Information Pamphlet No. 27

SAND AND GRAVEL RESOURCES IN
YANKTON COUNTY, SOUTH DAKOTA

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United States Geological Survey,
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INTRODUCTION

This pamphlet is one of a series of reports describing the geology and water resources of Yankton County. It is designed to be an uncomplicated, non-technical aid in the search for sand and gravel deposits.

Other reports in the series include:


Report (a.) describes the availability, quality, and location of major aquifers (water-bearing deposits) in a short, easy to read, pamphlet. Report (b.) is a more technical and somewhat more exhaustive investigation of the water resources of the County. Report (c.) is a scientific investigation of the geology of Yankton County.

GEOLOGIC OVERVIEW

Most of the sand and gravel deposits found in Yankton County were deposited by glacial ice or meltwater that covered the region thousands of years ago. Some sand and gravel has been deposited by streams since the retreat of the glaciers. A short description of geologic terms used in this text follows.

Glacial Till

The glaciers were large masses of ice that thousands of years ago, originated from snow accumulations to the north. These glaciers flowed southward to the area that is now Yankton County, picking up earth debris as they went. Some of this debris, a mixture of clay, silt, sand, gravel, and boulders was redeposited directly from the ice. Till, the term used to describe this mixture, is also often called "blue clay" or "boulder clay." In the Yankton County area the till is made up primarily of clay and is not considered a source of sand and gravel. However, small isolated sand and gravel hills or lenses may occur.
Glacial Outwash

Glacial outwash is the term used to describe any deposit of glacial debris which has been washed and sorted by water flowing from melting glacier ice. The grain size of these deposits depends upon the velocity of the water which deposited them and upon the type of material. Deposits left by slow flowing streams are made up primarily of silts and clays. Very fast flowing streams may have left streambeds composed entirely of boulders. Most glacial outwash, however, is made up of an assortment of sand and gravel, with minor amounts of finer and coarser materials. Deposits of glacial outwash are a major source of sand and gravel in Yankton County.

Alluvium

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

Terrace Deposits

Terrace deposits are flat-topped alluvial or outwash deposits that are remnants of former flood plains. The streams which made them have since cut their channels deeper and developed new flood plains at lower levels. Some of the sand and gravel found in Yankton County occurs in this type of deposit.

Western Sand

Western Sand is an informal term used to describe sand and gravel deposited by non-glacial streams other than the present-day streams. Because these deposits are derived from non-glacial sources, they contain less silt and clay, and are well-sorted when compared to other aggregate sources in Yankton County.

Bedrock

Bedrock refers to the consolidated rocks underlying the glacial deposits. In Yankton County the bedrock consists primarily of shales and chalk. Bedrock crops out along the Missouri River and along several other creeks in Yankton County. No sand or gravel exists below bedrock found at the surface or encountered in test holes.
EXPLANATION OF TABLES

Table 1 is a list of only those test holes in which sand or gravel was encountered within 25 feet of the land surface. This table gives the locations of the test holes, and the depths and descriptions of the sand and gravel deposits. The complete logs of all the test holes drilled in Yankton County are on file at the South Dakota Geological Survey in Vermillion, South Dakota.

Table 2 is a list of sand and gravel pits on file with the South Dakota Department of Transportation, Division of Highways in Pierre, South Dakota. Where possible this table gives the landowner, location, thickness of overburden, thickness of sand and gravel being mined, and type of aggregate deposit for each pit. The actual thickness of a deposit may be greater than that which is listed in the table as being mined.

EXPLANATION OF MAP

The map shows the location of the test holes and sand and gravel pits. It also shows the towns, major highways, and major lakes, rivers, and creeks.

Test-hole data are shown on the map using three types of map symbols. A dot (●) represents a test hole in which sand or gravel was found within 25 feet of the land surface, with 0 to 5 feet of overburden. A square (■) indicates that sand or gravel was found within 25 feet of the land surface but greater than 5 feet of overburden was encountered. These two types of symbols are numbered and the pertinent test-hole information is listed in Table 1. The third symbol is an open circle (○), which indicates that no sand or gravel was found within 25 feet of the land surface. Logs of these test holes are available at the South Dakota Geological Survey in Vermillion, South Dakota. Locations of the sand and gravel pits are indicated by a crossed pick and shovel (ው). The pits which are numbered are listed in Table 2, and additional information is on file at the Department of Transportation, Division of Highways, in Pierre, South Dakota. No attempt was made to distinguish the inactive pits from the actively mined pits.

To aid in the delineation of the most promising areas of finding sand and gravel, the map has been divided into three area types, "good," "fair," and "poor." These three types of areas were differentiated using test-hole data, sand and gravel pit locations, soil survey information, topographic map and aerial photograph interpretation, and field observations. Areas with a "good" or "fair" probability of finding sand and gravel have been assigned a letter on the map and are discussed further in the following section.

Sand and gravel deposits found in the "good" areas are generally thick, have very little overburden, and cover a broad area. In these areas, much mining for sand and gravel has already
occurred and is occurring at the present time. Sand and gravel deposits in the "fair" areas are generally thinner, have more overburden, or are laterally discontinuous. There are sand and gravel deposits in the "poor" areas, but a very expensive and exhaustive exploration program would be needed to locate all of these deposits.

**Sand and Gravel**

The areas, marked "A," consist of outwash and alluvial deposits located within the James River valley. Although a large number of "good" portions are found within these areas, they have been designated as "fair" because of their lack of lateral and vertical continuity. Much of the sand and gravel has been removed and replaced by silty alluvium, due to erosion by the James River.

Area "B," designated as "good," located in the northwest part of the County, is associated with a large highland known as the James Ridge. The deposits contain up to several hundred feet of poorly sorted sands and gravels, which are not laterally continuous over the entire area. The thickness of overburden is highly variable over the area, but averages about 5 feet for all test holes drilled.

Area "C," designated as "fair," contains remnant terrace deposits found in the Mud Creek valley. The deposits of sand and gravel found there are thin and discontinuous.

Area "D," designated as "fair," consists of outwash and alluvial deposits located within the Turkey Creek valley. The sand and gravel is found in remnant terrace deposits along the valley walls and in isolated patches along the valley floor.

Area "E," designated as "fair," contains significant quantities of western sand. The deposits are discontinuous due to post-depositional erosion. Much sand and gravel has been mined from this area.

Area "F," designated as "good," consists of sand and gravel deposits found within the downstream portion of the Turkey Creek valley. Thick and continuous terrace deposits are found along the valley walls. Much mining for sand and gravel has occurred within this area.

Area "G," is located on the flood plain of the Missouri River. It has been designated as "fair" because the sand found there is very fine and contains much silt and clay. Large amounts of silty, alluvial overburden cover any good deposits of sand and gravel.

Area "H," designated as "fair," contains discontinuous remnant terrace deposits along the walls of the Marne Creek valley.
Area "I," designated as "good," contains thick deposits of sand and gravel within the James River valley. This portion of the James River valley differs from the portions marked "A" in that there is very little overburden and less erosion by the James River has occurred.

The areas marked "J" and "K" contain outwash deposits within the valley of Beaver Creek. Sand and gravel deposits found in the areas marked "J" are discontinuous due to post-depositional erosion. Sand and gravel deposits found in the areas marked "K" are thick and continuous. Much mining for sand and gravel has occurred and is occurring in the areas marked "K."

Area "L," is a small body of outwash located just east of Lesterville. It has been designated as "fair," because of the large amounts of overburden covering much of the area.

Area "M," designated as "good," is a small isolated deposit of sand and gravel located on a hilltop just north of Yankton.

Area "N," designated as "fair," and located in the southwest part of the County, contains scattered deposits of western sand, named the Bon Homme Gravel. Test holes, gravel pits and outcrops reveal material ranging from medium sand to medium gravel. Test holes drilled in Area "N" encountered up to 36 feet of western sand but the deposits are discontinuous due to post-depositional erosion.

ECONOMIC CONSIDERATIONS

It should be emphasized that this study is quite general and should be used only as a guide to further exploration and development of the sand and gravel resources. The development of a specific site will depend upon material specifications for the desired use, development costs, transportation costs, and future markets.
TABLE 1. LIST OF TEST HOLES IN YANKTON COUNTY, SOUTH DAKOTA, WHICH CONTAIN SAND OR GRAVEL WITHIN 25 FEET OF THE LAND SURFACE.

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: 093N-54W-08DD
LEGAL LOCATION: SE SE SEC. 08, T. 093 N., R. 54 W.

14 - 64 SAND, FINE

* * * *

TEST HOLE NUMBER: 2
LOCATION: 093N-54W-20AA
LEGAL LOCATION: NE NE SEC. 20, T. 093 N., R. 54 W.

9 - 14 SAND, FINE, CLAYEY
14 - 79 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 3
LOCATION: 093N-54W-22AAAA
LEGAL LOCATION: NE NE NE NE SEC. 22, T. 093 N., R. 54 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

5 - 40 SAND, BROWN, FINE TO MEDIUM; WITH THIN LAYERS OF GRAY-BROWN SILT

* * * *

TEST HOLE NUMBER: 4
LOCATION: 093N-54W-35ADCC
LEGAL LOCATION: SW SW SE NE SEC. 35, T. 093 N., R. 54 W.

0 - 55 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 5
LOCATION: 093N-54W-35CCCC
LEGAL LOCATION: SW SW SW SW SEC. 35, T. 093 N., R. 54 W.
8 -  21  SAND, DARK-BROWN, MEDIUM
21 -  25  SAND, GRAY, MEDIUM

** ** *

TEST HOLE NUMBER:  6
LOCATION:  093N-55W-02CADC
LEGAL LOCATION:  SW SE NE SW SEC. 02, T. 093 N., R. 55 W.

0 -  33  SAND, FINE; MOIST (ALLUVIUM)

** ** *

TEST HOLE NUMBER:  7
LOCATION:  093N-55W-02DADD
LEGAL LOCATION:  SE SE NE SE SEC. 02, T. 093 N., R. 55 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

3 -  86  SAND, FINE TO MEDIUM, VERY WELL SORTED

** ** *

TEST HOLE NUMBER:  8
LOCATION:  093N-55W-06DAAC
LEGAL LOCATION:  SW NE NE SE SEC. 06, T. 093 N., R. 55 W.

9 -  29  GRAVEL, REDDISH-BROWN, COARSE, COBBLY, SANDY

** ** *

TEST HOLE NUMBER:  9
LOCATION:  093N-55W-08BBBC
LEGAL LOCATION:  SW NW NW SEC. 08, T. 093 N., R. 55 W.

5 -  15  GRAVEL, REDDISH-BROWN, SANDY; DRY
15 -  33  GRAVEL, REDDISH-BROWN, SANDY, COBBLY; MOIST

** ** *

TEST HOLE NUMBER:  10
LOCATION:  093N-55W-10CB
LEGAL LOCATION:  NW SW SEC. 10, T. 093 N., R. 55 W.

12 -  69  SAND, FINE

7
TEST HOLE NUMBER: 11
LOCATION: 093N-55W-11DD
LEGAL LOCATION: SE SE SEC. 11, T. 093 N., R. 55 W.

12 - 26 SAND, FINE

TEST HOLE NUMBER: 12
LOCATION: 093N-55W-12ADBB
LEGAL LOCATION: NW NW SE NE SEC. 12, T. 093 N., R. 55 W.

7 - 85 SAND, FINE; SAMPLED AT 65 FEET

TEST HOLE NUMBER: 13
LOCATION: 093N-55W-16AA
LEGAL LOCATION: NE NE SEC. 16, T. 093 N., R. 55 W.

0 - 19 SAND, FINE
19 - 59 SAND, MEDIUM

TEST HOLE NUMBER: 14
LOCATION: 093N-56W-01DDBA
LEGAL LOCATION: NE NW SE SE SEC. 01, T. 093 N., R. 56 W.

0 - 6 SAND, REDDISH-BROWN, PEBBLY; MOIST

TEST HOLE NUMBER: 15
LOCATION: 093N-56W-02DAAA
LEGAL LOCATION: NE NE NE SE SEC. 02, T. 093 N., R. 56 W.

8 - 10 GRAVEL, SILTY, SANDY

TEST HOLE NUMBER: 16
LOCATION: 093N-56W-10CCCC
LEGAL LOCATION: SW SW SW SW SEC. 10, T. 093 N., R. 56 W.

8
PRELIMINARY LOG — SUBJECT TO CHANGE

13 — 18 SAND, BROWN, VERY ARGILLACEOUS; SOME PEBBLES (OXIDISED TILL)

* * *

TEST HOLE NUMBER: 17
LOCATION: 093N-56W-12BAD
LEGAL LOCATION: SW SE NE NW SEC. 12, T. 093 N., R. 56 W.

11 — 48 GRAVEL, SANDY; SATURATED

* * *

TEST HOLE NUMBER: 18
LOCATION: 093N-56W-13CCBC
LEGAL LOCATION: SW NW SW SW SEC. 13, T. 093 N., R. 56 W.

1 — 15 SAND, BROWN, FINE
15 — 22 SAND, COARSE
22 — 28 SAND, COARSE; SATURATED

* * *

TEST HOLE NUMBER: 19
LOCATION: 093N-56W-16ACAB
LEGAL LOCATION: NW NE SW NE SEC. 16, T. 093 N., R. 56 W.

18 — 28 SAND, BROWN, FINE, SILTY, PEBBLY; SATURATED

* * *

TEST HOLE NUMBER: 20
LOCATION: 093N-56W-21ADDD
LEGAL LOCATION: SE SE SE NE SEC. 21, T. 093 N., R. 56 W.

0 — 15 SAND, LIGHT-BROWN, FINE; DRY
15 — 28 SAND, GRAY, FINE, CLAYEY; MOIST

* * *

TEST HOLE NUMBER: 21
LOCATION: 093N-57W-01AAAA
LEGAL LOCATION: NE NE NE NE SEC. 01, T. 093 N., R. 57 W.
1 - 3 SAND, MEDIUM TO COARSE

** **

TEST HOLE NUMBER: 22
LOCATION: 093N-57W-02BAAB
LEGAL LOCATION: NW NE NE NW SEC. 02, T. 093 N., R. 57 W.

24 - 25 SAND, BROWN, GRAVELLY
25 - 26 SAND, BROWN, CLAYEY

** **

TEST HOLE NUMBER: 23
LOCATION: 093N-57W-03DADA
LEGAL LOCATION: NE SE NE SE SEC. 03, T. 093 N., R. 57 W.

1 - 10 SAND, BROWN, PEBBLY
22 - 24 GRAVEL, SANDY
24 - 28 SAND, BROWN

** **

TEST HOLE NUMBER: 24
LOCATION: 093N-57W-07CCBD
LEGAL LOCATION: SE NW SW SW SEC. 07, T. 093 N., R. 57 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

0 - 12 SAND, LIGHT-BROWN TO YELLOW-BROWN, FINE TO MEDIUM, SILTY

** **

TEST HOLE NUMBER: 25
LOCATION: 093N-57W-10CBCC
LEGAL LOCATION: SW SW NW SW SEC. 10, T. 093 N., R. 57 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

0 - 24 SAND, LIGHT-TAN, FINE TO MEDIUM (WESTERN- DERIVED SAND; BON HOMME GRAVEL)
24 - 36 SAND, LIGHT-TAN TO REDDISH, FINE TO MEDIUM, BUT SOME IS COARSE (BON HOMME GRAVEL)

** **

TEST HOLE NUMBER: 26
LOCATION: 093N-57W-11CBDD
LEGAL LOCATION: NW SE NW SW SEC. 11, T. 093 N., R. 57 W.
0 - 28 SAND, BROWN, FINE
* * * *
TEST HOLE NUMBER: 27
LOCATION: 093N-57W-16CAAA
LEGAL LOCATION: NE NE NE SW SEC. 16, T. 093 N., R. 57 W.

5 - 20 SAND, BROWN, CLAYEY
* * * *
TEST HOLE NUMBER: 28
LOCATION: 093N-57W-23BADD
LEGAL LOCATION: SE SE NE NW SEC. 23, T. 093 N., R. 57 W.

0 - 28 SAND, BROWN, PEBBLY
* * * *
TEST HOLE NUMBER: 29
LOCATION: 094N-54W-04BCB
LEGAL LOCATION: NW SW NW SW SEC. 04, T. 094 N., R. 54 W.

10 - 15 SAND, LIGHT-BROWN, COARSE, GRAVELLY, CLAYEY; MOIST, CHALK PEBBLES
* * * *
TEST HOLE NUMBER: 30
LOCATION: 094N-54W-04CC 1
LEGAL LOCATION: SW SW SEC. 04, T. 094 N., R. 54 W.

0 - 4 SAND, FINE, CLAYEY
* * * *
TEST HOLE NUMBER: 31
LOCATION: 094N-54W-04DDCD
LEGAL LOCATION: SW SW SE SE SEC. 04, T. 094 N., R. 54 W.

12 - 18 SAND, LIGHT-BROWN, CLAYEY, PEBBLY; MOIST
* * * *
TEST HOLE NUMBER: 32
LOCATION: 094N-54W-08DCCC

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<td>GRAVEL, DRY</td>
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TEST HOLE NUMBER: 38
LOCATION: 094W-54W-14AAAB
LEGAL LOCATION: NW NE NE NE SEC. 14, T. 094 N., R. 54 W.

11 - 21 SAND, LIGHT-BROWN, MEDIUM, SILTY, GRAVELLY; MOIST

** ** *

TEST HOLE NUMBER: 39
LOCATION: 094W-54W-16AABA
LEGAL LOCATION: NE NW NE NE SEC. 16, T. 094 N., R. 54 N.

18 - 26 SAND, BROWN, CLAYEY, GRAVELLY; VERY MOIST

** ** *

TEST HOLE NUMBER: 40
LOCATION: 094N-54W-16BB
LEGAL LOCATION: NW NW SEC. 16, T. 094 N., R. 54 W.

14 - 49 GRAVEL, FINE, SILTY

** ** *

TEST HOLE NUMBER: 41
LOCATION: 094N-54W-16CCCC
LEGAL LOCATION: SW SW SW SW SEC. 16, T. 094 N., R. 54 W.

15 - 60 SAND, FINE TO MEDIUM, VERY WELL SORTED DESPITE SOME MINOR GRAVEL

** ** *

TEST HOLE NUMBER: 42
LOCATION: 094N-54W-18AAAA
LEGAL LOCATION: NE NE NE NE SEC. 18, T. 094 N., R. 54 W.

0 - 12 SAND, BROWN, CLAYEY, SILTY, PEBBLY
12 - 15 GRAVEL, SANDY, SILTY, CLAYEY

** ** 

13
TEST HOLE NUMBER: 43
LOCATION: 094N-54W-21DD
LEGAL LOCATION: SE SE SEC. 21, T. 094 N., R. 54 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

21 - 80 GRAVEL, MEDIUM

** ** **

TEST HOLE NUMBER: 44
LOCATION: 094N-54W-21DDDD
LEGAL LOCATION: SE SE SE SEC. 21, T. 094 N., R. 54 W.

21 - 80 GRAVEL, PEA-SIZE; CAVING, SAMPLED AT 60 FEET

** ** **

TEST HOLE NUMBER: 45
LOCATION: 094N-54W-23DDDD
LEGAL LOCATION: SE SE SE SEC. 23, T. 094 N., R. 54 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

22 - 38 SAND, MEDIUM TO COARSE

** ** **

TEST HOLE NUMBER: 46
LOCATION: 094N-54W-30BBBB
LEGAL LOCATION: NW NW NW NW SEC. 30, T. 094 N., R. 54 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

16 - 42 SAND, MEDIUM

** ** **

TEST HOLE NUMBER: 47
LOCATION: 094N-54W-32AA
LEGAL LOCATION: NE NE SEC. 32, T. 094 N., R. 54 W.

7 - 93 SAND, FINE

** ** **

TEST HOLE NUMBER: 48
LOCATION: 094N-54W-33CC
LEGAL LOCATION: SW SW SEC. 33, T. 094 N., R. 54 W.

4 - 9 SAND, FINE, CLAYEY

14
9 - 79 SAND, FINE

* * * *

TEST HOLE NUMBER: 49
LOCATION: 094N-54W-35AAAA
LEGAL LOCATION: NE NE NE NE SEC. 35, T. 094 N., R. 54 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

23 - 42 SAND, COARSE

* * * *

TEST HOLE NUMBER: 50
LOCATION: 094N-54W-35CCCC
LEGAL LOCATION: SW SW SW SW SEC. 35, T. 094 N., R. 54 W.

5 - 23 SAND, LIGHT-BROWN, MEDIUM
23 - 33 SAND, LIGHT-BROWN, MEDIUM; SATURATED

* * * *

TEST HOLE NUMBER: 51
LOCATION: 094N-55W-05AAAA
LEGAL LOCATION: NE NE NE NE SEC. 05, T. 094 N., R. 55 W.

0 - 2 SAND, YELLOW, PEBBLY; DRY
5 - 19 SAND, RED, MEDIUM, PEBBLY; MOIST
19 - 21 GRAVEL, RED, SANDY
21 - 29 SAND, RED, MEDIUM TO COARSE, PEBBLY; DRY

* * * *

TEST HOLE NUMBER: 52
LOCATION: 094N-55W-05BABB
LEGAL LOCATION: NW NW NE NW SEC. 05, T. 094 N., R. 55 W.

0 - 11 SAND, FINE TO MEDIUM; MINOR GRAVEL
11 - 67 SAND, FINE TO COARSE; COARSENS TO GRAVEL

* * * *

TEST HOLE NUMBER: 53
LOCATION: 094N-55W-05CAAC
LEGAL LOCATION: SW NE NE SW SEC. 05, T. 094 N., R. 55 W.

9 - 15 SAND, YELLOW, SILTY, PEBBLY; MOIST

* * * *

15
TEST HOLE NUMBER: 54
LOCATION: 094N-55W-07CCBB
LEGAL LOCATION: NW NW SW SW SEC. 07, T. 094 N., R. 55 W.

9 - 125 SAND, FINE TO COARSE; GRADING DOWNWARD INTO MEDIUM SAND TO COARSE GRAVEL

TEST HOLE NUMBER: 55
LOCATION: 094N-55W-08ABCB
LEGAL LOCATION: NW SW NW NE SEC. 08, T. 094 N., R. 55 W.

0 - 2 SAND, BROWN, COARSE (ROADFILL)
15 - 21 SAND, REDDISH-BROWN, FINE
21 - 27 SAND, REDDISH-BROWN, SILTY, PEBBLY; MOIST

TEST HOLE NUMBER: 56
LOCATION: 094N-55W-12ABAA
LEGAL LOCATION: NE NE NW NE SEC. 12, T. 094 N., R. 55 W.

0 - 24 SAND, BROWN, SILTY; DRY
14 - 28 SAND, BROWN, SILTY; MOIST

TEST HOLE NUMBER: 57
LOCATION: 094N-55W-12ABAA
LEGAL LOCATION: NE NE NE NW SEC. 12, T. 094 N., R. 55 W.

1 - 28 SAND, BROWN, SILTY

TEST HOLE NUMBER: 58
LOCATION: 094N-55W-17AACC
LEGAL LOCATION: SW SW NE NE SEC. 17, T. 094 N., R. 55 W.

1 - 3 SAND, COARSE, GRAVELLY, COBBLY
3 - 4 GRAVEL, RED, SILTY, SANDY

TEST HOLE NUMBER: 59
LOCATION: 094N-55W-17ADCC
LEGAL LOCATION: SW SW SE NE SEC. 17, T. 094 N., R. 55 W.

1 - 3 SAND AND GRAVEL
** * *

TEST HOLE NUMBER: 60
LOCATION: 094N-55W-17DDDC
LEGAL LOCATION: SW SE SE SE SEC. 17, T. 094 N., R. 55 W.

1 - 5 SAND, YELLOW, MEDIUM TO COARSE, PEBBLY; DRY
5 - 10 SAND, RED, COARSE, COBBLY; DRY
10 - 20 GRAVEL, REDDISH-BROWN, COARSE, COBBLY
20 - 38 GRAVEL, REDDISH-BROWN, COARSE; SATURATED
** * *

TEST HOLE NUMBER: 61
LOCATION: 094N-55W-21CCCD
LEGAL LOCATION: SE SW SW SW SEC. 21, T. 094 N., R. 55 W.

9 - 20 GRAVEL, SAMPLED AT 20 FEET
20 - 42 GRAVEL, PEA-SIZE
** * *

TEST HOLE NUMBER: 62
LOCATION: 094N-55W-34BABB
LEGAL LOCATION: NW NW NE NW SEC. 34, T. 094 N., R. 55 W.

2 - 38 GRAVEL, SANDY, COBBLY; MOIST
** * *

TEST HOLE NUMBER: 63
LOCATION: 094N-55W-34CC
LEGAL LOCATION: SW SW SEC. 34, T. 094 N., R. 55 W.

24 - 39 SAND, VERY FINE
** * *

TEST HOLE NUMBER: 64
LOCATION: 094N-55W-34DADA
LEGAL LOCATION: NE SE NE SE SEC. 34, T. 094 N., R. 55 W.
6 - 11  SAND, REDDISH-BROWN, FINE; MOIST
13 - 20  GRAVEL, REDDISH-BROWN, SANDY, COBBLY

* * * *

TEST HOLE NUMBER: 65
LOCATION: 094N-55W-36DADD 1
LEGAL LOCATION: SE SE NE SE SEC. 36, T. 094 N., R. 55 W.

20 - 114  SAND, FINE TO MEDIUM; COARSE IN LOWER FEW FEET; INCLUDING FINE GRAVEL

* * * *

TEST HOLE NUMBER: 66
LOCATION: 094N-55W-36DADD 2
LEGAL LOCATION: SE SE NE SE SEC. 36, T. 094 N., R. 55 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

19 - 50  SAND, FINE TO MEDIUM; SOME PEBBLES

* * * *

TEST HOLE NUMBER: 67
LOCATION: 094N-56W-CICDCC
LEGAL LOCATION: SW SE SW SW SEC. 01, T. 094 N., R. 56 W.

20 - 25  GRAVEL, SANDY, SILTY
25 - 26  SAND, FINE; SATURATED

* * * *

TEST HOLE NUMBER: 68
LOCATION: 094N-56W-02DAAA
LEGAL LOCATION: NE NE NE NE SEC. 02, T. 094 N., R. 56 W.

5 - 13  SAND, DARK-YELLOW, SILTY, PEBBLY; DRY
18 - 48  SAND, COARSE, GRAVELY

* * * *

TEST HOLE NUMBER: 69
LOCATION: 094N-56W-02DADD
LEGAL LOCATION: NE NE NE SE SEC. 02, T. 094 N., R. 56 W.

5 - 128  SAND AND GRAVEL, MEDIUM SAND AND VERY COARSE GRAVEL; COARSENS DOWNWARD EXCEPT FOR FINE GRAVEL AT 72 TO 77 FEET
TEST HOLE NUMBER: 70
LOCATION: 094N-56W-12ABAB
LEGAL LOCATION: NW NE NW NE SEC. 12, T. 094 N., R. 56 W.

24 - 33 SAND, GRAVELLY

TEST HOLE NUMBER: 71
LOCATION: 094N-56W-12BCCB
LEGAL LOCATION: NW SW NW NW SEC. 12, T. 094 N., R. 56 W.

0 - 4 SAND, YELLOWISH-BROWN, FINE; DRY

TEST HOLE NUMBER: 72
LOCATION: 094N-56W-13AAAA
LEGAL LOCATION: NE NE NE NE SEC. 13, T. 094 N., R. 56 W.

2 - 22 SAND, SILTY, PEBBLY
22 - 29 GRAVEL, SILTY, SANDY

TEST HOLE NUMBER: 73
LOCATION: 094N-56W-18CCCCB
LEGAL LOCATION: NW SW SW SW SEC. 18, T. 094 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

2 - 8 GRAVEL, MEDIUM

TEST HOLE NUMBER: 74
LOCATION: 094N-56W-25ABCB
LEGAL LOCATION: NW SW NW NE SEC. 25, T. 094 N., R. 56 W.

5 - 10 SAND, LIGHT-BROWN, FINE, SILTY; DRY
10 - 17 GRAVEL, DARK-BROWN, SANDY; DRY
17 - 27 GRAVEL, COARSE, SANDY; DRY

TEST HOLE NUMBER: 75

19
LOCATION: 094W-56W-25ACAD
LEGAL LOCATION: SE NE SW NE SEC. 25, T. 094 N., R. 56 W.

17 - 20 SAND, LIGHT-BROWN, FINE; MOIST, CLEAN
20 - 26 SAND, YELLOWISH-BROWN, FINE; MOIST, CLEAN

* * * *

TEST HOLE NUMBER: 76
LOCATION: 094W-56W-31BAAC
LEGAL LOCATION: SW NE NE NW SEC. 31, T. 094 N., R. 56 W.

23 - 30 GRAVEL, CLAYEY

* * * *

TEST HOLE NUMBER: 77
LOCATION: 094N-57W-05CCCC
LEGAL LOCATION: SW SW SW SW SEC. 05, T. 094 N., R. 57 W.

4 - 22 SAND, BROWN, SILTY; SATURATED

* * * *

TEST HOLE NUMBER: 78
LOCATION: 094N-57W-05CDDC
LEGAL LOCATION: SW SW SE SW SEC. 05, T. 094 N., R. 57 W.

3 - 13 GRAVEL, SANDY
13 - 23 SAND, PEBBLY

* * * *

TEST HOLE NUMBER: 79
LOCATION: 094W-57W-07ADAA
LEGAL LOCATION: NE NE SE NE SEC. 07, T. 094 N., R. 57 W.

13 - 23 SAND, GRAY, CLAYEY; SATURATED

* * * *

TEST HOLE NUMBER: 80
LOCATION: 094W-57W-07ADDAA
LEGAL LOCATION: NE SE SE NE SEC. 07, T. 094 N., R. 57 W.

20
2 - 15 SAND AND GRAVEL, MEDIUM SAND TO MEDIUM GRAVEL; COARSENING DOWNWARD

** **

TEST HOLE NUMBER: 81
LOCATION: 094N-57W-07BCCC
LEGAL LOCATION: SW SW SW NW SEC. 07, T. 094 N., R. 57 W.

2 - 10 SAND, BROWN, CLAYEY, PEBBLY

** **

TEST HOLE NUMBER: 82
LOCATION: 094N-57W-07CDCC
LEGAL LOCATION: SE SE SE SW SEC. 07, T. 094 N., R. 57 W.

0 - 12 GRAVEL, SILTY, SANDY
12 - 16 GRAVEL, VERY SANDY, SILTY
16 - 20 GRAVEL, VERY SANDY, SILTY; MOIST
20 - 32 SAND, PEBBLY; SATURATED

** **

TEST HOLE NUMBER: 83
LOCATION: 094N-57W-30BCCC
LEGAL LOCATION: SW SW NW SW SEC. 30, T. 094 N., R. 57 W.

1 - 12 SAND, BROWN, CLAYEY; DRY
12 - 16 SAND, BROWN, CLAYEY; MOIST
16 - 28 SAND, BROWN, CLAYEY; SATURATED

** **

TEST HOLE NUMBER: 84
LOCATION: 095N-54W-02BCCC
LEGAL LOCATION: SW SW NW SW SEC. 02, T. 095 N., R. 54 W.

16 - 28 SAND, BROWN, CLAYEY, PEBBLY; SATURATED

** **

TEST HOLE NUMBER: 85
LOCATION: 095N-54W-07BCCB
LEGAL LOCATION: NW SW NW SEC. 07, T. 095 N., R. 54 W.

12 - 28 SAND, BROWN, CLAYEY, PEBBLY; SATURATED

TEST HOLE NUMBER: 86
LOCATION: 095N-54W-12DCDD
LEGAL LOCATION: SE SE SW SE SEC. 12, T. 095 N., R. 54 W.

0 - 8 SAND, GRAVELLY

TEST HOLE NUMBER: 87
LOCATION: 095N-54W-13ADAD
LEGAL LOCATION: SE NE SE NE SEC. 13, T. 095 N., R. 54 W.

8 - 10 SAND, LIGHT-BROWN, COARSE, SILTY, PEBBLY; DRY

TEST HOLE NUMBER: 88
LOCATION: 095N-54W-14DDAD
LEGAL LOCATION: SE NE SE SE SEC. 14, T. 095 N., R. 54 W.

15 - 18 SAND, BROWN, CLAYEY

TEST HOLE NUMBER: 89
LOCATION: 095N-54W-24BBBB
LEGAL LOCATION: NW NW NW NW SEC. 24, T. 095 N., R. 54 W.

3 - 12 SAND, COARSE
24 - 44 SAND AND GRAVEL, COARSE SAND TO MEDIUM GRAVEL (MOSTLY CHALK FRAGMENTS)

TEST HOLE NUMBER: 90
LOCATION: 095N-54W-32ABBA
LEGAL LOCATION: NE NW NW NE SEC. 32, T. 095 N., R. 54 W.

7 - 9 SAND, LIGHT-BROWN, SILTY, PEBBLY; DRY

TEST HOLE NUMBER: 91

22
LOCATION: 095N-54W-34ADDC
LEGAL LOCATION: SW SE SE NE SEC. 34, T. 095 N., R. 54 W.

21 - 86 SAND, GRAY, FINE TO MEDIUM, CLAYEY; SATURATED

* * * *

TEST HOLE NUMBER: 92
LOCATION: 095N-55W-03DDDC
LEGAL LOCATION: SW SE SE SE SEC. 03, T. 095 N., R. 55 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

4 - 8 GRAVEL, FINE
10 - 13 GRAVEL, MEDIUM

* * * *

TEST HOLE NUMBER: 93
LOCATION: 095N-55W-04CCCC
LEGAL LOCATION: SW SW SW SW SEC. 04, T. 095 N., R. 55 W.

2 - 4 GRAVEL, GRAYISH-BROWN, SANDY, COBBLY; DRY

* * * *

TEST HOLE NUMBER: 94
LOCATION: 095N-55W-07CBBBB
LEGAL LOCATION: NW NW NW SW SEC. 07, T. 095 N., R. 55 W.

17 - 24 SAND, GRAYISH-BROWN, SILTY; SATURATED
24 - 33 GRAVEL, MEDIUM, SANDY, WELL SORTED

* * * *

TEST HOLE NUMBER: 95
LOCATION: 095N-55W-08AABA
LEGAL LOCATION: NE NW NE NE SEC. 08, T. 095 N., R. 55 W.

0 - 1 GRAVEL, LIGHT-BROWN, SANDY; DRY (ROADFILL)

* * * *

TEST HOLE NUMBER: 96
LOCATION: 095N-55W-10CCCC
LEGAL LOCATION: SW SW SW SW SEC. 10, T. 095 N., R. 55 W.

23
4 -  7 GRAVEL, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 97
LOCATION: 095N-55W-183BBB
LEGAL LOCATION: NW NW NW NW SEC. 18, T. 095 N., R. 55 W.

12 - 15 SAND, FINE; WITH CLAM SHELLS
18 - 37 SAND, FINE

* * * *

TEST HOLE NUMBER: 98
LOCATION: 095N-55W-18BCCB
LEGAL LOCATION: NW SW SW NW SEC. 18, T. 095 N., R. 55 W.

0 -  4 SAND, SILTY, PEBBLY

* * * *

TEST HOLE NUMBER: 99
LOCATION: 095N-55W-20AAAB
LEGAL LOCATION: NW NE NE NE SEC. 20, T. 095 N., R. 55 W.

0 - 15 GRAVEL, SANDY; DRY

* * * *

TEST HOLE NUMBER: 100
LOCATION: 095N-55W-20DAAC
LEGAL LOCATION: SW NE NE SE SEC. 20, T. 095 N., R. 55 W.

0 -  7 GRAVEL, COBBLY; ABANDONED HOLE

* * * *

TEST HOLE NUMBER: 101
LOCATION: 095N-55W-21BBA
LEGAL LOCATION: NE NW NW NW SEC. 21, T. 095 N., R. 55 W.

0 -  5 GRAVEL, BROWN, SANDY
5 - 17 GRAVEL, COARSE, COBBLY

* * * *

24
TEST HOLE NUMBER: 102
LOCATION: 095N-55W-29BADD
LEGAL LOCATION: SE SE NE NW SEC. 29, T. 095 N., R. 55 W.

2 - 13 GRAVEL, BROWN, COARSE, SILTY, SANDY; DRY
13 - 27 GRAVEL, BROWN, COARSE, SILTY, SANDY; SATURATED

** **

TEST HOLE NUMBER: 103
LOCATION: 095N-55W-29BBAB
LEGAL LOCATION: NW NE NW NW SEC. 29, T. 095 N., R. 55 W.

2 - 10 GRAVEL, YELLOW, COARSE, SANDY
10 - 18 GRAVEL, RED, VERY COARSE
18 - 20 GRAVEL, COBBLY; ABANDONED HOLE

** **

TEST HOLE NUMBER: 104
LOCATION: 095N-55W-32ADBA
LEGAL LOCATION: NE NW SE NE SEC. 32, T. 095 N., R. 55 W.

10 - 18 SAND, YELLOW, MEDIUM, PEBBLY
18 - 20 GRAVEL, BROWN, SANDY

** **

TEST HOLE NUMBER: 105
LOCATION: 095N-55W-32CBB
LEGAL LOCATION: NW NW SW SW SEC. 32, T. 095 N., R. 55 W.

0 - 3 SAND, LIGHT-BROWN, FINE, PEBBLY; DRY
3 - 33 SAND, BROWN, FINE, PEBBLY; MOIST

** **

TEST HOLE NUMBER: 106
LOCATION: 095N-55W-32DACB
LEGAL LOCATION: NW SW NE SE SEC. 32, T. 095 N., R. 55 W.

6 - 9 SAND, LIGHT-BROWN, SILTY, PEBBLY
9 - 15 SAND, REDDISH-BROWN, FINE TO MEDIUM
15 - 20 GRAVEL, REDDISH-BROWN, FINE
TEST HOLE NUMBER: 107
LOCATION: 095N-55W-32DDCD 2
LEGAL LOCATION: SE SW SE SE SEC. 32, T. 095 N., R. 55 W.

12 - 78 SAND AND GRAVEL, COARSE SAND TO FINE GRAVEL; CHANGING TO COARSE GRAVEL AND COBBLES WITH DEPTH

** **

TEST HOLE NUMBER: 108
LOCATION: 095N-55W-32DDDC 1
LEGAL LOCATION: SW SE SE SE SEC. 32, T. 095 N., R. 55 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

24 - 78 GRAVEL, MEDIUM TO VERY COARSE

** **

TEST HOLE NUMBER: 109
LOCATION: 095N-56W-03BBBB 2
LEGAL LOCATION: NW NW NW NW SEC. 03, T. 095 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

6 - 8 SAND, FINE, CLAYEY
14 - 19 SAND, FINE

** **

TEST HOLE NUMBER: 110
LOCATION: 095N-56W-03CCDC
LEGAL LOCATION: SW SE SW SW SEC. 03, T. 095 N., R. 56 W.

12 - 15 SAND, LIGHT-BROWN, SILTY

** **

TEST HOLE NUMBER: 111
LOCATION: 095N-56W-05CBBC
LEGAL LOCATION: SW NW NW NW SEC. 05, T. 095 N., R. 56 W.

6 - 7 SAND, YELLOW, MEDIUM, PEBBLY

** **

TEST HOLE NUMBER: 112
LOCATION: 095N-56W-06BAAA
LEGAL LOCATION: NE NE NE NW SEC. 06, T. 095 N., R. 56 W.
8  18  SAND, LIGHT-BROWN, SILTY, PEBBLY; MOIST
25  27  GRAVEL, LIGHT-BROWN, COARSE, SANDY
       * * *

TEST HOLE NUMBER:  113
LOCATION:  095N-56W-06R00
LEGAL LOCATION:  NW NW SW NW SEC. 06, T. 095 N., R. 56 W.

5  10  SAND, REDDISH-BROWN, MEDIUM
10  18  SAND, DARK-BROWN, COARSE, PEBBLY
18  28  GRAVEL, DARK-BROWN, FINE
       * * *

TEST HOLE NUMBER:  114
LOCATION:  095N-56W-08R00
LEGAL LOCATION:  NE SE SE SE SE SEC. 08, T. 095 N., R. 56 W.

2  31  SAND, FINE TO MEDIUM; WITH MINOR GRAVEL
       * * *

TEST HOLE NUMBER:  115
LOCATION:  095N-56W-09R00
LEGAL LOCATION:  SW SW SW SE SEC. 09, T. 095 N., R. 56 W.

0  5  SAND, LIGHT-BROWN, FINE TO MEDIUM; SOME MINOR SILT
       * * *

TEST HOLE NUMBER:  116
LOCATION:  095N-56W-12R00
LEGAL LOCATION:  SW SW NE NW SEC. 12, T. 095 N., R. 56 W.

0  4  SAND, LIGHT-BROWN, FINE, SILTY; DRY
       * * *

TEST HOLE NUMBER:  117
LOCATION:  095N-56W-16R00
LEGAL LOCATION:  SE SW SW SW SEC. 16, T. 095 N., R. 56 W.

2  118  GRAVEL, MEDIUM TO COARSE
       * * *

27
TEST HOLE NUMBER: 110
LOCATION: 095N-56W-17ADAA
LEGAL LOCATION: NE NE SE NE SEC. 17, T. 095 N., R. 56 W.

6 - 28 SAND, REDDISH-BROWN, CLAYEY, PEBBLY
* * * *

TEST HOLE NUMBER: 119
LOCATION: 095N-56W-17DAAD
LEGAL LOCATION: SE NE NE SE SEC. 17, T. 095 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

1 - 28 SAND, MEDIUM; WITH MINOR GRAVEL
* * * *

TEST HOLE NUMBER: 120
LOCATION: 095N-56W-18AAAA
LEGAL LOCATION: NE NE NE NE SEC. 18, T. 095 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

2 - 6 GRAVEL
* * * *

TEST HOLE NUMBER: 121
LOCATION: 095N-56W-18AAAA 3
LEGAL LOCATION: NE NE NE NE SEC. 18, T. 095 N., R. 56 W.

0 - 6 SAND, MEDIUM TO COARSE
* * * *

TEST HOLE NUMBER: 122
LOCATION: 095N-56W-18ABADAA
LEGAL LOCATION: NE NE SE NE SEC. 18, T. 095 N., R. 56 W.

5 - 9 SAND, REDDISH-BROWN, SILTY
9 - 37 GRAVEL, REDDISH-BROWN, SANDY; ABANDONED HOLE
* * * *

TEST HOLE NUMBER: 123
LOCATION: 095N-56W-19ABBA
LEGAL LOCATION: NE NW NW NE SEC. 19, T. 095 N., R. 56 W.
0 - 4  GRAVEL, SILTY, SANDY

** ** *

TEST HOLE NUMBER: 124
LOCATION: 095N-56W-20BAAB
LEGAL LOCATION: NW NE NE NW SEC. 20, T. 095 N., R. 56 W.

14 - 15  SAND, REDDISH-BROWN

** ** *

TEST HOLE NUMBER: 125
LOCATION: 095N-56W-21AABB 1
LEGAL LOCATION: NW NW NE NE SEC. 21, T. 095 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

15 - 48  SAND AND GRAVEL, MEDIUM SAND AND MEDIUM GRAVEL; INTERBEDDED WITH CLAY LAYERS

** ** *

TEST HOLE NUMBER: 126
LOCATION: 095N-56W-21AABB 3
LEGAL LOCATION: NW NW NE NE SEC. 21, T. 095 N., R. 56 W.

22 - 55  GRAVEL, FINE; WITH FINE SAND AND THIN LAYERS OF CLAY

** ** *

TEST HOLE NUMBER: 127
LOCATION: 095N-56W-21AABB
LEGAL LOCATION: NW NE NE NW SEC. 21, T. 095 N., R. 56 W.

2 - 48  SAND, BROWN, MEDIUM, CLAYHY, PEBBLY; MOIST

** ** *

TEST HOLE NUMBER: 128
LOCATION: 095N-56W-21DCDC
LEGAL LOCATION: SW SE SW SE SEC. 21, T. 095 N., R. 56 W.

5 - 20  SAND, BROWN, MEDIUM TO COARSE; MOIST
20 - 22  SAND, DARK-BROWN, FINE; MOIST
22 - 63  SAND, BROWN, MEDIUM; SOME GRAVEL, MOIST

29
TEST HOLE NUMBER: 129  
LOCATION: 095N-56W-28AABA  
LEGAL LOCATION: NE NW NE NE SEC. 28, T. 095 N., R. 56 W.

10 - 11 GRAVEL, REDDISH-BROWN, SANDY; MOIST  
11 - 30 SAND, DARK-REDDISH-BROWN, COARSE, PEBBLY; MOIST

** **

TEST HOLE NUMBER: 130  
LOCATION: 095N-56W-31BRRB  
LEGAL LOCATION: NW NW NW NW SEC. 31, T. 095 N., R. 56 W.

20 - 25 GRAVEL, CLAYEY, SANDY; SATURATED

** **

TEST HOLE NUMBER: 131  
LOCATION: 095N-56W-32BCCC  
LEGAL LOCATION: SW SW SW NW SEC. 32, T. 095 N., R. 56 W.

20 - 22 GRAVEL, LIGHT-BROWN, COARSE, SANDY; SATURATED

** **

TEST HOLE NUMBER: 132  
LOCATION: 095N-56W-34ABCA  
LEGAL LOCATION: NE SW NW NE SEC. 34, T. 095 N., R. 56 W.

0 - 4 SAND, LIGHT-BROWN, VERY SILTY, PEBBLY; DRY (ROADFILL)  
14 - 15 SAND, COARSE, PEBBLY; DRY  
15 - 28 GRAVEL, MEDIUM, SANDY, POORLY SORTED

** **

TEST HOLE NUMBER: 133  
LOCATION: 095N-56W-36CCBC 3  
LEGAL LOCATION: SW NW SW SW SEC. 36, T. 095 N., R. 56 W.

5 - 7 SAND, LIGHT-BROWN, SILTY, PEBBLY; DRY

** **
TEST HOLE NUMBER: 134
LOCATION: 095N-57W-01BAAA
LEGAL LOCATION: NE NE NE NW SEC. 01, T. 095 N., R. 57 W.

24 - 28 SAND, BLACK, MEDIUM, SILTY, CLAYEY; MOIST

* * *

TEST HOLE NUMBER: 135
LOCATION: 095N-57W-12DDDA
LEGAL LOCATION: NE SE NE SE SEC. 12, T. 095 N., R. 57 W.

0 - 6 GRAVEL
6 - 17 SAND, BROWN, GRAVELLY

* * *

TEST HOLE NUMBER: 136
LOCATION: 095N-57W-12DDCC
LEGAL LOCATION: SW SW SE SE SEC. 12, T. 095 N., R. 57 W.

0 - 12 SAND, BROWN; DRY
12 - 24 GRAVEL, SANDY; DRY
24 - 43 GRAVEL, SILTY, SANDY; SATURATED

* * *

TEST HOLE NUMBER: 137
LOCATION: 095N-57W-13ADD
LEGAL LOCATION: SE SE SE NE SEC. 13, T. 095 N., R. 57 W.

16 - 18 GRAVEL, FINE TO MEDIUM

* * *

TEST HOLE NUMBER: 138
LOCATION: 095N-57W-15CCDD
LEGAL LOCATION: SE SE SW SW SEC. 15, T. 095 N., R. 57 W.

0 - 16 GRAVEL, BROWN, COARSE, SANDY; DRY

* * *

TEST HOLE NUMBER: 139
LOCATION: 095N-57W-16CCC
LEGAL LOCATION: SW SW SW SEC. 16, T. 095 N., R. 57 W.

31
0 - 10 GRAVEL, RED; DRY

* * * *

TEST HOLE NUMBER: 140
LOCATION: 095N-57W-22DCC 1
LEGAL LOCATION: SW SW SE SEC. 22, T. 095 N., R. 57 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

20 - 62 SAND, MEDIUM; WITH FINE GRAVEL AND SOME SMALL PEBBLES

* * * *

TEST HOLE NUMBER: 141
LOCATION: 095N-57W-22DCCC 2
LEGAL LOCATION: SW SW SE SEC. 22, T. 095 N., R. 57 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

18 - 50 SAND, MEDIUM; WITH SOME GRAVEL AND PEBBLES

* * * *

TEST HOLE NUMBER: 142
LOCATION: 095N-57W-22DDD
LEGAL LOCATION: SE SE SE SEC. 22, T. 095 N., R. 57 W.

6 - 12 SAND, CLAYEY; DRY
12 - 16 SAND, CLAYEY; SATURATED

* * * *

TEST HOLE NUMBER: 143
LOCATION: 095N-57W-23DAAD
LEGAL LOCATION: SE NE SE SE SEC. 23, T. 095 N., R. 57 W.

25 - 28 SAND, GRAY, PEBBLY; SATURATED

* * * *

TEST HOLE NUMBER: 144
LOCATION: 095N-57W-26DADD
LEGAL LOCATION: SE NE SE SEC. 26, T. 095 N., R. 57 W.

15 - 33 GRAVEL, SANDY; SATURATED

* * * *

32
TEST HOLE NUMBER: 145
LOCATION: 095N-57W-26DDDD
LEGAL LOCATION: SE SE SE SE SEC. 26, T. 095 N., R. 57 W.

0 - 2 SAND, BROWN, MEDIUM

* * *

TEST HOLE NUMBER: 146
LOCATION: 095N-57W-33DDDC
LEGAL LOCATION: SW SE SE SW SEC. 33, T. 095 N., R. 57 W.

5 -  8 SAND, BROWN, MEDIUM, PEBBLY; MOIST
8 - 15 SAND, GRAY, FINE; SATURATED
21 - 27 GRAVEL, BROWN, FINE TO MEDIUM, SANDY; SATURATED

* * *

TEST HOLE NUMBER: 147
LOCATION: 095N-57W-33DDDA
LEGAL LOCATION: NE SE SE SE SEC. 33, T. 095 N., R. 57 W.

4 - 17 SAND, LIGHT-BROWN, MEDIUM, PEBBLY; MOIST
17 - 28 GRAVEL, DARK-BROWN, SANDY, CLAYEY; SATURATED

* * *

TEST HOLE NUMBER: 148
LOCATION: 095N-57W-35ABAA
LEGAL LOCATION: NE NE NW NE SEC. 35, T. 095 N., R. 57 W.

3 - 28 SAND, BROWN, GRAVELLY, POORLY SORTED

* * *

TEST HOLE NUMBER: 149
LOCATION: 096N-54W-03CDCC
LEGAL LOCATION: SW SW SE SW SEC. 03, T. 096 N., R. 54 W.

0 - 4 GRAVEL

* * *

TEST HOLE NUMBER: 150
LOCATION: 096N-54W-03CDCC

33
LEGAL LOCATION: SW SE SE SW SEC. 03, T. 096 N., R. 54 W.

0 - 12 GRAVEL, SANDY, SILTY, CLAYEY

** * *

TEST HOLE NUMBER: 151
LOCATION: 096N-54W-15ABAA
LEGAL LOCATION: NE NE NW NE SEC. 15, T. 096 N., R. 54 W.

0 - 1 SAND; DRY
1 - 16 GRAVEL; DRY

** * *

TEST HOLE NUMBER: 152
LOCATION: 096N-54W-16DDAA
LEGAL LOCATION: NE NE SE SE SEC. 16, T. 096 N., R. 54 W.

15 - 28 SAND, GRAY, CLAYEY

** * *

TEST HOLE NUMBER: 153
LOCATION: 096N-54W-17CBBB
LEGAL LOCATION: NW NW NW NW SW SEC. 17, T. 096 N., R. 54 W.

4 - 7 GRAVEL, BROWN, SANDY; MOIST

** * *

TEST HOLE NUMBER: 154
LOCATION: 096N-54W-21AABB
LEGAL LOCATION: NW NW NE NE SEC. 21, T. 096 N., R. 54 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

23 - 25 SAND AND GRAVEL, COARSE

** * *

TEST HOLE NUMBER: 155
LOCATION: 096N-54W-34DDDD
LEGAL LOCATION: SE SE SE SE SEC. 34, T. 096 N., R. 54 W.

11 - 28 GRAVEL, FINE TO COARSE; WITH MINOR SAND, CHALK FRAGMENTS

** * *
TEST HOLE NUMBER: 156
LOCATION: 096N-55W-12BDCB
LEGAL LOCATION: NW SW NW NW SEC. 12, T. 096 N., R. 55 W.

0 - 6 SAND, REDDISH-BROWN, FINE TO MEDIUM, SILTY
* * * *

TEST HOLE NUMBER: 157
LOCATION: 096N-55W-13CDDC
LEGAL LOCATION: SE SW SW SW SEC. 18, T. 096 N., R. 55 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

6 - 11 GRAVEL, FINE TO MEDIUM
* * * *

TEST HOLE NUMBER: 158
LOCATION: 096N-55W-30BBAA
LEGAL LOCATION: NE NE NW NW SEC. 30, T. 096 N., R. 55 W.

0 - 8 GRAVEL, SILTY, SANDY
* * * *

TEST HOLE NUMBER: 159
LOCATION: 096N-55W-32BCCB
LEGAL LOCATION: SW NW SW NW SEC. 32, T. 096 N., R. 55 W.

0 - 8 SAND, RED, CLAYEY
8 - 18 GRAVEL, SANDY
* * * *

TEST HOLE NUMBER: 160
LOCATION: 096N-55W-33DDDD
LEGAL LOCATION: SE SE SE SE SEC. 33, T. 096 N., R. 55 W.

6 - 8 SAND, MEDIUM; WITH MEDIUM GRAVEL
* * * *

TEST HOLE NUMBER: 161
LOCATION: 096N-55W-35DABD
LEGAL LOCATION: NW SW NE SE SEC. 35, T. 096 N., R. 55 W.
TEST HOLE NUMBER: 162
LOCATION: 096N-56W-15CCCC
LEGAL LOCATION: SW SW SW SW SEC. 15, T. 096 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE
24 - 26 GRAVEL, COARSE

TEST HOLE NUMBER: 163
LOCATION: 096N-56W-28CCBA
LEGAL LOCATION: NE NW SW SW SEC. 28, T. 096 N., R. 56 W.
6 - 8 GRAVEL; DRY
14 - 16 GRAVEL; DRY

TEST HOLE NUMBER: 164
LOCATION: 096N-56W-29CCAB
LEGAL LOCATION: NW NE SW SW SEC. 29, T. 096 N., R. 56 W.
0 - 6 GRAVEL, DARK-BROWN, COARSE, SILTY; DRY

TEST HOLE NUMBER: 165
LOCATION: 096N-56W-29CDDD
LEGAL LOCATION: SE SE SE SW SEC. 29, T. 096 N., R. 56 W.
2 - 4 GRAVEL, BROWN, FINE, SANDY, CLAYEY; MOIST

TEST HOLE NUMBER: 166
LOCATION: 096N-56W-31BBBB
LEGAL LOCATION: NW NW NW NW SEC. 31, T. 096 N., R. 56 W.
4 - 5 SAND, WHITE, MEDIUM, SILTY, PEBBLY; MOIST

36
TEST HOLE NUMBER: 167
LOCATION: 096N-56W-31CCBB
LEGAL LOCATION: NW NW SW SW SEC. 31, T. 096 N., R. 56 W.

11 - 26 SAND, LIGHT-BROWN, MEDIUM, PEBBLY; MOIST

TEST HOLE NUMBER: 168
LOCATION: 096N-56W-31CCCC 1
LEGAL LOCATION: SW SW SW SW SEC. 31, T. 096 N., R. 56 W.

0 - 66 SAND, FINE TO COARSE; COARSENING DOWNWARD TO VERY COARSE GRAVEL

TEST HOLE NUMBER: 169
LOCATION: 096N-56W-31CCCD
LEGAL LOCATION: SE SW SW SW SEC. 31, T. 096 N., R. 56 W.

1 - 4 SAND, BROWN, MEDIUM, SILTY, PEBBLY; DRY
4 - 24 GRAVEL, BROWN, MEDIUM, SANDY; DRY
24 - 28 SAND, LIGHT-BROWN, MEDIUM, PEBBLY; MOIST

TEST HOLE NUMBER: 170
LOCATION: 096N-56W-34DCAAA
LEGAL LOCATION: NE NE SW SE SEC. 34, T. 096 N., R. 56 W.

0 - 14 SAND, SILTY, PEBBLY
18 - 23 GRAVEL, BROWN, COARSE, VERY SANDY, CLAYY; ABANDONED HOLE

TEST HOLE NUMBER: 171
LOCATION: 096N-56W-34DDBC
LEGAL LOCATION: SW NW SE SE SEC. 34, T. 096 N., R. 56 W.

2 - 53 GRAVEL, SANDY

TEST HOLE NUMBER: 172
LOCATION: 096N-56W-35DCDA 1

37
LEGAL LOCATION: NE SE SW SE SEC. 35, T. 096 N., R. 56 W.

0 - 25 SAND AND GRAVEL, MEDIUM SAND TO FINE GRAVEL
25 - 51 SAND AND GRAVEL, COARSE SAND TO COARSE GRAVEL

** * * *

TEST HOLE NUMBER: 173
LOCATION: 096N-56W-36DDCD
LEGAL LOCATION: SE SW SE SE SEC. 36, T. 096 N., R. 56 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

0 - 25 GRAVEL, FINE; WITH FINE TO MEDIUM SAND

** * * *

TEST HOLE NUMBER: 174
LOCATION: 096N-57W-09AADC
LEGAL LOCATION: SW SE NE NE SEC. 09, T. 096 N., R. 57 W.

15 - 29 GRAVEL; SAMPLED AT 24 FEET

** * * *

TEST HOLE NUMBER: 175
LOCATION: 096N-57W-09DDDA
LEGAL LOCATION: NE SE SE SE SEC. 09, T. 096 N., R. 57 W.

0 - 3 SAND, MEDIUM

** * * *

TEST HOLE NUMBER: 176
LOCATION: 096N-57W-11BCCA
LEGAL LOCATION: NE SW SW NW SEC. 11, T. 096 N., R. 57 W.

2 - 5 GRAVEL, BROWN, COARSE, Sandy, Cobbley; DRY
5 - 15 SAND, YELLOWISH-BROWN, FINE, SILTY; MOIST

** * * *

TEST HOLE NUMBER: 177
LOCATION: 096N-57W-11DABC
LEGAL LOCATION: NW SW NE SE SEC. 11, T. 096 N., R. 57 W.

38
3 - 12 GRAVEL, BROWN, SANDY, COBBLY; MOIST
12 - 28 SAND, BROWN, COARSE; MOIST
   * * *

TEST HOLE NUMBER: 178
LOCATION: 096N-57W-13BCBA
LEGAL LOCATION: NE NW SW NW SEC. 13, T. 096 N., R. 57 W.

1 - 6 GRAVEL, LIGHT-BROWN, SANDY, CLAYEY; MOIST
12 - 16 SAND, LIGHT-BROWN, GRAVELLY, CLAYEY;
     MOIST
18 - 30 SAND, BROWN, MEDIUM, PEBBLY, CLAYEY;
     MOIST
   * * *

TEST HOLE NUMBER: 179
LOCATION: 096N-57W-13CDDC
LEGAL LOCATION: SE SW SE SW SEC. 13, T. 096 N., R. 57 W.

0 - 15 SAND, BROWN; DRY
   * * *

TEST HOLE NUMBER: 180
LOCATION: 096N-57W-13DCCA
LEGAL LOCATION: NE SW SE SE SEC. 13, T. 096 N., R. 57 W.

22 - 30 SAND, BROWN, CLAYEY; MOIST
   * * *

TEST HOLE NUMBER: 181
LOCATION: 096N-57W-13DDCC
LEGAL LOCATION: SW SW SE SE SEC. 13, T. 096 N., R. 57 W.
PRELIMINARY LOG -- SUBJECT TO CHANGE

0 - 22 SAND AND GRAVEL, COARSE SAND TO MEDIUM
     GRAVEL
22 - 38 GRAVEL, MEDIUM TO COARSE (THIN LAYER OF
     GRAY SILTY CLAY AT 27 FEET)
   * * *

TEST HOLE NUMBER: 182
LOCATION: 096N-57W-25BBAA
LEGAL LOCATION: NE NE NW NW SEC. 25, T. 096 N., R. 57 W.

39
10 – 26 SAND, DARK-BROWN, MEDIUM, PEBBLY; MOIST

** **

TEST HOLE NUMBER: 183
LOCATION: 096N-57W-26DDDD
LEGAL LOCATION: SE SE SE SE SEC. 26, T. 096 N., R. 57 W.

3 – 5 GRAVEL, BROWN, SANDY, COBBLY; MOIST
5 – 7 SAND, LIGHT-BROWN, GRAVELLY; MOIST
7 – 16 SAND, BROWN, FINE, SILTY; MOIST

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

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: C. M. Thranum - Menno
- b. Location: SW 1/4 sec. 4, T. 96 N., R. 57 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 9.0
- e. Overburden thickness (ft): 4.0

Pit 2
- a. Landowner: Ernest Mueller - Lesterville
- b. Location: S 1/2 NE 1/4 sec. 36, T. 96 N., R. 57 W.
- c. Aggregate type: Filler
- d. Deposit thickness (ft): 5.4+
- e. Overburden thickness (ft): 1.5

Pit 3
- a. Landowner: Douglas Orth - Lesterville
- b. Location: S 1/2 SW 1/4 sec. 36, T. 96 N., R. 57 W.
- c. Aggregate type: Sand
- d. Deposit thickness (ft): 7.7+
- e. Overburden thickness (ft): 2.0

Pit 4
- a. Landowner: Jamesville Colony - Utica
- b. Location: SW 1/4 SE 1/4 sec. 28, T. 96 N., R. 56 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 7.5
- e. Overburden thickness (ft): 1.0
Pit 5
a. Landowner: Jamesville Colony - Utica
b. Location: SE 1/4 sec. 28, T. 96 N., R. 56 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 6
a. Landowner: Robert Schlaefle - Rt. 2, Yankton
b. Location: SE 1/4 sec. 34, T. 96 N., R. 56 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 9.0*
e. Overburden thickness (ft): 5.1

Pit 7
a. Landowner: Roy G. Anderson - Yankton
b. Location: NW 1/4 sec. 32, T. 96 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 8
a. Landowner: Lavert Hippen - Irene
b. Location: E 1/2 NW 1/4 sec. 3, T. 95 N., R. 54 W.
c. Aggregate type: Sand and gravel
d. Deposit thickness (ft): 20.0+
e. Overburden thickness (ft): 1.5

Pit 9
a. Landowner: Martin Sather - Irene
b. Location: SE 1/4 sec. 3, T. 95 N., R. 54 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 10
a. Landowner: Andrew A. Maizen - 312 Green St., Yankton
b. Location: SE 1/4 sec. 37, T. 95 N., R. 55 W.
c. Aggregate type: Sand
d. Deposit thickness (ft): 10.0
e. Overburden thickness (ft): 1.5

Pit 11
a. Landowner: Reuben Knodel - Yankton
b. Location: NE 1/4 sec. 20, T. 95 N., R. 55 W.
c. Aggregate type: Filler
d. Deposit thickness (ft): 4.0
e. Overburden thickness (ft): 1.0

42
Pit 12
a. Landowner: Reuben Knodel - Yankton
b. Location: NE 1/4 sec. 20, T. 95 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 8.5+
e. Overburden thickness (ft): 1.5

Pit 13
a. Landowner: Yankton County - Yankton
b. Location: SE 1/4 sec. 18, T. 95 N., R. 55 W.
c. Aggregate type: Sand and gravel
d. Deposit thickness (ft): 8.0
e. Overburden thickness (ft): 2.0

Pit 14
a. Landowner: Rosa Frohreich - Utica
b. Location: SW 1/4 sec. 20, T. 95 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 15.0
e. Overburden thickness (ft): 3.0

Pit 15
a. Landowner: Lydia Bohlmann - Yankton
b. Location: NW 1/4 sec. 29, T. 95 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 6.4+
e. Overburden thickness (ft): 2.1

Pit 16
a. Landowner: Marie Hofferma - Mission Hill
b. Location: N 1/2 SW 1/4 NW 1/4 sec. 33, T 95 N., R. 55 W.
c. Aggregate type: Sand
d. Deposit thickness (ft): 15.0
e. Overburden thickness (ft): 4.0

Pit 17
a. Landowner: Ed Voll - Yankton
b. Location: NE 1/4 sec. 31, T. 95 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 9.0
e. Overburden thickness (ft): 1.0

Pit 18
a. Landowner: ----
b. Location: SE 1/4 NE 1/4 sec. 25, T. 95 N., R. 36 W.
c. Aggregate type: Filler
d. Deposit thickness (ft): 10.0
e. Overburden thickness (ft): 4.0

43
Pit 19
a. Landowner: William Brauneisreither - Irene
b. Location: W 1/2 NW 1/4 sec. 1, T. 95 N., R. 56 W.
c. Aggregate type: Sand
d. Deposit thickness (ft): 8.0
e. Overburden thickness (ft): 2.0

Pit 20
a. Landowner: Herman Baaherman - Utica
b. Location: NE 1/4 NE 1/4 sec. 20, T. 95 N., R. 56 W.
c. Aggregate type: Filler
d. Deposit thickness (ft): 4.0
e. Overburden thickness (ft): 2.0

Pit 21
a. Landowner: Yankton County - Yankton
b. Location: SE 1/4 sec. 8, T. 95 N., R. 56 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 12.0
e. Overburden thickness (ft): 3.0

Pit 22
a. Landowner: Adolph Diede - Lesterville
b. Location: NE 1/4 sec. 1, T. 95 N., R. 57 W.
c. Aggregate type: Sand
d. Deposit thickness (ft): 15.0
e. Overburden thickness (ft): 2.0

Pit 23
a. Landowner: ----
b. Location: NE 1/4 sec. 5, T. 94 N., R. 57 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 24
a. Landowner: Sanford J. Pechous - Tabor
b. Location: SW 1/4 sec. 7, T. 94 N., R. 57 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 8.0
e. Overburden thickness (ft): 3.5

Pit 25
a. Landowner: Adolph Seetak - Tabor
b. Location: SE 1/4 SE 1/4 sec. 12, T. 94 N., R. 58 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 8.0
e. Overburden thickness (ft): 2.0
Pit 26
a. Landowner: Charles Vellek - Rt. 2, Yankton
b. Location: NE 1/4 NW 14 NW 1/4 NE 1/4
   sec. 12, T. 94 N., R. 56 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 10.3
e. Overburden thickness (ft): 2.9

Pit 27
a. Landowner: Charles Vellek, Rt. 2, Yankton
b. Location: NE 1/4 sec. 12, T. 94 N., R. 56 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 11.0+
e. Overburden thickness (ft): 2.0

Pit 28
a. Landowner: Chester Stewart - Yankton
b. Location: SE 1/4 SE 1/4 sec. 12, T. 94 N., R. 56 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 12.0
e. Overburden thickness (ft): 3.0

Pit 29
a. Landowner: Yankton County - Yankton
b. Location: SW 1/4 sec. 7, T. 94 N., R. 55 W.
c. Aggregate type: Sand and gravel
d. Deposit thickness (ft): 12.0
e. Overburden thickness (ft): 3.5

Pit 30
a. Landowner: John F. Frick - Yankton
b. Location: NE 1/4 sec. 18, T. 94 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 15.0+
e. Overburden thickness (ft): 3.5

Pit 31
a. Landowner: William M. Smith - Yankton
b. Location: NE 1/4 SE 1/4 sec. 28, T. 94 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 9.0+
e. Overburden thickness (ft): 4.0

Pit 32
a. Landowner: William M. Smith - Yankton
b. Location: NW 1/4 SW 1/4 sec. 27, T. 94 N., R. 55 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): 10.0
e. Overburden thickness (ft): 5.0
Pit 33
a. Landowner: Merle Knudtson - Volin
b. Location: SE 1/4 SE 1/4 sec. 2, T. 94 N., R. 54 W.
c. Aggregate type: Clay
d. Deposit thickness (ft): 6.0
e. Overburden thickness (ft): 0.5

Pit 34
a. Landowner: Mrs. Edna Oursland - Volin
b. Location: NW 1/4 sec. 13, T. 94 N., R. 54 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 35
a. Landowner: Leland Nelson - Volin
b. Location: SW 1/4 sec. 13, T. 94 N., R. 54 W.
c. Aggregate type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 36
a. Landowner: Anna Ryken - Yankton
b. Location: SW 1/4 sec. 14, T. 93 N., R. 56 W.
c. Aggregate type: Piller
d. Deposit thickness (ft): 4.0+
e. Overburden thickness (ft): 0.5
Map showing test holes, sand and gravel pits, and sand and gravel deposits in Yankton County.