



Professional Service Industries, Inc.
821 Corporate Court, Waukesha, WI 53189
Phone: (262) 521-2125
Fax: (262) 521-2471

May 7, 2024

Short Elliott Hendrickson
425 W. Water St., Suite 300
Appleton, WI 54911

Attn: Mr. Trevor Frank
Senior Architect

Re: Geotechnical Exploration and Evaluation
Proposed Public Safety Building
E. Taylor St. and S. Dousman St.
Prairie du Chien, WI
PSI Project No. 00523381

Dear Mr. Frank:

The geotechnical exploration and evaluation for the referenced project has been completed. An electronic copy of the report is being provided via email. Paper copies can be issued upon request. 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), an Intertek Company, 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.

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Nicole Carlson
Department Manager
Geotechnical Services

James M. Becco, P.E.
Principal Consultant

Patrick J. Patterson, P.E., P.G.
Senior Engineer
Environmental Services



The above Professional Engineering Seal and signature is an electronic reproduction of the original seal and signature. Original hard copies can be provided upon request. This electronic reproduction shall not be construed as an original or certified document.

**REVISED GEOTECHNICAL EXPLORATION
AND EVALUATION**

For the:

Proposed Public Safety Building
E. Taylor St. and S. Dousman St.
Prairie du Chien, WI

Prepared for:

Short Elliott Hendrickson
425 W. Water St., Suite 300
Appleton, WI 54911

Prepared by:

Professional Service Industries, Inc.
821 Corporate Court, Waukesha, WI 53189
Phone: (262) 521-2125
Fax: (262) 521-2471

May 7, 2024

PSI Project Number: 00523381

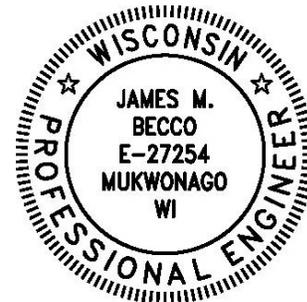


Handwritten signature of Nicole Carlson in black ink.

Nicole Carlson
Department Manager
Geotechnical Services

Handwritten signature of James M. Becco in black ink.

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



Handwritten signature of Patrick J. Patterson in black ink.

Patrick J. Patterson, P.E., P.G.
Senior Engineer
Environmental Services



The above Professional Engineering Seal and signature is an electronic reproduction of the original seal and signature. Original hard copies can be provided upon request. This electronic reproduction shall not be construed as an original or certified document.

TABLE OF CONTENTS

INTRODUCTION	1
General.....	1
Purpose	1
Scope	1
Authorization	1
SITE AND PROJECT DESCRIPTION	1
Site Features	1
Project Description	2
EXPLORATION AND LABORATORY PROCEDURES	2
Scope Summary	2
Field Exploration.....	3
Laboratory Physical Testing.....	4
DESCRIPTION OF SUBSURFACE CONDITIONS.....	4
General.....	4
Soil Conditions.....	4
Groundwater Observations	5
EVALUATION AND RECOMMENDATIONS	5
General Development Considerations	5
Site Preparation and Grading	6
Foundation Evaluation	8
Floor Slab Subgrade.....	9
Exterior/Unheated Area Slabs	10
Utility Construction.....	10
CONSTRUCTION CONSIDERATIONS	11
Groundwater Control	11
Excavations and Site Drainage	11
Seismic Design Considerations	12
PAVEMENT DESIGN RECOMMENDATIONS	13
STORMWATER MANAGEMENT AREA CONSIDERATIONS	15
GENERAL COMMENTS.....	17

APPENDIX (in order of appearance)

- Figure 1 – Boring Location Plan
- Soil Boring Logs
- General Notes
- Soil Evaluation – Storm Form
- USDA Classification Chart



INTRODUCTION

General

This report presents the results of the geotechnical exploration and evaluation for the proposed Prairie du Chien Public Safety Facility project located in Prairie du Chien, Wisconsin. The work was performed for Short Elliott Hendrickson, at the request of Mr. Trevor Frank.

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, floor slab, stormwater management, and pavement designs for the proposed project.

Scope

The scope of services included the subsurface exploration, an evaluation of soil characteristics by field and laboratory testing, and an evaluation of the data obtained. Subgrade preparation recommendations and construction considerations are also provided. The scope of the field work, including the number, location, and depth of the borings was determined by Short Elliott Hendrickson.

Authorization

The description of services and authorization to perform this geotechnical exploration and evaluation were in the form an Short Elliott Hendrickson Subcontract, dated March 27, 2024, which included PSI Proposal No. 420760, dated March 25, 2024. This report has been prepared on behalf of, and exclusively for the use of Short Elliott Hendrickson. 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's General Conditions.

SITE AND PROJECT DESCRIPTION

Site Features

The project site is located at the northeast corner of E. Taylor St. and S. Dousman St., in Prairie du Chien, Wisconsin. At the time of the exploration, the property was vacant and grass covered. It is understood that the parcel was previously occupied by a large medical complex. The surrounding parcels were generally developed with commercial and residential structures. Aerial photos of various years between 1994 and 2020 reviewed on Google Earth indicate that at the time of the earliest photo, the site was occupied by the previous medical complex and associated paved areas, which covered most of the property. The site remains relatively similar

in appearance through the 2013 photo. In the 2019 photo, the medical complex is no longer present, and the site is grass covered. However, several of the photos were grainy, and details were difficult to discern. The subject site is depicted on the enclosed Boring Location Plan (Figure 1).

The topography of the general area is relatively flat, sloping down to the west, with an elevation difference of approximately 2 feet (EL. 639 to EL. 637).

Project Description

Based on information provided by the client, it is understood that the proposed project will consist of an approximately 37,000 square foot one-story, slab-on-grade structure. No basement is planned. The structure will be supported by conventional spread footings. It is understood that the maximum column and wall load will be 80 kips and 10 klf, respectively. A finished floor elevation was not provided. For the purpose of this report, it is estimated that the floor will be at about EL. 638.5, and that only nominal cuts and fills of up to about 1 foot will be required.

Pavements for this project are understood to consist of asphalt and/or concrete parking lots and driveways. Traffic loading was not provided.

Two stormwater management areas are proposed within the northwest (B-1) and southwest (B-2) corner of the property. The type, size, bottom elevation, and other design details of the stormwater management area have not been provided.

When additional information becomes available and/or if any of the information provided herein is incorrect or changes, PSI must be informed so that any necessary re-evaluation or revisions to this report can be made.

EXPLORATION AND LABORATORY PROCEDURES

Scope Summary

The field and laboratory data utilized in the evaluation 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 standard laboratory testing.

With respect to the stormwater management areas, the field and laboratory work for classification of the subgrade soils was performed to provide information for use by the basin design personnel when considering requirements of Chapter NR151 of the Wisconsin Administrative Code, WDNR Technical Standard 1002 (Site Evaluation for Stormwater Infiltration), or other applicable local or state guidelines/regulations/requirements. The design

of the proposed stormwater management area was beyond the scope of services for this project.

Field Exploration

Ten (10) soil borings were drilled for this project. Borings B-1 and B-2 were drilled within planned stormwater areas to a depths of about 27 and 25 feet. The remaining borings were performed within building and pavement areas to depths of about 15 to 30 feet. 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 a consumer grade GPS device. They are estimated to be accurate to within several feet. The surface elevations shown on the logs were estimated by interpolation of a 1-foot contour map of the property, provided by the client. The elevations are estimated to be accurate to within about 1 foot.

The soil test borings were performed with an all-terrain (ATV) mounted drilling rig utilizing continuous flight hollow stem augers to advance the holes. Representative samples were obtained by the Standard Penetration Test (SPT) method using split-spoon sampling in general accordance with ASTM D-1586 procedures. Samples were secured at 2.5-foot intervals to a depth of 10 feet, and then at 5-foot intervals thereafter to the end of the borings. As an exception, samples were obtained at 2-foot intervals at the borings performed within the proposed stormwater management areas. 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 soil 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. The soil samples were visually classified in general accordance with the Unified Soil Classification System. As an exception, the samples from B-1 and B-2 were visually classified by a certified soil tester in general accordance with USDA National Resources Conservation Service textural soil classification procedures. 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.

Laboratory Physical Testing

Soil samples obtained from the exploration were visually classified in the laboratory, and subjected to testing, which included moisture content determinations. Selected cohesive soil samples were tested in unconfined compression with a controlled strain loading rate and/or with a calibrated hand penetrometer to aid in evaluating the soil strength characteristics. The values of strength tests performed on soil samples obtained by the Standard Penetration Test Method (SPT) are considered approximate, recognizing that the SPT method provides a representative but somewhat disturbed soil sample.

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

General

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 an approximate boundary between the various soil classifications. It must be recognized that the soil descriptions are considered representative estimates for the specific test hole location, but those 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.

Soil Conditions

USCS Classification (B-3 through B-10)

The surficial materials at the borings consisted of about 5 to 12 inches of silt and sand topsoil predominantly classified as fill. As an exception, a discernible topsoil layer was not present at B-6. The underlying soils at B-4, B-5, B-7, B-8, and B-10; and the materials extending from the surface at B-6 consisted of brown to dark brown sand or sand and gravel fill to a depth of about 3 feet (EL. 635 to EL. 636). Some of the fill samples contained concrete, brick and wood fragments. The underlying natural soils at these locations, and extending from the surface at B-3 and B-9 consisted predominantly of fine to medium or fine to coarse sand with varying gravel content. The granular fill soils were in a loose to medium dense condition with N-values between 3 and 14 blow per foot. The natural granular soils were also in a loose to medium dense condition with N-values between 5 and 12.

USDA Classification (B-1 and B-2)

The materials extending from the surface at B-1 consisted of gravelly loamy sand, sand, very and gravelly medium sand classified as fill to a depth of about 11.5 feet (EL. 626.5). The

materials extending from the surface at B-2 consisted of silty clay loam and sandy loam classified as fill to a depth of about 12.5 feet (EL. 624.5). The underlying soils consisted of medium sand, fine to medium sand, sandy loam, and gravelly sandy loam.

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 at completion. Groundwater was encountered during auger advancement in borings B-1, B-2, B-6, B-7, B-8, B-9, and B-10 at depths ranging from 22 to 23.5 feet (EL. 617 to EL. 614.5) below existing grade. Groundwater was not present upon completion at these borings, and was not encountered at the remaining borings. 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 and is recommended to further 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, conventional spread footings, along with conventional slab-on-grade construction, can be used for support of the proposed structure. Fill soils were encountered in several of the building borings to a depth of about 3 feet (EL. 635 to EL. 636) below the existing surface. Fill soils are not suitable for support and all foundations must be extended to bear upon underlying suitable natural soils. Based on the estimated floor elevation, undercuts of up to about 2 feet may be necessary for interior footings. Some nominal undercutting may also be necessary for frost depth footings. However, some variation is likely. Some difficulty with excavation and subgrade stability may be experienced.

The existing soils can be utilized for support of the floor slab and pavements after proper subgrade preparation. However, some over-excavation of unsuitable soils may be necessary, especially within existing fill. Asphalt and concrete pavement can be used in the parking lot and driveway areas.

A discussion of the building foundation and pavement design parameters, as well as the support conditions for the floor slab and pavement are included in later sections.

Site Preparation and Grading

The presence of organic topsoil and vegetation in the subgrade can adversely affect the serviceability of structural fills, foundations, floor slabs, pavements, and other structures placed upon them. Approximately 5 to 12 inches of topsoil and topsoil fill were present on the surface of the site at most of the boring locations. However, some variation should be expected. All topsoil, vegetation, trees, roots, and other organic matter must be stripped from the areas of footings, floor slabs, pavements, sidewalks, and other structures.

Site preparation will require removal of the remnants of former buildings, including foundations and underground utilities. Extensive areas of loose backfill material may be encountered within former utility trenches, and in the former building, basement, and other structural 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 building, utilities, or other structures.

After stripping the topsoil and cutting high areas of the site to the planned finished grade, and prior to the placement of new fill which may be placed to raise grades, the subgrade must be thoroughly proofrolled to detect unstable, yielding soils. This should consist of overlapping passes in a perpendicular grid pattern, with a fully-loaded tandem-axle dump truck, or other equipment of similar size and weight suitable for the surface conditions. Proofrolling should be performed in consultation with the geotechnical engineer at the time of construction. Removal of loose, unstable or otherwise unsuitable soils may be necessary, and may become extensive in areas of existing fill. Some difficulty with subgrade preparation may be experienced, especially in wet or cold weather, or during thawing conditions. Additionally, instability can become more severe in silty and clayey materials, which are considered to be moderately to highly moisture sensitive. It is generally recommended that earthwork be carried out during relatively warm, dry weather. Any soft, wet, or otherwise unstable zones which cannot be improved by scarification and aeration, must be removed and replaced with compacted structural fill, such as clean crushed stone, possibly in conjunction with the use of a geotextile fabric. Construction delays and difficulty with subgrade stabilization may be experienced during periods of wet and/or cool weather.

Every effort must be made to keep excavations dry. If construction proceeds during wet weather, some additional over-excavation 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 foundation subgrade soils is reduced.

Where site grades are raised in excess of 2 feet, the first lift of new fill must be placed so as to extend a minimum lateral distance of 5 feet beyond the planned top building pad dimension (for fills less than 5 feet in thickness), or for a distance equal to at least 1 foot laterally beyond the top pad dimension for every foot of fill thickness (for fills greater than 5 feet in depth). Subsequent lifts can then be placed on an approximate 1H:1V slope back up to the planned top perimeter dimension of the pad. Similarly, where undercutting of unsuitable soils is performed beneath foundations, floor slabs, or other structural areas, it is recommended that the removal extend laterally beyond the perimeter of the structure at least 1 foot for every foot of removal below the planned bearing depth. Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities. In addition, proper placement, and compaction of new fill to raise grades is essential for proper foundation support.

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 or a low-plasticity cohesive soil. If fine-grained soils, such as those with high silt or clay content are used, they should generally be placed over large open areas, where conditions are more favorable for the proper placement and compaction of such materials. It must be recognized that high silt or clay content materials are difficult to compact when placed at moisture contents beyond a few percent of the optimum moisture content. In addition, the near surface silty soils on this site are generally considered to be moisture sensitive; therefore, some difficulty with subgrade preparation should be expected, especially if they become wet during 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). Silt, clay and wet granular soils are not suitable for reuse as compacted fill in trenches, or adjacent to foundation stem walls or retaining walls.

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.

It is recommended that well-graded granular soils be utilized as backfill in new utility trenches and alongside below grade walls to reduce the potential for consolidation and settlement of the fill. All fill soils must be placed and compacted under engineering-controlled conditions, to provide suitable support for overlaying structures and roadways. Additional guidance can be provided at the time of construction in the selection process for grade-raising fill and trench backfill.

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 Evaluation

The proposed structure may be supported by a conventional spread foundation system, bearing on suitable naturally occurring soils or within structural fill, prepared as discussed in a previous section. Based upon the estimated floor elevation (EL. 638.5), interior and exterior footings will bear at about EL. 637 and EL. 634.5, respectively. However, existing fill soils were encountered in several of the building borings to a depth of about 3 feet (EL. 635 to EL. 636) below the existing surface. Fill soils are not suitable for support and all foundations must be extended through such materials and any buried topsoil to bear upon underlying suitable natural soils. Undercuts of up to about 2 feet may be necessary for interior footings. Some nominal undercutting may also be necessary for frost depth footings. However, some variation is likely. Conventional spread footings bearing upon suitable natural soils, or upon compacted structural fill (or lean concrete mix), may be designed for a net allowable soil pressure of 2,000 psf. However, some undercutting of loose, unstable, or otherwise unsuitable soils is likely to be necessary.

The suitability of the existing soils for support of the proposed foundation must be determined by testing by a qualified geotechnical engineer during construction, utilizing static cone penetrometer tests or dynamic cone penetrometer tests for cohesive and granular soils, respectively. Soft, loose, or otherwise unsuitable materials, not disclosed by the borings, may be encountered in the foundation excavations at the bearing elevation. If unsuitable existing soil is present, it must be removed throughout a zone extending one foot laterally for each two feet removed below the foundation, on either side of the planned footing. The over-excavated area must be backfilled with structural compacted fill.

In lieu of the use of compacted structural fill, lean concrete mix can be used to replace the unsuitable soils. The foundation excavations should be about 4 inches wider than the proposed footing width and must extend to suitable natural bearing soils. The concrete must be placed immediately after excavation to avoid intrusion of soil into the excavation. The concrete should contain sufficient aggregate and cement to attain a 28-day compressive strength of at least 1000 psi. Some sloughing or caving of the overlying soils may be experienced. Should this occur during concrete placement, the area must be removed and recast. Additionally, should caving become extensive (such as can more typically occur within granular or soft clay soil), it may be necessary to substantially widen excavations to avoid soil intrusion into the concrete. This may result in the use of additional concrete quantities significantly in excess of preconstruction budget estimates.

All perimeter footings and footings in poorly heated or unheated areas must be placed at a depth of at least four (4) feet (or deeper if required by local code or in accordance with customary practice) below the finished exterior grade for frost protection. All footings must be

protected from the effects of frost if construction is carried out during winter months. Interior footings not subject to frost action may be placed at a shallower depth of at least eighteen (18) inches below the floor slab, provided they bear on suitable natural soils or engineered fills.

It is recommended that the footings supporting individual columns have a minimum dimension of 24 inches, and continuous footings have a minimum width of 18 inches, even if the maximum recommended allowable bearing pressure is not fully utilized. In order to minimize the effects of any slight differential movement that may occur due to variations in the character of the supporting soils and any variations in seasonal moisture contents, it is recommended that all foundations be suitably reinforced to make them as rigid as needed.

In general, the performance of the foundation system on this site is dependent on the various factors discussed herein. The excavation, preparation, and concreting of foundations should be monitored and tested by a representative of the soils engineer.

Floor Slab Subgrade

Prior to constructing the floor slabs or pavements, and prior to the placement of any fill used to raise grades, the exposed subgrade must be prepared utilizing the proofrolling procedures described previously. In areas that exhibit soft, yielding or unstable soil conditions, the following remedial measures are recommended to provide a stable subgrade. It must be recognized that the high silt and clay content soils are highly sensitive to increases in moisture and construction disturbance. It will therefore be necessary to maintain these materials in a relatively dry condition to allow for proper subgrade preparation. It is recommended that the proofrolling operations be monitored by a representative of the geotechnical engineer to ensure that a firm, suitable subgrade is present prior to placement of new fills, or to construction of floor slabs and pavements.

Localized wet, soft or unstable areas can be undercut to such depths determined necessary in the field to reach stable material, and the area backfilled with imported crushed stone, such as the 1¼-inch gradation specified in Section 305 of the WisDOT Standard Specifications, placed and compacted as recommended in the Site Preparation section of this report. If relatively thick zones or areas of extensive yielding are observed, and they cannot be stabilized by normal discing, aeration and recompaction procedures, undercutting and replacement with crushed stone and geotextile fabric (if needed) may also be required in these areas.

The floor slab(s) may be designed utilizing an estimated modulus of subgrade reaction of 175 pci based on the presence of suitable and stable granular soils, prepared as discussed in this report. However, this is based on common range values obtained from 1 ft. x 1 ft. plate load tests on specific soil types. Depending on how the slab load is applied, the value may need to be modified for larger areas using the following:

Modulus of Subgrade Reaction $k_s = \left(\frac{k}{B}\right)$ for cohesive soil
 $k_s = k \left(\frac{B+1}{2B}\right)^2$ for cohesionless soil

where: k_s = coefficient of vertical subgrade reaction for loaded area
 k = coefficient of vertical subgrade reaction for a 1x1 foot square area
 B = width of area loaded, in feet

The final design and detailing should be performed by a qualified structural engineer based on the intended slab use, loading conditions and anticipated subgrade conditions.

A granular mat, which can be designed as a drainage layer, should be provided below the floor slab. This must be a minimum of six (6) inches in thickness and properly compacted. In moisture sensitive areas, a vapor retarder may be placed beneath the floor slab or base course, however, it is recommended that the architect be consulted in this regard. The proper use of a vapor retarder may not completely prevent moisture beneath or on top of slabs. If the base course contains sharp particles, a cushion layer of sand approximately 2 inches in thickness may be required to provide protection from puncture.

The floor slabs should be suitably reinforced to make them as rigid as necessary and proper joints provided at the junction of slabs and the foundation system so that a small amount of independent movement can occur without causing damage. Large floor areas must be provided with joints at frequent intervals (maximum spacing of 30 times the slab thickness, per ACI) to compensate for concrete volume changes (shrinkage). It is recommended that appropriate construction methods and curing procedures be used to minimize shrinkage and curling of the floor slabs.

Exterior/Unheated Area Slabs

Based on the borings, entry slabs, sidewalks, aprons, and other slabs in exterior or unheated areas will predominantly bear upon sand soils. Such materials are not considered to be highly frost susceptible. However, it must be noted that slabs placed directly upon more frost susceptible soils, such as those with high silt or clay content, are subject to heaving and subsequent settlement due to freeze/thaw cycles. This can result in cracking, misalignment, and other related effects (especially at joints). If more fine-grained soils are encountered in areas beyond the borings, or are used to raise grades, it is recommended that consideration be given to limited undercutting of frost susceptible materials, where encountered, to a depth of 1 to 2 feet below the slab, and replacement with well graded, properly placed and compacted granular soils. A properly designed underdrain system connected to the municipal sewer (if permissible) or directed to on-site stormwater management areas should also be incorporated to reduce the potential effects of freeze/thaw cycles.

Utility Construction

In general, the on-site soils can be used for support of utility lines. However, some undercutting of soft, loose, unstable, or otherwise unsuitable or unstable soils, in conjunction with the

placement of crushed stone or other suitable granular backfill may be necessary, especially within existing fill. Some difficulty with the stability of utility trenches may be experienced, especially in the presence of water. The use of shoring, bracing, or trench boxes will be required.

All fill soils must be properly placed and compacted under engineering-controlled conditions to provide suitable support for overlaying structures and roadways. Silty and clayey soils, organic soils, and wet materials are not recommended for use as backfill within utility trenches due to the substantial difficulty of obtaining proper compaction in confined areas.

As with all excavation work, all open cut trenches must be properly shored and braced as required by applicable federal and state OSHA codes, and as necessary to protect life and property.

CONSTRUCTION CONSIDERATIONS

Groundwater Control

Groundwater observations were made during the drilling operations, and in the open boreholes at completion. Groundwater was encountered during auger advancement in borings B-1, B-2, and B-6 through B-10 at depths of about 22 to 23.5 feet (EL. 617 to EL. 614.5) below existing grade. All of the holes caved to varying depths upon withdrawal of the auger; therefore, observations could not be made below the caved depth.

Based on the observations, and the estimated floor elevation (EL. 638.5), no major difficulties during excavation and construction of the proposed shallow foundation system and associated shallow utilities is anticipated. A gravity drainage system and filtered sump pumps or other conventional dewatering procedures, may be adequate to control low volume perched water. However, for rising groundwater levels, or for large volume perched zones (and dependent upon the depth of the stormwater basins), prolonged dewatering with a series of sump pumps with sufficient lifting capacity may be necessary to facilitate construction.

Seasonal variations in precipitation, site drainage conditions, soil permeability, and other factors can cause groundwater levels to rise and/or perched zones to be present in the upper soils at varying times of the year, including during construction.

Excavations and Site Drainage

Sloping, shoring or bracing of the excavation sidewalls will be necessary to facilitate construction and to protect life and property. Sloughing and caving should be expected within unprotected excavations. 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. However, severe instability may occur within granular or soft clay soils, especially encroaching upon and extending below the groundwater

or perched zones. All excavation work must be performed in accordance with OSHA and local building code requirements.

Where excavations encroach upon or extend below the groundwater or perched zones and into granular or soft clay soils, a substantially unstable subgrade may develop when the confining effect of the overburden is removed. Significant sloughing or caving of sidewalls may also occur. Some overexcavation of softened or loosened soils, in conjunction with the use of a crushed stone working mat, may be necessary to establish a stable bearing subgrade. Additionally, significantly widened excavations may result, or be required to maintain or achieve sidewall stability.

All excavations must be performed with caution and utilize methods which will prevent undermining or destabilization of buildings, 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.

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.

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.

Seismic Design Considerations

The soils encountered in the borings are estimated to meet the criteria for Site Class D in accordance with 1613.2.5.2 of the International Building Code-2018 (which directs to the

simplified design procedure outlined in ASCE 7 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures).

PAVEMENT DESIGN RECOMMENDATIONS

Pavements for this project are understood to consist of asphalt and/or concrete parking lots and driveways, and concrete loading docks. Traffic loads were not provided for the purpose of this report. We assume the light-duty and heavy duty traffic loading will not exceed 40,000 18-kip ESAL's (up to 8 light delivery trucks per day) and 80,000 18-kip ESAL's (based on up to 8 light delivery trucks, 2 medium trucks and 1 heavy delivery truck per day) respectively for a 20-year design life. When the actual project traffic loads are determined, they must be provided to PSI so that any revision to the pavement section and recommendations provided herein can be made.

The pavement subgrade soils encountered in the borings generally consisted of sand, with an estimated visual AASHTO classification of A-2-4. They are generally rated as fair for pavement subgrade support due to their moderate frost susceptibility, fair drainage characteristics, and lower susceptibility to strength loss when exposed to free water. Based on the A-2-4 soil classification an estimated Resilient Modulus, M_r of 4000 psi and Modulus of Subgrade Reaction, K of 200 was used for this evaluation. In order to use these values, all new fill used to raise low areas must have pavement support characteristics that are equal to or better than the granular soils.

During construction, the surficial subgrade soils can become wet, softened and disturbed from rainfall and construction equipment. Therefore, prior to placing the pavement base materials, the subgrade must be proofrolled as outlined previously. Particular attention should be given to high traffic areas that have become rutted and areas of backfilled trenches. Localized wet, soft, or unstable areas can be undercut to such depths determined necessary in the field to reach stable materials, and the area backfilled with crushed stone, such as 1¼-inch dense graded base (Section 305 of the State of Wisconsin Standard Specification for Highway and Structure Construction). If relatively large or thick zones of extensive yielding are observed, and normal discing and recompaction procedures cannot stabilize them, undercutting and replacement with crushed stone and geotextile fabric may be required in these areas. Preparation and evaluation of the pavement subgrade must be performed as outlined in the Site Preparation section of this report.

The recommended minimum pavement section was determined utilizing the WinPAS pavement design software. This program embodies the methodology of the 1993 AASHTO Guide for the Design of Pavement Structures. The following design factors were used in developing the recommended pavement sections.

- Design Life: 20 years
- Design Traffic (Heavy Duty): 110,000 ESALs (rigid); 80,000 ESALs (flexible)
- Design Traffic (Light Duty): 40000 ESALs
- Soils Resilient Modulus, Mr: 4000
- Modulus of Subgrade Reaction, k: 175 pci
- Reliability: 85%
- Initial Serviceability: 4.5 (rigid); 4.2 (flexible)
- Terminal Serviceability: 2.0
- Standard Deviation: 0.35 (rigid), 0.45 (flexible)
- Load Transfer Coefficient J: 3.2
- Concrete Modulus of Rupture: 600 psi
- Structural Coefficient Hot Mix Asphalt: 0.44
- Structural Coefficient Aggregate Base: 0.14

The following table presents the recommended thickness for a flexible pavement structure on a properly prepared clay subgrade, along with their recommended structural coefficients.

PAVEMENT COMPONENTS	HEAVY DUTY AREAS	STANDARD DUTY AREAS	WISCONSIN DOT SPECIFICATIONS
Asphaltic Concrete Surface Course	1.5"	1.75"	Section 460 (a=0.44)
Asphaltic Concrete Binder Course	2.0"	2.25"	Section 460 (a=0.44)
Aggregate Base Course	9"	9"	Section 305 1¼" Crushed Stone (a=0.14)

The asphaltic base and surface course should be placed and provided in accordance with Section 455/460 of the State of Wisconsin Standard Specification for Highway and Structure Construction. The crushed aggregate base course should be provided and placed in accordance with Section 301/305 of the Standard Specification.

It may be advantageous to utilize rigid Portland Cement Concrete pavement at entrance and exit aprons. It is recommended that a minimum of 6 inches of 4,000 psi, air-entrained concrete (5 to 7 percent) be utilized along with a 6-inch thickness of aggregate base for a rigid pavement section. The construction materials and procedures should be in accordance with Section 415 and Section 305 (for concrete and base course, respectively) of the WisDOT Standard Specification.

The thickness designs shown above are based on an estimated traffic loading by PSI; the assumption that all subgrade materials, natural or fill, have minimum strength characteristics equal to or greater than the expected clay soils; the subgrade being properly prepared; and the pavement being properly drained to prevent softening and erosion of the subgrade. Actual

service life will be dependent upon deterioration caused by weather conditions and pavement use. All pavement materials and construction must be in accordance with the guidelines of the State of Wisconsin Standard Specification for Highway and Structure construction. If design traffic loading is found to be different from that discussed above; or if the soils encountered at planned subgrade vary from the anticipated clay fill soils; new pavement section designs may be necessary.

It should be recognized that all pavements require regular maintenance and occasional repairs to keep the pavements in a serviceable condition. Maintenance is necessary to reduce the effects of pavement stress caused by changes in temperature and moisture, repetitive traffic loadings, and movement of the subgrade soils. As pavement distress is observed, it should be repaired as quickly as possible. Timely sealing of joints and cracks is essential to help reduce the potential for water to enter the pavement section and cause rapid deterioration of the pavement during freeze-thaw cycles. Unrepaired areas will generally lead to more severe and widespread distress, and eventually, pavement disintegration. Therefore, annual maintenance should include sealing of cracks and joints, and maintenance of proper surface drainage to avoid ponding water on or near the pavements. Periodic pavement condition surveys of the pavement can also be implemented to evaluate the need for other surface maintenance, and treatments or repairs that may be needed to obtain the design service life.

The subject site is located in an area that experiences annual freezing cycles. The granular subgrade soils encountered at the borings are not generally considered to be highly susceptible to frost action. However, near surface layers of finer grained soils may be encountered. In addition, it is generally good customary practice to control surface runoff in order to reduce the potential for frost action. It is recommended that underdrains be placed within the subgrade, just below the granular base, to help reduce the potential for trapping water within the aggregate base layer. Sufficient drain tiles extending radially outward an adequate distance from each interior catch basin must be installed. In addition, drain tiles should extend along curb lines, up the slope from curb inlets. The drain tile should be directly connected to the storm sewer manholes or catch basins (if permissible by local municipal or other applicable code). The drain tile should consist of perforated PVC pipe of adequate diameter placed beneath the base layer, extending a sufficient distance into the subgrade. The pipe should be surrounded by appropriately sized clean stone, with the pipe and stone being wrapped with a geotextile filter fabric to reduce the potential for soils to migrating into and obstruct the pipe. It is also recommended that roof drains be connected to the stormwater collection system to minimize the potential for this water to enter the base and subgrade.

STORMWATER MANAGEMENT AREA CONSIDERATIONS

As requested by the client, borings B-1 and B-2 were performed in the area of the proposed stormwater management. The subgrade soils encountered at these locations have been visually classified in general accordance with the USDA textural soil classification system The

materials extending from the surface at B-1 consisted of gravelly loamy sand, sand, very and gravelly medium sand classified as fill to a depth of about 11.5 feet (EL. 626.5). The materials extending from the surface at B-2 consisted of silty clay loam and sandy loam classified as fill to a depth of about 12.5 feet (EL. 624.5). The underlying soils consisted of medium sand, fine to medium sand, sandy loam, and gravelly sandy loam to the termination depths. Groundwater was encountered at a depth of about 22 feet (EL. 616 and EL. 619).

With regard to the above soil and groundwater conditions encountered at the borings, NR 151.124(4)(c)1 and 2 – *Infiltration rate exemptions* indicates that infiltration practices located in an area where the infiltration rate of the soil measured at the proposed bottom of the infiltration system is less than 0.6 inches per hour using a scientifically credible field test method; or an area where the least permeable soil horizon to 5 feet below the proposed bottom of the infiltration system using the USDA method of soils analysis consists of sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay or clay may be credited toward meeting the requirements, but the decision to infiltrate under these conditions is optional. In addition, NR 151.124(4)(b)1 – *Separation distances* indicates that infiltration practices shall be located so that the characteristics of the soil and the separation distance between the bottom of the infiltration system and the elevation of seasonal high groundwater or the top of bedrock are in accordance with the following Table (reproduced from NR 151.124):

TABLE 3. SEPARATION DISTANCES AND SOIL CHARACTERISTICS		
SOURCE AREA	SEPARATION DISTANCE	SOIL CHARACTERISTICS
Industrial, Commercial, Institutional Parking Lots and Roads	5 feet or more	Filtering Layer*
Residential Arterial Roads	5 feet or more	Filtering Layer*
Roofs Draining to Surface Infiltration Practices	1 foot or more	Native or Engineered Soil with Particles Finer than Coarse Sand
Roofs Draining to Surface Infiltration Practices	Not Applicable	
All Other Impervious Source Areas	3 feet or more	Filtering Layer*

*Defined in NR 151.002(14r) as a "soil that has at least a 3-foot deep layer with at least 20 percent fines; or at least a 5-foot deep layer with at least 10 percent fines; or an engineered soil with an equivalent level of protection as determined by the regulatory authority for the site."

The information shown above is a selected excerpt from NR151 that is intended only as general guidance for considering stormwater management in conjunction with the encountered subsurface conditions at the borings. Basin design must be performed by a qualified and experienced firm. In addition, the entirety of Chapter NR151 of the Wisconsin Administrative Code, the Site Evaluation for Stormwater Infiltration (1002) document, and other applicable

references; along with appropriate state, local or other municipal requirements must be consulted as part of site specific stormwater design.

It is recommended that stormwater management basins not be placed in close proximity to basements or other below grade structures. Proper and careful consideration of soils and subsurface conditions must be given during site and design planning, and extreme care must be exercised during construction. Lateral migration of water may result in substantially increased sump pump activity and can quickly overcome the ability of such pumps to maintain a desirable water level, resulting in significant flooding. The potential for such conditions to occur can greatly increase when below grade floor elevations encroach upon or are below the elevation of basin bottoms and/or when basins are placed in close proximity to structures (strongly not recommended). In addition, the presence of granular or other generally permeable soils, which is typically necessary in the areas of structures for utility backfill, alongside basement walls, or within other development excavations/trenches can act as extensive migration channels to rapidly carry large volumes of water from basins and into nearby below grade structures. Building codes or municipal regulations may require that floor elevations of below grade structures be a specified distance above the water level of nearby basins or other stormwater features. It is therefore recommended that the design engineer (or other appropriate representative) review applicable municipal or other regulatory requirements and verify the design normal and design high water elevations of stormwater basins/features with respect to planned or existing below grade slab elevations.

GENERAL COMMENTS

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

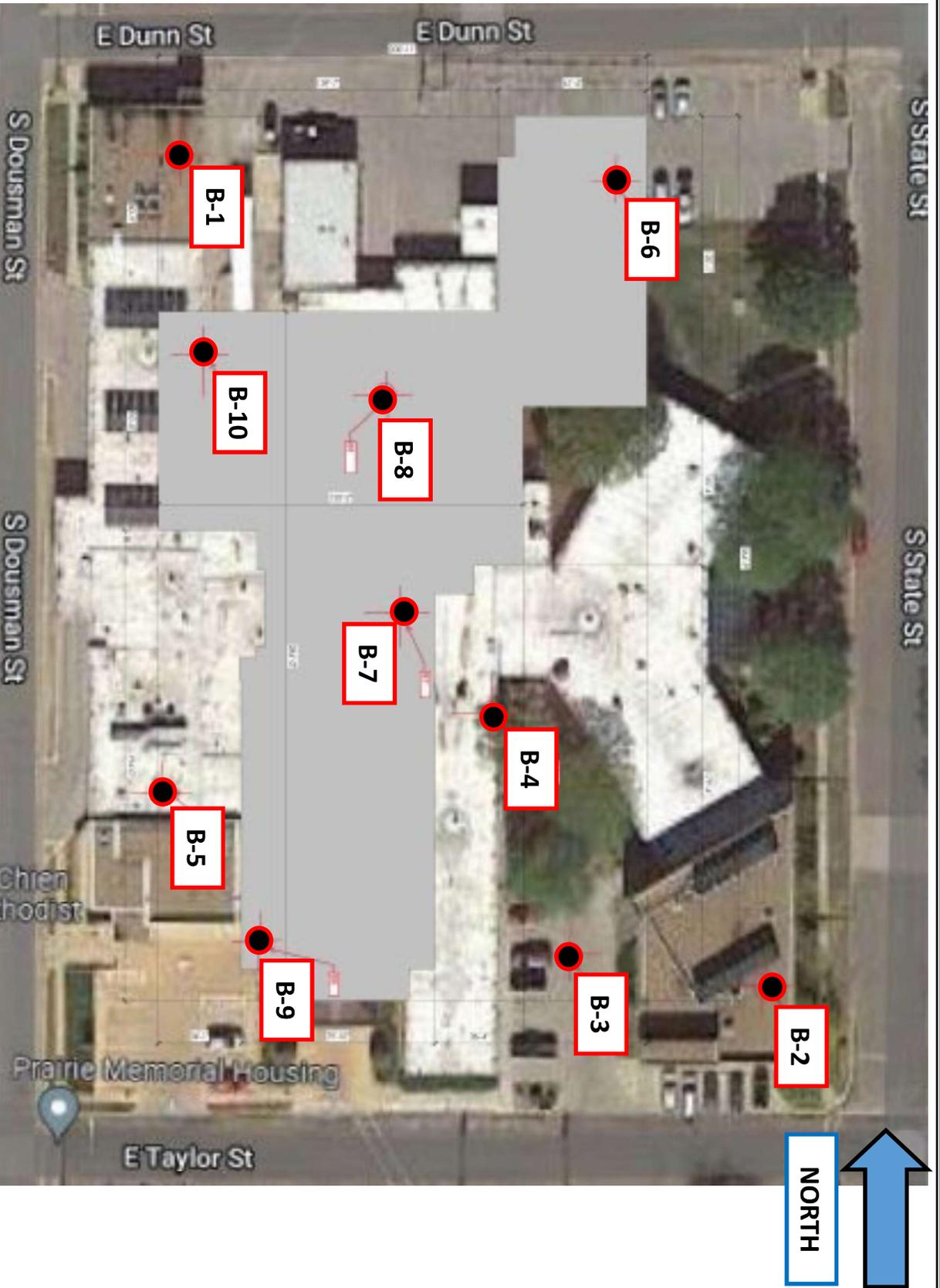
This geotechnical study has been conducted in a manner consistent with that level of care ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The findings, recommendations and opinions contained herein have been promulgated in accordance 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 soil engineer, to test and evaluate the subgrade stability, bearing capacities, and the selection, placement and compaction of controlled fills. WisDOT Standard Specifications for Highway and

Structure Construction can also serve as a guide in implementing the subgrade preparation and other earthwork operations.

Appendix

Figure 1 – Boring Location Plan
Soil Boring Logs
General Notes
Soil Evaluation – Storm Form
USDA Classification Chart



Prairie du Chien PSC Facility
 NEC of S. Dousman St. and E. Taylor St.
 Prairie du Chien, WI

FIGURE 1: BORING LOCATION PLAN

SCALE: 1 inch = 60 feet (approx.)

DATE: 04/30/2024

PROJECT NUMBER: 00523381

DATE STARTED: 4/15/24 **DRILL COMPANY:** Groundbreaking Exploration
DATE COMPLETED: 4/15/24 **DRILLER:** Jonathan **LOGGED BY:** Wilber
COMPLETION DEPTH: 27.0 ft **DRILL RIG:** ATV
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: 638 ft **SAMPLING METHOD:** 2-in SS
LATITUDE: _____ **HAMMER TYPE:** Automatic
LONGITUDE: _____ **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** _____
REMARKS: _____

BORING B-1

Water
 ▽ While Drilling 22 feet
 ▼ Upon Completion Not Obsvd
 ▽ Delay N/A

BORING LOCATION: _____

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks	
									N in blows/ft		STRENGTH, tsf			
									Moisture, %					
									X Moisture		■ PL			
									● LL		▲ Qu		* Qp	
638	0			1	24	Fill, Very Dark Brown Gravelly Loamy Sand, Moist		4-5-3-4 N=8	10	○				
635	3			2	10	Fill, Dark Brown Sand, Moist		2-2-1-2 N=3	8	○	X			
630	5			3	10			2-1-1-2 N=2	7	○	X			
630	7			4	10	Fill, Light Brownish Gray Very Gravelly Medium Sand, Moist to Very Moist		2-3-3-3 N=6		○				
625	10			5	7			12-8-11-14 N=19	7	X	○			
625	12			6	20	Dark Brown Medium Sand, Moist		9-10-14-17 N=24	14	X	○			
620	15			7	18			3-3-5-6 N=8	2	X	○			
620	17			8	24	Brown Fine to Medium Sand, Moist to Wet		3-3-3-5 N=6	2	X	○			
615	20			9	18			2-3-3-4 N=6	3	X	○			
615	22			10	24	End of Boring at 27' Cave-In at 10'		3-3-4-6 N=7	3	X	○			
	24			11	18			5-4-4-7 N=8	3	X	○			
	25			12	16		3-3-3-4 N=6	22		○	X			
	26			13	16		3-2-0-0 N=2	24		○	X			
	27			14	12		2-5-10-6 N=15	18		○	X			



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
PROJECT: Proposed Prairie du Chien Public Safety Bldg
LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/16/24
DATE COMPLETED: 4/16/24
COMPLETION DEPTH: 25.0 ft
BENCHMARK: N/A
ELEVATION: 639 ft
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS:

DRILL COMPANY: Groundbreaking Exploration
DRILLER: Jonathan **LOGGED BY:** Wilber
DRILL RIG: ATV
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: 2-in SS
HAMMER TYPE: Automatic
EFFICIENCY: N/A
REVIEWED BY:

BORING B-2

Water
 ∇ While Drilling 22 feet
 ▾ Upon Completion Not Obsvd
 ▽ Delay N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
									N in blows/ft	Moisture, %	
0	0			1	24	Fill, Black Silty Clay Loam, Moist		2-3-4-4 N=7	9	⊗	
				2	10	Fill, Very Dark Brown Silty Clay Loam, Moist		3-3-3-4 N=6	13	⊗	
635	5			3	18	Fill, Very Dark Grayish Brown Silty Clay Loam, Moist		4-5-8-12 N=13	13	⊗	* Q _r = 1.1 tsf
				4	10	Fill, Brown Sandy Loam, Moist		50/3"	7	×	>> ⊗
630	10			5	10			62/8"	6	×	>> ⊗
				6	6			50/5"	5	×	>> ⊗
				7	0	Dark Brown Gravelly Sandy Loam, Moist		50/1"	6	×	>> ⊗
625	15			8	15			9-9-11-16 N=20	3	×	
				9	16	Brown Gravelly Sandy Loam, Moist to Wet		3-6-5-5 N=11	3	⊗	
620	20			10	24			3-3-4-6 N=7	12	⊗	
				11	18			2-3-3-4 N=6	4	⊗	
615	25			12	16			3-4-3-4 N=7	15	⊗	
				13	18			2-3-4-4 N=7	26	⊗	
						End of Boring at 25'					
						Cave-In at 10'					



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
PROJECT: Proposed Prairie du Chien Public Safety Bldg
LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/16/24
 DATE COMPLETED: 4/16/24
 COMPLETION DEPTH: 15.0 ft
 BENCHMARK: N/A
 ELEVATION: 639 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-3

Water	▽	While Drilling	Not Obsvd
	∇	Upon Completion	Not Obsvd
	∇	Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks	
									N in blows/ft ⊙					
									Moisture, %					
									×	⊙	■	+		
									STRENGTH, tsf					
									▲	*				
0						Topsoil, Dark Brown Silt, Fine Sand, Moist (10"± Thick)	TPSL		6	×				
				1	16	Brown Medium to Coarse Sand and Gravel, Moist	SP	3-4-4 N=8	3	×	⊙			
				2	18	Brown Fine to Medium Sand, Trace Gravel, Moist	SP	2-3-4 N=7	5	×	⊙			
635				3	18	Brown Fine to Coarse Sand, Trace to With Gravel, Moist		3-3-3 N=6	4	×	⊙			
				4	18	Brown Fine to Coarse Sand, Trace to With Gravel, Moist	SP	3-3-5 N=8	4	×	⊙			
630				5	18	Brown Fine to Coarse Sand, Trace to With Gravel, Moist		3-4-4 N=8	3	×	⊙			
625						End of Boring at 15'								
						Cave-In at 9'								



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/15/24
 DATE COMPLETED: 4/15/24
 COMPLETION DEPTH: 15.0 ft
 BENCHMARK: N/A
 ELEVATION: 639 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-4

Water	▽	While Drilling	Not Obsvd
	∇	Upon Completion	Not Obsvd
	∇	Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks		
									N in blows/ft ⊙						
									Moisture, %						
									×	⊙	■	⊕			
									STRENGTH, tsf						
									▲	⊙	*	⊙			
0						Topsoil Fill, Dark Brown Silty Stone Sand, Moist (12"± Thick)	TPSL FILL		7	×					
				1	16	Fill, Brown Fine to Medium Sand and Gravel, Possible Concrete and Brick Fragments, Moist	FILL	3-3-4 N=7	5	⊙					
635				2	6	Brown Medium Sand, With to Trace Gravel, Moist to Very Moist	SP	2-3-4 N=7	6	⊙					
5				3	18				5	⊙					
630				4	18				2	×	⊙				
625				5	16			4-4-4 N=8	3	×	⊙				
						End of Boring at 15'									
						Cave-In at 9'									



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/16/24
 DATE COMPLETED: 4/16/24
 COMPLETION DEPTH: 15.0 ft
 BENCHMARK: N/A
 ELEVATION: 638 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-5

Water:
 ▽ While Drilling Not Obsvd
 ▾ Upon Completion Not Obsvd
 ▿ Delay N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA		Additional Remarks
									N in blows/ft @		
									Moisture, %		
									STRENGTH, tsf		
									×	Moisture	▣ PL
									⊙		▣ LL
									▲ Qu	*	Qp
									0	25	50
									0	2.0	4.0
638	0	Topsoil Fill				Topsoil Fill, Dark Brown Silty Fine Sand, Moist (12"± Thick)	TPSL FILL		6	×	
635	3	Fill		1	18	Fill, Dark Brown Sand and Gravel, Trace Silt, Moist	FILL	3-5-6 N=11	12	⊙	
635	6	Brown Fine to Medium Sand		2	18	Brown Fine to Medium Sand, Trace Gravel, Moist	SP	3-6-6 N=12	5	×	⊙
630	9	Brown Fine to Medium Sand		3	18	Brown Fine to Medium Sand, Trace Gravel, Moist		3-3-3 N=6	4	×	⊙
630	12	Brown Fine to Medium Sand		4	12	Brown Fine to Medium Sand, Trace Gravel, Moist		3-3-8 N=11	4	×	⊙
625	15	Brown Fine to Coarse Sand		5	18	Brown Fine to Coarse Sand, Possible Gravel, Very Moist		3-3-3 N=6	5	×	⊙
						End of Boring at 15'					
						Cave-In at 9'					



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/16/24
 DATE COMPLETED: 4/16/24
 COMPLETION DEPTH: 30.0 ft
 BENCHMARK: N/A
 ELEVATION: 639 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-6

Water:
 ▽ While Drilling: 23.5 feet
 ▾ Upon Completion: Not Obsvd
 ▿ Delay: N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0		Fill, Brown Sand and Gravel, Possible Brick Fragments, Moist (36"± Thick)		1	18	FILL	5-6-8 N=14	5	×	⊙	
635	5	Brown Fine to Medium Sand, Trace to With Gravel, Moist		2	18	SP	3-4-8 N=12	6	×	⊙	
				3	18		3-4-4 N=8	3	×	⊙	
630	10			4	18		3-3-4 N=7	3	×	⊙	
625	15			5	18		3-4-4 N=8	4	×	⊙	
620	20	Brown Fine to Medium Sand, Trace Clay, Moist		6	18	SP	3-4-5 N=9	3	×	⊙	
615	25	Brown Fine to Coarse Sand, Trace Gravel, Moist to Wet		7	18	SP	2-2-3 N=5	6	×	⊙	
610	30	End of Boring at 30' Cave-In at 15'		8	18		4-5-7 N=12	21	×	⊙	



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

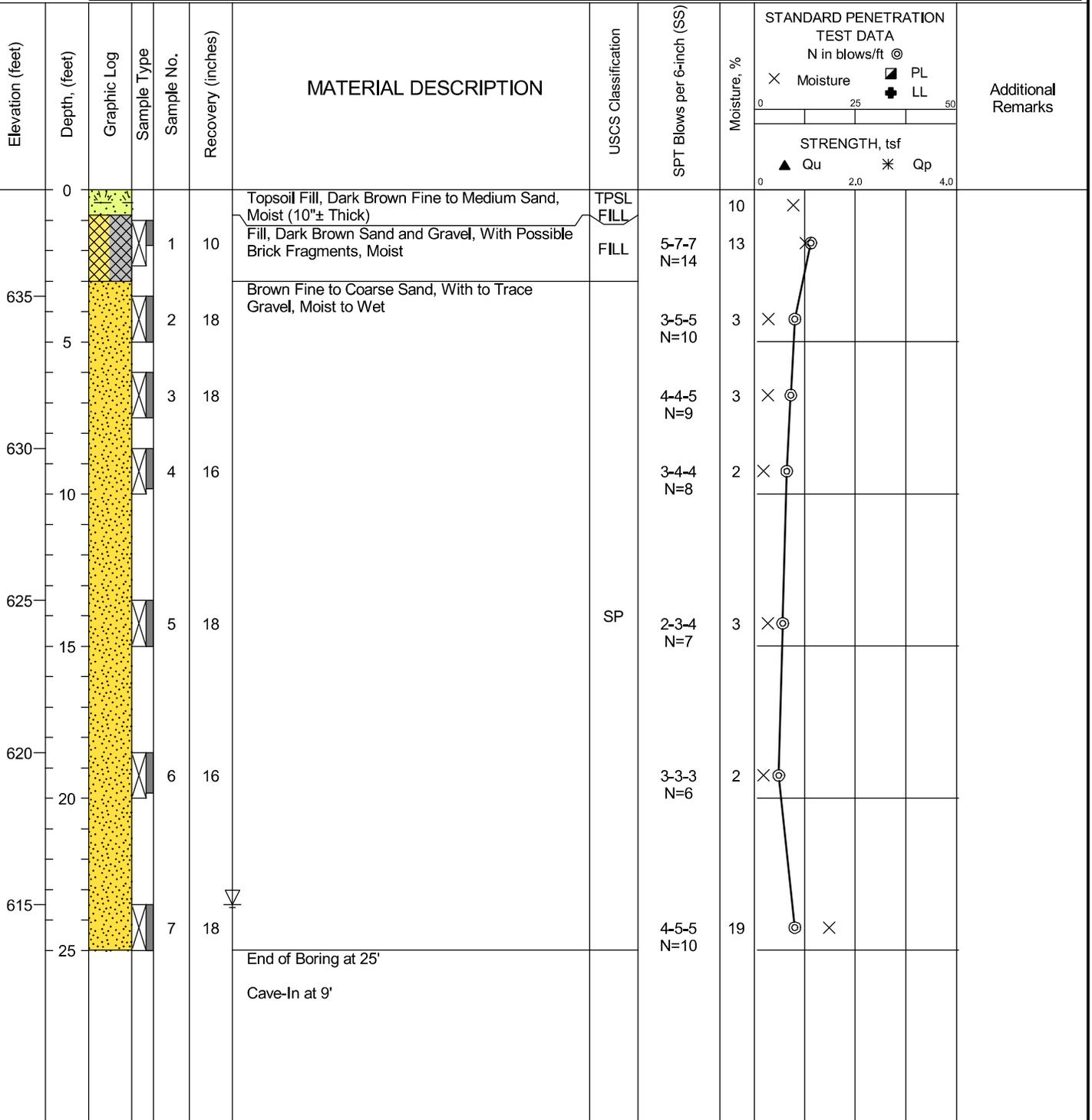
PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/15/24 **DRILL COMPANY:** Groundbreaking Exploration
DATE COMPLETED: 4/15/24 **DRILLER:** Jonathan **LOGGED BY:** Wilber
COMPLETION DEPTH: 25.0 ft **DRILL RIG:** ATV
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: 638.5 ft **SAMPLING METHOD:** 2-in SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:**

BORING B-7

Water
 ▽ While Drilling 23.5 feet
 ▾ Upon Completion Not Obsvd
 ▾ Delay N/A

BORING LOCATION:



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
PROJECT: Proposed Prairie du Chien Public Safety Bldg
LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/15/24
 DATE COMPLETED: 4/15/24
 COMPLETION DEPTH: 25.0 ft
 BENCHMARK: N/A
 ELEVATION: 639 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-8

Water	▽ While Drilling	23.5 feet
	▽ Upon Completion	Not Obsvd
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks			
									N in blows/ft		Moisture, %					
0						Topsoil Fill, Dark Brown Silty Fine Sand, Moist (12"± Thick)	TPSL FILL									
				1	12	Fill, Dark Brown Silty Fine to Coarse Sand and Trace Gravel, Possible Brick Fragments, Moist	FILL	3-2-1 N=3	7	×						
635	5			2	18	Brown Fine to Coarse Sand, Trace to With Gravel, Moist to Wet	SP	3-3-4 N=7	6	⊗						
				3	18			3-4-4 N=8	4	⊗						
630	10			4	18			4-4-5 N=9	6	⊗						
				5	18			4-6-6 N=12	2	×	⊗					
625	15			6	18			3-4-5 N=9	3	×	⊗					
620	20			7	18			3-5-5 N=10	3	×	⊗					
615	25				18				22		⊗	×				
						End of Boring at 25' Cave-In at 10'										



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/16/24
 DATE COMPLETED: 4/16/24
 COMPLETION DEPTH: 25.0 ft
 BENCHMARK: N/A
 ELEVATION: 638 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

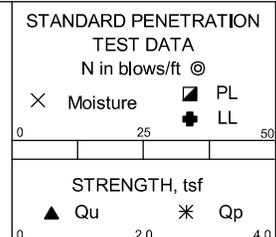
DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-9

Water: ∇ While Drilling 23.5 feet
 ∇ Upon Completion Not Obsvd
 ∇ Delay N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0					Topsoil, Dark Brown Silty Fine Sand, Moist (5"± Thick)	TPSL				
635	5			1	18	Brown Fine to Coarse Sand, Trace to With Gravel, Moist		3-4-6 N=10	4		
	10			2	18			2-3-5 N=8	4		
630	15			3	18			2-3-3 N=6	5		
	20			4	18			3-3-4 N=7	3		
625	25			5	18		SP	3-3-4 N=7	3		
620	30			6	18			3-4-6 N=10	3		
615	35			7	18			3-5-6 N=11	19		
25	25					End of Boring at 25' Cave-In at 10'					



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

DATE STARTED: 4/15/24
 DATE COMPLETED: 4/15/24
 COMPLETION DEPTH: 25.0 ft
 BENCHMARK: N/A
 ELEVATION: 638 ft
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Groundbreaking Exploration
 DRILLER: Jonathan LOGGED BY: Wilber
 DRILL RIG: ATV
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: 2-in SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY:

BORING B-10

Water	▽ While Drilling	23.5 feet
	▽ Upon Completion	Not Obsvd
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	STANDARD PENETRATION TEST DATA				Additional Remarks	
									N in blows/ft		Moisture, %			
0	0	Topsoil Fill, Dark Brown Silty Fine to Medium Sand (5"± Thick)		1	16	Fill, Dark Brown Silty Fine to Coarse Sand and Gravel, Brick and Wood Fragments, Very Moist	TPSL FILL	3-3-3 N=6	7	×	⊙			
635	5	Brown Fine to Coarse Sand, Trace Gravel, Moist to Wet		2	18			3-4-6 N=10	4	×	⊙			
630	10			3	18			2-3-3 N=6	5	×	⊙			
625	15			4	18			3-4-7 N=11	5	×	⊙			
620	20			5	18		SP	3-3-4 N=7	3	×	⊙			
615	25			6	18			3-3-4 N=7	2	×	⊙			
				7	18	End of Boring at 25' Cave-In at 7'		4-4-5 N=9	18		⊙	×		



Professional Service Industries, Inc.
 821 Corporate Court, Suite 100
 Waukesha, WI 53189
 Telephone: (262) 521-2125

PROJECT NO.: 00523381
 PROJECT Proposed Prairie du Chien Public Safety Bldg
 LOCATION: NEC of E. Taylor St. & S. Dousman St.
 Prairie du Chien, WI

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.	☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
HSA: Hollow Stem Auger - typically 3 1/4" or 4 1/4" I.D. openings, except where noted.	■ ST: Shelby Tube - 3" O.D., except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry	▮ RC: Rock Core
R.C.: Diamond Bit Core Sampler	⬇ TC: Texas Cone
H.A.: Hand Auger	☞ BS: Bulk Sample
P.A.: Power Auger - Handheld motorized auger	☒ PM: Pressuremeter
	CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N ₆₀ : A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q _u : Unconfined compressive strength, TSF
Q _p : Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL), %
DD: Dry unit weight, pcf
▼, ▼, ▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Relative Density</u>	<u>N - Blows/foot</u>
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

<u>Description</u>	<u>Criteria</u>
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

<u>Component</u>	<u>Size Range</u>
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

<u>Description</u>	<u>Criteria</u>
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

<u>Q_u - TSF</u>	<u>N - Blows/foot</u>	<u>Consistency</u>
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

<u>Description</u>	<u>Criteria</u>
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

<u>Description</u>	<u>Criteria</u>	<u>Description</u>	<u>Criteria</u>
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick	Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick	Lensed:	Inclusion of small pockets of different soils
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing	Layer:	Inclusion greater than 3 inches thick (75 mm)
Slickensided:	Fracture planes appear polished or glossy, sometimes striated	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
		Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

<u>Q_u - TSF</u>	<u>Consistency</u>
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

<u>Description</u>	<u>Criteria</u>
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

<u>Voids</u>	<u>Void Diameter</u>
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

<u>Component</u>	<u>Size Range</u>
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

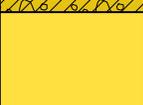
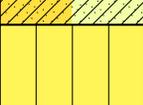
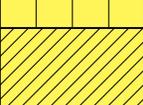
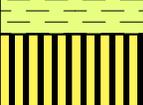
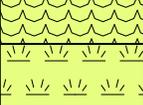
<u>Rock Mass Description</u>	<u>RQD Value</u>
Excellent	90 - 100
Good	75 - 90
Fair	50 - 75
Poor	25 - 50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

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

SOIL EVALUATION - STORM

In accordance with SPS 382.365 & 385, Wis. Adm. Code and WDNR Standard 1002

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road. <p style="text-align: center;">Please print all information.</p> Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04 (1) (m)].				County	
				Crawford	
				Parcel I.D.	
Reviewed by:					
Date:					
Property Owner		Property Location: Prairie du Chien, WI			
Property Owner's Mailing Address		Govt. Lot			
		Lot #	Block #		
		Subd. Name or CSM#			
City	State	Zip Code	Phone Number		
		<input checked="" type="checkbox"/> City	<input type="checkbox"/> Village <input type="checkbox"/> Town		
		Nearest Road			
		Prairie du Chien			
Drainage area _____ <input type="checkbox"/> sq. ft. <input type="checkbox"/> acres		Hydraulic Application Test Method:			
Optional:		<input checked="" type="checkbox"/> Morphological Evaluation			
Test Site Suitable for (check all that apply)		<input type="checkbox"/> Double Ring Infiltrometer			
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Bioretention trench	<input type="checkbox"/> Trench(es)			
<input type="checkbox"/> Rain Garden	<input type="checkbox"/> Grassed swale	<input type="checkbox"/> Reuse			
<input type="checkbox"/> Infiltration trench	<input type="checkbox"/> SDS (> 15' wide)	<input type="checkbox"/> Other _____			
		Soil Moisture			
		Date of Borings: April 16, 2024			
		USDA-NRCS WETS Value: 11			
		<input type="checkbox"/> Dry = 1;			
		<input checked="" type="checkbox"/> Normal = 2;			
		<input type="checkbox"/> Wet = 3.			

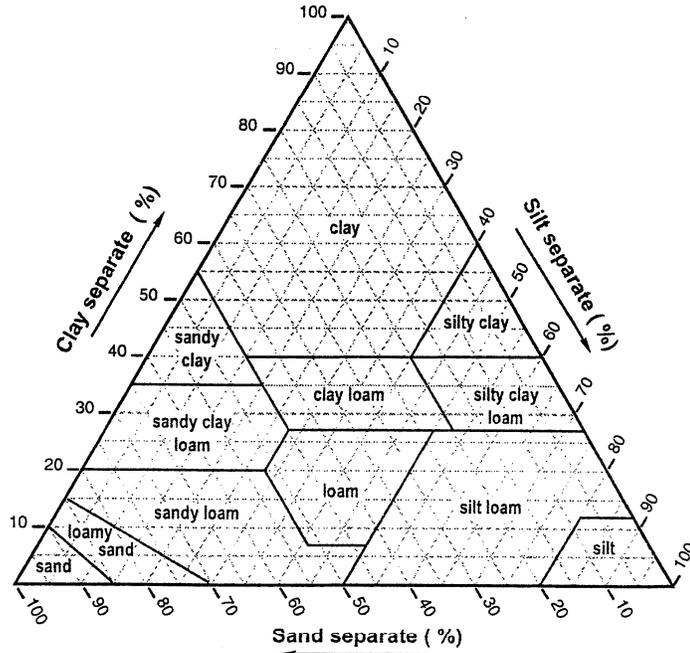
1	Obs. #	<input checked="" type="checkbox"/> Boring	B-1	Ground surface elevation ±	Elevation of limiting factor: 22'±					
		<input type="checkbox"/> Pit								
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-48	10YR 2/2		grls	0 m	mfr		>15		1.63
2	48-96	10YR 3/3		s	0 sg	ml		<15		3.6
3	96-138	10YR 6/2		vgrf-ms	0 sg	ml		>35		3.6
4	138-216	10YR 3/3		ms	0 sg	ml		<15		3.6
5	216-324	10YR 4/3		f-ms	0 sg	ml		<15		3.6
Comment: fill soils with miscellaneous debris to 11.5 feet below grade; saturated soils at 22 feet below grade										

2	Obs. #	<input checked="" type="checkbox"/> Boring	B-2	Ground surface elevation ±	Elevation of limiting factor: 22'±					
		<input type="checkbox"/> Pit								
Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr.
1	0-24	10YR 2/1		sicl	0 thin pl	mfi		<14		-0.96
2	24-48	10YR 2/2		sicl	1 thin pl	mfi		<15		0.04
3	48-72	10YR 3/2		sic	1 f sbk	mfi		<15		0.07
4	72-144	10YR 5/3		sl	1 f sbk	mfr		<15		0.5
5	144-168	10YR 3/3		grsl	1 f sbk	mfr		>15		0.5
6	168-192	10YR 3/3		grsl	2 f sbk	mfr		>16		1.5
7	192-240	10YR 4/3		grsl	3 f sbk	mfr		>17		2.5
8	240-264	10YR 4/3		grsl	4 f sbk	mfr		>18		3.5
9	264-300	10YR 3/3		grsl	5 f sbk	mfr		>19		4.5
Comment: fill soils with miscellaneous debris to 12.5 feet below grade; saturated soils at 22 feet below grade										

CST/PSS Name (Please Print)	Signature	CST/PSS/Geologist Number
Patrick J. Patterson		G-229
Address	Date Evaluation Conducted	Telephone Number
821 Corporate Court, Waukesha, WI 53189	4/16/2024	262 521 2125

Texture Triangle:

Fine Earth Texture Classes (————)



TEXTURE MODIFIERS - Conventions for using "Rock Fragment Texture Modifiers" and for using textural adjectives that convey the "% volume" ranges for Rock Fragments - Size and Quantity.

Fragment Content % By Volume	Rock Fragment Modifier Usage
< 15	No texture adjective is used (noun only; e.g., <i>loam</i>).
15 to < 35	Use adjective for appropriate size; e.g., <i>gravelly</i> .
35 to < 60	Use "very" with the appropriate size adjective; e.g., <i>very gravelly</i> .
60 to < 90	Use "extremely" with the appropriate size adjective; e.g., <i>extremely gravelly</i> .
≥ 90	No adjective or modifier. If ≤ 10% fine earth, use the appropriate noun for the dominant size class; e.g., <i>gravel</i> . Use Terms in Lieu of Texture.

(SOIL) TEXTURE

This is the numerical proportion (percent by weight) of sand, silt, and clay in a soil. Sand, silt, and clay content is estimated in the field by hand (or quantitatively measured in the office/lab by hydrometer or pipette) and then placed within the texture triangle to determine **Texture Class**. Estimate the **Texture Class**; e.g., *sandy loam*; or **Subclass**; e.g., *fine sandy loam* of the fine earth (≤ 2 mm) fraction, or choose a **Term in Lieu of Texture**; e.g., *gravel*. If appropriate, use a **Textural Class Modifier**; e.g., *gravelly silt loam*.

NOTE: Soil Texture encompasses only the fine earth fraction (≤ 2 mm). **Particle Size Distribution (PSD)** encompasses the whole soil, including both the fine earth fraction (≤ 2 mm; weight %) and rock fragments (> 2 mm; volume %).

TEXTURE CLASS

Texture Class or Subclass	Code	
	Conv.	NASIS
Coarse Sand	cos	COS
Sand	s	S
Fine Sand	fs	FS
Very Fine Sand	vfs	VFS
Loamy Coarse Sand	lcos	LCOS
Loamy Sand	ls	LS
Loamy Fine Sand	lfs	LFS
Loamy Very Fine Sand	lvfs	LVFS
Coarse Sandy Loam	cosl	COSL
Sandy Loam	sl	SL
Fine Sandy Loam	fsl	FSL
Very Fine Sandy Loam	vfsl	VFSL
Loam	l	L
Silt Loam	sil	SIL
Silt	si	SI
Sandy Clay Loam	scl	SCL
Clay Loam	cl	CL
Silty Clay Loam	sicl	SICL
Sandy Clay	sc	SC
Silty Clay	sic	SIC
Clay	c	C

TEXTURE MODIFIERS - (adjectives)

ROCK FRAGMENTS: Size & Quantity ¹	Code		Criteria: Percent (By Volume) of Total Rock Fragments and Dominated By (name size): ¹
	Conv.	PDP/NASIS	
ROCK FRAGMENTS (> 2 mm; ≥ Strongly Cemented)			
Gravelly	GR	GR	≥ 15% but < 35% gravel
Fine Gravelly	FGR	GRF	≥ 15% but < 35% fine gravel
Medium Gravelly	MGR	GRM	≥ 15% but < 35% med. gravel
Coarse Gravelly	CGR	GRC	≥ 15% but < 35% coarse gravel
Very Gravelly	VGR	GRV	≥ 35% but < 60% gravel
Extremely Gravelly	XGR	GRX	≥ 60% but < 90% gravel
Cobbly	CB	CB	≥ 15% but < 35% cobbles
Very Cobbly	VCB	CBV	≥ 35% but < 60% cobbles
Extremely Cobbly	XCB	CBX	≥ 60% but < 90% cobbles
Stony	ST	ST	≥ 15% but < 35% stones
Very Stony	VST	STV	≥ 35% but < 60% stones
Extremely Stony	XST	STX	≥ 60% but < 90% stones
Bouldery	BY	BY	≥ 15% but < 35% boulders
Very Bouldery	VBY	BYV	≥ 35% but < 60% boulders
Extremely Bouldery	XBY	BYX	≥ 60% but < 90% boulders
Channery	CN	CN	≥ 15% but < 35% channers
Very Channery	VCN	CNV	≥ 35% but < 60% channers
Extremely Channery	XCN	CNX	≥ 60% but < 90% channers
Flaggy	FL	FL	≥ 15% but < 35% flagstones
Very Flaggy	VFL	FLV	≥ 35% but < 60% flagstones
Extremely Flaggy	XFL	FLX	≥ 60% but < 90% flagstones
PARAROCK FRAGMENTS (> 2 mm; < Strongly Cemented) ^{2, 3}			
Parabouldery	PBY	PBY	(same criteria as bouldery)
Very Parabouldery	VPBY	PBYV	(same criteria as very bouldery)
Extr. Parabouldery	XPBY	PBYX	(same criteria as ext. bouldery)
etc.	etc.	etc.	(same criteria as non-para)

¹ The "Quantity" modifier (e.g., *very*) is based on the total rock fragment content. The "Size" modifier (e.g., *cobbly*) is independently based on the largest, dominant fragment size. For a mixture of sizes (e.g., *gravel and stones*), a smaller size-class is named only if its quantity (%) sufficiently exceeds that of a larger size-class. For field texture determination, a smaller size-class must exceed 2 times the quantity (vol. %) of a larger size class before it is named (e.g., 30% gravel and 14% stones = *very gravelly*, but 20% gravel and 14% stones = *stony*). For more explicit naming criteria see NSSH-Part 618, Exhibit 618.11(Soil Survey Staff, 2001b).