



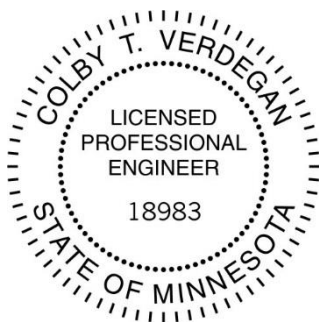
Revised Design Phase Geotechnical Evaluation:

Proposed Hugo Apartment
14775 Victor Hugo Blvd. North
Hugo, Minnesota

Prepared for:

Mr. Mark Lambert
Summit Management, LLC

November 14, 2022
20916.22.MNT



I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly licensed engineer under the laws of the State of Minnesota.

A handwritten signature in black ink that reads 'Colby T. Verdegan'.

Colby T. Verdegan, PE
Geotechnical Engineer
Registration Number 18983
Date: November 14,2022

Chosen Valley Testing Inc.

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Mark Lambert
Summit Management, LLC
6770 Stillwater Blvd,
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mlambert@summitre.net

November 14, 2022

**Re: Revised Design Phase Geotechnical Evaluation
Proposed Hugo Apartment
14775 Victor Hugo Blvd North
Hugo, Minnesota
CVT Project 20916.22.MNT**

Dear Mr. Lambert,

As authorized, we have revised our previously issued geotechnical evaluation for the proposed apartment buildings in Hugo, Minnesota. The revisions were made to incorporate as drilled locations and elevations determined for most of the borings after the report was issued. This letter briefly summarizes the findings in the attached report.

Summary of Boring Results

At the surface, the borings typically encountered about 1 ½ to 2 feet of clayey topsoil. Below the topsoil, three of the boring encountered about 2 ½ feet of rather clean sand that was suspected to be fill and was termed “possible” fill on the Log of Boring sheets.

The uppermost natural soils consisted of silty clayey sands. These materials extended to a depth of about 6 ½ feet at most locations but extended deeper at a few locations. Only one boring did not appear to have this layer,

Sandy lean clays dominated at depth in all of the borings and all of the boring terminated in these soils. At most locations, the clays turned from brown to gray at depths of about 5 to 12 feet, but more typically 10 to 12 feet.

Water was observed at a depth of 10 feet in the extreme northwest boring (Boring B-7), corresponding to about elevation 910 feet. This is the only boring where free water was observed. The glacial clays encountered were not highly permeable. This limited the ability for water to collect and be observed in the borings. The color transition in the clays from brown to gray at most locations, suggested groundwater is present across the site. The depths of the transitions typically corresponded to elevations of about 908 to 912 feet on the datum used to locate the borings. The elevation of the coloration changes tended to be lower in

the southern and eastern borings and appeared to be in the range of 906 to about 908 in those areas. Long term water monitoring with piezometers or wells would be required to better determine static groundwater levels.

Summary of Analysis and Recommendations

The topsoil is not suitable for support of building or pavements and should be removed from below these areas along with any fill, foundations, slabs or utilities or other unsuitable soils. At most of the locations explored, these materials appeared to be about 2 feet thick. The existing silty clayey sands appear suitable for use as bulk fill below building and paved areas, provided they are properly moisturized or dried, if needed to attain compaction.

After grading the bearing soils are expected to consist primarily of natural silty clayey sands or shallow depths of silty clayey sand fill over the natural soils. Based on the borings and assuming proper implementation of our recommendations, the soils at most locations are expected to be suitable for support of foundation sized to exert pressures of up to 2,500 psf. This allowable bearing pressure includes a safety factor of at least 3 against shear failure. Total post-construction settlements are expected to be on the order of 1 inch or less, while differential settlement between similarly loaded footings is expected to be on the order of ½ inch or less.

Remarks

We appreciate the opportunity to serve you. The attached report provides more details of our analysis. If you have any questions about our report, please feel free to contact us at (651) 756-7384.

Sincerely,
Chosen Valley Testing, Inc.



Hannah Fischer
Graduate Geological Engineer



Colby T. Verdegan, PE
Sr. Geotechnical/Materials Engineer

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**Revised Design Phase Geotechnical Report
Proposed Hugo Apartments
14775 Victor Hugo Blvd North
Hugo, Minnesota**

CVT Project Number: 20916.22.MNT

Date: November 14, 2022

A. Introduction

The intent of this report is to present our findings to the client in the same logical sequence that led us to arrive at the opinions and recommendations expressed. Since our services often must be completed before the design is finished, assumptions are often needed to prepare a proper scope and to analyze the data. A complete and thorough review of the entire document, including its assumptions and its appendices, should be undertaken immediately upon receipt.

A.1. Purpose

This geotechnical report was prepared to aid in the design and construction of the proposed apartment complex in Hugo, Minnesota. The report includes revisions to soil boring elevations and locations, based on surveying of the borings after the report was issued. Our services were authorized by Mr. Mark Lambert of Summit Development.

A.2. Scope

To obtain data for analysis, a total of 18 borings were drilled on site. All of the apartment borings were drilled to the planned depths of about 15 to 20 feet. Our engineering scope consisted of providing the report presenting our findings and geotechnical recommendations for the proposed building and pavements.

A.3. Boring Locations and Elevations

Preferred boring locations were indicated to Chosen Valley Testing (CVT) on a site plan provided by the client. The sketch in the Appendix of this reports was made by superposing the plan and a topographic survey showing all borings all except B-12 onto a satellite view of the area, using Google Earth software. The survey was provided by E.G. Rud & Sons, and also included ground surface elevations at the borings after drilling. The location of B-12 was based on plotting the GPS coordinates used to stake the borings onto the satellite view. The associated ground elevation for B-12 was based on contours on the topographic survey of the site by E.G. Rud.

A.4. Geologic Background

A geotechnical report is based on subsurface data collected for the specific structure or problem. Available geologic data from the region can help interpretation of the data and is briefly summarized in this section.

Geologic maps indicate that the dominant soils in the area are glacial till. Bedrock was expected to be more than 50 feet below the surface and not a consideration for the project. Aerial photographs indicate a farmstead covered much of the building site but was gradually removed between about 2004 and 2014. The removal appeared to include filling and removals, although the true nature was hard to judge.

B. Subsurface Data

Procedures: The borings were performed using penetration test procedures (Method of Test D1586 of the American Society for Testing and Materials). With the penetration test procedures method, a hollow-stem auger is drilled to the desired sampling depth. A 2-inch OD sampling tube is then screwed onto the end of a sampling rod, inserted through the hole in the auger's tip, and then driven into the soil with a 140-pound hammer dropped repeatedly from a height of 30 inches above the sampling rod. The sampler is driven 18 inches into the soil, unless the material is too hard. The samples are generally taken at 2½ to 5-foot intervals. The core of soil obtained was classified and logged by the driller on site and a representative portion was then sealed and delivered to the geotechnical engineer for further review.

B.1. Stratification

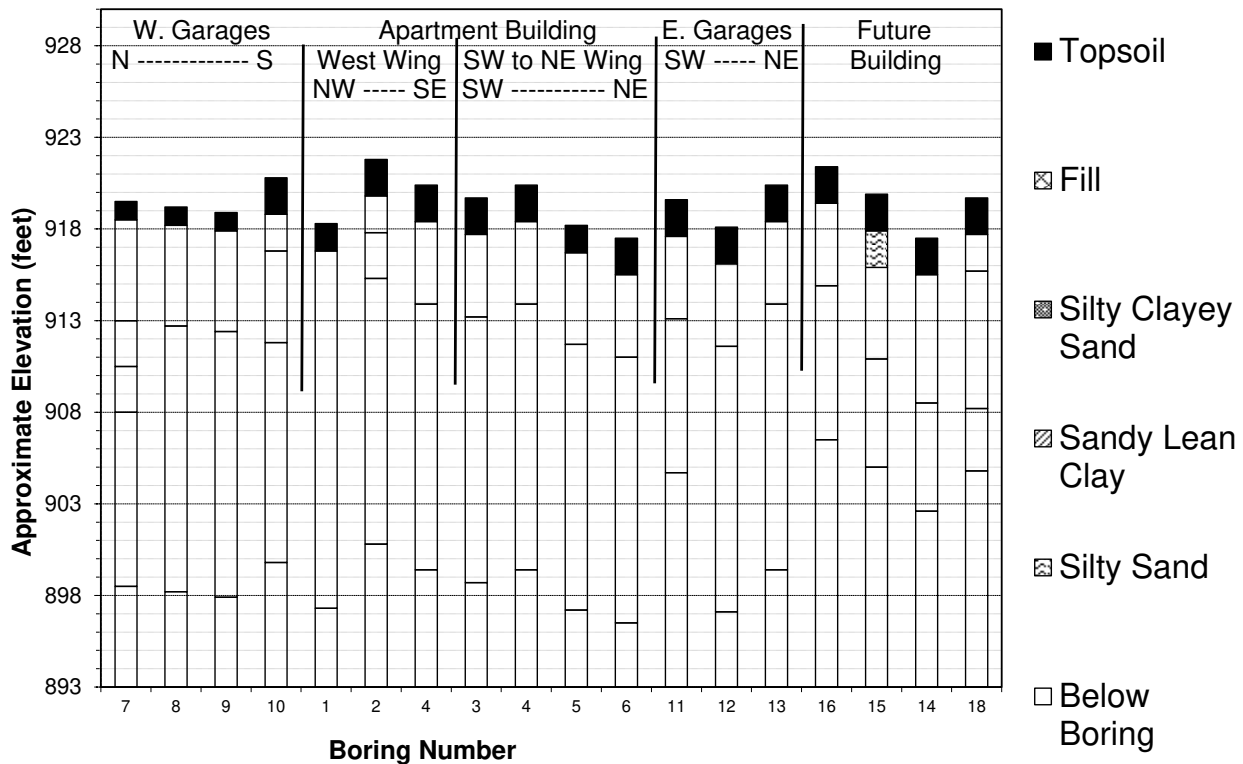
At the surface, the borings typically encountered about 1 ½ to 2 feet of clayey topsoil.

Below the topsoil, three of the boring encountered about 2 ½ feet of rather clean sand that was suspected to be fill and was termed "possible" fill on the Log of Boring sheets.

The uppermost natural soils consisted of silty clayey sands. These materials extended to a depth of about 6 ½ feet at most locations but extended deeper at a few locations. Only one boring did not appear to have this layer,

Sandy lean clays dominated at depth in all of the borings and all of the boring terminated in these soils. At most locations, the clays turned from brown to gray at depths of about 5 to 12 feet, but more typically 10 to 12 feet.

For the reader's convenience, we have summarized the soil boring data on the cross-section which follows. The reader is referred to the log sheets in the Appendix for more detailed information.



B.2. Penetration Test and Laboratory Test Results

The number of blows needed for the hammer to advance the penetration test sampler is an indicator of soil characteristics. The results tend to be more meaningful for natural mineral soils, than for fill soils. In fill soils, compaction tests are more meaningful.

Penetration resistance value ("N" Value) of 6 to 13 blows per foot (BPF) was recorded in the possible fill. Values of 7 to 20 BPF were recorded in the silty clayey sands indicating they were loose to medium dense. Penetration test values in the sandy lean clays ranged from 4 to 19 BPF indicating they were very soft to very stiff, but mostly medium to rather stiff.

A key to descriptors used to qualify the relative density of soil (such as *soft*, *stiff*, *loose*, and *dense*) can be found on the Legend to Soil Description in the Appendix.

B.3. Groundwater Data

During drilling, the drillers may note the presence of moisture on the sampler, in the cuttings, or in the borehole itself. These findings are reported on the boring logs. Because water levels vary with weather, time of year, and other factors, the presence or lack of water during exploration is subject to interpretation and is not always conclusive.

Water was observed at a depth of 10 feet in the extreme northwest boring (Boring B-7), corresponding to about elevation 910 feet. This is the only boring where free water was observed. The water was

associated with a sandy zone within the glacial clays.

The glacial clays encountered were not highly permeable. This limited the ability for water to collect and be observed in the borings. The color transition in the clays from brown to gray at most locations, suggested groundwater is present across the site. The depths of the transitions typically corresponded to elevations of about 908 to 912 feet on the datum used to locate the borings. The elevation of the coloration changes tended to be lower in the southern and eastern borings and appeared to be in the range of 906 to about 908 in those areas. Long term water monitoring with piezometers or wells would be required to better determine static groundwater levels. We would expect groundwater levels to fluctuate similarly to nearby creeks and rivers, along with local weather patterns.

C. Design Data

Because each structure has a different loading configuration and intensity, different grades, and different structural or performance tolerances, the results of a geotechnical exploration will mean different things for different facilities. If the facility changes, Chosen Valley Testing should be contacted to discuss possible implications of the changes. Without a chance to review such changes, the recommendations of the soils engineer may no longer be valid or appropriate.

The project consists of the construction of a three-story apartment building. The building appears to be a slab on grade structure with detached garages and on-grade exposed parking areas. The structure is to consist of concrete or masonry foundations, with wood framing. Maximum foundation loads are assumed to be on the order of 50 kips per column and 5 kips per lineal foot. We assumed less than 5 feet of cutting and filling will be needed.

We have assumed that the parking and drive areas will experience primarily light to moderate traffic loads and assumed to experience primarily auto traffic and occasional commercial truck traffic.

D. Analysis

The topsoil is not suitable for support of building or pavements and should be removed from below these areas along with any fill, foundations, slabs or utilities or other unsuitable soils. At most of the locations explored, these materials appeared to be about 2 feet thick. The existing silty clayey sands appear suitable for use as bulk fill below building and paved areas, provided they are properly moisturized or dried, if needed to attain compaction.

After grading the bearing soils are expected to consist primarily of natural silty clayey sands or shallow depths of silty clayey sand fill over the natural soils. Based on the borings and assuming proper implementation of our recommendations, the soils at most locations are expected to be suitable for support of foundation sized to exert pressures of up to 2,500 psf. This allowable bearing pressure includes a safety factor of at least 3 against shear failure. Total post-construction settlements are expected to be on the order of 1 inch or less, while differential settlement between similarly loaded footings is expected to be on the order of ½ inch or less.

We recommended that CVT be retained to make a final evaluation of bearing conditions and earthwork corrections during construction, and again before placing footing concrete.

The remainder of the report provides more details of our recommendations.

E. Recommendations-Excavation/Backfill

E.1. Grading Recommendations

E.1.a. Topsoil Removal: The topsoil is not suitable for building or pavement support, and should be removed from below building and pavements, along with any existing fill, foundations, utilities or other unsuitable materials. At most of the locations explored, about 2 feet of removal is expected.

E.1.b. Subgrade Evaluation: The bearing soils in the excavations should be evaluated by CVT personnel before placing fill or foundations. Any unsuitable materials observed should be removed and replaced with engineered granular fill.

E.1.c. Oversizing: Any stripping or corrective excavations should be oversized at least 1 foot beyond the foundations for each foot of fill needed below footing grade. This oversizing can be reduced by up to 50% if rather precise staking is present during grading.

E.1.d. Filling and Compaction: The existing silty clayey sands appear to be suitable for bulk use below the building provided it can be adequately compacted. The fill should be placed in lifts adjusted to the compactor being used and the material being compacted. We recommend limiting lifts to no more than 1 foot. This assumes large, self-propelled or tow-behind compactors are used. All materials below the building, in the oversized areas, or used as backfill for walls should be compacted to a minimum of 95% of its maximum standard Proctor density (ASTM D 698).

We recommend using clean, free-draining sands or gravels having less than 5% passing a #200 sieve as fill in the upper 4 to 6 inches below the slabs, although coarser and more specialized material are often needed for radon protection systems. This material will have to be imported.

E.2. Building Design

E.2.a. Foundation Depth: We recommend placing foundations at least 42 inches below the exposed ground surface for frost protection. Interior foundations in heated areas may be placed directly below slabs. Footings for unheated structures should be placed at least 60 inches below the exposed ground surface.

E.2.b. Bearing Capacity: Based on the assumed loads and implementation of the earthwork recommendations, we are of the opinion that foundations may be designed to exert pressures of up to 2,500 psf. This allowable bearing pressure includes a safety factor of at least 3 against shear failure.

E.2.c. Settlement: Based on a bearing pressure of 2,500 psf, total post-construction settlements are

expected to be on the order of 1 inch or less. Differential settlement between similarly loaded footings is expected to be on the order of ½ inch or less.

E.2.d. Vapor Barrier: If the slab will receive coverings that are less permeable than concrete, a vapor barrier should be placed below the slab. Some contractors prefer to place this barrier below the sand, to limit the potential for curling.

E.2.e. Slab Design: The completed slab subgrade is expected to consist of at least silty clayey sands. We recommend using a modulus of subgrade reaction of no more than 150 pounds per cubic inch for these conditions.

E.2.f. Below-Grade Walls: Lateral support values are provided for design of below-grade walls. Backfill should be compacted to at least 95% of its maximum standard Proctor density (ASTM D 698). Lateral resistance will depend on the materials used. We recommend using clean, free-draining sands, having less than 10% fines, as fill against below-grade walls. The sands should be capped with pavements or clayey topsoil. The table below includes support values for the recommended clean sands. These values do not include a safety factor.

Poorly Graded Sands (SP) 95% Standard Proctor Density	
Internal Friction Angle (degrees)	34
Cohesion (psf)	0
Coefficient of Friction between Concrete and Soil	0.50
Moist Unit Weight (pcf)	120
At-Rest Coefficient (K _o)	0.44
Active Coefficient (K _a)	0.28
Passive Coefficient (K _p)	3.54

The actual loads exerted on the structure will depend on the movement or flexure of the structure. For sand fill, horizontal movement or flexure of about 0.2% of the height of soil retained may be sufficient to mobilize frictional forces from the at-rest state to the active state. Wall backfill should be provided with a drainage outlet.

F. Paved Areas

F.1. Stripping

We recommend stripping all organic topsoil along with any otherwise unsuitable materials that may be encountered during construction from below any paved areas to a depth of at least 3 feet below the pavements. Below this depth, it should be adequate to strip the root zone. As noted earlier, the topsoil materials appeared to be about 1 ½ to 2 feet thick.

The soils present after stripping are expected to consist primarily of silty clayey sands. We recommend

scarify and compact exposed portions of the subgrade that are within 2 feet of the pavement section. This is intended to make the subgrade more uniform and disrupt possible seepage zones near the surface that might hold water.

F.2. Fill Placement and Compaction

The existing silty clayey sand appear suitable for reuse as subgrade soils for pavements. Otherwise, for a higher quality subgrade, a layer of clean sands or gravel could be placed below the pavements. If that is done, the surface receiving the sand or gravel should be sloped to drain, to prevent water from collecting below the pavements and encourage localized heaving or weakening.

Fill placed in the upper 3 feet of the subgrade should be compacted to at least 100% of its maximum standard Proctor density. Below 3 feet, compaction to 95% is recommended. Compaction to 90% is usually sufficient in green areas. The completed pavement subgrade should be able to pass a test roll. Areas not passing the test roll should be reworked and stabilized as needed to pass the test roll.

F.3. Pavement Design

We suggest a flexible pavement section consisting of at least 8 inches of aggregate base and 3 1/2 inches of bituminous. This pavement section should be reviewed by the project civil construction as regards anticipate traffic loads, and in consideration of final grades and local practices.

G. Construction Testing and Documentation

G.1. Excavation

Most of stripping can likely be accomplished with a variety of equipment if conditions are dry. Because the soil type present are sensitive to moisture and disturbance, tracked equipment would likely be required if the soils are wet or become wet. Deeper excavations will require the use of a backhoe. A backhoe with a smooth lipped bucket is recommended to limit disturbance of the natural bearing soils.

G.2. Cold Weather

If the excavation occurs during freezing temperatures, good winter construction practices should be used. Frozen fill should be thawed before placing and filling should not be placed on frozen ground. Slab areas should be completely thawed prior to placing concrete.

G.3. Construction Testing and Documentation

The bottom of the excavations should be evaluated and documented by qualified geotechnical personnel to assess the soils at bearing depth. Any fill placed below building areas should be evaluated for conformance to the project gradation recommendations and should be tested for compaction. If filling proceeds during periods of freezing weather, full-time testing should be considered to help confirm that imported fill is thawed prior to and during compaction, and that all snow has been removed before placement of the fill.

Although our firm offers testing services relating to civil and structural components of the structure (such as concrete testing, reinforcement observations, etc.), specification of such services are beyond our work scope and the designer should be consulted as to such requirements.

H. Level of Care

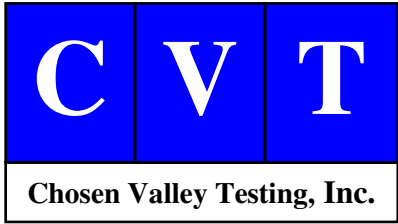
The services provided for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area, under similar budget and time constraints. This is our professional responsibility. No other warranty, expressed or implied, is made.

Appendix

Boring Location Sketch

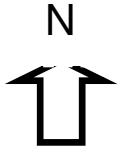
Log of Boring # 1-18

Legend to Soil Description



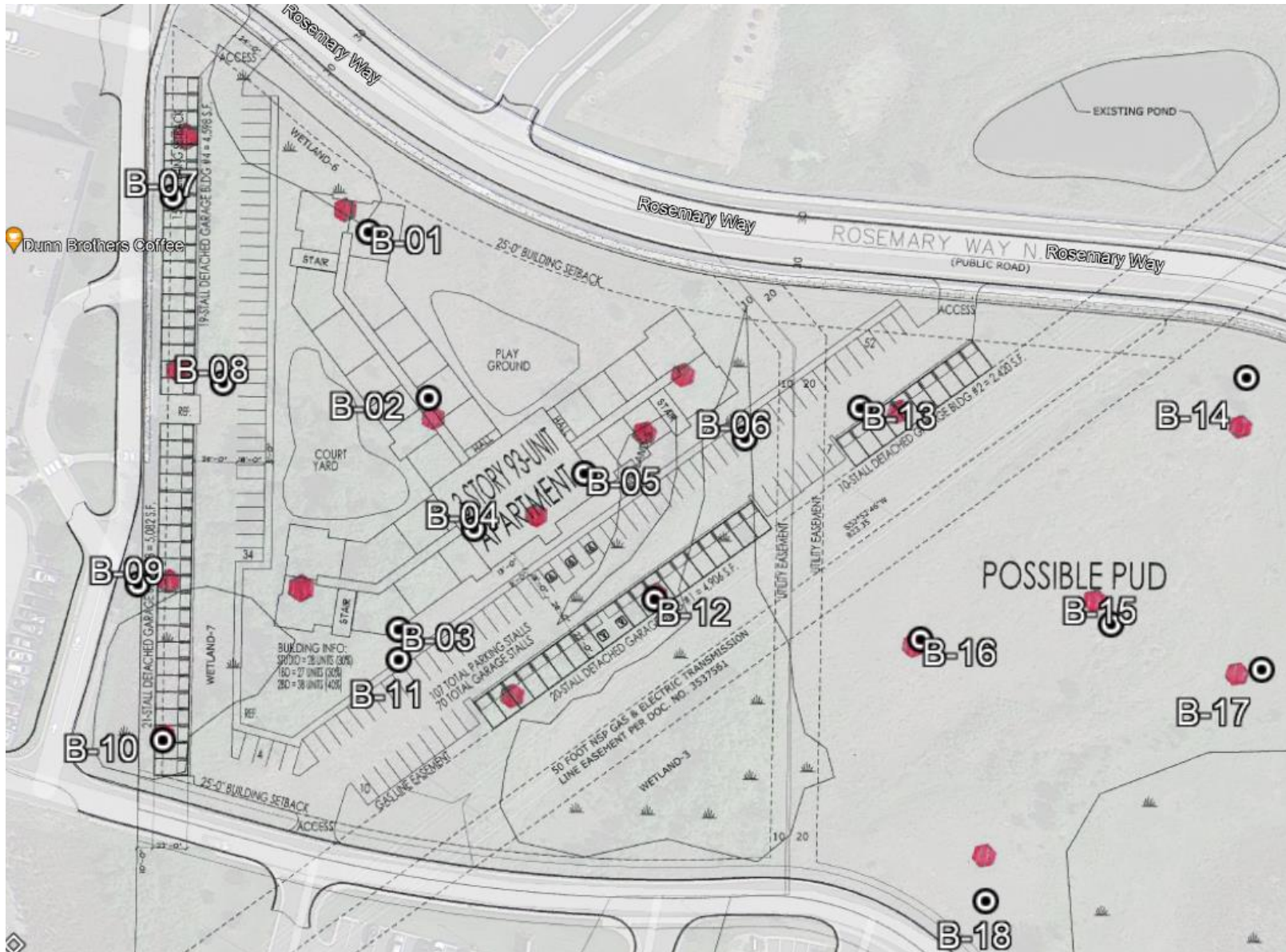
Legend

- Boring Locations



Boring Location Sketch

Hugo Apartment
East of 14775 Victor Hugo Blvd N
Hugo, Minnesota
CVT Project 20916.22.MNT



LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota			BORING: B-01			
			LOCATION: See attached sketch.			
			DATE: 10/19/22	SCALE: 1" = 3'		
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
917.5	0.0					
916.0	1.5	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, brown then dark brown, moist.			Elevations estimated from contours on Topographic Survey of Site dated 8/8/2022 by E.G. Rud and Sons, Inc.
		SC CL	SANDY LEAN CLAY , brown, wet, rather soft to rather stiff. (Glacial Till)	5		
			Below 5 feet, trace Gravel, grey.	5		
				6		
				7		
				10		
				8		
				10		
896.5	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota		BORING: B-02				
		LOCATION: See attached sketch.				
		DATE: 10/19/22	SCALE: 1" = 3'			
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
922.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
920.0	2.0		POSSIBLE FILL Poorly Graded Sand with Silt to silty sand, fine-to-medium grained, brown, moist.	6		
918.0	4.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, loose. (Glacial Till)	8		
915.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown and light grey, wet, medium to stiff. (Glacial Till) At 7 feet, brown.	14		
				10		
				11		
			Below 12 feet, grey.	8		
				12		
901.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-03		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
918.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown and light grey, moist, medium dense. (Glacial Till)	11		
913.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	7		
				8		
				7		
				13		
				10		
				9		
899.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-04		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
921.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
919.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, loose to medium dense. (Glacial Till)	15		
914.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, rather soft to stiff. (Glacial Till)	10		
			Below 10 feet, grey.	9		
				7		
				5		
				7		
900.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-05		
				LOCATION: See attached sketch.		
				DATE: 10/20/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
918.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
916.5	1.5	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, loose to medium dense. (Glacial Till)	14		
911.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, medium to stiff. (Glacial Till) Below 7 feet, grey.	11 7 9 11		
897.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.	13		

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-06		
				LOCATION: See attached sketch.		
				DATE: 10/19/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
918.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, dark brown, moist.			
916.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, loose. (Glacial Till)	6		
911.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, greyish brown, wet, medium to rather stiff. (Glacial Till)	7		
				8		
				9		
				8		
				11		
				12		
897.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-07		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Roots, brown, moist.			
919.0	1.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, loose to medium dense. (Glacial Till)	15		
913.5	6.5	SC CL	SANDY LEAN CLAY , trace gravel, greyish brown, wet, medium to stiff. (Glacial Till)	8		
911.0	9.0	SC SM	SILTY CLAY SAND , fine-to-medium grained, trace Gravel, brown, water bearing, medium dense. (Glacial Till)	12	▽	
908.5	11.5	SC CL	SANDY LEAN CLAY , trace gravel, grey, wet, medium to rather stiff. (Glacial Till)	8		
				6		
				8		
899.0	21.0		End of boring. Water was observed at 10 feet during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-08		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.5	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Roots, dark brown, moist.			
919.5	1.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, medium dense. (Glacial Till)	11		
914.0	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, greyish brown, wet, rather stiff to very stiff. (Glacial Till)	9		
			Below 10 feet, grey.	15		
				17		
				22		
899.5	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.	11		

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-09		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
918.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Roots, brown, moist.			
917.0	1.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown and light grey, moist, medium dense. (Glacial Till)	14		
911.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, rather stiff to stiff. (Glacial Till) At 7 feet, seems of sand. Below 10 feet, grey.	9 10 9 6 11		
897.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-10		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
918.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand, trace Gravel, brown, moist.			
916.0	2.0		POSSIBLE FILL , Poorly Graded Sand with Silt, fine grained, trace Gravel, brown, moist.	13		
914.0	4.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown and grey, moist, loose. (Glacial Till)	8		
				9		
909.0	9.0	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	6		
			Below 12 feet, grey.	10		
				9		
				8		
897.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-11		
				LOCATION: See attached sketch.		
				DATE: 10/18/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
918.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand, trace Gravel, brown, moist.			
916.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, medium dense. (Glacial Till)	13		
911.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	11		
			Below 12 feet, grey.	8		
903.1	14.9		End of boring. Water was not observed during drilling. Boring was sealed upon completion.	12		
				11		

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-12		
				LOCATION: See attached sketch.		
				DATE: 10/20/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
918.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
916.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, medium dense. (Glacial Till)	20		
911.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, medium to stiff. (Glacial Till)	13		
			Below 12 feet, grey.	10		
				8		
				11		
				12		
897.0	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-13		
				LOCATION: See attached sketch.		
				DATE: 10/19/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.5	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
918.5	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, greyish brown, moist, loose. (Glacial Till)	7		
914.0	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brownish grey, wet, medium to rather stiff. (Glacial Till)	7		
			Below 12 feet, grey.	9		
				9		
				12		
				11		
899.5	21.0		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22(SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-14		
				LOCATION: See attached sketch.		
				DATE: 10/19/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
918.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, light brown, moist, loose to medium dense. (Glacial Till)	12		
				8		
				18		
911.0	9.0	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, rather stiff to stiff. (Glacial Till)	10		
			Below 12 feet, grey	14		
				13		
905.1	14.9		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-15		
				LOCATION: See attached sketch.		
				DATE: 10/19/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
918.0	2.0	SM	SILTY SAND , fine grained, brown, moist, medium dense. (Glacial Till)	13		
916.0	4.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, medium dense. (Glacial Till)	11		
				13		
911.0	9.0	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, rather stiff to very stiff. (Glacial Till)	10		
			Below 12 feet, grey.	19		
				14		
905.1	14.9		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-16		
				LOCATION: See attached sketch.		
				DATE: 10/19/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
920.5	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
918.5	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown, moist, medium dense. (Glacial Till)	11		
914.0	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	8		
			Below 12 feet, grey.	12		
				14		
				15		
905.6	14.9		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-17		
				LOCATION: See attached sketch.		
				DATE: 10/19/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
916.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, dark brown, moist.			
914.0	2.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, brown and grey, moist, loose. (Glacial Till)	9		
909.5	6.5	SC CL	SANDY LEAN CLAY , trace Gravel, brownish grey, wet, rather soft to rather stiff. (Glacial Till)	6		
			Belwo 10 feet, grey.	7		
				4		
				7		
901.1	14.9		End of boring. Water was not observed during drilling. Boring was sealed upon completion.	10		

LOB: 20916.22.MNT (HUGO APARTMENTS).GPI 11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)












LOG OF BORING

CHOSEN VALLEY TESTING

PROJECT: 20916.22.MNT Design Phase Geotechnical Evaluation Hugo Apartments East of 14775 Victor Hugo Blvd N Hugo, Minnesota				BORING: B-18		
				LOCATION: See attached sketch.		
				DATE: 10/20/22	SCALE: 1" = 3'	
Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
924.0	0.0	OL	TOPSOIL , Slightly Organic Poorly Graded Sand with Silt, trace Gravel, brown, moist.			
922.0	2.0		POSSIBLE FILL , Poorly Graded Sand with Silt, fine grained, greyish brown, moist.	16		
920.0	4.0	SC SM	SILTY CLAYEY SAND , fine grained, trace Gravel, greyish brown, moist, loose. (Glacial Till)	8		
				5		
				5		
912.5	11.5	SC CL	SANDY LEAN CLAY , trace Gravel, grey, wet, medium to rather stiff. (Glacial Till)	8		
				9		
909.1	14.9		End of boring. Water was not observed during drilling. Boring was sealed upon completion.			



LOB_20916.22.MNT (HUGO APARTMENTS).GPI_11/4/22 (SEE REPORT AND STANDARD PLATES FOR EVALUATION AND DESCRIPTIVE TERMINOLOGY.)

UNIFIED SOIL CLASSIFICATION (ASTM D-2487/2488)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND		
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO. 4. SIEVE	CLEAN GRAVELS <5% FINES	$C_u > 4$ AND $1 < C_c < 3$	GW	WELL-GRADED GRAVEL		
		GRAVELS WITH FINES >12% FINES	$C_u > 4$ AND $1 > C_c > 3$	GP	POORLY-GRADED GRAVEL		
		SANDS >50% OF COARSE FRACTION PASSES ON NO. 4. SIEVE	CLEAN SANDS <5% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	
			SANDS AND FINES >12% FINES	FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	
	FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT < 50	INORGANIC	$P_i > 7$ AND PLOTS > "A" LINE	CL	LEAN CLAY	
				$P_i > 4$ AND PLOTS < "A" LINE	ML	SILT	
			ORGANIC	LL (oven dried)/LL (not dried) < 0.75	OL	ORGANIC CLAY OR SILT	
		SILTS AND CLAYS LIQUID LIMIT > 50	INORGANIC	PI PLOTS > "A" LINE	CH	FAT CLAY	
PI PLOTS < "A" LINE				MH	ELASTIC SILT		
ORGANIC			LL (oven dried)/LL (not dried) < 0.75	OH	ORGANIC CLAY OR SILT		
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT		


Relative Proportions of Sand and Gravel	
TERM	PERCENT
Trace	< 15
With	15 - 29
Modifier	> 30
Relative Proportions of Fines	
TERM	PERCENT
Trace	< 5
With	5 - 12
Modifier	> 12
Grain Size Terminology	
TERM	SIZE
Boulder	< 12 in.
Cobble	3 in. - 12 in.
Gravel	#4 sieve to 3 in.
Sand	#200 sieve to #4 sieve
Silt or Clay	Passing #200 sieve

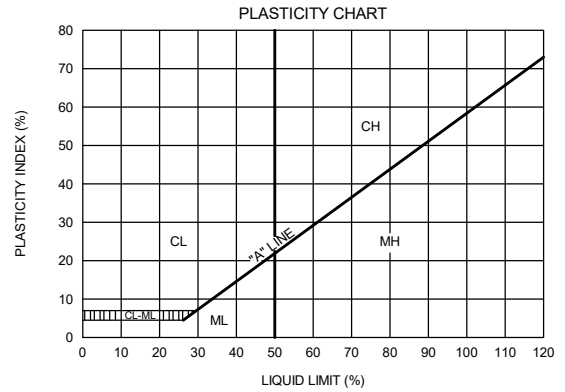
SAMPLE TYPES

-  Hollow Stem
-  Standard Penetration Test

TEST SYMBOLS

- | | |
|-----------------------------|--|
| MC - MOISTURE CONTENT | LL - LIQUID LIMIT |
| OC - ORGANIC CONTENT | PI - PLASTISITY INDEX |
| CN - CONSOLIDATION | SW - SWELL TEST |
| DD - DRY DENSITY | UU - Unconsolidated Undrained triaxial |
| PP - POCKET PENETROMETER | |
| RV - R-VALUE | |
| SA - SIEVE ANALYSIS | |
| P200 - % PASSING #200 SIEVE | |


-  WATER LEVEL (WITH TIME OF MEASUREMENT)



PENETRATION RESISTANCE (RECORDED AS BLOWS / 0.5 FT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	COMPRESSIVE STRENGTH (TSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 1	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 3	0.25 - 0.50
MEDIUM DENSE	10 - 30	RATHER SOFT	4 - 5	0.50 - 1.0
DENSE	30 - 50	MEDIUM	6 - 8	1.0 - 2.0
VERY DENSE	OVER 50	RATHER STIFF	9 - 12	2.0 - 4.0
		STIFF	13 - 16	4.0 - 8.0
		VERY STIFF	17 - 30	8.0 - 15.0
		HARD	OVER 30	OVER 15.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

CVT- 20257.22.MNT (AFFINITY-LAKEVILLE).GPJ - 6/24/22

<h2 style="margin: 0;">Chosen Valley Testing</h2> <p style="margin: 0;">Job No. 20257.22.MNT</p>	<h2 style="margin: 0;">LEGEND TO SOIL DESCRIPTIONS</h2>	 <p style="margin: 0; font-size: small;">Chosen Valley Testing, Inc.</p>
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