DOCUMENT 00 90 00
ADDENDUM

ADDENDUM NO. [2] **Date: March 31, 2021**

RE: **LA CROSSE HOUSING AUTHORITY**
ST JAMES MAINTENANCE REMODEL AND ADDITION
1415 ST JAMES STREET
LA CROSSE, WI 54603
HSR PROJECT NO. 20032-1

FROM: HSR Associates, Inc
100 Milwaukee Street
La Crosse, WI 54603
(608) 784-1830

To: Prospective Bidders

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated March 2021. Acknowledge receipt of this Addendum in the space provided on the bid form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of 2 pages, 1 Bidding Requirements section.

CHANGES TO BIDDING REQUIREMENTS AND CONDITIONS OF THE CONTRACT:

1. Section 00 30 00 INFORMATION AVAILABLE TO BIDDERS
    a. Section added to include geotechnical report in the bid documents.

CHANGES TO GENERAL REQUIREMENTS:

2. Section 01 30 00 Administrative Requirements
    a. Add the following sub-paragraph to 3.02 Pre Construction Meeting paragraph C. Agenda:

    "10. Perform a review of the interior and exterior of the existing structure to take notes, video document and photo document the existing condition of the building prior to excavation adjacent to the existing building.

CHANGES TO DRAWINGS

3. Sheet S800 FOUNDATION Details (No drawing reissued)
    a. Remove note #2 on Detail 1 Over Excavation Detail and replace with the following:

    "2. The geotechnical report included in section 00 30 00 Information Available to Bidders issued with Addendum #2 identifies a buried layer of topsoil below the footing elevation. The geotechnical engineer has deemed this layer of soils to be inadequate for footing support. Excavate to remove this layer of soils below the footings and backfill with suitable soils as approved by the geotechnical engineer. This soil replacement work and any shoring or similar efforts to protect existing site items including structures and

utilities, etc. is included in the base scope of the project. Where over excavation work not associated with the buried layer of topsoil is required, the contractor will be compensated on a pre-established unit cost agreed upon by the Contractor, Architect/Engineer, and Owner."

END OF DOCUMENT 00 90 00

DOCUMENT 00 30 00

INFORMATION AVAILABLE TO BIDDERS

The following documents contain information about existing conditions which are pertinent to the Work of this Project and are available for the general information of all Bidders. The availability of such information shall not relieve any Bidder from responsibility to visit the Project Site, to become familiar with the local conditions under which the Work is to be performed and to correlate the Bidder's observations with the requirements of the Bidding Documents.

1. SOIL INVESTIGATION REPORT

The Soil Investigation Report No. (March, 29, 2021 17990.21.WIL) as prepared by (Choosen Valley Testing – Frederick E. Schuster PE) is for reference purposes only and shall not be considered a part of the Contract Documents. The Architect/Engineer does not certify its completeness or accuracy. The Contractor may do additional testing and evaluation to verify subsurface conditions. A copy of the soil investigation report printed half size on green paper is bound herein following as a part of this Section 00 30 00.

END OF DOCUMENT 00 30 00

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C V T

Chosen Valley Testing

Design Phase Geotechnical Report:

Proposed Maintenance Shop Addition
Housing Authority of the City of La Crosse
1415 St. James Street
La Crosse, Wisconsin

Prepared for:

Mr. Jeremy Gunderson
Facilities Manager
Housing Authority of the City of La Crosse
c/o: Mr. Kyle Schauf, AIA
Architect, Director HSR Board of Directors

March 29, 2021
17990.21.WIL

WISCONSIN FREDERICK E. SCHUSTER E-46610 CEDAR FALLS IA PROFESSIONAL ENGINEER	I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly registered engineer under the laws of the State of Wisconsin. Frederick E. Schuster, PE Geotechnical Engineer Registration Number 46610 Date: March 29, 2021

Chosen Valley Testing, Inc.

Geotechnical Engineering and Testing • 1019 2nd Avenue SW Onalaska, WI 54650 • Phone (608) 782-5505 • Fax (608) 785-2818

Mr. Jeremy Gunderson
Facilities Manager
Housing Authority of the City of La Crosse
Sparta, Wisconsin 54656

March 29, 2021

c/o: Mr. Kyle Schauf, AIA
Architect, Director HSR Board of Directors
kschauf@hsrassociates.com

Re: Design Phase Geotechnical Evaluation Services
Proposed Maintenance Shop Addition
Housing Authority of the City of La Crosse
1415 St. James Street
La Crosse, Wisconsin
CVT Project Number: 17990.21.WIL

Dear Mr. Gunderson:

As authorized, we have completed the geotechnical evaluation for the proposed Maintenance Shop Addition for Housing Authority of the City of La Crosse at 1415 St. James Street in La Crosse, Wisconsin. This letter briefly summarizes the findings in the attached report.

Summary of Boring Results

Borings: At the surface, the borings encountered about 1 to 4 feet of slightly organic silty sand topsoil. Beneath the topsoil layer, silty to clean sand fill with trace slag, concrete, and asphalt was met to depths of about 6 ½ to 10 feet below the surface. Beneath the sand fill materials, all borings except the northernmost boring met a layer of buried topsoil consisting of slightly organic silts to silty sands to depths of 10 to 11½ feet. The center and southern site borings terminated at planned depths within this buried topsoil layer.

Beneath the sand fill and buried topsoil, alluvial clean sands were encountered in the building borings. The building borings and northernmost boring terminated in alluvial sands at depths of about 11 to 21 feet below the surface.

Groundwater: Water was encountered in most of the borings during drilling, at depths of about 7 ½ to 12 feet. The observed water levels correspond to elevations of about 633 ½ to 637 feet. We would expect groundwater levels to fluctuate similarly to nearby creeks and rivers, along with local weather patterns.

Summary of Analysis and Recommendations

Based on the borings, the soils in the building area appear to consist mostly of fill and buried topsoil over mostly clean sands at depths. We recommend removing all of the topsoil, fill materials, and buried topsoil from the building areas, along with any foundations, utilities, or otherwise unsuitable materials from the building areas. The surficial topsoil was about 1 to 2 feet thick while the fill materials and buried topsoil were encountered to depths of about 10 to 11 ½ feet.

The unsuitable materials should be replaced as needed with engineered granular fill. The clean natural sands dominating at depth appear suitable for this purpose.

Most footings are expected to bear on the engineered granular fill over natural sands. Because some of these soils were rather loose relative to the foundation loads, footings excavations terminating in these soils should be surface compacted with a large plate tamper or turtle compactor before placing the concrete.

Based on the assumed loads and implementation of the earthwork recommendations, we are of the opinion that foundations may be designed to exert a bearing pressures of up to 3,000 psf. This allowable bearing pressure includes a safety factor of at least 3 against shear failure.

Based on a bearing pressure of 3,000 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.

Because of the depth of fills at the site, a more cost effect approach may be to have the new structure supported on intermediate to deep foundations, such as helical anchors or Geopiers ®.

The attached report provides discussion of soil correction approach if that option is chosen. The helical anchors and the Geopier ® applications, which appear more applicable, are only generalized, as these are proprietary products, and the design must be completed by engineers for the possible vendors. We can facilitate contact with possible vendors, if desired.

Remarks

CVT appreciates the opportunity to provide geotechnical services on this project. The attached report provides further details of our analysis and recommendations for the building and pavements. If you have any questions about our report, please feel free to contact us at (608) 782-5505.

Sincerely,
Chosen Valley Testing, Inc.

Frederick Schuster, PE
Geotechnical Engineer

Matthew Reisdorfer, PE
General Manager/Geotechnical Engineer

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Design Phase Geotechnical Report
Proposed Maintenance Shop Addition
Housing Authority of the City of La Crosse
1415 St. James Street
La Crosse, Wisconsin

CVT Project Number: 17990.21.WIL
Date: March 29, 2021

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 Maintenance Shop Addition for Housing Authority of the City of La Crosse at 1415 St. James Street in La Crosse, Wisconsin. Our services were authorized by Mr. Kyle Schauf, AIA of HSR Associates on behalf of the owner.

A.2. Scope

To obtain data for analysis, a total of 5 borings were drilled to depths of about 10 to 20 feet on site. Our engineering scope consisted of providing geotechnical recommendations for the proposed addition including bearing capacity, estimated settlements, earthwork corrections, alternative foundation types, and pavement recommendations.

A.3. Boring Locations and Elevations

The boring locations were indicated to Chosen Valley Testing on a site plan provided by HSR Architects. The boring locations were staked in the field by Chosen Valley Testing and were then offset as needed due to access constraints. The Boring Location Sketch in the Appendix shows the approximate boring locations as drilled.

Ground surface elevations at the borings were estimated using a laser level. The finished floor at the northeast entrance of the existing building was used as a benchmark and was understood to be at an elevation of 647.0 feet.

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 suggest that the natural soils in the area are primarily alluvial soils overlying glacial outwash deposits of sands and gravels. Bedrock is commonly found 200 to 250 feet below the surface and consists of the Cambrian System Sandstone.

B. Subsurface Data

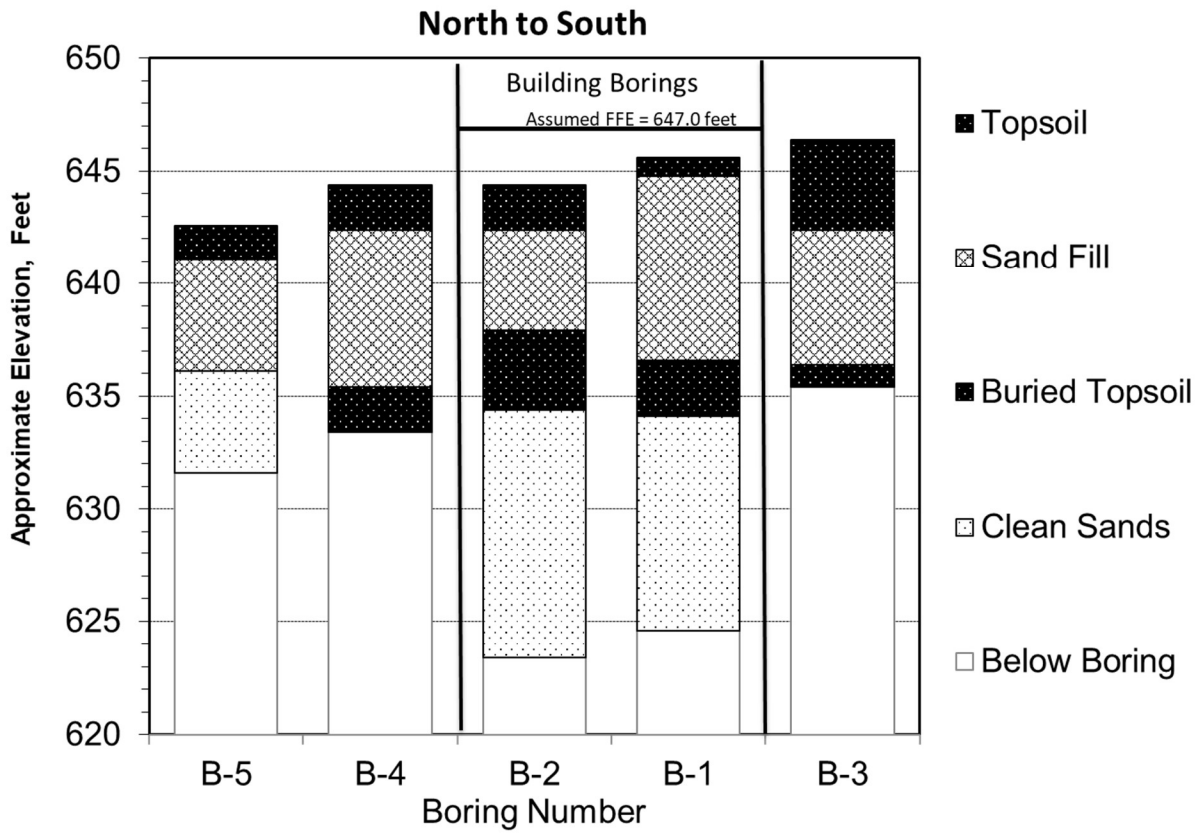
Procedures: The borings were performed using penetration test procedures (Method of Test D1586 of the American Society for Testing and Materials). This procedure allows for the extraction of intact soil specimen from deep in the ground. With this method, a hollow-stem auger is drilled to the desired 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 encountered about 1 to 4 feet of slightly organic silty sand topsoil. Beneath the topsoil layer, silty to clean sand fill with trace slag, concrete, and asphalt was met to depths of about 6 ½ to 10 feet below the surface. Beneath the sand fill materials, all borings except the northernmost boring (Boring B-5) met a layer of buried topsoil consisting of slightly organic silts to silty sands to depths of 10 to 11½ feet. The center and southern site borings (Borings B-3 and B-4) terminated at planned depths within this buried topsoil layer.

Beneath the sand fill and buried topsoil, alluvial clean sands were encountered in the building borings (Borings B-1 and B-2). The building borings and northernmost boring terminated in alluvial sands at depths of about 11 to 21 feet below the surface.

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 values ("N" Value) of 4 to 15 blows per foot (BPF) were recorded in the fill, indicating it was variable and not placed with compactive effort. The buried topsoil returned N-Values of 1 to 8 BPF, indicating it was very loose to loose or very soft to medium. The alluvial sands returned N-Values of 6 to 10 BPF, indicating it was loose to medium dense.

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 encountered in most of the borings during drilling, at depths of about 7 ½ to 12 feet. The observed water levels correspond to elevations of about 633 ½ to 637 feet. 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 an approximate 3,000 square foot addition with additional interior garage space / storage and a small break room to the existing Housing Authority of the City of La Crosse Maintenance Shop. The addition is understood to have wood framed exterior walls with premanufactured wood roof trusses, all supported on frost depth, cast-in-place concrete foundations. For purposes of analysis, we assumed the building to have maximum wall loads on the order of 3,000 pounds per lineal foot and 100 kips for columns. The finished floor elevation is assumed to be near the existing building's FFE of 647.0 feet, which will require fills of about 1 to 3 feet above existing grade at the borings.

D. Analysis

Based on the borings, the soils in the building area appear to consist mostly of fill and buried topsoil over mostly clean sands at depths. We recommend removing all of the topsoil, fill materials, and buried topsoil from the building areas, along with any foundations, utilities, or otherwise unsuitable materials from the building areas. The surficial topsoil was about 1 to 2 feet thick while the fill materials and buried topsoil were encountered to depths of about 10 to 11 ½ feet.

The unsuitable materials should be replaced as needed with engineered granular fill. The clean natural sands dominating at depth appear suitable for this purpose.

Most footings are expected to bear on the engineered granular fill over natural sands. Because some of these soils were rather loose relative to the foundation loads, footing excavations terminating in these soils should be surface compacted with a large plate tamper or turtle compactor before placing the concrete.

Based on the assumed loads and implementation of the earthwork recommendations, we are of the opinion that foundations may be designed to exert a bearing pressures of up to 3,000 psf. This allowable bearing pressure includes a safety factor of at least 3 against shear failure.

Based on a bearing pressure of 3,000 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.

Because of the depth of fills at the site, a more cost effect approach may be to have the new structure supported on intermediate to deep foundations, such as helical anchors or Geopiers ®.

The attached report provides discussion of soil correction approach if that option is chosen. The helical anchors and the Geopier ® applications, which appear more applicable, are only generalized, as these are proprietary products, and the design must be completed by engineers for the possible vendors. We can facilitate contact with possible vendors, if desired.

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

E. Building Recommendations

E.1. Grading Recommendations

E.1.a. Stripping and Excavation: We recommend removing the topsoil and fill and any other unsuitable soils encountered from below the entire building area. The tabulation below shows the anticipated depth of excavation depth at the boring locations.

Boring	Approx. Surface Elevation (feet)	Approx. Assumed Bottom Footing Elevation (feet)	Approx. Depth of Unsuitable Soils (feet)	Approx. Assumed Bottom Elevation of Unsuitable Soils (feet)
B-1	645 1/2	643	11 1/2	634
B-2	644 1/2	643	10	634 1/2

These materials should be replaced with engineered granular fill. The clean natural silty sands and clean sands dominating at depth and some of the existing clean sand fill, provided any debris would be sorted and discarded, appear suitable for foundation and slab support.

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, Compaction, and Surface Compaction: For ease in construction, we recommend using clean sands or gravels having less than 12% particles passing a #200 sieve, where fill is needed below the foundations or in the building area. We assume that most of these materials will have to be imported. Otherwise, the natural poorly graded sands and poorly graded sands with silt and some of the existing clean sand fill would be expected to meet this gradation.

Fill placed on site 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 surface compacting the natural soils at the base of the footing trenches with a plate tamper or turtle type compactor.

E.2. Building Design

E.2.a. Foundation Depth: We recommend placing foundations at least 48 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.

Footings adjoining existing structures or within the influence zone affecting footings for existing structures are recommended to match the adjoining structure's footing depth, unless an analysis has been completed to verify that the existing structure can withstand the additional loading.

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 3,000 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 3,000 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 primarily engineered granular fill overlying natural clean sands. We recommend using a modulus of subgrade reaction of no more than 200 pounds per cubic inch for these conditions.

We recommend placing a layer of clean sand, having less than 5% particles passing the number 200 sieve, as fill in the upper 4 to 6 inches of the subgrade (just below slabs). Because the upper sands on site are dominantly clean this should not be necessary.

E.2.f. Lateral Earth Pressures: We recommend using clean, free-draining sands or gravels having less than 10% fines as fill against retaining walls or other below-grade walls. This fill should be compacted to at least 95% of its maximum standard Proctor density (ASTM D 698). The top of the sand should be capped with clayey topsoil or pavement. A draintile is normally included at the base of the wall backfill to prevent moisture from collecting behind the wall.

The table following this paragraph provides recommended 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 (Ko)	0.44
Active Coefficient (Ka)	0.28
Passive Coefficient (Kp)	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.

F. Paved Areas

F.1. Stripping and Grading

We recommend stripping and removing the existing pavements from the areas that will have pavements placed, along with any topsoil materials that may be present within 2 feet of pavement section. Subgrades should be scarified to encourage uniformity and compacted as needed to pass a test roll. New fill needed in paved areas should consist of a uniform soil type. We recommend using imported or onsite sands or gravels having less than 20% particles passing a number 200 sieve below all paved areas.

All fill in paved areas should be compacted to at least 95% of its maximum standard Proctor density. 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.2. Pavement Design

As mentioned, silty sands and clean sands are expected to be the dominant materials present at subgrade elevation. We recommend designing pavements using support values with the following estimated characteristics:

Soil Type	AASHTO Classification	Frost Index	Design Group Index	K-Value	Soil Support Factor	Est. California Bearing Ratio
Sand	A-3	F-2	6	250	5.0	10 – 20
Silty Sand	A-2-4/A-4	F-3	10	200	4.5	5 – 15

Again, the proposed parking areas are assumed to experience primarily auto traffic and occasional commercial truck traffic. We recommend a minimum pavement section consisting of at least 3 inches of bituminous and 6 inches of aggregate base or 5 inches of concrete and 4 inches of aggregate base in auto traffic areas. In more frequent heavy commercial truck traffic areas, we recommend increasing the sections to a minimum of 4 inches of bituminous and 8 inches of aggregate base or 6 inches of concrete and 4 inches of aggregate base. These sections should be considered preliminary, subject to review by the project civil engineering consultant, and subject to their experience with pavement design and performance in the area of the project.

The above pavement section assumes that the subgrade has been sufficiently scarified and compacted to pass a test roll. Observation of the test roll should be documented by qualified geotechnical personnel. The necessity of scarifying and recompacting the subgrade would be determined by the test roll.

These sections should be considered preliminary, subject to review by the project civil engineering consultant, and subject to their experience with pavement design and performance in the area of the project.

G. General Grading Recommendations

G.1. Excavation

Stripping can likely be performed with a variety of equipment, provided the soils are not dry. The deep 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. Groundwater/De-watering

Water was encountered during drilling and water is likely to be encountered during corrective excavations. We would expect that dewatering well would likely be necessary when excavations extended below the water table.

G.3. Sideslopes

The contractor will be required to slope or shore the excavations as needed to meet OSHA requirements for safety and to limit disturbance to surrounding structures. The imported sand fill and natural clean sands on site are expected to be primarily Type C soils as defined by OSHA.

G.4. 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.5. 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 # 1-5

Legend to Soil Description

Chosen Valley Testing, Inc.

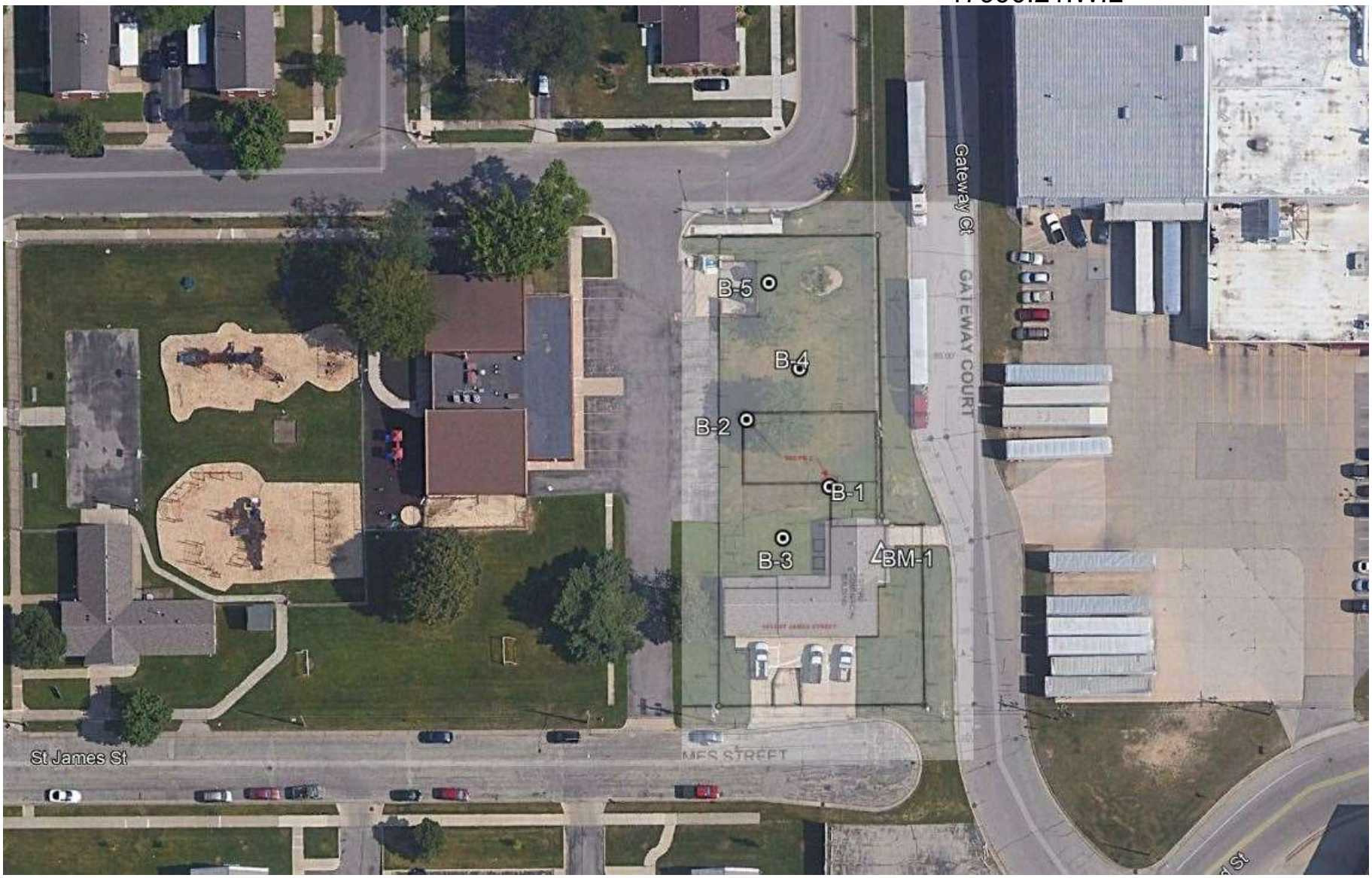
Legend

- Boring Location
- Bench Mark

N

Proposed Boring Location Sketch

Proposed Maintenance Shop Addition
Housing Authority of the City of La Crosse
1415 St. James Street
La Crosse, Wisconsin
17990.21.WIL



LOG OF BORING

CHOSEN VALLEY TESTING CVT

PROJECT: 17990.21.WIL Design Phase Geotechnical Evaluation Proposed Maitenance Shop Addition 1415 St. James Street La Crosse, Wisconsin	BORING: **B-1** LOCATION: See attached sketch DATE: 3/12/2021 SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
645.6	0.0	SM	**Slightly Organic SILTY SAND** black. (Topsoil / Fill)			Benchmark: Finished floor elevation at the northeast entrance of the existing building, understood elevation 647.0 feet.
644.8	0.8	SP SM	**POORLY GRADED SAND with SILT** trace gravel, fine grained, light brown, moist, loose. (Fill)	6		
			Trace slag around 5'.	9		
			Trace concrete around 7.5'.	4		
636.6	9.0	SM	**Slightly Organic SILTY SAND** fine grained, black, wet, very loose. (Topsoil)	1		
634.1	11.5	SP	**POORLY GRADED SAND** fine to medium grained, gray, wet to water bearing, loose. Water bearing below 12'.	9	▽	
				8		
			Trace gravel around 20'.	6		
624.6	21.0		End of boring. Water encountered during drilling below around 12'. Boring sealed upon completion.			

CVT STANDARD 17990.21.WIL (LA CROSSE MAITENANCE SHOP ADDITION).GPJ LOG A GNNN06.GDT 3/26/21

LOG OF BORING

CHOSEN VALLEY TESTING CVT

PROJECT: 17990.21.WIL Design Phase Geotechnical Evaluation Proposed Maitenance Shop Addition 1415 St. James Street La Crosse, Wisconsin	BORING: **B-2** LOCATION: See attached sketch DATE: 3/12/2021 SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
644.4	0.0	SM	**Slightly Organic SILTY SAND** dark brown. (Topsoil / Fill)			
642.4	2.0	SM	**SILTY SAND** trace asphalt, fine grained, brown, moist, loose. (Fill)	8 5		
637.9	6.5	ML OL	**Slightly Organic SILT** seams of sand, black, wet, soft. (Topsoil) Water encountered around 7.5'.	3	▽	PP = 1.0 tsf
634.4	10.0	SP SM	**POORLY GRADED SAND with SILT** fine grained, gray, water bearing, loose. (Alluvium)	9		
632.9	11.5	SP	**POORLY GRADED SAND** trace gravel, fine to medium grained, gray, water bearing, loose to medium dense. (Alluvium)	10 9 5		
623.4	21.0		End of boring. Water encountered during drilling below around 7.5'. Boring sealed upon completion.			

CVT STANDARD 17990.21.WIL (LA CROSSE MAITENANCE SHOP ADDITION).GPJ LOG A GNNN06.GDT 3/26/21

LOG OF BORING

CHOSEN VALLEY TESTING CVT

PROJECT: 17990.21.WIL Design Phase Geotechnical Evaluation Proposed Maitenance Shop Addition 1415 St. James Street La Crosse, Wisconsin	BORING: **B-3** LOCATION: See attached sketch DATE: 3/12/2021 SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
646.4	0.0	SM	**Slightly Organic SILTY SAND** fine grained, black, moist, loose. (Topsoil / Fill)	7		
642.4	4.0	SM	**SILTY SAND** fine grained, dark gray, moist, loose. (Fill) Black and brown mixed below 6.5'.	4 9		
636.4	10.0	ML OL	**Slightly Organic SILT** black, wet, medium. (Topsoil)	8		
635.4	11.0		End of boring. Boring sealed upon completion.			PP = 0.75 tsf

LOG OF BORING

CHOSEN VALLEY TESTING CVT

PROJECT: 17990.21.WIL Design Phase Geotechnical Evaluation Proposed Maitenance Shop Addition 1415 St. James Street La Crosse, Wisconsin	BORING: **B-4** LOCATION: See attached sketch DATE: 3/12/2021 SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
644.4	0.0	SM	**Slightly Organic SILTY SAND** fine grained, dark brown, moist. (Topsoil / Fill)			
642.4	2.0	SM	**SILTY SAND with GRAVEL** fine grained, brown, moist, loose. (Fill)	7		
			Trace asphalt around 5'.	8		
637.9	6.5	SP SM	**POORLY GRADED SAND with SILT** trace asphalt, fine grained, brown, wet, very loose. (Fill)	2		
635.4	9.0	SM	**Slightly Organic SILTY SAND** fine grained, black, water bearing, very loose. (Topsoil)	2	▽	
633.4	11.0		End of boring. Water encountered during drilling below around 9'. Boring sealed upon completion.			

CVT STANDARD 17990.21.WIL (LA CROSSE MAITENANCE SHOP ADDITION).GPJ LOG A GNNN06.GDT 3/26/21

LOG OF BORING

CHOSEN VALLEY TESTING CVT

PROJECT: 17990.21.WIL Design Phase Geotechnical Evaluation Proposed Maitenance Shop Addition 1415 St. James Street La Crosse, Wisconsin	BORING: **B-5** LOCATION: See attached sketch DATE: 3/12/2021 SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
642.6	0.0	SM	**Slightly Organic SILTY SAND** dark brown. (Topsoil)			
641.1	1.5	SM	**SILTY SAND with GRAVEL** fine grained, brown, moist, loose to medium dense. (Fill)	7		
			Trace asphalt around 5'.	15		
636.1	6.5	SP SM	**POORLY GRADED SAND with SILT** fine grained, gray, wet to water bearing, loose to medium dense. (Alluvium)	8		
			Water bearing below 9'.		▽	
631.6	11.0			10		
			End of boring. Water encountered during drilling below around 9'. Boring sealed upon completion.			

CVT STANDARD 17990.21.WIL (LA CROSSE MAITENANCE SHOP ADDITION).GPJ LOG A GNNN06.GDT 3/26/21

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	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>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

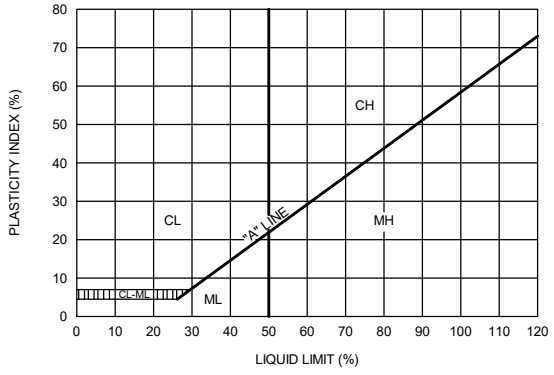
Standard Penetration Test

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

PLASTICITY CHART



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	
VERY DENSE	OVER 50	RATHER STIFF	9 - 12	1.0 - 2.0
		STIFF	13 - 16	
		VERY STIFF	17 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* 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).

Chosen Valley Testing

Job No. CVT

LEGEND TO SOIL DESCRIPTIONS

CVT

CVT LEGEND.GPJ 3/8/19