FARMLAND CONVERSION STUDY

For:

General Plan Amendment No. 21-0424
28.91 Acres
North of McCutchen Road, East and West of Mountain Vista Drive
City of Bakersfield, State of California

Portion of Section 30, Township 30 South, Range 27 East, M.D.M.

Prepared for:

ORR Development 2, LLC

Prepared by:

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Project No. 15-008.07

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1.0 Introduction

As the United States continues to urbanize, one of the many challenges facing the City of Bakersfield and Kern County is blending the need to preserve agricultural land and open space with the demand for development in metropolitan edges. Projects involving changes in land use sometimes convert agricultural lands to non-agricultural uses. Conserving productive agricultural lands requires a careful project-specific evaluation of the direct and indirect effects, as well as the cumulative effects, of agricultural land conversion. This technical report provides analysis for the existing farmland and agricultural operations on the project site and evaluates the potential adverse impacts on the conversion of farmland to non-agricultural uses. In order to analyze the proposed project's potential impact to agricultural lands, this study utilized factors identified in the Metropolitan Bakersfield General Plan (MBGP) and in accordance with the California Environmental Quality Act (CEQA) Guidelines and statutes.

2.0 Purpose of Study

This Farmland Conversion Study addresses the conversion of approximately 28.91+/- acres of agricultural land to non-agricultural uses, and identifies impacts, mitigation, and significance after mitigation. The subject property is within the MBGP planning area and subject to the California Environmental Quality Act.

The Lead Agency (City of Bakersfield) typically bases a determination of agricultural resources significance on the thresholds established by the CEQA Guidelines. The Environmental Checklist Form of the CEQA Guidelines (Appendix "G"), contains a list of impacts that may be deemed potentially significant. The lead agency should address questions from this checklist that are relevant to a project's environmental effects. The questions from Appendix "G", pertaining to agricultural resources follow:

Agriculture Resources - In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland.

Would the project:

a. *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*
b. *Conflict with existing zoning for agricultural use or a Williamson Act Contract?*
c. *Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?*

3.0 Project Description

The proposed project is located on the north side of McCutchen Road and east and west of Mountain Vista Drive within the City of Bakersfield limits, further described as being a portion of the southwest quarter of Section 30, Township 30 South, Range 27 East, Mount Diablo Meridian. This Farmland Conversion Study addresses the conversion of two parcels consisting of 28.91 acres gross in size. The property is identified as Assessor's Parcel Numbers 541-010-23 and 27. According to the United States Geological Survey (USGS) Gosford 7.5-minute quadrangle maps and visual inspection of the property, a majority of the topography of the site is flat. The property elevation ranges from approximately 338 to 343 feet above mean sea level at the center of the site.

In 2005, the FPEIR for the Old River Ranch Project was certified, which approved an 1,853-acre master planned community consisting of low to high medium density residential, commercial, recreational space, a school, and public service infrastructure land uses. The proposed project site is within the boundaries of the Old River Ranch Project and considered an "outparcel" in the analysis. Since the proposed project had separate property ownership at the time of processing, it was not considered a part of the overall Old River Ranch Project.

The proposed project, though once determined an outparcel, is now surrounded by development and has become an infill site. Tract numbers 7043 and 7044 have recorded maps to the east and north, and tentative tract maps are approved for Tract numbers 7041, 6792, 7190, and 7042 to the north, south, southeast, and west, respectively. The dominant land uses in the area are residential in nature, with Independence High School to the east, and active almond orchards in production to the south. Many of the agricultural areas within the project vicinity are or already have transitioned to residential land uses.

The existing land use designation of the project site is R-IA (Resource-Intensive Agriculture). The project site has an existing zone classification of R-1 (Single-Unit Dwelling). As part of the proposed project, the City of Bakersfield (City) will consider a General Plan Amendment to change the land use designation to LR (Low Density Residential). The request is a necessary requirement for the land use to complement the existing zone classification. An application for Vesting Tentative Tract Map (VTTM) number 7410 is also being processed for the subject parcels, to further subdivide the site into 147 residential lots. The map is proposed to be developed in four phases.

The subject property is presently vacant, but has historically been used for agriculture. The project site is adjacent to vacant land to the north and west that are in the stages to commence grading activities for future single-family residential homes. Single-family residential homes exist to the east and further north of the vacant land, and agricultural uses to the south across McCutchen Road and further west of Buena Vista Road. *See Table 1 below*.

Table 1: Existing Land Use and Zoning

Location	Land Use	Zone	Current Use
Proposed Project Site	R-IA	R-1	Vacant Land
North	LR	R-1/P.U.D.	Vacant Land and Single Family Residential
East	LR	R-1/P.U.D.	Single Family Residential
South	LR and HMR	R-2/P.U.D.	Agriculture - Orchards
West	LR	R-1/P.U.D.	Vacant Land

R-IA – Resource-Intensive Agriculture
LR – Low Density Residential
HMR – High Medium Density Residential
R-1 – Single-Unit Dwelling
P.U.D. – Planned Unit Development

4.0 Environmental Setting

State

The 2022-2023 California Agricultural Statistics Review prepared by the California Department of Food & Agriculture states that California had 68,400 farming operations for the year 2022, representing a decrease of 0.9 percent from 2021. These farming and ranching operations span over 24.0 million acres of land. California remained the leading state in gross cash receipts from farming in 2022, with combined commodities representing 10.4 percent of the national total. Gross cash receipts in farming were $55.9 billion in 2022, representing an increase from $51.4 billion in output for 2021. Top agricultural revenue was led by the dairy industry, followed by grapes, miscellaneous crops, and cattle.

The average farm size in California is 351 acres compared with the U.S. average of 463 acres, and approximately 400 crops are recognized in the state, including seeds, flowers and ornamental. Modern agricultural practices in the United States have greatly increased the productivity of an acre of land. One acre can produce 60,000 pounds of strawberries, 16,500 pounds of garlic, 30,000 pounds of carrots, 26,000 pounds of cantaloupe, or 1,186 pounds of cotton lint. California's top 20 crops and livestock commodities account for 74 percent of the state's gross farm income, and a $47.9 billion value in 2022. Agricultural exports for the state reached $23.6 billion for 2022, which represents an increase of 4.4 percent from the previous year. California's agricultural export values have increased by 9.6 percent over the past ten years.

California has some of the most agriculturally productive counties in the nation. The top ten agricultural producing counties located in California are the following: Tulare, Fresno, Kern, Monterey, Merced, Stanislaus, San Joaquin, Imperial, Kings, and Ventura.

Regional

The valley region of Kern County is highly suitable for agricultural cultivation. A review of the California Department of Food and Agriculture Crop Reports indicates a history of high agricultural production for many crops over the years and continuing to the present. Factors that influence high agricultural activity today are climate, availability of water, dependable market demand, good soils, and most importantly, proper management. Agriculture in Kern County has been extensive since the introduction of livestock in the 1860's. Livestock raising on large land grants and some production of grain under dry-farming methods were the primary agricultural pursuits until about 1880. Rapid agricultural development occurred after 1880 due to the development of irrigation, inexpensive land, favorable crop yields, the arrival of two railroads, the development of the petroleum industry, and access to markets.

Agricultural production in the City and Kern County makes significant contributions to the economy of the state. Nine of the top ten agriculture producing counties nationwide are located in California, as discussed under the state setting above. Kern County's agricultural production outranks twenty states in agricultural production and is the fourth largest producer of agricultural products in the state.

The Kern County Department of Agriculture compiles local crop production and values for each calendar year. According to the 2023 Kern County Agricultural Crop Report, the gross value of all agricultural commodities produced in Kern County was $8,626,533,000. This amount represents a 12 percent increase from the crop value from the previous year in 2022. Much of the $5 billion crop value, about 66 percent, was derived from five commodities in 2024: grapes, citrus, pistachios, almonds, and carrots. These five agricultural commodities make up the majority of the county's agricultural revenue.

5.0 Regulatory Setting

California Land Conservation (Williamson) Act of 1965

The California Land Conservation Act of 1965, also referred to as the Williamson Act (Government Code Section 51200), was established with the basic intent of encouraging the preservation of the state's agricultural lands in view of the increasing trends toward their "premature and unnecessary" urbanization. The Williamson Act enables local governments to enter into voluntary contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments, which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971. The Act supports California's conservation, food security, and orderly growth goals while helping farmers and ranchers to stay in production.

Farmland Security Zone Contract of 1998

In 1998, the State Department of Conservation passed legislation that would allow individual counties to establish an additional program for farmlands to enter into contract

with the state to receive a similar benefit as the Williamson Act contract. The Farmland Security Zone is a 20-year self-renewing contract that allows property owners with qualifying parcels to receive an additional 35 percent in tax savings above that which is received under the Williamson Act land use contract.

Both of these contracts, Williamson Act and Farmland Security Zone, require that lands be within an established agricultural preserve. Agricultural lands that are not under contract face the greatest threat for conversion, as they are assessed higher property taxes due to their proximity to urbanization. According to the Kern County GIS, the property is located within the boundaries of Agricultural Preserve No. 10. None of the subject property is subject to a Williamson Act land use contract or Farmland Security Zone.

Public Resources Code Section 21060.1

Public Resources Code Section 21060.1 defines agricultural land (that meets the requirements as defined in Government Code Section 51201, Williamson Act) for purposes of assessing environmental impacts using the Department of Conservation Farmland Mapping and Monitoring Program (FMMP) categories. In 1982, the FMMP was established in response to a critical need for assessing the location, quality and quantity of agricultural lands and their conversion. The FMMP is a non-regulatory program and provides a consistent and impartial analysis of documenting changes in agricultural land use throughout the state. Government Code Section 65570 mandates the FMMP to biennially report on the conversion of farmland and grazing land with updated maps and data for the public. The data consists of the current inventory of agricultural resources and has a minimum mapping unit of ten acres.

The FMMP's study area is contiguous with modern soil surveys developed by the United States Department of Agriculture. The technical soil ratings combined with current land use created the basis for the classification system for Important Farmland Maps of these lands. Important Farmland Maps include eight mapping categories: prime farmland, farmland of Statewide importance, unique farmland, farmland of local importance, grazing land, urban and built-up land, other land, and water.

Under the FMMP, the proposed project site is designated as "Prime Farmland" (California Department of Conservation, Division of Land Resource Protection, updated 2020). Prime Farmland is defined as farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops. Additionally, the land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date. (California Department of Conservation)

Land Use and Zoning Regulations

Land uses located within agricultural areas are regulated by the general plan and zoning ordinances of the lead jurisdiction of the planning boundary. Land uses and density permitted in agricultural areas are identified with development parameters in these

documents. The project is located in the incorporated City of Bakersfield and its Sphere of Influence, governed by the goals and policies of the Metropolitan Bakersfield General Plan and Bakersfield Municipal Code Title 17 Zoning. Each of the plans are discussed below as they relate to agricultural lands.

Metropolitan Bakersfield General Plan (MBGP)

The adopted MBGP is the fundamental policy document of the City and allows for development within planned growth boundaries. Comprised of various elements, the MBGP provides guidance for land use compatibility, circulation, housing, conservation, open space, noise, safety, downtown redevelopment, public services and facilities, parks, the Kern River plan, and historical resources within the defined growth boundaries.

The Conservation Element of the MBGP addresses biological, mineral and water resources, soils and agriculture, and air quality. Goals and policies within the MBGP are established for specific direction and guiding action for the conservation of soils and agriculture within the City. Historically, the subdivision of lands has resulted in substantial loss of prime agricultural lands being taken out of production and subsequently, land use patterns of low density sprawl contribute to this loss in Bakersfield. Applicable goals and policies from the MBGP related to agriculture are provided below.

Goals

1. Provide for the planned management, conservation, and wise utilization of agricultural land in the planning area.
2. Promote soil conservation and minimize development of prime agricultural land as defined by the following criteria:
    a. Capability Class I and/or II irrigated soils
    b. 80-100 Storie Index rating
    c. Gross crop return of $200 or more per acre per year
    d. Annual carrying capacity of 1 animal unit per acre per year
3. Establish urban development patterns and practices that promote soil conservation and that protect areas of agricultural production of food and fiber crops, and nursery products.

Policies

1. Determine the extent and location of all prime agricultural land within the study area.
2. Review projects that propose subdividing or urbanizing prime agricultural land to ascertain continued commercial agricultural production in the project vicinity will be affected.
3. Protect areas designated for agricultural use, which include Class I and II agricultural soils having surface delivery water systems, from the encroachment of residential and commercial subdivision development activities.
4. Monitor the amount of prime agricultural land taken out of production for urban uses or added within the plan area.

5. Continue implementing land grading ordinances that reduce soil erosion/siltation commonly associated with land development.
6. Land use patterns, grading, and landscaping practices shall be designed to prevent soil erosion while retaining natural watercourses when possible.
7. Encourage agricultural uses to employ soil conservation measures to prevent erosion.
8. Encourage landowners to retain their lands in agricultural production.
9. Encourage property owners to improve or preserve soil conditions.
10. Prohibit premature removal of ground cover in advance of development and require measures to prevent soil erosion during and immediately after construction.
11. Minimize the alteration of natural drainage and require development plans to include necessary construction to stabilize runoff and silt deposition through enforcement of grading and flood protection ordinances.
12. When considering proposals to convert designated agricultural lands to non-agricultural use, the decision-making body of the City and County shall evaluate the following factors to determine the appropriateness of the proposal:
    - Soil quality
    - Availability of irrigation water
    - Proximity to non-agricultural uses
    - Proximity to intensive parcelization
    - Effect on properties subject to “Williamson Act” land use contract
    - Ability to be provided with urban services (sewer, water, roads, etc.)
    - Ability to affect the application of agricultural chemicals on nearby agricultural properties
    - Ability to create a precedent-setting situation that leads to the premature conversion of prime agricultural lands
    - Demonstrated project need
    - Necessity of buffers such as lower densities, setbacks, etc.
13. Buffers such as setbacks, berms, greenbelts, and open space areas shall be established to separate farmland from incompatible urban uses.
14. Future development which involves in-fill of the urban area as opposed to development on the urban fringes shall be encouraged.
15. Sensitive subdivision design of lands near or adjacent to agricultural areas shall be conducted with consideration given to the impacts of non-agricultural uses on agricultural uses.
16. To reduce the potential for conflicts between agricultural and non-agricultural uses sensitive subdivision design of lands near or adjacent to agricultural areas shall be conducted including provisions for buffer zones (i.e., a road, canal, wall, easement, or setback).

Implementation

Per the MBGP, the goals and policies listed above will be achieved through the implementation measures and programs listed below.

1. Retain latest Soil Conservation Service Maps to determine the location of capability Class I and/or II irrigated soils, and Storie Index 80-100 soils.
2. Evaluate discretionary projects for their impact on agricultural resources.
3. Document urban expansion and changes in the amount of agricultural land for purposes of determining cumulative impacts to prime agricultural land.
4. Periodically review and update grading ordinances that take into account the potential of soil erosion.
5. Encourage the use of Land Conservation Act contracts in areas designated for agricultural land use.
6. Provide public information on economic incentives available to aid in the preservation of prime agricultural land.
7. Review General Plan Amendment proposals in urban uses in accordance with factors specified in Agricultural Conservation Policy No. 14.

6.0 Project Impacts

Conversion of Prime Farmland

The proposed project site consists of 28.91 acres designated as “Prime Farmland” by the state Department of Conservation. Limitations upon agriculture in the City planning area include increased amounts of salinity in the soil and urban expansion. As discussed in the MBGP, the subdivision of lands has resulted in substantial prime agricultural acreages being taken out of production. As the parcels become developed and urban sprawl increases, as well as pressures from the state to meet emergency housing needs. As the urban expansion eliminates buffers to agricultural land, so does the elimination of available land for agricultural production opportunities. This in turn, has depressed the agricultural economy.

The proposed project has a Resource-Intensive Agriculture (R-IA) land use designation per the MBGP and a Single-Unit Dwelling (R-1) zone classification per Title 17 of the Bakersfield Municipal Code. The current conflicting land use designation does not allow the uses defined in the Zoning Ordinance for Single-Unit Dwelling development. The project site zone classification supports the land use designation for agricultural activities. Agricultural production activities have not occurred on-site since the Applicant purchased the property years ago.

Currently, the site is an in-fill lot or vacant development surrounded by residential land uses. Located to the north and west of the site are residential developments, a school and residential development to the east, and rural residential and agricultural land that is zoned for multi-family development to the south.

Pursuant to the implementation of the policies with the MBGP listed in Section 5 above, when considering proposals to convert designated agricultural lands to non-agricultural uses, the City would consider the following factors to determine the level of impact:

- Soil quality,
- Availability of irrigation water,
- Proximity to non-agricultural uses,
- Proximity to intensive parcelization,
- Effect on properties subject to “Williamson Act” land use contracts,
- Ability to be provided with urban services (sewer, water, roads, etc.),
- Ability to affect the application of agricultural chemicals on nearby agricultural properties,
- Ability to create a precedent-setting situation that leads to the premature conversion of prime agricultural lands,
- Demonstrated project need, and
- Necessity of buffers such as lower densities, setbacks, etc.

Each of the criteria above has been applied to the current on-site conditions and analyzed below.

Soil Quality

Presently, the proposed area for site development consists 28.91 gross acres of fallow agricultural land with relatively flat topography. Per the Geotechnical Engineering Investigation (see Appendix A), subsurface soils were explored by drilling sixteen borings to depths ranging up to fifteen feet below existing site grade to evaluate subsurface soil conditions. The results of the field investigation determined the project site soils encountered consist of very loose silty sand upper soils, loose to medium dense silty sand up to three feet below the surface soils, and loose to dense sandy silt at depths below three feet. Groundwater was not encountered during the field investigation and historically, encountered at depths greater than fifty feet below site grade in the vicinity.

According to the California Department of Conservation, two criteria, one for land use and another for soil, must be met to be considered as Prime Farmland and Farmland of Statewide Importance. The land use must have been used for irrigated agricultural production within four years of the Important Farmland Map date analyzed by the state. Soil types must meet the physical and chemical criteria as determined by the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). The NCRS is a leader in soil science dedicated to studying, classifying, mapping, and conserving soils. Soils suitability for most kinds of field crops is rated from Class I to Class VIII, with Class I soils having the fewest limitations that restrict their practical use. A prime farmland soils designation requires a Class I or Class II land capability classification rating, indicating soils have slight to moderate limitations that reduce the choice of plants or require special to moderate conservation practices (USDA).

The predominant silty sands soils encountered on-site are moderately strong and moderately compressible. Soil type, groundwater depth, relative density, initial confining pressure, and intensity and duration of groundshaking were evaluated as low for the liquefaction potential of the site, and no mitigation measures were suggested in the soils report (Krazan 2024). Analyzation of the soils has indicated the project site soil conditions

appear to be conducive to the proposed future development of the residential tract. Since the site contains prime soils, conversion of the site to urban uses would represent a significant impact under this criterion.

Availability of Irrigation Water

Water is an important input in crop production, as the project site has been used for agricultural purposes in the past. However, flood and row irrigation equipment previously used to irrigate crops have since been removed from the site. Some water districts have limits on the amount of water they can deliver to agricultural crops. Water demands change somewhat when croplands are converted to urban uses. Net irrigation requirements give the average amount of water required by specific crops at given locations in addition to the amount of water normally received there in the form of precipitation. Urban water consumption depends on the land use established. Some industrial users, such as food processors, require very large volumes of water. Commercial uses require less water than industrial uses, but more water than residential uses.

Water use on-site would be subject to the restrictions set forth by the City of Bakersfield as the water purveyor of the site. Conversion of the site land use designation from resource intensive agriculture to low density residential will represent a decrease in water usage. The amount and type of water contamination generated in urban areas differ from those generated in farmlands.

Urbanization usually results in increased surface water concentrations of fecal coliforms, oil, grease, and heavy metals. Most farmers systematically apply a variety of pesticides and fertilizers to their crops. Some of these chemicals reach the soil and eventually leach into the groundwater. Soil and groundwater contamination also occur where chemicals are mixed or stored, where wells are constructed or abandoned, and through rainwater infiltration. Agricultural application of pesticides accounts for approximately 92 percent of all pesticide uses in California (including chlorine).

Conversion of farmlands to urban land use decreases the area whereon which vegetation is treated with chemicals. These decreases are due to the addition of impervious surfaces associated with non-agricultural uses. Conversion of the project site to residential uses will represent a less than significant impact under this criterion.

Proximity to Non-Agricultural Uses

The site is surrounded by non-agricultural land uses to the north, east, and west. Conversion of agricultural land is considered more significant when the project site is surrounded and influenced by other land in agricultural production. When surrounding lands are urbanized or built-up, conversion of the agricultural land would be consistent with growth patterns in the vicinity. Conversion of lands to consistent land uses would result in having fewer impacts on surrounding properties.

Farming operations can affect urban neighbors by creating inconveniences or discomforts such as equipment noise, odors from manure and other chemicals, and dust or smoke.

Farming operations may also result in impacts such as traffic of farm machinery on the streets. The introduction of adjacent residential uses creates a greater number of land use conflicts than non-residential urban uses such as commercial and industrial uses.

Residential uses can have adverse impacts on agricultural operations because of the introduction of pests, disease, weeds, traffic, vandalism, and trespassing. Residents can limit farming operations by complaining about impacts from noise, dust, smoke, odors, and spray drift from pesticide and fertilizer use. The property located across McCutchen Road to the south of the project site, is planted with orchards and in active production; however, the site is currently zoned R-2 (Small Lot Single-Unit Dwelling). As development in the area continues, the future of the site to the south could be developed with high density single family residences. Implementation of the proposed infill project will complete the connection of the surrounding residential uses to the north, east and west.

Surrounding land use designations are planned for residential land use under the MBGP. Land uses to the north, east, southeast, and west of the project site are designated LR (Low Density Residential). Planned land use to the south of the site is designated HMR (High Medium Density Residential). Since the project site is primarily surrounded by existing residential land uses and entirely surrounded by land with planned land use designations for residential use, the proposed development will likely have less than significant impacts on the farmland to the south. The proposed project site is within close proximity to substantial amounts of non-agricultural uses and will continue the logical and consistent development pattern. This pattern of residential development is primarily a result of the consistent development towards the southwest area of Bakersfield, as the extension of infrastructure has occurred to serve urban land uses. Therefore, conversion to non-agricultural land uses would have a less than significant impact on adjacent non-agricultural uses.

Proximity to Intensive Parcelization

The surrounding land use designations are all residential in nature. As stated in Section 3 above, the approved tract maps are being constructed for the subdivision of lots for single family residential land uses to the north, east and west of the project site. When the final maps for these tracts are recorded, there will be hundreds of additional parcels resulting from the subdivisions. Since the surrounding area is and planned in the near future to be intensively parcelized, conversion to non-agricultural use would represent a less than significant impact under this criterion.

Effect on Properties Subject to "Williamson Act" Land Use Contracts

All of the land surrounding the project site is designated as Prime Farmland according to the state Farmland Mapping and Monitoring Program. However, no adjacent parcels are currently enrolled in land use contracts under the California Land Conservation Williamson Act or within a Farmland Security Zone contract. Although the active farmland to the south of the project site is not under contract, the agricultural operations may be affected by the close proximity of surrounding urbanized areas. Additionally, land values

tend to increase due to the proximity of urban areas and services, thereby encouraging the conversion of farmland to urban uses. Since the project site is not within close proximity to any contracted lands, the proposed project poses a less than significant impact under this criterion.

Ability to be Provided with Urban Services (Sewer, Water, Roads, Etc.)

Due to the residential nature within the project vicinity, urban services are readily available to the site. Per the MBGP Circulation Element, access to the proposed project site would be via McCutchen Road, designated an arterial road, and Mountain Vista Drive, designated a collector road. The sewer will be stubbed in from Tract 7043 to the east through Agri River Avenue. Likewise, after construction of the proposed site development, the sewer will be extended to the west property boundary for Tract 7042 to stub into for service. Sewer and wastewater service will be provided by the City of Bakersfield (City) and served by Treatment Plant No. 3. Water service to the project site will be supplied by the City Water Department. Analysis has concluded that the water supply would be sufficient in normal, dry, and multiple-dry year scenarios. Water demand for the project site after conversion to non-agricultural uses would be less than that of agricultural production as designated by the land use of the site. Solid waste generated by the project site would be collected by the City Solid Waste Department, managed and disposed of in the local landfill disposal sites. Fire, police and emergency services would be provided by the City and Kern County through their mutual aid agreements. Fees for emergency services would be required by the developer when obtaining building permits and through property taxes. The site is located approximately six miles from the Kern County Library - Southwest Branch and adequate to accommodate services as needed. Therefore, impacts would be less than significant under this criterion.

Ability to Affect the Application of Agricultural Chemicals on Nearby Agricultural Properties

Federal and state laws restrict pesticide use on agricultural land in close proximity to urbanized areas. Implementation of pesticide restrictions are governed by the Kern County Agricultural Commissioner through the pesticide permitting process. According to the MBGP, land use designations adjacent to the proposed project site, including the current orchard in production to the south, consist of residential land uses. Existing land uses are primarily residential in the project vicinity. Implementation of the proposed project could affect the application of pesticides and other agricultural chemicals on the property located south of the project site. However, the adjacent existing residential has already affected the application of agricultural chemical use on the farmland to the south of the project site. Therefore, buildout of the proposed project poses a less than significant impact to the neighboring growers.

Ability to Create a Precedent-Setting Situation that Leads to the Premature Conversion of Prime Agricultural Lands

Urban uses are quickly approaching from north, east and west of the proposed project site, with agricultural use limited to south. Subdivisions are under construction to the north, east and west of the project. The proposed project site is an island with R-IA (Resource-Intensive Agriculture) land use designation and surrounded by land use designated LR (Low Density Residential) to the north, east, southeast, and west, and HMR (High Medium Density Residential) to the south. Conversion of prime agricultural lands to urban uses would be permanent and consistent with the surrounding residential land uses. Currently, the development trend in the City is similar to that of the proposed project in that as the City expands, new development converts outlying farmland to non-agricultural uses. Therefore, conversion of the proposed 28.91 gross acre project site to a non-agricultural use will not be precedent setting. Conversion of agricultural land would represent a less than significant impact under this criterion.

Demonstrated Project Need

The California Department of Housing and Community Development (HCD) conducts research and analysis of the state's housing markets, then identifies and provides support for housing challenges facing the state. HCD has created policies in response to California's current housing crisis. During the last ten years, housing production averaged fewer than 80,000 new homes each year, while the projected need of the state is 180,000 additional homes annually (HCD 2025). Californian renters pay more than 30 percent of their income on rent on average, causing additional challenges for the state to overcome. (HCD 2025) While the rising costs and lack of supply of housing units have limited opportunities for Californians, HCD assures the housing crisis is a solvable issue. Policies focused on improving housing affordability are outlined in HCD's Statewide Housing Plan. Many action items included in the plan consider streamlining housing construction, reducing permit costs, providing funding incentives for jurisdictions meeting housing goals, and establishing funding for affordable housing investments. Approximately 1.8 million new housing units are needed to meet the projected population growth of the state by 2025. (HCD 2025) Therefore, conversion of agricultural land to residential uses on the project site would help meet the housing needs of the state and would represent a less than significant impact under this criterion.

Necessity of Buffers Such as Lower Densities, Setbacks, Etc.

Providing buffer zones can help protect agricultural land and crops from undesired urban contaminants. Likewise, providing ample buffer zones can help protect urban developments from undesired agricultural pesticides and spraying. Buffer zones can be established through roads, canals, walls, landscaping, easements, setbacks, and other similar design features. If residential developments do not incorporate buffer zones into their design, sometimes the growers must allocate a portion of their crop land to serve as a buffer zone. Commercial and industrial projects often incorporate parking lots and landscaped areas to serve as buffer zones to adjacent agricultural lands.

The proposed project would consist of a subdivision for 147 residential lots and nine landscape lots. The proposed residential subdivision development will be separated by perimeter walls and roadways to the adjacent residential uses to the north, east, and west. The completion of the proposed development will offer greater connectivity, cycling lanes and sidewalks to the adjacent residential subdivisions. The proposed residential project will be separated by a subdivision wall along the south project boundary and McCutchen Road, an arterial road, to the agricultural land use located to the south. Thus, impacts associated with the necessity of buffers would be less than significant.

Effects on Other Agricultural Properties of Operations

Other changes in the existing environment could affect adjacent agricultural land by limiting the agricultural feasibility of the land. The following types of effects from agricultural conversion could generally reduce agricultural feasibility:

- Conversion of farmland may affect nearby growers by placing restrictions and limitations on pesticides, fungicides, and herbicides used on the crops. Restrictions could also be placed on noise, burning, and dust.
- Vehicle emissions from adjacent transportation routes and increased roadways can impact the health and survival of the crops.
- Because of increased residential and commercial development, the farmers' share of the water supply could decline as competition for water increases. Agricultural water consumption could eventually decrease below the minimum threshold necessary to operate delivery systems economically.
- As urbanization proceeds in Bakersfield, land prices may increase above the land's value for agricultural production.
- Increased traffic congestion reduces the efficiency and increases the hazards of moving crops and farm machinery along rural roads. Road congestion also increases the amount of time required to transport crops, which in turn increases shipping costs and the risk of spoilage.
- Croplands and nearby agricultural lands that support farming are important sources of food, water, and cover for some native plants and animals. These resources are largely eliminated when farmlands are converted to urban use.
- Vandalism is on the rise in the Metropolitan Bakersfield area. Fields adjacent to highways experience unauthorized entry most frequently. Trespass, crop pilferage, and damage to irrigation equipment have become common problems in Kern County. Farmers often incur major costs when farm equipment has to be left unguarded overnight and is damaged from vandalism.

7.0 Conclusion

Based upon the preceding analysis, conversion of farmland on the proposed project site is considered less than significant for the following reasons:

- The site is immediately adjacent to residential developments to the north, east, and west;
- Urban development in the area has increased parcelization;
- There are no active Williamson Act land use contracts within 1.5 miles of the proposed project site;
- Public utilities, water and roads are readily accessible in the project vicinity;
- The proposed project will not negatively affect application of agricultural chemicals to the lands south of the proposed project site;
- The MBGP designated neighboring lands as High Medium Residential suitable for small lot residential development in which the active farms are located;
- The proposed project will contribute 147 residential lots to help the state housing crisis; and
- Proposed project provides adequate buffer zone from existing actively farmed lands to the south.

However, conversion of prime agricultural land is a significant and unavoidable impact with increased development and urbanization. While the conversion of agricultural land represents a permanent reduction in the state's agricultural land resources, the project site would have a less than significant impact on the surrounding properties to the north, east and west. The proposed project may have an impact on the farmland located south of the site, but the impacts would be similar in nature to the existing residential land uses in proximity of the farmland. Farmers near the proposed project will inevitably be affected by planned development in the vicinity and may result in additional conversion of agricultural land.

It is assumed that further development of the MBGP planning area will occur, and most likely on "prime" agricultural soils that exist on the valley floor. The MBGP concludes that conversion of prime agricultural lands to urban uses will result in a reduction of the regional agricultural economy and is considered a significant adverse impact. A statement of overriding considerations for this impact was adopted by the City when the MBGP was certified. Implementation of the proposed project will result in the conversion of 28.91 acres of land zoned for residential with a land use designated for agricultural use to urban uses. However, the MBGP has determined that conversion of farmland to non-agricultural uses is considered significant.

Resources

- **Air Quality Resources Board**
  (Air Quality San Joaquin Valley – 2025)
- **California Department of Conservation**
  (Division of Land Resource Protection)
  (Farmland Conversion Reports – 2016-2018)
  (Farmland of Local Importance Definitions – 2018)
  (Guidebook for Collaboration & Consolidation – 2019)
- **California Department of Food and Agriculture**
  (California Agricultural Statistics Review – 2022-2023)
- **California Department of Water Resources**
  (SGMA Bulletin 118, Update 2020)
- **California Farm Water Coalition**
  (The Water Fact Book – California Agriculture and Its Use of Water)
- **City of Bakersfield**
  (Metropolitan Bakersfield General Plan)
  (Planning & Land Use Map GIS)
  (Bakersfield Municipal Code - Title 17)
- **Environmental Data Resources**
  (Aerial Photographs 1985; 1994; 2003; 2004; 2009; 2016; 2020; 2023)
- **Farmland Mapping and Monitoring Program – CA Department of Conservation**
  (Farmland Conversion Reports 2016 to 2018)
  (Kern County – Interim Farmland Area 2016-2018 Land Use Conversion)
  (Kern County – Important Farmland Area 2016-2018 Land Use Conversion)
  (Important Farmland in California)
- **Federal Emergency Management Agency**
  (Flood Insurance Rate Map Community Panel No. 06029C 2300E)

- **Geotechnical Engineering Investigation Proposed Tract No. 7410**

  (Krazan & Associates, Inc., Geotechnical Engineering Division – 2024)
- **Kern County Department of Agriculture and Measurement Standards**

  (Pesticide Use Report Data – 2024)

  (Kern County Agricultural Crop Reports – Fruit and Nut Crops, 2023)
- **Kern County Planning and Development Services Department**

  (Kern County General Plan Elements – Land Use, Open Space, and Conservation Element)

  (Williamson Act Land Use Contract – GIS Mapping)

  (Guidelines for Agricultural Soils/Farmland Conversion Studies)
- **State of California**

  (California Environmental Quality Act, Sacramento - January 2025)

  (California Health and Safety Code § 11501 thru 11503)

  (California Health and Safety Code § 26569.24 thru 26569.28)

  (Geologic Energy Management Division –2025)
- **United States Department of Agriculture, Natural Resources Conservation Services**

  (Soil Survey of Kern County, California, Southwest Part Maps and Information, 2009)
- **United States Department of Agriculture - Soil Conservation Service**

  (USDA Soil Survey of Kern County, California, Southwestern Part)
- **United States Geological Survey**

  (Topographic Gosford Quadrangle Map – Kern County, CA)

APPENDIX A

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED TRACT NO. 7410
MCCUTCHEN ROAD AND MOUNTAIN VISTA DRIVE
BAKERSFIELD, CALIFORNIA

PROJECT NO. 022-24137
NOVEMBER 8, 2024

Prepared for:

MR. KEITH GARDINER
ORR DEVELOPMENT 2, LLC
29341 KIMBERLINA ROAD
WASCO, CALIFORNIA 93280

Prepared by:

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Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

November 8, 2024

Project No. 022-24137

Mr. Keith Gardiner
ORR Development 2, LLC
29341 Kimberlina Road
Wasco, California 93280

RE: Geotechnical Engineering Investigation
Proposed Tract No. 7410
McCutchen Road and Mountain Vista Drive
Bakersfield, California

Dear Mr. Gardiner:

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 TRACT NO. 7410
MCCUTCHEN ROAD AND MOUNTAIN VISTA DRIVE
BAKERSFIELD, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Tract No. 7410 to be located at McCutchen Road and Mountain Vista Drive in Bakersfield, 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. Appendices B and C contain guides to earthwork and pavement 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 August 29, 2024 (KA Proposal No. P1103-24) 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 16 borings to depths ranging from approximately 10 to 15 feet for evaluation of the subsurface conditions at the project site.
- 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 structure are unavailable. On a preliminary basis, it is understood that the proposed development will include the construction of a new residential subdivision comprised of approximately 147 lots. The buildings are planned to be single- and two-story wood-framed structures utilizing conventional shallow foundations and concrete slab-on-grade construction. Foundation loads are anticipated to be light to moderate. On-site paved areas and landscaping are also planned for the development.

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 rectangular in shape and encompasses approximately 28.91 acres. The site is located on the north side of McCutchen Road, on the west side of the Mountain Vista Drive alignment in Bakersfield, California. A residential development is located north of the site. A rural residential development and agricultural land is located to the south. A residential development and school are located to the east. A residential development is also located to the west.

Presently, the area of proposed development consists of fallow agricultural land. The site had a scattered weed/grass growth and the surface soils have a loose consistency. Buried and overhead utilities are located along the edges of the site and may extend into the site. The site is relatively level with no major changes in grade.

GEOLOGIC SETTING

Geologically, the property is situated on the eastern flank, near the south end of the Great Valley Geomorphic Province. This province is a large northwesterly trending geosyncline or structural trough between the Coast Range Mountains and the Sierra Nevada Mountains. Erosion from both of these mountain systems has resulted in the deposition of immense thickness of sediments in the Valley floor.

Heavily-laden streams from the Sierra Nevada have built very prominent alluvial fans along the margins of the San Joaquin Valley. This has resulted in a rather flat topography in the vicinity of the project site. The site is composed of alluvial deposits which are mostly cohesionless sands and silts.

The south end of the San Joaquin Valley is surrounded on all sides, excluding the north, by active fault systems (San Andreas, White Wolf-Breckenridge-Kern Canyon and Garlock Faults). Numerous smaller faults exist within the valley floor.

There is on-going seismic activity in the Kern County area, with the most noticeable earthquake being the July 21, 1952 Kern County Earthquake. The initial shock was 7.7 magnitude shake with the epicenter near Wheeler Ridge. Vertical displacements of as much as three feet occurred at the fault line. Estimated average value of the maximum bedrock accelerations from the 1952 event are about 0.25 gravity at the project site.

The closest known faults to the property are subsurface faults located at the Fruitvale Oil Field. These faults cut the older sediments and, although numerous, are not thought to be active in the last two million years.

No evidence was observed that indicated surface faulting has occurred across the property during the Holocene time. Faults not yet identified, however, may exist. The site is not within an Earthquake Fault Zone (special studies zone).

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 16 borings to depths ranging from approximately 10 to 15 feet below existing site grade, using a truck-mounted drill rig. In addition, 6 bulk subgrade samples were obtained from the site for laboratory R-value testing. The approximate boring and bulk sample locations 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, gradation, shear strength, consolidation potential, R-value and moisture-density relationships of the materials encountered. In addition, chemical tests were performed to evaluate the soil-cement reactivity. Details of the laboratory test program and results of the laboratory tests 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 sandy silt. These soils are disturbed, have low strength characteristics and are highly compressible when saturated.

Below the loose surface soils, approximately 2 to 3 feet of loose to medium dense silty sand, sandy silt or silty sand/sandy silt were encountered. Field and laboratory tests suggest that these soils are moderately strong and moderately compressible. Penetration resistance ranged from 17 to 37 blows per foot. Dry densities ranged from 95 to 112 pcf. Representative soil samples consolidated approximately 3½ to 8½ percent under a 2 ksf load when saturated. Representative soil samples had angles of internal friction of 27 and 28 degrees.

Below 3 to 4 feet, predominately loose to dense sandy silt, sand or silty sand/sandy silt were encountered. Field and laboratory tests suggest that these soils are moderately strong and moderately compressible. Penetration resistance ranged from 18 to 59 blows per foot. Dry densities ranged from 90 to 111 pcf. Representative soil samples consolidated approximately 5 to 7 percent under a 2 ksf load when saturated. These soils had similar strength characteristics as the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the boring logs 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.

GEOLOGIC AND SEISMIC HAZARDS

Soil liquefaction, a primary geologic/seismic hazard, is a state of soil particle suspension, caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs in soils, such as sands, in which the strength is purely frictional. However, liquefaction has occurred in soils other than clean sands. Liquefaction usually occurs under vibratory conditions, such as those induced by seismic events.

To evaluate the liquefaction potential of the site, the following items were evaluated:

1) Soil type

2) Groundwater depth

3) Relative density

4) Initial confining pressure

5) Intensity and duration of groundshaking

The predominant soils within the project site consist of layers of silty sands, sandy silts and sands. Groundwater was not encountered within the depths explored. In addition, groundwater has been historically encountered at depths greater than 50 feet below site grade within the project site and vicinity. Therefore, the potential for liquefaction and related settlement is low at this site and no liquefaction mitigation procedures are necessary for this project.

Secondary hazards from earthquakes include rupture, seiche, slope instability, landslides, lateral spreading, and subsidence. Since there are no known faults within the immediate area, ground rupture from surface faulting should not be a potential problem. Seiche, lateral spreading, slope instability, and landslides are not hazards in the area either. In addition, there are no known occurrences of structural or architectural damage due to deep subsidence in the Bakersfield area. The total and differential seismic-induced settlements should be less than 1-inch.

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, moderately compressible upper native soils and existing development, appear to be conducive to the development of the project. The upper soils within the project site 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.

Fill material was not encountered in our borings. However, fill may be present between and beyond our boring locations. The extent of fill material was determined based on limited test borings and visual observation. Verification of the extent of fill should be determined during site grading. It is recommended that fill soils which have not been properly compacted and certified be excavated and stockpiled so that the native soils can be prepared properly. It is anticipated the fill material will be suitable for reuse as Engineered Fill, provided it is cleansed of excessive organics and debris.

In order to reduce the amount of differential settlement and provide uniform building support for the proposed buildings, it is recommended following stripping operations and demolition activities, the exposed subgrade within proposed building areas be excavated an additional depth of 48 inches, worked until uniform and free from large clods, moisture-conditioned to at or above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on the ASTM Test Method D1557. In addition, it is recommended the proposed structure foundations be supported by a minimum of 24 inches of Engineered Fill. Over-excavation should extend to a minimum of 5 feet beyond structural elements. The on-site native 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 &

Associates to verify stability. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation. Soft or pliant areas encountered should be excavated to firm native ground.

The site has been used for agricultural purposes. Associated with these developments are buried structures, such as irrigation 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. It is suspected that demolition activities of the existing structures will disturb the upper soils. 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 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 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 an allowable bearing pressure of 2,000 psf for dead-plus-live loads. Footings should have a minimum embedment of 12 inches.

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 and pavements 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; 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.

Fill material was not encountered in our borings. However, fill may be present between and beyond our boring locations. The extent of fill material was determined based on limited test borings and visual observation. Verification of the extent of fill should be determined during site grading. It is

recommended that fill soils which have not been properly compacted and certified be excavated and stockpiled so that the native soils can be prepared properly. It is anticipated the fill material will be suitable for reuse as Engineered Fill, provided it is cleansed of excessive organics and debris.

The site has been utilized for agricultural purposes. Associated with these developments are buried structures, such as irrigation lines that extend into the project site. Any buried structures, including utilities or loosely backfilled excavations, encountered during construction should be properly removed and the resulting excavations backfilled. It is suspected that demolition activities of the existing structures will disturb the upper soils. After demolition activities, it is recommended that these disturbed soils 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. Water wells should be abandoned in accordance with county standards. Oil wells should be abandoned in accordance with state and federal guidelines. 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 backfilled with Engineered Fill.

In order to reduce the amount of differential settlement and provide uniform building support for the structures, it is recommended following stripping operations and demolition activities, the exposed subgrade within proposed building areas be excavated an additional depth of 4 feet, worked until uniform and free from large clods, moisture-conditioned to at or above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on the ASTM Test Method D1557. In addition, it is recommended the proposed structure foundations be supported by a minimum of 24 inches of Engineered Fill. Over-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 & Associates to verify stability. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation. Soft or pliant areas should be excavated to firm native ground.

Following stripping operations and demolition activities, it is recommended that at a minimum, the upper 24 inches of exposed subgrade soils beneath the exterior flatwork and pavement areas be excavated, worked until uniform and free from large clods, moisture-conditioned to at or above optimum moisture content, 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. Prior to backfilling, the bottom of the excavation should be proof-rolled and observed by Krazan & Associates to verify stability. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation. Soft or pliant areas encountered should be excavated to firm native ground.

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 at or above 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-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 native soils are predominately silty sand, sandy silt and silty sand/sandy silt. These 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.

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 predominately non-expansive 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 diameter. 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 to at or above optimum moisture content, and compacted to achieve at least 90 percent of maximum density based on ASTM Test Method D1557. 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 2022 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 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 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.

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 Soil Bearing Capacity
Dead Load Only	1,500 psf
Dead-Plus-Live Load	2,000 psf
Total Load, including wind or seismic loads	2,650 psf

Footings should have a minimum depth of 12 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.

The total settlement is not expected to exceed 1 inch. Differential settlement should be less than ½ inch. Most of the settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.35 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 300 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 value above may be used for short duration, wind, or seismic loads.

Floor Slabs and Exterior Flatwork

In areas that will utilize moisture-sensitive floor coverings, concrete slab-on-grade floors should be underlain by a water vapor retarder. The water vapor retarder should be installed in accordance with accepted engineering practice. The water vapor retarder should consist of a vapor retarder sheeting underlain by a minimum of 3 inches of compacted, clean, gravel of ¾-inch maximum size. To aide in concrete curing an optional 2 to 4 inches of granular fill may be placed on top of the vapor retarder. The granular fill should consist of damp clean sand with at least 10 to 30 percent of the sand passing the 100 sieve. The sand should be free of clay, silt, or organic material. Rock dust which is manufactured sand from rock crushing operations is typically suitable for the granular fill. This granular fill material should be compacted.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. All fills required to bring the building pads to grade should be Engineered Fills.

The floor slab should be reinforced at a minimum with #3 reinforcement bars at 18 inches on-center each way within the middle one-third. Thicker floor slabs with increased concrete strength and reinforcement should be designed wherever heavy concentrated loads, heavy equipment, or machinery is anticipated.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To reduce moisture vapor intrusion, it is recommended that a vapor retarder be installed. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to reduce the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

Excavation Stability

Temporary excavations planned for the construction of the building and 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	1½:1
5-10	1½:1
10-15	1¾:1
15+	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	40 H
0.25 H	40 H
H	40 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.

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 40 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 60 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.

The 2022 CBC requires determination of dynamic seismic lateral earth pressures on foundation walls and retaining walls supporting more than 6 feet of backfill height due to design earthquake ground motions. The Site Modified Peak Ground Acceleration (PGA_M), based on ASCE7-16 and information from the SEAOC and OSHPD Seismic Design Maps website (https://seismicmaps.org), is 0.528. We recommend an incremental seismic lateral pressure of 24 pcf be included in the stability analyses for the retaining wall. The incremental seismic lateral pressure should be applied in a reverse triangular distribution at the back side of the wall.

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 a minimum width of 12 inches and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete or other suitable backfill to reduce surface drainage into the wall drain system. The aggregate should conform to Class 2 permeable materials graded in accordance with the CalTrans Standard Specifications (2018). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel, provided 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 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 line of the drainage blanket and should have a minimum diameter of four inches. Collector pipes may be either slotted or perforated. Slots should be no wider than ⅛ inch in diameter, while perforations should be no more than ¼ inch in diameter. If retaining walls are less than 6 feet in height, 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 walls) 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 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

Six subgrade soil 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	12-24"	Silty Sand/Sandy Silt (SM/ML)	38
2	12-24"	Sandy Silt (ML)	20
3	12-24"	Silty Sand/Sandy Silt (SM/ML)	30
4	12-24"	Silty Sand/Sandy Silt (SM/ML)	36
5	12-24"	Silty Sand/Sandy Silt (SM/ML)	38
6	12-24"	Sandy Silt (ML)	28

The test results are low to moderate and indicate fair 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*	Class III Aggregate Subbase*	Compacted Subgrade**
4.0	2.0"	6.5"	--	12.0"
4.0	2.0"	4.5"	2.0"	12.0"
4.5	2.5"	7.0"	--	12.0"
4.5	2.5"	4.0"	3.0"	12.0"

5.0	2.5"	8.0"	--	12.0"
5.0	2.5"	5.0"	3.5"	12.0"
5.5	3.0"	8.5"	--	12.0"
5.5	3.0"	5.0"	4.0"	12.0"
6.0	3.0"	10.5"	--	12.0"
6.0	3.0"	6.5"	4.5"	12.0"
6.5	3.5"	11.0"	--	12.0"
6.5	3.5"	6.0"	5.0"	12.0"
7.0	4.0"	12.0"	--	12.0"
7.0	4.0"	6.5"	6.0"	12.0"
7.5	4.0"	13.0"	--	12.0"
7.5	4.0"	7.5"	6.0"	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"	4.0"	12.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	7.0"	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***
******Minimum compressive strength of 3000 psi***

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 at or above 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-as necessary and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Seismic Parameters – 2022 California Building Code

The Site Class per Section 1613 of the 2022 California Building Code (2022 CBC) and ASCE 7-16, Chapter 20 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. A site modified peak ground acceleration of 0.528 may be used for seismic analysis. For seismic design of the structures based on the seismic provisions of the 2022 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
Site Coefficient F_a	1.200	Table 1613.2.3 (1)
S_s	1.013	Section 1613.2.1
S_{MS}	1.215	Section 1613.2.3
S_{DS}	0.810	Section 1613.2.4
Site Coefficient F_v	1.929	Table 1613.2.3 (2)
S_1	0.371	Section 1613.2.1
S_{M1}	0.716	Section 1613.2.3
S_{D1}	0.477	Section 1613.2.4
T_S	0.589	Section 1613.2

* Based on Equivalent Lateral Force (ELF) Design Procedure being used.

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 CBC 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 (164 ppm) and are above the maximum allowable values established by HUD/FHA and CBC. Therefore, it is recommended that Type II cement be used 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 foundation design. 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.

Steve Nelson
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ II
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GEOTECHNICAL
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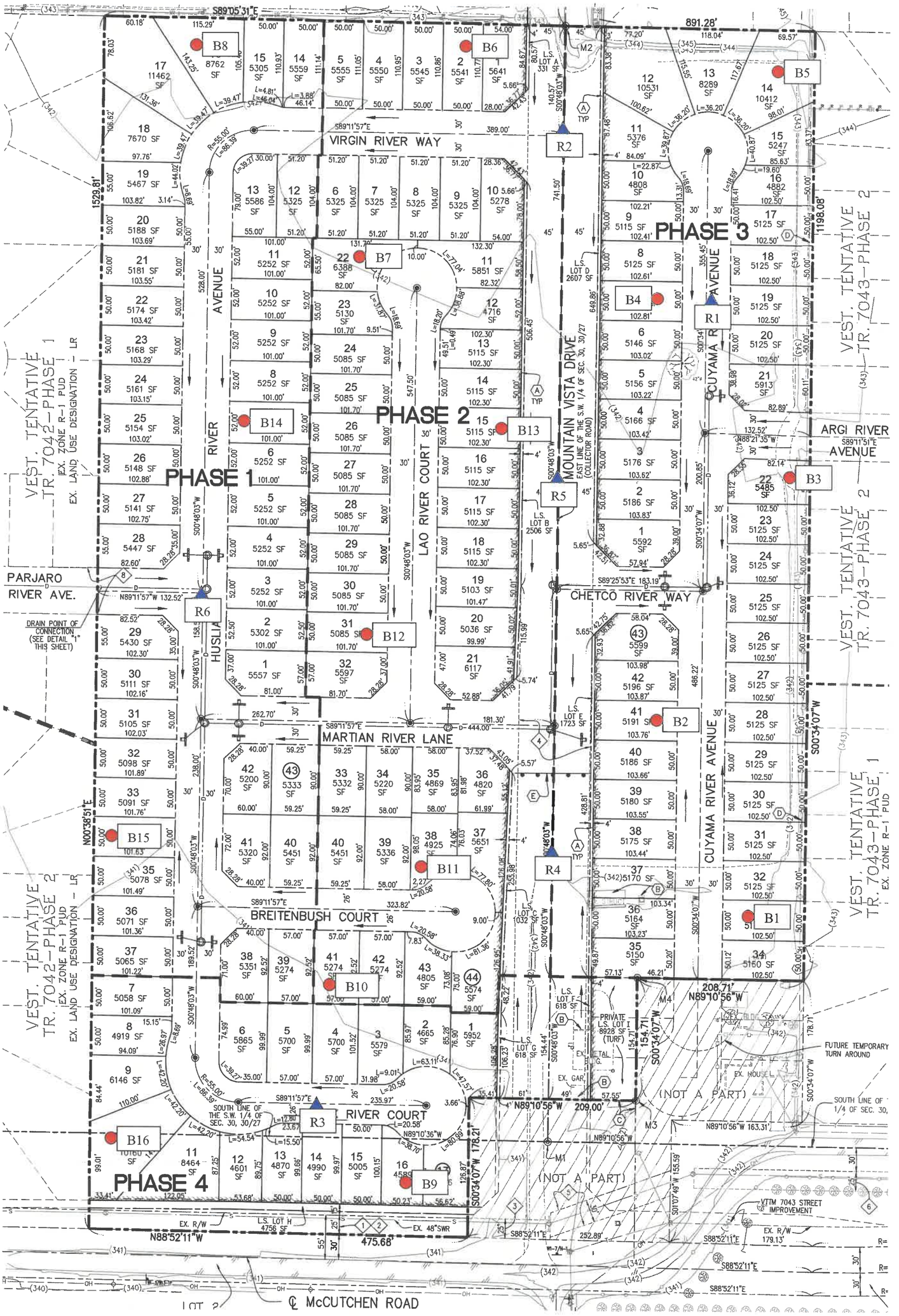
Managing Engineer
RCE No. 2698/RCE No. 60185

SN/DRJ:ht



● APPROXIMATE BORING LOCATION

▲ APPROXIMATE R-VALUE LOCATION

N
W E
S

SITE MAP	**Scale:** NTS	**Date:** November 2024	Krazan GEOTECHNICAL ENGINEERING
Tract 7410 **McCutchen Road and Mountain Vista Drive** **Bakersfield, California**	**Drawn by:** HT	**Approved by:** DJ	
	Project No. 022-24137	**Figure No.** 1	

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Sixteen 4½-inch 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 were performed at selected depths. This test represents the resistance to driving a 2½-inch diameter core barrel sampler. 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. 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 completed 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

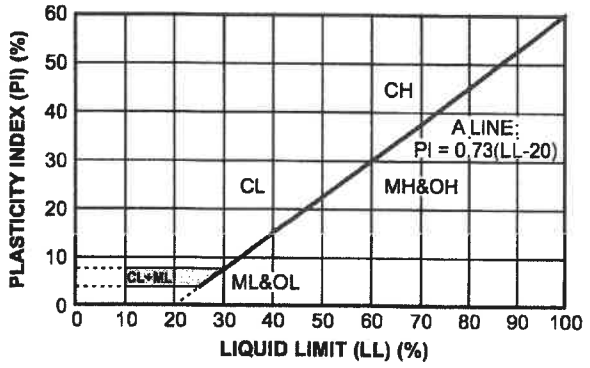
CONSISTENCY CLASSIFICATION

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 0.42
Fine-grained	No. 40 to No. 200	0.42 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART



Log of Boring B1

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-1

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		***SANDY SILT (ML)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2		***SILTY SAND/SANDY SILT (SM/ML)*** Medium dense, fine- to medium-grained; brown, damp, drills easily	102.6	4.7		22
6			101.3	6.9		34
8			105.3	4.8		27
14		End of Borehole				

Penetration Test blows/ft: 20, 40, 60

Water Content (%): 10, 20, 30, 40

Drill Method: Solid Flight | **Drill Date:** 10-16-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 15 Feet

Krazan and Associates

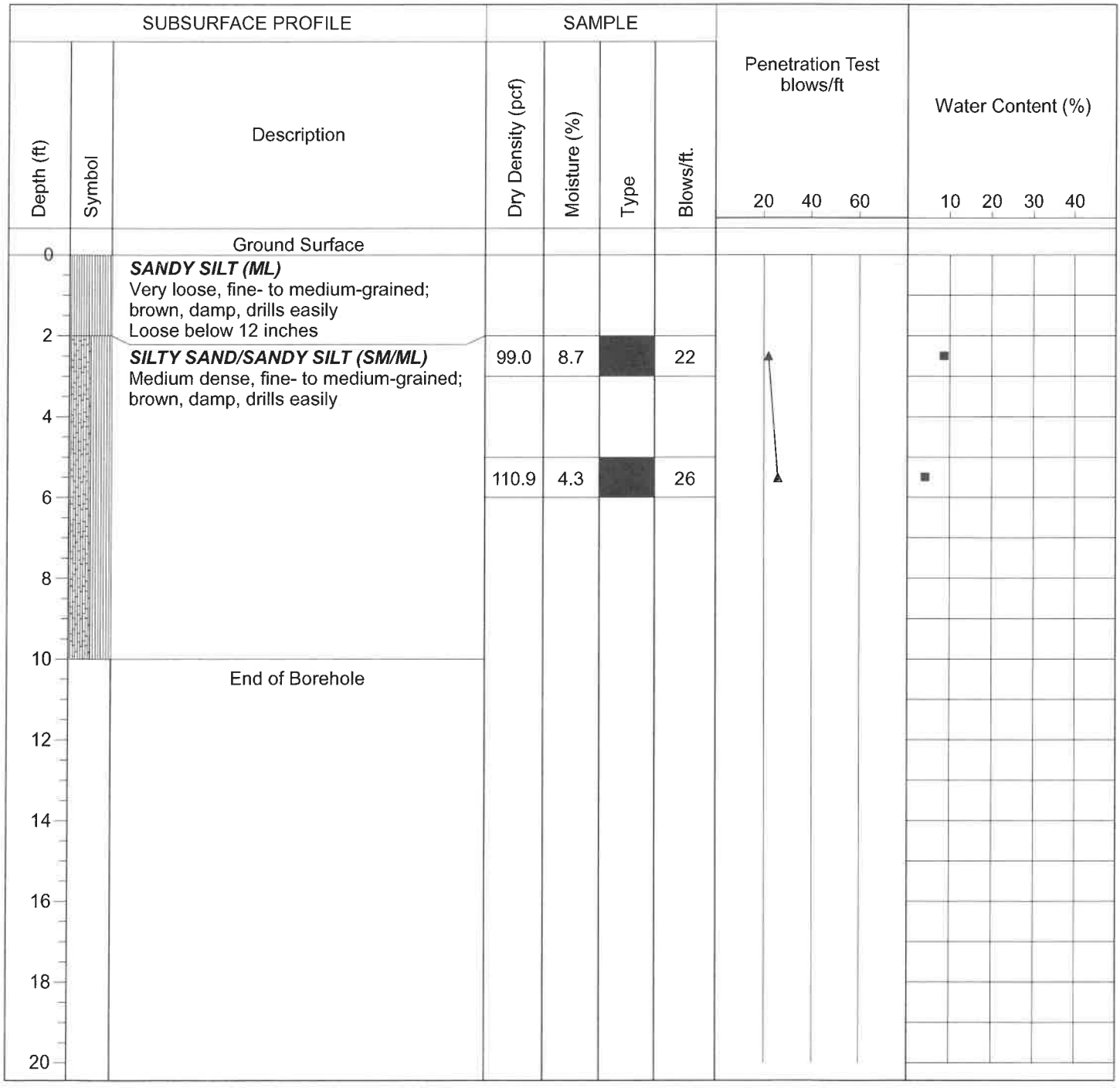
Log of Boring B2

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-2

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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



Drill Method: Solid Flight **Drill Date:** 10-16-24

Drill Rig: CME 45C-4 **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 10 Feet

Sheet: 1 of 1

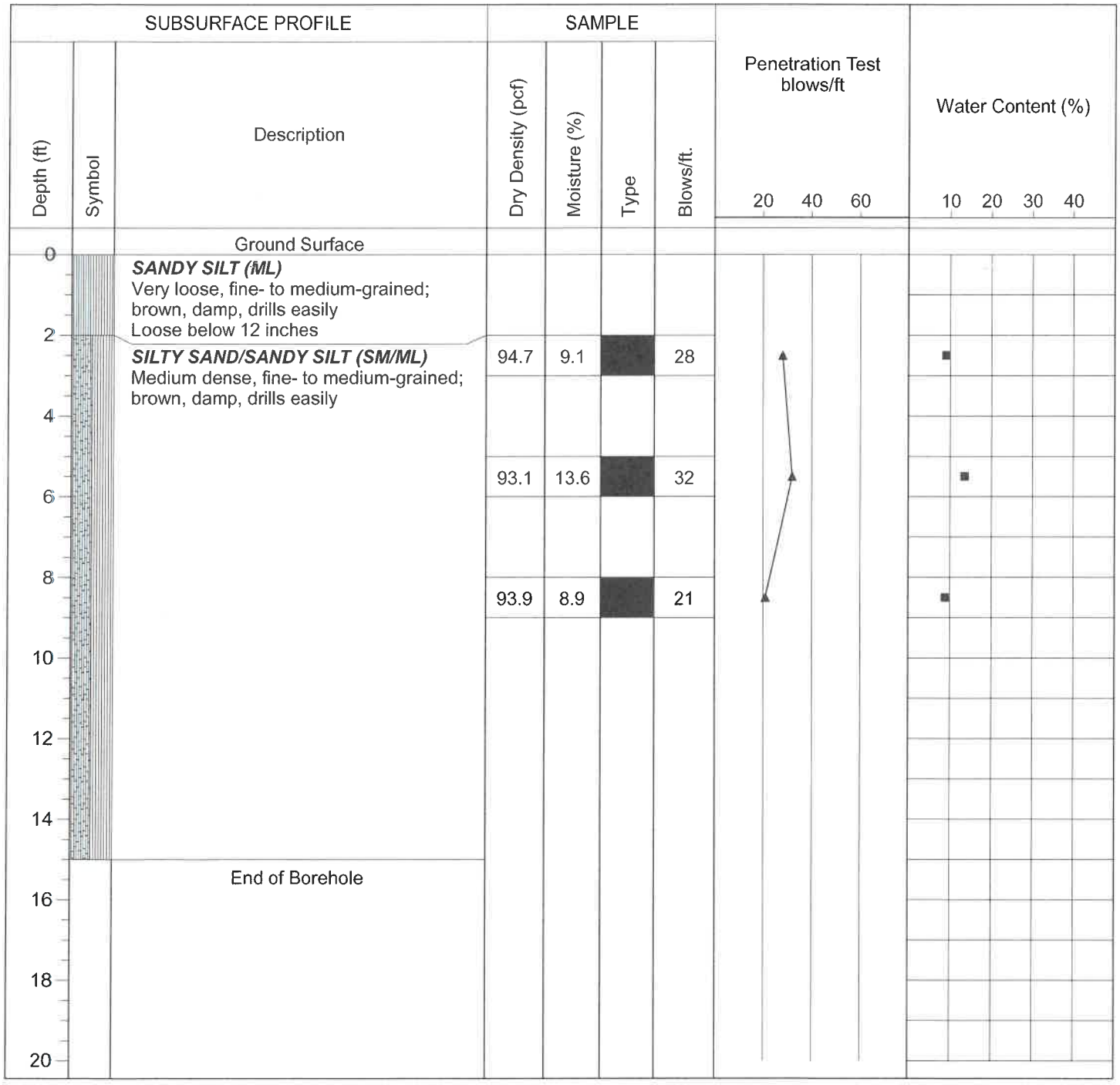
Log of Boring B3

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-3

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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



Drill Method: Solid Flight **Drill Date:** 10-16-24

Drill Rig: CME 45C-4 **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 15 Feet

Sheet: 1 of 1

Log of Boring B4

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-4

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		***SANDY SILT (ML)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2		***SILTY SAND/SANDY SILT (SM/ML)*** Medium dense, fine- to medium-grained; brown, damp, drills easily	97.3	7.8		27
4						
6			89.8	12.5		22
8						
10		End of Borehole				
12						
14						
16						
18						
20						

Penetration Test blows/ft: 20, 40, 60

Water Content (%): 10, 20, 30, 40

Drill Method: Solid Flight | **Drill Date:** 10-16-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 10 Feet

Krazan and Associates

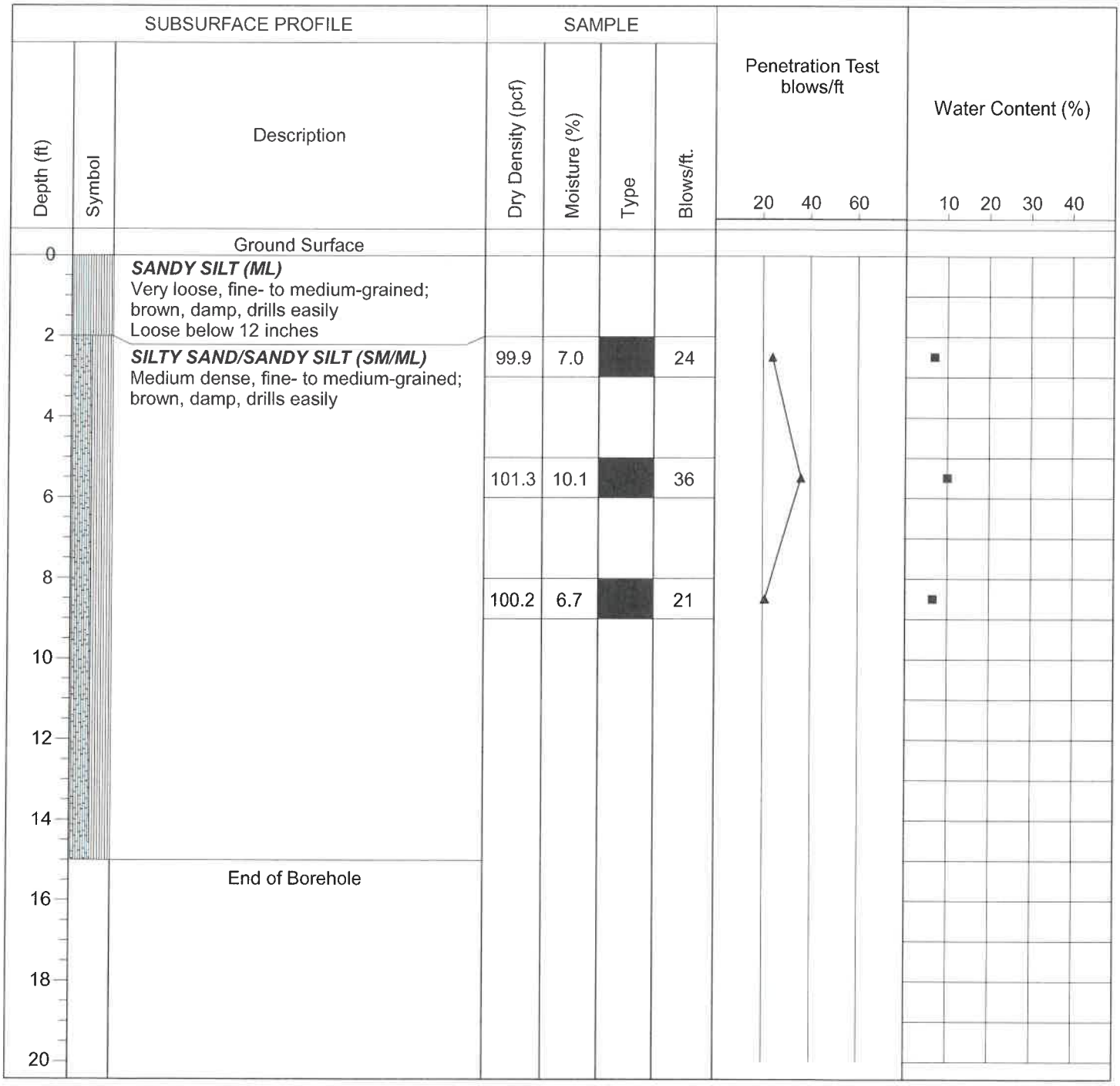
Log of Boring B5

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-5

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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



Drill Method: Solid Flight | **Drill Date:** 10-16-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 15 Feet

Krazan and Associates

Sheet: 1 of 1

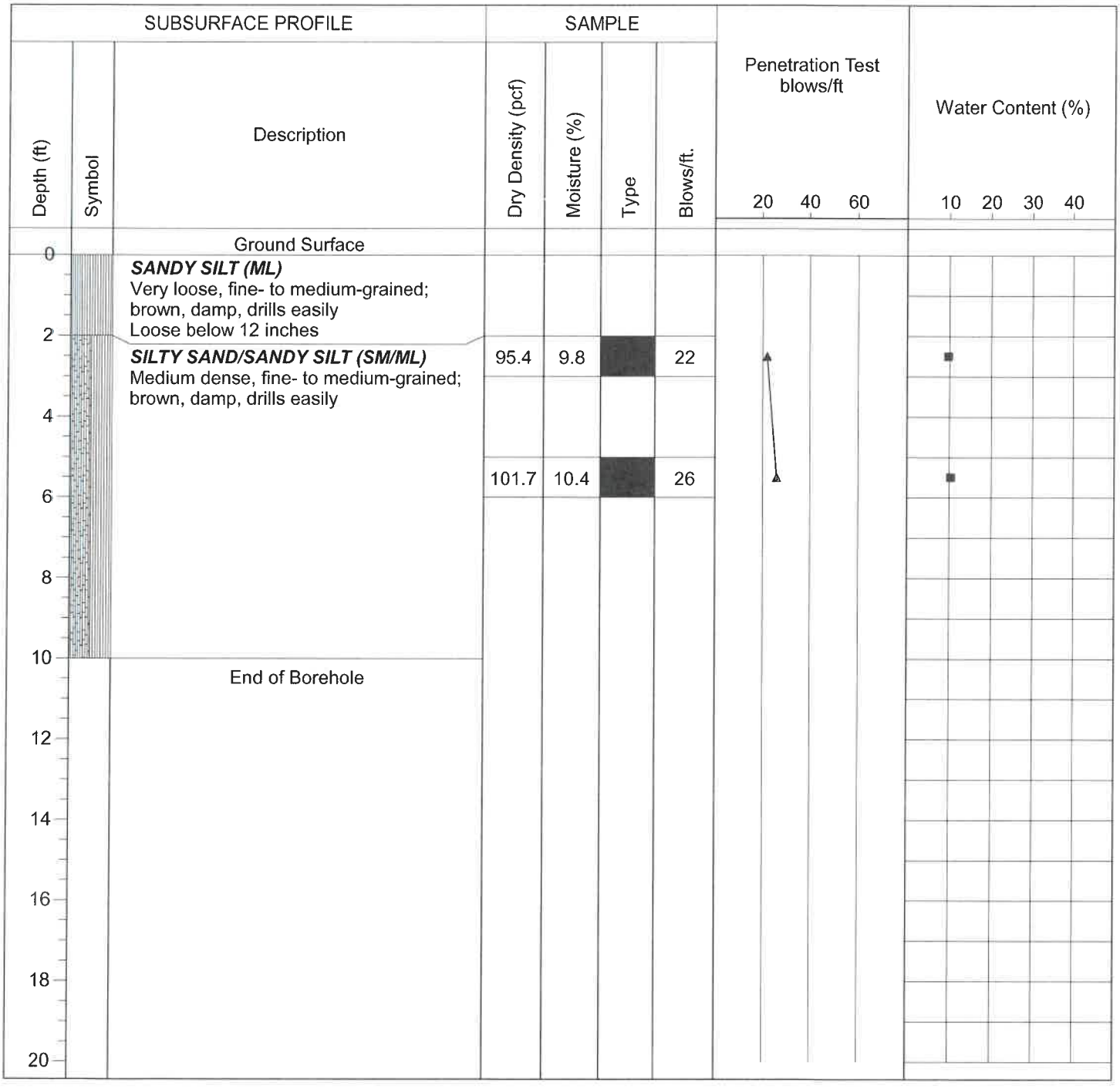
Log of Boring B6

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-6

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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



Drill Method: Solid Flight **Drill Date:** 10-16-24

Drill Rig: CME 45C-4 **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 10 Feet

Krazan and Associates

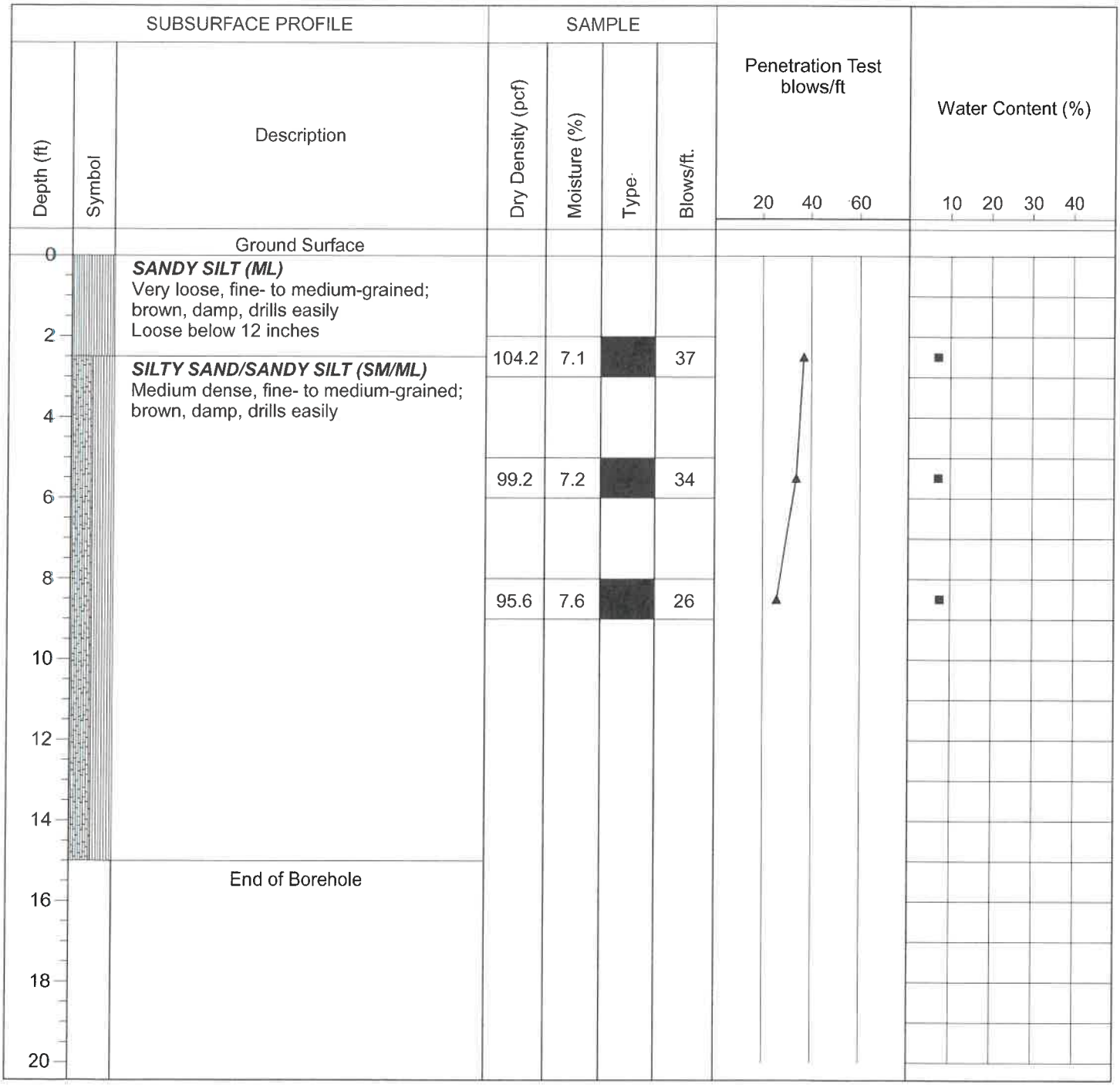
Log of Boring B7

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-7

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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



Drill Method: Solid Flight **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 15 Feet

Sheet: 1 of 1

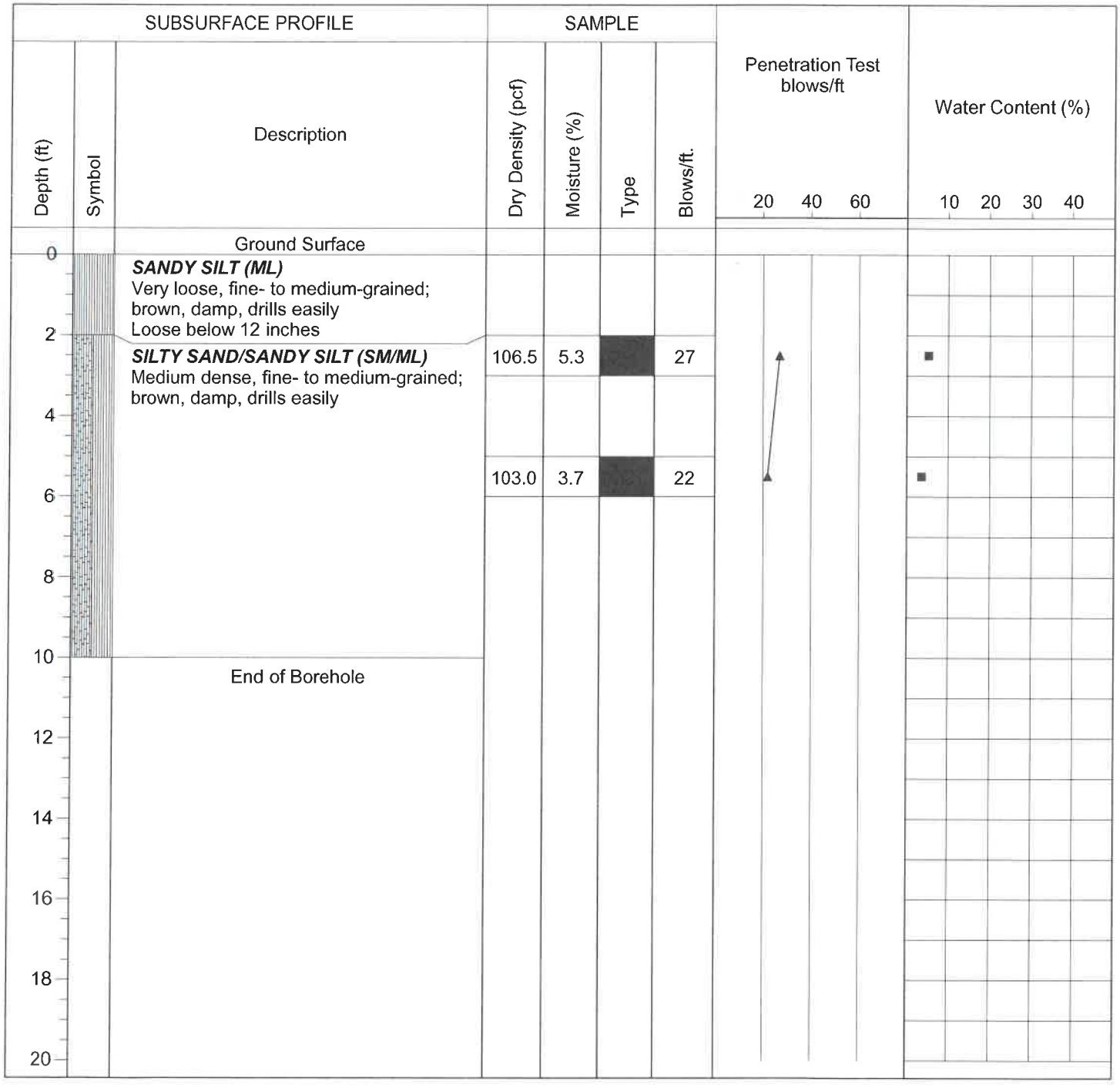
Log of Boring B8

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-8

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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



Drill Method: Solid Flight | **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 10 Feet

Krazan and Associates

Sheet: 1 of 1

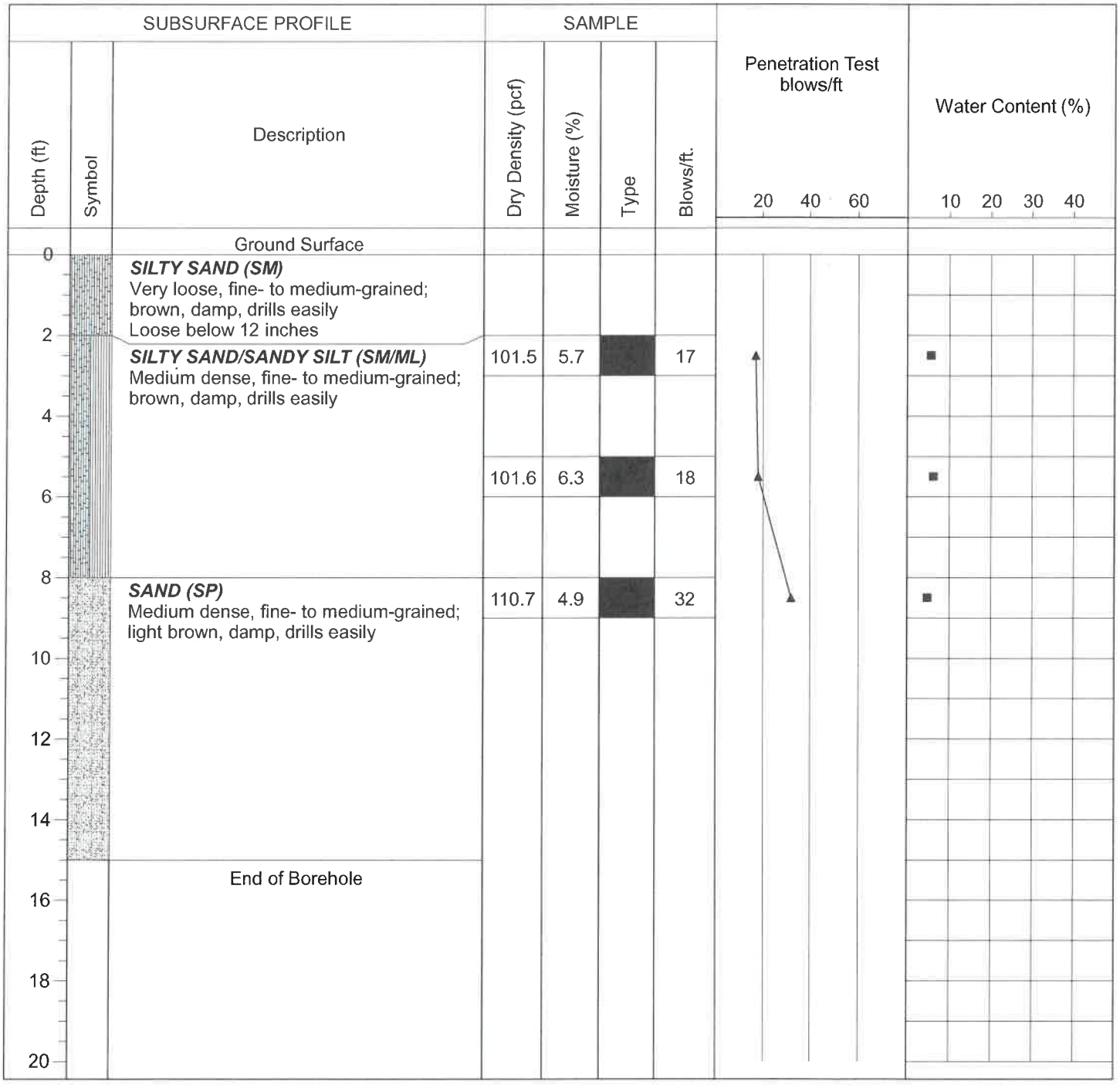
Log of Boring B9

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-9

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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



Drill Method: Solid Flight **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 15 Feet

Krazan and Associates

Sheet: 1 of 1

Log of Boring B10

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-10

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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
0		Ground Surface						
0		***SILTY SAND (SM)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches						
2		***SILTY SAND/SANDY SILT (SM/ML)*** Medium dense, fine- to medium-grained; brown, damp, drills easily	99.6	4.7		21		■
4		***SANDY SILT (ML)*** Medium dense, fine- to medium-grained; gray, damp, drills easily						
6			99.7	7.2		38		■
8								
10		End of Borehole						
12								
14								
16								
18								
20								

Drill Method: Solid Flight **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 10 Feet

Sheet: 1 of 1

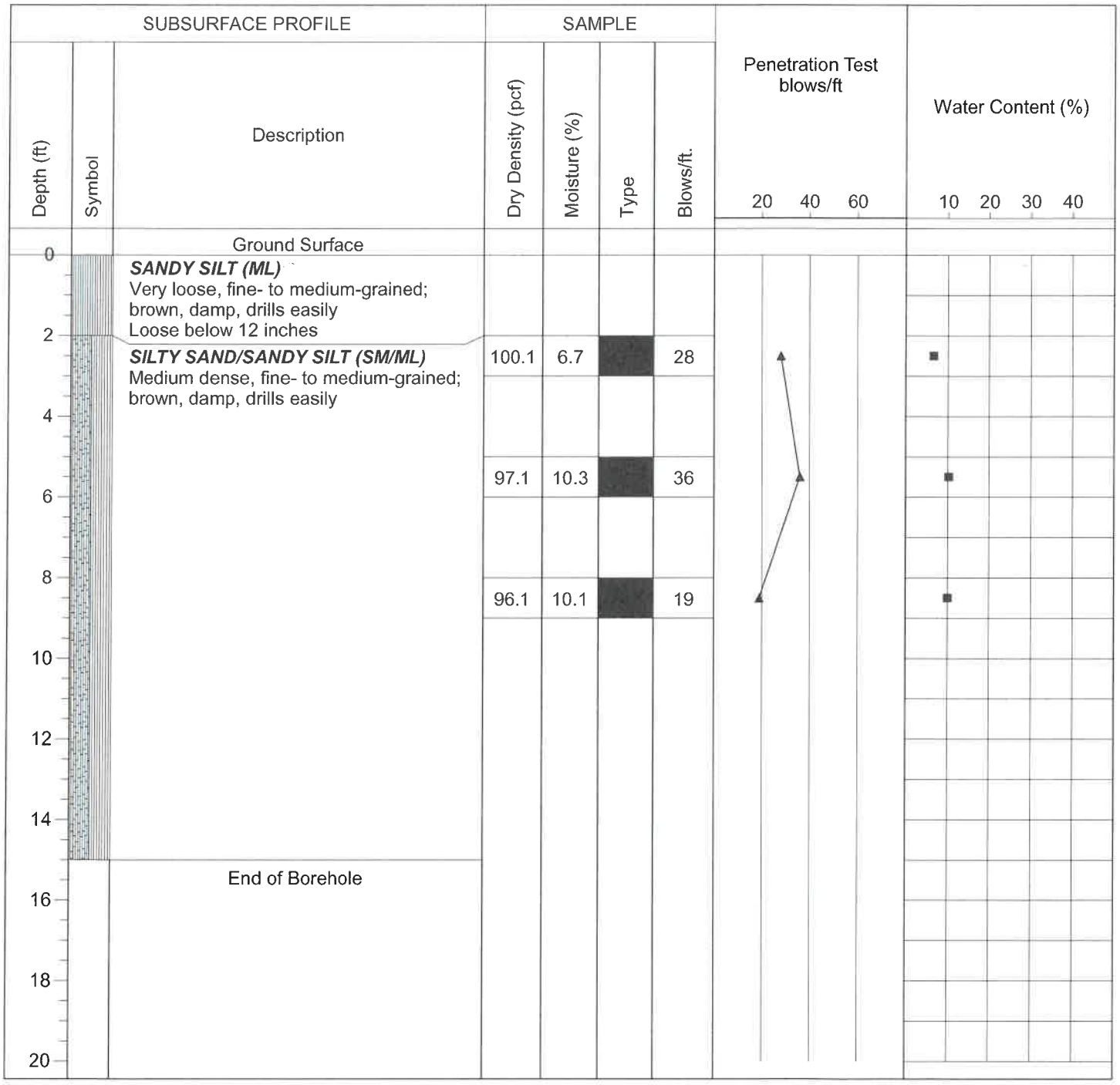
Log of Boring B11

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-11

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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



Drill Method: Solid Flight | **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 15 Feet

Krazan and Associates

Sheet: 1 of 1

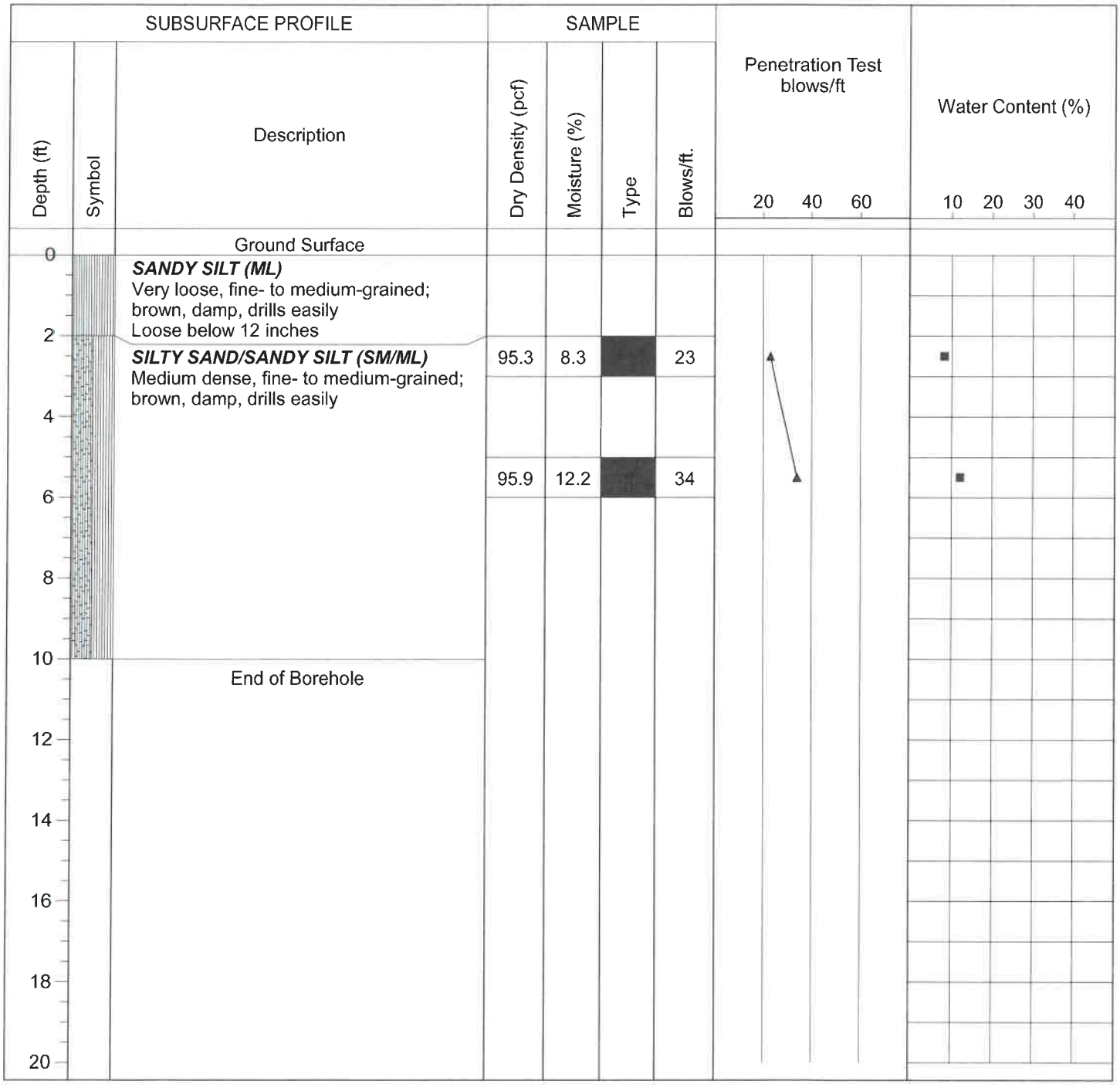
Log of Boring B12

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-12

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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



Drill Method: Solid Flight | **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 | **Krazan and Associates** | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 10 Feet

Sheet: 1 of 1

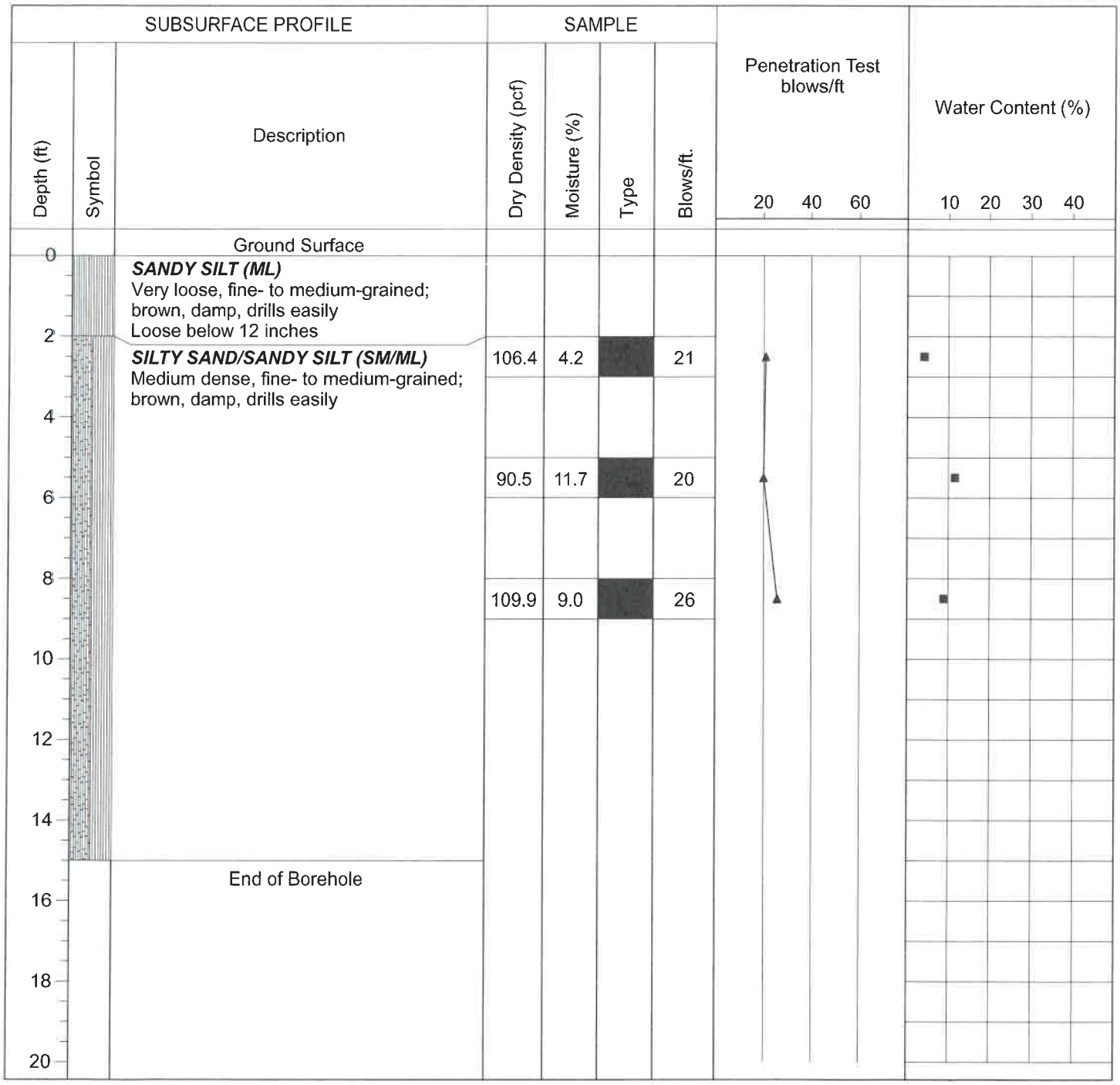
Log of Boring B13

Project: Tract 7410 **Project No:** 022-24137

Client: ORR Development 2, LLC **Figure No.:** A-13

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California **Logged By:** Dave Adams

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



Drill Method: Solid Flight **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 15 Feet

Sheet: 1 of 1

Log of Boring B14

Project: Tract 7410

Project No: 022-24137

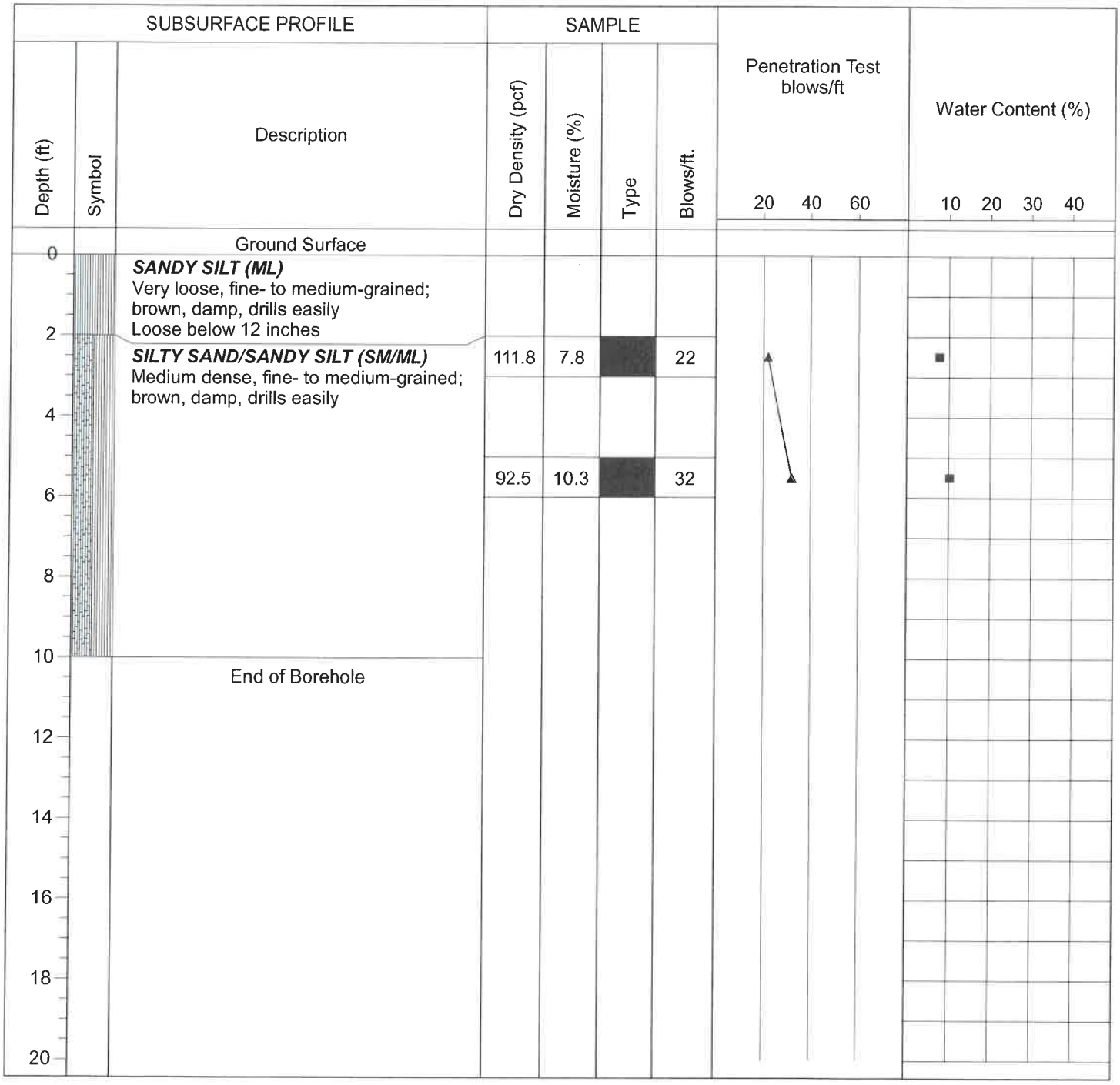
Client: ORR Development 2, LLC

Figure No.: A-14

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California

Logged By: Dave Adams

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



Drill Method: Solid Flight

Drill Rig: CME 45C-4

Driller: Jim Watts

Krazan and Associates

Drill Date: 10-17-24

Hole Size: 4½ Inches

Elevation: 10 Feet

Log of Boring B15

Project: Tract 7410

Project No: 022-24137

Client: ORR Development 2, LLC

Figure No.: A-15

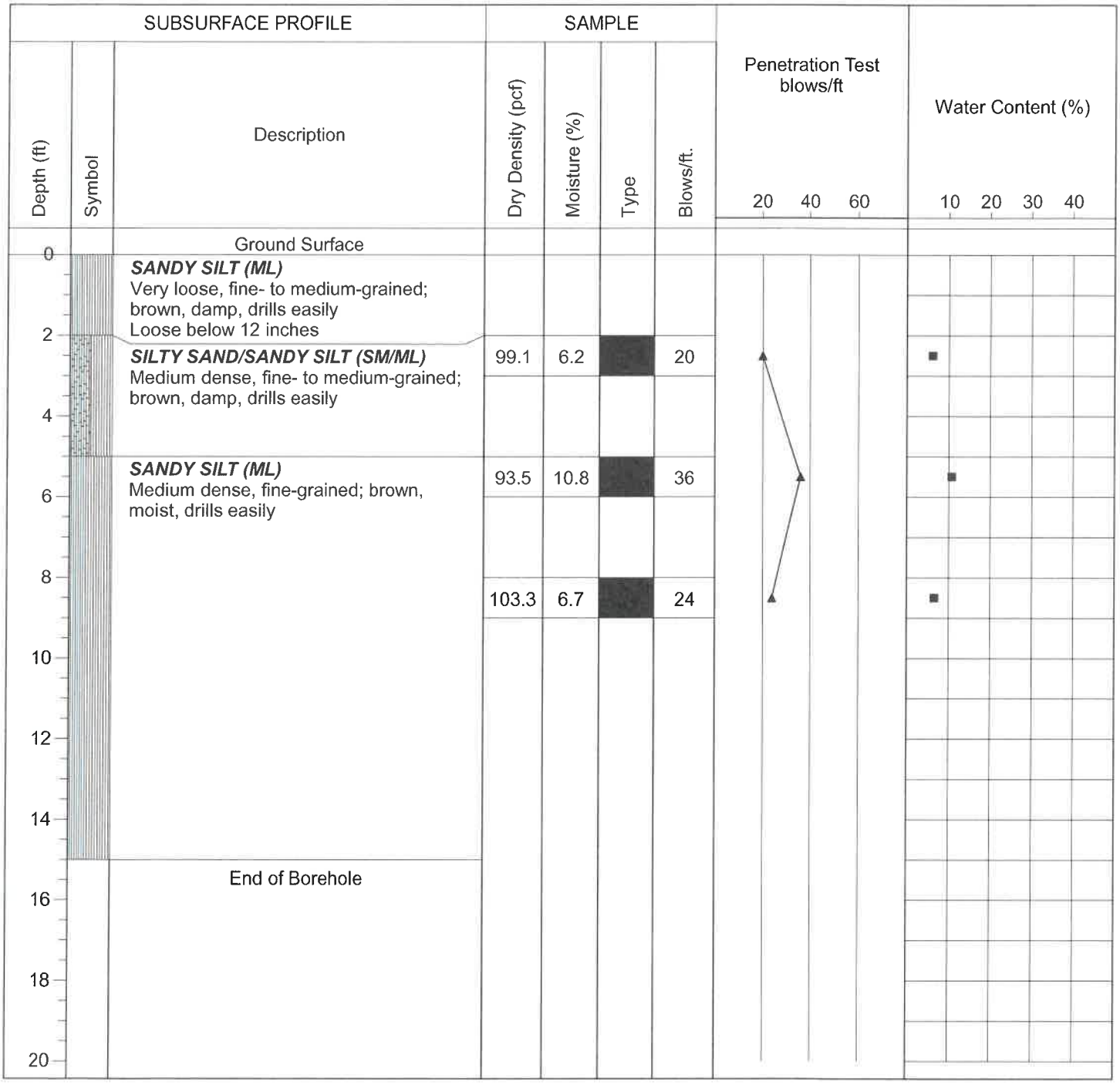
Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California

Logged By: Dave Adams

Depth to Water>

Initial: None

At Completion: None



Drill Method: Solid Flight

Drill Rig: CME 45C-4

Driller: Jim Watts

Krazan and Associates

Drill Date: 10-17-24

Hole Size: 4½ Inches

Elevation: 15 Feet

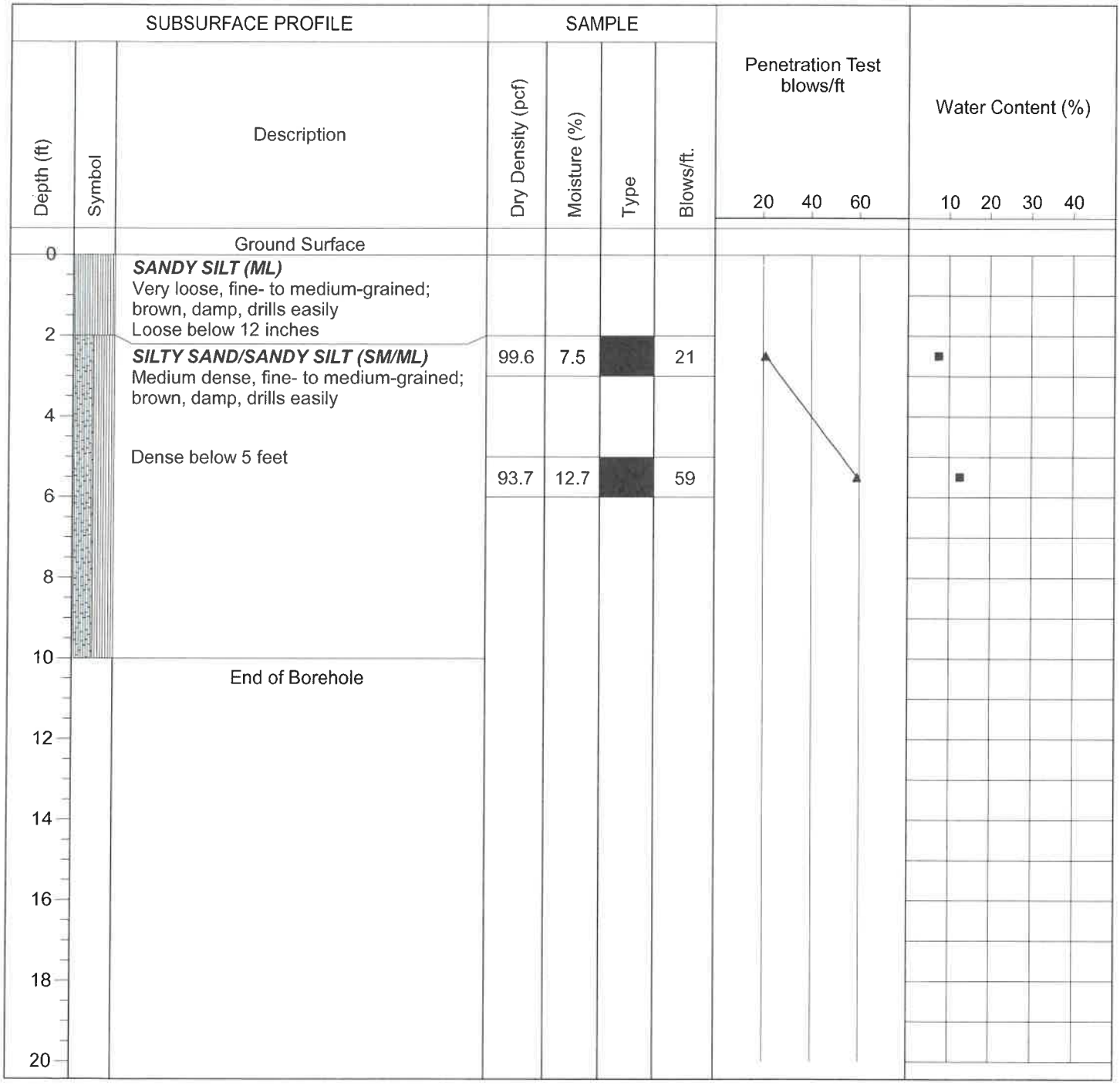
Log of Boring B16

Project: Tract 7410 | **Project No:** 022-24137

Client: ORR Development 2, LLC | **Figure No.:** A-16

Location: McCutchen Road and Mountain Vista Drive, Bakersfield, California | **Logged By:** Dave Adams

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



Drill Method: Solid Flight | **Drill Date:** 10-17-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 10 Feet

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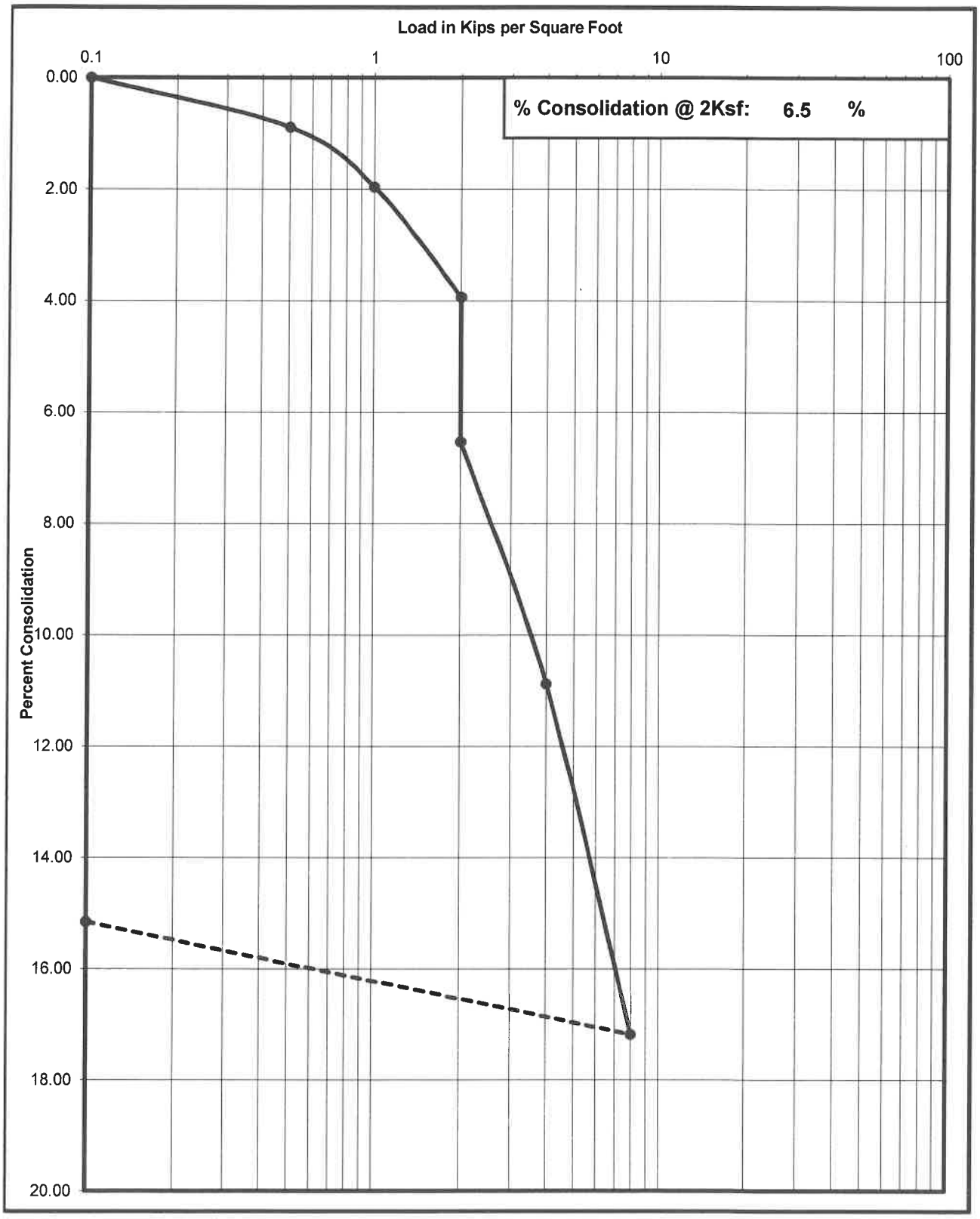
Sheet: 1 of 1

Consolidation Test

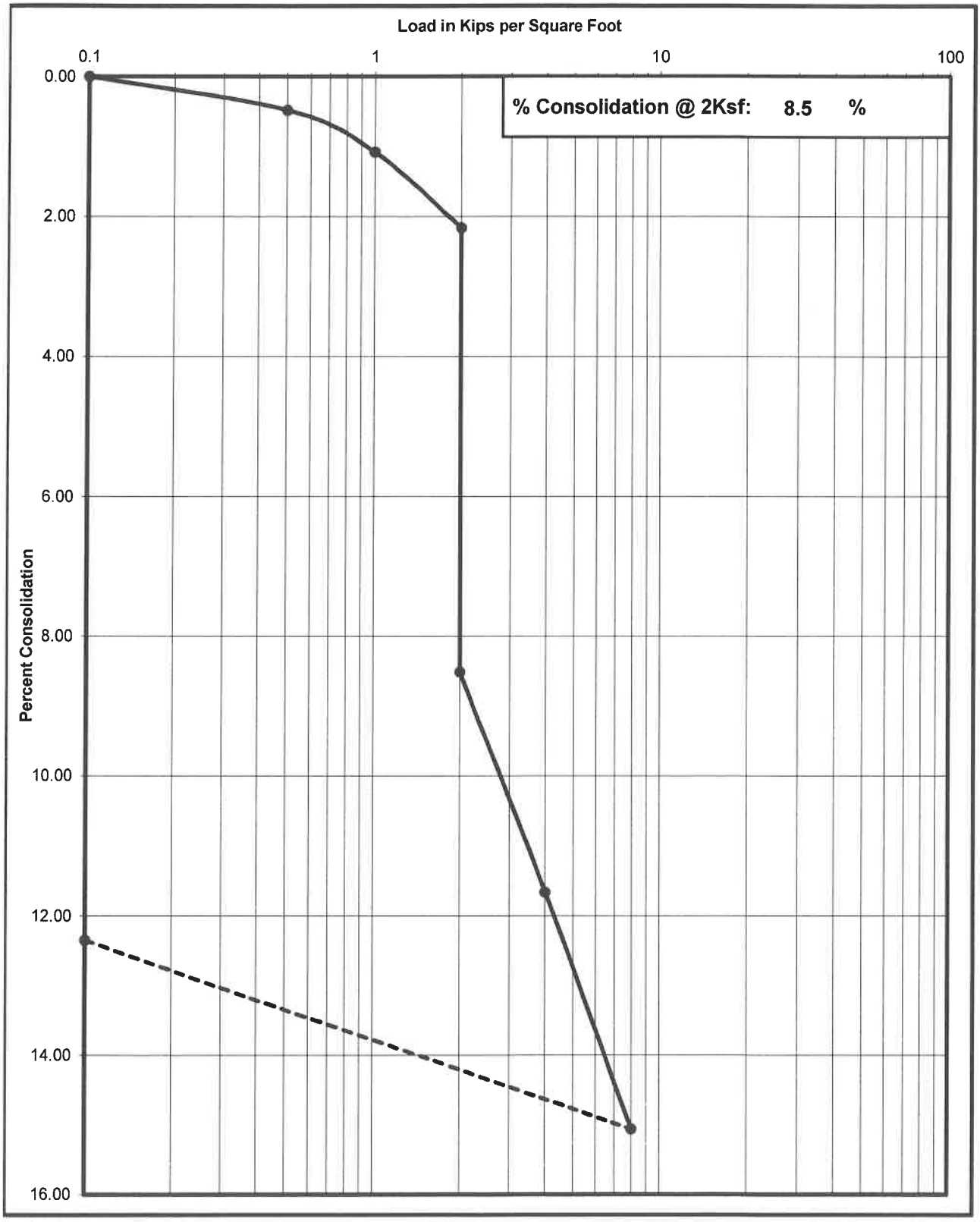
Project No	Boring No. & Depth	Date	Soil Classification
022-24137	B1 @ 2-3'	11/4/2024	SM/ML



Krazan Testing Laboratory

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
022-24137	B9 @ 2-3'	11/4/2024	SM/ML



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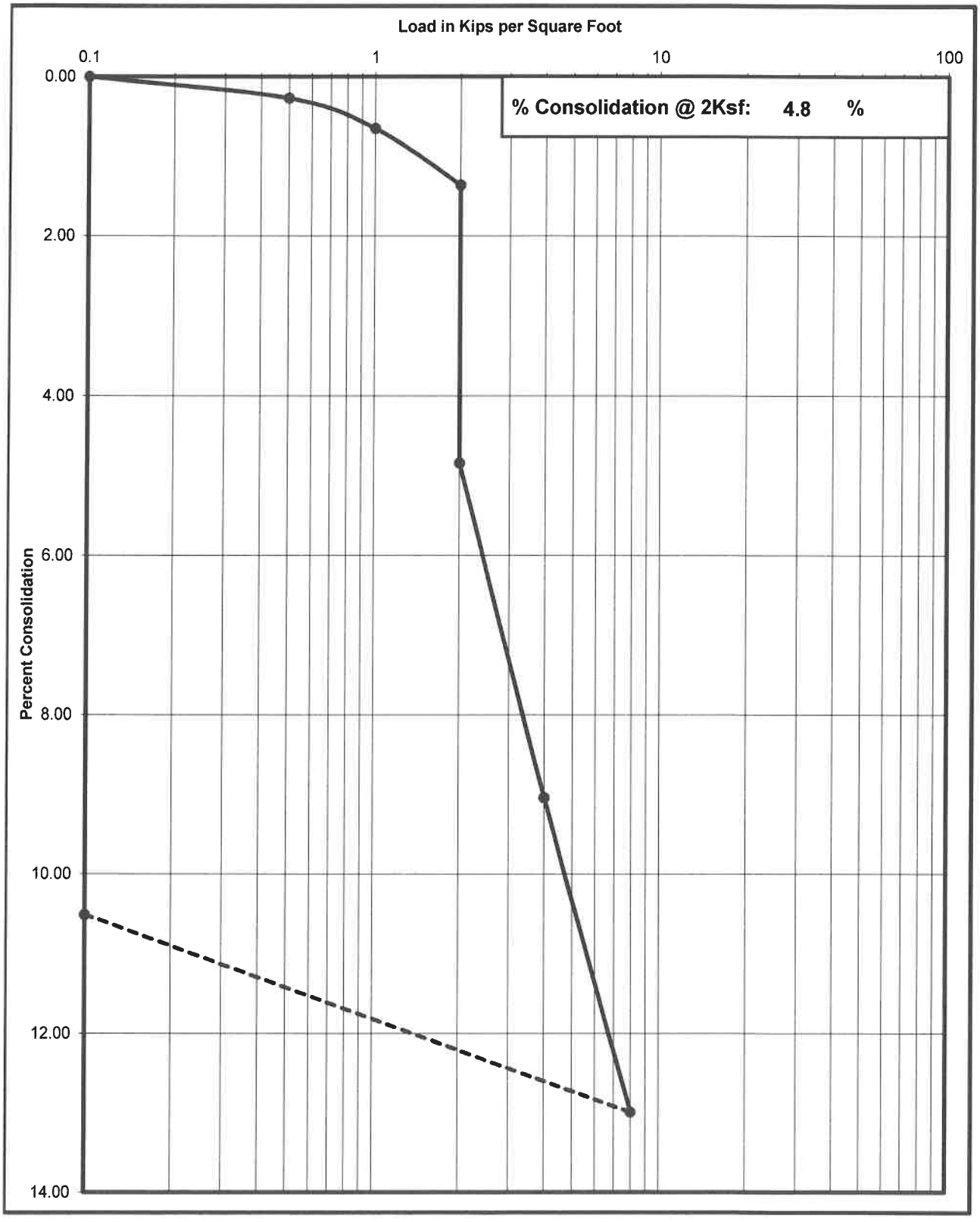
Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
022-24137	B9 @ 5-6'	11/4/2024	SM/ML



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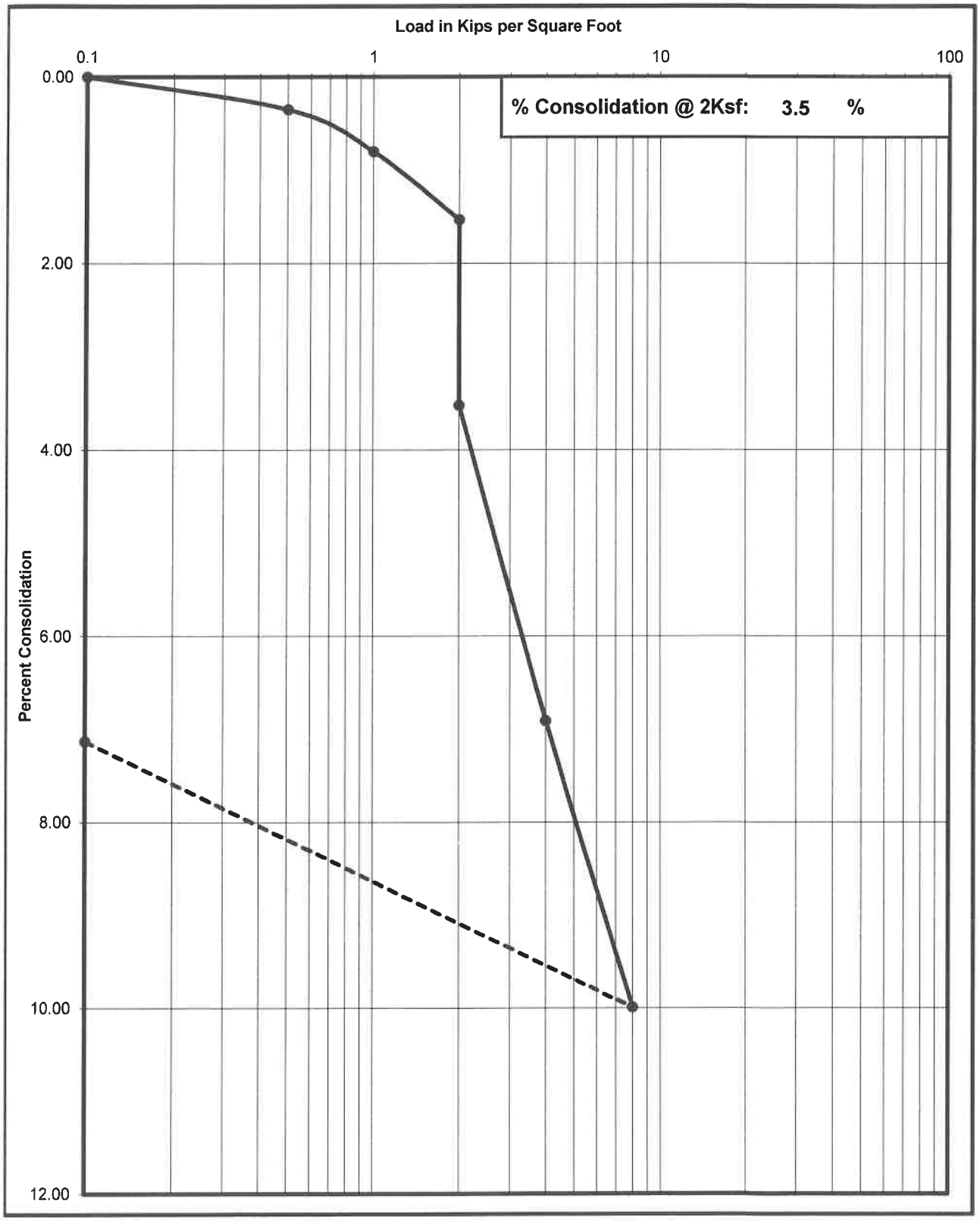
Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
022-24137	B15 @ 2-3'	11/4/2024	SM/ML



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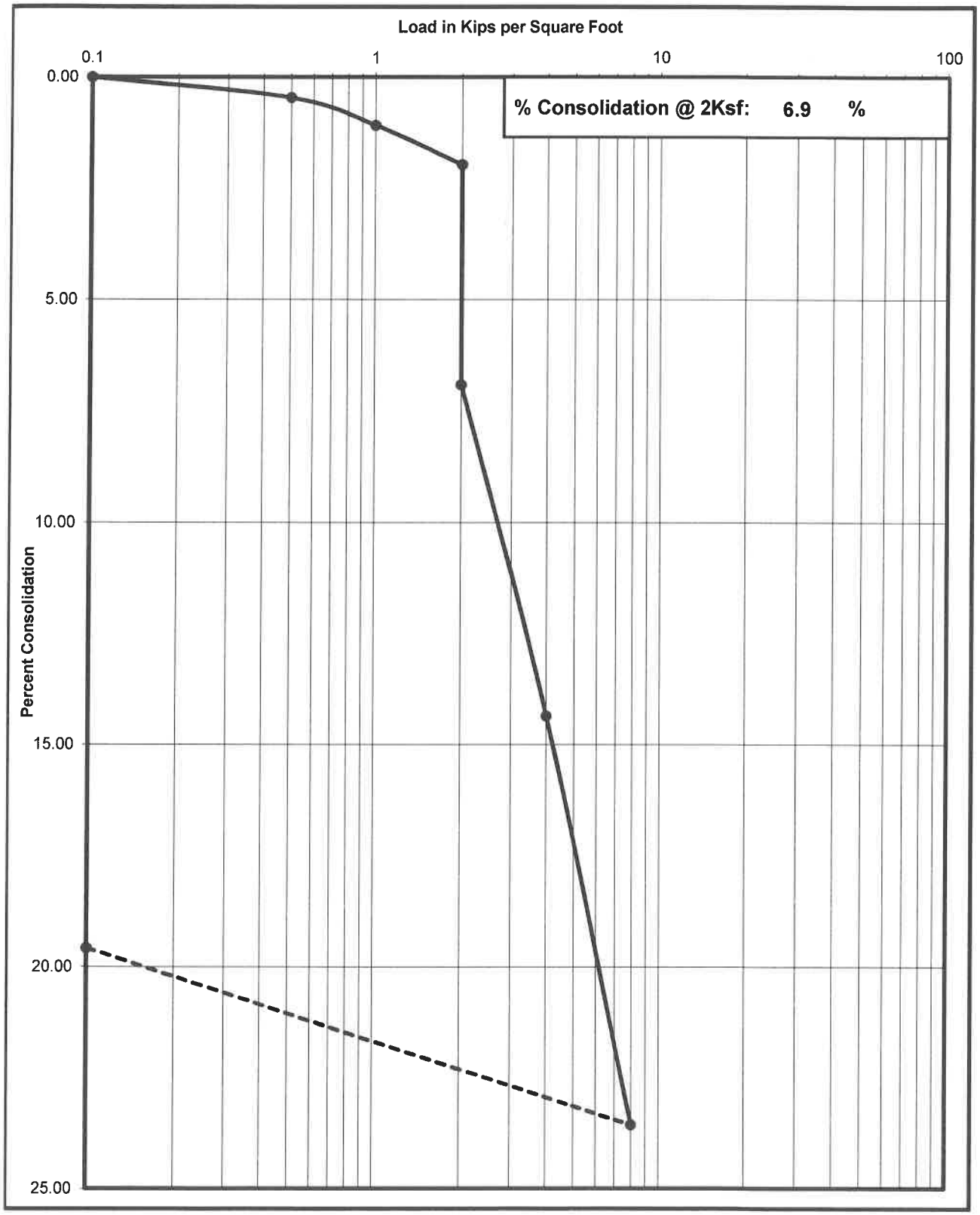
Consolidation Test

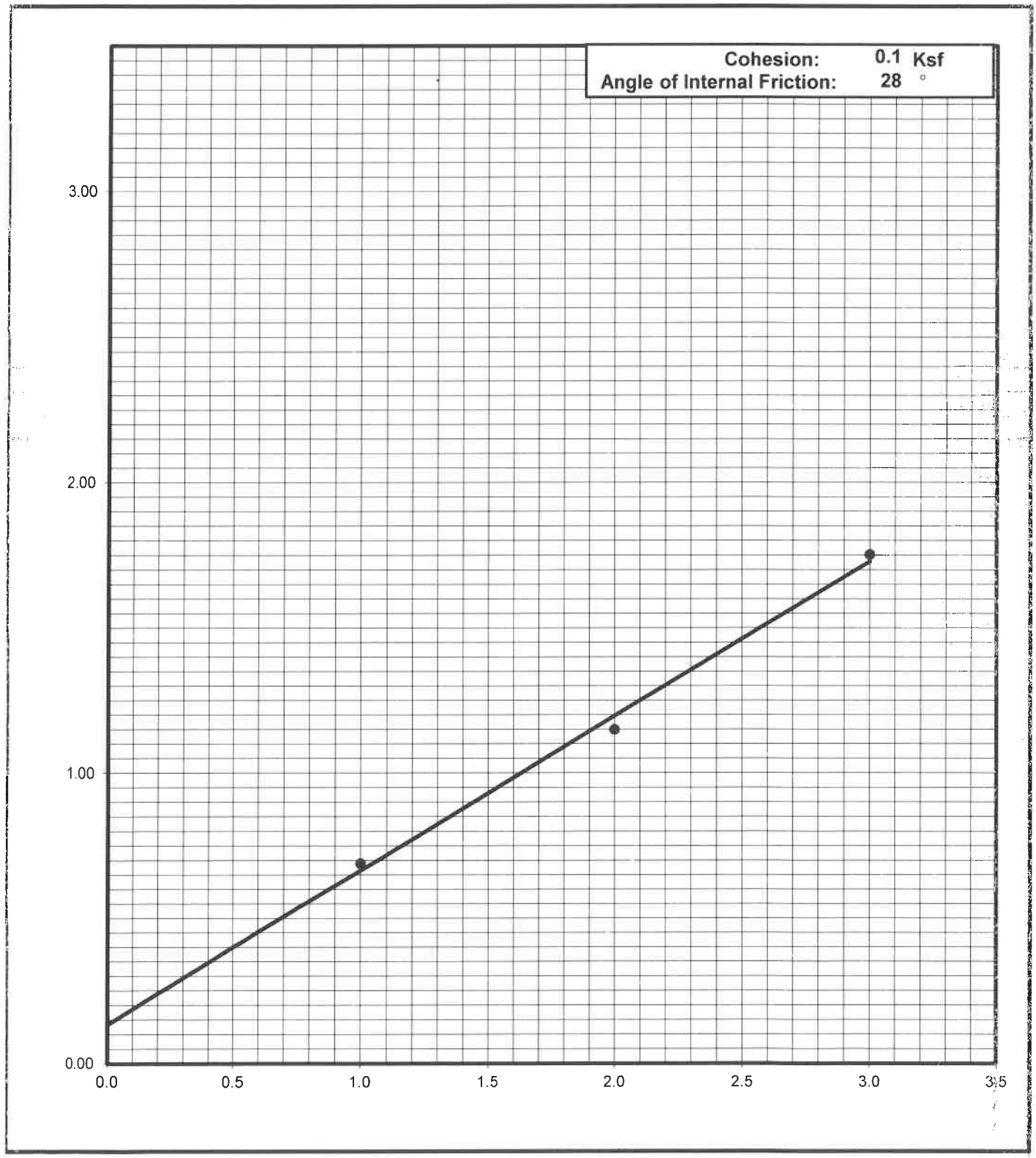
Project No	Boring No. & Depth	Date	Soil Classification
022-24137	B15 @ 5-6'	11/4/2024	ML



Krazan Testing Laboratory

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

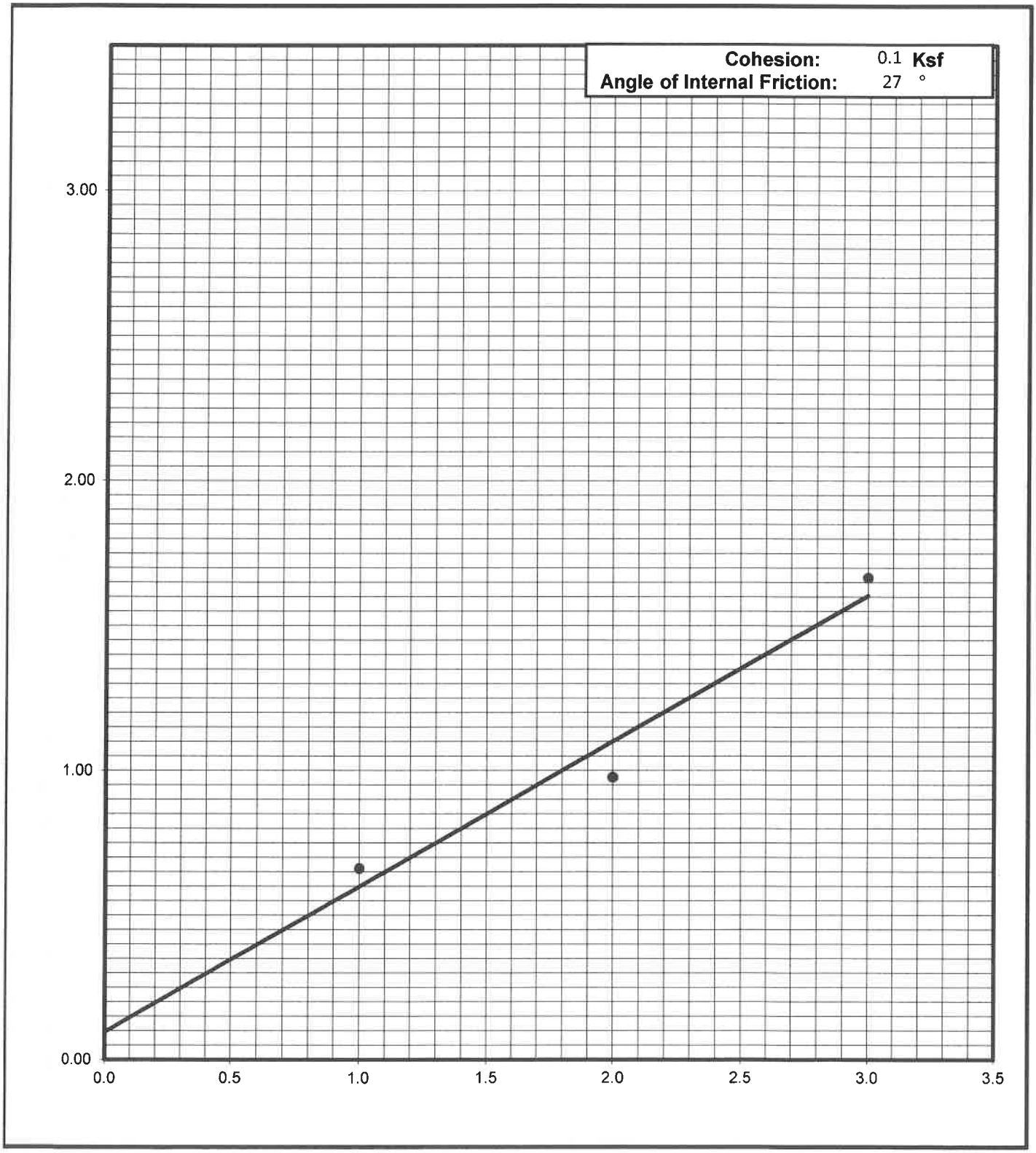
Project Number	Boring No. & Depth	Soil Type	Date
022-24137	B3 @ 2-3'	SM/ML	11/4/2024



Krazan Testing Laboratory

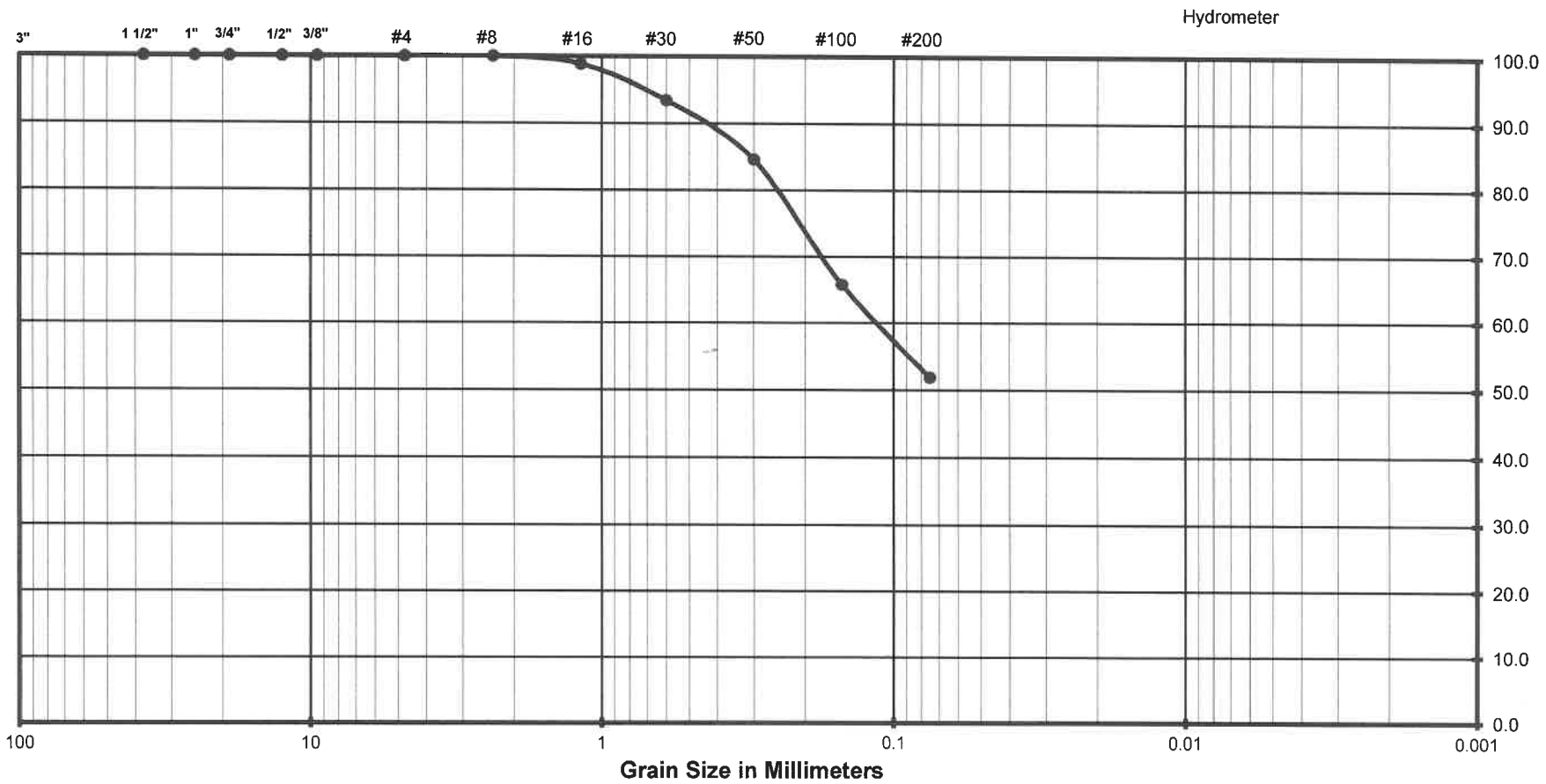
Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
022-24137	B7 @ 2-3'	ML	11/4/2024



Krazan Testing Laboratory

Grain Size Analysis

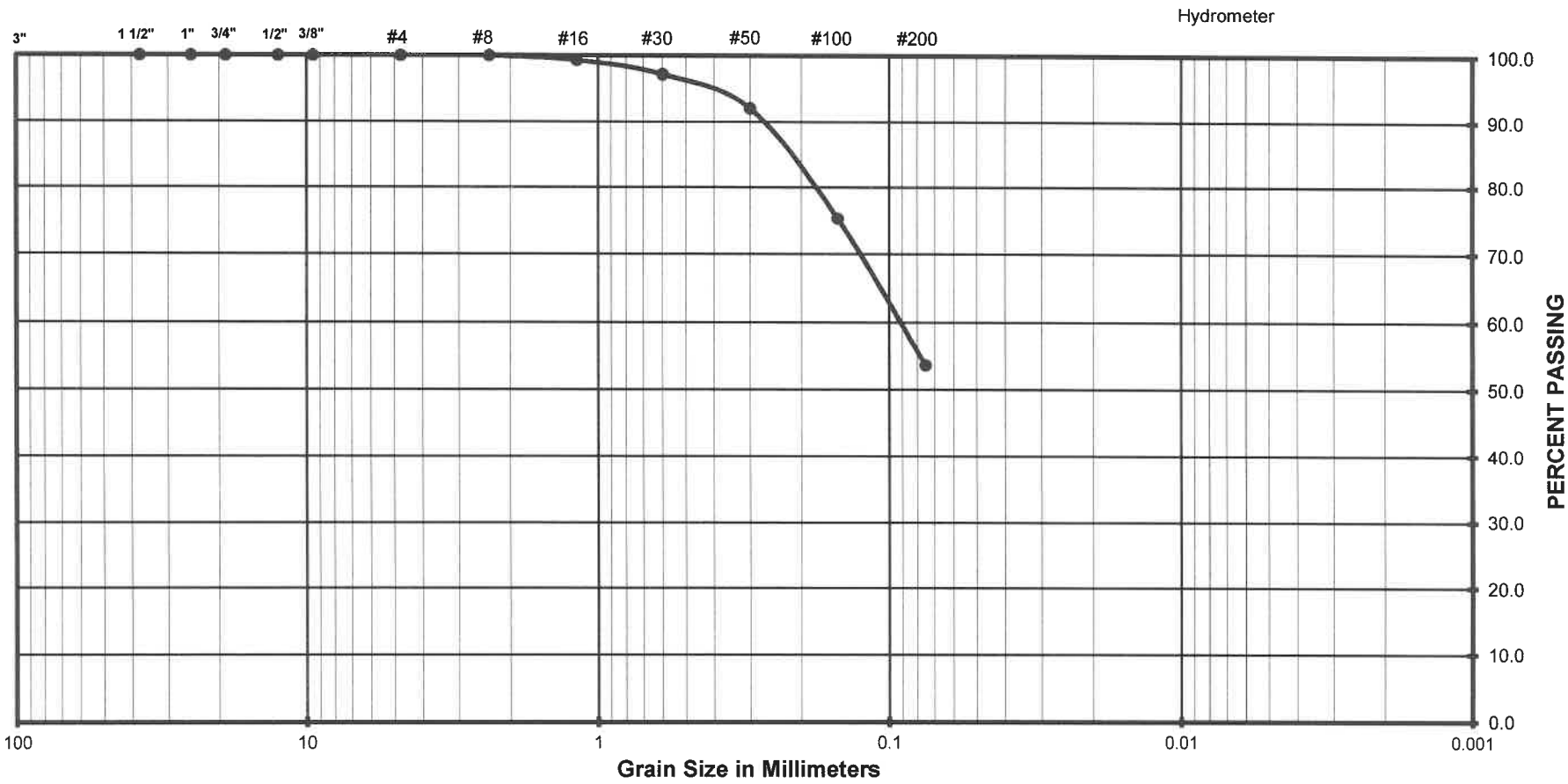


(Unified Soils Classification)

Project Name	Tract 7410
Project Number	022-24137
Soil Classification	SM/ML
Sample Number	B1 @ 2-3'

Krazan Testing Laboratory

Grain Size Analysis



(Unified Soils Classification)

Project Name	Tract 7410
Project Number	022-24137
Soil Classification	SM/ML
Sample Number	B9 @ 2-3'

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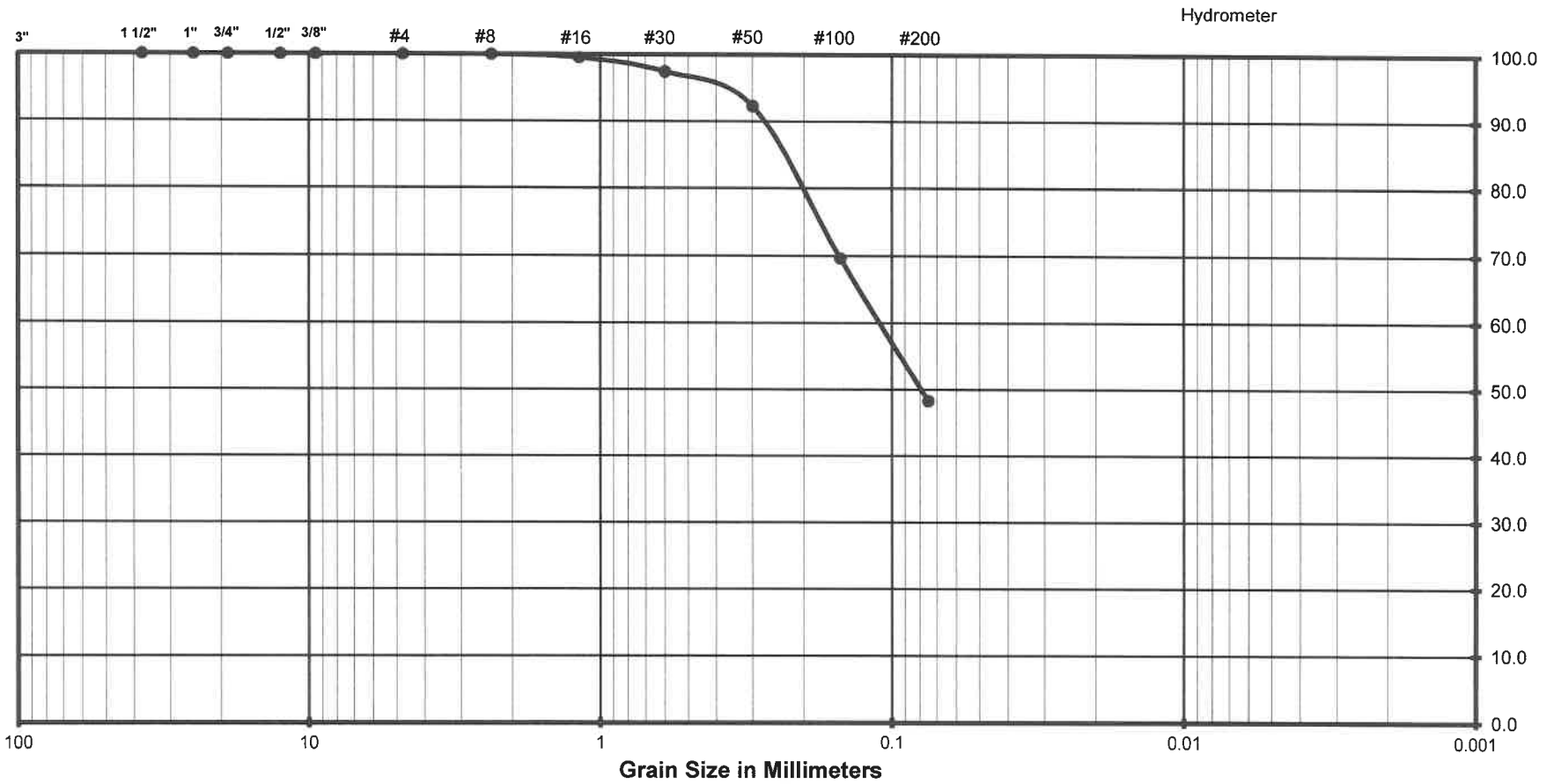
Grain Size Analysis



(Unified Soils Classification)

Project Name	Tract 7410
Project Number	022-24137
Soil Classification	SM/ML
Sample Number	B15 @ 2-3'

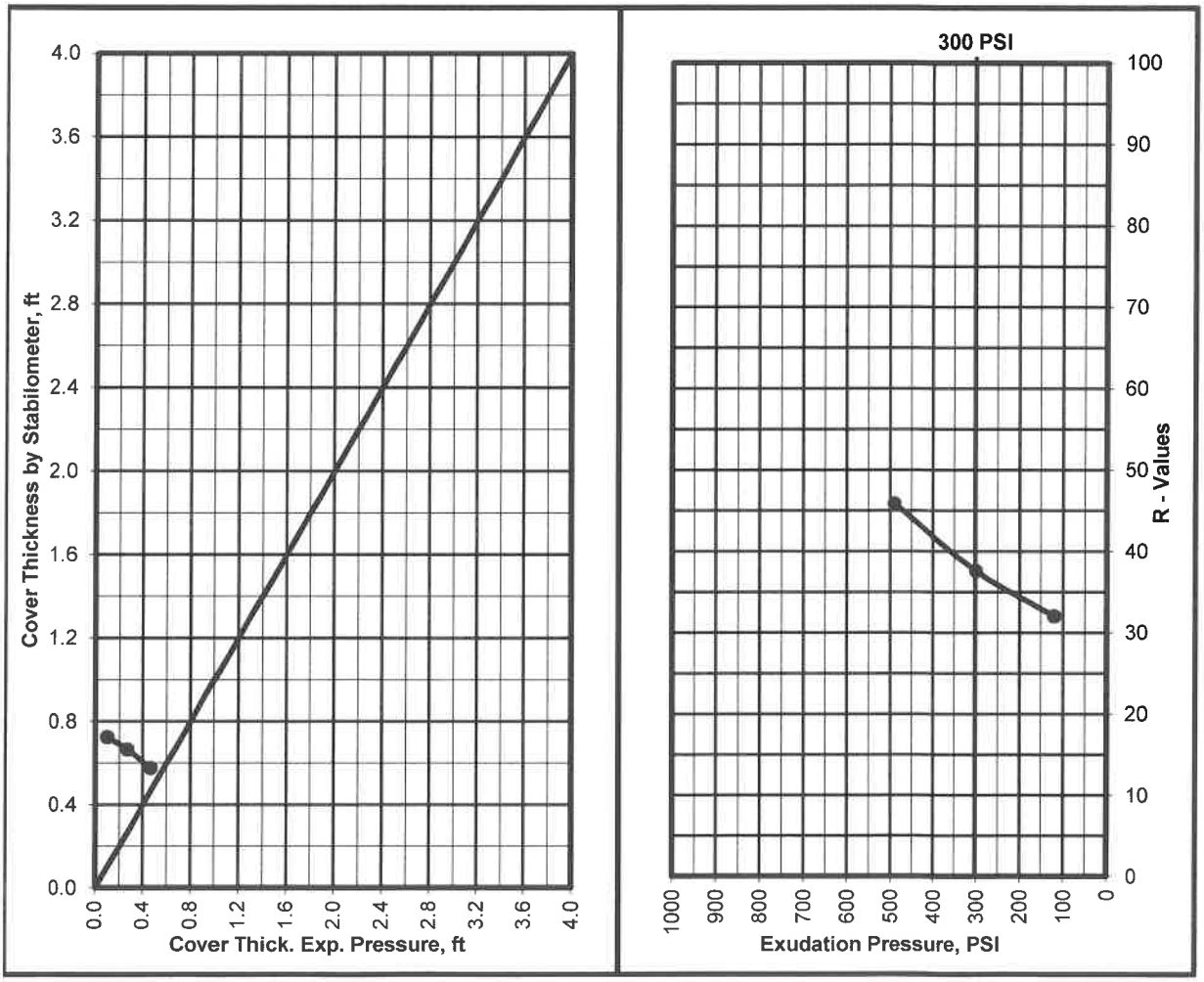
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	022-24137
Project Name	:	Tract 7410
Date	:	11/4/2024
Sample Location/Curve Number	:	RV#1
Soil Classification	:	SM/ML

TEST	A	B	C
Percent Moisture @ Compaction, %	12.3	12.8	13.3
Dry Density, lbm/cu.ft.	119.1	118.8	118.3
Exudation Pressure, psi	490	300	120
Expansion Pressure, (Dial Reading)	14	8	3
Expansion Pressure, psf	61	35	13
Resistance Value R	46	38	32

R Value at 300 PSI Exudation Pressure	**38**
R Value by Expansion Pressure (TI =): 5	**Expansion Pressure nil**



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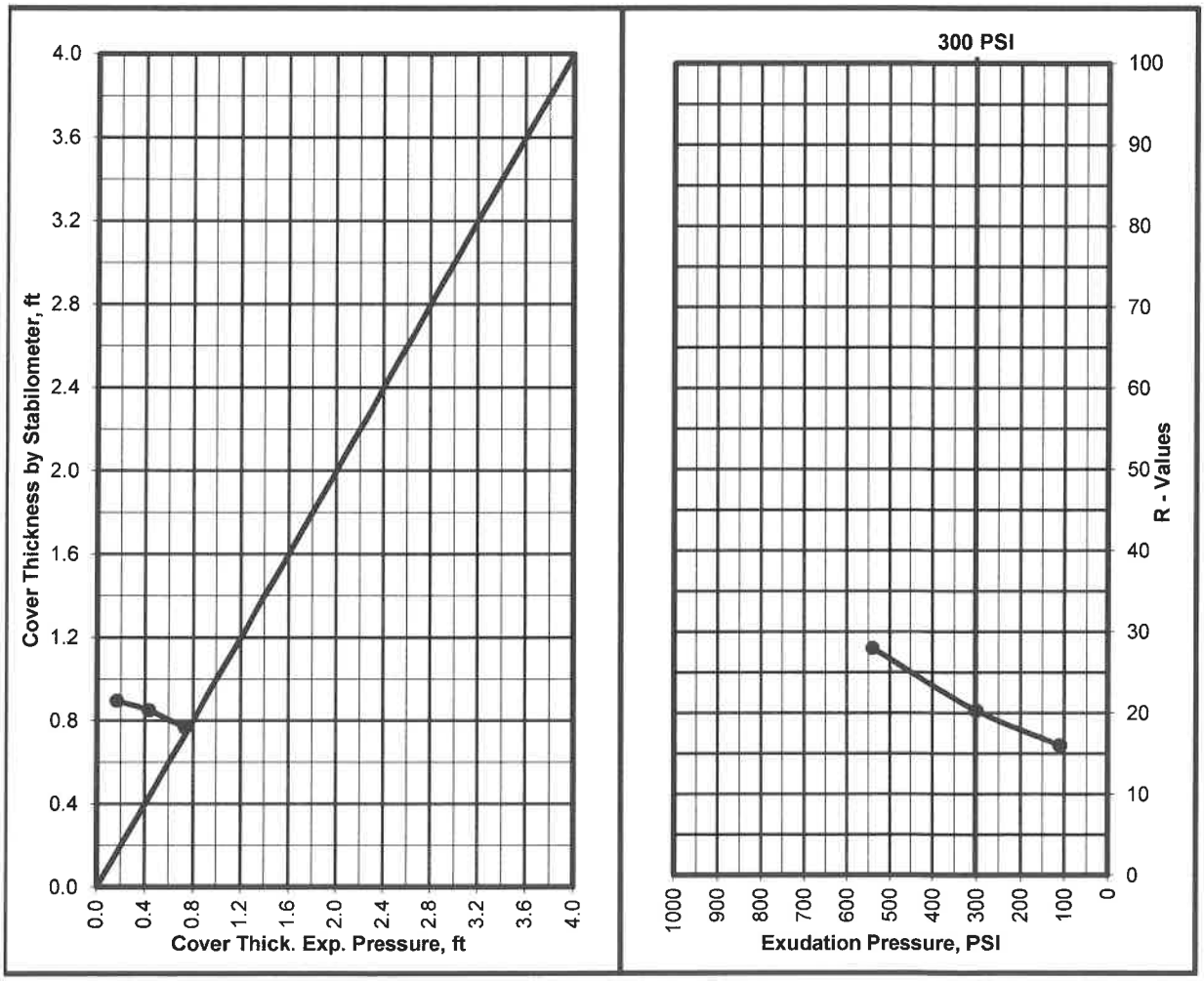
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	022-24137
Project Name	:	Tract 7410
Date	:	11/4/2024
Sample Location/Curve Number	:	RV#2
Soil Classification	:	ML

TEST	A	B	C
Percent Moisture @ Compaction, %	13.7	14.5	15.2
Dry Density, lbm/cu.ft.	117.6	116.3	115.2
Exudation Pressure, psi	540	300	110
Expansion Pressure, (Dial Reading)	22	13	5
Expansion Pressure, psf	95	56	22
Resistance Value R	28	20	16

R Value at 300 PSI Exudation Pressure	**20**
R Value by Expansion Pressure (TI =): 5	**29**



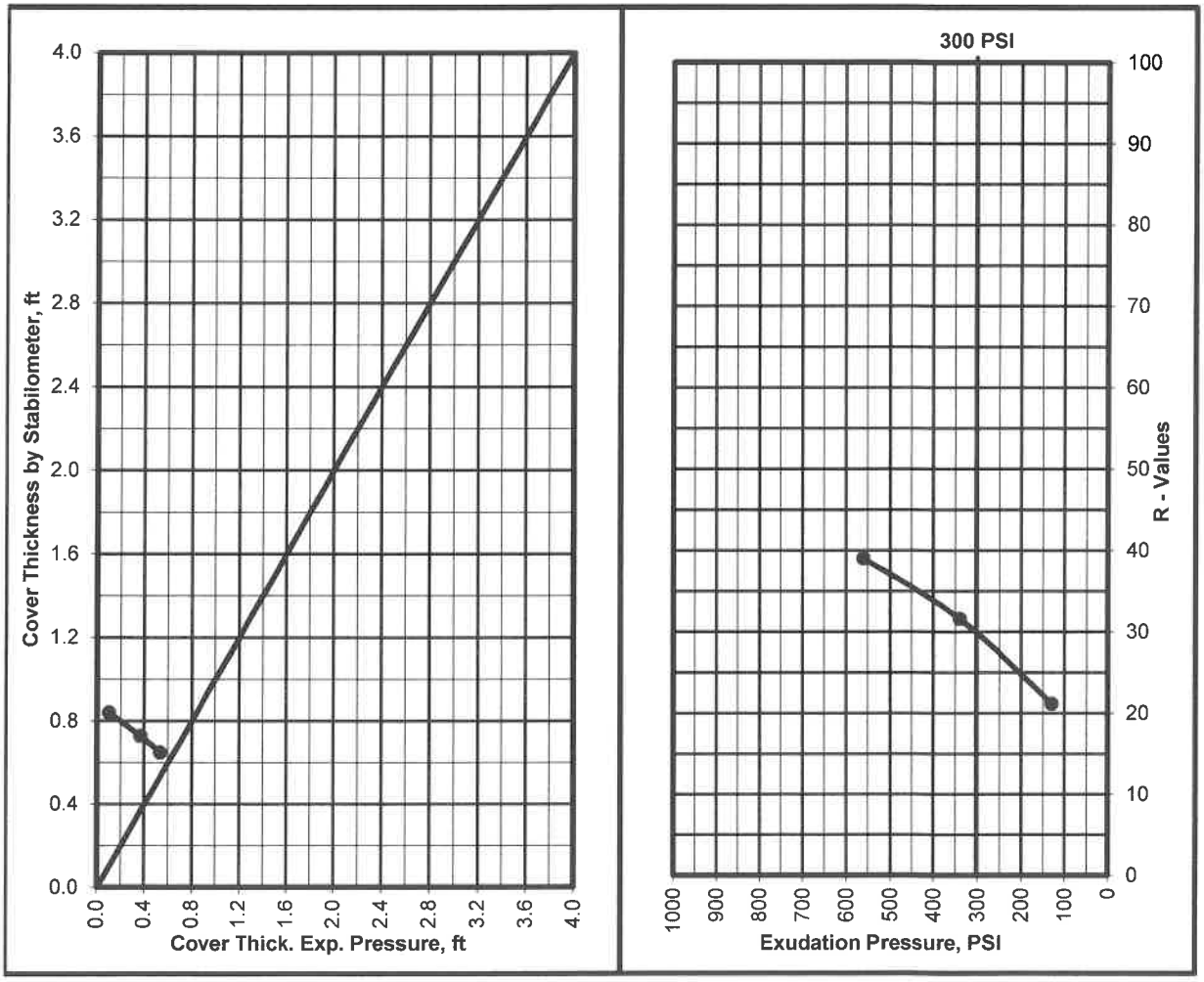
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	022-24137
Project Name	:	Tract 7410
Date	:	11/4/2024
Sample Location/Curve Number	:	RV#3
Soil Classification	:	SM/ML

TEST	A	B	C
Percent Moisture @ Compaction, %	11.6	12.6	13.1
Dry Density, lbm/cu.ft.	120.1	118.9	117.8
Exudation Pressure, psi	560	340	130
Expansion Pressure, (Dial Reading)	16	11	3
Expansion Pressure, psf	69	48	13
Resistance Value R	39	32	21

R Value at 300 PSI Exudation Pressure	**30**
R Value by Expansion Pressure (TI =): 5	**Expansion Pressure nil**



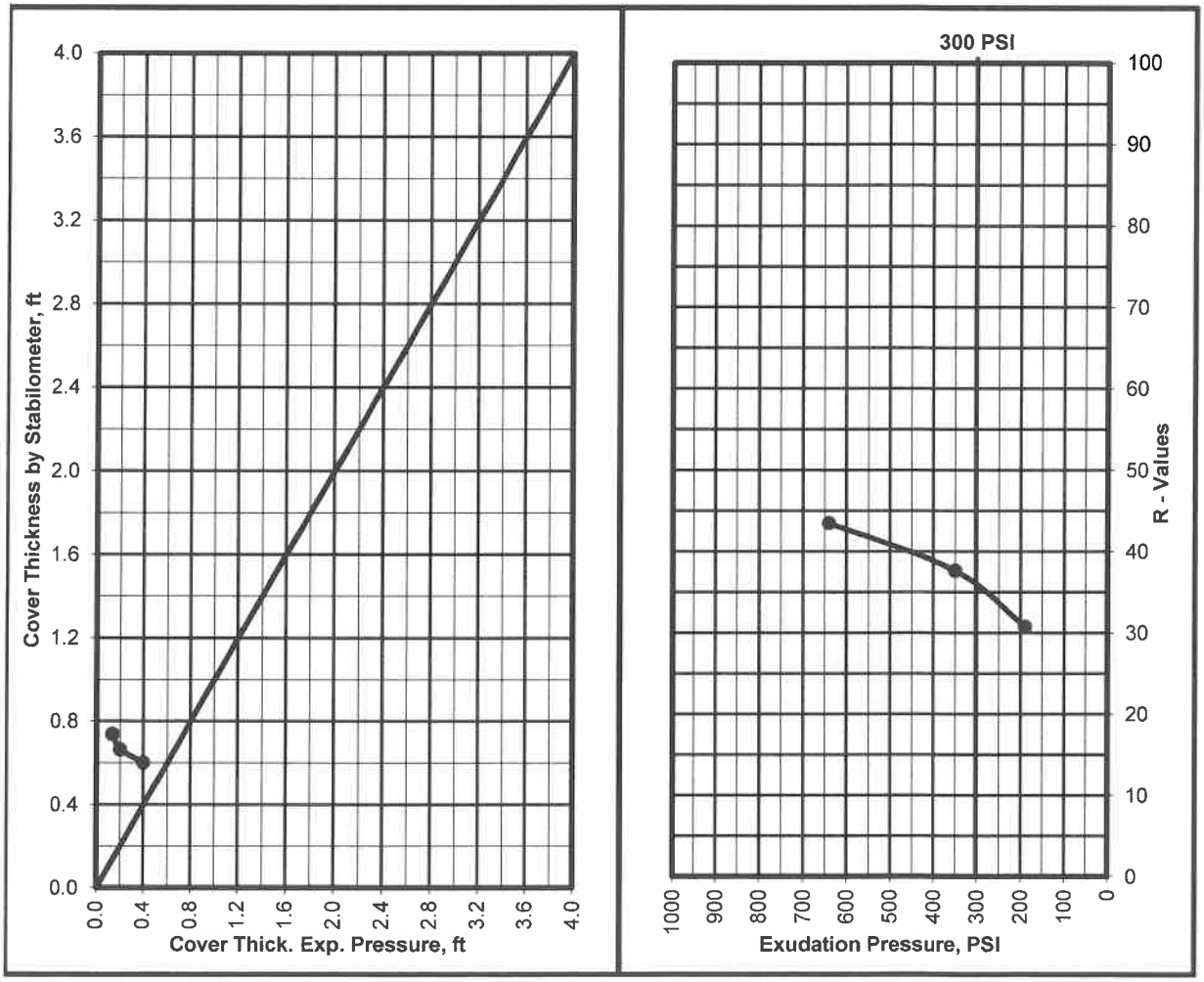
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	022-24137
Project Name	:	Tract 7410
Date	:	11/4/2024
Sample Location/Curve Number	:	RV#4
Soil Classification	:	SM/ML

TEST	A	B	C
Percent Moisture @ Compaction, %	12.4	12.9	11.7
Dry Density, lbm/cu.ft.	118.5	117.7	119.5
Exudation Pressure, psi	350	190	640
Expansion Pressure, (Dial Reading)	6	4	12
Expansion Pressure, psf	26	17	52
Resistance Value R	38	31	43

R Value at 300 PSI Exudation Pressure	**36**
R Value by Expansion Pressure (TI =): 5	**Expansion Pressure nil**



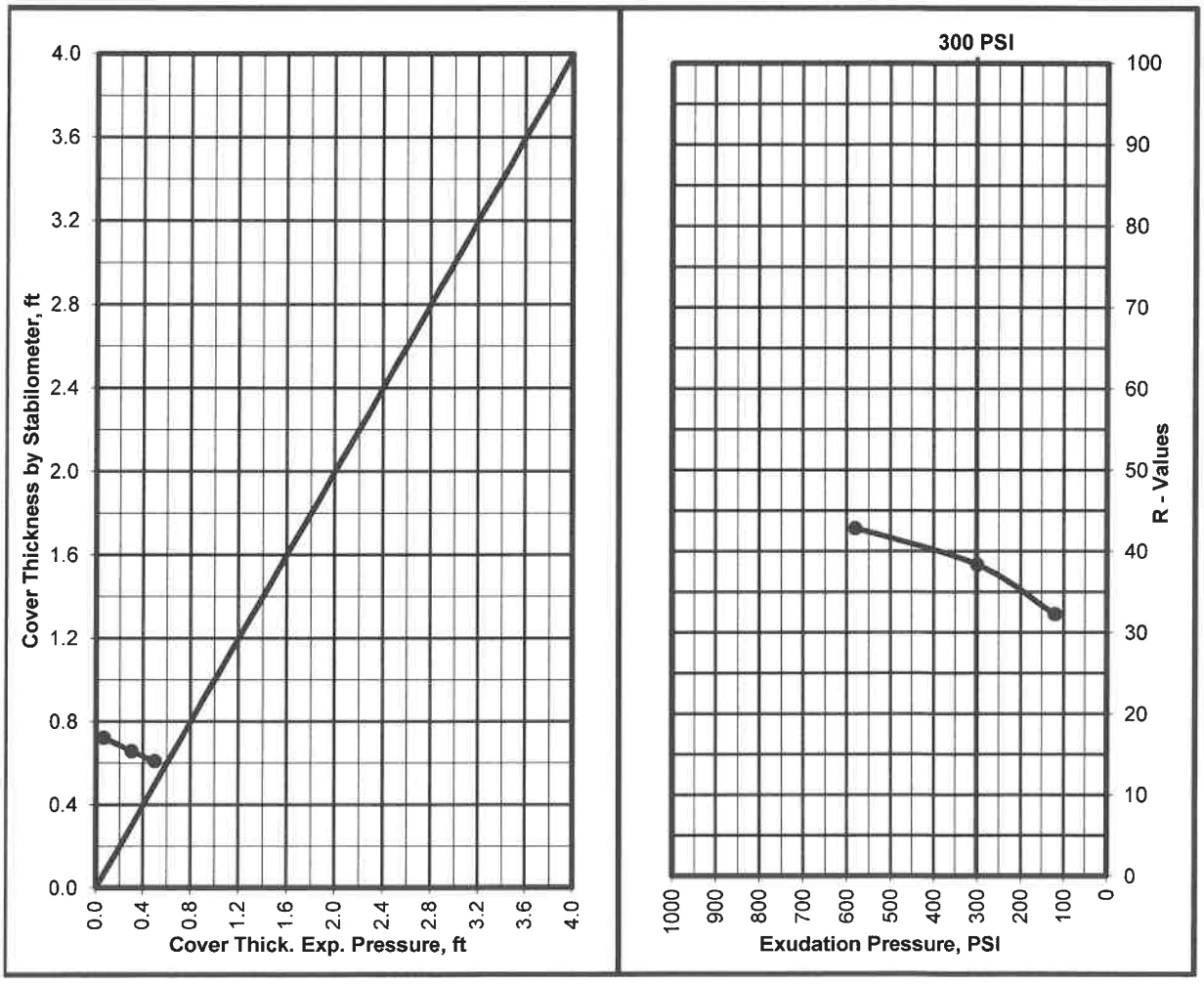
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	022-24137
Project Name	:	Tract 7410
Date	:	11/4/2024
Sample Location/Curve Number	:	RV#5
Soil Classification	:	SM/ML

TEST	A	B	C
Percent Moisture @ Compaction, %	13.6	14.1	13.1
Dry Density, lbm/cu.ft.	118.7	117.5	119.6
Exudation Pressure, psi	300	120	580
Expansion Pressure, (Dial Reading)	9	2	15
Expansion Pressure, psf	39	9	65
Resistance Value R	38	32	43

R Value at 300 PSI Exudation Pressure	**38**
R Value by Expansion Pressure (TI =): 5	**Expansion Pressure nil**



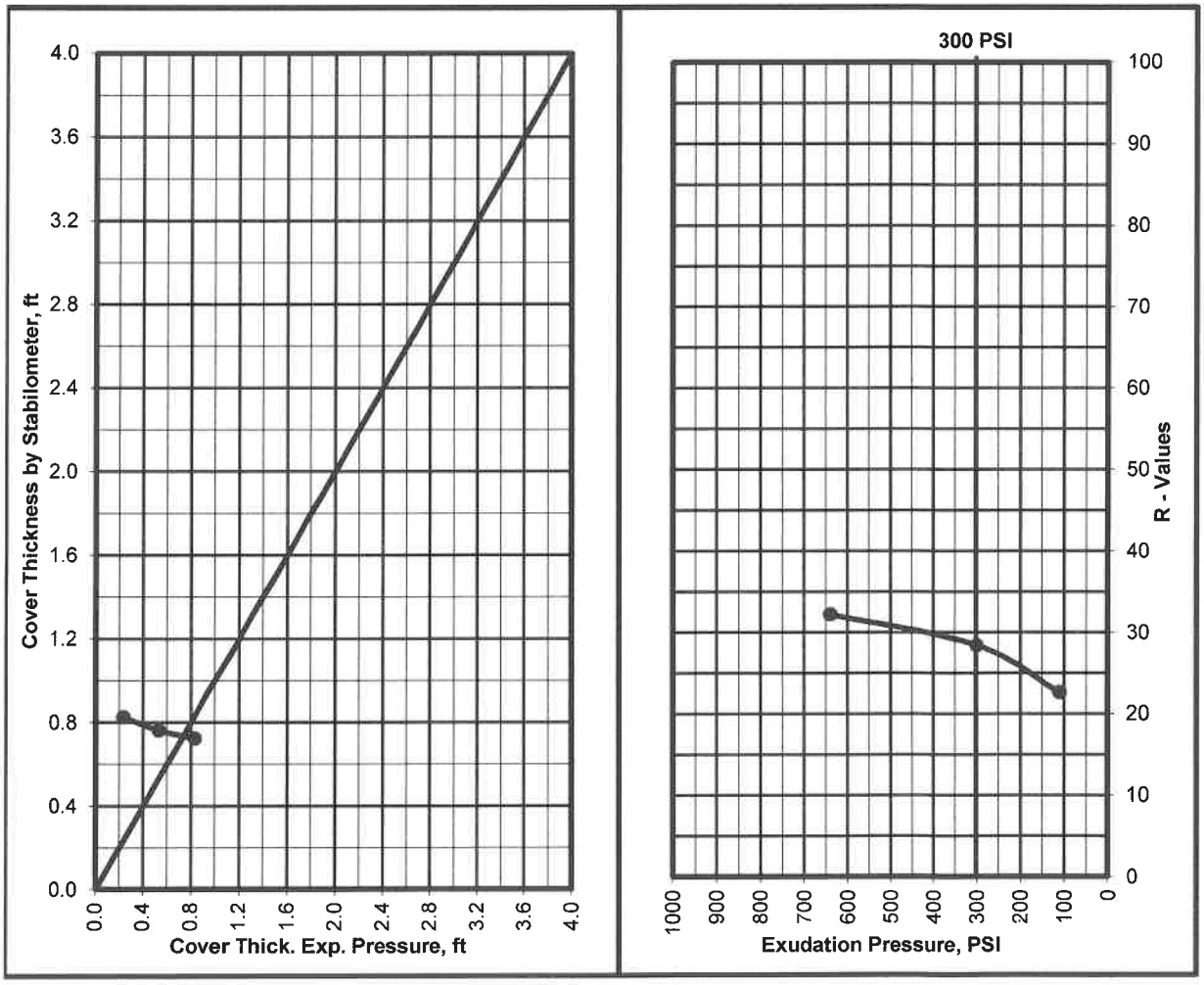
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	022-24137
Project Name	:	Tract 7410
Date	:	11/4/2024
Sample Location/Curve Number	:	RV#6
Soil Classification	:	ML

TEST	A	B	C
Percent Moisture @ Compaction, %	13.1	13.7	12.6
Dry Density, lbm/cu.ft.	118.5	117.5	119.3
Exudation Pressure, psi	300	110	640
Expansion Pressure, (Dial Reading)	16	7	25
Expansion Pressure, psf	69	30	108
Resistance Value R	28	23	32

R Value at 300 PSI Exudation Pressure	**28**
R Value by Expansion Pressure (TI =): 5	**30**



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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 2018 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.