GLENARDEN APARTMENTS

GEOTECHNICAL INVESTIGATION

PRINCE GEORGE'S COUNTY, MARYLAND

June 10, 2016

HARDIN-KIGHT ASSOCIATES, INC.
CONSULTING ENGINEERS

June 10, 2016

Project No.: 16163

Pennrose Properties, LLC
575 S. Charles Street, Suite 140
Baltimore, MD 21201

Attention: Mr. Patrick Bateman

Reference: Geotechnical Investigation
Glenarden Apartments – Phase 1
Prince George's County, Maryland

Dear Mr. Bateman:

In accordance with your request, we have completed a geotechnical investigation for the above referenced project. Transmitted herein is a report of our findings and recommendations regarding foundation support, slab support, site grading, pavements, utility construction, retaining walls, stormwater management facilities, and related geotechnical considerations.

We appreciate the opportunity to assist you in this project. Please call us if you have any questions concerning geotechnical aspects of this site.

Very truly yours,

HARDIN-KIGHT ASSOCIATES, INC.

Justin A. Frizzell, P.E.

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STATE OF MARYLAND
STEPHEN E. KIGHT
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GEOTECHNICAL INVESTIGATION
for
GLENARDEN APARTMENTS
PRINCE GEORGE'S COUNTY, MARYLAND
June 10, 2016

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for
GLENARDEN APARTMENTS
Prince George's County, Maryland

June 10, 2016

OVERVIEW OF CONCLUSIONS & RECOMMENDATIONS

The following is a summary of conclusions and recommendations regarding improvements for the proposed Glenarden Apartments in Prince George's County, Maryland.

1. The site is suitable for the proposed development. Building foundations may be supported on normal shallow spread footings proportioned for an allowable soil pressure of 3,000 psf. However, existing fill associated with the demolished buildings was encountered at many of the boring and test pit locations to depths of up to approximately 8 feet below existing grade. In addition, older fills were encountered in isolated areas to as deep as 16.5 feet below the existing ground surface. We recommend that, at most locations, the existing fill be compacted to improve the density and consistency of the fill soils, and proof rolled to identify soft areas, prior to the placement of new fill. If soft areas are encountered during the compaction and proof roll procedures they will need to be removed and replaced.

2. Due to the presence of existing fill, the footing excavations must be closely inspected and tested by the geotechnical engineer or his representative. Soft or loose areas encountered during the inspection will require removal and replacement or lowering of the footing excavation.

3. The southern portion of the building located along Brightseat Road (eastern side of site), labeled as the "Senior" building, will require controlled fill of up to approximately 9 feet to achieve slab subgrade. Approximately 4 to 8 feet of rubble fill, above up to 12 feet of older fill, was encountered in that area. The loads applied by the weight of the fill and the new building will cause unacceptable settlement. We recommend that settlement monitoring points be installed prior to and during fill placement, and that an additional surcharge be added. Foundation construction must not begin until we have confirmed that the settlement is complete. Alternatively, the rubble fill may be removed and replaced with controlled, compacted fill, prior to the construction of new fills. The methodology for surcharge and settlement monitoring is described in the *Recommendations* section of this report.

3. The on-site fill soils are generally acceptable for re-use as controlled, compacted fill. However, the clayey fill soil is generally wet of the optimum moisture content and may require drying during re-use. High plasticity clays were encountered in some of the borings. High plasticity clay should not be used within 2 feet of foundation bottoms, or within 1 foot of pavement or slab subgrade.

4. Existing foundations and slabs were generally not encountered during the investigation. However, one column footing was observed. Therefore, it should be anticipated that some intact foundations will be encountered. In addition, existing utilities were observed. Existing foundations, utilities, and other structures must be completely removed and replaced with controlled fill. Some existing structures may remain in place, if approved by the owner, site engineer, and this office.

5. We anticipate that clayey soils will be encountered at roadway subgrade in some areas. These soils are considered to be low-strength with respect to pavement support. The low-strength soils will require removal and replacement if they are encountered in the top foot below pavement subgrade, or treatment with hydrated lime or soil cement.

6. Very dense materials will be encountered at some locations within the existing fill. Very dense materials were generally not encountered in the natural soils. Although blasting is very unlikely to be required, the contractor should be prepared for difficult excavations in some areas, particularly within the existing fill.

7. Perched water was observed in many of the borings and test pits, particularly within the existing fill. The contractor must be prepared for conventional construction dewatering, particularly for excavations deeper than 4 feet below existing grades.

8. Due to the presence of clay, fill, or water at, or near the bottom of the proposed SWM facilities, the site is generally not suitable for infiltration. The SWM facilities design should exclude infiltration.

REPORT OF GEOTECHNICAL INVESTIGATION

GLENARDEN APARTMENTS
LANHAM, MARYLAND
JUNE 10, 2016

1.0 INTRODUCTION

Submitted herein is our report of subsurface investigation for the proposed new townhome and multi-family unit condo residential site to be constructed in the Lanham area of Prince George's County, Maryland. In conjunction with the proposed improvements, this investigation was undertaken in accordance with your request to evaluate the subsurface conditions and to make recommendations for design and construction of foundations, slabs, pavements, retaining walls, utilities, site grading and stormwater management. This report includes the results of exploratory drilling, test pit excavations, engineering analysis, and recommendations.

We were provided with a site plan entitled *Glenarden Apartments – Soil Boring Plan, Parcels 'A' & 'B'*, dated March 2016, prepared by Ben Dyer Associates, Inc., (BDA). The site plan provides existing and proposed topography, and the layout of the proposed buildings with first floor slab grades, stormwater management facility locations and paved areas with proposed pavement grades. The plan also includes the proposed boring locations and their tabulated depths. The Boring and Test Pit Location Plan is found in Appendix A. The site engineer and the structural engineer chose the locations for the proposed borings.

2.0 SITE CONDITIONS

The site is located just west of Brightseat Road, immediately south of Hamlin Street and north of Ewarts Street, in Lanham, Prince George's County, Maryland. The site is bounded by wooded areas to the west and southeast, and residential areas in all other directions. The Site Location Map is included as Figure 1, in Appendix A.

The site was formerly occupied by a residential community, which, based on historical photographs, was built in the mid to late 1970's. The majority of the site is cleared, with isolated wooded areas located throughout the site in former landscape areas, between the old building and pavement areas. The previous buildings and roadways have been demolished and there is gravel and crushed concrete spread over the ground at the former building locations. A swimming pool was located on the eastern/central portion of the site. Although the pavements and buildings have been removed, the abandoned utilities seem, for the most part, to be still in place.

The site is rolling, with site topography generally sloping in all directions from a knoll located towards the southern/central portion of the site. Based on the site plan, ground surface elevations range from a low elevation of approximately 100 feet above Mean Sea

Level (MSL) on the southwestern corner of the site, to a high elevation of approximately 144 feet above MSL, on the knoll. The ground surface was generally stable throughout the site at the time of the drilling, with isolated wet spots at depressed areas around the site.

3.0 PROPOSED CONSTRUCTION

Based on the previously referenced site plan, the proposed construction will consist primarily of slab-on-grade townhomes, with one 4-story, light frame structure (the Senior building) and a 1-story community building, with associated paved areas and utilities. The Phase 1 portion of the construction will consist of a total of 7 townhome buildings (labeled as TH-A thru TH-F), with 4 to 7 units in each building, the community building, and the northern half of the Senior building. The southern half of the Senior building is part of the Phase 2 portion of the construction. The townhome buildings are to be located on the northeastern portion of the overall site, the Senior building is to be located on the eastern portion of the site, and the community building is to be located on the eastern/central portion, just west of the Senior building. Access to the Phase 1 buildings will be from various proposed roadways, which are unnamed at this time, from Hamlin Street.

Based on conversations with Wolfman & Associates, the structural engineer, we understand that the Senior building will be light frame construction and that the maximum column and wall loads will be 85 kips and 6 kips per linear foot, respectively. The townhomes will have maximum column loads of 20 kips and wall loads of 3.5 kips per linear foot.

Based on the design drawings and discussions with BDA, we understand that there will be at least 11 stormwater management facilities scattered across the site, and are presumably mainly micro-bio-retention facilities. The details were not available at the time of the writing of this report. Two (2) of the proposed facilities are located within the Phase 1 portion of the construction.

We understand that the proposed buildings will not have basements. Based on the site plan, the townhome slabs are to range in elevation from approximately El. 117 to El. 132 feet above MSL. Controlled fill, up to approximately 8 feet in height, and excavations of up to approximately 3 feet will be required to achieve proposed townhome slab sub-grade elevations. For the Phase 1 (northern) portion of the Senior building, controlled fill of up to 3 feet will be required. The Phase 2 (southern) portion of the Senior building will require controlled fill of up to approximately 9 feet. The community building will require excavations of up to approximately 4 feet. The proposed roadways will require controlled fill of up to approximately 8 feet and excavations of up to approximately 2 feet, to reach proposed pavement subgrade elevations.

The recommendations and conclusions contained in this report are based on the proposed construction as described above. If actual conditions vary from those described above, this office should be contacted to review this report and prepare alternate recommendations if needed.

4.0 INVESTIGATION

Thirty-four (34) borings and 23 test pits were conducted as a part of this investigation. They are identified as B-34 thru B-42, B-48 thru B-58, R-13 thru R-24, R-26, SWM-8 and SWM-10. The borings were staked in the field by BDA. The borings were drilled to depths of 10 to 23 feet below the ground surface. The test pits are identified as TP-1 through TP-22 (and R-16). The test pits were located by this office using the existing site features and the staked boring locations and should be considered approximate. The elevations at the test pit locations were estimated from the topographic map, and the boring elevations were provided by BDA.

Standard Penetration Testing was performed in the borings as per ASTM Test Designation D 1586 *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils,* and soil samples were retrieved at 2.5-foot intervals to 10 feet and at 5-foot intervals, thereafter. Standard Penetration Testing involves driving a 2-inch O.D., 1 ⅜ - inch I.D. split-spoon sampler with a 140-pound hammer free-falling 30 inches. The SPT N-value, given as blows per foot (bpf), is defined as the total number of blows required to drive the sampler from 6 to 18 inches.

Soil samples were returned to the laboratory for testing. Laboratory testing was performed upon representative samples recovered during the subsurface exploration. Conclusions and recommendations regarding site development were derived from engineering analysis of field and laboratory data, and review of the site plan.

The soils have been visually classified in general accordance with the Unified Soil Classification System (ASTM D 2488). The soils in the SWM borings were also classified in accordance with USDA. Descriptions as provided on the logs are visual, supplemented by the laboratory test results. The recent boring and test pit logs are included in Appendix B. The laboratory test results are included in Appendix C.

Groundwater levels were generally recorded in the borings during drilling, at the completion of the soil sampling, and at approximately 24 hours after the completion of drilling. In addition, groundwater-monitoring standpipes were installed in all of the SWM borings and in select building and roadway borings, to prevent caving and allow for a more accurate 24 hour water level reading.

5.0 SUBSURFACE CONDITIONS

5.1 Geology

According to the *Prince George's County Geologic Map*, (Heather Quinn, 2003; revised 2006), based on the *Prince George's County Geologic Map* (Glaser 1996), with *Distribution of Silt Loam Soils in Upland Deposits* (Hack, 1977), the geologic units underlying the site are both the sand-gravel facies and the silt-clay facies of the Potomac Group. The Potomac Group includes the Patapsco, Arundel and Patuxent Formations. In Prince George's County these units have not been mapped separately at the county scale; instead sediments of the Potomac Group have been mapped according to dominant lithology: sand-gravel facies (Kps) or silt-clay facies (Kpc). The maximum thickness of the Potomac Group is about 1000 feet.

The sand-gravel facies is largely the lower Potomac Group (Patuxent Formation), but the upper portion (Patapsco Formation) also contains considerable sand and some gravel, which is included in this map unit. The lithology is essentially fine- to coarse-grained sand, grading to pebbly sand and gravel, coarse to very coarse in places, which is arranged in thin to very thick lenticular beds. The sands and gravels are typically white, buff, and yellow to brown. Clay clasts are common, as are ironstone pods and limonitic layers. Interbedded with these coarser clastics are scattered thin lenticular bodies of tough massive silt-clay. The silt-clay is white, pale gray, or variegated; dark-gray, where highly organic. As is typical of fluvial sediments, few beds are laterally continuous for any great distance; consequently, great variability in outcrop lithology is common.

The silt-clay facies of the Potomac Group, comprised of the Arundel Clay and much of the lower Patapsco Formation. The lithology is predominantly compact red and dark-gray clay containing large and small lenses and pods of sand and minor gravel. Some of the clay is strikingly variegated in color. Dark-gray lignitic clay is most characteristic of the Arundel but occurs at other stratigraphic levels as well. Much of the clay is internally massive and weathers hackly. Silt-clay lenses in the uppermost portion of the unit tend to be whitish or pale-gray, and thinner.

5.2 Soils

The USDA Natural Resources Conservation Service (NRCS) *Web Soil Survey for Prince George's County, Maryland* indicates the site is underlain by Russett-Chrisiana-Urban Land soils, 0-5% slopes (RuB), Sassafras-Urban land complex, 5-15% slopes (SnD) and Woodstown-Urban land complex, 0-5% slopes (WuB). The following is a brief summary of the NRCS information:

The Russett soils consist of moderately well drained soils located on drainhead complexes, swales, broad interstream divides and interfluves. The parent material is clayey fluviomarine deposits. The depth to the water table is more than 80 inches. The frequency of flooding and ponding is described as none.

The Christiana soils consist of moderately well drained soils located on hillslopes, interfluves, swales, and drainhead complexes. The parent material is clayey fluviomarine deposits. The depth to the water table is about 20 to 40 inches. The frequency of flooding and ponding is described as none.

The Sassafras soils consist of well drained soils located on knolls, fluviomarine terraces, ravines and interfluves. The parent material is loamy fluviomarine deposits. The depth to the water table is more than 80 inches. The frequency of flooding and ponding is described as none.

The Woodstown soils consist of moderately well drained soils located on broad interstream divides, swales, fluviomarine terraces, depressions, interfluves, and drainhead complexes. The parent material is loamy fluviomarine deposits. The depth to the water table is more than 80 inches. The frequency of flooding and ponding is described as none.

The Urban Land soils consist of man-made fill and must be characterized with an on-site investigation.

Please refer to the above referenced publication for a more detailed description of the site soils.

5.3 Conditions Encountered

The conditions encountered are suitable for the proposed development. Existing fill associated with the previous construction was encountered in 28 of the borings. The majority of the fill was approximately 2 to 5 feet in depth, but deeper fill of up to approximately 9.5 feet was encountered in 6 of the borings. The existing fill associated with the demolished buildings varies from fine to coarse grained soils with varying amounts of construction debris including concrete, brick and pavement fragments. In some areas the fill has significant amounts of organics. The recent existing fill soils are loose/soft to medium dense/very stiff, referencing SPT resistance values ranging from 4 blows per foot (bpf) to 21 bpf.

In addition to the fill associated with the demolition, there also appears to be areas that were filled prior to the previous construction. These fills have been in place for a relatively long period of time, and are difficult to discern from the natural soils. In some cases they

are labeled as "possible fill." The older fill or possible fill was observed in 10 of the borings. The older fill is primarily clayey in nature, but is more coarse-grained in some cases (2 borings). The older fill is medium stiff to very stiff, referencing SPT values ranging from 6 bpf to 14 bpf.

The natural soils generally consist of interbedded fine- and coarse-grained soils. High plasticity clay was observed in 8 of the borings. The natural soils are loose/soft to very dense/hard, referencing SPT values ranging from 5 bpf to 50 blows for 4 inches of penetration. However, the natural soils are primarily medium dense/stiff.

Groundwater was encountered in the borings during drilling, or observed after the completion of drilling, in 24 of the borings. Many of the borings in which water was not observed were caved at a relatively shallow depth. The water is perched in the existing fill, and in the interbedded sandy natural strata. Water monitoring standpipes were installed in all of the stormwater management borings, and in select building and roadway borings, to accurately determine water table elevations.

The laboratory tests conducted on representative soil samples from the recent investigation indicate that the soil moisture contents range from 5.1% to 32.7%, with an average moisture content of 15.7%. Moisture density relationship tests (proctors) were performed on bulk samples from Borings R-14 and R-16. The clayey soils were found to have a maximum dry density of 116.2 pcf, at an optimum moisture content of 12%. The sandy soils have a maximum dry density of 104.0, at an optimum moisture content of 13.9%. Therefore, the site soils are generally somewhat wet of optimum. Typical fill soil is classified as sandy lean clay with a liquid limit of 25 and a plasticity index of 8. The test on the representative natural fat clay indicated that the liquid limit is 54 and the plasticity index is 29. The granular natural soils were also tested and found to be silty fine to very fine sand, which ranged from being non plastic to slightly plastic, with a liquid limit of 21 and a plasticity index of 3. The laboratory test results are included as Appendix D. CBR testing is currently underway. The results will be presented as an addendum to the report, under a separate cover.

Detailed records of the conditions encountered are included on the boring and test pit logs, included in Appendix B. Boring profiles are included as Figures 3 through 5 in Appendix A.

6.0 ANALYSIS/DISCUSSION

In our opinion, the subsurface conditions on this site are suitable for the proposed development. However, existing fill soils were encountered in the borings and test pits. The existing fill soils will need to be inspected, compacted and proof rolled prior to the

placement of new, controlled fill. Special consideration will need to be given to the fill located on the southern, Phase 2 portion of the Senior building.

6.1 Earthwork

Controlled fills, up to approximately 9 feet in height, and excavations of up to approximately 4 feet, will be required to achieve the proposed slab and roadway sub-grades. The largest fills will be located on the Phase 2 portion of the Senior building, and for townhome buildings TH-C and TH-D. The on-site existing fill may be used as controlled, compacted structural fill, provided it is constructed in accordance with the recommendations in this report.

The site contains existing fill in many areas, particularly at the locations of the previous buildings and pool. While the fill appears generally medium stiff to very stiff, it will be necessary to carefully compact, inspect, and improve isolated soft conditions that may be present in the inherently variable uncontrolled fill, prior to the placement of new, controlled fill. Compaction should be implemented to improve the density and consistency of the fill soils. The soils must be compacted using a large smooth drum vibratory compactor with a minimum gross drum weight in excess of 10,000 pounds, and capable of imparting a force equal to 30,000 pounds at a minimum of 1,000 vpm (note: Ingersol Rand models SD 100 through SD 180 meet this criteria). In areas where clayey fill soils are present at the surface, a sheep foot or rubber tire roller must be used. In addition, the fill subgrade should be proofrolled using a loaded tandem dump truck, or a rubber tire roller, with a gross weight in excess of 30 tons. If debris or isolated soft areas are encountered during the compaction or proof roll procedures, they should be removed and replaced under the direction of the geotechnical engineer.

Due to the loads applied by the new fills and the Senior building, unacceptable settlement is anticipated in the larger existing fills on the southern portion of the proposed building. Settlement monitoring points must be established at the bottom, mid-point, and top of the new fill. The settlement points must be monitored at least 3 times a week, and up to once a day. The foundation construction on that side of the building must not begin until the geotechnical engineer has confirmed that the settlement is complete.

We recommend that at least 4 additional feet of surcharge be placed on the Phase 2 portion of the Senior building pad to simulate the building loads and decrease the time required for settlement. We anticipate that the settlement will take on the order of 30 days or less.

A surcharge fill is not required on the northern half of the Senior building, where less new fill is required. However, we anticipate that some of the fill on the northern portion of the building, on the order of 1 to 2 feet, will require removal and replacement, due to organic

material observed in the fill. The geotechnical engineer or his qualified representative may determine the over-excavation required based on the compaction, proof roll and penetration testing process.

The on-site existing fill soils are acceptable for re-use as controlled, compacted fill. However, large pieces of concrete and other types of debris must be removed from the existing fill prior to its re-use as controlled, compacted fill. It may be necessary to dry some of the clayey fill soils in order to achieve the required compaction. High plasticity clayey soils must not be used within 2 feet of proposed foundation bottoms, or within 1 foot of pavement or slab subgrade. It is important that fill be placed in accordance with the *Recommendations* section of this report.

Intact foundations and slabs were generally not observed in the test pits, and are not expected to be encountered during construction on a widespread basis. However, one column footing, approximately 9 feet long, with a drop of a few inches towards the middle of the footing, was encountered in Test Pits TP-13 and TP-14, located on the southeastern portion of the Senior building. It is possible that other isolated foundations or slabs may be encountered. In addition, existing utilities such as storm drain pipes and structures were observed. Existing foundations, utilities, and other structures must be completely removed and replaced with controlled fill under the supervision of the geotechnical engineer. It is possible that some structures may be left in place, if approved by the owner, geotechnical engineer and structural engineer.

Very loose, saturated rubble was observed at the location of the demolished swimming pool. This material is completely saturated due to the voids in the rubble and clayey, impermeable nature of the underlying natural clays. It will be necessary to completely remove this rubble fill and replace it with controlled, compacted fill under the supervision of the geotechnical engineer.

Perched groundwater was encountered in the majority of the borings and test pits, at depths ranging from approximately 4 to 18.5 feet below existing grade. Therefore, groundwater will be encountered during site grading in some areas, particularly where larger excavations are required to achieve proposed grades. The contractor should be prepared for typical construction dewatering.

Very dense materials may be encountered at some isolated locations, particularly within the existing fill. Although blasting is very unlikely to be required, the contractor should be prepared for difficult excavations in some areas. In particular, very dense rubble fill was encountered in Test Pit TP-4, located in proposed Building TH-F. Excavations of up to 3 feet are required for that building.

6.2 Foundations

Based on the results of the borings, the existing fill (after compaction and proof roll for the majority of the site) and controlled, compacted fill on this site are suitable for support of spread footings proportioned for an allowable bearing pressure of 3,000 psf. Settlement on the order of 1 inch total and ½ inch differential can be anticipated based upon this design. Soft/loose soils and pieces of debris may be encountered for foundations that are in the inherently variable existing fill. The footing excavations should be closely inspected and tested by the geotechnical engineer or his representative. These footing areas must be tested by the geotechnical engineer with a Modified Penetrometer Test (MPT) or Dynamic Cone Penetrometer (DCP) to a depth of at least 3 feet below the bottom of the foundation. Soft or loose areas will require removal and replacement in accordance with the *Recommendations* section of this report. Large pieces of debris may also be encountered in the existing fill during foundation excavations. The larger debris will require removal and replacement at the direction of the geotechnical engineer.

Water was observed either during drilling or at 24 hours after the completion of drilling in most of the borings at depths of 4 feet or more below existing grades. The water appears to be in a perched condition in the existing fill and interbedded sandy soils. Perched groundwater may be encountered during footing excavations, particularly where cuts are required to achieve slab subgrade. Standard construction dewatering techniques should be utilized when groundwater is encountered.

6.3 Seismic Information

Utilizing the SPT data from the field exploration and the guidelines set forth by the 2012 International Building Code (IBC 2012 – Table 1613.5.2), the subsurface soil at the site is classified as "Site Class D".

6.4 Slab on Grade

Floor slabs for the building can be designed as concrete slabs on grade. The slab can be designed based on a modulus of subgrade reaction of 120 pci. Controlled, compacted fill of up to approximately 9 feet, and excavations of up to approximately 4 feet will be required to reach proposed slab sub-grades. The slabs should be designed and constructed in accordance with the *Recommendations* section of this report.

6.5 Subsurface Utilities

The natural and fill soils are generally considered to be suitable for the support of the utility pipe systems. The soils encountered during utility installation can be generally used

for trench backfill. However, moisture conditioning is likely to be required for the clayey fill soils. In addition, the very hard clay soils may be excavated in chunks that must be pulverized prior to reuse as compacted backfill.

Very dense materials were encountered in the borings within the existing fill. The contractor should be prepared for difficult excavations in the existing fill in some areas. Very dense materials were encountered in the natural soils in Boring B-53 at a depth of 6 feet, and in Boring B-54 at a depth of 9 feet. Therefore, we do not anticipate that difficult excavations will be encountered in the natural soils on a widespread basis, but may be encountered in isolated areas during the deeper utility excavations.

Groundwater was encountered during drilling, or was observed after the completion of drilling, in 24 of the borings at depths ranging from approximately 4 to 18.5 feet below existing grades. The water was perched, either within the existing fill, or in the interbedded granular natural soils. We anticipate that perched water will be encountered during utility excavations in many areas. The contractor should be prepared for routine construction dewatering. The materials removed during construction are likely to be wet of optimum, and drying may be required to achieve compaction specifications for the backfill, particularly for the clayey soils.

6.6 Pavements

The soils encountered are generally suitable for use in construction of compacted fill for the pavement areas. CBR testing is currently underway. The results will be submitted as an addendum to this report. Based on the site plans, controlled fills of up to approximately 8 feet are required and excavations of up to approximately 2 feet will be required in the proposed roadway areas.

The soils encountered are generally suitable for use in construction of compacted fill for the pavement areas. However, low-strength fine-grained soils were encountered in many of the borings and test pits. Although the CBR test results are not available at this time, we anticipate that the granular soils will have a CBR on the order of 7 or greater. This is considered to be fair to good with respect to pavement support. We anticipate that the fine-grained, clayey natural and fill soils have a CBR on the order of 7 or less. This is considered to be poor with respect to pavement support. When the low-strength soils are encountered at the proposed roadway subgrade, they must either be over-excavated and replaced with soils that have a CBR greater than 7, or improved by chemical stabilization. We recommend that chemical stabilization using hydrated lime, cement or Calciment® be strongly considered, particularly if the construction is to be conducted during the winter months. The pavement section detailed in the *Recommendations* section of this report can be used if the low strength soils are replaced or improved.

If a granular base course is used in the pavement section, as proposed, it is important that completed portions of the base be positively drained and protected from construction traffic, particularly after precipitation. Surface water which is trapped in the completed stone base may contribute to deterioration of the subgrade if construction traffic is allowed to traverse a saturated granular base. We suggest that the pavement areas be paved as soon as practical to reduce the potential for subgrade softening due to surface water, and to reduce the possibility of disturbance due to traffic on an exposed pavement subgrade (even automobile traffic).

Standard Prince George's County pavement sections may be utilized for this project. The pavement designs are based on a CBR value of 6. If the soils used to fill the site are found to have a CBR value of less than 6, or if the assumed traffic loading is not as stated above, the pavement design should be re-evaluated.

6.7 Retaining Walls

The building will contain foundation walls that retain earth on one side. The retaining walls will restrict the lateral movement of soil backfill, and the full internal resistance of the soil will not be mobilized. The use of "at rest" lateral earth pressure criteria, which assumes a non-yielding wall for the building walls is applicable for design purposes. Any site retaining walls that are not restrained at the top can be designed using active soil pressure. Lateral Earth Pressure Diagrams are included as Figures 6 and 7 in Appendix A.

Coarse-grained granular soils are recommended for the backfill of the retaining walls, particularly for any modular block, geogrid type walls. It is very important that only free-draining material be utilized in the reinforced area behind the block walls. The underlying granular soils found throughout the site may be used for constructing the reinforced area behind the wall.

It is important that water not be allowed to accumulate behind the retaining wall for the southern portion of the Senior building during construction. The grading must prevent water from flowing to or ponding adjacent to the wall to prevent hydrostatic pressure. Alternately, the wall may be drained using conventional foundation systems including a drainage layer adjacent to the wall and a foundation drain at the base. A detail for the optional foundation wall drain is included as Figure 8 in Appendix A.

6.8 Stormwater Management

Infiltration is not feasible due to the presence of shallow perched groundwater and clayey soils. Perched water was observed in the water monitoring standpipe at 24 hours after the completion of drilling in Boring SWM-8 at a depth of 6 feet (El. 115.1), and in Boring

SWM-10 at a depth of 12.7 feet (El. 121.2). The SWM facilities must include underdrains for dewatering.

Typically micro-bioretention type SWM facilities are excavated and filled with a very loose soil mixture to facilitate seepage and ostensibly filtering stormwater. If micro-bioretention facilities are planned, these very loose conditions must be located beyond a 1 horizontal to 1 vertical (1H:1V) projection from the edge of pavement or back of curb to prevent possible settlement. Similarly, the loosely filled facilities must be located beyond a minimum projected line of 2H:1V when adjacent to structures.

The on-site fine-grained soils are suitable if impervious soils are required for SWM facility core trenches or liners. The Soil Conservation Service, Maryland Standards and Specifications - Code 378, states that the soils used in construction of an impervious core must meet the requirements for USCS designations SC, or CL. Soils designated as CL were found in the recent borings and test pits.

The undisturbed natural soils are suitable for support of foundations proportioned for an allowable soil pressure of 3,000 psf. Slopes may be constructed to a maximum gradient of 2H:1V.

7.0 RECOMMENDATIONS

7.1 Earthwork

1. We recommend that structural fill areas be compacted using a large vibratory drum roller (or sheep's foot or rubber tire roller where clay is at the surface) with a minimum gross drum weight in excess of 10,000 pounds, and capable of imparting a force equal to 30,000 pounds at a minimum of 1,000 vpm, and proof rolled using a loaded tandem dump truck or a rubber tire roller with a gross weight in excess of 30 tons, prior to the placement of controlled fill or construction of the new pavement section. We recommend that the geotechnical engineer also perform penetration testing to 3 feet below the existing surface prior to fill placement. We recommend that soft or loose subgrade soils identified during this process be removed and replaced. The compaction and proof roll shall be performed in the presence of a geotechnical engineer or his representative.

2. We recommend that settlement monitoring points be installed on the southern half (Phase 2) of the Senior building before and during the placement of the new fill, as described in the *Analysis/Discussion* section of this report. We recommend that the settlement points be monitored on a regular basis, and that foundation construction not begin on the southern side until the geotechnical engineer has confirmed that the settlement is complete.

3. We recommend that at least 4 feet of surcharge fill be placed on the southern portion of the Senior building pad. We anticipate that settlement will be complete in 30 days or less.

4. We recommend that the rubble that was used to backfill the swimming pool be completely removed and replaced with controlled, compacted fill.

5. We recommend that structural fills in building areas be compacted to a minimum of 95% of the maximum dry density as determined by the modified moisture density relationship test (AASHTO T-180, ASTM D1557). Fill in the pavement and retaining wall areas may be compacted to 92%, with the exception of the top foot below pavement subgrade, which must be compacted to 97%.

6. We recommend that fill be placed in layers of 8 inches or less. We recommend that each layer of fill be tested and approved prior to placement of the succeeding layer. We recommend that fill which fails to meet the minimum compaction requirements be compacted and reworked until satisfactory compaction is obtained.

7. We recommend that off-site borrow soils proposed for use as structural fills meet the requirements for soil classifications GM, GP, GW, SM, SP, SW in accordance with the Unified Soil Classification System (D-2487). We recommend that the off-site borrow soils contain no more than 30% material passing the U.S. standard #200 sieve with a maximum plasticity index (PI) equal to 10.

8. We recommend that difficult excavations be anticipated in isolated areas within the existing fill.

9. We recommend that the contractor be prepared for standard construction dewatering for excavations deeper than approximately 4 feet below the existing ground surface.

7.2 Foundations

1. We recommend that the proposed structures be founded on spread footings bearing on existing fill subsoils, or suitably compacted structural fill, and designed for an allowable soil bearing pressure of 3,000 psf. Settlement on the order of 1 inch total and ½ inch differential can be anticipated based upon this design. We recommend that footings be at least 16 inches in width for continuous strip footings, and 24 inches for isolated column footings.

2. We recommend that the footing excavation bottoms be compacted using a trench compactor to provide a uniform compacted surface.

3. We recommend that the footing excavations be closely inspected and tested by the geotechnical engineer using a Modified Penetrometer Test (MPT) or Dynamic Cone Penetrometer (DCP) to a depth of at least 3 feet below the bottom of the foundation.

4. We recommend that soft or loose soils encountered during the footing inspections be removed and replaced with controlled fill compacted to a minimum of 95% of the maximum dry density, as determined by the modified moisture density relationship test (AASHTO T-180, ASTM D1557). Alternatively, the footing may be lowered through the soft or loose soils.

5. We recommend that large pieces of debris (4"+) encountered during the footing excavations be removed and replaced at the direction of the geotechnical engineer.

6. We recommend that the footings be completed the same day they are excavated. We recommend that footings that are not poured the same day be re-inspected and tested.

7. We recommend that exterior footings be located a minimum of 30 inches below the lowest adjacent exposed grade for frost protection. Interior footings in permanently heated areas may be located at minimum depths below slab level.

8. We recommend that the contractor be prepared to encounter groundwater for foundation excavations at depths greater than approximately 4 feet below the existing surface. We recommend that typical construction dewatering be implemented when groundwater is encountered.

7.3 Seismic Information

1. We recommend that the site be classified as "Site Class D".

7.4 Slab on grade

1. We recommend that ground floor slabs be designed as floating slabs, not rigidly connected to bearing walls or foundations to accommodate differential settlement between foundations and the slab. The slabs may rest on footing projections. The slabs may be rigidly connected to the foundation if the design takes into

consideration the potential for differential settlement between the slab and the foundation.

2. We recommend that the slab be designed based on a modulus of subgrade reaction of 120 pci.

3. We recommend that a minimum 4-inch thick layer of free draining granular material be placed beneath floor slabs to improve drainage and provide a firm level surface for concrete placement. We recommend that a plastic vapor barrier be provided between the concrete and drainage layer to prevent dampness.

4. Prior to placement of the drainage layer, we recommend that the slab subgrade be inspected, tested, and approved by a soils testing agency. We recommend that loose or wet areas that yield under construction traffic be either compacted in place, or removed and replaced with suitably compacted fill.

7.5 Subsurface Utilities

1. We recommend that a 6-inch granular bedding be placed beneath the pipe to provide uniform support when the pipe is supported on clayey soil, rock, or when groundwater is encountered.

2. We recommend that the contractor provide construction dewatering devices and adequate earth support systems during utility installation when groundwater is encountered.

3. We recommend that the contractor be prepared for difficult excavations due to concrete rubble and other debris located within the existing fill.

4. We recommend that utility backfill be compacted in accordance with the *Earthwork Recommendations* section of this report.

7.6 Pavements

1. We recommend that the pavement subgrade preparation be conducted in the presence of the geotechnical engineer or his representative. The completed work shall be tested and approved by the geotechnical engineer prior to construction of the succeeding work.

2. We recommend that the geotechnical engineer or his qualified representative inspect the soil type at pavement subgrade prior to paving. If materials with low strength characteristics (i.e. CBR<6) are identified by the inspector, we

recommend that they be removed and replaced with controlled, compacted fill. Alternatively, we recommend that the low-strength soils be treated with 3 to 5% hydrated lime or Portland cement. The final lime or cement application can be established based on the subgrade soils. For 4% cement, 12 inches thick, the estimated application rate is 40 pounds per square yard.

3. We recommend that pavement subgrade be proof rolled using a loaded tandem dump truck or a rubber tire roller with a gross weight in excess of 30 tons. We recommend that soft, loose or wet conditions identified during the proof roll be corrected in accordance with the following procedures:

   a. materials may be removed and replaced with suitable fill materials compacted to the required density.
   b. the materials may be reworked and re-compacted until satisfactorily compacted to the required density.
   c. unsatisfactory subgrade may be improved by installation of ground stabilization cloth and additional thickness of base material.
   d. longitudinal underdrains shall be installed in poorly drained areas as directed.

4. We recommend that the standard Prince George's County pavement section be utilized for preliminary design purposes, based on a design CBR of 7.0 or more.

5. We recommend that the top foot of soil at the pavement subgrade be compacted to 97% of the maximum dry density, as determined by the modified moisture density relationship test (AASHTO T-180, ASTM D1557). Underlying soils may be compacted to 92%.

6. We recommend that the contractor proceed with the placement of pavement aggregate base course within twenty four hours after subgrade approval, and proceed with the construction of the HMA binder course within twenty four hours of the satisfactory construction of the base course. If precipitation occurs during the course of these operations, a re-evaluation by the geotechnical engineer is recommended prior to proceeding.

7. We recommend that the contract documents include provisions for placement for extra work associated with preparation of the pavement subgrade on a unit price basis for the following items:

   a. for undercut of unsuitable materials and removal to an on-site storage area; per cubic yard
   b. for undercut of unsuitable materials and off-site removal; per cubic yard

c. for replacement fill using on-site soils; per cubic yard
d. for replacement fill using off-site soils; per cubic yard
e. for ground stabilization cloth; per square yard
f. for longitudinal underdrain; per linear foot

8. We recommend that large debris (4"+) encountered in the pavement areas in the existing fill, be removed and replaced at the discretion of the geotechnical engineer.

7.7 Retaining Walls

1. We recommend the use of "at-rest" lateral earth pressure criteria for the below grade foundation walls, which assumes a non-yielding wall. For retaining walls that are not fixed at the top of the wall, including the above grade foundation walls and the site retaining walls, we recommend that the "active" earth pressure criteria be utilized.

2. We recommend that the foundation and retaining walls be backfilled with on-site granular materials, or granular borrow, which meet the following requirements:

   20 percent maximum passing a U.S. Standard #200 sieve
   60 percent minimum passing a U.S. Standard #40 sieve
   Angle of Internal Friction = 32 degrees (minimum)
   Bulk (wet) Density = 130 pcf (maximum)
   Plasticity = Non-Plastic

3. We recommend that fill placed behind the walls be constructed in 6-inch loose lifts and compacted to a minimum of 92% of the maximum dry density as determined by the modified moisture density relationship test (AASHTO T-180, ASTM D1557).

4. We recommend that only granular backfill be used behind the foundation walls and retaining walls. For computation of design pressures, we recommend the following design parameters:

   Angle of Internal Friction = 32 Degrees
   Bulk (wet) Density = 130 PCF
   Coefficient of At-Rest Earth Pressure = 0.47
   Equivalent At-Rest Pressure = 61 PSF/FT
   Coefficient of Active Earth Pressure = 0.31
   Equivalent Active Earth Pressure = 40 PSF/FT

5. We recommend that exterior granular backfill be capped with pavement or 12 inches of impervious soil in the area of the walls, where possible.

6. We recommend that the slab subgrade drain away from the retaining wall on the southern side of the Senior building during construction. The grading must prevent water from flowing to or ponding adjacent to the wall to prevent hydrostatic pressure during construction. Alternately, the wall may be drained using conventional foundation systems including a drainage layer adjacent to the wall and a foundation drain at the base. A detail for the optional foundation wall drain is included as Figure 8 in Appendix A.

7.8 Stormwater Management

These preliminary recommendations are provided as a guide to assist in consideration of the stormwater management facility design.

1. We recommend that SWM Facilities be designed and constructed as conventional detention or retention facilities. The site is not suitable for infiltration. Micro-bioretention facilities are acceptable provided that they include bottom drainage.

2. We recommend that SWM Facilities be designed in accordance with Maryland Stormwater Design Manual.

3. We recommend that micro-bioretention faciilites adjacent to pavements and site structures be located beyond a 1 horizontal to 1 vertical projection from the structure or back of curb to prevent settlement of the pavement or structure.

4. We recommend that micro-bioretention faciilites adjacent to buildings be located beyond a 2 horizontal to 1 vertical projection from the foundation to prevent settlement of the building.

5. We recommend that the foundations for SWM structures be proportioned for an allowable soil pressure of 3,000 psf, and that foundation soils be tested and confirmed during construction.

6. We recommend that the earth slopes be constructed to a maximum gradient of 2H:1V or flatter. Flatter slopes are recommended, where possible, to facilitate maintenance and to reduce the potential for erosion.

7. We recommend that the earth pressure against structures be computed based on an angle of internal friction of 32 degrees, and unit weight of 130 pounds per cubic foot.

8. We recommend that the proposed final stormwater management design be reviewed by this office. A final review with modified final recommendations, if deemed necessary, will be prepared.

9. We recommend that the stormwater management facility installation be monitored by the geotechnical engineer, in addition to the certifying engineer, to confirm the satisfactory completion of geotechnical aspects of the installation.

7.9 Construction Inspection and Testing

We recommend that the owner retain the services of a geotechnical engineer to:

1. Monitor earthwork operations including topsoil removal, approval of the ground surface prior to placement of fill, proofrolling, and performance of compaction tests.

2. Observe foundation construction including inspection of the footing excavations, and performance of modified penetration tests to confirm subfoundation soil suitability.

3. Test and inspect subgrade preparation for pavements including monitoring, proofrolling, and confirming subgrade suitability prior to placement of base or surface courses.

8.0 LIMITATIONS

This report was prepared in accordance with generally accepted practice for geotechnical engineering in this area. It is intended for the use of the client for the specific site, as shown on Figure 2, for design purposes. The recommendations are based on the general description of the structures and site development as characterized above. If the project is substantially modified, this office should be notified so that we can review our recommendations to determine what impact the changes will have. We request the opportunity to review the site development and structural drawings as they become available.

The soil and water conditions discussed herein represent the conditions encountered at the locations of the exploratory borings and test pits, as shown on the location plan. Variations in the soils between the boring and test pit locations, and below the depths explored, should be anticipated.

Attached are copies of our boring and test pits logs, a boring and test pit location plan, site location map, soil profiles, lateral earth pressure diagrams, an optional foundation wall drain detail, and laboratory test results for your reference. If you have any questions concerning this report, please call our office.

APPENDIX A

FIGURES

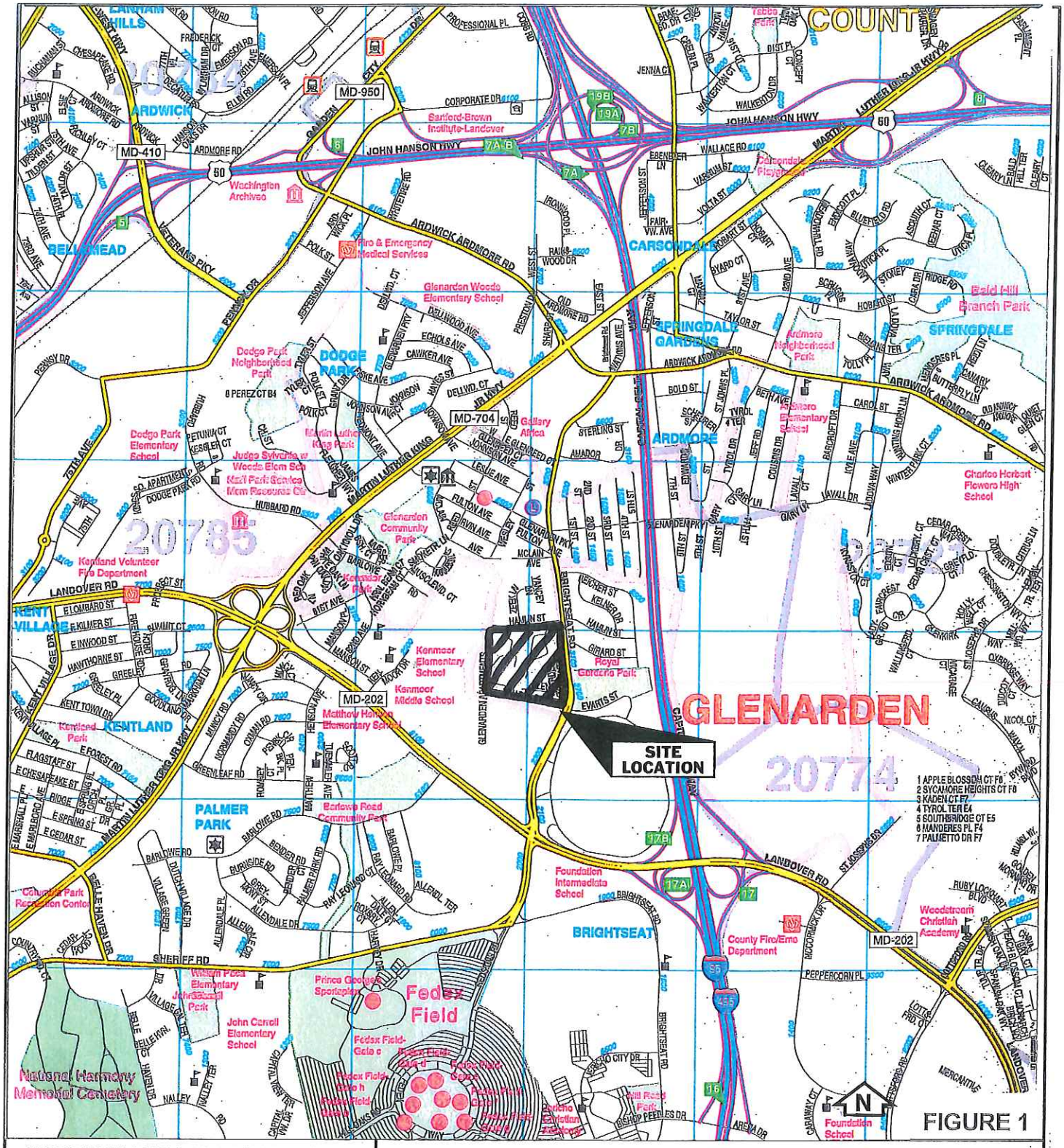


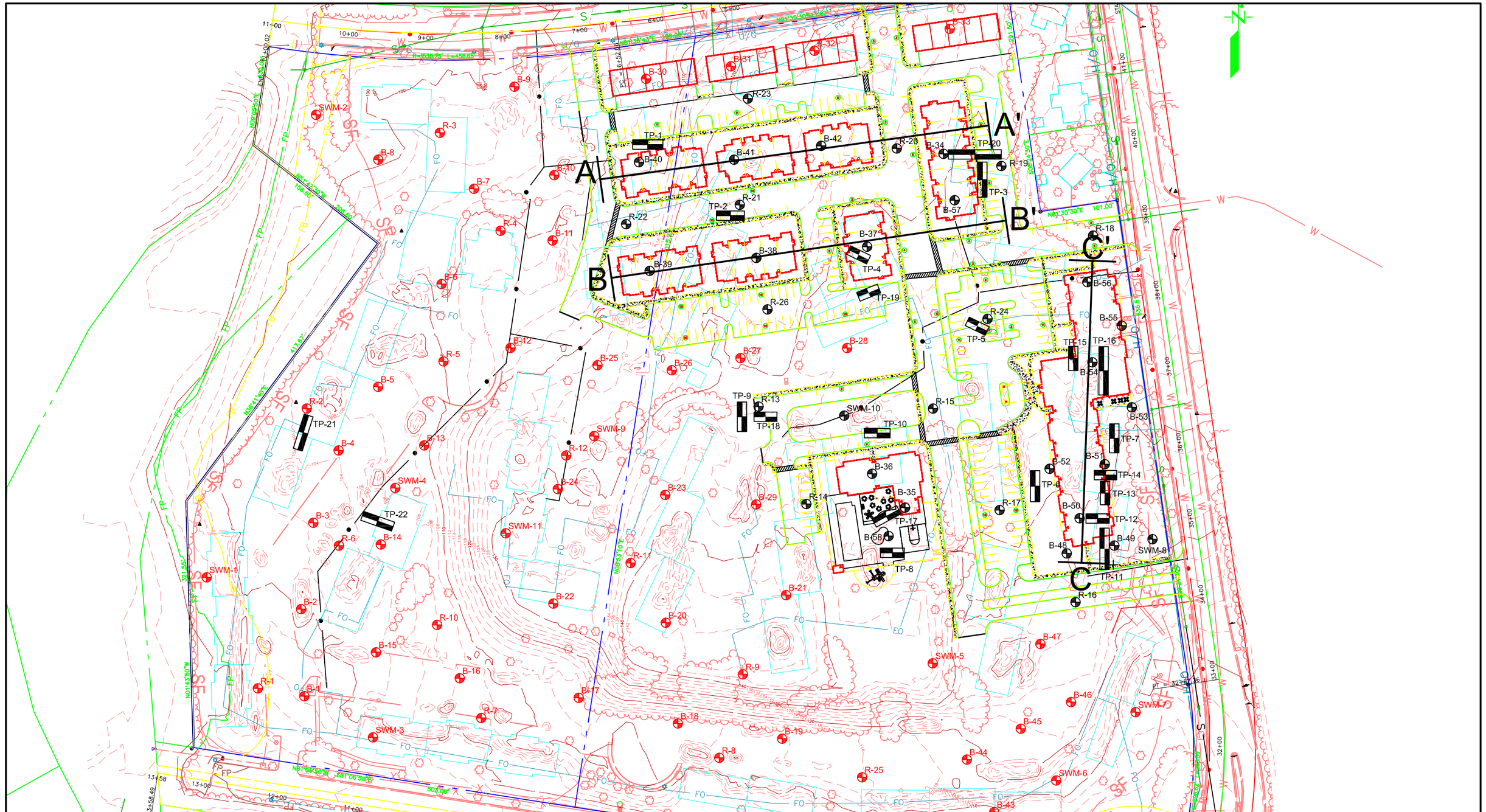
FIGURE 1

HARDIN-KIGHT ASSOCIATES, INC.
Consulting Engineers

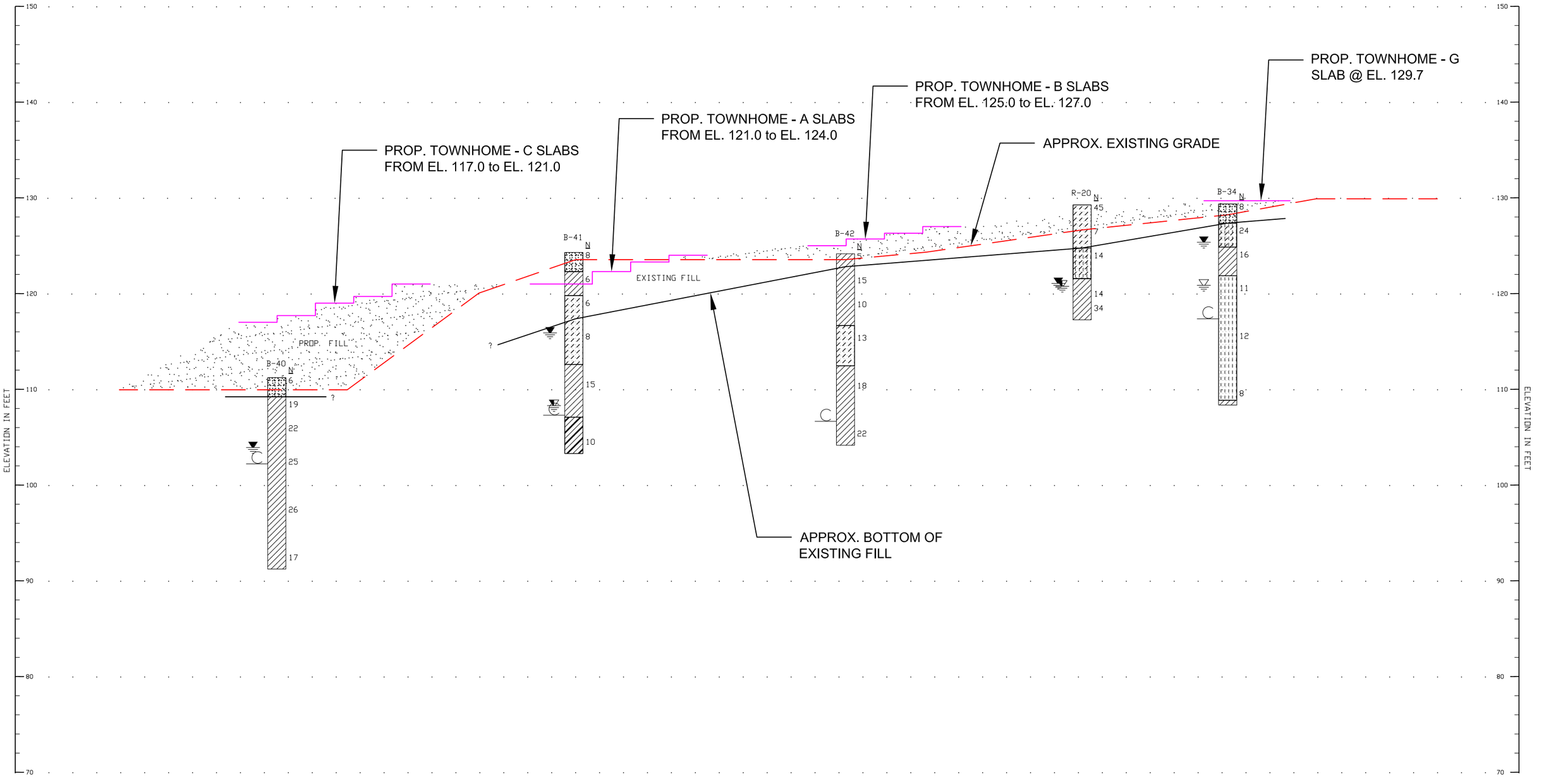
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061
(410) 553-0802
Fax (410) 553-0808

GLENARDEN APARTMENTS
SITE LOCATION MAP
PRINCE GEORGE'S COUNTY, MARYLAND

SCALE	DATE	SOURCE	REVIEWED BY	PROJECT NO.
1" = 2000'	MAY 2016	ADC	JAF	16163



PROJECT: 16163	GLENARDEN APARTMENTS		DATE: JUNE 2016
SCALE: 1" = 120'	BORING AND TEST PIT LOCATION PLAN		DRAWN BY: JFD
			CHECKED BY: JAF
FIGURE 2	FILE: 16163 - Glenarden Apartments	HARDIN-KIGHT ASSOCIATES, INC. CONSULTING ENGINEERS	



- Poorly graded SAND with silt
- Lean CLAY
- Clayey SAND
- Medium to highly plastic CLAY
- Silty clayey SAND
- Silty SAND
- Cave Depth
- Encountered Water Level
- Completion Water Level
- 24 Hour Water Level

SCALE:
HORIZONTAL 1"=40'
VERTICAL 1"=10'

Hardin-Kight Associates, Inc.

Consulting Engineers

7524 WB&A ROAD, SUITE 100 GLEN BURNIE, MARYLAND 21061

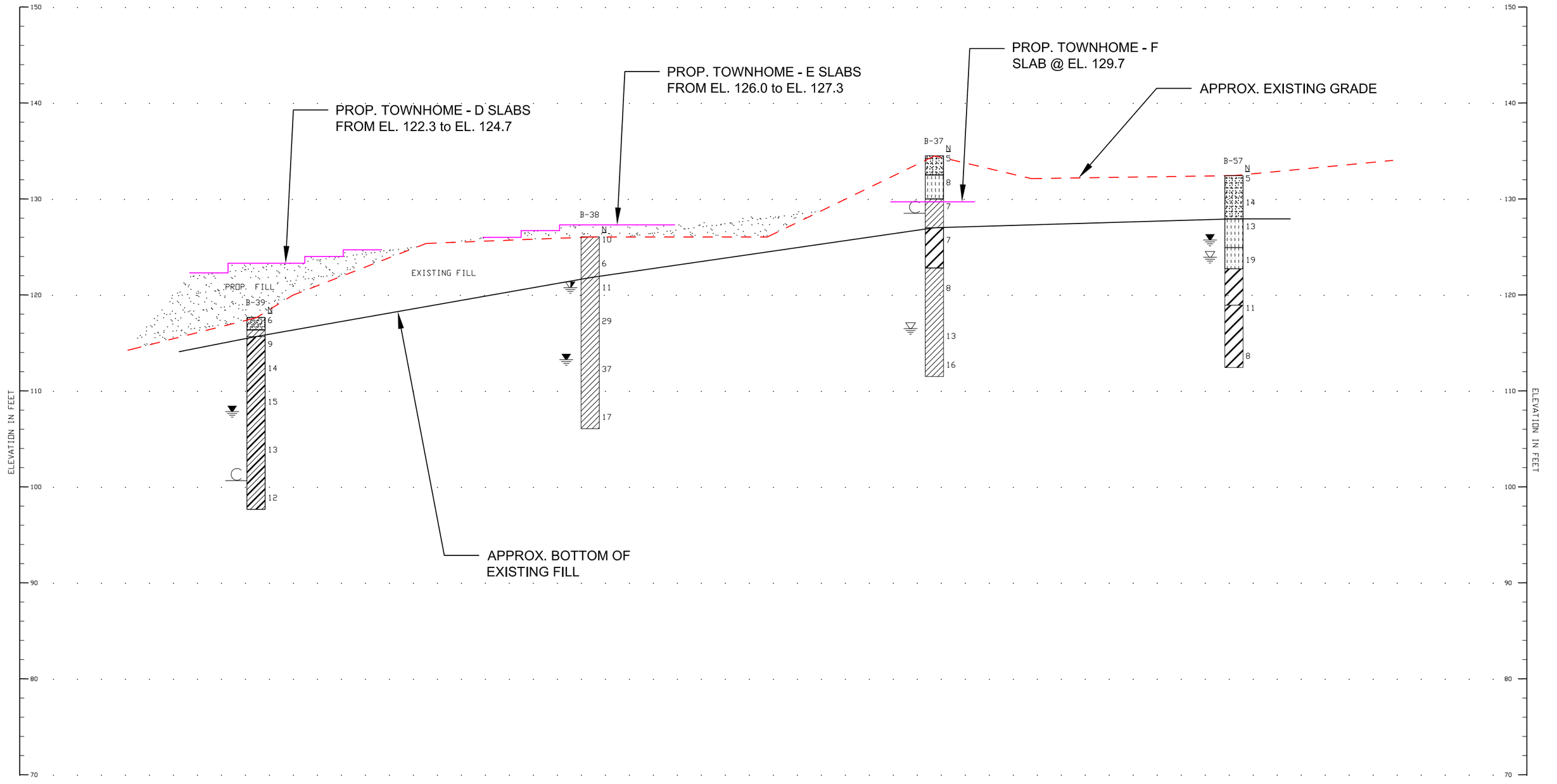
PHONE: (410) 553-0802 FAX: (410) 553-0808 HKAI@HARDIN-KIGHTASSOCIATES.COM

GLENARDEN APARTMENTS

SECTON A-A'

PRINCE GEORGE'S COUNTY, MARYLAND

HKA Job#: 16163
FIGURE 3
June 10, 2016



- Poorly graded SAND with clay
- Lean CLAY
- Medium to highly plastic CLAY
- Poorly graded SAND with silt
- Silty SAND
- Poorly graded SAND
- Fat CLAY
- Cave Depth
- Encountered Water Level
- Completion Water Level
- 24 Hour Water Level

SCALE:
HORIZONTAL 1"=40'
VERTICAL 1"=10'

Hardin-Kight Associates, Inc.

Consulting Engineers

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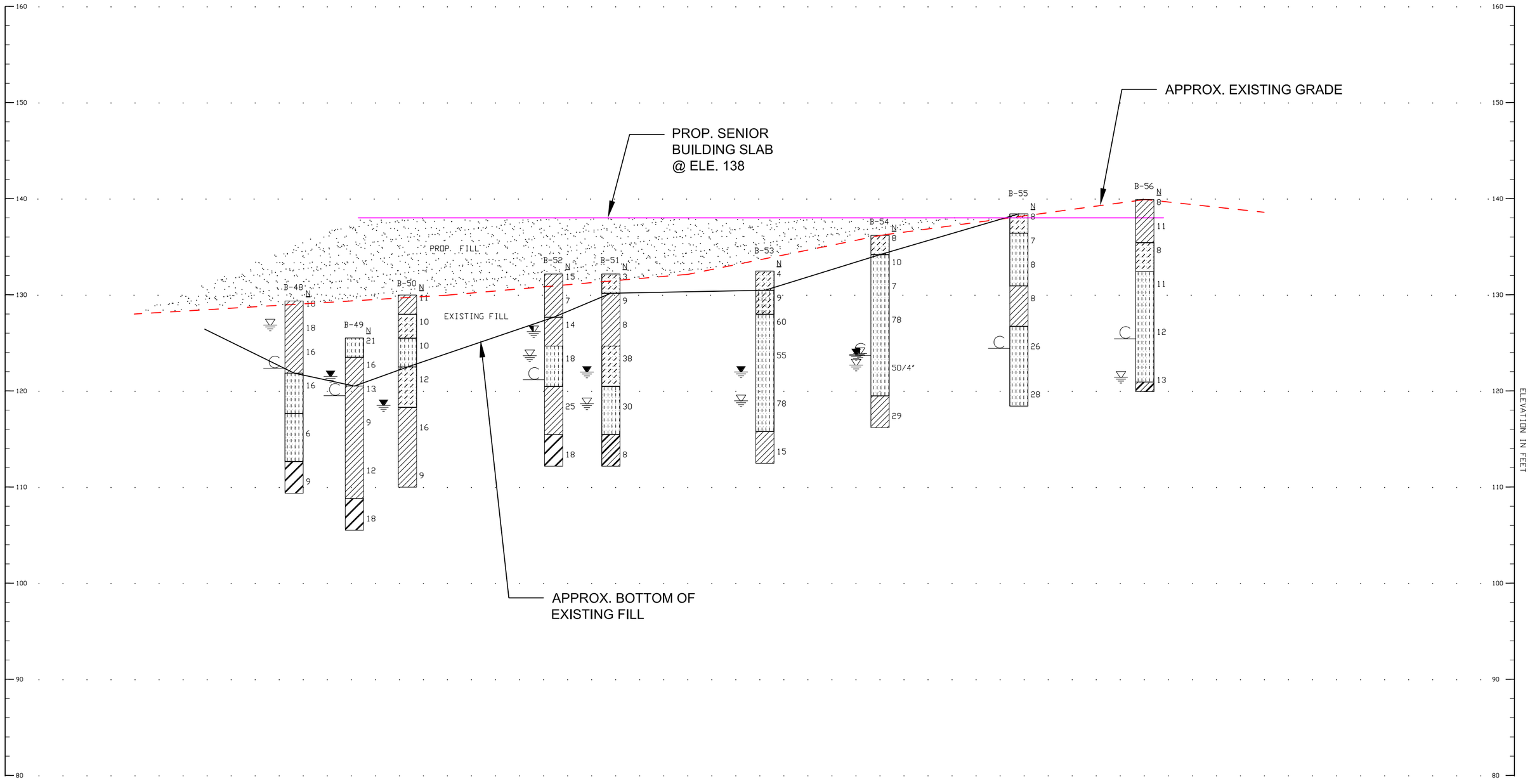
GLENARDEN APARTMENTS
SECTON B-B'

PRINCE GEORGE'S COUNTY, MARYLAND

HKA Job #: 16163
FIGURE 4
June 10, 2016



- Lean CLAY
- Clayey SAND
- Poorly graded SAND
- Silty SAND
- Fat CLAY
- Poorly graded SAND with silt
- Medium to highly plastic CLAY
- Silty clayey SAND
- Cave Depth
- Encountered Water Level
- Completion Water Level
- 24 Hour Water Level

SCALE:
HORIZONTAL 1"=40'
VERTICAL 1"=10'

Hardin-Kight Associates, Inc.

Consulting Engineers

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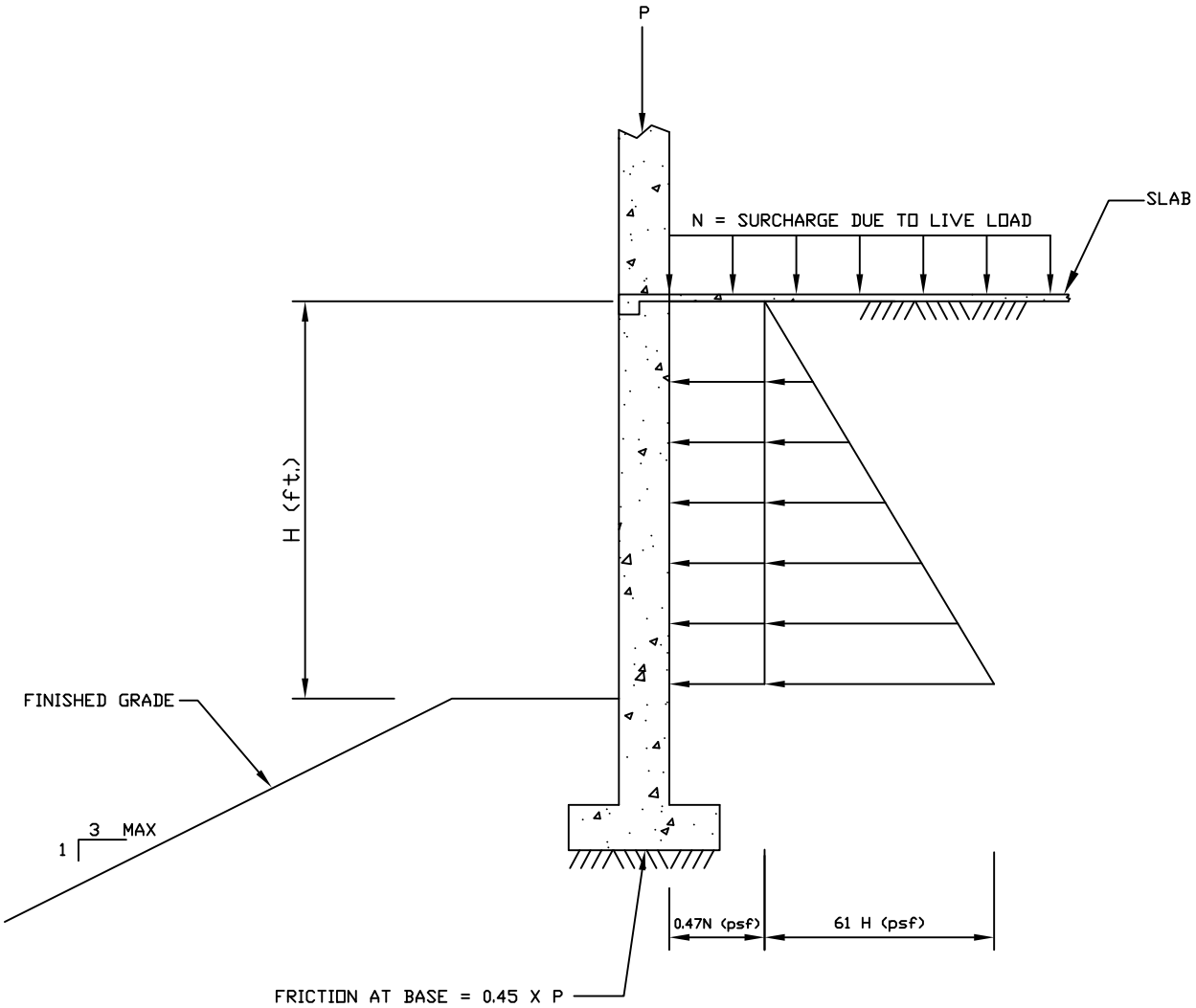
GLENARDEN APARTMENTS
SECTON C-C'

PRINCE GEORGE'S COUNTY, MARYLAND

HKA Job #: 16163
FIGURE 5
June 10, 2016



AT-REST/PASSIVE CASE FOR RESTRAINED (FOUNDATION) WALLS

NOTES:
1) FOR HORIZONTAL BACKFILL ONLY
2) COHESION IS NEGLECTED FOR ALL MATERIAL
3) ASSUMES NO HYDROSTATIC PRESSURE

FIGURE 6

HARDIN-KIGHT ASSOCIATES, INC.
Consulting Engineers

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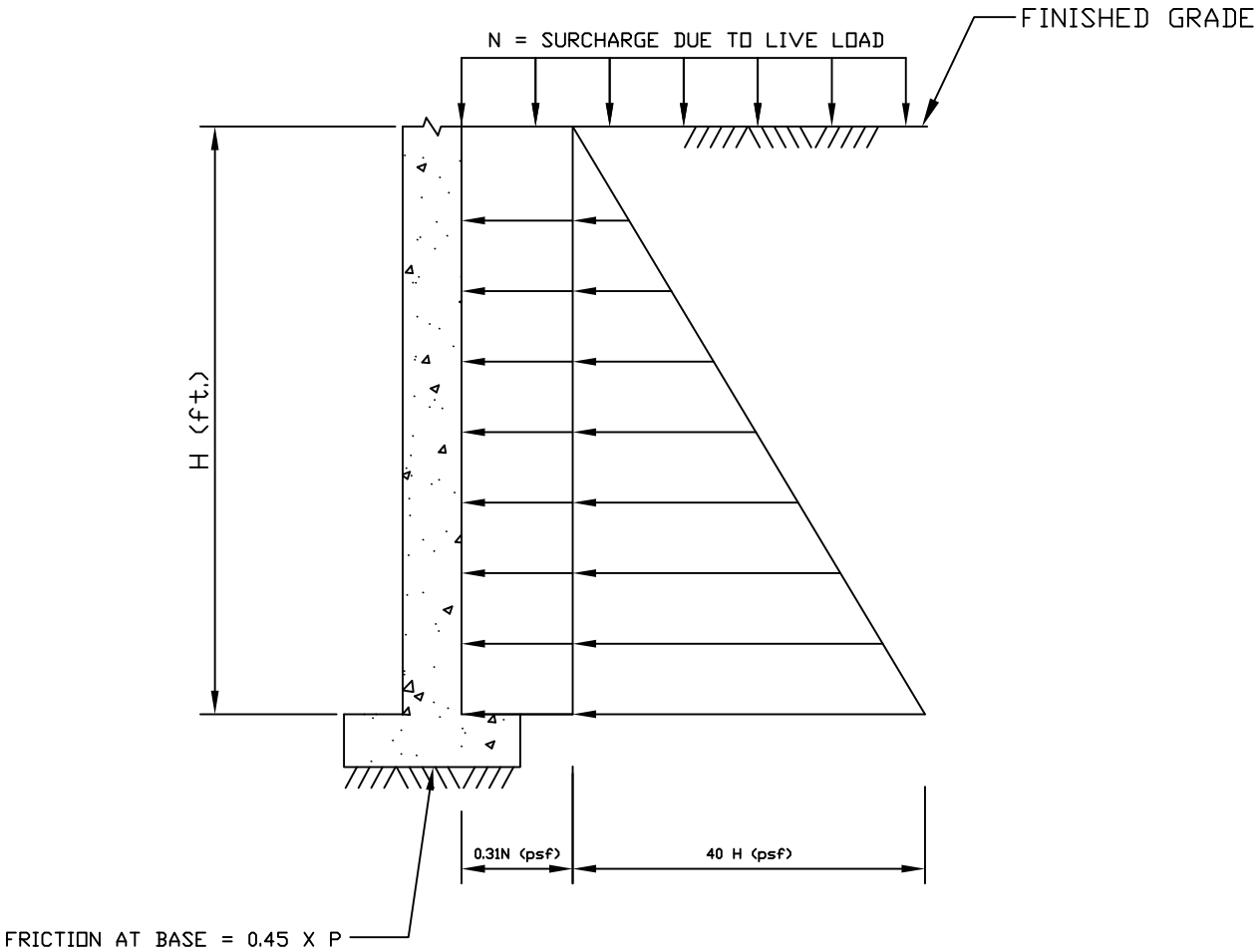
Fax (410) 553-0808

GLENARDEN APARTMENTS

LATERAL EARTH PRESSURE DIAGRAM

PRINCE GEORGE'S COUNTY, MARYLAND

SCALE	DATE	SOURCE	REVIEWED BY	PROJECT NO.
NTS	JUNE 2016	HKA	SEK	16163



ACTIVE CASE FOR UNRESTRAINED RETAINING WALLS

NOTES:
1) FOR HORIZONTAL BACKFILL ONLY
2) COHESION IS NEGLECTED FOR ALL MATERIAL
3) ASSUMES NO HYDROSTATIC PRESSURE

FIGURE 7

HARDIN-KIGHT ASSOCIATES, INC.
Consulting Engineers

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Glen Burnie, Maryland 21061
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GLENARDEN APARTMENTS

LATERAL EARTH PRESSURE DIAGRAM

PRINCE GEORGE'S COUNTY, MARYLAND

SCALE	DATE	SOURCE	REVIEWED BY	PROJECT NO.
NTS	JUNE 2016	HKA	JAF	16163

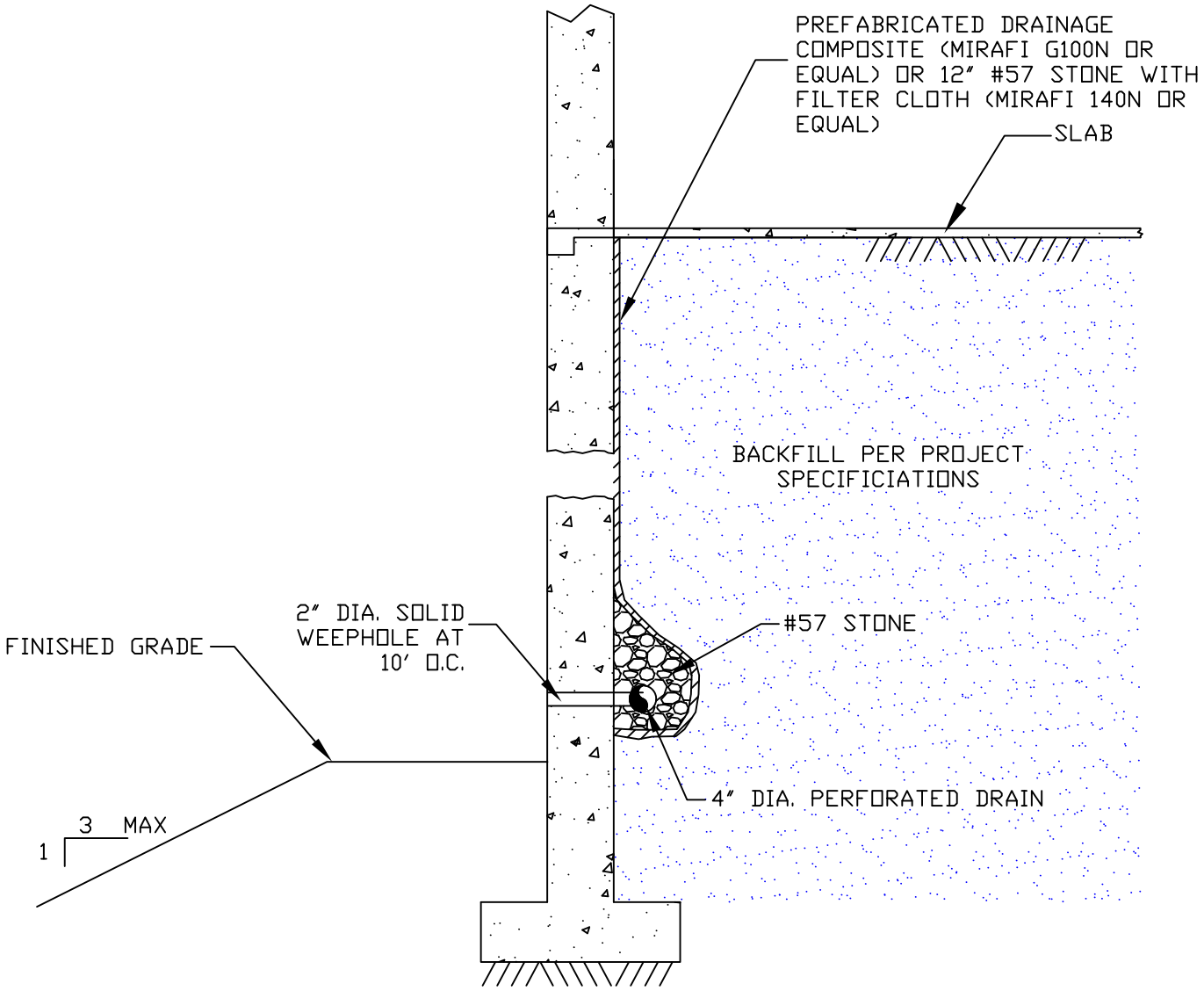

FIGURE 8

HARDIN-KIGHT ASSOCIATES, INC.
Consulting Engineers

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Glen Burnie, Maryland 21061
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Fax (410) 553-0808

GLENARDEN APARTMENTS

OPTIONAL INTERIOR FOUNDATION WALL DRAIN DETAIL

PRINCE GEORGE'S COUNTY, MARYLAND

SCALE	DATE	SOURCE	REVIEWED BY	PROJECT NO.
NTS	JUNE 2016	HKA	JAF	16163

APPENDIX B
BORING AND TEST PIT LOGS

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458643 E: 1352272

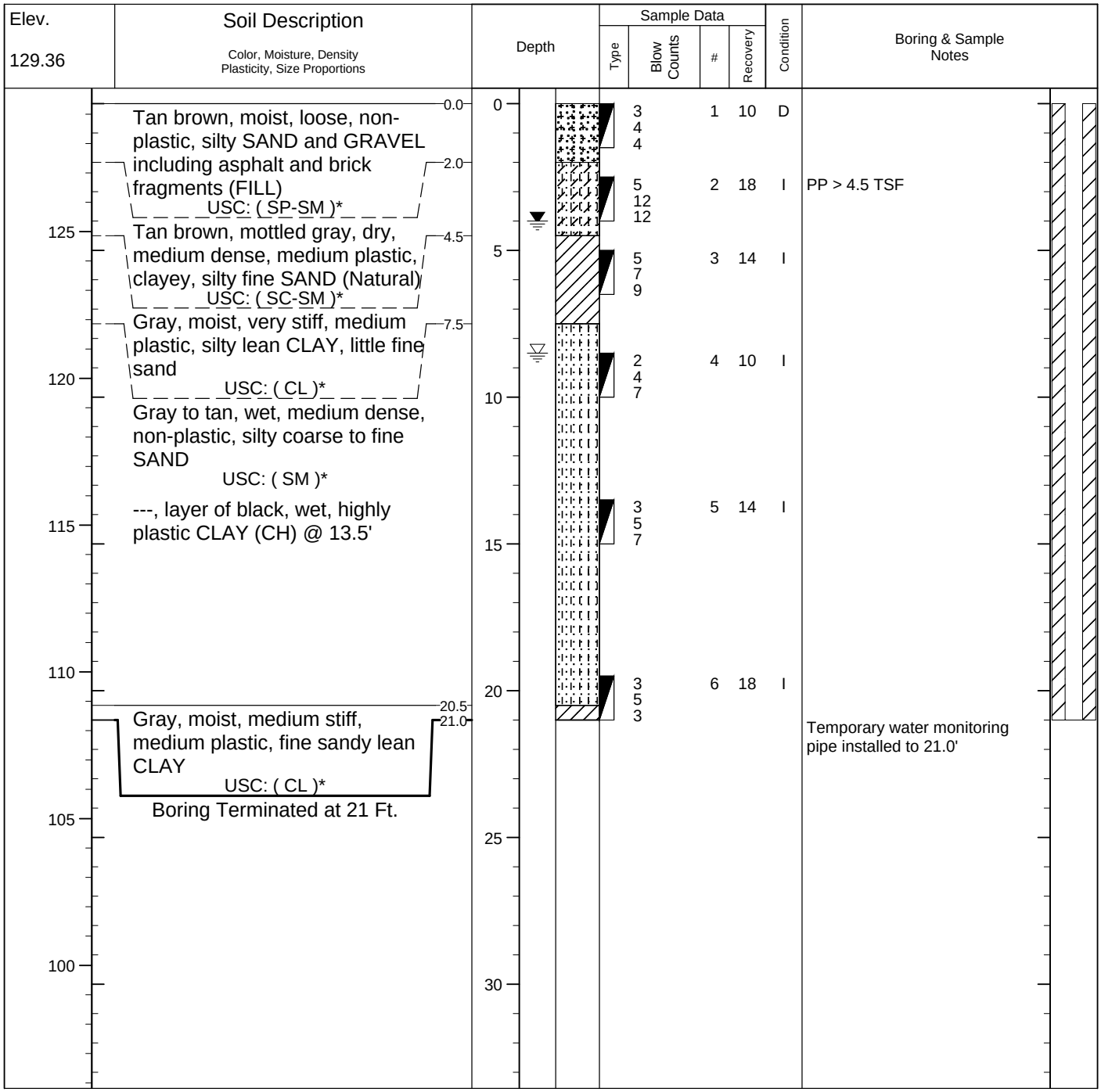
BORING NO. **B-34**
JOB NO. 16163

Surf. Elev.: 129.36
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



Depth	Type	Blow Counts	#	Recovery	Condition
0		3, 4, 4	1	10	D
		5, 12, 12	2	18	I
5		5, 7, 9	3	14	I
10		2, 4, 7	4	10	I
15		3, 5, 7	5	14	I
20		3, 5, 3	6	18	I
25					
30					

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	8.5'	
Completion	Dry	12.0'
On at		
On 5/19 at	4.0'	Pipe

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

BORING NO. **B-35**
JOB NO. 16163

Surf. Elev.: 137.78
Elev. from: Survey
Offset Elev:
Offset Dist.: 20'

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction: S

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16

Elev. 137.78	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
135	0.0 Gray tan, moist, medium dense, non-plastic, silty medium to fine SAND and GRAVEL including brick fragments (FILL) USC: (SP-SM)*	0		7 10 11	1	14	I	Offset 20' South in old pool area, still in new building footprint
				8 5 5	2	12	I	
	---, medium dense, brick and concrete fragments, water in tip of spoon @ 2.5' ---, moist @ 5.0'	5		4 5 5	3	4	D	
130	7.5 Gray to orange brown, mottled pink, moist, medium stiff, medium plastic, lean CLAY, little fine sand (Natural) USC: (CL)*			5 5 5	4	18	I	PP = 1.7 TSF
		10						
125	11.7 Red to gray, moist, medium dense, medium plastic, clayey fine SAND USC: (SC)*			3 4 8	5	18	I	
	14.5 Gray, moist, medium dense, non-plastic, silty medium to fine SAND USC: (SM)*	15						
120	---, wet @ 19.5'	20		4 5 6	6	18	I	
	21.0 Boring Terminated at 21 Ft.							
115		25						
110		30						
105								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	4.0'	
Completion		
On at		
On 5/20 at	Dry	2.2'

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

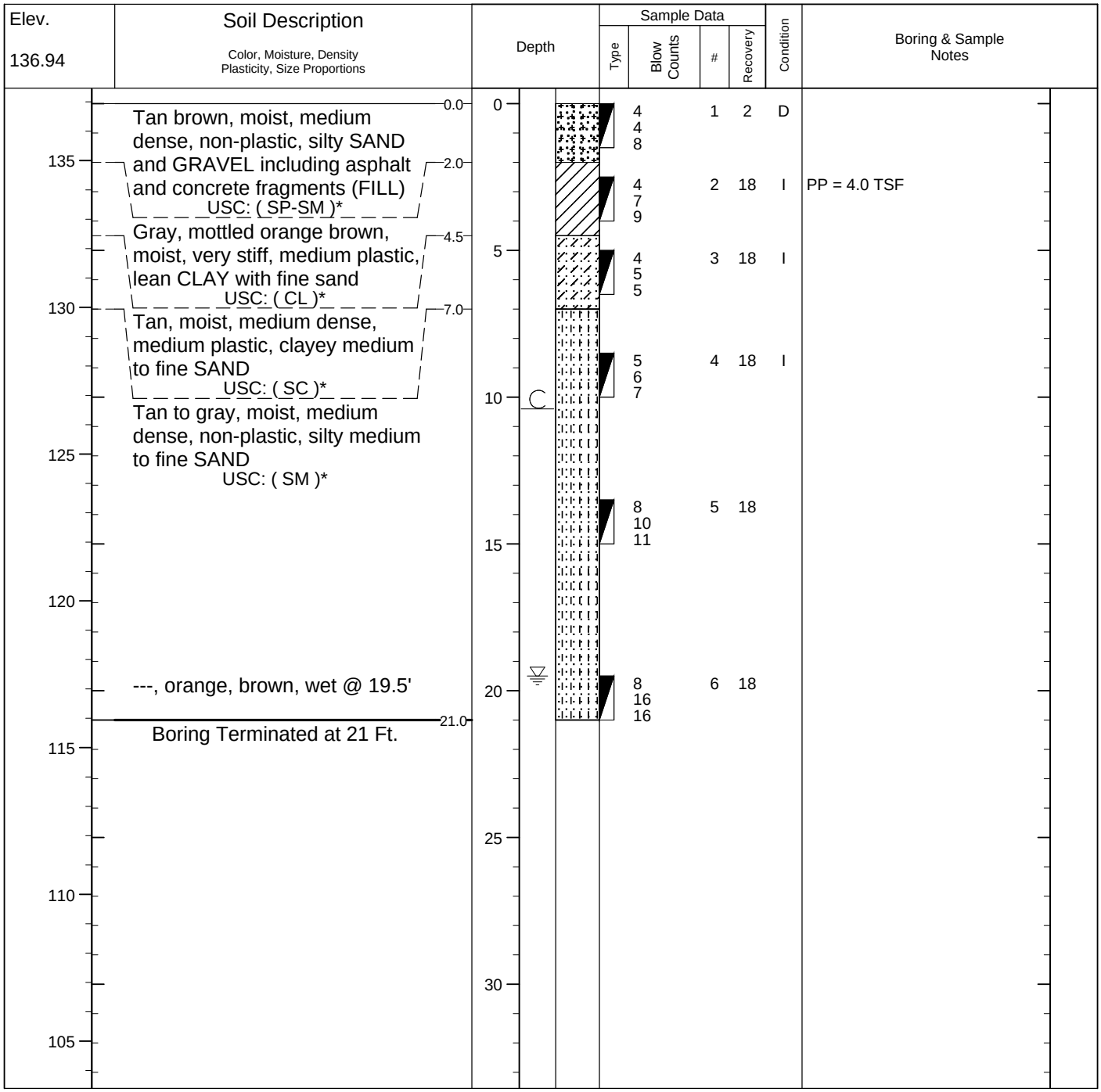
BORING NO. **B-36**
JOB NO. 16163

Surf. Elev.: 136.94
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	19.5'	
Completion		
On at		
On 5/20 at	Dry	10.4'

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7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458522 E: 1352172

BORING NO. **B-37**
JOB NO. 16163

Surf. Elev.: 134.50
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16

Elev. 134.50	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
135	Tan brown to gray, moist, loose, slightly plastic, silty medium to fine SAND and GRAVEL including brick, concrete and asphalt fragments (FILL)	0.0		5 3 2	1	12	I	
	USC: (SP-SM)*	2.0						
130	Tan brown, moist, loose, slightly plastic, silty fine SAND with gravel including brick fragments, trace organics (FILL)	4.5		4 4 4	2	18	I	
	USC: (SM)*	7.5		5 4 3	3	8	I	PP = 1.8 TSF
125	Orange to gray brown, moist, medium stiff, medium plastic, fine sandy lean CLAY (Possible FILL)			3 4 3	4	18	I	PP = 0.7 TSF
	USC: (CL)*	11.7						
120	Gray, mottled orange brown, moist, medium stiff, high plastic, fat CLAY, with fine to very fine sand (Natural)			4 3 5	5	18	I	
	USC: (CH)*							
	Gray to tan brown, wet, medium stiff, medium plastic, fine sandy lean CLAY							
	USC: (CL)*	19.0		7 5 8	6	18	I	PP = 2.5 TSF
115	Red, mottled orange brown and gray, moist, stiff, medium plastic, lean CLAY, little fine sand							
	USC: (CL)*			6 8 8	7	18	I	PP = 3.1 TSF
	---, very stiff @ 21.5'	23.0						
	Boring Terminated at 23 Ft.							
110								
105								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	18.0'	
Completion	Dry	6.0'
On at		
On 5/19 at	Dry	5.0'

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Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458508 E: 1352028

BORING NO. **B-38**
JOB NO. 16163

Surf. Elev.: 126.06
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16

Elev. 126.06	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
125	0.0 Brown to gray brown, moist, stiff, medium plastic, lean CLAY with fine sand (Possible FILL) USC: (CL)* ---, medium stiff @ 2.5'	0		2 4 6	1	15	I	PP = 4.0 TSF
				2 3 3	2	13	I	PP = 0.5 TSF
120	4.5 Orange brown to tan brown, moist, stiff, medium plastic, fine sandy lean CLAY (Probable Natural) 7.5 USC: (CL)*	5		6 5 6	3	18	I	PP = 2.6 TSF
115	Red, mottled gray, orange brown, medium black, moist, very stiff, medium plastic, lean CLAY, little fine sand (Natural) USC: (CL)*	10		7 13 16	4	18	I	PP > 4.5 TSF
110		15		12 18 19	5	18	I	PP > 4.5 TSF
105	20.0 Boring Terminated at 20 Ft.	20		3 7 10	6	18	1	PP = 3.9 TSF Temporary water monitoring pipe installed to 20.0'
100		25						
95		30						

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered		
Completion		
On	at 5.3'	6.5'
On 5/19	at 12.8'	Pipe

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458491 E: 1351889

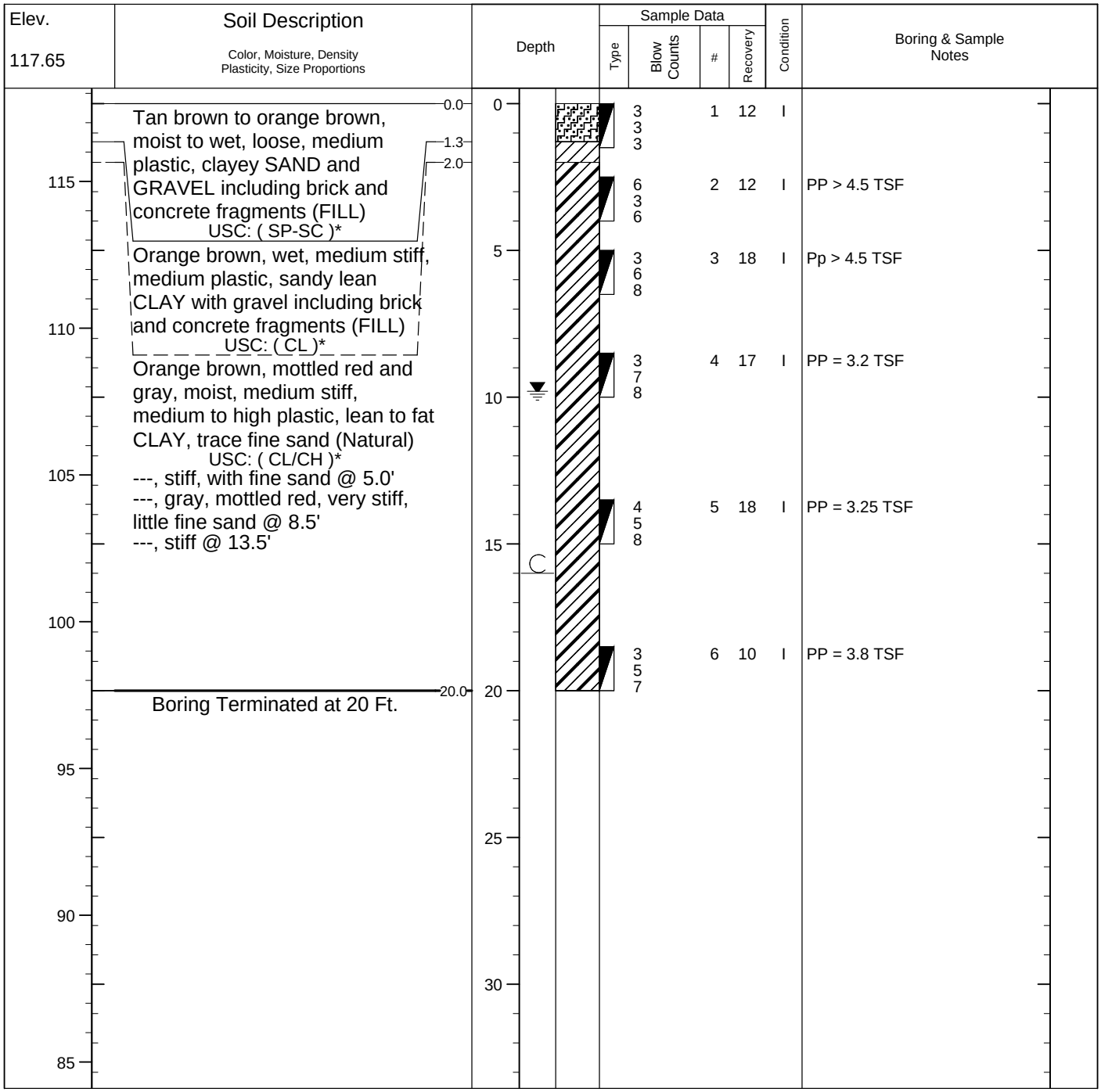
BORING NO. **B-39**
JOB NO. 16163

Surf. Elev.: 117.65
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	
Completion	Dry 17.0'
On at	
On 5/19 at 24 hrs	9.8' 16.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458632 E: 1351875

BORING NO. **B-40**
JOB NO. 16163

Surf. Elev.: 111.22
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16

Elev. 111.22	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
110	0.0 Brown to gray brown, wet, loose, non-plastic, silty SAND and GRAVEL (FILL) 2.0 USC: (SP-SM)*	0		1 3 3	1	2	D	
	Red to mottled gray and orange brown, moist, very stiff, medium plastic, lean CLAY, trace fine sand (Natural) USC: (CL)*			3 7 12	2	16	I	
105		5		7 9 13	3	18	I	PP > 4.5 TSF
	---, some fine sand @ 8.5'			7 10 15	4	18	I	PP = 4.3 TSF
100		10						
	---, trace fine sand @ 13.5'			7 10 16	5	18	I	PP = 4.3 TSF
95		15						
	---, some fine sand @ 18.0'			5 7 10	6	18	I	PP = 4.0 TSF
90	20.0 Boring Terminated at 20 Ft.	20						
85		25						
80		30						

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	9.0'
On at		
On 5/19 at	7.3'	8.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458636 E: 1351999

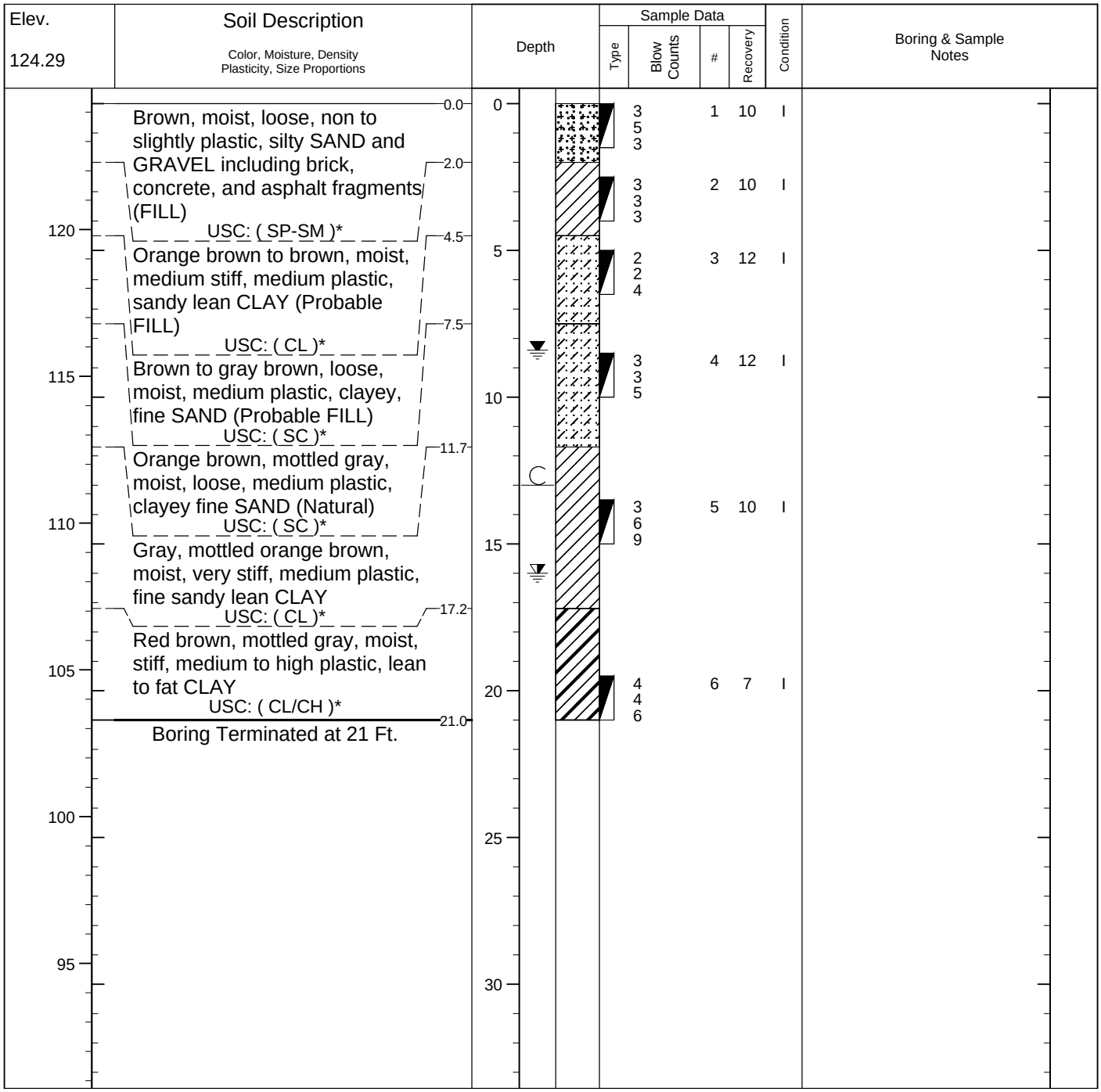
BORING NO. **B-41**
JOB NO. 16163

Surf. Elev.: 124.29
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	16.0'	17.0'
On at		
On 5/19 at	8.4'	13.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458654 E: 1352112

BORING NO. **B-42**
JOB NO. 16163

Surf. Elev.: 124.16
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16

Elev. 124.16	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
120	0.0 Orange brown to tan, moist, medium stiff, medium plastic, fine sandy lean CLAY,some gravel including brick and asphalt fragments, trace debris including PVC fragments (FILL)	0		3 2 3	1	6	D	
	2.0 USC: (CL)*							
	4.5 Red, mottled gray, moist, very stiff, medium plastic, lean CLAY with fine sand (Natural)	5		5 7 8	2	12	I	PP > 4.5 TSF
	7.5 USC: (CL)*			4 4 6	3	10	I	PP = 3.5 TSF
115	Gray, mottled orange brown and red, dry, stiff, medium plastic, fine sandy silty lean CLAY	10		3 5 8	4	6	I	
	USC: (CL)*							
	11.7 Orange brown to gray, moist, medium dense, medium plastic, clayey fine SAND			3 7 11	5	12	I	PP > 4.5 TSF
110	USC: (SC)*	15	C					
	Red, mottled orange brown and gray, moist, very stiff, medium plastic, lean CLAY, little fine sand							
	USC: (CL)*							
105	---, red mottled gray @ 18.5'			7 8 14	6	18	I	PP > 4.5 TSF
	20.0 Boring Terminated at 20 Ft.	20						
100		25						
95		30						

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered Dry	
Completion Dry	17.5'
On at	
On 5/19 at Dry	15.5'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458123 E: 1352432

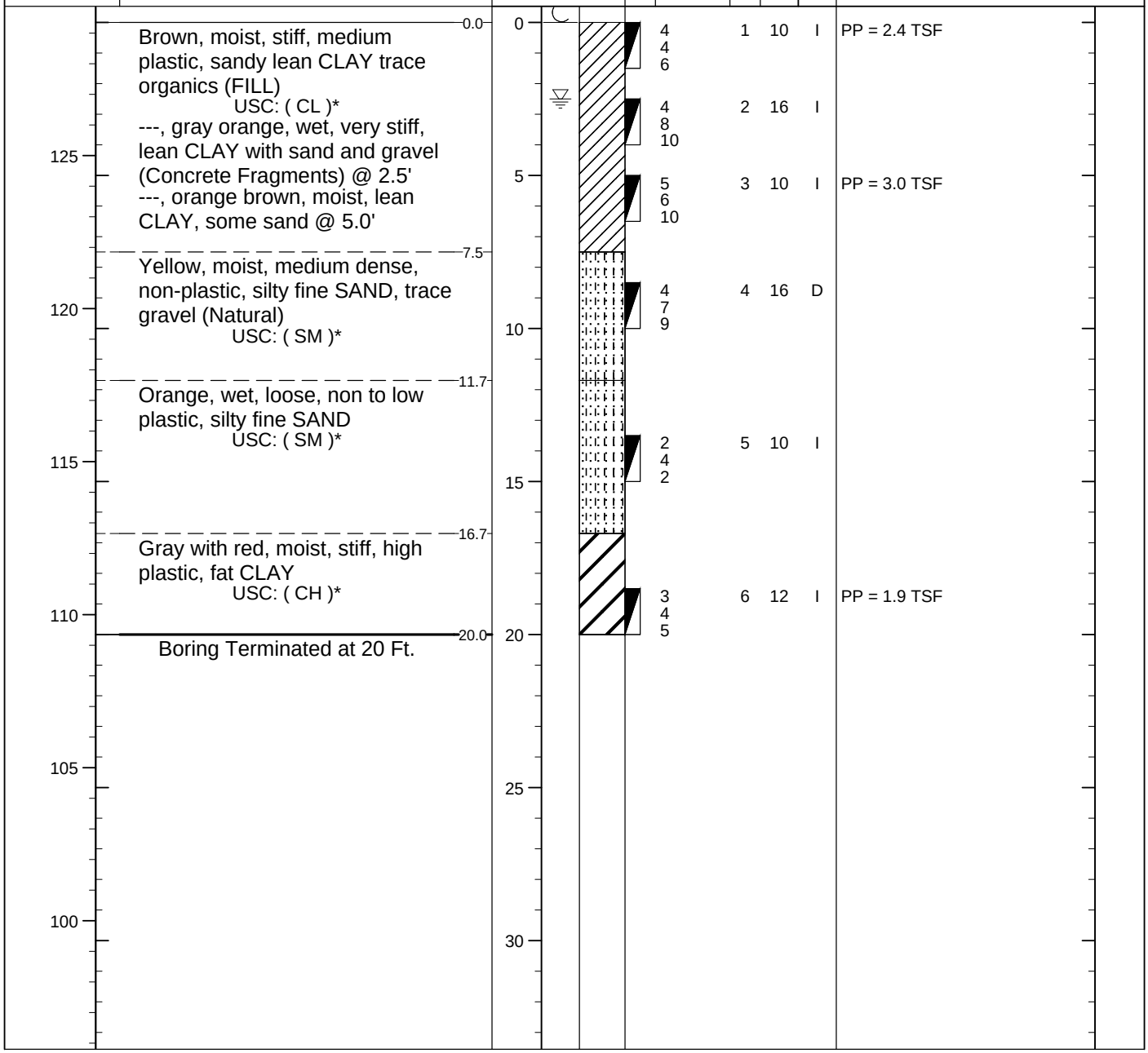
BORING NO. **B-48**
JOB NO. 16163

Surf. Elev.: 129.35
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JFD
Date Started: 5/20/16
Date Finished: 5/20/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 2.5'	
Completion --	7.0'
On at	
On 5/24 at Dry	0.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458133 E: 1352494

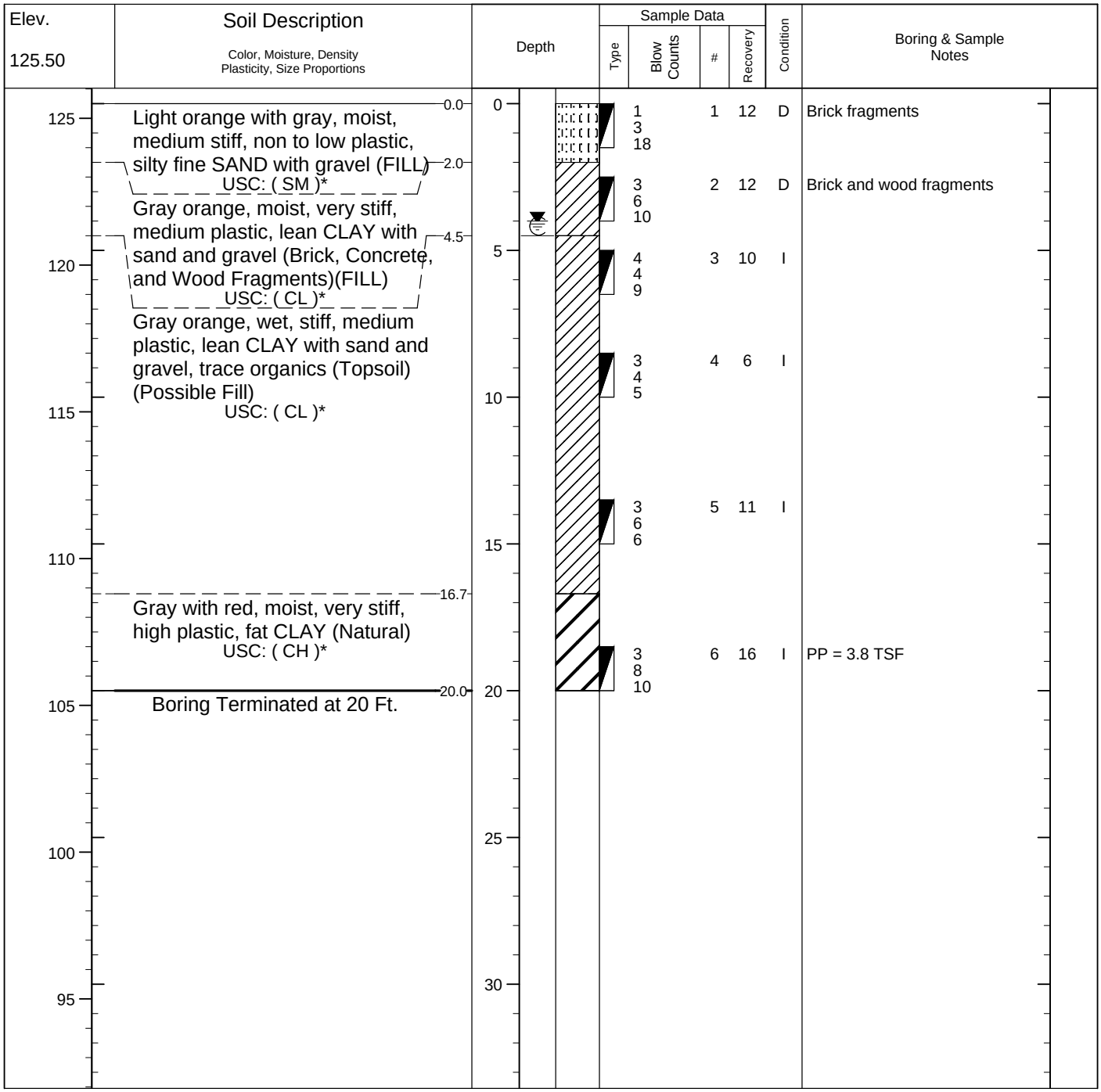
BORING NO. **B-49**
JOB NO. 16163

Surf. Elev.: 125.50
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JFD
Date Started: 5/20/16
Date Finished: 5/20/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	6.0'
On at		
On 5/24 at	4.0'	4.5'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458169 E: 1352449

BORING NO. **B-50**
JOB NO. 16163

Surf. Elev.: 129.98
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16

Elev. 129.98	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
130	0.0 Orange brown to olive green, moist, stiff, medium plastic, fine sandy lean CLAY, trace gravel including brick fragments (FILL)	0		3 5 6	1	13	I	PP = 3.2 TSF
	2.0 USC: (CL)*							
125	4.5 Tan brown to gray brown, moist, medium dense, medium plastic, clayey medium to fine SAND, trace gravel (FILL)	5		5 5 5	2	16	I	PP = 2.5 TSF
	7.5 USC: (SC)*			5 5 5	3	10	I	
120	Tan brown, moist, medium dense, non to slightly plastic, silty medium to fine SAND, trace gravel (Possible FILL)	10		5 6 6	4	10	I	
	11.7 USC: (SM)*							
115	Gray brown to gray, moist, medium dense, medium plastic, clayey medium to fine SAND (Natural)	15		4 6 10	5	6	I	
	USC: (SC)*							
	16.7 Tan to orange brown to gray, moist, very stiff, medium plastic, lean CLAY with fine sand			4 4 5	6	14	I	PP = 2.5 TSF
110	USC: (CL)*	20						
	20.0 Gray, mottled red, moist, medium stiff, medium plastic, lean CLAY, trace fine sand							
	USC: (CL)*							
	Boring Terminated at 20 Ft.							
105		25						
100		30						

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion		
On at		
On 5/20 at	11.5'	13.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458239 E: 1352482

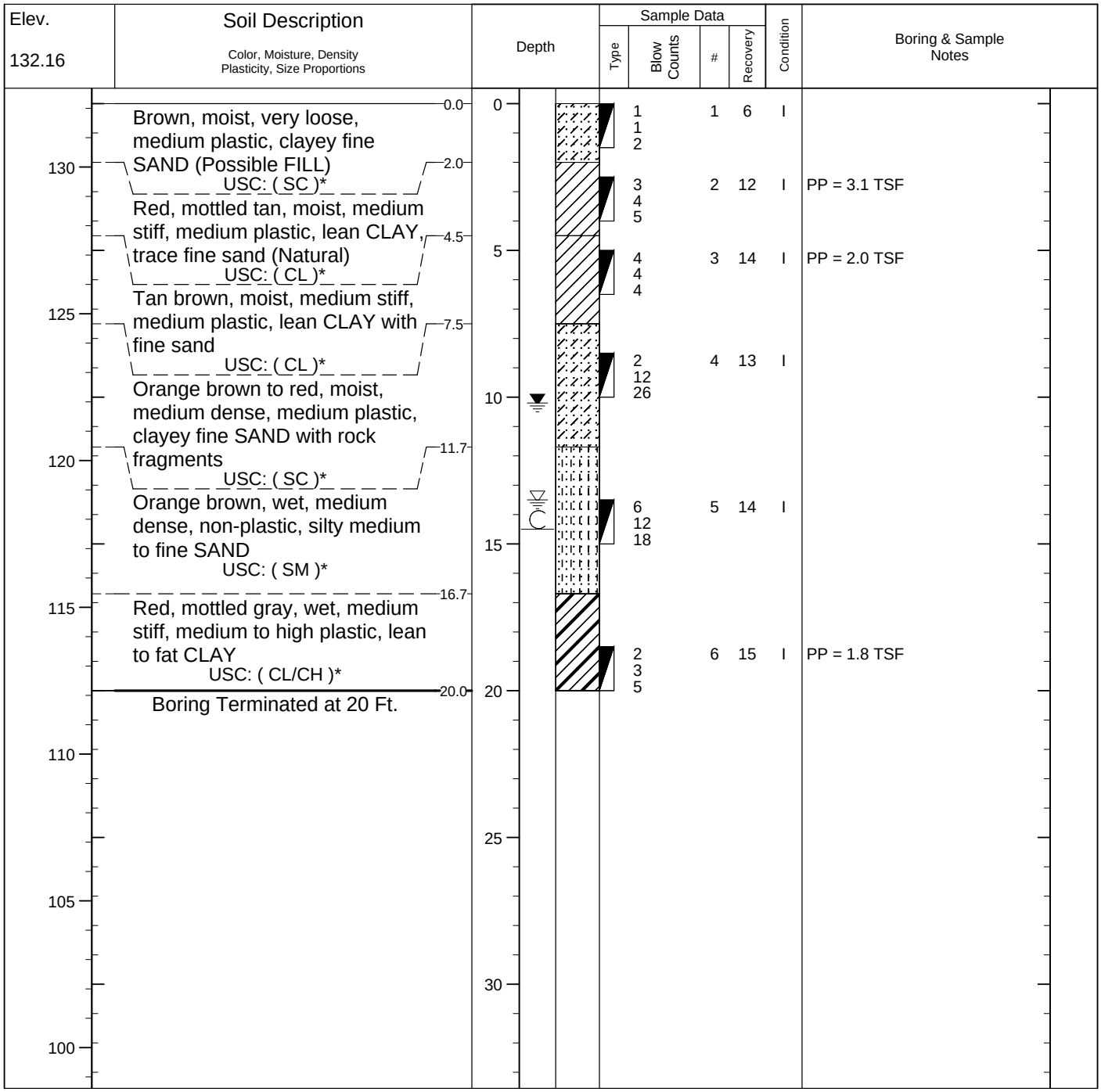
BORING NO. **B-51**
JOB NO. 16163

Surf. Elev.: 132.16
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	13.5'	
Completion		
On at		
On 5/20 at	10.2'	14.5'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458233 E: 1352410

BORING NO. **B-52**
JOB NO. 16163

Surf. Elev.: 132.16
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JFD
Date Started: 5/20/16
Date Finished: 5/20/16

Elev. 132.16	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
130	0.0 Dark gray, moist, stiff, medium plastic, lean CLAY with sand and gravel (FILL) USC: (CL)*	0		7 7 8	1	13	I	PP = 3.8 TSF
	---, medium stiff @ 2.5'			4 3 4	2	12	I	
	4.5 Gray with orange, moist, stiff, medium plastic, lean CLAY (Natural) USC: (CL)*	5		8 8 6	3	12	I	PP = 4.3 TSF
125	7.5 Gray orange, wet, medium dense, non-plastic, silty fine SAND with clay layers USC: (SM)*			4 8 10	4	12	I	
120	11.7 Orange, wet, very stiff, medium plastic, sandy lean CLAY USC: (CL)*	10		8 10 15	5	17	I	PP = 2.75 TSF
115	16.7 Gray with red, moist, very stiff, high plastic, fat CLAY USC: (CH)*	15		8 6 12	6	16	I	PP = 2.75 TSF
	20.0 Boring Terminated at 20 Ft.	20						
110		25						
105		30						
100								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	8.5'	
Completion	6.0'	11.0'
On at		
On 5/31 at	Dry	4.3'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458313 E: 1352517

BORING NO. **B-53**
JOB NO. 16163

Surf. Elev.: 132.47
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16

Elev. 132.47	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
130	0.0 Orange brown to tan, moist, very loose, medium plastic, clayey medium to fine SAND, little gravel including asphalt fragments (FILL)	0		1 1 3	1	10	I	
	2.0 USC: (SC)*							
	4.5 Orange brown to tan, moist, loose, slightly to medium plastic, clayey, silty medium to fine SAND (Natural)	5		2 5 4	2	18	I	
125	USC: (SC-SM)*			4 26 34	3	6	I	
	Tan brown, moist, very dense, non-plastic, silty medium to fine SAND, trace rock fragments	10		10 20 35	4	14	I	
120	USC: (SM)*							
	---, orange brown, wet @ 8.5'	15		6 36 42	5	12	I	
	16.7							
115	Red, mottled gray, moist, very stiff, medium plastic, lean CLAY, trace fine sand	20		5 6 9	6	16	I	PP = 3.2 TSF
	USC: (CL)*							
	20.0 Boring Terminated at 20 Ft.							
110		25						
105		30						
100								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 13.5'	
Completion	
On at	
On 5/20 at 24 hrs 10.5'	15.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458367 E: 1352439

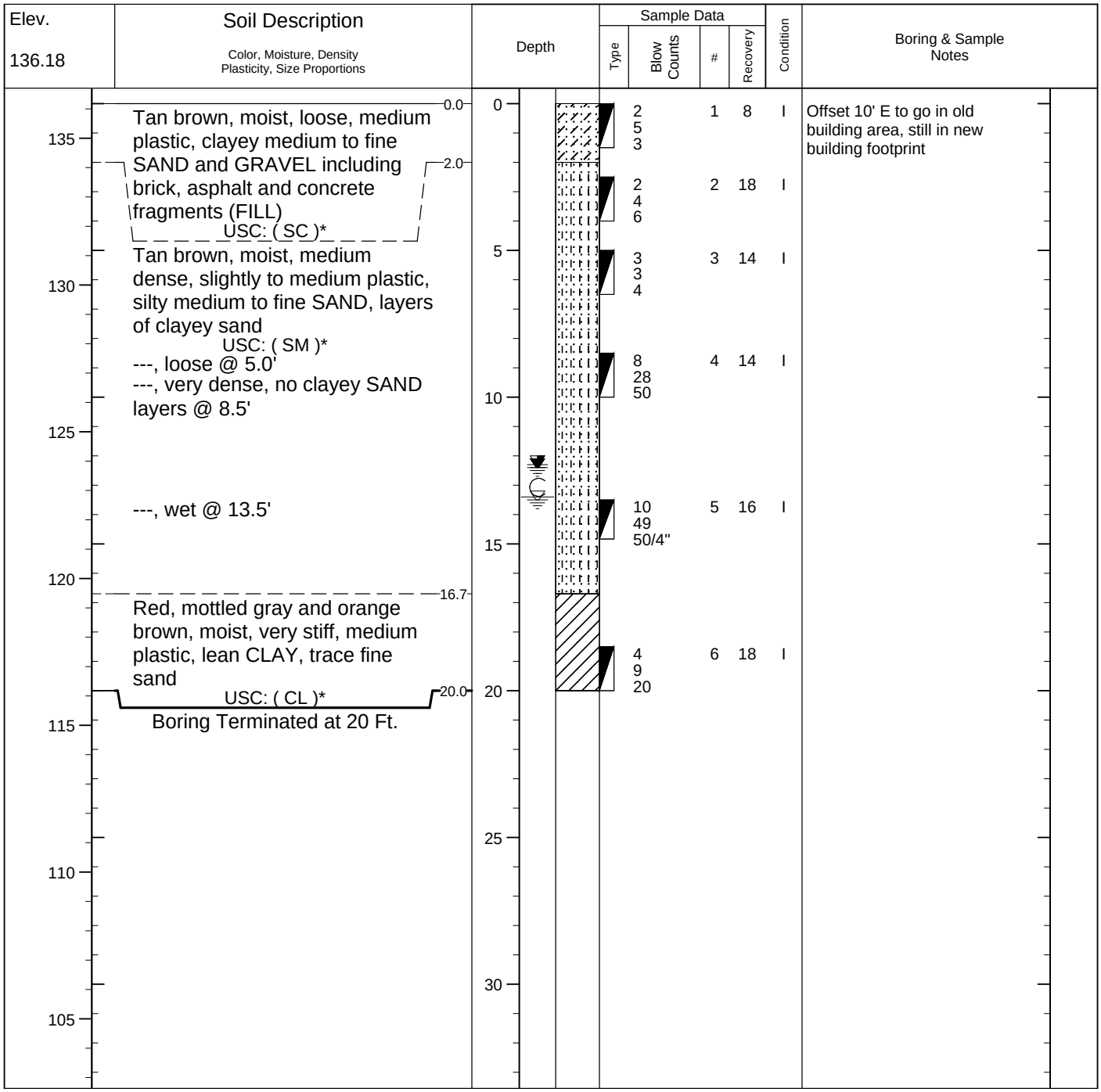
BORING NO. **B-54**
JOB NO. 16163

Surf. Elev.: 136.18
Elev. from: Survey
Offset Elev:
Offset Dist.: 10'

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction: E

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	13.5,	
Completion	12.3'	12.5'
On at		
On 5/20 at	12.4'	13.4'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458420 E: 1352504

BORING NO. **B-55**
JOB NO. 16163

Surf. Elev.: 138.42
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16

Elev. 138.42	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
138.42	0.0 Tan brown to orange brown, moist, loose, medium plastic, clayey medium to fine SAND	0		2 3 5	1	10	I	
	2.0 USC: (SC)* Tan brown to orange brown, moist, loose, non to slightly plastic, silty medium to fine SAND, trace clay			2 3 4	2	10	I	
135	USC: (SM)*	5		2 3 5	3	11	I	
	7.5 Gray, mottled orange brown, moist, medium stiff, medium plastic, fine sandy lean CLAY			3 4 4	4	12	I	PP = 3.0 TSF
130	USC: (CL)*	10						
	11.7 Orange brown to tan, moist, medium dense, non-plastic, silty medium to fine SAND		C	7 11 15	5	11	I	
125	USC: (SM)*	15						
120	---, wet @ 18.5'			10 12 16	6	8	I	
	20.0 Boring Terminated at 20 Ft.	20						
115		25						
110		30						
105								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	14.0'
On at		
On 5/20 at	Dry	14.2'

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Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458476 E: 1352459

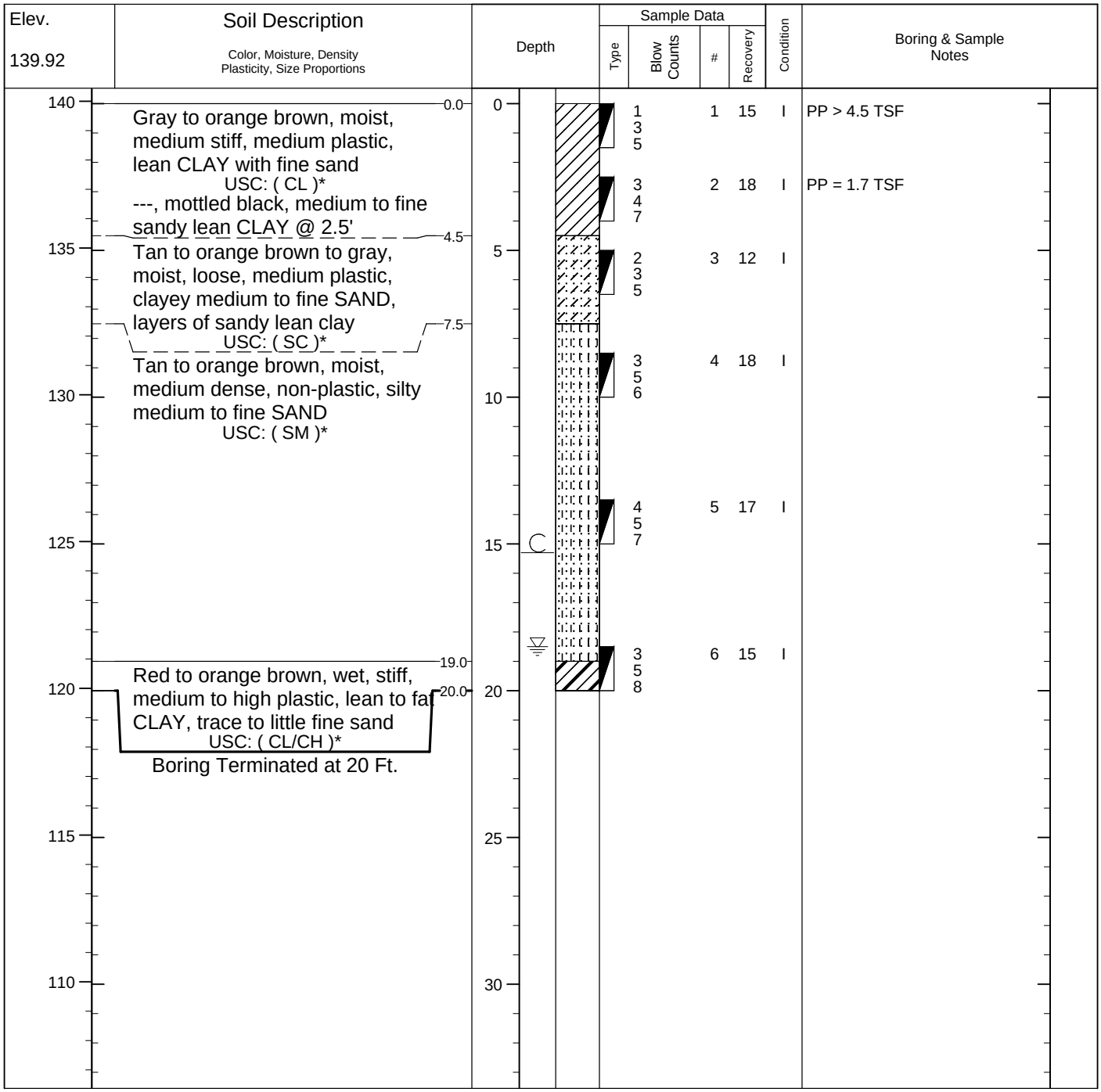
BORING NO. **B-56**
JOB NO. 16163

Surf. Elev.: 139.92
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 18.5'	
Completion	
On at	
On 5/20 at Dry	15.3'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458583 E: 1352286

BORING NO. **B-57**
JOB NO. 16163

Surf. Elev.: 132.43
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JFD
Date Started: 5/20/16
Date Finished: 5/20/16

Elev. 132.43	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
130	0.0 Light orange, moist, loose, non-plastic, fine SAND some silt (FILL) USC: (SP-SM)*	0		2 2 3	1	14	I	
	---, medium dense, trace organics (Topsoil) @ 2.5'			4 9 5	2	12	I	
	4.5 Light Gray, moist, medium dense, non-plastic, silty fine SAND (Natural) USC: (SM)*	5		3 8 5	3	11	I	
125	7.5 Orange, wet, medium dense, low to medium plastic, silty fine SAND			8 9 10	4	13	I	PP = 1.8 TSF
	9.7 USC: (SM)*	10						
120	Gray with red, moist, very stiff, high plastic, fat CLAY USC: (CH)*			2 5 6	5	12	I	PP = 2.2 TSF
	---, stiff @ 13.5'	15						
115								
	---, medium stiff @ 18.5'			3 4 4	6	8	I	PP = 1.9 TSF
	20.0 Boring Terminated at 20 Ft.	20						
110								
		25						
105								
		30						
100								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	8.5'	
Completion		
On at		
On 5/24 at	6.7'	6.7'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

BORING NO. **B-58**
JOB NO. 16163

Surf. Elev.: 136.82
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16

Elev. 136.82	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
135	0.0 Tan to gray, dry, very loose, medium plastic, clayey fine SAND with gravel including concrete fragments (FILL) 2.0	0		1 2 2	1	18	I	
	USC: (SC)*			2 2 3	2	18	I	PP > 1.0 TSF
130	Tan gray mottled orange brown, moist, soft, medium plastic, silty lean CLAY, little fine sand (Natural) 4.5	5		2 4 3	3	18	I	
	USC: (CL)*							
125	Orange brown to tan, moist, loose, slightly to medium plastic, silty fine SAND, lumps of sandy clay	10		4 5 6	4	18	I	
	USC: (SM)*							
	---, medium dense @ 8.5'	15		4 7 7	5	18	I	
120	---, tan, wet @ 18.5'	20		4 6 6	6	18	I	
	20.0 Boring Terminated at 20 Ft.							
115		25						
110		30						
105								

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	
Completion	
On at	
On 5/20 at Dry	11.1'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

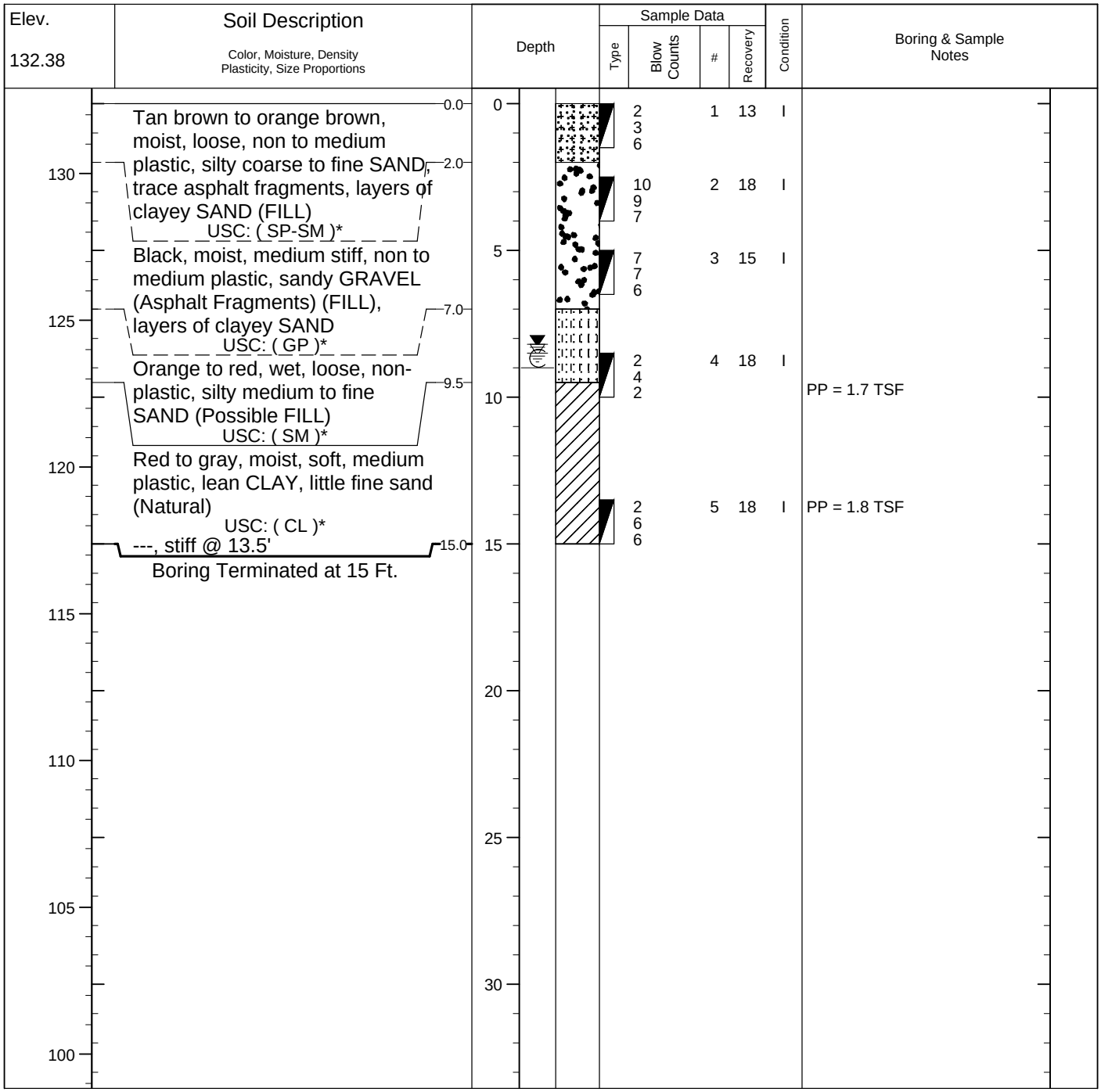
BORING NO. **R-13**
JOB NO. 16163

Surf. Elev.: 132.38
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	8.5'	
Completion	Dry	11.0'
On at		
On 5/19 at	8.2'	9.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

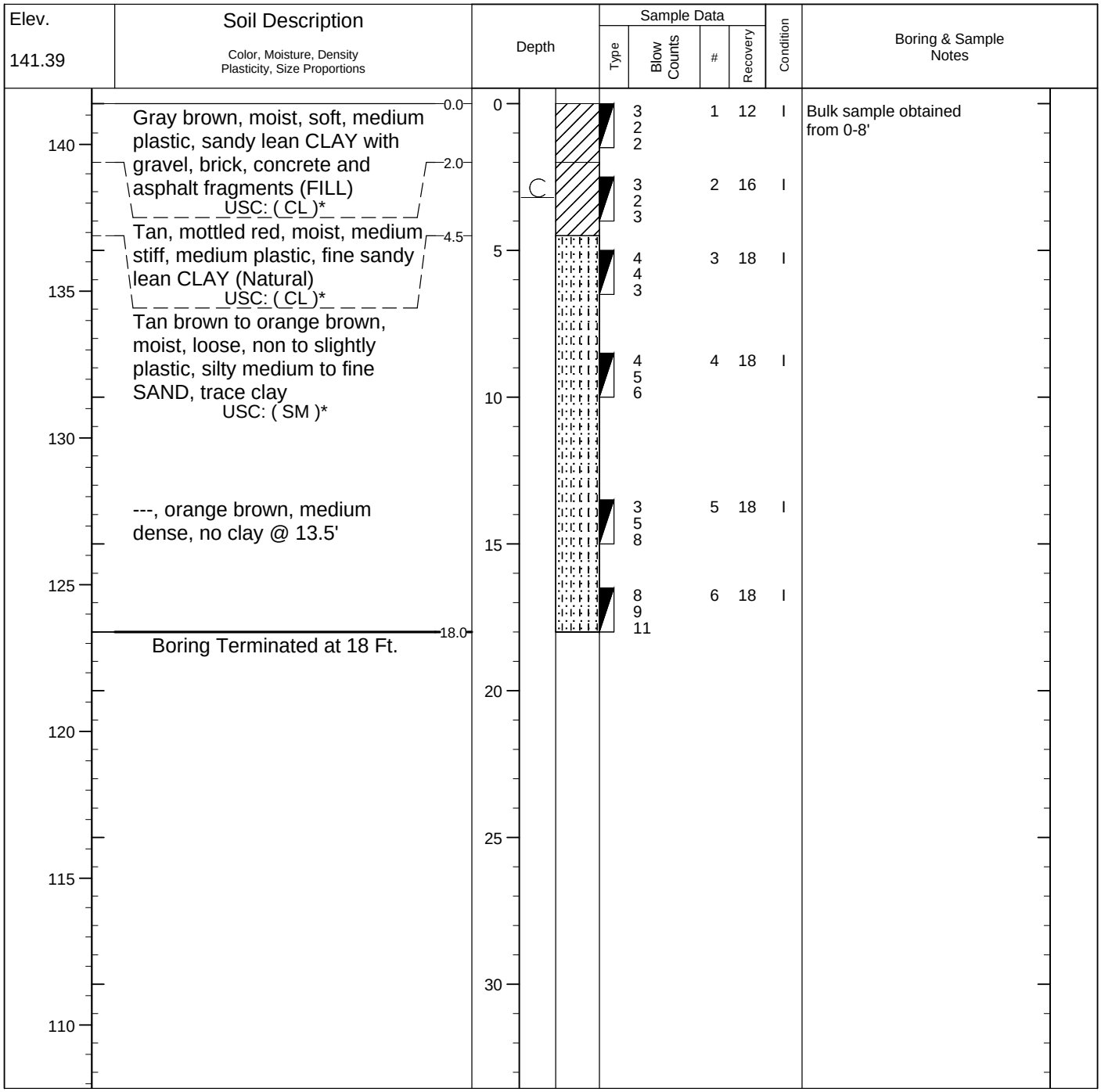
BORING NO. **R-14**
JOB NO. 16163

Surf. Elev.: 141.39
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion		
On at		
On 5/20 at	Dry	3.2'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

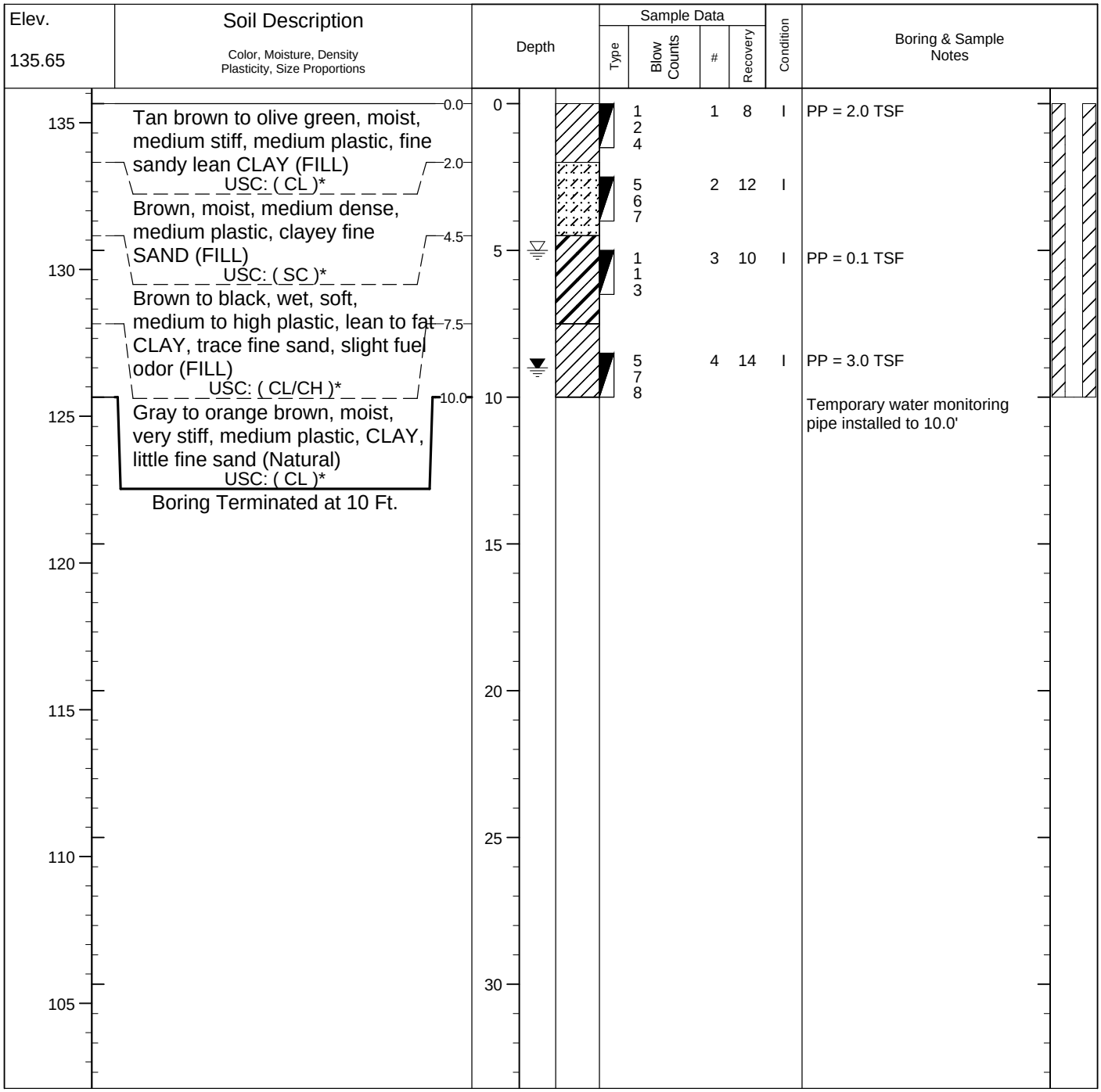
BORING NO. **R-15**
JOB NO. 16163

Surf. Elev.: 135.65
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/20/16
Date Finished: 5/20/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	5.0'	
Completion		
On at		
On 5/24 at	9.0'	Pipe

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **R-16**
JOB NO. 16163

Surf. Elev.: 127.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 25'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016

Elev. 127.0±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
125	0.0 Red, moist, stiff, medium plastic, sandy lean CLAY, some gravel (Asphalt and brick) (FILL) USC: (CL)*	0	1		DCP @ 0.0': 7-8-14-16
					DCP @ 1.7': 20/1"
	3.0 Gray mottled orange, moist, loose to medium dense, non-plastic, silty fine SAND (FILL) USC: (SM)*		2		DCP @ 3.9': 3-6-7-12
120	4.0 Gray mottled orange, moist, loose to medium dense, non-plastic, silty fine SAND (Natural) USC: (SM)*	5	3		@ 4.0' Encountered Buried Storm Drain Bulk sample from 5.0'-6.0' DCP @ 6.0': 5-5-8-12
			4		DCP @ 8.0': 2-3-5-8
115	---, loose, some gravel (Iron Cemented Sand) @ 6.0'	10	5		DCP @ 10.0': 4-4-3-3
110	15.0 Test Pit Terminated at 15 Ft.	15			
105		20			
100		25			
95		30			

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

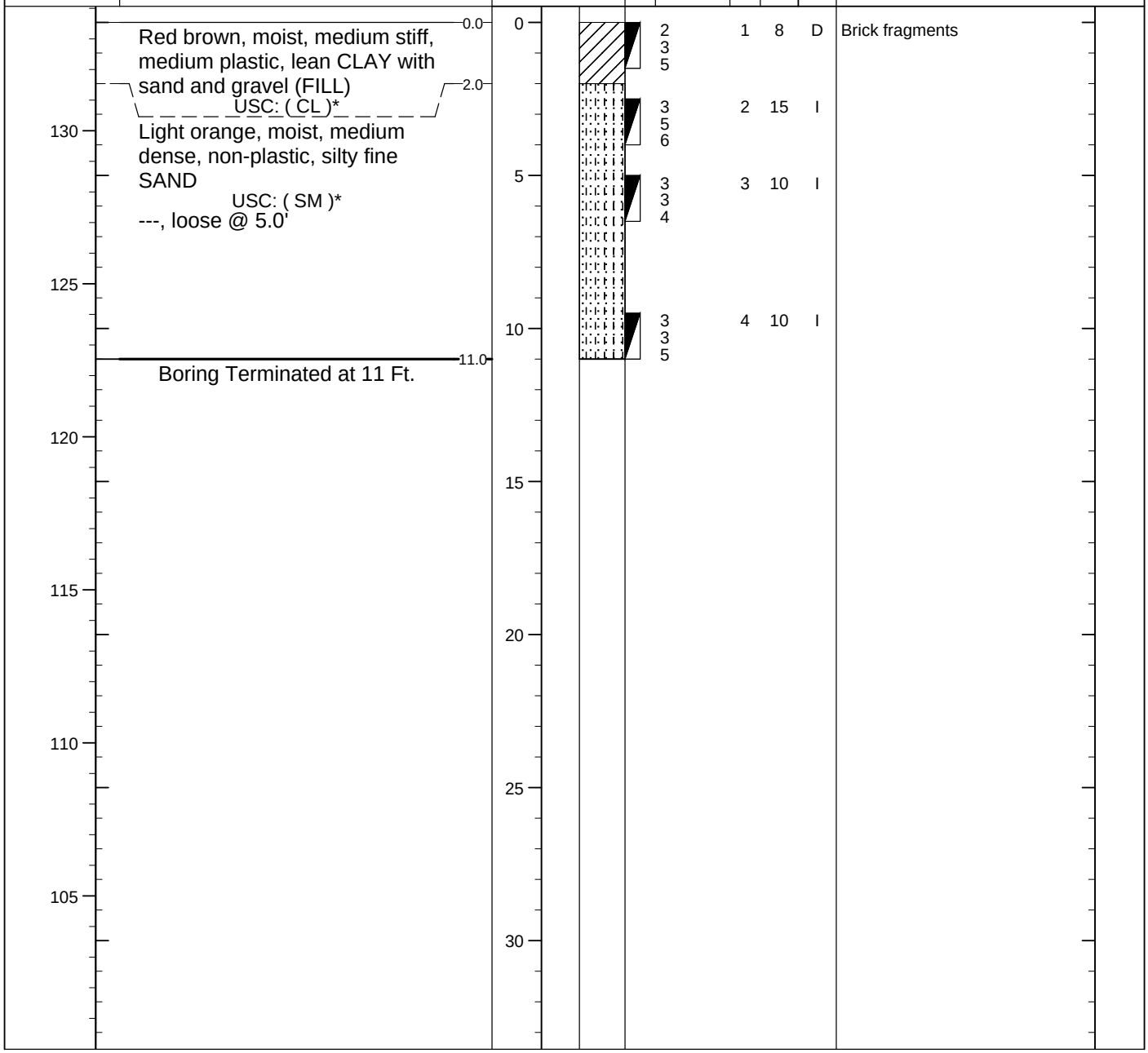
BORING NO. **R-17**
JOB NO. 16163

Surf. Elev.: 133.54
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JFD
Date Started: 5/20/16
Date Finished: 5/20/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered Dry	
Completion Dry	7.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

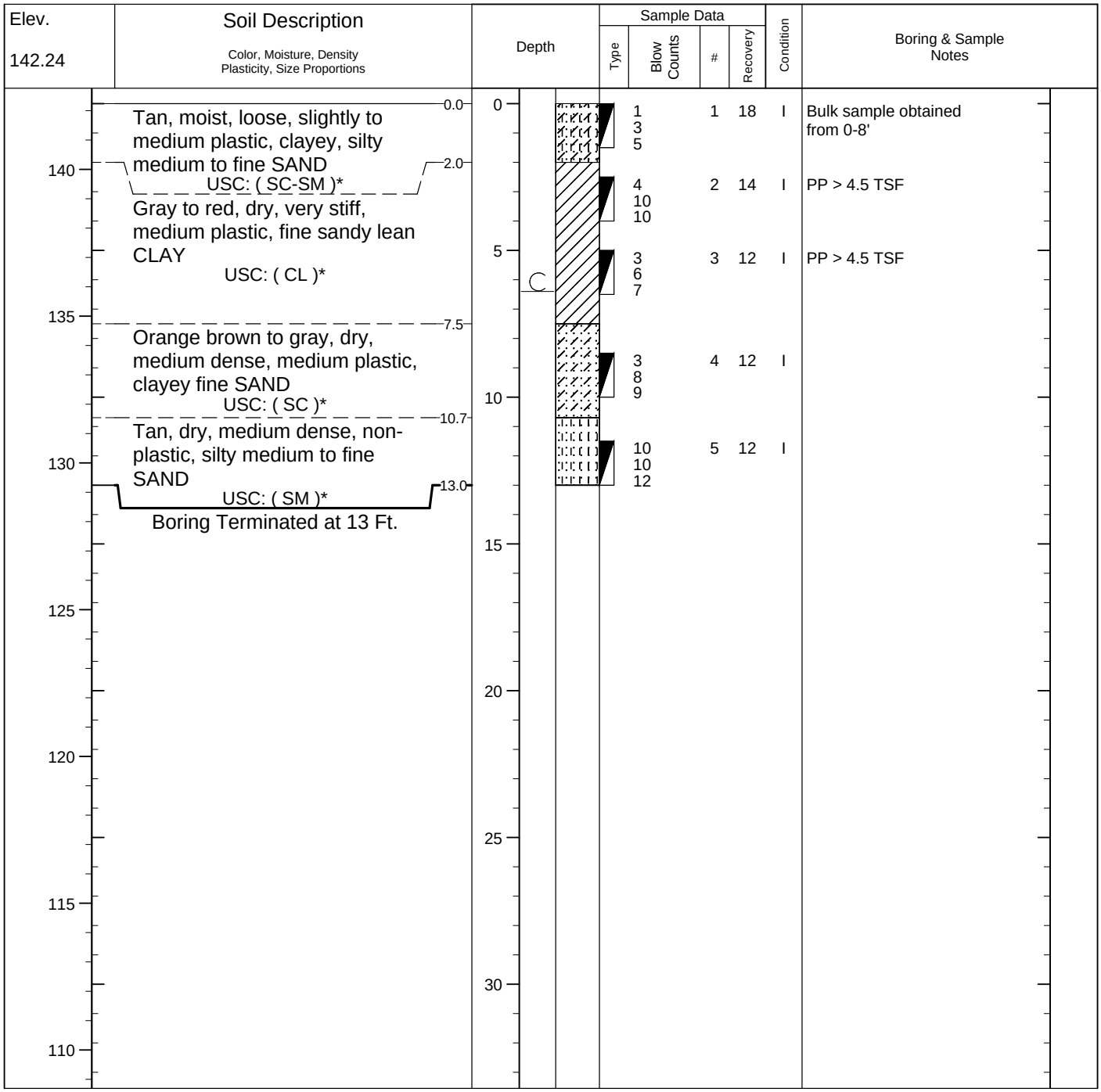
BORING NO. **R-18**
JOB NO. 16163

Surf. Elev.: 142.24
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered Dry	
Completion Dry	7.0'
On at	
On 5/20 at Dry	6.4'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

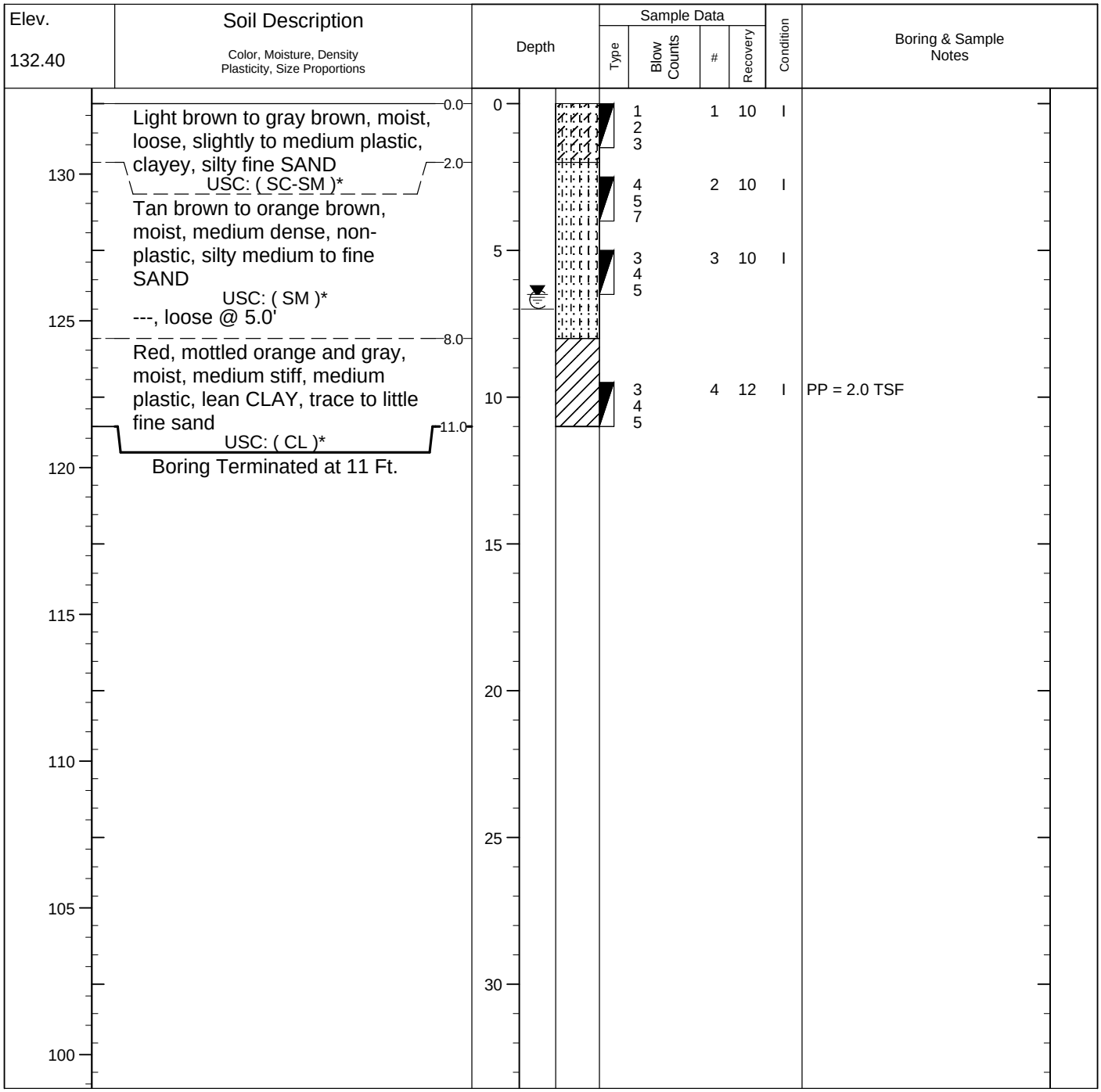
BORING NO. **R-19**
JOB NO. 16163

Surf. Elev.: 132.40
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	
Completion Dry	8.0'
On at	
On 5/19 at 6.5'	7.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: 458650 E: 1352211

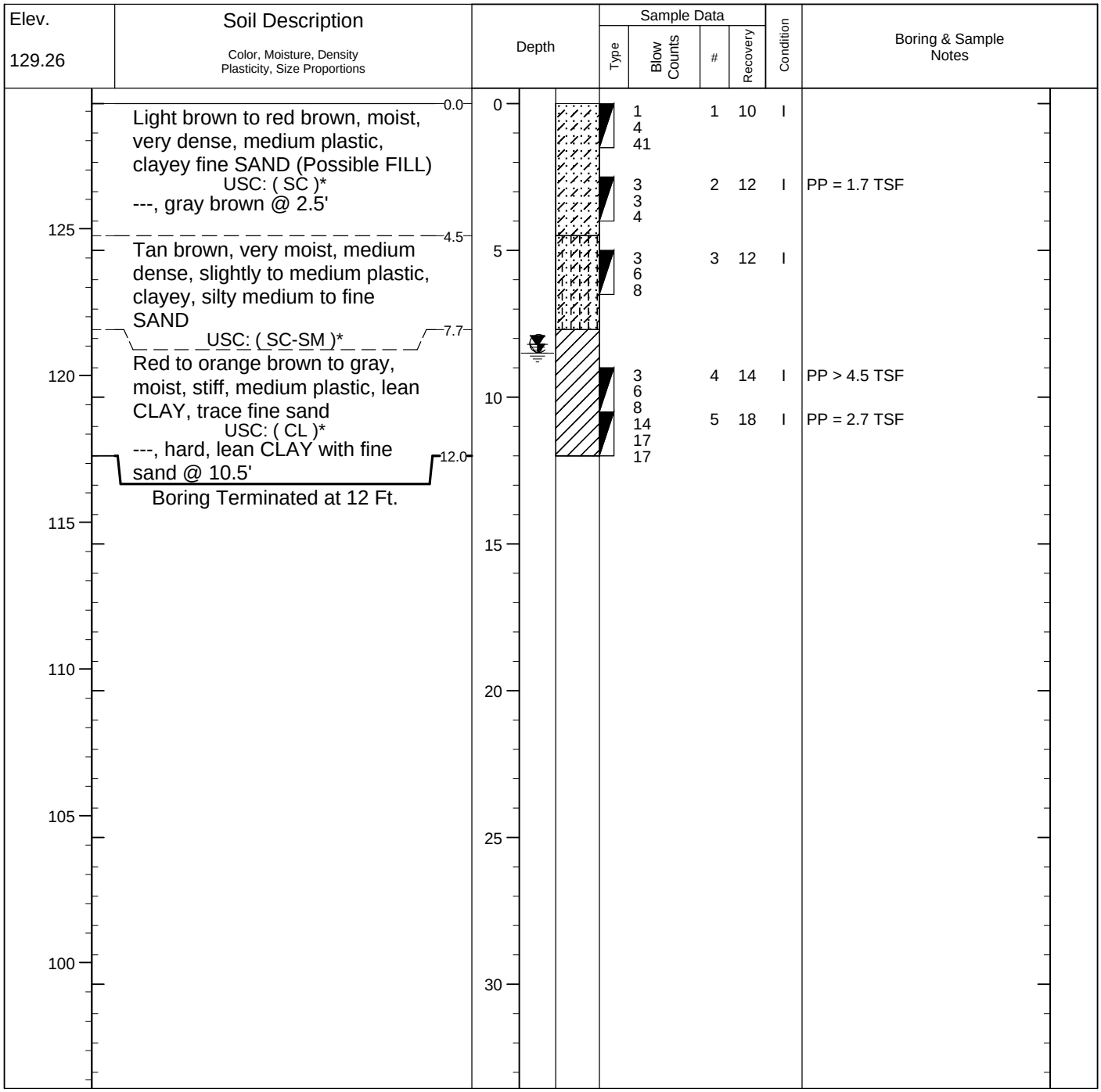
BORING NO. **R-20**
JOB NO. 16163

Surf. Elev.: 129.26
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	8.5'
On at	
On 5/19 at 24 hrs	8.2' 8.5'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

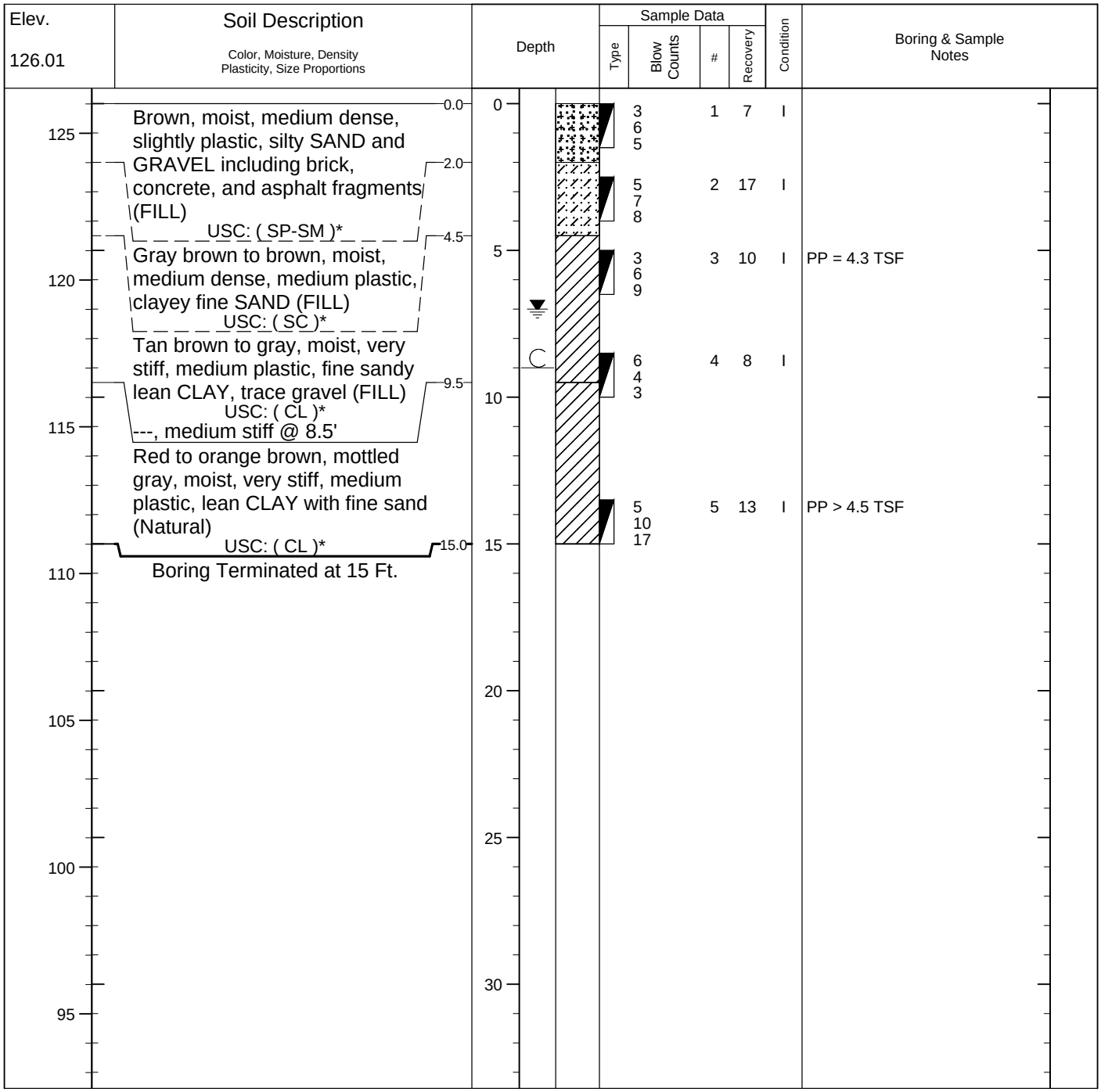
BORING NO. **R-21**
JOB NO. 16163

Surf. Elev.: 126.01
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	13.0'
On at		
On 5/19 at 24 hrs	7.0'	9.0'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

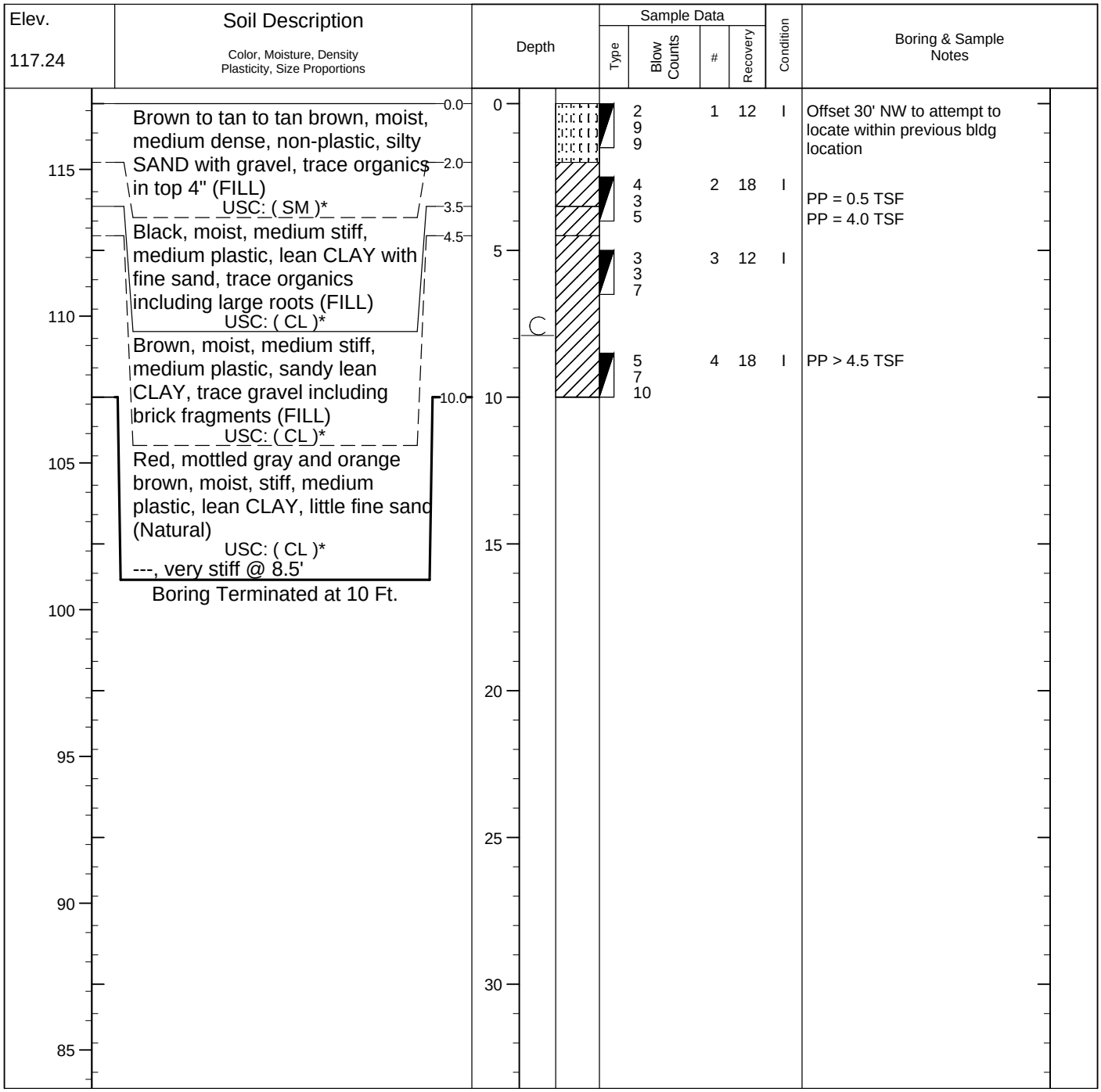
BORING NO. **R-22**
JOB NO. 16163

Surf. Elev.: 116.24
Elev. from: Survey
Offset Elev: +1.0'
Offset Dist.: 30'

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction: NE

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered Dry	
Completion Dry	7.5'
On at	
On 5/19 at 24 hrs Dry	7.9'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

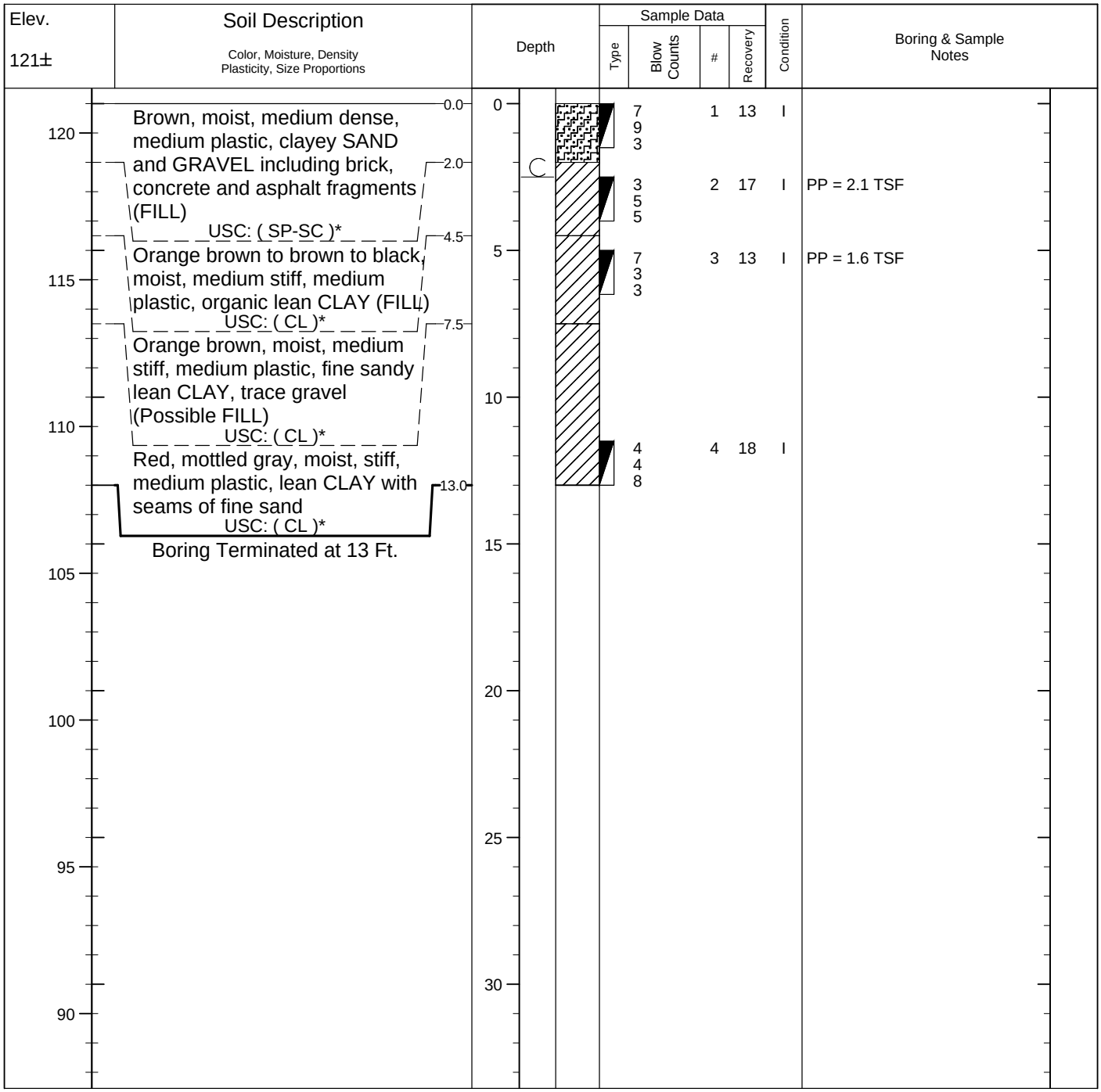
BORING NO. **R-23**
JOB NO. 16163

Surf. Elev.: 121±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	
Completion	
On	at
On 5/19	at 24 hrs Dry 2.5'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

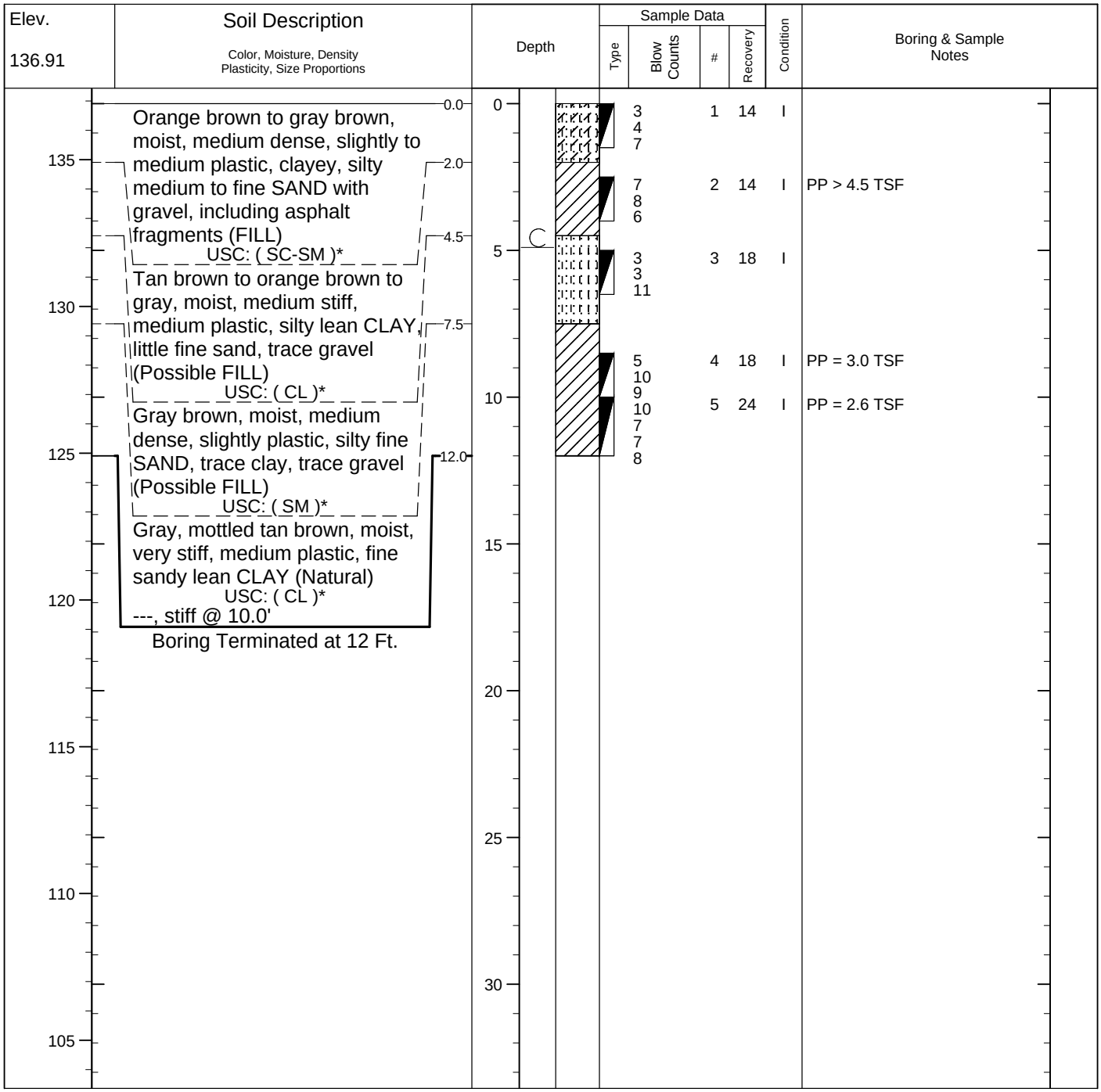
BORING NO. **R-24**
JOB NO. 16163

Surf. Elev.: 136.91
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion		
On at		
On 5/20 at 24 hrs	Dry	4.9'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

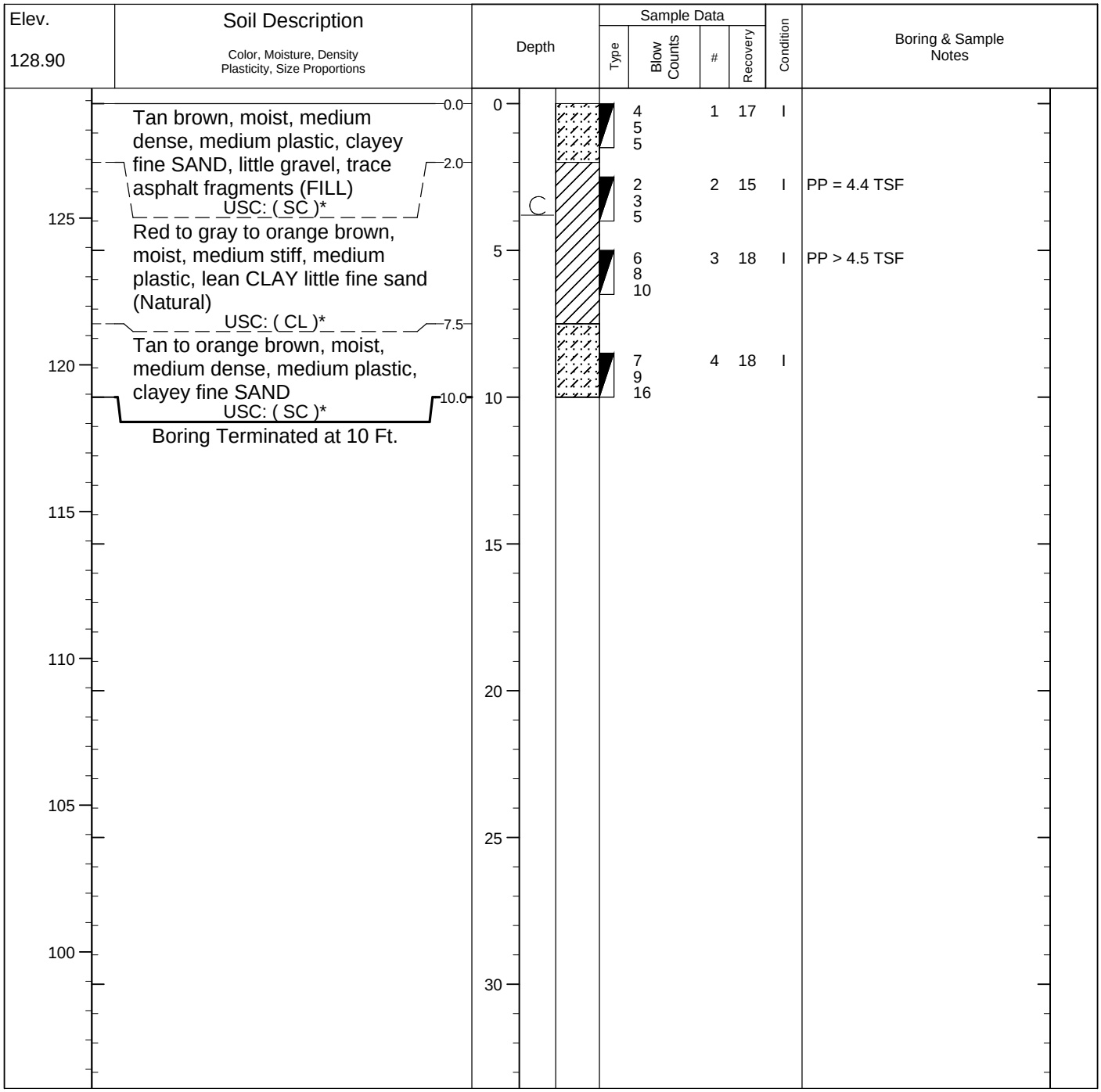
BORING NO. **R-26**
JOB NO. 16163

Surf. Elev.: 128.90
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/18/16
Date Finished: 5/18/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	5.0'
On at		
On 5/19 at 24 hrs	Dry	3.8'

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

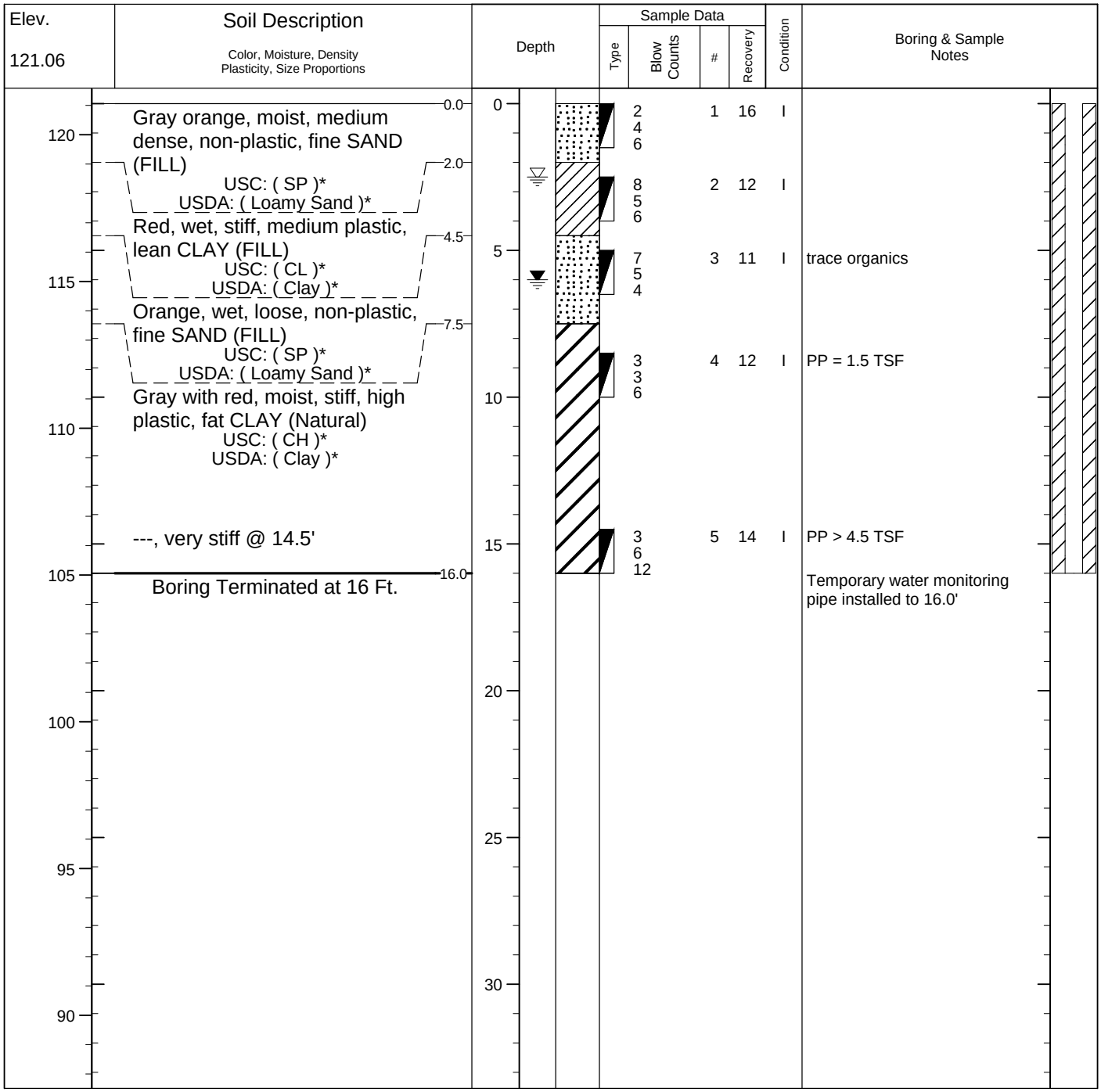
BORING NO. **SWM-8**
JOB NO. 16163

Surf. Elev.: 121.06
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JFD
Date Started: 5/20/16
Date Finished: 5/20/16



* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	2.5'	
Completion		3.0'
On at		
On 5/24 at	6.0'	Pipe

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Boring Location: N: E:

BORING NO. **SWM-10**
JOB NO. 16163

Surf. Elev.: 133.90
Elev. from: Survey
Offset Elev:
Offset Dist.:

Hammer Wt. 140 lb.
Hammer Drop: 30"
Sampler Size: 2" split spoon
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8"
Boring Method: HSA

Foreman: Allied
Inspector: JAF
Date Started: 5/19/16
Date Finished: 5/19/16

Elev. 133.90	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
133.90	0.0 Brown, moist, stiff, medium plastic, lean CLAY with fine sand (Possible FILL)	0		8 7 6	1	16	I	PP > 4.5 TSF
	2.0 USC: (CL)* USDA: (Clay)* Tan brown, mottled orange brown, moist, very stiff, medium plastic, fine sandy lean CLAY (Natural)			4 10 13	2	18	I	PP > 4.5 TSF
130		5		7 16 15	3	18	I	PP = 4.0 TSF
	USC: (CL)* 7.5 USDA: (Clay Loam)* ---, hard @ 5.0'							
125	Red, mottled gray, moist, very stiff, medium plastic, lean CLAY, seams of fine sand	10		7 10 11	4	18	I	PP > 4.5 TSF
	USC: (CL)* USDA: (Clay)*							
120	---, very stiff, no sand seams @ 13.5'	15		5 6 12	5	18	I	PP = 2.8 TSF
	---, hard with fine sand @ 15.0'			11 14 16 17	6	24	I	
	17.0 Boring Terminated at 17 Ft.							Temporary water monitoring pipe installed to 17.0'
115		20						
110		25						
105		30						

* Visual Description - in general accordance with ASTM D 2488 and AASHTO M145

Notes: Surface elevations provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On at	
On 5/20 at 24 hrs	12.7' Pipe

KEY TO SYMBOLS

Symbol	Description
Misc. Symbols	
▽	Water encountered during drilling
▼	24 hr water reading
C	Depth to caving
▽	Water level at completion
Soil Samplers	
	Standard penetration test
	Bag Sample
Monitor Well Details	
	temporary screened water monitoring pipe, removed after 24 hour water reading
Strata	
	Poorly graded SAND with silt
	Silty clayey SAND
	Lean CLAY
	Silty SAND
	Clayey SAND

Symbol	Description
	Fat CLAY
	Poorly graded SAND with clay
	Medium to highly plastic CLAY
	Poorly graded GRAVEL
	Poorly graded SAND

Notes:

1. Borings were performed from May 18, 2016 through May 20, 2016. Test pits were performed from June 1, 2016 through June 8, 2016.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. PP - indicates results of pocket penetrometer, used to estimate the unconfined compressive strength of fine-grained soils.

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

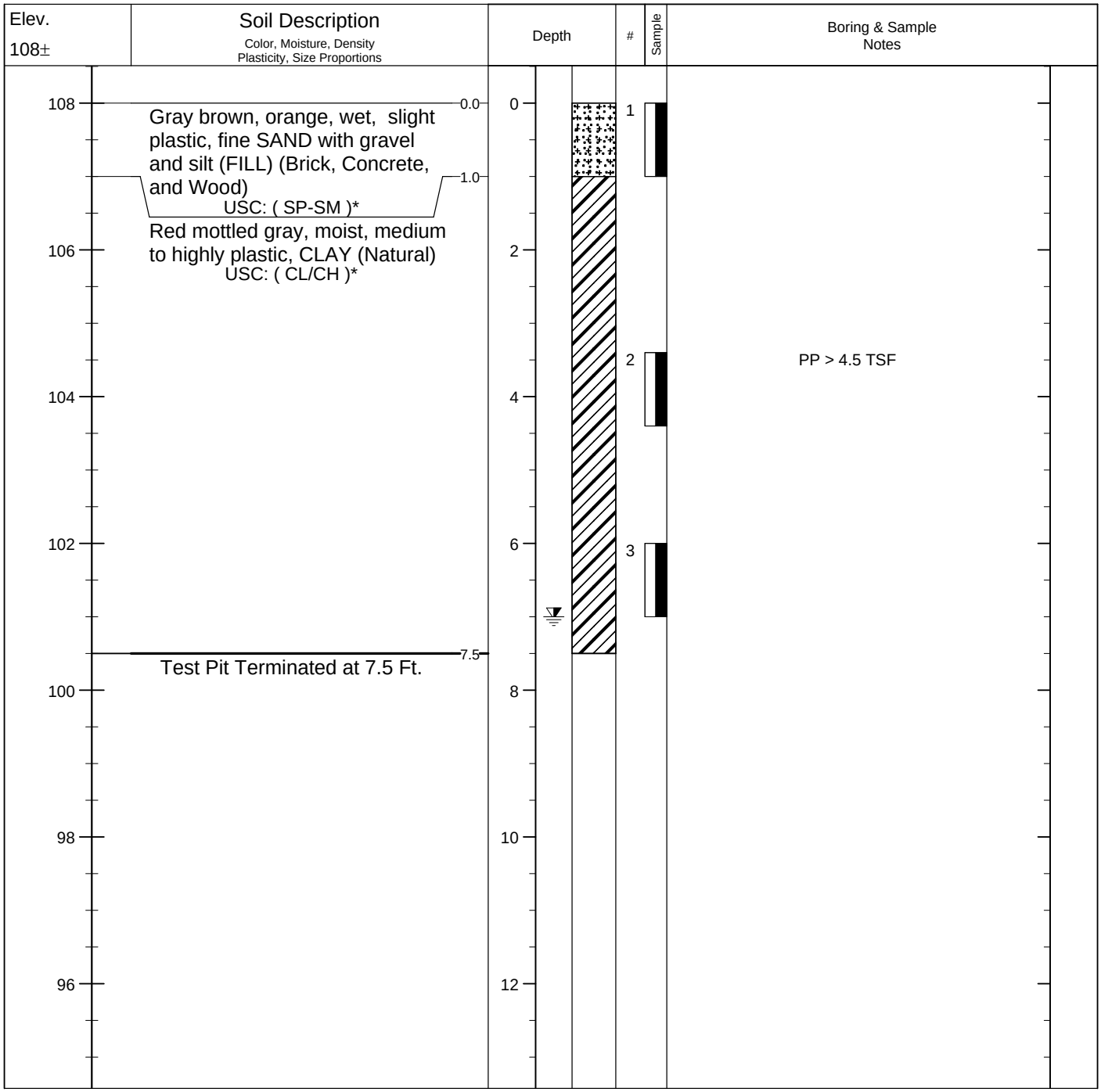
TEST PIT NO. **TP-1**
JOB NO. 16163

Surf. Elev.: 108±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 10'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	7.0'
On at	
On at	

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Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

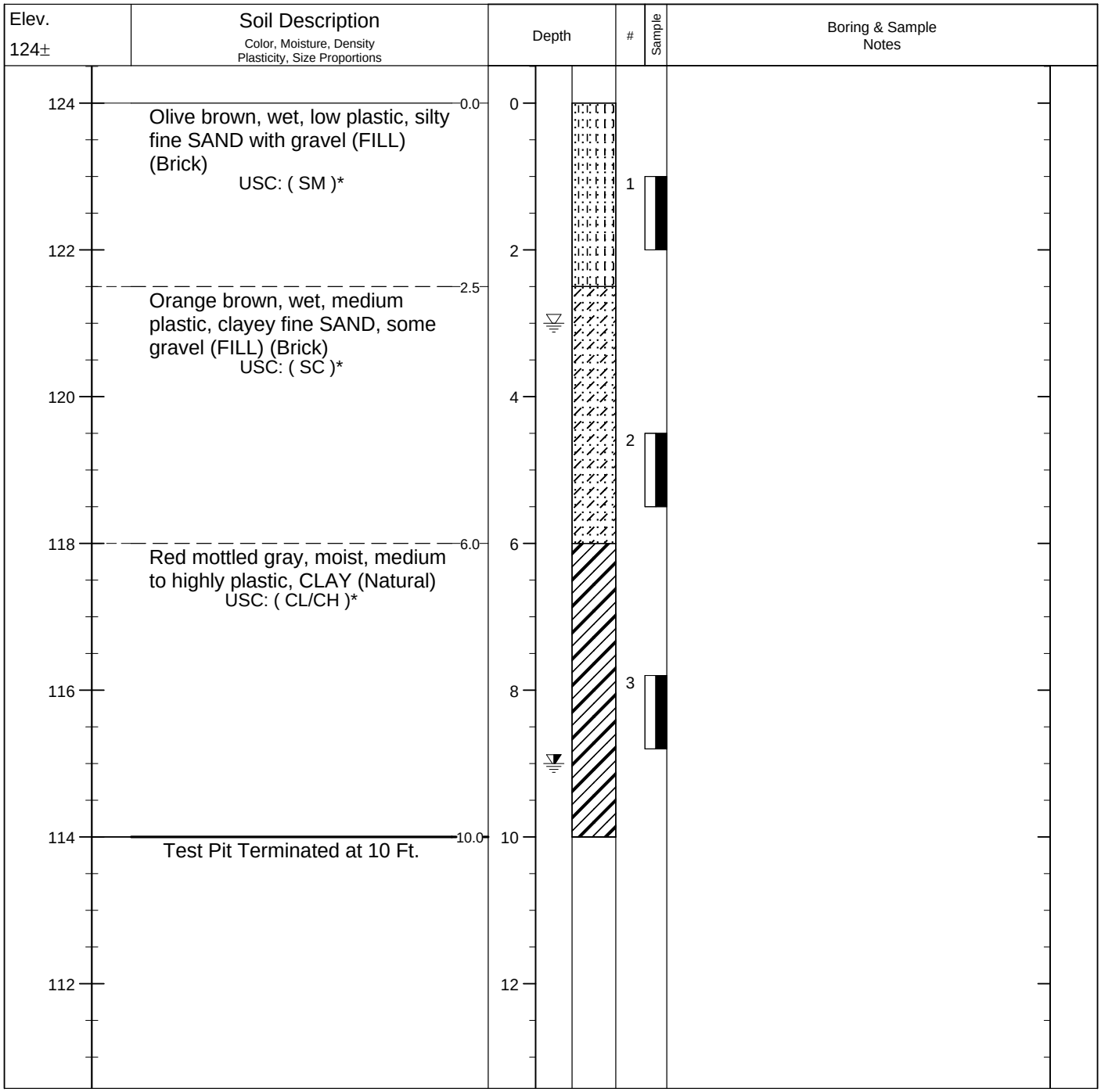
TEST PIT NO. **TP-2**
JOB NO. 16163

Surf. Elev.: 124±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 12'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	3.0'	
Completion	9.0'	
On	at	
On	at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-3**
JOB NO. 16163

Surf. Elev.: 131±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016

Elev. 131±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
130	0.0 Orange, wet, non to low plastic, silty fine SAND with gravel (FILL) (Brick and Concrete) USC: (SM)*	0	1		
128		2			
126	4.0 Gray mottled orange, wet, non-plastic, fine SAND with silt (Natural) USC: (SP-SM)*	4			
124		6	2		
122	8.0 Orange, wet, low plastic, silty fine SAND USC: (SM)*	8	3		
120	10.0 Test Pit Terminated at 10 Ft.	10			
118		12			

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	7.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

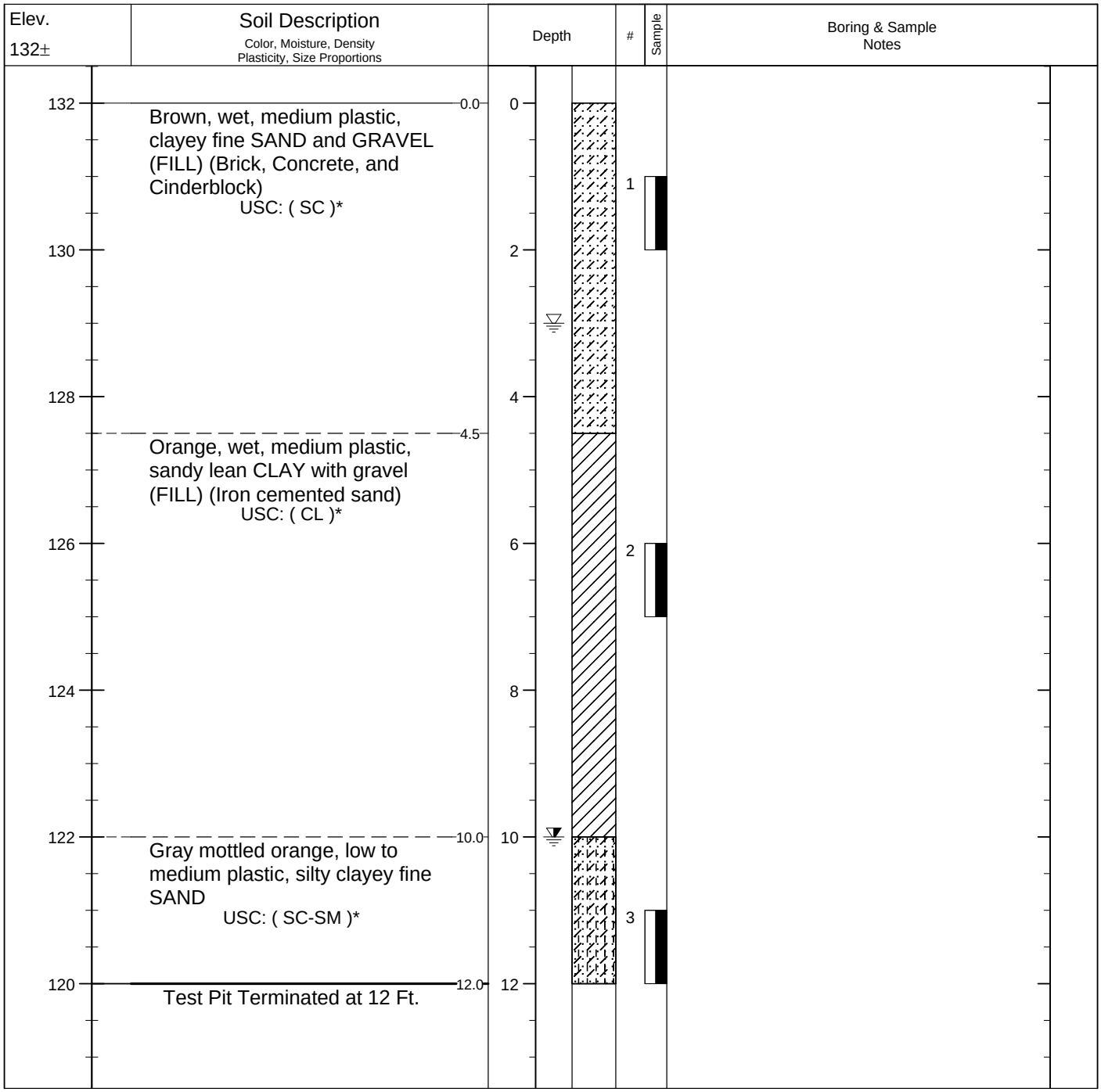
TEST PIT NO. **TP-4**
JOB NO. 16163

Surf. Elev.: 132±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 12'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	3.0'
Completion	10.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

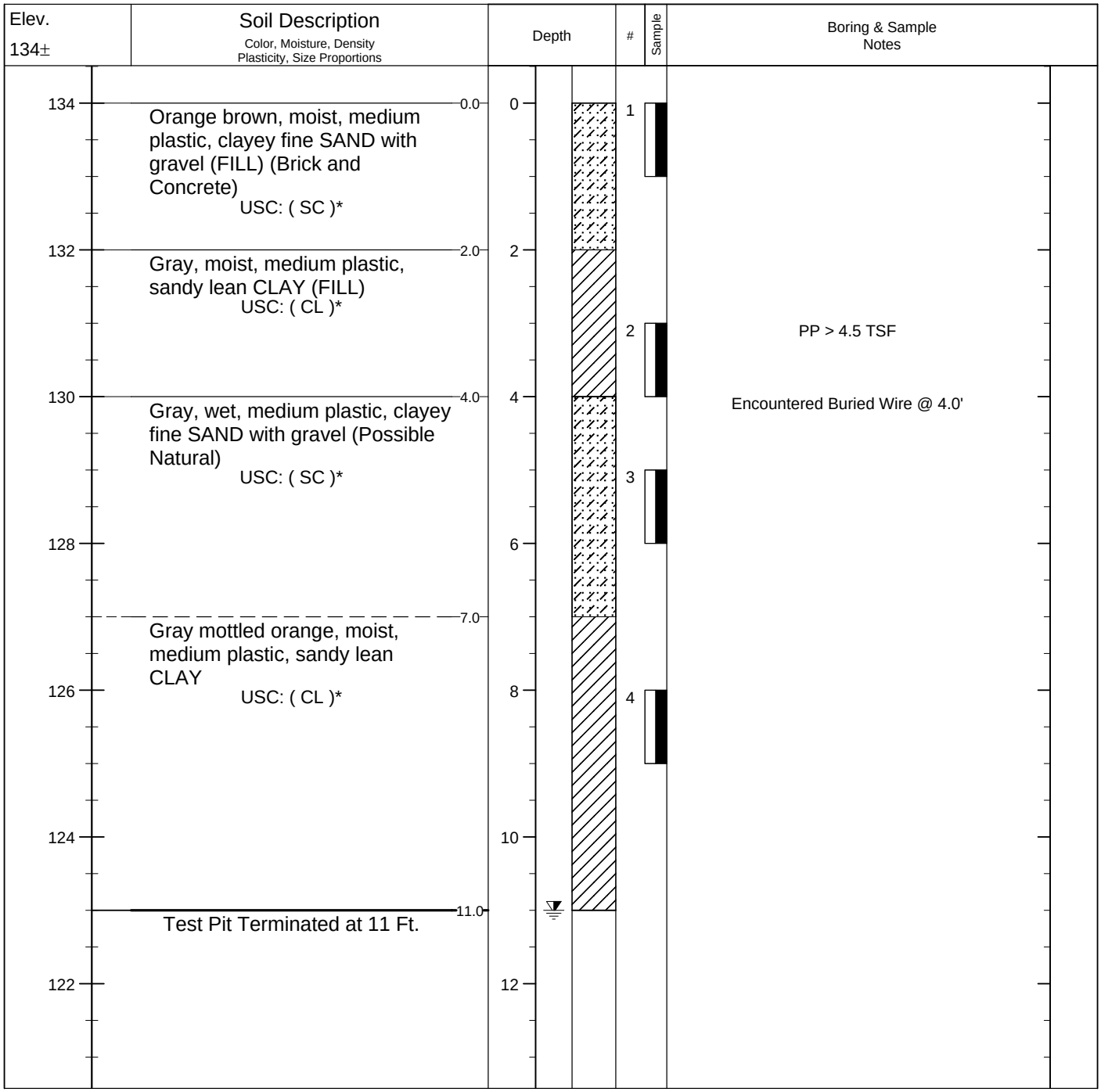
TEST PIT NO. **TP-5**
JOB NO. 16163

Surf. Elev.: 134±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	11.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

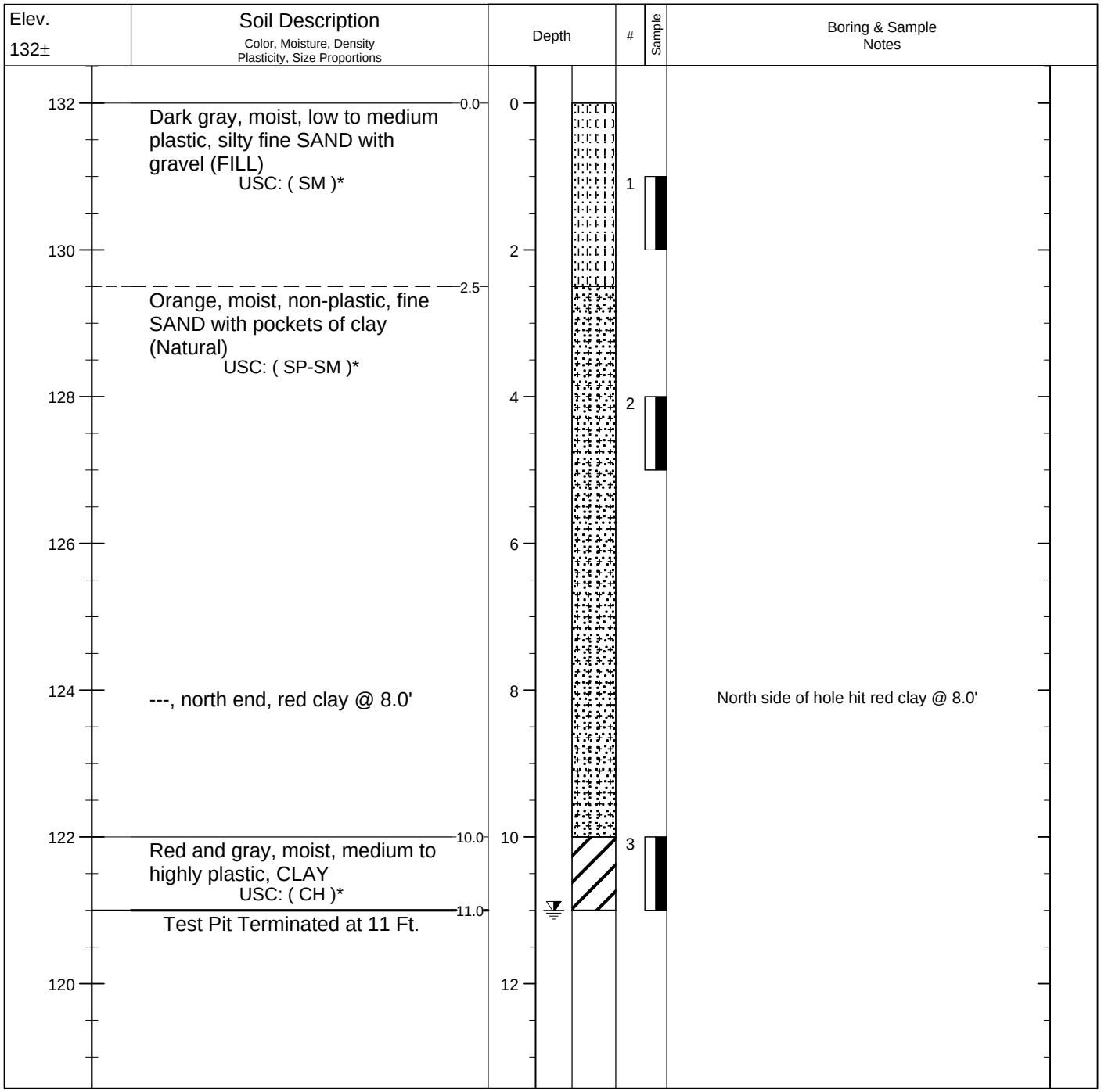
TEST PIT NO. **TP-6**
JOB NO. 16163

Surf. Elev.: 132±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	11.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-7**
JOB NO. 16163

Surf. Elev.: 131±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016

Elev. 131±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
130	0.0 Red brown, moist, slightly plastic, silty fine to very fine SAND, trace gravel (FILL) USC: (SM)*	0	1		PP = 1.75 TSF
128		2			
126	4.0 Gray mottled orange, moist, non-plastic, silty fine to very fine SAND with pockets of clay (Natural) USC: (SM)*	4	2		Encountered Buried pipe @ 4.0'
124	---, iron cemented sand fragments @ 7.0'	6			
122		8	3		
120	11.0 Test Pit Terminated at 11 Ft.	10			
118		12			

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	9.0'
On at		
On at		

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-8**
JOB NO. 16163

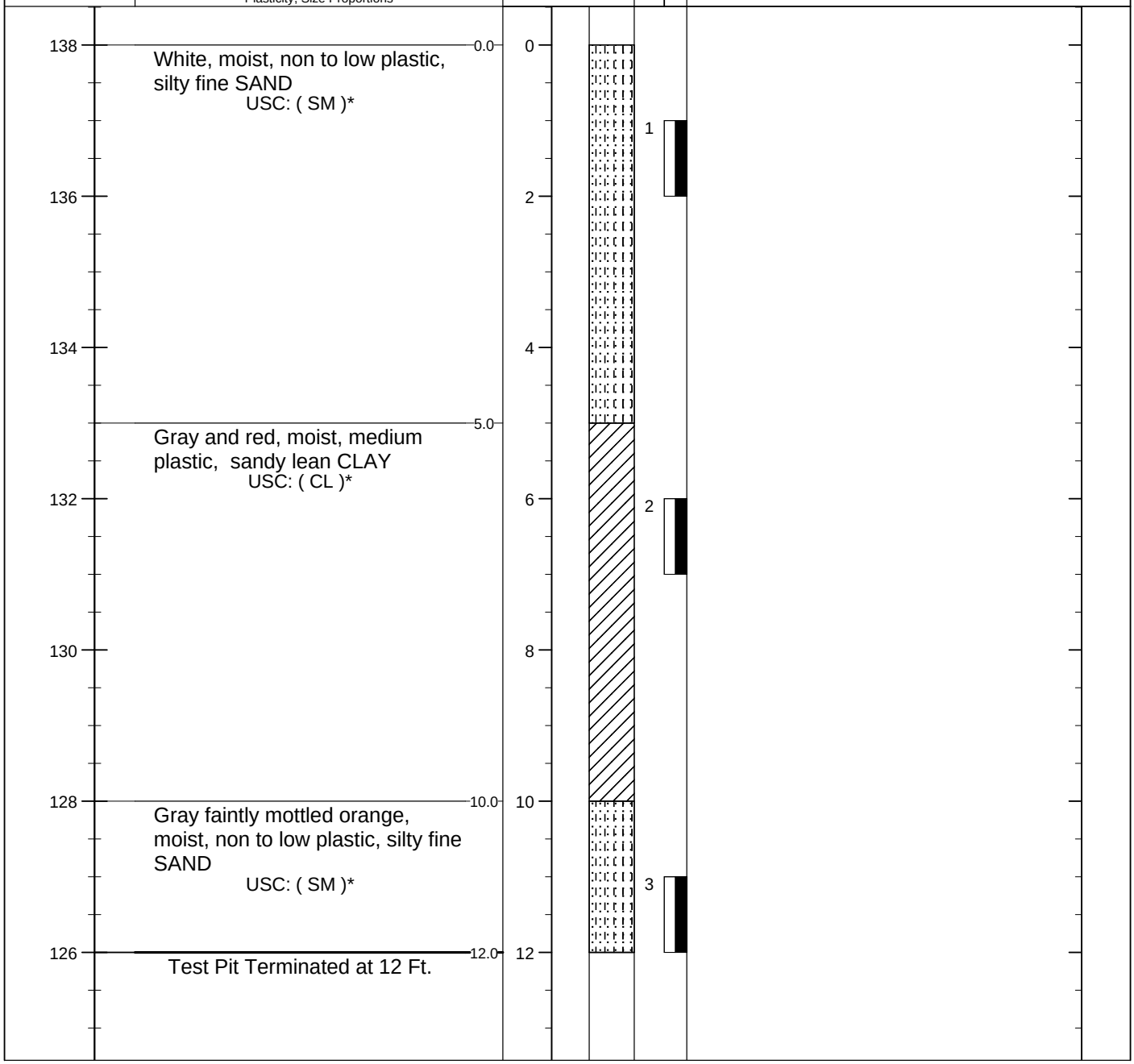
Surf. Elev.: 138±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016

Elev. 138±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
138	0.0 White, moist, non to low plastic, silty fine SAND USC: (SM)*	0	1		
136		2			
134		4			
	5.0 Gray and red, moist, medium plastic, sandy lean CLAY USC: (CL)*				
132		6	2		
130		8			
128	10.0 Gray faintly mottled orange, moist, non to low plastic, silty fine SAND USC: (SM)*	10	3		
126	12.0 Test Pit Terminated at 12 Ft.	12			



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

	Water	Caved
Encountered	Dry	
Completion	Dry	9.0'
On at		
On at		

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

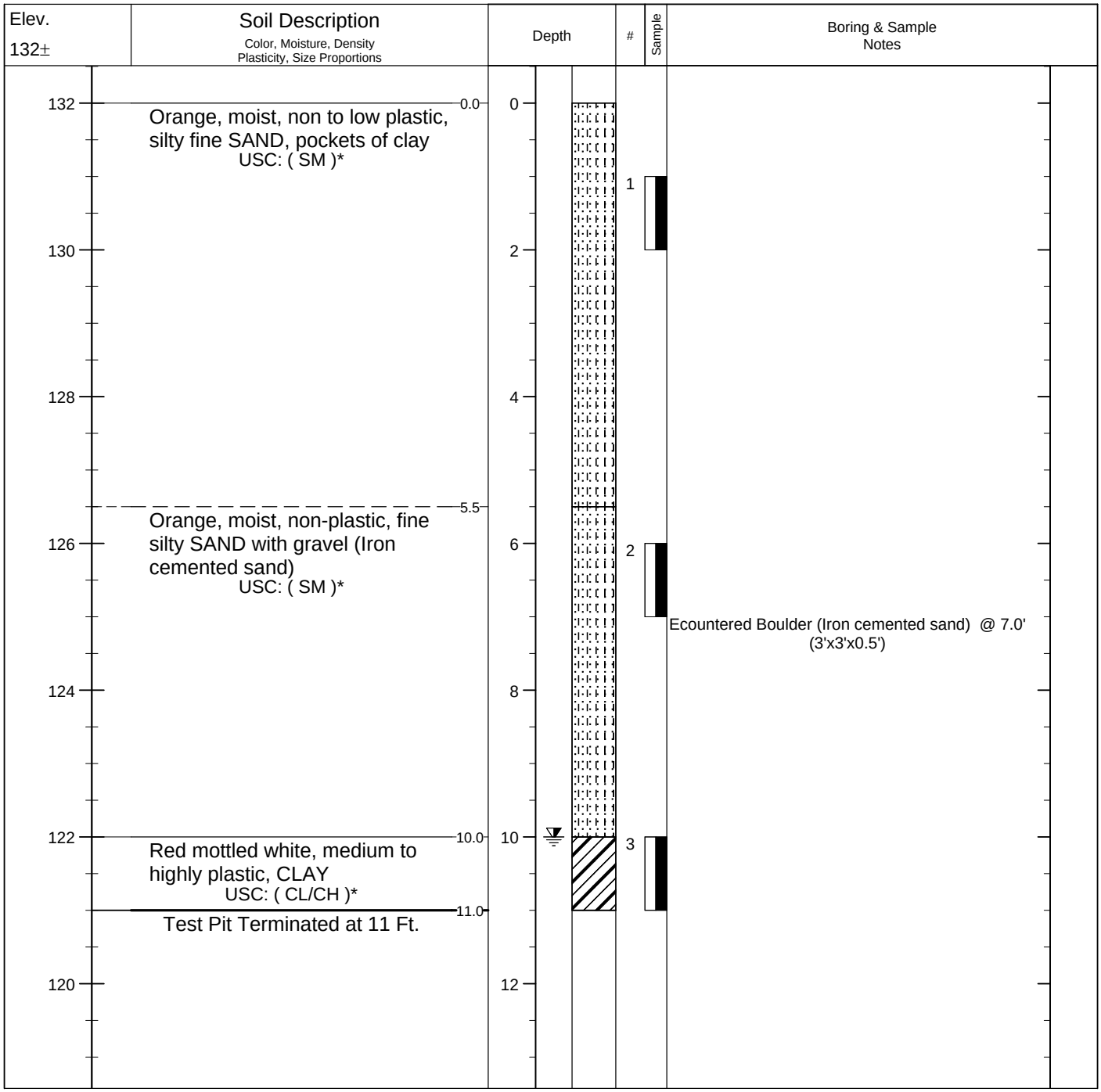
TEST PIT NO. **TP-9**
JOB NO. 16163

Surf. Elev.: 132±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 12
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	10.0'
Completion	10.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-10**
JOB NO. 16163

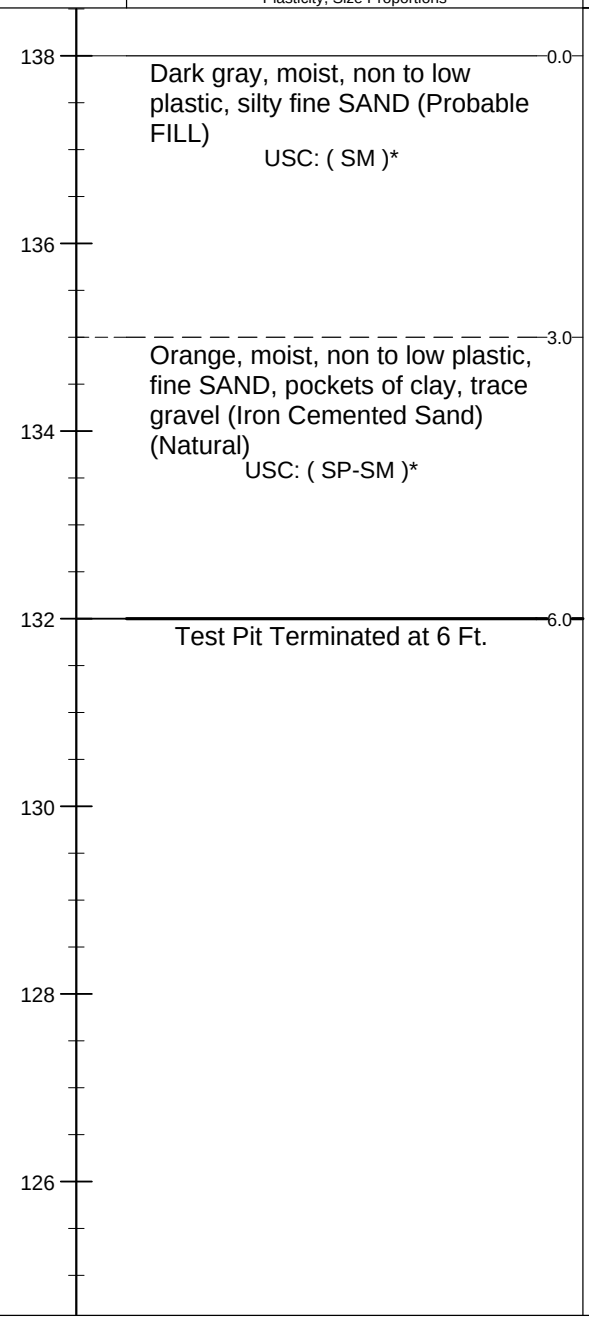
Surf. Elev.: 138±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/1/2016
Date Finished: 6/1/2016

Elev. 138±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
138	0.0 Dark gray, moist, non to low plastic, silty fine SAND (Probable FILL) USC: (SM)*	0	1		
136		2			
	3.0 Orange, moist, non to low plastic, fine SAND, pockets of clay, trace gravel (Iron Cemented Sand) (Natural) USC: (SP-SM)*				
134		4	2		
132	6.0 Test Pit Terminated at 6 Ft.	6			
130		8			
128		10			
126		12			



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered Dry	
Completion Dry	6.0'
On at	
On at	

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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

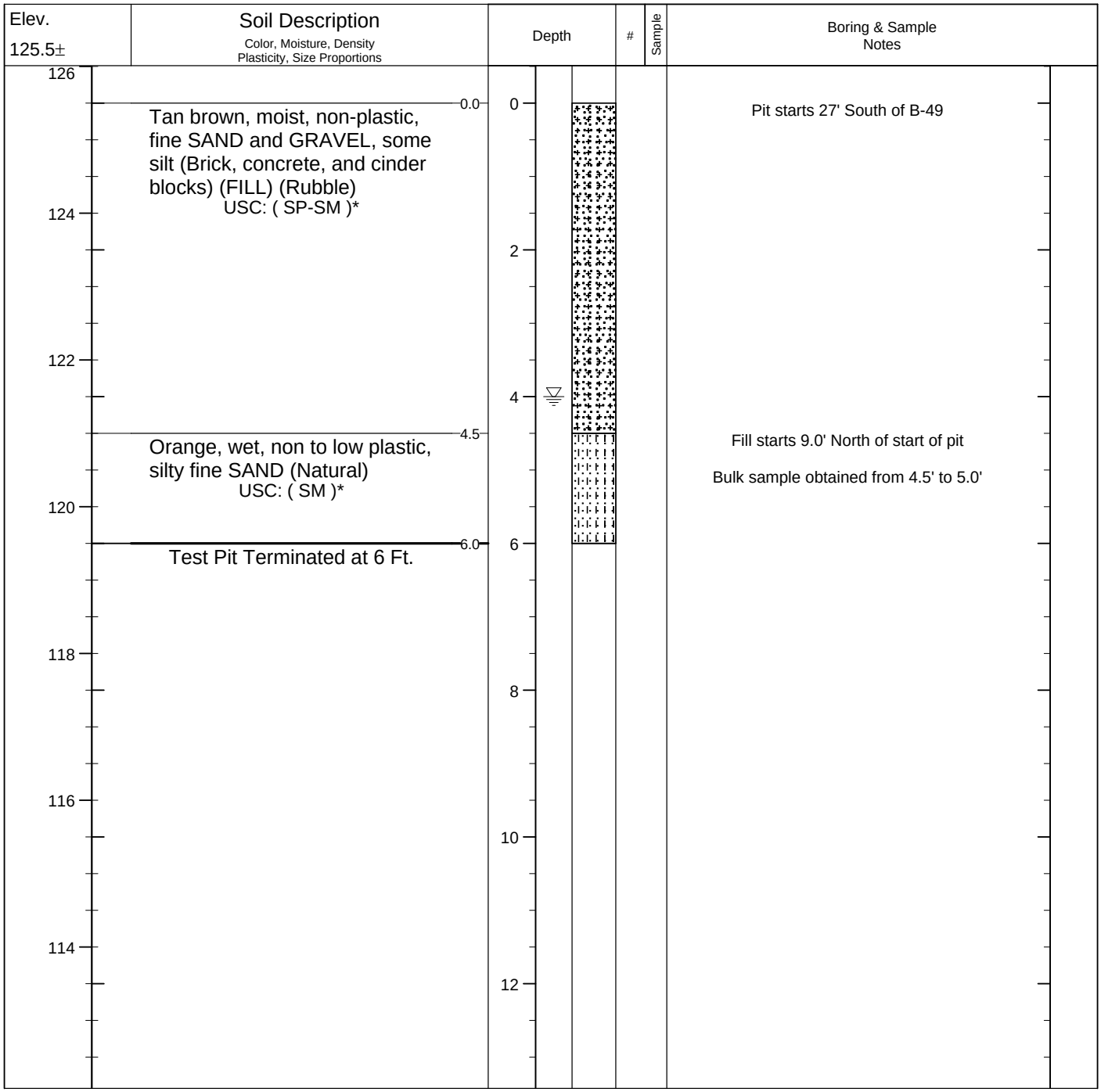
TEST PIT NO. **TP-11**
JOB NO. 16163

Surf. Elev.: 125.5±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 60'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 4.0'	
Completion	
On at	
On at	

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Office: (410) 553-0802
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Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-12**
JOB NO. 16163

Surf. Elev.: 129.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 45'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016

Elev. 129.0±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
128	0.0 Tan brown, moist, non-plastic, fine SAND and GRAVEL, some silt (Brick, concrete, and cinder blocks) (FILL) (Rubble) USC: (SP-SM)*	0			Pit starts @ B-50
126		2			@ 3.0' Fill is difficult to excavate
124		4			
122	6.0 Orange, wet, non to low plastic, silty fine SAND (Natural) USC: (SM)*	6			Rubble starts 9.0' East of start of pit
120	9.0 Test Pit Terminated at 9 Ft.	8			8.0' of Fill from 20.0' to 30.0' East of start of pit
118		10			
116		12			

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 8.0'	
Completion	
On at	
On at	

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Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-13**
JOB NO. 16163

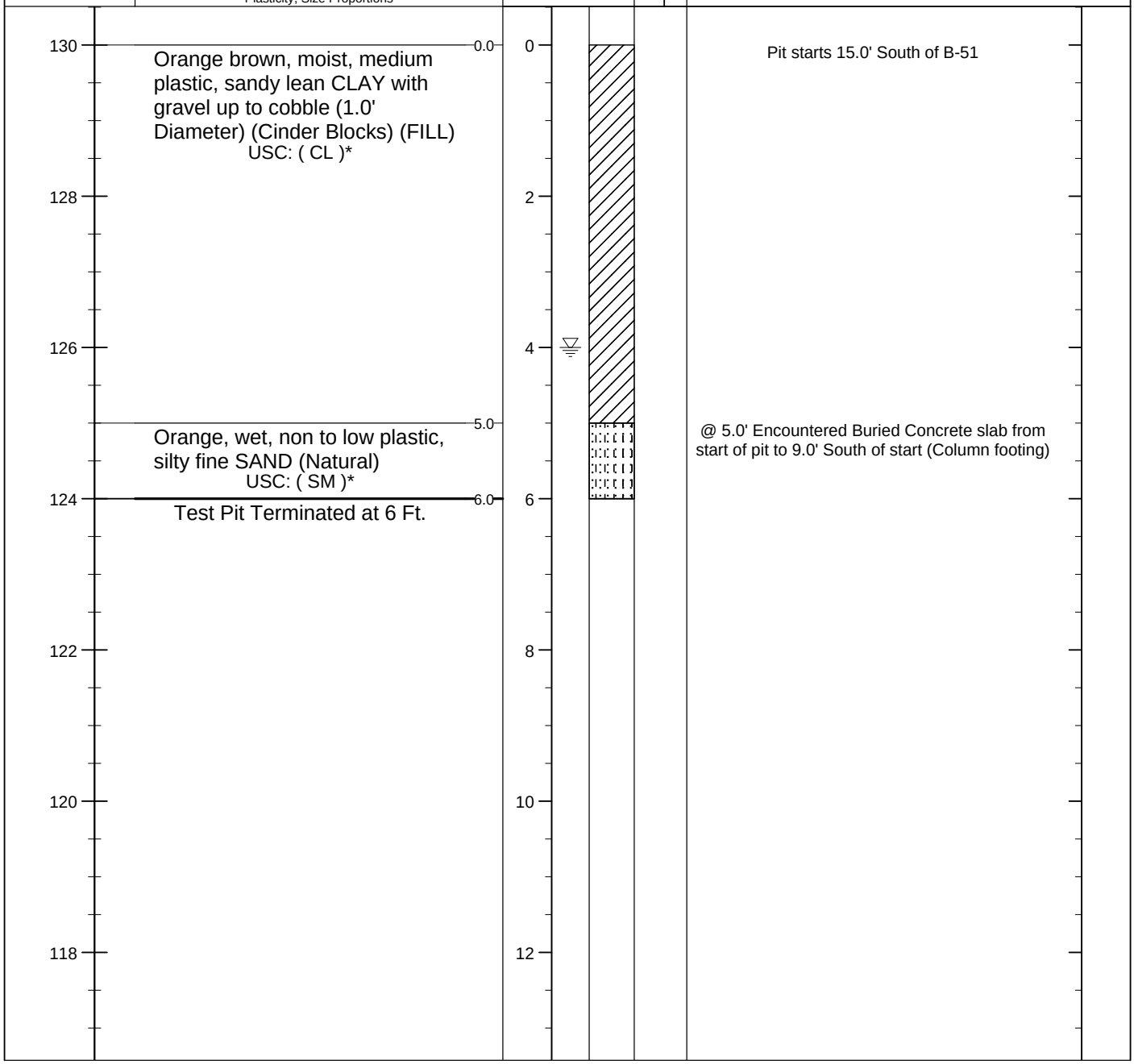
Surf. Elev.: 130.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 18'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016

Elev. 130.0±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
130	0.0 Orange brown, moist, medium plastic, sandy lean CLAY with gravel up to cobble (1.0' Diameter) (Cinder Blocks) (FILL) USC: (CL)*	0			Pit starts 15.0' South of B-51
128		2			
126		4 ▽			
	5.0 Orange, wet, non to low plastic, silty fine SAND (Natural) USC: (SM)*				@ 5.0' Encountered Buried Concrete slab from start of pit to 9.0' South of start (Column footing)
124	6.0 Test Pit Terminated at 6 Ft.	6			
122		8			
120		10			
118		12			



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 4.0'	
Completion	
On at	
On at	

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Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

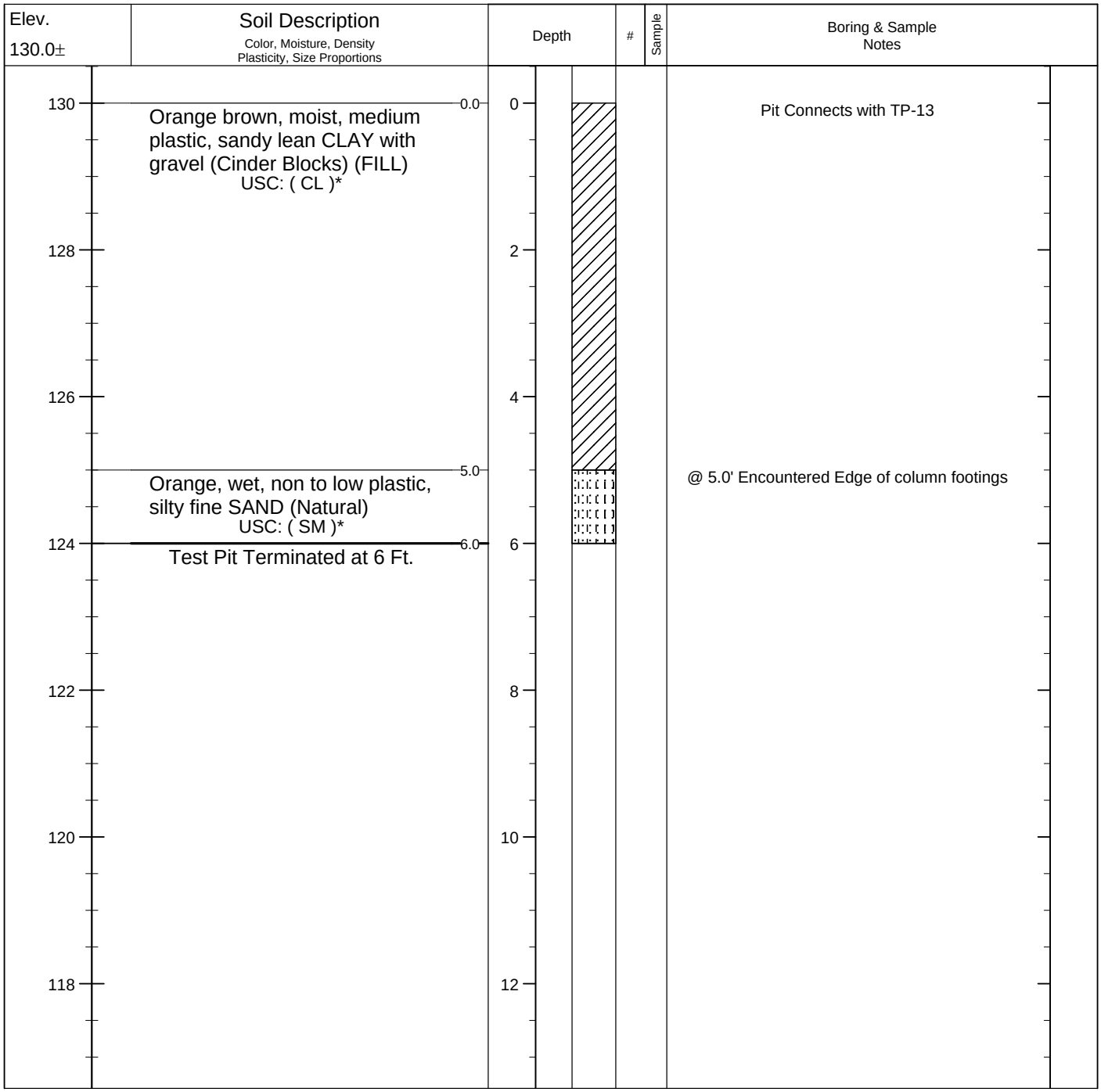
TEST PIT NO. **TP-14**
JOB NO. 16163

Surf. Elev.: 130.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On at	
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

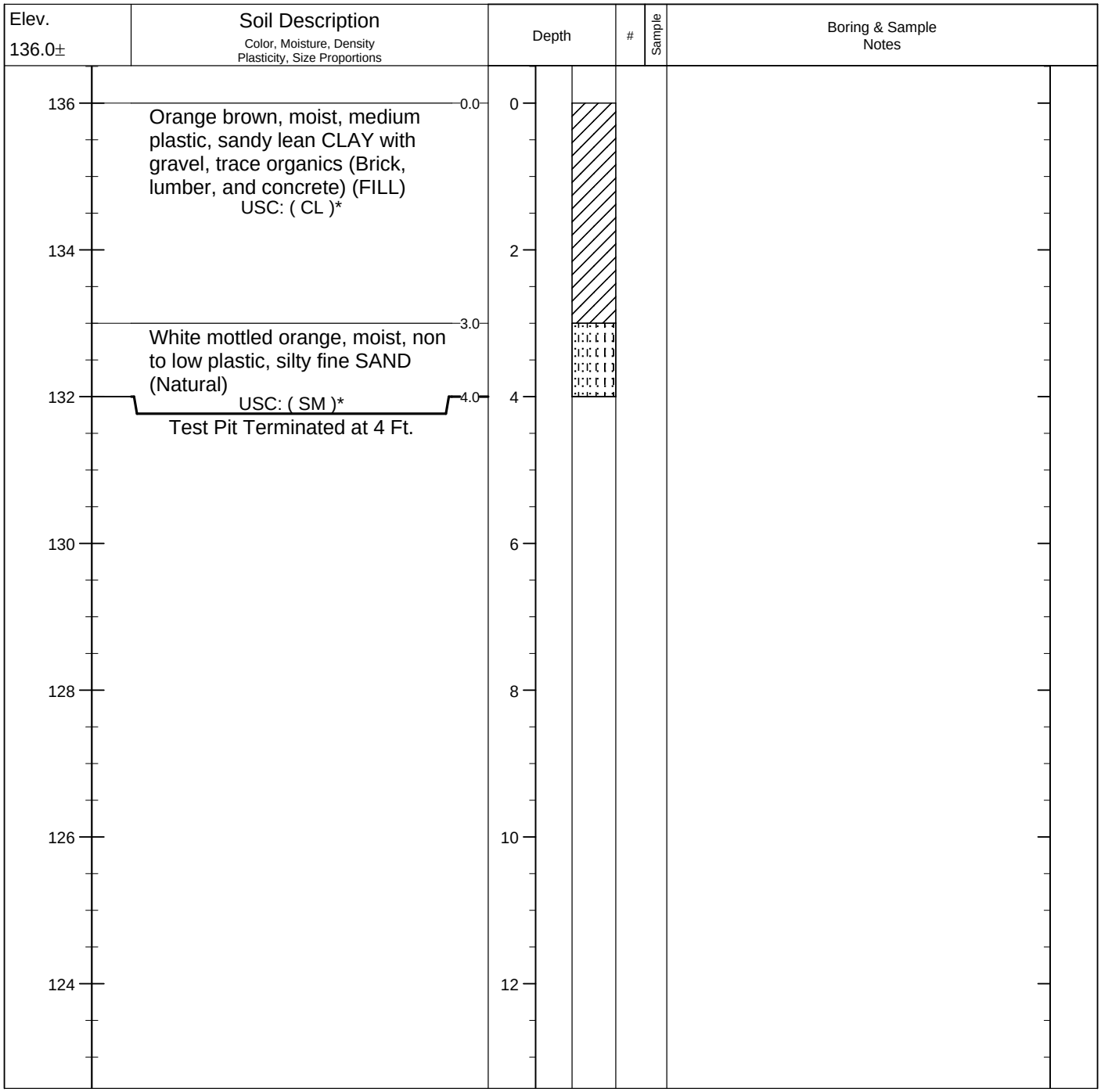
TEST PIT NO. **TP-15**
JOB NO. 16163

Surf. Elev.: 136.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 22'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On at	
On at	

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7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-16**
JOB NO. 16163

Surf. Elev.: 136.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 75'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016

Elev. 136.0±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
136	0.0 Brown, moist, medium plastic, sandy lean CLAY with gravel and organics (Brick, concrete, cinder blocks) (Topsoil) (FILL) USC: (CL)*	0			Pit starts 30.0' NE of B-54
134		2			
132	3.0 White mottled orange, moist, non to low plastic, silty fine SAND (Natural) USC: (SM)*	4			@ 3.0' Encountered Buried pipe 63.0' South of start of pit
130	5.0 Test Pit Terminated at 5 Ft.	6			
128		8			
126		10			
124		12			

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On	at
On	at

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

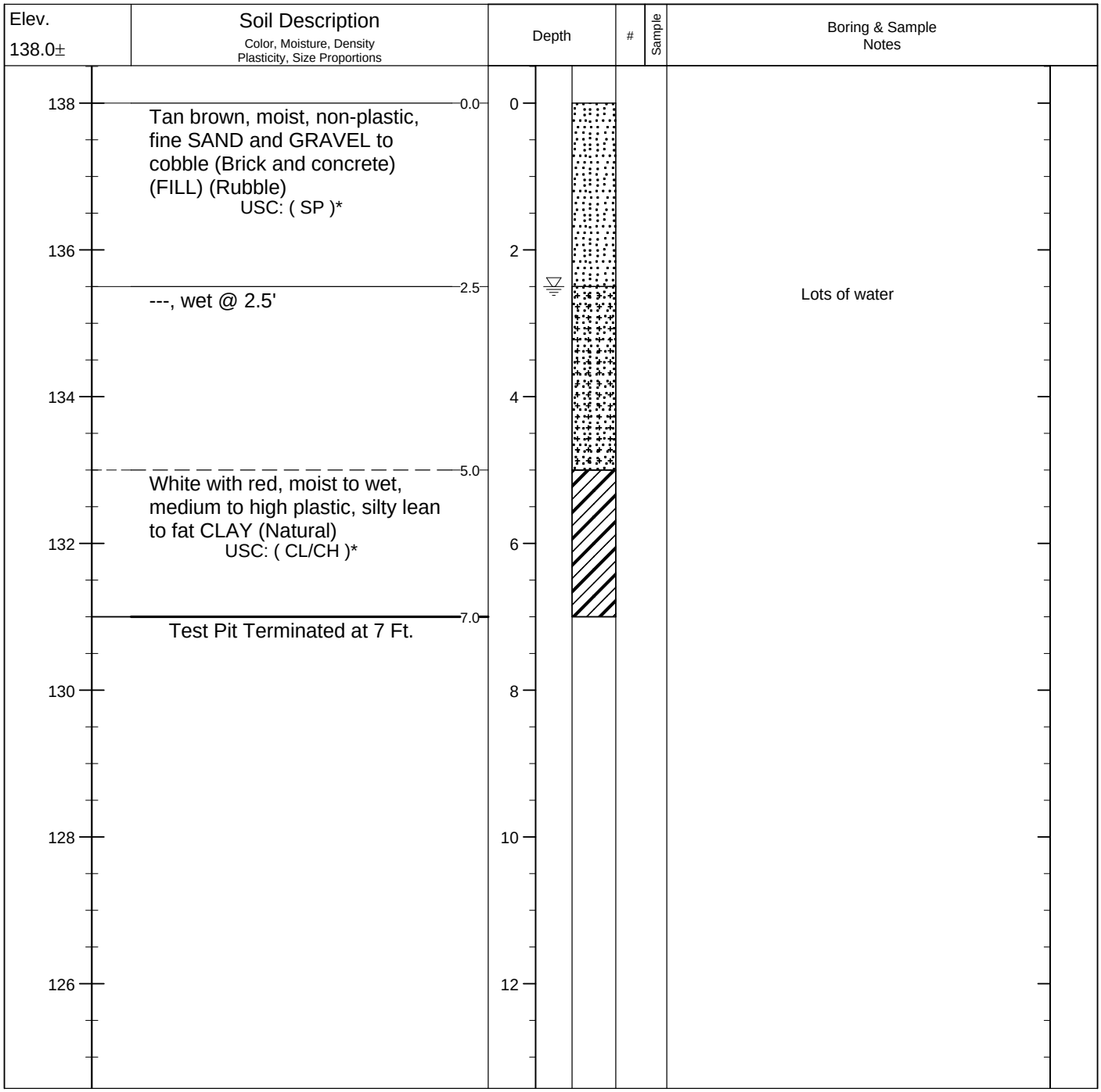
TEST PIT NO. **TP-17**
JOB NO. 16163

Surf. Elev.: 138.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: NE-SW
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 2.5'	
Completion	
On at	
On at	

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Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

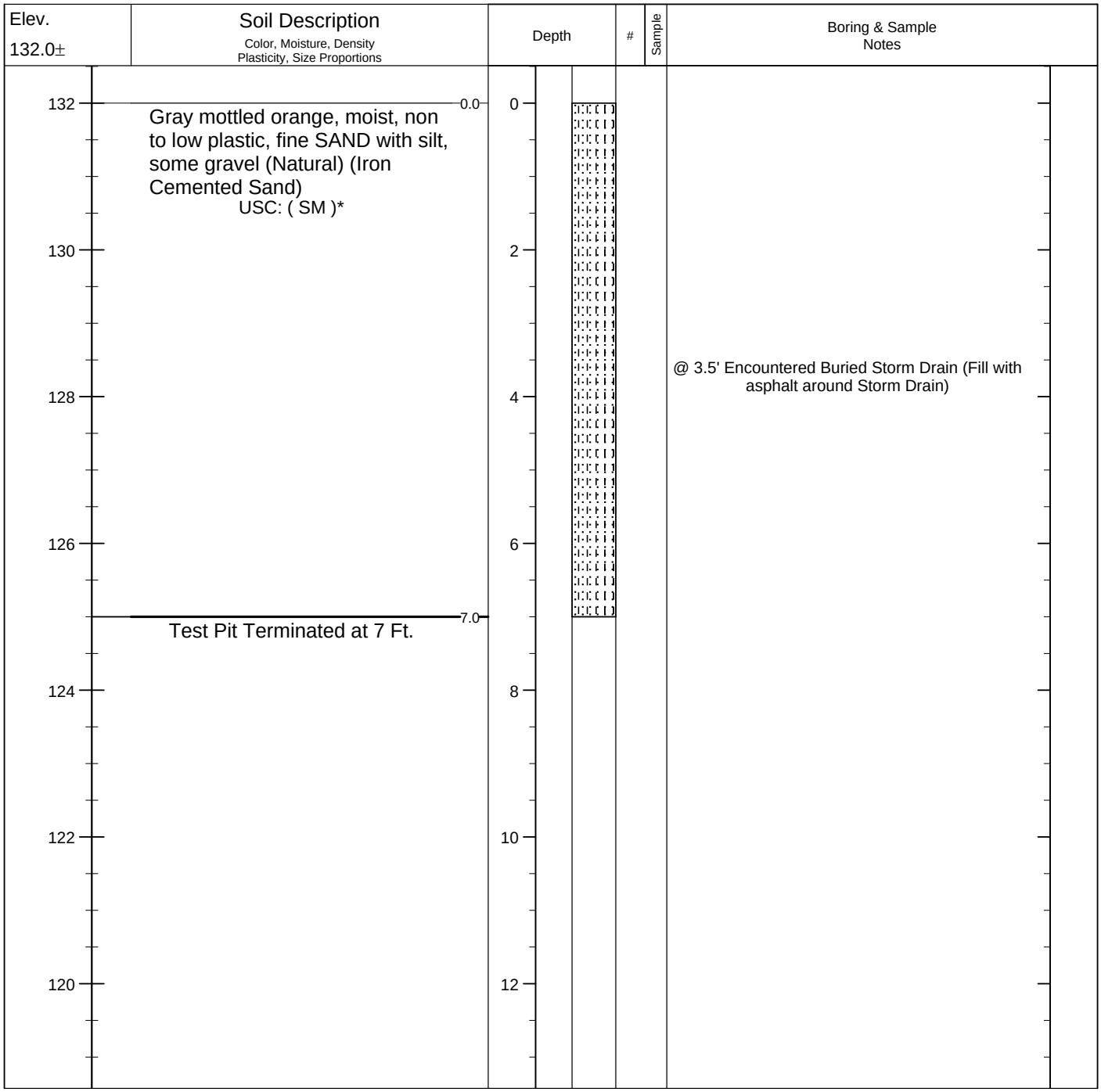
TEST PIT NO. **TP-18**
JOB NO. 16163

Surf. Elev.: 132.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 15'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On at	
On at	

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7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-19**
JOB NO. 16163

Surf. Elev.: 133.5±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 12'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016

Elev. 133.5±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
134					
	0.0 — Brown, moist, non-plastic, fine SAND and GRAVEL (Brick, concrete, and cinder blocks) (FILL) USC: (SP)*	0			@ 1.0' Very difficult to excavate
132		2			
130					
	4.0 — Orange, moist, medium plastic, lean CLAY, some sand and gravel (Possible FILL) (Iron Cemented Sand) USC: (CL)*	4			
128					
	6.0 — Test Pit Terminated at 6 Ft.	6			
126		8			
124		10			
122		12			

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 3.0'	
Completion	
On at	
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

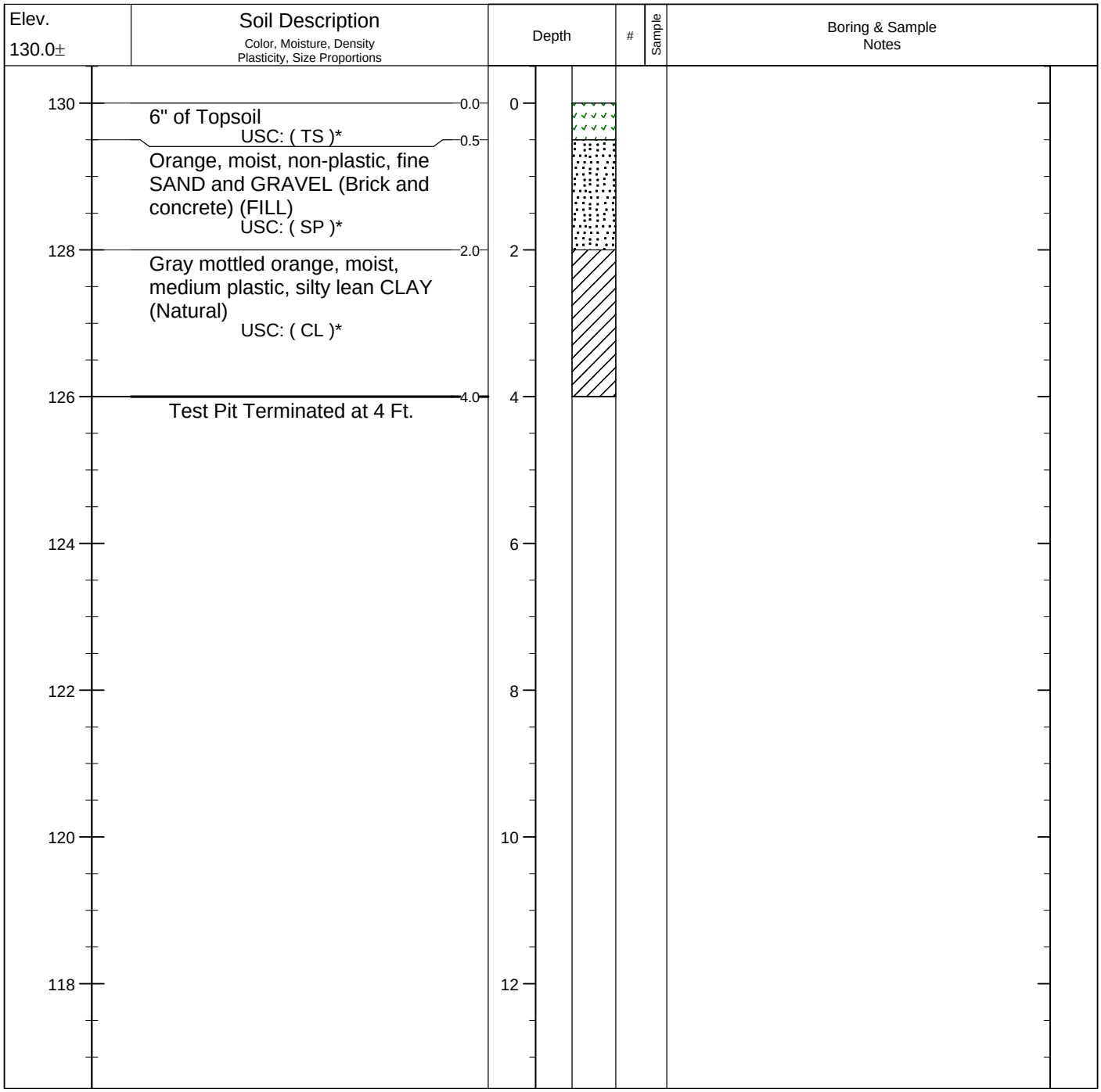
TEST PIT NO. **TP-20**
JOB NO. 16163

Surf. Elev.: 130.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 60'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On at	
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

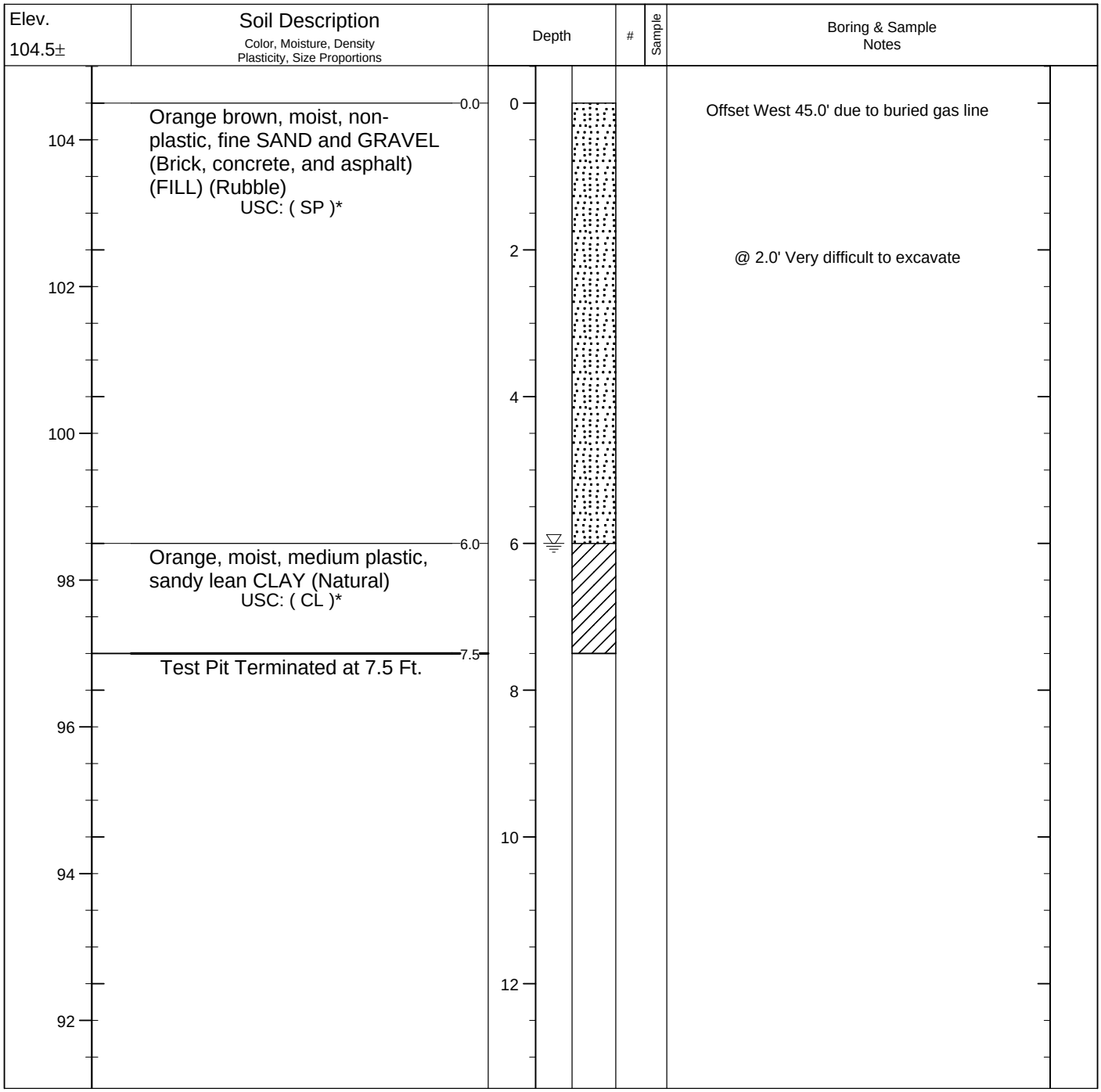
TEST PIT NO. **TP-21**
JOB NO. 16163

Surf. Elev.: 104.5±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 30'
Orientation: N-S
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered 6.0'	
Completion	
On at	
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: Glenarden Apartments
Contracted With: Pennrose Properties
Project Location: Prince George's County, Maryland
Test Pit Location: N: E:

TEST PIT NO. **TP-22**
JOB NO. 16163

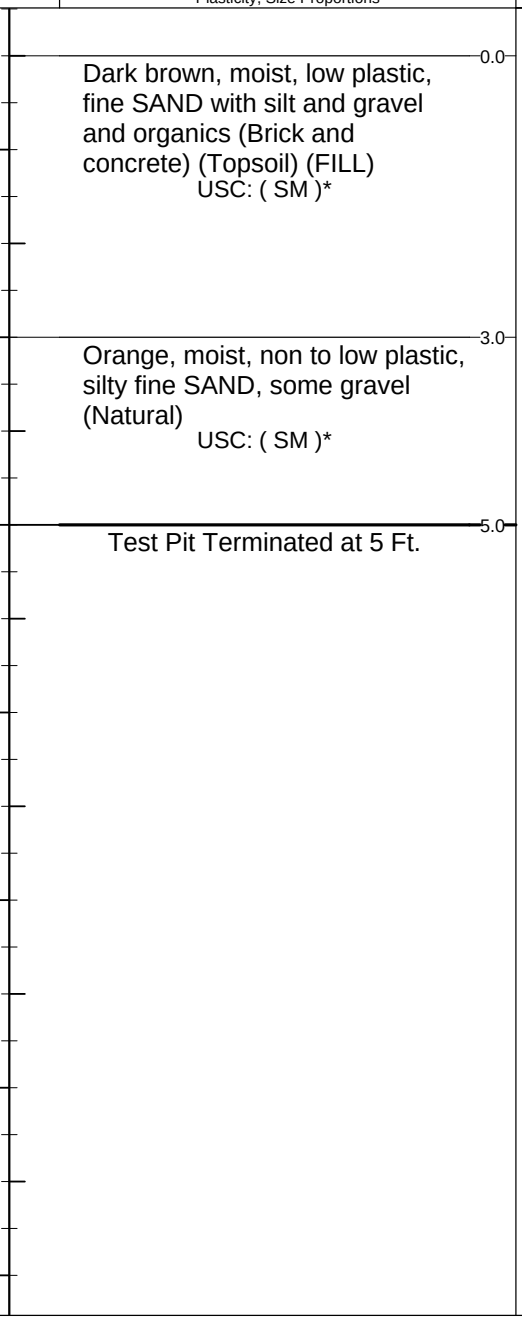
Surf. Elev.: 105.0±
Elev. from: Topo
Offset Elev:
Offset Dist.:

Hammer Wt.
Hammer Drop:
Sampler Size:
Offset Direction:

Pit Width: 3.5'
Pit Length: 40'
Orientation: E-W
Excavator:

Foreman: Allied
Inspector: JFD
Date Started: 6/8/2016
Date Finished: 6/8/2016

Elev. 105.0±	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	#	Sample	Boring & Sample Notes
104	0.0 – Dark brown, moist, low plastic, fine SAND with silt and gravel and organics (Brick and concrete) (Topsoil) (FILL) USC: (SM)*	0			
102	3.0 – Orange, moist, non to low plastic, silty fine SAND, some gravel (Natural) USC: (SM)*	2			
100	5.0 – Test Pit Terminated at 5 Ft.	4			
98		6			
96		8			
94		10			
92		12			



* Visual Description - in general accordance with ASTM D 2488

Notes: Surface elevations from topographic map provided by Ben Dyer Associates, Inc.

Water	Caved
Encountered	Dry
Completion	
On	at
On	at

KEY TO SYMBOLS

Symbol	Description
Misc. Symbols	
	Water level at completion
	Water encountered during drilling
Soil Samplers	
	Bag Sample
Strata	
	Poorly graded SAND with silt
	Medium to highly plastic CLAY
	Silty SAND
	Clayey SAND
	Lean CLAY
	Silty clayey SAND
	Fat CLAY
	Poorly graded SAND
	Topsoil

Notes:

1. Borings were performed from May 18, 2016 through May 20, 2016. Test pits were performed from June 1, 2016 through June 8, 2016.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. PP - indicates results of pocket penetrometer, used to estimate the unconfined compressive strength of fine-grained soils.

APPENDIX C

LABORATORY TEST RESULTS

Summary of Laboratory Test Results

Project: Glenarden Apartments
Job #: 16163

Report Date: 6/9/2016
Report Status: Final

Lab Number	Boring	Sample	Depth	Moisture Content	Description	USC Class.	Liquid Limit	Plastic Limit	Plastic Index	% Gravel	% Sand	% Fines	Notes
160251	B-34	S-1	0.0'-1.5'	8.2%									
160252	B-34	S-2	2.5'-4.0'	12.5%									
160253	B-34	S-3	5.0'-6.5'	19.5%									
160254	B-34	S-4	8.5'-10.0'	22.2%									
160255	B-36	S-1	0.0'-1.5'	12.3%									
160256	B-36	S-2	2.5'-4.0'	15.7%									
160257	B-36	S-3	5.0'-6.5'	12.6%									
160258	B-36	S-4	8.5'-10.0'	7.0%									
160206	B-37	S-4	8.5'-10.0'	30.6%	Brownish yellow, fat CLAY with fine to very fine sand	CH	54	25	29	0	20	80	
160259	B-38	S-1	0.0'-1.5'	12.5%									
160260	B-38	S-2	2.5'-4.0'	16.5%									
160261	B-38	S-3	5.0'-6.5'	14.5%									
160262	B-38	S-4	8.5'-10.0'	16.8%									
160263	B-40	S-1	0.0'-1.5'	19.6%									
160264	B-40	S-2	2.5'-4.0'	19.7%									
160265	B-40	S-3	5.0'-6.5'	21.1%									
160266	B-40	S-4	8.5'-10.0'	25.6%									
160267	B-42	S-1	0.0'-1.5'	17.7%									
160268	B-42	S-2	2.5'-4.0'	13.6%									
160269	B-42	S-3	5.0'-6.5'	20.1%									
160270	B-42	S-4	8.5'-10.0'	18.1%									
160271	B-49	S-1	0.0'-1.5'	12.0%									
160272	B-49	S-2	2.5'-4.0'	18.6%									
160273	B-49	S-3	5.0'-6.5'	22.8%									
160274	B-49	S-4	8.5'-10.0'	21.9%									
160275	B-51	S-1	0.0'-1.5'	16.7%									
160276	B-51	S-2	2.5'-4.0'	18.8%									
160277	B-51	S-3	5.0'-6.5'	18.6%									
160278	B-51	S-4	8.5'-10.0'	15.2%									

Summary of Laboratory Test Results

Project: Glenarden Apartments
Job #: 16163

Report Date: 6/9/2016
Report Status: Final

Lab Number	Boring	Sample	Depth	Moisture Content	Description	USC Class.	Liquid Limit	Plastic Limit	Plastic Index	% Gravel	% Sand	% Fines	Notes
160279	B-53	S-1	0.0'-1.5'	12.9%									
160280	B-53	S-2	2.5'-4.0'	15.4%									
160281	B-53	S-3	5.0'-6.5'	12.4%									
160282	B-53	S-4	8.5'-10.0'	18.8%									
160283	B-55	S-1	0.0'-1.5'	13.0%									
160284	B-55	S-2	2.5'-4.0'	13.0%									
160285	B-55	S-3	5.0'-6.5'	7.5%									
160286	B-55	S-4	8.5'-10.0'	16.1%									
160287	B-57	S-1	0.0'-1.5'	16.1%									
160288	B-57	S-2	2.5'-4.0'	9.1%									
160289	B-57	S-3	5.0'-6.5'	7.6%									
160290	B-57	S-4	8.5'-10.0'	21.0%									
160291	R-13	S-1	0.0'-1.5'	15.1%									
160292	R-13	S-2	2.5'-4.0'	-									Bit. Conc. in sample, no moisture
160293	R-13	S-3	5.0'-6.5'	-									Bit. Conc. in sample, no moisture
160294	R-13	S-4	8.5'-10.0'	18.7%									
160295	R-13	S-5	13.5'-15.'	22.1%									
160205	R-14	Bulk	0'-8'	17.4%	Pink, very fine sandy lean CLAY	CL	25	17	8	6	39	55	
160296	R-14	S-1	0.0'-1.5'	23.6%									
160297	R-14	S-2	2.5'-4.0'	19.0%									
160298	R-14	S-3	5.0'-6.5'	20.4%									
160299	R-14	S-4	8.5'-10.0'	17.7%									
160300	R-14	S-5	13.5'-15.0'	9.5%									
160301	R-14	S-6	16.5'-18.0'	7.0%									
160302	R-15	S-1	0.0'-1.5'	15.0%									
160303	R-15	S-2	2.5'-4.0'	9.5%									
160304	R-15	S-3	5.0'-6.5'	19.7%									
160305	R-15	S-4	8.5'-10.0'	16.6%									
160358	R-16	S-1	0.5'-1.7'	9.7%									
160359	R-16	S-2	3.9'-4.0'	7.3%									
160360	R-16	S-3	5.0'-6.0'	9.9%									
160361	R-16	S-4	7.5'-8.0'	7.9%									
160362	R-16	S-5	9.5'-10.0'	25.6%									

Summary of Laboratory Test Results

Project: Glenarden Apartments
Job #: 16163

Report Date: 6/9/2016
Report Status: Final

Lab Number	Boring	Sample	Depth	Moisture Content	Description	USC Class.	Liquid Limit	Plastic Limit	Plastic Index	% Gravel	% Sand	% Fines	Notes
160306	R-17	S-1	0.0'-1.5'	21.4%									
160307	R-17	S-2	2.5'-4.0'	15.5%									
160308	R-17	S-3	5.0'-6.5'	7.9%									
160309	R-17	S-4	9.5'-11.0'	5.5%									
160310	R-18	S-1	0.0'-1.5'	11.9%									
160311	R-18	S-2	2.5'-4.0'	12.9%									
160312	R-18	S-3	5.0'-6.5'	15.0%									
160313	R-18	S-4	8.5'-10.0'	8.7%									
160314	R-18	S-5	11.5'-13.0'	5.1%									
160315	R-19	S-1	0.0'-1.5'	15.8%									
160316	R-19	S-2	2.5'-4.0'	6.4%									
160317	R-19	S-3	5.0'-6.5'	5.2%									
160318	R-19	S-4	9.5'-11.0'	23.3%									
160319	R-20	S-1	0.0'-1.5'	12.0%									
160320	R-20	S-2	2.5'-4.0'	14.0%									
160321	R-20	S-3	5.0'-6.5'	12.4%									
160322	R-20	S-4	8..0'-10.5'	23.1%									
160323	R-20	S-5	13.5'-15.0'	21.9%									
160324	R-21	S-1	0.0'-1.5'	17.6%									
160325	R-21	S-2	2.5'-4.0'	13.6%									
160326	R-21	S-3	5.0'-6.5'	13.4%									
160327	R-21	S-4	8.5'-10.0'	15.8%									
160328	R-21	S-5	13.5'-15.0'	19.9%									
160329	R-22	S-1	0.0'-1.5'	15.6%									
160330	R-22	S-2	2.5'-4.0'	19.8%									
160331	R-22	S-3	5.0'-6.5'	18.8%									
160332	R-22	S-4	8.5'-10.0'	15.8%									
160333	R-23	S-1	0.0'-1.5'	21.0%									
160334	R-23	S-2	2.5'-4.0'	17.4%									
160335	R-23	S-3	5.0'-6.5'	14.7%									
160336	R-23	S-4	8.5'-10.0'	20.9%									

Summary of Laboratory Test Results

Project: Glenarden Apartments
Job #: 16163

Report Date: 6/9/2016
Report Status: Final

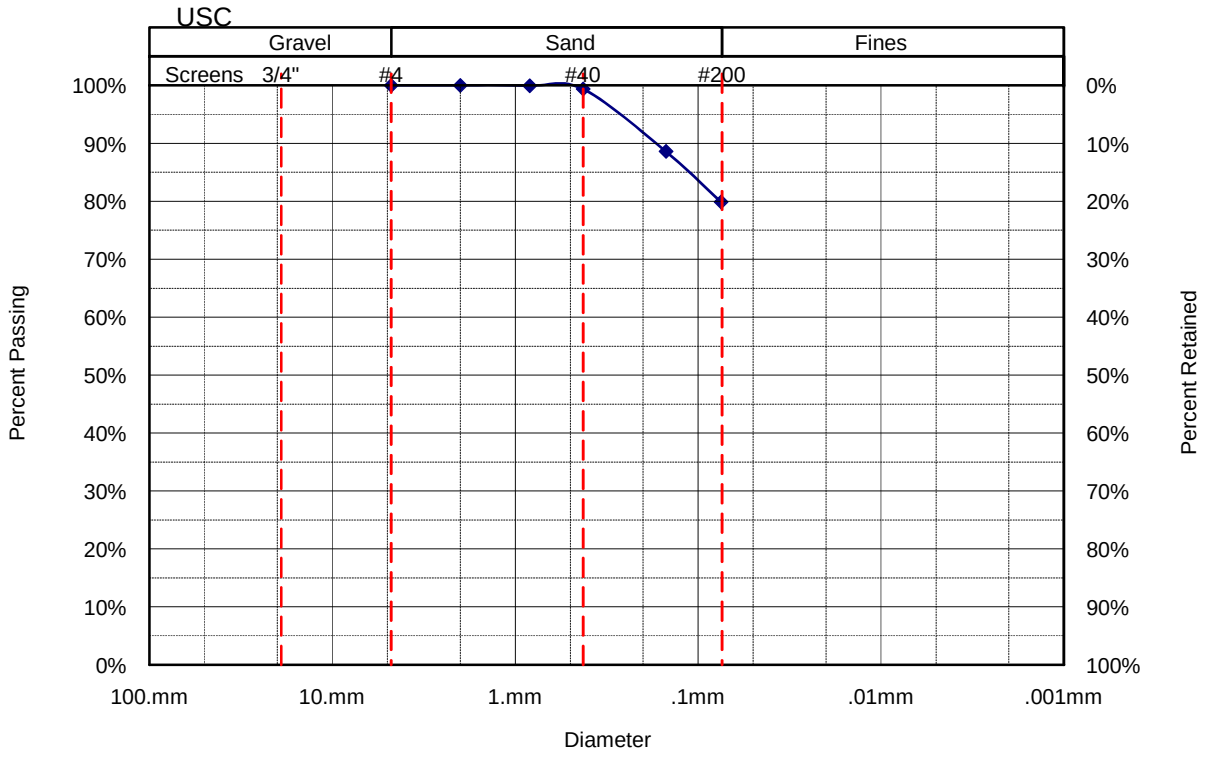
Lab Number	Boring	Sample	Depth	Moisture Content	Description	USC Class.	Liquid Limit	Plastic Limit	Plastic Index	% Gravel	% Sand	% Fines	Notes
160337	R-24	S-1	0.0'-1.5'	13.5%									
160338	R-24	S-2	2.5'-4.0'	12.9%									
160339	R-24	S-3	5.0'-6.5'	9.7%									
160340	R-24	S-4	8.5'-10.0'	9.6%									
160341	R-24	S-5	10.0'-12.0'	16.0%									
160342	R-26	S-1	0.0'-1.5'	13.5%									
160343	R-26	S-2	2.5'-4.0'	20.4%									
160344	R-26	S-3	5.0'-6.5'	16.5%									
160345	R-26	S-4	8.5'-10.0'	15.8%									
160346	SWM-08	S-1	0.0'-1.5'	13.4%									
160347	SWM-08	S-2	2.5'-4.0'	28.4%									
160348	SWM-08	S-3	5.0'-6.5'	20.0%									
160349	SWM-08	S-4	8.5'-10.0'	26.4%									
160350	SWM-10	S-1	0.0'-1.5'	13.9%									
160351	SWM-10	S-2	2.5'-4.0'	12.8%									
160352	SWM-10	S-3	5.0'-6.5'	13.3%									
160353	SWM-10	S-4	8.5'-10.0'	18.4%									
160242	TP-01	S-1	0'-1'	19.0%									
160243	TP-02	S-1	1'-2'	17.9%									
160244	TP-03	S-1	3'-4'	15.8%									
160245	TP-04	S-1	1'-2'	32.7%									
160246	TP-05	S-1	0'-1'	7.8%									
160247	TP-06	S-1	1'-2'	16.5%									
160240	TP-07	S-1	1'-2'	12.6%	Strong brown, silty fine to very fine SAND	SM	21	18	3	9	58	33	
160241	TP-07	S-2	4'-5'	10.1%	Strong brown, silty fine to very fine SAND	SM	NP	--	--	5	78	17	
160248	TP-08	S-1	1'-2'	14.3%									
160249	TP-09	S-1	1'-2'	12.4%									
160250	TP-10	S-1	1'-2'	14.1%									

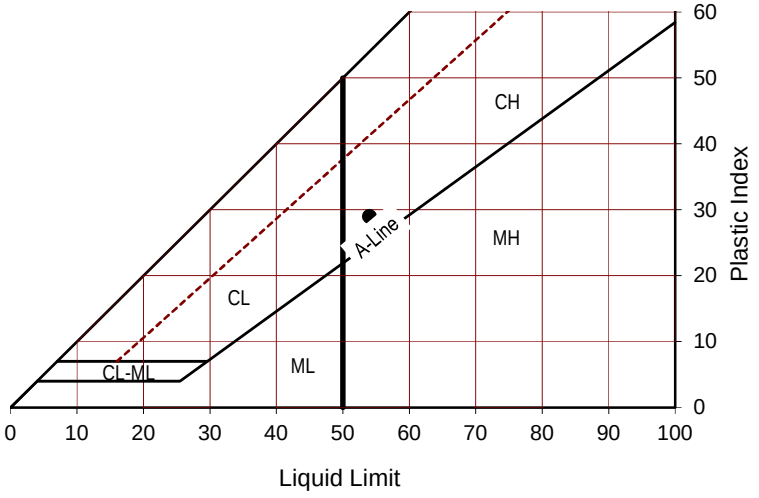
Project: Glenarden Apartments
Identification: B-37, S-4, 8.5'-10.0'
Description: Brownish yellow, fat CLAY with fine to very fine sand

Job #: 16163
Lab #: 160206
Report Date: 6/8/2016
Report Status: Final

Received: 5/20/2016

Laboratory Analysis





Moisture Content - ASTM D2216*
Received Moisture: 30.6%

Plasticity - ASTM D4318*
Liquid Limit: 54
Plastic Limit: 25
Plasticity Index: 29
A-Line: 24.8

Gradation - ASTM D422*
Gravel: 0%
Sand: 20%
Fines: 80%

D_{60}	C_U
D_{30}	C_C
D_{10}	

Classification - ASTM D2487*
USCS: CH
AASHTO: A-7-6
USDA:

Notes:

* - Laboratory accredited by AAP to preform this method

Checked By:

Tested By:

HARDIN-KIGHT ASSOCIATES, INC.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

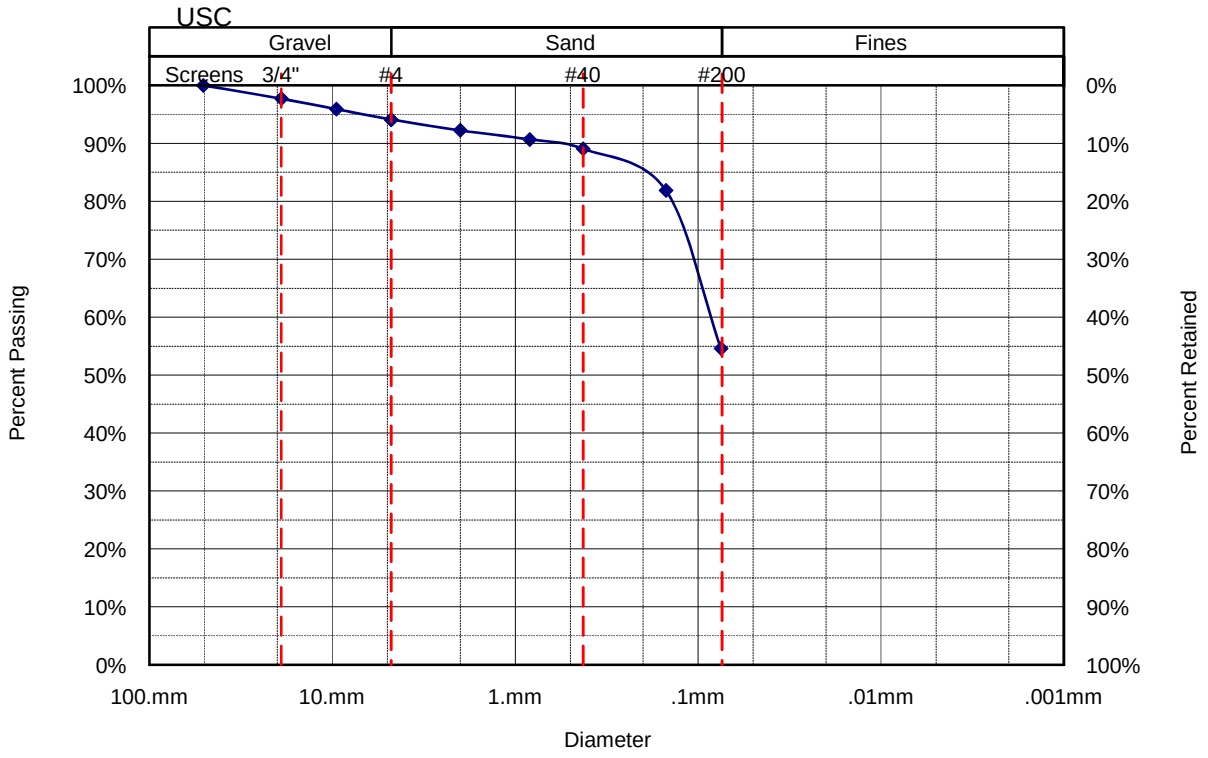
Phone (410) 553-0802
Fax: (410) 553-0808

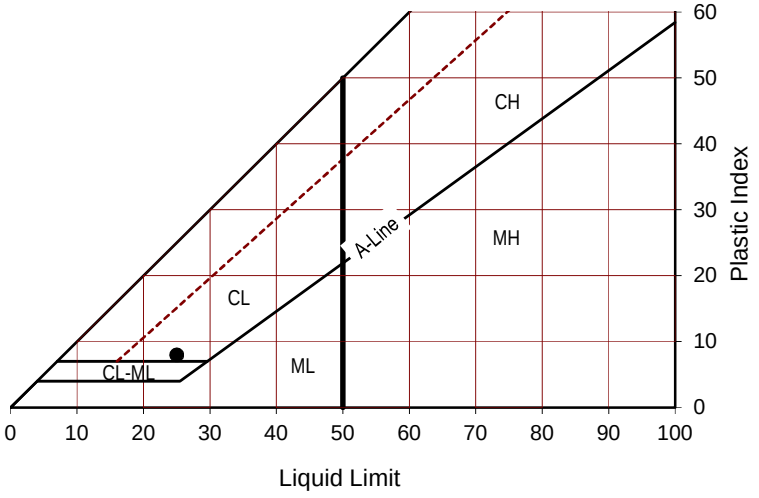
Project: Glenarden Apartments
Identification: R-14, Bulk, 0'-8'
Description: Pink, very fine sandy lean CLAY

Received: 5/20/2016

Job #: 16163
Lab #: 160205
Report Date: 6/6/2016
Report Status: Final

Laboratory Analysis





Moisture Content - ASTM D2216*
Received Moisture: 17.4%

Plasticity - ASTM D4318*
Liquid Limit: 25
Plastic Limit: 17
Plasticity Index: 8
A-Line: 4.0

Gradation - ASTM D422*
Gravel: 6%
Sand: 39%
Fines: 55%

D_{60}	C_U
D_{30}	C_C
D_{10}	

Classification - ASTM D2487*
USCS: CL
AASHTO: A-4
USDA:

Notes:

* - Laboratory accredited by AAP to preform this method

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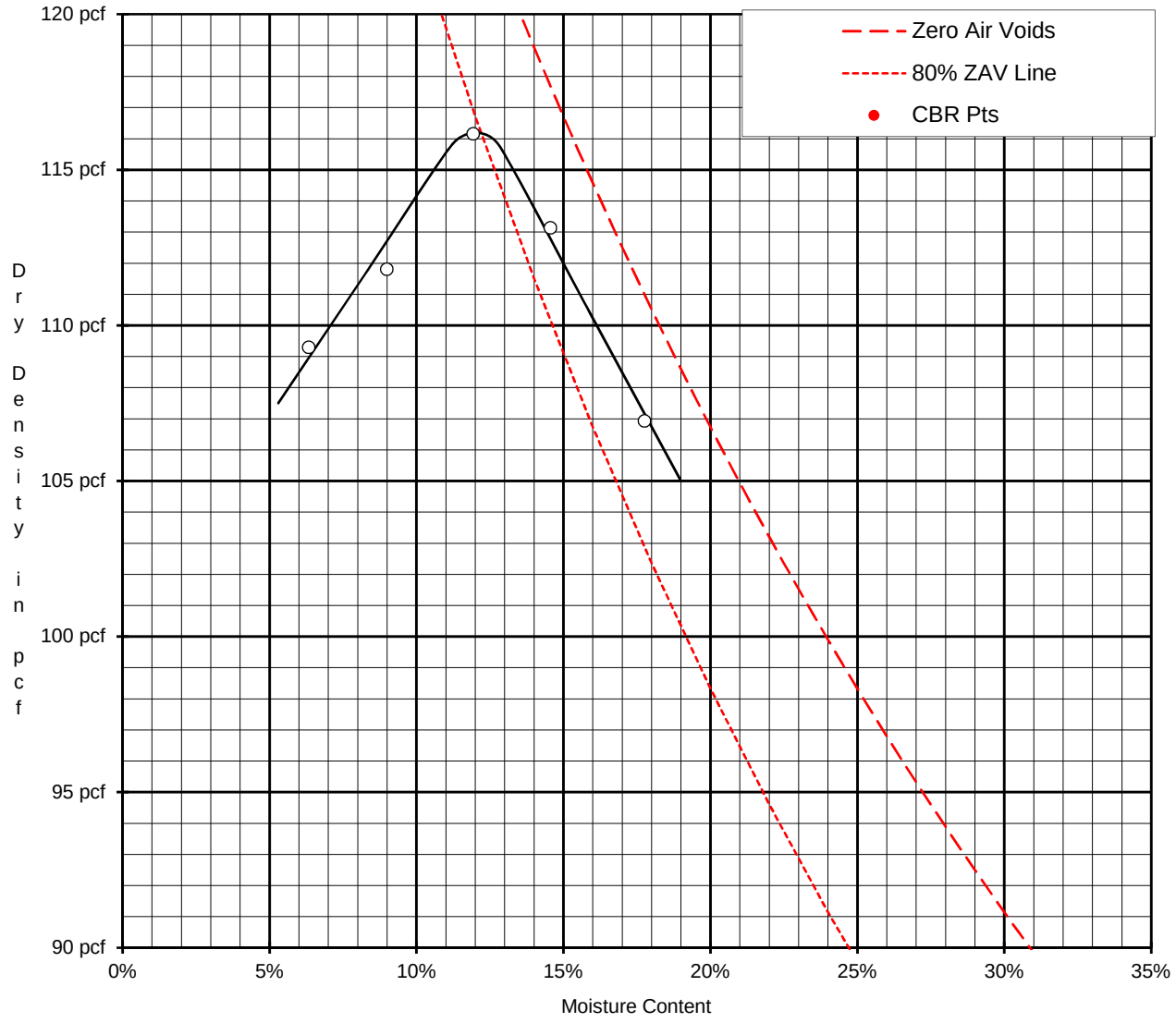
Moisture Density Relationship

Project:	Glenarden Apartments	Lab #:	160205
Job #:	16163	Report Date:	6/9/2016
Identification:	R-14, Bulk, 0'-8'	Report Status:	Preliminary
Description:	Pink, very fine sandy lean CLAY		See Note
		Moisture Content:	17.0%
Sample Received:	5/20/2016	Maximum Dry Density:	116.2pcf
Test Method:	AASHTO T99 A	Optimum Moisture:	12.0%
		Zero Air Void Specific Gravity:	2.60



Gradation	Received	- Oversize	Molded
+2"	0%	0%	
-2" : +3/4"	1%	0%	
-3/4" : +3/8"	2%	2%	0%
-3/8" : +#4	2%	2%	0%
-#4	95%	96%	100%

Notes:
Additional testing for this sample is ongoing which may impact the results shown.

Tested By:

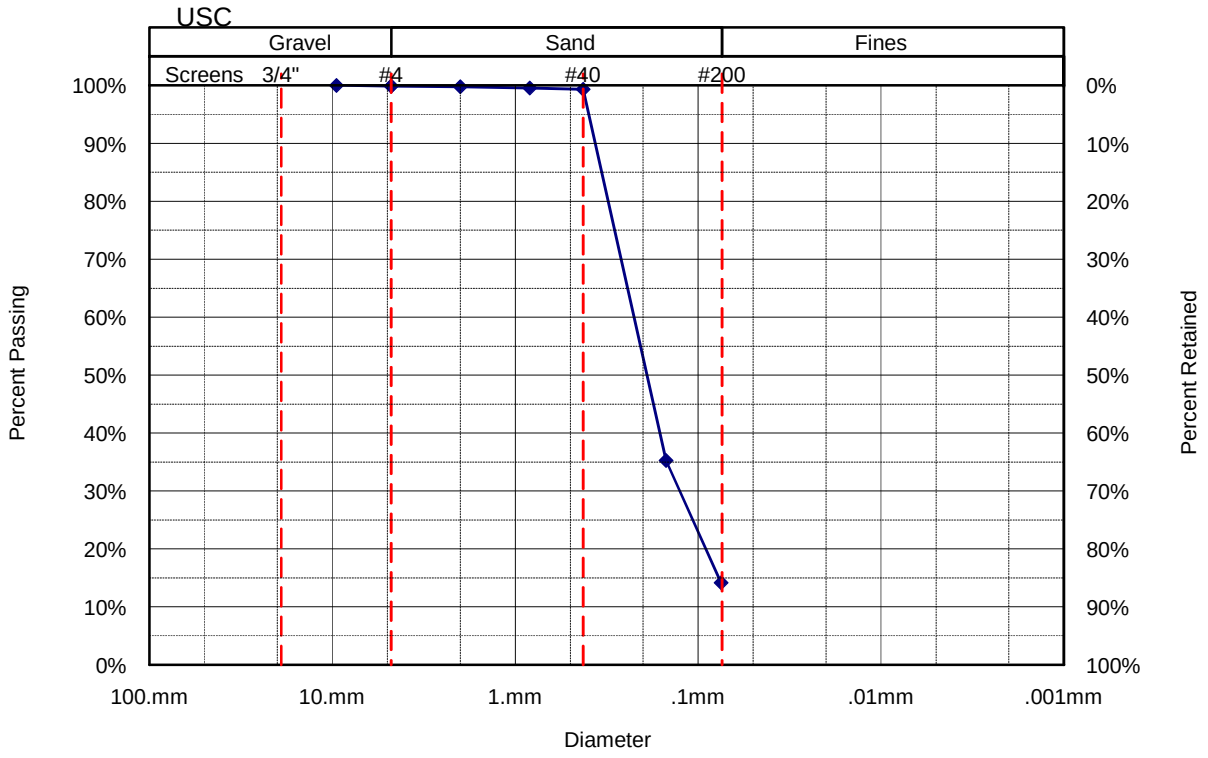
Checked By:

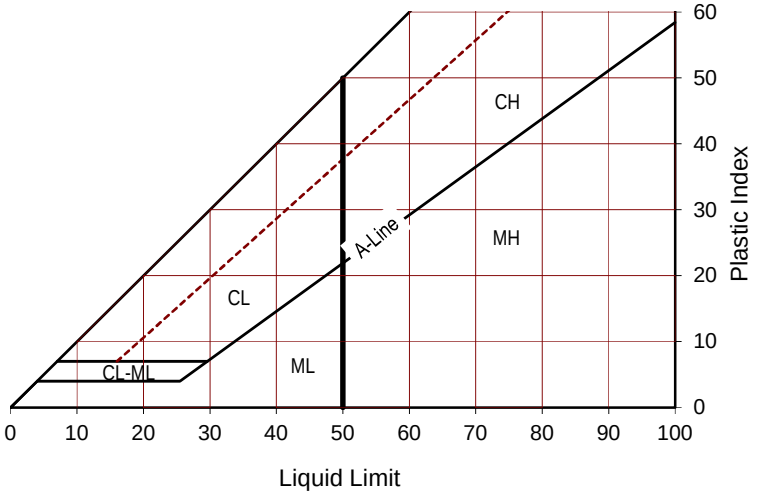
Project: Glenarden Apartments
Identification: R-16, Bulk, 4'-5'
Description: Reddish yellow, silty fine to very fine SAND

Received: 6/8/2016

Job #: 16163
Lab #: 160357
Report Date: 6/10/2016
Report Status: Final

Laboratory Analysis





Moisture Content - ASTM D2216*
Received Moisture: 7.1%

Plasticity - ASTM D4318*
Liquid Limit: NP
Plastic Limit: --
Plasticity Index: --
A-Line: --

Gradation - ASTM D422*
Gravel: 0%
Sand: 86%
Fines: 14%

D_{60}	C_U
D_{30}	C_C
D_{10}	

Classification - ASTM D2487*
USCS: SM
AASHTO: A-2-4
USDA:

Notes:

* - Laboratory accredited by AAP to preform this method

Checked By:

Tested By:

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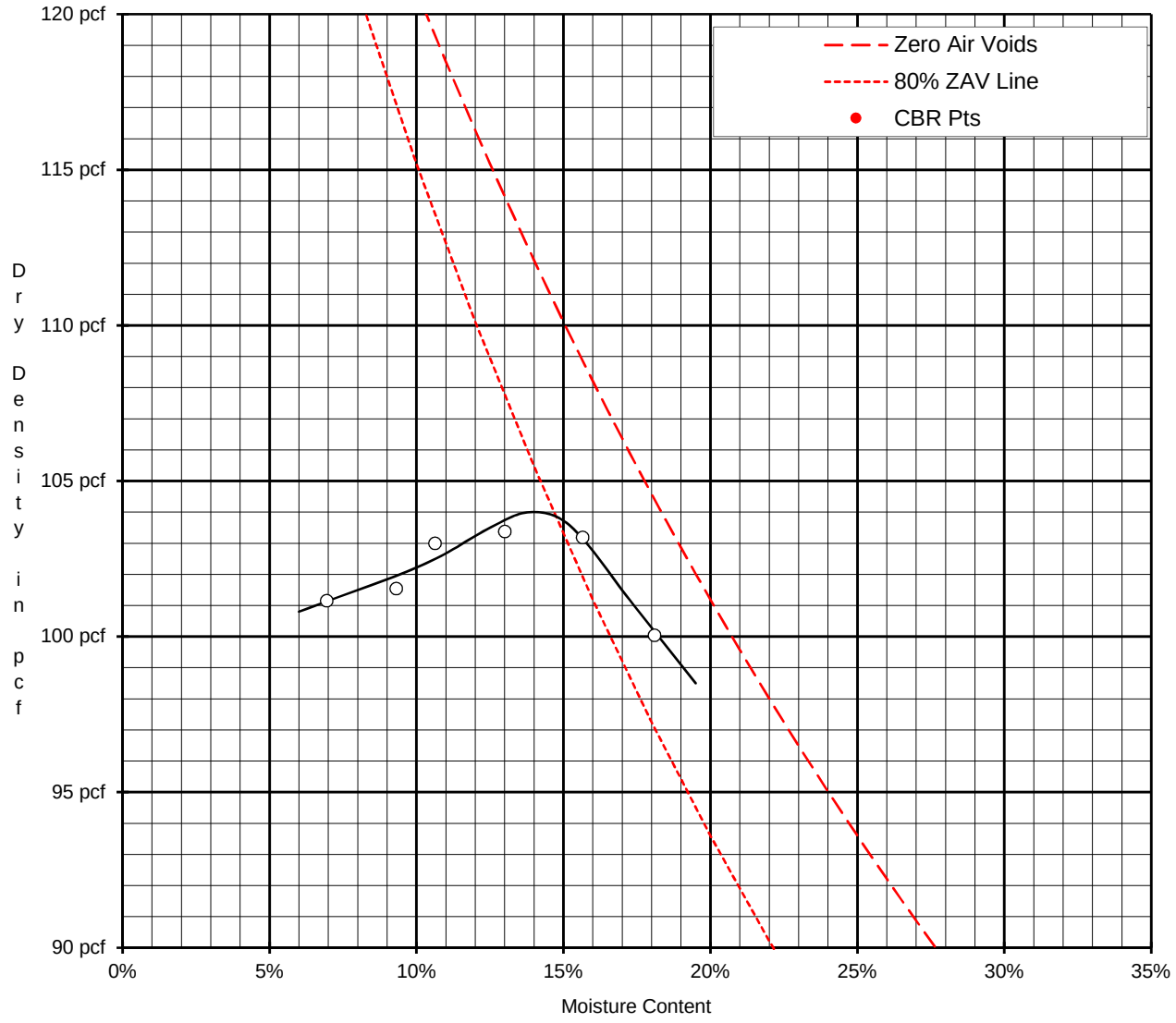
Moisture Density Relationship

Project:	Glenarden Apartments	Lab #:	160357
Job #:	16163	Report Date:	6/10/2016
Identification:	R-16, Bulk, 4'-5'	Report Status:	Preliminary
Description:	Reddish yellow, silty fine to very fine SAND		See Note
		Moisture Content:	7.0%
Sample Received:	6/8/2016	Maximum Dry Density:	104.0pcf
Test Method:	AASHTO T99 A	Optimum Moisture:	13.9%
		Zero Air Void Specific Gravity:	2.40



Gradation	Received	- Oversize	Molded
+2"	0%	0%	
-2" : +3/4"	1%	0%	
-3/4" : +3/8"	2%	2%	0%
-3/8" : +#4	2%	2%	0%
-#4	95%	96%	100%

Notes:
Additional testing for this sample is ongoing which may impact the results shown.

Tested By:

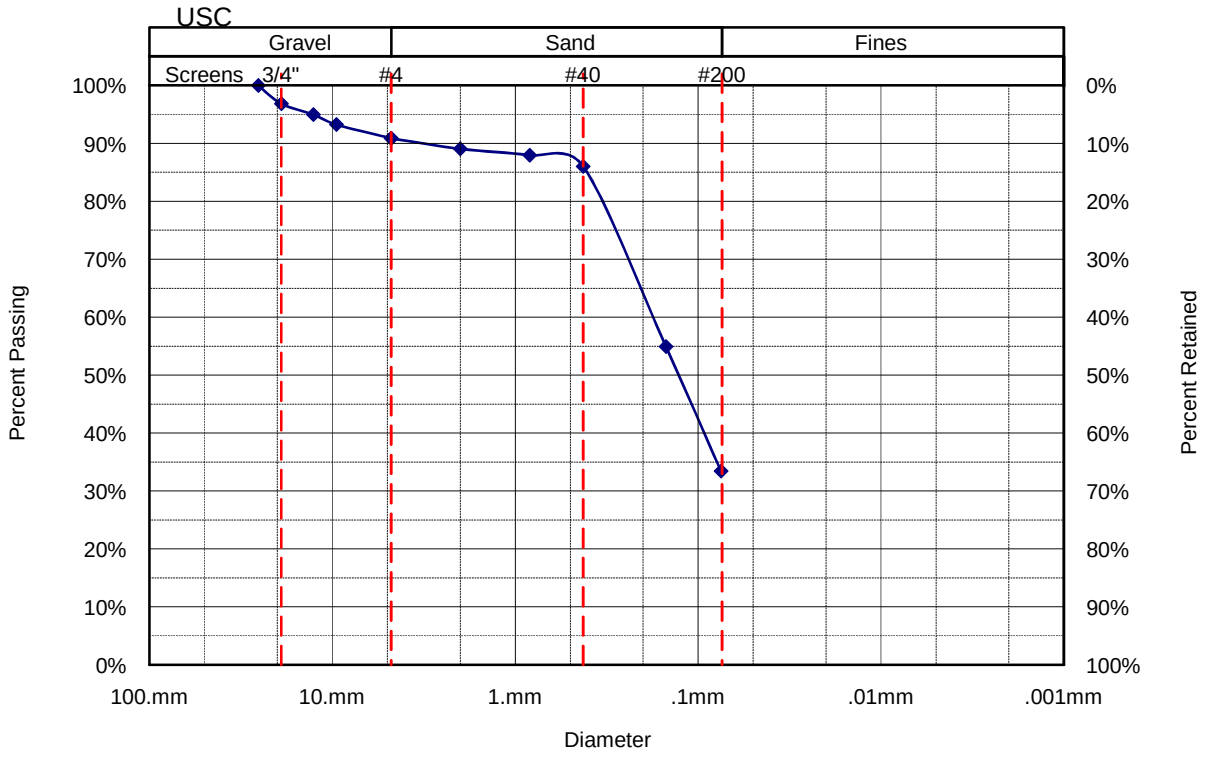
Checked By:

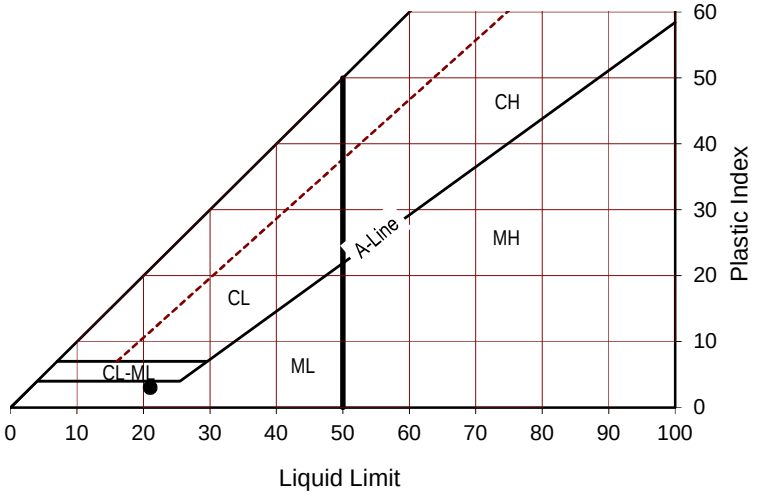
Project: Glenarden Apartments
Identification: TP-7, S-1, 1'-2'
Description: Strong brown, silty fine to very fine SAND

Job #: 16163
Lab #: 160240
Report Date: 6/8/2016
Report Status: Final

Received: 5/20/2016

Laboratory Analysis





Moisture Content - ASTM D2216*
Received Moisture: 12.6%

Plasticity - ASTM D4318*
Liquid Limit: 21
Plastic Limit: 18
Plasticity Index: 3
A-Line: 4.0

Gradation - ASTM D422*
Gravel: 9%
Sand: 58%
Fines: 33%

D_{60}	C_U
D_{30}	C_C
D_{10}	

Classification - ASTM D2487*
USCS: SM
AASHTO: A-2-4
USDA:

Notes:

* - Laboratory accredited by AAP to preform this method

Checked By:

Tested By:

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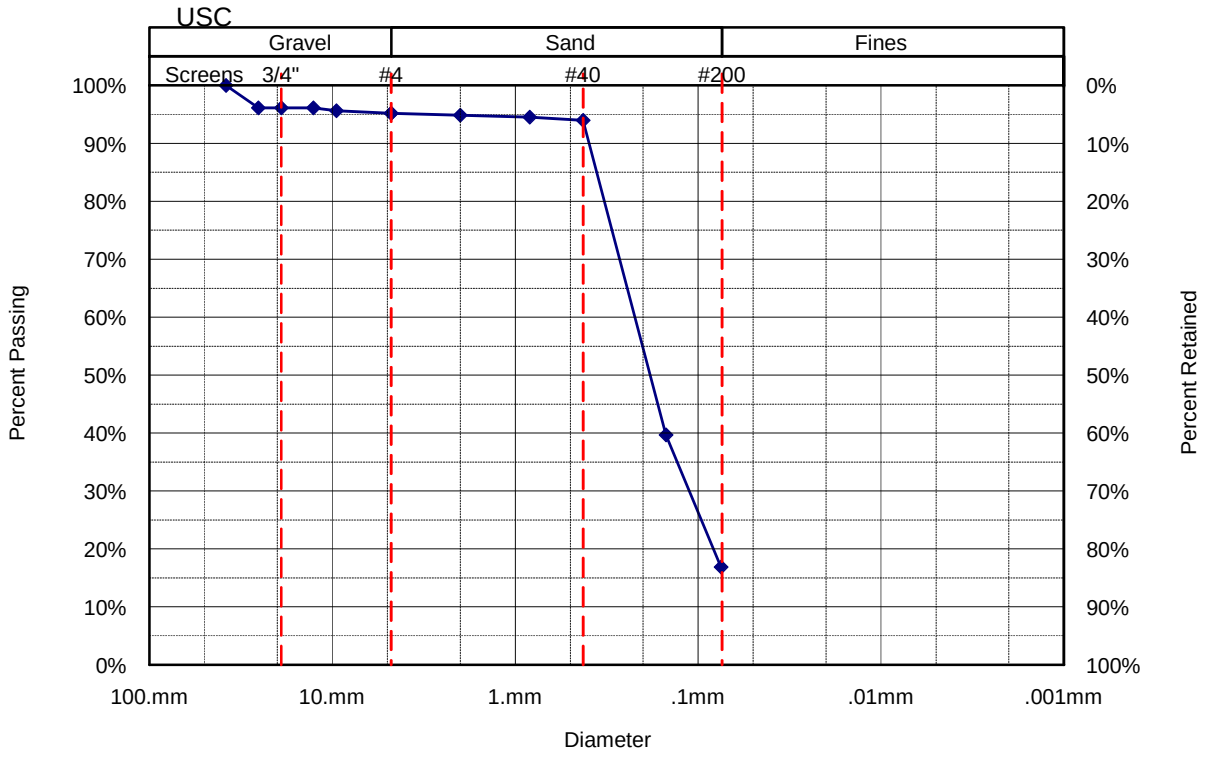
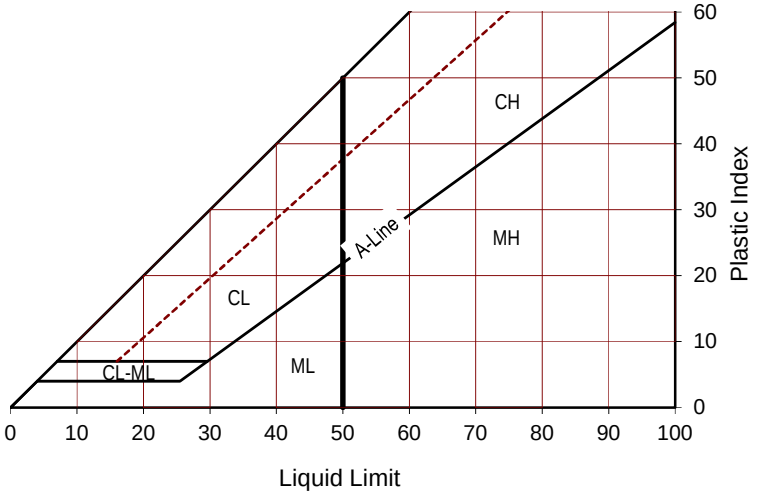
Project: Glenarden Apartments
Identification: TP-7, S-2, 4'-5'
Description: Strong brown, silty fine to very fine SAND

Job #: 16163
Lab #: 160241
Report Date: 6/8/2016
Report Status: Final

Received: 5/20/2016

Laboratory Analysis





Moisture Content - ASTM D2216*
Received Moisture: 10.1%

Plasticity - ASTM D4318*
Liquid Limit: NP
Plastic Limit: --
Plasticity Index: --
A-Line: --

Gradation - ASTM D422*
Gravel: 5%
Sand: 78%
Fines: 17%

D_{60}	C_U
D_{30}	C_C
D_{10}	

Classification - ASTM D2487*
USCS: SM
AASHTO: A-2-4
USDA:

Notes:

* - Laboratory accredited by AAP to preform this method

Checked By:

Tested By:

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