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PBC Project No.
04029

AECOM Project No.
60763208

DRAFT

Mr. Jose Barajas
Public Building Commission of Chicago
50 West Washington Street, Room 200
Chicago, IL 60602

Subject: Geotechnical Services for DWM New Facility (4825 W. Lawrence) PBC Project No.: 04029

Dear Mr. Barajas:

This letter report summarizes the results of the subsurface exploration and geotechnical engineering evaluation completed by AECOM Technical Services, Inc. (AECOM) for the above referenced project. The following report contains the logs of thirteen (13) geotechnical soil borings, geotechnical laboratory testing results, and geotechnical considerations regarding anticipated construction at the site.

Project Description

It is our understanding that the Public Building Commission of Chicago (PBC), along with its partners at the City of Chicago Department of Water Management (DWM), and the Aldermanic Offices of the 45th Ward, are planning construction of a new operations facility at 4825 W. Lawrence Avenue in Chicago, Illinois. The site is located in the greater northeast Chicago area and is currently used as an open lot for material staging. The site has a triangular shape and is boarded by W. Lawrance Avenue to the north, Cicero Avenue to the east, and Canadian Pacific Railway to the west/southwest.

The proposed construction will include a new two-story building that will be used for DWM administrative operations, warehouse and inventory storage, and interior parking. Proposed construction will also include an open structure for material staging, a material loading area, a single story 500 square foot building, outdoor paved parking areas, and site improvements for stormwater management and landscape ordinance. The proposed layout considered at the time of the subsurface investigation is included as Figure 1 of the Attachments.

Procedures

Boring Layout Procedures

Thirteen (13) geotechnical soil borings, identified as B-25-01 through B-25-13, were completed by Wang Testing Services (Wang) under subcontract to AECOM on August 7 through 15, 2025. The locations of the borings are presented in Figure 2 (2025 Existing Conditions) included in the Attachments. Boring locations were selected and field located by AECOM with approval from PBC. Boring locations were adjusted in the field to avoid overhead and underground utilities, as necessary.

Prior to mobilization, AECOM and Wang cleared public underground utilities at the site by contacting Illinois's public utility locating service, JULIE. AECOM subcontractor, Ground Penetrating Radar Systems (GPRS), performed a private utility locate at each boring location to clear the boring from underground utilities and obstructions. AECOM then performed hand augers to 5 feet below ground surface (bgs) to identify underground utilities or obstructions. Upon arrival at the site with the drilling crew, an AECOM field representative conducted a safety tailgate meeting and performed a site walk with the drill crew prior to start of work. During the site walk, underground utilities and access to the boring locations were identified.

Final boring locations were surveyed by AECOM. Ground surface elevations and horizontal coordinates are presented on the boring logs and are referenced to City of Chicago Datum (CCD) and Illinois East North American Datum of 1983 (NAD83). A summary of the subsurface investigation performed at the site is presented in Table 1.

Table 1. Summary of Geotechnical Subsurface Investigation

Boring	Easting[1] [feet]	Northing[1] [feet]	Ground Surface Elevation [feet CCD]	Termination Depth [feet bgs]
B-25-01	1143003.584	1931363.886	34.3	78.8[2]
B-25-02	1143303.673	1931368.451	34.1	50.0
B-25-03	1143035.993	1931244.356	34.8	50.0
B-25-04	1143278.474	1931243.668	34.8	50.0
B-25-05	1143092.491	1931051.109	36.3	50.0
B-25-06	1143325.962	1931108.084	34.8	50.0
B-25-07	1143186.123	1931156.709	35.5	30.0
B-25-08	1143232.615	1930753.798	34.3	30.0
B-25-09	1143335.619	1930933.504	35.5	30.0
B-25-10	1143334.527	1930586.877	37.1	30.0
B-25-11	1143198.678	1931016.009	35.4	10.0
B-25-12	1143363.294	1930490.804	39.5	10.0
B-25-13	1142940.515	1931418.180	33.4	10.0

Notes: “CCD” = City of Chicago Datum, “bgs” = below ground surface

1. Horizontal coordinates referenced to NAD83 Illinois State Planes, East Zone
2. Boring terminated at 78.8 feet due to practical refusal in weathered bedrock.

Drilling and Sampling Procedures

The soil borings were completed by a two-person Wang drill crew using Diedrich D-25 and Central Mine Equipment CME-55 truck mounted, and Geoprobe 7822 DT track mounted drill rigs. During drilling operations, an AECOM field technician was on-site to provide oversight and coordination of the drilling and sampling program. In general, the soil borings were advanced using continuous flight hollow-stem augers or a combination of soil-stem auger and rotary wash drilling methods.

Soil sampling was generally performed at 2.5-foot intervals to a depth of 10 feet and at 5-foot intervals below 10 feet until the boring termination depth. Soil samples were obtained using either split-spoon or a thin walled tube sampler in general accordance with ASTM D1586 and ASTM D1587, respectively. Please refer to the boring logs included in the Attachments for details on the sampling intervals and type used at each individual soil boring location.

A log of soil samples obtained from each boring was prepared by the AECOM field representative during drilling operations. Split-spoon samples were placed in sealed jars and thin walled samples were sealed at each end and delivered to our geotechnical laboratory subcontractor, Wang, for testing. Boreholes were backfilled with bentonite chips and soil cuttings to ground surface. Soil cuttings and drilling fluids generated during drilling operations were containerized in 55-gallon steel drums for disposal by others.

Infiltration Testing Procedures

Infiltration tests were completed at boring locations B-25-12 and B-25-13 by AECOM’s drilling subcontractor, Wang. The infiltration tests were performed using a single ring infiltrometer with casing embedded 5 feet (B-25-12) and 7 feet (B-25-13) below existing grade in accordance with the Chicago Stormwater Management Ordinance Manual.

The single-ring infiltrometer method consists of driving a 12-inch open cylinder into the ground to the desired test depth and then filling the ring with clean water and observing the water level drop over time. Test data sheets and results from the infiltration tests are included in the Attachments.

Vane Shear Testing

In-situ vane shear tests were completed at location B-25-01 at depths of 6, 12, and 18 feet below ground surface. Vane shear test results completed by Wang are included in the Attachments.

Geotechnical Field Testing

Soil samples were classified in accordance with the AECOM Soil Classification System, which is included in the Attachments. Estimated soil group symbols (where applicable) are presented in parentheses following the soil descriptions on the boring log and are in general conformance with the Unified Soil Classification System (USCS), which serves as the basis of the AECOM Soil Classification System. A brief explanation of the classification of soil samples is presented in the AECOM Field and Laboratory Procedures included in the Attachments.

The relative density of encountered granular soils (or granular like material) was estimated in-situ through the Standard Penetration Test (SPT) using a calibrated automatic hammer. For this report, an assumed average energy transfer ratio (hammer efficiency) of 80% was used. As outlined in ASTM Standard D1586, the SPT resistance (N-value) of split-spoon samples is based on the blows required to advance the sampler over two (2) successive 6-inch intervals after a 6-inch initial set. Where cohesive soils were encountered, the unconfined compressive strength was estimated using a calibrated hand penetrometer on recovered disturbed SPT samples. Results from the field tests are plotted on the boring log included in the Attachments.

Geotechnical Laboratory Testing

Laboratory testing was performed on select samples to aid in classification and to estimate material index and strength properties. The geotechnical laboratory testing was completed by AECOM’s laboratory subcontractor Wang. The following laboratory tests were completed by Wang:

- ASTM D2166 – Unconfined Compression Strength of Cohesive Soils (12 tests)
- ASTM D2216 – Soil Water Content (112 tests)
- ASTM D2435 – One-Dimensional Consolidation (2 tests)
- ASTM D4318 – Liquid Limit, Plastic Limit, and Plasticity Index of Soils (22 tests)
- ASTM D6913 – Sieve Analysis (5 tests)

Soil moisture, liquid limit, plastic limit, and unconfined compression strength test results are plotted on the boring logs included in the Attachments. A summary table and geotechnical laboratory data sheets as provided by Wang are included in the Attachments.

Boring Log Procedures and Qualifications

General material descriptions are noted on the individual boring logs. Additionally, select results from the field and laboratory tests are plotted on the representative boring logs. It should be noted that the strata contact lines represent approximate boundaries between encountered soil types; the actual transition between soil types in the field may be gradual in both the horizontal and vertical directions. Subsurface conditions and water levels at other locations may differ from the conditions encountered at the boring locations. Furthermore, the subsurface conditions may change over time. These variables need proper assessment when utilizing the information presented on the boring logs.

Exploration Results

Site Conditions

Conditions encountered at the site, an abandoned lot, during field operations were similar to those depicted in Figure 2 in the Attachments. At the time of drilling, the site was consisted of an open gravel area to the north with buildings and covered salt pile to the south. Based on historical aerial photography, the northern gravel area had been used for staging transportation containers. Existing site grades at the boring locations were between +33.4 feet and +39.5 feet CCD.

Subsurface Conditions

General soil conditions encountered in the borings consisted of near surface fill materials underlain by layers of medium stiff to hard clays. A summary of the generalized subsurface profile encountered in the borings is presented in Table 2.

Table 2. General Soil Profile

Unit	Description	Depth to Top of Unit Range [feet bgs]	Elevation Top of Unit Range [feet CCD]	Unit Thickness Range [feet]	SPT N Range [bpf]	Consistency Range[1]
1	Fill Materials	0.0	39.5 to 33.4	1.0 to 6.5	4 to 25	-
2	Clay – dark gray	0.0 to 5.5	35.8 to 31.6	2.0 to 9.5	5 to 12	Med. Stiff to Hard
3	Clay – brown and gray	3.0 to 12.0	31.8 to 25.1	4.0 to 9.0	4 to 16	Stiff to Hard
4	Upper Clay – gray[2]	8.0.0 to 16.0	26.8 to 18.8	14.3 to 29.0	11 to 20	Stiff to Hard
5	Lower Clay – gray[3]	26.3 to 37.0	10.0 to -2.7	21.0 to 33.7	16 to 77	Hard
6	Silty Clay – gray[4]	58.0	-23.7	10.5	70 to 77	Hard
7	Weathered Bedrock[4]	68.5	-34.2	-[5]	50/6” to 50/3”	-

Notes: “bpf” = blows per foot

1. Consistency range based on hand penetrometer readings.
2. Silty sand was encountered at boring location B-25-07 from 26.5 feet bgs (+9 feet CCD) to the boring termination depth of 30 feet bgs (+5.5 feet CCD).
3. Layer encountered in borings B-25-01 through B-25-07. Layer thickness assumes top of silty clay elevation is constant throughout site.
4. Layer encountered at boring location B-25-01.
5. Boring B-25-01 was terminated in layer, therefore total unit thickness is unknown.

Non-engineered fill materials were encountered at locations B-25-01, B-25-02, B-25-04 through B-25-06, and B-25-09 through B-25-13, and generally consisted of gravel, sand, or clay. Layer thickness of the fill materials ranged between 1 to 6.5 feet where encountered.

Below the fill materials, a unit of dark gray lean clay with consistency ranging from medium stiff to hard and unit thickness of 5 to 12 feet was encountered at all locations except B-25-02 and B-25-11.

Below the fill materials and/or blackish gray clay, brown to gray clay with consistency ranging from stiff to hard and unit thickness ranging between 3 and 12 feet was encountered at all locations except B-25-05, B-25-09, and B-25-12.

Below the brown to gray clay, gray lean clay with stiff to hard consistency was encountered at all boring locations advanced below 10 feet bgs. The gray clay was generally of hard consistency below 26.5 to 37 feet bgs. At location B-25-01, a layer of silty clay was encountered below the gray lean clay from 58 to 68.5 feet bgs. Below the silty clay, split spoon refusal was encountered at 68.5 feet bgs. Based on the material descriptions and relatively high SPT N-values observed in the unit below 68.5 bgs, the lower unit is considered to be highly weathered bedrock.

The conditions encountered in the borings and the laboratory testing results do not indicate the presence of shrink/swell or collapsible features that are of concern for design.

Groundwater Conditions

During drilling operations, groundwater observations were recorded while drilling (WD) and sampling (WS). Groundwater observations made during drilling operations are presented on the boring logs included in the Attachments. During drilling and sampling, groundwater was encountered at 10.5 feet bgs (+25.8 feet CCD) and 8.5 (+27.0 CCD) at locations B-25-05 and B-25-09, respectively. Prior to backfilling B-25-04, groundwater was observed at 6.3 feet bgs (+28.5 feet CCD) 24 hours after boring completion. For design, we recommend a groundwater elevation of +28.8 feet CCD be used for the design of the permanent features at the site.

It should be noted that groundwater observed during drilling may not be representative of the static groundwater present at the site. Additionally, the introduction of drilling fluid into the boreholes inhibit accurate groundwater measurements.

Table 3. Summary of Groundwater Observations

Boring	Groundwater Depth [feet bgs]	Groundwater Elevation [feet CCD]	Observed	Date
B-25-04	6.3	28.5	AB	8/12/2025
B-25-05	10.5	25.8	WD	8/11/2025
B-25-09	8.5	27.0	WS	8/8/2025

Notes:” CCD” = City of Chicago Datum, “bgs” = below ground surface, “WS” = while sampling, “AB” = at boring completion, “WD” = while drilling

Analysis and Recommendations

AECOM understands that the proposed site construction will consist of a new structure supported on a foundation. Analysis and recommendations for building foundations for the site are presented in this section. It should be noted that at the time of this report, details pertaining to new structures and foundation loads were being developed by the Design Build Contractor. The design data and analysis presented in this report should be considered by the Design Build Contractor during their design process.

Seismic Site Classification

Based on information obtained from the subsurface investigation, the soils at this site can be categorized as Site Class C. Using the American Society of Engineers (ASCE) Hazard Tool, seismic design spectral response parameters were calculated and are presented in Table 4. The design codes referenced for the calculation are ASCE 7-10 and ASCE 7-16. Values presented in Table 4 assume Risk Category III for the site structures.

Table 4. Seismic Design Parameters

Code	S_S	S_1	F_a	F_v	S_{DS}	S_{D1}
ASCE 7-10	0.133	0.061	1.2	1.7	0.107	0.069
ASCE 7-16	0.116	0.062	1.3	1.5	0.100	0.062

Source: Design parameters obtained from online ASCE Hazard Tool.

Site Preparation

New building and pavement areas should be cleared of existing surficial fill soils, trees, roots, debris, frozen soil or other unsuitable material for an area extending at least five feet beyond the edges of the proposed new structures and pavement areas. The exposed subgrade in areas that will receive new fill should be proof-rolled prior to fill placement to delineate remaining soft or unstable materials. Proof-rolling should involve traversing the subgrade with a heavily-loaded piece of construction equipment, such as a fully-loaded multi-axle dump truck. Soft or unstable materials should be disced and recompacted in place or removed and replaced with structural soil fill. If used, compaction of the cohesive fill should be accomplished with a kneading type operation such as can be accomplished with a sheepsfoot roller to thoroughly break down larger soil clods and blend the soil together. Clod breakage, lift thickness, and moisture content control are essential for compaction of cohesive (clayey) soils.

If site grades are to be raised, they should be raised with structural fill consisting preferably of well graded sand and gravel containing less than 15% by weight passing a No. 200 sieve (IDOT Coarse Aggregate CA-6). Alternative materials such as native site clays encountered in the borings are suitable for raising site grades if they are properly moisture conditioned and compacted as discussed below. It is important to note that raising of site grades may induce additional post-construction settlement. If grade changes are proposed, AECOM will need to re-evaluate the foundation recommendations presented in this report.

All fill materials should be compacted a minimum of 90 percent of the maximum dry density determined from the modified Proctor test (ASTM D1557). For areas supporting loads more than 400 psf, the fill should be compacted to a minimum of 95 percent of the maximum dry density from the modified Proctor test. Moisture should be controlled within three percent of the optimum moisture content determined from the modified Proctor test. If onsite soils are to be used as fill, these materials may require moisture conditioning to achieve adequate compaction. Drying of the cohesive soils, if used, may be required to achieve adequate compaction. Site soils used as fill material should be placed in lifts, not to exceed 8 inches in loose thickness, and compacted to a minimum of 95% of the modified Proctor maximum dry density within proposed structure footprints. Density tests should be performed on each lift of fill placed to check that the adequate densities are achieved.

Based on the results of the soil borings, with the exception of non-engineered fill materials encountered in the upper 1 to 6.5 feet of the soil profile, the existing inorganic site soils removed from cut areas may be suitable for reuse as fill to raise grades in other areas of the site. However, due to the fine-grained nature of the clayey site soils and the in-place moisture contents, they will likely require some moisture conditioning (wetting or scarifying with drying depending on the season) to achieve the minimum compaction requirements. Additional recommendations pertaining to site preparation and fill placement are provided in the AECOM Earthwork Guidelines statement included in the Attachments. We recommend that a qualified technician be present at the site during stripping and filling operations to confirm the subgrade is properly prepared, that only approved backfill materials are used, and to confirm that the soils have been properly compacted.

Foundation Recommendations

The following subsections provide recommendations for shallow and deep foundations. These recommendations are based on available soil data collected during the site subsurface investigation and laboratory testing presented in this letter report. Foundation loads for proposed structures were not available at the time of writing this report; therefore, foundation recommendations are general and may need to be revisited as the design progresses. Based on provided information, it is assumed that the new structures will be placed on shallow spread footings or deep foundations consisting of drilled shafts or driven piles.

Shallow Foundations

Based on conditions encountered in the borings, the native site clays underlying the non-engineered fill materials are suitable for support of new structures utilizing conventional shallow spread footings. Based on our understanding of the proposed site layout, perimeter building walls for the two-story building can be supported by continuous strip footings. For strip footings, we recommend placing the footings at a frost depth of 4 feet below the ground surface bearing on 2 feet of compacted structural fill. These footings bearing at 4 feet below final grade on 2 feet of structural fill can be designed using net ultimate and net allowable bearing capacities of 6,000 and 2,000 psf, respectively. Assuming a minimum strip footing width of 2.5 feet and maximum sustained dead load of 4.5 kips/ft, settlement for frost depth footing bearing on 2 feet of structural fill is anticipated to be 1 inch or less with differential of 0.5 inches or less. Settlement predictions are based on consolidation test results and parameters obtained from laboratory testing by Wang and are included in the Attachments.

Similarly, where interior columns are placed, we anticipate they can be supported on shallow spread footings at frost depth of 4 feet constructed on 3 feet of compacted structural fill. For an over-excavation of existing soils of 3 feet, frost depth footings bearing at 4 feet below final grade on 3 feet of structural fill can be designed using net ultimate and net allowable bearing capacities of 6,000 and 2,000 psf, respectively. Assuming a spread footing of 9 feet by 9 feet and maximum sustained dead load of 162 kips, settlement for frost depth spread footings bearing on 3 feet of structural fill is anticipated to be 1 inch or less with differential of 0.5 inches or less.

For the proposed 500 SF one story building located near B-25-08, continuous strip footings and shallow spread foundations placed at a frost depth of 4 feet and bearing on 2 feet of structural fill can be designed using net ultimate and net allowable bearing capacities of 3,000 and 1,000 psf, respectively. For frost depth footings bearing on 2 feet of structural fill, settlement is anticipated to be 1 inch or less with differential settlement of 0.5 inches or less.

For the proposed 9,500 SF (50 feet by 190 feet) open structure for material staging located near B-25-08, a mat foundation placed at a depth of 4 feet bearing on 3 feet of structural fill can be designed using net ultimate and net allowable bearing capacities of 5,400 and 1,800 psf, respectively. For a mat foundation bearing on 2 feet of structural fill, settlement is anticipated to be 1 inch or less with differential settlement of 0.5 inches or less for sustained average dead load bearing pressure of 500 psf. For average sustained dead load bearing pressure of 1,000 psf, settlement is anticipated to be 2 inch or less with differential less than 0.5 inch. It should be noted that the footprint of the proposed open structure is partially over the existing salt pile footprint. Due to historical pre-loading from the existing salt pile, differential settlement of the open structure may be greater than anticipated and could approach one-inch. At the time of this report, the dimensions and historical loading of the soil below the salt pile footprint was unknown. Additional exploration and laboratory testing may be required within the footprint of the salt pile to further refine this settlement estimate.

It should be noted that at the time of this report, anticipated loads for shallow foundations were not available. For shallow foundations, it is important to note that the design of the foundations may be controlled by tolerable settlement criteria and not the soil bearing capacity.

General Shallow Foundation Recommendations

We recommend that the foundation excavations be observed by a qualified representative to document that the bearing soils are similar to those encountered during our exploration. Where structural fill is used, we recommend granular material similar to Illinois Department of Transportation (IDOT) CA-6 be utilized. Structural fill should be placed and compacted to 95 percent the maximum dry density as determined by the modified Proctor test (ASTM D1557). Where unsuitable soils or over-excavations are performed, soils should be removed in a zone extending 1 foot horizontally beyond all edges of the foundation for each vertical foot of structural fill placed beneath the foundation (1H:1V). Foundations bearing on compacted structural fill can be designed using an unfactored coefficient of friction between concrete and subsoil of 0.5 for foundation sliding.

We recommend a minimum of 5-foot separation between the edge of existing and new foundations where possible. If this separation cannot be maintained, additional settlement may be induced on existing footings and a reduced bearing capacity may be required for design. The reduced bearing capacity will need to be analyzed on a case-by-case basis once the design has been further developed.

If the provided bearing capacity recommendations cannot be achieved in design, or if the excavations become prohibitively large and present the potential to undermine nearby structures or utilities, we recommend a deep foundation system consisting of driven piles or drilled shafts be considered.

Deep Foundation Design Parameters

As discussed above, deep foundations are a suitable foundation alternative. Geotechnical design parameters for deep foundation (driven steel piles or drilled shafts) are defined below and are summarized in the Soil Parameter Table included in the Attachments. Design parameters for deep foundations include the following:

1. Boring Number
2. Boring coordinates in Easting and Northing, feet
3. Ground surface elevation at boring location
4. Depth range of soil unit
5. Description of predominant soil type
6. Estimated USCS soil classification
7. Total unit weight of the soil
8. Average of SPT N-value
9. Undrained and drained soil cohesion, c, c’.
10. Undrained and drained soil friction angle, ϕ, ϕ’

The properties indicated in the soil parameters table were developed through correlation of field test results, laboratory results, published resources, and use of engineering judgment. Based on the encountered profile, it is assumed that deep foundations would develop required capacities when bearing in the lower silty clay encountered below 58 feet bgs.

For design, we recommend that soil strength parameters in the upper 5 feet of the soil profile be neglected per AASHTO design guidelines for driven piles and drilled shafts. In addition, we recommend that a qualified inspector be present during construction to confirm that the soil conditions encountered are similar to those encountered in the borings and anticipated in design.

Design parameters presented in the parameter table of the Attachments are based on the results of the soil borings performed at this site. It is possible that subsurface conditions, even short distances from the borings, could be significantly different from those encountered at the boring locations.

Floor Slab on Grade Recommendations

We recommend that the final 6 inches below the floor slabs consist of open graded granular material with gradation similar to IDOT Coarse Aggregate CA-7. This material will act as a capillary break between the foundation pad and the underlying subgrade. Floor slabs should be isolated from the foundations to allow for slight differential movements between the foundation members and the floor slabs. Based on the subgrade preparation procedure described in the previous Site Grading Considerations, floor slabs bearing on compacted structural fill can be designed using a modulus subgrade reaction of 100 pci.

Exterior Slab Recommendations

Excessively loose or soft subgrade materials should be stripped within exterior slab areas. If necessary, compacted structural fill may be used to raise grades beneath exterior slabs.

The native clays at the site are frost susceptible and have a potential to develop frost heave. At locations where clay was encountered, the frost-susceptible soils should be removed to a depth of 3.5 feet and replaced with well-graded clean sands or sand and gravel containing less than 3% by weight passing the No. 200 sieve. This material should be placed in thin lifts, not exceeding 8 inches in loose thickness, and be compacted as specified in the following Construction Considerations section.

Pavement Recommendations

Non-engineered fill soils at depths up to 3 feet below the ground surface was encountered at locations proposed for pavement. These fill soils present some risk of long term settlement related cracking and deterioration of pavements. Although complete removal of the non-engineered fill beneath the pavements presents the lowest risk of long-term settlement, partial removal may provide adequate performance depending on loading and usage. Depending on pavement loading, use of geosynthetics, such as geogrid or geotextile, can be considered where non-engineered fill is not completely removed.

Prior to the placement of any pavement section, the existing site should be stripped of any surficial materials such as asphalt, concrete, topsoil, frozen soil, debris and salt. Once surface preparation is complete, the subgrade l should then be compacted with a smooth drummed vibratory compactor. We recommend a minimum of 2 passes in perpendicular directions with a compactor with a minimum static weight of 10 tons. Upon completion of the compaction, the subgrade should be proof-rolled with a rubber-tired vehicle with a minimum gross weight of 20 tons such as a fully loaded dump-truck. Any areas which show signs of rutting or excessive deflection should be undercut and backfilled with compacted base course material. For base course material, we recommend aggregate material meeting Illinois Department of Transportation (IDOT) CA-6 gradation be utilized.

A minimum flexible pavement system consisting of 3 inches of asphalt and 12 inches of granular base coarse is recommended for light duty passenger vehicles. Where heavy truck use is anticipated, approximately 6 inches of asphalt and 15 inches of granular base course is recommended.

If rigid pavements are considered, they should be designed using a subgrade reaction modulus of 100 pounds per cubic inch for properly graded and compacted granular soils. Rigid pavements should be well reinforced with heavy paving mesh as a minimum. A minimum rigid pavement section consisting of 6 inches of reinforced concrete overlying 4 inches of base course is recommended. Where heavy truck use is anticipated, the base course thickness should be at least 8 inches.

Structural fill for raising grades and as base course material in pavement areas should consist of crushed stone meeting IDOT specifications for CA-6 coarse aggregate. The use of recycled concrete aggregate for pavement sections is acceptable, but must be evaluated by the contractor. The aggregate should be free of steel and other deleterious material, and gradations should match those required for a pavement base course per Illinois DOT recommendations. The base course should be placed in loose lifts not exceeding 6 inches and should be compacted to a minimum of 95% of the maximum dry density as determined by the Modified Proctor Compaction Test (ASTM Standard D1557). Structural fill shall be moisture conditioned to be within 2% of the optimum moisture content.

Pavement subgrades should be positively drained. Drainage should be provided at any low areas and along the edges of pavements and parking lots to prevent the accumulation of free water within the base course, which otherwise can result in subgrade softening and pavement deterioration under exposure and repeated traffic loading conditions. Around storm inlets or catch basins, it may be appropriate to utilize subsurface finer drains to allow water to drain out of the base course which may otherwise collect in low areas. Good pavement base course and subgrade drainage will help reduce pavement deterioration and extend its useful life. Pavement maintenance such as crack sealing and seal coating will also be required at the appropriate times, regardless of pavement thickness. At a minimum, the pavement should be monitored on an annual basis and cracks sealed to reduce water penetration into the base course.

For pavement design, we recommend the following pavement design parameters for the underlying clay subgrade:

- Frost Group Index – F3
- Design Group Index – 14
- Soil Support Value – 3.8
- Modulus of Subgrade Reaction (k) – 100 pci
- California Bearing Ratio (CBR) – 3

Infiltration Analysis

Data collected during the field infiltration tests are to be analyzed using the methods outlined in the "Chicago Stormwater Manual" by Wang. Results from the infiltration analysis are presented in Table 5. Based on the analysis, field results indicate slow infiltration rates where native clay is present. Therefore, to implement infiltration based on best management practices (BMPs), additional design features will be required.

Table 5. Site Infiltration Results

Test Location	Boring Location	Ground Surface Elevation [feet CCD]	Test Depth [feet bgs]	Test Elevation [feet CCD]	Infiltration Rate [in/hr]	Soil Description
INF-01	B-25-12	39.5	3	36.5	185.7	Gravel
INF-02	B-25-13	33.4	4	29.4	<0.01(1)	Clay

Note:

1. Infiltration rate less than minimum rate that is measurable by field test.

Construction Considerations

Based on the results of our exploration activities, we do not anticipate groundwater seepage into open excavations for pavements or shallow foundations. Seepage from perched water tables within the upper clay layers may occur depending on location. Potential of groundwater seepage may temporarily accumulate due to surface water drainage following periods of extended or heavy rain. For drilled shafts extending into underlying granular seams, as encountered at location B-25-07, groundwater seepage into the excavation is anticipated.

All excavations should comply with Occupational Safety and Health Administration (OSHA) requirements. For excavations, we recommend the in-place very stiff to stiff native clay be considered Type C based on OSHA regulations. Excavation safety is the responsibility of the contractor. Material stockpiles or heavy equipment should not be placed near the edge of excavation slopes. Additionally, any groundwater pumped from the site should comply with environmental, local, and state regulations.

General Qualifications

General Qualifications applicable to subsurface exploration are attached and are an integral part of this report. The report has been prepared in accordance with generally accepted soil and foundation engineering practices to aid in the evaluation of this property and to assist the owner and the architect and/or engineer in the design of this project. No other warranty, expressed or implied is made. The scope of this report is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects relevant to soil and foundation characteristics.

We recommend that AECOM be provided the opportunity to review the final project plans and specifications to confirm that the recommendations contained in this report have been interpreted in accordance with our intent. AECOM should be retained to observe and verify that the foundation bearing strata are consistent with the findings of this report. Without this oversight and special testing, we cannot be responsible for misinterpretations of our data, our analyses, and/or our recommendations, or how these items are incorporated in the final design.

Closing

We appreciate this opportunity to be of service to you. If there are any questions with regard to the information contained in this report, or if we may be of further assistance, please contact us.

Respectfully,

AECOM Technical Services, Inc.

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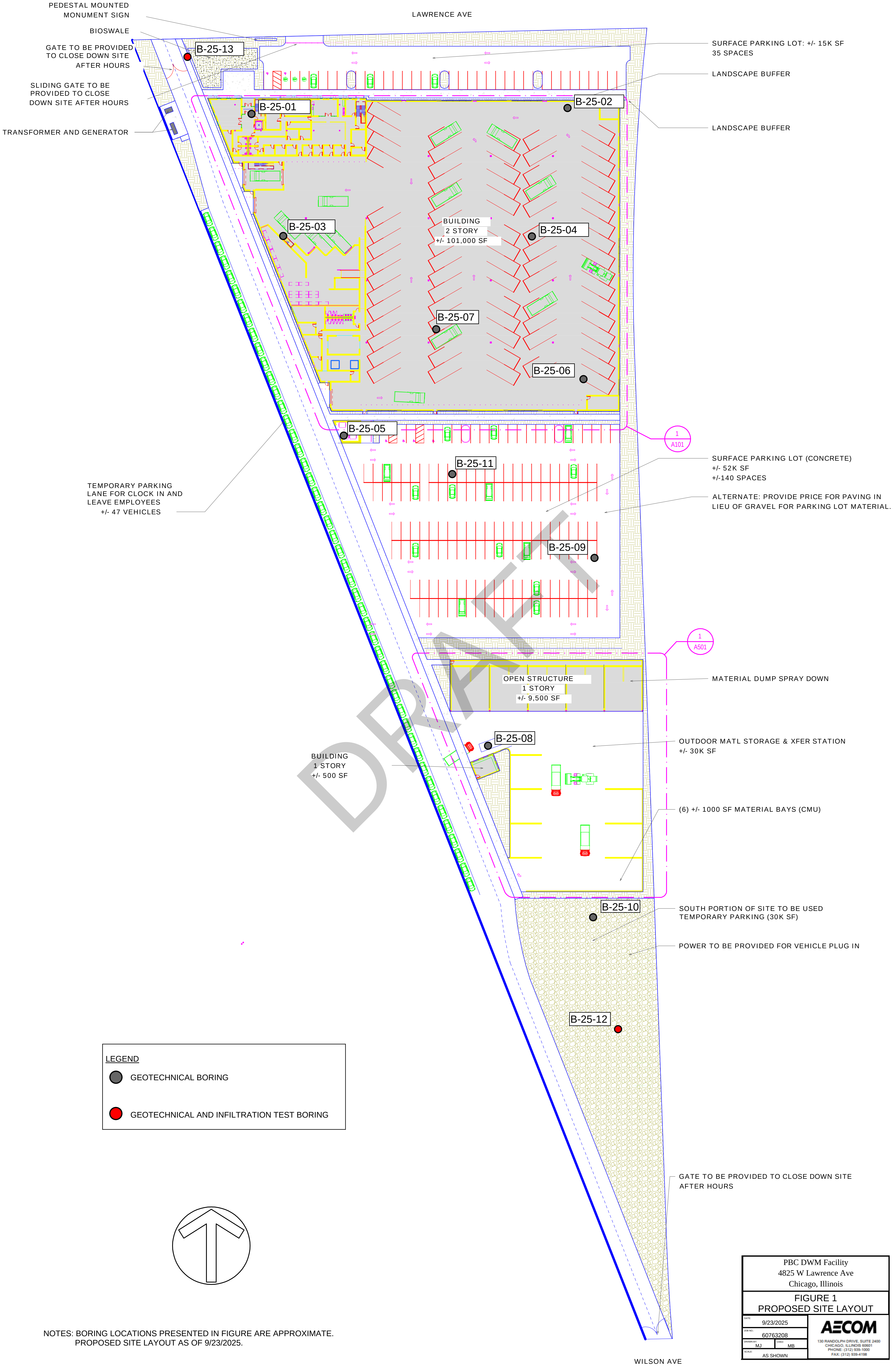
Attachments:

Figure 1 – Proposed Site Layout
Figure 2 – 2025 Existing Conditions (with Boring Locations)
Soil Boring Logs
Figure 3 – Subsurface Profile (Fence Diagram)
Key to Boring Logs and Fence Diagram
Soil Parameters Table for DMW New Facility
Summary of Geotechnical Laboratory Test Results
Wang Engineering Geotechnical Laboratory Test Results
Field Infiltration Test Results
In-Situ Vane Shear Test Results
AECOM General Notes
Soil Classification System
AECOM Field and Laboratory Procedures
AECOM Standard Boring Log Procedures
AECOM General Qualifications



LEGEND

● GEOTECHNICAL BORING

🔴 GEOTECHNICAL AND INFILTRATION TEST BORING

NOTES: BORING LOCATIONS PRESENTED IN FIGURE ARE APPROXIMATE.
PROPOSED SITE LAYOUT AS OF 9/23/2025.

PBC DWM Facility
4825 W Lawrence Ave
Chicago, Illinois

FIGURE 1
PROPOSED SITE LAYOUT

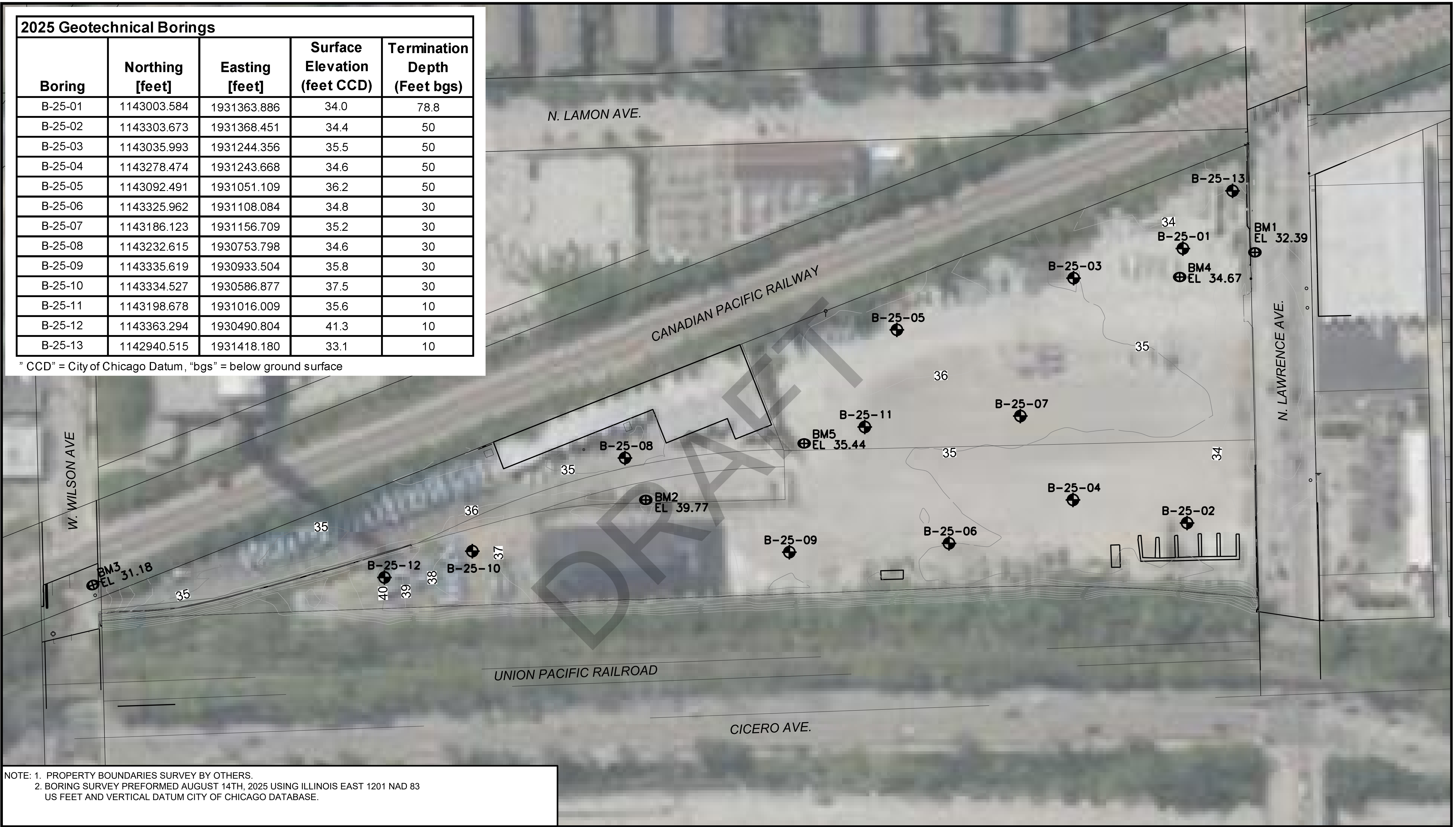
DATE: 9/23/2025
JOB NO.: 60763208
DRAWN BY: MJ
CHKD: MB
SCALE: AS SHOWN

AECOM
130 RANDOLPH DRIVE, SUITE 2400
CHICAGO, ILLINOIS 60601
PHONE: (312) 939-1000
FAX: (312) 939-4198

2025 Geotechnical Borings

Boring	Northing [feet]	Easting [feet]	Surface Elevation (feet CCD)	Termination Depth (Feet bgs)
B-25-01	1143003.584	1931363.886	34.0	78.8
B-25-02	1143303.673	1931368.451	34.4	50
B-25-03	1143035.993	1931244.356	35.5	50
B-25-04	1143278.474	1931243.668	34.6	50
B-25-05	1143092.491	1931051.109	36.2	50
B-25-06	1143325.962	1931108.084	34.8	30
B-25-07	1143186.123	1931156.709	35.2	30
B-25-08	1143232.615	1930753.798	34.6	30
B-25-09	1143335.619	1930933.504	35.8	30
B-25-10	1143334.527	1930586.877	37.5	30
B-25-11	1143198.678	1931016.009	35.6	10
B-25-12	1143363.294	1930490.804	41.3	10
B-25-13	1142940.515	1931418.180	33.1	10

" CCD" = City of Chicago Datum, "bgs" = below ground surface



NOTE: 1. PROPERTY BOUNDARIES SURVEY BY OTHERS.
2. BORING SURVEY PREFORMED AUGUST 14TH, 2025 USING ILLINOIS EAST 1201 NAD 83 US FEET AND VERTICAL DATUM CITY OF CHICAGO DATABASE.

⊕ B-25-XX	GEOTECHNICAL BORING
⊕ BMX EL XX.XX	BENCH MARKS & ELEVATION
40	MAJOR CONTOUR & LABEL
38	MINOR CONTOUR

LAND CONTOURS DISPLAYED AT 1' & 5' MINOR & MAJOR

50 0 100
GRAPHIC SCALE IN FEET

AECOM

DWM NEW FACILITY
4825 W. LAWRENCE
CITY OF CHICAGO DEPARTMENT OF WATER

2025 EXISTING CONDITIONS

DATE: 20250926
DRWN: CL
CKBY: MB
FIGURE 2

File: C:\OneDrive\AECOM\PBC Geotechnical Services 2025 – PBC Geotechnical – DWM New Facility\900_CAD_GIS\910_CAD\04 FIGURES\Geotechnical\Ex-Cond Boring Locations.dwg Time: Sep 24, 2025 – 5:00pm

CLIENT
Public Building Commission of Chicago

LOG OF BORING NUMBER **B-25-01**

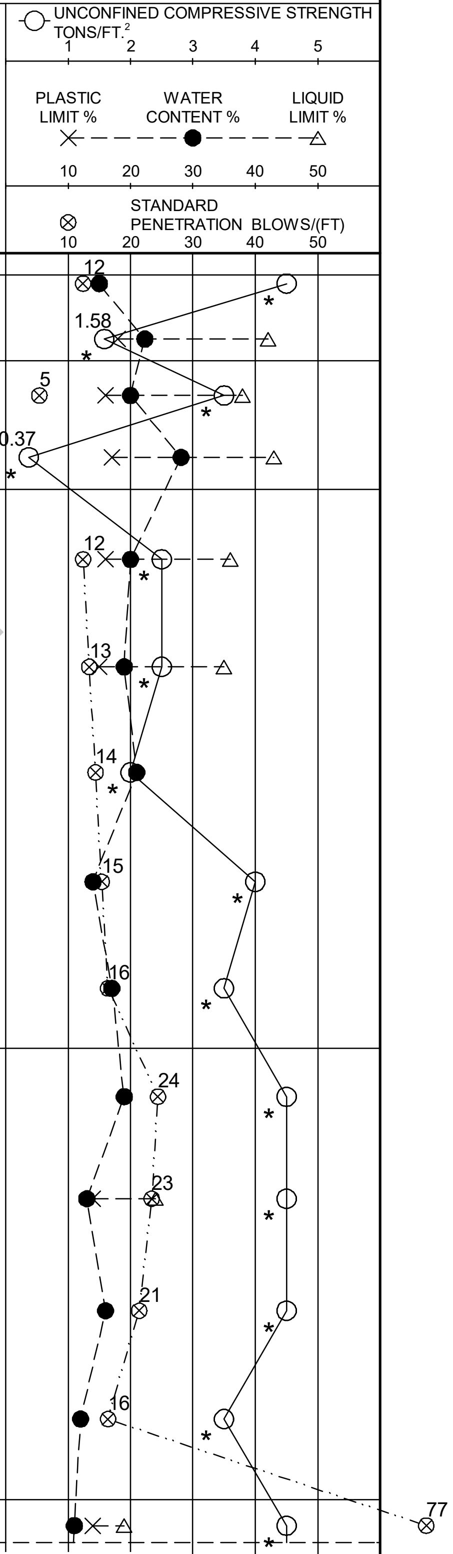
PROJECT NAME
DWM New Facility Geotech

ARCHITECT-ENGINEER
AECOM

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

SURFACE ELEVATION +34.3 CCD

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
			FILL: Gravel	
			1.0	
	1	SS	Lean clay with sand - little gravel - dark gray - hard to very stiff (CL)	
5.0	ST1	ST	5.0	100
	2	SS	Lean clay - little gravel - brown and gray - medium stiff to soft (CL) - vane shear test performed at 6 feet	
10.0	ST2	ST		95
			11.0	
			Lean clay - little gravel - gray - very stiff to hard (CL) - vane shear test performed at 12 feet	
15.0	3	SS		
			- vane shear test performed at 18 feet	
20.0	4	SS		
25.0	5	SS		
30.0	6	SS		
35.0	7	SS		
			37.0	
			Lean clay - little gravel - gray - hard (CL)	
40.0	8	SS		
45.0	9	SS		
50.0	10	SS		
55.0	11	SS		
			58.0	
			Silty clay - little gravel - gray - hard (CL-ML)	
60.0	12	SS		



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

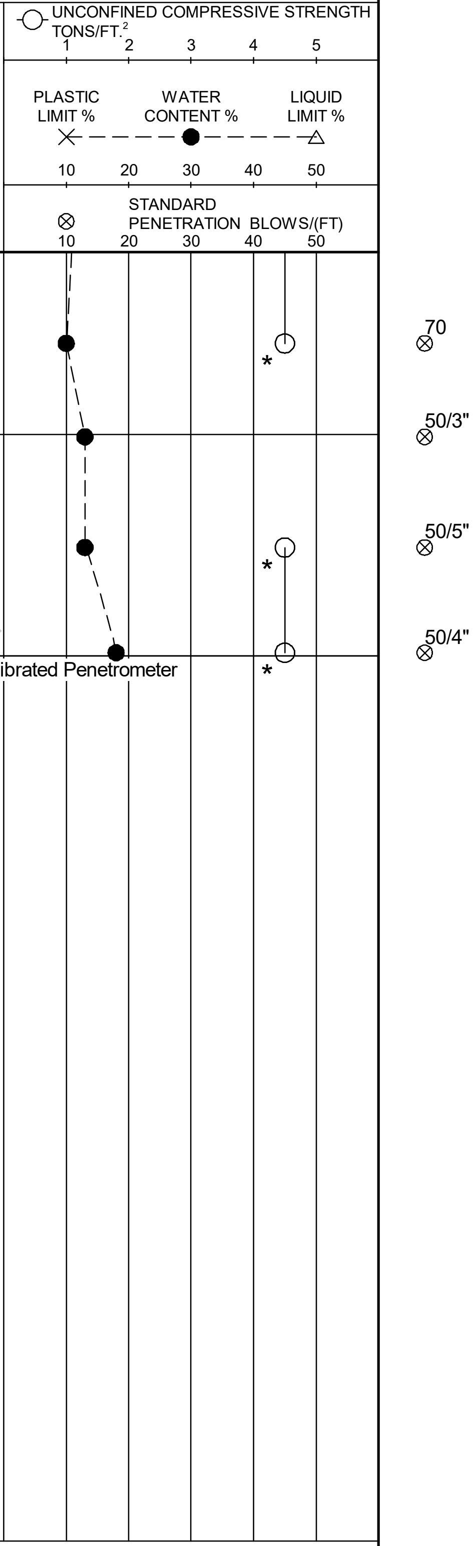
AECOM JOB NO. 60763208

SHEET NO. 1 OF 2

AECOM	CLIENT **Public Building Commission of Chicago**	LOG OF BORING NUMBER	**B-25-01**
	PROJECT NAME **DWM New Facility Geotech**	ARCHITECT-ENGINEER **AECOM**	

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +34.3 CCD (Continued)	UNIT DRY WT. LBS./FT.^{3}
						Silty clay - little gravel - gray - hard (CL-ML)	
65.0		13	SS				
						68.5	
		14	SS			Weathered bedrock - gray - hard	
70.0							
		15	SS				
75.0							
78.8		16	SS			78.8	
						End of Boring Boring advanced to 18.5 feet using hollow-stem auger. Boring advanced from 18.5 to 78.8 feet using rotary bit and drilling fluid. HW casing driving to 20 feet. Standard Penetration Test performed with automatic hammer. Boring backfilled with chipped bentonite.	



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

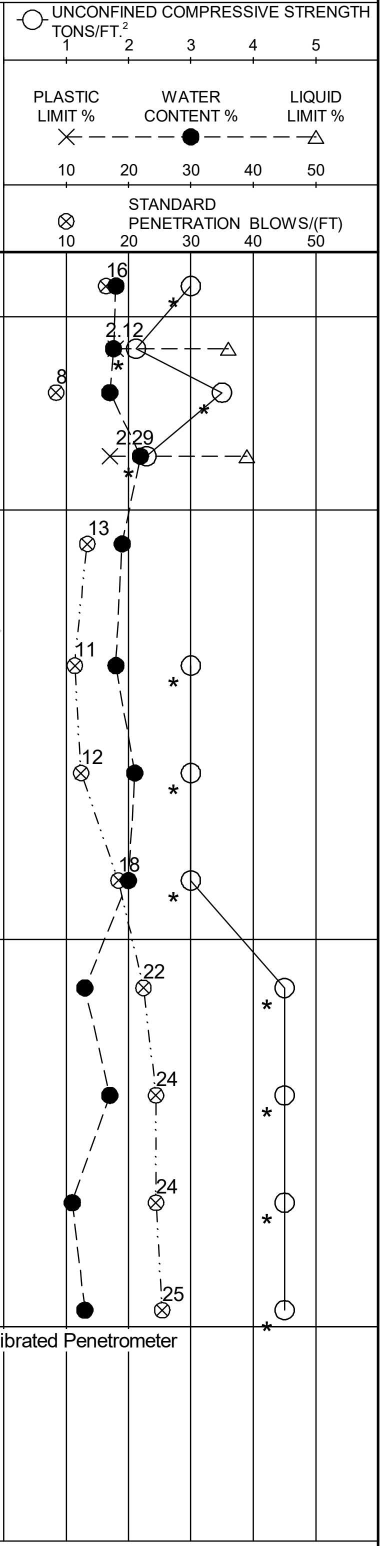
NORTHING **1931363.886**	BORING STARTED **8/13/25**	AECOM OFFICE **Chicago, IL**	
EASTING **1143003.584**	BORING COMPLETED **8/13/25**	ENTERED BY **MB**	SHEET NO. **2** OF **2**
WL	RIG/FOREMAN **7822 DT/Wang**	APP'D BY	AECOM JOB NO. **60763208**

AECOM	CLIENT **Public Building Commission of Chicago**	LOG OF BORING NUMBER	**B-25-02**
	PROJECT NAME **DWM New Facility Geotech**	ARCHITECT-ENGINEER **AECOM**	

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

SURFACE ELEVATION +34.1 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS	Fill: Clay - little sand and gravel - gray, brown, and black - very stiff	
				3.0	
5.0		ST1	ST	Lean clay - little gravel - gray with brown - very stiff (CL)	111
		2	SS		
10.0		ST2	ST		105
				12.0	
15.0		3	SS	Lean clay - little gravel - gray - very stiff (CL)	
20.0		4	SS		
25.0		5	SS		
30.0		6	SS		
				32.0	
35.0		7	SS	Lean clay - little to some gravel - gray - hard (CL)	
40.0		8	SS		
45.0		9	SS		
50.0		10	SS	50.0	



* Calibrated Penetrometer

End of Boring
Boring advanced to 8 feet with solid-stem auger.
Boring advanced from 8 to 50 feet with rotary bit and drilling fluid.
HW temporary casing driven to 8 feet.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with chipped bentonite.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

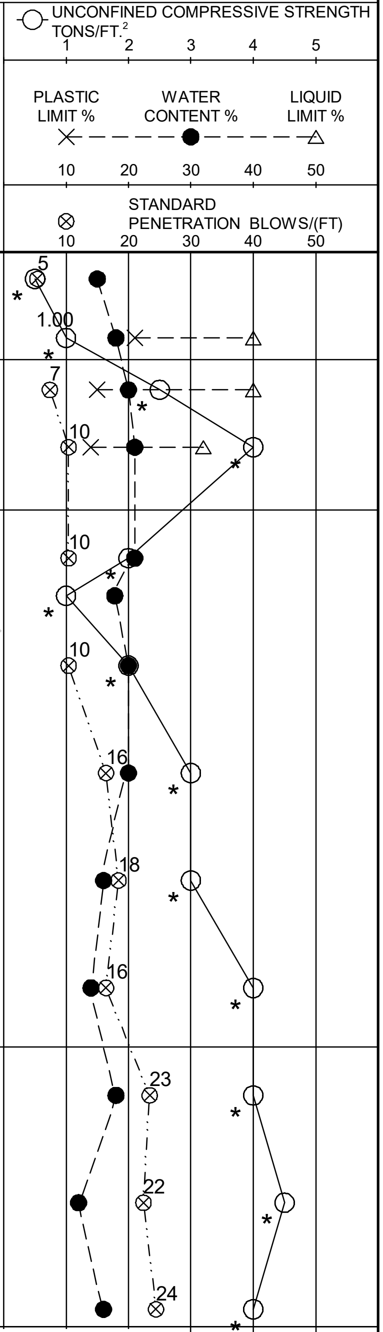
NORTHING **1931368.451**	BORING STARTED **8/12/25**	AECOM OFFICE **Chicago, IL**	
EASTING **1143303.673**	BORING COMPLETED **8/12/25**	ENTERED BY **MB**	SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **CME-55/Wang**	APP'D BY	AECOM JOB NO. **60763208**

AECOM

CLIENT	**Public Building Commission of Chicago**
LOG OF BORING NUMBER	**B-25-03**
PROJECT NAME	**DWM New Facility Geotech**
ARCHITECT-ENGINEER	**AECOM**
SITE LOCATION	**4825 W. Lawrence Ave., Chicago, IL**

SURFACE ELEVATION +34.8 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS	Lean clay - little gravel - dark gray - medium stiff to stiff (CL)	
5.0		ST1	ST	5.0	90
		2	SS	Lean clay with sand - little gravel - gray - very stiff to hard (CL)	
10.0		3	SS		
				12.0	
				Lean clay - little gravel - gray - stiff to hard (CL)	
15.0		4	SS		
		ST2	ST		110
20.0		5	SS		
25.0		6	SS		
30.0		7	SS		
35.0		8	SS		
				37.0	
				Lean clay - some gravel - gray - hard (CL)	
40.0		9	SS		
45.0		10	SS		
50.0		11	SS	50.0	



End of Boring
Boring advanced to 8 feet with solid-stem auger.
Boring advanced from 8 to 50 feet with rotary bit and drilling fluid.
HW temporary casing driven to 10 feet.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with chipped bentonite.

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING 1931244.356	BORING STARTED 8/14/25	AECOM OFFICE Chicago, IL	
EASTING 1143035.993	BORING COMPLETED 8/14/25	ENTERED BY MB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/Wang	APP'D BY	AECOM JOB NO. 60763208

AECOM	CLIENT **Public Building Commission of Chicago**	LOG OF BORING NUMBER **B-25-04**
	PROJECT NAME **DWM New Facility Geotech**	ARCHITECT-ENGINEER **AECOM**

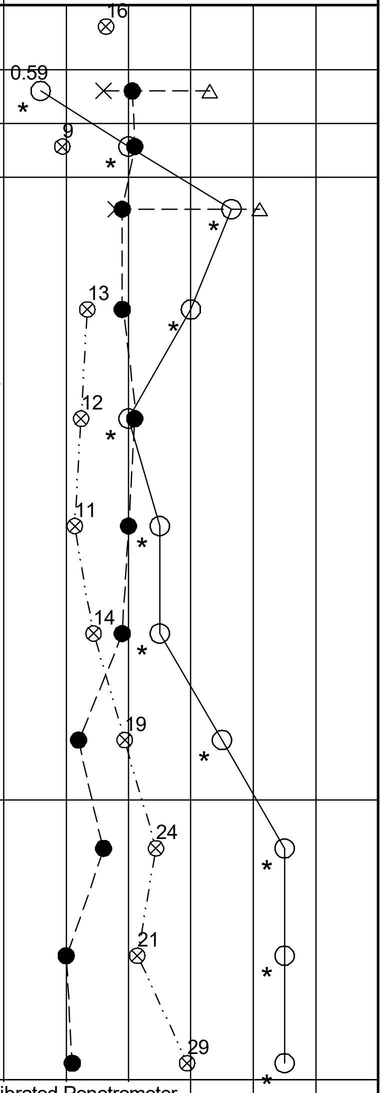
SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

-○- UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % × WATER CONTENT % ● LIQUID LIMIT % △ 10 20 30 40 50

⊗ STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +34.8 CCD	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Gravel - medium dense 3.0	
5.0		ST1	ST			Sandy lean clay with gravel - brown to gray - medium stiff (CL) 5.5	103
		2	SS		▼	Lean clay - brown to gray - very stiff (CL) 8.0	
10.0		ST2	ST			Lean clay - little gravel - gray - very stiff (CL)	109
15.0		3	SS				
20.0		4	SS				
25.0		5	SS				
30.0		6	SS				
35.0		7	SS			37.0	
						Lean clay - little to some gravel - gray - hard (CL)	
40.0		8	SS				
45.0		9	SS				
50.0		10	SS			50.0	



End of Boring
Boring advanced to 8 feet with solid-stem auger.
Boring advanced from 8 to 50 feet with rotary bit and drilling fluid.
HW temporary casing driven to 8 feet.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with chipped bentonite.

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

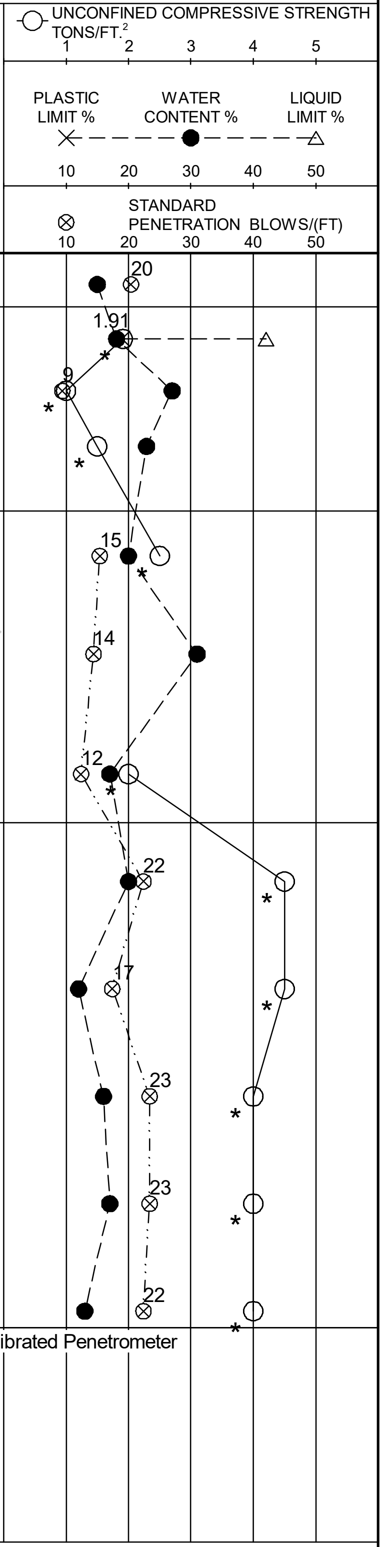
NORTHING **1931243.668**	BORING STARTED **8/12/25**	AECOM OFFICE **Chicago, IL**	
EASTING **1143278.474**	BORING COMPLETED **8/12/25**	ENTERED BY **MB**	SHEET NO. **1** OF **1**
WL **6.3 @ 24 Hr.**	RIG/FOREMAN **CME-55/Wang**	APP'D BY	AECOM JOB NO. **60763208**

AECOM

CLIENT	**Public Building Commission of Chicago**
LOG OF BORING NUMBER	**B-25-05**
PROJECT NAME	**DWM New Facility Geotech**
ARCHITECT-ENGINEER	**AECOM**
SITE LOCATION	**4825 W. Lawrence Ave., Chicago, IL**

SURFACE ELEVATION +36.3 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS	Fill: Gravel - glass - black - medium dense	
2.5				Lean clay - little gravel - dark gray to gray - stiff (CL)	
5.0		ST1	ST		109
		2	SS		
10.0		ST2	ST		101
12.0				Lean clay - little gravel - gray - very stiff (CL)	
15.0		3	SS		
20.0		4	SS		
25.0		5	SS		
26.5				Lean clay - little gravel - gray - hard (CL)	
30.0		6	SS		
35.0		7	SS		
40.0		8	SS		
45.0		9	SS		
50.0		10	SS		



End of Boring

Boring advanced to 8 feet with solid-stem auger.

Boring advanced from 8 to 50 feet with rotary bit and drilling fluid.

HW temporary casing driven to 8 feet.

Standard Penetration Test performed with automatic hammer.

Boring backfilled with chipped bentonite.

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING	1931051.109	BORING STARTED	8/11/25	AECOM OFFICE	Chicago, IL
EASTING	1143092.491	BORING COMPLETED	8/11/25	ENTERED BY	MB
				SHEET NO.	1 OF 1
WL	10.5 WD	RIG/FOREMAN	CME-55/Wang	APP'D BY	
				AECOM JOB NO.	60763208

AECOM

CLIENT **Public Building Commission of Chicago**

LOG OF BORING NUMBER **B-25-06**

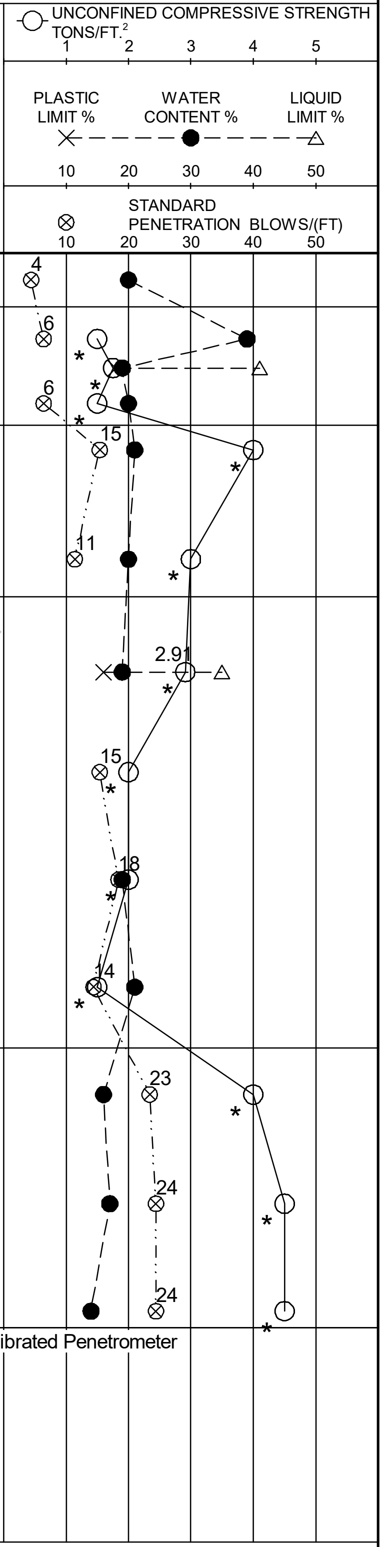
PROJECT NAME **DWM New Facility Geotech**

ARCHITECT-ENGINEER **AECOM**

SITE LOCATION **4825 W. Lawrence Ave., Chicago, IL**

SURFACE ELEVATION +34.8 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
				Fill: Clay with gravel - soft	
		1	SS		
2.5				Lean clay - little gravel - dark gray - stiff	
5.0		2	SS		
		ST2	ST	- Shelby tube sample (ST1) collected in offset boring at 4.5 to 6.5 feet	
		3	SS		
8.0				Lean clay - little gravel - brown to gray - hard to very stiff (CL)	
10.0		4	SS		
15.0		5	SS		
16.0				Lean clay - little gravel - gray - very stiff to stiff (CL)	
20.0		ST1	ST		110
25.0		6	SS		
30.0		7	SS		
35.0		8	SS		
37.0				Lean clay - little to some gravel - hard (CL)	
40.0		9	SS		
45.0		10	SS		
50.0		11	SS		
50.0				End of Boring Boring advanced 50 feet with rotary bit and drilling fluid. HW temporary casing driven to 8 feet. Standard Penetration Test performed with automatic hammer. Boring backfilled with chipped bentonite.	



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING 1931108.084	BORING STARTED 8/11/25	AECOM OFFICE Chicago, IL
EASTING 1143325.962	BORING COMPLETED 8/11/25	ENTERED BY MB / SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/Wang	APP'D BY / AECOM JOB NO. 60763208

AECOM

CLIENT
Public Building Commission of Chicago

LOG OF BORING NUMBER **B-25-07**

PROJECT NAME
DWM New Facility Geotech

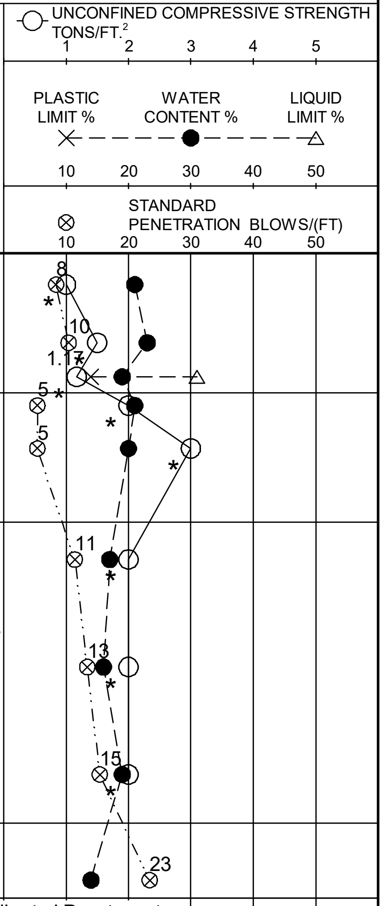
ARCHITECT-ENGINEER
AECOM

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

SURFACE ELEVATION +35.5 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY		DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS				Lean clay - little gravel - dark gray - stiff (CL)	
5.0		2	SS				- Shelby tube sample (ST1) collected in offset boring at 4.5 to 6.5 feet	
		ST1	ST			6.5		107
		3	SS				Lean clay - little gravel - brown to gray - very stiff (CL)	
10.0		4	SS					
						12.5		
							Lean clay - little gravel - gray - very stiff (CL)	
15.0		5	SS					
20.0		6	SS					
25.0		7	SS					
						26.5	Silty sand - little gravel - gray - medium dense - moist (SM)	
30.0		8	SS			30.0		

End of Boring
Boring advanced to 30 feet with hollow-stem auger.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with chipped bentonite.



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING **1931156.7088**	BORING STARTED **8/8/25**	AECOM OFFICE **Chicago, IL**
EASTING **1143186.1226**	BORING COMPLETED **8/8/25**	ENTERED BY **MB** / SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **D-25/Wang**	APP'D BY / AECOM JOB NO. **60763208**

AECOM

CLIENT
Public Building Commission of Chicago

LOG OF BORING NUMBER **B-25-08**

PROJECT NAME
DWM New Facility Geotech

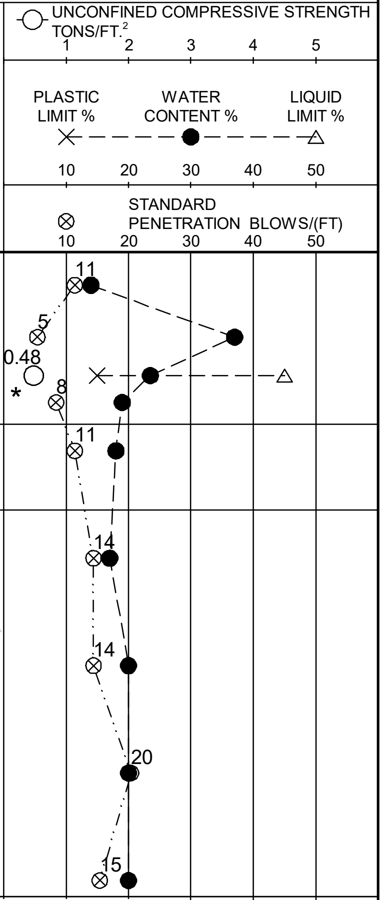
ARCHITECT-ENGINEER
AECOM

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

SURFACE ELEVATION +34.3 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS	Lean clay - little gravel - dark gray - medium to soft (CL)	
5.0		2	SS	- Shelby tube sample (ST1) collected in offset boring at 4.5 to 6.5 feet	
		ST1	ST		102
8.0		3	SS		
10.0		4	SS	Lean clay - little gravel - brown to gray - stiff (CL)	
12.0				Lean clay - little gravel - gray - stiff to very stiff (CL)	
15.0		5	SS		
20.0		6	SS		
25.0		7	SS	- cobble at 25 feet	
30.0		8	SS		

End of Boring
Boring advanced to 30 feet with hollow-stem auger.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with chipped bentonite.



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING 1930753.798	BORING STARTED 8/7/25	AECOM OFFICE Chicago, IL	
EASTING 1143232.615	BORING COMPLETED 8/7/25	ENTERED BY MB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN D-25/Wang	APP'D BY	AECOM JOB NO. 60763208

AECOM

CLIENT
Public Building Commission of Chicago

LOG OF BORING NUMBER **B-25-09**

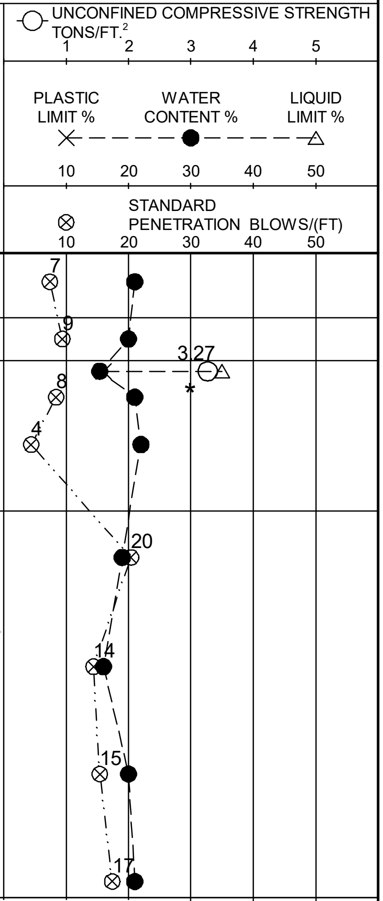
PROJECT NAME
DWM New Facility Geotech

ARCHITECT-ENGINEER
AECOM

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

SURFACE ELEVATION +35.5 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS	Fill: Clay - some gravel - black - medium	
3.0					
5.0		2	SS	Lean clay - little gravel and organics - dark gray - stiff (CL)	
5.0		ST1 3	ST SS	Lean clay - little gravel - gray - very stiff to medium (CL) - Shelby tube sample (ST1) collected in offset boring at 4 to 6 feet	116
▼					
10.0		4	SS		
12.0				Lean clay - little gravel - gray - very stiff to stiff (CL)	
15.0		5	SS		
20.0		6	SS		
25.0		7	SS		
30.0		8	SS		
30.0				End of Boring Boring advanced to 30 feet with hollow-stem auger. Standard Penetration Test performed with automatic hammer. Boring backfilled with chipped bentonite.	



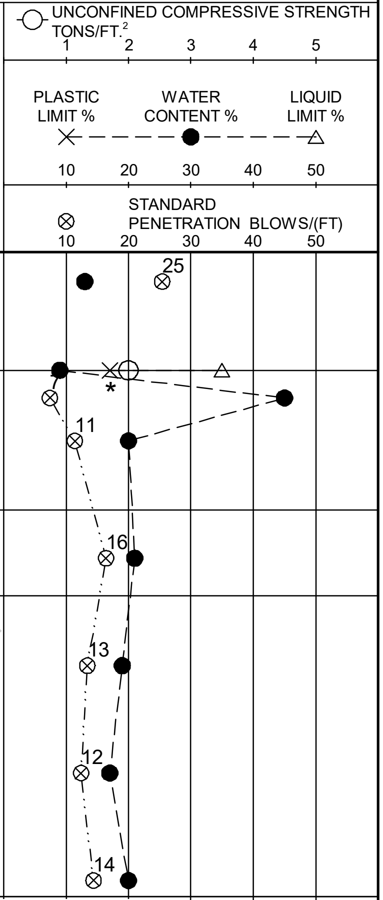
*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING 1930933.504	BORING STARTED 8/8/25	AECOM OFFICE Chicago, IL
EASTING 1143335.619	BORING COMPLETED 8/8/25	ENTERED BY MB / SHEET NO. 1 OF 1
WL 8.5 WS	RIG/FOREMAN D-25/Wang	APP'D BY / AECOM JOB NO. 60763208

CLIENT	**Public Building Commission of Chicago**	LOG OF BORING NUMBER	**B-25-10**
PROJECT NAME	**DWM New Facility Geotech**	ARCHITECT-ENGINEER	**AECOM**
SITE LOCATION	**4825 W. Lawrence Ave., Chicago, IL**		

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +37.1 CCD	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Clayey gravel with sand - dark gray - medium dense - moist (GC)	
5.0		STA	ST			5.5	
		STB	ST			Lean clay with gravel - dark gray to gray - very stiff to medium stiff (CL)	
		3	SS				
10.0		4	SS				
						12.0	
						Lean clay - brown to gray - very stiff (CL)	
15.0		5	SS				
						16.0	
						Lean clay - little gravel - gray - stiff (CL)	
20.0		6	SS				
25.0		7	SS				
30.0		8	SS			30.0	
						End of Boring Boring advanced to 30.0 feet with hollow-stem auger. Standard Penetration Test performed with automatic hammer. Boring backfilled with chipped bentonite.	



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING	1930586.877	BORING STARTED	8/7/25	AECOM OFFICE	Chicago, IL		
EASTING	1143334.527	BORING COMPLETED	8/7/25	ENTERED BY	MB	SHEET NO.	1 OF 1
WL		RIG/FOREMAN	D-25/Wang	APP'D BY		AECOM JOB NO.	60763208

CLIENT
Public Building Commission of Chicago

LOG OF BORING NUMBER **B-25-11**

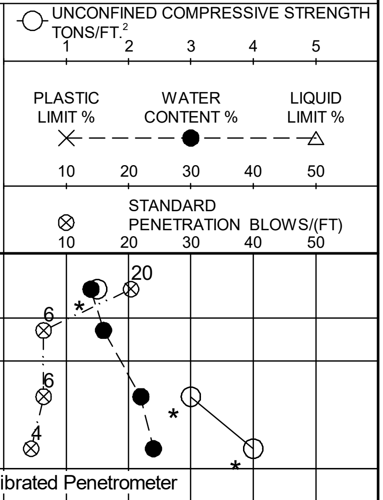
PROJECT NAME
DWM New Facility Geotech

ARCHITECT-ENGINEER
AECOM

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

SURFACE ELEVATION +35.4 CCD

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY		DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			3.0	Fill: Clay - little gravel - trace cinders - black - stiff	
5.0		2	SS			5.0	Fill: Gravel - loose	
		3	SS				Lean clay - little gravel - brown to gray - very stiff to hard (CL)	
10.0		4	SS			10.0		
							End of Boring Boring advanced to 10 feet with hollow-stem auger. Standard Penetration Test performed with automatic hammer. Boring backfilled with automatic hammer.	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING **1931016.009**

BORING STARTED **8/7/25**

AECOM OFFICE **Chicago, IL**

EASTING **1143198.678**

BORING COMPLETED **8/7/25**

ENTERED BY **MB**

SHEET NO. **1** OF **1**

WL

RIG/FOREMAN **D-25/Wang**

APP'D BY

AECOM JOB NO. **60763208**

AECOM	CLIENT **Public Building Commission of Chicago**	LOG OF BORING NUMBER **B-25-12**
	PROJECT NAME **DWM New Facility Geotech**	ARCHITECT-ENGINEER **AECOM**

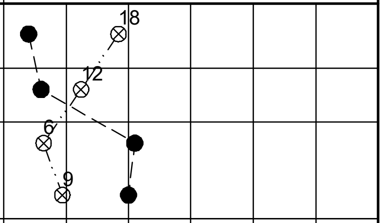
SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

-○- UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % ✕ – – – WATER CONTENT % ● – – – LIQUID LIMIT % △ 10 20 30 40 50

⊗ STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +39.5 CCD	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Gravel - black - medium dense 3.0	
5.0		2	SS			Fill: Silty sand with gravel - brown - medium dense (SM) 5.5	
		3	SS			Lean clay - little gravel - blackish gray - medium to stiff (CL)	
10.0		4	SS			10.0	



End of Boring
Boring advanced to 10 feet with hollow-stem auger.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with automatic hammer.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING **1930490.804**	BORING STARTED **8/8/25**	AECOM OFFICE **Chicago, IL**	
EASTING **1143363.294**	BORING COMPLETED **8/8/25**	ENTERED BY **MB**	SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **D-25/Wang**	APP'D BY	AECOM JOB NO. **60763208**

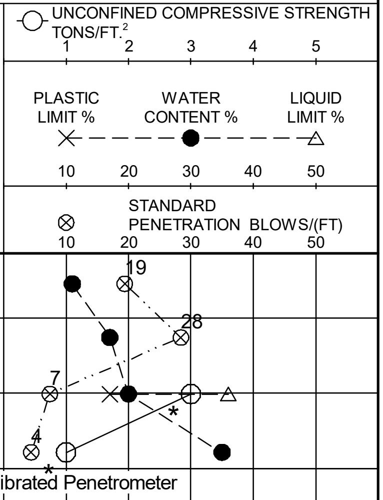
AECOM

CLIENT **Public Building Commission of Chicago**	LOG OF BORING NUMBER **B-25-13**
PROJECT NAME **DWM New Facility Geotech**	ARCHITECT-ENGINEER **AECOM**

SITE LOCATION
4825 W. Lawrence Ave., Chicago, IL

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +33.4 CCD	UNIT DRY WT. LBS./FT.³
		1	SS			▨ Fill: Gravel with sand - trace brick and cinders - black - medium dense - moist 3.0	
5.0		2	SS			▨ Fill: Silty sand with gravel - trace cinders - black to brown - medium dense - moist (SM) 6.5	
		3	SS			▨ Lean clay - grayish brown - very stiff to stiff (CL)	
10.0		4	SS			10.0	

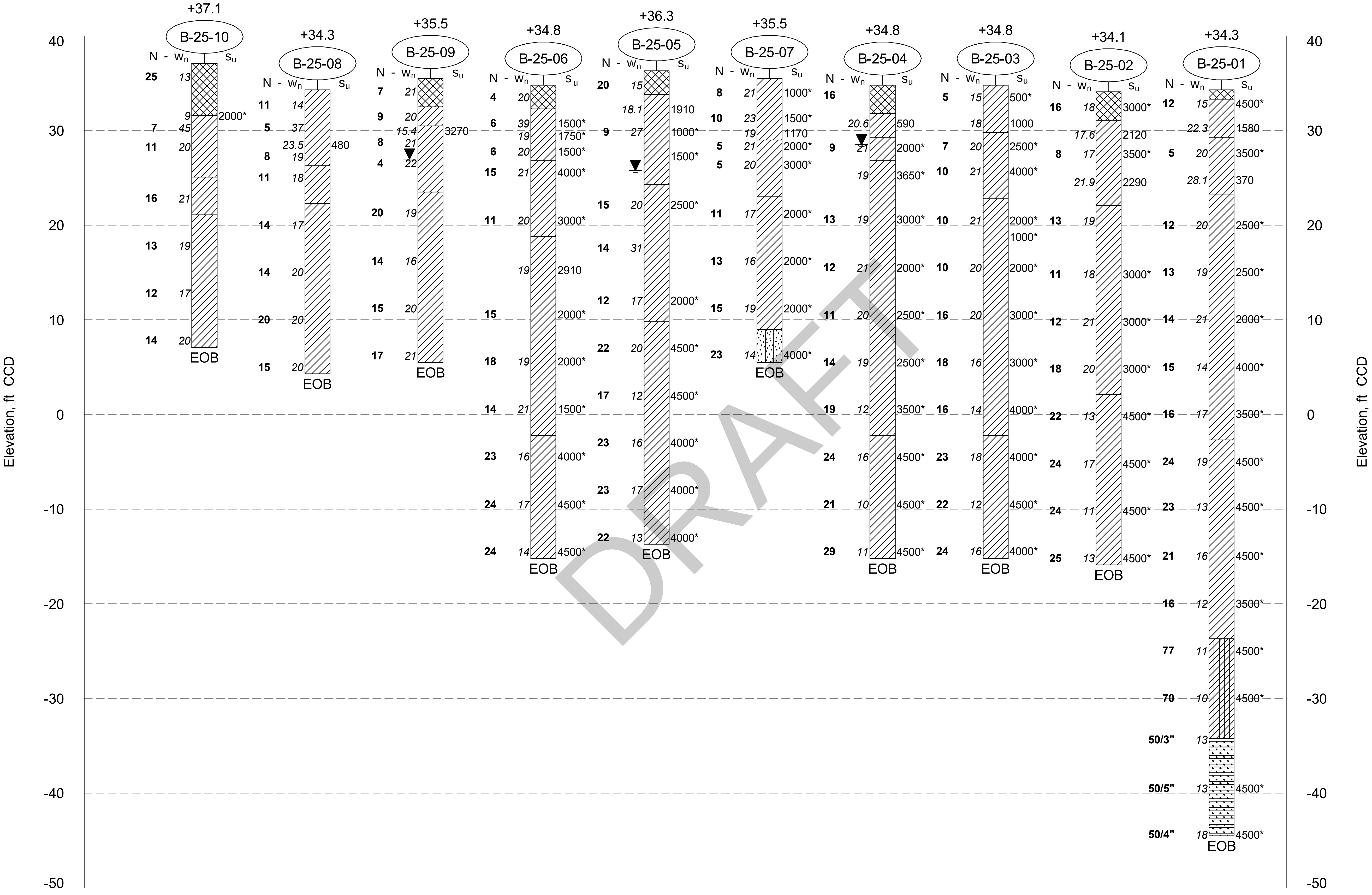
End of Boring
Boring advanced to 10 feet with hollow-stem auger.
Standard Penetration Test performed with automatic hammer.
Boring backfilled with automatic hammer.



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

NORTHING **1931418.18**	BORING STARTED **8/14/25**	AECOM OFFICE **Chicago, IL**	
EASTING **1142940.515**	BORING COMPLETED **8/14/25**	ENTERED BY **MB**	SHEET NO. **1** OF **1**
WL	RIG/FOREMAN **CME-55/Wang**	APP'D BY	AECOM JOB NO. **60763208**



Legend: N=SPT [blows/ft], w_n=Water Content [%], s_u=Undrained Shear Strength [psf], (*)=Pocket Penetrometer

Note:1) Borings are spaced equidistant for presentation purposes.
2) Undrained shear strength (su) based on hand penetrometer reading.

FENCE_DIAGRAM_11X17 60763208_PBC GEOTECH.GPJ FS_DATATEMPLATE.GDT 9/10/25

Project Name: DWM New Facility Geotech
Site Location: 4825 W. Lawrence Ave., Chicago, IL

AECOM No.	Date	Created by	Checked by	Figure No
60763208	9/10/2025	MB		1

SUBSURFACE PROFILE
FOUNDATION BORINGS

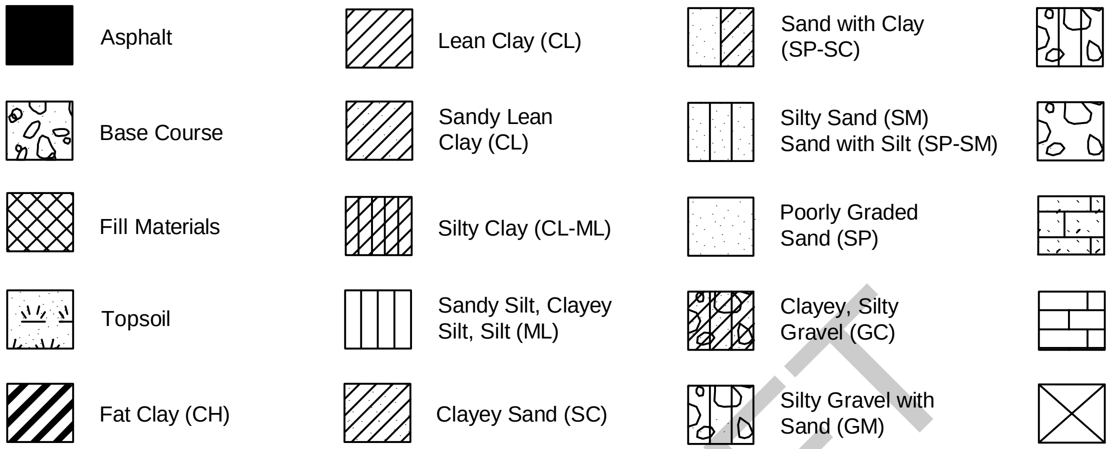
Telephone:
Fax:
http://www.aecom.com/

AECOM

AECOM

KEY TO BORING LOGS AND FENCE DIAGRAMS

TYPICAL PROFILE GRAPHIC SYMBOLS



DRILLING AND SAMPLING SYMBOLS

SS: Split Spoon Sample
ST: Shelby Tube Sample
PA: Power Auger
RB: Rotary Bit
DB: Diamond Bit-NX, BX, AX
HA: Hand Auger
BD: Blind Drill - No Sampling

WATER LEVEL MEASUREMENT SYMBOLS

WD: While Drilling
WS: While Sampling
BCI: Before Casing Installation
BCR: Before Casing Removal
ACR: After Casing Removal
AB: After Boring Completion
▼ Observed Groundwater Depth During Drilling

Notes:

Water Level Measurements:
Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In granular soils, the indicated elevations are considered reliable groundwater levels. In cohesive soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

Gradation Description and Terminology:
Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; 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 described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity. See AECOM General Notes in Appendix H for additional information regarding major components of samples, consistency of cohesive soils, and relative density of granular soils.

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler,except where otherwise noted. Also note, WOH represents that the split spoon sampler was advanced by weight of hammer.

Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

DRAFT Soil Parameters Table
Public Building Commission of Chicago
DMW New Facility
Chicago, Illinois

Boring Number	Coordinates		Approximate Ground Surface Elevation	Unit Depth Range [feet]		Predominant Soil Type	Geotechnical Soil Classification	Index Properties [%]				Total unit weight$^{(2)}$	SPT N-value	Undrained (Total)		Drained (Effective)	
	Easting [feet]	Northing [feet]	[feet CCD]	From	To	[-]	[USCS]	LL	w_{avg}	PL	PI	[pcf]	[N_{avg}]	Cohesion, c [ksf]	Friction angle, ϕ [degree]	Cohesion, c' [ksf]	Friction angle, ϕ' [degree]
B-25-01	1143003.584	1931363.886	34.3	0.0	1.0	Fill: Gravel	FILL-GP	-	15	-	-	115	12	Note 1	Note 1	Note 1	Note 1
				1.0	5.0	Lean Clay	CL	42	15	18	24	120	-	1.6	0	0	27
				5.0	11.0	Lean Clay	CL	41	20	16	25	115	5	0.4	0	0	28
				11.0	37.0	Lean Clay	CL	36	18	16	20	130	14	2.0	0	0	29
				37.0	58.0	Lean Clay	CL	24	15	14	10	135	21	3.0	0	0	30
				58.0	68.5	Silty Clay	CL-ML	19	11	14	5	100	74	4.5	0	0	31
				68.5	78.8	Wthrd. Bedrock	-	-	15	-	-	-	50/4"	4.5	0	0	34
				78.8	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-02	1143303.673	1931368.451	34.1	0.0	3.0	Fill: Clay	FILL-CL	-	18	-	-	120	16	Note 1	Note 1	Note 1	Note 1
				3.0	12.0	Lean Clay	CL	38	17	18	20	130	8	2.1	0	0	29
				12.0	32.0	Lean Clay	CL	-	20	-	-	130	14	2.0	0	0	29
				32.0	50.0	Lean Clay	CL	-	14	-	-	135	24	3.0	0	0	30
				50.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-03	1143035.993	1931244.356	34.8	0.0	5.0	Lean Clay	CL	40	15	21	19	120	5	1.0	0	0	27
				5.0	12.0	Lean Clay	CL	40	20	15	25	125	9	1.0	0	0	28
				12.0	20.0	Lean Clay	CL	32	21	15	18	125	10	1.0	0	0	28
				20.0	37.0	Lean Clay	CL	-	17	-	-	130	17	2.0	0	0	29
				37.0	50.0	Lean Clay	CL	-	15	-	-	135	23	3.0	0	0	30
				50.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-04	1143278.474	1931243.668	34.8	0.0	3.0	Fill: Gravel	FILL-GP	-	4	-	-	115	16	Note 1	Note 1	Note 1	Note 1
				3.0	5.5	Sandy Lean Clay	CL	33	-	16	17	125	-	0.6	0	0	27
				5.5	8.0	Lean Clay	CL	41	21	18	23	130	9	1.0	0	0	28
				8.0	37.0	Lean Clay	CL	-	18	-	-	130	14	2.0	0	0	29
				37.0	50.0	Lean Clay	CL	-	12	-	-	135	25	3.0	0	0	30
				50.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-

DRAFT Soil Parameters Table
Public Building Commission of Chicago
DMW New Facility
Chicago, Illinois

Boring Number	Coordinates		Approximate Ground Surface Elevation	Unit Depth Range [feet]		Predominant Soil Type	Geotechnical Soil Classification	Index Properties [%]				Total unit weight$^{(2)}$	SPT N-value	Undrained (Total)		Drained (Effective)	
	Easting [feet]	Northing [feet]												Cohesion, c [ksf]	Friction angle, ϕ [degree]	Cohesion, c' [ksf]	Friction angle, ϕ' [degree]
			[feet CCD]	From	To	[-]	[USCS]	LL	w_{avg}	PL	PI	[pcf]	[N_{avg}]				
B-25-05	1143092.491	1931051.109	36.3	0.0	2.5	Fill: Gravel	FILL-GP	-	15	-	-	115	20	Note 1	Note 1	Note 1	Note 1
				2.5	12.0	Lean Clay	CL	42	27	19	23	130	9	1.5	0	0	27
				12.0	26.5	Lean Clay	CL	-	23	-	-	130	14	2.0	0	0	29
				26.5	50.0	Lean Clay	CL	-	16	-	-	135	21	3.0	0	0	30
				50.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-06	1143325.962	1931108.084	34.8	0.0	2.5	Fill: Clay	FILL-CL	-	20	-	-	120	4	Note 1	Note 1	Note 1	Note 1
				2.5	8.0	Lean Clay	CL	41	30	18	23	125	6	0.6	0	0	27
				8.0	16.0	Lean Clay	CL	-	21	-	-	130	13	1.5	0	0	28
				16.0	37.0	Lean Clay	CL	35	19	16	19	130	16	2.0	0	0	29
				37.0	50.0	Lean Clay	CL	-	16	-	-	135	24	3.0	0	0	30
				50.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-07	1143186.123	1931156.709	35.5	0.0	6.5	Lean Clay	CL	31	22	14	17	125	9	1.0	0	0	27
				6.5	12.5	Lean Clay	CL	-	21	-	-	130	5	1.0	0	0	28
				12.5	26.5	Lean Clay	CL	-	17	-	-	130	13	2.0	0	0	29
				26.5	30.0	Silty Sand	SM	-	14	-	-	115	23	0.0	32	0	32
				30.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-08	1143232.615	1930753.798	34.3	0.0	8.0	Lean Clay	CL	45	23	15	30	120	8	0.5	0	0	27
				8.0	12.0	Lean Clay	CL	-	18	-	-	125	11	1.0	0	0	28
				12.0	30.0	Lean Clay	CL	-	19	-	-	130	16	2.0	0	0	29
				30.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-09	1143335.619	1930933.504	35.5	0.0	3.0	Fill: Clay	FILL-CL	-	21	-	-	120	7	Note 1	Note 1	Note 1	Note 1
				3.0	5.0	Lean Clay	CL	35	20	16	19	130	9	1.0	0	0	28
				5.0	12.0	Lean Clay	CL	-	22	-	-	130	6	1.0	0	0	28
				12.0	30.0	Lean Clay	CL	-	19	-	-	130	17	2.0	0	0	29
				30.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-

DRAFT Soil Parameters Table
Public Building Commission of Chicago
DMW New Facility
Chicago, Illinois

Boring Number	Coordinates		Approximate Ground Surface Elevation	Unit Depth Range [feet]		Predominant Soil Type	Geotechnical Soil Classification	Index Properties [%]				Total unit weight(2)	SPT N-value	Undrained (Total)		Drained (Effective)	
	Easting [feet]	Northing [feet]	[feet CCD]	From	To	[-]	[USCS]	LL	w_{avg}	PL	PI	[pcf]	[N_{avg}]	Cohesion, c [ksf]	Friction angle, ϕ [degree]	Cohesion, c' [ksf]	Friction angle, ϕ' [degree]
B-25-10	1143334.527	1930586.877	37.1	0.0	5.5	Fill: Gravel	FILL-GC	-	10	-	-	115	25	Note 1	Note 1	Note 1	Note 1
				5.5	12.0	Lean Clay	CL	35	33	17	18	120	9	1.0	0	0	27
				12.0	16.0	Lean Clay	CL	-	21	-	-	130	16	2.0	0	0	28
				16.0	30.0	Lean Clay	CL	-	19	-	-	130	13	1.5	0	0	29
				30.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-11	1143198.678	1931016.009	35.4	0.0	3.0	Fill: Clay	FILL-CL	-	14	-	-	120	20	Note 1	Note 1	Note 1	Note 1
				3.0	5.0	Fill: Gravel	FILL-GP	-	16	-	-	115	6	Note 1	Note 1	Note 1	Note 1
				5.0	10.0	Lean Clay	CL	-	23	-	-	120	5	1.5	0	0	29
				10.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-12	1143363.294	1930490.804	39.5	0.0	3.0	Fill: Gravel	FILL-GP	-	4	-	-	115	18	Note 1	Note 1	Note 1	Note 1
				3.0	5.5	Fill: Silty Sand	FILL-SP	-	6	-	-	115	12	Note 1	Note 1	Note 1	Note 1
				5.5	10.0	Lean Clay	CL	-	21	-	-	120	8	0.9	0	0	27
				10.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-
B-25-13	1142940.515	1931418.180	33.4	0.0	3.0	Fill: Gravel	FILL-GP	-	11	-	-	115	20	Note 1	Note 1	Note 1	Note 1
				3.0	6.5	Fill: Silty Sand	FILL-SP	-	17	-	-	115	6	Note 1	Note 1	Note 1	Note 1
				6.5	10.0	Lean Clay	CL	36	28	17	19	120	5	1.0	0	0	28
				10.0	-	End of Boring	-	-	-	-	-	-	-	-	-	-	-

NOTE: (1) Materials not tested during field investigation; subsequently, anticipated material properties are not presented.

(2) For soil below the groundwater table, the effective soil unit weight should be used. The effective soil unit weight is the unit wieght of water (62.4 pcf) subtracted from the total soil unit weight.

Summary of Geotechnical Laboratory Test Results

Boring	Sample Number	Sample Depth [feet bgs]	USCS	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Soil Dry Unit Weight [pcf]	Soil Moisture Content [%]	Unconfined Compressive Strength [tsf]	Initial Void Ratio	Compression Index[1]	Swelling Index	Preconsolidation Pressure [psf]	% Gravel	% Sand	% Silt	% Clay
B-25-01	ST1	3.5 – 5.5	CL	42	18	24	100.4	22.3	1.58	0.71	-	-	-	-	-	-	-
B-25-01	2	6.0 – 7.5	CL	38	16	22	-	-	-	-	-	-	-	-	-	-	-
B-25-01	ST2	8.5 – 10.5	CL	43	16	27	94.9	28.1	0.37	0.81	-	-	-	-	-	-	-
B-25-01	3	13.5 – 15.0	CL	36	16	20	-	-	-	-	-	-	-	-	-	-	-
B-25-01	4	18.5 – 20.0	CL	35	15	20	-	-	-	-	-	-	-	-	-	-	-
B-25-01	9	43.5 – 45.0	CL	24	14	10	-	-	-	-	-	-	-	-	-	-	-
B-25-01	12	58.5 – 60.0	CL	19	14	5	-	-	-	-	-	-	-	-	-	-	-
B-25-02	ST1	3.5 – 5.5	CL	36	18	18	111.4	17.6	2.12	0.54	-	-	-	-	-	-	-
B-25-02	ST2	8.5 – 10.5	CL	39	17	22	104.9	21.9	2.29	0.64	-	-	-	-	-	-	-
B-25-03	ST1	3.0 – 5.0	CL	40	21	19	90.2	18.0	1.00	0.90	-	-	-	-	-	-	-
B-25-03	2	6.0 – 7.5	CL	40	15	25	-	-	-	-	-	-	-	0.0	16.3	30.9	52.8
B-25-03	3	8.5 – 10.0	CL	32	14	18	-	-	-	-	-	-	-	0.0	18.3	34.8	47.0
B-25-03	ST2	15.0-17.0	CL	-	-	-	110.4	17.8	-	0.55	0.13	0.041	4,164	-	-	-	-
B-25-04	ST1	3.0 – 5.0	CL	33	16	17	102.7	20.6	0.59	0.67	-	-	-	-	-	-	-
B-25-04	ST2	8.5 – 10.5	CL	41	18	23	109.1	19.0	3.65	0.57	-	-	-	-	-	-	-
B-25-05	ST1	3.0 – 5.0	CL	42	19	23	108.5	18.1	1.91	0.58	-	-	-	-	-	-	-
B-25-05	ST2	8.0 – 10.0	CL	-	-	-	101.0	22.9	-	0.70	0.17	0.054	3,201	-	-	-	-
B-25-06	ST2	4.5 – 6.5	CL	41	18	23	-	-	-	-	-	-	-	-	-	-	-
B-25-06	ST1	18.5 – 20.5	CL	35	16	19	109.6	19.0	2.91	0.57	-	-	-	-	-	-	-
B-25-07	ST1	4.5 – 6.5	CL	31	14	17	106.9	19.0	1.17	0.61	-	-	-	-	-	-	-
B-25-07	8	28.5 – 30.0	SM	-	-	-	-	-		-	-	-	-	4.8	72.6	13.1	9.4
B-25-08	ST1	4.5 – 5.5	CL	45	15	30	101.5	23.5	0.48	0.69	-	-	-	-	-	-	-
B-25-09	ST1	4.0 – 6.0	CL	35	16	19	115.9	15.4	3.27	0.48	-	-	-	-	-	-	-
B-25-10	STA/STB	4.5 – 6.5	CL	35	17	18	-	-		-	-	-	-	-	-	-	-
B-25-12	2	3.5 – 5.0	SM	-	-	-	-	-	-	-	-	-	-	15.0	65.9	14.7	4.4
B-25-13	3	6.0 – 7.5	CL	36	17	19	-	-	-	-	-	-	-	0.1	11.2	34.3	54.4

Notes: “bgs” = below ground surface

1. Presented values were field corrected by Wang Engineering.

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

WATER CONTENT of SOILS and ROCK by MASS

AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	*Hour*
Oven in:	8/20/2025	15:30
Analyst:	JD	
Oven out:	8/21/2025	13:00
Analyst:	IR	

Boring No. **B-25-01**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**6-7.5**	**13.5-15**	**18.5-20**	**23.5-25**	**28.5-30**
Mass of tare and wet soil Ww (g) =	37.21	35.35	36.19	35.20	37.80	37.97
Mass of tare and dry soil Wd (g) =	33.71	31.42	31.98	31.35	33.30	34.68
Mass of tare Wt (g) =	11.07	11.65	11.10	11.19	11.43	11.06
Water content w =	**15%**	**20%**	**20%**	**19%**	**21%**	**14%**

Sample No.	**7**	**8**	**9**	**10**	**11**	**12**
Sampling interval	**33.5-35**	**38.5-40**	**43.5-45**	**48.5-50**	**53.5-55**	**58.5-60**
Mass of tare and wet soil Ww (g) =	36.31	37.80	36.05	36.37	35.17	36.29
Mass of tare and dry soil Wd (g) =	32.69	33.47	33.28	32.82	32.50	33.73
Mass of tare Wt (g) =	11.17	11.25	11.12	11.30	11.07	11.17
Water content w =	**17%**	**19%**	**13%**	**16%**	**12%**	**11%**

Sample No.	**13**	**14**	**15**	**16**		
Sampling interval	**63.5-65**	**68.5-70**	**73.5-75**	**78.5-80**		
Mass of tare and wet soil Ww (g) =	35.59	35.94	39.39	36.13		
Mass of tare and dry soil Wd (g) =	33.28	32.98	36.20	32.37		
Mass of tare Wt (g) =	11.22	10.98	11.07	11.06		
Water content w =	**10%**	**13%**	**13%**	**18%**		

Prepared By: Matt Ciapas Date: 9/2/2025
Approved By: Mickey Snider Date: 9/2/2025

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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	Hour
Oven in:	8/21/2025	12:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No. **B-25-02**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**6-7.5**	**13.5-15**	**18.5-20**	**23.5-25**	**28.5-30**
Mass of tare and wet soil Ww (g) =	38.50	38.06	36.23	39.49	37.10	36.44
Mass of tare and dry soil Wd (g) =	34.38	34.05	32.23	35.20	32.56	32.24
Mass of tare Wt (g) =	11.37	11.13	11.25	10.98	11.17	11.68
Water content w =	**18%**	**17%**	**19%**	**18%**	**21%**	**20%**

Sample No.	**7**	**8**	**9**	**10**		
Sampling interval	**33.5-35**	**38.5-40**	**43.5-45**	**48.5-50**		
Mass of tare and wet soil Ww (g) =	36.31	36.37	35.83	38.56		
Mass of tare and dry soil Wd (g) =	33.45	32.63	33.38	35.38		
Mass of tare Wt (g) =	11.43	11.10	11.17	11.57		
Water content w =	**13%**	**17%**	**11%**	**13%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
Approved By: Mickey Snider Date: 9/2/2025

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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.

Project: PBC DWM Operations Facility

WEI Job No: 11255119

Sample Type: SS

Sample Date: N/A

	Date	Hour
Oven in:	8/21/2025	14:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No. **B-25-03**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**6-7.5**	**8.5-10**	**13.5-15**	**18.5-20**	**23.5-25**
Mass of tare and wet soil Ww (g) =	35.71	37.39	36.37	37.14	35.59	35.45
Mass of tare and dry soil Wd (g) =	32.47	33.07	32.00	32.74	31.55	31.46
Mass of tare Wt (g) =	11.14	11.52	10.85	11.32	11.24	11.26
Water content w =	**15%**	**20%**	**21%**	**21%**	**20%**	**20%**

Sample No.	**7**	**8**	**9**	**10**	**11**	
Sampling interval	**28.5-30**	**33.5-35**	**38.5-40**	**43.5-45**	**48.5-50**	
Mass of tare and wet soil Ww (g) =	36.75	36.74	37.27	36.42	38.56	
Mass of tare and dry soil Wd (g) =	33.20	33.63	33.20	33.66	34.74	
Mass of tare Wt (g) =	11.16	11.12	11.12	11.29	11.26	
Water content w =	**16%**	**14%**	**18%**	**12%**	**16%**	

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025

Approved By: Mickey Snider Date: 9/2/2025

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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	Hour
Oven in:	8/20/2025	15:30
Analyst:	JD	
Oven out:	8/21/2025	13:00
Analyst:	IR	

Boring No. **B-25-04**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**6-7.5**	**13.5-5**	**18.5-20**	**23.5-25**	**28.5-30**
Mass of tare and wet soil Ww (g) =	35.58	35.69	38.73	35.43	35.93	36.75
Mass of tare and dry soil Wd (g) =	34.66	31.45	34.37	31.24	31.78	32.56
Mass of tare Wt (g) =	11.45	11.33	11.21	11.21	11.17	11.02
Water content w =	**4%**	**21%**	**19%**	**21%**	**20%**	**19%**

Sample No.	**7**	**8**	**9**	**10**		
Sampling interval	**33.5-35**	**38.5-40**	**43.5-45**	**48.5-50**		
Mass of tare and wet soil Ww (g) =	35.71	37.86	35.58	36.03		
Mass of tare and dry soil Wd (g) =	33.17	34.13	33.29	33.48		
Mass of tare Wt (g) =	11.22	11.12	11.31	11.13		
Water content w =	**12%**	**16%**	**10%**	**11%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	Hour
Oven in:	8/21/2025	12:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No. **B-25-05**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**6-7.5**	**13.5-15**	**18.5-20**	**23.5-25**	**28.5-30**
Mass of tare and wet soil Ww (g) =	37.36	37.25	37.02	35.76	39.97	35.61
Mass of tare and dry soil Wd (g) =	33.88	31.66	32.75	29.89	35.69	31.57
Mass of tare Wt (g) =	11.39	11.15	11.68	11.20	11.15	11.06
Water content w =	**15%**	**27%**	**20%**	**31%**	**17%**	**20%**

Sample No.	**7**	**8**	**9**	**10**		
Sampling interval	**33.5-35**	**38.5-40**	**43.5-45**	**48.5-50**		
Mass of tare and wet soil Ww (g) =	35.85	37.96	37.74	37.51		
Mass of tare and dry soil Wd (g) =	33.24	34.28	33.92	34.54		
Mass of tare Wt (g) =	11.30	11.12	11.15	11.26		
Water content w =	**12%**	**16%**	**17%**	**13%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	Hour
Oven in:	8/21/2025	12:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No.	**B-25-06**					
Sample No.	**1**	**2**	**3**	**4**	**5**	**7**
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**	**13.5-15**	**23.5-25**
Mass of tare and wet soil Ww (g) =	38.36	35.23	37.67	37.56	37.41	36.44
Mass of tare and dry soil Wd (g) =	33.79	28.57	33.32	33.07	32.99	32.40
Mass of tare Wt (g) =	11.15	11.30	11.31	11.35	11.08	11.13
Water content w =	**20%**	**39%**	**20%**	**21%**	**20%**	**19%**

Sample No.	**8**	**9**	**10**	**11**		
Sampling interval	**28.5-30**	**33.5-35**	**38.5-40**	**43.5-45**		
Mass of tare and wet soil Ww (g) =	38.89	38.27	36.97	35.43		
Mass of tare and dry soil Wd (g) =	34.16	34.56	33.16	32.38		
Mass of tare Wt (g) =	11.16	11.53	11.10	11.16		
Water content w =	**21%**	**16%**	**17%**	**14%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
Approved By: Mickey Snider Date: 9/2/2025

WATER CONTENT of SOILS and ROCK by MASS

AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	*Hour*
Oven in:	8/21/2025	13:30
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No.	**B-25-07**					
Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**	**13.5-15**	**18.5-20**
Mass of tare and wet soil Ww (g) =	35.89	36.17	35.65	36.25	36.63	37.88
Mass of tare and dry soil Wd (g) =	31.62	31.53	31.41	32.03	32.98	34.08
Mass of tare Wt (g) =	11.21	11.15	11.24	11.40	11.27	11.03
Water content w =	**21%**	**23%**	**21%**	**20%**	**17%**	**16%**

Sample No.	**7**	**8**				
Sampling interval	**23.5-25**	**28.5-30**				
Mass of tare and wet soil Ww (g) =	35.44	37.21				
Mass of tare and dry soil Wd (g) =	31.49	34.03				
Mass of tare Wt (g) =	11.09	11.03				
Water content w =	**19%**	**14%**				

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
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Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	Hour
Oven in:	8/20/2025	17:00
Analyst:	JD	
Oven out:	8/21/2025	13:00
Analyst:	IR	

Boring No. **B-25-08**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**	**13.5-15**	**18.5-20**
Mass of tare and wet soil Ww (g) =	35.81	36.26	37.38	37.47	37.58	37.78
Mass of tare and dry soil Wd (g) =	32.86	29.51	33.17	33.45	33.69	33.40
Mass of tare Wt (g) =	11.14	11.36	11.36	11.34	11.18	11.31
Water content w =	**14%**	**37%**	**19%**	**18%**	**17%**	**20%**

Sample No.	**7**	**8**				
Sampling interval	**23.5-25**	**28.5-30**				
Mass of tare and wet soil Ww (g) =	37.33	36.70				
Mass of tare and dry soil Wd (g) =	32.94	32.55				
Mass of tare Wt (g) =	11.11	11.27				
Water content w =	**20%**	**20%**				

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.

Project: PBC DWM Operations Facility

WEI Job No: 11255119

Sample Type: SS

Sample Date: N/A

	Date	Hour
Oven in:	8/20/2025	17:00
Analyst:	JD	
Oven out:	8/21/2025	13:00
Analyst:	IR	

Boring No. **B-25-09**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**	**13.5-15**	**18.5-20**
Mass of tare and wet soil Ww (g) =	37.47	37.34	35.65	36.91	37.11	37.20
Mass of tare and dry soil Wd (g) =	33.06	33.06	31.49	32.18	32.92	33.52
Mass of tare Wt (g) =	11.75	11.37	11.27	11.05	11.27	11.12
Water content w =	**21%**	**20%**	**21%**	**22%**	**19%**	**16%**

Sample No.	**7**	**8**				
Sampling interval	**23.5-25**	**28.5-30**				
Mass of tare and wet soil Ww (g) =	35.18	36.77				
Mass of tare and dry soil Wd (g) =	31.12	32.34				
Mass of tare Wt (g) =	11.12	11.15				
Water content w =	**20%**	**21%**				

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025

Approved By: Mickey Snider Date: 9/2/2025

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Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	*Hour*
Oven in:	8/20/2025	17:00
Analyst:	JD	
Oven out:	8/21/2025	13:00
Analyst:	IR	

Boring No. **B-25-10**

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**	**13.5-15**	**18.5-20**
Mass of tare and wet soil Ww (g) =	35.99	37.66	36.64	36.12	35.65	36.06
Mass of tare and dry soil Wd (g) =	33.04	36.07	28.75	32.01	31.49	32.18
Mass of tare Wt (g) =	11.10	11.15	11.13	10.96	11.35	11.34
Water content w =	**13%**	**6%**	**45%**	**20%**	**21%**	**19%**

Sample No.	**7**	**8**				
Sampling interval	**23.5-25**	**28.5-30**				
Mass of tare and wet soil Ww (g) =	38.52	39.81				
Mass of tare and dry soil Wd (g) =	34.66	35.16				
Mass of tare Wt (g) =	11.36	11.36				
Water content w =	**17%**	**20%**				

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
Approved By: Mickey Snider Date: 9/2/2025

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Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	*Hour*
Oven in:	8/21/2025	12:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No. **B-25-11**

Sample No.	**1**	**2**	**3**	**4**		
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**		
Mass of tare and wet soil Ww (g) =	35.72	36.50	36.57	37.44		
Mass of tare and dry soil Wd (g) =	32.79	33.04	31.98	32.29		
Mass of tare Wt (g) =	11.38	11.76	11.08	11.05		
Water content w =	**14%**	**16%**	**22%**	**24%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
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AASHTO T 275 / ASTM D 2216

Client: Wang Testing Services, Inc.

Project: PBC DWM Operations Facility

WEI Job No: 11255119

Sample Type: SS

Sample Date: 8/14/2025

	Date	Hour
Oven in:	8/21/2025	14:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

Boring No. **B-25-12**

Sample No.	**1**	**2**	**3**	**4**		
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**		
Mass of tare and wet soil Ww (g) =	36.31	37.51	35.65	35.51		
Mass of tare and dry soil Wd (g) =	35.35	35.90	31.49	31.41		
Mass of tare Wt (g) =	11.70	11.11	11.20	11.26		
Water content w =	**4%**	**6%**	**21%**	**20%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025

Approved By: Mickey Snider Date: 9/2/2025

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Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Sample Type: SS
Sample Date: N/A

	Date	*Hour*
Oven in:	8/21/2025	12:00
Analyst:	JD	
Oven out:	8/22/2025	9:30
Analyst:	JG	

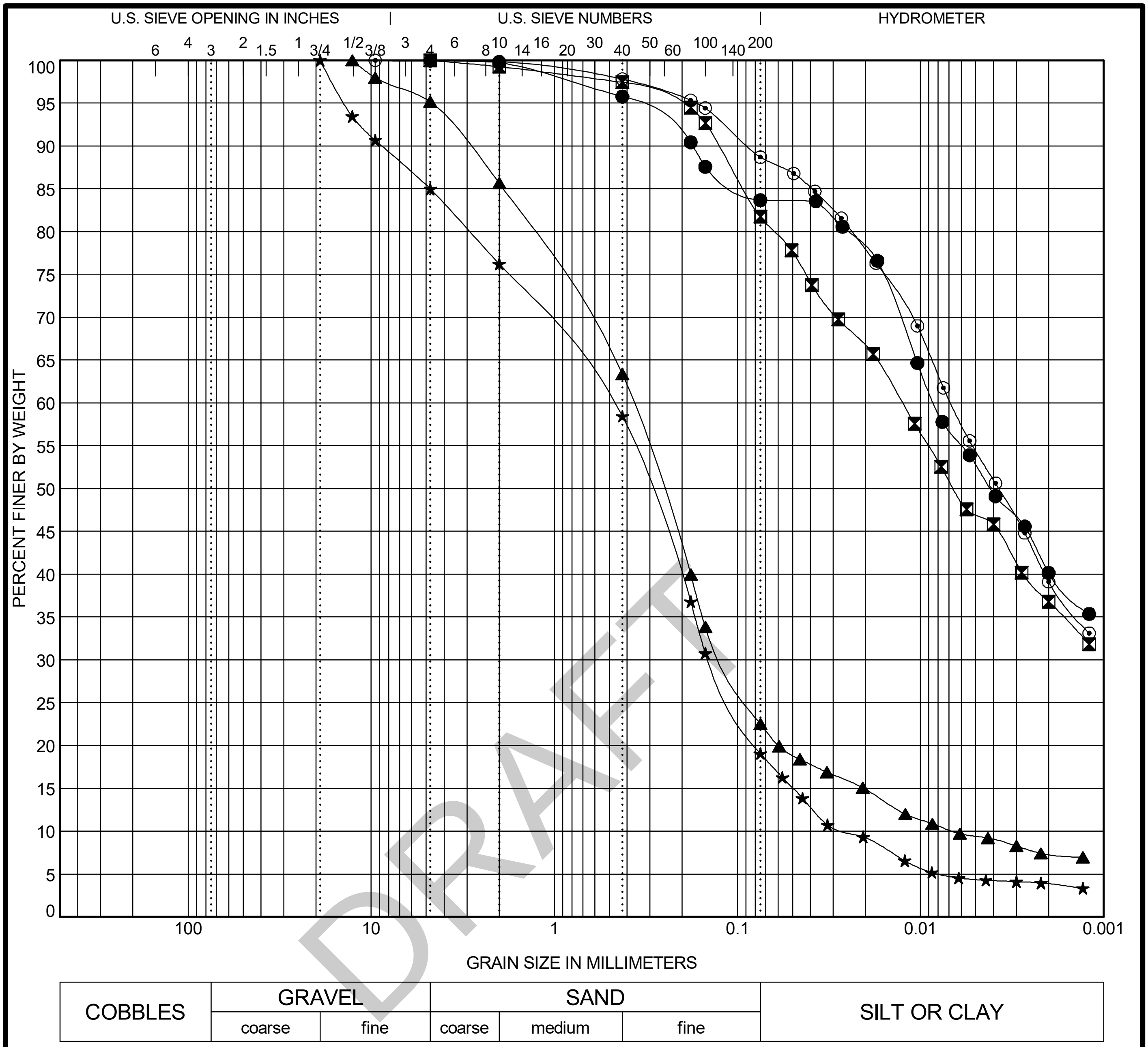
Boring No.	**B-25-13**					
Sample No.	**1**	**2**	**3**	**4**		
Sampling interval	**1-2.5**	**3.5-5**	**6-7.5**	**8.5-10**		
Mass of tare and wet soil Ww (g) =	37.25	35.91	37.04	35.88		
Mass of tare and dry soil Wd (g) =	34.61	32.32	32.71	29.43		
Mass of tare Wt (g) =	11.22	11.21	11.14	11.08		
Water content w =	**11%**	**17%**	**20%**	**35%**		

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Sample No.						
Sampling interval						
Mass of tare and wet soil Ww (g) =						
Mass of tare and dry soil Wd (g) =						
Mass of tare Wt (g) =						
Water content w =						

Prepared By: Matt Ciapas Date: 9/2/2025
Approved By: Mickey Snider Date: 9/2/2025

AASHTO ACCREDITATION PROGRAM



	Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
●	**B-25-03#2**	**6.0 ft**	**LEAN CLAY with SAND(CL)**	**40**	**15**	**25**		
☒	**B-25-03#3**	**8.5 ft**	**LEAN CLAY with SAND(CL)**	**32**	**14**	**18**		
▲	**B-25-07#8**	**28.5 ft**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**	**5.60**	**56.27**
★	**B-25-12#2**	**3.5 ft**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**	**1.65**	**18.99**
⊙	**B-25-13#3**	**6.0 ft**	**LEAN CLAY(CL)**	**36**	**17**	**19**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-25-03#2**	**6.0 ft**	**4.75**	**0.008**			**0.0**	**16.3**	**30.9**	**52.8**
☒	**B-25-03#3**	**8.5 ft**	**4.75**	**0.013**			**0.0**	**18.3**	**34.8**	**47.0**
▲	**B-25-07#8**	**28.5 ft**	**12.7**	**0.376**	**0.118**	**0.007**	**4.8**	**72.6**	**13.1**	**9.4**
★	**B-25-12#2**	**3.5 ft**	**19**	**0.486**	**0.143**	**0.026**	**15.0**	**65.9**	**14.7**	**4.4**
⊙	**B-25-13#3**	**6.0 ft**	**9.5**	**0.007**			**0.1**	**11.2**	**34.3**	**54.4**

WEI
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Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION

Project: PBC DWM Operations Facility

Location: Chicago, IL

Number: 11255119 (60763208)

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

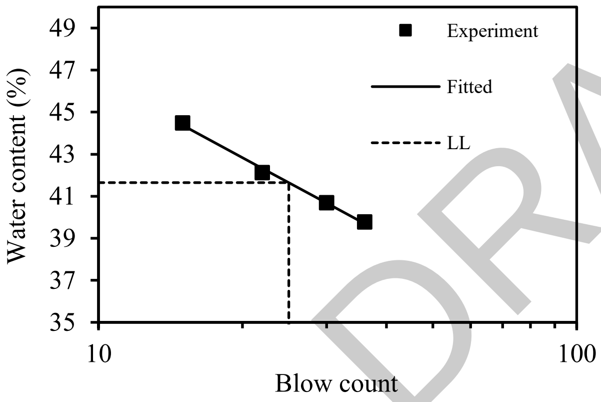
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-01, ST (3.5-5.5ft.)
Sample description: Dark Gray LEAN CLAY (CL)
% retained on #40 sieve: 8%

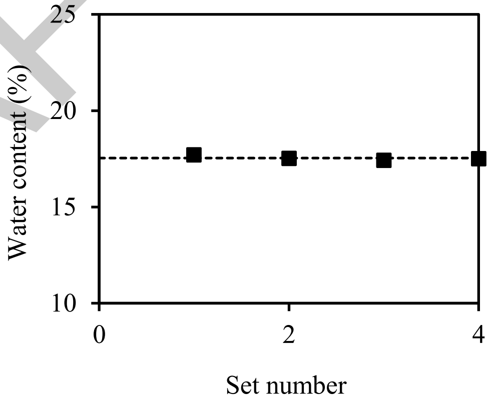
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.16*	*20.05*	*17.52*	*36*	39.78	39.70
2	*11.22*	*20.66*	*17.93*	*30*	40.69	40.67
3	*11.09*	*21.92*	*18.71*	*22*	42.13	42.33
4	*11.17*	*23.61*	*19.78*	*15*	44.48	44.37

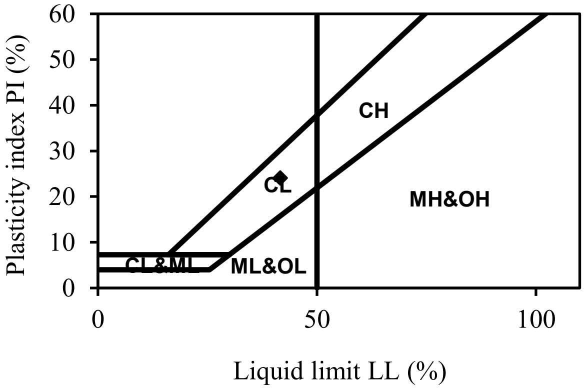
Liquid limit (%) = 41.65
Slope of flow line = 0.127

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.20*	*23.30*	*21.48*	17.70
2	*11.12*	*20.24*	*18.88*	17.53
3	*11.08*	*20.92*	*19.46*	17.42
4	*11.50*	*23.05*	*21.33*	17.50

Plastic limit (%) = 17.54







Liquid limit (%) = ***42***
Plastic limit (%) = ***18***
Plasticity index (%) = ***24***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

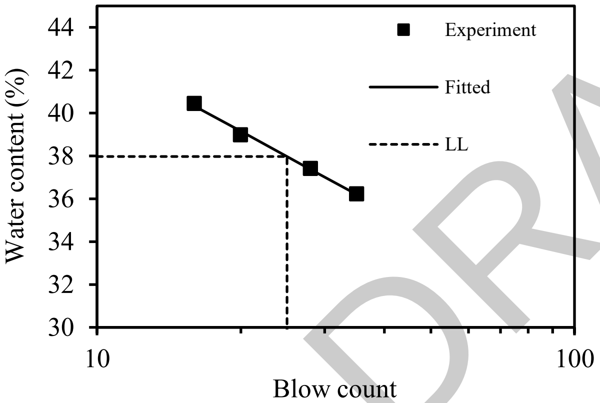
Analyst name: L. Varzaru
Test date: August 28, 2025
Soil Sample ID: B-25-01, SS#2 (6-7.5ft.)
Sample description: Brown/Gray LEAN CLAY (CL)
% retained on #40 sieve: 1%

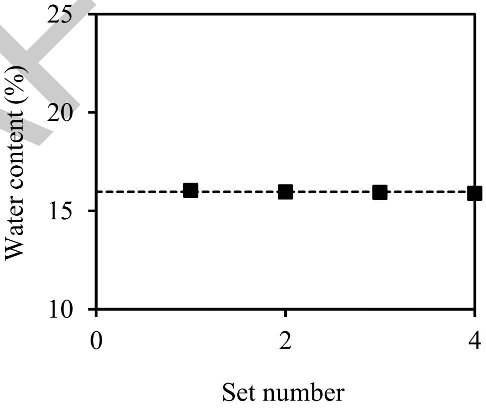
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.16*	*20.11*	*17.73*	*35*	36.23	36.20
2	*11.14*	*20.91*	*18.25*	*28*	37.41	37.38
3	*11.20*	*23.68*	*20.18*	*20*	38.98	39.15
4	*11.16*	*20.78*	*18.01*	*16*	40.44	40.32

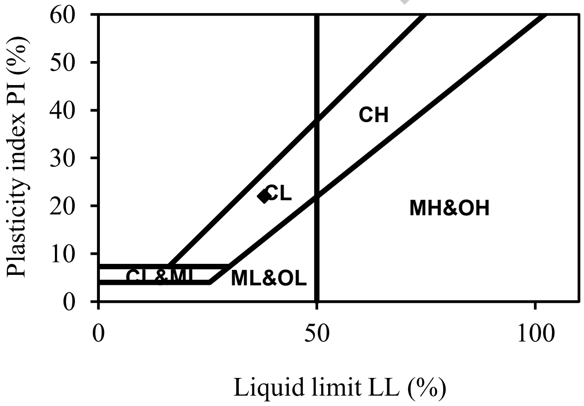
Liquid limit (%) = 37.97
Slope of flow line = 0.138

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.08*	*20.26*	*18.99*	16.06
2	*11.27*	*21.00*	*19.66*	15.97
3	*11.08*	*23.29*	*21.61*	15.95
4	*11.12*	*22.35*	*20.81*	15.89

Plastic limit (%) = 15.97







Liquid limit (%) = ***38***
Plastic limit (%) = ***16***
Plasticity index (%) = ***22***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

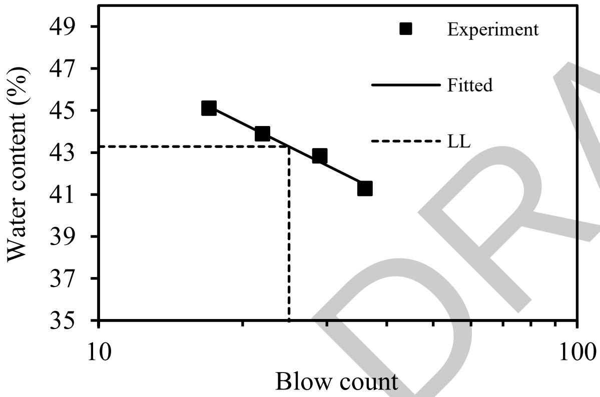
Analyst name: L. Varzaru
Test date: September 4, 2025
Soil Sample ID: B-25-01, ST (8.5-10.5ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 4%

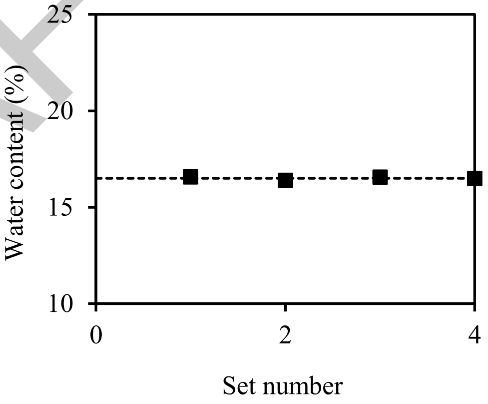
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.10*	*22.29*	*19.02*	*36*	41.29	41.48
2	*11.24*	*21.31*	*18.29*	*29*	42.84	42.55
3	*11.15*	*21.74*	*18.51*	*22*	43.89	43.91
4	*11.12*	*20.93*	*17.88*	*17*	45.12	45.18

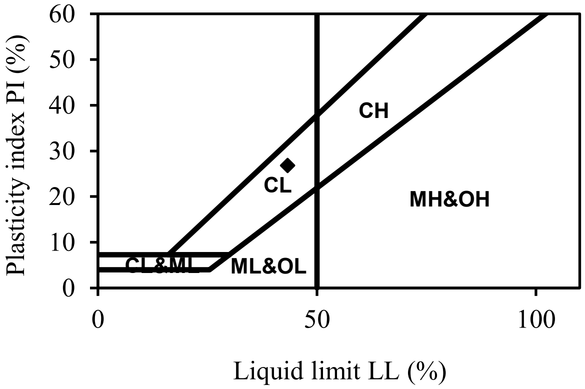
Liquid limit (%) = 43.28
Slope of flow line = 0.114

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.09*	*22.56*	*20.93*	16.57
2	*11.16*	*20.04*	*18.79*	16.38
3	*11.08*	*20.30*	*18.99*	16.56
4	*11.12*	*20.73*	*19.37*	16.48

Plastic limit (%) = 16.50







Liquid limit (%) = ***43***
Plastic limit (%) = ***16***
Plasticity index (%) = ***27***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

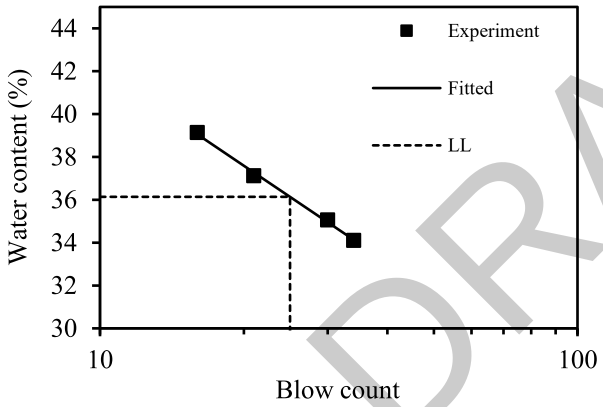
Analyst name: L. Varzaru
Test date: August 28, 2025
Soil Sample ID: B-25-01, SS#3 (13.5-15ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 10%

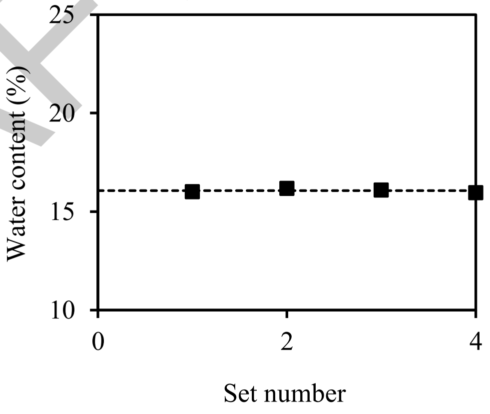
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*10.99*	*21.53*	*18.85*	*34*	34.10	34.13
2	*11.46*	*21.09*	*18.59*	*30*	35.06	34.95
3	*11.12*	*22.61*	*19.50*	*21*	37.11	37.28
4	*11.17*	*21.16*	*18.35*	*16*	39.14	39.05

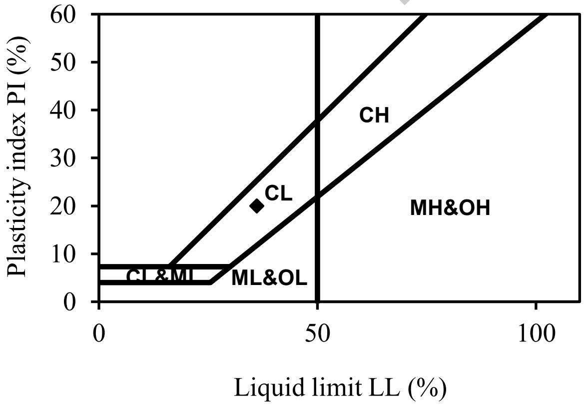
Liquid limit (%) = 36.14
Slope of flow line = 0.178

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.09*	*21.45*	*20.02*	16.01
2	*11.05*	*23.33*	*21.62*	16.18
3	*11.29*	*20.30*	*19.05*	16.11
4	*11.14*	*21.09*	*19.72*	15.97

Plastic limit (%) = 16.07







Liquid limit (%) = ***36***
Plastic limit (%) = ***16***
Plasticity index (%) = ***20***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

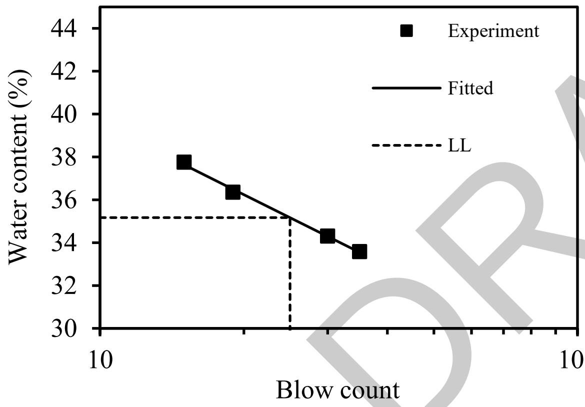
Analyst name: L. Varzaru
Test date: August 28, 2025
Soil Sample ID: B-25-01, SS#4 (18.5-20ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 8%

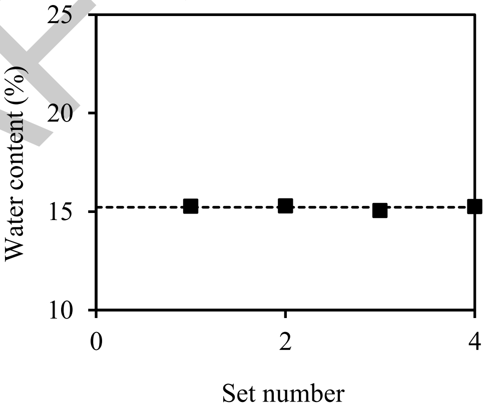
Set #	Tare mass (g)	Tare with wet soil (g)	Tare with dry soil (g)	Blow count	Water content (%)	Water content fitted (%)
	Wc	Ww	Wd	N	w	
1	*11.42*	*24.35*	*21.10*	*35*	33.57	33.54
2	*11.38*	*22.93*	*19.98*	*30*	34.30	34.29
3	*11.16*	*22.64*	*19.58*	*19*	36.34	36.49
4	*11.16*	*26.78*	*22.50*	*15*	37.74	37.64

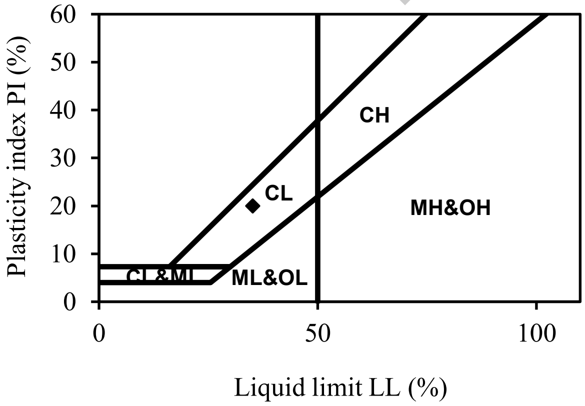
Liquid limit (%) = 35.17
Slope of flow line = 0.136

Set #	Tare mass (g)	Tare with wet soil (g)	Tare with dry soil (g)	Water content (%)
	Mc	Mw	Md	w
1	*11.15*	*22.32*	*20.84*	15.27
2	*11.12*	*21.52*	*20.14*	15.30
3	*11.25*	*20.65*	*19.42*	15.06
4	*11.21*	*22.01*	*20.58*	15.26

Plastic limit (%) = 15.22







Liquid limit (%) = *35*
Plastic limit (%) = *15*
Plasticity index (%) = *20*

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

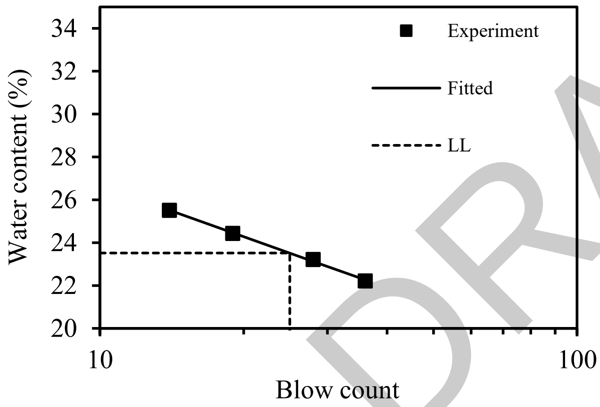
Analyst name: L. Varzaru
Test date: August 29, 2025
Soil Sample ID: B-25-01, SS#9 (43.5-45ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 19%

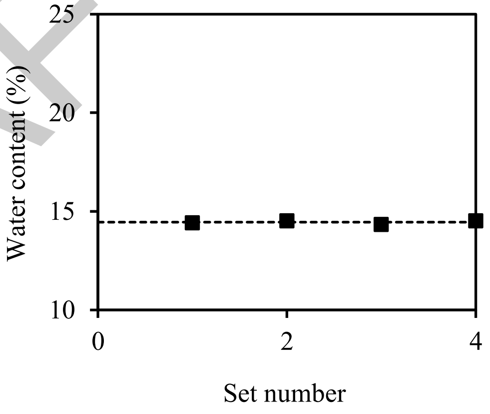
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.01*	*20.20*	*18.53*	*36*	22.21	22.26
2	*11.20*	*21.55*	*19.60*	*28*	23.21	23.13
3	*11.16*	*20.99*	*19.06*	*19*	24.43	24.46
4	*11.11*	*21.64*	*19.50*	*14*	25.51	25.51

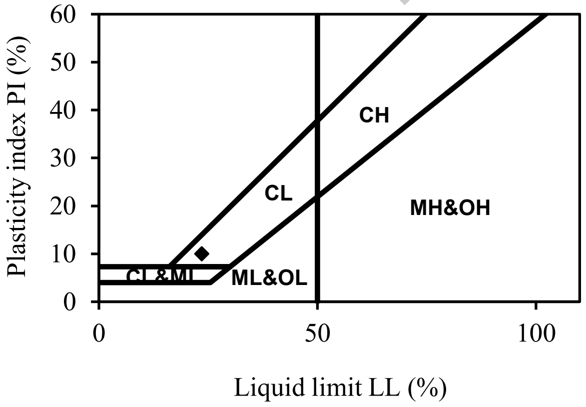
Liquid limit (%) = **23.52**
Slope of flow line = **0.144**

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.01*	*22.35*	*20.92*	14.43
2	*11.23*	*22.43*	*21.01*	14.52
3	*10.96*	*21.88*	*20.51*	14.35
4	*11.08*	*20.15*	*19.00*	14.52

Plastic limit (%) = **14.45**







Liquid limit (%) = ***24***
Plastic limit (%) = ***14***
Plasticity index (%) = ***10***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

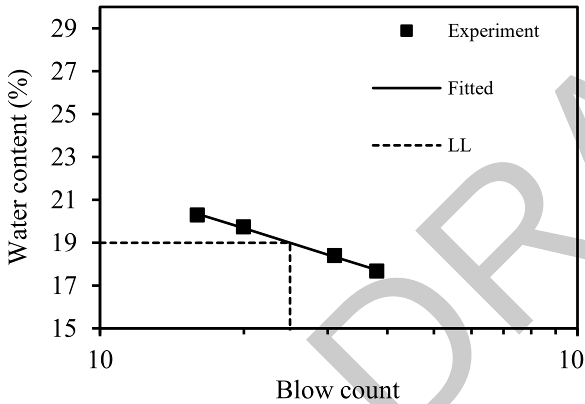
Analyst name: L. Varzaru
Test date: August 28, 2025
Soil Sample ID: B-25-01, SS#12 (58.5-60ft.)
Sample description: Gray SILTY CLAY (CL-ML)
% retained on #40 sieve: 14%

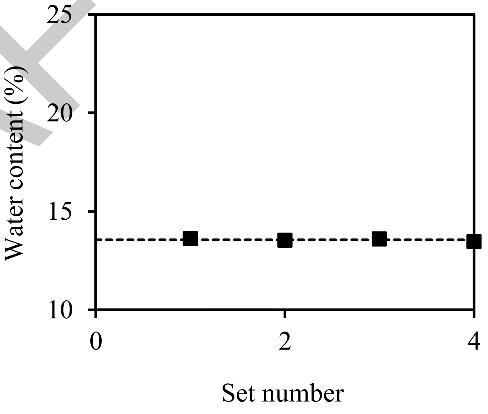
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.22*	*22.54*	*20.84*	*38*	17.67	17.73
2	*11.33*	*22.66*	*20.90*	*31*	18.39	18.34
3	*11.11*	*22.76*	*20.84*	*20*	19.73	19.67
4	*11.26*	*23.12*	*21.12*	*16*	20.28	20.34

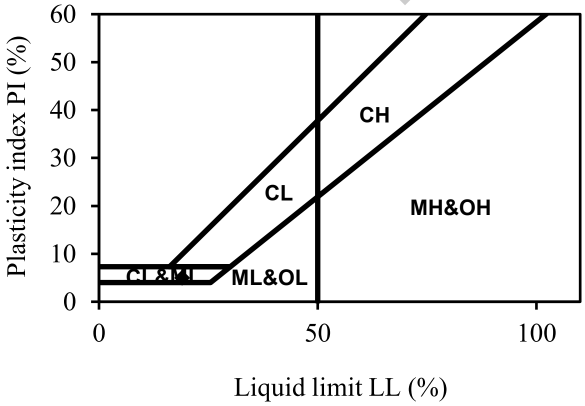
Liquid limit (%) = 18.99
Slope of flow line = 0.160

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.34*	*24.68*	*23.08*	13.63
2	*11.17*	*20.23*	*19.15*	13.53
3	*11.16*	*23.60*	*22.11*	13.61
4	*11.16*	*22.45*	*21.11*	13.47

Plastic limit (%) = 13.56







Liquid limit (%) = ***19***
Plastic limit (%) = ***14***
Plasticity index (%) = ***5***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

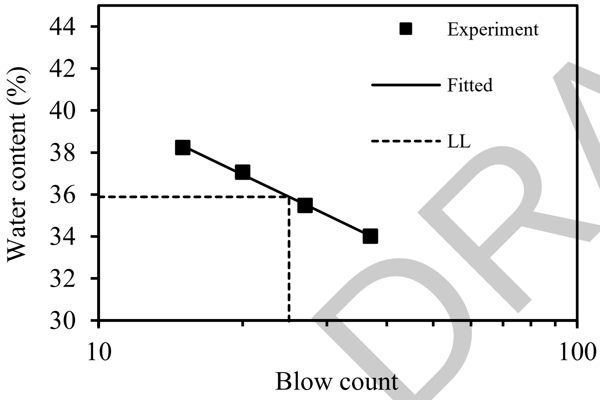
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-02, ST (3.5-5.5ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 6%

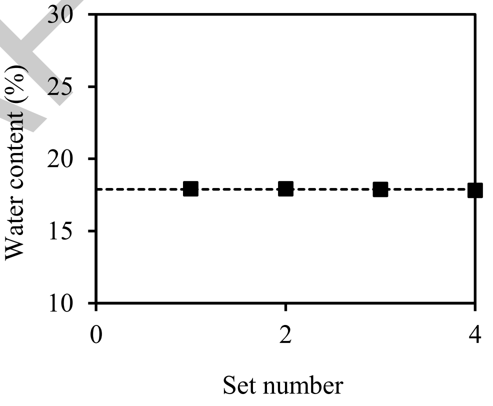
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.53*	*20.12*	*17.94*	*37*	34.01	34.02
2	*11.45*	*23.02*	*19.99*	*27*	35.48	35.52
3	*11.11*	*20.65*	*18.07*	*20*	37.07	36.94
4	*11.17*	*20.28*	*17.76*	*15*	38.24	38.31

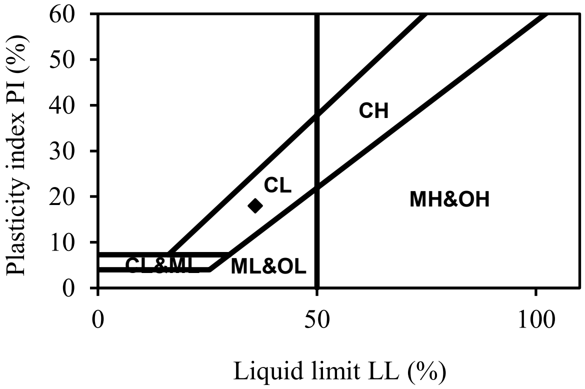
Liquid limit (%) = 35.88
Slope of flow line = 0.132

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.16*	*20.17*	*18.80*	17.93
2	*10.98*	*20.78*	*19.29*	17.93
3	*11.25*	*21.87*	*20.26*	17.87
4	*11.12*	*24.02*	*22.07*	17.81

Plastic limit (%) = 17.88







Liquid limit (%) = ***36***
Plastic limit (%) = ***18***
Plasticity index (%) = ***18***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

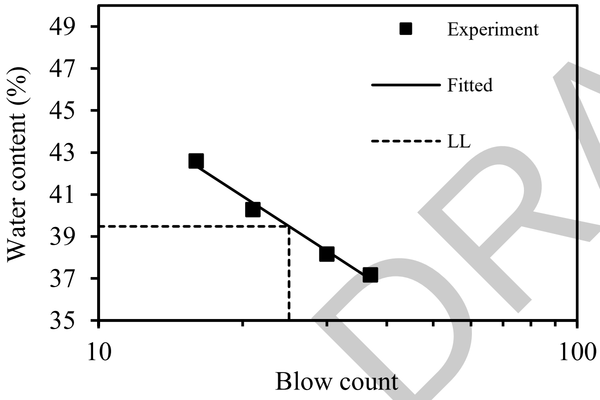
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-02, ST (8.5-10.5ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 2%

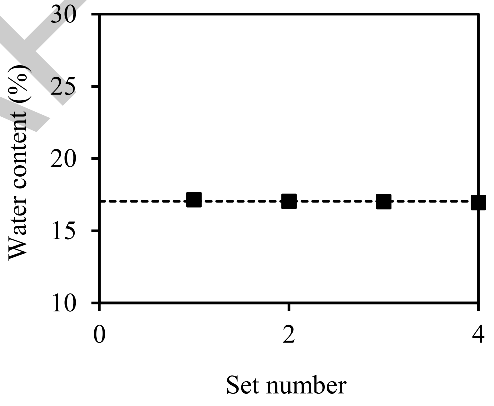
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.20*	*21.20*	*18.49*	*37*	37.17	36.96
2	*11.44*	*20.89*	*18.28*	*30*	38.16	38.31
3	*11.19*	*23.03*	*19.63*	*21*	40.28	40.60
4	*11.17*	*20.71*	*17.86*	*16*	42.60	42.35

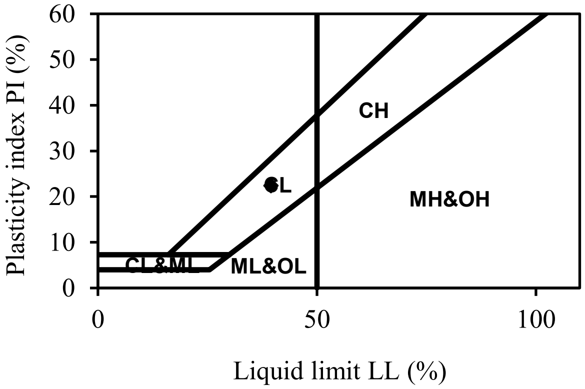
Liquid limit (%) = 39.48
Slope of flow line = 0.162

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.40*	*21.65*	*20.15*	17.14
2	*11.36*	*20.22*	*18.93*	17.04
3	*11.22*	*22.22*	*20.62*	17.02
4	*11.29*	*21.36*	*19.90*	16.96

Plastic limit (%) = 17.04







Liquid limit (%) = *39*
Plastic limit (%) = *17*
Plasticity index (%) = *22*

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

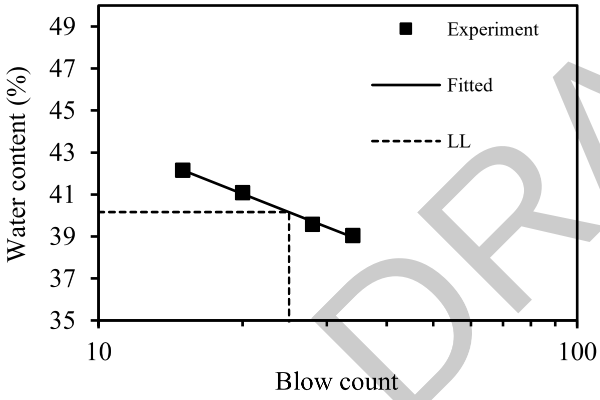
Analyst name: L. Varzaru
Test date: September 4, 2025
Soil Sample ID: B-25-03, ST (3-5ft.)
Sample description: Dark Gray LEAN CLAY (CL)
% retained on #40 sieve: 17%

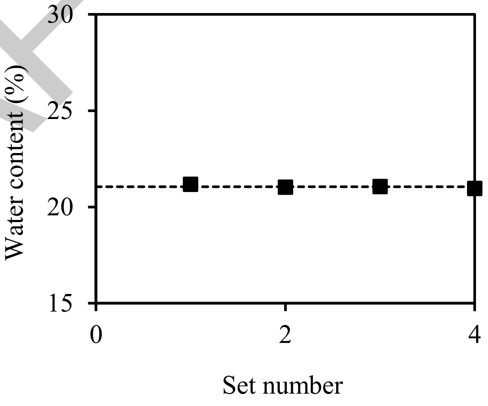
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.20*	*20.28*	*17.73*	*34*	39.05	38.96
2	*11.44*	*21.42*	*18.59*	*28*	39.58	39.72
3	*11.41*	*21.30*	*18.42*	*20*	41.08	41.03
4	*11.25*	*21.03*	*18.13*	*15*	42.15	42.15

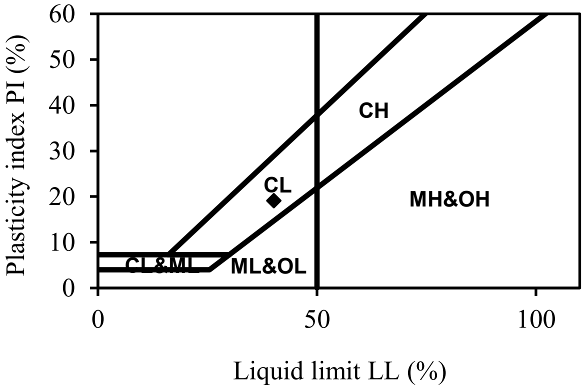
Liquid limit (%) = 40.16
Slope of flow line = 0.096

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.52*	*21.08*	*19.41*	21.17
2	*11.19*	*21.32*	*19.56*	21.03
3	*11.09*	*22.82*	*20.78*	21.05
4	*11.19*	*21.12*	*19.40*	20.95

Plastic limit (%) = 21.05







Liquid limit (%) = ***40***
Plastic limit (%) = ***21***
Plasticity index (%) = ***19***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

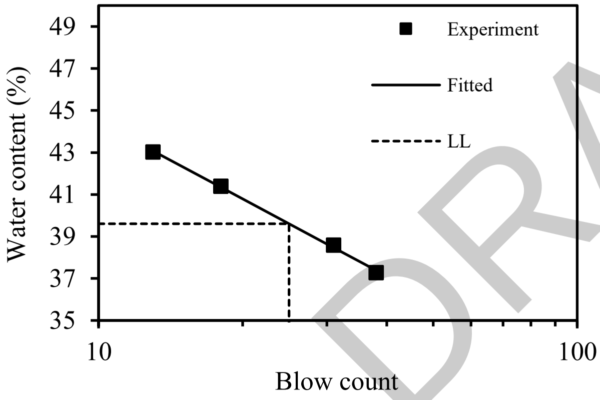
Analyst name: L. Varzaru
Test date: August 29, 2025
Soil Sample ID: B-25-03, SS#2 (6-7.5ft.)
Sample description: Gray LEAN CLAY with SAND (CL)
% retained on #40 sieve: 4%

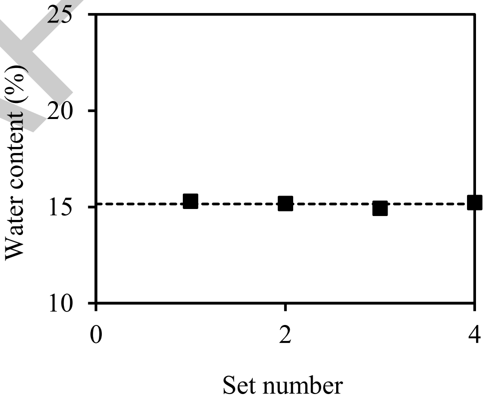
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.02*	*23.43*	*20.06*	*38*	37.28	37.39
2	*11.22*	*20.02*	*17.57*	*31*	38.58	38.47
3	*11.12*	*21.71*	*18.61*	*18*	41.39	41.35
4	*11.14*	*21.38*	*18.30*	*13*	43.02	43.07

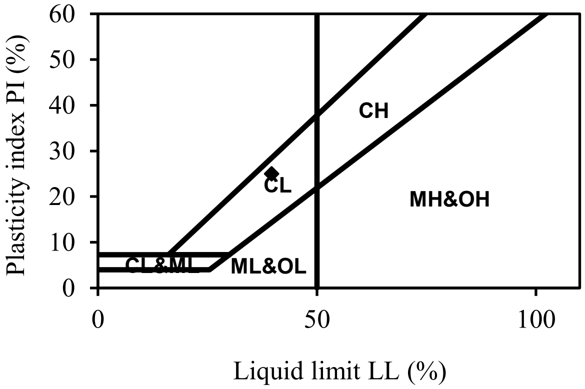
Liquid limit (%) = 39.60
Slope of flow line = 0.132

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.16*	*20.89*	*19.60*	15.28
2	*11.29*	*22.75*	*21.24*	15.18
3	*11.10*	*22.34*	*20.88*	14.93
4	*11.07*	*20.91*	*19.61*	15.22

Plastic limit (%) = 15.15







Liquid limit (%) = ***40***
Plastic limit (%) = ***15***
Plasticity index (%) = ***25***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

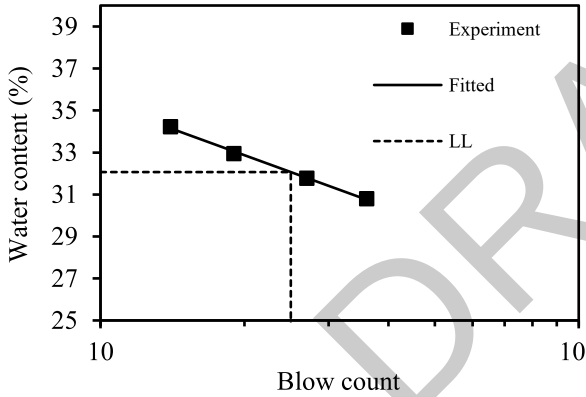
Analyst name: L. Varzaru
Test date: August 29, 2025
Soil Sample ID: B-25-03, SS#3 (8.5-10ft.)
Sample description: Gray LEAN CLAY with SAND (CL)
% retained on #40 sieve: 3%

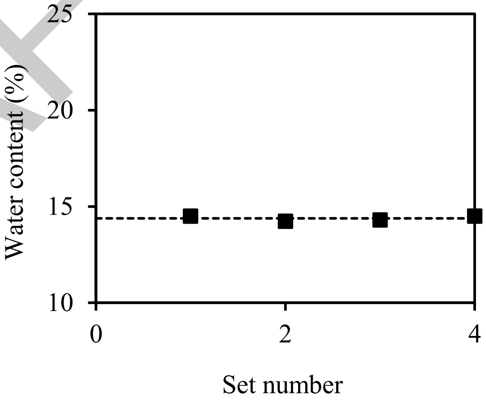
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.19*	*22.02*	*19.47*	*36*	30.80	30.75
2	*11.69*	*21.02*	*18.77*	*27*	31.78	31.79
3	*11.10*	*23.61*	*20.51*	*19*	32.94	33.05
4	*11.37*	*21.33*	*18.79*	*14*	34.23	34.15

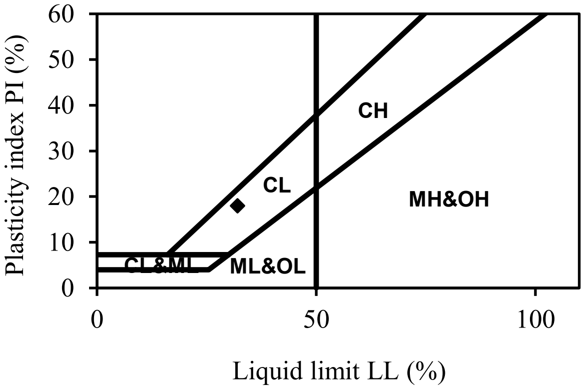
Liquid limit (%) = 32.07
Slope of flow line = 0.111

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.11*	*20.67*	*19.46*	14.49
2	*11.56*	*22.40*	*21.05*	14.23
3	*11.07*	*20.58*	*19.39*	14.30
4	*11.16*	*21.90*	*20.54*	14.50

Plastic limit (%) = 14.38







Liquid limit (%) = ***32***
Plastic limit (%) = ***14***
Plasticity index (%) = ***18***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119

Prep Method: air dried

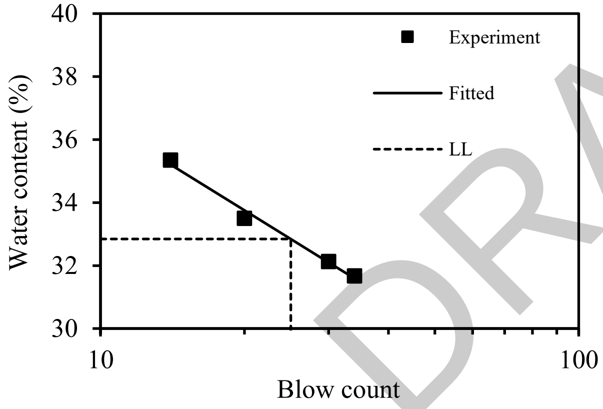
Analyst name: L. Varzaru
Test date: September 4, 2025
Soil Sample ID: B-25-04, ST (3-5ft.)
Sample description: Brown/Gray SANDY LEAN CLAY w/ GRAVEL (CL)
% retained on #40 sieve: 22%

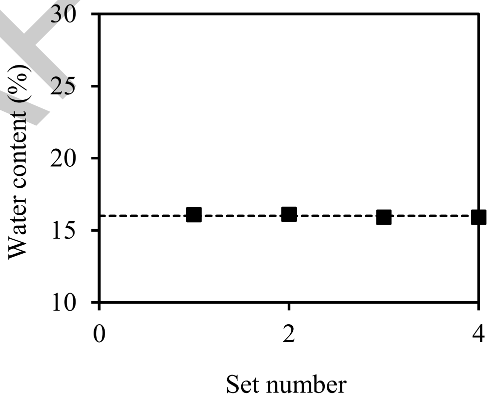
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.11*	*21.92*	*19.32*	*34*	31.67	31.59
2	*11.04*	*21.61*	*19.04*	*30*	32.13	32.10
3	*11.19*	*21.63*	*19.01*	*20*	33.50	33.75
4	*11.15*	*20.53*	*18.08*	*14*	35.35	35.21

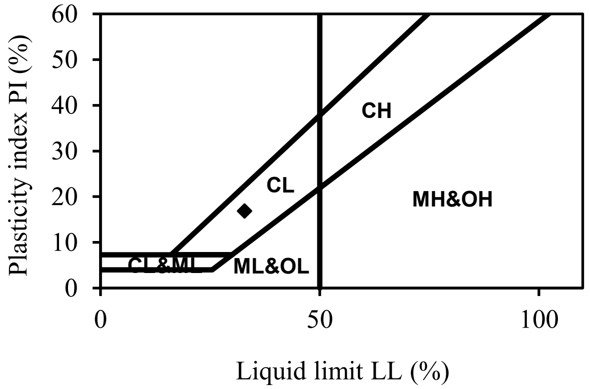
Liquid limit (%) = 32.84
Slope of flow line = 0.122

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.08*	*22.85*	*21.22*	16.07
2	*11.21*	*21.59*	*20.15*	16.11
3	*11.36*	*22.07*	*20.60*	15.91
4	*11.14*	*22.29*	*20.76*	15.90

Plastic limit (%) = 16.00







Liquid limit (%) = ***33***
Plastic limit (%) = ***16***
Plasticity index (%) = ***17***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

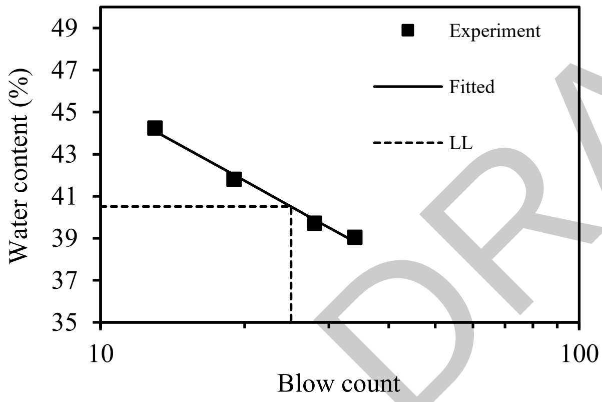
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-04, ST (8.5-10.5ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 5%

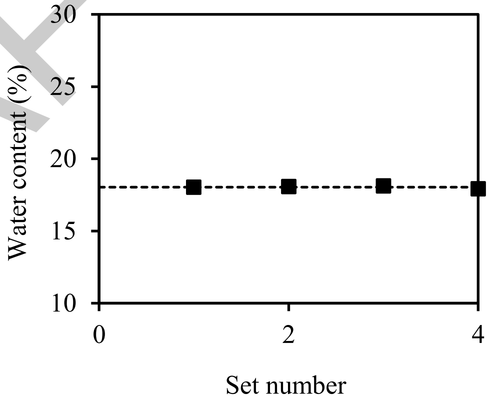
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.21*	*21.43*	*18.56*	*34*	39.05	38.83
2	*11.16*	*20.06*	*17.53*	*28*	39.72	39.89
3	*11.29*	*20.72*	*17.94*	*19*	41.80	42.01
4	*11.38*	*20.28*	*17.55*	*13*	44.25	44.09

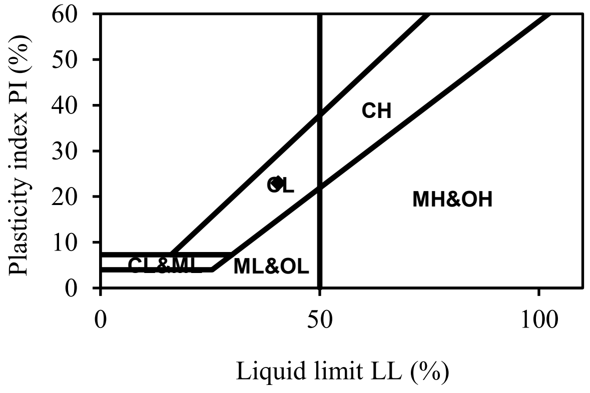
Liquid limit (%) = 40.51
Slope of flow line = 0.132

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.66*	*20.17*	*18.87*	18.03
2	*11.41*	*21.54*	*19.99*	18.07
3	*11.25*	*22.01*	*20.36*	18.11
4	*11.10*	*24.39*	*22.37*	17.92

Plastic limit (%) = 18.03







Liquid limit (%) = ***41***
Plastic limit (%) = ***18***
Plasticity index (%) = ***23***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

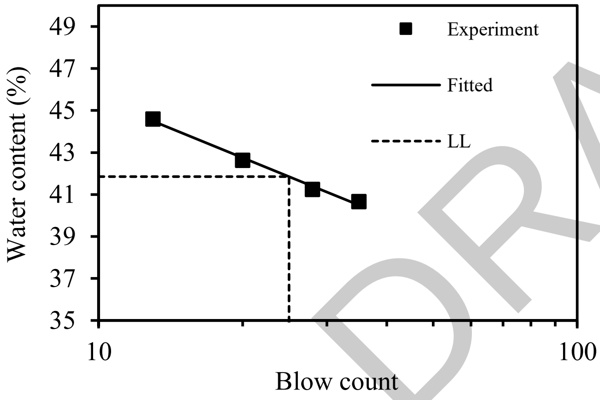
Client:	**Wang Testing Services, Inc.**	**Analyst name:**	**L. Varzaru**
Project:	**PBC DWM Operations Facility**	**Test date:**	**September 4, 2025**
WEI Job No:	**11255119**	**Soil Sample ID:**	**B-25-05, ST (3-5ft.)**
Prep Method:	**air dried**	**Sample description:**	**Gray LEAN CLAY (CL)**
		% retained on #40 sieve:	**14%**

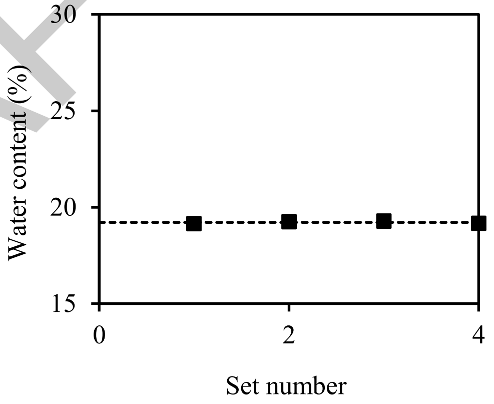
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.37*	*20.64*	*17.96*	*35*	40.67	40.49
2	*11.18*	*21.66*	*18.60*	*28*	41.24	41.39
3	*11.09*	*20.66*	*17.80*	*20*	42.62	42.75
4	*11.30*	*20.80*	*17.87*	*13*	44.60	44.49

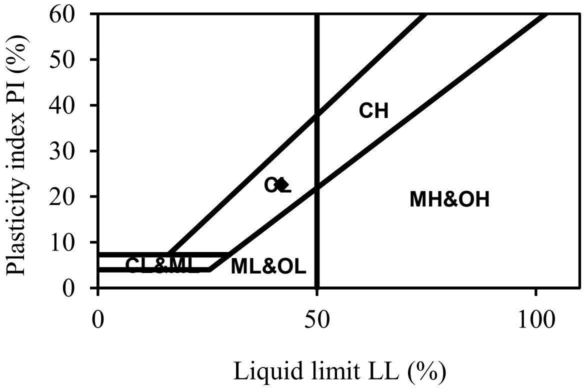
Liquid limit (%) = 41.85
Slope of flow line = 0.095

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.14*	*22.09*	*20.33*	19.15
2	*11.41*	*21.82*	*20.14*	19.24
3	*11.12*	*22.94*	*21.03*	19.27
4	*11.30*	*22.49*	*20.69*	19.17

Plastic limit (%) = 19.21







Liquid limit (%) = ***42***
Plastic limit (%) = ***19***
Plasticity index (%) = ***23***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

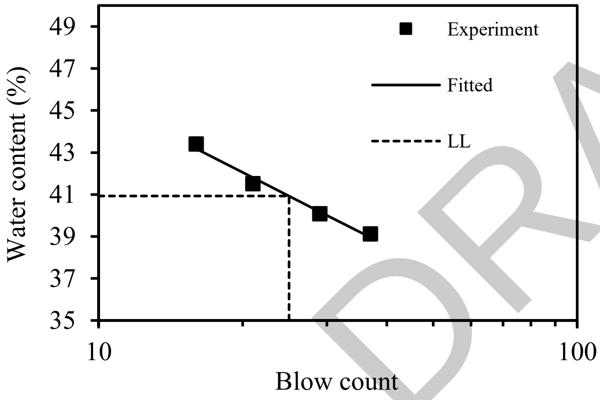
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-06, ST (4.5-6.5ft.)
Sample description: Dark Gray LEAN CLAY (CL)
% retained on #40 sieve: 7%

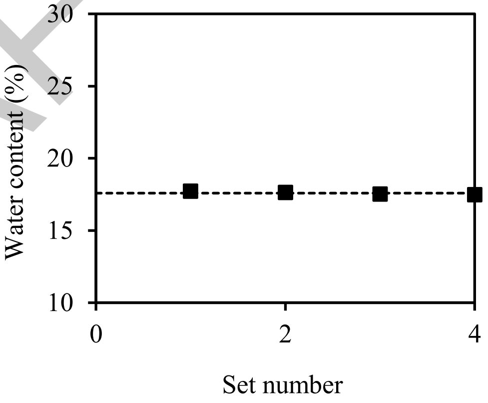
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.10*	*20.88*	*18.13*	*37*	39.12	38.95
2	*11.07*	*21.87*	*18.78*	*29*	40.08	40.18
3	*11.18*	*21.44*	*18.43*	*21*	41.52	41.81
4	*11.08*	*21.29*	*18.20*	*16*	43.40	43.17

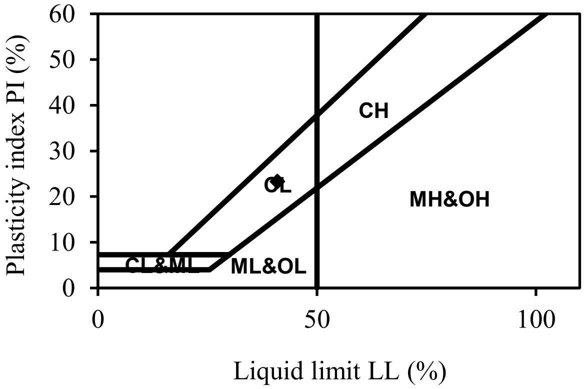
Liquid limit (%) = 40.93
Slope of flow line = 0.122

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.12*	*22.61*	*20.88*	17.73
2	*11.14*	*20.35*	*18.97*	17.62
3	*11.80*	*21.12*	*19.73*	17.53
4	*11.28*	*21.77*	*20.21*	17.47

Plastic limit (%) = 17.59







Liquid limit (%) = ***41***
Plastic limit (%) = ***18***
Plasticity index (%) = ***23***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

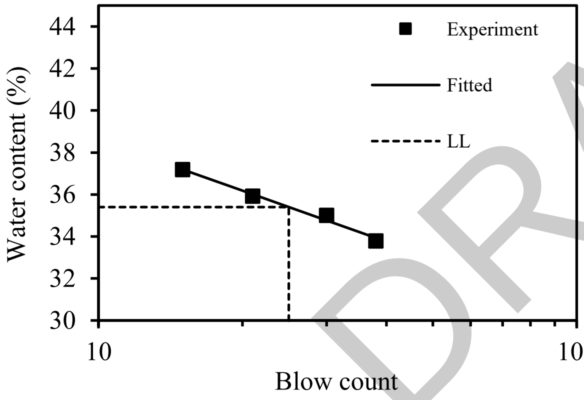
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-06, ST (18.5-20.5ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 5%

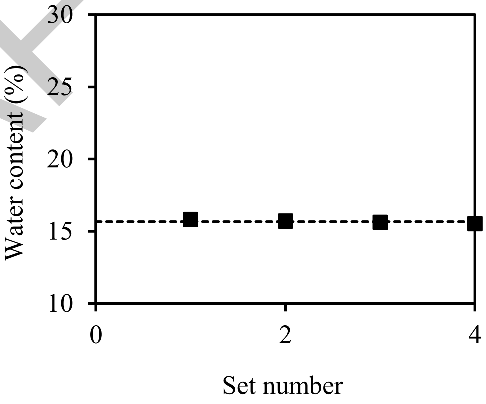
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.17*	*22.18*	*19.40*	*38*	33.78	33.93
2	*11.07*	*21.02*	*18.44*	*30*	35.01	34.76
3	*11.35*	*22.36*	*19.45*	*21*	35.93	36.01
4	*11.33*	*20.37*	*17.92*	*15*	37.18	37.19

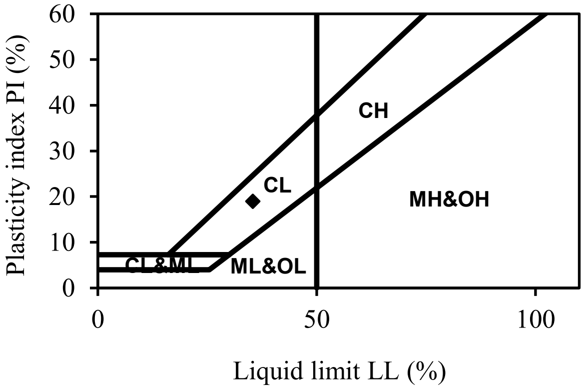
Liquid limit (%) = 35.40
Slope of flow line = 0.099

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.14*	*22.63*	*21.06*	15.83
2	*11.05*	*21.07*	*19.71*	15.70
3	*11.08*	*20.04*	*18.83*	15.61
4	*11.76*	*20.84*	*19.62*	15.52

Plastic limit (%) = 15.67







Liquid limit (%) = ***35***
Plastic limit (%) = ***16***
Plasticity index (%) = ***19***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

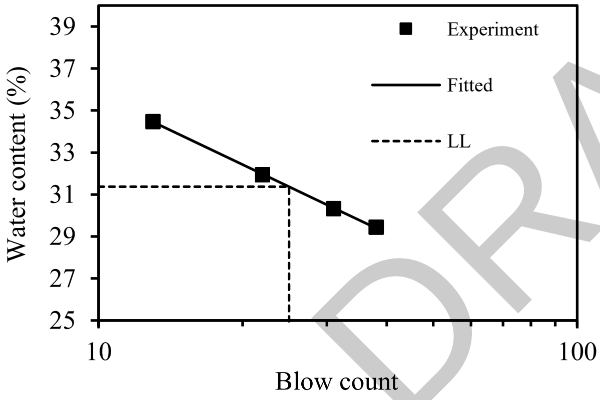
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-07, ST (4.5-6.5ft.)
Sample description: Dark Gray LEAN CLAY (CL)
% retained on #40 sieve: 10%

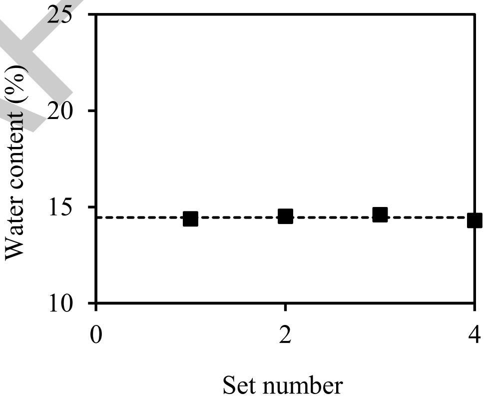
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.12*	*21.89*	*19.44*	*38*	29.45	29.40
2	*11.21*	*21.74*	*19.29*	*31*	30.32	30.36
3	*11.64*	*23.58*	*20.69*	*22*	31.93	31.97
4	*11.14*	*21.71*	*19.00*	*13*	34.48	34.45

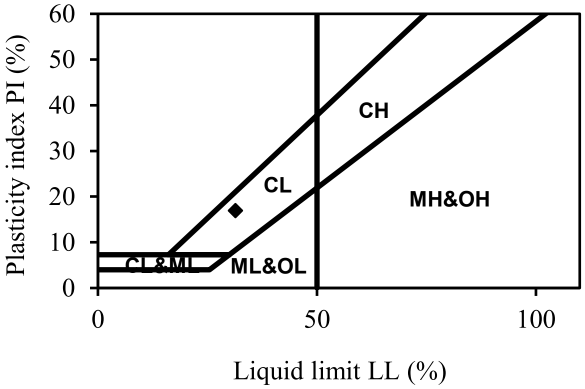
Liquid limit (%) = 31.37
Slope of flow line = 0.147

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*10.92*	*20.62*	*19.40*	14.39
2	*11.08*	*20.31*	*19.14*	14.52
3	*11.19*	*22.81*	*21.33*	14.60
4	*11.36*	*21.35*	*20.10*	14.30

Plastic limit (%) = 14.45







Liquid limit (%) = ***31***
Plastic limit (%) = ***14***
Plasticity index (%) = ***17***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

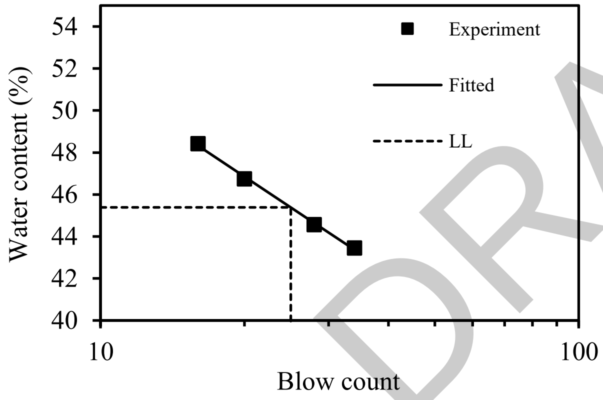
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-08, ST (4.5-5.5ft.)
Sample description: Dark Gray LEAN CLAY (CL)
% retained on #40 sieve: 9%

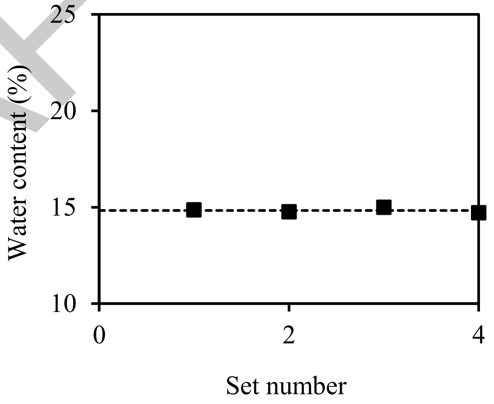
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.20*	*20.18*	*17.46*	*34*	43.45	43.36
2	*11.08*	*20.52*	*17.61*	*28*	44.56	44.64
3	*11.29*	*22.12*	*18.67*	*20*	46.75	46.85
4	*11.10*	*21.86*	*18.35*	*16*	48.41	48.32

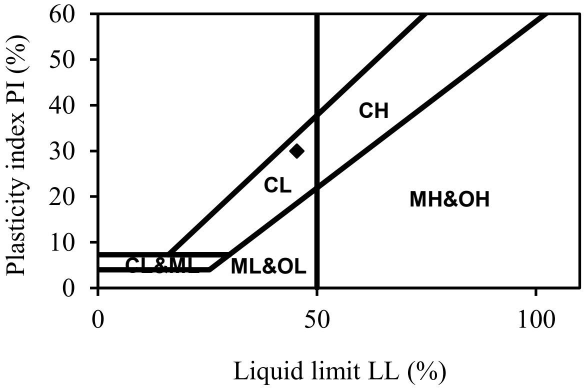
Liquid limit (%) = 45.39
Slope of flow line = 0.143

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.10*	*20.53*	*19.31*	14.86
2	*11.33*	*21.98*	*20.61*	14.76
3	*11.06*	*22.49*	*21.00*	14.99
4	*11.02*	*21.47*	*20.13*	14.71

Plastic limit (%) = 14.83







Liquid limit (%) = ***45***
Plastic limit (%) = ***15***
Plasticity index (%) = ***30***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

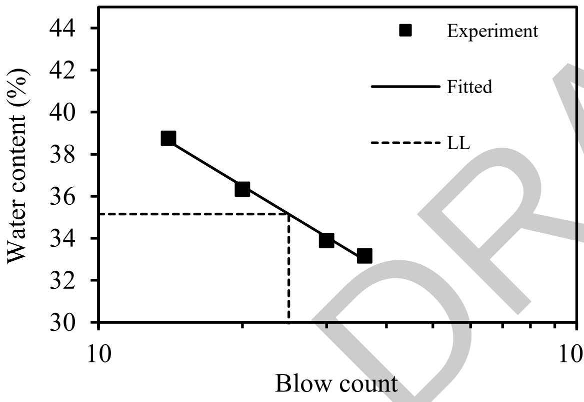
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-09, ST (4-6ft.)
Sample description: Gray LEAN CLAY (CL)
% retained on #40 sieve: 8%

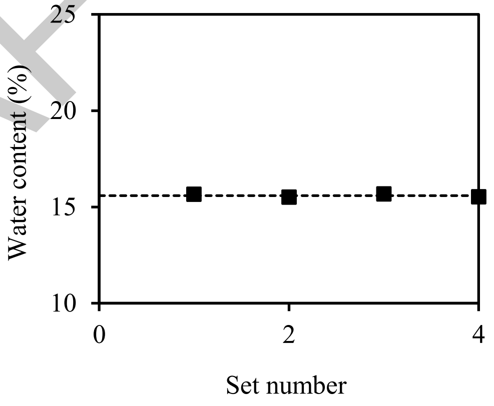
Set #	Tare mass (g)	Tare with wet soil (g)	Tare with dry soil (g)	Blow count	Water content (%)	Water content fitted (%)
	Wc	Ww	Wd	N	w	
1	*11.38*	*21.78*	*19.19*	*36*	33.16	32.97
2	*11.16*	*20.64*	*18.24*	*30*	33.90	34.06
3	*11.05*	*21.37*	*18.62*	*20*	36.33	36.49
4	*11.15*	*21.14*	*18.35*	*14*	38.75	38.62

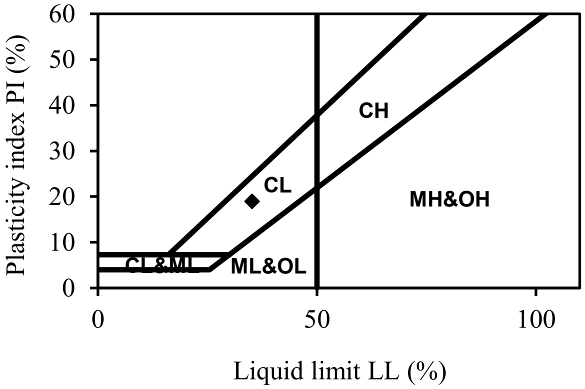
Liquid limit (%) = 35.15
Slope of flow line = 0.167

Set #	Tare mass (g)	Tare with wet soil (g)	Tare with dry soil (g)	Water content (%)
	Mc	Mw	Md	w
1	*11.16*	*20.84*	*19.53*	15.65
2	*11.66*	*21.57*	*20.24*	15.50
3	*11.12*	*22.93*	*21.33*	15.67
4	*11.37*	*23.65*	*22.00*	15.52

Plastic limit (%) = 15.59







Liquid limit (%) = ***35***
Plastic limit (%) = ***16***
Plasticity index (%) = ***19***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

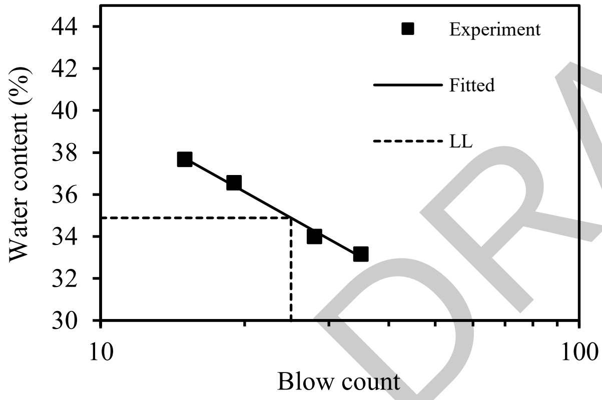
Analyst name: L. Varzaru
Test date: September 3, 2025
Soil Sample ID: B-25-10, ST (4.5-6.5ft.)
Sample description: Gray LEAN CLAY w/ GRAVEL (CL)
% retained on #40 sieve: 20%

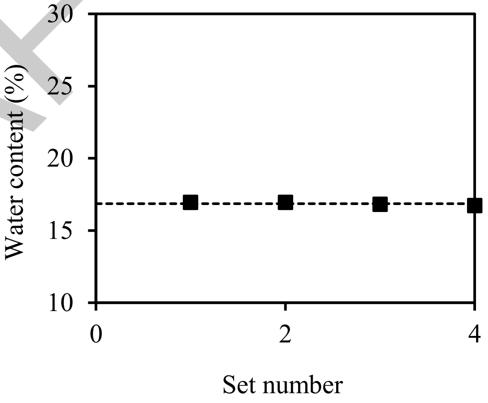
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.08*	*21.80*	*19.13*	*35*	33.17	33.02
2	*11.38*	*22.14*	*19.41*	*28*	34.00	34.26
3	*10.96*	*20.11*	*17.66*	*19*	36.57	36.41
4	*11.29*	*20.61*	*18.06*	*15*	37.67	37.71

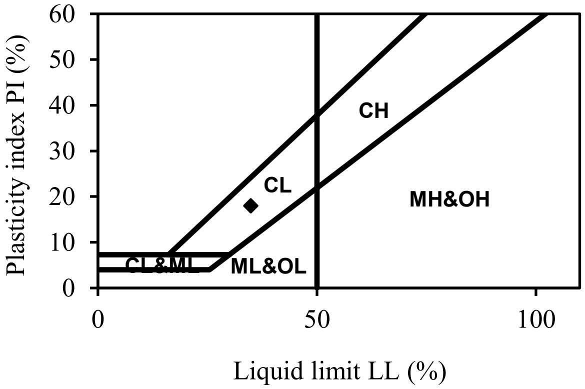
Liquid limit (%) = 34.89
Slope of flow line = 0.157

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.02*	*20.68*	*19.28*	16.95
2	*11.08*	*20.40*	*19.05*	16.94
3	*11.24*	*25.62*	*23.55*	16.82
4	*11.19*	*23.47*	*21.71*	16.73

Plastic limit (%) = 16.86







Liquid limit (%) = ***35***
Plastic limit (%) = ***17***
Plasticity index (%) = ***18***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Wang Testing Services, Inc.
Project: PBC DWM Operations Facility
WEI Job No: 11255119
Prep Method: air dried

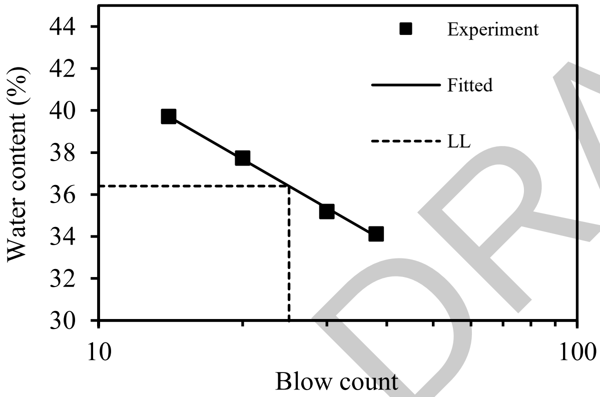
Analyst name: L. Varzaru
Test date: August 29, 2025
Soil Sample ID: B-25-13, SS#3 (6-7.5ft.)
Sample description: Brown LEAN CLAY (CL)
% retained on #40 sieve: 2%

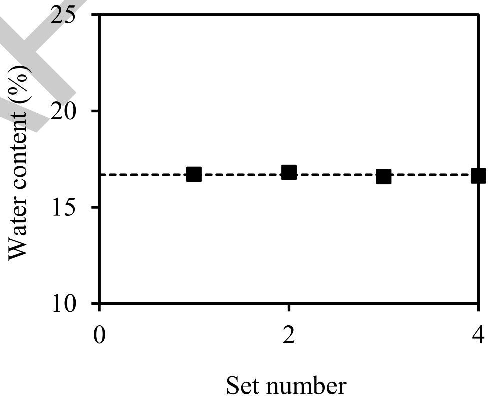
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.08*	*21.34*	*18.73*	*38*	34.12	34.01
2	*11.34*	*21.29*	*18.70*	*30*	35.19	35.36
3	*11.04*	*20.86*	*18.17*	*20*	37.73	37.67
4	*11.38*	*21.23*	*18.43*	*14*	39.72	39.71

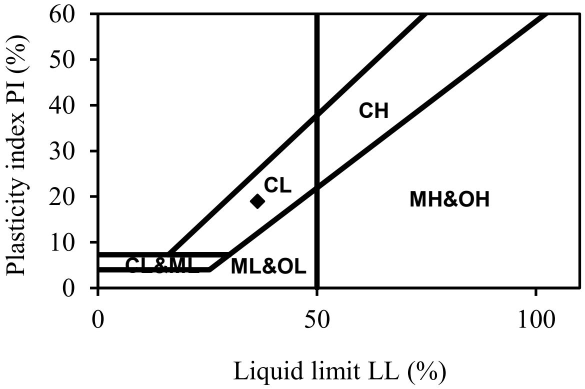
Liquid limit (%) = 36.40
Slope of flow line = 0.155

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.31*	*21.30*	*19.87*	16.71
2	*11.08*	*20.81*	*19.41*	16.81
3	*11.06*	*21.74*	*20.22*	16.59
4	*10.93*	*23.49*	*21.70*	16.62

Plastic limit (%) = 16.68







Liquid limit (%) = ***36***
Plastic limit (%) = ***17***
Plasticity index (%) = ***19***

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-01, ST (3.5-5.5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 42
Plastic Limit (%): 18

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Dark Gray LEAN CLAY (CL)
Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.08 in
Average initial diameter d_0 = 2.88 in
Height to diameter ratio= 2.11
Mass of wet sample = 1277.70 g
Mass of dry sample and tare = 1232.00 g
Mass of tare = 187.25 g
Specific gravity = 2.75 (estimated)

Initial water content w = 22.30% (specimen)
Initial unit weight g = 122.79 pcf
Initial dry unit weight g_d = 100.40 pcf
Initial void ratio e_0 = 0.71
Initial degree of saturation S_r = 86%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 1.58 tsf
Shear Strength= 0.79 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	9.55	0.49	0.10
0.06	28.65	0.99	0.31
0.09	45.36	1.48	0.49
0.12	66.85	1.97	0.72
0.15	88.34	2.47	0.95
0.18	102.67	2.96	1.10
0.21	114.60	3.45	1.22
0.24	124.15	3.95	1.32
0.27	131.32	4.44	1.39
0.30	136.09	4.93	1.43
0.35	143.25	5.75	1.49
0.40	150.42	6.58	1.55
0.45	152.80	7.40	1.56
0.50	155.19	8.22	1.57
0.55	157.58	9.04	1.58
0.60	152.80	9.87	1.52
0.65	152.80	10.69	1.51
0.70	148.03	11.51	1.45
0.80	133.70	13.15	1.28
0.90	109.83	14.80	1.03
1.00	88.34	16.44	0.82

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025
Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

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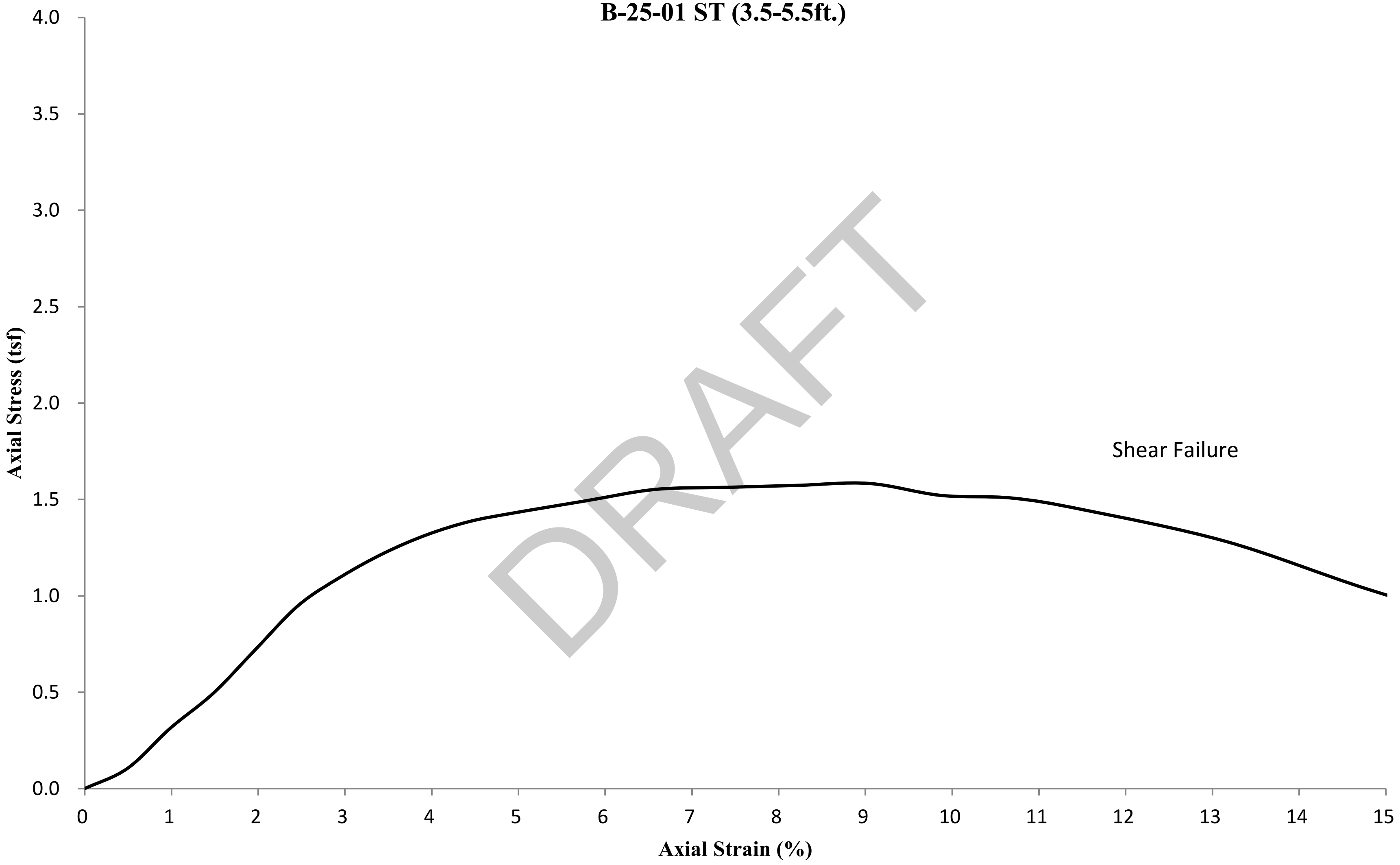

UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-01, ST (8.5-10.5ft.)
Type/Condition: ST/Undisturbed

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Gray LEAN CLAY (CL)

Liquid Limit (%): 43
Plastic Limit (%): 16

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.10 in
Average initial diameter d_0 = 2.84 in
Height to diameter ratio= 2.15
Mass of wet sample = 1236.44 g
Mass of dry sample and tare = 1152.83 g
Mass of tare = 187.88 g
Specific gravity = 2.75 (estimated)

Initial water content w = 28.14% (specimen)
Initial unit weight g = 121.64 pcf
Initial dry unit weight g_d = 94.93 pcf
Initial void ratio e_0 = 0.81
Initial degree of saturation S_r = 96%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 0.37 tsf
Shear Strength= 0.18 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	2.39	0.49	0.03
0.06	4.78	0.98	0.05
0.09	7.16	1.48	0.08
0.12	9.55	1.97	0.11
0.15	11.94	2.46	0.13
0.18	14.33	2.95	0.16
0.21	16.71	3.44	0.18
0.24	19.10	3.93	0.21
0.27	19.10	4.43	0.21
0.30	21.49	4.92	0.23
0.35	23.88	5.74	0.26
0.40	26.26	6.56	0.28
0.45	28.65	7.38	0.30
0.50	28.65	8.19	0.30
0.55	31.04	9.01	0.32
0.60	33.43	9.83	0.34
0.65	33.43	10.65	0.34
0.70	33.43	11.47	0.34
0.80	35.81	13.11	0.35
0.90	38.20	14.75	0.37
1.00	38.20	16.39	0.36

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

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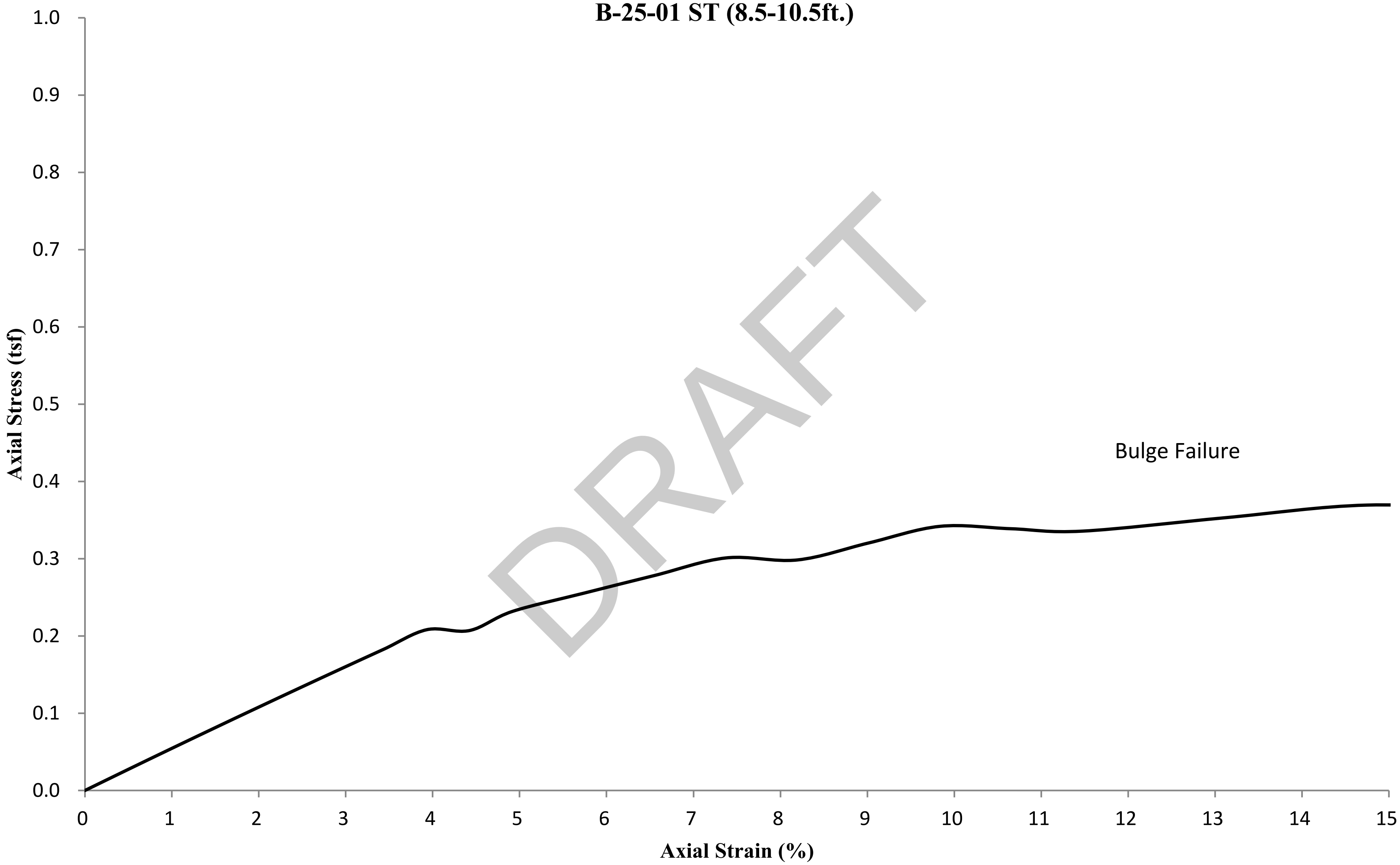
Unconfined Axial Stress v. Axial Strain
B-25-01 ST (8.5-10.5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: **PBC DWM Operations Facility**
Client: **Wang Testing Services, Inc.**
WEI Job No.: **11255119 (60763208)**
Soil Sample ID: **B-25-02, ST (3.5-5.5ft.)**
Type/Condition: **ST/Undisturbed**
Liquid Limit (%): 36
Plastic Limit (%): 18

Analyst name: **J. George**
Date received: **8/13/2025**
Test date: **8/27/2025**
Sample description: **Gray LEAN CLAY (CL)**
Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.13 in
Average initial diameter d_0 = 2.86 in
Height to diameter ratio= 2.14
Mass of wet sample = 1357.90 g
Mass of dry sample and tare = 1319.32 g
Mass of tare = 164.41 g
Specific gravity = 2.75 (estimated)

Initial water content w = 17.58% (specimen)
Initial unit weight g = 130.93 pcf
Initial dry unit weight g_d = 111.36 pcf
Initial void ratio e_0 = 0.54
Initial degree of saturation S_r = 89%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 2.12 tsf
Shear Strength= 1.06 tsf

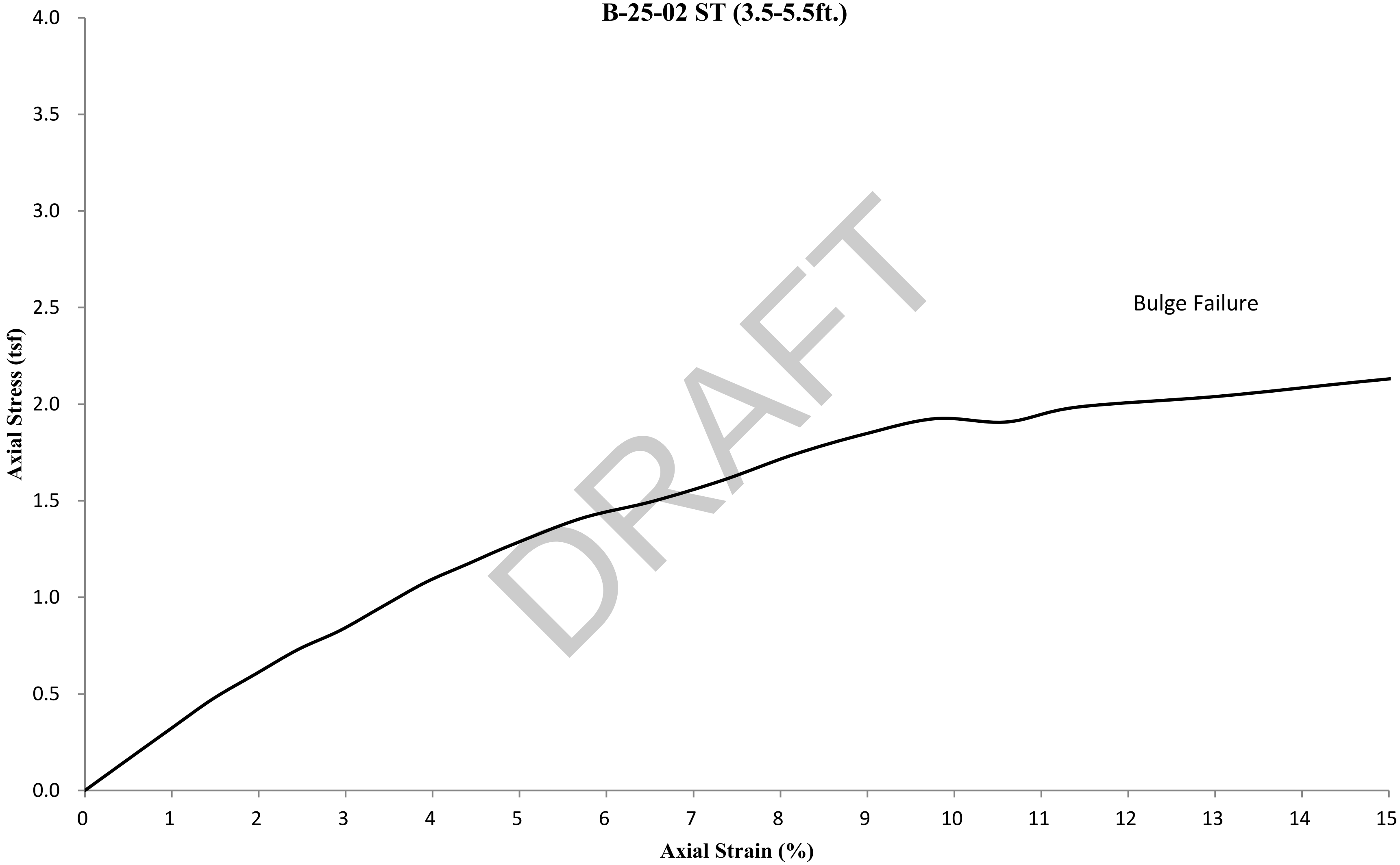
Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	14.33	0.49	0.16
0.06	28.65	0.98	0.32
0.09	42.98	1.47	0.47
0.12	54.91	1.96	0.60
0.15	66.85	2.45	0.73
0.18	76.40	2.94	0.83
0.21	88.34	3.43	0.95
0.24	100.28	3.91	1.08
0.27	109.83	4.40	1.17
0.30	119.38	4.89	1.27
0.35	133.70	5.71	1.41
0.40	143.25	6.52	1.50
0.45	155.19	7.34	1.61
0.50	169.52	8.16	1.74
0.55	181.46	8.97	1.85
0.60	191.01	9.79	1.92
0.65	191.01	10.60	1.91
0.70	200.56	11.42	1.98
0.80	210.11	13.05	2.04
0.90	222.04	14.68	2.12
1.00	233.98	16.31	2.19

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025
Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

Unconfined Axial Stress v. Axial Strain
B-25-02 ST (3.5-5.5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-02, ST (8.5-10.5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 39
Plastic Limit (%): 17

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Gray LEAN CLAY (CL)

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.07 in
Average initial diameter d_0 = 2.86 in
Height to diameter ratio= 2.12
Mass of wet sample = 1311.65 g
Mass of dry sample and tare = 1263.16 g
Mass of tare = 187.01 g
Specific gravity = 2.75 (estimated)

Initial water content w = 21.88% (specimen)
Initial unit weight g = 127.87 pcf
Initial dry unit weight g_d = 104.91 pcf
Initial void ratio e_0 = 0.64
Initial degree of saturation S_r = 95%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 2.29 tsf
Shear Strength= 1.15 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	2.39	0.49	0.03
0.06	9.55	0.99	0.11
0.09	28.65	1.48	0.32
0.12	54.91	1.98	0.60
0.15	85.95	2.47	0.94
0.18	112.22	2.96	1.22
0.21	133.70	3.46	1.44
0.24	155.19	3.95	1.67
0.27	176.68	4.45	1.89
0.30	193.39	4.94	2.06
0.35	212.49	5.76	2.24
0.40	219.66	6.59	2.29
0.45	195.78	7.41	2.03
0.50	119.38	8.24	1.23
0.55	76.40	9.06	0.78
0.60	57.30	9.88	0.58
0.65	57.30	10.71	0.57
0.70	38.20	11.53	0.38
0.80	28.65	13.18	0.28
0.90	38.20	14.82	0.36
1.00	40.59	16.47	0.38

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

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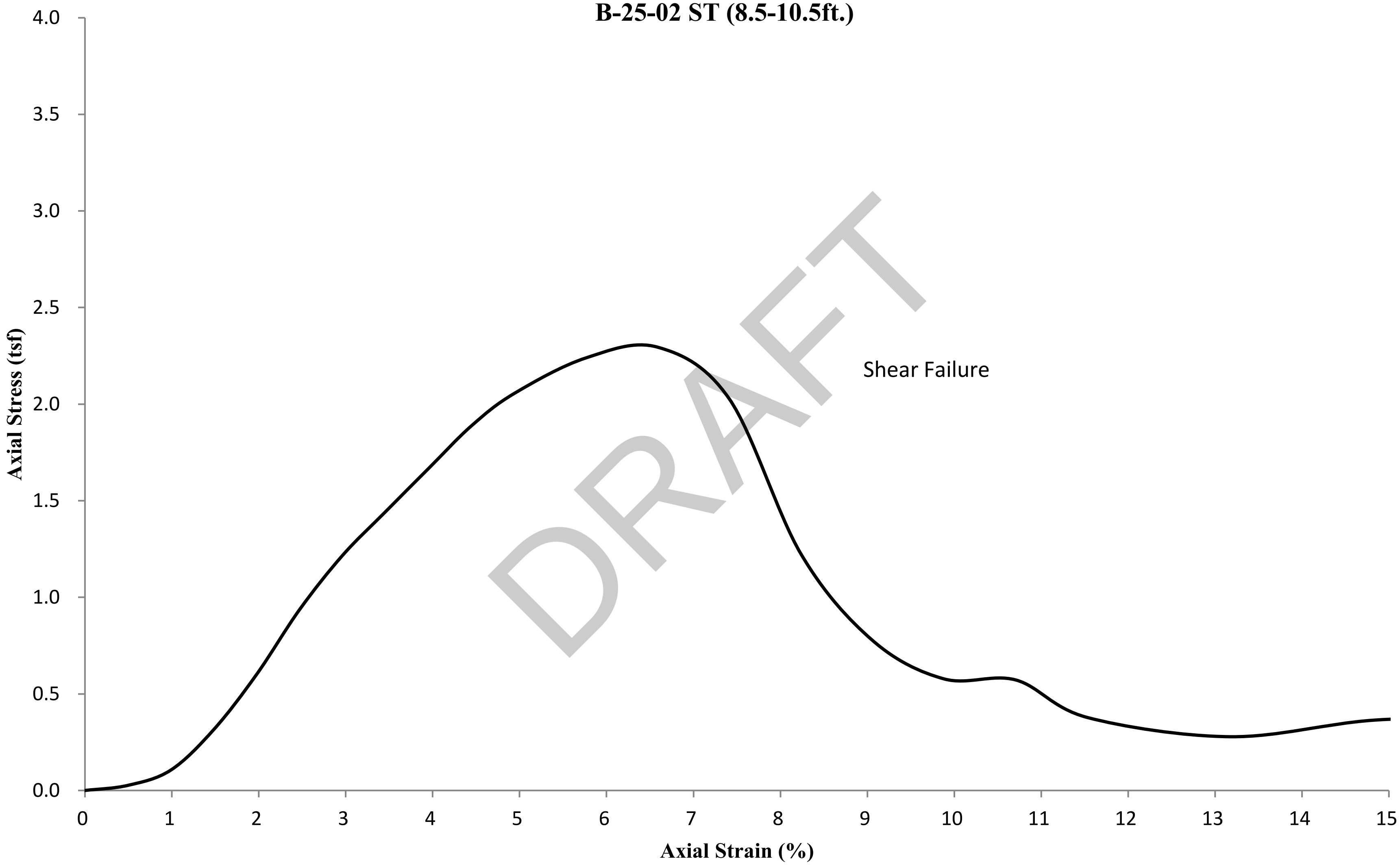
Unconfined Axial Stress v. Axial Strain
B-25-02 ST (8.5-10.5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-03, ST (3-5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 40
Plastic Limit (%): 21

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Dark Gray LEAN CLAY (CL)
Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.06 in
Average initial diameter d_0 = 2.87 in
Height to diameter ratio= 2.11
Mass of wet sample = 1096.57 g
Mass of dry sample and tare = 1116.95 g
Mass of tare = 187.46 g
Specific gravity = 2.75 (estimated)

Initial water content w = 17.98% (specimen)
Initial unit weight g = 106.38 pcf
Initial dry unit weight g_d = 90.17 pcf
Initial void ratio e_0 = 0.90
Initial degree of saturation S_r = 55%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 1.00 tsf
Shear Strength= 0.50 tsf

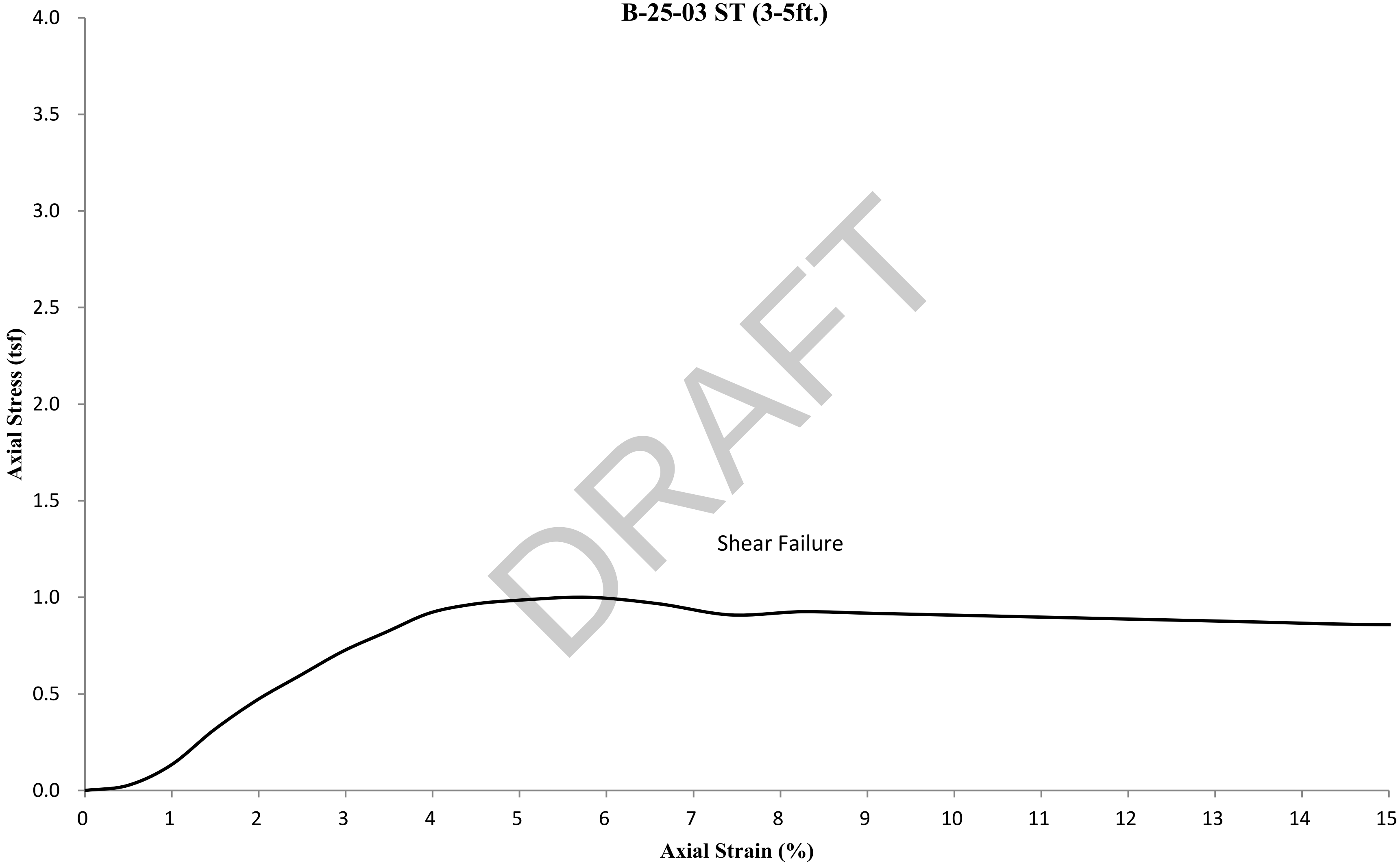
Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	2.39	0.49	0.03
0.06	11.94	0.99	0.13
0.09	28.65	1.48	0.31
0.12	42.98	1.98	0.47
0.15	54.91	2.47	0.60
0.18	66.85	2.97	0.72
0.21	76.40	3.46	0.82
0.24	85.95	3.96	0.92
0.27	90.73	4.45	0.96
0.30	93.12	4.95	0.98
0.35	95.50	5.77	1.00
0.40	93.12	6.60	0.97
0.45	88.34	7.42	0.91
0.50	90.73	8.25	0.93
0.55	90.73	9.07	0.92
0.60	90.73	9.90	0.91
0.65	90.73	10.72	0.90
0.70	90.73	11.55	0.89
0.80	90.73	13.19	0.88
0.90	90.73	14.84	0.86
1.00	93.12	16.49	0.86

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025
Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

Unconfined Axial Stress v. Axial Strain
B-25-03 ST (3-5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-04, ST (3.5-5.5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 33
Plastic Limit (%): 16

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Brown/Gray SANDY LEAN CLAY w/ GRAVEL (CL)
Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 5.95 in
Average initial diameter d_0 = 2.86 in
Height to diameter ratio= 2.08
Mass of wet sample = 1239.75 g
Mass of dry sample and tare = 1166.42 g
Mass of tare = 138.64 g
Specific gravity = 2.75 (estimated)

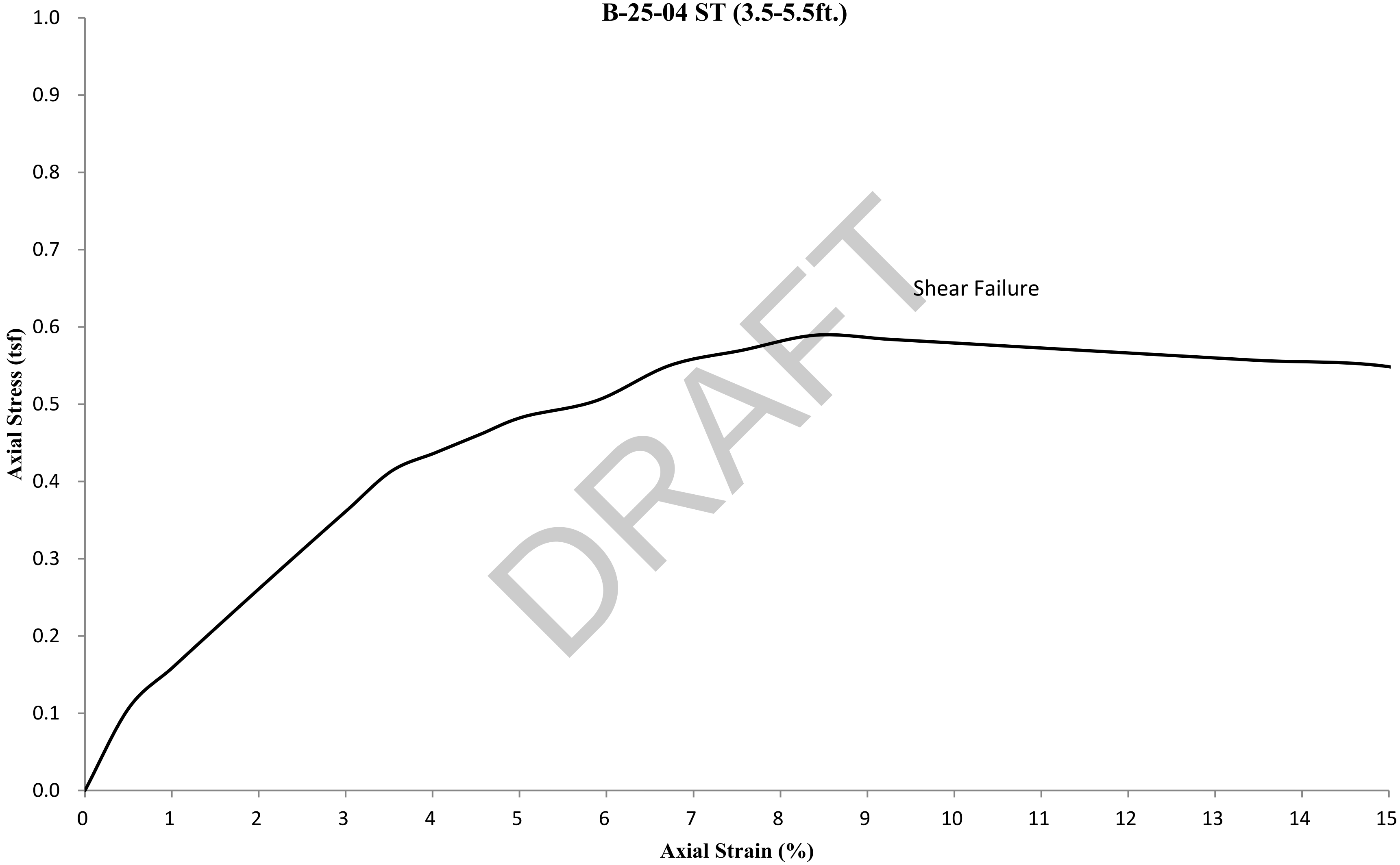
Initial water content w = 20.62% (specimen)
Initial unit weight g = 123.92 pcf
Initial dry unit weight g_d = 102.73 pcf
Initial void ratio e_0 = 0.67
Initial degree of saturation S_r = 85%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 0.59 tsf
Shear Strength= 0.29 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	9.55	0.50	0.11
0.06	14.33	1.01	0.16
0.09	19.10	1.51	0.21
0.12	23.88	2.02	0.26
0.15	28.65	2.52	0.31
0.18	33.43	3.03	0.36
0.21	38.20	3.53	0.41
0.24	40.59	4.04	0.44
0.27	42.98	4.54	0.46
0.30	45.36	5.05	0.48
0.35	47.75	5.89	0.50
0.40	52.53	6.73	0.55
0.45	54.91	7.57	0.57
0.50	57.30	8.41	0.59
0.55	57.30	9.25	0.58
0.60	57.30	10.09	0.58
0.65	57.30	10.93	0.57
0.70	57.30	11.77	0.57
0.80	57.30	13.46	0.56
0.90	57.30	15.14	0.55
1.00	52.53	16.82	0.49

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025
Checked by: Mickey Snider Date: 9/9/2025

Unconfined Axial Stress v. Axial Strain
B-25-04 ST (3.5-5.5ft.)



UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-04, ST (8.5-10.5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 41
Plastic Limit (%): 18

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Gray LEAN CLAY (CL)

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.12 in
Average initial diameter d_0 = 2.87 in
Height to diameter ratio= 2.13
Mass of wet sample = 1345.40 g
Mass of dry sample and tare = 1269.54 g
Mass of tare = 138.51 g
Specific gravity = 2.75 (estimated)

Initial water content w = 18.95% (specimen)
Initial unit weight g = 129.74 pcf
Initial dry unit weight g_d = 109.07 pcf
Initial void ratio e_0 = 0.57
Initial degree of saturation S_r = 91%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 3.65 tsf
Shear Strength= 1.82 tsf

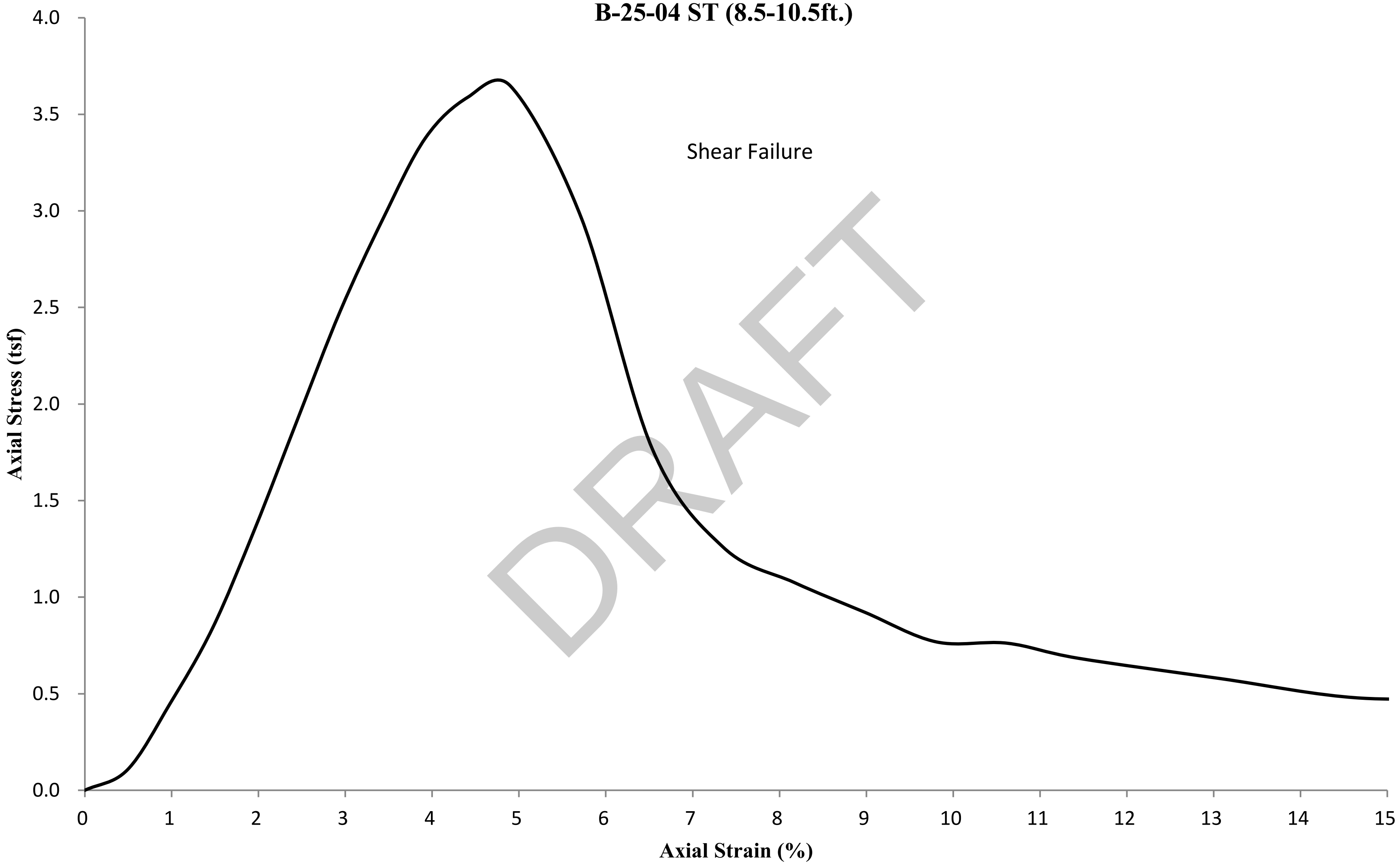
Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	9.55	0.49	0.11
0.06	40.59	0.98	0.45
0.09	76.40	1.47	0.84
0.12	124.15	1.96	1.36
0.15	176.68	2.45	1.92
0.18	229.21	2.94	2.48
0.21	274.57	3.43	2.96
0.24	315.16	3.92	3.38
0.27	336.65	4.41	3.59
0.30	343.81	4.90	3.65
0.35	281.73	5.72	2.96
0.40	169.52	6.54	1.77
0.45	121.77	7.35	1.26
0.50	105.05	8.17	1.08
0.55	90.73	8.99	0.92
0.60	76.40	9.80	0.77
0.65	76.40	10.62	0.76
0.70	69.24	11.44	0.68
0.80	59.69	13.07	0.58
0.90	50.14	14.71	0.48
1.00	52.53	16.34	0.49

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

Unconfined Axial Stress v. Axial Strain
B-25-04 ST (8.5-10.5ft.)



UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-05, ST (3-5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 42
Plastic Limit (%): 19

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Gray LEAN CLAY (CL)
Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.15 in
Average initial diameter d_0 = 2.84 in
Height to diameter ratio= 2.16
Mass of wet sample = 1313.30 g
Mass of dry sample and tare = 1300.52 g
Mass of tare = 188.39 g
Specific gravity = 2.75 (estimated)

Initial water content w = 18.09% (specimen)
Initial unit weight g = 128.13 pcf
Initial dry unit weight g_d = 108.50 pcf
Initial void ratio e_0 = 0.58
Initial degree of saturation S_r = 86%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 1.91 tsf
Shear Strength= 0.95 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	14.33	0.49	0.16
0.06	38.20	0.98	0.43
0.09	64.46	1.46	0.72
0.12	90.73	1.95	1.01
0.15	107.44	2.44	1.19
0.18	121.77	2.93	1.34
0.21	133.70	3.42	1.46
0.24	143.25	3.91	1.56
0.27	152.80	4.39	1.66
0.30	159.97	4.88	1.72
0.35	169.52	5.70	1.81
0.40	176.68	6.51	1.87
0.45	181.46	7.32	1.91
0.50	181.46	8.14	1.89
0.55	176.68	8.95	1.82
0.60	171.91	9.76	1.76
0.65	171.91	10.58	1.74
0.70	162.36	11.39	1.63
0.80	155.19	13.02	1.53
0.90	136.09	14.65	1.32
1.00	114.60	16.27	1.09

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

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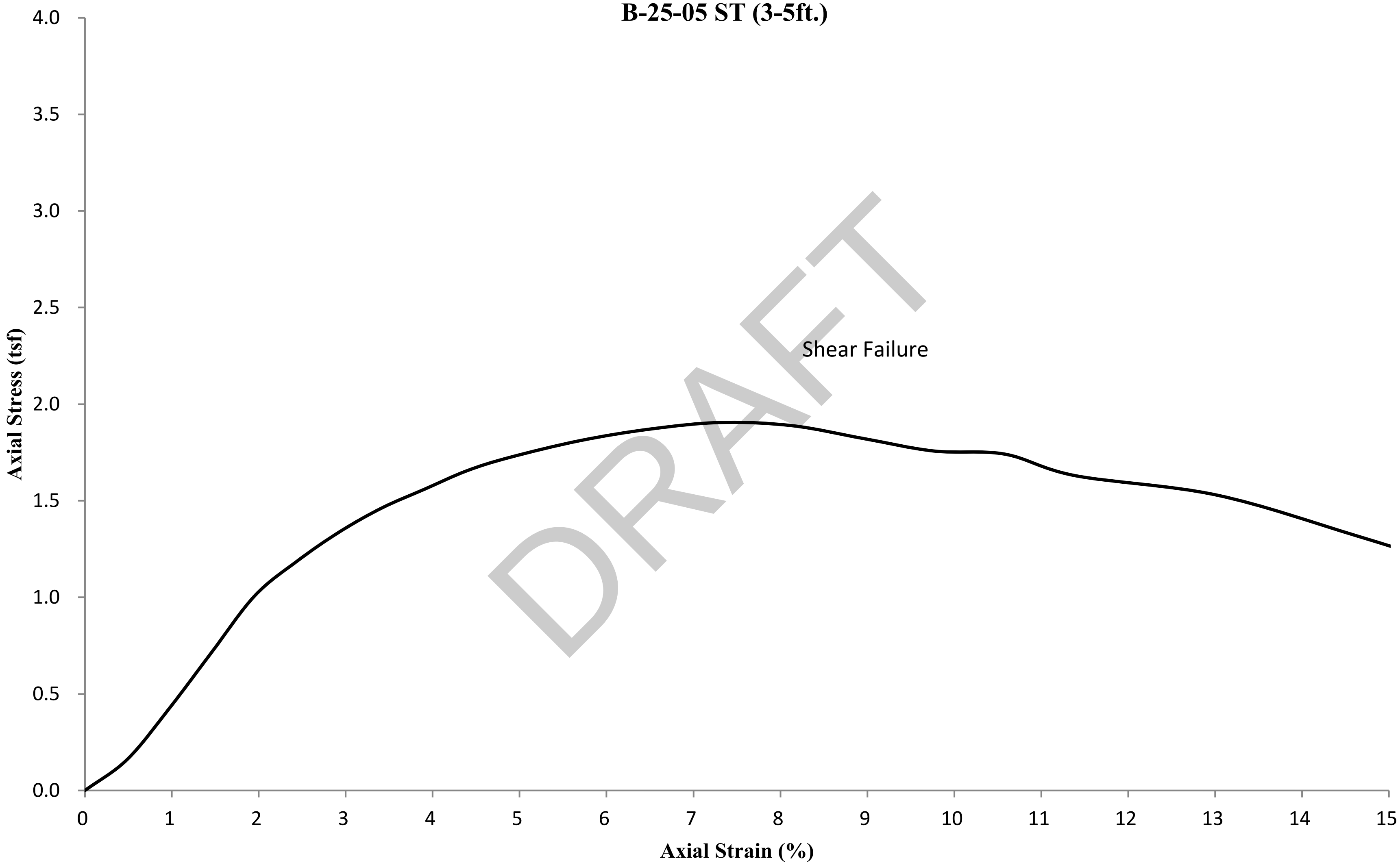
Unconfined Axial Stress v. Axial Strain
B-25-05 ST (3-5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-06, ST (18.5-20.5ft.)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 35
Plastic Limit (%): 16

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Gray LEAN CLAY (CL)

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.10 in
Average initial diameter d_0 = 2.86 in
Height to diameter ratio= 2.13
Mass of wet sample = 1343.73 g
Mass of dry sample and tare = 1315.91 g
Mass of tare = 186.48 g
Specific gravity = 2.75 (estimated)

Initial water content w = 18.97% (specimen)
Initial unit weight g = 130.40 pcf
Initial dry unit weight g_d = 109.60 pcf
Initial void ratio e_0 = 0.57
Initial degree of saturation S_r = 92%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 2.91 tsf
Shear Strength= 1.46 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	16.71	0.49	0.19
0.06	35.81	0.98	0.40
0.09	57.30	1.48	0.63
0.12	78.79	1.97	0.86
0.15	102.67	2.46	1.12
0.18	121.77	2.95	1.32
0.21	145.64	3.44	1.57
0.24	171.91	3.93	1.85
0.27	198.17	4.43	2.12
0.30	217.27	4.92	2.31
0.35	238.76	5.74	2.52
0.40	253.08	6.56	2.65
0.45	262.63	7.38	2.72
0.50	272.18	8.20	2.80
0.55	281.73	9.02	2.87
0.60	288.90	9.84	2.91
0.65	288.90	10.66	2.89
0.70	293.67	11.47	2.91
0.80	298.45	13.11	2.90
0.90	303.22	14.75	2.89
1.00	305.61	16.39	2.86

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

AASHTO
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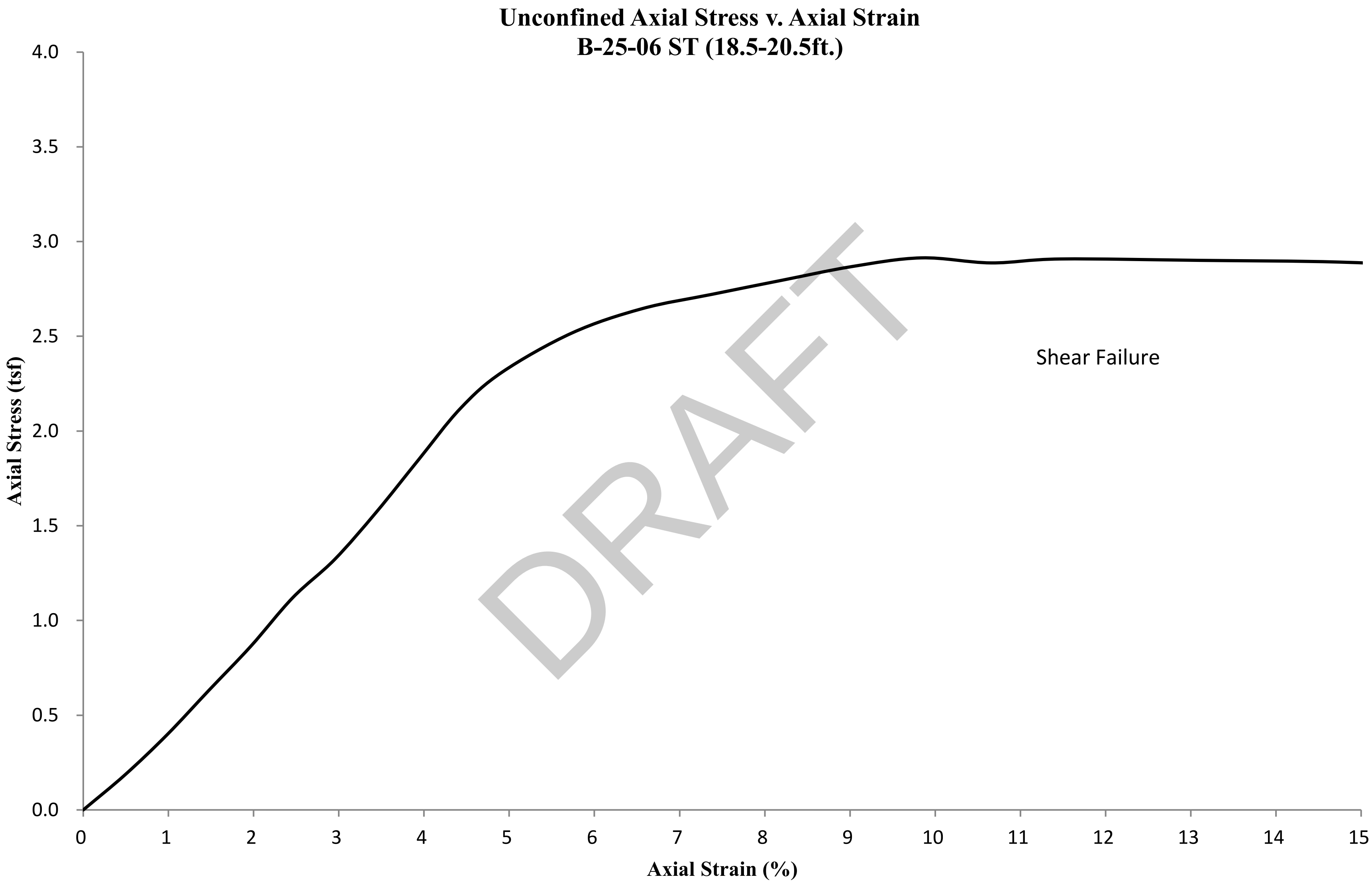
PROGRAM


Unconfined Axial Stress v. Axial Strain
B-25-06 ST (18.5-20.5ft.)
Axial Stress (tsf)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Axial Strain (%)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Shear Failure

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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: **PBC DWM Operations Facility**
Client: **Wang Testing Services, Inc.**
WEI Job No.: **11255119 (60763208)**
Soil Sample ID: **B-25-07, ST (4.5-6.5ft.)**
Type/Condition: **ST/Undisturbed**
Liquid Limit (%): 31
Plastic Limit (%): 14

Analyst name: **J. George**
Date received: **8/13/2025**
Test date: **8/27/2025**
Sample description: **Dark Gray LEAN CLAY (CL)**

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.02 in
Average initial diameter d_0 = 2.87 in
Height to diameter ratio= 2.10
Mass of wet sample = 1298.37 g
Mass of dry sample and tare = 1279.15 g
Mass of tare = 188.06 g
Specific gravity = 2.75 (estimated)

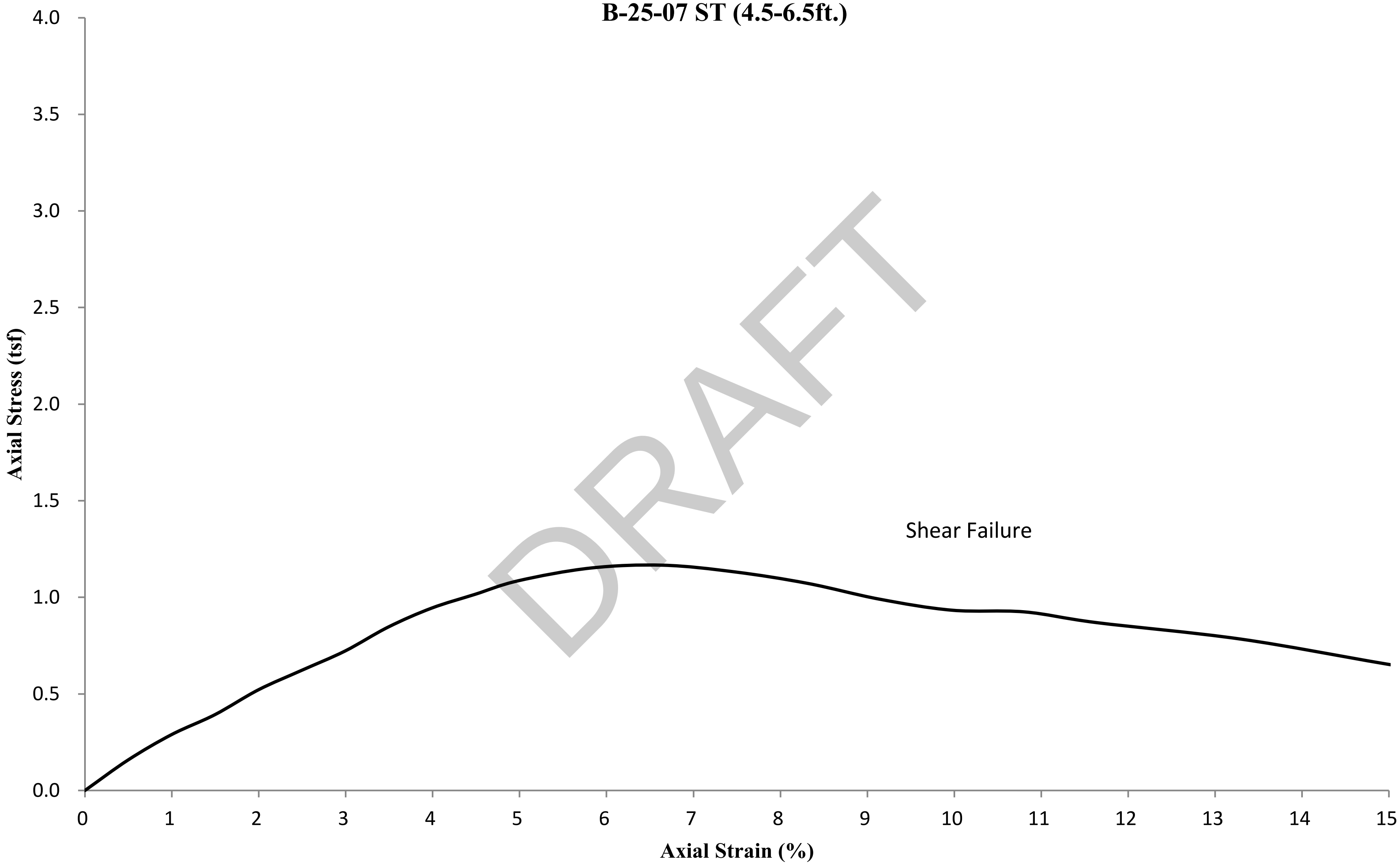
Initial water content w = 19.00% (specimen)
Initial unit weight g = 127.14 pcf
Initial dry unit weight g_d = 106.85 pcf
Initial void ratio e_0 = 0.61
Initial degree of saturation S_r = 86%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 1.17 tsf
Shear Strength= 0.58 tsf

Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	14.33	0.50	0.16
0.06	26.26	1.00	0.29
0.09	35.81	1.50	0.39
0.12	47.75	1.99	0.52
0.15	57.30	2.49	0.62
0.18	66.85	2.99	0.72
0.21	78.79	3.49	0.85
0.24	88.34	3.99	0.94
0.27	95.50	4.49	1.02
0.30	102.67	4.99	1.09
0.35	109.83	5.82	1.15
0.40	112.22	6.65	1.17
0.45	109.83	7.48	1.13
0.50	105.05	8.31	1.07
0.55	97.89	9.14	0.99
0.60	93.12	9.97	0.93
0.65	93.12	10.80	0.92
0.70	88.34	11.64	0.87
0.80	81.18	13.30	0.78
0.90	69.24	14.96	0.66
1.00	57.30	16.62	0.53

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025
Checked by: Mickey Snider Date: 9/9/2025

Unconfined Axial Stress v. Axial Strain
B-25-07 ST (4.5-6.5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-08, ST (4.5-5.5ft.)
Type/Condition: ST/Undisturbed

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Dark Gray LEAN CLAY (CL)

Liquid Limit (%): 45
Plastic Limit (%): 15

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.18 in
Average initial diameter d_0 = 2.87 in
Height to diameter ratio= 2.15
Mass of wet sample = 1315.07 g
Mass of dry sample and tare = 1250.16 g
Mass of tare = 185.64 g
Specific gravity = 2.75 (estimated)

Initial water content w = 23.54% (specimen)
Initial unit weight g = 125.41 pcf
Initial dry unit weight g_d = 101.52 pcf
Initial void ratio e_0 = 0.69
Initial degree of saturation S_r = 94%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 0.48 tsf
Shear Strength= 0.24 tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	7.16	0.49	0.08
0.06	14.33	0.97	0.16
0.09	19.10	1.46	0.21
0.12	28.65	1.94	0.31
0.15	33.43	2.43	0.36
0.18	38.20	2.91	0.41
0.21	38.20	3.40	0.41
0.24	40.59	3.88	0.43
0.27	42.98	4.37	0.46
0.30	45.36	4.86	0.48
0.35	42.98	5.67	0.45
0.40	40.59	6.47	0.42
0.45	38.20	7.28	0.39
0.50	35.81	8.09	0.37
0.55	33.43	8.90	0.34
0.60	33.43	9.71	0.34
0.65	33.43	10.52	0.33
0.70	33.43	11.33	0.33
0.80	31.04	12.95	0.30
0.90	28.65	14.57	0.27
1.00	26.26	16.19	0.25

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025

Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

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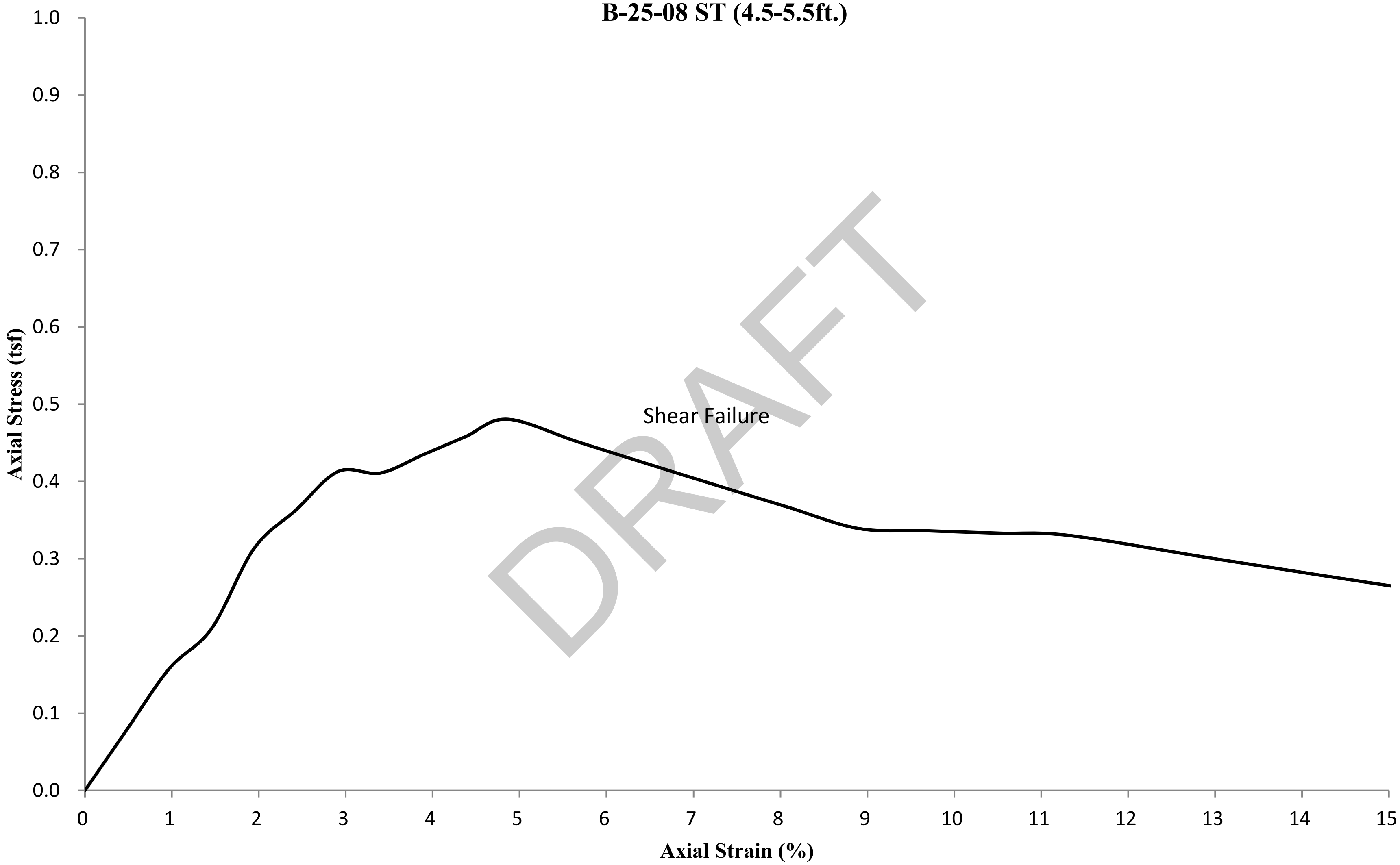
Unconfined Axial Stress v. Axial Strain
B-25-08 ST (4.5-5.5ft.)



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UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: PBC DWM Operations Facility
Client: Wang Testing Services, Inc.
WEI Job No.: 11255119 (60763208)
Soil Sample ID: B-25-09, ST (4.0-6.0ft.)
Type/Condition: ST/Undisturbed

Analyst name: J. George
Date received: 8/13/2025
Test date: 8/27/2025
Sample description: Gray LEAN CLAY (CL)

Liquid Limit (%): 35
Plastic Limit (%): 16

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 = 6.10 in
Average initial diameter d_0 = 2.88 in
Height to diameter ratio= 2.12
Mass of wet sample = 1391.23 g
Mass of dry sample and tare = 1356.96 g
Mass of tare = 151.58 g
Specific gravity = 2.75 (estimated)

Initial water content w = 15.42% (specimen)
Initial unit weight g = 133.79 pcf
Initial dry unit weight g_d = 115.92 pcf
Initial void ratio e_0 = 0.48
Initial degree of saturation S_r = 88%
Average Rate of Strain= 1%/min
Unconfined compressive strength q_u = 3.27 tsf
Shear Strength= 1.63 tsf

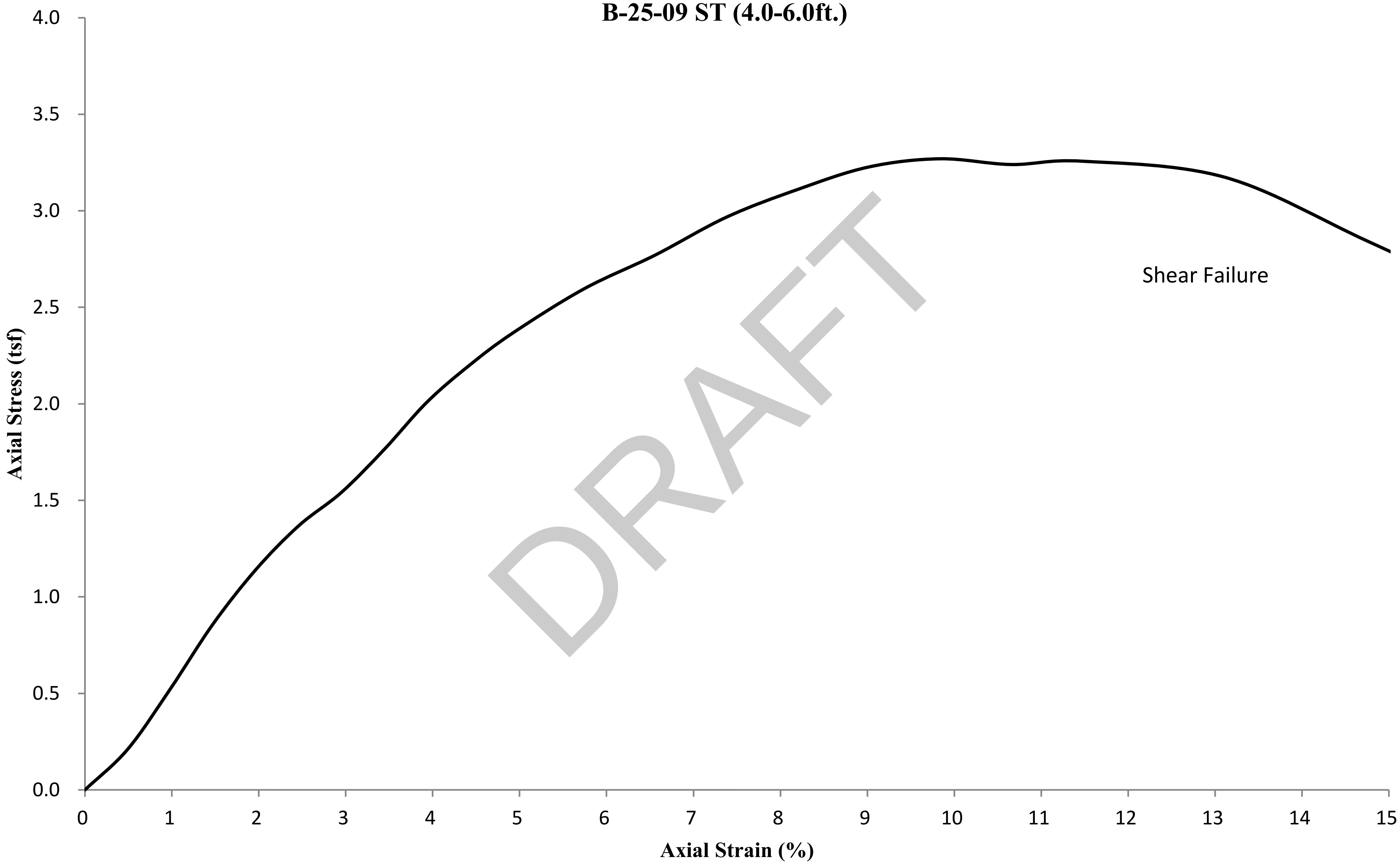
Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	19.10	0.49	0.21
0.06	47.75	0.98	0.52
0.09	78.79	1.48	0.86
0.12	105.05	1.97	1.14
0.15	126.54	2.46	1.37
0.18	143.25	2.95	1.54
0.21	164.74	3.44	1.76
0.24	188.62	3.93	2.01
0.27	207.72	4.43	2.20
0.30	224.43	4.92	2.37
0.35	248.31	5.74	2.59
0.40	267.41	6.56	2.77
0.45	288.90	7.38	2.97
0.50	305.61	8.20	3.11
0.55	319.94	9.02	3.23
0.60	327.10	9.84	3.27
0.65	327.10	10.66	3.24
0.70	331.87	11.47	3.26
0.80	329.49	13.11	3.17
0.90	300.83	14.75	2.84
1.00	269.80	16.39	2.50

NOTES:

Prepared by: Matt Ciapas Date: 9/9/2025
Checked by: Mickey Snider Date: 9/9/2025

AASHTO ACCREDITATION PROGRAM

Unconfined Axial Stress v. Axial Strain
B-25-09 ST (4.0-6.0ft.)



SHELBY TUBE DESCRIPTION

WEI JOB # 11255119 (60763208)

ANALYST: J. George

PROJECT: PBC DWM Operations Facility

EXTRUSION DATE: 8/27/2025

CLIENT: Wang Testing Services, Inc.

BORING ID: B-25-06 (4.5-6.5 ft)

SAMPLE ID: ST

Length of Recovery 8"

▨

▨

* 1.75P

* 2.0P
▨

Soil Description

Gray/Dark Gray LEAN CLAY (CL)
Not enough sample for UCS test

	Tare Mass	11.03
TOP	Wet + tare	55.21
	Dry + tare	48.5
		18%
	Tare Mass	10.97
MIDDLE	Wet + tare	49.21
	Dry + tare	42.36
		22%
BOTTOM	Tare Mass	11.04
	Wet + tare	48.79
	Dry + tare	43.2
		17%

* Penetrometer Reading
▨ Moisture content taken in Hatched area

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SHELBY TUBE DESCRIPTION

WEI JOB # **11255119 (60763208)**
ANALYST: J. George
PROJECT: **PBC DWM Operations Facility**
EXTRUSION DATE: 8/27/2025
CLIENT: **Wang Testing Services, Inc.**

BORING ID: **B-25-10 (4.5-6.5 ft)**
SAMPLE ID: ST

Length of Recovery 8"

Soil Description

5" Dark Gray CLAYEY GRAVEL w/ SAND (GC)

3" Dark Gray SANDY LEAN CLAY w/ GRAVEL (CL)
Not enough sample for UCS test

* 2.0P

TOP	Tare Mass	11.18
	Wet + tare	67.55
	Dry + tare	63.8
		7%
MIDDLE	Tare Mass	10.98
	Wet + tare	62.28
	Dry + tare	58.55
		8%
BOTTOM	Tare Mass	11.32
	Wet + tare	54.95
	Dry + tare	50.31
		12%

* Penetrometer Reading
▨ Moisture content taken in Hatched area

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ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: PBC DWM Operations Facility
Client: WTS
Soil Sample ID: Boring B-25-03, ST, 15 to 17 feet
Sample Description: Gray LEAN CLAY (CL)
Initial sample height = 0.988 in
Initial sample mass = 165.46 g
Initial water content = 17.81%
Initial dry unit weight = 110.43 pcf
Initial void ratio = 0.554
Initial degree of saturation = 88.41%

Final sample mass = 164.11 g
Final dry sample mass = 140.45 g
Final water content = 16.84%
Final dry unit weight = 116.13 pcf
Final void ratio = 0.478
Final degree of saturation = 96.98%
Estimated specific gravity = 2.75

Tested by: M. Ciapas
Prepared by: M. Snider
Test date: 9/5/2025
WEI: 11255119
Ring diameter = 2.499 in
Ring mass = 109.78 g
Initial sample and ring mass = 275.24 g
Tare mass = 13.58 g
Final ring and sample mass = 274.25 g
Mass of wet sample and tare = 177.69 g
Mass of dry sample and tare = 154.03 g
Initial dial reading = 0.01000 in
Final dial reading = 0.05847 in
LL = 36 %
PL = 17 %
% Sand = n.a. %
% Silt = n.a. %
% Clay = n.a. %

Compression and Swelling Indices

Compression index C_c = 0.140
Field corrected C_c = 0.131
Swelling index C_s = 0.041

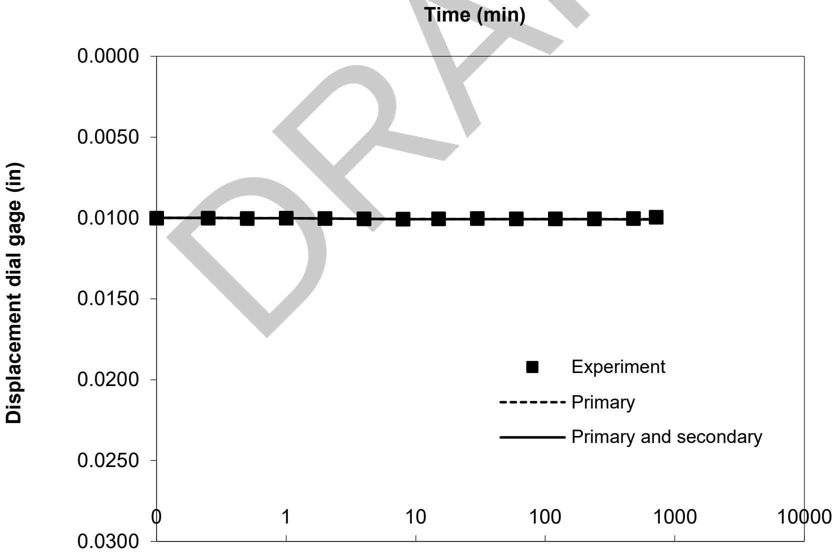
Preconsolidation pressure,s_C
Casagrande Method = 4164 psf

Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	C_v ft^2/day	Cae %	Elapsed time min
1	100.0	0.00996	0.00010	0.01	0.554	N/A	N/A	720
2	200.0	0.01000	0.00023	0.02	0.554	0.0171	0.01	720
3	500.0	0.01017	0.00058	0.08	0.553	0.0950	0.01	720
4	1000.0	0.01289	0.00090	0.38	0.548	0.1282	0.08	720
5	2000.0	0.02149	0.00135	1.30	0.534	0.1433	0.10	720
6	4000.0	0.03337	0.00193	2.56	0.514	0.1611	0.12	720
7	8000.0	0.04788	0.00253	4.09	0.490	0.1659	0.18	720
8	16000.0	0.06864	0.00324	6.26	0.457	0.1534	0.22	720
9	32000.0	0.09445	0.00413	8.97	0.415	0.1646	0.32	720
10	8000.0	0.08981	0.00295	8.38	0.424	N/A	N/A	720
11	2000.0	0.07697	0.00198	6.98	0.445	N/A	N/A	720
12	500.0	0.06042	0.00123	5.23	0.473	N/A	N/A	720

Applied stress	Elapsed time	Dial	Fitted Primary	Fitted Primary and Secondary
psf	min	in	in	in
50.0	*0.00*	0.01000	0.00998	0.00998
	0.10	0.01002	0.00999	0.00999
	0.25	0.01002	0.01000	0.01000
	0.50	0.01003	0.01001	0.01001
	1.00	0.01002	0.01002	0.01002
	2.00	0.01003	0.01004	0.01004
	4.00	0.01006	0.01005	0.01005
	8.00	0.01008	0.01006	0.01006
	15.00	0.01005	0.01007	0.01007
	30.00	0.01004	0.01007	0.01007
	60.00	0.01006	0.01007	0.01007
	120.00	0.01006	0.01007	0.01008
	240.00	0.01005	0.01007	0.01008
	480.00	0.01003	0.01007	0.01009
	720.20	0.00996	0.01007	0.01009

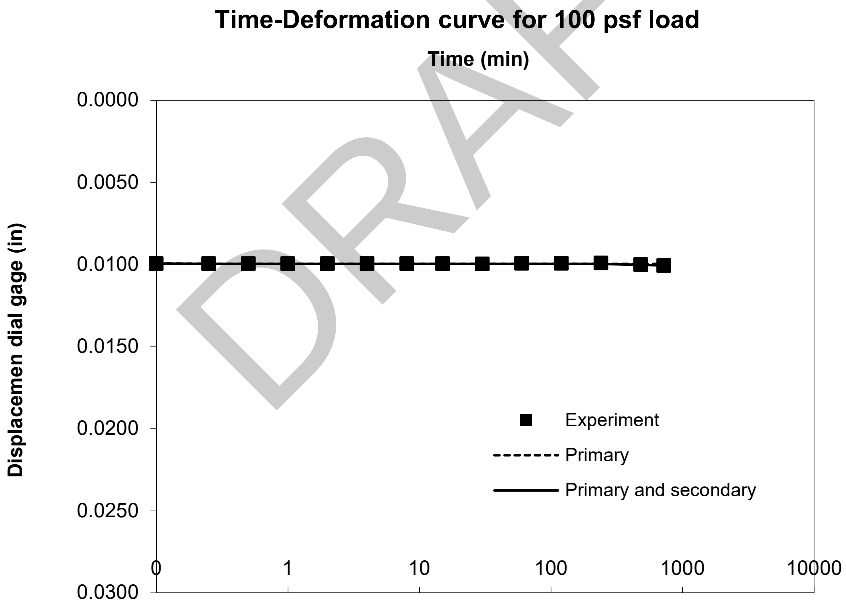
h_0 = 0.98800 in
U_s = 99%
t_s = 10.11 min
d_s = 0.01007 in
d_0 = 0.00998 in
d_{100} = 0.01007 in
d = 0.49399 in
C_v = 0.0430 in^2/min
r_i = 44.2%
r_p = -207.8%
r_s = 263.6%
Slope = 0.0000
Intercept = 0.0101
h_c = 0.9879 in
t_c = 45.91 min
C_{ae} = 0.002%

Time-Deformation curve for 50 psf seating load



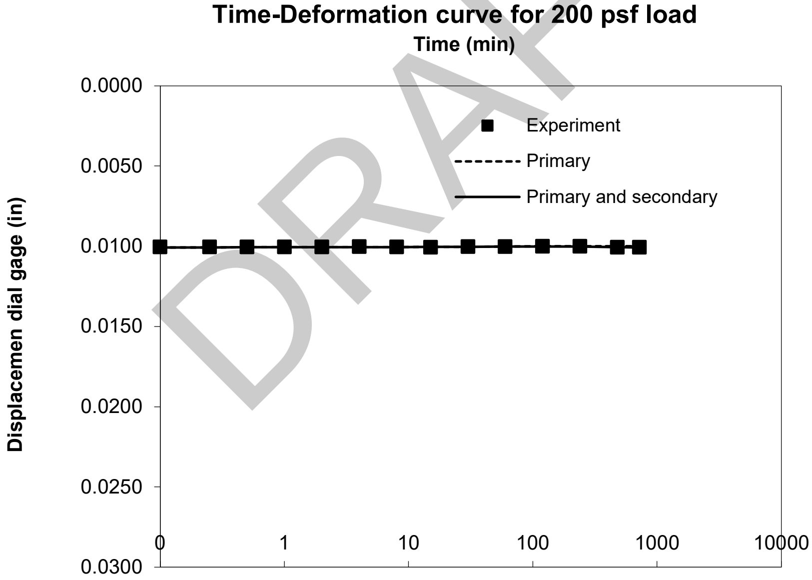
Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
100.0	*0.00*	0.00995	0.00995	0.00995
	0.10	0.00996	0.00995	0.00995
	0.25	0.00995	0.00995	0.00995
	0.50	0.00995	0.00995	0.00995
	1.00	0.00995	0.00995	0.00995
	2.00	0.00996	0.00996	0.00996
	4.00	0.00996	0.00996	0.00996
	8.00	0.00995	0.00996	0.00996
	15.00	0.00996	0.00996	0.00996
	30.00	0.00997	0.00996	0.00996
	60.00	0.00994	0.00996	0.00996
	120.00	0.00994	0.00996	0.00996
	240.00	0.00992	0.00996	0.00996
	480.00	0.01001	0.00996	0.01001
	720.20	0.01006	0.00996	0.01006

h_0 = 0.98805 in
U_s = 99%
t_s = 17.40 min
d_s = 0.00996 in
d_0 = 0.00995 in
d_{100} = 0.00996 in
d = 0.49402 in
C_v = 0.0250 in^2/min
r_i = -1.8%
r_p = 8.7%
r_s = 93.1%
Slope = 0.0003
Intercept = 0.0092
h_c = 0.9880 in
t_c = 329.54 min
C_{ae} = 0.030%



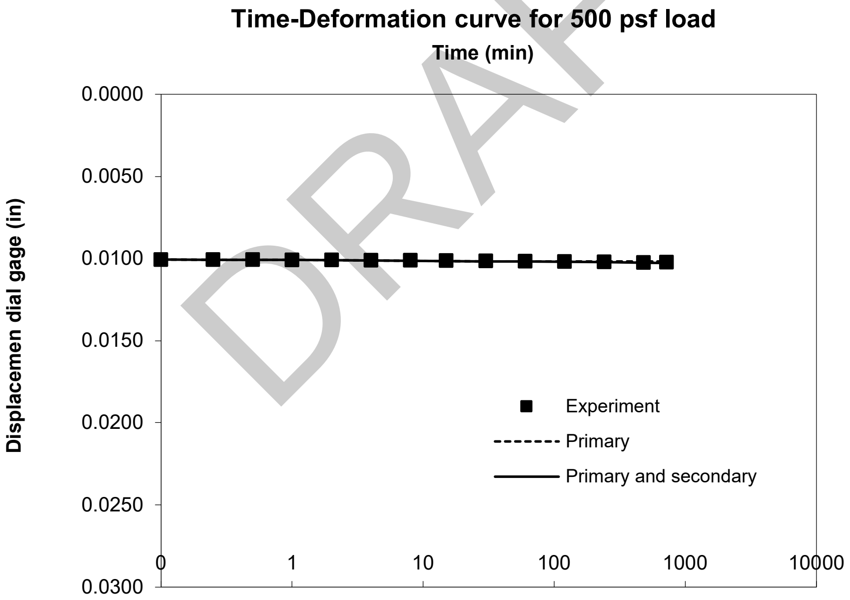
Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
200.0	*0.00*	0.01004	0.01007	0.01007
	0.10	0.01004	0.01007	0.01007
	0.25	0.01004	0.01007	0.01007
	0.50	0.01004	0.01007	0.01007
	1.00	0.01004	0.01007	0.01007
	2.00	0.01004	0.01006	0.01006
	4.00	0.01004	0.01006	0.01006
	8.00	0.01004	0.01005	0.01005
	15.00	0.01008	0.01005	0.01005
	30.00	0.01003	0.01004	0.01004
	60.00	0.01003	0.01002	0.01002
	120.00	0.01001	0.01001	0.01001
	240.00	0.01000	0.01000	0.01003
	480.00	0.01007	0.01000	0.01006
	720.20	0.01008	0.01000	0.01007

h_0 = 0.98796 in
U_s = 99%
t_s = 254.56 min
d_s = 0.01000 in
d_0 = 0.01007 in
d_{100} = 0.01000 in
d = 0.49398 in
C_v = 0.0017 in^2/min
r_i = 92.7%
r_p = -197.0%
r_s = 204.4%
Slope = 0.0001
Intercept = 0.0098
h_c = 0.9880 in
t_c = 140.50 min
C_{ae} = 0.010%



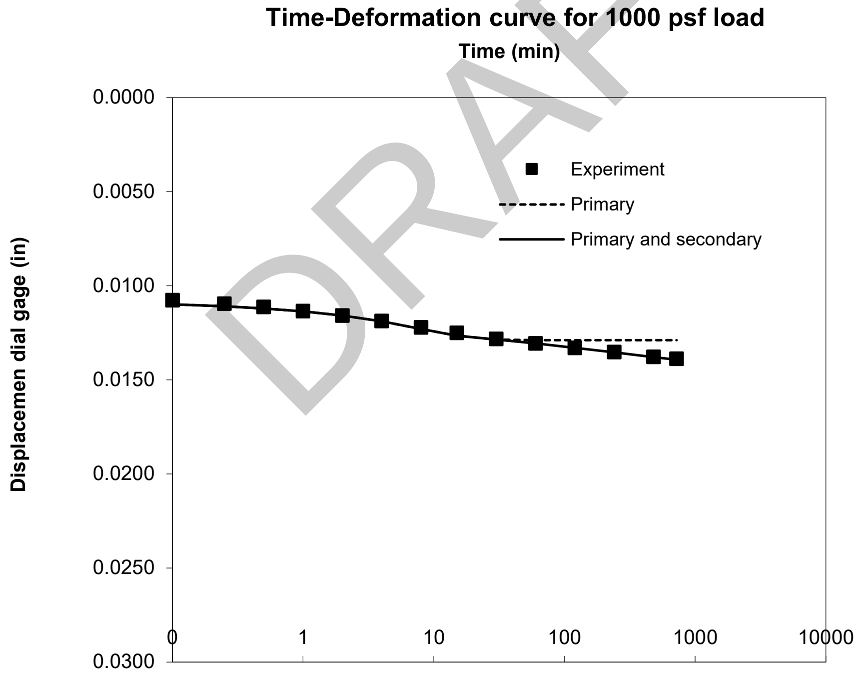
Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
500.0	*0.00*	0.01008	0.01006	0.01006
	0.10	0.01008	0.01006	0.01006
	0.25	0.01008	0.01007	0.01007
	0.50	0.01008	0.01007	0.01007
	1.00	0.01008	0.01008	0.01008
	2.00	0.01009	0.01009	0.01009
	4.00	0.01011	0.01011	0.01011
	8.00	0.01011	0.01013	0.01013
	15.00	0.01013	0.01015	0.01015
	30.00	0.01016	0.01016	0.01016
	60.00	0.01018	0.01017	0.01017
	120.00	0.01018	0.01017	0.01018
	240.00	0.01021	0.01017	0.01022
	480.00	0.01025	0.01017	0.01025
	720.20	0.01022	0.01017	0.01027

h_0 = 0.98792 in
U_s = 99%
t_s = 45.75 min
d_s = 0.01017 in
d_0 = 0.01006 in
d_{100} = 0.01017 in
d = 0.49394 in
C_v = 0.0095 in^2/min
r_i = -16.7%
r_p = 82.1%
r_s = 34.6%
Slope = 0.0001
Intercept = 0.0099
h_c = 0.9878 in
t_c = 97.46 min
C_{ae} = 0.012%



Applied stress	Elapsed time	Dial	Fitted Primary	Fitted Primary and Secondary
psf	min	in	in	in
1000.0	*0.00*	0.01019	0.01083	0.01083
	0.10	0.01077	0.01099	0.01099
	0.25	0.01096	0.01109	0.01109
	0.50	0.01113	0.01120	0.01120
	1.00	0.01135	0.01136	0.01136
	2.00	0.01160	0.01158	0.01158
	4.00	0.01189	0.01189	0.01189
	8.00	0.01223	0.01230	0.01230
	15.00	0.01252	0.01265	0.01265
	30.00	0.01283	0.01285	0.01285
	60.00	0.01307	0.01289	0.01306
	120.00	0.01331	0.01289	0.01330
	240.00	0.01354	0.01289	0.01355
	480.00	0.01379	0.01289	0.01379
	720.20	0.01389	0.01289	0.01393

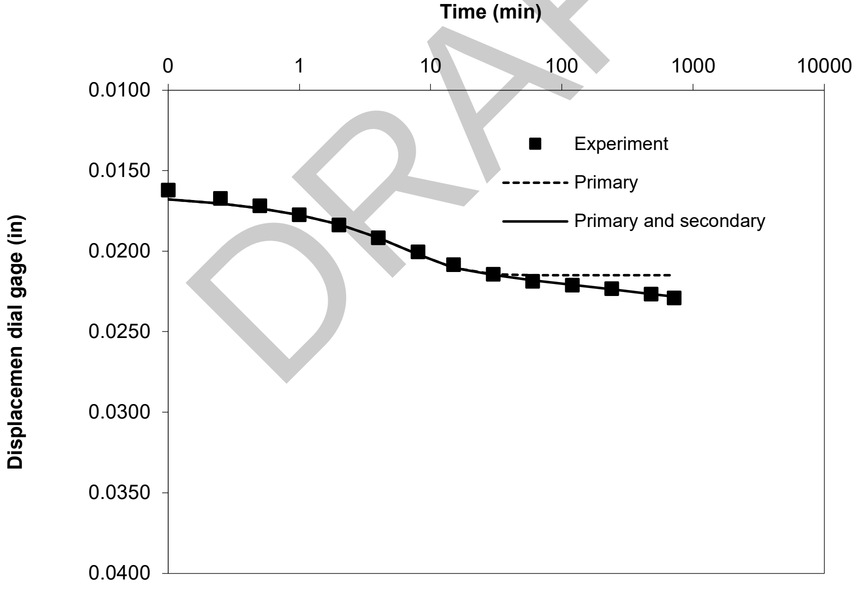
h_0 = 0.98781 in
U_s = 99%
t_s = 33.79 min
d_s = 0.01287 in
d_0 = 0.01083 in
d_{100} = 0.01289 in
d = 0.49307 in
C_v = 0.0128 in^2/min
r_i = 17.2%
r_p = 55.8%
r_s = 27.0%
Slope = 0.0008
Intercept = 0.0116
h_c = 0.9851 in
t_c = 36.48 min
C_{ae} = 0.082%



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
2000.0	*0.00*	0.01392	0.01633	0.01633
	0.10	0.01621	0.01678	0.01678
	0.25	0.01672	0.01704	0.01704
	0.50	0.01718	0.01734	0.01734
	1.00	0.01774	0.01775	0.01775
	2.00	0.01838	0.01834	0.01834
	4.00	0.01917	0.01918	0.01918
	8.00	0.02005	0.02021	0.02021
	15.00	0.02084	0.02103	0.02103
	30.00	0.02145	0.02144	0.02147
	60.00	0.02187	0.02149	0.02181
	120.00	0.02211	0.02149	0.02209
	240.00	0.02234	0.02149	0.02238
	480.00	0.02268	0.02149	0.02266
	720.20	0.02290	0.02149	0.02283

h_0 = 0.98408 in
U_s = 99%
t_s = 29.78 min
d_s = 0.02144 in
d_0 = 0.01633 in
d_{100} = 0.02149 in
d = 0.48954 in
C_v = 0.0143 in^2/min
r_i = 26.8%
r_p = 57.5%
r_s = 15.7%
Slope = 0.0009
Intercept = 0.0201
h_c = 0.9765 in
t_c = 27.78 min
C_{ae} = 0.097%

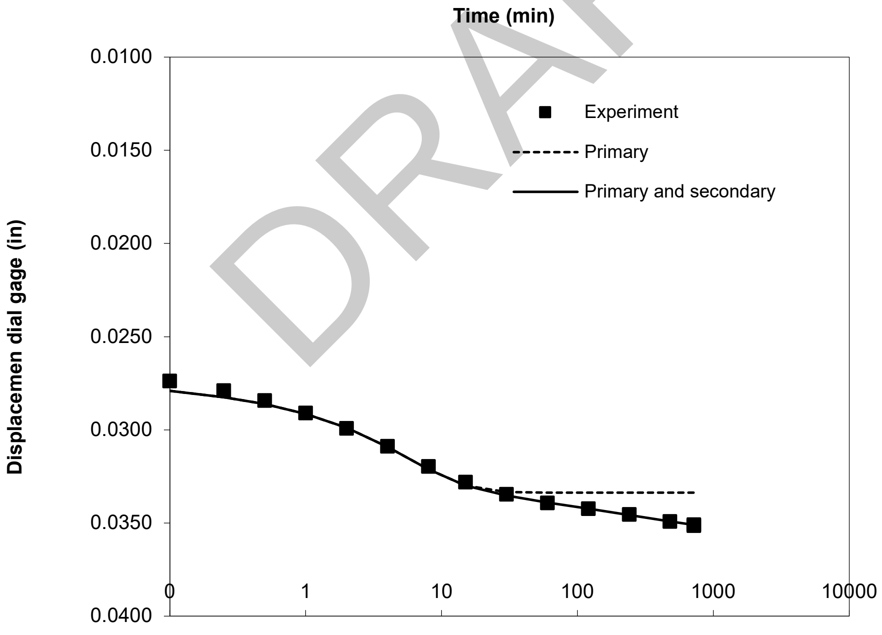
Time-Deformation curve for 2000 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
4000.0	0.00	0.02304	0.02736	0.02736
	0.10	0.02739	0.02792	0.02792
	0.25	0.02791	0.02825	0.02825
	0.50	0.02844	0.02862	0.02862
	1.00	0.02910	0.02914	0.02914
	2.00	0.02994	0.02988	0.02988
	4.00	0.03090	0.03092	0.03092
	8.00	0.03197	0.03212	0.03212
	15.00	0.03281	0.03299	0.03299
	30.00	0.03348	0.03334	0.03352
	60.00	0.03394	0.03337	0.03389
	120.00	0.03425	0.03337	0.03423
	240.00	0.03455	0.03337	0.03457
	480.00	0.03493	0.03337	0.03491
	720.20	0.03515	0.03337	0.03511

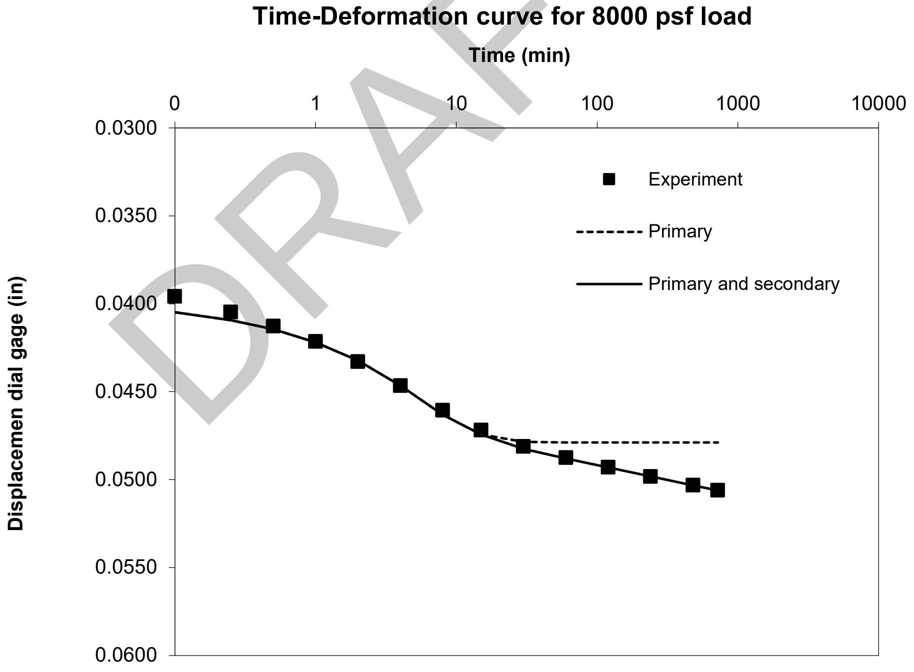
h_0 = 0.97496 in
U_s = 99%
t_s = 25.88 min
d_s = 0.03331 in
d_0 = 0.02736 in
d_{100} = 0.03337 in
d = 0.48382 in
C_v = 0.0161 in^2/min
r_i = 35.6%
r_p = 49.7%
r_s = 14.7%
Slope = 0.0011
Intercept = 0.0319
h_c = 0.9646 in
t_c = 20.79 min
C_{ae} = 0.117%

Time-Deformation curve for 4000 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
8000.0	0.00	0.03544	0.03969	0.03969
	0.10	0.03957	0.04048	0.04048
	0.25	0.04047	0.04093	0.04093
	0.50	0.04126	0.04145	0.04145
	1.00	0.04214	0.04218	0.04218
	2.00	0.04328	0.04322	0.04322
	4.00	0.04465	0.04465	0.04465
	8.00	0.04606	0.04631	0.04631
	15.00	0.04719	0.04744	0.04744
	30.00	0.04811	0.04785	0.04825
	60.00	0.04874	0.04788	0.04879
	120.00	0.04929	0.04788	0.04930
	240.00	0.04982	0.04788	0.04981
	480.00	0.05031	0.04788	0.05032
	720.20	0.05060	0.04788	0.05062

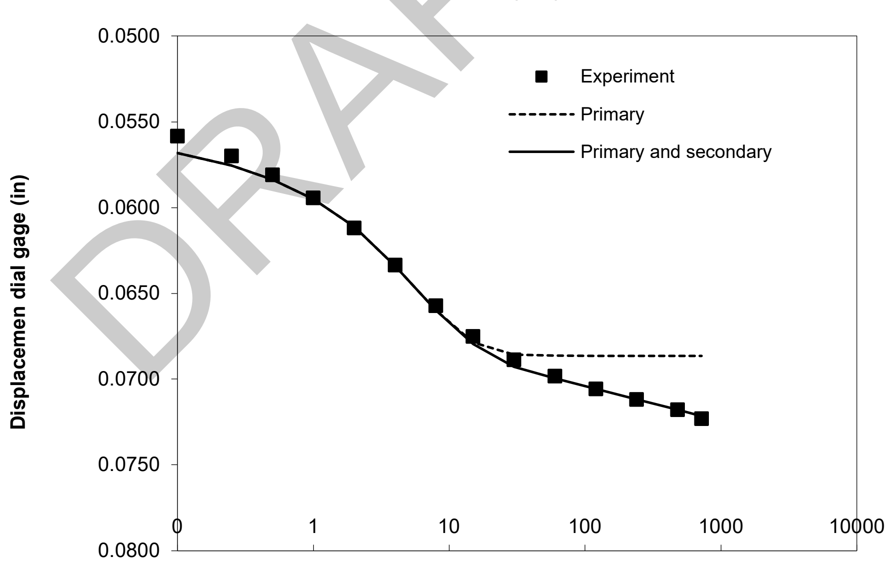
h_0 = 0.96256 in
U_s = 99%
t_s = 24.44 min
d_s = 0.04780 in
d_0 = 0.03969 in
d_{100} = 0.04788 in
d = 0.47711 in
C_v = 0.0166 in^2/min
r_i = 28.0%
r_p = 54.1%
r_s = 17.9%
Slope = 0.0017
Intercept = 0.0458
h_c = 0.9501 in
t_c = 17.46 min
C_{ae} = 0.178%



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
16000.0	*0.00*	0.05085	0.05560	0.05560
	0.10	0.05585	0.05683	0.05683
	0.25	0.05700	0.05755	0.05755
	0.50	0.05809	0.05835	0.05835
	1.00	0.05944	0.05949	0.05949
	2.00	0.06120	0.06111	0.06111
	4.00	0.06335	0.06339	0.06339
	8.00	0.06573	0.06599	0.06599
	15.00	0.06751	0.06785	0.06794
	30.00	0.06888	0.06858	0.06928
	60.00	0.06982	0.06864	0.06996
	120.00	0.07057	0.06864	0.07057
	240.00	0.07118	0.06864	0.07118
	480.00	0.07179	0.06864	0.07179
	720.20	0.07232	0.06864	0.07215

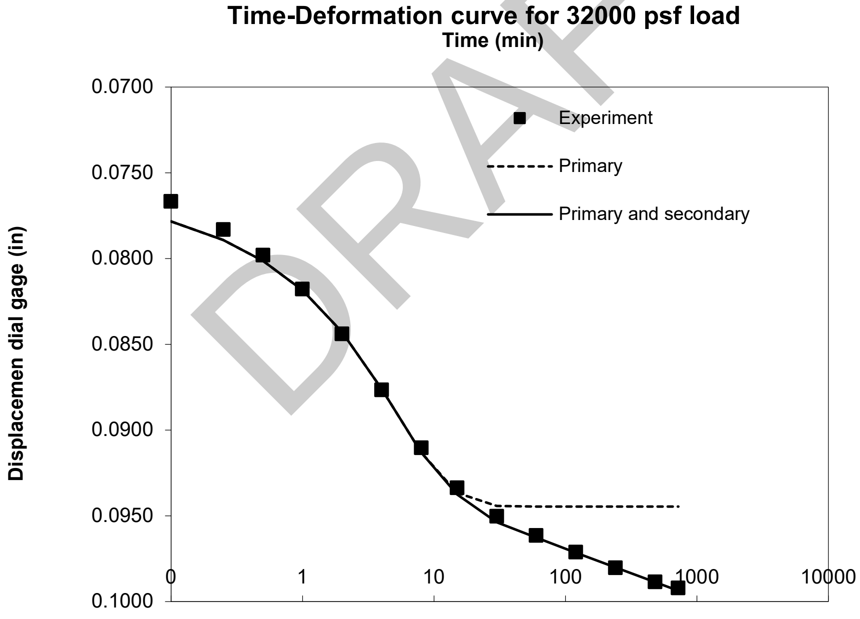
h_0 = 0.94715 in
U_s = 99%
t_s = 25.42 min
d_s = 0.06851 in
d_0 = 0.05560 in
d_{100} = 0.06864 in
d = 0.46794 in
C_v = 0.0153 in^2/min
r_i = 22.1%
r_p = 60.7%
r_s = 17.1%
Slope = 0.0020
Intercept = 0.0663
h_c = 0.9294 in
t_c = 13.52 min
C_{ae} = 0.219%

Time-Deformation curve for 16000 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
32000.0	*0.00*	0.07241	0.07599	0.07599
	0.10	0.07667	0.07784	0.07784
	0.25	0.07831	0.07892	0.07892
	0.50	0.07980	0.08013	0.08013
	1.00	0.08178	0.08185	0.08185
	2.00	0.08439	0.08427	0.08427
	4.00	0.08766	0.08759	0.08759
	8.00	0.09103	0.09131	0.09131
	15.00	0.09337	0.09365	0.09374
	30.00	0.09502	0.09441	0.09537
	60.00	0.09615	0.09445	0.09627
	120.00	0.09712	0.09445	0.09714
	240.00	0.09802	0.09445	0.09800
	480.00	0.09885	0.09445	0.09886
	720.20	0.09921	0.09445	0.09937

h_0 = 0.92559 in
U_s = 99%
t_s = 22.54 min
d_s = 0.09427 in
d_0 = 0.07599 in
d_{100} = 0.09445 in
d = 0.45639 in
C_v = 0.0165 in^2/min
r_i = 13.3%
r_p = 68.9%
r_s = 17.8%
Slope = 0.0029
Intercept = 0.0912
h_c = 0.9035 in
t_c = 13.95 min
C_{ae} = 0.318%



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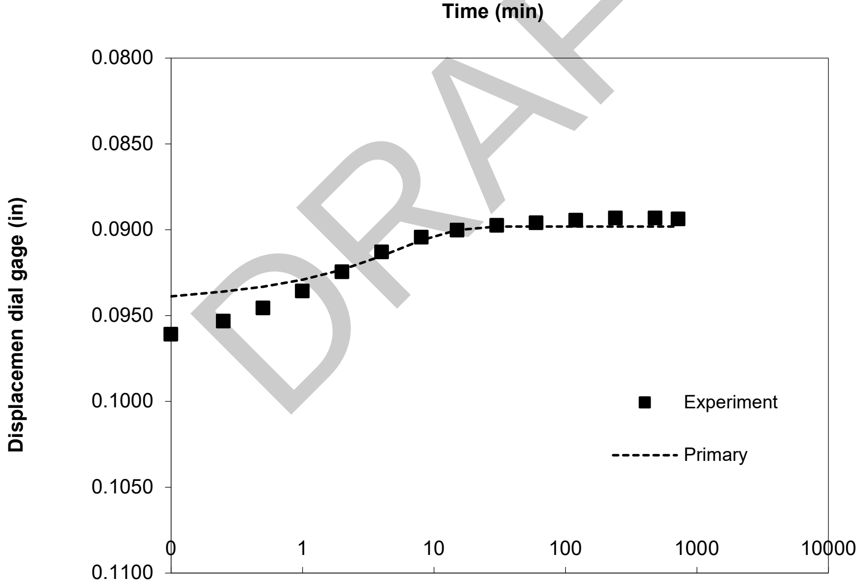
Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
8000.0	*0.00*	0.09924	0.09431	0.09431
	0.10	0.09609	0.09387	0.09387
	0.25	0.09533	0.09361	0.09361
	0.50	0.09455	0.09332	0.09332
	1.00	0.09357	0.09291	0.09291
	2.00	0.09246	0.09233	0.09233
	4.00	0.09130	0.09153	0.09157
	8.00	0.09044	0.09062	0.09073
	15.00	0.09003	0.09003	0.09020
	30.00	0.08974	0.08983	0.09006
	60.00	0.08959	0.08981	0.09012
	120.00	0.08945	0.08981	0.09019
	240.00	0.08932	0.08981	0.09026
	480.00	0.08931	0.08981	0.09033
	720.20	0.08937	0.08981	0.09037

h_0 = 0.89876 in
U_s = 99%
t_s = 23.40 min
d_s = 0.08986 in
d_0 = 0.09431 in
d_{100} = 0.08981 in
d = 0.45297 in
C_v = 0.0156 in^2/min
r_i = 49.6%
r_p = 45.3%
r_s = 5.1%
Slope = -0.0002
Intercept = 0.0899
h_c = 0.9082 in
t_c = 2.82 min
C_{ae} = 0.026%

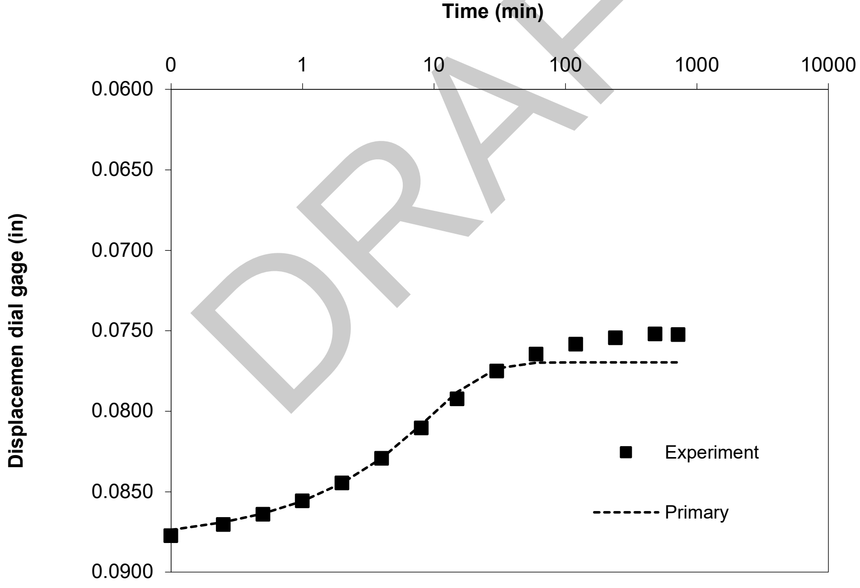
Time-Deformation curve for 8000 psf unload



AASHTO ACCREDITATION PROGRAM

Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
2000.0	*0.00*	0.08926	0.08822	0.08822
	0.10	0.08775	0.08738	0.08738
	0.25	0.08704	0.08689	0.08689
	0.50	0.08641	0.08635	0.08635
	1.00	0.08558	0.08557	0.08557
	2.00	0.08446	0.08448	0.08448
	4.00	0.08294	0.08293	0.08293
	8.00	0.08104	0.08084	0.08084
	15.00	0.07923	0.07880	0.07902
	30.00	0.07752	0.07734	0.07787
	60.00	0.07646	0.07698	0.07783
	120.00	0.07584	0.07697	0.07812
	240.00	0.07546	0.07697	0.07844
	480.00	0.07522	0.07697	0.07875
	720.20	0.07525	0.07697	0.07893

h_0 = 0.90874 in
U_s = 99%
t_s = 41.03 min
d_s = 0.07708 in
d_0 = 0.08822 in
d_{100} = 0.07697 in
d = 0.45770 in
C_v = 0.0091 in^2/min
r_i = 7.5%
r_p = 80.3%
r_s = 12.3%
Slope = -0.0010
Intercept = 0.0780
h_c = 0.9210 in
t_c = 9.21 min
C_{ae} = 0.112%

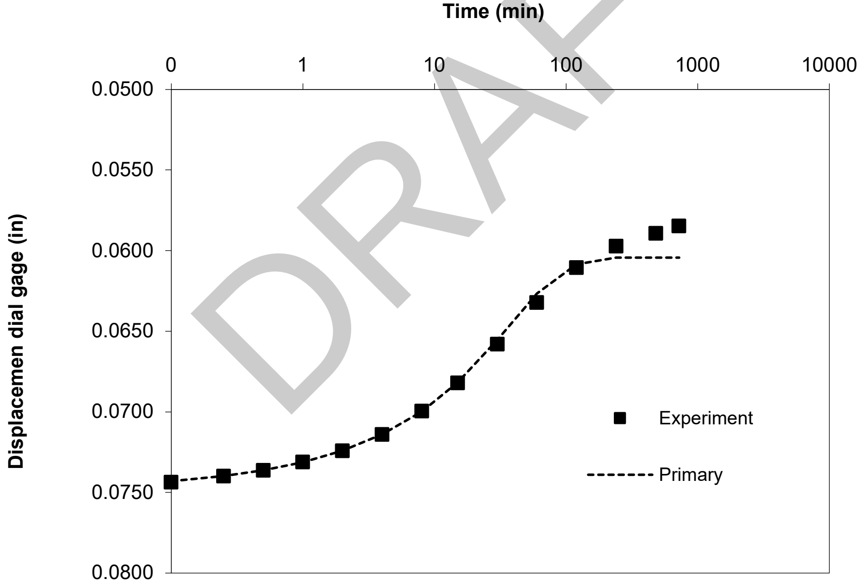


Time-Deformation curve for 2000 psf unload

Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
500.0	*0.00*	0.07525	0.07484	0.07484
	0.10	0.07437	0.07430	0.07430
	0.25	0.07400	0.07398	0.07398
	0.50	0.07363	0.07363	0.07363
	1.00	0.07312	0.07312	0.07312
	2.00	0.07242	0.07241	0.07241
	4.00	0.07140	0.07141	0.07141
	8.00	0.06996	0.06998	0.06998
	15.00	0.06822	0.06819	0.06819
	30.00	0.06581	0.06554	0.06554
	60.00	0.06322	0.06267	0.06267
	120.00	0.06106	0.06085	0.06085
	240.00	0.05972	0.06044	0.06044
	480.00	0.05892	0.06042	0.06042
	720.20	0.05847	0.06042	0.06070

h_0 = 0.92275 in
U_s = 99%
t_s = 159.66 min
d_s = 0.06057 in
d_0 = 0.07484 in
d_{100} = 0.06042 in
d = 0.46518 in
C_v = 0.0024 in^2/min
r_i = 2.4%
r_p = 85.9%
r_s = 11.7%
Slope = -0.0036
Intercept = 0.0703
h_c = 0.9376 in
t_c = 601.23 min
C_{ae} = 0.380%

Time-Deformation curve for 500 psf unload



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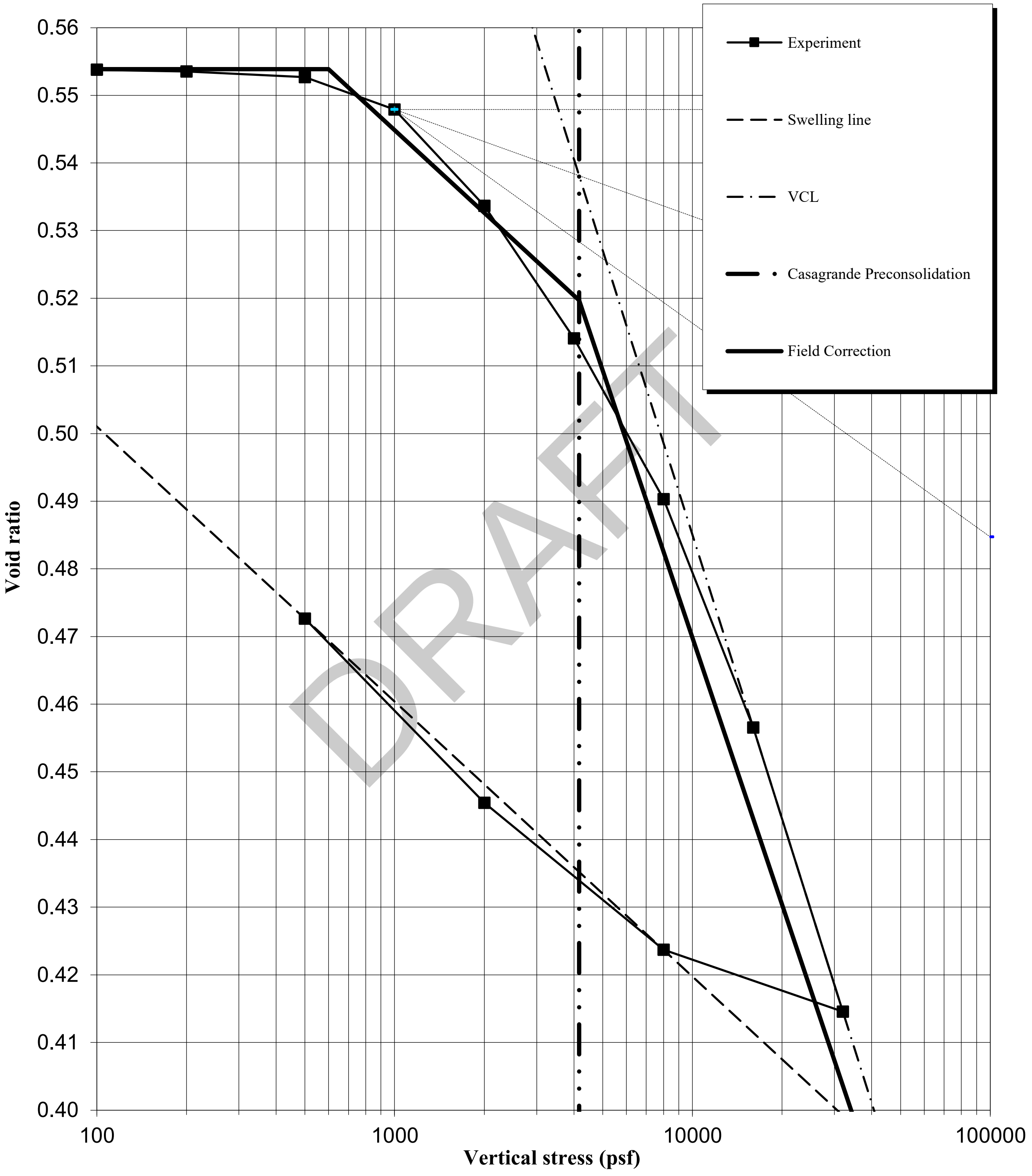
CONSOLIDATION CURVE

Boring B-25-03, 15 to 17 feet



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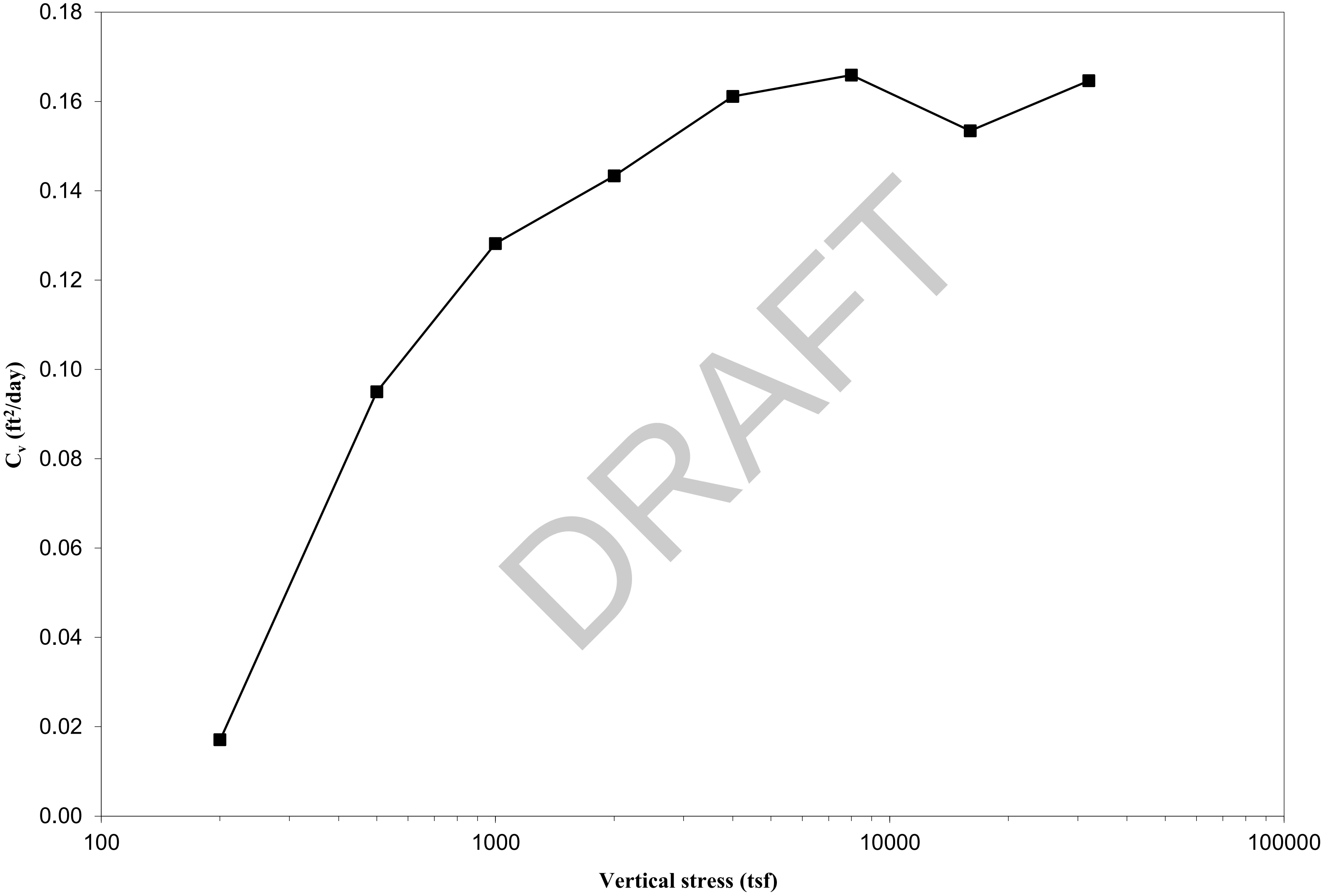
CONSOLIDATION COEFFICIENT (C_v) vs. VERTICAL STRESS

Boring B-25-03, 15 to 17 feet



AASHTO R18

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ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: **PBC DWM Operations Facility**
Client: **WTS**
Soil Sample ID: **Boring B-25-05, ST, 8 to 10 feet**
Sample Description: **Brown/Gray LEAN CLAY (CL)**

Initial sample height = 0.986 in
Initial sample mass = 157.46 g
Initial water content = 22.85%
Initial dry unit weight = 100.98 pcf
Initial void ratio = 0.699
Initial degree of saturation = 89.87%

Final sample mass = 154.03 g
Final dry sample mass = 128.17 g
Final water content = 20.18%
Final dry unit weight = 108.37 pcf
Final void ratio = 0.583
Final degree of saturation = 95.10%
Estimated specific gravity = 2.75

Tested by: **M. Ciapas**
Prepared by: **M. Snider**
Test date: **9/5/2025**
WEI: **11255119**

Ring diameter = 2.499 in
Ring mass = 109.40 g
Initial sample and ring mass = 266.86 g
Tare mass = 13.42 g
Final ring and sample mass = 263.72 g
Mass of wet sample and tare = 167.45 g
Mass of dry sample and tare = 141.59 g
Initial dial reading = 0.01000 in
Final dial reading = 0.07723 in
LL = 42 %
PL = 18 %
% Sand = n.a. %
% Silt = n.a. %
% Clay = n.a. %

Compression and Swelling Indices

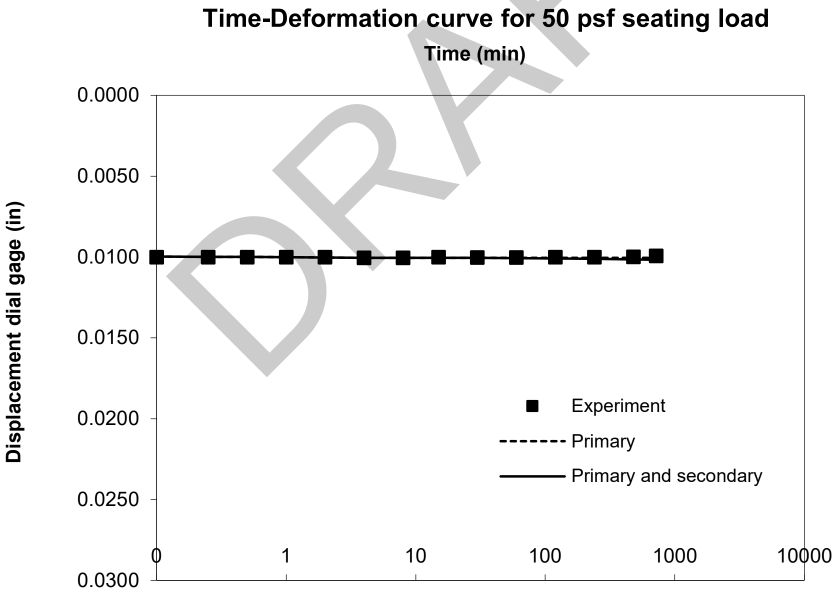
Compression index C_c = 0.170
Field corrected C_c = 0.165
Swelling index C_s = 0.054

Preconsolidation pressure,s_C
Casagrande Method = 3201 psf

Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	C_v ft^2/day	Cae %	Elapsed time min
1	100.0	0.00991	0.00010	0.00	0.699	N/A	N/A	720
2	200.0	0.01017	0.00023	0.04	0.699	0.0392	0.02	720
3	500.0	0.01236	0.00058	0.30	0.694	0.2034	0.04	720
4	1000.0	0.01789	0.00090	0.89	0.684	0.1485	0.11	720
5	2000.0	0.02852	0.00135	2.02	0.665	0.1565	0.14	720
6	4000.0	0.05172	0.00193	4.43	0.624	0.1577	0.21	720
7	8000.0	0.06862	0.00253	6.20	0.594	0.1486	0.26	720
8	16000.0	0.09155	0.00324	8.60	0.553	0.1471	0.29	720
9	32000.0	0.12033	0.00413	11.61	0.502	0.1574	0.39	720
10	8000.0	0.11579	0.00295	11.03	0.512	N/A	N/A	720
11	2000.0	0.09678	0.00198	9.00	0.546	N/A	N/A	720
12	500.0	0.07982	0.00123	7.21	0.577	N/A	N/A	720

Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
50.0	*0.00*	0.01000	0.00996	0.00996
	0.10	0.01001	0.00997	0.00997
	0.25	0.01001	0.00998	0.00998
	0.50	0.01001	0.00999	0.00999
	1.00	0.01001	0.01001	0.01001
	2.00	0.01002	0.01003	0.01003
	4.00	0.01006	0.01004	0.01004
	8.00	0.01005	0.01005	0.01005
	15.00	0.01003	0.01005	0.01005
	30.00	0.01003	0.01005	0.01005
	60.00	0.01004	0.01005	0.01006
	120.00	0.01002	0.01005	0.01009
	240.00	0.01002	0.01005	0.01012
	480.00	0.00999	0.01005	0.01015
	720.20	0.00993	0.01005	0.01016

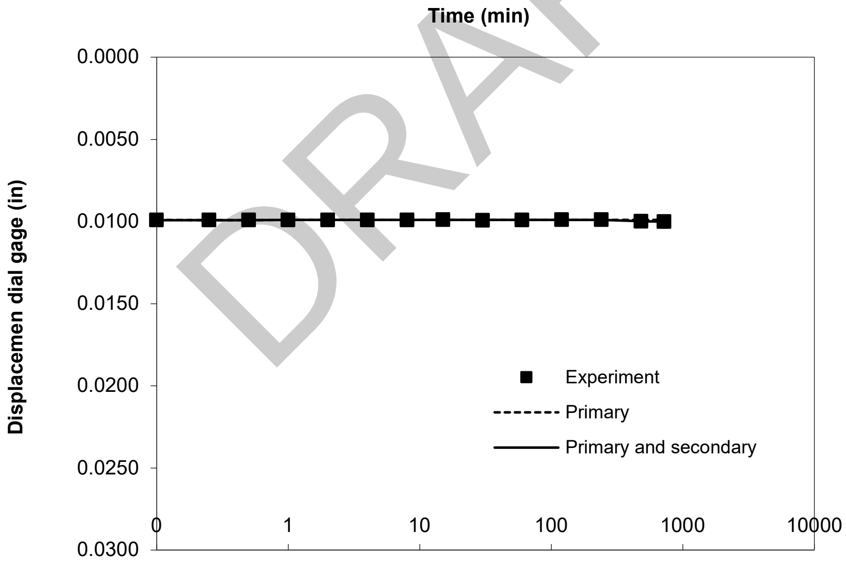
h_0 = 0.98600 in
U_s = 99%
t_s = 8.35 min
d_s = 0.01005 in
d_0 = 0.00996 in
d_{100} = 0.01005 in
d = 0.49300 in
C_v = 0.0518 in^2/min
r_i = 59.9%
r_p = -138.6%
r_s = 178.7%
Slope = -0.0001
Intercept = 0.0102
h_c = 0.9859 in
t_c = 46.59 min
C_{ae} = 0.009%



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
100.0	*0.00*	0.00991	0.00991	0.00991
	0.10	0.00991	0.00991	0.00991
	0.25	0.00991	0.00991	0.00991
	0.50	0.00991	0.00991	0.00991
	1.00	0.00991	0.00991	0.00991
	2.00	0.00991	0.00991	0.00991
	4.00	0.00991	0.00991	0.00991
	8.00	0.00991	0.00991	0.00991
	15.00	0.00990	0.00991	0.00991
	30.00	0.00994	0.00991	0.00991
	60.00	0.00991	0.00991	0.00991
	120.00	0.00990	0.00991	0.00991
	240.00	0.00989	0.00991	0.00991
	480.00	0.00999	0.00991	0.00998
	720.20	0.01002	0.00991	0.01003

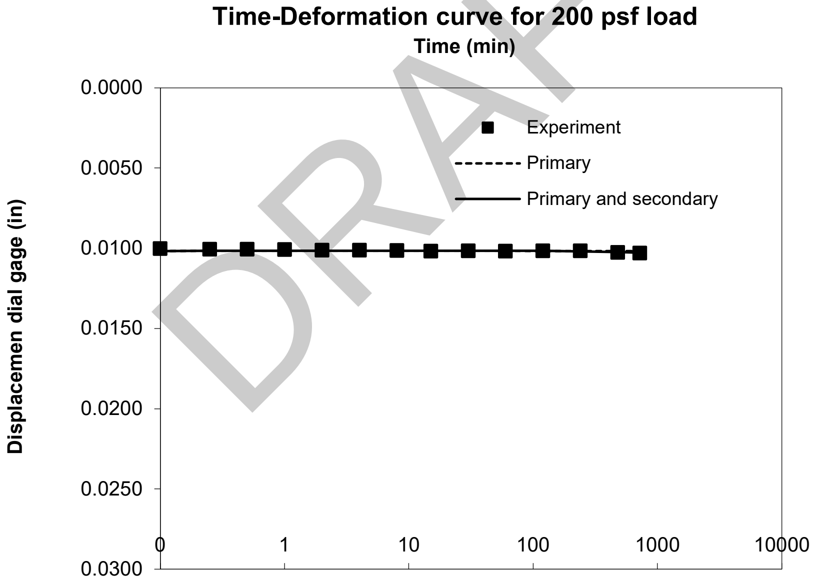
h_0 = 0.98609 in
U_s = 99%
t_s = 15.78 min
d_s = 0.00991 in
d_0 = 0.00991 in
d_{100} = 0.00991 in
d = 0.49305 in
C_v = 0.0274 in^2/min
r_i = 6.2%
r_p = -5.8%
r_s = 99.6%
Slope = 0.0003
Intercept = 0.0093
h_c = 0.9861 in
t_c = 257.10 min
C_{ae} = 0.027%

Time-Deformation curve for 100 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
200.0	*0.00*	0.00997	0.01017	0.01017
	0.10	0.01004	0.01017	0.01017
	0.25	0.01006	0.01017	0.01017
	0.50	0.01006	0.01017	0.01017
	1.00	0.01008	0.01017	0.01017
	2.00	0.01013	0.01017	0.01017
	4.00	0.01013	0.01017	0.01017
	8.00	0.01015	0.01017	0.01017
	15.00	0.01019	0.01017	0.01017
	30.00	0.01016	0.01017	0.01017
	60.00	0.01018	0.01017	0.01017
	120.00	0.01017	0.01017	0.01017
	240.00	0.01017	0.01017	0.01020
	480.00	0.01026	0.01017	0.01025
	720.20	0.01030	0.01017	0.01028

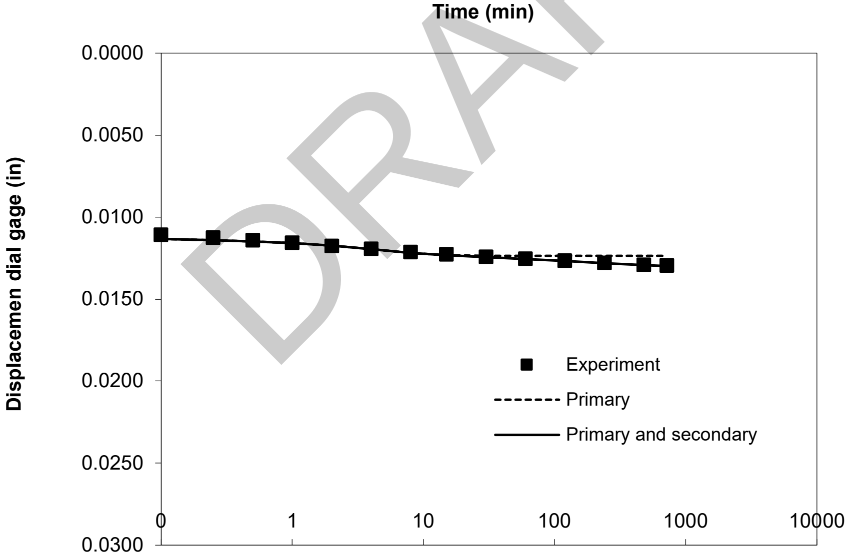
h_0 = 0.98603 in
U_s = 99%
t_s = 110.49 min
d_s = 0.01017 in
d_0 = 0.01017 in
d_{100} = 0.01017 in
d = 0.49292 in
C_v = 0.0039 in^2/min
r_i = 60.3%
r_p = 0.1%
r_s = 39.6%
Slope = 0.0002
Intercept = 0.0098
h_c = 0.9858 in
t_c = 153.94 min
C_{ae} = 0.017%



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
500.0	*0.00*	0.01030	0.01120	0.01120
	0.10	0.01109	0.01132	0.01132
	0.25	0.01127	0.01139	0.01139
	0.50	0.01141	0.01147	0.01147
	1.00	0.01157	0.01158	0.01158
	2.00	0.01176	0.01174	0.01174
	4.00	0.01195	0.01195	0.01195
	8.00	0.01214	0.01218	0.01218
	15.00	0.01228	0.01232	0.01232
	30.00	0.01242	0.01236	0.01243
	60.00	0.01255	0.01236	0.01255
	120.00	0.01267	0.01236	0.01267
	240.00	0.01279	0.01236	0.01279
	480.00	0.01291	0.01236	0.01291
	720.20	0.01295	0.01236	0.01298

h_0 = 0.98570 in
U_s = 99%
t_s = 21.20 min
d_s = 0.01235 in
d_0 = 0.01120 in
d_{100} = 0.01236 in
d = 0.49211 in
C_v = 0.0203 in^2/min
r_i = 34.1%
r_p = 43.5%
r_s = 22.4%
Slope = 0.0004
Intercept = 0.0118
h_c = 0.9836 in
t_c = 19.71 min
C_{ae} = 0.041%

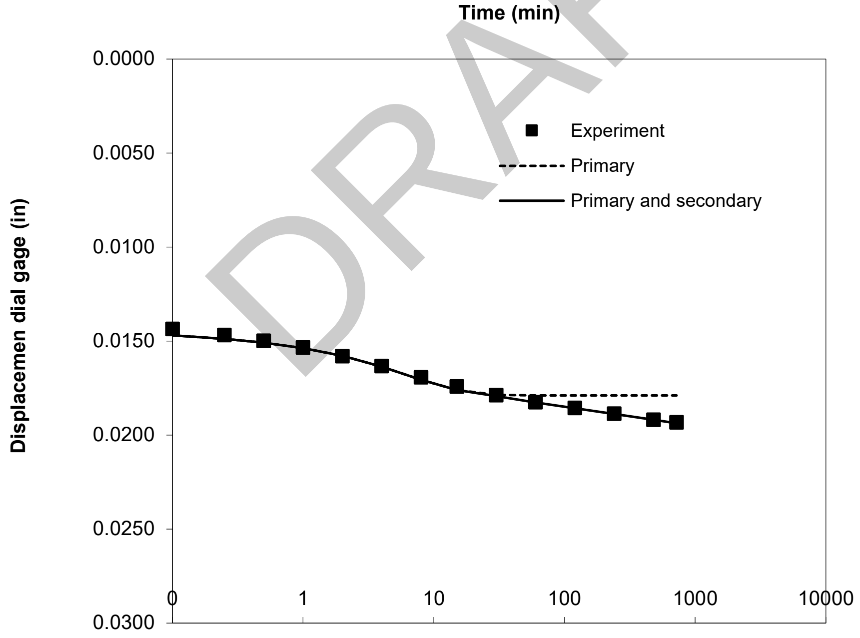
Time-Deformation curve for 500 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
1000.0	*0.00*	0.01298	0.01439	0.01439
	0.10	0.01436	0.01470	0.01470
	0.25	0.01468	0.01488	0.01488
	0.50	0.01499	0.01508	0.01508
	1.00	0.01535	0.01537	0.01537
	2.00	0.01581	0.01578	0.01578
	4.00	0.01634	0.01636	0.01636
	8.00	0.01693	0.01706	0.01706
	15.00	0.01743	0.01761	0.01761
	30.00	0.01789	0.01787	0.01792
	60.00	0.01826	0.01789	0.01826
	120.00	0.01857	0.01789	0.01857
	240.00	0.01888	0.01789	0.01888
	480.00	0.01919	0.01789	0.01919
	720.20	0.01933	0.01789	0.01937

h_0 = 0.98302 in
U_s = 99%
t_s = 28.80 min
d_s = 0.01786 in
d_0 = 0.01439 in
d_{100} = 0.01789 in
d = 0.48993 in
C_v = 0.0148 in^2/min
r_i = 22.1%
r_p = 55.2%
r_s = 22.6%
Slope = 0.0010
Intercept = 0.0164
h_c = 0.9781 in
t_c = 26.41 min
C_{ae} = 0.105%

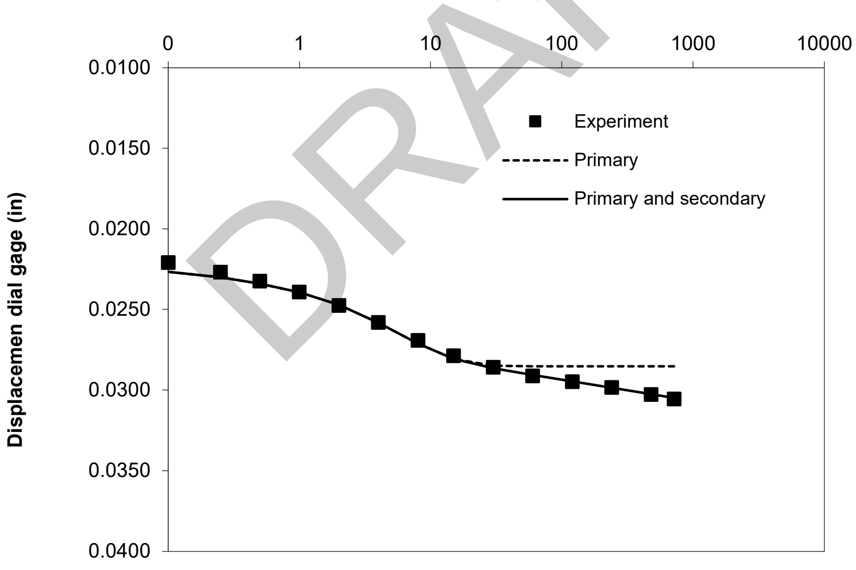
Time-Deformation curve for 1000 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
2000.0	*0.00*	0.01945	0.02207	0.02207
	0.10	0.02209	0.02266	0.02266
	0.25	0.02268	0.02301	0.02301
	0.50	0.02324	0.02340	0.02340
	1.00	0.02392	0.02394	0.02394
	2.00	0.02476	0.02472	0.02472
	4.00	0.02580	0.02582	0.02582
	8.00	0.02693	0.02711	0.02711
	15.00	0.02787	0.02807	0.02807
	30.00	0.02859	0.02848	0.02864
	60.00	0.02912	0.02852	0.02907
	120.00	0.02948	0.02852	0.02947
	240.00	0.02985	0.02852	0.02986
	480.00	0.03027	0.02852	0.03026
	720.20	0.03056	0.02852	0.03049

h_0 = 0.97655 in
U_s = 99%
t_s = 26.82 min
d_s = 0.02846 in
d_0 = 0.02207 in
d_{100} = 0.02852 in
d = 0.48535 in
C_v = 0.0156 in^2/min
r_i = 23.5%
r_p = 58.1%
r_s = 18.4%
Slope = 0.0013
Intercept = 0.0267
h_c = 0.9675 in
t_c = 23.01 min
C_{ae} = 0.136%

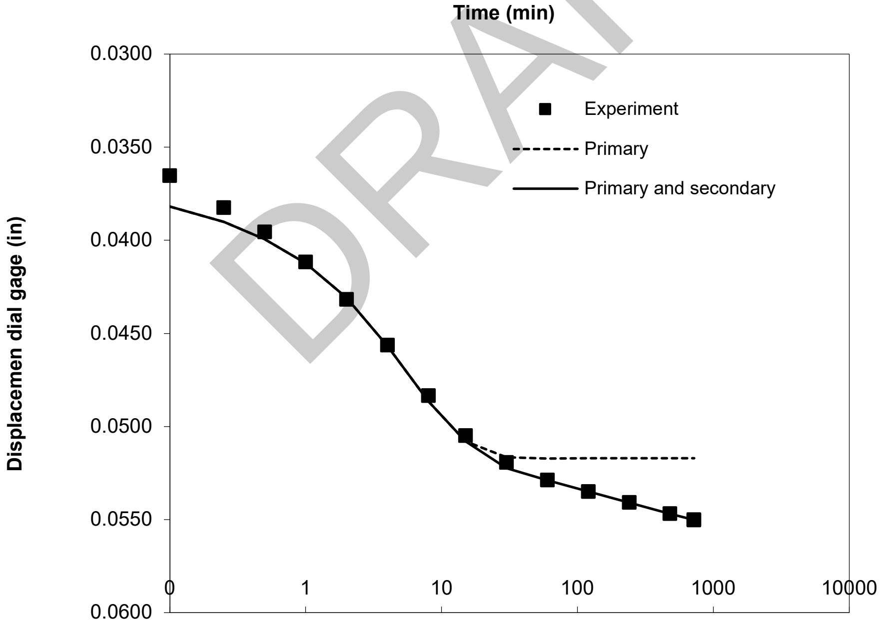
Time-Deformation curve for 2000 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
4000.0	0.00	0.03085	0.03680	0.03680
	0.10	0.03654	0.03820	0.03820
	0.25	0.03826	0.03902	0.03902
	0.50	0.03956	0.03994	0.03994
	1.00	0.04118	0.04124	0.04124
	2.00	0.04318	0.04308	0.04308
	4.00	0.04564	0.04568	0.04568
	8.00	0.04835	0.04866	0.04866
	15.00	0.05049	0.05080	0.05080
	30.00	0.05195	0.05165	0.05223
	60.00	0.05289	0.05172	0.05290
	120.00	0.05350	0.05172	0.05349
	240.00	0.05408	0.05172	0.05409
	480.00	0.05469	0.05172	0.05468
	720.20	0.05502	0.05172	0.05503

h_0 = 0.96515 in
U_s = 99%
t_s = 25.58 min
d_s = 0.05157 in
d_0 = 0.03680 in
d_{100} = 0.05172 in
d = 0.47587 in
C_v = 0.0158 in^2/min
r_i = 24.6%
r_p = 61.7%
r_s = 13.7%
Slope = 0.0020
Intercept = 0.0494
h_c = 0.9443 in
t_c = 15.15 min
C_{ae} = 0.209%

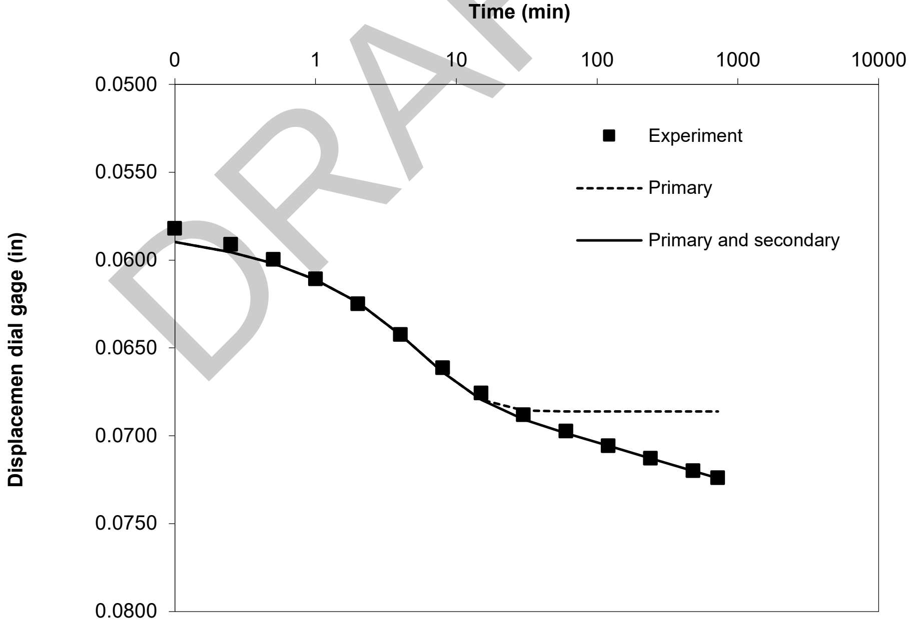
Time-Deformation curve for 4000 psf load



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
8000.0	0.00	0.05555	0.05797	0.05797
	0.10	0.05819	0.05897	0.05897
	0.25	0.05910	0.05954	0.05954
	0.50	0.05996	0.06019	0.06019
	1.00	0.06107	0.06111	0.06111
	2.00	0.06248	0.06241	0.06241
	4.00	0.06423	0.06425	0.06425
	8.00	0.06612	0.06638	0.06638
	15.00	0.06757	0.06793	0.06793
	30.00	0.06880	0.06856	0.06908
	60.00	0.06973	0.06862	0.06985
	120.00	0.07056	0.06862	0.07056
	240.00	0.07128	0.06862	0.07128
	480.00	0.07200	0.06862	0.07200
	720.20	0.07239	0.06862	0.07241

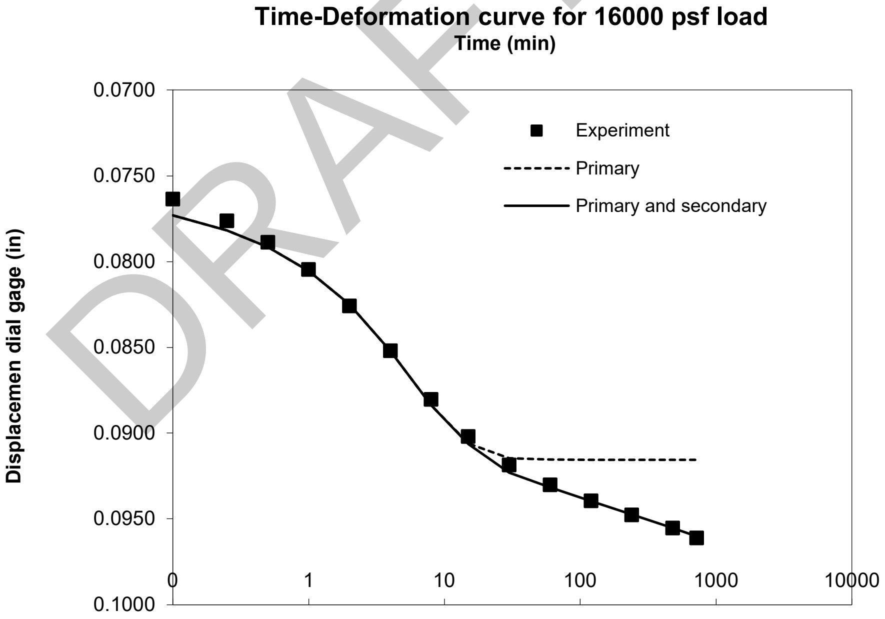
h_0 = 0.94045 in
U_s = 99%
t_s = 26.06 min
d_s = 0.06851 in
d_0 = 0.05797 in
d_{100} = 0.06862 in
d = 0.46635 in
C_v = 0.0149 in^2/min
r_i = 14.4%
r_p = 63.2%
r_s = 22.4%
Slope = 0.0024
Intercept = 0.0656
h_c = 0.9274 in
t_c = 18.29 min
C_{ae} = 0.257%

Time-Deformation curve for 8000 psf load



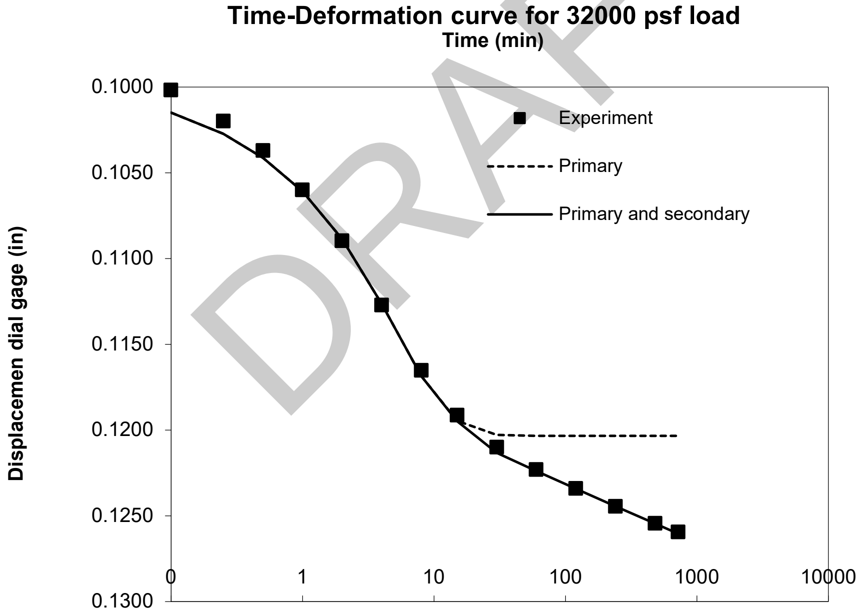
Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
16000.0	*0.00*	0.07275	0.07582	0.07582
	0.10	0.07636	0.07731	0.07731
	0.25	0.07764	0.07818	0.07818
	0.50	0.07888	0.07915	0.07915
	1.00	0.08048	0.08054	0.08054
	2.00	0.08259	0.08249	0.08249
	4.00	0.08521	0.08520	0.08520
	8.00	0.08805	0.08839	0.08839
	15.00	0.09021	0.09062	0.09066
	30.00	0.09186	0.09148	0.09231
	60.00	0.09303	0.09155	0.09317
	120.00	0.09395	0.09155	0.09396
	240.00	0.09477	0.09155	0.09475
	480.00	0.09554	0.09155	0.09554
	720.20	0.09611	0.09155	0.09601

h_0 = 0.92325 in
U_s = 99%
t_s = 25.19 min
d_s = 0.09139 in
d_0 = 0.07582 in
d_{100} = 0.09155 in
d = 0.45616 in
C_v = 0.0147 in^2/min
r_i = 13.1%
r_p = 67.3%
r_s = 19.5%
Slope = 0.0026
Intercept = 0.0885
h_c = 0.9045 in
t_c = 14.45 min
C_{ae} = 0.290%



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
32000.0	*0.00*	0.09623	0.09938	0.09938
	0.10	0.10017	0.10150	0.10150
	0.25	0.10198	0.10273	0.10273
	0.50	0.10370	0.10411	0.10411
	1.00	0.10601	0.10607	0.10607
	2.00	0.10896	0.10885	0.10885
	4.00	0.11272	0.11263	0.11263
	8.00	0.11651	0.11684	0.11684
	15.00	0.11914	0.11945	0.11947
	30.00	0.12101	0.12028	0.12132
	60.00	0.12230	0.12033	0.12239
	120.00	0.12340	0.12033	0.12341
	240.00	0.12445	0.12033	0.12443
	480.00	0.12544	0.12033	0.12545
	720.20	0.12593	0.12033	0.12605

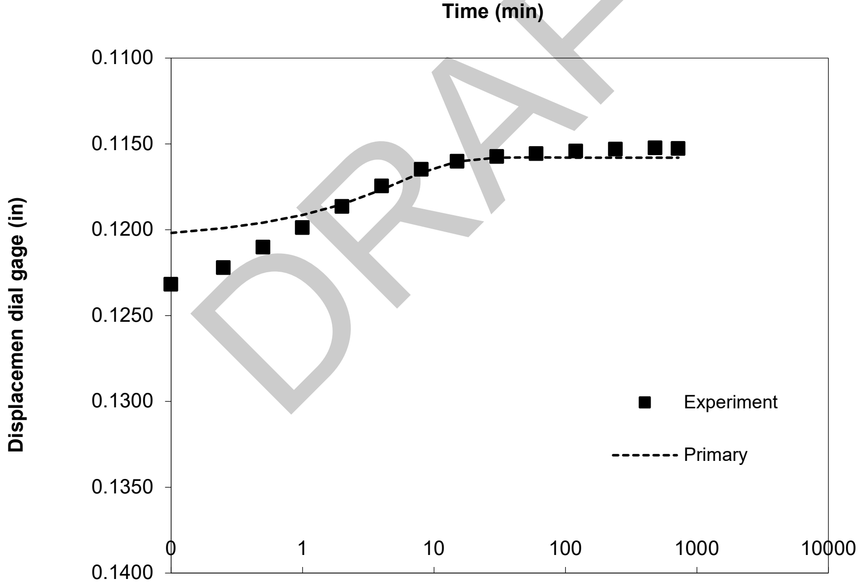
h_0 = 0.89977 in
U_s = 99%
t_s = 22.22 min
d_s = 0.12012 in
d_0 = 0.09938 in
d_{100} = 0.12033 in
d = 0.44307 in
C_v = 0.0157 in^2/min
r_i = 10.6%
r_p = 70.5%
r_s = 18.9%
Slope = 0.0034
Intercept = 0.1164
h_c = 0.8757 in
t_c = 14.83 min
C_{ae} = 0.388%



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
8000.0	*0.00*	0.12598	0.12066	0.12066
	0.10	0.12318	0.12019	0.12019
	0.25	0.12220	0.11991	0.11991
	0.50	0.12101	0.11960	0.11960
	1.00	0.11987	0.11916	0.11916
	2.00	0.11865	0.11853	0.11853
	4.00	0.11745	0.11767	0.11767
	8.00	0.11648	0.11669	0.11673
	15.00	0.11602	0.11604	0.11616
	30.00	0.11574	0.11581	0.11602
	60.00	0.11557	0.11579	0.11609
	120.00	0.11542	0.11579	0.11618
	240.00	0.11531	0.11579	0.11627
	480.00	0.11524	0.11579	0.11636
	720.20	0.11527	0.11579	0.11641

h_0 = 0.87002 in
U_s = 99%
t_s = 23.63 min
d_s = 0.11584 in
d_0 = 0.12066 in
d_{100} = 0.11579 in
d = 0.43889 in
C_v = 0.0145 in^2/min
r_i = 49.5%
r_p = 45.3%
r_s = 5.2%
Slope = -0.0003
Intercept = 0.1160
h_c = 0.8802 in
t_c = 5.53 min
C_{ae} = 0.033%

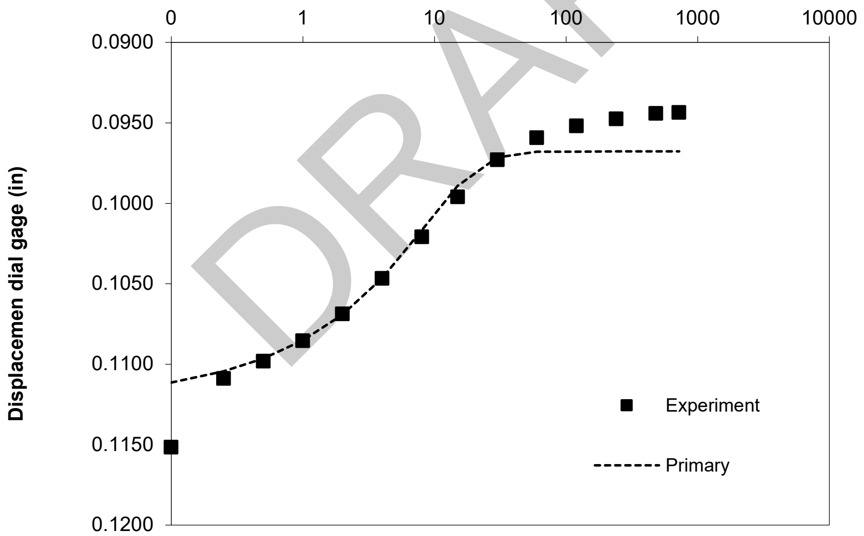
Time-Deformation curve for 8000 psf unload



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
2000.0	*0.00*	0.11515	0.11236	0.11236
	0.10	0.11515	0.11114	0.11114
	0.25	0.11090	0.11043	0.11043
	0.50	0.10982	0.10964	0.10964
	1.00	0.10854	0.10851	0.10851
	2.00	0.10687	0.10691	0.10691
	4.00	0.10468	0.10466	0.10466
	8.00	0.10209	0.10168	0.10176
	15.00	0.09961	0.09892	0.09935
	30.00	0.09731	0.09714	0.09797
	60.00	0.09593	0.09679	0.09800
	120.00	0.09520	0.09678	0.09838
	240.00	0.09475	0.09678	0.09877
	480.00	0.09443	0.09678	0.09916
	720.20	0.09436	0.09678	0.09938

h_0 = 0.88085 in
U_s = 99%
t_s = 37.09 min
d_s = 0.09694 in
d_0 = 0.11236 in
d_{100} = 0.09678 in
d = 0.44571 in
C_v = 0.0095 in^2/min
r_i = 13.4%
r_p = 74.9%
r_s = 11.7%
Slope = -0.0013
Intercept = 0.0979
h_c = 0.8992 in
t_c = 6.88 min
C_{ae} = 0.143%

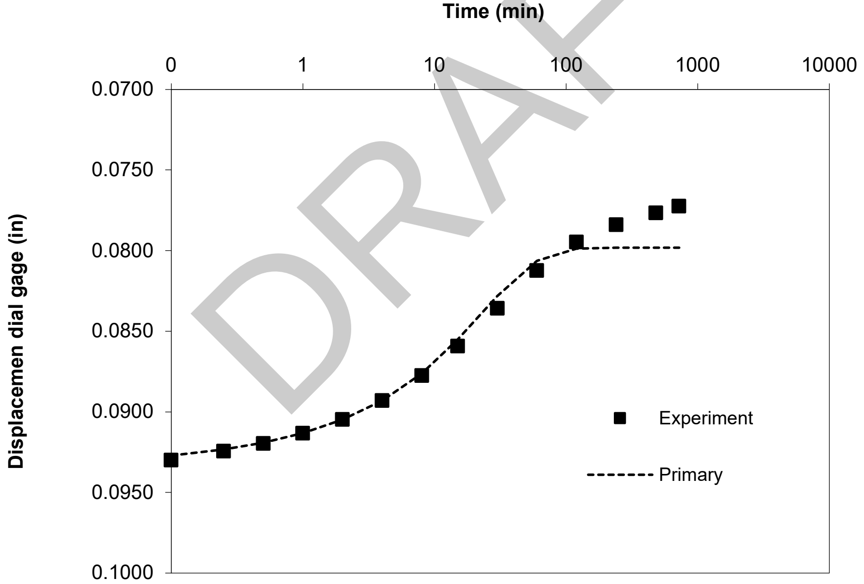
Time-Deformation curve for 2000 psf unload



Applied stress psf	Elapsed time min	Dial in	Fitted Primary in	Fitted Primary and Secondary in
500.0	*0.00*	0.09430	0.09335	0.09335
	0.10	0.09300	0.09271	0.09271
	0.25	0.09244	0.09234	0.09234
	0.50	0.09197	0.09192	0.09192
	1.00	0.09133	0.09133	0.09133
	2.00	0.09048	0.09049	0.09049
	4.00	0.08931	0.08931	0.08931
	8.00	0.08775	0.08763	0.08763
	15.00	0.08593	0.08552	0.08552
	30.00	0.08357	0.08281	0.08281
	60.00	0.08123	0.08064	0.08064
	120.00	0.07947	0.07988	0.07988
	240.00	0.07840	0.07982	0.07991
	480.00	0.07766	0.07982	0.08082
	720.20	0.07723	0.07982	0.08135

h_0 = 0.90170 in
U_s = 99%
t_s = 101.43 min
d_s = 0.07996 in
d_0 = 0.09335 in
d_{100} = 0.07982 in
d = 0.45471 in
C_v = 0.0036 in^2/min
r_i = 5.6%
r_p = 79.2%
r_s = 15.2%
Slope = -0.0030
Intercept = 0.0869
h_c = 0.9162 in
t_c = 224.59 min
C_{ae} = 0.329%

Time-Deformation curve for 500 psf unload



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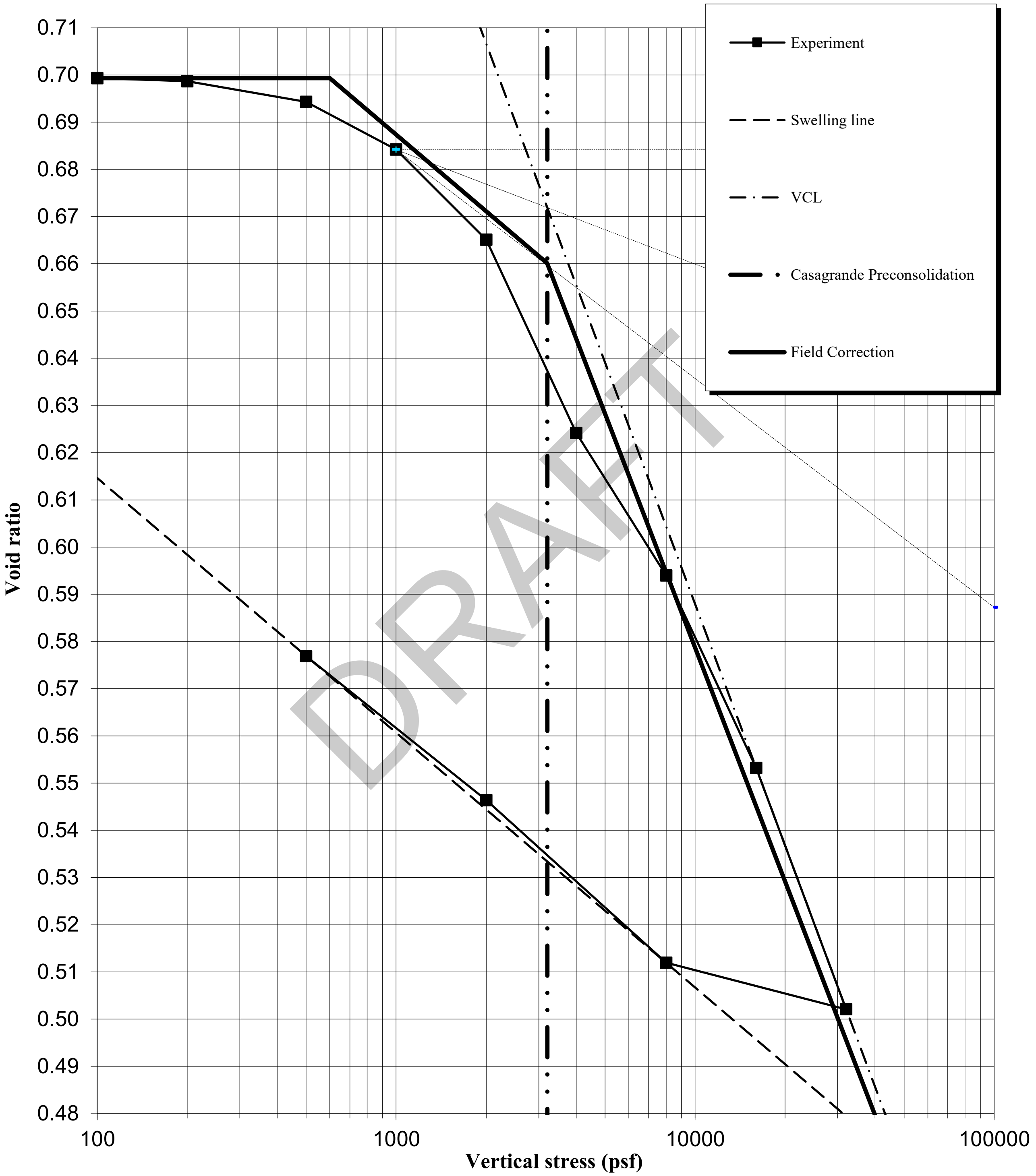
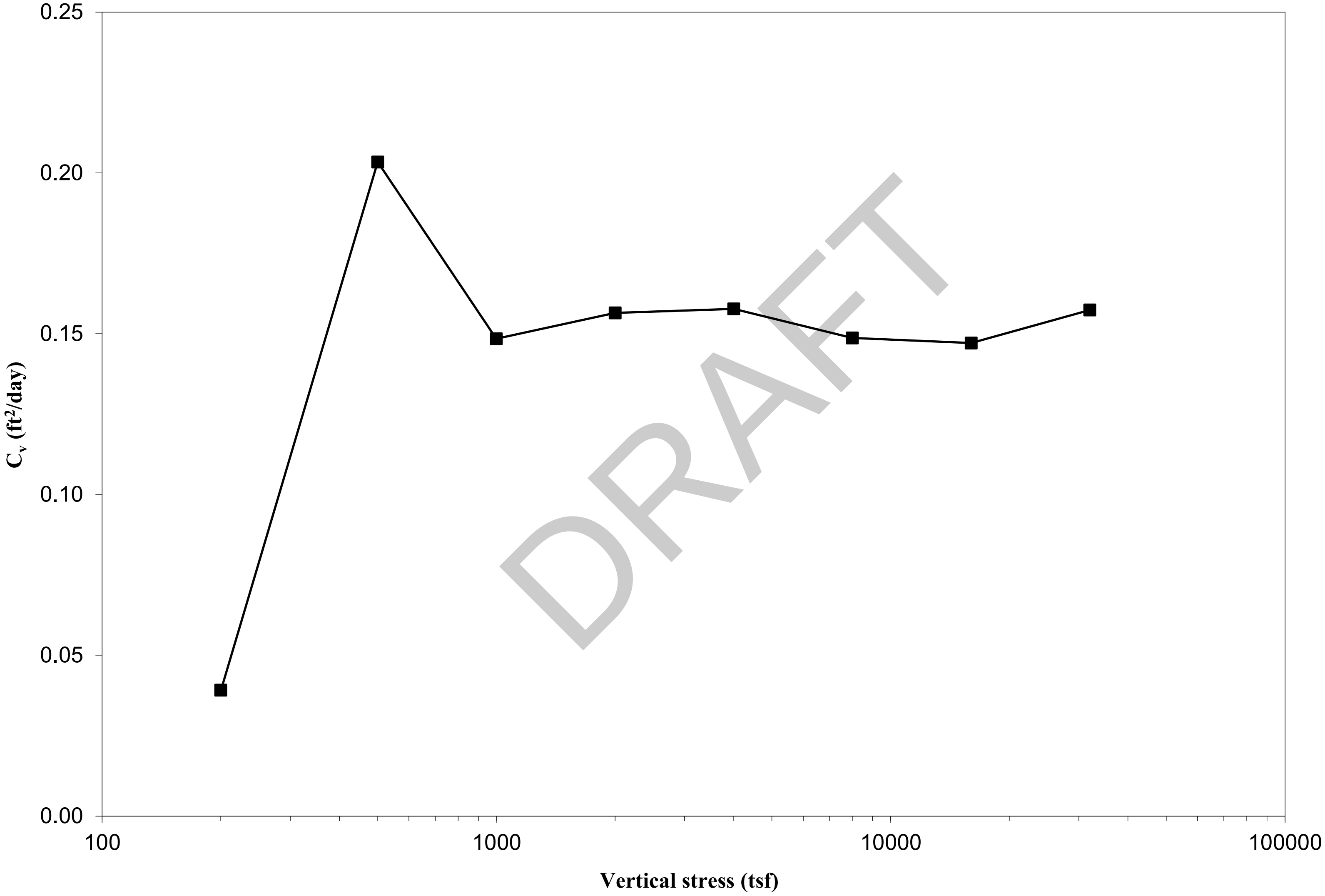
CONSOLIDATION CURVE

Boring B-25-05, 8 to 10 feet



CONSOLIDATION COEFFICIENT (C_v) vs. VERTICAL STRESS

Boring B-25-05, 8 to 10 feet



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Infiltration Rate Determination for A Single Ring Infiltrometer

Ref: 2024 City of Chicago Stormwater Ordinance Manual

Project Identification:	PBC-DWM, 4825 W. Lawrence; Terracon # 11255119
Test Identification:	INF-01
Soil Type:	Poorly sorted gravel
Tested By:	Eric Datz

Ring Diameter:	15.24	cm
Ring Total Height:	213.36	cm
Penetration Depth:	7.62	cm

Elapsed Time (minutes)	Change in Time (minutes)	Water Decline (cm)	Cumulative Volume (cm^3)
0.00	0.00	0.00	0.00
0.03	0.03	2.54	463.33
0.07	0.03	2.54	926.67
0.10	0.03	2.54	1390.00
0.20	0.10	7.62	2780.00
0.27	0.07	5.08	3706.67
0.38	0.12	7.62	5096.67
0.50	0.12	7.62	6486.67
0.63	0.13	7.62	7876.67
1.00	0.37	12.70	10193.33
1.23	0.23	12.70	12510.00
1.48	0.25	12.70	14826.67
1.72	0.23	12.70	17143.33
2.07	0.35	12.70	19460.00
2.27	0.20	12.70	21776.67
2.68	0.42	12.70	24093.33

Totals: 132.08 24093.33

Distance of ground surface to initial water level, z : 205.74 cm
Total water drop, y_t : 132.08 cm

Infiltration rate, $i_n = y_n / t_n$

$i_n =$ 0.60 cm/sec

Downward flow rate, $i_w = (i_n*r^2)/((1.5r)^2)$

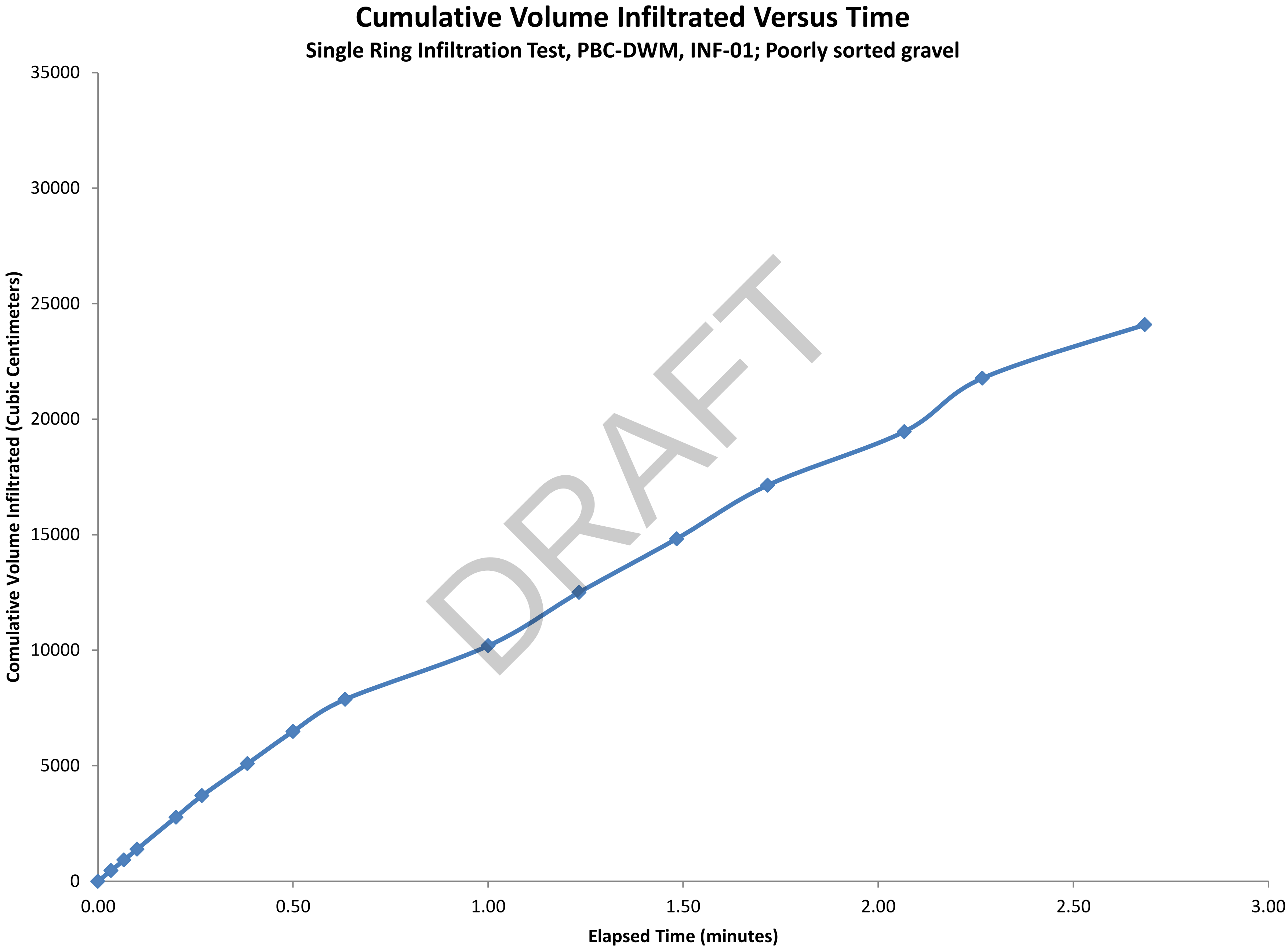
$i_w =$ 0.269 cm/sec

Depth of wetted zone, $L = (y_t * r^2) / [n * (1.5r)^2]$; where n is the assumed in-situ porosity of the soil. A value of 0.2 to 0.3 for permeable soils would be typical.

n = 0.30
L = 195.67 cm

Design infiltration rate, $K = (i_w * L) / (z + L)$

K = 0.131 cm/sec
K = 185.70 in/hr


Cumulative Volume Infiltrated Versus Time
Single Ring Infiltration Test, PBC-DWM, INF-01; Poorly sorted gravel
Cumulative Volume Infiltrated (Cubic Centimeters)
35000
30000
25000
20000
15000
10000
5000
0
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Elapsed Time (minutes)

Infiltration Rate Determination for A Single Ring Infiltrometer

Ref: 2024 City of Chicago Stormwater Ordinance Manual

Project Identification:	PBC-DWM, 4825 W. Lawrence; Terracon # 11255119
Test Identification:	INF-02
Soil Type:	Soft gray clay
Tested By:	Eric Datz

Ring Diameter:	15.24	cm
Ring Total Height:	213.36	cm
Penetration Depth:	10.16	cm

Elapsed Time (minutes)	Change in Time (minutes)	Water Decline (cm)	Cumulative Volume (cm^3)
0	0	0.00	0.00
905	905	0.00	0.00
	Totals:	0.00	0.00

Distance of ground surface to initial water level, z :	203.20	cm
Total water drop, y_t :	0.00	cm

Infiltration rate, $i_n = y_n / t_n$

i_n = 0.00 cm/sec

Downward flow rate, $i_w = (i_n * r^2)/((1.5r)^2)$

i_w = 0.000 cm/sec

Depth of wetted zone, $L = (y_t * r^2) / [n * (1.5r)^2]$; where n is the assumed in-situ porosity of the soil. A value of 0.2 to 0.3 for permeable soils would be typical.

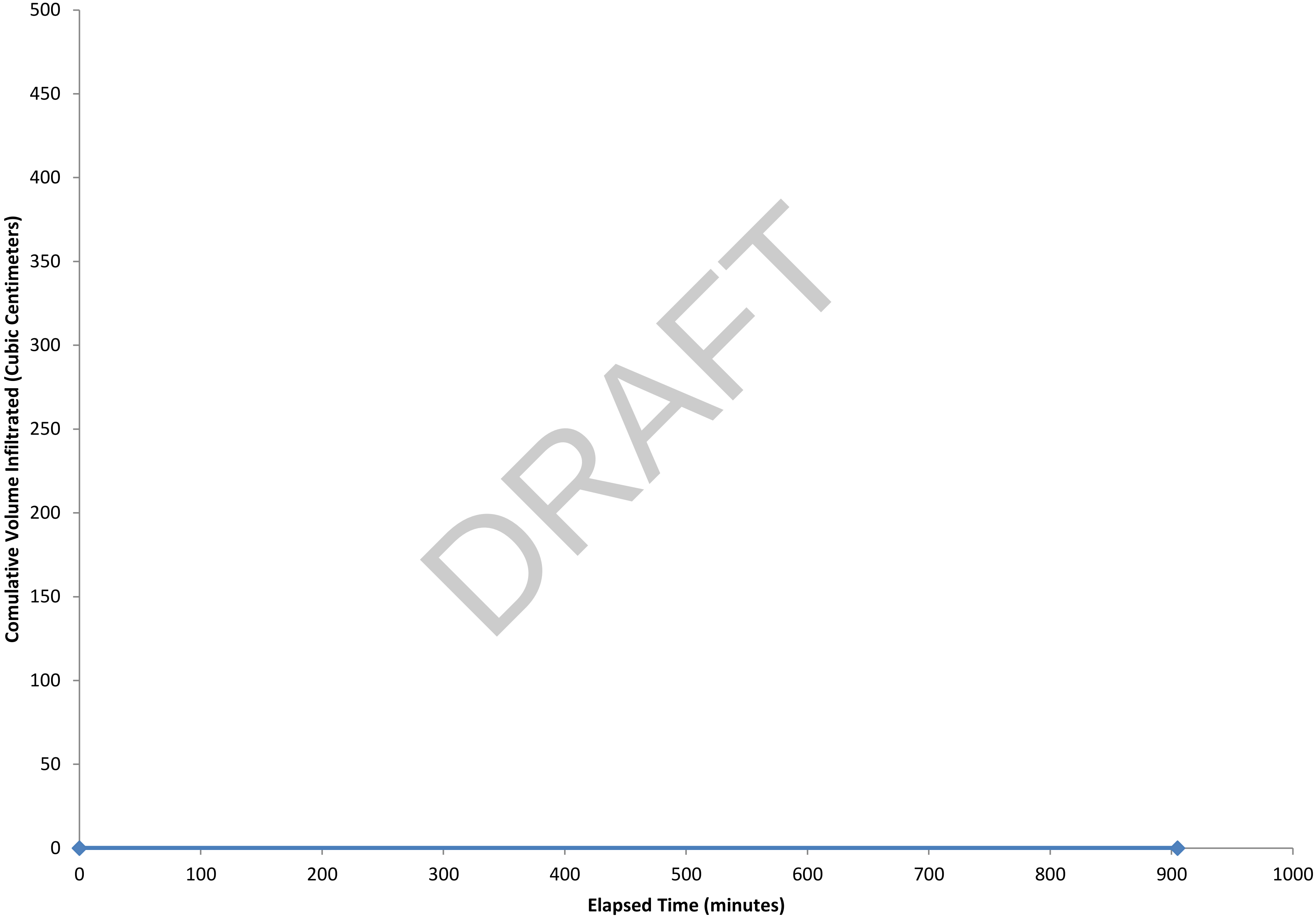
n = 0.30

L = 0.00 cm

Design infiltration rate, $K = (i_w * L) / (z + L)$

K = 0.000 cm/sec

K = 0.00 in/hr



Cumulative Volume Infiltrated Versus Time

Single Ring Infiltration Test, PBC-DWM INF-02; Soft gray clay

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VANE SHEAR TEST RESULTS

(ASTM D-2573)

PROJECT NUMBER: 11255119 / 1100-46-01

PROJECT NAME: PBC DWM

BORING No : B25-01

LOCATION: 4825 W. Lawrence, Chicago

Test No	Depth (Feet)	Vane Size	C (10^{-2} x cm^{-3})	U/R	as (cm)	af (cm)	Su K (as-af) x C kg/cm2	Su (kg/cm2 X 2048.16) psf	S
1	6'	S	0.2	U	7.4	0.5	1.475176	2973.49	3.83
				R	2.2	0.4	0.37872	775.679	
2	8'	S	0.2	U	Soil strength exceeds vane capacity				NA
				R					
3	12'	S	0.2	U	Soil strength exceeds vane capacity				NA
				R					
4									
5									
6									
7									
8									
9									
10									

U = Undisturbed R = Remolded S = Sensitivity

VST EQUIPMENT: ROCTEST VANE BORER M-1000

Vane Size	Dimensions (cm)	C 10^{2} X cm^{-3}
S (small)	5 x 11	0.2
M (medium)	6.5 x 13	0.1
L (large)	8 x 17.2	0.05

Test Performed By: E. Datz

Date: 8/13/2025

Check By: A. Kurnia

Date: 9/16/2025

Torque Caliberation Constant (K) 1.052 Kg/cm

AECOM General Notes

Drilling and Sampling Symbols:

SS : Split Spoon - 1-3/8" I.D. 2" O.D. (Unless otherwise noted)	HS : Hollow Stem Auger
ST : Shelby Tube-2" O.D. (Unless otherwise noted)	WS : Wash Sample
PA : Power Auger	FT : Fish Tail
DB : Diamond Bit-NX, BX, AX	RB : Rock Bit
AS : Auger Sample	BS : Bulk Sample
JS : Jar Sample	PM : Pressuremeter Test
VS : Vane Shear	GS : Giddings Sampler
OS : Osterberg Sampler	

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

Water Level Measurement Symbols:

WL : Water Level	WCI : Wet Cave In
WS : While Sampling	DCI : Dry Cave In
WD : While Drilling	BCR : Before Casing Removal
AB : After Boring	ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

Gradation Description and Terminology:

Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; 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 described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

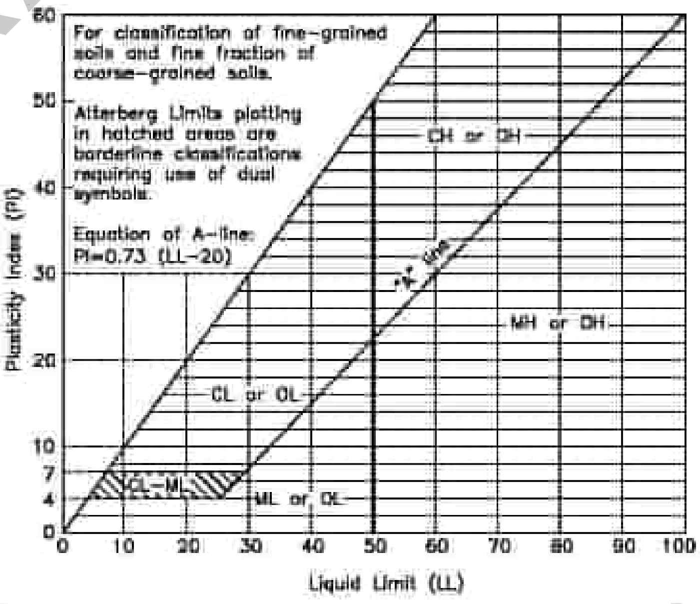
Major Component of Sample	**Size Range**	**Description of Other Components Present in Sample**	**Percent Dry Weight**
Boulders	Over 8 in. (200 mm)	Trace	1-9
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Little	10-19
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)	Some	20-34
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)	And	35-50
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

Consistency of Cohesive Soils:

Relative Density of Granular Soils:

Unconfined Compressive Strength, Qu, tsf	**Consistency**	**N-Blows per foot**	**Relative Density**
<0.25	Very Soft	0 - 3	Very Loose
0.25 - 0.49	Soft	4 - 9	Loose
0.50 - 0.99	Medium (firm)	10 - 29	Medium Dense
1.00 - 1.99	Stiff	30 - 49	Dense
2.00 - 3.99	Very Stiff	50 - 80	Very Dense
4.00 - 8.00	Hard	>80	Extremely Dense
>8.00	Very Hard		

Soil Classification System (1)

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravel (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well-graded, gravel, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent . . . . . . GW, GP, SW, SP More than 12 percent . . . . . . GM, GC, SM, SC 5 to 12 percent . . . . . . Borderline cases requiring dual symbols[3]	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			GP	Poorly graded gravel, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravel, gravel-sand-silt mixtures		Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
			GC	Clayey gravel, gravel-sand-clay mixtures		Atterberg limits above "A" line or PI greater than 7	
	Sand (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sand (Little or no fines)	SW	Well-graded sand, gravelly sand, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			SP	Poorly graded sand, gravelly sand, little or no fines		Not meeting all gradation requirements for SW	
		Sand with fines (Appreciable amount of fines)	SM	Silty sand, sand-silt mixtures		Atterberg limits below "A" line or PI less than 4	Limits plotting in hatched zone with PI between 4 and 7 are borderline cases requiring use of dual symbols
			SC	Clayey sand, sand-clay mixtures		Atterberg limits above "A" line or PI greater than 7	
Fine-grained soils (More than half of material is smaller than No. 200 sieve size)	Silt and clay (Liquid limit less than 50)		ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity	Plasticity Chart (2) 		
			CL	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay			
			OL	Organic silt and organic silty clay of low plasticity			
	Silt and clay (Liquid limit greater than 50)		MH	Inorganic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silt			
			CH	Inorganic clay of high plasticity, fat clay			
			OH	Organic clay of medium to high plasticity, organic silt			
	Highly organic soils		PT	Peat and other highly organic soil			

1. See AECOM General Notes for component gradation terminology, consistency of cohesive soils and relative density of granular soils.
2. Reference: Unified Soil Classification Systems
3. Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

AECOM Field and Laboratory Procedures

Subsurface Exploration Procedures

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer or a drop hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the borehole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the boreholes. They are turned and hydraulically advanced by a truck, trailer or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open boreholes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the boreholes. The open stem allows the sampling tool to be used without removing the augers from the borehole. Hollow stem augers thus provide support to the sides of the borehole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the boreholes. In this process, surface casing and/or drilling fluids are used to maintain open boreholes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (or triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

AECOM Field and Laboratory Procedures

Field Sampling Procedures

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) - (ASTM Standard D-1586-99)

In the split-barrel sampling procedure, a 2-inch O.D. split barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - ASTM Standard D-1587-94

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are identified, sealed and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

AECOM Laboratory Procedures

Water Content (Wc)
The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)
In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)
In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γd)
The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples
In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in accordance with the AECOM Soil Classification System which is described on a separate sheet. The soil descriptions on the boring logs are derived from this system as well as the component gradation terminology, consistency of cohesive soils and relative density of granular soils as described on a separate sheet entitled "AECOM General Notes". The estimated group symbols included in parentheses following the soil descriptions on the boring logs are in general conformance with the Unified Soil Classification System (USCS) which serves as the basis of the AECOM Soil Classification System.

AECOM Standard Boring Log Procedures

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by experienced geotechnical engineers, and as such, differences between the field logs and the final logs may exist. The engineer preparing the report reviews the field logs, laboratory test data and classifications, and using judgment and experience in interpreting this data, may make further changes. It is common practice in the geotechnical engineering profession not to include field logs and laboratory data sheets in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then discarded unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

AECOM General Qualifications

Underground Engineering

This report has been prepared in general accordance with normally accepted geotechnical engineering practices to aid in the evaluation of this site and to assist our Client in the design of this project. We have prepared this report for the purpose intended by our Client, and reliance on its contents by anyone other than our Client is done at the sole risk of the user. No other warranty, either expressed or implied, is made. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects relevant to the geotechnical characteristics. In the event that any changes in the design or location of the facilities as outlined in this report are planned, we should be informed so that the changes can be reviewed and the conclusions of this report modified as necessary in writing by the geotechnical engineer. As a check, we recommend that we be authorized to review the project plans and specifications to confirm that the recommendations contained in this report have been interpreted in accordance with our intent. Without this review, we will not be responsible for the misinterpretation of our data, our analysis, and/or our recommendations, nor how these are incorporated into the final design.

The analysis and recommendations submitted in this report are based on the data obtained from the soil borings performed at the locations indicated on the location diagram and from the information discussed in this report. This report does not reflect any variations which may occur between the borings. In the performance of subsurface explorations, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in soil and rock conditions exist on most sites between boring locations and that seasonal and annual fluctuations in groundwater levels will likely occur. The nature and extent of variations may not become evident until the course of construction. If variations then appear evident, it will be necessary for a re-evaluation of the recommendations contained in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

The geotechnical engineer of record is the professional engineer who authored the geotechnical report. It is recommended that all construction operations dealing with earthwork and foundations be observed by the geotechnical engineer of record or the geotechnical engineer's appointed representative to confirm that the design requirements are fulfilled in the actual construction. For some projects, this may be required by the governing building code.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria, viruses, and the byproducts of such organisms) assessment of the site, or identification of or prevention of pollutants, hazardous materials or conditions. Other studies beyond the scope of this project would be required to evaluate the potential of such contamination or pollution.