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SAND AND GRAVEL RESOURCES IN
HUTCHINSON COUNTY, SOUTH DAKOTA

by

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United States Geological Survey,
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and Hutchinson County

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ILLUSTRATION

(Located inside back cover)

Map showing test holes, gravel pits, Codell sandstone exposures, and sand and gravel deposits in Hutchinson County, South Dakota

INTRODUCTION

This pamphlet is the first in a series of reports describing the geology and water resources of Hutchinson County. It is designed to indicate the most promising areas in which to search for aggregate material. Quality of the deposits encountered was not analyzed, nor was the quantity of available reserves measured, as these would require prior knowledge of the material specifications for each intended use.

Other reports in the series include:

- a. Major aquifers in Hutchinson and Turner Counties, South Dakota: South Dakota Geological Survey, Information Pamphlet, Lindgren, R., U.S. Geological Survey, (in preparation).
- b. Water resources of Hutchinson and Turner Counties, South Dakota: United States Geological Survey, Water Resources Investigations Report, Lindgren, R. (in preparation).
- c. Geology of Hutchinson and Turner Counties, South Dakota: South Dakota Geological Survey, Bulletin, Duchossois, G. E. (in preparation).

The first report contains a generalized evaluation of the yield, quality, and location of major aquifers (water-bearing deposits), in a condensed, easy-to-read pamphlet. The second and third reports are more technical and present a more comprehensive investigation of the geology and water resources within the two-County area. All basic data used to compile these reports are available from the South Dakota Geological Survey's open file.

It is recommended that the following publication, explaining how aggregate-bearing landforms are recognized, be used as a companion reference to this pamphlet:

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.

GEOLOGIC OVERVIEW

The topography of Hutchinson County exemplifies youthful glacial terrain, namely rolling hills and valleys with many knobs and sloughs. Most sand and gravel deposits were formed by glacial processes associated with the glaciers that covered this region thousands of years ago, late in the Pleistocene Epoch. Others have been deposited by streams since the glaciers retreated. The following brief description of geologic terms should be used as an aid in further understanding the deposition of sand and gravel.

Till

Till is the term used to define the unsorted and unstratified material either laid down by an active glacier at the base of the ice, or deposited by a glacier as the ice melted. This mixture of boulders, sand, gravel, clay, and silt is often called "boulder clay" or "blue clay." Although till covers most of Hutchinson County, it is not considered a source of sand and gravel, as at best, only a few, small isolated lenses occur.

Outwash

Glacial outwash is a general term geologists use to describe any deposits of clay, silt, sand, gravel, or boulders that have been washed, sorted, and subsequently deposited by flowing glacial meltwater. Outwash grain size depends upon sediment type and velocity of the water that transported and deposited the material. A lake or slowly flowing stream will usually deposit silts and clays, while rapidly flowing water may leave stream beds composed almost entirely of boulders. Most outwash, however, is a mixture of material between these two extremes, and is composed of an assortment of sand and gravel with minor amounts of finer and coarser materials. The majority of the colored areas on the map included in this publication indicate outwash deposits.

Alluvium

Alluvium is the term used to describe a mixture of clays, silts, sands, and gravels deposited by streams since the retreat of the glaciers. The size of material found in any one deposit is dependent on the same factors that determined grain size in glacial outwash. Alluvium occurs in the valleys of present day streams, and where deposits consist primarily of sand and gravel, mining for construction materials may take place.

Terrace Deposits

Terrace deposits are flat-topped, fluvial deposits that may or may not be of glacial origin. Being remnants of former floodplains, streams that formed them have since cut their channels deeper and developed new floodplains at lower elevations. These alluvial or outwash deposits account for many of the aggregate deposits found in Hutchinson County.

Bedrock

Bedrock is the older, consolidated rock beneath the glacial deposits. In Hutchinson County, the bedrock consists of shale, sandstone, chalk, and quartzite (locally known as "pink granite"). Outcrops of bedrock in Hutchinson County include Carlile

Shale along sections of Wolf Creek and the James River; Codell Sandstone along portions of Twelve Mile Creek and the James River; and Niobrara chalk along portions of Pony Creek, Wolf Creek, and the James River. Codell Sandstone outcrops were mapped during this study because they are potential sources of construction material. Generally, when bedrock units are found at or near the ground surface, no sand or gravel exists below that point.

EXPLANATION OF TABLES

Table 1 is a compilation of test holes that encountered sand or gravel in the upper 25 feet. This table lists:

- a. location of the test hole,
- b. depth of hole, and
- c. description of aggregate encountered.

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 the formation of this list. The complete set of test-hole logs is on file at the Office of the South Dakota Geological Survey in Vermillion.

Table 2 is a list of gravel pits on file with the District Office, South Dakota Division of Highways, Mitchell. The owner, material type, and where possible, thickness of overburden and aggregate being mined, have been listed. The actual thickness of a deposit may be greater than that mined, as 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 closed circle (●) indicates the presence of sand or gravel within 25 feet of the land surface with 5 feet or less of overburden. A square (■) indicates that sand or gravel was encountered within 25 feet of the land surface, but that more than 5 feet of overburden existed. The test holes represented by these symbols are numbered and listed in table 1. An open circle (○) indicates that no sand or gravel was found in the upper 25 feet.

Gravel pits are labelled with a crossed pick and shovel (⌘), those numbered, being listed in table 2. Additional information concerning the numbered gravel pits is on file at the Division of Highways District Office in Mitchell, South Dakota.

To help illustrate the most promising areas, the map has been divided into three area types, each expressing the probability of discovering new sources of economically extractable sand or gravel. Those areas designated as "good" indicate a comparatively thick deposit with thin overburden and underlying large tracts of land. Those considered "fair" lack one or more of these favorable attributes. Areas designated as "good" or "fair" have been assigned a color as well as a letter, and are discussed later in the text.

Areas designated as "poor" are composed mainly of till but may contain random deposits of sand and gravel. Many of these deposits have been located by test holes and gravel pits on the map, and some of the pits in these areas are very productive. However, these deposits are generally limited and difficult to locate.

Those areas considered "poor" may contain areas of sand and/or gravel, but they are usually too small, too scattered, and/or too deep to be primarily worth locating.

The above three classifications evolved through an extensive drilling program, the study of soil types, the study of gravel pits and their locations, topographic map and aerial photograph interpretations, and field observations.

Sand and Gravel

Area "A" (Fair) represents the northernmost reaches of both Twelve Mile Creek and its southern tributary. These two relatively narrow valleys contain only intermittent terrace and valley floor deposits. Some excavation of coarse aggregate does occur, though expansion seems remote due to scarcity of the resource.

Areas "B," "F," and "G" (Fair) include those areas of the James River valley where deposits consist predominantly of alluvial sands and silts. In these areas, there appear to be few, if any, valley-wall deposits. Although the floodplain deposits often attain thicknesses of 50 feet or more, the grain size is usually too small to be of any commercial value as an aggregate. There does, however, seem to be some usage of these materials as fill. Codell Sandstone outcrops do offer possibilities for sandpit development in areas "B" and "G."

Area "C" (Good) encompasses the confluence of Twelve Mile Creek and its southern fork. This area exhibits little or no overburden, up to 25 feet of primarily sandy valley floor deposits, a few valley wall terrace remnants up to 15 feet thick, and numerous Codell Sandstone exposures.

Area "D" (Good) covers approximately 6 square miles, incorporating roughly 2 miles of the James River, 3 miles of Plum Creek and 1 1/2 miles of Dry Creek. This area consists of extensive

sand and gravel deposits, existing primarily as valley-floor outwash in the James River Valley (down to a depth of 40 feet) and as both valley-floor and valley-wall deposits in the Plum Creek and Dry Creek drainages. With an average overburden thickness of less than 3 feet, geologically these deposits offer promising development prospects. It must be remembered, however, that mining in the floodplain of any drainage system may necessitate the implementation of specialized dredging equipment, due to the shallow water table often found in these areas.

Area "E" (Fair). The majority of the Plum Creek drainage system offers a fair probability of uncovering terrace remnants up to 15 feet thick, with less than 3 feet of overburden. However, it is because these deposits are so localized that this area is designated as only "fair."

Areas "H" and "I" (Fair) represent the majority of the Wolf Creek and Elm Creek drainages, the northern section of Lonetree Creek and the southern part of Dry Creek. They have been assessed as "fair" because the only occurrences of aggregate are discontinuous terrace remnants and patchy stream bed veneers. Added to this, thicknesses of aggregate deposits and overburdens vary widely. In the most promising areas of the Wolf Creek and Elm Creek systems, where deposits are already being mined, up to 10 feet of aggregate is usually being removed.

Area "J" (Fair). The northern section of these deposits represents a well defined terrace that lies along the edge of a larger, northwest-southeast trending glacial moraine. This moraine delineates part of the southern edge of the Missouri Coteau. The thick pockets of sand and fine gravel present in this terrace have been extensively worked, because little or no overburden is present. However, the majority of the deposits remaining are thin, and future development prospects look meager.

The southern part of this area represents the northern limit of more extensive deposits to be found in Bon Homme County occurring along the present day Emanuel Creek. However, in Hutchinson County, some outwash does exist underlying an alluvial overburden. High water-table conditions would most likely necessitate dredging, if development were to take place.

Area "K" (Fair). In both of these broad, shallow drainages, aggregate is found as fine, valley-floor deposits. The deposits generally become more coarse at depth and in a southeast direction. Shallow water-table conditions may cause problems in excavating these deposits.

Area "L" (Good). This area surrounds the Town of Olivet and offers easy access to some of the largest deposits of coarse aggregate found in Hutchinson County. Deposits are primarily a coarse sand to a fine to medium gravel, with little or no overburden. These outwash deposits are probably the result of ice in the James River valley damming drainage from the west and

northwest. The occurrence of large amounts of sand can be explained by the ice picking this up locally, (due to the close proximity of the Codell Sandstone to the surface), and later redepositing it when the ice melted.

Although Area "M" (Fair) exhibits the same type and thicknesses of aggregate as area "L," an average overburden of more than 10 feet prohibits pit development. This is readily apparent when one compares the number of working pits in the two areas. Along the James River valley, pockets of aggregate with less overburden probably do exist, but high water-table conditions would also inhibit development.

Area "N" (Good) is a promising body of outwash with thicknesses of up to 30 feet and overburden generally less than 5 feet. Additional test holes should be drilled in this area prior to development in order to better define the deposit.

Area "O" (Fair). The southern section of this area encompasses the upstream portion of Clay Creek valley. Patchy, clayey, sands constitute the valley floor deposits while the few intermittent valley wall deposits present, are already partially developed.

The northern section of this area represents the edge of more extensive deposits in Turner County, occurring within the Turkey Ridge Creek valley. The reader is referred to:

Sand and gravel resources in Turner County, South Dakota: South Dakota Geological Survey, Information Pamphlet no. 34, Jarrett, M. J., 1986.

This paper is available from the Geological Survey Office in Vermillion.

The remainder of Hutchinson County has been mapped as poor, though some areas will contain sand and gravel deposits. However, due to their widely scattered nature, exploration efforts should first be concentrated in those areas marked "good" and "fair."

Codell Sandstone

Codell Sandstone outcrops occur along Twelve Mile Creek and the northern part of the James River valley in Hutchinson County, though the exposures differ markedly in appearance. Near the Hanson County line in northern Hutchinson County, exposures exhibit a near white, fine-grained, highly quartzose sand with variable cementation. In more southern exposures, around the Milltown area, outcrops exhibit a siltier, iron-stained, fine to medium quartzose sand. Cementation is again variable, and the color ranges from a yellowish brown to a reddish brown. Discontinuous interbedded clay beds and gravel stringers appear more numerous in the southernmost exposures.

Outcrops also vary in size, the largest usually being found along stream and river cuts. Here fluvial action has maintained near vertical sandstone cliffs by constantly washing away any slump material.

Codell Sandstone may have applications in the construction industry as a mortar sand or as an asphaltic concrete sand. However, there are many geologic and economic factors that would have to be considered before any type of aggregate pit development takes place. Some of these include overburden and formation thickness, local water levels, material specifications, development costs, transportation economics and future markets.

TABLE 1. LIST OF TEST HOLES IN HUTCHINSON COUNTY, SOUTH DAKOTA,
WHICH CONTAIN SAND OR GRAVEL IN THE UPPER 25 FEET.

LITHOLOGIC DESCRIPTIONS, AS LISTED, HAVE BEEN CONDENSED FROM
DATA CONTAINED IN 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.
NUMERICAL VALUES INDICATE DEPTH IN FEET BELOW LAND SURFACE.

TEST HOLE NUMBER: 1
LOCATION: 097N-56W-02CDCC
LEGAL LOCATION: SW SW SE SW SEC. 02, T. 097 N., R. 56 W.

3 - 30 SAND, FINE, VERY CLAYEY; SATURATED

* * * *

TEST HOLE NUMBER: 2
LOCATION: 097N-56W-24ABBB
LEGAL LOCATION: NW NW NW NE SEC. 24, T. 097 N., R. 56 W.

2 - 11 SAND, BROWN, MEDIUM TO COARSE, CLAYEY;
SATURATED, OXIDIZED, SOME FINE GRAVEL
11 - 12 GRAVEL, MEDIUM TO COARSE, ROUNDED;
SATURATED
12 - 15 SAND, BROWN, MEDIUM, CLAYEY; SATURATED,
OXIDIZED

* * * *

TEST HOLE NUMBER: 3
LOCATION: 097N-57W-06CCCB
LEGAL LOCATION: NW SW SW SW SEC. 06, T. 097 N., R. 57 W.

21 - 36 SAND AND GRAVEL

* * * *

TEST HOLE NUMBER: 4
LOCATION: 097N-57W-19AC
LEGAL LOCATION: SW NE SEC. 19, T. 097 N., R. 57 W.

20 - 27 SAND; DIRTY

* * * *

TEST HOLE NUMBER: 5

LOCATION: 097N-58W-02BAA
LEGAL LOCATION: NE NE NW SEC. 02, T. 097 N., R. 58 W.

3 - 8 SAND

* * * *

TEST HOLE NUMBER: 6
LOCATION: 097N-58W-03DAAD
LEGAL LOCATION: SE NE NE SE SEC. 03, T. 097 N., R. 58 W.

1 - 3 GRAVEL, BROWN, MEDIUM; MOIST

* * * *

TEST HOLE NUMBER: 7
LOCATION: 097N-58W-05BBBB 1
LEGAL LOCATION: NW NW NW NW SEC. 05, T. 097 N., R. 58 W.

9 - 15 SAND AND GRAVEL, YELLOWISH-BROWN, MEDIUM
SAND TO FINE PEBBLE GRAVEL; QUARTZ,
MUDROCKS, AND A VARIETY OF ROCK TYPES

* * * *

TEST HOLE NUMBER: 8
LOCATION: 097N-58W-05BBBB 2
LEGAL LOCATION: NW NW NW NW SEC. 05, T. 097 N., R. 58 W.

22 - 28 SAND, MEDIUM TO COARSE; SOME FINE
PEBBLES; MOSTLY QUARTZ WITH SOME MUD-
ROCKS AND A VARIETY OF ROCK TYPES

* * * *

TEST HOLE NUMBER: 9
LOCATION: 097N-58W-08DCCC
LEGAL LOCATION: SW SW SW SE SEC. 08, T. 097 N., R. 58 W.

6 - 11 SAND, LIGHT-BROWN, FINE, MEDIUM, SLIGHTLY
CLAYEY; SATURATED

* * * *

TEST HOLE NUMBER: 10
LOCATION: 097N-58W-09CCCC
LEGAL LOCATION: SE SW SW SW SEC. 09, T. 097 N., R. 58 W.

0 - 23 SAND, BROWN, MEDIUM TO COARSE; DRY TO
MOIST, SATURATED AT 15 FEET
23 - 25 GRAVEL, BROWN, COARSE, SANDY; SATURATED
25 - 63 SAND, BROWN, MEDIUM TO COARSE; SATURATED,
MEDIUM GRAVEL FROM 40 TO 48 FEET, SOME
COBBLES

* * * *

TEST HOLE NUMBER: 11
LOCATION: 097N-58W-10DCBB
LEGAL LOCATION: NW NW SW SE SEC. 10, T. 097 N., R. 58 W.

2 - 36 SAND AND GRAVEL

* * * *

TEST HOLE NUMBER: 12
LOCATION: 097N-58W-11BBAD
LEGAL LOCATION: SE NE NW NW SEC. 11, T. 097 N., R. 58 W.

4 - 20 SAND; DIRTY
20 - 75 SAND; WITH STREAKS OF BLUE CLAY

* * * *

TEST HOLE NUMBER: 13
LOCATION: 097N-58W-11CBBC
LEGAL LOCATION: SW NW NW SW SEC. 11, T. 097 N., R. 58 W.

2 - 4 GRAVEL, BROWN, FINE, CLAYEY, SANDY;
MOIST, OXIDIZED
4 - 14 SAND, BROWN, FINE TO MEDIUM, MODERATELY
SORTED; MOIST, OXIDIZED
14 - 24 SAND, BROWN, MEDIUM TO COARSE, MODERATELY
SORTED; MOIST, OXIDIZED
24 - 93 SAND, BROWN, COARSE, MODERATELY TO WELL-
SORTED; MOIST, OXIDIZED, SOME MEDIUM
GRAVEL FROM 32 FEET, SATURATED AT 58
FEET

* * * *

TEST HOLE NUMBER: 14
LOCATION: 097N-58W-12BCCB
LEGAL LOCATION: NW SW SW NW SEC. 12, T. 097 N., R. 58 W.

6 - 50 SAND AND GRAVEL, FINE SAND TO MEDIUM
PEBBLE GRAVEL; WIDE VARIETY OF ROCK
TYPES; SOME CLAY AT 22 AND 40 FEET

* * * *

TEST HOLE NUMBER: 15
LOCATION: 097N-58W-12DDDA
LEGAL LOCATION: NE SE SE SE SEC. 12, T. 097 N., R. 58 W.

9 - 18 SAND AND GRAVEL, YELLOWISH-BROWN, MEDIUM
SAND TO FINE PEBBLE GRAVEL; WIDE
VARIETY OF ROCK TYPES

* * * *

TEST HOLE NUMBER: 16
LOCATION: 097N-58W-12DDDD
LEGAL LOCATION: SE SE SE SE SEC. 12, T. 097 N., R. 58 W.

14 - 18 SAND, COARSE; TO FINE GRAVEL

* * * *

TEST HOLE NUMBER: 17
LOCATION: 097N-58W-14ABAD
LEGAL LOCATION: SE NE NW NE SEC. 14, T. 097 N., R. 58 W.

0 - 19 SAND AND GRAVEL, YELLOWISH-BROWN, MEDIUM
SAND TO COARSE PEBBLE GRAVEL; QUARTZ
AND A WIDE VARIETY OF ROCK TYPES;
YELLOWISH-BROWN TILL FROM 0 TO 2 FEET

* * * *

TEST HOLE NUMBER: 18
LOCATION: 097N-58W-15ABAB
LEGAL LOCATION: NW NE NW NE SEC. 15, T. 097 N., R. 58 W.

0 - 4 SAND AND GRAVEL, COARSE SAND, FINE PEBBLE
GRAVEL, SLIGHTLY CLAYEY; OXIDIZED,
MOIST
4 - 7 SAND, RED-BROWN, FINE TO MEDIUM, VERY
CLAYEY; MOIST, OXIDIZED
9 - 11 SAND, FINE TO COARSE, POORLY SORTED,
SLIGHTLY SILTY TO CLAYEY; OXIDIZED,
MOIST
11 - 13 GRAVEL, FINE; SOME CLAY, DRY, WITH COARSE

SAND

* * * *

TEST HOLE NUMBER: 19
LOCATION: 097N-58W-15ADBD 1
LEGAL LOCATION: SE NW SE NE SEC. 15, T. 097 N., R. 58 W.

0 - 20 SAND, FINE TO MEDIUM; SOME ORGANIC BLACK
MATERIAL FROM 5 TO 15 FEET; SOME BROWN
CLAY FROM 15 TO 20 FEET; DRILLER
REPORTS SAND AND GRAVEL
20 - 42 SAND AND GRAVEL, FINE SAND TO FINE
GRAVEL, VERY CLAYEY; WIDE VARIETY OF
ROCK TYPES

* * * *

TEST HOLE NUMBER: 20
LOCATION: 097N-58W-15CCCC
LEGAL LOCATION: SW SW SW SW SEC. 15, T. 097 N., R. 58 W.

7 - 16 SAND, BROWN, MEDIUM, SLIGHTLY CLAYEY;
OXIDIZED

* * * *

TEST HOLE NUMBER: 21
LOCATION: 097N-58W-17DAA
LEGAL LOCATION: NE NE SE SEC. 17, T. 097 N., R. 58 W.

8 - 170 SAND

* * * *

TEST HOLE NUMBER: 22
LOCATION: 097N-58W-18DDDD
LEGAL LOCATION: SE SE SE SE SEC. 18, T. 097 N., R. 58 W.

0 - 32 SAND AND GRAVEL, FINE SAND TO FINE PEBBLE
GRAVEL; MOSTLY QUARTZ, SOME MUDROCKS,
CARBONATES, AND A WIDE VARIETY OF
ROCKS; TOPSOIL FROM 0 TO 1 FOOT; FINE
TO MEDIUM SAND FROM 1 TO 7 FEET

* * * *

TEST HOLE NUMBER: 23

LOCATION: 097N-58W-20ABBA

LEGAL LOCATION: NE NW NW NE SEC. 20, T. 097 N., R. 58 W.

25 - 49 SAND, FINE TO COARSE, SOME FINE TO MEDIUM
PEBBLES; MOSTLY QUARTZ WITH A LITTLE
COAL, MUDSTONES, AND RED AND GREEN
GRAINS; SEVERAL THIN CLAY LAYERS, CLAY
FROM 37 TO 38 FEET (WESTERN DERIVED
ALLUVIUM)

* * * *

TEST HOLE NUMBER: 24

LOCATION: 097N-58W-21BBCC

LEGAL LOCATION: SW SW NW NW SEC. 21, T. 097 N., R. 58 W.

15 - 50 SAND, MEDIUM TO COARSE, SOME FINE
PEBBLES; MOSTLY QUARTZ WITH SOME
MUDROCKS, CARBONATES, COAL, AND RED
AND GREEN GRAINS (WESTERN DERIVED
ALLUVIUM)

* * * *

TEST HOLE NUMBER: 25

LOCATION: 097N-58W-21BCCC

LEGAL LOCATION: SW SW SW NW SEC. 21, T. 097 N., R. 58 W.

25 - 83 SAND, MEDIUM TO COARSE, SOME FINE
PEBBLES; MOSTLY QUARTZ WITH SOME COAL,
MUDROCKS AND CARBONATES AND A FEW RED
AND GREEN GRAINS; MORE PEBBLES BELOW 55
FEET (WESTERN DERIVED ALLUVIUM)

* * * *

TEST HOLE NUMBER: 26

LOCATION: 097N-58W-23CDCC

LEGAL LOCATION: SW SW SE SW SEC. 23, T. 097 N., R. 58 W.

19 - 23 SAND, BROWN, FINE, VERY CLAYEY; SATURATED
25 - 27 SAND, BROWN, FINE, VERY CLAYEY, VERY
SILTY

* * * *

TEST HOLE NUMBER: 27

LOCATION: 097N-58W-26BBAA

LEGAL LOCATION: NE NE NW NW SEC. 26, T. 097 N., R. 58 W.

0 - 8 SAND, FINE; LITTLE CLAY

* * * *

TEST HOLE NUMBER: 28

LOCATION: 097N-58W-26DADD

LEGAL LOCATION: SE SE NE SE SEC. 26, T. 097 N., R. 58 W.

3 - 25 SAND, FINE TO MEDIUM, VERY CLAYEY
25 - 33 SAND, MEDIUM TO COARSE, CLAYEY

* * * *

TEST HOLE NUMBER: 29

LOCATION: 097N-58W-33DDDC

LEGAL LOCATION: SW SE SE SE SEC. 33, T. 097 N., R. 58 W.

15 - 23 SAND AND GRAVEL; DRY

* * * *

TEST HOLE NUMBER: 30

LOCATION: 097N-58W-34BBBB

LEGAL LOCATION: NW NW NW NW SEC. 34, T. 097 N., R. 58 W.

20 - 25 GRAVEL, PEA- TO NUT-SIZE

* * * *

TEST HOLE NUMBER: 31

LOCATION: 097N-58W-35ACDD

LEGAL LOCATION: SE SE SW NE SEC. 35, T. 097 N., R. 58 W.

3 - 15 SAND, FINE TO MEDIUM, CLAYEY
15 - 20 SAND, MEDIUM TO COARSE, SLIGHTLY CLAYEY

* * * *

TEST HOLE NUMBER: 32

LOCATION: 097N-58W-36DDDD 1

LEGAL LOCATION: SE SE SE SE SEC. 36, T. 097 N., R. 58 W.

0 - 6 SAND, MEDIUM, CLAYEY

* * * *

TEST HOLE NUMBER: 33
LOCATION: 097N-59W-01BBCC
LEGAL LOCATION: SW SW NW NW SEC. 01, T. 097 N., R. 59 W.

2 - 6 GRAVEL, BROWN, COARSE, VERY SANDY, POORLY
SORTED; MOIST, OXIDIZED
16 - 22 GRAVEL, BROWN, MEDIUM, VERY CLAYEY;
MOIST, OXIDIZED, SATURATED AT 18 FEET

* * * *

TEST HOLE NUMBER: 34
LOCATION: 097N-59W-01BCCC
LEGAL LOCATION: SW SW SW NW SEC. 01, T. 097 N., R. 59 W.

0 - 1 GRAVEL, BROWN, MEDIUM, CLAYEY, SANDY;
DRY, OXIDIZED

* * * *

TEST HOLE NUMBER: 35
LOCATION: 097N-59W-02ABAB
LEGAL LOCATION: NW NE NW NE SEC. 02, T. 097 N., R. 59 W.

4 - 8 SAND, BROWN, MEDIUM, CLAYEY, SILTY,
POORLY SORTED; OXIDIZED, SATURATED
9 - 20 GRAVEL, BROWN, MEDIUM, CLAYEY, POORLY
SORTED; OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 36
LOCATION: 097N-59W-02BABB
LEGAL LOCATION: NW NW NE NW SEC. 02, T. 097 N., R. 59 W.

1 - 6 GRAVEL, BROWN, COARSE, CLAYEY, POORLY
SORTED; OXIDIZED, DRY

* * * *

TEST HOLE NUMBER: 37
LOCATION: 097N-59W-17DCCC
LEGAL LOCATION: SW SW SW SE SEC. 17, T. 097 N., R. 59 W.

1 - 7 SAND, BROWN, MEDIUM TO COARSE, GRAVELLY;
MOIST, OXIDIZED, SOME SILT, SOME CLAY,
SATURATED AT 4 FEET

7 - 26 SAND, BROWN, COARSE; FINE GRAVEL,
OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 38
LOCATION: 097N-59W-21BBBB
LEGAL LOCATION: NW NW NW NW SEC. 21, T. 097 N., R. 59 W.

0 - 17 SAND AND GRAVEL, YELLOWISH-BROWN, MEDIUM
SAND TO MEDIUM PEBBLE GRAVEL; QUARTZ
WITH SHALE AND A WIDE VARIETY OF ROCK
TYPES
24 - 44 SAND AND GRAVEL, MEDIUM SAND TO COARSE
PEBBLE GRAVEL; QUARTZ AND SHALE WITH
A WIDE VARIETY OF ROCK TYPES

* * * *

TEST HOLE NUMBER: 39
LOCATION: 097N-59W-27AAA
LEGAL LOCATION: NE NE NE SEC. 27, T. 097 N., R. 59 W.

2 - 25 SAND; DIRTY

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TEST HOLE NUMBER: 40
LOCATION: 097N-59W-32AD
LEGAL LOCATION: SE NE SEC. 32, T. 097 N., R. 59 W.

2 - 35 SAND

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TEST HOLE NUMBER: 41
LOCATION: 097N-60W-07BDDA
LEGAL LOCATION: NE SE SE NW SEC. 07, T. 097 N., R. 60 W.

1 - 6 GRAVEL, BROWN, MEDIUM TO COARSE, SILTY;
SOME SAND, SOME CLAY, DRY, OXIDIZED

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TEST HOLE NUMBER: 42
LOCATION: 097N-60W-09BBBB
LEGAL LOCATION: NW NW NW NW SEC. 09, T. 097 N., R. 60 W.

0 - 1 SAND, BROWN, MEDIUM; DRY
4 - 9 SAND, BROWN, COARSE; SATURATED
9 - 26 SAND, BROWN, FINE, CLAYEY, SILTY;
SATURATED

* * * *

TEST HOLE NUMBER: 43
LOCATION: 097N-60W-12CCCC
LEGAL LOCATION: SW SW SW SW SEC. 12, T. 097 N., R. 60 W.

1 - 21 SAND, BROWN, FINE; LITTLE SILT, SATURATED

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TEST HOLE NUMBER: 44
LOCATION: 097N-60W-17CDDC
LEGAL LOCATION: SE SW SE SW SEC. 17, T. 097 N., R. 60 W.

13 - 33 SAND AND GRAVEL, COARSE SAND, FINE PEBBLE
GRAVEL, VERY CLAYEY; OXIDIZED
SATURATED

* * * *

TEST HOLE NUMBER: 45
LOCATION: 097N-60W-20DCCC
LEGAL LOCATION: SW SW SW SE SEC. 20, T. 097 N., R. 60 W.

0 - 5 SAND, BROWN, FINE TO MEDIUM, SILTY;
MOIST

* * * *

TEST HOLE NUMBER: 46
LOCATION: 097N-60W-29DAAA
LEGAL LOCATION: NE NE NE SE SEC. 29, T. 097 N., R. 60 W.

1 - 4 GRAVEL, BROWN, FINE, SANDY, SILTY;
SATURATED

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TEST HOLE NUMBER: 47
LOCATION: 097N-60W-29DADA
LEGAL LOCATION: NE SE NE SE SEC. 29, T. 097 N., R. 60 W.

0 - 7 SAND, FINE, VERY SILTY; SATURATED
7 - 16 SAND AND GRAVEL, FINE TO MEDIUM SAND,
FINE GRAVEL

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TEST HOLE NUMBER: 48
LOCATION: 097N-60W-35DDDD
LEGAL LOCATION: SE SE SE SE SEC. 35, T. 097 N., R. 60 W.

5 - 14 SAND AND GRAVEL, CLAYEY

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TEST HOLE NUMBER: 49
LOCATION: 098N-56W-13DDAD
LEGAL LOCATION: SE NE SE SE SEC. 13, T. 098 N., R. 56 W.

22 - 37 SAND, COARSE; SOME MEDIUM SAND AND A FEW
FINE PEBBLES, MOSTLY QUARTZ WITH A FEW
RED GRAINS AND CLASTS OF A WIDE VARIETY
OF ROCK TYPES; CLAY FROM 34 TO 35 FEET

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TEST HOLE NUMBER: 50
LOCATION: 098N-56W-34ADDD
LEGAL LOCATION: SE SE SE NE SEC. 34, T. 098 N., R. 56 W.

2 - 4 SAND, BROWN, FINE, SILTY, CLAYEY;
SATURATED

* * * *

TEST HOLE NUMBER: 51
LOCATION: 098N-57W-05CDCC
LEGAL LOCATION: SW SW SE SW SEC. 05, T. 098 N., R. 57 W.

0 - 8 SAND, LIGHT-BROWN, FINE, SLIGHTLY CLAYEY
14 - 21 SAND, BROWN, COARSE, SLIGHTLY CLAYEY;
MOIST, TOO COARSE TO CONTINUE BEYOND
21 FEET

* * * *

TEST HOLE NUMBER: 52
LOCATION: 098N-57W-07DDAA
LEGAL LOCATION: NE NE SE SE SEC. 07, T. 098 N., R. 57 W.

0 - 2 SAND, BROWN, MEDIUM; DRY
2 - 16 GRAVEL, BROWN, FINE, VERY SANDY;
SATURATED AT 5 FEET
16 - 40 SAND, DARK-BROWN, FINE, VERY SILTY; MOIST

* * * *

TEST HOLE NUMBER: 53
LOCATION: 098N-58W-25AAAA
LEGAL LOCATION: NE NE NE NE SEC. 25, T. 098 N., R. 58 W.

8 - 12 SAND, BROWN, FINE TO MEDIUM; DRY

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TEST HOLE NUMBER: 54
LOCATION: 098N-58W-31ADAD
LEGAL LOCATION: SE NE SE NE SEC. 31, T. 098 N., R. 58 W.

1 - 5 SAND, BROWN, COARSE, SLIGHTLY CLAYEY,
POORLY SORTED; DRY, OXIDIZED
5 - 16 SAND, BROWN, VERY FINE, WELL-SORTED;
MOIST, OXIDIZED, CLEAN
20 - 22 SAND, DARK-BROWN, MEDIUM, CLAYEY, SILTY,
POORLY SORTED; MOIST TO SATURATED,
OXIDIZED

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TEST HOLE NUMBER: 55
LOCATION: 098N-58W-31DADA
LEGAL LOCATION: NE SE NE SE SEC. 31, T. 098 N., R. 58 W.

0 - 4 SAND, CLAYEY, PEBBLY, POORLY SORTED
(ROADFILL)
4 - 10 GRAVEL, RED-BROWN, FINE, SANDY, CLAYEY;
OXIDIZED

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TEST HOLE NUMBER: 56
LOCATION: 098N-58W-34BBBB
LEGAL LOCATION: NW NW NW NW SEC. 34, T. 098 N., R. 58 W.

1 - 7 SAND, BROWN, COARSE; SOME FINE GRAVEL,
SATURATED

- 7 - 11 SAND, BROWN, MEDIUM; LITTLE GRAVEL SATURATED
- 11 - 16 SAND, GRAY, MEDIUM; SATURATED

* * * *

TEST HOLE NUMBER: 57
 LOCATION: 098N-59W-09DCCC
 LEGAL LOCATION: SW SW SW SE SEC. 09, T. 098 N., R. 59 W.

- 4 - 9 SAND, BROWN, FINE, CLAYEY, MODERATELY WELL-SORTED; OXIDIZED, MOIST
- 22 - 25 SAND, BROWN, FINE, VERY SILTY, MODERATELY WELL-SORTED; OXIDIZED, SATURATED

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TEST HOLE NUMBER: 58
 LOCATION: 098N-59W-09DCDD
 LEGAL LOCATION: SE SE SW SE SEC. 09, T. 098 N., R. 59 W.

- 0 - 3 SAND, BROWN, SILTY, POORLY SORTED; OXIDIZED

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TEST HOLE NUMBER: 59
 LOCATION: 098N-59W-24CCBC
 LEGAL LOCATION: SW NW SW SW SEC. 24, T. 098 N., R. 59 W.

- 5 - 12 SAND AND GRAVEL, YELLOWISH-BROWN, MEDIUM SAND TO FINE PEBBLE GRAVEL; SOME MEDIUM PEBBLES; MUDROCKS, CARBONATES, AND A WIDE VARIETY OF ROCK TYPES

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TEST HOLE NUMBER: 60
 LOCATION: 098N-59W-27BBBA
 LEGAL LOCATION: NE NW NW NW SEC. 27, T. 098 N., R. 59 W.

- 0 - 2 SAND, BROWN, COARSE, MODERATELY TO POORLY SORTED; DRY, OXIDIZED
- 6 - 13 GRAVEL, BROWN, FINE, CLAYEY; SATURATED, OXIDIZED, CLEANER AT 8 FEET
- 13 - 17 SAND, BROWN, MEDIUM, WELL-SORTED; SATURATED, OXIDIZED
- 17 - 22 SAND, GRAY, MEDIUM, WELL-SORTED;

SATURATED, UNOXIDIZED

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TEST HOLE NUMBER: 61
LOCATION: 098N-59W-27DCDD
LEGAL LOCATION: SE SE SW SE SEC. 27, T. 098 N., R. 59 W.

3 - 11 GRAVEL, BROWN, MEDIUM, POORLY SORTED;
SOME COARSE SAND, SATURATED

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TEST HOLE NUMBER: 62
LOCATION: 098N-59W-34AADD
LEGAL LOCATION: SE SE NE NE SEC. 34, T. 098 N., R. 59 W.

0 - 2 SAND, BROWN, FINE, WELL-SORTED; MOIST,
OXIDIZED
6 - 7 SAND, BROWN, FINE, MODERATELY WELL-
SORTED; MOIST, OXIDIZED, SOME CLAY

* * * *

TEST HOLE NUMBER: 63
LOCATION: 098N-59W-34ADDD
LEGAL LOCATION: SE SE SE NE SEC. 34, T. 098 N., R. 59 W.

3 - 5 SAND, GRAY, FINE, VERY SILTY, VERY
CLAYEY; MOIST, OXIDIZED
5 - 7 SAND, BROWN, MEDIUM TO COARSE, CLAYEY;
SATURATED, OXIDIZED
9 - 18 GRAVEL, BROWN, MEDIUM TO COARSE, POORLY
SORTED, ROUNDED GRAINS; SATURATED,
OXIDIZED, SOME COARSE SAND

* * * *

TEST HOLE NUMBER: 64
LOCATION: 098N-59W-35BD
LEGAL LOCATION: SE NW SEC. 35, T. 098 N., R. 59 W.

2 - 6 GRAVEL
20 - 24 SAND, SILTY
24 - 180 SAND AND CLAY, BLUE CLAY

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TEST HOLE NUMBER: 65
LOCATION: 098N-59W-35CBCC
LEGAL LOCATION: SW SW NW SW SEC. 35, T. 098 N., R. 59 W.

2 - 3 GRAVEL, BROWN, MEDIUM; DRY, OXIDIZED

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TEST HOLE NUMBER: 66
LOCATION: 098N-59W-35DD
LEGAL LOCATION: SE SE SEC. 35, T. 098 N., R. 59 W.

10 - 30 SAND LAYERS

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TEST HOLE NUMBER: 67
LOCATION: 099N-57W-01ADAA
LEGAL LOCATION: NE NE SE NE SEC. 01, T. 099 N., R. 57 W.

0 - 8 SAND AND GRAVEL, YELLOWISH-BROWN, MEDIUM
SAND TO FINE PEBBLE GRAVEL; WIDE
VARIETY OF ROCK TYPES; TOPSOIL FROM 0
TO 1 FOOT

* * * *

TEST HOLE NUMBER: 68
LOCATION: 099N-57W-04AADA 1
LEGAL LOCATION: NE SE NE NE SEC. 04, T. 099 N., R. 57 W.

7 - 9 SAND, BROWN, FINE, VERY CLAYEY, POORLY
SORTED; OXIDIZED, MOIST

9 - 17 GRAVEL, BROWN, COARSE, CLAYEY, SANDY;
OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 69
LOCATION: 099N-57W-04CCDC
LEGAL LOCATION: SW SE SW SW SEC. 04, T. 099 N., R. 57 W.

7 - 9 SAND, CLAYEY, POORLY SORTED; MOIST
13 - 20 GRAVEL, BROWN, MEDIUM, VERY CLAYEY;
OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 70
LOCATION: 099N-57W-05BABB
LEGAL LOCATION: NW NW NE NW SEC. 05, T. 099 N., R. 57 W.

3 - 6 SAND, BROWN, MEDIUM, SILTY; DRY
9 - 12 SAND, BROWN, MEDIUM, CLAYEY; SATURATED
12 - 41 SAND, BROWN, FINE; SATURATED

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TEST HOLE NUMBER: 71
LOCATION: 099N-57W-06BBBB
LEGAL LOCATION: NW NW NW NW SEC. 06, T. 099 N., R. 57 W.

0 - 10 SAND AND GRAVEL, YELLOWISH-BROWN, FINE
SAND TO MEDIUM PEBBLE GRAVEL; SAND IS
MOSTLY QUARTZ WITH A VARIETY OF ROCK
TYPES; PEBBLES ARE A WIDE VARIETY OF
ROCK TYPES; TOPSOIL FROM 0 TO 1 FOOT

* * * *

TEST HOLE NUMBER: 72
LOCATION: 099N-57W-06BBCC
LEGAL LOCATION: SW SW NW NW SEC. 06, T. 099 N., R. 57 W.

0 - 2 SAND, BROWN, MEDIUM; MOIST, OXIDIZED
2 - 6 SAND, BROWN, MEDIUM, VERY CLAYEY, POORLY
SORTED; SATURATED, OXIDIZED
25 - 26 SAND, GRAY, MEDIUM TO FINE, CLAYEY,
POORLY SORTED; SATURATED, UNOXIDIZED,
SOME FINE GRAVEL

* * * *

TEST HOLE NUMBER: 73
LOCATION: 099N-57W-06CCCC
LEGAL LOCATION: SW SW SW SW SEC. 06, T. 099 N., R. 57 W.

0 - 6 SAND, BROWN, MEDIUM, MODERATELY WELL-
SORTED; MOIST, OXIDIZED
15 - 16 SAND, BROWN, MEDIUM, CLAYEY, POORLY
SORTED; VERY MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 74
LOCATION: 099N-57W-06CCDC

LEGAL LOCATION: SW SE SW SW SEC. 06, T. 099 N., R. 57 W.

- 2 - 7 GRAVEL, BROWN, COARSE, POORLY SORTED,
ROUNDED; SOME COARSE SAND, MOIST,
SATURATED AT 6 FEET
- 7 - 14 GRAVEL, REDDISH-BROWN, MEDIUM, POORLY
SORTED, ANGULAR; SATURATED

* * * *

TEST HOLE NUMBER: 75
LOCATION: 099N-57W-07CDDD
LEGAL LOCATION: SE SE SE SW SEC. 07, T. 099 N., R. 57 W.

- 1 - 2 SAND, REDDISH-BROWN, MEDIUM, CLAYEY,
POORLY SORTED; MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 76
LOCATION: 099N-57W-08DDDC
LEGAL LOCATION: SW SE SE SE SEC. 08, T. 099 N., R. 57 W.

- 1 - 9 SAND AND GRAVEL, REDDISH, COARSE;
OXIDIZED, WITH A CLAY STRINGER FROM 6
TO 7 FEET

* * * *

TEST HOLE NUMBER: 77
LOCATION: 099N-57W-09BAAA
LEGAL LOCATION: NE NE NE NW SEC. 09, T. 099 N., R. 57 W.

- 4 - 21 SAND AND GRAVEL, REDDISH, COARSE, CLAYEY;
OXIDIZED, VERY COARSE GRAVEL AT 9 FEET
AND FROM 15 TO 18 FEET

* * * *

TEST HOLE NUMBER: 78
LOCATION: 099N-57W-09BABA
LEGAL LOCATION: NE NW NE NW SEC. 09, T. 099 N., R. 57 W.

- 0 - 1 GRAVEL, COARSE, CLAYEY; DRY (ROADFILL)
- 1 - 11 SAND, BROWN, VERY COARSE, CLAYEY,
POORLY SORTED; OXIDIZED, DRY
- 17 - 22 SAND, GRAY, MEDIUM TO COARSE, VERY

CLAYEY; WITH COARSE PEBBLES, UN-
OXIDIZED, MOIST

* * * *

TEST HOLE NUMBER: 79
LOCATION: 099N-57W-10CCCC
LEGAL LOCATION: SW SW SW SW SEC. 10, T. 099 N., R. 57 W.

8 - 17 SAND AND GRAVEL, YELLOWISH-BROWN, FINE
SAND TO FINE PEBBLE GRAVEL, CLAYEY;
WIDE VARIETY OF ROCK TYPES

* * * *

TEST HOLE NUMBER: 80
LOCATION: 099N-57W-18ABBA
LEGAL LOCATION: NE NW NW NE SEC. 18, T. 099 N., R. 57 W.

13 - 16 SAND, BROWN, FINE, SILTY, CLAYEY;
OXIDIZED

* * * *

TEST HOLE NUMBER: 81
LOCATION: 099N-57W-20ABBA
LEGAL LOCATION: NE NW NW NE SEC. 20, T. 099 N., R. 57 W.

0 - 4 SAND, REDDISH, CLAYEY; POORLY SORTED;
OXIDIZED
10 - 13 GRAVEL, REDDISH-BROWN, FINE; WITH COARSE
SAND, OXIDIZED, SOME CLAY PRESENT

* * * *

TEST HOLE NUMBER: 82
LOCATION: 099N-57W-20BBCB
LEGAL LOCATION: NW SW NW NW SEC. 20, T. 099 N., R. 57 W.

9 - 19 SAND, BROWN, MEDIUM, POORLY SORTED, VERY
SILTY, CLAYEY; OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 83
LOCATION: 099N-57W-20DCDD
LEGAL LOCATION: SE SE SW SE SEC. 20, T. 099 N., R. 57 W.

6 - 26 SAND AND GRAVEL, BROWN, FINE; CLEAN,
OXIDIZED, SATURATED, VERY COARSE GRAVEL
FROM 18 TO 19 FEET

* * * *

TEST HOLE NUMBER: 84
LOCATION: 099N-57W-28BCBB
LEGAL LOCATION: NW NW SW NW SEC. 28, T. 099 N., R. 57 W.

5 - 8 SAND, BROWN, MEDIUM TO COARSE, SILTY;
OXIDIZED, MOIST, WITH SOME CLAY
8 - 10 SAND, MEDIUM TO COARSE, VERY CLAYEY; SOME
PEBBLES, OXIDIZED, MOIST

* * * *

TEST HOLE NUMBER: 85
LOCATION: 099N-57W-28DDDD
LEGAL LOCATION: SE SE SE SE SEC. 28, T. 099 N., R. 57 W.

1 - 20 SAND, REDDISH-BROWN, FINE TO COARSE,
SILTY, CLAYEY; SATURATED, OXIDIZED,
SOME GRAVEL

* * * *

TEST HOLE NUMBER: 86
LOCATION: 099N-57W-30CBCB
LEGAL LOCATION: NW SW NW SW SEC. 30, T. 099 N., R. 57 W.

9 - 13 SAND, MEDIUM TO COARSE, VERY CLAYEY;
SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 87
LOCATION: 099N-57W-31DB
LEGAL LOCATION: NW SE SEC. 31, T. 099 N., R. 57 W.

10 - 60 SAND, SILTY

* * * *

TEST HOLE NUMBER: 88
LOCATION: 099N-58W-01ABAB
LEGAL LOCATION: NW NE NW NE SEC. 01, T. 099 N., R. 58 W.

0 - 2 SAND, BROWN, FINE TO MEDIUM, SILTY; DRY
23 - 25 SAND, BROWN, FINE TO MEDIUM, SILTY; SOME
PEBBLES, MOIST, SATURATED AT 24 FEET

* * * *

TEST HOLE NUMBER: 89
LOCATION: 099N-58W-03CBCC
LEGAL LOCATION: SW SW NW SW SEC. 03, T. 099 N., R. 58 W.

6 - 7 SAND, BROWN, FINE, SILTY; MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 90
LOCATION: 099N-58W-04CCCB
LEGAL LOCATION: NW SW SW SW SEC. 04, T. 099 N., R. 58 W.

6 - 14 SAND AND GRAVEL, RED-BROWN, COARSE SAND,
VERY FINE PEBBLE GRAVEL, VERY CLAYEY;
OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 91
LOCATION: 099N-58W-08AADD
LEGAL LOCATION: SE SE NE NE SEC. 08, T. 099 N., R. 58 W.

19 - 22 SAND, BROWN, FINE, VERY CLAYEY, SILTY;
MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 92
LOCATION: 099N-58W-08BBCB
LEGAL LOCATION: NW SW NW NW SEC. 08, T. 099 N., R. 58 W.

2 - 6 SAND, REDDISH-BROWN, MEDIUM, SILTY;
MOIST, OXIDIZED
19 - 50 SAND, BROWN, MEDIUM, MODERATELY SORTED;
SATURATED, OXIDIZED, CLEAN, COARSENS
WITH DEPTH

* * * *

TEST HOLE NUMBER: 93
LOCATION: 099N-58W-08CBCC
LEGAL LOCATION: SW SW NW SW SEC. 08, T. 099 N., R. 58 W.

14 - 18 SAND, BLACK-GRAY, VERY FINE, SILTY,
CLAYEY

* * * *

TEST HOLE NUMBER: 94
LOCATION: 099N-58W-16BCAA
LEGAL LOCATION: NE NE SW NW SEC. 16, T. 099 N., R. 58 W.

6 - 9 GRAVEL, MEDIUM TO COARSE; MOIST
9 - 51 SAND, BROWN, COARSE, GRAVELLY; OXIDIZED,
SATURATED

* * * *

TEST HOLE NUMBER: 95
LOCATION: 099N-58W-23DDDD
LEGAL LOCATION: SE SE SE SE SEC. 23, T. 099 N., R. 58 W.

2 - 5 SAND, BROWN, MEDIUM, SILTY; MOIST

* * * *

TEST HOLE NUMBER: 96
LOCATION: 099N-58W-25BCBB
LEGAL LOCATION: NW NW SW NW SEC. 25, T. 099 N., R. 58 W.

4 - 15 SAND, BROWN, FINE, SILTY; SATURATED,
OXIDIZED
15 - 35 SAND, BROWN, FINE TO COARSE; SATURATED,
OXIDIZED

* * * *

TEST HOLE NUMBER: 97
LOCATION: 099N-58W-36DDDD
LEGAL LOCATION: SE SE SE SE SEC. 36, T. 099 N., R. 58 W.

4 - 9 SAND, BROWN, MEDIUM TO COARSE, SILTY,
CLAYEY, PEBBLY; SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 98
LOCATION: 099N-59W-01CBBC
LEGAL LOCATION: SW NW NW SW SEC. 01, T. 099 N., R. 59 W.

1 - 9 SAND AND GRAVEL, REDDISH, COARSE SAND,
SILTY; OXIDIZED
9 - 14 SAND, MEDIUM-COARSE, POORLY SORTED;
OXIDIZED, SOME FINE GRAVEL
14 - 43 GRAVEL, MEDIUM, WELL-SORTED; OXIDIZED,
WELL-SORTED AT 16 AND 24 FEET,
SATURATED AT 36 FEET, WITH STRINGERS OF
MEDIUM SAND

* * * *

TEST HOLE NUMBER: 99
LOCATION: 099N-59W-01DBAC
LEGAL LOCATION: SW NE NW SE SEC. 01, T. 099 N., R. 59 W.

7 - 10 SAND, FINE
10 - 38 GRAVEL

* * * *

TEST HOLE NUMBER: 100
LOCATION: 099N-59W-02BBAD
LEGAL LOCATION: SE NE NW NW SEC. 02, T. 099 N., R. 59 W.

5 - 9 SAND, BROWN, VERY FINE, VERY SILTY;
MOIST, OXIDIZED
9 - 18 SAND, BROWN, COARSE, CLAYEY, POORLY
SORTED; SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 101
LOCATION: 099N-59W-03BCDD
LEGAL LOCATION: SE SE SW NW SEC. 03, T. 099 N., R. 59 W.

3 - 14 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 102
LOCATION: 099N-59W-04AAAA
LEGAL LOCATION: NE NE NE NE SEC. 04, T. 099 N., R. 59 W.

1 - 15 SAND, BROWN, MEDIUM

* * * *

TEST HOLE NUMBER: 103
LOCATION: 099N-59W-08AAAA
LEGAL LOCATION: NE NE NE NE SEC. 08, T. 099 N., R. 59 W.

20 - 23 GRAVEL, BROWN, COARSE

* * * *

TEST HOLE NUMBER: 104
LOCATION: 099N-59W-11BACA
LEGAL LOCATION: NE SW NE NW SEC. 11, T. 099 N., R. 59 W.

2 - 14 SAND, DARK-BROWN, MEDIUM, VERY CLAYEY;
SATURATED
14 - 29 SAND AND GRAVEL, GRAY-BLACK, COARSE SAND,
FINE GRAVEL, POORLY SORTED; SATURATED
(ALLUVIUM)

* * * *

TEST HOLE NUMBER: 105
LOCATION: 099N-59W-11BDAD
LEGAL LOCATION: SE NE SE NW SEC. 11, T. 099 N., R. 59 W.

6 - 29 SAND, BROWN, FINE, VERY SILTY, VERY
CLAYEY; SOME PEBBLES, MOIST, OXIDIZED,
SATURATED AT 11 FEET

* * * *

TEST HOLE NUMBER: 106
LOCATION: 099N-59W-11CCCC
LEGAL LOCATION: SW SW SW SW SEC. 11, T. 099 N., R. 59 W.

2 - 14 SAND, BROWN, FINE TO MEDIUM
14 - 18 GRAVEL, BROWN, COARSE; WITH COAL

* * * *

TEST HOLE NUMBER: 107
LOCATION: 099N-59W-11DDDD
LEGAL LOCATION: SE SE SE SE SEC. 11, T. 099 N., R. 59 W.

2 - 4 SAND, BROWN, MEDIUM, VERY CLAYEY, POORLY
SORTED; MOIST, OXIDIZED
4 - 10 GRAVEL, BROWN, FINE, CLAYEY, SANDY,
POORLY SORTED; SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 108
LOCATION: 099N-59W-15BABB
LEGAL LOCATION: NW NW NE NW SEC. 15, T. 099 N., R. 59 W.

4 - 8 SAND, BROWN, MEDIUM, SILTY, CLAYEY;
OXIDIZED
8 - 18 SAND, BROWN, COARSE; SOME CLAY AND SILT,
OXIDIZED

* * * *

TEST HOLE NUMBER: 109
LOCATION: 099N-59W-19DAAA
LEGAL LOCATION: NE NE NE SE SEC. 19, T. 099 N., R. 59 W.

1 - 6 SAND, BROWN, MEDIUM, SILTY; OXIDIZED

* * * *

TEST HOLE NUMBER: 110
LOCATION: 099N-59W-28ABAB
LEGAL LOCATION: NW NE NW NE SEC. 28, T. 099 N., R. 59 W.

0 - 1 SAND, LIGHT-BROWN, FINE; DRY, OXIDIZED,
SOME FINE GRAVEL
8 - 12 GRAVEL, BROWN, FINE, SILTY, CLAYEY; SOME
COARSE SAND, SATURATED, OXIDIZED
23 - 32 SAND, GRAY, FINE, SILTY; SATURATED,
UNOXIDIZED

* * * *

TEST HOLE NUMBER: 111
LOCATION: 099N-59W-28CBBB
LEGAL LOCATION: NW NW NW SW SEC. 28, T. 099 N., R. 59 W.

1 - 4 SAND, BROWN, FINE TO MEDIUM, SILTY; DRY,
OXIDIZED, SOME FINE GRAVEL

* * * *

TEST HOLE NUMBER: 112
LOCATION: 099N-59W-33BAAA
LEGAL LOCATION: NE NE NE NW SEC. 33, T. 099 N., R. 59 W.

4 - 6 SAND, BROWN, MEDIUM, WELL-SORTED; MOIST
7 - 10 SAND, DARK-BROWN, FINE TO MEDIUM, VERY
SILTY, VERY CLAYEY; MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 113
LOCATION: 099N-59W-33CCCC
LEGAL LOCATION: SW SW SW SW SEC. 33, T. 099 N., R. 59 W.

7 - 12 SAND, YELLOWISH-BROWN, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 114
LOCATION: 099N-59W-33CDDC
LEGAL LOCATION: SW SE SE SW SEC. 33, T. 099 N., R. 59 W.

4 - 5 GRAVEL, BROWN, MEDIUM, CLAYEY; OXIDIZED,
MOIST

* * * *

TEST HOLE NUMBER: 115
LOCATION: 099N-60W-02ADAD
LEGAL LOCATION: SE NE SE NE SEC. 02, T. 099 N., R. 60 W.

23 - 28 GRAVEL

* * * *

TEST HOLE NUMBER: 116
LOCATION: 100N-57W-33ADDD
LEGAL LOCATION: SE SE SE NE SEC. 33, T. 100 N., R. 57 W.

20 - 23 SAND, GRAY, FINE, SLIGHTLY CLAYEY;
SATURATED

* * * *

TEST HOLE NUMBER: 117
LOCATION: 100N-57W-34ABBB
LEGAL LOCATION: NW NW NW NE SEC. 34, T. 100 N., R. 57 W.

20 - 22 SAND, GRAY, FINE, CLAYEY; UNOXIDIZED,
MOIST TO SATURATED

* * * *

TEST HOLE NUMBER: 118
LOCATION: 100N-57W-34DAAD
LEGAL LOCATION: SE NE NE SE SEC. 34, T. 100 N., R. 57 W.

17 - 19 SAND, GRAYISH, MEDIUM TO COARSE, POORLY
SORTED, CLAYEY; SATURATED
24 - 29 SAND, GRAY-BROWN, MEDIUM TO COARSE, VERY
CLAYEY; OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 119
LOCATION: 100N-57W-34DDDA
LEGAL LOCATION: NE SE SE SE SEC. 34, T. 100 N., R. 57 W.

4 - 14 SAND, DARK-BROWN, MEDIUM, VERY CLAYEY,
PEBBLY; SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 120
LOCATION: 100N-57W-36CCCC
LEGAL LOCATION: SW SW SW SW SEC. 36, T. 100 N., R. 57 W.

0 - 4 SAND, BROWN, VERY SILTY

* * * *

TEST HOLE NUMBER: 121
LOCATION: 100N-58W-07CDDD
LEGAL LOCATION: SE SE SE SW SEC. 07, T. 100 N., R. 58 W.

4 - 6 SAND AND GRAVEL, COARSE SAND, MEDIUM
GRAVEL, VERY CLAYEY; OXIDIZED,
SATURATED
6 - 12 SAND, REDDISH-BROWN, MEDIUM TO COARSE;
OXIDIZED, SATURATED, SOME CLAY,
BECOMES MORE CLAYEY AT 10 FEET

* * * *

TEST HOLE NUMBER: 122
LOCATION: 100N-58W-24ABAB
LEGAL LOCATION: NW NE NW NE SEC. 24, T. 100 N., R. 58 W.

9 - 11 GRAVEL, BROWN, FINE TO MEDIUM, SOME
COARSE SAND; SATURATED, OXIDIZED

12 - 21 SAND, BROWN, FINE TO MEDIUM, SILTY;
SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 123
LOCATION: 100N-58W-24BABA
LEGAL LOCATION: NE NW NE NW SEC. 24, T. 100 N., R. 58 W.

4 - 6 SAND, BROWN, MEDIUM, MODERATELY WELL-
SORTED; MOIST, OXIDIZED
6 - 7 SAND, GRAY, MEDIUM, CLAYEY, POORLY
SORTED; MOIST, SLIGHTLY OXIDIZED
7 - 22 SAND, BROWN, FINE TO MEDIUM, VERY CLAYEY,
POORLY SORTED; MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 124
LOCATION: 100N-58W-25ABBA
LEGAL LOCATION: NE NW NW NE SEC. 25, T. 100 N., R. 58 W.

16 - 21 GRAVEL, BROWN, MEDIUM TO COARSE, VERY
CLAYEY, SANDY, POORLY SORTED;
SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 125
LOCATION: 100N-58W-25BABB
LEGAL LOCATION: NW NW NE NW SEC. 25, T. 100 N., R. 58 W.

7 - 8 SAND, BROWN, COARSE, CLAYEY; SATURATED
11 - 14 SAND, BROWN, COARSE, SILTY, CLAYEY;
SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 126
LOCATION: 100N-58W-25DCDC
LEGAL LOCATION: SW SE SW SE SEC. 25, T. 100 N., R. 58 W.

0 - 1 GRAVEL, BROWN, COARSE, MODERATELY SORTED;
DRY, OXIDIZED

* * * *

TEST HOLE NUMBER: 127

LOCATION: 100N-58W-25DDDD
LEGAL LOCATION: SE SE SE SE SEC. 25, T. 100 N., R. 58 W.

0 - 4 GRAVEL, REDDISH-BROWN, COARSE, POORLY
SORTED; DRY, SOME COARSE SAND
25 - 34 SAND, GRAY, FINE, VERY SILTY; UNOXIDIZED

* * * *

TEST HOLE NUMBER: 128
LOCATION: 100N-58W-31BAAA
LEGAL LOCATION: NE NE NE NW SEC. 31, T. 100 N., R. 58 W.

3 - 18 SAND, BLACK, VERY FINE, CLAYEY
18 - 21 SAND, MEDIUM TO COARSE, VERY CLAYEY

* * * *

TEST HOLE NUMBER: 129
LOCATION: 100N-59W-07BBBB
LEGAL LOCATION: NW NW NW NW SEC. 07, T. 100 N., R. 59 W.

0 - 7 SAND, TAN-BROWN, FINE, GRAVELLY; MOIST,
CALCAREOUS, GRAVEL CONTENT INCREASES
AT 4 FEET
7 - 9 GRAVEL, BROWN, SANDY, WELL-SORTED; MOIST

* * * *

TEST HOLE NUMBER: 130
LOCATION: 100N-59W-07DCDC
LEGAL LOCATION: SW SE SW SE SEC. 07, T. 100 N., R. 59 W.

2 - 3 SAND, DARK-REDDISH-BROWN, FINE, SLIGHTLY
CLAYEY; MOIST, OXIDIZED
3 - 6 SAND, BRIGHT-BEIGE, FINE, VERY CLAYEY;
MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 131
LOCATION: 100N-59W-08CDCC
LEGAL LOCATION: SW SW SE SW SEC. 08, T. 100 N., R. 59 W.

6 - 12 SAND, BROWN, FINE, SILTY, CLAYEY;
SATURATED

* * * *

TEST HOLE NUMBER: 132
LOCATION: 100N-59W-09CCDC
LEGAL LOCATION: SW SE SW SW SEC. 09, T. 100 N., R. 59 W.

4 - 10 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 133
LOCATION: 100N-59W-11CCCC
LEGAL LOCATION: SW SW SW SW SEC. 11, T. 100 N., R. 59 W.

10 - 26 SAND, BROWN, FINE; SATURATED, CLAYEY

* * * *

TEST HOLE NUMBER: 134
LOCATION: 100N-59W-21CBCC
LEGAL LOCATION: SW SW NW SW SEC. 21, T. 100 N., R. 59 W.

0 - 3 SAND, BROWN, MEDIUM, CLAYEY; OXIDIZED
3 - 5 SAND, BROWN, FINE, SILTY; MOIST, OXIDIZED
5 - 9 SAND, GRAY, FINE, SILTY, CLAYEY;
UNOXIDIZED
15 - 38 SAND, TAN, FINE, VERY SILTY, CLAYEY;
OXIDIZED

* * * *

TEST HOLE NUMBER: 135
LOCATION: 100N-59W-21DCDD
LEGAL LOCATION: SE SE SW SE SEC. 21, T. 100 N., R. 59 W.

1 - 15 SAND AND GRAVEL, ORANGE, MEDIUM TO COARSE
GRAVEL

* * * *

TEST HOLE NUMBER: 136
LOCATION: 100N-59W-27ADCC
LEGAL LOCATION: SW SW SE NE SEC. 27, T. 100 N., R. 59 W.

6 - 14 SAND, BROWN, FINE, VERY CLAYEY; SATURATED
18 - 24 SAND, BROWN, VERY FINE, VERY CLAYEY;
SATURATED

* * * *

TEST HOLE NUMBER: 137
LOCATION: 100N-59W-29AABA
LEGAL LOCATION: NE NW NE NE SEC. 29, T. 100 N., R. 59 W.

0 - 9 SAND, REDDISH-BROWN, MEDIUM, MODERATELY
SORTED; MOIST, OXIDIZED
9 - 13 SAND, BROWN, COARSE, MODERATELY TO POORLY
SORTED; MOIST, OXIDIZED, SOME FINE
GRAVEL
13 - 14 GRAVEL, COARSE, SANDY, POORLY SORTED;
MOIST, OXIDIZED
14 - 21 SAND, YELLOW-BROWN, FINE, WELL-SORTED;
MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 138
LOCATION: 100N-59W-29BCBB
LEGAL LOCATION: NW NW SW NW SEC. 29, T. 100 N., R. 59 W.

0 - 9 SAND, BROWN, FINE TO MEDIUM; SOME
PEBBLES, MOIST, OXIDIZED, SATURATED AT
6 FEET
9 - 19 SAND, BROWN, MEDIUM TO COARSE, SILTY;
SATURATED, OXIDIZED
22 - 27 GRAVEL, COARSE; SATURATED

* * * *

TEST HOLE NUMBER: 139
LOCATION: 100N-59W-32ADDD
LEGAL LOCATION: SE SE SE NE SEC. 32, T. 100 N., R. 59 W.

6 - 22 SAND, MEDIUM, VERY SILTY, VERY CLAYEY;
SATURATED

* * * *

TEST HOLE NUMBER: 140
LOCATION: 100N-59W-33BBBA
LEGAL LOCATION: NE NW NW NW SEC. 33, T. 100 N., R. 59 W.

15 - 58 SAND, BROWN, VERY FINE, SILTY; DRY,
SATURATED AT 21 FEET

* * * *

TEST HOLE NUMBER: 141

LOCATION: 100N-59W-34ADAB

LEGAL LOCATION: NW NE SE NE SEC. 34, T. 100 N., R. 59 W.

10 - 24 SAND, BROWN, FINE, VERY CLAYEY, POORLY
SORTED; SATURATED, OXIDIZED; COARSE
SAND AT 20 FEET

* * * *

TEST HOLE NUMBER: 142

LOCATION: 100N-59W-35DDAA

LEGAL LOCATION: NE NE SE SE SEC. 35, T. 100 N., R. 59 W.

3 - 5 SAND, ORANGE, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 143

LOCATION: 100N-60W-14CDDD

LEGAL LOCATION: SE SE SE SW SEC. 14, T. 100 N., R. 60 W.

2 - 9 GRAVEL, MEDIUM, POORLY SORTED; MOIST,
WITH COARSE SAND AND GRAY-GREEN CLAY

* * * *

TEST HOLE NUMBER: 144

LOCATION: 100N-60W-23AACD

LEGAL LOCATION: SE SW NE NE SEC. 23, T. 100 N., R. 60 W.

3 - 7 GRAVEL, BROWN, FINE, SILTY; MOIST, SOME
COARSE SAND

* * * *

TEST HOLE NUMBER: 145

LOCATION: 100N-60W-23ADDA

LEGAL LOCATION: NE SE SE NE SEC. 23, T. 100 N., R. 60 W.

2 - 4 GRAVEL, BROWN, MEDIUM, CLAYEY, SANDY,
POORLY SORTED, SUBANGULAR; SLIGHTLY
MOIST

7 - 17 GRAVEL, BROWN, COARSE; MOIST (TILL)

* * * *

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

EXPLANATION:

Column Description:

- a. Landowner and address
- b. Location - given as half and 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: Maxwell Colony - Scotland
- b. Location: SE 1/4 sec. 31, T. 97 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 2

- a. Landowner: Gerold Newell - Olivet
- b. Location: NW 1/4 NE 1/4 sec. 2, T. 97 N., R. 58 W.
- c. Aggregate type: ----
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 3

- a. Landowner: Charles Deutscher - Olivet
- b. Location: NW 1/4 sec. 2, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 4

- a. Landowner: Edwin Knodel - Menno
- b. Location: NE 1/4 SW 1/4 sec. 2, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 5

- a. Landowner: Eddie Johnson - Olivet
- b. Location: SW 1/4 NE 1/4 sec. 3, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 6

- a. Landowner: Harold Goehring - Olivet
- b. Location: NW 1/4 sec. 3, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 7

- a. Landowner: Albert Gillette - Olivet
- b. Location: SE 1/4 sec. 3, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 8

- a. Landowner: Frank Dilger - Yankton
- b. Location: NE 1/4 sec. 4, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 16
- e. Overburden thickness (ft): 1

Pit 9

- a. Landowner: Frank Kepplinger - Scotland
- b. Location: NW 1/4 NW 1/4 sec. 5, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 6.9
- e. Overburden thickness (ft): 1.5

Pit 10

- a. Landowner: W. M. Gosser - Olivet
- b. Location: E 1/2 NE 1/4 sec. 10, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 11

- a. Landowner: W. M. Gosser - Olivet
- b. Location: N 1/2 SE 1/4 sec. 10, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 12

- a. Landowner: Jennie and Julius Barth - Olivet
- b. Location: S 1/2 NW 1/4 NW 1/4 sec. 11, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 13

- a. Landowner: Alvin Gillette - Olivet
- b. Location: NW 1/4 SW 1/4 sec. 11, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 18
- e. Overburden thickness (ft): 2

Pit 14

- a. Landowner: Donald E. Deters - Olivet
- b. Location: N 1/2 SE 1/4 sec. 14, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 15

- a. Landowner: Maxwell Colony - Scotland
- b. Location: E 1/2 SE 1/4 sec. 25, T. 97 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 16

- a. Landowner: Ray Gall - Scotland
- b. Location: NE 1/4 sec. 2, T. 97 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 17

- a. Landowner: Dan Eberhardt - Olivet
- b. Location: SE 1/4 sec. 2, T. 97 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 17
- e. Overburden thickness (ft): 1

Pit 18

- a. Landowner: Guido Schoeffler - Tripp
- b. Location: SE 1/4 SW 1/4 sec. 17, T. 97 N., R. 60 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 19

- a. Landowner: Ed Tucheck/James Sykora - Tripp
- b. Location: NW 1/4 NW 1/4 sec. 20, T. 97 N., R. 60 W.
- c. Aggregate type: Fine Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 20

- a. Landowner: Theodore Heinrich - Tripp
- b. Location: SW 1/4 sec. 20, T. 97 N., R. 60 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 21

- a. Landowner: Frank Tucek - Tripp
- b. Location: SE 1/4 sec. 20, T. 97 N., R. 60 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 22

- a. Landowner: Lothar Maag - Tripp
- b. Location: NE 1/4 sec. 29, T. 97 N., R. 60 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 10
- e. Overburden thickness (ft): 2.5

Pit 23

- a. Landowner: Kent Wintersteen - Olivet
- b. Location: NE 1/4 SE 1/4 sec. 28, T. 98 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 24

- a. Landowner: Geneva and Lloyd Sorlein - Olivet
- b. Location: NW 1/4 NW 1/4 sec. 34, T. 98 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 25

- a. Landowner: Raymond Frier - Olivet
- b. Location: S 1/2 SE 1/4 sec. 27, T. 98 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 6
- e. Overburden thickness (ft): 2

Pit 26

- a. Landowner: Ed Beitz - Scotland
- b. Location: SW 1/4 sec. 35, T. 98 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 8
- e. Overburden thickness (ft): 2

Pit 27

- a. Landowner: Harvey Wall - Freeman
- b. Location: NE 1/4 NE 1/4 sec. 4 T. 99 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 28

- a. Landowner: Fred Buckman - Freeman
- b. Location: SW 1/4 sec. 4, T. 99 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 29

- a. Landowner: D. S. Gross - Freeman
- b. Location: SW 1/4 SE 1/4 sec. 4, T. 99 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 11
- e. Overburden thickness (ft): 4.5

Pit 30

- a. Landowner: Mayer
- b. Location: NE 1/4 NW 1/4 sec. 7, T. 99 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 31

- a. Landowner: Ernest Moeller - Freeman
- b. Location: N 1/2 NE 1/4 sec. 9, T. 99 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 10
- e. Overburden thickness (ft): 2

Pit 32

- a. Landowner: Harvey Wall - Freeman
- b. Location: E 1/2 NW 1/4 sec. 9, T. 99 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 33

- a. Landowner: Clinton Bauer - Freeman
- b. Location: NE 1/4 sec. 33, T. 99 N., R. 57 W.
- c. Aggregate type: Sand
- d. Deposit thickness (ft): 8.4
- e. Overburden thickness (ft): 3.4

Pit 34

- a. Landowner: Roland Schoppert - Freeman
- b. Location: SE 1/4 sec. 2, T. 99 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 35

- a. Landowner: Eugene Harnisch - Parkston
- b. Location: Sec. 8, T. 99 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 36

- a. Landowner: LeRoy Junke - Parkston
- b. Location: NE 1/4 sec. 2, T. 99 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 7.5
- e. Overburden thickness (ft): 3.5

Pit 37

- a. Landowner: Emery Weiss - Parkston
- b. Location: SW 1/4 sec. 2, T. 99 N., R. 59 W.
- c. Aggregate type: Sand
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 38

- a. Landowner: Edwin Baltzer - Parkston
- b. Location: SE 1/4 sec. 2, T. 99 N., R. 59 W.
- c. Aggregate type: Sand - Gravel
- d. Deposit thickness (ft): 9.6
- e. Overburden thickness (ft): 2

Pit 39

- a. Landowner: L. O. Varney - Parkston
- b. Location: SW 1/4 SE 1/4 sec. 10, T. 99 N., R. 59 W.
- c. Aggregate type: Sand and Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 40

- a. Landowner: Emery Weiss - Parkston
- b. Location: S 1/2 SE 1/4 sec. 11, T. 99 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 41

- a. Landowner: Emery Weiss - Parkston
- b. Location: SE 1/4 SE 1/4 sec. 11, T. 99 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 8.9
- e. Overburden thickness (ft): 1.5

Pit 42

- a. Landowner: Wilmer Wuertzer - Parkston
- b. Location: SW 1/4 sec. 12. T. 99 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 43

- a. Landowner: Emil J. Tshetter - Emery
- b. Location: SE 1/4 NE 1/4 sec. 19, T. 100 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 13.4
- e. Overburden thickness (ft): 1

Pit 44

- a. Landowner: J. J. Mandel - Freeman
- b. Location: SW 1/4 NW 1/4 sec. 20, T. 100 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 6.8
- e. Overburden thickness (ft): 1.2

Pit 45

- a. Landowner: Ben Semmler - Emery
- b. Location: SW 1/4 sec. 20, T. 100 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 46

- a. Landowner: Leonard Juhnke - Parkston
- b. Location: NW 1/4 sec. 31, T. 100 N., R. 58 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 6.5
- e. Overburden thickness (ft): 2

Pit 47

- a. Landowner: Leonard Juhnke - Parkston
- b. Location: SW 1/4 sec. 15, T. 100 N., R. 59 W.
- c. Aggregate type: Sand - Binder
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 48

- a. Landowner: Steve Adams - Ethan
- b. Location: NE 1/4 sec. 18, T. 100 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 49





- a. Landowner: Leonard Juhnke - Parkston
- b. Location: W 1/2 sec. 22, T. 100 N., R. 59 W.
- c. Aggregate type: Sand
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 50

- a. Landowner: Leonard Juhnke - Parkston
- b. Location: N 1/2 sec. 27, T. 100 N., R. 59 W.
- c. Aggregate type: Sand
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 51

- a. Landowner: Robert Steinbrook - Parkston
- b. Location: SE 1/4 sec. 33, T. 100 N., R. 59 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 9
- e. Overburden thickness (ft): 2

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

Letters A through O designate areas described in the text.

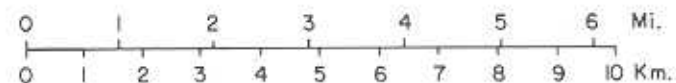
- //8 ● Test hole containing sand or gravel in upper 25 feet with 0-5 feet of overburden. Number refers to Table 1.
- //9 ■ Test hole containing sand or gravel in upper 25 feet with 6-25 feet of overburden. Number refers to Table 1.
- Test hole containing no sand or gravel in upper 25 feet.
- (7) ✕ Gravel pit; those with a number are listed in Table 2.



Index map of South Dakota showing location of Hutchinson 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, Codell sandstone exposures, and sand and gravel deposits in Hutchinson County.

