sand, brown, medium; saturated at 6 feet

Test Hole 224

Location: NE NW NE NW sec. 3, T. 102 N., R. 60 W.

1- 4 Gravel, brown, medium to coarse, sandy; moist

Test Hole 225

Location: SW SW SE SE sec. 12, T. 101 N., R. 63 W.

0- 1 Sand, light-brown, fine, very pebbly; moist

Test Hole 226

Location: SE SE SE SE sec. 36, T. 101 N., R. 63 W.

6- 8 Sand and gravel, reddish-brown, clayey;
saturated

Test Hole 227

Location: SE SE SE SW sec. 31, T. 101 N., R. 62 W.

4-13 Gravel, dark-brown, coarse, sandy, silty;
saturated

Test Hole 228

Location: NW NW SW NW sec. 32, T. 101 N., R. 62 W.

0-11 Sand, brown, fine, pebbly; moist

Test Hole 229

Location: NE SE NE SE sec. 36, T. 101 N., R. 62 W.

6-13 Sand, red-brown, coarse, pebbly; saturated

Test Hole 230

Location: NW NW NW NW sec. 1, T. 101 N., R. 62 W.

11-12 Sand and gravel

Test Hole 231

Location: NW NW NW NW sec. 7, T. 101 N., R. 61 W.

5- 9 Sand, medium, clayey; saturated

Test Hole 232

Location: NW NW NW NW sec. 18, T. 101 N., R. 61 W.

5- 9 Sand, black, medium, silty; saturated

Test Hole 233

Location: SW NW NW NW sec. 18, T. 101 N., R. 61 W.

1- 3 Sand, brown, medium; moist

Test Hole 234

Location: NE NE NE NW sec. 17, T. 101 N., R. 61 W.

5- 6 Sand, yellow-brown, medium, pebbly; dry

Test Hole 235

Location: NW SW SW NW sec. 16, T. 101 N., R. 61 W.

0- 6 Gravel, coarse

Test Hole 236

Location: NW SW SW NW sec. 16, T. 101 N., R. 61 W.

1- 4 Gravel, sandy; dry

Test Hole 237

Location: SE SE SE SE sec. 4, T. 101 N., R. 61 W.

1- 4 Sand, coarse

Test Hole 237a

Location: SE SE SE SE sec. 4, T. 101 N., R. 61 W.

6-16 Sand, brown, medium; moist, saturated at 10 feet

Test Hole 238

Location: SW SE SE SW sec. 10, T. 101 N., R. 61 W.

10-11 Sand, brown, fine to medium; moist

Test Hole 239

Location: NE NW NW NW sec. 22, T. 101 N., R. 61 W.

1- 5 Gravel, brown, coarse, sandy; moist

Test Hole 240

Location: SE SE SW NE sec. 27, T. 101 N., R. 61 W.

17-25 Sand, coarse, fine to medium, gravelly

Test Hole 241

Location: SE SE SE SE sec. 33, T. 101 N., R. 61 W.

23-24 Gravel, fine

Test Hole 242

Location: NE NE NE NE sec. 36, T. 101 N., R. 61 W.

4- 7 Sand, brown, coarse, pebbly; moist

Test Hole 243

Location: SW SW SW SW sec. 7, T. 101 N., R. 60 W.

0- 3 Sand, brown, pebbly; moist

3-17 Gravel, dark-brown, sandy; very moist

Test Hole 244

Location: SE NE SE NE sec. 18, T. 101 N., R. 60 W.

0-12 Gravel, light-tan, fine, poorly-sorted; moist,
compact

Test Hole 245

Location: NE NE NW NW sec. 5, T. 101 N., R. 60 W.

5- 6 Sand, brown, medium, clayey; moist

Test Hole 246

Location: SW SW SE SE sec. 5, T. 101 N., R. 60 W.

0- 5 Sand, light-brown, medium; moist

Test Hole 247

Location: SW SW SW NW sec. 4, T. 101 N., R. 60 W.

0- 9 Gravel, brown, medium to coarse

Test Hole 248

Location: NE NW NW NE sec. 4, T. 101 N., R. 60 W.

2- 6 Gravel, yellow-brown, clayey; moist

Test Hole 249

Location: SE SE SE SE sec. 4, T. 101 N., R. 60 W.

0- 5 Gravel, red-brown, sandy, well-sorted; moist

Test Hole 250

Location: NE SE NE SE sec. 4, T. 101 N., R. 60 W.

0- 5 Gravel, light-brown, sandy, poorly-sorted; moist

Test Hole 251

Location: NW NW NW SW sec. 3, T. 101 N., R. 60 W.

6- 7 Gravel, yellow-brown, silty; moist

Test Hole 252

Location: NW NE NE NW sec. 3, T. 101 N., R. 60 W.

1- 6 Gravel, brown, medium, sandy; moist

Test Hole 253

Location: NW NW NW NW sec. 2, T. 101 N., R. 60 W.

0- 4 Sand, light-brown, coarse; dry

Test Hole 254

Location: SW SW NW NW sec. 2, T. 101 N., R. 60 W.

0-11 Sand, brown, medium, pebbly; moist

Test Hole 255

Location: NW SW NW SW sec. 2, T. 101 N., R. 60 W.

0- 2 Gravel, brown, coarse; sandy

Test Hole 256

Location: SW SE SW SW sec. 2, T. 101 N., R. 60 W.

0-18 Gravel, brown, fine, sandy; moist

Test Hole 257

Location: SE NE SE SW sec. 2, T. 101 N., R. 60 W.

0- 1 Sand, light-brown, pebbly; dry

1- 5 Gravel, light-brown, sandy

5-25 Gravel, brown, medium to coarse, sandy; moist

Test Hole 258

Location: SW SW SE SE sec. 2, T. 101 N., R. 60 W.

0- 4 Sand, medium to coarse, pebbly, silty; dry

4- 9 Sand, yellow-brown, medium; moist

9-23 Gravel, sandy, clayey; saturated

Test Hole 259

Location: SW NW SW NW sec. 1, T. 101 N., R. 60 W.

4- 8 Sand, brown, medium; saturated

Test Hole 260

Location: SE SE NE NE sec. 1, T. 101 N., R. 60 W.

10-13 Sand, yellow-brown, fine, clayey; moist

Test Hole 261

Location: NW NW SW SW sec. 1, T. 101 N., R. 60 W.

2- 3 Sand, brown, medium; dry

3-10 Sand, brown, pebbly, clayey; saturated at 6 feet

10-28 Sand, dark-brown, coarse; saturated

Test Hole 262

Location: NW NW NW NW sec. 12, T. 101 N., R. 60 W.

1- 4 Sand, brown, pebbly, silty; dry

4-12 Sand, brown, fine, clayey, silty; moist, saturated
at 8 feet

14-19 Sand, brown, fine to coarse, silty; saturated

19-30 Sand, gray, coarse to fine, clayey

Test Hole 263

Location: NE NE NE SE sec. 12, T. 101 N., R. 60 W.

13-17 Sand, orange-brown, clayey, pebbly; moist

Test Hole 264

Location: NE NE SE SE sec. 12, T. 101 N., R. 60 W.

3- 8 Gravel, yellow-brown, clayey, sandy; moist

Test Hole 265

Location: SW NW NW SW sec. 10, T. 101 N., R. 60 W.

17-20 Gravel, medium, shaley

Test Hole 266

Location: SW SE SE SE sec. 9, T. 101 N., R. 60 W.

9-25 Gravel, clayey, sandy; saturated

Test Hole 267

Location: NW NW SW NW sec. 16, T. 101 N., R. 60 W.

4- 8 Sand, brown, silty; moist

Test Hole 268

Location: NW SW NW SW sec. 16, T. 101 N., R. 60 W.

2-10 Sand, brown, medium to coarse, gravelly, silty

10-12 Gravel, brown, fine to coarse, silty; saturated

Test Hole 269

Location: NE NE NE SE sec. 16, T. 101 N., R. 60 W.

0- 3 Sand, brown, coarse, silty; dry

3- 6 Sand, red-brown, pebbly, silty; dry

6-21 Gravel, brown, sandy, silty; moist at 12 feet

Test Hole 270

Location: NE NW NW NW sec. 27, T. 101 N., R. 60 W.

12-14 Sand, brown, very clayey; saturated

Test Hole 271

Location: NW NW SW NW sec. 32, T. 101 N., R. 60 W.

- 1-18 Sand, brown, medium to coarse; saturated at
3 feet
- 18-22 Sand, tan, fine; saturated

Test Hole 272

Location: SW SW SW SW sec. 35, T. 101 N., R. 60 W.

- 4- 8 Sand, red-brown, medium, well-sorted; moist
- 8-11 Sand, brown, fine to medium, silty, fairly well-
sorted; saturated

TABLE 2. List of sand and gravel pits in Davison County, South Dakota, which are on file at the District Office, SD Department of Transportation, Division of Highways, Mitchell, SD.

Explanation:

Column description

- a. Landowner and address
- b. Location - given as quarter sections, section number, township, and range
- c. Aggregate Type
- d. Average thickness of deposits in feet
- e. Average thickness of overburden in feet

Pit 1

- a. Landowner: John Althen - Mt. Vernon
- b. Location: NW 1/4 sec. 19, T. 104 N., R. 62 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 5.0
- e. Overburden thickness (ft): 2.5

Pit 2

- a. Landowner: Oscar Halverson - Mt. Vernon
- b. Location: NE 1/4 sec. 33, T. 104 N., R. 62 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 6.0
- e. Overburden thickness (ft): .5

Pit 3

- a. Landowner: Evan HohBack - Mt. Vernon
- b. Location: SE 1/4 SE 1/4 sec. 28, T. 104 N., R. 62 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 4

- a. Landowner: Arnold Halverson - Mt. Vernon
- b. Location: NE 1/4 sec. 32, T. 104 N., R. 61 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft): 2.0

Pit 5

- a. Landowner: Davison County - Mitchell
- b. Location: NE 1/4 sec. 33, T. 104 N., R. 61 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft): 2.0

Pit 6

- a. Landowner: Don Stehly - Mitchell
- b. Location: NW 1/4 sec. 34, T. 104 N., R. 61 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 9.4
- e. Overburden thickness (ft): 1.7

Pit 7

- a. Landowner: R. A. and Laurence Kippes - Mitchell
- b. Location: NW 1/4 sec. 35, T. 104 N., R. 61 W.
- c. Aggregate Type: Sand and gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft) 1.5

Pit 8

- a. Landowner: Alvin Koepke - Mitchell
- b. Location: NE 1/4 sec. 15, T. 104 N., R. 61 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 9

- a. Landowner: Morrison Brothers - Mitchell
- b. Location: SE 1/4 sec. 15, T. 104 N., R. 60 W.
- c. Aggregate Type: ----
- d. Deposit thickness (ft): 6+
- e. Overburden thickness (ft): 0

Pit 10

- a. Landowner: Davison County - Mitchell
- b. Location: SW 1/4 sec. 14, T. 104 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.6
- e. Overburden thickness (ft): 3.1

Pit 11

- a. Landowner: Floyd Morrison - Mitchell
- b. Location: NW 1/4 sec. 23, T. 104 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.6
- e. Overburden thickness (ft): 3.1

Pit 12

- a. Landowner: Nugent
- b. Location: NE 1/4 sec. 22, T. 104 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft): 1.5

Pit 13

- a. Landowner: Davison County - Mitchell
- b. Location: NW 1/4 sec. 23, T. 104 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft): 1.0

Pit 14

- a. Landowner: Joe Ellwein - Mitchell
- b. Location: SW 1/4 sec. 23, T. 104 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 12.0+
- e. Overburden thickness (ft): 2.5

Pit 15

- a. Landowner: Donald Baker - Mt. Vernon
- b. Location: NW 1/4 sec. 30, T. 103 N., R. 62 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 7.7
- e. Overburden thickness (ft): 3.8

Pit 16

- a. Landowner: Evan HohBack - Mt. Vernon
- b. Location: SW 1/4 SW 1/4 sec. 30, T. 103 N., R. 62 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 7.5
- e. Overburden thickness (ft): 2.2

Pit 17

- a. Landowner: William Smith - Mt. Vernon
- b. Location: NE 1/4 sec. 2, T. 103 N., R. 62 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 7.0
- e. Overburden thickness (ft): 1.0

Pit 18

- a. Landowner: Olen Holland - Mt. Vernon
- b. Location: NW 1/4 sec. 1, T. 103 N., R. 62 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 10.0
- e. Overburden thickness (ft): 1.0

Pit 19

- a. Landowner: Orville Butts - Mitchell
- b. Location: NW 1/4 sec. 7, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 9.7
- e. Overburden thickness (ft): 2.1

Pit 20

- a. Landowner: Chris Butts - Mitchell
- b. Location: NE 1/4 sec. 7, T. 103 N., R. 60 W.
- c. Aggregate Type: ----
- d. Deposit thickness (ft): 10.0
- e. Overburden thickness (ft): 1.5

Pit 21

- a. Landowner: William Wilson - Mitchell
- b. Location: NE 1/4 SW 1/4 sec. 5, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 7.0
- e. Overburden thickness (ft): 2.0

Pit 22

- a. Landowner: Joe Ellwein - Mitchell
- b. Location: SW 1/4 sec. 3, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft): 1.5

Pit 23

- a. Landowner: Joe Ellwein - Mitchell
- b. Location: SE 1/4 sec. 3, T. 103 N., R. 60 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 7.5
- e. Overburden thickness (ft): 2.0

Pit 24

- a. Landowner: R. C. Mommer - Mitchell
- b. Location: NE 1/4 & E 1/2 NW 1/4 sec. 14, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 9.2
- e. Overburden thickness (ft): 2.0

Pit 25

- a. Landowner: Evan HohBack - Mt. Vernon
- b. Location: SE 1/4 sec. 15, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 10.7
- e. Overburden thickness (ft): 2.9

Pit 26

- a. Landowner: Reynolds Hereford Farm - Mitchell
- b. Location: SE 1/4 sec. 14, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 12.0
- e. Overburden thickness (ft): 4.0

Pit 27

- a. Landowner: Tom Green - Mitchell
- b. Location: SW 1/4 sec. 13, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 12.0
- e. Overburden thickness (ft): 1.0

Pit 28

- a. Landowner: Roy Kangas - Mitchell
- b. Location: SW 1/4 sec. 33, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 29

- a. Landowner: Theo. Schumacher - Mitchell
- b. Location: SW 1/4 sec. 34, T. 103 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.0
- e. Overburden thickness (ft): 1.5

Pit 30

- a. Landowner: Eve Hansen - Mitchell
- b. Location: SE 1/4 SE 1/4 sec. 9, T. 102 N., R. 60 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 7.6
- e. Overburden thickness (ft): 2.8

Pit 31

- a. Landowner: Carl Strand - Mitchell
- b. Location: NE 1/4 NE 1/4 sec. 16, T. 102 N., R. 60 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 6.0
- e. Overburden thickness (ft): 3.0

Pit 32

- a. Landowner: C. O. Strand - Mitchell
- b. Location: NW 1/4 sec. 15, T. 102 N., R. 60 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 7.4
- e. Overburden thickness (ft): 4.3

Pit 33

- a. Landowner: Marion Windelboe - Mitchell
- b. Location: NE 1/4 sec. 15, T. 102 N., R. 60 W.
- c. Aggregate Type: Sand
- d. Deposit thickness (ft): 10.0
- e. Overburden thickness (ft): 4.0

Pit 34

- a. Landowner: Rienhold Roduner - Mitchell
- b. Location: SW 1/4 sec. 22, T. 102 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 6.9
- e. Overburden thickness (ft): 2.0

Pit 35

- a. Landowner: Floyd Knappen - Mitchell
- b. Location: W 1/2 NW 1/4 sec. 17, T. 101 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 12.0
- e. Overburden thickness (ft): 2.0

Pit 36

- a. Landowner: Wayne Hohn - Mitchell
- b. Location: SE 1/4 sec. 8, T. 101 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 37

- a. Landowner: Orville Hohn - Mitchell
- b. Location: SW 1/4 NE 1/4 sec. 17, T. 101 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 8.5
- e. Overburden thickness (ft): 2.0

Pit 38




- a. Landowner: Orville Hohn - Mitchell
- b. Location: W 1/2 NE 1/4 sec. 17, T. 101 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 7.0
- e. Overburden thickness (ft): 1.5

Pit 39

- a. Landowner: A. W. Blackman - Ethan
- b. Location: NE 1/4 SE 1/4 sec. 17, T. 101 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 5.0
- e. Overburden thickness (ft): 2.0


Pit 40

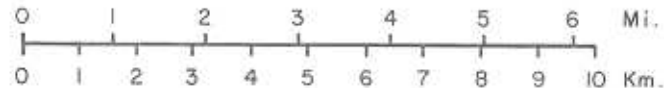
- a. Landowner: Frank Clement - Ethan
- b. Location: SE 1/4 sec. 2, T. 101 N., R. 60 W.
- c. Aggregate Type: Gravel
- d. Deposit thickness (ft): 10.0
- e. Overburden thickness (ft): 2.0

-  Good probability of finding sand or gravel deposits.
-  Fair probability of finding sand or gravel deposits.
-  Poor probability of finding sand or gravel deposits.

Letters A through H designate areas described in the text.

- 118 ● Test hole containing sand or gravel in upper 25 feet with 0-5 feet of overburden. Number refers to table 1.
- 119 ■ Test hole containing sand or gravel in upper 25 feet with 6-25 feet of overburden. Number refers to table 1.
- Test hole containing no sand or gravel in upper 25 feet.
- (7) ✕ Gravel pit; those with a number are listed in table 2.

 Approximate boundary



Index map of South Dakota showing location of Davison County.

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Sectionized township

Map showing test holes, gravel pits, and sand and gravel deposits in Davison County.

