

**GEOTECHNICAL ENGINEERING REPORT**

**Proposed Walmart Expansion #2403  
310 31st Avenue Southeast  
Puyallup, Washington 98374  
PSI Project No. 07041419 R1**

**PREPARED FOR:**

**Wal-Mart Real Estate Business Trust  
Bentonville, Arkansas  
c/o Galloway and Company Inc.  
Greenwood Village, Colorado**

**December 6, 2024**

**BY:**

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SUBJECT: **Geotechnical Engineering Report**  
WALMART STORE 2403 EXPANSION  
310 31ST AVENUE SOUTHEAST  
PUYALLUP, WASHINGTON  
PSI REPORT NUMBER 07041419 R1

Professional Service Industries, Inc. (PSI), an Intertek company, is pleased to submit the revised Geotechnical Engineering Report for the referenced project. This consolidated report includes the following components:

- Original Geotechnical Engineering Report, dated October 20, 2021.
- Addendum 1 - Pavement Analysis, dated November 1, 2021.
- Supplemental Geotechnical Consultation - Bioretention Infiltration, dated December 5, 2022.

This revised version addresses desk audit comments from Maggie Corder's email dated November 25, 2024, on behalf of Walmart Real Estate Business Trust, consolidating the above reports into a cohesive document. It streamlines information, incorporates audit feedback, and updates recommendations for design and construction purposes. PSI appreciates the opportunity to contribute to this project and remains available for materials testing, inspection services, and further assistance during construction.

If you have any questions or require further assistance, please do not hesitate to contact us at your convenience.

Respectfully submitted,  
**Professional Services Industries, Inc.**



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## TABLE OF CONTENTS

**Electronic Navigation:** The TOC below and **Keywords** are hyperlinked to sections of relevance. The  Symbol will return the reader to the TOC.

|  | Page No. |
|--|----------|
| 1.0 Project Information.....                               | 1        |
| 1.1 Project Authorization.....                             | 1        |
| 1.2 Project Description .....                              | 1        |
| 2.0 Site and Subsurface Conditions .....                   | 2        |
| 2.1 Site Description.....                                  | 2        |
| 2.2 Site Geology .....                                     | 2        |
| 2.3 Topography.....  | 2        |
| 2.4 Faulting .....   | 2        |
| 2.5 Lurching and Shallow Ground Rupture .....              | 2        |
| 2.6 Landslides and Slope Stability.....                    | 2        |
| 2.7 Field Exploration and Laboratory Testing Program ..... | 2        |
| 2.8 Subsurface Conditions.....                             | 3        |
| 2.9 Seismic Design Parameters.....                         | 3        |
| 3.0 Geotechnical Conclusions and Recommendations .....     | 5        |
| 3.1 Geotechnical Discussion .....                          | 5        |
| 3.2 Liquefaction Potential.....                            | 5        |
| 3.3 Site Preparation .....                                 | 5        |
| 3.4 Earthwork .....  | 6        |
| 3.5 Foundations .....                                      | 8        |
| 3.6 Floor Slabs.....                                       | 9        |
| 3.7 Bioretention Infiltration.....                         | 10       |
| 3.8 Pavement Design .....                                  | 10       |
| 3.9 Plan Review and Construction Observation.....          | 12       |
| 4.0 Geotechnical Risk and Report Limitations.....          | 13       |

- FIGURES**      Site Vicinity Map
- Boring Location Plan
- APPENDIX A**    Field Exploration & Laboratory Testing Program
- APPENDIX B**    Geotechnical Engineering Fact Sheet



## INDEX OF TABLES

|  | Page No. |
|--|----------|
| Table 2.1: Field Exploration Summary .....                   | 2        |
| Table 2.2: Seismic design parameter.....                     | 4        |
| Table 3.1: Compaction Criteria and Testing Frequency.....    | 6        |
| Table 3.2: Pavement Design Parameters .....                  | 11       |
| Table 3.3: Estimated Flexible Pavement Section Options ..... | 11       |
| Table 3.4: Estimated Rigid Pavement Section Options.....     | 11       |



## **1.0 PROJECT INFORMATION**

### **1.1 PROJECT AUTHORIZATION**

This revised report presents the results of PSI's geotechnical investigation for the proposed Walmart Store #2403 expansion, located at 310 31st Avenue Southeast in Puyallup, Washington as shown in the Site Vicinity Map presented in Figure 1. The original geotechnical investigation was conducted in accordance with PSI proposal number 0704-353378, dated September 5, 2021, with project authorization provided by Mr. Ryan James of Galloway in an email dated September 10, 2021.

This consolidated report integrates findings from the original investigation (October 20, 2021), Addendum 1 - Pavement Analysis (November 1, 2021), and the Supplemental Geotechnical Consultation for Bioretention Infiltration (December 5, 2022), as part of a desk audit revision requested by Walmart Real Estate Business Trust.

### **1.2 PROJECT DESCRIPTION**

Project information was provided by Mr. Ryan James in an email dated September 3, 2021. The provided documentation includes a utility plan titled "Walmart, Puyallup, WA," prepared by Pacland and dated June 30, 2005.

PSI understands that the proposed improvements at the existing Walmart store will include a 3,500-square-foot addition supported on shallow foundations located at the southwest corner of the existing Walmart Superstore. Although the planned structural loads were not provided, based on similar projects, PSI estimates column loads to range less than 100 kips and wall loads to be approximately 1.5 kips per linear foot. The ground floor will remain at grade and is expected to consist of a reinforced concrete slab with floor loads of less than 150 psf.

Should any discrepancies arise between the information provided and the actual construction plans, PSI requests immediate notification to allow for any necessary modifications to this report. PSI will not be held responsible for changes to the project scope or design if not provided the opportunity to review and revise the recommendations accordingly.



## 2.0 SITE AND SUBSURFACE CONDITIONS

### 2.1 SITE DESCRIPTION

The site is located at 310 31st Avenue Southeast in Puyallup, Washington. It consists of a single parcel that contains Walmart Store #2403 and its associated parking and drive lanes. The site is bound on all sides by commercial and residential properties. Highway 512 is located to the west and Bradley Lake is located to the east.

### 2.2 SITE GEOLOGY

According to the USGS Geologic Map of Washington State, the area is underlain by Pleistocene glacial recessional outwash, comprising silt, clay, sand, and gravel.

### 2.3 TOPOGRAPHY

Based on The National Map developed by the United States Geological Survey, the property for the existing Walmart is relatively flat, at an elevation of about 440 to 443 feet (NAVD88). In the location of the proposed addition, the elevation is approximately 443 feet.

### 2.4 FAULTING

PSI has reviewed the USGS Quaternary Fault and Fold Database of the United States, and the following have been mapped within about 15 miles of the project site. Tacoma Fault Zone with 6.3 miles to the North

### 2.5 LURCHING AND SHALLOW GROUND RUPTURE

No evidence of active fault rupture was observed during subsurface exploration, and no faults are mapped crossing the site. Therefore, the potential for ground rupture from faulting is considered low..

### 2.6 LANDSLIDES AND SLOPE STABILITY

Seismically induced land sliding is not considered a hazard on or adjacent to the project site due to the absence of significant steep slopes in or around the project area.

### 2.7 FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

In line with PSI proposal number 0704-353378 and correspondence with Mr. Ryan James, the exploration aimed to assess subsurface conditions and develop geotechnical foundation design criteria for the proposed addition. The scope included site reconnaissance, two test borings using hollow stem auger drilling methods, laboratory testing of collected samples, engineering analysis of subsurface materials, and preparation of this report. Figure 2 shows the locations of these soil borings and the proposed improvements.

**TABLE 2.1: FIELD EXPLORATION SUMMARY**

| Design Element    | Boring Designation | Boring Depth (ft) |
|-------------------|--------------------|-------------------|
| Proposed Addition | B1                 | 25                |
|                   | B2                 | 25                |



Sampling procedures were performed in general accordance with ASTM D1586 (Standard Penetration Test). Detailed methodologies for the field exploration are presented in Appendix A. Soil samples were identified on-site, placed in sealed containers, and transported to the laboratory for classification and testing. Upon completion of drilling, the boreholes were backfilled with bentonite chips to comply with site restoration and safety standards.

Boring locations were selected by PSI personnel and positioned in the field using a recreational-grade GPS system. However, elevations of the ground surface at the boring locations were not provided and should be surveyed by others before construction. Depths and elevations of subsurface strata discussed in this report are referenced to the existing grade at the time of drilling. Approximate boring locations are illustrated in the Boring Location Plan provided in Figure 2.

To supplement the field exploration, PSI conducted a laboratory testing program to evaluate additional engineering characteristics of the subsurface soils. Laboratory testing adhered to applicable ASTM standards and is detailed in Appendix A. Portions of samples not altered or consumed during laboratory testing will be retained for three months from the date of this report before being discarded.

## 2.8 SUBSURFACE CONDITIONS

A detailed description of the Field Exploration Program can be found in Appendix A. Laboratory test results are presented on the exploration logs and in detail in Appendix B.

The field exploration revealed approximately 3 inches of asphalt overlying 3 inches of aggregate base rock at borings B1 and B2. Subsurface materials primarily consist of poorly graded gravelly sand with trace silt, exhibiting medium dense to very dense relative densities and moisture contents ranging from 7% to 29%. In boring B1, this sand extended to the termination depth of 26.5 feet. In boring B2, poorly graded sandy gravel with trace silt was encountered at 20 feet below ground surface, extending to the termination depth of 26.5 feet.

## 2.9 SEISMIC DESIGN PARAMETERS

We understand that the project is governed by the International Building Code (IBC), 2021 edition. As part of this code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event as well as the properties of the soil that underlie the site.

As part of the procedure to evaluate seismic forces, the code requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper 100 feet of the ground surface. Our borings extended to a depth of about 25 feet below ground surface (bgs), but to define the Site Class for this project, we have interpreted the results of soil test borings drilled within the project site and estimated appropriate soil properties below the base of the borings to a depth of 100 feet as permitted by the code. The estimated soil properties were based upon the soils encountered at the site, data available in published geologic reports, and our experience with subsurface conditions in the general site area.

Based upon our evaluation, the subsurface conditions at the site are consistent with the characteristics of a **Site Class "D"** as defined in Chapter 20.3.3 of the ASCE 7-16. The associated probabilistic ground acceleration values and site coefficients for the general site area were obtained from the USGS geohazards web page (<https://seismicmaps.org/>) using the **ASCE 7-16** option and are presented in the table below.



**TABLE 2.2: SEISMIC DESIGN PARAMETERS**

| Period (sec) | Mapped MCE Spectral Response Acceleration (g) |       | Site Coefficients    |     | Adjusted MCE <sub>R</sub> Spectral Response Acceleration (g) |       | Design Spectral Response Acceleration (g) |       |
|--------------|---|-------|----------------------|-----|--|-------|---|-------|
|              | <i>S<sub>s</sub></i>                          |       | <i>F<sub>a</sub></i> |     | <i>S<sub>M<sub>s</sub></sub></i>                             |       | <i>S<sub>D<sub>s</sub></sub></i>          |       |
| 0.2          |   | 1.261 |                      | 1.2 |  | 1.513 |   | 1.009 |
| 1.0          | <i>S<sub>1</sub></i>                          | 0.435 | <i>F<sub>v</sub></i> | *   | <i>S<sub>M<sub>1</sub></sub></i>                             | *     | <i>S<sub>D<sub>1</sub></sub></i>          | *     |

2% Probability of Exceedance in 50 years for Latitude, Longitude: (47.161044°, 122.28875°)

MCE<sub>R</sub> = Maximum Considered Earthquake

\* Section 11.4.8

The Site Coefficients referring to ASCE 7-16 Section 11.4.8 require the structural engineer to apply appropriate calculations as needed. The design of structures should comply with the requirements of the governing justification's building codes and standard practices of the Structural Engineering Association of Washington.



## **3.0 GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS**

### **3.1 GEOTECHNICAL DISCUSSION**

The results of field and supplemented laboratory tests indicate the presence of two distinct soil strata at the drilled locations. Should changes in the project criteria occur, a review must be made by PSI to determine if modifications to our recommendations will be required.

*The following geotechnical design recommendations have been developed based on the previously described project characteristics and subsurface conditions encountered. The proposed construction should be performed in accordance with these recommendations and the applicable building code, and local governmental standards which have jurisdiction over this project. If there are changes in the project criteria, PSI should be retained to determine if modifications in the recommendations will be required. The findings of such a review would be presented in a supplemental report. Once final design plans and specifications are available, a general review by PSI is recommended to confirm that the conditions anticipated in preparing this geotechnical report are consistent with the earthwork and foundation recommendations contained within the construction documents.*

### **3.2 LIQUEFACTION POTENTIAL**

Soil liquefaction typically occurs in saturated, loose to medium dense cohesionless soils, and in clays and silts with low plasticity indexes, especially where groundwater is relatively shallow (within 50 feet of the ground surface). During an earthquake, ground shaking can increase porewater pressure, leading to a decrease in soil bearing strength and potential ground surface settlement.

According to the Washington State Department of Natural Resources, the Puyallup area has varying degrees of liquefaction susceptibility, with certain areas, such as the abandoned channels of the Puyallup River and Wapato Creek, being particularly susceptible and having liquefied in past earthquakes.

However, based on the subsurface information collected at the project site, the potential for soil liquefaction is considered low, and it is not a design consideration for this project.

### **3.3 SITE PREPARATION**

PSI recommends that organics, loose, and otherwise unsuitable soils at the project site be stripped and removed from the building areas. Buried piping, where encountered, must be completely removed and rerouted from below proposed building foundations. Concrete structures and remnants of previous structures encountered during site excavation and site construction operations should be completely removed beneath the planned foundations and replaced with an engineered fill.

After the surficial materials have been stripped and completely removed from proposed development areas, PSI should observe the subgrade to identify any loose or unsuitable areas. Where organic, loose, or otherwise unsuitable soils are identified, within structural areas of the project, these soils should be completely removed and replaced with structural fill.



### 3.4 EARTHWORK

#### 3.4.1 MOISTURE SENSITIVE SOILS / WEATHER RELATED CONCERNS

The soil encountered at this site are expected to be sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundations construction activities during dry weather.

If grading occurs in a period of increased rainfall, unstable subgrade conditions may be present. These conditions may require stabilizing the subgrade with admixtures, such as cement kiln dust or a coarse aggregate. Isolated areas may be stabilized using a separation fabric with one-foot compacted aggregate base over the geogrid. Additional recommendations can be provided, as required, during construction.

#### 3.4.2 PROOF ROLLING

After site preparation and over-excavation, newly exposed subgrades in areas intended for structures and pavements must be approved by the Geotechnical Engineer prior to fill placement. These subgrades should be proof-rolled using a loaded tandem axle dump truck or similar rubber-tired equipment (minimum 20 tons) under the observation of the Geotechnical Engineer’s representative.

The purpose of proof rolling is to identify marginal or loose near-surface materials or unsuitable soils that may require undercutting. Areas that exhibit deflection, rutting, or excessive pumping during proof rolling and cannot be adequately densified in place should be undercut to suitable soils and backfilled as directed by the Geotechnical Engineer. Proof rolling should not be conducted on saturated or frozen soils or during wet weather.

#### 3.4.3 STRUCTURAL FILL

##### 3.4.3.1 GENERAL

All structural fill within building, pavement, and sidewalk areas must be compacted in accordance with the criteria provided in Table 3.1. Coarse granular fill should be compacted until it is well keyed. Structural fill materials must be free from deleterious materials, including brush, roots, and construction debris. The earthwork contractor’s compactive efforts should be evaluated based on field observations, and lift thicknesses adjusted as necessary to meet compaction requirements.

**TABLE 3.1: COMPACTION CRITERIA AND TESTING FREQUENCY**

| Material Type                               | Density Test Method | Minimum Compaction (%) | Moisture Content Range (ref. to optimum moisture content) |         | Testing Frequency (min. 3 per lift) |
|---|---------------------|------------------------|---|---------|-------------------------------------|
|   |                     |                        | Minimum   | Maximum |                                     |
| Engineered Fill (coarse-grained/ Base Rock) | ASTM D 1557         | 95                     | -3%   | +3%     | 1 per 2,000 sf                      |



### **3.4.3.2 GRANULAR FILL**

Imported granular fill materials should consist of sand, gravel, or fragmental rock with a maximum size on the order of 4 inches and with no more than about 5% passing the No. 200 sieve (washed analysis). Material satisfying these requirements can usually be placed during periods of wet weather. The first lift of granular fill placed over a fine-grained subgrade should be about 18 in. thick and subsequent lifts about 12 inches thick when using medium- to heavy-weight vibratory rollers. Granular structural fill should be limited to a maximum size of about 1 ½ inches when compacted with hand-operated equipment. We also recommend that lift thicknesses be limited to less than 8 inches when using hand-operated vibratory plate compactors.

### **3.4.3.3 DRAIN ROCK**

Drain rock, "capillary break" material, or "free-draining" material should have less than 2 percent passing the No. 200 (75-µm) sieve (washed analysis). Examples of these materials include ¾-inch to ¼-inch or 1½-inch to ¾-inch, or 3-inch to 1-inch crushed rock.

### **3.4.4 EXCAVATIONS**

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better ensure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability. 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.

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

### **3.4.5 SLOPES**

Any permanent cut or fill slopes should not exceed 3 Horizontal to 1 Vertical (3H:1V). Excavations extending below a 1H:1V plane extending down from any adjacent footings should be shored for safety. All excavations should be inspected by a representative of the geotechnical engineer during construction to allow any modifications to be made due to variation in the soil types. All work should be performed in accordance with Department of Labor Occupational Safety and Health Administration (OSHA) guidelines as described in the previous section.



### 3.4.6 UTILITIES

Utility trenches may be backfilled with imported soil above the pipe zone. Trench backfills should be moisture conditioned to within 0 to 4 percent above the optimum moisture content, compacted in 6- to 8-inch lifts to a minimum of 90 percent of the maximum dry density as determined by the modified Proctor (ASTM D1557). In pavement areas, the top 12-inches of soil subgrade should reach a minimum of 95 percent of this Proctor. If rocks larger than 3-inches in maximum size are encountered, they should be removed from the backfill material prior to placement in the utility trenches. Pipe zone backfill requirements should be in conformance with the requirements of the local agencies having jurisdiction but should consist of clean granular sand material having a sand equivalent equal to or above 30. Jetting or flooding of utility backfill is not recommended. If smaller compaction equipment such as jumping jacks or plate compactors are used, thinner lifts will be required to achieve compaction. Where utilities cross building perimeters, concrete or concrete slurry should be used for backfilling around the utility to prevent moisture from migrating along the utility trench and entering the building envelope.

### 3.4.7 FLATWORK

For sidewalks or other flatwork located adjacent to grade-supported foundations, the undercutting and select fill placement operations for the building should extend beyond the perimeter of the building and pavements to at least the width of the adjacent sidewalk or flatwork.

Any other sidewalks or flatwork not adjacent to buildings should be placed on an improved subgrade meeting or exceeding the pavement subgrade improvement methods previously recommended. If the sidewalk subgrade consists of material with a plasticity index of 25 or greater, a 12-inch-thick layer of material satisfying the requirements of select fill provided in the [FILL MATERIALS](#) section must be placed below the sidewalk. The material should be compacted to 95% or greater than the maximum dry unit weight and contain a moisture content between -1 and +3% optimum moisture content.

Proper drainage around grade-supported sidewalks and flatwork is also very important to reduce potential movements. Elevating the sidewalks where possible and providing rapid, positive drainage away from them will reduce moisture variations within the underlying soils and will therefore provide valuable benefit in reducing the full magnitude of potential movements from being realized.

## 3.5 FOUNDATIONS

In our opinion, the structural loads of the proposed development can be supported on conventional spread footing foundations constructed in accordance with the following design criteria. Additionally, PSI recommends that foundation type and bearing strata be consistent throughout a structure.

### 3.5.1 SHALLOW FOUNDATIONS

Shallow spread and continuous footings founded on the well compacted structural fill at a depth of at least 18 inches below lowest adjacent finished grade can be designed for a maximum net allowable soil bearing pressure of 3,000 pounds per square foot (psf) and a modulus of subgrade reaction (k) of 100 pounds per cubic inch (pci). Minimum widths of 36 inches for column footings and 18 inches for continuous footings should be used in foundation design to reduce the possibility of a local bearing capacity failure.

If unsuitable soils are encountered at footing excavation bottoms, the unsuitable material should be over excavated to suitable subgrade material and replaced with granular structural fill. The total width of the over-excavation area beneath the design footing elevation should increase by 1 foot for each foot of over-excavation. The over excavated areas should be backfilled with Structural Fill or clean crushed rock and compacted in accordance with the [Structural Fill Materials](#) section of this report.



Based on the assumed loads and the recommended site preparation, we estimate that post-construction total settlement will be less than 1 inch. Differential settlement is estimated to be less than ½ inch over a 40-foot span. These magnitudes of estimated settlements are assumed to be within tolerable limits but should be confirmed by the project architect and structural engineer.

We recommend the use of a smooth-edged excavator to make the footing excavations. The foundation excavations should be observed by a representative of PSI prior to steel or concrete placement to assess that the foundation materials can support the design loads and are consistent with the materials and recommendations discussed in this report.

The base frictional resistance and the passive soil resistance will counteract the horizontal loads on shallow foundations. Footings cast against natural competent soil or compacted soil may be designed using a frictional coefficient between the concrete and soil of 0.4. An ultimate equivalent fluid pressure of 300 pounds per cubic foot (pcf) may be used to compute the ultimate passive resistance. This assumes footings are cast neat against native silt or backfilled with granular structural fill.

After opening, footing excavations should be observed, and concrete should be placed as quickly as possible to avoid exposure of the excavations to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond within 20 feet of the open excavation during or after construction. When possible, the foundation concrete should be placed during the same day the foundation excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce moisture loss or gain.

PSI should be consulted during the design of the foundation pad to verify that the appropriate parameters are utilized. PSI should provide periodic observation during construction of the foundation pad to verify that the design parameters and the soil materials used during construction correspond.

### 3.6 FLOOR SLABS

To limit the settlement due to presence of soft soil at the surface, PSI recommends that the soils within the building footprint be over-excavated to a depth of at least 8" foot below new slabs-on-grade and capillary break material (pad grade) and replaced by Structural fill as described in Fill Material Section.

Based on the near surface soil encountered in the probes/borings, PSI estimates that a unit modulus of subgrade reaction ( $K_1$ ) of 100 pounds per square inch per inch (psi/in) is suitable for concrete slab sections supported by compacted sandy silt. The coefficient of subgrade reaction ( $K_s$ ) is the unit pressure required to produce a unit settlement in soils. The general equations to account for the effect of width of foundations in soils is given by:

$$K_s = K_1 \left( \frac{B + 1}{2B} \right)^2 \quad \text{For cohesionless Soil}$$

$$K_s = \frac{K_1}{B} \quad \text{For Cohesive Soil}$$

where, B= Width of foundation in feet.

$K_1$  = Unit modulus of subgrade reaction for a one-foot square footing.

In areas that will have moisture-sensitive materials placed directly on the floor, PSI recommends that the slabs-on-grade be underlain by a minimum 8 inches of sand or rounded aggregate base to provide a capillary break. A durable vapor-retarding membrane should be installed beneath the slab-on-grade to reduce the risks of damp floors. The vapor-retarding membrane should be installed in accordance with the manufacturer's recommendations.



### 3.7 BIORETENTION INFILTRATION

This section summarizes the bioretention infiltration recommendations from the Supplemental Geotechnical Consultation – Bioretention Infiltration, issued on December 5, 2021, as part of the overall geotechnical evaluation for Walmart Store #2403 Expansion in Puyallup, Washington. The original report (October 20, 2021) did not include infiltration rate estimates for stormwater management, which were later provided and addressed in this supplement.

A bioretention system is proposed approximately 150 feet south of the existing Walmart Supercenter as part of the project. The system will encompass 3,500 square feet and requires infiltration rate estimates at depths of 4 to 5 feet below grade. Per the City of Puyallup Geotechnical Testing Procedure (June 2019), initial saturated hydraulic conductivity (Ksat) may be estimated using grain size distribution data, which is acceptable for this stage of design.

Estimated Saturated Hydraulic Conductivity (Ksat):

- 1- From the subsurface investigation conducted in 2021, PSI performed borings to a depth of 26.5 feet and utilized grain size distribution data from the upper 10 feet to estimate an initial Ksat of 2 inches/hour.
- 2- Based on the possible presence of compacted fill at this location, a correction factor was applied as per City of Puyallup guidelines, resulting in a design Ksat of 0.7 inches/hour.
- 3- A factor of safety of 2 should be applied to the design Ksat for stormwater facility design.

It should be noted that this estimated Ksat value is based on a soil sample collected from 7.5 feet below grade, located approximately 150 feet north of the proposed bioretention facility. The grain size distribution of this sample may not fully represent the subsurface conditions at the bioretention system location.

*PSI recommends conducting field infiltration testing during construction at the bioretention facility location and design depth to confirm the estimated infiltration rate. Design adjustments should be made as needed based on the field test results to ensure compliance with local stormwater management requirements.*

### 3.8 PAVEMENT DESIGN

This section summarizes the pavement design recommendations from Addendum 1 – Pavement Evaluation, issued on November 21, 2021, as part of the overall geotechnical evaluation for Walmart Store #2403 Expansion in Puyallup, Washington. The original report (October 20, 2021) did not include updated vehicle and pavement loading information, which was later provided and addressed in this addendum.

Pavement design recommendations for various traffic levels were developed based on assumptions about traffic volumes, drive paths, and the anticipated support characteristics of pavement subgrades. PSI used the AASHTO Guide for Design of Pavement Structures, published by the American Association of State Highway and Transportation Officials, to evaluate the recommended pavement thicknesses. This methodology considers factors such as pavement performance, traffic, soil support, materials, environment, drainage, and reliability. PSI is available to conduct site-specific laboratory testing and evaluations to refine these parameters upon request.



The following parameters were used for the pavement design:

**TABLE 3.2: PAVEMENT DESIGN PARAMETERS**

|   |  |
|---|--|
| Reliability, percent                            | 85   |
| Design Life                                     | 20 Years                                     |
| Initial Serviceability Index, Flexible Pavement | 4.2  |
| Initial Serviceability Index, Rigid Pavement    | 4.5  |
| Terminal Serviceability Index                   | 2.0  |
| Traffic Load for Light Duty Pavement            | 109,500 equivalent single axle loads (ESALs) |
| Traffic Load for Heavy Duty Pavement            | 335,800 equivalent single axle loads (ESALs) |
| Standard Deviation, Flexible Pavement           | 0.45   |
| Standard Deviation, Rigid Pavement              | 0.35   |
| Concrete Compressive Strength                   | 4,000 psi                                    |
| Subgrade California Bearing Ratio (CBR)         | 10.0 for Gravelly Sand Subgrade              |
| Subgrade Modulus of Subgrade Reaction, k in pci | 100 for Gravelly Sand Subgrade               |

The below presented estimated pavement sections are based on the field and laboratory test results for the project, local pavement design practice, design assumptions presented herein and previous experience with similar projects. The project Civil Engineer should verify that the ESAL and other design values are appropriate for the expected traffic and design life of the project. PSI should be notified in writing if the assumptions or design parameters are incorrect or require modification.

**TABLE 3.3: ESTIMATED FLEXIBLE PAVEMENT SECTION OPTIONS**

| Component                         | Light Duty | Heavy Duty |
|-----------------------------------|------------|------------|
| Hot Mixed Asphalt Concrete (HMAC) | 3"         | 4"         |
| Crushed Rock Base (CRB)           | 8"         | 9"         |

**TABLE 3.4: ESTIMATED RIGID PAVEMENT SECTION OPTIONS**

| Component                                 | Light Duty | Heavy Duty |
|---|------------|------------|
| Portland Cement Reinforced Concrete (PCC) | 5"         | 7"         |
| Crushed Rock Base (CRB)                   | 6"         | 6"         |

We recommend that rigid pavement sections be used in all heavy truck traffic areas. The concrete pavement should extend throughout the areas that require extensive turning and maneuvering of delivery vehicles. For dumpster pad areas and access routes, 8-inch-thick concrete pavement is recommended.



Pavements can be expected to crack due to environmental factors and require periodic maintenance to reduce damage to the pavement structure should be planned throughout the life of the pavement. During the paving life, maintenance to seal surface cracks within concrete or asphalt paving and to reseal joints within concrete pavement should be undertaken to achieve the desired paving life. Perimeter drainage should be controlled to prevent or retard influx of surface water from areas surrounding the paving. Water penetration leads to paving degradation. Water penetration into base or subgrade materials, sometimes due to irrigation or surface water infiltration leads to pre-mature paving degradation. Curbs should be used in conjunction with asphalt paving to reduce potential for infiltration of moisture into the base course. Curbs should extend the full depth of the base course and should extend at least 3 inches into the underlying subgrade. The base layer should be tied into the area inlets to drain water that may collect in the base.

### 3.8.1 PAVEMENT MATERIALS

Pavement material requirements for the above pavement sections are presented below:

- **Compacted Subgrade:** Pavement subgrade preparation should be performed in accordance with the *EARTHWORK* section.
- **Aggregate Base Course:** Aggregate base should be placed in a maximum of 8-inch compacted lifts. The base materials should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. Aggregate base materials should be moisture conditioned to between  $\pm 3$  percentage points of the optimum moisture content.
- **Hot Mix Asphalt Concrete (HMAC) Surface Course:** Should meet all requirements specified in WSDOT standard Specification. The mix should be compacted to between 92 and 97 percent of the maximum theoretical density.
- **Portland Cement Concrete:** Concrete used for paving should have a minimum compressive strength of 4,000 psi at 28-days. The concrete pavements should be reinforced and jointed per current ACI recommendations.
- **Concrete Reinforcement:** Should be in accordance with applicable ACI standards.

All materials should conform to and be placed in accordance with the latest version of the Standard WSDOT.

### 3.9 PLAN REVIEW AND CONSTRUCTION OBSERVATION

After final plans and specifications are complete, PSI should review the final design and specifications so that the earthwork and foundation recommendations are properly interpreted and implemented. It is considered imperative that the Geotechnical Engineer and/or their representative be present during earthwork operations and foundation installations to observe the field conditions with respect to the design documents and specifications. PSI will not be responsible for changes in the project design or project information it was not provided, or interpretations and field quality control observations made by others. PSI would be pleased to provide these services for this project.



## 4.0 GEOTECHNICAL RISK AND REPORT LIMITATIONS

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitute PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

Services performed by PSI for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area. No warranty, expressed or implied, is made.

The recommendations submitted are based on the available subsurface information obtained by PSI, and information provided by the client, client's representative and client's design consultants. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation and/or other recommendations are required. If PSI is not retained to perform these functions, PSI cannot be responsible for the impact of those conditions on the performance of the project.

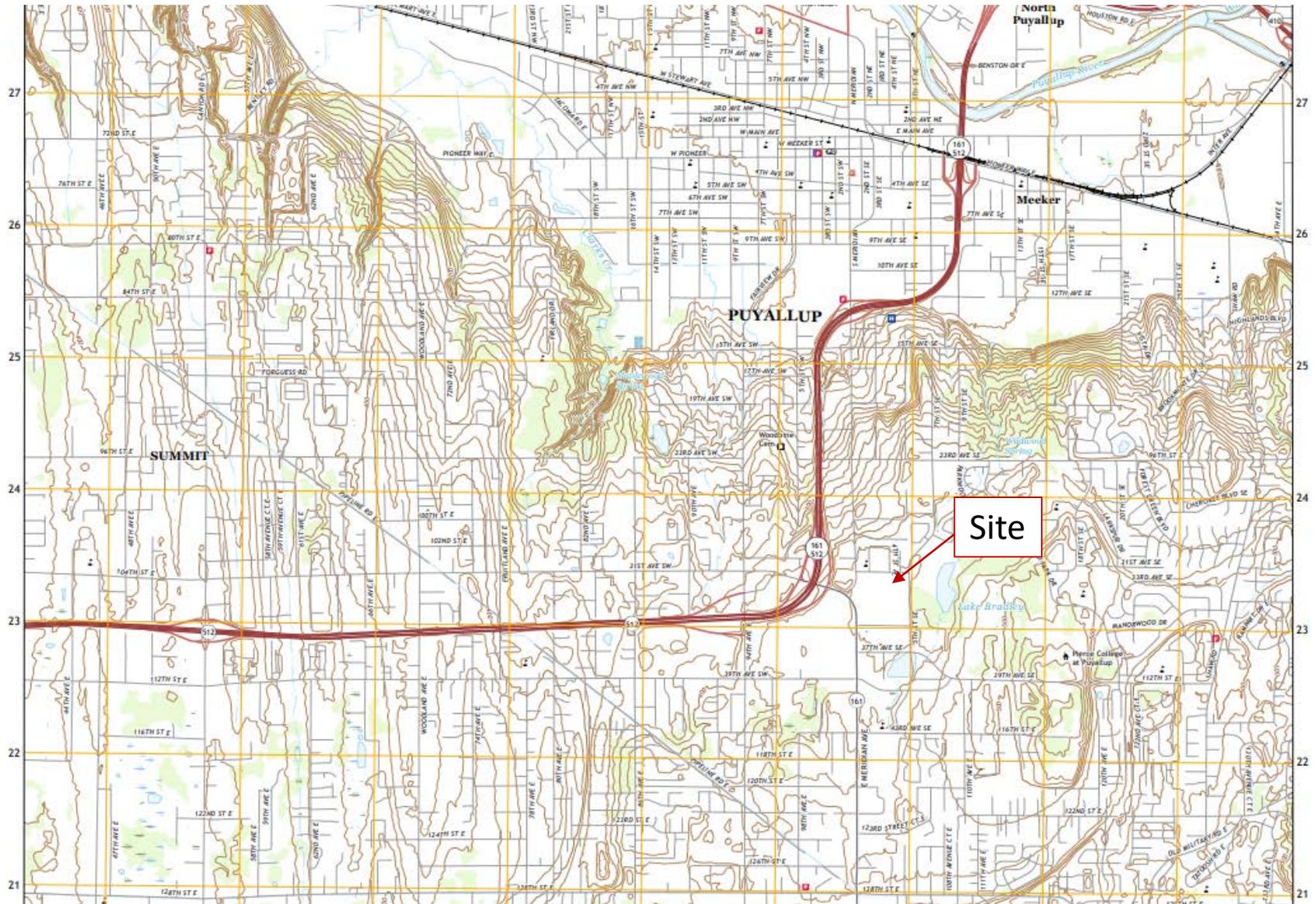
The Geotechnical Engineer should be retained and provided with the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations.

This revised report has been prepared for the exclusive use of Walmart Stores, Inc., Galloway & Company, Inc., and their respective successors and assigns for the building addition to the Walmart Supercenter located at 310 31st Ave SE, Puyallup, WA 98374.



## FIGURES





The National Map published by USGS - Puyallup Quadrangle 7.5-Minute Series, Pierce County



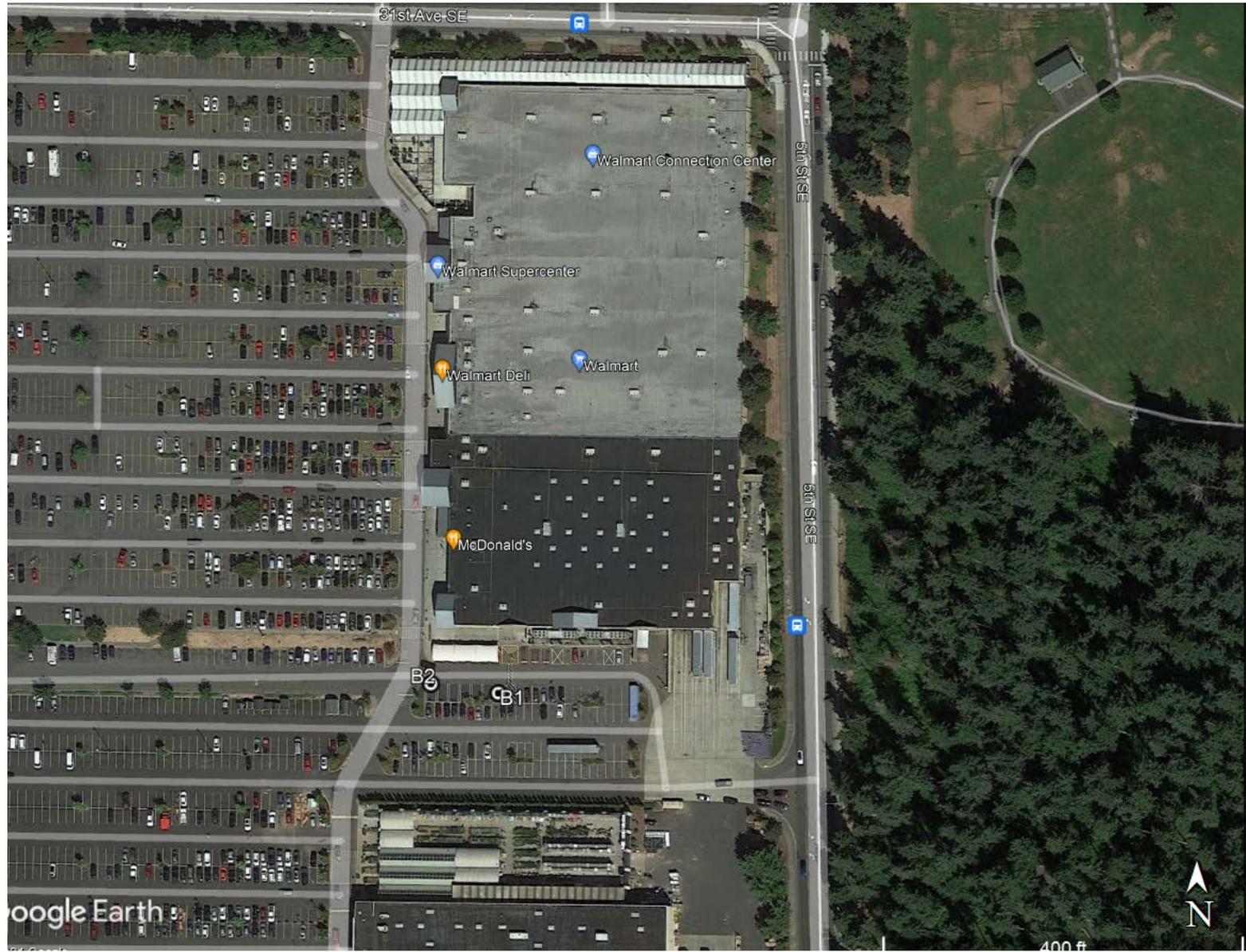
Walmart Store #2403 (Puyallup, WA)

JOB NO. 07041419

Site Vicinity Map

FIGURE NO.

1



Google Earth Imagery



Walmart Store #2403 (Puyallup, WA)

JOB NO. 07041419

Investigation Location Map

FIGURE NO. 2



## **APPENDIX A**

Field Exploration & Laboratory Testing Program

## **FIELD EXPLORATION PROGRAM**

PSI explored subsurface conditions on September 30, 2021. The field exploration consisted of advancing two hollow stem auger borings outside of the southwest corner of the existing building.

Approximate exploration locations are shown on Figure 2, Investigation Location Map. PSI notified the Washington Utility Notification Center to indicate the approximate location of underground utilities in the vicinity of the proposed exploration locations prior to commencing field activities.

A representative from PSI's office observed the drilling and prepared borings logs of the conditions encountered. It should be noted that the subsurface conditions presented on the boring logs are representative of the conditions at the specific locations drilled. Variations may occur and should be expected across the site. The soil morphology represents the approximate boundary between subsurface materials and the transitions may be gradual and indistinct.

### **Boring Location Selection and Staking**

The boring plan was prepared by PSI and approved by Galloway prior to drilling. The approved boring plan was superimposed onto Google Earth™ Imagery and the latitude and longitude were recorded. The approved boring locations were also superimposed onto The National Map developed by USGS, which uses the North American Vertical Datum of 1988 (NAVD88), and the elevations of the boring locations were recorded. The location of the borings in the field were established by hand-held GPS using the coordinates from Google Earth™. The latitude, longitude and elevation are noted on each boring log with the perceived accuracy unknown. If accurate locations and elevations are needed, PSI recommends the client/owner have boring locations and elevations determined by survey methods.

### **Hollow Stem Auger Borings**

Hollow stem auger borings were advanced using a CME-85 track-mounted drill rig owned and operated by Holt Services, Inc located in Vancouver, Washington. Soil samples were recovered at selected depths during drilling using a Split Spoon Sampler driven by a 140-lb weight free falling 30 inches. A standard split spoon sampler with an outside diameter of 2.0 inches and inside diameter of 1.42 inches was used. The number of blows required to drive the sampler 12 inches is designated as the penetration resistance (N-value, blows per foot) and provides an indication of the consistency of cohesive soils and the relative density of granular materials.

### **Field Classification**

Soil samples were initially classified visually in the field. Consistency, color, relative moisture, degree of plasticity, and other distinguishing characteristics of the soil samples were noted. The terminology used in the soil classifications and other modifiers are depicted in the General Notes and Soil Classification Chart.

## **LABORATORY TESTING PROGRAM AND PROCEDURES**

Soil samples obtained during the field explorations were examined in our laboratory. The physical characteristics of the samples were noted, and the field classifications were modified, where necessary. Representative samples were selected during the course of the examination for further testing.

### **Moisture Content**

Natural moisture content determinations were made on selected soil samples in general accordance with ASTM D2216. The natural moisture content is defined as the ratio of the weight of water to the dry weight of soil, expressed as a percentage. Results are shown on the exploration logs.

### **Visual-Manual Classification**

The soil samples were classified in general accordance with guidelines presented in ASTM D2487. Certain terminology incorporating current local engineering practice, as provided in the Soil Classification Chart, is included with, or in lieu of, ASTM terminology. The term which best described the major portion of the sample was used in determining the soil type (i.e., gravel, sand, silt or clay). Results are shown on the exploration logs.

### **Sieve Analysis**

The determination of the amount of material finer than the U.S. Standard No. 200 (75- $\mu$ m) sieve was made on selected soil sample in general accordance with ASTM D1140. In general, the sample was dried in an oven and then washed with water over the No. 200 sieve. The mass retained on the No. 200 sieve was dried in an oven, and the dry weight recorded. Results from this test procedure assist in determining the fraction, by weight, of coarse-grained and fine-grained soils in the sample. Results are shown on the exploration logs.

The determination of the gradation curve of the coarse-grained material was made on selected soil samples in general accordance with ASTM D6913. In general, the oven dried mass retained on the No. 200 sieve is passed over progressively smaller sieve openings, by agitating the sieves by hand or by a mechanical apparatus. The mass retained on each sieve is recorded as a fraction of the total sample, including the percent passing the No. 200 sieve. Results are shown on the Grain Size Analyses below.



# 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<sub>60</sub>: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
- Q<sub>u</sub>: Unconfined compressive strength, TSF
- Q<sub>p</sub>: 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    ANGULARITY OF COARSE-GRAINED PARTICLES

| <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+                   |

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





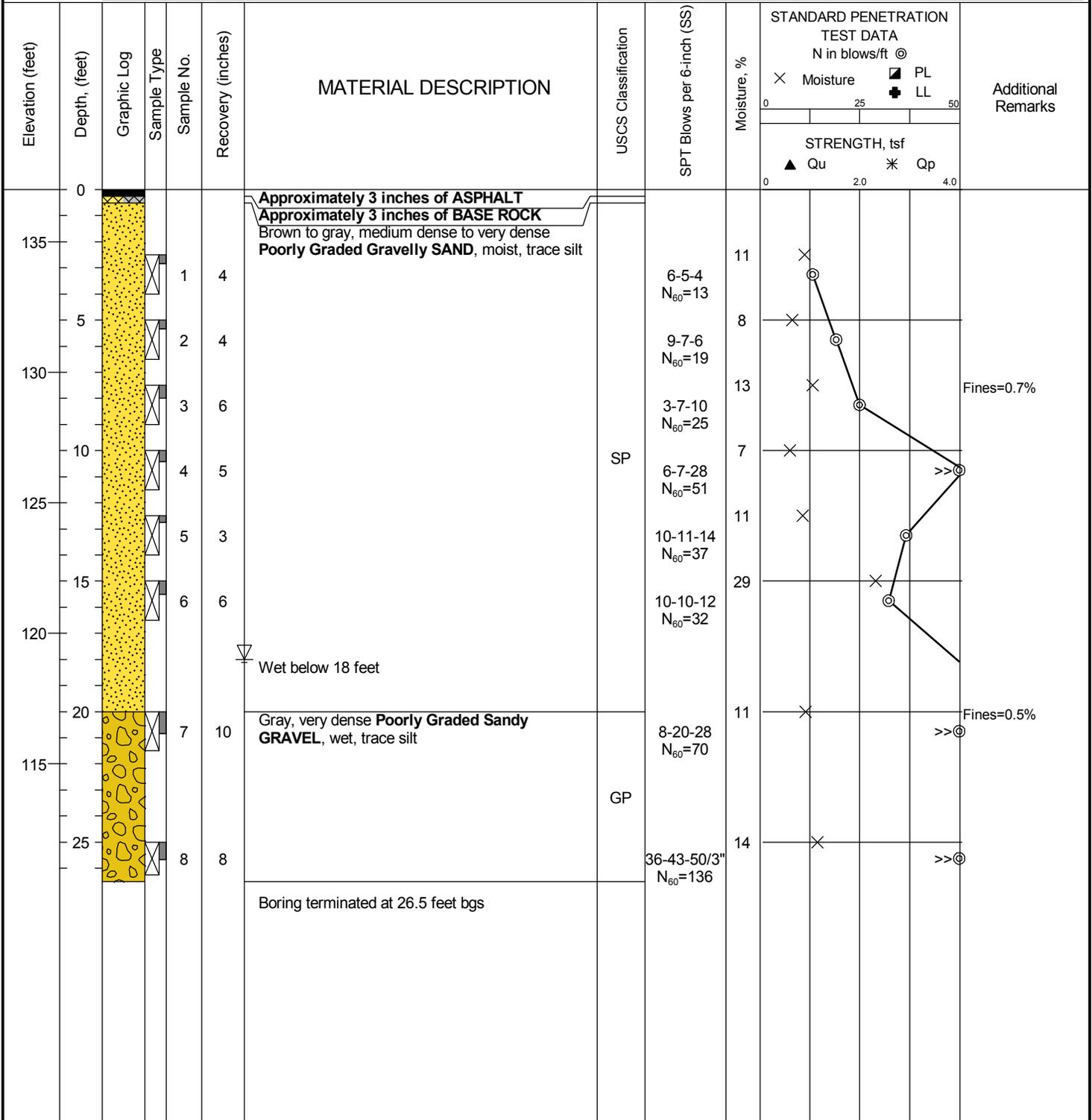
**DATE STARTED:** 9/30/21 **DRILL COMPANY:** Holt Services Inc  
**DATE COMPLETED:** 9/30/21 **DRILLER:** John **LOGGED BY:** Brandon  
**COMPLETION DEPTH:** 26.3 ft **DRILL RIG:** CME-85  
**BENCHMARK:** N/A **DRILLING METHOD:** Hollow Stem Auger  
**ELEVATION:** 137 ft **SAMPLING METHOD:** 2-in SS  
**LATITUDE:** 47.16° **HAMMER TYPE:** Automatic  
**LONGITUDE:** -122.2895° **EFFICIENCY:** 88%  
**STATION:** N/A **OFFSET:** N/A **REVIEWED BY:** SRS

## BORING B2

|              |   |                 |         |
|--------------|---|-----------------|---------|
| <b>Water</b> | ▽ | While Drilling  | 18 feet |
|              | ▼ | Upon Completion | feet    |
|              | ▽ | Delay           | N/A     |

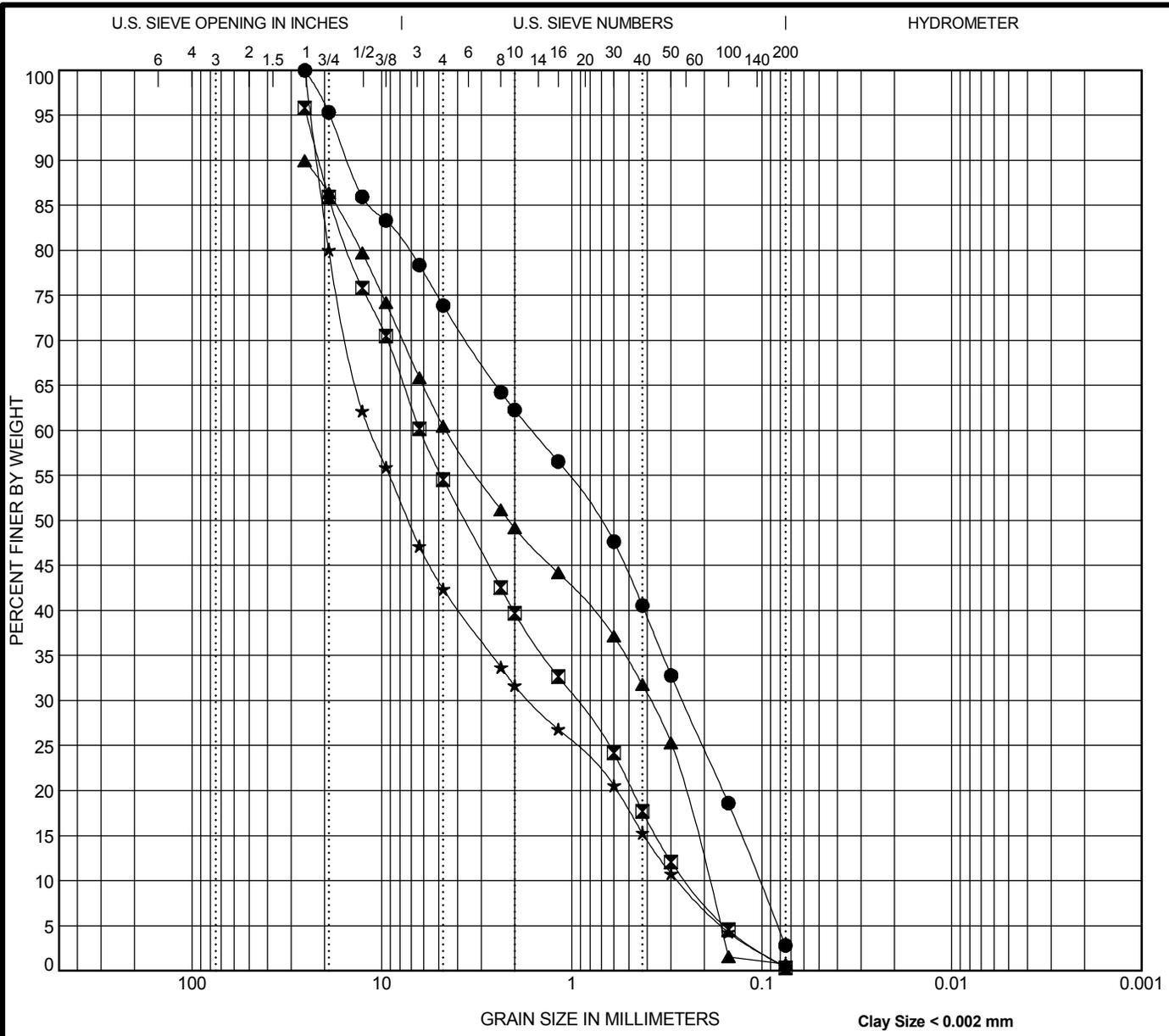
**BORING LOCATION:**

**REMARKS:**  $N_{60}$  denotes the normalization to 60% efficiency as described in ASTM D4633.



Professional Service Industries, Inc.  
 6032 N. Cutter Circle, Suite 480  
 Portland, OR 97219  
 Telephone: (503) 289-1778

**PROJECT NO.:** 07041419  
**PROJECT:** Walmart Superstore No. 2403 Expansion  
**LOCATION:** 310 31st Avenue Southeast  
 Puyallup  
 Washington



## APPENDIX B

### Geotechnical Investigation Fact Sheet





**GEOTECHNICAL INVESTIGATION FACT SHEET**

PROJECT LOCATION: 310 31st Ave SE, Puyallup, WA

Engineer: Omar Abuseiba, P.E.

Phone #: +1 346 227 3875

Geotechnical Engineering Co.: Intertek-PSI

Report Date: 12/06/2024

Ground Water Elevation: 18 feet bgs.

Fill Soils Characteristics: Structural Engineered Fill

Date Groundwater Measured: 09/27/2021

Maximum Liquid Limit: NA

Topsoil/Stripping Depth: Not Applicable/Remove Pavements

Maximum Plasticity Index: NA

Undercut (If Required): Not Required

Specified Compaction: 95% of ASTM 1557

Standard Proctor Results: Not Tested

Moisture Content Range: ±2% of OMC of ASTM 1557

pH: Not tested, see original geotechnical report

Corrective actions required for construction based on pH level noted: See original geotechnical report

Resistivity: Not tested, see original geotechnical report

Corrective actions required for construction based on resistivity level noted: See original geotechnical report

Cement Type: See original geotechnical report

Recommended local DOT subbase/base material (reference section plan in Foundation Subsurface Preparation):

3/4"-0 Aggregate Rock

Recommended Compaction Control Tests:

1 Test for Each 2000 Sq. Ft. each Lift (bldg. area) 1 Test for Each 4000 Sq. Ft. each Lift (parking area)

Structural Fill Maximum Lift Thickness 8 in. (Measured loose)

Subgrade Design CBR value = 10

| <u>COMPONENT</u>                           | <u>ASPHALT</u>  |              | <u>CONCRETE</u> |              |
|--|-----------------|--------------|-----------------|--------------|
|  | <u>Standard</u> | <u>heavy</u> | <u>standard</u> | <u>heavy</u> |
| Stabilized Subgrade<br>(If Applicable)     | _____           | _____        | _____           | _____        |
| Base Material<br>(Stone, Sand/Shell, etc.) | <u>8</u>        | <u>9</u>     | <u>6</u>        | <u>6</u>     |
| Asphalt Base Course                        | _____           | _____        |                 |              |
| Leveling Binder Course                     | _____           | _____        |                 |              |
| Surface Course (Asphalt/Concrete)          | <u>3</u>        | <u>4</u>     | <u>5</u>        | <u>7</u>     |

**NOTE:** This information shall not be used separately from the geotechnical report.





**FOUNDATION DESIGN CRITERIA**

PROJECT LOCATION: 310 31st Ave SE, Puyallup, WA

Engineer: Omar Abuseiba, P.E.

Phone #: +1 346 227 3875

Geotechnical Engineering Co.: Intertek-PSI

Report Date: 12/06/2024

Foundation type: Shallow Foundation

Allowable bearing pressure: 3,000 psf

Factor of Safety: 3

Minimum footing dimensions: Individual: 36"

Continuous: 18"

Minimum footing embedment: Exterior: 18"

Interior: 12"

Frost depth: 18"

Maximum foundation settlements: Total: < 1 Inch

Differential: < 1/2 Inch

Slab: Potential vertical rise: None

Capillary Break (not a vapor barrier) describe: 8 inches of angular free draining rock

Subgrade reaction modulus: 100 psi/in Method obtained: Estimated

Active Equivalent Fluid Pressures: No Walls Planned

Passive Equivalent Fluid Pressures: 300 pcf

Perimeter Drains (describe): Building: None Recommended

Retaining Walls : N/A

Retaining Wall: At rest pressure: N/A

Coefficient of friction: N/A

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

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SITE BUILDING AREA-FOUNDATION SUBSURFACE PREPARATION  
WAL-MART- JOB #07041419 R1,  
Puyallup, WA  
12/06/24

UNLESS SPECIFICALLY INDICATED OTHERWISE IN THE DRAWINGS AND/OR SPECIFICATIONS, THE LIMITS OF THIS SUBSURFACE PREPARATION ARE CONSIDERED TO BE THAT PORTION OF THE SITE DIRECTLY BENEATH AND 5 FEET BEYOND THE BUILDING AND APPURTENANCES.

APPURTENANCES ARE THOSE ITEMS ATTACHED TO THE BUILDING PROPER, TYPICALLY INCLUDING, BUT NOT LIMITED TO, THE BUILDING SIDEWALKS, GREENHOUSE CANOPIES, PORCHES, RAMPS, STOOPS, TRUCK WELLS/DOCKS, CONCRETE APRONS AT THE AUTOMOTIVE CENTER, COMPACTOR PAD, ETC. APPURTENANCES SHALL ALSO INCLUDE SCREENWALLS AT THE COMPACTOR, TRUCK DOCK AND THE BALE/PALLET STORAGE AREA(S). THE INTERIOR SLAB-ON-GRADE BASE AND THE VAPOR BARRIER, WHERE REQUIRED, DO NOT EXTEND BEYOND THE LIMITS OF THE ACTUAL BUILDING.

ESTABLISH THE FINAL SUBGRADE ELEVATION TO ALLOW FOR THE CONCRETE SLAB. REFERENCE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR REQUIRED SLAB THICKNESS.

EXISTING FOUNDATIONS, SLABS, PAVEMENTS, AND BELOW-GRADE STRUCTURES SHALL BE REMOVED FROM THE BUILDING AREA. REMOVE SURFACE VEGETATIONS, TOPSOIL, ROOT SYSTEMS, ORGANIC MATERIAL, AND SOFT OR OTHERWISE UNSATISFACTORY MATERIAL FROM THE BUILDING AREA. SUBGRADE MATERIAL SHALL BE FREE OF ORGANIC AND OTHER DELETERIOUS MATERIALS. PROOFROLL EXPOSED SUBGRADE.

STRUCTURAL FILL COMPACTCION SHALL MEET THE FOLLOWING REQUIREMENTS:

STRUCTURAL FILL MATERIAL SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8 INCHES IN THICKNESS AND COMPACTED TO AT LEAST 95 PERCENT OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-1557) AT A MOISTURE CONTENT WITHIN 3 PERCENT BELOW TO 3 PERCENT ABOVE THE OPTIMUM.

THE FOUNDATION SYSTEM SHALL BE ISOLATED SPREAD FOOTINGS AT COLUMNS AND CONTINUOUS SPREAD FOOTINGS AT WALLS.

THIS FOUNDATION SUBSURFACE PREPARATION DOES NOT CONSTITUTE A COMPLETE SITE WORK SPECIFICATION. IN CASE OF CONFLICT, INFORMATION COVERED IN THIS PREPARATION SHALL TAKE PRECEDENCE OVER THE WAL-MART SPECIFICATIONS. REFER TO THE SPECIFICATIONS FOR SPECIFIC INFORMATION NOT COVERED IN THIS PREPARATION. THIS INFORMATION WAS TAKEN FROM A GEOTECHNICAL REPORT PREPARED BY INTERTEK-PSI, DATED 12/06/24 (GEOTECHNICAL REPORT IS FOR INFORMATION ONLY AND IS NOT A CONSTRUCTION SPECIFICATION).

