DRAFT

# GEOTECHNICAL ENGINEERING INVESTIGATION
# PROPOSED LIME PLANT
# ACE ASH LANDFILL
# ATHOL STREET AND ROBERTS ROAD
# TRONA, CALIFORNIA

**PROJECT NO. 022-18063**
AUGUST 14, 2018

**Prepared for:**

**MR. LARRY TROWSDALE**
**PVL LIME**
82532 2ND STREET
TRONA, CALIFORNIA 93562

**Prepared by:**

**KRAZAN & ASSOCIATES, INC.**
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Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

August 14, 2018

KA No. 022-18063

Mr. Larry Trowsdale
PVL Lime
82532 2nd Street
Trona, California 93562

**RE: Geotechnical Engineering Investigation**
**Proposed Lime Plant**
**Ace Ash Landfill**
Athol Street and Roberts Road
Trona, California

Dear Mr. Trowsdale:

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (661) 837-9200.

Respectfully submitted,
**KRAZAN & ASSOCIATES, INC.**

David R. Jarosz, II
Managing Engineer
RGE No. 2698/RCE No. 60185

DRJ:ht

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**GEOTECHNICAL ENGINEERING INVESTIGATION**
**PROPOSED LIME PLANT**
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**ATHOL STREET AND ROBERTS ROAD**
**TRONA, CALIFORNIA**

## INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Lime Plant to be located on the southwest corner of Athol Street and Roberts Road in Trona, California. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, Engineered Fill, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior flatwork, retaining walls, pavement design and soil cement reactivity.

A site plan showing the approximate boring locations is presented following the text of this report. A description of the field investigation, boring logs, and the boring log legend are presented in Appendix A. Appendix A also contains a description of the laboratory-testing phase of this study, along with the laboratory test results. Appendix B contains a guide to earthwork specifications. When conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

## PURPOSE AND SCOPE

This investigation was conducted to evaluate the soil and groundwater conditions at the site, to make geotechnical engineering recommendations for use in design of specific construction elements, and to provide criteria for site preparation and Engineered Fill construction.

Our scope of services was outlined in our proposal dated June 5, 2018 (KA Proposal No. P339-18) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- A field investigation consisting of drilling 36 borings to depths ranging from approximately 3 to 55 feet for evaluation of the subsurface conditions at the project site. Some of the borings were terminated due to auger refusal.

- Performing laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Evaluation of the data obtained from the investigation and an engineering analysis to provide recommendations for use in the project design and preparation of construction specifications.

- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

## PROPOSED CONSTRUCTION

We understand that design of the proposed development is currently underway; structural load information and other final details pertaining to the structures are unavailable. The project involves the design and construction of a new lime plant to be located within a previous ash landfill. It is understood the buildings will be single- or two-story structures. Equipment including bins, conveyors, etc. will be associated with the development. It is anticipated the structures and equipment will be supported on conventional foundations, mat foundations or drilled piers. Foundation loads are anticipated to be light to moderate.

In the event, these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

## SITE LOCATION AND SITE DESCRIPTION

The site is irregular in shape and encompasses approximately 57 acres. The site is located on the southwest corner of Athol Street and Roberts Road in Trona, California. An existing industrial development is located south of the site. Vacant land is located east of the site. Vacant land including rolling hills is located north of the site. A fly ash processing facility is located to the west. Railroad tracks are located along the eastern boundary.

Presently, the site is predominately vacant. Scattered piles of ash are located within the site. The site previously consisted of excavated basins that were backfilled with fly ash. Due to the various stages of backfill, the site has an uneven topography. The site is covered with a sparse weed growth and the surface soils have a loose consistency.

## GEOLOGIC SETTING

The site is located in the northwest portion of the Searles Valley within the southern margin of the Basin and Range Geomorphic Province of California. The Basin and Range Geomorphic Province is the westernmost part of the Great Basin. The province is characterized by interior drainage with lakes and playas, and the typical horst and graben structures. Searles Valley is a structural basin that is approximately 25 miles long and 10 miles wide, with the lowest part occupied by Searles Lake.

Searles Valley is a north-trending closed basin underlain by unconsolidated sediments of Quaternary age. Geophysical evidence indicates the fill is about 3,300 feet thick in the center of the basin (Mabey, 1956). Surrounding the basin and beneath the unconsolidated deposits are the consolidated basement rock of the Slate and Argus Ranges, Spangler Hills, and other hills.

The near surface deposits in the vicinity of the subject site are indicated to be comprised of Quaternary Alluvium consisting of silts, sands, gravels, cobbles, and boulders derived from erosion of the local mountain ranges.

Several faults are located in the vicinity of Searles Valley. The Tank Canyon Fault is the nearest active fault to the site and is located approximately 8 km east of the site. Other faults located near the site include the Panamint Valley located 22 km to the east of Tank Canyon Fault, the Garlock Fault 27 km to the south, and Little Lake Fault located 25 km west of the site. There are no active fault traces in the project vicinity. Accordingly, the project area is not within an Earthquake Fault Zone.

## FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 36 borings to depths ranging from approximately 3 to 55 feet below existing site grade, using a truck-mounted drill rig. Some of the borings were terminated due to auger refusal. In addition, four bulk subgrade samples were collected for R-value testing. Furthermore, two percolation tests were performed at depths of 4 to 8 feet below existing site grade. The approximate locations of the borings, R-values and percolation tests are shown on the site plan. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural moisture, density, shear strength, gradation, R-value and consolidation potential of the materials encountered. In addition, chemical tests were performed to evaluate the sulfate and chloride concentration of the soils. Details of the laboratory test program and results of the laboratory test are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

## SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the upper soils consisted of approximately 6 to 12 inches of very loose silty sand or fly ash slurry fill. These soils are disturbed, have low strength characteristics and are highly compressible.

Below the upper soils, in some of the borings, approximately 1 to 8 feet of granular fill material was encountered. The fill material predominately consisted of silty sand and gravelly silty sand. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Limited testing was performed on the fill soils during the time of our field and laboratory investigation. The limited testing indicates the fill soils had varying strength characteristics ranging from loosely placed to compacted.

Below the loose surface soils and/or granular fill soils, approximately 9 to 51 feet of fly ash or fly ash slurry was encountered. This material had varying strength characteristics. Penetration resistance ranged from 3 blows per foot to over 50 blows per 6 inches. Dry densities ranged from 32 to 83 pcf. Representative soil samples consolidated approximately ½ to 3½ percent under a 2 ksf load when saturated. Representative soil samples had angles of internal friction of 37 to 53 degrees.

Below 10 to 51 feet, predominately medium dense to very dense silty sand or gravelly silty sand were encountered. Some of these soils were intermixed with cobbles. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 13 blows per foot to over 50 blows per 6 inches. Dry densities ranged from 72 to 120 pcf. These soils extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

## GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was not encountered.

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

## PERCOLATION TESTING

Two percolation tests were performed within the site to evaluate the soil absorption characteristics. The percolation tests were performed in the areas adjacent to the backfilled basins. The percolation tests were performed at depths of approximately 4 to 7 feet below the existing ground surface. The tests were conducted in general accordance with the criteria set in the "Manual of Septic Tank Practice" published by the Department of Health, Education, and Welfare. Results of the tests are as follows:

| Test No. | Depth (feet) | Percolation Rate (min/in) | Soil Classification |
|---|---|---|---|
| P1 | 4 | 240 | Silty Sand (SM) |
| P2 | 7 | 6 | Gravelly Silty Sand (SM) |

The test results indicate that the soils tested at approximately 4 to 7 feet have poor to good absorption characteristics. The test results do not include a factor of safety. The percolation rates given are based on 1 inch of fall within an 8-inch diameter hole with a 6-inch head of water. The drainage rate does not include a factor of safety.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

### Administrative Summary

In brief, the subject site and soil conditions, with the exception of the loose surface soils, fill material, potential for differential settlement and existing development, appear to be conducive to the development of the project. The surface soils have a loose consistency. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated. Accordingly, it is recommended that the surface soils be recompacted. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

Approximately 1 to 8 feet of granular fill material was encountered within the borings drilled at the site. The granular fill overlays the fly ash and fly ash slurry. The fill material predominately consisted of silty sand and gravelly silty sand. In addition, stockpiles of fill are located within the site. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Verification of the extent of fill should be determined during site grading. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates the fill soils had varying strength characteristics ranging from loosely placed to compacted. Therefore, it is recommended that the fill soils in areas of proposed shallow conventional or mat foundations be excavated and stockpiled so that the subgrade soils can be prepared properly. These soils will be suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics and debris. Prior to backfilling, Krazan & Associates, Inc. should inspect the bottom of the excavation to verify no additional excavation will be required.

In order to provide uniform foundation support, it is recommended that following stripping, fill removal operations, and demolition activities, the upper 24 inches of soils within the area of structures to be supported on shallow conventional or mat foundations be excavated, worked until uniform and free from large clods, moisture-conditioned as necessary, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, it is recommended that the proposed conventional or mat foundations be supported by a minimum of 24 inches of Engineered Fill. Excavation should extend to a minimum of 5 feet beyond structural elements. The on-site soils will be suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics, debris, and fragments greater than 4 inches in maximum dimension. Prior to backfilling, the bottom of the excavation should be proof-rolled and observed by Krazan & Associates, Inc. to verify stability. This

compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation. Fill material should be compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

The site is underlain by 9 to 51 feet of fly ash or fly ash slurry. This material has varying strength characteristics. It is understood the Owner does not want to support the structures on foundations extending through this material. Due to the varying thickness and strength of this material, foundations supported on the fly ash material may settle up to a foot. In addition, differential settlements of up to 6 inches could occur. The Owner should be aware structures and equipment supported on the fly ash may need to be re-leveled over time as settlement occurs.

Existing structures are located within the project site vicinity. Associated with these developments are buried structures, such as utility lines that may extend into the project site. Any buried structures or loosely backfilled excavations encountered should be properly removed and the resulting excavations backfilled. After demolition activities, it is recommended that these disturbed soils be removed and/or recompacted. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation.

Sandy and gravelly soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy and gravelly soils.

After completion of the recommended site preparation the site should be suitable for shallow footing support. The proposed structure footings may be designed utilizing conventional or mat foundations with an allowable bearing pressure of 2,500 psf and 1,800 psf, respectively for dead-plus-live loads. Conventional footings, if utilized, should have a minimum embedment of 18 inches. The proposed structures may be supported on drilled cast in place concrete piers/caissons. Recommendations regarding conventional foundations and drilled piers are provided in the foundation section of this report.

**Groundwater Influence on Structures/Construction**

Based on our findings and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations for the project. However, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

## Site Preparation

General site clearing should include removal of vegetation; concrete and metal debris; existing utilities; structures including foundations; basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for use as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Approximately 1 to 8 feet of granular fill material was encountered within the borings drilled at the site. In addition, stockpiles of fill are located within the site. The granular fill overlays the fly ash and fly ash slurry. The fill material predominately consisted of silty sand and gravelly silty sand. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Verification of the extent of fill should be determined during site grading. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates the fill soils had varying strength characteristics ranging from loosely placed to compacted. Therefore, it is recommended that the fill soils in the areas of conventional shallow or mat foundations be excavated and stockpiled so that the subgrade soils can be prepared properly. Limits of removal and recompaction should extend 5 feet beyond structural elements. These soils will be suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics and debris. Prior to backfilling, Krazan & Associates, Inc. should inspect the bottom of the excavation to verify no additional excavation will be required.

Existing structures are located within the project site vicinity. Associated with these developments are buried structures such as utility lines that may extend into the project site. Demolition activities should include proper removal of any buried structures. Any buried structures, including utilities or loosely backfilled excavations, encountered during construction should be properly removed and the resulting excavations backfilled. Disturbed areas caused by demolition activities should be removed and/or recompacted. Excavations, depressions, or soft and pliant areas extending below planned finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be cleaned to firm subgrade and backfilled with Engineered Fill.

In order to provide uniform foundation support, it is recommended that following stripping, fill removal operations, and demolition activities, the upper 24 inches of soils within the area of structures to be supported on shallow conventional or mat foundations be excavated, worked until uniform and free from large clods, moisture-conditioned as necessary, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, it is recommended that the proposed conventional or mat foundations be supported by a minimum of 24 inches of Engineered Fill. Excavation should extend to a minimum of 5 feet beyond structural elements. The on-site soils will be

suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics, debris, and fragments larger than 4 inches in maximum dimension. Prior to backfilling, the bottom of the excavation should be proof-rolled and observed by Krazan and Associates, Inc. to verify stability. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation. Fill material should be compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Following stripping, granular fill removal, and demolition activities, the exposed subgrade within the exterior flatwork and pavement areas should be excavated/scarified to a depth of at least 12 inches, worked until uniform and free from large clods, moisture-conditioned as necessary, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend a minimum of 2 feet beyond flatwork and pavements. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

As indicated previously, fill material is located on the site. It is recommended that any uncertified fill material encountered within pavement areas be removed and/or recompacted. The fill material should be moisture-conditioned to near optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. As an alternative, the Owner may elect not to recompact the existing fill within paved areas. However, the Owner should be aware that the paved areas may settle, which may require annual maintenance. At a minimum, it is recommended that the upper 12 inches of subgrade soil be moisture-conditioned as necessary and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

The upper soils, during wet winter months, become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

**Engineered Fill**

The organic-free, on-site, upper soils and fill material are predominately silty sand, gravelly silty sand and fly ash. These soils will be suitable for re-use as Engineered Fill provided they are cleansed of excessive organics, debris and fragments greater than 4 inches in maximum dimension.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported Fill material should be predominantly granular material with a plasticity index less than 10 and an expansion index less than 15. Imported Fill should be free from rocks and lumps greater than 4 inches in maximum dimension. All Imported Fill material should be submitted for approval to the Soils Engineer at least 48 hours prior to delivery to the site.

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned as necessary, and compacted to achieve at least 90 percent of maximum density based on ASTM Test Method D1557. Clayey soils should be moisture-conditioned to a minimum of 2 percent above optimum moisture content. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

**Drainage and Landscaping**

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. In accordance with Section 1804 of the 2016 California Building Code, it is recommended that the ground surface adjacent to foundations be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures, or to an approved alternative means of drainage conveyance. Swales used for conveyance of drainage and located within 10 feet of foundations should be sloped a minimum of 2 percent. Impervious surfaces, such as pavement and exterior concrete flatwork, within 10 feet of building foundations should be sloped a minimum of 1 percent away from the structure. Drainage gradients should be maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

**Utility Trench Backfill**

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards by a Contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the Contractor. Traffic and vibration adjacent to trench walls should be minimized; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

Sandy and gravelly soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy and gravelly soils.

Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. The utility trench backfill placed in pavement areas should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. Pipe bedding should be in accordance with pipe manufacturer's recommendations.

The Contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The Contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

**Excavation Stability**

Temporary excavations planned for the construction of remedial excavations, buildings, or other associated structures may be excavated, according to the accepted engineering practices following Occupational Safety and Health Administration (OSHA) standards by a Contractor experienced in such work. Open, unbraced excavations in undisturbed soils should be made according to the table below.

| Recommended Excavation Slopes | |
|---|---|
| **Depth of Excavation (ft)** | **Slope (Horizontal:Vertical)** |
| | **Temporary** |
| 0-5 | 1:1 |
| 5-10 | 1½:1 |
| 10-15 | 1½:1 |
| 15-20 | 1¾:1 |
| 20+ | 2:1 |

If, due to space limitation, excavation near existing structures or roads is performed in a vertical position, braced shorings or shields may be used for supporting vertical excavations. Therefore, in order to comply with the local and state safety regulations, a properly designed and installed shoring system would be required to accomplish planned excavation and installation. A specialty Shoring Contractor should be responsible for the design and installation of such a shoring system during construction. The lateral pressures provided below may be used in the design of a braced-type shoring system.

| Recommended Lateral Earth Pressure for Braced Shoring | |
|---|---|
| **Depth of Excavation Below Ground Surface (feet)** | **Lateral Soil Pressure (psf)** |
| 0 | 0 |
| 0.25 H | 35 H |
| H | 35 H |
| **Where H is the total depth of the excavation in feet.** | |

The foregoing does not include excess hydrostatic pressure or surcharge loading. Fifty percent of any surcharge load, such as construction equipment weight, should be added to the lateral load given above.

Since the Contractor has the ultimate responsibility for excavation stability, he may design a different shoring system for the excavation.

The excavation/shoring recommendations provided herein are based on soil characteristics derived from limited test borings within the site. Variations in soil conditions will likely be encountered during the excavations. Krazan & Associates, Inc. should be afforded the opportunity to provide field review to evaluate the actual conditions and account for field condition variations not otherwise anticipated in the preparation of this recommendation.

**Foundations - Conventional**

After completion of the recommended site preparation, the site should be suitable for shallow footing support. The proposed structures may be supported on a shallow foundation system bearing on a minimum of 24 inches of Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

| Load | Allowable Loading |
|---|---|
| Dead Load Only | 1,875 psf |
| Dead-Plus-Live Load | 2,500 psf |
| Total Load, Including Wind or Seismic Loads | 3,325 psf |

The footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footings should have a minimum width of 12 inches, regardless of load. Ultimate design of foundations and reinforcement should be performed by the project Structural Engineer.

The footing excavations should not be allowed to dry out any time prior to pouring concrete. It is recommended that footings be reinforced by at least one No. 4 reinforcing bar in both top and bottom.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the above value may be used for short duration, wind, or seismic loads. All of the above earth pressures are unfactored and are, therefore, not inclusive of factors of safety.

**Foundations - Mat Foundations**

The proposed equipment may be supported on a thick mat foundation system, bearing on a minimum of 24 inches of Engineered Fill. The mat foundations may be designed for the following maximum allowable soil bearing pressures:

| Load | Allowable Loading |
|---|---|
| Dead Load Only | 1,350 psf |
| Dead-Plus-Live Load | 1,800 psf |
| Total Load, including wind or seismic loads | 2,400 psf |

The mat should have a minimum thickness of 12 inches. The mat should be reinforced at a minimum with No. 4 reinforcement bars at 18 inches, on-center. Ultimate design of foundations and reinforcement should be performed by the project Structural Engineer.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the above value may be used for short duration, wind, or seismic loads.

**Foundations - Drilled Caissons**

The structures may be supported on drilled caissons using an allowable sidewall friction of 450 psf. This value is for dead-plus-live loads. This value may be increased ⅓ for short duration loads, such as wind or seismic. Uplift loads can be resisted by caissons using an allowable sidewall friction of 250 psf of the surface area and the weight of the pier. Caissons should have a minimum embedment depth of 10 feet below existing site grade. The upper 2 feet should be neglected from friction calculations.

Lateral loads for caissons may be designed using the 2016 CBC flagpole formula with a lateral bearing capacity of 175 psf/ft. This value can be doubled for allowable deflections of up to ½ inch. The lateral loading criteria is based on the assumption that the load application is applied at the ground level and flexible cap conditions apply.

Sandy and gravelly soil conditions have been encountered within the site. These sandy and gravelly soils may cave during drilling operations. Caving sandy and gravelly soils will require casing of the caissons. The casing and shaft diameter should match. Undersized casings should not be used, and the casings should have adequate strength to reduce earth pressure. The casings should be progressively pushed before drilling. Precautions should accordingly be taken to reduce caving. Drilling speed and timing of concrete placement should be coordinated. Concrete pumps with adequate hose length to allow gradual impact-free filling of pier cavities is recommended. Concrete in the sandy and gravelly

areas should not be allowed to fall freely more than 3 feet, and should be prevented from striking the walls of the drilled hole, thus, creating soil sloughing and caving. Concrete with a slump on the order of 5 to 6 inches should be used.

**Lateral Earth Pressures and Retaining Walls**

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 35 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 55 pounds per square foot per foot per depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1 (horizontal to vertical) or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways. All of the above earth pressures are unfactored and are, therefore, not inclusive of factors of safety.

Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have minimum width of 12 inches, should extend upward to within 12 inches of the top of the wall, and should be encapsulated by a geotextile filter fabric, such as Mirafi 140N or equivalent. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete, or other suitable backfill material to reduce surface drainage into the wall drain system. The aggregate should conform to Class 2 permeable materials graded in accordance with Section 68-2.02F(3) of the CalTrans Standard Specifications (2010). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or equivalent substitute, are acceptable alternatives in lieu of gravel provided that they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

Drainage pipes should be placed with the perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The pipes should be placed no higher than 6 inches above the heel of the wall in the center of the drainage blanket and should have a minimum diameter of 4 inches. Collector pipes may be either slotted of perforated. Slots should be no wider than ⅛-inch, while perforations should be no more than ¼-inch in diameter. If retaining walls are less than 6 feet high, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 4-inch diameter holes (concrete wall) or unmortared head joints (masonry walls) and not be higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to Section 88-1.02 of the CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep-hole to retard soil piping.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

**R-Value Test Results and Pavement Design**

Four subgrade samples were obtained from the project site for R-value testing at the locations shown on the attached site plan. The samples were tested in accordance with the State of California Materials Manual Test Designation 301. Results of the tests are as follows:

| Sample | Depth | Description | R-Value at Equilibrium |
|---|---|---|---|
| 1 | 12-36" | Fly Ash | 88 |
| 2 | 12-36" | Silty Sand (SM) w/ Fly Ash | 78 |
| 3 | 12-36" | Silty Sand (SM) w/ Fly Ash | 79 |
| 4 | 12-36" | Fly Ash | 86 |

The test results are high and indicate good subgrade support characteristics under dynamic traffic loads. The following table shows the recommended pavement sections for various traffic indices.

| Traffic Index | Asphaltic Concrete | Class II Aggregate Base* | Compacted Subgrade** |
|---|---|---|---|
| 4.0 | 2.0" | 4.0" | 12.0" |
| 4.5 | 2.5" | 4.0" | 12.0" |
| 5.0 | 2.5" | 4.0" | 12.0" |
| 5.5 | 3.0" | 4.0" | 12.0" |
| 6.0 | 3.0" | 4.0" | 12.0" |
| 6.5 | 3.5" | 4.0" | 12.0" |
| 7.0 | 4.0" | 4.0" | 12.0" |
| 7.5 | 4.0" | 4.0" | 12.0" |

**** 95% compaction based on ASTM Test Method D1557 or CAL 216***
***** 90% compaction based on ASTM Test Method D1557 or CAL 216***

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic and an index of 7.0 may be used for light truck traffic.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

**PORTLAND CEMENT PAVEMENT**
**LIGHT DUTY**

| Traffic Index | Portland Cement Concrete*** | Class II Aggregate Base* | Compacted Subgrade** |
|---|---|---|---|
| 4.5 | 5.0" | -- | 12.0" |

**HEAVY DUTY**

| Traffic Index | Portland Cement Concrete*** | Class II Aggregate Base* | Compacted Subgrade** |
|---|---|---|---|
| 7.0 | 6.5" | -- | 12.0" |

**** 95% compaction based on ASTM Test Method D1557 or CAL 216***
***** 90% compaction based on ASTM Test Method D1557 or CAL 216***
******Minimum compressive strength of 3000 psi***

As indicated previously, fill material is located on the site. It is recommended that any uncertified fill material encountered within pavement areas be removed and/or recompacted. The fill material should be moisture-conditioned to near optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. As an alternative, the Owner may elect not to recompact the existing fill within paved areas. However, the Owner should be aware that the paved areas may settle, which may require annual maintenance. At a minimum, it is recommended that the upper 12 inches of subgrade soil be moisture-conditioned as necessary and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

**Seismic Parameters – 2016 California Building Code**

The Site Class per Section 1613 of the 2016 California Building Code (2016 CBC) and Table 20.3-1 of ASCE 7-10 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2016 CBC, we recommend the following parameters:

| Seismic Item | Value | CBC Reference |
|---|---|---|
| Site Class | D | Section 1613.3.2 |
| Site Coefficient $F_a$ | 1.009 | Table 1613.3.3 (1) |
| $S_s$ | 1.227 | Section 1613.3.1 |
| $S_{MS}$ | 1.238 | Section 1613.3.3 |
| $S_{DS}$ | 0.826 | Section 1613.3.4 |
| Site Coefficient $F_v$ | 1.589 | Table 1613.3.3 (2) |
| $S_1$ | 0.411 | Section 1613.3.1 |
| $S_{M1}$ | 0.653 | Section 1613.3.3 |
| $S_{D1}$ | 0.435 | Section 1613.3.4 |

## Pipe Corrosion

Based on previous testing within the facility and current results of the soluble chloride concentration, the near surface soils exhibit an extremely high corrosive environment for underground metal structures, such as pipes. Therefore, it is recommended cathodic protection is used.

It is recommended that all buried metallic pressure piping should be designed and installed with a bonded dielectric type coating, such as coal tar epoxy, fusion bonded epoxy, or tape coating and cathodic protection. The use of a dielectric type coating alone (without cathodic protection) is not recommended.

## Soil Cement Reactivity

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete (or stucco) and the soil. HUD/FHA and UBC have developed criteria for evaluation of sulfate levels and how they relate to cement reactivity with soil and/or water.

Soil samples were obtained from the site and tested in accordance with State of California Materials Manual Test Designation 417. The sulfate concentrations detected from these soil samples were greater than 150 ppm and are above the maximum allowable values established by HUD/FHA and UBC. Therefore, it is recommended that a Type V cement be used within the concrete to compensate for sulfate reactivity with the cement.

## Compacted Material Acceptance

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent on the stability of that material. The Soils Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with an in situ moisture content significantly less than optimum moisture. This type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

## Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

## LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of building foundation and on-site drainage disposal designs. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

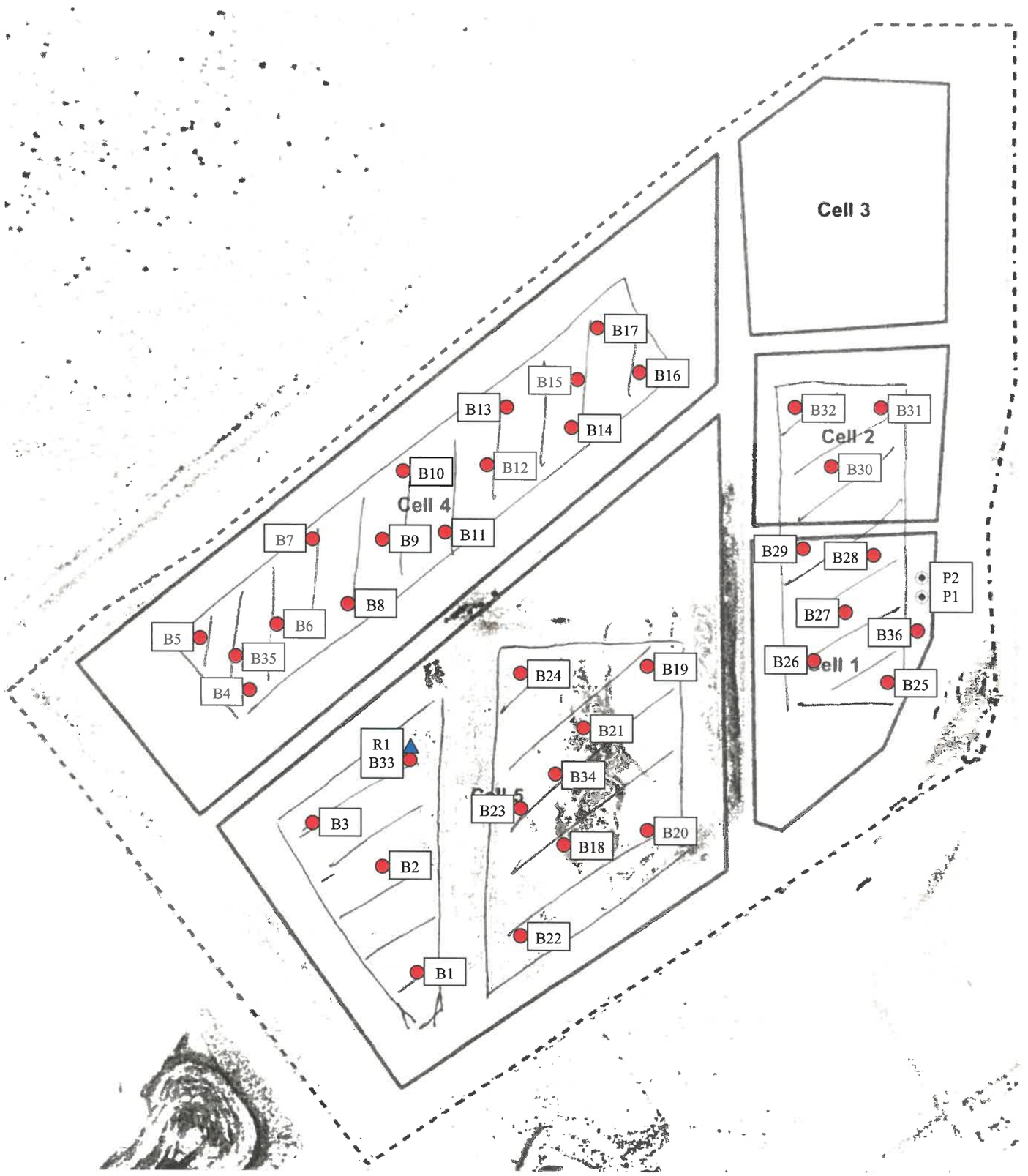
The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (661) 837-9200.

Respectfully submitted,
**KRAZAN & ASSOCIATES, INC.**

David R. Jarosz, II
Managing Engineer
RGE No. 2698/RCE No. 60185

DRJ:ht




▲ APPROXIMATE PERCOLATION TEST LOCATION

● APPROXIMATE BORING LOCATION

▲ APPROXIMATE R-VALUE LOCATION

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| | | |
|---|---|---|
| **SITE MAP** | **Scale:** NTS | **Date:** July 2018 |
| **Lime Plant**<br>**Ace Ash Landfill**<br>**Trona, California** | **Drawn by:** HT | **Approved by:** DJ |
| | **Project No.** 022-18063 | **Figure No.** 1 |

Krazan
GEOTECHNICAL ENGINEERING

# APPENDIX A

# FIELD AND LABORATORY INVESTIGATIONS

## Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Thirty-six 6½-inch diameter exploratory borings were advanced. The boring locations are shown on the site plan.

The soils encountered were logged in the field during the exploration and, with supplementary laboratory test data, are described in accordance with the Unified Soil Classification System.

Modified standard penetration tests and standard penetration tests were performed at selected depths. These tests represent the resistance to driving a 2½-inch and 1½-inch diameter split barrel sampler, respectively. The driving energy was provided by a hammer weighing 140 pounds falling 30 inches. Relatively undisturbed soil samples were obtained while performing this test. Bag samples of the disturbed soil were obtained from the auger cuttings. The modified standard penetration tests are identified in the sample type on the boring logs with a full shaded in block. The standard penetration tests are identified in the sample type on the boring logs with half of the block shaded. All samples were returned to our Clovis laboratory for evaluation.

## Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the foundation soil underlying the site. Test results were used as criteria for determining the engineering suitability of the surface and subsurface materials encountered.

In-situ moisture content, dry density, consolidation, direct shear and sieve analysis tests were determined for the undisturbed samples representative of the subsurface material. R-value tests were completed for select bag samples obtained from the auger cuttings. These tests, supplemented by visual observation, comprised the basis for our evaluation of the site material.

---

The logs of the exploratory borings and laboratory determinations are presented in this Appendix.

# UNIFIED SOIL CLASSIFICATION SYSTEM

## UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

| | | | |
|---|---|---|---|
| **COARSE-GRAINED SOILS** (more than 50% of material is larger than No. 200 sieve size.) | | | |
| **GRAVELS** More than 50% of coarse fraction larger than No. 4 sieve size | Clean Gravels (Less than 5% fines) | GW | Well-graded gravels, gravel-sand mixtures, little or no fines |
| | | GP | Poorly-graded gravels, gravel-sand mixtures, little or no fines |
| | Gravels with fines (More than 12% fines) | GM | Silty gravels, gravel-sand-silt mixtures |
| | | GC | Clayey gravels, gravel-sand-clay mixtures |
| **SANDS** 50% or more of coarse fraction smaller than No. 4 sieve size | Clean Sands (Less than 5% fines) | SW | Well-graded sands, gravelly sands, little or no fines |
| | | SP | Poorly graded sands, gravelly sands, little or no fines |
| | Sands with fines (More than 12% fines) | SM | Silty sands, sand-silt mixtures |
| | | SC | Clayey sands, sand-clay mixtures |
| **FINE-GRAINED SOILS** (50% or more of material is smaller than No. 200 sieve size.) | | | |
| **SILTS AND CLAYS** Liquid limit less than 50% | | ML | Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity |
| | | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| | | OL | Organic silts and organic silty clays of low plasticity |
| **SILTS AND CLAYS** Liquid limit 50% or greater | | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts |
| | | CH | Inorganic clays of high plasticity, fat clays |
| | | OH | Organic clays of medium to high plasticity, organic silts |
| **HIGHLY ORGANIC SOILS** | | PT | Peat and other highly organic soils |

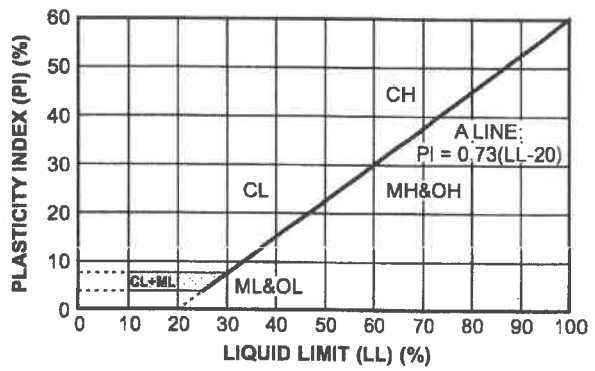
## CONSISTENCY CLASSIFICATION

| Description | Blows per Foot |
|---|---|
| *Granular Soils* | |
| Very Loose | < 5 |
| Loose | 5 – 15 |
| Medium Dense | 16 – 40 |
| Dense | 41 – 65 |
| Very Dense | > 65 |
| *Cohesive Soils* | |
| Very Soft | < 3 |
| Soft | 3 – 5 |
| Firm | 6 – 10 |
| Stiff | 11 – 20 |
| Very Stiff | 21 – 40 |
| Hard | > 40 |

## GRAIN SIZE CLASSIFICATION

| *Grain Type* | *Standard Sieve Size* | *Grain Size in Millimeters* |
|---|---|---|
| Boulders | Above 12 inches | Above 305 |
| Cobbles | 12 to 13 inches | 305 to 76.2 |
| Gravel | 3 inches to No. 4 | 76.2 to 4.76 |
| Coarse-grained | 3 to ¾ inches | 76.2 to 19.1 |
| Fine-grained | ¾ inches to No. 4 | 19.1 to 4.76 |
| Sand | No. 4 to No. 200 | 4.76 to 0.074 |
| Coarse-grained | No. 4 to No. 10 | 4.76 to 2.00 |
| Medium-grained | No. 10 to No. 40 | 2.00 to 0.042 |
| Fine-grained | No. 40 to No. 200 | 0.042 to 0.074 |
| Silt and Clay | Below No. 200 | Below 0.074 |

## PLASTICITY CHART



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# Log of Boring B1

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

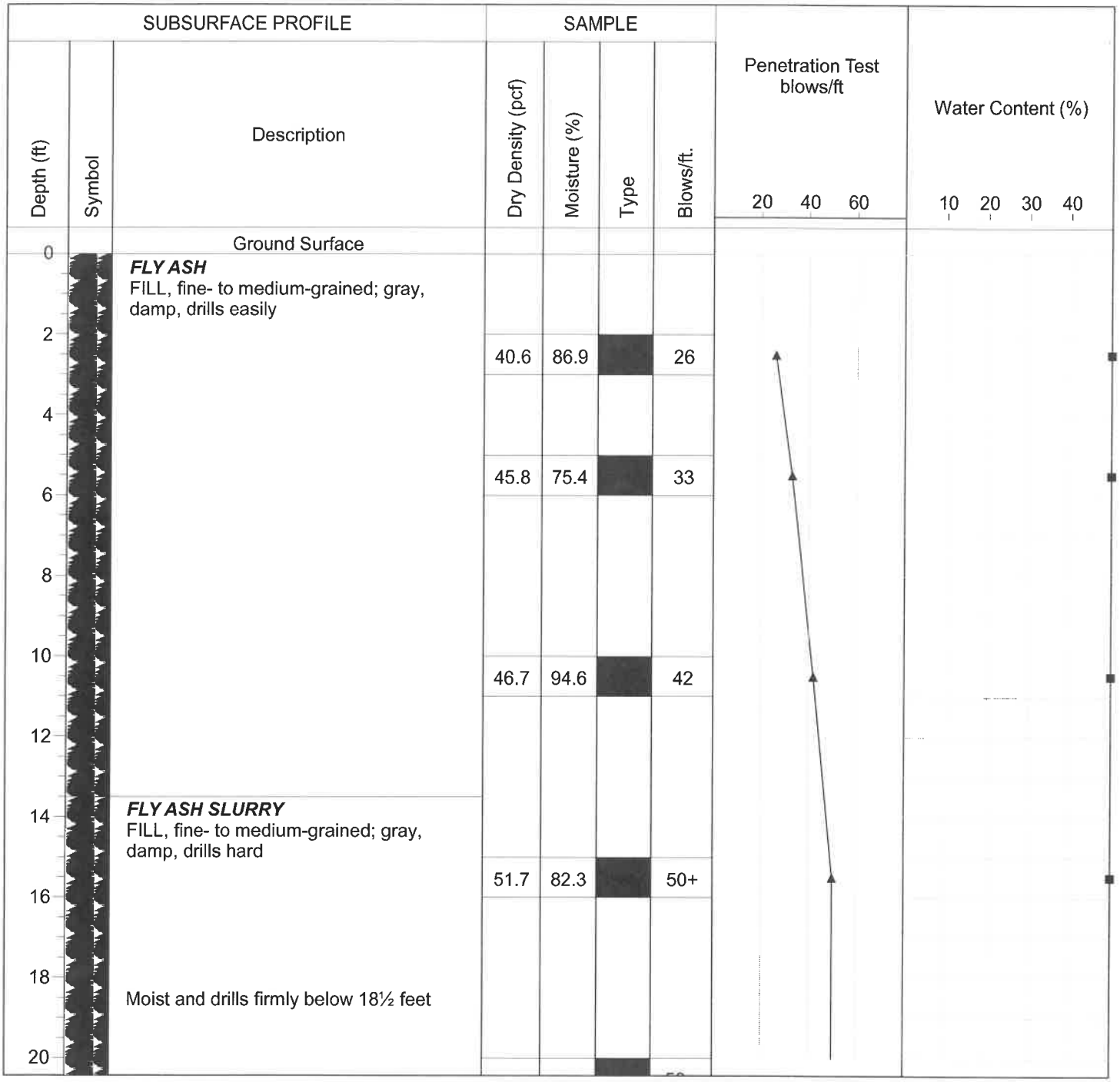
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-1

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-9-18

**Hole Size:** 6½ Inches

**Elevation:** 27½ Feet

DRAFT

# Log of Boring B1

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>** **Initial:** None

**Project No:** 022-18063

**Figure No.:** A-1

**Logged By:** R. Alexander

**At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | Penetration Test blows/ft | Water Content (%) |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | 20 40 60 | 10 20 30 40 |
| 22 | | | 39.9 | 114.6 | | 50+ | | |
| 24 | | | | | | | | |
| 26 | | ***SILTY SAND (SM)*** Very dense, fine- to coarse-grained; light brown, damp, drills firmly | 105.9 | 9.6 | | 50+ | | |
| | | Auger refusal at 27½ feet | | | | | | |
| 28 | | End of Borehole | | | | | | |
| 30 | | | | | | | | |
| 32 | | | | | | | | |
| 34 | | | | | | | | |
| 36 | | | | | | | | |
| 38 | | | | | | | | |
| 40 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-9-18

**Hole Size:** 6½ Inches

**Elevation:** 27½ Feet

DRAFT

# Log of Boring B2

**Project:** Lime Plant

**Project No:** 022-18063

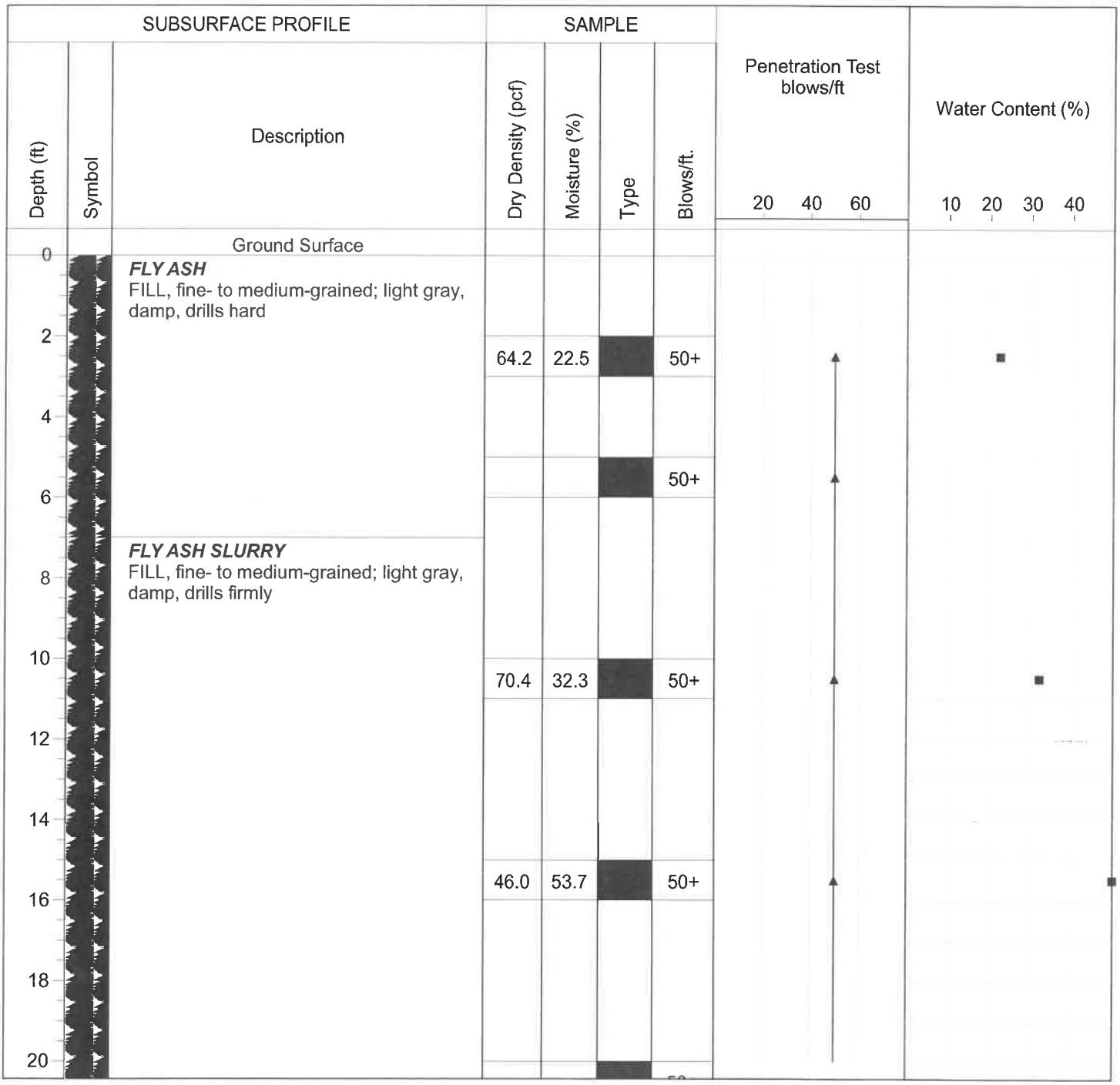
**Client:** PVL Lime

**Figure No.:** A-2

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-9-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 36 Feet

DRAFT

# Log of Boring B2

**Project:** Lime Plant

**Project No:** 022-18063

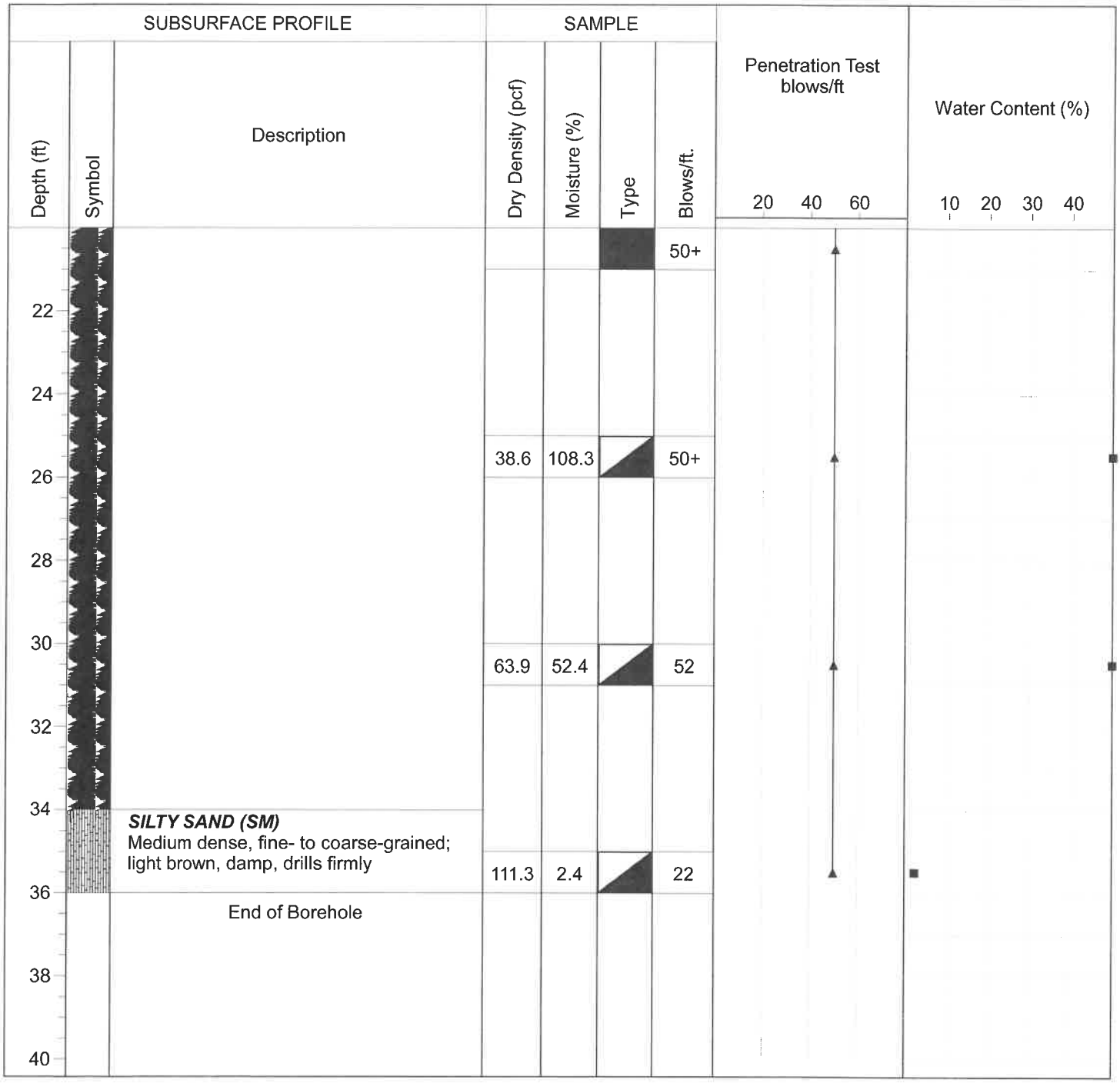
**Client:** PVL Lime

**Figure No.:** A-2

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-9-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 36 Feet

**Sheet:** 2 of 2

DRAFT

# Log of Boring B3

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-3

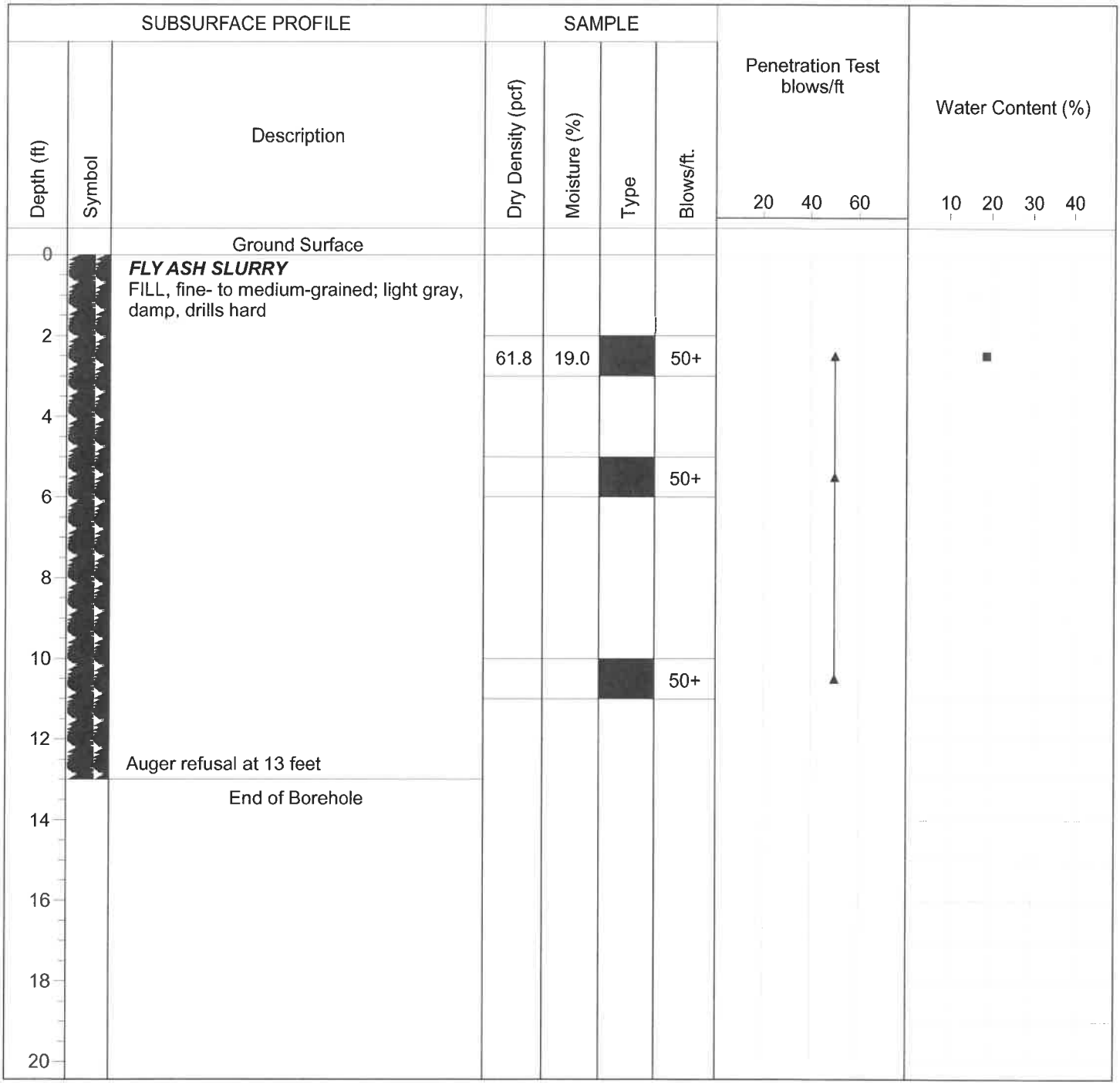
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-10-18

**Hole Size:** 6½ Inches

**Elevation:** 13 Feet

**Sheet:** 1 of 1

DRAFT

# Log of Boring B4

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-4

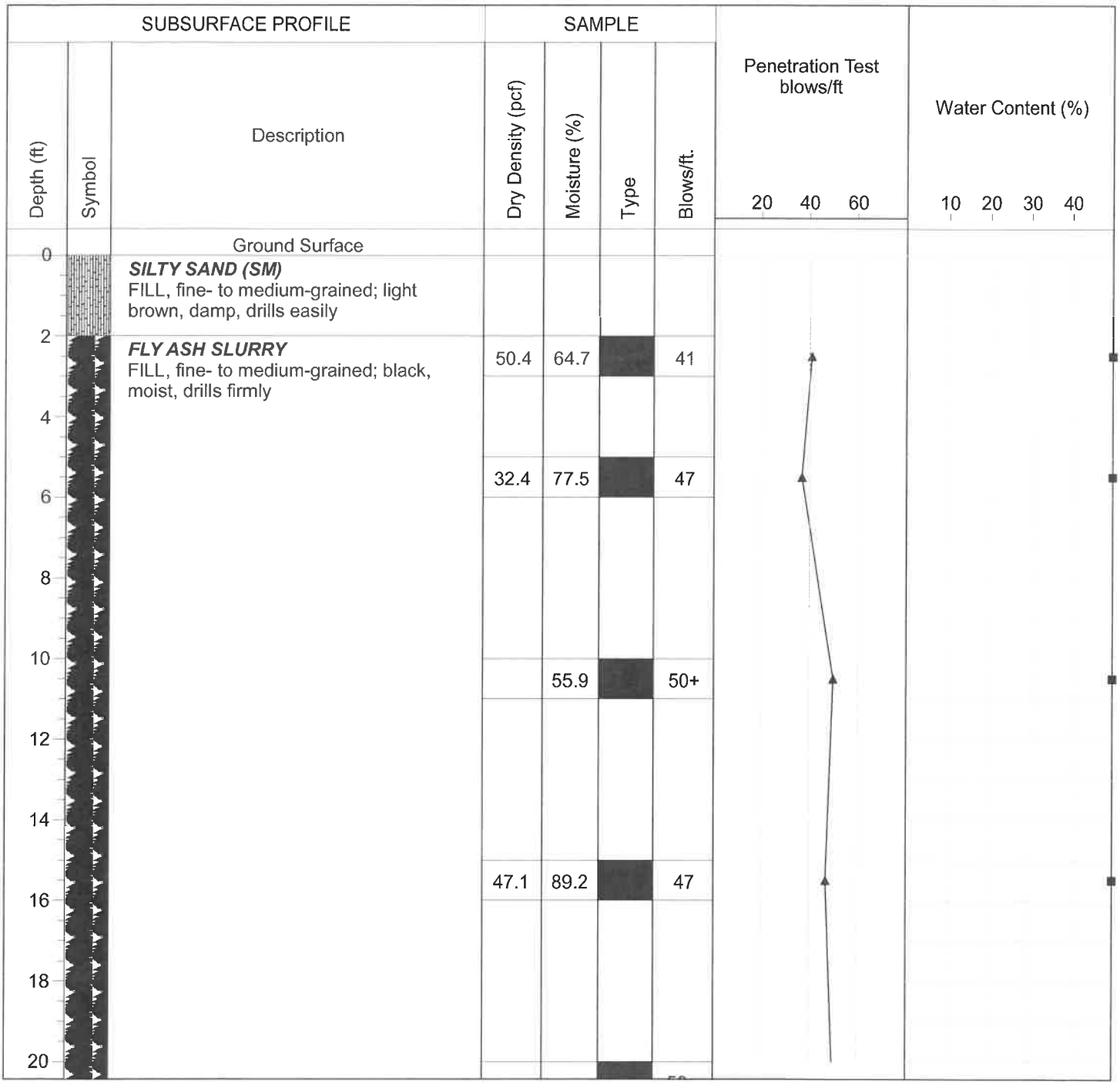
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 42½ Feet

DRAFT

# Log of Boring B4

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-4

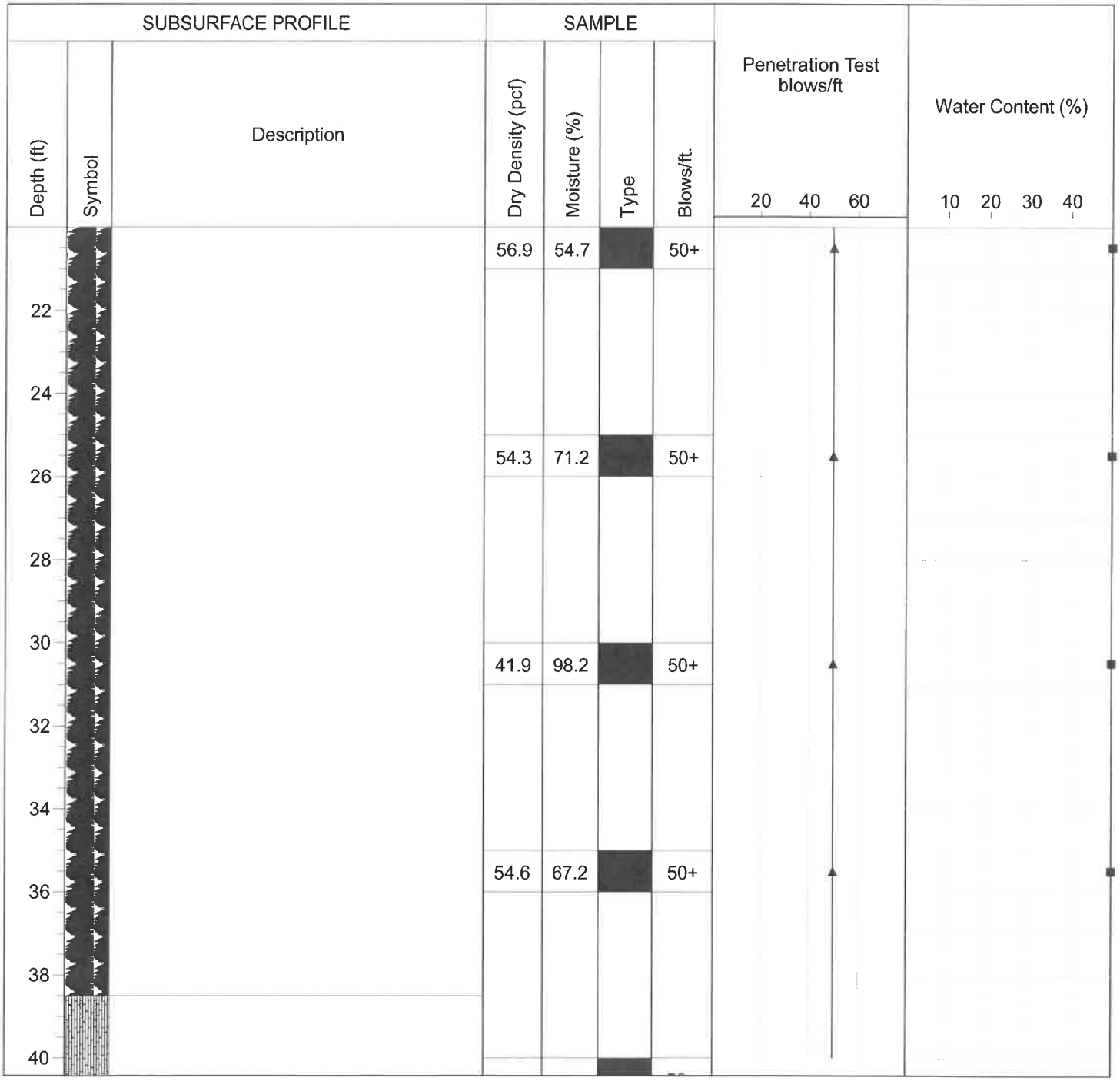
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 42½ Feet

DRAFT

# Log of Boring B4

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-4

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | Penetration Test blows/ft | Water Content (%) |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | 20 40 60 | 10 20 30 40 |
| | | ***GRAVELLY SILTY SAND (SM)*** Very dense, fine- to medium-grained with COBBLES; light brown, damp, drills firmly | | | | 50+ | | |
| 42 | | End of Borehole | | | | | | |
| 44 | | | | | | | | |
| 46 | | | | | | | | |
| 48 | | | | | | | | |
| 50 | | | | | | | | |
| 52 | | | | | | | | |
| 54 | | | | | | | | |
| 56 | | | | | | | | |
| 58 | | | | | | | | |
| 60 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-10-18

**Hole Size:** 6½ Inches

**Elevation:** 42½ Feet

DRAFT

# Log of Boring B5

**Project:** Lime Plant

**Project No:** 022-18063

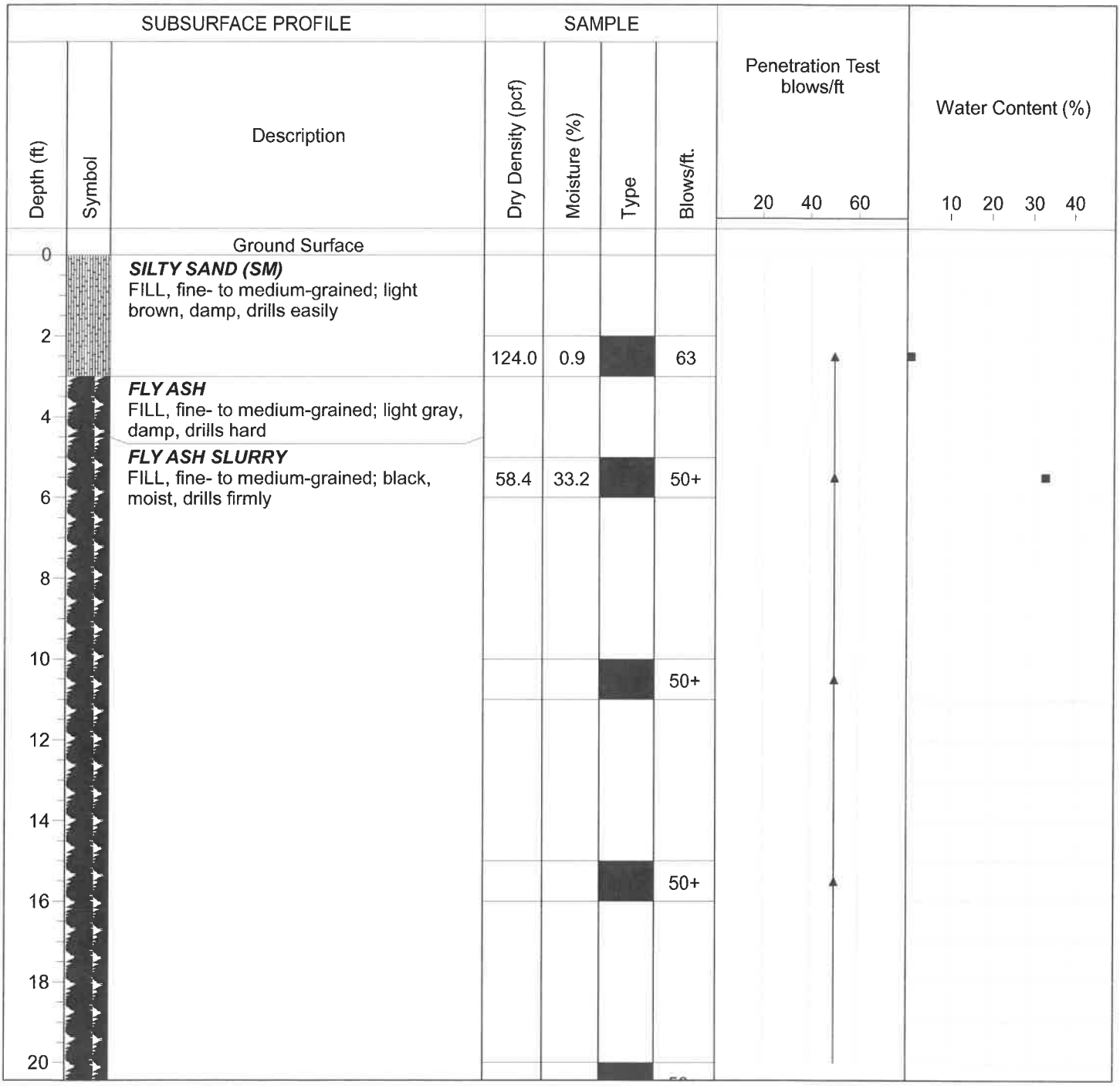
**Client:** PVL Lime

**Figure No.:** A-5

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 37 Feet

DRAFT

# Log of Boring B5

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

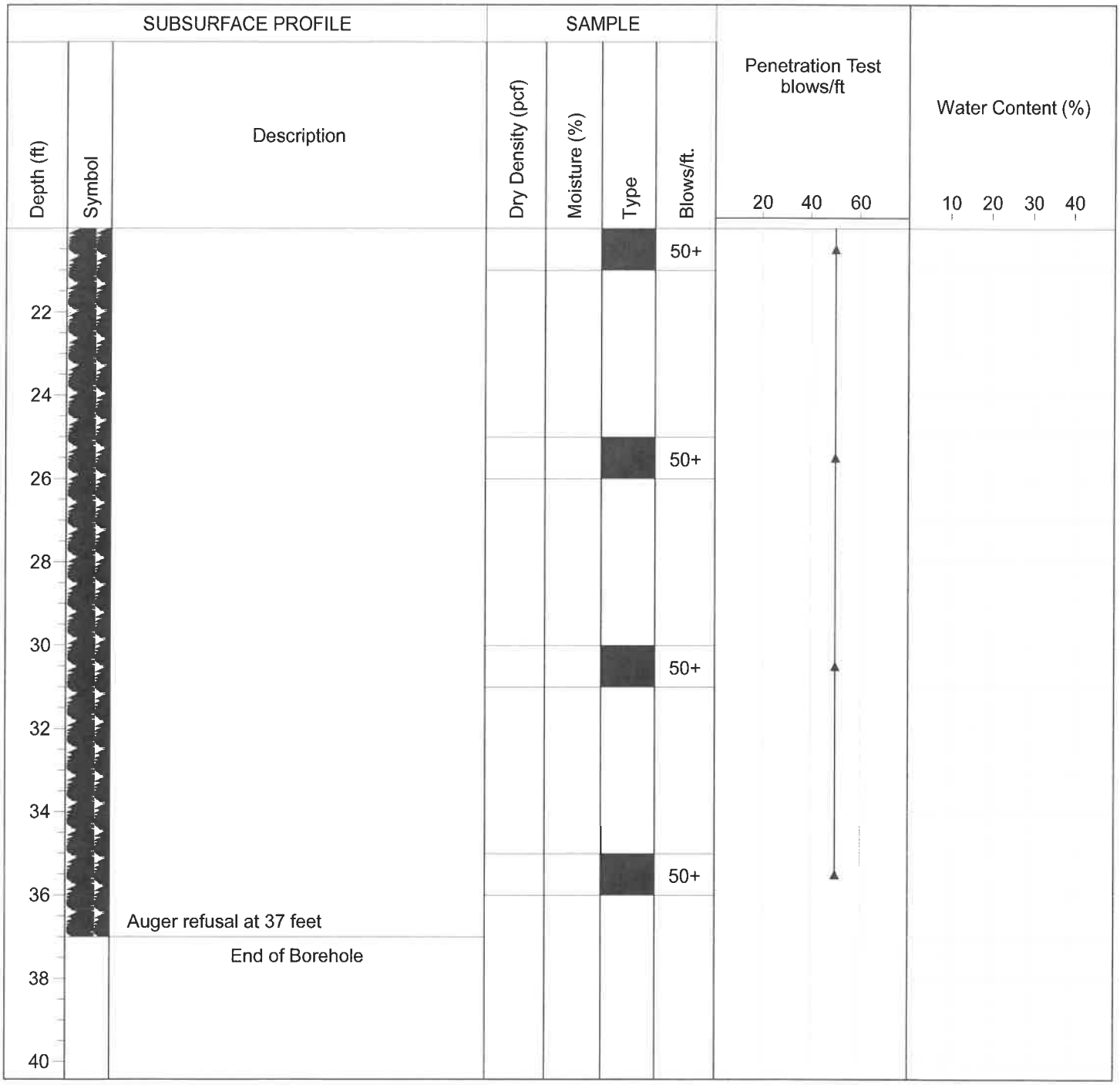
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-5

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-10-18

**Hole Size:** 6½ Inches

**Elevation:** 37 Feet

DRAFT

# Log of Boring B6

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-6

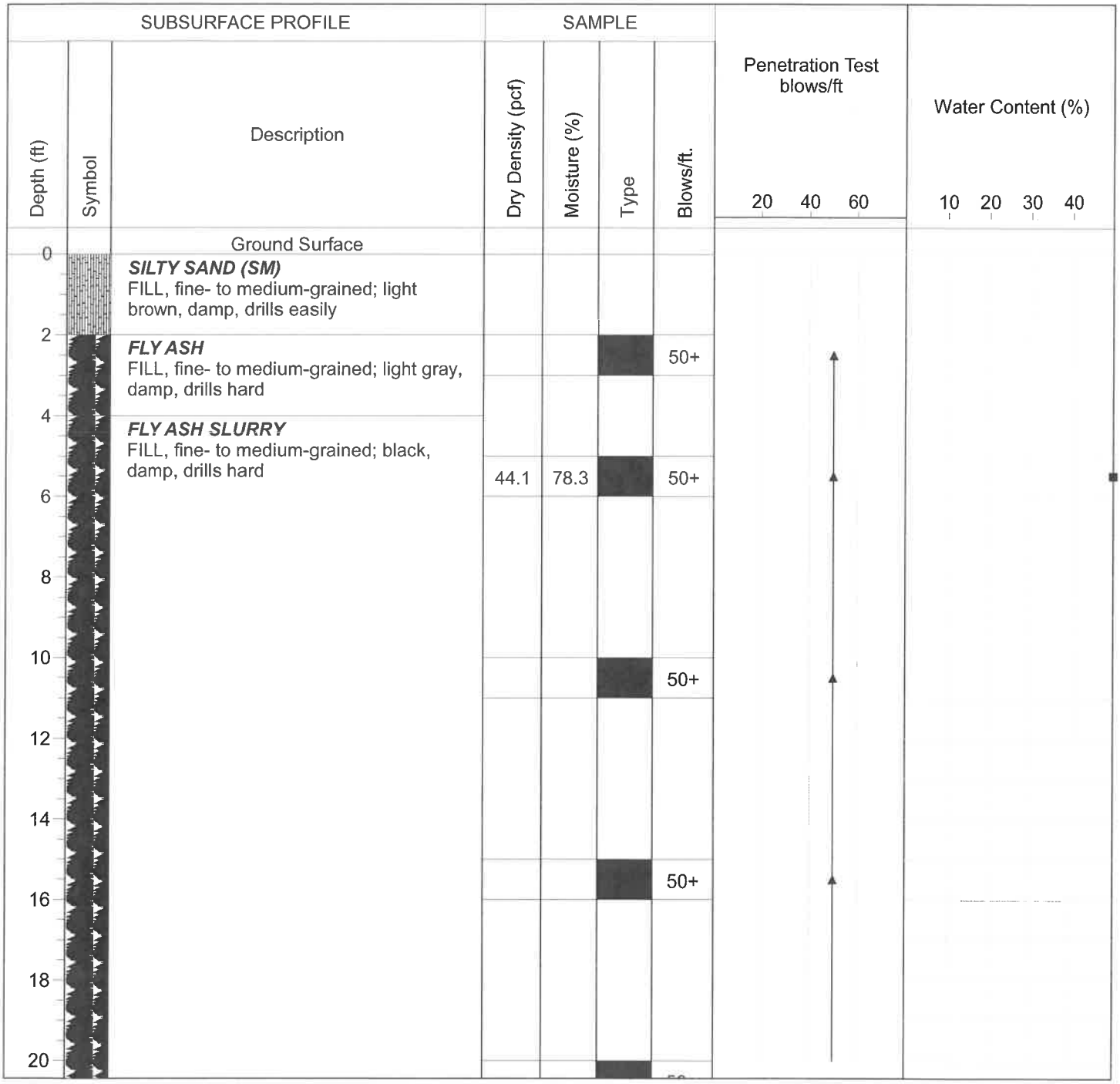
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 53 Feet

DRAFT

# Log of Boring B6

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-6

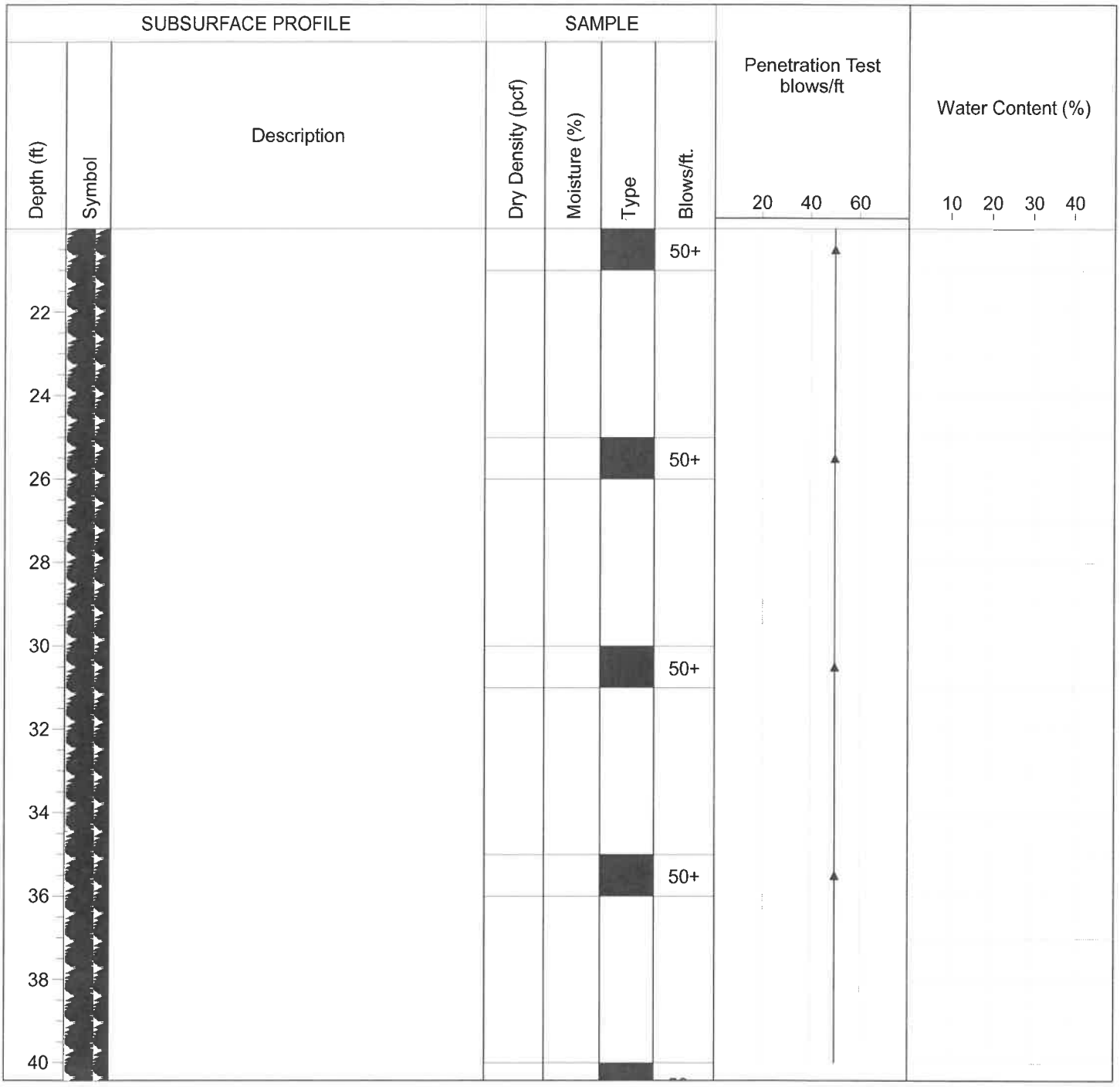
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 53 Feet

DRAFT

# Log of Boring B6

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-6

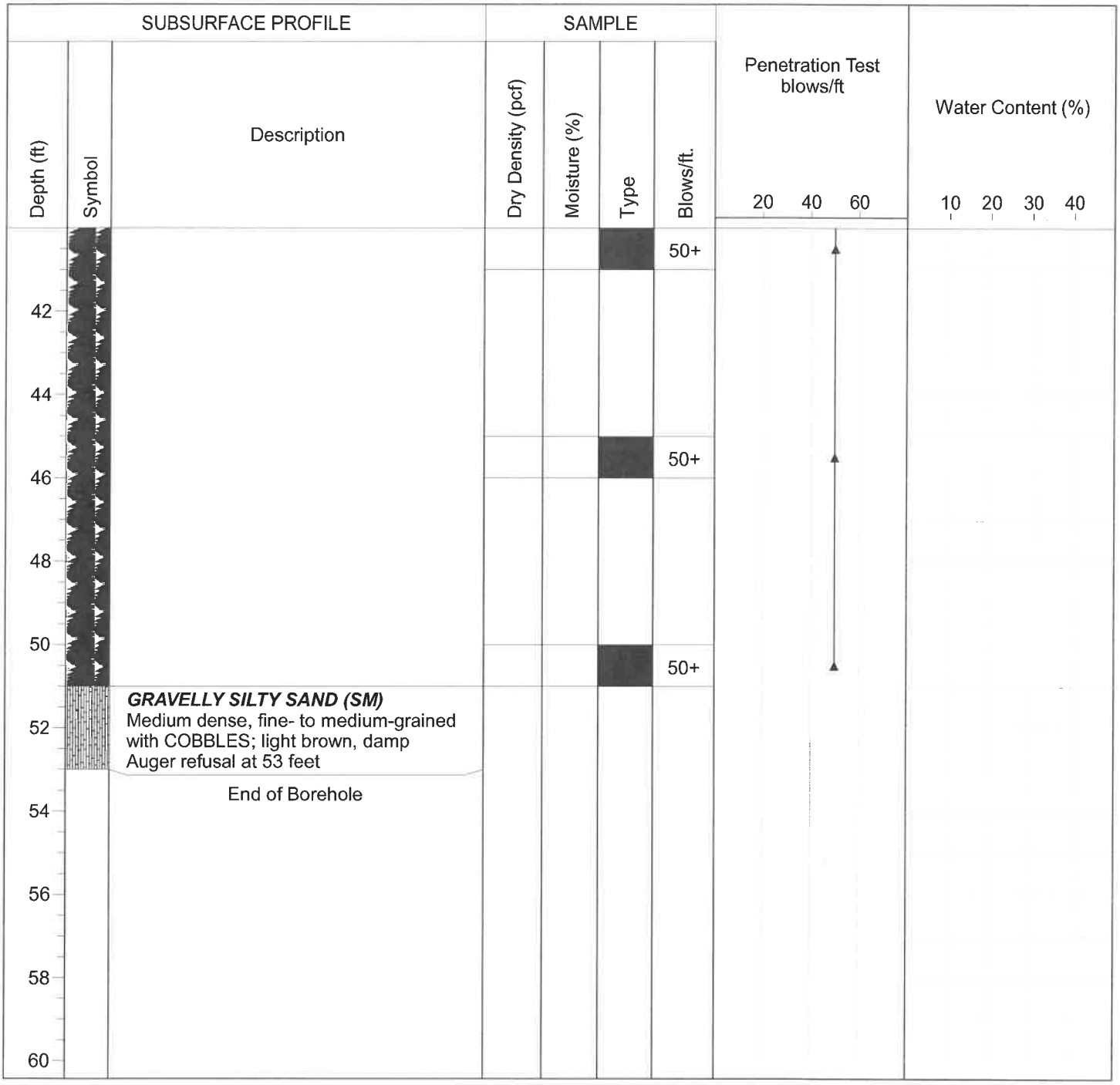
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 53 Feet

DRAFT

# Log of Boring B7

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-7

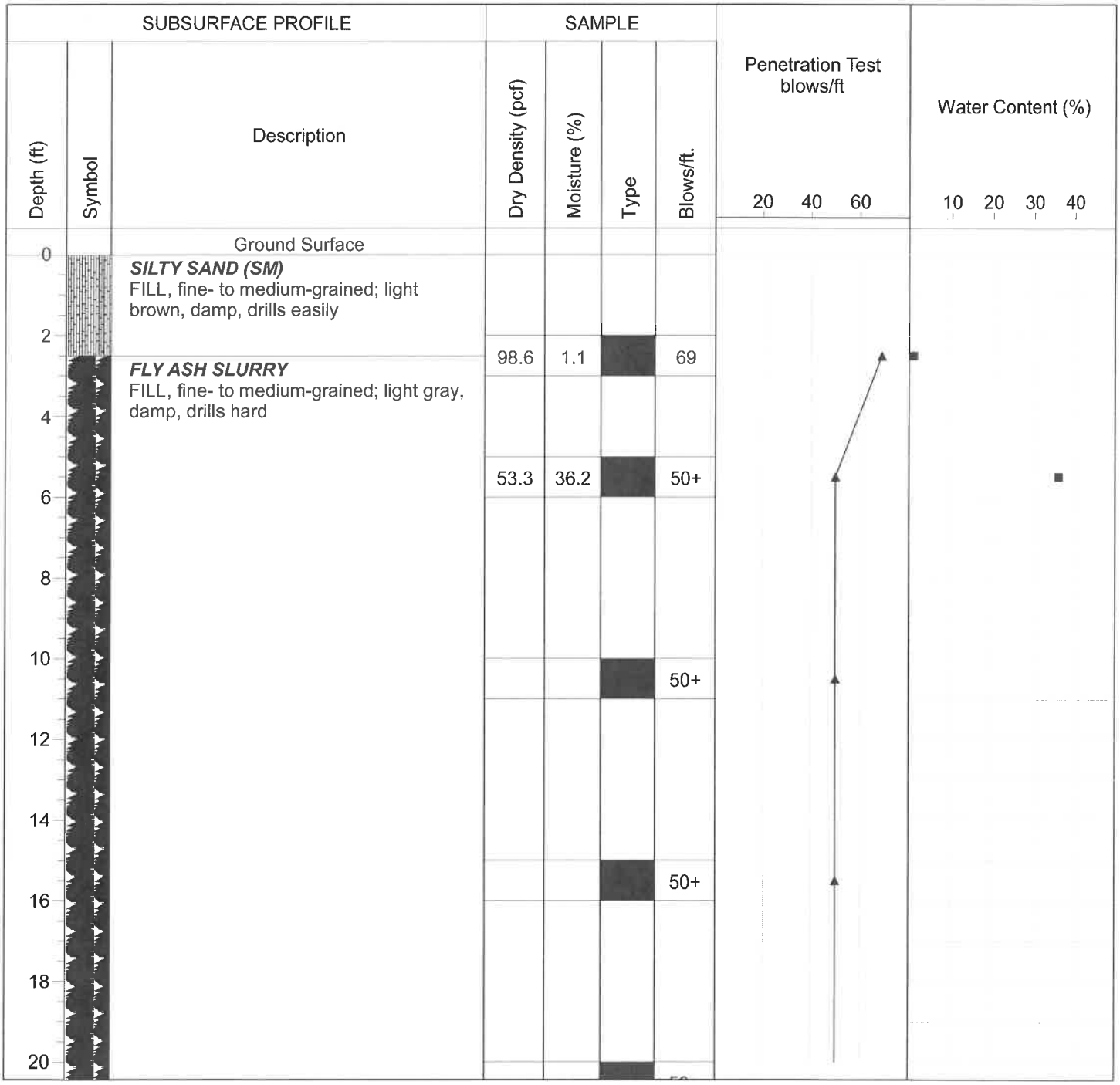
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 40 Feet

DRAFT

# Log of Boring B7

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-7

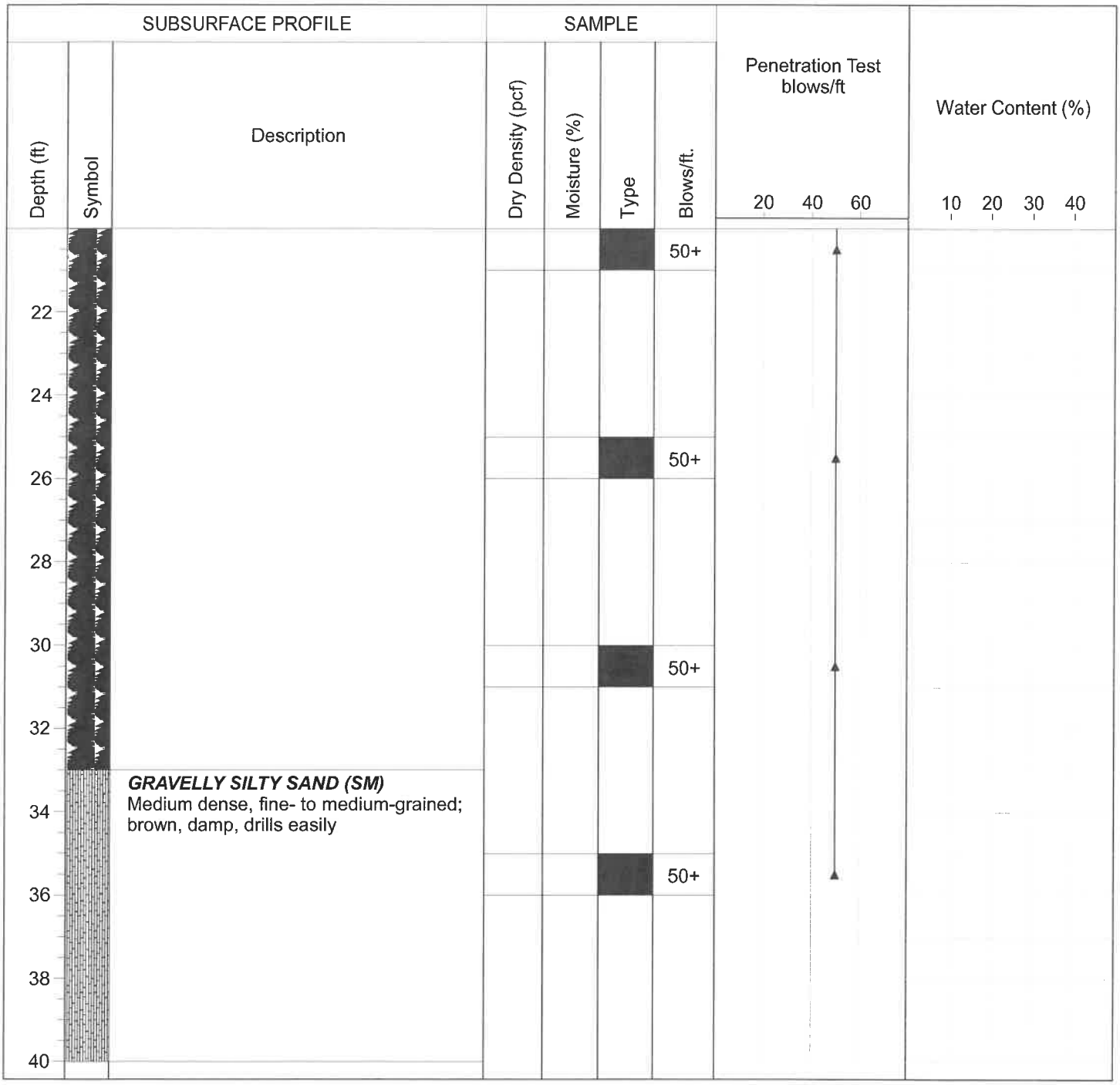
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 40 Feet

DRAFT

# Log of Boring B8

**Project:** Lime Plant

**Project No:** 022-18063

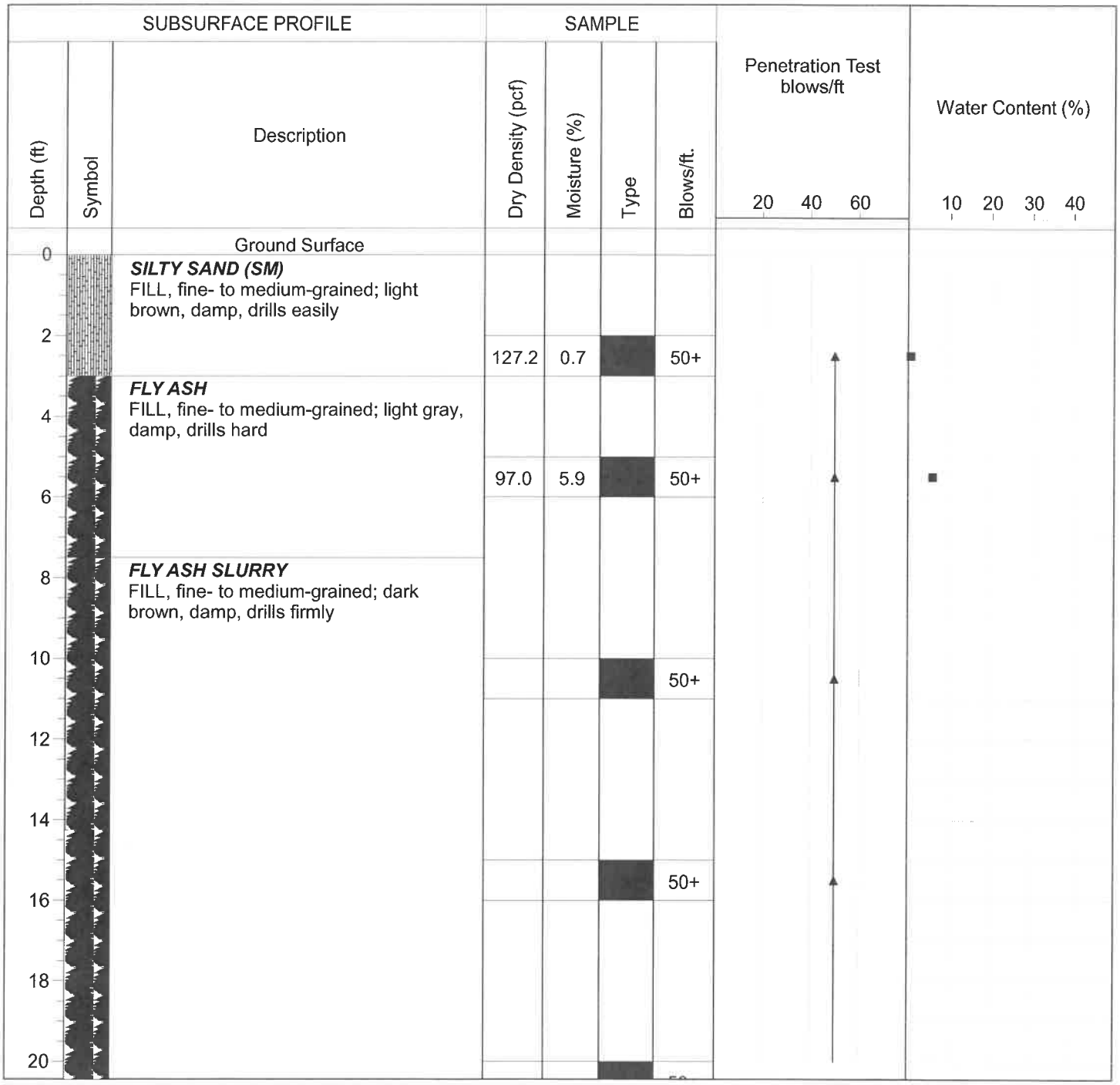
**Client:** PVL Lime

**Figure No.:** A-8

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 55 Feet

DRAFT

# Log of Boring B8

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-8

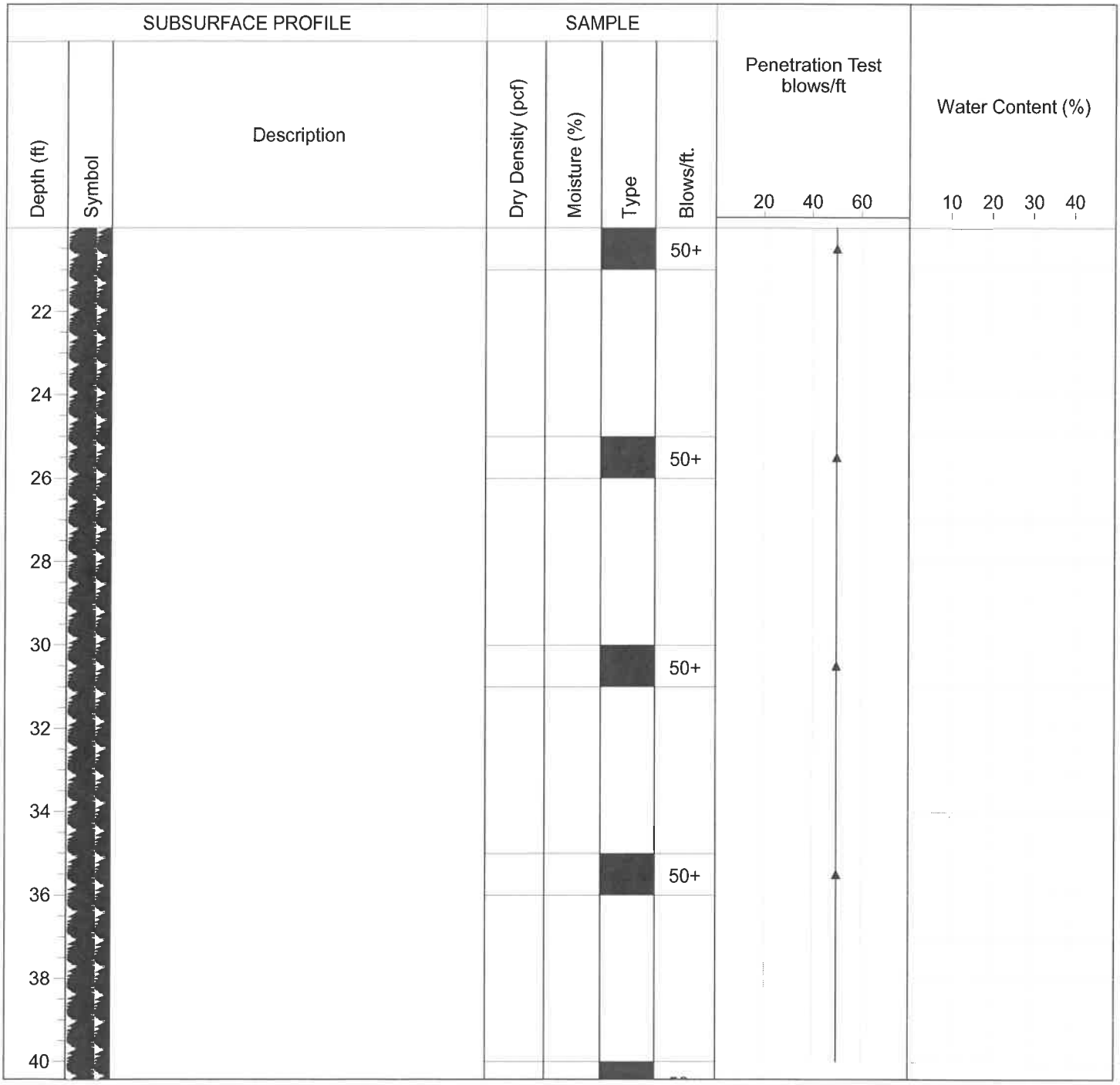
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 55 Feet

DRAFT

# Log of Boring B8

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-8

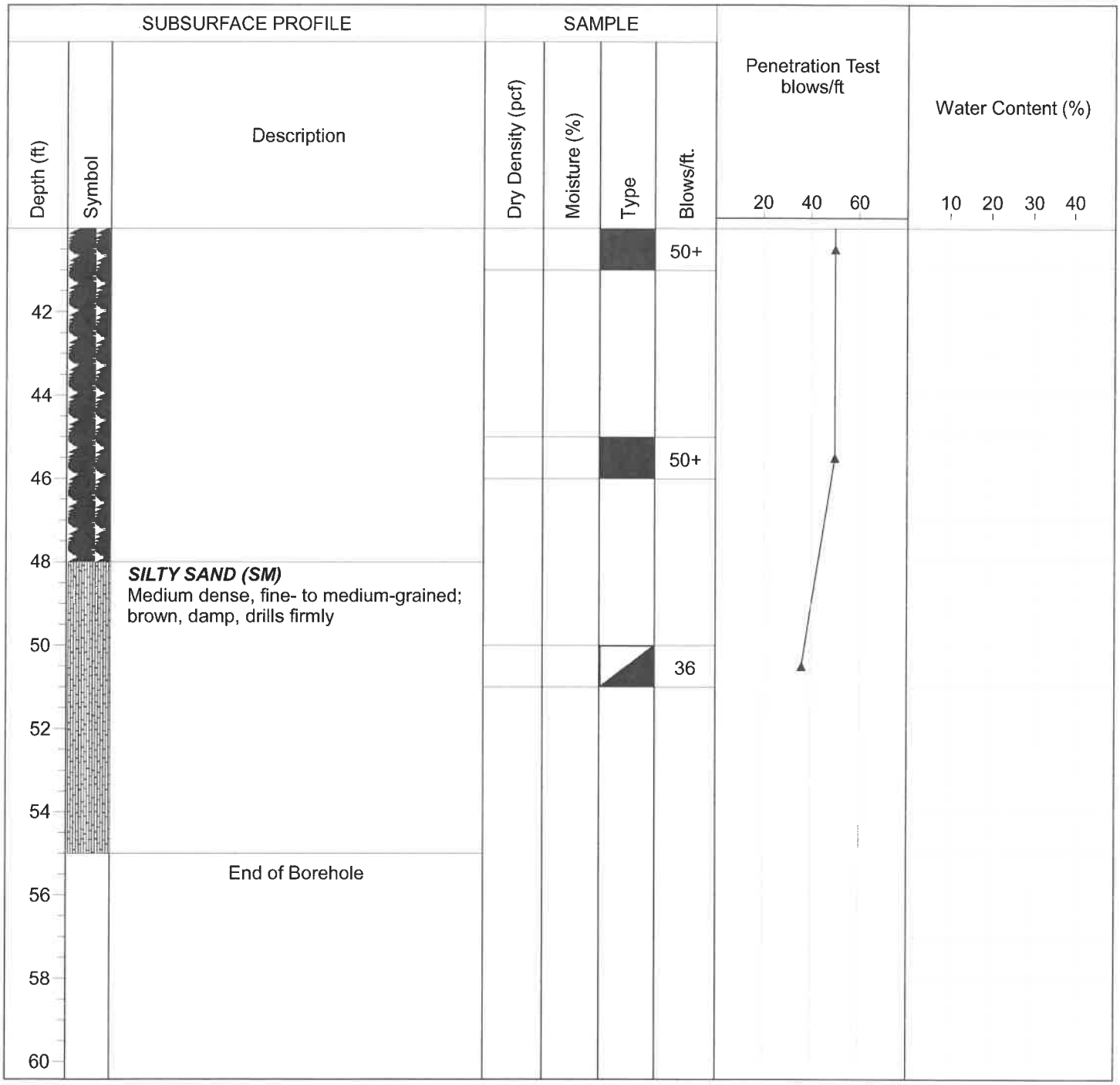
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-10-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 55 Feet

DRAFT

# Log of Boring B9

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-9

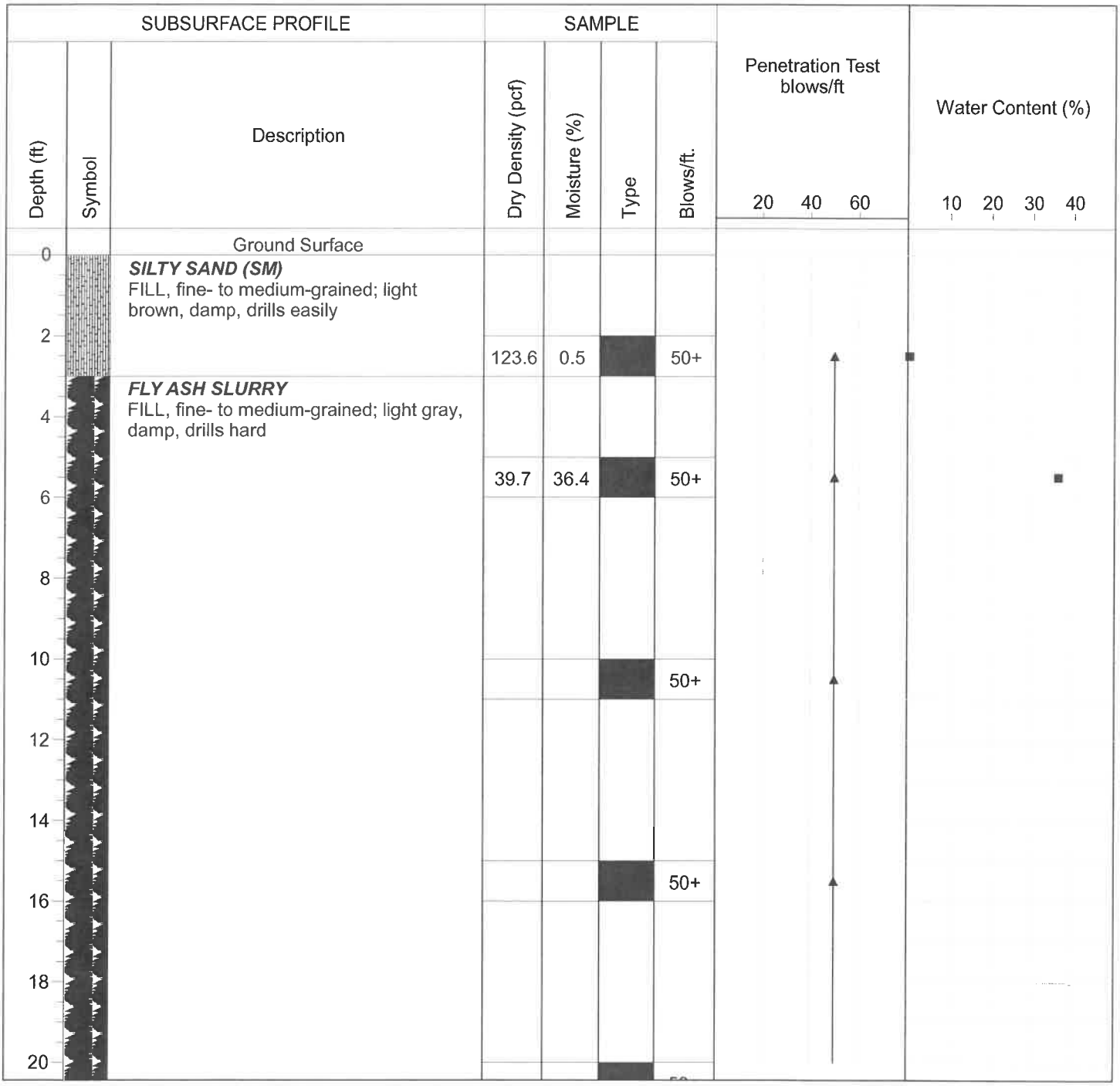
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-10-18

**Hole Size:** 6½ Inches

**Elevation:** 36 Feet

DRAFT

# Log of Boring B9

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-9

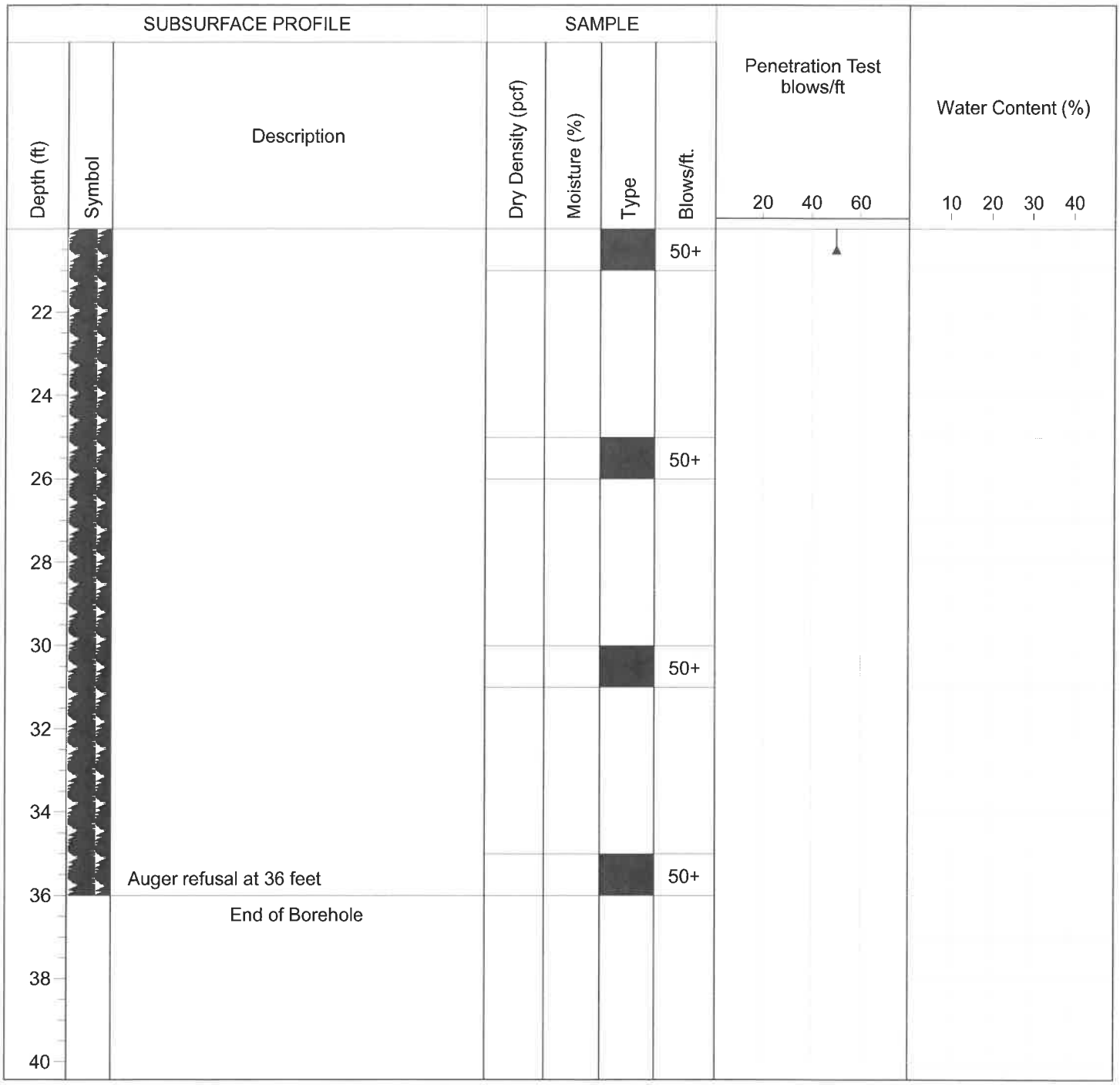
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-10-18

**Hole Size:** 6½ Inches

**Elevation:** 36 Feet

DRAFT

# Log of Boring B10

**Project:** Lime Plant

**Project No:** 022-18063

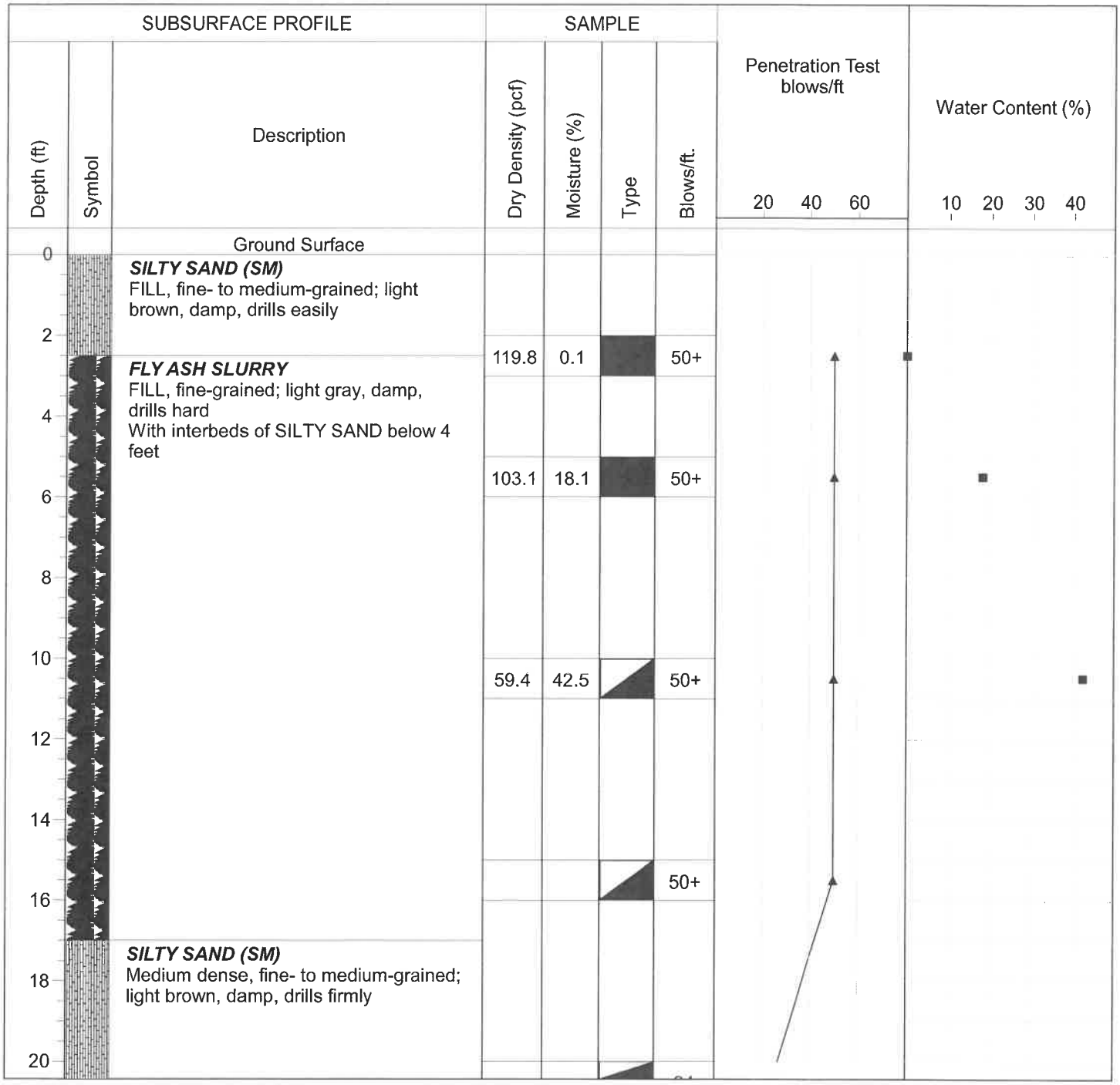
**Client:** PVL Lime

**Figure No.:** A-10

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-20-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 25 Feet

DRAFT

# Log of Boring B10

**Project:** Lime Plant

**Project No:** 022-18063

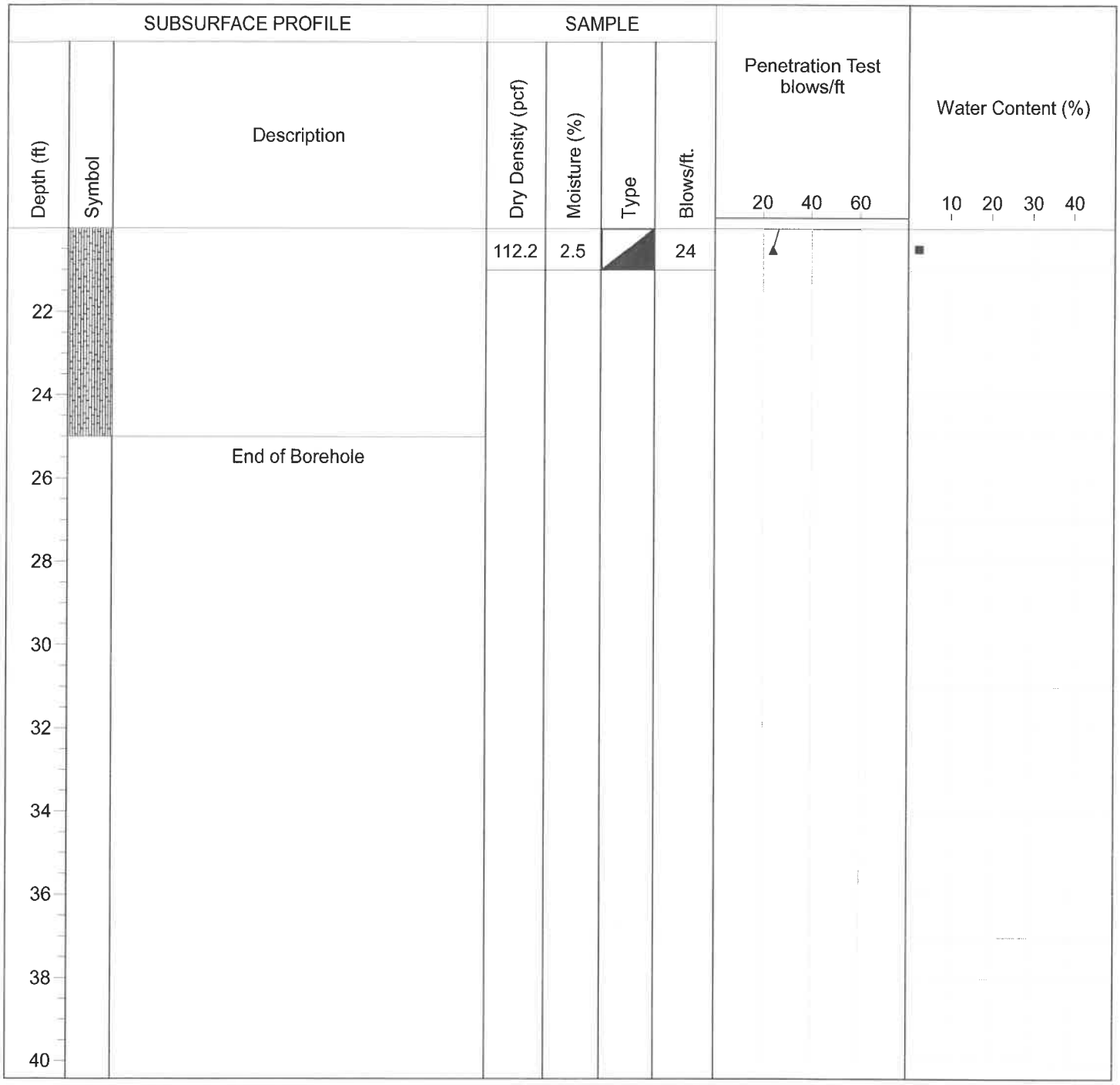
**Client:** PVL Lime

**Figure No.:** A-10

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-20-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 25 Feet

**Sheet:** 2 of 2

DRAFT

# Log of Boring B11

**Project:** Lime Plant

**Project No:** 022-18063

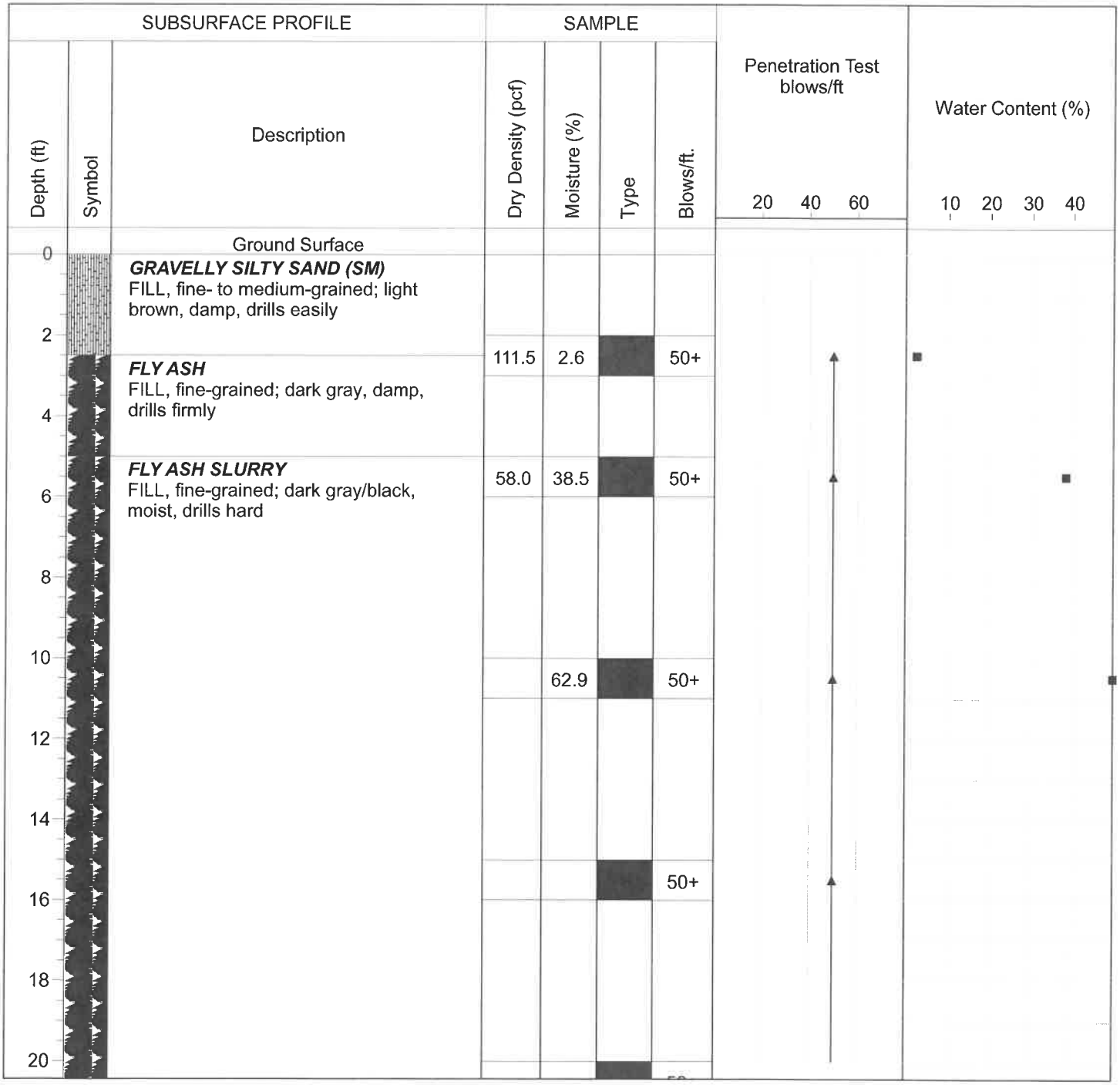
**Client:** PVL Lime

**Figure No.:** A-11

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B11

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-11

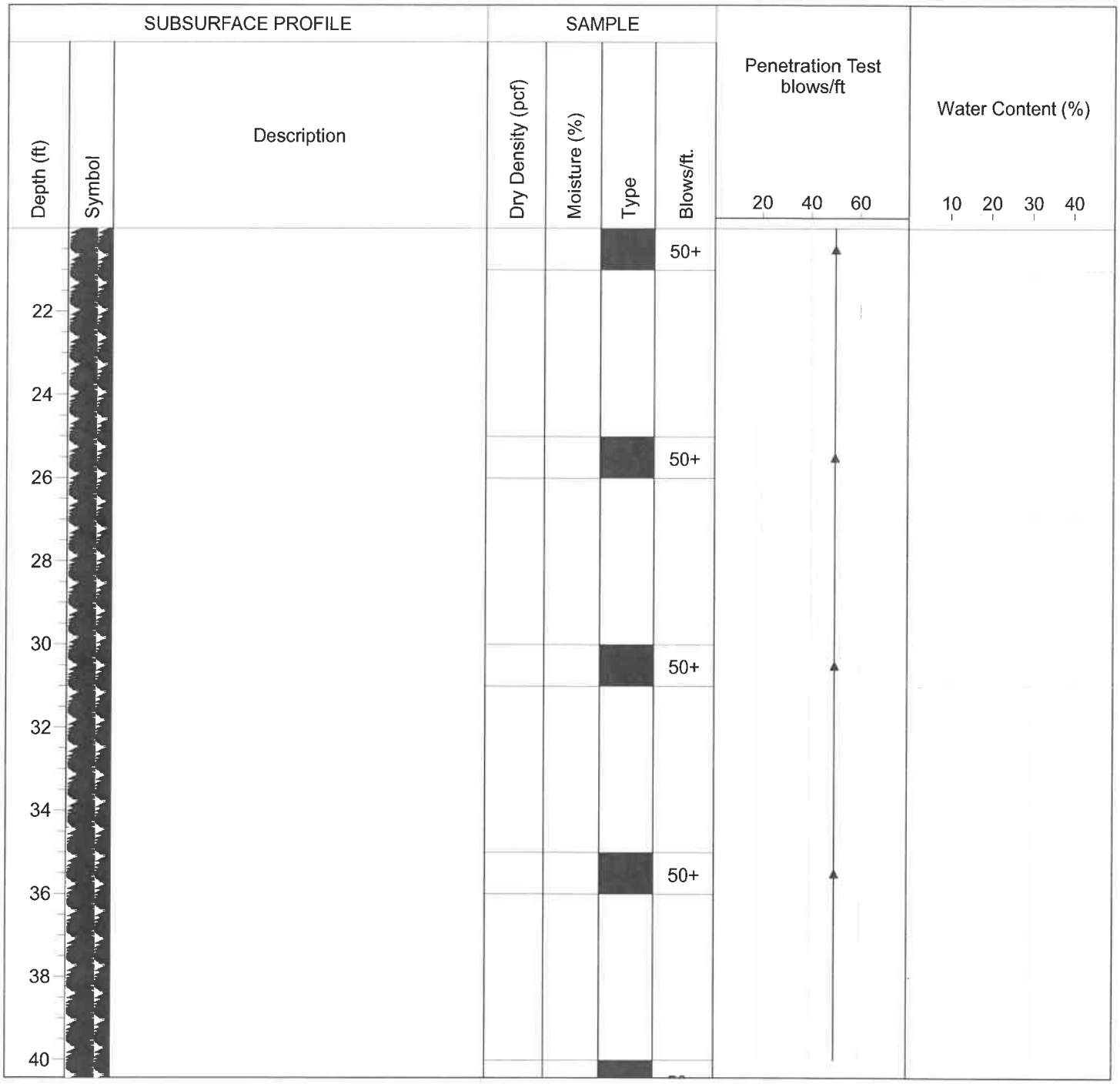
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B11

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-11

**Logged By:** R. Alexander

**At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | Penetration Test blows/ft (20 40 60) | Water Content (%) (10 20 30 40) |
| 42 | | | | | | 50+ | | |
| 44 | | | | | | | | |
| 46 | | ***SILTY SAND (SM)*** Medium dense, fine- to medium-grained; light brown, damp, drills firmly | 106.9 | 10.0 | | 24 | | |
| 48 | | | | | | | | |
| 50 | | End of Borehole | | | | | | |
| 52 | | | | | | | | |
| 54 | | | | | | | | |
| 56 | | | | | | | | |
| 58 | | | | | | | | |
| 60 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B12

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-12

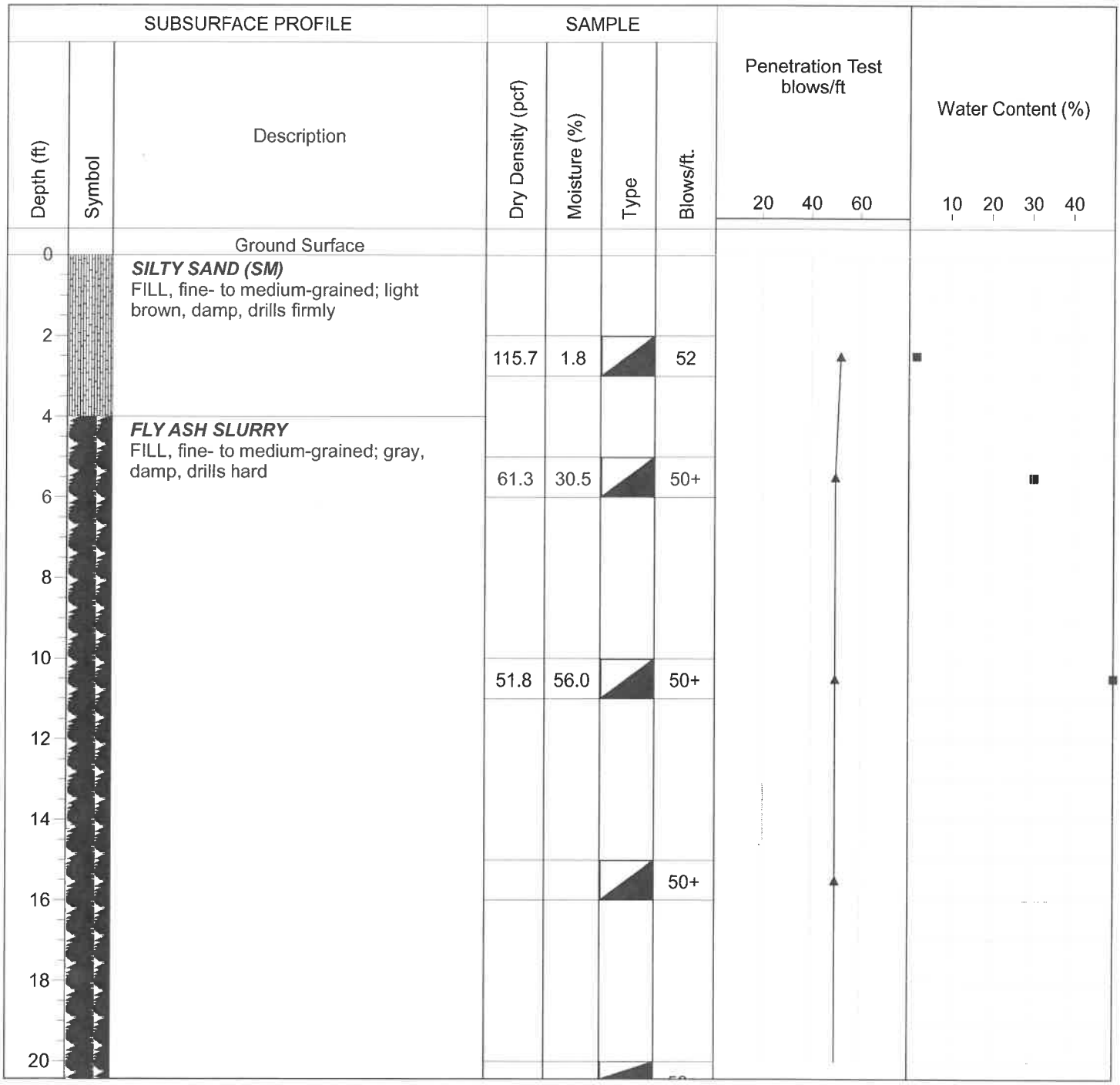
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 44 Feet

DRAFT

# Log of Boring B12

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-12

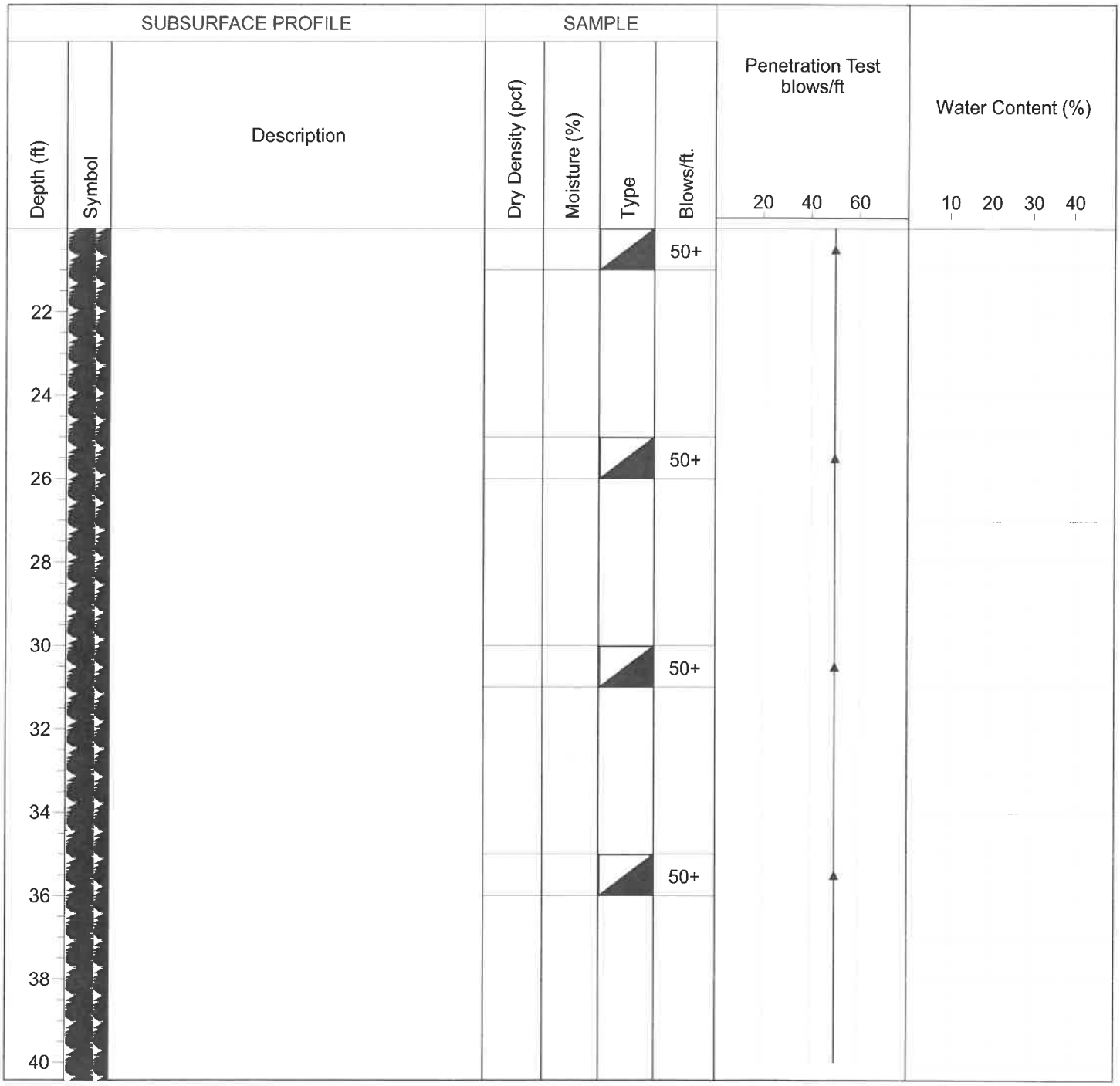
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-19-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 44 Feet

DRAFT

# Log of Boring B12

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-12

**Logged By:** R. Alexander

**At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | Penetration Test blows/ft | Water Content (%) |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | 20 40 60 | 10 20 30 40 |
| 42 | | | | | | | | |
| | | ***GRAVELLY SILTY SAND (SM)*** Very dense, fine- to medium-grained; brown, damp, drills firmly Auger refusal at 44 feet | 119.6 | 1.5 | | 50+ | | |
| 44 | | End of Borehole | | | | | | |
| 46 | | | | | | | | |
| 48 | | | | | | | | |
| 50 | | | | | | | | |
| 52 | | | | | | | | |
| 54 | | | | | | | | |
| 56 | | | | | | | | |
| 58 | | | | | | | | |
| 60 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 44 Feet

**Sheet:** 3 of 3

DRAFT

# Log of Boring B13

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-13

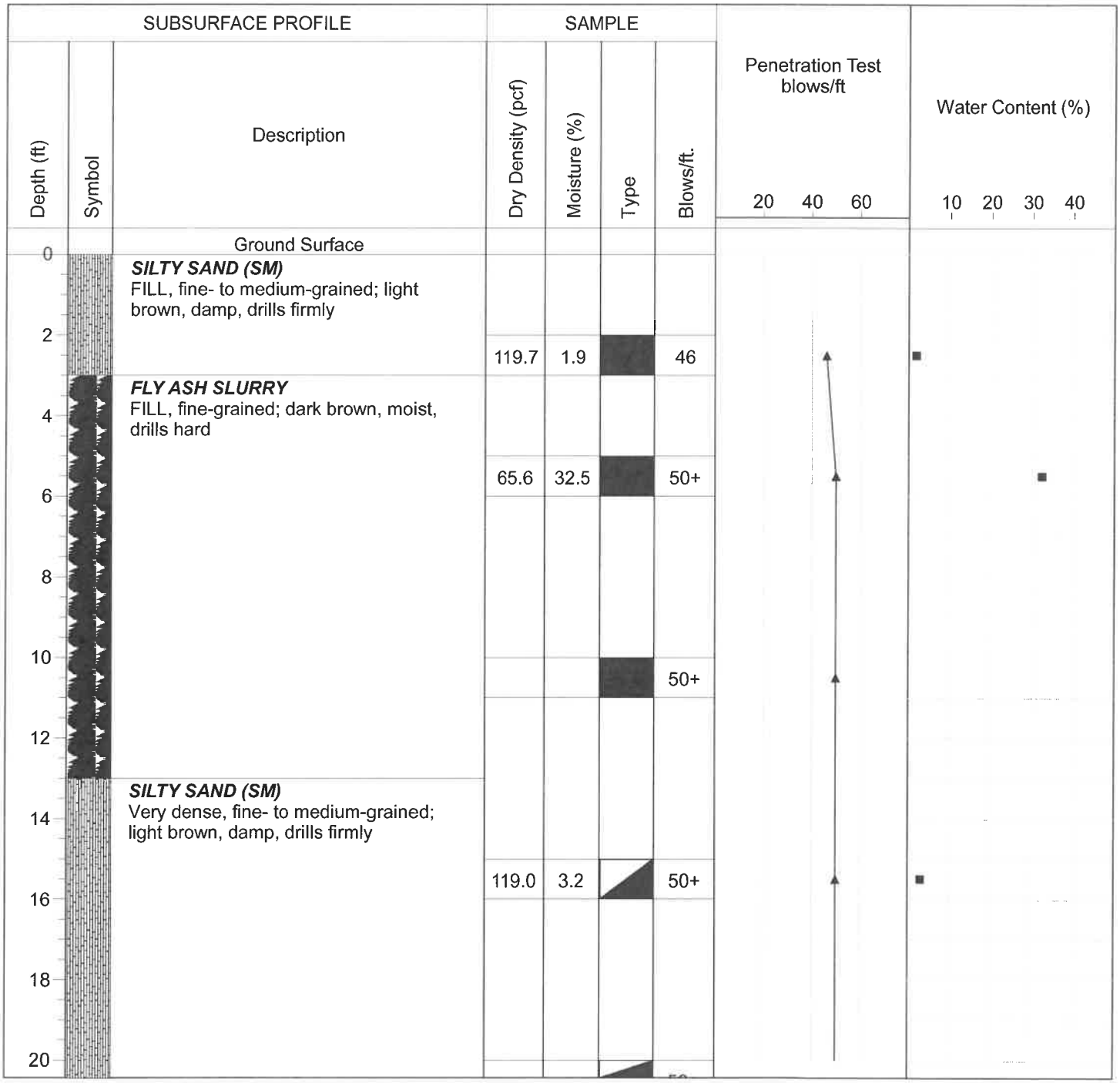
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 25 Feet

DRAFT

# Log of Boring B13

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-13

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | Penetration Test blows/ft | Water Content (%) |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | 20 40 60 | 10 20 30 40 |
| | | | 115.6 | 5.6 | | 50+ | ▲ | ■ |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| | | End of Borehole | | | | | | |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |
| 32 | | | | | | | | |
| 34 | | | | | | | | |
| 36 | | | | | | | | |
| 38 | | | | | | | | |
| 40 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 25 Feet

DRAFT

# Log of Boring B14

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-14

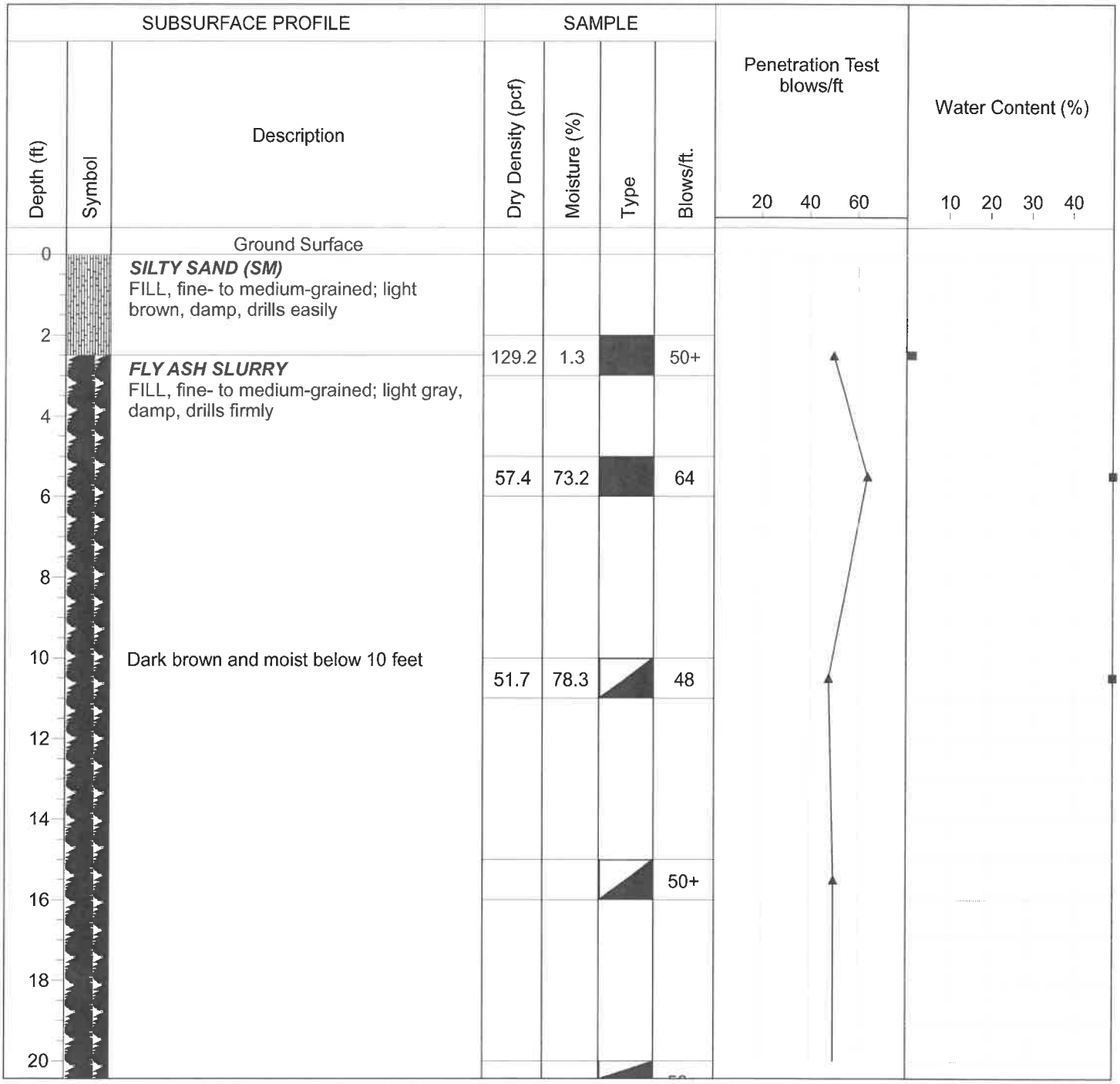
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-11-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 50 Feet

DRAFT

# Log of Boring B14

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-14

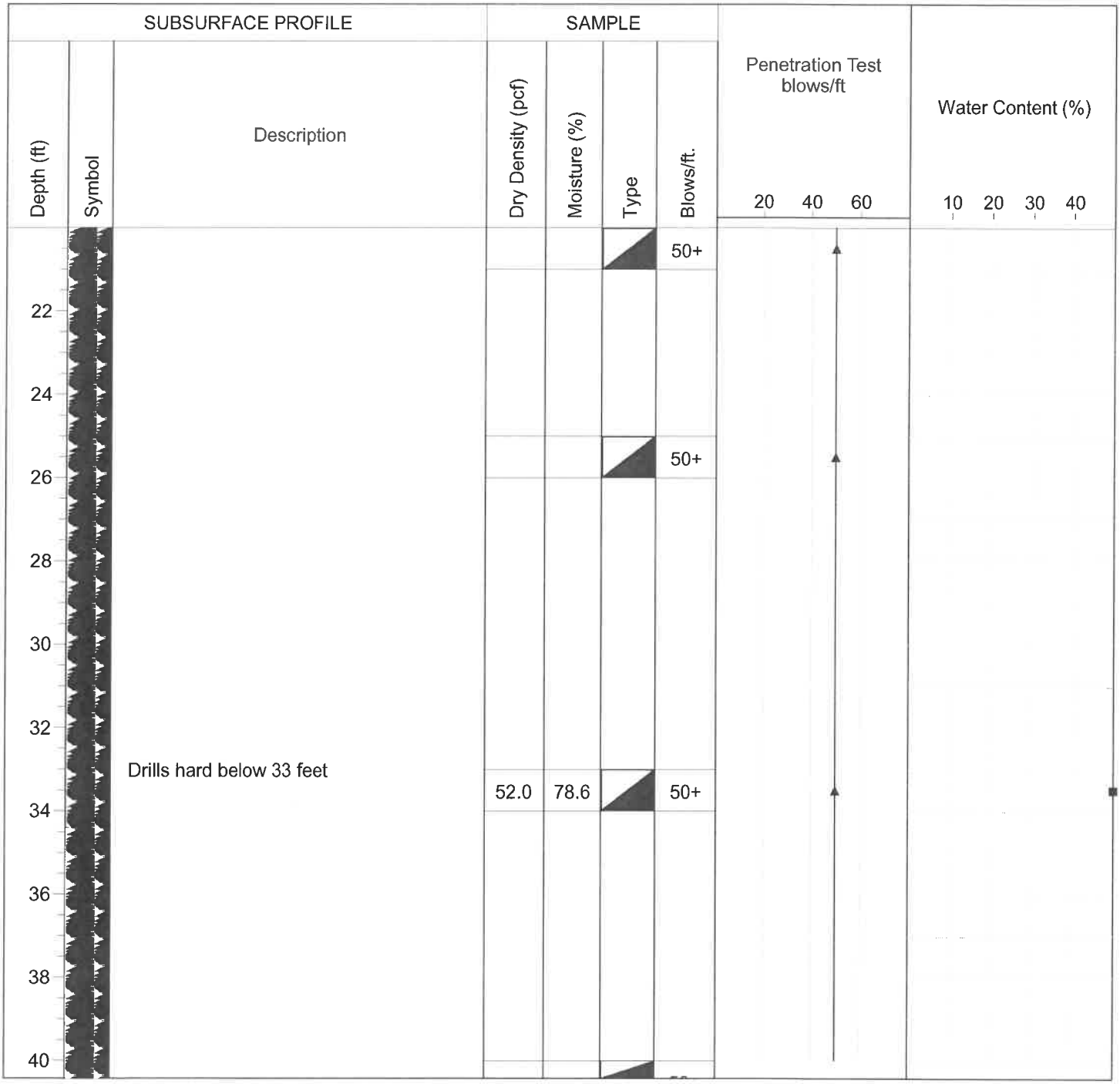
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-11-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 50 Feet

DRAFT

# Log of Boring B14

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

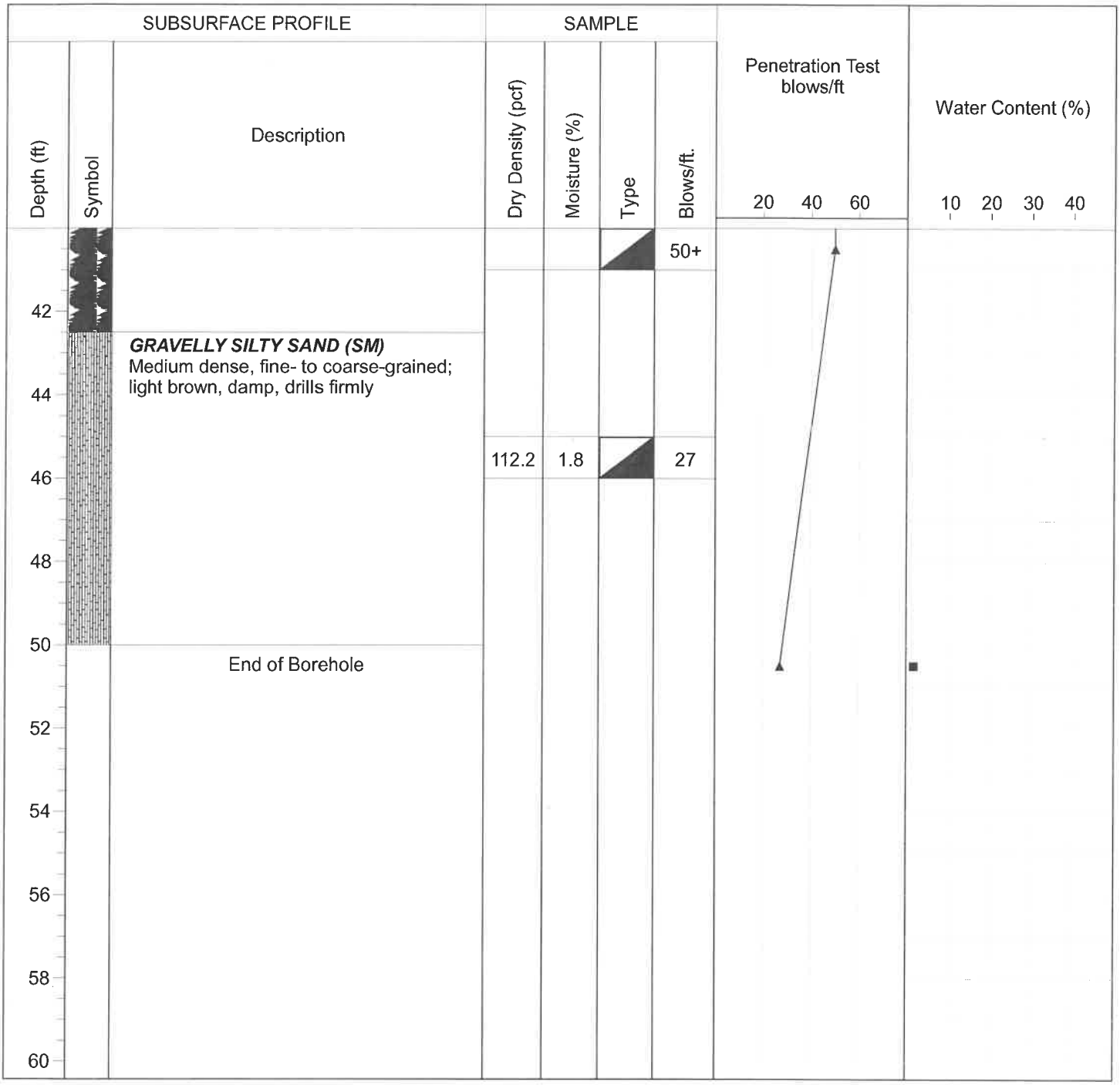
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-14

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-11-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B15

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-15

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None

| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. |
|---|---|---|---|---|---|---|
| 0 | | Ground Surface | | | | |
| | | ***SILTY SAND (SM)*** FILL, fine- to medium-grained; light brown, damp, drills firmly | | | | |
| 2 | | Auger refusal at 3 feet | 121.5 | 0.7 | | 50+ |
| | | End of Borehole | | | | |
| 4 | | | | | | |
| 6 | | | | | | |
| 8 | | | | | | |
| 10 | | | | | | |
| 12 | | | | | | |
| 14 | | | | | | |
| 16 | | | | | | |
| 18 | | | | | | |
| 20 | | | | | | |

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-10-18

**Hole Size:** 6½ Inches

**Elevation:** 3 Feet

DRAFT

# Log of Boring B16

**Project:** Lime Plant

**Project No:** 022-18063

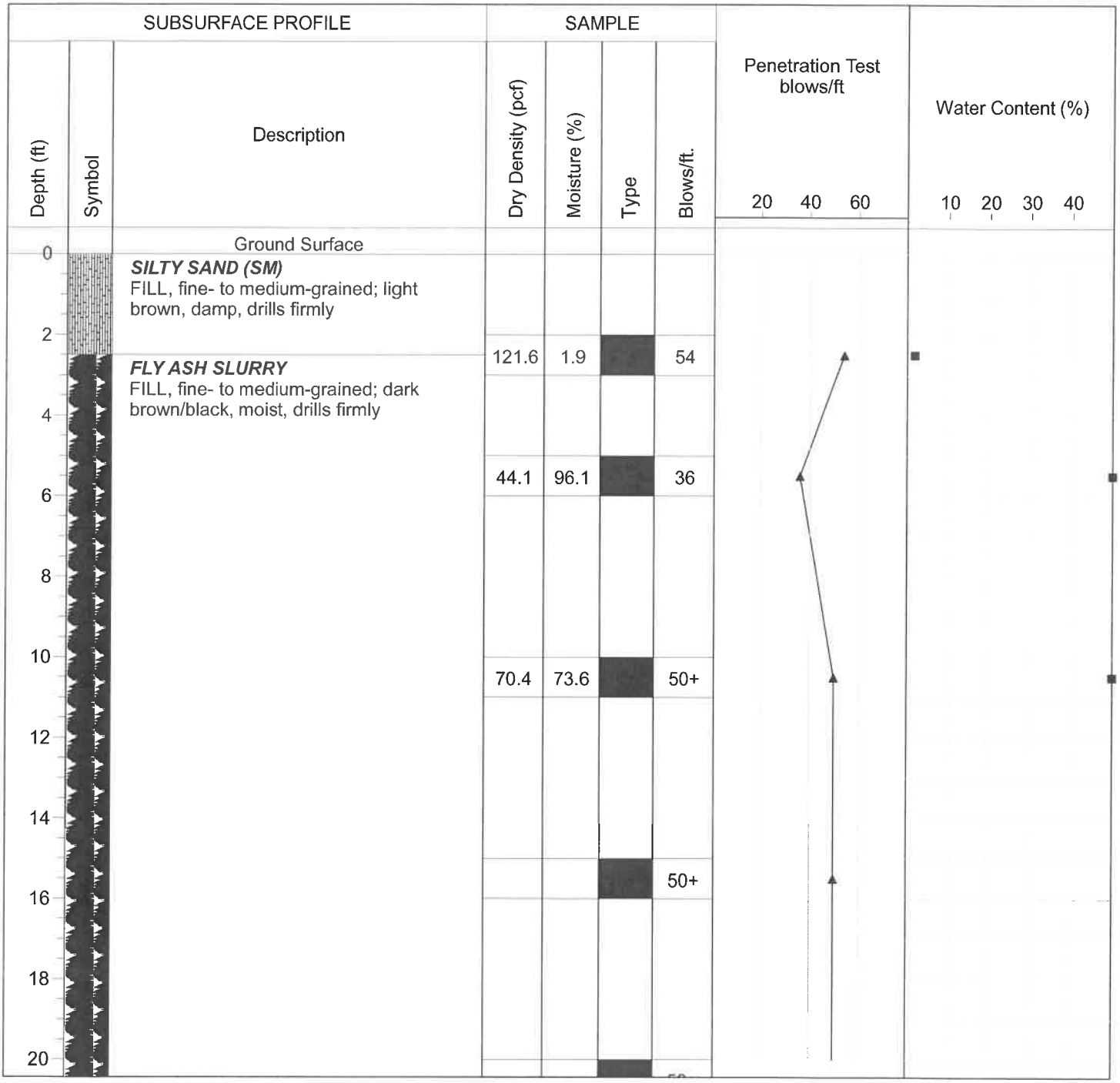
**Client:** PVL Lime

**Figure No.:** A-16

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-11-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 50 Feet

DRAFT

# Log of Boring B16

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

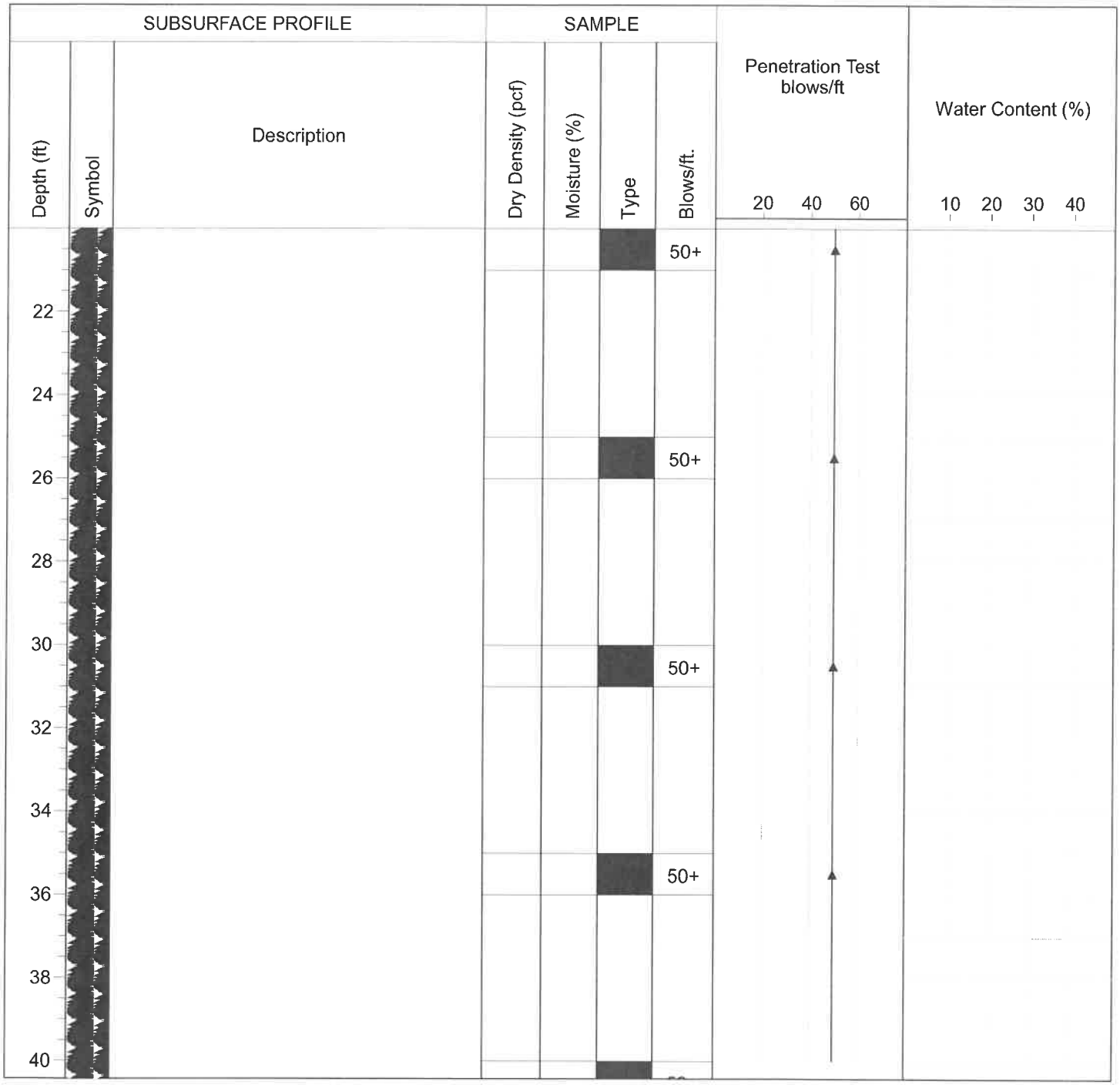
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-16

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-11-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B16

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-16

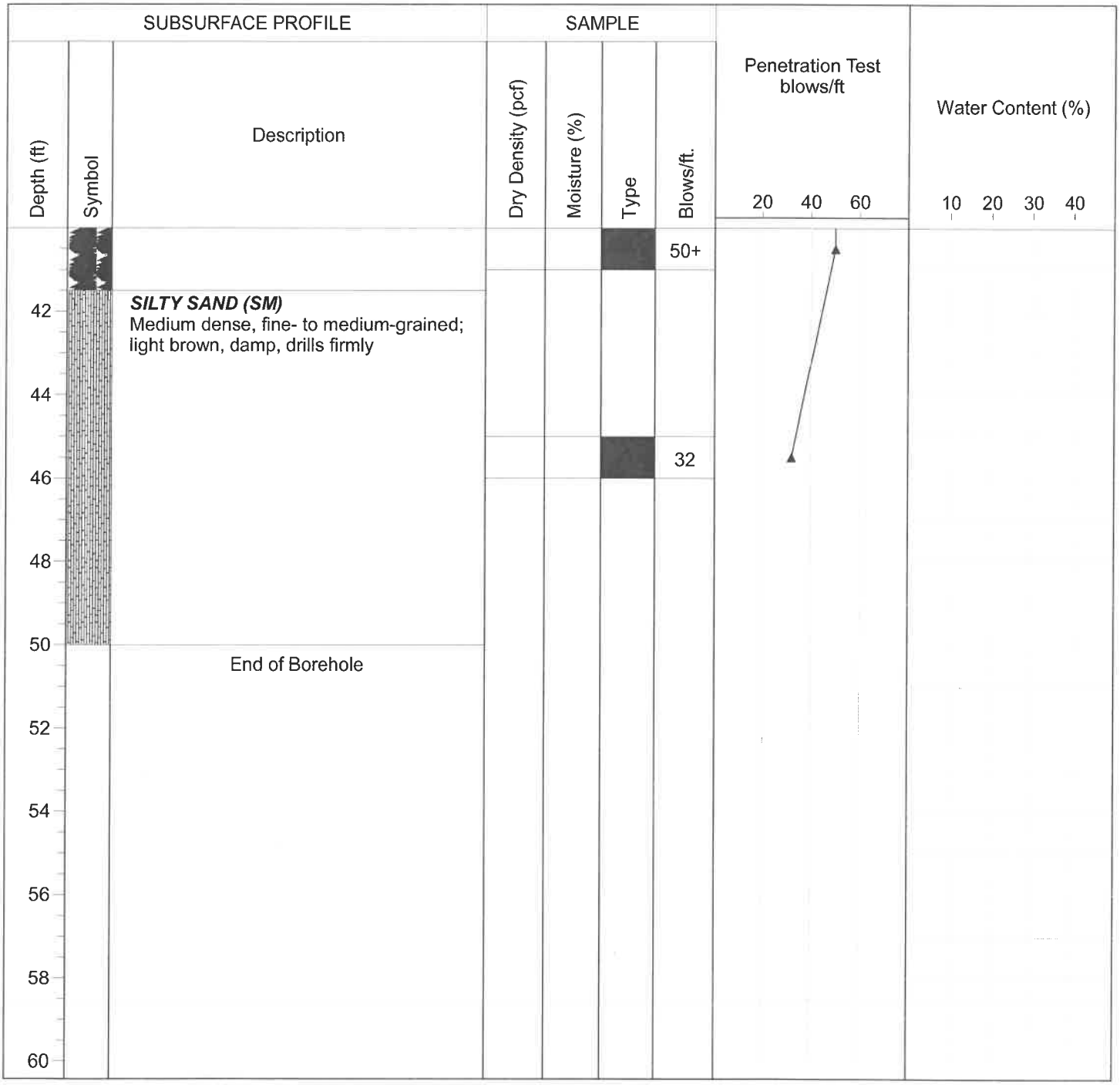
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-11-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 50 Feet

DRAFT

# Log of Boring B17

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-17

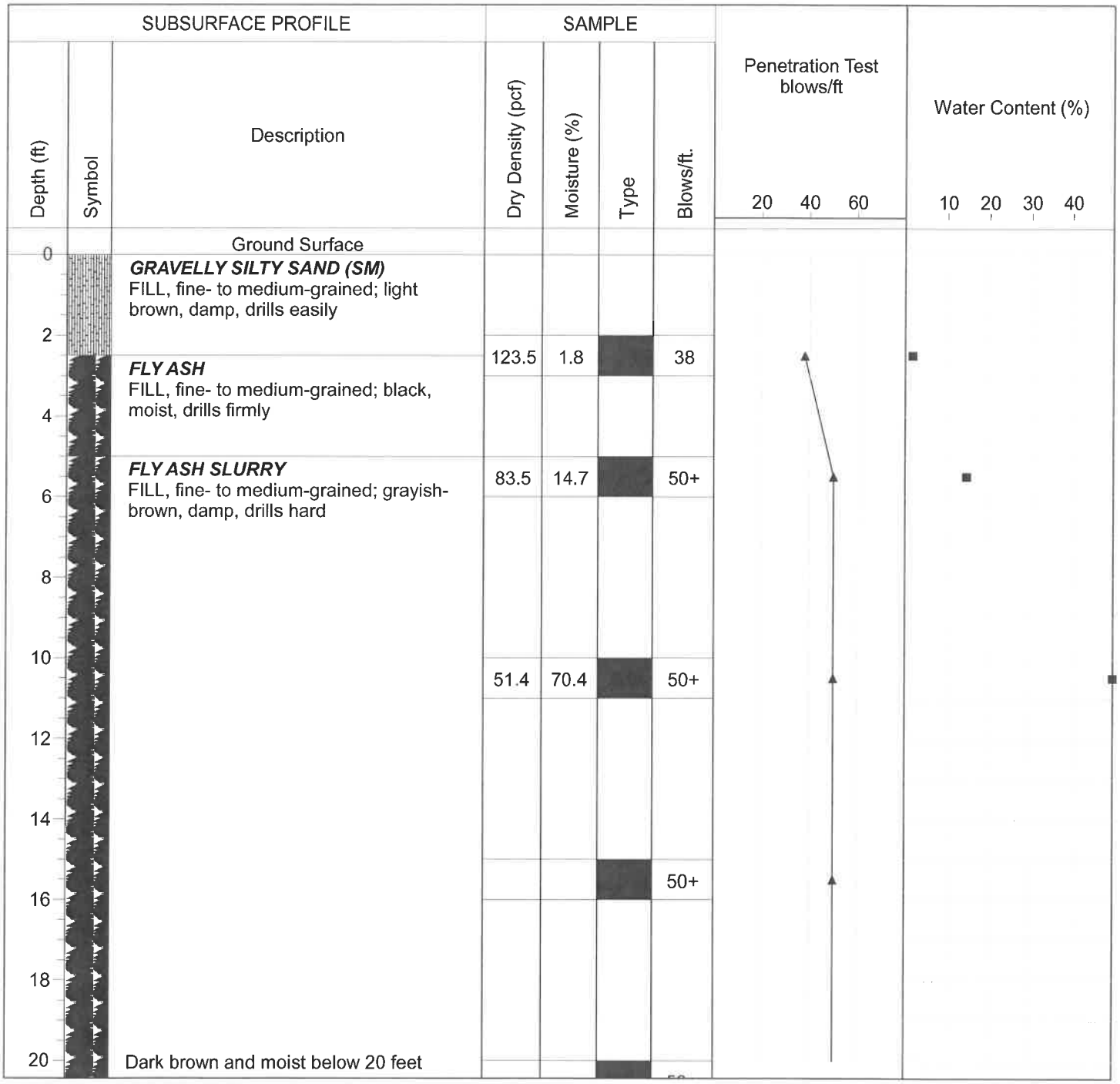
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-11-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 31½ Feet

DRAFT

# Log of Boring B17

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-17

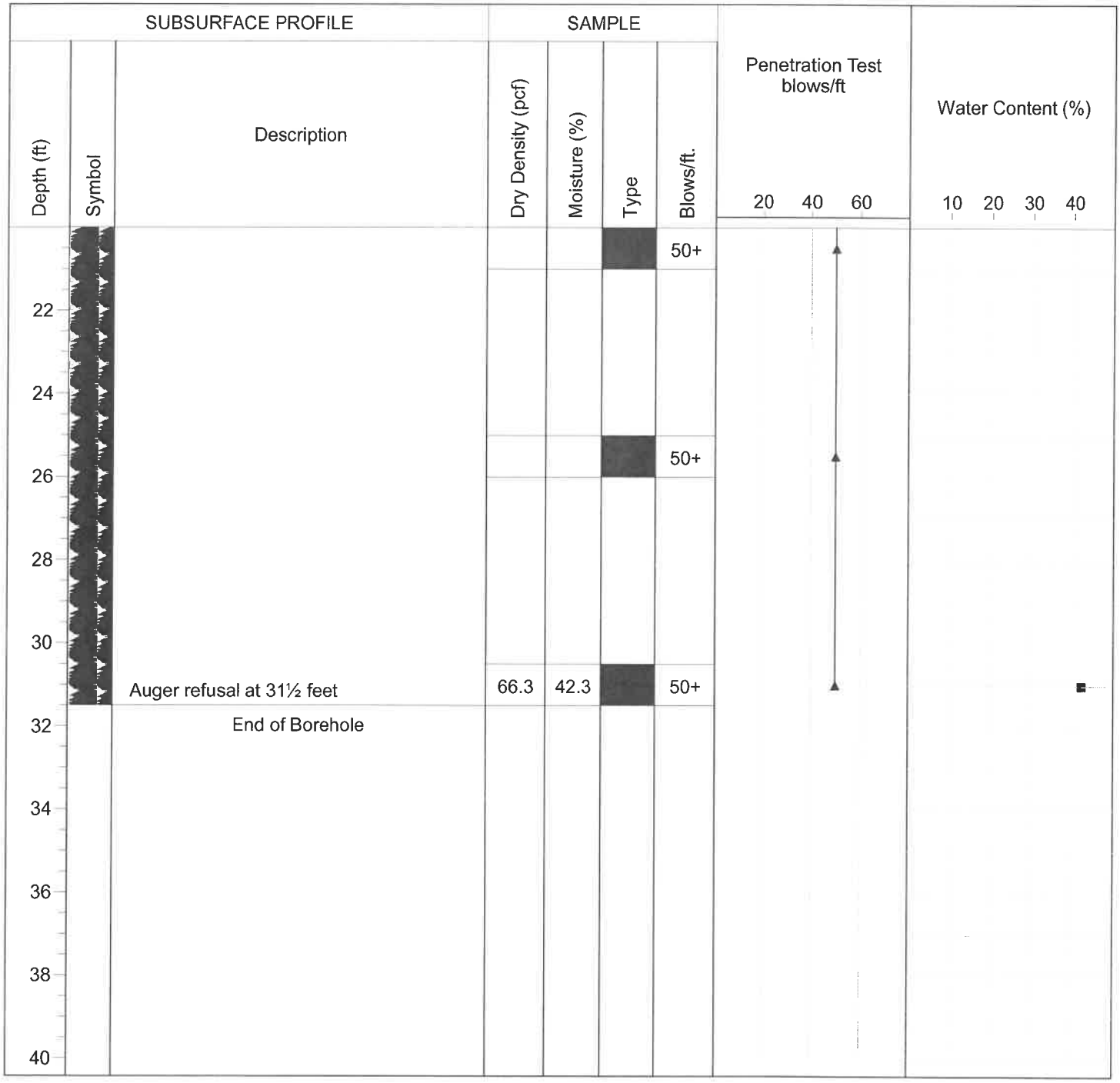
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-11-18

**Hole Size:** 6½ Inches

**Elevation:** 31½ Feet

DRAFT

# Log of Boring B18

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-18

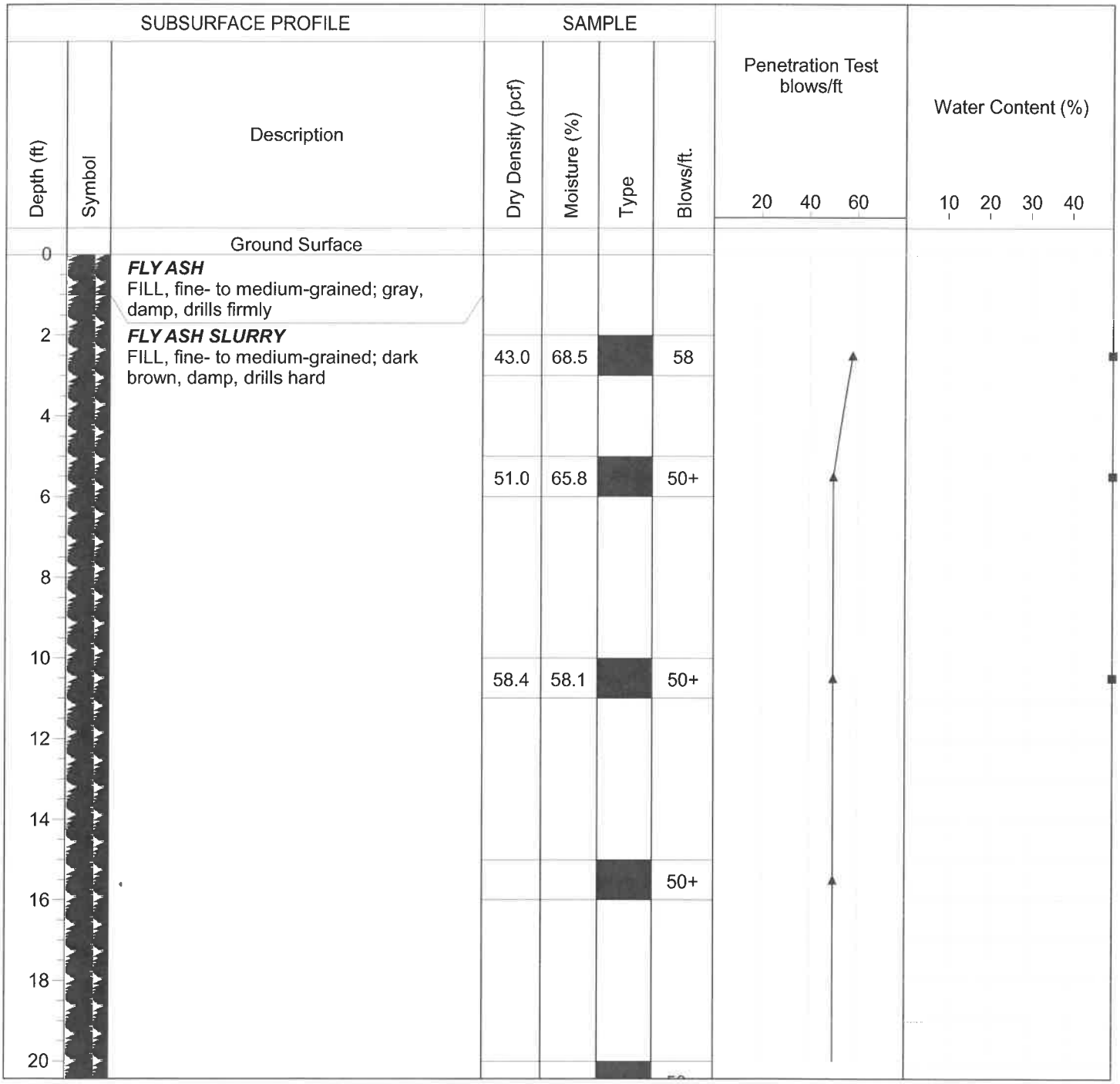
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-11-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 31 Feet

DRAFT

# Log of Boring B18

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

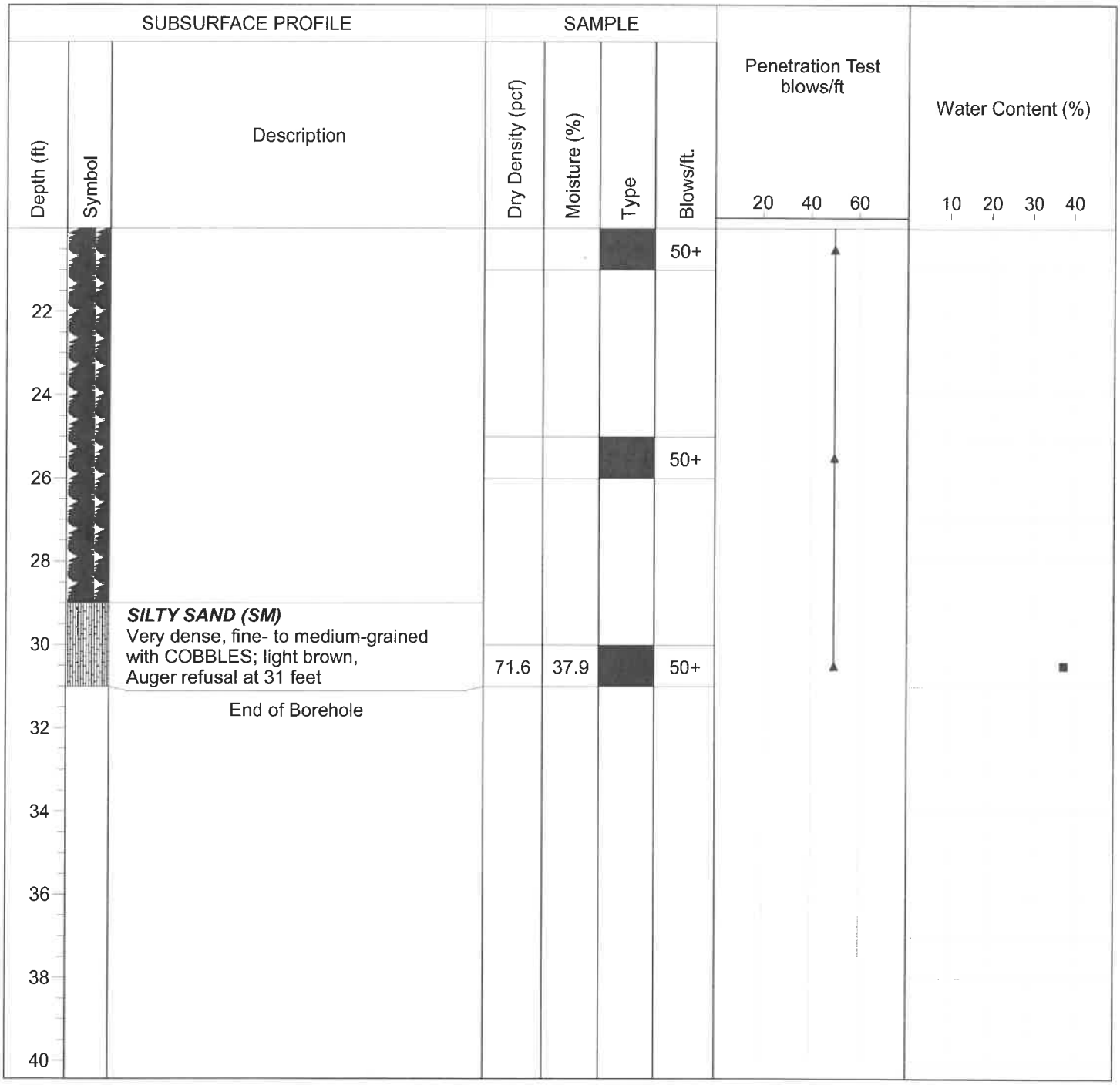
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-18

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-11-18

**Hole Size:** 6½ Inches

**Elevation:** 31 Feet

DRAFT

# Log of Boring B19

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

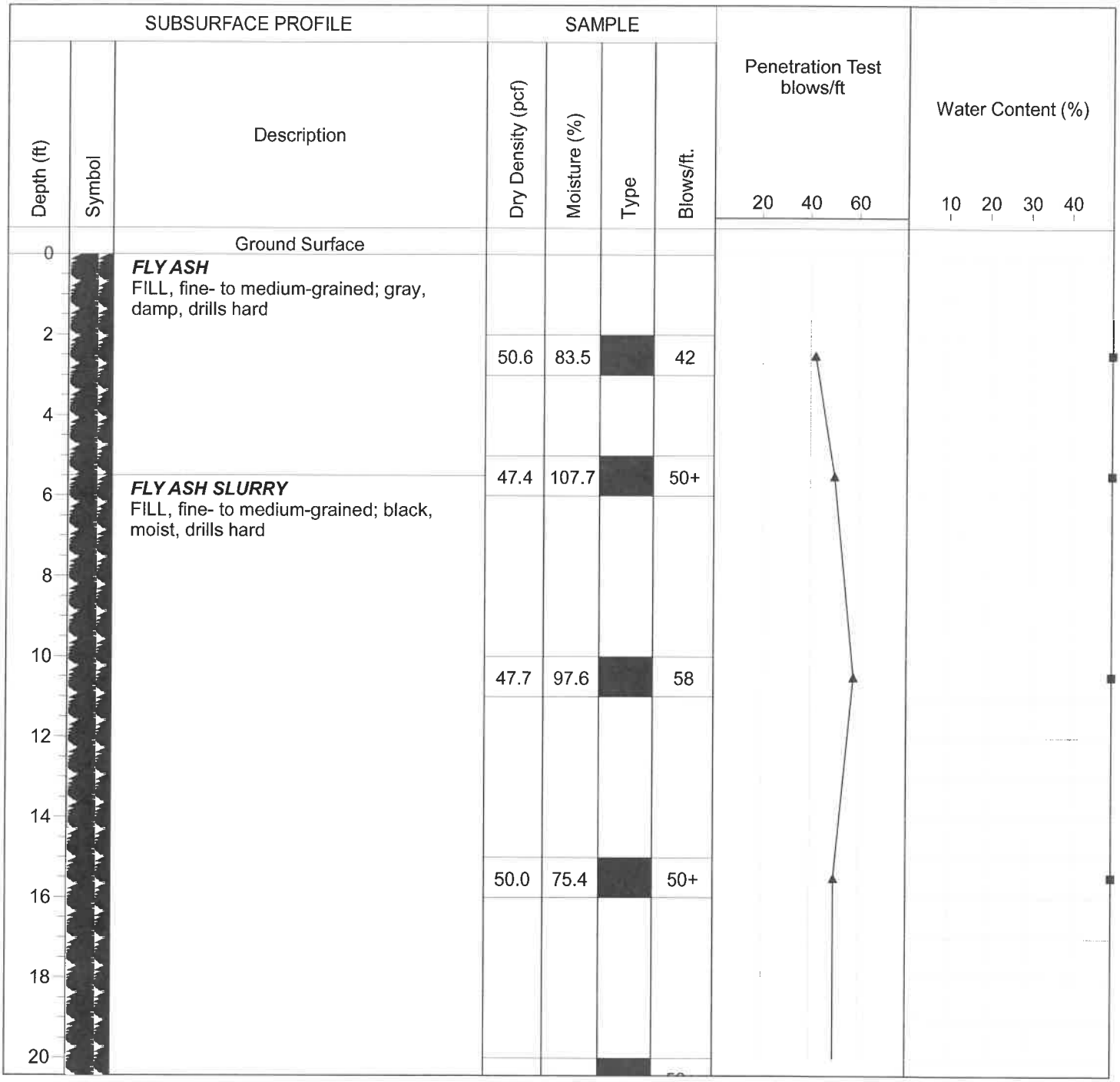
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-19

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-11-18

**Hole Size:** 6½ Inches

**Elevation:** 30 Feet

DRAFT

# Log of Boring B19

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

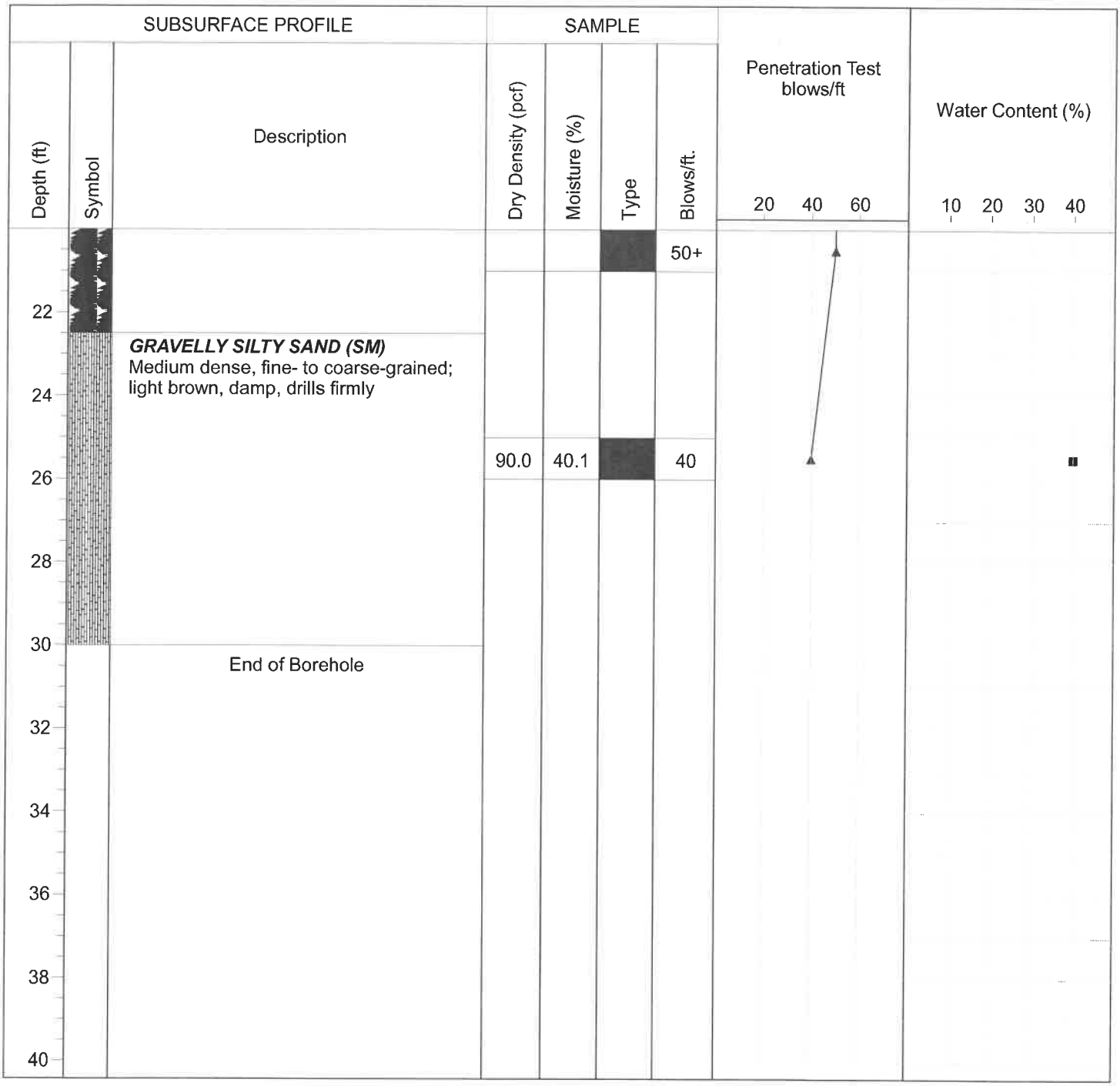
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-19

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-11-18

**Hole Size:** 6½ Inches

**Elevation:** 30 Feet

DRAFT

# Log of Boring B20

**Project:** Lime Plant

**Project No:** 022-18063

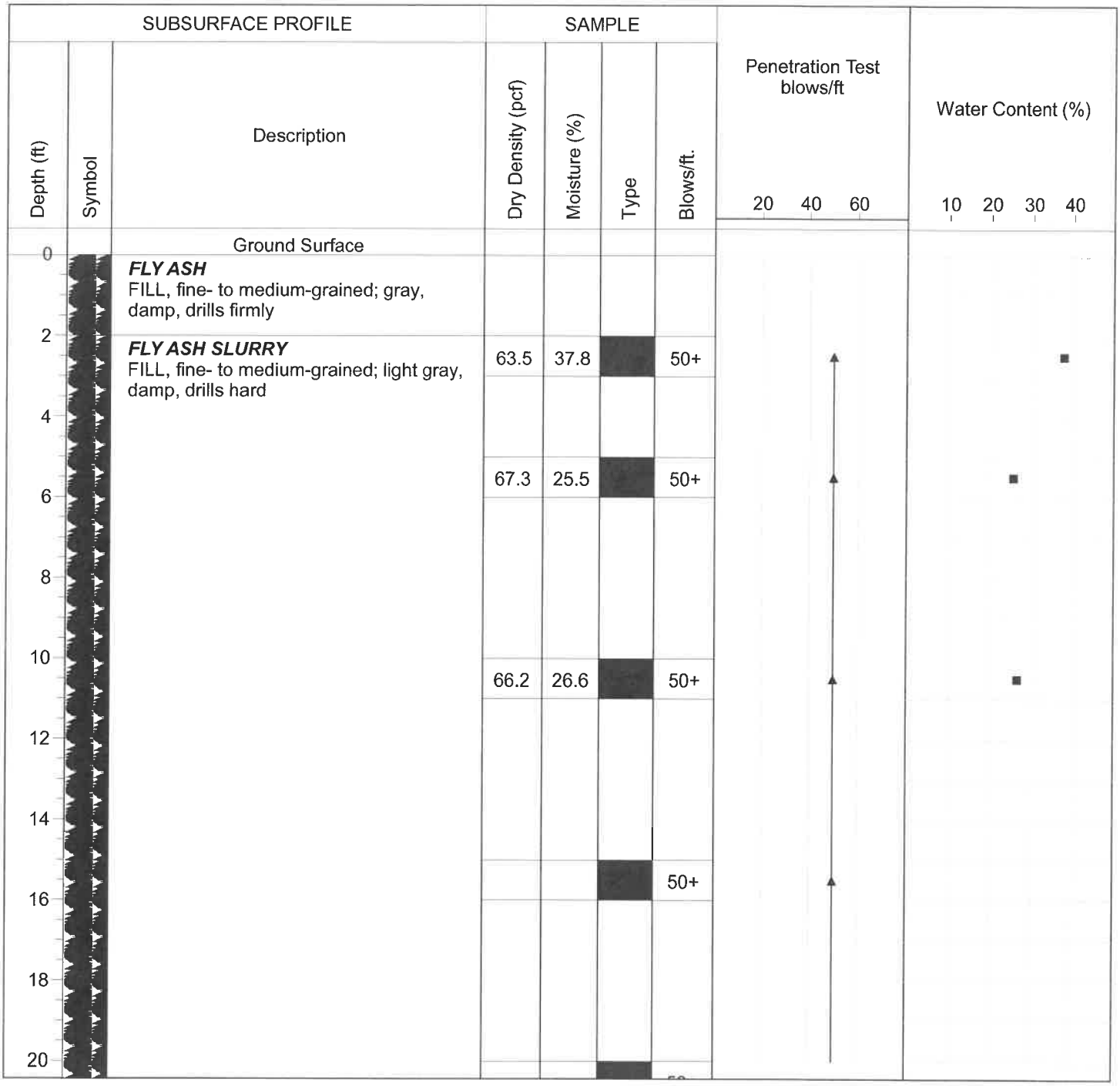
**Client:** PVL Lime

**Figure No.:** A-20

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 21½ Feet

DRAFT

# Log of Boring B20

**Project:** Lime Plant

**Project No:** 022-18063

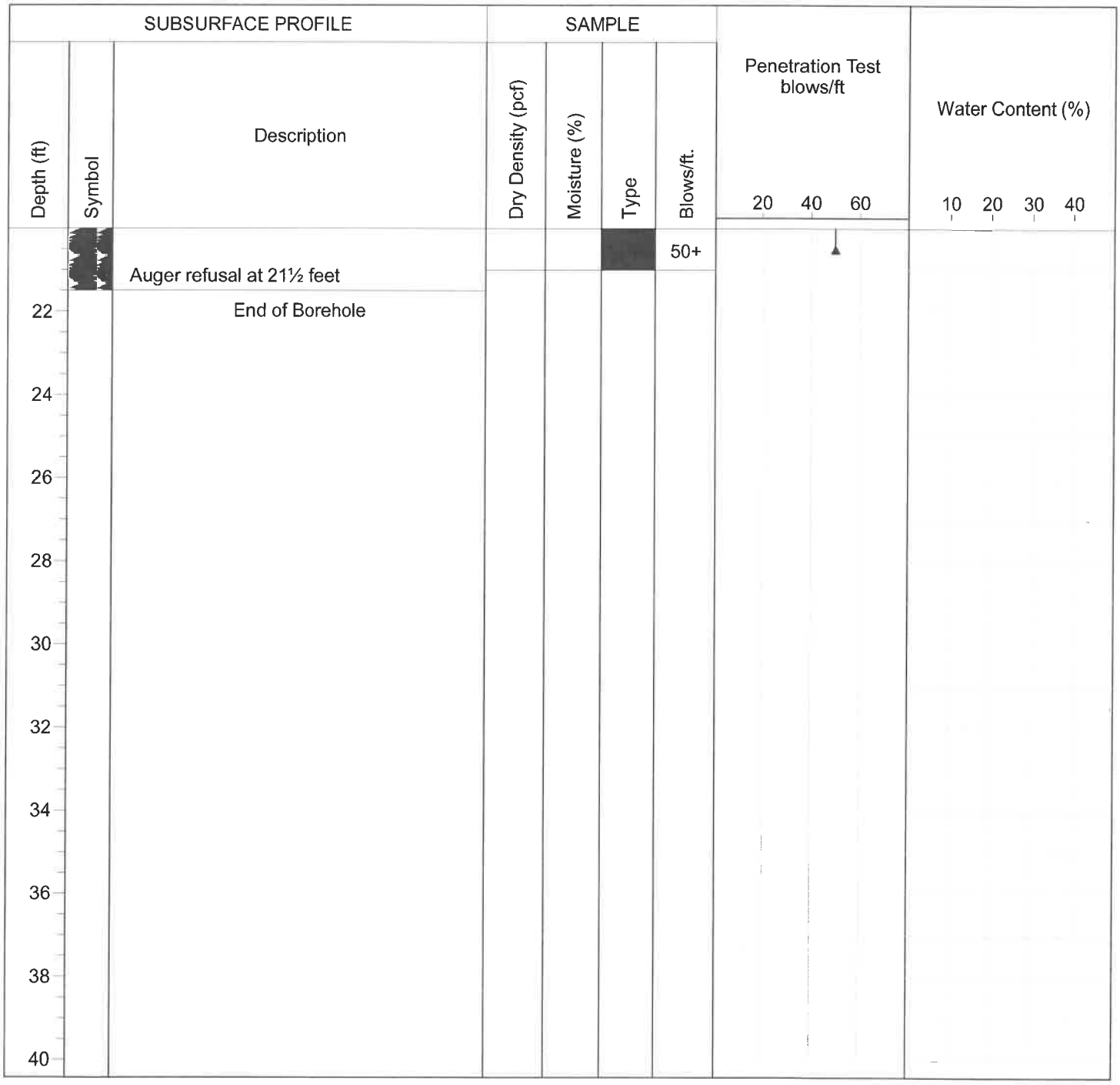
**Client:** PVL Lime

**Figure No.:** A-20

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 21½ Feet

DRAFT

# Log of Boring B21

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-21

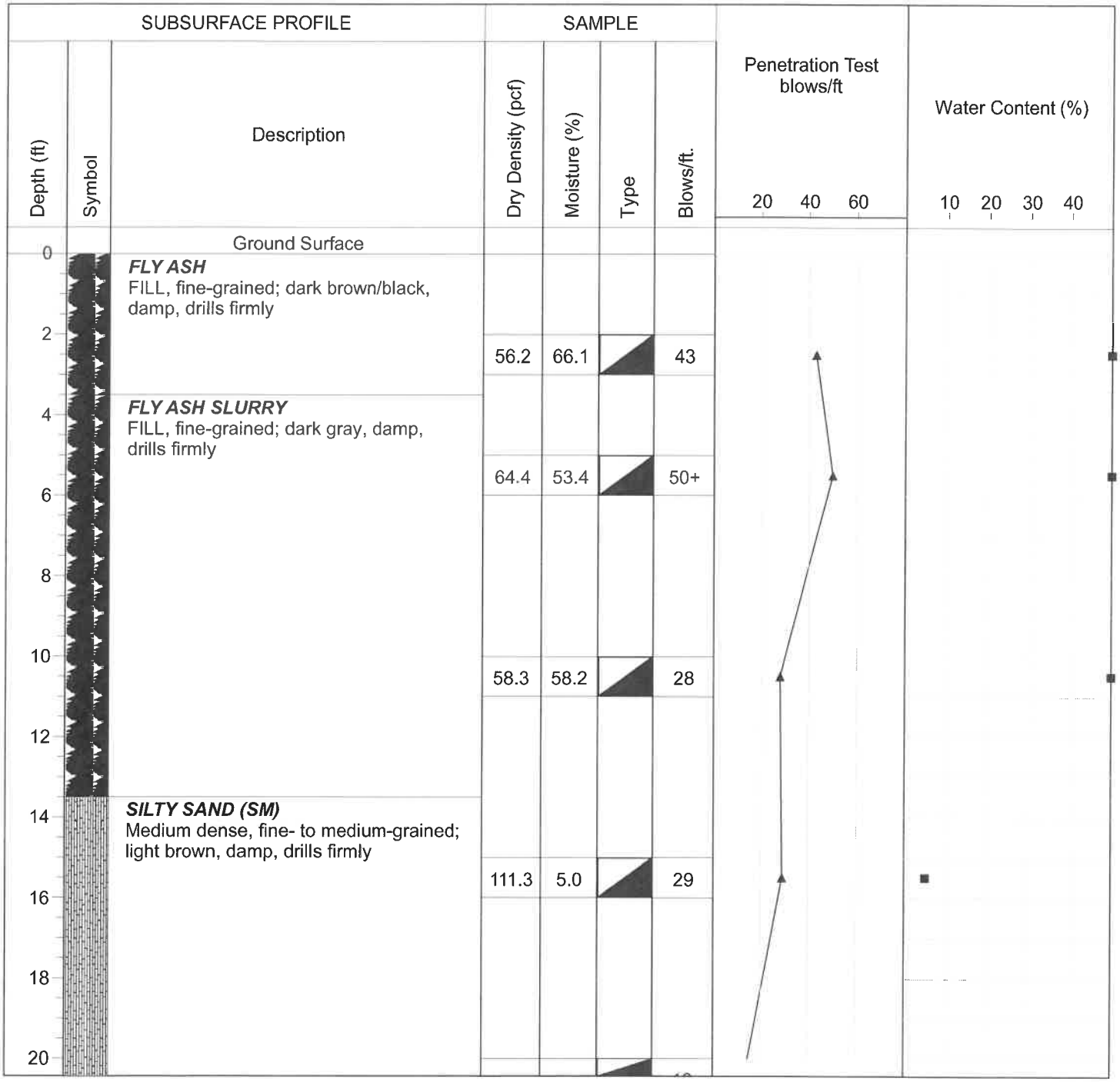
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 25 Feet

DRAFT

# Log of Boring B21

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-21

**Logged By:** R. Alexander

**At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | Penetration Test blows/ft | Water Content (%) |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | 20 40 60 | 10 20 30 40 |
| | | | 110.4 | 2.8 | | 13 | | |
| 22 | | | | | | | | |
| 24 | | Auger refusal at 25 feet | | | | 50+ | | |
| | | End of Borehole | | | | | | |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |
| 32 | | | | | | | | |
| 34 | | | | | | | | |
| 36 | | | | | | | | |
| 38 | | | | | | | | |
| 40 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 25 Feet

**Sheet:** 2 of 2

DRAFT

# Log of Boring B22

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-22

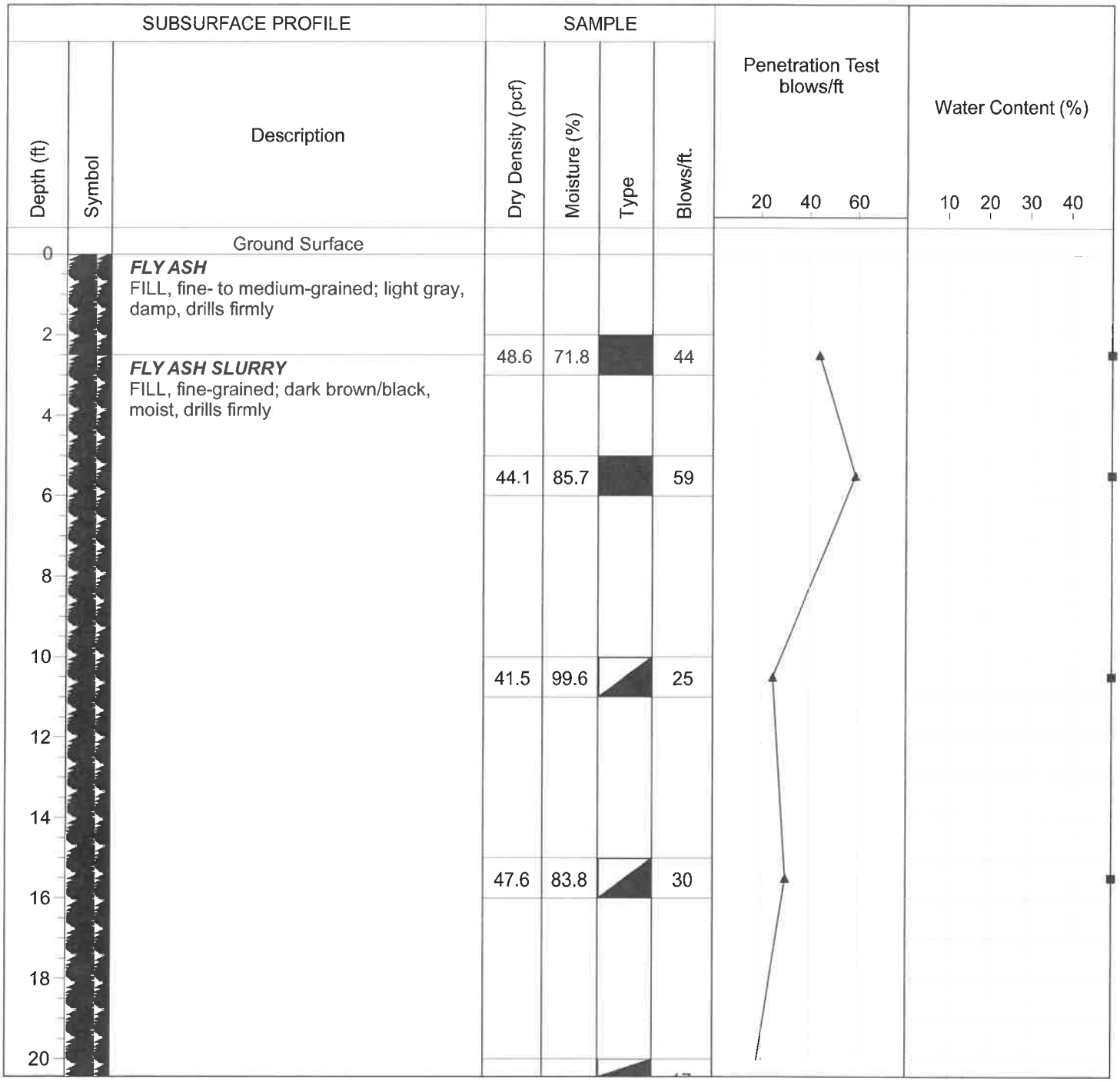
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 50 Feet

DRAFT

# Log of Boring B22

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-22

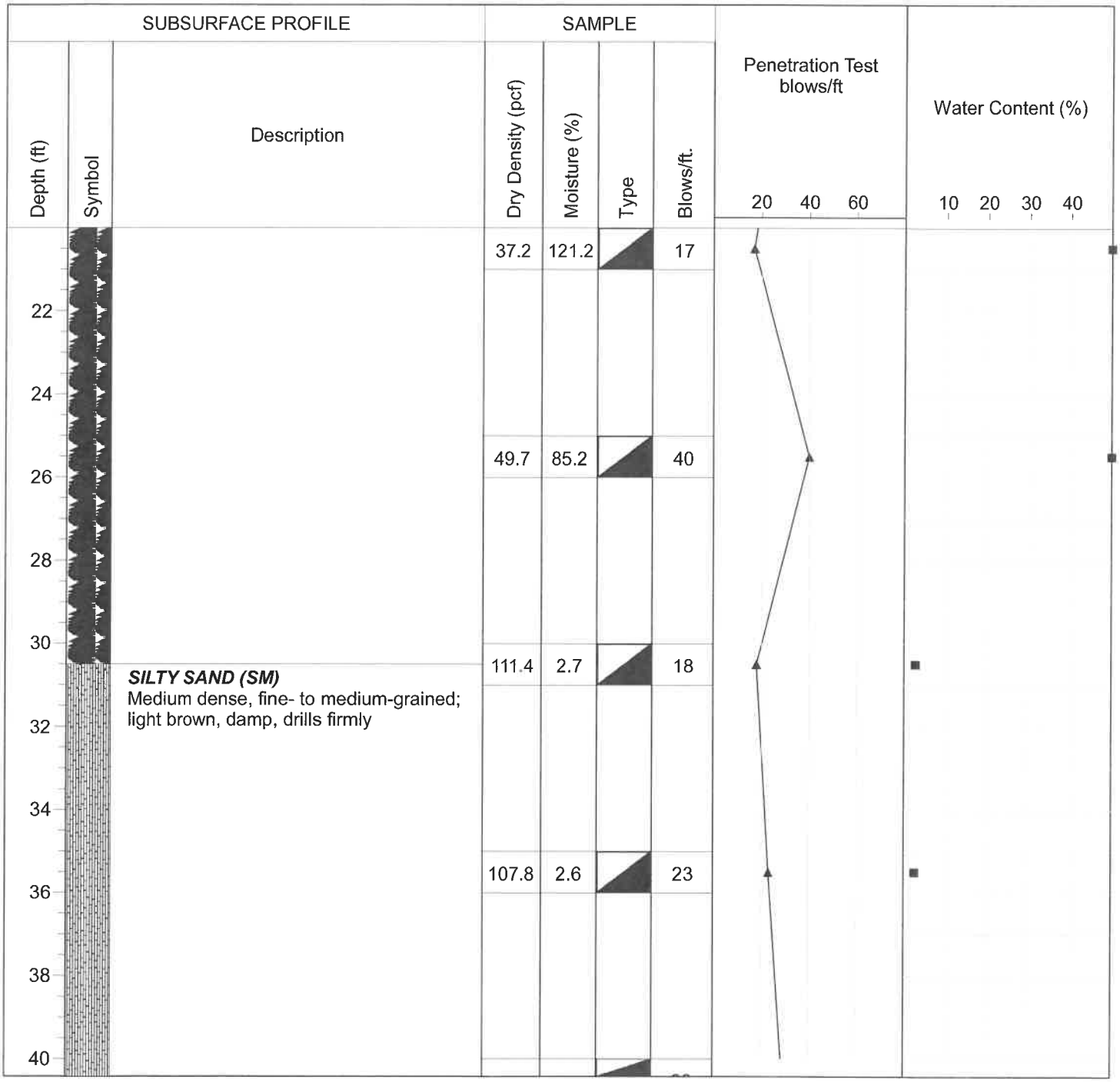
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 50 Feet

DRAFT

# Log of Boring B22

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-22

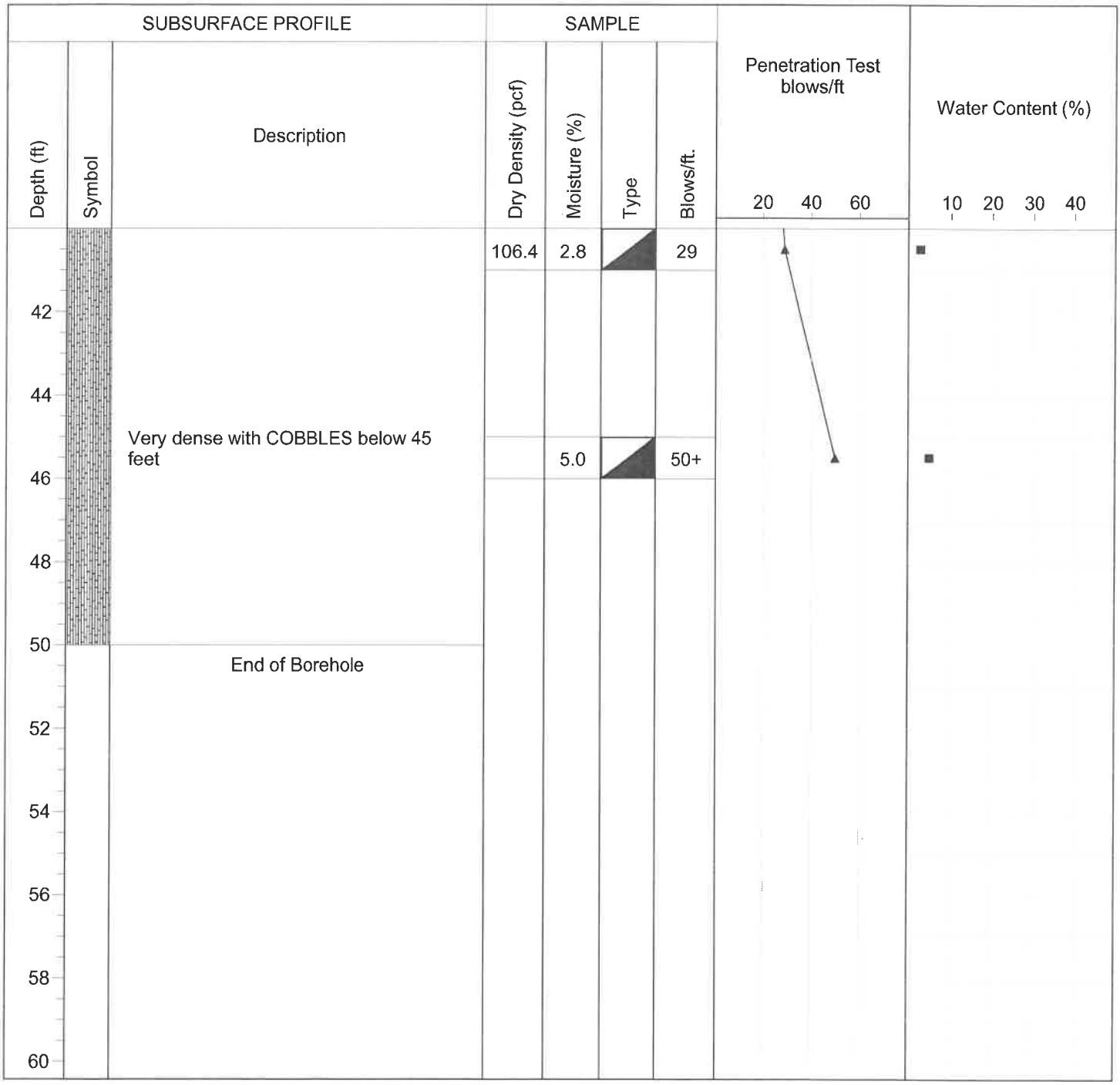
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B23

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-23

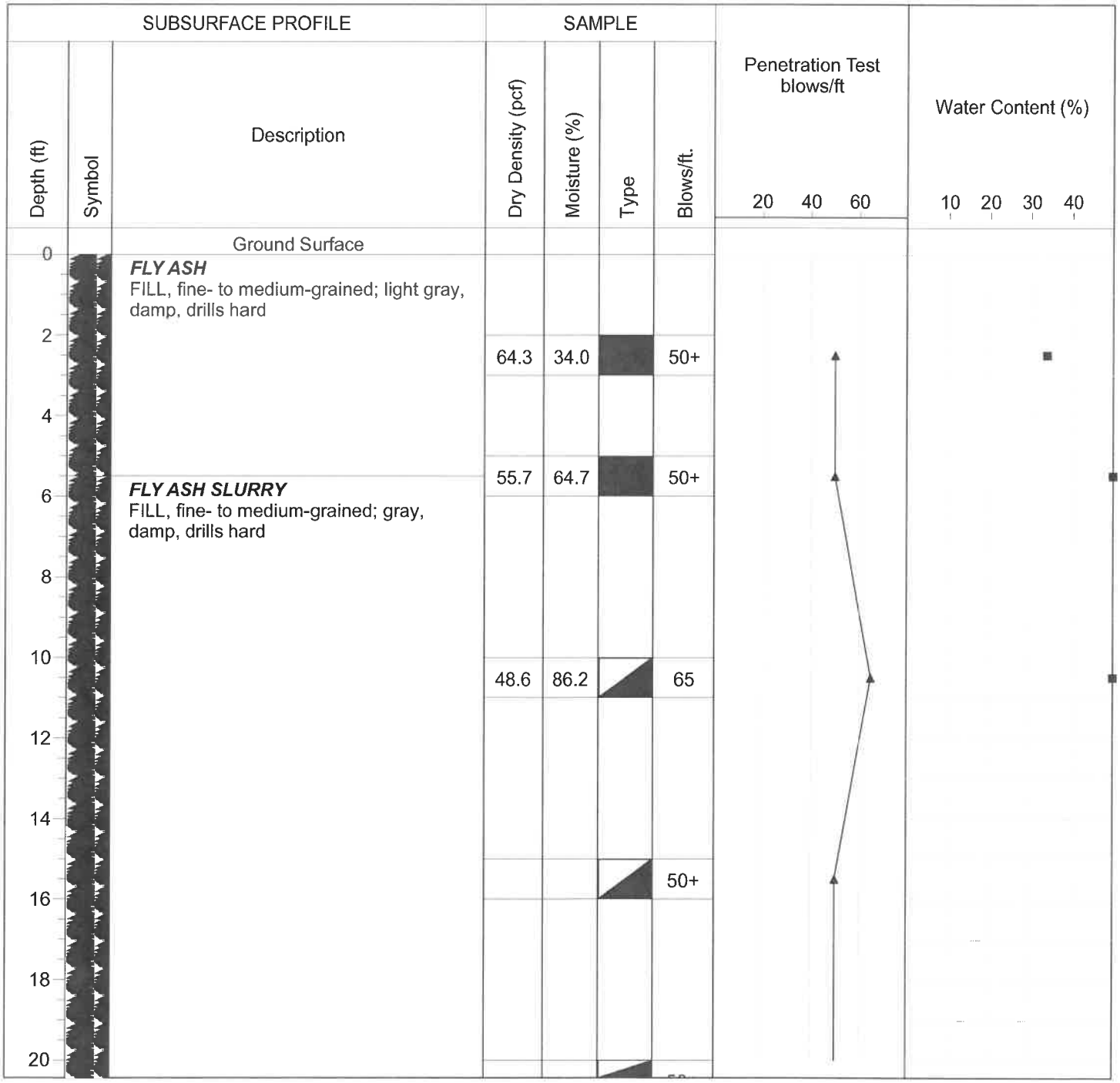
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B23

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-23

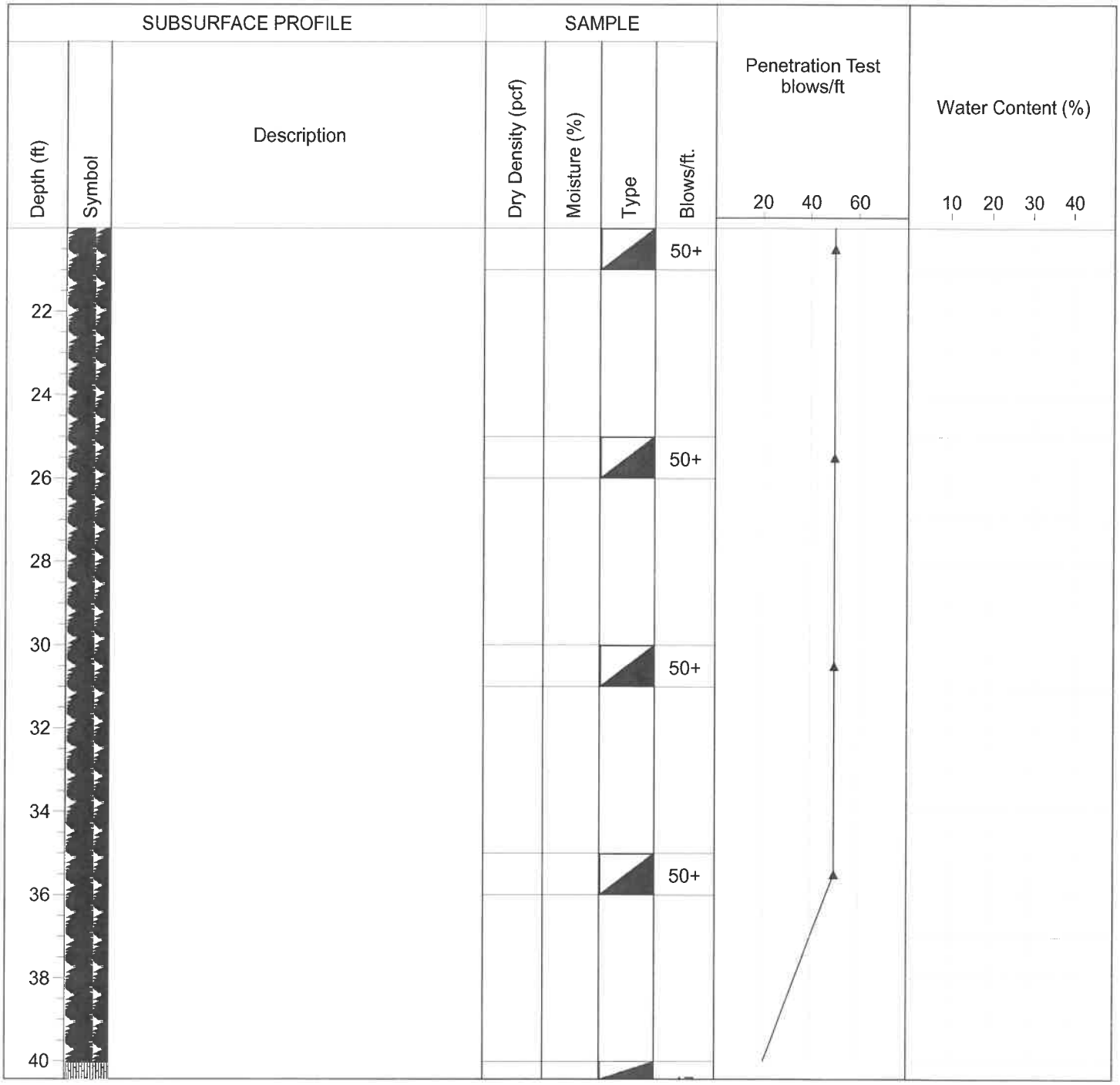
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

DRAFT

# Log of Boring B23

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-23

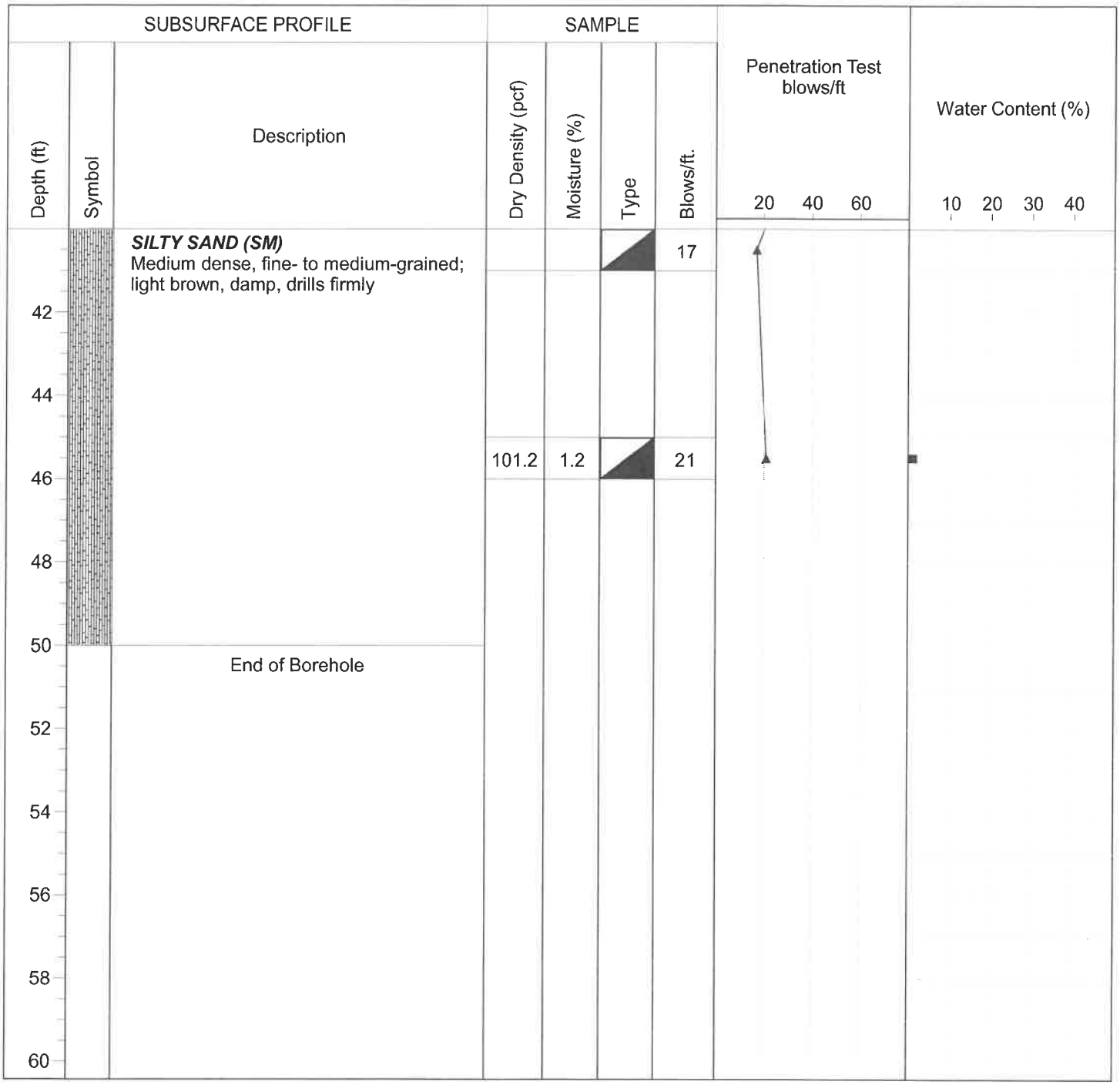
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 50 Feet

**Sheet:** 3 of 3

DRAFT

# Log of Boring B24

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-24

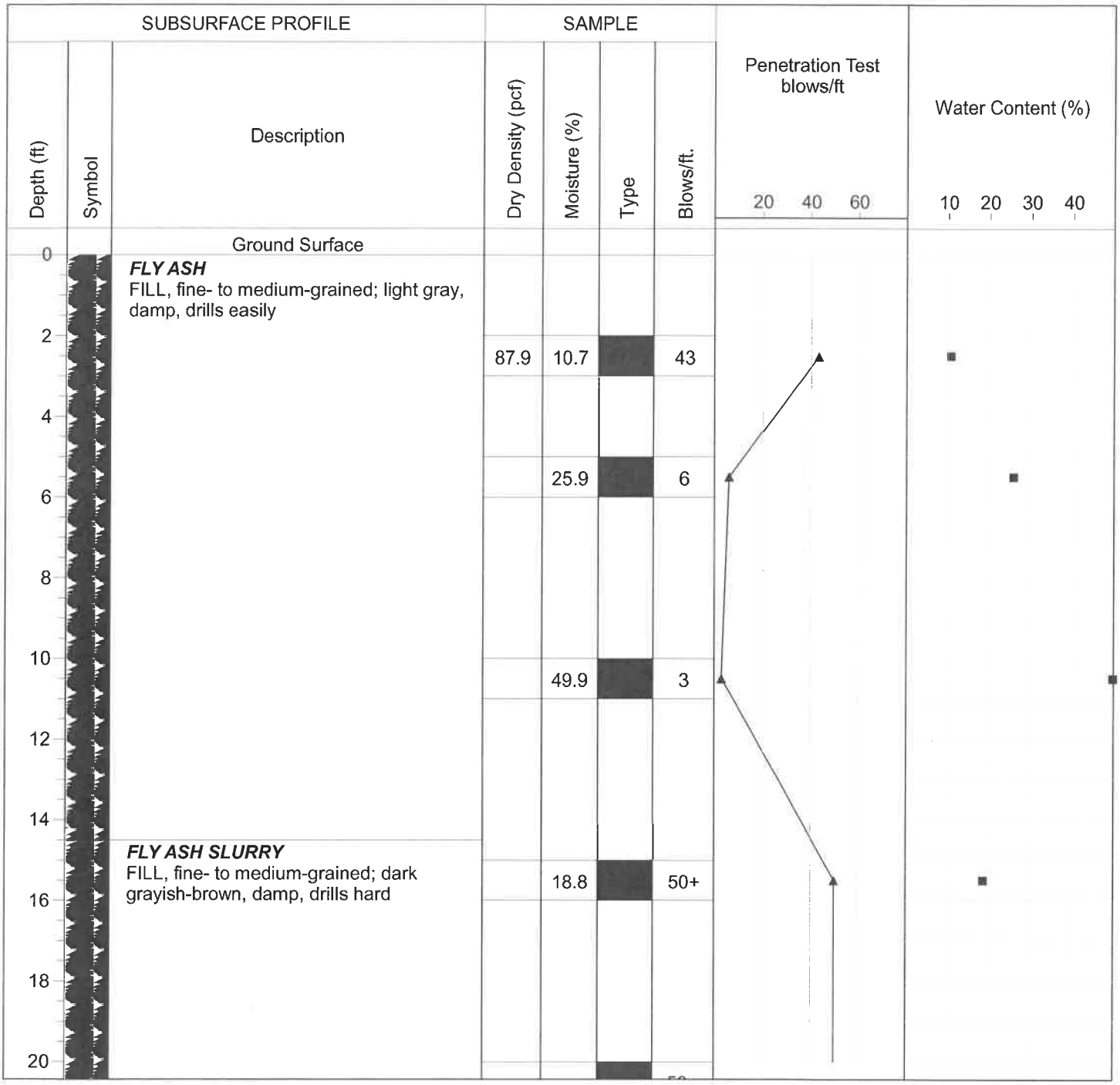
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-19-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 40 Feet

DRAFT

# Log of Boring B24

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-24

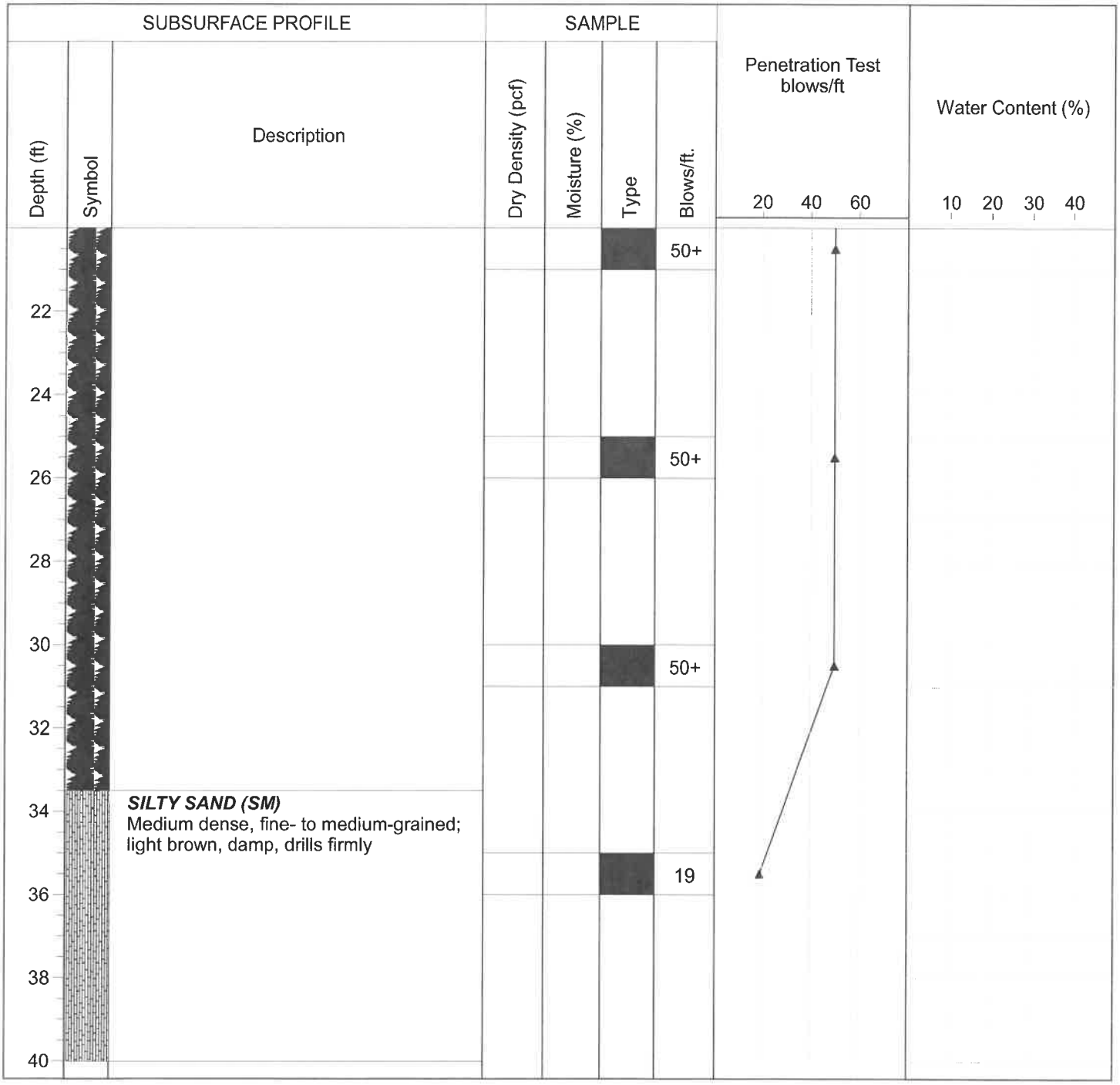
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-19-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 40 Feet

DRAFT

# Log of Boring B25

**Project:** Lime Plant

**Project No:** 022-18063

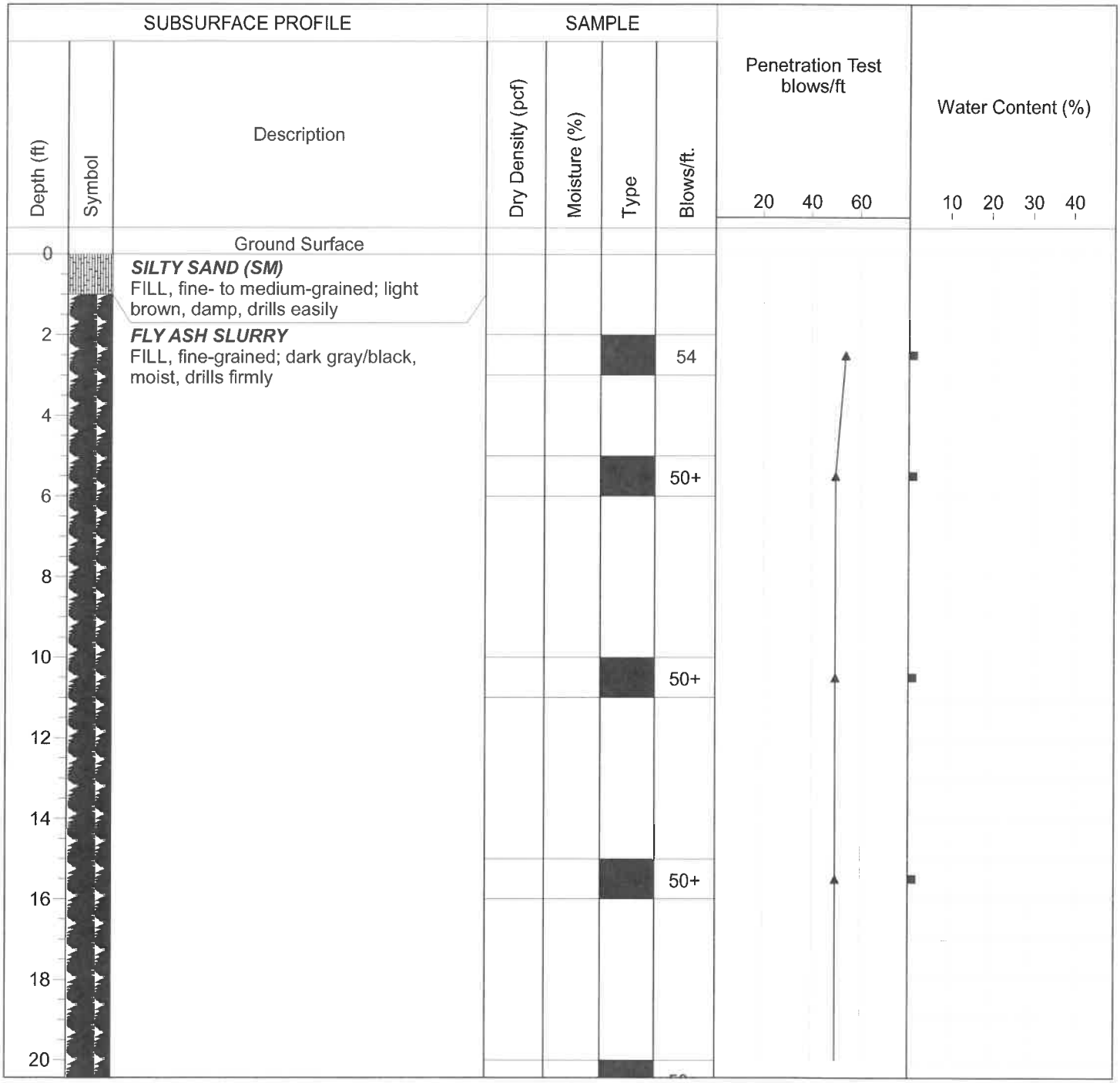
**Client:** PVL Lime

**Figure No.:** A-25

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-12-18

**Hole Size:** 6½ Inches

**Elevation:** 28½ Feet

DRAFT

# Log of Boring B25

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-25

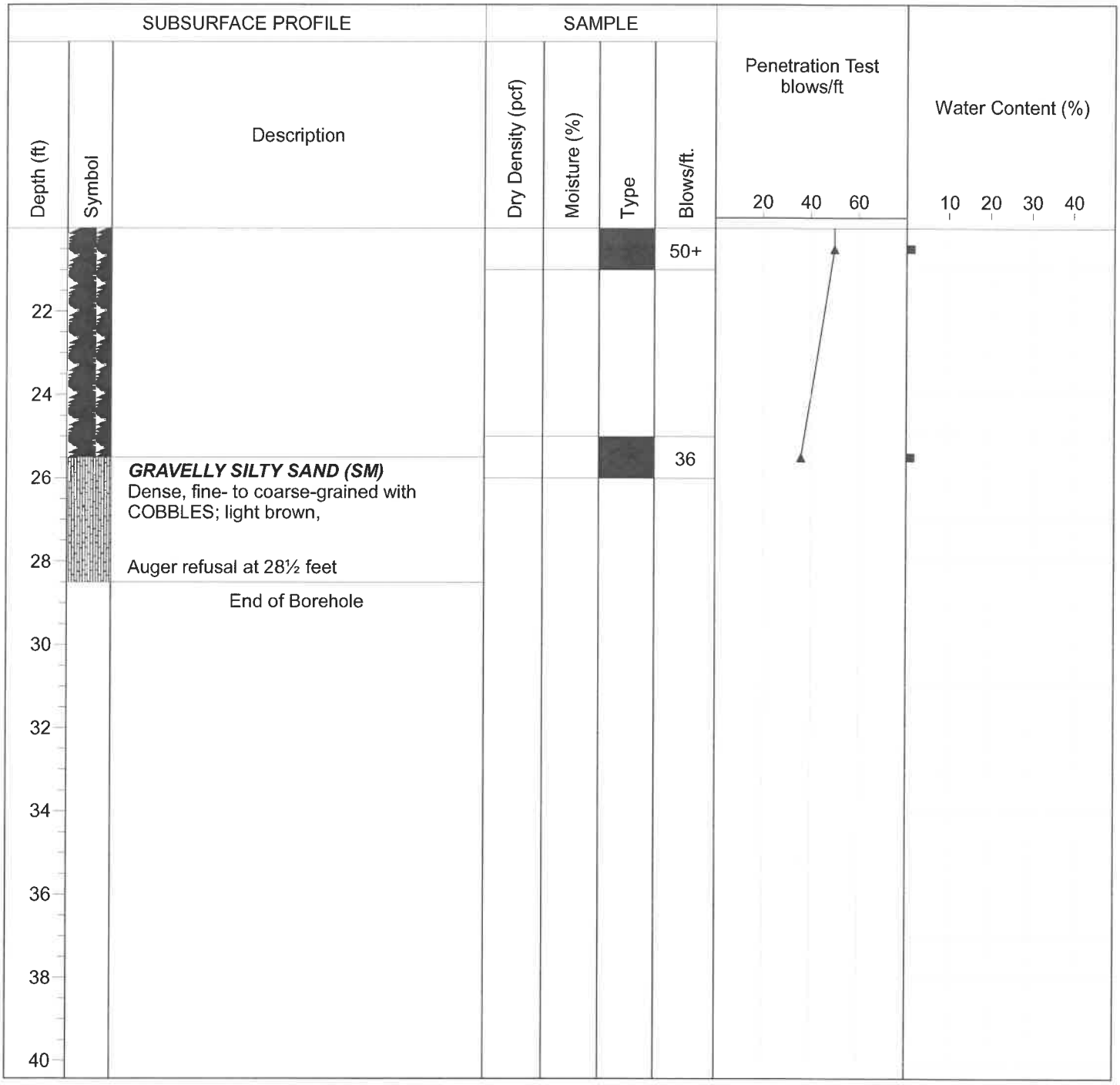
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-12-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 28½ Feet

DRAFT

# Log of Boring B26

**Project:** Lime Plant

**Project No:** 022-18063

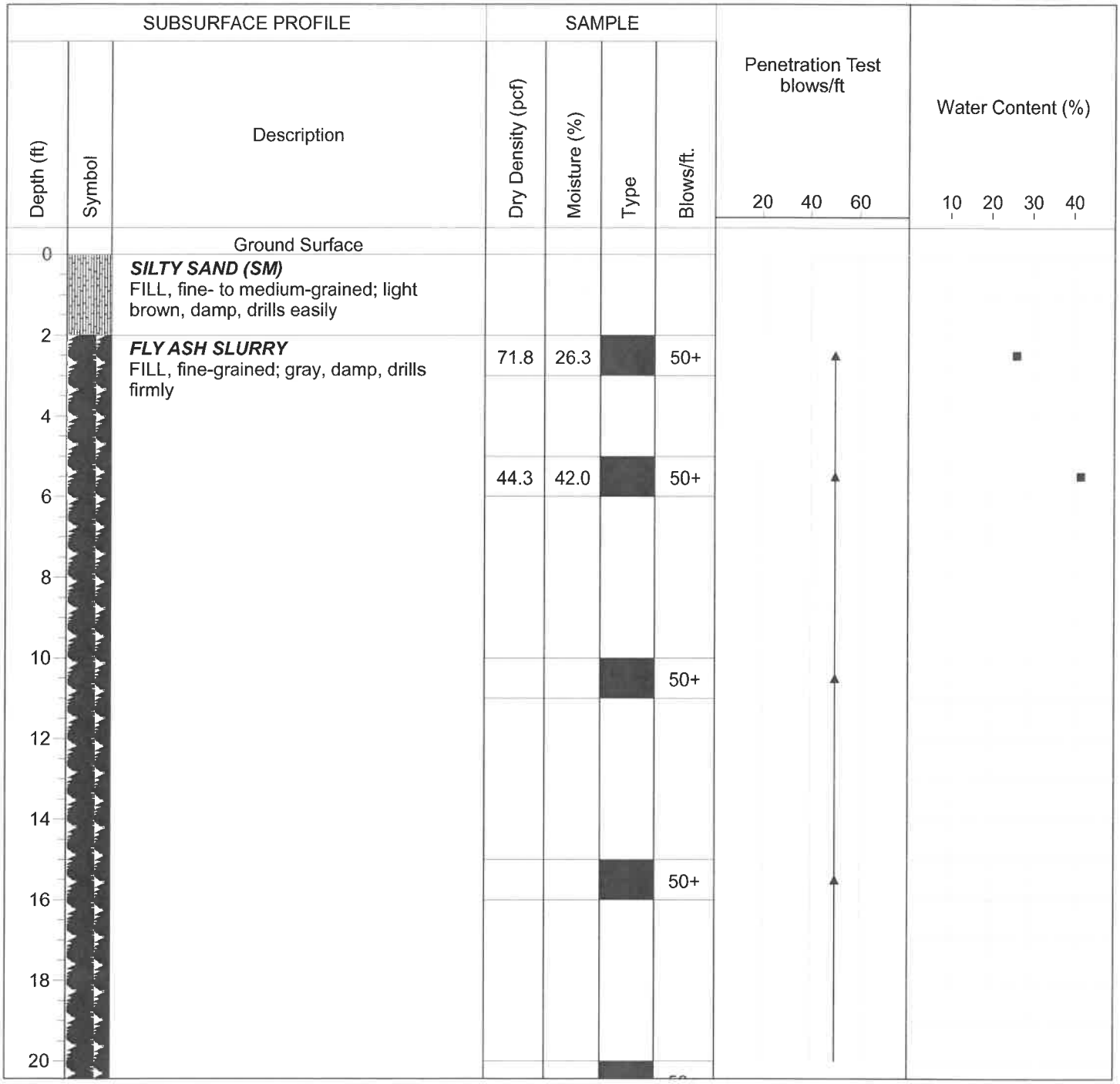
**Client:** PVL Lime

**Figure No.:** A-26

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-17-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 24 Feet

DRAFT

# Log of Boring B26

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-26

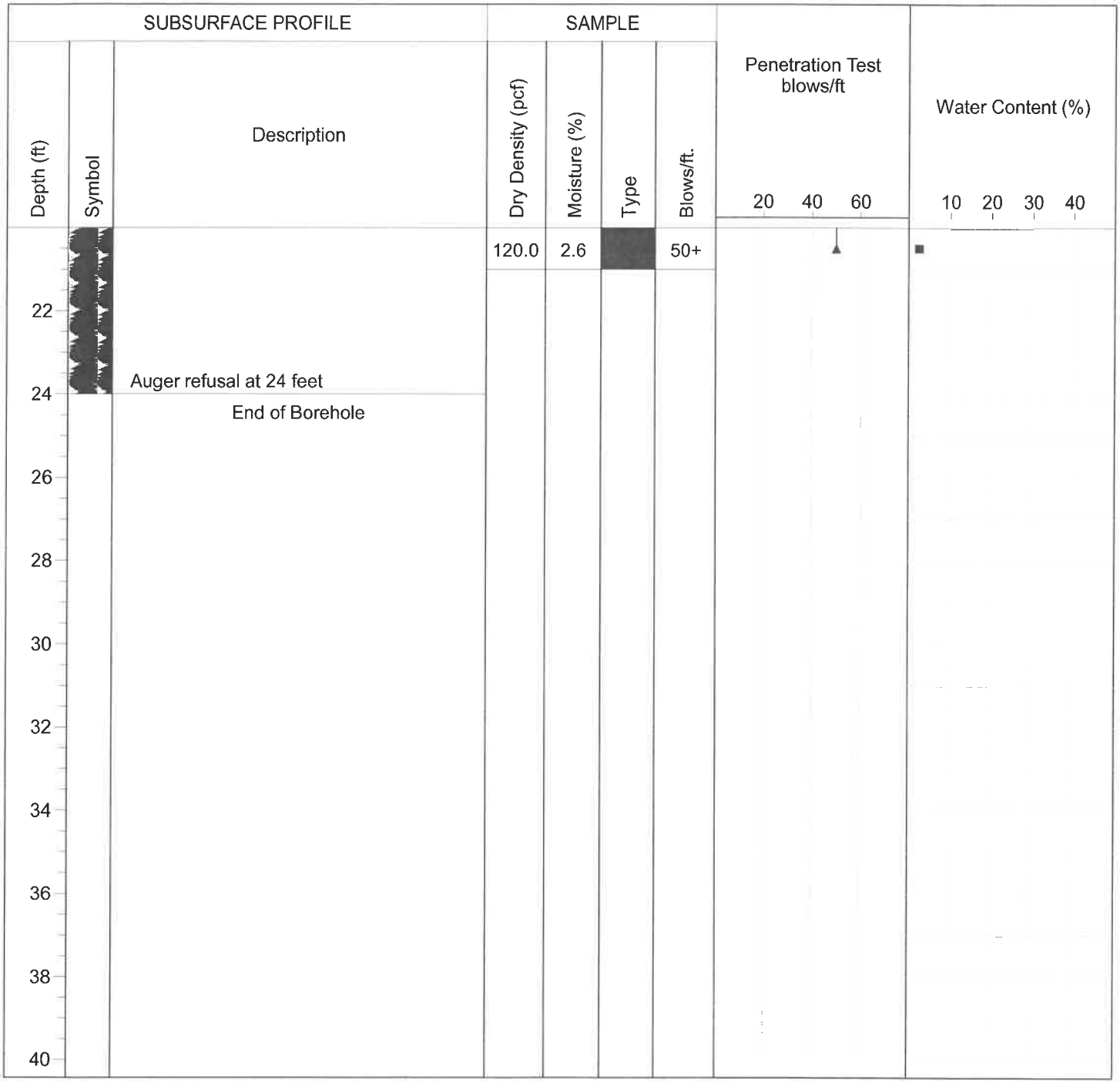
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-17-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 24 Feet

DRAFT

# Log of Boring B27

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-27

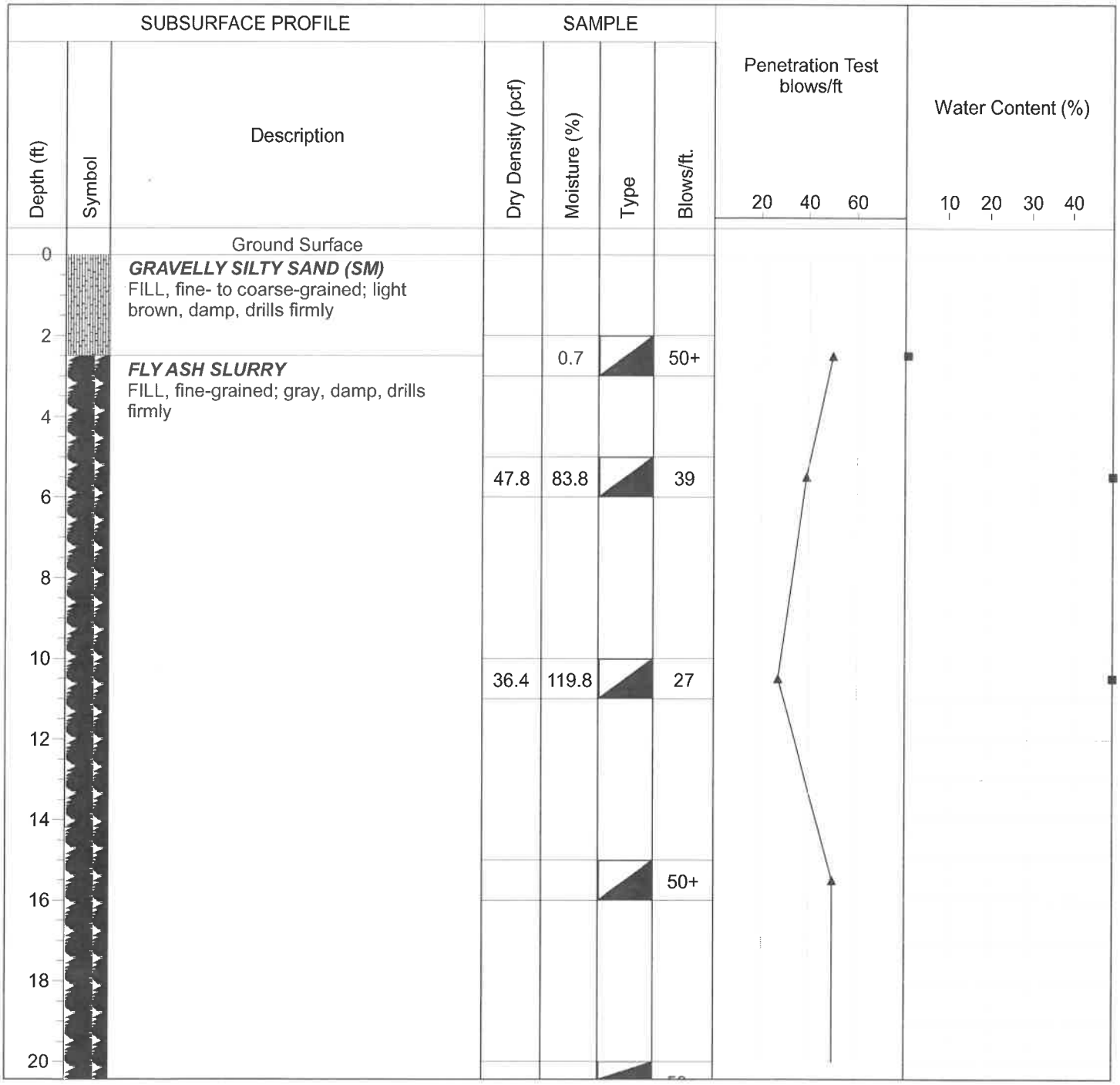
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-17-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 36 Feet

DRAFT

# Log of Boring B27

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-27

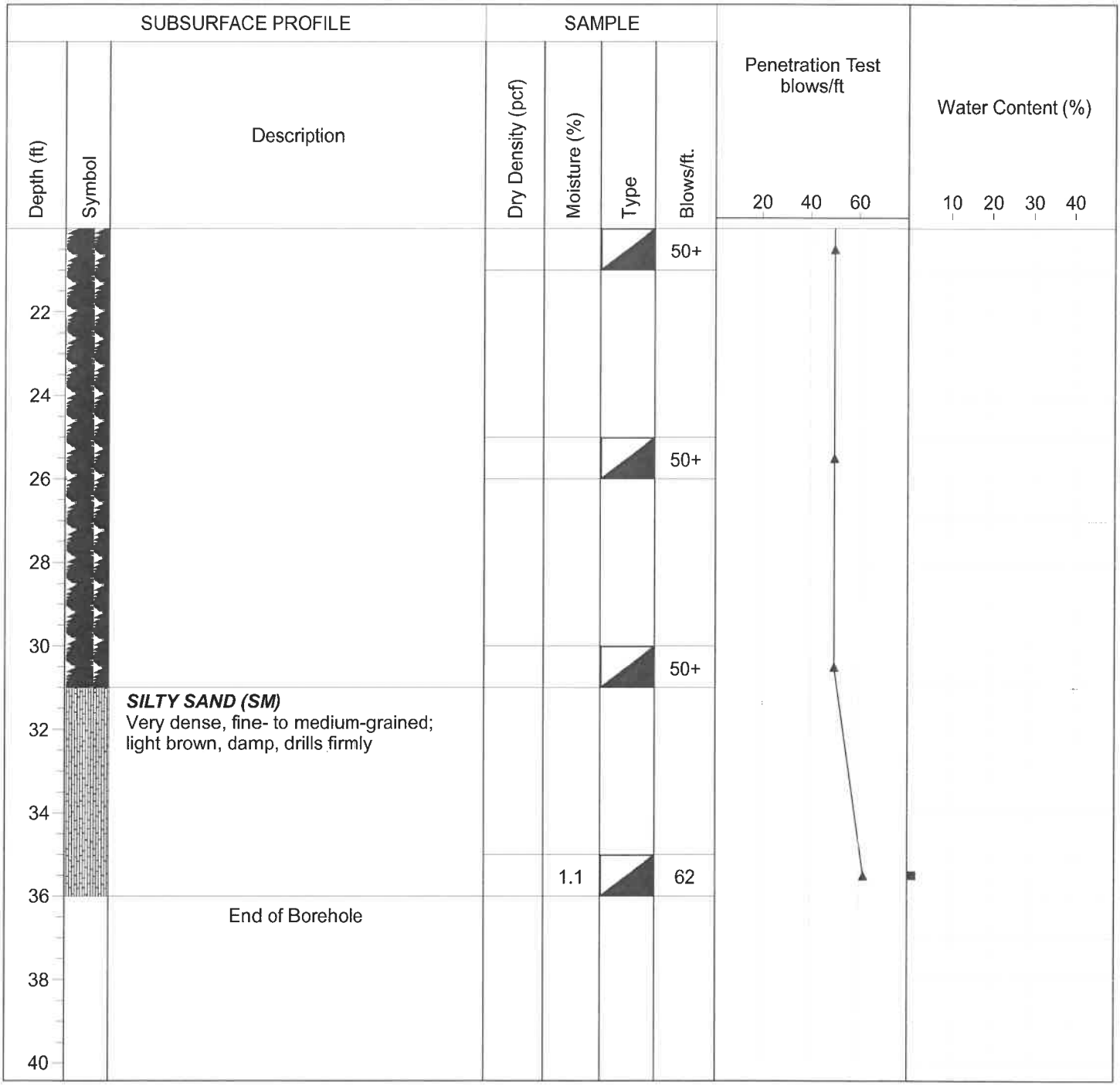
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-17-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 36 Feet

**Sheet:** 2 of 2

DRAFT

# Log of Boring B28

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-28

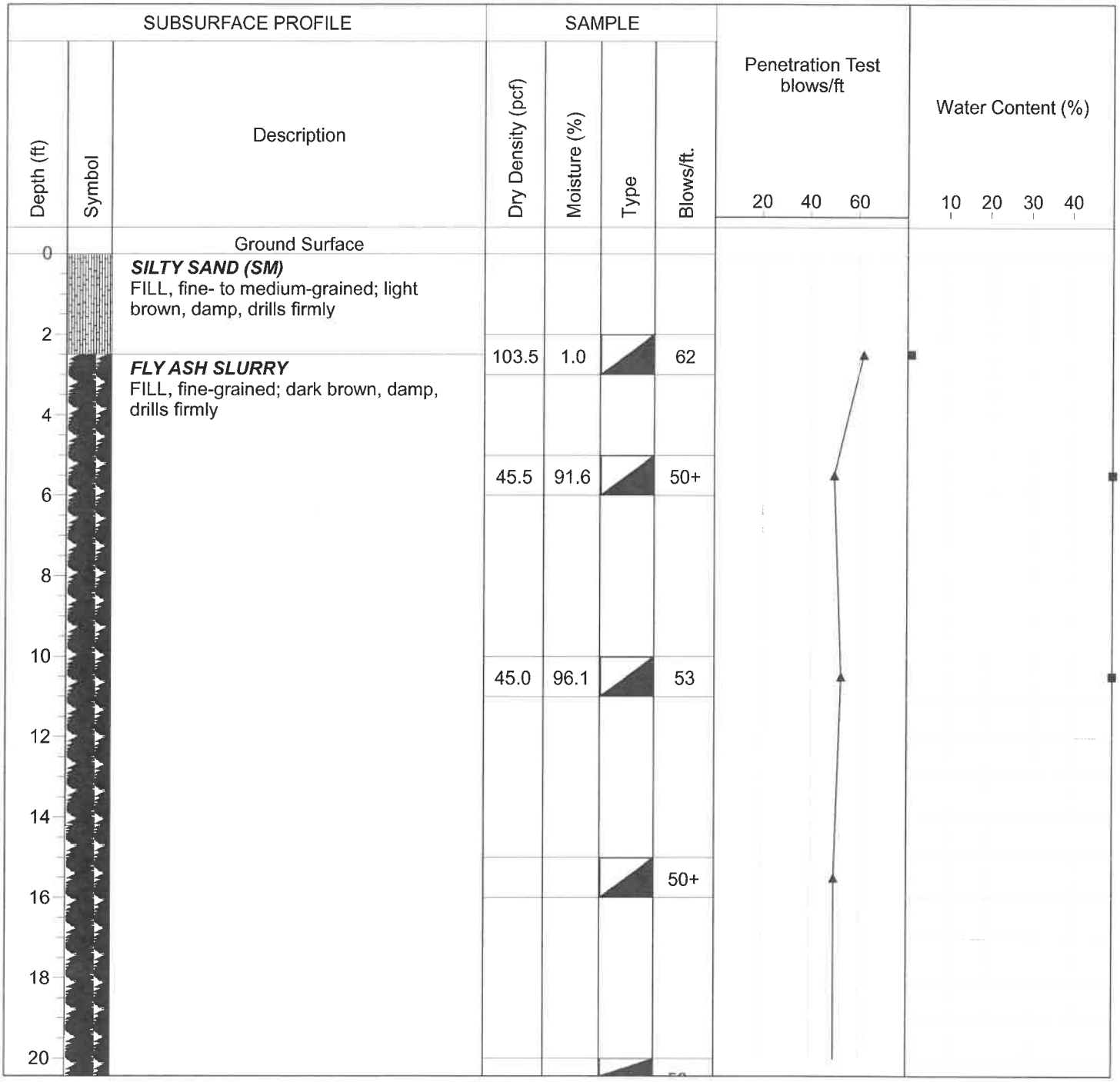
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 28 Feet

DRAFT

# Log of Boring B28

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-28

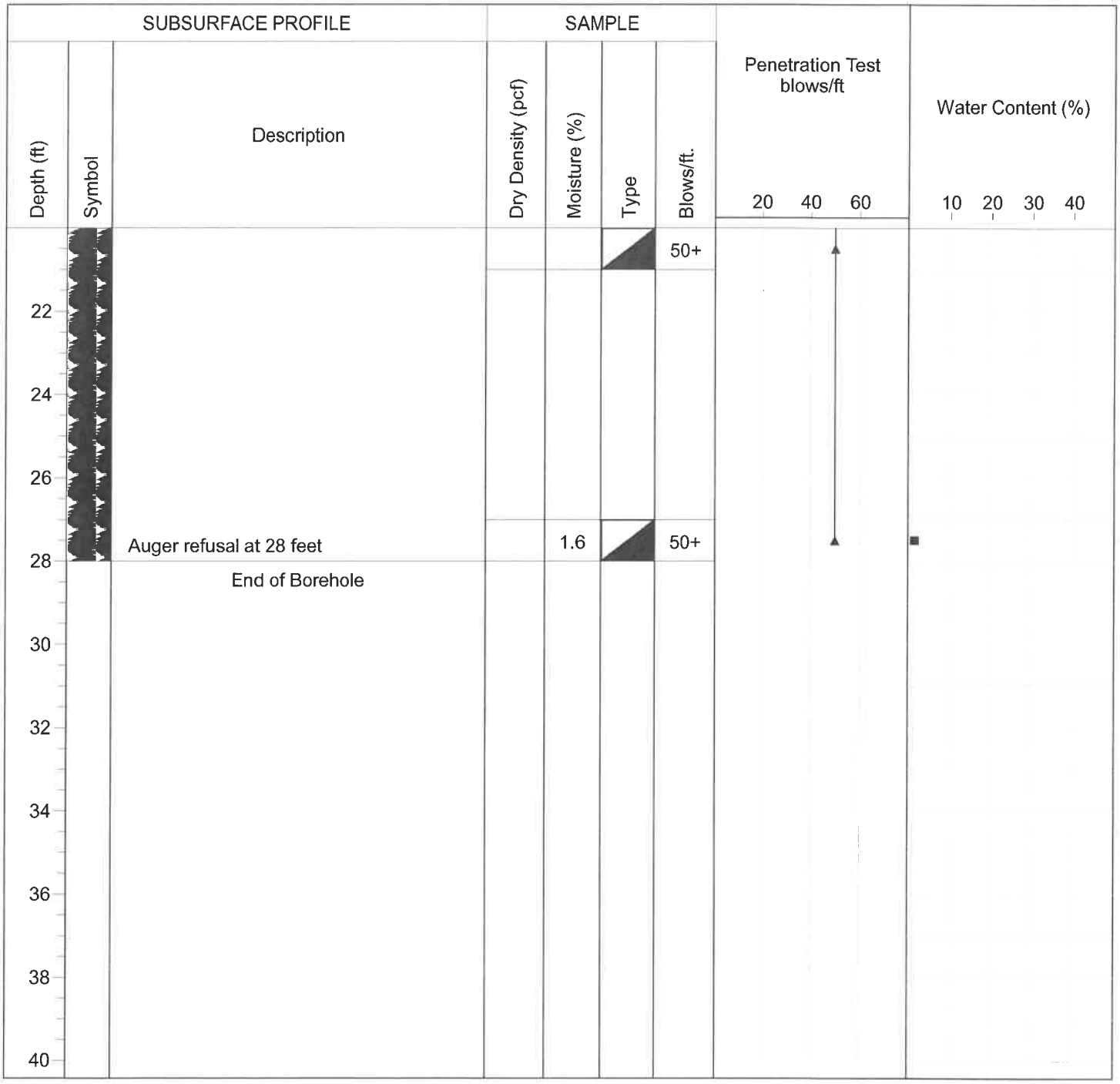
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 28 Feet

DRAFT

# Log of Boring B29

**Project:** Lime Plant

**Project No:** 022-18063

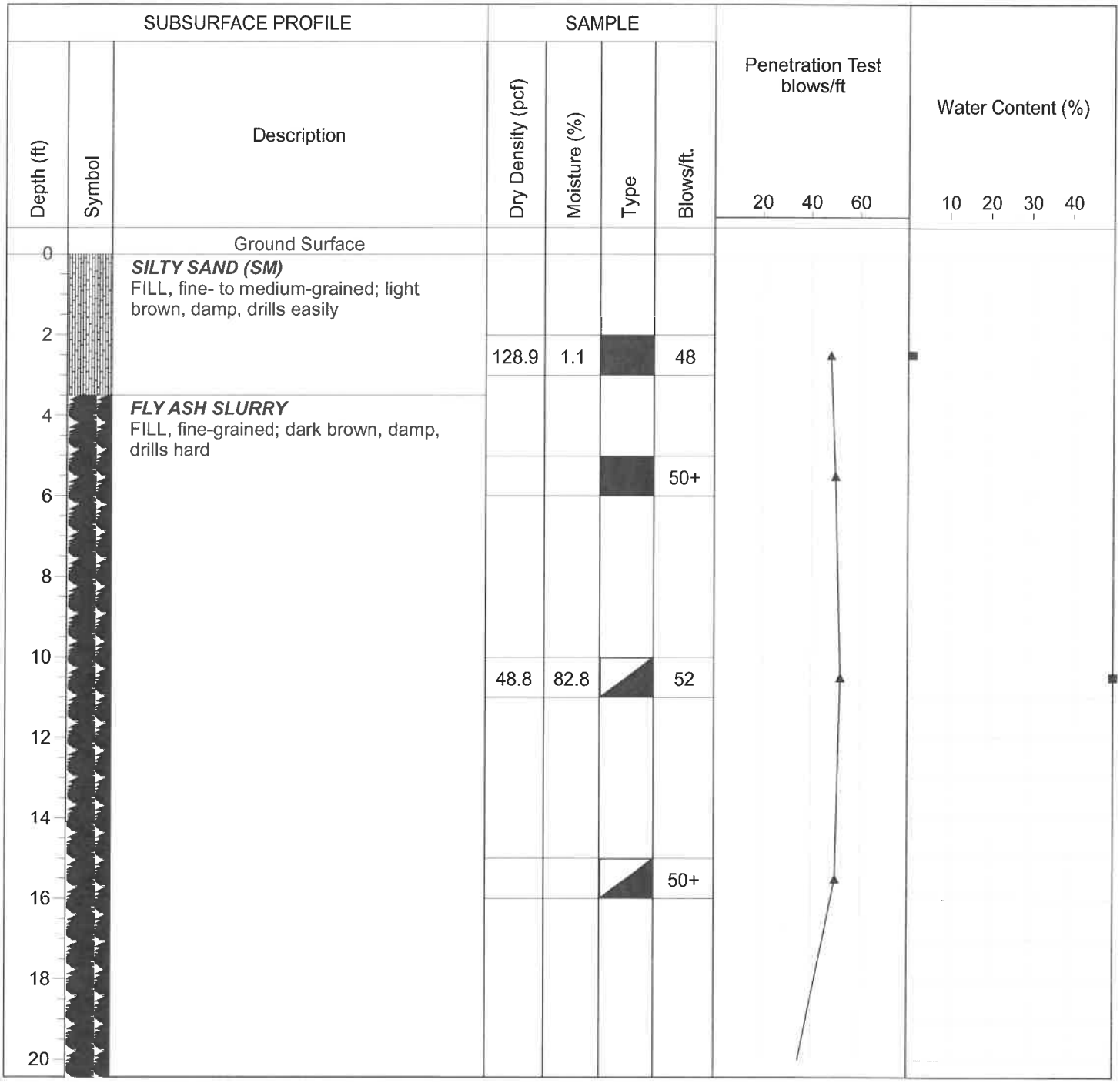
**Client:** PVL Lime

**Figure No.:** A-29

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 26 Feet

DRAFT

# Log of Boring B29

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-29

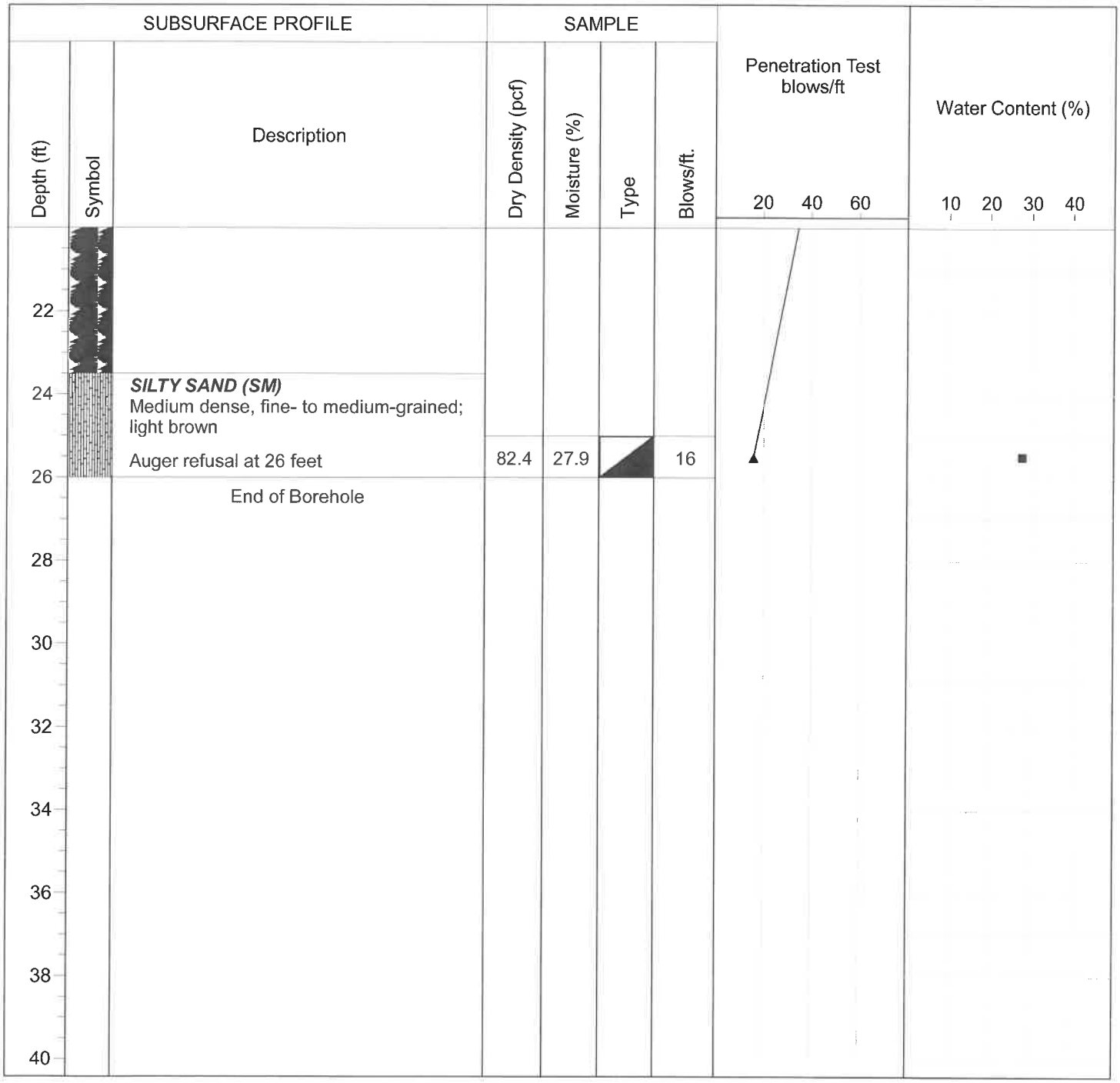
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 26 Feet

**Sheet:** 2 of 2

DRAFT

# Log of Boring B30

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-30

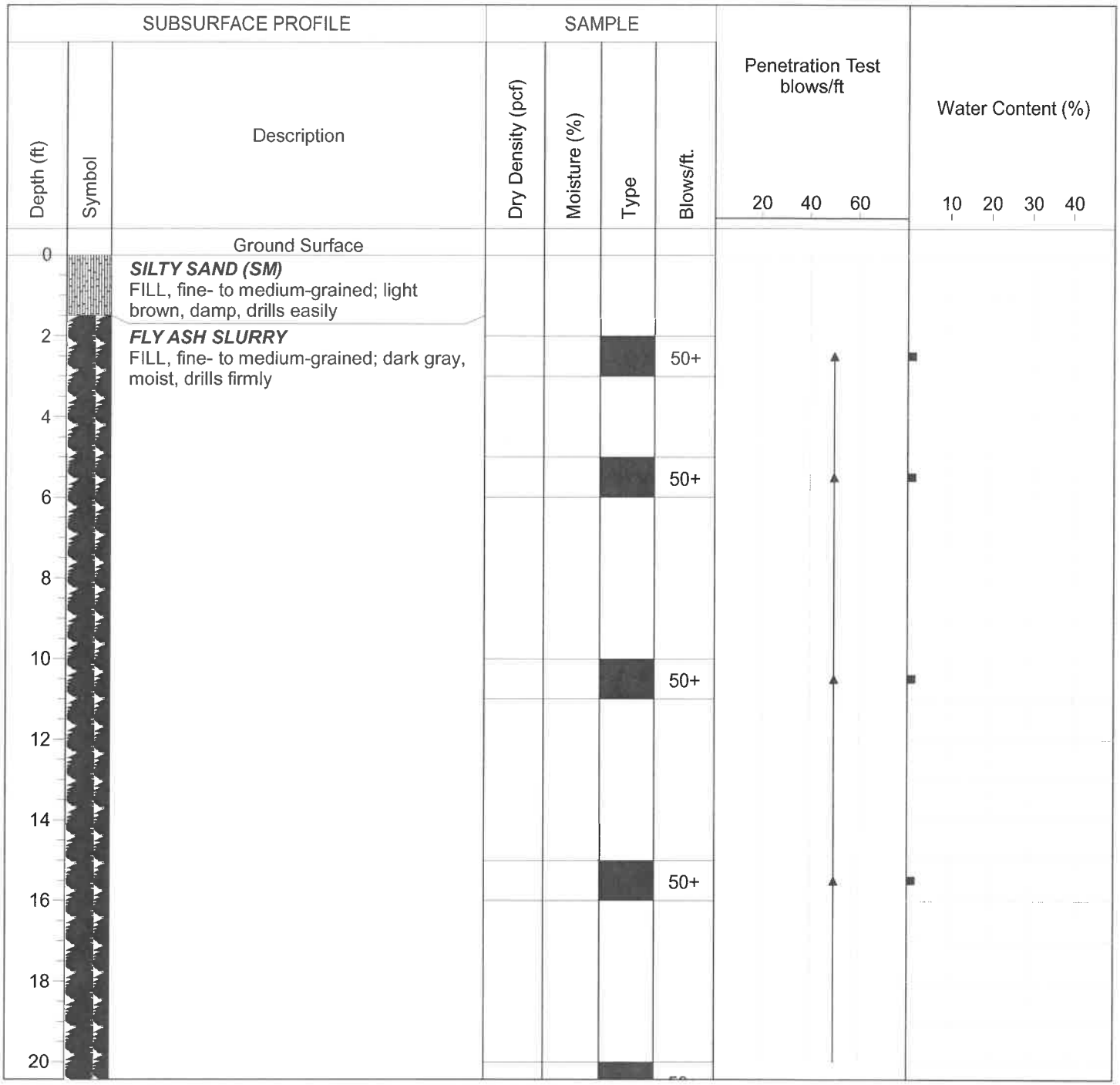
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-12-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 46 Feet

DRAFT

# Log of Boring B30

**Project:** Lime Plant

**Project No:** 022-18063

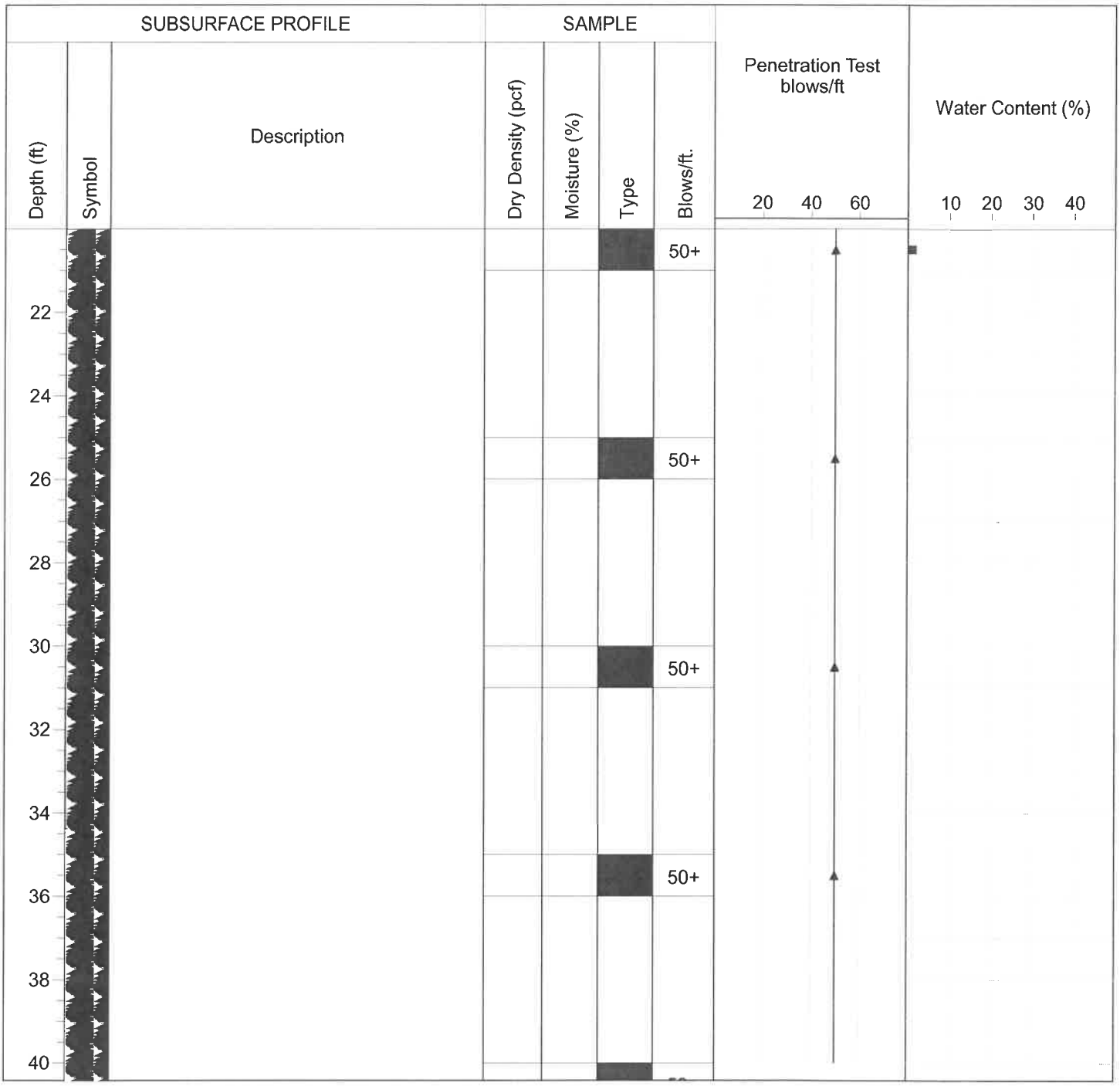
**Client:** PVL Lime

**Figure No.:** A-30

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-12-18

**Hole Size:** 6½ Inches

**Elevation:** 46 Feet

DRAFT

# Log of Boring B30

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-30

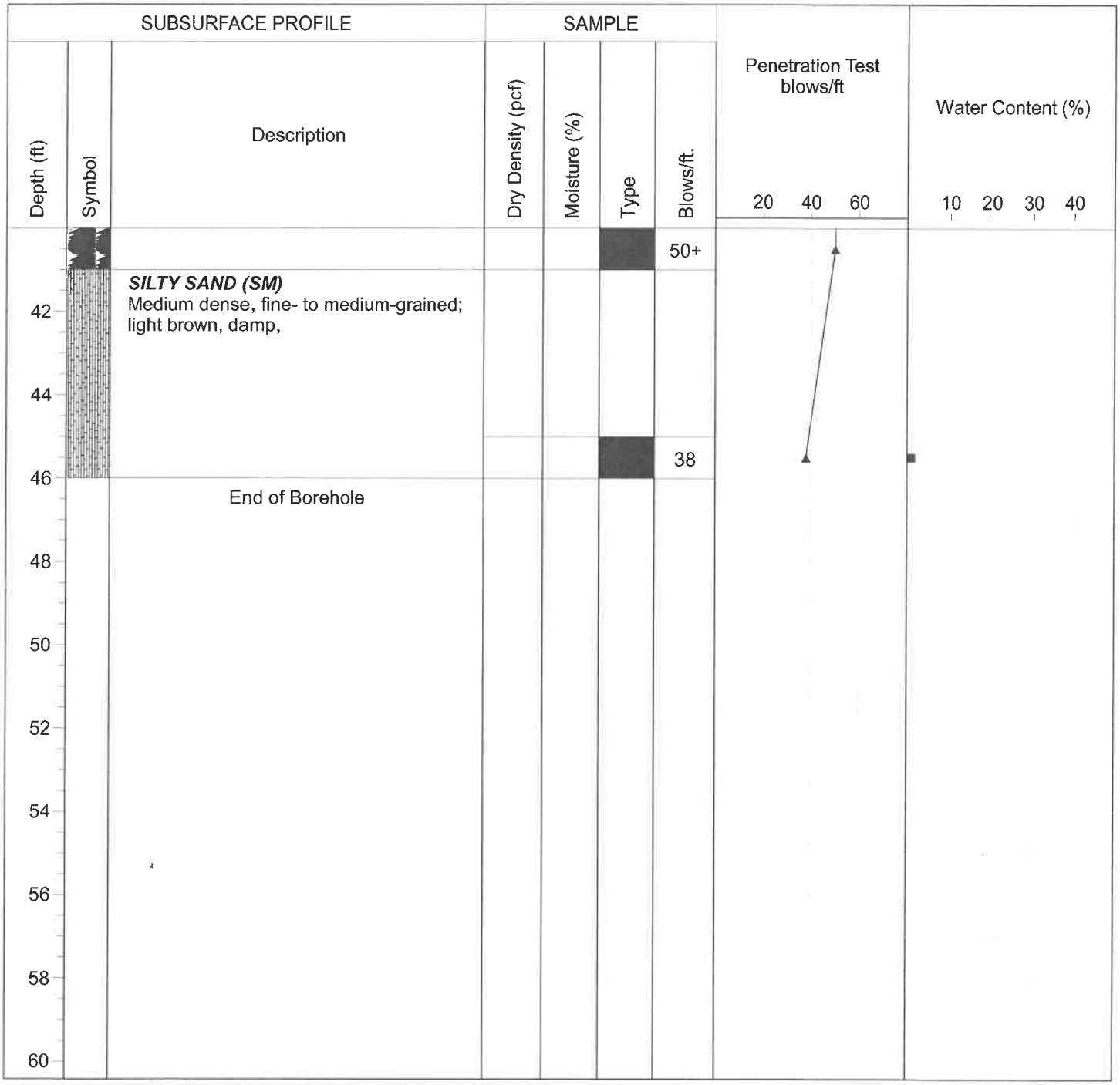
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-12-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 46 Feet

DRAFT

# Log of Boring B31

**Project:** Lime Plant

**Project No:** 022-18063

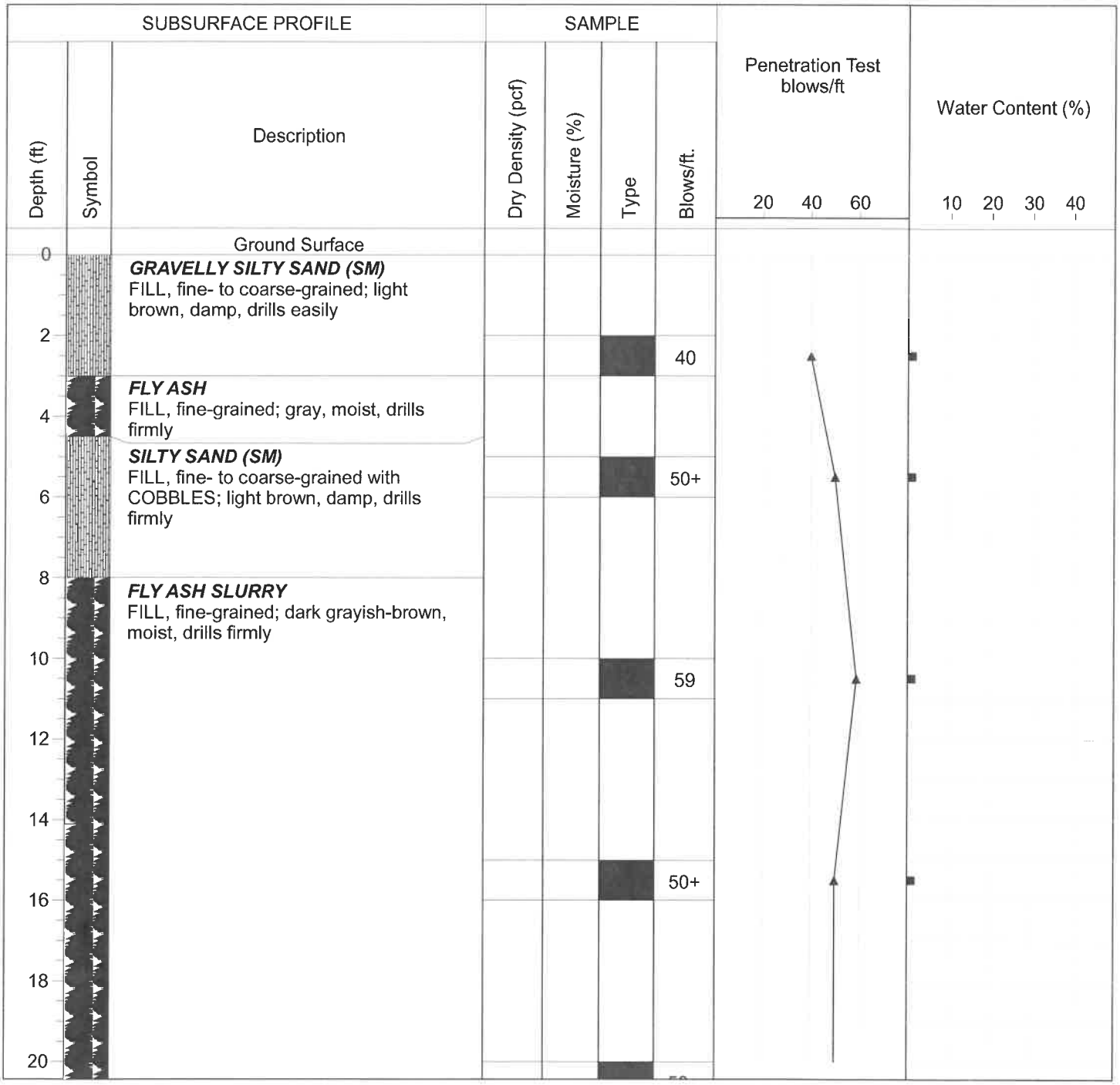
**Client:** PVL Lime

**Figure No.:** A-31

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-12-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 41 Feet

DRAFT

# Log of Boring B31

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

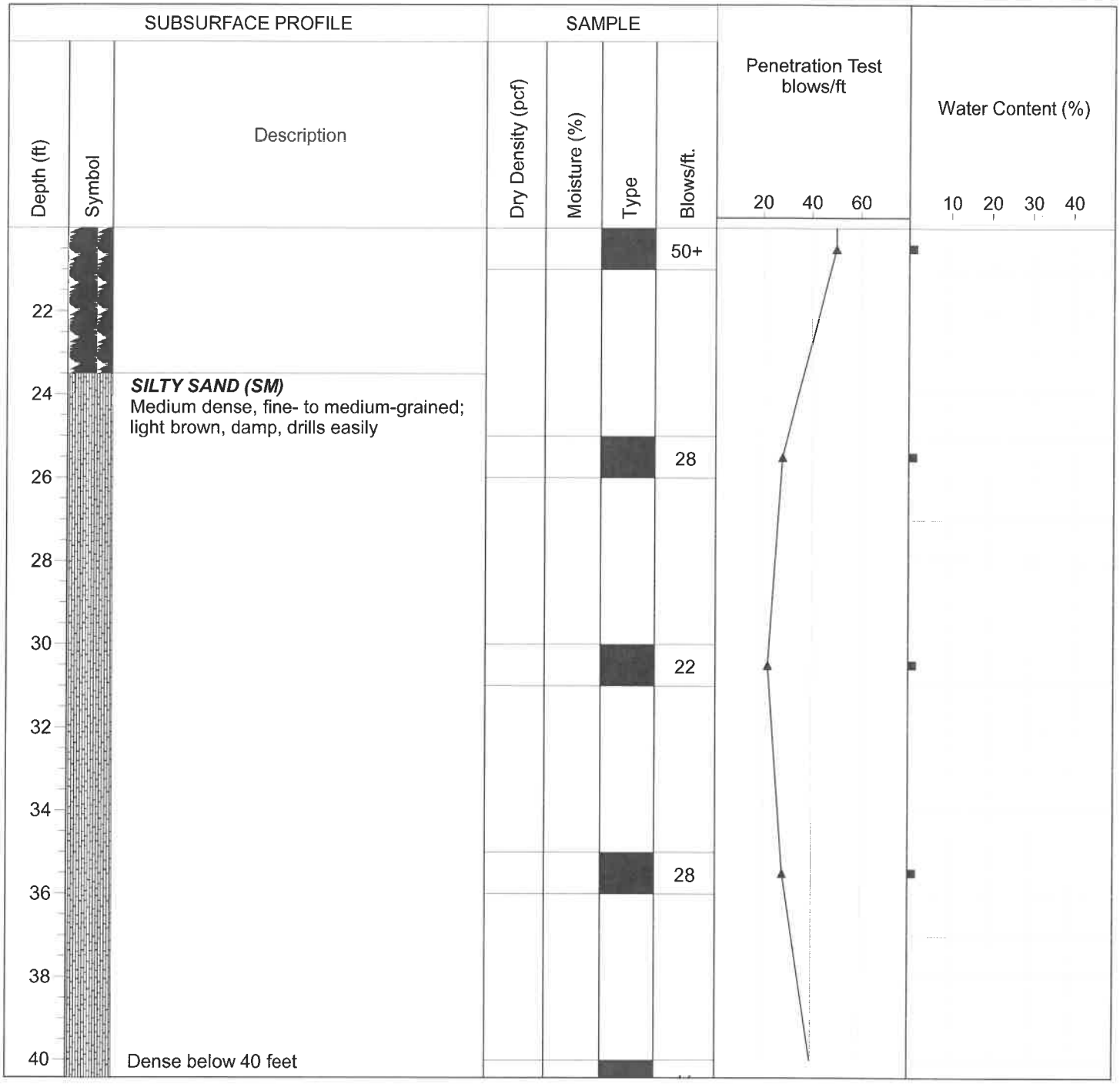
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-31

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-12-18

**Hole Size:** 6½ Inches

**Elevation:** 41 Feet

DRAFT

# Log of Boring B31

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-31

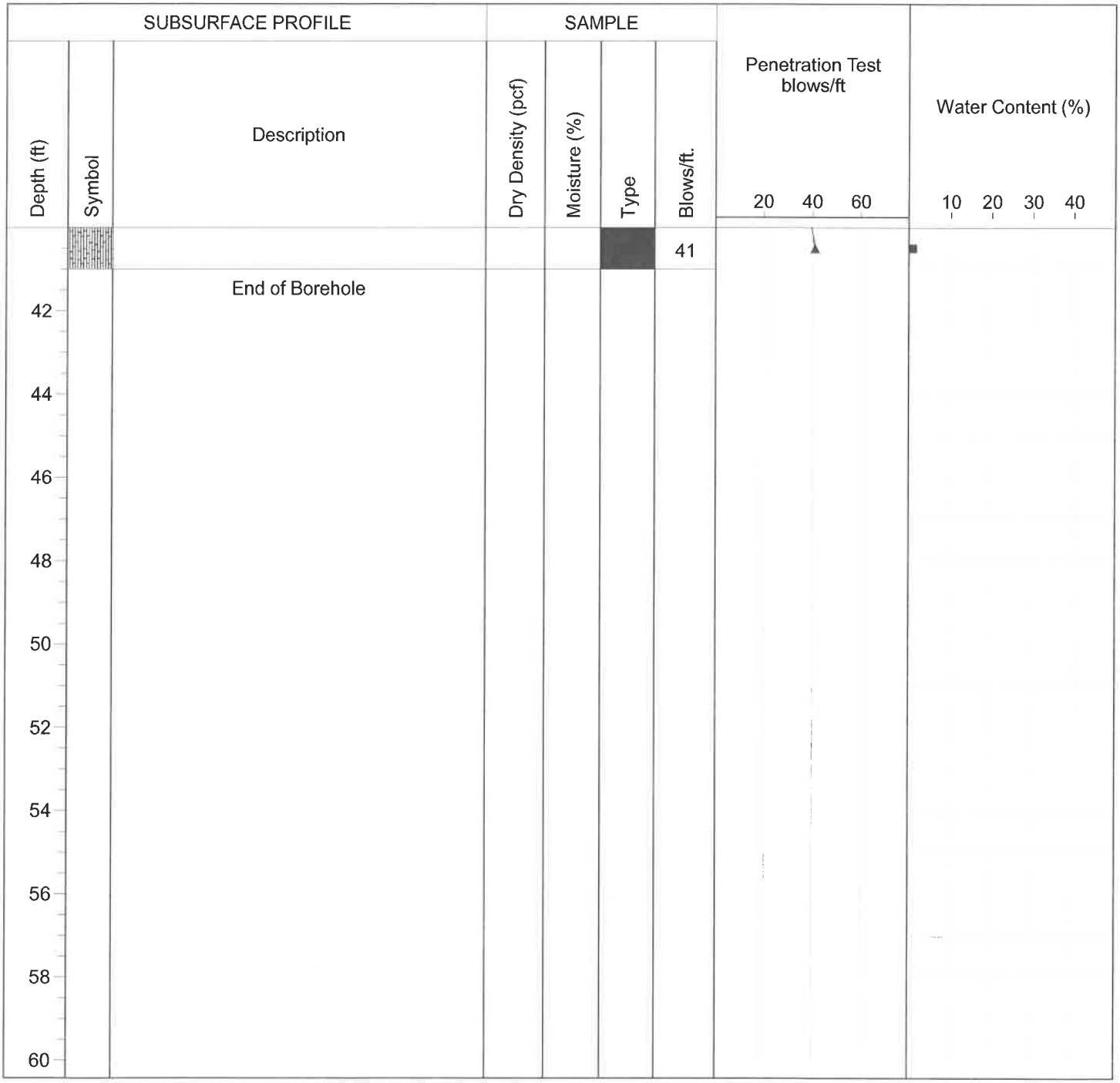
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-12-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 41 Feet

DRAFT

# Log of Boring B32

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-32

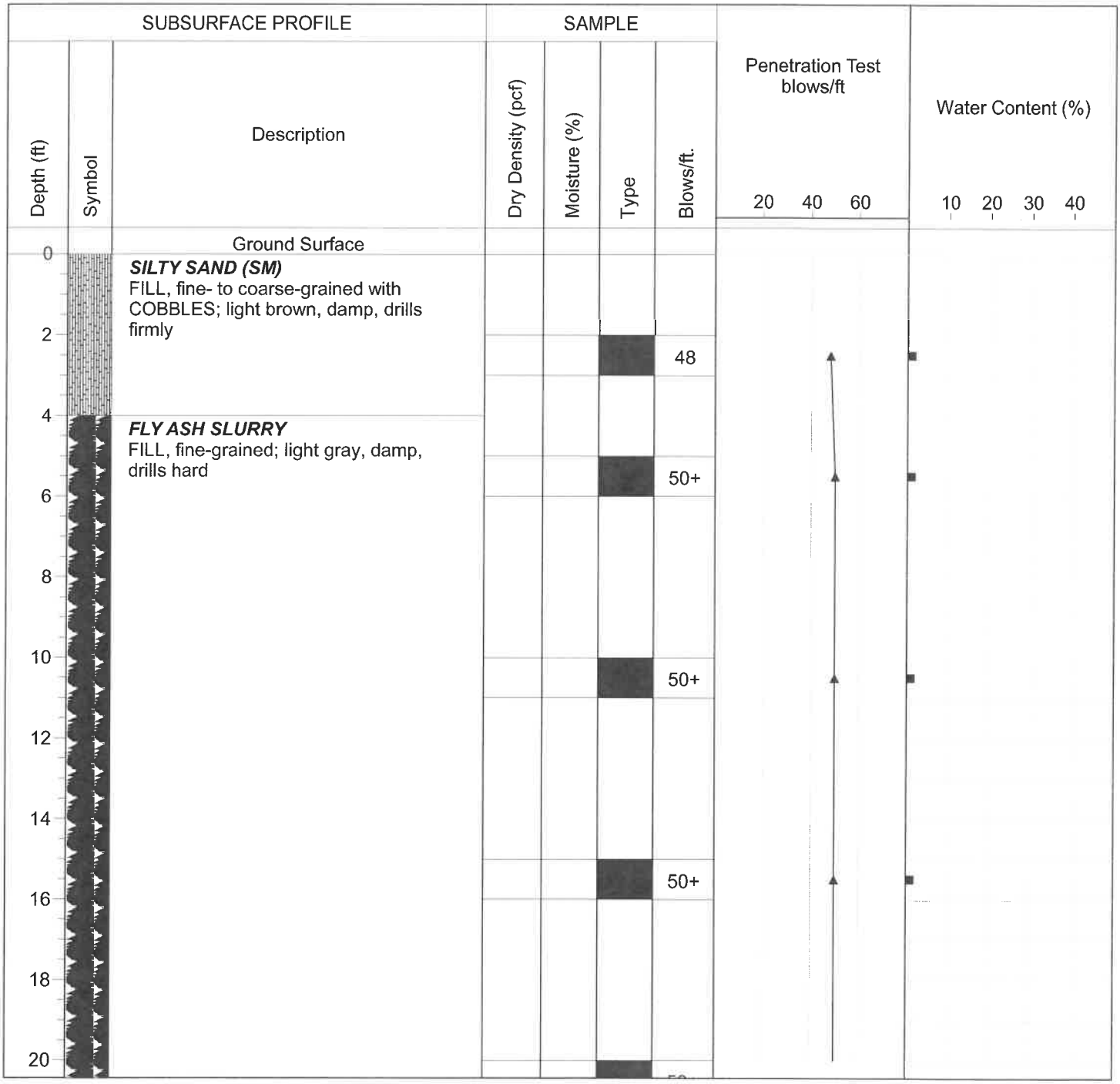
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-12-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 29 Feet

DRAFT

# Log of Boring B32

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-32

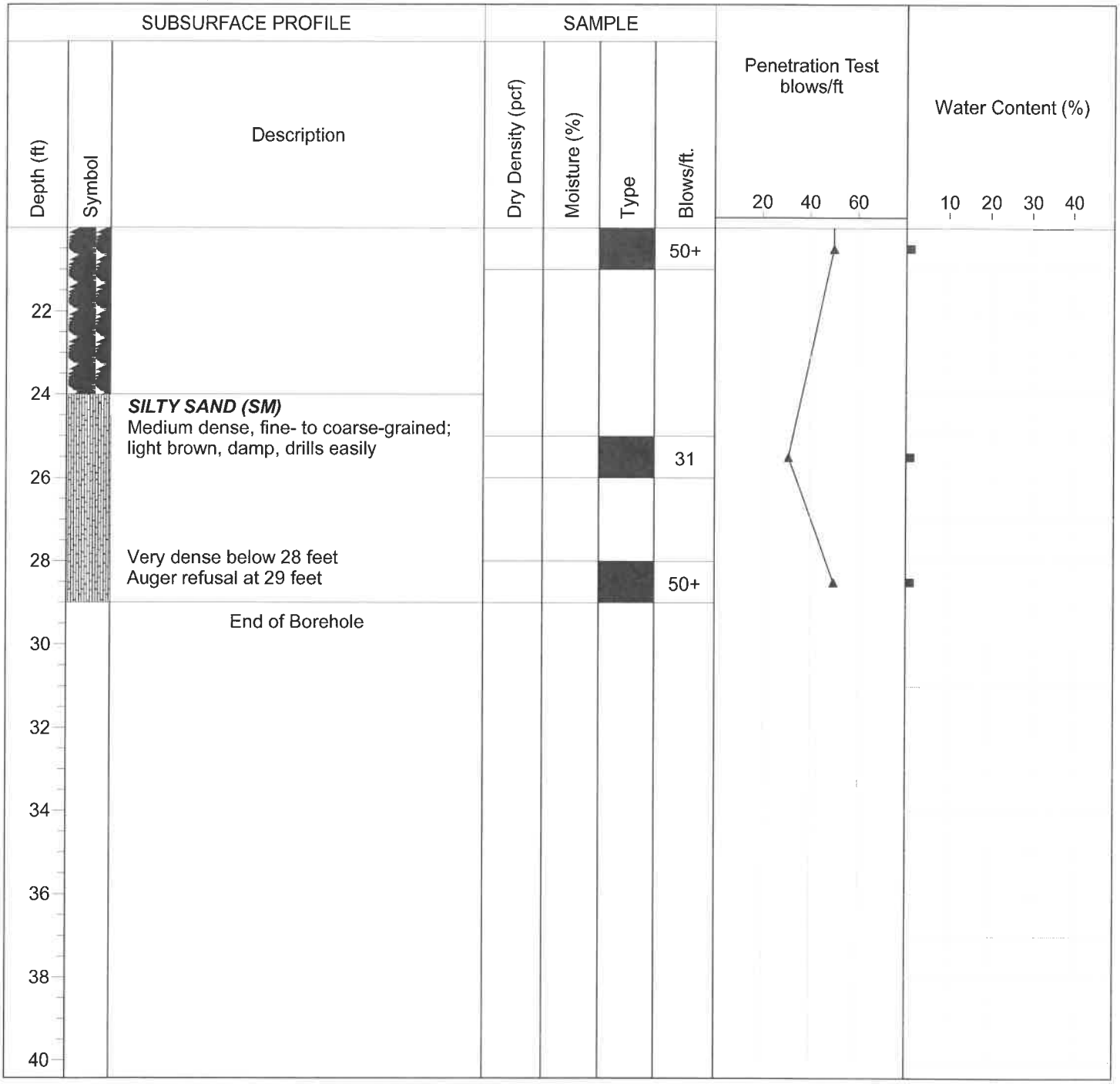
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-12-18

**Hole Size:** 6½ Inches

**Elevation:** 29 Feet

DRAFT

# Log of Boring B33

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-33

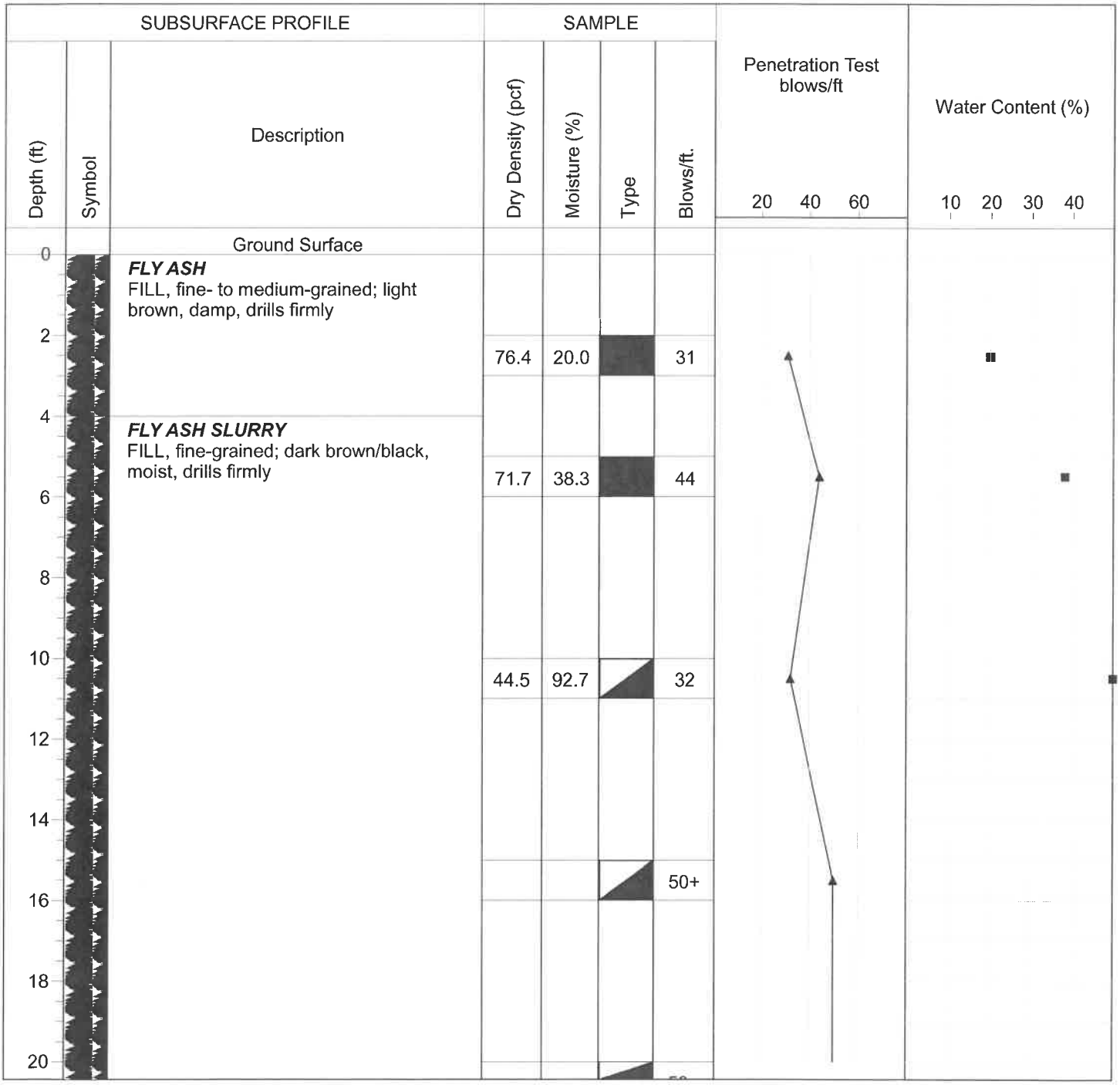
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 31 Feet

DRAFT

# Log of Boring B33

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-33

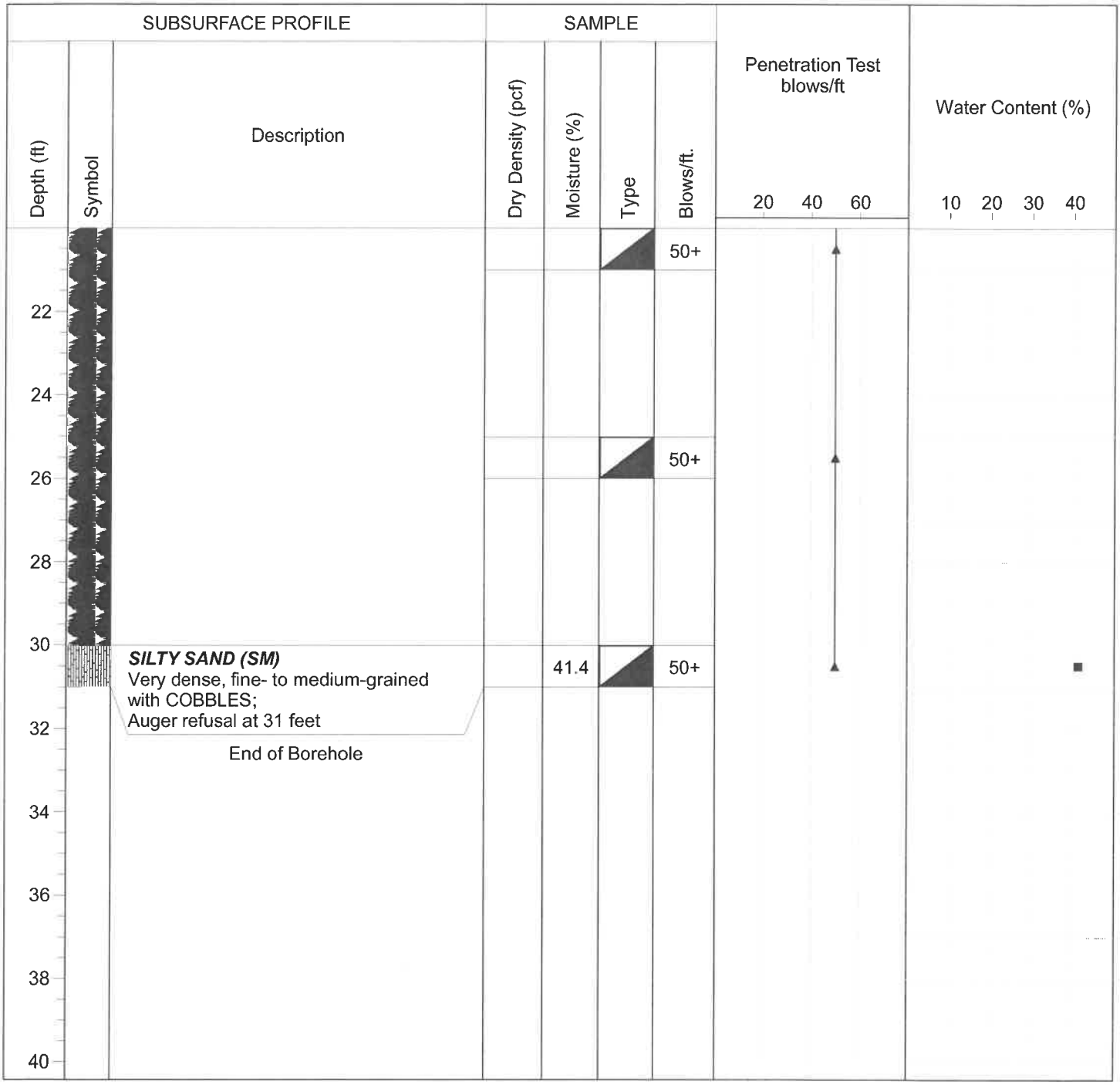
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-18-18

**Hole Size:** 6½ Inches

**Elevation:** 31 Feet

DRAFT

# Log of Boring B34

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-34

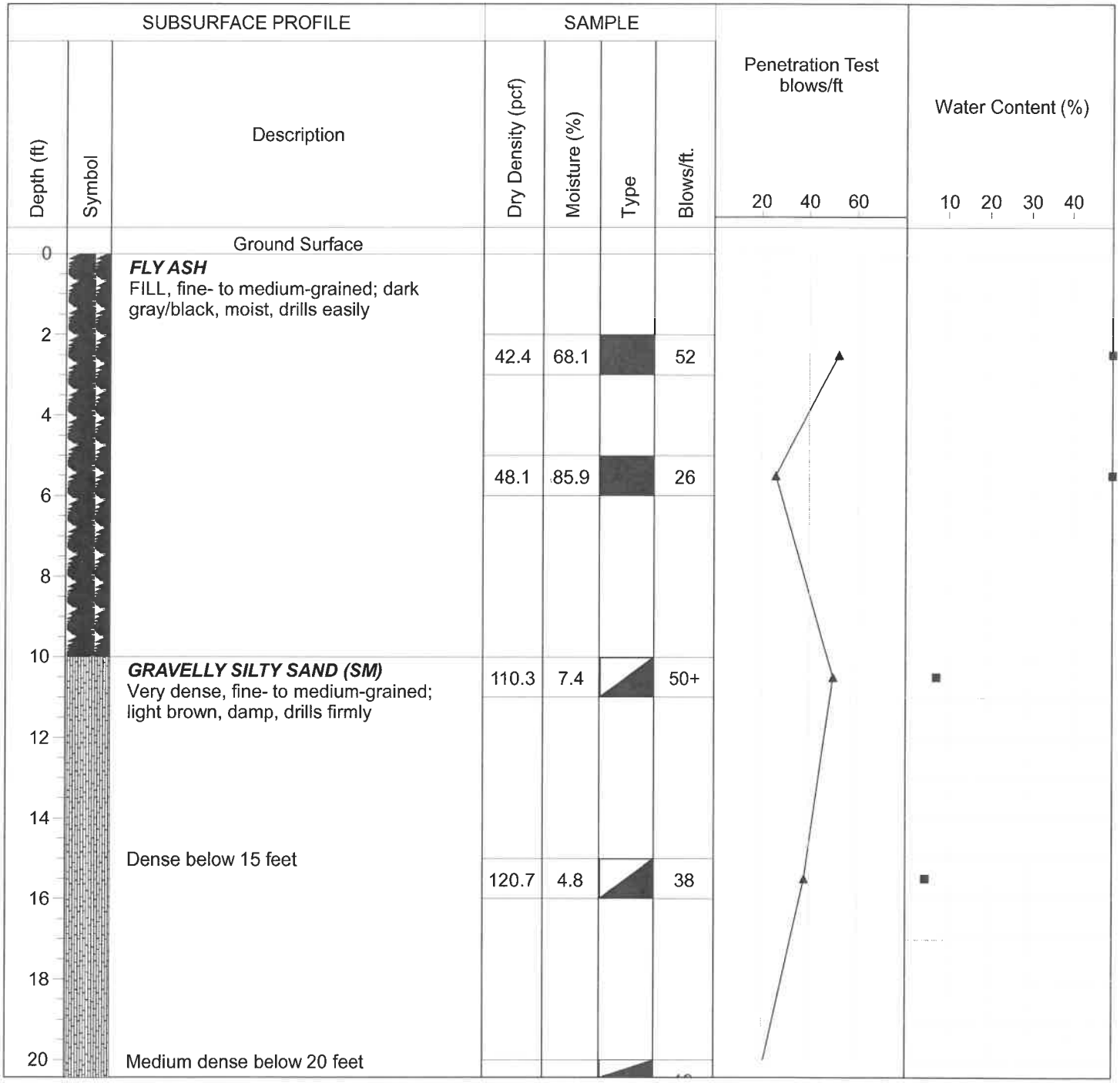
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-19-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 25 Feet

DRAFT

# Log of Boring B34

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-34

**Logged By:** R. Alexander

**At Completion:** None

| SUBSURFACE PROFILE | | | SAMPLE | | | | Penetration Test blows/ft | Water Content (%) |
|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Symbol | Description | Dry Density (pcf) | Moisture (%) | Type | Blows/ft. | 20 40 60 | 10 20 30 40 |
| 22 | | | 109.6 | 3.0 | | 19 | | |
| 24 | | | | | | | | |
| 26 | | End of Borehole | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |
| 32 | | | | | | | | |
| 34 | | | | | | | | |
| 36 | | | | | | | | |
| 38 | | | | | | | | |
| 40 | | | | | | | | |

**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-19-18

**Hole Size:** 6½ Inches

**Elevation:** 25 Feet

**Sheet:** 2 of 2

DRAFT

# Log of Boring B35

**Project:** Lime Plant

**Client:** PVL Lime

**Location:** Ace Ash Landfill, Trona, CA

**Depth to Water>**

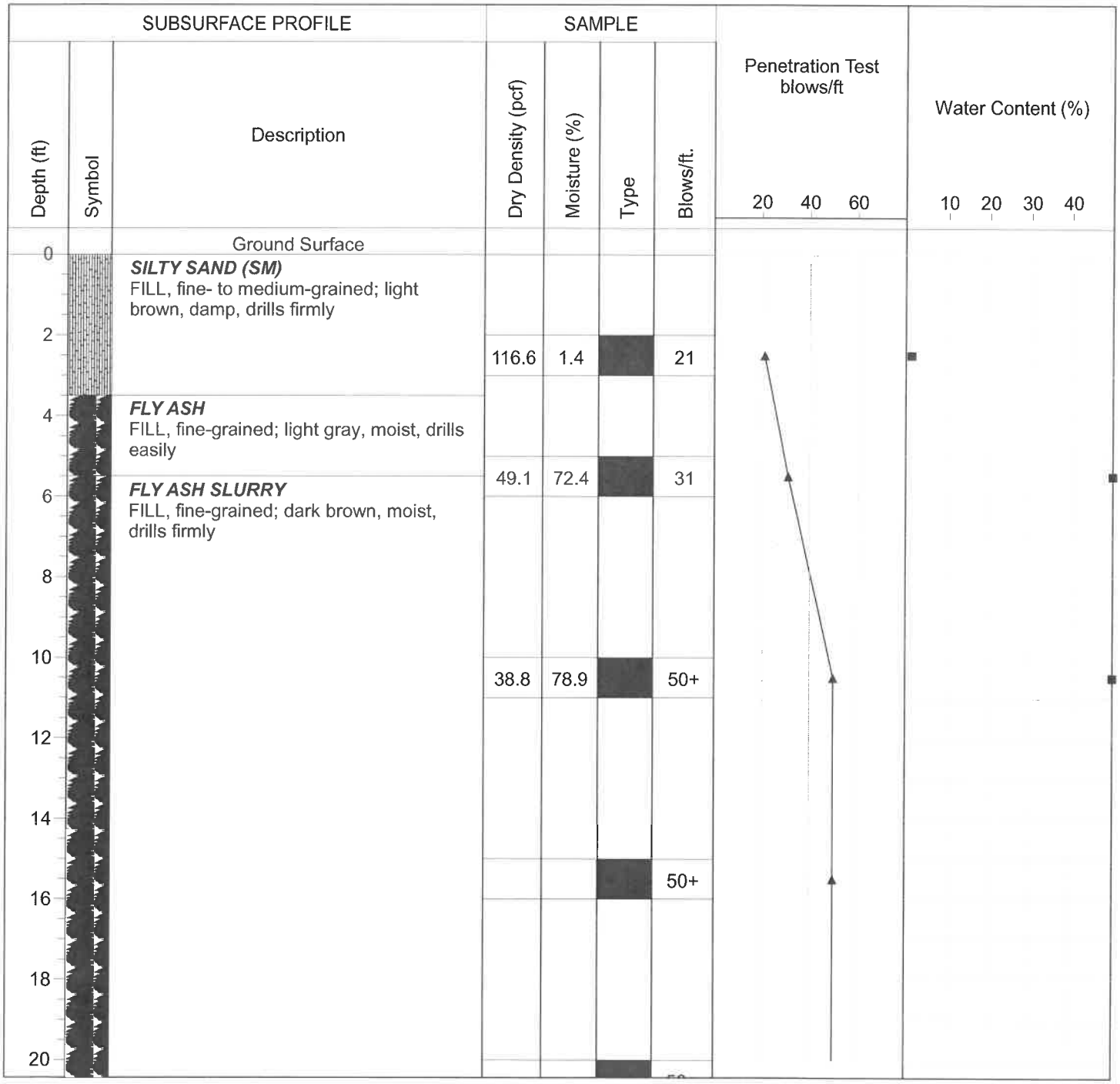
**Initial:** None

**Project No:** 022-18063

**Figure No.:** A-35

**Logged By:** R. Alexander

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-20-18

**Hole Size:** 6½ Inches

**Elevation:** 56 Feet

DRAFT

# Log of Boring B35

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-35

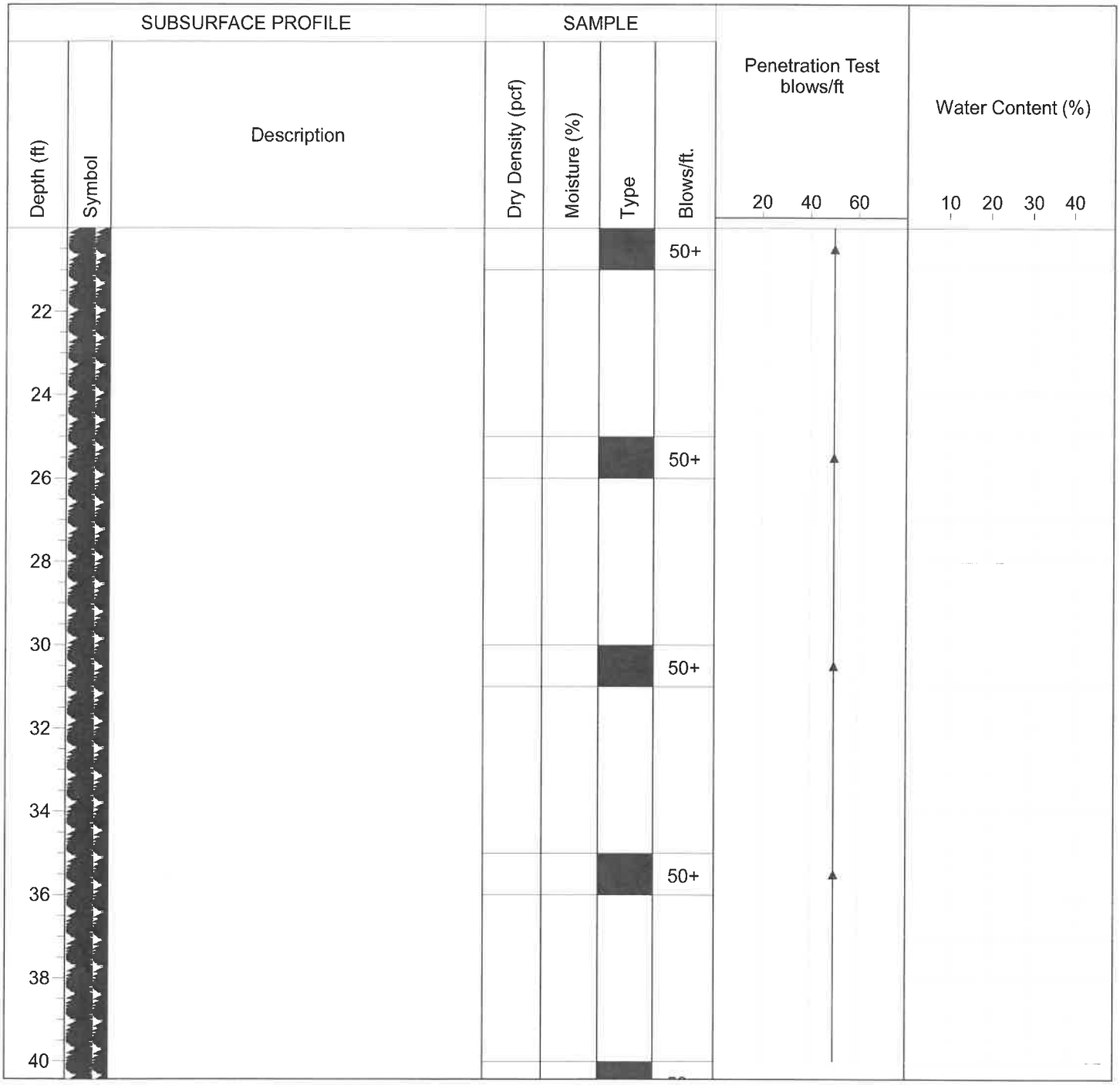
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Rig:** CME 45B

**Driller:** Brent Snyder

**Krazan and Associates**

**Drill Date:** 7-20-18

**Hole Size:** 6½ Inches

**Elevation:** 56 Feet

DRAFT

# Log of Boring B35

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-35

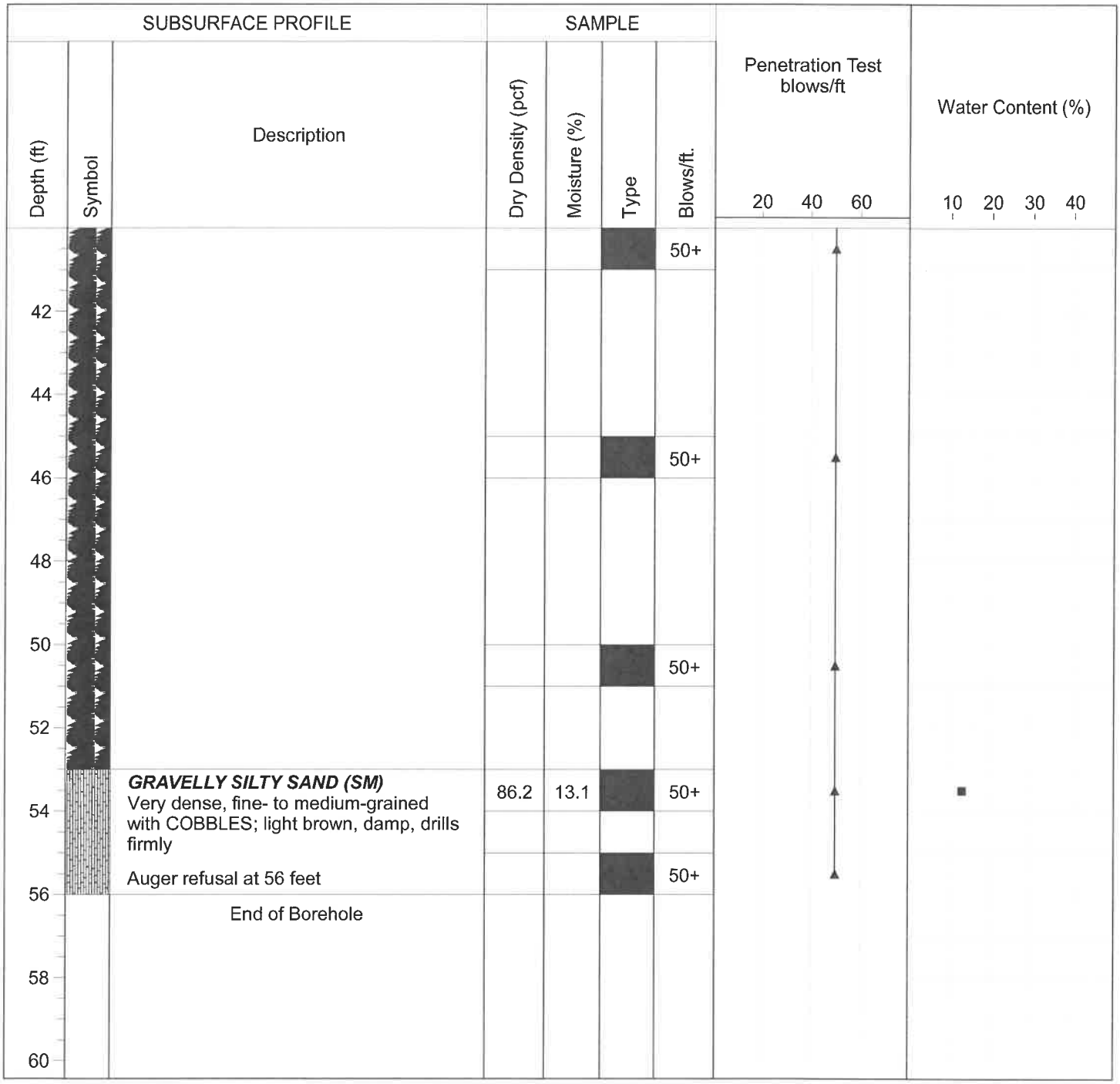
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-20-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 56 Feet

DRAFT

# Log of Boring B36

**Project:** Lime Plant

**Project No:** 022-18063

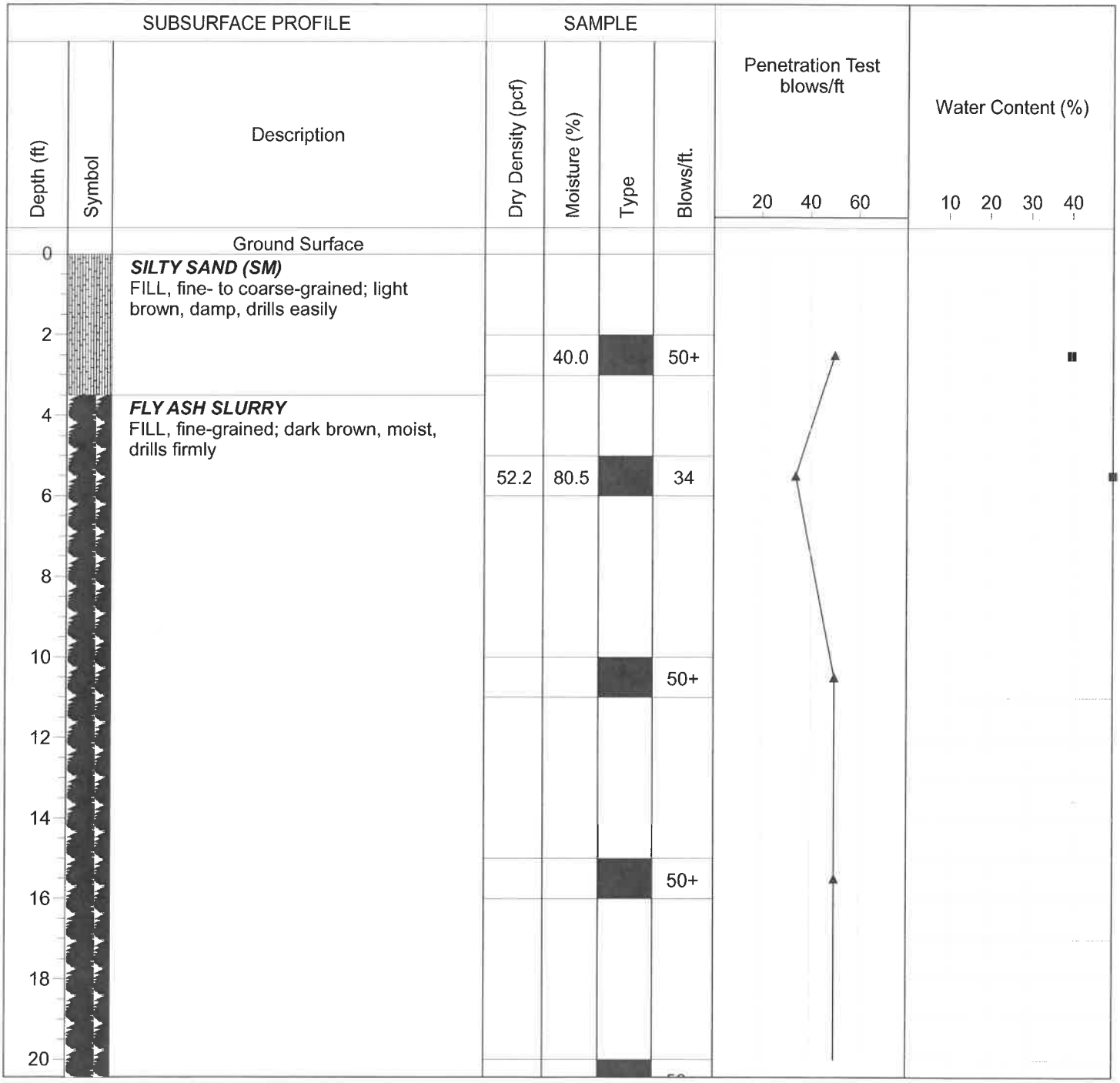
**Client:** PVL Lime

**Figure No.:** A-36

**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>** **Initial:** None **At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

**Driller:** Brent Snyder

**Elevation:** 30 Feet

DRAFT

# Log of Boring B36

**Project:** Lime Plant

**Project No:** 022-18063

**Client:** PVL Lime

**Figure No.:** A-36

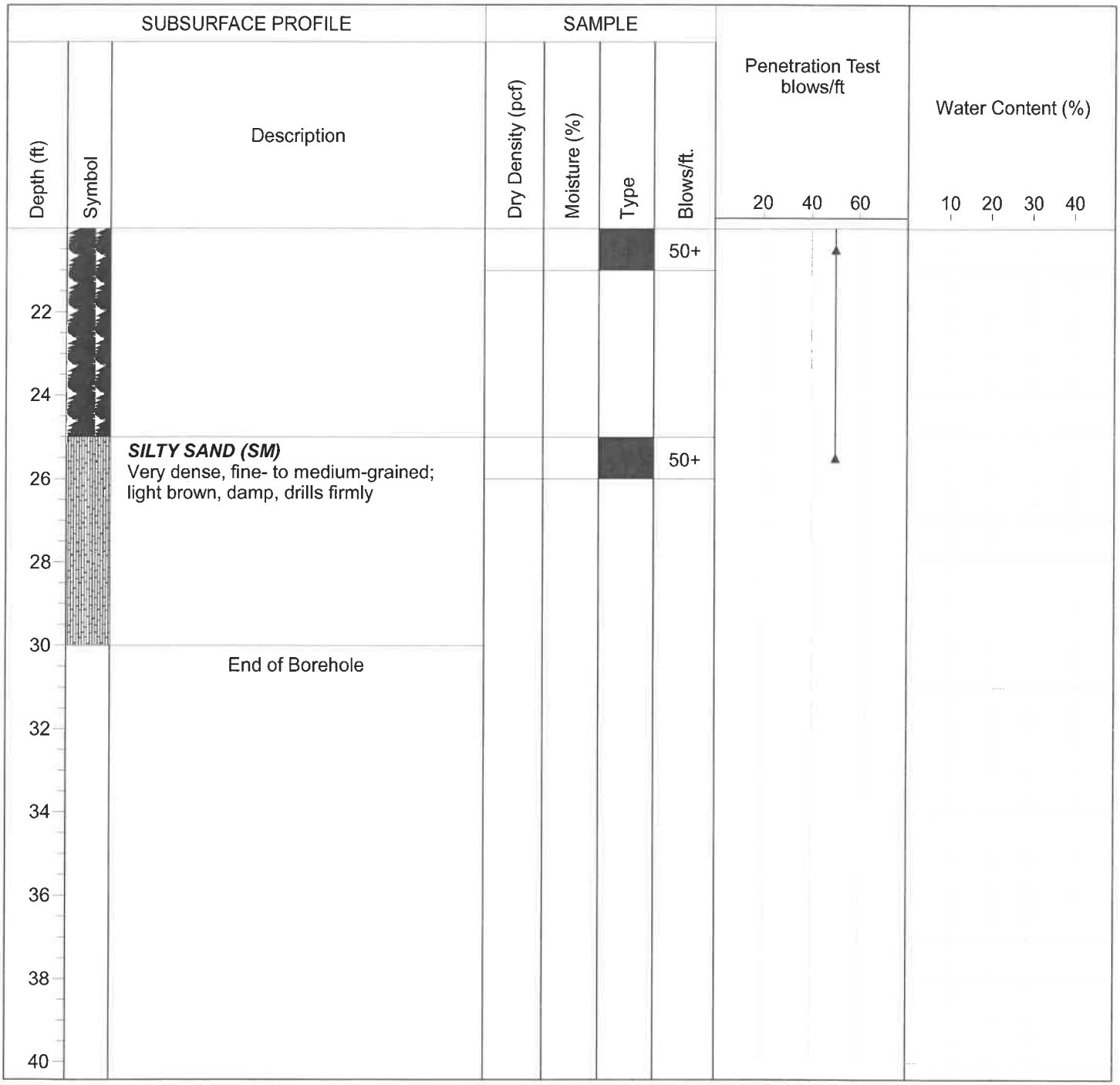
**Location:** Ace Ash Landfill, Trona, CA

**Logged By:** R. Alexander

**Depth to Water>**

**Initial:** None

**At Completion:** None




**Drill Method:** Hollow Stem

**Drill Date:** 7-18-18

**Drill Rig:** CME 45B

**Krazan and Associates**

**Hole Size:** 6½ Inches

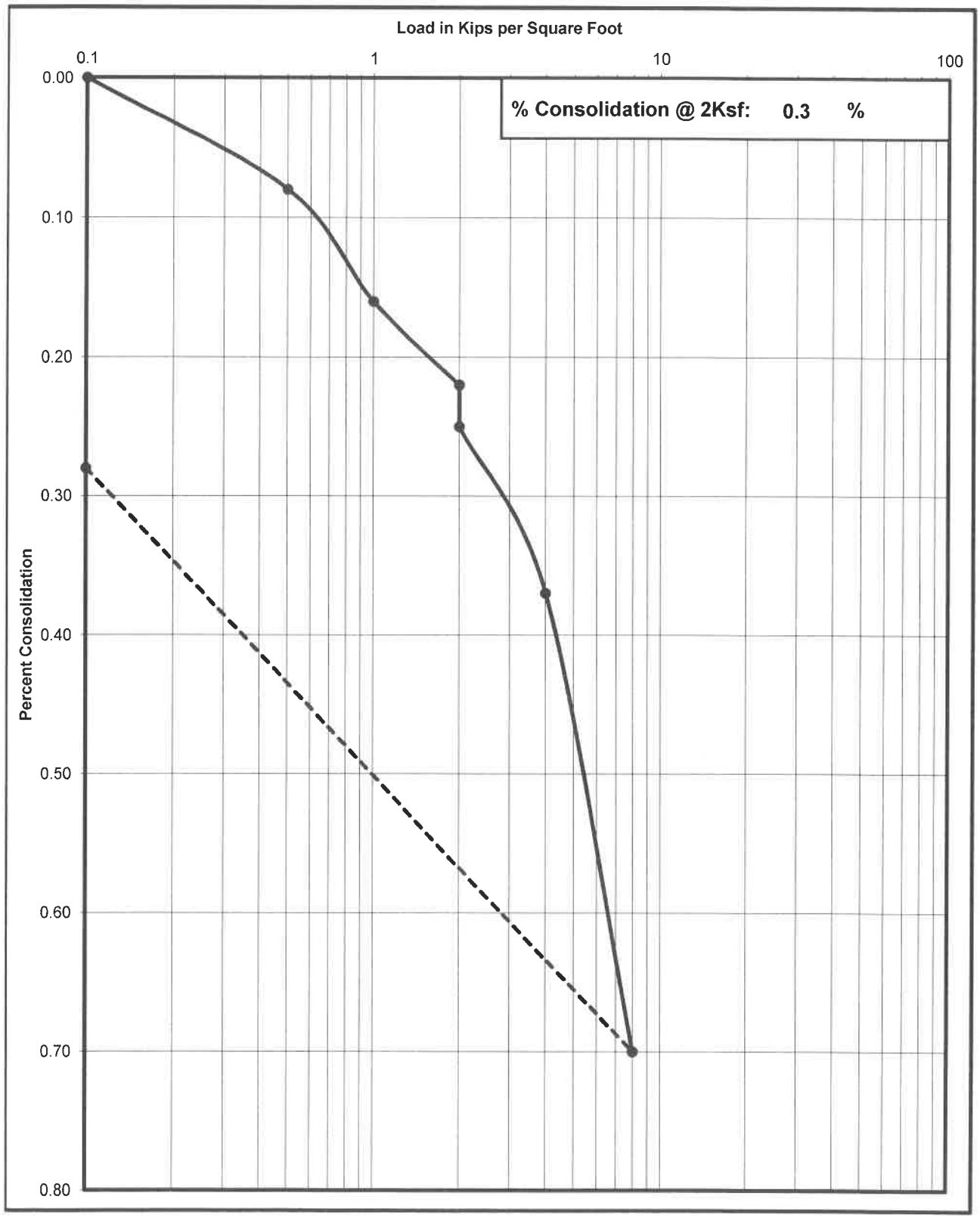
**Driller:** Brent Snyder

**Elevation:** 30 Feet

DRAFT

# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B1 @ 2-3' | 8/3/2018 | ML |

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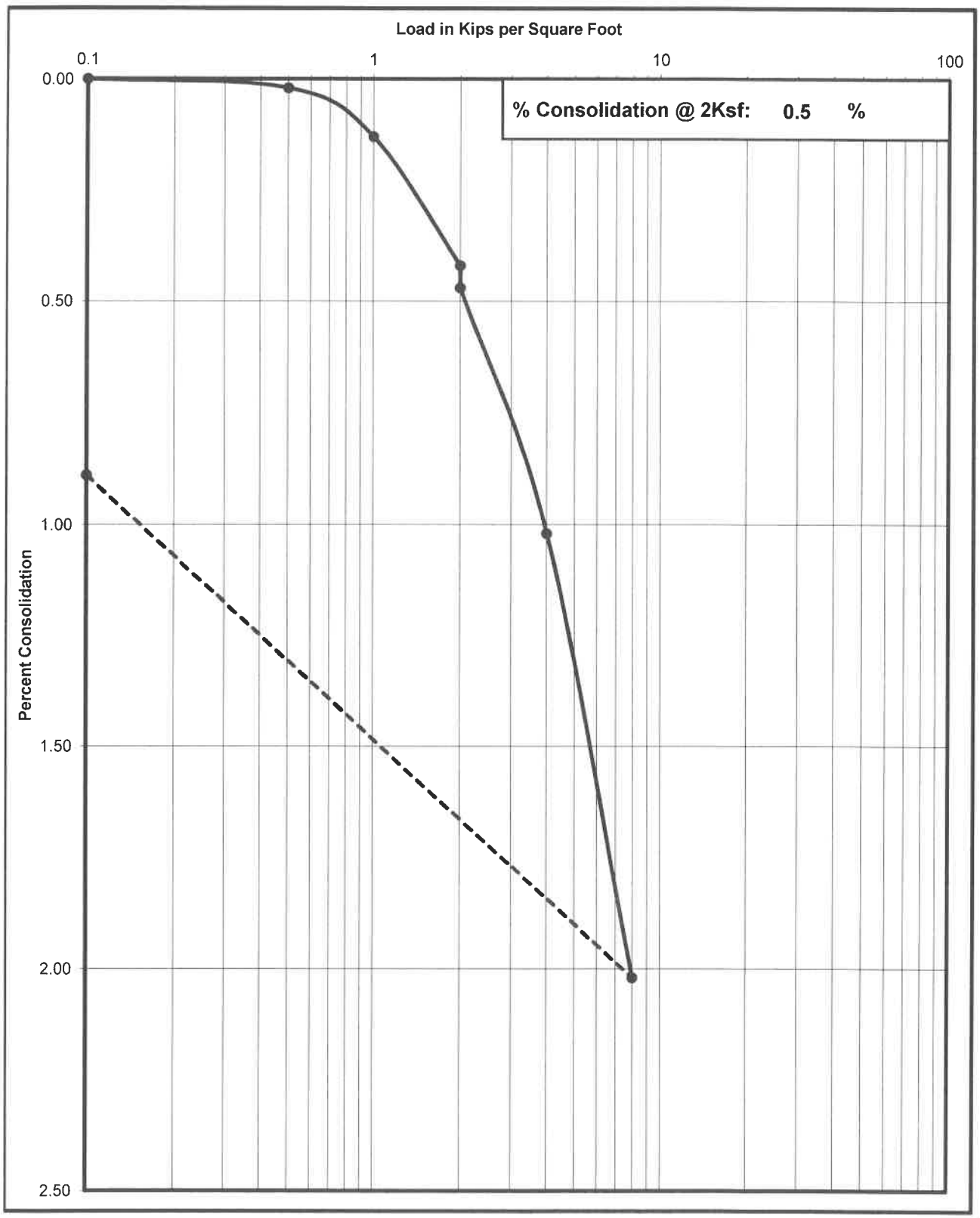
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B1 @ 5-6' | 8/3/2018 | ML |

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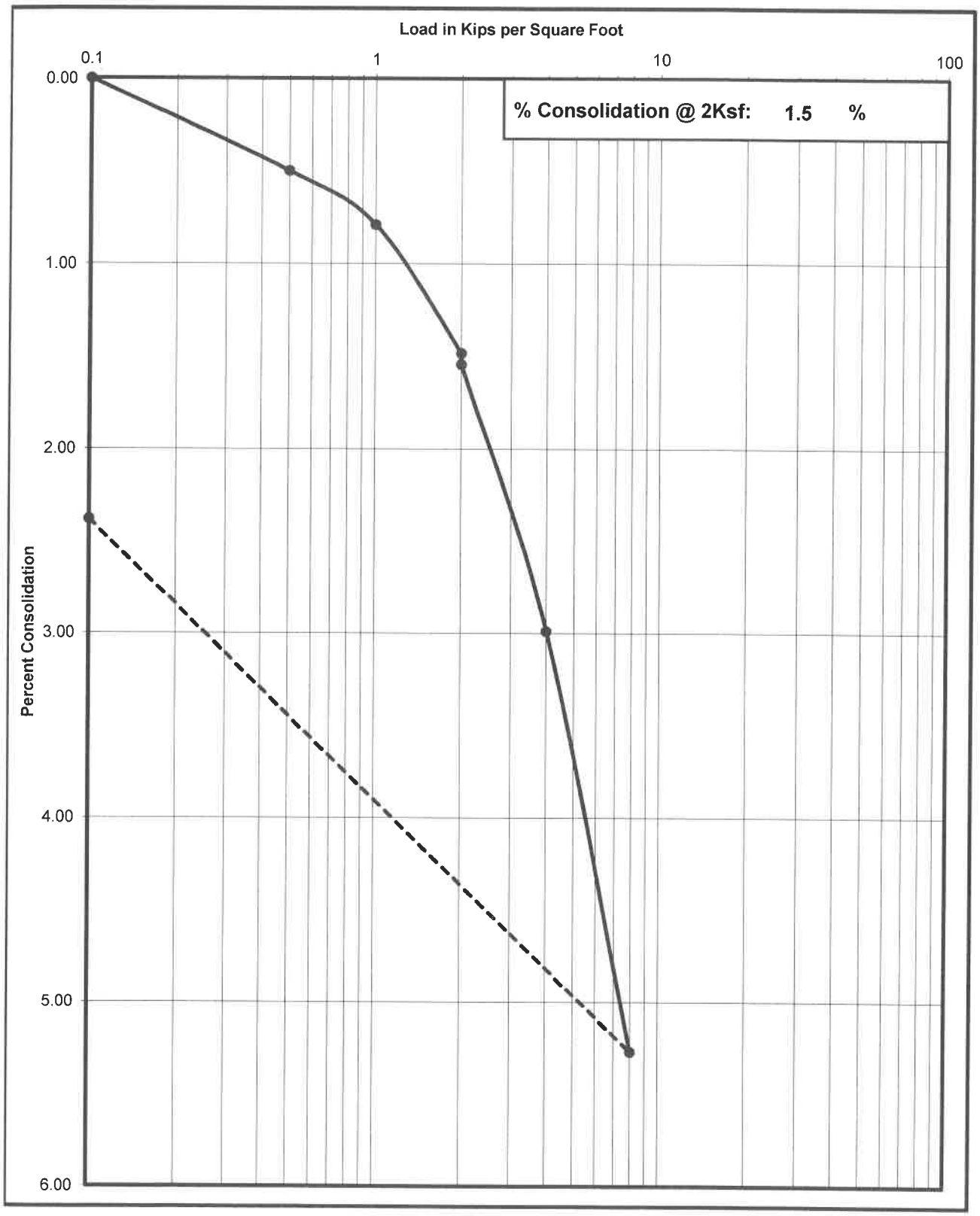
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B4 @ 2-3' | 8/3/2018 | ML |

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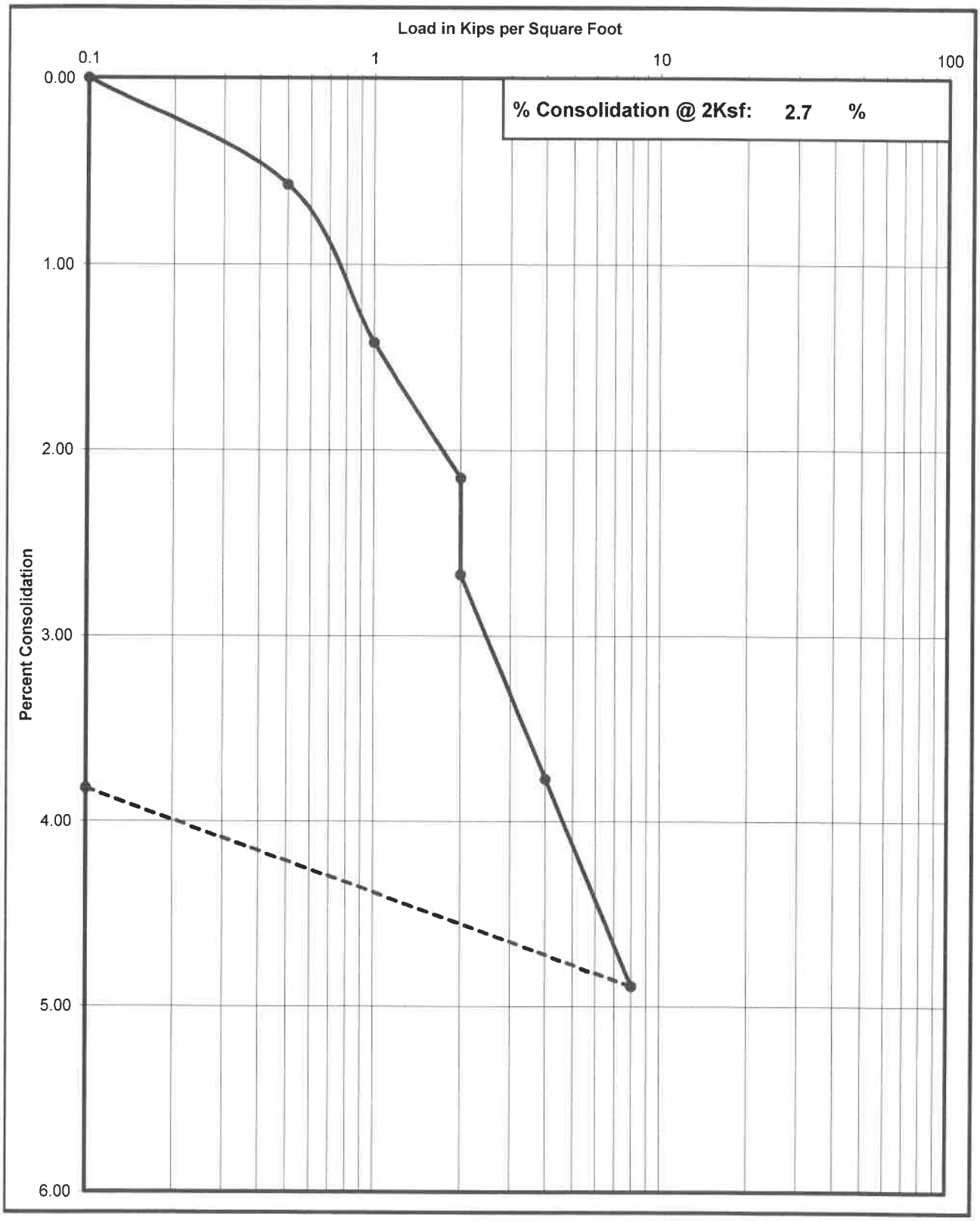
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B16 @ 2-3' | 8/3/2018 | SM |

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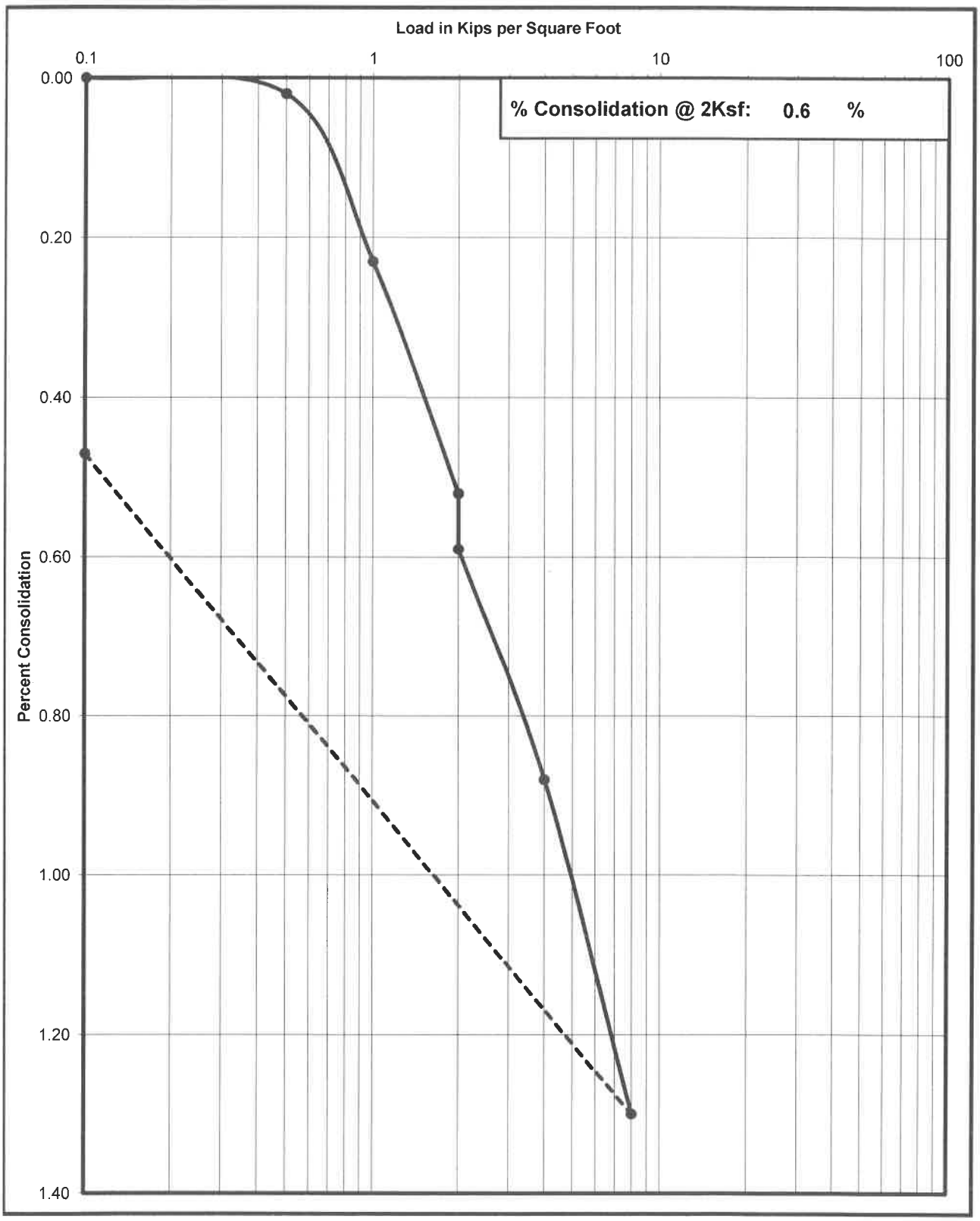
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B16 @ 5-6' | 8/3/2018 | ML |

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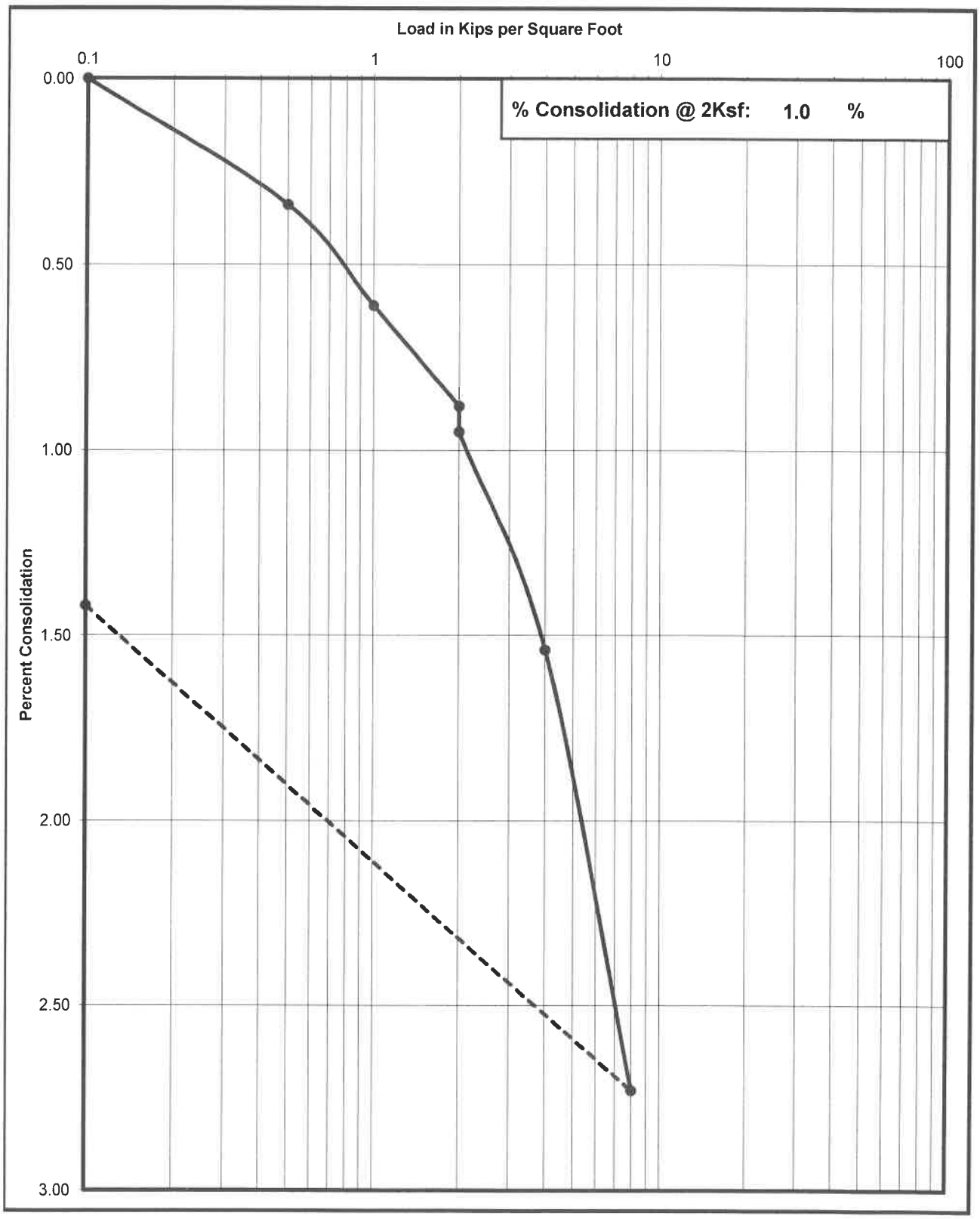
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B22 @ 2-3' | 8/6/2018 | ML |

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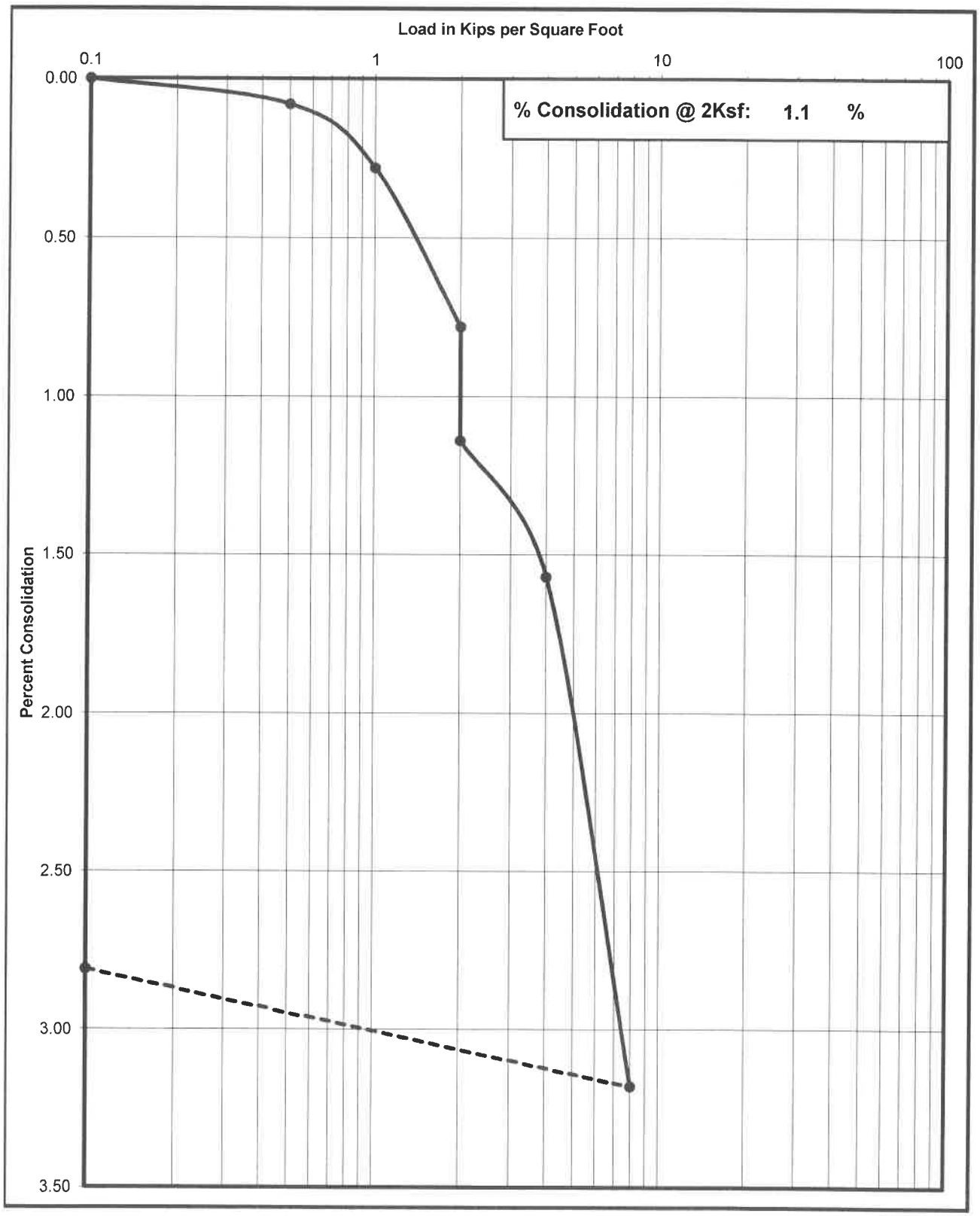
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B24 @ 2-3' | 8/6/2018 | ML |

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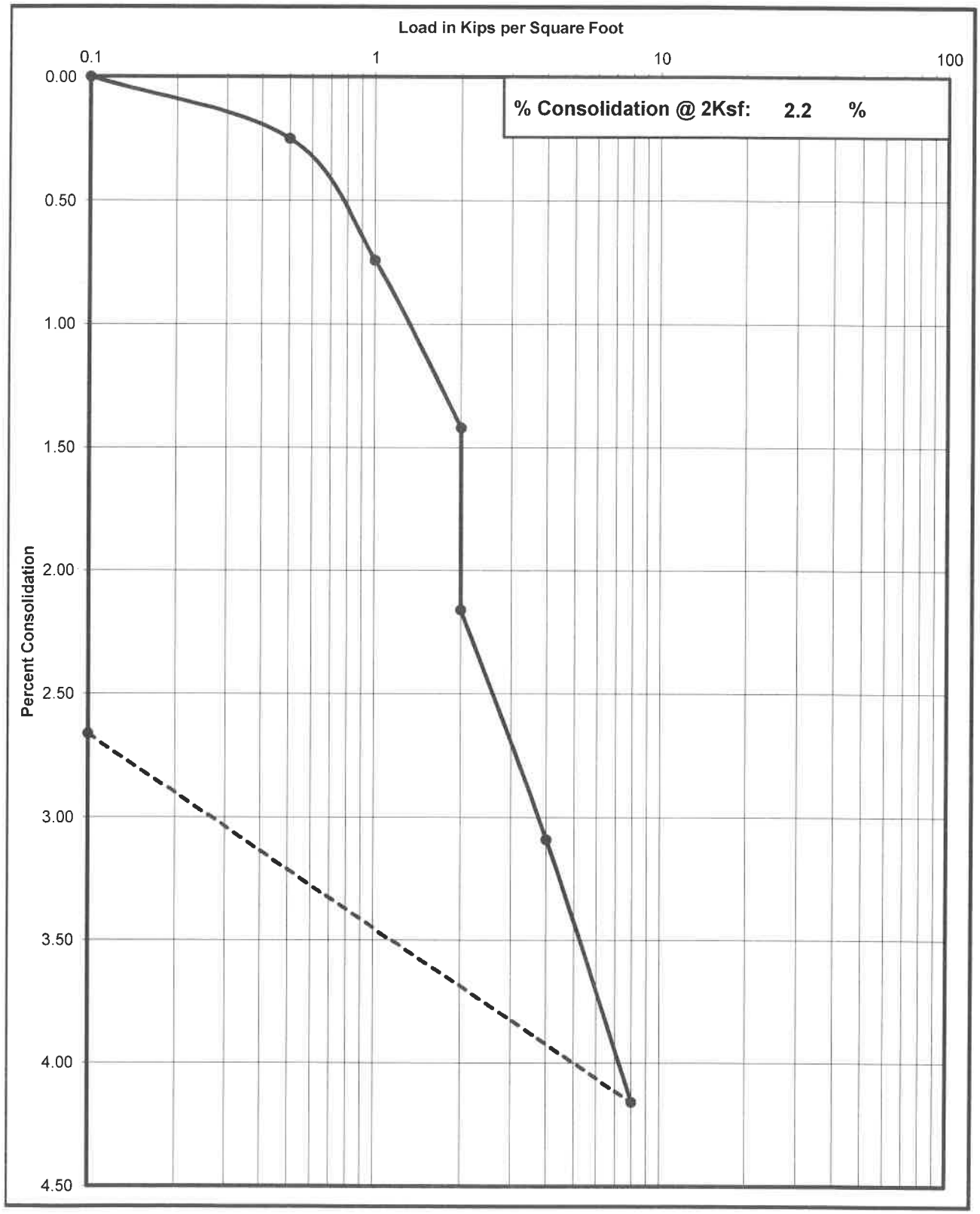
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B31 @ 2-3' | 8/3/2018 | SM |

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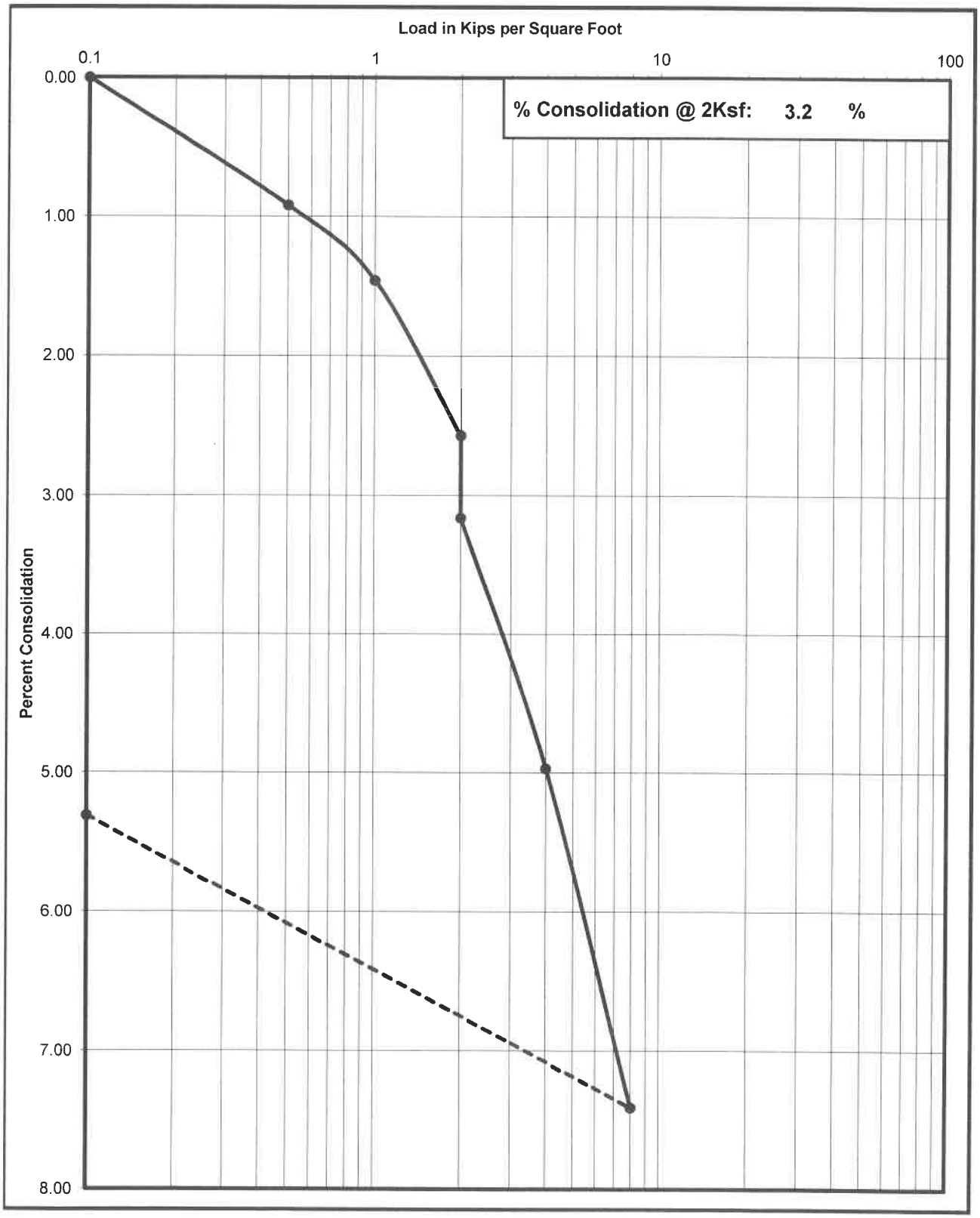
# Consolidation Test

| Project No | Boring No. & Depth | Date | Soil Classification |
|---|---|---|---|
| 022-18063 | B33 @ 2-3' | 8/6/2018 | ML |

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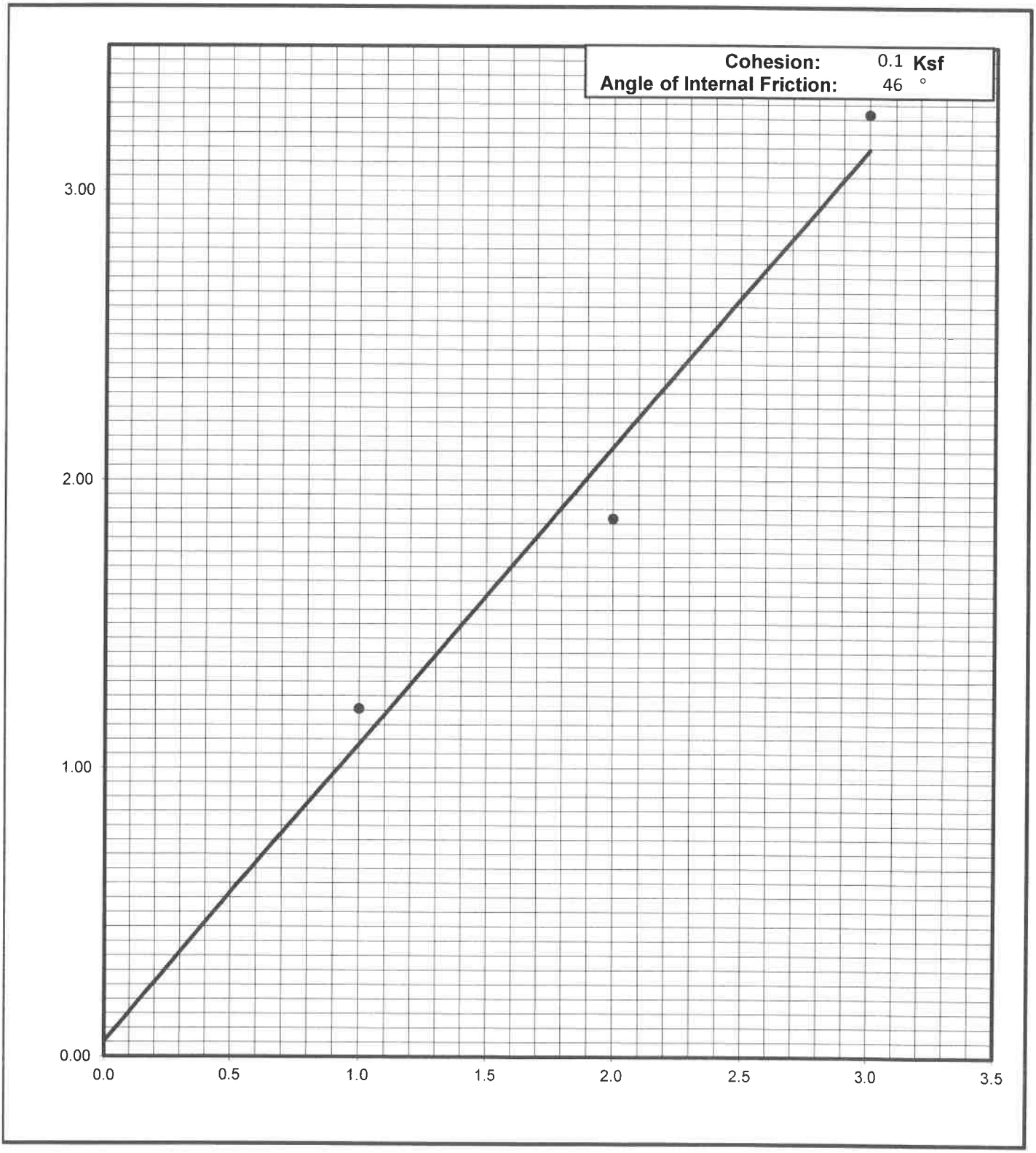
# Shear Strength Diagram (Direct Shear)
## ASTM D - 3080 / AASHTO T - 236

| Project Number | Boring No. & Depth | Soil Type | Date |
|---|---|---|---|
| 022-18063 | B4 @ 5-6' | ML | 8/3/2018 |

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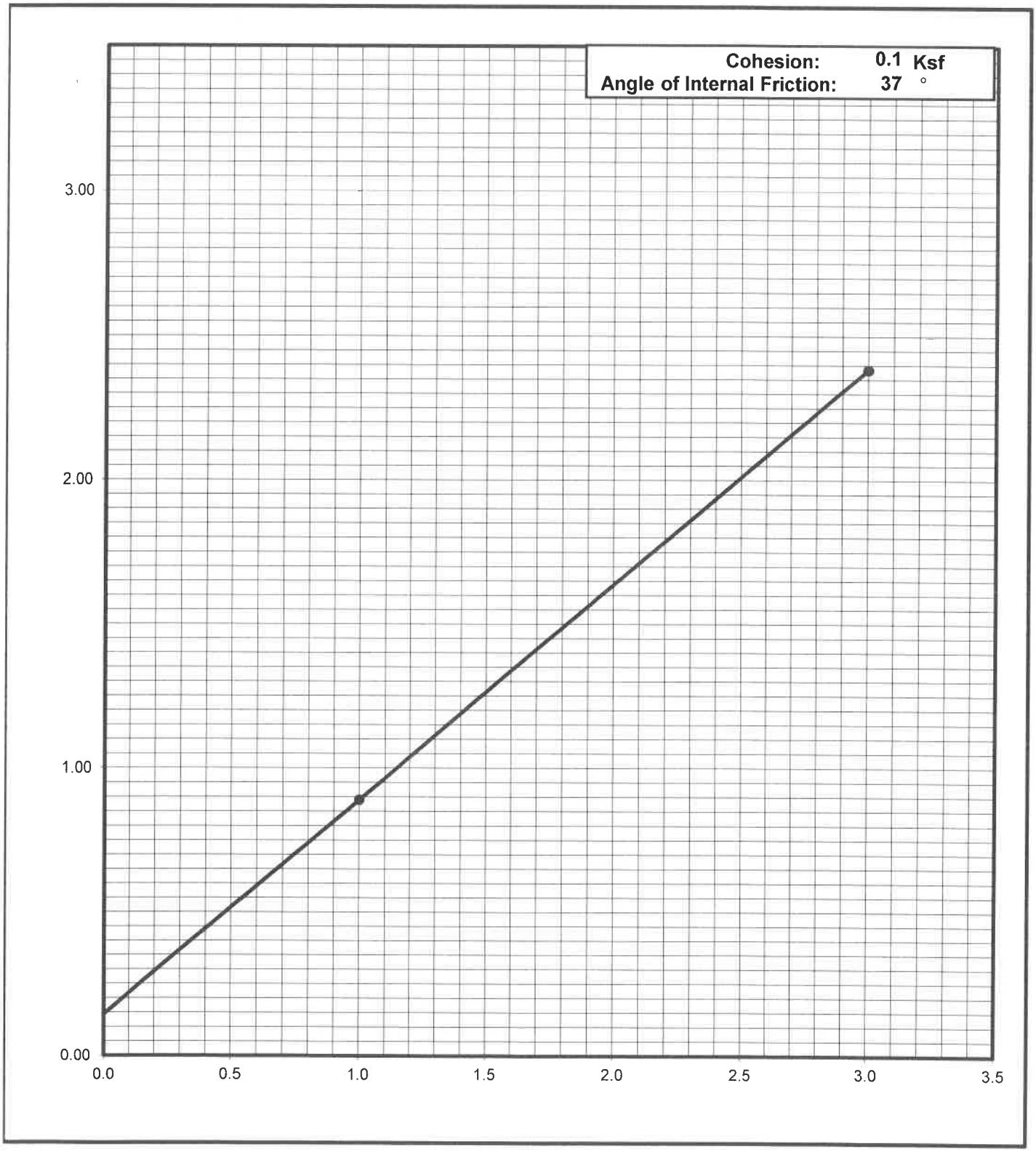
# Shear Strength Diagram (Direct Shear)
## ASTM D - 3080 / AASHTO T - 236

| Project Number | Boring No. & Depth | Soil Type | Date |
|---|---|---|---|
| 022-18063 | B17 @ 2-3' | SM | 8/3/2018 |

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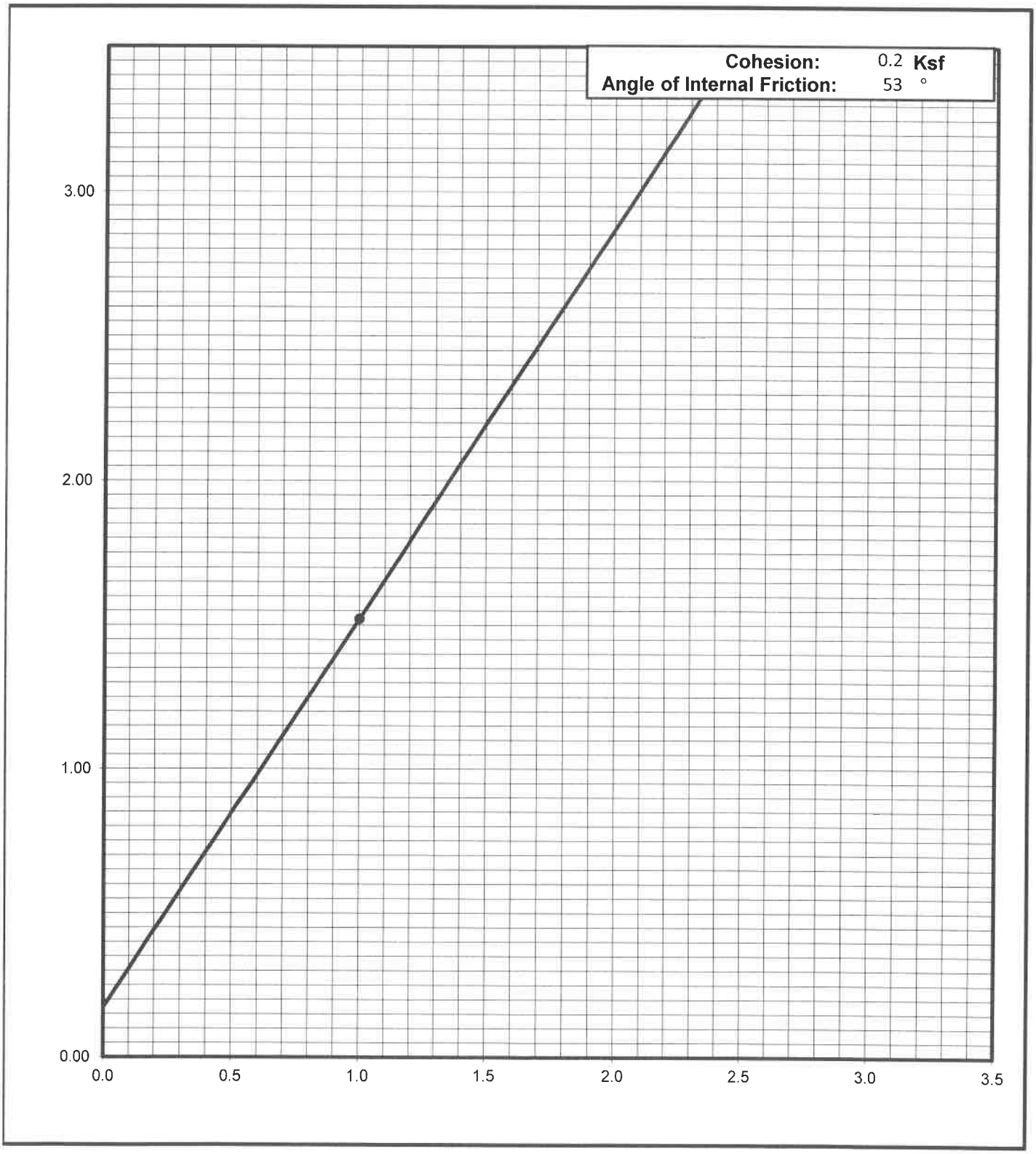
# Shear Strength Diagram (Direct Shear)
## ASTM D - 3080 / AASHTO T - 236

| Project Number | Boring No. & Depth | Soil Type | Date |
|---|---|---|---|
| 022-18063 | B33 @ 5-6' | ML | 8/6/2018 |

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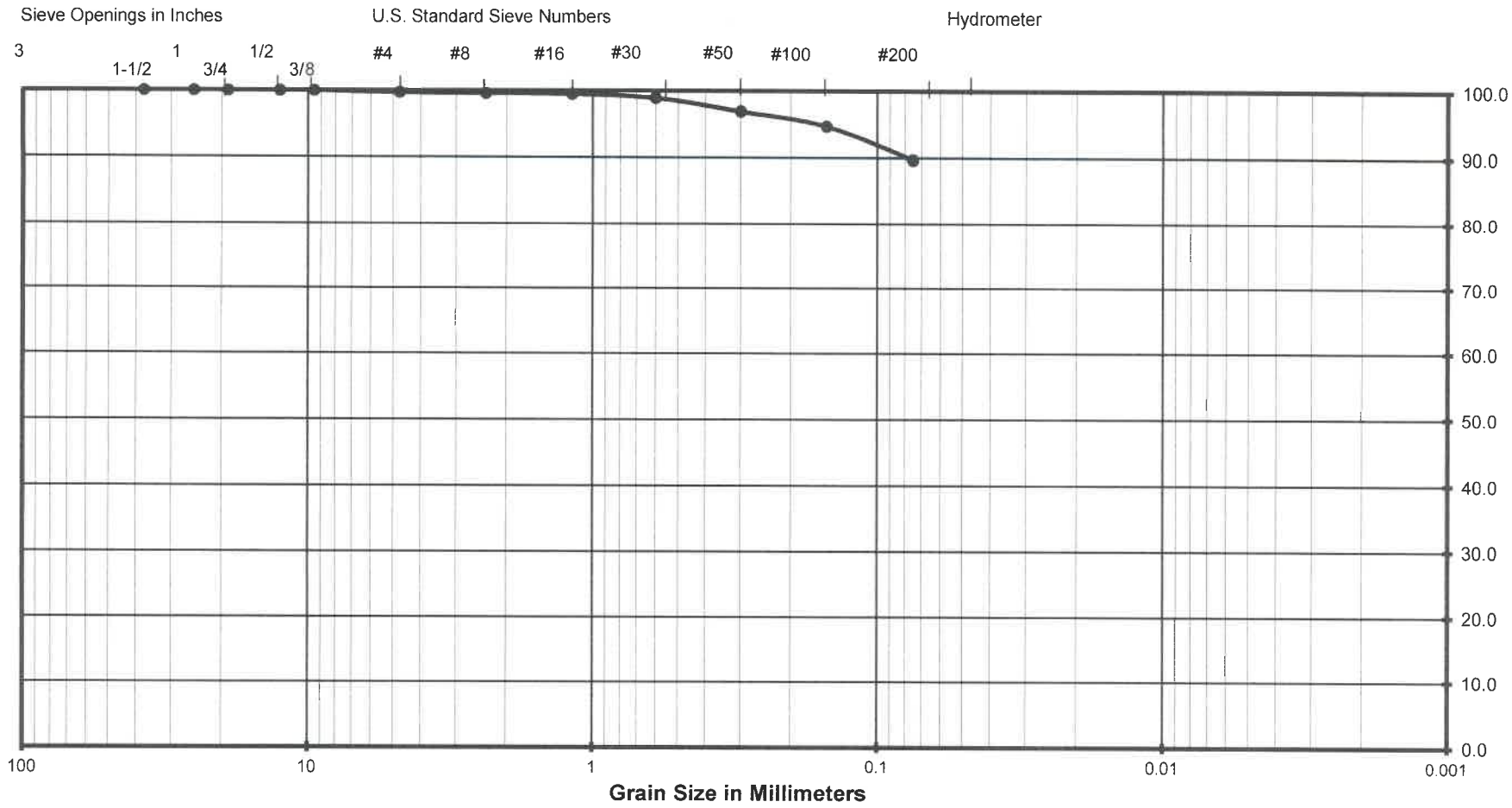
# Grain Size Analysis




(Unified Soils Classification)

| | |
|---|---|
| Project Name | Lime Plant |
| Project Number | 022-18063 |
| Soil Classification | ML |
| Sample Number | B16 @ 5-6' |

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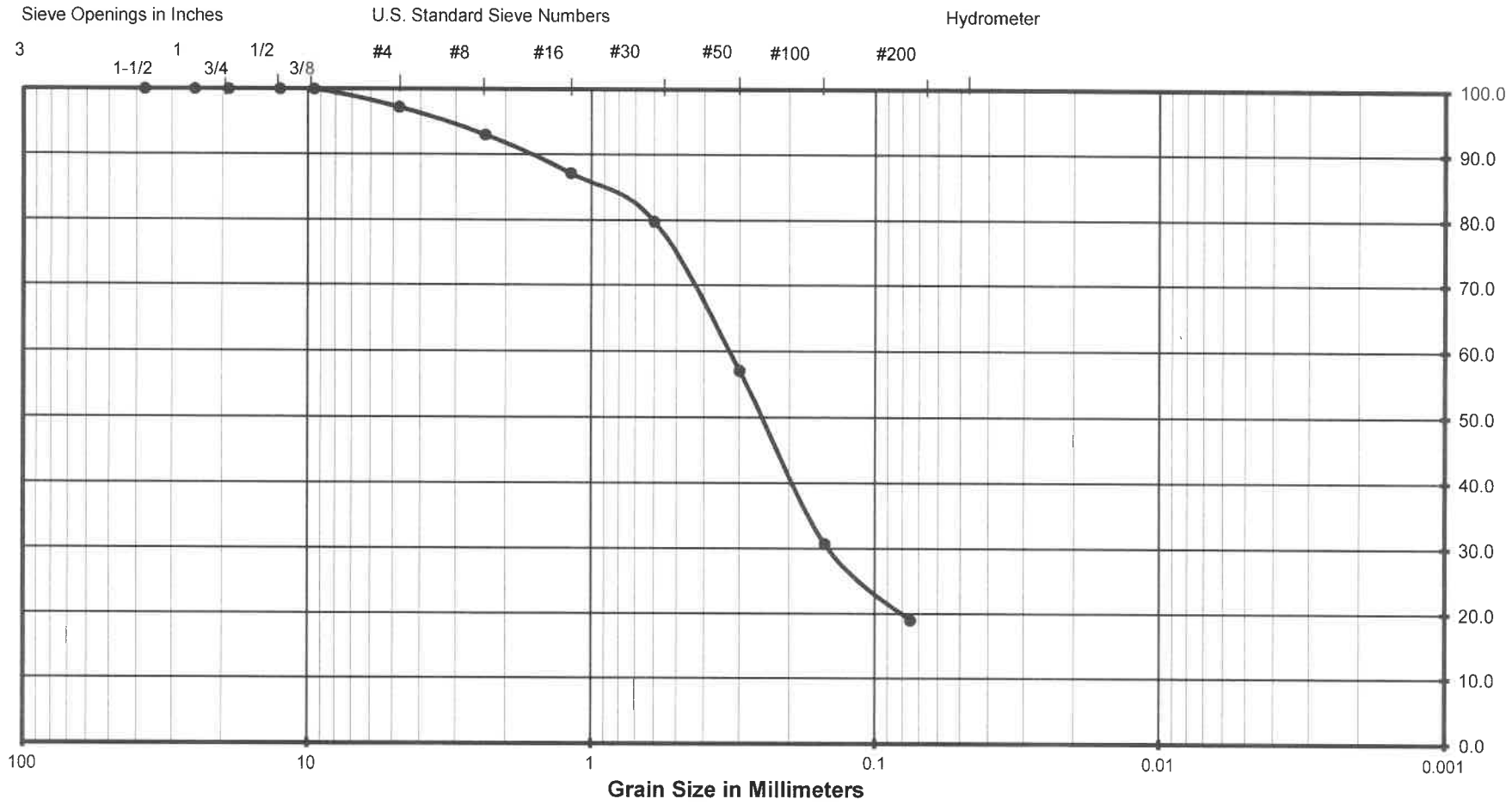
# Grain Size Analysis




**(Unified Soils Classification)**

| | |
|---|---|
| Project Name | Lime Plant |
| Project Number | 022-18063 |
| Soil Classification | SM |
| Sample Number | B31 @ 2-3' |

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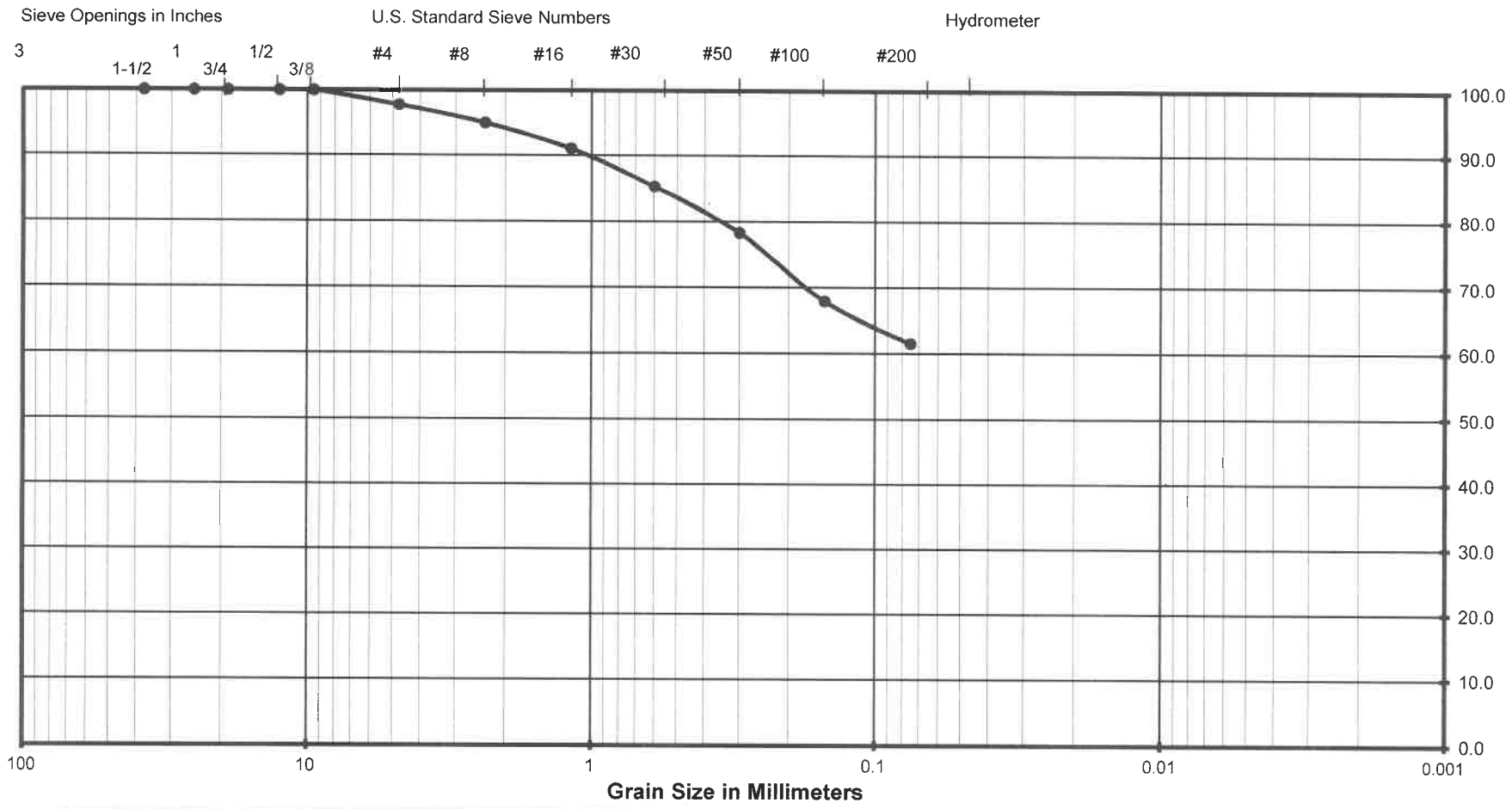
# Grain Size Analysis




**(Unified Soils Classification)**

| | |
|---|---|
| Project Name | Lime Plant |
| Project Number | 022-18063 |
| Soil Classification | ML |
| Sample Number | B33 @ 2-3' |

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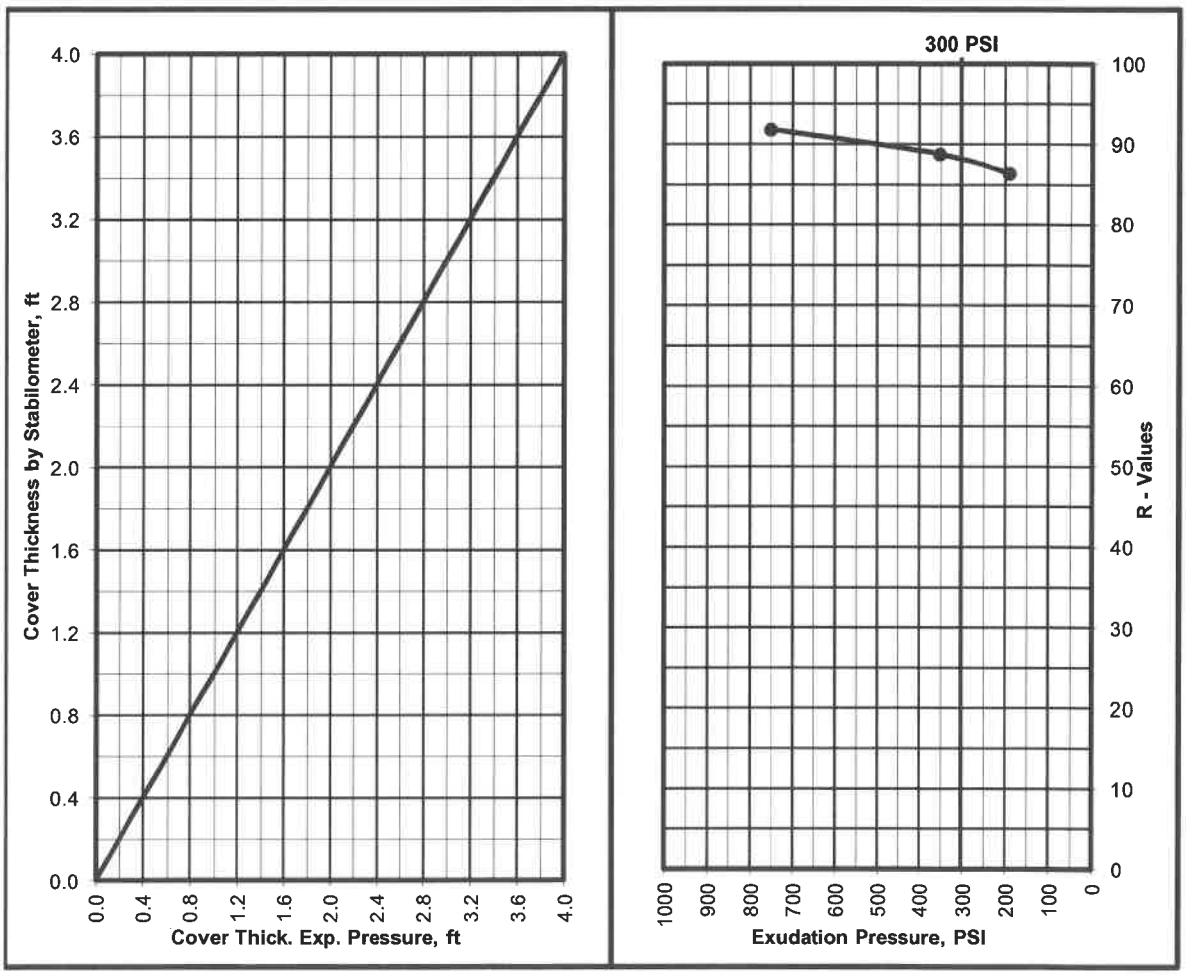
# R - VALUE TEST
## ASTM D - 2844 / CAL 301

| | | |
|---|---|---|
| Project Number | : | 2218063 |
| Project Name | : | Lime Plant |
| Date | : | 7/26/2018 |
| Sample Location/Curve Number | : | RV1 Lime Plant 1.0'-3.0' |
| Soil Classification | : | Fine Grained Flyash |

| TEST | A | B | C |
|---|---|---|---|
| Percent Moisture @ Compaction, % | 18.8 | 20.0 | 17.5 |
| Dry Density, lbm/cu.ft. | 92.5 | 91.7 | 93.5 |
| Exudation Pressure, psi | 354 | 191 | 752 |
| Expansion Pressure, (Dial Reading) | -- | -- | -- |
| Expansion Pressure, psf | -- | -- | -- |
| Resistance Value R | 89 | 86 | 92 |

| | |
|---|---|
| **R Value at 300 PSI Exudation Pressure** | **88** |
| **R Value by Expansion Pressure (TI =): 5** | **Expansion Pressure nil** |

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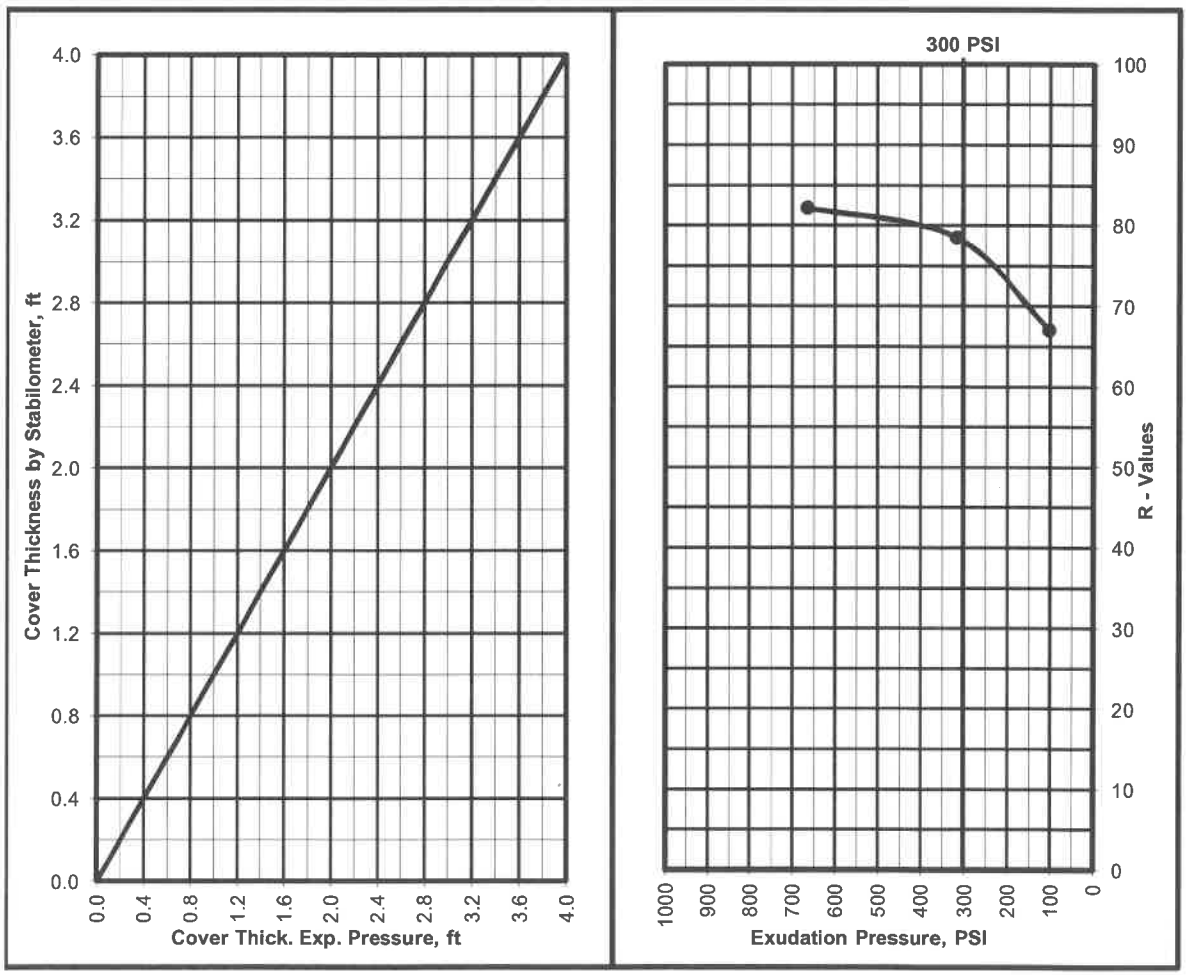
# R - VALUE TEST
## ASTM D - 2844 / CAL 301

| | | |
|---|---|---|
| Project Number | : | 2218063 |
| Project Name | : | Lime Plant |
| Date | : | 7/26/2018 |
| Sample Location/Curve Number | : | RV2 Lime Plant 1.0'-3.0' |
| Soil Classification | : | F-M Silty Sand w/Fly Ash |

| TEST | A | B | C |
|---|---|---|---|
| Percent Moisture @ Compaction, % | 10.4 | 9.9 | 10.2 |
| Dry Density, lbm/cu.ft. | 120.0 | 120.2 | 119.9 |
| Exudation Pressure, psi | 103 | 665 | 318 |
| Expansion Pressure, (Dial Reading) | -- | -- | -- |
| Expansion Pressure, psf | -- | -- | -- |
| Resistance Value R | 67 | 82 | 79 |

| | |
|---|---|
| **R Value at 300 PSI Exudation Pressure** | **78** |
| **R Value by Expansion Pressure (TI =): 5** | **Expansion Pressure nil** |

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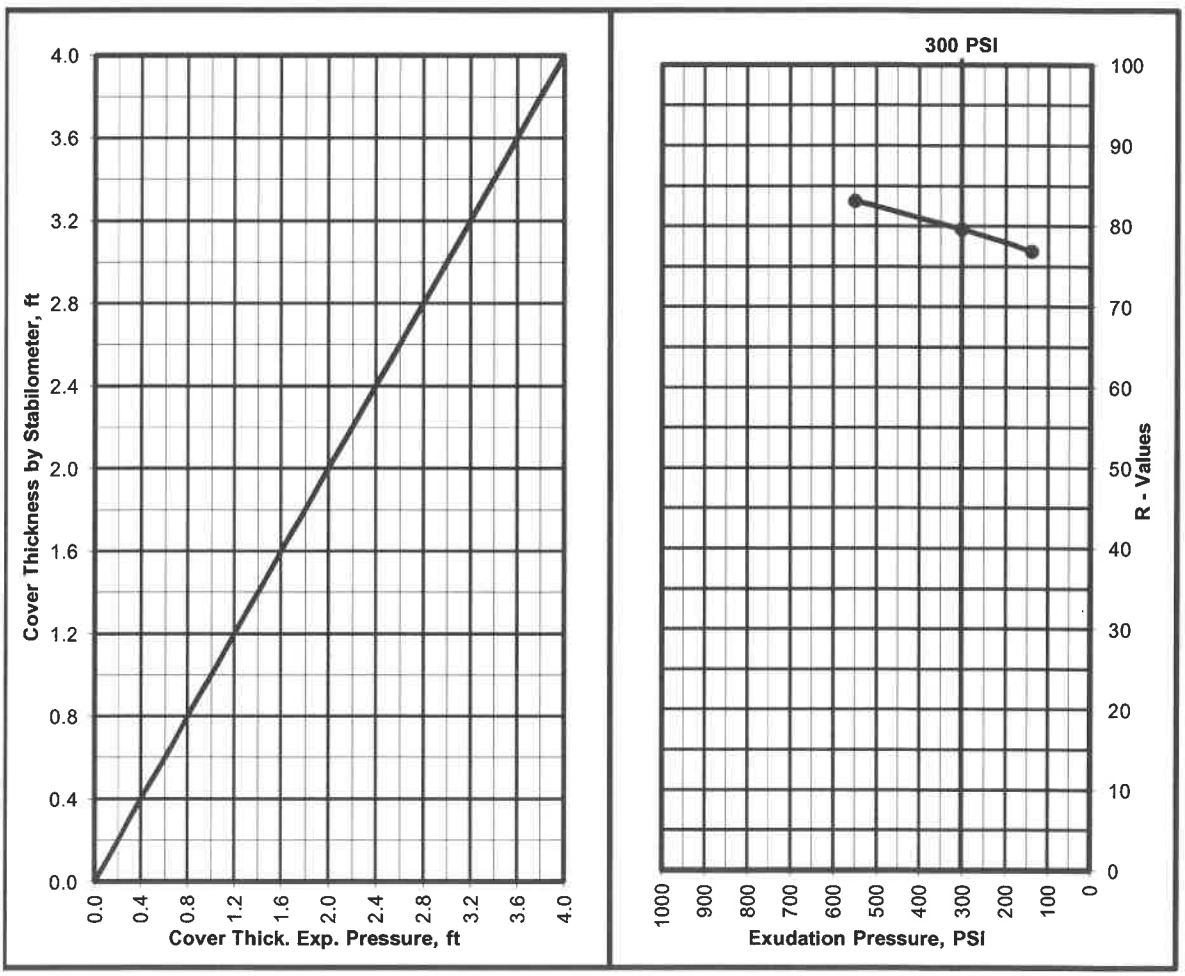
# R - VALUE TEST
## ASTM D - 2844 / CAL 301

| | | |
|---|---|---|
| Project Number | : | 2218063 |
| Project Name | : | Lime Plant |
| Date | : | 7/26/2018 |
| Sample Location/Curve Number | : | RV3 Lime Plant 1.0'-3.0' |
| Soil Classification | : | F-M Silty Sand w/Fly Ash |

| TEST | A | B | C |
|---|---|---|---|
| Percent Moisture @ Compaction, % | 10.1 | 10.9 | 10.5 |
| Dry Density, lbm/cu.ft. | 119.4 | 119.4 | 119.4 |
| Exudation Pressure, psi | 549 | 139 | 302 |
| Expansion Pressure, (Dial Reading) | -- | -- | -- |
| Expansion Pressure, psf | -- | -- | -- |
| Resistance Value R | 83 | 77 | 80 |

| | |
|---|---|
| **R Value at 300 PSI Exudation Pressure** | **79** |
| **R Value by Expansion Pressure (TI =): 5** | **Expansion Pressure nil** |

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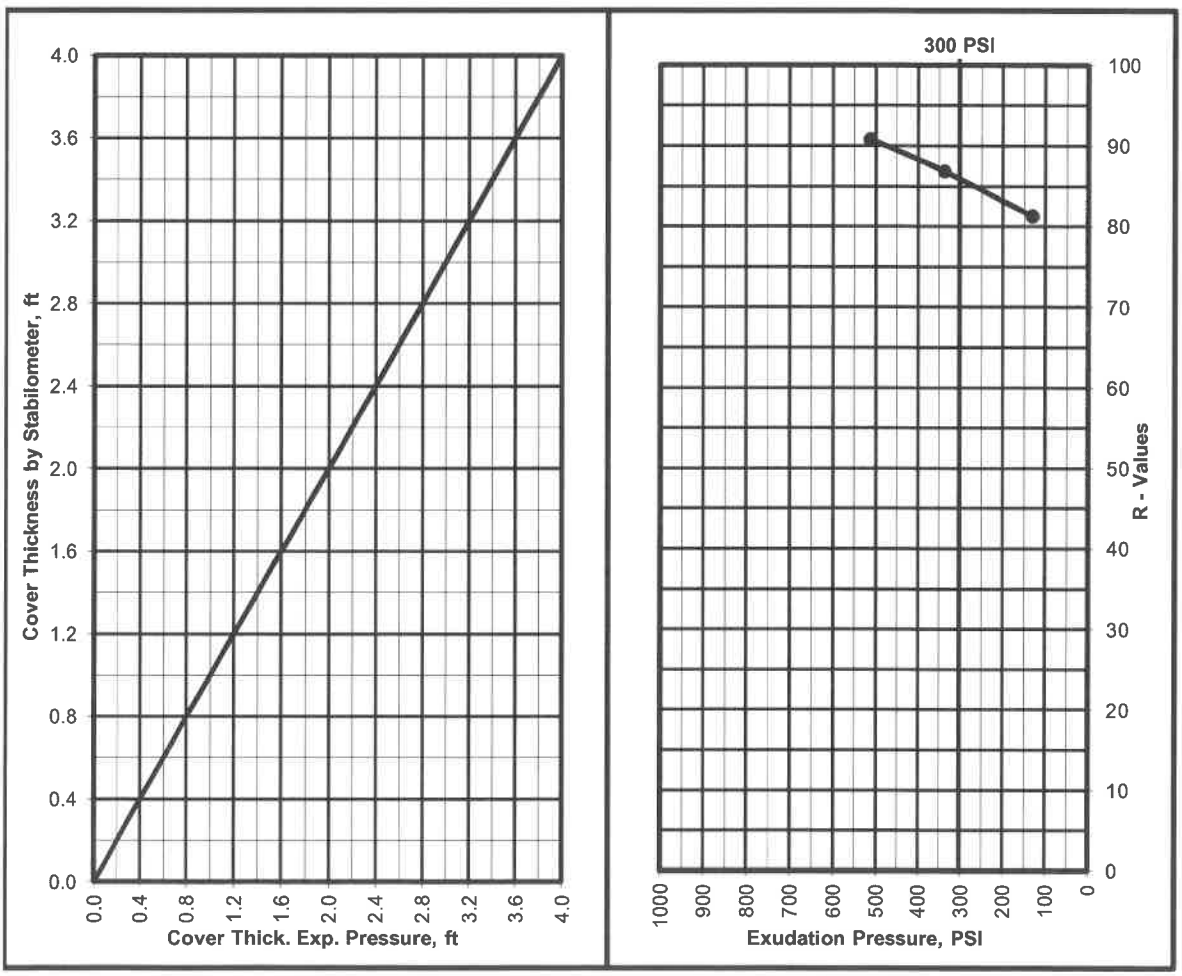
# R - VALUE TEST
## ASTM D - 2844 / CAL 301

| | | |
|---|---|---|
| Project Number | : | 2218063 |
| Project Name | : | Lime Plant |
| Date | : | 7/26/2018 |
| Sample Location/Curve Number | : | RV4 Lime Plant 1.0'-3.0' |
| Soil Classification | : | Fine Grained FlyAsh |

| TEST | A | B | C |
|---|---|---|---|
| Percent Moisture @ Compaction, % | 17.6 | 18.8 | 16.3 |
| Dry Density, lbm/cu.ft. | 95.3 | 93.2 | 96.0 |
| Exudation Pressure, psi | 338 | 131 | 513 |
| Expansion Pressure, (Dial Reading) | -- | -- | -- |
| Expansion Pressure, psf | -- | -- | -- |
| Resistance Value R | 87 | 81 | 91 |

| | |
|---|---|
| **R Value at 300 PSI Exudation Pressure** | **86** |
| **R Value by Expansion Pressure (TI =): 5** | **Expansion Pressure nil** |

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# APPENDIX B

# EARTHWORK SPECIFICATIONS

## GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

**SCOPE OF WORK:** These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

**PERFORMANCE:** The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Soils Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

**TECHNICAL REQUIREMENTS**: All compacted materials shall be densified to a density not less than 90 percent relative compaction based on ASTM Test Method D1557 or CAL-216, as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be as determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

**SOILS AND FOUNDATION CONDITIONS**: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the Contract documents for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

**DUST CONTROL:** The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

## SITE PREPARATION

Site preparation shall consist of site clearing and grubbing and the preparations of foundation materials for receiving fill.

**CLEARING AND GRUBBING:** The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Soils Engineer to be deleterious or otherwise unsuitable. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots larger than 1 inch. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavations should not be permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas which are to receive fill materials shall not be permitted.

**SUBGRADE PREPARATION:** Surfaces to receive Engineered Fill, building or slab loads shall be prepared as outlined above, excavated/scarified to a depth of 12 inches, moisture-conditioned as necessary, and compacted to 90 percent relative compaction.

Loose soil areas, areas of uncertified fill, and/or areas of disturbed soils shall be moisture-conditioned as necessary and recompacted to 90 percent relative compaction. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any of the fill material.

**EXCAVATION:** All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

**FILL AND BACKFILL MATERIAL:** No material shall be moved or compacted without the presence of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

**PLACEMENT, SPREADING AND COMPACTION:** The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer.

Both cut and fill areas shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

**SEASONAL LIMITS:** No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill are as specified.

# APPENDIX C

## PAVEMENT SPECIFICATIONS

**1. DEFINITIONS** - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to is the 2010 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

**2. SCOPE OF WORK** - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically noted as "Work Not Included."

**3. PREPARATION OF THE SUBGRADE** - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

**4. UNTREATED AGGREGATE BASE** - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, 1½ inches maximum size. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent.

**5. AGGREGATE SUBBASE** - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class 2 material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

**6. ASPHALTIC CONCRETE SURFACING** - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment and spreading and compacting mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50° F. The surfacing shall be rolled with a combination of steel wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

**7. FOG SEAL COAT** - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.