DANE COUNTY DEPT. OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION

1919 Alliant Energy Center Way
Madison, Wisconsin 53713
Office: 608/266-4018 ◊ Fax: 608/267-1533
Public Works Engineering Division

ADDENDUM 1

May 7, 2019

ATTENTION ALL REQUEST FOR BID (RFB) HOLDERS

RFB NO. 318062 - ADDENDUM NO. 1

CAPITAL CITY TRAIL REHABILITATION – PH. 2

BIDS DUE: Tuesday, May 14, 2019 2:00 PM. DUE DATE AND TIME ARE NOT CHANGED BY THIS ADDENDUM.

This Addendum is issued to modify, explain or clarify the original Request for Bid (RFB) and is hereby made a part of the RFB. Please attach this Addendum to the RFB.

PLEASE MAKE THE FOLLOWING CHANGES:

1. **Section 32 11 23**
   Delete current Section 32 11 23; replace with new Section 32 11 23, issued with this Addendum.

2. **Sheet G2.0**
   Delete current Sheet G2.0; replace with new Sheet G2.0, issued with this Addendum.

3. **SheetC2.0**
   Delete current Sheet C2.0; replace with new Sheet C2.0, issued with this Addendum.

PLEASE NOTE THE FOLLOWING CONTRACTOR SUBMITTED QUESTIONS:

Q1: Is a soils report available for the project?
A1: The “Subsurface Exploration and Foundation Analysis” is included with this addendum.

If any additional information about this Addendum is needed, please call Ryan Shore at 608/266-4475, shore@countyofdane.com.

Sincerely,

Ryan L Shore

Project Manager

Enclosures:
- Section 32 11 23
- Sheet G2.0
- Sheet C2.0
- Subsurface Exploration and Foundation Analysis Report

SECTION 32 11 23

CRUSHED AGGREGATE BASE COURSE

PART 1 - GENERAL

1.01 Section Includes

A. Furnishing and placing crushed aggregate base course as a foundation for asphaltic concrete pavement or Portland cement concrete pavement.

1.02 References

A. ASTM C136 - Sieve Analysis of Fine and Coarse Aggregate.

B. ASTM D1557 - Standard Test Methods Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

C. Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, Current Edition (WisDOT).

1.03 Submittals

A. Submit aggregate gradation; ASTM C136.

B. Submit truck weight slips. Include as a minimum, truck number, date, time, gross weight, tare weight and net weight.

PART 2 - PRODUCTS

2.01 Crushed Aggregate

A. Meet material requirements of WisDOT.

B. Gradation
   1. Except for reclaimed asphaltic pavement, conform to the gradations listed in the following table:

	Percentage Passing By Weight		
Sieve Size	3-Inch Base	1 1/4-Inch Base	3/4-Inch Base
3-Inch	90 - 100	- - -	- - -
1 1/2-Inch	60 - 85	- - -	- - -
1 1/4-Inch	- - -	95 - 100	- - -
1-Inch	- - -	- - -	100
3/4-Inch	40 - 65	70 - 93	95 - 100
3/8-Inch	- - -	42 - 80	50 - 90
No. 4	15 - 40	25 - 63	35 - 70
No. 10	10 - 30	16 - 48	15 - 55
No. 40	5 - 20	8 - 28	10 - 35
No. 200	2 - 12	2 - 12[a, c]	5 - 15[b]

   a. Limited to a maximum of 8 percent in base course placed between new and old pavement.
   b. 8 - 15 percent passing when base is ≥ 50% crushed gravel.
   c. 4 - 10 percent passing when base is ≥ 50% crushed gravel.
   2. Use 1 1/4-Inch Base in top 4 or more inches of base. Use 3-Inch Base or 1 1/4-Inch Base in the lower base layers.
   3. Use 3/4-Inch Base in the top 3 inches of unpaved portion of the shoulder. Also, if using 3-Inch Base in the lower base layers, use 3/4-Inch Base in the top 3 inches of the shoulder foreslopes. Use 3/4-Inch Base or 1 1/4-Inch Base elsewhere in shoulders.

2.02 Reclaimed Asphaltic Pavement

A. If Contract Documents allow reclaimed asphaltic pavement, the material shall conform to the following:
   100 percent passing a 1 1/4-inch sieve.
   75 percent or less passing a No. 4 sieve.
   Asphalt content between 3 and 6.5 percent.

B. If reclaimed or recycled asphalt millings are used they shall be integrated into existing or imported gravel base material as approved by owner.

PART 3 - EXECUTION

3.01 Preparation

A. Check subgrade for conformity with grade and cross section.

B. Remove depressions and ruts that may have been caused after subgrade completion.

C. Proof-roll subgrade prior to placing aggregate with a loaded tandem-axle dump truck under the observance of the Engineer. Subgrade shall not rut or displace significantly under the weight of the loaded truck. Soft or unstable areas that cannot be improved by additional compaction shall be undercut, replaced with suitable fill material, and recompacted.

3.02 Lines and Grade

A. Construct the base course to the line, grade and cross section as shown on the Drawings or as directed by the Engineer.

B. For streets without curb and gutter, the Engineer will provide grade stakes at a minimum distance of 50 feet along the centerline. For streets with curb and gutter, the Engineer will stake the curb and gutter and will provide centerline cuts and fills from the curb stakes. Provide Engineer with a minimum of 48 hours notice of the need for grade stakes.

C. Contractor may use slope meters or GPS type controls on machines for grade control. However, the contractor is responsible for verifying the finish grade elevations with a level at a minimum of every 50 feet along the centerline.

3.03 Equipment

A. The weight, type, capacity and method of operation of all hauling and spreading equipment shall be appropriate for the work and shall not damage the subgrade or previously laid base course. Spreading equipment shall be designed and operated to spread the material in uniform layers without significant segregation.

B. Motor graders used for mixing and shaping shall have weight, rigidity and design suitable for the work.

C. Compaction equipment shall be of the rolling type, vibratory type or combination thereof. Tamping rollers shall exert a weight of not less than 150 pounds per square inch of tamping surface on each tamping foot in a transverse row. Pneumatic-tire rollers or other equipment shall have a weight of not less than 150 pounds per linear inch of overall rolling width.

3.04 Placing Base Course

A. Place material in a manner to minimize segregation and to facilitate spreading in a uniform layer.

B. Place material in maximum 6-inch thick compacted layers. If material is placed in more than one layer, each layer shall be approximately the same thickness.

C. Compact each layer to 95 percent of the maximum dry density in accordance with ASTM D1557. If material is deficient in moisture content for readily attaining the required density, moisten the material as necessary.

D. All material placed on the subgrade or previous layer shall be spread, shaped and compacted on the same day.

E. Proposed Gravel Shoulder shall be 4” Thick, 12” Wide min., Slope 6:1 max, Shape to match existing grades, Slope 3:1 max beyond 12”

3.05 Constructing Aggregate Shoulders

A. General
   1. Construct aggregate shoulders to the elevations and typical sections the plans show, except for minor modifications needed to conform to other work.
   2. Use equipment that does not damage or mar the pavement surface, curbs, or appurtenances.
   3. Place aggregate directly on the shoulder area between the pavement edge and the outer shoulder limits. Recover uncontaminated material deposited outside the limits and place within the limits.
   4. Do not deposit aggregate on the pavement during placement, unless the engineer specifically allows. Do not leave aggregate on the pavement overnight. After placing the shoulder aggregate, keep the pavement surface free of lose aggregate.
   5. Spread and compact the aggregate in compacted layers of 4 inches or less.
   6. After final compaction, shape the shoulders to remove longitudinal ridges and transition to existing grade to ensure proper drainage.
   7. Clean any aggregate material from the trail surface.

B. Shoulders Adjacent to Concrete Pavement or Base
   1. Construct shoulders along concrete pavement or concrete base so the completed shoulder is at the approximate grade and cross-section before opening the pavement to public traffic.

C. Shoulders Adjacent to Asphaltic Pavement or Surfacing
   1. If the trail is closed to through traffic during construction, construct the aggregate shoulders before opening the trail.
   2. Unless the special provisions specify otherwise, provide aggregate shoulder material compacted to a temporary 3:1 or flatter cross slope from the surface of the pavement edge.
   3. Provide and maintain signing and other traffic protection and control devices until completing shoulder construction to the required cross-section and flush with the asphaltic pavement surfacing.

D. Shaping Shoulders
   1. Do not contaminate the shoulder aggregate with deleterious material. Incorporate material obtained from shaping shoulders in the new shoulder or as the plans show.

3.06 Tolerances

A. Smoothness: Maximum variation of 3/8 inch when measured with a 10-foot straight edge.

B. Compacted Thickness: Plus or minus 1/4 inch.

3.07 Proof Rolling

A. Proof roll the completed base course with a loaded tri-axle dump truck with a minimum gross weight of 30 tons. The surface shall not rut, displace, or roll under the weight of the loaded truck. Soft or unstable areas that cannot be improved by additional compaction shall be replaced and recompacted. Proof rolling shall be done in the presence of the Engineer.

3.08 Field Quality Control

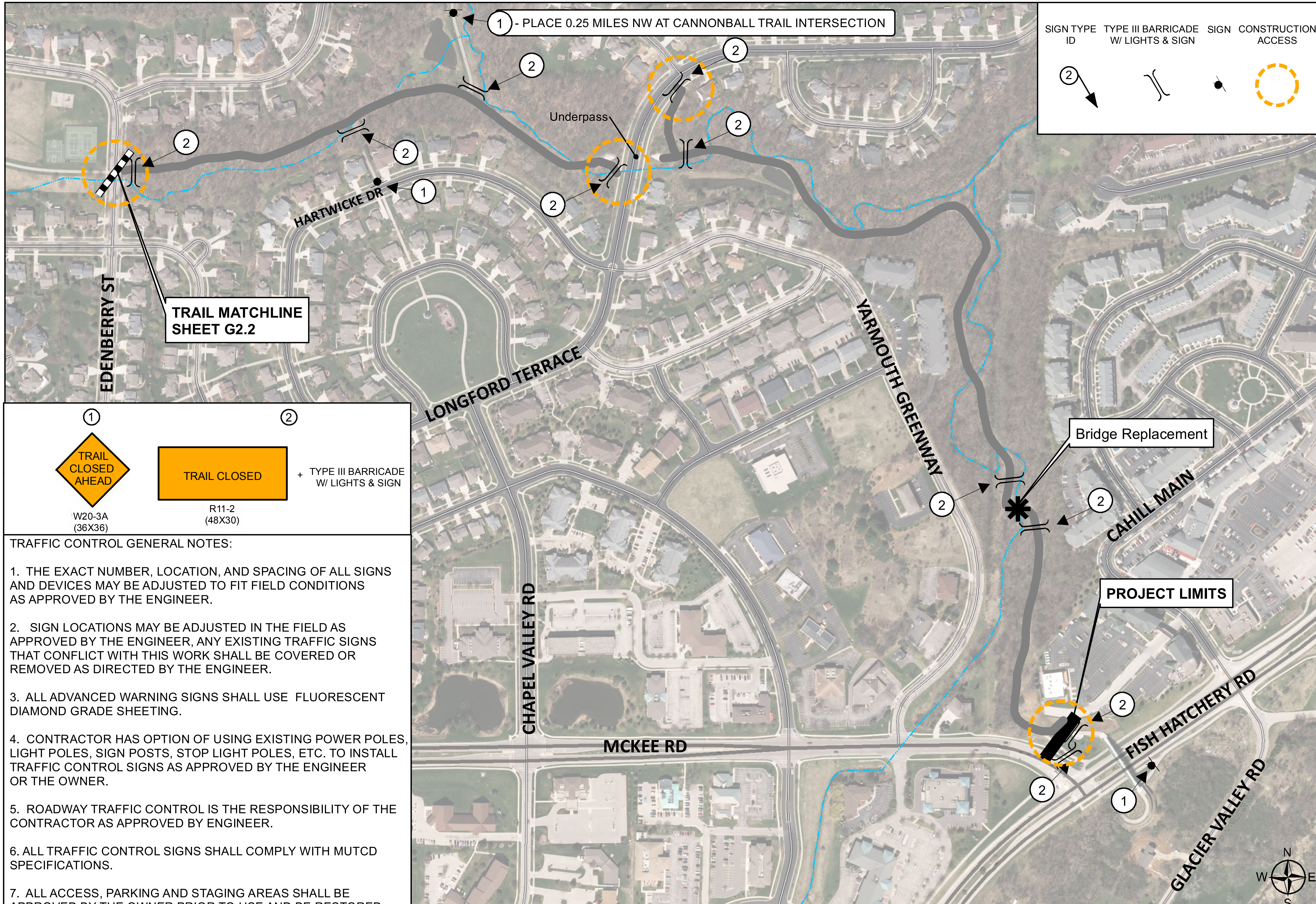
A. Contractor is responsible for meeting the compaction requirements. The Engineer or authorized representative of the owner has the option to require the Contractor to hire an independent testing firm, at the Contractor’s expense, to perform compaction tests to confirm the in-place density.

B. Field inspection will be performed by the Engineer or an authorized representative of the Owner.

C. Determination of moisture content shall be in accordance with ASTM D3017. Determination of density shall be in accordance with ASTM D2922.

D. If tests indicate the work does not meet the specified requirements, remove and replace the work.

END OF SECTION



TRAFFIC CONTROL GENERAL NOTES:

1. THE EXACT NUMBER, LOCATION, AND SPACING OF ALL SIGNS AND DEVICES MAY BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

2. SIGN LOCATIONS MAY BE ADJUSTED IN THE FIELD AS APPROVED BY THE ENGINEER, ANY EXISTING TRAFFIC SIGNS THAT CONFLICT WITH THIS WORK SHALL BE COVERED OR REMOVED AS DIRECTED BY THE ENGINEER.

3. ALL ADVANCED WARNING SIGNS SHALL USE FLUORESCENT DIAMOND GRADE SHEETING.

4. CONTRACTOR HAS OPTION OF USING EXISTING POWER POLES, LIGHT POLES, SIGN POSTS, STOP LIGHT POLES, ETC. TO INSTALL TRAFFIC CONTROL SIGNS AS APPROVED BY THE ENGINEER OR THE OWNER.

5. ROADWAY TRAFFIC CONTROL IS THE RESPONSIBILITY OF THE CONTRACTOR AS APPROVED BY ENGINEER.

6. ALL TRAFFIC CONTROL SIGNS SHALL COMPLY WITH MUTCD SPECIFICATIONS.

7. ALL ACCESS, PARKING AND STAGING AREAS SHALL BE APPROVED BY THE OWNER PRIOR TO USE AND BE RESTORED.

TRAIL TRAFFIC CONTROL PLAN

CAPITAL CITY TRAIL PAVEMENT RESTORATION & BRIDGE REPLACEMENT
DANE COUNTY PARKS

CITY OF FITCHBURG
DANE COUNTY, WI

Drawn By ADD
Reviewed by CJ
Issue Date 4/26/19

G2.0

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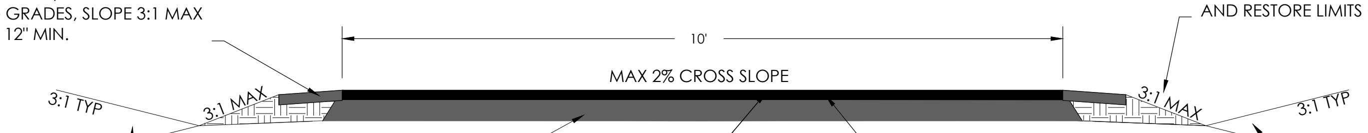
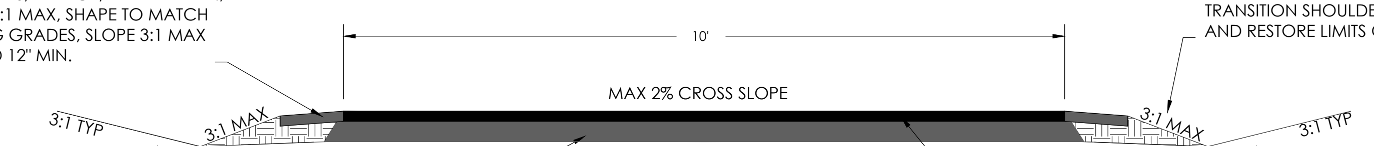
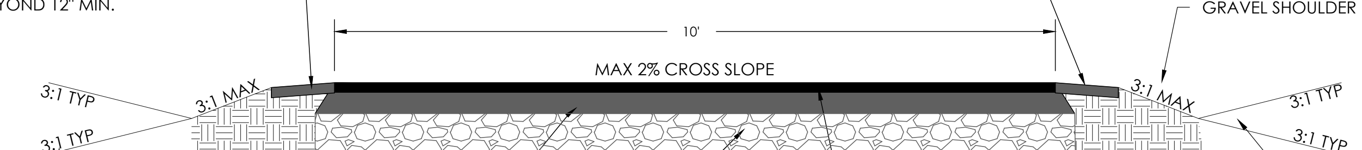


TYPICAL TRAIL CROSS SECTION - PAVEMENT TYPE A



TYPICAL TRAIL CROSS SECTION - PAVEMENT TYPE B



TYPICAL TRAIL CROSS SECTION - BRIDGE REPLACEMENT NEW TRAIL ALIGNMENT

GENERAL NOTES:

1. TRAIL CENTERLINE AND EXISTING DRAINAGE PROFILES/PATTERNS SHALL BE MAINTAINED.
2. PAVING AND GRADING SHALL BE ADJUSTED TO MATCH EXISTING ELEVATIONS OF ADJACENT MANHOLES, CULVERTS, BRIDGES, SIDEWALKS, ROADWAYS, AND CONCRETE APRONS TO PROVIDE A SMOOTH TRANSITION AND ENSURE PROPER DRAINAGE, UNLESS OTHERWISE SPECIFIED ON PLANS.

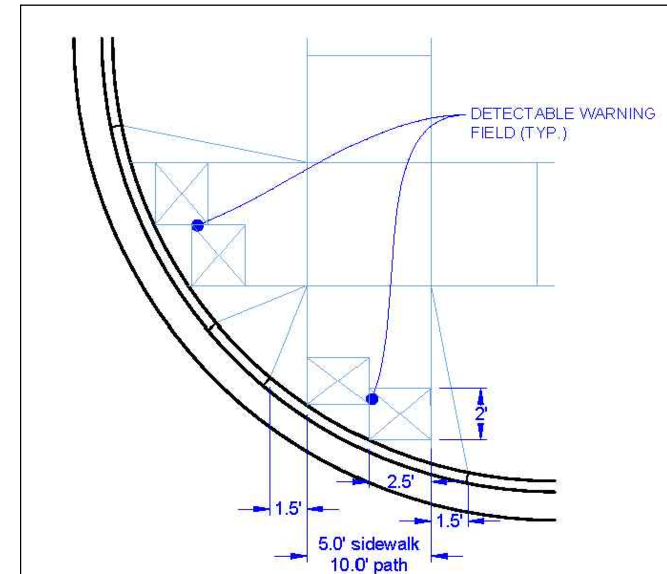
TYPICAL TRAIL - PAVEMENT TYPE A

1. REMOVE PAVEMENT, ADD 3" TO EXISTING BASE, GRADE, PAVE, SHOULDER, TOPSOIL, SEED & MULCH.
2. THIS SHALL BE DONE IN AREAS WHERE TREE ROOTS IMPACT MAY BE SEVERE AND ADJACENT TO STRUCTURES SUCH AS BOX CULVERT CROSSING AND REST AREAS.
3. DUE TO THE INCREASED PROFILE ELEVATION, ADJACENT SLOPES AND GRADES SHALL BE CORRECTED TO 3:1 MAX SLOPES TO ACCOMMODATE ANY INCREASE IN FINISHED TRAIL ELEVATION AND ENSURE PROPER DRAINAGE AS APPROVED BY THE ENGINEER.

TYPICAL TRAIL - PAVEMENT TYPE B

1. PULVERIZE PAVEMENT, GRADE, PAVE, SHOULDER, TOPSOIL, SEED AND MULCH.
2. THIS SHALL BE DONE IN AREAS WHERE THE EXISTING BASE IS SOUND, BUT THE PAVEMENT IS SHOWING SHRINKAGE OR EDGE CRACKING. THIS OPTION IS PREFERRED OVER TYPE A, BECAUSE IT REQUIRES LESS LOADED TRAFFIC ON THE PATH, WHICH REDUCES THE NEED FOR FULL DEPTH RECONSTRUCTION AND UNDERCUTTING.
3. DUE TO THE INCREASED PROFILE ELEVATION, ADJACENT SLOPES AND GRADES SHALL BE CORRECTED TO 3:1 MAX SLOPES TO ACCOMMODATE ANY INCREASE IN FINISHED TRAIL ELEVATION AND ENSURE PROPER DRAINAGE AS APPROVED BY THE ENGINEER.

TRAIL CONSTRUCTION TECHNIQUES NOTES



TYPE 2 RAMP
PLAN VIEW

1. CURB TAPERS AT CURB CUTS SHALL BE 18" UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. THE WIDTH OF THE FLAT BOTTOM OF THE RAMP AT THE CURB SHALL BE 60" MINIMUM.
3. THE MAXIMUM SLOPE OF THE RAMP BETWEEN THE BACK OF THE CURB AND THE FRONT OF THE DETECTABLE WARNING FIELD SHALL NOT EXCEED 2%. THE MAXIMUM SLOPE OF THE RAMP BETWEEN THE FRONT OF THE DETECTABLE WARNING FIELD AND THE SIDEWALK SHALL NOT EXCEED ONE INCH PER FOOT.
4. ALL HANDICAP RAMPS SHALL INCLUDE DETECTABLE WARNING FIELDS WITH TRUNCATED DOMES. FOR A BIKE PATH RAMP, DETECTABLE WARNINGS SHALL BE A MINIMUM OF 10' X 2.0'.
5. DETECTABLE WARNING FIELD SHALL BE ORIENTED IN A MANNER THAT IT IS PARALLEL TO THE DIRECTION OF PEDESTRIAN TRAFFIC. WHEN CURB IS PERPENDICULAR TO DIRECTION OF PEDESTRIAN TRAFFIC, INSTALL DETECTABLE WARNING FIELD TIGHT TO BACK OF CURB. WHEN CURB IS NOT PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAFFIC, STAGER DETECTABLE WARNING FIELD PANELS TO MINIMIZE SPACE BETWEEN DETECTABLE WARNING FIELD PANELS AND BACK OF CURB.
6. WHEN CONDITIONS REQUIRE MORE INFORMATION, REFER TO "UFAS" (UNIFORM FEDERAL ACCESSIBILITY STANDARDS).
7. SIDEWALK THICKNESS SHALL BE 7-INCHES AT RAMPS.
8. PROVIDE A 1/2" EXPANSION JOINT AT ALL RAMP LOCATIONS.
9. CONSTRUCTION FORMS SHALL BE EQUAL TO OR GREATER THAN THE SIDEWALK THICKNESS.
10. PROVIDE A MINIMUM 5' LEVEL LANDING AREA (1.5% MAXIMUM SLOPE) IN THE DIRECTION OF PEDESTRIAN TRAVEL AT THE TOP OF THE RAMP.
11. BIKE PATH RAMPS SHALL NOT EXCEED 1:12 SLOPE.

1. FITCHBURG SIDEWALK/BIKE PATH RAMP

GEC
General Engineering Company
P.O. Box 340 • 916 Silver Lake Dr. • Portage, WI 53901
608-742-2169 (Office) • 608-742-2592 (Fax)
www.generalengineering.net

CONSTRUCTION DETAILS
CAPITAL CITY TRAIL PAVEMENT RESTORATION
DANE COUNTY PARKS

CITY OF FITCHBURG
DANE COUNTY, WI

NO.	BY	DATE	REVISIONS

0 400
SCALE

DRAWN BY	LAL
REVIEWED BY	KDA
ISSUE DATE	FEB 2019
GEC FILE NO.	2-1118-535
SHEET NO.	C2.0

Ripon Office
608 North Stanton Street
Ripon, Wisconsin 54971

January 29, 2019

Mr. Lukasz Lyzwa
General Engineering Company
916 Silver Lake Drive
Portage, Wisconsin 53901

Re: Subsurface Exploration and Foundation Analysis
Pedestrian Bridge Replacement
Capital City Trail
Fitchburg, Wisconsin
PSI Project No. 00921239

Dear Mr. Lyzwa,

The subsurface exploration and foundation analysis for the above referenced project has been completed, the results of which are included herein. A copy has been provided electronically. After you have had the opportunity of reading the report, please call at any time with any questions or comments you may have. Professional Service Industries, Inc. (PSI) appreciates the opportunity to be of service on this project and looks forward to continuing as your geotechnical consultant during the design and construction phases, as well as your upcoming projects.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Hanna Dolinski
Staff Geologist

Jeffery Fischer
Branch Manager

James M. Becco, P.E.
Regional Vice President

SUBSURFACE EXPLORATION AND FOUNDATION ANALYSIS

Pedestrian Bridge Replacement
Capital City Trail
Fitchburg, Wisconsin

Prepared for

Mr. Lukasz Lyzwa
General Engineering Company
916 Silver Lake Drive
Portage, Wisconsin 53901

Prepared by

Professional Service Industries, Inc.
608 North Stanton Street
Ripon, Wisconsin

Date: January 29, 2019

PSI Project: 00921239

Hanna Dolinski
Staff Geologist

Jeffrey Fischer
Branch Manager

James M. Becco, P.E.
Regional Vice President

TABLE OF CONTENTS

INTRODUCTION

General

This report presents the results of the subsurface exploration and foundation analysis for the proposed Pedestrian Bridge Replacement located on the Capital City Trail in Fitchburg, Wisconsin. The work was performed for General Engineering, at the request of Mr. Lukasz Lyzwa.

Purpose

The purpose of this study was to evaluate the subsurface conditions at specific boring locations on the site, and to establish parameters for use by the design engineers and architects in preparing the foundation and subgrade.

Scope

The scope of services included a site reconnaissance, the subsurface exploration, a determination of soil characteristics by field and laboratory testing, and an evaluation and analysis of the data obtained. The scope of the field exploration program, including the number, depth, and location of the borings, was determined by the client.

Authorization

The description of services and authorization to perform this subsurface exploration and foundation analysis were in the form of a signed acceptance copy of PSI Proposal No. 0092-258158, dated October 5, 2018. The general conditions for the performance of the work were referenced in the proposal. This report has been prepared on behalf of, and exclusively for the use of General Engineering. The information contained in this report may not be relied upon by any other parties without the express written consent of PSI, and acceptance by such parties of PSI' General Conditions.

SITE AND PROJECT DESCRIPTION

Site Features

The project site is located on the Capital City Trail approximately 1,000 feet north of the intersection of Fish Hatchery and Mckee Road, in Fitchburg, Wisconsin. At the time of the exploration, the site consisted of an existing wood pedestrian bridge overlaying a creek along the Capital City Trail. Based upon aerial photography viewed on Google Earth, it appears that the project site has remained a wooded pedestrian bridge along the Capital City Trail in each of the available photographs dating back to 1992.

The surface of the site is generally flat, sloping down towards the northwest with an elevation difference of about a foot between the borings. The surface of the site was firm but difficult to access due to the narrow size of the trail at the time of the exploration, and an ATV-mounted drill rig was required. The surrounding parcels consisted of Capital City Trail to the north and south; wooded areas to the east and west.

Project Description

From the information provided by the client, the proposed project will consist of the replacement of an existing wood, single span, pedestrian bridge with a new pedestrian bridge that will be supported by a Helical Pier foundation. It is understood that the proposed concrete bridge will span an area approximately 60 feet long and be approximately 12 feet wide at its base. The channel bottom elevation is approximately EL. 904.4. The known top of deck elevation will be EL. 908.8. No other information regarding loading and design parameters was provided at the time of the report.

EXPLORATION AND LABORATORY PROCEDURES

Scope Summary

The field and laboratory data utilized in the evaluation and analysis of the subsurface materials was obtained by drilling exploratory test borings, securing soil samples by the split-spoon sampling method and subjecting the samples to laboratory testing.

Field Exploration

A total of two (2) soil test borings were proposed for this project to a depth of about 85 feet. However, auger refusal was experienced at B-1 and B-2 at a depth of about 26 feet (EL. 882.1 and EL. 881.9) on cobbles, boulders, or possible bedrock. The number, depths, and locations of the borings were determined by the client. The borings were located in the field by the drill crew utilizing conventional taping procedures referenced to existing site features and the existing roadway. They are estimated to be accurate to within several feet. The approximate locations of the borings performed are shown on the Boring Location Plan (Figure 1), which is provided in the Appendix of this report. The surface elevations shown on the logs were provided by the client.

The soil test borings were performed with an ATV-mounted rotary drilling rig utilizing continuous flight hollow stem augers to advance the holes. An ATV-mounted drill rig was required due to the difficulty of accessing the site. Representative samples were obtained by the Standard Penetration Test (SPT) method using split-spoon sampling procedures in general accordance with ASTM D-1586 procedures. Samples were collected at 2.5 foot intervals to 10 feet, and then at 5 foot intervals thereafter to the end of the borings. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling thirty (30) inches, required to advance the split-spoon sampler one (1) foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of the three (3) successive increments of six (6) inches penetration. The “N” value is obtained by adding the second and third incremental numbers. The SPT provides a means of estimating the relative density of granular soils and comparative consistency of cohesive soils, thereby providing a method of evaluating the relative strength and compressibility characteristics of the subsoils.

The SPT samples were transferred into clean glass jars immediately after retrieval and returned to the laboratory upon completion of the field operations. Samples will be discarded unless other instructions are received. All soil samples were visually classified by a soil engineer in general accordance with the Unified Soil Classification System (ASTM D- 2488-75). A description of the subsurface conditions encountered at each boring location is shown on the enclosed Soil Boring Logs. After completion of the borings, the auger holes were backfilled to the ground surface with bentonite chips.

A copy of the Soil Boring Logs and Boring Location Plan (Figure 1) are enclosed in the Appendix. The soil stratification shown on the logs represents the approximate soil conditions in the actual boring locations at the time of the exploration. The terms and symbols used on the logs are described in the General Notes found in the Appendix.

<u>Laboratory Physical Testing</u>

Soil samples obtained from the exploration were visually classified in the laboratory, and subjected to testing, which included moisture content determination. The laboratory testing was performed in general accordance with the respective ASTM methods, as applicable, and the results are shown on the boring logs in the Appendix.

DESCRIPTION OF SUBSURFACE CONDITIONS

<u>General</u>

A description of the subsurface conditions encountered at the test boring locations is shown on the Soil Boring Logs. The lines of demarcation shown on the logs represent approximate boundaries between the various soil classifications. It must be recognized that the soil descriptions are considered representative for the specific test hole location, but that variations may occur between and beyond the sampling intervals and boring locations. Soil depths, topsoil and layer thicknesses, and demarcation lines utilized for preconstruction planning should not be expected to yield exact and final quantities. A summary of the major soil profile components is described in the following paragraphs.

<u>Soil Conditions</u>

The surface materials encountered at the borings consisted of about 4 and 10 inches of brown clay with silt classified as topsoil fill. The underlying material consisted of dark brown to gray sand and/or clay with varying amounts of gravel and silt classified as fill to a depth of about 7.5 feet (EL. 900.6 and EL. 900.4). The underlying natural material at the borings consisted of predominantly light brown to reddish brown sand and/or silt with varying amounts of gravel to the maximum depth of the borings.

The granular fill soils were in a loose to medium dense condition with Standard Penetration resistances (N-values) of 5 and 15 blows per foot of penetration (bpf). The cohesive fill soils were in a stiff to medium dense in consistency with unconfined compressive strengths of 1.5 to 3.0 tsf, and with N-values between 6 to 9 bpf. The natural granular soils were in a medium dense to very dense condition with N-values between 7 bpf to 50 blows per 2 inches of penetration.

The fill materials within the near surface profile were classified as such based on their varied visual characteristics and composition. However, it must be recognized that in the absence of foreign substances and/or debris within the soil samples obtained, it is often difficult to distinguish between natural soils and clean soil fill.

Auger refusal on cobbles, boulders or possible bedrock was encountered in each of the borings at a depth of about 26 feet (EL. 882.1 and EL. 881.9) below existing grade. Refusal depths are outlined below:

Boring No.	Approximate Refusal Elevation (Feet)	Approximate Refusal Depth (Feet)
B-1	882.1	26
B-2	881.9	26

The foregoing discussion of soil conditions on this site represents a generalized soil profile as determined at the test boring locations. A more detailed description and supporting data for each test location can be found on the individual soil boring logs.

Groundwater Observations

Groundwater observations were made during the drilling operations, and in the open boreholes upon completion. Groundwater was not encountered in the borings at the time of auger advancement or upon completion. All of the holes caved to varying depths upon withdrawal of the auger; therefore, observations could not be made below the caved depth.

The groundwater observations reported herein are considered approximate. It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Longer term monitoring would be required to better evaluate groundwater levels on this site.

EVALUATION AND RECOMMENDATIONS

General Development Considerations

In view of the subsurface conditions encountered in the test borings, together with the structural loading criteria and development grades anticipated, a helical pier foundation system can be used for support of the proposed pedestrian bridge. However, fill soils were encountered in the borings to a depth of about 7.5 feet (EL. 900.6 and EL. 900.4). These soils are not considered to be suitable for support. Helical piers must be extended to bear upon the underlying medium dense to very dense natural soils encountered at a depth of about 13.5 feet (EL. 894.6 and EL. 894.5). However some variation in the depth to suitable bearing material should be expected. In addition, as part of initial design planning, it is recommended that an experienced contractor be consulted in order to discuss the feasibility of utilizing helical piers to support the planned pedestrian bridge, in light of the unsuitable overburden soils and refusal conditions encountered in the borings. It may be necessary to conduct a test installation to determine if helical piers can be turned a sufficient distance into the natural materials to develop adequate capacity and support stability.

Site Preparation

The presence of organic topsoil and vegetation in the subgrade can adversely affect the serviceability of structural fills, foundations, floor slabs, and other structures placed upon them. Approximately 4 and 10 inches of topsoil fill was present on the surface of the borings. However, some variation should be anticipated. All topsoil, vegetation, trees, roots, and other organic matter (and concrete and asphalt) must be stripped from possible areas of pavements, sidewalks, and other structures.

Site preparation will require removal of the existing pedestrian bridge and remnants of former structures, foundations and underground utilities. Extensive areas of loose backfill material may be encountered within utility trenches, adjacent to the existing structures, and in former structure areas. These will also require removal. The areas, including basements, must then be properly backfilled with compacted structural fill. Prior to the backfilling, the areas must be observed by a PSI representative to evaluate the suitability of the subgrade for subsequent support of the new utilities or other structures.

Every effort must be made to keep excavations dry. If construction proceeds during wet weather, some additional overexcavation may be necessary. If weather permits, the soil could be dried and recompacted. A crushed stone working mat, possibly in conjunction with a geotextile fabric may also be feasible to help stabilize subgrades. Site grading runoff should be directed to catch basins, so that the potential for the softening of the pavement subgrade soils is reduced.

When a firm and stable subgrade is established, low areas may be raised to planned grades with properly compacted structural fill. Any new fill should be a clean granular soil, such as those materials meeting the gradations outlined in Section 209 or 305 of the State of Wisconsin Standard Specification for Highway and Structure Construction. Fill must be placed in layers of not more than nine (9) inches in thickness, at moisture contents at or near optimum, and be compacted to a minimum density of 95 percent of the maximum dry density as determined by ASTM designation D-698 (Standard Proctor). The on-site natural soils can generally be used as new fill to raise grades, generally over large areas. However, some sorting or moisture conditioning may be required. Silt, clay, and wet granular soils are not suitable for reuse as fill in trenches, or adjacent to foundation stem walls or retaining walls. Importing of suitable granular backfill soils is likely to be necessary.

Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities. This is especially true of clayey soils, where scarification and aeration may be required to achieve near - optimum moisture levels prior to compaction. A sheepsfoot roller is generally required for compaction of clayey soils, whereas a vibratory smooth drum roller is preferred for granular material. Small hand-operated compactors should be used in confined areas; granular fills are generally more readily compacted to the required densities in such applications.

The selection of fill materials for various applications should be done in consultation with the soils engineer. Similarly, the evaluation of the subgrade and placement and compaction of fill for structural applications should be monitored and tested by a qualified representative of the soils engineer.

Foundation Analysis

Based on the information provided, it is understood that the proposed pedestrian bridge will be supported by a helical pier foundation system. A helical pier foundation system is a design/build foundation system that must be designed and installed by a qualified contractor.

Based upon the soil conditions encountered within the borings, and for preliminary purposes, it is estimated that a 10 –12 inch double helix anchor will develop an allowable capacity of about 20 to 30 kips or more, where the tip is installed a sufficient distance in to the medium dense silt and sand soils encountered at a depth of about 13.5 feet (EL. 894.6 and EL. 894.5) at the borings. Larger diameter helices, additional helices, or additional embedment depth (into the very dense sand encountered at a depth of about 18.5 feet in each boring) can be utilized to develop a higher capacity, if required. However, extremely difficult installation conditions will be experienced with increasing depth when encroaching upon the very dense sand soils encountered at a depth of about 18.5 feet (EL. 889.6 and EL. 889.4) in the borings. Some damage to piers may occur, requiring removal/replacement, the use of higher yield strength, different pier size, or the use of an alternative foundation type. Helical piers must be extended through any unsuitable materials to bear upon the refusal materials. However, some variation should be expected, and final pier depths will vary.

It is recommended that installation of piers be monitored and documented by a representative of the geotechnical engineer to verify installation complies with the project specifications. In addition, as noted previously, the estimated capacity provided above is intended for use in preliminary design planning. An experienced contractor must be consulted to provide final design of the piers, including bearing requirements, shaft size, helix spacing and other necessary parameters.

CONSTRUCTION CONSIDERATIONS

Groundwater Control

Because no groundwater was encountered in the upper levels of the boreholes during the exploration, no major difficulties during excavation and construction of the proposed foundation system is anticipated. A gravity drainage system and filtered sump pumps or other conventional dewatering procedures, may be adequate to control perched water if encountered. However, for deeper excavations, or for substantial perched zones, if encountered, prolonged dewatering with a series of sumps or well points and high capacity sump pumps, or other more comprehensive means may be necessary to facilitate construction.

While little or no groundwater was encountered at the time the borings were drilled, seasonal variations in precipitation and site drainage conditions can cause groundwater to be present in the upper soils.

Excavations and Site Drainage

Sloping, shoring or bracing of the excavation sidewalls will be necessary. Trenching will be difficult due to the instability of vertical slopes, and will therefore require a flattening of trench sides, or some other means of protection, to facilitate construction and to protect life and property. Substantial sloughing and caving should be expected within unprotected excavations. However, severe instability can be expected within granular or soft clay soils, especially encroaching upon and extending below the groundwater. The degree of excavation instability problems is dependent upon the depth and length of time that excavations remain open, excavation bank slopes, water levels and the effectiveness of any dewatering systems.

All excavations must be performed with caution and utilize methods which will prevent undermining or destabilization of utilities, pavements, or other structures. The use of a properly designed shoring and bracing, sheet piling, or underpinning system must be utilized as necessary to adequately protect utilities, pavements, and other structures. This must be performed by an experienced specialty contractor. Additionally, extreme care must be used during the installation of any bracing system, especially those using driven or vibratory methods, in order to avoid damaging existing buildings, utilities, and other structures. Consideration should be given to the performance of video and/or photographic documentation of the condition of nearby buildings, utilities, and other structures prior to installation.

Since the subgrade soils are generally sensitive to moisture, every effort should be made to provide adequate drainage across the site during construction, and to prevent ponding of runoff on the subgrade. These soils are also subject to erosion caused by runoff, and erosion control measures should be implemented where needed or required by local ordinances.

Auger refusal on cobbles, boulders, or possible bedrock was encountered at the borings at a depth of about 26 feet (EL. 882.1 and EL. 881.9) below existing grade at the test boring locations, and medium dense to very dense soils were present with increasing depth. Substantial difficulty digging and drilling, and longer excavation times will be experienced with increasing depth. Pier refusal conditions should be expected within the very dense granular soils.

It is mandated that excavations, whether they be for utility trenches, basement excavations or footing excavations, be constructed in accordance with current Occupational Safety and Health Administration (OSHA) guidelines to protect workers and others during construction. PSI recommends that these regulations be strictly enforced.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

Seismic Design Considerations

Based upon the soils encountered at the borings, and Table 1613.5.2 from the 2006 International Building Code, the site is considered to be classified as Seismic Class D.

GENERAL COMMENTS

This geotechnical exploration and foundation analysis has been prepared to aid in the evaluation of the foundation conditions on this site. The recommendations presented herein are based on the available soil information and the design information provided. Any changes in the design information or building locations should be brought to the attention of the soils engineer to determine if modifications in the recommendations are required. The final design plans and specifications should also be reviewed by the soils engineer to determine that the recommendations presented herein have been interpreted and implemented as intended.

This geotechnical study has been conducted in a manner consistent with that level of care ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The findings, recommendations and opinions contained herein have been promulgated in accordance with generally accepted practice in the fields of foundation engineering, soils mechanics, and engineering geology. No other representations, expressed or implied, and no warranty or guarantee is included or intended in this report.

It is recommended that the earthwork and foundation operations be monitored by the soils engineer, to test and evaluate the bearing capacities, and the selection, placement and compaction of controlled fills.

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APPROXIMATE BORING LOCATIONS PLAN

Pedestrian Bridge Replacement
Capital City Trail
Fitchburg, Wisconsin

Scale:	1"= 140'
Date:	1/22/2019
Project Number:	00921239

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SOIL BORING LOG: B - 1

Project: Capital City Trail Bridge

Project No.: 00921239

Location: Fitchburg, Wisconsin

Drill Date: January 14, 2019

DEPTH (feet)	EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 908.1	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1	907.1	10" Brown CLAY with silt, moist (TOPSOIL FILL)	1-SS	11			28	
2	906.1	Light brown gravelly SAND with silt, moist (FILL)					7	
3	905.1		2-SS	9	3.0	2.66	23	
4	904.1	Brown CLAY with silt, moist (FILL)						
5	**903.1**							
6	902.1	Brown to Gray CLAY with sand and silt, trace roots and gravel, moist (FILL)	3-SS	7	1.5		17	
7	901.1							
8	900.1		4-SS	8			8	
9	899.1							
10	**898.1**	Light brown SAND with silt, moist						
11	897.1		5-SS	9			6	
12	896.1							
13	895.1							
14	894.1		6-SS	25			20	
15	**893.1**							
16	892.1	Brown SILT with sand, trace gravel, very moist						
17	891.1							
18	890.1							
19	889.1		7-SS	50/4"			12	
20	**888.1**							
21	887.1							
22	886.1							
23	885.1	Reddish brown SAND with silt and gravel, moist						
24	884.1		8-SS	50/4"			9	
25	**883.1**							
26	882.1							
27	881.1	**AUGER REFUSAL @ 26± FEET COBBLES, BOULDERS, OR POSSIBLE BEDROCK**						

FIELD OBSERVATIONS:

Water Level during drilling: None Encountered

Water Level upon completion: None Encountered

Caved at upon completion: 20.5± feet below ground surface (EL. 887.6±)

Delay Time: N/A --

Water Level delayed: N/A

Caved at delayed: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.

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SOIL BORING LOG: B - 2

Project: Capital City Trail Bridge **Project No.:** 00921239

Location: Fitchburg, Wisconsin **Drill Date:** January 14, 2019

DEPTH (feet)	EL. (feet)	VISUAL SOIL CLASSIFICATION — GROUND SURFACE ELEVATION: 907.9	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
		4" Dark brown CLAY with silt, trace gravel, moist (TOPSOIL FILL)					26	
1	906.9	Light brown gravelly SAND with silt, moist (FILL)	1-SS	15			18	
2	905.9							
3	904.9	Dark brown to Brown CLAY with silt and sand, trace gravel, moist (FILL)	2-SS	6			14	
4	903.9							
5	**902.9**							
6	901.9	Dark brown to Brown SAND with silt, trace gravel, clay, and roots, moist (FILL)	3-SS	5			15	
7	900.9							
8	899.9	Light brown SAND with silt, moist	4-SS	7			6	
9	898.9							
10	**897.9**							
11	896.9		5-SS	12			8	
12	895.9							
13	894.9							
14	893.9	Light brown to Reddish brown SAND with silt and gravel, moist to damp	6-SS	26			17	
15	**892.9**							
16	891.9							
17	890.9							
18	889.9							
19	888.9		7-SS	50/3"			15	
20	**887.9**							
21	886.9							⊥
22	885.9							
23	884.9							
24	883.9		8-SS	50/2"			5	
25	**882.9**							
26	881.9							
27	880.9	**AUGER REFUSAL @ 26± FEET COBBLES, BOULDERS, OR POSSIBLE BEDROCK**						

FIELD OBSERVATIONS:

Water Level $_{\text{during drilling}}$: None Encountered

Water Level $_{\text{upon completion}}$: None Encountered

Caved at $_{\text{upon completion}}$: 21± feet below ground surface (EL. 886.9±)

Delay Time: N/A

Water Level $_{\text{delayed}}$: N/A

Caved at $_{\text{delayed}}$: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.