Architectural
Structural
Geotechnical

RMG
Engineers / Architects

Materials Testing
Forensic
Civil/Planning

SOILS AND GEOLOGY STUDY

Hillside at Lorson Ranch – "Area I"
El Paso County, Colorado

PREPARED FOR:

Lorson Ranch Metropolitan District No.1
212 N. Wahsatch Ave, Ste. 301
Colorado Springs, CO 80903

complete - Thank you

JOB NO. 181988

January 3, 2022

Respectfully Submitted,
RMG – Rocky Mountain Group

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Reviewed by,
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1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

northeast quarter

The project lies in the north half of Section 24 and in the south half of Section 13, Township 15 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

1.2 Existing Land Use

The site is to be subdivided from three existing parcels. The total area of the proposed site is to be approximately 128.33 acres, as denoted on the *Lorson Ranch Area I Site Plan* provided by Matrix, dated November 4, 2021. The parcels included are:

- All of El Paso County Parcel No. 5500000369. This parcel currently consists of a total of 35 acres and is currently undeveloped.
- All of El Paso County Parcel No. 5500000370. This parcel currently consists of a total of 35 acres and is currently undeveloped.
- A portion of El Paso County Parcel No. 5500000371. This parcel currently consists of a total of 276.97 acres and is currently undeveloped.

The parcel is to maintain the current zoning "PUD" (Planned Unit Development), but a transition from PUD 6 007 to PUDSP has been requested.

1.3 Project Description

489

2.5

The proposed site development is to consist of 494 single-family residential units. The majority of the lots reportedly range from 3,825 to 6,600 square feet. Eight “buffer” lots, approximately 5 acres each along the southern boundary, are to provide transition from the smaller lots within the new Hillside at Lorson Ranch subdivision to the existing Peaceful Valley Lake Estates to the south. Entrance into the subdivision is to be provided from the west by extending the existing Trappe Drive and Lorson Boulevard, from the east by extending Kingston Peak Place, and from the north by two interior roadways (Elk Hills Drive and Tin Mountain Trail) extending south from Lorson Boulevard. Additional proposed land usage includes landscaped easements, parks, open spaces, trail corridors, utility easements, and drainage and detention facilities. The Proposed Lot Layout With Test Boring Locations plan is presented in Figure 2.

The streets within the subdivision are to be Local Residential - Public with a 50’ R.O.W and constructed to El Paso County standards. The extension of Lorson Boulevard is to be Major Residential Collector – Public with a 64’ R.O.W. The streets are to be maintained by El Paso County Department of Transportation.

The development is to utilize sewer and water services provided by Widefield Water and Sanitation District. Neither individual wells nor on-site wastewater treatment systems are proposed.

2.0 QUALIFICATIONS OF PREPARERS

This Soils and Geology Study was prepared by a professional geologist as defined by Colorado Revised Statures section 34-1-201(3) and by a qualified geotechnical engineer as defined by policy statement 15, "Engineering in Designated Natural Hazards Areas" of the Colorado State Board of Registration for Professional Engineers and Professional Land Surveyors. (Ord. 96-74; Ord. 01-42)

The principle investigators for this study are Kelli Zigler P.G., and Tony Munger, P.E. Ms. Zigler is a Professional Geologist as defined by State Statute (C.R.S 34-1-201) with over 21 years of experience in the geological and geotechnical engineering field. Ms. Kelli Zigler holds a B.S. in Geology from the University of Tulsa. Ms. Zigler has supervised and performed numerous geological and geotechnical field investigations throughout Colorado.

Tony Munger is a licensed professional engineer with over 21 years of experience in the construction engineering (residential) field. Mr. Munger and holds a Bachelor of Science in Architectural Engineering from the University of Wyoming.

3.0 STUDY OVERVIEW

The purpose of this investigation is to characterize the general geotechnical and geologic site conditions, and present our opinions of the potential effect of these conditions on the proposed development of single-family residences within the referenced site. As such, our services exclude evaluation of the environmental and/or human, health-related work products or recommendations previously prepared, by others, for this project.

Revisions to the conclusions presented in this report may be issued based upon submission of the Development Plan. This study has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC) specifically Chapter 8 last updated August 27, 2019 applicable sections include 8.4.8 and 8.4.9. and the Engineering Criteria Manual (ECM), specifically Appendix C last updated July 9, 2019.

This report presents the findings of the study performed by RMG relating to the geotechnical and geologic conditions of the above-referenced site. Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

3.1 Scope and Objective

The scope of this study is to include a physical reconnaissance of the site and a review of pertinent, publically available documents including (but not limited to) previous geologic and geotechnical reports, overhead and remote sensing imagery, published geology and/or hazard maps, design documents, etc. Our services exclude the evaluation of the environmental and/or human, health-related work products or recommendations previously prepared, by others, for this project.

The objectives of our study are to:

- Identify geologic conditions that are present on this site,
- Analyze the potential negative impacts of these conditions on the proposed site development,
  - Analyze the potential negative impacts to the surrounding properties and/or public services resulting from the proposed site development as it relates to existing geologic hazards,
  - Provide our opinion of suitable techniques that may be utilized to mitigate the potential negative impacts identified herein.

This report presents the findings of the study performed by RMG relating to the geologic conditions of the above-referenced site. Revisions and modifications to this report may be issued subsequently by RMG, based upon:

- Additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report,
- Review of pertinent documents (development plans, plat maps, drainage reports/plans, etc.) not available at the time of this study,
- Comments received from the governing jurisdiction and/or their consultants subsequent to submission of this document.

3.2 Site Evaluation Techniques

The information included in this report has been compiled from:

- Field reconnaissance
- Geologic and topographic maps
- Review of selected publicly available, pertinent engineering reports
- Available aerial photographs
- Exploratory soil test borings by RMG
- Laboratory testing of representative site soil and rock samples by RMG
- Geologic research and analysis
- Site development plans prepared by others

Geophysical investigations were not considered necessary for characterization of the site geology. Monitoring programs, which typically include instrumentation and/or observations for changes in groundwater, surface water flows, slope stability, subsidence, and similar conditions, are not known to exist and were not considered applicable for the scope of this report.

3.3 Additional Documents

Additional documents reviewed during the performance of this study are included in Appendix A.

4.0 SITE CONDITIONS

4.1 Existing Site Conditions

The entire site is undeveloped. Overhead power lines along the western boundary are to reside within a power line easement, which is to be designated as open space.

4.2 Topography

Based on our site reconnaissance and the preliminary Auto-Cad drawings provided by Matrix, the site topography is generally rolling hills. The elevation varies by approximately 30 feet across the site, sloping generally downwards from the northwest to the southeast.

east to west in the west
and south in the east?

4.3 Vegetation

The majority of the site consists of low-lying native grasses and weeds and for the most part remains in an undisturbed (native) state.

4.4 Aerial photographs and remote-sensing imagery

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1999, CGS surficial geologic mapping, and historical photos by historicaerials.com dating back to 1947. Historically, the site has remained generally undisturbed since 1947 other than the construction of the overhead power lines that were put in place prior to 1969.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

The subsurface conditions within the property were explored by drilling 78 exploratory test borings to depths of approximately 12 to 20 feet below the existing ground surface. The test boring locations are presented on the Proposed Lot Layout With Test Boring Locations plan, Figure 2. Additionally, 6 preliminary test borings were performed in March of 2020. The Test Boring Logs for these preliminary borings are included in Appendix B.

The number of borings is in excess of the minimum one test boring per 10 acres of development up to 100 acres and one additional boring for every 25 acres of development above 100 acres as required by the ECM, Section C.3.3.

The test borings were drilled with a power-driven, continuous-flight auger drill rig. Samples were obtained during drilling of the test boring in general accordance with ASTM D-1586 and D-3550, utilizing a 2-inch O.D. Split Barrel Sampler and a 2½-inch O.D. California sampler, respectively. Results of the penetration tests are shown on the drilling logs. The proposed lot layout is shown on the Proposed Lot Layout with Test Boring Locations plan, Figure 2. An Explanation of Test Boring Logs is shown in Figure 3, and the Test Boring Logs are shown in Figures 4 through 42.

5.1 Laboratory Testing

Soil laboratory testing was performed as part of this investigation. The laboratory tests included moisture content, dry density, grain-size analyses, Atterberg Limits and Swell/Consolidation tests. A Summary of Laboratory Test Results is presented in Figure 43. Soils Classification Data is presented in Figures 44 through 47. Swell/Consolidation Test Results are presented in Figures 48 through 84.

5.2 Groundwater

Groundwater was not encountered in the test borings during the field exploration. Based on the water contents for the samples collected at the time of drilling, moistures were not elevated and do not indicate an elevated groundwater condition.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels. Based on our knowledge of the area and engineering design and construction techniques commonly employed in the El Paso County area at this time, it is our opinion that there is insufficient reason to preclude full-depth basements on any of the lots in this subdivision at this time.

6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

The site is located within the western flank of the Colorado Piedmont section of the Great Plains physiographic province. The Colorado Piedmont, formed during Late Tertiary and Early Quaternary time (approximately 2,000,000 years ago), is a broad, erosional trench which separates the Southern Rocky Mountains from the High Plains. During the Late Mesozoic and Early Cenozoic Periods (approximately 70,000,000 years ago), intense tectonic activity occurred, causing the uplifting of the Front Range and associated downwarping of the Denver Basin to the east. Relatively flat uplands and broad valleys characterize the present-day topography of the Colorado Piedmont in this region.

6.1 Subsurface Soil Conditions

The subsurface materials encountered in the test borings performed for this study were classified within the laboratory using the Unified Soil Classification System (USCS). The majority of the laboratory testing focused on the Swell/Consolidation test results for the sub-excavation recommendations and limited classifications were completed on the clay and claystone materials. The soils were identified and classified as native sandy clay (low to high plasticity CL-CH) and sandy claystone.

Additional descriptions and the interpreted distribution (approximate depths) of the subsurface materials are presented on the Test Boring Logs. The classifications shown on the logs are based upon the engineer’s classification of the samples at the depths indicated. Stratification lines shown on the logs represent the approximate boundaries between material types and the actual transitions may be gradual and vary with location.

6.2 Bedrock Conditions

In general, the bedrock (as mapped by Colorado Geologic Survey - CGS) beneath the site is considered to be part of the Pierre Shale formation. Bedrock was encountered in the majority of test borings performed for this investigation. Bedrock conditions are anticipated to be encountered in the excavations or utility trenches for the proposed development.

6.3 U.S. Soil Conservation Service

The U.S. Soil Conservation Service along with United States Department of Agriculture (USDA) has identified the soils on the property as:

- 56 – Nelson-Tassel fine sandy loam, 3 to 18 percent slopes. The Nelson-Tassel fine sandy loam was mapped by the USDA to encompass the majority of the property. The Nelson-Tassel fine sandy loam encompasses approximately115 acres for a total of 94 percent of the property. Properties of the sandy loam include, well-drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to be medium, frequency of flooding is none, and landforms include hills.

- 108 – Wiley silt loam, 3 to 9 percent slopes. The Wiley silt loam was mapped by the USDA to encompass a small portion of the property near the center of the southern property boundary. Properties of the sandy loam include, well-drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to be medium, frequency of flooding and/or ponding is none, and landforms include hills.

The USDA Soil Survey Map is presented in Figure 86 and the FEMA Map is presented in Figure 87.

6.4 General Geologic Conditions

Based on our field observations, the USDA map, and the Geologic Map of the Fountain Quadrangle, an interpreted geologic map of significant surficial deposits and features was mapped for the site. The identified geologic conditions affecting the development are presented in the Engineering and Geology Map, Figure 85.

The site generally consists of sandy clay derived from the underlying claystone bedrock. Two geologic units were mapped at the site as:

- *Qp - Piney Creek Alluvium* – silty to gravelly humus-rich alluvium along/within all valleys. The alluvium was encountered in the borings across the site at various depths and is anticipated in the low-lying areas.
- *Kp – Pierre Shale, cone-in-cone zone of Lavington (1933)* dark-gray to tan-gray to olive-gray, subblocky to finely fissile non-calcareous shale, silty shale with thin bentonite beds and very fine grained-grained sandstone. Thickness of this zone is approximately 2,290 (Scott and Cobban, 1986). Residual clay and claystone were encountered in all the borings across the site up to depths of 20 feet.

6.5 Structural Features

Structural features such as schistocity, folds, zones of contortion or crushing, joints, shear zones or faults were not observed on the site, in the surrounding area, or in the soil samples collected for laboratory testing.

6.6 Surficial (Unconsolidated) Deposits

Lake and pond sediments, swamp accumulations, sand dunes, marine terrace deposits, talus accumulations, creep, or slope wash were not observed on the site. Slump and slide debris were also not observed on the site.

6.7 Engineering Geology

Charles Robinson and Associates (1977) have mapped one environmental engineering unit at the site as:

- 2A – Stable alluvium, colluvium and bedrock on flat to gentle to moderate slopes (5 to 12%).

One additional unit has been mapped:

- Ea – *Powerline Easement* – to remain as open space. Development is not proposed within the easement.

The engineering geology is presented in the Engineering and Geology Map, Figure 85.

6.8 Features of Special Significance

Features of special significance such as accelerated erosion, (advancing gully head, badlands, or cliff reentrants) were not observed on the property. Features indicating settlement or subsidence such as fissures, scarplets, and offset reference features were not observed on the property or surrounding areas.

Features indicating creep, slump, or slide masses in bedrock and surficial deposits were not observed on the property.

6.9 Drainage of Water and Groundwater

The overall topography varies by approximately 30 feet across the site, sloping generally downwards from the northwest to the southeast. It is anticipated the direction of groundwater is towards Jimmy Camp Creek located to the west of the site. Groundwater was not encountered in the test borings performed for this investigation. Groundwater water depths are greater than 20 feet in the area and are not anticipated to affect basement foundation construction.

7.0 ECONOMIC MINERAL RESOURCES

Under the provision of House Bill 1529, it was made a policy by the State of Colorado to preserve for extraction commercial mineral resources located in a populous county. Review of the *El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction*, *Map 2* indicates the site is identified as platted/and or developed, with that extraction of the clay and claystone resources are not considered to be economical compared to materials available elsewhere within the county.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*, the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped "Poor" for coal resources, no active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on the site.

8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS

The El Paso County Engineering Criteria Manual recognizes and delineates the difference between hazards and constraints. A geologic hazard is one of several types of adverse geologic conditions capable of causing significant damage or loss of property and life. Geologic hazards are defined in Section C.2.2 Sub-section E.1 of the ECM. A geologic constraint is one of several types of adverse geologic conditions capable of limiting or restricting construction on a particular site. Geologic constraints are defined in Section C.2.2 Sub-section E.2 of the ECM (1.15 Definitions of Specific Terms and Phrases). The following geologic constraints were considered in the preparation of this report, and are not are not anticipated to pose a significant risk to the proposed development:

- Avalanches
- Debris Flow-Fans/Mudslides
- Floodplains
- Ground Subsidence
- Landslides
- Rockfall
- Ponding water
- Steeply Dipping Bedrock
- Unstable or Potentially Unstable Slopes
- Scour, Erosion, accelerated erosion along creek banks and drainageways
- Springs and High Groundwater
- Corrosive Minerals

The following sections present geologic constraints that have been identified on the property:

8.1 Expansive Soils and Bedrock

Shallow foundations are anticipated for the majority of the development, and it is our understanding a mass subexcavation is proposed for most or all of the buildable lots. Subexcavation and replacement with moisture-conditioned structural fill is a commonly utilized method of mitigating expansive soils. Based on the test borings performed by RMG for this investigation, the sandy clay and claystone generally possess low to very high swell potential.

Mitigation
Our subexcavation recommendations are presented in Section **13.0 Subexcavation and Replacement** of this report and the attached Figure 88.

Note, the recommended subexcavation and replacement process does not guarantee that the swell potential will be reduced to acceptable levels. It is possible that the expansive material will retain swell potential in excess of the allowable value presented herein, even after processing and moisture-conditioning. If (at the time of the lot-specific subsurface soil investigation and/or the open excavation observation) the soil is found to possess swell potential in excess of acceptable levels for the foundation system and design parameters proposed for construction at that time, overexcavation and replacement of some or all of the previously placed fill material may be required.

Provided that appropriate mitigations and/or foundation design adjustments are implemented, the presence of expansive soils or bedrock is not considered to pose a risk to the proposed structures.

8.2 Faults and Seismicity

Based on review of the Earthquake and Late Cenozoic Fault and Fold Map Server provided by CGS located at http://dnrwebmapgdev.state.co.us/CGSOnline/ and the recorded information dating back to November of 1900, Colorado Springs has not experienced a recorded earthquake with a magnitude greater than 1.6 during that time period. The nearest recorded earthquakes over 1.6 occurred in December of 1995 in Manitou Springs, which experienced magnitudes ranging between 2.8 to 3.5. Additional earthquakes over 1.6 occurred between 1926 and 2001 in Woodland Park, which experienced magnitudes ranging from 2.7 to 3.3. Both of these locations are in the vicinity of the Ute Pass Fault, which is greater than 10 miles from the subject site.

Earthquakes felt at this site will most likely result from minor shifting of the granite mass within the Pikes Peak Batholith, which includes pull from minor movements along faults found in the Denver basin. It is our opinion that ground motions resulting from minor earthquakes may affect structures (and the surrounding area) at this site if minor shifting were to occur.

Mitigation
The Pikes Peak Regional Building Code, 2017 Edition, indicates maximum considered earthquake spectral response accelerations of 0.185g for a short period (S_s) and 0.059g for a 1-second period (S_1). Based on the results of our experience with similar subsurface conditions, we recommend the

site be classified as Site Class B, with average shear wave velocities ranging from 2,500 to 5,000 feet per second for the materials in the upper 100 feet.

8.3 Radon

"Radon Act 51 *passed by Congress set the natural outdoor level of radon gas (0.4 pCi/L) as the target radon level for indoor radon levels.*

Southern El Paso County and the 80925 zip code located in Lorson Ranch, has an EPA assigned Radon Zone of 1. A radon zone of 1 predicts an average indoor radon screening level greater than 4 pCi/L, which is above the recommended levels assigned by the EPA. Lorson Ranch is located in a high risk area of the country. *The EPA recommends you take corrective measures to reduce your exposure to radon gas.*

Most of Colorado is generally considered to have the potential of high levels of radon gas, based on the information provided at:
https://www.elpasocountyhealth.org/sites/default/files/CDPHERadonMap.pdf. There is not believed to be unusual hazardous levels of radon from naturally occurring sources at this site.

Mitigation

Radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards. Radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards. Passive radon mitigation systems are also available.

Passive and active mitigation procedures are commonly employed in this region to effectively reduce the buildup of radon gas. Measures that can be taken after the residence is enclosed during construction include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, it is recommended that the residence be tested after they are enclosed and commonly utilized techniques are in place to minimize the risk.

8.4 Proposed Grading, Erosion Control, Cuts and Masses of Fill

Based on the test borings for this investigation, the excavations are anticipated to encounter sandy clay and claystone. The on-site soils can generally be used as site-grading fill, though use of claystone within the fill should be avoided where the fill will be located below the proposed foundations.

A preliminary Auto-Cad drawing provided by Core Engineering was reviewed and considered in the preparation of this report. Proposed cuts across the site and within the proposed building envelopes are anticipated to vary between 0 and 13 feet. The majority of the deeper cuts are proposed around the detention pond areas. Proposed fills cross the site and within the proposed building envelopes are anticipated to vary between 0.5 and 6 feet.

Prior to placement of overlot fill or removal and recompaction of the existing materials, topsoil, low-density native soil, fill and organic matter should be removed from the fill area. The subgrade should be scarified, moisture conditioned to within 2% of the optimum moisture content, and recompacted to the same degree as the overlying fill to be placed. The placement and compaction of fill should be periodically observed and tested by a representative of RMG during construction.

If unsuitable fill soils are encountered at the time of construction for the single-family residences, they should be removed (overexcavated) and replaced with compacted structural fill. The zone of overexcavation shall extend to the bottom of the unsuitable fill zone and shall extend at least that same distance beyond the building perimeter (or lateral extent of any fill, if encountered first). Provided that this recommendation is implemented, the presence of this fill is not considered to pose a risk to proposed structures.

We anticipate that the deepest excavation cuts for crawlspace and garage level construction will be approximately 3 to 4 feet below the existing ground surface, and for basement level construction will be approximately 6 to 8 feet below the existing ground surface, not including subexcavation, where performed. We believe the clay and claystone will classify as Type B materials as defined by OSHA in 29 CFR Part 1926. OSHA requires that temporary excavations made in Type B materials be laid back at ratios no steeper than 1:1 (horizontal to vertical)), respectively, unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope designed by a professional engineer. Long term cut slopes in the upper soil should be limited to no steeper than 3:1 (horizontal to vertical). Flatter slopes will likely be necessary should groundwater conditions occur. It is recommended that long term fill slopes be no steeper than 3:1 (horizontal to vertical).

Guideline Site Grading Specifications are included in the Appendix C.

9.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT

Geologic hazards (as described in Section 8.0 of this report) were not found to be present at this site. Geologic constraints (also as described in section 8.0 of this report) such as: expansive soils and bedrock, faults, seismicity, and radon were found on the site. Where avoidance is not readily achievable, it is our opinion that the existing geologic and engineering conditions can be satisfactorily mitigated through proper engineering, design, and contraction practices.

10.0 BURIED UTILITIES

Based upon the conditions encountered in the test borings, we anticipate that the soils encountered in individual utility trench excavations will consist mostly of native or moisture conditioned and recompacted sandy clay and claystone. It is anticipated the sandy clay will be encountered at stiff to very stiff densities and claystone at medium hard to very hard relative densities. Bedrock conditions are anticipated within the utility trenches.

We believe the clay and claystone will classify as Type B materials as defined by OSHA in 29 CFR Part 1926. OSHA requires that temporary excavations made in Type B materials be laid back at ratios no steeper than 1:1 (horizontal to vertical)), respectively, unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope designed by a professional engineer.

11.0 PAVEMENTS

The proposed roadways with in this development will require a new pavement design prepared in accordance with the El Paso County regulations. The interior roadways are to be classified as Local Residential – Public, according to the preliminary AutoCAD drawing provided by Matrix. The extension of Lorson Boulevard is to be classified as a Major Residential Collector – Public with a 64' R.O.W section. ***The actual pavement section design for individual streets will be completed following overlot grading and rough cutting of the street subgrade.***

The Lorson Ranch area has generally preferred to construct the roadways with a composite roadway section consisting of Hot Mix Asphalt over Cement-Treated Subgrade (CTS). For purposes of this report, we anticipate the subgrade soils will primarily have American Association of State Highway and Transportation Officials (AASHTO) Soil Classifications of A-6 with indices ranging between 15 to 31 with an estimated design subgrade "R-values" on the order of approximately 3 to 5.

The ECM notes that mitigation measures may be required for expansive soils, shallow ground water, subgrade instability, etc. Based on the AASHTO classification of the soils in the subdivision and laboratory swell testing, the subgrade soils are expected to encounter low to very high expansive potential. Therefore, special mitigation measures may be necessary for subgrade preparation.

Pavement materials should be selected, prepared, and placed in accordance with the El Paso County specification and the Pikes Peak Region Asphalt Paving Specifications. Tests should be performed in accordance with the applicable procedures presented in the final design.

12.0 ANTICIPATED FOUNDATION SYSTEMS AND DRAINS

Based on the information presented previously, conventional shallow foundation systems are anticipated to be suitable for the proposed residential structures. It is our understanding a combination of crawlspace and basement excavations is proposed for the lots. Typical foundation cuts are anticipated to be approximately 3 to 4 feet below the final ground surface for crawlspace, and garage foundations and 6 to 8 feet below the final ground surface for basement foundations, not including subexcavation, where performed.

Expansive soils and/or bedrock are anticipated to be encountered in all of the excavations at foundation and floor slab bearing levels. Removal and replacement with structural fill is anticipated. This can be accomplished through "mass" subexcavation and replacement with moisture-conditioned expansive soils/bedrock during land development operations, lot-specific overexcavation and replacement with structural fill during construction, or a combination of the two. However, it should be noted that the use of subexcavated and moisture-conditioned expansive soils as fill below foundations may result in a condition that is not suitable for all shallow foundations.

It must be understood that the subexcavation and replacement process does not guarantee that the swell potential will be reduced to acceptable levels. It is possible that the expansive material will retain swell potential in excess of the allowable value presented herein, even after processing and moisture-conditioning. In such a case, the material will need to be removed, reconditioned, and replaced until the swell potential is reduced to the stated value.

If (at the time of the lot-specific subsurface soil investigation and/or the open excavation observation) the soil is found to possess swell potential in excess of acceptable levels for the foundation system and design parameters proposed for construction at that time, overexcavation and replacement of some or all of the previously placed fill material may be required.

It is also possible that material that was properly conditioned, placed, and compacted during the subexcavation process will require removal (overexcavation) and replacement at the time of construction. The swell potential of the moisture-conditioned structural fill is dependent on many factors, including (but not limited to) density/degree of compaction, moisture content (particularly changes that occur in the moisture content from the time of placement to the time of actual foundation construction), etc. Additionally, various construction processes which can adversely affect the performance of moisture-conditioned structural fill are completed at times before and after our observations, as well as between the time of land development and when the lot-specific foundation is constructed.

While the subexcavation and replacement process is generally considered suitable for use with shallow foundation types, it may result in design parameters that are not consistent with the future builder(s)' pre-existing foundation designs. In such a case, the builder would either need to obtain a foundation designed for parameters consistent with the subsurface soil conditions present at that time, or perform additional mitigation (in most cases, this consists of overexcavation and replacement with material suitable to provide the design parameters utilized in that pre-existing foundation design).

The final foundation design parameters are to be determined based on lot-specific subsurface soil investigations performed at the time of construction. However, for a structure supported atop moisture-conditioned structural fill, the maximum allowable bearing pressures are anticipated to be in the range of 2,000 to 3,000 psf with minimum dead loads in the range of 800 to 1,500 psf. For a structure supported atop granular, non-expansive structural fill, the maximum allowable bearing pressures are anticipated to range from 2,000 to 2,400 psf with no minimum dead load requirement.

The foundation designs should be prepared by a qualified Colorado Registered Professional Engineer using the recommendations presented in this report. This foundation system should be designed to span a minimum of 10 feet under the design loads. The bottoms of exterior foundations should be at least 30 inches below finished grade for frost protection.

12.1 Foundation Drains

A subsurface perimeter drain is recommended around portions of the structures which will have habitable or storage space located below the finished ground surface. This includes crawlspace areas but not the walkout trench, if applicable.

Shallow groundwater conditions were not encountered in the test boring performed for this study or the previously reviewed geotechnical engineering/geologic investigations. Depending on the conditions encountered during the site-specific subsurface soil investigations and the conditions observed at the time of the open excavation observations, additional subsurface drainage systems may be recommended.

It must be understood that the drain systems are designed to intercept some types of subsurface moisture and not others. Therefore, the drains could operate properly and not mitigate all moisture problems relating to foundation performance or moisture intrusion into the basement area.

13.0 SUBEXCAVATION AND REPLACEMENT

The proposed lots within the Hillside at Lorson Ranch contain expansive clay and claystone bedrock at depths that are anticipated to effect the performance of foundations and floor slabs. Subexcavation of the expansive soils and bedrock and replacement as moisture-conditioned structural fill is considered an acceptable alternative to the typical lot-by-lot overexcavations that have been performed for previous filings with in the Lorson Ranch area.

13.1 Subexcavation

Subexcavation below the lots and replacement with moisture conditioned and recompacted onsite material is the best alternative to reduce heave risk and enhance the performance of the foundations, roadways and flat work.

and roads

Where sub-excavation is to be performed, vegetation, organic and deleterious material shall be cleared and disposed of in accordance with applicable requirements prior to performing excavation and/or filling operations. The subexcavation should extend to minimum depths up to 10 feet (as indicated on Figure 88, Subexcavation Recommendations) below the bottom of all proposed foundations components, and at least those same distances (laterally) beyond the proposed "buildable" area on each lot. Before the placement of moisture-conditioned fill, the underlying subgrade shall be scarified, moisture conditioned to within 2% of the optimum moisture content and compacted to the degree specified for the overlying fill material.

13.2 Structural Fill

Areas to receive moisture-conditioned expansive soils used as structural fill should have topsoil, organic material, or debris removed. After subexcavation to the recommended depth below the bottom of all foundation components, the upper 6 inches of exposed soil should be scarified and moisture-conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 95 percent of the maximum dry density as determined by the Standard Proctor test (ASTM D-698) or to a minimum of 92 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557) prior to placing structural fill.

Moisture-conditioned structural fill placed on slopes should be benched into the slope. Maximum bench heights should not exceed 4 feet, and bench widths should be wide enough to accommodate compaction equipment.

Replacement structural fill is to consist of a moisture-conditioned, on-site cohesive fill material. The fill material shall be processed, moisture-conditioned, and replaced as follows:

- Fill shall be free of deleterious material, and shall not contain rocks or cobbles greater than 6 inches in diameter.
- If claystone is to be incorporated into the fill, it shall be thoroughly "pulverized" and shall not contain claystone chunks greater than 3 inches in diameter.
- Fill materials shall be moisture-conditioned to a minimum of 1 percent to 4 percent above optimum moisture content, as determined by the Standard Proctor test, ASTM D-698.
- The moisture-conditioned materials should be placed in maximum 6" compacted lifts. These materials should be compacted to a minimum of 95 percent of the maximum dry density as determined by the Standard Proctor test (ASTM D-698).

Material not meeting the above requirements shall be reprocessed.

Materials used for moisture-conditioned structural fill should be approved by RMG prior to use. Moisture-conditioned structural fill should not be placed on frozen subgrade or allowed to freeze during moisture-conditioning and placement.

To verify the condition of the compacted soils, density tests should be performed during placement. The first density tests should be conducted when 24 inches of fill have been placed.

The existing soils will require the addition of water to achieve the required moisture content. The fill soils should be thoroughly mixed or disked to provide uniform moisture content through the fill. It should be noted that clay and claystone materials compacted at the above moisture contents are likely to result in wet, slick conditions. We recommend that the excavation contractor retained to perform this work have significant experience processing sub-excavation and moisture-conditioned soils.

Frequent moisture content and density tests shall be performed in the field to verify conformance with the above specifications. Furthermore, representative samples of the moisture-conditioned fill shall be obtained by personnel of RMG on a daily basis for follow-up swell testing to demonstrate that the swell potential has been reduced to not more than 1 percent swell when saturated under a 1,000 psf surcharge pressure. Areas where the follow-up swell tests indicate swells higher than that value shall have the fill material removed, reprocessed, recompacted, and retested.

RMG should be contacted a minimum of 3 days prior to initiation of sub-excavation and moisture conditioning processes in order to schedule appropriate field services. Fill shall not be placed on frozen subgrade or allowed to freeze during processing. The time of the year when night temperatures are above freezing are the most optimal period for a sub-excavation operation.

Following completion of the sub-excavation and moisture conditioning process, it is imperative that the "as-compacted" moisture content be maintained prior to construction and establishment of landscape irrigation. This may require reprocessing of materials and addition of supplemental water to prevent remobilization of swell potential within the fill.

14.0 DETENTION STORAGE CRITERIA

This section has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC), the Engineering Criteria Manual (ECM) Section 2.2.6 and Appendix C.3.2.B, and the El Paso County (EPC) Drainage Criteria Manual, Volume 1 Section 11.3.3.

14.1 Soil and Rock Design Parameters

Test borings TB-12, TB-13, TB-39, and TB-40 were located in the general vicinity of the proposed detention pond. RMG has performed laboratory tests of soil from across the proposed development. Based upon field and laboratory testing, the following soil and rock parameters are typical for the soils likely to be encountered, and are recommended for use in detention pond embankment design.

Soil Description	Unit Weight (lb/ft^3)	Friction Angle (degree)	Active Earth Pressure, Ka	Passive Earth Pressure, Kp	At Rest Earth Pressure, Ko
Lean Clay and Claystone with Sand (CL)	105	20	0.490	2.040	0.658
High Plasticity Clay and Claystone (CH)	105	17	0.548	1.826	0.708

14.2 Detention Pond Considerations

Based on a review of the preliminary AutoCAD drawings provided by Matrix and Core Engineering, the proposed detention pond is to be excavated to depths ranging between 0.4 to 13.3 feet below the surrounding ground surface. As such, above-ground embankment construction is not anticipated. Likewise, impounded stormwater runoff is not anticipated to be stored above the natural ground surface. Detention pond side slopes are to be constructed with a maximum 3:1 slope. Side slopes should be constructed in accordance with applicable sections of the El Paso County Engineering Criteria Manual, the El Paso County Drainage Criteria Manual, and the El Paso County Land Development Code.

and embankment raised up to 15' (west pond), 4' on east pond

15.0 ADDITIONAL STUDIES

The findings, conclusions and recommendations presented in this report were provided to evaluate the suitability of the site for future development. Unless indicated otherwise, the test borings, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction. We recommend that a *lot-specific* subsurface soil investigation be performed for the proposed structures. The extent of any fill soils encountered during the lot-specific investigation(s) should be evaluated for suitability to support the proposed structures prior to construction. Additionally, the groundwater conditions encountered in the lot-specific investigation should be evaluated to determine the feasibility of basement construction on that lot.

The lot-specific subsurface soil investigations should consider the proposed structure type, anticipated foundation loading conditions, location within the property, and local construction methods. Recommendations resulting from the investigations should be used for design and confirmed by on-site observation and testing during development and construction.

16.0 CONCLUSIONS

Based upon our evaluation of the geologic conditions, it is our opinion that the proposed development is feasible. The geologic conditions identified (expansive soils and bedrock, faults, seismicity, and radon) are not considered unusual for the Front Range region of Colorado. Mitigation of geologic conditions is most effectively accomplished by avoidance. However, where avoidance is not a practical or acceptable alternative, geologic conditions should be mitigated by implementing appropriate planning, engineering, and local construction practices.

In addition to the previously identified mitigation alternatives, surface and subsurface drainage systems should be implemented. Exterior, perimeter foundation drains should be installed around below-grade habitable or storage spaces. Surface water should be efficiently removed from the building area to prevent ponding and infiltration into the subsurface soil.

The foundation systems for the proposed single family structures should be designed and constructed based upon recommendations developed in a site-specific subsurface soil investigation.

Foundation selection and design should consider the potential for subsurface expansive soil-related movements. Mitigation techniques commonly used in the El Paso County area include overexcavation and replacement with structural fill, sub-excavation and replacement with on-site moisture-conditioned soils, and/or the installation of deep foundation systems all of which are considered common construction practices for this area.

We believe the clay and claystone will classify as Type B as defined by OSHA in 29CFR Part 1926, date January 2, 1990. OSHA requires temporary slopes made in Type B materials be laid back at ratios no steeper than 1:1 (horizontal to vertical) unless the excavation is shored or braced. Flatter slopes will likely be necessary should groundwater conditions occur.

Long term cut slopes in the upper soil should be limited to no steeper than 3:1 (horizontal to vertical). Flatter slopes will likely be necessary should groundwater conditions occur. It is recommended that long term fill slopes be no steeper than 3:1 (horizontal to vertical).

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

17.0 CLOSING

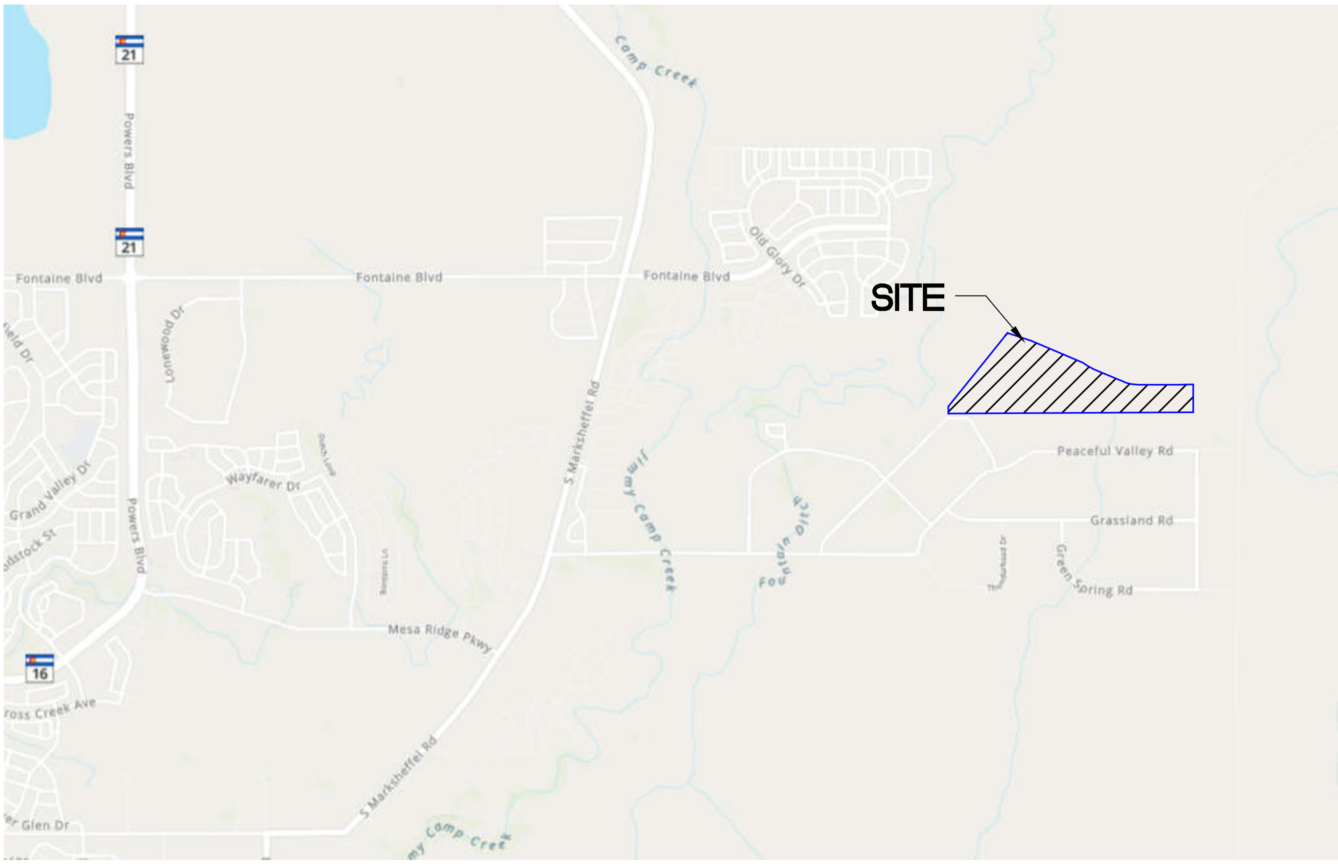
This report is for the exclusive purpose of providing geologic hazards information and preliminary geotechnical engineering recommendations. The scope of services did not include, either specifically or by implication, evaluation of wild fire hazards, environmental assessment of the site, or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to, biological or toxicological issues, are beyond the scope of this report. If the owner is concerned about the potential for such contamination or conditions, other studies should be undertaken.

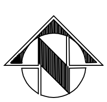
This report has been prepared for **Lorson Ranch Metropolitan District No. 1** in accordance with generally accepted geotechnical engineering and engineering geology practices. The conclusions and recommendations in this report are based in part upon data obtained from review of available topographic and geologic maps, review of available reports of previous studies conducted in the site vicinity, a site reconnaissance, and research of available published information, soil test borings, soil laboratory testing, and engineering analyses. The nature and extent of variations may not become evident until construction activities begin. If variations then become evident, RMG should be retained to re-evaluate the recommendations of this report, if necessary.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied, is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

If we can be of further assistance in discussing the contents of this report or analysis of the proposed development, from a geotechnical engineering point-of-view, please feel free to contact us.

FIGURES





NOT TO SCALE
BASE MAP PROVIDED BY MAPQUEST

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Englewood, CO 80112
(303) 688-9475
Northern Office:
Greeley / Evans, CO 80620
(970) 330-1071

SITE VICINITY MAP

HILLSIDE AT LORSON RANCH
"AREA I"
EL PASO COUNTY, CO
LORSON RANCH METRO DIST. NO. 1

JOB No. 181988

FIG No. 1

DATE 1-3-2022

JOB No. 181988

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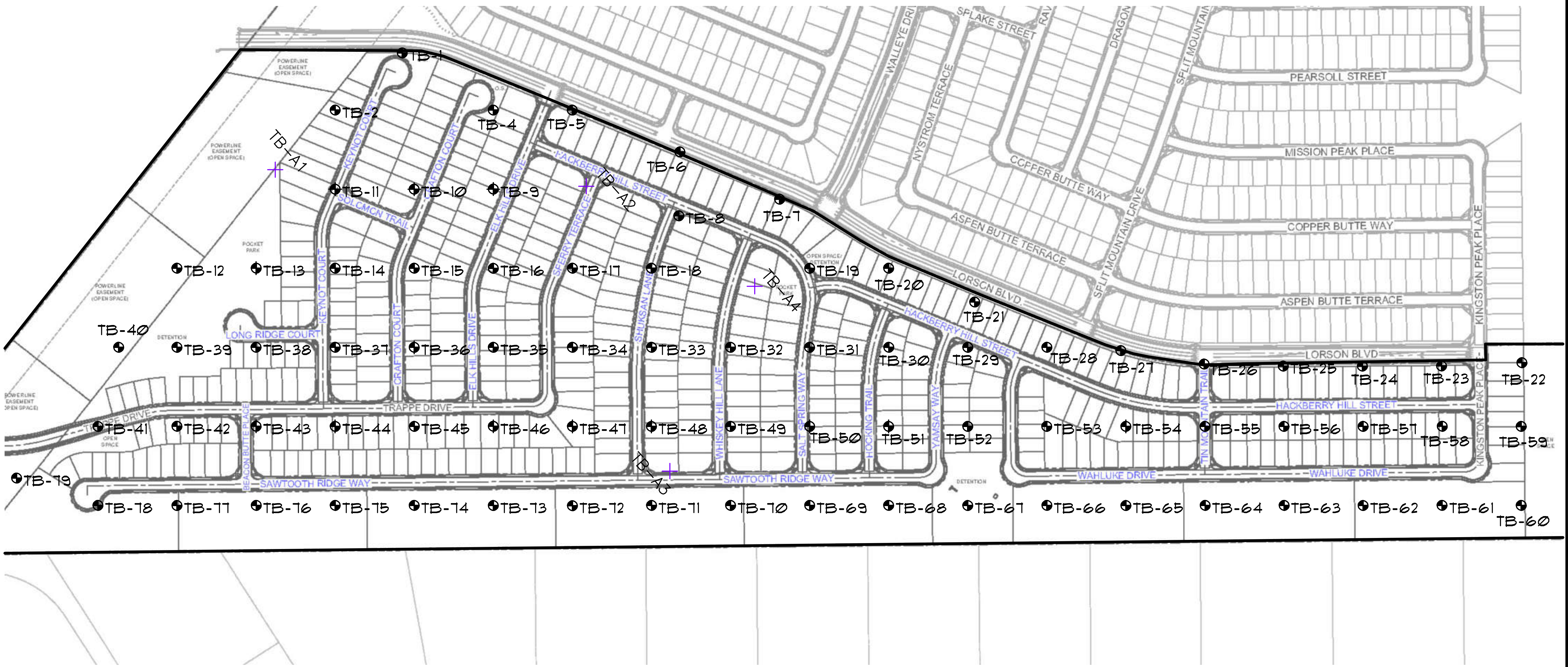
(719) 687-6077
Monument Office:
(719) 488-2145
Pueblo / Canon City:
(719) 544-7750



REFERENCE
NOT TO SCALE

DENOTES APPROXIMATE LOCATION OF TEST BORING

HILLSIDE AT LORSON RANCH, "AREA I"
EL PASO COUNTY, CO
LORSON RANCH METRO DIST. NO. 1

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	
REVISION:	DATE: JOB #:

PROPOSED LOT LAYOUT WITH TEST BORING LOCATIONS

SHEET No.
FIG-2

SOILS DESCRIPTION

CLAYSTONE

FILL: CLAY, SANDY

SANDY CLAY

UNLESS NOTED OTHERWISE, ALL LABORATORY
TESTS PRESENTED HEREIN WERE PERFORMED BY:
RMG - ROCKY MOUNTAIN GROUP
2910 AUSTIN BLUFFS PARKWAY
COLORADO SPRINGS, COLORADO

SYMBOLS AND NOTES

XX — STANDARD PENETRATION TEST - MADE BY DRIVING A SPLIT-BARREL SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).

XX — UNDISTURBED CALIFORNIA SAMPLE - MADE BY DRIVING A RING-LINED SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-3550. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).

FREE WATER TABLE

DEPTH AT WHICH BORING CAVED

BULK — DISTURBED BULK SAMPLE

AUG — AUGER "CUTTINGS"

4.5 — WATER CONTENT (%)

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EXPLANATION OF TEST BORING LOGS

JOB No. 181988

FIGURE No. 3

DATE Jan/03/2022

TEST BORING: 1

DATE DRILLED: 3/19/21

NO GROUNDWATER ON 3/19/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAY, SANDY, brown, stiff to hard, moist	0 – 14	Clay, sandy	4 – 5	18	7.0
			9 – 10	50/11"	8.2
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	14 – 19.7	Claystone, sandy	14 – 14.7	50/8"	11.5
			19 – 19.7	50/8"	10.8

TEST BORING: 2

DATE DRILLED: 3/19/21

NO GROUNDWATER ON 3/19/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAY, SANDY, brown, hard, moist	0 – 9	Clay, sandy	4 – 5	50	7.5
CLAYSTONE, SANDY, brown, with rust staining, hard to very hard, moist	9 – 14.4	Claystone, sandy	9 – 9.5	50/6"	10.6
			14 – 14.4	50/5"	11.6

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TEST BORING LOG

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FIGURE No. 4

DATE Jan/03/2022

TEST BORING: 4

DATE DRILLED: 3/16/21

NO GROUNDWATER ON 3/16/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAY, SANDY, light brown to brown, with rust staining, hard, moist	0–5		4–5	42	11.9
CLAYSTONE, SANDY, light brown to brown, with rust staining, hard, moist	5–14.5		9.5	50/6"	11.6
			14.5	50/6"	11.3

TEST BORING: 5

DATE DRILLED: 3/16/21

NO GROUNDWATER ON 3/16/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAY, SANDY, brown, with rust staining, very stiff, moist	0–5		4–5	27	9.8
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	5–19		9.5	50/9"	11.6
			14.5	50/6"	9.0
			19	10/0"	9.9

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TEST BORING LOG

JOB No. 181988

FIGURE No. 5

DATE Jan/03/2022

TEST BORING: **6** DATE DRILLED: 3/16/21 NO GROUNDWATER ON 3/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, hard, moist				38	13.6
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	5			50/6"	14.6
	10			50/9"	12.8
	15			50/6"	11.6
	20				

TEST BORING: **7** DATE DRILLED: 3/16/21 NO GROUNDWATER ON 3/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, hard, moist				50	14.5
CLAYSTONE, SANDY, brown, with rust staining, hard, moist	5			50/6"	14.3
	10			50/6"	13.5
	15				

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TEST BORING LOG

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FIGURE No. 6

DATE Jan/03/2022

TEST BORING: **8** DATE DRILLED: 3/16/21 NO GROUNDWATER ON 3/16/21	DEPTH (FT)	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	4–4.7		50/8"	17.8
	9–9.75		50/9"	16.0
	14–14.5		50/6"	14.9
	19–19.5		50/6"	10.4

TEST BORING: **9** DATE DRILLED: 3/16/21 NO GROUNDWATER ON 3/16/21	DEPTH (FT)	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	4–5		17	9.0
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	9–9.8		50/10"	9.2
	14–14.75		50/9"	10.6
	19–19.5		50/6"	9.5

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TEST BORING LOG

JOB No. 181988

FIGURE No. 7

DATE Jan/03/2022

TEST BORING: **10** DATE DRILLED: 3/16/21 NO GROUNDWATER ON 3/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, hard, moist	5			31	12.6
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	10			50/7"	12.3
	15			50/6"	12.2
	20			50/6"	11.3

TEST BORING: **11** DATE DRILLED: 3/19/21 NO GROUNDWATER ON 3/19/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to dark brown, with rust staining, medium hard to hard, moist	5			50/7"	13.2
	10			50/6"	10.9
	15			50/6"	11.4
	20			10/0"	11.0

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TEST BORING LOG

JOB No. 181988

FIGURE No. 8

DATE Jan/03/2022

TEST BORING: **12** DATE DRILLED: 3/19/21 NO GROUNDWATER ON 3/19/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	0–5			19	10.9
CLAYSTONE, SANDY, brown to dark brown, with rust staining, medium hard to hard, moist	5–20			50/9"	12.1
				50/10"	9.6
				50/8"	12.8

TEST BORING: **13** DATE DRILLED: 3/19/21 NO GROUNDWATER ON 3/19/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, stiff to very stiff, moist	0–12			11	8.1
				20	8.0
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	12–20			50/10"	11.8
				50/8"	11.7

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TEST BORING LOG

JOB No. 181988

FIGURE No. 9

DATE Jan/03/2022

TEST BORING: 14

DATE DRILLED: 3/19/21

NO GROUNDWATER ON 3/19/21

DEPTH (FT)	DESCRIPTION	BLOWS PER FT.	WATER CONTENT %
0 – 12	CLAY, SANDY, brown, with rust staining, very stiff, moist		
5		27	8.4
10		23	13.7
12 – 19.5	CLAYSTONE, SANDY, brown to dark brown, with rust staining, hard to very hard, moist		
15		50/6"	10.5
20		50/6"	11.9

TEST BORING: 15

DATE DRILLED: 3/19/21

NO GROUNDWATER ON 3/19/21

DEPTH (FT)	DESCRIPTION	BLOWS PER FT.	WATER CONTENT %
0 – 17	CLAY, SANDY, brown, stiff to very stiff, moist		
5		13	8.4
10		20	9.4
15		27	10.0
17 – 19.75	CLAYSTONE, SANDY, brown, with rust staining, medium hard, moist		
20		50/9"	10.9

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TEST BORING LOG

JOB No. 181988

FIGURE No. 10

DATE Jan/03/2022

TEST BORING: **16** DATE DRILLED: 3/19/21 NO GROUNDWATER ON 3/19/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to dark brown, with rust staining, hard to very hard, moist					
	5			50/11"	11.0
	10			50/6"	12.5
	15			50/5"	11.9
	20			50/6"	13.3

TEST BORING: **17** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist					
	5			28	9.4
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist					
	10			50	11.1
	15			50/5"	11.6
	20			50/5"	12.3

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TEST BORING LOG

JOB No. 181988

FIGURE No. 11

DATE Jan/03/2022

TEST BORING: **18** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, moist					
CLAYSTONE, SANDY, olive, with rust staining, hard to very hard, moist	4			50/6"	10.1
	9			50/8"	9.3
	14			50/5"	12.3
	19			50/7"	18.9

TEST BORING: **19** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, with rust staining, hard to medium hard to very hard, moist	4			50/11"	16.1
	9			50/8"	16.8
	14			50/7"	16.4
	19			50/5"	12.0

Depth scale: 5, 10, 15, 20

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TEST BORING LOG

JOB No. 181988

FIGURE No. 12

DATE Jan/03/2022

TEST BORING: **20** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist	5			50/11"	11.7
	10			50/5"	13.3
	15			50/5"	12.9

TEST BORING: **21** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist	5			50/10"	10.4
	10			50/6"	9.4
	15			50/5"	11.6
	20			50/7"	11.7

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TEST BORING LOG

JOB No. 181988

FIGURE No. 13

DATE Jan/03/2022

TEST BORING: **22**

DATE DRILLED: 3/24/21

NO GROUNDWATER ON 3/24/21

DESCRIPTION	DEPTH (FT)	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, very stiff, moist	5		24	9.1
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	10		50/9"	7.9
	15		50/8"	9.1
	20		50/5"	7.8

TEST BORING: **23**

DATE DRILLED: 3/24/21

NO GROUNDWATER ON 3/24/21

DESCRIPTION	DEPTH (FT)	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, stiff to very stiff, moist	5		13	8.8
	10		18	8.5
	15		24	9.1
CLAYSTONE, SANDY, brown, with rust staining, medium hard, moist	20		50/11"	8.5

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TEST BORING LOG

JOB No. 181988

FIGURE No. 14

DATE Jan/03/2022

TEST BORING: **24** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	5			24	9.2
CLAYSTONE, SANDY, brown, medium hard, moist	10			50/11"	8.8
	15			50/10"	7.9
	20			30	8.8

TEST BORING: **25** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, stiff to very stiff, moist	5			13	8.0
	10			22	7.9
CLAYSTONE, SANDY, brown, firm to medium hard, moist	15			50	8.3
	20			25	8.5

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TEST BORING LOG

JOB No. 181988

FIGURE No. 15

DATE Jan/03/2022

TEST BORING: **26** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, hard, moist	0–14				
	5			50	9.2
	10			34	9.6
CLAYSTONE, SANDY, brown, medium hard to hard, moist	14–20				
	15			50/10"	9.1
	20			50/11"	8.1

TEST BORING: **27** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	0–7				
	5			18	9.5
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	7–19.5				
	10			50/10"	12.5
	15			50/8"	11.1
	20			50/6"	12.1

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TEST BORING LOG

JOB No. 181988

FIGURE No. 16

DATE Jan/03/2022

TEST BORING: **28** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, light brown, hard to very hard, moist				50/7"	9.5
	5				
				50/6"	9.8
	10				
				50/5"	12.3
	15				

TEST BORING: **29** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, stiff to hard, moist				15	7.1
	5				
				50	12.6
	10				
				32	11.8
	15				
CLAYSTONE, SANDY, light brown, very hard, moist				50/6"	10.4
	20				

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TEST BORING LOG

JOB No. 181988

FIGURE No. 17

DATE Jan/03/2022

TEST BORING: **30**

DATE DRILLED: 3/23/21

NO GROUNDWATER ON 3/23/21

CLAYSTONE, SANDY, light brown, medium hard to hard, moist

DEPTH (FT)	BLOWS PER FT.	WATER CONTENT %
5	40	8.8
10	50/11"	10.0
15	50/8"	11.1
20	50/7"	12.4

TEST BORING: **31**

DATE DRILLED: 3/23/21

NO GROUNDWATER ON 3/23/21

CLAYSTONE, SANDY, brown, hard, moist

DEPTH (FT)	BLOWS PER FT.	WATER CONTENT %
5	50	13.0
10	50/6"	11.4
15	50/6"	10.6

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FIGURE No. 18

DATE Jan/03/2022

TEST BORING: **32** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, light brown to brown, medium hard to very hard, moist	5			44	9.4
	10			50/9"	10.2
	15			50/8"	12.5
	20			50/6"	12.3

TEST BORING: **33** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, stiff, moist	5			14	10.5
CLAYSTONE, SANDY, light brown, medium hard to hard, moist	10			36	7.1
	15			50/9"	13.4
	20			50/8"	11.9

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FIGURE No. 19

DATE Jan/03/2022

TEST BORING: **34** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	5			39	8.7
	10			20	9.5
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	15			50/8"	9.8
	20			50/8"	8.7

TEST BORING: **35** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, hard, moist	5			43	8.8
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	10			50	12.0
	15			50/11"	13.5
	20			50/11"	13.2

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TEST BORING LOG

JOB No. 181988

FIGURE No. 20

DATE Jan/03/2022

TEST BORING: **36** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown to brown, with rust staining, stiff to very stiff, moist					
	5			15	9.1
	10			35	9.2
	15			29	12.9
	20			32	14.1

TEST BORING: **37** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, stiff to very stiff, moist					
	5			18	13.9
	10			17	16.7
	15			22	18.7
CLAYSTONE, SANDY, brown, with rust staining, medium hard, moist	20			49	17.5

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TEST BORING LOG

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FIGURE No. 21

DATE Jan/03/2022

TEST BORING: **38** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, very stiff to stiff to hard, moist	5			29	13.5
	10			18	14.1
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	15			50	16.6
	20			50/7"	13.1

TEST BORING: **39** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, with rust staining, hard, moist	5			43	10.9
CLAYSTONE, SANDY, brown, with rust staining, hard to very hard, moist	10			50/6"	13.3
	15			50/5"	11.6

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TEST BORING LOG

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FIGURE No. 22

DATE Jan/03/2022

TEST BORING: 40

DATE DRILLED: 3/23/21
NO GROUNDWATER ON 3/23/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAY, SANDY, brown, with rust staining, hard, moist	0–8				
	5			43	9.6
CLAYSTONE, SANDY, brown, with rust staining, medium hard to hard, moist	8–20				
	10			50	10.7
	15			50/10"	13.1
	20			50/8"	11.3

TEST BORING: 41

DATE DRILLED: 3/23/21
NO GROUNDWATER ON 3/23/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAYSTONE, SANDY, brown, hard to very hard, moist	0–19.5				
	5			50/10"	13.0
	10			50/4"	11.2
	15			50/5"	9.9
	20			50/7"	14.7

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FIGURE No. 23

DATE Jan/03/2022

TEST BORING: **42** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to dark gray, hard to very hard, moist				50/9"	10.9
	5				
				50/7"	11.2
	10				
				50/4"	11.3
	15				
				50/5"	9.9
	20				

TEST BORING: **43** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff, moist				23	8.5
	5				
CLAYSTONE, SANDY, brown to olive, very hard, moist				50/5"	11.7
	10				
				50/3"	11.7
	15				

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TEST BORING LOG

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FIGURE No. 24

DATE Jan/03/2022

TEST BORING: **44** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff, moist					
	5			24	7.4
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist					
	10			50	10.8
	15			50/8"	12.2
				50/5"	10.7
	20				

TEST BORING: **45** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist					
	5			45	11.8
				50/6"	11.9
	10				
				50/4"	12.0
	15				

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FIGURE No. 25

DATE Jan/03/2022

TEST BORING: **46** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	5			27	9.6
CLAYSTONE, SANDY, brown to olive, firm to very hard, moist	10			44	10.4
	15			50/5"	11.2
	20			50/4"	12.0

TEST BORING: **47** DATE DRILLED: 3/23/21 NO GROUNDWATER ON 3/23/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist	5			50/11"	12.0
	10			50/3"	13.1
	15			50/3"	11.6

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TEST BORING LOG

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FIGURE No. 26

DATE Jan/03/2022

TEST BORING: **48** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive and dark gray, medium hard to very hard, moist					
	5			42	16.5
	10			50/6"	12.1
	15			50/6"	11.6
				50/4"	9.4
	20				

TEST BORING: **49** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive and dark gray, hard to very hard, moist					
	5			50	15.1
	10			50/5"	13.5
	15			50/5"	12.7
				50/4"	11.9
	20				

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TEST BORING LOG

JOB No. 181988

FIGURE No. 27

DATE Jan/03/2022

TEST BORING: 50

DATE DRILLED: 3/24/21
NO GROUNDWATER ON 3/24/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist	0–14.5				
	~4.5		■	50/9"	12.3
	~9.5		◣	50/3"	10.7
	~14.5		◣	50/3"	12.7

TEST BORING: 51

DATE DRILLED: 3/24/21
NO GROUNDWATER ON 3/24/21

Description	Depth (ft)	Symbol	Samples	Blows per ft.	Water content %
CLAY, SANDY, brown to olive, very stiff, moist	0–6				
	~4.5		■	19	6.6
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist	6–19.5				
	~9.5		◣	50/8"	8.7
	~14.5		■	50/8"	12.1
	~19		■	50/5"	11.1

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FIGURE No. 28

DATE Jan/03/2022

TEST BORING: **52** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown to olive, very stiff, moist	5			25	7.0
	10			24	10.1
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist	15			50/7"	10.0
	20			50/5"	12.2

TEST BORING: **53** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown to olive, stiff, moist	5			13	8.2
CLAYSTONE, SANDY, brown to olive, firm to very hard, moist	10			35	8.6
	15			50/9"	10.4
	20			50/6"	11.1

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FIGURE No. 29

DATE Jan/03/2022

TEST BORING: **54** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown to olive, very stiff, moist	5			19	8.3
CLAYSTONE, SANDY, brown to olive, medium hard to hard, moist	10			50/8"	9.5
	15			50/8"	10.7
	20			50/9"	11.6

TEST BORING: **55** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, stiff to very stiff to hard, moist	5			11	7.1
	10			23	7.8
	15			31	8.6
CLAYSTONE, SANDY, light brown, medium hard, moist	20			40	12.1

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FIGURE No. 30

DATE Jan/03/2022

TEST BORING: **56** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, stiff to hard, moist	5			13	8.0
	10			27	9.2
	15			31	8.9
	20			33	8.8

TEST BORING: **57** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, stiff to very stiff, moist	5			9	8.9
	10			15	8.7
	15			17	9.4
CLAYSTONE, SANDY, brown, with rust staining, medium hard, moist	20			50	9.9

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FIGURE No. 31

DATE Jan/03/2022

TEST BORING: **58** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, stiff to very stiff, moist					
	5			9	8.5
	10			15	8.9
	15			31	9.5
CLAYSTONE, SANDY, brown, with rust staining, medium hard, moist	20			34	11.3

TEST BORING: **59** DATE DRILLED: 3/24/21 NO GROUNDWATER ON 3/24/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist					
	5			19	9.1
	10			33	9.4
CLAYSTONE, SANDY, brown, with rust staining, medium hard to very hard, moist	15			50/10"	11.9
	20			50/7"	11.9

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TEST BORING LOG

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FIGURE No. 32

DATE Jan/03/2022

TEST BORING: **60** DATE DRILLED: 4/20/21 NO GROUNDWATER ON 4/20/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, stiff, moist					
	5			13	8.7
	10			17	8.9
	15				9.1
CLAYSTONE, SANDY, brown to olive, hard, moist				50/8"	11.7
	20				

TEST BORING: **61** DATE DRILLED: 4/20/21 NO GROUNDWATER ON 4/20/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown to brown to olive, very stiff, moist					
	5			24	9.4
	10			24	9.4
	15			26	9.7

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TEST BORING LOG

JOB No. 181988

FIGURE No. 33

DATE Jan/03/2022

TEST BORING: **62**

DATE DRILLED: 4/20/21
NO GROUNDWATER ON 4/20/21

DEPTH (FT)	DESCRIPTION	BLOWS PER FT.	WATER CONTENT %
0	CLAY, SANDY, light brown, medium stiff to stiff, moist		
5		7	10.9
10		14	9.4
14	CLAYSTONE, SANDY, brown to olive, medium hard, moist		
15			8.3
20		36	9.2

TEST BORING: **63**

DATE DRILLED: 4/20/21
NO GROUNDWATER ON 4/20/21

DEPTH (FT)	DESCRIPTION	BLOWS PER FT.	WATER CONTENT %
0	CLAY, SANDY, light brown, stiff to very stiff, moist		
5		10	9.1
10		22	6.8
13	CLAYSTONE, SANDY, dark brown, firm, moist		
15		45	12.4

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TEST BORING LOG

JOB No. 181988

FIGURE No. 34

DATE Jan/03/2022

TEST BORING: **64** DATE DRILLED: 4/20/21 NO GROUNDWATER ON 4/20/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, tan, very stiff, moist	5			19	8.2
	10			36	9.3
	15				9.1
CLAYSTONE, SANDY, brown to olive, hard, moist	20			50/8"	9.6

TEST BORING: **65** DATE DRILLED: NO GROUNDWATER ON	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, tan to olive, medium hard to very hard, moist	5			50	15.4
	10			50/6"	9.6
	15			50/5"	11.6

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TEST BORING LOG

JOB No. 181988

FIGURE No. 35

DATE Jan/03/2022

TEST BORING: 66
DATE DRILLED: 4/16/21
NO GROUNDWATER ON 4/16/21

DEPTH (FT)	DESCRIPTION	BLOWS PER FT.	WATER CONTENT %
0 – 17	CLAY, SANDY, light brown, very stiff, moist		
4–5		25	7.7
9–10		19	10.1
14–15			9.7
17 – 19.7	CLAYSTONE, SANDY, brown to olive, hard, moist		
19		50/8"	12.5

TEST BORING: 67
DATE DRILLED: 4/16/21
NO GROUNDWATER ON 4/16/21

DEPTH (FT)	DESCRIPTION	BLOWS PER FT.	WATER CONTENT %
0 – 15	CLAY, SANDY, light brown, very stiff, moist		
4–5		16	6.3
9–10		28	7.1
14–15		26	8.2

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TEST BORING LOG

JOB No. 181988

FIGURE No. 36

DATE Jan/03/2022

TEST BORING: **68** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff, moist	5			20	5.3
	10			18	8.7
CLAYSTONE, SANDY, brown to olive, very hard, moist	15				8.6
				10/0"	11.4

TEST BORING: **69** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist	5			35	8.5
	10			50/7"	11.7
				50/5"	11.6
	15				

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FIGURE No. 37

DATE Jan/03/2022

TEST BORING: **68** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff, moist	5			20	5.3
	10			18	8.7
CLAYSTONE, SANDY, brown to olive, very hard, moist	15				8.6
	20			10/0"	11.4

TEST BORING: **69** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist	5			35	8.5
	10			50/7"	11.7
	15			50/5"	11.6

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TEST BORING LOG

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FIGURE No. 37

DATE Jan/06/2022

TEST BORING: **70** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff to hard, moist					
	5			38	8.2
	10			31	8.8
	15				9.8
CLAYSTONE, SANDY, brown to olive, very hard, moist				50/6"	10.1
	20				

TEST BORING: **71** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist					
	5			50/10"	13.1
	10			50/9"	13.1
				50/5"	11.3
	15				

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TEST BORING LOG

JOB No. 181988

FIGURE No. 38

DATE Jan/06/2022

TEST BORING: **72**

DATE DRILLED: 4/16/21
NO GROUNDWATER ON 4/16/21

Description	DEPTH (FT)	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, medium hard to hard, moist	5		36	11.7
	10		50/8"	11.7
	15			12.3
	20		50/9"	10.3

TEST BORING: **73**

DATE DRILLED: 4/20/21
NO GROUNDWATER ON 4/20/21

Description	DEPTH (FT)	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, with gravel, brown to olive, stiff, moist	5		15	7.8
CLAYSTONE, SANDY, brown to olive, medium hard to hard, moist	10		50/9"	11.6
	15			12.5
	20		50/8"	13.6

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JOB No. 181988

FIGURE No. 39

DATE Jan/03/2022

TEST BORING: **74** DATE DRILLED: 4/20/21 NO GROUNDWATER ON 4/20/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, stiff, moist	5			14	8.8
CLAYSTONE, SANDY, brown to olive, firm to very hard,moist	10			29	12.6
					7.1
AUGER REFUSAL AT 13 FEET DUE TO VERY HARD BEDROCK					

TEST BORING: **75** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, hard, moist	5			50/9"	7.8
	10			50/6"	7.3
	15			50/8"	11.0

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TEST BORING LOG

JOB No. 181988

FIGURE No. 40

DATE Jan/03/2022

TEST BORING: **76** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist				50/11"	11.6
	5				
				50/6"	9.7
	10				
AUGER REFUSAL AT 12 FEET DUE TO VERY HARD BEDROCK					

TEST BORING: **77** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown to olive, hard to very hard, moist				50/8"	9.3
	5				
				50/8"	11.4
	10				
				50/5"	10.0
	15				
				50/5"	8.8
	20				

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TEST BORING LOG

JOB No. 181988

FIGURE No. 41

DATE Jan/03/2022

TEST BORING: **78** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff, moist					
	5			22	7.1
CLAYSTONE, SANDY, brown to olive, medium hard to very hard, moist					
	10			50/9"	11.7
	15			50/8"	12.1
	20			50/5"	11.7

TEST BORING: **79** DATE DRILLED: 4/16/21 NO GROUNDWATER ON 4/16/21	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, light brown, very stiff, moist					
	5			21	6.4
	10			22	8.4
CLAYSTONE, SANDY, brown to olive, hard, moist					
	15			50/11"	14.0
	20			50/9"	13.1

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TEST BORING LOG

JOB No. 181988

FIGURE No. 42

DATE Jan/03/2022

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
1	4.0	7.0								
1	9.0	8.2								
1	14.0	11.5	108.2						2.4	
1	19.0	10.8								
2	4.0	7.5								
2	9.0	10.6	105.5	38	20	0.0	94.0		1.7	CL
2	14.0	11.6								
4	4.0	11.9								
4	9.0	11.6								
4	14.0	11.3	118.4						1.1	
5	4.0	9.8								
5	9.0	11.6	126.6						4.7	
5	14.0	9.0								
5	19.0	9.9								
6	4.0	13.6								
6	9.0	14.6								
6	14.0	12.8	108.9						7.3	
6	19.0	11.6								
7	4.0	14.5								
7	9.0	14.3	113.6						3.7	
7	14.0	13.5								
8	4.0	17.8	104.0						- 1.1	
8	9.0	16.0								
8	14.0	14.9								
8	19.0	10.4								
9	4.0	9.0								
9	9.0	9.2								
9	14.0	10.6	129.3						7.6	
9	19.0	9.5								
10	4.0	12.6								
10	9.0	12.3								
10	14.0	12.2								
10	19.0	11.3								
11	4.0	13.2	108.4	38	24	1.4	85.2		- 0.6	CL

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SUMMARY OF LABORATORY TEST RESULTS

JOB No. 181988
FIGURE No. 43
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Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
11	9.0	10.9								
11	14.0	11.4								
11	19.0	11.0								
12	4.0	10.9								
12	9.0	12.1								
12	14.0	9.6	124.3						4.0	
12	19.0	12.8								
13	4.0	8.1								
13	9.0	8.0	104.5						0.6	
13	14.0	11.8								
13	19.0	11.7								
14	4.0	8.4								
14	9.0	13.7								
14	14.0	10.5	112.2						- 2.2	
14	19.0	11.9								
15	4.0	8.4								
15	9.0	9.4								
15	14.0	10.0								
15	19.0	10.9	115.1						5.3	
16	4.0	11.0								
16	9.0	12.5	120.2						1.0	
16	14.0	11.9								
16	19.0	13.3								
17	4.0	9.4								
17	9.0	11.1	114.0	41	27				1.4	
17	14.0	11.6								
17	19.0	12.3								
18	4.0	10.1								
18	9.0	9.3								
18	14.0	12.3	105.5						1.7	
18	19.0	18.9								
19	4.0	16.1								
19	9.0	16.8	111.5						0.4	
19	14.0	16.4								

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Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
19	19.0	12.0								
20	4.0	11.7								
20	9.0	13.3								
20	14.0	12.9	112.3						0.3	
21	4.0	10.4								
21	9.0	9.4	108.3						- 0.5	
21	14.0	11.6								
21	19.0	11.7								
22	4.0	9.1								
22	9.0	7.9	122.1						4.8	
22	14.0	9.1								
22	19.0	7.8								
23	4.0	8.8								
23	9.0	8.5								
23	14.0	9.1								
23	19.0	8.5	126.4						6.0	
24	4.0	9.2								
24	9.0	8.8								
24	14.0	7.9	123.7						6.3	
24	19.0	8.8								
25	4.0	8.0								
25	9.0	7.9	112.3						4.0	
25	14.0	8.3		38	25	0.0	88.7			CL
25	19.0	8.5								
26	4.0	9.2		39	25	0.0	88.9		- 3.2	CL
26	9.0	9.6								
26	14.0	9.1								
26	19.0	8.1								
27	4.0	9.5								
27	9.0	12.5								
27	14.0	11.1	114.1						0.8	
27	19.0	12.1								
28	4.0	9.5								
28	9.0	9.8								

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28	14.0	12.3		39	24		90.3		3.1	CL
29	4.0	7.1								
29	9.0	12.6	117.5						0.8	
29	14.0	11.8								
29	19.0	10.4								
30	4.0	8.8		44	31	0.0	93.2			CL
30	9.0	10.0								
30	14.0	11.1	128.6						6.3	
30	19.0	12.4								
31	4.0	13.0								
31	9.0	11.4	119.3						0.9	
31	14.0	10.6								
32	4.0	9.4								
32	9.0	10.2								
32	14.0	12.5	129.2						7.1	
32	19.0	12.3								
33	4.0	10.5								
33	9.0	7.1	113.6						0.1	
33	14.0	13.4								
33	19.0	11.9								
34	4.0	8.7	129.6						7.1	
34	9.0	9.5								
34	14.0	9.8								
34	19.0	8.7								
35	4.0	8.8								
35	9.0	12.0	119.2						4.8	
35	14.0	13.5								
35	19.0	13.2								
36	4.0	9.1								
36	9.0	9.2								
36	14.0	12.9	109.3						- 1.1	
36	19.0	14.1								
37	4.0	13.9								
37	9.0	16.7	111.1	36	22	0.0	89.6		0.0	CL

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FIGURE No. 43

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Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
37	14.0	18.7								
37	19.0	17.5								
38	4.0	13.5								
38	9.0	14.1	113.7						0.1	
38	14.0	16.6								
38	19.0	13.1								
39	4.0	10.9								
39	9.0	13.3								
39	14.0	11.6	118.0						2.5	
40	4.0	9.6	108.0						0.9	
40	9.0	10.7								
40	14.0	13.1								
40	19.0	11.3								
41	4.0	13.0								
41	9.0	11.2	118.1	41	25				0.2	
41	14.0	9.9								
41	19.0	14.7								
42	4.0	10.9								
42	9.0	11.2								
42	14.0	11.3	117.0						1.9	
42	19.0	9.9								
43	4.0	8.5								
43	9.0	11.7								
43	14.0	11.7	114.3						0.7	
44	4.0	7.4								
44	9.0	10.8	121.7	47	33	0.0	91.0		0.7	CL
44	14.0	12.2								
44	19.0	10.7								
45	4.0	11.8								
45	9.0	11.9								
45	14.0	12.0	120.6						2.2	
46	4.0	9.6								
46	9.0	10.4	119.5						- 8.4	
46	14.0	11.2								

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Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
46	19.0	12.0								
47	4.0	12.0								
47	9.0	13.1								
47	14.0	11.6	109.0	39	24	0.3	93.5		- 1.0	CL
48	4.0	16.5								
48	9.0	12.1	99.4						- 3.1	
48	14.0	11.6								
48	19.0	9.4								
49	4.0	15.1								
49	9.0	13.5								
49	14.0	12.7	112.3						0.8	
49	19.0	11.9								
50	4.0	12.3								
50	9.0	10.7	105.2						- 0.8	
50	14.0	12.7								
51	4.0	6.6								
51	9.0	8.7	108.0						- 3.3	
51	14.0	12.1								
51	19.0	11.1								
52	4.0	7.0	103.9	34	18		89.3		- 0.3	CL
52	9.0	10.1								
52	14.0	10.0								
52	19.0	12.2								
53	4.0	8.2								
53	9.0	8.6	112.1						2.6	
53	14.0	10.4								
53	19.0	11.1								
54	4.0	8.3								
54	9.0	9.5								
54	14.0	10.7	119.0						3.2	
54	19.0	11.6								
55	4.0	7.1								
55	9.0	7.8	99.6						- 4.6	
55	14.0	8.6								

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SUMMARY OF LABORATORY TEST RESULTS

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
55	19.0	12.1								
56	4.0	8.0								
56	9.0	9.2								
56	14.0	8.9	112.2						2.6	
56	19.0	8.8								
57	4.0	8.9								
57	9.0	8.7								
57	14.0	9.4								
57	19.0	9.9	125.5	40	23		91.2		3.4	CL
58	4.0	8.5								
58	9.0	8.9								
58	14.0	9.5	105.9						1.4	
58	19.0	11.3								
59	4.0	9.1								
59	9.0	9.4	111.0						0.0	
59	14.0	11.9								
59	19.0	11.9								
60	4.0	8.7								
60	9.0	8.9	87.8	33	17	0.0	90.8		- 0.6	CL
60	14.0	9.1								
60	19.0	11.7								
61	4.0	9.4								
61	9.0	9.4								
61	14.0	9.7	95.7						- 1.7	
62	4.0	10.9								
62	9.0	9.4								
62	14.0	8.3								
62	19.0	9.2								
63	4.0	9.1								
63	9.0	6.8								
63	14.0	12.4	110.9						2.7	
64	4.0	8.2								
64	9.0	9.3	99.7						- 2.9	
64	19.0	9.6								

SUMMARY OF LABORATORY TEST RESULTS

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
65	4.0	15.4								
65	9.0	9.6	92.7						- 0.4	
65	14.0	11.6								
66	4.0	7.7	98.1						- 0.5	
66	9.0	10.1								
66	14.0	9.7								
66	19.0	12.5								
67	4.0	6.3								
67	9.0	7.1	88.1	31	16	0.0	89.6		- 4.9	CL
67	14.0	8.2								
68	4.0	5.3								
68	9.0	8.7								
68	14.0	8.6		33	20	0.0	79.0			CL
68	19.0	11.4								
69	4.0	8.5								
69	9.0	11.7								
69	14.0	11.6	107.0						- 0.6	
70	4.0	8.2	91.8						- 1.4	
70	9.0	8.8								
70	14.0	9.8								
70	19.0	10.1								
71	4.0	13.1								
71	9.0	13.1								
71	14.0	11.3	112.1						0.4	
72	4.0	11.7								
72	9.0	11.7	118.7						1.8	
72	14.0	12.3								
72	19.0	10.3								
73	4.0	7.8								
73	9.0	11.6	114.0						- 1.7	
73	14.0	12.5								
73	19.0	13.6								
74	4.0	8.8								
74	9.0	12.6		37	26	0.0	80.5			CL

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SUMMARY OF LABORATORY TEST RESULTS

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
74	12.0	7.1								
75	4.0	7.8								
75	9.0	7.3	103.5						- 2.2	
75	14.0	11.0								
76	4.0	11.6	100.5						- 1.3	
76	9.0	9.7								
76	14.0	9.4								
77	4.0	9.3								
77	9.0	11.4								
77	14.0	10.0	119.4	35	23	0.0	80.5		1.2	CL
77	19.0	8.8								
78	4.0	7.1								
78	9.0	11.7	114.0						2.8	
78	14.0	12.1								
78	19.0	11.7								
79	4.0	6.4	101.1						- 4.5	
79	9.0	8.4								
79	14.0	14.0								
79	19.0	13.1								

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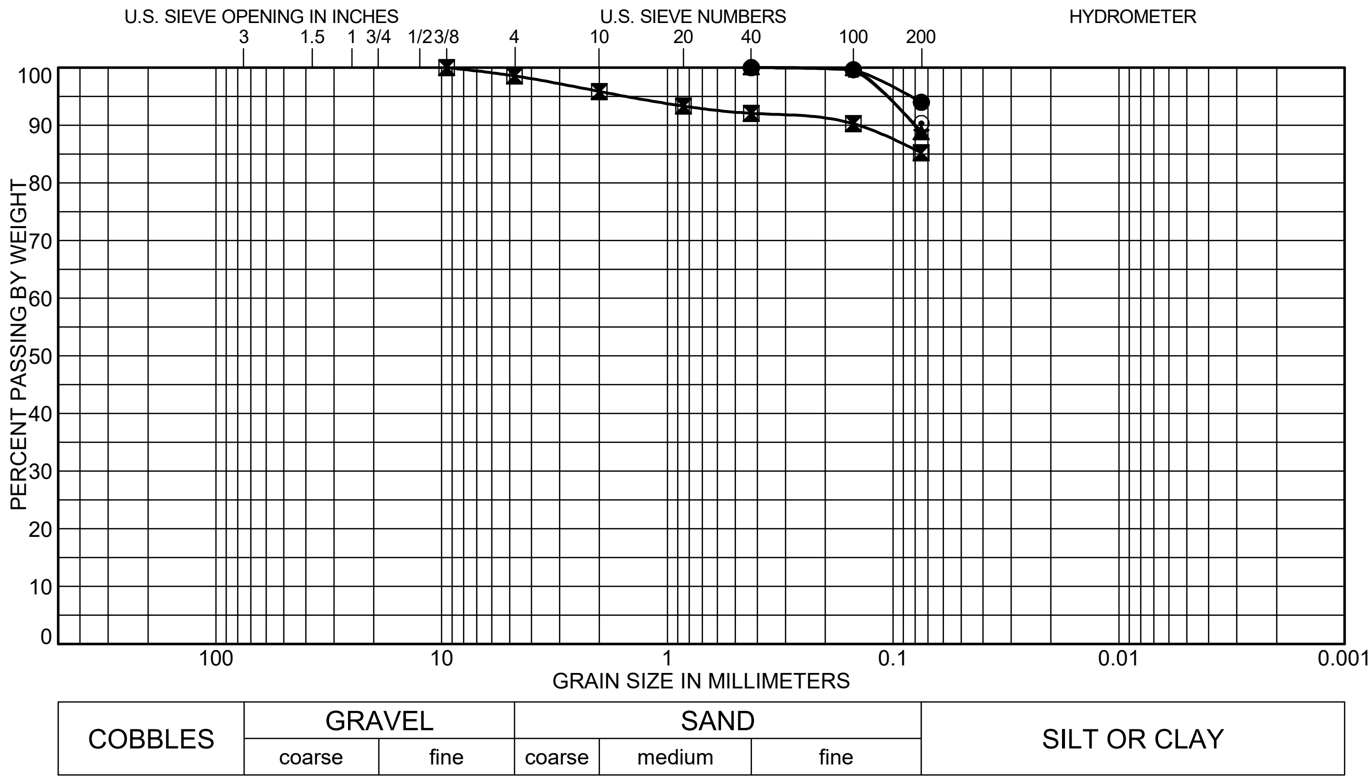
SUMMARY OF LABORATORY TEST RESULTS



	Test Boring	Depth (ft)	Classification	LL	PL	PI
●	**2**	**9.0**	**LEAN CLAY(CL)**	**38**	**18**	**20**
⧗	**11**	**4.0**	**LEAN CLAY(CL)**	**38**	**14**	**24**
▲	**25**	**14.0**	**LEAN CLAY(CL)**	**38**	**13**	**25**
★	**26**	**4.0**	**LEAN CLAY(CL)**	**39**	**14**	**25**
⊙	**28**	**14.0**	**LEAN CLAY(CL)**	**39**	**15**	**24**

	Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
●	**2**	**9.0**	**0.0**	**6.0**	**94.0**	
⧗	**11**	**4.0**	**1.4**	**13.3**	**85.2**	
▲	**25**	**14.0**	**0.0**	**11.3**	**88.7**	
★	**26**	**4.0**	**0.0**	**11.1**	**88.9**	
⊙	**28**	**14.0**			**90.3**	

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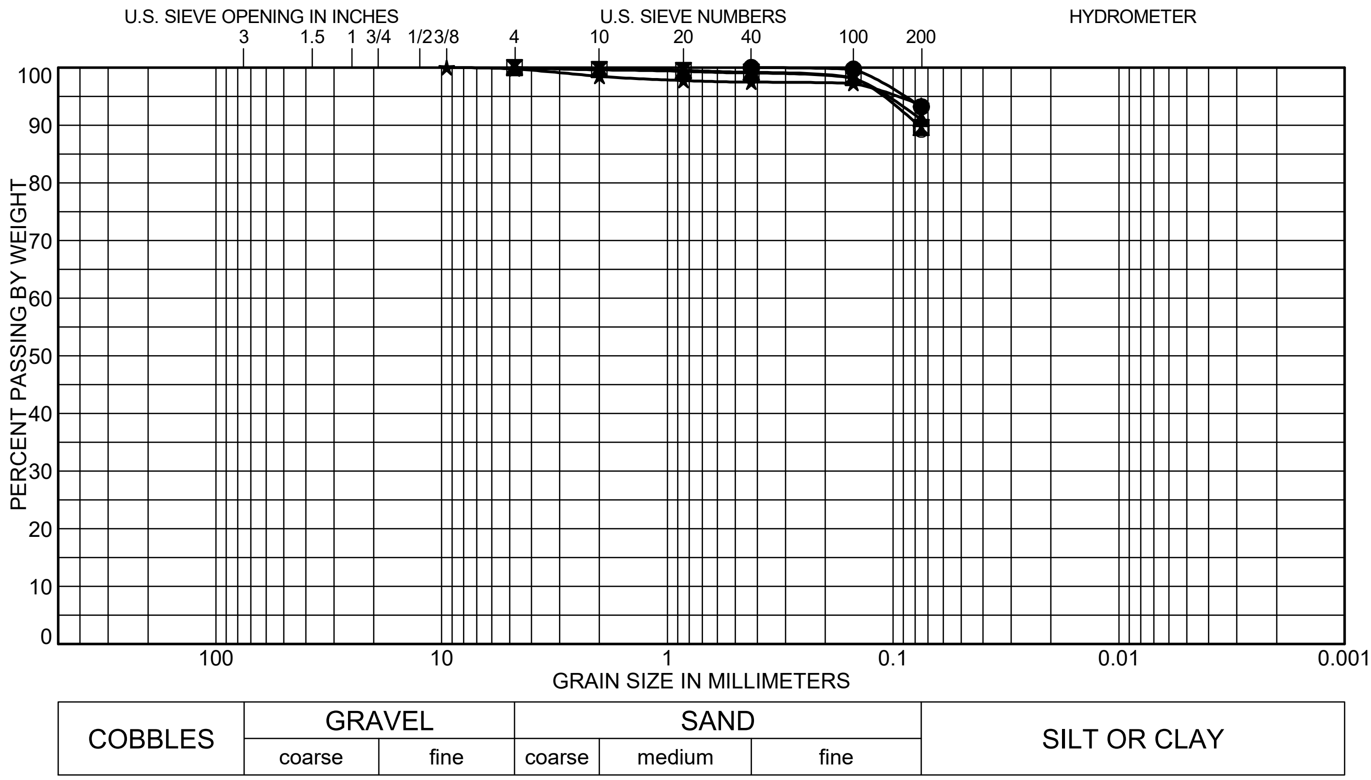
SOIL CLASSIFICATION DATA

JOB No. 181988

FIGURE No. 44

DATE Jan/03/2022



	Test Boring	Depth (ft)	Classification	LL	PL	PI
●	**30**	**4.0**	**LEAN CLAY(CL)**	**44**	**13**	**31**
⧗	**37**	**9.0**	**LEAN CLAY(CL)**	**36**	**14**	**22**
▲	**44**	**9.0**	**LEAN CLAY(CL)**	**47**	**14**	**33**
★	**47**	**14.0**	**LEAN CLAY(CL)**	**39**	**15**	**24**
⊙	**52**	**4.0**	**LEAN CLAY(CL)**	**34**	**16**	**18**

	Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
●	**30**	**4.0**	**0.0**	**6.8**	**93.2**	
⧗	**37**	**9.0**	**0.0**	**10.4**	**89.6**	
▲	**44**	**9.0**	**0.0**	**9.0**	**91.0**	
★	**47**	**14.0**	**0.3**	**6.3**	**93.5**	
⊙	**52**	**4.0**			**89.3**	

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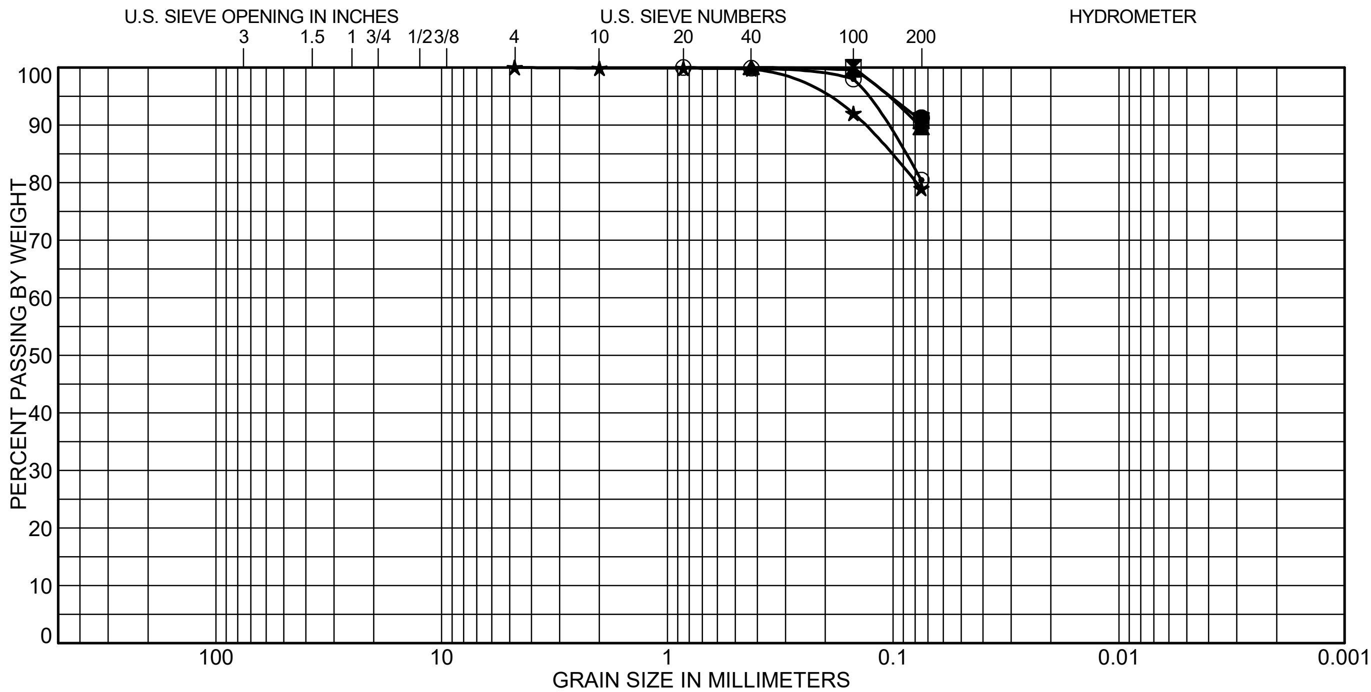
SOIL CLASSIFICATION DATA

JOB No. 181988

FIGURE No. 45

DATE Jan/03/2022



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Test Boring	Depth (ft)	Classification	LL	PL	PI
●	**57**	**19.0**	**LEAN CLAY(CL)**	**40**	**17**	**23**
⧗	**60**	**9.0**	**LEAN CLAY(CL)**	**33**	**16**	**17**
▲	**67**	**9.0**	**LEAN CLAY(CL)**	**31**	**15**	**16**
★	**68**	**14.0**	**LEAN CLAY with SAND(CL)**	**33**	**13**	**20**
⊙	**74**	**9.0**	**LEAN CLAY with SAND(CL)**	**37**	**11**	**26**

	Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
●	**57**	**19.0**			**91.2**	
⧗	**60**	**9.0**	**0.0**	**9.2**	**90.8**	
▲	**67**	**9.0**	**0.0**	**10.4**	**89.6**	
★	**68**	**14.0**	**0.0**	**21.0**	**79.0**	
⊙	**74**	**9.0**	**0.0**	**19.5**	**80.5**	

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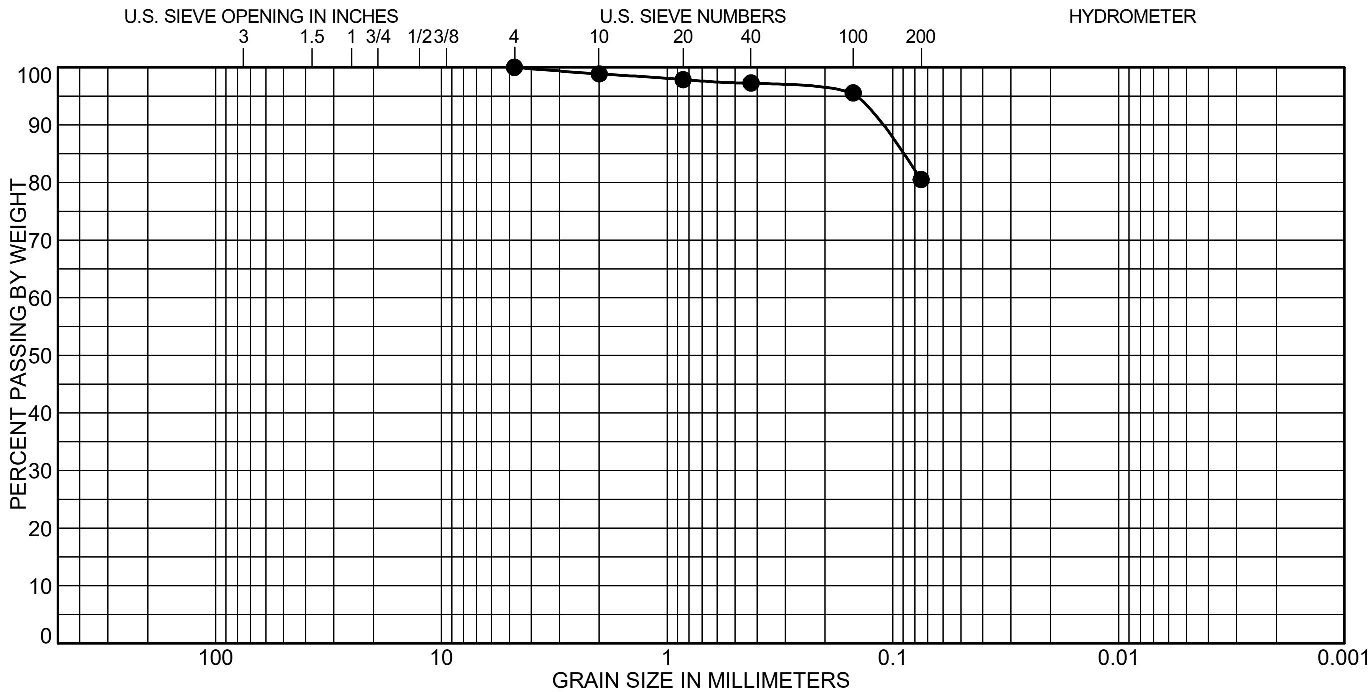
SOIL CLASSIFICATION DATA

JOB No. 181988

FIGURE No. 46

DATE Jan/03/2022



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Test Boring	Depth (ft)	Classification	LL	PL	PI
●	**77**	**14.0**	**LEAN CLAY with SAND(CL)**	**35**	**12**	**23**

	Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
●	**77**	**14.0**	**0.0**	**19.5**	**80.5**	

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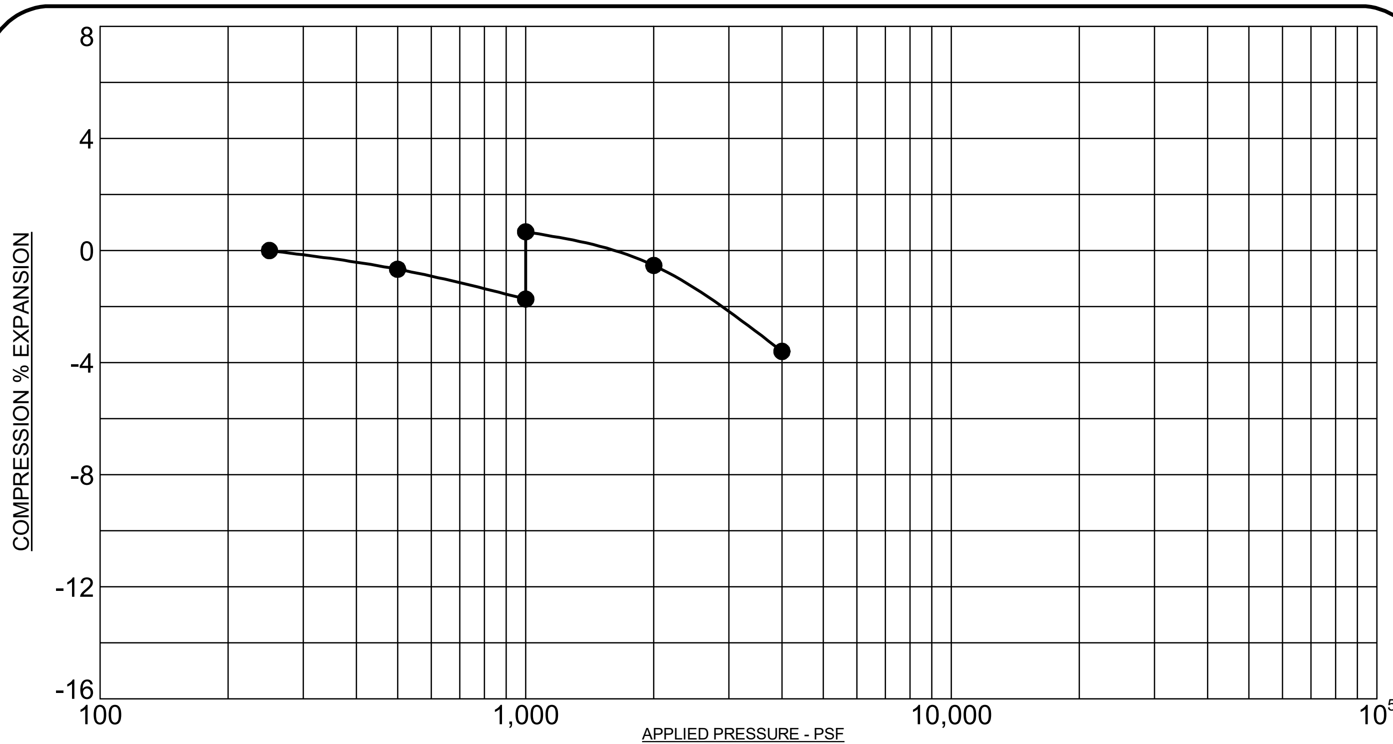
SOIL CLASSIFICATION DATA

JOB No. 181988

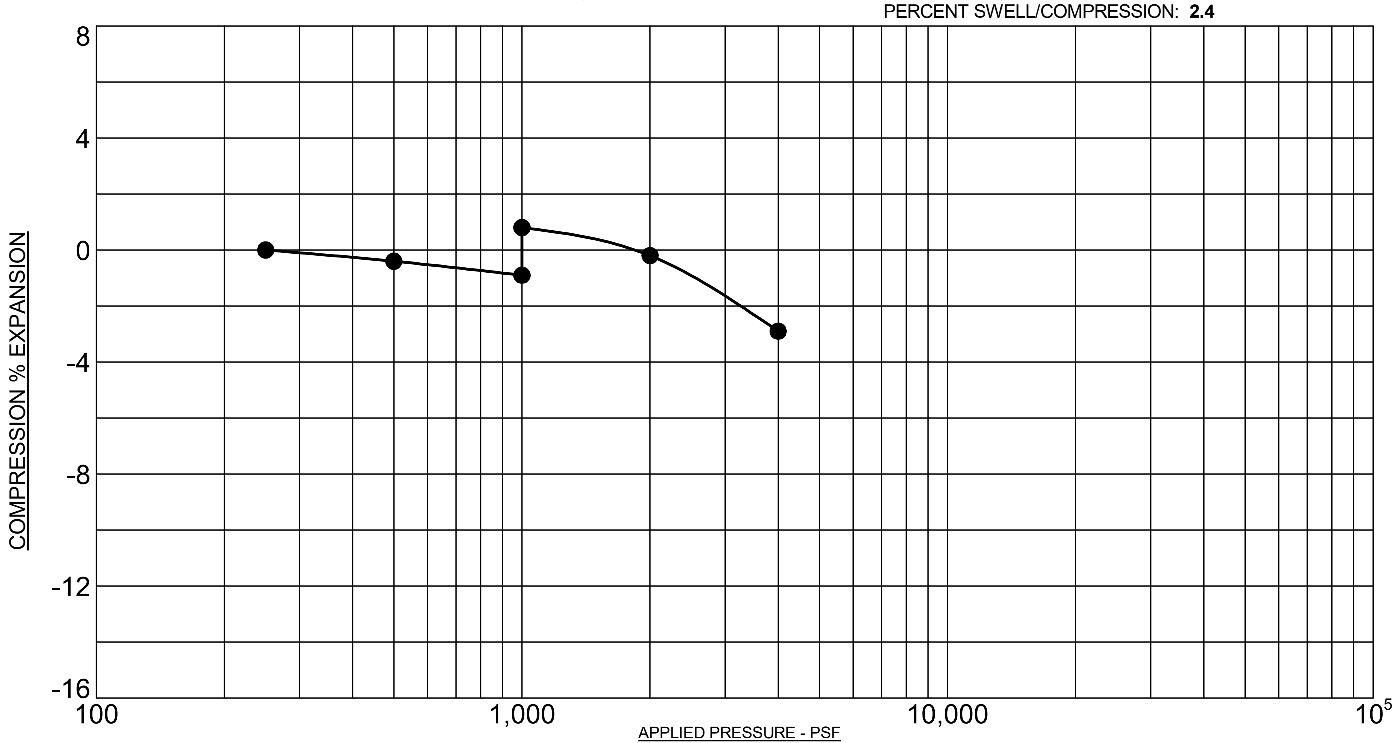
FIGURE No. 47

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **1 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **108.2 PCF**
NATURAL MOISTURE CONTENT: **11.5%**
PERCENT SWELL/COMPRESSION: **2.4**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **2 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **105.5 PCF**
NATURAL MOISTURE CONTENT: **10.6%**
PERCENT SWELL/COMPRESSION: **1.7**

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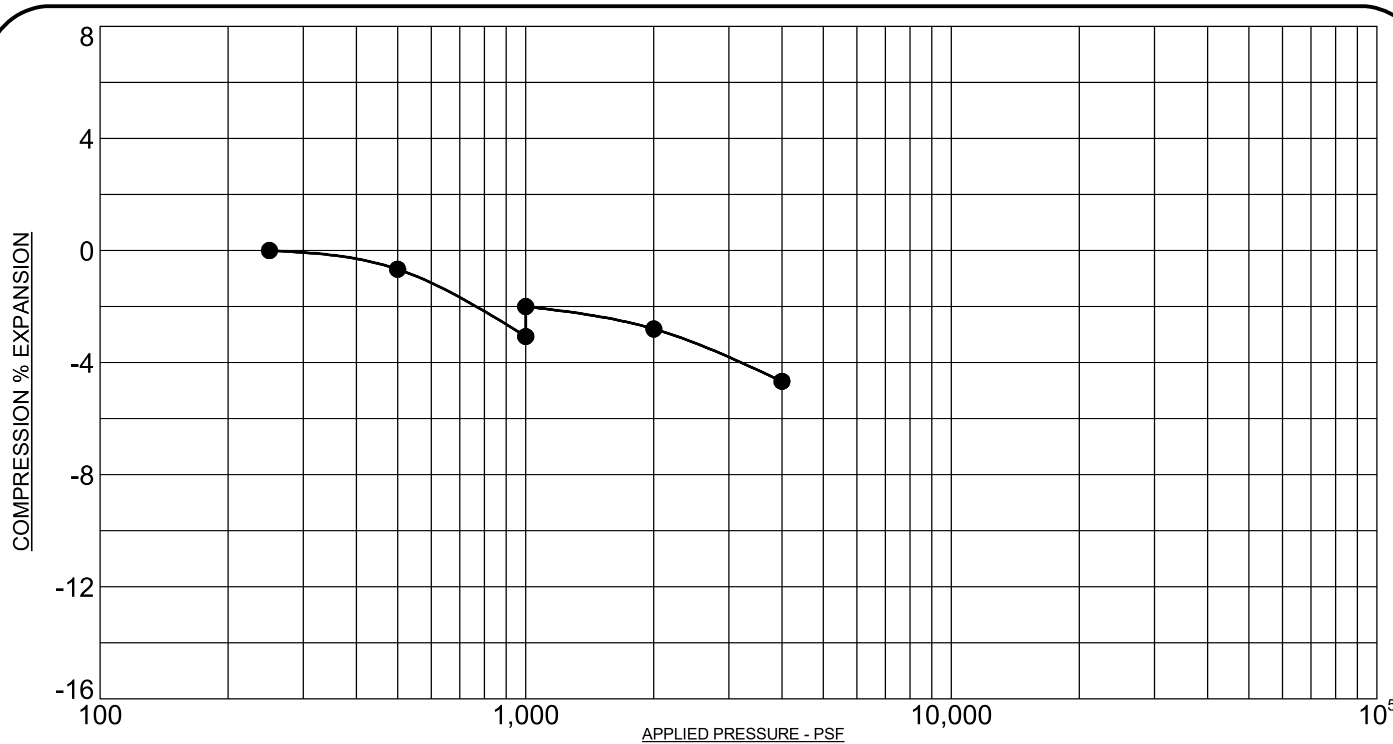
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

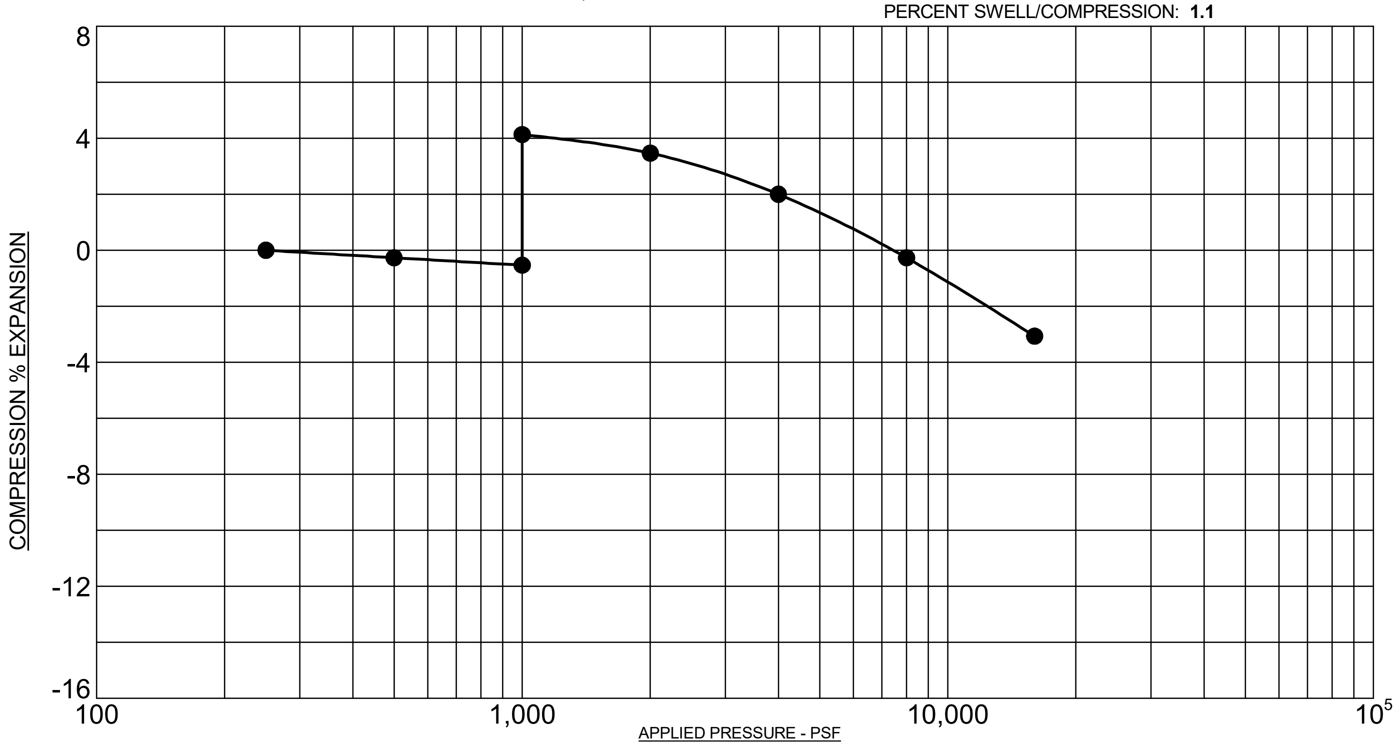
FIGURE No. 48

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **4 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **118.4 PCF**
NATURAL MOISTURE CONTENT: **11.3%**
PERCENT SWELL/COMPRESSION: **1.1**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **5 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **126.6 PCF**
NATURAL MOISTURE CONTENT: **11.6%**
PERCENT SWELL/COMPRESSION: **4.7**

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SWELL/CONSOLIDATION TEST RESULTS

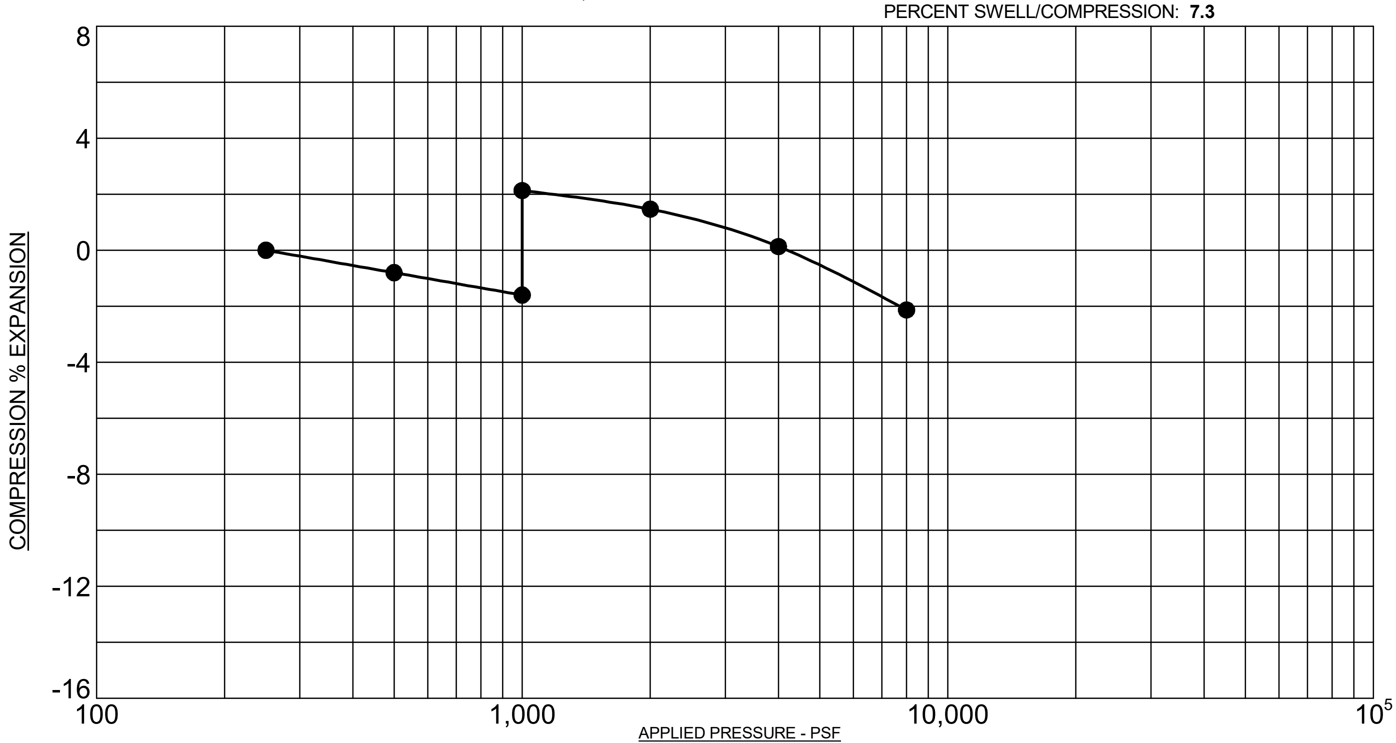
JOB No. 181988

FIGURE No. 49

DATE Jan/03/2022

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **6 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **108.9 PCF**
NATURAL MOISTURE CONTENT: **12.8%**
PERCENT SWELL/COMPRESSION: **7.3**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **7 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **113.6 PCF**
NATURAL MOISTURE CONTENT: **14.3%**
PERCENT SWELL/COMPRESSION: **3.7**

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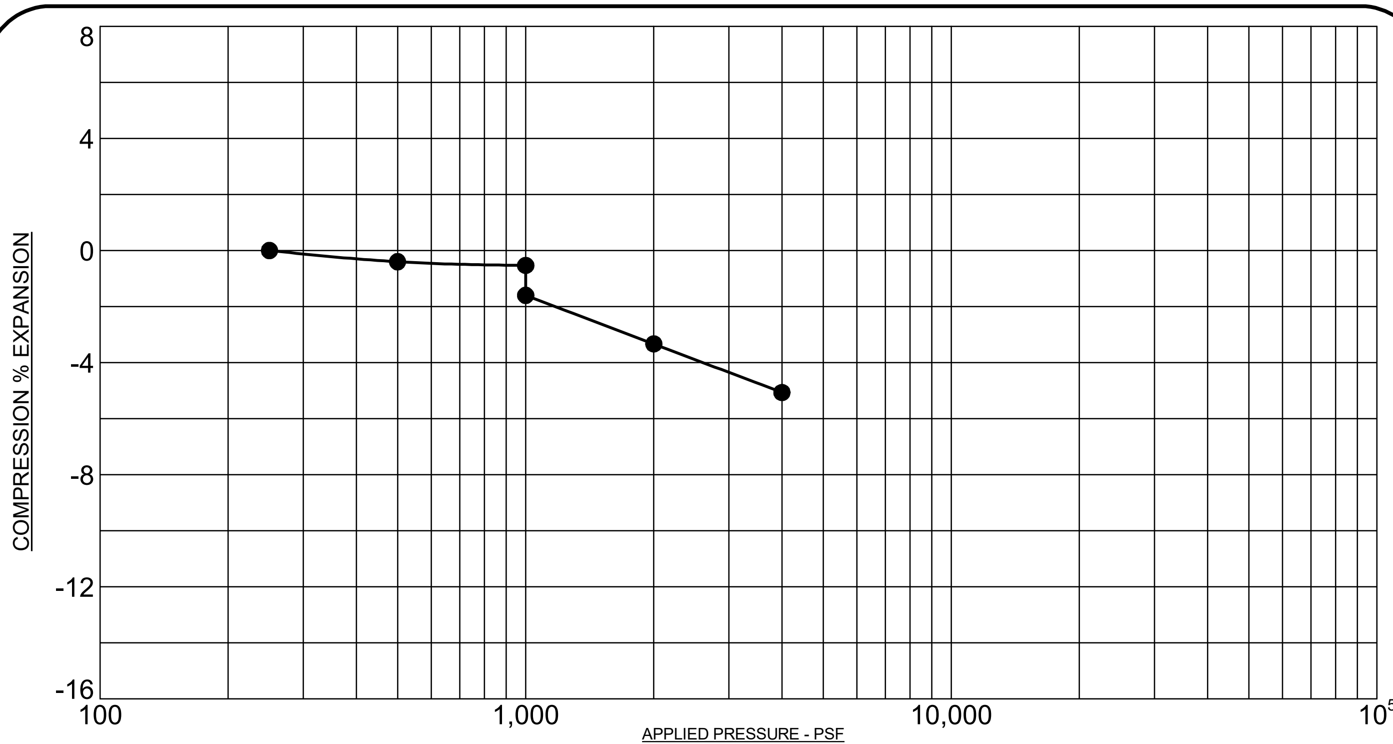
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

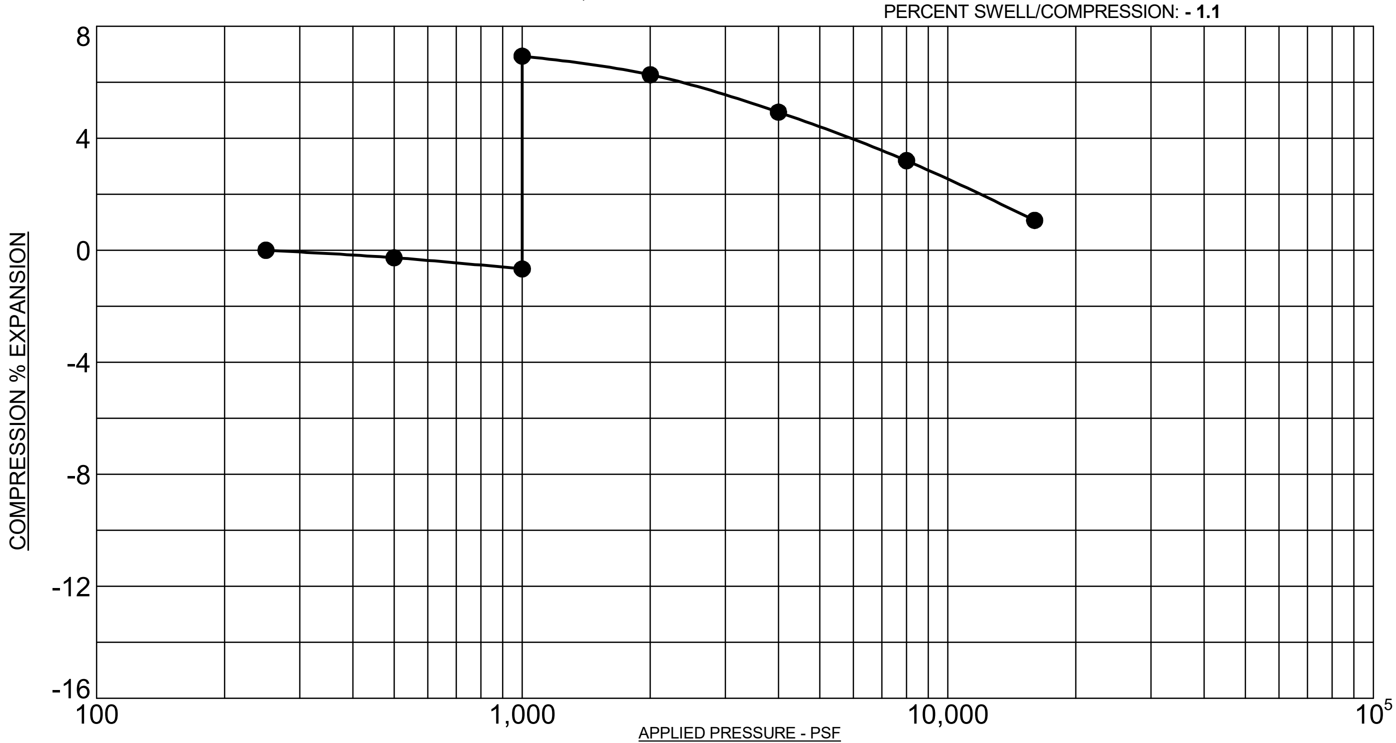
FIGURE No. 50

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **8 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **104.0 PCF**
NATURAL MOISTURE CONTENT: **17.8%**
PERCENT SWELL/COMPRESSION: **- 1.1**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **9 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **129.3 PCF**
NATURAL MOISTURE CONTENT: **10.6%**
PERCENT SWELL/COMPRESSION: **7.6**

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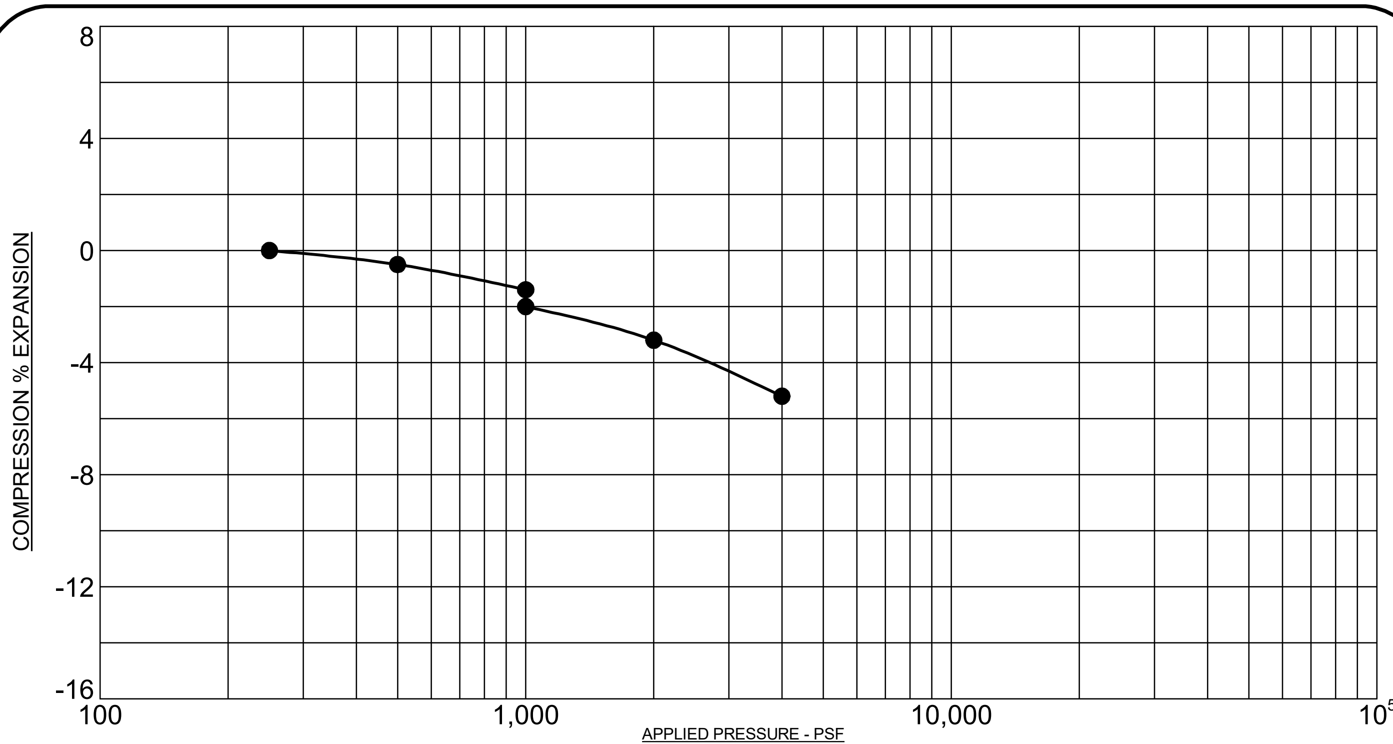
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

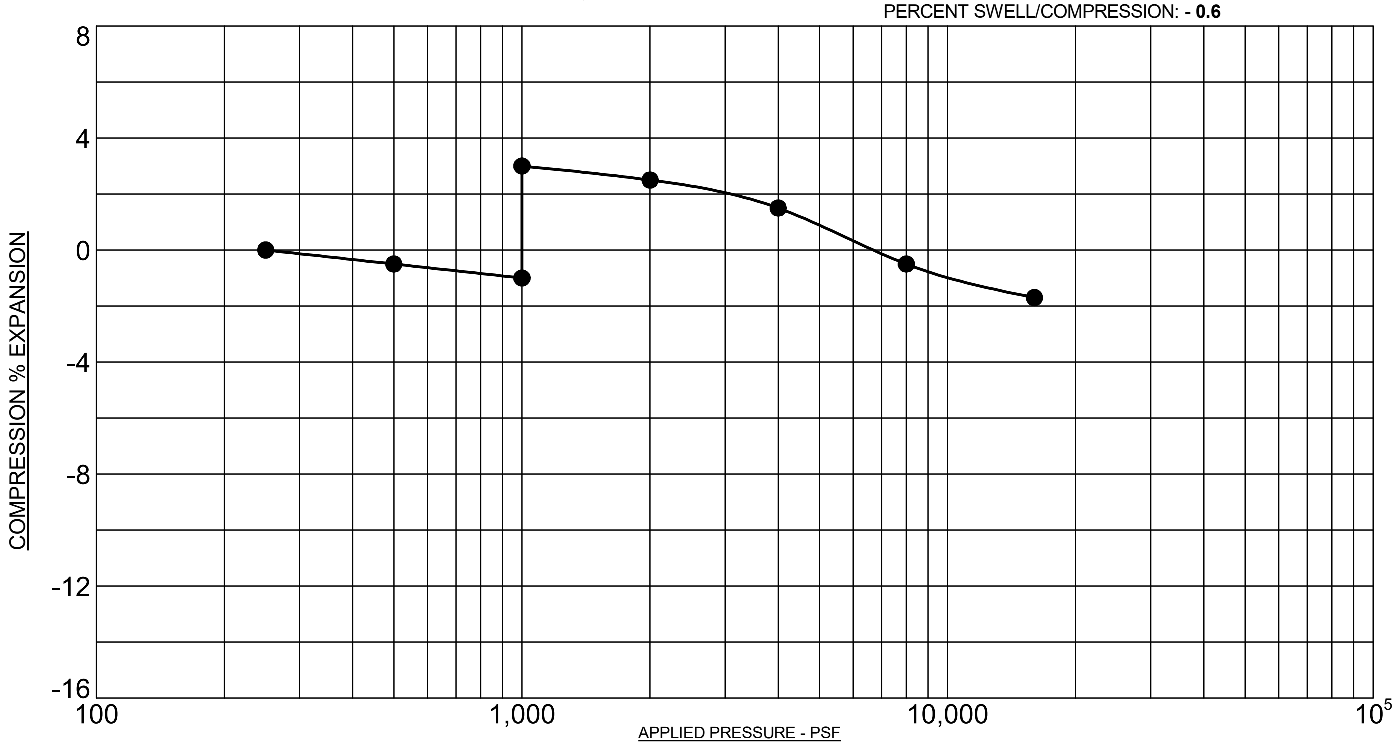
FIGURE No. 51

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **11 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **108.4 PCF**
NATURAL MOISTURE CONTENT: **11.5%**
PERCENT SWELL/COMPRESSION: **- 0.6**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **12 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **124.3 PCF**
NATURAL MOISTURE CONTENT: **9.6%**
PERCENT SWELL/COMPRESSION: **4.0**

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SWELL/CONSOLIDATION TEST RESULTS

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FIGURE No. 52

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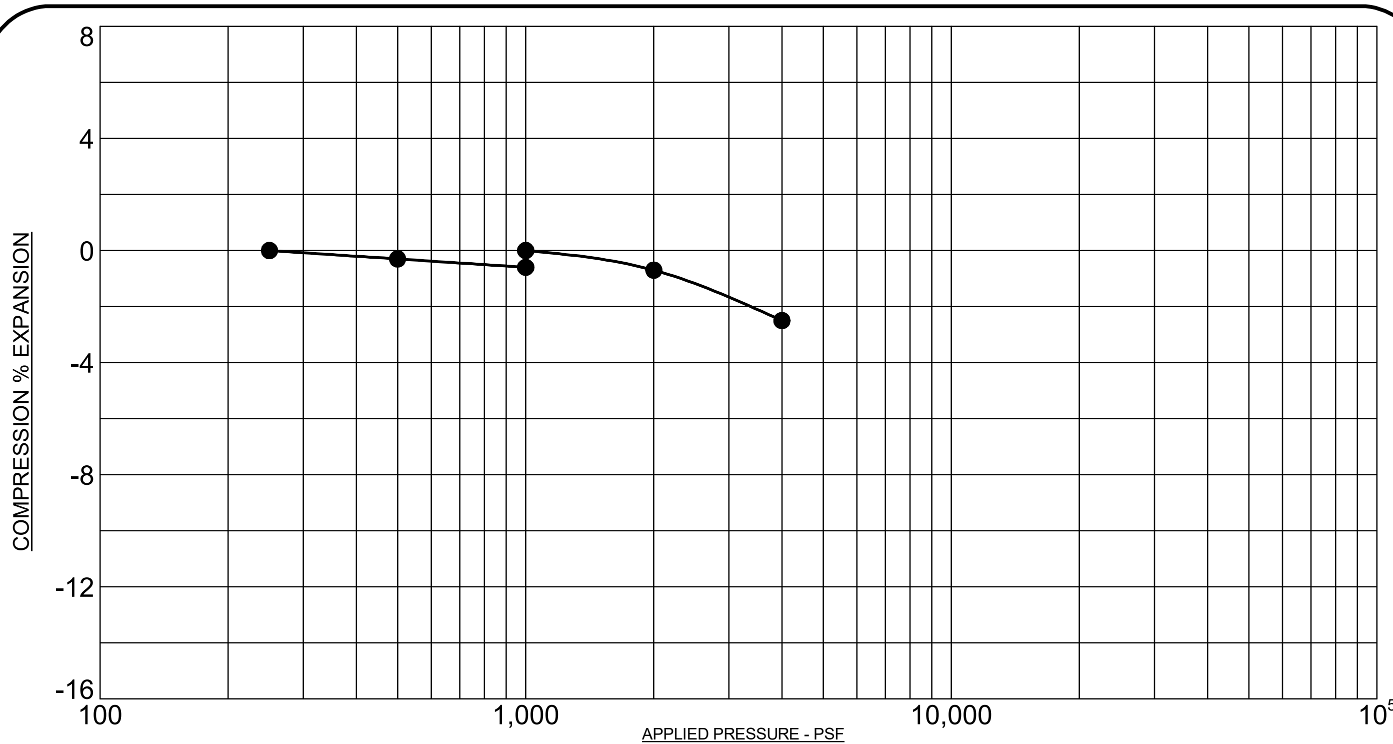
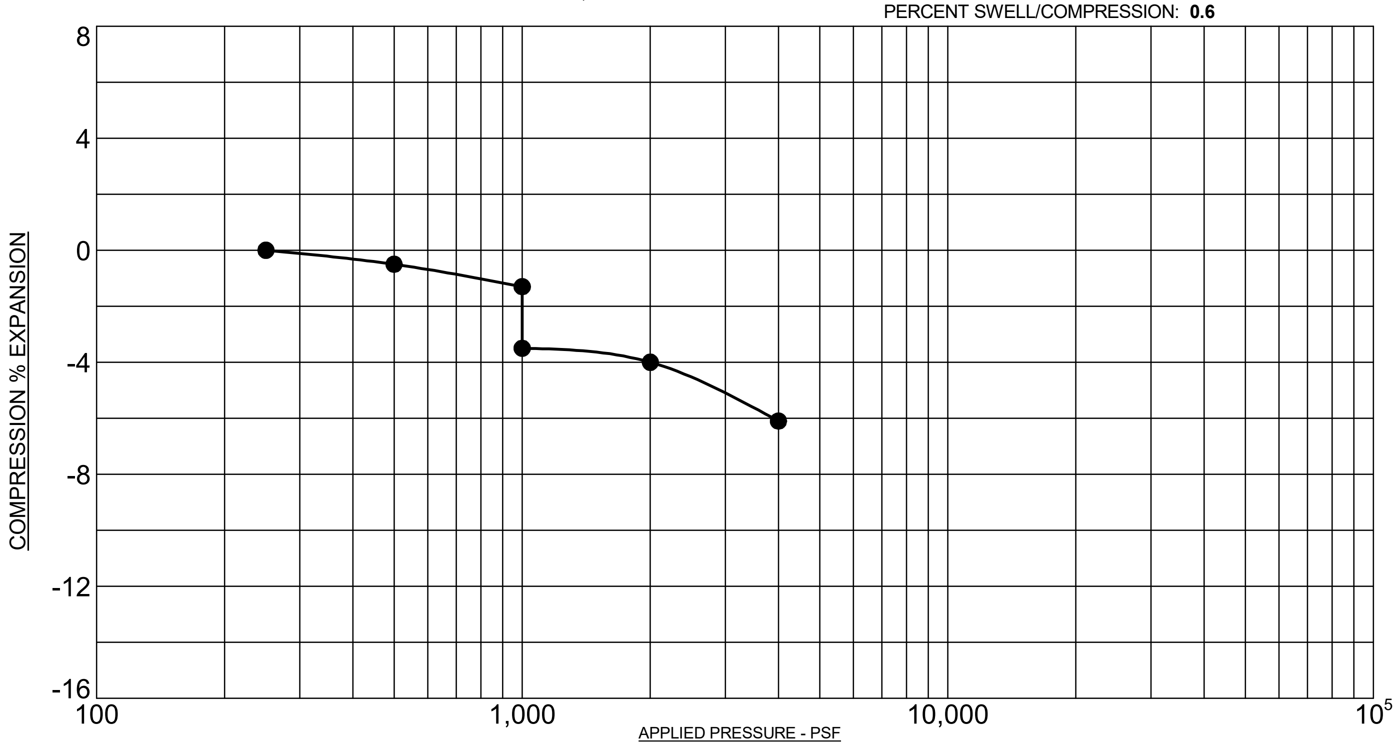


PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **13 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **104.5 PCF**
NATURAL MOISTURE CONTENT: **8.0%**
PERCENT SWELL/COMPRESSION: **0.6**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **14 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **112.2 PCF**
NATURAL MOISTURE CONTENT: **10.5%**
PERCENT SWELL/COMPRESSION: **- 2.2**

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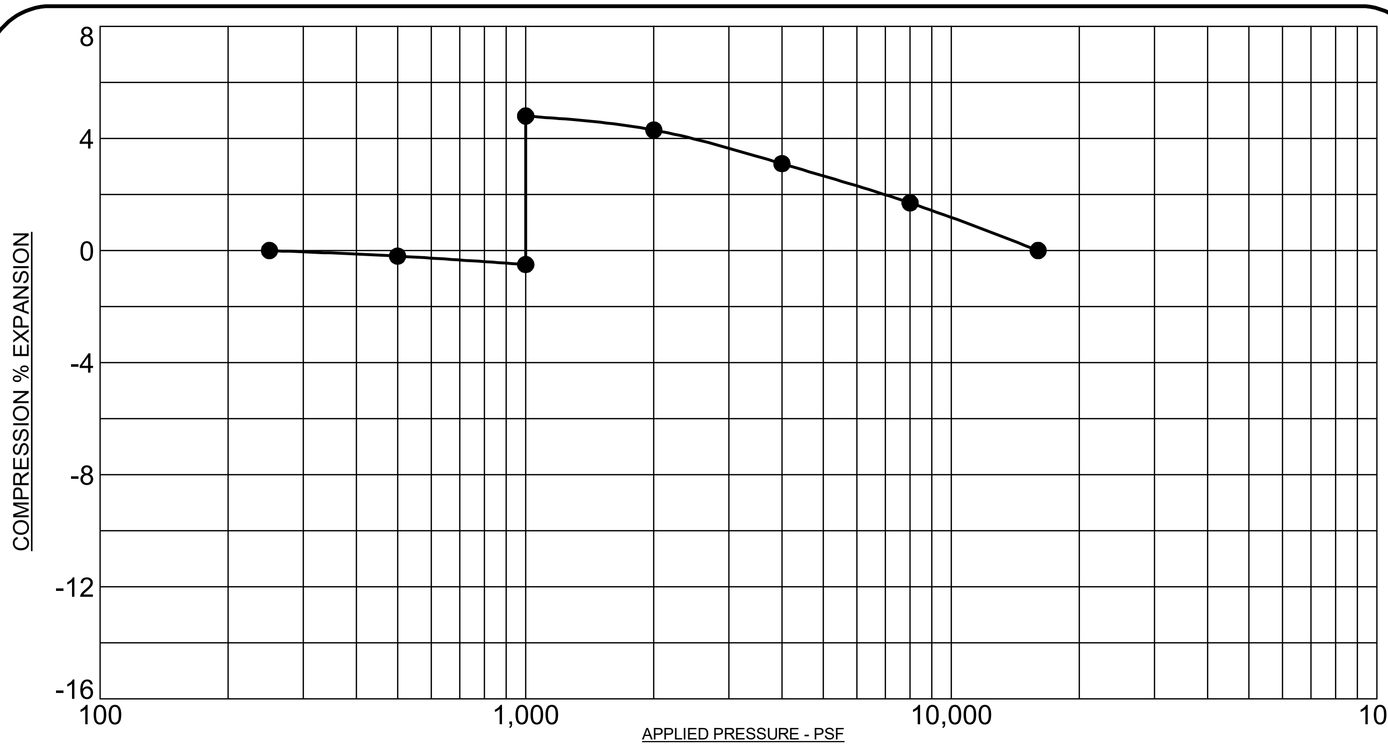
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

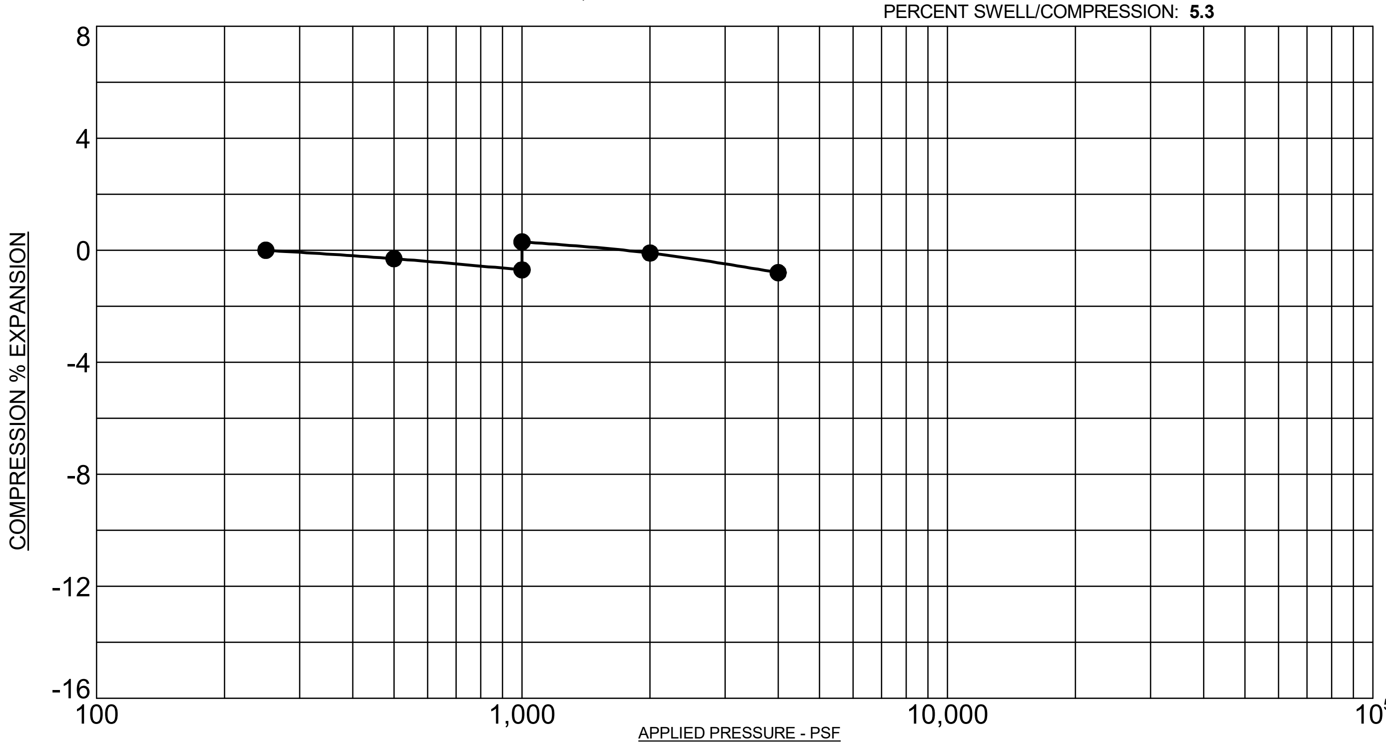
FIGURE No. 53

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **15 @ 19 FT**
NATURAL DRY UNIT WEIGHT: **115.1 PCF**
NATURAL MOISTURE CONTENT: **10.9%**
PERCENT SWELL/COMPRESSION: **5.3**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **16 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **120.2 PCF**
NATURAL MOISTURE CONTENT: **12.6%**
PERCENT SWELL/COMPRESSION: **1.0**

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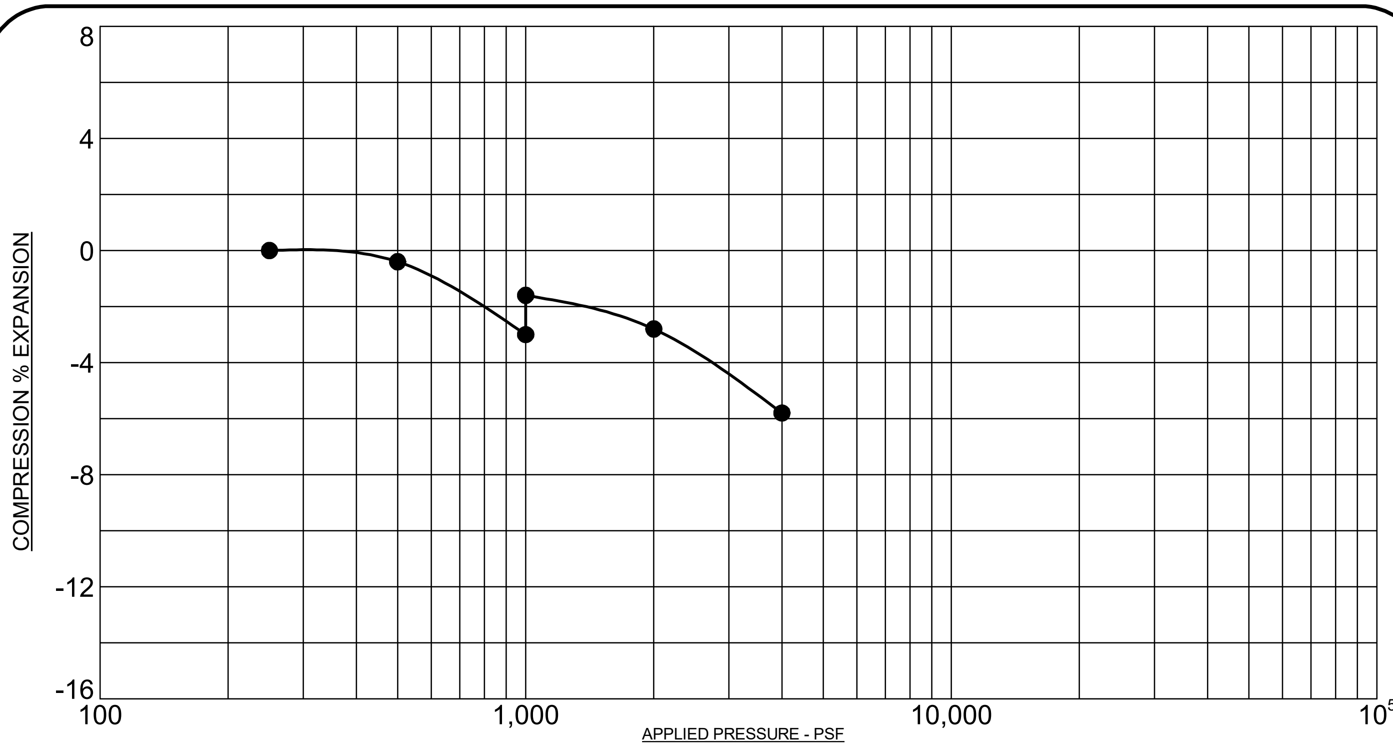
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

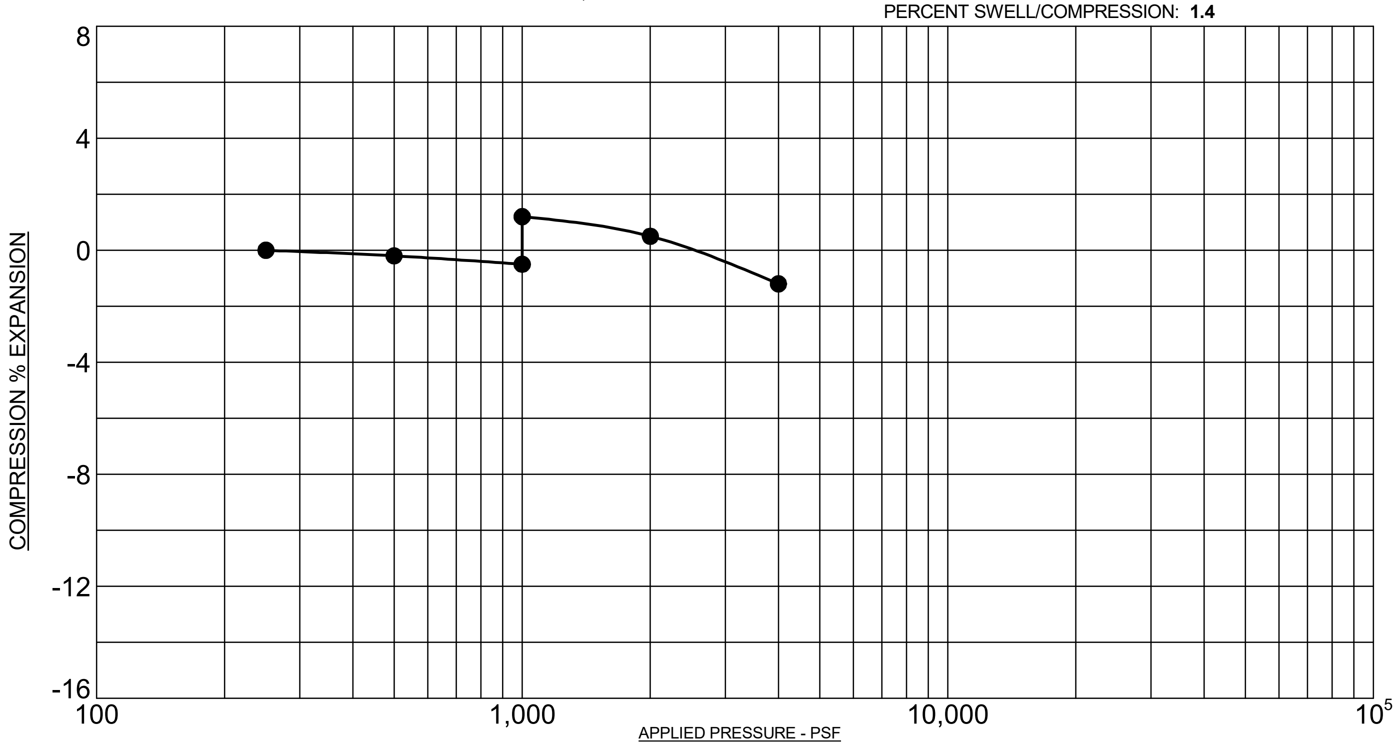
FIGURE No. 54

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **17 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **114.0 PCF**
NATURAL MOISTURE CONTENT: **11.2%**
PERCENT SWELL/COMPRESSION: **1.4**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **18 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **105.5 PCF**
NATURAL MOISTURE CONTENT: **12.3%**
PERCENT SWELL/COMPRESSION: **1.7**

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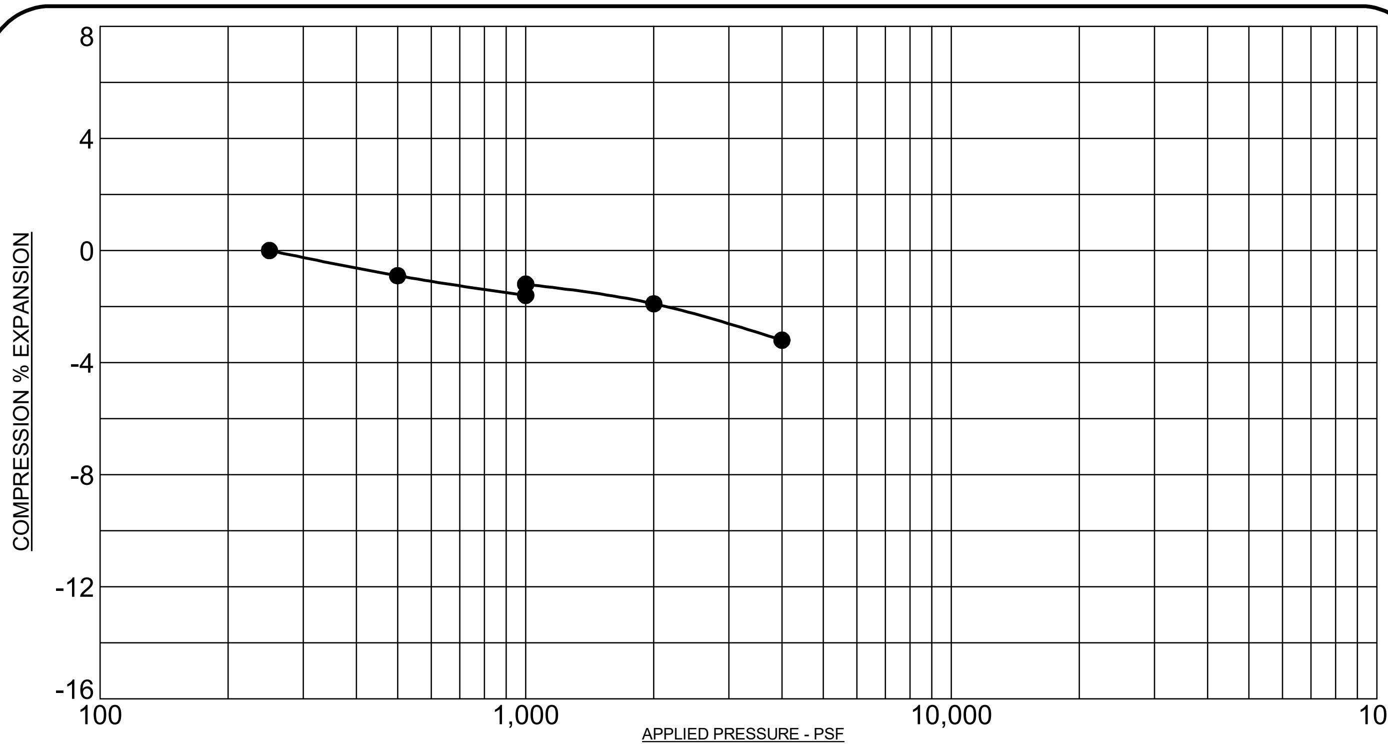
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

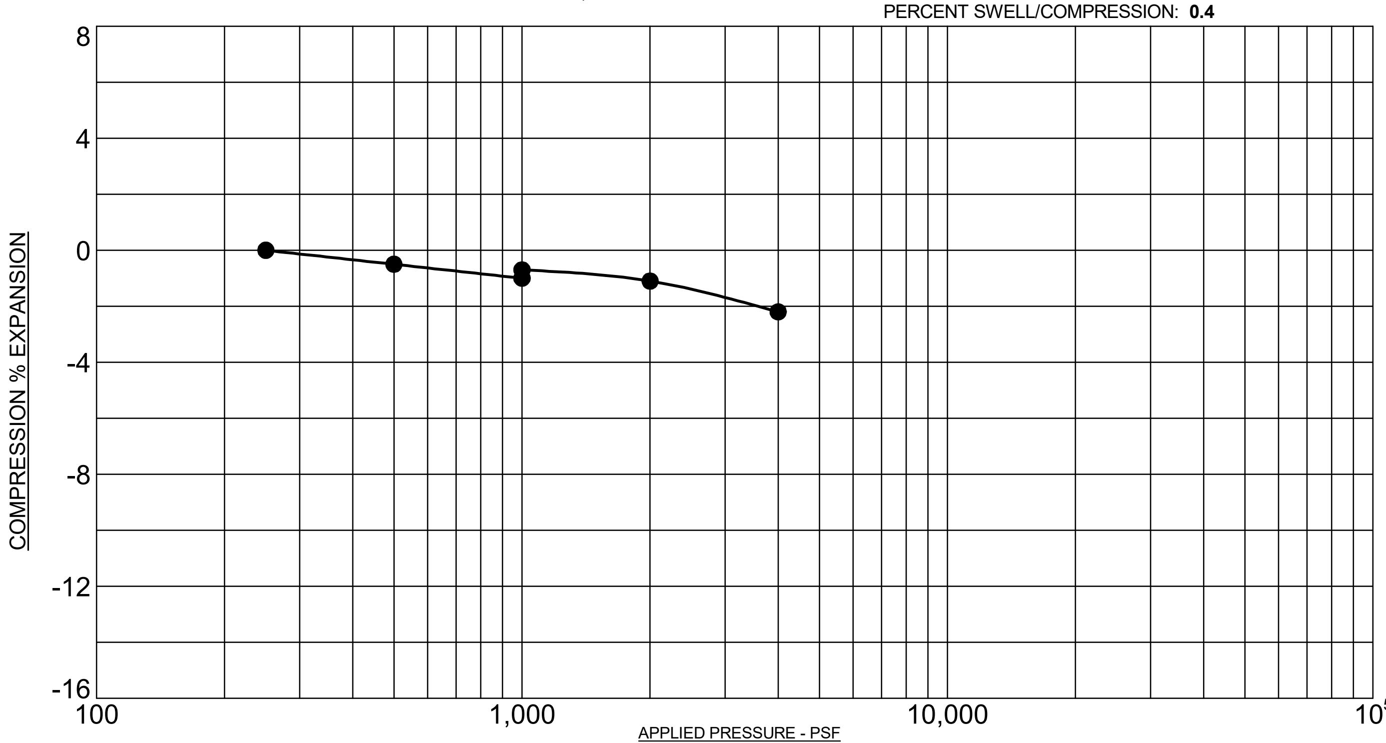
FIGURE No. 55

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **19 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **111.5 PCF**
NATURAL MOISTURE CONTENT: **16.8%**
PERCENT SWELL/COMPRESSION: **0.4**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **20 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **112.3 PCF**
NATURAL MOISTURE CONTENT: **12.9%**
PERCENT SWELL/COMPRESSION: **0.3**

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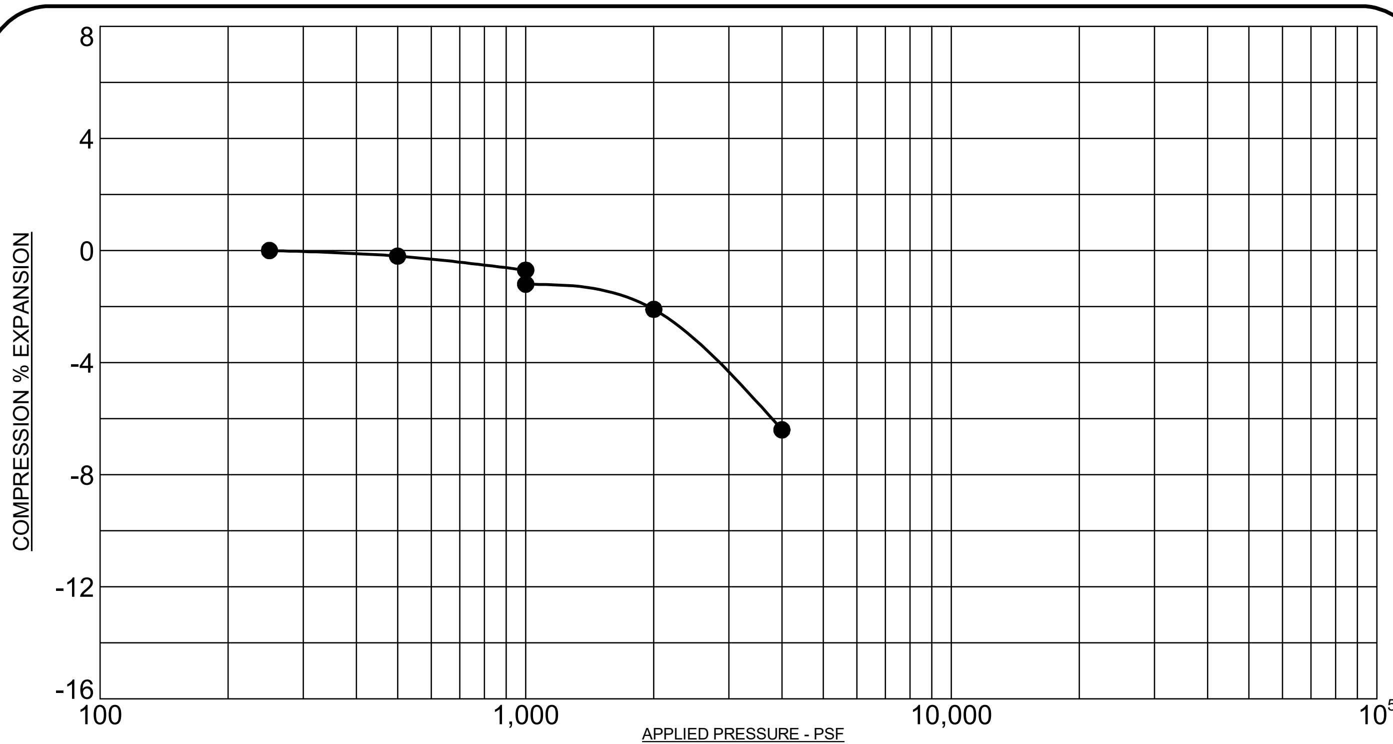
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

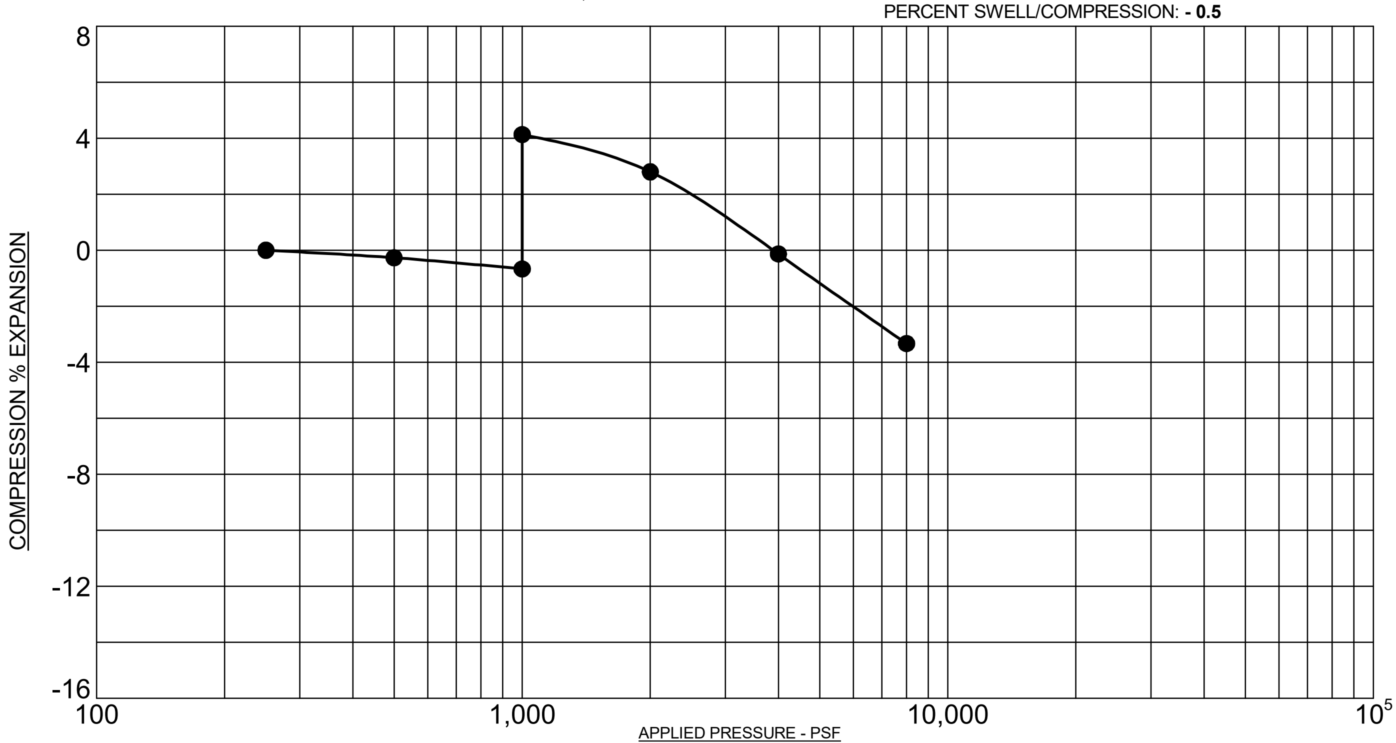
FIGURE No. 56

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **21 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **108.3 PCF**
NATURAL MOISTURE CONTENT: **9.4%**
PERCENT SWELL/COMPRESSION: **- 0.5**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **22 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **122.1 PCF**
NATURAL MOISTURE CONTENT: **7.9%**
PERCENT SWELL/COMPRESSION: **4.8**

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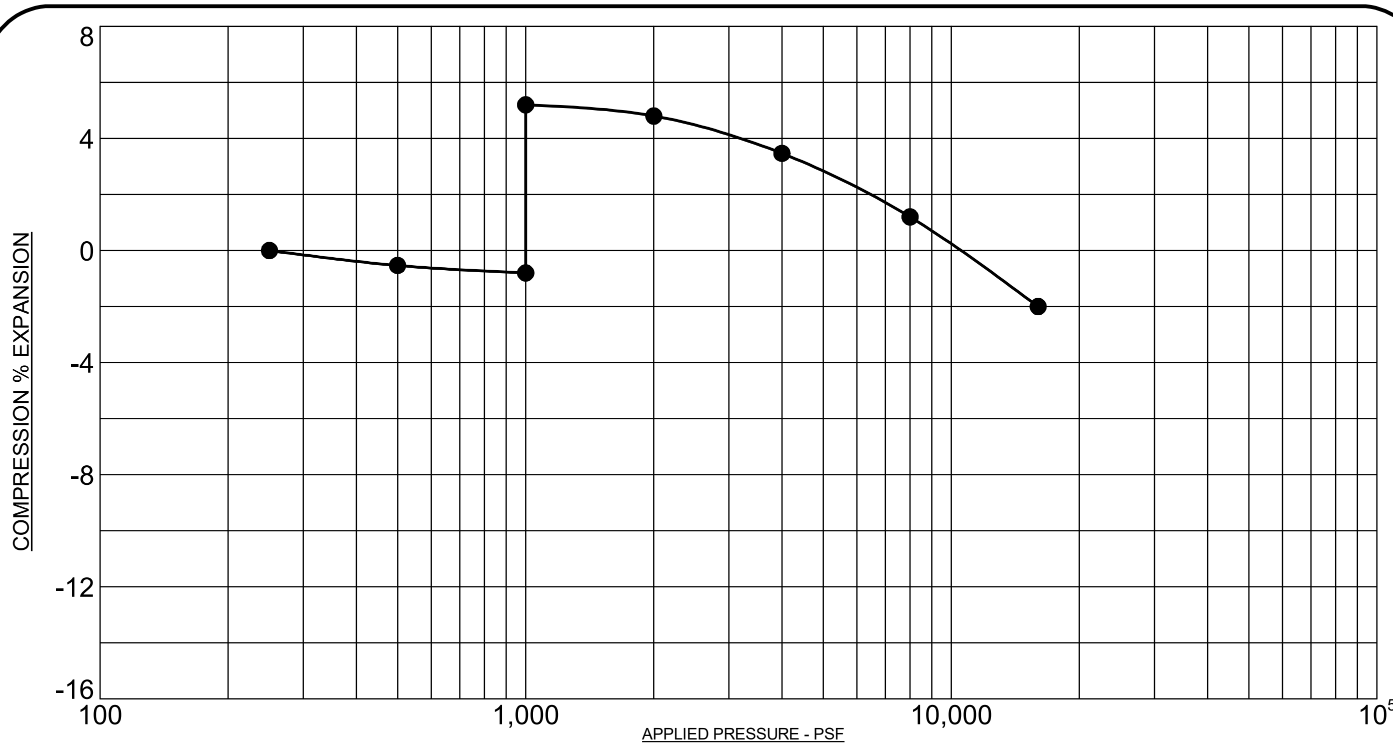
JOB No. 181988

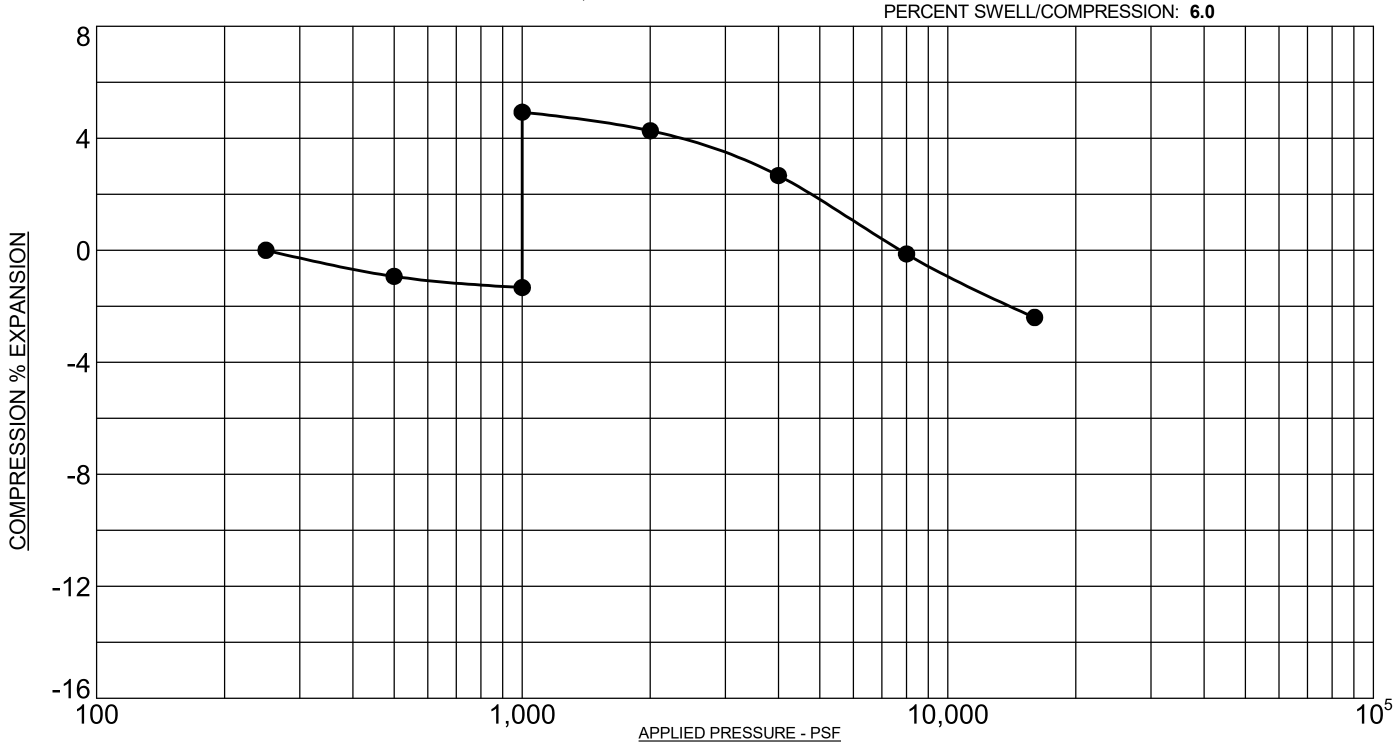
FIGURE No. 57

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **23 @ 19 FT**
NATURAL DRY UNIT WEIGHT: **126.4 PCF**
NATURAL MOISTURE CONTENT: **8.5%**
PERCENT SWELL/COMPRESSION: **6.0**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **24 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **123.7 PCF**
NATURAL MOISTURE CONTENT: **7.9%**
PERCENT SWELL/COMPRESSION: **6.3**

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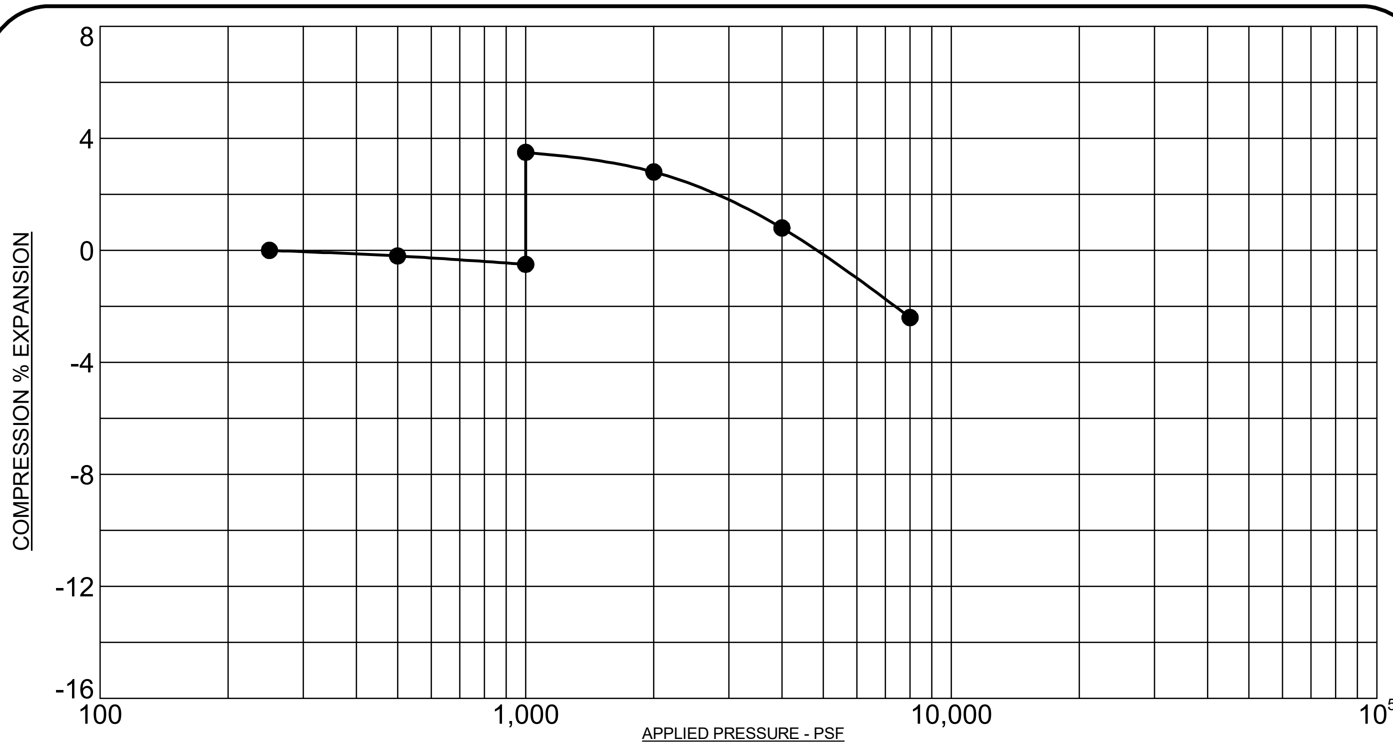
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

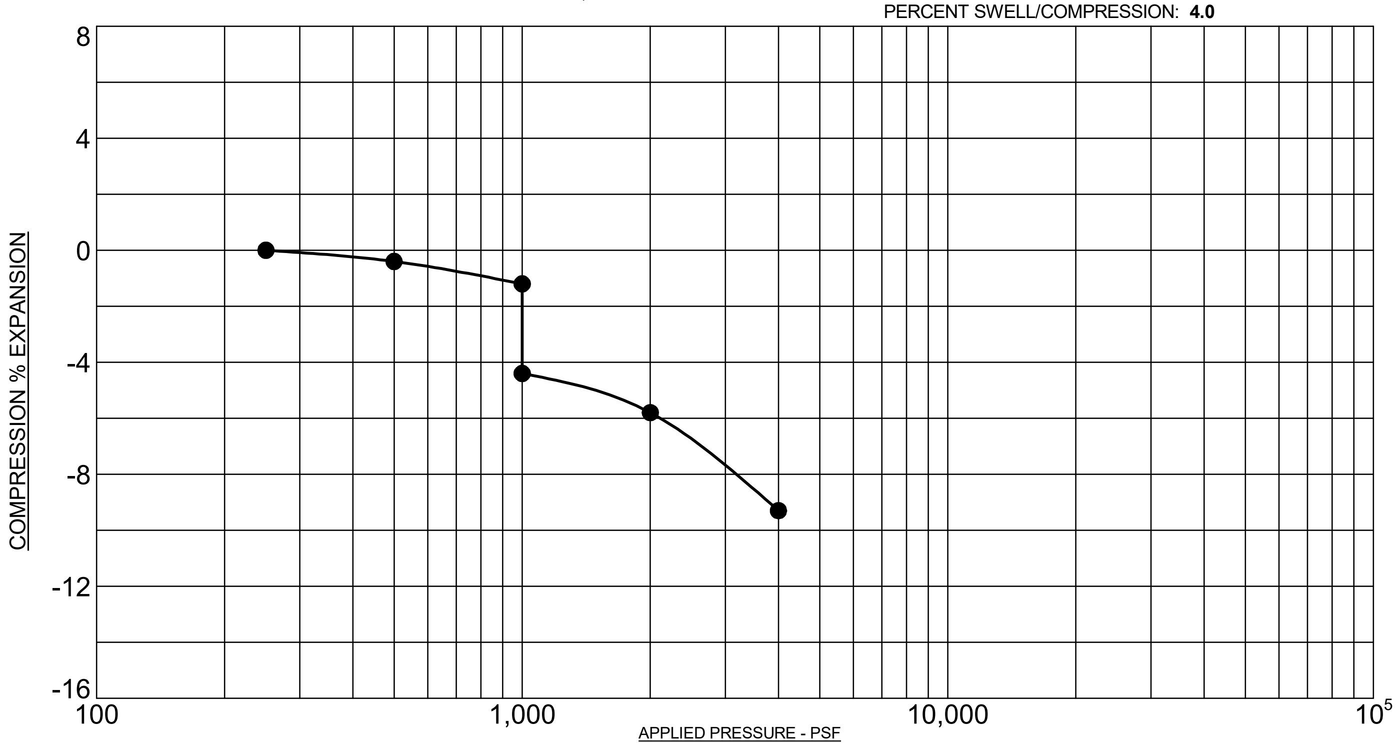
FIGURE No. 58

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **25 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **112.3 PCF**
NATURAL MOISTURE CONTENT: **7.9%**
PERCENT SWELL/COMPRESSION: **4.0**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **26 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **PCF**
NATURAL MOISTURE CONTENT: **%**
PERCENT SWELL/COMPRESSION: **- 3.2**

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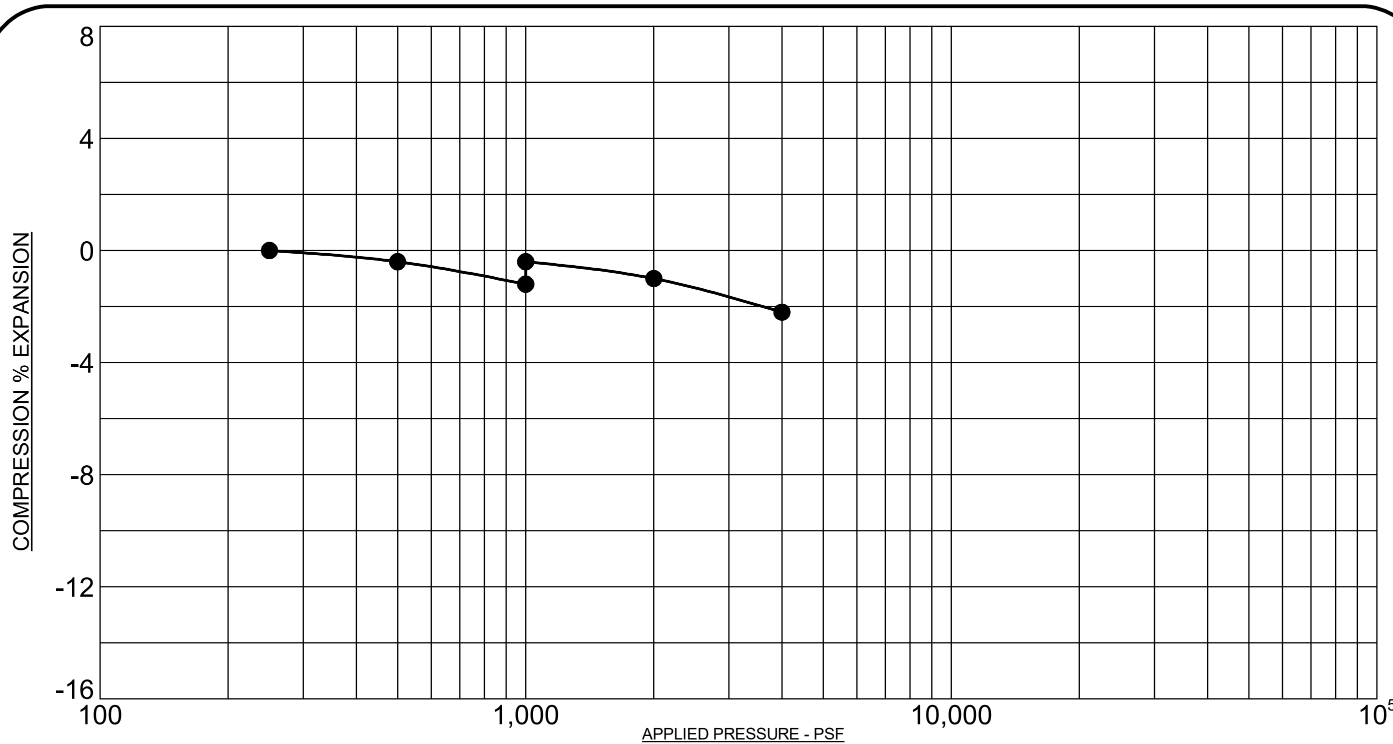
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

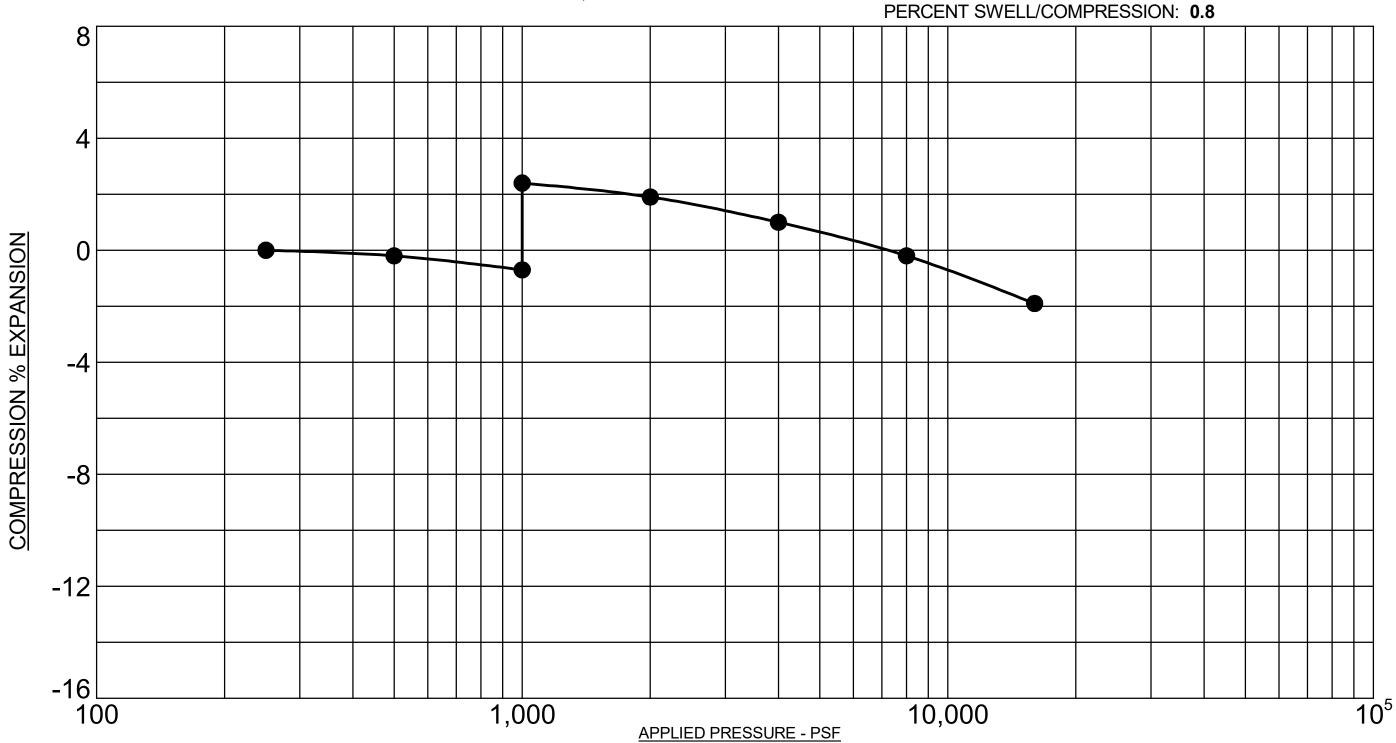
FIGURE No. 59

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **27 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **114.1 PCF**
NATURAL MOISTURE CONTENT: **11.1%**
PERCENT SWELL/COMPRESSION: **0.8**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **28 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **PCF**
NATURAL MOISTURE CONTENT: **%**
PERCENT SWELL/COMPRESSION: **3.1**

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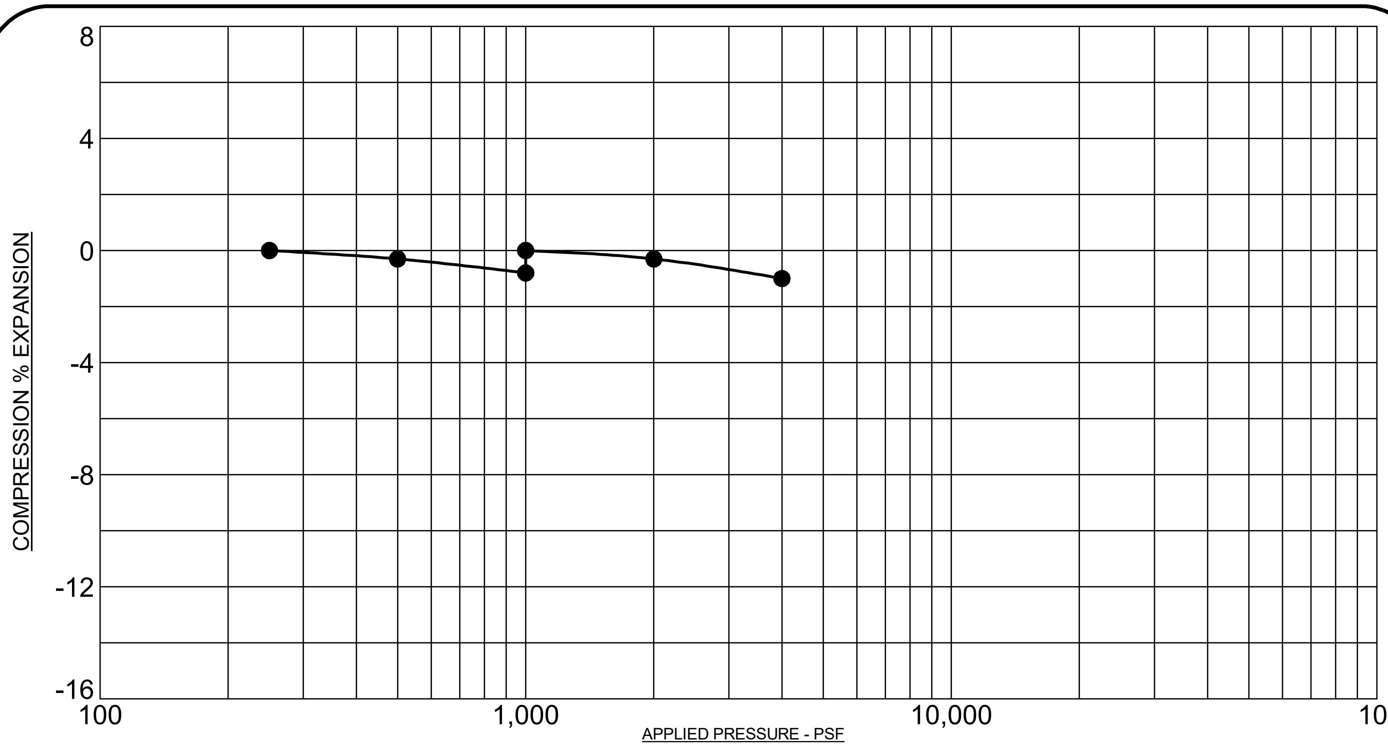
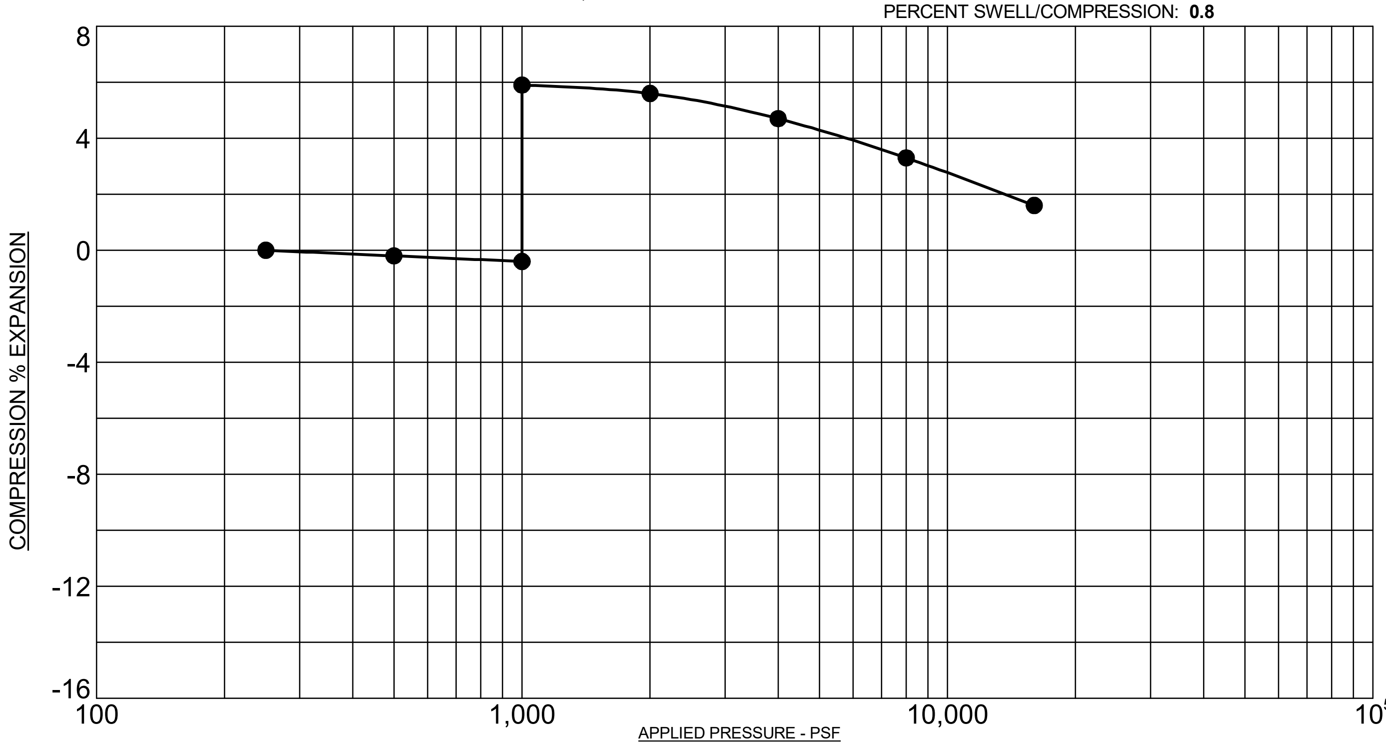
FIGURE No. 60

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **29 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **117.5 PCF**
NATURAL MOISTURE CONTENT: **12.6%**
PERCENT SWELL/COMPRESSION: **0.8**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **30 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **128.6 PCF**
NATURAL MOISTURE CONTENT: **11.1%**
PERCENT SWELL/COMPRESSION: **6.3**

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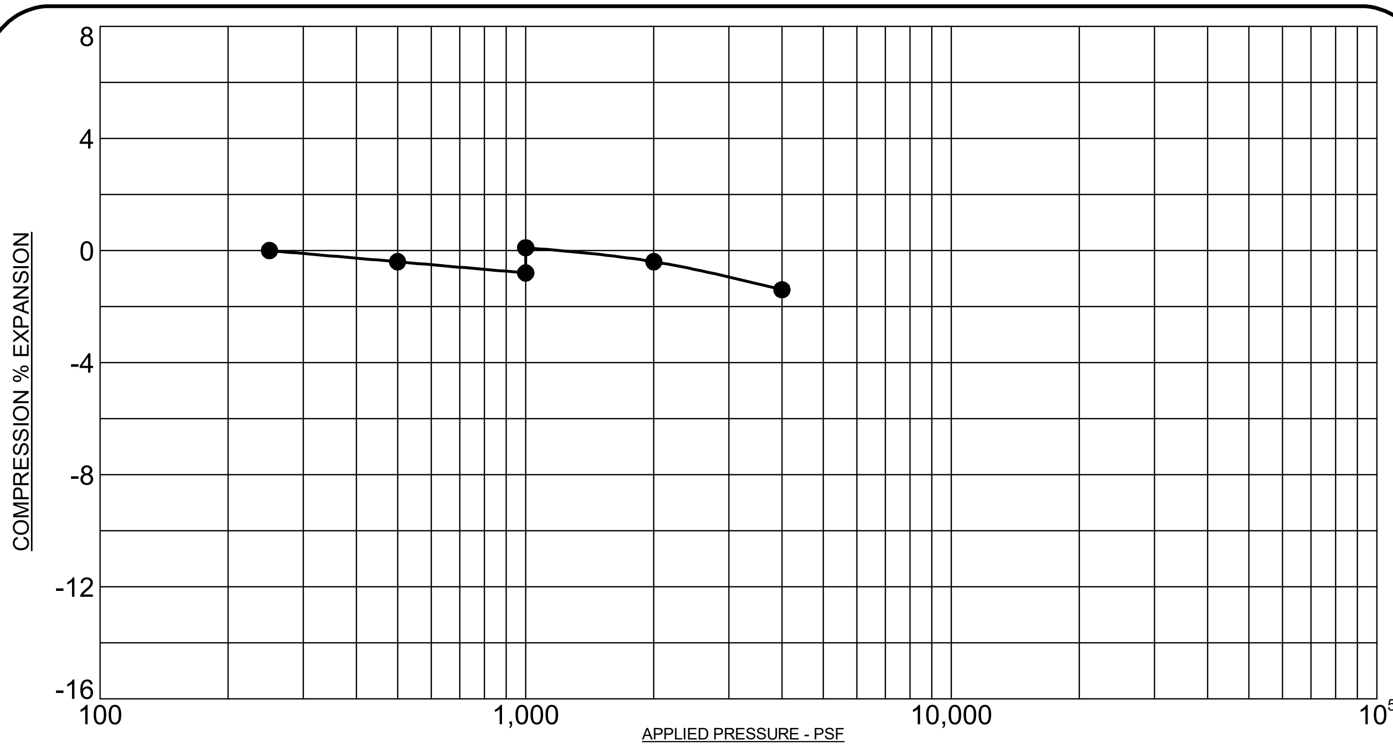
JOB No. 181988

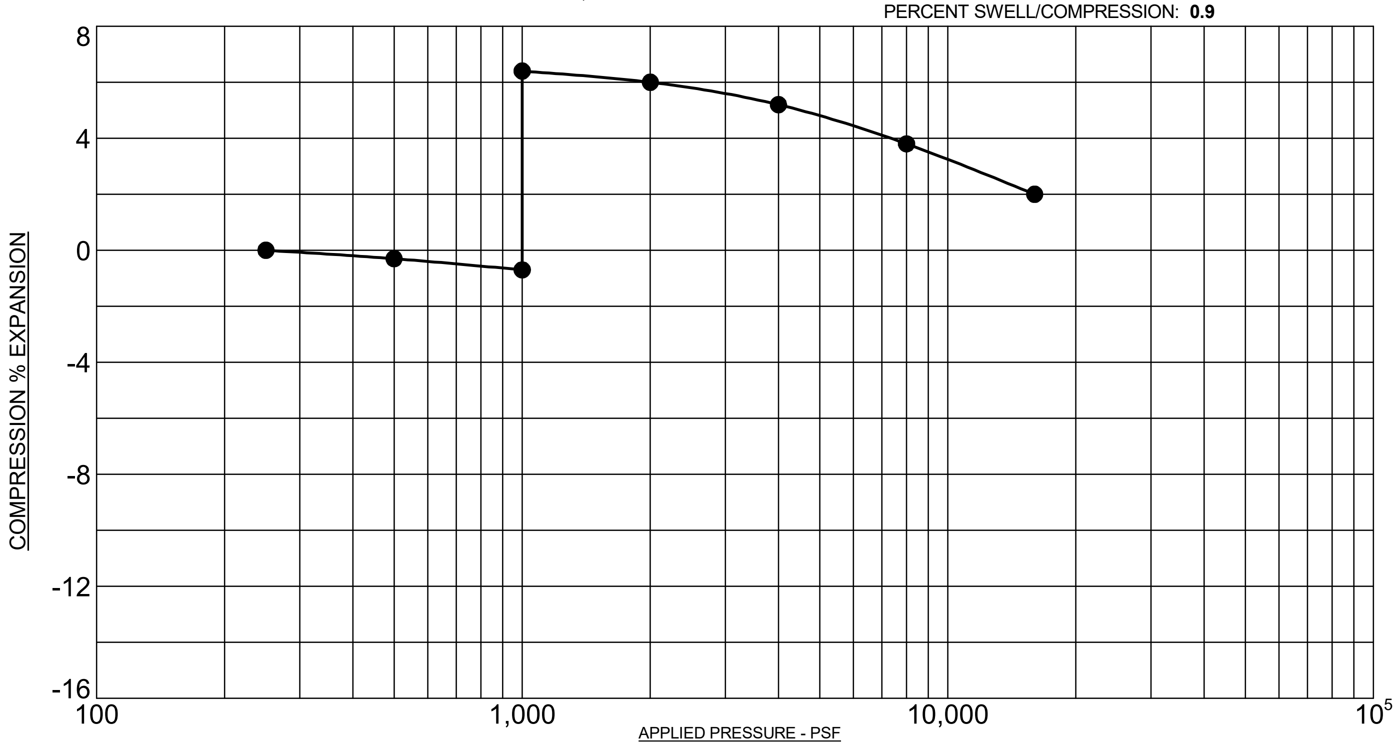
FIGURE No. 61

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **31 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **119.3 PCF**
NATURAL MOISTURE CONTENT: **11.4%**
PERCENT SWELL/COMPRESSION: **0.9**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **32 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **129.2 PCF**
NATURAL MOISTURE CONTENT: **12.5%**
PERCENT SWELL/COMPRESSION: **7.1**

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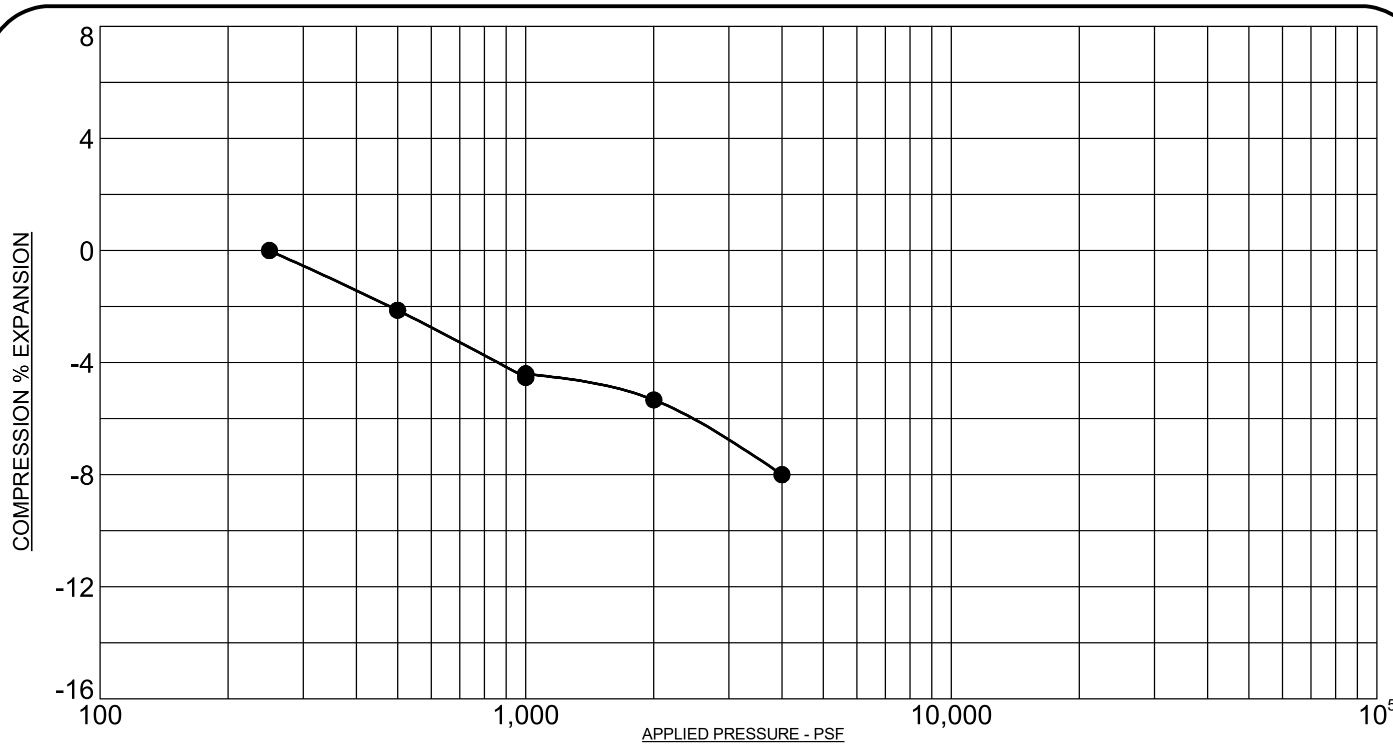
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

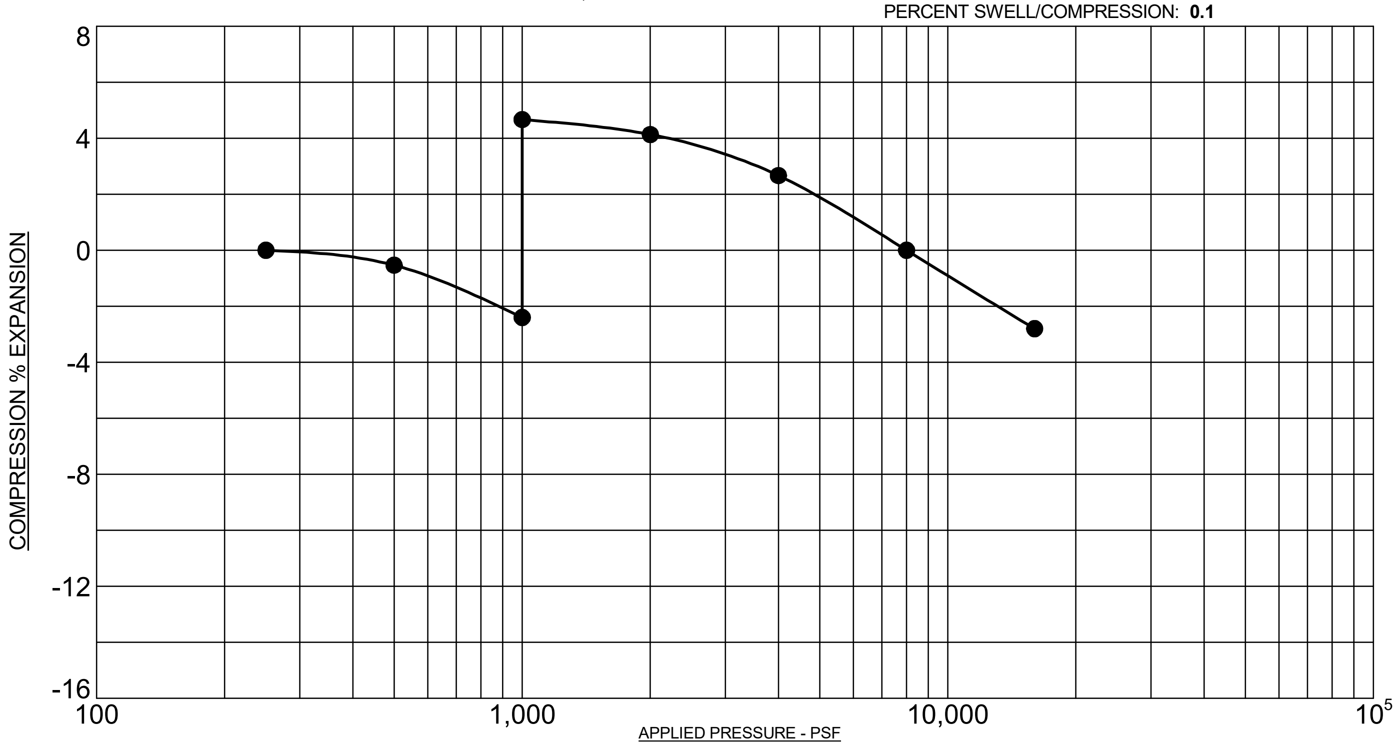
FIGURE No. 62

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **33 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **113.6 PCF**
NATURAL MOISTURE CONTENT: **7.1%**
PERCENT SWELL/COMPRESSION: **0.1**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **34 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **129.6 PCF**
NATURAL MOISTURE CONTENT: **8.7%**
PERCENT SWELL/COMPRESSION: **7.1**

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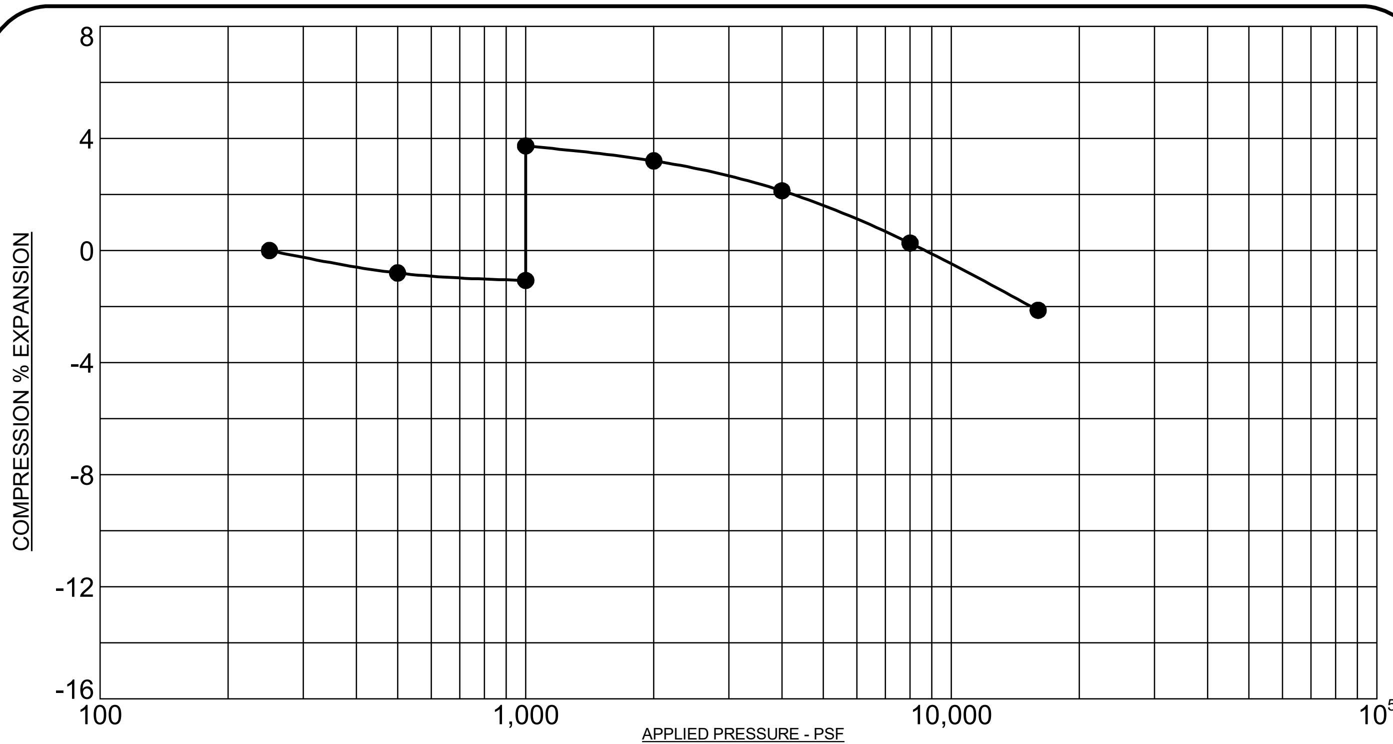
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

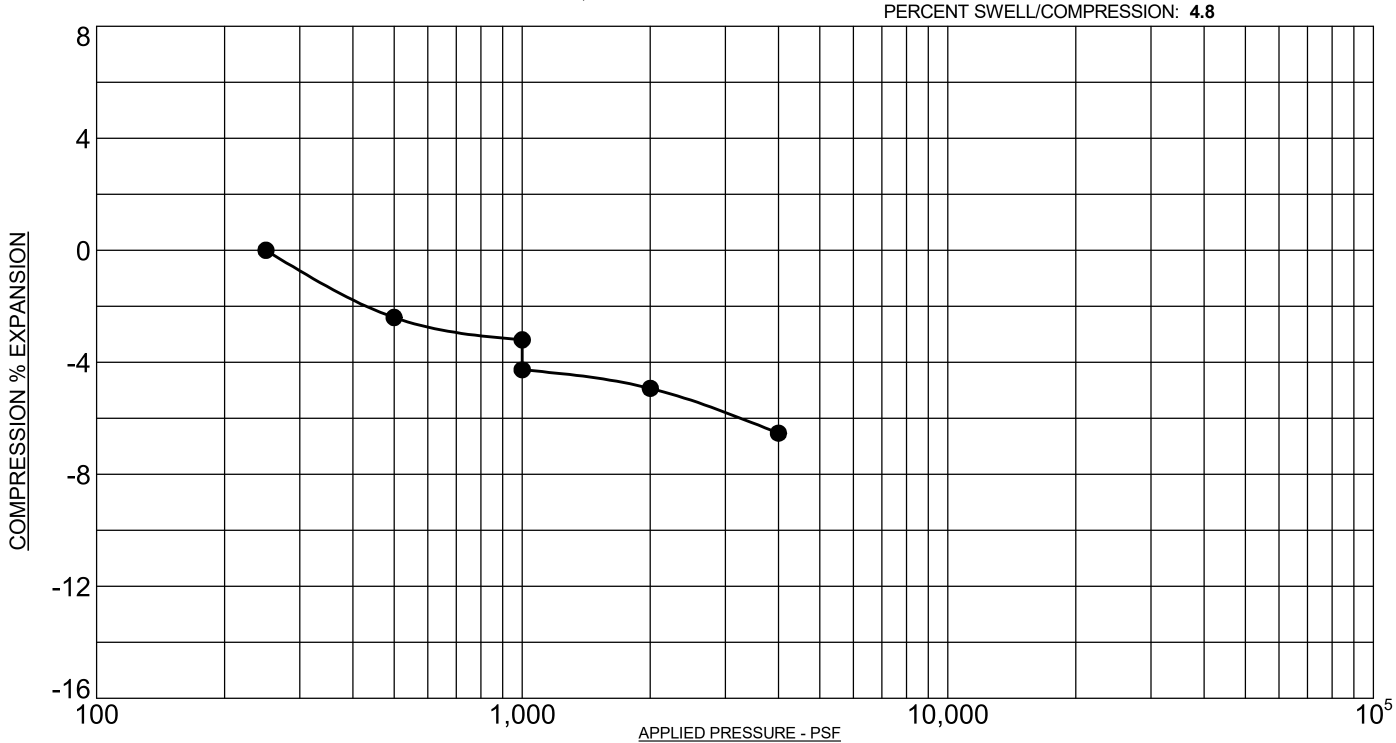
FIGURE No. 63

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **35 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **119.2 PCF**
NATURAL MOISTURE CONTENT: **12.0%**
PERCENT SWELL/COMPRESSION: **4.8**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **36 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **109.3 PCF**
NATURAL MOISTURE CONTENT: **12.9%**
PERCENT SWELL/COMPRESSION: **- 1.1**

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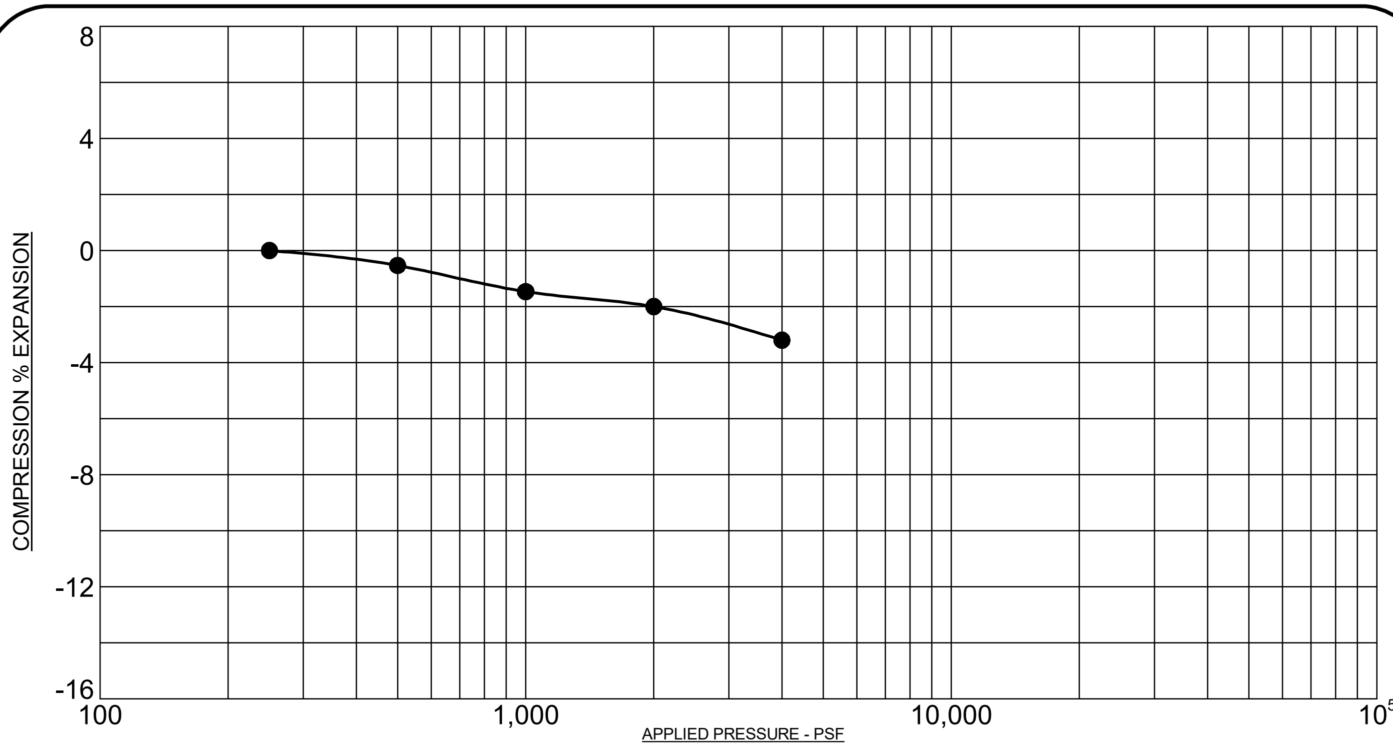
JOB No. 181988

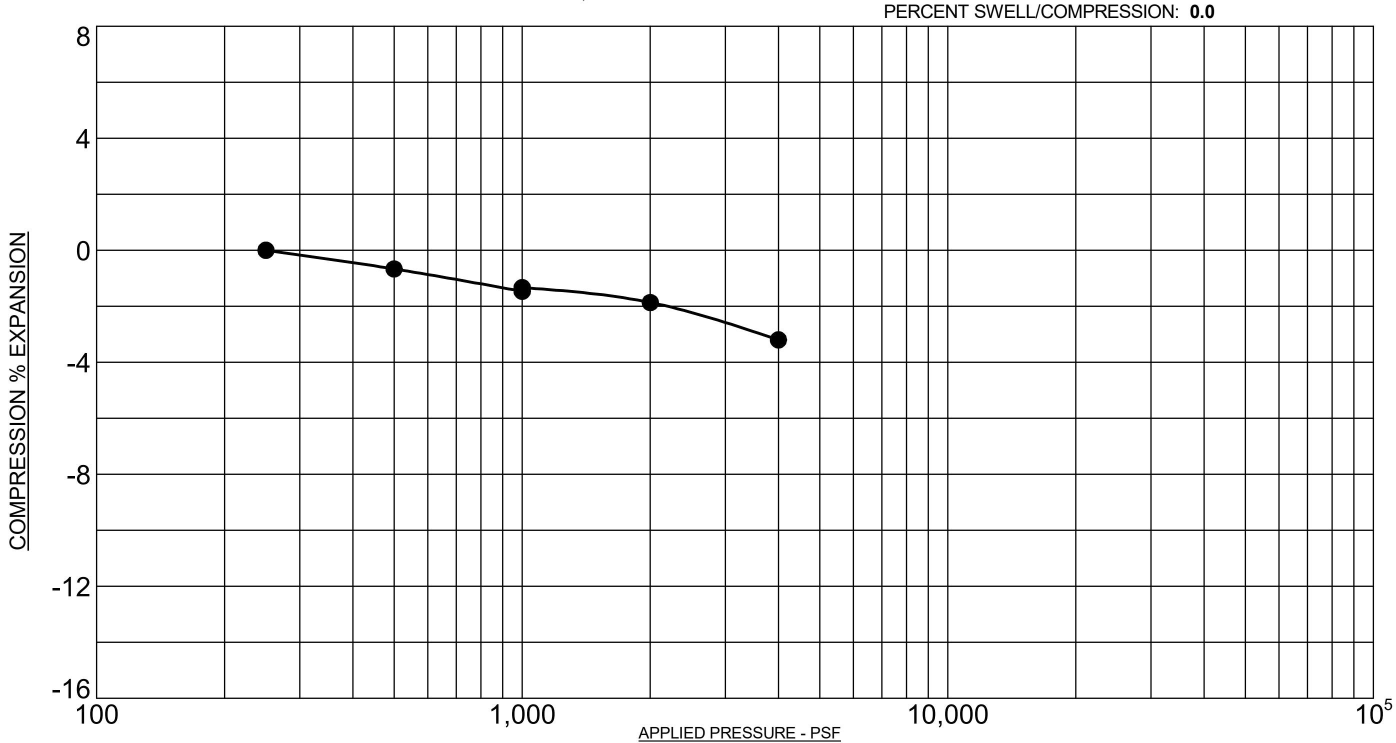
FIGURE No. 64

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **37 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **111.1 PCF**
NATURAL MOISTURE CONTENT: **16.7%**
PERCENT SWELL/COMPRESSION: **0.0**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **38 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **113.7 PCF**
NATURAL MOISTURE CONTENT: **14.1%**
PERCENT SWELL/COMPRESSION: **0.1**

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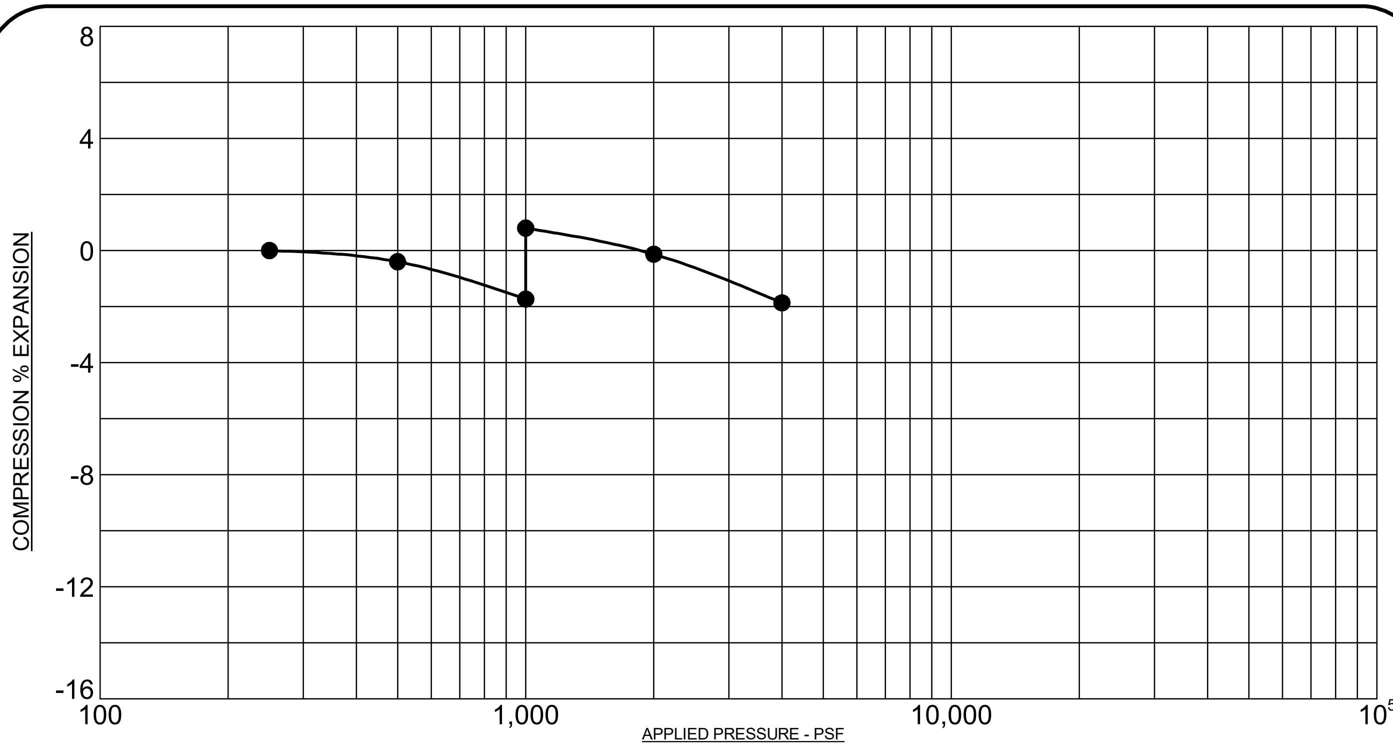
FIGURE No. 65

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **39 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **118.0 PCF**
NATURAL MOISTURE CONTENT: **11.6%**
PERCENT SWELL/COMPRESSION: **2.5**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **40 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **108.0 PCF**
NATURAL MOISTURE CONTENT: **9.6%**
PERCENT SWELL/COMPRESSION: **0.9**

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FIGURE No. 66

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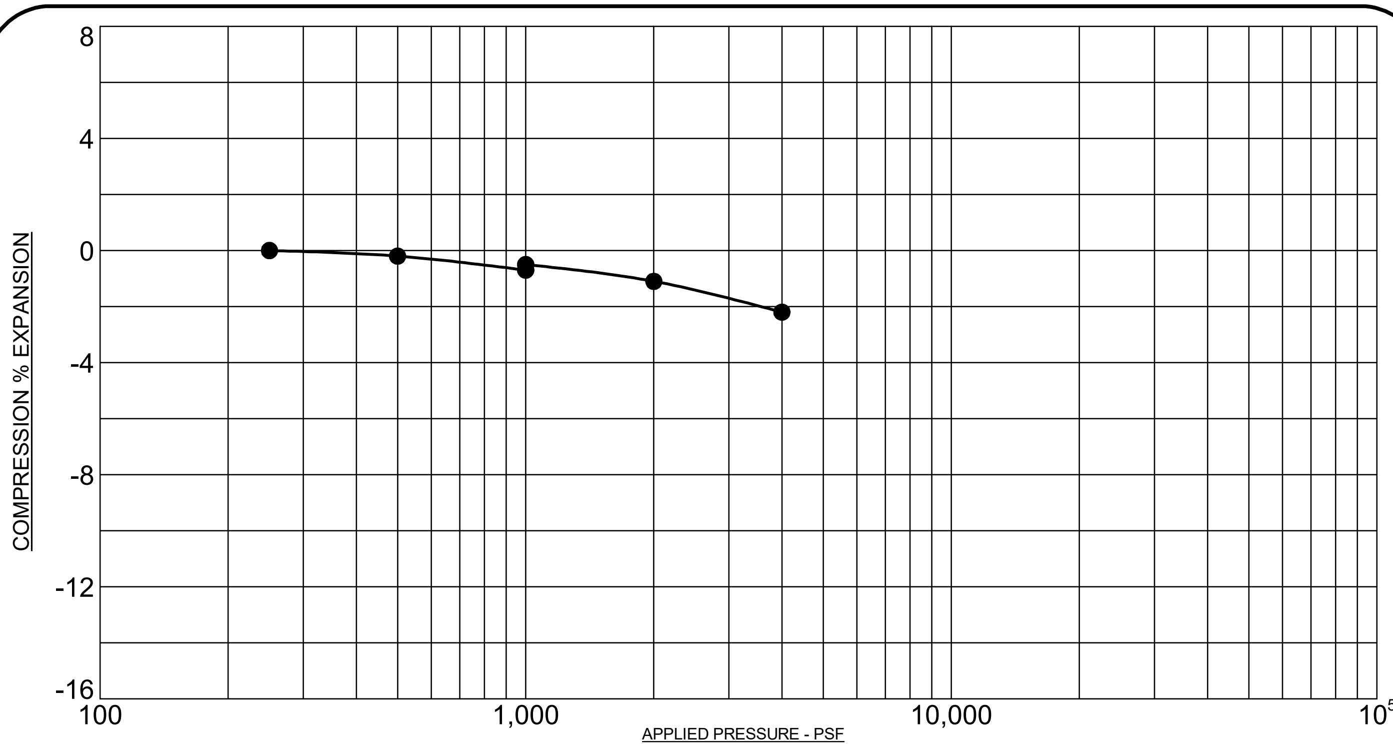
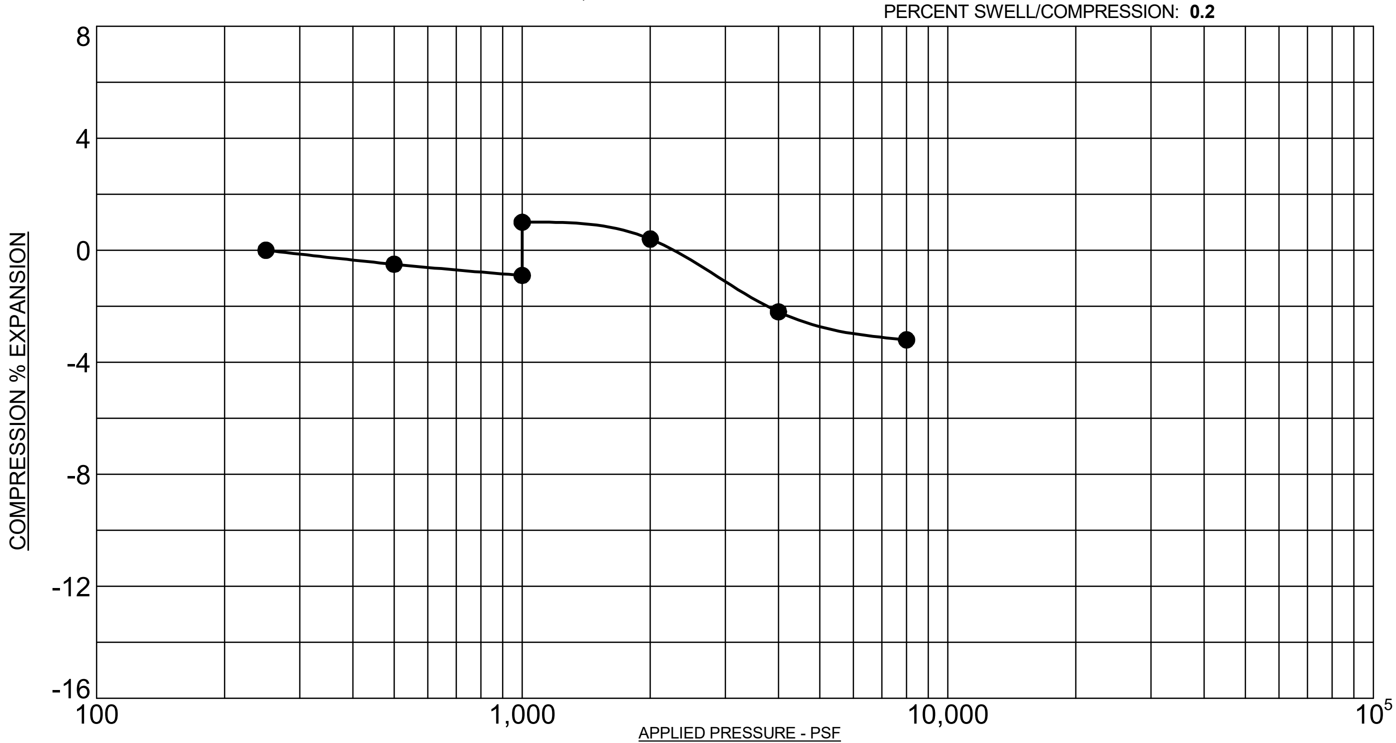


PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **41 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **118.1 PCF**
NATURAL MOISTURE CONTENT: **11.2%**
PERCENT SWELL/COMPRESSION: **0.2**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **42 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **117.0 PCF**
NATURAL MOISTURE CONTENT: **11.3%**
PERCENT SWELL/COMPRESSION: **1.9**

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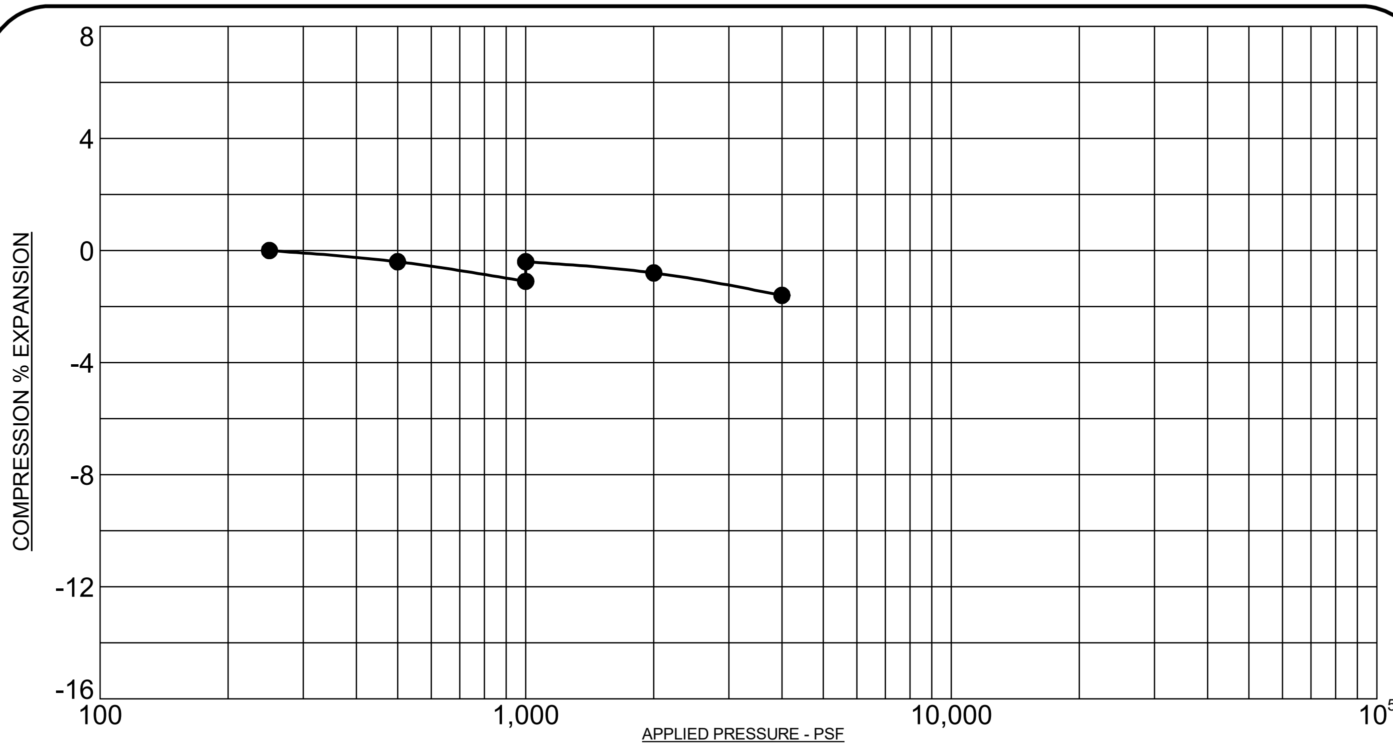
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

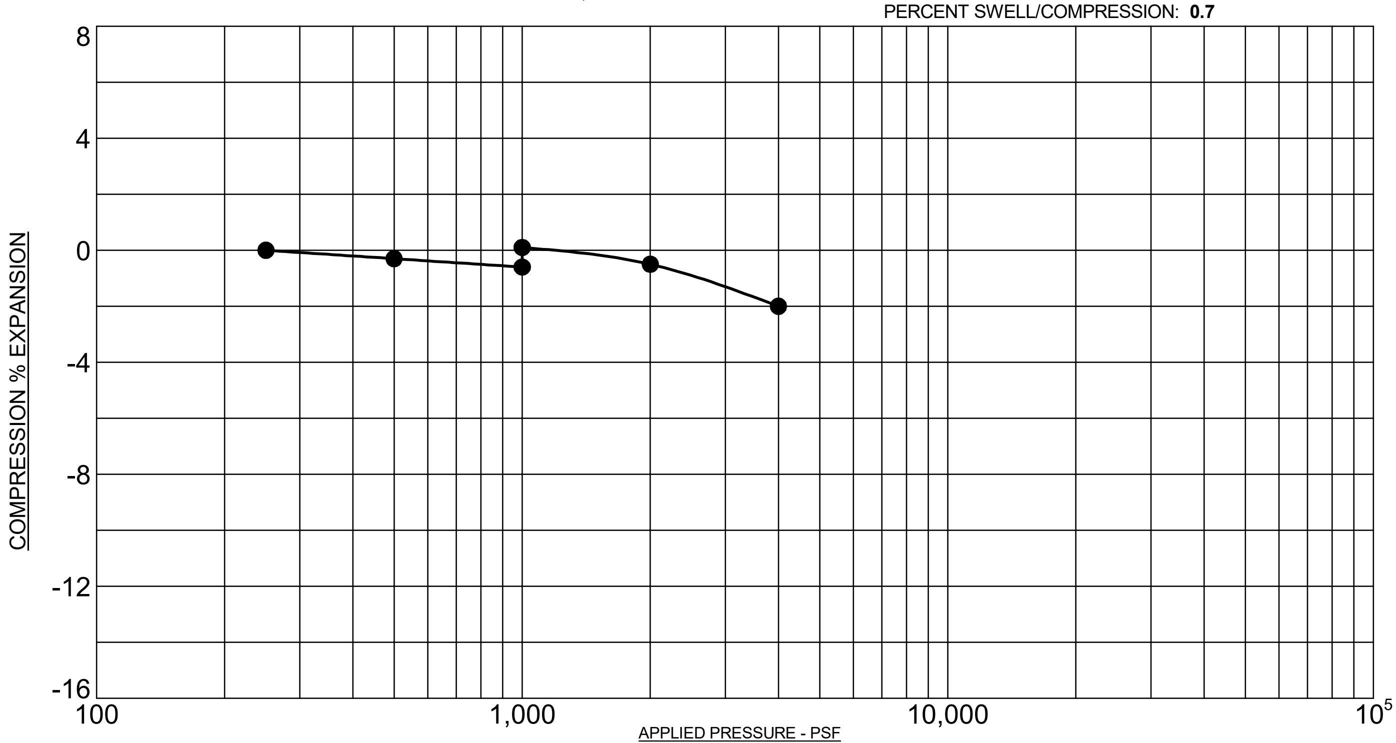
FIGURE No. 67

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **43 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **114.3 PCF**
NATURAL MOISTURE CONTENT: **11.7%**
PERCENT SWELL/COMPRESSION: **0.7**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **44 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **121.7 PCF**
NATURAL MOISTURE CONTENT: **10.8%**
PERCENT SWELL/COMPRESSION: **0.7**

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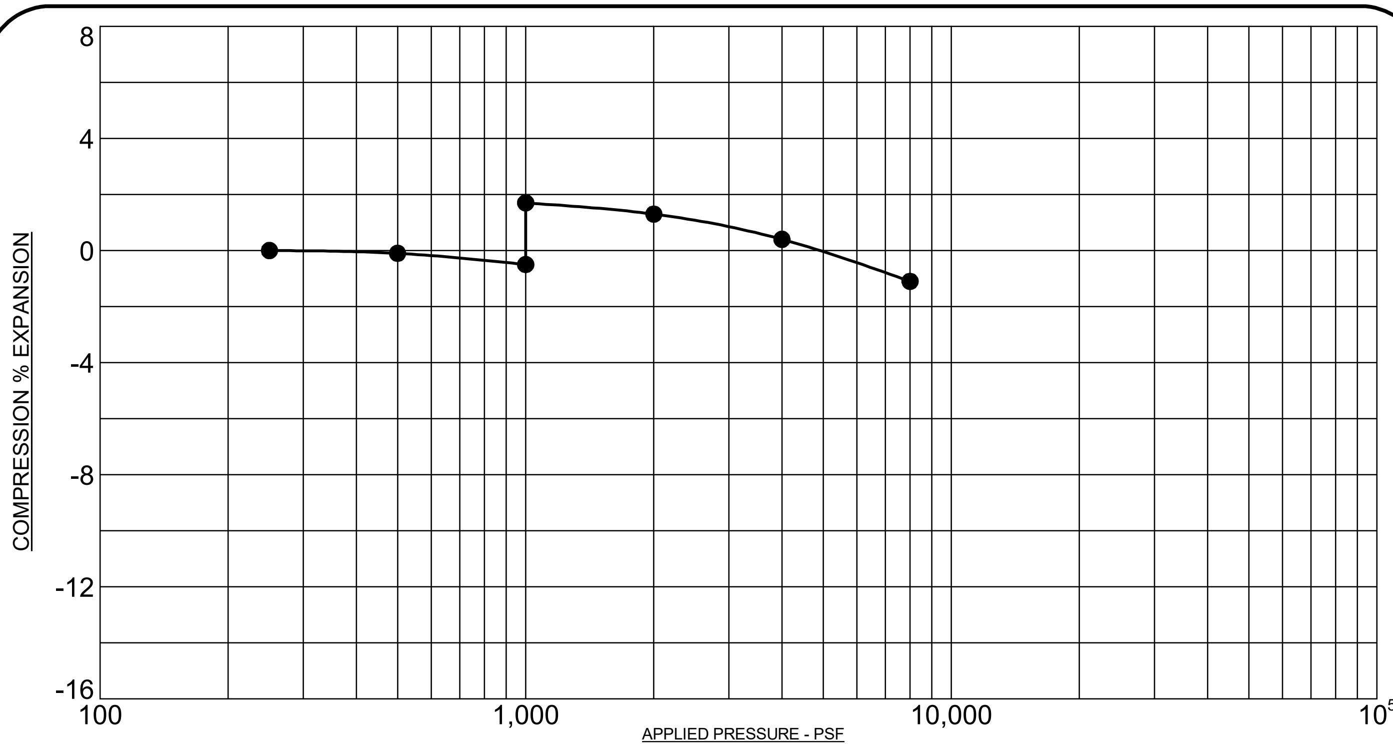
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

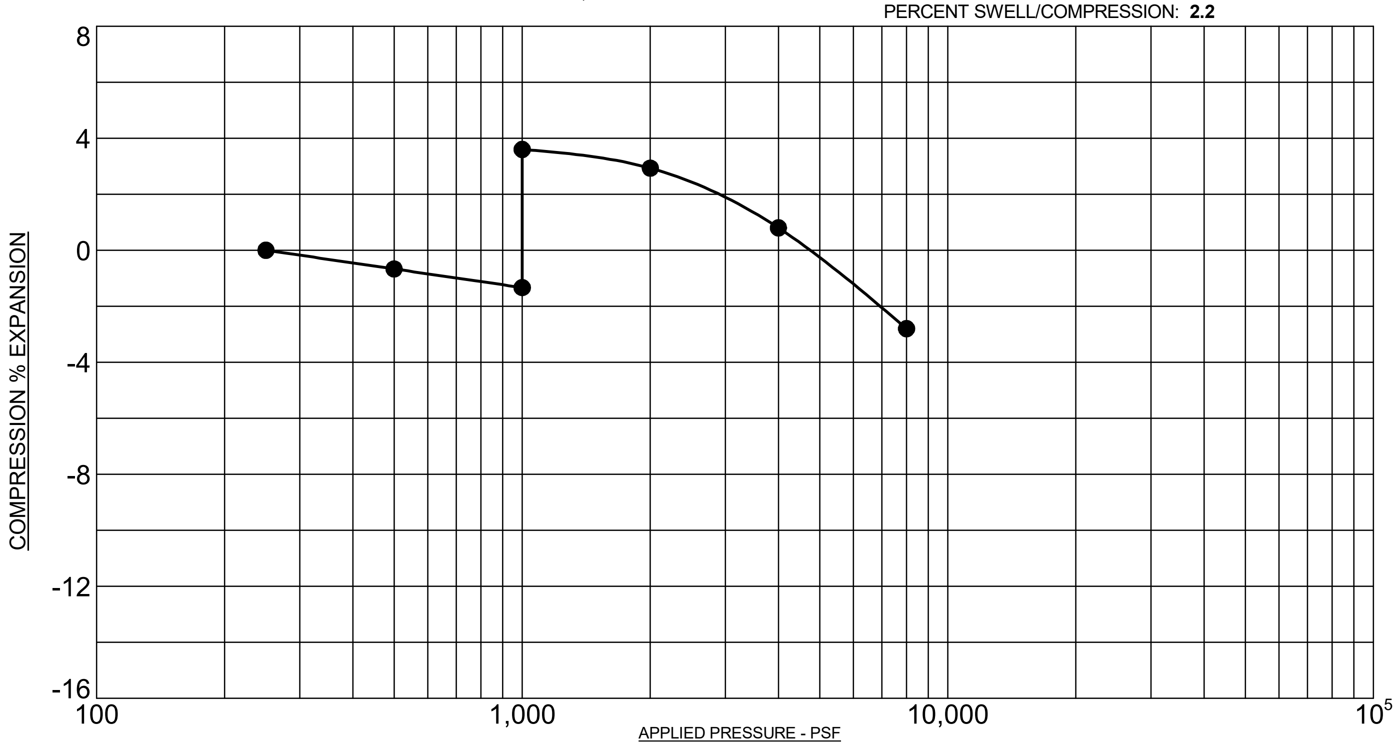
FIGURE No. 68

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **45 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **120.6 PCF**
NATURAL MOISTURE CONTENT: **12.0%**
PERCENT SWELL/COMPRESSION: **2.2**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **46 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **119.5 PCF**
NATURAL MOISTURE CONTENT: **10.4%**
PERCENT SWELL/COMPRESSION: **4.9**

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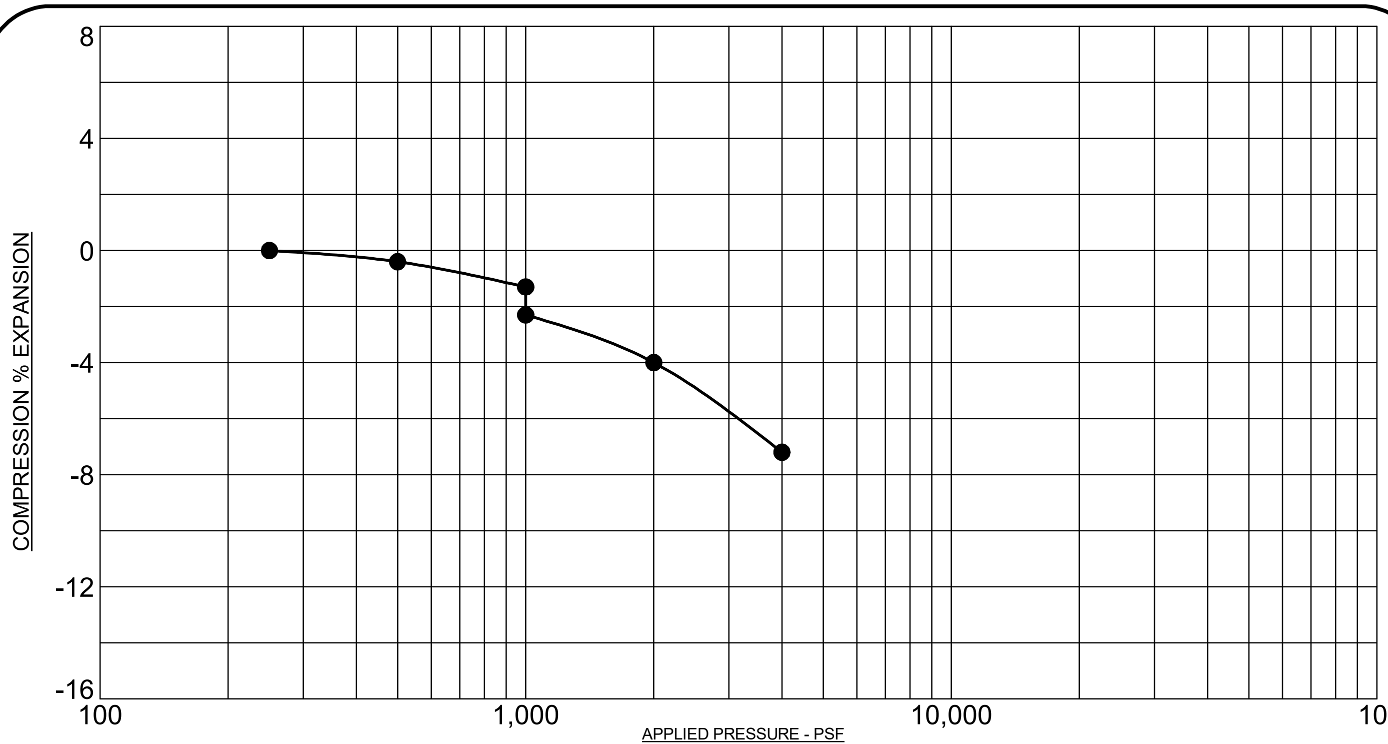
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

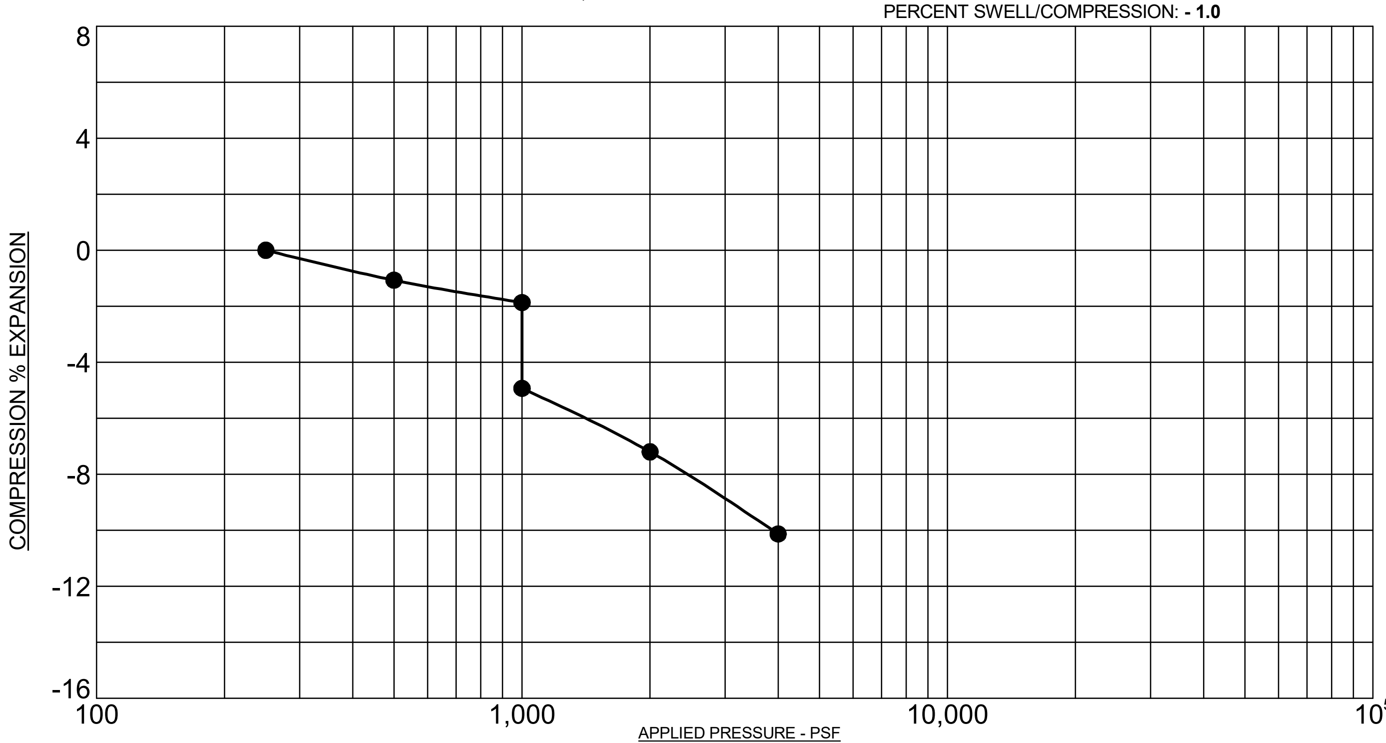
FIGURE No. 69

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **47 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **109.0 PCF**
NATURAL MOISTURE CONTENT: **11.6%**
PERCENT SWELL/COMPRESSION: **- 1.0**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **48 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **99.4 PCF**
NATURAL MOISTURE CONTENT: **12.1%**
PERCENT SWELL/COMPRESSION: **- 3.1**

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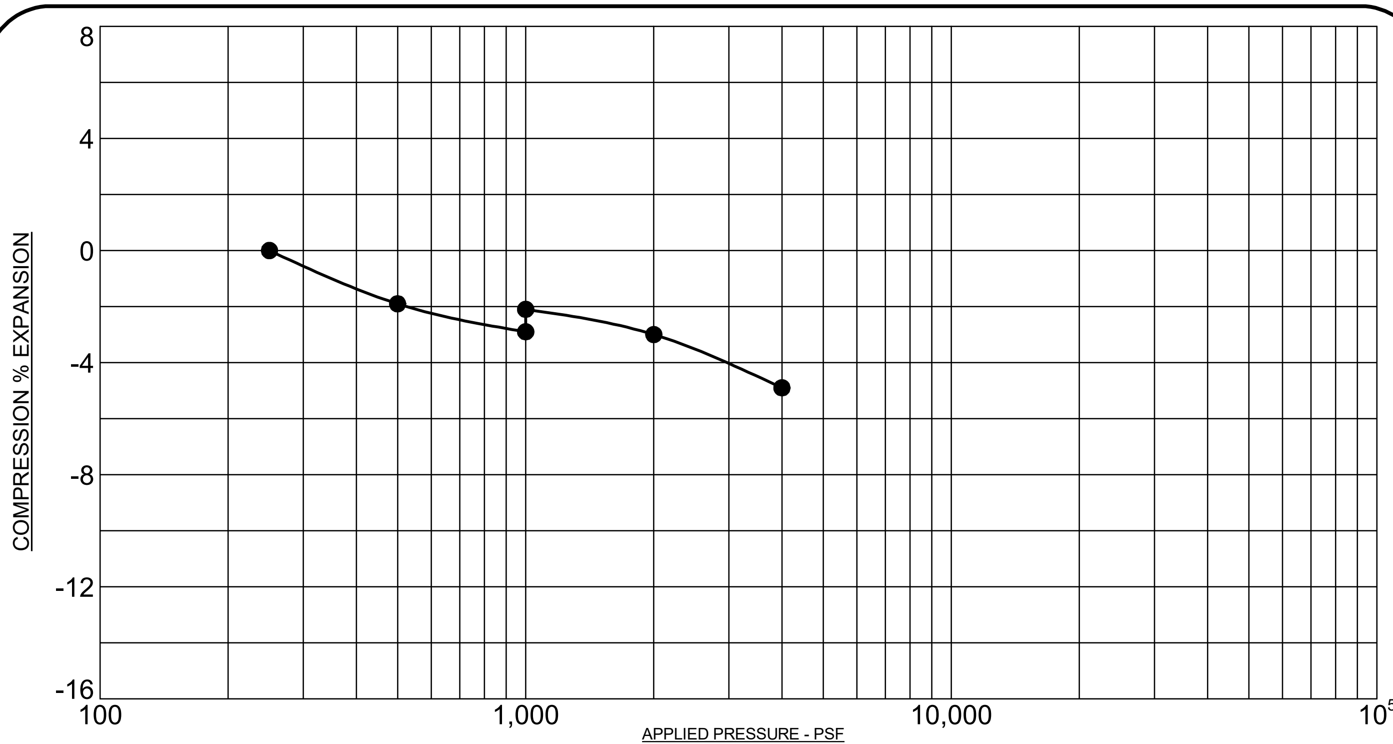
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

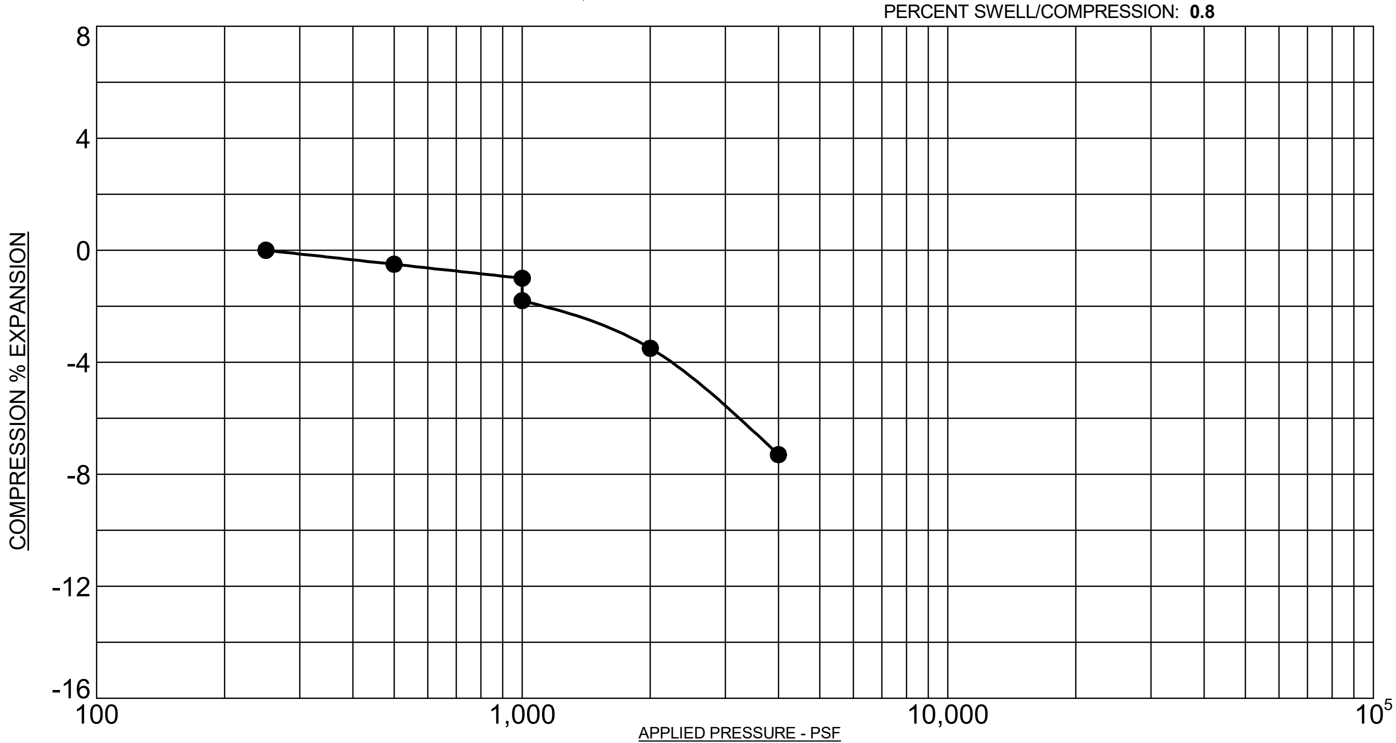
FIGURE No. 70

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **49 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **112.3 PCF**
NATURAL MOISTURE CONTENT: **12.7%**
PERCENT SWELL/COMPRESSION: **0.8**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **50 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **105.2 PCF**
NATURAL MOISTURE CONTENT: **10.7%**
PERCENT SWELL/COMPRESSION: **- 0.8**

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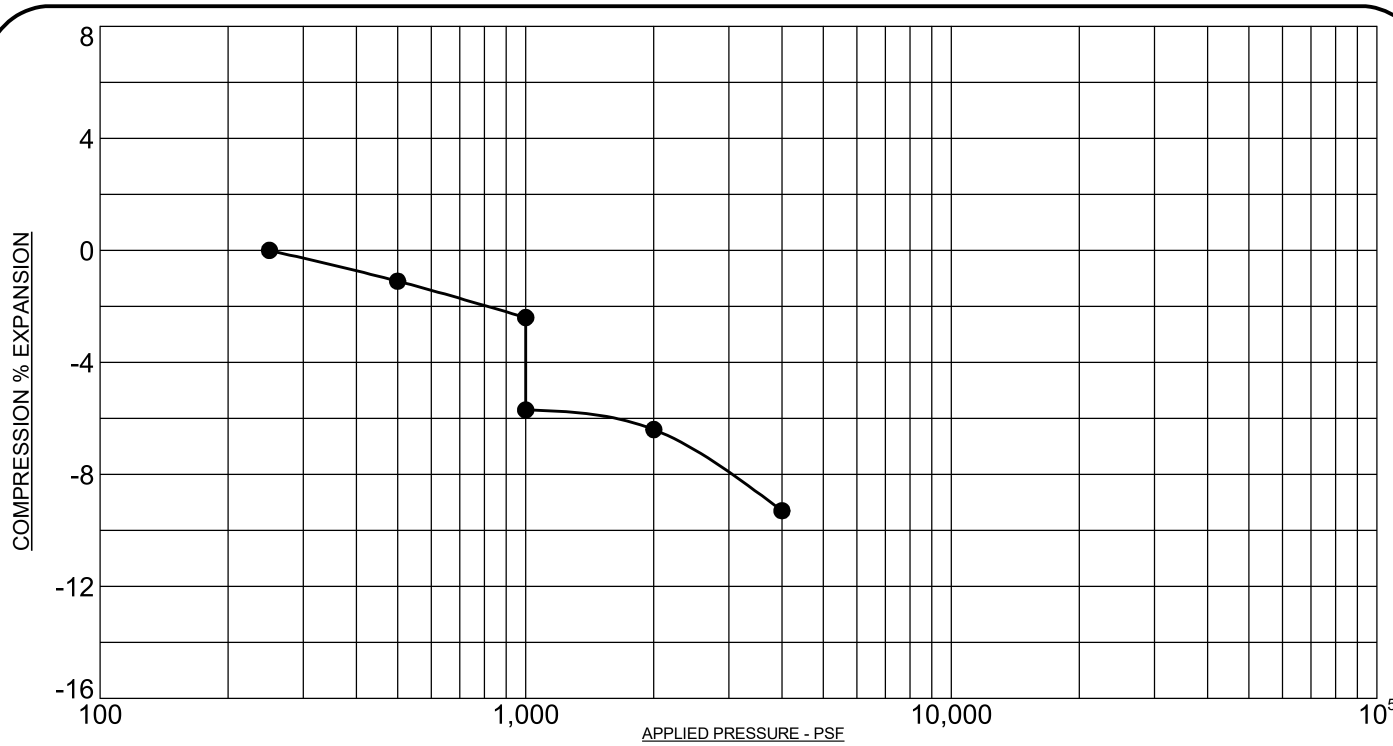
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

FIGURE No. 71

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **51 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **108.0 PCF**
NATURAL MOISTURE CONTENT: **9.9%**
PERCENT SWELL/COMPRESSION: **- 3.3**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **52 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **103.9 PCF**
NATURAL MOISTURE CONTENT: **7.0%**
PERCENT SWELL/COMPRESSION: **- 0.3**

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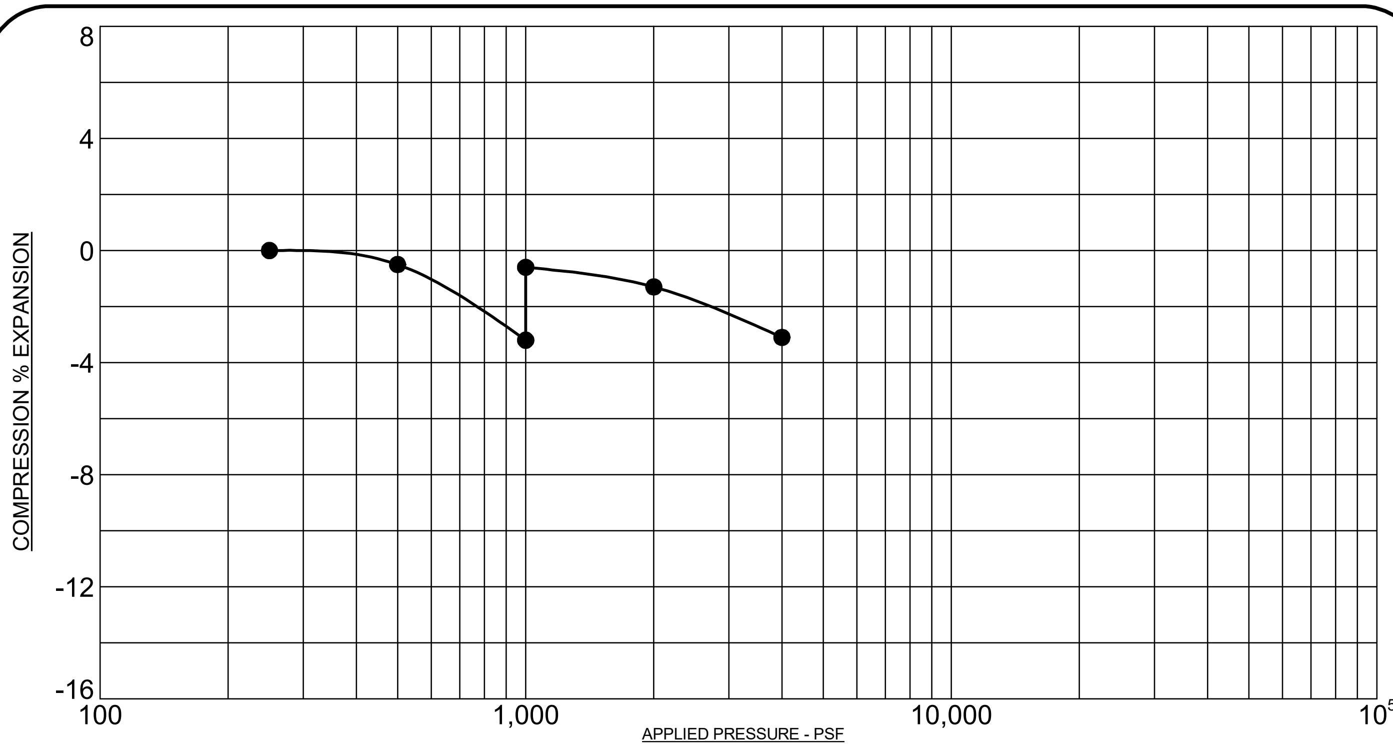
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

FIGURE No. 72

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **53 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **112.1 PCF**
NATURAL MOISTURE CONTENT: **8.6%**
PERCENT SWELL/COMPRESSION: **2.6**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **54 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **119.0 PCF**
NATURAL MOISTURE CONTENT: **10.7%**
PERCENT SWELL/COMPRESSION: **3.2**

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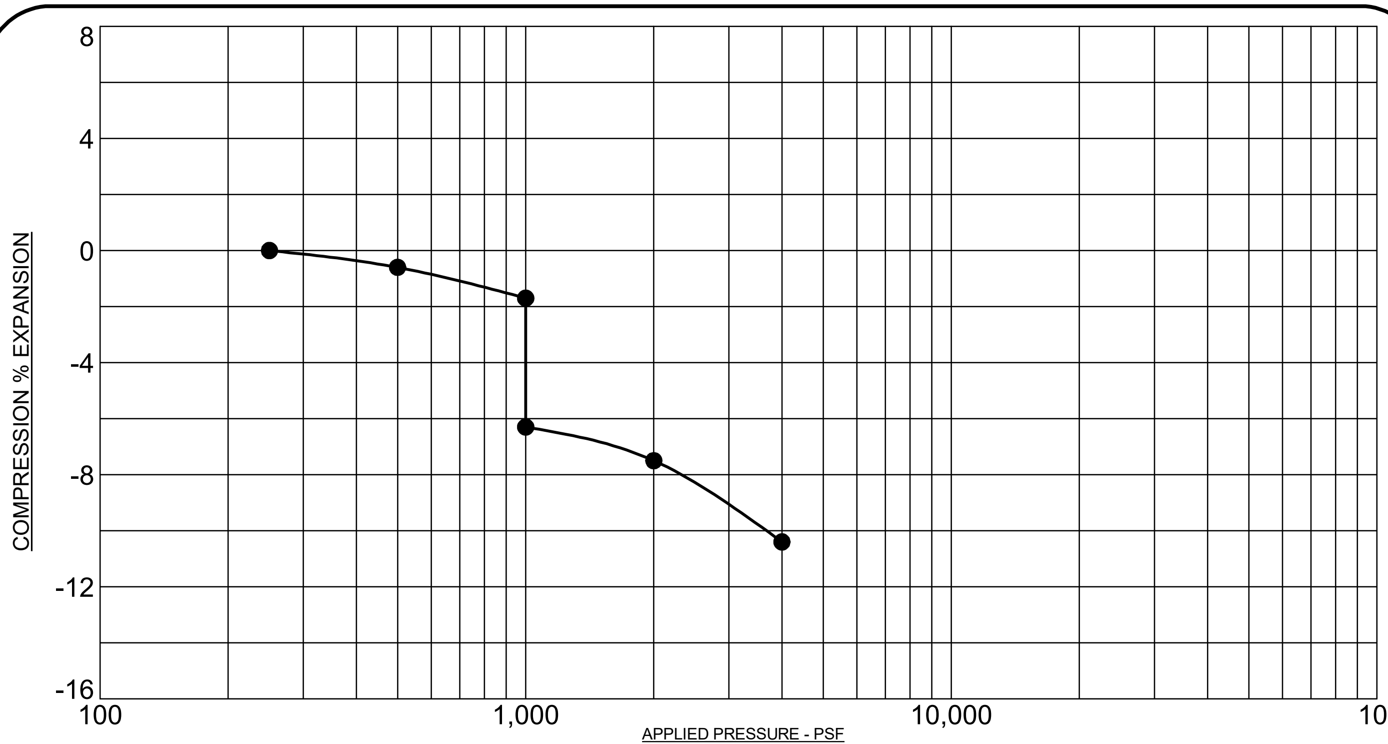
JOB No. 181988

FIGURE No. 73

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **55 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **99.6 PCF**
NATURAL MOISTURE CONTENT: **7.8%**
PERCENT SWELL/COMPRESSION: **- 4.6**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **56 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **112.2 PCF**
NATURAL MOISTURE CONTENT: **8.9%**
PERCENT SWELL/COMPRESSION: **2.6**

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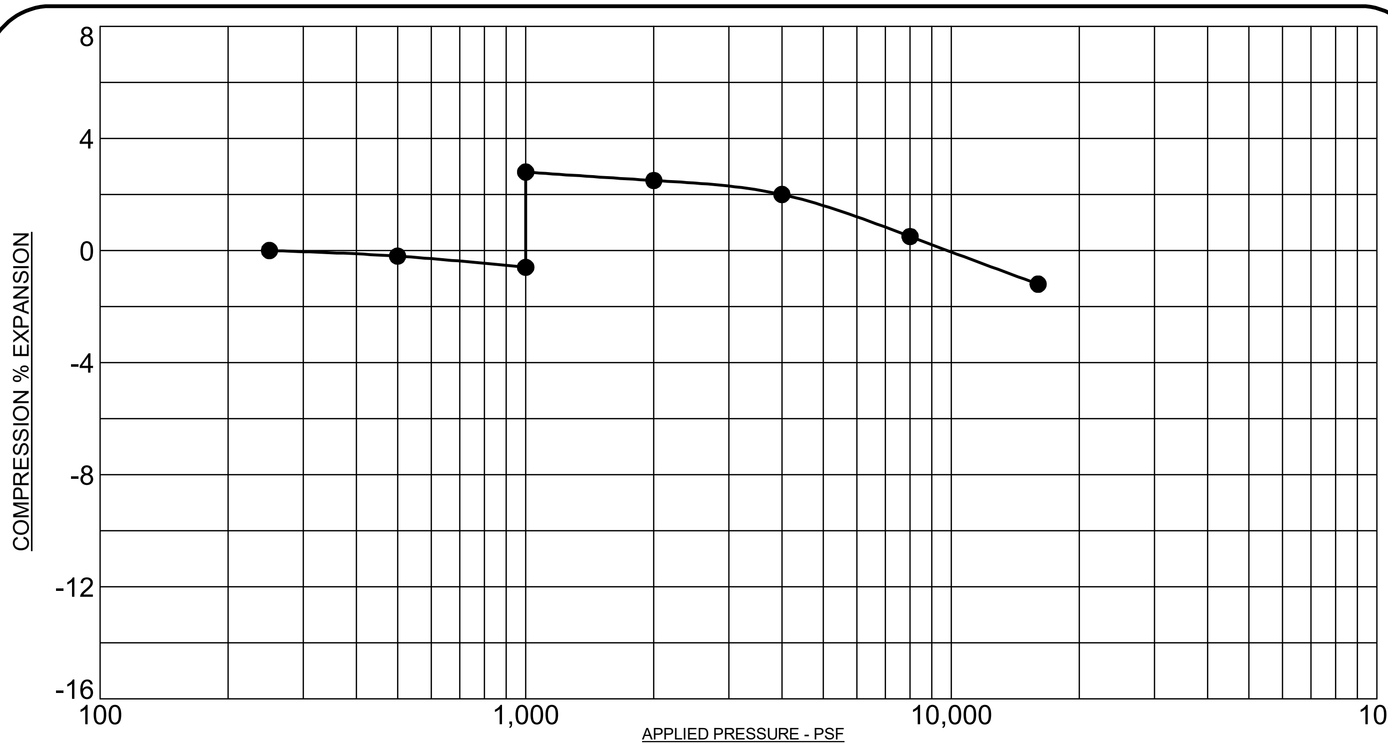
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

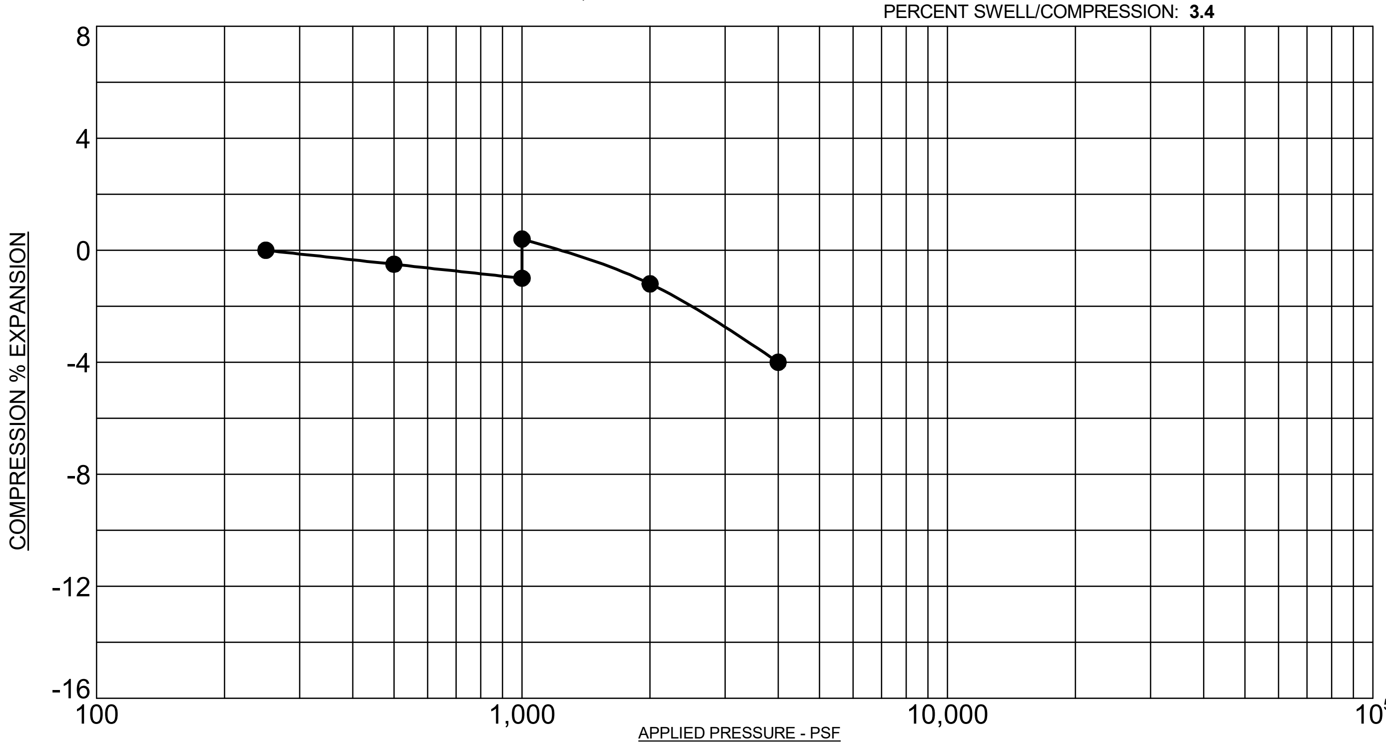
FIGURE No. 74

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **57 @ 19 FT**
NATURAL DRY UNIT WEIGHT: **125.5 PCF**
NATURAL MOISTURE CONTENT: **9.9%**
PERCENT SWELL/COMPRESSION: **3.4**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **58 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **105.9 PCF**
NATURAL MOISTURE CONTENT: **9.5%**
PERCENT SWELL/COMPRESSION: **1.4**

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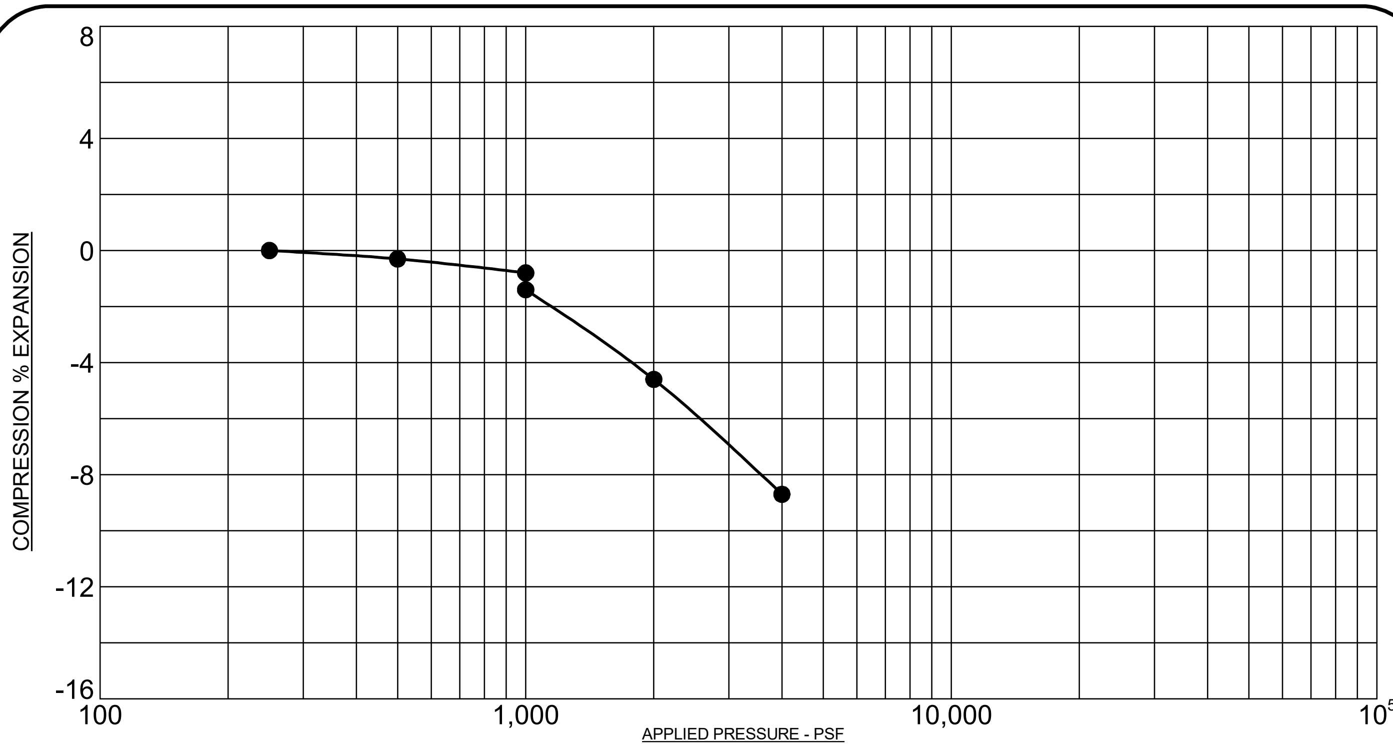
JOB No. 181988

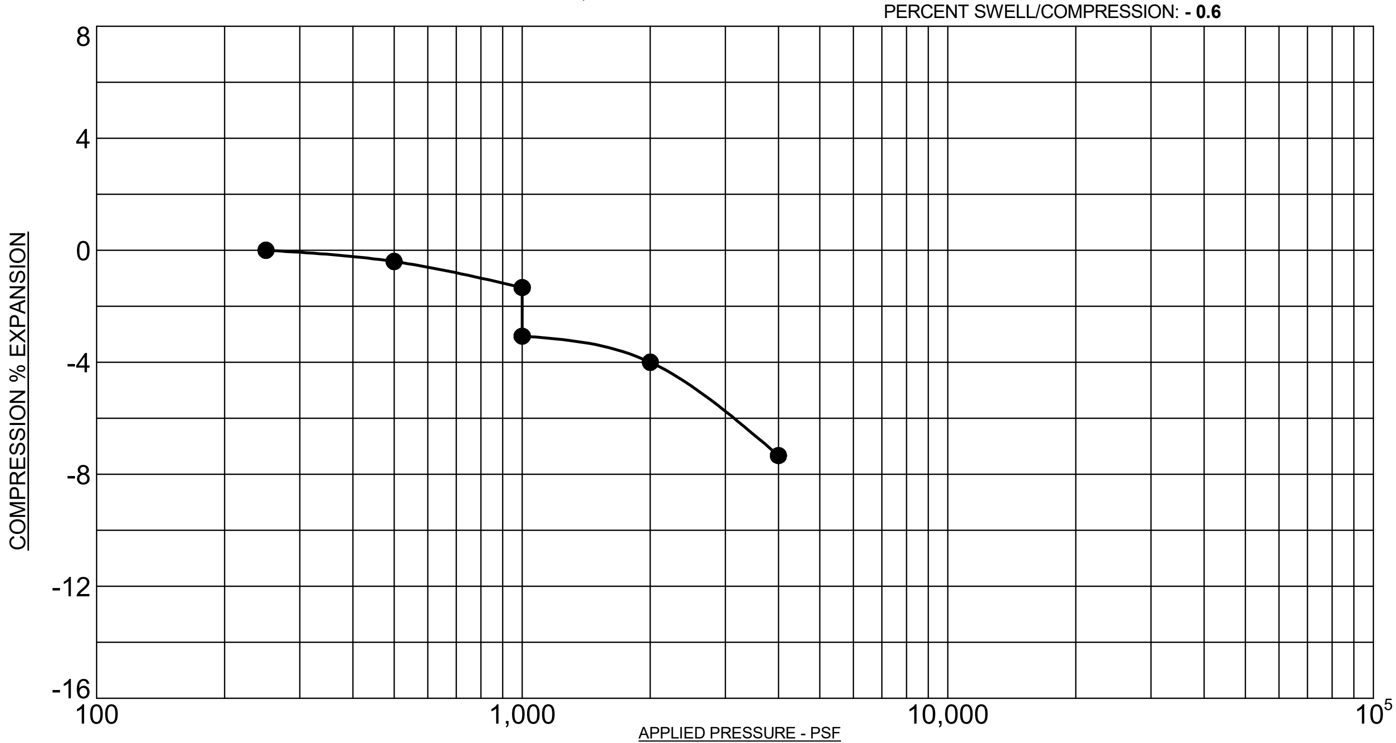
FIGURE No. 75

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **60 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **87.8 PCF**
NATURAL MOISTURE CONTENT: **8.9%**
PERCENT SWELL/COMPRESSION: **- 0.6**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **61 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **95.7 PCF**
NATURAL MOISTURE CONTENT: **9.7%**
PERCENT SWELL/COMPRESSION: **- 1.7**

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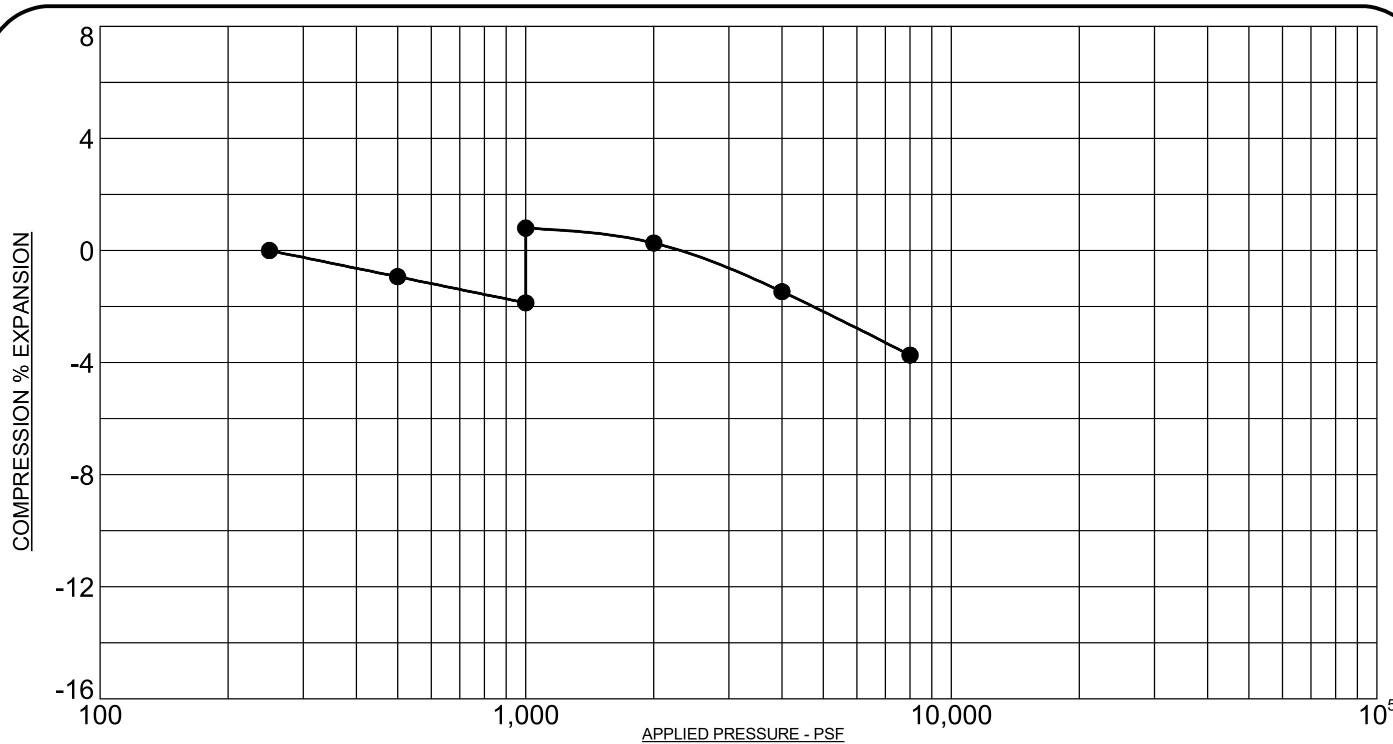
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

FIGURE No. 76

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **63 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **110.9 PCF**
NATURAL MOISTURE CONTENT: **12.4%**
PERCENT SWELL/COMPRESSION: **2.7**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **64 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **99.7 PCF**
NATURAL MOISTURE CONTENT: **9.3%**
PERCENT SWELL/COMPRESSION: **- 1.6**

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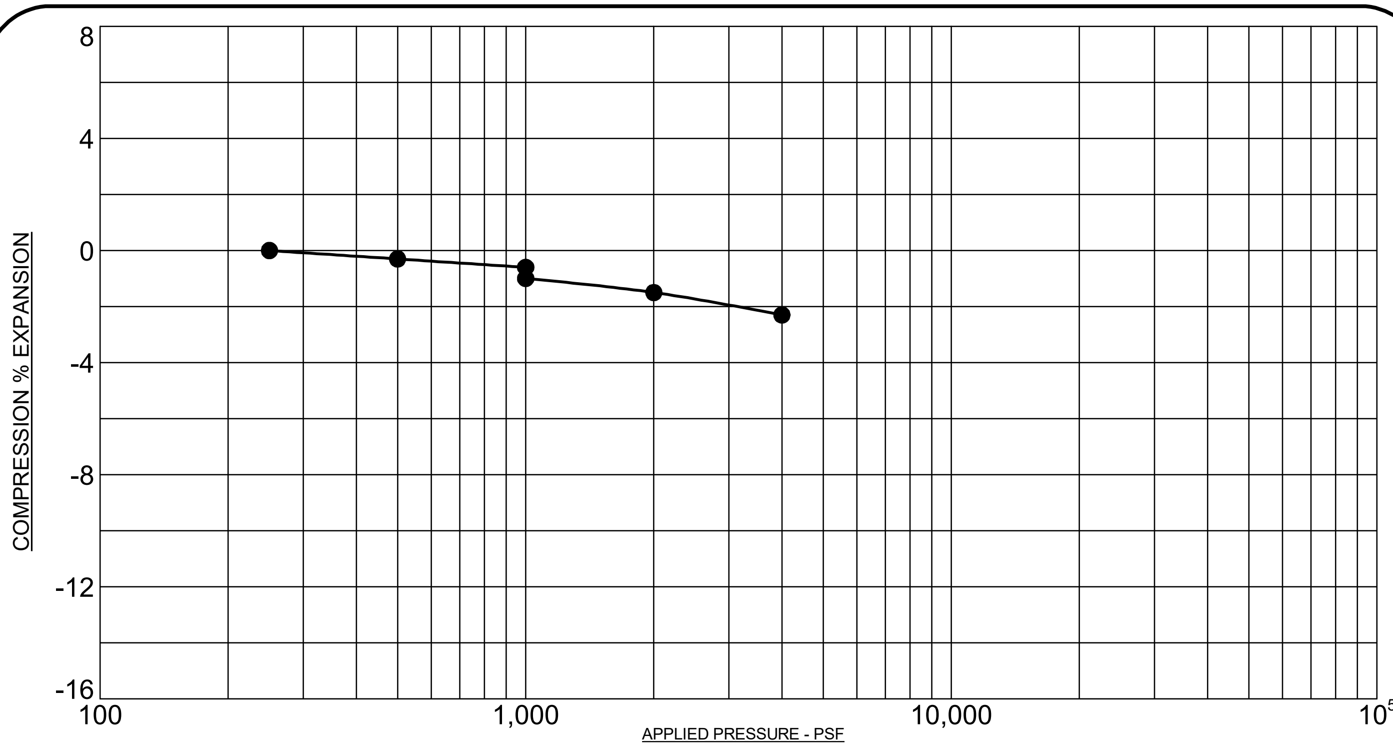
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

FIGURE No. 77

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **65 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **92.7 PCF**
NATURAL MOISTURE CONTENT: **9.6%**
PERCENT SWELL/COMPRESSION: **- 0.4**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **66 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **98.1 PCF**
NATURAL MOISTURE CONTENT: **7.7%**
PERCENT SWELL/COMPRESSION: **- 0.5**

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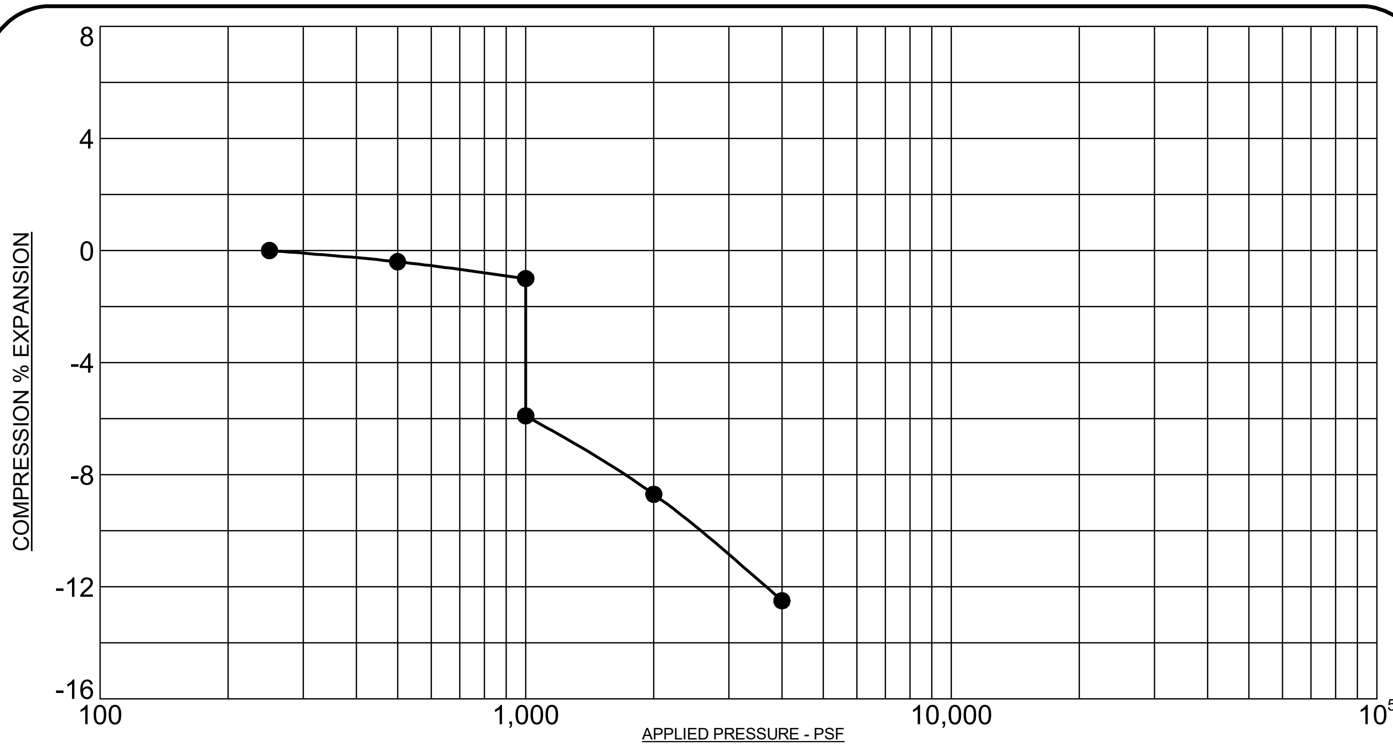
JOB No. 181988

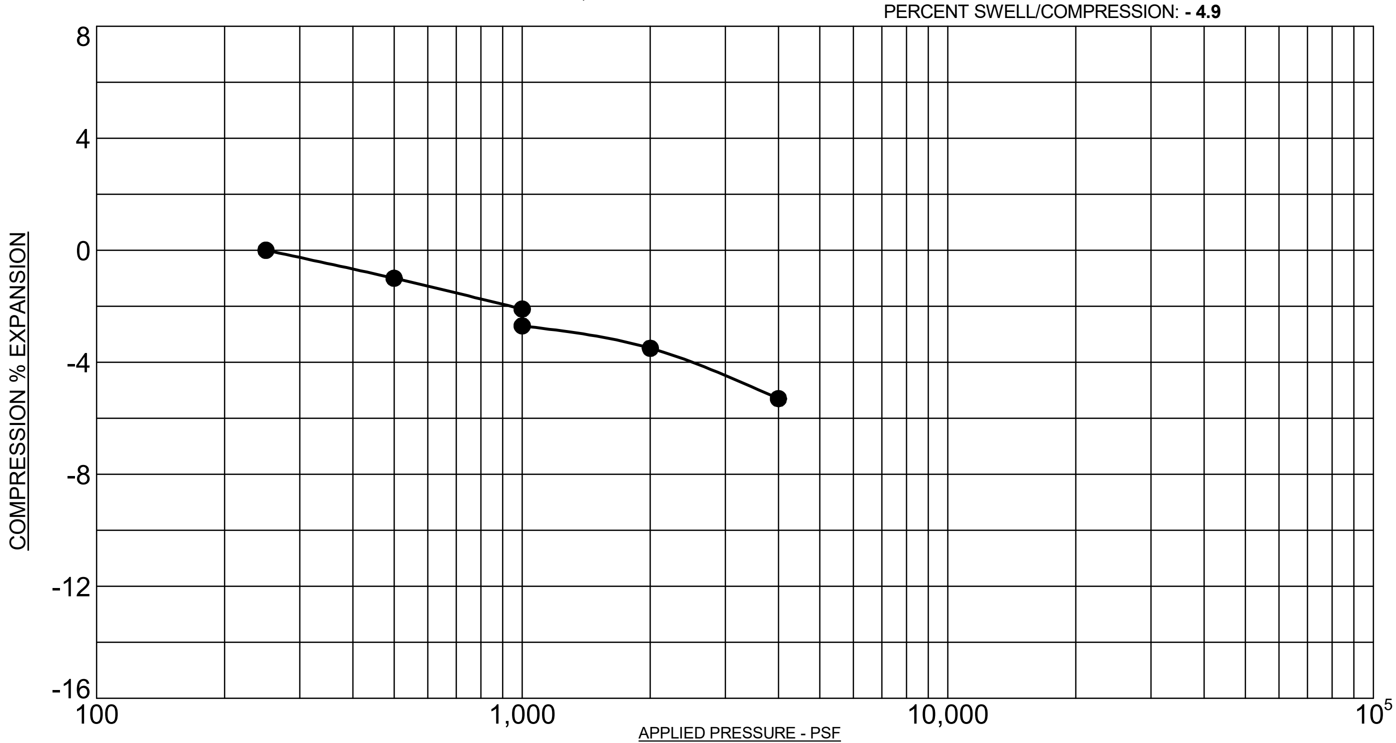
FIGURE No. 78

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **67 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **88.1 PCF**
NATURAL MOISTURE CONTENT: **7.1%**
PERCENT SWELL/COMPRESSION: **- 4.9**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **69 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **107.0 PCF**
NATURAL MOISTURE CONTENT: **11.6%**
PERCENT SWELL/COMPRESSION: **- 0.6**

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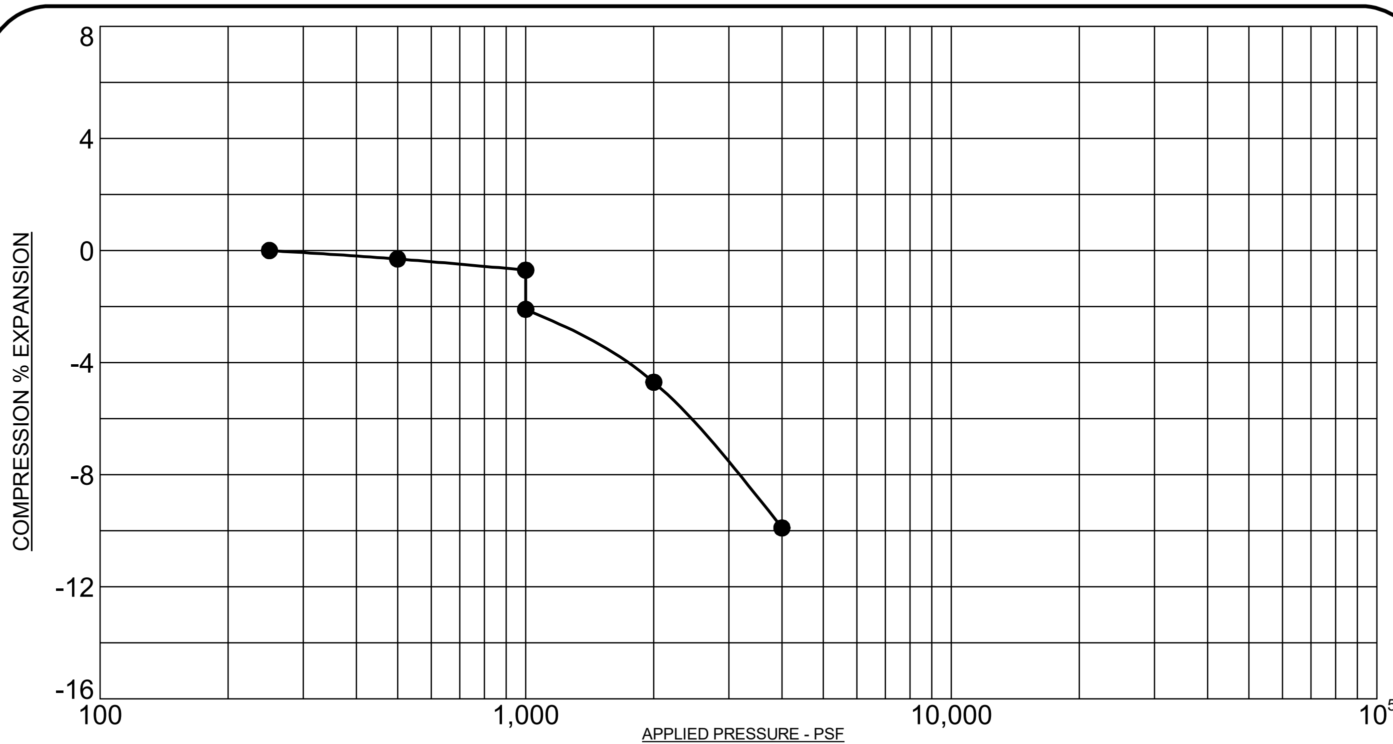
JOB No. 181988

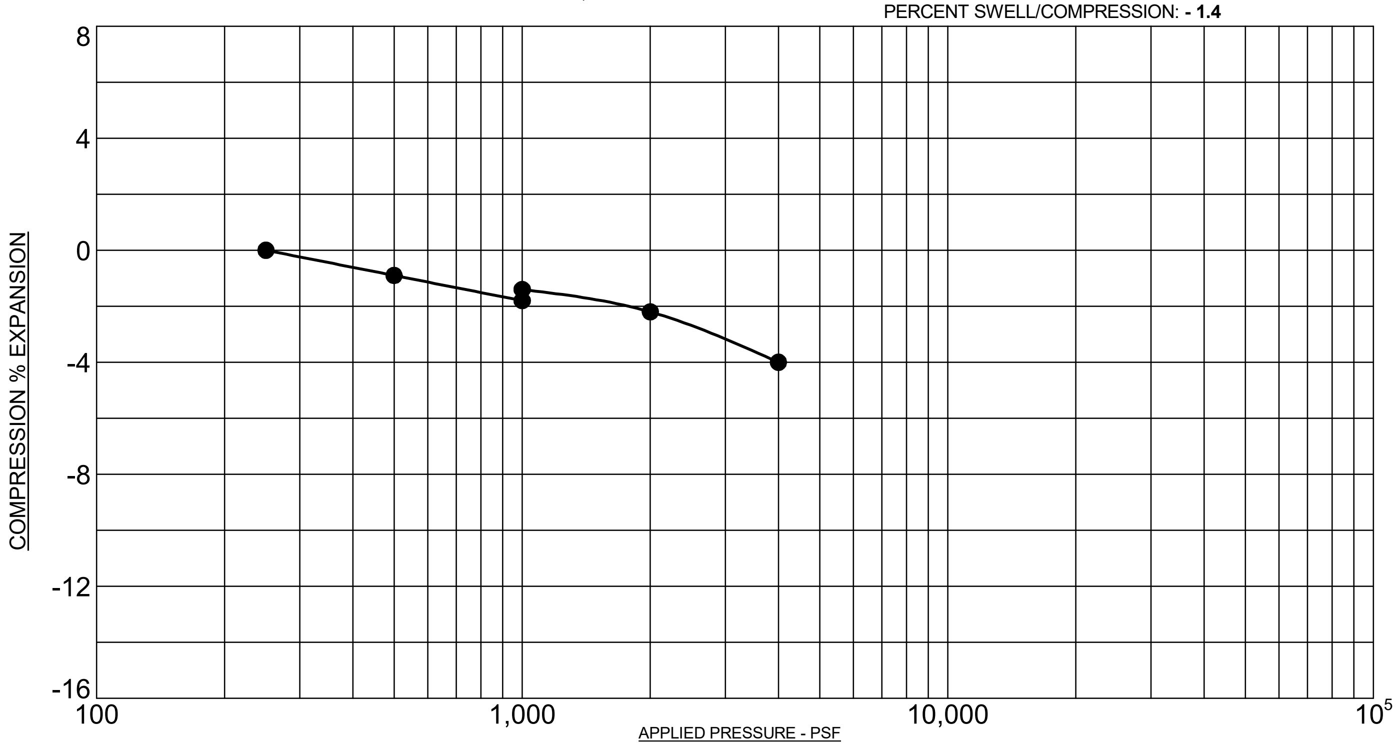
FIGURE No. 79

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **70 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **91.8 PCF**
NATURAL MOISTURE CONTENT: **8.2%**
PERCENT SWELL/COMPRESSION: **- 1.4**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **71 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **112.1 PCF**
NATURAL MOISTURE CONTENT: **11.4%**
PERCENT SWELL/COMPRESSION: **0.4**

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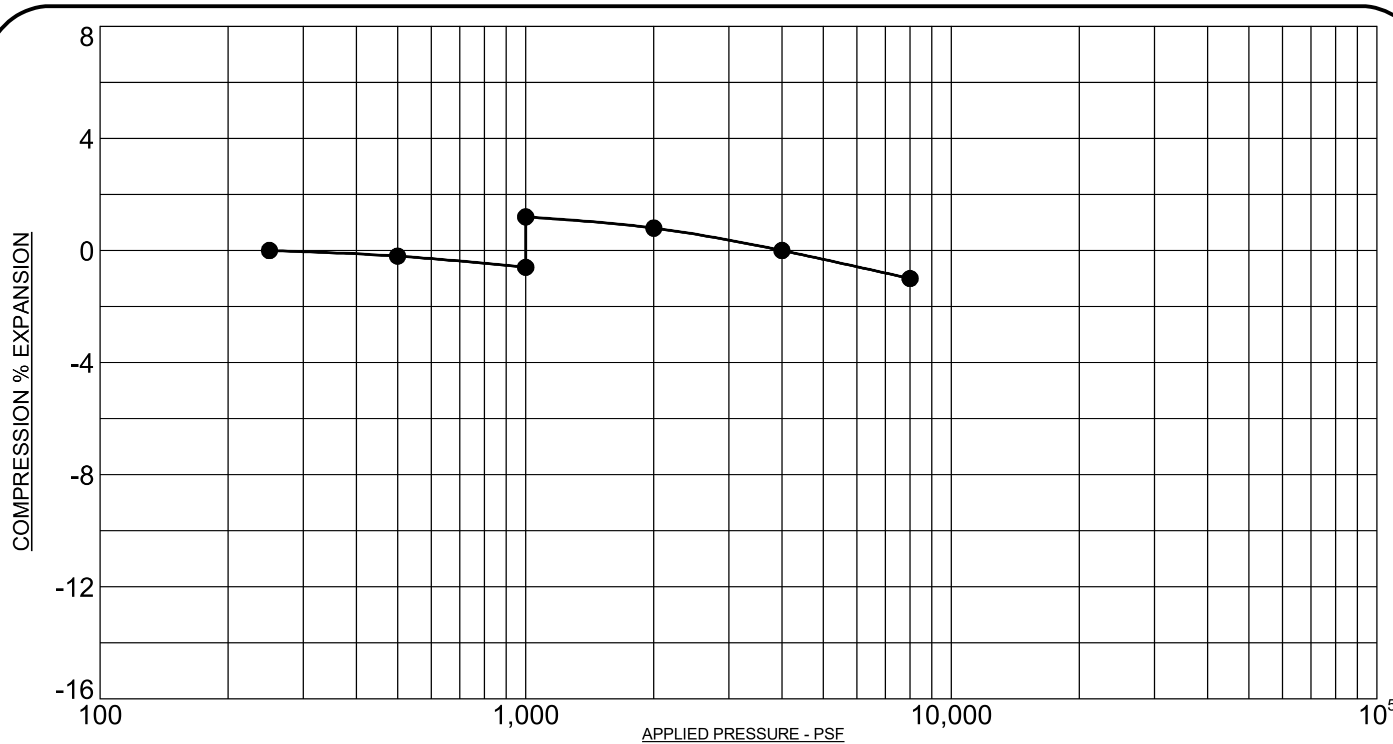
FIGURE No. 80

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **72 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **118.7 PCF**
NATURAL MOISTURE CONTENT: **11.7%**
PERCENT SWELL/COMPRESSION: **1.8**

PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **73 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **114.0 PCF**
NATURAL MOISTURE CONTENT: **11.6%**
PERCENT SWELL/COMPRESSION: **- 1.7**

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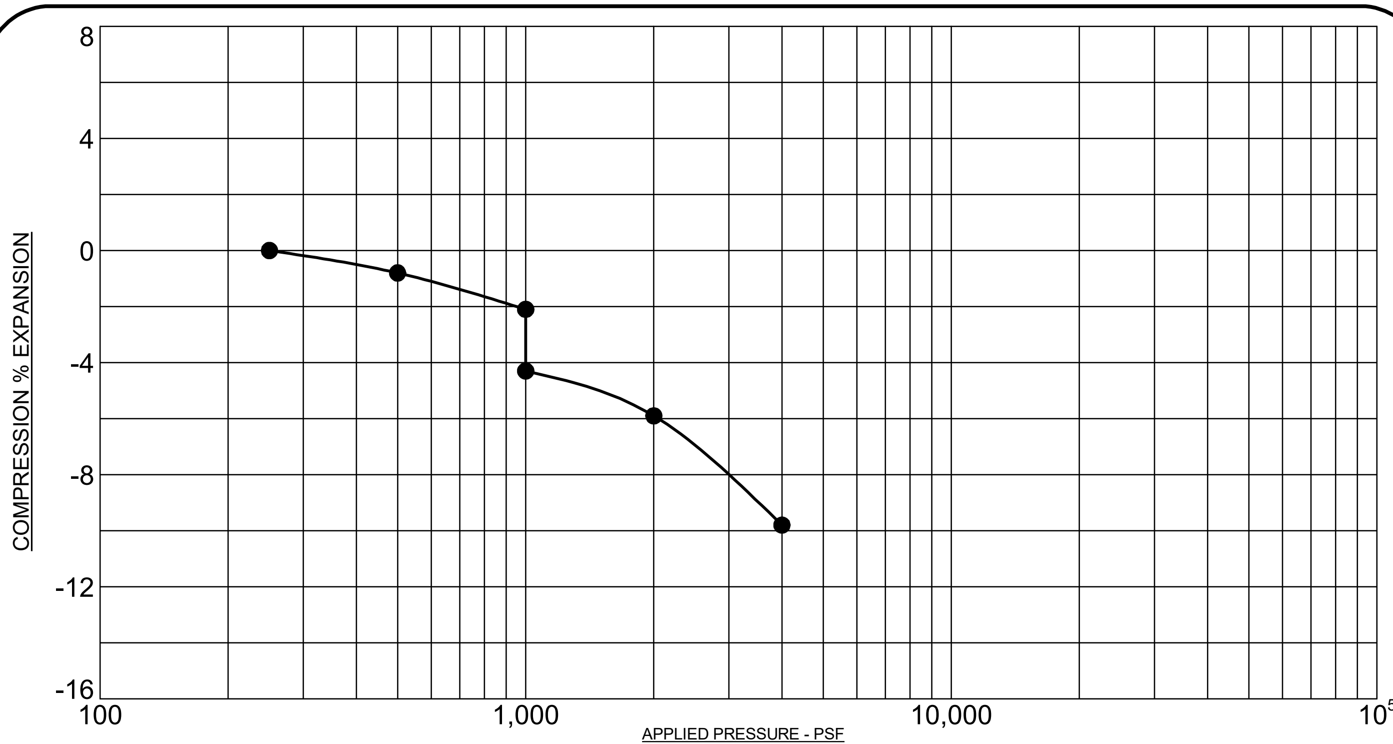
JOB No. 181988

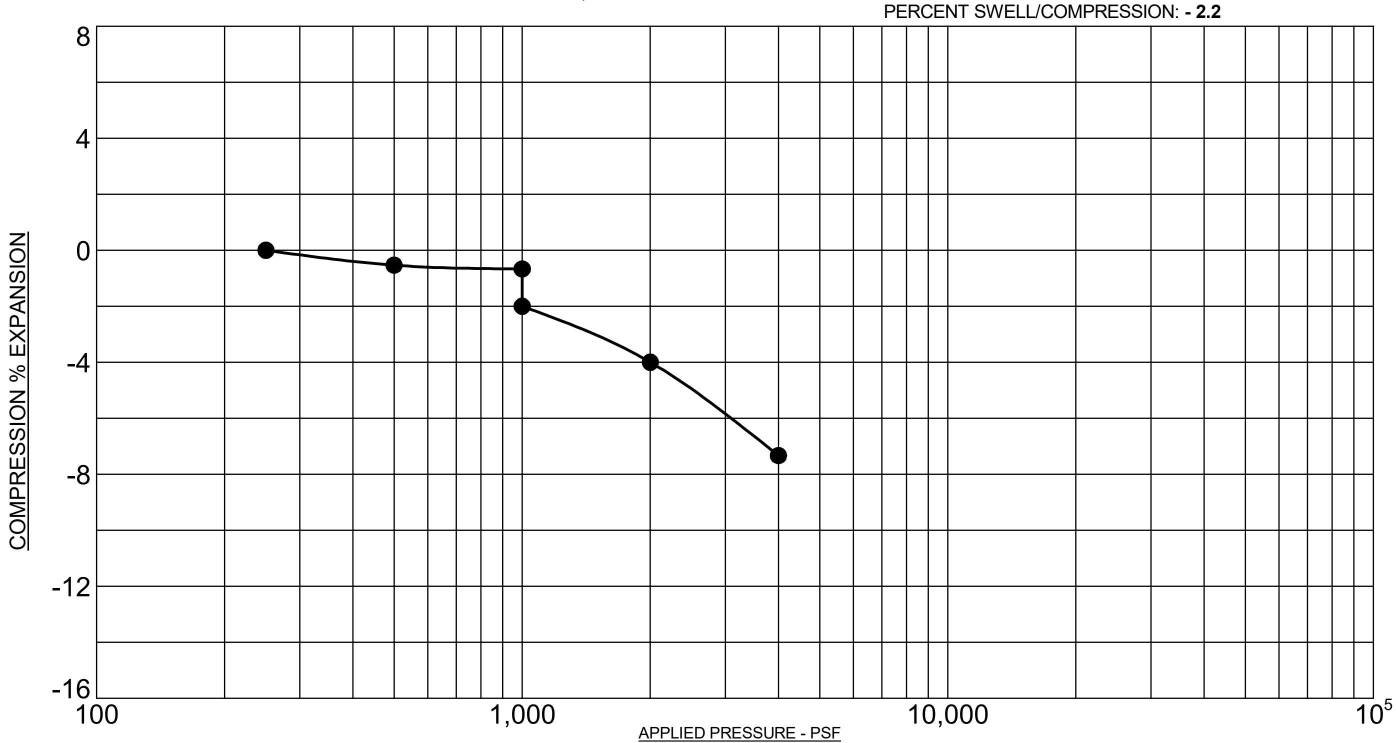
FIGURE No. 81

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **75 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **103.5 PCF**
NATURAL MOISTURE CONTENT: **7.3%**
PERCENT SWELL/COMPRESSION: **- 2.2**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **76 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **100.5 PCF**
NATURAL MOISTURE CONTENT: **11.6%**
PERCENT SWELL/COMPRESSION: **- 1.3**

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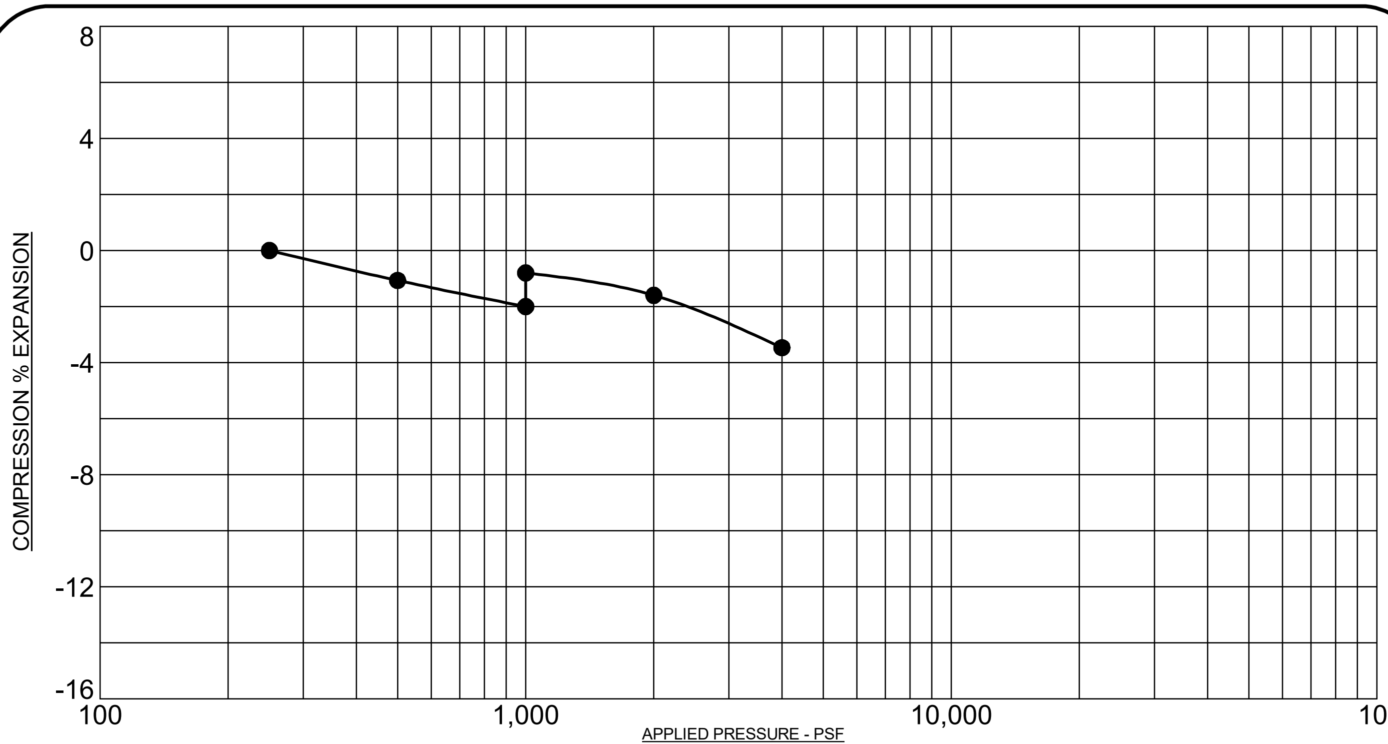
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

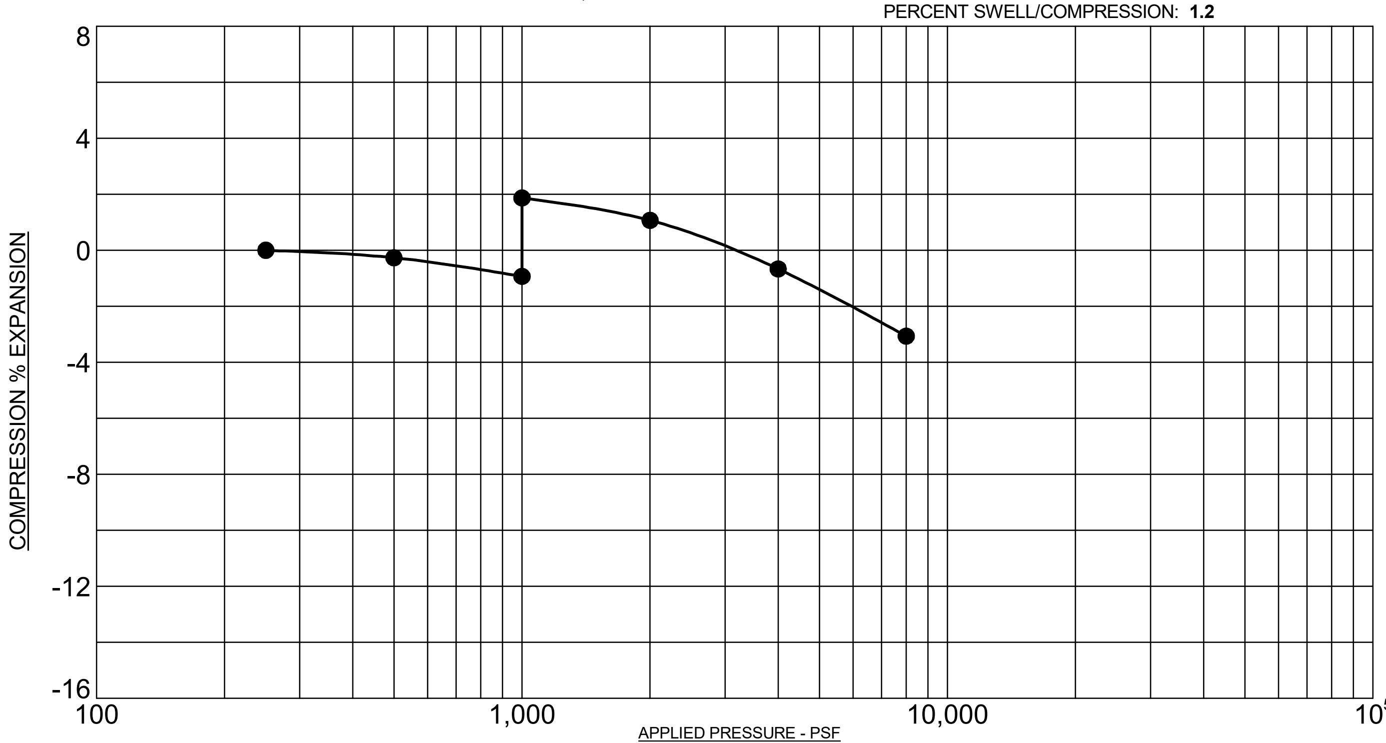
FIGURE No. 82

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **77 @ 14 FT**
NATURAL DRY UNIT WEIGHT: **119.4 PCF**
NATURAL MOISTURE CONTENT: **10.0%**
PERCENT SWELL/COMPRESSION: **1.2**



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAYSTONE, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **78 @ 9 FT**
NATURAL DRY UNIT WEIGHT: **114.0 PCF**
NATURAL MOISTURE CONTENT: **11.8%**
PERCENT SWELL/COMPRESSION: **2.8**

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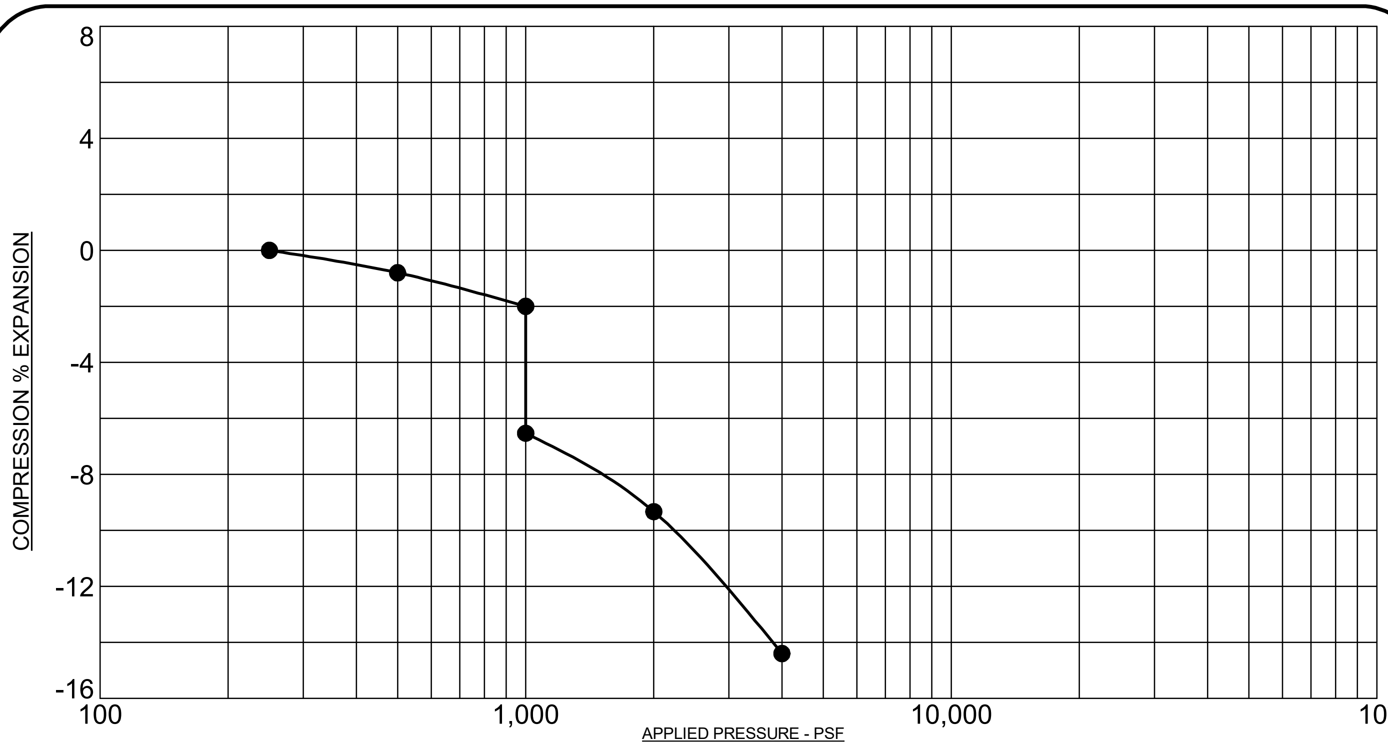
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

FIGURE No. 83

DATE Jan/03/2022



PROJECT: **Lorson Boulevard, Area I, El Paso County, Colorado**
SAMPLE DESCRIPTION: **CLAY, SANDY**
NOTE: SAMPLE WAS INUNDATED WITH WATER AT 1,000 PSF

SAMPLE LOCATION: **79 @ 4 FT**
NATURAL DRY UNIT WEIGHT: **101.1 PCF**
NATURAL MOISTURE CONTENT: **6.4%**
PERCENT SWELL/COMPRESSION: **- 4.5**

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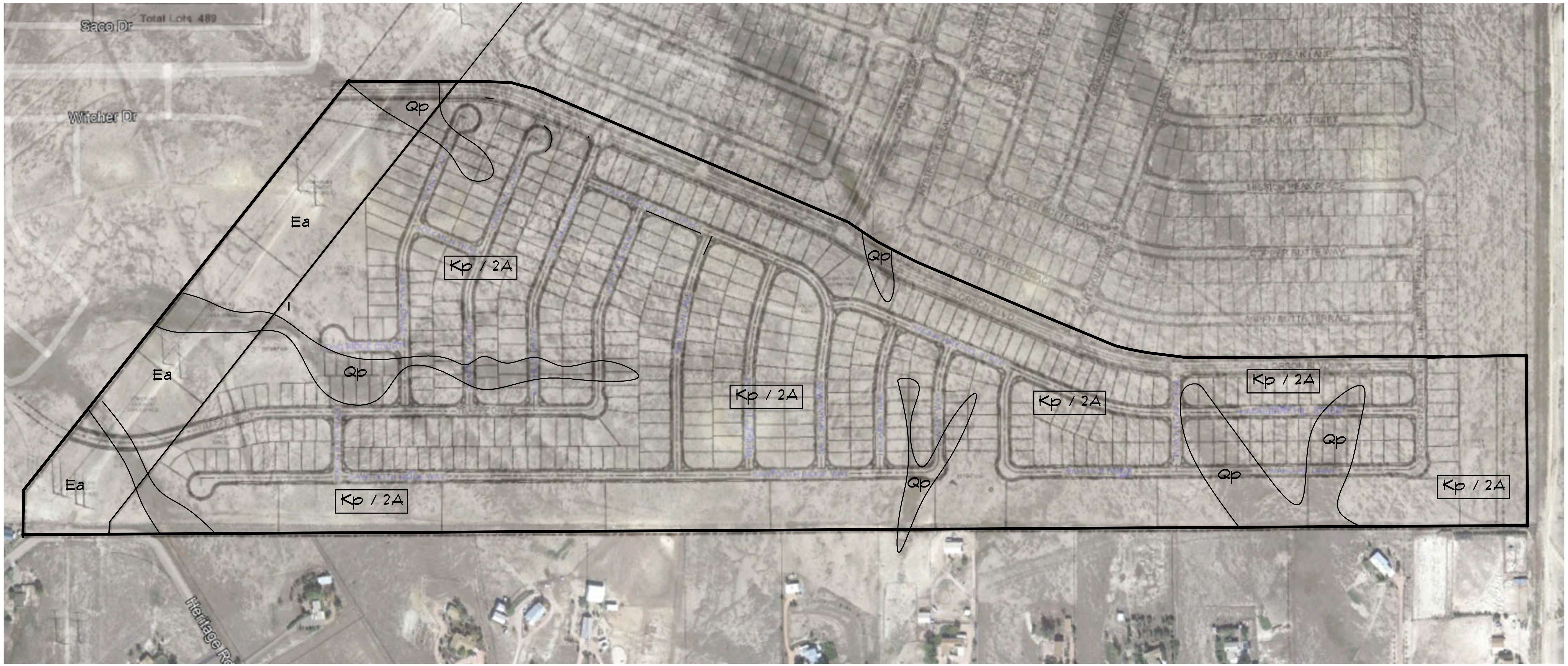
SWELL/CONSOLIDATION TEST RESULTS

JOB No. 181988

FIGURE No. 84

DATE Jan/03/2022



GEOLOGIC UNITS

- *Qp - Piney Creek Alluvium* - silty to gravelly humus-rich alluvium along/within all valleys. The alluvium was encountered in the borings across the site at various depths and is anticipated in the low-lying areas.
- *Kp - Pierre Shale, cone-in-cone zone of Lavington (1933)* dark-gray to tan-gray to olive-gray, subblocky to finely fissile non-calcareous shale, silty shale with thin bentonite beds and very fine grained-grained sandstone. Thickness of this zone is approximately 2,290 (Scott and Cobban, 1986). Residual clay and claystone were encountered in all the borings across the site up to depths of 20 feet.

ENGINEERING UNITS

- 2A - Stable alluvium, colluvium and bedrock on flat to gentle to moderate slopes (5 to 12%).

ADDITONAL UNIT

- Ea - *Powerline Easement* - to remain as open space. Development is not proposed within the easement.

REFERENCE
NOT TO SCALE

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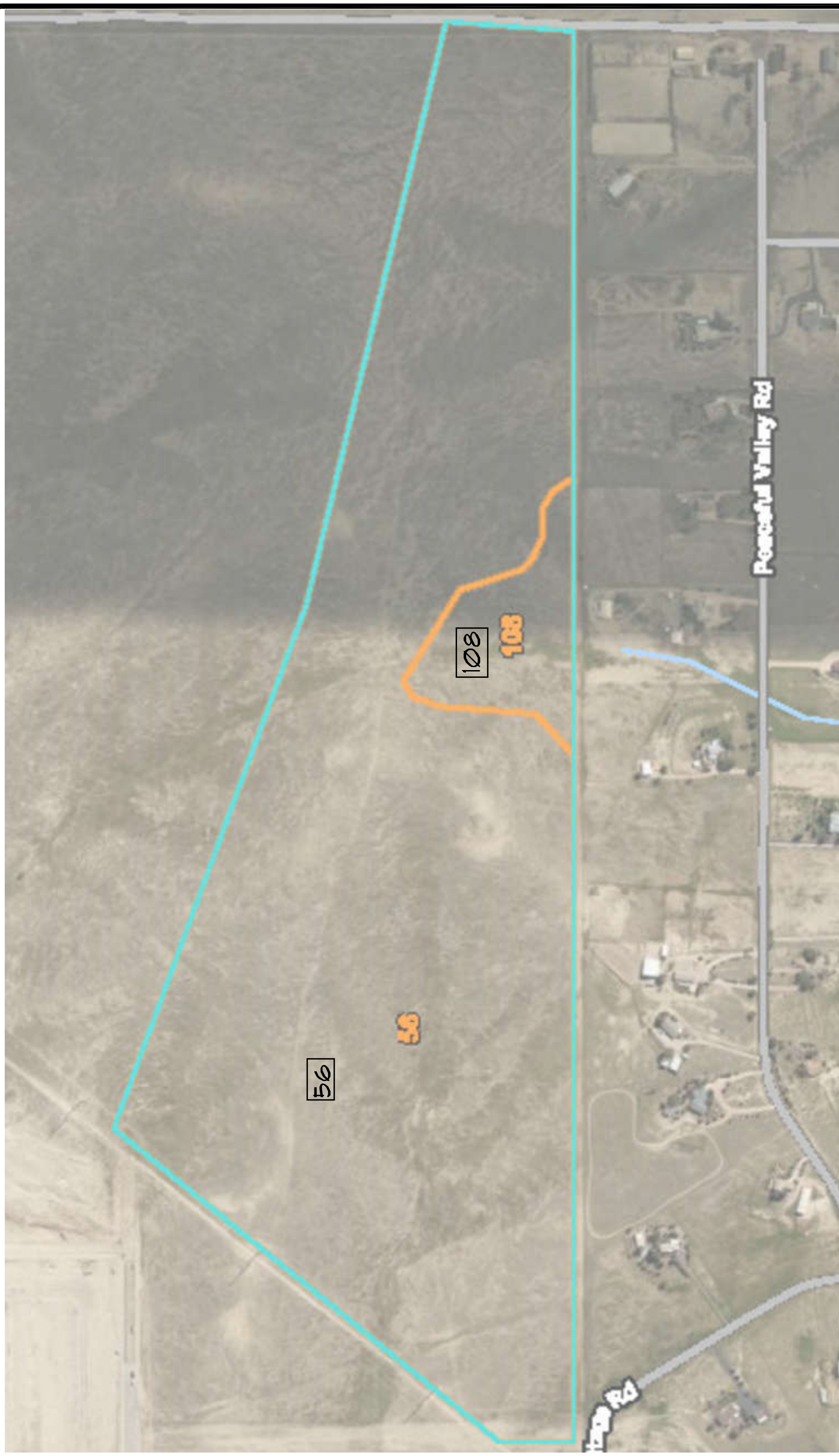
(719) 687-6077
Monument Office:
(719) 488-2145
Pueblo / Canon City:
(719) 544-7750

HILLSIDE AT LORSON RANCH, "AREA I"
EL PASO COUNTY, CO
LORSON RANCH METRO DIST. NO. 1

ENGINEER:	TM	
DRAWN BY:	KZ	
CHECKED BY:	TM	
ISSUED:	1/03/2022	
REVISION:		DATE: JOB #:

ENGINEERING AND GEOLOGY MAP

SHEET No. FIG-85



56 - Nelson-Tassel, fine sandy loam, 3 to 18 percent slopes

108 - Wiley silty loam, 3 to 9 percent slopes

PROPERTY BOUNDARIES ARE NOT ACCURATE, LINES DRAWN FOR VISUAL LOT PLACEMENT ONLY

NOT TO SCALE
BASE MAP PROVIDED BY USDA

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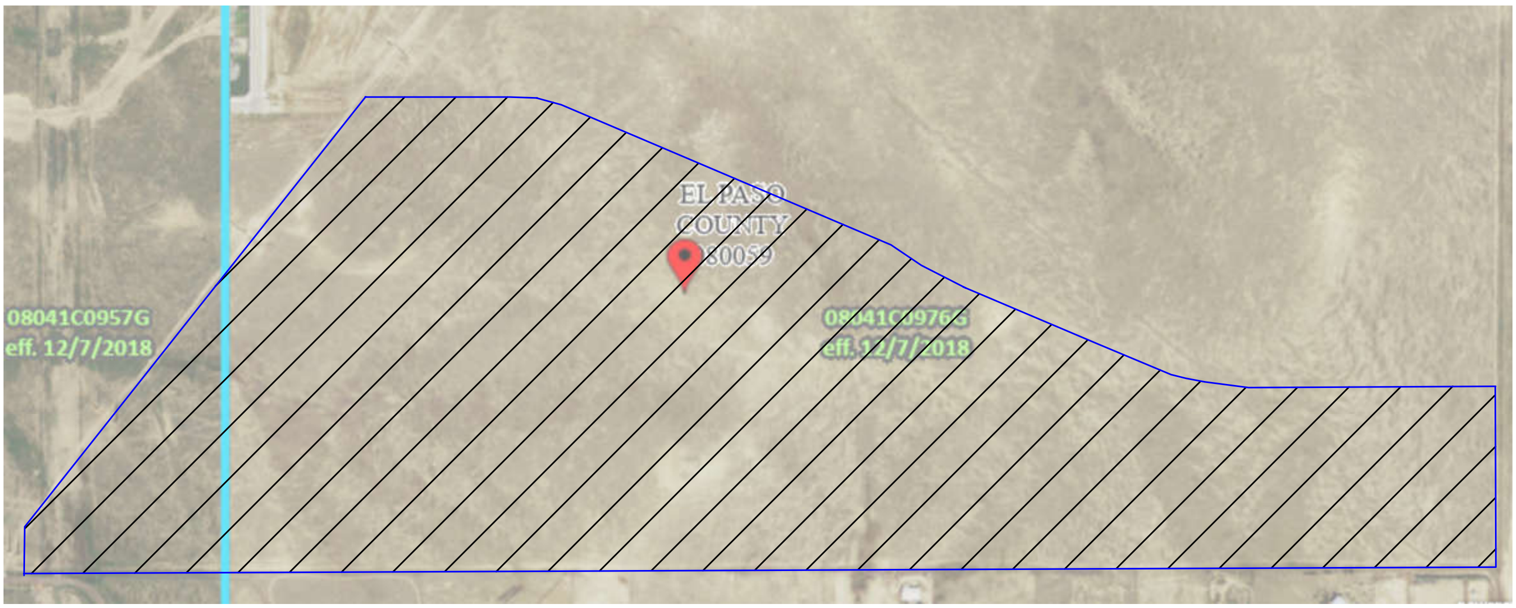
USDA SOIL SURVEY MAP

HILLSIDE AT LORSON RANCH
"AREA I"
EL PASO COUNTY, CO
LORSON RANCH METRO DIST. NO. 1

JOB No. 181988

FIG No. 86

DATE 1-3-2022



ENTIRE SITE IS ZONE X

NOT TO SCALE
BASE MAP PROVIDED BY FEMA

PROPERTY BOUNDARIES ARE NOT ACCURATE, LINES DRAWN FOR VISUAL LOT PLACMENT ONLY

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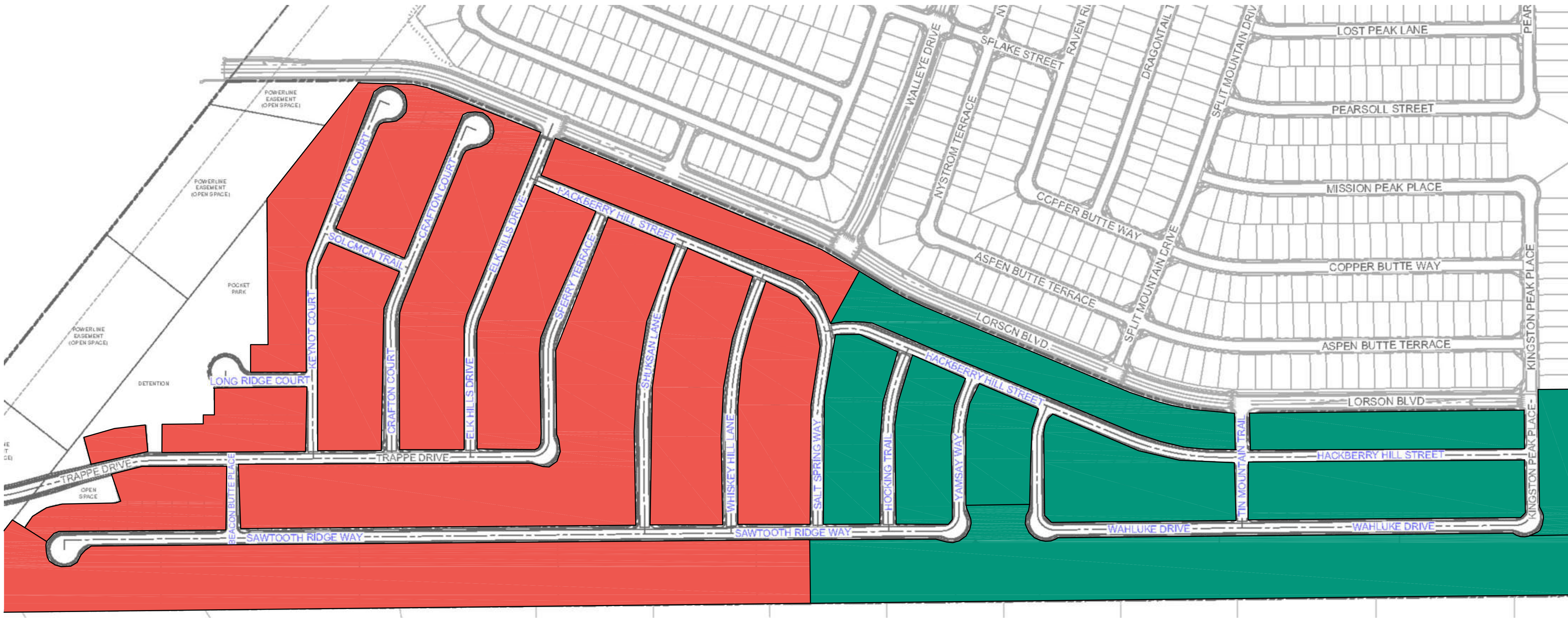
FEMA MAP

HILLSIDE AT LORSON RANCH
"AREA I"
EL PASO COUNTY, CO
LORSON RANCH METRO DIST. NO. 1

JOB No. 181988

FIG No. 87

DATE 1-3-2022



SUBEXCAVATION TO:
8 FEET BELOW AND **8 FEET** (LATERALLY) BEYOND **SPREAD FOOTING** FOUNDATION COMPONENTS

SUBEXCAVATION TO:
10 FEET BELOW AND **10 FEET** (LATERALLY) BEYOND **SPREAD FOOTING** FOUNDATION COMPONENTS

Address how far subexcavation should go below the roads

REFERENCE
NOT TO SCALE

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(719) 544-7750

HILLSIDE AT LORSON RANCH, "AREA I"
EL PASO COUNTY, CO
LORSON RANCH METRO DIST. NO. 1

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	1-3-2022
REVISION:	DATE: JOB #:

SUBEXCAVATION RECOMMENDATIONS

SHEET No.
FIG-88

APPENDIX A
Additional Reference Documents

1. *Preliminary Site Plan (AutoCAD drawing), Hillside at Lorson Ranch Development Plan, First Submittal, not dated, provided by Matrix via electronic email on January 4, 2022.*
2. *Cut-Fill Tick Marks, AutoCAD drawing, not dated, provided by Core Engineering via electronic email on January 4, 2022.*
3. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 08041C0957G and 081041C0975G,* Federal Emergency Management Agency (FEMA), effective December 7, 2018.
4. *Geologic Map of the Fountain quadrangle, El Paso County, Colorado*, Jonathan L. White, Kassandra O. Lindsey, Matthew L. Morgan, and Shannon A. Mahan. Colorado Geological Survey Open-File Report OF-17-05.
5. *Fountain, Quadrangle, Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
6. *Fountain, Quadrangle, Map of Potential Geologic Hazards and Surficial Deposits*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
7. *Geologic map of the Pueblo 1 degree x 2 degrees quadrangle, south-central Colorado,* Scott, G.R., Taylor, R.B., Epis, R.C., and Wobus, R.A., 1976.
8. *Pikes Peak Regional Building Department:* https://www.pprbd.org/.
9. https://property.spatialest.com/co/elpaso/#/property/5522105006 Schedule No.: 5522105006.
10. *Colorado Geological Survey, USGS Geologic Map Viewer*: http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/.
11. *Historical Aerials:* https://www.historicaerials.com/viewer, Images dated 1947, 1960, 1969, 1999, 2005, 2009, 2011, 2013, and 2015.
12. *USGS Historical Topographic Map Explorer:* http://historicalmaps.arcgis.com/usgs/ Colorado Springs Quadrangles dated 1950, 1951, 1958, 1963, 1969, 1970, 1975, 1978, 1981, 1994, 2013 and 2016.
13. *Google Earth Pro*, Imagery dated 1999, 2003, 2004, 2005, 2006, 2011, 2015, 2017, 2019, 2020 and 2021.

APPENDIX B
RMG Preliminary Test Borings

TEST BORING: **A-1** DATE DRILLED: 3/18/20 NO GROUNDWATER ON 3/18/20	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown, medium hard to very hard, moist					
	5			50/11"	--
	10			50/4"	--
	15			50/4"	--

TEST BORING: **A-2** DATE DRILLED: 3/18/20 NO GROUNDWATER ON 3/18/20	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown, medium hard to very hard, moist					
	5			50/8"	--
	10			50/4"	--
	15			50/5"	--

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TEST BORING LOG

JOB No. 175706

FIGURE No. 1

DATE Mar/22/2021

TEST BORING: **A-3**

DATE DRILLED: 3/18/20

NO GROUNDWATER ON 3/18/20

DESCRIPTION	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown, medium hard to very hard, moist	5			50/10"	--
	10			50/7"	--
	15			50/5"	--

TEST BORING: **A-4**

DATE DRILLED: 3/18/20

NO GROUNDWATER ON 3/18/20

DESCRIPTION	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	5			30	--
CLAYSTONE, SANDY, brown, hard, moist	10			50/6"	--
	15			50/6"	--

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TEST BORING LOG

JOB No. 175706

FIGURE No. 2

DATE Mar/22/2021

TEST BORING: **A-5**

DATE DRILLED: 3/18/20

NO GROUNDWATER ON 3/18/20

Description	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAYSTONE, SANDY, brown, medium hard to hard, moist	5			50/10"	--
	10			50/6"	--
	15			50/6"	--

TEST BORING: **A-6**

DATE DRILLED: 3/18/20

NO GROUNDWATER ON 3/18/20

Description	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
CLAY, SANDY, brown, very stiff, moist	5			20	--
	10			27	--
CLAYSTONE, SANDY, brown, medium hard, moist	15			50/11"	--
	20			50/9"	--

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TEST BORING LOG

JOB No. 175706

FIGURE No. 3

DATE Mar/22/2021

APPENDIX C
Guideline Site Grading Specifications

Description: Unless specified otherwise by local or state regulatory agencies, these guideline specifications are for the excavation, placement and compaction of material from locations indicated on the plans, or staked by the Engineer, as necessary to achieve the required elevations. These specifications shall also apply to compaction of materials that may be placed outside of the project.

General: The Geotechnical Engineer shall approve fill materials, method of placement, moisture contents and percent compactions, and shall give written approval of the compacted fill.

Clearing Site: The Contractor shall remove trees, brush, rubbish, vegetation, topsoil and existing structures before excavation or fill placement is commenced. The Contractor shall dispose of the cleared material to provide the Owner with a clean job site. Cleared material shall not be placed in areas to receive fill or where the material will support structures. Clearing shall also include removal of existing fills that do not meet the requirements of this specification and existing structures.

Preparation of Slopes or Drainage Areas to Receive Fill: Natural slopes or slopes of drainage gullies where grades are 20 percent (5:1, horizontal to vertical) or steeper shall be benched prior to fill placement. Benches shall be at least 10 feet wide. Benches may require additional width to accommodate excavation or compaction equipment. At least one bench shall be provided for each 5 feet or less of vertical elevation difference. The bench surface shall be essentially horizontal perpendicular to the slope or at a slight incline into the slope.

Scarifying: Topsoil and vegetation shall be removed from the ground surface in areas to receive fill. The surface shall be plowed or scarified a minimum of 12 inches until the surface is free from ruts, hummocks or other uneven features which would prevent uniform compaction by the equipment to be used.

Compacting Area to Receive Fill: After the area to receive fill has been cleared and scarified, it shall be disked or bladed until it is free from large clods, moisture conditioned to a proper moisture content and compacted to the maximum density as specified for the overlying fill. Areas to receive fill shall be worked, stabilized, or removed and replaced, if necessary, in accordance with the Geotechnical Engineer's recommendations in preparation for fill.

Fill Materials: Fill material shall be free from organic material or other deleterious substances, and shall not contain rocks or lumps having a diameter greater than six inches. Fill materials shall be obtained from cut areas shown on the plans or staked in the field by the Engineer or imported to the site and shall be approved by the Geotechnical Engineer prior to placement. It is recommended that the fill materials have nil to low expansion potential, i.e., consist of silty to slightly clayey sand.

- The moisture-conditioned materials should be placed in maximum 6" compacted lifts. These materials should be compacted to a minimum of 92 percent of the maximum

- Modified Proctor dry density or 95 percent of the maximum Standard Proctor dry density. Material not meeting the above requirements shall be reprocessed.

Materials used for moisture-conditioned structural fill should be approved by RMG prior to use. Moisture-conditioned structural fill should not be placed on frozen subgrade or allowed to freeze during moisture conditioning and placement.

Moisture Content: Fill materials shall be moisture conditioned to within limits of optimum moisture content specified. Sufficient laboratory compaction tests shall be made to determine the optimum moisture content for the various soils encountered in borrow areas or imported to the site.

The contractor may be required to add moisture to the excavation materials in the borrow area if, in the opinion of the Geotechnical Engineer, it is not possible to obtain uniform moisture content by adding water to the fill material during placement. The Contractor may be required to rake or disk the fill soils to provide uniform moisture content through the soils.

The application of water to embankment materials shall be made with watering equipment, approved by the Geotechnical Engineer, which will give the desired results. Water jets from the spreader shall not be directed at the embankment with such force that fill materials are eroded.

Should too much water be added to the fill, such that the material is too wet to permit the desired compaction to be obtained, compacting and work on that section of the fill shall be delayed until the material has been allowed to dry to the required moisture content. The Contractor will be permitted to rework the wet material in an approved manner to hasten its drying.

Compaction of Fill Areas: Selected fill material shall be placed and mixed in evenly spread layers. After each fill layer has been placed, it shall be uniformly compacted to not less than the specified percentage of maximum density. Fill materials shall be placed such that the thickness of loose material does not exceed 10 inches and the compacted lift thickness does not exceed 6 inches.

Compaction, as specified above, shall be obtained by the use of sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other equipment approved by the Geotechnical Engineer. Granular fill shall be compacted using vibratory equipment or other equipment approved by the Geotechnical Engineer. Compaction shall be accomplished while the fill material is at the specified moisture content. Compaction of each layer shall be continuous over the entire area.

Moisture Content and Density Criteria:

A. Fill placed in roadways and utility trenches should be moisture conditioned and compacted in accordance with El Paso County Specifications.

B. Fill placed outside of roadways and utility trenches should be compacted to at least 92% of the maximum Modified Proctor density (ASTM D-1557) or at least 95% of the maximum Standard Proctor density (ASTM D-698) at a moisture content within 2% of optimum.

Compaction of Slopes: Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction operations shall be continued until slopes are stable, but not too dense for planting, and such that there is no appreciable amount of loose soil on the slopes. Compaction of slopes may be done progressively in increments of three to five feet in height or after the fill is brought to its total height. Permanent fill slopes shall not exceed 3:1 (horizontal to vertical).

Density Testing: Field density testing shall be performed by the Geotechnical Engineer at locations and depths of his choosing. Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Density tests shall be taken in compacted material below the disturbed surface. When density tests indicate the density or moisture content of any layer of fill or portion thereof is below that required, the particular layer or portion shall be reworked until the required density or moisture content has been achieved.

Observation and Testing of Fill: Observation by the Geotechnical Engineer shall be sufficient during the placement of fill and compaction operations so that he can declare the fill was placed in general conformance with Specifications. All observations necessary to test the placement of fill and observe compaction operations will be at the expense of the Owner.

Seasonal Limits: No fill material shall be placed, spread or rolled while it is frozen, thawing, or during unfavorable weather conditions. When work is interrupted by heavy precipitation, fill operations shall not be resumed until the Geotechnical Engineer indicates the moisture content and density of previously placed materials are as specified.

Reporting of Field Density Tests: Density tests made by the Geotechnical Engineer shall be submitted progressively to the Owner. Dry density, moisture content, percent compaction, and approximate location shall be reported for each test taken.