

**GEOTECHNICAL ENGINEERING
SERVICES REPORT
JOB NO. 1-40707**

**SANDOVAL COUNTY
JUDICIAL COMPLEX
REMODEL**

RIO RANCHO, NEW MEXICO

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PREPARED FOR:

SOUDER MILLER & ASSOCIATES

September 5, 2024
Job No. 1-40707

Souder Miller & Associates
5454 Venice Ave. NE, Suite D
Albuquerque, NM 87113

Attn: Keaton P. Chancellor

RE: Geotechnical Engineering Services Report
Sandoval County Judicial Complex Remodel
Rio Rancho, New Mexico

Dear Mr. Chancellor:

Submitted herein is the Geotechnical Engineering Services Report for the above-referenced project. The report contains the results of our field investigation, laboratory testing, and recommendations for foundation, floor slab, retaining wall and pavement design as well as criteria for site grading and seismic design.

It has been a pleasure to serve you on this project. If you should have any questions, please contact this office.

Respectfully submitted:
GEO-TEST, INC.

Patrick R. Whorton, PE



Reviewed By:

Patrick J. Byres, PE

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INTRODUCTION

This report presents the results of our geotechnical engineering services investigation performed by this firm for the proposed Sandoval County Judicial Complex Remodel project in Rio Rancho, New Mexico.

The objectives of this investigation were to:

- 1) Evaluate the nature and engineering properties of the subsurface soils underlying the site.
- 2) Provide recommendations for foundation, slab on grade, retaining wall and pavement design as well as criteria for site grading and seismic design.

The investigation includes subsurface exploration, selected soil sampling, laboratory testing of the samples, performing an engineering analysis and preparation of this report.

PROPOSED CONSTRUCTION

It is understood that the project consists of the demolition of a portion of the existing building and the addition of a new wing to the building. The new wing will be approximately 27,000 square feet in plan area and will be 2-stories with no basement. Maximum column and continuous foundation loads not exceeding 200 kips and 3.0 kips per lineal foot respectively are anticipated. A 'future wing' is also planned to be constructed at an unknown future date. A Conceptual Site Plan, Figure 1 and Demolition Plan, Figure 2 are included in a later section of this report.

Should structural loads or other project details vary significantly from those outlined above, this firm should be notified for review and possible revision of the recommendations contained herein.

FIELD EXPLORATION

Ten (10) exploratory borings were drilled at the site. Four (4) were drilled within existing pavement areas to a depth of 5 feet below existing surface grades. Six (6) were drilled to depths of 25 to 50 feet below existing surface grade. Locations of the borings are shown on the attached Boring Location Map, Figure 3. The soils encountered in the borings were continuously examined, visually classified and logged during the drilling operation. The boring logs are presented in a following section of this report. Drilling was accomplished using a truck mounted drill rig equipped with 3.25-inch inside diameter hollow stem auger. Subsurface materials were sampled at five foot

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intervals or less utilizing an open tube split barrel sampler driven by a standard penetration test hammer.

LABORATORY TESTING

Selected samples were tested in the laboratory to determine certain engineering properties of the soils. Moisture contents were determined to evaluate the various soil deposits with depth. The results of these tests are shown on the boring logs.

Sieve analysis and Atterberg limits tests were performed to aid in soil classification as well as unconfined compression testing to determine soil strength characteristics. The results of these tests are presented in the Summary of Laboratory Results and on the individual test reports presented in a following section of this report.

SURFACE CONDITIONS

The existing Judicial Complex consists of a central lobby (round portion) with a two-story south wing and a predominantly single-story north wing, See Figure 3 & Photo 1. The central lobby and north wing are slated for demolition, see Figure 2. The new building area(s) will then be partially located within the former footprint of the north wing. The portion of the proposed footprint(s) which is not currently occupied by the existing building consists of un-landscaped 'utility corridor' running along the east side of the building. Although it was not spotted, it is believed that a storm drain runs through this area as a drop inlet is present on the north end and a manhole within the vicinity of Boring 8, see Photo 2. There is a CMU perimeter wall running along the west side of the site, east of which is an undeveloped lot populated with native shrubs and grasses, see Photo 3.

The existing pavement section encountered at the Boring 1 & 2 locations was found to be 4 inches of asphalt over subgrade. The existing pavement section encountered at the Boring 3 & 4 locations consisted of 3 inches of asphalt over 6 inches of base course.

SUBSURFACE SOIL CONDITIONS

As indicated by the exploratory borings, the subsurface soils beneath the proposed building site consisted of a surficial layer of very loose to medium dense non-plastic silty sand and poorly graded sand with silt which was encountered at the surface or below existing landscaping and extended to depths of 11 to 15 feet below surface grades. Below the surficial layer, moderately firm to very firm medium plasticity sandy clay was encountered. The thickness of the clay layer ranged from 1.5 feet to 9 feet thick and

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contained interbedded layers of sand. Below the sandy clay, medium to very dense non-plastic poorly graded sand with varying amounts of silt and gravel was encountered and extended to the full depth explored.

The near surface soils encountered beneath the existing pavement at the Boring 1 & 2 locations consisted of a medium plasticity clayey sand which was encountered beneath the existing pavement section and extended to the full depth explored. The near surface soils encountered beneath the existing pavement at the Boring 3 & 4 locations consisted of non-plastic silty sand which was encountered below the existing pavement and extended to the full depth explored.

Free groundwater was not encountered in the exploratory borings. Soil moisture contents encountered within the sand were generally dry and were generally moist within the clay layers encountered.

SITE SEISMICITY

Based on the results of our investigations, as well as experience in the area, Site Class D is appropriate for structural design. Based on the seismic site class and regional factors, seismic coefficients were determined in accordance with IBC 2021 and are presented in the following table:

The following design data is based on a Site Class D classification and data provided in accordance with IBC 2021/ASCE 7-16.

Mapped Spectral Acceleration, S_s	0.479 g
Mapped Spectral Acceleration, S_1	0.157 g
Site Modified Spectral Acceleration, S_{MS}	0.678 g
Site Modified Spectral Acceleration, S_{M1}	0.358 g
Design Spectral Acceleration, S_{DS}	0.452 g
Design Spectral Acceleration, S_{D1}	0.239 g
Site Coefficient, F_A	1.417
Site Coefficient, F_v	2.287
Seismic Design Category	D

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CONCLUSIONS AND RECOMMENDATIONS

The near-surface soils underlying the proposed expansion site were found to be loose in their present condition in some areas extending to depths up to 20 feet below surface grade. In addition, very loose soils were encountered within the aforementioned east side 'utility corridor' which is believed to be trench backfill. These soils as well as soils disturbed during the construction/demolition of the existing building as not considered suitable to provide reliable support of the proposed building addition(s). Foundations bearing on these soils would be susceptible to excessive differential settlements, particularly upon significant moisture increases.

These soils could be improved via excavation and placement of structural fill, however, given that loose soils were encountered to depth of up to 10.0 feet below surface grade, this would require an overexcavation of the existing soils throughout the building area to such an extent as to provide for at least 10.0 feet of properly compacted, non-expansive structural fill below all foundations and floor slabs in order to support the proposed foundation loads. This would require an excavation on the order of 12.0 feet below existing surface grade immediately adjacent to the existing building. An excavation to this depth would undermine the foundations of the existing building and would require significant shoring during earthwork operations to prevent excessive movement of the existing building.

Therefore, given the soil conditions encountered as part of this investigation, it is recommended that the proposed building addition be supported on a deep foundation system extending to a minimum depth of 25 feet below existing surface grade. Several types of foundation systems could be utilized for this purpose. Given the dry loose sand present in the upper 10 feet and coarse dry sand at greater depths, augercast piles is the primary recommendation, for a deep foundation system given the relatively high axial and lateral load bearing capacity augercast piles provide. As an alternative, helical piers or micropiles would also be feasible. These systems would likely be easier/cheaper to install than augercast piles but would likely require closer pile spacing to support the heavier building loads as well as battered piles to provide lateral support and would need to be designed and installed by a contractor specializing in these foundations. Detailed recommendations and discussion of deep foundation types are included in later sections of this report.

Even if placed as an independent slab, a slab on grade floor slab would still be subject to excessive settlement given the loose soils present up to 10 feet below surface grade. Site preparation to allow for a slab on grade would require an excavation to a depth which would undermine the existing building foundation the avoidance of which is partially why a deep foundation system which no overexcavation required is recommended for the project. Therefore, it is recommended that the floor slab for the proposed addition be constructed as a structural slab supported entirely by the grade beams and in turn the deep foundation bearing within deeper dense soils. The use of a structural slab will

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require no subgrade support and as such no excavation will be required to support the slab.

It is unknown but assumed that the existing building is founded on shallow spread-type footings. As the foundation systems recommended herein are all of the deep foundation type, slight differential settlement between the existing building and the addition may occur resulting in cosmetic damage. Therefore, it is recommended that the connection between the addition and existing building be installed with a flexible 'expansion' type joint which will allow for independent building movement.

As an alternative to the use of a deep foundation system, the site would also be a good candidate for the use of a rammed aggregate pier ground improvement. This type of ground improvement would consist of compacting and/or vibrating gravel/cobble columns into the existing site soils in order to increase the density of the existing soils to increase the bearing capacity of the soils and reduce the potential for settlement to acceptable tolerances. This would allow for the use of traditional spread-type footings to support the proposed addition(s) with traditional slabs on grade without the need for excavation of the existing site soils. These types of systems are proprietary technology and are designed and installed by firms specializing in this type of ground improvement. These types of systems may also produce excessive vibration which may be destructive or at least disruptive to the existing building which should be taken into consideration when exploring this option.

Post-construction moisture increases in the supporting soils could cause some differential foundation movements. Therefore, moisture protection is considered a critical design consideration and should be reflected in overall site grading and drainage details as recommended in the Moisture Protection section of this report.

FOUNDATIONS

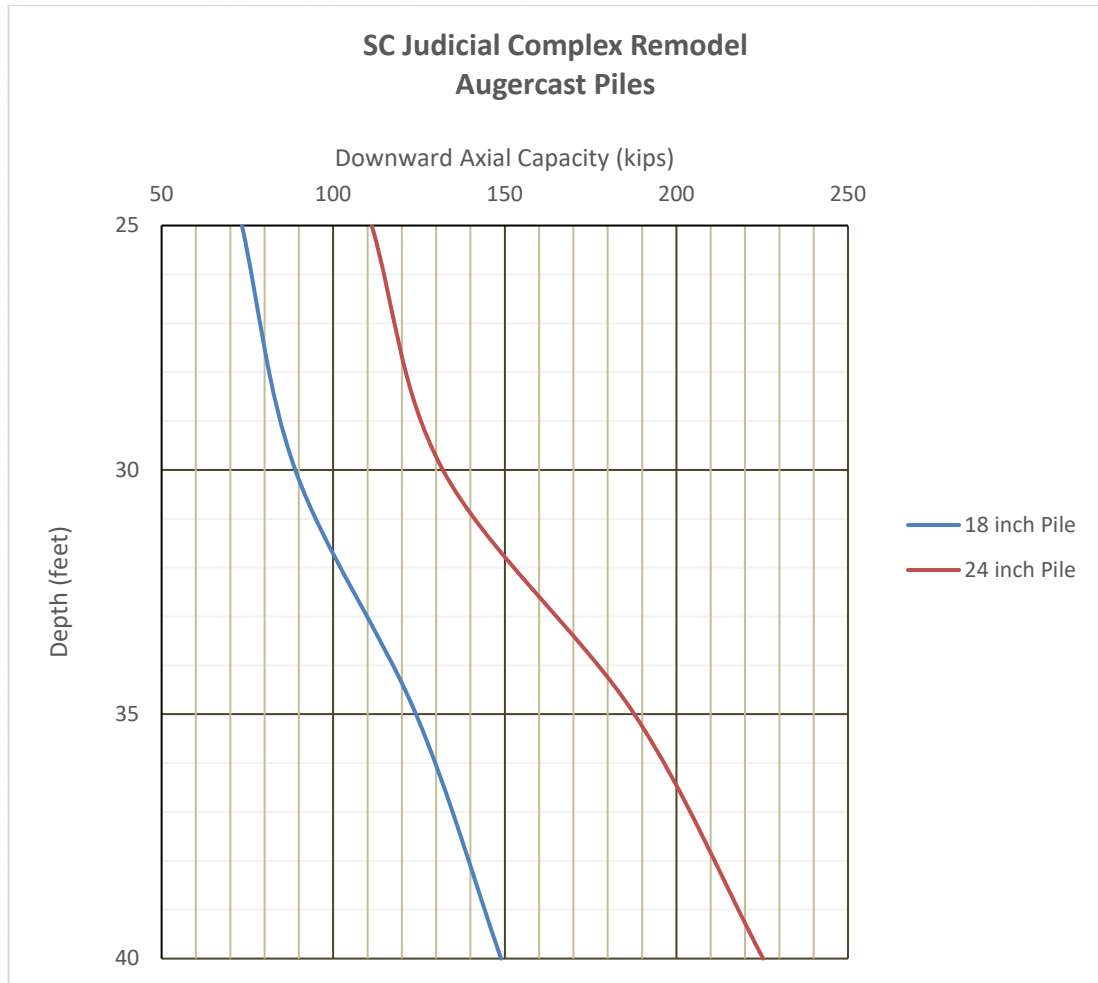
Augercast Piles

The addition may also be supported on a deep foundation system consisting of augered pressure grouted (augercast) piles extending to a minimum depth of 25 feet below existing site grades. Estimated allowable downward capacities for 18 and 24 inch diameter augercast piles, extending to a minimum depth of 25 feet below finished site grades are shown on a design chart presented below:

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The capacities presented on the chart apply to the allowable downward supporting capacity in kips versus depth in feet below finished grade. The depths are based on the assumption that finished grades will be near the existing site grades at the boring locations.

The downward capacities apply to the allowable soil supporting capability of isolated piles and do not consider the structural strength of the piles. Piles can be considered isolated when they are spaced at least 3 diameters center-to-center. Closer spaced piles may require group capacity reductions which may be provided by this firm as necessary. The estimated capacities apply to full dead plus realistic live loads and can be safely increased by one-third for total loads including wind or seismic forces.

Augercast piles will also resist uplift and lateral forces. The allowable uplift capacity can be considered as being equal to 70 percent of the allowable downward capacity. A detailed analysis of lateral soil resistance will be required using the computer program LPILE Plus by Ensoft (or equivalent) once the actual lateral forces, depth, and diameter of the piers have been determined. This analysis may be performed by this firm upon request.

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The following criteria should be followed during the installation of augered, pressure grouted piling:

- 1) Careful measurements should be made to verify that the piles are advanced to the recommended tip elevations.
- 2) The grout injection pressure should be maintained within the limits of 160 to 240 pounds per square inch. The pressure should be checked by observing a pressure gauge at the pump and the pumping rate.
- 3) Grout flow should be maintained in the range of 13 to 15 seconds, as tested in general accordance with the Corps of Engineers test method CRD-C-79-77, provided a $\frac{3}{4}$ inch opening is substituted for the $\frac{1}{2}$ inch opening.
- 4) A comparison should be made of the volume of grout actually injected and the theoretical volume of each pile. For acceptance, the injected grout volume should exceed the theoretical volume by at least 15 percent.
- 5) Auger cuttings should be continuously examined for verification of soil conditions.

The quality control procedures outlined above are considered extremely important for the proper construction and resulting performance of the piles.

Maximum total and differential settlements of pile foundations designed and constructed as recommended herein are estimated not to exceed $\frac{3}{4}$ inch for the soil moisture contents encountered during this investigation.

Micropiles

The proposed structure may also be supported by a pressure grouted micropile deep foundation system supporting reinforced concrete grade beams. It is suggested that a single pressure grouted micropile having a grouted diameter of 200 millimeters (7.8 inches), a nominal grout-to-ground bond strength of 1,500 pounds per square foot and installed to a depth of 25 feet below existing surface grades should have an allowable axial capacity on the order of 18 kips. In order to avoid group effect reduction in capacity, it is suggested that micropiles be spaced no closer than 2.5 feet center to center.

The preceding suggested design parameters should be considered preliminary, used only for feasibility studies and should not be used in actual micropile design as these values are based on general knowledge and estimations which have not been confirmed by any load test data or practical experience by this firm.

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As there are many micropile systems and installation techniques available, many of which utilize proprietary technology; the actual foundation design should be performed by a specialty contractor who is qualified to perform micropile design and construction. This report should be made available to the specialty contractor to aid in design. It is recommended that the final foundation design be verified by an onsite load test.

Even with the use of a deep foundation system, moisture protection of the supporting soils is considered essential for the satisfactory performance of the structure. This should be reflected in the overall site grading and drainage details as presented in a following section of this report.

Total settlements of foundations are anticipated not to exceed 0.5 inch for the soil moisture contents encountered during this investigation or moisture contents introduced during construction. However, as the foundation design will be conducted by a specialty contractor who is qualified to perform micropile design and construction, that firm should provide actual settlement estimates based on their design.

Helical Piers

The proposed structure may also be supported by reinforced concrete grade beams supported by a helical pier foundation system extending to a depth of 25 feet below finished floor elevation. There is considerable variation in the type, configuration and installation depth of the helical piers which may be utilized for the project. These factors will be influenced by manufacturer, the structural design as well as available inventory and installation equipment. In addition, most helical pier installers will provide product specific design recommendations to accommodate the needs of the structural design. Due to these factors, it is not recommended that helical pier specific design recommendations be provided by this firm. Rather, it is recommended that a qualified helical pier installer be provided a copy of this geotechnical report as well as loading and other requirements for the structure design in order to design and install the helical pier system. Recommendations of qualified installers may be provided by this firm upon request.

It is recommended that an onsite load capacity test of the selected pier(s) be conducted prior to installation to ensure that the pier configuration selected for use will perform as estimated.

Even with the use of a deep foundation system, moisture protection of the supporting soils is considered essential for the satisfactory performance of the structure. This should be reflected in the overall site grading and drainage details as presented in a following section of this report.

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Total settlements of foundations are anticipated not to exceed 0.5 inch for the soil moisture contents encountered during this investigation or moisture contents introduced during construction. However, as the foundation design will be conducted by a specialty contractor who is qualified to perform helical pile design and installation, that firm should provide actual settlement estimates based on their design.

Rammed Aggregate Piers & Spread Footings

As an alternative to supporting the structure on a deep foundation system as discussed above, it may be possible to improve the native soils in-situ via the use of Rammed Aggregate Piers. This may improve the subsurface soils beneath the site such that the proposed building addition(s) may be supported by a shallow foundation system without the need for overexcavation to improve the site soils. The use of rammed aggregate piers may also increase the bearing capacity to greater than could be achieved with compacted structural fill while reducing total settlement to within acceptable limits. In addition, the piers could improve the subsurface soils at greater depths which will minimize the risk of settlement of the deeper loose soils.

Rammed aggregate pier systems utilize proprietary technology such that design and installation are performed by a specialty contractor. As such, Geo-Test, Inc. is not able to provide any specific design criteria with regard to rammed aggregate piers. Instead, a copy of this report should be provided to a rammed aggregate pier construction/design firm to ensure their system is feasible at this site and to provide a plan to the design team showing the proposed locations, depths, and methods that will be used to achieve the required improvement of the soils beneath the site. The specialty contractor should also specify the allowable bearing pressure and estimated settlements of a shallow foundation system bearing on the soils densified by the procedure. The actual ground improvement achieved by that process is then verified in the field by performing standard penetration testing at selected locations. Geo-Test is available to assist the design team in evaluating rammed aggregate options as required.

RETAINING WALLS

Retaining walls which are structurally integrated into the building should be founded on foundations as recommended for the building. This firm should be notified if any non-integrated retaining walls are proposed and foundation recommendations for these walls may be provided by this firm as required.

Lateral pressure against retaining walls will depend upon the degree of restraint. Walls which are restrained so as to limit movement at the top of the wall to less than 0.001 times the height of the wall should be designed for an 'at rest' earth pressure of 55 pounds per square foot of depth. Walls free to

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move at the top should be designed using an 'active' earth pressure equal to 35 pounds per square foot per foot of depth. These recommended lateral pressures are applicable to a condition of horizontal backfill without surcharge loads. Analysis of earth pressures produced by sloping backfill or surcharge loads can be provided by this firm upon request.

The lateral pressures presented above assume no buildup of hydrostatic pressures behind the walls. To prevent the buildup of hydrostatic pressures, adequate weep holes should be provided or composite drainage systems such as Miradrain or equivalent can be installed on the backside of the walls prior to backfilling. The drainage layer should be connected to a collector pipe at the base of the walls and routed to a sump or to a positive gravity drain.

Retaining wall backfill should meet the structural fill specifications outlined in the Site Grading section of this report. During backfilling, the contractor should be limited to the use of hand operated compaction equipment within a zone of about 3 feet horizontally from the back of the walls. The use of heavier equipment could apply lateral pressures well in excess of the recommended design earth pressure, particularly over the upper portions of the walls.

PAVEMENT DESIGN

The majority of the existing near surface soils encountered throughout the site classify according to the American Association of State Highway and Transportation Officials (AASHTO) soil classification system as A-2-4 with a lesser amount of A-6 encountered at the Boring 1 & 2 locations on the access road located to the northwest of the Judicial Complex. The A-2-4 soils have a correlated R-Value of 55 and are considered excellent subgrade soils for pavements. The A-6 soils have a correlated R-Value of 10 and are considered poor subgrade soils for pavements.

Based on the above, the quality of onsite soils varies relative to location such that the pavement section recommended below are designed for use with the worst subgrade soils encountered and thus will require no special subgrade preparation other than moisture conditioning and compaction. Prior to the placement of pavement sections recommended below, the subgrade soils should be scarified to a depth of 12 inches, moisture conditioned to ± 2 percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D-1557.

With the above recommended subgrade preparation, a flexible pavement section consisting of 3 inches of Hot Mix Asphalt (HMA) over 6 inches of aggregate base course placed directly over a minimum of 12 inches of properly compacted native subgrade is recommended for automobile parking areas and drive lanes with an allowance for 2 percent truck traffic. Areas of regular truck traffic exceeding this allowance or in areas where A-6 subgrade soils are present should utilize a heavy-duty flexible pavement section consisting of 4

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inches of Hot Mix Asphalt (HMA) over 6 inches of aggregate base course placed directly over a minimum of 12 inches of properly compacted native subgrade or the rigid pavement section recommended below.

The HMA should be SPIII, SPIV or equivalent parking lot mix, compacted to a target density of 94.5 percent, with a minimum compaction of 92 and a maximum compaction of 97 percent of the theoretical maximum density. The recommended Performance Grade (PG) asphalt binder used should be 64-22 according to the NMDOT Design Manual. These pavement recommendations are in general conformance with publications prepared by the *Asphalt Institute*.

With the above recommended subgrade preparation, a rigid pavement section consisting of 6 inches of Portland Cement Concrete (PCC) placed directly over a minimum of 12 inches of properly compacted subgrade is recommended for areas of concentrated heavy vehicle loads such as dumpster pads and loading docks. The pavement recommendations are in general conformance with ACI 330R-01 *Guide for Design and Construction of Concrete Parking Lots*.

The PCC should have a minimum compressive strength of 4000 psi, be air entrained to between 4.5 and 7.0 percent, and have a maximum aggregate size of 2 inches. The concrete should be placed at a maximum slump of 4 inches. Admixtures may be used to increase the slump and workability provided that the compressive strength is not compromised.

The use of reinforcement within the PCC should be left to the discretion of the structural engineer; however, it is recommended that the pavement be constructed with load transfer joints designed for heavy traffic.

SITE GRADING

The following general guidelines should be included in the project construction specifications to provide a basis for quality control during site grading. It is recommended that all subgrade and backfill be placed and compacted under engineering observation and in accordance with the following:

- 1) In order to provide a uniform bearing surface for the placement of concrete elements such as grade beams and structural slabs, as well as below pavements, it is recommended that the subgrade surface be densified prior to the placement of concrete.
- 2) Densification of the exposed native soils should consist of scarifying to a depth of 12 inches, moisture conditioning to the optimum moisture content or above and compacting the subgrade to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D-1557.

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- 3) Should structural fill be required for grading purposes or to backfill any retaining structures, the results of this investigation indicate that the onsite soils are generally suitable for this purpose, however, onsite blending of excavated soils prior to use as structural fill will be required to meet the specifications below.
- 4) All structural fill and backfill should be free of vegetation and debris and contain no rocks larger than 3 inches. Gradation of the backfill material, as determined in accordance with ASTM D-422, should be as follows:

Size	Percent Passing
3 inch	100
No. 4	60 - 100
No. 200	5 - 45

- 5) The plasticity index of the structural fill should be no greater than 15 when tested in accordance with ASTM D-4318.
- 6) Structural fill, general backfill and base course consisting of soils approved by the geotechnical engineer, shall be placed in 18-inch loose lifts and compacted with approved compaction equipment. Loose lifts should be reduced to 8 inches if handheld compaction equipment is used. All compaction of fill or backfill shall be accomplished to a minimum of 95 percent of the maximum dry density as determined in accordance with ASTM D-1557. The moisture content of the structural fill during compaction should be within 2 percent of the optimum moisture content.
- 7) Tests for degree of compaction should be determined by the ASTM D-1556 method or ASTM D-6938. Observation and field tests should be performed during fill and backfill placement by the geotechnical engineer to assist the contractor in obtaining the required degree of compaction. If less than 95 percent is indicated, additional compaction effort should be made with adjustment of the moisture content as necessary until 95 percent compaction is obtained.

EXCAVATIONS

Excavation of the surficial soils can be readily accomplished using normal earthmoving equipment. Excavated slopes for foundation and utility construction should be designed and constructed in accordance with 29 CFR 1926, Subpart P, and any applicable state or local regulations. Excavated temporary and permanent slopes should not exceed 1.5 to 1 (horizontal to vertical). The contractor should be responsible for all temporary excavation

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slopes excavated for the purpose of structural fill placement as well as the design of any required temporary shoring, as applicable. Shoring, bracing, and benching should be performed by the contractor in accordance with applicable safety standards. Spoil piles and heavy equipment should not be allowed within 5 feet of the top of the slopes.

Although not anticipated with the recommendations provided herein, should excavation immediately adjacent to an existing structure be performed, this excavation could result in undermining the existing foundations and floor slabs. If this occurs, the existing building should be shored and no loss of ground should be allowed. As an alternative to shoring, segmental excavation may be attempted. The procedure would be to excavate from the bottom of the existing foundations to the bottom of the excavation at a 1.5 horizontal to 1 vertical slope. The excavation can then be completed to the existing foundations in maximum 8 foot segments. Adjacent excavation should not be made until structural fill has been placed back up to the bottom of the existing foundations.

MOISTURE PROTECTION

Precautions should be taken during and after construction to minimize moisture increase of foundation soils. Accumulations of excessive moisture could be harmful to some types of interior flooring, to HVAC ductwork beneath the slabs, and can weaken or cause other changes in the soils supporting the foundations and slabs. This can cause differential movement of the foundations and can result in cosmetic or structural damage to the structure.

Positive drainage should be established away from the exterior walls of the structure. A typical adequate slope is 6 inches in the first 5 feet with positive drainage being provided from those points to streets, pavement or natural water courses. If necessary to provide positive drainage, the building area should be raised above adjacent grades with structural fill.

Roof runoff from the structure should be collected by gutters and downspouts or roof canals and discharged to splash blocks which carry water rapidly away from the structures' foundation. Should lot size or other factors impede positive drainage away from the structure to less than 5 feet from foundations, a non-perforated drain system should be installed to carry water to a minimum of five feet away from foundations or to streets or natural water courses.

Utility backfill should be well compacted and should meet the specifications outlined in the Site Grading section of this report. Special care should be taken during installation of the subfloor sewer and water lines to reduce the possibility of future subsurface saturation.

Irrigation within 10 feet of foundations is discouraged or at the very least should be carefully controlled. Proper landscaping and drainage maintenance are

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required to preclude accumulation of excessive moisture in the soils below the structure and throughout the site. This should include but is not limited to routine maintenance checks of irrigation system to ensure no leakage and proper functionality and that irrigation is adjusted and maintained seasonally so that over watering does not occur. Native drought resistant plants are recommended for use in landscaping. Landscape features should not impede positive drainage away from foundations as recommended above.

Drainage control ponds or any other drainage/landscaping feature which allows for surface waters to infiltrate the subsurface soils are not recommended for this site. If absolutely required, drainage features should not be placed within 20 feet of building foundations.

The foregoing recommendations should only be considered minimum requirements for overall site development. It is recommended that a civil/drainage engineer be consulted for more detailed grading and drainage recommendations.

FOUNDATION REVIEW AND INSPECTION

This report has been prepared to aid in the evaluation of this site and to assist in the design of this project. It is recommended that the geotechnical engineer be provided the opportunity to review the final design drawings and specifications in order to determine whether the recommendations in this report are applicable to the final design. Review of the final design drawings and specifications should be noted in writing by the geotechnical engineer.

In order to permit correlation between the conditions encountered during construction and to confirm recommendations presented herein, it is recommended that the geotechnical engineer be retained to perform continuous observations and testing during the earthwork portion of this project. Observation and testing should be performed during construction to confirm that suitable fill soils are placed upon competent materials and properly compacted and foundation elements penetrate the recommended soils.

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CLOSURE

Our conclusions, recommendations and opinions presented herein are:

- 1) Based upon our evaluation and interpretation of the findings of the field and laboratory program.
- 2) Based upon an interpolation of soil conditions between and beyond the explorations.
- 3) Subject to confirmation of the conditions encountered during construction.
- 4) Based upon the assumption that sufficient observation will be provided during construction.
- 5) Prepared in accordance with generally accepted professional geotechnical engineering principles and practice.

This report has been prepared for the sole use of Souder Miller & Associates, specifically to aid in the design of the proposed Sandoval County Judicial Complex Remodel project in Rio Rancho, New Mexico, and not for use by any third parties without consent.

We make no other warranty, either expressed or implied. Any person using this report for bidding or construction purposes should perform such independent investigation as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project. If conditions encountered during construction appear to be different than indicated by this report, this office should be notified.

All soil samples will be discarded 60 days after the date of this report unless we receive a specific request to retain the samples for a longer period of time.

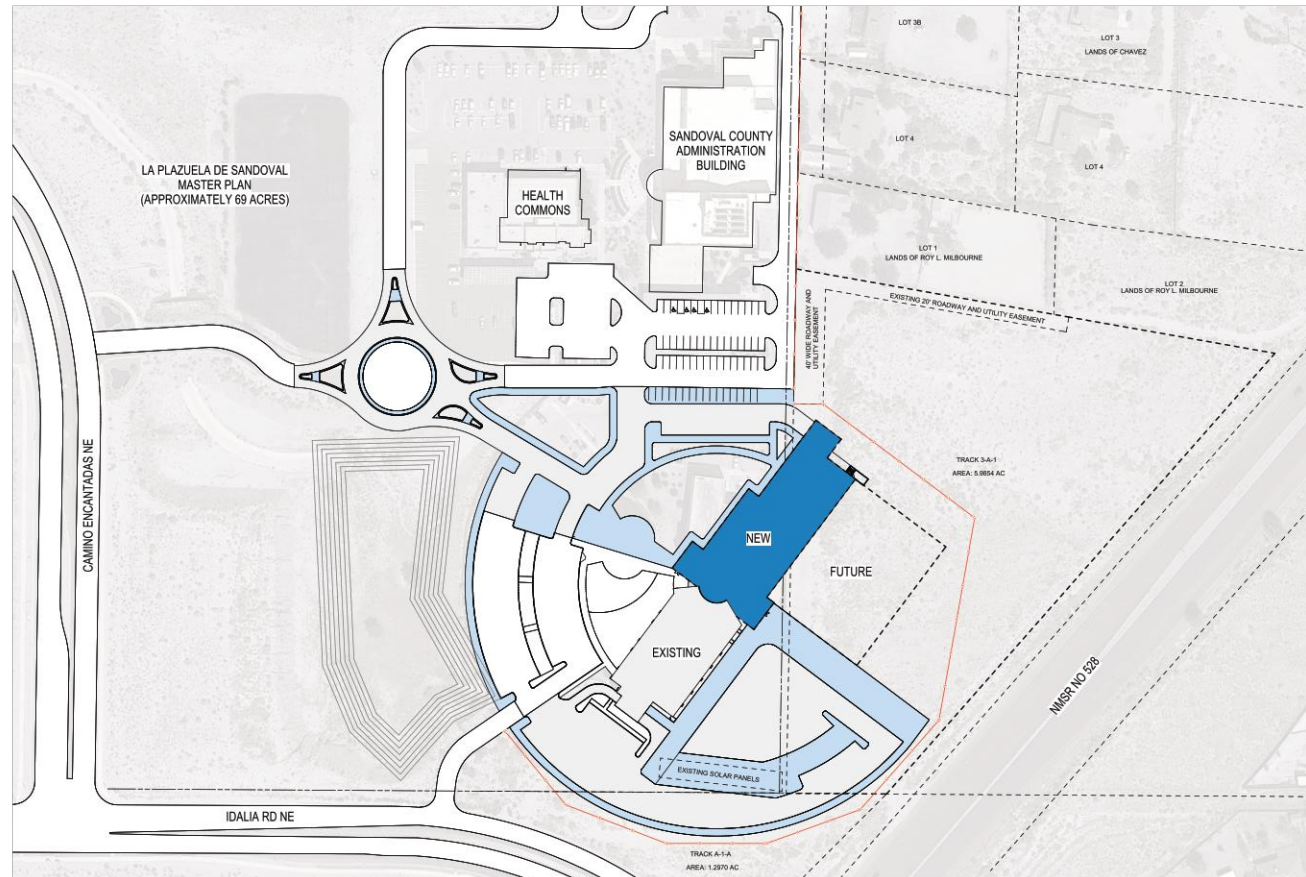
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CONCEPTUAL SITE PLAN

Sandoval County Judicial Complex



SITE PLAN
SCALE 1" = 50'-0"

**HUITT
ZOLLARS**
FEB 2024

SC Judicial Complex Remodel
Rio Rancho, New Mexico
Job No. 1-40707

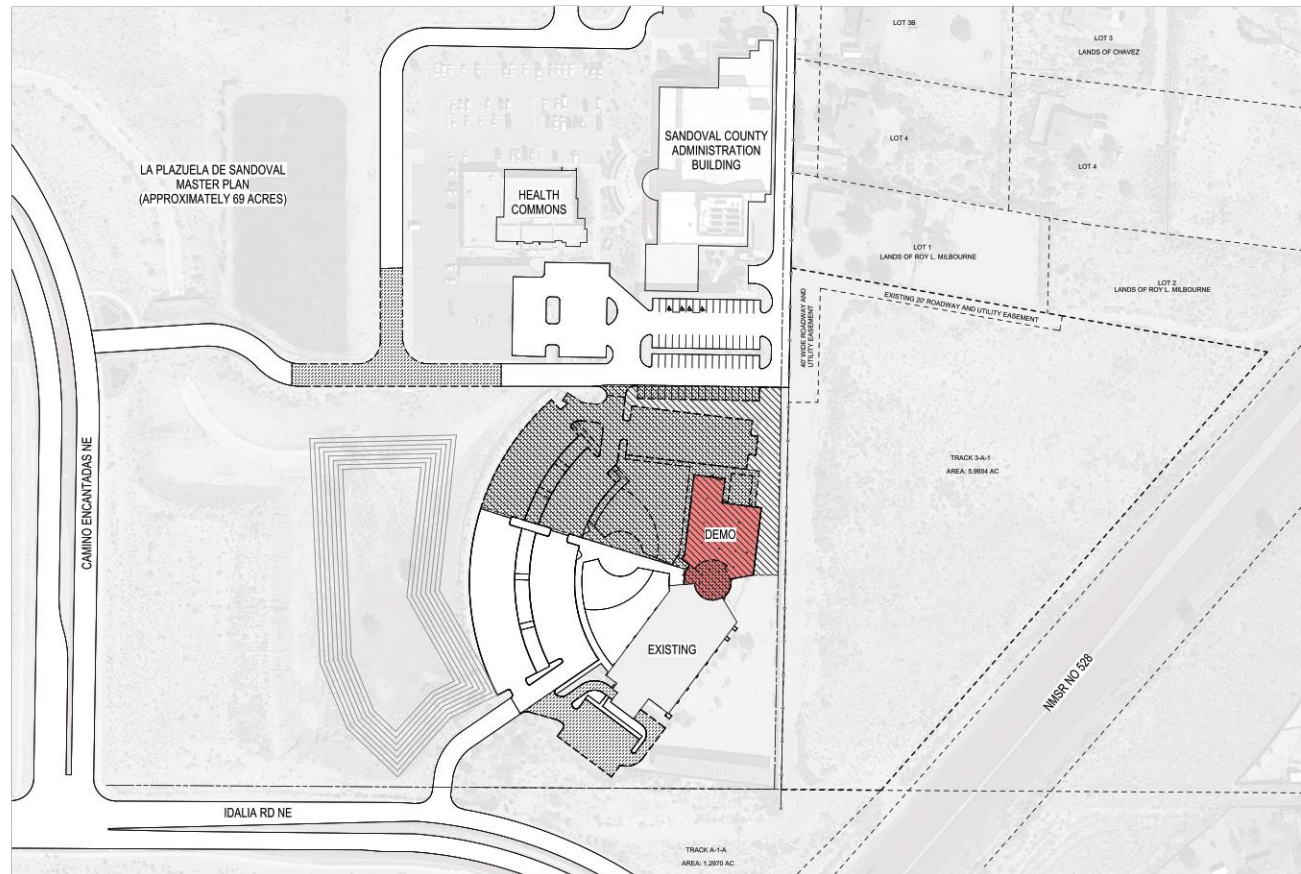
Figure 1



GEO-TEST
GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

SITE DEMOLITION PLAN

Sandoval County Judicial Complex



SITE PLAN - DEMOLITION
SCALE 1" = 80'-0"

HUITT ZOLLARS
FEB 2024

SC Judicial Complex Remodel
Rio Rancho, New Mexico
Job No. 1-40707

Figure 2



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GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

BORING LOCATION MAP



SC Judicial Complex Remodel
Rio Rancho, New Mexico
Job No. 1-40707

Figure 3



GEO-TEST
GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

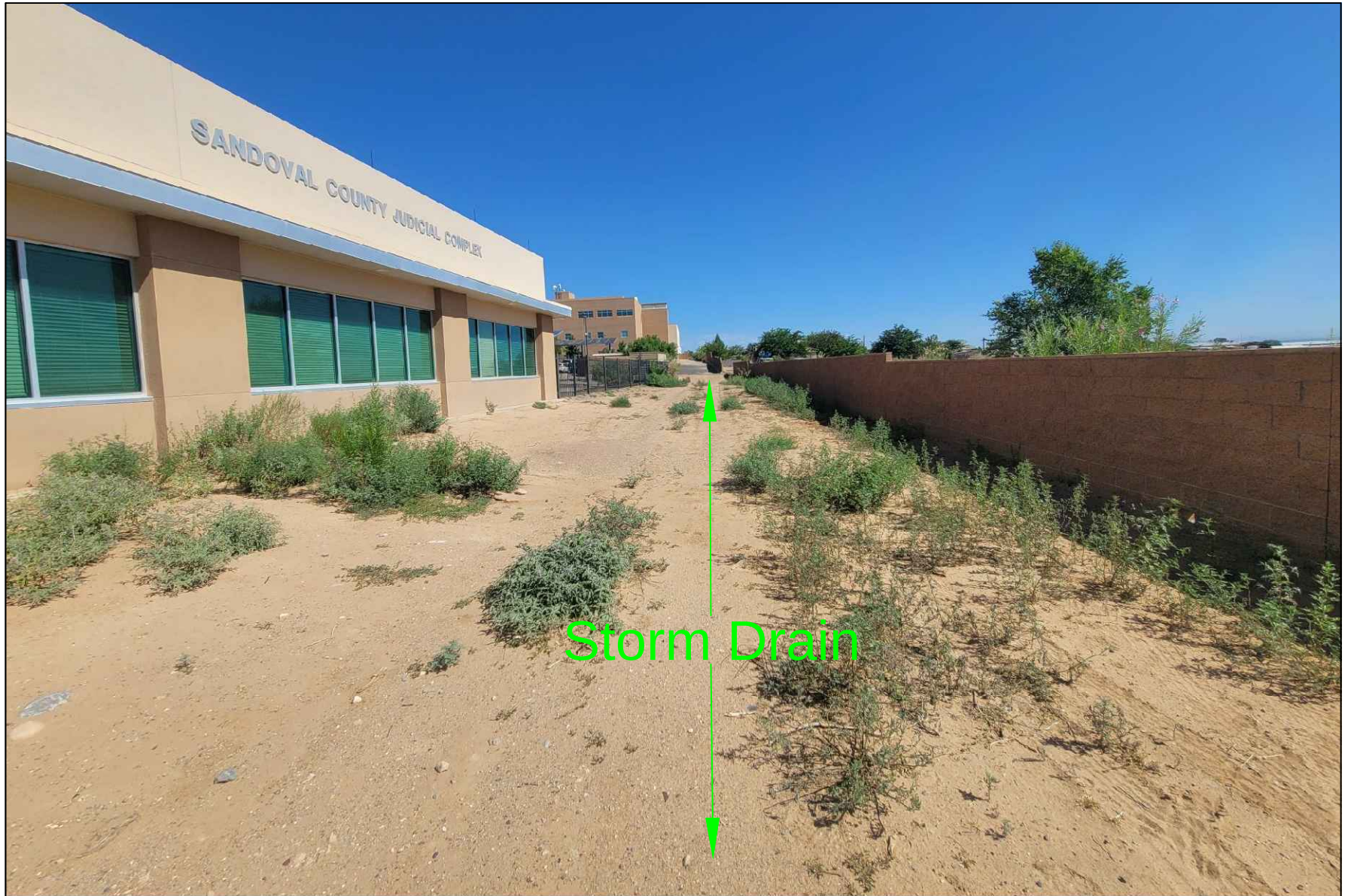


Project: SC Judicial Complex Remodel

1-40707

Photo 1: Looking east from Boring 3

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Project: SC Judicial Complex Remodel 1-40707

Photo 2: East side of Building looking north

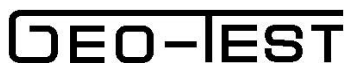
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Project: SC Judicial Complex Remodel 1-40707

Photo 3: East side of Building looking southwest

GEO-TEST



Project: SC Judicial Complex Remodel

Date: 08/16/2024

Elevation:

Project No: 1-40707

Type: 2.25" ID HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 1

During Drilling: none

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE					SUBSURFACE PROFILE		N blows/ft 20 40 60 80			
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION				
5			AC		13		AC	4 inches ASPHALT				
							SC	CLAYEY SAND, medium plasticity, moist, light brown				
								Stopped Auger @ 5				
10												
15												
20												
25												
30												

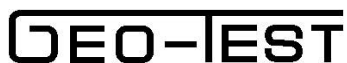
LOG OF TEST BORING 1-40707.GPJ GEO TEST.GDT 8/21/24

LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve

AMSL - Above Mean Sea Level
CS - Continuous Sampler
UD - Undisturbed
ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: SC Judicial Complex Remodel

Date: 08/16/2024

Elevation:

Project No: 1-40707

Type: 2.25" ID HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 2

During Drilling: none

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE	N blows/ft			
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION				
							AC	4 inches ASPHALT	20	40	60	80
5			AC		13		SC	CLAYEY SAND, medium plasticity, moist, light brown				
								Stopped Auger @ 5 feet				
10												
15												
20												
25												
30												

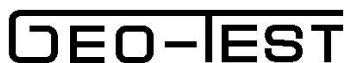
LOG OF TEST BORING 1-40707.GPJ GEO TEST.GDT 8/21/24

LEGEND

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Project: SC Judicial Complex Remodel

Date: 08/16/2024

Elevation:

Project No: 1-40707

Type: 2.25" ID HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 3

During Drilling: none

After 24 Hours:

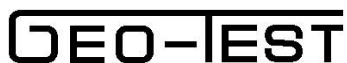
DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE	N blows/ft			
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION				
							AC	3 inches ASPHALT over 6 inches BASE COURSE	20	40	60	80
5			AC		4		SM	SILTY SAND, non-plastic, dry, light brown				
								Stopped Auger @ 5 feet				
10												
15												
20												
25												
30												

LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve

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Date: 08/16/2024

Elevation:

Project No: 1-40707

Type: 2.25" ID HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 4

During Drilling: none

After 24 Hours:

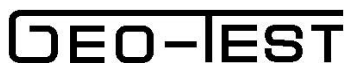
DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE	N blows/ft			
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION				
							AC	3 inches ASPHLT over 6.5 inches BASE COURSE	20	40	60	80
5			AC		9		SM	SILTY SAND, non-plastic, moist, light brown				
								Stopped Auger @ 5 feet				
10												
15												
20												
25												
30												

LEGEND

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Project: SC Judicial Complex Remodel

Date: 08/15/2024

Project No: 1-40707

Elevation:

Type: 3.25" ID HSA

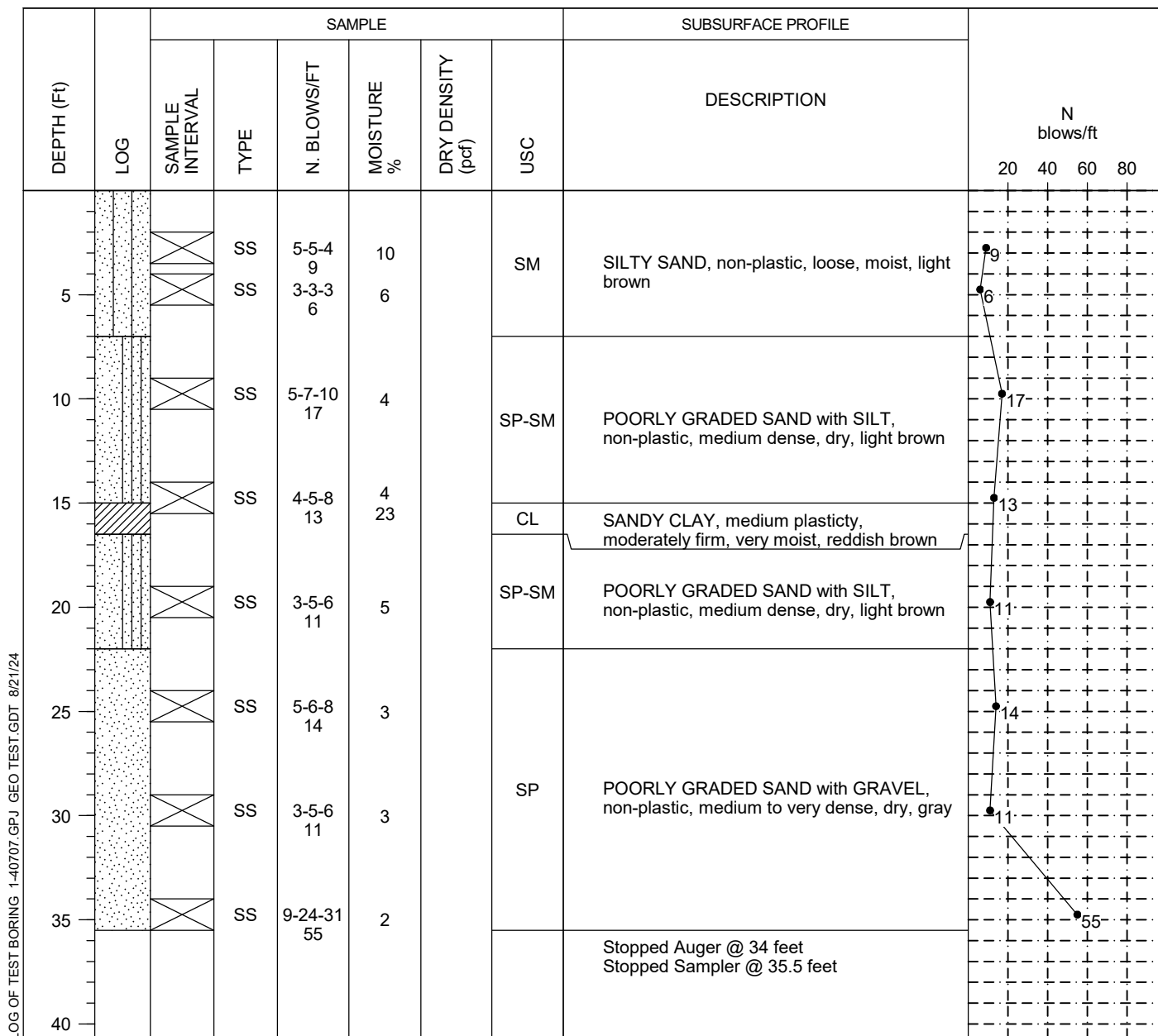
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 5

During Drilling: none

After 24 Hours:



LEGEND

SS - Split Spoon
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UD/SL - Undisturbed Sleeve

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Project: SC Judicial Complex Remodel

Date: 08/15/2024

Project No: 1-40707

Elevation:

Type: 3.25" ID HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 6

During Drilling: none

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE					SUBSURFACE PROFILE		N blows/ft
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	
									20 40 60 80
							AC	4 inches ASPHALT	
5			SS	4-3-2	7		SP-SM	POORLY GRADED SAND with SILT, non-plastic, loose to medium dense, slightly moist, light brown	5
			SS	5	10				5
				2-2-3					
10			SS	3-6-8	6				14
				14					
15			SS	5-7-11	21		CL	SANDY CLAY, medium plasticity, firm, moist, reddish brown	18
				18					
20			SS	3-4-5	6		SM	SILTY SAND, non-plastic, moist, light brown	9
				9	22		CL	SANDY CLAY, medium plasticity, moderately firm, moist, reddish brown	
25			SS	6-7-13	5		SP	POORLY GRADED SAND with GRAVEL, non-plastic, medium dense to dense, dry, gray	20
				20					
30			SS	5-7-17	3				24
				24					
35			SS	8-19-26	2				45
				45					
40			SS	4-9-19	7		SM	SILTY SAND, non-plastic, medium dense, dry, reddish brown	28
				28					
45			SS	5-10-15	3		SP	POORLY GRADED SAND, non-plastic, medium dense to dense, dry, gray	25
				25					
50			SS	9-11-24	3				35
				35					
55								Stopped Auger @ 49 feet Stopped Sampler @ 50.5 feet	
60									

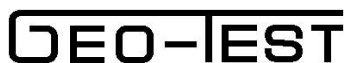
LOG OF TEST BORING 1-40707.GPJ GEO TEST.GDT 8/21/24

LEGEND

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Project: SC Judicial Complex Remodel

Date: 08/14/2024

Project No: 1-40707

Elevation:

Type: 3.25" ID HSA

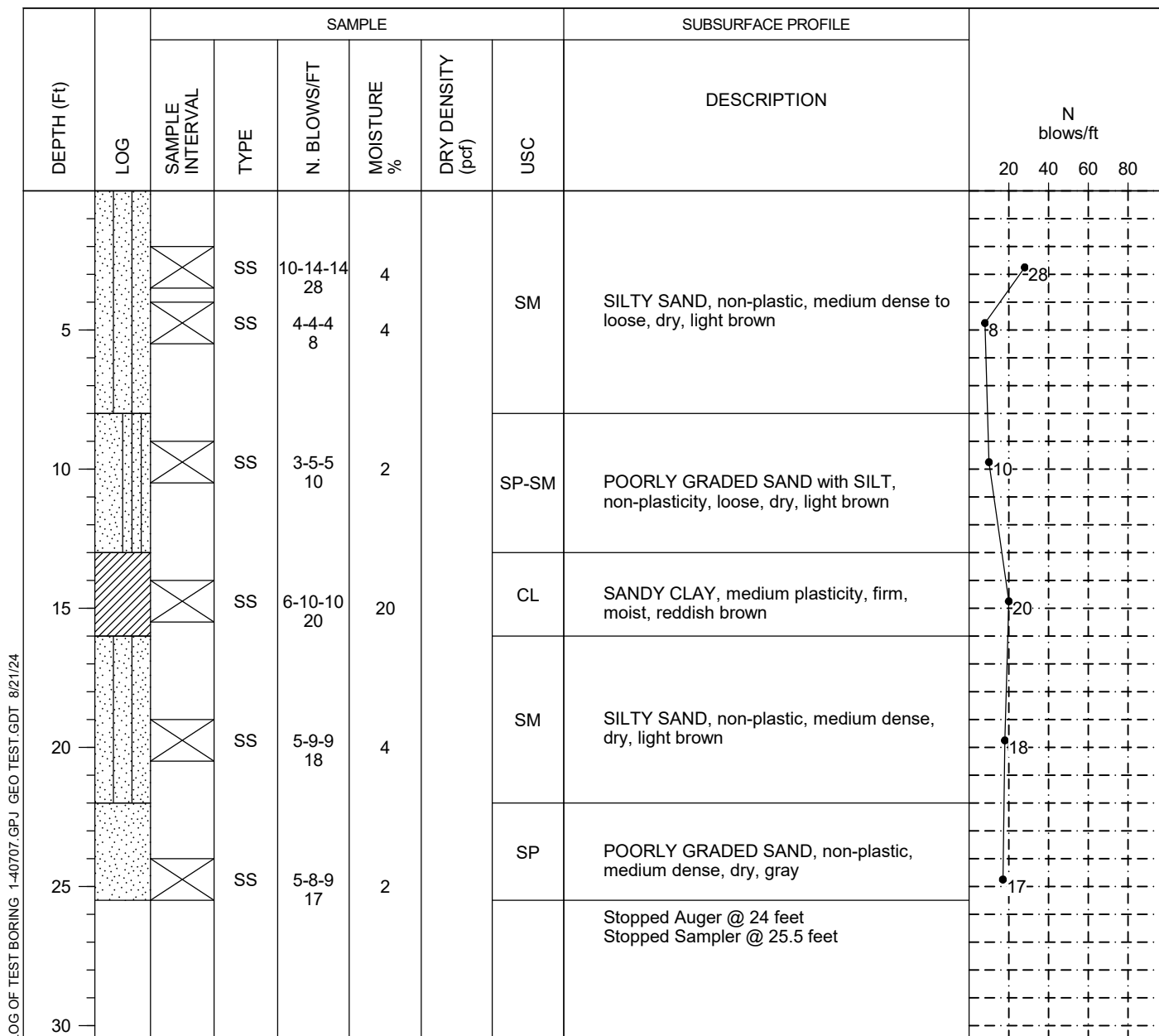
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 7

During Drilling: none

After 24 Hours:

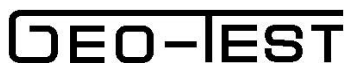


LEGEND

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Project: SC Judicial Complex Remodel

Date: 08/14/2024

Project No: 1-40707

Elevation:

Type: 3.25" ID HSA

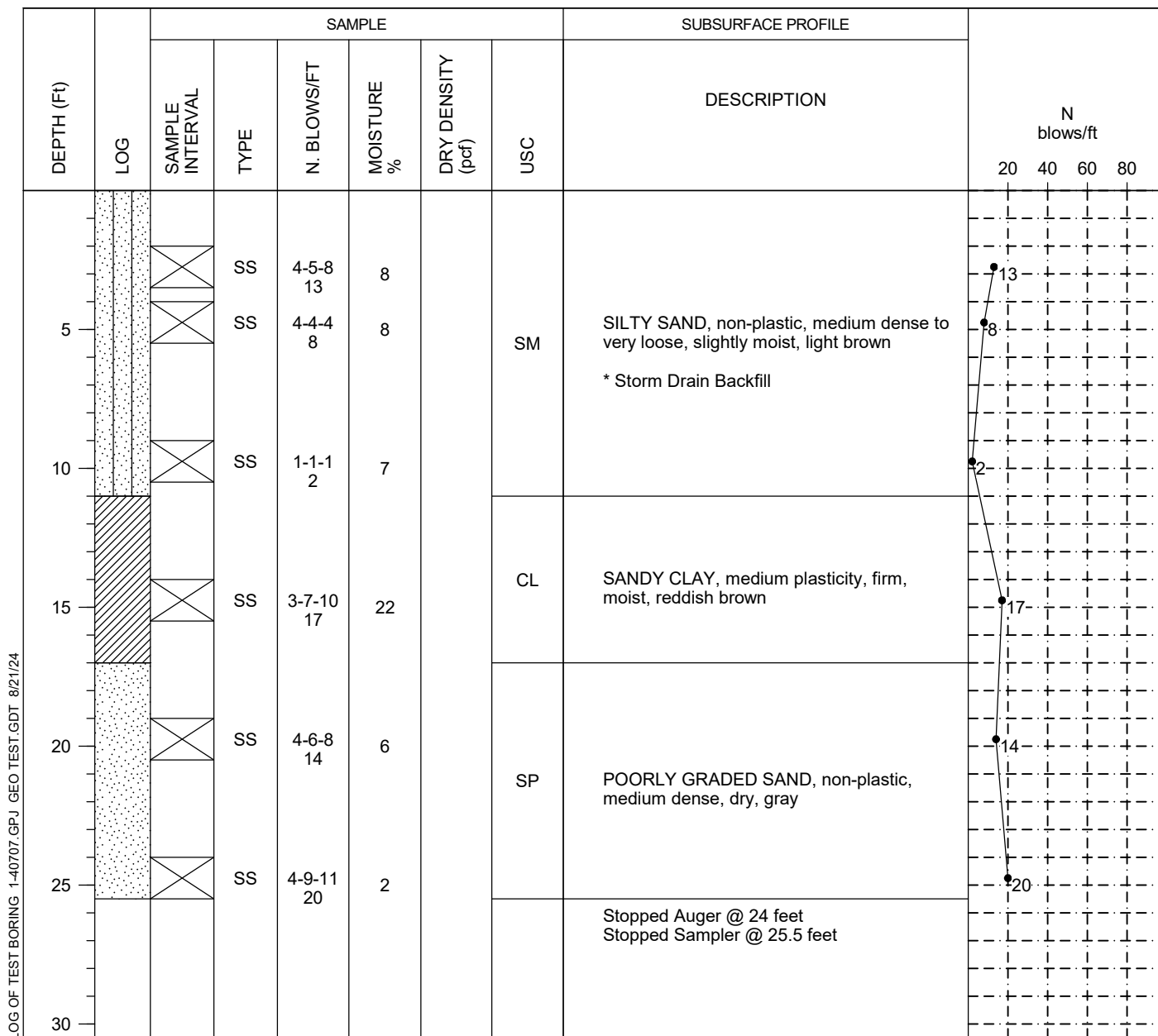
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 8

During Drilling: none

After 24 Hours:



LEGEND

SS - Split Spoon

AC - Auger Cuttings

UD/SL - Undisturbed Sleeve

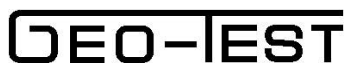
AMSL - Above Mean Sea Level

CS - Continuous Sampler

UD - Undisturbed

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Project: SC Judicial Complex Remodel

Date: 08/14/2024

Elevation:

Project No: 1-40707

Type: 3.25" ID HSA

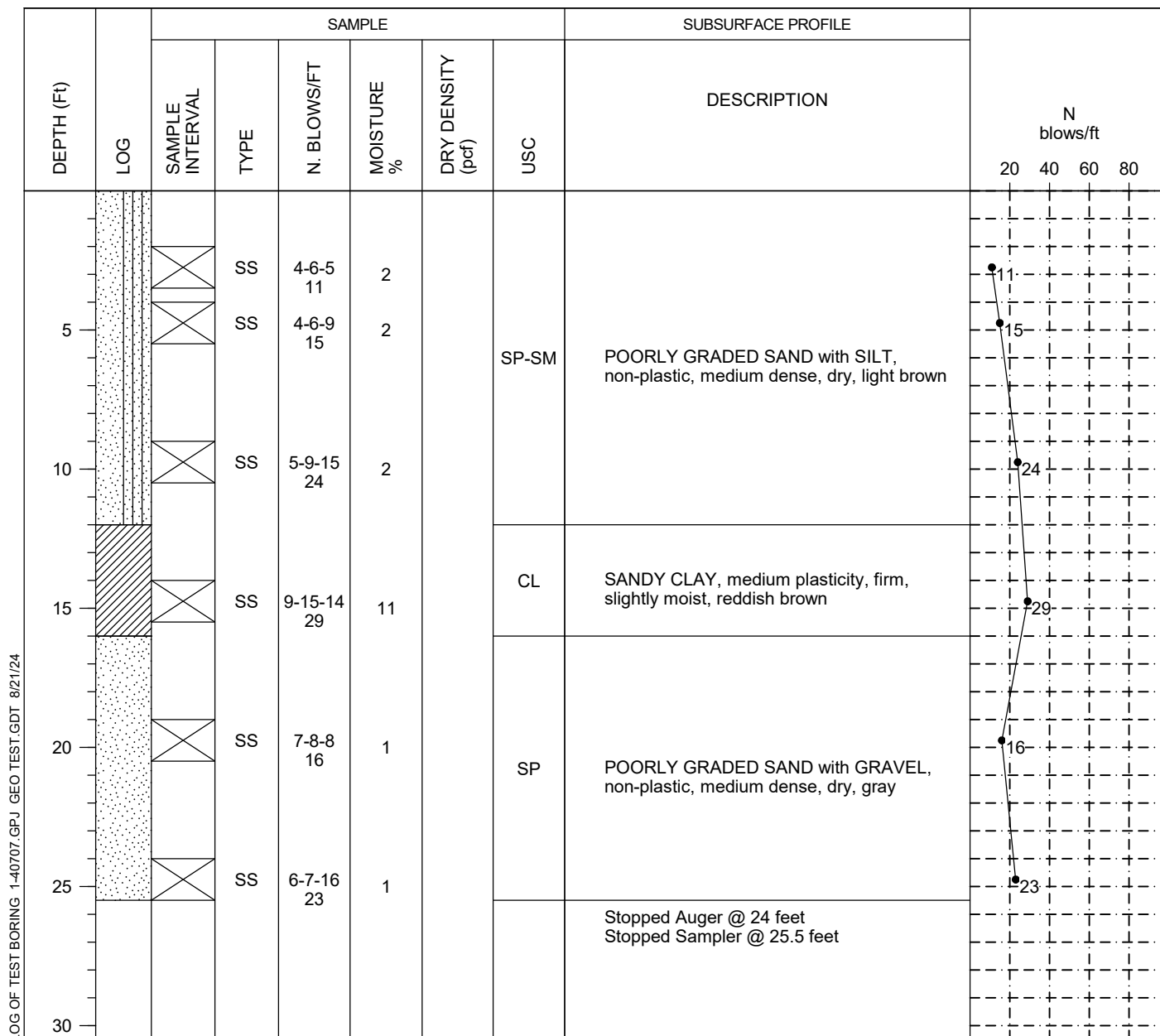
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 9

During Drilling: none

After 24 Hours:

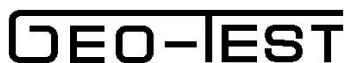


LEGEND

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Project: SC Judicial Complex Remodel

Date: 08/14/2024

Elevation:

Project No: 1-40707

Type: 3.25" ID HSA

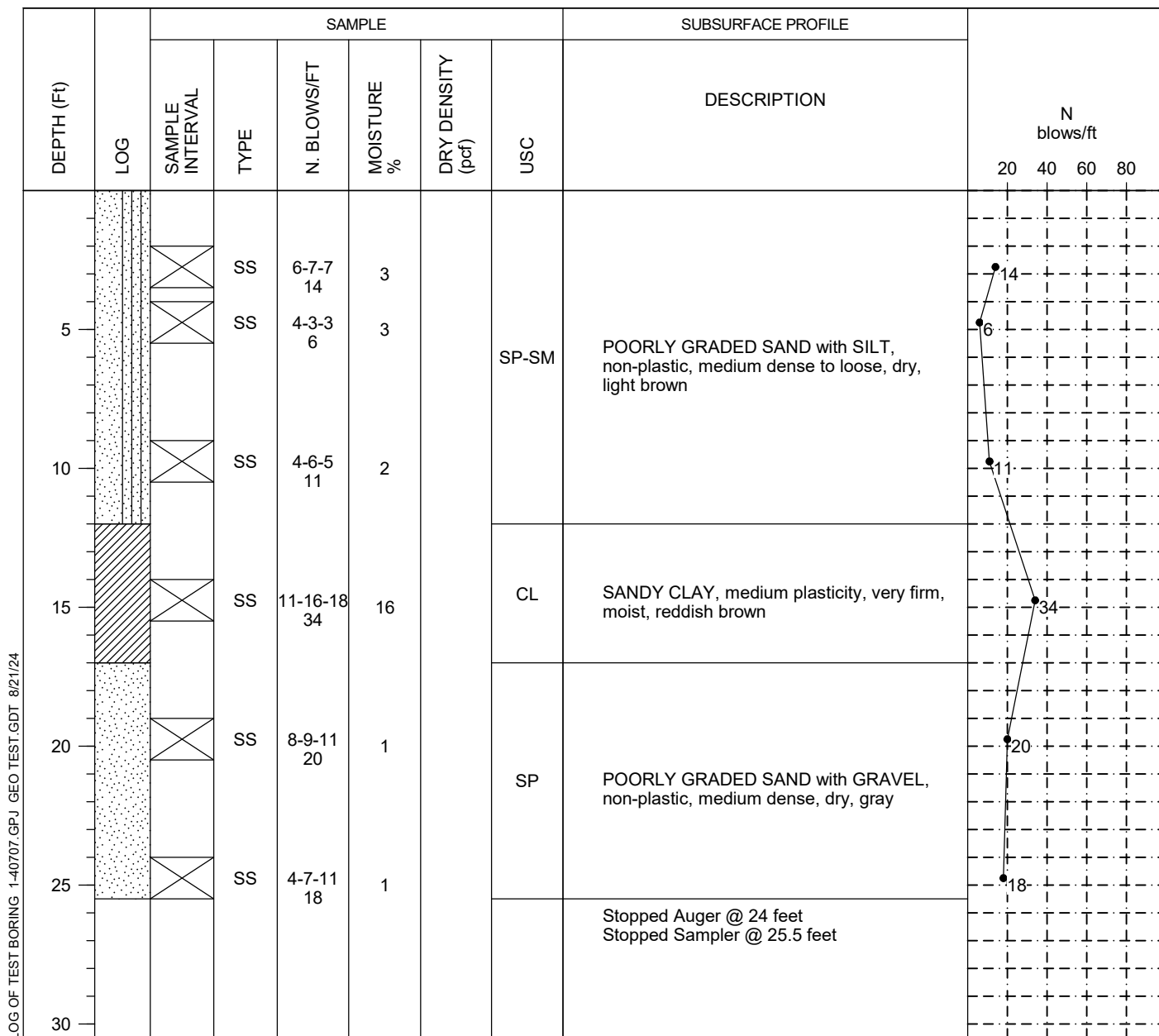
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 10

During Drilling: none

After 24 Hours:



LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve

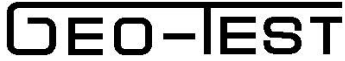
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SUMMARY OF LABORATORY RESULTS

Sheet 1 of 3

SUMMARY OF LABORATORY RESULTS 1-40707.GPJ GEO TEST.GDT 8/21/24

						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
1	2.5		12.9														
2	2.5	SC	12.6	29	16	46	59	98	100								
3	2.5	SM	4.0	NP	NP	16	39	69	93	98	100						
4	2.5		8.6														
5	3.0		9.8														
5	5.0	SM	6.0	NP	NP	18	50	94	100								
5	10.0		3.9														
5	14.5		4.4														
5	15.5		22.9														
5	20.0	SP-SM	4.9	NP	NP	9	35	97	100								
5	25.0		2.9														
5	30.0	SP	2.5	NP	NP	2	12	76	99	99	100						
5	35.0		2.4														
6	3.0		6.8														
6	5.0		10.2														
6	10.0	SP-SM	5.9	NP	NP	11	17	94	100								
6	15.0		20.8														
6	19.5		6.0														
6	20.5	CL	21.8	36	18	68	90	99	100								
						LL = LIQUID LIMIT PI = PLASTICITY INDEX NP = NON PLASTIC or NO VALUE						Project: SC Judicial Complex Remodel					
												Location: Rio Rancho, NM					
												Number: 1-40707					

SUMMARY OF LABORATORY RESULTS

						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
6	25.0		4.7														
6	30.0		2.7														
6	35.0		2.3														
6	40.0	SM	7.4	NP	NP	22	52	91	100								
6	45.0		3.4														
6	50.0		3.5														
7	3.0		3.7														
7	5.0	SM	4.5	NP	NP	27	66	90	100								
7	10.0		2.2														
7	15.0		19.9														
7	20.0		4.3														
7	25.0		2.3														
8	3.0	SM	7.7	NP	NP	15	39	87	99	100							
8	5.0		8.4														
8	10.0		7.3														
8	15.0	CL	21.5	30	15	71	93	98	99	100							
8	20.0		6.2														
8	25.0		1.9														
9	3.0		2.4														
						LL = LIQUID LIMIT PI = PLASTICITY INDEX NP = NON PLASTIC or NO VALUE						Project: SC Judicial Complex Remodel					
												Location: Rio Rancho, NM					
												Number: 1-40707					

SUMMARY OF LABORATORY RESULTS 1-40707.GPJ GEO TEST.GDT 8/21/24

SUMMARY OF LABORATORY RESULTS

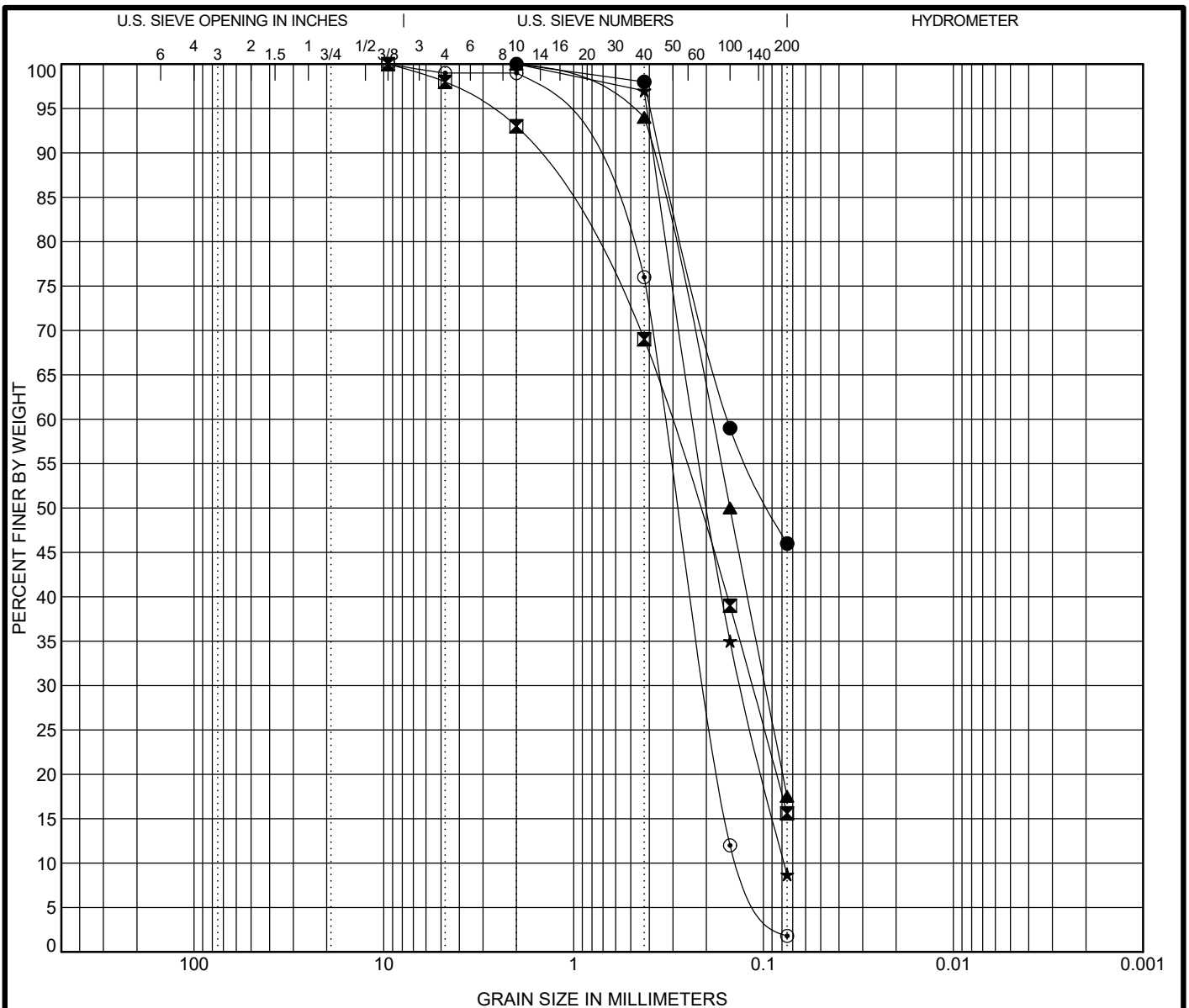
						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
9	5.0	SP-SM	2.0	NP	NP	11	34	92	100								
9	10.0		1.7														
9	15.0		10.9														
9	20.0		0.9														
9	25.0		1.0														
10	3.0		2.9														
10	5.0		2.8														
10	10.0	SP-SM	2.1	NP	NP	10	31	72	92	94	96	97	100				
10	15.0		16.3														
10	20.0		0.8														
10	25.0		0.8														

SUMMARY OF LABORATORY RESULTS 1-40707.GPJ GEO TEST.GDT 8/21/24



LL = LIQUID LIMIT
PI = PLASTICITY INDEX
NP = NON PLASTIC or NO VALUE

Project: SC Judicial Complex Remodel
Location: Rio Rancho, NM
Number: 1-40707



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification			LL	PL	PI	Cc	Cu
●	2	2.5	CLAYEY SAND(SC)			29	13	16		
⊠	3	2.5	SILTY SAND(SM)			NP	NP	NP		
▲	5	5.0	SILTY SAND(SM)			NP	NP	NP		
★	5	20.0	POORLY GRADED SAND with SILT(SP-SM)			NP	NP	NP	0.98	2.94
⊙	5	30.0	POORLY GRADED SAND(SP)			NP	NP	NP	0.94	2.50
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	2	2.5	2	0.154			0.0	54.0	46.0	
⊠	3	2.5	9.5	0.311	0.115		2.0	82.4	15.6	
▲	5	5.0	2	0.19	0.098		0.0	82.5	17.5	
★	5	20.0	2	0.228	0.131	0.078	0.0	91.3	8.7	
⊙	5	30.0	9.5	0.328	0.201	0.131	1.0	97.2	1.8	

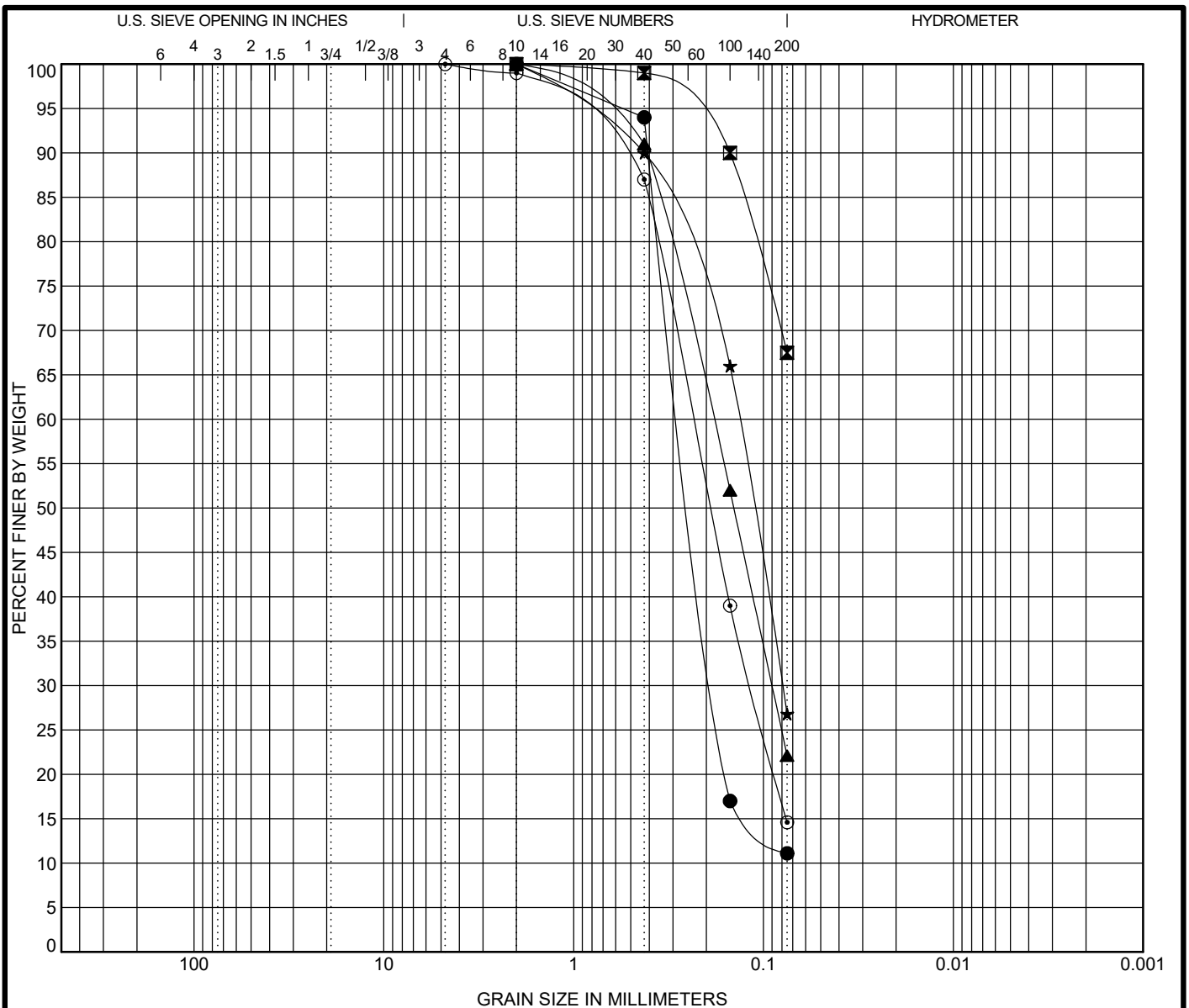
GEO-TEST

GRAIN SIZE DISTRIBUTION

Project: SC Judicial Complex Remodel

Location: Rio Rancho, NM

Number: 1-40707



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification			LL	PL	PI	Cc	Cu
●	6	10.0	POORLY GRADED SAND with SILT(SP-SM)			NP	NP	NP	1.81	4.07
⊠	6	20.5	SANDY LEAN CLAY(CL)			36	18	18		
▲	6	40.0	SILTY SAND(SM)			NP	NP	NP		
★	7	5.0	SILTY SAND(SM)			NP	NP	NP		
⊙	8	3.0	SILTY SAND(SM)			NP	NP	NP		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	6	10.0	2	0.268	0.179		0.0	88.9	11.1	
⊠	6	20.5	2				0.0	32.5	67.5	
▲	6	40.0	2	0.186	0.09		0.0	77.9	22.1	
★	7	5.0	2	0.135	0.079		0.0	73.2	26.8	
⊙	8	3.0	4.75	0.237	0.116		0.0	85.4	14.6	

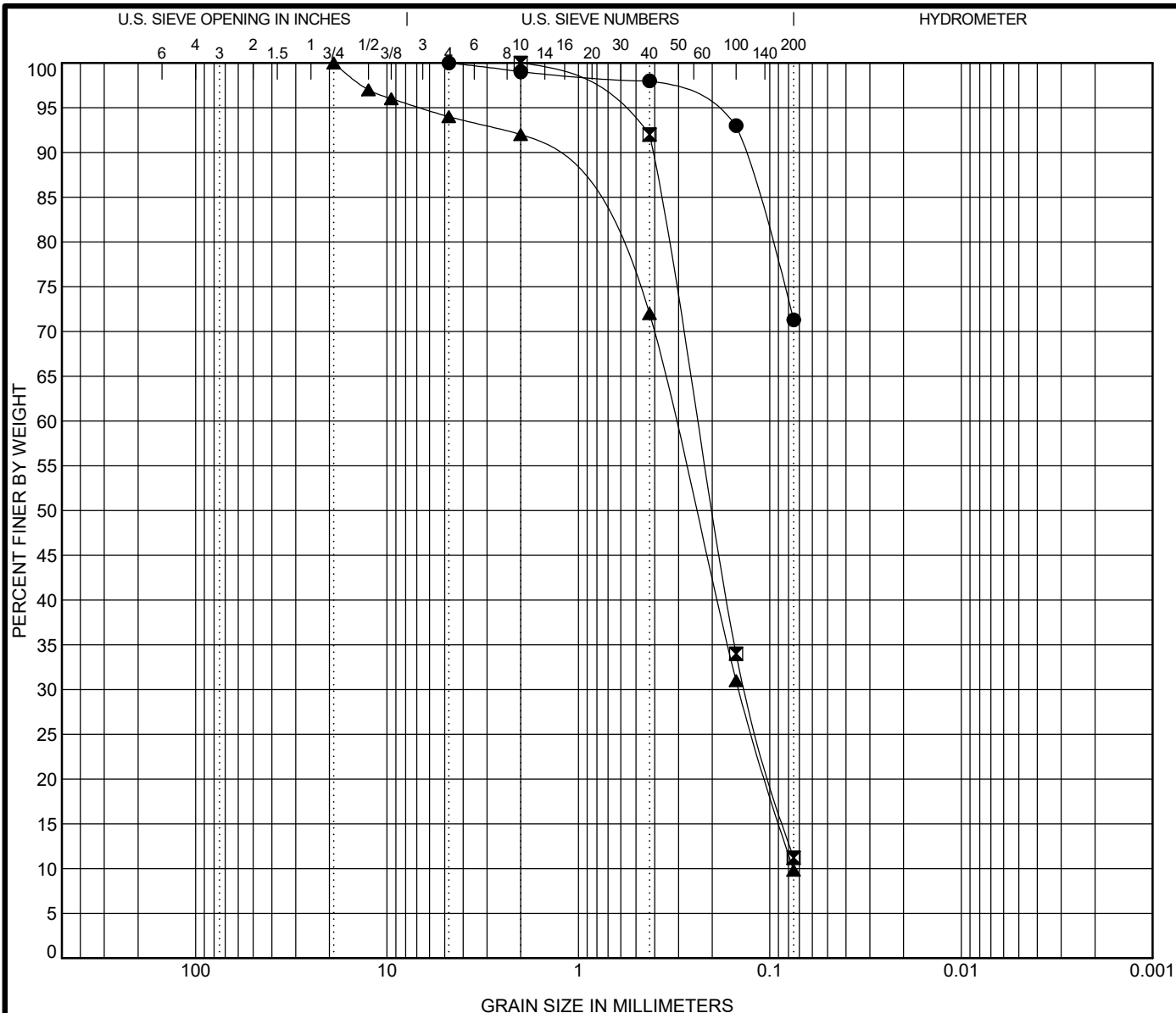
GEO-TEST

GRAIN SIZE DISTRIBUTION

Project: SC Judicial Complex Remodel

Location: Rio Rancho, NM

Number: 1-40707



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	8	15.0	LEAN CLAY with SAND(CL)	30	15	15		
☒	9	5.0	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	1.02	3.31
▲	10	10.0	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	0.89	4.15

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	8 15.0	4.75				0.0	28.7	71.3	
☒	9 5.0	2	0.239	0.133		0.0	88.8	11.2	
▲	10 10.0	19	0.313	0.145	0.075	6.0	84.2	9.8	

GEO-TEST

GRAIN SIZE DISTRIBUTION

Project: SC Judicial Complex Remodel

Location: Rio Rancho, NM

Number: 1-40707



Unconfined Compression

Undisturbed Cylindrical Sample

Project	SC Judicial Complex Remodel
Job #	1-40707
Sample	Boring 6 @ 15 ft
Description of Soil	Sandy Clay (CL)
Date	8/20/2024

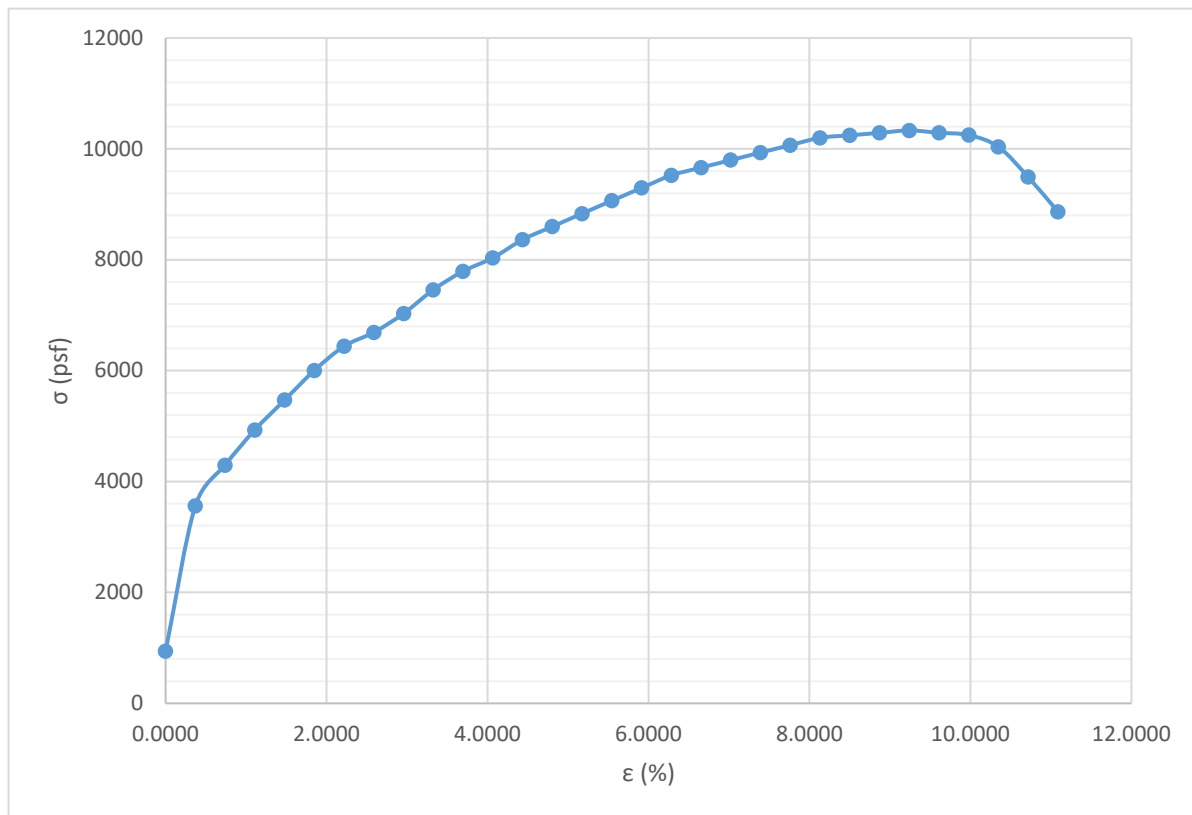
Initial Height (L_0)	2.706 in
Specimen Diameter (D_0)	1.396 in
Weight of Specimen	132.9 grams

Moisture Content	
Wet Weight (g)	132.1
Dry Weight (g)	107.8

Initial Area Of Specimen	1.530597 in ²
Volume of Specimen	4.141794 in ³

Moisture	0.2254
	22.54 %

Unit Weight (γ)	122.24 pcf
Dry Unit Weight (γ_d)	99.75 pcf



$q_u =$ 10332.08 psf

$S_u =$ 5166.039 psf



Unconfined Compression

Undisturbed Cylindrical Sample

Project	SC Judicial Complex Remodel
Job #	1-40707
Sample	Boring 8 @ 15 ft
Description of Soil	Sandy Clay (CL)
Date	8/20/2024

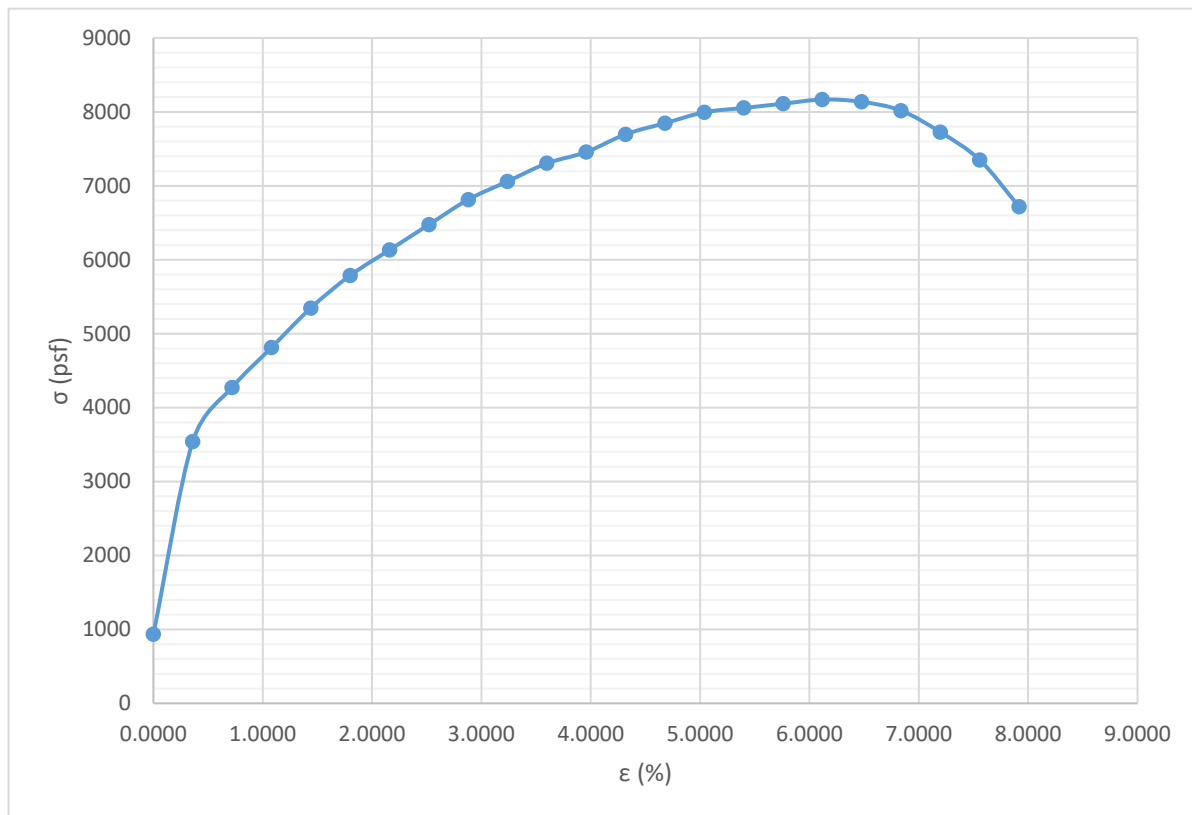
Initial Height (L_0)	2.779 in
Specimen Diameter (D_0)	1.4 in
Weight of Specimen	127.9 grams

Moisture Content	
Wet Weight (g)	127.2
Dry Weight (g)	97.2

Initial Area Of Specimen	1.53938 in ²
Volume of Specimen	4.277938 in ³

Moisture	0.3086
	30.86 %

Unit Weight (γ)	113.90 pcf
Dry Unit Weight (γ_d)	87.03 pcf



$q_u =$ 8167.422 psf

$S_u =$ 4083.711 psf