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Geotechnical Evaluation Report

9th Street Northeast Reconstruction

SU-8-992(045); PCN 23537
Main Avenue to 12th Avenue
West Fargo, North Dakota

Prepared for

Houston Engineering, Inc.

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

REGISTERED PROFESSIONAL ENGINEER
EZRA BALLINGER
PE 7328
DATE 11-25-2025
NORTH DAKOTA

Ezra Ballinger, PE
Principal Engineer
Registration Number: PE-7328
November 25, 2025

Braun Intertec Corporation

Project B2212151

November 25, 2025 Project B2212151

Jeff Lansink, PE
Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Re: Geotechnical Evaluation
9th Street Northeast Reconstruction
SU-8-992(045); PCN 23537
Main Avenue to 12th Avenue
West Fargo, North Dakota

Dear Mr. Lansink:

We are pleased to present this Geotechnical Evaluation Report for the proposed reconstruction of 9th Street Northeast from Main Avenue to 12th Avenue. The purpose of this geotechnical evaluation is to assist Houston Engineering, Inc. (Houston) and the other project team members in designing the pavement section and providing recommendations for the project earthwork. Our results and recommendations are summarized in the attached report.

Thank you for making Braun Intertec Corporation (Braun Intertec) your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Ezra Ballinger at 701.205.2515 (eballinger@braunintertec.com).

Sincerely,
Braun Intertec Corporation

Cody Mathiason
Senior Manager

Ezra Ballinger, PE
Principal Engineer

Table of Contents

Table of Contents (Continued)

Appendix

List of Tables

1.0 Introduction

1.1 Project Description

This geotechnical evaluation report addresses the reconstruction of an approximate 0.9-mile section of 9th Street Northeast in West Fargo. The project termini are Main Street on the south end and at the south side of the roundabout at 12th Avenue Northeast on the north end. The current alignment is a two-lane rural roadway that will be reconstructed as a three-lane modified urban section and will include a sidewalk on one or both sides depending on the location. The vertical alignment will largely match the existing at centerline and involve fills of a few feet in the existing ditches and beneath the new sidewalks. The scope of the project is illustrated in the Soil Boring Location Sketch attached in the Appendix of this report.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses, and/or recommendations.

1.2 Site Conditions and History

The roadway currently exists as a two-lane, bituminous-surfaced, rural section roadway throughout the project area. There is a railroad crossing approximately ¼ mile north of the south terminus. Ditches border the roadway on the east and west sides. The pavements are generally in good condition.

1.3 Purpose

The purpose of the geotechnical evaluation is to assist Houston Engineering, Inc. (Houston) and the project stakeholders with the evaluation of the soil beneath the roadway and in the widening areas.

1.4 Background Information and Reference Documents

We reviewed the following information:

- Drawings titled 9th Street NE, Main Ave to 12th Ave N, Cass County, City of West Fargo, North Dakota, Project No. SU-8-992(045) provided by Jeff Lansink of Houston via email on February 23, 2023.
- Aerial photography of the site available in Google Earth™ with an imagery date of July 2021.
- The Geologic Map of North Dakota (L. Clayton, 1980) for aid in classification of the existing soils.
- The NDDOT Standard Specifications for Road and Bridge Construction, dated 2024.

1.5 Scope of Services

We performed our scope of services for the project in accordance with our Proposal to Houston, dated June 30, 2022, and authorized on October 18, 2022. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and clearing the exploration location of underground utilities. We selected and staked the new exploration locations. We acquired the surface elevations by interpolation from the plans provided by Houston. Location coordinates were collected with a commercially available handheld GPS. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.
- Performing 21 flight auger borings, denoted as LSS-01 to LSS-21, to nominal depths of 7 feet below grade across the site.
- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.
- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations design and construction of pavements.

2.0 Results

2.1 Geologic Overview

The project area is underlain by soil placed by sediments from Glacial Lake Agassiz which once covered the area. These soils extend to depths of about 90 to 100 feet and are underlain by stronger glacial till soils placed during past glaciations.

We based the geologic origins used in this report on the soil types, laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

2.2 Boring Results

All our borings were advanced through the pavement surface. The approximate bituminous pavement thicknesses encountered at each boring location are provided in Table 2-1.

Table 2-1. Existing Pavement Section

Boring Number	Bituminous Thickness (inches)	"Aggregate Base"[1] Thickness (inches)
LSS-01	5 1/2	10
LSS-02	9	9
LSS-03	9	12
LSS-04	9	15
LSS-05	8	22
LSS-06	8	7
LSS-07	9	5
LSS-08	8	7
LSS-09	9	6
LSS-10	10	7
LSS-11	8	6
LSS-12	10	4
LSS-13	10	4
LSS-14	10	6
LSS-15	8	5
LSS-16	8	5
LSS-17	8	5
LSS-18	10	7
LSS-19	8	6
LSS-20	8	6
LSS-21	8	5

[1]The "Aggregate Base" layer is the granular soils identified immediately beneath the bituminous in the borings. Additional testing would be required to confirm that these soils meet the requirements of an NDDOT Class 5 Aggregate Base Course. These soils should not be considered for reuse as Class 5 if additional testing is not performed prior to construction.

Beneath the pavement section we encountered primarily fat clay soils to the depth explored. These soils contained a mix of organics in some cases just below the "aggregate base" and often contained sand and silt lenses and laminations. A layer of clayey sand was encountered in Borings LSS-04, LSS-05, LSS-10 and LSS-21. The soils generally graded wetter with depth.

2.3 Groundwater

We did not observe groundwater while performing our bores. Groundwater may take days or longer to reach equilibrium in the boreholes and we immediately backfilled them, in accordance with our scope of work. Based on our experience in the area we anticipate that seasonally, stabilized groundwater levels will be within the upper 5 to 10 feet of the ground surface. If the project team identifies a need for more accurate determination of groundwater depth, we can install piezometers. Project planning should anticipate seasonal and annual fluctuations of groundwater.

2.4 Laboratory Test Results

The boring logs show the results of moisture content testing we performed, next to the tested sample depth. We also performed Atterberg limits, mechanical sieve-hydrometer, and standard Proctor testing on bulk samples of material obtained from each boring. The Appendix contains the results of these tests.

3.0 Recommendations

3.1 Design and Construction Discussion

3.1.1 Traffic Loads

The roadway is planned to have a concrete pavement section. You provided us with the following traffic data to use in our pavement design.

- 7,500 total vehicles per day with 8.9% heavy trucks in 2023
- 9,300 total vehicles per day with 8.9% heavy trucks in 2043

Based on the provided vehicle types and quantities we calculate the total equivalent 18-kip single axle loads (ESALs) over the design life of 20 years to be approximately 4.5 million.

3.1.2 Existing Pavement Section

The pavement material thicknesses measured in our borings are presented in Table 2-1. The average bituminous thickness measured at the boring locations was about 8 1/2 inches. We also noted granular soils that appeared to be like aggregate base, but testing to confirm the actual material properties/classification was not a part of this scope. This material ranged in thickness from 4 to 22 inches, with typical values being between 5 and 7 inches.

3.1.3 Pavement Subgrade Strength

While California Bearing Ratio (CBR) tests were not included in our project scope, based on our familiarity with the project soils and past projects, we utilized a CBR of 2.5 to perform our pavement design.

3.1.4 Pavement Subgrade Drainage

Due to the frost susceptible nature of the fat clay soils at the site, consideration should be given to ensuring the subgrade beneath the aggregate base is crowned to drain water. Water should not be allowed to pond on and infiltrate the subgrade. This will enhance subgrade drainage efforts and reduce the potential for the subgrades to become saturated and heave upon freezing; strength loss upon thawing will also be reduced.

3.1.5 Potential Environmental Contamination

At the southern end of the project alignment the roadway runs alongside a tank farm. This portion of the project has been evaluated for environmental contaminants in the past and may require special handling when the contractor is working in this area. We provided our information related to the environmental impacts to Houston.

3.2 Roadway Construction

3.2.1 Removals and Scarification

We recommend existing pavements, including the bituminous surface and any aggregate base materials, be removed from the current roadway alignment. Where the new roadway will extend over areas that were previously ditches, we recommend stripping existing vegetation, trees, topsoil, and root zones from beneath the proposed pavement and shoulders. Removal should extend from the proposed left grading point of intersection (PI) to the proposed right grading PI, then down and out at a 1H:1V slope to at least 3 feet below the aggregate base of the proposed pavement and shouldering.

We also recommend materials that have an organic content greater than 5 percent be removed from within 3 vertical feet of the proposed subgrade located between the shoulder lines.

3.2.2 Excavated Slopes

Based on the borings, we anticipate on-site soils in excavations will consist of fat clay. These soils are typically considered Type B Soil under OSHA (Occupational Safety and Health Administration) guidelines above groundwater and Type C Soil below groundwater. OSHA guidelines indicate unsupported excavations in Type B Soil should have a gradient no steeper than 1H:1V and in Type C Soil, gradients should be limited to 1.5H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches.” This document states that excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

3.2.3 Excavation Dewatering

We recommend removing groundwater from the excavations. Project planning should include temporary sumps and pumps for excavations in low-permeability soils, such as clays.

3.2.4 Excavation Backfill and Additional Required Fill

The existing bituminous surfacing may be recycled and mixed with imported or on-site aggregate base to manufacture material that meets the requirements for Class 5 aggregate base materials. The existing granular fills soils immediately beneath the bituminous section may also be used provided additional testing shows that it meets, or can be blended to meet, the requirements for Class 5 aggregate base.

Organic soil removed from the excavations should be segregated and stockpiled for removal from the site. These materials should not be reused as embankment fill below the roadway. These soils could be reused as topsoil, if desired once the roadway reconstruction has been completed.

The excavated materials may be reused in widening areas as needed. Imported soils may consist of fat clays (CH) or lean clays (CL) like the existing soils provided they are free of organic material and debris. Topsoil or organic soils should not be used within 3 vertical feet of pavement subgrades. We recommend the materials be placed in loose lifts not to exceed 8 inches, be moisture conditioned to within 0 to 4 percentage points above optimum and compacted to a minimum of 95 percent.

3.3 Pavement Section

3.3.1 Pavement Subgrade Proof Roll

After preparing the subgrade as described above and prior to the placement of the aggregate base, we recommend proof-rolling the subgrade soils with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the proof roll. Areas that fail the proof roll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the proof roll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and recompacting, sub cutting material and replacing it with soil or crushed aggregate, chemical stabilization, and/or geotextiles. We recommend performing a second proof roll after the aggregate base material is in place, and prior to placing concrete pavement.

3.3.2 Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine a CBR value for pavement design. Based on our experience with similar fat clay soils anticipated at the pavement subgrade elevation, we recommend pavement design assume a CBR value of 2.5. Note the contractor may need to perform limited removal of unsuitable or less suitable soil to achieve this value.

For calculation of the rigid pavement thicknesses, we utilized Figure 3.7 of the AASHTO Guide for Design of Pavement Structures. The input parameters used in our rigid pavement thickness calculations were:

- Effective modulus of subgrade reaction (k) = 100 pounds per cubic inch (pci)
- Mean concrete modulus of rupture = 650 pounds per square inch (psi)
- Load transfer coefficient = 3.2
- Drainage coefficient = 0.9
- Design serviceability loss = 2.2
- ESALs = 4.5 million

- Reliability = 85%
- Standard deviation = 0.35

Based on the anticipated traffic loads and subgrade parameters stated above, we recommend the pavement section consists of 12-inches of NDDOT Class 5 Aggregate Base Course with 10-inches of concrete pavement. We recommend specifying concrete for pavements that have a minimum 28-day compressive strength of 4,000 psi. Note that it is our understanding that 12-inches is the minimum required aggregate base section by the City of West Fargo. If a reduced base thickness is considered, we recommend 6-inches as a minimum.

We also recommend the use of geotextile separation fabric between the pavements and the clay subgrades. The intention of the geotextile separation fabric is to provide separation between the aggregate base and the clay layer to maintain the pavement's aggregate base thickness over the life of the pavement; and also, to maintain the drainage capabilities of the aggregate base materials. The use of geotextile separation fabric is accounted for in the thickness calculations within the Drainage Coefficient.

3.3.3 Materials and Compaction

We recommend specifying aggregate base meeting the requirements of the North Dakota Department of Transportation (NDDOT) Specification 816.02 for Class 5 Aggregate Base. We recommend the bituminous wear and base courses meet the requirements of NDDOT Specification 818.02.

We recommend the aggregate base be compacted to a minimum of 100 percent of its maximum standard Proctor dry density. We recommend that the bituminous pavement be compacted to at least 92.5 percent of the maximum theoretical density, with no individual test results less than 90 percent.

We recommend specifying concrete for pavements that has a minimum 28-day compressive strength of 4,000 psi, and a modulus of rupture (Mr) of at least 650 psi. We also recommend Type I cement meeting the requirements of ASTM C 150. We recommend specifying 5 to 8 percent entrained air for exposed concrete to provide resistance to freeze-thaw deterioration. We also recommend using a water/cement ratio of 0.45 or less for non-reinforced concrete exposed to de-icers; and a water/cement ratio of 0.40 or less for reinforced concrete exposed to de-icers.

We recommend geotextile separation fabric meet the NDDOT Specification 858 for Type S1 or S2 Separation fabrics (non-woven). Consideration could also be given to using Type R1 as it will provide some reinforcement as well as separation.

3.3.4 Subgrade Drainage

We recommend drainage be provided for aggregate base placed over the on-site soil or similar soil. Drainage should be provided by sloping the subgrade and daylighting the aggregate base to the shoulders. Loosely placed topsoil over the aggregate slough generally will not impede the flow of water out of the aggregate base layer provided the subgrade is sloped to drain to the ditches. Water should not be allowed to infiltrate the clay

subgrade but instead flow down the in-slopes and be collected and routed through the ditches and culverts on either side of the road.

4.0 Procedures

4.1 Power Auger Borings

We performed the power auger borings with a truck-mounted auger drill in general accordance with ASTM D1452. We inferred the soil classifications and strata depths from the cuttings brought to the surface by dead pulling the auger after screwing it to selected depths in the ground. At desired depths, we placed auger cuttings in bags and jars.

4.2 Exploration Logs

4.2.1 Log of Boring Sheets

The Appendix includes Log of Boring sheets for our power auger borings. The logs identify and describe the penetrated geologic materials and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on samples and groundwater measurements. The Appendix also includes a Fence Diagram intended to provide a summarized cross-sectional view of the soil profile across the site.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

4.2.2 Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) laboratory test results, and (4) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

4.3 Material Classification and Testing

4.3.1 Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

4.3.2 Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM or AASHTO procedures.

4.4 Groundwater Measurements

The drillers checked for groundwater while advancing the power auger borings, and again after auger withdrawal. We then filled the boreholes or allowed them to remain open for an extended period of observation, as noted on the boring logs.

5.0 Qualifications

5.1 Variations in Subsurface Conditions

5.1.1 Material Strata

We developed our evaluation, analyses, and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation, and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may re-evaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

5.1.2 Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications, and other seasonal and annual factors.

5.2 Continuity of Professional Responsibility

5.2.1 Plan Review

We based this report on a limited amount of information, and we made several assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design

changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

5.2.2 Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the bores and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

5.3 Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

5.4 Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix

Soil Boring Location Sketch
Fence Diagram
Log of Boring Sheets LSS-01 to LSS-21
Descriptive Terminology of Soil
Laboratory Test Results

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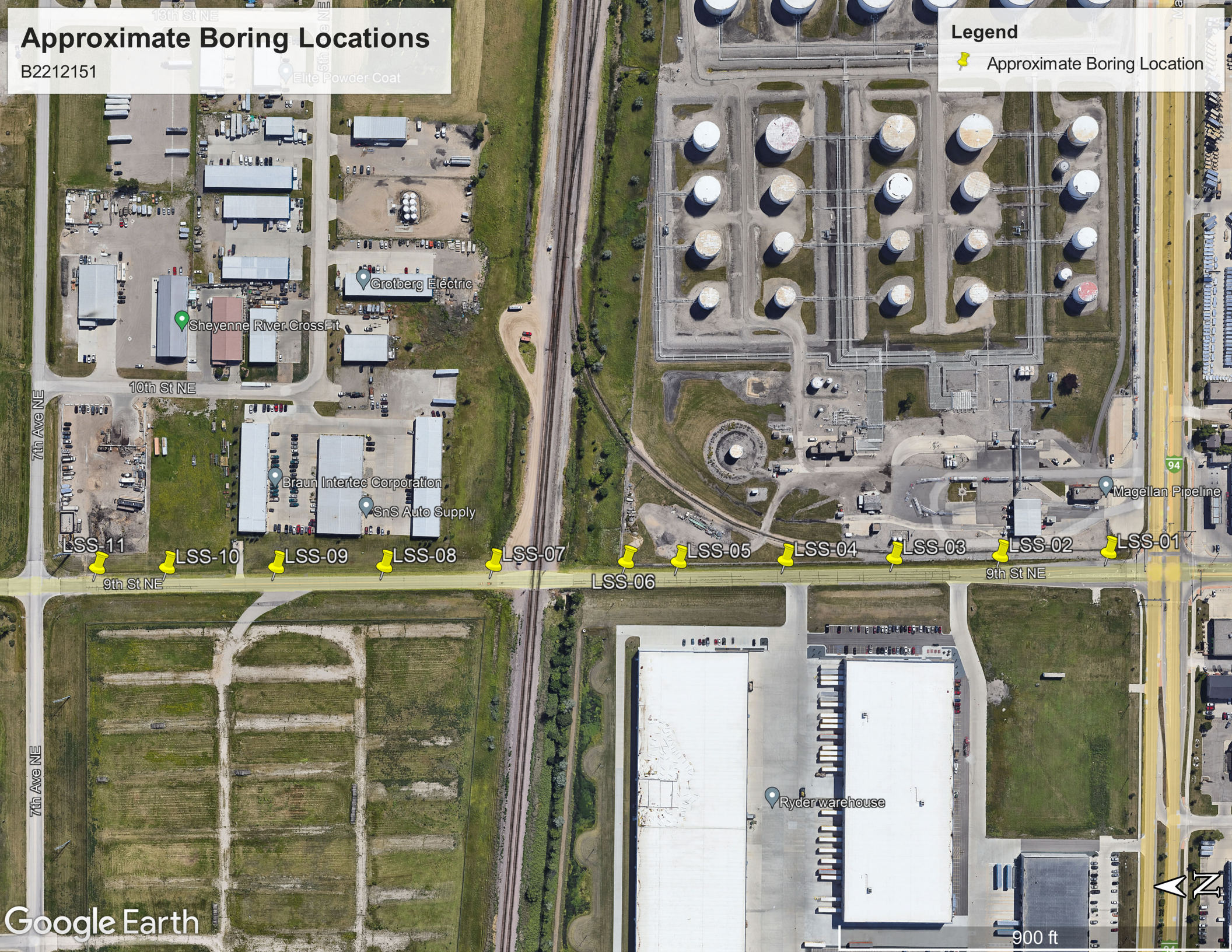
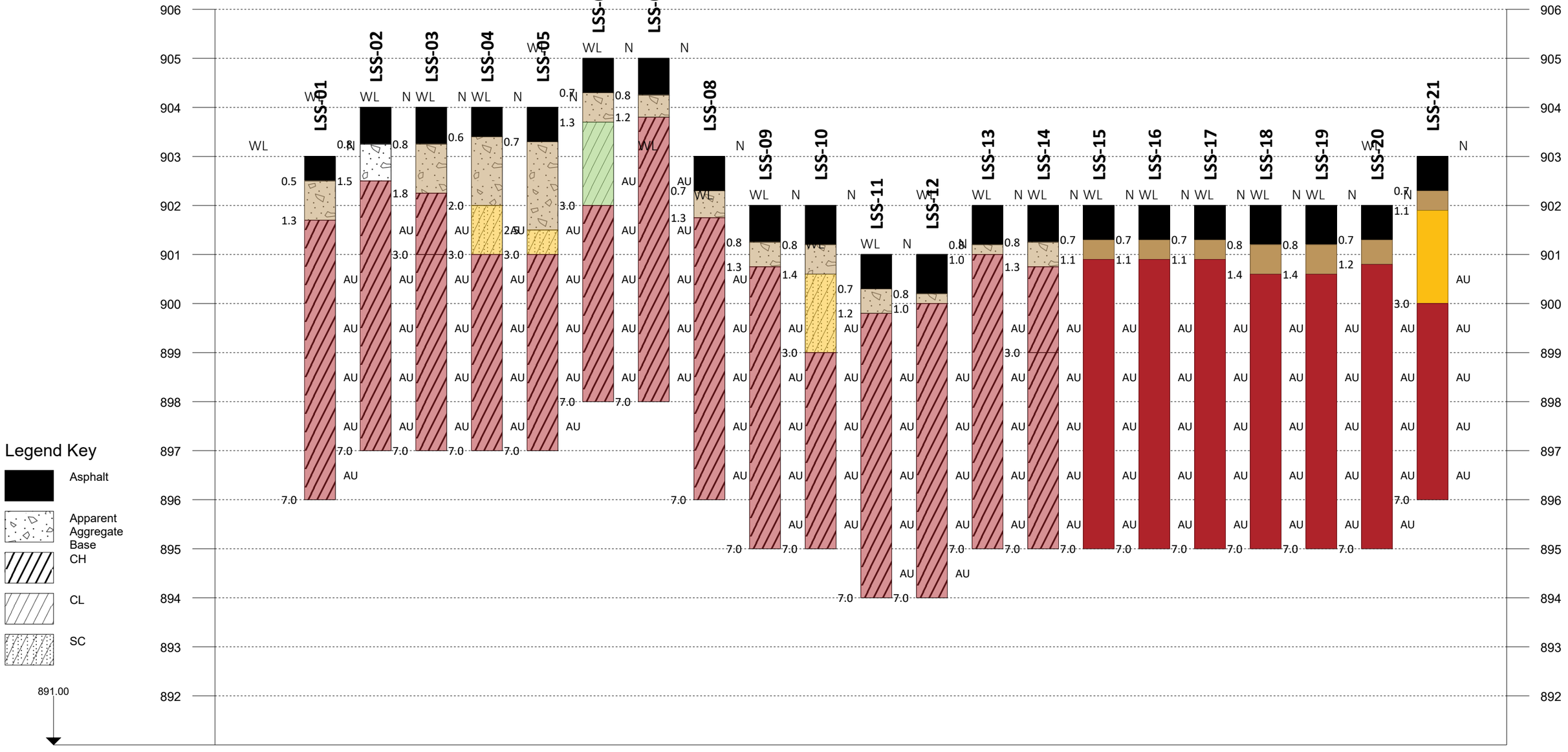

Approximate Boring Locations
B2212151
Legend
Approximate Boring Location
13th St NE
Elite Powder Coat
Grotberg Electric
Sheyenne River CrossFit
10th St NE
7th Ave NE
Braun Intertec Corporation
SnS Auto Supply
Magellan Pipeline
94
LSS-11
LSS-10
LSS-09
LSS-08
LSS-07
LSS-06
LSS-05
LSS-04
LSS-03
LSS-02
LSS-01
9th St NE
9th St NE
Ryder warehouse
7th Ave NE
Google Earth
900 ft
N

Approximate Boring Locations

B2212151



SECTION LINE 1

Fence Diagram
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

Project ID:	B2212151
Vert. Scale:	1"= 2'
Hor. Scale:	NTS
Date:	02/24/2023

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-01**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.87698 LONGITUDE: -96.88276
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 903.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
902.5		BITUMINOUS, Bituminous surfacing, 5 1/2 inches					
0.5 901.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed), 10 inches					
1.3		FAT CLAY (CH), brown to dark brown					
		Trace Sand from 2 to 4 feet		AU		7	
				AU		30	
		Silt lenses and gray and brown below 4 feet					Frost to a depth of 4 feet
				AU		34	
			5				
				AU		26	
							Pavement Restored with Bituminous Patch
				AU		33	
896.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-02**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.87767 LONGITUDE: -96.88278
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 904.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
903.2		BITUMINOUS, Bituminous surfacing, 9 inches					
0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed), 9 inches					
902.5							
1.5		FAT CLAY (CH), brown to dark brown					
		Trace Sand from 2 to 4 feet					Frost to a depth of 4 feet
				AU		7	
				AU		30	
		Fat Clay, Silt lenses, brown and gray below 4 feet					
				AU		34	
			5				
				AU		28	
							Pavement Restored with Bituminous Patch
				AU		31	
897.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-03**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.87834 LONGITUDE: -96.88280
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 904.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
903.2		BITUMINOUS, Bituminous surfacing, 9 inches					
0.8 902.2		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed), 12 inches					
1.8 901.0		FAT CLAY (CH), fine to coarse-grained, trace Gravel, brown and gray		AU		1	Frost to a depth of 4 feet
3.0		FAT CLAY (CH), dark brown to gray		AU		15	
		Dark brown to gray and trace Sand to 4 feet *Silt lenses below 4 feet*		AU		31	
			5	AU		32	
							Pavement Restored with Bituminous Patch
897.0				AU		30	
7.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-04**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.87904 LONGITUDE: -96.88281
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 904.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
903.4	BITUMINOUS, Bituminous surfacing, 9 inches					
0.6	APPARENT AGGREGATE BASE, SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
902.0						Frost to a depth of 4 feet
2.0	CLAYEY SAND (SC), fine to coarse-grained, trace Gravel, brown, moist		AU		4	
901.0						
3.0	FAT CLAY (CH), fine to coarse-grained, trace Gravel, trace Sand, dark brown, moist		AU		13	
			AU		34	
5	*Trace Sand to 5 feet* *Silt lenses below 5 feet*		AU		28	
						Pavement Restored with a Bituminous Patch
			AU		28	
897.0						
7.0	END OF BORING					Water not observed while drilling.
	Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-05**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.87971 LONGITUDE: -96.88282
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 904.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
903.3	BITUMINOUS, Bituminous surfacing, 8 inches					
0.7	APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, dark brown to gray, moist					Frost to a depth of 4 feet
901.5			AU		4	
2.5	CLAYEY SAND (SC), trace Gravel, brown, moist					
901.0			AU		12	
3.0	FAT CLAY (CH), fine to coarse-grained, trace Gravel, dark brown to gray, moist					
			AU		31	
	Trace Sand to 5 feet	5				
	Silt lenses below 5 feet		AU		34	
						Pavement Restored with Bituminous Patch
			AU			
897.0						
7.0	END OF BORING					Water not observed while drilling.
	Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-06**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88005 LONGITUDE: -96.88281
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 905.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
904.3		BITUMINOUS, Bituminous surfacing, 8 inches					
0.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, brown, frozen (moist when thawed)					
903.7							
1.3		SANDY LEAN CLAY (CL), trace Gravel, dark brown, moist					Frost to a depth of 4 feet
				AU		3	
902.0							
3.0		FAT CLAY (CH), fine to coarse-grained, trace Sand, trace Gravel, dark brown to gray, moist					
				AU		21	
				AU		19	
			5				
		Silt lenses below 5 feet					
				AU		30	
							Pavement Restored with Bituminous Patch
				AU		29	
898.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-07**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88089 LONGITUDE: -96.88283
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 905.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BITUMINOUS, Bituminous surfacing, 9 inches					
904.2							
0.8							
903.8							
1.2		FAT CLAY (CH), fine to coarse-grained, trace Gravel, trace Sand, dark brown to gray					Frost to a depth of 4 feet
				AU		4	
				AU		23	
		Silt lenses below 4 feet					
				AU		21	
5							
				AU		24	
							Pavement Restored with Bituminous Patch
				AU		30	
898.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-08**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88159 LONGITUDE: -96.88284
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 903.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
902.3		BITUMINOUS, Bituminous surfacing, 8 inches					
0.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
901.8							
1.3		FAT CLAY (CH), fine to coarse-grained, trace Gravel, trace Sand, brown and gray					Frost to a depth of 4 feet
				AU		5	
		Silt lenses below 3 feet					
				AU		22	
				AU		26	
5							
				AU		20	
							Pavement Restored with Bituminous Patch
				AU		37	
896.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-09**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88228 LONGITUDE: -96.88284
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.2		BITUMINOUS, Bituminous surfacing, 9 inches					
0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
900.8							
1.3		FAT CLAY (CH), fine to coarse-grained, trace Sand, trace Gravel (TOPSOIL)					Frost to a depth of 4 feet
				AU		4	
				AU			
				AU		23	
5							
				AU		30	
		Silt lenses at 6 feet					Pavement Restored with Bituminous Patch
				AU		30	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-10**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88297 LONGITUDE: -96.88284
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.2		BITUMINOUS, Bituminous surfacing, 10 inches					
0.8 900.6		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown					
1.4 899.0		CLAYEY SAND (SC), fine to coarse-grained, trace Gravel, brown		AU		3	Frost to a depth of 4 feet
3.0		FAT CLAY (CH), fine to coarse-grained, trace Gravel, trace Sand, brown gray *Silt lenses below 3 feet*		AU		12	
				AU		31	
			5				
				AU		35	Pavement Restored with Bituminous Patch
895.0				AU		32	
7.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-11**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88342 LONGITUDE: -96.88283
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 901.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
900.3		BITUMINOUS, Bituminous surfacing, 8 inches					
0.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
899.8		FAT CLAY (CH), fine to coarse-grained, trace Sand, trace Gravel, brown to gray					
1.2							Frost to a depth of 4 feet
				AU		3	
				AU		16	
		Silt lenses below 4 feet					
				AU		30	
			5				
				AU		29	
							Pavement Restored with Bituminous Patch
				AU		27	
894.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-12**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88420 LONGITUDE: -96.88284
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 901.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BITUMINOUS, Bituminous surfacing, 10 inches					
900.2 0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, brown, frozen (moist when thawed), 4 inches					
900.0 1.0		FAT CLAY (CH), trace Clayey Sand, Gravel, brown to gray					Frost to a depth of 4 feet
				AU		20	
		Silt lenses below 3 feet					
				AU		26	
				AU		27	
			5				
				AU		24	
							Pavement Restored with Bituminous Patch
				AU		22	
894.0 7.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-13**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88486 LONGITUDE: -96.88287
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BITUMINOUS, Bituminous surfacing, 10 inches					
901.2 0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, brown, frozen (moist when thawed), 4 inches					
901.0 1.0		FAT CLAY (CH), trace Sand, little Gravel, brown to gray					Frost to a depth of 4 feet
				AU		5	
				AU		23	
		Silt lenses below 4 feet					
				AU		30	
5							
				AU		28	
							Pavement Restored with Bituminous Patch
				AU		30	
895.0 7.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-14**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88520 LONGITUDE: -96.88285
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.2		BITUMINOUS, Bituminous surfacing, 9 inches					
0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, frozen (moist when thawed), 6 inches					
900.8							
1.3		FAT CLAY with SAND (CH), trace Gravel, brown, moist					Frost to a depth of 4 feet
				AU		3	
899.0							
3.0		FAT CLAY (CH), trace Gravel, trace Sand, brown to gray, moist					
				AU		22	
		Silt lenses below 4 feet					
				AU		31	
			5				
				AU		31	
							Pavement Restored with Bituminous Patch
				AU		32	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-15**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88571 LONGITUDE: -96.88287
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BITUMINOUS, Bituminous surfacing, 8 inches					
901.3							
0.7		POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed), 5 inches					
900.9							
1.1		FAT CLAY (CH), trace Sand, trace Gravel, brown to gray, moist					
							Frost to a depth of 4 feet
				AU		4	
				AU		20	
		Silt lenses below 4 feet					
				AU		32	
5							
				AU		31	
							Pavement Restored with Bituminous Patch
				AU		28	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-16**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88667 LONGITUDE: -96.88286
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.3	BITUMINOUS, Bituminous surfacing, 8 inches					
0.7	APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
900.9	FAT CLAY (CH), trace Sand, trace Gravel, brown to gray, moist					
1.1						Frost to a depth of 4 feet
			AU		3	
			AU		27	
	Silt lenses below 4 feet					
			AU		30	
5						
			AU		32	
						Pavement Restored with Bituminous Patch
			AU		32	
895.0						
7.0	END OF BORING					Water not observed while drilling.
	Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-17**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88720 LONGITUDE: -96.88288
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.3		BITUMINOUS, Bituminous surfacing, 8 inches					
0.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), trace Gravel, brown, frozen (moist when thawed), 5 inches					
900.9		FAT CLAY (CH), trace Sand, trace Gravel, brown to gray					
1.1							Frost to a depth of 4 feet
				AU		17	
				AU		28	
				AU		24	
		Silt lenses below 5 feet	5				
				AU		31	
							Pavement Restored with Bituminous Patch
				AU		29	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-18**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88788 LONGITUDE: -96.88288
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.2		BITUMINOUS, Bituminous surfacing, 10 inches					
0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed), 7 inches					
900.6							
1.4		FAT CLAY (CH), Gravel, brown to gray, moist					
		Trace Sand from 2 to 4 feet					Frost to a depth of 4 feet
				AU		18	
				AU		29	
		Silt lenses below 4 feet					
				AU		33	
			5				
				AU		23	
							Pavement Restored with Bituminous Patch
				AU		27	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-19**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88871 LONGITUDE: -96.88289
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.2		BITUMINOUS, Bituminous surfacing, 8 inches					
0.8		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed), 6 inches					
900.6							
1.4		FAT CLAY (CH), trace Gravel, brown to gray, moist					Frost to a depth of 4 feet
				AU		3	
		Trace Sand to 3 feet					
		Silt lenses below 3 feet		AU		28	
				AU		33	
			5				
				AU		29	Pavement Restored with Bituminous Patch
				AU		24	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-20**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88919 LONGITUDE: -96.88290
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 902.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
901.3		BITUMINOUS, Bituminous surfacing, 8 inches					
0.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
900.8							
1.2		FAT CLAY (CH), trace Gravel, brown to gray, moist					Frost to a depth of 4 feet
				AU		20	
				AU		28	
				AU		28	
		Trace Sand to 5 feet	5				
		Silt lenses below 5 feet		AU		29	
							Pavement Restored with Bituminous Patch
				AU		29	
895.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2212151
Geotechnical Evaluation
SU-8-992(045); PCN 23537
9th St NE
West Fargo , North Dakota

BORING: **LSS-21**
LOCATION: See attached sketch
DATUM: WGS 84
LATITUDE: 46.88979 LONGITUDE: -96.88290
DRILLER: M. Swenson LOGGED BY: C. Mathiason START DATE: 01/24/23 END DATE: 01/24/23
SURFACE ELEVATION: 903.0 ft RIG: 7508 METHOD: 3 1/4" HSA SURFACING: Bituminous Pavement WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
902.3		BITUMINOUS, Bituminous surfacing, 8 inches					
0.7		APPARENT AGGREGATE BASE, POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, frozen (moist when thawed)					
901.9							
1.1		CLAYEY SAND (SC), Gravel, brown, moist					Frost to a depth of 4 feet
				AU		25	
900.0							
3.0		FAT CLAY (CH), trace Gravel, brown to gray, moist					
				AU		31	
		Trace Sand to 4 feet					
				AU		28	
			5				
		Silt lenses below 5 feet					
				AU		30	
							Pavement Restored with Bituminous Patch
				AU		28	
896.0							
7.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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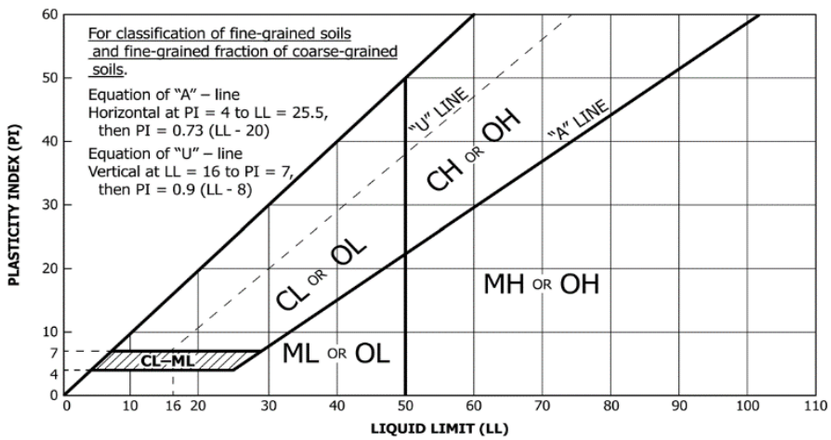
Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3^D$	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3^D$	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[I]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K L M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OL	Organic clay[K L M N] / Organic silt[K L M O]
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K L M]
			PI plots below "A" line	MH	Elastic silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OH	Organic clay[K L M P] / Organic silt[K L M Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	**q_p**	Pocket penetrometer strength, tsf
WD	Wet density, pcf	**q_U**	Unconfined compression test, tsf
P200	% Passing #200 sieve	**LL**	Liquid limit
MC	Moisture content, %	**PL**	Plastic limit
OC	Organic content, %	**PI**	Plasticity index

Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L,M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▽▼).

Sample Symbols

Standard Penetration Test
Modified California (MC)
Auger
Grab Sample
Rock Core
Thinwall (TW)/Shelby Tube (SH)
Texas Cone Penetrometer
Dynamic Cone Penetrometer

5/2021

Hydrometer And Sieve Analysis

AASHTO T88

02/10/2023

BRAUN INTERTEC
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526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

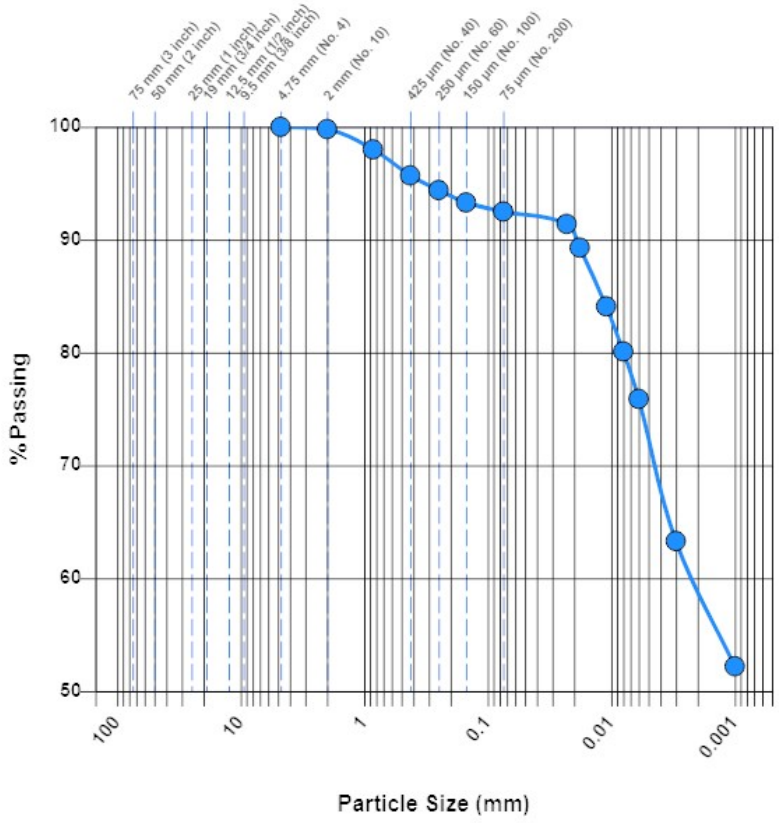
Sample Information

Sample Number:	504319	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-01		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/09/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.8	-
850 µm (No. 20)	98.0	-
425 µm (No. 40)	95.7	-
250 µm (No. 60)	94.4	-
150 µm (No. 100)	93.3	-
75 µm (No. 200)	92.5	-
22.8 (µm)	91.4	-
17.8 (µm)	89.3	-
10.6 (µm)	84.1	-
7.6 (µm)	80.1	-
5.5 (µm)	75.9	-
2.8 (µm)	63.3	-
1.2 (µm)	52.2	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%):	0.2	**Sand (%):**	7.3	**Silt (%):**	34.7	**Clay (%):**	57.8
D_{60} (µm):	2.4						

General

Remarks: LL = 68
PL = 19
PI = 49

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Hydrometer And Sieve Analysis

AASHTO T88

02/09/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

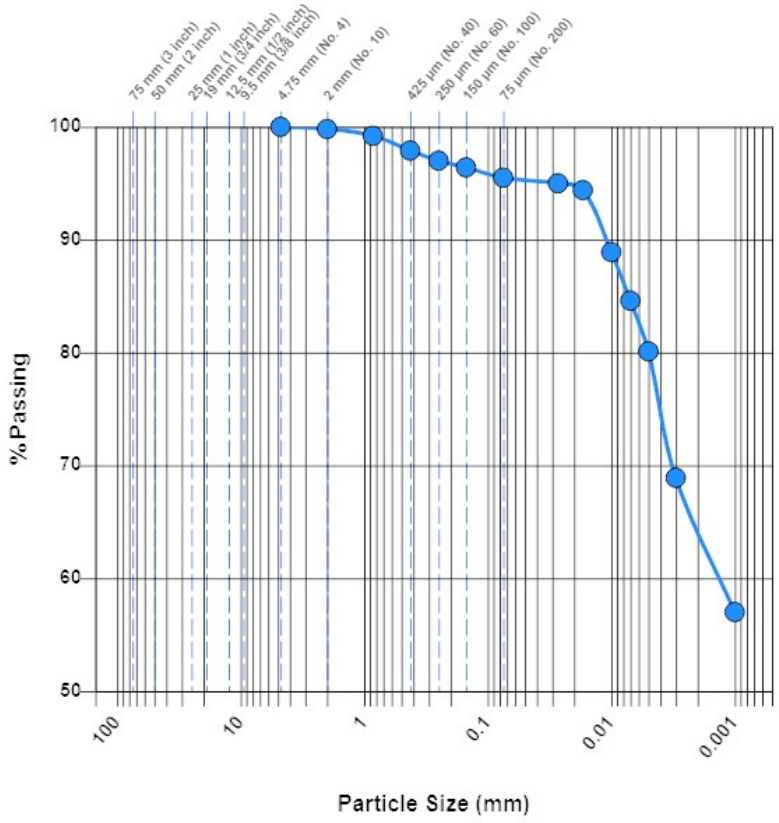
Sample Information

Sample Number:	504320	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-02		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/08/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.8	-
850 µm (No. 20)	99.2	-
425 µm (No. 40)	97.9	-
250 µm (No. 60)	97.0	-
150 µm (No. 100)	96.4	-
75 µm (No. 200)	95.5	-
27.1 (µm)	95.0	-
17.2 (µm)	94.4	-
10.2 (µm)	88.9	-
7.4 (µm)	84.6	-
5.3 (µm)	80.1	-
2.7 (µm)	68.9	-
1.2 (µm)	57.0	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown/Brown Mix

Gravel (%):	0.2	**Sand (%):**	4.3	**Silt (%):**	32.5	**Clay (%):**	63.0
D_{60} (µm):	1.5						

General

Remarks: LL = 72
PL = 22
PI = 50

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Hydrometer And Sieve Analysis

AASHTO T88

02/03/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

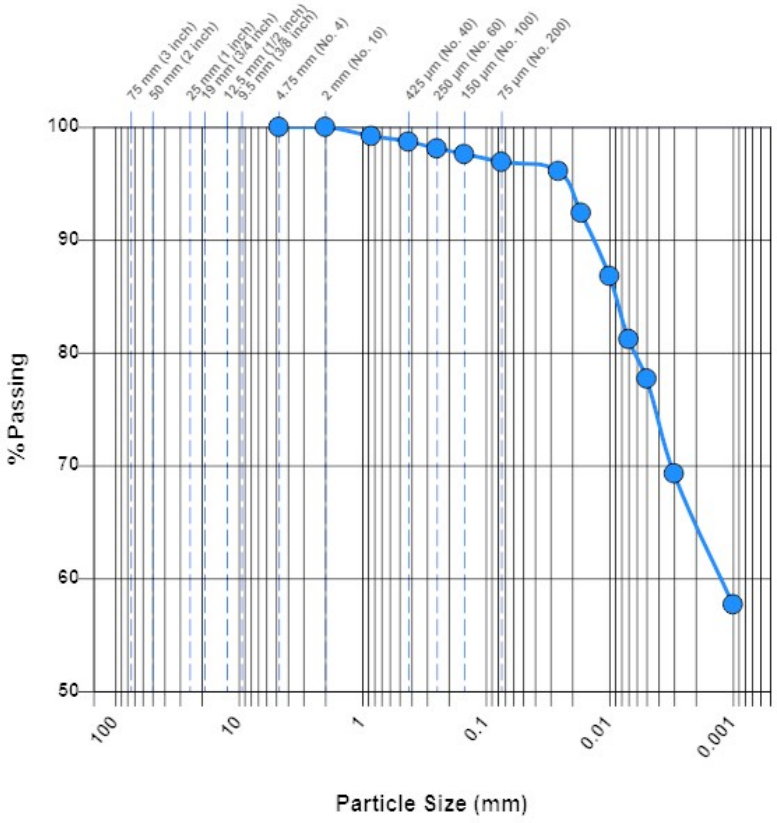
Sample Information

Sample Number:	504321	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-03		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.2	-
425 µm (No. 40)	98.7	-
250 µm (No. 60)	98.1	-
150 µm (No. 100)	97.6	-
75 µm (No. 200)	96.9	-
25.5 (µm)	96.1	-
16.5 (µm)	92.4	-
9.8 (µm)	86.8	-
7.2 (µm)	81.2	-
5.2 (µm)	77.7	-
2.6 (µm)	69.3	-
1.1 (µm)	57.7	-



Soil Classification: A-7-6; Fat Clay (CH)

Gravel (%):	0.0	**Sand (%):**	3.1	**Silt (%):**	33.4	**Clay (%):**	63.5
D_{60} (µm):	1.4						

General

Remarks: LL =76
PL =23
PI =53

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Hydrometer And Sieve Analysis

AASHTO T88

02/03/2023

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Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

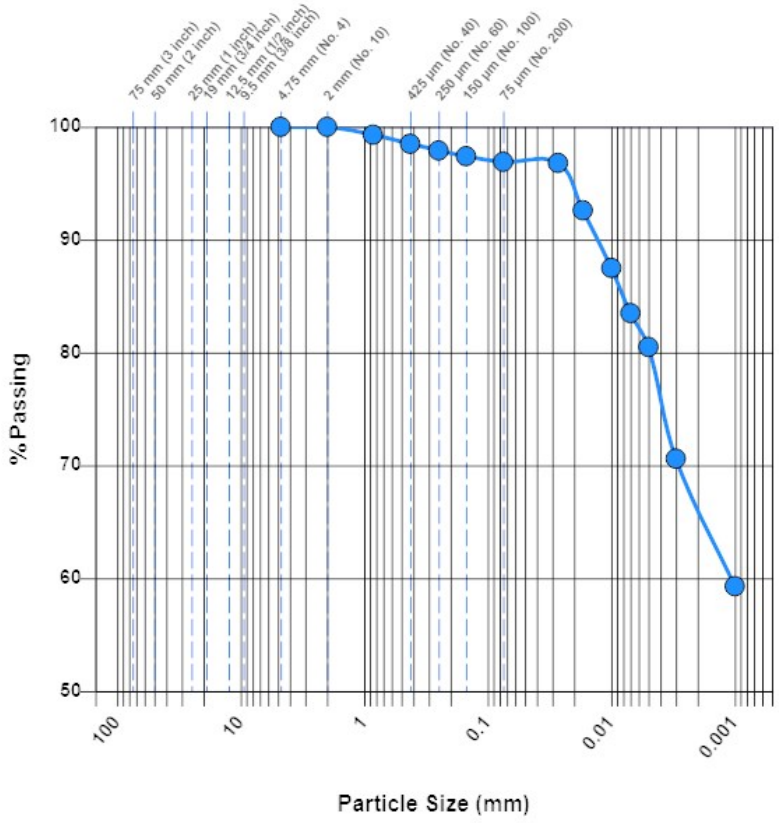
Sample Information

Sample Number:	504322	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-04		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.3	-
425 µm (No. 40)	98.5	-
250 µm (No. 60)	97.9	-
150 µm (No. 100)	97.4	-
75 µm (No. 200)	96.9	-
27.0 (µm)	96.8	-
17.4 (µm)	92.6	-
10.3 (µm)	87.5	-
7.4 (µm)	83.5	-
5.3 (µm)	80.5	-
2.7 (µm)	70.6	-
1.2 (µm)	59.3	-



Soil Classification: A-7-6; Fat Clay (CH)

Gravel (%):	0.0	**Sand (%):**	3.1	**Silt (%):**	31.9	**Clay (%):**	65.0
D_{60} (µm):	1.1						

General

Remarks: LL =76
PL =22
PI =54

Hydrometer And Sieve Analysis

AASHTO T88

02/09/2023

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PO Box 485
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Phone: 701-232-8701

Client:

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1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

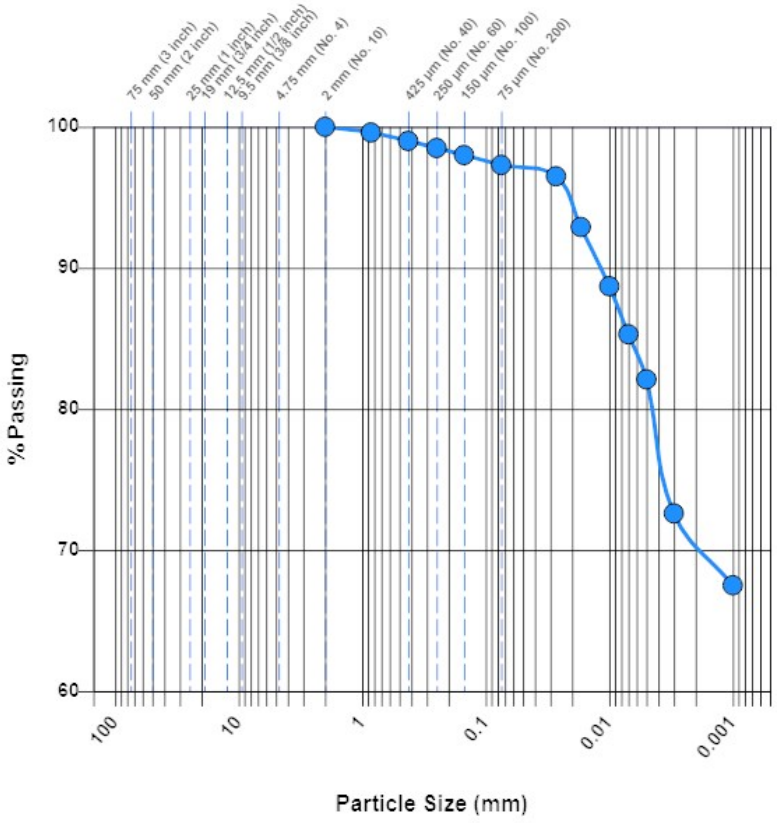
Sample Information

Sample Number:	504323	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-05		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/08/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.6	-
425 µm (No. 40)	99.0	-
250 µm (No. 60)	98.5	-
150 µm (No. 100)	98.0	-
75 µm (No. 200)	97.3	-
26.9 (µm)	96.5	-
17.3 (µm)	92.9	-
10.2 (µm)	88.7	-
7.3 (µm)	85.3	-
5.3 (µm)	82.1	-
2.7 (µm)	72.6	-
1.2 (µm)	67.5	-



Soil Classification: A-7-6; Fat Clay (CH), Grey

Gravel (%): 0.0 **Sand (%):** 2.7 **Silt (%):** 27.2 **Clay (%):** 70.1

General

Remarks: LL = 73
PL = 24
PI = 49

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Hydrometer And Sieve Analysis

AASHTO T88

02/10/2023

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Phone: 701-232-8701

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1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

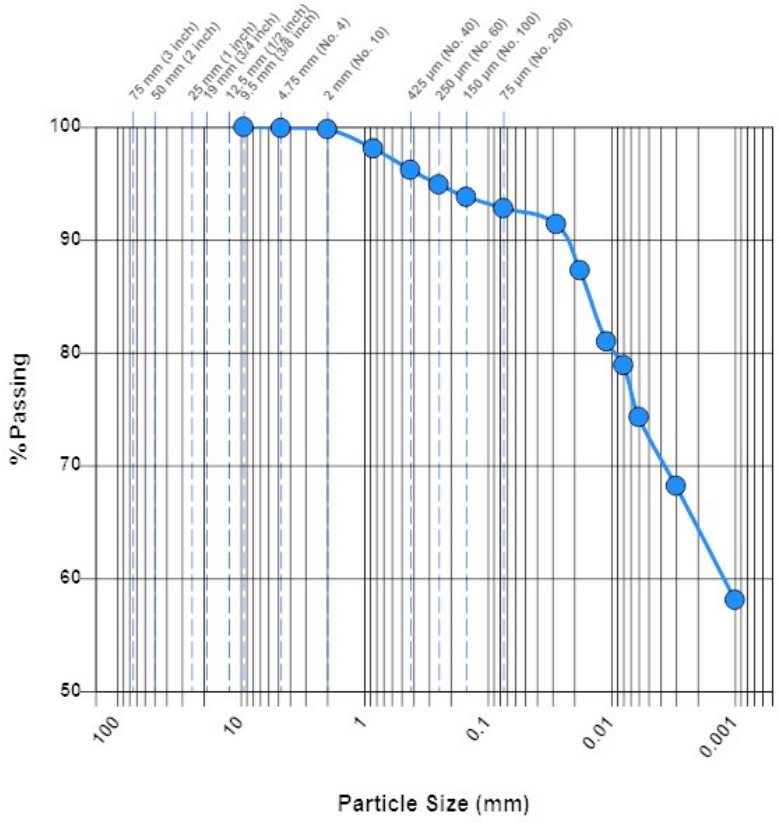
Sample Information

Sample Number:	504324	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-06		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/09/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
9.5 mm (3/8 inch)	100.0	-
4.75 mm (No. 4)	99.9	-
2 mm (No. 10)	99.8	-
850 µm (No. 20)	98.1	-
425 µm (No. 40)	96.2	-
250 µm (No. 60)	94.9	-
150 µm (No. 100)	93.8	-
75 µm (No. 200)	92.8	-
27.6 (µm)	91.4	-
17.8 (µm)	87.3	-
10.6 (µm)	81.0	-
7.5 (µm)	78.9	-
5.5 (µm)	74.3	-
2.7 (µm)	68.2	-
1.2 (µm)	58.1	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%):	0.2	**Sand (%):**	7.0	**Silt (%):**	29.6	**Clay (%):**	63.2

D_{60} (µm): 1.4

General

Remarks: LL = 76
PL = 23
PI = 53

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Hydrometer And Sieve Analysis

AASHTO T88

02/03/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

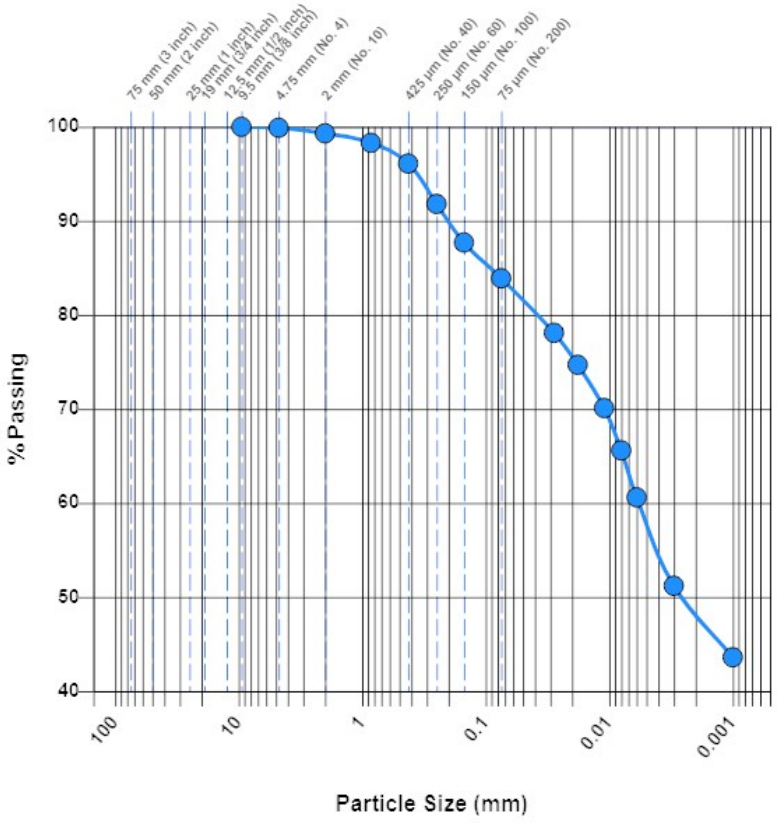
Sample Information

Sample Number:	504326	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-07		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
9.5 mm (3/8 inch)	100.0	-
4.75 mm (No. 4)	99.9	-
2 mm (No. 10)	99.3	-
850 µm (No. 20)	98.3	-
425 µm (No. 40)	96.1	-
250 µm (No. 60)	91.8	-
150 µm (No. 100)	87.7	-
75 µm (No. 200)	83.9	-
28.3 (µm)	78.1	-
18.2 (µm)	74.7	-
10.8 (µm)	70.1	-
7.8 (µm)	65.6	-
5.6 (µm)	60.6	-
2.8 (µm)	51.2	-
1.2 (µm)	43.6	-



Soil Classification: A-7-6; Fat Clay (CH)

Gravel (%):	0.7	**Sand (%):**	15.4	**Silt (%):**	36.5	**Clay (%):**	47.4
D_{60} (µm):	5.8						

General

Remarks: LL =63
PL =17
PI =46

BRAUN INTERTEC
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Hydrometer And Sieve Analysis

AASHTO T88

02/03/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

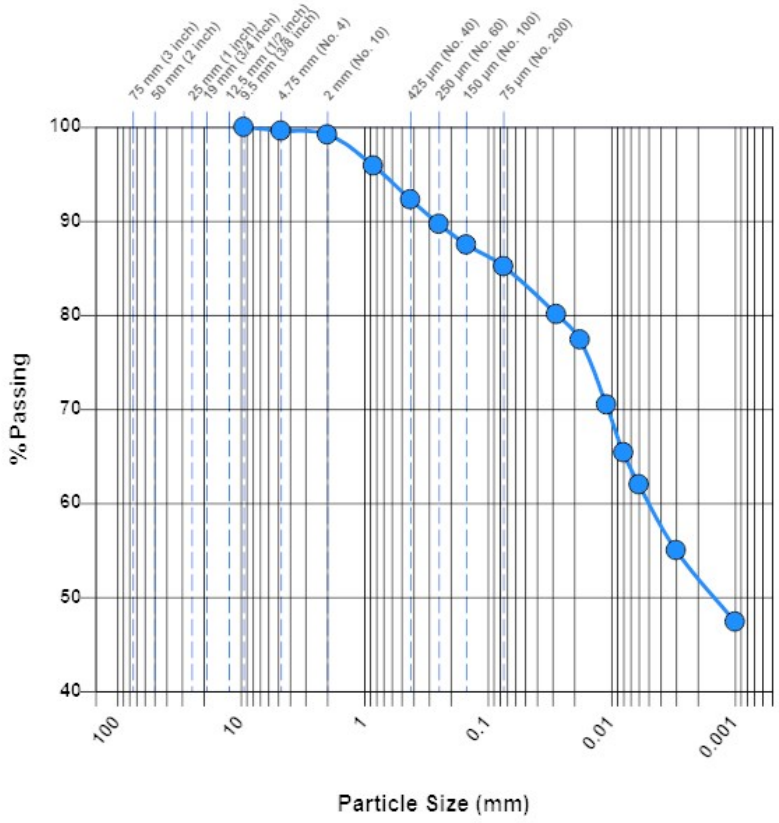
Sample Information

Sample Number:	504328	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-08		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
9.5 mm (3/8 inch)	100.0	-
4.75 mm (No. 4)	99.6	-
2 mm (No. 10)	99.2	-
850 µm (No. 20)	95.9	-
425 µm (No. 40)	92.3	-
250 µm (No. 60)	89.7	-
150 µm (No. 100)	87.5	-
75 µm (No. 200)	85.2	-
27.5 (µm)	80.1	-
17.6 (µm)	77.4	-
10.6 (µm)	70.5	-
7.7 (µm)	65.4	-
5.5 (µm)	62.0	-
2.8 (µm)	55.0	-
1.2 (µm)	47.4	-



Soil Classification: A-7-6; Fat Clay (CH)

Gravel (%): 0.8 **Sand (%):** 14.0 **Silt (%):** 34.0 **Clay (%):** 51.2

D_{60} (µm): 5.1

General

Remarks: LL= 76
PL =22
PI =54

Hydrometer And Sieve Analysis

AASHTO T88

02/09/2023

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Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

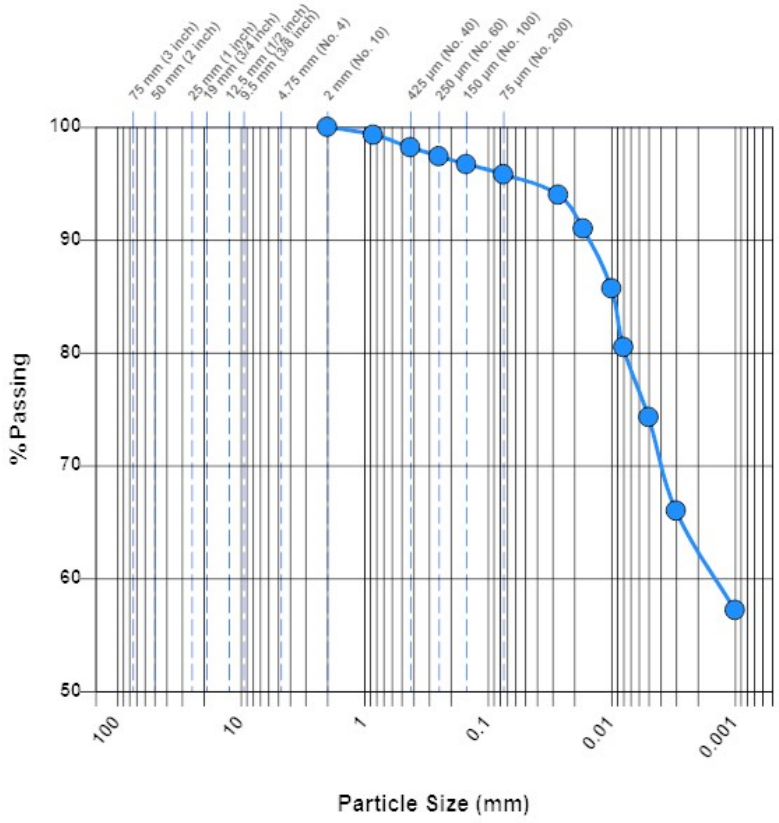
Sample Information

Sample Number:	504329	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-09		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/08/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.3	-
425 µm (No. 40)	98.2	-
250 µm (No. 60)	97.4	-
150 µm (No. 100)	96.7	-
75 µm (No. 200)	95.8	-
27.0 (µm)	94.0	-
17.3 (µm)	91.0	-
10.3 (µm)	85.7	-
7.5 (µm)	80.5	-
5.4 (µm)	74.3	-
2.7 (µm)	66.0	-
1.2 (µm)	57.2	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%):	0.0	**Sand (%):**	4.2	**Silt (%):**	34.2	**Clay (%):**	61.6
D_{60} (µm):	1.6						

General

Remarks: LL = 72
PL = 24
PI = 48

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Hydrometer And Sieve Analysis

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02/03/2023

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Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

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SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

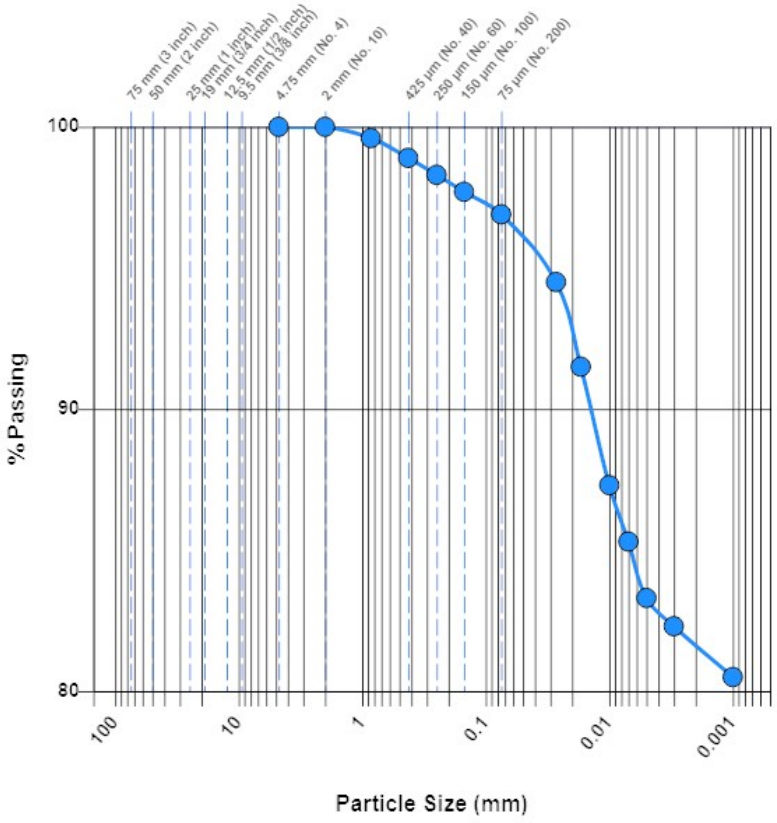
Sample Information

Sample Number:	504330	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-10		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.6	-
425 µm (No. 40)	98.9	-
250 µm (No. 60)	98.3	-
150 µm (No. 100)	97.7	-
75 µm (No. 200)	96.9	-
27.1 (µm)	94.5	-
17.4 (µm)	91.5	-
10.3 (µm)	87.3	-
7.3 (µm)	85.3	-
5.3 (µm)	83.3	-
2.5 (µm)	82.3	-
1.1 (µm)	80.5	-



Soil Classification: A-7-6; Fat Clay (CH)

Gravel (%): 0.0 **Sand (%):** 3.1 **Silt (%):** 15.5 **Clay (%):** 81.4

General

Remarks: LL =82
PL =23
PI =59

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Hydrometer And Sieve Analysis

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1401 21st Avenue North
Fargo, ND 58102

Project:

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9th St NE
West Fargo, ND

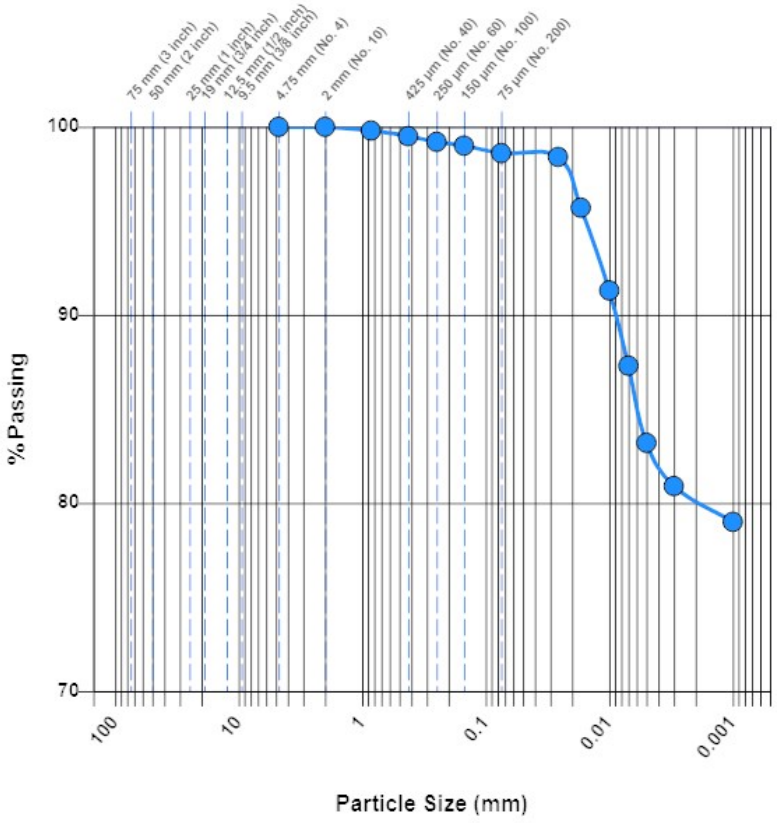
Sample Information

Sample Number:	504331	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-11		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.8	-
425 µm (No. 40)	99.5	-
250 µm (No. 60)	99.2	-
150 µm (No. 100)	99.0	-
75 µm (No. 200)	98.6	-
26.1 (µm)	98.4	-
16.7 (µm)	95.7	-
9.9 (µm)	91.3	-
7.1 (µm)	87.3	-
5.2 (µm)	83.2	-
2.5 (µm)	80.9	-
1.1 (µm)	79.0	-



Soil Classification: A-7-6; Fat Clay (CH)

Gravel (%): 0.0 **Sand (%):** 1.4 **Silt (%):** 18.6 **Clay (%):** 80.0

General

Remarks: LL =80
PL =22
PI =58

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Hydrometer And Sieve Analysis

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Houston Engineering, Inc.
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Fargo, ND 58102

Project:

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SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

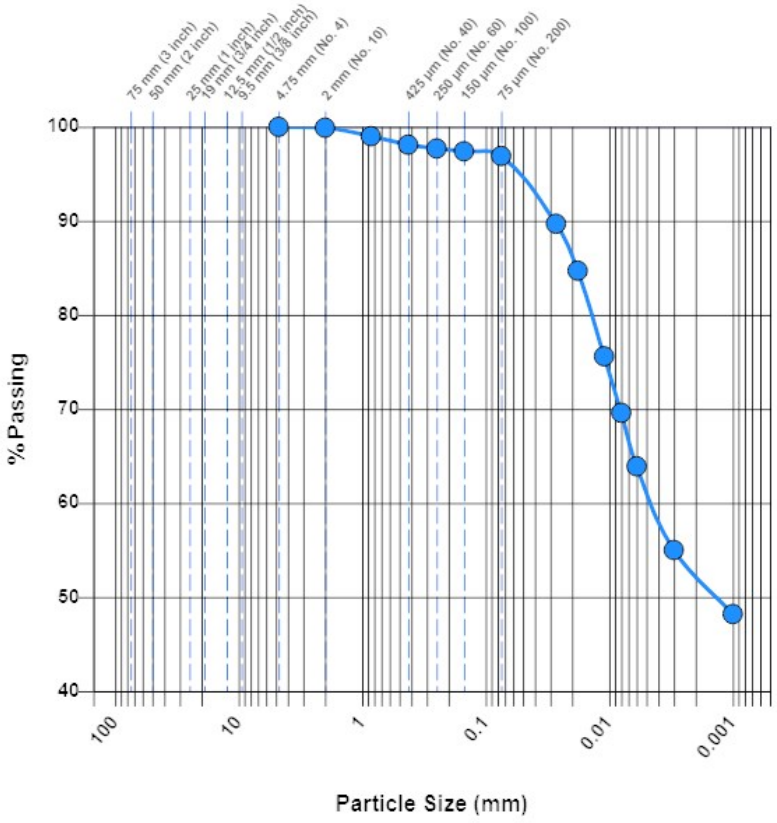
Sample Information

Sample Number:	504332	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-12		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/20/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.9	-
850 µm (No. 20)	99.0	-
425 µm (No. 40)	98.1	-
250 µm (No. 60)	97.7	-
150 µm (No. 100)	97.4	-
75 µm (No. 200)	96.9	-
27.1 (µm)	89.7	-
17.6 (µm)	84.7	-
10.6 (µm)	75.6	-
7.7 (µm)	69.6	-
5.5 (µm)	63.9	-
2.8 (µm)	55.0	-
1.2 (µm)	48.2	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%):	0.1	**Sand (%):**	3.0	**Silt (%):**	45.3	**Clay (%):**	51.6
D_{60} (µm):	4.7						

General

Remarks: LL = 73
PL = 20
PI = 53

Hydrometer And Sieve Analysis

AASHTO T88

02/09/2023

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PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

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9th St NE
West Fargo, ND

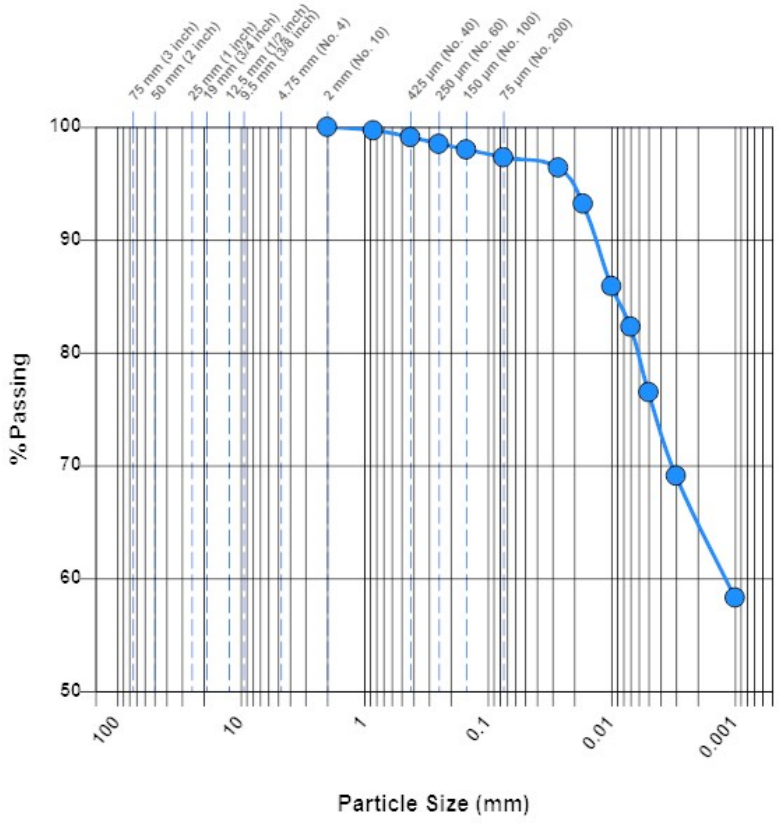
Sample Information

Sample Number:	504333	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-13		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/07/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.7	-
425 µm (No. 40)	99.1	-
250 µm (No. 60)	98.5	-
150 µm (No. 100)	98.0	-
75 µm (No. 200)	97.3	-
26.8 (µm)	96.4	-
17.3 (µm)	93.2	-
10.3 (µm)	85.9	-
7.4 (µm)	82.3	-
5.4 (µm)	76.5	-
2.7 (µm)	69.1	-
1.2 (µm)	58.3	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%):	0.0	**Sand (%):**	2.7	**Silt (%):**	33.6	**Clay (%):**	63.7

D_{60} (µm): 1.3

General

Remarks: LL = 71
PL = 24
PI = 47

Hydrometer And Sieve Analysis

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02/23/2023

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Client:

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9th St NE
West Fargo, ND

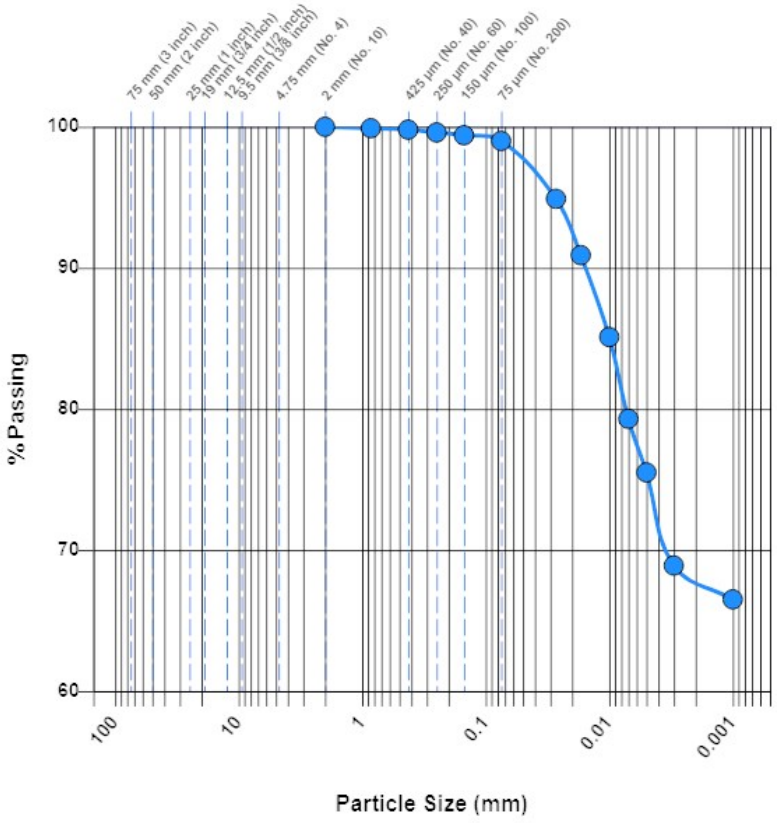
Sample Information

Sample Number:	504334	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-14		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/22/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	99.8	-
250 µm (No. 60)	99.6	-
150 µm (No. 100)	99.4	-
75 µm (No. 200)	99.0	-
26.7 (µm)	94.9	-
17.3 (µm)	90.9	-
10.2 (µm)	85.1	-
7.4 (µm)	79.3	-
5.3 (µm)	75.5	-
2.7 (µm)	68.9	-
1.1 (µm)	66.5	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

Gravel (%):	0.0	**Sand (%):**	1.0	**Silt (%):**	31.3	**Clay (%):**	67.7		
D_{60} (µm):	56.1	**D_{30} (µm):**	41.5	**D_{10} (µm):**	31.8	**C_u:**	1.76	**C_c:**	0.97

General

Remarks: LL = 82
PPL = 21
PI = 61

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Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

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SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

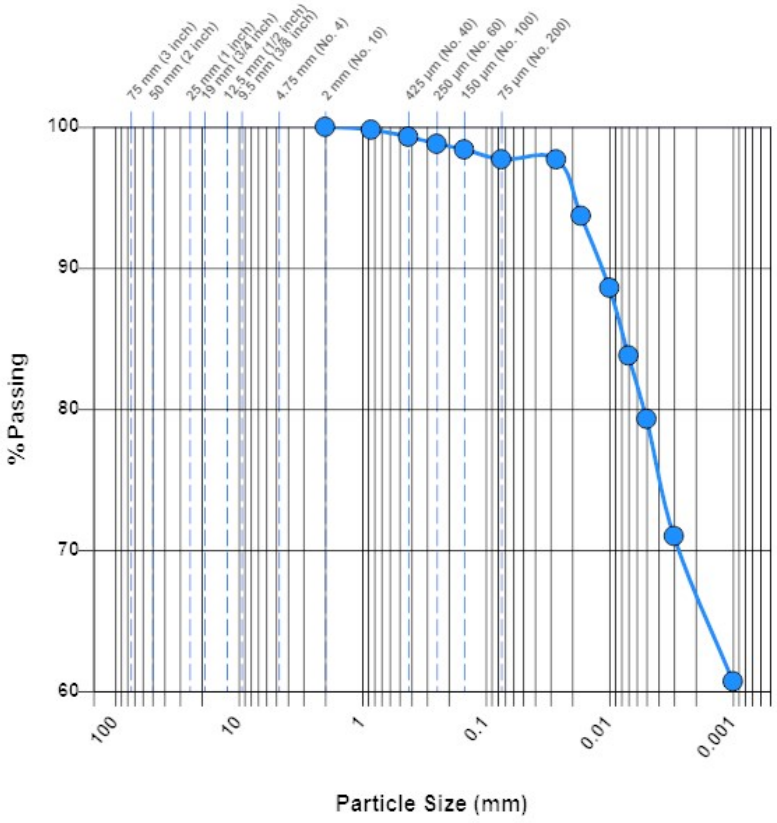
Sample Information

Sample Number:	504335	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-15		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/07/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.8	-
425 µm (No. 40)	99.3	-
250 µm (No. 60)	98.8	-
150 µm (No. 100)	98.4	-
75 µm (No. 200)	97.7	-
26.8 (µm)	97.7	-
17.3 (µm)	93.7	-
10.2 (µm)	88.6	-
7.4 (µm)	83.8	-
5.3 (µm)	79.3	-
2.7 (µm)	71.0	-
1.2 (µm)	60.7	-



Soil Classification: A-7-6; Fat Clay (CH), Brown

Gravel (%): 0.0 **Sand (%):** 2.3 **Silt (%):** 31.8 **Clay (%):** 65.9

General

Remarks: LL = 72
PL = 22
PI = 50

Hydrometer And Sieve Analysis

AASHTO T88

02/21/2023

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PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

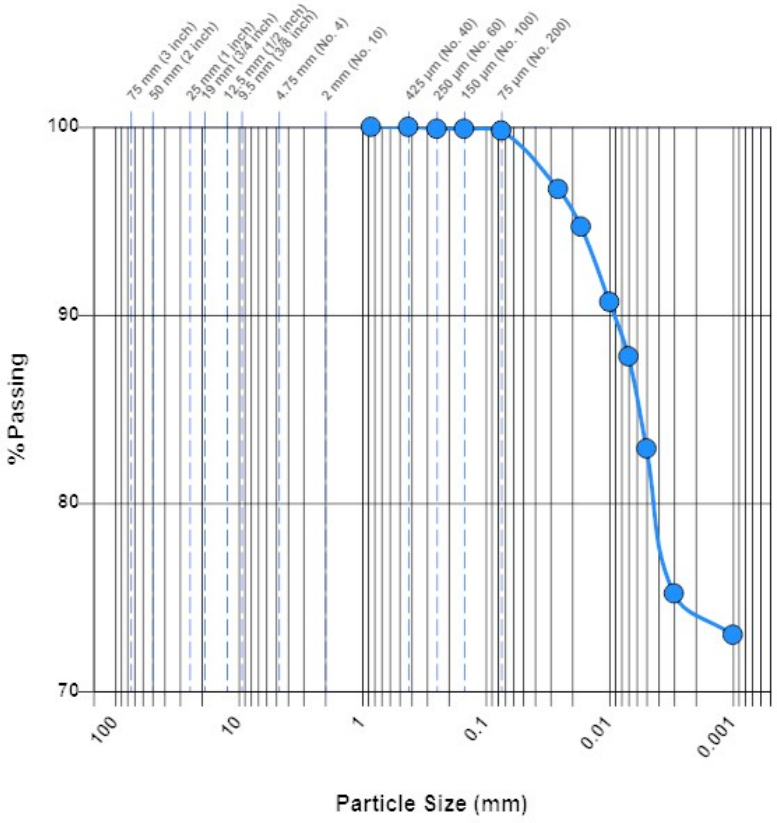
Sample Information

Sample Number:	504336	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-16		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/20/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
850 µm (No. 20)	100.0	-
425 µm (No. 40)	100.0	-
250 µm (No. 60)	99.9	-
150 µm (No. 100)	99.9	-
75 µm (No. 200)	99.8	-
26.2 (µm)	96.7	-
16.8 (µm)	94.7	-
9.9 (µm)	90.7	-
7.1 (µm)	87.8	-
5.1 (µm)	82.9	-
2.6 (µm)	75.2	-
1.1 (µm)	73.0	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

Gravel (%): 0 **Sand (%):** 0.2 **Silt (%):** 25.7 **Clay (%):** 74.1

General

Remarks: LL = 85
PL = 23
PI = 62

Hydrometer And Sieve Analysis

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02/16/2023

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Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

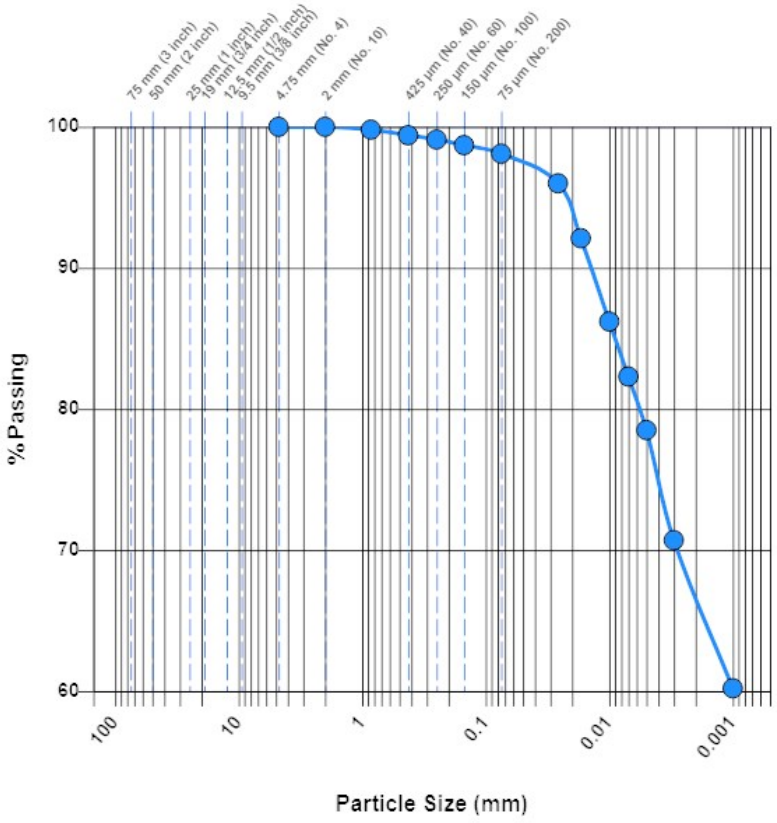
Sample Information

Sample Number:	504338	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-17		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/15/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.8	-
425 µm (No. 40)	99.4	-
250 µm (No. 60)	99.1	-
150 µm (No. 100)	98.7	-
75 µm (No. 200)	98.1	-
26.3 (µm)	96.0	-
17.0 (µm)	92.1	-
10.1 (µm)	86.2	-
7.3 (µm)	82.3	-
5.2 (µm)	78.5	-
2.7 (µm)	70.7	-
1.2 (µm)	60.2	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%): 0.0 **Sand (%):** 1.9 **Silt (%):** 32.6 **Clay (%):** 65.5

General

Hydrometer And Sieve Analysis

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02/21/2023

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Phone: 701-232-8701

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SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

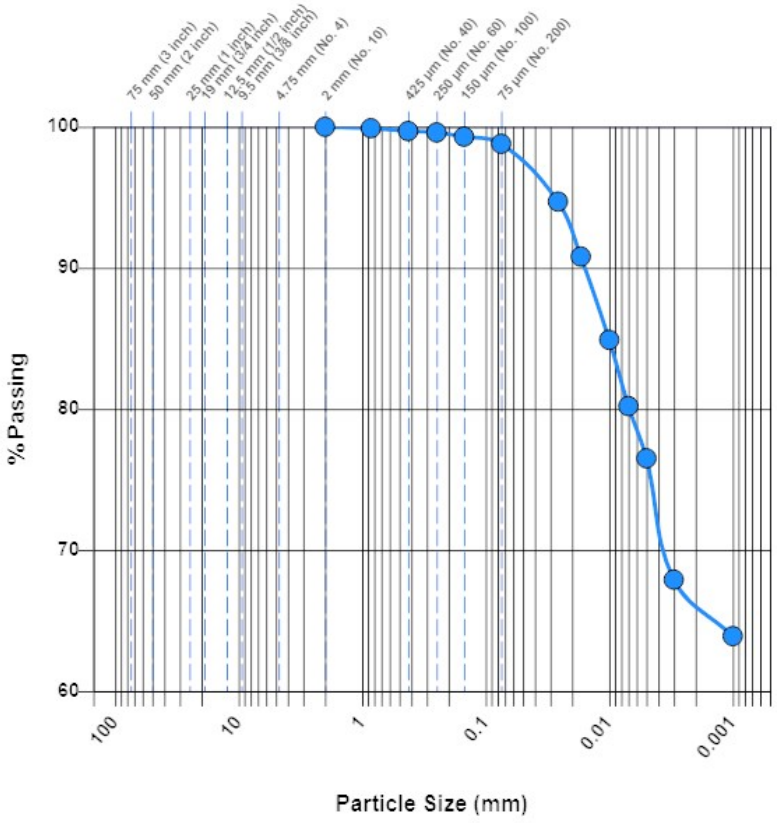
Sample Information

Sample Number:	504339	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-18		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/20/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	99.7	-
250 µm (No. 60)	99.6	-
150 µm (No. 100)	99.3	-
75 µm (No. 200)	98.8	-
26.0 (µm)	94.7	-
16.8 (µm)	90.8	-
10.0 (µm)	84.9	-
7.2 (µm)	80.2	-
5.2 (µm)	76.5	-
2.6 (µm)	67.9	-
1.1 (µm)	63.9	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown

Gravel (%): 0.0 **Sand (%):** 1.2 **Silt (%):** 32.9 **Clay (%):** 65.9

General

Remarks: LL = 79
PL = 21
PI = 58

Hydrometer And Sieve Analysis

AASHTO T88

02/09/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

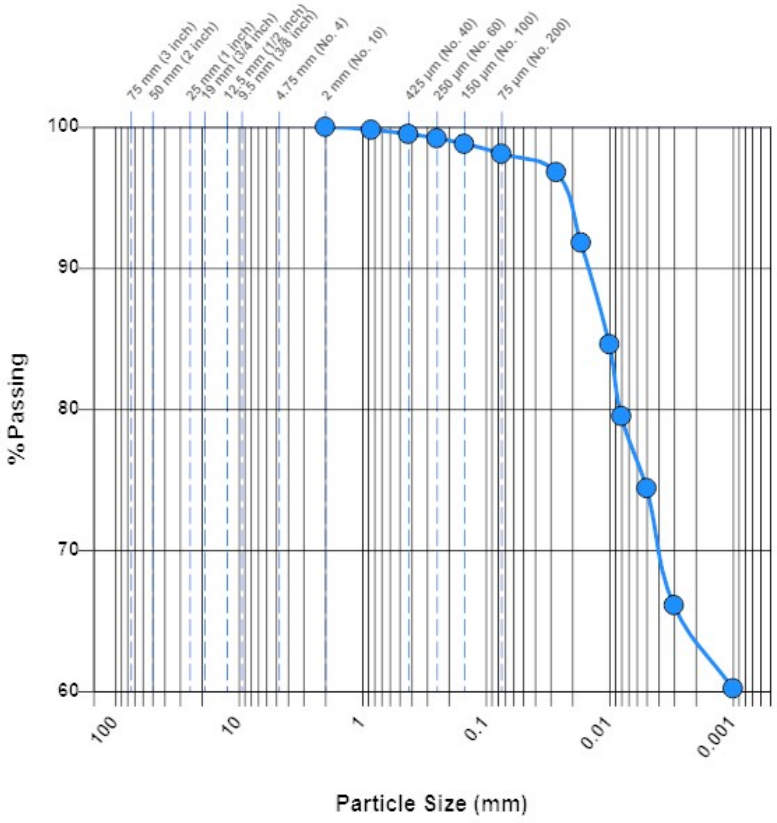
Sample Information

Sample Number:	504340	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-19		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/07/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.8	-
425 µm (No. 40)	99.5	-
250 µm (No. 60)	99.2	-
150 µm (No. 100)	98.8	-
75 µm (No. 200)	98.1	-
26.6 (µm)	96.8	-
17.3 (µm)	91.8	-
10.3 (µm)	84.6	-
7.5 (µm)	79.5	-
5.4 (µm)	74.4	-
2.7 (µm)	66.1	-
1.2 (µm)	60.2	-



Soil Classification: A-7-6; Fat Clay (CH), Brown

Gravel (%): 0.0 **Sand (%):** 1.9 **Silt (%):** 34.9 **Clay (%):** 63.2

General

Remarks: LL = 70
PL = 23
PI = 47

Hydrometer And Sieve Analysis

AASHTO T88

02/09/2023

BRAUN INTERTEC
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526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

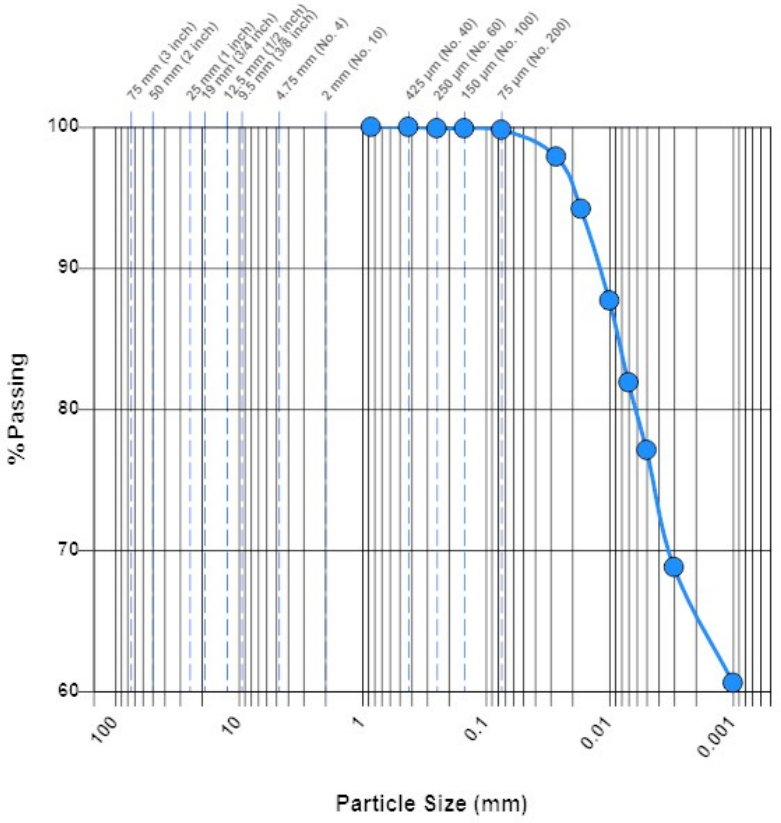
Sample Information

Sample Number:	504341	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-20		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/07/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
850 µm (No. 20)	100.0	-
425 µm (No. 40)	100.0	-
250 µm (No. 60)	99.9	-
150 µm (No. 100)	99.9	-
75 µm (No. 200)	99.8	-
26.6 (µm)	97.9	-
17.1 (µm)	94.2	-
10.2 (µm)	87.7	-
7.4 (µm)	81.9	-
5.4 (µm)	77.1	-
2.7 (µm)	68.8	-
1.2 (µm)	60.6	-



Soil Classification: A76; Fat Clay (CH), Dark Brown/ Grey Mix

Gravel (%): 0 **Sand (%):** 0.2 **Silt (%):** 35.1 **Clay (%):** 64.7

General

Remarks: LL = 70
PL = 23
PI = 47

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Hydrometer And Sieve Analysis

AASHTO T88

02/10/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

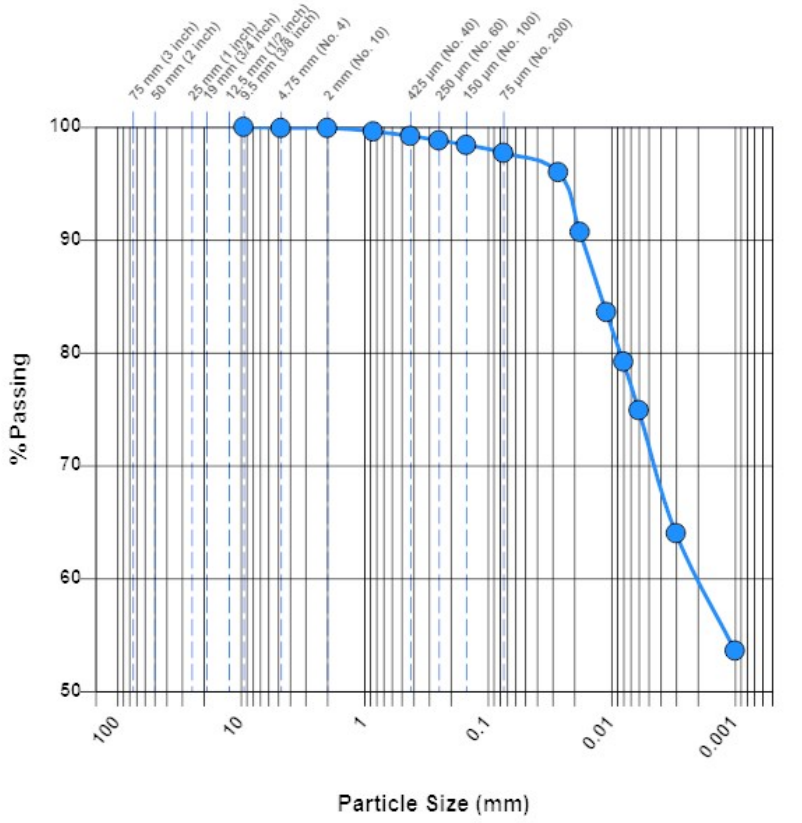
Sample Information

Sample Number:	504342	**Depth (ft):**	1' - 7'
Sampling Method:	Auger Boring ASTM D1452	**Sampled By:**	Drill Crew
Boring Number:	LSS-21		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/09/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
9.5 mm (3/8 inch)	100.0	-
4.75 mm (No. 4)	99.9	-
2 mm (No. 10)	99.9	-
850 µm (No. 20)	99.6	-
425 µm (No. 40)	99.2	-
250 µm (No. 60)	98.8	-
150 µm (No. 100)	98.4	-
75 µm (No. 200)	97.7	-
27.3 (µm)	96.0	-
17.7 (µm)	90.7	-
10.5 (µm)	83.6	-
7.6 (µm)	79.2	-
5.5 (µm)	74.9	-
2.8 (µm)	64.0	-
1.2 (µm)	53.6	-



Soil Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

Gravel (%):	0.1	**Sand (%):**	2.2	**Silt (%):**	38.9	**Clay (%):**	58.8
D_{60} (µm):	2.2						

General

Remarks: LL = 77
PL = 27
PI = 50

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Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/15/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

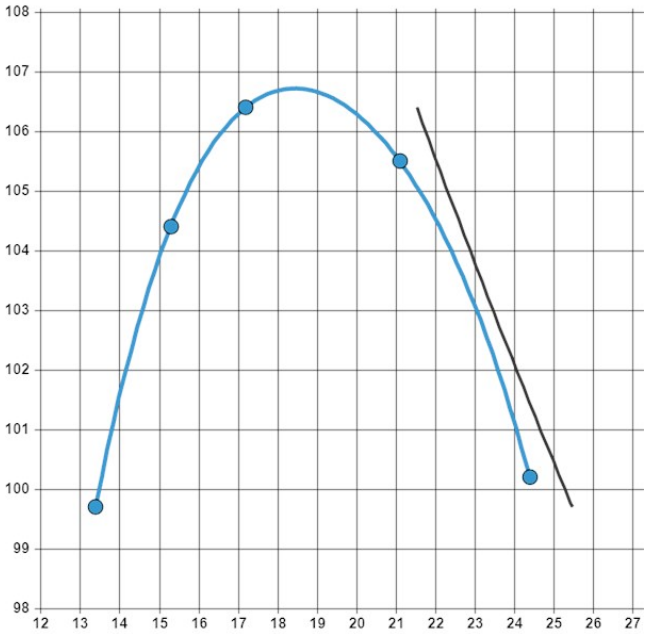
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504319	**Depth (ft):**	1' - 7'
Boring Number:	LSS-01	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/09/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-01
Maximum Dry Density (pcf):	107.0
Optimum Moisture (%):	18.5
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	68
Plastic Limit:	19
Plastic Index:	49
Retained On #4 (%):	0.9
Mold Mass (gr):	4137.4
Mold Volume (cc):	942.4

Visual Manual Classification: Fat Clay with trace Gravel (CH), Dark Brown

General

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Modified Proctor M-D Relationship

ND T 180

02/09/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

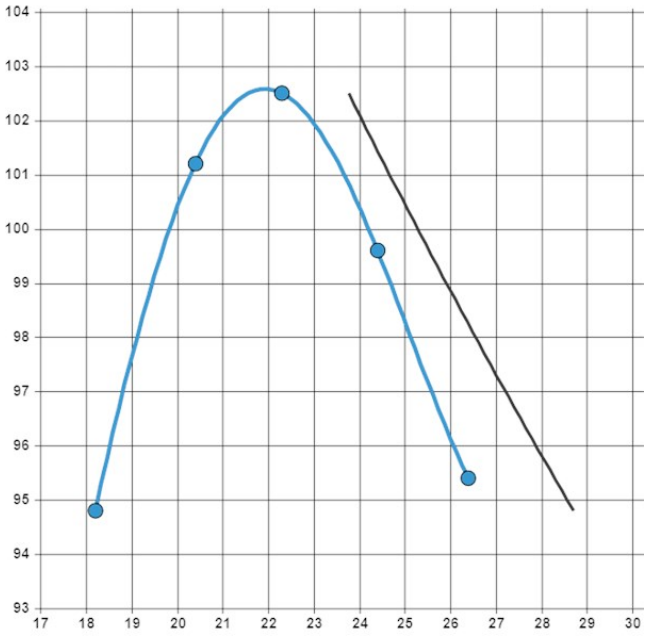
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504320	**Depth (ft):**	1' - 7'
Boring Number:	LSS-02	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-02
Maximum Dry Density (pcf):	103.0
Optimum Moisture (%):	21.9
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	72
Plastic Limit:	22
Plastic Index:	50
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.3
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown/Brown Mix

General

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Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/08/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

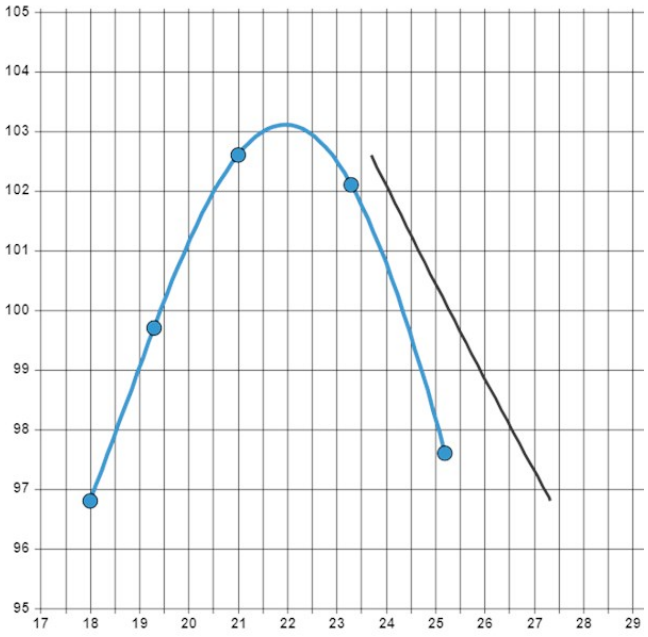
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504321	**Depth (ft):**	1' - 7'
Boring Number:	LSS-03	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/06/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-03
Maximum Dry Density (pcf):	103.0
Optimum Moisture (%):	22.0
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	76
Plastic Limit:	23
Plastic Index:	53
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.3
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Grey

General

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Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/08/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

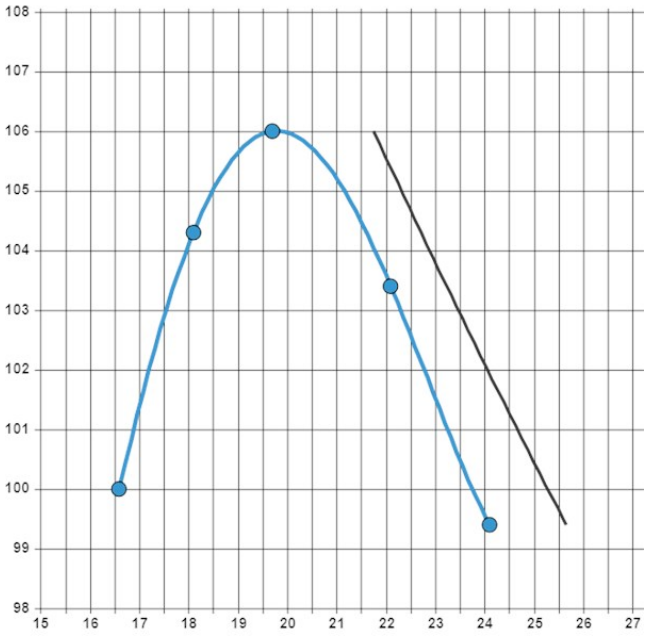
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504322	**Depth (ft):**	1' - 7'
Boring Number:	LSS-04	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/06/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-04
Maximum Dry Density (pcf):	106.0
Optimum Moisture (%):	19.8
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	76
Plastic Limit:	22
Plastic Index:	54
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.7
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Brown/Light Brown Mix

General

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Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/09/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

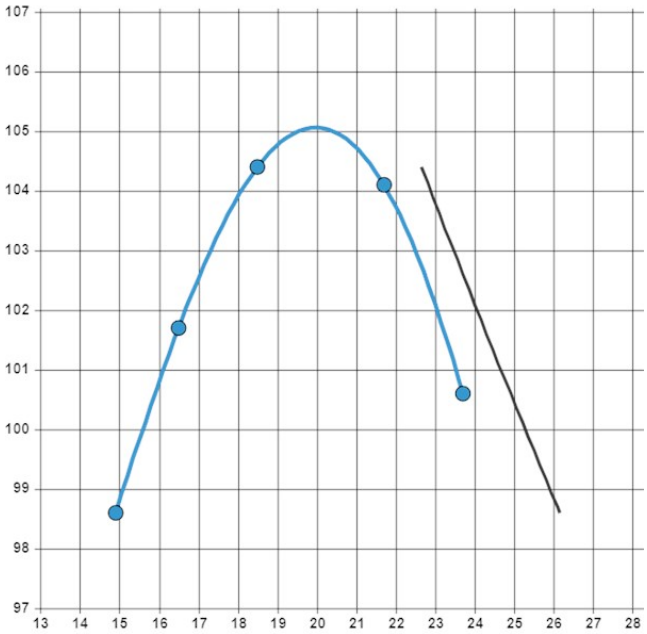
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504323	**Depth (ft):**	1' - 7'
Boring Number:	LSS-05	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/07/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-05
Maximum Dry Density (pcf):	105.0
Optimum Moisture (%):	20.0
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	73
Plastic Limit:	24
Plastic Index:	49
Retained On #4 (%):	0.0
Mold Mass (gr):	4175.5
Mold Volume (cc):	942.1

Visual Manual Classification: A-7-6; Fat Clay (CH), Grey

General

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West Fargo, ND 58078
Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/10/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

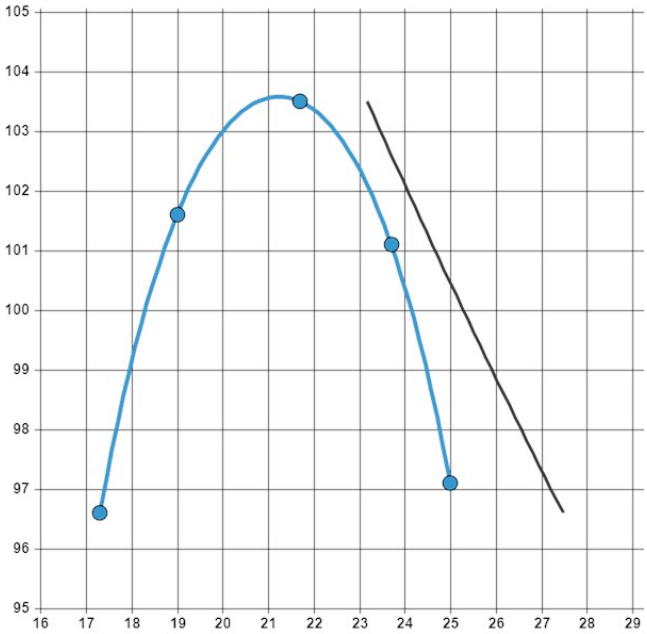
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504324	**Depth (ft):**	1' - 7'
Boring Number:	LSS-06	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/07/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-06
Maximum Dry Density (pcf):	104.0
Optimum Moisture (%):	21.2
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	76
Plastic Limit:	23
Plastic Index:	53
Retained On #4 (%):	0.0
Mold Mass (gr):	4138.0
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown

General

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West Fargo, ND 58078
Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/08/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

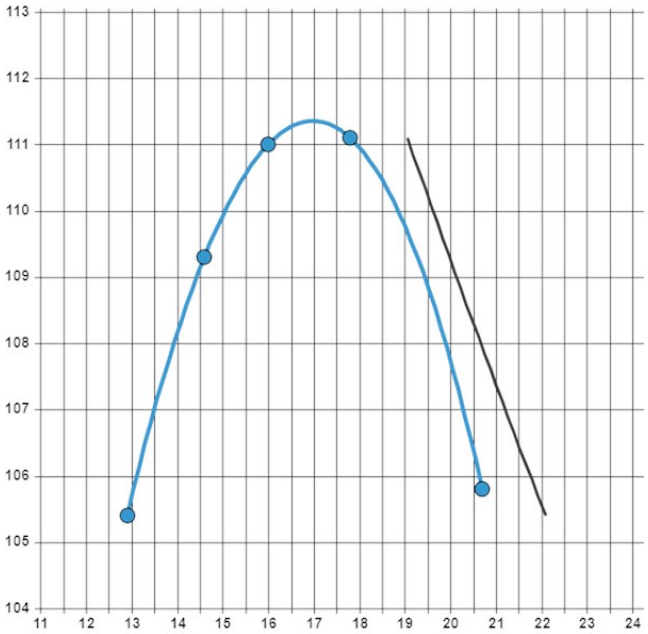
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504326	**Depth (ft):**	1' - 7'
Boring Number:	LSS-07	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/06/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-07
Maximum Dry Density (pcf):	111.0
Optimum Moisture (%):	17.0
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	63
Plastic Limit:	17
Plastic Index:	46
Retained On #4 (%):	4.1
Mold Mass (gr):	4129.0
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay with trace Gravel (CH), Dark Brown

General

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West Fargo, ND 58078
Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/08/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

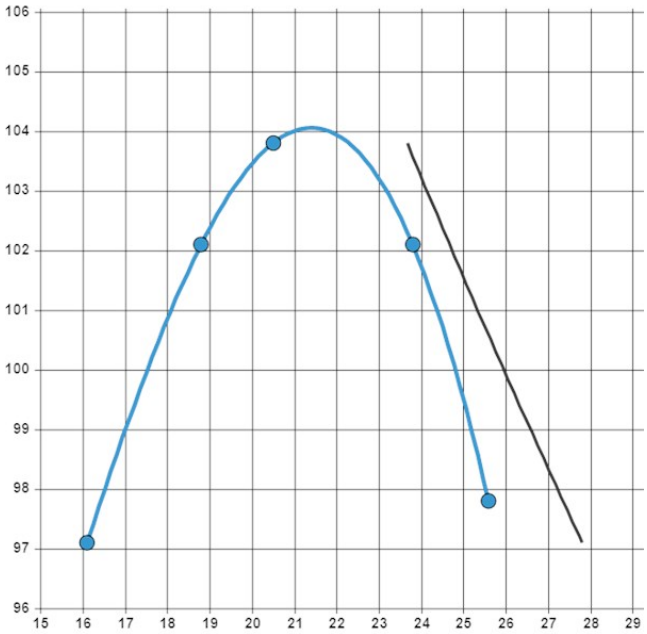
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504328	**Depth (ft):**	1' - 7'
Boring Number:	LSS-08	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/06/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-08
Maximum Dry Density (pcf):	104.0
Optimum Moisture (%):	21.4
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	76
Plastic Limit:	22
Plastic Index:	54
Retained On #4 (%):	1.0
Mold Mass (gr):	4129.3
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay with trace Gravel (CH), Dark Brown

General

BRAUN INTERTEC
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PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/09/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

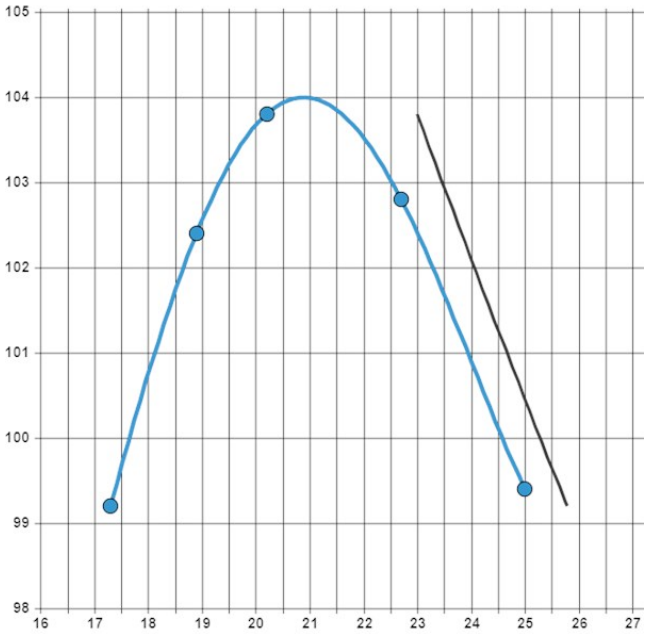
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504329	**Depth (ft):**	1' - 7'
Boring Number:	LSS-09	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/06/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-09
Maximum Dry Density (pcf):	104.0
Optimum Moisture (%):	20.9
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	72
Plastic Limit:	24
Plastic Index:	48
Retained On #4 (%):	0.0
Mold Mass (gr):	4137.3
Mold Volume (cc):	942.1

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown

General

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Modified Proctor M-D Relationship

ND T 180

02/08/2023

526 10th St NE, Suite 300
PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

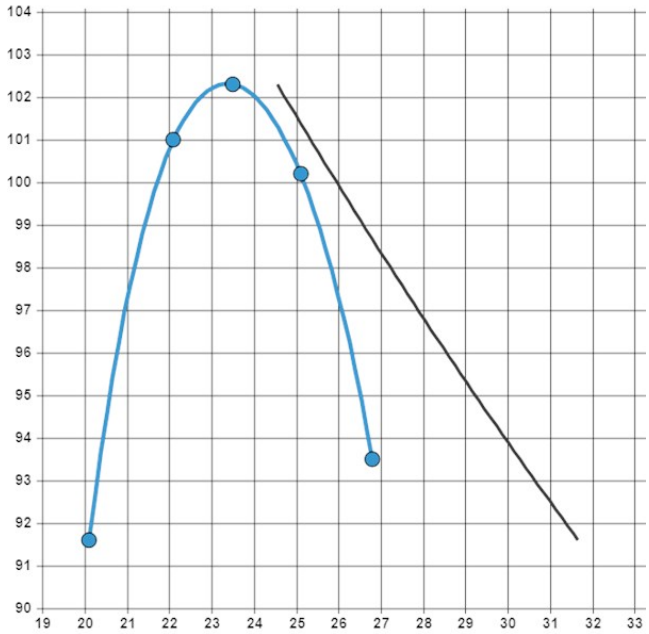
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504330	**Depth (ft):**	1' - 7'
Boring Number:	LSS-10	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/06/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-10
Maximum Dry Density (pcf):	102.0
Optimum Moisture (%):	23.4
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	82
Plastic Limit:	23
Plastic Index:	59
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.3
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Brown/Dark Brown Mix

General

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West Fargo, ND 58078
Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/08/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

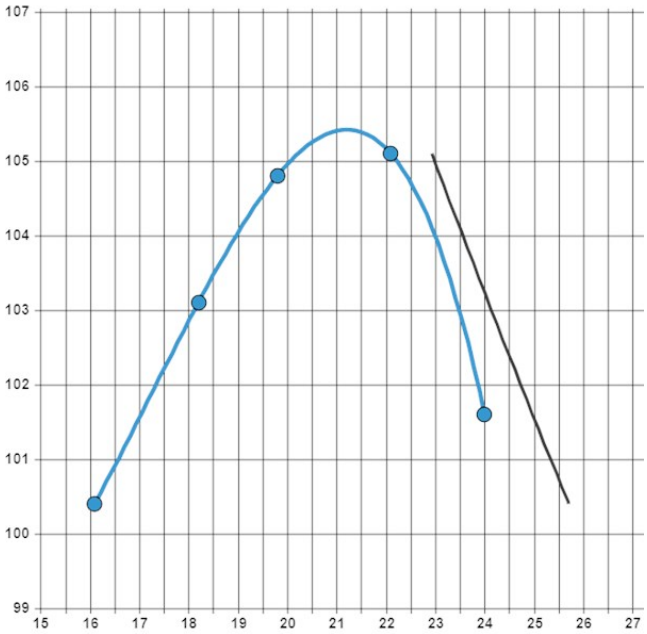
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504331	**Depth (ft):**	1' - 7'
Boring Number:	LSS-11	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/24/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/03/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-11
Maximum Dry Density (pcf):	105.0
Optimum Moisture (%):	21.2
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	80
Plastic Limit:	22
Plastic Index:	58
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.4
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Brown/Grey Mix

General

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West Fargo, ND 58078
Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/23/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

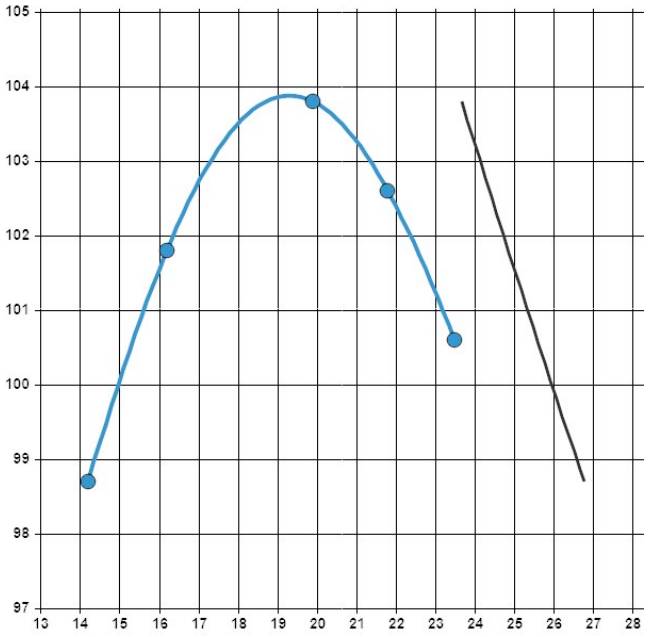
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504332	**Depth (ft):**	1' - 7'
Boring Number:	LSS-12	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/21/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data



Proctor ID:	P-12
Maximum Dry Density (pcf):	104.0
Optimum Moisture (%):	19.3
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	73
Plastic Limit:	20
Plastic Index:	53
Retained On #4 (%):	0.0
Mold Mass (gr):	4128.7
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown

General

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Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/08/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

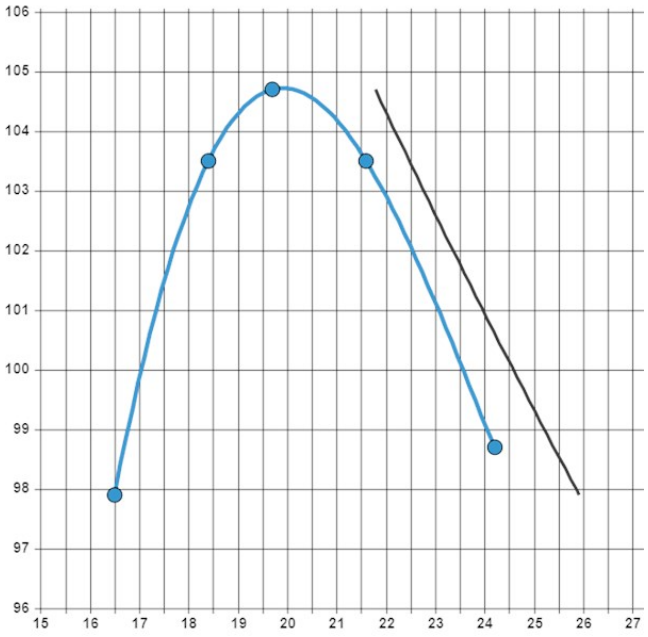
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504333	**Depth (ft):**	1' - 7'
Boring Number:	LSS-13	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/03/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-13
Maximum Dry Density (pcf):	105.0
Optimum Moisture (%):	19.9
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.65
Liquid Limit:	71
Plastic Limit:	24
Plastic Index:	47
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.2
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown

General

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Modified Proctor M-D Relationship

ND T 180

02/23/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

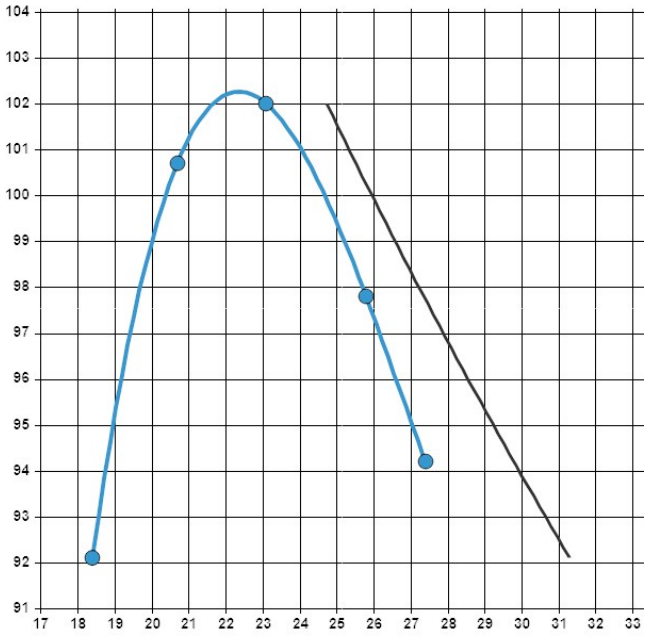
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504334	**Depth (ft):**	1' - 7'
Boring Number:	LSS-14	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/22/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data



Proctor ID:	P-14
Maximum Dry Density (pcf):	102.0
Optimum Moisture (%):	22.4
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	82
Plastic Limit:	21
Plastic Index:	61
Retained On #4 (%):	0.0
Mold Mass (gr):	4139.8
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

General

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ND T 180

02/08/2023

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Fargo, ND 58102

Project:

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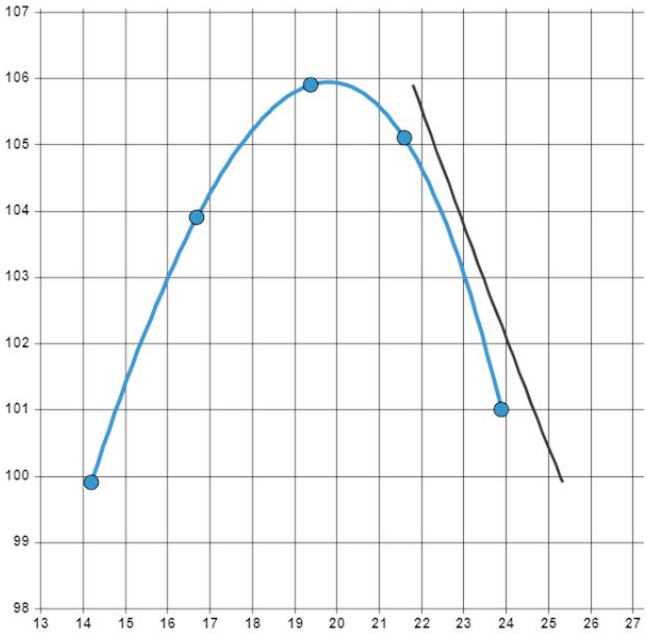
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504335	**Depth (ft):**	1' - 7'
Boring Number:	LSS-15	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-15
Maximum Dry Density (pcf):	106.0
Optimum Moisture (%):	19.8
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	72
Plastic Limit:	22
Plastic Index:	50
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.4
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Brown

General

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Modified Proctor M-D Relationship

ND T 180

02/21/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

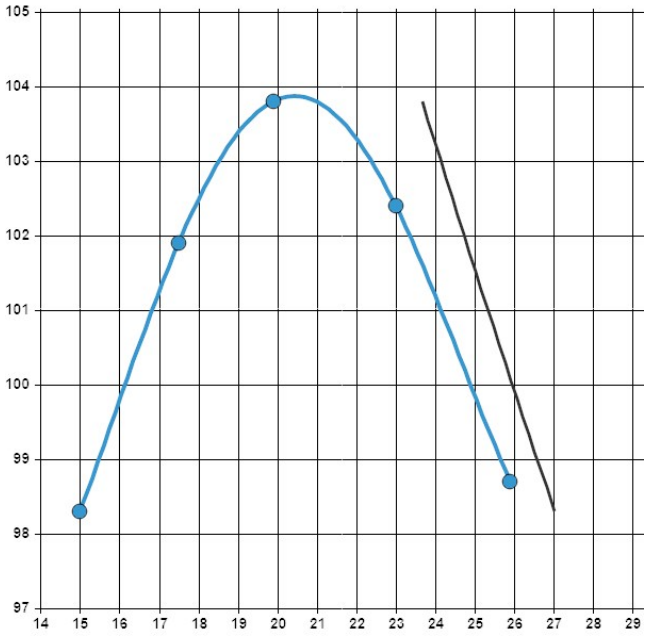
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504336	**Depth (ft):**	1' - 7'
Boring Number:	LSS-16	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/20/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data



Proctor ID:	P-16
Maximum Dry Density (pcf):	104.0
Optimum Moisture (%):	20.4
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	85
Plastic Limit:	23
Plastic Index:	62
Retained On #4 (%):	0.0
Mold Mass (gr):	4136.8
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

General

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Modified Proctor M-D Relationship

ND T 180

02/15/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

Project:

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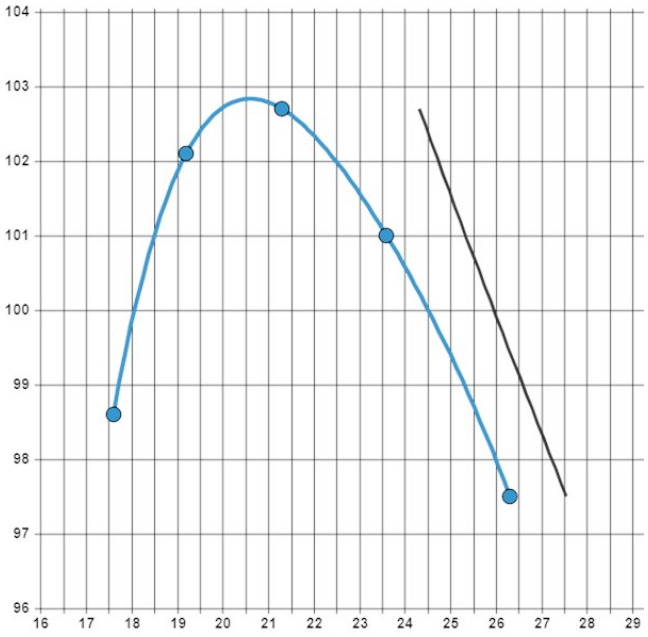
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504338	**Depth (ft):**	1' - 7'
Boring Number:	LSS-17	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/10/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-17
Maximum Dry Density (pcf):	103.0
Optimum Moisture (%):	20.6
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	71
Plastic Limit:	24
Plastic Index:	47
Retained On #4 (%):	0.0
Mold Mass (gr):	4131.7
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown

General

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Modified Proctor M-D Relationship

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02/21/2023

Client:

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1401 21st Avenue North
Fargo, ND 58102

Project:

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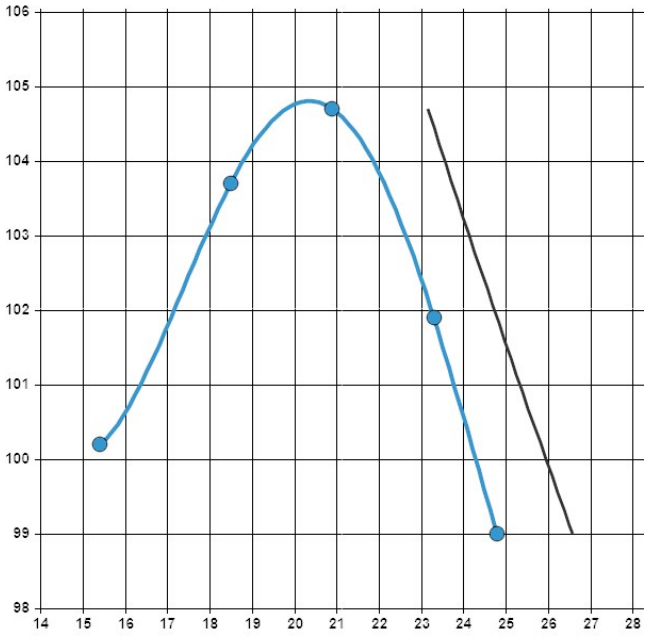
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504339	**Depth (ft):**	1' - 7'
Boring Number:	LSS-18	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/20/2023	**Tested By:**	Jacquemart, Trevor

Laboratory Data



Proctor ID:	P-18
Maximum Dry Density (pcf):	105.0
Optimum Moisture (%):	20.4
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.75
Liquid Limit:	79
Plastic Limit:	21
Plastic Index:	58
Retained On #4 (%):	0.0
Mold Mass (gr):	4131.2
Mold Volume (cc):	942.9

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown

General

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ND T 180

02/08/2023

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PO Box 485
West Fargo, ND 58078
Phone: 701-232-8701

Client:

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Fargo, ND 58102

Project:

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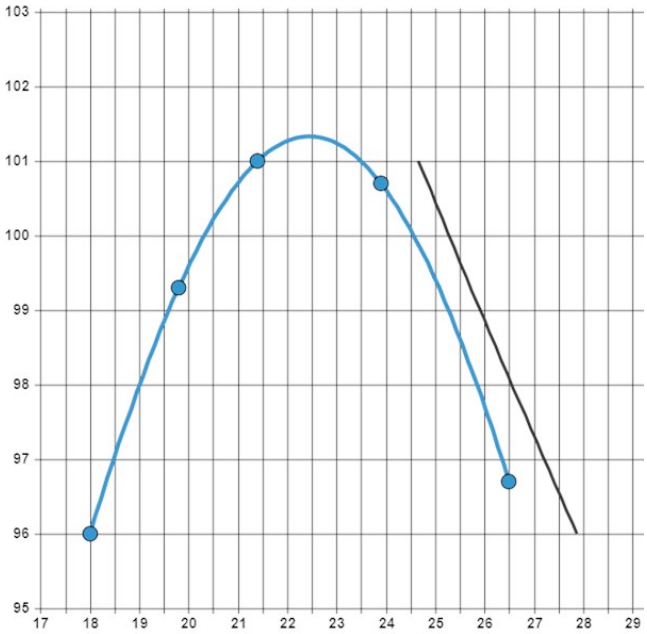
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504340	**Depth (ft):**	1' - 7'
Boring Number:	LSS-19	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/02/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-19
Maximum Dry Density (pcf):	101.0
Optimum Moisture (%):	22.5
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	70
Plastic Limit:	23
Plastic Index:	47
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.7
Mold Volume (cc):	942.9

Visual Manual Classification: A-7-6; Fat Clay (CH), Brown

General

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Client:

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Fargo, ND 58102

Project:

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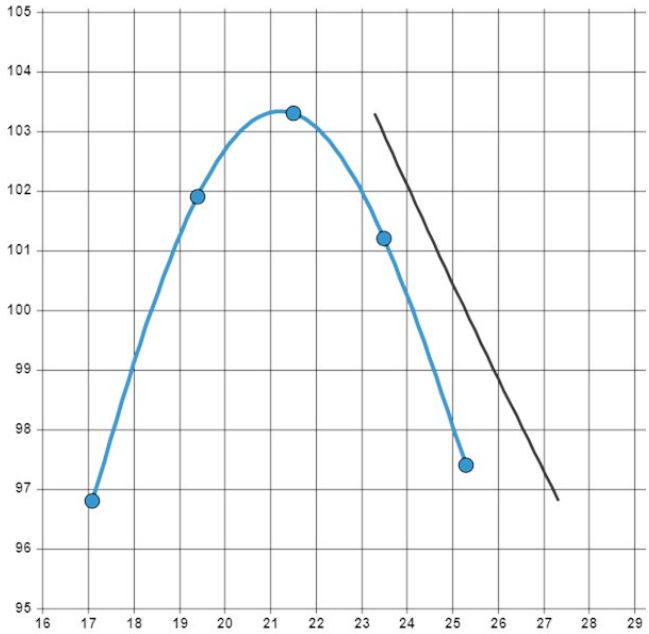
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504341	**Depth (ft):**	1' - 7'
Boring Number:	LSS-20	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/01/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-20
Maximum Dry Density (pcf):	103.0
Optimum Moisture (%):	21.2
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	70
Plastic Limit:	23
Plastic Index:	47
Retained On #4 (%):	0.0
Mold Mass (gr):	4129.4
Mold Volume (cc):	942.4

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

General

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Phone: 701-232-8701

Modified Proctor M-D Relationship

ND T 180

02/10/2023

Client:

Houston Engineering, Inc.
1401 21st Avenue North
Fargo, ND 58102

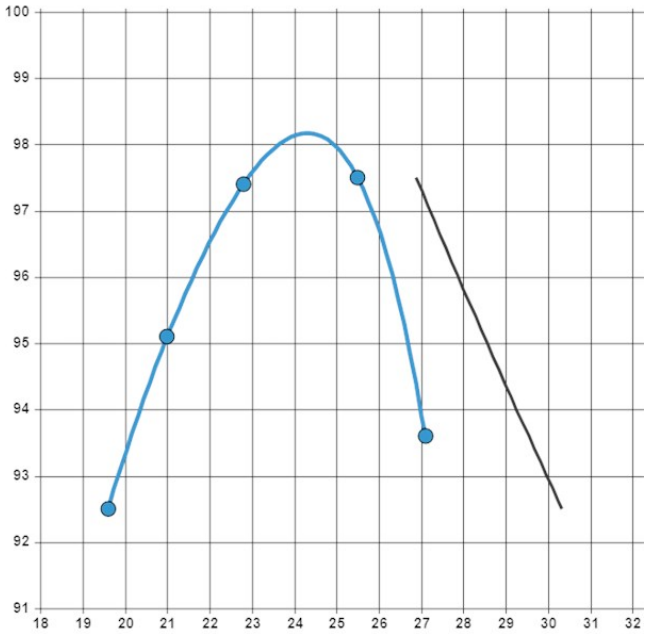
Project:

B2212151
SU-8-992(045); PCN 23537
9th St NE
West Fargo, ND

Sample Information

Sample Number:	504342	**Depth (ft):**	1' - 7'
Boring Number:	LSS-21	**Sampled By:**	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Sample Date:	01/06/2023		
Received Date:	01/30/2023	**Lab:**	526 10th Street NE, Suite 300, West Fargo, ND
Tested Date:	02/08/2023	**Tested By:**	Lage, Andrew

Laboratory Data



Proctor ID:	P-21
Maximum Dry Density (pcf):	98.0
Optimum Moisture (%):	24.3
Method:	Method A
Rammer Type:	Manual Round
Specific Gravity:	2.70
Liquid Limit:	77
Plastic Limit:	27
Plastic Index:	50
Retained On #4 (%):	0.0
Mold Mass (gr):	4131.1
Mold Volume (cc):	942.9

Visual Manual Classification: A-7-6; Fat Clay (CH), Dark Brown/Grey Mix

General