GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 East 50th Street North
Sioux Falls, South Dakota 57104
Phone 605-335-5512 Fax 605-335-0773

July 18, 2023

Doug Van Zee
724 Park Lane South
Canton, South Dakota 57013

Subj: Sand & Gravel Exploration
Van Zee Property
Near Platte, South Dakota
GeoTek #23-0946

Introduction

We are submitting this correspondence to present our written report detailing the sand and gravel exploration program for the referenced project. Our work was performed in accordance with your authorization.

Property Location & Description

The Van Zee property (about 800 acres in size) is located along the east side of 371st Avenue (between 269th Street and 271st Street) in Charles Mix County, South Dakota. A property location map (Figure 1) is attached showing the location of the property. The town of Platte is located about 7 miles southwest of the property. A drainageway runs through the property in an east-west direction.

Borings & Ground Surface Elevations

We performed 24 borings at the property on July 6 and July 10, 2023. The borings were advanced using 6-inch diameter flight auger to depths varying from 5 feet to 45 feet (most of the depths were between 20 feet and 35 feet). The subsurface conditions encountered at the boring locations are illustrated by means of the attached boring logs. Figure 2 (boring location map) is attached showing the relative location of the borings. The GPS coordinates (latitudes and longitudes) at the boring locations are attached (Table 1). We did not determine the ground surface elevations at the boring locations.

Water Levels

Measurements to record the groundwater levels were made at the boring locations. The time and level of the groundwater readings are recorded on the boring logs. Groundwater was measured at depths varying from 3 ½ feet to 23 feet at borings 3, 4, 10, 11, 12, 13, 14, 17, 18, 19 and 23.

Groundwater did not enter the boreholes at the other borings at the time of our measurements. Long term groundwater monitoring was not included in our work scope.

Subsurface Conditions

The subsurface profile at the boring locations consisted of the following soil types: fine alluvium soils, coarse alluvium soils and glacial till soils. The fine alluvium soils were encountered at the surface at the majority of the borings (not at boring 3). The coarse alluvium soils were encountered at the surface at boring 3 and beneath the fine alluvium soils at borings 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 17, 18, 19 and 23. The glacial till soils were encountered beneath the fine alluvium soils and coarse alluvium soils at the majority of the borings (not at boring 22). Refusal was encountered at a depth of 5 feet at boring 22. The refusal was likely a cobble within the fine alluvium soils or glacial till soils.

Soil Types

Fine Alluvium Soils

Fine alluvium soils are soils with more than 50 percent by weight passing the #200 sieve that have been deposited by moving water. The fine alluvium soils consisted of lean clay (CL) and sandy lean clay (CL).

Coarse Alluvium Soils

Coarse alluvium soils are soils with less than 50 percent by weight passing the #200 sieve that have been deposited by moving water. The coarse alluvium soils consisted of clayey sand (SC) and sand with silt (SP-SM).

Glacial Till Soils

Glacial till soils are soils with more than 50 percent by weight passing the #200 sieve that have been deposited and consolidated by a glacier. The glacial till soils consisted of lean clay (CL), lean clay with sand (CL) and sandy lean clay (CL).

Laboratory Testing

Select samples from the borings were submitted to the laboratory for testing. The tests consisted of sieve analysis tests. The sieve analysis tests were performed in accordance with ASTM procedures. The results of the sieve analysis tests are shown on the attached data sheet.

Discussion

As previously stated, coarse alluvium soils were encountered at borings 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 17, 18, 19 and 23. Figure 3 shows the borings where the coarse alluvium soils were encountered. The coarse alluvium soils extended to depths varying from 5 feet to 35 feet. The thickness of the coarse alluvium soils varied from 4 feet to 28 feet.

Based on our observations of the collected samples and the results of the sieve analysis tests, it is our opinion that the sand and gravel could be used as structural fill within buildings and agricultural structures with limited processing (sieving and crushing). The limited processing would likely consist of removing oversized particles. Some processing would be needed for the sand and gravel to meet the SDDOT requirements of an aggregate base course material or gravel surfacing material.

Standard of Care

Our services for your project were performed in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering profession currently practicing at this time and area.

Remarks

We trust this report provides you with the necessary information for the project. Please note that the samples will be discarded 30 days from the reporting date. If you have any questions or require additional information, please contact our office.

GeoTek Engineering & Testing Services, Inc.

Jared Haskins

Jared Haskins, PE
Geotechnical Manager

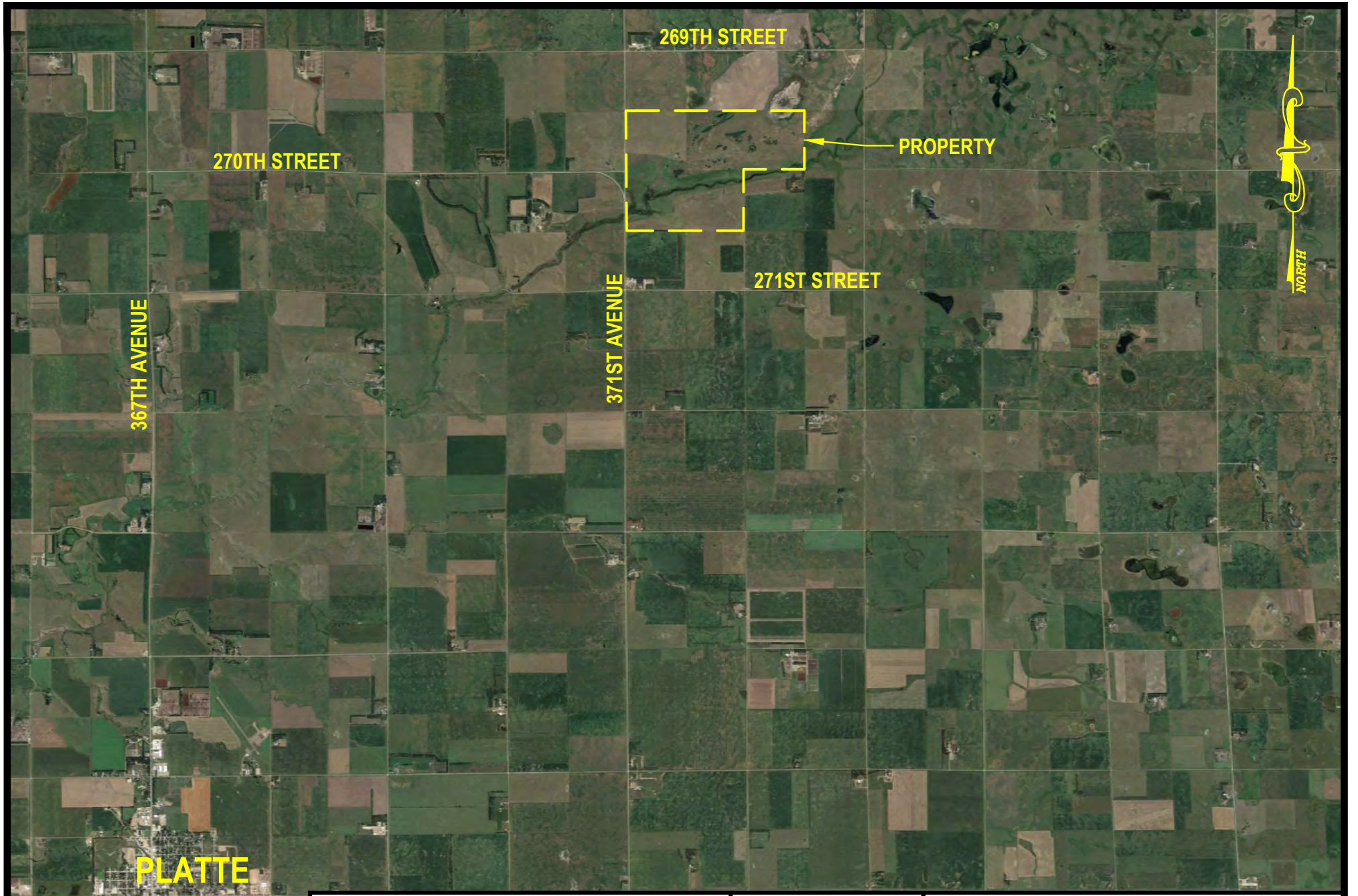

FIGURE 1
PROPERTY LOCATION MAP
SAND AND GRAVEL EXPLORATION
VAN ZEE PROPERTY
NEAR PLATTE, SD

ACAD/GEOTEK/JARED/23-0946

PROJECT#: 23-0946

DRAWN BY: PRH

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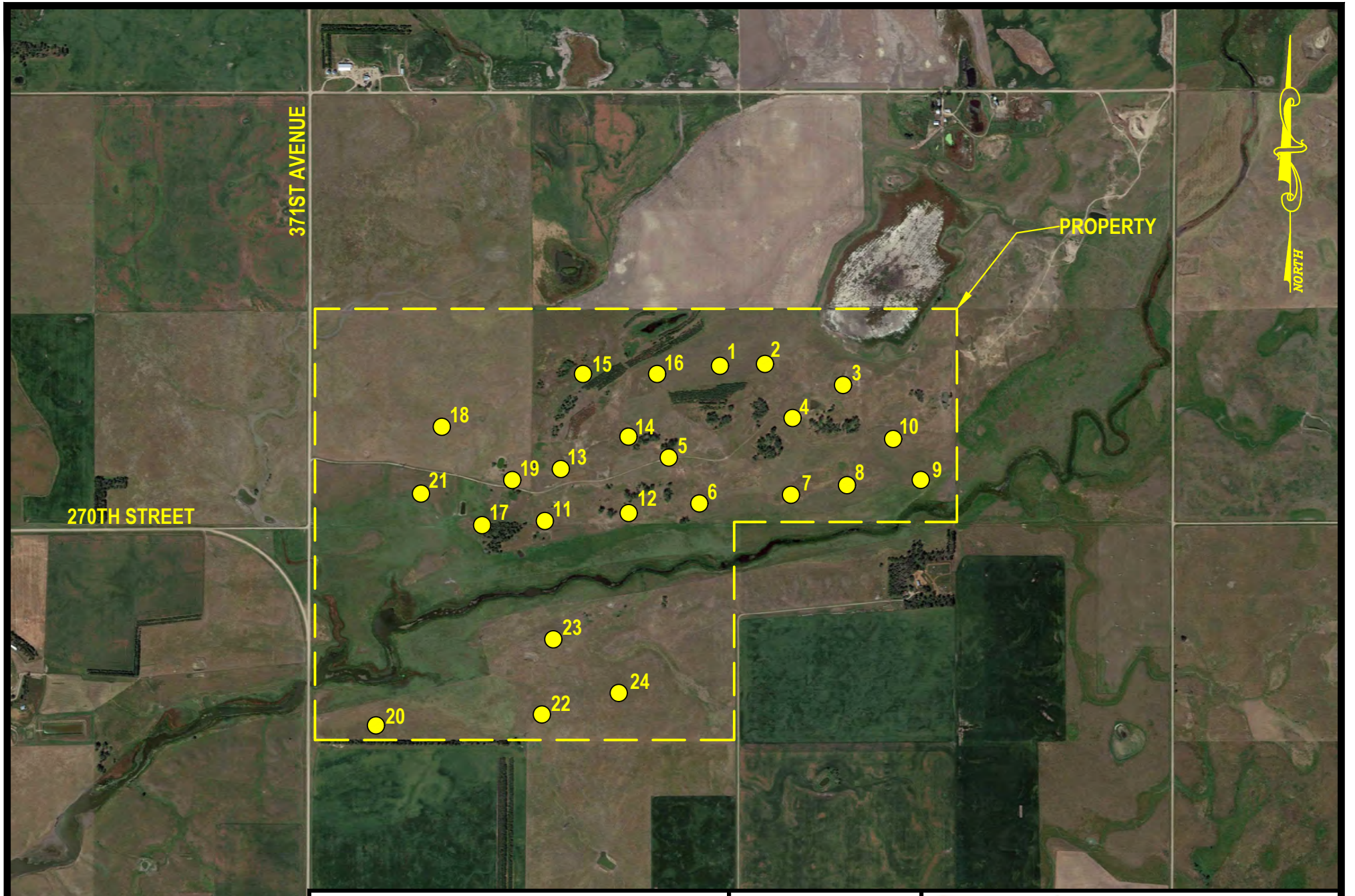

FIGURE 2
BORING LOCATION MAP
SAND AND GRAVEL EXPLORATION
VAN ZEE PROPERTY
NEAR PLATTE, SD

ACAD/GEOTEK/JARED/23-0946

PROJECT#: 23-0946

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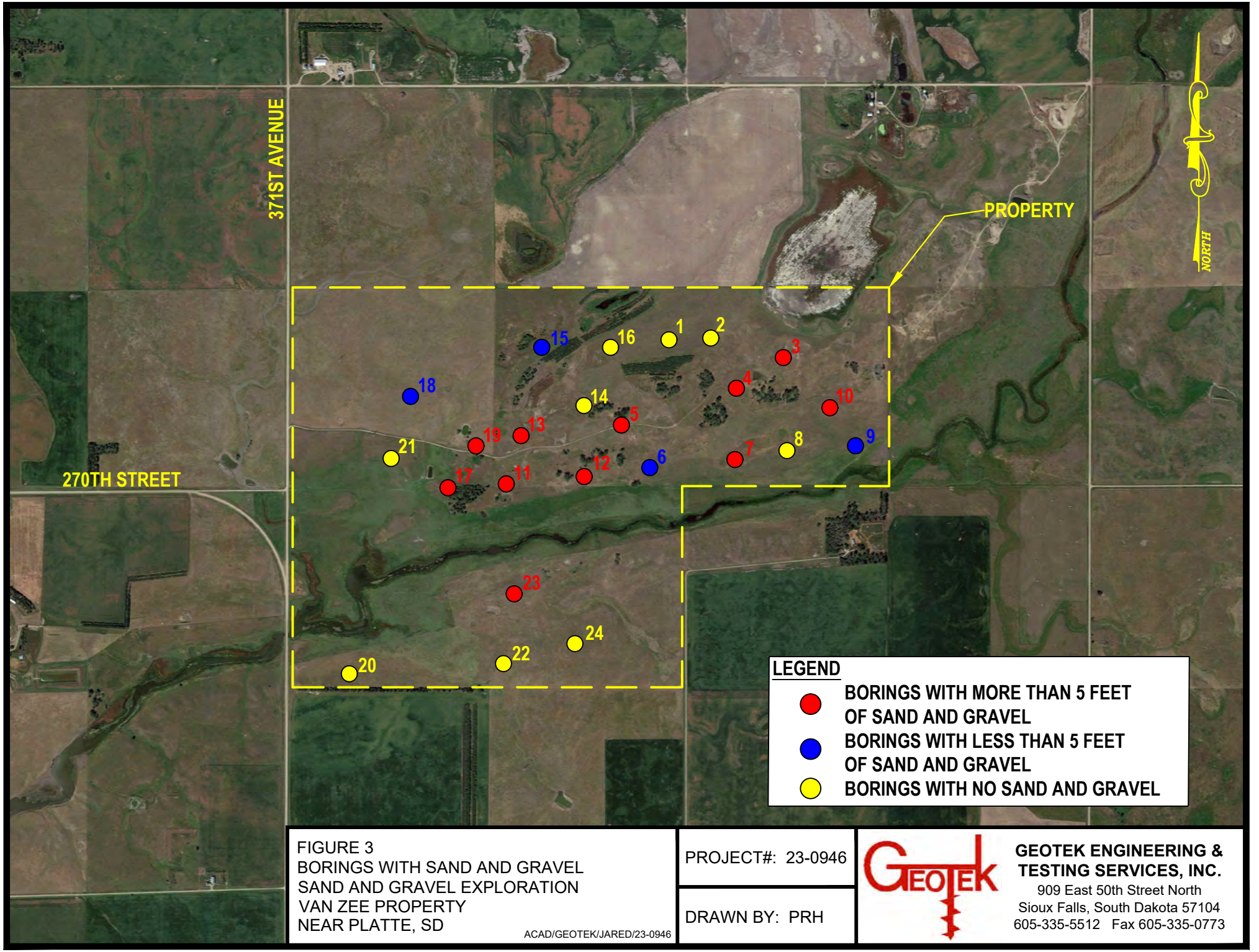

FIGURE 3
BORINGS WITH SAND AND GRAVEL
SAND AND GRAVEL EXPLORATION
VAN ZEE PROPERTY
NEAR PLATTE, SD

ACAD/GEOTEK/JARED/23-0946

PROJECT#: 23-0946

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Table 1. GPS Coordinates

Boring Number	GPS Coordinates	
1	43°28'35.52"N	98°44'49.03"W
2	43°28'35.45"N	98°44'42.77"W
3	43°28'32.72"N	98°44'30.26"W
4	43°28'29.30"N	98°44'38.48"W
5	43°28'24.34"N	98°44'58.92"W
6	43°28'18.32"N	98°44'53.13"W
7	43°28'19.64"N	98°44'39.43"W
8	43°28'20.40"N	98°44'30.25"W
9	43°28'21.30"N	98°44'18.35"W
10	43°28'26.76"N	98°44'21.60"W
11	43°28'16.53"N	98°45'18.60"W
12	43°28'17.98"N	98°45'5.76"W
13	43°28'23.10"N	98°45'15.79"W
14	43°28'26.94"N	98°45'5.08"W
15	43°28'34.09"N	98°45'13.26"W
16	43°28'34.56"N	98°45'0.65"W
17	43°28'16.22"N	98°45'29.46"W
18	43°28'28.17"N	98°45'34.53"W
19	43°28'21.82"N	98°45'23.63"W
20	43°27'52.47"N	98°45'47.75"W
21	43°28'20.04"N	98°45'38.46"W
22	43°27'53.39"N	98°45'20.55"W
23	43°28'2.76"N	98°45'17.31"W
24	43°27'55.70"N	98°45'7.46"W

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **1 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	4:07 pm	20	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 4:06 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **2 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**LEAN CLAY**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	3:45 pm	15	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 3:45 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **3 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SAND WITH SILT: a little gravel, fine to medium grained, brown, dry to waterbearing, (SP-SM)	COARSE ALLUVIUM		▼	1	FA					
					2	FA					
10	**SANDY LEAN CLAY**: a little gravel, gray, moist, (CL)	GLACIAL TILL			3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	3:24 pm	20	--	3.5	▼ 3.5
--	--	--	--	--	--
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START 7-6-23 COMPLETE 7-6-23 3:22 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **4 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**SAND WITH SILT**: a little gravel, medium to coarse grained, brown, dry to waterbearing, percent passing the #200 sieve = 7% (from 10' to 15') (SP-SM)	COARSE ALLUVIUM			2	FA					
					3	FA					
				▼	4	FA					
22	**LEAN CLAY WITH SAND**: a little gravel, gray, moist, (CL)	GLACIAL TILL			5	FA					
					6	FA					
					7	FA					
35	Bottom of borehole at 35 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	6:41 pm	35	--	17	▼ 15
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--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 6:35 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **5 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
4	**SAND WITH SILT**: a little gravel, medium to coarse grained, brown, dry to moist, percent passing the #200 sieve = 10% (from 10' to 15') (SP-SM)	COARSE ALLUVIUM			2	FA					
					3	FA					
					4	FA					
20	**LEAN CLAY WITH SAND**: a little gravel, gray, moist, (CL)	GLACIAL TILL			5	FA					
					6	FA					
30	Bottom of borehole at 30 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	6:05 pm	30	--	20	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 6:05 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **6 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
1	**LEAN CLAY**: dark brown, dry to moist, (CL)	FINE ALLUVIUM									
	SAND WITH SILT: a little gravel, fine to medium grained, brown, dry, (SP-SM)	COARSE ALLUVIUM			1	FA					
5	**SANDY LEAN CLAY**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	11:05 am	15	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 11:05 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **7 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
1	**LEAN CLAY**: dark brown, dry, (CL)	FINE ALLUVIUM									
	SAND WITH SILT: a little gravel, fine to medium grained, brown, dry to moist, (SP-SM)	COARSE ALLUVIUM			1	FA					
					2	FA					
10	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			3	FA					
15	**LEAN CLAY WITH SAND**: a little gravel, gray, moist, (CL)	GLACIAL TILL			4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	10:44 am	20	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 10:44 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **8 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
4	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	10:23 am	15	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 10:23 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **9 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
1	**SANDY LEAN CLAY**: dark brown, dry to moist, (CL)	FINE ALLUVIUM									
	SAND WITH SILT: with gravel, fine to coarse grained, brown, dry, (SP-SM)	COARSE ALLUVIUM			1	FA					
5	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	9:55 am	15	--	14	none
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--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 9:54 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **10 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
6	**CLAYEY SAND**: a trace of gravel, fine to medium grained, brown, dry, (SC)	COARSE ALLUVIUM		▼	2	FA					
10	**SAND WITH SILT**: a trace of gravel, fine to medium grained, brown, moist to waterbearing, (SP-SM)	COARSE ALLUVIUM			3	FA					
15	**SAND WITH SILT**: a little gravel, medium to coarse grained, gray, waterbearing, (SP-SM)	COARSE ALLUVIUM			4	FA					
23	**LEAN CLAY WITH SAND**: a little gravel, gray, moist, (CL)	GLACIAL TILL			5	FA					
					6	FA					
					7	FA					
35	Bottom of borehole at 35 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	9:34 am	35	--	8	▼ 8
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 9:27 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **11 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
7	**SAND WITH SILT**: a little gravel, fine to medium grained, brown, moist to waterbearing, percent passing the #200 sieve = 7% (from 15' to 20') (SP-SM)	COARSE ALLUVIUM		▼	2	FA					
					3	FA					
					4	FA					
23	**LEAN CLAY WITH SAND**: a little gravel, gray, moist to wet, (CL)	GLACIAL TILL			5	FA					
					6	FA					
					7	FA					
35	Bottom of borehole at 35 feet.										

WATER LEVEL MEASUREMENTS

START 7-6-23 COMPLETE 7-6-23 12:11 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	12:11 pm	35	--	9.5	▼ 9.5
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **12 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
3	**SANDY LEAN CLAY**: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
	SAND WITH SILT: a little gravel, fine to medium grained, brown, moist to waterbearing, (SP-SM)	COARSE ALLUVIUM		▼	2	FA					
10	**SANDY LEAN CLAY**: a little gravel, brown, moist to wet, (CL)	GLACIAL TILL			3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	11:40 am	20	--	17	▼ 7
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--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 11:28 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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605-335-5512 Fax

GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **13 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
7	**CLAYEY SAND**: a trace of gravel, fine grained, brown, dry, percent passing the #200 sieve = 16% (from 10' to 15') (SC)	COARSE ALLUVIUM			2	FA					
					3	FA					
15	**SAND WITH SILT**: with gravel, fine to medium grained, brown, dry to waterbearing, percent passing the #200 sieve = 11% (from 25' to 30') (SP-SM)	COARSE ALLUVIUM		▼	4	FA					
					5	FA					
					6	FA					
					7	FA					
35	**SANDY LEAN CLAY**: a little gravel, brown, moist, (CL)	GLACIAL TILL			8	FA					
40	**LEAN CLAY WITH SAND**: a little gravel, gray, moist, (CL)	GLACIAL TILL			9	FA					
45	Bottom of borehole at 45 feet.										

WATER LEVEL MEASUREMENTS

START 7-6-23 COMPLETE 7-6-23 1:16 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	1:24 pm	45	--	17	▼ 17
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

GEOTEK ENGINEERING
& TESTING SERVICES, INC.
909 E 50th St N, Sioux Falls, SD
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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **14 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL		▼	2	FA					
					3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	4:07 pm	15	--	11	▼ 7
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 4:06 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **15 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
6	**CLAYEY SAND**: a little gravel, fine to medium grained, brown, moist, (SC)	COARSE ALLUVIUM			2	FA					
10	**LEAN CLAY**: a little gravel, gray, moist, (CL)	GLACIAL TILL			3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	1:53 pm	20	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 1:53 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **16 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
6	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	2:18 pm	20	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 2:18 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **17 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LAB TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM									
3					1	FA					
	SAND WITH SILT: a little gravel, fine to medium grained, brown, moist, percent passing the #200 sieve = 9% (from 10' to 15') (SP-SM)	COARSE ALLUVIUM			2	FA					
					3	FA					
17	**LEAN CLAY WITH SAND**: a little gravel, brown, moist to wet, (CL)	GLACIAL TILL			4	FA					
					5	FA					
25	**LEAN CLAY WITH SAND**: a little gravel, gray, moist, (CL)	GLACIAL TILL			6	FA					
30	Bottom of borehole at 30 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-10-23	10:12 am	30	--	28	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-10-23 COMPLETE 7-10-23 10:11 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **18 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: dark brown, dry to moist, (CL)	FILL			1	FA					
7	**CLAYEY SAND**: a little gravel, fine grained, brown, moist, (SC)	COARSE ALLUVIUM			2	FA					
10	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			3	FA					
					4	FA					
20	Bottom of borehole at 20 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	7:18 pm	20	--	19	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-10-23 COMPLETE 7-10-23 10:47 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **19 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**SAND WITH SILT**: with gravel, fine to medium grained, brown, moist, a few cobbles below 16', percent passing the #200 sieve = 12% (from 10' to 15') (SP-SM)	COARSE ALLUVIUM			2	FA					
					3	FA					
					4	FA					
20	**LEAN CLAY WITH SAND**: a little gravel, gray, moist to wet, (CL)	GLACIAL TILL			5	FA					
					6	FA					
30	Bottom of borehole at 30 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-10-23	11:14 am	30	--	28	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-10-23 COMPLETE 7-10-23 11:14 am

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **20 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-10-23	12:12 pm	15	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-10-23 COMPLETE 7-10-23 12:11 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **21 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-6-23	7:18 pm	15	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-6-23 COMPLETE 7-6-23 7:18 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **22 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	LEAN CLAY: dark brown, dry to moist, with a few cobbles (CL)	FINE ALLUVIUM			1	FA					
5	Refusal at 5 feet. Bottom of borehole at 5 feet.										

WATER LEVEL MEASUREMENTS

START 7-10-23 COMPLETE 7-10-23 12:54 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-10-23	12:54 pm	5	--	5	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **23 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: dark brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
3	**SAND WITH SILT**: a trace of gravel, fine to medium grained, brown, dry to moist, (SP-SM)	COARSE ALLUVIUM			2	FA					
					3	FA					
17	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL		▼	4	FA					
					5	FA					
					6	FA					
30	Bottom of borehole at 30 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-10-23	1:27 pm	30	--	23	▼ 23
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

START 7-10-23 COMPLETE 7-10-23 1:27 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

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GEOTECHNICAL TEST BORING LOG

GEOTEK # **23-0946** BORING NO. **24 (1 of 1)**

PROJECT **Sand & Gravel Exploration, Van Zee Property, Near Platte, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS WC	D	LL	PL	QU
	SANDY LEAN CLAY: brown, dry to moist, (CL)	FINE ALLUVIUM			1	FA					
5	**LEAN CLAY WITH SAND**: a little gravel, brown, moist, (CL)	GLACIAL TILL			2	FA					
					3	FA					
15	Bottom of borehole at 15 feet.										

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL
7-10-23	1:54 pm	15	--	14	none
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

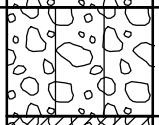
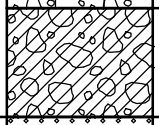
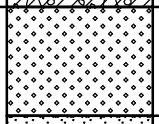
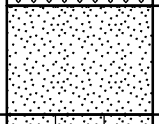
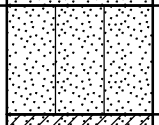
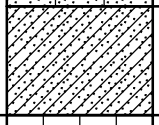
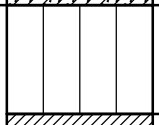
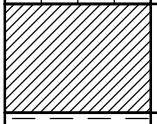
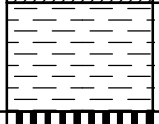
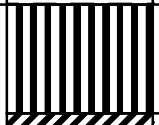
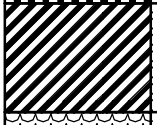
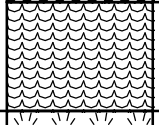
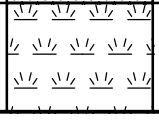
START 7-10-23 COMPLETE 7-10-23 1:54 pm

METHOD
6" Flight Auger

CREW CHIEF Mike Wagner

GEOTECHNICAL TEST BORING 23-0946.GPJ GEOTEKENG.GDT 7/18/23

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS AND DESCRIPTIVE TERMINOLOGY

SYMBOLS FOR DRILLING AND SAMPLING

Symbol	Definition
Bag	Bag sample
CS	Continuous split-spoon sampling
DM	Drilling mud
FA	Flight auger; number indicates outside diameter in inches
HA	Hand auger; number indicates outside diameter in inches
HSA	Hollow stem auger; number indicates inside diameter in inches
LS	Liner sample; number indicates outside diameter of liner sample
N	Standard penetration resistance (N-value) in blows per foot
NMR	No water level measurement recorded, primarily due to presence of drilling fluid
NSR	No sample retrieved; classification is based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit
SH	Shelby tube sample; 3-inch outside diameter
SPT	Standard penetration test (N-value) using standard split-spoon sampler
SS	Split-spoon sample; 2-inch outside diameter unless otherwise noted
WL	Water level directly measured in boring
▼	Water level symbol

SYMBOLS FOR LABORATORY TESTS

Symbol	Definition
WC	Water content, percent of dry weight; ASTM:D2216
D	Dry density, pounds per cubic foot
LL	Liquid limit; ASTM:D4318
PL	Plastic limit; ASTM:D4318
QU	Unconfined compressive strength, pounds per square foot; ASTM:D2166

DENSITY/CONSISTENCY TERMINOLOGY

Density Term	N-Value	Consistency Term
Very Loose	0-4	Soft
Loose	5-8	Firm
Medium Dense	9-15	Stiff
Dense	16-30	Very Stiff
Very Dense	Over 30	Hard

PARTICLE SIZES

Term	Particle Size
Boulder	Over 12”
Cobble	3” – 12”
Gravel	#4 – 3”
Coarse Sand	#10 – #4
Medium Sand	#40 – #10
Fine Sand	#200 – #40
Silt and Clay	passes #200 sieve

DESCRIPTIVE TERMINOLOGY

Term	Definition
Dry	Absence of moisture, powdery
Frozen	Frozen soil
Moist	Damp, below saturation
Waterbearing	Pervious soil below water
Wet	Saturated, above liquid limit
Lamination	Up to ½” thick stratum
Layer	½” to 6” thick stratum
Lens	½” to 6” discontinuous stratum

GRAVEL PERCENTAGES

Term	Range
A trace of gravel	2-4%
A little gravel	5-15%
With gravel	16-50%

GEOTEK ENGINEERING
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REPORTED TO:

Doug Van Zee
724 Park Lane South
Canton, South Dakota 57013

PROJECT: 23-0946

Sand & Gravel Exploration
Van Zee Property
Near Platte, South Dakota

COPIES TO:

DATE REPORTED: 7/18/2023

Sample Information

Sampled By: Flight Auger

Material Type: Sand and Gravel

Tested By: GeoTek

Date Received: 7/6/2023 & 7/10/2023

Date Tested: 7/17/2023

Laboratory Test Data (ASTM C 136)

	Test Boring Location / Depth (ft)						
	4	5	11	13	13	17	19
	15’ – 20’	10’ – 15’	15’ – 20’	10’ – 15’	25’ – 30’	10’ – 15’	10’ – 15’
Sieve Size	Percent Passing						
3”	100	100	100	100	100	100	100
2”	100	100	100	100	100	100	100
1 ½”	100	100	100	100	100	100	100
1"	100	100	98	100	99	99	99
3/4"	98	100	96	99	97	98	96
5/8”	97	100	93	98	93	96	94
1/2"	93	98	89	95	84	93	91
3/8"	88	94	86	92	77	88	87
#4	72	78	75	79	61	76	71
#8	49	62	65	69	49	66	55
#16	31	50	55	60	38	56	43
#40	15	28	25	47	26	37	27
#50	12	20	14	41	22	24	21
#100	8	12	8	23	15	11	14
#200	7.2	10.3	6.6	16.4	11.1	9.3	11.9

Remarks:

By: _____

Nick Bierle, PE