



STORMWATER MANAGEMENT PLAN (SWMP)

FOR

Project:

Venetucci Boulevard & B Street at US-85 MP 137
El Paso County, CO

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INTRODUCTION

The purpose of this report is to outline the SWMP plan for the Venetucci Boulevard and B Street at US-85 MP 137 improvements (herein the “Project”), located within the jurisdictional limits of El Paso County (“the County”).

PERMIT COVERAGE AND APPLICATIONS

Based upon a Site Disturbance Area of one (1) acre or more, this Project requires the approval of this Stormwater Management Plan and a Grading and Erosion Control Plan with the County and the issuance of a Colorado Discharge Permit System (CDPS) - Stormwater Discharge Associated with Construction Activities Application (the General Permit) through the Colorado Department of Public Health and Environment (CDPHE).

The primary goal of pollution prevention efforts during Project construction is to control sediment and pollutants that originate on the site and prevent them from flowing to surface waters. A successful pollution prevention program also relies upon careful inspection and adjustments during the construction process to enhance its effectiveness. It is the intent of this plan to implement stormwater control measures (CMs), also referred to as best management practices (BMP), for enhancing the quality of stormwater discharges associated with the construction activity. CM designs are based on the criteria set forth by the General Permit, the Urban Storm Drainage Criteria Manual, Volume 3, El Paso County Drainage Criteria Manual Vol. 2 (“DCM”) and the El Paso County Engineering Criteria Manual (“ECM”). This plan must be implemented before construction begins on the site. It primarily addresses the impact of storm rainfall and runoff on areas of the ground surface disturbed during the construction process. In addition, there are recommendations for controlling other sources of pollution that could accompany the major construction activities. Applicability of this plan shall be terminated when disturbed areas are stabilized, temporary erosion controls are removed, construction activities covered herein have ceased and the permit has been inactivated.

SITE DESCRIPTION

GENERAL PROJECT DESCRIPTION

The Project is approximately 3.70 acres in size. The Project improvements include widening the southern side of B Street to accommodate a right turn lane onto Venetucci Boulevard, a dual left turn lane serving US-85 from B Street, a northbound acceleration lane on US-85, reconstruction of the existing median on B Street, repaving, conduit for a new traffic signal at the B Street and US-85 intersection, and a new concrete sidewalk along the south side of B Street. Stormwater throughout the site will be conveyed via overland flow and within drainage ditches and culverts/storm pipe. With the improvements, no impacts are anticipated to the existing culverts or ditches. All flows will outfall to the same location and maintain existing flow patterns.

PROJECT LOCATION

The Project is located at the intersection of B Street and US-85 (Venetucci Boulevard/CanAm Highway) in El Paso County, Colorado. The Project is bound by commercial businesses to the North, vacant land to the South, and Interstate 25 to the East. A vicinity map has been provided in the Appendix of this report.

SITE CONDITIONS

VEGETATION

The existing Project consists of existing asphalt roadways (60%), gravel walks (2%), and native vegetation (38%). Within the native vegetation areas, the vegetative cover varies from 50-85% as determined from aerial observation. Existing trees are present along the north, south, and east sides of the property. Aerial inspection was utilized to determine the percent cover.

DRAINAGE CHARACTERISTICS

Generally, the Project has two (2) general drainage patterns in which runoff is conveyed: to the south via existing ditches, culverts, and inlets to Clover Ditch / Fisher's Canyon and to the east via existing ditches to an existing culvert that directs flows to another existing ditch adjacent to I-25. There is no offsite area tributary to the Project. This historic runoff pattern will generally be maintained and unaffected with the proposed Project.

The 5-year and 100-year design storm events were used in determining rainfall and runoff for the proposed drainage system per Chapter 6 of the El Paso County Drainage Criteria. Table 6-2 of the El Paso County Drainage Criteria is the source for rainfall data for the design storm events. Design runoff was calculated using the Rational Method for developed conditions as established in the El Paso County Drainage Criteria Manual and the Mile-High Flood District Manual. Runoff coefficients for the proposed development were determined using Table 6-6 of the El Paso County Drainage Manual by calculating weighted impervious values for each specific site basin.

Since the increase in impervious surface area associated with the Project is less than twenty (20) percent from existing conditions, permanent water quality is not required for the Project.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel 08041C0743G for El Paso County and incorporated areas (eff. 12/07/2018), the entire Project within an area of minimal flood hazard (Zone X). The FEMA FIRM panel is included in the Appendix.

ULTIMATE DISCHARGE

The Project ultimately discharges into Clover Ditch / Fisher's Canyon. There are no streams that cross through the Project.

SOILS

According to the Natural Resources Conservation Service (NRCS), the on-site soils consist primarily of Limon Clay and Nunn Clay Loam, both of which are classified as Hydrologic Soil Group (HSG) C. HSG C soils are considered to generally have a slow infiltration rate when thoroughly wet and moderately high runoff potential.

DEWATERING

Groundwater dewatering is not anticipated per the Report of Geotechnical Engineering Evaluation by Professional Service Industries, Inc. dated 01/2/2025. According to the Report of Geotechnical Engineering Evaluation, groundwater was observed in one boring at a depth of 15 feet below existing grade.

If groundwater is encountered during construction and the site must be dewatered, the operator shall file for appropriate dewatering permits (Permit No. COG070000) with the CDPHE. If groundwater is encountered, a State of Colorado General Permit for Construction Dewater Activities will also be required. The state dewatering permit application and associated information can be found at

<https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits>. The permit application will need to be filled out 30 days prior to the anticipated discharge. Refer to the Mile High Flood District's (MHFD) detail and fact sheet for additional dewatering operations information.

AREAS & VOLUMES

The gross Project area is approximately 3.70 acres. The total anticipated Project disturbance area is approximately 2.47 acres. The estimated earthwork quantities are as follows:

Cut: ± 487 cubic yards

Fill: ± 652 cubic yards

Net: ± 165 cubic yards FILL

EROSION & SEDIMENT CONTROL MEASURES

Construction operations including grading, hauling of soil, drainage, pavement work, and final stabilization shall implement erosion and sediment control measures as described below and in the Timing section of this report. Additional measures shall be implemented as appropriate.

Erosion and sediment control measures shall be implemented during construction of the Project. One construction entrance with vehicle tracking control (VTC) shall be implemented to reduce off-site sediment tracking. The entrance will be located north of the intersection of the existing Venetucci Boulevard and B Street. Temporary Soil Stockpiles (SP) shall be protected from stormwater using Silt Fence (SF) or other perimeter control to inhibit soil transport as well as at material storage areas. SF will also be used for perimeter control. A Concrete Washout Area (CWA) shall be placed near the entrance to the site. Plastic Fence (PF) will be placed around the Stabilized Staging Area (SSA). Trees in close proximity to or within the Limits of Construction will be protected in place with Tree Protection (TP). Erosion Log Ditch Checks will be utilized within adjacent existing ditches. Inlet Protection (IP) will be used to protect existing inlets. Erosion Control Blanket (ECB) will be used in areas where proposed grade is steeper than 4:1 to protect slopes. In addition to those measures noted above, Portable Toilets will also be utilized on Project. Permanent native seeding will be used stabilize areas once in final condition. Portable toilets shall be located on flat surfaces away from drainage paths, tied-down or staked-down, emptied regularly, and where possible secondary containment pans shall be provided under the portable toilets. Please see the Grading and Erosion Control Plans for locations and sizing of recommended erosion control measures.

All persons engaged in earth disturbances shall design, implement, and maintain acceptable soil erosion and sedimentation control measures in conformance with the erosion and sediment control technical standards adopted by the County. Any earth disturbances shall be conducted in such a manner to effectively control runoff volumes, reduce accelerated soil erosion, sediment movement, and deposition off-site. All earth disturbances shall be completed in such a manner so that the total amount of soil exposed at any given time shall be minimized, and the exposed area of any disturbed land shall be limited to the shortest possible period of time. Earth disturbance areas shall be graded and stabilized with permanent soil erosion control measures pursuant to approved plans and specifications.

Permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed within fourteen (14) calendar days after final grading or the final earth disturbances have been completed. When it is not possible to permanently stabilize a disturbed area after an earth disturbance has been completed or where significant earth disturbance activity ceases, temporary soil erosion control measures shall be implemented within fourteen (14) calendar days. All temporary soil erosion control measures shall be maintained until final stabilization has been achieved.

Paved and impervious surfaces which are adjacent to construction sites must be swept on a daily basis and as needed during the day when sediment and other materials are tracked or discharged onto them. Either sweeping by hand or use of street sweepers is acceptable. Street sweepers using water while sweeping is preferred in order to minimize dust. Flushing off paved surfaces with water is prohibited.

All construction site operators shall control waste such as discarded building materials, hazardous chemicals (to include but not be limited to, heavy equipment maintenance fluids, motor oil, antifreeze and secondary containment of vehicle fuel), litter, and sanitary waste at the construction site that may cause adverse impacts to water quality. Chemicals, paints, solvents, fertilizers, and other toxic materials must be stored in weatherproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the Project, treated, and disposed at an approved solid waste or chemical disposal facility. On-site fueling is not anticipated with this Project.

Throughout build-out, the contractor shall be responsible for implementing and maintaining CMs to control erosion and sediment problems on all idle lots.

All stockpiles shall require erosion and sediment control. All stockpiles shall:

- Not be located adjacent to a waterway.
- Be stabilized within 14 days after establishment. Stabilization shall include, but not be limited to, surface roughening, seeding, and mulching.
- Not exceed 10 feet in height.
- Utilize silt fence in all down slope sides of the stockpile.

TIMING & SCHEDULE

The proposed project will begin in the Fall of 2025. The general sequence of the phasing of the related construction activities will occur according to the following anticipated sequence:

Project sequence:

Phased CM Implementation – Initial Phase (Pre-Development Grading and Erosion Control Permit)

The initial phase shall consist of the temporary construction CMs to minimize potential for erosion and sediment transfer while mobilizing and preparing the Project for construction activities. The operator shall complete the anticipated initial phase sequencing as follows:

1. Prepare and submit the State of Colorado, Colorado Department of Public Health and Environment (CDPHE) application. A copy of the permit shall be provided to CDOT upon receipt from the CDPHE.
2. Install SWMP information sign (S) in accordance with applicable county, state, and CDOT requirements.
3. Ensure that general construction CMs which are required throughout the Project at locations shown on the GEC plans or as dictated by construction activities are operational.
4. Install perimeter controls and ensure that the limits of construction (LOC) are defined as necessary or known by all parties which will be responsible for construction on the Project.
5. Install tree protection (TP) to protect existing trees in place as indicated on the GEC plans.
6. Install erosion log ditch checks as indicated on the GEC plans.

7. Install Inlet Protection (IP) around the upstream of each installed culvert and at existing inlets.
8. Install stabilized vehicle tracking control pad (VTC) and concrete washout area (CWA) as indicated on the GEC plans.
9. Construct required stabilized staging area (SSA).
10. Install silt fence (SF) as shown on the GEC plans.
11. Upon completion of the initial CM installation the operator shall schedule a pre-construction meeting with CDOT and the County erosion control inspector to confirm CMs installed are adequate prior to proceeding with additional land disturbing activities.
12. Complete clearing and grubbing of the Project as necessary to proceed with initial grading operations. Stockpile materials in accordance with the stockpile management (SP) CM.

Phased CM Implementation - Interim Phase (Pre-Development Grading and Erosion Control Permit)

The Interim phase shall consist of the temporary construction CMs to minimize potential for erosion and sediment transfer during the construction of the proposed roadways and associated limited site improvements. The operator shall complete the anticipated Interim phase sequencing as follows:

1. Confirm existing CMs from the initial phase, which are to be maintained throughout construction, are in working order and compliant with applicable regulations.
2. Repair and/or replace any existing CMs which are deemed inadequate.
3. Complete required temporary grading operations necessary for construction. Conduct excavation as needed for the underground utilities. Stockpile materials in accordance with the stockpile management (SP) CM.
4. Temporary stabilize (TS) all areas of the Project which will remain inactive for a period greater than 30 days. Temporary stabilization shall be implemented within 14 days of disturbance.
5. Complete required grading operations necessary for construction of the proposed commercial building and associated site and utility improvements. Stockpile materials in accordance with the stockpile management (SP) CM.
6. Construct underground dry utilities for new traffic signal.
7. Complete fine grading and proceed with temporary stabilization (TS) and permanent stabilization (PS) practices in accordance with approved landscape plans.

Phased CM Implementation - Final Phase

The Final phase shall consist of the temporary construction CMs to minimize potential for erosion and sediment transfer during the construction of the proposed paving and associated limited site improvements to achieve final stabilization:

1. Confirm existing CMs from the initial phase, which are to be maintained throughout construction, are in working order and compliant with applicable regulations.
2. Repair and/or replace any existing CMs which are deemed inadequate.
3. Complete required temporary grading operations necessary for construction. Stockpile materials in accordance with the stockpile management (SP) CM.

4. Temporary stabilize (TS) all areas of the Project which will remain inactive for a period greater than 30 days. Temporary stabilization shall be implemented within 14 days of disturbance
5. Add base course and commence paving.
6. Achieve permanent stabilization in accordance with El Paso County, CDPHE, and CDOT requirements.
7. Remove remaining CMs once permanent stabilization (PS) has been achieved. Repair and stabilize areas disturbed through CM removal.
8. Notify CDOT of intent to file the notice of inactivation with EL PASO COUNTY and CDPHE and receive CDOT acceptance to proceed with stormwater management close-out.
9. Notify the EL PASO COUNTY of the intent to file the notice of inactivation and receive EL PASO COUNTY field acceptance prior to proceeding with filing the notice of inactivation with the EL PASO COUNTY.
10. Proceed with filing the notice of inactivation with the EL PASO COUNTY and CDPHE.
11. Provide CDOT with a copy of all stormwater documentation (permits, inspection reports, logs, etc.). Upon completion of Project, file the notice of inactivation.

STORMWATER MANAGEMENT CONTROLS

QUALIFIED STORMWATER MANAGER

The Qualified Stormwater Manager is the Operator selected for the project. The Qualified Stormwater Manager is an individual knowledgeable in the principles and practices of erosion and sediment control and pollution prevention, and with the skills to assess the effectiveness of stormwater controls implemented to meet the requirements of the General Permit. The Qualified Stormwater Manager will be sufficiently qualified for the required duties per the ECM Appendix 1.5. The Qualified Stormwater Manager is responsible for developing, implementing, maintaining and revising the Grading and Erosion Control Plan. The activities and responsibilities of the Qualified Stormwater Manager shall address all aspects of the facility's Grading and Erosion Control Plan.

SITE SPECIFIC POLLUTION SOURCES

Further identification of site-specific pollutants that fall within the categories outlined in the next section may be field noted using the corresponding log included in the appendices of this report. The logs are intended to record site-specific pollutants, the date of arrival on the Project, the date removed from the Project, and the methods of treatment.

IDENTIFICATION OF POLLUTANT SOURCES

Evaluation of general sediment and non-sediment pollution sources associated with Project construction activities, as outlined within the General Permit, consist of the following:

- **Disturbed and Stored Soils** – Earth disturbing activities (grading, excavation, etc.) will be necessary for this Project; therefore, the potential exists for disturbed site soils to contribute sediment to stormwater discharges.
- **Vehicle Tracking and Sediment** – Construction traffic will be entering and exiting the Project; therefore, the potential exists for vehicle tracking to contribute sediment to stormwater discharges.

- **Management of Contaminated Soils** – Contaminated soils are not anticipated on this Project. If encountered, the SWMP Administrator shall take appropriate containment and treatment measures.
- **Loading and Unloading Operations** – Loading and unloading operations will be taking place at the Project; therefore, the potential exists for these operations to introduce sediment and non-sediment pollutants to stormwater discharges.
- **Outdoor Storage of Materials** – Limited outdoor storage of materials is anticipated with construction of this Project; however, outdoor storage of chemicals, fertilizers, etc. is not anticipated.
- **Vehicle and Equipment Maintenance and Fueling** – Routine maintenance and fueling of vehicles and equipment is anticipated with this Project; therefore, the potential exists for pollutants associated with these activities to contribute pollutants to stormwater discharges.
- **Significant Dust or Particulate Generating Processes** – Earth disturbing activities (grading, excavation, etc.) will be necessary for this Project; therefore, the potential exists for windblown site soils to contribute sediment to stormwater discharges.
- **Routine Maintenance** – Routine maintenance involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc., other than those identified within Vehicle and Equipment Maintenance and Fueling are not anticipated with this Project. If encountered, the SWMP Administrator shall take appropriate containment and treatment measures.
- **Onsite Waste Management** – Waste management consisting of solid waste piles, liquid wastes, dumpsters, etc. are anticipated onsite; therefore, the potential exists for these operations to introduce sediment and non-sediment pollutants to stormwater discharges.
- **Concrete Truck / Equipment Washing** – Concrete truck and equipment washing are anticipated with this Project. The SWMP Administrator shall take appropriate containment and treatment measures.
- **Dedicated Asphalt and Concrete Batch Plants** – Dedicated asphalt and/or concrete batch plants are not anticipated with this Project. If encountered, the SWMP Administrator shall take appropriate containment and treatment measures and document as necessary.
- **Non-Industrial Waste Sources** – Non-Industrial waste sources limited to portable sanitary facilities are anticipated with this Project.
- **Additional Pollutant Sources** – Additional areas or procedures where potential spills could occur are not anticipated with this Project.

Logs for the identification of pollutant sources are included in the Appendices for reference and use.

Based on the following, the potential to contribute pollutants to stormwater discharges is not significant for most of the pollutants identified above:

- Relatively Low Frequency of the Activities
- The Ability to Schedule Activities During Dry Weather
- Existing Project Topography
- The Ability to Implement Primary and Secondary Containment for Product Storage
- The Ability to Locate Activities Away from Drainage Ways

Potential pollutant sources noted below shall be mitigated by use of CMs as noted in the following sections:

- Disturbed and Stored Soils
- Vehicle Tracking and Sediment
- Loading and Unloading Operations
- Outdoor Storage

- Vehicle Equipment and Maintenance Fueling
- Significant Dust or Particulate Generating Processes
- Non-Industrial Waste Sources

BEST MANAGEMENT PRACTICES FOR STORMWATER POLLUTION PREVENTION

Structural Practices for Erosion and Sediment Control

Structural CMs shall be implemented onsite to minimize erosion and sediment transport. Recommended CMs based upon a limited site review may be seen within the SWMP Site Map included in the Appendices of this report. Additional CMs shall be implemented by the SWMP Administrator if necessary to prevent sediment-laden runoff from leaving the Project. The SWMP shall be updated to reflect any changes or revisions enacted in the field. Temporary Structural CMs for this Project consist of:

- Silt Fence (SF): A silt fence is a woven geotextile fabric attached to wooden posts and trenched into the ground. It is designed as a sediment barrier to intercept sheet flow runoff from disturbed areas.
- Erosion Control Ditch Checks: Erosion Control Ditch Checks are temporary grade control structures placed in drainage channels to limit the erosivity of stormwater by reducing flow velocity.
- Plastic Fence (PF): Plastic fence delineates and protects the Stabilized Staging Area and protect existing trees in place.
- Vehicle Tracking Control (VTC): Vehicle tracking controls provide stabilized construction site access where vehicles exit the site onto paved public roads. An effective vehicle tracking control helps remove sediment (mud or dirt) from vehicles, reducing tracking onto the paved surface.
- Erosion Control Blanket (ECB): A temporary degradable rolled erosion control product composed of processed natural or polymer fibers which are mechanically, structurally or chemically bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment. ECBs can be further differentiated into rapidly degrading single-net and double-net types or slowly degrading types.
- Inlet Protection (IP): Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet. Inlet protection can be constructed from rock socks, sediment control logs, silt fence, block and rock socks, or other materials

There are no Permanent Structural CMs anticipated for this Project.

Non-Structural Practices for Erosion and Sediment Control

Non-Structural CMs shall be implemented onsite to minimize erosion and sediment transport. Recommended CMs based upon a limited site review may be seen within the SWMP Site Map included in the Appendices of this report. Additional CMs shall be implemented by the SWMP Administrator if necessary to prevent sediment-laden runoff from leaving the Project. The SWMP shall be updated to reflect any changes or revisions enacted in the field. Non- Structural CMs for this Project consist of:

- Permanent Seeding and Mulching (SM): To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade.

- Good Housekeeping (Multiple Practices): Implement construction site good housekeeping practices to prevent pollution associated with solid, liquid and hazardous construction-related materials and wastes. Stormwater Management Plans (SWMPs) should clearly specify CMs including these good housekeeping practices:
 1. Provide for waste management.
 2. Establish proper building material staging areas.
 3. Designate paint and concrete washout areas.
 4. Establish proper equipment/vehicle fueling and maintenance practices.
 5. Control equipment/vehicle washing and allowable non-stormwater discharges.
 6. Develop a spill prevention and response plan.
- Stabilized Staging and Storage Area (SSA): A stabilized staging area is a clearly designated area where construction equipment and vehicles, stockpiles, waste bins, and other construction-related materials are stored. The contractor office trailer may also be located in this area.
- Concrete Washout Area (CWA): Concrete waste management involves designating and properly managing a specific area of the construction site as a concrete washout area. A concrete washout area can be created using one of several approaches designed to receive wash water from washing of tools and concrete mixer chutes, liquid concrete waste from dump trucks, mobile batch mixers, or pump trucks.
- Tree Protection (TP): Plastic fence will be used to protect existing trees in place.
- Stockpile Management (SP): Stockpile management includes measures to minimize erosion and sediment transport from soil stockpiles.

Phased CM Implementation

Construction of the identified improvements will take place under three main phases of construction anticipated as identified within the construction sequencing included within this report.

A Land Disturbance, CM Installation, and Stabilization Log is provided in the Appendices and shall be filled out accordingly during CM implementation.

Materials Handling and Spill Prevention

Any hazardous or potentially hazardous material that is brought onto the construction site shall be handled properly in order to reduce the potential for stormwater pollution. In an effort to minimize the potential for a spill of petroleum product or hazardous materials to come in contact with stormwater, the following steps shall be implemented:

- Material Safety Data Sheets (MSDS) information shall be kept onsite for any and all applicable materials.
- All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, additives for soil stabilization, concrete, curing compounds and additives, etc.) shall be stored in a secure location, under cover and in appropriate, tightly sealed containers when not in use.
- The minimum practical quantity of all such materials shall be kept on the job site and scheduled for delivery as close to time of use as practical.
- A spill control and containment kit (containing, for example, absorbent material, acid neutralizing agent, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) shall be provided on the construction site and location(s) shown on Site Maps.
- All of the product in a container shall be used before the container is disposed of. All such containers shall be triple rinsed, with water prior to disposal. The rinse water used in these

containers shall be disposed of in a manner in compliance with State and Federal regulations and shall not be allowed to mix with stormwater discharges.

- All products shall be stored in and used from the original container with the original product label and used in strict compliance with the instructions on the product label.
- The disposal of excess or used products shall be in strict compliance with instructions on the product label.

Temporary onsite fuel tanks for construction vehicles shall meet all state and federal regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations. From NFPA 30: All tanks shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel.

The tanks shall be in sound condition free of rust or other damage which might compromise containment. Fuel storage areas shall meet all Environmental Protection Agency (EPA), OSHA and other regulatory requirements for signage, fire extinguisher, etc. Hoses, valves, fittings, caps, filler nozzles and associated hardware shall be maintained in proper working condition at all times. The location of fuel tanks shall be shown on the Site Maps and shall be located to minimize exposure to weather and surface water drainage features.

The Operator shall develop and implement a Materials Handling and Spill Prevention Plan (MHSPP) in accordance with the EPA and State of Colorado requirements. In the event of an accidental spill, immediate action shall be undertaken by the Operator to contain and remove the spilled material. All hazardous materials, including contaminated soil, shall be disposed of by the Operator in the manner specified by federal, state and local regulations and by the manufacturer of such products. As soon as possible, the spill shall be reported to the appropriate agencies. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States shall be properly reported. The Operator shall prepare a written record of any spill and associated clean-up activities of petroleum products or hazardous materials in excess of 1 gallon or reportable quantities, whichever is less.

Any spills of petroleum products or hazardous materials in excess of Reportable Quantities as defined by EPA or the state or local agency regulations, shall be immediately reported to the Colorado Department of Public Health and Environment spill reporting lines.

- CDPHE Environmental Release and Incident Reporting Line (877) 518-5608.

For reference, a bulletin on Environmental Spill Reporting published by the CDPHE, has been included in the Appendices of this report.

Vehicle Tracking and Dust Control

Vehicle Tracking Control CMs (structural and non-structural) shall be implemented in order to control potential sediment discharges from vehicle tracking. Practices shall be implemented for all areas of potential vehicle tracking which include but are not limited to reduced Project access and utilization of designated haul routes.

Areas of soil that are denuded of vegetation and have little protection from particles being picked up and carried by wind should be protected with a temporary cover or kept under control with water or other soil adhering products to limit wind transported particles exiting the Project perimeter.

Waste Management and Disposal

An effective first step towards preventing pollution in stormwater from work sites involves using a commonsense approach to improve the facility's basic housekeeping methods. Poor housekeeping practices result in increased waste and potential for stormwater contamination.

No solid materials are allowed to be discharged from the Project with stormwater. All solid waste, including disposable materials incidental to the construction activities, must be collected and placed in containers. Secure covers for the containers shall be provided at all times to meet state and local requirements. The location of solid waste receptacles shall be identified on the SWMP by the Operator.

Concrete waste is anticipated with this Project; and therefore, a dedicated concrete washout is required. The SWMP Administrator shall take appropriate containment and treatment measures and document as necessary.

Portable Toilets

Portable toilets shall be provided on-site as necessary for construction personnel. Portable toilets shall be located on flat surfaces away from drainage paths, tied-down or staked-down, emptied regularly, and where possible secondary containment pans shall be provided under the portable toilets. Portable toilets will be located a minimum of 10 feet from stormwater inlets and 50 feet from state waters. They will be secured at all four corners to prevent overturning and cleaned on a weekly basis. They will be inspected daily for spills. In the event of a spill, the Permittee shall follow spill prevention measures as noted in the Appendix.

NON-STORMWATER DISCHARGE COMPONENTS

Only specifically authorized non-stormwater discharges are allowed to enter the storm sewer and all authorized non-stormwater discharges shall be eliminated or reduced to the extent practical. There are no non-stormwater discharges anticipated at the Project.

Appropriate control measures shall be used to minimize the discharge of pollutants. Such control measures will be strictly followed to ensure any impacts from non-stormwater discharges are reduced or eliminated. Appropriate control measures are:

- Emergency Fire Fighting Activities
- Uncontaminated ground water or spring water

If possible, direct uncontaminated ground water or spring water to stabilized points of discharge. If discharged to a disturbed area, assure measures to control erosive velocities and sediment control measures are implemented. Velocity control measures include riprap aprons and other conveyance measures. Sediment control measures might include stone check dams, sediment traps and basins.

If uncontaminated ground water is discharged off-site, a Construction Dewatering Permit will be required. This Permit will not apply if dewatering is not performed or if water is not discharged off-site.

- Landscape Irrigation Return Flows

Volume of water used for irrigation prior to establishment of vegetation shall be controlled to prevent excess runoff and erosion. Temporary sediment control measures shall remain in place until all upstream disturbed areas are stabilized. Sediment loss will be controlled using sediment control measures such as wattles, sediment fence, and vegetative buffers.

STABILIZATION AND STORMWATER MANAGEMENT

TEMPORARY STABILIZATION AND SHORT-TERM STORMWATER MANAGEMENT

The County considers the completion of over-lot grading operations, by definition, to be substantially complete; therefore, all areas that will be dormant for more than 30 days after the completion of the over-lot grading will require temporary seeding within 14 days of establishment. This does not preclude the 7-day requirement for areas fully completed in the future. At a minimum, in ensuring that this requirement is followed, adequate phasing/scheduling will be required.

FINAL STABILIZATION AND LONG-TERM STORMWATER MANAGEMENT

In the natural condition, the site soil is stabilized by means of native vegetation. The final stabilization technique to be used at this project for stabilizing soils shall be to provide a protective cover of landscaping vegetation, pavement and granular stabilization material. Seeding should be conducted after final grade is achieved and soils are prepared to take advantage of soil moisture and seed germination. The Qualified Stormwater Manager should evaluate the short and long-term forecasts prior to applying permanent seed.

Final site stabilization is achieved when vegetative cover provides permanent stabilization with a density greater than 70 percent of the pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed over the entire area to be stabilized by vegetative cover.

INSPECTION AND MAINTENANCE

Inspections shall be the responsibility of the Qualified Stormwater Manager throughout the construction process.

INSPECTION SCHEDULE REQUIREMENTS

Inspection and maintenance of erosion control measures shall comply with the criteria set forth by the General Permit (COR400000), or the following, whichever is more stringent.

The Permittee or Contractor shall produce written and signed records every seven (7) days and after within 24 hours after every significant precipitation events or snow melt that causes surface erosion. All necessary maintenance and repair shall be completed immediately. If more frequent inspections are required to ensure that control measures are properly maintained and operated, the inspection schedule shall be modified to meet this need.

When snow cover exists over the entire site for an extended period, inspections are not always feasible. This condition should be documented, including date of snowfall and date of melting conditions to bring awareness of and preparation for areas where melting conditions may pose a risk of surface erosion.

A copy of the SWMP shall be maintained at the site at all times. Any degradation of the control measures described in the SWMP or excessive accumulation of sediments shall be remedied immediately upon discovery. The Contractor shall record all storm events on the Storm Event Log included in **Appendix**.

INSPECTION PROCEDURES

The inspection shall include observations of:

- The Construction Site Perimeter and Discharge Points;
- All Disturbed Areas;
- Vehicles and Equipment;
- Areas Used for Material / Waste Storage That are Exposed to Precipitation;
- Other Areas Determined to Have a Significant Potential for Stormwater Pollution;
- Erosion and Sediment Control Measures Identified in the SWMP; and
- Any Other Structural Control Measures That May Require Maintenance.

The inspection must determine if there is evidence of, or the potential for, pollutants entering the drainage system. Control measures should be reviewed to determine if they still meet the design intent and operational criteria in the SWMP and if they continue to adequately control pollutants at the site. Any control measures not operating in accordance with the SWMP must be addressed as soon as possible, immediately in most cases, to minimize the discharge of pollutants and the SWMP must be updated and inspections must be documented.

Examples of specific items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. Ultimately, it is the responsibility of the Contractor to assure the adequacy of site pollutant discharge controls. Actual physical site conditions or contractor practices could make it necessary to install more controls than are shown on the plans. Assessing the need for additional controls and implementing them or adjusting existing controls will be an ongoing requirement until the site achieves final stabilization.

1. Vehicle Tracking Control - Locations where vehicles enter and exit the site shall be inspected for evidence of offsite sediment tracking. Exits shall be maintained as necessary to prevent the release of sediment from vehicles leaving the site. Any sediment deposited on the adjacent roadway shall be removed as necessary throughout the day or at the end of every day and disposed of in an appropriate manner. Sediment shall not be washed into storm sewer systems.
2. Erosion Control Devices - Rolled erosion control products (nets, blankets, turf reinforcement mats) and marginally vegetated areas (areas not meeting required vegetative densities for final stabilization) must be inspected frequently. Riling, rutting and other signs of erosion indicate the erosion control device is not functioning properly and additional erosion control devices are warranted.
3. Sediment Control Devices - Sediment barriers (silt fence, sediment control logs, etc.), traps and basins must be inspected, and they must be cleaned out at such time as their original capacity has been reduced by 50 percent. All material excavated from behind sediment barriers or in traps and basins shall be incorporated into onsite soils or spread out on an upland portion of the site and stabilized. To minimize the potential for sediment releases from the Project, site perimeter control devices shall be inspected with consideration given to changing up-gradient conditions.
4. Material Storage Areas - Material storage areas should be located to minimize exposure to weather. Inspections shall evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system or discharging from the site. If necessary, the materials must be covered, or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas. All state and local regulations pertaining to material storage areas shall be adhered to.
5. Vegetation - Seed/Sod shall be free of weedy species and appropriate for site soils and regional climate. Seeding, sodding, tacking, and mulching shall be completed, in accordance with the

requirements outlined within the Project Manual and locations identified within the plans, immediately after topsoil is applied and final grade is reached. Grassed areas shall be inspected to confirm that a healthy stand of grass is maintained. Rip-rap, mulch, gravel, decomposed granite or other equivalent permanent stabilization measures may be employed in lieu of vegetation based on site-specific conditions and CDOT approval.

6. Discharge Points - All discharge points must be inspected to determine whether erosion and sediment control measures are effective in preventing discharge of sediment from the site or impacts to receiving waters.

Based on the inspection results, all necessary maintenance and repair shall be completed immediately and in no cases longer than seventy-two (72) hours after identification. The inspection reports must be completed after each inspection. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWMP at the time of inspection and specifically identify all incidents of non-compliance.

The Qualified Stormwater Manager shall ensure that, at a minimum, the following is recorded for each inspection and kept onsite for reference:

- a. The inspector's name and signature (must be a Qualified Stormwater Manager),
- b. The date and type of the inspection (regular inspection vs. post-storm inspection),
- c. Weather conditions at the time of the inspection,
- d. Phase of construction at the time of the inspection,
- e. Estimated acreage of disturbance at the time of inspection,
- f. The minimum frequency of inspections chosen,
- g. Location(s) of discharges of sediment or other pollutants from the site,
- h. Location(s) of control measures needing maintenance,
- i. Location(s) and identification of inadequate control measures
- j. Location(s) and identification of additional control measures are needed that were not in place at the time of inspection, and
- k. Any corrective actions taken.

If repairs are needed to any control measures, they shall be completed immediately. After adequate corrective action(s) and maintenance have been taken, or where a report does not identify any incidents requiring corrective action or maintenance, the report shall contain a statement stating the following:

"I verify that, to the best of my knowledge and belief, all corrective action and maintenance items identified during the inspection are complete, and the site is currently in compliance with the permit."

This statement must be signed by a Qualified Stormwater Manager. If it is infeasible to install or repair of control measure immediately after discovering the deficiency, the following information must be documented and kept on record:

1. Describe why it is infeasible to initiate the installation or repair immediately; and
2. Provide a schedule for installing or repairing the control measure and returning it to an effective operating condition as soon as possible.

The use and maintenance of log books, photographs, field notebooks, drawings or maps should also be included in the SWMP records when appropriate. Copies of the Inspection and Sampling Report Forms have been included in **Appendix** for reference and use.

CONTROL MEASURE MAINTENANCE / REPLACEMENT AND FAILED CONTROL MEASURES

Site inspection procedures noted above must address maintenance of control measures that are found to no longer function as needed and designed, as well as preventive measures to proactively ensure continued operation.

The Qualified Stormwater Manager shall implement a preventative maintenance program to ensure that control measure breakdowns and failures are handled proactively. Site inspections should uncover any conditions which could result in the discharge of pollutants to storm sewers and surface waters and shall be rectified. For example, sediment shall be removed from silt fences on a regular basis to prevent failure of the control measure. Sediment shall be removed to an appropriate location so that it will not become an additional pollutant source.

The inspection process must also include replacement of control measures when needed or the addition of new control measures in order to adequately manage the pollutant sources at the site.

Any control measure deficiencies, replacement or additional control measures that may be required shall be documented on the Stormwater Management Site Map and on the appropriate Inspection Form. If amendments to the SWMP are required, these amendments shall be documented on the SWMP Amendment Log included in **Appendix** for reference and use.

DISPOSITION OF TEMPORARY MEASURES

Most temporary erosion and sediment control measures must be removed within 30 days after final site stabilization is achieved. Trapped sediment and disturbed soil areas resulting from the disposal of temporary measures must be returned to final plan grades and permanently stabilized to prevent further soil erosion.

PLAN MODIFICATIONS

This document should be viewed as a “living document” that is continuously being reviewed and modified as a part of the overall process of evaluating and managing stormwater quality issues at the site. The Qualified Stormwater Manager shall amend the SWMP when there is a change in design, construction, operation or maintenance of the site which would require the implementation of new or revised CMs or if the SWMP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activity or when CMs are no longer necessary and are removed. These actions are defined under the Control Measure Maintenance/Replacement and Failed Control Measure Section of this report.

Plan revisions made prior to or following a change(s) onsite, including revisions to sections addressing site conditions and control measures, a notation must be included in the plan that identifies:

- Date of site change,
- The control measure removed or modified,
- The location(s) of those control measures, and
- Any changes to the control measure.

This document does not incorporate or rely on control measures owned or operated by another entity.

REFERENCES

Colorado Discharge Permit System (CDPS) – Stormwater Discharge Associated with Construction Activities Application - Prepared by Water Quality Control Division, Colorado Department of Public Health and Environment; Revised April 2019.

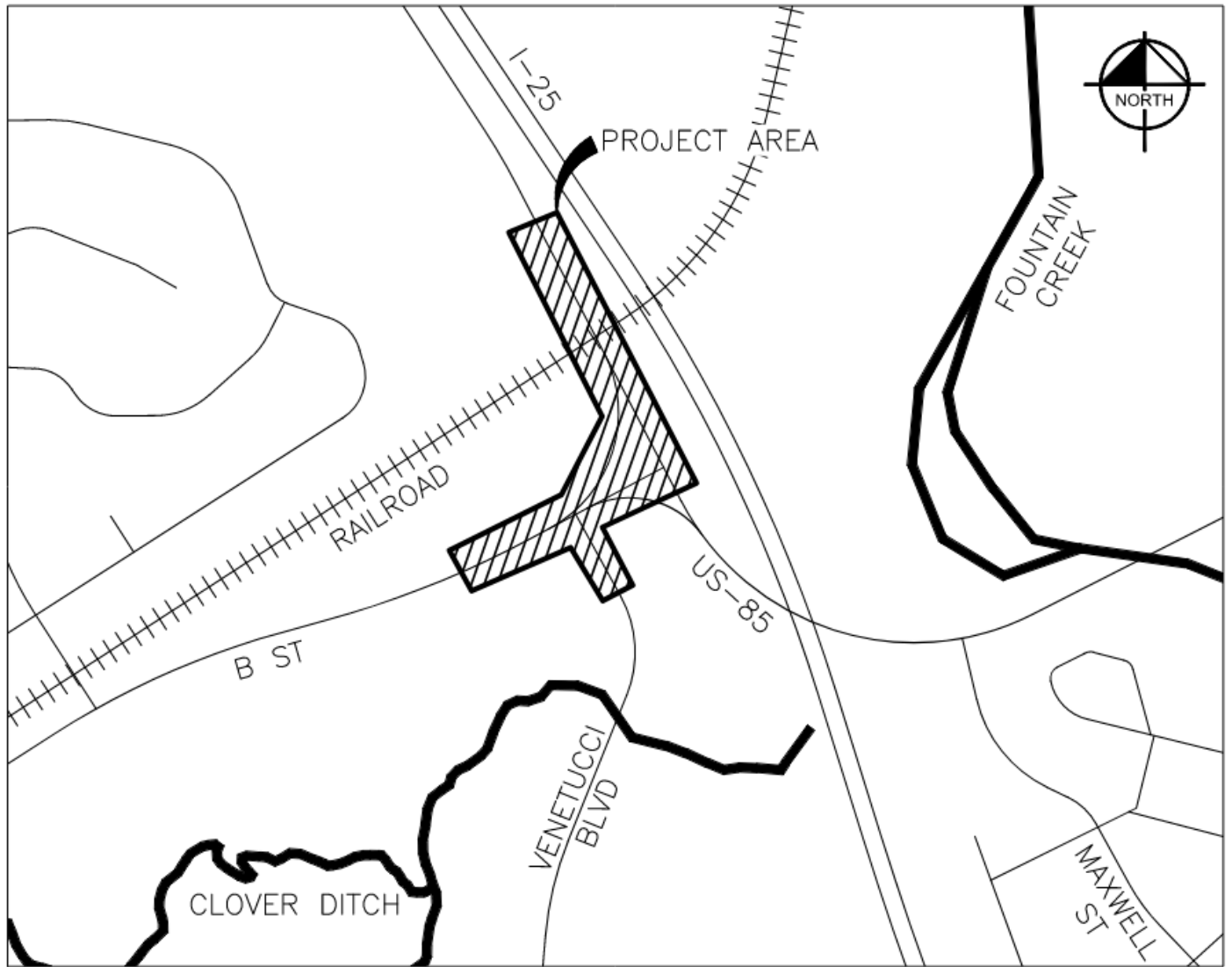
Colorado Discharge Permit System (CDPS) General Permit – Stormwater Discharges Associated with Construction Activity - Prepared by Water Quality Control Division, Colorado Department of Public Health and Environment; signed and issued on January 31, 2024 and administratively continued effective April 1, 2024.

NRCS Web Soil Survey - Website: <http://websoilsurvey.nrcs.usda.gov>

Stormwater Discharges Associated with Construction Activity – Stormwater Management Plan Preparation Guidance - Prepared by Water Quality Control Division, Colorado Department of Public Health and Environment; Revised April 2011.

Urban Storm Drainage Criteria Manual, Volume 3 – Mile High Flood District; Originally Published September 1992, Partially Updated March 2024.

**APPENDIX A
VICINITY MAP AND STORMWATER MANAGEMENT PLANS /
SITE MAPS**



VICINITY MAP
N.T.S.

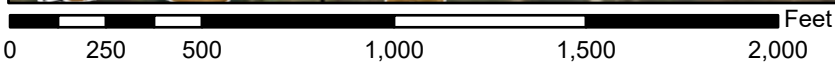
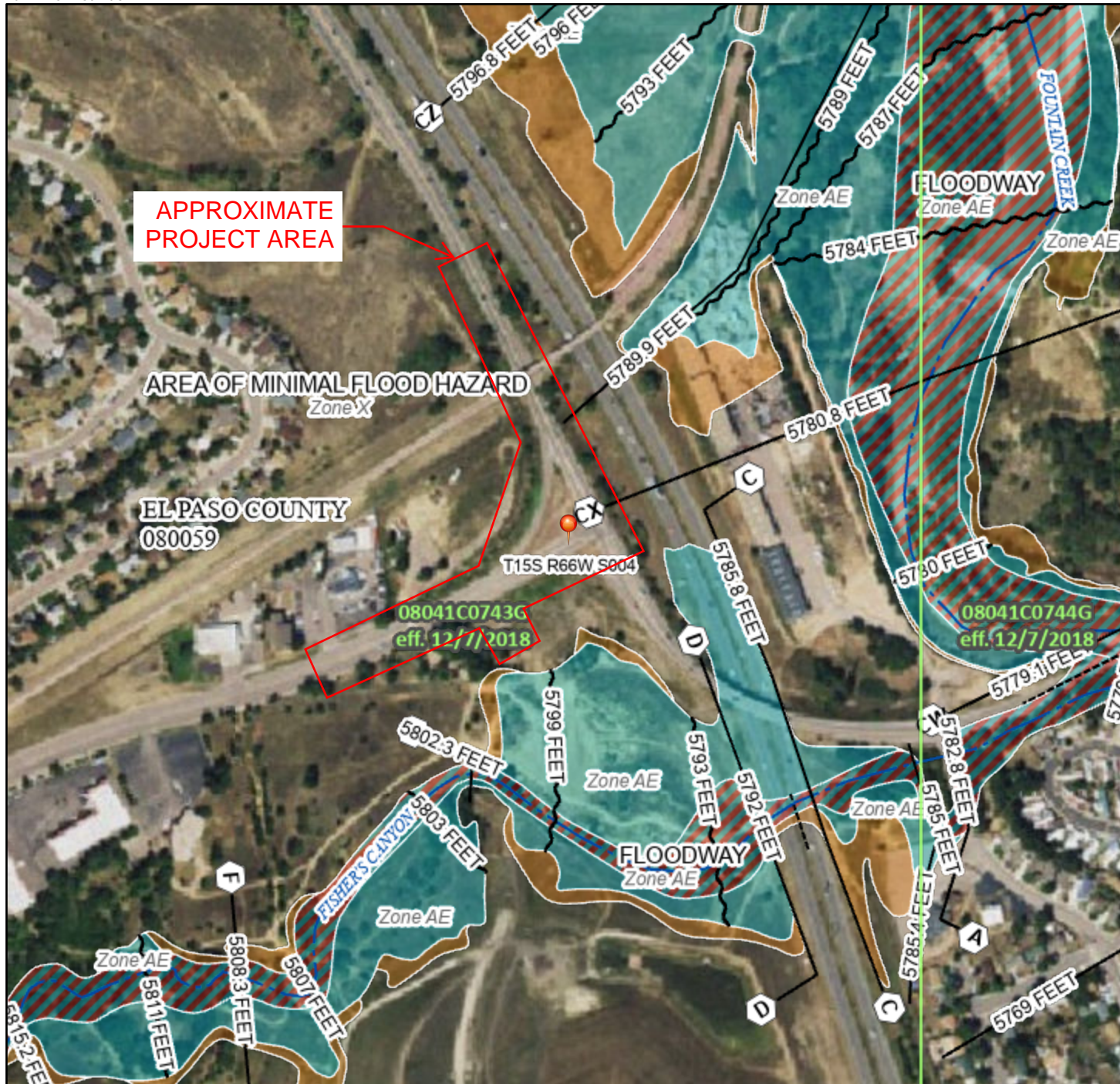
SWMP PLANS TO BE INSERTED ONCE APPROVED.

**APPENDIX B
FEMA FIRM MAP**

National Flood Hazard Layer FIRMMette



104°47'23"W 38°46'52"N



1:6,000

104°46'46"W 38°46'24"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **10/3/2024 at 10:26 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



APPENDIX C
SOILS INFORMATION AND GEOTECHNICAL REPORT



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **El Paso County Area, Colorado**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other


 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 22, Sep 3, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	7.6	1.6%
16	Chaseville gravelly sandy loam, 1 to 8 percent slopes	26.6	5.5%
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	75.9	15.8%
47	Limon clay, 0 to 3 percent slopes	63.8	13.3%
59	Nunn clay loam, 0 to 3 percent slopes	121.0	25.2%
82	Schamber-Razor complex, 8 to 50 percent slopes	129.7	27.0%
96	Truckton sandy loam, 0 to 3 percent slopes	0.3	0.1%
111	Water	16.1	3.4%
118	Fort loam, 1 to 5 percent slopes, cool	15.9	3.3%
127	Midway-Razor clay loams, dry, 1 to 18 percent slopes	21.1	4.4%
128	Razor clay loam, dry, 2 to 5 percent slopes	2.3	0.5%
Totals for Area of Interest		480.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Blakeland and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blakeland

Setting

Landform: Flats, hills
Landform position (three-dimensional): Side slope, talus
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits
derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent

Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

16—Chaseville gravelly sandy loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 367l

Elevation: 6,100 to 7,000 feet

Mean annual precipitation: 16 to 18 inches

Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 125 to 145 days

Farmland classification: Not prime farmland

Map Unit Composition

Chaseville and similar soils: 98 percent

Minor components: 2 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chaseville

Setting

Landform: Hills, alluvial fans, terraces

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from arkose

Typical profile

A1 - 0 to 6 inches: gravelly sandy loam

A2 - 6 to 19 inches: very gravelly sandy loam

C1 - 19 to 40 inches: extremely gravelly loamy coarse sand

C2 - 40 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 1 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

28—Ellicott loamy coarse sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 3680
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Ellicott and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ellicott

Setting

Landform: Stream terraces, flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

A - 0 to 4 inches: loamy coarse sand
C - 4 to 60 inches: stratified coarse sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

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Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R069XY031CO - Sandy Bottomland
Other vegetative classification: SANDY BOTTOMLAND (069AY031CO)
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquoll

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

47—Limon clay, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 368p
Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Limon, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Limon, Occasionally Flooded

Setting

Landform: Alluvial fans, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium derived from shale

Typical profile

A - 0 to 4 inches: clay
AC - 4 to 12 inches: silty clay
C - 12 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R069XY033CO - Salt Flat
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

59—Nunn clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3693
Elevation: 5,400 to 6,500 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Terraces, fans

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed alluvium

Typical profile

A - 0 to 12 inches: clay loam

Bt - 12 to 26 inches: clay loam

BC - 26 to 30 inches: clay loam

Bk - 30 to 58 inches: sandy clay loam

C - 58 to 72 inches: clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 2 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3c

Hydrologic Soil Group: C

Ecological site: R069XY042CO - Clayey Plains

Other vegetative classification: CLAYEY PLAINS (069AY042CO)

Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 4 percent

Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

82—Schamber-Razor complex, 8 to 50 percent slopes

Map Unit Setting

National map unit symbol: 369y
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Schamber and similar soils: 55 percent
Razor and similar soils: 43 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schamber

Setting

Landform: Breaks
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite and/or colluvium derived from granite and/or eolian deposits derived from granite

Typical profile

A - 0 to 5 inches: gravelly loam
AC - 5 to 15 inches: very gravelly loam
C - 15 to 60 inches: very gravelly sand

Properties and qualities

Slope: 8 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R069XY064CO - Gravel Breaks
Hydric soil rating: No

Description of Razor

Setting

Landform: Breaks

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Clayey slope alluvium over residuum weathered from shale

Typical profile

A - 0 to 3 inches: clay loam

Bw - 3 to 9 inches: clay loam

Bk - 9 to 31 inches: clay

Cr - 31 to 35 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 5 percent

Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 15.0

Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Ecological site: R069XY047CO - Alkaline Plains

Other vegetative classification: ALKALINE PLAINS (069AY047CO)

Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent

Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

96—Truckton sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2yvrđ

Elevation: 5,400 to 7,000 feet

Mean annual precipitation: 14 to 23 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 90 to 155 days

Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Truckton and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Truckton

Setting

Landform: Fan remnants, interfluves

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Wind re-worked alluvium derived from arkose

Typical profile

A - 0 to 4 inches: sandy loam

Bt1 - 4 to 12 inches: sandy loam

Bt2 - 12 to 19 inches: sandy loam

C - 19 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent

Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: R049XB210CO - Sandy Foothill

Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 5 percent
Landform: Hills, interfluves
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Bresser

Percent of map unit: 5 percent
Landform: Terraces, interfluves
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Pleasant, frequently ponded

Percent of map unit: 2 percent
Landform: Closed depressions
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Urban land

Percent of map unit: 2 percent
Hydric soil rating: No

Ellicott, occasionally flooded

Percent of map unit: 1 percent
Landform: Drainageways, flood plains
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R067BY031CO - Sandy Bottomland
Hydric soil rating: No

111—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

118—Fort loam, 1 to 5 percent slopes, cool

Map Unit Setting

National map unit symbol: 2rgqs
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 125 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort

Setting

Landform: Interfluves, fans
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy alluvium and/or eolian deposits

Typical profile

A - 0 to 4 inches: loam
Bt - 4 to 12 inches: clay loam
Btk - 12 to 33 inches: clay loam
Bk1 - 33 to 47 inches: loam
Bk2 - 47 to 79 inches: sandy loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Ecological site: R069XY006CO - Loamy Plains

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Forage suitability group: Loamy (G069XW017CO)

Other vegetative classification: Loamy (G069XW017CO), Loamy Plains #6
(069XY006CO_2)

Hydric soil rating: No

Minor Components

Willid

Percent of map unit: 10 percent

Landform: Interfluves

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R069XY006CO - Loamy Plains

Other vegetative classification: Loamy (G069XW017CO), Loamy Plains #6
(069XY006CO_2)

Hydric soil rating: No

Oterodry

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: R069XY026CO - Sandy Plains

Other vegetative classification: Not Suited (G069XW000CO)

Hydric soil rating: No

127—Midway-Razor clay loams, dry, 1 to 18 percent slopes

Map Unit Setting

National map unit symbol: 2t52f

Elevation: 3,700 to 6,400 feet

Mean annual precipitation: 12 to 14 inches

Mean annual air temperature: 48 to 54 degrees F

Frost-free period: 130 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Midway, dry, and similar soils: 46 percent

Razor, dry, and similar soils: 44 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Midway, Dry

Setting

Landform: Hillslopes, ridges

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Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 3 inches: clay loam

AC - 3 to 9 inches: clay

C - 9 to 16 inches: paragravelly clay

Cr - 16 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 18 percent

Depth to restrictive feature: 11 to 20 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high
(0.00 to 0.21 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 5 percent

Maximum salinity: Very slightly saline to slightly saline (2.0 to 7.9 mmhos/cm)

Sodium adsorption ratio, maximum: 10.0

Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Ecological site: R069XY046CO - Shaly Plains

Hydric soil rating: No

Description of Razor, Dry

Setting

Landform: Hillslopes, pediments

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 4 inches: clay loam

Bw - 4 to 15 inches: silty clay

Bky - 15 to 30 inches: clay

Cr - 30 to 79 inches: bedrock

Properties and qualities

Slope: 1 to 9 percent

Depth to restrictive feature: 20 to 39 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Medium

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Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high
(0.00 to 0.21 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 5 percent

Maximum salinity: Very slightly saline to slightly saline (2.0 to 7.9 mmhos/cm)

Sodium adsorption ratio, maximum: 10.0

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Ecological site: R069XY047CO - Alkaline Plains

Hydric soil rating: No

Minor Components

Manzanola

Percent of map unit: 9 percent

Landform: Hillslopes, fan remnants

Landform position (two-dimensional): Footslope, backslope

Landform position (three-dimensional): Base slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R069XY042CO - Clayey Plains

Other vegetative classification: Loamy Plains #6 (069XY006CO_2)

Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Hydric soil rating: No

128—Razor clay loam, dry, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t529

Elevation: 3,700 to 6,400 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 48 to 54 degrees F

Frost-free period: 130 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Razor, dry, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Razor, Dry

Setting

Landform: Pediments

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 4 inches: clay loam

Bw - 4 to 15 inches: silty clay

Bky - 15 to 30 inches: clay

Cr - 30 to 79 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: 20 to 39 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high
(0.00 to 0.21 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Gypsum, maximum content: 5 percent

Maximum salinity: Very slightly saline to slightly saline (2.0 to 7.9 mmhos/cm)

Sodium adsorption ratio, maximum: 10.0

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 6s

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: R069XY047CO - Alkaline Plains

Hydric soil rating: No

Minor Components

Midway, dry

Percent of map unit: 10 percent

Landform: Hillslopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: R069XY046CO - Shaly Plains

Hydric soil rating: No

Manzanola, dry

Percent of map unit: 5 percent

Landform: Fan remnants

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R069XY042CO - Clayey Plains

Other vegetative classification: Loamy Plains #6 (069XY006CO_2)

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Hydric soil rating: No

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Report of Geotechnical Engineering Evaluation

Proposed Multifamily Development
Venetucci Boulevard at South Academy Boulevard
Colorado Springs, Colorado

Prepared for

Thompson Thrift Residential
111 Monument Circle, Suite 1500
Indianapolis, Indiana 46204
ATTN: Mr. Tim Govert

Prepared by

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January 2, 2025

PSI Project 05322879



Project Number: 05322879
January 2, 2025

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**Subject: Report of Geotechnical Engineering Evaluation
Proposed Multi-family Development
Venetucci Boulevard at South Academy Boulevard
Colorado Springs, Colorado**

Dear Mr. Tim Govert:

Professional Service Industries, Inc (PSI), an Intertek Company, is pleased to transmit our Report of Geotechnical Engineering Evaluation for the proposed multifamily development in Colorado Springs, Colorado. This report includes the results of the field exploration and laboratory testing, as well as recommendations for site preparation and foundation design.

If you have questions pertaining to this report, or if we may be of further service, please contact us at your convenience.

PSI thanks you for your business and we look forward to finding ways to grow our partnership, expand our services, and continue Building Better Together.

For Professional Service Industries, Inc.

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Staff Engineer

Reviewed by: Lloyd Lasher, P.E.
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Hannah C. Tawfik, P.E.
Senior Project Engineer

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1.0 INTRODUCTION

Professional Service Industries, Inc. (PSI), an Intertek Company, has conducted a geotechnical engineering evaluation for the proposed multifamily development in Colorado Springs, Colorado. The purpose of our study was to characterize the general subsurface strata at the subject site and to develop recommendations for site preparation and provide geotechnical parameters for the pavement and foundation design for the proposed development. Our services on this project were performed in general accordance with PSI Proposal Number 431918 Revision 1 dated August 12, 2024, and authorized by the Agreement for Consulting Services between PSI and Thompson Thrift Residential signed August 20, 2024.

PSI's scope of services for the geotechnical study did not include an assessment of environmental conditions in the soil, bedrock, surface water, groundwater, or air, on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

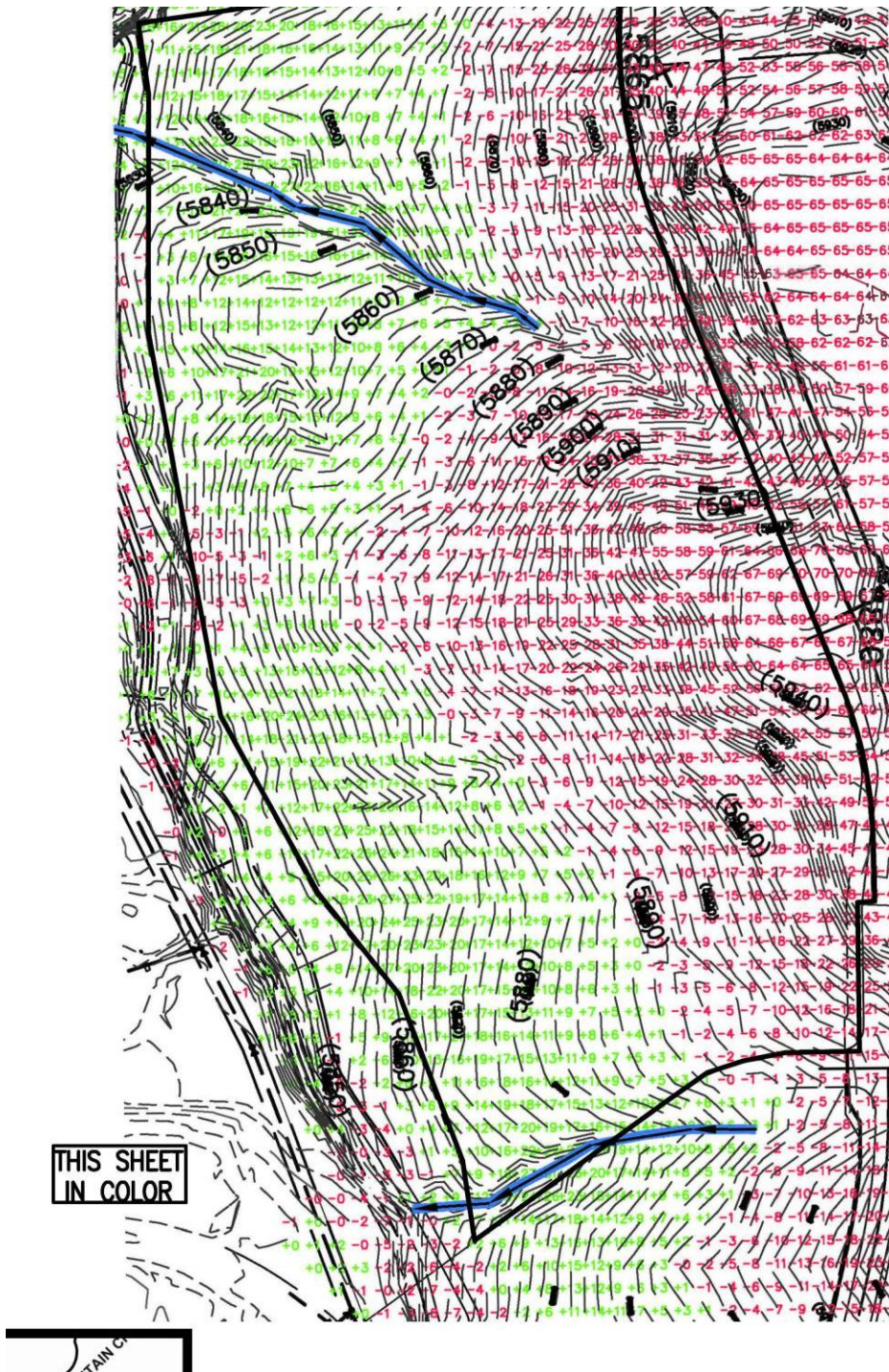
The report, which follows, presents a brief review of our understanding of the project, a discussion of the site and subsurface conditions encountered, and our recommendations for design and construction of foundations and pavements.

2.0 PROJECT INFORMATION

PSI understands that Thompson Thrift Residential is planning a multifamily development in Colorado Springs Colorado. The site lies at 38.7699 N latitude and 104.7866 W longitude. The site is bordered by vacant land and a creek to the north, Venetucci Boulevard and a commercial development to the east, undeveloped lots and more vacant land to the south, and a creek, additional vacant land, and a residential development to the west.

Project information was provided in an email by Tim Govert, which included a Geotechnical RFP dated July 30, 2024 and a Site Plan dated July 22, 2024. PSI was also provided a preliminary geotechnical report dated July 6, 2023, and testing documents from earthwork performed at the site in 2013. We understand plans are to develop an approximately 16.23-acre site located west of Venetucci Boulevard and approximately ¼ mile north of South Academy Boulevard in Colorado Springs, Colorado. We anticipate the proposed development will consist of 10, three-story multi-family apartment buildings; three, single to two-story amenity buildings; a detention pond; retaining walls 4 to 30 feet in height; and a swimming pool. The apartment buildings are anticipated to be wood frame with no basements planned. Surface parking is also planned with several carport structures.

The site slopes significantly downward towards the northern and western sides of the site up to approximately 60 feet. Significant site grading (cuts of up to 70 feet and fills of up to 20 feet) reportedly occurred in the early 2010s to support surrounding development.



The above map was obtained from the provided preliminary geotechnical report by others, showing the grading that reportedly occurred in the early 2010s.

Descriptions of the site are based upon observations made during our field exploration program.



Proposed grades were provided on the July 22, 2024 grading plan. Based on our current project understanding, we anticipate the proposed development will follow existing grades to the extent possible with maximum cuts and/or fills of 5 feet or less across much of the previously graded site area. Fills of up to 40 feet may be required to achieve planned grades along the western side of the site to expand the development area further west. Cuts of 5 to 35 feet are planned for the proposed detention pond area in the northern portion of the site.

It appears retaining walls are planned around the pond and along the western side of the site, ranging from 4 to 30-feet in height, and appear to be supporting new fill. No information was provided regarding the pond or retaining wall design. PSI has provided recommended soil parameters for typical wall backfill including lateral earth pressures to aid in design of the retaining walls by others. Internal stability is typically performed by the wall manufacturer depending on the proposed wall type. External stability is not included in this scope of services but will need to be performed once the wall type and geometry is established. Global and external wall stability analysis can be performed, if requested, for a separate fee once more design information is known.

Anticipated structural loads were provided in the RFP. Based on this, we anticipate structural loads will be on the order of 75 kips for isolated columns in residential buildings and 3 kips per linear foot for walls. No below grade levels are planned.

Pavements are estimated to have a design traffic load of 2 (standard duty) or 5 (heavy duty) EDLAs for a 20-year pavement life. Please notify PSI of the anticipated loads when available, such that our recommendations may be reviewed and modified as necessary.

The geotechnical recommendations presented in this report are based upon the provided project information and the subsurface materials described in this report. If any of the noted information is incorrect, please inform us so that we may amend the recommendations presented in this report, if needed.

3.0 SUBSURFACE INFORMATION

The following sections provide information relating to subsurface conditions encountered at the boring locations and published geologic information in the general vicinity of the project site. The geology section is based upon the “Geological Map of Colorado” by Ogden Tweto dated 1979 and information relating to subsurface conditions within the property gathered from our current field study.

3.1 Site Geology and Geologic Hazards

Based on the referenced map by Tweto 1979, the site lies in an area mapped as Pierre Shale-Upper unit (Phanerozoic, Mesozoic, Cretaceous) can be described as “Sedimentary, Clastic, Mudstone, Shale”.



The site was apparently undeveloped prior to 1993, however significant site grading (cuts of up to 70 feet and fills of up to 20 feet) reportedly occurred in the early 2010s to support surrounding development. PSI was provided the testing documents for the mass grading that was performed in 2014. Based on the provided information the fill was generally placed in a controlled manner, however; the 2023 report and previous documentation provided indicate substandard on-site soils were utilized during site grading.

The site may be considered as part of the Colorado Springs Geological Hazard Ordinance area, which includes areas west of I-25. A geological hazard report is not included in this scope of services. Due to the current and proposed slopes, the Colorado Geological Survey may require a geological hazards study.

3.2 Subsurface Conditions

As part of PSI's evaluation of this site, thirty (30) exploratory borings were drilled at the approximate locations as indicated on Figure 2, the Boring Location Map, as follows:

- Fifteen (15) borings were drilled in the approximate areas of the multi-family apartment buildings approximately 25 to 35 feet below existing grade;
- Two (2) borings were drilled in the approximate locations of the amenity buildings to a depth of approximately 20 to 25 feet below existing grade;
- One (1) boring was drilled in the approximate area of the 4 foot retaining wall location to depths of approximately 15 feet below existing grade;
- Four (4) borings were drilled in the approximate location of the 11 to 30 feet retaining wall to depths of approximately 20 to 40 feet below existing grade;
- One (1) boring was drilled in the planned location of the detention pond to depths of approximately 45 feet below existing grade. One boring was also drilled to a depth of 5-feet for a percolation test;
- Six (6) borings were drilled in the pavement areas to depths of approximately 10 to 15 feet below existing grade.

The borings were advanced using a CME-75/55 truck-mounted drill rig equipped with 4-inch diameter, solid-stem, continuous-flight augers. Soil samples were recovered at selected depths during drilling with the truck-mounted drill rig using a Modified California Barrel Sampler (with an inside diameter of 2 inches and an outside diameter of 2.4 inches) or split spoon sampler (with a outside diameter of 2 inches) driven by a 140-pound hammer free-falling 30 inches. The total number of blows required to drive the sampler for 12 inches of penetration is designated as the penetration resistance (N-value, blows per foot) which provides an indication of the consistency of cohesive soils and the relative density of granular materials. While the procedure is similar to that employed in the Standard Penetration Test (ASTM D1586), the penetration resistance obtained using the California barrel sampler is generally higher than that obtained using the standard split-spoon sampler. A correction factor of 0.6 for sand and 0.77 for clay is



used for N-Values collected using the Modified California sampler. The N-values on the logs were not corrected for the Modified California sampler or hammer efficiency.

A representative from our office observed the drilling of the borings and logs were prepared of the encountered conditions. Individual logs of the borings are presented on Figures 3 through 32. It should be noted that the subsurface conditions presented on the boring logs are representative of the conditions at the specific locations drilled. Variations may occur and should be expected across the site. The stratification represents the approximate boundary between subsurface materials and the transitions may be gradual and indistinct. Water level information obtained during our field operations is also shown on the boring logs.

3.2.1 General Subsurface Profile

The soil profile generally consisted of documented fill material, low to high plasticity clay, and bedrock. PSI observed the documented fill material from the current ground surface to approximately 14-feet below existing grade in the borings performed along the western portion of the site. However, based on the provided information, we understand deeper fills are likely present on the slopes where PSI was unable to obtain borings. The documented fill material generally consisted of clay with varying amounts of sand, described as dry to moist, brown to dark brown, gray, orange, medium stiff to hard, and medium dense to dense in consistency. Claystone fragments and trace gravel were also observed within the fill. The fill was predominantly encountered along the western side of the site to extend the terrace. It should be noted that the apparent fill can be difficult to discern in the absence of deleterious materials, therefore depths should be considered approximate.

The low to high plasticity clay was observed at surface grade to approximately 3 to 10-feet below existing grade, with the exception of few areas. The clay can be described as having fine to coarse grained sand with trace gravel, dry to moist, brown to dark brown, gray to dark gray, black, and stiff to hard in consistency.

Claystone was encountered at the ground surface generally on the eastern portion of the site where the site was previously cut during grading and varied to up to 29 feet below existing grade. It can be described as containing fine to coarse sand with trace gravel, dry to moist, brown to dark brown, gray to dark gray, black and orange, weathered to hard in consistency. Bedrock depths were variable across the site.

3.2.2 Groundwater Conditions

Groundwater was observed in one boring, B28, as shown in figure 2, approximately 15 feet below existing grade during drilling operations. It should be noted that it is possible for the groundwater to be perched or fluctuate during the year depending upon climatic and rainfall conditions and changes to surface topography and drainage patterns. Discontinuous zones of perched water may also exist, or develop, within the overburden and bedrock materials. The groundwater levels presented in this report are the levels that were observed at the time of our field activities. We recommend the contractor determine water levels at the time of construction.



3.2.3 Swell Potential

PSI has reviewed the “Potentially Swelling Soil and Rock in the Front Range Urban Corridor, Colorado” by Stephen S. Hart, dated 1972. Based on this published map, the subject site lies with an area described as having “Low and Moderate Swell Potential” designation. Low Swell Potential designation is described as “This category includes several bedrock formations and many surficial deposits. The thickness of the surficial deposits may be variable, therefore, bedrock with a higher swell potential may locally be less than 10 feet below the surface.” Moderate Swell Potential designation is described as, “This category includes several bedrock formations and a few surficial deposits of variable thickness. Special foundation designs are generally necessary to prevent damage.”

PSI performed ASTM D4546 Swell Testing on selected samples of the recovered on-site material from the soil borings. The following table summarizes the results of the Denver Swell tests:

Boring	Depth (feet)	Surcharge Pressure (psf)	Moisture Content (%)	Volume Change (%)	Swell Pressure (psf)
B1	2 ½	250	21.2	2.7	2,100
B1	7 ½	750	20.5	2.7	3,900
B2	7 ½	750	15.8	3.5	4,100
B2	10	1000	10.7	3.1	3,800
B3	7 ½	750	15.1	3.9	9,300
B3	10	1000	16.8	2.7	6,300
B4	2 ½	250	22.9	9.2	7,200
B5	5	500	13.6	6.0	7,500
B6	5	250	20.5	6.3	6,300
B6	7 ½	500	15.2	4.4	4,100
B8	7 ½	750	12.7	15.7	5,300
B9	5	500	12.2	17.1	4,300
B10	2 ½	250	18.6	5.5	4,800
B10	5	250	13.0	6.0	1,100
B10	7 ½	500	13.2	13.2	10,000
B11	5	500	9.6	2.8	3,200
B12	5	500	11.6	3.1	3,400
B12	10	1000	13.2	3.1	5,900
B13	15	1000	18.7	5.9	12,400
B14	7 ½	750	21.6	6.9	9,600
B14	10	1000	20.3	7.5	13,700
B16	2 ½	250	20.1	8.5	10,600
B16	5	500	14.2	7.3	11,500
B17	5	500	19.0	5.1	8,800
B18	5	250	15.3	12.3	11,000
B18	10	750	18.9	4.7	12,500
B19	5	250	18.2	7.5	6,300
B19	7 ½	500	20.4	5.3	6,800



B20	7 ½	250	11.6	7.1	4,100
B20	10	500	15.4	4.9	6,100
B20	15	1000	13.6	4.1	6,300
B22	10	500	13.5	5.1	4,300
B23	5	500	14.6	4.8	3,900
B23	10	1000	15.4	3.6	7,600
B24	5	500	15.8	6.0	11,100
B25	5	250	14.3	11.6	11,600
B26	5	500	24.6	4.0	6,200
B26	7 ½	750	21.5	4.7	7,800
B27	7 ½	750	12.5	5.9	4,100
B27	10	1000	11.9	-0.8	NA
B28	2 ½	250	15.1	6.4	4,500
B29	10	1000	19.7	3.1	6,100
B30	5	500	18.1	-0.1	NA
B30	7 1/2	500	19.5	7.7	12,800

The laboratory swell test results are included in Appendix A and on the individual boring logs. The test results indicated swell percentages of -0.8 to 17.1 percent when tested under a surcharge pressure of 250, 500, 750 and 1,000 psf. Once the samples were hydrated under the surcharge pressure and swelling had stopped, additional pressure was applied until the sample was at or below its initial volume.

Based upon the swell test results, the majority of the on-site soils and bedrock materials encountered are classified as having a “very high” potential for swell, therefore; mitigation for swell is required. A Standard Proctor test indicated the remolded clay soils also exhibited a swell percent of 3.9 percent when tested within the range of optimum moisture content. If excessive drying and rewetting of these soils is allowed to occur, the risk of swell will increase. Proper drainage and good maintenance should be followed.

3.2.4 Laboratory Testing

The soil samples obtained during the field exploration were transported to the laboratory and selected soil samples were tested in the laboratory to determine material properties for our evaluation. Laboratory testing was accomplished in general accordance with ASTM and other applicable procedures. Laboratory testing was performed on selected samples to evaluate the classification and other engineering characteristics of the subsurface materials. Laboratory test data along with detailed descriptions of the soils can be found on the logs of borings and in Appendix A. The samples that were not altered by laboratory testing will be retained for 30 days from the date of this report and then will be discarded without further notice.



4.0 GEOTECHNICAL EVALUATION

The primary geotechnical concerns at this site are high swelling and high plastic soils, significant previous and future planned site grading, and variable depths to bedrock.

- The on-site soils and bedrock exhibited very high swell potential. PSI performed a Standard Proctor test on a bulk sample of the high plastic clay soils, which appears to be the majority of the shallow site soils. The majority of the in-place soils were tested to be below optimum moisture content. A remolded sample was tested for swell potential, and exhibited a borderline high result.

Due to the composition of the soils being high plastic, generally 90 percent clay, and having significant concentrations of high swelling claystone bedrock that is difficult to process, it is PSI's opinion that the on-site soils be used in specified areas only. Bedrock should NOT be reused for structural purposes.

- Significant site grading has previously occurred on the site, including along the western slopes. We have been provided with testing reports of this fill placement. We understand Thompson Thrift will also perform significant site grading in areas. Due to the thickness and extent of the previously placed fill, there is still an inherent risk of poorly compacted or unsuitable materials may exist. We assess the risk of supporting the proposed development on the previously placed fill materials as relatively low given the relatively light anticipated structural loads associated with the proposed development and the assumption that the materials were likely placed with the intention of supporting commercial or retail development based on the adjacent properties. We recommend a contingency be included in the event that unsuitable materials such as organic materials, debris or other unsuitable/unstable materials are encountered and require additional overexcavation or removal.

However, due to the amount of site grading and construction of slopes, the depth of the previously placed fill, and the clay soils, secondary post-construction settlement may occur within the deep fills and clay soils. Therefore, PSI recommends using an imported fill in accordance with Section 5.1. This material will compact more thoroughly and secondary consolidation should occur during construction. We also recommend 100 percent compaction of all newly placed fills.

Installation of settlement plates to monitor construction settlement is recommended. Settlement plates primarily consist of a base plate with a riser rod attached to it. The original location of the plate and riser rod is survey verified and as stockpile loads are placed/maintained, they are regularly surveyed such that subsequent survey shots quantify the magnitude of settlement at the base plate. When fill approaches the top of the riser, an extension riser rod can be added, and the process repeated until desired surcharge stockpile height is reached. Thereafter, measured settlement is regularly recorded between each subsequent survey effort until recorded settlement movement between survey efforts is deemed to be at a tolerable level.



The progress of settlement with time throughout the fill placement period should be submitted regularly to PSI to review the progress of the consolidation due to the fill placement. Installation of the settlement plates should follow manufacturer's instructions.

- Depths to bedrock were variable across the site. Due to the low permeability rates of the claystone bedrock, excavations into bedrock may trap water and provide opportunity to activate swelling soils and bedrock. Therefore, we recommend placing dry wells within each excavation, and the bottom of the excavation should be sloped to drain to the area of the dry well. Dry wells should be placed at low points of bedrock within the excavation and determined during grading operations. PSI can assist with locations with the Civil Engineer. Permanent sumps are also an option. We further recommend that excavations into bedrock across the site be positively drained to proper drainage channels so as not to create additional pooling areas. Drainage of the excavations will be imperative to reduce the risk of swell of the on-site soils and bedrock.

Based on these concerns, PSI recommends the soils in the building areas be overexcavated to a depth of no less than 10-feet below bottom of proposed slab elevation and replaced with 5-feet of properly placed imported fill overlying 5-feet of moisture conditioned and recompact on-site material in accordance with this report. Pavements should bear at least 30-inches of amended soil including 12-inches of lime treatment overlying 18-inches of moisture conditioned structural fill. New fill soils used to bring the site to final grade may be included in the total amount of amended soil below buildings and pavements, provided they are placed in accordance with this report. Bedrock material should not be reused as structural fill. On-site soils and existing fill material may be used in the bottom of the overexcavation and below pavements placed as outlined in this report.

The above recommendations for soil amendment may result in soil heave up to approximately 2-inches in the occurrence of moisture fluctuation of the soils below the building. Based on this we recommend use of Type III foundations and provide a dead load during construction.

In lieu of an overexcavation, PSI recommends consideration of a drilled pier and structural slab design for proposed buildings.

The recommended minimum pavement thicknesses for the subject development have been based on lime treatment and a subgrade support R-Value of at least 40. Pavements should bear at least 30-inches of amended soil including 12-inches of lime treatment overlying 18-inches of moisture conditioned structural fill.

Moisture fluctuation of the onsite soils will increase its swell/settlement potential, therefore maintenance of the structure and pavements, as well as controlling water runoff will be critical to the functionality of the facility. Proper moisture control will be imperative at this site during



and following construction, and for the life of the project. The risk of swelling/collapsing soils can be reduced, but not eliminated, by preventing fluctuations in moisture content. Therefore, it is imperative that positive slope away from the building and foundations is maintained, hardscape is constructed around the building perimeter, utilities are prevented from transmitting water via trench bedding or broken lines, and pavements are regularly maintained. Plantings may be placed near the buildings so long as they are xeric in nature and require only drip irrigation. Positive drainage away from the building must be provided and maintained.

The following geotechnical design recommendations have been developed on the basis of the described project characteristics and subsurface conditions encountered. Once final design/grading plans and specifications are available, a general review by PSI is required as a means to check that the recommendations presented in the following sections of this report are properly interpreted and implemented.

5.0 SITE GRADING RECOMMENDATIONS

Prior to site grading or excavation for foundation construction, the site will need to be stripped of all topsoil, vegetation, abandoned utilities, demolition or other debris, etc. We recommend a stripping depth of approximately 3-inches be anticipated for removal of topsoil and vegetation based on the soil boring results. Structures should bear no less than 10-feet of amended soil below bottom of slab in the building areas, to include 5-feet of non-expansive imported fill material overlying 5-feet of moisture conditioned and recompacted on-site material. Pavements should bear at least 30-inches of amended soil including 12-inches of lime treatment overlying 18-inches of moisture conditioned structural fill. Soils should be compacted in accordance with Section 5.2. Excavations should extend no less than 10-feet laterally outside building limits and to one-foot behind back of curb in pavement areas.

Overexcavation into bedrock can create areas where surface water and slowly infiltrating water to collect in the excavation. Therefore, we recommend placing dry wells within each excavation, and the bottom of the excavation should be sloped to drain to the area of the dry well. Permanent sumps are also an option. Drainage of the excavations and overall site will be imperative to reduce the risk of swell of the on-site soils and bedrock.

Following rough grading and over-excavation for moisture conditioning and prior to placement of structural fill, a proofroll should be performed. The proofroll should be conducted with a loaded tandem-axle dump truck or similar pneumatic-tired equipment with a minimum weight of 15 tons. Areas that deflect excessively should be further over-excavated, moisture conditioned and recompacted.

Trash and debris, if encountered, should be removed from the site and disposed of in accordance with local and state regulations.

Some areas may be more difficult to process and may require additional stabilization effort. This may include additional overexcavation, rock, and/or geogrid.



The quantity of bedrock requiring excavation will be dependent on proposed grades. Excavations into the sandstone/claystone bedrock are expected to require moderate effort with standard excavation equipment. No blasting, chiseling, etc. is anticipated to be needed, based on the soils at the boring locations.

5.1 Structural Fill

Based on PSI's field and laboratory data, the on-site bedrock material is generally unsuitable for re-use as site grading, backfill soils, or for use as structural fill. On-site overburden soil/existing fill material may be reused at the bottom 5-feet of the building overexcavation and below pavements. Imported fill to be used in the upper 5-feet of the building overexcavation should follow the outline below. Depending on the proposed retaining wall type, stricter backfill specifications may need to be met possibly including permeability and gradation requirements. On-site soils may be used in non-structural areas.

Imported structural fill should be free of organic or other deleterious materials, have a liquid limit less than 30, a plasticity index less than 10, and meet the following gradation outlined below. This select fill criteria is intended as a general guideline. Select imported fill materials should have a swell potential of less than 1 percent when compacted to 95 percent of maximum dry unit weight (MDUW) and at 2 percent below optimum moisture content (OMC) and tested under a swell test surcharge of 500 psf. The MDUW and OMC should be determined by ASTM D698 (Standard Proctor).

<u>Screen Size</u>	<u>Percent Passing</u>
2 Inch	100
#4	50 – 100
#200	10 – 30

Imported fill material proposed for use on this site that does not meet these criteria should be submitted to the project geotechnical engineer for evaluation and approval. The geotechnical engineer should evaluate the proposed import fill prior to purchase and delivery. Fine-grained soils used for fill require close moisture content control and careful placement by the contractor to achieve the recommended degree of compaction and to address swell potential and settlement issues.

5.2 General Fill Placement and Testing

Unless otherwise specified, imported fill material should be compacted to at least 95 percent of the maximum dry unit weight as determined by the Standard Proctor Test (ASTM D698). **For fill depths in excess of 5 feet, compaction should be 100 percent maximum dry unit weight. Each lift of compacted fill should be tested for density by a representative of the geotechnical engineer prior to placement of subsequent lifts.** Clay fill soils should be moisture conditioned to a range from optimum moisture content to four percent above optimum moisture content.



Sand fill soils should be moisture conditioned to between 2 percent below and 2 percent above optimum moisture content. Fill material should be placed in maximum eight-inch loose lifts.

PSI must be retained as the materials testing firm to provide full-time testing and observation services. A sample(s) of the proposed backfill soil(s) should be obtained for moisture density relationship (proctor test) three to four days prior to backfilling operations to expedite compaction and moisture content testing by PSI.

Weather conditions in the site area are typically dry in the summer and early fall. Precipitation in the form of snowfall is common from October through March. While grading can be inhibited for short periods during and following times of precipitation, grading can generally be conducted year-round. The major factor that must be considered during the winter months is ground freezing. During extended periods of sub-freezing weather, it can be difficult to properly moisture condition and compact soils. Grading must be conducted during the warmer parts of the day in freezing weather.

6.0 GEOTECHNICAL RECOMMENDATIONS

The proposed structures may be founded on monolithic slab foundations bearing on moisture conditioned and recompacted structural fill soils.

6.1 Post-Tensioned Slab-on-Grade Foundation Recommendations

PSI understands the client is planning the use of a post-tensioned concrete slab for the support of the proposed residential buildings. The post-tensioned slab and foundation should be supported on imported fill overlying moisture conditioned and recompacted on-site soil extending at least 10-feet below bottom of slab and designed as a Type III (Reinforced and Stiffened) slab. The post-tensioned slab system may be designed for an allowable soil bearing capacity of 500 psf while interior grade beams, turn down portions of the slab or exterior footings can be designed for an allowable soil bearing capacity of 3,000 psf. The frost depth for the area is 30 inches. Exterior footings or turn-down portions of the slab should extend to no less than 30-inches to account for frost depth.

We anticipate potential movements of PT Slabs can be reduced to about 2-inches following soil amendment as previously outlined to a depth of at least 10 feet below the planned slab subgrade, barring unforeseen and uncontrollable deep wetting of on-site soils and bedrock.

The post-tensioned systems should be designed by a structural engineer experienced in post-tensioned slab design and design criteria of the Post-Tensioning Institute (PTI), Third Edition, as required by the 2013 CBC (Section 1808.6). The post-tensioned design should incorporate the design parameters presented in the following table.



Post-tensioned Slab Design Parameters

Post-tensioned Slab-on-Ground Design Parameters (Reference: PTI DC 10.1-08, 3 rd Edition)	Design Values
Thornthwaite Moisture Index (I_m)	-20
Equilibrium Suction (pF)	3.9
Edge Lift Moisture Variation Distance (e_m , feet)	4.0
Edge Lift Differential Soil Movements (y_m , inches)	1.6
Center Lift Moisture Variation Distance (e_m , feet)	8.2
Center Lift Differential Soil Movements (y_m , inches)	0.5

To reduce moisture vapor transmission, we recommend a vapor retarding membrane be included in the design. Membrane specification should be provided by manufacturer. Vapor retarders should be installed in accordance with ACI 302.1, Chapter 3.

The thickened edges, interior grade beams or perimeter footings for the post-tensioned slabs should be embedded in accordance with the recommendations presented in this report or as directed by the structural engineer, whichever is deeper.

Post-tensioned slabs are susceptible to excessive edge lift, regardless of the underlying soil conditions. Placing reinforcing steel at the bottom of the perimeter footings and the interior stiffener beams can reduce this potential. The structural engineer should design the foundation system to reduce the potential of edge lift for the proposed structures.

During the construction of the post-tension foundation system, the slabs should be bonded integrally to the grade beams. Pouring the concrete monolithically achieves this, however, other structural methods may be used, as decided by the structural engineer.

Special subgrade pre-saturation is not deemed necessary prior to placing concrete; however, the subgrade soils should be moisture-conditioned and recompact as recommended to a depth of at least 10-feet below the slab subgrade to maintain a moist condition prior to concrete placement. The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soils. However, even with the incorporation of the recommendations, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil expansion and shrinkage.



6.2 Seismic Parameters

The project site is located within a municipality that employs the International Building Code, 2018 edition. As part of this code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event as well as the properties of the soils that underlay the site. As part of the procedure to evaluate seismic forces, the code requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper 100 feet of the ground surface. To define the Site Class for this project, we have interpreted the expected results of soil test borings drilled with the project site and estimated appropriate soil properties below grade to a depth of 100 feet, as permitted by Chapter 20.3-1 of the code. The estimated soil properties were based upon data available in published geologic reports and our experience with subsurface conditions in the general site area.

Based upon our evaluation, it is our opinion that the subsurface conditions within the site are consistent with the characteristics of Site Class C as defined in Chapter 20.3-1 of the ASCE 7-16 code.

The USGS-NEHRP interpolated probabilistic ground motion values near latitude 38.7699° N latitude and 104.7866° W longitude obtained from the USGS geohazards web page are as follows:

Period (seconds)	2% Probability of Event in 50 years (g)	Site Coefficients	Maximum Spectral Acceleration Parameters	Design Spectral Acceleration Parameters	
0.2 (S_s)	0.199	$F_a = 1.3$	$S_{ms} = 0.259$	$S_{Ds} = 0.173$	$T_0 = 0.067$
1.0 (S_1)	0.058	$F_v = 1.5$	$S_{m1} = 0.087$	$S_{D1} = 0.058$	$T_s = 0.335$
			$S_{ms} = F_a S_s$ $S_{m1} = F_v S_1$	$S_{Ds} = \frac{2}{3} * S_{ms}$ $S_{D1} = \frac{2}{3} * S_{m1}$	$T_0 = 0.2 * S_{D1} / S_{Ds}$ $T_s = S_{D1} / S_{Ds}$

The Site Coefficients, F_a and F_v presented in the above table were interpolated from Chapter 20.3-1 as a function of the site classification and mapped spectral response acceleration at the short (S_s) and 1 second (S_1) periods.

6.3 Pavement Recommendations

The following analysis and minimum pavement thickness recommendations are in general accordance with AASHTO and the Colorado Department of Transportation Manual for Road and Bridge Construction based upon our current understanding of the project.

6.3.1 Subgrade Preparation Recommendations

The pavement sections should bear on no less than 30-inches of amended soils. We recommend performing 1-foot of lime treatment overlying 1½ feet of moisture treated and recompacted structural fill.



Once the areas below the parking area have been recompacted, the existing site soils should be proofrolled to identify areas of loose soils. The proofroll should be conducted with a loaded tandem-axle dump truck or similar pneumatic-tired equipment with a minimum weight of 15 tons.

6.3.2 Minimum Pavement Thickness Recommendations

Based on the use of lime-treated soils, PSI has used an R-value of 40 for the support soils of the proposed pavement sections. Pavements will be designed to the minimum asphalt depth for this soil type. A soil specific lime mix should be performed.

PSI has identified two pavement categories based on the proposed development anticipated traffic use and traffic loads:

- 14,600 ESALs (Light-Duty Traffic)
- 36,500 ESALs (Heavy-Duty Traffic)

We have also used the following design criteria; a 20-year design life, a Pavement Serviceability Index (PSI) of 2.5 and a Reliability of 85 percent.

Minimum pavement section options are provided for asphalt over aggregate base course (composite section), and rigid (Portland Cement Concrete) pavement. Based on this information for the subject pavement, the following minimum pavement sections were determined, as presented in the following table.

Pavement Area	Composite Section	Full-Depth Asphalt	Full-Depth Portland Cement Concrete
Light Duty Traffic	3 inches Asphalt over 4 inches Aggregate Base Course	4 inches	5 inches
Heavy Duty Traffic	3 inches Asphalt over 5 inches Aggregate Base Course	4 ½ inches	6 inches

Concrete pavement at least **seven inches thick** is recommended for the **trash dumpster run-ups** due to the heavy wheel and impact loads that this area receives. The run-up should extend far enough away to support all wheels of the sanitation truck while stopped and in the loading position. Concrete pavement is also recommended in areas, which receive continuous repetitive traffic such as product unloading areas and parking lot entrances.



6.3.3 Flexible Pavement

Flexible pavement is not recommended for Dumpster Pad/ Sanitation Truck Run-up areas. For Dumpster Pad/Sanitation Truck Run-up areas, we recommend rigid pavement as discussed in the following *Rigid Pavement Section*. Allowances for proper drainage and proper material selection of base materials are most important for performance of asphaltic pavements. Ruts and birdbaths in asphalt pavement allow for quick deterioration of the pavement primarily due to saturation of the underlying base and subgrade.

Hot bituminous pavement should meet the requirements as detailed for SuperPave Mixtures in Colorado Department of Transportation Standard Specifications for Road and Bridge Construction. Material meeting the Colorado Department of Transportation requirements for Grading S ($\frac{3}{4}$ inch nominal) or Grading SG ($1\frac{1}{2}$ inch nominal) is recommended. In addition, the following are presented as general guidelines for properties of asphaltic concrete.

Parking Lot	
Asphalt Cement	PG 64-22
Asphalt Content	As per mix design
Percent Air Voids	3½-5

Asphalt material should be obtained from an approved mix design stating the SuperPave Mixture properties, including optimum asphalt content, job mix formula, and recommended mixing and placing temperatures. Materials and construction methods should be in accordance with the CDOT Standard Specifications for Road and Bridge Construction Section 403.

6.3.4 Aggregate Base Course

If aggregate base course is used as part of the pavement section, the materials should conform to CDOT requirements for Class 6 aggregate base course per Table 703-2 and construction methods should conform to Section 304 of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction.

6.3.5 Rigid Pavement

The use of concrete for on-site pavements may be considered by the owner. Should concrete pavement be utilized, the concrete should be properly reinforced and jointed and should be constructed from a concrete mixture, which has a 28-day minimum laboratory compressive strength of 4,000 psi. We recommend a maximum water cement ratio of 0.45 and an air-entrainment specification of 5 percent (± 1.5 percent) be followed. Expansion joints should be sealed with a polyurethane sealant so that moisture infiltration into the subgrade soils and resultant concrete deterioration at the joints is reduced.

6.3.6 Lime Treatment

The pavement subgrade should consist of a mixture of native, hydrated or quick lime and water as outlined by ASTM C977, and CDOT 307.



The upper 12 inches of the subgrade soils should be blended with hydrated or quick lime and recompact. The sulfate content of the proposed pavement subgrade materials should be verified prior to the design of the lime treatment.

The lime mix design should meet the following minimum requirements:

- Minimum pH of 12.3 after completion of initial mixing
- Plasticity Index (PI) less than 6
- Minimum hydrated lime of 5.0 percent by dry weight
- Minimum unconfined compressive strength between 160 and 700 psi
- Sulfate concentrations not to exceed 0.2 percent

Actual lime design may vary based on laboratory testing that must be performed once a source of lime is confirmed.

6.4 Lateral Earth Pressures

Based on our understanding of the project, retaining walls will be required (approximately 4 to 30-feet in height). We have provided soil parameters for typical wall backfill materials to assist with the design of conventional retaining walls. Additional or different soil parameters may be required for other wall types (mechanically stabilized earth (MSE), sheet pile, tie-back/anchored, etc.). PSI should review retaining wall design once known to verify our parameters are applicable.

Retaining walls should be designed to resist lateral earth pressures. Lateral earth pressure is developed from the soils present within a wedge formed by the vertical retaining wall and an imaginary line extending up and away from the bottom of the wall at an approximate 45° angle. The lateral earth pressures are determined by multiplying the vertical applied pressure by the appropriate lateral earth pressure coefficient K . If the walls are rigidly attached to the structure and not free to rotate or deflect at the top, PSI recommends designing the walls for the “at-rest” lateral earth pressure condition using K_0 . Walls that are permitted to rotate and deflect at the top can be designed for the active lateral earth pressure condition using K_a . Passive pressure can be determined using K_p , with a factor of safety of 2.0. Recommended parameters for use in relatively short above grade walls are as follows:



Recommended Parameters Typical Wall Backfill Materials			
Material Type	Drained Friction Angle (ϕ')		
In-Situ Lean Clay***	24°		
On-Site Clayey Sands/Structural Fill***	30°		
Compacted Dense Graded Crushed Stone	42°		
Total Soil Density (pcf)	110		
Maximum Toe Pressure on Structural Fill (psf)	2,000		
Groundwater Elevation	Approximately 5810 in Boring B28; generally dry in remaining (elevations approximate)		
Parameters specific to soil type	Clays	Structural Fill	Crushed Stone
Friction Factor for Base	0.30	0.38	0.60 *
Coefficient of Active Pressure (K_a) **	0.42	0.33	0.20 *
Coefficient of Passive Pressure (K_p) **	2.37	3.00	5.0 *
Coefficient of At-Rest Pressure (K_o) **	0.59	0.50	0.33 *

* These values may be used for design only if the crushed stone backfill extends back from the wall certain distances. These are a horizontal distance approximately equal to or greater than the total height of the wall at the surface, and at least one-foot beyond the heel of the wall footing.

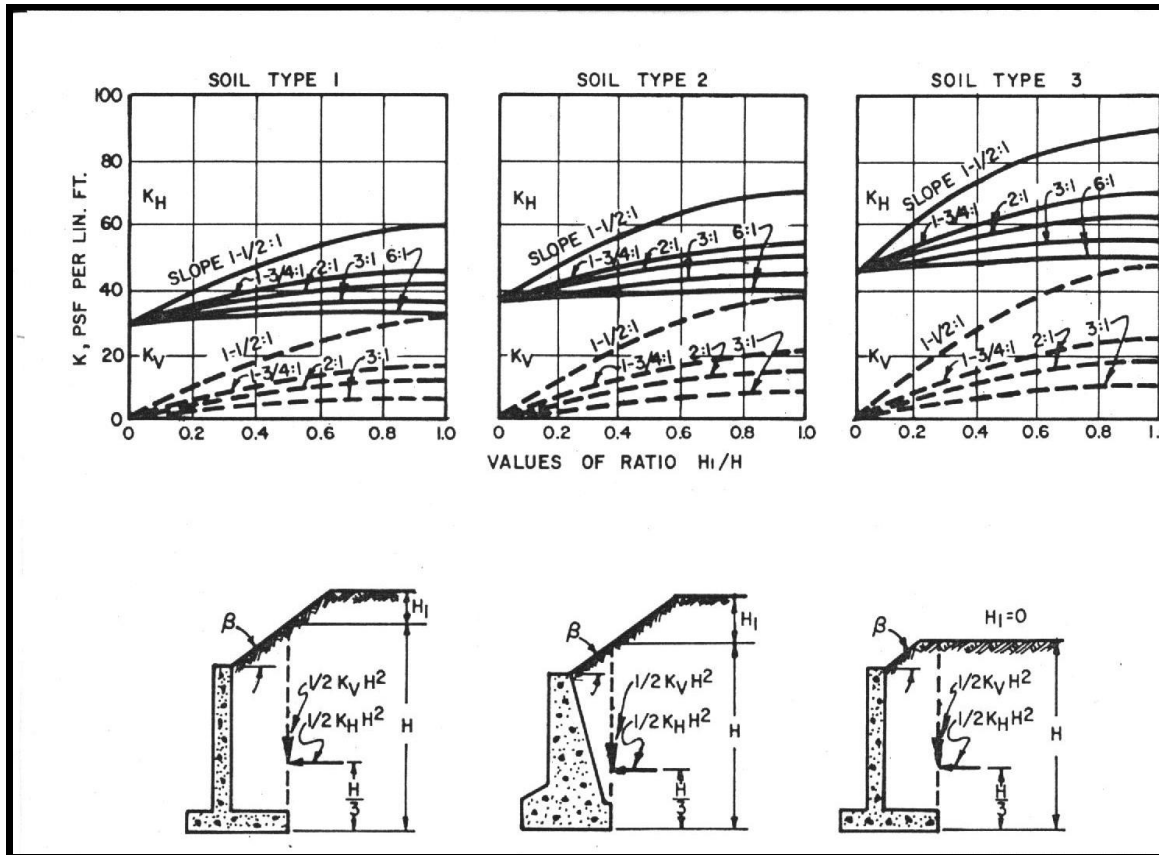
** Earth pressure coefficients valid for level backfill conditions with no surcharge

*** The on-site high plastic clays and bedrock should not be used as wall backfill

The values presented above were calculated based on positive drainage and are provided to prevent the buildup of hydrostatic pressure. If surface loads are placed near the walls, such as traffic loads, they should be designed to resist an additional uniform lateral load of one-half of the vertical surface loads. An “equivalent fluid” pressure can be obtained from the above chart by multiplying the appropriate K-factor times the total unit weight of the soil. This applies to unsaturated conditions only. If a saturated “equivalent fluid” pressure is needed, the effective unit weight (total unit weight minus unit weight of water) should be multiplied times the appropriate K-factor and the unit weight of water added to that resultant. However, PSI does not recommend that earth retaining walls be designed with a hydrostatic load and that drainage should be provided to relieve the pressure.

PSI recommends that retaining wall backfill be provided with positive drainage. In specific design cases where water is allowed to build up on the wall structure, the hydrostatic load correlating to the maximum height of the water build up should be added to the lateral loads acting on the wall.

The designs of retaining walls need to take into account the effects of geometry and loading conditions. The following charts have been included from NAVFAC 7.02 concerning slopes in the grade at the top of below grade wall. Depending on the geometry of the site, the lateral loading on the retaining wall should be modified according to these charts.



Soil Type 1 – Clean Sand and Gravel, GW, GP, SW, SP

Soil Type 2 – Dirty Sand and Gravel of Restricted Permeability, GM, GM-GP, SM-SP, SM

Soil Type 3 – Stiff Residual Silts and Clays, Silty Fine Sands, Clayey Sands and Gravels: CL, ML, CH, MH, SM, SC, GC

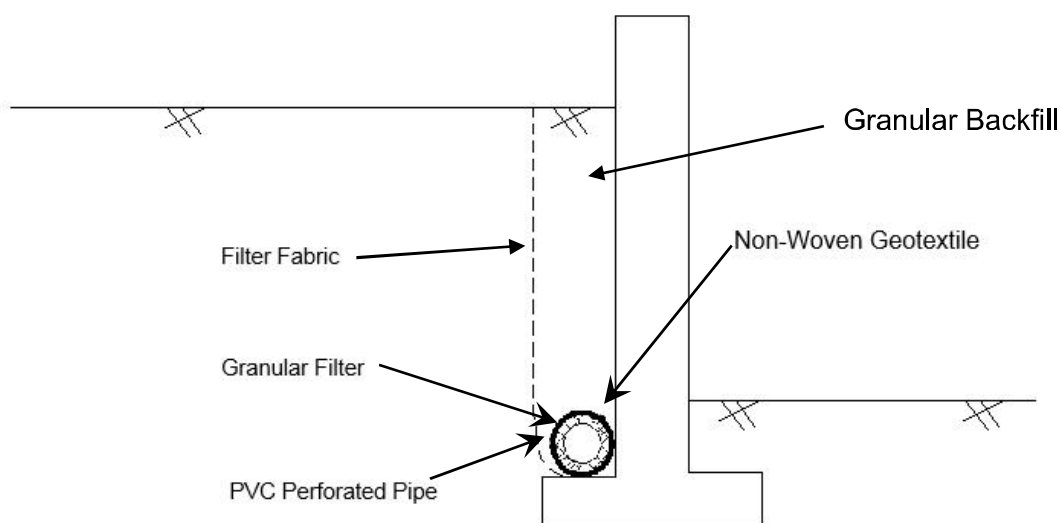
Retaining Wall Backfill and Compaction

Backfill of retaining walls shall consist of low plastic soils or granular materials. The backfill materials should be placed in lifts that do not exceed 8-inches loose. The lift thickness may need to be reduced to thinner lifts immediately behind the walls to achieve the desired amount of compaction without overstressing the wall with the compaction process. The backfill materials should be compacted to at least 90 percent of the standard Proctor maximum dry density. Granular material with less than 10 percent passing the #200 sieve should be placed in uniform lifts. Granular material shall be compacted to a minimum dry density of at least 90 percent standard Proctor or 70 percent relative density. Backfill that is placed within 4-feet or 4-feet plus the height of the wall (minus 4-feet) / 2 for wall over 4 feet high, should be placed in thinner lifts with hand compaction equipment to achieve the specified density. Heavy compactors and grading equipment should not be allowed to operate within these limits during the backfilling of the below grade walls to reduce the developing of excessive temporary or



long-term lateral soil pressures from the installation process. PSI recommends that a representative of the geotechnical engineer be present to monitor the below grade wall excavation, construction and backfilling processes. Care should be exercised during the backfilling operation to prevent overstressing and damaging the walls.

PSI recommends that retaining wall backfill be provided with adequate drainage. The actual wall drainage system is a function of the elevation, height and geometry of the wall system and should be designed by a licensed professional engineer. An example of a typical wall drain is as follows:



The placement of a limited amount of granular material behind a retaining wall does not appreciably change the coefficient of lateral earth pressure acting on that wall. The lateral earth pressure acting on a retaining structure is a function of the weight of the soil that exist above the theoretical plane projecting up from the base of the wall. The soil above this plane is held in place by two forces, the strength of the soil itself and the lateral resistance of the retaining wall. Therefore, a thin layer of granular material behind the wall is of little consequence on the forces acting on the wall.

6.5 Pool Recommendations

We recommend the pool bottom and walls should be constructed in and atop no less than 5-feet of imported structural fill. Lateral earth pressure values from the previous section may be used to aid in design of the below grade pool walls.

PSI recommends the following with regard to the proposed swimming pool:



- Special care should be given during construction to prevent surface runoff, rain, or other precipitation from collecting under the pool. If gravity drainage or sumps are not available this water can cause extreme distress to the pool construction and clog the drainage system.
- PSI recommends installing a free draining granular underdrain system below the bottom of the pool and beside the sidewalls of the pool that is gravity drained or has access to an operating sump system.
- In the presence of plastic clays either under the pool or along the sidewalls, care should be taken to reduce the potential for water to pool, collect or otherwise interact with the high plasticity clays for periods of time exceeding a few days. High plasticity clays can swell in the presence of free water and cause heaving of the floor of the pool or distress in the sidewalls resulting in distress in the pool liner. A non-permeable liner placed on the clay with a free draining granular drain between the liner and the pool structure should be considered in these cases.
- Leaks and other sources of water associated with the swimming pool should be prevented from transmitting water to surrounding soils.

6.6 Soil Corrosivity

Samples obtained in the subsurface profile of the upper 5 feet was tested to evaluate the chemical reactivity of the on-site soils and are shown in the following table. Soil pH was performed using method AASHTO T289-91. Water Soluble Sulfate testing was performed using AASHTO T290-91/ASTM D4327.

Summary of Chemical Reactivity Testing

Boring ID	Depth (feet)	Soil pH	Water Soluble Sulfates
B7	5	9.0	0.044%
B26	2 ½	7.8	0.31%

The existing soil has a potential for corrosion issues in the presence of water. Consideration should be given to providing cathodic protection for buried metal surfaces greater than 5-feet.

These results classified the soil in the “S0 to S2” sulfate exposure category according to the American Concrete Institute (ACI) Design Manual Section 318, Chapter 4, 2014 Edition. It is our opinion that concrete in contact with the existing soils may be designed for “S2” sulfate exposure. PSI recommends using Type V Portland Cement. A corrosion engineer should be contacted prior to construction. The source of imported fill should be tested for corrosivity properties.

6.7 Percolation Test

On September 19, 2024, PSI conducted a percolation test near Boring Nos. B28, within the proposed detention pond area. The soil in that area generally consisted of low to high plasticity



clay. Based on the percolation test performed, the soil has an estimated percolation rate of 8 inches per hour. The underlying clay soils and bedrock will percolate at a much slower rate. Depending on the grading of the pond area and the imported soils used, a percolation test should be performed at that time. An appropriate factor of safety should be applied. The grading and pond soils should be reviewed prior to design.

6.8 Drainage Recommendations

PSI recommends that surface infiltration be minimized to reduce the potential for surface water to saturate the soils below the foundations. The ground surface, landscaping, and flatwork should be sloped to drain away from the building. Roof down spouts and drains should discharge well beyond the limits of the building or into the sewer collection system. Additionally, drains should be placed behind retaining walls to prevent hydrostatic buildup.

The precautions listed below are considered good construction practice. These recommendations are not required but can be followed to prevent moisture content variation and help reduce potential damage caused by movement of the supporting subgrade.

- Some increase in moisture content is inevitable as a result of development and associated landscaping. However, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices. Drought tolerant planting design as well as low-pressure, drip irrigation utilizing a master valve and flow sensor should be used within 5-feet of the building foundations.
- Proper slope away from building (5 to 10 percent) and in parking areas (3 to 5 percent) should be maintained. ADA ramp areas may be designed as needed for accessibility, provided the area is sloped to drain away from the building and foundations. The proper drainage away from the building should extend at least 10-feet outside building limits.
- Swales placed within 10-feet of the building should be designed to prevent water collection next to the building foundations. The positive drainage away from buildings should be properly constructed and maintained. Sedimentation build up or other flow and/or grade changes should be prevented.
- Utility backfill in areas supporting slabs should be moisture conditioned or dried by scarification and compacted. Backfill in all interior and exterior water and sewer line trenches should be uniformly compacted. Care must be taken to prevent water transmission via bedding material.

7.0 LIMITATIONS

The recommendations submitted are based on the subsurface information obtained by PSI and design details provided by Thompson Thrift Residential. If there are revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during



construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. This report has been prepared for the exclusive use of Thompson Thrift Residential and their consultants for the specific application to the proposed multifamily development to be located at Venetucci Boulevard at South Academy Boulevard in Colorado Springs, Colorado.



Taken From Google Earth



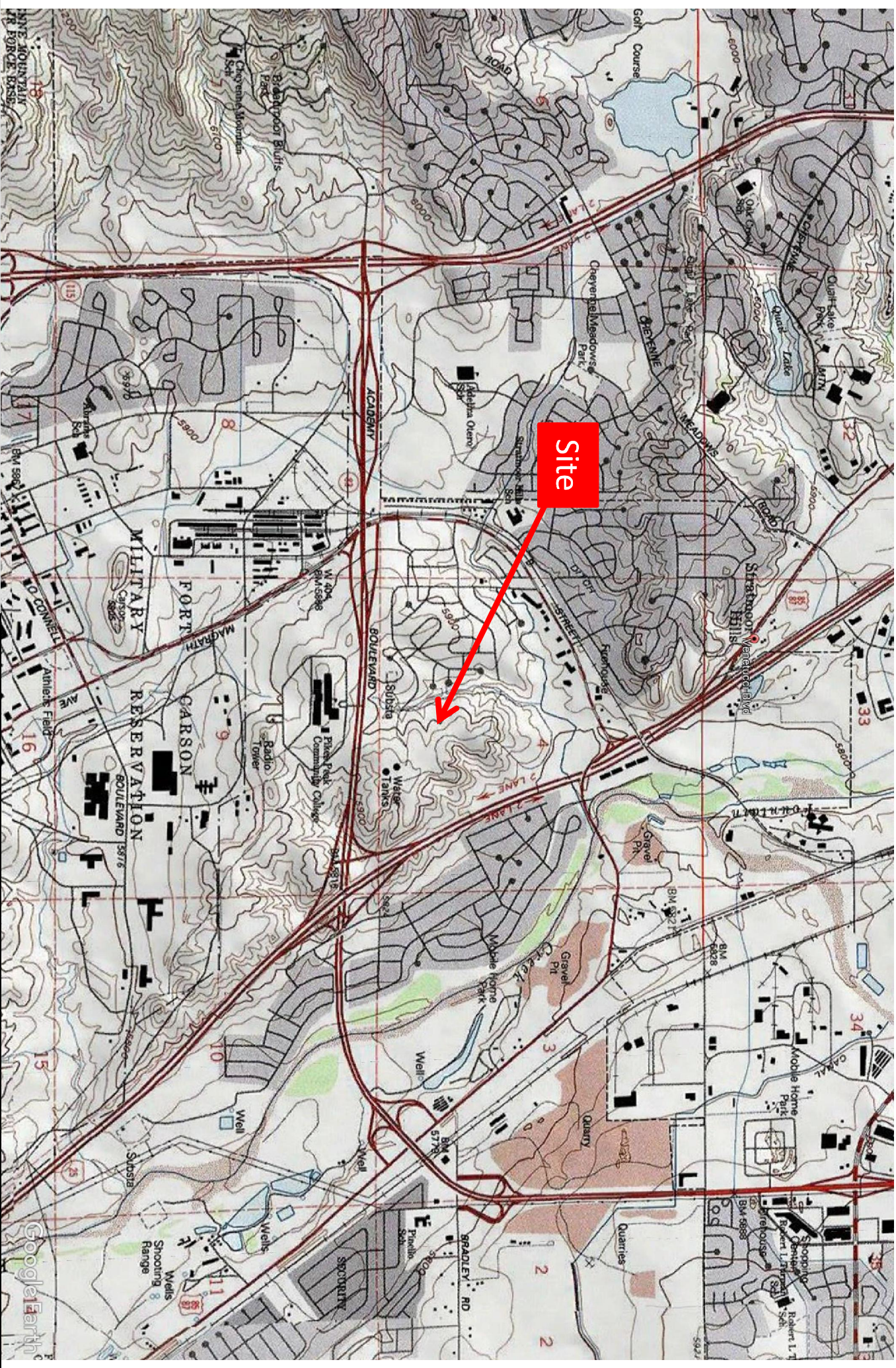
TTRes Multifamily Venetucci – Colorado Springs, CO

JOB NO. 05322874

Site Vicinity Map

FIGURE NO.

1a



Taken From USGS Map -



TTRes Multifamily Venetucci – Colorado Springs, CO

Site Topographical Map


JOB NO. 05322874

FIGURE NO. 1b

FIGURE: 3

DATE STARTED: 9/11/24 DATE COMPLETED: 9/11/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5900 ft LATITUDE: 38.7686° LONGITUDE: -104.7854° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 1	
		Water ∇ While Drilling Not Observed ▼ Upon Completion Not Observed ∇ Delay N/A		BORING LOCATION: Building 10 See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
0						Apparent Fill: Consists of clay and fine to coarse grained sand, dry to moist, brown to dark brown/gray/orange, medium stiff to stiff.	10-12 N=22	21			
5895	5			2	12		10-12 N=22	17			
				3	12		5-5 N=10	21			
5890	10			4	12	Claystone: Dry, black, hard, iron oxidation staining.	7-5 N=12				-200 = 98.2% DD = 101 pcf S(250) = 2.7% P = 2.1K -200 = 94.8% DD = 91 pcf LL = 66 PL = 24 S(750) = 2.7% P = 3.9K
5885	15			5	7		50/7"	18			>> @ -200 = 99.4%
5880	20			6	6		50/6"				>> @
5875	25			7	7		50/7"				>> @

	Professional Service Industries, Inc. 1070 West 124th Avenue, Suite 800 Westminster, CO 80234 Telephone: (303) 424-5578	PROJECT NO.: 05322879 PROJECT: TTRes Venetucci Multifamily LOCATION: Venetucci Blvd at South Academy Blvd Colorado Springs, CO
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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 4

DATE STARTED: 9/11/24 DATE COMPLETED: 9/11/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5899 ft LATITUDE: 38.7689° LONGITUDE: -104.7861° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 2 <div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> Water <input type="checkbox"/> While Drilling <input type="checkbox"/> Upon Completion <input type="checkbox"/> Delay </div> <div style="width: 15%;"> Not Observed Not Observed N/A </div> </div> BORING LOCATION: Building 7 See Figure No. 2	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Apparent Fill: Consists of clay and fine grained sand with trace gravel, dry to moist, brown to dark brown/orange, very stiff to hard, medium dense to dense.	8-18 N=26 50/8"	12	<div style="display: flex; justify-content: space-between;"> <div> X Moisture 0 25 50 </div> <div> PL LL </div> </div> <div style="display: flex; justify-content: space-between;"> <div> STRENGTH, tsf ▲ Qu * Qp 0 2.0 4.0 </div> <div> -200 = 44.7% >> @ 200 = 97.4% >> @ 200 = 98.6% DD = 110 pcf S(750) = 3.5% P = 4.1K S(1000) = 3.1% P = 3.8K DD = 114 pcf GRAD >> @ 200 = 43.8% >> @ 200 = 99.0% >> @ </div> </div>	
5895	5			2	8			18		
5890	10			4	12	Claystone: Dry, dark brown/black, weathered to hard	50/11" 50/12"	16 11		
5885	15			5	12		50/12"			
5880	20			6	12		16-32 N=48	20		
5875	25			7	10	Weathered Bedrock Zone from 18 to 22 feet	50/10"			



Professional Service Industries, Inc.
 1070 West 124th Avenue, Suite 800
 Westminster, CO 80234
 Telephone: (303) 424-5578

PROJECT NO.: 05322879
PROJECT: TTRes Venetucci Multifamily
LOCATION: Venetucci Blvd at South Academy Blvd
 Colorado Springs, CO

FIGURE: 5

DATE STARTED: 9/11/24 DATE COMPLETED: 9/11/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 5898 ft LATITUDE: 38.7688° LONGITUDE: -104.7864° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 3			
		Water <input type="checkbox"/> While Drilling Not Observed <input type="checkbox"/> Upon Completion Not Observed <input type="checkbox"/> Delay N/A		BORING LOCATION: Retaining Wall See Figure No. 2			

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @				Additional Remarks
								X Moisture <input type="checkbox"/> PL <input type="checkbox"/> LL		STRENGTH, tsf ▲ Qu * Qp			
5895	0			1	8	Apparent Fill: Consists of clay and poorly graded sand with trace gravel, dry to moist, brown to dark brown, very stiff to hard.	50/8"						>>⊕ ⊕ GRAD -200 = 59.9% >>⊕ DD = 122 pcf S(750) = 3.9% P = 9.3K -200 = 97.0% S(1000) = 2.7% P = 6.3K DD = 112 pcf >>⊕
	5		2	12		20-22 N=42							
5890			3	7		50/7"	15	X					
	10		4	12		20-24 N=44	17	X					
5885	15		5	8		50/8"							
						Weathered Bedrock Zone from 8 to 12 feet							

	Professional Service Industries, Inc. 1070 West 124th Avenue, Suite 800 Westminster, CO 80234 Telephone: (303) 424-5578	PROJECT NO.: 05322879 PROJECT: TTRes Venetucci Multifamily LOCATION: Venetucci Blvd at South Academy Blvd Colorado Springs, CO
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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 6

DATE STARTED: 9/11/24 DATE COMPLETED: 9/11/24 COMPLETION DEPTH: 10.0 ft BENCHMARK: N/A ELEVATION: 5897 ft LATITUDE: 38.7688° LONGITUDE: -104.7855° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 4	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Pavement See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
5895	0			1	12	Claystone: Dry to moist, brown to dark brown/black/orange, weathered to hard, trace gravel.	16-21 N=37 50/9"	23	X Moisture PL LL 0 25 50	▲ Qu * Qp 0 2.0 4.0	GRAD -200 = 98.1% DD = 109 pcf S(250) = 9.2% P = 7.2K
	5		2	9							
5890			3	6							
	10		4	3							

	Professional Service Industries, Inc. 1070 West 124th Avenue, Suite 800 Westminster, CO 80234 Telephone: (303) 424-5578	PROJECT NO.: 05322879 PROJECT: TTRes Venetucci Multifamily LOCATION: Venetucci Blvd at South Academy Blvd Colorado Springs, CO
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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 7

DATE STARTED: 9/11/24 DATE COMPLETED: 9/11/24 COMPLETION DEPTH: 10.0 ft BENCHMARK: N/A ELEVATION: 5892 ft LATITUDE: 38.7697° LONGITUDE: -104.7852° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 5	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Pavement See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
5890	0			1	9	Claystone: Dry, black, hard.	50/9"				>>⊙
	5		2	7	50/7"		14	×	>>⊙	@5(500) = 6.0% P = 7.5K GRAD @200 = 99.3% DD = 113 pcf	
5885			3	4	50/4"				>>⊙		
	10		4	5	50/5"		13	×	>>⊙	@200 = 99.0%	

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 8

DATE STARTED: 9/11/24 DATE COMPLETED: 9/11/24 COMPLETION DEPTH: 30.0 ft BENCHMARK: N/A ELEVATION: 5896 ft LATITUDE: 38.7694° LONGITUDE: -104.7856° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 6 <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Water ▽ ▽ ▽ </div> BORING LOCATION: Building 8 See Figure No. 2	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks	
									X Moisture ▣ PL + LL	▲ Qu * Qp		
5895	0			1	9	Claystone: Dry to moist, brown/dark gray/black, hard	50/9"				>>⊕	
	2		9	50/9"	21		X		>>⊕-200 = 99.0% S(250) = 6.3% P = 6.3K DD = 104 pcf DD = 110 pcf S(500) = 4.4% P = 4.1K			
5890	5		3	3	50/3"		15	X		>>⊕		
	4		5	50/5"					>>⊕			
5885	10											
	5		5	50/5"	17		X		>>⊕ DD = 108 pcf			
5880	15											
	6		3	50/3"					>>⊕			
5875	20											
	7	3	50/3"	11	X		>>⊕-200 = 99.7%					
5870	25											
	8	0	50/0"					>>⊕				



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PROJECT: TTRes Venetucci Multifamily
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 Colorado Springs, CO

FIGURE: 9

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5890 ft LATITUDE: 38.7695° LONGITUDE: -104.7851° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 7	
		Water <input type="checkbox"/> While Drilling Not Observed <input type="checkbox"/> Upon Completion Not Observed <input type="checkbox"/> Delay N/A		BORING LOCATION: Building 9 See Figure No. 2	











Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Claystone: Dry, dark gray/black, hard.				
5885	5			1	7		50/7"	14	X Moisture <input checked="" type="checkbox"/> PL <input checked="" type="checkbox"/> LL	
				2	5		50/5"	14	X Moisture <input checked="" type="checkbox"/> PL <input checked="" type="checkbox"/> LL	>> @ LL = 94 >> @ PL = 20
				3	5		50/5"	11	X Moisture	>> @ GRAD -200 = 99.3%
5880	10			4	4		50/4"			>> @
5875	15			5	4		50/4"	12	X Moisture	>> @
5870	20			6	5		50/5"			>> @
5865	25			7	6		50/6"			>> @


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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 10

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5887 ft LATITUDE: 38.7761° LONGITUDE: -104.7853° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 8	
		Water <input type="checkbox"/> While Drilling Not Observed <input type="checkbox"/> Upon Completion Not Observed <input type="checkbox"/> Delay N/A		BORING LOCATION: Building 5 See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
								<input type="checkbox"/> Moisture <input type="checkbox"/> PL <input type="checkbox"/> LL			
								0 25 50 0 2.0 4.0			
	0					Claystone: Dry, dark gray/black, hard.					
5885				1	4		50/4"				>>⊕
	5			2	4		50/4"	12	×		>>⊕
5880				3	4		50/4"	13	×		>>⊕-200 = 96.4% DD = 101 pcf
	10			4	3		50/3"	12	×		>>⊕-S(750) = 15.7% P = 5.3K
5875											
	15			5	6		50/6"	12	×		>>⊕ DD = 112 pcf
5870											
	20			6	3		50/3"	12	×		>>⊕
5865											
	25			7	6		50/6"				>>⊕

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 11

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5889 ft LATITUDE: 38.7704° LONGITUDE: -104.7854° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B 9 <div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> Water <input type="checkbox"/> While Drilling <input type="checkbox"/> Upon Completion <input type="checkbox"/> Delay </div> <div style="width: 15%;"> Not Observed Not Observed N/A </div> </div> BORING LOCATION: Building 5 See Figure No. 2	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
									X Moisture PL LL 0 25 50	▲ Qu * Qp 0 2.0 4.0	
	0					Claystone: Dry, dark gray/black, hard.					
5885				1	7		50/7"	16	X		>> @ 200 = 99.2%
	5			2	4		50/4"	12	*		>> @ 5(500) = 17.1% P = 6.5K DD = 97 pcf
5880				3	4		50/4"				>> @
	10			4	4		50/4"	13	*		>> @
5875				5	4		50/4"				>> @
	15										
5870				6	4		50/4"				>> @
	20										
5865				7	6		50/6"				>> @
	25										

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 12

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 30.0 ft BENCHMARK: N/A ELEVATION: 5898 ft LATITUDE: 38.7684° LONGITUDE: -104.7863° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B10	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Building 7 See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
0				1	12	Fat Clay: Coarse grained sand, dry, brown to dark brown, very stiff.	CH				
5895				2	11	Claystone: Dry, brown/dark gray/black, hard. trace gravel					
5				3	10						
5890				4	5						
10				5	11						
5885				6	11						
15				7	6						
5880				8	6						
20											
5875											
25											
5870											
30											

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 13

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 10.0 ft BENCHMARK: N/A ELEVATION: 5899 ft LATITUDE: 38.7694° LONGITUDE: -104.7866° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B11	
		Water <input type="checkbox"/> While Drilling Not Observed <input type="checkbox"/> Upon Completion Not Observed <input type="checkbox"/> Delay N/A		BORING LOCATION: Pavement See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0	0			1	7	Apparent Fill: Consists of clay and fine to medium grained sand with gravel, moist, brown to dark brown, hard.	50/7"			>>⊕
5895	5		2	7	Claystone: Dry, dark gray/black, hard.	50/7"	10	×	>>⊕200 = 42.5% S(500) = 2.8% P = 3.2K DD = 119 pcf	
5890	10		3	7		50/7"		>>⊕		
			4	9		50/9"		>>⊕		


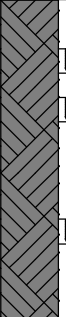


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 Colorado Springs, CO

FIGURE: 14

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 5895 ft LATITUDE: 38.77° LONGITUDE: -104.7867° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B12	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Retaining Wall See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks	
0	0			1	12	Fat Clay: Fine to medium grained sand with gravel, moist, brown/dark gray/black, stiff to very stiff, claystone (bedrock) interface.	CH	7-11 N=18	17	STRENGTH, tsf ▲ Qu * Qp 0 2.0 4.0	LL = 61 PL = 21 S(500) = 3.1% P = 3.4K GRAD @200 = 85.2% DD = 111 pcf S(1000) = 3.1% P = 5.9K DD = 112 pcf DD = 114 pcf
5890	5			2	12	Claystone: Dry, brown/dark gray/black, weathered to hard, trace gravel		15-28 N=43	12		
				3	6			50/6"			
5885	10			4	12			50/12"	13		
5880	15			5	12			14-26 N=40	16		
5875	20			6	8	Weathered Bedrock Zone from 13 to 17 feet		50/8"			



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FIGURE: 15

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 35.0 ft BENCHMARK: N/A ELEVATION: 5898 ft LATITUDE: 38.7701° LONGITUDE: -104.7866° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B13	
		Water ∇ While Drilling Not Observed ▼ Upon Completion Not Observed ∇ Delay N/A		BORING LOCATION: Building 4 See Figure No. 2	


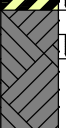
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks	
									N in blows/ft @ X Moisture PL LL STRENGTH, tsf ▲ Qu * Qp		
5895	0			1	12	Apparent Fill: Consists of clay and medium to coarse grained sand with trace gravel, dry to moist, brown to dark brown, stiff to hard, claystone fragments, claystone (bedrock) interface.	7-7 N=14 50/11"	12	X	-200 = 72.9%	
	5		2	11							
5890			3	6				50/6"			
	10		4	12				16-21 N=37			GRAD -200 = 64.2%
5885				5	6	Claystone: Dry, brown/dark gray/black, hard, trace gravel.	50/6"	19	X	S(1000) = 5.9% P = 12.4K DD = 111 pcf	
5880			6	6				50/6"	21	X	
5875			7	6				50/6"			
5870			8	4				50/4"	12	*	DD = 100 pcf
5865			9	2				50/2"			
	35										

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 16

DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 30.0 ft BENCHMARK: N/A ELEVATION: 5898 ft LATITUDE: 38.7698° LONGITUDE: -104.7864° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B14	
		Water ▽ While Drilling Not Observed ▼ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Building 6 See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks	
									X Moisture PL LL 0 25 50	▲ Qu * Qp 0 2.0 4.0		
5895	0			1	12	Fat Clay: Medium to coarse grained sand with trace gravel, moist, brown to dark brown, hard.	CH	12	X		>>⊕	
	5		2	10						>>⊕		
5890	10			3	12	Claystone: Dry, brown to dark brown/dark gray/black/orange, weathered to hard, trace gravel.	17-20		⊕		DD = 109 pcf LL = 74 PL = 21 S(750) = 6.9% P = 9.6K -200 = 99.3% S(1000) = 7.5% P = 13.7K DD = 110 pcf	
	15		4	12			22	X	>>⊕			
5885	20			5	9		50/9"				>>⊕	
5880	25			6	11		50/11"	21	X		>>⊕	
5875	30			7	4		50/4"				>>⊕	
5870				8	6		50/6"				>>⊕	



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 Colorado Springs, CO

FIGURE: 17




DATE STARTED: 9/12/24 DATE COMPLETED: 9/12/24 COMPLETION DEPTH: 30.0 ft BENCHMARK: N/A ELEVATION: 5894 ft LATITUDE: 38.7699° LONGITUDE: -104.7858° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B15	
		Water <input type="checkbox"/> While Drilling Not Observed <input type="checkbox"/> Upon Completion Not Observed <input type="checkbox"/> Delay N/A		BORING LOCATION: Building 6 See Figure No. 2	


Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks	
0						Claystone: Dry, dark gray/black, hard					
5890				1	6		50/6"			>>①	
5				2	4		50/4"	12	✕	>>①	
5885				3	4		50/4"			>>①	
10				4	4		50/4"	12	✕	>>①	
5880				5	4		50/4"	6	✕	>>②-200 = 99.9%	
5875				6	3		50/3"			>>①	
5870				7	0		50/3"			>>①	
5865				8	0	50/3"			>>①		

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 18

DATE STARTED: 9/13/24		DRILL COMPANY: Dakota Drilling, Inc.		<div>BORING B16</div>	
DATE COMPLETED: 9/13/24		DRILLER: DER LOGGED BY: DW			
COMPLETION DEPTH: 25.0 ft		DRILL RIG: CME-75		<div>Water</div> <div>  While Drilling Not Observed  Upon Completion Not Observed  Delay N/A </div>	
BENCHMARK: N/A		DRILLING METHOD: Solid Stem Auger			
ELEVATION: 5880 ft		SAMPLING METHOD: Modified California			
LATITUDE: 38.7708°		HAMMER TYPE: Manual		<div>BORING LOCATION:</div> <div>Building 3</div>	
LONGITUDE: -104.7857°		EFFICIENCY: N/A			
STATION: N/A OFFSET: N/A		REVIEWED BY: HT		See Figure No. 2	
REMARKS:					

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification		Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ☉				Additional Remarks
									0	25		50		
									STRENGTH, tsf					
									▲ Qu	✱ Qp	✕ Moisture	■ PL	⬛ LL	
									0	2.0		4.0		
	0					Claystone: Dry, dark gray/black, hard								
				1	12			13-41 N=54 50/4"	20		✕		>>☉GRAD -200 = 98.5% DD = 109 pcf	
5875	5			2	4				14		✕	■	>>☉S(250) = 8.5% P = 10.6K S(500) = 7.3%	
				3	4			50/4"					>>☉P = 11.5K DD = 122 pcf	
5870	10			4	4			50/4"	14		✕		>>☉LL = 63 PL = 19	
								50/2"					>>☉	
5865	15			5	2									
5860	20		6	4				50/4"	12		✕	>>☉DD = 92 pcf		
5855	25		7	4				50/4"				>>☉		

	Professional Service Industries, Inc.	PROJECT NO.: 05322879
	1070 West 124th Avenue, Suite 800	PROJECT: TTRes Venetucci Multifamily
	Westminster, CO 80234	LOCATION: Venetucci Blvd at South Academy Blvd
	Telephone: (303) 424-5578	Colorado Springs, CO

FIGURE: 19

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 10.0 ft BENCHMARK: N/A ELEVATION: 5885 ft LATITUDE: 38.7708° LONGITUDE: -104.7858° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B17	
		Water <input type="checkbox"/> While Drilling Not Observed <input type="checkbox"/> Upon Completion Not Observed <input type="checkbox"/> Delay N/A		BORING LOCATION: Pavement See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0	0			1	12	Fat Clay: Moist, brown to dark gray/black, very stiff, claystone fragments.	CH			
5880	5			2	9	Claystone: Dry to moist, dark gray/black, hard.		15-14 N=29	21	
				3	4			50/4"	19	
5875	10			4	5			50/5"		

STANDARD PENETRATION TEST DATA N in blows/ft @ X Moisture PL LL 0 25 50	STRENGTH, tsf ▲ Qu * Qp 0 2.0 4.0
---	---

	-200 = 97.7% >> -200 = 97.0% S(500) = 5.1% P = 8.8K DD = 115 pcf
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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 20

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 30.0 ft BENCHMARK: N/A ELEVATION: 5883 ft LATITUDE: 38.769° LONGITUDE: -104.7859° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B18 <div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> Water <input type="checkbox"/> While Drilling <input type="checkbox"/> Upon Completion <input type="checkbox"/> Delay </div> <div style="width: 15%;"> Not Observed Not Observed N/A </div> </div> BORING LOCATION: Building 3 See Figure No. 2	
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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
0						Claystone: Dry, brown/gray to dark gray/black, weathered to hard, trace gravel.					
5880				1	12		22-25 N=47 50/6"				S(500) = 12.3% P = 11.0K DD = 113 pcf
5				2	6						
5875				3	5		50/5"				
10				4	8		50/8"				
5870											
15				5	6		50/6"				S(200) = 96.0% S(750) = 4.7% P = 12.5K DD = 115 pcf
5865											
20				6	12		13-15 N=28				DD = 107 pcf
5860											
25				7	2		50/2"				
5855											
30				8	4	Weathered Bedrock Zone 0 to 3 feet and 18 to 22 Feet	50/4"				



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 Colorado Springs, CO

FIGURE: 21

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 5884 ft LATITUDE: 38.7718° LONGITUDE: -104.7816° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B19	
		Water ∇ While Drilling Not Observed ▼ Upon Completion Not Observed ∇ Delay N/A		BORING LOCATION: Pavement See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0									N in blows/ft @ X Moisture PL 0 25 50 STRENGTH, tsf ▲ Qu * Qp 0 2.0 4.0	
5880	5			1	12	Clay: Fine to coarse grained sand with trace gravel, dry, brown to dark brown/gray, stiff to very stiff.	CL	11-15 N=26		
				2	12			11-26 N=37		
5875	10			3	12			13-13 N=26		
				4	12	Claystone: Dry, dark gray/black, hard.		9-10 N=19		
5870	15			5	4			50/4"		


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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 22

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5885 ft LATITUDE: 38.7719° LONGITUDE: -104.7859° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B20	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Amenity Building See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Claystone: Fine to coarse grained sand with gravel, brown/gray to dark gray/black/orange, very stiff to hard.	50/7"			
5880	5			1	7		50/5"			
				2	5					
				3	6		50/6"	12	×	■
5875	10			4	7		50/7"	15	×	
5870	15			5	12		18-16 N=34	14	×	⊙
5865	20			6	6		50/6"			
5860	25			7	7	Weathered Bedrock Zone from 13 to 17 feet.	50/7"	20	×	⊙



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 Colorado Springs, CO

The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 23

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 45.0 ft BENCHMARK: N/A ELEVATION: 5886 ft LATITUDE: 38.7723° LONGITUDE: -104.7859° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B21	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Detention Pond See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
5885	0			1	10	Fat Clay: Fine to coarse grained sand with trace gravel, dry, dark brown, hard.	CH			
				2	7					
5880	5			3	10	Claystone: Dry to moist, brown/gray to dark gray/black/orange, weathered to hard. trace gravel		13	50/7"	>> @ 200 = 93.2%
				4	11				50/10"	>> @
5875	10								50/11"	>> @
5870	15			5	9			12	50/9"	>> @ 200 = 87.3%
5865	20			6	8				50/8"	>> @
5860	25			7	7			14	50/7"	>> @ 200 = 88.3%
5855	30			8	7			12	50/7"	>> @ 200 = 86.7%
5850	35			9	12			21	16-17 N=33	>> @ 200 = 94.7%
5845	40			10	12				16-20 N=36	
	45			11	12	Weathered Bedrock Zone from 35 to 45 feet.		22	18-16 N=34	>> @ 200 = 98.3%

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 24

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 15.0 ft BENCHMARK: N/A ELEVATION: 5885 ft LATITUDE: 38.7701° LONGITUDE: -104.7863° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B22	
		Water ∇ While Drilling Not Observed ▼ Upon Completion Not Observed ∇ Delay N/A		BORING LOCATION: Pool See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks	
0				1	12	Fat Clay: Dry, dark brown/dark gray/black, very stiff to hard, trace gravel, claystone fragments	CH				
5880	5		2	6	Claystone: Dry, brown/dark gray/black, weathered to hard, trace gravel						
			3	7			50/7"	12			
5875	10		4	12			16-24 N=40	14			
5870	15		5	9		Weathered Bedrock Zone from 8 to 12 feet.	50/9"				


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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 25

DATE STARTED: 9/13/24 DATE COMPLETED: 9/13/24 COMPLETION DEPTH: 40.0 ft BENCHMARK: N/A ELEVATION: 5884 ft LATITUDE: 38.7718° LONGITUDE: -104.7865° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B23	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Retaining Wall See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STRENGTH, tsf	Additional Remarks
0						Apparent Fill: Consists of clay and medium grained sand with gravel, dry, dark brown, very stiff to hard, claystone fragments				
5880	5			1	12		19-21 N=40			
				2	6		50/6"	15		>> S(500) = 4.8% P = 3.9K GRAD
				3	8		50/8"			>> S(200) = 97.9% DD = 110 pcf
5875	10			4	7	Clay: Coarse grained sand with gravel, dry to moist, brown to dark brown, very stiff to hard, claystone fragments	50/7"	15		>> S(200) = 95.3% S(1000) = 3.6% P = 7.6K DD = 115 pcf
5870	15			5	6		50/6"	12		>> S(200) = 93.5%
5865	20			6	12		15-19 N=34	18		-200 = 88.5%
5860	25			7	7		50/7"	14		>> S(200) = 93.5%
5855	30			8	6	Claystone: Fine to coarse grained sand with trace gravel, moist, brown to dark brown/gray, weathered to hard.	50/6"	16		>> S(200) = 93.5%
5850	35			9	12		11-15 N=26			
5845	40			10	7	Weathered Bedrock Zone from 33 to 37 feet.	50/7"			>> S(200) = 93.5%

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 26

DATE STARTED: 9/14/24 DATE COMPLETED: 9/14/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5882 ft LATITUDE: 38.7712° LONGITUDE: -104.7866° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B24 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="3" style="width: 30px; text-align: center; vertical-align: middle;">Water</td> <td style="width: 30px; text-align: center;">▽</td> <td style="width: 40px;">While Drilling</td> <td style="width: 40px;">Not Observed</td> </tr> <tr> <td style="text-align: center;">▼</td> <td>Upon Completion</td> <td>Not Observed</td> </tr> <tr> <td style="text-align: center;">▽</td> <td>Delay</td> <td>N/A</td> </tr> </table> BORING LOCATION: Building 2 See Figure No. 2		Water	▽	While Drilling	Not Observed	▼	Upon Completion	Not Observed	▽	Delay	N/A
Water	▽	While Drilling	Not Observed												
	▼	Upon Completion	Not Observed												
	▽	Delay	N/A												

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STRENGTH, tsf	Additional Remarks
5880	0			1	12	Apparent Fill: Consists of clay and fine to coarse grained sand, moist, brown to dark brown, stiff. Claystone: Medium to coarse grained sand with trace gravel, dry to moist, brown to dark brown/dark gray/black, weathered to hard.	9-11 N=20 50/9"	16		
5875	5			2	9		50/9"	13		
5870	10			3	9		15-17 N=32			
5865	15			4	12		11-13 N=24	18		
5860	20			5	12		20-22 N=42			
	25			6	12	Weathered Bedrock Zone from 5 to 25 Feet				
				7	12					



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FIGURE: 27

DATE STARTED: 9/14/24 DATE COMPLETED: 9/14/24 COMPLETION DEPTH: 30.0 ft BENCHMARK: N/A ELEVATION: 5884 ft LATITUDE: 38.7714° LONGITUDE: -104.7866° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: DER LOGGED BY: DW DRILL RIG: CME-75 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B25	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Building 1 See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
0						Apparent Fill: Consists of clay and medium to coarse grained sand with gravel, dry, brown to dark brown, very stiff.	CL				
5880	5			1	12	Claystone: Medium to coarse grained sand with gravel, dry, brown/gray to dark gray/black, hard	17-21 N=38 50/12"				
				2	12						
				3	6						
5875	10			4	7						
5870	15			5	10						
5865	20			6	10						
5860	25			7	10						
5855	30			8	6						

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The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 28

DATE STARTED: 9/19/24 DATE COMPLETED: 9/19/24 COMPLETION DEPTH: 25.0 ft BENCHMARK: N/A ELEVATION: 5882 ft LATITUDE: 38.7707° LONGITUDE: -104.7867° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: ERC LOGGED BY: JW DRILL RIG: CME-55 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B26 <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> Water <input type="checkbox"/> While Drilling <input checked="" type="checkbox"/> Upon Completion <input type="checkbox"/> Delay </div> <div style="width: 30%;"> Not Observed Not Observed N/A </div> </div> BORING LOCATION: Building 2 See Figure No. 2	
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Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
5880	0			1	12	Apparent Fill: Consists of clay and fine to coarse grained sand with gravel, dry to moist, brown to dark brown/black, medium stiff to very stiff.	5-6 N=11 8-20 N=28	24	⊗	DD = 95 pcf LL = 58 PL = 20	
5875	5		2	12	25			⊗	GRAD -200 = 97.1% S(500) = 4.0% P = 6.2 Ksf DD = 105 pcf DD = 106 pcf		
5870	10		3	12	22	×	>>⊗ S(750) = 4.7% P = 7.8 Ksf DD = 105 pcf -200 = 98.1%				
5865	15		4	12	21	×	>>⊗				
5860	20		5	10			>>⊗				
	25		6	6	18	×	>>⊗ DD = 106 pcf Qu = 3.8 tsf				
			7	4			>>⊗				
						50/12"					
						50/12"					
						50/10"					
						50/6"					
						50/4"					



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FIGURE: 29

DATE STARTED: 9/19/24 DATE COMPLETED: 9/19/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 5882 ft LATITUDE: 38.7708° LONGITUDE: -104.7868° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: ERC LOGGED BY: JW DRILL RIG: CME-55 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B27	
		Water ∇ While Drilling Not Observed ▼ Upon Completion Not Observed ∇ Delay N/A		BORING LOCATION: Amenity Building See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STRENGTH, tsf	Additional Remarks
									STANDARD PENETRATION TEST DATA N in blows/ft @ × Moisture □ PL + LL 0 25 50 STRENGTH, tsf ▲ Qu * Qp 0 2.0 4.0	
5880	0			1	12	Apparent Fill: Consists of clay and fine to medium grained sand with gravel, dry, light brown to brown/gray, very stiff, claystone fragments.	10-20 N=30 15-20 N=35	13	×	-200 = 96.0%
	5		2	12						
5875			3	12	Claystone: Dry, brown to dark brown/dark gray, weathered to hard, trace gravel, iron oxidation staining.	20-25 N=45 50/11"	13	×		DD = 121 pcf -200 = 97.5%
	10		4	11						S(750) = 5.9% P = 4.1 Ksf DD = 114 pcf S(1000) = -0.8%
5870										
	15		5	11			50/11"			>>⊙
5865										
	20			6	10	Weathered Bedrock Zone from 7 to 9 feet.	50/10"	20	×	>>⊙ DD = 107 pcf



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FIGURE: 30

DATE STARTED: 9/19/24 DATE COMPLETED: 9/19/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: 5825 ft LATITUDE: 38.7721° LONGITUDE: -104.7872° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: ERC LOGGED BY: JW DRILL RIG: CME-55 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B28	
		Water ∇ While Drilling 15 feet ▼ Upon Completion 15 feet ∇ Delay N/A		BORING LOCATION: Retaining Wall See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
									N in blows/ft @ X Moisture PL LL	STRENGTH, tsf ▲ Qu * Qp	
5820	5			1	12	Fat Clay: Fine to medium grained sand with gravel and debris, dry to moist, brown to dark brown/dark gray, stiff to very stiff. claystone fragments. Weathered Claystone: Moist, dark brown/dark gray, very stiff.	CH	15	9-10 N=19 10-20 N=30	Qu = 94.9% S(250) = 6.4% P = 4.5 Ksf DD = 104 pcf	
5815	10		2	12	26			10-10 N=20 10-15 N=25	DD = 98 pcf -200 = 88.5%		
5810	15		3	12	28			10-14 N=24	DD = 96 pcf -200 = 90.6%		
5805	20		4	12	14-15 N=29						



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 Colorado Springs, CO

FIGURE: 31

DATE STARTED: 9/19/24 DATE COMPLETED: 9/19/24 COMPLETION DEPTH: 20.0 ft BENCHMARK: N/A ELEVATION: N/A LATITUDE: 38.7713° LONGITUDE: -104.7873° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: ERC LOGGED BY: JW DRILL RIG: CME-55 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B29	
		Water ▽ While Drilling Not Observed ▽ Upon Completion Not Observed ▽ Delay N/A		BORING LOCATION: Retaining Wall See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STRENGTH, tsf	Additional Remarks
0				1	12	Fat Clay: Fine to medium grained sand with gravel, dry to moist, dark brown/black, stiff, observable debris.	CH	9-9 N=18	15	DD = 81 pcf -200 = 85.2%
	2		12	Claystone: Dry, dark brown/dark gray/black, hard, trace gravel.	7-8 N=15	17	DD = 99 pcf -200 = 86.3%			
5			3	10	50/10"					
10			4	10	50/10"	20	DD = 108 pcf S(1000) = 3.1% P = 6.1 Ksf			
15			5	6	50/6"	20	DD = 105 pcf Qu = 6.0 tsf			
20			6	6	50/6"					

	Professional Service Industries, Inc. 1070 West 124th Avenue, Suite 800 Westminster, CO 80234 Telephone: (303) 424-5578	PROJECT NO.: 05322879 PROJECT: TTRes Venetucci Multifamily LOCATION: Venetucci Blvd at South Academy Blvd Colorado Springs, CO
--	--	--

The stratification lines represent approximate boundaries. The transition may be gradual.

FIGURE: 32

DATE STARTED: 9/19/24 DATE COMPLETED: 9/19/24 COMPLETION DEPTH: 10.0 ft BENCHMARK: N/A ELEVATION: 5875 ft LATITUDE: 38.7707° LONGITUDE: -104.7871° STATION: N/A OFFSET: N/A REMARKS:		DRILL COMPANY: Dakota Drilling, Inc. DRILLER: ERC LOGGED BY: JW DRILL RIG: CME-55 DRILLING METHOD: Solid Stem Auger SAMPLING METHOD: Modified California HAMMER TYPE: Manual EFFICIENCY: N/A REVIEWED BY: HT		BORING B30	
		Water ∇ While Drilling Not Observed ▼ Upon Completion Not Observed ∇ Delay N/A		BORING LOCATION: Pavement See Figure No. 2	

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	STRENGTH, tsf	Additional Remarks
0											
5870	5			1	12	Apparent Fill: Consists of clay and fine to medium grained sand with gravel, dry, brown to dark brown, stiff, observable debris Fat Clay: Dry, brown/dark gray, stiff, trace gravel. Claystone: Moist, dark brown/dark gray, hard, trace gravel.	CH	19	6-10 N=16 10-12 N=22		DD = 98 pcf GRAD -200 = 86.6% DD = 109 pcf LL = 67 PL = 22 >> @ S(250) = -0.1% DD = 113 pcf >> @ S(500) = 7.7% P = 12.8 Ksf DD = 121 pcf
5865	10			2	12			18			
				3	7			20	50/7"		
				4	7			12	50/7"		

	Professional Service Industries, Inc. 1070 West 124th Avenue, Suite 800 Westminster, CO 80234 Telephone: (303) 424-5578	PROJECT NO.: 05322879 PROJECT: TTRes Venetucci Multifamily LOCATION: Venetucci Blvd at South Academy Blvd Colorado Springs, CO
--	--	--

The stratification lines represent approximate boundaries. The transition may be gradual.

KEY TO SYMBOLS



Apparent Fill



USCS High Plasticity Clay



USCS Low Plasticity Clay



Bedrock



Weathered Shale

SSA = Solid Stem Auger

HSA = Hollow Stem Auger

CFA = Continuous Flight Auger

SPT = Standard Penetration Test

MC - Modified California Sampler

SS = Split-spoon Sampler

ST = Shelby Tube Sampler

RC = Rock Core

DD = Dry Density

MC = Moisture Content

LL = Liquid Limit

PL = Plastic Limit

-200 = Percent Passing the
No. 200 Sieve (%)S(250) = Swell under 250 psf
surcharge pressure (%)S(500) = Swell under 500 psf
surcharge pressure (%)S(1000) = Swell under 1000 psf
surcharge pressure (%)Qu = Unconfined Compressive
Strength

RQD = Rock Quality Designation

REC'D = Rock Core Recovery
Percentage

PID = Photo Ionic Detector (ppm)

The borings were advanced into the ground using 4-inch solid stem augers. At regular intervals throughout the boring depths, soil samples were obtained with either a 1.4-inch I.D., 2.0-inch O.D., split-spoon sampler or a 2.0-inch I.D., 2.4-inch O.D. Modified California sampler. The samplers were first seated 6-inches to penetrate any loose cuttings and then driven an additional foot where possible with blows of a 140-pound hammer falling 30-inches. The number of hammer blows required to drive the sampler each 6-inch increment is recorded in the field. The penetration resistance "N-value" is redesignated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. N-values recorded on the boring logs are uncorrected. The split-spoon sampling procedures used during this exploration are in general accordance with ASTM Designation D 1586.



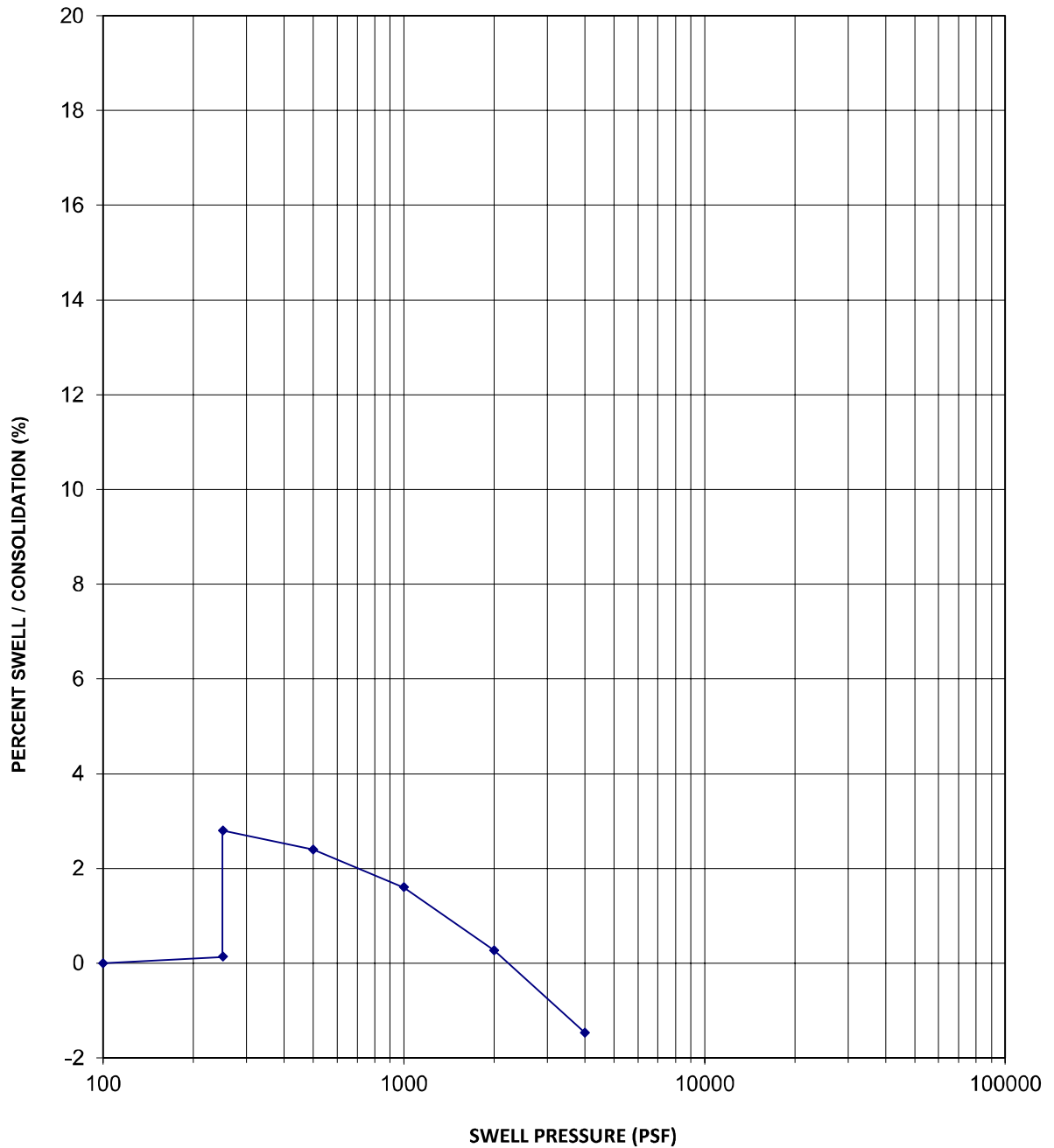
Professional Service Industries, Inc.
1070 West 124th Avenue, Suite 800
Westminster, CO 80234
Telephone: (303) 424-5578
Fax: (303) 423-5625

PSI Job No.: 05322879
Project: TTRes Venetucci Multifamily
Location: Venetucci Blvd at South Academy Blvd
Colorado Springs, CO

Appendix A

Laboratory Test Results

SWELL-CONSOLIDATION TEST



Sample Location	B1
Sample Depth	2.5 feet
Sample Description	Apparent Fill
USCS Classification	

Dry Density	101 pcf
In-Situ Moisture Content	21.2 %
Volume Change	2.7 %
Swell Pressure	2,100 psf



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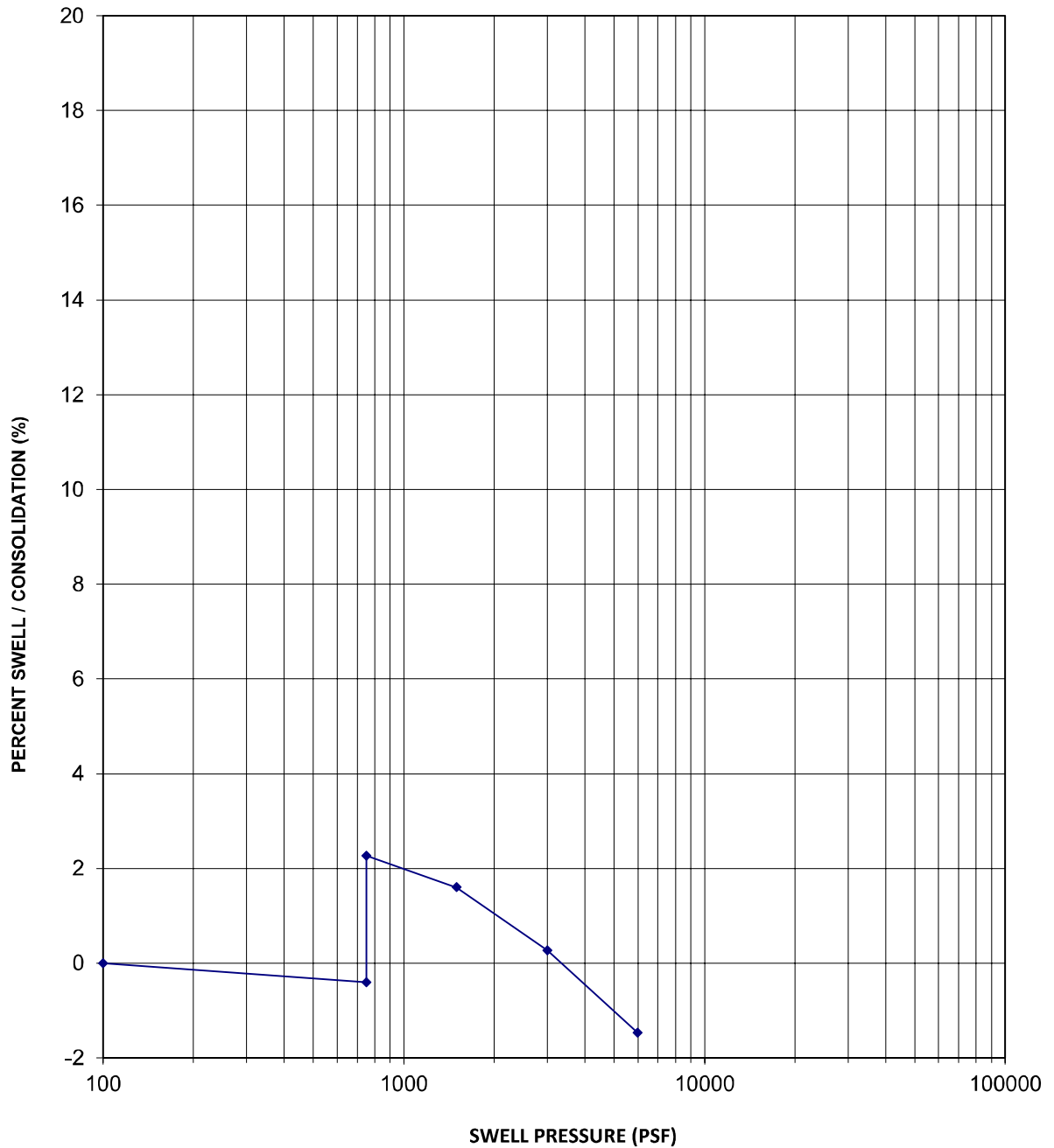
5322879

SWELL - CONSOLIDATION TEST

FIGURE NO.

A1

SWELL-CONSOLIDATION TEST



Sample Location	B1
Sample Depth	7.5 feet
Sample Description	Apparent Fill
USCS Classification	

Dry Density	101 pcf
In-Situ Moisture Content	20.5 %
Volume Change	2.7 %
Swell Pressure	3,900 psf



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SWELL - CONSOLIDATION TEST

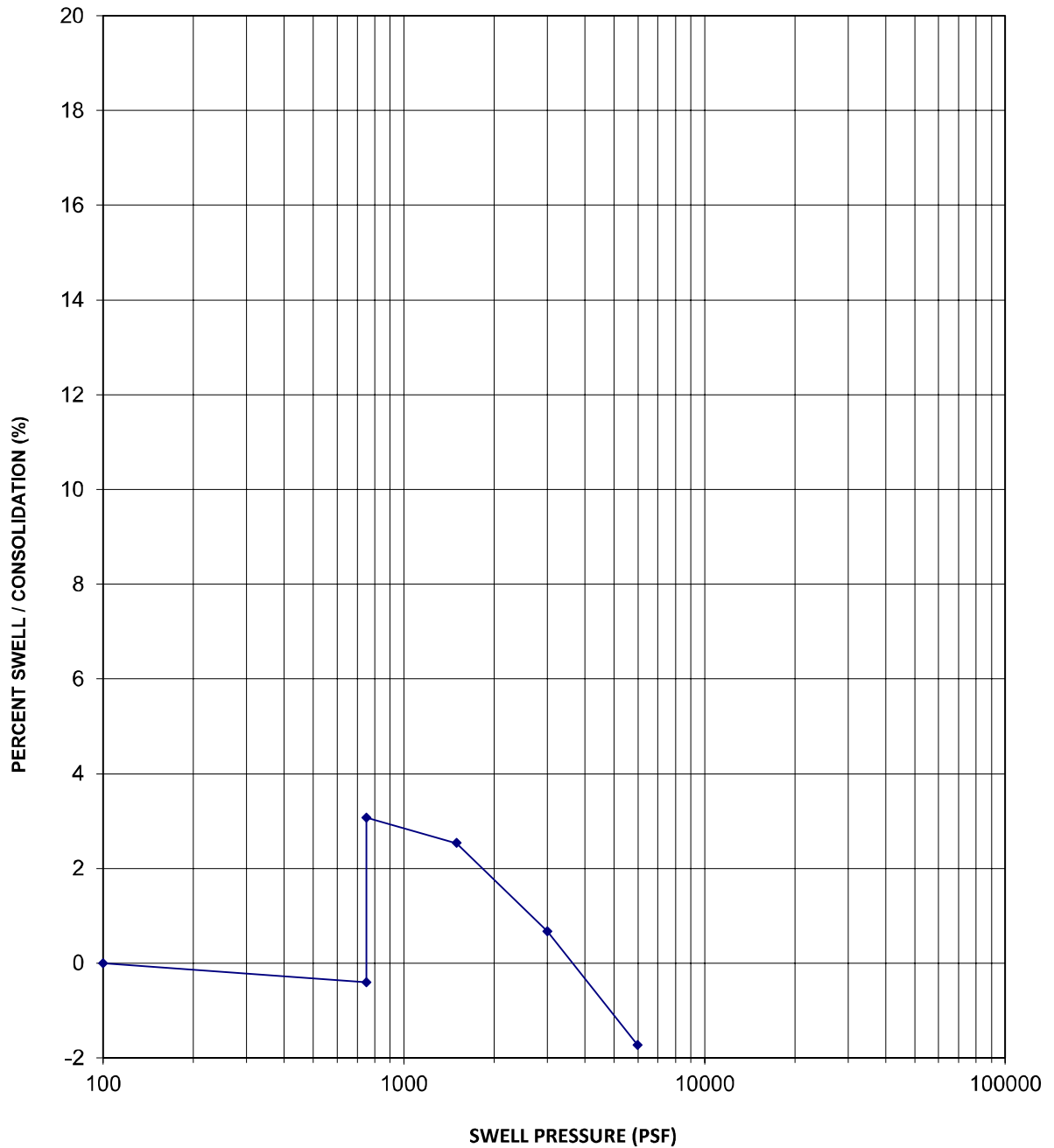
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FIGURE NO.

A2

SWELL-CONSOLIDATION TEST



Sample Location	B2
Sample Depth	7.5 feet
Sample Description	Apparent Fill
USCS Classification	

Dry Density	110 pcf
In-Situ Moisture Content	15.8 %
Volume Change	3.5 %
Swell Pressure	4,100 psf



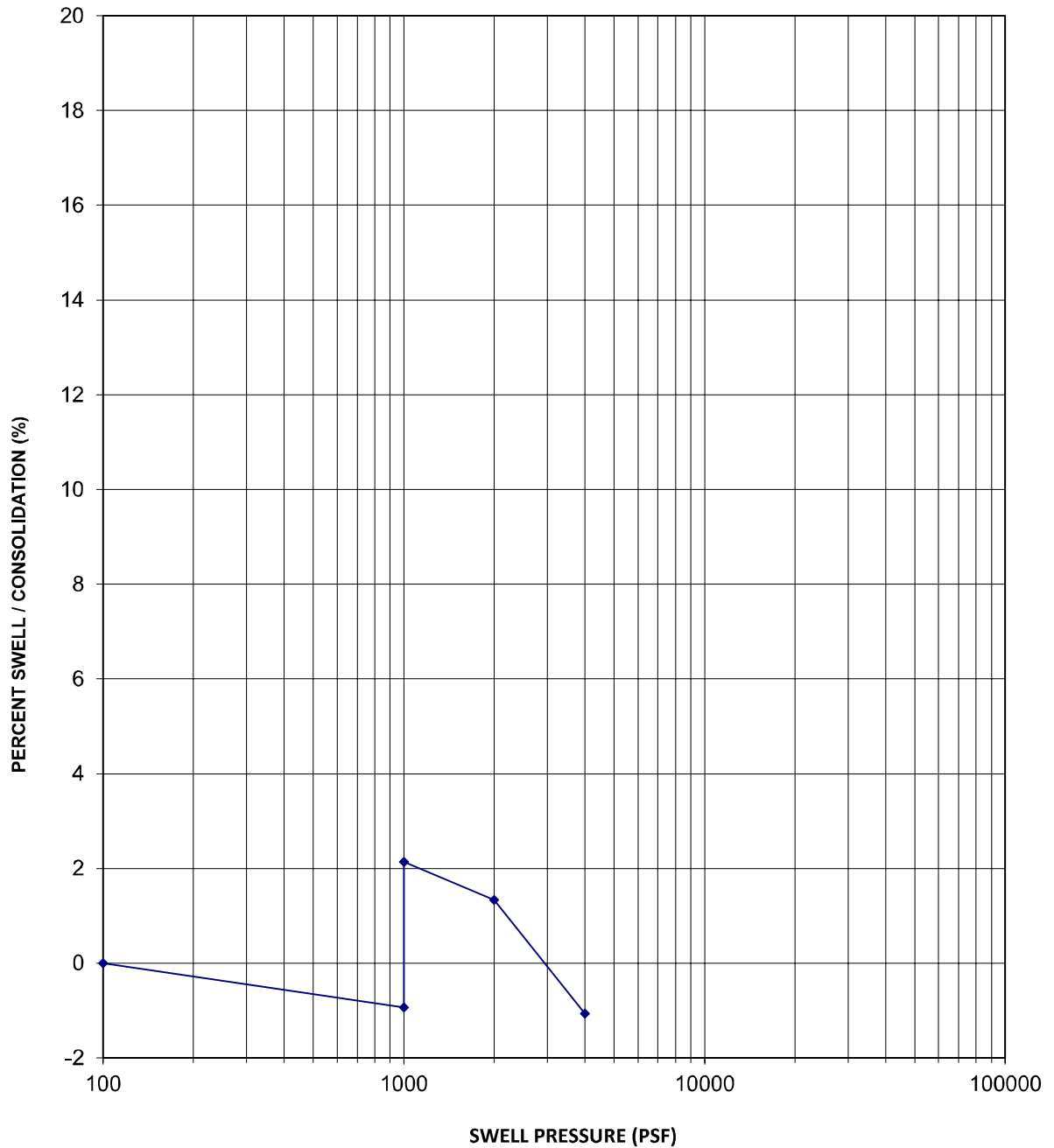
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SWELL - CONSOLIDATION TEST

FIGURE NO. A3

SWELL-CONSOLIDATION TEST



Sample Location	B2
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	114 pcf
In-Situ Moisture Content	10.7 %
Volume Change	3.1 %
Swell Pressure	3,800 psf



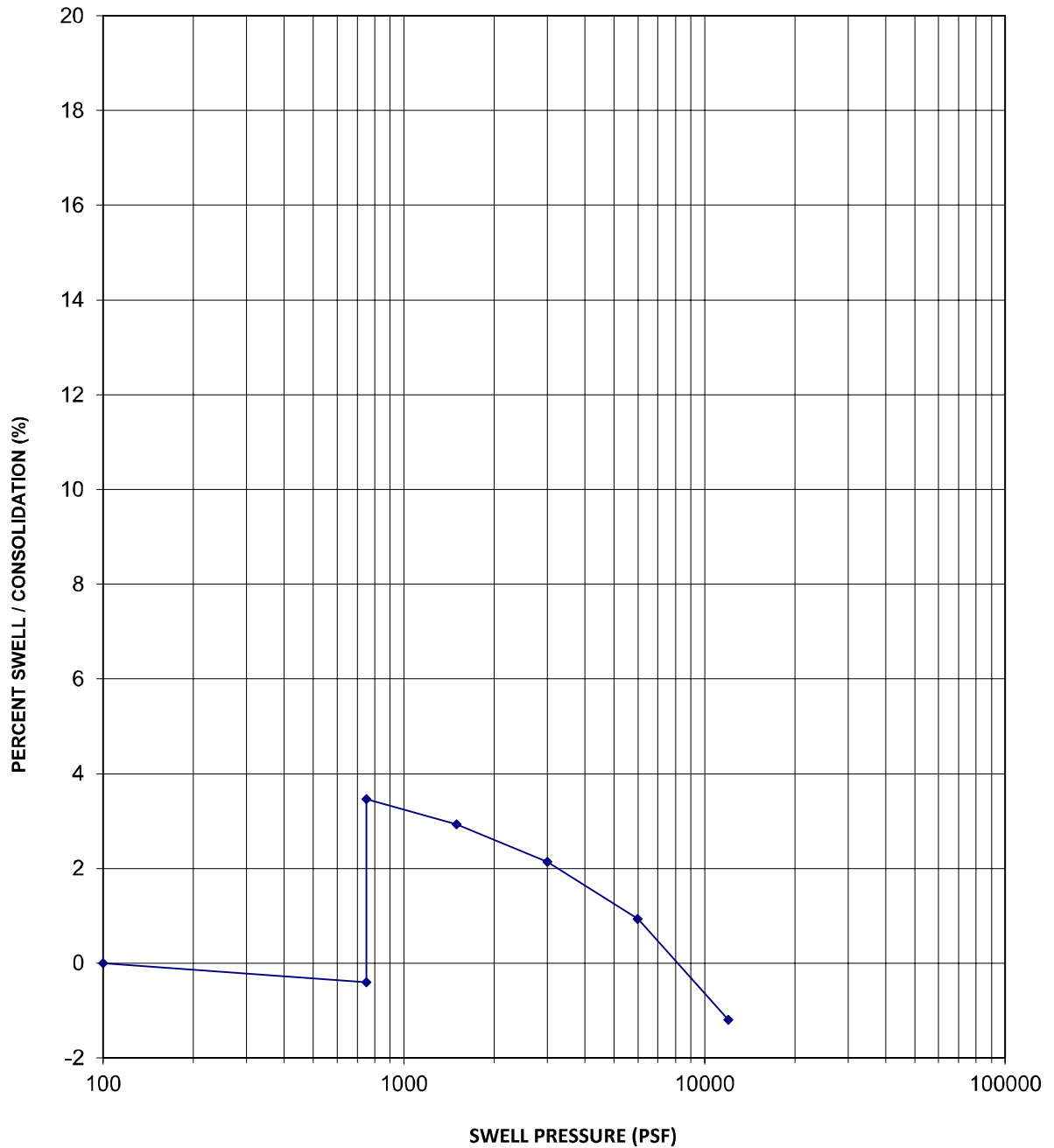
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SWELL - CONSOLIDATION TEST

FIGURE NO. A4

SWELL-CONSOLIDATION TEST



Sample Location	B3
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	122 pcf
In-Situ Moisture Content	15.1 %
Volume Change	3.9 %
Swell Pressure	9,300 psf



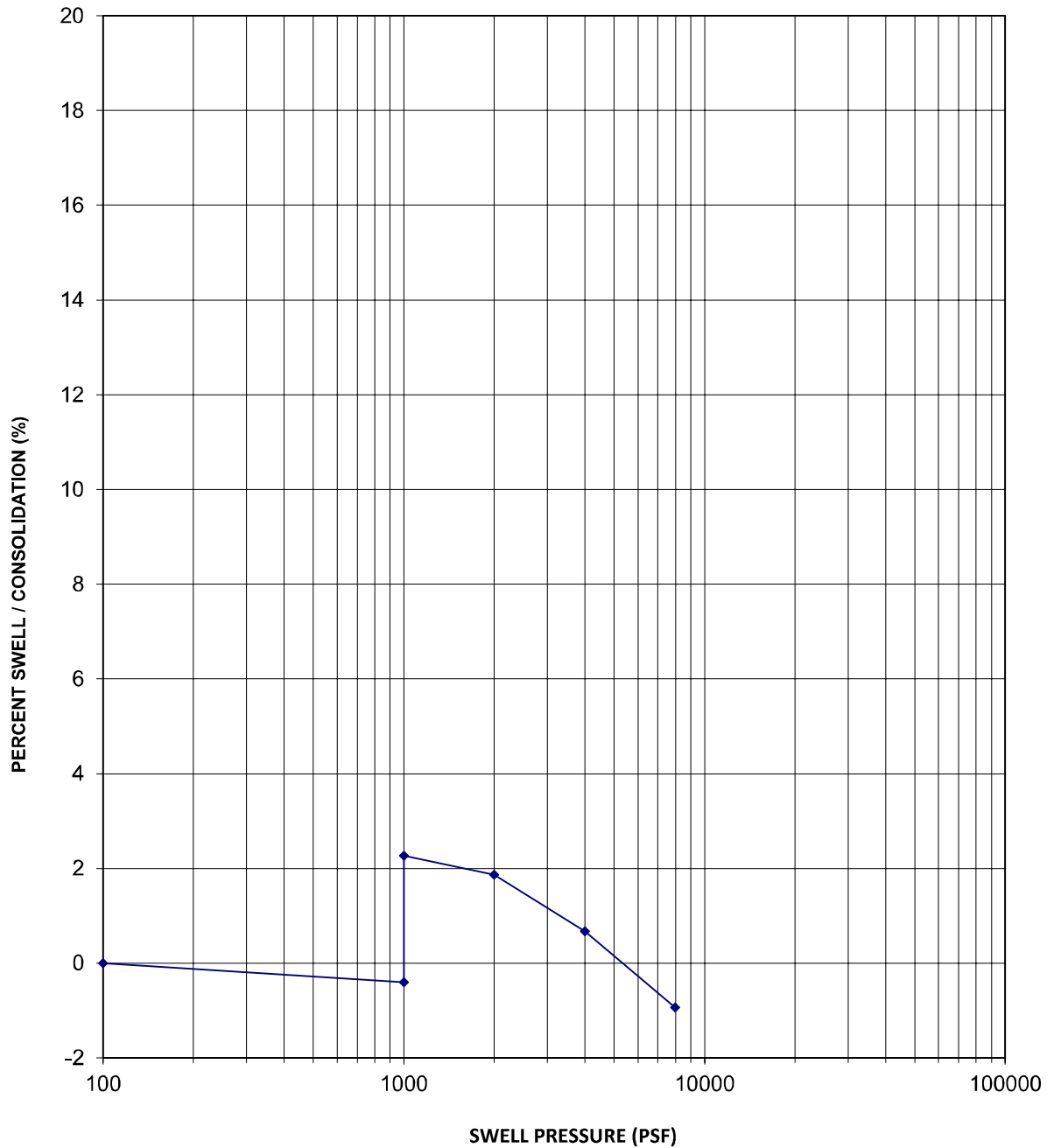
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SWELL - CONSOLIDATION TEST

FIGURE NO. A5

SWELL-CONSOLIDATION TEST



Sample Location	B3
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	112 pcf
In-Situ Moisture Content	16.8 %
Volume Change	2.7 %
Swell Pressure	6,300 psf



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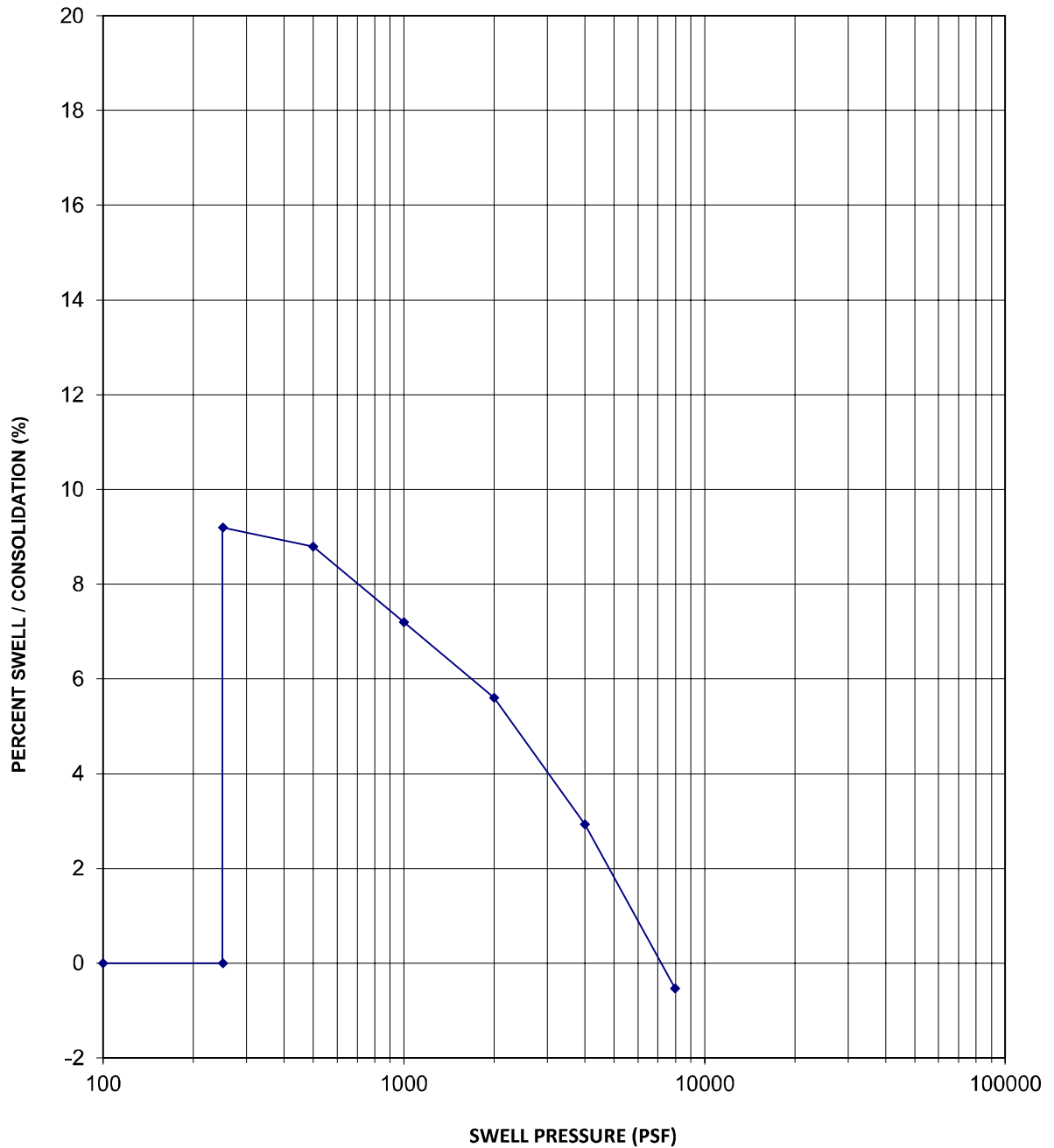
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A6

SWELL-CONSOLIDATION TEST



Sample Location	B4
Sample Depth	2.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	109 pcf
In-Situ Moisture Content	22.9 %
Volume Change	9.2 %
Swell Pressure	7,200 psf



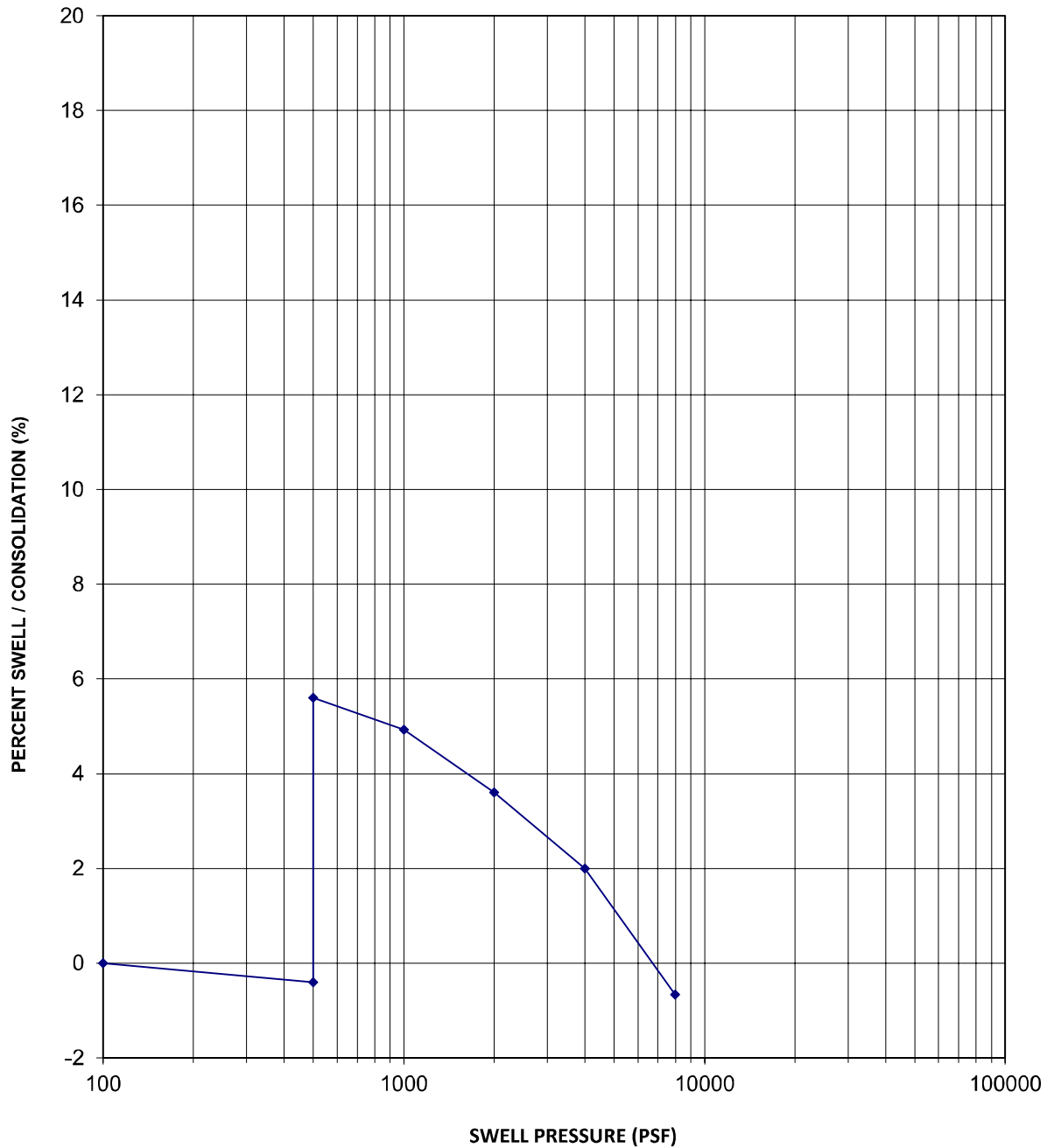
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SWELL - CONSOLIDATION TEST

FIGURE NO. A7

SWELL-CONSOLIDATION TEST



Sample Location	B5
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	113 pcf
In-Situ Moisture Content	13.6 %
Volume Change	6.0 %
Swell Pressure	7,500 psf



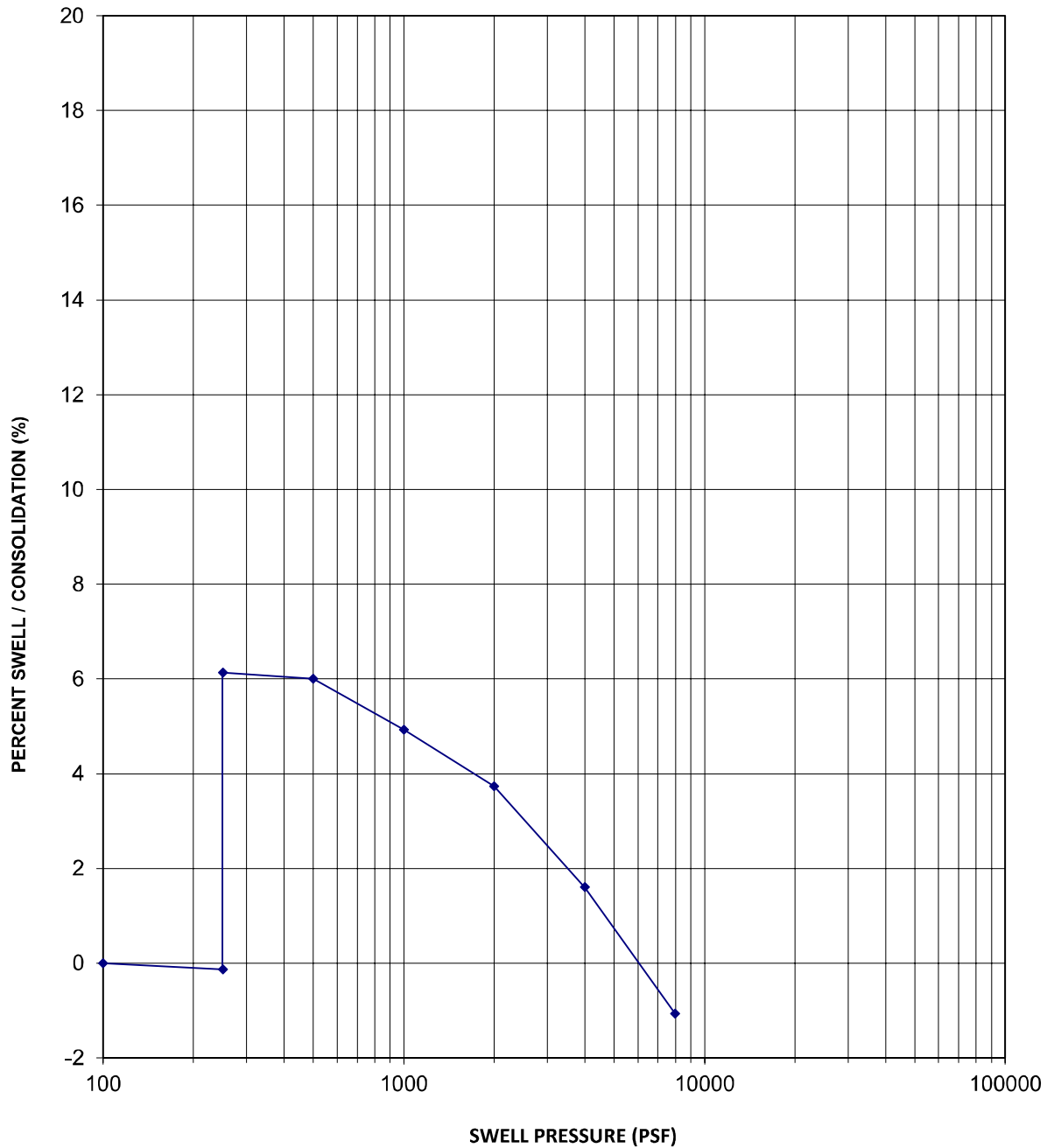
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SWELL - CONSOLIDATION TEST

FIGURE NO. A8

SWELL-CONSOLIDATION TEST



Sample Location	B6
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	104 pcf
In-Situ Moisture Content	20.5 %
Volume Change	6.3 %
Swell Pressure	6,300 psf



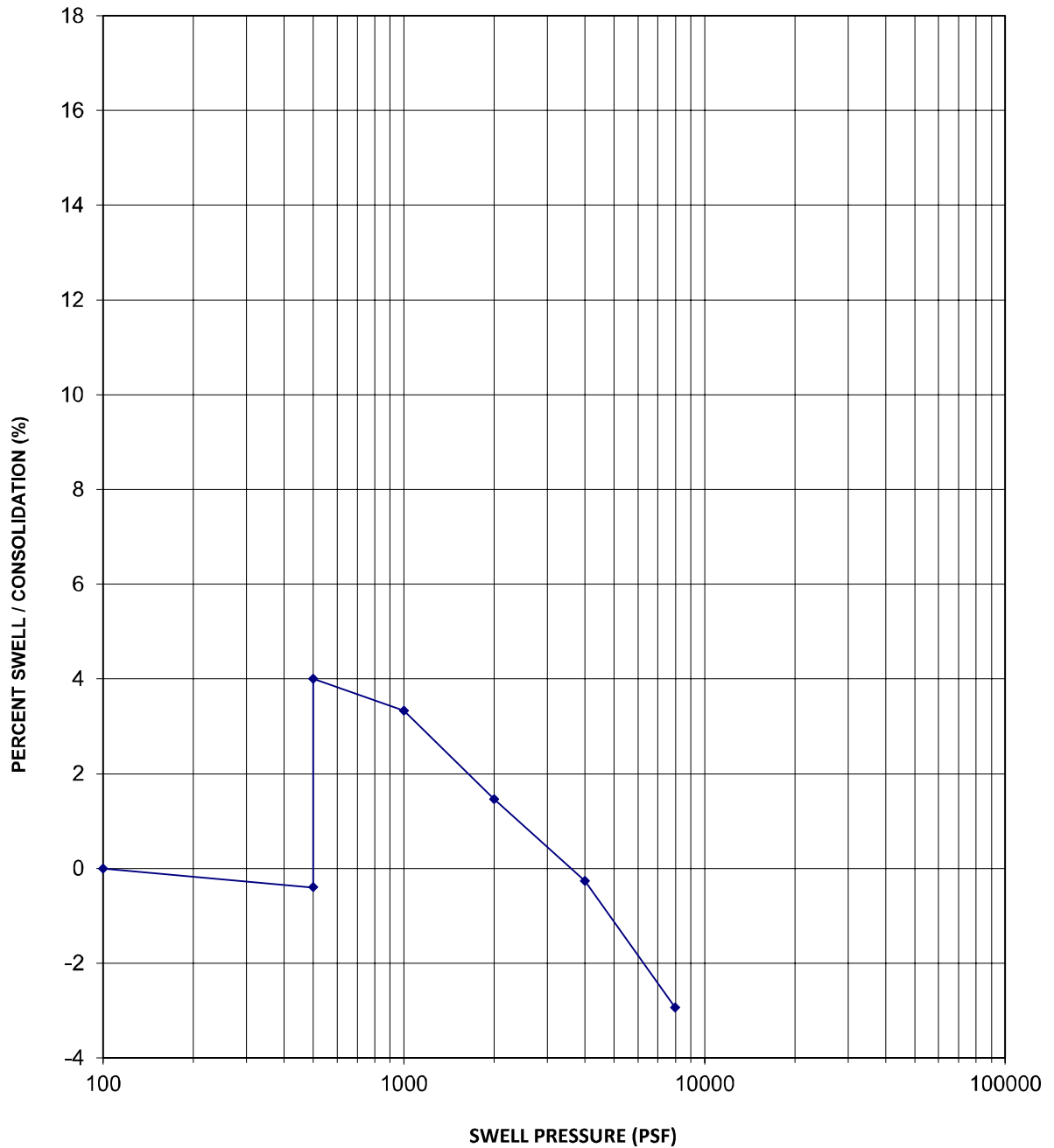
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SWELL - CONSOLIDATION TEST

FIGURE NO. A9

SWELL-CONSOLIDATION TEST



Sample Location	B6
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	110 pcf
In-Situ Moisture Content	15.2 %
Volume Change	4.4 %
Swell Pressure	4,100 psf



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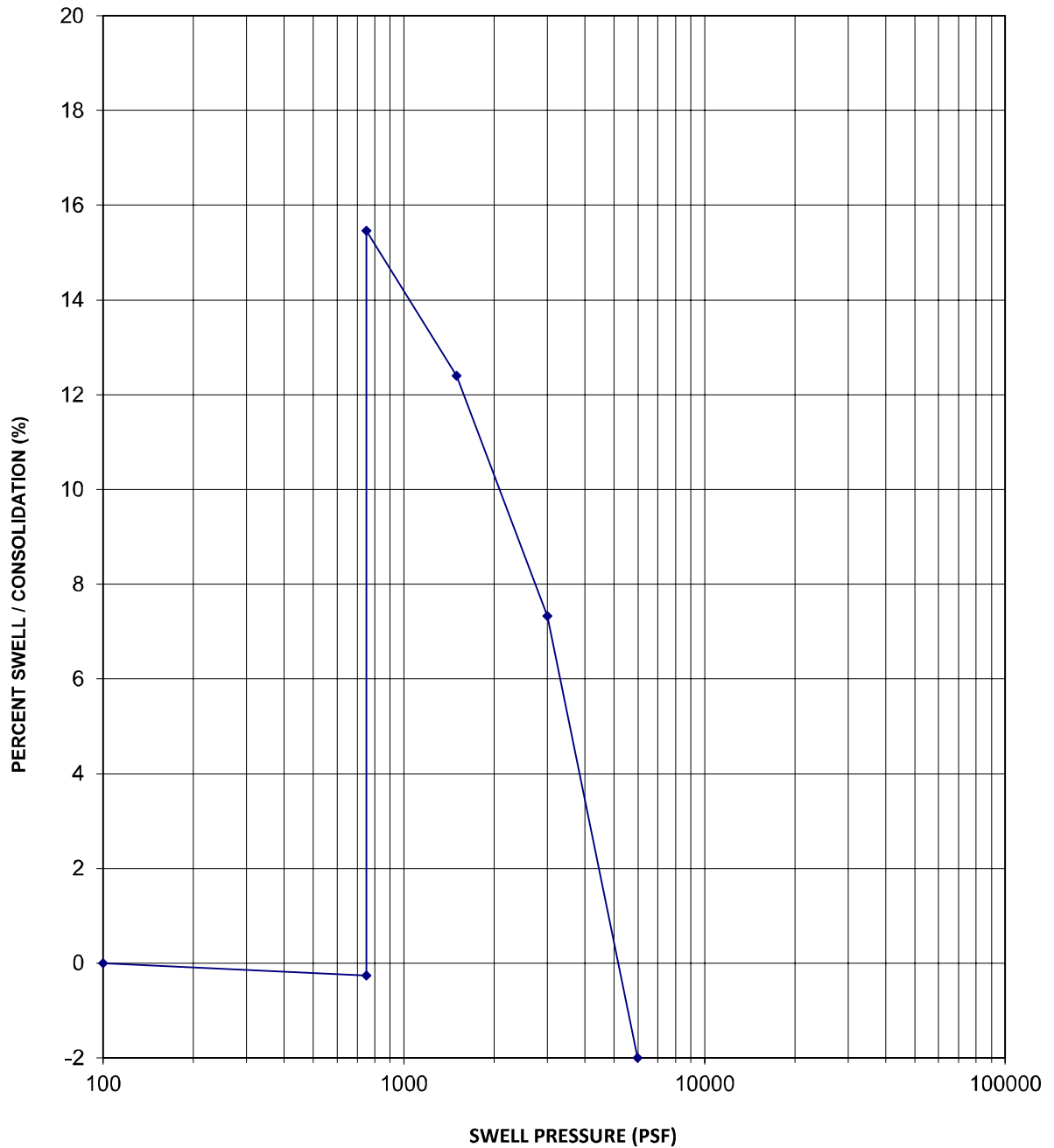
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A10

SWELL-CONSOLIDATION TEST



Sample Location	B8
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	101 pcf
In-Situ Moisture Content	12.7 %
Volume Change	15.7 %
Swell Pressure	5,300 psf



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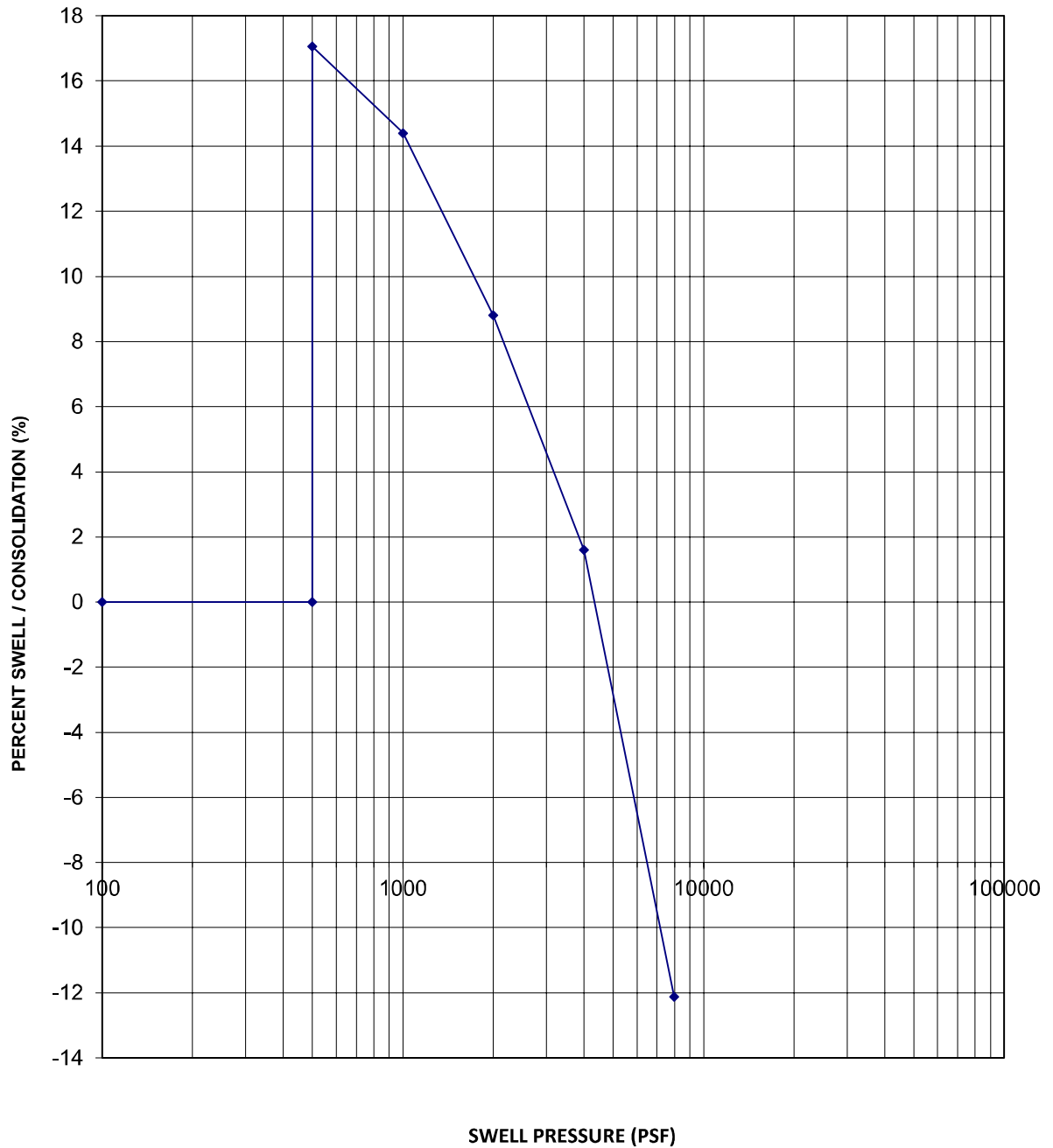
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A11

SWELL-CONSOLIDATION TEST



Sample Location	B9
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	97 pcf
In-Situ Moisture Content	12.2 %
Volume Change	17.1 %
Swell Pressure	4,300 psf



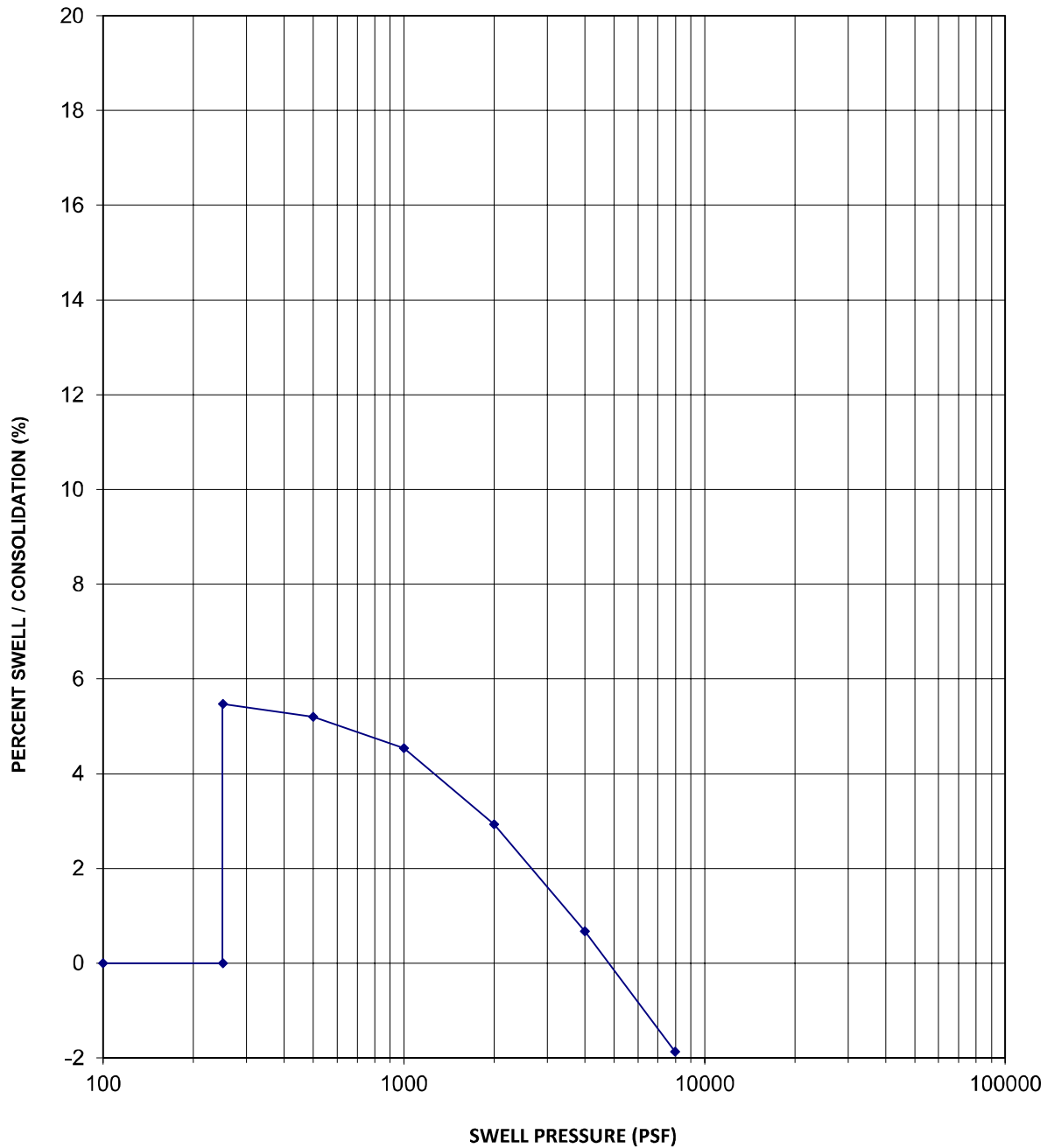
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SWELL - CONSOLIDATION TEST

FIGURE NO. A12

SWELL-CONSOLIDATION TEST



Sample Location	B10
Sample Depth	2.5 feet
Sample Description	Clay
USCS Classification	CH

Dry Density	109 pcf
In-Situ Moisture Content	18.6 %
Volume Change	5.5 %
Swell Pressure	4,800 psf



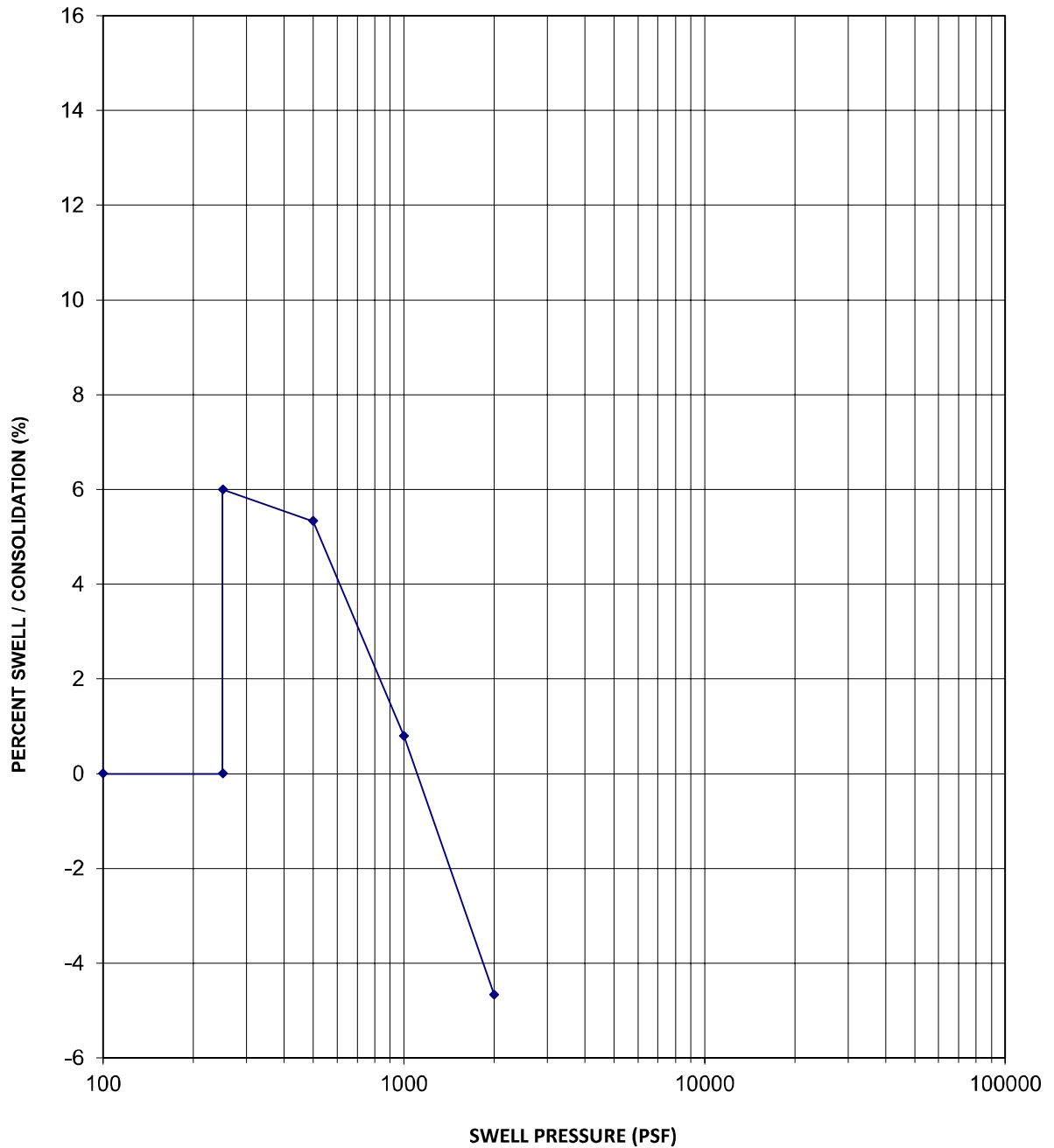
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SWELL - CONSOLIDATION TEST

FIGURE NO. A13

SWELL-CONSOLIDATION TEST



Sample Location	B10
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	92 pcf
In-Situ Moisture Content	13.0 %
Volume Change	6.0 %
Swell Pressure	1,100 psf



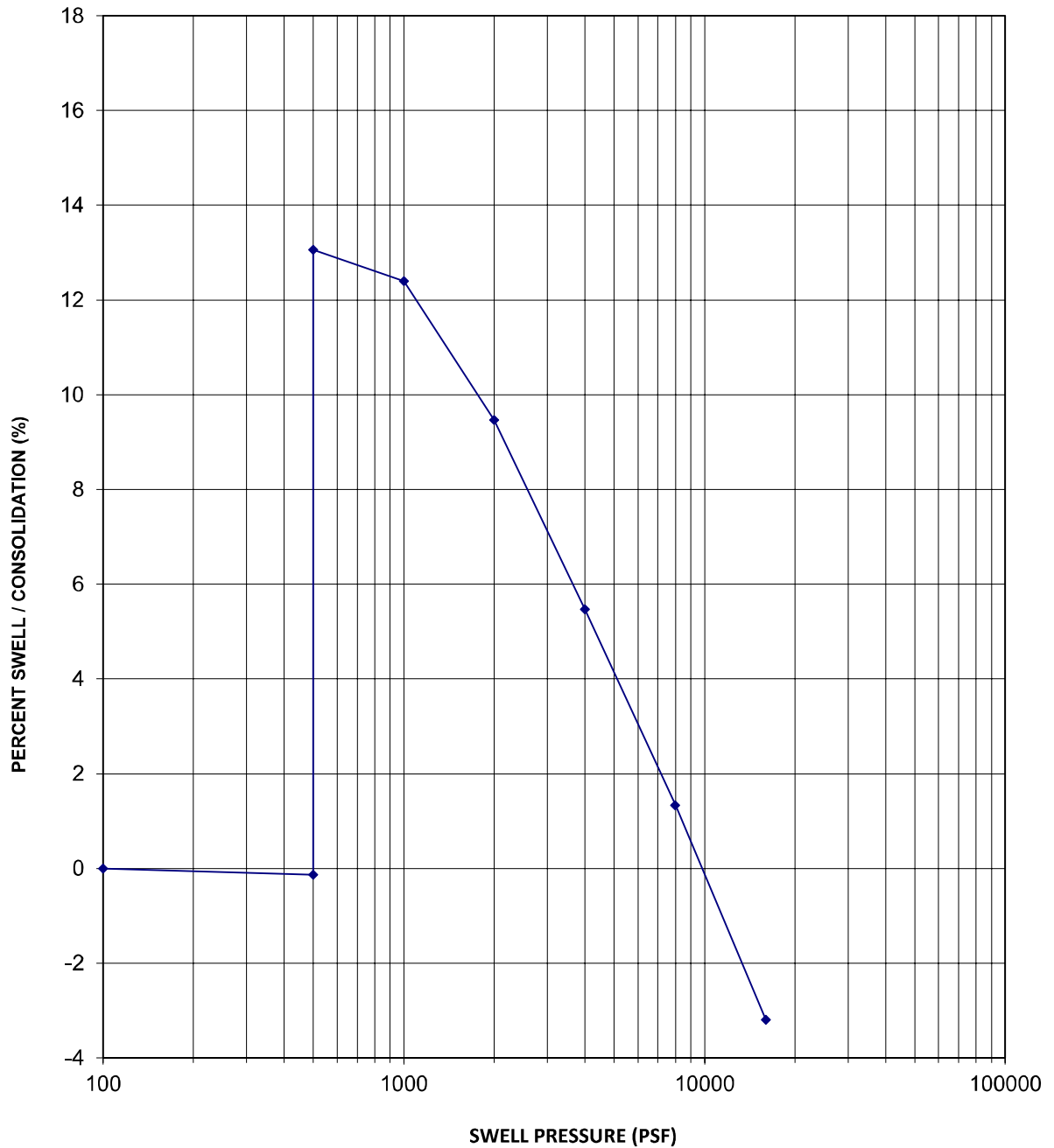
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SWELL - CONSOLIDATION TEST

FIGURE NO. A14

SWELL-CONSOLIDATION TEST



Sample Location	B10
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	115 pcf
In-Situ Moisture Content	13.2 %
Volume Change	13.2 %
Swell Pressure	10,000 psf



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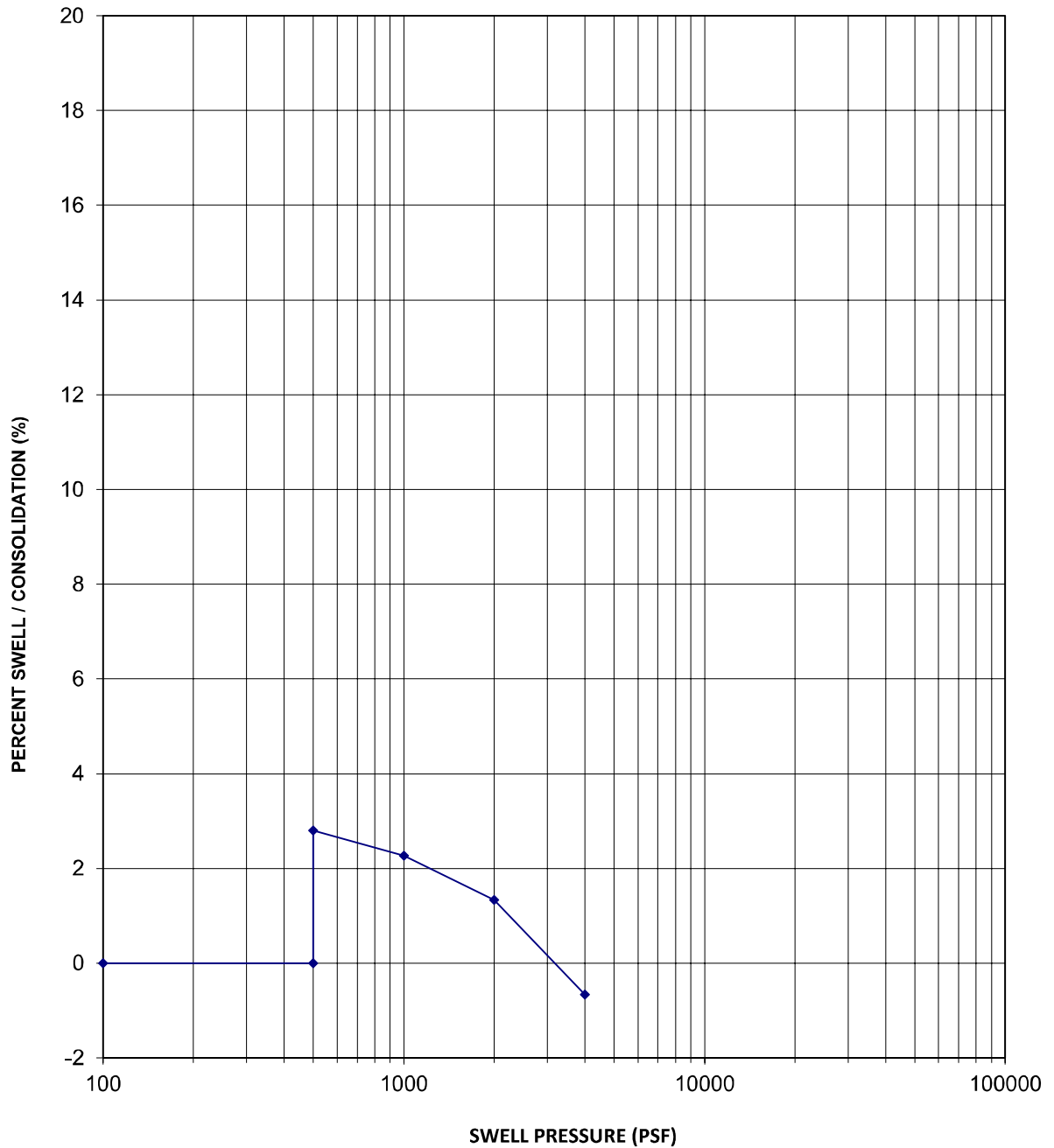
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A15

SWELL-CONSOLIDATION TEST



Sample Location	B11
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	119 pcf
In-Situ Moisture Content	9.6 %
Volume Change	2.8 %
Swell Pressure	3,200 psf



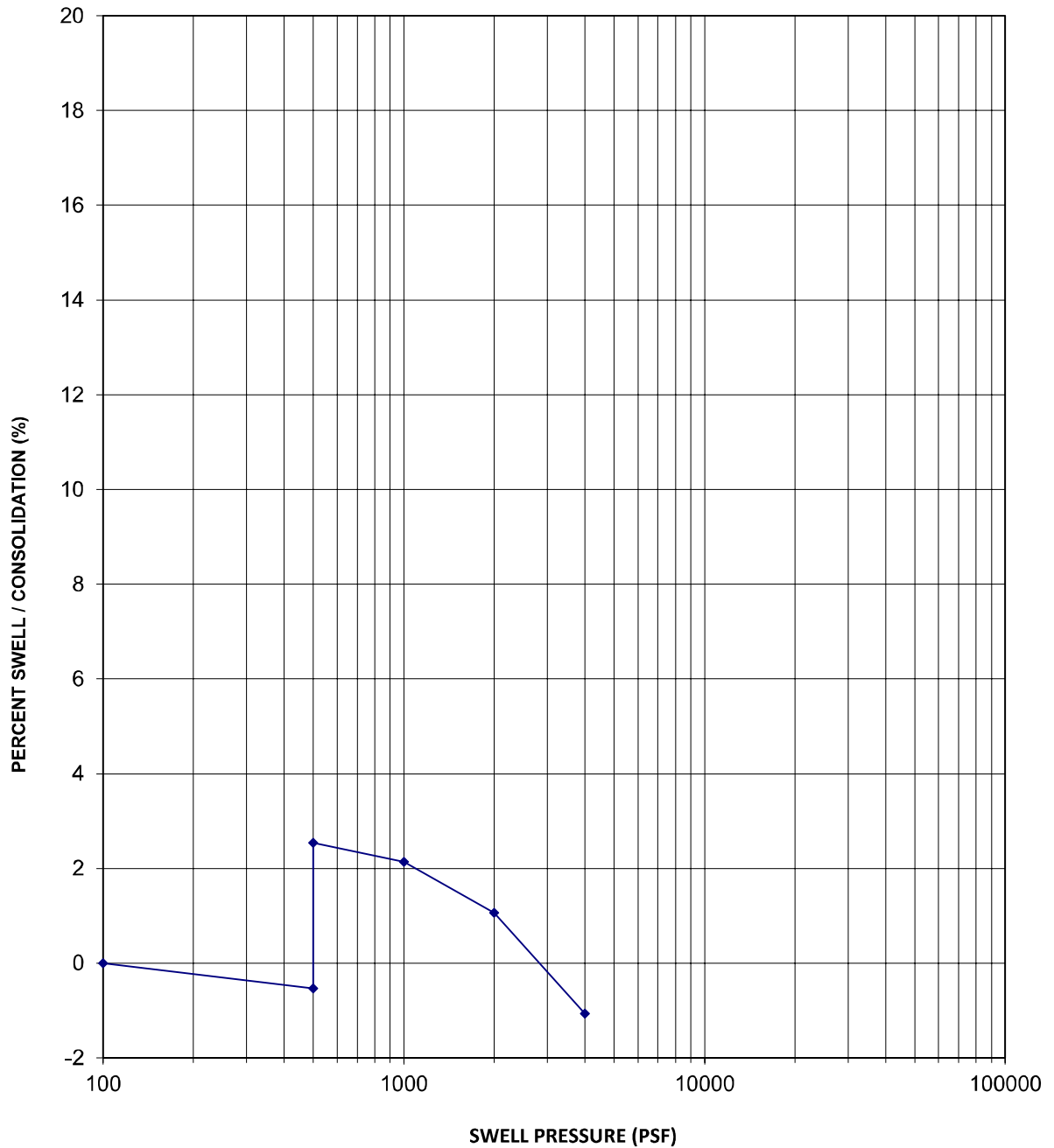
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SWELL - CONSOLIDATION TEST

FIGURE NO. A16

SWELL-CONSOLIDATION TEST



Sample Location	B12
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	111 pcf
In-Situ Moisture Content	11.6 %
Volume Change	3.1 %
Swell Pressure	3,400 psf



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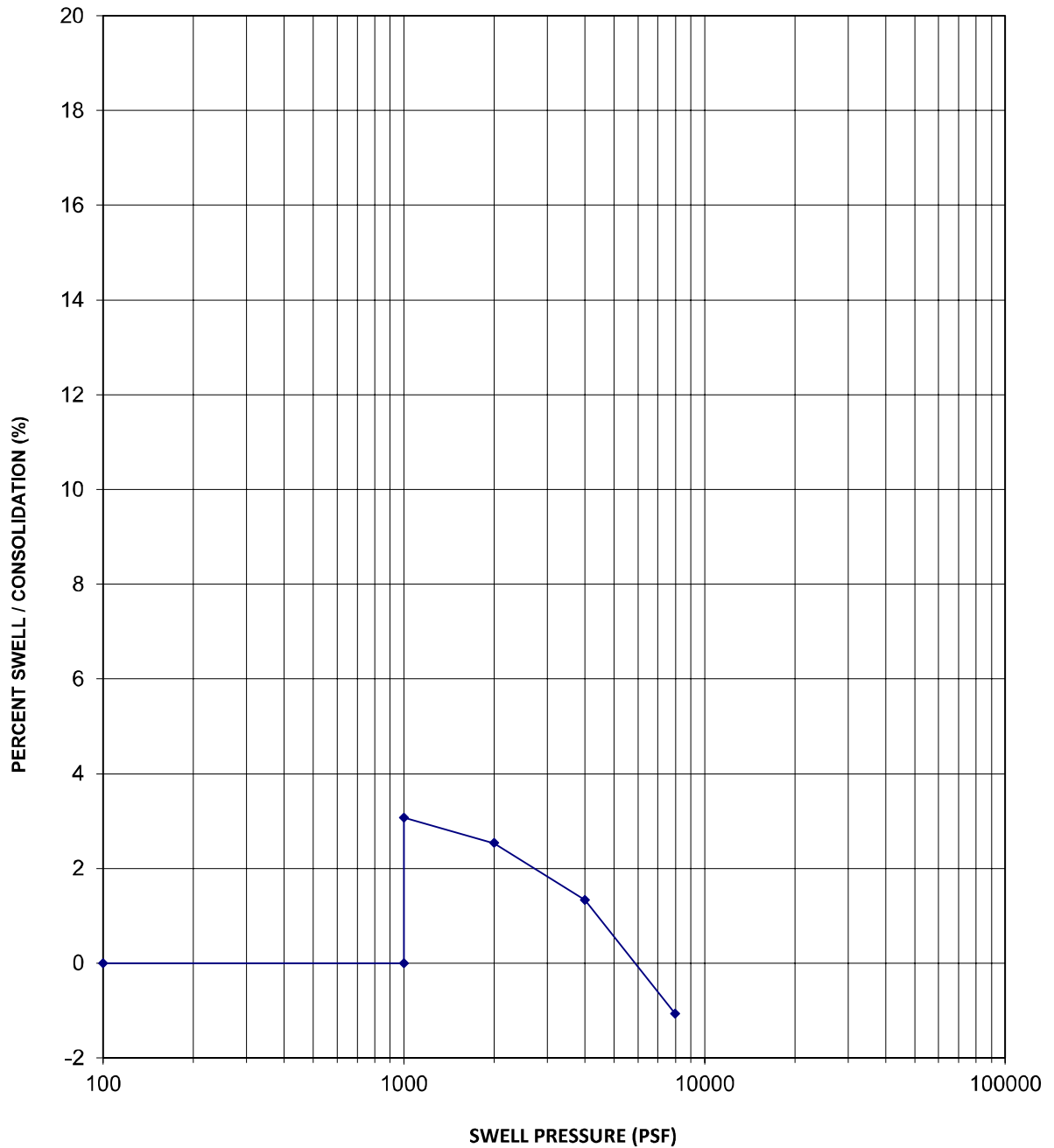
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A17

SWELL-CONSOLIDATION TEST



Sample Location	B12
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	112 pcf
In-Situ Moisture Content	13.2 %
Volume Change	3.1 %
Swell Pressure	5,900 psf



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JOB NO.

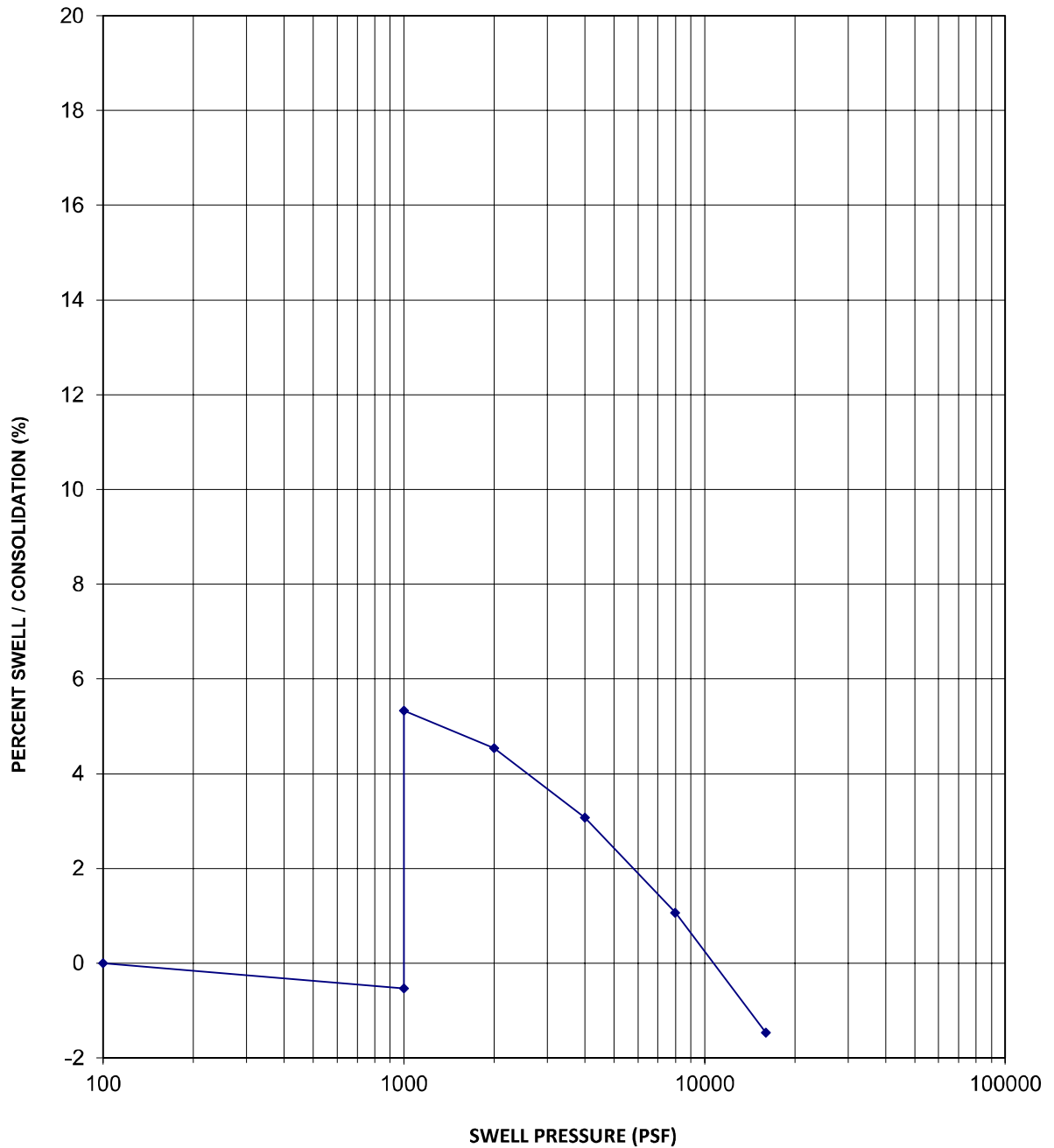
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A18

SWELL-CONSOLIDATION TEST



Sample Location	B13
Sample Depth	15 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	111 pcf
In-Situ Moisture Content	18.7 %
Volume Change	5.9 %
Swell Pressure	12,400 psf



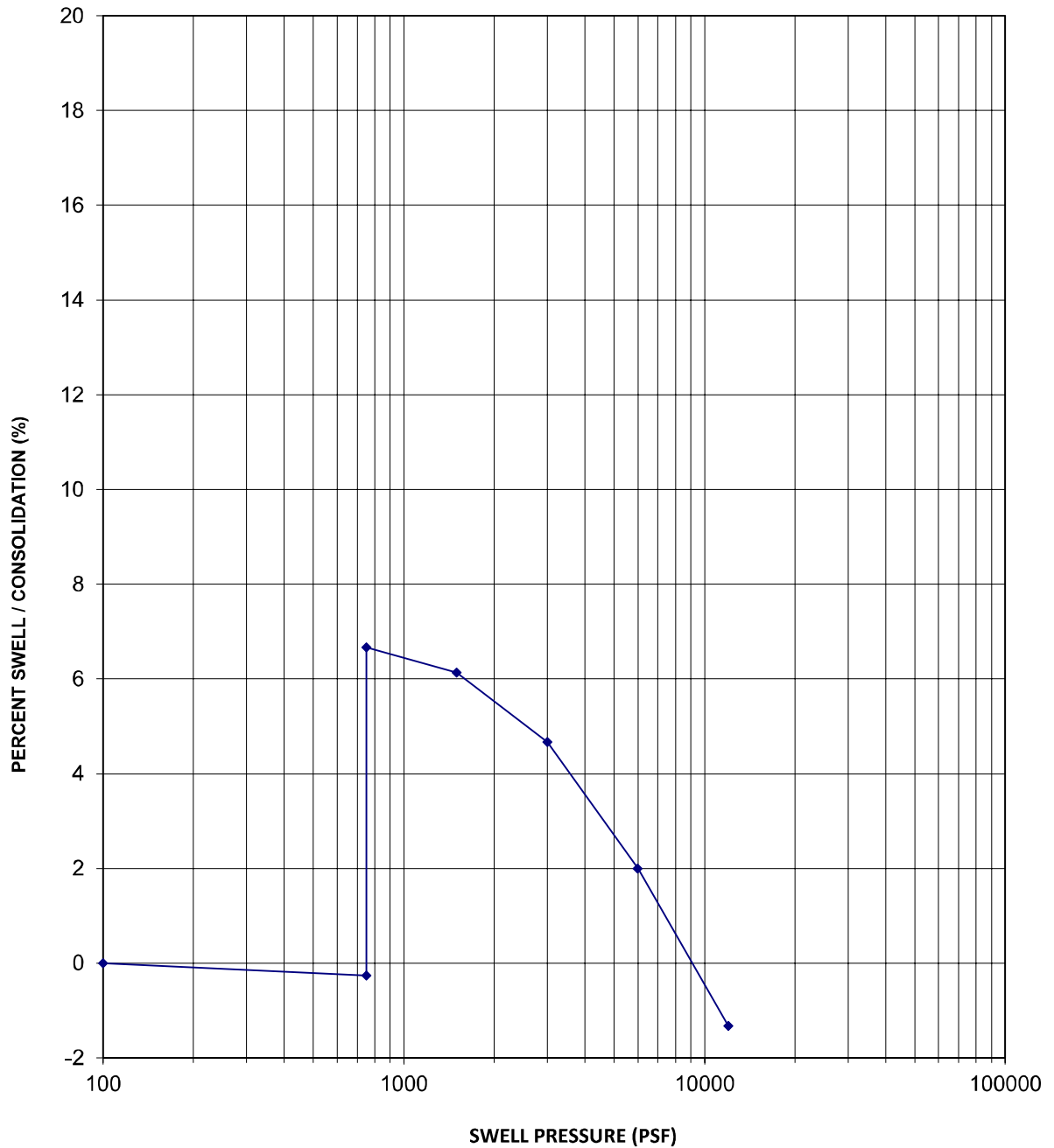
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SWELL - CONSOLIDATION TEST

FIGURE NO. A19

SWELL-CONSOLIDATION TEST



Sample Location	B14
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	109 pcf
In-Situ Moisture Content	21.6 %
Volume Change	6.9 %
Swell Pressure	9,600 psf



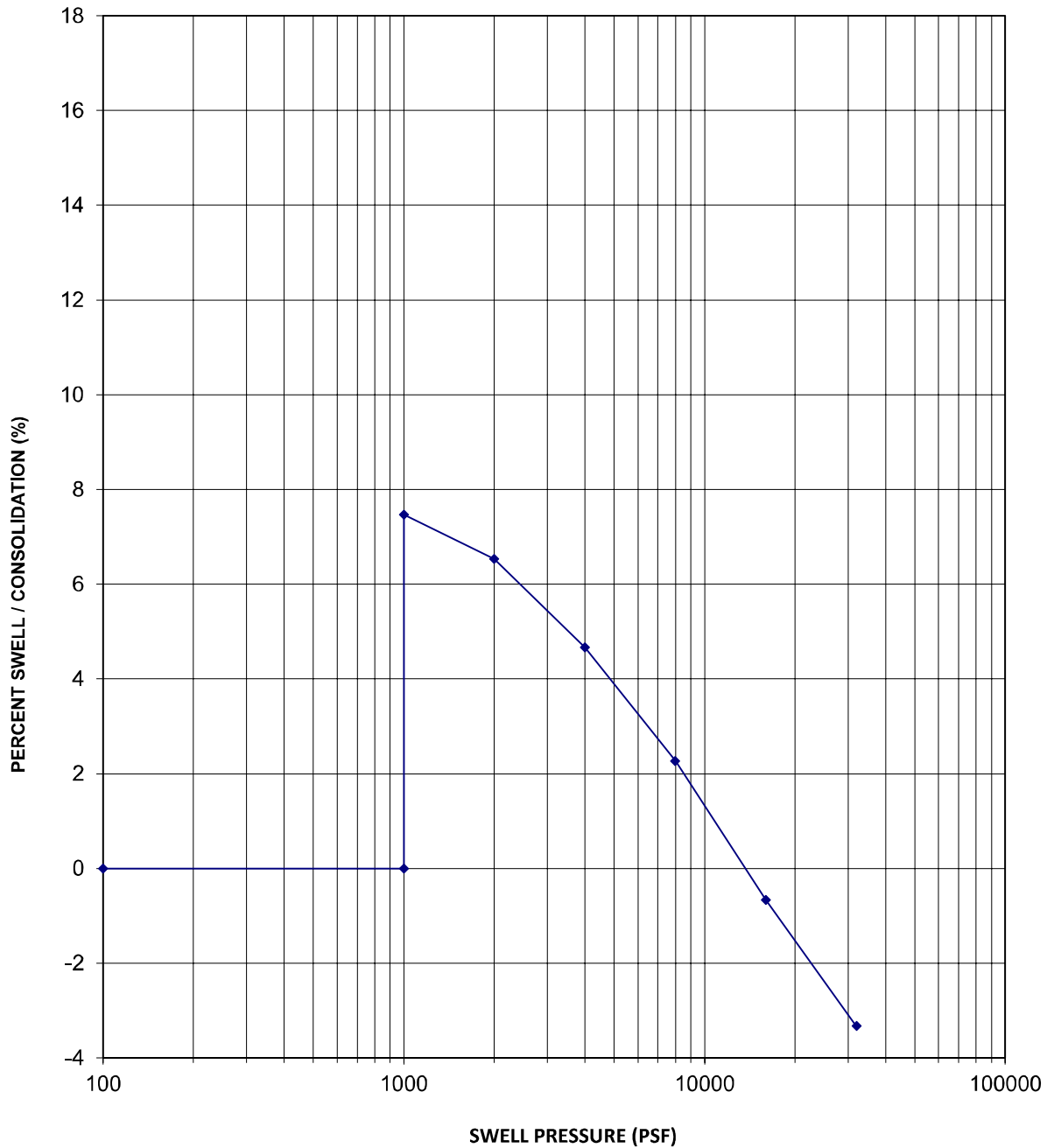
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SWELL - CONSOLIDATION TEST

FIGURE NO. A20

SWELL-CONSOLIDATION TEST



Sample Location	B14
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	110 pcf
In-Situ Moisture Content	20.3 %
Volume Change	7.5 %
Swell Pressure	13,700 psf



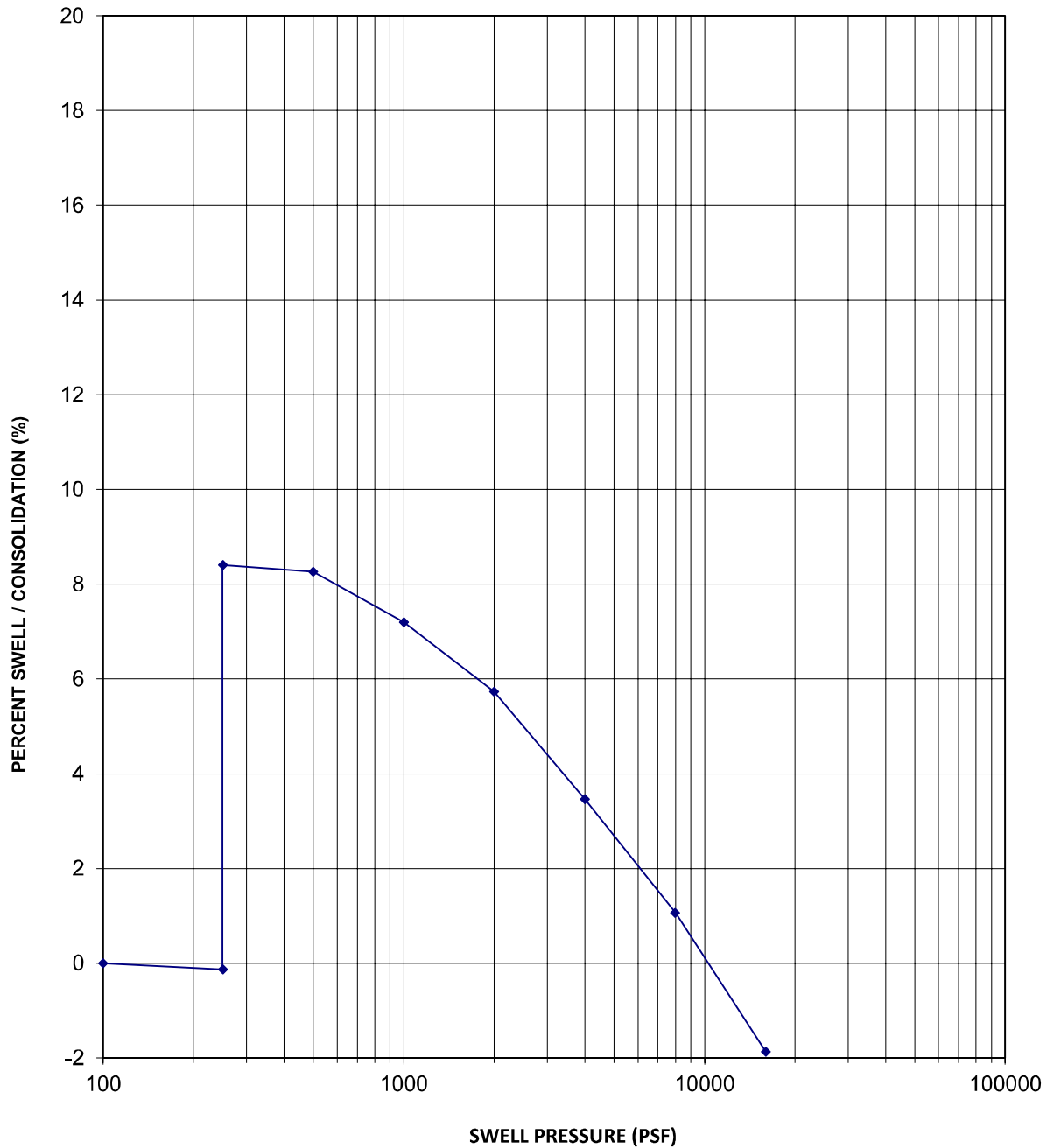
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SWELL - CONSOLIDATION TEST

FIGURE NO. A21

SWELL-CONSOLIDATION TEST



Sample Location	B16
Sample Depth	2.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	109 pcf
In-Situ Moisture Content	20.1 %
Volume Change	8.5 %
Swell Pressure	10,600 psf



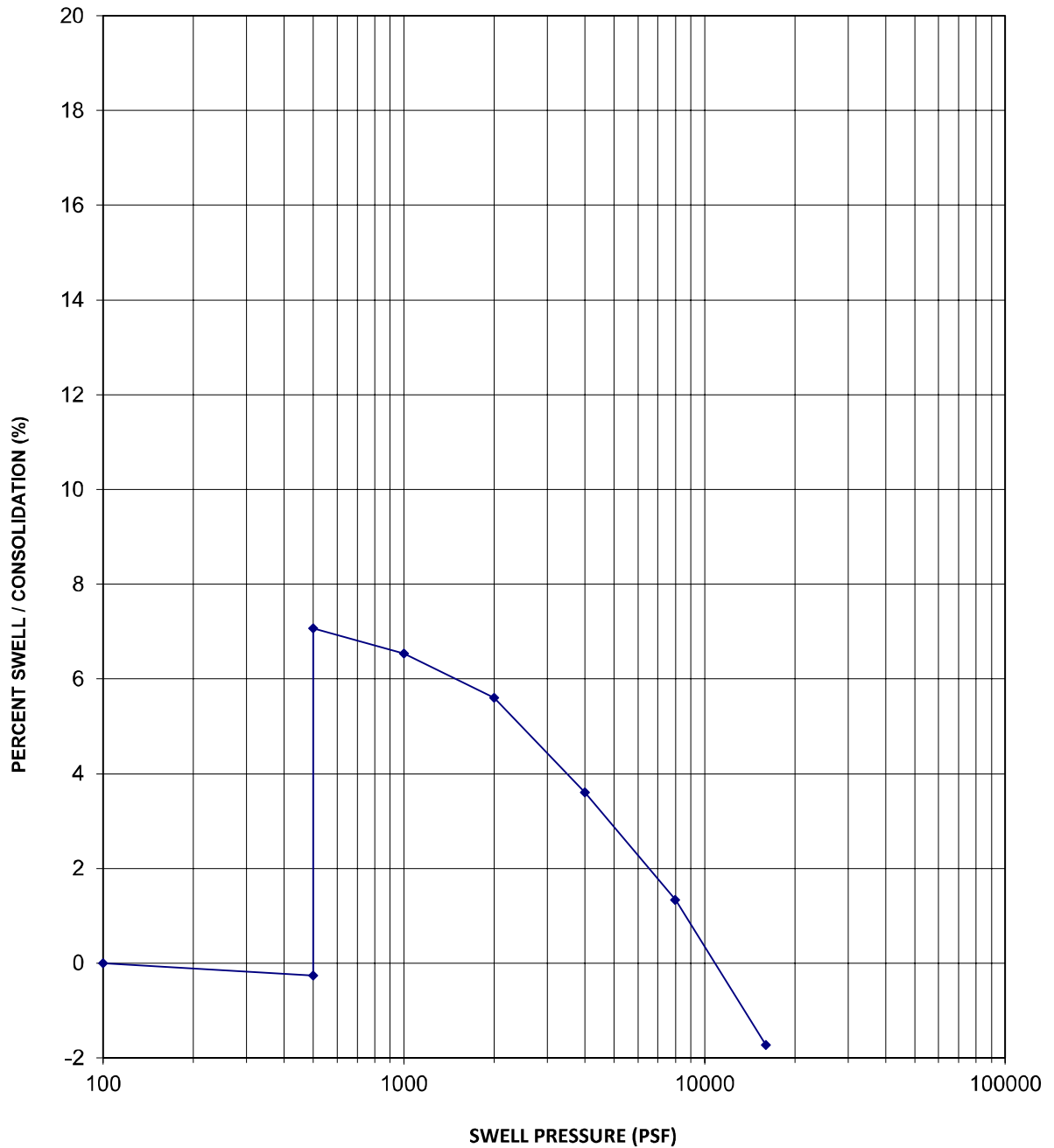
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SWELL - CONSOLIDATION TEST

FIGURE NO. A22

SWELL-CONSOLIDATION TEST



Sample Location	B16
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	122 pcf
In-Situ Moisture Content	14.2 %
Volume Change	7.3 %
Swell Pressure	11,500 psf



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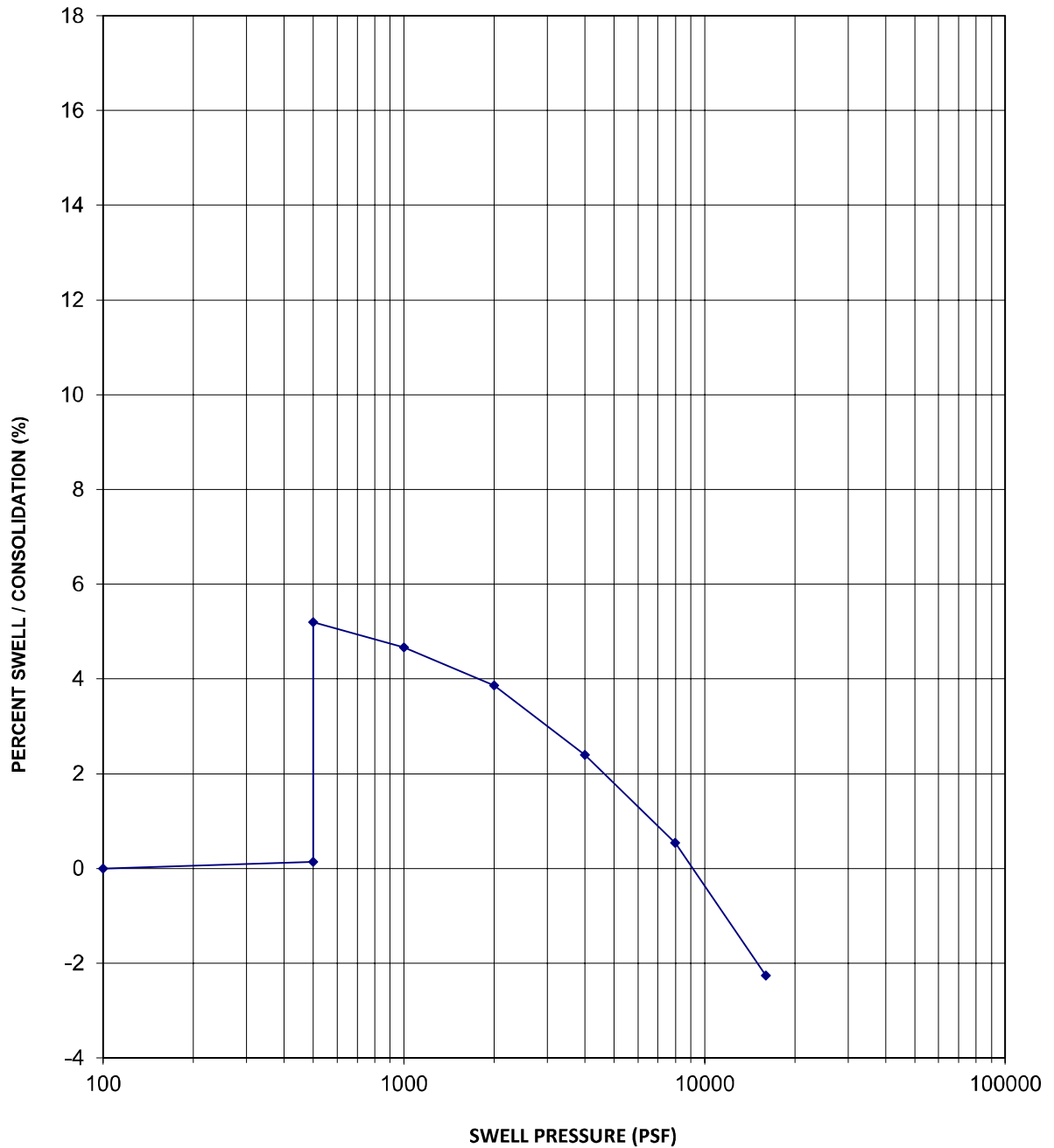
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A23

SWELL-CONSOLIDATION TEST



Sample Location	B27
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	115 pcf
In-Situ Moisture Content	19.0 %
Volume Change	5.1 %
Swell Pressure	8,800 psf



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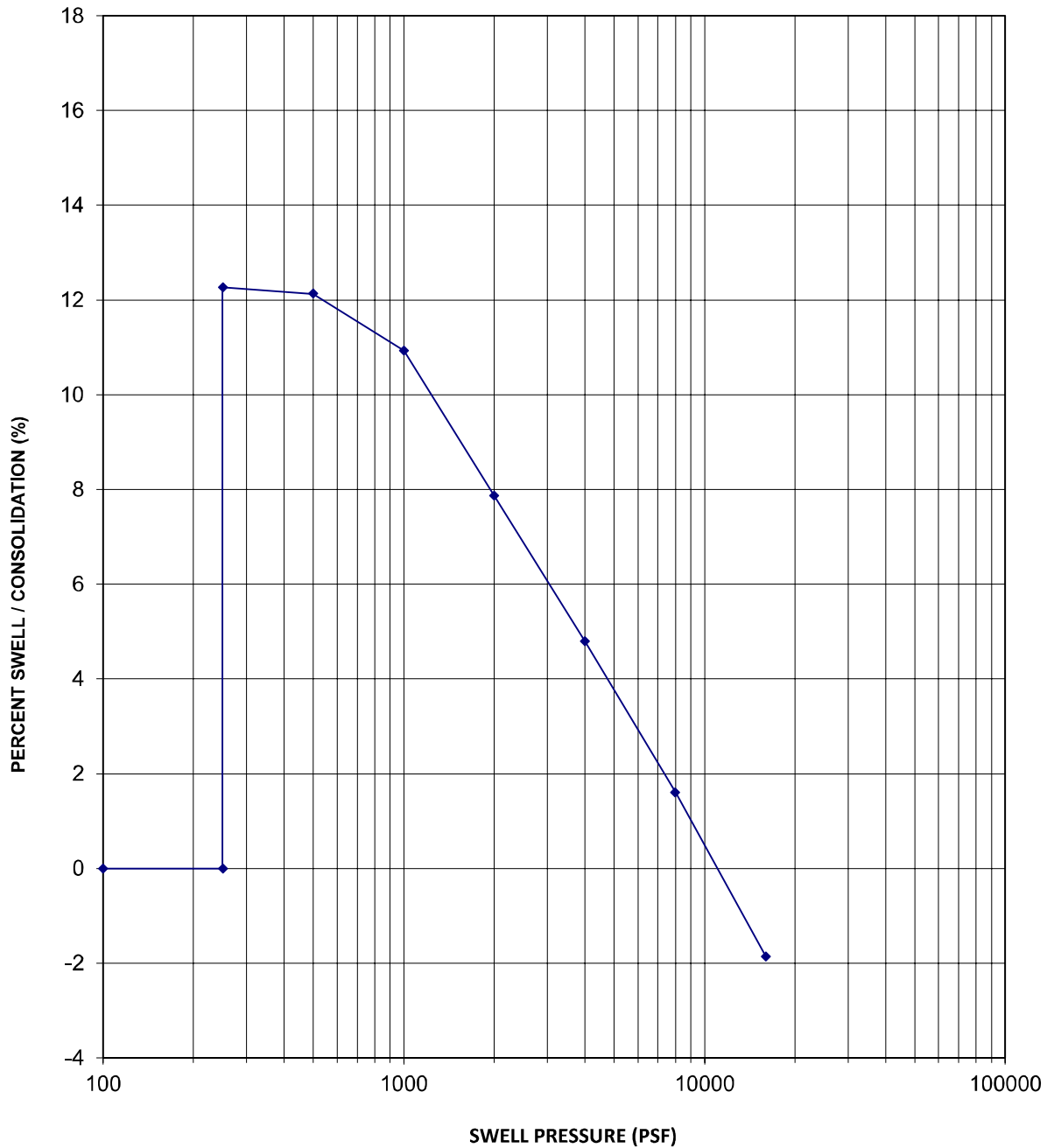
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A24

SWELL-CONSOLIDATION TEST



Sample Location	B18
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	113 pcf
In-Situ Moisture Content	15.3 %
Volume Change	12.3 %
Swell Pressure	11,000 psf



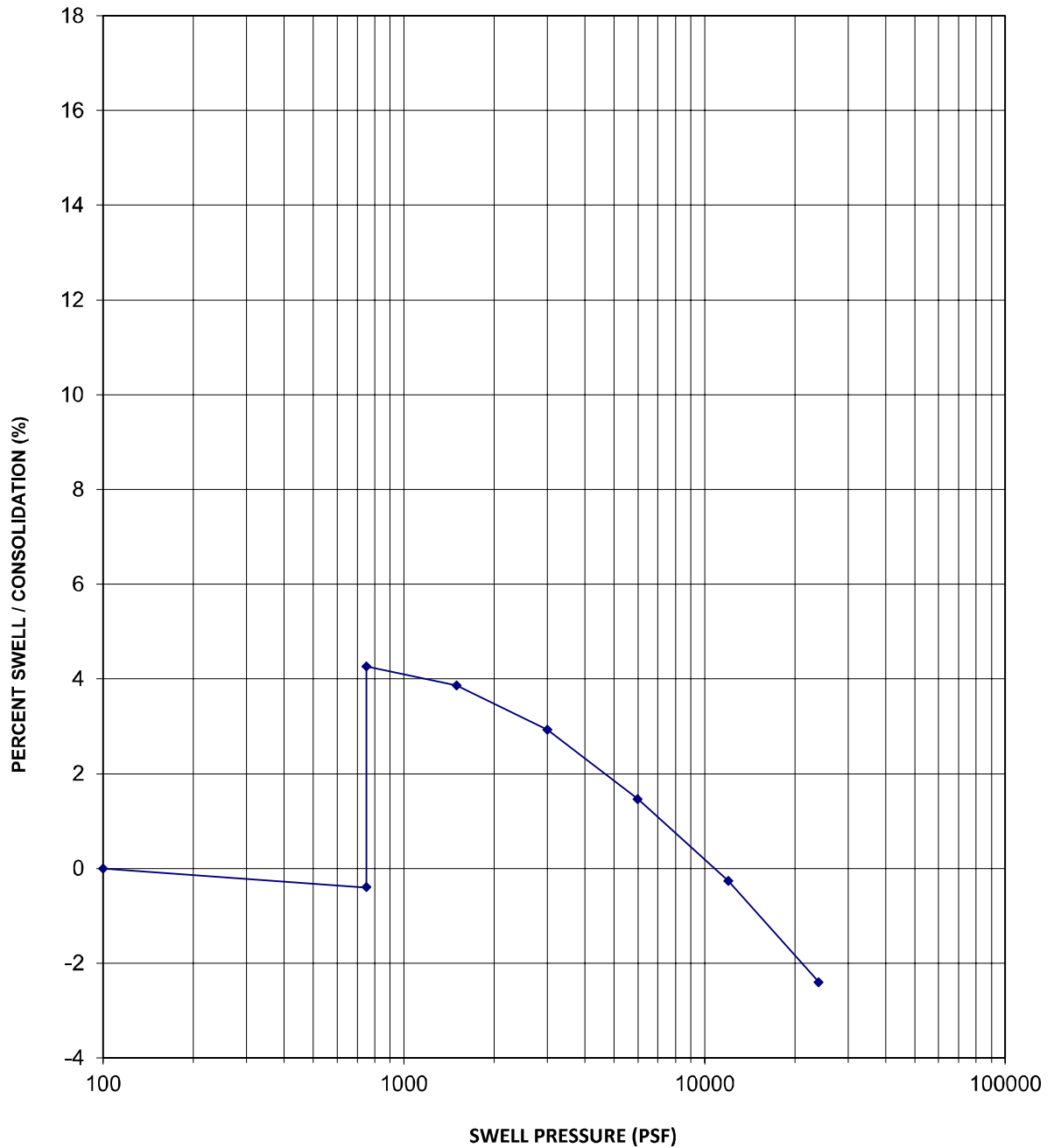
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SWELL - CONSOLIDATION TEST

FIGURE NO. A25

SWELL-CONSOLIDATION TEST



Sample Location	B18
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	115 pcf
In-Situ Moisture Content	18.9 %
Volume Change	4.7 %
Swell Pressure	12,500 psf



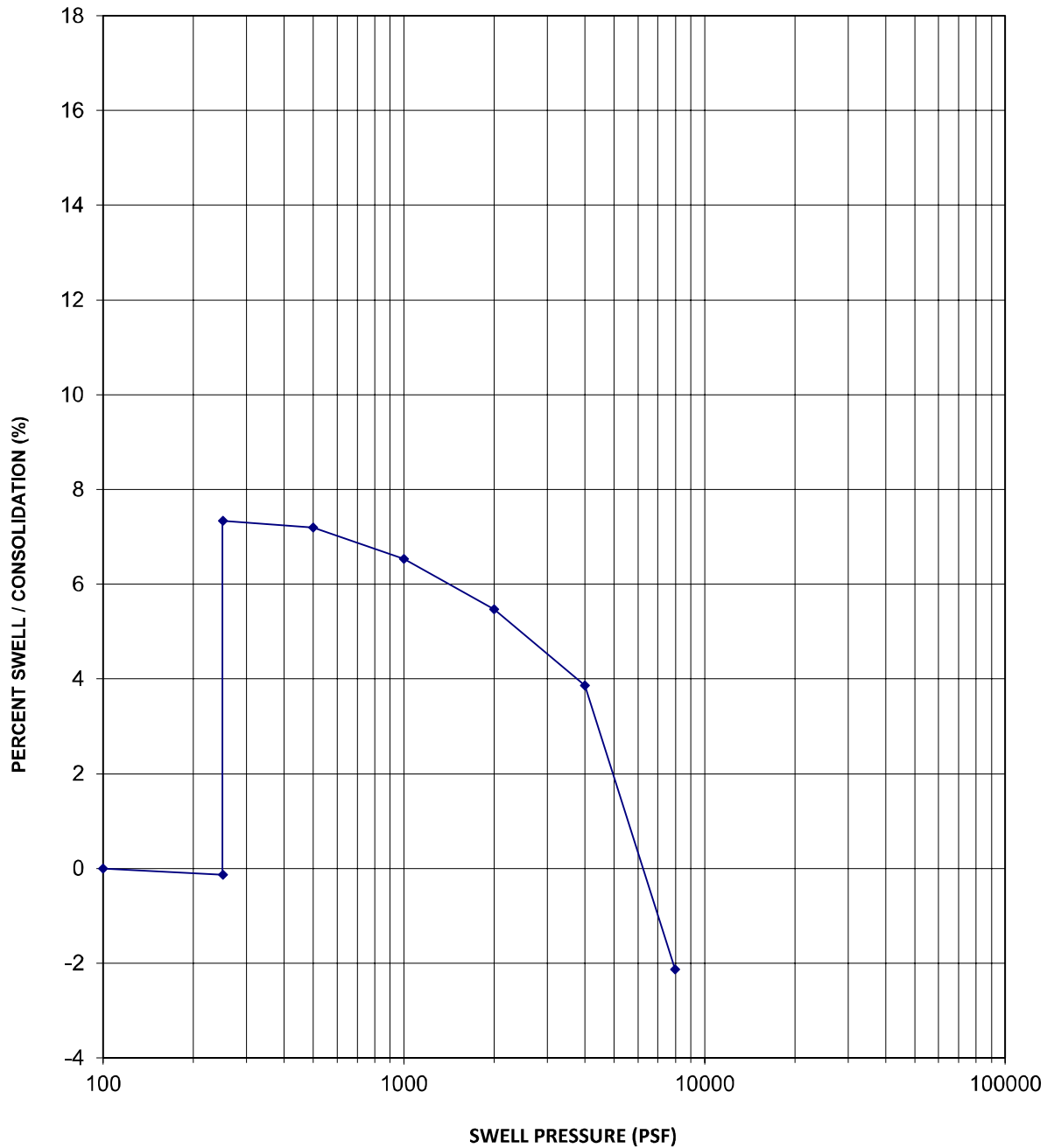
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SWELL - CONSOLIDATION TEST

FIGURE NO. A26

SWELL-CONSOLIDATION TEST



Sample Location	B19
Sample Depth	5 feet
Sample Description	Clay
USCS Classification	CL

Dry Density	114 pcf
In-Situ Moisture Content	18.2 %
Volume Change	7.5 %
Swell Pressure	6,300 psf



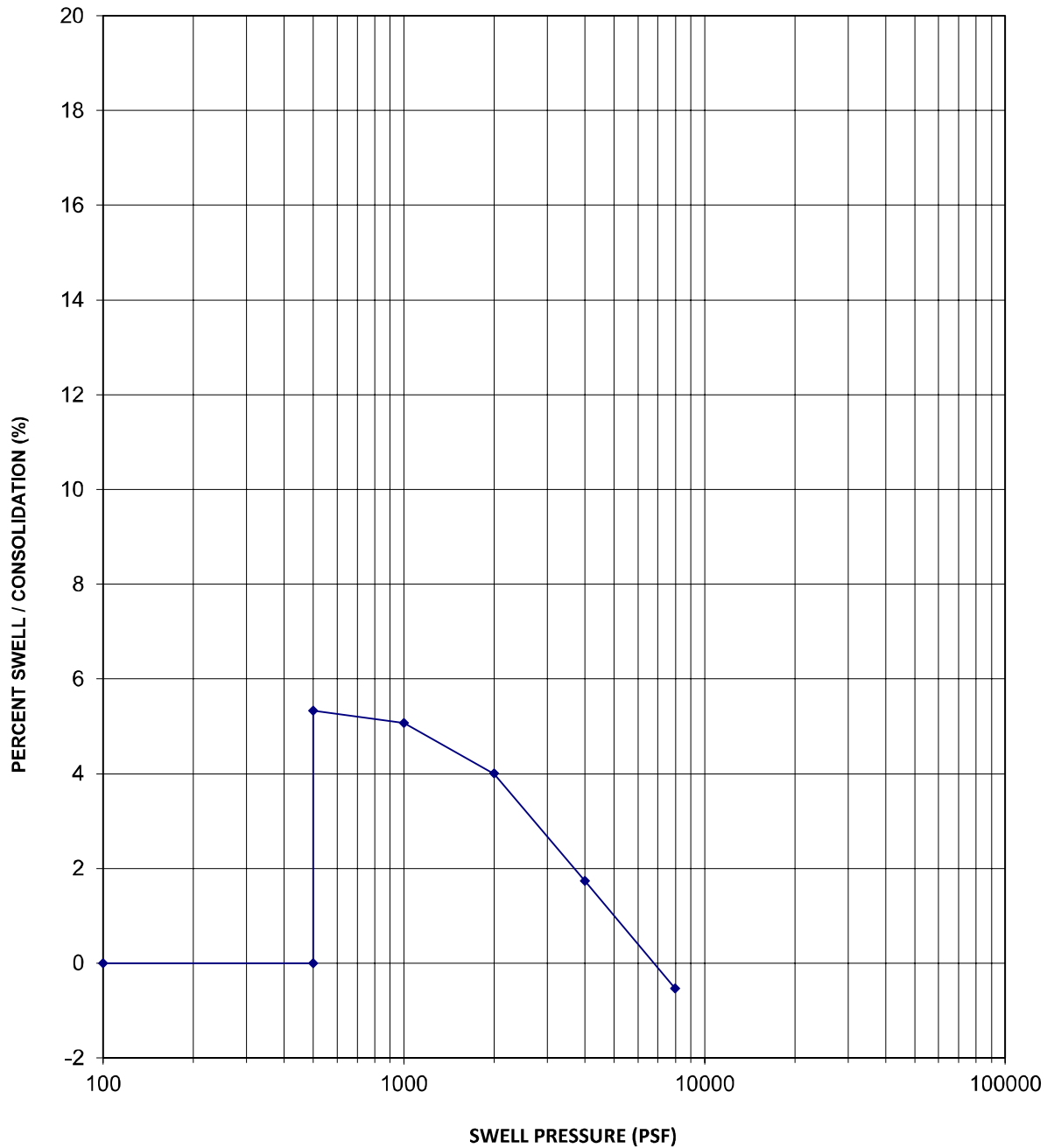
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JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A27

SWELL-CONSOLIDATION TEST



Sample Location	B19
Sample Depth	7.5 feet
Sample Description	Clay
USCS Classification	CL

Dry Density	106 pcf
In-Situ Moisture Content	20.4 %
Volume Change	5.3 %
Swell Pressure	6,800 psf



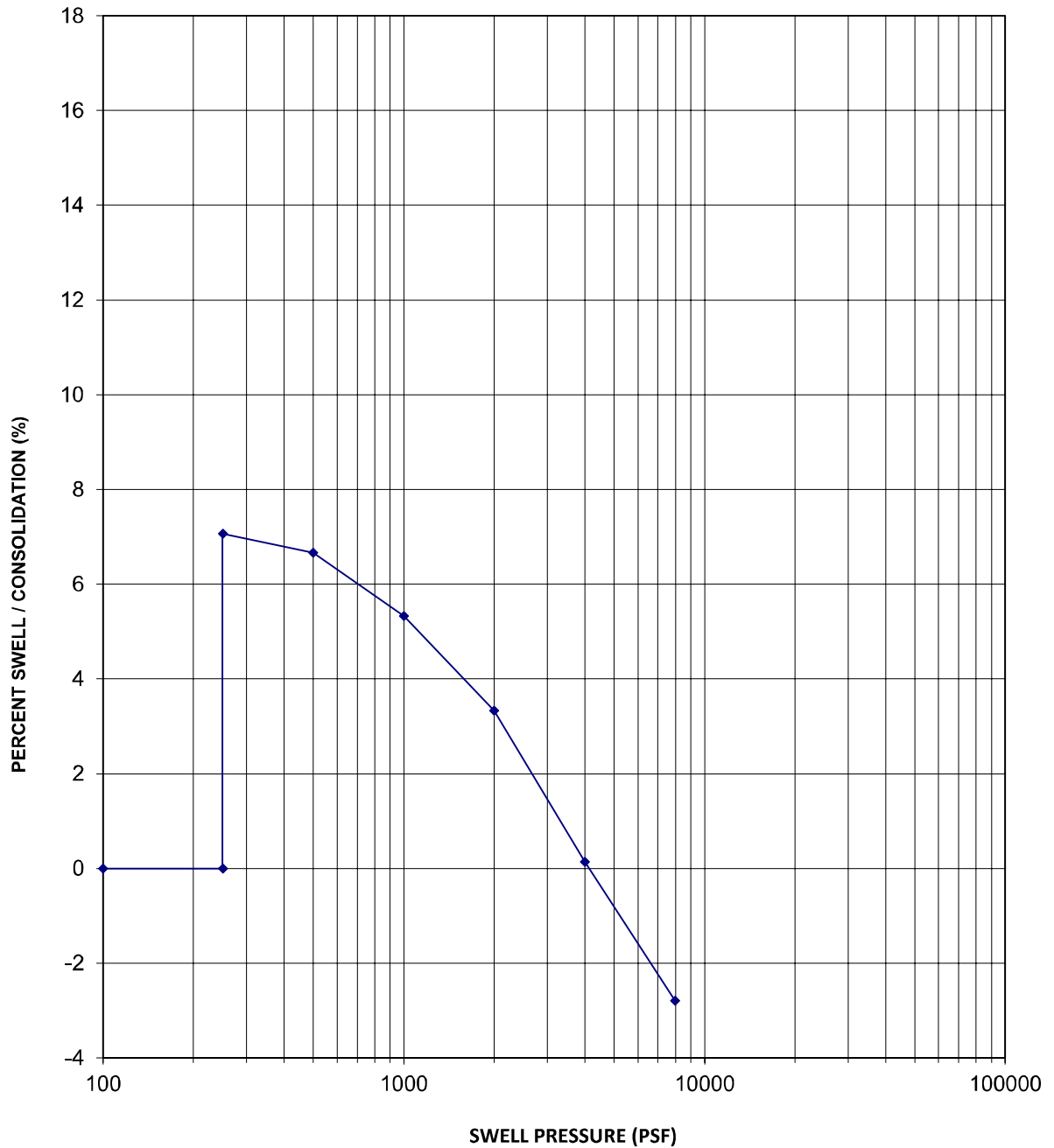
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SWELL - CONSOLIDATION TEST

FIGURE NO. A28

SWELL-CONSOLIDATION TEST



Sample Location	B20
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	116 pcf
In-Situ Moisture Content	11.6 %
Volume Change	7.1 %
Swell Pressure	4,100 psf



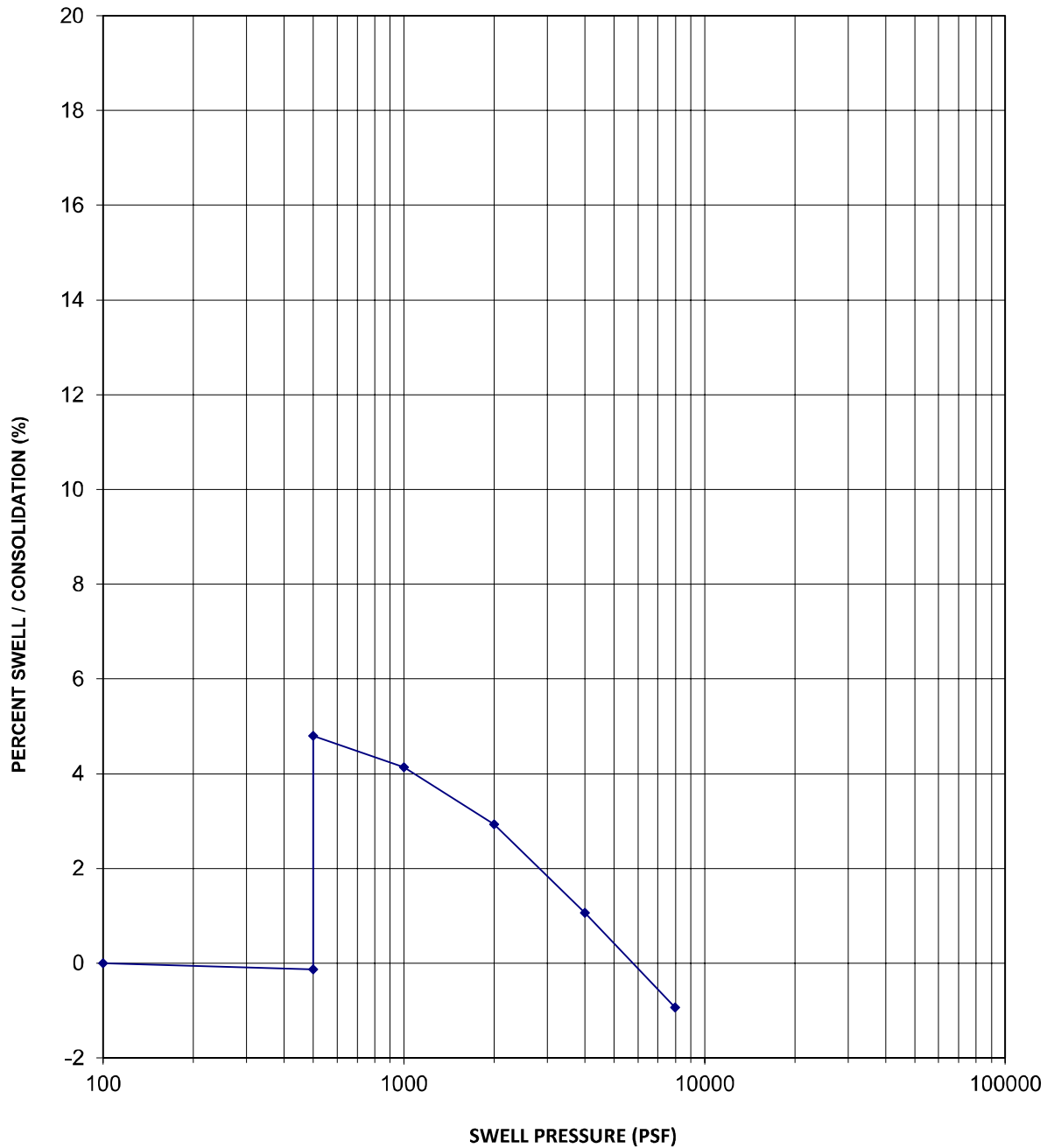
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SWELL - CONSOLIDATION TEST

FIGURE NO. A29

SWELL-CONSOLIDATION TEST



Sample Location	B20
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	110 pcf
In-Situ Moisture Content	15.4 %
Volume Change	4.9 %
Swell Pressure	6,100 psf



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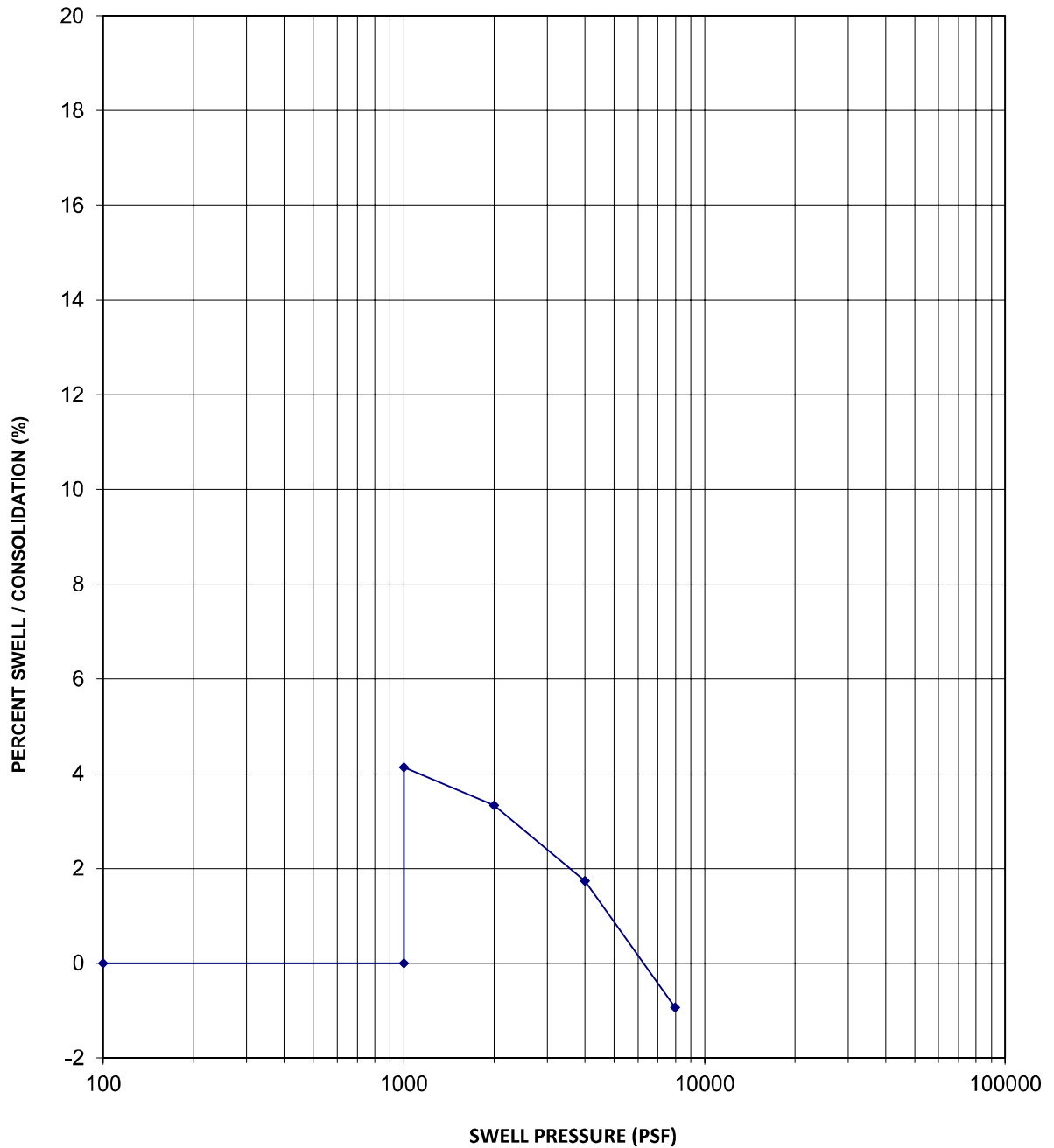
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A30

SWELL-CONSOLIDATION TEST



Sample Location	B20
Sample Depth	15 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	110 pcf
In-Situ Moisture Content	13.6 %
Volume Change	4.1 %
Swell Pressure	6,300 psf



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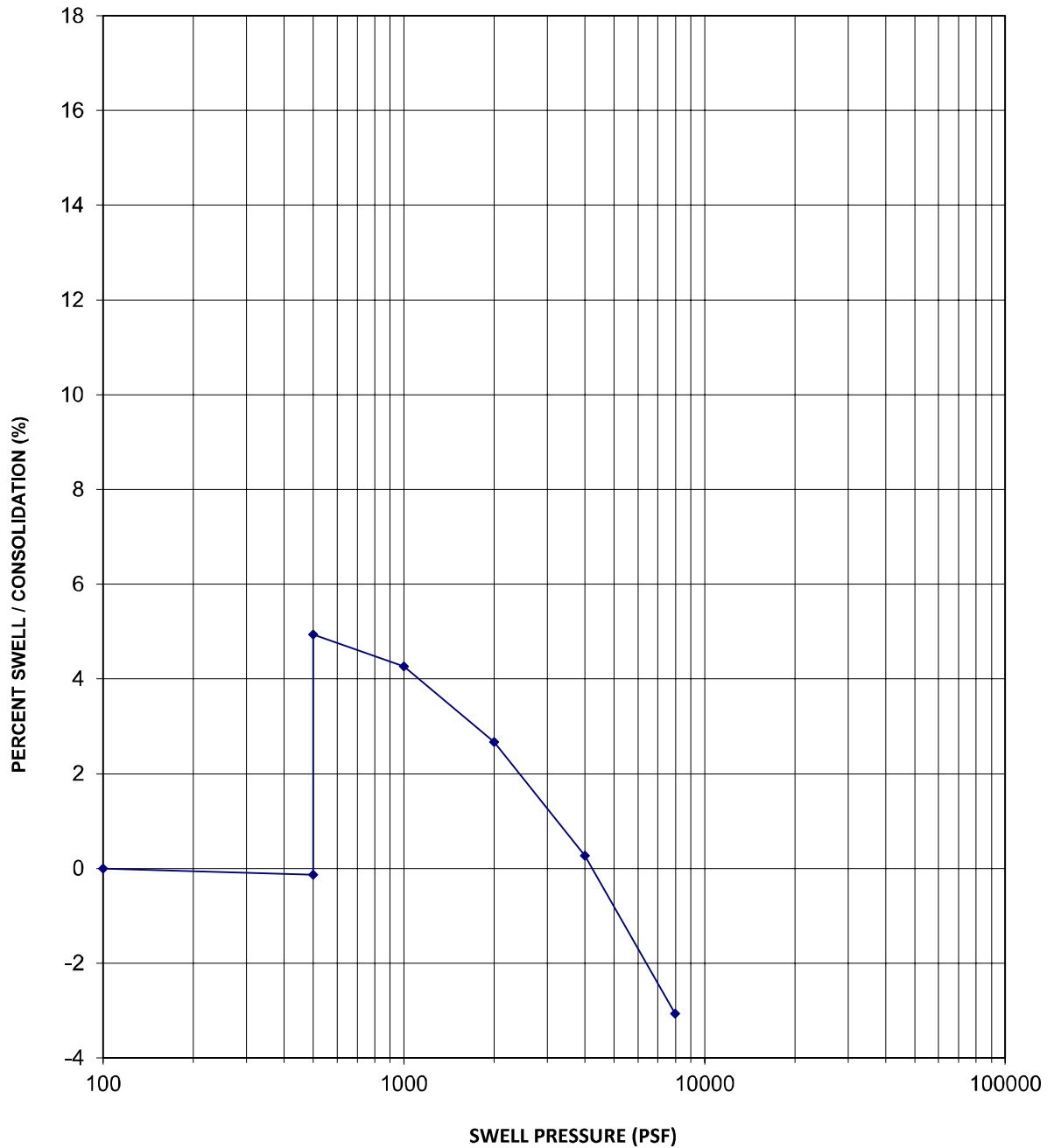
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SWELL - CONSOLIDATION TEST

FIGURE NO.

A31

SWELL-CONSOLIDATION TEST



Sample Location	B22
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	109 pcf
In-Situ Moisture Content	13.5 %
Volume Change	5.1 %
Swell Pressure	4,300 psf



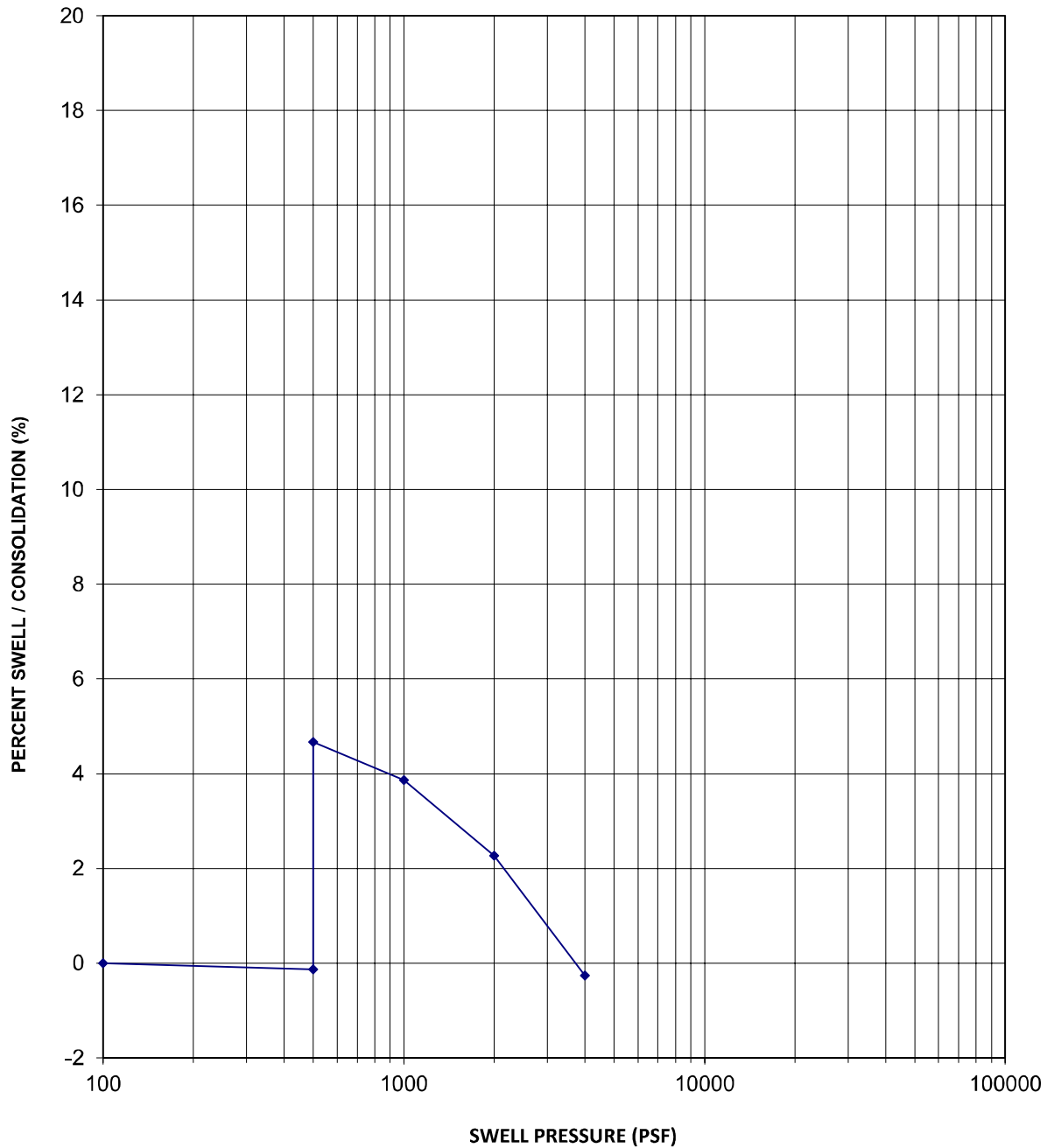
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A32

SWELL-CONSOLIDATION TEST



Sample Location	B23
Sample Depth	5 feet
Sample Description	Apparent Fill
USCS Classification	

Dry Density	110 pcf
In-Situ Moisture Content	14.6 %
Volume Change	4.8 %
Swell Pressure	3,900 psf



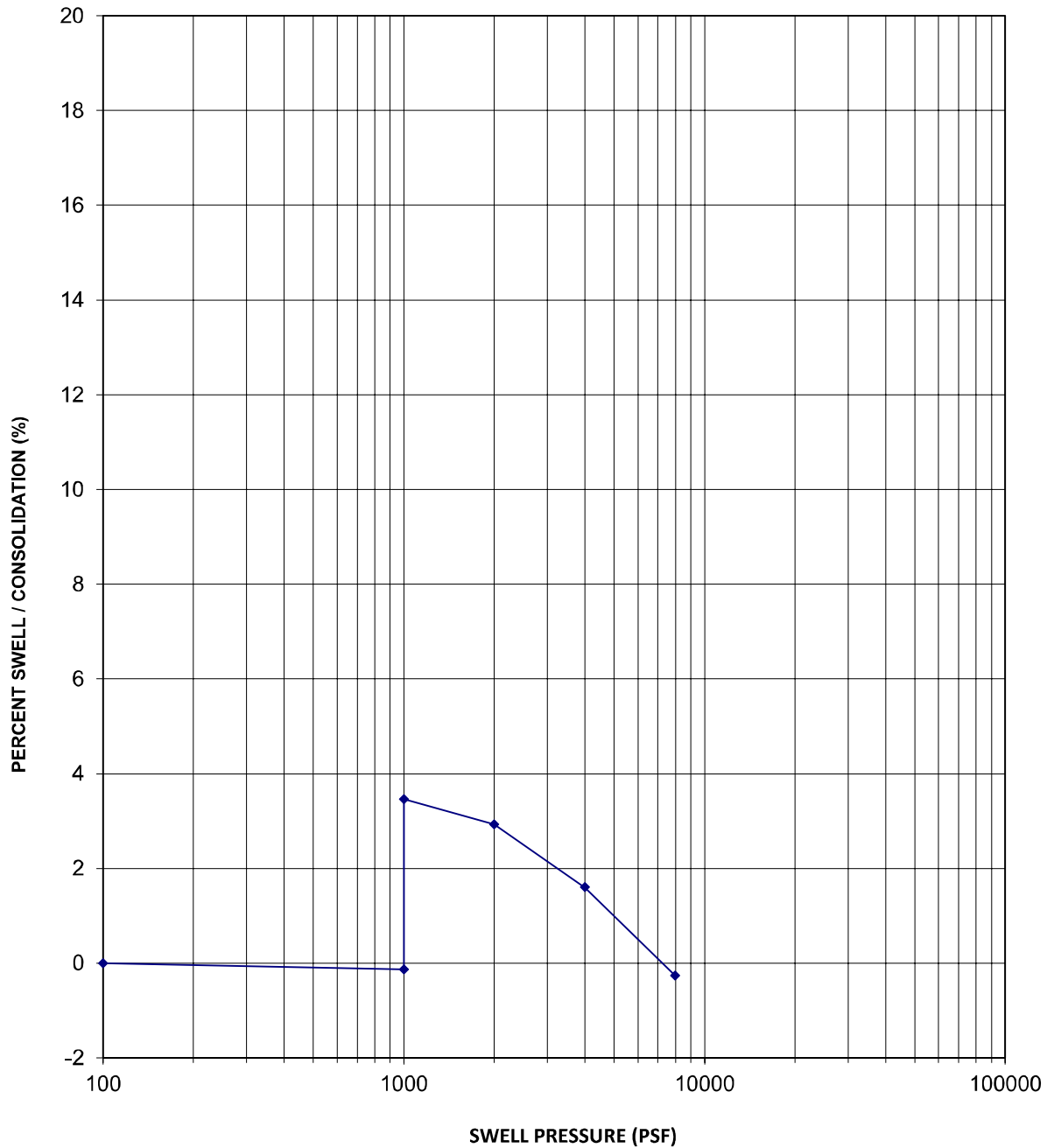
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A33

SWELL-CONSOLIDATION TEST



Sample Location	B23
Sample Depth	10 feet
Sample Description	Clay
USCS Classification	CL

Dry Density	115 pcf
In-Situ Moisture Content	15.4 %
Volume Change	3.6 %
Swell Pressure	7,600 psf



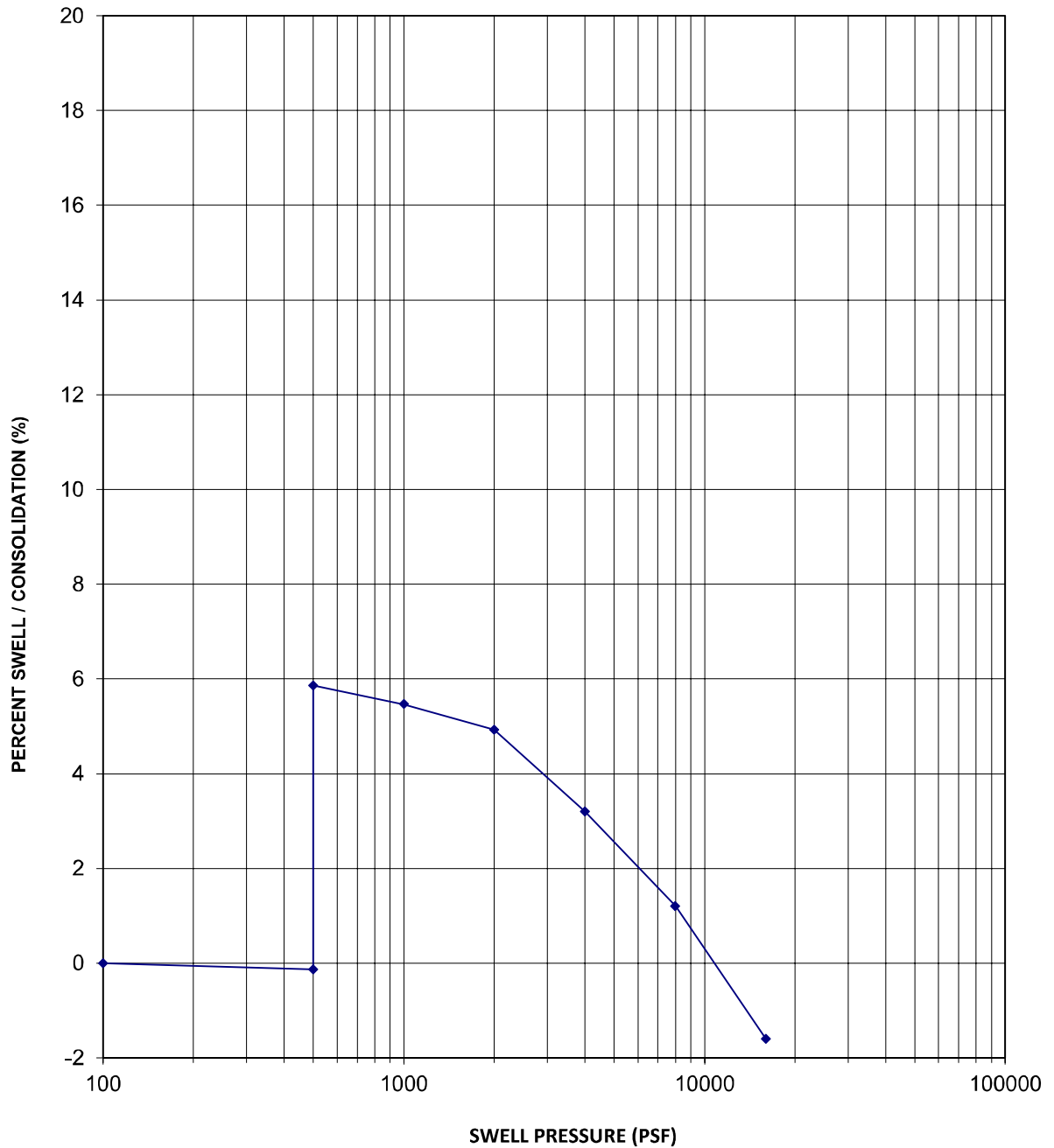
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A34

SWELL-CONSOLIDATION TEST



Sample Location	B24
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	117 pcf
In-Situ Moisture Content	15.8 %
Volume Change	6.0 %
Swell Pressure	11,100 psf



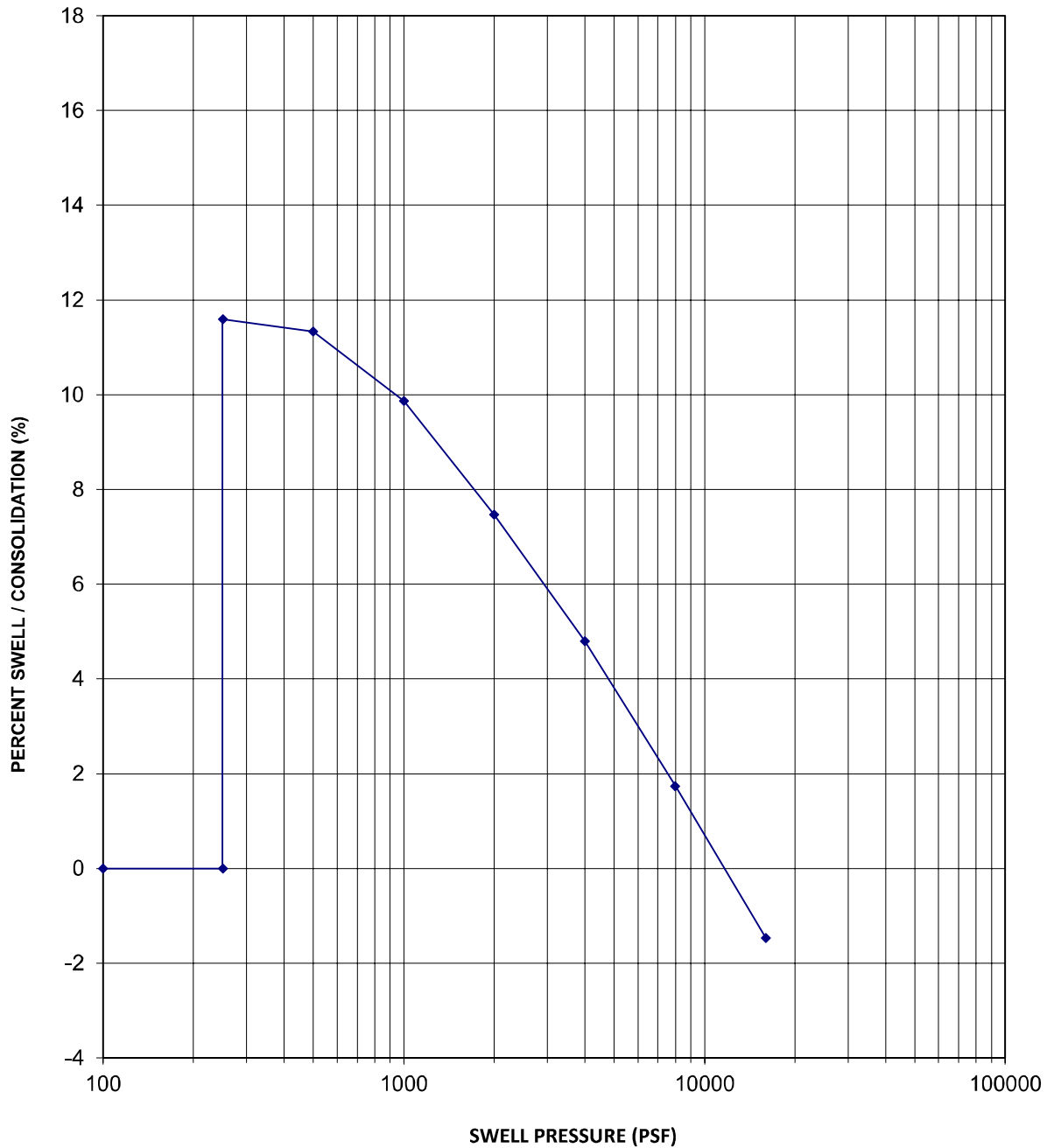
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A35

SWELL-CONSOLIDATION TEST



Sample Location	B25
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	115 pcf
In-Situ Moisture Content	14.3 %
Volume Change	11.6 %
Swell Pressure	11,600 psf



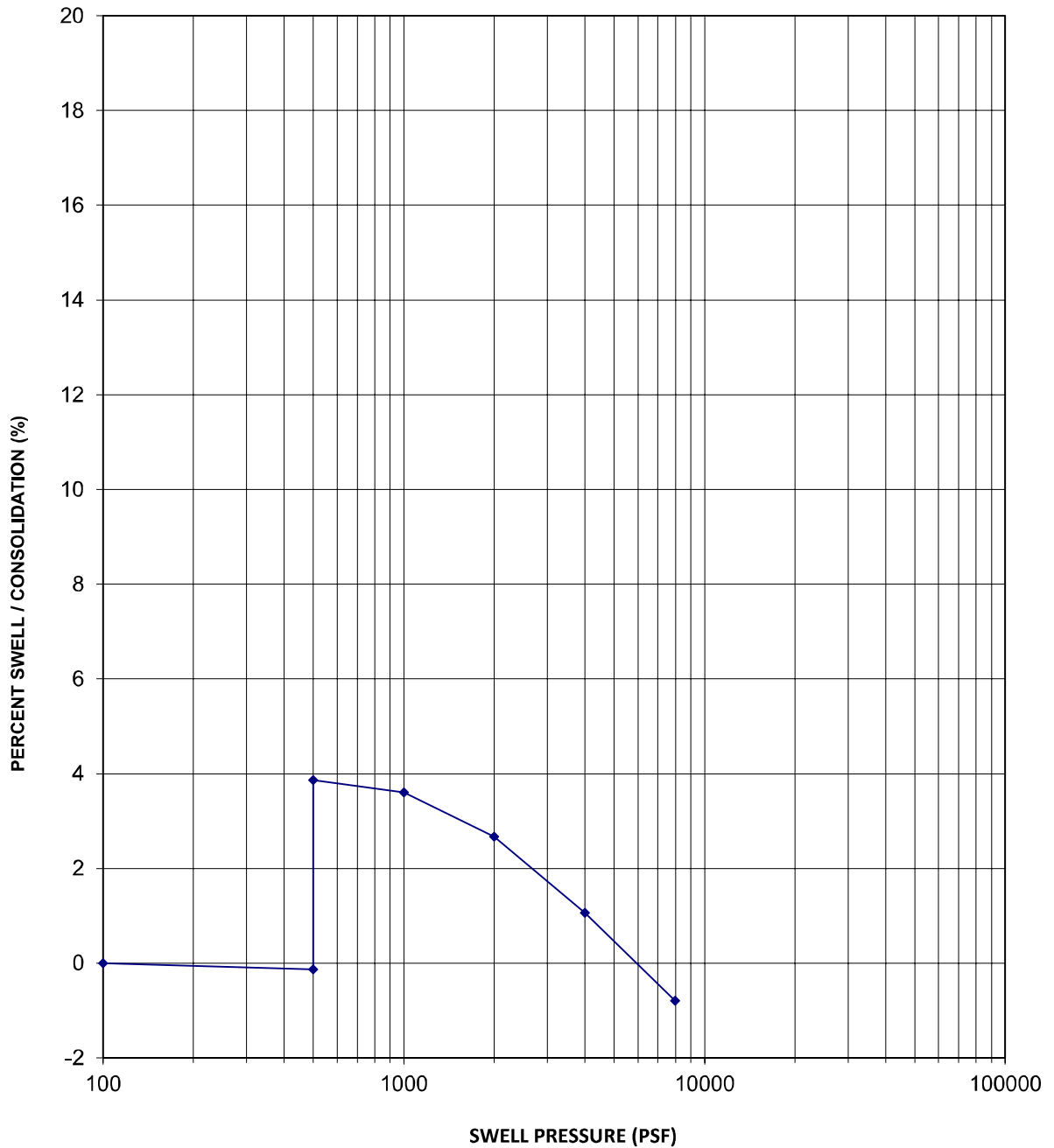
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A36

SWELL-CONSOLIDATION TEST



Sample Location	B26
Sample Depth	5 feet
Sample Description	Apparent Fill
USCS Classification	

Dry Density	105 pcf
In-Situ Moisture Content	24.6 %
Volume Change	4.0 %
Swell Pressure	6,200 psf



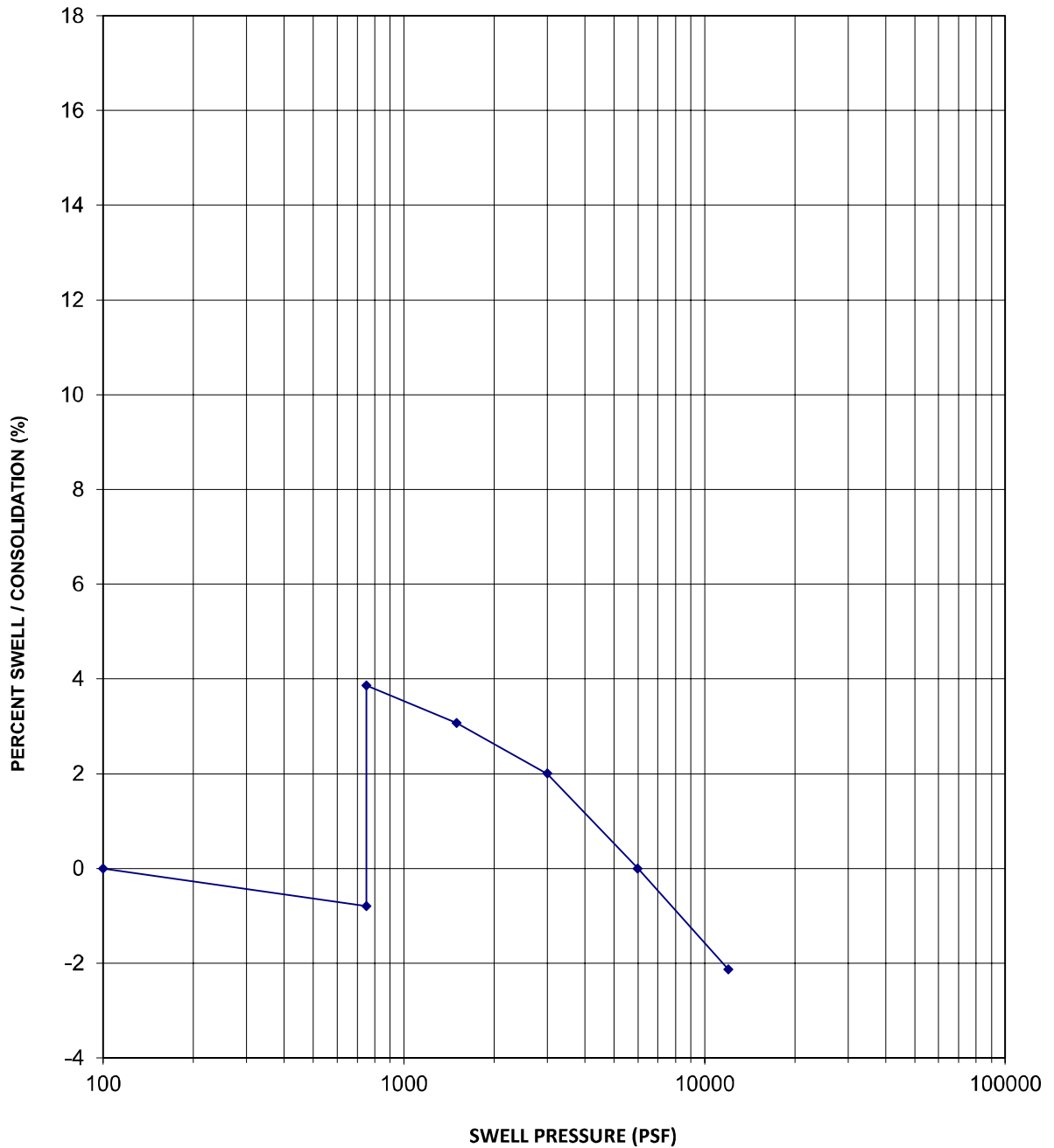
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A37

SWELL-CONSOLIDATION TEST



Sample Location	B26
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	106 pcf
In-Situ Moisture Content	21.5 %
Volume Change	4.7 %
Swell Pressure	7,800 psf



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JOB NO.

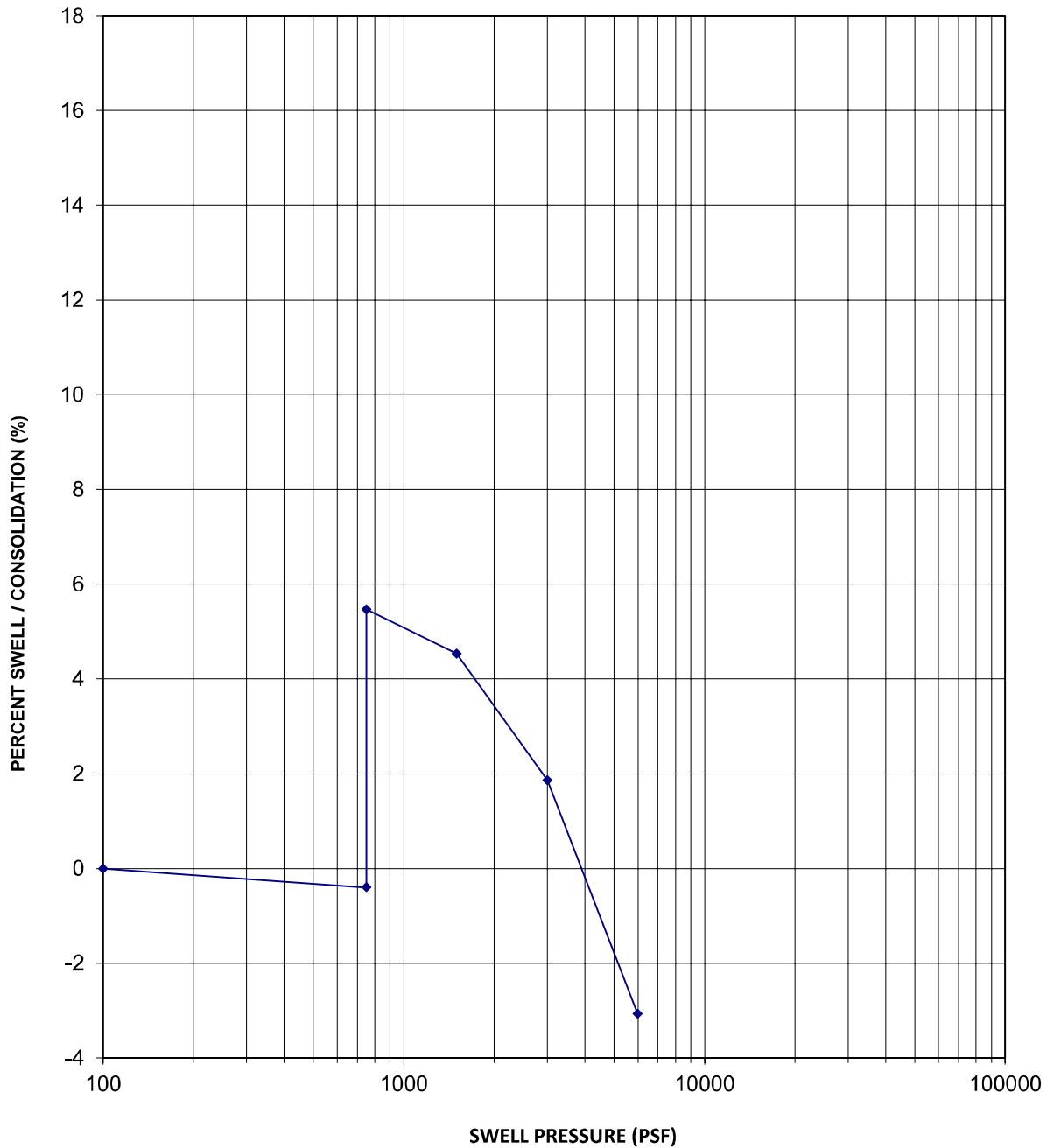
5322879

SWELL - CONSOLIDATION TEST

FIGURE NO.

A38

SWELL-CONSOLIDATION TEST



Sample Location	B27
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	121 pcf
In-Situ Moisture Content	12.5 %
Volume Change	5.9 %
Swell Pressure	4,100 psf



TTRes Venetucci Multifamily

SWELL - CONSOLIDATION TEST

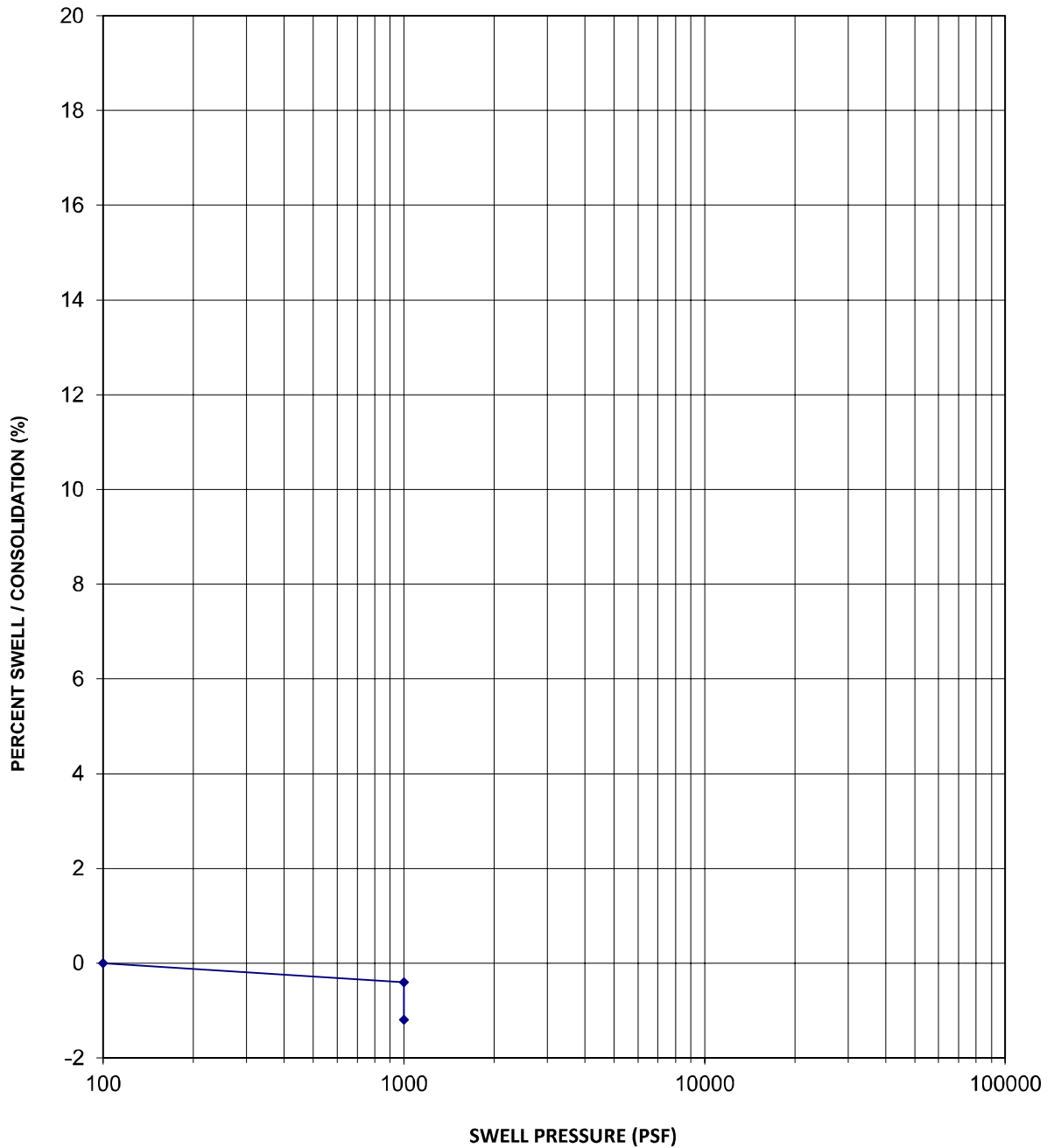
JOB NO.

5322879

FIGURE NO.

A39

SWELL-CONSOLIDATION TEST



Sample Location	B27
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	114 pcf
In-Situ Moisture Content	11.9 %
Volume Change	-0.8 %
Swell Pressure	psf



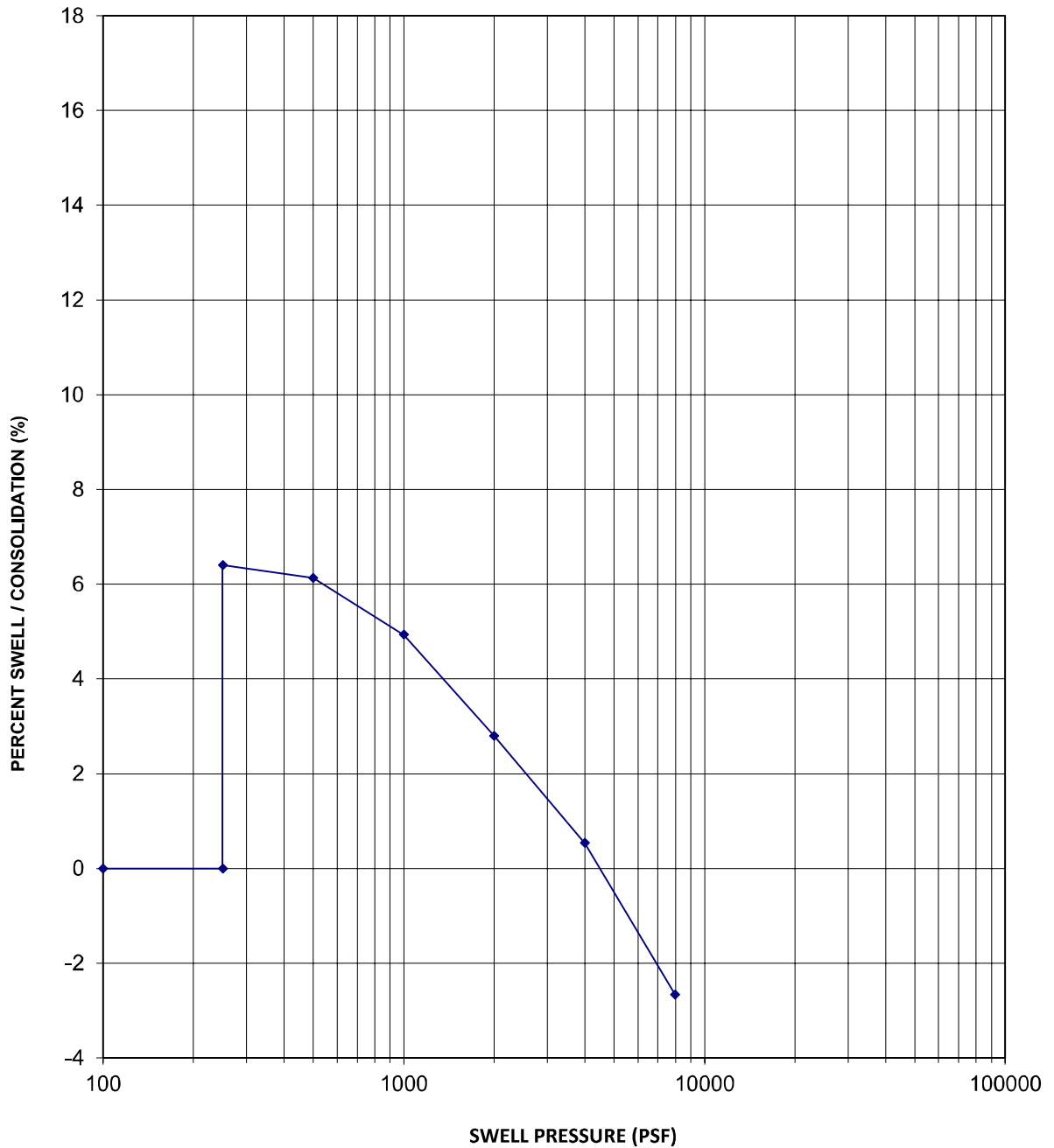
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A40

SWELL-CONSOLIDATION TEST



Sample Location	B28
Sample Depth	2.5 feet
Sample Description	Clay
USCS Classification	CH

Dry Density	104 pcf
In-Situ Moisture Content	15.1 %
Volume Change	6.4 %
Swell Pressure	4,500 psf



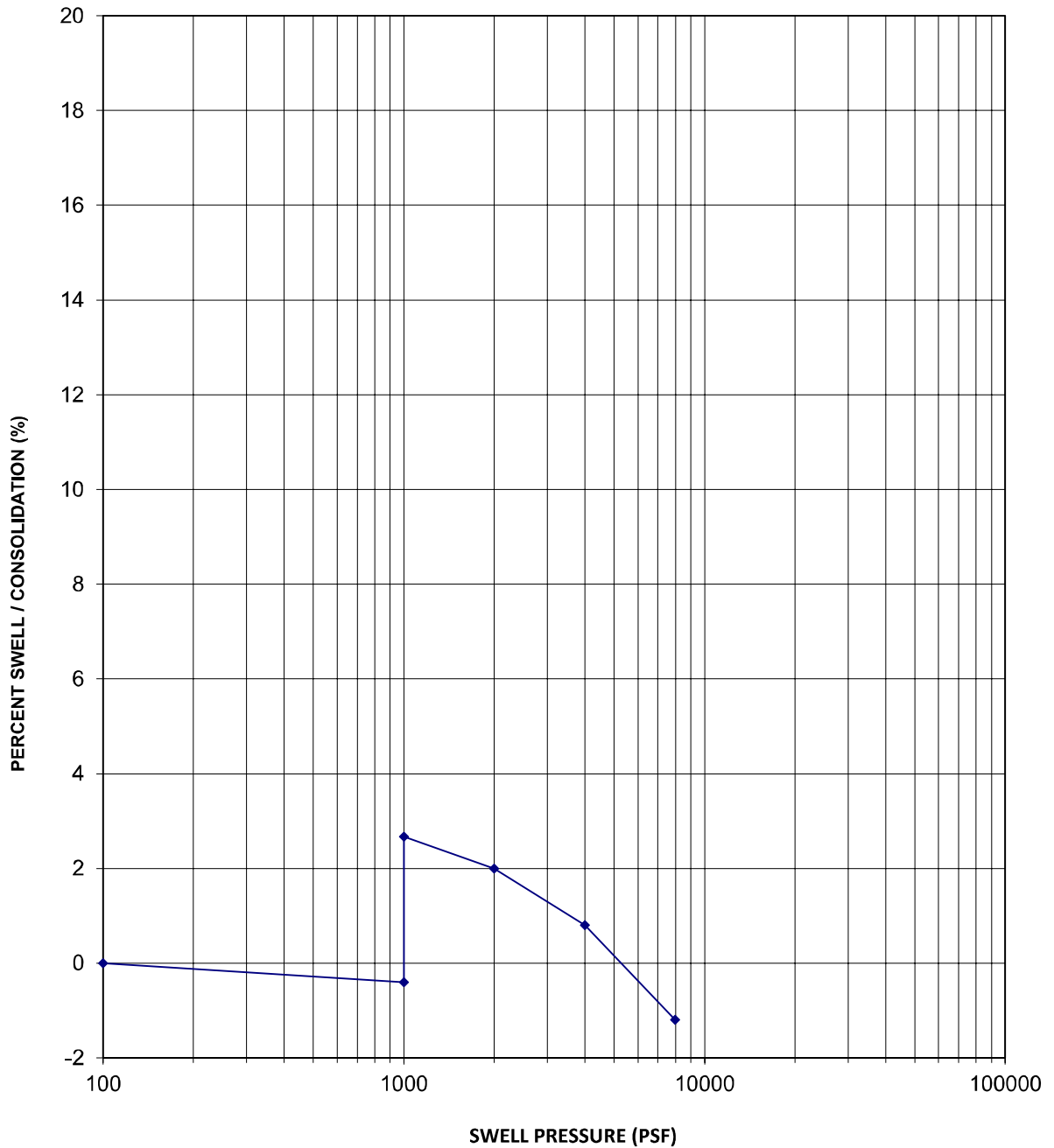
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A41

SWELL-CONSOLIDATION TEST



Sample Location	B29
Sample Depth	10 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	108 pcf
In-Situ Moisture Content	19.7 %
Volume Change	3.1 %
Swell Pressure	6,100 psf



TTRes Venetucci Multifamily

JOB NO.

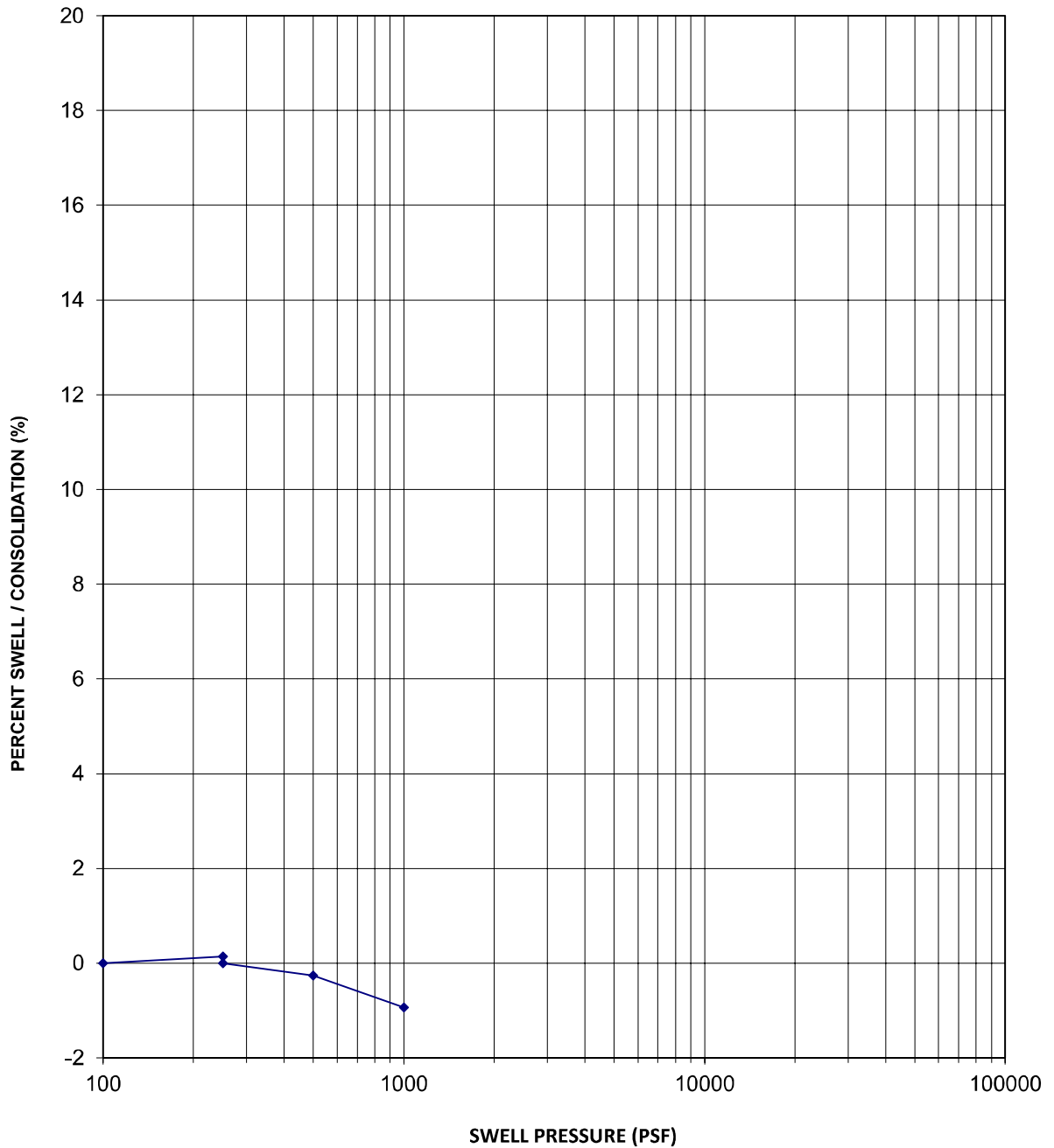
5322879

SWELL - CONSOLIDATION TEST

FIGURE NO.

A42

SWELL-CONSOLIDATION TEST



Sample Location	B30
Sample Depth	5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	109 pcf
In-Situ Moisture Content	18.1 %
Volume Change	-0.1 %
Swell Pressure	psf



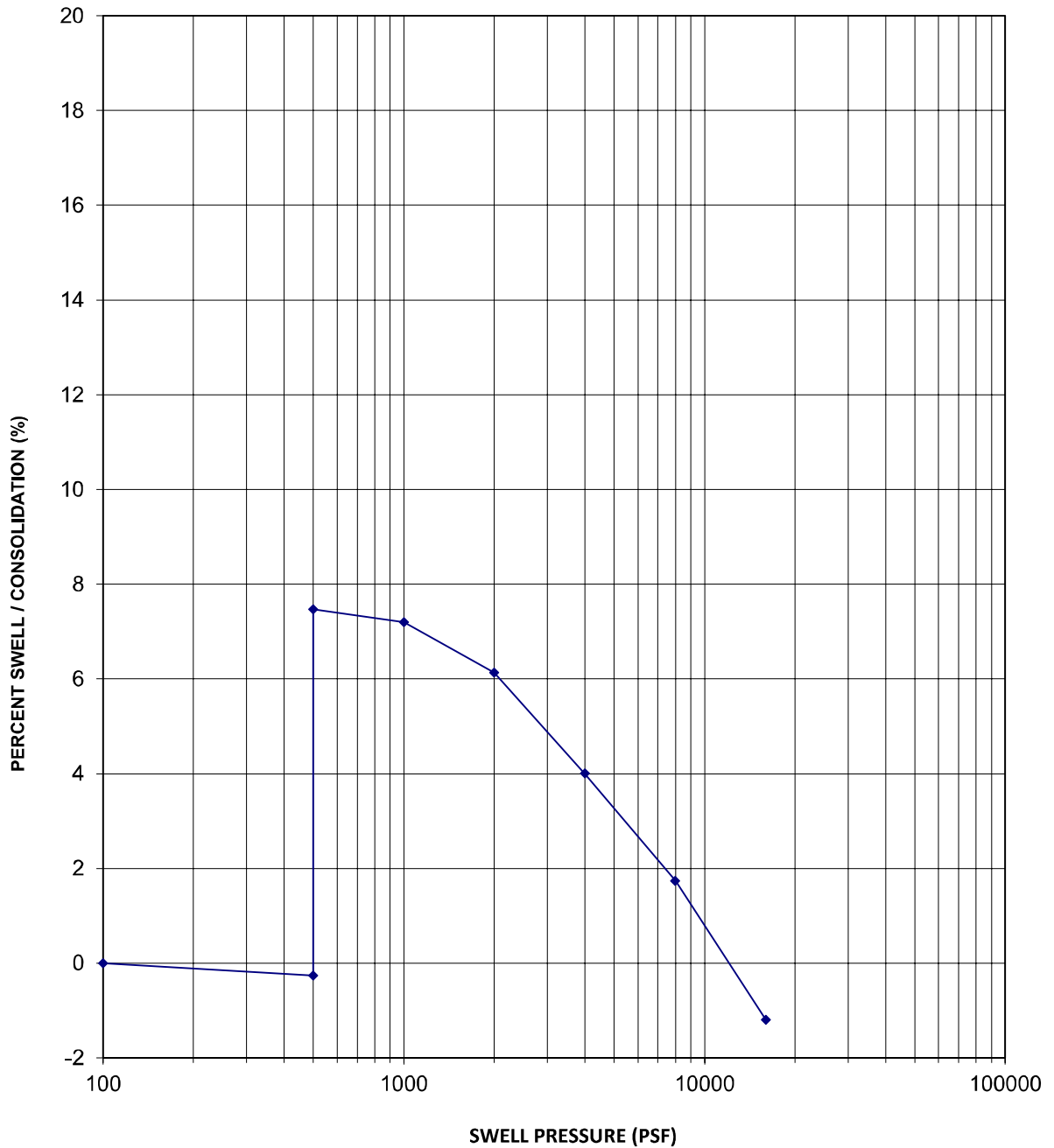
TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. A43

SWELL-CONSOLIDATION TEST



Sample Location	B30
Sample Depth	7.5 feet
Sample Description	Bedrock
USCS Classification	

Dry Density	113 pcf
In-Situ Moisture Content	19.5 %
Volume Change	7.7 %
Swell Pressure	12,800 psf

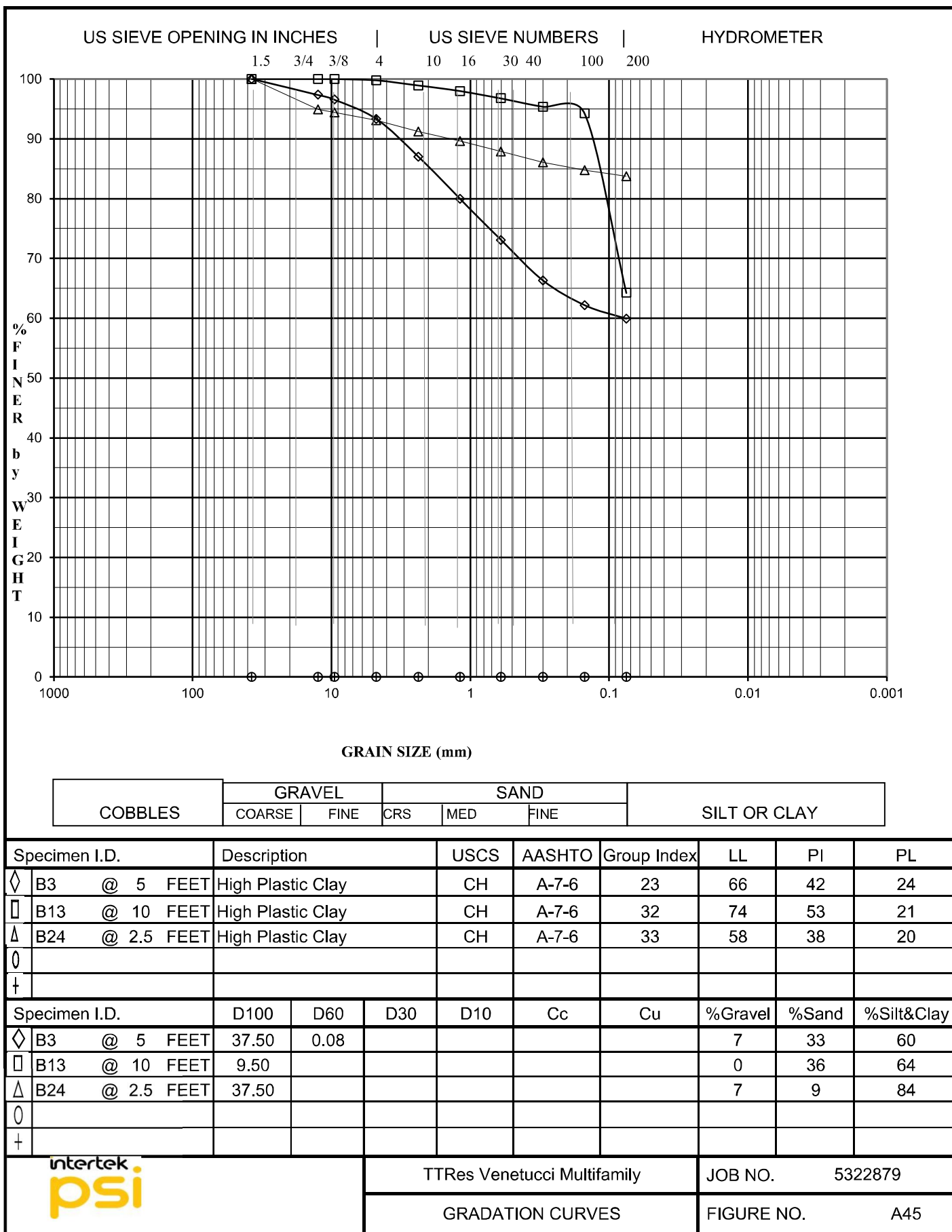


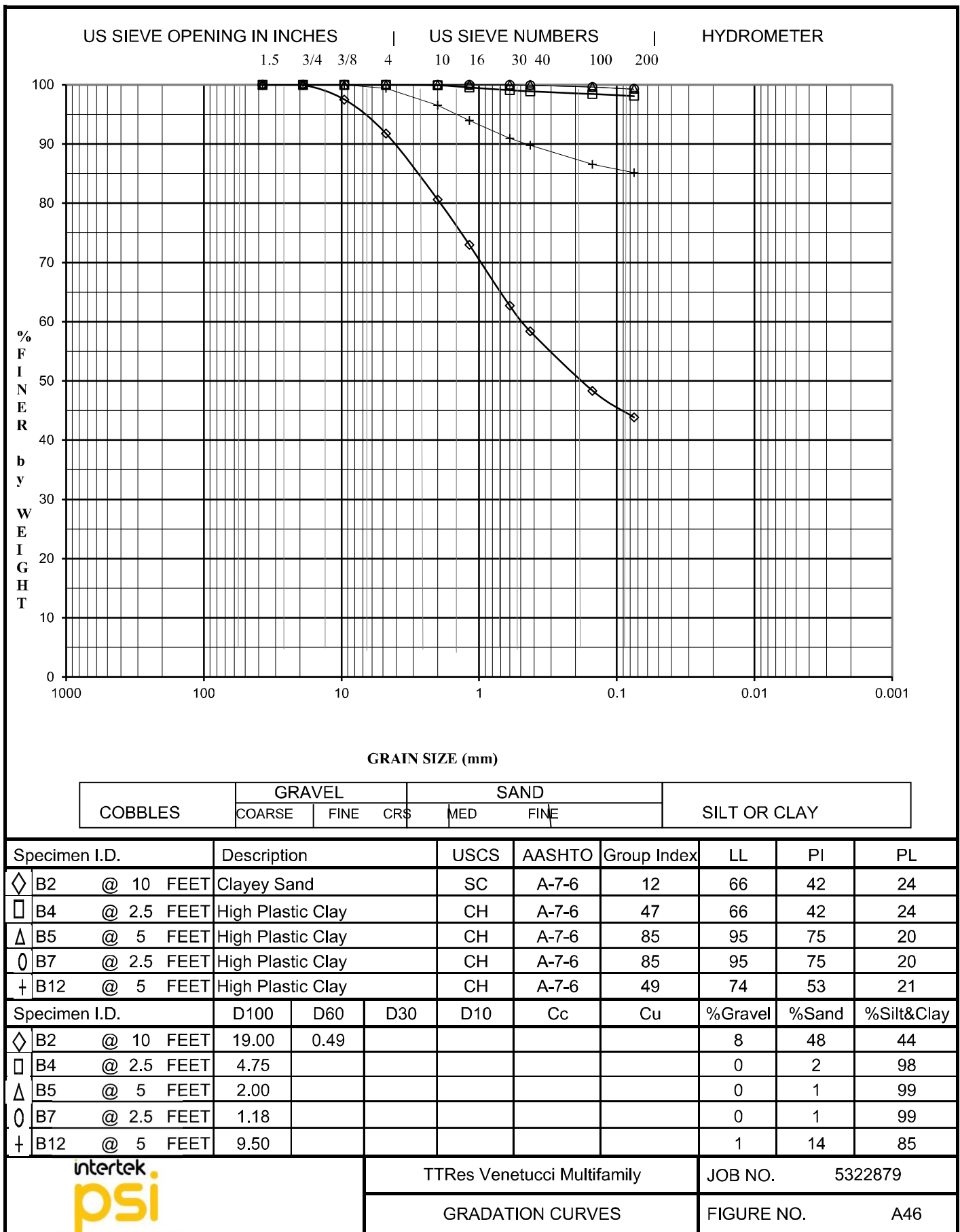
TTRes Venetucci Multifamily

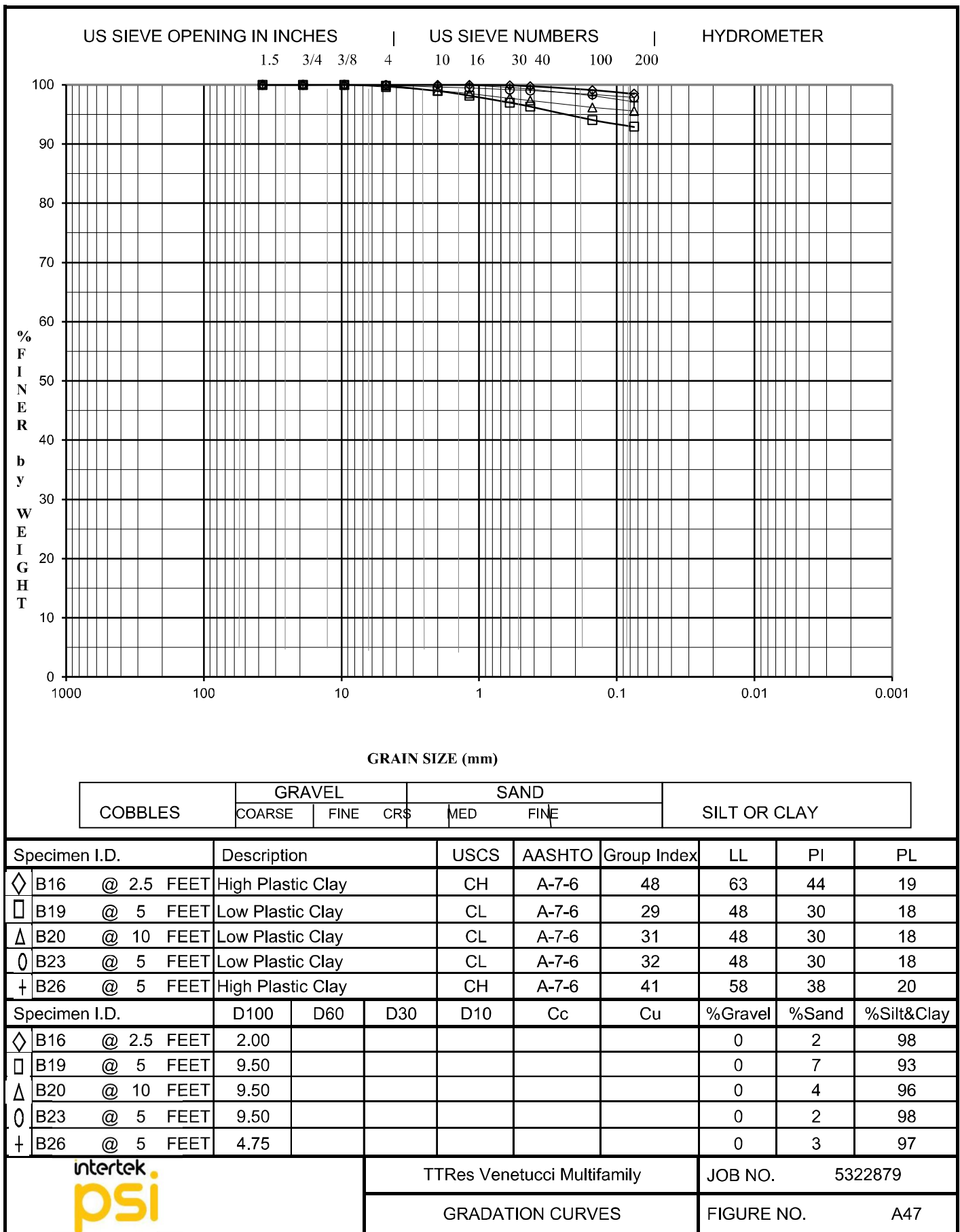
JOB NO. 5322879

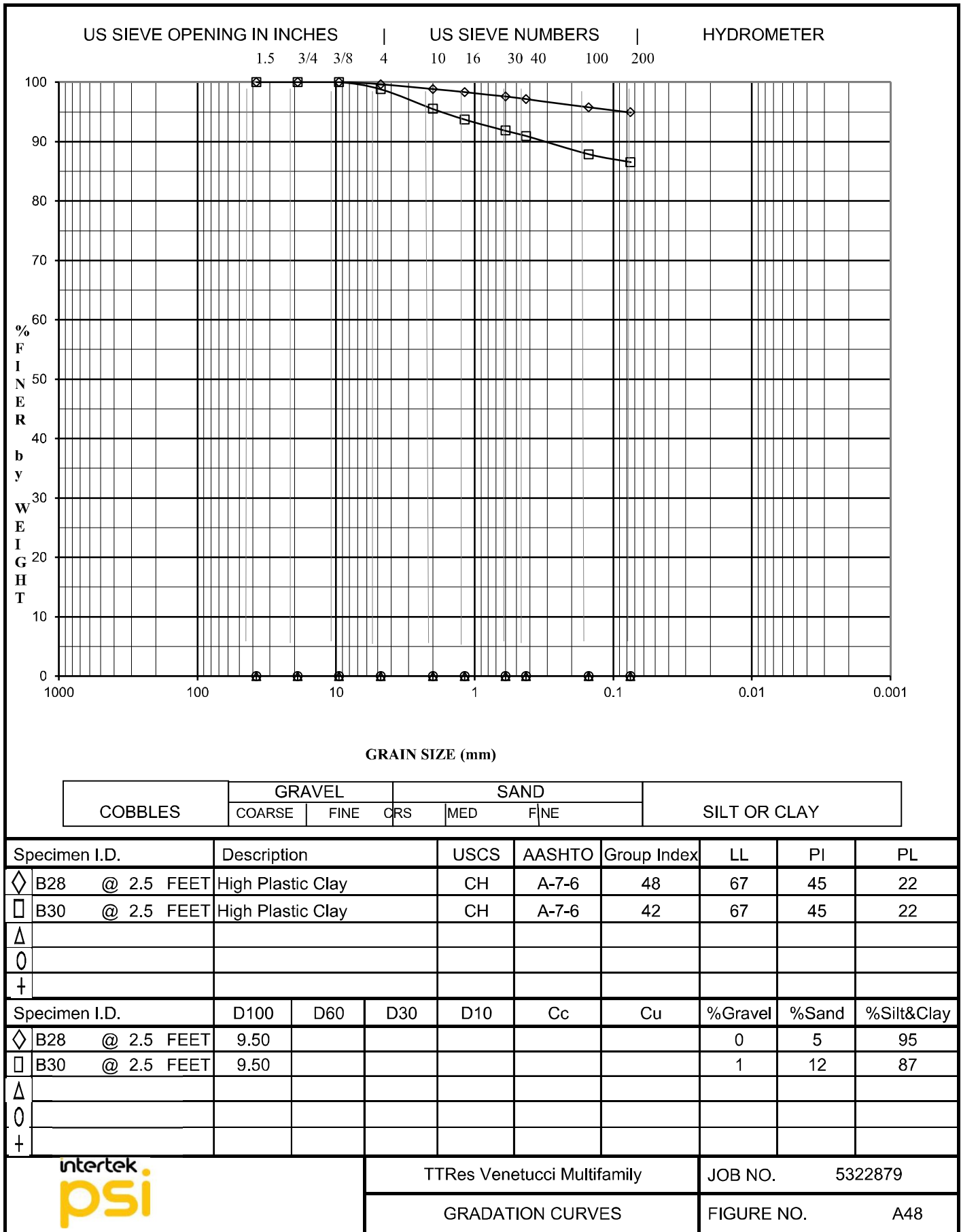
SWELL - CONSOLIDATION TEST

FIGURE NO. A44







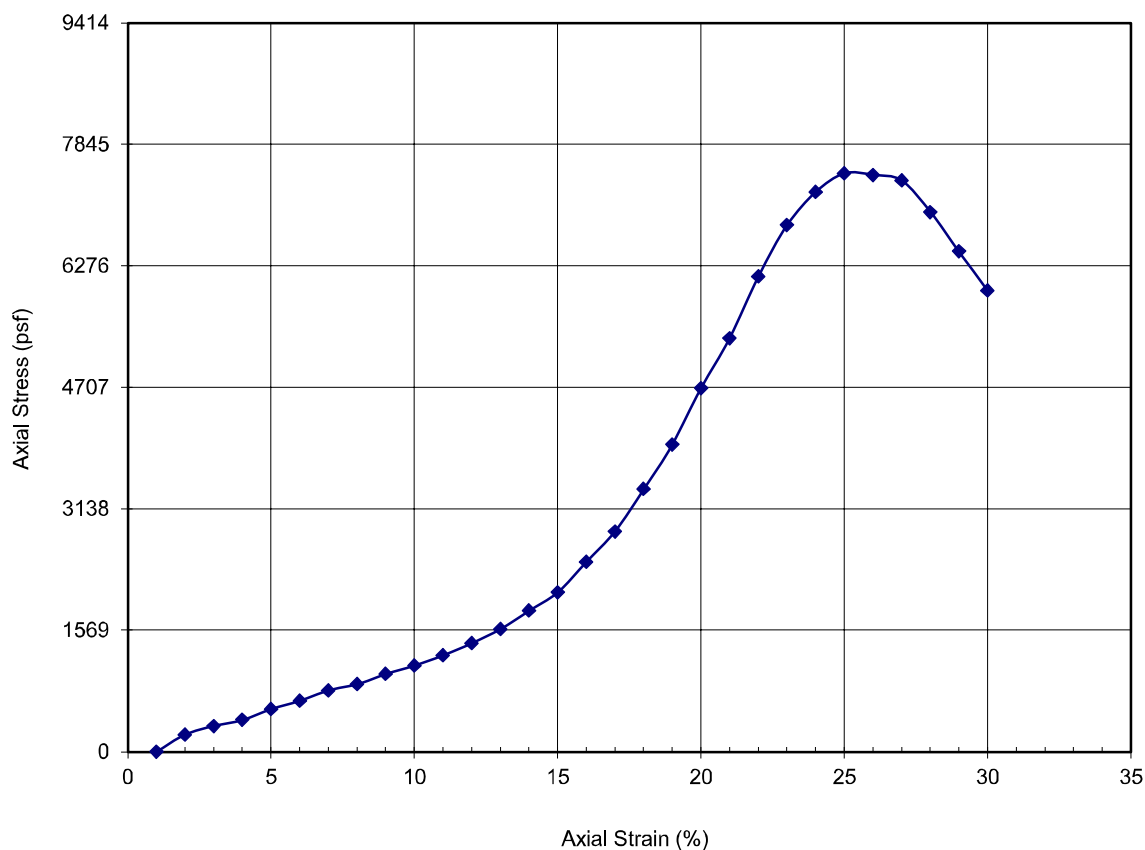


UNCONFINED COMPRESSION REPORT

Tested For: Thompson Thrift Residential
111 Monument Circle, Suite 1500
Indianapolis, Indiana 46204

Project Name: Proposed Multi-Family
Development
Sample Date: September 14, 2024
Project No. 05322879
Sample No. B26
Depth 20

UNCONFINED COMPRESSION TEST: ASTM D2166



Wet Density (pcf)	125.0	Initial Height (in)	3.96
Dry Density (pcf)	105.6	Initial Diameter (in)	1.92
Moisture Content (%)	18.3	Relative Compaction (%)	N/A
Compressive Strength (psf)	7,500	Deviation From OMC (%)	N/A

Remarks:

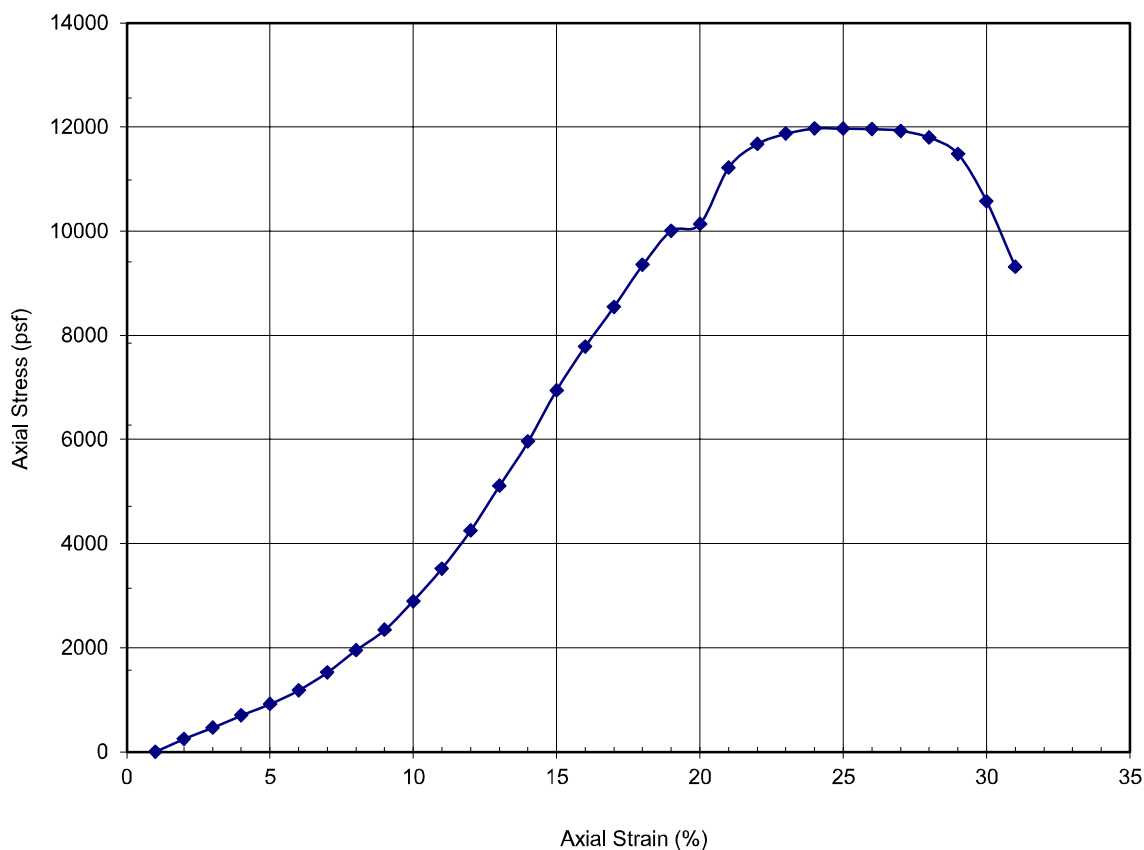
Respectfully Submitted,
Professional Service Industries, Inc.

UNCONFINED COMPRESSION REPORT

Tested For: Thompson Thrift Residential
111 Monument Circle, Suite 1500
Indianapolis, Indiana 46204

Project Name: Proposed Multi-Family
Development
Sample Date: September 14, 2024
Project No. 05322879
Sample No. B29
Depth 15

UNCONFINED COMPRESSION TEST: ASTM D2166



Wet Density (pcf)	126.2	Initial Height (in)	4.01
Dry Density (pcf)	105.2	Initial Diameter (in)	1.94
Moisture Content (%)	20.0	Relative Compaction (%)	N/A
Compressive Strength (psf)	12,000	Deviation From OMC (%)	N/A

Remarks:

Respectfully Submitted,
Professional Service Industries, Inc.

REPORT OF MOISTURE DENSITY RELATIONSHIP OF SOIL

Tested For: Thompson Thrift Residential

Project Name: TTRes Venetucci Blvd

Sample Date: September 11, 2024

Project No. 05322879-1

Report No. 1

Sample No. 1

Sample Source:

Sample Classification: A-7-6 (51) CH fat clay

General Description:

Test Method: ASTM D698 Method A

Rammer: Manual

Method of Preparation: Moist

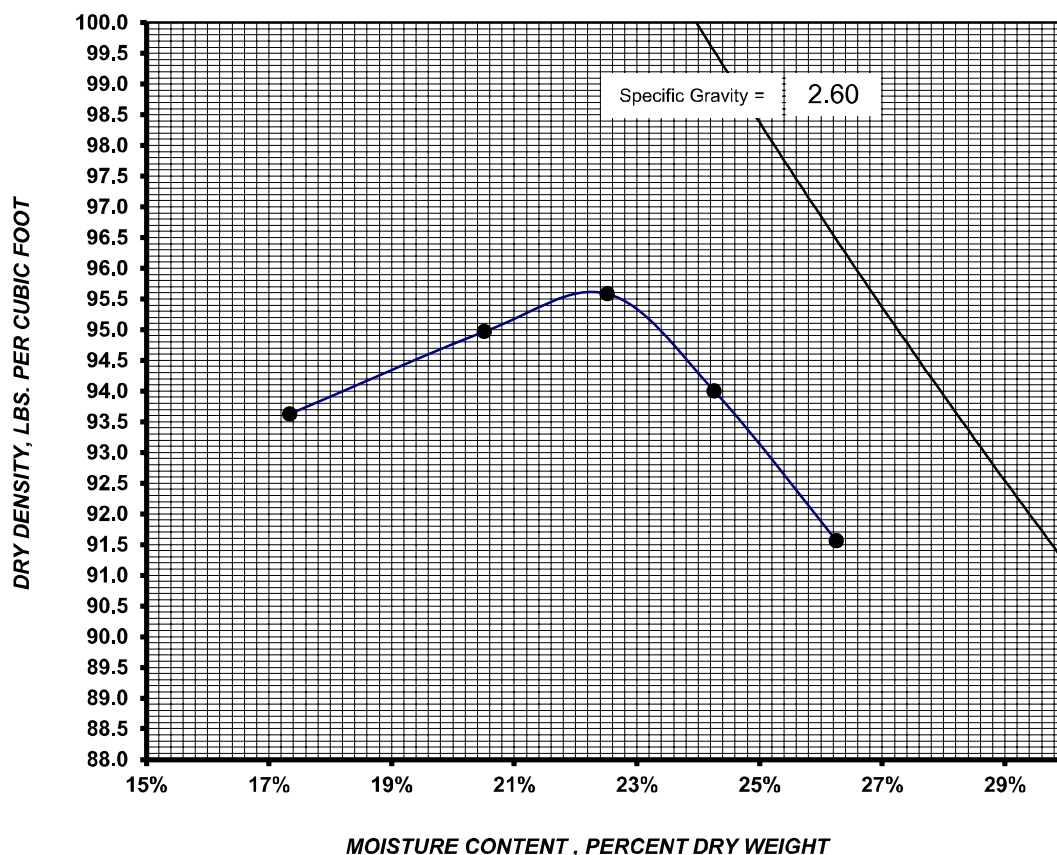
Atterberg Limits (AASHTO T-89/T-90)

LL: 67.8 **PL:** 20.06 **PI:** 47.7

Specific Gravity: 2.60 Estimate

Maximum Dry Density (pcf): 95.6

Optimum Moisture Content (%): 22.2



Grain Size Analysis

(ASTM C136 and/ or C117)

Sieve Size	Percent Passing
3"	100
3"	100
1 1/2"	100
3/4"	100
1/2"	100
3/8"	100
No. 4	99
No. 8	99
No. 10	98
No. 16	98
No. 30	97
No. 40	97
No. 50	97
No. 100	96
No. 200	95

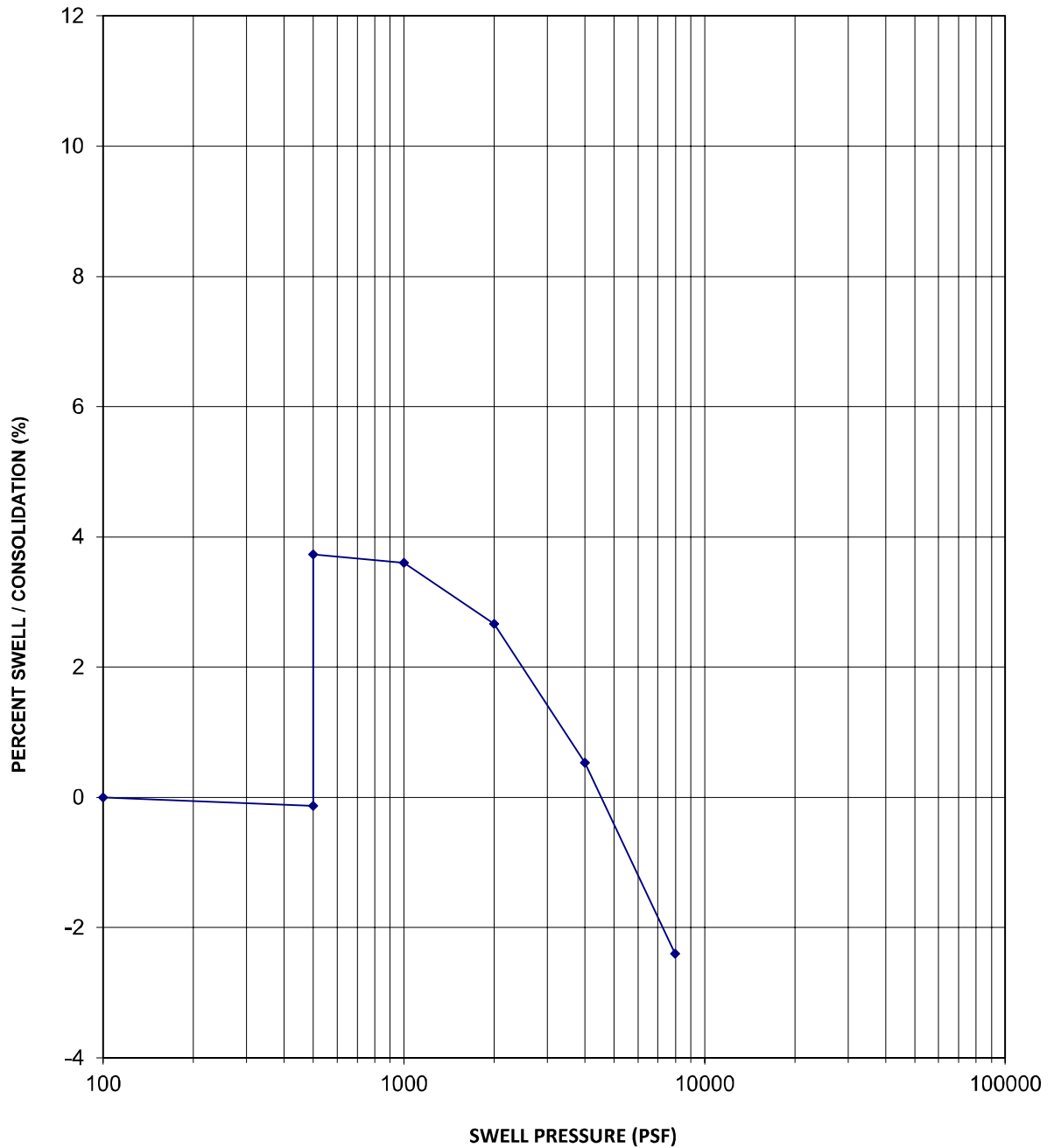
Respectfully Submitted,
Professional Service Industries, Inc.

Remarks:

Lab Tech: TH

REPORTS MAY NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION BY PROFESSIONAL SERVICE INDUSTRIES, INC.

SWELL-CONSOLIDATION TEST



Sample Location	Remolded
Sample Depth	0 feet
Sample Description	Fat Clay
USCS Classification	CH

Dry Density	102 pcf
In-Situ Moisture Content	24.5 %
Volume Change	3.9 %
Swell Pressure	4,700 psf



TTRes Venetucci Multifamily

JOB NO. 5322879

SWELL - CONSOLIDATION TEST

FIGURE NO. 0

**APPENDIX D
IDENTIFICATION OF POLLUTANT SOURCES**

Outdoor Storage of Materials Log

[illegible]

Vehicle Equipment Maintenance and Fueling Log

[illegible]

Routine Maintenance Log

[illegible]

Onsite Waste Management Log

[illegible]

Non-Industrial Waste Sources Log

[illegible]

Additional Pollutant Sources Log

[illegible]

APPENDIX E
LAND DISTURBANCE / CONTROL MEASURE / STABILIZATION LOG

Land Disturbance / **Control Measure** / Stabilization Log[illegible]

APPENDIX F
CDPHE ENVIRONMENTAL SPILL REPORTING / CONTROL MEASURE

Spill Prevention and Response Plan

(Sample Plan – This plan has been produced to assist the General Contractor. This plan shall be revised and updated as needed by the contractor to fit the specific needs of the construction site and may need to be updated to reflect different type of materials and chemicals).

General Spill Control Practices

Any hazardous or potentially hazardous material that is brought onto the construction site shall be handled properly to reduce the potential for stormwater pollution. In an effort to minimize the potential for a spill of petroleum product or hazardous materials to come in contact with stormwater, the following steps shall be implemented:

- ☐ Material Safety Data Sheets (MSDS) information shall be kept on site for any and all applicable materials.
- ☐ A spill control and containment kit shall be provided on the construction site
- ☐ All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, additives for soil stabilization, concrete, curing compounds and additives, etc.) shall be stored in a secure location, under cover and in appropriate, tightly sealed containers when not in use.
- ☐ The minimum practical quantity of all such materials shall be kept on the job site and scheduled for delivery as close to time of use as practical.
- ☐ All products shall be stored in and used from the original container with the original product label and used in strict compliance with the instructions on the product label.
- ☐ All of the product in a container shall be used before the container is disposed of. All such containers shall be triple rinsed, with water prior to disposal. The rinse water used in these containers shall be disposed of in a manner in compliance with State and Federal regulations and shall not be allowed to mix with stormwater discharges. The disposal of excess or used products shall be in strict compliance with instructions on the product label.
- ☐ If utilized, temporary onsite fuel tanks for construction vehicles shall meet all state and federal regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations. The tanks shall be in sound condition free of rust or other damage which might compromise containment. All tanks in excess of 50 gallons shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel. The operator / qualified stormwater manager should familiarize themselves with and follow local and state requirements.

Spill Response Plan

In the event of an accidental spill, immediate action shall be undertaken by the Operator to contain and remove the spilled material.

- ☐ All hazardous materials, including contaminated soil, shall be disposed of by the Operator in the manner specified by federal, state and local regulations and by the manufacturer of such products.
- ☐ Spilled materials shall be cleaned-up by following the procedures outlined by the MSDS.
- ☐ As soon as possible, the spill shall be reported to the appropriate agencies as required by law. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States shall be properly reported. Any spills of petroleum products or hazardous materials in excess of Reportable Quantities as defined by EPA or the state or local agency regulations, shall be immediately reported to the Colorado Department of Public Health and Environment (CDPHE) spill reporting lines.
 - ☐ CDPHE Environmental Release and Incident Reporting Line (877) 518-5608.
 - ☐ National Response Center - (800) 424-8802
- ☐ The Operator shall prepare a written record of any spill and associated clean-up activities of petroleum products or hazardous materials in excess of 1 gallon or reportable quantities, whichever is less. At a minimum, the following shall be documented: Nature of spill, quantity of spill, date/time spill occurred, agency notification if necessary, clean-up procedures used, daily monitoring (for the following 7 days), photographs, and interview(s) with any witnesses of the event.



Environmental Spill Reporting

*24–Hour Emergency and Incident Reporting Line
Office of Emergency Preparedness & Response*

1-877-518-5608

Updated: June, 2018

Reporting chemical spills and releases in Colorado

General

For all hazardous substance incidents, local emergency response agencies must be notified.

Releases from fixed facilities

The Superfund Amendments and Reauthorization Act (SARA) Title III, requires reporting releases from fixed facilities

Refer to the SARA Title III List of Lists, available from the Environmental Protection Agency (EPA), for the reportable quantity.

The party that owns the spilled material must immediately notify the following agencies or organizations:

- National Response Center (NRC) 1-800-424-8802;
- Colorado Emergency Planning Committee (CEPC), represented by the Colorado Department of Public Health and Environment (CDPHE) 1-877-518-5608; and
- Local Emergency Planning Committee (LEPC) 1-720-852-6600.

In addition to telephone notification, the responsible party must also send written notification describing the release and associated emergency response to both the CEPC (in this case, CDPHE) and the LEPC.

Releases from RCRA facilities

Emergency releases from facilities permitted under the Resource Conservation and Recovery Act (RCRA) are reportable according to the permit requirements.

The permit often requires reporting to CDPHE, even if the amount of the release is less than a reportable quantity under SARA Title III (6 CCR 1007-3 Part 264).

Permitted facilities and generators and transporters of hazardous waste are required to have and implement a contingency plan that describes the actions facility personnel must take in response to fires, explosions or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, surface or ground water at the facility (6 CCR 1007-3 Sections 261, 262, 263, 264 and 265).

Whenever there is an imminent or actual emergency situation, appropriate state or local agencies, with designated response roles as described in the contingency plan, must be notified immediately.

The National Response Center or government official designated as the regional on-scene coordinator must be notified immediately if it is determined that the facility has had a release, fire or explosion that could threaten human health or the environment outside the facility.

CDPHE and local authorities must be notified when the facility is back in compliance and ready to resume operations. In addition, the facility must send a written report to CDPHE within 15 days of any incident that requires implementation of the contingency plan. The contingency plan should include current contact information for notification and submittal of written reports.

Permitted facilities, generators and transporters that store hazardous waste must notify CDPHE within 24 hours of any release to the environment that is greater than one (1) pound and must submit a written report to CDPHE within 30 days of the release (6 CCR 1007-3).

Transportation accidents

Transportation accidents that require reporting:

- Result in a spill or release of a hazardous substance in excess of the reportable quantity (40 CFR Part 302.6)
- Cause injury or death or cause estimated property damage exceeding \$50,000.
- Cause an evacuation of the general public lasting one or more hours.

Those that close or shut down one or more major transportation arteries or facilities or result in fire, breakage, spillage, or suspected contamination from radioactive or infectious substances must immediately be reported to the National Response Center.

Refer to the EPA SARA Title III List of Lists for those substances that have reportable quantities.

In addition to the NRC being notified, the local emergency number (9-1-1) must be called and CDPHE should be notified.

Written notification of any transportation accident involving a release of hazardous materials must be provided to the U.S. Department of Transportation within 30 days (49 CFR Part 171.16)

Since hazardous waste is a subset of hazardous materials, transporters who have discharged hazardous waste must notify the NRC and provide a written report to the US Department of Transportation as noted in the above reporting requirements.

The transporter must give immediate notice to the nearest Colorado State Patrol office (8 CCR 1507-8 HMP 5) and the nearest law enforcement agency if the accident or spill involved a vehicle (42-20-113(3) CRS).

Notification and a written report detailing the ultimate disposition of the discharge of hazardous waste must also be provided to CDPHE (6 CCR 1007-2 Section 263.30). This may be a duplicate copy of the US Department of Transportation report

In the event of a spill or discharge of hazardous waste at a transfer facility, the transporter must notify CDPHE within 24 hours if the spill exceeds 55 gallons or if there is a fire or explosion.

Within 15 days of a reportable incident, the transporter must submit a written report of the incident to CDPHE, including the final disposition of the material (6 CCR 1007-2 Section 263.40).

Releases of hazardous waste at a transfer facility may also require notification to the National Response Center and a written report to the U.S. Department of Transportation.

Releases to water

A release of any chemical, oil, petroleum product, sewage, etc., which may enter waters of the State of Colorado (which include surface water, ground water and dry gullies or storm sewers leading to surface water) must be reported to CDPHE immediately (25-8-601 CRS).

Written notification to CDPHE must follow within five (5) days (5 CCR 1002-61, Section 61.8(5)(d)).

Any accidental discharge to the sanitary sewer system must be reported immediately to the local sewer authority and the affected wastewater treatment plant.

Releases of petroleum products and certain hazardous substances listed under the Federal Clean Water Act (40 CFR Part 116) must be reported to the National Response Center as well as to CDPHE (1-877-518-5608) as required under the Clean Water Act and the Oil Pollution Act.

Releases to air

Any unpredictable failure of air pollution control or process equipment that results in the violation of emission

control regulations should be reported CDPHE by 10 a.m. of the following working day, followed by a written notice explaining the cause of the occurrence and describing action that has been or is being taken to correct the condition causing the violation and to prevent such excess emissions in the future (5 CCR 1001-2 Common Provisions Regulations Section II.E).

If emergency conditions cause excess emissions at a permitted facility, the owner/operator must provide notice to CDPHE no later than noon of the next working day following the emergency, and follow by written notice within one month of the time when emission limitations were exceeded due to the emergency (5 CCR 1001-5, Regulation 3 Part C, Section VII.C.4).

Releases from oil and gas wells

All spills or releases of exploration and production wastes or produced fluids which meet the reporting thresholds of the Colorado Oil and Gas Conservation Commission (COGCC) Rule 906 shall be reported verbally to the COGCC within 24 hours of discovery and on the COGCC Spill/Release Report Form 19 within 72 hours of discovery.

Spills or releases are reportable to the COGCC in the following circumstances:

- 1) the spill or release impacts or threatens to impact any waters of the state, (which include surface water, ground water and dry gullies or storm sewers leading to surface water), a residence or occupied structure, livestock or a public byway;
- 2) a spill or release in which 1 barrel or more is released outside of berms or other secondary containment; or
- 3) any spill or release of 5 barrels or more.

COGCC also requires reportable spills or releases be reported to the surface owner and local government. Whether or not they are reportable, spills or releases of any size must be stopped, cleaned up, and investigated as soon as practicable.

If the spill or release impacts or threatens to impact waters of the state, it must also be reported immediately to CDPHE (25-8-601 CRS).

Releases from storage tanks

Petroleum releases of 25 gallons or more (or any size that causes a sheen on nearby surface waters) from regulated aboveground and underground fuel storage tanks must be reported to the Division of Oil and Public Safety (303-318-8547) within 24 hours. If the report is made after business hours, please leave a message on the technical assistance line for the Division of Oil and Public Safety, and contact the 24 hour CDPHE Emergency and Incident Reporting Line. This includes spills from fuel dispensers.

Spills or releases of hazardous substances from regulated storage tanks in excess of the reportable quantity (40 CFR Part 302.6) must be reported to the National Response Center and the local fire authority immediately, and to the Division of Oil and Public Safety within 24 hours. (8-20.5-208 CRS and 7 CCR 1101-14 Article 4).

Owners/operators of regulated storage tanks must contain and immediately clean up a spill or overfill of less than 25 gallons of petroleum and a spill or overfill of a hazardous substance that is less than the reportable quantity.

If cleanup cannot be accomplished within 24 hours, the Division of Oil and Public Safety must be notified immediately (7 CCR 1101-14 Article 4-4).

CDPHE should also be notified in the case of hazardous substance releases as cleanup activities may be covered by state solid or hazardous waste requirements (6 CCR 1007-2, 6 CCR 1007-3).

Any release that has or may impact waters of the state (which include surface water, ground water and dry

gullies or storm sewers leading to surface water), no matter how small, must be reported immediately to CDPHE (25-8-601 CRS).

Releases from pipelines

Releases of five or more gallons of hazardous liquids or carbon dioxide from a pipeline that result in explosion or fire, cause injury or death or cause estimated property damage (including cost of clean-up and recovery, value of lost product and property damage) exceeding \$50,000 must be reported immediately to the US Department of Transportation Office of Pipeline Safety (49 CFR Part 195 Subpart B) and the National Response Center.

Releases of five or more gallons of hazardous liquids or carbon dioxide from interstate pipelines that do not involve explosion or fire, injury or death or property damage exceeding \$50,000 should be reported to the US Department of Transportation Office of Pipeline Safety within 30 days after the incident.

Releases of natural gas from intrastate pipelines that cause injury or death, property damage in excess of \$50,000 (including the cost of lost product), closure of a public road, or evacuation of 50 or more people must be reported immediately to the Colorado Public Utilities Commission, Pipeline Safety Group (4 CCR 723-11-2).

Releases of natural gas or liquefied natural gas (LNG) from interstate pipelines that cause injury or death, property damage in excess of \$50,000 (including the cost of lost product), or results in an emergency shutdown of the facility must be reported immediately to the National Response Center and the US Dept of Transportation Office of Pipeline Safety.

Releases of oil, petroleum products or other hazardous liquids from interstate and intrastate pipelines that have or may enter waters of the State of Colorado (which include surface water, ground water and dry gullies or storm sewers leading to surface water) must be reported to CDPHE immediately (25-8-601 CRS). CDPHE should also be notified of releases to soil, as cleanup activities may be covered by state solid or hazardous waste requirements (6 CCR 1007-2, 6 CCR 1007-3).

Radiological accidents, incidents, and events

CDPHE must be notified of any condition that has caused or threatens to cause an event, which meets or exceeds the criteria specified in (6 CCR 1007-1) RH 4.51 and RH 4.52 of the State of Colorado *Rules and Regulations Pertaining to Radiation Control*. Reportable events include lost radioactive materials, lost radiation producing machines, over-exposures to persons, contamination events and fires or explosions involving radioactive materials.

Depending upon the severity of the event, notification may be required immediately, within 24 hours, or within 30 days. In most cases, a written follow-up report is also required.

If you are unsure of the proper notification requirement, please contact CDPHE immediately. Telephone event notifications can be made to the CDPHE Radiation Program at any time by calling 1-303-877-9757.

Notification Numbers

Colorado Department of Public Health and Environment toll-free 24-hour environmental emergency and incident reporting line: (877) 518-5608 (24-hour)

National Response Center
(800) 424-8802 (24-hour)

State Oil Inspector (Colorado Division of Oil & Public Safety-Above & Underground Storage Tank Regulators)
(303) 318-8547

**APPENDIX G
STORM EVENT LOG**

[illegible]

**APPENDIX H
INSPECTION AND SAMPLING REPORTS**

CONSTRUCTION STORMWATER SITE INSPECTION REPORT

Facility Name		Permittee					
Date of Inspection		Weather Conditions					
Permit Certification #		Disturbed Acreage					
Phase of Construction		Inspector Title					
Inspector Name							
Is the above inspector a qualified stormwater manager? (permittee is responsible for ensuring that the inspector is a qualified stormwater manager)			<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">YES</td> <td style="width: 50%; text-align: center;">NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	YES	NO	<input type="checkbox"/>	<input type="checkbox"/>
YES	NO						
<input type="checkbox"/>	<input type="checkbox"/>						

INSPECTION FREQUENCY					
Check the box that describes the minimum inspection frequency utilized when conducting each inspection					
At least one inspection every 7 calendar days	<input type="checkbox"/>				
At least one inspection every 14 calendar days, with post-storm event inspections conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosions	<input type="checkbox"/>				
<ul style="list-style-type: none"> This is this a post-storm event inspection. Event Date: _____ 	<input type="checkbox"/>				
Reduced inspection frequency - Include site conditions that warrant reduced inspection frequency	<input type="checkbox"/>				
<ul style="list-style-type: none"> Post-storm inspections at temporarily idle sites 	<input type="checkbox"/>				
<ul style="list-style-type: none"> Inspections at completed sites/area 	<input type="checkbox"/>				
<ul style="list-style-type: none"> Winter conditions exclusion 	<input type="checkbox"/>				
Have there been any deviations from the minimum inspection schedule? If yes, describe below.	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">YES</td> <td style="width: 50%; text-align: center;">NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	YES	NO	<input type="checkbox"/>	<input type="checkbox"/>
YES	NO				
<input type="checkbox"/>	<input type="checkbox"/>				

INSPECTION REQUIREMENTS*
i. Visually verify all implemented control measures are in effective operational condition and are working as designed in the specifications
ii. Determine if there are new potential sources of pollutants
iii. Assess the adequacy of control measures at the site to identify areas requiring new or modified control measures to minimize pollutant discharges
iv. Identify all areas of non-compliance with the permit requirements, and if necessary, implement corrective action
*Use the attached Control Measures Requiring Routine Maintenance and Inadequate Control Measures Requiring Corrective Action forms to document results of this assessment that trigger either maintenance or corrective actions

AREAS TO BE INSPECTED			
Is there evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system or discharging to state waters at the following locations?			
	NO	YES	If "YES" describe discharge or potential for discharge below. Document related maintenance, inadequate control measures and corrective actions Inadequate Control Measures Requiring Corrective Action form
Construction site perimeter	<input type="checkbox"/>	<input type="checkbox"/>	
All disturbed areas	<input type="checkbox"/>	<input type="checkbox"/>	
Designated haul routes	<input type="checkbox"/>	<input type="checkbox"/>	
Material and waste storage areas exposed to precipitation	<input type="checkbox"/>	<input type="checkbox"/>	
Locations where stormwater has the potential to discharge offsite	<input type="checkbox"/>	<input type="checkbox"/>	
Locations where vehicles exit the site	<input type="checkbox"/>	<input type="checkbox"/>	
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	

CONTROL MEASURES REQUIRING ROUTINE MAINTENANCE

Definition: Any control measure that is still operating in accordance with its design and the requirements of the permit, but requires maintenance to prevent a breach of the control measure. These items are not subject to the corrective action requirements as specified in Part I.B.1.c of the permit.

Are there control measures requiring maintenance?	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	If "YES" document below

[illegible]

INADEQUATE CONTROL MEASURES REQUIRING CORRECTIVE ACTION

Definition: Any control measure that is not designed or implemented in accordance with the requirements of the permit and/or any control measure that is not implemented to operate in accordance with its design. This includes control measures that have not been implemented for pollutant sources. If it is infeasible to install or repair the control measure immediately after discovering the deficiency the reason must be documented and a schedule included to return the control measure to effective operating condition as possible.

Are there inadequate control measures requiring corrective action?	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	If "YES" document below

Are there additional control measures needed that were not in place at the time of inspection?	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	If "YES" document below

[illegible]

REPORTING REQUIREMENTS

The permittee shall report the following circumstances orally within twenty-four (24) hours from the time the permittee becomes aware of the circumstances, and shall mail to the division a written report containing the information requested within five (5) working days after becoming aware of the following circumstances. The division may waive the written report required if the oral report has been received within 24 hours.

All Noncompliance Requiring 24-Hour Notification per Part II.L.6 of the Permit			
a. Endangerment to Health or the Environment Circumstances leading to any noncompliance which may endanger health or the environment regardless of the cause of the incident (See Part II.L.6.a of the Permit) <i>This category would primarily result from the discharge of pollutants in violation of the permit</i>			
b. Numeric Effluent Limit Violations <ul style="list-style-type: none"> ○ Circumstances leading to any unanticipated bypass which exceeds any effluent limitations (See Part II.L.6.b of the Permit) ○ Circumstances leading to any upset which causes an exceedance of any effluent limitation (See Part II.L.6.c of the Permit) ○ Daily maximum violations (See Part II.L.6.d of the Permit) <i>Numeric effluent limits are very uncommon in certifications under the COR400000 general permit. This category of noncompliance only applies if numeric effluent limits are included in a permit certification.</i>			

Has there been an incident of noncompliance requiring 24-hour notification?	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	If "YES" document below

Date and Time of Incident	Location	Description of Noncompliance	Description of Corrective Action	Date and Time of 24 Hour Oral Notification	Date of 5 Day Written Notification *

*Attach copy of 5 day written notification to report. Indicate if written notification was waived, including the name of the division personnel who granted waiver.

After adequate corrective action(s) and maintenance have been taken, or where a report does not identify any incidents requiring corrective action or maintenance, the individual(s) designated as the Qualified Stormwater Manager, shall sign and certify the below statement:

“I verify that, to the best of my knowledge and belief, all corrective action and maintenance items identified during the inspection are complete, and the site is currently in compliance with the permit.”

Name of Qualified Stormwater Manager

Title of Qualified Stormwater Manager

Signature of Qualified Stormwater Manager

Date

Notes/Comments

**APPENDIX I
SWMP AMENDMENT LOG**

AMENDMENT LOG

[illegible]