NMG Geotechnical, Inc.

January 16, 2023

Project No. 20079-02

To: Dopudja & Wells Consulting
6789 Quail Hill Parkway, #421
Irvine, CA 92603

Attention: Mr. Stephen Dopudja

Subject: Geotechnical Exploration and Review of Grading and Improvement Plan, Proposed Lake Rialto, City of Rialto, County of San Bernardino, California

In accordance with your request and authorization, NMG Geotechnical, Inc. (NMG) has performed a geotechnical exploration and review of the grading and improvement plan for the proposed Lake Rialto, in the city of Rialto, California. We have reviewed the grading and improvement plan of the proposed lake prepared by Wilson Mikami Corporation, received on November 29, 2022. The site is located south of the Waste Water Treatment Plant (WWTP) located at 501 E. Santa Ana Avenue in an industrial area of the city of Rialto (Figure 1). The subject property is a topographically low area that was historically used as sand and gravel quarries and infiltration ponds.

NMG previously performed a geotechnical exploration of a portion of the subject site in 2010 for a proposed bio-fuel production plant. Related to that plant, we also performed geotechnical exploration of a portion of the Agua Mansa Landfill property to the south and the Holliday property to the west. Plans for the plant did not move beyond the initial feasibility studies. The pertinent boring and trench data from these studies were compiled and reviewed prior to drilling three additional hollow-stem-auger borings. The pertinent data from the prior studies are also included in this report.

The main geotechnical issues for this proposed habitat and lake project are:

- Stability of the perimeter slopes, especially during emptying and re-filling of the lake;
- Erodibility and potential soil piping of the sandy alluvium;
- Impact of lake development on existing slopes and adjacent properties, including existing electric transmission towers along the southern portion of the site;
- Presence of uncertified fills placed during prior grading/disposal at the site;
- Presence of the Agua Mansa Landfill rubble material along the southern boundary of the subject site; and
- The potential for strong seismic shaking.

This report provides our geotechnical findings and conclusions, and provides preliminary recommendations for project design, grading and construction. The project aspects related to potential hazardous materials, groundwater quality and biological concerns are not under the purview of NMG.

If you have any questions regarding this report, please contact our office. We appreciate the opportunity to provide our services.

Respectfully submitted,

NMG GEOTECHNICAL, INC.

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

NMG Geotechnical, Inc. (NMG) has performed geotechnical exploration at the proposed Lake Rialto located to the south of the Waste Water Treatment Plant (WWTP) in the city of Rialto, County of San Bernardino, California. This study included a geotechnical review of the grading and improvement plan titled "City of Rialto Grading and Improvement Plan" (Sheets 1 through 10 of 10), prepared by Wilson Mikami Corporation (WMC) and received by NMG on November 29, 2022. The purpose of our study was to evaluate the site conditions, identify potential geotechnical issues and constraints, and to provide remedial grading measures for the proposed grading. We have worked with the project team, including Dopudja & Wells Consulting, WMC as civil engineer, Buck Associates Consultants as biologist, and the City of Rialto as reviewers for the past two years.

This report presents our geotechnical findings, conclusions, and recommendations for design, grading and construction. This report includes appendices with pertinent references (Appendix A); geotechnical boring, CPT and trench logs (Appendix B); laboratory test data (Appendix C); updated seismic analysis (Appendix D); slope stability analysis (Appendix E); and General Earthwork and Grading Specifications (Appendix F). Illustrations include Site Location and Regional Fault Map (Figures 1 and 2); Geotechnical Map (Plate 1); Remedial Measures Map (Plate 2); and Geologic Cross-Sections (Plate 3).

Our scope of services for this study includes the following.

- **Background and Aerial Photo Review:** The background review included researching and compiling geotechnical data related to the site, including both published and unpublished reports, maps, and records of groundwater data. This study also included a review of stereoscopic pairs of aerial photographs dating back to 1930, and review of topographic maps dating back to 1901. The collected data were compiled onto a map. A list of the reviewed references is included in Appendix A.
- **Site Reconnaissance:** NMG visited the site to evaluate current site conditions, map the limits of the landfill and the perimeter slope conditions, and to locate and stake boring locations prior to our subsurface exploration. We also reviewed site locations with representatives of the WWTP and contacted DigAlert for utility clearance prior to the field work.
- **Subsurface Exploration:** The additional subsurface exploration consisted of excavation, sampling, and surface logging of three additional hollow-stem-auger borings at the site (H-1 through H-3). The logs of these and prior borings, CPTs and trenches by NMG and others are presented in Appendix B. Their locations are shown on the Geotechnical Map (Plate 1).
- **Laboratory Testing:** Laboratory testing of selected earth materials was conducted in general conformance with applicable ASTM test standards for soil classification and evaluation of engineering properties. Test results from this and prior studies are summarized and presented in Appendix C. The in-situ moisture content and dry density data are included on the geotechnical boring logs (Appendix B).

- **Geotechnical Analysis:** Geotechnical analysis of the collected data included preparation of a geotechnical map, creating an overall geologic and hydrogeologic site model, developing geologic cross-sections, and preparation of geotechnical boring logs. We evaluated and analyzed the proposed conceptual grading in light of general slope stability, settlement and liquefaction potential. The seismic data is updated per the 2022 California Building Code. Analyses were also performed to provide general recommendations for design of foundations and structures.
- **Report Preparation:** We prepared this report, which includes preliminary recommendations related to future lake design, rough grading, design of structures and construction, with accompanying illustrations and appendices.

Please note our scope of work did not include biological assessment of the site or environmental evaluations of the subsurface soil or groundwater.

1.2 Site Location and Description

The roughly 14.5-acre site is located south of the WWTP located at 501 E. Santa Ana Avenue in an industrial area of the city of Rialto (Figure 1). Current access to the site is through the plant. The subject property is an undeveloped area that was historically used for sand and gravel quarries and as infiltration ponds for the WWTP. The site is a topographically low area that has been graded many times in the past, resulting in a number of areas of undocumented fills (Plate 1). The elevations within the site vary from a high of 935 feet above mean sea level (msl) at the southwest corner to a low of 878 feet msl in the eastern basin area. The bottom of the western basin varies from 892 to 900 feet msl and the eastern basin from 878 to 890 feet msl.

There are three WWTP clarifier tanks located to the northwest of the site, with a concrete drainage channel that outlets into a rip-rap pad (an infiltrates) in the northern-central portion of the site. A chain link fence separates the WWTP from the subject site. There is also a bioenergy facility northeast of the lake site with tanks and equipment pads that is also enclosed with a chain link fence. The Agua Mansa landfill (construction and demolition debris) is located to the south of the site.

The Rialto Channel is a concrete lined channel located immediately east of the site and the landfill. Currently, secondary treated effluent water from the WWTP is discharged to the channel. This channel extends to the south approximately 3,200 feet and drains into a meander in the Santa Ana River.

There are two Southern California Edison (SCE) easements that cross the southern portion of the site in an east-west direction. The overhead power line easements have three metal and wood towers/poles located within the project limits (shown on Plate 1). There is also an underground pipeline associated with the waste water treatment plant that exists along the eastern side of the site, between the WWTP and the Rialto Channel.

The eastern basin has been used as an equipment yard and is relatively free of vegetation. The western basin is covered with grasses, shrubs and some trees.

1.3 Site History

Our review of historic aerial photographs dating back to 1930 and historic topographic maps dating back to 1901 revealed the following.

- Agua Mansa Road and Riverside Avenue appear on the 1901 topographic map.
- Prior to 1930, the sites were essentially in their natural condition as a flat alluvial plain with low grasses and dirt roads. It appears there was a dirt road traversing the southern side of the property with an overhead power line. The original topography ranged in elevation from approximately 950 to 1,000 feet msl, sloping gently toward the southwest.
- In 1959, it appears the northern portion of the waste water treatment plant had been constructed, with several ponds at the WWTP and two large basin excavations in the area of the subject site that appear to have water in the bottom. A sand and gravel quarry was being excavated to the west and northwest of the site, extending slightly onto the landfill property to the southwest.
- By 1966, a larger basin was added to the north of the two basins seen in the 1959 photos. Between 1966 and 1980, these basins had various amounts of water and sediment. Also, it appeared that the shape of the basins had been modified throughout this time and there were more structures constructed at the WWTP. The Rialto Channel appears to have been constructed by 1978.
- By 1977, the Agua Mansa landfill site had been mined extensively for sand and gravel and the southern portion of the site consisted of a deep pit that had filled with groundwater. Between 1986 and 1989, the Agua Mansa site began to be used as a landfill and in 1995, landfill operations were ongoing throughout the Agua Mansa site.
- Beginning in the 1995 photo, it appears the basins were dry and no longer used for infiltration. The secondary treated effluent water from the WWTP was being outlet into the Rialto Channel.
- By 2002, the waste water treatment plant to the north of the City site had been expanded to nearly its current extent. The v-ditch draining from the WWTP with a rip-rap pad for infiltration was constructed.
- In the 2006 photos, it appears there was ongoing grading in the bottom of the easterly basin, with heavy equipment extending from the bioenergy facility property to the northeast. In 2007, the eastern basin and the energy company property was cleared of vegetation and appeared to have been recently graded as pads.
- In 2009, the bioenergy facility to the northeast had been constructed.
- By 2019, the third clarifier tank had been constructed on the WWTP. By 2020, the two small tanks at the southern end of the energy company had also been constructed.

1.4 Previous Studies

We reviewed data from several prior site-specific groundwater studies published for the Agua Mansa site and unpublished data for the subject site. The more substantial studies are summarized below.

- Pioneer Consultants performed a geotechnical evaluation of the La Roca Pit at the Agua Mansa landfill in 1975. Their study included evaluating the existing aggregate onsite and determining the depth to groundwater at the site. Their investigation in the quarry excavation encountered groundwater from 6 to 12 feet deep. They recommended mining operations continue down to or near the groundwater table, after which the site modified to be used as a disposal site.
- In 1980 and 1985, Gary S. Rasmussen and Associates (Rasmussen and Associates, 1980, 1985a, 1985b) performed engineering geology and groundwater quality evaluations at the Agua Mansa site. During their February 1980 site visit, groundwater was observed in the deep pit in the southern portion of the site. They estimated groundwater was at an elevation of 859.5 feet msl, provided recommendations regarding type of material to be disposed of in the landfill, and recommended two monitoring wells be installed at the site.
- In July 2007, Kleinfelder, Inc. performed a limited subsurface exploration of the City site for a proposed Rialto BioSolids Processing Facility addition that was never constructed. They excavated seven hollow-stem-auger borings throughout the site. Their boring locations are shown on Plate 1 and copies of the boring logs are provided in Appendix B.
- In 2010, NMG performed geotechnical investigations at the subject site, the eastern portion of the landfill site, and at the Holliday site to the west for a proposed bio-fuel production plant. The studies included numerous hollow-stem borings, cone penetrometer probes, test pits, and laboratory testing. Downhole geophysics were performed on the Holliday site to the west. Boring, trench and CPT locations from that study pertinent to this study are shown on Plate 1; copies of the logs are provided in Appendix B, and copies of the laboratory test results from the prior study are included in Appendix C.
- In 2018, AECOM performed a supplemental geotechnical investigation at the WWTP and prepared a memorandum presenting the data and the recommendations for the WWTP clarifier tank # 3. They drilled two borings (SB-4 and SB-5) in the area of the proposed tank (Plate 1). The boring logs are provided in Appendix B and the associated laboratory testing is included in Appendix C. The tank site was subsequently graded and the tank constructed in 2019, which can be seen on historic aerial photos.

These and other pertinent published reports and maps reviewed for this study are referenced in Appendix A.

1.5 Proposed Project

The proposed Lake Rialto will consist of restoration of the existing low-lying areas to the south of the WWTP to accommodate the biofiltration and/or storage of the secondary treated wastewater from the WWTP. There are two planned basins, including the western shallow basin that will be used for permanent water quality treatment and the eastern deep basin to store water with perimeter vegetation. The eastern basin (or lake) will be larger and deeper (bottom elevation of 857 feet msl). Both the western basin and lake will be lined and have a water surface at 905 feet msl. Based on these elevations, the western basin will have up to 10 feet of water and the eastern basin will have up to 48 feet of water.

The lake supply waste water will be piped through an 18- to 24-inch RCP pipe drain system along the north side of the lake to outlet into the western basin at the west and northeast corners, and at the bottom of the lake. There will be a small island in the western basin at 908 feet msl. There will be an earthen bench around both basins and a large pad area at the northwestern edge of the lake at a 903 elevation that will be used for planting vegetation.

The WWTP currently outlets into the Rialto Channel and the lake will be used to stop flow to the channel for a few days. There will be a drain structure at the southeast end of the lake bottom that will be used to empty the lake at least once a year. We understand the lake will be emptied slowly through a nearly horizontal pipe that will be connected to the bottom of a pump station wet well at the southeast corner of the lake. The pump station with a wet well 72 feet below ground is planned in the southeast corner of the lake, as shown on Sheets 7 and 8 of the grading plan. The nearly horizontal outlet pipe is designed as an 18-inch reinforced concrete pipe (RCP) that will extend approximately 230 feet from the lake to the wet well. The design elevation of the RCP is near 852 to 855 feet msl.

The lake will then be filled over several days with the discharge from the WWTP, so the channel can remain dry for a time.

The plan reviewed for this report is the "City of Rialto Grading and Improvement Plan, Lake Rialto," prepared by Wilson Mikami Corporation and dated September 12, 2022. It includes 10 sheets as follows:

- Sheet 1 is the title sheet with notes, a vicinity map and plan index;
- Sheets 2 and 3 are the detail sheets, including the liner information;
- Sheet 4 is the grading plan;
- Sheets 5 through 7 are the drainage inlet and outlet plan and profile sheets;
- Sheet 8 is the pump station precise grading plan;
- Sheet 9 shows the offsite parking plan; and
- Sheet 10 is the erosion control plan.

The proposed grading will include up to 28 feet of cut below existing grades and up to 15 feet of fill above existing grades. The perimeter cut and fill slopes are designed at a 2H:1V slope ratio and up to 60 feet high to the perimeter access road, and then up to 30 feet high above the lake level. Interior slopes in the western basin and between the two basins are designed at 2H:1V and vary between 7 and 17 feet high.

2.0 GEOTECHNICAL FINDINGS

2.1 Geologic Setting

The site is located in San Bernardino County, just north of the Santa Ana River and the La Loma Hills in the Peninsular Range Province of California. The site is underlain by deep alluvium at the southern side of San Bernardino valley area. The site has undergone several episodes of grading and there are undocumented fills locally throughout the site. Directly south of the site is the Agua Mansa Landfill, from which rubble fills have extended onto the subject site. The site is located in a seismically complex area, with both strike-slip and frontal thrust fault systems. There are no active faults mapped within the site. The closest active fault is the San Jacinto Fault located approximately 3 miles northeast of the site.

2.2 Earth Units

Earth units consist primarily of younger Holocene-age alluvium with lessor amounts of undocumented fill materials within the low areas. The earth units are described below.

Undocumented Fill: Varying amounts of undocumented fill (non-engineered and/or tested fills) are mapped at the site. The limits of these fill are difficult to distinguish since the soil composition is similar to the underlying native deposits. Based on the historic aerial photos, the onsite basins have been excavated down to groundwater, and have been reshaped several times over the past 60 years. There may be more fill than shown on the Geotechnical Map (Plate 1), especially in the bottom of the basins.

Prior mapping and exploration by Kleinfelder encountered fill materials. Two of their borings (B-1 and B-5) in the eastern basin area encountered up to 30 feet of fill that consisted of olive brown to gray brown silty sand and sand with silt and gravel. They found petroleum odor at 15 feet in both borings and wood in the sample at 20 feet in B-5 indicating it was fill. We drilled an additional boring (H-2) in this area and encountered mostly light yellowish-brown, olive brown to dark gray silty fine to coarse sand that was dense to very dense. There was a sandy silt layer with gravel between 20 and 25 feet in H-2 that may have been near the bottom of the fill. The blow counts in the fill were quite high, over 68 blows per foot with a 140-pound weight dropping 30 inches per blow.

The undocumented fill material at the Agua Mansa landfill is inert construction debris (NMG, 2010b). NMG previously drilled at the eastern end of the landfill, directly south of the subject site. Six exploratory borings encountered the undocumented fill/debris material, which ranged from 15 to 65 feet thick in the borings. Borings Y-1 and Y-2 are shown on Plate 1 and the logs are included in Appendix B. The material generally consisted of varying amounts of sand and silt, with a large quantity of construction debris (wood, concrete and steel) and rubber tires. During the time of our fieldwork, landfill activities were ongoing and we observed broken concrete, tile, plaster, rebar, concrete light poles, and other inert construction debris being dumped. Since that time, they have placed additional fill. Currently, there is a 50-foot high 3H:1V fill slope along the southern boundary of the subject site. It appears that some of the undocumented fill with rubble from the landfill operations extends onto the subject site, locally covering the southern slopes. These fills contain mostly concrete slabs with reinforcement steel, rock, asphalt and other construction materials. These materials were placed locally over the eroded slope in the southeast corner of the eastern basin and appears to have spilled over the southern slope of the western basin.

Alluvium: Holocene-age alluvium was encountered in all the borings excavated onsite. Borings at the subject site encountered alluvium at the ground surface locally and below fill. Borings at the Agua Mansa site encountered alluvium at the base of the landfill material, at depths of 15 to 65 feet below ground surface at the time of exploration. Alluvium is also exposed locally in the perimeter slopes. The alluvium was generally found to consist of gray, olive brown and yellowish-brown fine to coarse-grained sand and gravel, with trace silt and clay. The material was moist, dense, highly friable, micaceous and locally iron-stained. Scattered thin silt layers were observed in the borings onsite. The alluvium below a depth of 5 feet was generally dense to very dense based on high blow counts and dry density test results. Samples were sometimes disturbed due to the presence of cobbles and clean sands.

2.3 Geologic Structure

The geologic structure within the native alluvium has been influenced by active streambed deposition. The alluvium was likely deposited as runoff within the ancient Lytle Creek riverbed, which was previously identified within the subject site (Rasmussen and Associates, 1980). The alluvium was deposited in relatively flat layers that have not been structurally tilted. Limited exposures at the site show that the crude layers within the alluvium are generally sub-horizontal.

2.4 Faulting and Seismicity

Faulting: The site is located in a complex seismically active area with several Holocene-age faults nearby. The right-lateral strike-slip San Andreas Fault, which separates the Pacific Plate from the North American Plate, and the San Jacinto Fault lie within 10 and 3.8 miles, respectively, northeast of the site (Figure 2). The San Bernardino Mountains to the northeast of the site were tectonically created by the combined seismic forces from these strike-slip faults. The frontal thrust fault (the Cucamonga Fault) system is located along the base of the San Gabriel Mountains, approximately 10 miles northwest of the site. The primary seismic hazard for this site is ground shaking and secondary effects due to a future earthquake on one of these major regionally active faults.

The site is not located within a fault-rupture hazard zone as defined by the Alquist-Priolo Special Studies Zones Act (CGS, 2018) and no evidence of active faulting was observed during this investigation or prior work at the site (Appendix A). There are no faults mapped by the State at the site (Figure 2, CGS 2010).

Using the USGS deaggregation computer program (2023) and the site coordinates of 34.0512 degrees north latitude and -117.3605 degrees west longitude, the main contributing active fault to the site is the San Jacinto Fault located 6.2 km northeast of site. This fault has a Moment Magnitude (M_W) of 8.0.

Seismicity: Properties in southern California are subject to seismic hazards of varying degrees depending upon the proximity, degree of activity, and capability of nearby faults. These hazards can be primary (i.e., directly related to the energy release of an earthquake such as surface rupture and ground shaking) or secondary (i.e., related to the effect of earthquake energy on the physical world which can cause phenomena such as liquefaction and ground lurching).

As previously discussed, the site is not located within a fault-rupture hazard zone and no evidence of active faulting was observed during this exploration, or by prior work at the site. Therefore, the potential for primary ground rupture is considered slight to nil. The primary seismic hazard for this site is ground shaking due to a future earthquake on one of the major regional active faults, such as the San Jacinto, San Andreas, or the Cucamonga Faults.

Seismic design parameters were calculated based on computer program by the Structural Engineers Association/Office of Statewide Health Planning and Development (2023) and the results are presented in Section 3.18 of this report. The data is also presented in Appendix D.

The secondary seismic hazards of tsunami or seiche are considered very slight to nil, as the site is located greater than 50 miles from the ocean and no confined bodies of water or reservoirs are within the vicinity of the site. Once the lake is filled, there is a potential for seiche during a future earthquake event. However, the lake and western basin are all surrounded by earthen berms in a low area, and thus, is not anticipated to adversely impact the surrounding properties. The site is not located in an area designated as susceptible to liquefaction as mapped by the County of San Bernardino (2021). The densities of the underlying soils should make the potential for liquefaction low (further discussed in Section 2.9).

2.5 Mass Movements

There are no landslides mapped at the site and the site is not mapped by the County of San Bernardino as susceptible to landslides (2021). The topography at site consists of locally over-steepened slopes within the native alluvium, and shallow surficial failure, erosion and creep features are evident on the steep slopes.

Cross-Section A-A' (Plate 3) shows the area of the prior erosion gully and mapped surficial failures that were observed in 2010 by NMG. This area of the slope was repaired and recompacted with an excavator and bulldozer; however, we understand it was not observed and tested by a geotechnical engineer.

2.6 Groundwater

Groundwater was encountered in the deeper exploratory borings during investigations between 2007 and 2021. In July 2007, the groundwater below the eastern basin was at elevation of 845 feet msl (B-1 by Kleinfelder, 2007). In borings drilled by NMG between April and August of 2010, groundwater was encountered at elevations of 839 to 840 feet msl. Recent borings drilled in February 2021 by NMG found the groundwater at an elevation of 835 feet msl in Boring H-2.

Historically, groundwater beneath the landfill was as shallow as 870 feet msl in 1947 and as deep as 806 feet msl in 1970 (Rasmussen and Associates, 1980). This represents a groundwater fluctuation of 64 feet over a period of only 23 years. In 1980, groundwater was observed and measured at an elevation of 859.5 feet msl. These fluctuations and the shallow groundwater were probably influenced by periods of heavy rainfall, grading of the sand and gravel quarries around the site, and possibly from historic use of infiltration ponds at the site.

In general, due to the coarse-grained nature of the native alluvium, the vicinity of the site to the Santa Ana River, and the site being located within a groundwater recharge area, fluctuations in groundwater levels should be anticipated depending upon local conditions such as rainfall, high-water levels in the river, groundwater pumping, and nearby irrigation practices.

2.7 Laboratory Testing

Laboratory testing was performed on representative samples of onsite soils collected during our field exploration to characterize their engineering properties. Laboratory tests performed on selected relatively undisturbed and bulk soil samples included:

- In-situ moisture content and dry density;
- Grain-size distribution;
- Atterberg limits;
- Consolidation;
- Direct shear;
- Specific gravity; and
- Corrosivity to metals.

Laboratory tests were conducted in general conformance with applicable American Society for Testing and Materials (ASTM) standard test methods.

NMG also performed a significant amount of laboratory testing at and adjacent to the subject site. These data include tests of expansion index, soluble sulfate, maximum density and optimum moisture content, R-value, drainage (effective porosity), and hydraulic conductivity.

The vast majority of native soil at the site is sand and gravel, generally classified as SM and SP, with some amounts of ML (silt) per the Unified Soil Classification System. (Hence, the attraction of sand and aggregate mining for the area.) The in-place soil also has relatively high dry densities and low compressibility. Hydro-consolidation (collapse) potential ranged from 0.4 percent to 2.7 percent in a sample from Boring H-3 in the bottom of the west basin. Collapse potentials from more numerous testing of alluvium at the adjacent sites were significantly less, generally zero to less than 1 percent (NMG, 2010a and 2010b). Near-surface soils, both fill and alluvium, are predominantly non-expansive (expansive soil was encountered by NMG at an adjacent site but was the product of other activities).

Direct shear tests on three samples from this study had ultimate friction angles between 32 and 37 with cohesions of zero to 310 psf, respectively. Peak values ranged from 37 to 39 with cohesions of zero to 440 psf, respectively. These values were higher than the majority of testing from alluvium samples from adjacent areas.

The soil at the subject site and adjacent areas showed negligible soluble sulfate contents, moderate corrosion potentials (to ferrous metals), and relatively low chloride contents.

Twelve samples from the adjacent study area were tested for effective and total porosity and hydraulic conductivity. The samples tested were collected from either the native alluvium (depths of 15 to 30 feet deep) or from the underlying alluvial fan deposits (depths of 40 to 57.5 feet deep). The results indicate that the upper alluvium samples had generally higher hydraulic conductivity (0.0015 to 0.0030 cm/sec or 4.3 to 8.5 feet/day), while the underlying fan deposits had lower hydraulic conductivities (1.82E-04 to 9.58E-06 cm/sec or 0.52 to 0.03 feet/day).

Test results for this exploration are summarized in Appendix C, along with pertinent laboratory test results from adjacent sites. In-situ moisture content and dry density data from this study are also shown on the geotechnical boring logs (Appendix B).

2.8 Slope Stability

As previously mentioned, there have been surficial failures and erosion on the existing perimeter slopes around the basins. These existing slopes vary in steepness from 2H:1V to 1H:1V, and are up to 70 feet high. There are local areas of alluvium exposure, and some of the slopes have been repaired as fill slopes.

Several geologic cross-sections were developed for the site to show these existing slopes and their relationship to adjacent existing improvements (Plate 3). Slope stability analysis was performed on cross-sections showing the steeper and/or higher slopes and those located below existing structures. Cross-Section B-B' crosses the eastern basin in a north-south direction, showing the waste water treatment plant to the north and the landfill in the south. Cross-Section D-D' is drawn through a slope below the existing waste water effluent pipeline and offsite structures/tanks of the adjacent bioenergy facility. Cross-Section E-E' shows a slope in relation to an existing power pole on the hilltop. The proposed grading, as shown on our cross-sections, includes the perimeter landscape bench around most of the basins at an elevation of 902 feet msl, and upper pedestrian access path at an elevation of 908 feet msl just above the lake level. The path creates a raised fill bench at the toe of the existing perimeter slopes above the east side of the basin. The lake bottom will be cut down approximately 25 feet below existing bottom grade (as shown on Cross-Sections D-D' and E-E' on Plate 3). The future lake water level will be at an operating level of 905 feet msl (shown on cross-sections). We understand the lake will be drained at least once a year.

The perimeter slopes expose alluvium and fill. Both are similar in composition and were assigned the same shear strength parameters for the slope stability analyses: an internal friction angle (phi) of 30 degrees with a cohesion of 75 pcf. These parameters were derived from a compilation of the shear test results from this study as well as studies by NMG of adjacent areas. Results from thirteen samples, including samples with more fine-grained soil (silts), were combined in a single plot to determine an appropriate strength parameter for the slope stability analyses. The plot with selected strength envelope is included at the front of Appendix E.

The slope stability analysis was first performed on the perimeter slopes for the eastern basin assuming the high-water elevation of 905 feet in the basin, with the recommended slope stabilization measures shown on Cross-Sections B-B', D-D' and E-E' for both static and psedo-static conditions. This analysis shows the factor-of-safety (FOS) of the designed grading is acceptable with respect to slope stability, being greater than 1.5 for static and greater than 1.0 for the pseudo-static conditions.

In the event of lake liner leakage, groundwater levels could rise around the lake and impact slope stability. Therefore, we analyzed a "worst case" scenario where the groundwater was modeled behind in these slopes as building up to the lake level and then sloping down away from the reservoir to intersect the local groundwater table at 840 feet msl. Rapid drawdown analysis was then performed assuming the lake was empty but with this groundwater present behind the liner. These analyses resulted in FOS of less than 1.0 (0.86 to 0.92) near the slope-face, implying the potential for unacceptable local slope failures. Sensitivity analysis was performed to determine maximum acceptable groundwater rise behind the perimeter slopes that would still result in an acceptable FOS of 1.1 or greater.

Results are summarized below with a following discussion.

Northern Slope on Cross-Section B-B': The slope along the north side of the eastern basin as shown on Cross-Section B-B' is relatively high (82 feet), with the existing hillside above the graded basin up to the WWTP. Our analysis indicates a FOS of equal to or greater than 1.5 static and 1.1 pseudo-static. The rapid drawdown analyses from the highwater operating lake level to an empty lake show that the FOS will be less than 1.0 (0.92) near the slope-face. The maximum groundwater elevation behind the slopes to have a FOS of at least 1.1 is at an elevation of 884 feet msl.

Southern Slope on Cross-Section B-B': The slope along the south side of the eastern basin with the SCE transmission line towers shown on Cross-Section B-B' is relatively high (75 feet), with the existing slopes above the graded basin. Our analysis indicates an acceptable FOS equal to or greater than 1.5 static and 1.1 pseudo-static. The rapid drawdown analyses show that the FOS will be 0.86 near the slope-face. The maximum groundwater elevation behind the slopes to have a FOS of at least 1.1 is at an elevation of 887 feet msl.

Eastern Slope Below Bio-energy Facility on Cross-Section D-D': The design slope along the east side of the basin is shown on Cross-Section D-D', below the existing waste water line and the Bio-energy Facility is relatively high (70 feet). The analysis shows the FOS is equal to or greater than 1.5 static and 1.1 pseudo-static. The rapid drawdown analyses show that the FOS will be 0.90 near the slope-face. The maximum groundwater elevation behind the slopes to have a FOS of 1.1 is at an elevation of 879 feet msl.

Southern Slope with SCE Tower on Cross-Section E-E': The slope along the north side of the eastern basin as shown on Cross-Section E-E' is relatively high (70 feet), extending up to the SCE tower on the hilltop. Our analysis indicates a FOS greater than 1.5 static and 1.09 pseudo-static. The rapid drawdown analyses show that the FOS will be 0.91 near the slope-face. The maximum groundwater elevation behind the slopes to have a FOS of 1.1 is at an elevation of 883 feet msl.

We did not perform pseudostatic analyses for the rapid drawdown scenarios as the probability of a combination of earthquake, liner leakage, plus emptying of the lake occurring at the same time is considered very low.

2.9 Liquefaction Potential

Liquefaction is a phenomenon in which earthquake-induced cyclic stresses generate excess pore-water pressure in low density (loose), saturated, sandy soils and soft silts below the water table. This causes a loss of shear strength and, in many cases, ground settlement. For liquefaction to occur, all of the following four conditions must be present:

- There must be severe ground shaking, such as occurs during a strong earthquake.
- The soil material must be saturated or nearly saturated, generally below the water table.
- The corrected normalized standard penetration test (SPT) blow counts (N_1) or the CPT tip resistance (Q) must be relatively low.
- The soil material must be granular (usually sands or silts) with, at most, only low plasticity. Clayey soils and silts of relatively high plasticity are generally not subject to liquefaction.

The site is not located within an area of potential liquefaction, as mapped by the County of San Bernardino (2021). Based on the dense nature of fill and alluvium, the liquefaction potential is considered to be very low.

2.10 Settlement Potential

The conceptual plans show only minor design fills and no significant structures with foundations. Therefore, static settlement potential from those typical loading scenarios is very low. The in-place densities of the site soils indicate that dry sand settlement potential due to earthquake ground shaking is also relatively low. Test results from this study indicate there is a slight potential for settlement due to wetting of granular soils (also referred to as hydro-consolidation or collapse). However, more extensive testing of the alluvium in adjacent areas had much lower collapse potential as we understand that the basins will be lined. The collapse potential in the samples tested from the borings associated with this basin (H-1 and H-2) is relatively low, on the order of 1 percent or less. The samples with the higher collapse potential were from H-3 located in the western basin, which will be lined.

2.11 Existing Utilities and Structures

There are existing overhead and underground utilities and numerous structures/appurtenances located within and adjacent to the site (Plate 1). There are two SCE easements that cross the southern portion of the site in an east-west direction. The overhead power line easement has three power line towers located onsite, some of which are perched on hilltops above the basins. There is an existing waste water (effluent) pipeline that extends from the WWTP at the northeast portion of the site and trends south-southwest along the top of the east basin slope, to an existing manhole structure next to the Rialto Channel where the effluent discharges into the channel.

A groundwater observation well was located to the south within the Agua Mansa site (mapped in 2010); this well could not be found and is assumed buried at this time.

There is a new clarifier tank adjacent to the northwest portion of the site, and there are structures and appurtenances associated with the bioenergy facility to the northeast. There is an existing v-ditch and rip-rap pad onsite that drains water flows from the WWTP, and the water apparently infiltrates into the alluvium below the rip-rap pad in the northern portion of the basin.

2.12 Potential Infiltration

Infiltration testing was not performed at the site during this study. However, we noted runoff from the WWTP through a v-ditch that emptied onto the rip-rap pad within the northern portion of the site that infiltrates into the ground. We observed about 4 inches of water flowing in the v-ditch and it disappeared into the soils (likely alluvium) below the rip-rap. The water was slightly ponded, but some of the water was observed to flow further south into the basin.

In general, we believe the sandy alluvium is highly permeable. The siltier and clayey alluvium would have lower permeability. Compacted fill generally has lower permeability, especially if it has some percentage of fine-grained soil. For reference, laboratory testing of soils for permeability and hydraulic conductivity from the adjacent study by NMG are provided in Appendix C.

2.13 Erosion Potential

Unconsolidated sandy soils in the alluvium and fill are typically highly erodible when exposed at the ground surface and especially on slopes with uncontrolled water flowing over the tops-of-slopes. Infiltrating water can also find its way into the sandy layers and flow laterally and vertically through the soils. With uncontrolled drainage and infiltration, the flowing water in the sandy soils can create soil piping conditions where the hydraulic process in the subsurface granular soils can result in collapse or soil flow with the water creating voids where the layers are exposed at the surface. Seepage forces from water migrating downslope can also induce surficial slumps and/or shallow flow failures. The surface drainage at the site will need to be properly controlled. (See Sections 3.5, 3.10 and 3.20).

2.14 Earthwork Bulking, Shrinkage and Subsidence

The loss or gain of volume (shrinkage or bulking, respectively) of excavated natural materials and recompaction as fill varies according to earth material type and location. This volume change is represented as percent shrinkage (volume loss) or as percent bulking (volume gain) after recompaction of a unit volume of cut in this same material in its natural state. Due to the inherent variability of materials, earthwork volume changes are difficult to accurately quantify.

The following estimates are based on our experience with similar materials.

Earthwork Estimates	
Material	***Approximate Percent Shrinkage/Bulking***
Uncertified Fill	5 to 10 percent shrinkage
Colluvium and Topsoil	10 to 15 percent shrinkage
Alluvium	8 to 10 percent shrinkage
Weathered compacted fill	1 to 2 percent shrinkage

Ground subsidence at the site is estimated to be on the order of 0.2 foot, but less in the previously graded areas.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 General Conclusion and Recommendation

Based on the geotechnical exploration and our findings, construction of the proposed improvements is considered geotechnically feasible provided the geotechnical considerations and recommendations presented in this report are implemented during design, grading and construction of the project.

The recommendations herein should be considered minimum and may be superseded by more stringent requirements of the County of San Bernardino, the City of Rialto, and others. In addition to the preliminary recommendations herein, General Earthwork and Grading Specifications are also provided in Appendix F.

3.2 Site Clearing and Preparation

Significant vegetation, miscellaneous trash, concrete structures, pipelines to be abandoned, and other deleterious materials should be removed and disposed of offsite prior to the start of grading. Concrete and asphalt may be incorporated into fill materials provided the resulting material adheres to the recommendations provided in Section 3.4 and Appendix F of this report.

3.3 Remedial Removals

Unsuitable earth materials, including landfill rubble, loose fills and weathered alluvium should be removed prior to placement of new fill. We anticipate the removals will be on the order of 2 to 3 feet deep in the bottom of the basin, and up to 15 feet deep locally in the central portion of the basin where there is an existing loose fill berm. The less weathered, dense undocumented fill and alluvium should be reviewed and tested by the geotechnical consultant to confirm the exposed materials may be left in-place. Some of the loose fills on the perimeter slopes may also need to be removed and recompacted.

The actual depths and lateral limits of remedial removals should be determined in the field during grading based on the exposed conditions. Special consideration should be given to protect in-place the power poles within the SCE easement, as well as the adjacent pipeline and concrete-lined Rialto Channel along the eastern perimeter of the site.

Removal bottoms should expose competent alluvium or fill material. The removal bottoms should be observed, mapped and accepted by the geotechnical consultant prior to removal bottom preparation, and placement of fill.

Groundwater and wet material may be encountered in the northern portion of the site in the area where infiltration is occurring. Also, if grading is performed during the winter months, rain water may collect in the basins. If encountered, wet soil may require special handling, including top-loading and drying-back prior to placement as compacted fill.

3.4 Grading and Earthwork Specifications

Grading and excavations should be performed in accordance with the General Earthwork and Grading Specifications in Appendix F. These specifications include figures that depict minimum grading standards for slope construction and oversize-rock placement. Some specifications are reiterated below with additional recommendations.

Protection of Existing Improvements and Utilities: Existing improvements, including utilities adjacent to the proposed project that are to be protected in-place, should be located and visually marked prior to demolition and grading operations. Conditions of more sensitive improvements should be documented prior to grading for a record of existing conditions. Excavations adjacent to improvements to be protected in-place or any utility easement should be performed with care so as not to destabilize the adjacent ground. Utility lines that are to be abandoned (if any) should be removed and the excavation should be backfilled and compacted in accordance with the recommendations provided herein. The temporary backcuts for the lake embankment stabilization keys recommended in Section 3.5 should be observed by representatives of NMG to evaluate temporary stability conditions, especially where the cuts are below adjacent facilities, power poles, utilities, etc. Stockpiling of soils (more than 5 feet in height) at or near existing structures and over utility lines that are to remain in-place (if any) should not be allowed without review by the geotechnical consultant.

Fill Placement and Compaction: After completion of acceptable remedial removals, the approved bottom should be scarified, moisture-conditioned as needed, and recompacted prior to placement of fill. Fill should be placed in nearly horizontal lifts less than 8 inches in loose thickness, moisture-conditioned, and compacted to a minimum 90 percent of the maximum density as determined by Test Method ASTM D1557 (except as discussed in following sections). Fills placed against ground sloping more than 5H:1V should be keyed and benched into competent material. Moisture content of compacted fill should be over optimum moisture content and relatively uniform throughout the fill material.

Suitable Fill Materials: Onsite materials which are relatively free of deleterious materials, should be suitable for use as compacted fill. The rubble along the southern boundary will require significant material be sifted and disposed of offsite (e.g., steel, wood, etc.).

Oversize Material: Concrete and asphalt materials may be incorporated into the compacted fill provided the concrete is broken down to less than 4 feet in maximum diameter, and asphalt is reduced to a maximum dimension of 12 inches. Efforts should be made to place these recycled materials below 5 feet and/or 2 feet below proposed storm drain pipes/structures. Portland concrete should be free of metal (i.e., rebar, bolts, etc.). There is existing rip-rap locally along the south side of the basins, and this rock material over 12 inches in size should be placed in accordance with our oversize rock disposal specifications in Appendix F.

Slope-Face Construction: Slope-faces should be compacted to a minimum 90 percent relative compaction. Slopes should be either overbuilt and trimmed back to the compacted slope-face or built at grade with back-rolling every 4 vertical feet with a sheepsfoot roller and tested/accepted as the slope is constructed.

3.5 Slope Stabilization

The existing perimeter slopes vary in steepness and stability. Most are surficially unstable and have had erosion and failures over the years. Our slope stability analyses verified these conditions which will require remediation.

The eastern basin includes design fill over cut slopes up to 55 feet high, where the cut portion of the slope will expose sandy alluvium and undocumented fill materials. These materials are typically layered and subject to erosion and surficial instability. Therefore, stabilization fill keys are recommended for these slopes, as shown on the Remedial Measures Map (Plate 2) and the cross-sections (Plate 3). These stabilization fill keys vary from 15 to 20 feet wide, and 2 to 3 feet deep, with a 1 foot tilt-back toward the heel of the key. The backcuts for these slopes should be cut at 2H:1V where possible, but no steeper than 1.5H:1V.

There are design cut slopes above the eastern basin that are up to 30 feet high and anticipated to expose sandy alluvium. These slopes should also be provided with stabilization fills keys 15 feet wide by 2 to 3 feet deep. The backcut on the eastern side, below the existing waste water line, will need to be oversteepened locally to 1:1 (Cross-Section D-D' on Plate 3). This work should be completed after the slope below is stabilized.

There are two other planned cut slopes, one in the western basin and one on the south side of the hilltop with the SCE tower that are 15 to 20 feet high. Stabilization fill keys 15 feet wide by 2 to 3 feet deep are recommended to replace these slopes with compacted fill.

The stabilization fill keys should be constructed in accordance with the Earthwork and Grading Specifications presented in Appendix F. The backcuts should be mapped by an engineering geologist as these keys are excavated to evaluate the stability and to confirm the anticipated conditions, especially in the area of the existing sewer line where the backcut will be steeper. The key bottom should be reviewed and accepted by the geotechnical consultant prior to placement of fill.

3.6 Rippability and Oversize Material

The landfill rubble material includes abundant large slabs of concrete, some with steel reinforcement. Where this material is encountered along the southern edge, excavation and ripping may be difficult and oversize material will be generated. If steel is removed, the concrete and the slabs may be crushed or placed in deeper fill areas. However, the grading may not have enough deep fills to accommodate the amount of concrete generated and some may need to be exported from the site. Alternatively, the bottom of the basin could be overexcavated to place oversize material deeper than 5 feet below design grades. Also, it is possible that some of the material may be used for the designed rip-rap at the storm drain outlets.

The native alluvium and rubble fill is anticipated to be moderately easy to excavate with a D-9 bulldozer. Some cobbles and oversize materials may be generated. Recommendations and specifications for the placement of oversize materials in the fill are provided in more detail in Section 3.4 and Appendix F.

3.7 Lake Liner Design

The proposed water quality basin and lake are intended to hold water. Without a liner, the water loss due to infiltration would be significant. Sheet 2 of 10 of the grading plan shows the details for a liner to be placed on the bottom and sides of both basins below the landscape bench at a 903 foot elevation. This liner will be a reinforced Polypropylene (RPP) liner, 36 mil thick, tan color, Western Environmental Liner. The liner will be anchored in a 1-foot-wide trench at the outside edge of the landscape bench with compacted soil backfill. The bench is designed at a width of 10 feet and will have a 2.5-foot-high slope behind the bench that could be under the water level and may see wave action around the lake. This bench and slope will be provided with a 5-foot-thick fine-grained low permeability soil material that will impede infiltration around the edge of the basins.

Liner should be placed on even, competent grade, free of sharp rock or materials at the surface which may damage the liner. Construction of the liner should be observed/inspected during placement and upon completion to verify proper installation.

Annually, when the lake is emptied, the conditions of the liner should be reviewed. During the time the basins are emptied, maintenance of the liner and storm drain structures should be performed.

3.8 Groundwater, Dewatering, and Monitoring Wells

Groundwater seepage may be encountered during remedial grading near the existing rip-rap pad where infiltration is ongoing and/or if grading is performed during the winter. In these areas/conditions, dewatering may be necessary to complete the proposed grading and construction. We anticipate that dewatering at the site may be accomplished with sump pumps.

As described in Section 2.0, recent studies indicate that the groundwater table should not be encountered during earthwork and construction at the site.

For the proposed filling and emptying of the basins, we recommend installation of three groundwater observation wells to measure the impact (if any) of the new lake to the local water table. These well locations area shown on Plate 2 and the depths should be between 70 and 90 feet deep to intercept the existing water table. These groundwater observation wells should be monitored periodically, including during filling of the basins to evaluate the competency of the liner. Also, prior to and during emptying of the lake, the wells should be monitored to verify that the liner is functional and that groundwater has not risen above the maximum levels determined from rapid drawdown analyses. The action levels for each well are based on the slope stability analysis as discussed in Section 2.8 and shown in Appendix E. The following table summarizes the maximum recommended groundwater elevations at each cross-section location prior to lake draining.

Cross-Section Area	Maximum Allowable Groundwater Elevation Prior to Emptying Lake
B-B' North	884 feet msl
B-B' South	887 feet msl
D-D'	879 feet msl
E-E'	883 feet msl

If the groundwater is at or above these levels, the rapid emptying of the basin is not recommended. Slower rate of lake water discharge should be implemented while monitoring the groundwater levels. If for some reason the groundwater does not lower as the lake is drained, then lake draining should be suspended in order to determine the source of the groundwater and reasons for build up within the slopes.

Automated well reading and groundwater data collection devices are commercially available and should be considered for the recommended groundwater monitoring wells. Telemetry capabilities can also greatly enhance the timely transmission and analysis of groundwater conditions around the lake.

3.9 Settlement

As discussed in Section 2.10, post-construction settlements as the result of the proposed project are expected to be relatively minor with no significant impacts of the planned improvements or adjacent improvements.

3.10 Erosion Protection

There are clean layers of sand in the alluvium and fills that are more prone to erosion. If left unprotected or with uncontrolled drainage, significant erosion may occur.

Measures to reduce soils erosion and potential for soil piping include the following:

- Direct drainage into suitable devices with no ponding of water behind the tops of slopes;
- Replacement of the clean sandy layers exposed at the surface with a uniform compacted fill;
- Adding surface protection and planting to slopes to reduce the potential for slope erosion/soil piping;
- Adding additional anti-seep collars to the proposed storm drains and culverts throughout the site.

3.11 Pedestrian Trail, Access Road, and Offsite Parking Pavements

The proposed pedestrian trails and access roads around the basins will be subject to erosion and degradation if they are not paved or treated. The most durable pavement in a water environment would be Portland cement concrete (PCC), especially in the eastern basin where water levels will annually inundate some of these trails/roads. For pedestrian trail use, a minimum PCC slab thickness of 4 inches over the native soil subgrades is recommended. Some reinforcement is also recommended because of the water environment. At minimum, we recommend No. 3 reinforcing bar at 24 inches on-center, both directions, or an equivalent welded wire mesh reinforcement.

Asphalt concrete (AC) would not be recommended for trails and access roads around the east lake where they would be submerged for any length of time. For areas which will not be inundated, a full-depth AC pavement (AC on native soil) would be acceptable, as the existing soils at the site are generally very good pavement subgrade materials with high percentages of sand and gravel. (R-values of similar soil from adjacent sites were well over 50.) Therefore, the minimum recommended AC section for access roads which may be used by service trucks is 4 inches of AC over the native soil compacted to a minimum of 95 percent relative compaction, per ASTM D1557.

An alternative to PCC or AC pavements would be a cement treated soil pavement. Native sandy soil would be mixed with Portland cement and water to create a durable layer. We recommend a minimum cement treated layer thickness of 8 inches. The typical cement content for the soil-cement mixture is expected to be 9 to 11 percent by weight. Should this alternative be selected, onsite soil samples will need to be mixed with various concentrations of cement to create soil-cement specimens for compressive strength testing. Based on that testing, a design cement content will be established for the soil-cement pavement section to achieve the desired compressive strength. The cement content may be less (on the order of 6 percent) for areas which will not be subject to lake wave action or concentrated stormwater runoff. Stabilized decomposed granite may also be feasible for such areas.

The offsite parking shown on Sheet 9 is designed with an AC pavement section of 4 inches of AC over 6 inches aggregate base. This section is acceptable if this parking lot is limited to passenger vehicles and light duty service trucks.

Pavements should be constructed in conformance with the Specifications for Public Works Construction (the Greenbook).

3.12 Storm Drain Trenching and Inlet Structures

Sheets 5 and 6 of the grading plan show the proposed storm drain in plan and profile. This drain will tie into the existing waste water (effluent) pipeline in the northeast corner of the site and direct flows into three inlet structures, two in the west basin and one in the east basin. Where the pipe extends downslope, slope anchors should be provided. We also recommend that cutoff trenches be installed at the tops-of-slopes to provide a barrier to reduce the potential for piping of the bedding and shading sand around the storm drain into the basin.

3.13 Wet Well and Outlet Structure

The wet well with pumpstation and outlet structure described in Section 1.5 are relatively deep (72 feet to the wet well). The closest borings to these structures (B-1 by NMG and B-2, by Kleinfelder and Associates) encountered mostly sand, silty sand, gravelly sand and minor clayey sand and silt layers at depth. Although no groundwater was encountered in recent studies, the sandy soils are expected to be locally friable and have poor standup times. Therefore, construction of the pump station and outlet pipe will likely require specialized construction techniques, such as secant piles for the vertical wet well shaft and micro-tunneling or jack-and-bore for the lateral drain pipe. If required, additional geotechnical parameters for these or other proposed construction methods may be provided upon request.

The contractor/designer for these improvements should carefully evaluate the soil conditions provided in this report and present a written construction plan describing the means and methods to be employed for the structures for review and comment by the geotechnical consultant.

3.14 Foundation Design Parameters

For design of conventional foundations at the site, a net allowable bearing capacity of 2,800 psf may be assumed for a 12-inch-wide footing embedded 12 inches below the lowest adjacent grade. The allowable bearing pressure may be increased by 300 psf for every additional foot of width and by 900 psf for every additional foot of embedment depth up to a maximum of 4,000 psf. Higher bearing capacities may be allowable provided with appropriate settlement analysis of specific structures. The allowable bearing pressure may be increased by one-third for wind and seismic loading. We recommend that strip and isolated footings have a minimum embedment depth of 18 inches.

The footings of freestanding structures (including walls and pilasters) should have a minimum embedment depth of 24 inches into approved soils.

For lateral resistance against sliding, a friction coefficient of 0.38 may be used at the soil-foundation interface. Also, a soil unit weight of 120 pcf may be assumed for onsite materials.

For design of the pole-type foundations (i.e., light poles, shade structures, etc.), an allowable soil-bearing pressure (S_1) of 360 psf/ft may be used for Equation 18-1 (the "pole" equation) of the 2019 California Building Code (CBC) Section 1807.3.2.1 to determine the depth of embedment for the footings, considering level ground conditions. The equation is applicable for designed embedment depths of less than 12 feet for the purpose of computing lateral pressure. Also, for vertical loads on pole-type foundations, an allowable skin friction of 250 pounds per square foot may be used. For cast-in-place pole-type foundations, the vertical end bearing pressure should be neglected.

3.15 Lateral Earth Pressures

Recommendations for lateral earth pressures for conventional retaining walls and structures (if any) with approved onsite drained soils are as follows:

Lateral Earth Pressures Equivalent Fluid Pressure (psf/ft.)		
Conditions	***Level***	***2:1 Slope***
Active	40	65
At Rest	60	85
Passive	360	180 (if sloping in front of wall)

These parameters are based on a soil internal friction angle of 30 degrees and soil unit weight of 120 pcf. The above parameters do not apply for backfill that is highly expansive.

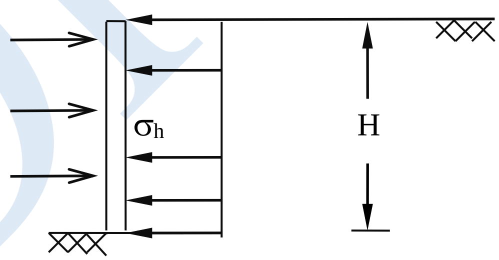
To design an unrestrained retaining wall, such as a cantilever wall, the active earth pressure may be used. For a restrained retaining wall, the at-rest pressure should be used. Passive pressure is used to compute lateral soils resistance developed against lateral structural movement. The passive pressures provided above may be increased by one-third for wind and seismic loads. The passive resistance is taken into account only if it is ensured that the soil against embedded structure will remain intact with time. Future landscaping/planting and improvements adjacent to the retaining walls should also be taken into account in the design of the retaining walls. Excessive soil disturbance, trenches (excavation and backfill), future landscaping adjacent to footings and over-saturation can adversely impact retaining structures and result in reduced lateral resistance. How much of the lateral resistance to be neglected will depend on the foundation type and nature of landscaping in front of the walls. Generally, the upper 1 to 2 feet of earth in front of walls with adjacent landscaping should be neglected for lateral resistance. Trench-type wall footings should have a minimum width of 10 inches.

For sliding resistance, the friction coefficient of 0.38 may be used at the concrete and soil interface. The coefficient of friction may also be increased by one-third for wind and seismic loading. The retaining walls may also need to be designed for additional lateral loads if other structures or walls are planned within a 1H:1V projection.

The seismic lateral earth pressure for walls and structures retaining more than 6 feet of soil and level backfill conditions may be estimated to be an additional 25 pcf for active and at-rest conditions. The earthquake soil pressure has a triangular distribution and is added to the static pressures. For the active and at-rest conditions, the additional earthquake loading is zero at the top and maximum at the base. The seismic lateral earth pressure does not apply to walls retaining less than, or equal to, 6 feet of soil (2022 CBC Section 1803.5.12).

3.16 Temporary Shoring

Temporary braced/anchored shoring of excavations without groundwater, up to 25 feet deep may use the following lateral earth pressure:



Where "H" is the retained height of the shoring, in feet, and σ_h is the uniform soil pressure in psf, as follows:

- Active: $\sigma_h = 23H$
- At-Rest: $\sigma_h = 36H$

3.17 Soil Corrosivity and Soluble Sulfate Contents

Based on laboratory testing, we anticipate that soluble sulfates exposure in the onsite soils may be classified as "S0" per Table 19.3.2.1 of ACI-318-14. Also, onsite soils are anticipated to be moderately corrosive to ferrous metals. Chloride contents were relatively low. Tested pH levels were average. Laboratory test results are included in Appendix C of this report. Other ACI guidelines for structural concrete are recommended.

3.18 Seismic Design Parameters

The following table summarizes the seismic design criteria for the subject site. The seismic design parameters are developed in accordance with 2022 CBC and ASCE 7-16, including Supplement Nos. 1 through 3.

Selected Seismic Design Parameters from 2022 CBC/ASCE 7-16	***Seismic Design Values***	***Reference***
Latitude	34.0512 North	
Longitude	-117.3605 West	
Controlling Seismic Source	San Jacinto	USGS, 2023
Distance to Controlling Seismic Source	3.8 Miles (6.2 km)	USGS, 2023
Site Class per Table 20.3-1 of ASCE 7-16	D	SEA/OSHPD, 2023
S_S, Spectral Acceleration for Short Periods	1.77 g	SEA/OSHPD, 2023
S_1, Spectral Accelerations for 1-Second Periods	0.69 g	SEA/OSHPD, 2023
F_a, Site Coefficient, Table 11.4-1 of ASCE 7-16	1.0	SEA/OSHPD, 2023
F_v, Site Coefficient, Table 11.4-2 of ASCE 7-16	1.7	
S_{DS}, Design Spectral Response Acceleration at Short Periods from Equation 11.4-3 of ASCE 7-16	1.18 g	SEA/OSHPD, 2023
S_{D1}, Design Spectral Response Acceleration at 1-Second Period from Equation 11.4-4 of ASCE 7-16	1.17 g*	
T_S, S_{D1}/ S_{DS}, Section 11.4.6 of ASCE 7-16	0.99 sec*	
T_L, Long-Period Transition Period	8 sec	SEA/OSHPD, 2023
PGA_M, Peak Ground Acceleration Corrected for Site Class Effects from Equation 11.8-1 of ASCE 7-16	0.82 g	SEA/OSHPD, 2023
Seismic Design Category, Section 11.6 of ASCE 7-16	D	

**These values have been increased by 50% as outlined in Supplement No. 3 of ASCE 7-16 Chapter 11.4.8.*

3.19 Utility Installation and Trench Backfill

Excavations should conform to all applicable safety requirements. Trench excavations adjacent to buildings and walls should also be in conformance with the clearance requirements on the grading and foundation plans. Excavations are anticipated to encounter native sandy alluvium or fills which may be classified as Type "C" soils per Cal/OSHA. Trench excavations for the proposed improvements are not anticipated to encounter groundwater; however, wet zones in the soil may be encountered adjacent to landscape areas and depending upon the time of year that construction is performed. Utility excavations should be stabilized per OSHA requirements (shoring or laying back of trench walls). Excavations should be reviewed periodically by the contractor's qualified person to confirm compliance with Cal/OSHA requirements.

Native soils should be suitable for use as trench backfill though some oversize rock/rubble may be generated in some excavations and should not be used to backfill the pipe zone or within 2 feet of top-of-pipes. Native backfill materials should be compacted to a minimum of 90 percent relative compaction (per ASTM D1557). Select granular backfill (i.e., clean sand with SE 30 or better) may be used in lieu of native soils, but should also be compacted or densified with water jetting and flooding.

3.20 Surface Drainage

Inadequate control of surface runoff or heavy irrigation after development of the site may result in nuisance seepage conditions and/or erosion. Maintaining adequate surface drainage, proper disposal of runoff water and control of irrigation will help reduce the potential for future moisture-related problems. Ponding of water on structural pads should not be allowed.

Surface drainage should be carefully taken into consideration during site planning, grading, landscaping, and future building design and construction. Positive surface drainage should be provided to direct runoff away from slopes and structures and toward pavements or suitable drainage devices. The devices should be maintained and periodically cleaned out, especially immediately before and during the rainy season. Each grading plan (rough and/or precise plan) should incorporate these features.

3.21 Maintenance of Graded Slopes

To reduce the erosion and surficial slumping potential of the graded slopes, permanent manufactured slopes should be protected from erosion by planting with appropriate ground cover or by placing suitable erosion protection. These measures should be applied as soon as is practical and prior to the rainy season. Proper drainage should be designed and maintained to collect surface waters and direct them away from slopes. In addition, the design and construction of improvements and landscaping should also provide appropriate drainage measures.

Consideration should be given to surficial protection of the slopes above the basin access road, such as covering the slope face with jute matting prior to planting.

3.22 Future Plan Reviews

Any modifications to the civil engineered grading plan for the proposed project should be reviewed, analyzed and accepted by the geotechnical consultant prior to grading. Future additional plans (precise grading plans, structural plans, etc.) should be reviewed by the geotechnical consultant and report prepared as needed.

3.23 Observation and Testing During Grading and Construction

The findings, conclusions and recommendations in this report are based upon interpretation of the existing data. Verification and refinement of actual geotechnical conditions during grading is essential, especially where slope stabilization is involved. Geotechnical observation and testing should be conducted during the future grading operations at the following stages.

- During and following clearing and grubbing, prior to site processing;
- During and following remedial removals to evaluate and accept the removal bottom;
- During and following cutting of slopes and excavation of slope-stabilization measures;
- During placement of compacted fill;
- During and upon completion of excavations for storm-drain structures and during trench backfill;
- During construction of the wet well and outlet pipeline;
- During installation of the groundwater monitoring wells;
- During construction and backfill of utility lines and/or structures;
- During pavement subgrade and aggregate-base preparation for street pavements; and
- When any unusual or unexpected geotechnical conditions are encountered during grading and construction.

Special inspections should also be conducted during placement of the lake liner to verify the following:

- Liner material (approved thickness, toughness, permeability, etc.).
- Lake bottom is free of hard and/or sharp objects.
- Liner is secured as specified.

4.0 LIMITATIONS

This report has been prepared for the exclusive use of our client, Dopudja & Wells and the City of Rialto, based on the specific scope of services requested by our client for the project described herein. This report or its contents should not be used or relied upon for other projects or by other parties without the written consent of our client and NMG and the involvement of a geotechnical professional. The means and methods used by NMG for this study are based on local geotechnical standards of practice, care, and requirements of governing agencies. No warranty or guarantee, express or implied is given.

The findings, conclusions, and recommendations are professional opinions based on interpretations and inferences made from geologic and engineering data from specific locations and depths, observed or collected at a given time. By nature, geologic conditions can vary from point to point, can be very different in between points, and can also change over time. Our conclusions and recommendations are subject to verification and modification with more exploration and/or observations during grading and construction when more subsurface data becomes available.

P:\2020\20079-02 DWC Lake Rialto\Drafting\GIS\20079-01 SiteLocation.mxd

0 300 600 Feet
1 inch = 600 feet
N

SITE LOCATION MAP

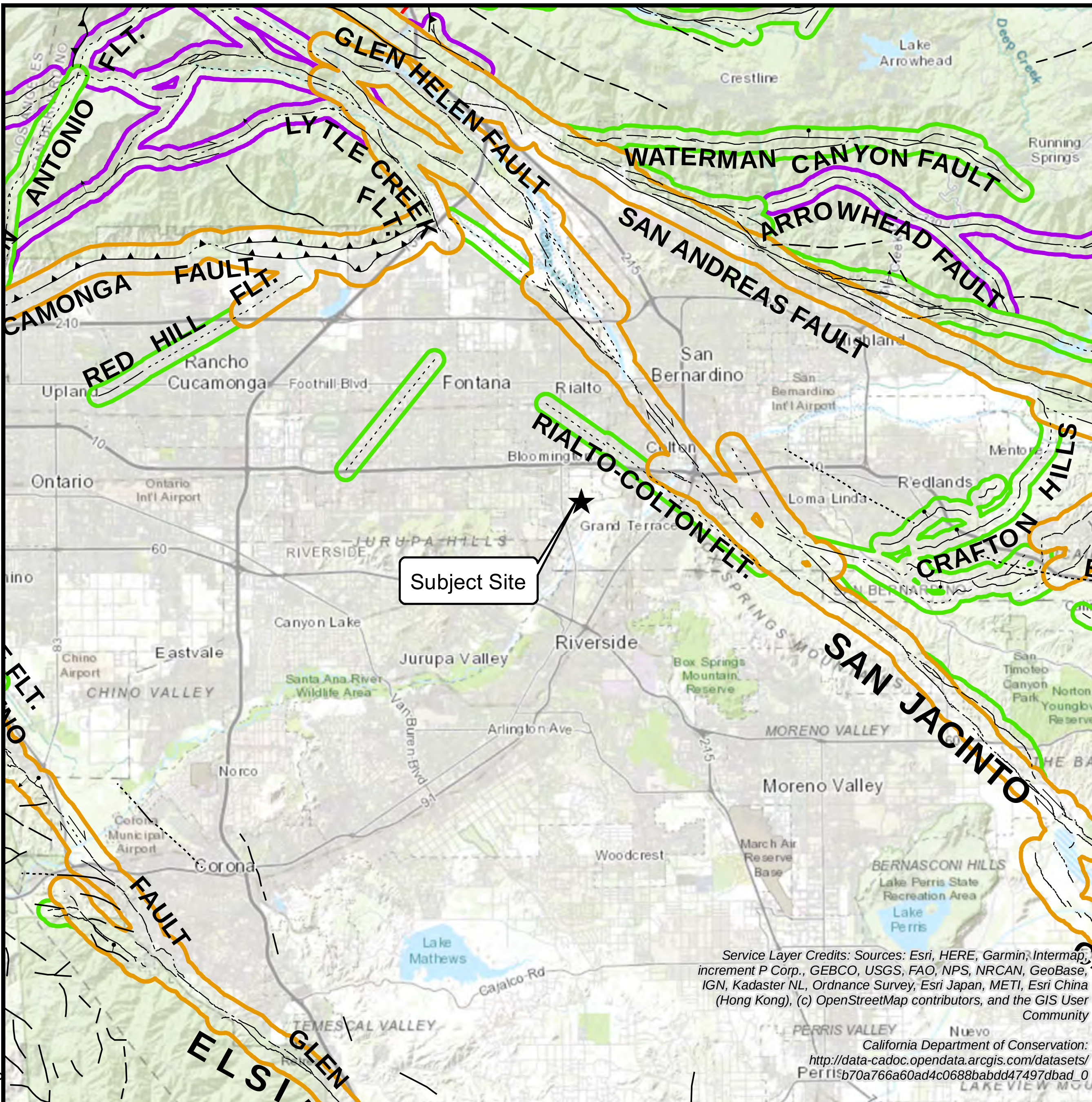
PROPOSED LAKE RIALTO
LOCATED SOUTH OF WWTP
CITY OF RIALTO, CALIFORNIA

Project Number: 20079-02
Project Name: DWC/Lake Rialto
Date: 1/16/2023

By: TM/TW

Figure 1

NMG



Legend

Faults

- Certain
- Approximately Located
- Concealed

Recency of Movement

- Historic
- Holocene
- Late Quaternary
- Quaternary

0 2.5 5 Miles

1 inch = 5 miles

N

REGIONAL FAULT MAP

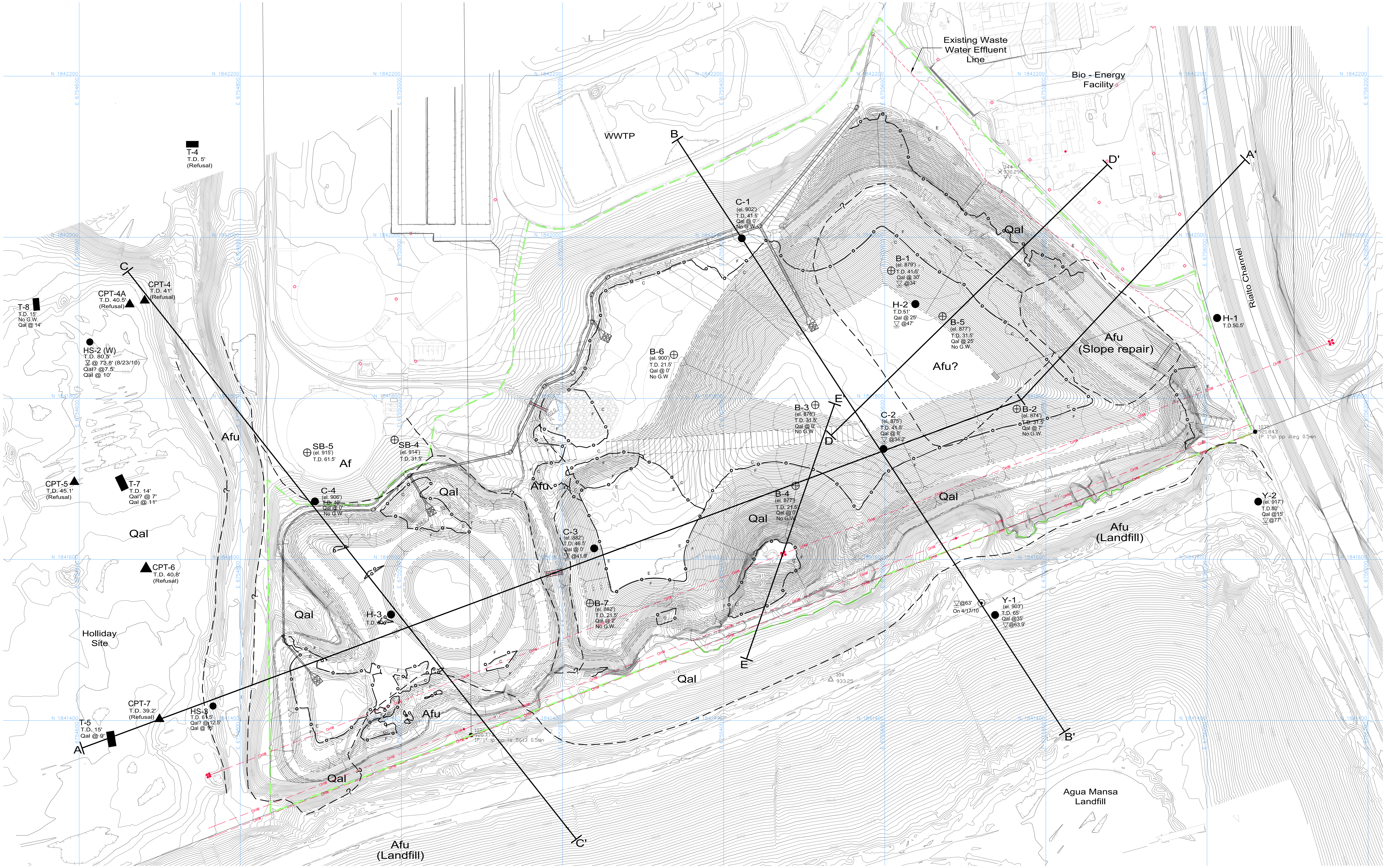
Base: California Geological Survey, Fault Activity Map of California, 2010

PROPOSED LAKE RIALTO
LOCATED SOUTH OF WWTP
CITY OF RIALTO, CALIFORNIA

Project Number: 20079-02 By: TM/TW
Project Name: DWC/Lake Rialto
Date: 1/16/2023 Figure 2

NMG

P:\2020\20079-02 DWC Lake Rialto\Drafting\GIS\20079-01 RegionalFault.mxd



LEGEND

EARTH UNITS - APPROXIMATE LIMITS SHOWN

Af — FILL PLACED BY WWTP, 2019

Afu — UNDOCUMENTED FILL

Qal — ALLUVIUM

SYMBOLS - LOCATIONS ARE APPROXIMATE

H-3
T.D.50.7' — HOLLOW-STEM AUGER BORING BY NMG, THIS INVESTIGATION SHOWING TOTAL DEPTH

SB-5
(el. 915')
T.D. 61.5' — HOLLOW-STEM AUGER BORING BY AECOM (2018), SHOWING TOP OF BORING ELEVATION AND TOTAL DEPTH

C-4
(el. 906')
T.D. 40'
Qal @ 0'
No G.W. — HOLLOW-STEM AUGER BORING BY NMG (2010A), SHOWING TOP OF BORING ELEVATION, TOTAL DEPTH, AND DEPTH TO EARTH UNIT AND GROUNDWATER

B-7
(el. 882')
T.D. 21.5'
Qal @ 2'
No G.W. — HOLLOW-STEM AUGER BORING BY KLEINFELDER AND ASSOCIATES (2007), SHOWING TOP OF BORING ELEVATION, TOTAL DEPTH, AND DEPTH TO EARTH UNIT AND GROUNDWATER

SYMBOLS - LOCATIONS ARE APPROXIMATE

Y-2
(el. 917')
T.D.80'
Qal @15'
▽@77' — HOLLOW-STEM AUGER BORING BY NMG (2010B), SHOWING TOP OF BORING ELEVATION, TOTAL DEPTH, AND DEPTH TO EARTH UNIT AND GROUNDWATER

▽@63'
On 4/17/10 — APPROXIMATE LOCATION OF PIEZOMETER WELL, SHOWING DEPTH TO GROUNDWATER

HS-2
T.D.75'
▽@63'
Qal @ 10' — HOLLOW-STEM AUGER BORING BY NMG (2010C), SHOWING TOTAL DEPTH, DEPTH TO GROUNDWATER AND DEPTH TO EARTH UNIT

CPT-7
T.D.39.2'
(Refusal) — CONE PENETROMETER TEST BY NMG (2010C), SHOWING TOTAL DEPTH

T-4
T.D. 5'
(Refusal) — TRENCH BY NMG (2010C), SHOWING TOTAL DEPTH

OTHER SYMBOLS - LOCATIONS ARE APPROXIMATE

GEOLOGIC CONTACT

E C F — CUT / FILL / EXISTING LINE

LIMITS OF THIS REPORT

GRAPHIC SCALE

40 0 20 40 80

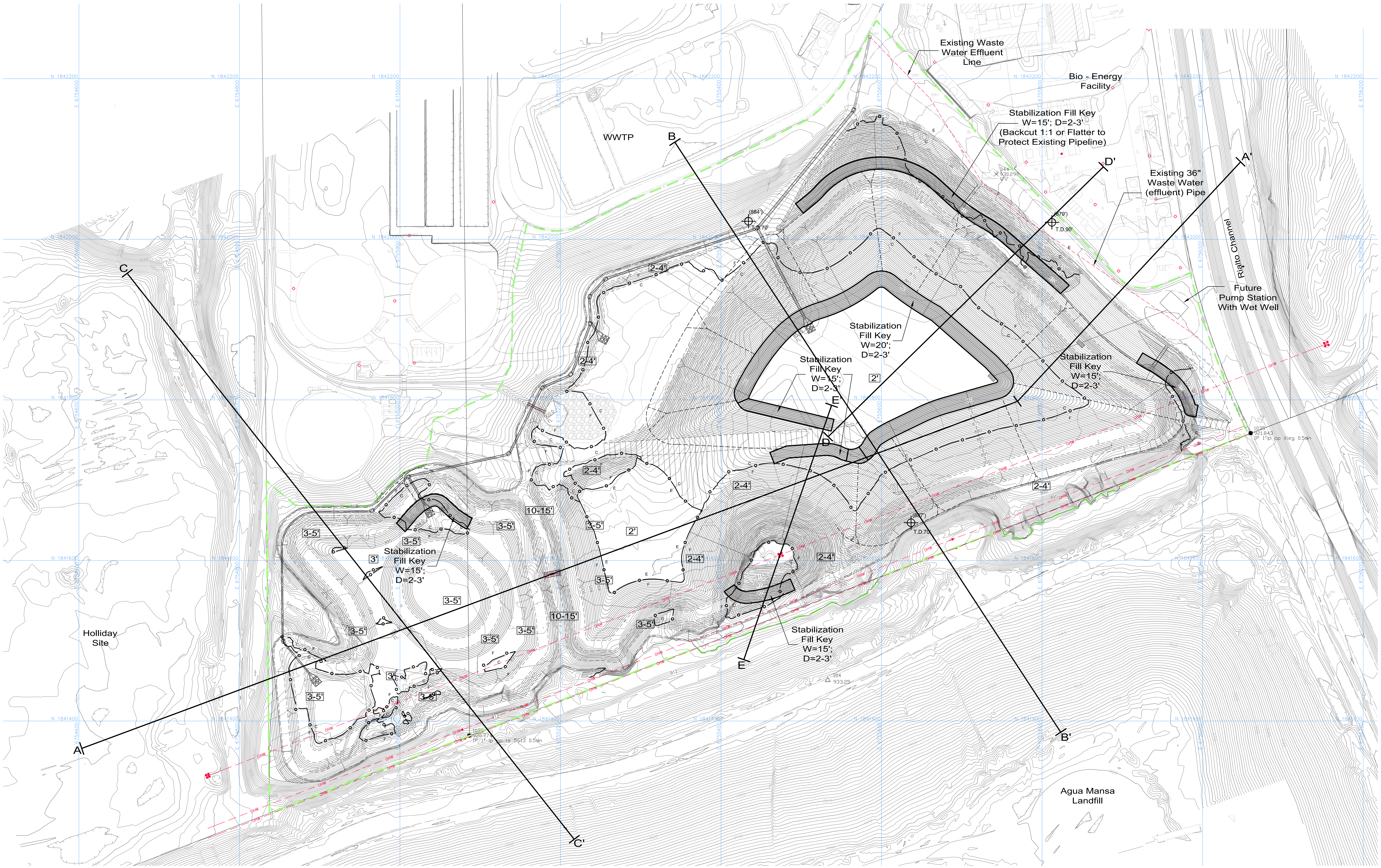
(IN FEET)
1 inch = 40 ft.

PLATE 1

GEOTECHNICAL MAP
PROPOSED LAKE RIALTO
CITY OF RIALTO, CALIFORNIA

Project No.: 20079-02 By:TM/TW
Project Name: DWC/Lake Rialto
Date: 1/16/2022 SCALE: 1" = 40'

NMG Geotechnical, Inc.



LEGEND

OTHER SYMBOLS - LOCATIONS ARE APPROXIMATE

C / F — DESIGN CUT / FILL / EXISTING / NATURAL LINE

3-5' — RECOMMENDED DEPTH OF REMEDIAL REMOVAL, BELOW EXISTING GRADE IN FILL AREAS AND BELOW DESIGN GRADE IN CUT AREAS

W=20' D=2-3' — RECOMMENDED STABILIZATION FILL KEY; SHOWING WIDTH AND DEPTH

LIMITS OF THIS REPORT

T.D.70' (887') — RECOMMENDED GROUNDWATER MONITORING WELL SHOWING TOTAL DEPTH (AND ACTION LEVEL ELEVATION)

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

PLATE 2

REMEDIAL MEASURES MAP
PROPOSED LAKE RIALTO
CITY OF RIALTO, CALIFORNIA

Project No.: 20079-02 By:TM/TW
Project Name: DWC/Lake Rialto
Date: 1/16/2023 SCALE: 1" = 40'

NMG Geotechnical, Inc.

PLATE 3

Project No.: 20079-02	By:TM/TW
Project Name: WYA/Lake Rialto	
Date:1/16/2023	SCALE: 1" = 40'

NMG Geotechnical, Inc.

APPENDIX A

APPENDIX A

REFERENCES

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APPENDIX A

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APPENDIX B

BORING LOGS
BY
NMG, THIS STUDY

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	*GRAVEL AND GRAVELLY SOILS* MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	*CLEAN GRAVELS* (LITTLE OR NO 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 (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	*CLEAN SANDS* (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND - SILT MIXTURES
			SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% 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 OR 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 GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Dual symbols are used to indicate gravels or sand with 5-12% fines and soils with fines classifying as CL-ML. Symbols separated by a slash indicate borderline soil classifications.

Sampler and Symbol Descriptions

- ■ Modified California sample (D-#)
- ◪ Standard Penetration Test (S-#)
- ◫ Shelby tube sample (T-#)
- ▩ Large bulk sample (B-#)
- ☒ Small bulk sample (SB-#)
- ▽ Approximate depth of groundwater during drilling
- ▼ Approximate depth of static groundwater

Note: Number of blows required to advance driven sample 12 inches (or length noted).

Laboratory and Field Test Abbreviations

AL	Atterberg limits (plasticity)
CC	Chemical Testing incl. Soluble Sulfate
CN	Consolidation
DS	Direct Shear
EI	Expansion Index
GS	Grain Size Analysis (Sieve, Hydro. and/or -No. 200)
MD	Maximum Density and Optimum Moisture
RV	Resistance Value (R-Value)
SE	Sand Equivalent
UU	Unconsolidated Undrained Shear Strength

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System and include color, moisture, and relative density or consistency. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate. Bedrock descriptions are based on visual classification and include rock type, moisture, color, grain size, strength, and weathering.
2. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were drilled. They are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO LOG OF BORING

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.

Date(s) Drilled	2/22/21	Logged By	BF
Drilling Company	2R Drilling, Inc.	Drill Bit Size/Type	10"
Drill Rig Type	CME 75 Hollow Stem	Hammer Data	140 lbs. @ 30-inch drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	No Groundwater Encountered.		
Comments			

H-1

Total Depth Drilled (ft)	50.5
Approximate Ground Surface Elevation (ft)	924.0 msl

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					SM	Surface: Dirt, top of slope, abundant cobbles. **Alluvium (Qal)** @ 1-5': Brown to dark brown silty gravelly fine to coarse SAND w/ some cobbles, damp, micaceous.			B-1 @ 1-5' CC, GS
920			B-1							
	5		D-1	32			@ 5': Dark yellowish brown to brown silty gravelly SAND, damp, medium dense, micaceous, friable, cobble in tip.	2.6	120.9	CC
			D-2	54		SP	@ 7.5': Grayish brown fine to coarse SAND with trace silt and some gravel, damp, dense, slightly micaceous, highly friable.	2.7	118.2	Bottom Ring Disturbed. GS, DS
	10		D-3	93			@ 10': Grayish brown/ Olive brown gravelly fine to coarse SAND with trace silt, damp, very dense, slightly micaceous, highly friable.	3.0	126.4	B-2 @ 10-15' GS
			B-2							
910										
	15		D-4	20		SM	@ 15': Upper: Olive brown silty fine SAND, damp, medium dense, micaceous, highly friable.	8.6	110.2	GS, DS
						SP	Lower: Olive/ Yellowish brown fine to medium SAND with trace to some silt, damp, medium dense, highly friable, micaceous, trace gravel in tip.			
	20		D-5	77/12"			@ 20': Grayish brown very fine to coarse SAND with trace silt, damp, very dense, slightly micaceous, highly friable, beds of finer sand in upper rings.	2.7	114.6	
900										
	25									

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	25		D-6	88/12"		SP	@ 25': Olive brown gravelly fine to coarse SAND with trace silt, damp, very dense, slightly micaceous, friable, some siltier beds in upper rings.	3.0		Disturbed.
	30		D-7 SB-1	76/12"			@ 30': Grayish/ Olive brown fine to coarse SAND with some gravel, damp to moist, very dense, slightly micaceous, highly friable, 1 1/2" clay bed at top of sample.	19.7	96.6	GS, DS SB-1 @ 30.5'
890										
	35		D-8	50/5"			@ 35': No Recovery. Driller observed cobble blocking sample.			
	40		D-9	48		CL	@ 40': Upper: Olive brown sandy silty CLAY, saturated, very stiff, plastic to highly plastic.	42.3		Disturbed. GS, AL
						SM-ML	Lower: Olive brown silty very fine SAND/ sandy SILT, moist, dense/ hard, micaceous, friable, more moist on top of clay layer.			Perched Water, No Groundwater.
880										
	45		D-10	72		SP	@ 45': Upper: Grayish brown fine to coarse SAND with some silt, damp, dense, highly friable, micaceous.	5.4	115.4	
						SM	Lower: Olive brown silty very fine SAND, damp, dense, micaceous, friable.			
	50		D-11	50/6"			@ 50': No Recovery.			
							Notes: Total Depth is 50.5 Feet. No Groundwater Encountered. Backfilled with Cuttings and Jetted/Tamped.			
870										
	55									

LOG OF BORING

West Yost/ Lake Rialto
Bloomington, CA

PROJECT NO. 20079-01

NMG

Date(s) Drilled	2/22/21	Logged By	BF
Drilling Company	2R Drilling, Inc.	Drill Bit Size/Type	10"
Drill Rig Type	CME 75 Hollow Stem	Hammer Data	140 lbs. @ 30-inch drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Stabilized at 45.8 Feet.		
Comments			

H-2

Total Depth Drilled (ft)	51.0
Approximate Ground Surface Elevation (ft)	881.0 msl

Elevation (ft)	Depth (ft)	SAMPLES Number	Blows per foot	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0			ML	Surface: Dirt, light brown gravelly sandy SILT. **Alluvium (Qal)**			
880								B-1 @ 1-5'
		B-1 D-1	68/12"		@ 2.5': Upper: Light olive/ yellowish brown very fine sandy SILT with some gravel, damp, hard, micaceous.	5.6	125.5	GS
				SM-ML	Lower: Light yellowish/ olive brown silty very fine SAND/ sandy SILT, damp, very dense/ hard, micaceous, slightly friable.			
	5	D-2	73	SP-SM	@ 5': Olive/ olive brown with green tint fine to coarse SAND with some silt and some gravel, damp to moist, dense, trace root hairs.	3.8	127.4	
		D-3	92		@ 7.5': Olive/ olive brown with green tint fine to coarse gravelly SAND with some silt, damp to moist, very dense, schist fragments in top of upper rings.	3.6	125.1	
	10	D-4	90/11"		@ 10': Olive/ olive brown with green tint gravelly fine to coarse SAND with some silt, damp to moist, very dense.	3.2	129.9	CN
870								
	15	D-5	87	SM-ML	@ 15': Dark gray silty fine to coarse SAND/ sandy SILT with trace gravel, damp to moist, very dense/ hard, micaceous.	7.3	129.3	
	20	D-6	50/4"	ML	@ 20': Driller observed rig chatter while sampling. Upper: Olive brown sandy SILT with trace gravel, moist, hard, micaceous.	5.4	118.9	AL, GS
860				SM-ML	Lower: Olive gray silty fine to medium SAND/ sandy SILT, moist to wet, very dense/ hard, trace gravel.			
	25							

LOG OF BORING

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	25	■	D-7	75/12"		SP	@ 25': Upper: Light yellowish brown medium to coarse SAND with trace gravel, damp, very dense, slightly micaceous, highly friable. Lower: Yellowish brown silty fine to coarse SAND with trace gravel, damp to moist, very dense, micaceous, highly friable.	2.6	122.6	
850	30	■	D-8	93/11"			@ 30': Light olive brown fine to medium SAND with trace silt, moist, very dense, micaceous, highly friable.	2.8	107.1	CN
	35	■	D-9	74		ML	@ 35': Upper: Olive to olive brown clayey SILT with some sand and some gravel, moist to wet, hard, slightly plastic, micaceous. Lower: Yellowish olive clayey SILT, moist, hard, slightly plastic, micaceous.	8.0	121.3	
840	40	■	D-10	83/11"		SM-ML	@ 40': Upper: Olive brown to light olive brown sandy SILT/ silty fine SAND, wet, hard/ very dense, micaceous, slightly plastic, 1/4"-1/2" clay bed in upper rings.	16.6	106.9	
						SP	Lower: Light olive brown fine to medium SAND with trace silt, wet, very dense, slightly micaceous, highly friable.			
	45	■	D-11	50/5"			@ 45': No recovery. ▼ ∇			
830	50	■	D-12	76/12"			@ 50': Olive brown fine to medium SAND with some silt, saturated, very dense, micaceous, highly friable.	19.4	108.5	
	55						Notes: Total Depth is 51 Feet. Groundwater Encountered at 47 Feet. Groundwater Stabilized at 45.8 Feet. Backfilled with Cuttings and Tamped.			

LOG OF BORING

West Yost/ Lake Rialto
Bloomington, CA

PROJECT NO. 20079-01

NMG

Date(s) Drilled	2/23/21	Logged By	BF	**H-3**
Drilling Company	2R Drilling, Inc.	Drill Bit Size/Type	10"	**Sheet 1 of 2**
Drill Rig Type	CME 75 Hollow Stem	Hammer Data	140 lbs. @ 30-inch drop	
Sampling Method(s)	Modified California, Bulk			
Approximate Groundwater Depth:	No Groundwater Encountered.			Total Depth Drilled (ft): 50.7
Comments				Approximate Ground Surface Elevation (ft): 895.0 msl

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					ML	Surface: Dirt, twigs and branches. **Alluvium (Qal)**			B-1 @ 1-5'
			B-1 D-1	22			@ 2.5': Light olive gray sandy SILT with trace gravel, dry to damp, stiff, slightly micaceous, silty CLAY in upper rings.	1.2	111.0	CN
890	5		D-2	37		SM-ML	@ 5': Light olive gray sandy SILT/ silty very fine SAND, damp, medium dense/ very stiff, trace rootlets, more sandy in upper rings.	1.5	115.1	
			D-3	29			@ 7.5': Light olive gray andy SILT/ silty very fine SAND, damp, very stiff/ medium dense, micaceous, friable, trace root hairs.	2.4	108.3	
	10		D-4	14			@ 10': Light olive gray sandy SILT/ silty very fine SAND, damp, stiff/ loose, micaceous, friable, trace root hairs.	4.4	98.7	AL, GS, CN
880	15		D-5	17		ML	@ 15': Light olive gray sandy SILT, damp, stiff, micaceous, highly weatherable.	2.0	100.3	
	20		D-6	19			@ 20': Light olive gray sandy SILT with trace gravel, damp, stiff, micaceous, trace rootlets, highly weatherable.	1.6	104.5	
870	25									

LOG OF BORING

West Yost/ Lake Rialto

Bloomington, CA

PROJECT NO. 20079-01

NMG

Elevation (ft)	Depth (ft)	Samples Type / Number	Samples Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
870	25	D-7	46		ML	@ 25': Light olive gray very fine sandy SILT, damp, hard, micaceous, bedded, trace root hairs.	6.7	96.9	
	30	D-8 SB-1	76		SM-ML	@ 30': Upper: Light olive brown sandy SILT/ silty fine to coarse SAND with some gravel, damp, hard/ very dense, micaceous, highly friable, calcium carbonate in sample ring (SB-1).	3.0		Sample Disturbed, 1 Ring. SB-1 @ 31'.
					SM	Lower: Light olive gray/ brown silty medium to coarse SAND with some gravel, damp, very dense, friable, large cobble in bottom ring.			
860	35	D-9	90/10"		SM-ML	@ 35': Light olive brown/ yellowish brown silty very fine SAND/ sandy SILT, damp, very dense/ hard, micaceous, friable, somewhat interbedded sand and silt.	2.9	108.8	
	40	D-10	73		SP	@ 40': Upper: Light grayish/ yellowish brown very fine to fine SAND with trace silt, damp, dense, friable, micaceous, upper rings are olive brown to dark olive brown silty CLAY/ clayey SILT.	4.5	111.6	
					ML	Lower: Olive to dark olive brown clayey SILT, wet, hard, plastic, micaceous.			
850	45	D-11	76/12"		SM	@ 45': Upper: Olive brown silty very fine SAND, damp, very dense, micaceous, highly friable, trace gravel in upper rings.	7.8	107.7	
					ML	Lower: Yellow/ Olive brown clayey SILT, damp to moist, hard, slightly micaceous, slightly plastic.			
	50	D-12	93/8"		SP-GP	@ 50': Very light gray/ white gravelly fine to coarse SAND with trace silt/ sandy GRAVEL, damp, very dense, cobble in rings, pulverized rock in sample.	0.9		Sample Disturbed, 1 Ring.
						Notes: Total Depth is 50.7 Feet. No Groundwater Encountered. Backfilled with Cuttings and Tamped/Jetted.			
840	55								

LOG OF BORING

West Yost/ Lake Rialto
Bloomington, CA

PROJECT NO. 20079-01

NMG

BORING LOGS
BY
AECOM, 9/26/18

Project: Rialto WWTP
Project Location: Rialto, CA
Project Number: 60570758

Log of Boring SB-4

Date(s) Drilled	5/10/2018 to 5/10/2018	Logged By	J. Leiva	Checked By	C. Goetz
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	6" bullet	Total Depth of Borehole	31.5' bgs
Drill Rig Type	CME95	Drilling Contractor	BC2	Surface Elevation	914.0 ft above msl
Borehole Backfill	Cement bentonite grout	Sampling Method(s)	Bulk, SPT, CAL	Hammer Data	140 lb./30 in. Automatic
Boring Location	N 34.1 E -117.4	Groundwater Level(s)	Not Encountered		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
914.0	0.0	Bulk	SS-1					Yellowish brown, Silty SAND (SM), fine to coarse grained sand, little to some fines, few angular to subangular gravel (up to 1"), trace organics, dry [FILL]		
910	5	SPT	SS-2	11 11 12				Yellowish brown, Silty SAND with Gravel (SM), fine to coarse grained sand, little fine to coarse grained gravel, little fines, medium dense	2.5	%G=22.6 %S=59.9 %M=13.4 %C=4.1
904.0	10.0	SPT	SS-3	7 11 21				Yellowish brown, Silty SAND (SM), fine to medium grained sand, some fines, trace fine grained gravel, 2" layer of sandy lean clay, dense [ALLUVIUM]		
900	15	CAL	SS-4	8 12 21				Light yellowish brown, Silty SAND (SM), fine grained sand, some fines, trace medium grained sand, trace iron oxidized staining	7.2	%G=0 %S=65.5 %M=31.2 %C=3.3
895	20	SPT	SS-5	8 12 15				Similar to SS-4, medium dense Light olive brown, Silty SAND (SM), fine grained sand, some fines, medium dense, dry		WC=6.6% %G=0 %S=62.8 %M=33.1 %C=4.2
889.0	25.0	SPT	SS-6	12 19 23				Yellowish brown, Poorly graded SAND with Silt (SP-SM), fine to coarse grained sand, few fines, dense, 6" layer of silty sand, moist		
884.0	30.0	SPT	SS-7	10				Light olive brown, Clayey SAND (SC), fine grained sand, some		

AECOM

Project: Rialto WWTP
Project Location: Rialto, CA
Project Number: 60570758

Log of Boring SB-4

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
			SS-7	21 28				882.5 fines, dense, moist 2" layer of coarse grained sand @ 30.2 ft 31.5 Boring Terminated at 31.5´ bgs		
880										
875										
870										
865										
860										
855										
850										

Project: Rialto WWTP	Log of Boring SB-5
Project Location: Rialto, CA	Sheet 1 of 2
Project Number: 60570758	

Date(s) Drilled	5/10/2018 to 5/10/2018	Logged By	J. Leiva	Checked By	C. Goetz
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	6" bullet	Total Depth of Borehole	61.5' bgs
Drill Rig Type	CME95	Drilling Contractor	BC2	Surface Elevation	915.0 ft above msl
Borehole Backfill	Cement bentonite grout	Sampling Method(s)	Bulk, SPT, CAL	Hammer Data	140 lb./30 in. Automatic
Boring Location	N 34.1 E -117.4	Groundwater Level(s)	Not Encountered		

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resist. Blows/6" OR CORE% RQD	SAMPLES: Recovery, %	SAMPLES: Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
915	0		SS-1					Light brownish gray, Silty SAND (SM), fine to coarse grained sand, little to some fines, few fine to coarse grained gravel (up to 1.5") [FILL]		
910	5		SS-2	7 8 12				Light yellowish brown, Lean CLAY (CL), few silt, trace fine to medium grained sand, trace fine grained gravel, very stiff, dry [ALLUVIUM]	10.9	*LL=46 PL=19 PI=-0.85 %G=0.2 %S=3.6 %M=82.3 %C=13.9*
905	10		SS-3	6 9 11				Light yellowish brown, Sandy Lean CLAY (CL), little fine grained sand, very stiff, dry [ALLUVIUM]		
900	15		SS-4	3 8 13				Light yellowish brown, Sandy SILT (ML), some fine grained sand, trace medium grained sand, trace fine grained gravel, trace iron oxidized staining, medium dense, dry [ALLUVIUM] little to some medium to coarse grained sand near the bottom	6.3	*%G=3 %S=43.6 %F=53.4*
895	20		SS-5	13 18 25				Light grayish brown, Silty SAND (SM), fine grained sand, little fines, dense, dry Olive brown, Sandy lean CLAY (CL) in shoe		
890	25		SS-6	7 18 26				Light yellowish brown, Silty SAND (SM), fine to medium grained sand, little fines, dense, dry		
885	30		SS-7	8				Light brownish gray, Poorly graded SAND with Silt (SP-SM), fine to	1.5	*%G=13.3 %S=79.9 %M=5.8 %C=1*

Elevation, feet	Depth, feet	Type	Number	Sampling Resist. Blows/6" OR CORE% RQD	Recovery, %	Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	REMARKS AND OTHER DETAILS
			SS-7	11 14				coarse grained sand, few fine grained gravel, few fines, medium dense, dry		
880	35		SS-8	18 23 32				880.0 / 35.0 Light yellowish brown, SILT with Sand (ML), little fine grained sand, trace medium grained sand, trace iron oxidized staining, hard, moist	15.6	*LL=30 PL=6 PI=-1.4 %G=0 %S=28.8 %M=62.8 %C=8.4*
875	40		SS-9	7 15 23				875.0 / 40.0 Light olive brown, Sandy Lean CLAY (CL), dense, 6" layer of clayey sand, hard		
870	45		SS-10	23 50/5"				870.0 / 45.0 Light gray, Well-graded SAND (SW), fine to coarse grained sand, few fine grained gravel, trace fines, very dense, dry		
865	50		SS-11	33 50/6"				865.0 / 50.0 Light gray, Well-graded SAND with Silt and Gravel (SW-SM), fine to coarse grained sand, little fine to coarse grained gravel (up to 1"), few fines, very dense, dry	2.0	*%G=28.6 %S=62.8 %F=8.6*
860	55		SS-12	34 50/6"				860.0 / 55.0 Light gray, Well-graded SAND with Gravel (SW), fine to coarse grained sand, little fine to coarse grained gravel, trace fines, very dense, dry		
855	60		SS-13	19 37 50				855.0 / 60.0 Light yellowish brown, Poorly graded SAND (SP), medium grained sand, trace fines, very dense, dry (853.5 / 61.5)		
								Boring Terminated at 61.5' bgs		
850										

Report: GEO_CR; File J:\AE_DEPTS\GEO\PROJECT FILES (GEOTECH)\RIALTO WWTP\RIALITO (6-1-18, PEGAH)\RIALTO WWTP.GPJ; 6/26/2018 2:16:06 PM

BORING, TRENCH AND CPT LOGS BY NMG, 10/11/10 10049-02

Date(s) Drilled	8/12/10	Logged By	PA
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME 85	Hammer Data	140 lbs @ 30" drop (auto)
Sampling Method(s)	Bulk, Modified California, SPT		
Approximate Groundwater Depth:	Groundwater At 73.7' (8-17-10)		
Comments	Monitering Well Installed		

HS-2

Total Depth Drilled (ft)	80.5
Approximate Ground Surface Elevation (ft)	914.2

Elevation (ft)	Depth (ft)	Samples: Type / Number	Blows per foot	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0			ML/SM	Surface: Loose dry SILT. **Artificial Wash Deposits (Aw)**			
		SPT-1	25		@ 2.5' Pale yellow interbedded SILT/gravelly SAND, dry, medium stiff/dense, laminated, slight FeO staining.	10.0		GS
910	5	D-1	49	GM	@ 5' Pale olive silty coarse-grained sandy pea-GRAVEL, dry, medium dense, massive, slight FeO staining.	6.2	109.1	
		SPT-2	27	SM	**Alluvium? (Qal?)** @ 7.5' Pale olive to pale gray silty SAND, dry to damp, medium dense, massive, well-sorted, micaceous, friable.	3.0		
	10	D-2	36	SM/ML	**Alluvium (Qal)** @ 10' Pale olive silty fine-grained SAND/fine grained sandy SILT, moist to very moist, medium stiff, FeO staining, micaceous, massive.	23.3	97.7	6" Tube Sample. CN
900		SPT-3 B-1	19	ML	@ 12.5' Pale olive to brown SILT with scattered sand lenses, moist, stiff, moderately laminated, FeO staining.	33.7 21.2		B-1 @ 12.5-15 Feet.
	15	D-3	43		@ 15' Olive SILT, moist, stiff, slight MnO/FeO staining, micaceous, massive.	19.9	100.7	
		SPT-4	33	SM	@ 17.5' Pale olive brown silty fine-grained SAND, moist, medium dense, massive, locally silty, micaceous.	15.9		
	20	D-4	79	ML	@ 20' Olive to gray slightly sandy SILT, moist, stiff, locally sand lenses, massive, slight FeO staining, micaceous.	21.5	100.3	6" Tube Sample. DS
890		SPT-5	33	SM/GM	@ 22.5' Pale olive to pale gray silty SAND/sandy GRAVEL, moist, medium dense to dense, graded, silt in upper sample.	14.4		
	25	D-5	50/6"	GM	@ 25' Pale gray SAND with coarse gravel, damp, dense, poorly sorted, friable, massive.	3.0	109.7	GS
		SPT-6	31	SM	@ 27.5' Pale yellow silty SAND, damp, medium dense, massive, slightly micaceous, friable, locally clean sand.	4.3		
	30							

LOG OF BORING

Rentech/ Rialto

Rialto

PROJECT NO. 10049-02

NMG

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30		D-6	83/11"			@ 30' Pale gray silty SAND, damp, dense, massive, micaceous, well-sorted, highly friable.	5.3	103.2	6" Tube Sample.
			SPT-7	35		ML	@ 32.5' Olive SILT, moist, stiff, micaceous, massive.	24.7		
880										
	35		D-7	50/6"		SM/ML	@ 35' Olive gray SILT to silty SAND, moist to very moist, dense/stiff, micaceous, slight FeO staining, massive, well-sorted, locally trace clay.	25.1	102.9	
			SPT-8	55			@ 37.5' Olive gray SILT to silty SAND, moist, dense/stiff, micaceous, slight FeO staining, massive, well-sorted.	19.4		
	40		D-8	50/3"		ML/GM	@ 40' Upper: Olive SILT, damp, medium stiff, massive, slight FeO staining, locally sandy. Lower: Sandy GRAVEL, damp, very dense, massive, friable, clasts up to 2" in diameter.	4.2	111.5	
			SPT-9	67		GM	**Alluvial Fan Deposits (Qf)** @ 42.5' Sandy GRAVEL, damp, very dense, massive, friable, clasts up to 2" in diameter.	3.0		
870										
	45		D-9	50/5"			@ 45' Olive coarse-grained sandy GRAVEL with fines, moist, very dense, massive, abundant pea-gravel sized clasts. -Sample Disturbed-	9.7		
			SPT-10	50/4"			@ 47.5' Pale yellow to olive sandy GRAVEL, moist, very dense, massive, poorly sorted.	2.8		
	50		D-10	50/3"			@ 50' Pale gray coarse-grained sandy GRAVEL, moist, very dense, massive, poorly sorted.	6.5	117.9	
			SPT-11	60		SM/GM	@ 52.5' Pale gray coarse-grained sandy GRAVEL grading to a silty SAND, moist, very dense, massive, poorly sorted.	4.0		
860										
	55		D-11	50/3"		CL/ML	@ 55' Upper: Pale olive to brown silty CLAY/clayey SILT, damp to moist, stiff, moderately plastic, massive, FeO staining.	4.3	122.5	
						SP	Lower: Pale gray SAND with few fines, damp to moist, dense, massive, slightly friable.			
			SPT-12	56		SM	@ 57.5' Pale gray silty SAND with scattered gravel, damp, dense, FeO staining, poorly sorted, massive.	3.8		
	60		D-12	50/6"		SP	@ 60' Pale gray SAND with few fines, damp to moist, dense, well-sorted, massive, friable, micaceous.	3.7	105.0	
850										
	65									

LOG OF BORING

Rentech/ Rialto
Rialto

PROJECT NO. 10049-02

NMG

Elevation (ft)	Depth (ft)	Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	65									
	70		D-13	41		ML	@ 70' Olive brown SILT with trace CLAY, very moist, stiff, massive, slight FeO/MnO staining.	32.7	92.9	
840	75						∇			
	80		D-14	50/6"			@ 80' No Recovery.			
830	85						Notes: Total Depth: 80.5 Feet. Groundwater Monitoring Well Installed. -Screen from 80-60 Feet. -Sand From 80-58 Feet. -Bentonite Plug From 58-53 Feet. -Cement Slurry From 53-0 Feet. -Well-Head Riser Installed. Groundwater Encountered at 73 Feet During Drilling. Groundwater At 73.85 Feet (8-23-10) Cuttings Drummed and Removed From Site.			
	90									
820	95									
	100									

Date(s) Drilled	8/11/10	Logged By	PA
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME 85	Hammer Data	140 lbs @ 30" drop (auto)
Sampling Method(s)	Modified California, SPT		
Approximate Groundwater Depth:	Groundwater Not Encountered		
Comments			

HS-3

Total Depth Drilled (ft)	61.5
Approximate Ground Surface Elevation (ft)	910.8

Elevation (ft)	Depth (ft)	Samples: Type Number	Samples: Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
910	0				GM	Surface: Pale yellowish brown slightly sandy SILT, loose, dry, scattered weeds. **Artificial Wash Deposits (Aw)**			
		D-1	16			@ 2.5' Pale brown silty sandy GRAVEL, damp, loose to medium dense, massive.	8.2	91.2	
	5	SPT-1	5		ML	@ 5' Pale gray SILT, dry to damp, loose to medium stiff, laminated, well-sorted, slightly micaceous.	17.1		
		D-2	22			@ 7.5' Pale yellowish brown SILT, dry to damp, medium stiff, micaceous, well-sorted, slightly micaceous.	7.4	83.1	CN
900	10	SPT-2	16		CH	@ 10' Pale yellowish brown silty CLAY, dry to damp, medium stiff, micaceous, well-sorted, slightly micaceous.	10.8		AL
		D-3	29		ML	**Alluvium? (Qal?)** @ 12.5' Pale olive to pale yellow slightly sandy SILT, damp, medium stiff, FeO staining, occasional sand blebs.	6.1	94.6	CN
	15	SPT-3	31		SM/ML	**Alluvium (Qal)** @ 15' Pale gray silty fine-grained SAND/sandy SILT, dry to damp, medium stiff/medium dense, slightly micaceous, highly friable.	2.5		
		D-4	40		SP	@ 17.5' Pale yellowish brown SAND with few fines, dry to damp, medium dense, slightly micaceous, highly friable. -Sample Disturbed-	2.1		6" Tube Sample.
890	20	SPT-4	18		ML	@ 20' Pale gray to olive SILT with trace SAND, moist, stiff, massive, slight FeO staining, micaceous.	19.3		
		D-5	36			@ 22.5' Pale gray to olive SILT with trace SAND, moist, stiff, massive, slight FeO staining, micaceous.	24.9	95.4	6" Tube Sample. CN
	25	SPT-5	24		SM/ML	@ 25' Pale olive gray silty fine-grained SAND/fine-grained sandy SILT, moist, massive, well-sorted, FeO staining.	16.1		
		D-6	39		SP	@ 27.5' Pale yellowish brown SAND with few fines, dry to damp, medium dense, few pebbles, massive, highly friable, micaceous. -Sample Disturbed-	1.8		6" Tube Sample.
	30								

LOG OF BORING
Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG

Elevation (ft)	Depth (ft)	Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
880	30		SPT-6	30		SM/SP	@ 30' Pale yellowish brown to gray slightly silty SAND, moist, medium dense, micaceous, scattered clasts up to 1" in diameter, massive, friable.	3.0		
			D-7	52		SM/ML	@ 32.5' Upper: Pale yellowish brown to gray silty SAND, moist, medium dense, poorly-sorted. Lower: Olive SILT, moist, stiff, FeO staining, micaceous.	4.2	109.1	6" Tube Sample.
	35		SPT-7	23		ML	@ 35' Pale gray to olive silty fine-grained sandy SILT, moist, medium stiff, locally clayey, highly micaceous, massive, slightly friable.	17.5		
			D-8	46		SM/ML SP	@ 37.5' Upper: Olive silty SAND/sandy SILT, moist, medium dense/stiff, highly micaceous, slight FeO staining, massive. Lower: Pale gray SAND with few fines, friable.	17.8	96.6	6" Tube Sample.
870	40		SPT-8	28		SM/ML	@ 40' Olive sandy SILT/silty SAND, moist, medium dense/stiff, massive, highly micaceous, slight FeO staining, slightly friable.	17.8		
			D-9	53		SP	@ 42.5' Pale yellowish brown SAND with few fines, damp, medium dense, well-sorted, FeO staining, highly friable.	4.5	107.1	6" Tube Sample.
	45		SPT-9	50/5"		GM	**Alluvial Fan Deposits (Qf)** @ 45' Pale gray sandy GRAVEL, damp, dense, massive, scattered cobbles, poorly sorted, micaceous.	2.8		
			D-10	50/4"			@ 47.5' Pale gray sandy GRAVEL with trace silt, damp, dense, clasts up to 2" in diameter, poorly sorted, micaceous, massive.	3.0	118.0	6" Tube Sample.
860	50		SPT-10	50/4"			@ 50' Pale gray sandy GRAVEL with trace silt, damp, dense, clasts up to 2" in diameter, poorly sorted, micaceous, massive.	2.4		
			D-11	72		ML	@ 52.5' Upper: Pale gray sandy GRAVEL with trace silt, damp to moist, dense, massive, poorly sorted, friable. Lower: Olive SILT, moist, medium stiff, micaceous, massive.	3.3	120.9	6" Tube Sample.
	55		SPT-11	25			@ 55' Olive fine-grained sandy SILT, moist, stiff, slight FeO staining, highly micaceous, massive.	21.1		
			D-12	45			@ 57.5' Olive gray SILT with trace clay, moist, medium stiff, locally silty sand lenses, calcium carbonate nodules, FeO staining, micaceous, massive.	29.1	95.6	6" Tube Sample.
850	60		SPT-12	23			@ 57.5' Olive gray SILT with trace clay, moist, medium stiff, locally silty sand lenses, calcium carbonate nodules, FeO staining, micaceous, massive.	33.9		
	65						Notes: Total Depth: 61.5 Feet. Groundwater Not Encountered. Cement Slurry Backfill. Cuttings Drummed and Removed From Site.			

LOG OF BORING
Rentech/ Rialto
Rialto

PROJECT NO. 10049-02

NMG

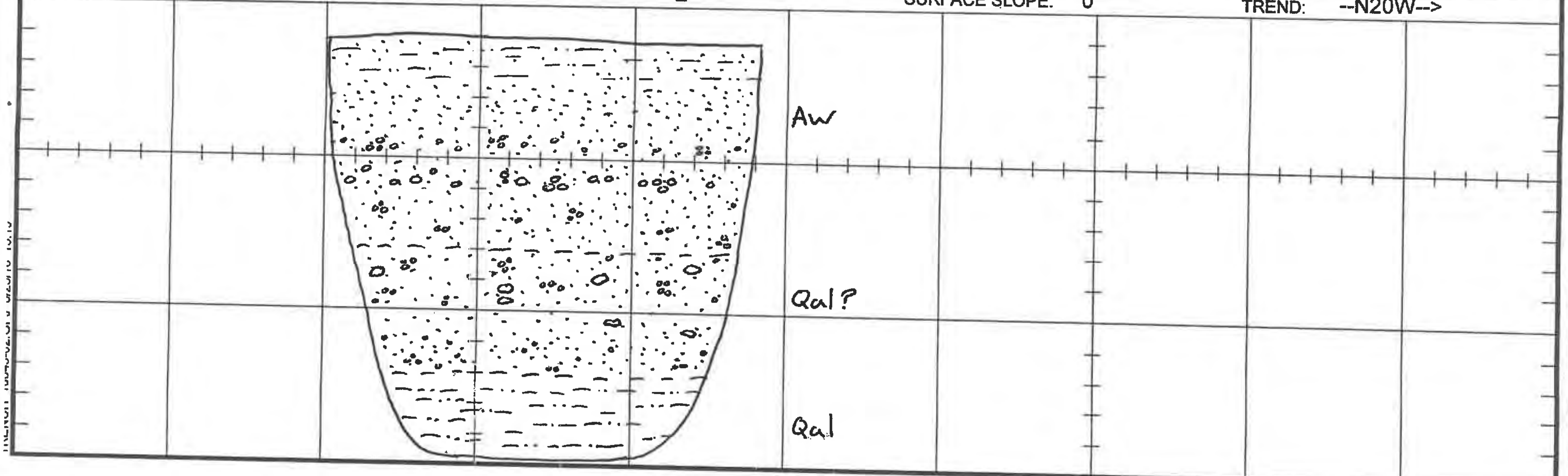
NMG Geotechnical, Inc.

LOG OF TRENCH NO: T-7

Project Name: Rentech/ Rialto	Logged By: PA	TRENCH NO.: T-7	ENGINEERING PROPERTIES
Project Number: 10049-02	Elevation: 911 ±		
Equipment: Case 580	Location:		

GEOLOGIC ATTITUDES	DATE: 8/9/10 DESCRIPTION:	GEOLOGIC UNIT	U.S.C.S.	SAMPLE NO.	MOISTURE CONTENT (%)	DRY DENSITY (pcf)
	Artificial Wash Deposits (Aw) Surface: Pale yellow slightly sandy SILT, dry, loose, scattered weeds.					
	@ 0-2' Pale yellow to pale gray silty fine-grained SAND/ sandy SILT, dry to damp, medium stiff, abundant roots, moderately well laminated, micaceous, friable.	Aw	SM/ML			
	@ 2-5' Pale gray coarse-grained SAND/GRAVEL, damp, dense, coarsening downwards, friable, roots.		SP/GP			
	Alluvium (Qal)? @ 7' Coarse-grained SAND with scattered gravel and cobbles up to 8" in diameter, few fines. @ 10' SAND with scattered gravel and few fines, no cobbles.	Qal?	SP			
	Alluvium (Qal) @ 11' Olive SILT with trace SAND, moist, medium stiff, FeO staining, micaceous, massive.		ML			
	@ 12' Olive silty fine-grained SAND/sandy SILT, moist, medium dense/stiff, highly micaceous, massive, slightly friable.	Qal	SM/ML			
	Notes: Total Depth: 14 Feet. Groundwater Not Encountered. Backfilled With Cuttings.					

GRAPHIC REPRESENTATION: West Wall SCALE: 1" = 5' ± SURFACE SLOPE: 0 TREND: --N20W-->



NMG Geotechnical, Inc.

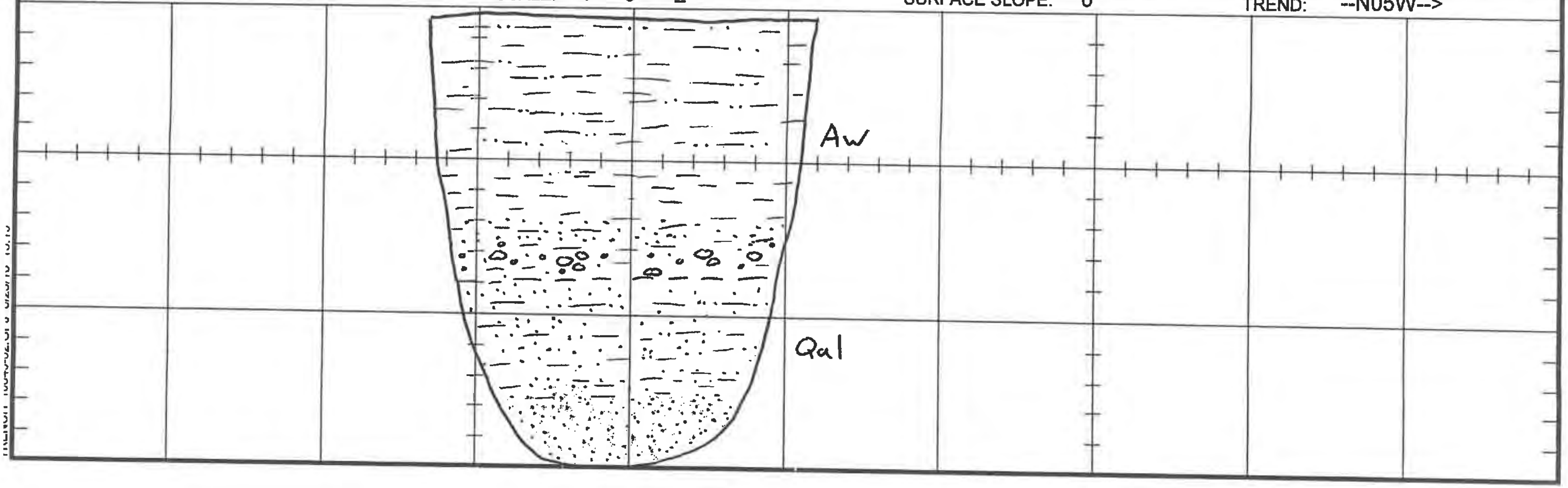
LOG OF TRENCH NO: T-5

NMG

Project Name: Rentech/ Rialto
Project Number: 10049-02
Equipment: Case 580
Logged By: PA
Elevation: 908 ±
Location:
TRENCH NO.: T-5

GEOLOGIC ATTITUDES	DATE: 8/9/10 DESCRIPTION:	GEOLOGIC UNIT	U.S.C.S.	SAMPLE NO.	MOISTURE CONTENT (%)	DRY DENSITY (pcf)
	Artificial Wash Deposits (Aw) Surface: Pale yellow silty fine-grained SAND/sandy SILT, dry, loose. @ 0-5' Pale olive to pale yellowish brown SILT, damp, medium stiff, thin laminations, roots, occasional burrows, micaceous, moderately fractured, locally friable, slight FeO staining.	Aw	ML			
B-1 @ 2 Feet				B-1		
	@ 7' Silty SAND/ sandy SILT.		SM/ML			
	@ 8' Scattered cobbles.					
	Alluvium (Qal) @ 9' Olive gray SILT, moist, medium stiff, FeO staining, root-hairs, massive.	Qal	ML			
	@ 13' Pale olive clean SAND, damp to moist, very friable, FeO staining.		SP			
	Notes: Total Depth: 15 Feet. Groundwater Not Encountered. Backfilled With Cuttings.					

GRAPHIC REPRESENTATION: East Wall SCALE: 1" = 5' ± SURFACE SLOPE: 0 TREND: --N05W-->



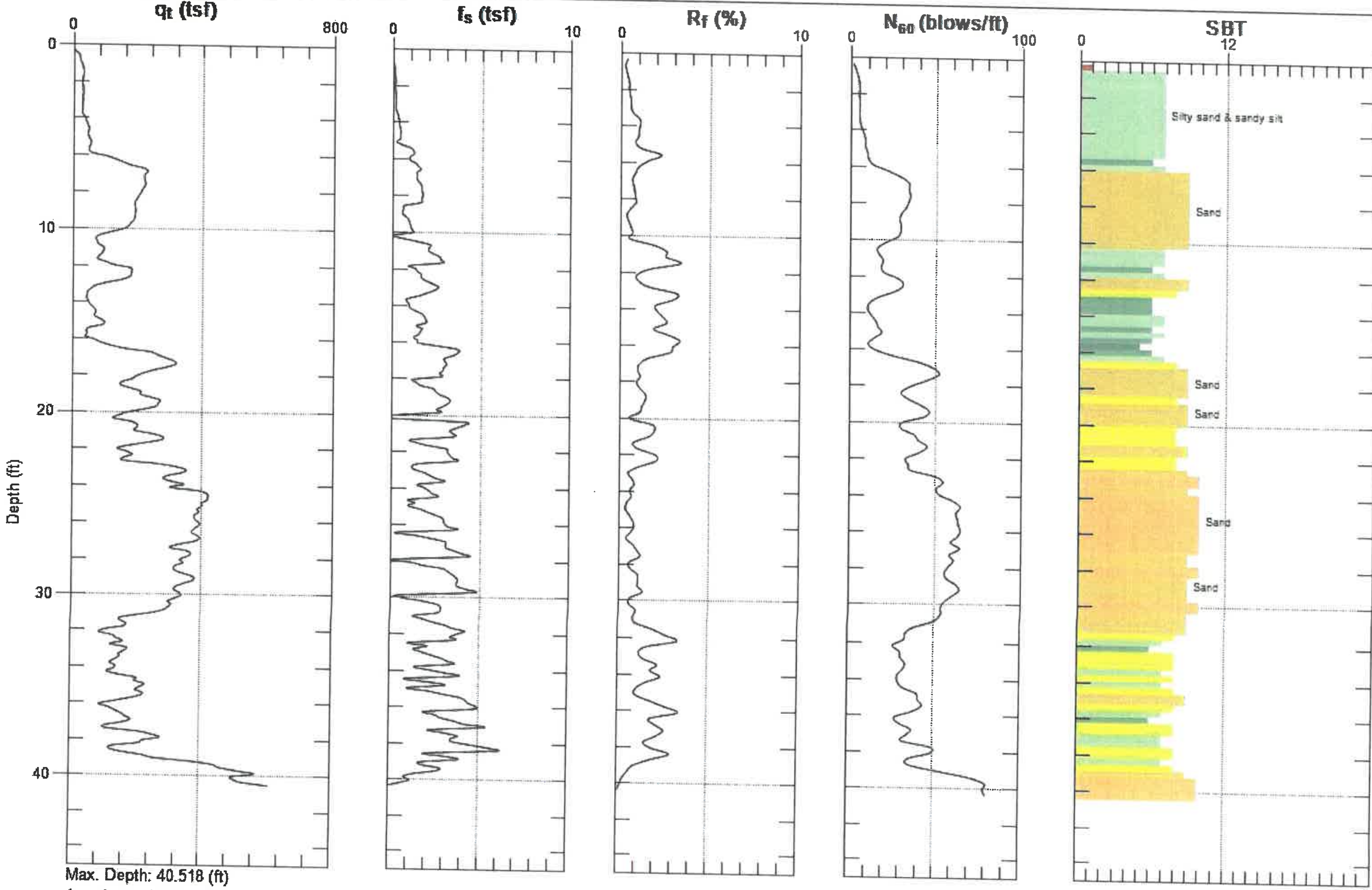
GREGG NMG

Site: HOLIDAY TRUCKING

Sounding: CPT-4A

Engineer: P. ANDERSON

Date: 8/18/2010 11:14



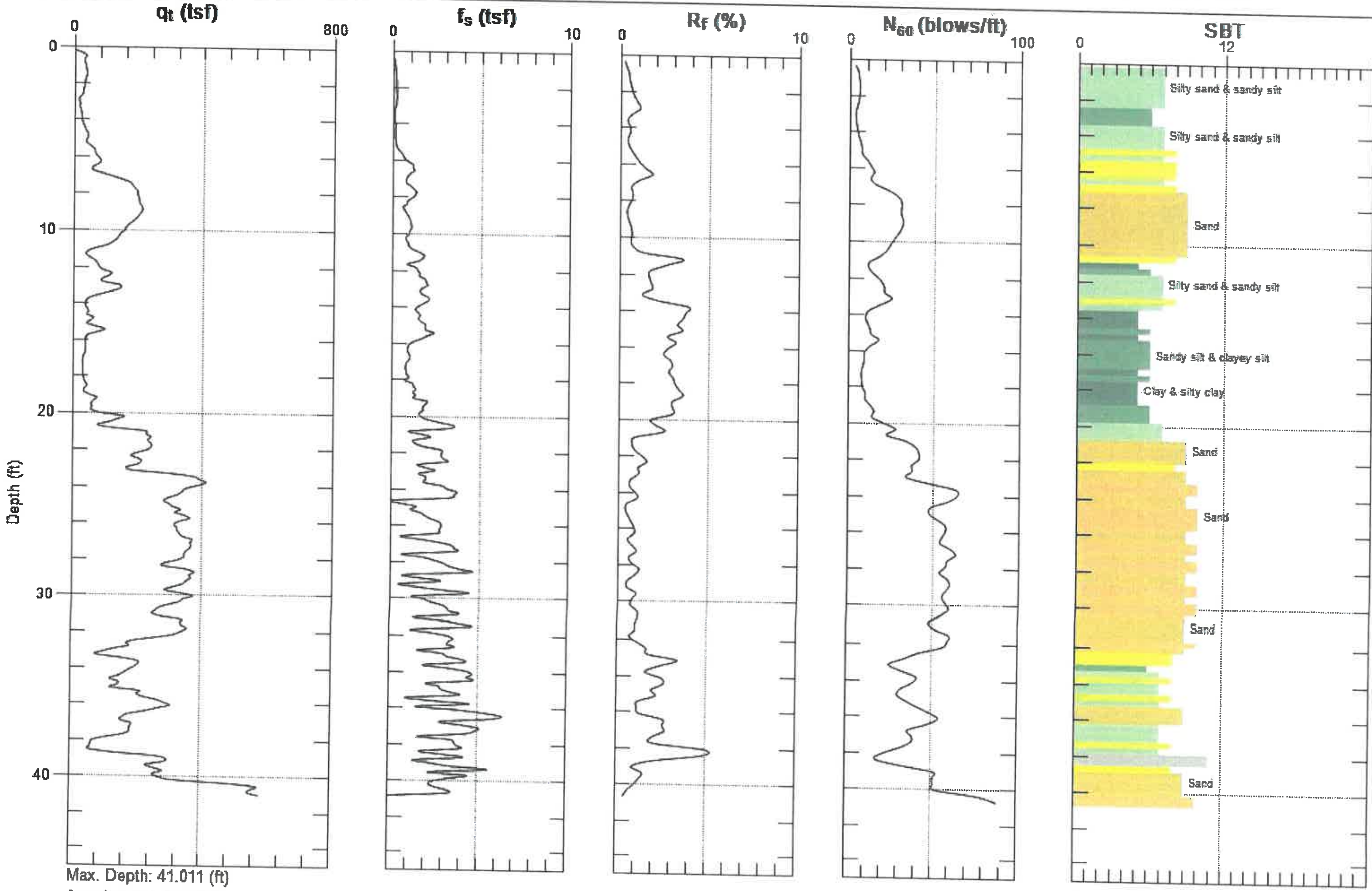
Max. Depth: 40.518 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG NMG

Site: HOLIDAY TRUCKING
Sounding: CPT-4

Engineer: P. ANDERSON
Date: 8/17/2010 08:47



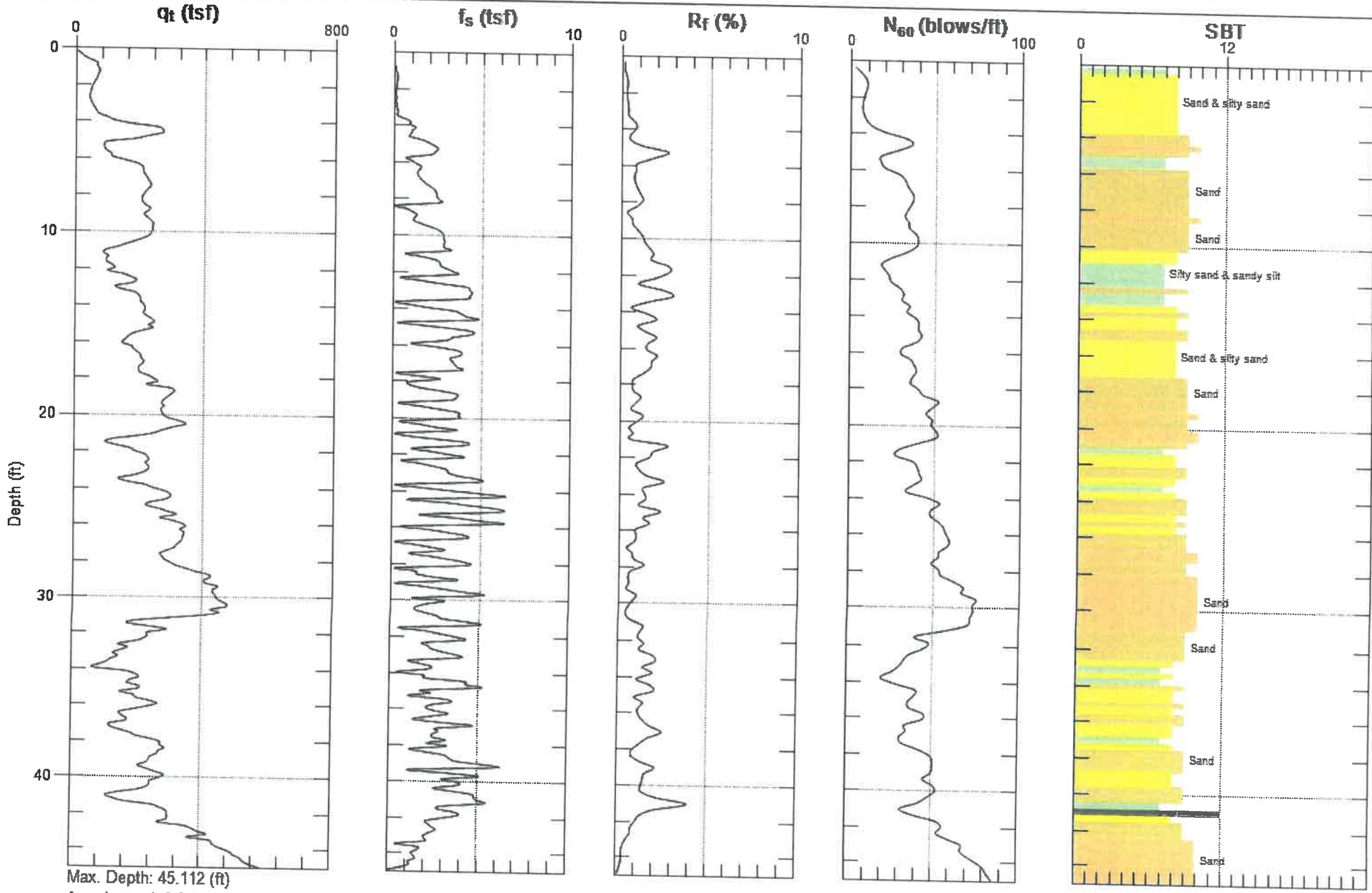
Max. Depth: 41.011 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG NMG

Site: HOLIDAY TRUCKING
Sounding: CPT-5

Engineer: P. ANDERSON
Date: 8/17/2010 10:13



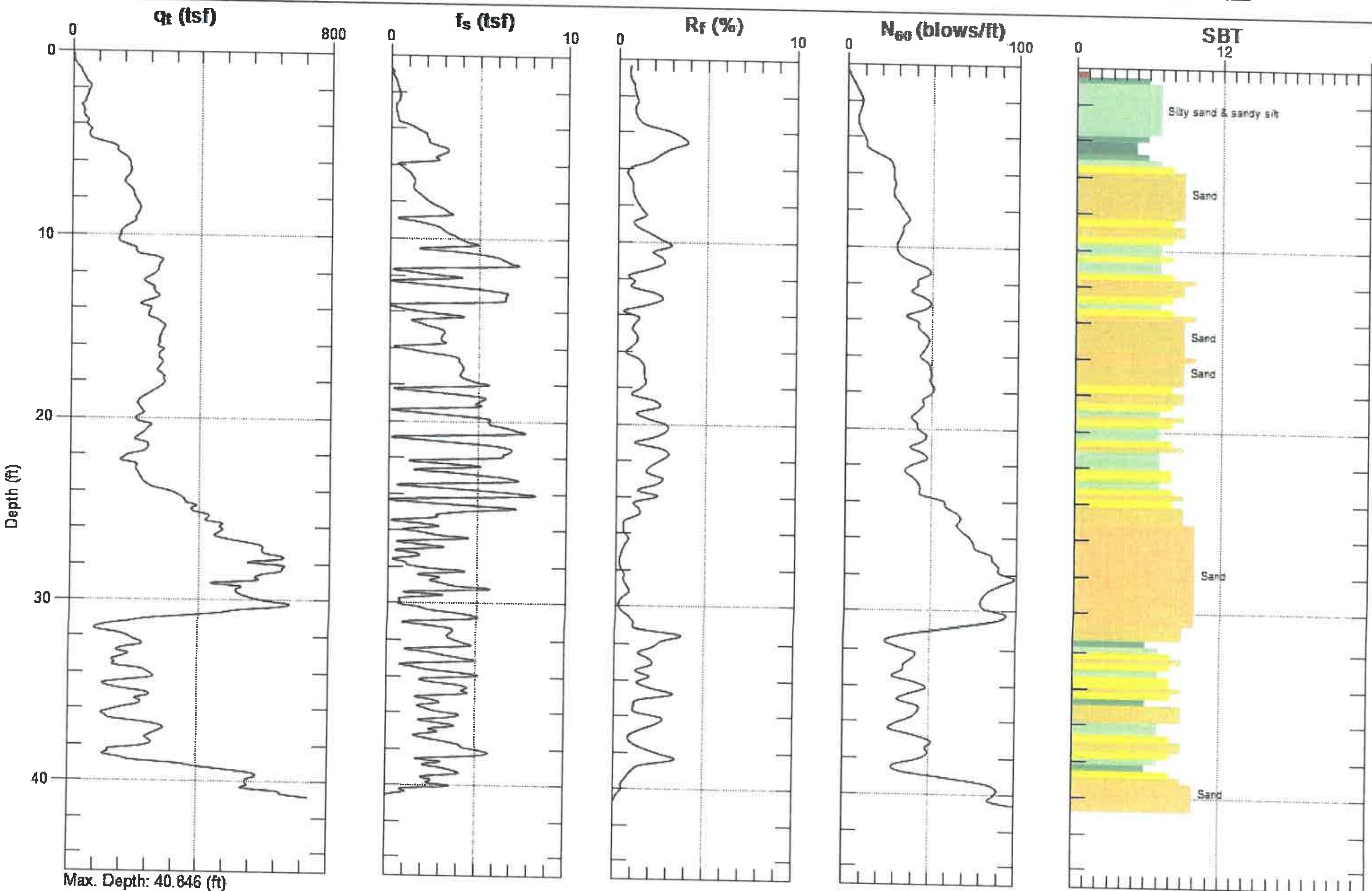
Max. Depth: 45.112 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG NMG

Site: HOLIDAY TRUCKING
Sounding: CPT-6

Engineer: P. ANDERSON
Date: 8/17/2010 12:22



Max. Depth: 40.846 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

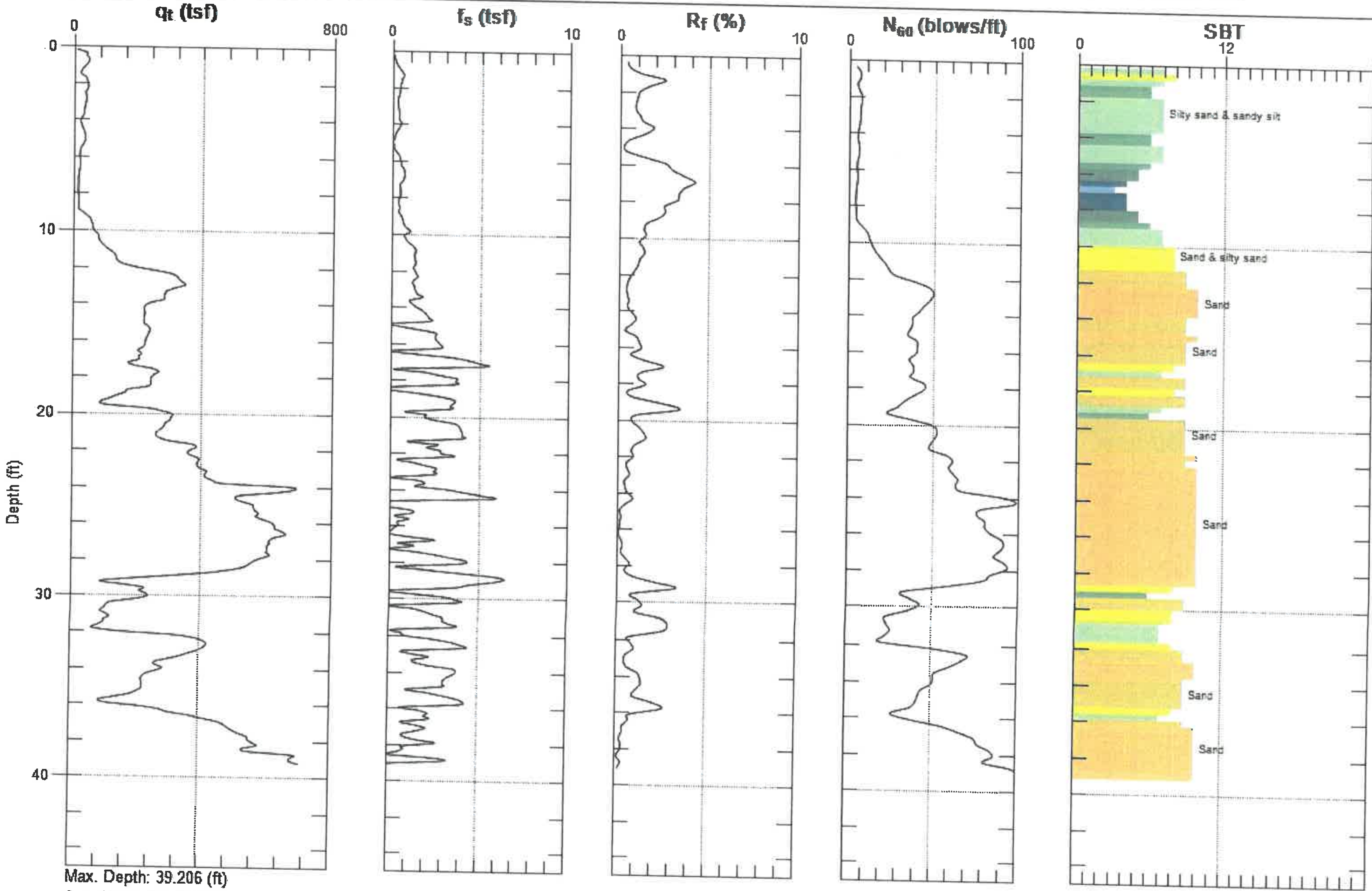
GREGG NMG

Site: HOLIDAY TRUCKING

Sounding: CPT-7

Engineer: P. ANDERSON

Date: 8/18/2010 09:49



Max. Depth: 39.206 (ft)

Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

BORING LOGS
BY
NMG, 5/5/10

Date(s) Drilled	4/14/10	Logged By	PA/ TK
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME-75	Hammer Data	140 llbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Not Encountered		
Comments	UTM 11S		

C-1

Total Depth Drilled (ft)	41.5
Approximate Ground Surface Elevation (ft)	902.0

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					SM	**Alluvium (Qal)** Surface: Light gray silty SAND/GRAVEL, few weeds, scattered cobbles.			
900			B-1							B-1 @ 0-5 Feet. EI, CC, MD, GS
			D-1	60			@ 2.5' Light yellowish brown silty fine-grained SAND, moist, medium dense, highly micaceous, slightly friable, slight FeO staining.	10.6	101.3	CN
	5		D-2	71			@ 5' Light olive brown silty fine-grained SAND, moist, medium dense to dense, highly micaceous, slight FeO staining, massive, slightly friable.	13.4	104.5	
	10		D-3	50/6"		SP	@ 10' Light gray coarse-grained SAND with gravel, damp, dense, massive, slightly friable. -Sample Disturbed-	1.9		GS
890										
	15		D-4	50/6"			@ 15' Light gray coarse-grained SAND with gravel, damp, dense, massive, slightly friable. - Sample Disturbed-	3.4	96.0	CN
	20		D-5	50/6"			@ 20' Light gray coarse-grained SAND with gravel, damp, dense, slightly micaceous, massive, highly friable. -Sample Disturbed-	2.1		GS
880										
	25		D-6	80		CH/ MH SM	@ 25' Upper: Dark grayish brown silty CLAY/clayey SILT, moist, stiff/dense, slight FeO staining, micaceous, massive. Lower: Pale gray fine-grained silty SAND, damp, dense.	8.5	102.7	AL, GS
	30									

LOG OF BORING
Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG

Elevation (ft)	Depth (ft)	Samples: Type	Samples: Number	Samples: Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30	■	D-7	50/6"			@ 30' Pale brown to brown slightly silty SAND, moist, dense, FeO staining, massive, friable. - Disturbed-	10.2	89.4	
870										
	35	■	D-8	50/5"		SM/GM	@ 35' Olive brown silty SAND with gravel/sandy GRAVEL, moist, dense, massive, friable. - Sample Disturbed-	4.9		
	40	■	D-9	50/4"			@ 40' -No Recovery- (Cobble in sample tip).			
860							Notes: Total Depth: 41.5 Feet. Groundwater Not Encountered. Backfilled with Concrete Grout.			
	45									
	50									
850										
	55									
	60									
840										
	65									

LOG OF BORING

Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Report: HOLLOW STEM; Project: P:\2010\10049-01\GINT\10049-01.GPJ; Data Template: NMGNOV98.GDT; Printed: 5/3/10

Date(s) Drilled	4/14/10	Logged By	PA/ TK
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME-75	Hammer Data	140 llbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Encountered at 34.2 feet.		
Comments	UTM 11S 0466791/ 3767934		

C-2

Sheet 1 of 2

Total Depth Drilled (ft)	41.5
Approximate Ground Surface Elevation (ft)	875.0

Elevation (ft)	Depth (ft)	SAMPLES: Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0		B-1			SM	**Alluvium (Qal)** Surface: Pale brown sandy SILT/silty SAND, moist, loose, scattered weeds.			CAM 17 Metals, TPH, VOC, SVOC, pH
			D-1	59			@ 2.5' Olive slightly silty SAND, moist, medium dense, locally silty, highly micaceous, slight FeO staining, friable. -Sample Disturbed-	17.5		B-1 @ 0-5 Feet. EI, CC, MD, GS CAM 17 Metals, TPH, VOC, SVOC, pH
870	5		D-2	50/6"		SM/SP	@ 5' Olive slightly silty SAND with scattered gravel, very moist, dense, slightly micaceous, massive, highly friable.	12.7	119.0	
	10		D-3	70			@ 10' -No Recovery-			PID=7ppm at 12-15 feet. VOC, TPH
860	15		D-4	50/6"			@ 15' -No Recovery-.			
	20		D-5	60/6"		SP	@ 20' Light gray SAND with few fines and scattered gravel, damp to moist, dense, massive, highly friable.	4.8	115.8	
850	25		D-6	50/6"			@ 25' Light gray SAND with few fines, damp, dense, massive, micaceous, highly friable. -Sample Disturbed-	4.9		
	30									

LOG OF BORING
Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30	■	D-7	50/6"			@ 30' Light olive brown SAND, moist, dense, scattered gravel, slightly micaceous, massive, highly friable. -Sample Disturbed-	4.2		
							∇			
840	35	■	D-8	50/6"		ML	@ 35' Olive SILT with trace sand, very moist to saturated, very stiff, highly micaceous, massive, slight FeO staining, slightly friable.	27.6	95.9	
	40	■	D-9	45		SP	@ 40' Light gray very coarse-grained SAND with gravel, saturated, dense, massive, highly friable. -Sample Disturbed-	10.4		
							Notes: Total Depth: 41.5 Feet. Groundwater @ 34.2 Feet. Backfilled with Cement Grout.			
830	45									
	50									
820	55									
	60									
810	65									

LOG OF BORING

Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Date(s) Drilled	4/13/10	Logged By	PA/ TK
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME-75	Hammer Data	140 llbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Encountered at 41.9 feet.		
Comments	UTM 11S 0466692/ 3767899		

C-3

Sheet 1 of 2

Total Depth Drilled (ft)	46.5
Approximate Ground Surface Elevation (ft)	882.0

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					SM	**Alluvium (Qal)** Surface: Light Brown SAND/GRAVEL.			CAM 17 Metals, TPH, VOC, SVOC, pH
880			B-1 D-1				@ 2.5' -No Sample- (Cobbles).			B-1 @ 0-5 Feet. CAM 17 Metals, TPH, VOC, SVOC, pH
	5		D-2	50/5"		SM	@ 5' Upper: Olive silty SAND with trace sand, moist, stiff, highly micaceous, massive.	8.3	113.3	GS
						SP	Lower: Pale olive SAND with few fines, damp to moist, dense, massive, slightly friable.			
	10		D-3	15/5"		SM/ GM	@ 10' Upper: Olive silty fine-grained SAND, moist, medium dense, highly micaceous, slight FeO staining. Lower: Coarse-grained sandy GRAVEL, moist, dense.	3.8	117.5	CN
870			D-4	50/6"		SP	@ 11' Pale gray SAND with few fines, moist, dense, slightly micaceous, slight FeO staining, massive, highly friable, cobble in sample tip.	5.8	113.8	
	15		D-5	50/6"			@ 15' -No Recovery- (Cobble in sample tip).			
	20		D-6	50/6"		GP	@ 20' Pale gray coarse-grained sandy GRAVEL, damp to moist, dense, massive, highly friable. -Sample Disturbed-	2.8		
860										
	25		D-7	55		ML	@ 25' Olive SILT, moist, stiff, highly micaceous, FeO staining, massive.	25.3	101.6	
	30									

LOG OF BORING

Rentech/ Rialto

Rialto

PROJECT NO. 10049-01

NMG

Report: HOLLOW STEM; Project: P:\2010\10049-01\GINT\10049-01.GPJ; Data Template: NMGNOV98.GDT; Printed: 5/3/10

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30		D-8	83		SP	@ 30' Dark yellowish brown SAND with few fines, moist, medium dense to dense, massive, slightly micaceous, highly friable.	4.8	97.8	
850										
	35		D-9	79		ML	@ 35' Olive SILT, moist, stiff, FeO staining, highly micaceous, massive.	21.0	101.8	
	40		D-10	58		SM	@ 40' Very dark grayish brown silty fine-grained SAND, saturated, medium dense, highly micaceous, FeO staining, massive, slightly friable.	27.2	97.9	
840										
	45		D-11	50		GP	@ 45' Pale gray coarse-grained sandy GRAVEL, saturated, medium dense, friable, massive.	10.9	127.1	
							Notes: Total Depth: 46.5 Feet. Groundwater Encountered at 41.9 Feet. Backfilled with Cement Grout.			
	50									
830										
	55									
	60									
820										
	65									

Report: HOLLOW STEM; Project: P:\2010\10049-01\GINT\10049-01.GPJ; Data Template: NMGNOV98.GDT; Printed: 4/29/10

LOG OF BORING

Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Date(s) Drilled	4/13/10	Logged By	PA/ TK
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME-75	Hammer Data	140 llbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Not Encountered		
Comments	UTM 11S 0466582/ 3767913		

C-4

Total Depth Drilled (ft)	40.5
Approximate Ground Surface Elevation (ft)	906.0

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					ML	**Alluvium (Qal)** Surface: Pale brown silty SAND with scattered gravel, weeds.			
			D-1	52			@ 2.5' Olive SILT with trace SAND, moist, stiff, highly micaceous, massive, slight FeO staining.	19.1	89.5	
900	5		D-2	50/6"		SM	@ 5' Olive silty fine-grained SAND, moist, medium dense, micaceous, massive, slight FeO staining, friable.	5.6	103.6	GS
	10		D-3	80			@ 10' Pale olive silty fine-grained SAND, damp, medium dense, micaceous, massive. -Sample Disturbed-	2.9		
890	15		D-4	75		ML/SM	@ 15' Pale gray very fine-grained sandy SILT/silty SAND, damp, stiff, highly micaceous, slight FeO staining, slightly friable.	5.2	103.6	AL, GS
	20		D-5	71			@ 20' Pale gray silty fine-grained SAND/sandy SILT, damp, medium dense/stiff, micaceous, slightly friable, slight FeO staining.	8.6	101.6	
880	25		D-6	50/6"		SM	@ 25' Pale olive silty fine-grained SAND, damp, dense, massive, micaceous, highly friable.	5.3	98.8	
	30									

Elevation (ft)	Depth (ft)	Samples: Type	Samples: Number	Samples: Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30		D-7	90		ML	@ 30' Pale gray SILT with trace clay, moist, stiff, highly micaceous, massive, slightly friable.	15.0	105.5	
870	35		D-8	90			@ 35' Olive SILT with trace SAND, moist, dense, MnO/FeO staining, highly micaceous, slightly friable, cobble in sample tip.	27.9	93.4	
	40		D-9	50/6"			@ 40' No Recovery.			
							Notes: Total Depth: 40.5 Feet. Groundwater Not Encountered. Backfilled with Cement Grout.			
860	45									
	50									
850	55									
	60									
	65									

LOG OF BORING

Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Date(s) Drilled	4/15/10	Logged By	PA/ TK
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME-85	Hammer Data	140 llbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Encountered at 63.9 feet.		
Comments	UTM 11S 0466836/ 3767862		

Y-1

Sheet 1 of 3

Total Depth Drilled (ft)	65.5
Approximate Ground Surface Elevation (ft)	Approx. 903

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0		B-1			SM	**Artificial Fill, Undocumented (Afu)** Surface: Brown silty SAND, damp, loose, scattered cobbles/concrete/rebar.			B-1 @ 0-5 Feet.
	5						@ 5' -No Sample- Yellowish brown slightly silty SAND, damp to moist, scattered gravel and cobbles.			CAM 17 Metals, TPH
	10		D-1	50/6"			@ 10' Light olive brown silty SAND, damp, medium dense, cobble in sample tip. -Sample Disturbed-	6.3		
	15		D-2	44			@ 15' Olive gray silty SAND, moist, medium dense, scattered gravel, slightly micaceous, massive, slightly friable.	6.2	110.5	
	20		D-3	44			@ 20' Upper: Black silty SAND with abundant wood fragments and scattered tires, damp, medium dense. Lower: Gray SAND with scattered gravel, damp, medium dense, massive, friable. -Sample Disturbed-	4.7		CAM 17 Metals, TPH, VOC
	25		D-4	16		SM/ML	@ 25' Gray silty SAND/ sandy SILT, moist, loose-medium dense/stiff, scattered gravel, friable.	36.0	67.9	
	30									

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30	■	D-5	50/6"		SM	@ 30' Dark olive gray silty SAND, damp, dense, slightly micaceous, slightly friable, hydrocarbon-like odor.	4.9	121.0	
	35	■	D-6	50/5"		SP	**Alluvium (Qal)** @ 35' Pale gray SAND with few fines, damp, scattered gravel, massive, slight FeO staining, highly friable. -Environmental Sample-			CAM 17 Metals, TPH, VOC, SVOC
	40	■	D-7	50/6"			@ 40' -No Recovery-			
	45	■	D-8	50/4"			@ 45' -No Recovery-.			
	50	■	D-9	50/6"		SP	@ 50' Pale gray SAND with gravel and few fines, damp, dense, massive, highly friable, slightly micaceous.	5.7	99.4	
	55	■	D-10	50/6"		ML	@ 55' Olive clayey SILT, moist, stiff, slight FeO staining, micaceous, massive.	31.6	87.8	
	60	■	D-11	50/4"			@ 60' Olive clayey SILT, moist, stiff, slight FeO staining, micaceous, massive.	39.8	80.5	
							∇			Groundwater: CAM 17 Metals, TPH, VOC,
	65									

LOG OF BORING
Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	65	■	D-12	50/4"			@ 65' -No Recovery-.			SVOC
							Notes: Total Depth: 65 Feet. Groundwater Encountered at 63.9 Feet. Grab-Groundwater Samples Collected Through Augers. Backfilled with Concrete Grout.			
	70									
	75									
	80									
	85									
	90									
	95									
	100									

LOG OF BORING
Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Date(s) Drilled	4/19/10	Logged By	PA/ TK
Drilling Company	Test America	Drill Bit Size/Type	8"
Drill Rig Type	CME-95	Hammer Data	140 llbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Encountered at 77 feet.		
Comments	UTM 11S 0466939/ 3767909		

Y-2

Total Depth Drilled (ft)	80.0
Approximate Ground Surface Elevation (ft)	Approx. 917

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					SM	**Artificial Fill, Undocumented (Afu)** Surface: Pale yellowish brown SAND/ GRAVEL, loose, scattered concrete.			
	5	■	D-1	20/1"			@ 5' -No Recovery- Brown silty SAND/ GRAVEL with concrete/ asphalt fragments throughout, moist, friable, cobbles in cuttings.			CAM 17 Metals, TPH
	10	■	D-2	50/6"			@ 10' Concrete/asphalt fragments. -Sample Disturbed-			
	15	■	D-3	50/6"		SM/GM	**Alluvium (Qal)** @ 15' Gray slightly silty SAND/GRAVEL, moist, dense, massive, friable. -Sample Disturbed-	4.7		
	20	■	D-4	50/5"		SP	@ 20' Gray coarse-grained gravely SAND, very moist, dense, friable, slightly micaceous.	4.8	122.9	CAM 17 Metals, TPH, VOC. SVOC GS
	25	■	D-5	50/4"			@ 25' Gray coarse-grained gravely SAND/sandy GRAVEL, very moist, dense, friable, slightly micaceous. -No Recovery-			
	30									

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30	■	D-6	50/1"			@ 30' -No Recovery- Cobble in tip.			
	35	■	D-7	50/3"		ML	@ 35' Upper: Olive fine grained sandy SILT, moist, stiff, scattered sand, FeO staining, highly micaceous.	10.3	102.0	
						SP	Lower: Gray SAND with few fines and scattered gravel, damp to moist, dense, highly friable.			
	40	■	D-8	50/5"		SM	@ 40' Olive fine-grained silty SAND with gravel and occasional coarse-grained sand, moist, dense, FeO staining, highly micaceous, friable.	9.7	87.1	
	45									
	50	■	D-9	50/5"		GP	@ 50' -No Recovery- Very coarse-grained sandy GRAVEL, few fines, damp, slightly micaceous, highly friable.			
	55									CAM 17 Metals, TPH
	60	■	D-10	50/4"		SP	@ 60' Pale gray coarse-grained gravely SAND, damp to moist, dense, micaceous, massive, highly friable. -Disturbed-			GS
	65									

LOG OF BORING
Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

Elevation (ft)	Depth (ft)	SAMPLES Type	Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	65									
	70	■	D-11	50/2"			@ 70' Pale gray coarse-grained gravely SAND/GRAVEL, moist, very dense, slightly micaceous, massive, highly friable.	5.0	102.2	
	75									
						∇				Grounwater: CAM 17 Metals, TPH, VOC, SVOC
	80						Notes: Total Depth: 80 Feet. Groundwater Encountered at 77 Feet. Set Temporary Well to Collect Grab-Groundwater Samples. Backfilled with Cement Grout.			
	85									
	90									
	95									
	100									

LOG OF BORING
Rentech/ Rialto
Rialto

PROJECT NO. 10049-01

NMG

BORING LOGS
BY
KLEINFELDER AND ASSOCIATES,
2007

Date Drilled	7/31/07	Water Depth:	34 feet (approx.)
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	879 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
		1		SM	**<u>Fill:</u> Silty Sand:** Olive-brown, slightly moist, dense, fine to medium grained sand, with trace coarse grained sand and fine gravel			GS
		2	14 30 39		--brown, medium dense, coarse grained sand	128.0	6.6	CP
875	5	3	19 20 17	SP-SM	**Sand with Silt and Gravel:** Gray-brown, slightly moist, dense, fine to coarse grained sand, gravel to 1-1/2" --trace iron-oxide staining			GS,PI
		4	16 50/3"		--olive-gray, very dense			
870	10	5	10 21 16		--olive-brown, dense, with some fractured rock in sampler			
865	15	6 7	32 30 20		--gray, mild petroleum type odor, fractured rock in sampler	116.9	4.1	CP
860	20	8	12 15 20		--olive-brown, dense, fine to medium grained sand			
855	25	9 10	32 22 10	SM	**Silty Sand:** Olive-brown, slightly moist, medium dense, fine to medium grained sand, with some fine gravel to 1", with trace coarse grained sand	117.3	4.8	GS
850	30	11	10 4 7	ML	**<u>Alluvium:</u> Sandy Silt:** Olive-brown, moist, stiff, fine to medium grained sand, slightly clayey			GS, PI
845				▽	--groundwater encountered			

KLEINFELDER	Rialto BioSolids Processing Facility 503 E. Santa Ana Ave. Rialto, California	PLATE A-2a
PROJECT NO. 86093	**LOG OF BORING B-1**	

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	Sample Type	Graphic Log	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION *(Continued From Previous Page)*	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
		12	10 18 36				--wet	94.6	29.7	CP
840						SP	**Sand:** Olive-brown, wet, dense, fine to medium grained sand, with trace fine gravel to 3/8" and trace coarse grained sand			
	40	13	10 16 30							GS
							Boring terminated at approximately 41-1/2 feet No refusal Groundwater was encountered at 34 feet Borehole backfilled using soil from cuttings			

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-1

PLATE A-2b

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Date Drilled	7/31/07	Water Depth:	Not Encountered
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	874 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
				SM	**Fill: Silty Sand:** Olive-brown to gray-brown, slightly moist, medium dense, fine to medium grained sand, with trace fine gravel, with interbedded clay and silt layers			
		1	8 12 13					
870	5	2	12 11 27			107.4	9.0	CP
		3	4 3 3	SP-SM	**Alluvium: Sand with Silt:** Olive-brown, slightly moist, loose, fine to medium grained sand, with trace coarse grained sand and fine gravel, weakly cemented			
865	10	4	4 6 7			115.3	5.0	CP
860	15	5	4 10 11		--gray-brown, medium dense, with trace iron-oxide staining			
855	20	6	16 50/6"		--dense			
850	25	7	8 16 18		--olive-brown, moist, dense, well graded			GS
845	30	8	20 22 38		--dense			

Boring terminated at approximately 31-1/2 feet
No refusal
Groundwater was not encountered
Borehole backfilled using soil from cuttings

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-2

PLATE A-3

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Date Drilled	7/31/07	Water Depth:	Not Encountered
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	876 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
875				SM/ML	**Alluvium: Silty Sand to Sandy Silt:** Olive-brown, slightly moist, fine grained sand, stiff, with trace iron-oxide staining			
		1	4 7 9					
870	5	2	12 30 48				7.7	GS
		3	12 30 21	SP-SM	**Sand with Silt:** Olive-brown, slightly moist, fine to medium grained sand, very dense, with some fine gravel to 1"			
865	10	4	20 33 50			104.3	4.4	GS
860	15	5 9	27 50/6"		--gray-brown, with some coarse grained sand, fractured rock in sampler			
855	20	6	22 40 35		--with a 4" interbedded silt layer, with some fine gravel to 1", with trace iron-oxide staining, cemented			
850	25	7	10 15 31	ML	**Sandy Silt:** Olive-brown, moist, fine grained sand, hard, with trace iron-oxide staining	94.3	27.3	PI, CP
845	30	8	6 10 15		--very stiff			GS

Boring terminated at approximately 31-1/2 feet
No refusal
Groundwater was not encountered
Borehole backfilled using soil from cuttings

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-3

PLATE A-4

GEOTECH TEMECULA 86093 RIALTO GINT LOGS 091807.GPJ KA RDLND.GDT 10/22/07

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Date Drilled	7/31/07	Water Depth:	Not Encountered
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	877 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	Sample Type	Graphic Log	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
						SP-SM	**Alluvium: Sand with Silt:** Gray-brown, slightly moist, medium dense, fine to medium grained sand, with trace iron-oxide staining			
875		1	5 9 13							
	5	2	19 34 50				--olive, very dense, increase in iron-oxide staining			
870		3	12 32 42				--olive-brown, with some coarse grained sand, with trace fine gravel			
	10	4	34 50/6"				--gray-brown, fractured rock in sampler			
865										
	15	5	50/6"				--no recovery due to fractured rock in sampler			
860										
	20									
							Boring terminated at approximately 21-1/2 feet No refusal Groundwater was not encountered Borehole backfilled using soil from cuttings			

GEOTECH TEMECULA 86093 RIALTO GINT LOGS 091807.GPJ KA RDLND.GDT 10/22/07

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-4

PLATE A-5

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Date Drilled	7/31/07	Water Depth:	Not Encountered
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	877 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	Sample Type	Graphic Log	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
875						SP-SM	**Fill: Sand with Silt and Gravel:** Olive-brown, slightly moist, medium dense, fine to coarse grained sand, with trace fine to coarse grained gravel to 1-1/2"			
		1	10 11 10							
	5	2	20 22 29				--dense	127.5	5.3	GS
870		3	12 15 16				--dark brown to gray, petroleum type odor			
	10	4	20 25 43				--fractured rock in sampler	124.4	4.1	
865										
	15	5	26 50/6"				--very dense, decrease in petroleum type odor			
860										
	20	6	11 50/6"				--wood debris in sample			
855										
	25	7	29 50/6"			SP-SM	**Alluvium: Sand with Silt:** Gray-brown, slightly moist, very dense, fine to coarse grained sand, with trace fine gravel, no petroleum type odor			
850										
	30	8	40 50/6"							
							Boring terminated at approximately 31-1/2 feet No refusal Groundwater was not encountered Borehole backfilled using soil from cuttings			

GEOTECH TEMECULA 86093 RIALTO GINT LOGS 091807.GPJ KA_RDLND.GDT 10/22/07

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-5

PLATE A-6

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Date Drilled	7/31/07	Water Depth:	Not Encountered
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	900 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	Sample Type	Graphic Log	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
						SP	**Alluvium: Sand:** Light yellow-brown, dry, very dense, fine to medium grained sand, with trace fine gravel to 3/4"			
895	5	1	19 35 42				--fractured rock in sampler			
890	10	2	34 40 50				--gray-brown		2.5	GS
885	15	3	25 35 50				--light orange-brown, interbedded coarse and fine grained sand, with trace iron-oxide staining			
880	20	4	50/6"				--dark brown, with some coarse grained sand, fractured rock in sampler			

Boring terminated at approximately 21-1/2 feet
No refusal
Groundwater was not encountered
Borehole backfilled using soil from cuttings

GEOTECH TEMECULA 86093 RIALTO GINT LOGS 091807.GPJ KA RDLND.GDT 10/22/07

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-6

PLATE A-7

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

Date Drilled	7/31/07	Water Depth:	Not Encountered
Drilled By:	2R Drilling	Date Measured:	7/31/07
Drilling Method:	CME 75, 8" HSA	Elevation:	882 feet (approx.)
Logged By:	J. Sipe	Datum:	MSL

Elevation (approx.) (feet)	Depth	Sample Number	Blows per 6"	Sample Type	Graphic Log	USCS Description	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	Dry Unit Weight (pcf)	Moisture Content (%)	Additional Tests & Remarks
		1				SP	**Fill: Sand:** Olive-brown, moist, fine grained sand, with trace fine gravel, with debris and trash			MAX, DS
880		2	7 4 10			SP	**Alluvium: Sand:** Olive-brown, slightly moist, medium dense, fine to medium grained sand, with trace fine gravel			
	5	3	50/6"				--gray-brown, very dense			DS
875		4	14 22 31				--fine grained sand			
	10	5	10 50/6"				--with fine to coarse grained gravel to 1-1/2", well graded	113.3	2.4	GS
870										
	15	6	50/5"				--no recovery due to fractured rock			
865										
	20	7	50/6"				--dark brown, increase in fine gravel content			

Boring terminated at approximately 21-1/2 feet
No refusal
Groundwater was not encountered
Borehole backfilled using soil from cuttings

KLEINFELDER

PROJECT NO. 86093

Rialto BioSolids Processing Facility
503 E. Santa Ana Ave.
Rialto, California

LOG OF BORING B-7

PLATE A-8

Legend to Logs on Plate A-1

Note: The boundaries between soil and/or rock types shown on the logs are approximate as the transition between different soil layers may be gradual.

APPENDIX C

LABORATORY TEST RESULTS

THIS INVESTIGATION

West Yost/ Lake Rialto
Project Number: 20079-01

APPENDIX
SUMMARY OF SOIL LABORATORY DATA

Bloomington, CA

Boring No.	Sample No.	Depth (feet)	End Depth (feet)	Elevation (feet)	Blow Count (N)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Degree of Sat. (%)	Sieve/Hydrometer: Fines Content (% pass. #200)	Sieve/Hydrometer: Clay Content (% pass. 2µ)	Atterberg Limits: LL (%)	Atterberg Limits: PI (%)	USCS Group Symbol	Direct Shear Ultimate: Cohesion (psf)	Direct Shear Ultimate: Friction Angle (°)	Direct Shear Peak: Cohesion (psf)	Direct Shear Peak: Friction Angle (°)	Compaction: Maximum Dry Density (pcf)	Compaction: Optimum Moisture Content (%)	Expansion Index	R-Value	Soluble Sulfate Content (% by wt)	Remarks
H-1	B-1	1.0	5.0	923.0						10	4			GP-GM										CC
H-1	D-1	5.0		919.0	32	124.0	120.9	2.6	17.5															CC
H-1	D-2	7.5		916.5	54	121.4	118.2	2.7	17.0	5				SW/SP	0	35	0	39.0						
H-1	D-3	10.0		914.0	93	130.1	126.4	3.0	24.0															
H-1	B-2	10.0	15.0	914.0						8	3			SP-SM										
H-1	D-4	15.0		909.0	20	119.7	110.2	8.6	43.8	8				SP-SM	0	32	0	38.0						
H-1	D-5	20.0		904.0	77/12"	117.7	114.6	2.7	15.5															
H-1	D-6	25.0		899.0	88/12"			3.0																Disturbed
H-1	D-7	30.0		894.0	76/12"	115.6	96.6	19.7	71.5	4				SW/SP	310	37	440	37.0						
H-1	D-8	35.0		889.0	50/5"																			NR
H-1	D-9	40.0		884.0	48			42.3		61	17	35	14	CL										Disturbed
H-1	D-10	45.0		879.0	72	121.6	115.4	5.4	31.6															
H-1	D-11	50.0		874.0	50/6"																			NR
H-2	D-1	2.5		878.5	68/12"	132.5	125.5	5.6	44.1	19	5	NP	NP	SM										
H-2	D-2	5.0		876.0	73	132.2	127.4	3.8	31.6															
H-2	D-3	7.5		873.5	92	129.6	125.1	3.6	28.1															
H-2	D-4	10.0		871.0	90/11"	134.0	129.9	3.2	28.8					SP/SM										CN
H-2	D-5	15.0		866.0	87	138.7	129.3	7.3	64.9															
H-2	D-6	20.0		861.0	50/4"	125.3	118.9	5.4	34.9	16	4	NP	NP	SM										
H-2	D-7	25.0		856.0	75/12"	125.9	122.6	2.6	19.0															
H-2	D-8	30.0		851.0	93/11"	110.1	107.1	2.8	13.1					SP/SM										CN
H-2	D-9	35.0		846.0	74	131.0	121.3	8.0	55.4															
H-2	D-10	40.0		841.0	83/11"	124.6	106.9	16.6	77.8															
H-2	D-11	45.0		836.0	50/5"																			NR
H-2	D-12	50.0		831.0	76/12"	129.6	108.5	19.4	95.0															
H-3	D-1	2.5		888.5	22	112.3	111.0	1.2	6.5					SM										CN
H-3	D-2	5.0		886.0	37	116.8	115.1	1.5	8.7															
H-3	D-3	7.5		883.5	29	110.9	108.3	2.4	11.6															
H-3	D-4	10.0		881.0	14	103.1	98.7	4.4	16.8	56	11	29	8	CL										CN
H-3	D-5	15.0		876.0	17	102.4	100.3	2.0	8.0															
H-3	D-6	20.0		871.0	19	106.2	104.5	1.6	7.2															
H-3	D-7	25.0		866.0	46	103.4	96.9	6.7	24.6															
H-3	D-8	30.0		861.0	76			3.0																Disturbed
H-3	D-9	35.0		856.0	90/10"	112.0	108.8	2.9	14.3															
H-3	D-10	40.0		851.0	73	116.6	111.6	4.5	23.7															

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West Yost/ Lake Rialto
Project Number: 20079-01

APPENDIX
SUMMARY OF SOIL LABORATORY DATA

Bloomington, CA

Boring/Sample Information						Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Degree of Sat. (%)	Sieve/ Hydrometer		Atterberg Limits		USCS Group Symbol	Direct Shear				Compaction		Expansion Index	R-Value	Soluble Sulfate Content (% by wt)	Remarks
															Ultimate		Peak							
Boring No.	Sample No.	Depth (feet)	End Depth (feet)	Elevation (feet)	Blow Count (N)					Fines Content (% pass. #200)	Clay Content (% pass. 2µ)	LL (%)	PI (%)		Cohesion (psf)	Friction Angle (°)	Cohesion (psf)	Friction Angle (°)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)				
H-3	D-11	45.0		846.0	76/12"	116.1	107.7	7.8	37.3															
H-3	D-12	50.0		841.0	93/8"			0.9																Disturbed

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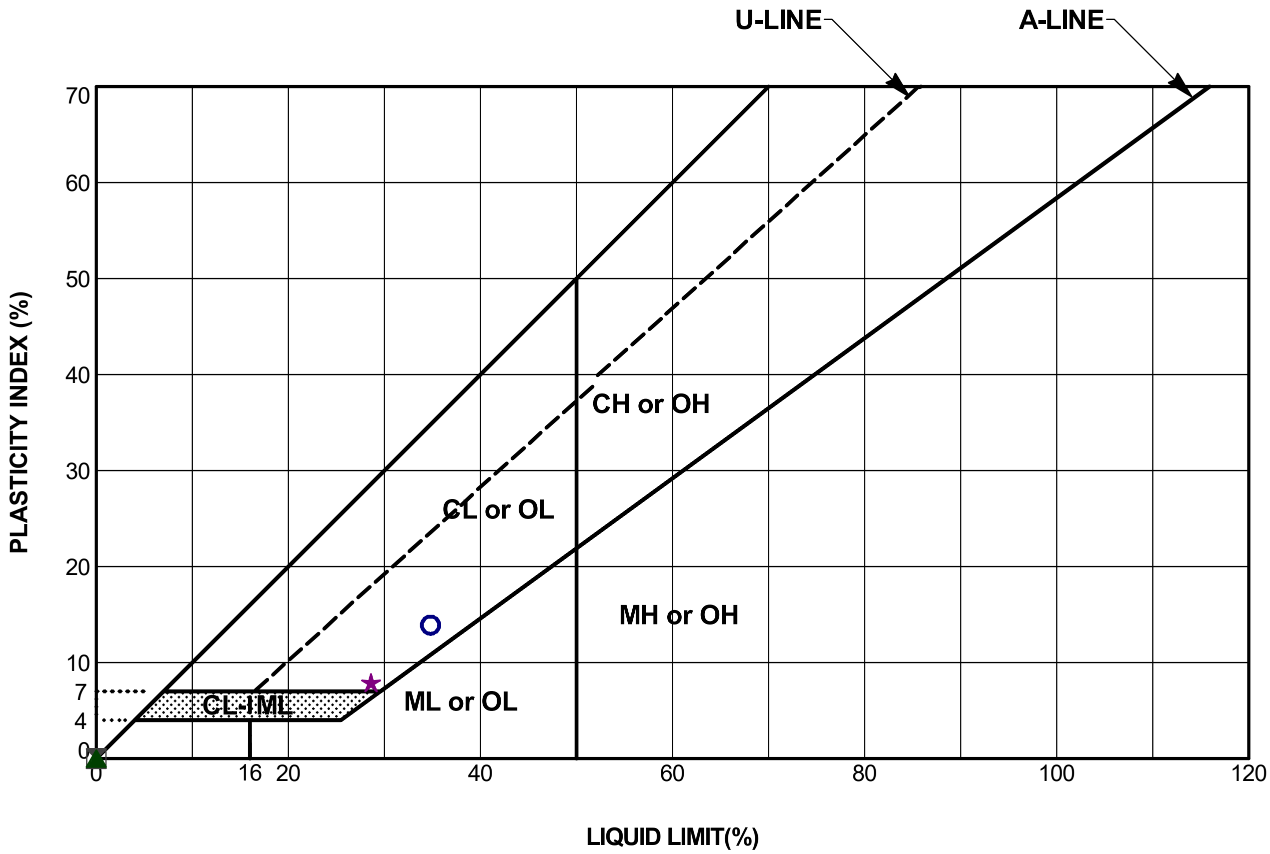
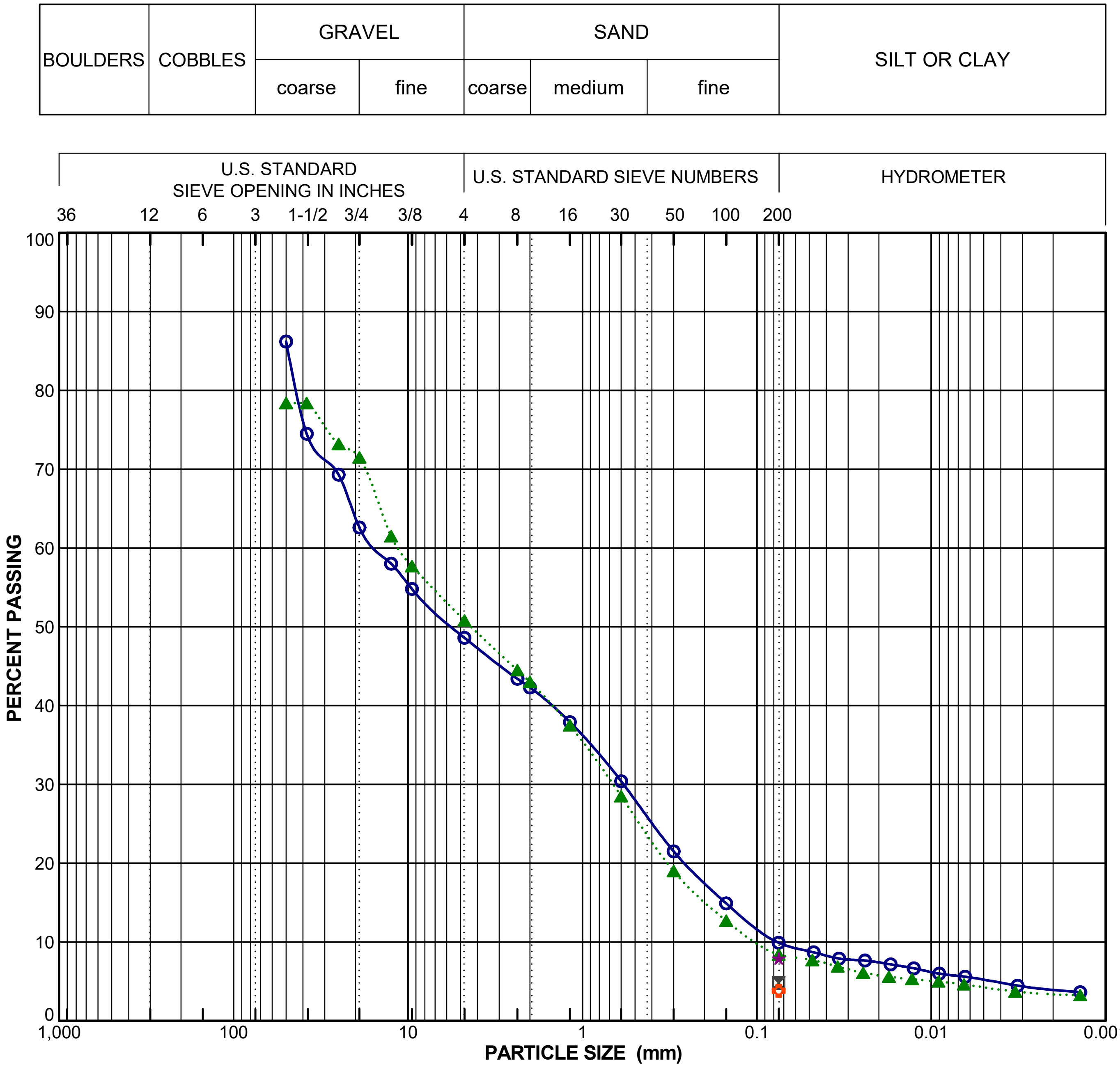


Symbol	Boring Number	Sample Number	Depth (feet)	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	H-1	D-9	40.0	61	35	14	CL	(Qal) Yellowish brown sandy CLAY
⊠	H-2	D-1	2.5	19	NP	NP	SM	(Qal) Olive brown silty SAND
▲	H-2	D-6	20.0	16	NP	NP	SM	(Qal) Olive gray silty SAND
★	H-3	D-4	10.0	56	29	8	CL	(Qal) Light grayish brown sandy CLAY

PLASTICITY CHART

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.



Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2µ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2µ (%)	USCS
○	H-1	B-1	1.0 - 5.0					197.2	0.3	10	4	GP-GM
⊠	H-1	D-2	7.5	3						5		SW/SP
▲	H-1	B-2	10.0 - 15.0					115.6	0.4	8	3	SP-SM
★	H-1	D-4	15.0	9						8		SP-SM
✪	H-1	D-7	30.0	20						4		SW/SP

PARTICLE SIZE DISTRIBUTION

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

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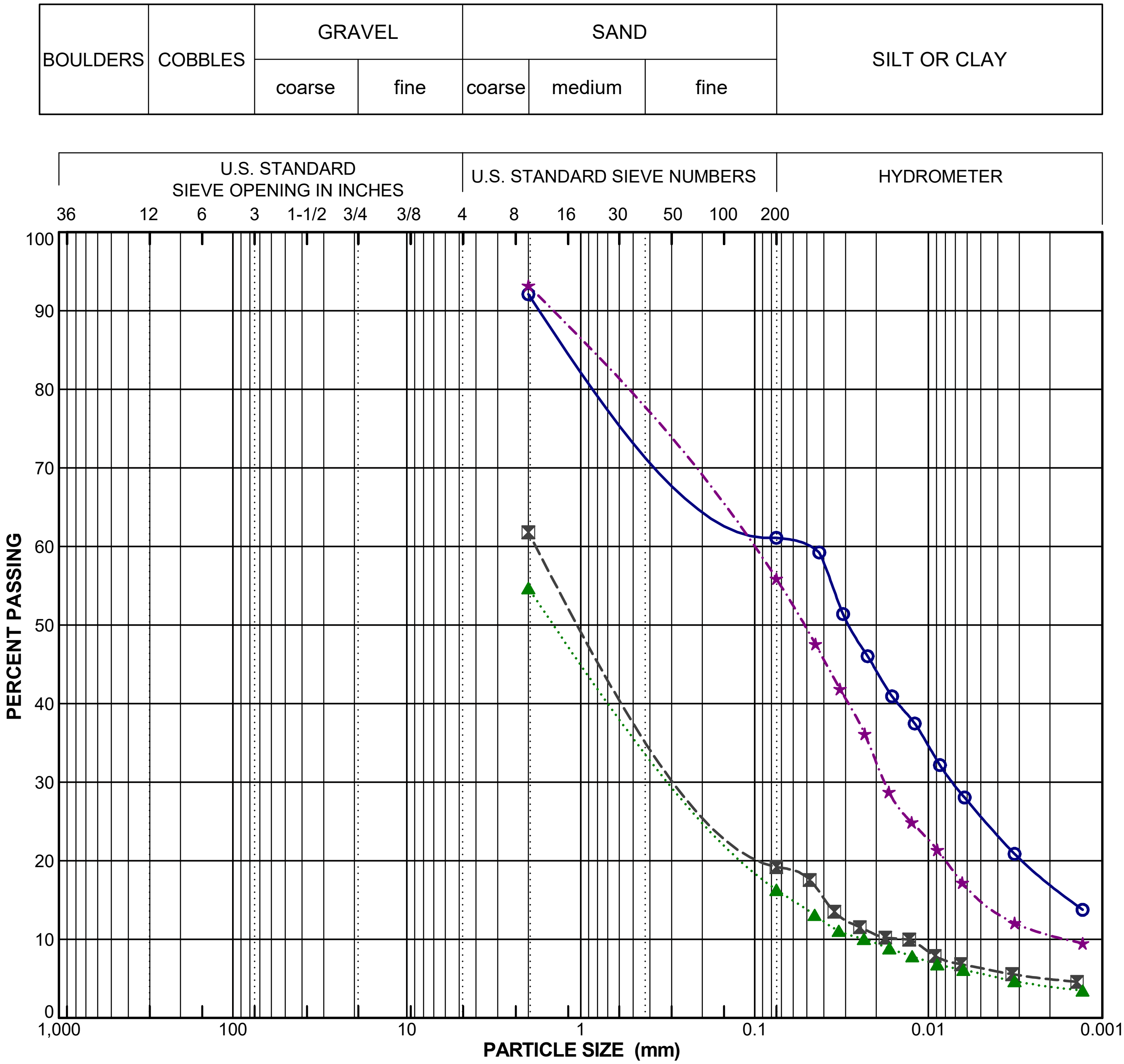
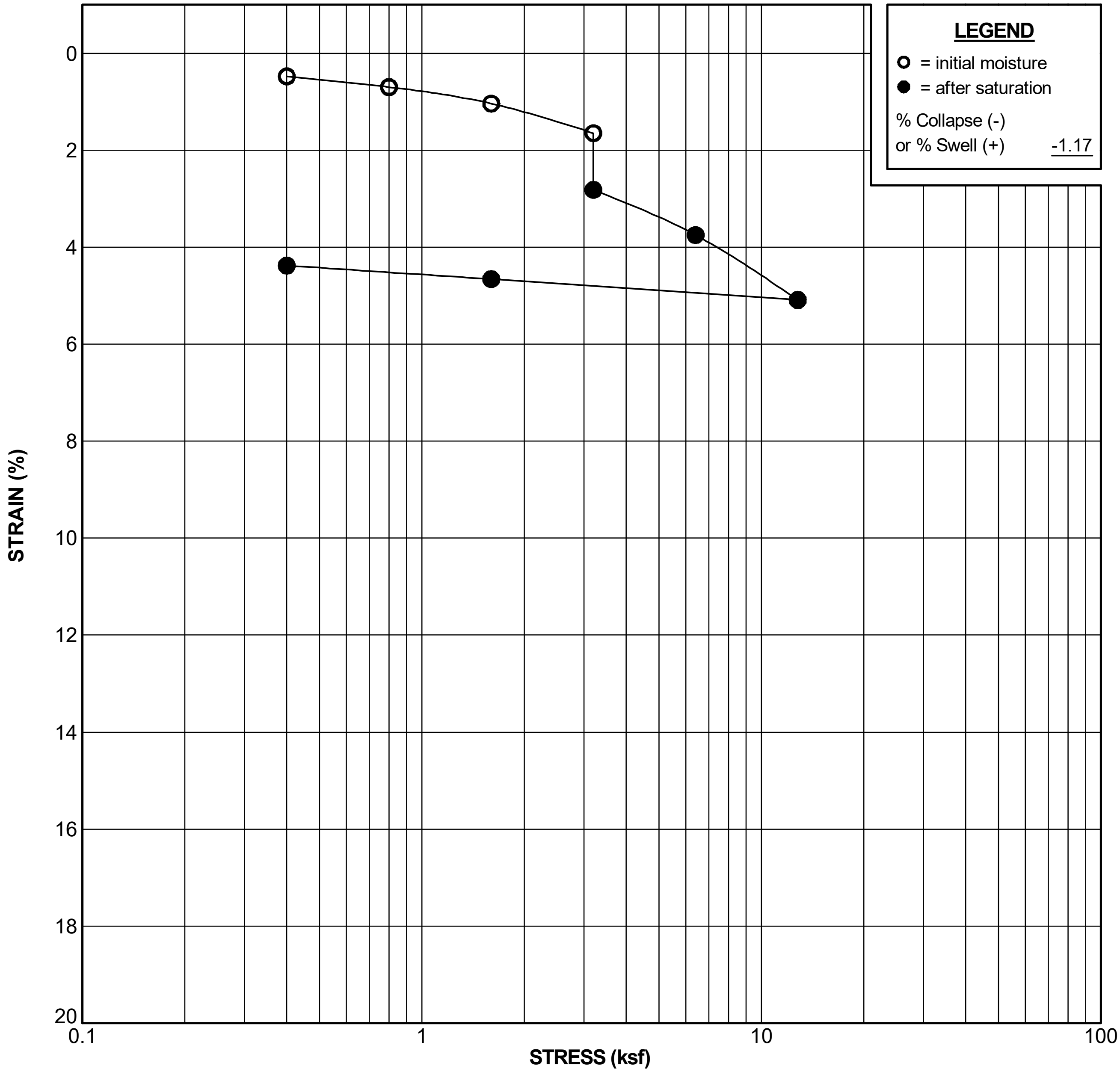


Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	H-1	D-9	40.0	42	35	14	0.82			61	17	CL
⊠	H-2	D-1	2.5	6	NP	NP				19	5	SM
▲	H-2	D-6	20.0	5	NP	NP				16	4	SM
★	H-3	D-4	10.0	4	29	8	0.73			56	11	CL

PARTICLE SIZE DISTRIBUTION

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.



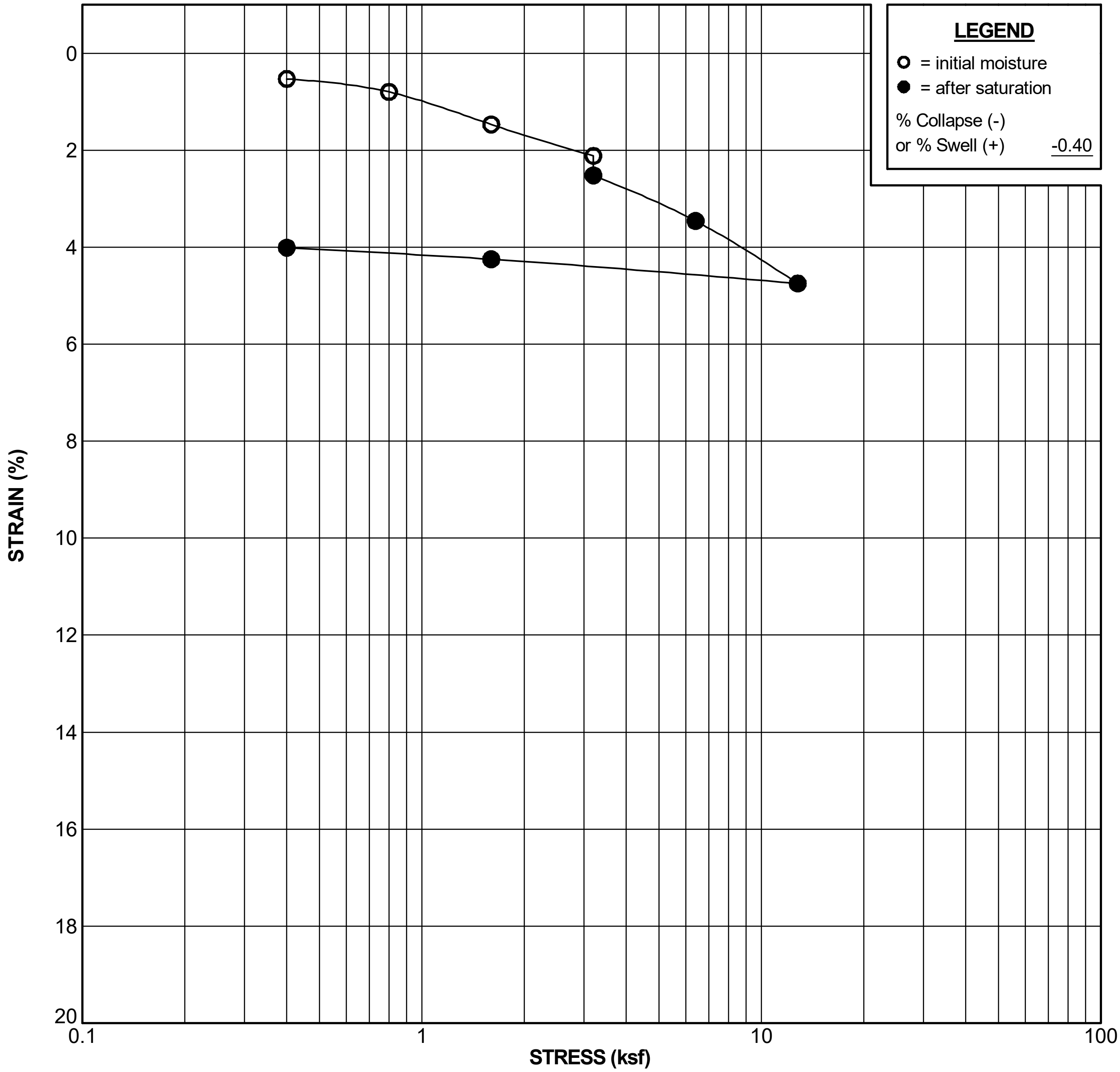
Boring No. H-2	Sample No. D-4	Depth: 10.0 ft
Sample Description: (Qal) Brown SAND with gravel		**USCS:** SP/SM
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	3.3	122.9	24.0	0.371
Final	11.4	128.2	98.0	0.314

CONSOLIDATION TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.



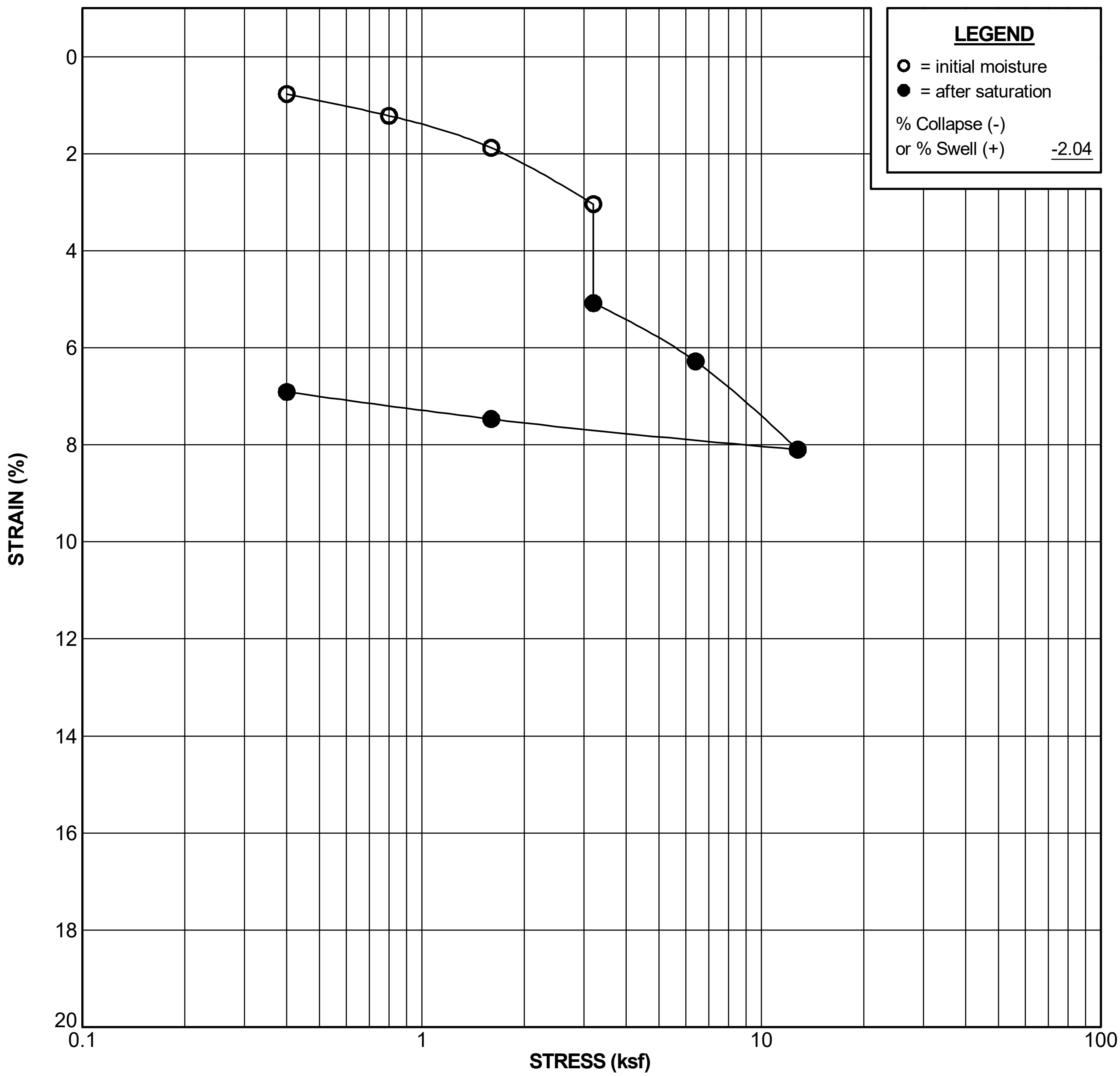
Boring No. H-2	Sample No. D-8	Depth: 30.0 ft
Sample Description: (Qal) Pale yellowish brown SAND		**USCS:** SP/SM
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	2.9	102.8	12.3	0.639
Final	18.5	106.9	86.7	0.576

CONSOLIDATION TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.



Boring No. H-3	Sample No. D-1	Depth: 2.5 ft
Sample Description: (Qal) Yellowish brown silty SAND		**USCS:** SM
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	1.7	107.0	8.0	0.575
Final	16.7	114.4	95.4	0.473

CONSOLIDATION TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.

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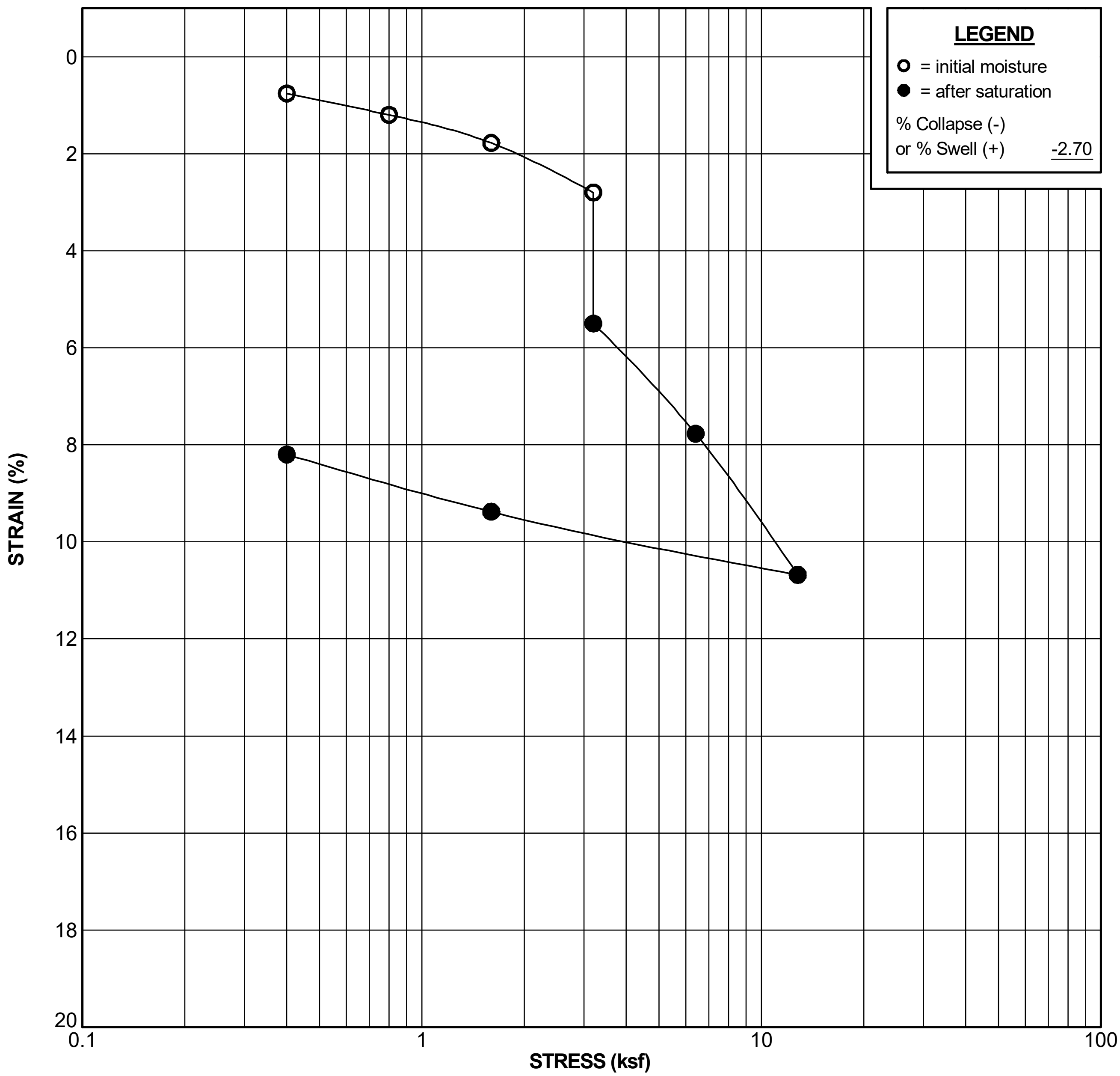


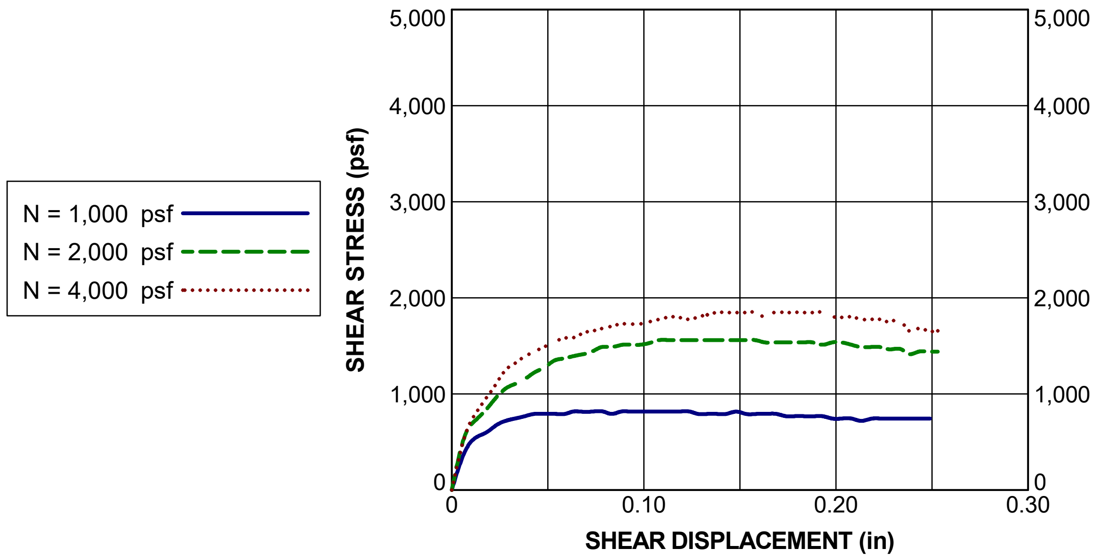
Boring No. H-3	Sample No. D-4	Depth: 10.0 ft
Sample Description: (Qal) Light grayish brown sandy CLAY		**USCS:** CL
Liquid Limit: 29	**Plasticity Index:** 8	**Percent Passing No. 200 Sieve:** 56

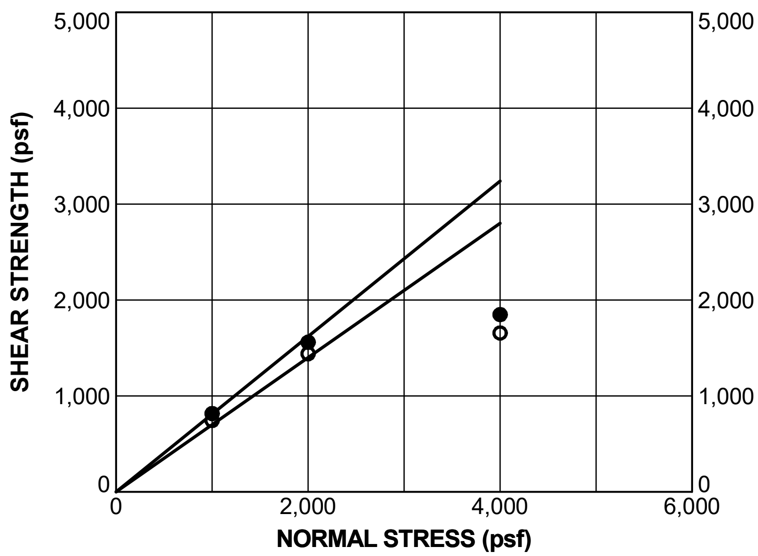
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	4.7	92.5	14.9	0.882
Final	26.5	100.1	100.0	0.739

CONSOLIDATION TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.





Boring No. H-1	**Sample No. D-2**	**Depth: 7.5 ft**	
Sample Description: (Qal) Pale gray SAND		**USCS:** SW/SP	
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**	5
Final Moisture Content (%): 27.1	**Final Dry Density (pcf):** 107.0	**Degree of Saturation (%):**	100
Sample Type: Undisturbed	**Rate of Shear (in./min.):** 0.05		

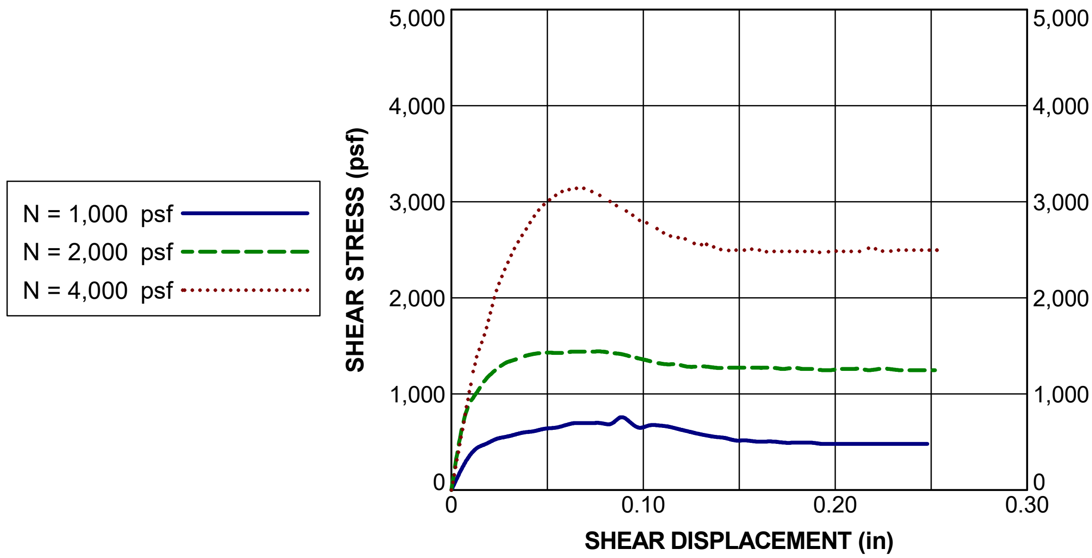
SHEAR STRENGTH PARAMETERS

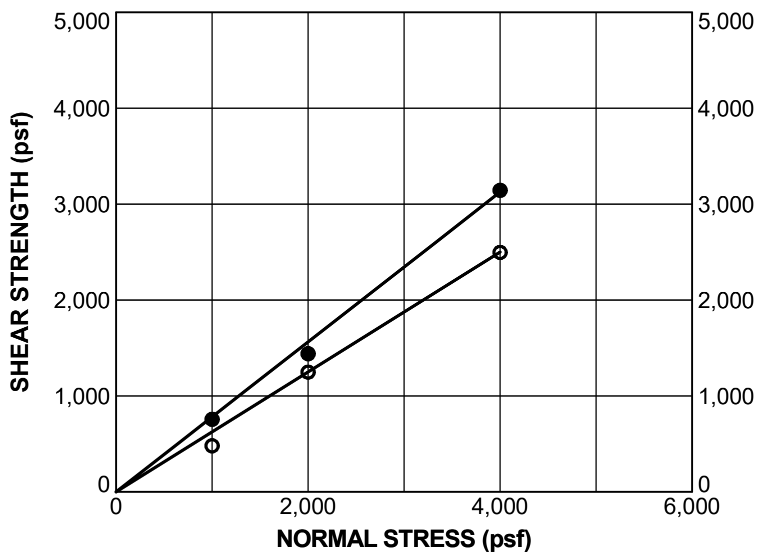
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	0	0
Friction Angle (degrees)	39.0	35.0

DIRECT SHEAR TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.





Boring No. H-1		**Sample No. D-4**		**Depth: 15.0 ft**	
Sample Description:	(Qal) Light brown SAND with silt			**USCS:**	SP-SM
Liquid Limit:		**Plasticity Index:**		**Percent Passing No. 200 Sieve:**	8
Final Moisture Content (%):	21.4	**Final Dry Density (pcf):**	107.5	**Degree of Saturation (%):**	99
Sample Type:	Undisturbed	**Rate of Shear (in./min.):**	0.05		

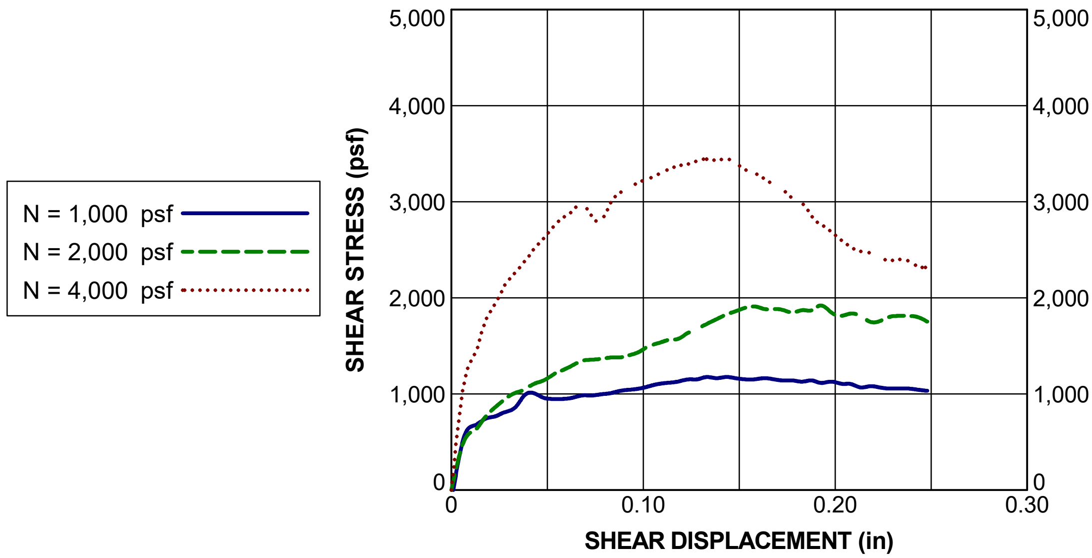
SHEAR STRENGTH PARAMETERS

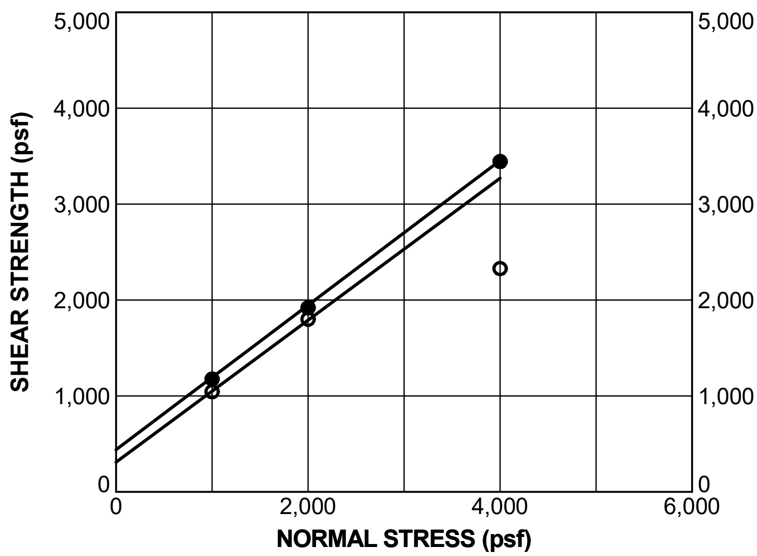
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	0	0
Friction Angle (degrees)	38.0	32.0

DIRECT SHEAR TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.





Boring No. H-1	**Sample No. D-7**	**Depth: 30.0 ft**
Sample Description: (Qal) Pale yellow SAND		**USCS:** SW/SP
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:** 4
Final Moisture Content (%): 24.4	**Final Dry Density (pcf):** 100.4	**Degree of Saturation (%):** 98
Sample Type: Undisturbed	**Rate of Shear (in./min.):** 0.05	

SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate ○
Cohesion (psf)	440	310
Friction Angle (degrees)	37.0	36.5

DIRECT SHEAR TEST RESULTS

West Yost/ Lake Rialto
Bloomington, CA
PROJECT NO. 20079-01

NMG Geotechnical, Inc.

Template: NMDSWGRAPH; Prj ID: 20079-01.GPJ; Printed: 5/21/21

Leighton

SPECIFIC GRAVITY and ABSORPTION of COARSE and FINE AGGREGATE

ASTM C 127 & C 128

Project Name:	West Yost/Lake Rialto	Tested By:	G. Bathala	Date:	03/26/21
Project No.:	20079-01	Checked By:	A. Santos	Date:	04/08/21

Boring Number:	H-1	H-1	H-2	H-2	
Sample Number:	D5	D6	D4	D7	
Depth (ft)	20.0	25.0	10.0	25.0	
Sample Description	Light olive brown (SM)g	Olive brown (SM)g	Olive gray (SM)g	Light olive brown SP-SM	
Percent material retained on sieve #4 (%)	18.1	26.4	27.6	3.5	
Percent material passing sieve #4 (%)	81.9	73.6	72.4	96.5	

Sample Passing #4 - ASTM C 128

Wt. of SSD Sample in Air + Container (g)	484.90	306.19	399.55	504.53	
Weight of Container (g)	0.00	0.00	0.00	0.00	
Wt. of Sat. Surface-Dry Sample in Air (g) **(S)**	484.90	306.19	399.55	504.53	
Wt. of Oven-Dry Sample + Container (g)	681.10	533.41	613.38	740.86	
Weight of Container (g)	201.19	234.38	219.26	243.90	
Weight of Oven-Dry Sample (g) **(A)**	479.91	299.03	394.12	496.96	
Weight of Flask + Water + Sample (g) **(C)**	974.22	857.68	919.46	979.46	
Weight of Flask + Water (g) **(B)**	674.05	669.56	671.37	669.56	
Temperature (°C)	24.5	24.5	24.5	24.5	
Correction Factor	0.99897	0.99897	0.99897	0.99897	

Calculations

Bulk Specific Gravity	[A/(B+S-C)]	**2.60**	**2.53**	**2.60**	**2.55**	
Bulk Specific Gravity (SSD)	[S/(B+S-C)]	**2.62**	**2.59**	**2.64**	**2.59**	
Apparent Specific Gravity	[A/(B+A-C)]	**2.67**	**2.70**	**2.70**	**2.66**	
Apparent Spec. Gravity, corrected to 20°C		**2.67**	**2.69**	**2.70**	**2.65**	
Absorption (%)	[(S-A)/A]	**1.0**	**2.4**	**1.4**	**1.5**	

Sample Retained #4 - ASTM C 127

Wt. of Sat. Surface-Dry Sample in Air + Cont. (g)	355.4	356.4	399.6	268.2	
Weight of Container (g)	248.7	248.7	248.7	248.7	
Wt. of Sat. Surface-Dry Sample in Air (g) **(B)**	106.7	107.7	150.9	19.5	
Weight of Sample + Container in Water (g)	965.8	965.8	993.3	911.5	
Weight of Container (g)	898.1	898.1	898.1	898.1	
Weight of Sample in Water (g) **(C)**	67.7	67.7	95.2	13.4	
Weight of Oven Dry Sample + Container (g)	353.9	354.6	397.3	268.1	
Weight of Container (g)	248.7	248.7	248.7	248.7	
Weight of Oven Dry Sample (g) **(A)**	105.2	105.9	148.6	19.4	
Temperature (°C)	24.5	24.4	24.5	24.4	
Correction Factor	0.99897	0.99899	0.99897	0.99899	

Calculations

Bulk Specific Gravity	[A/(B-C)]	**2.70**	**2.65**	**2.67**	**3.18**	
Bulk Specific Gravity (SSD)	[B/(B-C)]	**2.74**	**2.69**	**2.71**	**3.20**	
Apparent Specific Gravity	[A/(A-C)]	**2.81**	**2.77**	**2.78**	**3.23**	
Apparent Spec. Gravity, corrected to 20°C		**2.80**	**2.77**	**2.78**	**3.23**	
Absorption (%)	[(B-A)/A]	**1.4**	**1.7**	**1.5**	**0.5**	
Combined Apparent Specific Gravity		**2.69**	**2.71**	**2.72**	**2.67**	

Remarks:

Leighton

SPECIFIC GRAVITY of SOILS and SPECIFIC GRAVITY and ABSORPTION of COARSE AGGREGATE

ASTM D 854 and C 127

Project Name:	West Yost/Lake Rialto	Tested By:	G. Bathala	Date:	03/26/21
Project No.:	20079-01	Checked By:	J. Ward	Date:	04/08/21

Boring No.	H-3	H-3			
Sample No.	D2	D5			
Depth (ft)	N/A	N/A			
Sample Description	Pale olive SM	Light olive gray s(ML)			
Percent material retained on sieve #4 (%)	6.0	0.7			
Percent material passing sieve #4 (%)	94.0	99.3			

Sample Passing #4 - ASTM D 854

Flask / Container No.	H	I			
Weight of Dry Soil (g)	59.34	59.79			
Weight of Flask + Water + Soil (g)	710.99	708.45			
Weight of Flask + Water (g)	673.99	671.37			
Temperature (°C)	24.9	24.5			
Correction Factor	0.99887	0.99897			
Specific Gravity of Soil Passing #4	2.65	2.63			
Dry - Back Weight of Soil + Container (g)	304.85	296.30			
Weight of Container	245.54	236.62			
Dry - Back Weight of Soil	59.31	59.68			
Dry - Back Specific Gravity	2.66	2.64			

Sample Retained #4 - ASTM C 127

Wt. of Sat. Surface - Dry Soil in Air + Cont. (g)	273.1	251.1			
Weight of Container (g)	248.7	248.7			
Wt. of Sat. Surface - Dry Soil in Air (g) **(B)**	24.4	2.4			
Weight of Soil + Container in Water (g)	914.4	901.7			
Weight of Container (g)	898.1	900.4			
Weight of Soil in Water (g) **(C)**	16.3	1.3			
Weight of Oven Dry Soil + Container (g)	272.8	251.0			
Weight of Container (g)	248.7	248.7			
Weight of Oven Dry Soil (g) **(A)**	24.1	2.3			
Temperature (°C)	24.4	24.3			
Correction Factor	0.99899	0.99902			

Calculations

Ave. Specific Gravity of Soil Passing #4	**2.65**	**2.63**			
Bulk Specific Gravity [A/(B-C)]	**2.98**	**2.09**			
Bulk Specific Gravity (SSD) [B/(B-C)]	**3.01**	**2.18**			
Apparent Specific Gravity [A/(A-C)]	**3.09**	**2.30**			
Apparent Spec. Gravity, corrected to 20°C	**3.09**	**2.30**			
Absorption (%) [(B-A)/A]	**1.2**	**4.3**			
Combined Apparent Specific Gravity	**2.68**	**2.63**			

Remarks:

Table 1 - Laboratory Tests on Soil Samples

NMG Geotechnical, Inc.
West Yost Lake Rialto
Your #20079-01, HDR Lab #21-0233LAB
25-Mar-21

Sample ID			H-1, B-1 @ 1-5'	H-1, D-1 @ 5'
Resistivity		**Units**		
as-received		ohm-cm	16,400	27,600
saturated		ohm-cm	4,400	6,400
pH			7.2	7.6
Electrical Conductivity		mS/cm	0.09	0.09
Chemical Analyses				
Cations				
calcium	Ca^{2+}	mg/kg	75	72
magnesium	Mg^{2+}	mg/kg	5.8	4.9
sodium	Na^{1+}	mg/kg	11	10
potassium	K^{1+}	mg/kg	13	11
ammonium	NH_4^{1+}	mg/kg	25	23
Anions				
carbonate	CO_3^{2-}	mg/kg	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	198	220
fluoride	F^{1-}	mg/kg	2.5	3.3
chloride	Cl^{1-}	mg/kg	6.9	5.1
sulfate	SO_4^{2-}	mg/kg	51	61
nitrate	NO_3^{1-}	mg/kg	65	30
phosphate	PO_4^{3-}	mg/kg	13	21
Other Tests				
sulfide	S^{2-}	qual	na	na
Redox		mV	na	na

Resistivity per ASTM G187, pH per ASTM G51, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.

Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.

mg/kg = milligrams per kilogram (parts per million) of dry soil.

Redox = oxidation-reduction potential in millivolts

ND = not detected

na = not analyzed

LABORATORY TEST RESULTS

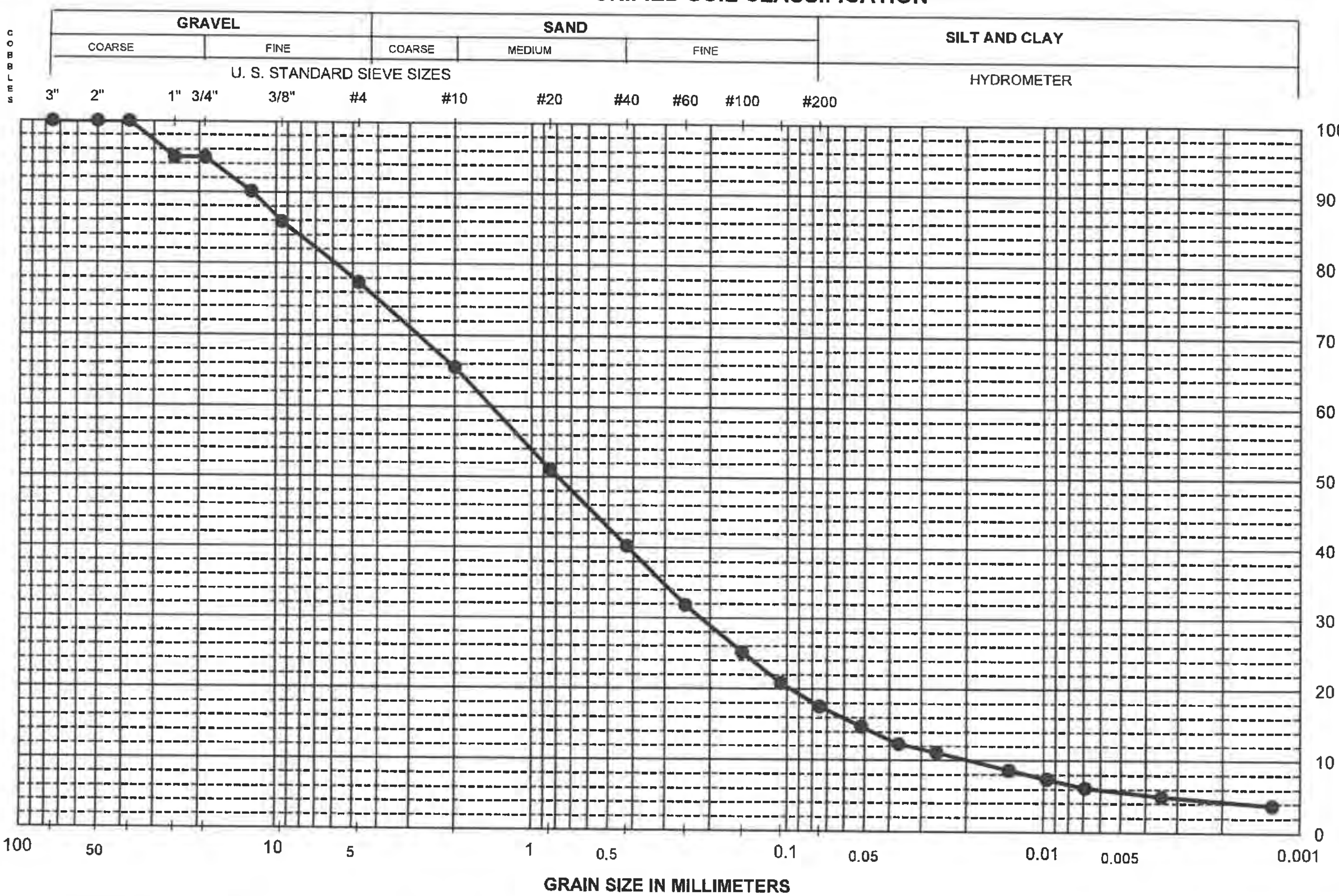
BY AECOM (2018)

Santa Ana Geotechnical Laboratory Testing Summary

Project Name: Rialto WWTP
Project Number: 60570758
Project Engineer: ML

Location				Initial Condition			Limits			Gradation				Direct Shear		
Boring Number	Sample Number	Depth (ft)	USCS Symbol	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Liquid Limit	Plasticity Index	Liquidity Index	Gravel (%)	Sand (%)	Fines (%)		Normal Stress Sequence (ksf)	Peak Friction Angle (deg)	Strength Intercept (ksf)
												Silt	Clay			
SB-1	2	5.0	SP-SM	4.9						27.3	62.5	8.2	2.0			
	4	15.0	SW-SM	2.6						35.1	56.4	5.6	2.9			
	8	35.0	SP-SM	2.7						32.0	58.5	7.0	2.5			
	10	45.0	SW-SM	3.1						13.6	79.5	4.7	2.2			
SB-2	2	5.0	SM	2.8						25.7	60.7	10.2	3.4			
	4	15.0	SM	8.5	114.4	105.5				12.6	55.9	26.8	4.7			
	5	25.0	SM	5.4						9.3	73.2	13.9	3.6			
	7	35.0	SM	15.0						0.0	51.6	45.2	3.2			
	10	50.0	SM	16.4						1.0	85.9	10.9	2.2			
SB-3	2	5.0	SM	3.6						22.6	62.5	11.1	3.8			
	3	10.0	SM	4.6						9.3	69.0	18.7	3.0			
	4	15.0	SP-SM	1.9						0.1	91.5	7.5	0.9			
	7	30.0	ML	23.2			36	8	-0.60	0.0	4.5	85.1	10.4			
SB-4	2	5.0	SM	2.5						22.6	59.9	13.4	4.1			
	4	15.0	SM	7.2						0.0	65.5	31.2	3.3			
	5A	20.0	S	6.6						0.0	62.8	33.1	4.2			
SB-5	2A	5.0	ML	10.9			46	19	-0.85	0.2	3.6	82.3	13.9			
	4	15.0	ML	6.3						3.0	43.6	53.4				
	7	30.0	SP-SM	1.5						13.3	79.9	5.8	1.0			
	8	35.0	ML	15.6			30	6	-1.40	0.0	28.8	62.8	8.4			
	11	50.0	SW-SM	2.0						28.6	62.8	8.6				

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	94.9
3/4"	19.00	94.9
1/2"	12.50	90.1
3/8"	9.50	85.9
#4	4.75	77.4
#10	2.00	65.5
#20	0.850	51.1
#40	0.425	40.2
#60	0.250	31.8
#100	0.150	25.1
#140	0.106	20.8
#200	0.075	17.5
Hydrometer Analysis	0.0515	14.7
	0.0368	12.3
	0.0262	11.0
	0.0137	8.6
	0.0097	7.4
	0.0069	6.1
	0.0035	4.9
	0.0013	3.7
	0.0013	3.7
	0.0013	3.7

% Cobbles	---
% Gravel	22.6
% Sand	59.9
% Fines	17.5
D_{85}	8.997
D_{60}	1.442
D_{30}	0.218
D_{15}	0.053
D_{10}	0.020
C_u	72.7
C_c	1.7

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 µm	Description and Classification
SB-4	2	5.0	●	2.5	—	—	4.1	Pale brown Silty SAND with Gravel (SM)

PROJECT NAME: Rialto WWTP

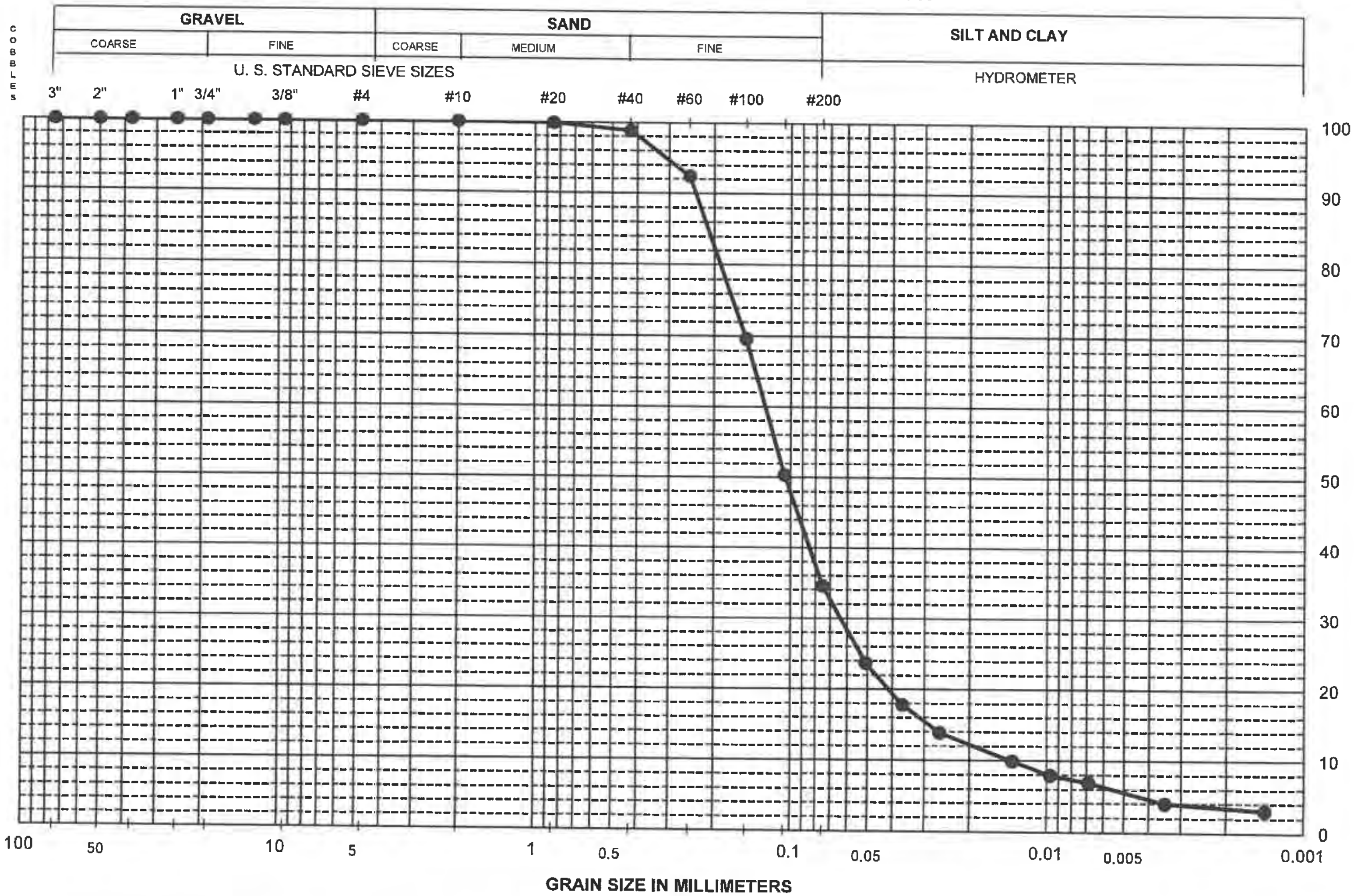
PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Hydro Rialto WWTP SB-4 5 ft

AECOM

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.9
#40	0.425	98.8
#60	0.250	92.4
#100	0.150	69.6
#140	0.106	50.3
#200	0.075	34.5
Hydrometer Analysis	0.0509	23.7
	0.0366	17.8
	0.0262	13.8
	0.0137	9.9
	0.0097	7.9
	0.0069	6.9
	0.0035	3.9
	0.0014	3.0
	0.0014	3.0
	0.0014	3.0

% Cobbles	---
% Gravel	0.0
% Sand	65.5
% Fines	34.5
D_{85}	0.212
D_{60}	0.126
D_{30}	0.064
D_{15}	0.029
D_{10}	0.014
C_u	9.0
C_c	2.3

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 μm	Description and Classification
SB-4	4	15.0	●	7.2	---	---	3.3	Pale brown Silty SAND (SM)

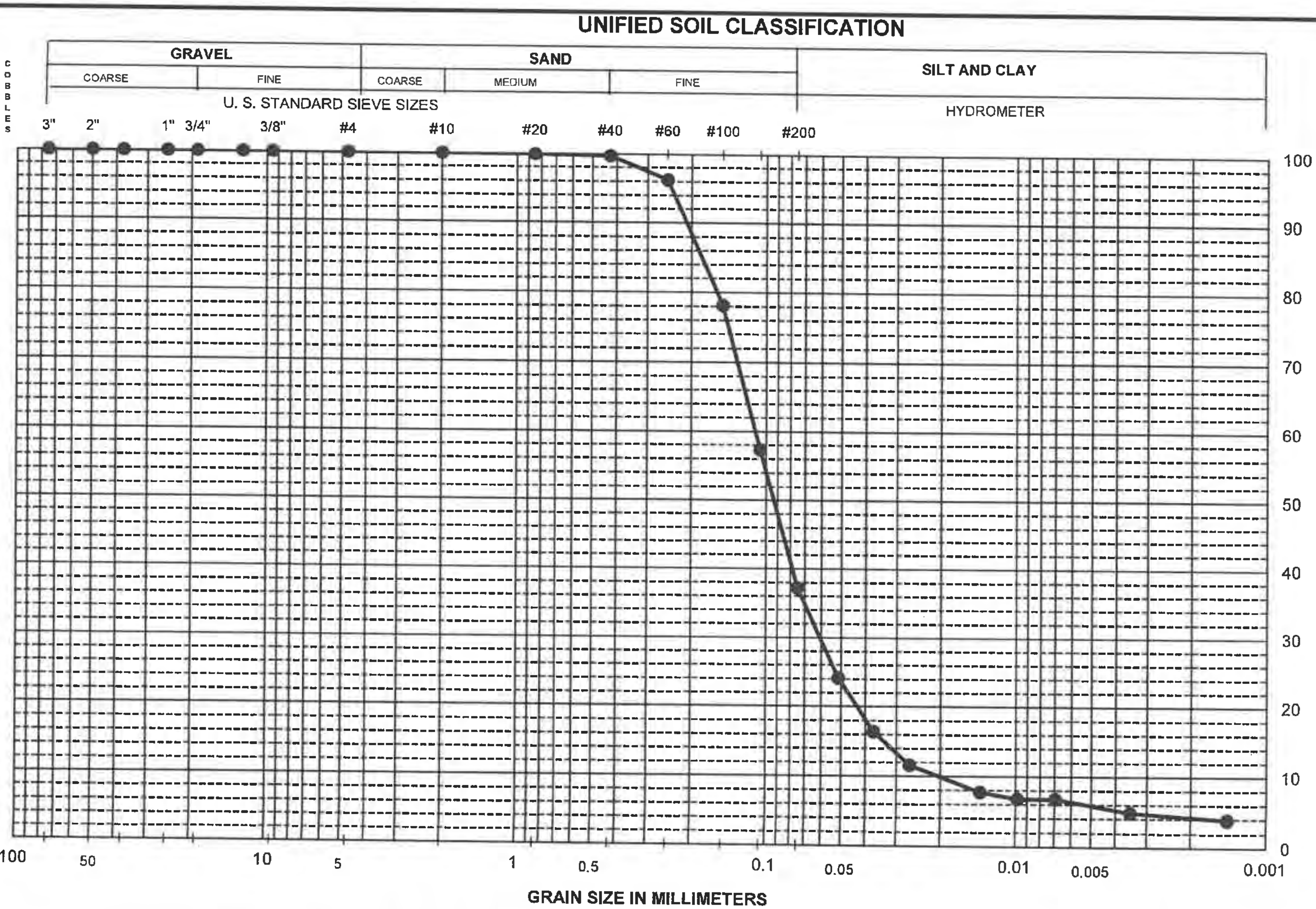
PROJECT NAME: Rialto WWTP

PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Hydro Rialto WWTP SB-4 15 ft

AECOM



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.9
#40	0.425	99.7
#60	0.250	96.2
#100	0.150	78.1
#140	0.106	57.3
#200	0.075	37.2
Hydrometer Analysis	0.0514	24.1
	0.0372	16.4
	0.0266	11.6
	0.0139	7.7
	0.0099	6.7
	0.0070	6.7
	0.0035	4.8
	0.0014	3.9
	0.0014	3.9
	0.0014	3.9

% Cobbles	---
% Gravel	0.0
% Sand	62.8
% Fines	37.2
D_{85}	0.182
D_{60}	0.111
D_{30}	0.061
D_{15}	0.034
D_{10}	0.020
C_u	5.4
C_c	1.6

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 μm	Description and Classification
SB-4	5A	20.0	●	6.6	—	—	4.2	Pale brown Silty SAND (SM)

PROJECT NAME: Rialto WWTP

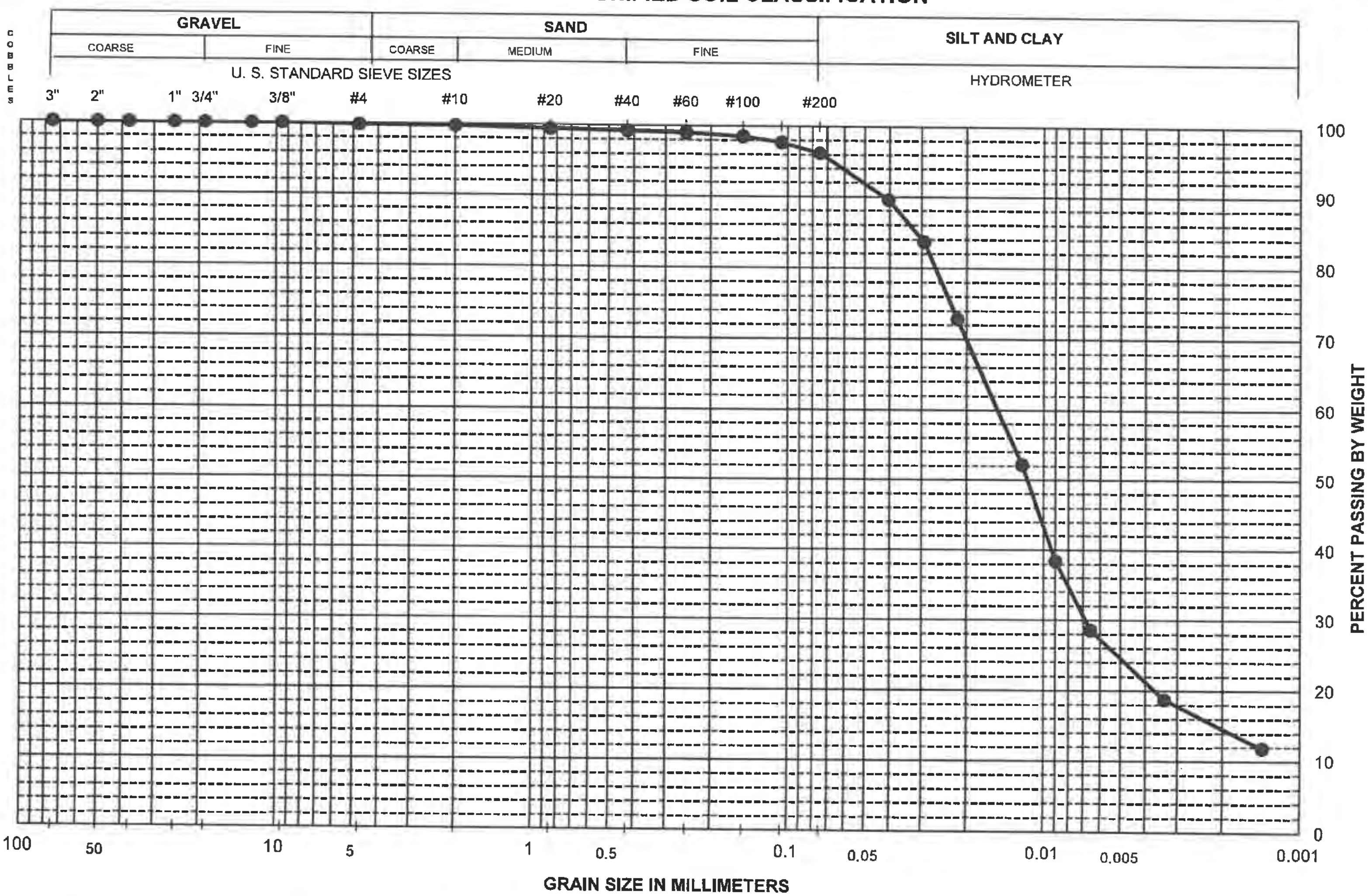
PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Hydro Rialto WWTP SB-4 20 ft

AECOM

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.8
#10	2.00	99.7
#20	0.850	99.4
#40	0.425	99.2
#60	0.250	99.0
#100	0.150	98.5
#140	0.106	97.7
#200	0.075	96.2
Hydrometer Analysis	0.0405	89.5
	0.0294	83.6
	0.0218	72.8
	0.0121	52.1
	0.0090	38.4
	0.0066	28.5
	0.0034	18.7
	0.0014	11.8
	0.0014	11.8
	0.0014	11.8

% Cobbles	---
% Gravel	0.2
% Sand	3.6
% Fines	96.2
D_{85}	0.032
D_{60}	0.015
D_{30}	0.007
D_{15}	0.002
D_{10}	----
C_u	----
C_c	----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 µm	Description and Classification
SB-5	2A	5.0	●	10.9	46	19	13.9	Pale brown Clayey SILT (ML)

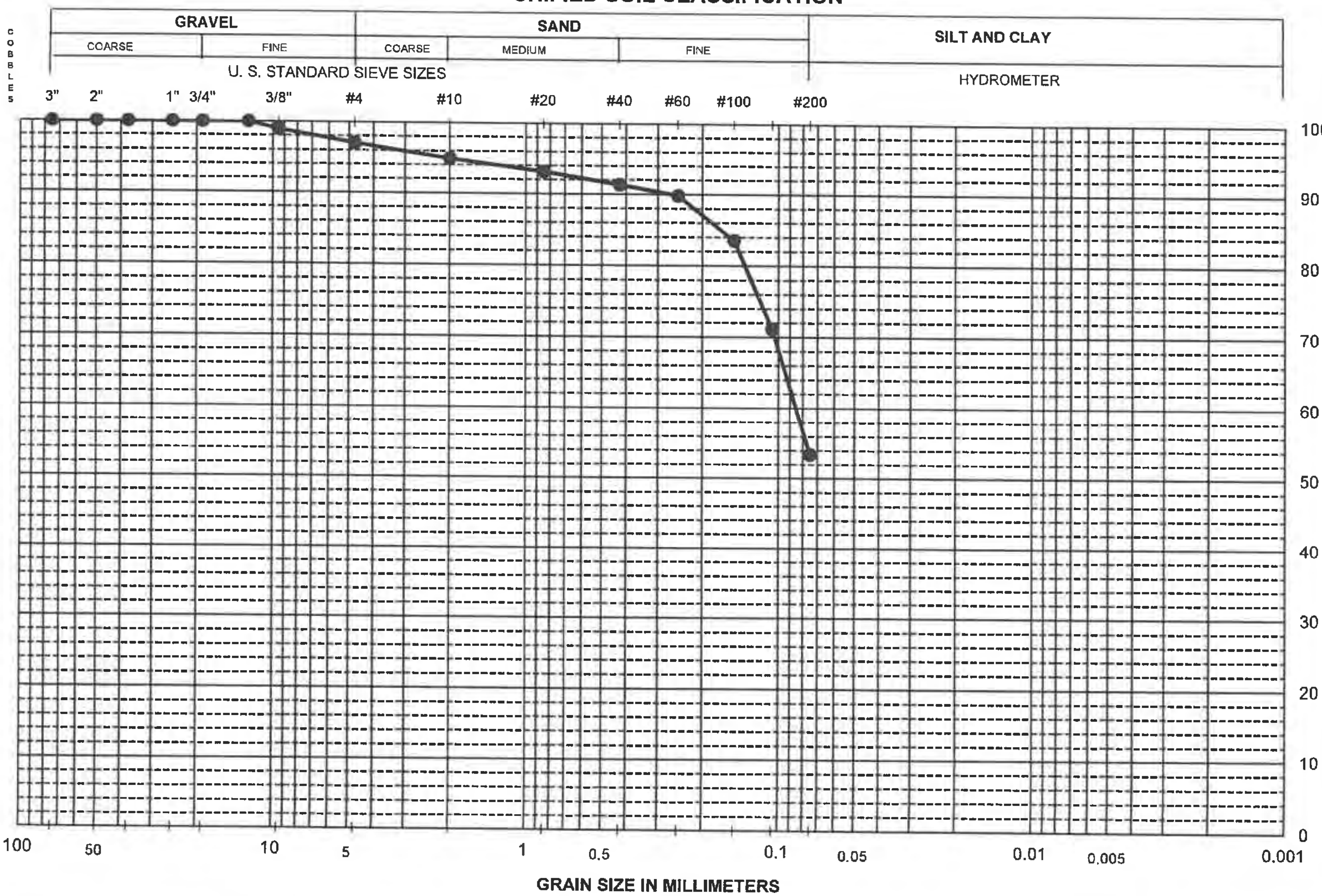
PROJECT NAME: Rialto WWTP
PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Hydro Rialto WWTP SB-5 5 ft

AECOM

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	98.9
#4	4.75	97.0
#10	2.00	94.9
#20	0.850	93.1
#40	0.425	91.3
#60	0.250	89.8
#100	0.150	83.5
#140	0.106	71.1
#200	0.075	53.4
Hydrometer Analysis		

% Cobbles	---
% Gravel	3.0
% Sand	43.6
% Fines	53.4
D_{85}	0.169
D_{60}	0.085
D_{50}	----
D_{30}	----
D_{15}	----
D_{10}	----
C_u	----
C_c	----

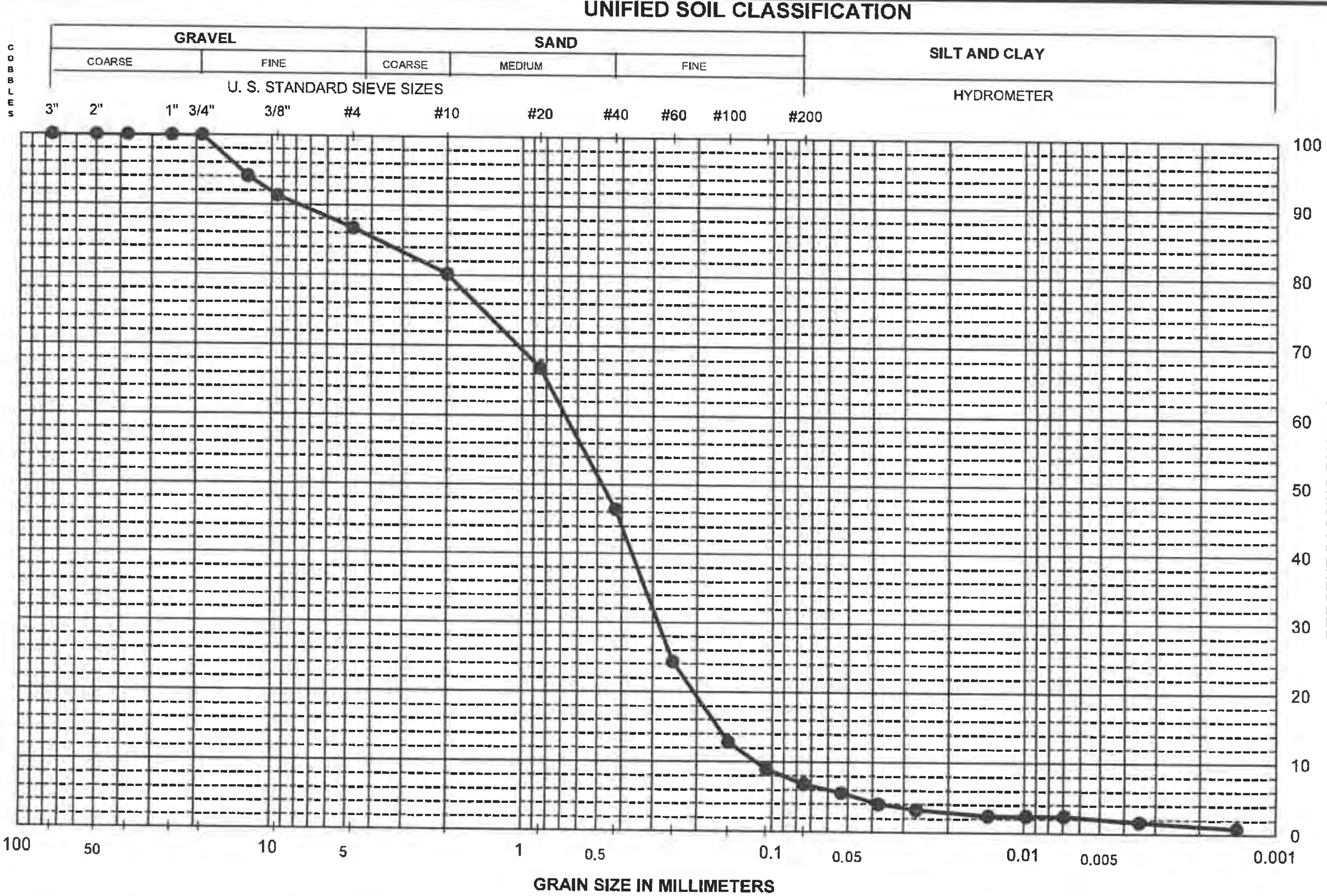
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 µm	Description and Classification
SB-5	4	15.0	●	6.3	---	---	---	Olive brown Sandy SILT (ML)

PROJECT NAME: Rialto WWTP
PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Rialto WWTP SB-5 15 ft

AECOM



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	94.1
3/8"	9.50	91.3
#4	4.75	86.7
#10	2.00	80.2
#20	0.850	66.8
#40	0.425	46.4
#60	0.250	24.3
#100	0.150	12.8
#140	0.106	8.9
#200	0.075	6.8
Hydrometer Analysis	0.0533	5.6
	0.0379	4.0
	0.0269	3.2
	0.0139	2.4
	0.0098	2.4
	0.0070	2.4
	0.0035	1.6
	0.0014	0.8
	0.0014	0.8
	0.0014	0.8

% Cobbles	---
% Gravel	13.3
% Sand	79.9
% Fines	6.8
D_{85}	3.788
D_{60}	0.675
D_{30}	0.287
D_{15}	0.165
D_{10}	0.117
C_u	5.8
C_c	1.0

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 µm	Description and Classification
SB-5	7	30.0	•	1.5	---	---	1.0	White Poorly Graded SAND with Silt (SP-SM)

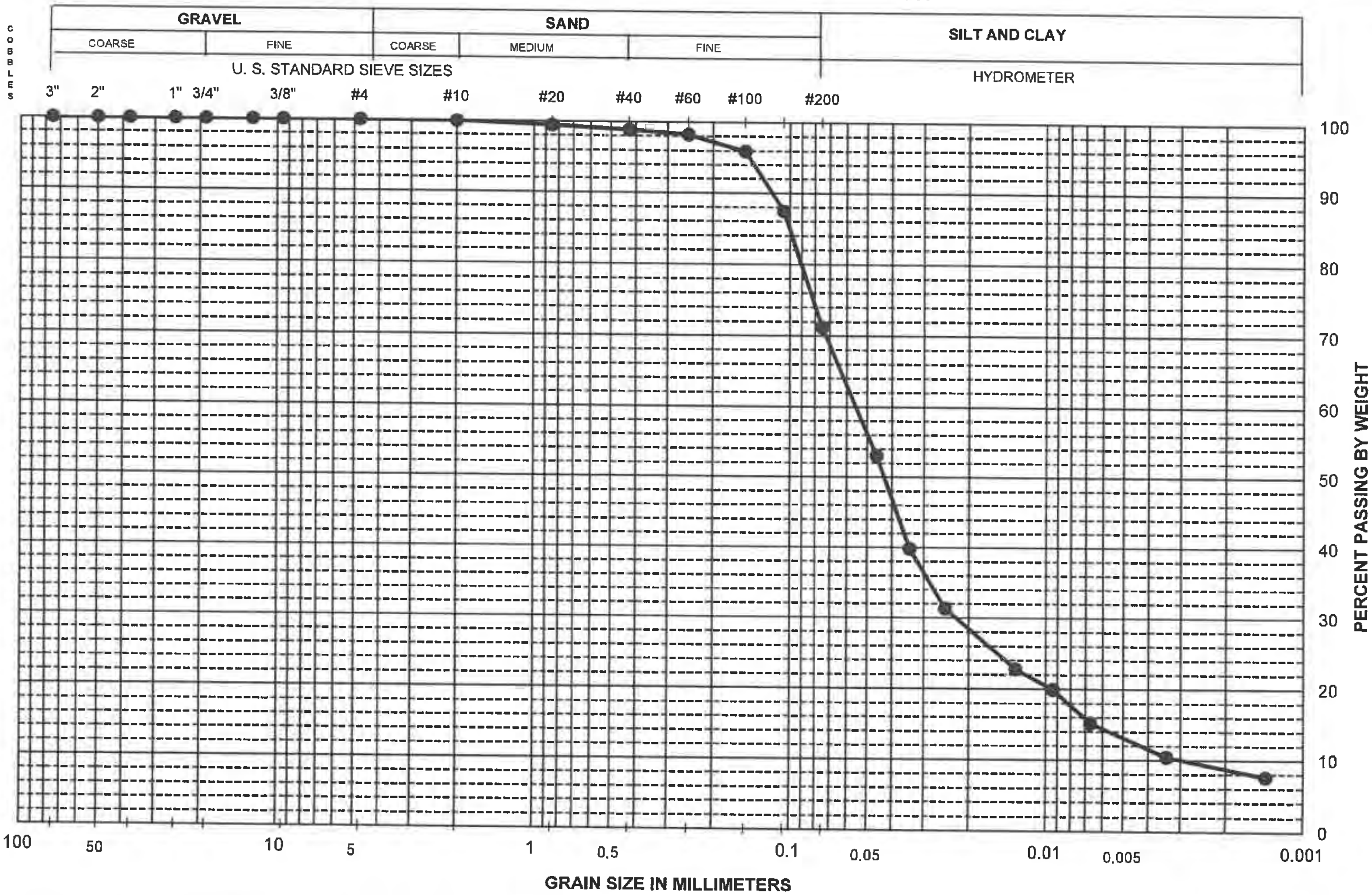
PROJECT NAME: Rialto WWTP
PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Hydro Rialto WWTP SB-5 30 ft

AECOM

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	99.9
#20	0.850	99.4
#40	0.425	98.8
#60	0.250	98.2
#100	0.150	95.9
#140	0.106	87.4
#200	0.075	71.2
Hydrometer Analysis	0.0460	53.1
	0.0341	39.8
	0.0248	31.3
	0.0131	22.7
	0.0094	19.9
	0.0067	15.2
	0.0034	10.4
	0.0014	7.6
	0.0014	7.6
	0.0014	7.6

% Cobbles	---
% Gravel	0.0
% Sand	28.8
% Fines	71.2
D_{85}	0.101
D_{60}	0.055
D_{30}	0.023
D_{15}	0.007
D_{10}	0.003
C_u	18.6
C_c	3.1

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 μm	Description and Classification
SB-5	8	35.0	●	15.6	30	6	8.4	Pale olive SILT with Sand (ML)

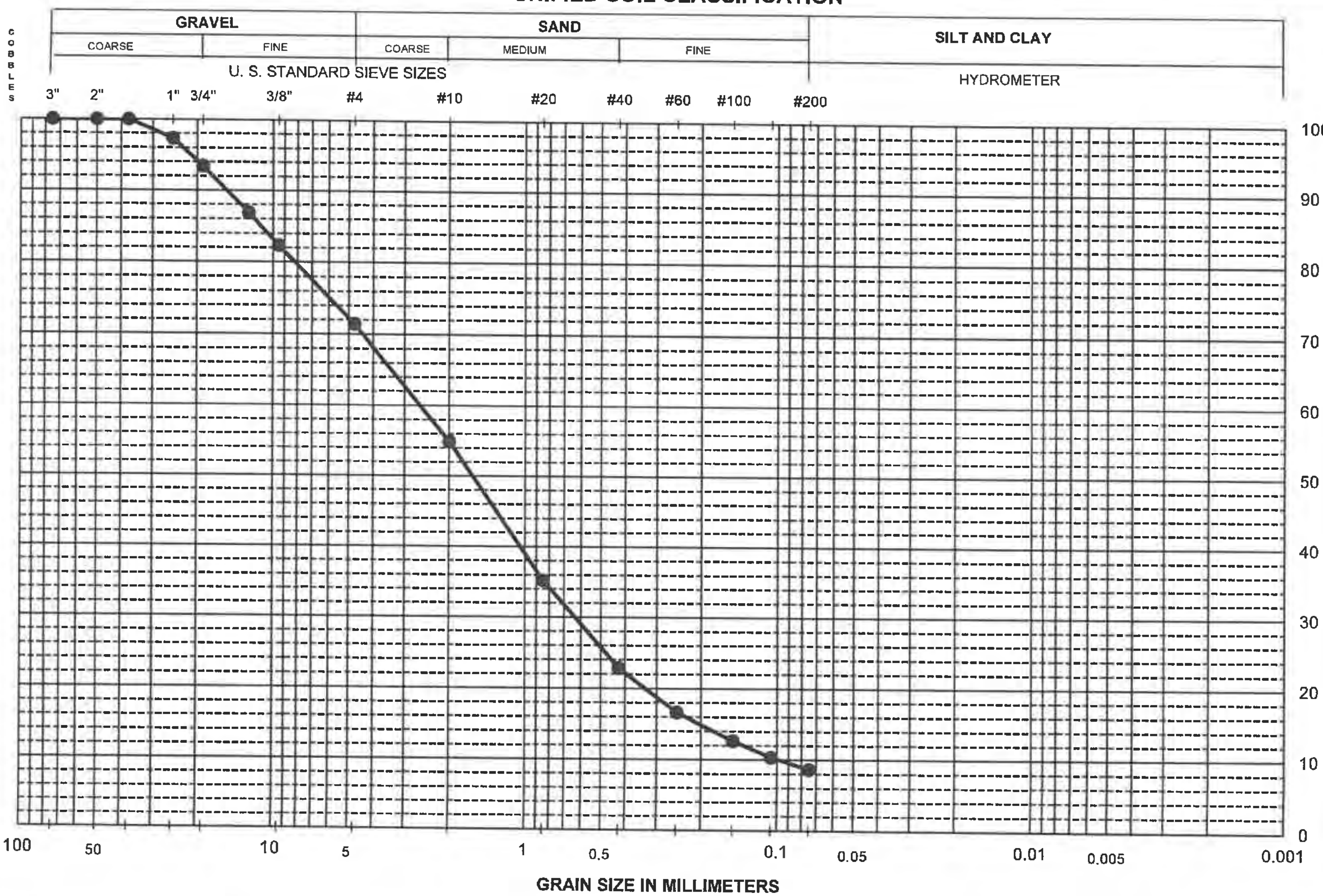
PROJECT NAME: Rialto WWTP
PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Hydro Rialto WWTP SB-5 35 ft

AECOM

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	97.3
3/4"	19.00	93.4
1/2"	12.50	86.8
3/8"	9.50	82.3
#4	4.75	71.4
#10	2.00	54.9
#20	0.850	35.2
#40	0.425	22.8
#60	0.250	16.6
#100	0.150	12.6
#140	0.106	10.3
#200	0.075	8.6

Hydrometer Analysis

% Cobbles	---
% Gravel	28.6
% Sand	62.8
% Fines	8.6
D_{85}	11.200
D_{60}	2.613
D_{50}	1.617
D_{30}	0.636
D_{15}	0.204
D_{10}	0.100
C_u	26.2
C_c	1.6

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 μm	Description and Classification
SB-5	11	50.0	●	2.0	---	---	---	**Light olive brown Well-Graded SAND with Silt and Gravel (SW-SM)**

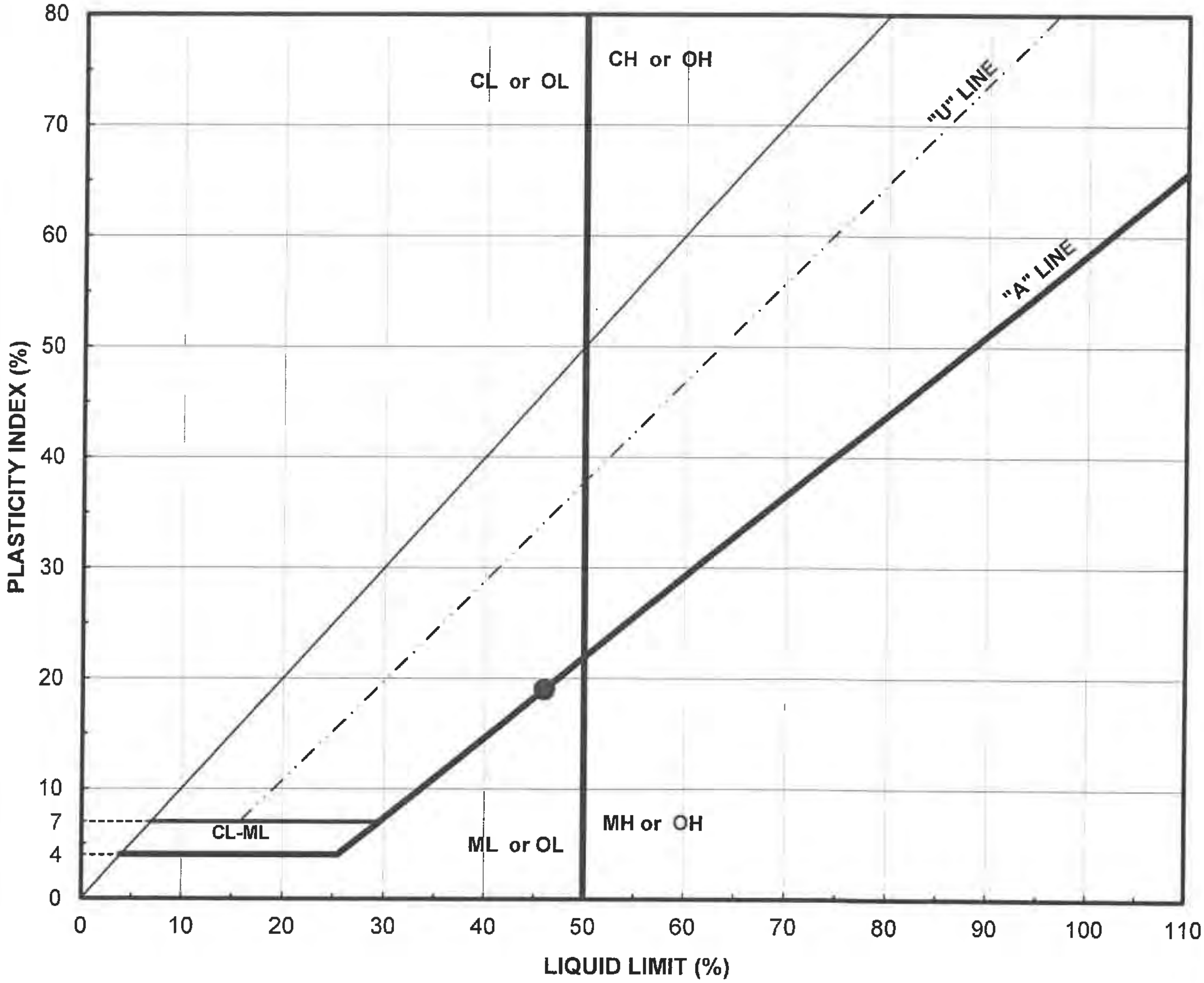
PROJECT NAME: Rialto WWTP

PROJECT NUMBER: 60570758

PARTICLE-SIZE DISTRIBUTION CURVES

C:\Projects\Rialto\SB-1\Sieve Rialto WWTP SB-5 50 ft

AECOM

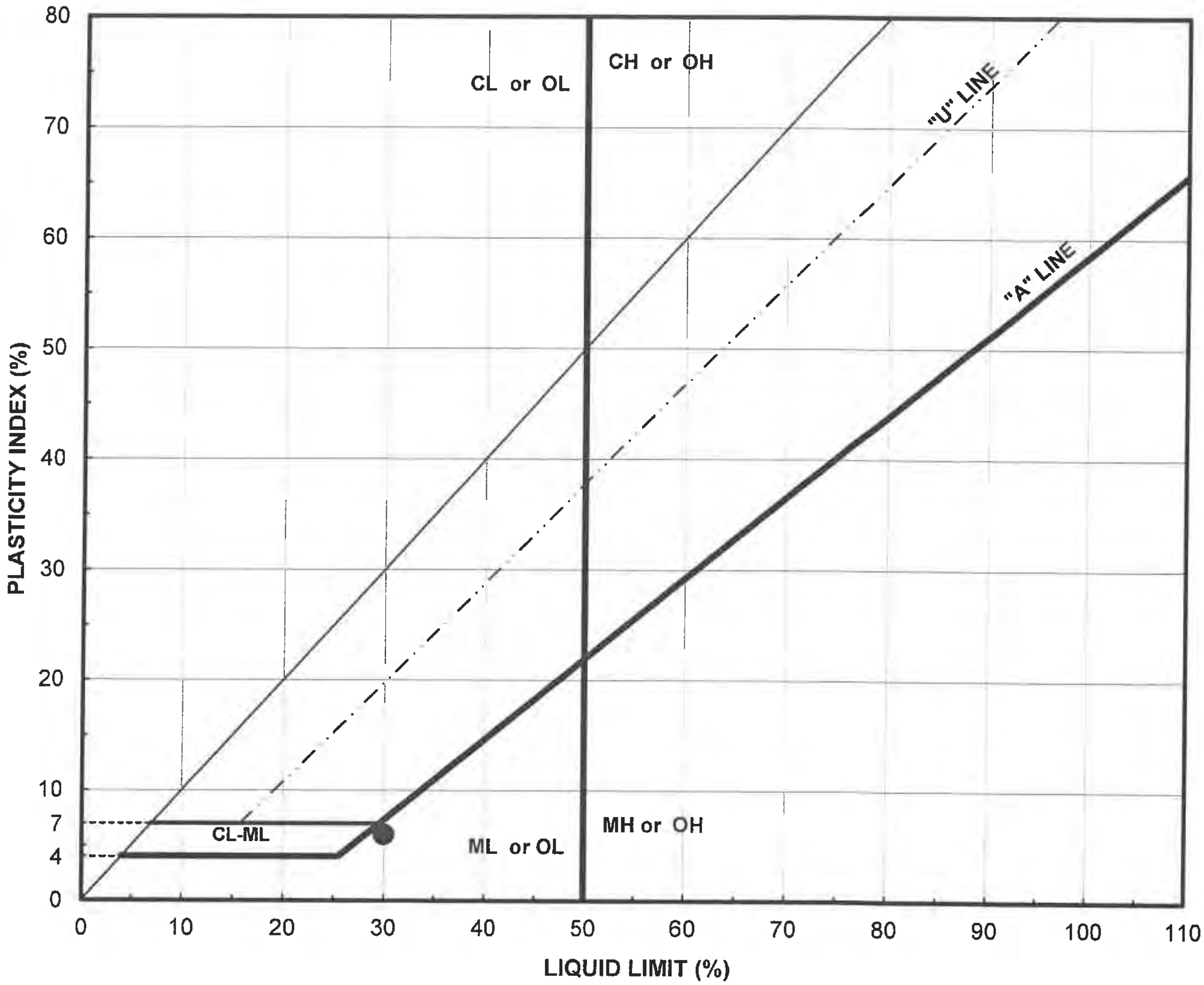


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
SB-5	2A	5.0	10.9	46	19	Pale brown Clayey SILT (ML)

Project Name: **Rialto WWTP**

Project Number: **60570758**

PLASTICITY CHART



Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
SB-5	8	35.0	15.6	30	6	Pale olive SILT with Sand (ML)

Project Name: **Rialto WWTP**
Project Number: **60570758**

PLASTICITY CHART

LABORATORY TEST RESULTS

NMG, 5/5/10
10049-01

Sample	*Compacted Moisture (%)*	*Compacted Dry Density (pcf)*	*Final Moisture (%)*	*Volumetric Swell (%)*	*Expansion Index[1] Value/Method*		*Expansive Classification[2]*	*Soluble Sulfate (%)*	*Sulfate Exposure[3]*
C-1 B-1 0'-5'	6.4	107.4	17.0	0	0	B	Very Low	0.05	Negligible
C-2 B-1 0'-5'	6.3	121.1	11.4	0	0	B	Very Low	0.05	Negligible

Test Method:

ASTM D4829 / UBC Standard 18-2

HACH SF-1 (Turbidimetric)

Notes:

1. Expansion Index (EI) method of determination:
   [A] E.I. determined by adjusting water content to achieve a 50 ±1% degree of saturation
   [B] E.I. calculated based on measured saturation within the range of 40% and 60%
2. 1997 UBC Table 18-1-B *(Classification of Expansive Soil)*
3. 1997 UBC Table 19-A-4 *(Requirement for Concrete Exposed to Sulfate-Containing Solutions)*

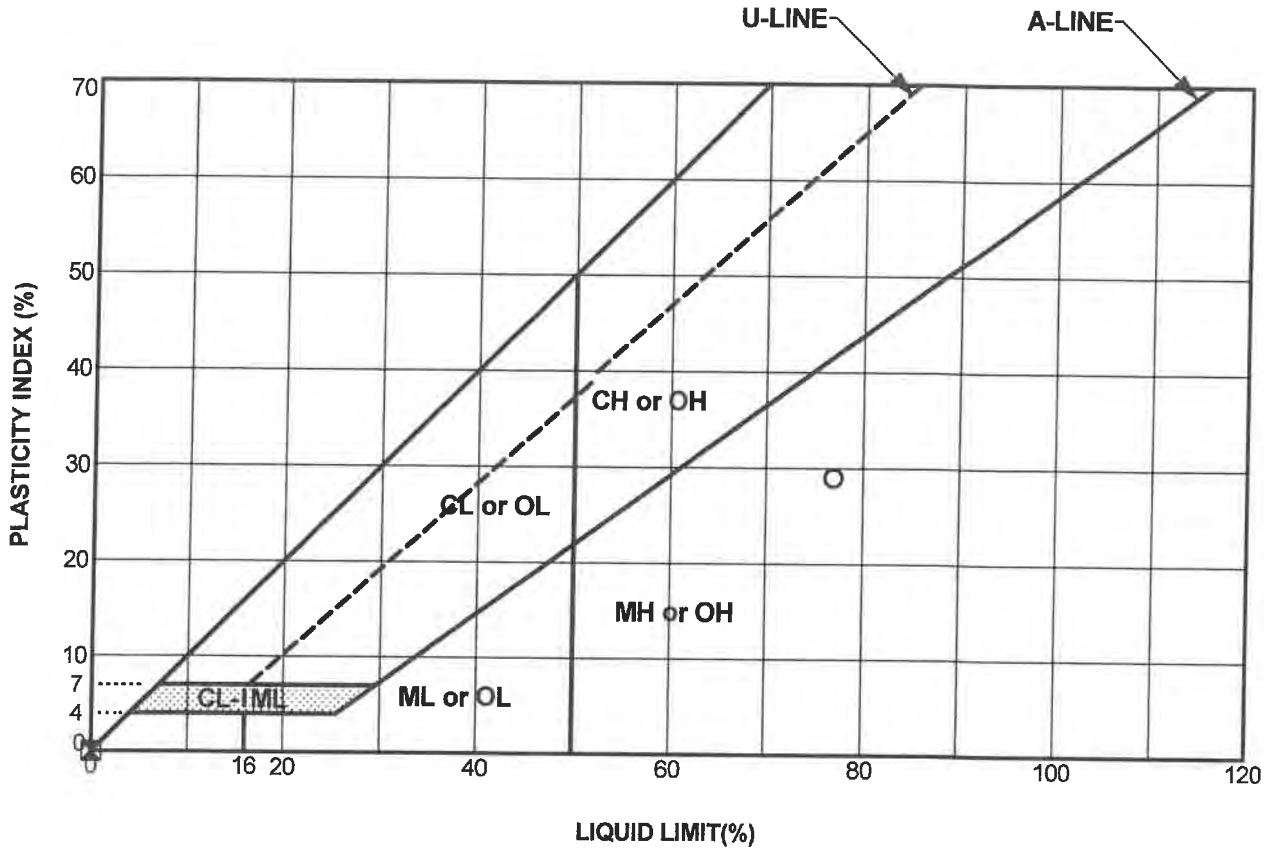
Expansion Index and Soluble Sulfate Test Results

(FRM001 Rev.5)

Project No. 10049-01

Project Name: Rentech / Rialto

NMG



Symbol	Boring Number	Depth (feet)	Sample Number	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	C-1	25.0	D-6	96	77	29	CH	(Qal) Dark Grayish Brown Silty CLAY
⊠	C-4	15.0	D-4	41	NP	NP	SM/ML	(Qal) Pale Gray Silty SAND / Sandy SILT

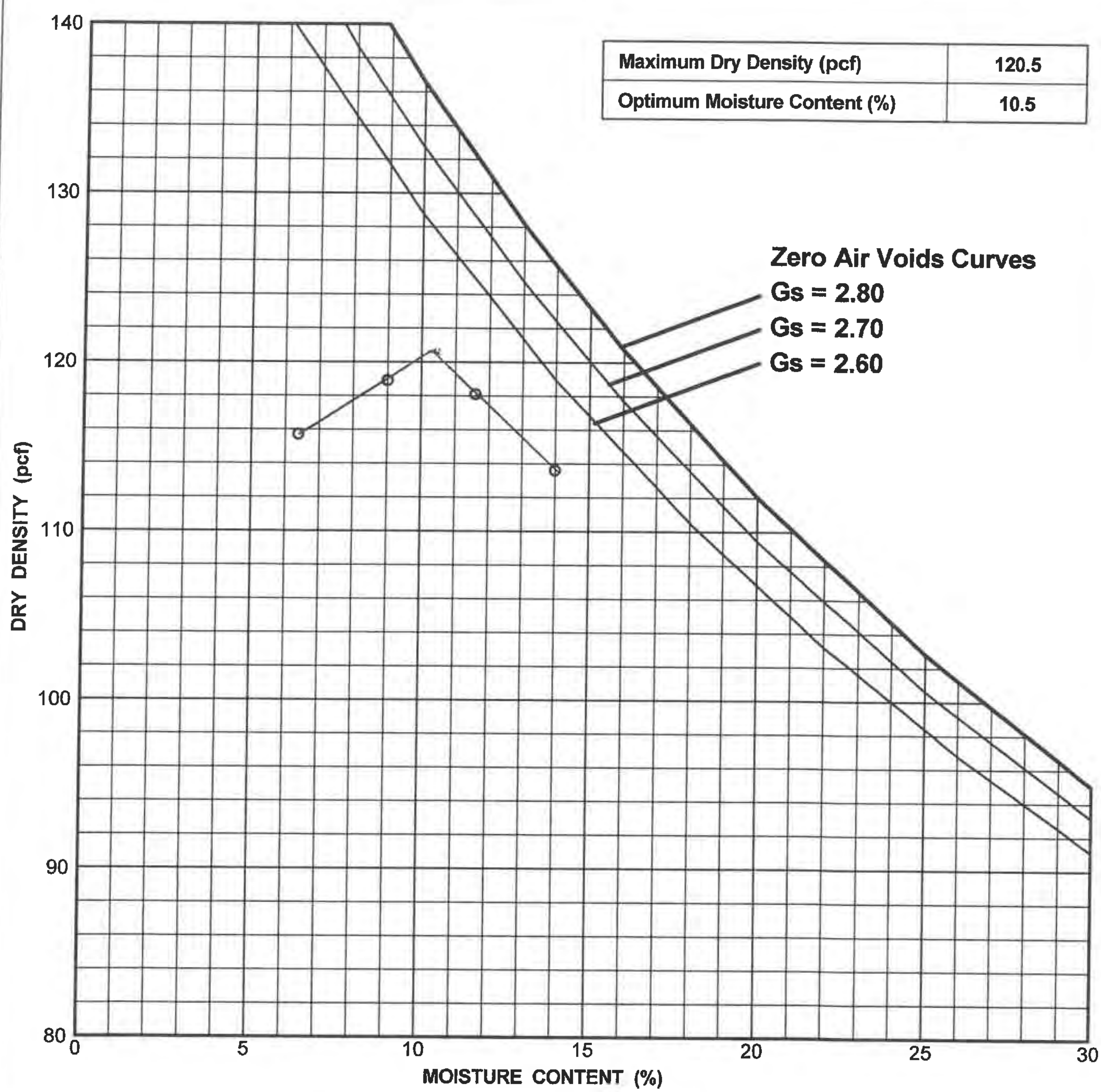
PLASTICITY CHART

Rentech/ Rialto

Rialto

PROJECT NO. 10049-01

NMG Geotechnical, Inc.



Maximum Dry Density (pcf)	120.5
Optimum Moisture Content (%)	10.5

Boring No. C-1	**Sample No. B-1**	**Depth: 2.0 ft**	
Sample Description: (Qal) Yellowish Brown Silty SAND			
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**	33
Comments: 1557A			

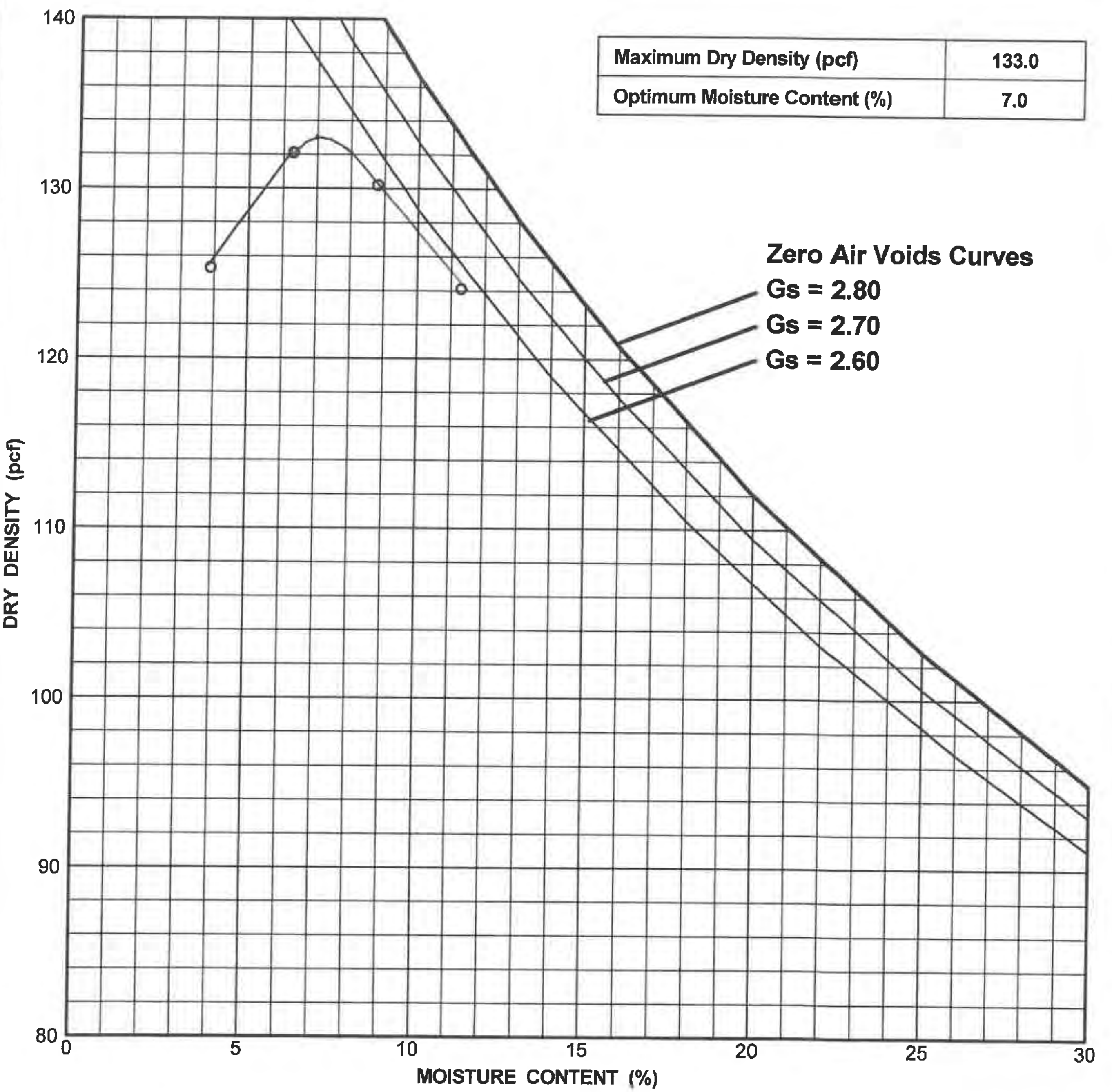
COMPACTION TEST RESULTS

Rentech/ Rialto

Rialto

PROJECT NO. 10049-01

NMG Geotechnical, Inc.

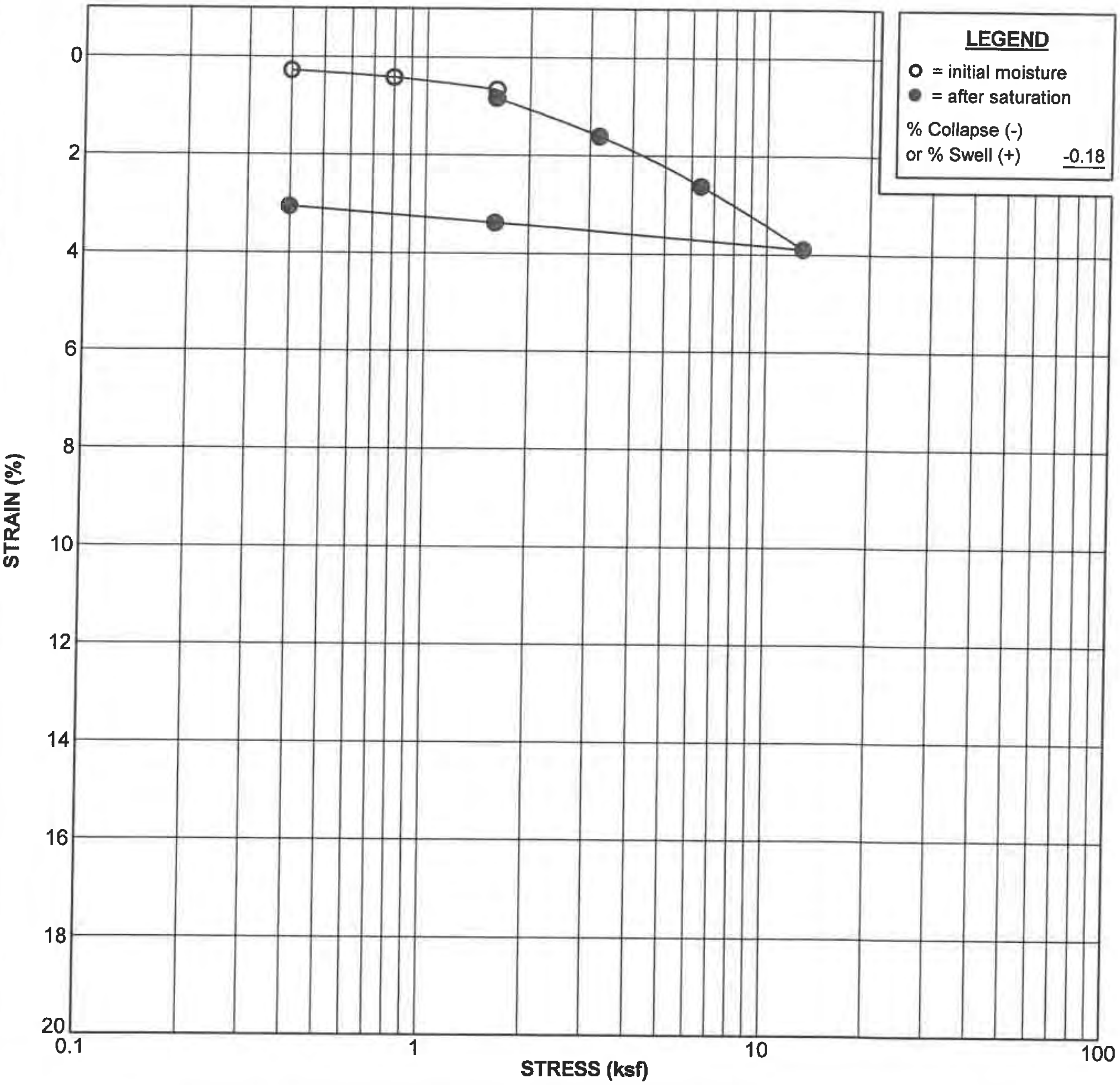


Boring No. C-2	Sample No. B-1	Depth: 2.0 ft
Sample Description:	(Qal) Pale Brown Silty SAND	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve: 20
Comments:	1557A	

COMPACTION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG Geotechnical, Inc.



Boring No. C-1	Sample No. D-1	Depth: 2.5 ft
Sample Description:	(Qal) Yellowish Brown Silty SAND	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	5.6	100.6	23.1	0.644
Final	18.8	103.7	83.8	0.595

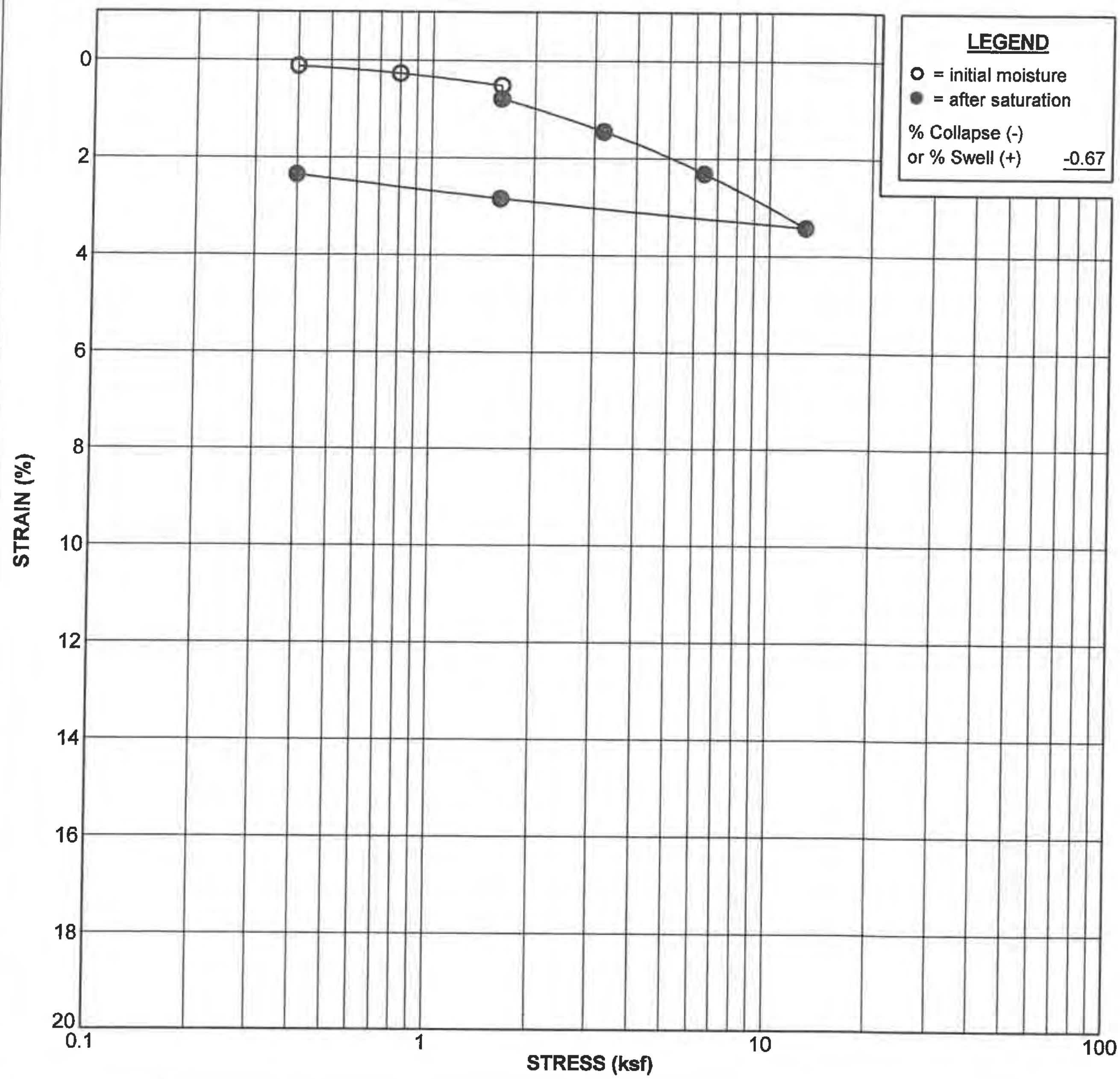
CONSOLIDATION TEST RESULTS

Rentech/ Rialto

Rialto

PROJECT NO. 10049-01

NMG Geotechnical, Inc.



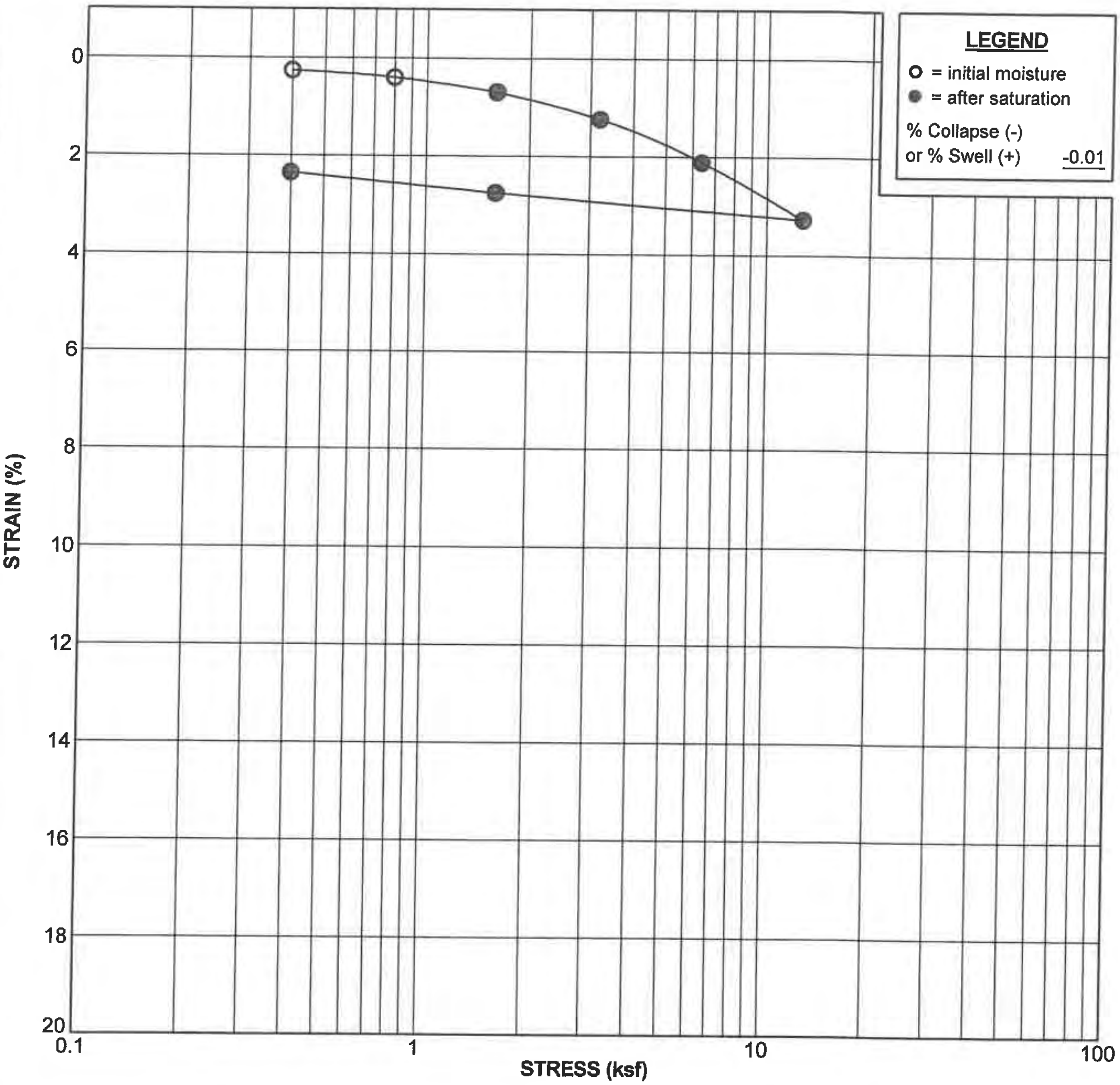
Boring No. C-1	Sample No. D-4	Depth: 15.0 ft
Sample Description:	(Qal) Light Gray SAND	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	4.1	96.0	14.9	0.723
Final	24.9	97.8	95.5	0.691

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG Geotechnical, Inc.



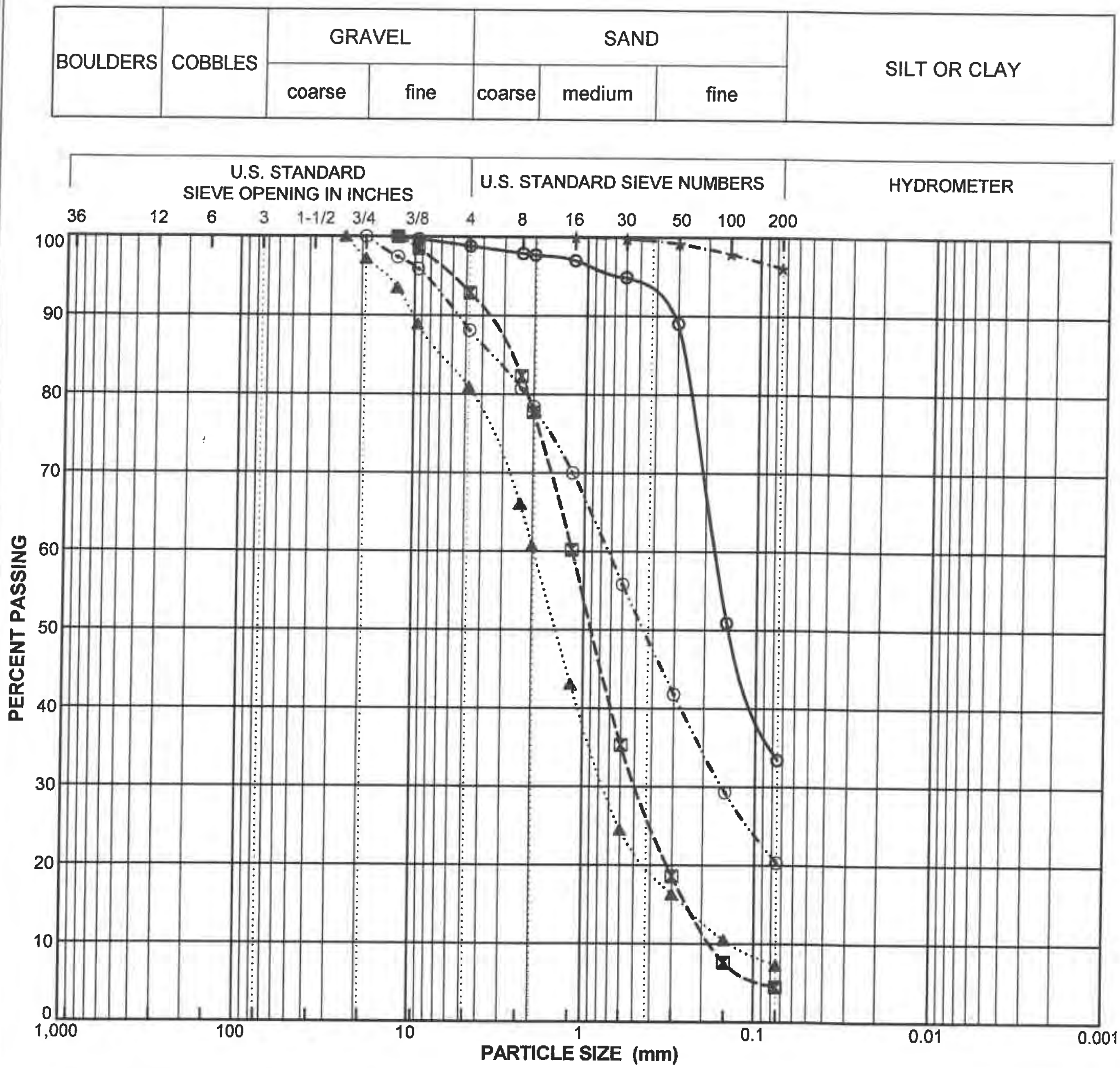
Boring No. C-3	Sample No. D-3	Depth: 10.0 ft
Sample Description:	(Qal) Olive Silty SAND	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	24.7	90.2	78.6	0.833
Final	26.7	92.3	89.4	0.792

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG Geotechnical, Inc.



Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	C-1	B-1	2.0							33		SM
⊠	C-1	D-3	10.0	2						5		SP
▲	C-1	D-5	20.0	2						7		SP
★	C-1	D-6	25.0	9	77	29				96		CH
⊙	C-2	B-1	2.0							20		SM

PARTICLE SIZE DISTRIBUTION

Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG Geotechnical, Inc.

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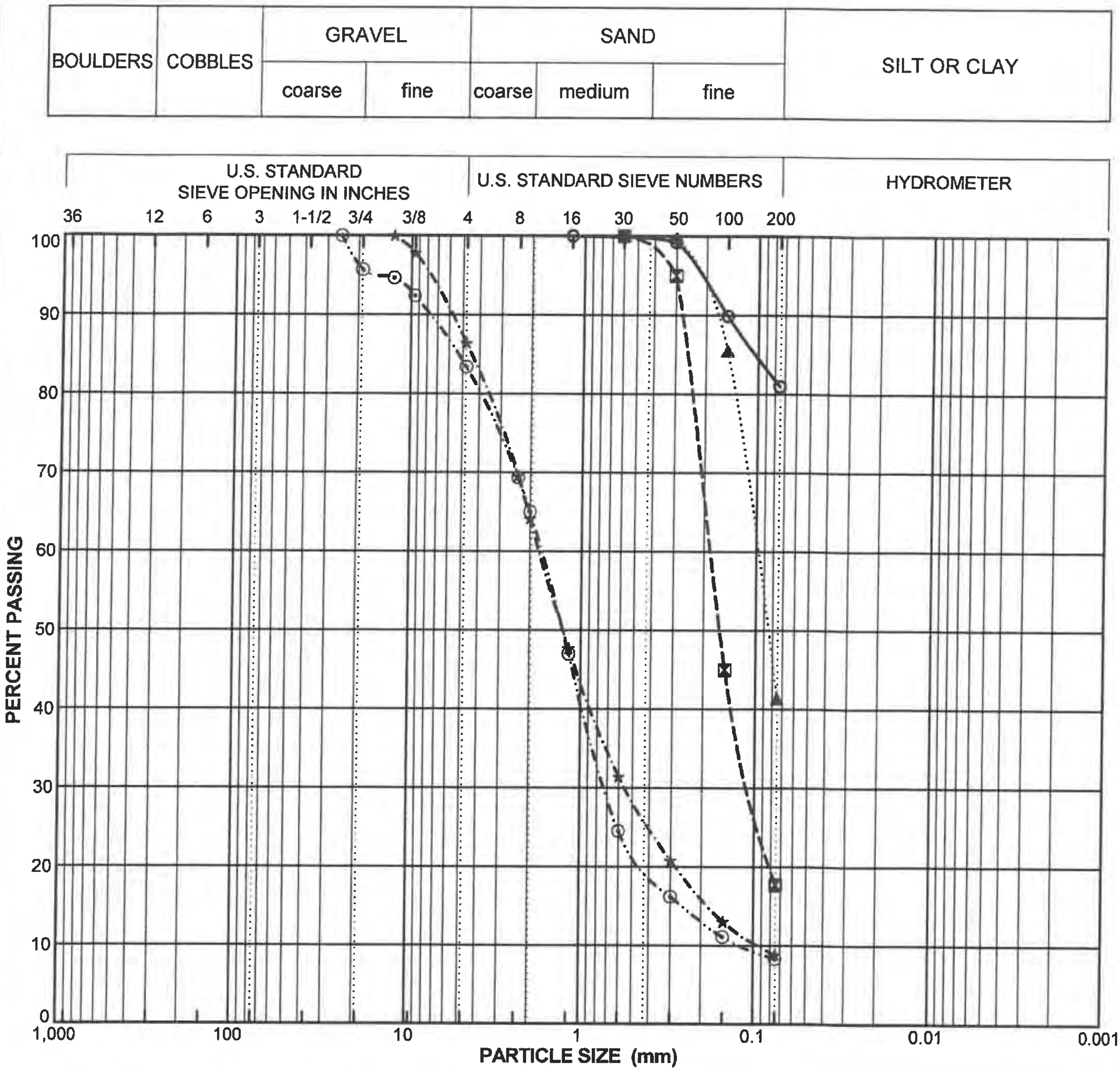


Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	C-3	D-2	5.0	8						81		SM
⊠	C-4	D-2	5.0	6						18		SM
▲	C-4	D-4	15.0	5	NP	NP				41		SM/ML
★	Y-2	D-4	20.0	5						9		SP
⊙	Y-2	D-10	60.0							8		SP

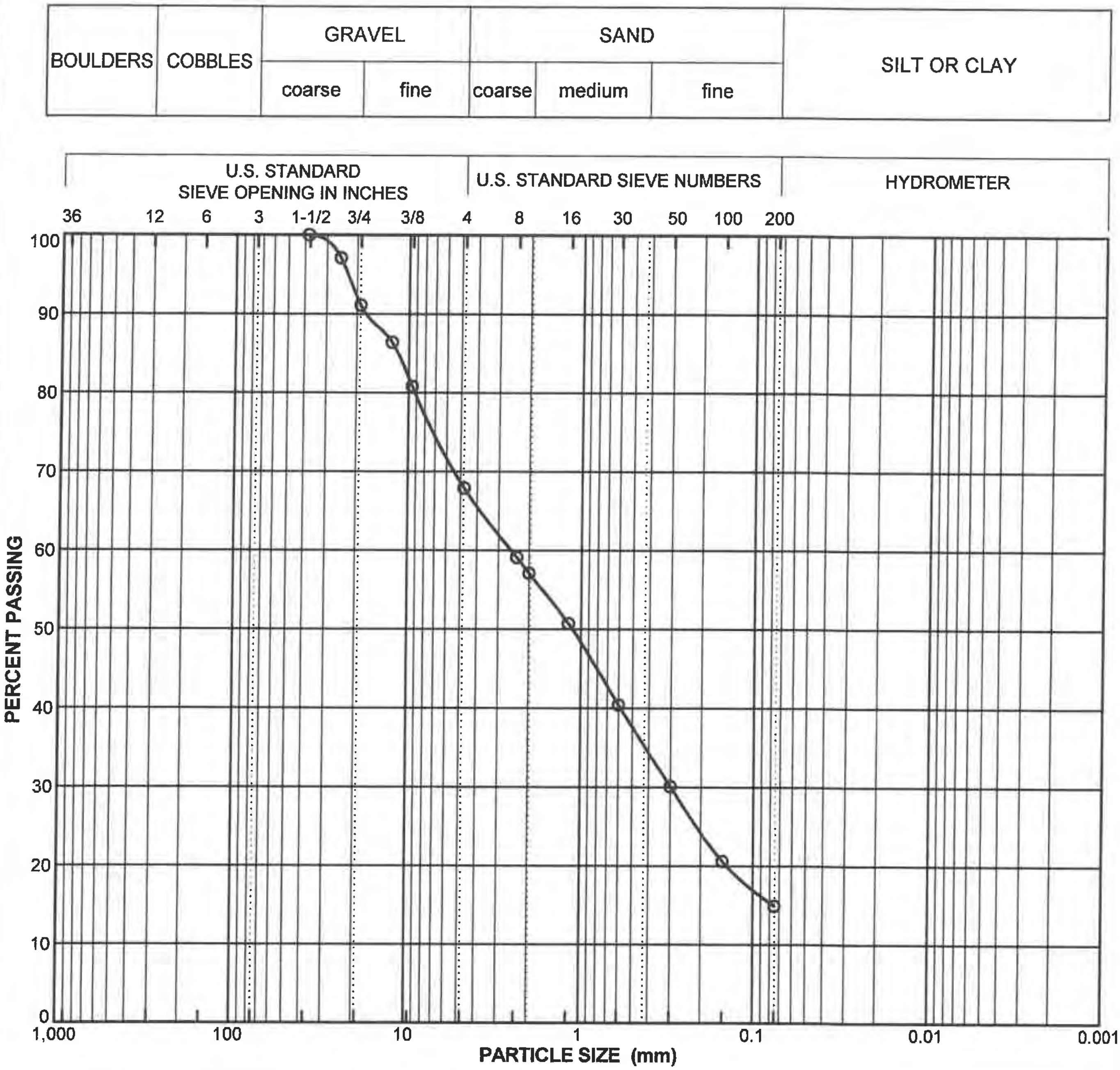
PARTICLE SIZE DISTRIBUTION

Rentech/ Rialto

Rialto

PROJECT NO. 10049-01

NMG Geotechnical, Inc.



Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2µ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2µ (%)	USCS
O	Y-5	B-1	2.0							15		SM

PARTICLE SIZE DISTRIBUTION

Rentech/ Rialto
Rialto
PROJECT NO. 10049-01

NMG Geotechnical, Inc.

LABORATORY TEST RESULTS

NMG, 10/11/10
10049-02

APPENDIX C
SUMMARY OF SOIL LABORATORY DATA

Boring/Sample Information							Sieve/ Hydrometer		Atterberg Limits			Direct Shear				Compaction					
												Ultimate		Peak							
Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Blow Count (N)	Field Moisture Content (%)	Field Dry Density (pcf)	Fines Content (% pass. #200)	Clay Content (% pass. 2µ)	LL (%)	PI (%)	USCS Group Symbol	Cohesion (psf)	Friction Angle (°)	Cohesion (psf)	Friction Angle (°)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Expansion Index	R-Value	Soluble Sulfate Content (% by wt)	Remarks / Other Laboratory Tests
GS-1	B-1	0.0					25	5	NP	NP	SM							0		0.015	
GS-2	B-1	0.0					4	2			SP							11		0.030	
HA-1	B-1	1.0							52	27	CH							105		0.080	
HS-1	D-2	7.5	903.5	52	9	104					ML	150	27	150	28						
HS-1	B-1	8.5	902.5				65	14	NP	NP	ML	200	29	400	29	119.0	11.5	18		0.055	
HS-1	D-3	12.5	898.5	42	2	112					SM/ML	0	31	0	31						
HS-1	D-9	42.5	868.5	50/3"	3	110	4				SP										
HS-2	SPT-1	2.5	911.7	25	10		44	7			SM										
HS-2	D-2	10.0	904.2	36	23	98					SM/ML										
HS-2	D-4	20.0	894.2	79	22	100					SM/ML	0	31	0	31						
HS-2	D-5	25.0	889.2	50/6"	3	110	7				SP/SM										
HS-3	SPT-2	10.0	900.8	16	11				59	36	CH										
HS-4	SPT-1	2.5	902.5	6	8		44				SM										
HS-4	D-2	10.0	895.0	34	36	87					ML	200	24	200	25						
HS-4	SPT-3	12.5	892.5	18	20		65	9			ML										
HS-4	D-4	20.0	885.0	44	27	97					ML	50	28	50	29						
HS-4	D-5	25.0	880.0	77/11"	6	104	6				SP/SM										
RW-1	D-2	7.5	905.5	50/6"	4	132					SM/SP	0	36	0	37						
RW-1	D-4	17.5	895.5	66	8	106					SM/SP	0	35	0	36						
SRI	B-1	2.8					58	7			ML										
T-1	B-1	4.5	948.0								SM								69		
T-11	B-1	1.0	912.5				65		NP	NP	ML					104.0	14.5				
T-2	B-1	1.0	945.0								SM								68		
T-4	B-1	1.0	942.5				21				SM					128.5	6.5		65		
T-5	B-1	2.0	906.0				93		36	5	ML	40	30	400	28	100.5	19.5	33		0.055	
T-5	B-1	2.1	905.9		22	92					ML										
T-5	B-1	2.2	905.8		22	92					ML										
T-6	B-1	2.0	903.0				99		70	45	CH	100	23	500	25	99.0	21.0	114		0.055	

NMG Geotechnical, Inc.

Laboratory Test Methods

The majority of NMG's laboratory testing is performed in general compliance with the latest test method by the American Standards for Testing and Materials (**ASTM**). Other testing procedures used include the State of California Department of Transportation Test Method (**CTM**), or other test method as designated below. The laboratory test results for this project are included in this appendix. Discussion, conclusion and recommendations pertaining to these results are found in the text of this report.

TEST METHOD		TEST DESCRIPTION
ASTM	*Other*	
D422		Particle Size Distribution (Full Sieve and Hydrometer)
D516	CTM 422	Chloride Content
D1140		Grain Size (Passing No. 200 sieve)
D1557[1]	CTM 216[2]	Soil and Aggregate Base Compaction 1 – Maximum Dry Density 2 – Maximum Wet Density
D1559[1] D1560[2] D2726[1]	CTM 308[2]	Asphalt Concrete Compaction (Maximum Density) 1 – Marshall Apparatus 2 – Hveem Apparatus
D1883		California Bearing Ratio Test
D2166		Unconfined Compressive Strength
D2216		Water (Moisture) Content and Dry Density
D2419	CTM 217	Sand Equivalent Value
D2435		Consolidation Properties
D2487 D2488		Description, Identification and Classification of Soils (Unified Soil Classification System, USCS)
D2844	CTM 301	Resistance (R-Value)
D3080		Direct Shear
D4318		Liquid Limits, Plastic Limit and Plasticity Index (Atterberg Limits)
D4829		Expansion Index
D5156	HACH SF-1 (Turbidimetric) CTM 417,422	Soluble Sulfate Content
G51		Ph
G57	CTM 643	Electric Resistivity

Sample	Compacted Moisture (%)	Compacted Dry Density (pcf)	Final Moisture (%)	Volumetric Swell (%)	Expansion Index[1] Value/Method		Expansive Classification[2]	Soluble Sulfate (%)	Sulfate Exposure[3]
HA-1 B-1 1'-2'	18.7	86.1	41.2	10.2	105	B	High	0.080	Negligible
HS-1 B-1 7.5'-10'	10.5	107.1	21.8	1.8	18	A	Very Low	0.055	Negligible
T-5 B-1 2'	13.6	90.8	33.4	3.7	33	B	Low	0.055	Negligible
T-6 B-1 1'-3'	20.1	88.3	40.7	10.4	114	B	High	0.055	Negligible
GS-1 S-1 0'	7.4	112.7	15.4	0	0	B	Very Low	0.015	Negligible
GS-2 S-1 0'	10.5	104.6	13.8	1.2	11	B	Very Low	0.030	Negligible

Test Method:

ASTM D4829 / UBC Standard 18-2

HACH SF-1 (Turbidimetric)

Notes:

1. Expansion Index (EI) method of determination:
   [A] E.I. determined by adjusting water content to achieve a 50 ±1% degree of saturation
   [B] E.I. calculated based on measured saturation within the range of 40% and 60%
2. 1997 UBC Table 18-1-B *(Classification of Expansive Soil)*
3. 1997 UBC Table 19-A-4 *(Requirement for Concrete Exposed to Sulfate-Containing Solutions)*

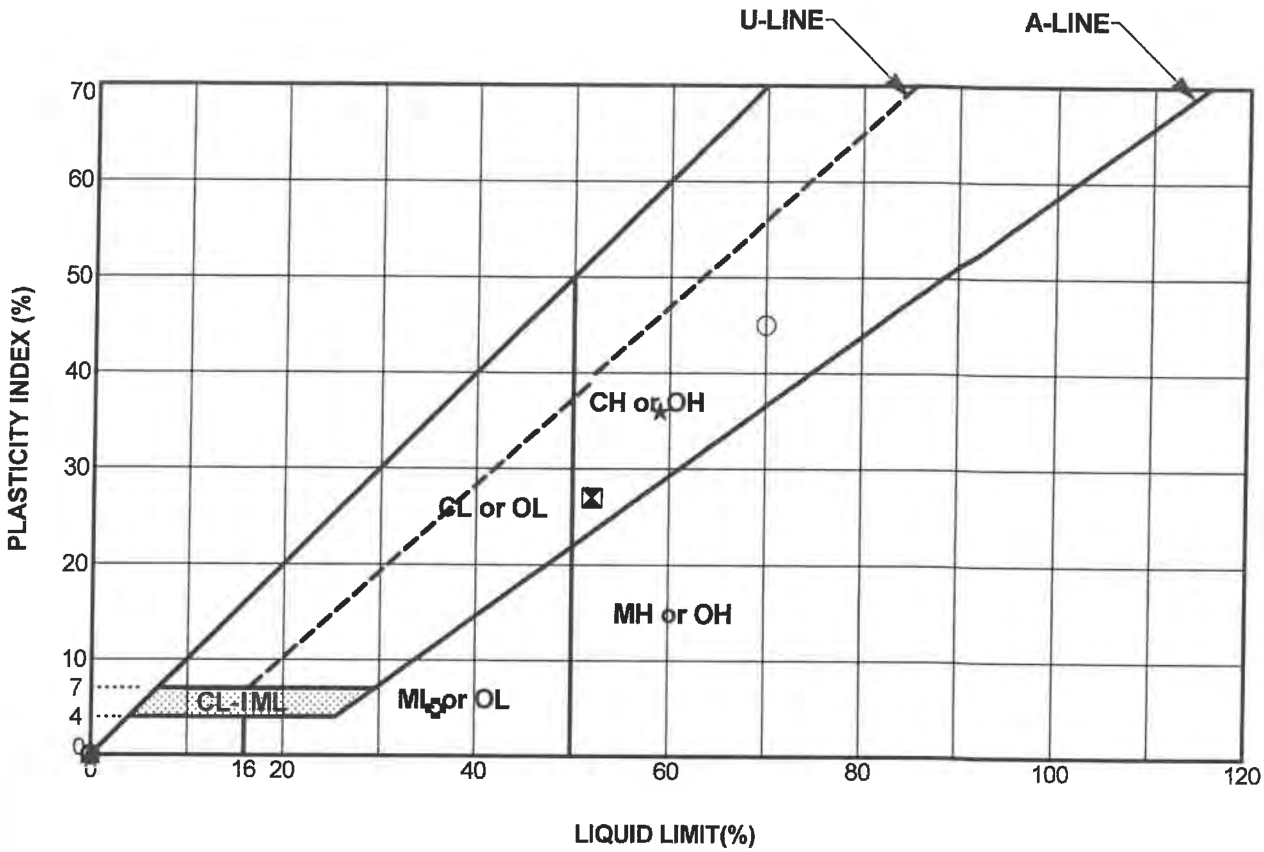
Expansion Index and Soluble Sulfate Test Results

(FRM001 Rev.5)

Project No. 10049-02

Project Name: Rentech / Rialto

NMG

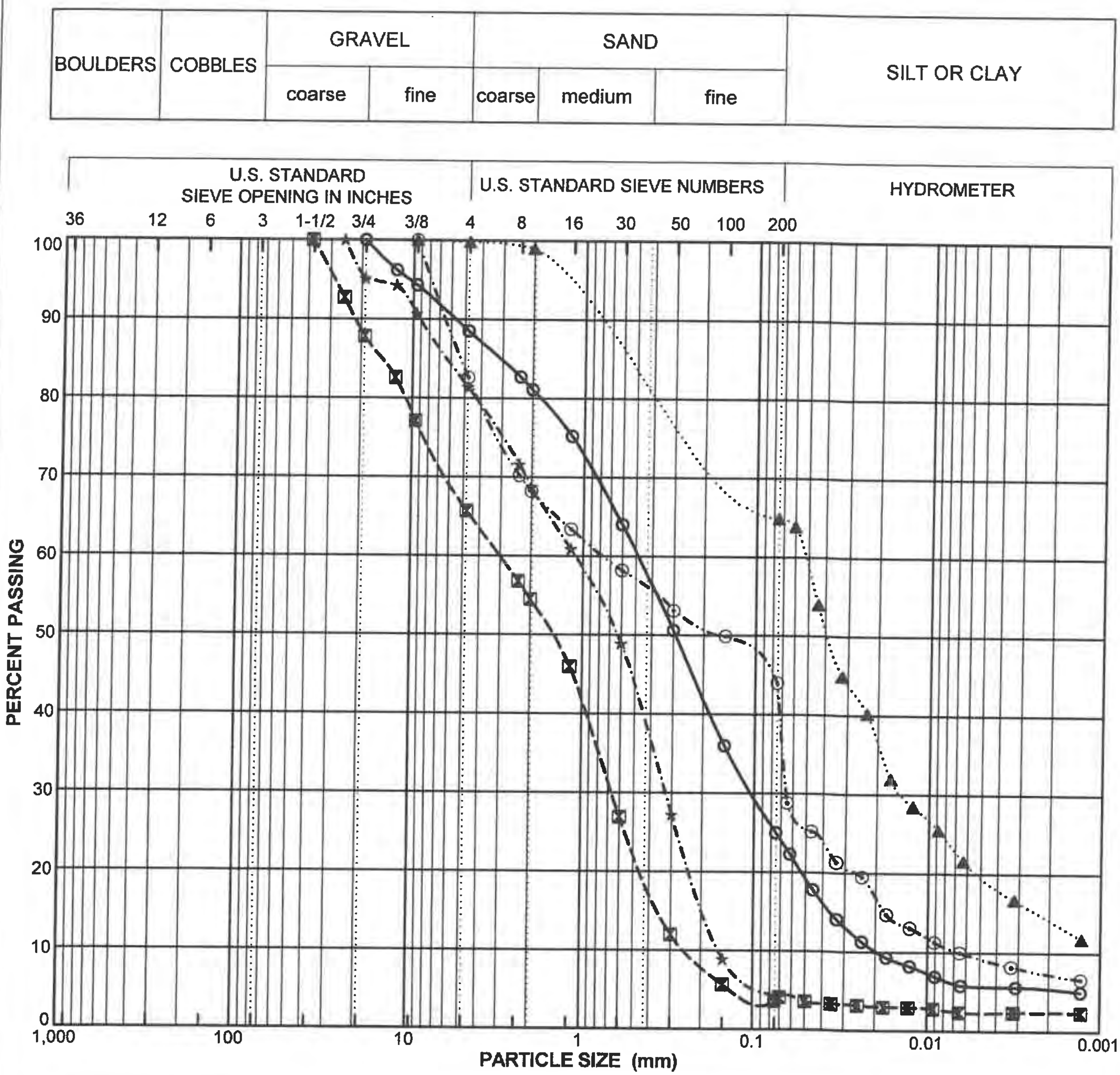


Symbol	Boring Number	Depth (feet)	Sample Number	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	GS-1	0.0	S-1	25	NP	NP	SM	(Qf) Yellowish Brown Silty SAND
⊠	HA-1	1.0	B-1		52	27	CH	(Aw) Gray Silty CLAY
▲	HS-1	8.5	B-1	65	NP	NP	ML	(Qal) Yellowish Brown Sandy SILT
★	HS-3	10.0	SPT-2		59	36	CH	(Aw) Pale Yellowish Brown Silty CLAY
⊙	T-11	1.0	B-1	65	NP	NP	ML	(Aw) Pale Yellow Sandy SILT
✪	T-5	2.0	B-1	93	36	5	ML	(Aw) Yellowish Brown Clayey SILT
○	T-6	2.0	B-1	99	70	45	CH	(Aw) Gray Silty CLAY

NMG Geotechnical, Inc.

PLASTICITY CHART

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02



Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	GS-1	S-1	0.0		NP	NP				25	5	SM
⊠	GS-2	S-1	0.0							4	2	SP
▲	HS-1	B-1	8.5		NP	NP				65	14	ML
★	HS-1	D-9	42.5	3				7.1	0.53	4		SP
⊙	HS-2	SPT-1	2.5	10						44	7	SM

PARTICLE SIZE DISTRIBUTION

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

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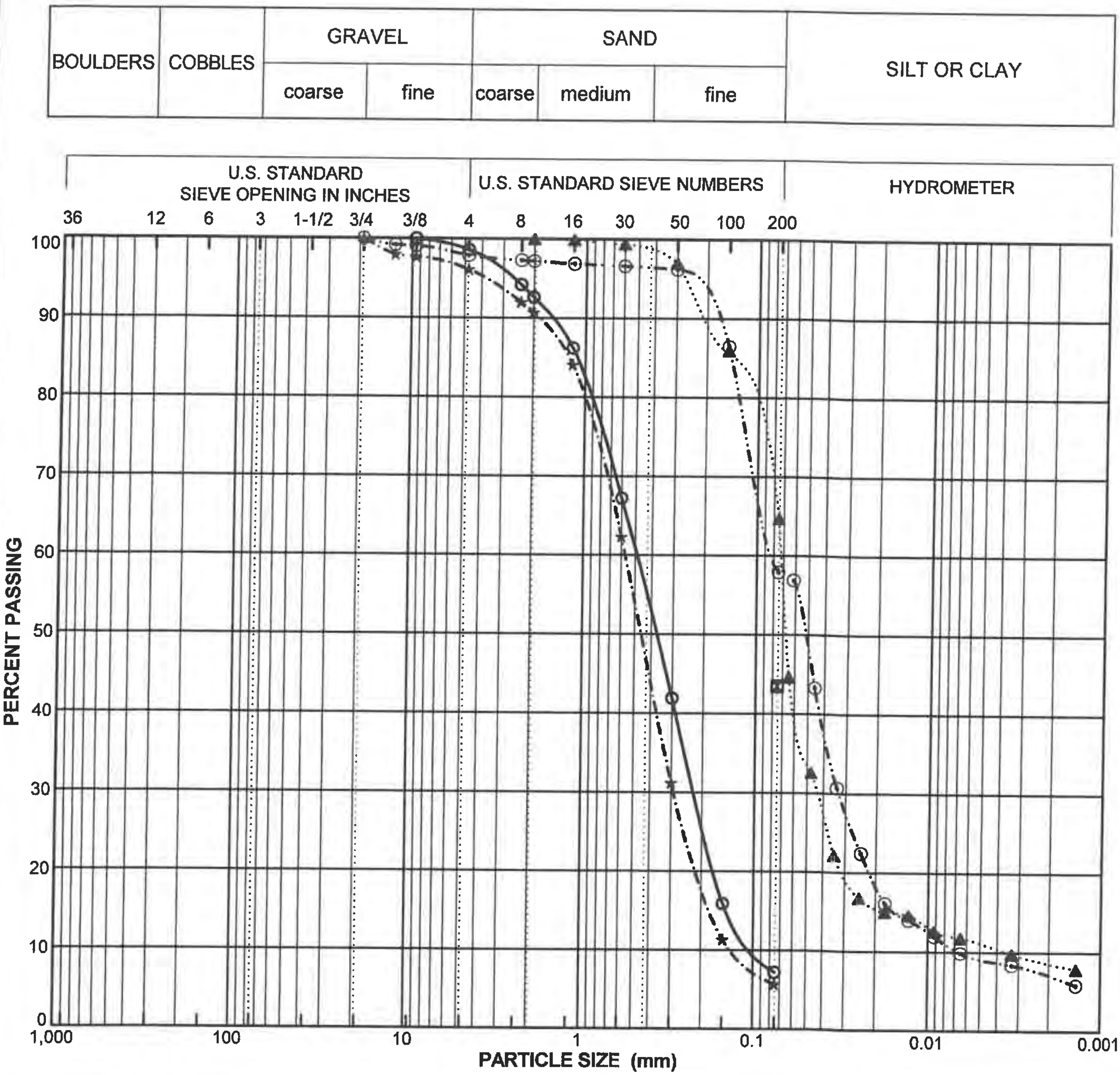


Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	HS-2	D-5	25.0	3				4.5	1.0	7		SP/SM
⊠	HS-4	SPT-1	2.5	8						44		SM
▲	HS-4	SPT-3	12.5	20						65	9	ML
★	HS-4	D-5	25.0	6				4.1	1.1	6		SP/SM
⊙	SRI	B-1	2.8							58	7	ML

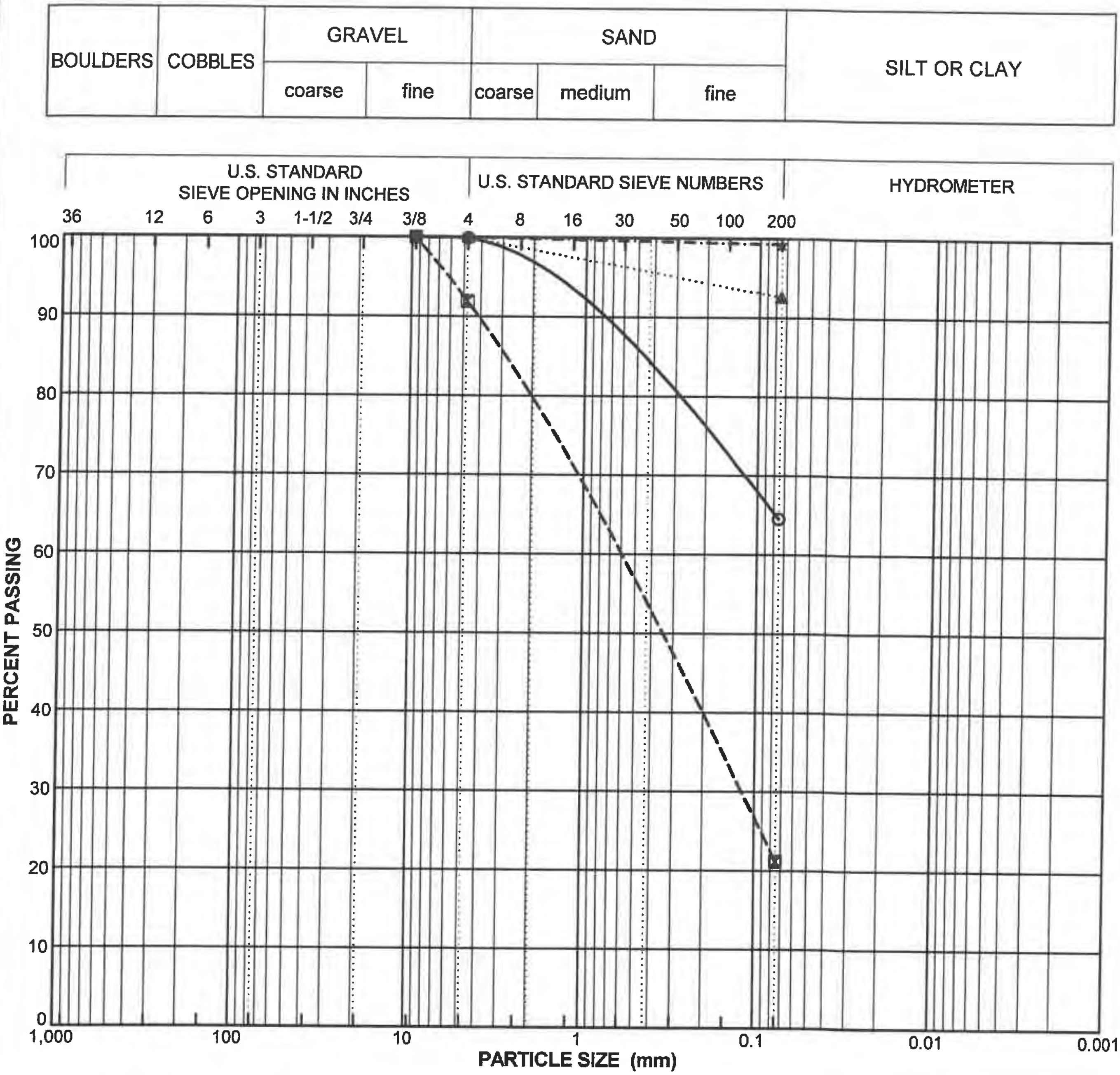
PARTICLE SIZE DISTRIBUTION

Rentech/ Rialto

Rialto

PROJECT NO. 10049-02

NMG Geotechnical, Inc.



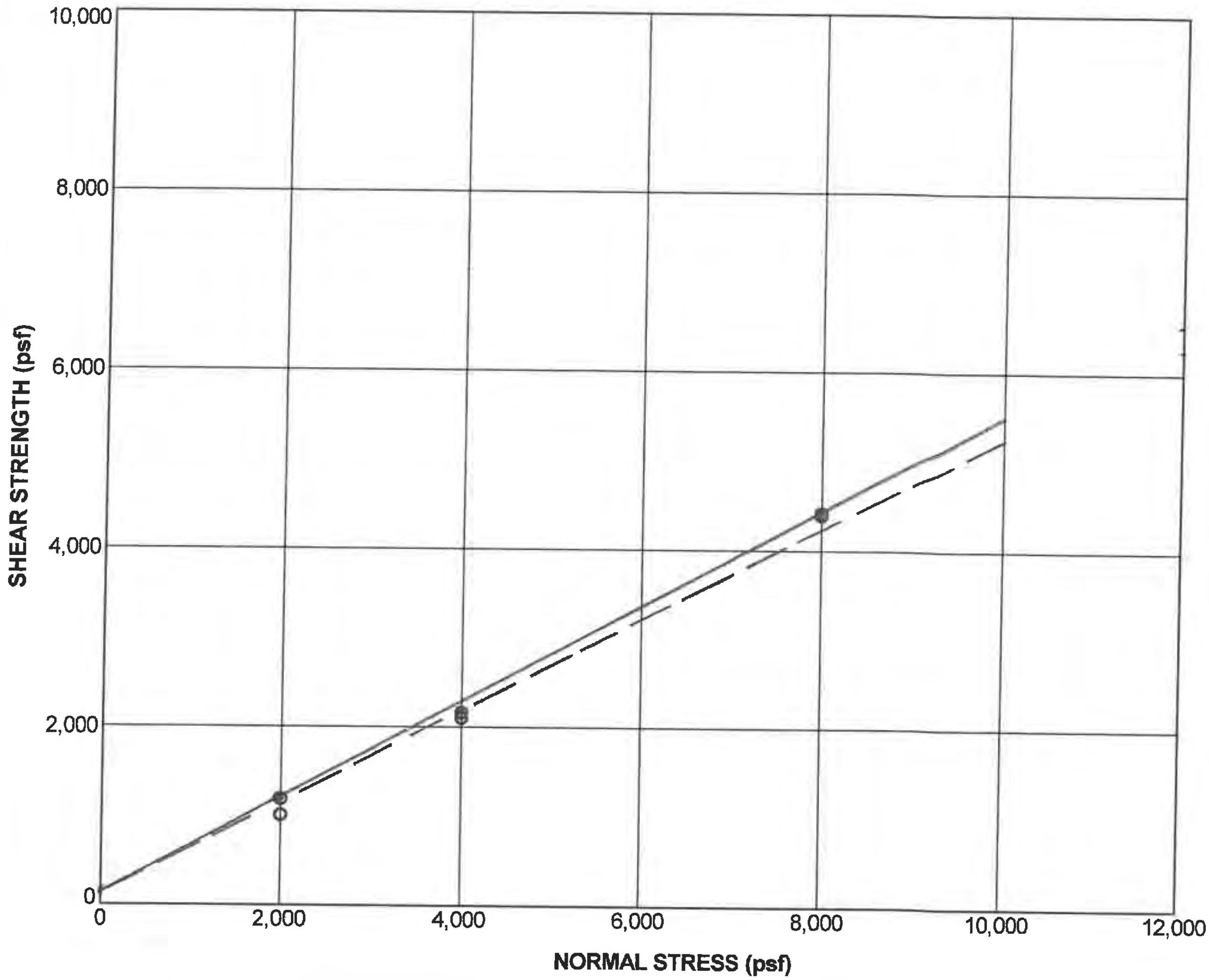
Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	T-11	B-1	1.0		NP	NP				65		ML
⊠	T-4	B-1	1.0							21		SM
▲	T-5	B-1	2.0		36	5				93		ML
★	T-6	B-1	2.0		70	45				99		CH

PARTICLE SIZE DISTRIBUTION

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Template: NMSIV; Prj ID: 10049-02.GPJ; Printed: 9/29/10



Boring No. HS-1	Sample No. D-2	Depth: 7.5 ft
Sample Description: (Qal) Grayish Brown Sandy SILT		
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**
Moisture Content (%): 16.8	**Dry Density (pcf):** 114.0	**Degree of Saturation (%):** 99
Sample Type: Undisturbed	**Rate of Shear (in./min.):** 0.005	

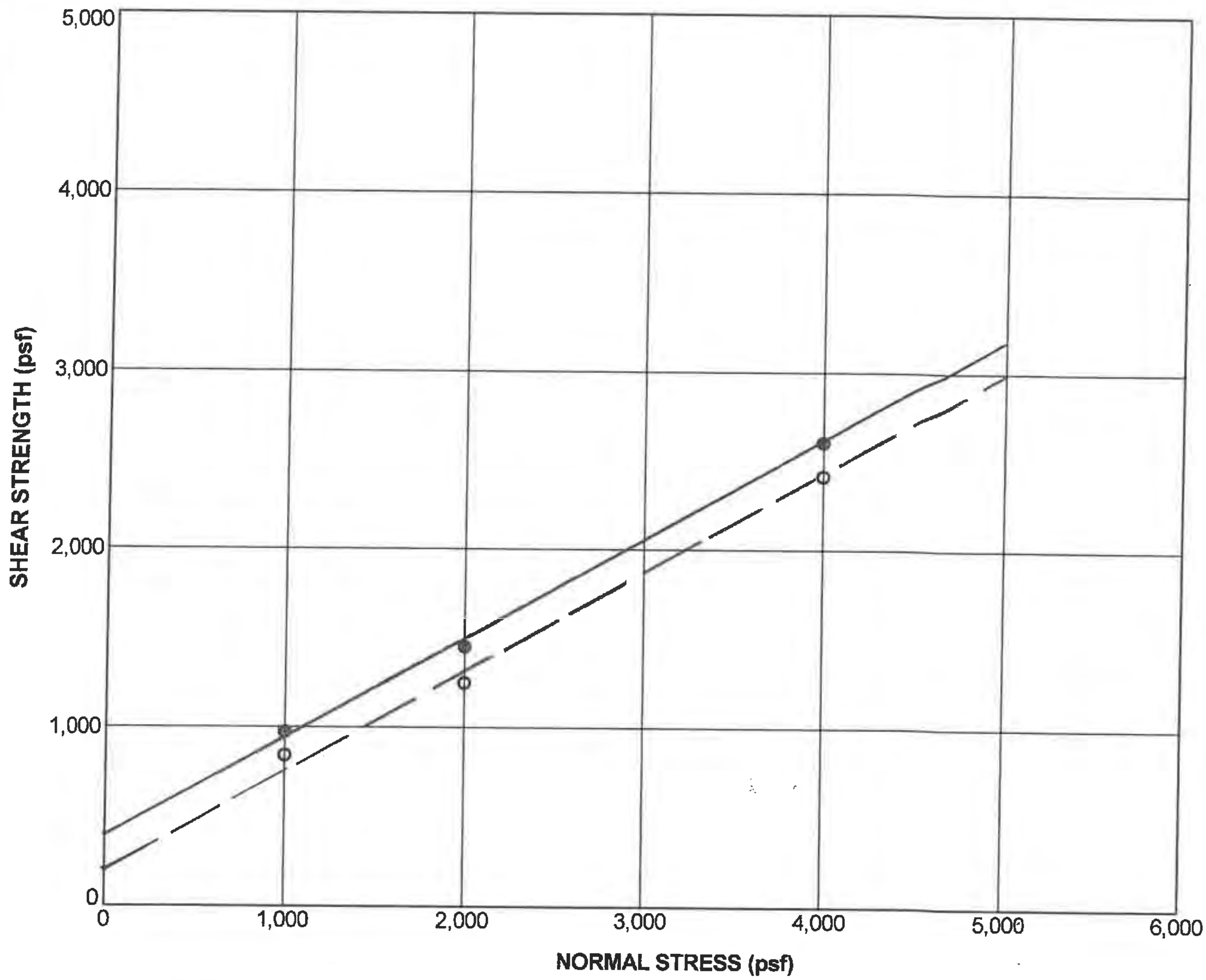
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate O
Cohesion (psf)	150	150
Friction Angle (degrees)	28	27.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. HS-1		Sample No. B-1		Depth: 8.5 ft	
Sample Description:	(Qal) Yellowish Brown Sandy SILT				
Liquid Limit:	NP	Plasticity Index:	NP	Percent Passing No. 200 Sieve:	65
Moisture Content (%):	17.2	Dry Density (pcf):	110.2	Degree of Saturation (%):	91
Sample Type:	Remolded to 92% RC	Rate of Shear (in./min.):	0.005		

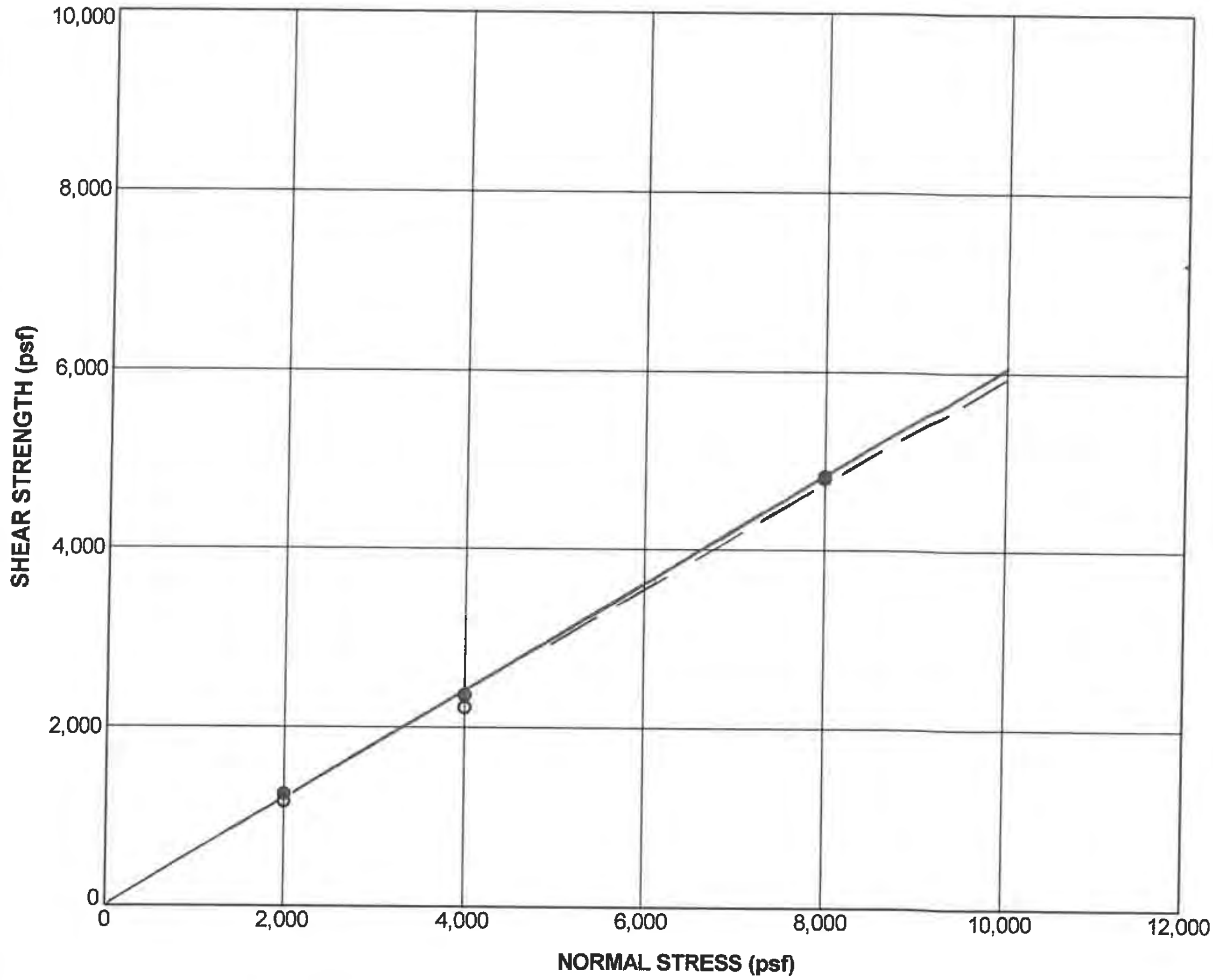
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate O
Cohesion (psf)	400	200
Friction Angle (degrees)	29	29.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



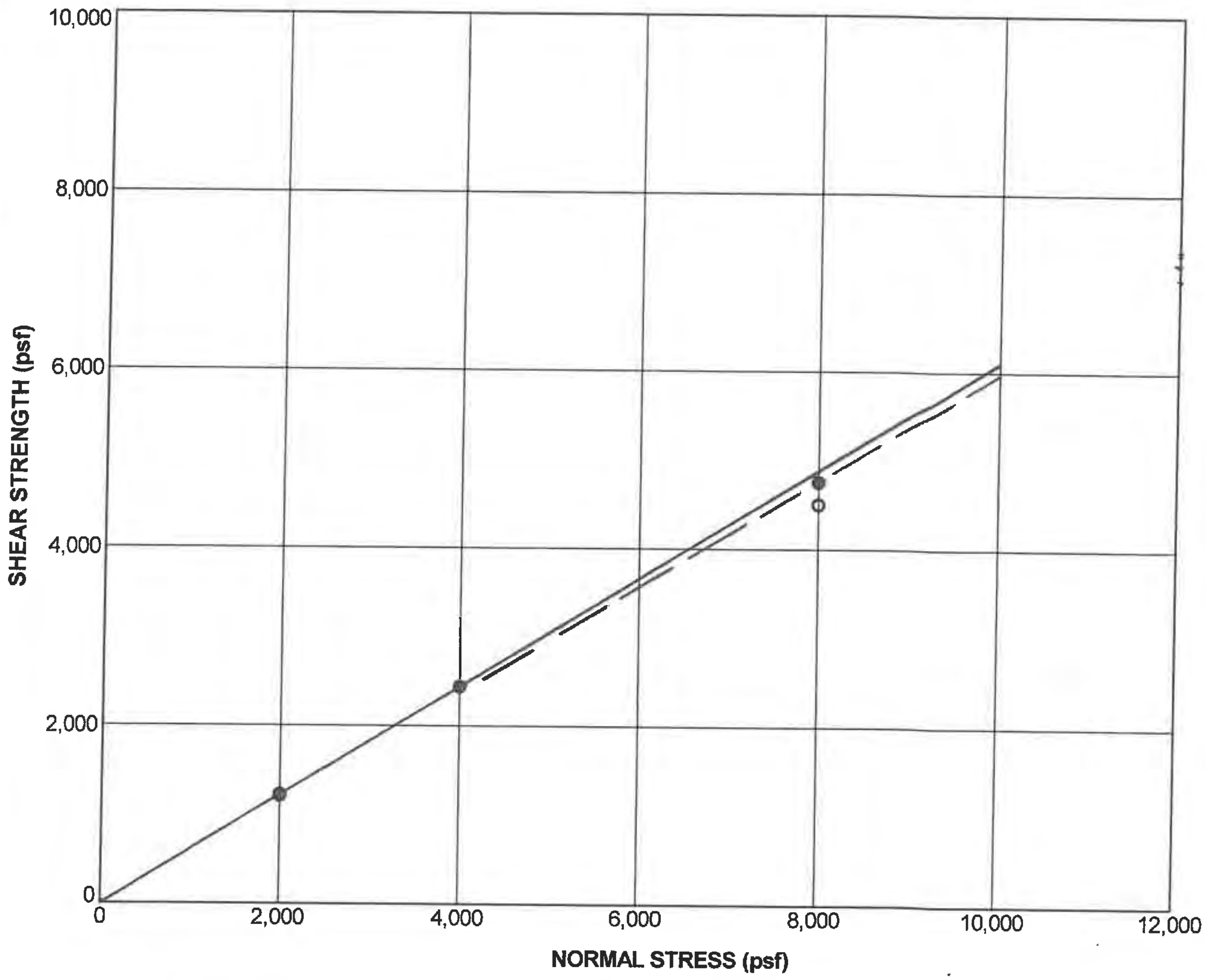
Boring No. HS-1		Sample No. D-3		Depth: 12.5 ft	
Sample Description:	(Qal) Grayish Brown Silty SAND / Sandy SILT				
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve:	
Moisture Content (%):	19.0	Dry Density (pcf):	108.8	Degree of Saturation (%):	97
Sample Type:	Undisturbed	Rate of Shear (in./min.):	0.05		

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate O
Cohesion (psf)	0	0
Friction Angle (degrees)	31	31.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. HS-2	**Sample No. D-4**	**Depth: 20.0 ft**
Sample Description:	(Qal) Grayish Brown Sandy SILT / Silty SAND	
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**
Moisture Content (%): 21.9	**Dry Density (pcf):** 104.0	**Degree of Saturation (%):** 98
Sample Type: Undisturbed	**Rate of Shear (in./min.):** 0.05	

SHEAR STRENGTH PARAMETERS

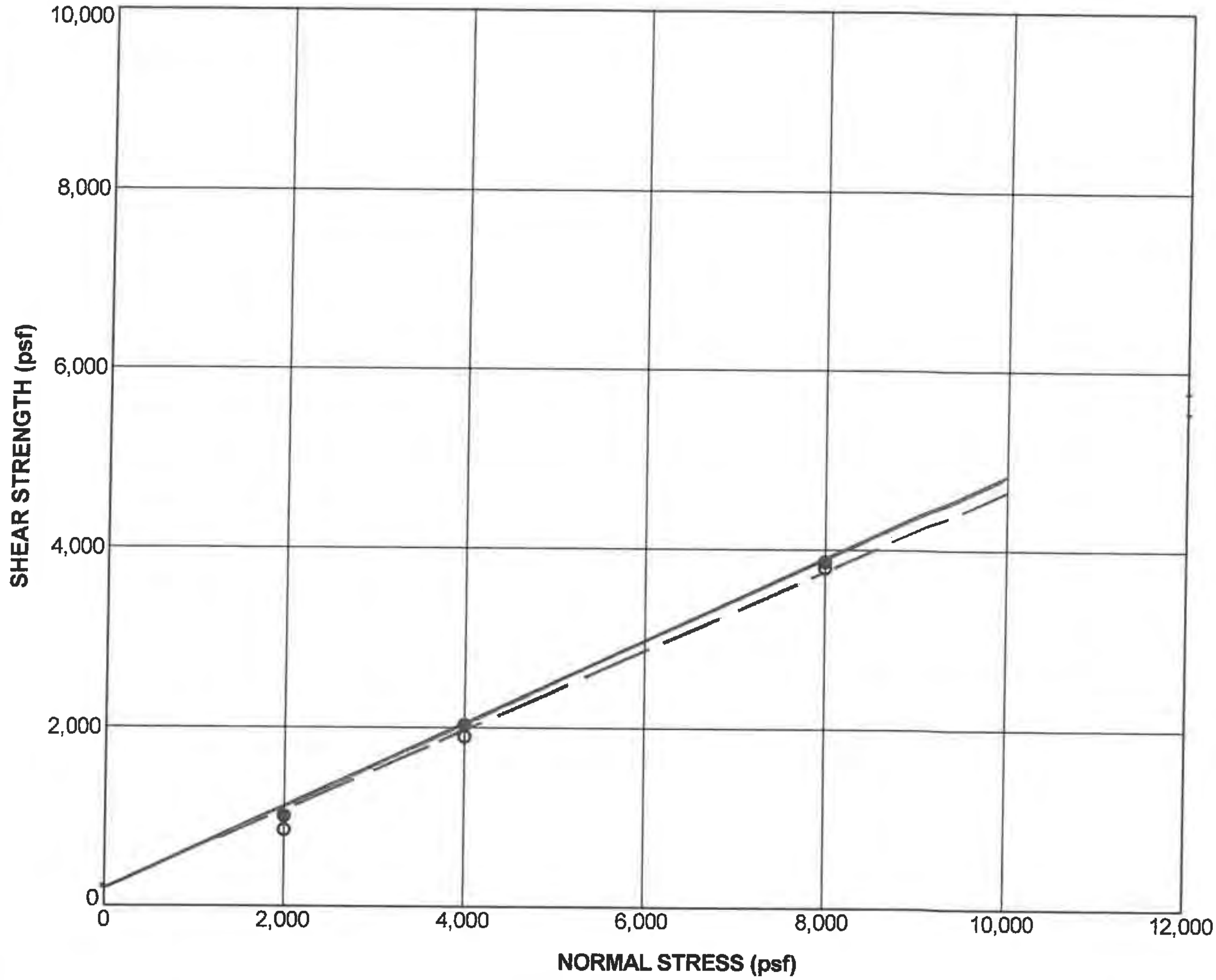
Parameter	Peak ●	Ultimate O
Cohesion (psf)	0	0
Friction Angle (degrees)	31	31.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Template: NMDS; Prj ID: 10049-02.GPJ; Printed: 9/29/10



Boring No. HS-4	Sample No. D-2	Depth: 10.0 ft
Sample Description: (Qal) Grayish Brown SILT		
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:
Moisture Content (%): 84.9	Dry Density (pcf): 92.0	Degree of Saturation (%): 282
Sample Type: Undisturbed	Rate of Shear (in./min.): 0.005	

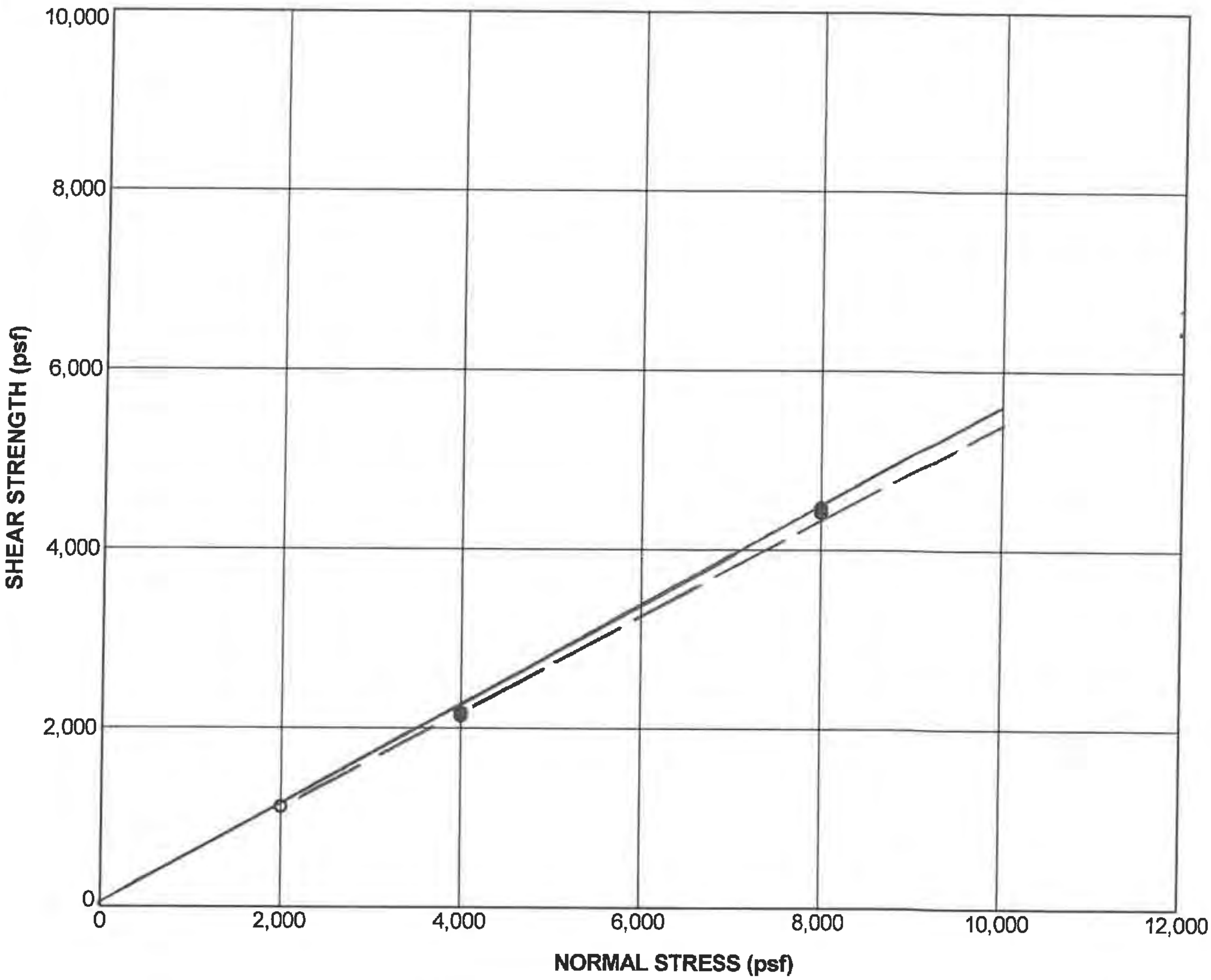
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate ○
Cohesion (psf)	200	200
Friction Angle (degrees)	25	24.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. HS-4		Sample No. D-4		Depth: 20.0 ft	
Sample Description:	(Qal) Grayish Brown Sandy SILT				
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve:	
Moisture Content (%):	28.2	Dry Density (pcf):	94.6	Degree of Saturation (%):	100
Sample Type:	Undisturbed	Rate of Shear (in./min.):	0.005		

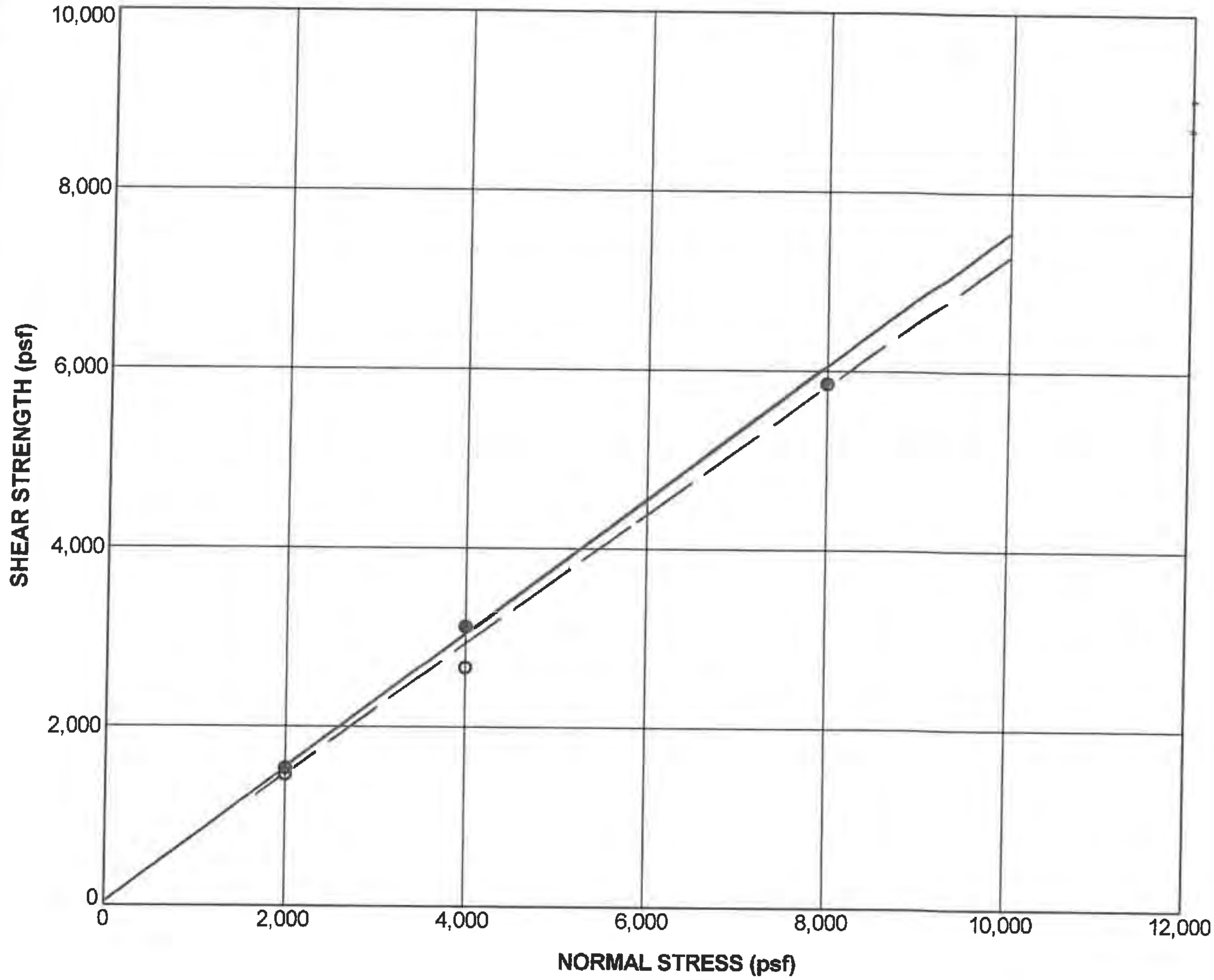
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate O
Cohesion (psf)	50	50
Friction Angle (degrees)	29	28.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. RW-1		**Sample No. D-2**		**Depth: 7.5 ft**	
Sample Description:	(Aw) Grayish Brown Silty SAND w/ Gravel				
Liquid Limit:		**Plasticity Index:**		**Percent Passing No. 200 Sieve:**	
Moisture Content (%):	13.5	**Dry Density (pcf):**	120.3	**Degree of Saturation (%):**	96
Sample Type:	Undisturbed	**Rate of Shear (in./min.):**	0.05		

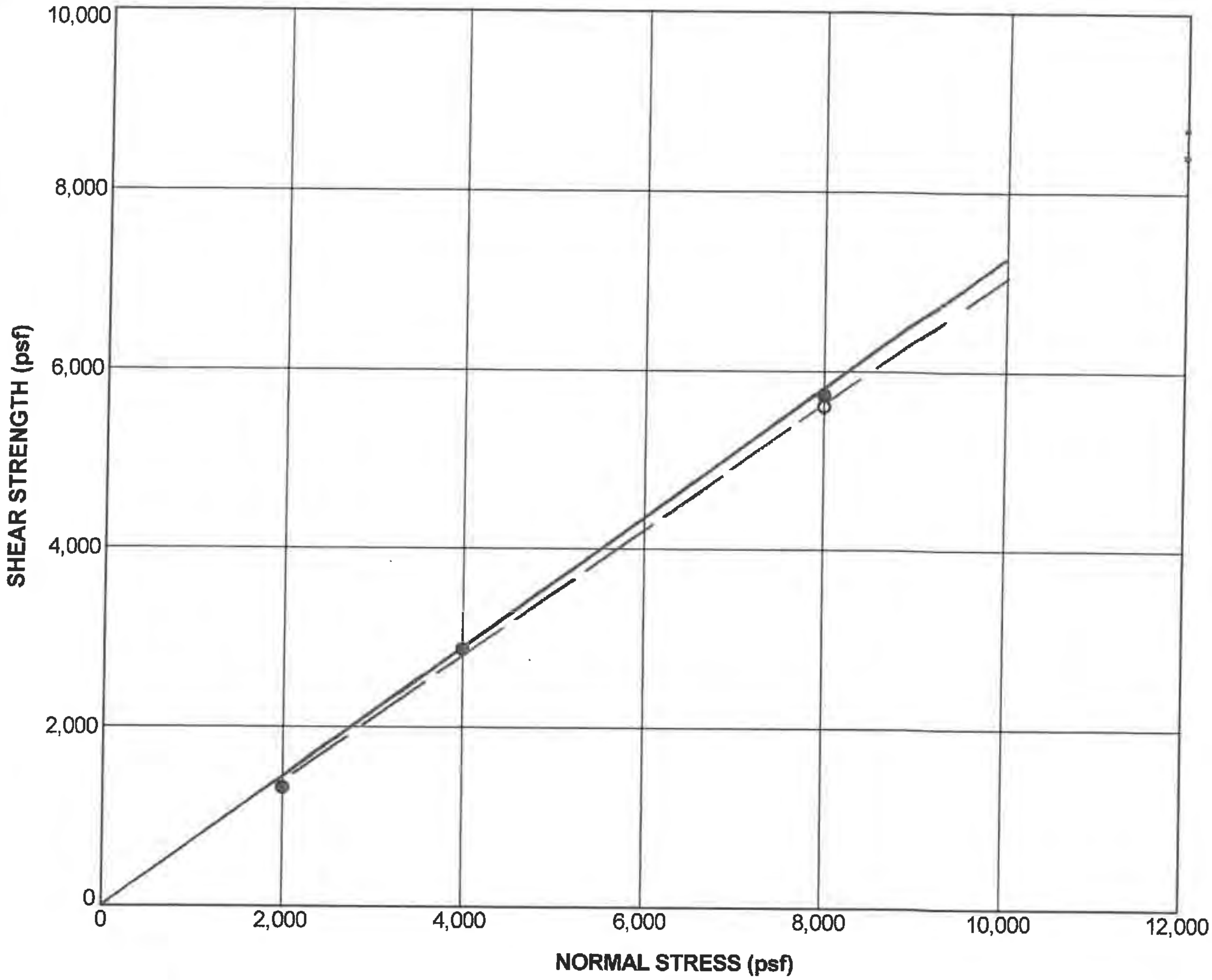
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate O
Cohesion (psf)	0	0
Friction Angle (degrees)	37	36.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. RW-1	Sample No. D-4	Depth: 17.5 ft
Sample Description: (Qal) Grayish Brown Silty SAND		
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:
Moisture Content (%): 21.7	Dry Density (pcf): 102.9	Degree of Saturation (%): 95
Sample Type: Undisturbed	Rate of Shear (in./min.): 0.05	

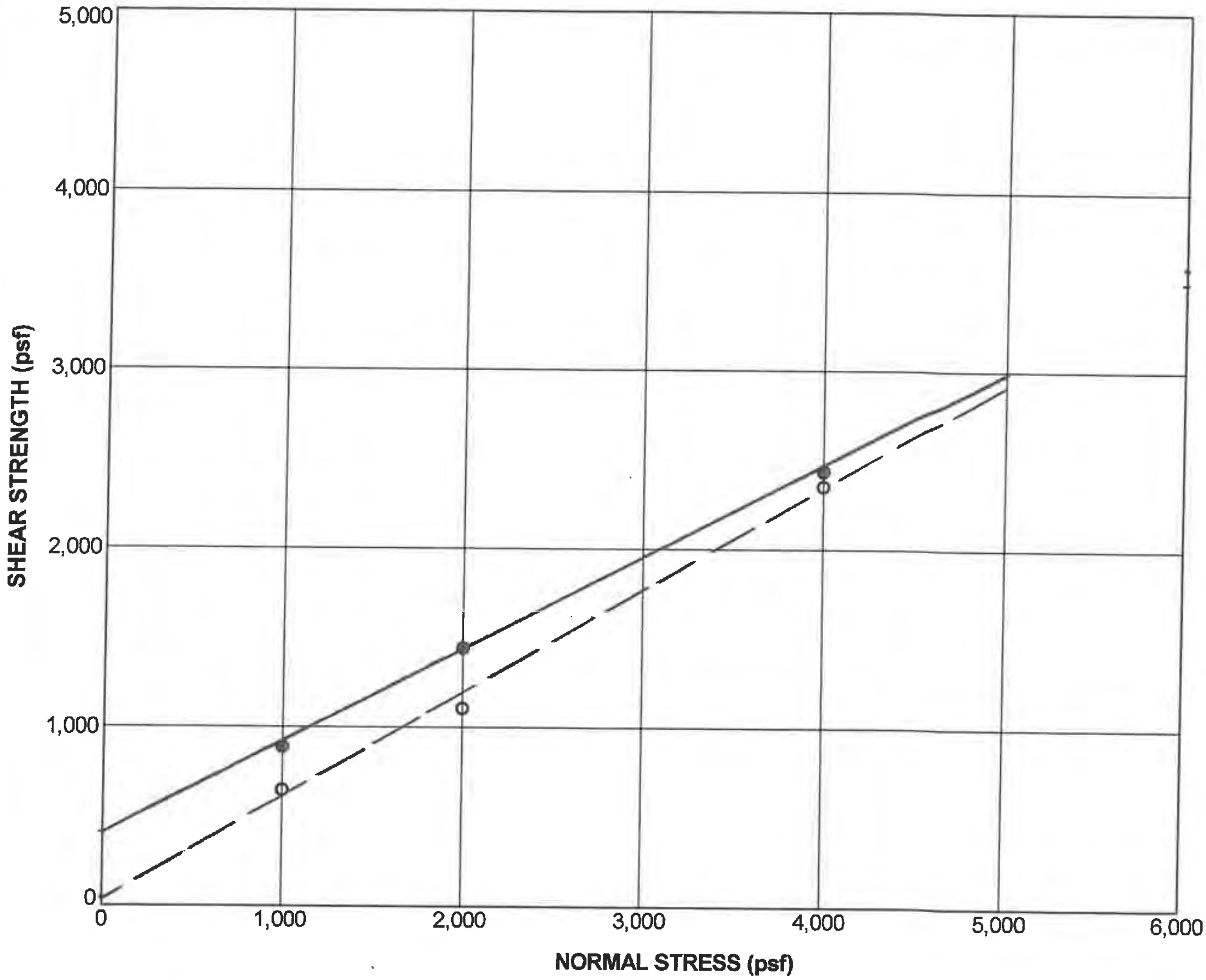
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate ○
Cohesion (psf)	0	0
Friction Angle (degrees)	36	35.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. T-5		Sample No. B-1		Depth: 2.0 ft	
Sample Description:	(Aw) Yellowish Brown Clayey SILT				
Liquid Limit:	36	Plasticity Index:	5	Percent Passing No. 200 Sieve:	93
Moisture Content (%):	25.5	Dry Density (pcf):	93.3	Degree of Saturation (%):	87
Sample Type:	Remolded to 92% RC	Rate of Shear (in./min.):	0.005		

SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate O
Cohesion (psf)	400	40
Friction Angle (degrees)	28	30.0

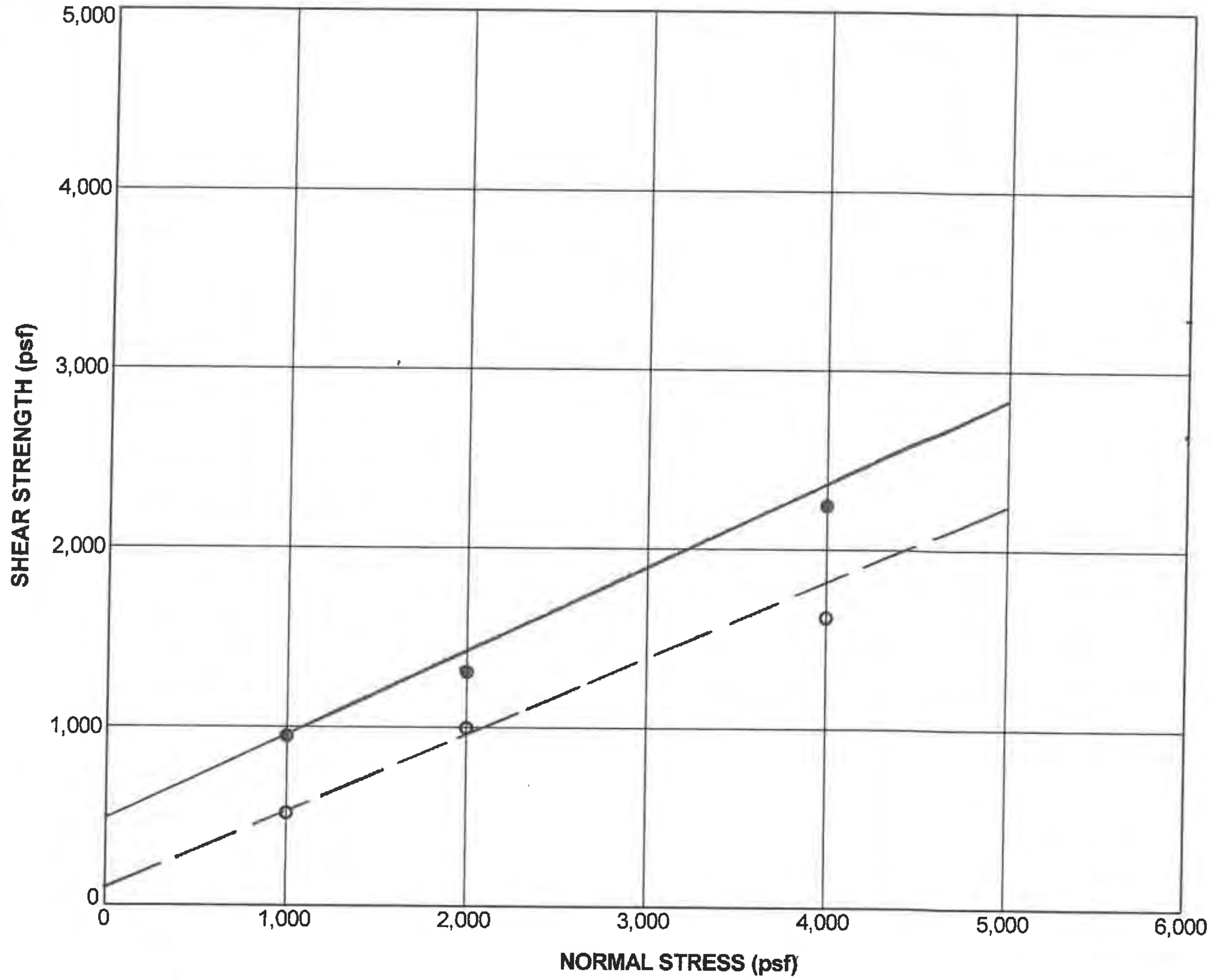
DIRECT SHEAR TEST RESULTS

Rentech/ Rialto

Rialto

PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. T-6		**Sample No. B-1**		**Depth: 2.0 ft**	
Sample Description:	(Aw) Gray Silty CLAY				
Liquid Limit:	70	**Plasticity Index:**	45	**Percent Passing No. 200 Sieve:**	99
Moisture Content (%):	30.2	**Dry Density (pcf):**	92.3	**Degree of Saturation (%):**	101
Sample Type:	Remolded to 92% RC	**Rate of Shear (in./min.):**	0.005		

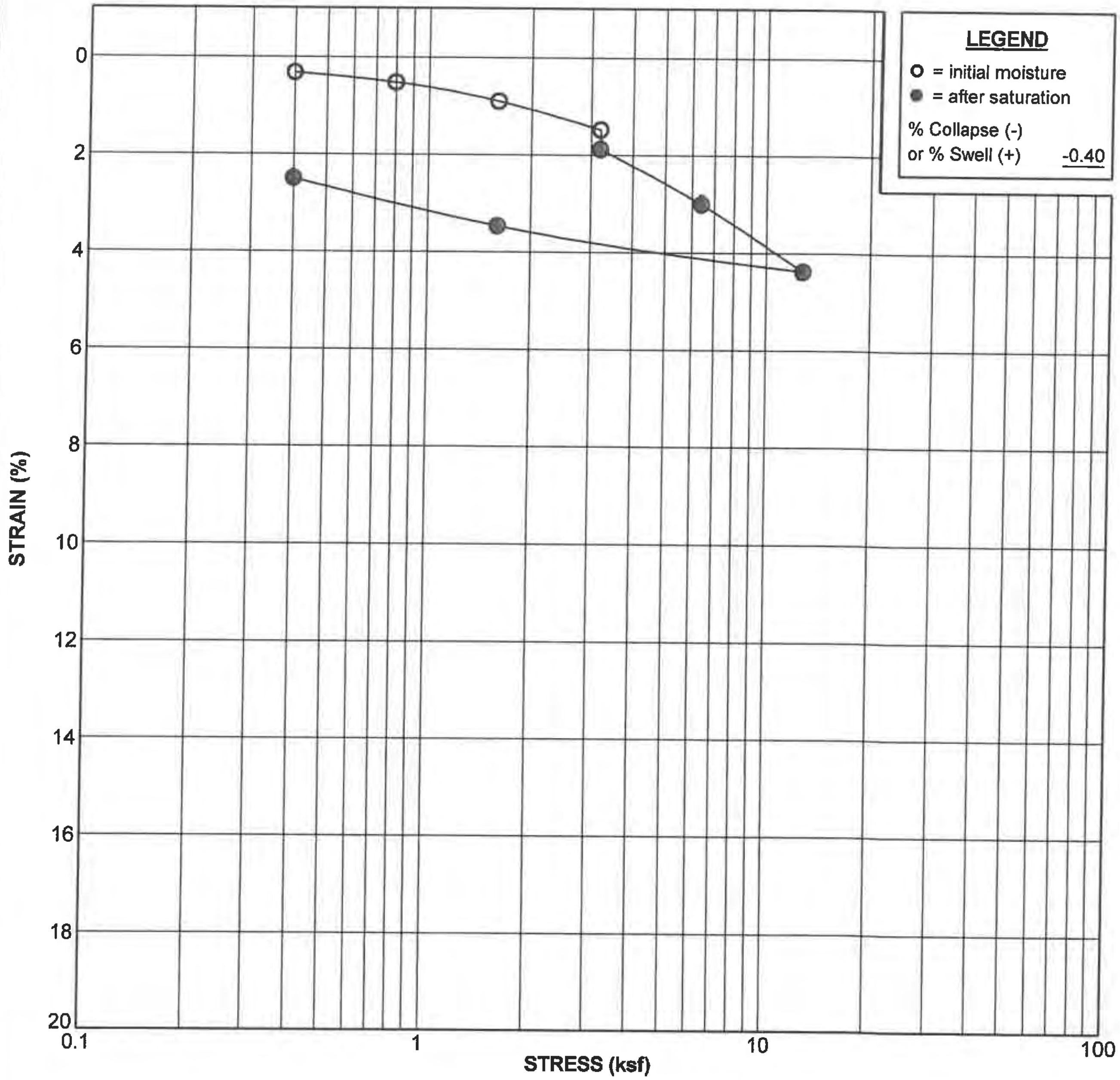
SHEAR STRENGTH PARAMETERS

Parameter	Peak ●	Ultimate O
Cohesion (psf)	500	100
Friction Angle (degrees)	25	23.0

DIRECT SHEAR TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. HS-1	Sample No. D-2	Depth: 7.5 ft
Sample Description:	(Qal) Grayish Brown Sandy SILT	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	8.8	93.5	30.4	0.768
Final	28.2	103.0	123.4	0.605

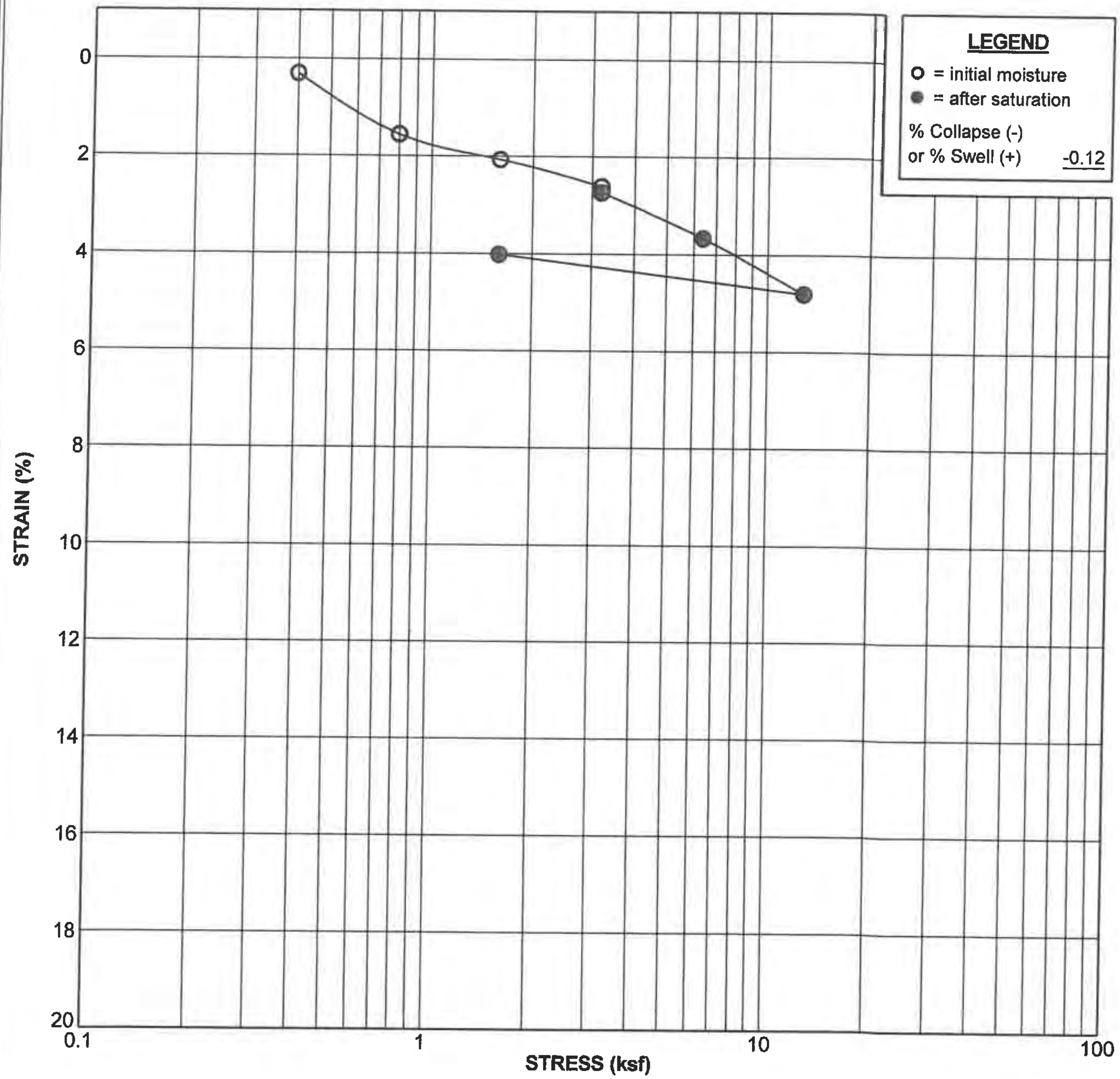
CONSOLIDATION TEST RESULTS

Rentech/ Rialto

Rialto

PROJECT NO. 10049-02

NMG Geotechnical, Inc.



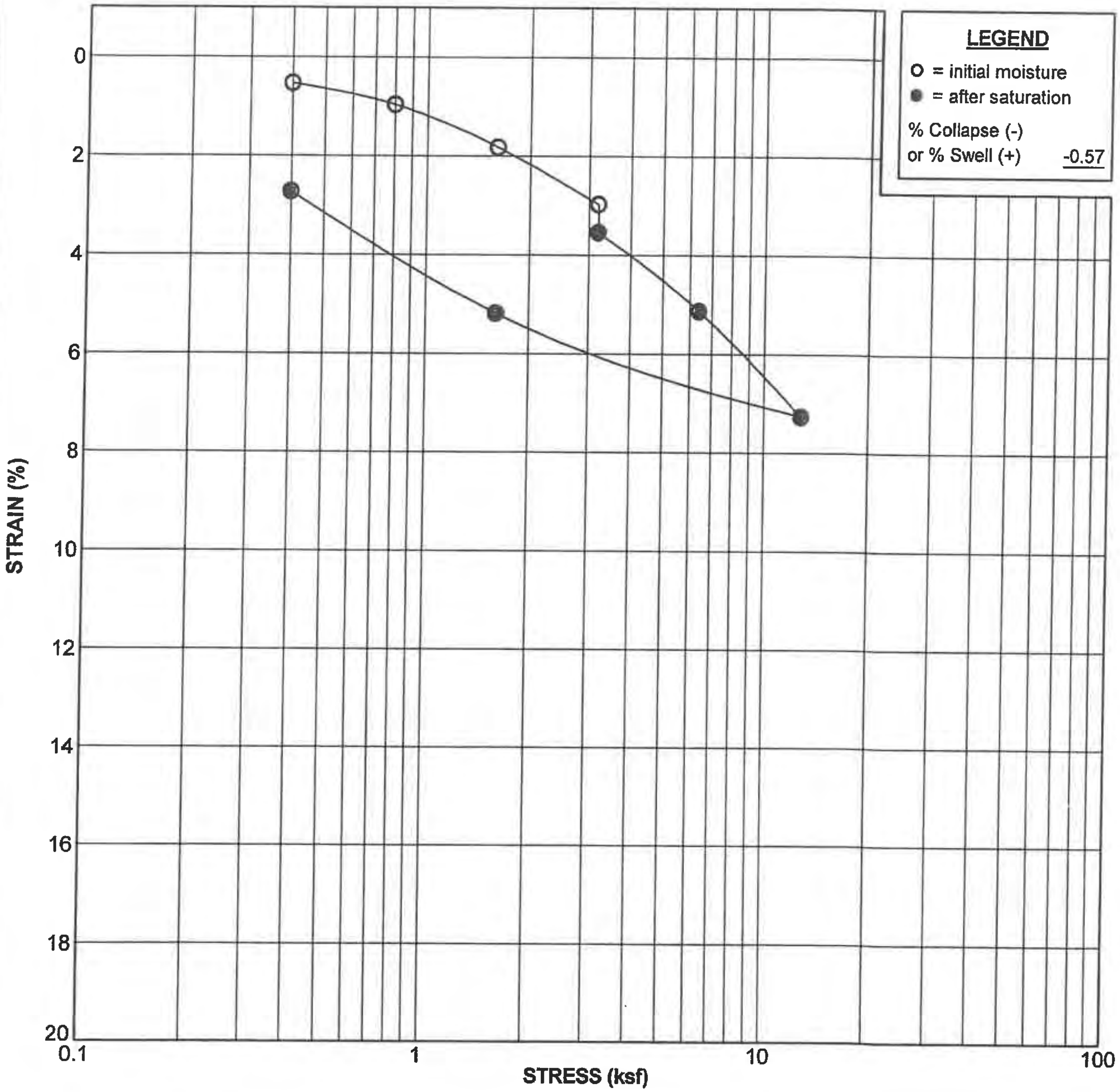
Boring No. HS-2	**Sample No. D-2**	**Depth: 10.0 ft**
Sample Description:	(Qal) Pale Olive Silty SAND / Sandy SILT	
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	14.2	97.5	53.9	0.697
Final	25.1	100.7	103.6	0.642

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. HS-3	Sample No. D-2	Depth: 7.5 ft
Sample Description:	(Aw) Pale Yellowish Brown SILT	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

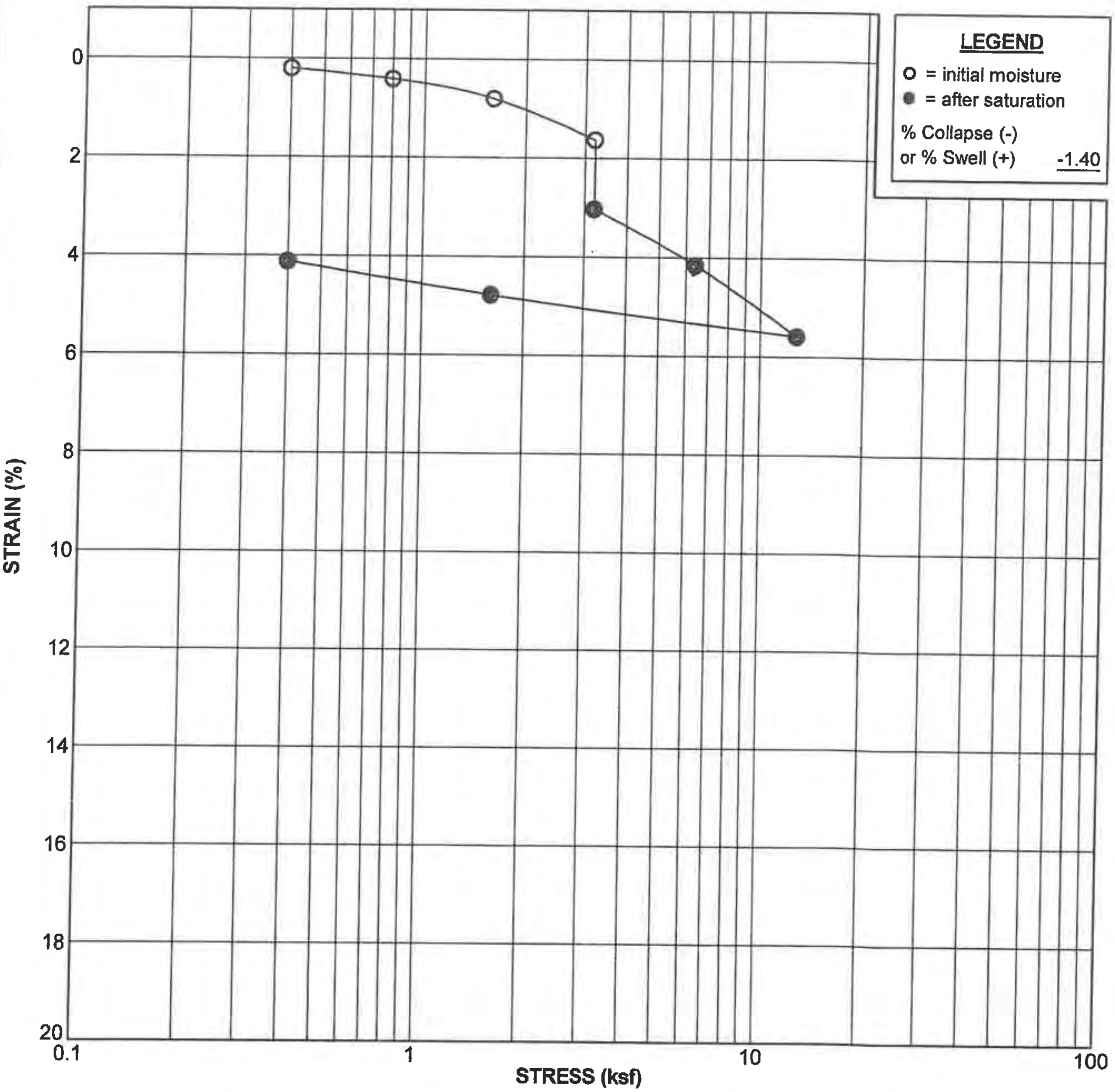
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	5.2	81.6	13.4	1.027
Final	41.0	83.7	111.4	0.976

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Template: NMCONS; Prj ID: 10049-02.GPJ; Printed: 9/20/10



Boring No. HS-3	**Sample No. D-3**	**Depth: 12.5 ft**
Sample Description:	(Qal) Pale Yellow Sandy SILT	
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

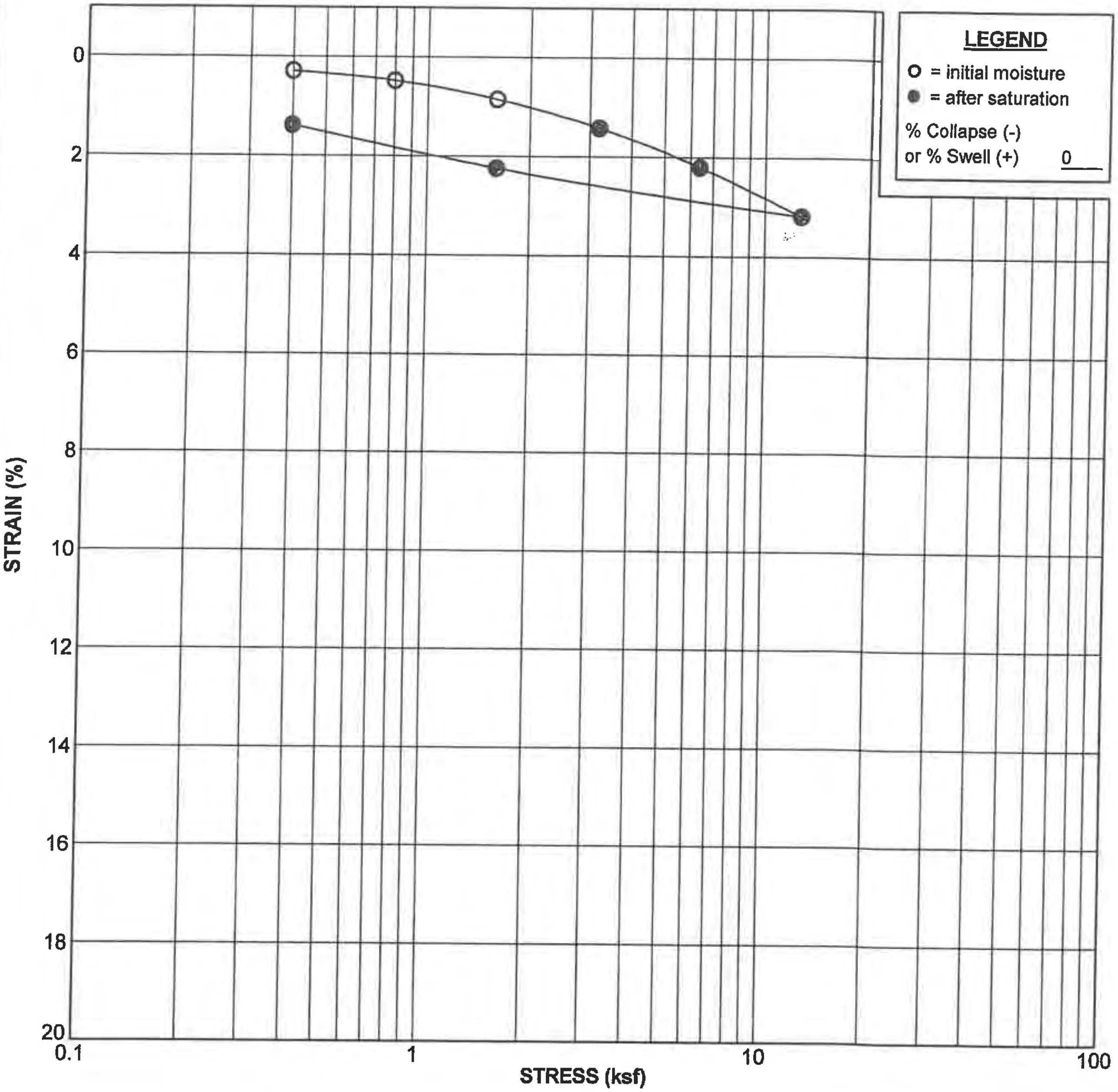
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	2.3	87.1	6.8	0.899
Final	28.7	90.6	92.2	0.825

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Template: NMCONS; Prj ID: 10049-02.GPJ; Printed: 9/20/10



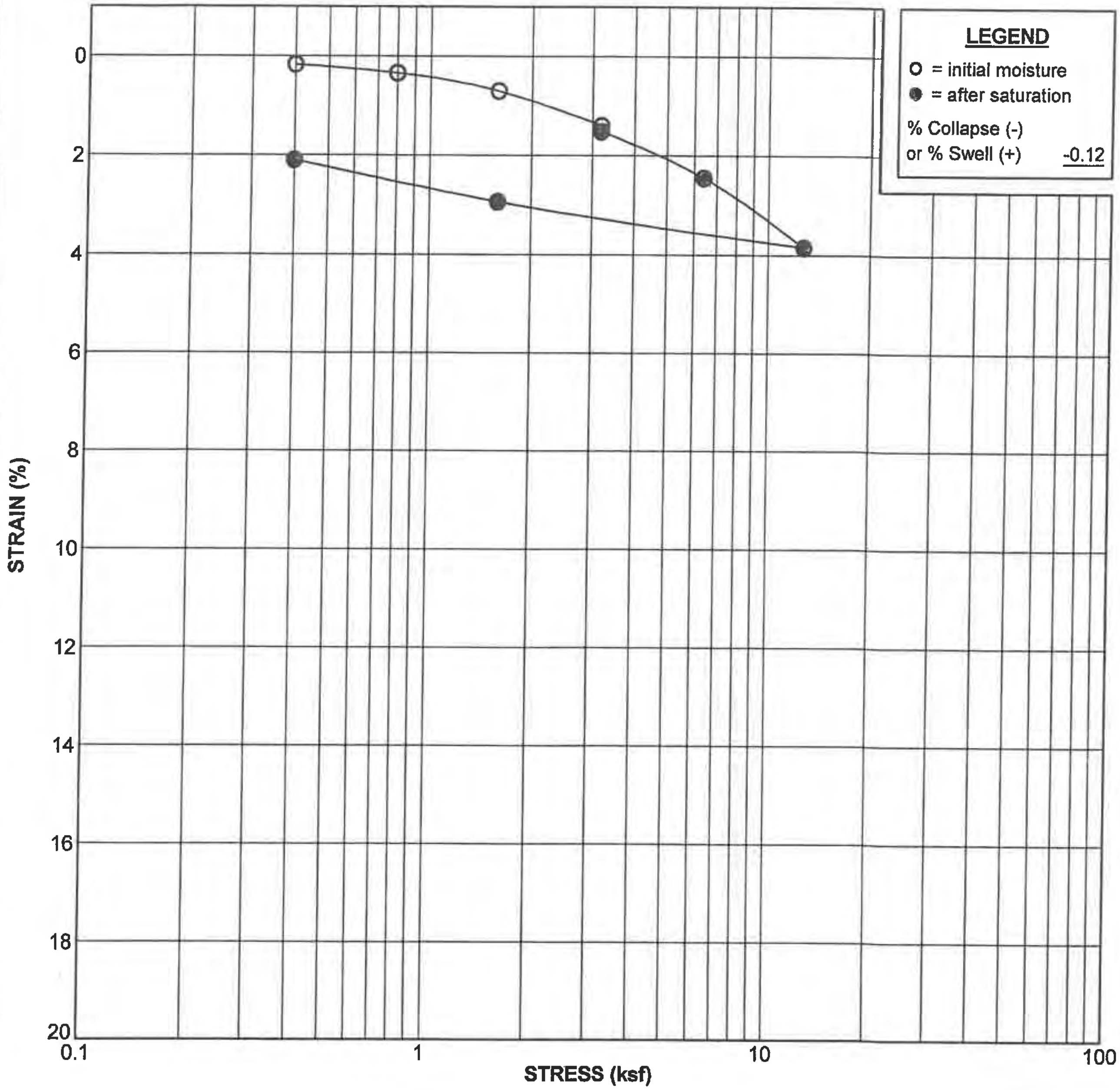
Boring No. HS-3	Sample No. D-5	Depth: 22.5 ft
Sample Description:	(Qal) Gray to Olive SILT	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	25.2	94.2	88.6	0.755
Final	29.7	95.5	107.6	0.732

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. HS-4	Sample No. D-1	Depth: 5.0 ft
Sample Description:	(Qal) Pale Olive to Light Gray Silty SAND / Sandy SILT	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

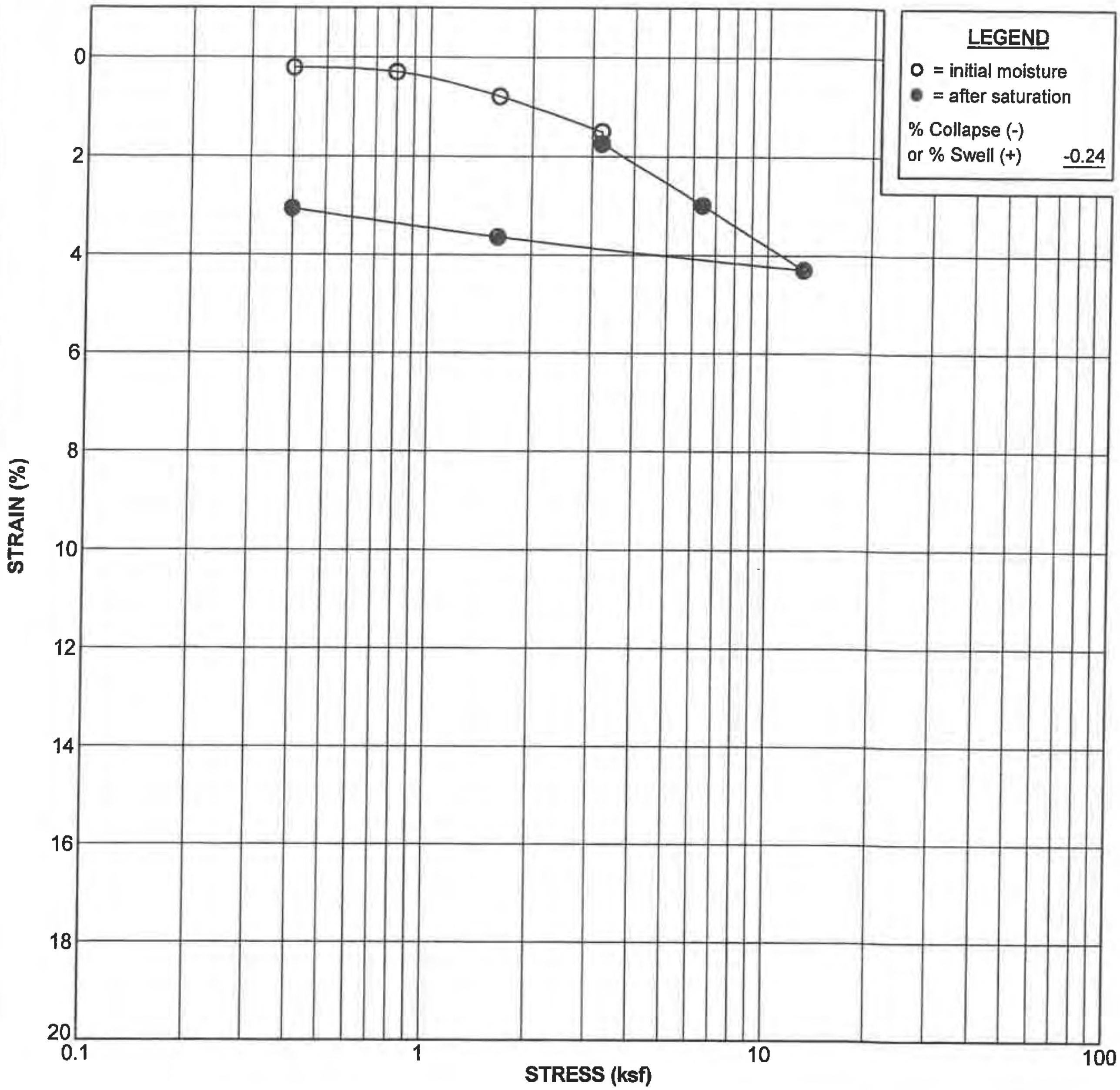
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	18.6	90.7	59.9	0.823
Final	30.7	92.6	103.5	0.786

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Template: NMCONS; Prj ID: 10049-02.GPJ; Printed: 9/20/10



Boring No. HS-4	Sample No. D-3	Depth: 15.0 ft
Sample Description:	(Qal) Pale Olive to Pale Gray Silty SAND / Sandy SILT	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	13.3	88.5	40.4	0.869
Final	29.2	91.2	95.2	0.813

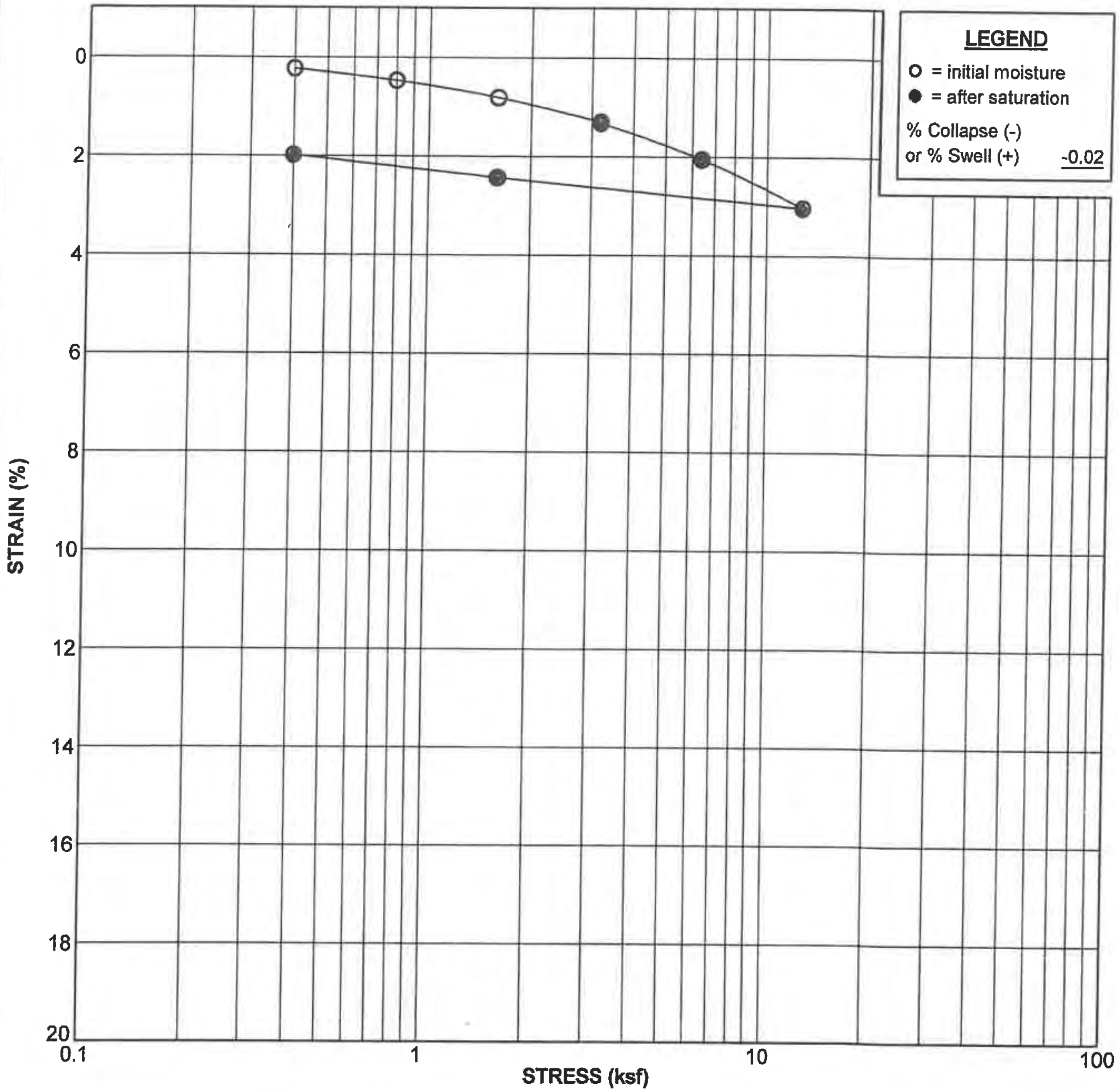
CONSOLIDATION TEST RESULTS

Rentech/ Rialto

Rialto

PROJECT NO. 10049-02

NMG Geotechnical, Inc.



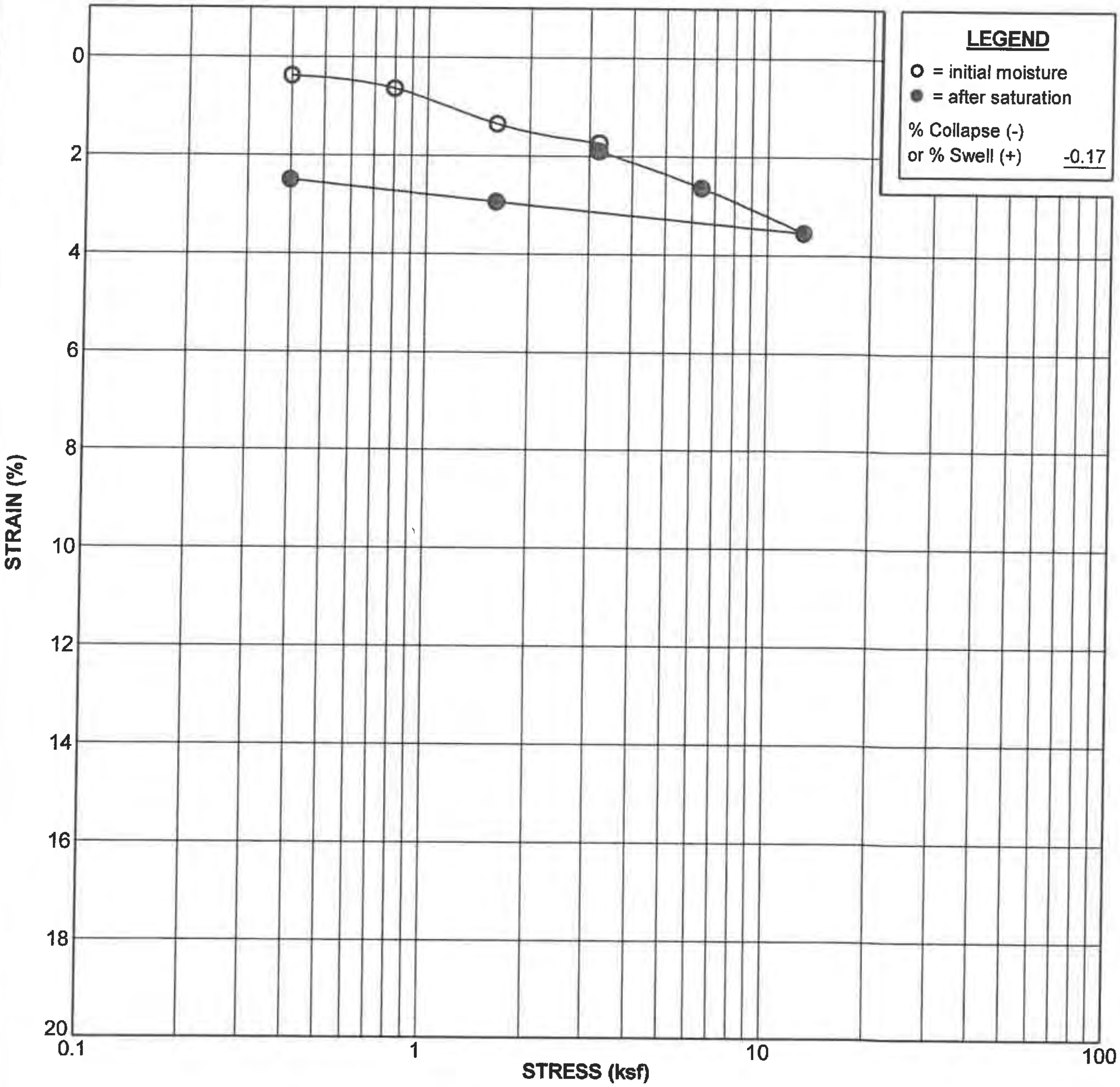
Boring No. HS-4	Sample No. D-6	Depth: 30.0 ft
Sample Description: (Qal) Olive SILT		
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	20.0	101.9	85.0	0.623
Final	22.3	103.8	99.6	0.593

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. RW-1	Sample No. D-3	Depth: 12.5 ft
Sample Description:	(Qal) Pale Gray Silty SAND	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	5.7	93.5	19.6	0.768
Final	25.9	95.8	94.5	0.726

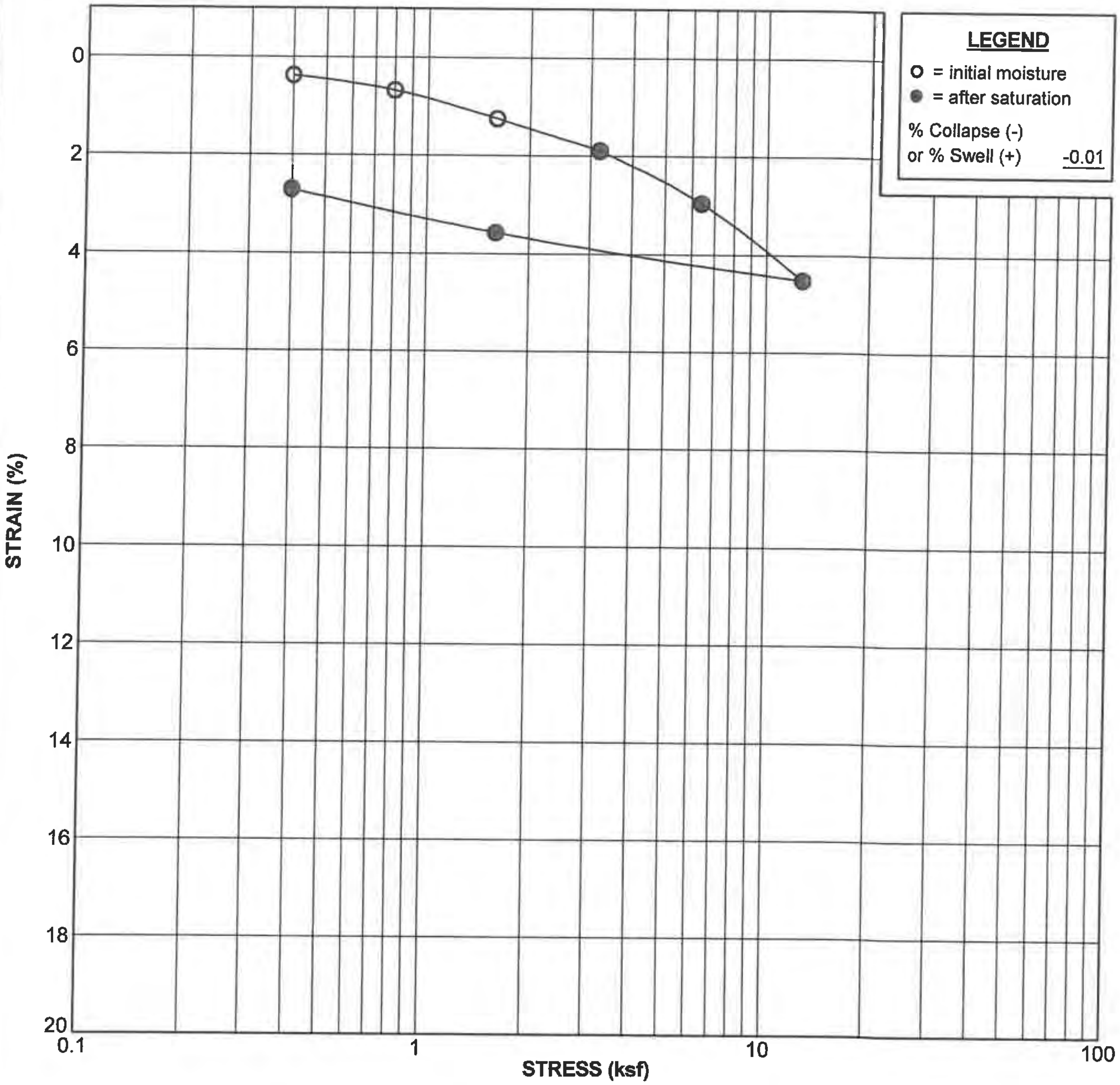
CONSOLIDATION TEST RESULTS

Rentech/ Rialto

Rialto

PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Boring No. RW-1	Sample No. D-5	Depth: 22.5 ft
Sample Description:	(Qal) Pale Gray Silty SAND / Sandy SILT	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

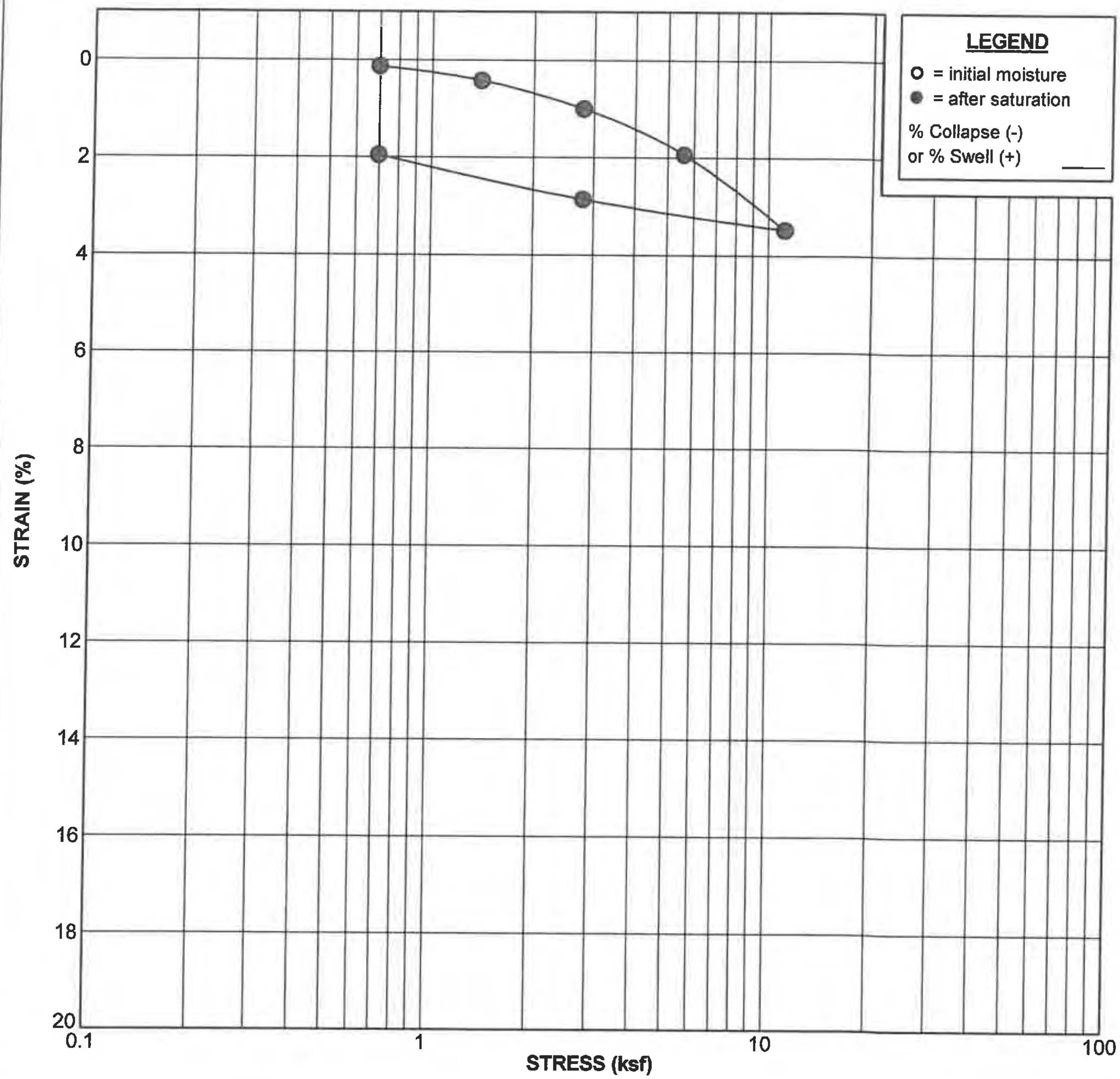
Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	24.8	98.0	95.5	0.688
Final	27.3	100.6	112.4	0.644

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Template: NMCONS; Prj ID: 10049-02.GPJ; Printed: 9/29/10



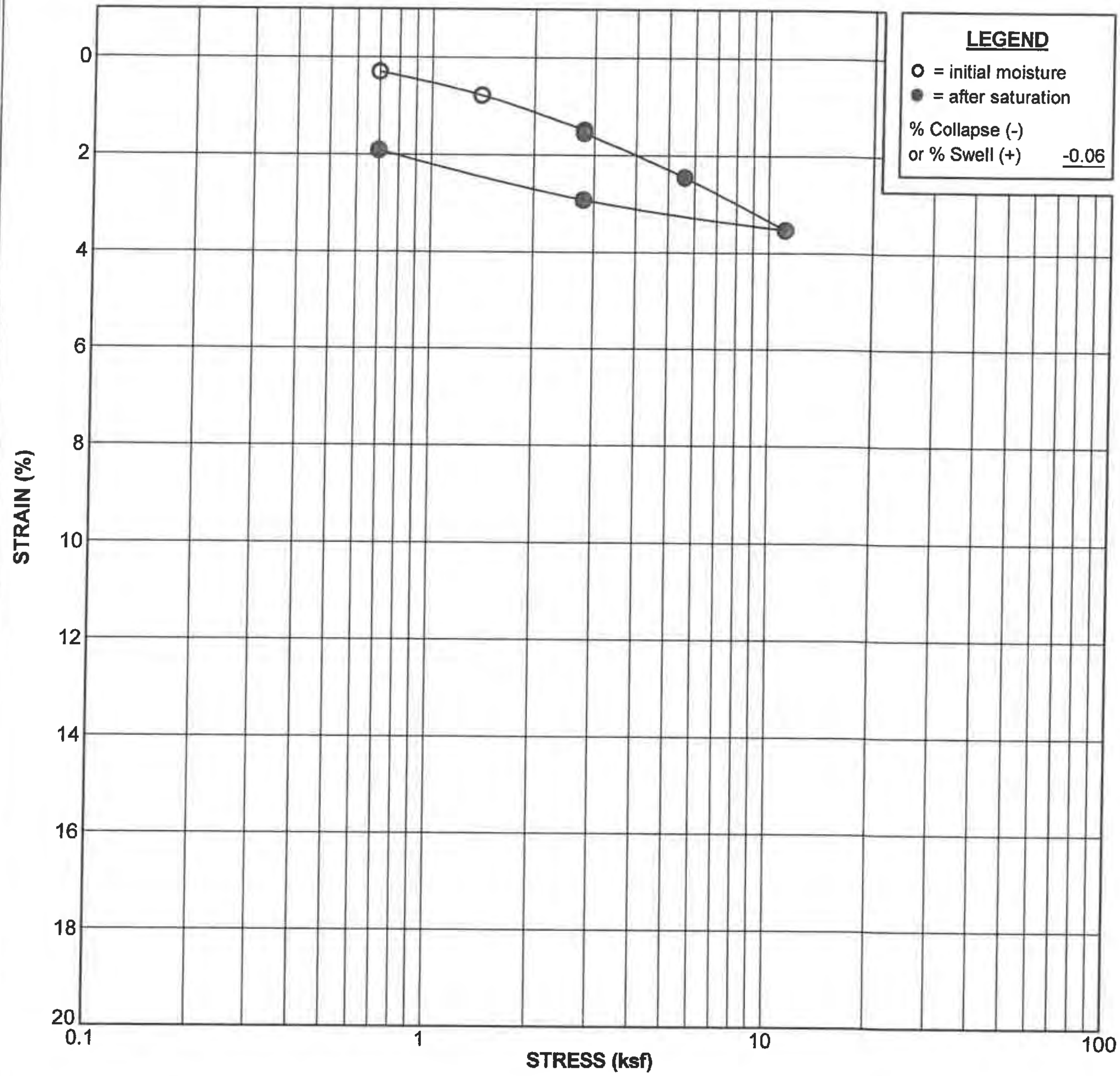
Boring No. T-5	Sample No. B-1	Depth: 2.1 ft
Sample Description:	(Aw) Yellowish Brown Clayey SILT (Remolded to 92% RC)	
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	21.5	92.4	72.2	0.790
Final	29.0	94.2	101.7	0.755

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



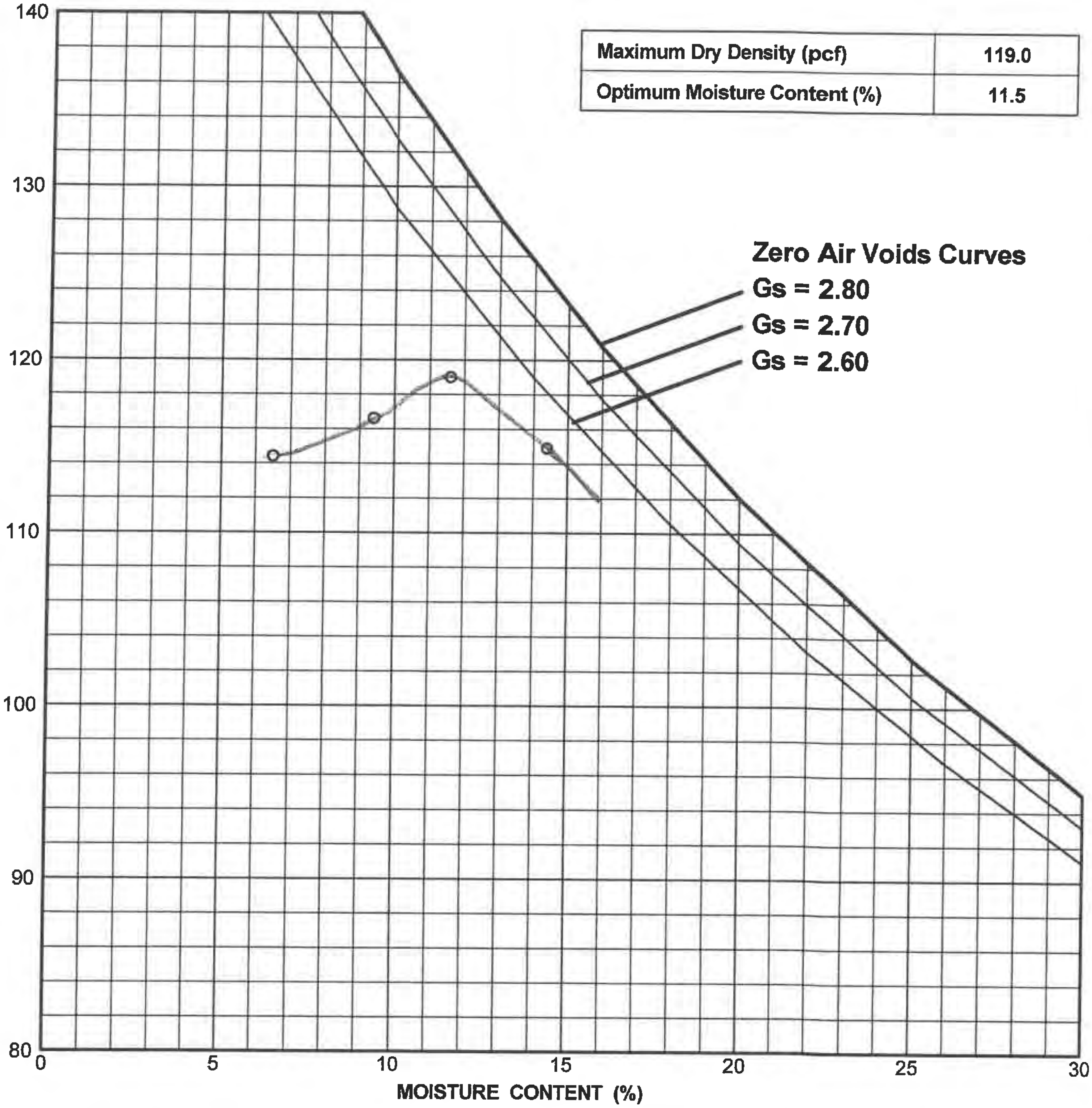
Boring No. T-5	Sample No. B-1	Depth: 2.2 ft
Sample Description:	(Aw) Yellowish Brown Clayey SILT (Remolded to 92% RC)	
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:**

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	21.5	92.3	72.0	0.792
Final	28.9	94.1	101.1	0.757

CONSOLIDATION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

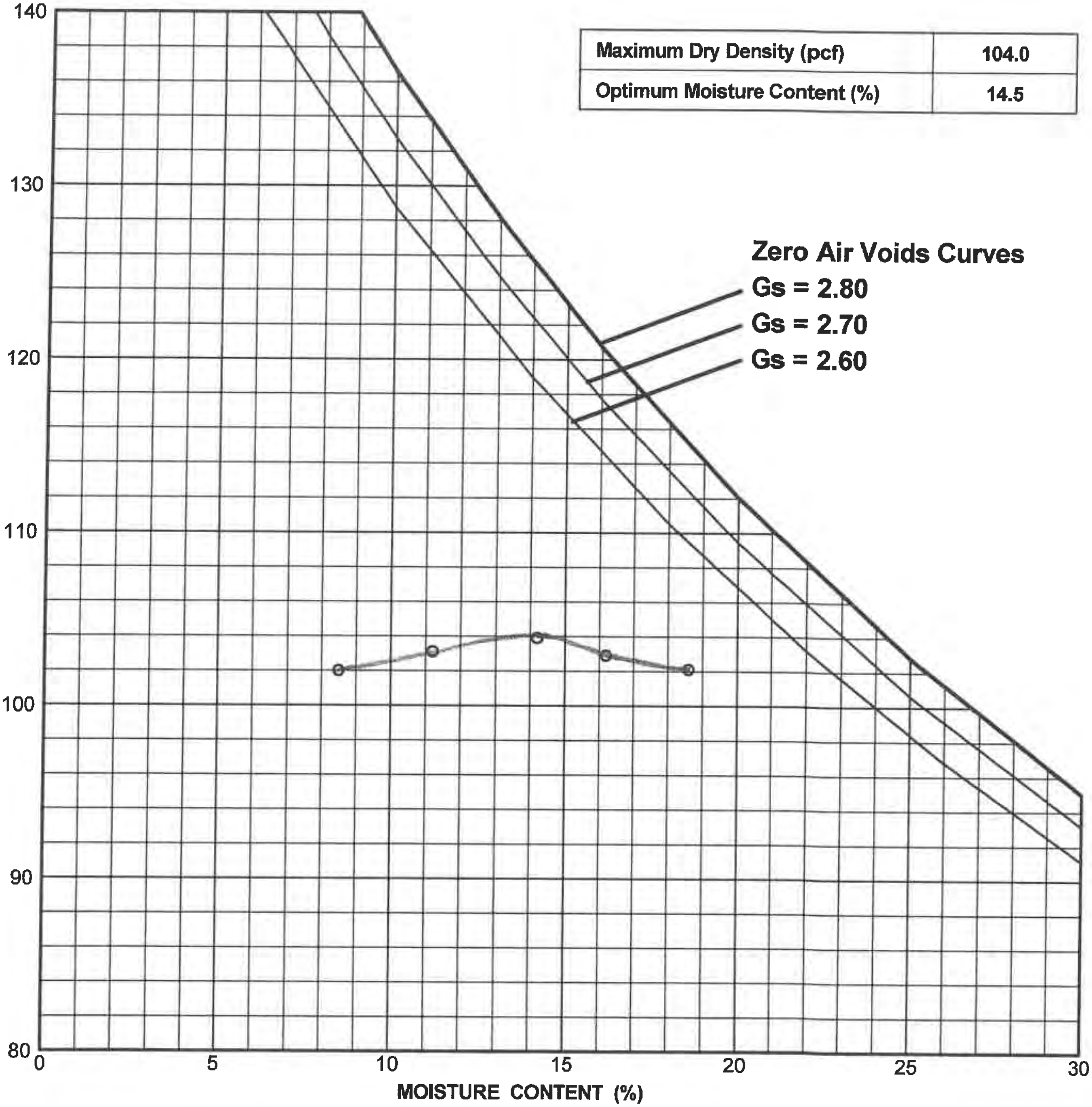


Boring No. HS-1	**Sample No. B-1**	**Depth: 8.5 ft**
Sample Description: (Qal) Yellowish Brown Sandy SILT		
Liquid Limit: NP	**Plasticity Index:** NP	**Percent Passing No. 200 Sieve:** 65
Comments: 1557A		

COMPACTION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



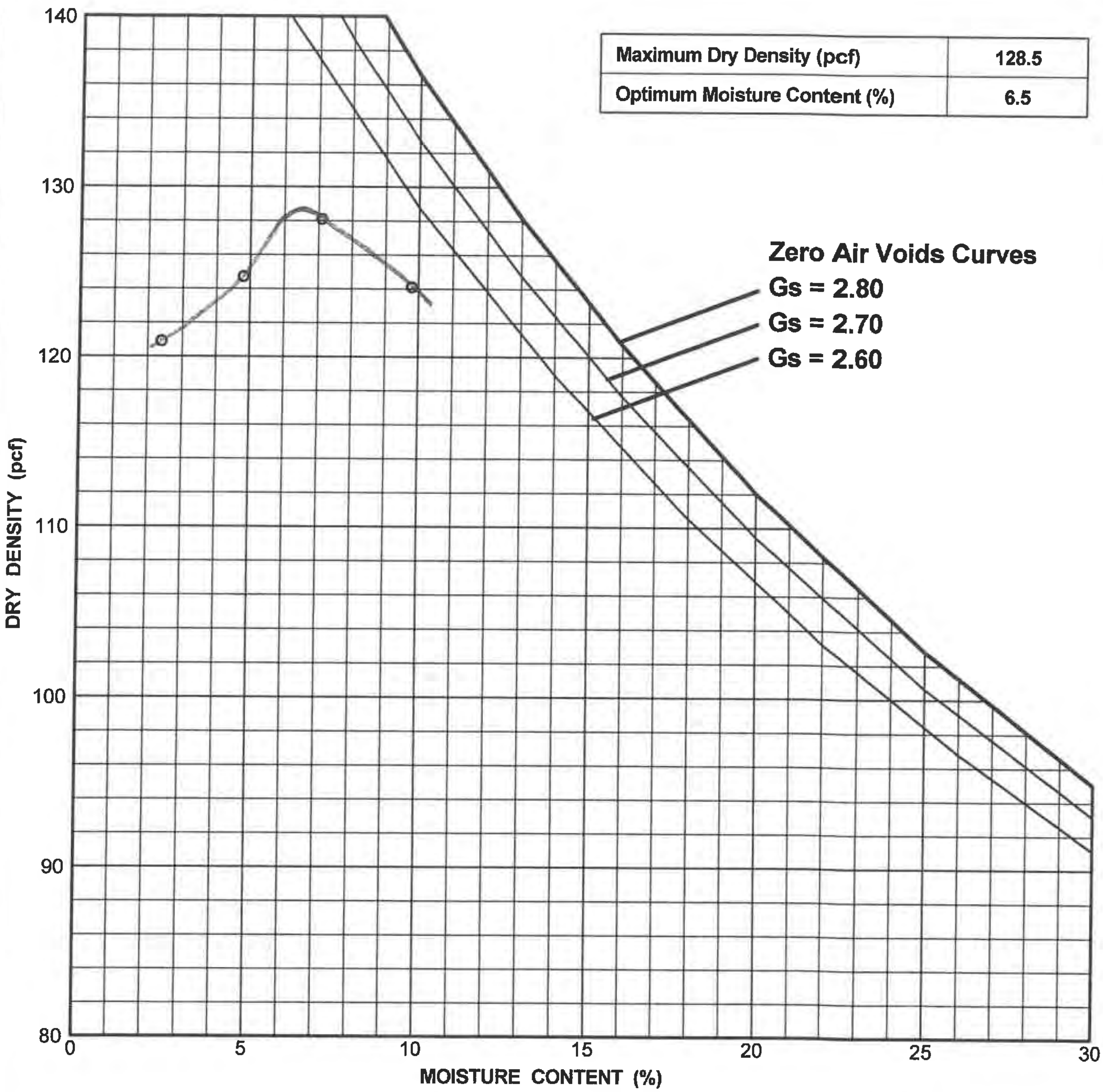
Maximum Dry Density (pcf)	104.0
Optimum Moisture Content (%)	14.5

Boring No. T-11		**Sample No. B-1**		**Depth: 1.0 ft**	
Sample Description:	(Aw) Pale Yellow Sandy SILT				
Liquid Limit:	NP	**Plasticity Index:**	NP	**Percent Passing No. 200 Sieve:**	65
Comments:	1557A				

COMPACTION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



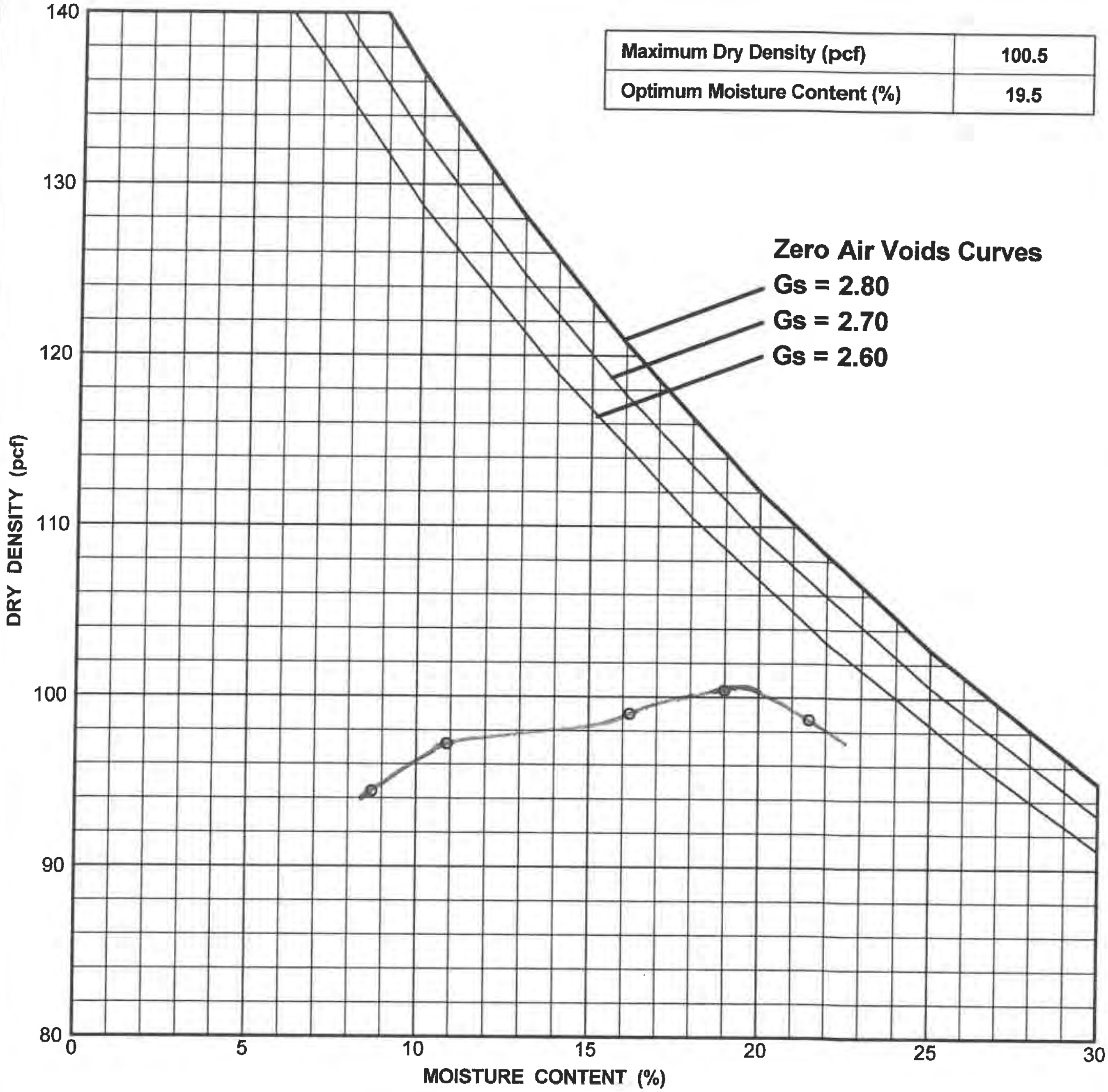
Maximum Dry Density (pcf)	128.5
Optimum Moisture Content (%)	6.5

Boring No. T-4	**Sample No. B-1**	**Depth: 1.0 ft**
Sample Description: (Afu) Brown Silty SAND		
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:** 21
Comments: 1557A		

COMPACTION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.



Maximum Dry Density (pcf)	100.5
Optimum Moisture Content (%)	19.5

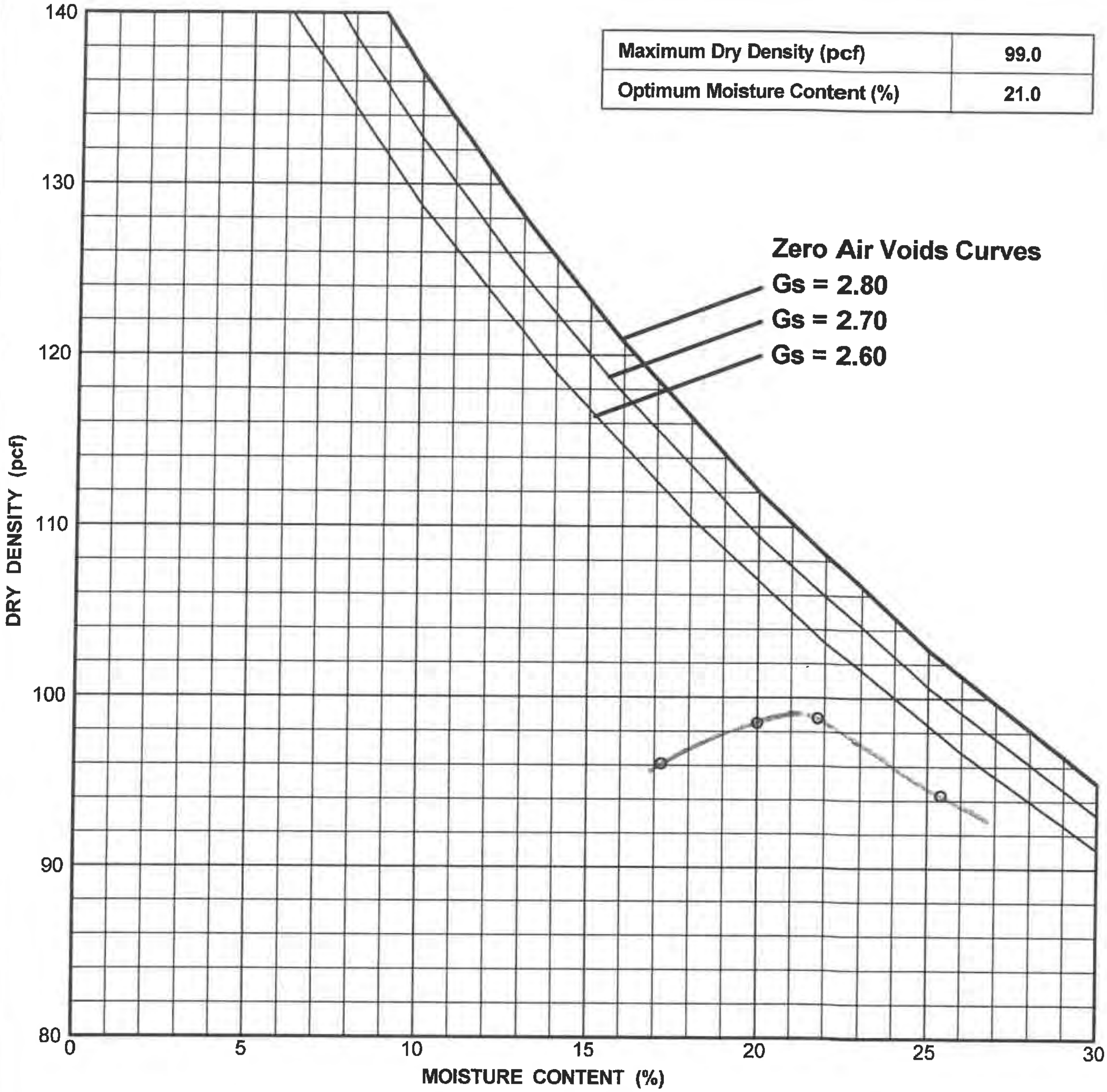
Boring No. T-5		Sample No. B-1		Depth: 2.0 ft	
Sample Description:	(Aw) Yellowish Brown Clayey SILT				
Liquid Limit:	36	Plasticity Index:	5	Percent Passing No. 200 Sieve:	93
Comments:	1557A				

COMPACTION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

Maximum Dry Density (pcf)	99.0
Optimum Moisture Content (%)	21.0



Boring No. T-6	**Sample No. B-1**	**Depth: 2.0 ft**
Sample Description: (Aw) Gray Silty CLAY		
Liquid Limit: 70	**Plasticity Index:** 45	**Percent Passing No. 200 Sieve:** 99
Comments: 1557A		

COMPACTION TEST RESULTS

Rentech/ Rialto
Rialto
PROJECT NO. 10049-02

NMG Geotechnical, Inc.

PROJECT NAME : RENTECH / RIALTO	PROJECT NUMBER : NMG#10049-02
SAMPLE I.D/NO.: : T-2 @ 1'	TESTED BY : RMC DATE : 31-Aug-10
SAMPLE LOCATION :	SAMPLED BY : DATE :
SAMPLE DESCRIPTIONS / CLASSIFICATION : GRAYISH BROWN SILTY SAND WITH GRAVEL (SM)	

TRIAL NO.		1		2		3		4	
MOLD NUMBER		AC3		4		10			
WATER ADDED	(ML)	65		70		75			
COMPACTOR PRESSURE	(PSI)	350		350		350			
GROSS WEIGHT	(GMS)	3272		3295		3288			
TARE WEIGHT	(GMS)	2115		2116		2123			
SAMPLE WET WEIGHT	(GMS)	1157		1179		1165			
EXUDATION PRESSURE	(PSI)	383		308		259			
SAMPLE HEIGHT	(IN.)	2.49		2.54		2.51			
EXPANSION	(IN.x10^{-4})	0		0		0			
STABILITY @ 160 PSI (2000 LBS) / @ 80 PSI (1000 LBS)		38	24	41	25	44	26		
TURNS DISPLACEMENT		3.11		3.28		3.66			
R-VALUE UNCORRECTED		72		69		64			
R-VALUE CORRECTED		72		69		64			
MOISTURE CONTENT	(%)	7.3		7.6		7.9			
DRY DENSITY	(PCF)	131.2		130.7		130.3			
ASSUMED TRAFFIC INDEX		4.0		4.0		4.0			
G.E. BY STABILITY		0.29		0.32		0.37			
G.E. BY EXPANSION		0.00		0.00		0.00			
R-VALUE @ EQUILIBRIUM	(BY EXUDATION)	68							
Gf		1.25							

REMARKS :

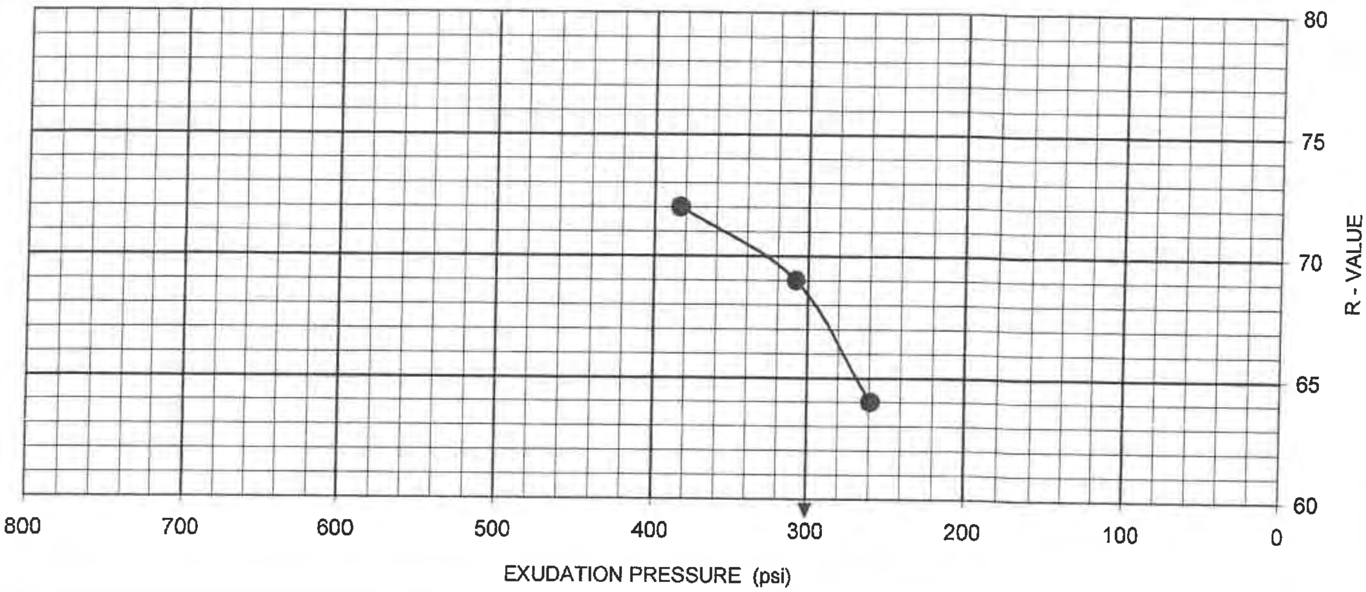
CHECKED BY:

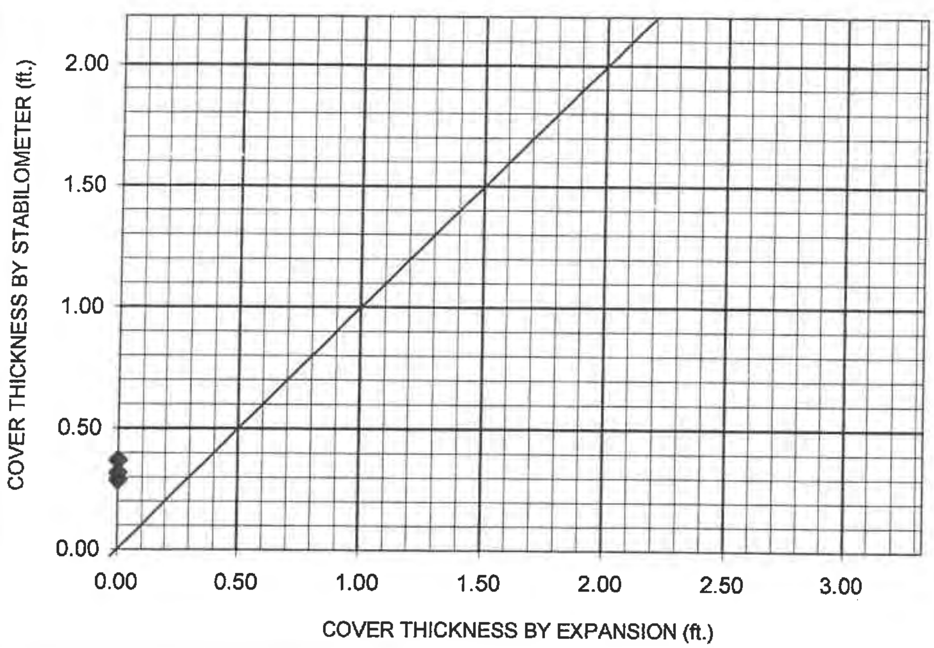
DATE :

THE DATA ABOVE IS BASED UPON PROCESSING AND TESTING OF SAMPLES "AS RECEIVED" FROM THE FIELD
TEST PROCEEDURES IN GENERAL CONFORMANCE TO LATEST REVISIONS OF CA TEST METHOD 301.

ZEISER KLING CONSULTANTS, INC.
151 Kalmus Dr., Suite H-6, Costa Mesa Ca. 92626
Tel: (714) 755-1355; Fax: (714) 755-1366

R - VALUE DATA





R - VALUE CURVES

NMG#10049-02

PROJECT NUMBER

RENTECH / RIALTO

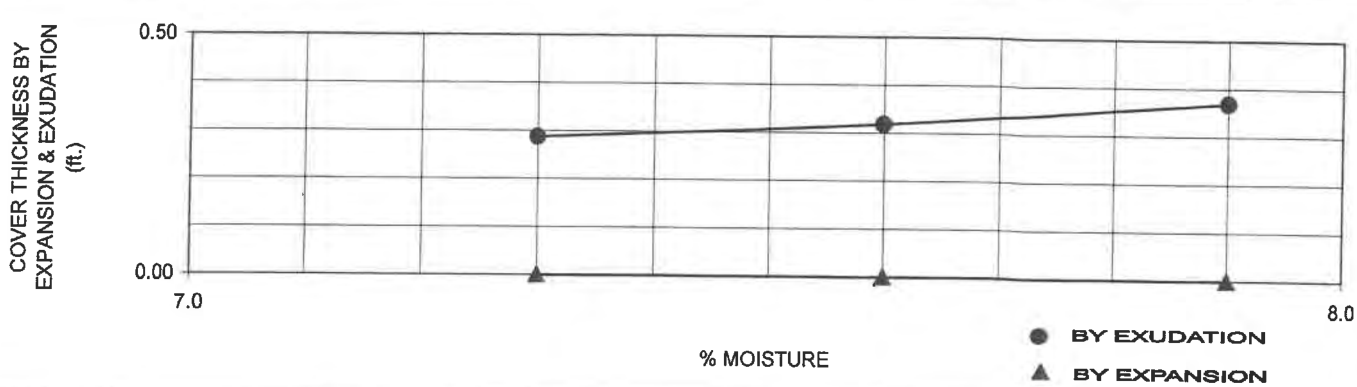
PROJECT NAME

T-2 @ 1'

SAMPLE NO. / LOCATION

R - VALUES

R-VALUE BY EXUDATION	68
R-VALUE BY EXPANSION	-
COVER THICKNESS (ft.)	-



PROJECT NAME : RENTECH / RIALTO

PROJECT NUMBER : NMG#10049-02

SAMPLE I.D/NO.: : T-4 @ 1'

TESTED BY : RMC DATE : 30-Aug-10

SAMPLE LOCATION :

SAMPLED BY : DATE :

SAMPLE DESCRIPTIONS / CLASSIFICATION : LT. BROWN SILTY SAND WITH GRAVEL (SM)

TRIAL NO.		1		2		3		4	
MOLD NUMBER		10		5		4			
WATER ADDED	(ML)	65		90		75			
COMPACTOR PRESSURE	(PSI)	350		350		350			
GROSS WEIGHT	(GMS)	3288		3274		3251			
TARE WEIGHT	(GMS)	2123		2117		2116			
SAMPLE WET WEIGHT	(GMS)	1165		1157		1135			
EXUDATION PRESSURE	(PSI)	396		326		281			
SAMPLE HEIGHT	(IN.)	2.57		2.55		2.50			
EXPANSION	(IN.x10^{-4})	0		0		0			
STABILITY @ 160 PSI (2000 LBS) / @ 80 PSI (1000 LBS)		38	21	42	23	44	24		
TURNS DISPLACEMENT		3.44		3.52		3.63			
R-VALUE UNCORRECTED		70		67		64			
R-VALUE CORRECTED		70		67		64			
MOISTURE CONTENT	(%)	8.7		9.0		9.3			
DRY DENSITY	(PCF)	126.4		126.1		125.9			
ASSUMED TRAFFIC INDEX		4.0		4.0		4.0			
G.E. BY STABILITY		0.31		0.34		0.37			
G.E. BY EXPANSION		0.00		0.00		0.00			
R-VALUE @ EQUILIBRIUM	(BY EXUDATION)	65							
Gf		1.25							

REMARKS :

CHECKED BY:

DATE :

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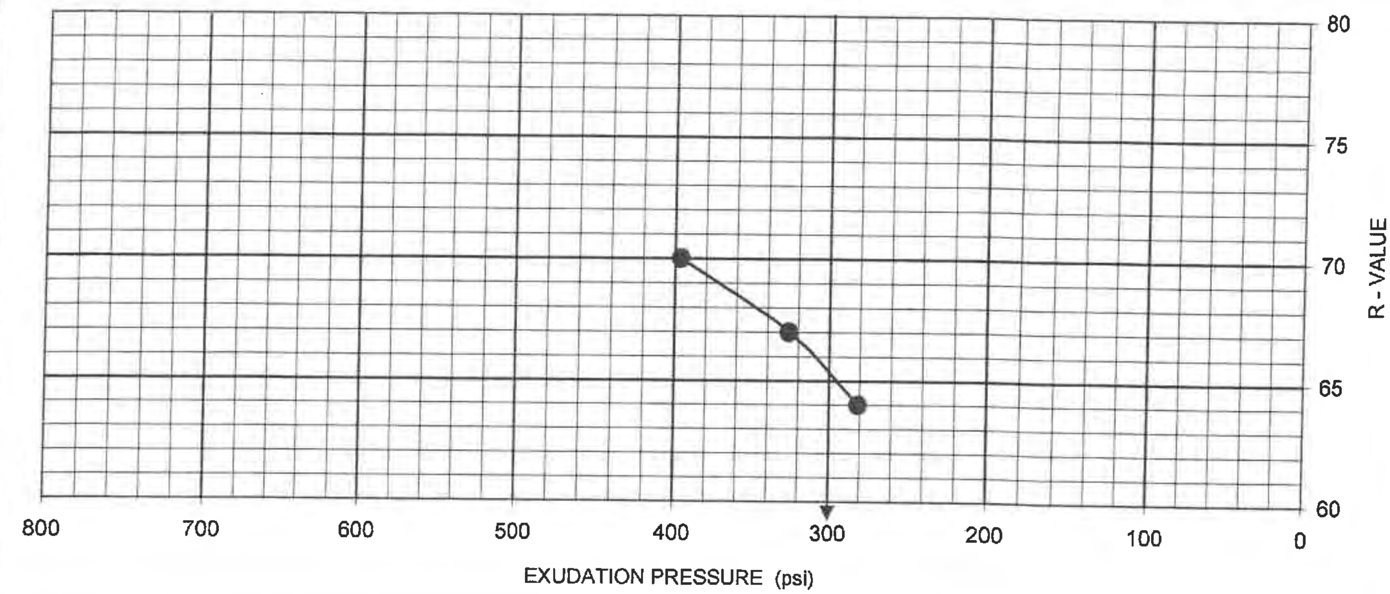
R - VALUE DATA



R - VALUE CURVES

NMG#10049-02

PROJECT NUMBER

RENTECH / RIALTO

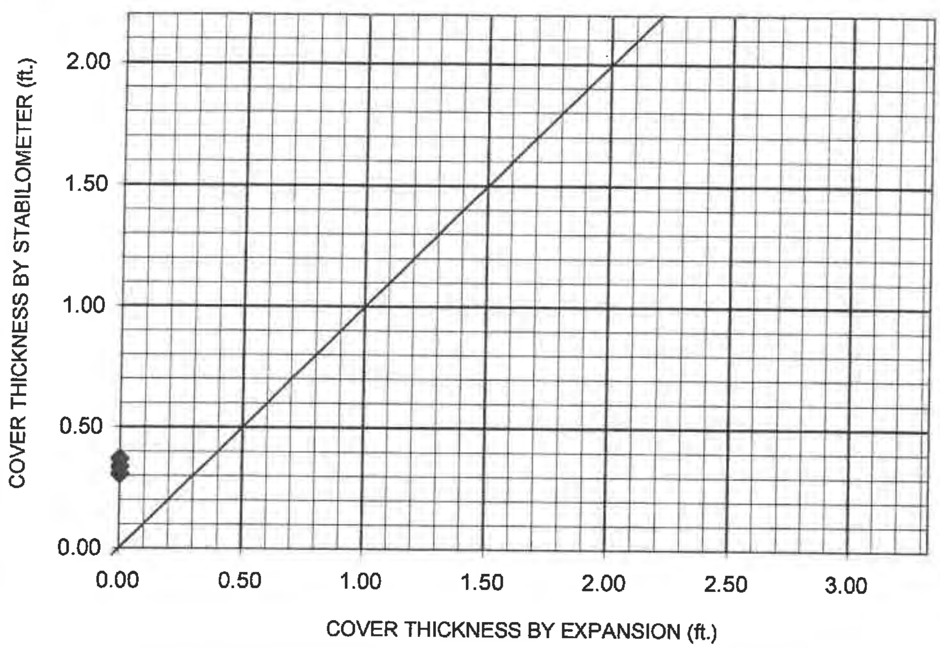
PROJECT NAME

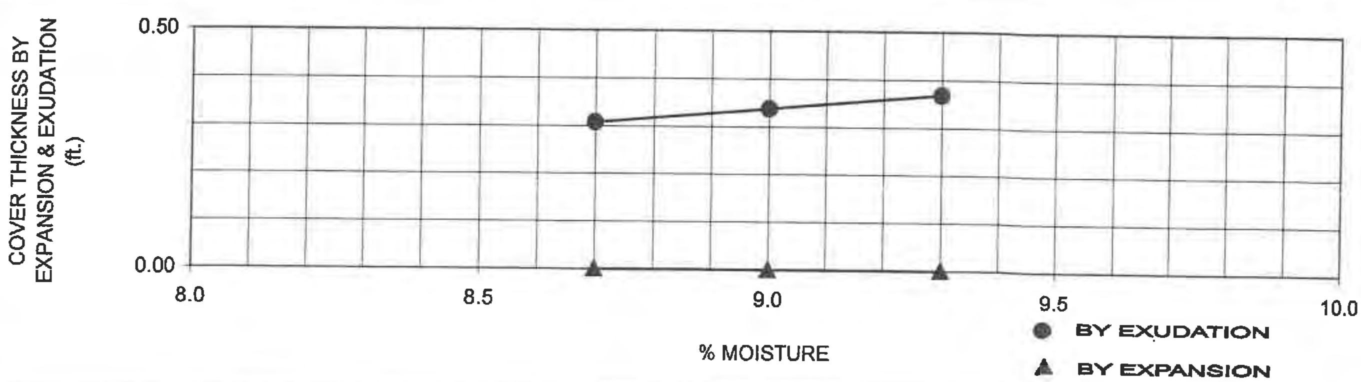
T-4 @ 1'

SAMPLE NO. / LOCATION

R - VALUES

R-VALUE BY EXUDATION	65
R-VALUE BY EXPANSION	-
COVER THICKNESS (ft.)	-





PROJECT NAME : RENTECH / RIALTO

PROJECT NUMBER : NMG#10049-02

SAMPLE I.D/NO.: : T-1 @ 4.5'

TESTED BY : RMC DATE : 30-Aug-10

SAMPLE LOCATION :

SAMPLED BY : DATE :

SAMPLE DESCRIPTIONS / CLASSIFICATION : BROWN SILTY SAND WITH GRAVEL (SM)

TRIAL NO.		1		2		3		4	
MOLD NUMBER		1		5		7			
WATER ADDED	(ML)	85		90		95			
COMPACTOR PRESSURE	(PSI)	350		350		350			
GROSS WEIGHT	(GMS)	3260		3274		3240			
TARE WEIGHT	(GMS)	2122		2117		2120			
SAMPLE WET WEIGHT	(GMS)	1138		1157		1120			
EXUDATION PRESSURE	(PSI)	347		288		248			
SAMPLE HEIGHT	(IN.)	2.51		2.55		2.47			
EXPANSION	(IN.x10^{-4})	0		0		0			
STABILITY @ 160 PSI (2000 LBS) / @ 80 PSI (1000 LBS)		35	21	39	23	43	24		
TURNS DISPLACEMENT		3.48		3.47		3.50			
R-VALUE UNCORRECTED		72		69		66			
R-VALUE CORRECTED		72		69		66			
MOISTURE CONTENT	(%)	7.9		8.2		8.4			
DRY DENSITY	(PCF)	127.3		127.1		126.7			
ASSUMED TRAFFIC INDEX		4.0		4.0		4.0			
G.E. BY STABILITY		0.29		0.32		0.35			
G.E. BY EXPANSION		0.00		0.00		0.00			
R-VALUE @ EQUILIBRIUM	(BY EXUDATION)	69							
Gf		1.25							

REMARKS :

CHECKED BY:

DATE :

THE DATA ABOVE IS BASED UPON PROCESSING AND TESTING OF SAMPLES "AS RECEIVED" FROM THE FIELD
TEST PROCEEDURES IN GENERAL CONFORMANCE TO LATEST REVISIONS OF CA TEST METHOD 301.

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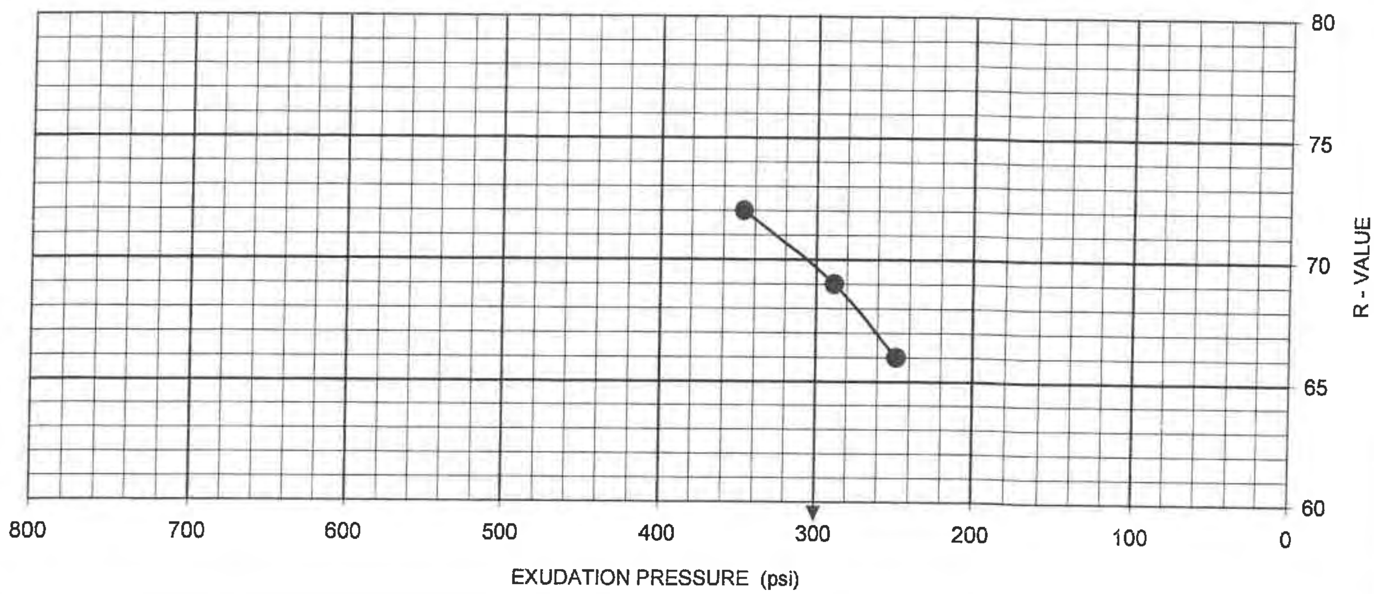
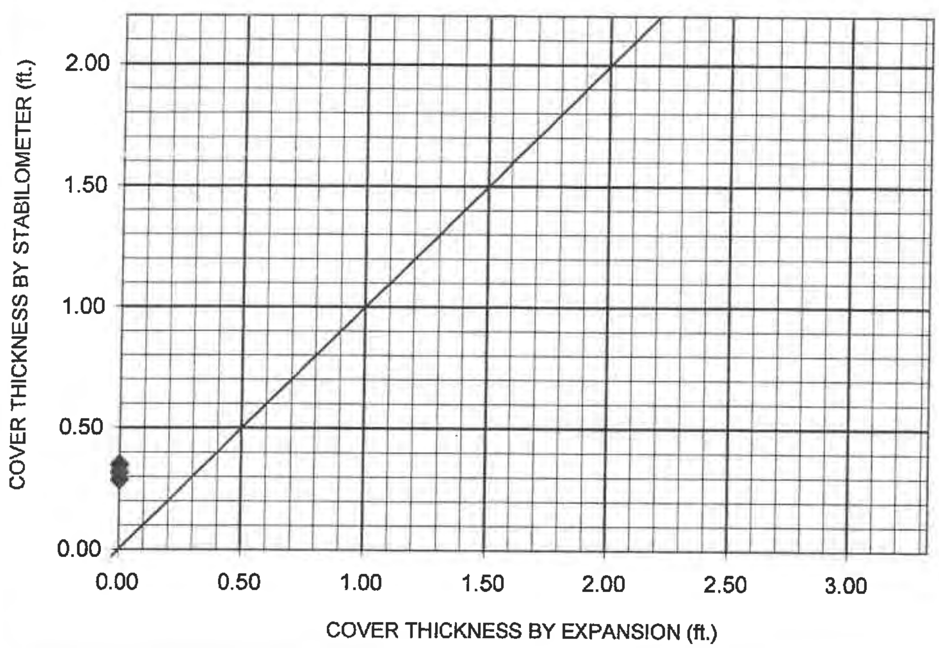
R - VALUE DATA





R - VALUE CURVES

NMG#10049-02

PROJECT NUMBER

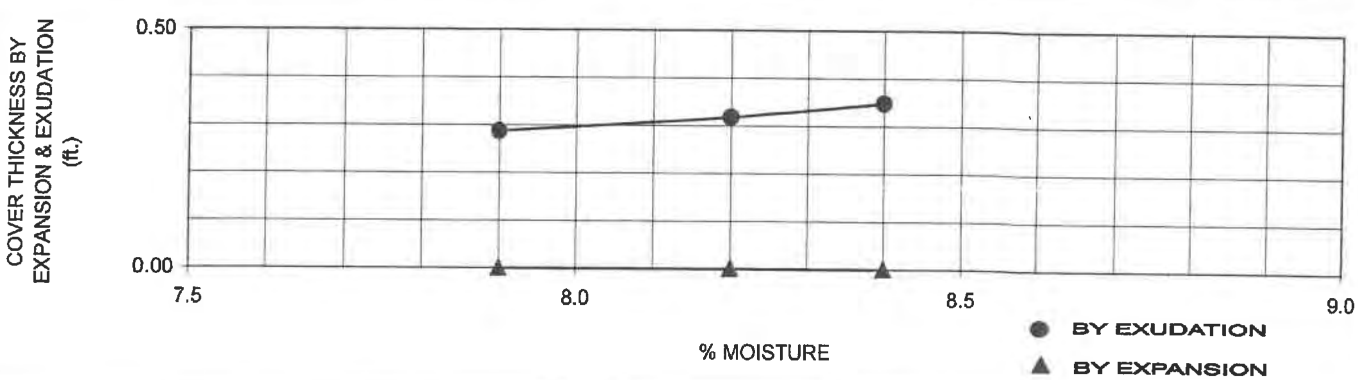
RENTECH / RIALTO

PROJECT NAME

T-1 @ 4.5'

SAMPLE NO. / LOCATION

R - VALUES	
R-VALUE BY EXUDATION	69
R-VALUE BY EXPANSION	-
COVER THICKNESS (ft.)	-



Order #: 1113554
Matrix: SOLID
Date Sampled: 09/23/2010
Time Sampled:
Sampled By:

Client: NMG Geotechnical
Client Sample ID: GS-1

Analyte	Result	DF	DLR	Units	Date/Analyst	
2580 B Redox Potential						
Redox Potential @ 25 C	436	1		mv	09/28/10	MS
300.0 Chloride by Ion Chromatography						
Chloride	12.7	1	10.0	mg/Kg	09/27/10	WW
Soluble Sulfate	ND	1	0.001	%	09/27/10	WW
9045 pH						
pH	7.55	1		NA	09/27/10	MS
Resistivity in Soil						
Resistivity	7900	1	NA	ohm/cm	09/29/10	APE

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 1113555 **Client:** NMG Geotechnical
Matrix: SOLID **Client Sample ID:** GS-2
Date Sampled: 09/23/2010
Time Sampled:
Sampled By:

Analyte	Result	DF	DLR	Units	Date/Analyst	
2580 B Redox Potential						
Redox Potential @ 25 C	450	1		mv	09/28/10	MS
300.0 Chloride by Ion Chromatography						
Chloride	16.9	1	10.0	mg/Kg	09/27/10	WW
Soluble Sulfate	0.001	1	0.001	%	09/27/10	WW
9045 pH						
pH	7.40	1		NA	09/27/10	MS
Resistivity in Soil						
Resistivity	6400	1	NA	ohm/cm	09/29/10	APE

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

PTS Laboratories

Project Name: Rentech/Rialto
Project Number: 10049-02

PTS File No: 40603
Client: NMG Geotechnical

TEST PROGRAM

CORE ID	Depth ft.	Core Recovery ft.	Hydraulic Conductivity API RP 40	Effective Porosity Mod. ASTM D425				Notes
		Plugs:	Vert. 1"	Vert. 1.5"				
Date Received: 8/16/10								
HS-1, D-6	27.5	0.50	X	X				
HS-2, D-6	30.0	0.50	X	X				
HS-1, D-12	57.5	0.50	X	X				
HS-1, D-4	17.5	0.50	X	X				
HS-2, D-2A	10.0	0.50	X	X				
HS-4, D-3A	15.0	0.50	X	X				
HS-3, D-4A	17.5	0.50	X	X				
HS-3, D-6A	27.5	0.50	X	X				
HS-3, D-8A	37.5	0.50						
HS-4, D-8A	40.0	0.50	X	X				
HS-3, D-9A	42.5	0.50	X	X				
HS-3, D-11A	52.5	0.50	X	X				
Date Received: 8/20/10								
HS-4, D-10A	50.0	0.50	X	X				
HS-3, D-10A	47.5	0.50						
TOTALS:	14 cores	7.0	12	12				

Laboratory Test Program Notes

PTS File No: 40603
Client: NMG Geotechnical

PHYSICAL PROPERTIES DATA - DRAINAGE (EFFECTIVE) POROSITY

PROJECT NAME: Rentech/Rialto
PROJECT NO: 10049-02

		METHODS:	Mod. ASTM D425	Mod. ASTM D425
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	TOTAL POROSITY, %Vb	EFFECTIVE POROSITY, %Vb
HS-1, D-6	27.5	R	33.1	30.1
HS-2, D-6	30.0	V	38.4	34.1
HS-1, D-12	57.5	V	34.5	19.8
HS-1, D-4	17.5	R	39.3	34.5
HS-2, D-2A	10.0	V	41.7	36.5
HS-4, D-3A	15.0	V	48.4	31.4
HS-3, D-4A	17.5	V	37.8	33.7
HS-3, D-6A	27.5	V	42.6	22.9
HS-4, D-8A	40.0	V	32.2	26.7
HS-3, D-9A	42.5	V	41.9	20.8
HS-3, D-11A	52.5	V	34.8	21.3
HS-4, D-10A	50.0	V	30.1	21.5

(1) Sample Orientation: H = horizontal; V = vertical; R = remold Vb = Bulk Volume

PTS File No: 40603
Client: NMG Geotechnical

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY

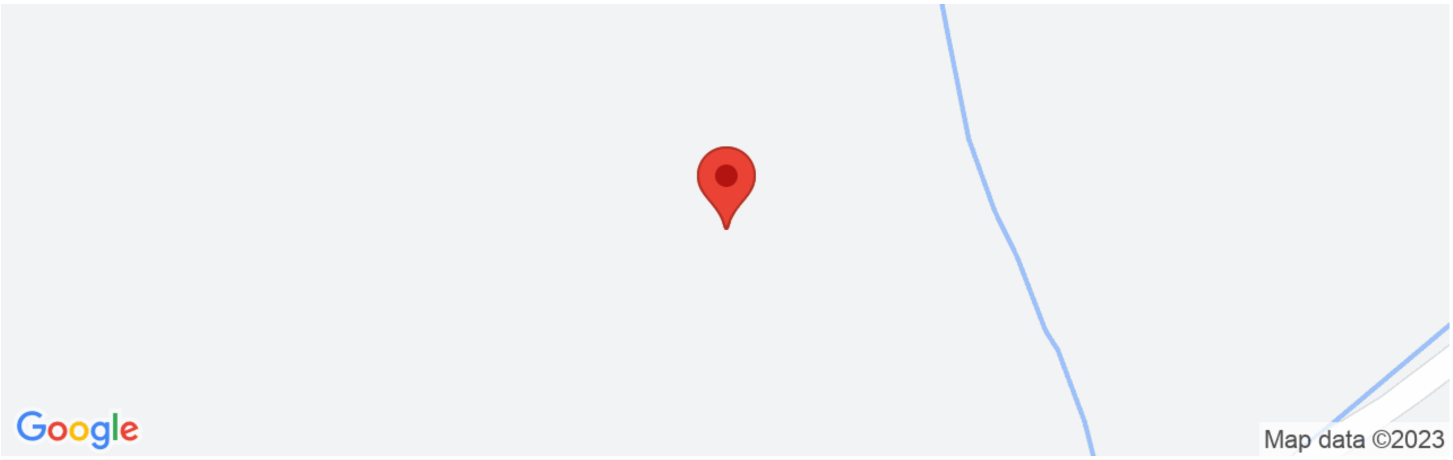
PROJECT NAME: Rentech/Rialto
PROJECT NO: 10049-02

		METHODS:	API RP 40; EPA 9100	
			25 PSI CONFINING STRESS	
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	EFFECTIVE (2,3) PERMEABILITY TO WATER, millidarcy	HYDRAULIC CONDUCTIVITY (2,3), cm/s
HS-1, D-6	27.5	R	2613	2.55E-03
HS-2, D-6	30.0	V	3270	3.21E-03
HS-1, D-12	57.5	V	16.0	1.57E-05
HS-1, D-4	17.5	R	1990	1.96E-03
HS-2, D-2A	10.0	V	1854	1.82E-03
HS-4, D-3A	15.0	V	185	1.82E-04
HS-3, D-4A	17.5	V	1439	1.47E-03
HS-3, D-6A	27.5	V	28.0	2.86E-05
HS-4, D-8A	40.0	V	372	3.80E-04
HS-3, D-9A	42.5	V	13.4	1.37E-05
HS-3, D-11A	52.5	V	9.40	9.58E-06
HS-4, D-10A	50.0	V	82.6	8.42E-05

(1) Sample Orientation: H = horizontal; V = vertical; R = remold
(2) Native State or Effective = With as-received pore fluids in place
(3) Permeability to water and hydraulic conductivity measured at saturated conditions

APPENDIX D

Latitude, Longitude: 34.0512, -117.3605



Date	1/3/2023, 3:09:41 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.768	MCE_R ground motion. (for 0.2 second period)
S_1	0.692	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.768	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.179	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.748	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.822	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.07	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.247	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.768	Factored deterministic acceleration value. (0.2 second)
S1RT	0.801	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.895	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.692	Factored deterministic acceleration value. (1.0 second)
PGAd	0.748	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.894	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.921	Mapped value of the risk coefficient at short periods
C_{R1}	0.896	Mapped value of the risk coefficient at a period of 1 s
C_V	1.454	Vertical coefficient

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U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.0512

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

-117.3605

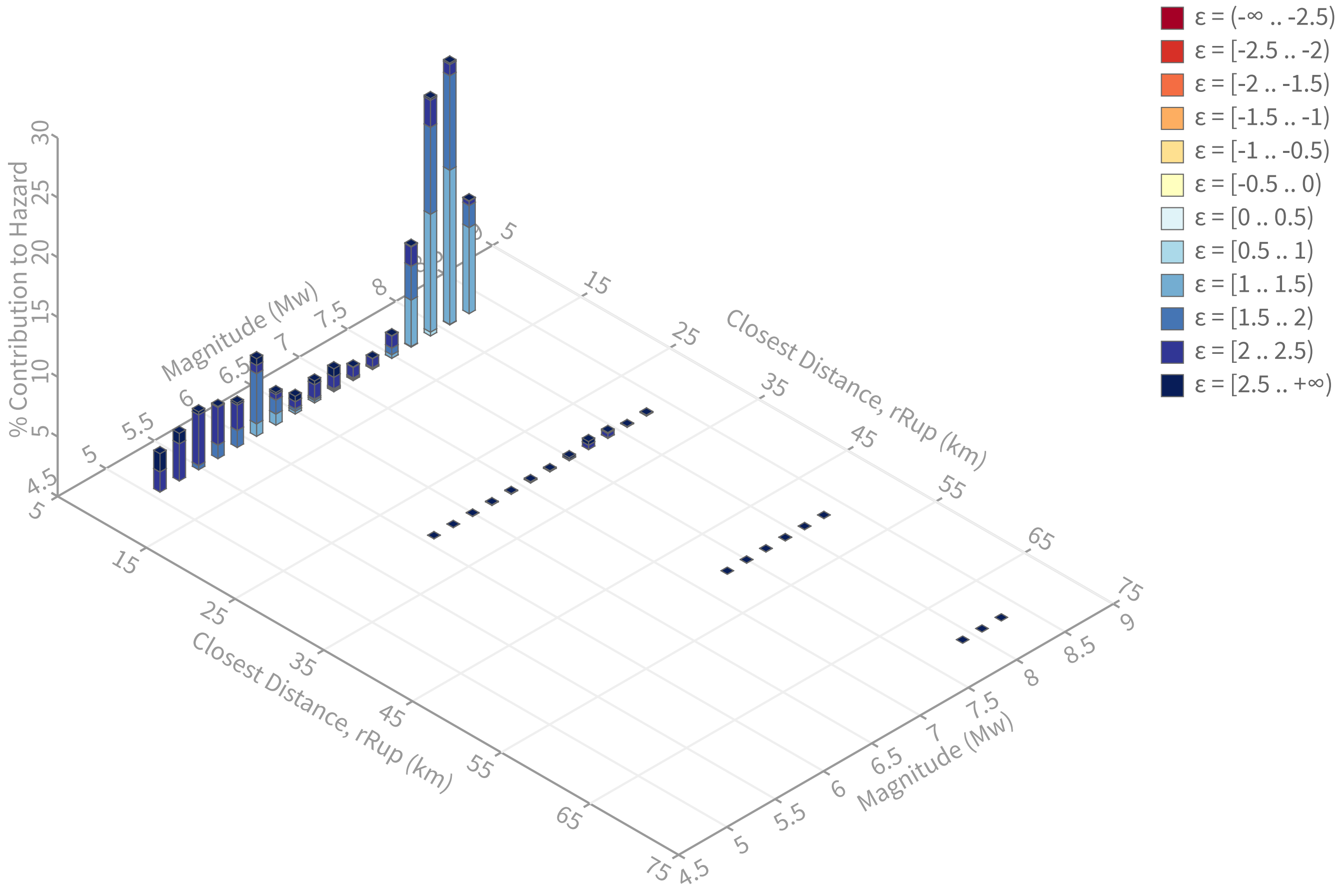
Site Class

259 m/s (Site class D)

Deaggregation

Component

Total


% Contribution to Hazard
Magnitude (Mw)
Closest Distance, rRup (km)
Closest Distance, rRup (km)
Magnitude (Mw)
ε = (-∞ .. -2.5)
ε = [-2.5 .. -2)
ε = [-2 .. -1.5)
ε = [-1.5 .. -1)
ε = [-1 .. -0.5)
ε = [-0.5 .. 0)
ε = [0 .. 0.5)
ε = [0.5 .. 1)
ε = [1 .. 1.5)
ε = [1.5 .. 2)
ε = [2 .. 2.5)
ε = [2.5 .. +∞)

Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.92402538 g

Recovered targets

Return period: 3318.5272 yrs
Exceedance rate: 0.0003013385 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.04 %

Mean (over all sources)

m: 7.23
r: 9.72 km
ε_0: 1.74 σ

Mode (largest m-r bin)

m: 8.1
r: 8.75 km
ε_0: 1.42 σ
Contribution: 21.91 %

Mode (largest m-r-ε_0 bin)

m: 8.1
r: 6.64 km
ε_0: 1.18 σ
Contribution: 12.9 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31	System							34.63
San Jacinto (San Bernardino) [3]		6.18	8.02	1.29	117.309°W	34.086°N	50.50	20.72
San Andreas (San Bernardino N) [4]		15.74	7.81	1.96	117.278°W	34.175°N	28.73	7.91
San Andreas (North Branch Mill Creek) [0]		15.31	7.99	1.70	117.270°W	34.171°N	31.81	1.78
UC33brAvg_FM32	System							34.58
San Jacinto (San Bernardino) [3]		6.18	8.01	1.30	117.309°W	34.086°N	50.50	20.66
San Andreas (San Bernardino N) [4]		15.74	7.82	1.95	117.278°W	34.175°N	28.73	7.96
San Andreas (North Branch Mill Creek) [0]		15.31	8.00	1.70	117.270°W	34.171°N	31.81	1.86
UC33brAvg_FM31 (opt)	Grid							15.40
PointSourceFinite: -117.361, 34.119		8.73	5.72	2.14	117.361°W	34.119°N	0.00	3.63
PointSourceFinite: -117.361, 34.119		8.73	5.72	2.14	117.361°W	34.119°N	0.00	3.63
PointSourceFinite: -117.361, 34.110		7.98	5.73	2.04	117.361°W	34.110°N	0.00	3.56
PointSourceFinite: -117.361, 34.110		7.98	5.73	2.04	117.361°W	34.110°N	0.00	3.56
UC33brAvg_FM32 (opt)	Grid							15.39
PointSourceFinite: -117.361, 34.119		8.73	5.72	2.14	117.361°W	34.119°N	0.00	3.63
PointSourceFinite: -117.361, 34.119		8.73	5.72	2.14	117.361°W	34.119°N	0.00	3.63
PointSourceFinite: -117.361, 34.110		7.98	5.73	2.04	117.361°W	34.110°N	0.00	3.56
PointSourceFinite: -117.361, 34.110		7.98	5.73	2.04	117.361°W	34.110°N	0.00	3.56

APPENDIX E

APPENDIX E

Slope Stability Analysis

Introduction

The results of our slope stability analyses related to the gross stability of cross sections are presented in this appendix. Slope stability analysis was performed using the computer program GSTABL7. The computer output and plots for selected trial failure surfaces analyzed are included for selected cross-sections.

Computer Aided Analysis

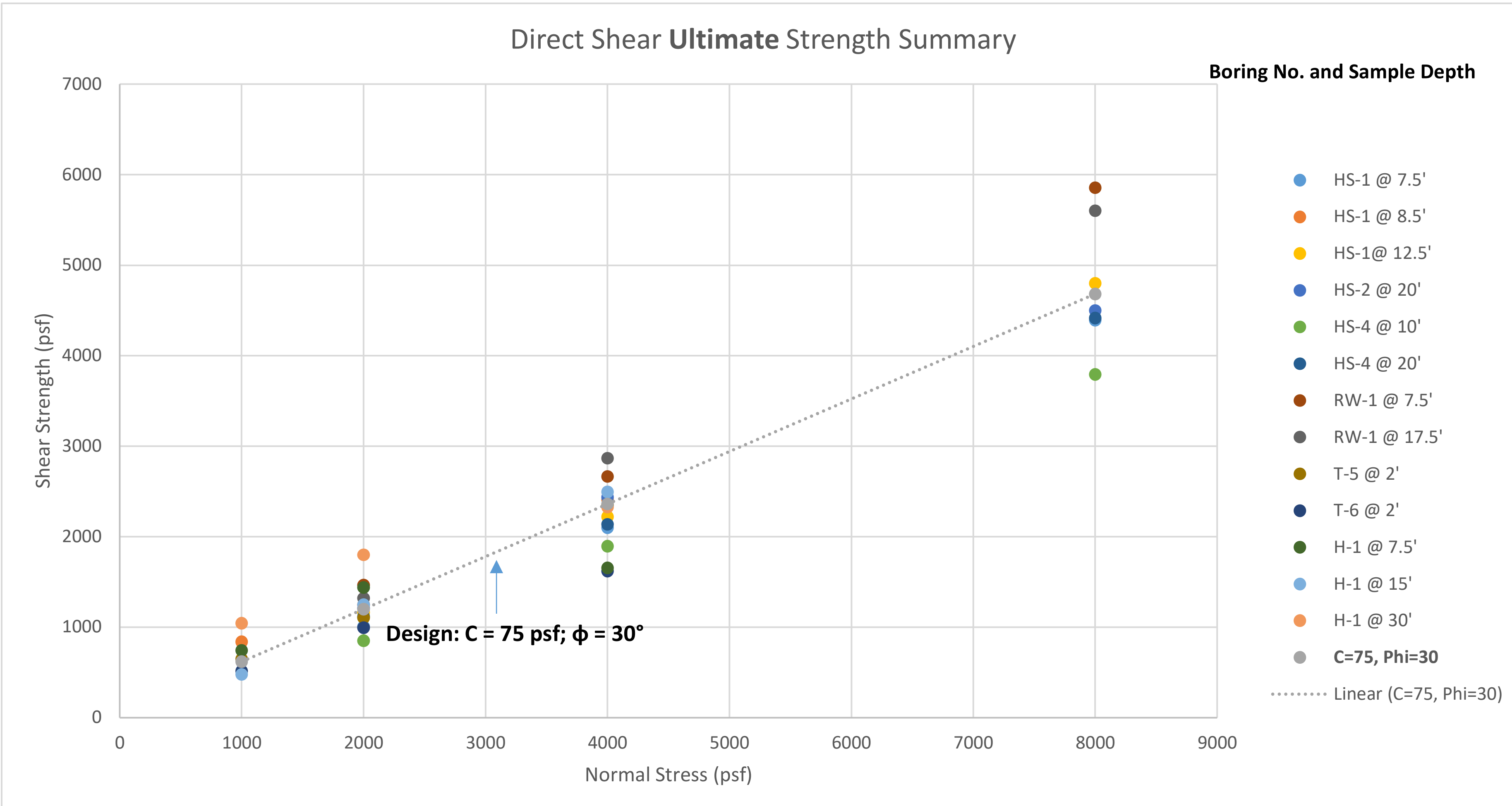
GSTABL7 solve slope stability problems by a two-dimensional limiting equilibrium method. The methods employed in this program include the Modified Bishop Method, which permits circular arc failure surfaces, and the Simplified Janbu Method and Spencer Method, which allow failure surfaces of general shape (circular arc and non-circular). The Simplified Janbu Method provides a solution that satisfies the force equilibrium, while the Spencer Method satisfies both force and moment equilibriums. All methods yield a "factor-of-safety" (FOS) against instability of the slope. A minimum design static factor-of-safety of 1.5 and a pseudo-static (seismic) factor-of-safety of 1.0 was used for global slope stability. The minimum factor-of-safety for rapid drawdown was 1.1.

Summary of Soil Strength Design Values

Based on laboratory direct shear test results at the site as well as from the local area of Rialto and our experience with materials similar to the onsite soils, the following strength parameters were used in our slope stability analysis.

Design Static Soil Strength Parameters

Earth Unit	***Cohesion (psf)***	***Friction Angle (degrees)***
Unidentified Compacted Fill (Afu)	75	30
Alluvium (Qal)	75	30


Direct Shear **Ultimate** Strength Summary
Boring No. and Sample Depth
Shear Strength (psf)
Normal Stress (psf)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Design: C = 75 psf; ϕ = 30°
HS-1 @ 7.5'
HS-1 @ 8.5'
HS-1@ 12.5'
HS-2 @ 20'
HS-4 @ 10'
HS-4 @ 20'
RW-1 @ 7.5'
RW-1 @ 17.5'
T-5 @ 2'
T-6 @ 2'
H-1 @ 7.5'
H-1 @ 15'
H-1 @ 30'
C=75, Phi=30
Linear (C=75, Phi=30)

Summary of Slope Stability Analysis

Cross-Section B-B' S

Filename	**Description**	**Factor of Safety (FS)**	
		Static	***Pseudostatic***
01, 01p	Design Condition	1.61	1.07
02	Rapid Drawdown Condition-Operating Lake Level El 905’	0.86	--
02m	Rapid Drawdown-Maximum Groundwater El 887’ (28 feet bgs)	1.10	--

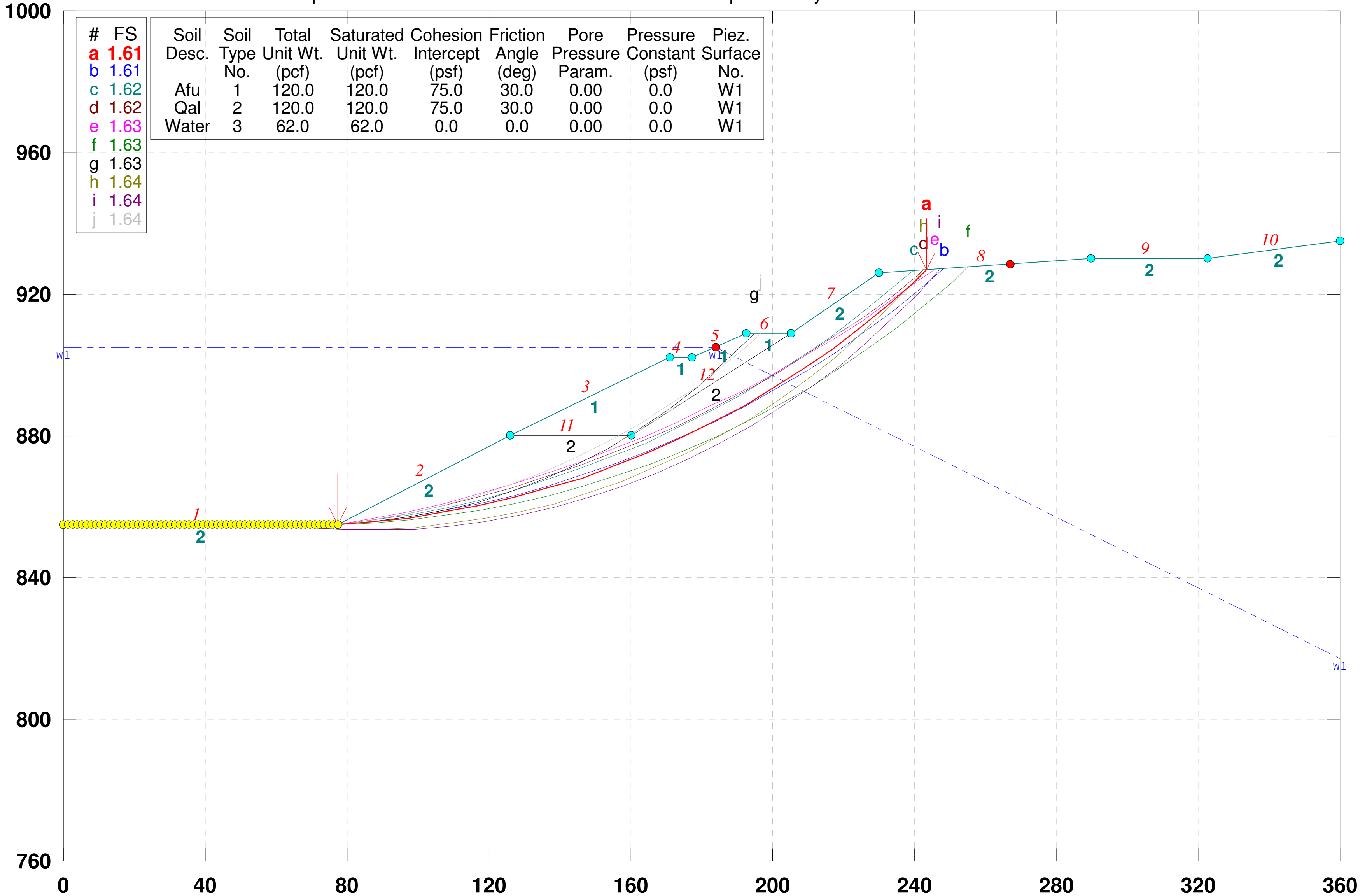
Project No.: 20079-02

Project Name: DWC / Lake Rialto

NMG

DWC / Lake Rialto; B-B' S; Design

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' s\01.pl2   Run By: TAC for TM   10/5/2022   04:30PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Afu	1	120.0	120.0	75.0	30.0	0.00	0.0	W1
Qal	2	120.0	120.0	75.0	30.0	0.00	0.0	W1
Water	3	62.0	62.0	0.0	0.0	0.00	0.0	W1

GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' S; Design

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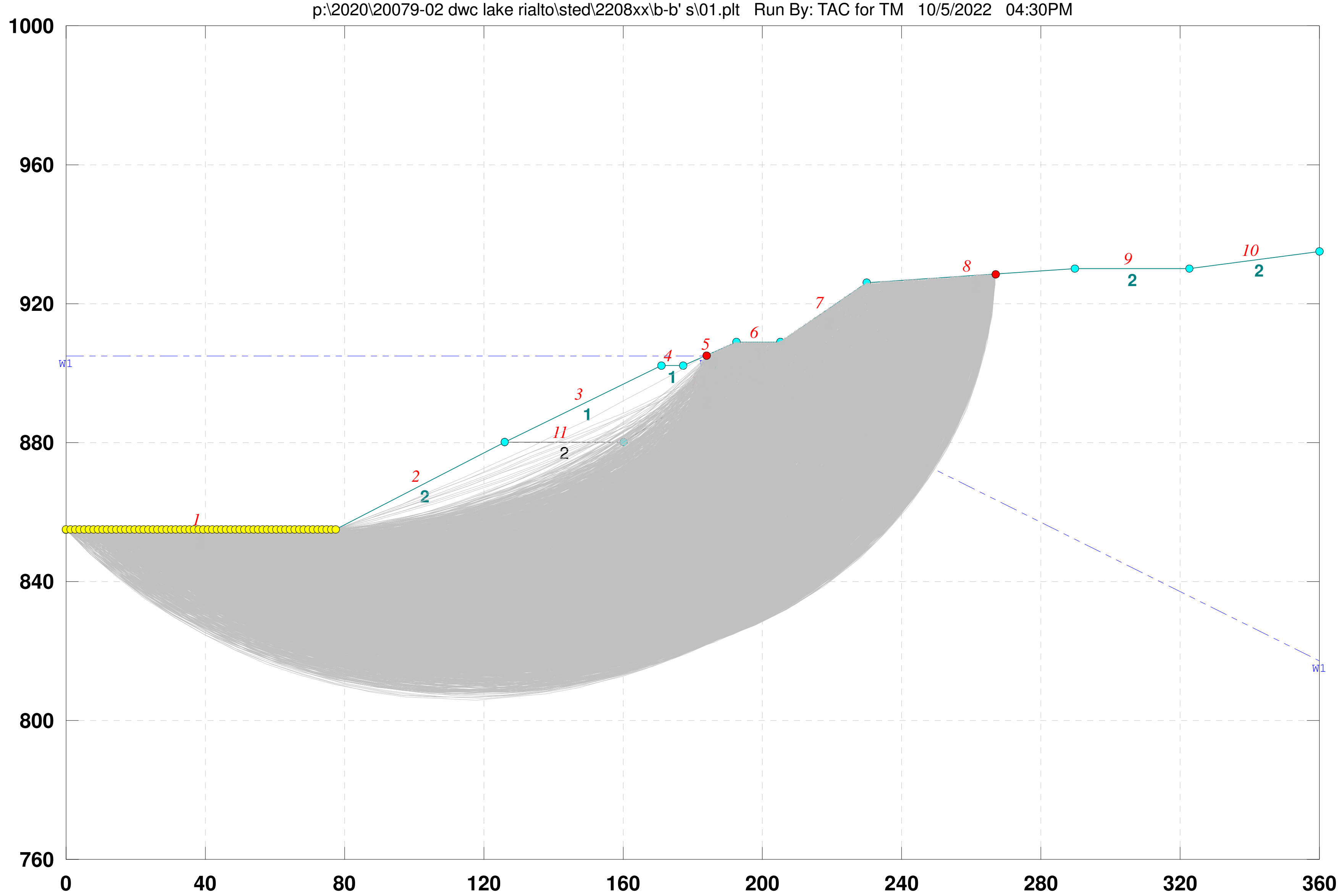

*** **GSTABL7** ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 04:30PM
Run By: TAC for TM
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Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\01.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\01.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; B-B' S; Design
BOUNDARY COORDINATES
10 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	855.00	77.50	855.00	2
2	77.50	855.00	126.00	880.00	2
3	126.00	880.00	171.00	902.00	1
4	171.00	902.00	177.50	902.00	1
5	177.50	902.00	192.50	909.00	1
6	192.50	909.00	205.00	909.00	1
7	205.00	909.00	230.00	926.00	2
8	230.00	926.00	290.00	930.00	2
9	290.00	930.00	322.50	930.00	2
10	322.50	930.00	360.00	935.00	2
11	126.00	880.00	160.00	880.00	2
12	160.00	880.00	205.00	909.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	905.00
2	184.00	905.00
3	360.00	817.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 77.50(ft)
Each Surface Terminates Between X = 184.00(ft)
and X = 267.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 3.059 FS Min = 1.605 FS Ave = 2.241
Standard Deviation = 0.329 Coefficient of Variation = 14.69 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.472	855.750
3	97.408	856.880
4	107.293	858.389
5	117.114	860.274
6	126.856	862.532
7	136.504	865.161
8	146.045	868.155
9	155.465	871.512
10	164.750	875.226
11	173.886	879.292
12	182.860	883.703
13	191.660	888.453
14	200.272	893.536
15	208.683	898.944
16	216.882	904.669
17	224.857	910.703
18	232.595	917.037
19	240.086	923.662
20	243.476	926.898

Circle Center At X = 62.925 ; Y = 1116.172 ; and Radius = 261.578
Factor of Safety
*** 1.605 ***
Individual data on the 29 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	2626.5	33203.0	30965.9	0.	0.	0.0	0.0	0.0
2	9.9	7613.6	29504.6	30379.2	0.	0.	0.0	0.0	0.0
3	9.9	12070.2	25809.7	29556.0	0.	0.	0.0	0.0	0.0
4	9.8	15976.9	22138.9	28497.2	0.	0.	0.0	0.0	0.0
5	8.9	17493.9	17023.9	24871.2	0.	0.	0.0	0.0	0.0
6	0.9	1825.5	1473.6	2333.4	0.	0.	0.0	0.0	0.0
7	9.6	21917.8	14893.0	25679.9	0.	0.	0.0	0.0	0.0
8	9.5	23825.4	11618.7	23925.5	0.	0.	0.0	0.0	0.0
9	9.4	25172.0	8438.6	21943.7	0.	0.	0.0	0.0	0.0
10	4.5	12568.2	2988.2	9930.2	0.	0.	0.0	0.0	0.0
11	4.7	13398.4	2380.9	9807.5	0.	0.	0.0	0.0	0.0
12	6.3	17892.4	1965.7	12116.5	0.	0.	0.0	0.0	0.0
13	2.9	8086.8	540.3	5194.0	0.	0.	0.0	0.0	0.0
14	3.6	9463.0	676.5	6236.9	0.	0.	0.0	0.0	0.0
15	5.4	13421.8	645.7	8428.8	0.	0.	0.0	0.0	0.0
16	1.1	2838.4	18.2	1696.1	0.	0.	0.0	0.0	0.0
17	7.7	18783.8	0.0	8163.8	0.	0.	0.0	0.0	0.0
18	0.7	1617.4	0.0	539.7	0.	0.	0.0	0.0	0.0
19	0.2	409.0	0.0	131.8	0.	0.	0.0	0.0	0.0
20	7.8	16560.6	0.0	3833.7	0.	0.	0.0	0.0	0.0
21	2.9	5075.7	0.0	323.4	0.	0.	0.0	0.0	0.0
22	1.8	2835.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	3.7	5521.4	0.0	0.0	0.	0.	0.0	0.0	0.0
24	8.2	12284.1	0.0	0.0	0.	0.	0.0	0.0	0.0
25	8.0	11583.6	0.0	0.0	0.	0.	0.0	0.0	0.0
26	5.1	7062.5	0.0	0.0	0.	0.	0.0	0.0	0.0
27	2.6	3148.9	0.0	0.0	0.	0.	0.0	0.0	0.0
28	7.5	5459.4	0.0	0.0	0.	0.	0.0	0.0	0.0
29	3.4	612.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 20 Coordinate Points
Point X-Surf Y-Surf

No.	(ft)	(ft)
1	77.500	855.000
2	87.454	855.960
3	97.369	857.258
4	107.235	858.890
5	117.040	860.856
6	126.773	863.152
7	136.422	865.778
8	145.977	868.728
9	155.426	872.001
10	164.759	875.592
11	173.965	879.497
12	183.034	883.712
13	191.954	888.231
14	200.716	893.050
15	209.310	898.164
16	217.726	903.565
17	225.953	909.249
18	233.984	915.208
19	241.808	921.436
20	248.614	927.241

Circle Center At X = 54.173 ; Y = 1149.030 ; and Radius = 294.954

Factor of Safety

*** 1.610 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.427	856.210
3	97.305	857.762
4	107.124	859.656
5	116.872	861.888
6	126.537	864.456
7	136.107	867.358
8	145.570	870.589
9	154.916	874.145
10	164.134	878.023
11	173.212	882.217
12	182.139	886.724
13	190.905	891.536
14	199.499	896.649
15	207.911	902.057
16	216.130	907.752
17	224.148	913.729
18	231.954	919.979
19	239.539	926.496
20	239.703	926.647

Circle Center At X = 47.535 ; Y = 1142.268 ; and Radius = 288.826

Factor of Safety

*** 1.615 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.391	856.471
3	97.233	858.242
4	107.017	860.311
5	116.733	862.678
6	126.372	865.338
7	135.926	868.291
8	145.386	871.533
9	154.743	875.061
10	163.989	878.872
11	173.114	882.963
12	182.110	887.329
13	190.969	891.967
14	199.684	896.872
15	208.245	902.040
16	216.645	907.466
17	224.876	913.145

```
   18        232.930      919.072
   19        240.800      925.241
   20        242.727      926.848
Circle Center At X =    34.203 ; Y =  1180.477 ; and Radius =   328.344
       Factor of Safety
      ***    1.616   ***
Failure Surface Specified By 20 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         77.500      855.000
    2         87.348      856.737
    3         97.147      858.732
    4        106.890      860.985
    5        116.570      863.493
    6        126.181      866.255
    7        135.716      869.269
    8        145.169      872.532
    9        154.532      876.044
   10        163.800      879.800
   11        172.965      883.800
   12        182.022      888.039
   13        190.965      892.514
   14        199.786      897.224
   15        208.481      902.164
   16        217.042      907.331
   17        225.465      912.722
   18        233.743      918.332
   19        241.870      924.159
   20        245.681      927.045
Circle Center At X =    16.585 ; Y =  1229.521 ; and Radius =   379.443
       Factor of Safety
      ***    1.626   ***
Failure Surface Specified By 21 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         77.500      855.000
    2         87.490      855.445
    3         97.457      856.258
    4        107.387      857.437
    5        117.267      858.981
    6        127.084      860.888
    7        136.824      863.155
    8        146.473      865.779
    9        156.019      868.756
   10        165.450      872.084
   11        174.751      875.756
   12        183.911      879.768
   13        192.917      884.115
   14        201.756      888.790
   15        210.418      893.788
   16        218.890      899.101
   17        227.160      904.723
   18        235.217      910.646
   19        243.051      916.861
   20        250.651      923.360
   21        255.352      927.690
Circle Center At X =    70.412 ; Y =  1126.423 ; and Radius =   271.516
       Factor of Safety
      ***    1.631   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         77.500      855.000
    2         87.475      855.714
    3         97.390      857.013
    4        107.211      858.895
    5        116.905      861.351
    6        126.437      864.373
    7        135.775      867.951
    8        144.886      872.073
```

9	153.739	876.724
10	162.302	881.888
11	170.547	887.547
12	178.444	893.682
13	185.966	900.271
14	193.088	907.291
15	194.628	909.000

Circle Center At X = 70.373 ; Y = 1024.650 ; and Radius = 169.799
Factor of Safety
*** 1.634 ***
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.110	855.000
2	69.069	854.094
3	79.060	853.662
4	89.060	853.706
5	99.046	854.226
6	108.997	855.220
7	118.889	856.686
8	128.700	858.620
9	138.407	861.020
10	147.990	863.878
11	157.426	867.189
12	166.694	870.945
13	175.773	875.137
14	184.642	879.757
15	193.281	884.793
16	201.671	890.234
17	209.793	896.068
18	217.628	902.282
19	225.159	908.861
20	232.368	915.791
21	239.240	923.056
22	242.485	926.832

Circle Center At X = 83.166 ; Y = 1063.567 ; and Radius = 209.949
Factor of Safety
*** 1.640 ***
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.110	855.000
2	69.060	853.999
3	79.046	853.464
4	89.045	853.396
5	99.037	853.795
6	109.000	854.660
7	118.911	855.989
8	128.750	857.779
9	138.494	860.027
10	148.122	862.728
11	157.614	865.875
12	166.949	869.462
13	176.105	873.481
14	185.065	877.923
15	193.807	882.779
16	202.312	888.037
17	210.563	893.687
18	218.542	899.716
19	226.229	906.111
20	233.610	912.858
21	240.668	919.942
22	247.205	927.147

Circle Center At X = 85.509 ; Y = 1067.441 ; and Radius = 214.075
Factor of Safety
*** 1.644 ***
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000

2	87.416	856.297
3	97.258	858.065
4	107.005	860.302
5	116.633	863.002
6	126.122	866.158
7	135.449	869.764
8	144.594	873.812
9	153.534	878.291
10	162.251	883.192
11	170.723	888.504
12	178.932	894.215
13	186.860	900.311
14	194.486	906.778
15	196.866	909.000

Circle Center At X = 55.321 ; Y = 1063.158 ; and Radius = 209.336

Factor of Safety

*** 1.644 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; B-B' S; Design; P-static

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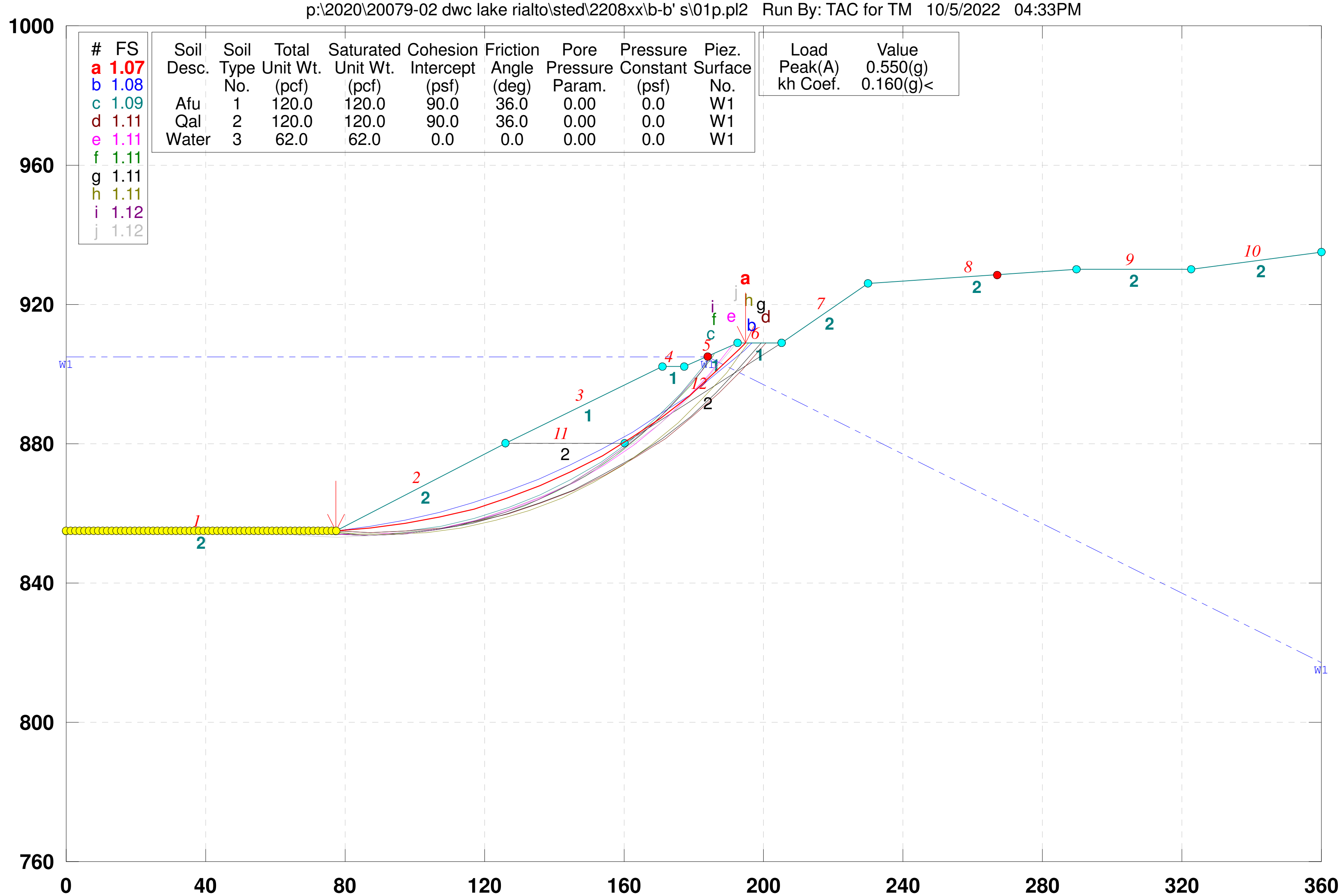

GSTABL7 v.2 FSmin=1.07

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' S; Design; P-static

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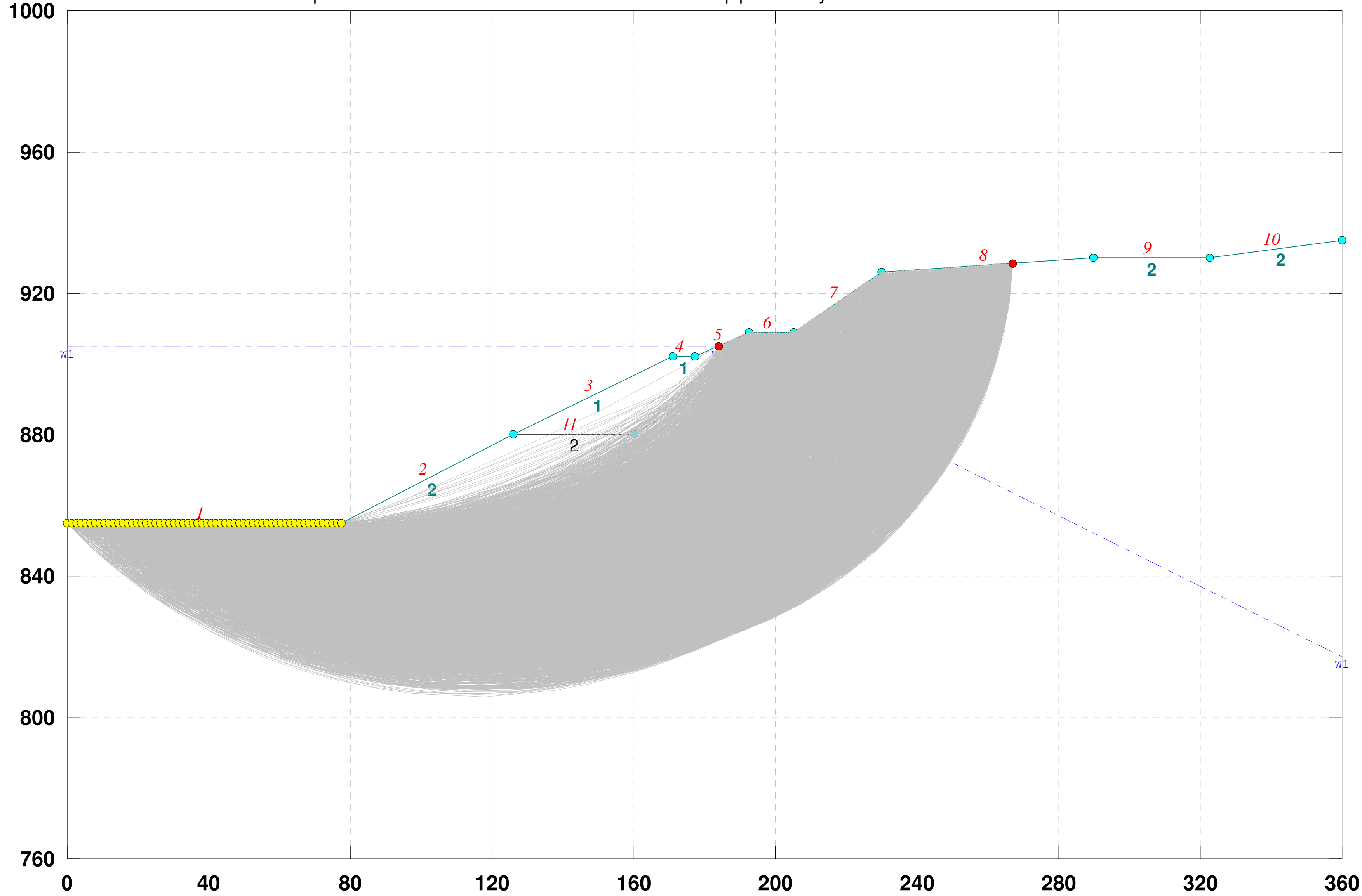

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                         ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
    ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
             (All Rights Reserved-Unauthorized Use Prohibited)
 *********************************************************************************
                   SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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 Unit System:              English
 Plotted Output Filename:  P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\01p.PLT
 PROBLEM DESCRIPTION:  DWC / Lake Rialto; B-B' S; Design; P-sta
                       tic
 BOUNDARY COORDINATES
    10 Top   Boundaries
    12 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1          0.00     855.00      77.50     855.00        2
     2         77.50     855.00     126.00     880.00        2
     3        126.00     880.00     171.00     902.00        1
     4        171.00     902.00     177.50     902.00        1
     5        177.50     902.00     192.50     909.00        1
     6        192.50     909.00     205.00     909.00        1
     7        205.00     909.00     230.00     926.00        2
     8        230.00     926.00     290.00     930.00        2
     9        290.00     930.00     322.50     930.00        2
    10        322.50     930.00     360.00     935.00        2
    11        126.00     880.00     160.00     880.00        2
    12        160.00     880.00     205.00     909.00        2
 User Specified Y-Origin =       760.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   120.0    120.0      90.0     36.0    0.00       0.0      1
   2   120.0    120.0      90.0     36.0    0.00       0.0      1
   3    62.0     62.0       0.0      0.0    0.00       0.0      1
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water =  62.40 (pcf)
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
 Pore Pressure Inclination Factor =  0.50
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          0.00      905.00
     2        184.00      905.00
     3        360.00      817.00
 Specified Peak Ground Acceleration Coefficient (A) =   0.550(g)
 Specified Horizontal Earthquake Coefficient (kh) =   0.160(g)
 Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
 Specified Seismic Pore-Pressure Factor =   0.000
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 4800 Trial Surfaces Have Been Generated.
   80 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
 Along The Ground Surface Between  X =   0.00(ft)
                              and  X =  77.50(ft)
 Each Surface Terminates Between   X = 184.00(ft)
```

and X = 267.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 2.052 FS Min = 1.074 FS Ave = 1.542
Standard Deviation = 0.236 Coefficient of Variation = 15.30 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.475	855.714
3	97.390	857.013
4	107.211	858.895
5	116.905	861.351
6	126.437	864.373
7	135.775	867.951
8	144.886	872.073
9	153.739	876.724
10	162.302	881.888
11	170.547	887.547
12	178.444	893.682
13	185.966	900.271
14	193.088	907.291
15	194.628	909.000

Circle Center At X = 70.373 ; Y = 1024.650 ; and Radius = 169.799
Factor of Safety
*** 1.074 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	2649.9	33211.4	30977.3	0.	0.	424.0	0.0	0.0
2	9.9	7535.6	29445.8	30349.1	0.	0.	1205.7	0.0	0.0
3	9.8	11585.2	25660.2	29356.7	0.	0.	1853.6	0.0	0.0
4	9.7	14762.6	21903.6	28003.5	0.	0.	2362.0	0.0	0.0
5	9.1	16222.2	17459.1	25129.5	0.	0.	2595.5	0.0	0.0
6	0.4	829.1	756.0	1164.8	0.	0.	132.7	0.0	0.0
7	9.3	18303.2	14595.6	24234.9	0.	0.	2928.5	0.0	0.0
8	9.1	18579.9	11387.2	21832.4	0.	0.	2972.8	0.0	0.0
9	8.9	18057.8	8364.2	19095.3	0.	0.	2889.3	0.0	0.0
10	5.4	10774.0	3815.2	10544.8	0.	0.	1723.8	0.0	0.0
11	3.1	6025.8	1743.6	5488.2	0.	0.	964.1	0.0	0.0
12	8.2	14885.2	2999.0	12656.2	0.	0.	2381.6	0.0	0.0
13	0.5	770.5	97.9	618.8	0.	0.	123.3	0.0	0.0
14	6.5	9029.3	1216.8	7486.3	0.	0.	1444.7	0.0	0.0
15	0.9	1008.6	180.7	871.5	0.	0.	161.4	0.0	0.0
16	5.6	5081.6	483.2	4094.9	0.	0.	813.1	0.0	0.0
17	2.0	1435.1	0.0	748.5	0.	0.	229.6	0.0	0.0
18	2.5	1520.4	0.0	372.4	0.	0.	243.3	0.0	0.0
19	4.0	1603.2	0.0	0.0	0.	0.	256.5	0.0	0.0
20	0.6	140.9	0.0	0.0	0.	0.	22.5	0.0	0.0
21	1.5	157.9	0.0	0.0	0.	0.	25.3	0.0	0.0

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.416	856.297
3	97.258	858.065
4	107.005	860.302
5	116.633	863.002
6	126.122	866.158
7	135.449	869.764

8	144.594	873.812
9	153.534	878.291
10	162.251	883.192
11	170.723	888.504
12	178.932	894.215
13	186.860	900.311
14	194.486	906.778
15	196.866	909.000

Circle Center At X = 55.321 ; Y = 1063.158 ; and Radius = 209.336
Factor of Safety
*** 1.080 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.494	854.663
3	97.482	855.153
4	107.396	856.466
5	117.167	858.595
6	126.728	861.523
7	136.015	865.232
8	144.963	869.696
9	153.512	874.884
10	161.604	880.760
11	169.181	887.286
12	176.194	894.415
13	182.593	902.099
14	184.968	905.485

Circle Center At X = 86.637 ; Y = 975.176 ; and Radius = 120.523
Factor of Safety
*** 1.094 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.492	854.592
3	97.487	854.885
4	107.438	855.876
5	117.295	857.560
6	127.010	859.930
7	136.536	862.974
8	145.825	866.677
9	154.833	871.020
10	163.514	875.983
11	171.828	881.541
12	179.732	887.667
13	187.188	894.331
14	194.159	901.500
15	200.495	909.000

Circle Center At X = 88.315 ; Y = 997.456 ; and Radius = 142.866
Factor of Safety
*** 1.105 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	68.305	855.000
2	78.266	854.114
3	88.265	853.993
4	98.244	854.636
5	108.145	856.041
6	117.910	858.199
7	127.480	861.097
8	136.801	864.719
9	145.818	869.043
10	154.478	874.044
11	162.730	879.692
12	170.526	885.955
13	177.820	892.796
14	184.570	900.174
15	190.736	908.047

```
   16        190.861      908.235
Circle Center At X =    84.856 ; Y =   984.587 ; and Radius =   130.639
       Factor of Safety
      ***    1.106   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         72.246      855.000
    2         82.203      854.072
    3         92.202      853.992
    4        102.173      854.760
    5        112.042      856.370
    6        121.739      858.812
    7        131.195      862.068
    8        140.340      866.113
    9        149.109      870.920
   10        157.439      876.453
   11        165.270      882.672
   12        172.545      889.533
   13        179.212      896.986
   14        185.223      904.978
   15        185.778      905.863
Circle Center At X =    88.148 ; Y =   971.737 ; and Radius =   117.815
       Factor of Safety
      ***    1.109   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         66.992      855.000
    2         76.948      854.064
    3         86.945      853.816
    4         96.935      854.258
    5        106.871      855.388
    6        116.705      857.200
    7        126.391      859.685
    8        135.883      862.833
    9        145.135      866.627
   10        154.104      871.051
   11        162.746      876.082
   12        171.021      881.697
   13        178.889      887.869
   14        186.313      894.568
   15        193.257      901.764
   16        199.334      909.000
Circle Center At X =    85.544 ; Y =   998.705 ; and Radius =   144.898
       Factor of Safety
      ***    1.112   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         73.559      855.000
    2         83.511      854.021
    3         93.509      853.829
    4        103.492      854.425
    5        113.396      855.806
    6        123.161      857.963
    7        132.725      860.882
    8        142.030      864.546
    9        151.017      868.932
   10        159.630      874.011
   11        167.817      879.754
   12        175.526      886.124
   13        182.709      893.081
   14        189.322      900.582
   15        195.323      908.581
   16        195.589      909.000
Circle Center At X =    90.952 ; Y =   980.577 ; and Radius =   126.776
       Factor of Safety
      ***    1.112   ***
Failure Surface Specified By 15 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	66.992	855.000
2	76.924	853.844
3	86.919	853.511
4	96.907	854.004
5	106.820	855.319
6	116.591	857.448
7	126.153	860.376
8	135.440	864.082
9	144.391	868.542
10	152.943	873.725
11	161.038	879.596
12	168.621	886.115
13	175.641	893.237
14	182.049	900.914
15	185.408	905.690

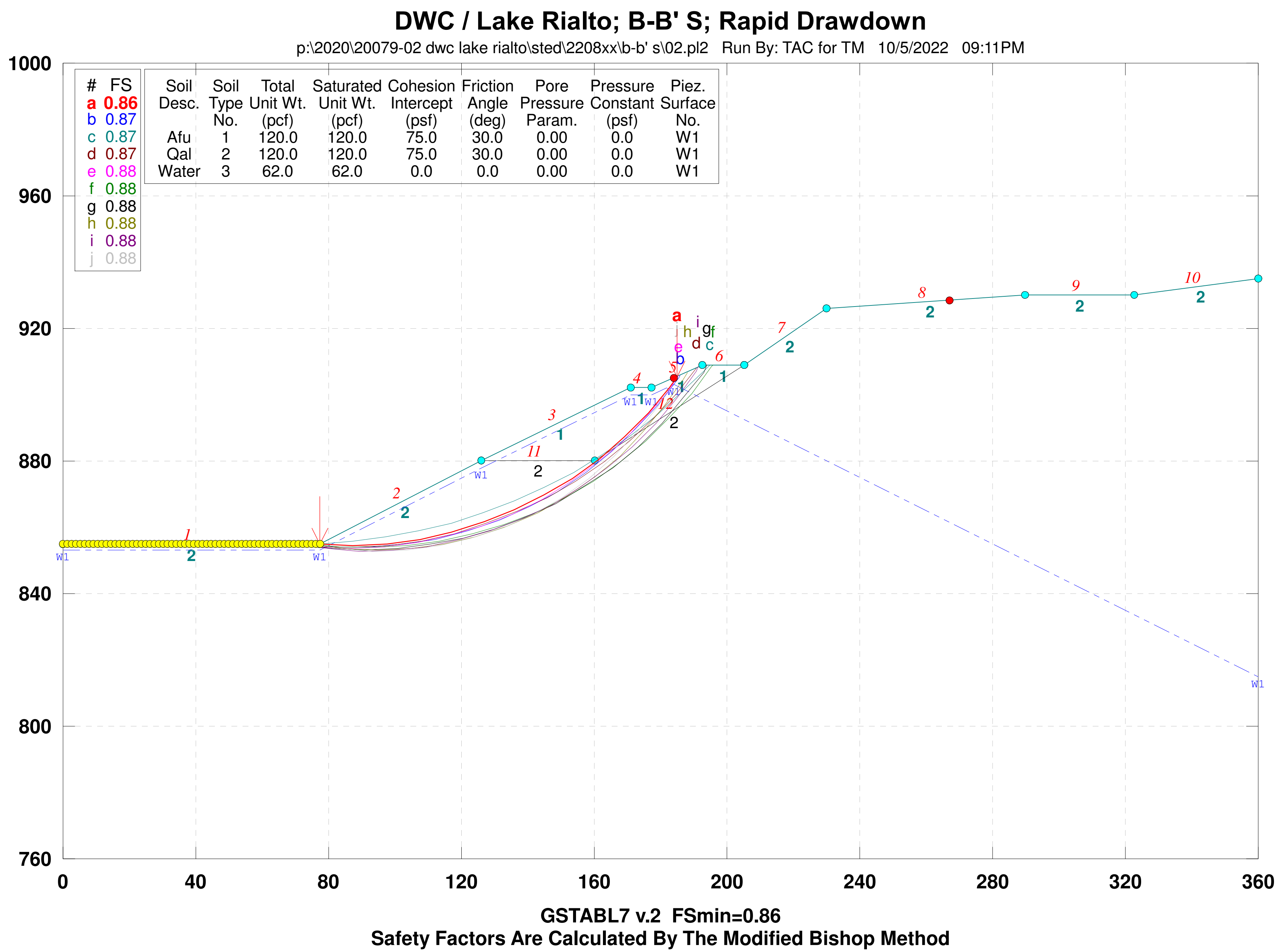
Circle Center At X = 85.948 ; Y = 974.617 ; and Radius = 121.110
Factor of Safety
*** 1.115 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.797	855.000
2	67.718	853.750
3	77.703	853.208
4	87.702	853.377
5	97.663	854.256
6	107.537	855.841
7	117.273	858.124
8	126.822	861.093
9	136.136	864.733
10	145.168	869.026
11	153.872	873.949
12	162.204	879.479
13	170.122	885.587
14	177.585	892.242
15	184.557	899.411
16	191.002	907.057
17	192.374	908.941

Circle Center At X = 80.326 ; Y = 993.806 ; and Radius = 140.622
Factor of Safety
*** 1.120 ***

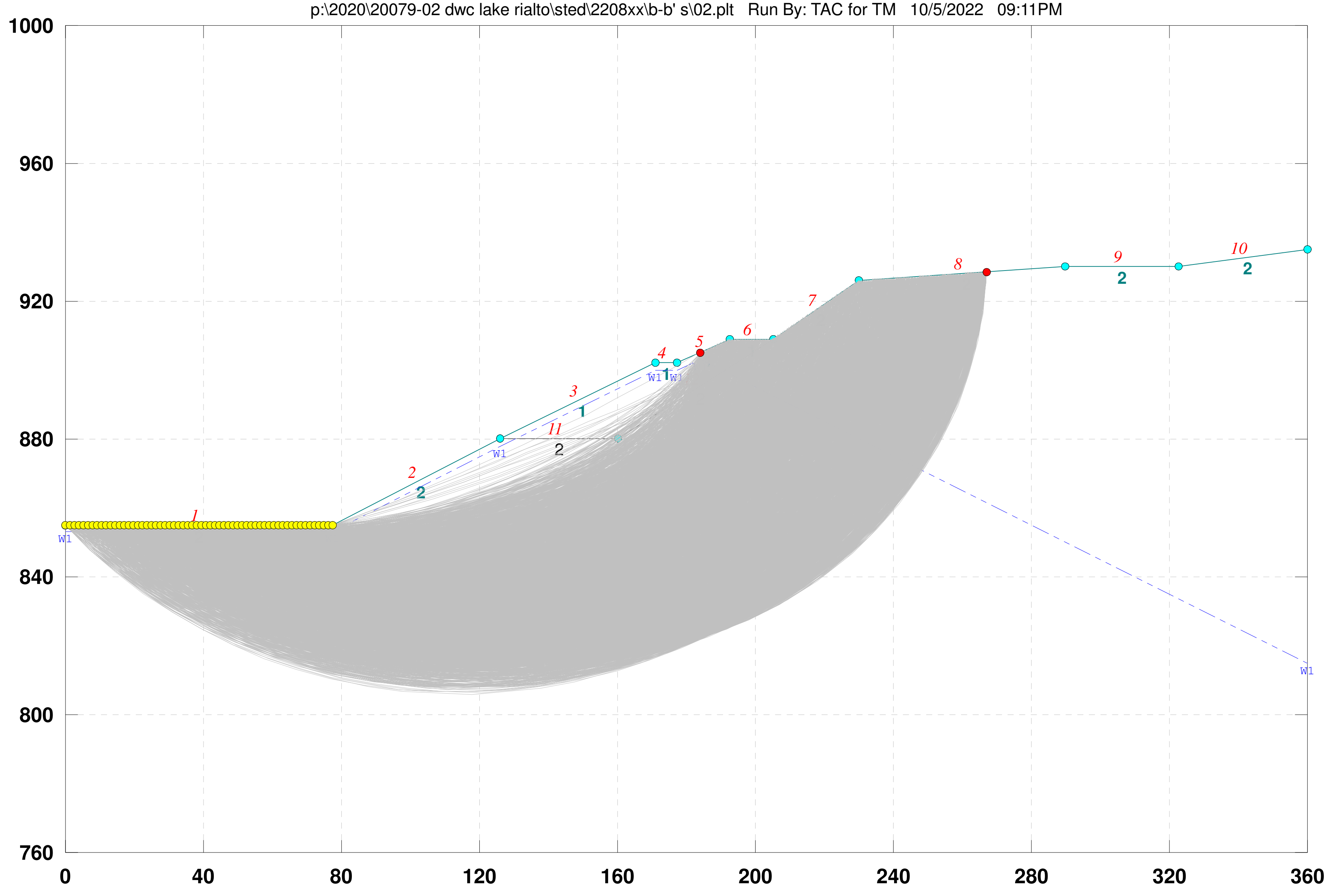
**** END OF GSTABL7 OUTPUT ****



DWC / Lake Rialto; B-B' S; Rapid Drawdown
p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' s\02.pl2 Run By: TAC for TM 10/5/2022 09:11PM
FS
a 0.86
b 0.87
c 0.87
d 0.87
e 0.88
f 0.88
g 0.88
h 0.88
i 0.88
j 0.88
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No.
Afu 1 120.0 120.0 75.0 30.0 0.00 0.0 W1
Qal 2 120.0 120.0 75.0 30.0 0.00 0.0 W1
Water 3 62.0 62.0 0.0 0.0 0.00 0.0 W1
GSTABL7 v.2 FSmin=0.86
Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' S; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' s\02.plt   Run By: TAC for TM   10/5/2022   09:11PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/5/2022
Time of Run: 09:11PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\02.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\02.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\02.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; B-B' S; Rapid Drawdow
n

BOUNDARY COORDINATES
10 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	855.00	77.50	855.00	2
2	77.50	855.00	126.00	880.00	2
3	126.00	880.00	171.00	902.00	1
4	171.00	902.00	177.50	902.00	1
5	177.50	902.00	192.50	909.00	1
6	192.50	909.00	205.00	909.00	1
7	205.00	909.00	230.00	926.00	2
8	230.00	926.00	290.00	930.00	2
9	290.00	930.00	322.50	930.00	2
10	322.50	930.00	360.00	935.00	2
11	126.00	880.00	160.00	880.00	2
12	160.00	880.00	205.00	909.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	853.00
2	77.50	853.00
3	126.00	878.00
4	171.00	900.00
5	177.50	900.00
6	184.00	903.00
7	360.00	815.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 77.50(ft)

Each Surface Terminates Between X = 184.00(ft)
and X = 267.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 1.830 FS Min = 0.859 FS Ave = 1.326
Standard Deviation = 0.203 Coefficient of Variation = 15.29 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.494	854.663
3	97.482	855.153
4	107.396	856.466
5	117.167	858.595
6	126.728	861.523
7	136.015	865.232
8	144.963	869.696
9	153.512	874.884
10	161.604	880.760
11	169.181	887.286
12	176.194	894.415
13	182.593	902.099
14	184.968	905.485

Circle Center At X = 86.637 ; Y = 975.176 ; and Radius = 120.523
Factor of Safety
*** 0.859 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.6	437.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.4	2854.5	0.0	619.3	0.	0.	0.0	0.0	0.0
3	10.0	9370.6	0.0	3249.5	0.	0.	0.0	0.0	0.0
4	9.9	14329.4	0.0	5610.5	0.	0.	0.0	0.0	0.0
5	9.8	18054.0	0.0	7482.7	0.	0.	0.0	0.0	0.0
6	8.8	18842.5	0.0	8139.9	0.	0.	0.0	0.0	0.0
7	0.7	1639.6	0.0	719.8	0.	0.	0.0	0.0	0.0
8	3.4	7660.4	0.0	3467.3	0.	0.	0.0	0.0	0.0
9	5.9	13790.1	0.0	6257.5	0.	0.	0.0	0.0	0.0
10	8.9	21068.0	0.0	9934.2	0.	0.	0.0	0.0	0.0
11	8.5	19564.6	0.0	9624.9	0.	0.	0.0	0.0	0.0
12	6.5	13854.7	0.0	7141.3	0.	0.	0.0	0.0	0.0
13	1.6	3239.6	0.0	1657.8	0.	0.	0.0	0.0	0.0
14	1.3	2481.5	0.0	1351.1	0.	0.	0.0	0.0	0.0
15	6.3	11372.6	0.0	6111.3	0.	0.	0.0	0.0	0.0
16	1.8	2912.7	0.0	1659.0	0.	0.	0.0	0.0	0.0
17	5.2	6373.0	0.0	3801.4	0.	0.	0.0	0.0	0.0
18	1.3	1066.1	0.0	611.5	0.	0.	0.0	0.0	0.0
19	5.1	2534.8	0.0	966.9	0.	0.	0.0	0.0	0.0
20	0.3	67.5	0.0	3.3	0.	0.	0.0	0.0	0.0
21	2.1	257.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	72.246	855.000
2	82.203	854.072
3	92.202	853.992
4	102.173	854.760
5	112.042	856.370
6	121.739	858.812
7	131.195	862.068

8	140.340	866.113
9	149.109	870.920
10	157.439	876.453
11	165.270	882.672
12	172.545	889.533
13	179.212	896.986
14	185.223	904.978
15	185.778	905.863

Circle Center At X = 88.148 ; Y = 971.737 ; and Radius = 117.815

Factor of Safety

*** 0.867 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.475	855.714
3	97.390	857.013
4	107.211	858.895
5	116.905	861.351
6	126.437	864.373
7	135.775	867.951
8	144.886	872.073
9	153.739	876.724
10	162.302	881.888
11	170.547	887.547
12	178.444	893.682
13	185.966	900.271
14	193.088	907.291
15	194.628	909.000

Circle Center At X = 70.373 ; Y = 1024.650 ; and Radius = 169.799

Factor of Safety

*** 0.870 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	68.305	855.000
2	78.266	854.114
3	88.265	853.993
4	98.244	854.636
5	108.145	856.041
6	117.910	858.199
7	127.480	861.097
8	136.801	864.719
9	145.818	869.043
10	154.478	874.044
11	162.730	879.692
12	170.526	885.955
13	177.820	892.796
14	184.570	900.174
15	190.736	908.047
16	190.861	908.235

Circle Center At X = 84.856 ; Y = 984.587 ; and Radius = 130.639

Factor of Safety

*** 0.871 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	66.992	855.000
2	76.924	853.844
3	86.919	853.511
4	96.907	854.004
5	106.820	855.319
6	116.591	857.448
7	126.153	860.376
8	135.440	864.082
9	144.391	868.542
10	152.943	873.725
11	161.038	879.596
12	168.621	886.115
13	175.641	893.237

```
   14        182.049      900.914
   15        185.408      905.690
Circle Center At X =    85.948 ; Y =   974.617 ; and Radius =   121.110
       Factor of Safety
      ***    0.875   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         73.559      855.000
    2         83.511      854.021
    3         93.509      853.829
    4        103.492      854.425
    5        113.396      855.806
    6        123.161      857.963
    7        132.725      860.882
    8        142.030      864.546
    9        151.017      868.932
   10        159.630      874.011
   11        167.817      879.754
   12        175.526      886.124
   13        182.709      893.081
   14        189.322      900.582
   15        195.323      908.581
   16        195.589      909.000
Circle Center At X =    90.952 ; Y =   980.577 ; and Radius =   126.776
       Factor of Safety
      ***    0.876   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         70.932      855.000
    2         80.849      853.712
    3         90.838      853.239
    4        100.832      853.584
    5        110.764      854.744
    6        120.569      856.711
    7        130.180      859.473
    8        139.533      863.011
    9        148.566      867.302
   10        157.218      872.316
   11        165.431      878.020
   12        173.151      884.377
   13        180.326      891.342
   14        186.908      898.871
   15        192.852      906.912
   16        194.146      909.000
Circle Center At X =    91.652 ; Y =   975.294 ; and Radius =   122.065
       Factor of Safety
      ***    0.878   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         74.873      855.000
    2         84.773      853.593
    3         94.762      853.111
    4        104.752      853.559
    5        114.657      854.933
    6        124.392      857.220
    7        133.873      860.401
    8        143.017      864.448
    9        151.746      869.328
   10        159.984      874.996
   11        167.660      881.405
   12        174.708      888.499
   13        181.067      896.217
   14        186.682      904.491
   15        188.011      906.905
Circle Center At X =    94.944 ; Y =   960.699 ; and Radius =   107.587
       Factor of Safety
      ***    0.878   ***
```

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	69.619	855.000
2	79.511	853.538
3	89.492	852.924
4	99.489	853.162
5	109.430	854.251
6	119.242	856.183
7	128.853	858.944
8	138.194	862.513
9	147.197	866.866
10	155.797	871.969
11	163.931	877.787
12	171.539	884.276
13	178.567	891.390
14	184.963	899.077
15	190.682	907.281
16	191.369	908.472

Circle Center At X = 91.715 ; Y = 970.033 ; and Radius = 117.136

Factor of Safety

*** 0.879 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.559	855.000
2	83.435	853.427
3	93.416	852.814
4	103.410	853.168
5	113.323	854.485
6	123.062	856.752
7	132.538	859.948
8	141.660	864.044
9	150.345	869.002
10	158.511	874.774
11	166.081	881.308
12	172.986	888.542
13	179.160	896.408
14	184.546	904.834
15	184.850	905.430

Circle Center At X = 94.758 ; Y = 956.297 ; and Radius = 103.491

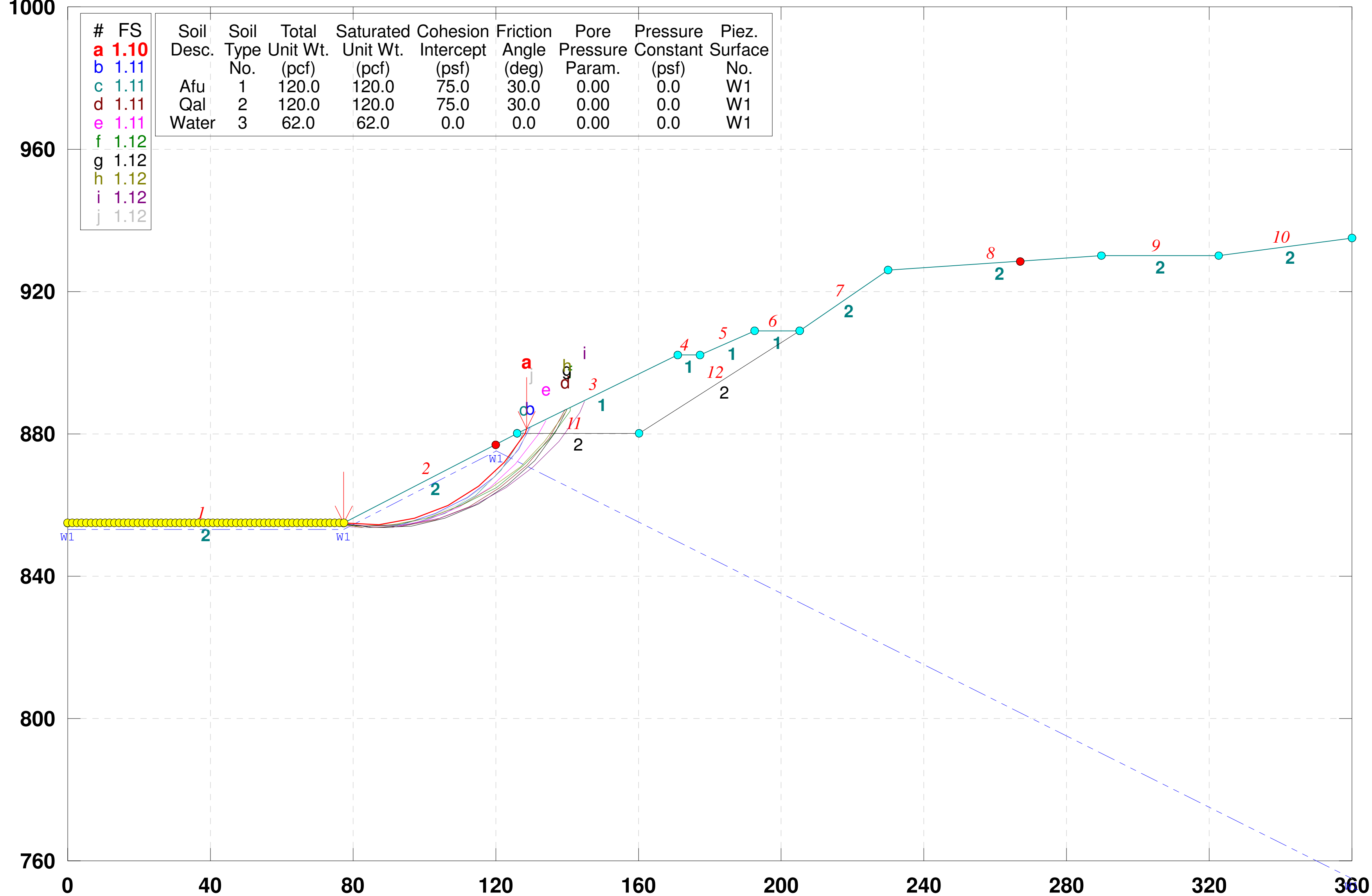
Factor of Safety

*** 0.881 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; B-B' S; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' s\02m.pl2   Run By: TAC for TM   10/5/2022   09:21PM

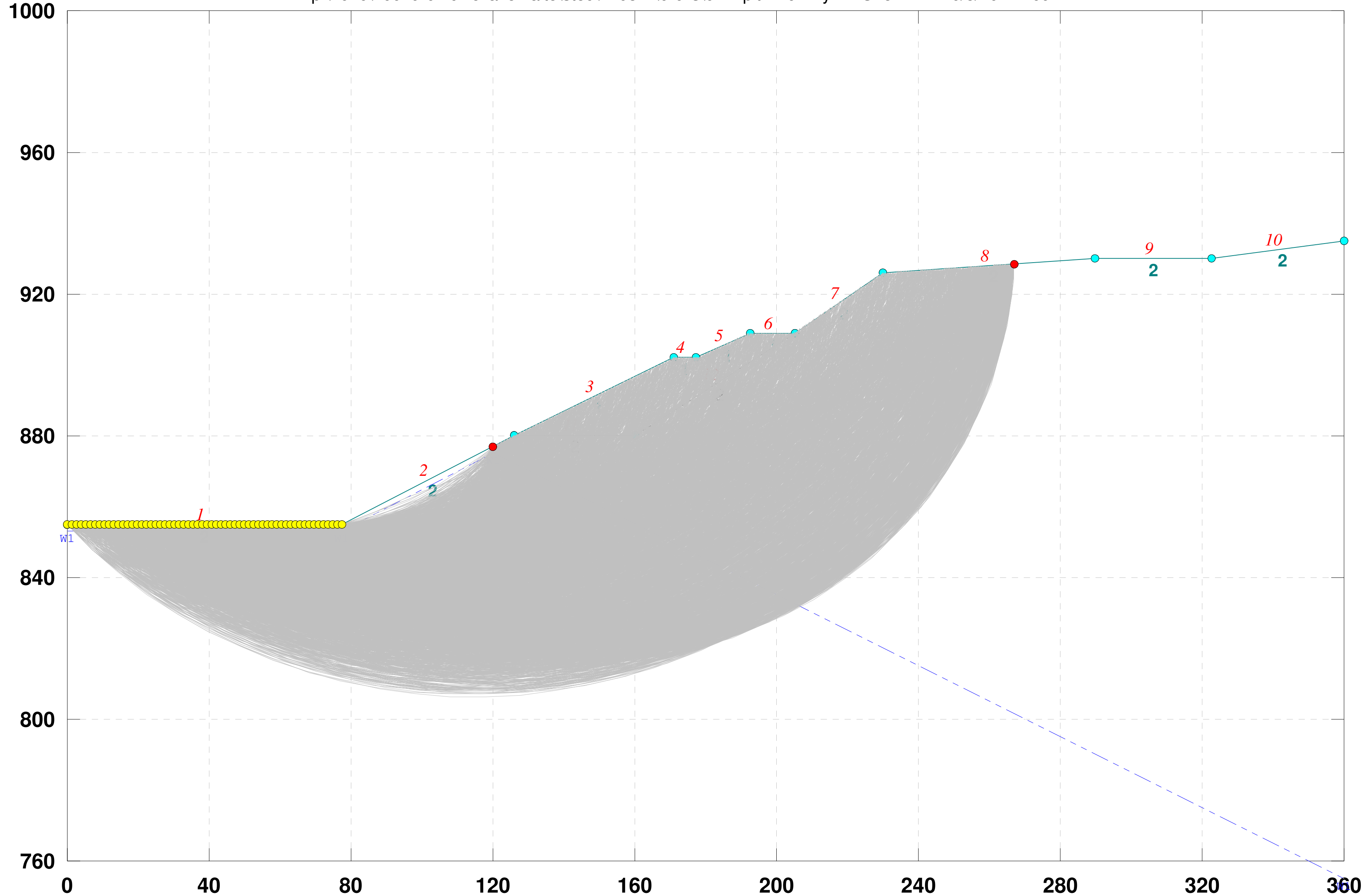


GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' S; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' s\02m.plt   Run By: TAC for TM   10/5/2022   09:21PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **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*********************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*********************************************************************************
Analysis Run Date:          10/5/2022
Time of Run:                09:21PM
Run By:                     TAC for TM
Input Data Filename:        P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\02m.in
Output Filename:            P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\02m.OUT
Unit System:                English
Plotted Output Filename:    P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' S\02m.PLT
PROBLEM DESCRIPTION:   DWC / Lake Rialto; B-B' S; Rapid Drawdow
                       n
BOUNDARY COORDINATES
   10 Top   Boundaries
   12 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1          0.00     855.00      77.50     855.00        2
    2         77.50     855.00     126.00     880.00        2
    3        126.00     880.00     171.00     902.00        1
    4        171.00     902.00     177.50     902.00        1
    5        177.50     902.00     192.50     909.00        1
    6        192.50     909.00     205.00     909.00        1
    7        205.00     909.00     230.00     926.00        2
    8        230.00     926.00     290.00     930.00        2
    9        290.00     930.00     322.50     930.00        2
   10        322.50     930.00     360.00     935.00        2
   11        126.00     880.00     160.00     880.00        2
   12        160.00     880.00     205.00     909.00        2
User Specified Y-Origin =       760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   120.0    120.0      75.0     30.0    0.00       0.0      1
  2   120.0    120.0      75.0     30.0    0.00       0.0      1
  3    62.0     62.0       0.0      0.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  4 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.        (ft)        (ft)
    1          0.00      853.00
    2         77.50      853.00
    3        120.00      875.00
    4        360.00      755.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
  80 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
Along The Ground Surface Between  X =   0.00(ft)
                             and  X =  77.50(ft)
Each Surface Terminates Between   X = 120.00(ft)
                            and   X = 267.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
```

10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 4.651 FS Min = 1.101 FS Ave = 1.747
Standard Deviation = 0.319 Coefficient of Variation = 18.26 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.500	855.000
2	87.495	854.685
3	97.358	856.335
4	106.706	859.887
5	115.177	865.201
6	122.441	872.074
7	128.218	880.236
8	128.700	881.320

Circle Center At X = 84.139 ; Y = 905.045 ; and Radius = 50.484
Factor of Safety
*** 1.101 ***
Individual data on the 12 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.6	435.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.4	2843.3	0.0	618.8	0.	0.	0.0	0.0	0.0
3	9.9	8502.7	0.0	2911.3	0.	0.	0.0	0.0	0.0
4	9.3	10695.6	0.0	4234.6	0.	0.	0.0	0.0	0.0
5	8.5	9853.5	0.0	4334.4	0.	0.	0.0	0.0	0.0
6	4.8	4735.2	0.0	2322.7	0.	0.	0.0	0.0	0.0
7	2.4	1938.7	0.0	655.0	0.	0.	0.0	0.0	0.0
8	0.9	609.0	0.0	73.9	0.	0.	0.0	0.0	0.0
9	2.7	1310.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	2.1	479.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.2	18.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.5	24.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.559	855.000
2	83.498	853.891
3	93.463	854.724
4	103.079	857.469
5	111.982	862.022
6	119.837	868.211
7	126.347	875.802
8	129.757	881.837

Circle Center At X = 84.250 ; Y = 904.872 ; and Radius = 51.005
Factor of Safety
*** 1.108 ***
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	76.186	855.000
2	86.088	853.598
3	96.049	854.472
4	105.556	857.576
5	114.113	862.749
6	121.279	869.724
7	126.682	878.139
8	127.631	880.797

Circle Center At X = 87.297 ; Y = 897.036 ; and Radius = 43.479
Factor of Safety
*** 1.113 ***
Failure Surface Specified By 9 Coordinate Points

```
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         73.559      855.000
    2         83.465      853.626
    3         93.460      853.939
    4        103.260      855.929
    5        112.585      859.540
    6        121.169      864.669
    7        128.768      871.170
    8        135.164      878.857
    9        139.707      886.701
Circle Center At X =    86.618 ; Y =   912.748 ; and Radius =    59.206
       Factor of Safety
      ***    1.114   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         70.932      855.000
    2         80.819      853.498
    3         90.815      853.771
    4        100.605      855.810
    5        109.879      859.550
    6        118.344      864.874
    7        125.733      871.612
    8        131.811      879.553
    9        134.071      883.946
Circle Center At X =    84.289 ; Y =   909.631 ; and Radius =    56.241
       Factor of Safety
      ***    1.114   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         72.246      855.000
    2         82.202      854.062
    3         92.186      854.626
    4        101.973      856.678
    5        111.342      860.173
    6        120.083      865.032
    7        127.997      871.144
    8        134.907      878.373
    9        140.656      886.555
   10        141.059      887.362
Circle Center At X =    83.474 ; Y =   920.466 ; and Radius =    66.422
       Factor of Safety
      ***    1.115   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         76.186      855.000
    2         86.104      853.719
    3         96.093      854.187
    4        105.848      856.389
    5        115.068      860.259
    6        123.473      865.677
    7        130.804      872.479
    8        136.837      880.454
    9        140.136      886.911
Circle Center At X =    88.436 ; Y =   910.796 ; and Radius =    57.125
       Factor of Safety
      ***    1.117   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         70.932      855.000
    2         80.879      853.973
    3         90.868      854.455
    4        100.670      856.434
    5        110.063      859.865
    6        118.833      864.670
    7        126.780      870.740
```

```
    8        133.723      877.936
    9        139.505      886.096
   10        139.843      886.768
Circle Center At X =    82.709 ; Y =   920.078 ; and Radius =    66.135
       Factor of Safety
      ***    1.118   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         74.873      855.000
    2         84.821      853.986
    3         94.809      854.479
    4        104.609      856.469
    5        113.998      859.911
    6        122.763      864.726
    7        130.703      870.805
    8        137.639      878.008
    9        143.412      886.174
   10        144.964      889.271
Circle Center At X =    86.609 ; Y =   919.809 ; and Radius =    65.863
       Factor of Safety
      ***    1.121   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         70.932      855.000
    2         80.810      853.443
    3         90.803      853.818
    4        100.536      856.112
    5        109.645      860.240
    6        117.787      866.045
    7        124.658      873.311
    8        130.000      881.765
    9        130.091      882.000
Circle Center At X =    83.877 ; Y =   904.994 ; and Radius =    51.642
       Factor of Safety
      ***    1.121   ***
          **** END OF GSTABL7 OUTPUT ****
```

Summary of Slope Stability Analysis

Cross-Section B-B' N

Filename	Description	Factor of Safety (FS)	
		Static	***Pseudostatic***
01, 01p	Design Condition	1.77	1.14
02	Rapid Drawdown Condition-Operating Lake Level El 905’	0.92	--
02m	Rapid Drawdown-Maximum Groundwater El 884’ (21 feet bgs)	1.10	--

Project No.: 20079-02

Project Name: DWC / Lake Rialto

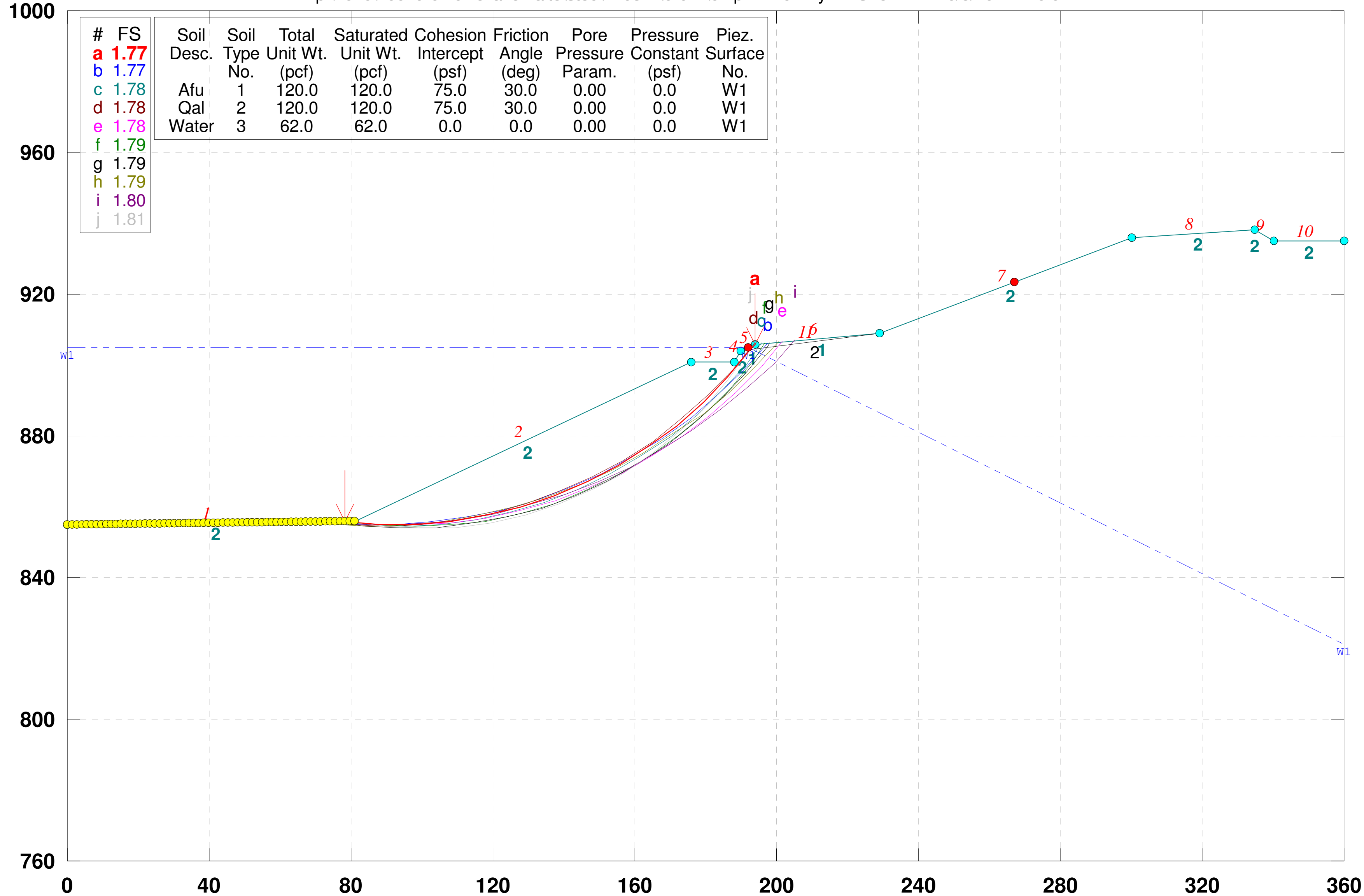
NMG

DWC / Lake Rialto; B-B' N; Design

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' n\01.pl2   Run By: TAC for TM   10/5/2022   10:01PM

#	FS
a	1.77
b	1.77
c	1.78
d	1.78
e	1.78
f	1.79
g	1.79
h	1.79
i	1.80
j	1.81

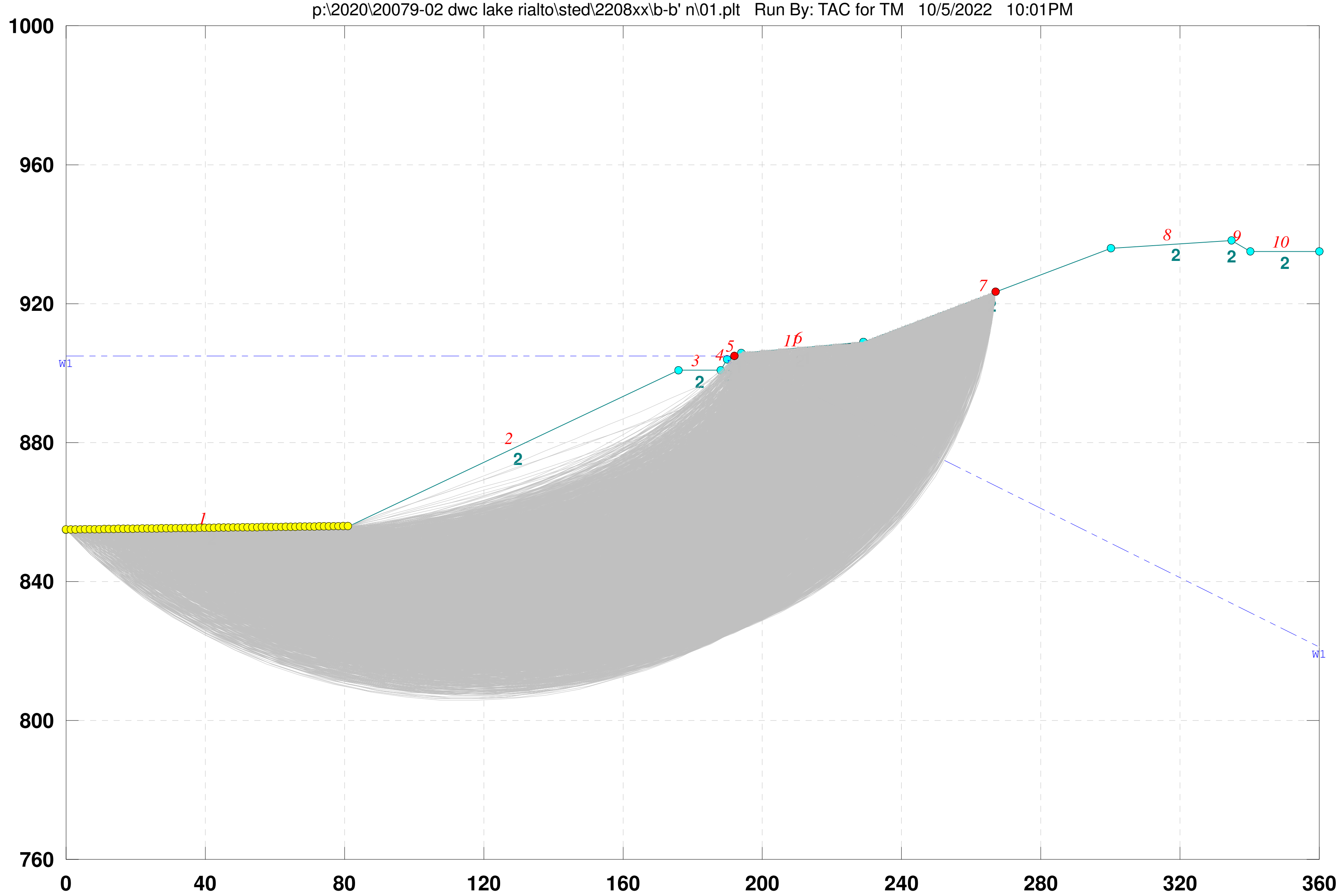
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Afu	1	120.0	120.0	75.0	30.0	0.00	0.0	W1
Qal	2	120.0	120.0	75.0	30.0	0.00	0.0	W1
Water	3	62.0	62.0	0.0	0.0	0.00	0.0	W1



GSTABL7 v.2 FSmin=1.77
Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' N; Design

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' n\01.plt   Run By: TAC for TM   10/5/2022   10:01PM



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                              ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*********************************************************************************
Analysis Run Date:        10/5/2022
Time of Run:              10:01PM
Run By:                   TAC for TM
Input Data Filename:      P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\01.in
Output Filename:          P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\01.OUT
Unit System:              English
Plotted Output Filename:  P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\01.PLT
PROBLEM DESCRIPTION:  DWC / Lake Rialto; B-B' N; Design
BOUNDARY COORDINATES
   10 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1          0.00     855.00      81.00     856.00        2
    2         81.00     856.00     176.00     901.00        2
    3        176.00     901.00     188.00     901.00        2
    4        188.00     901.00     190.00     904.00        2
    5        190.00     904.00     194.00     906.00        1
    6        194.00     906.00     229.00     909.00        1
    7        229.00     909.00     300.00     936.00        2
    8        300.00     936.00     335.00     938.00        2
    9        335.00     938.00     340.00     935.00        2
   10        340.00     935.00     360.00     935.00        2
   11        190.00     904.00     229.00     909.00        2
User Specified Y-Origin =       760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   120.0    120.0      75.0     30.0    0.00      0.0      1
  2   120.0    120.0      75.0     30.0    0.00      0.0      1
  3    62.0     62.0       0.0      0.0    0.00      0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  3 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      905.00
    2        192.00      905.00
    3        360.00      821.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
  80 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
Along The Ground Surface Between  X =   0.00(ft)
                              and  X =  81.00(ft)
Each Surface Terminates Between   X = 192.00(ft)
                             and   X = 267.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
```

Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 3.478 FS Min = 1.769 FS Ave = 2.611
Standard Deviation = 0.379 Coefficient of Variation = 14.50 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.222	855.158
3	98.222	855.150
4	108.190	855.943
5	118.063	857.531
6	127.778	859.903
7	137.271	863.046
8	146.482	866.938
9	155.353	871.555
10	163.825	876.867
11	171.845	882.841
12	179.362	889.436
13	186.326	896.612
14	192.694	904.323
15	193.795	905.897

Circle Center At X = 93.319 ; Y = 979.908 ; and Radius = 124.854
Factor of Safety
*** 1.769 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	42.3	8399.0	8447.9	0.	0.	0.0	0.0	0.0
2	7.2	1958.1	23579.7	22401.3	0.	0.	0.0	0.0	0.0
3	10.0	7961.9	29835.6	31103.8	0.	0.	0.0	0.0	0.0
4	10.0	13125.0	26486.5	30858.9	0.	0.	0.0	0.0	0.0
5	9.9	17156.9	23029.5	30116.3	0.	0.	0.0	0.0	0.0
6	9.7	19980.6	19547.5	28880.6	0.	0.	0.0	0.0	0.0
7	9.5	21566.8	16120.8	27159.7	0.	0.	0.0	0.0	0.0
8	9.2	21935.0	12824.4	24964.8	0.	0.	0.0	0.0	0.0
9	8.9	21152.5	9726.7	22309.9	0.	0.	0.0	0.0	0.0
10	8.5	19332.2	6887.5	19212.1	0.	0.	0.0	0.0	0.0
11	8.0	16629.0	4356.7	15691.1	0.	0.	0.0	0.0	0.0
12	4.2	7654.2	1429.8	7014.5	0.	0.	0.0	0.0	0.0
13	3.4	5259.7	839.1	4755.1	0.	0.	0.0	0.0	0.0
14	7.0	6665.4	1738.3	7472.8	0.	0.	0.0	0.0	0.0
15	1.7	677.8	417.8	1209.6	0.	0.	0.0	0.0	0.0
16	2.0	635.9	562.5	1009.3	0.	0.	0.0	0.0	0.0
17	2.0	534.7	69.8	534.6	0.	0.	0.0	0.0	0.0
18	0.7	105.8	0.0	56.5	0.	0.	0.0	0.0	0.0
19	0.0	2.1	0.0	0.5	0.	0.	0.0	0.0	0.0
20	0.2	17.3	0.0	2.2	0.	0.	0.0	0.0	0.0
21	0.9	48.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	72.763	855.898
2	82.734	855.135
3	92.733	855.080
4	102.712	855.732
5	112.620	857.089
6	122.406	859.145
7	132.023	861.887
8	141.421	865.304
9	150.554	869.377
10	159.375	874.087
11	167.841	879.409
12	175.909	885.317
13	183.539	891.782

```
   14        190.692      898.770
   15        197.332      906.247
   16        197.364      906.288
Circle Center At X =    88.517 ; Y =   996.190 ; and Radius =   141.173
       Factor of Safety
      ***    1.770   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         75.508      855.932
    2         85.449      854.845
    3         95.445      854.549
    4        105.432      855.046
    5        115.349      856.334
    6        125.133      858.403
    7        134.722      861.241
    8        144.055      864.831
    9        153.075      869.148
   10        161.724      874.168
   11        169.948      879.857
   12        177.696      886.179
   13        184.917      893.096
   14        191.568      900.564
   15        195.803      906.155
Circle Center At X =    94.174 ; Y =   980.610 ; and Radius =   126.067
       Factor of Safety
      ***    1.776   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         70.017      855.864
    2         79.963      854.824
    3         89.959      854.535
    4         99.948      854.999
    5        109.874      856.213
    6        119.681      858.169
    7        129.312      860.858
    8        138.714      864.264
    9        147.834      868.367
   10        156.619      873.145
   11        165.020      878.569
   12        172.989      884.611
   13        180.481      891.234
   14        187.453      898.402
   15        193.665      905.832
Circle Center At X =    88.798 ; Y =   987.391 ; and Radius =   132.861
       Factor of Safety
      ***    1.782   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         78.254      855.966
    2         88.217      855.107
    3         98.216      854.981
    4        108.198      855.590
    5        118.108      856.930
    6        127.892      858.995
    7        137.499      861.772
    8        146.875      865.248
    9        155.972      869.402
   10        164.738      874.214
   11        173.127      879.656
   12        181.095      885.699
   13        188.596      892.312
   14        195.592      899.457
   15        201.674      906.658
Circle Center At X =    94.925 ; Y =   991.022 ; and Radius =   136.081
       Factor of Safety
      ***    1.783   ***
Failure Surface Specified By 15 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.179	854.742
3	98.171	854.346
4	108.162	854.782
5	118.081	856.047
6	127.862	858.131
7	137.435	861.021
8	146.735	864.696
9	155.698	869.131
10	164.261	874.295
11	172.366	880.153
12	179.956	886.664
13	186.978	893.783
14	193.385	901.461
15	196.737	906.235

Circle Center At X = 97.928 ; Y = 974.604 ; and Radius = 120.258
Factor of Safety
*** 1.786 ***
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	74.136	855.915
2	84.043	854.555
3	94.027	853.990
4	104.024	854.224
5	113.971	855.254
6	123.804	857.075
7	133.460	859.675
8	142.878	863.036
9	151.997	867.139
10	160.761	871.956
11	169.112	877.457
12	176.997	883.607
13	184.367	890.367
14	191.173	897.692
15	197.374	905.538
16	197.906	906.335

Circle Center At X = 96.116 ; Y = 979.083 ; and Radius = 125.114
Factor of Safety
*** 1.789 ***
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.898	855.814
2	75.853	854.862
3	85.848	854.559
4	95.842	854.908
5	105.792	855.906
6	115.657	857.549
7	125.393	859.830
8	134.960	862.739
9	144.318	866.265
10	153.427	870.391
11	162.248	875.102
12	170.744	880.376
13	178.879	886.192
14	186.618	892.525
15	193.929	899.347
16	200.730	906.577

Circle Center At X = 85.494 ; Y = 1008.209 ; and Radius = 153.650
Factor of Safety
*** 1.791 ***
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	71.390	855.881
2	81.357	855.066
3	91.355	854.893

4	101.344	855.361
5	111.283	856.469
6	121.129	858.212
7	130.844	860.584
8	140.387	863.574
9	149.718	867.170
10	158.799	871.358
11	167.592	876.119
12	176.062	881.435
13	184.174	887.284
14	191.893	893.640
15	199.189	900.479
16	205.275	906.966

Circle Center At X = 89.076 ; Y = 1010.515 ; and Radius = 155.642
Factor of Safety
*** 1.800 ***
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	79.627	855.983
2	89.515	854.493
3	99.499	853.921
4	109.493	854.273
5	119.412	855.545
6	129.171	857.727
7	138.687	860.800
8	147.879	864.738
9	156.668	869.507
10	164.980	875.066
11	172.744	881.369
12	179.893	888.362
13	186.366	895.984
14	192.109	904.170
15	192.817	905.408

Circle Center At X = 100.692 ; Y = 962.188 ; and Radius = 108.274
Factor of Safety
*** 1.805 ***
**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; B-B' N; Design; P-Static

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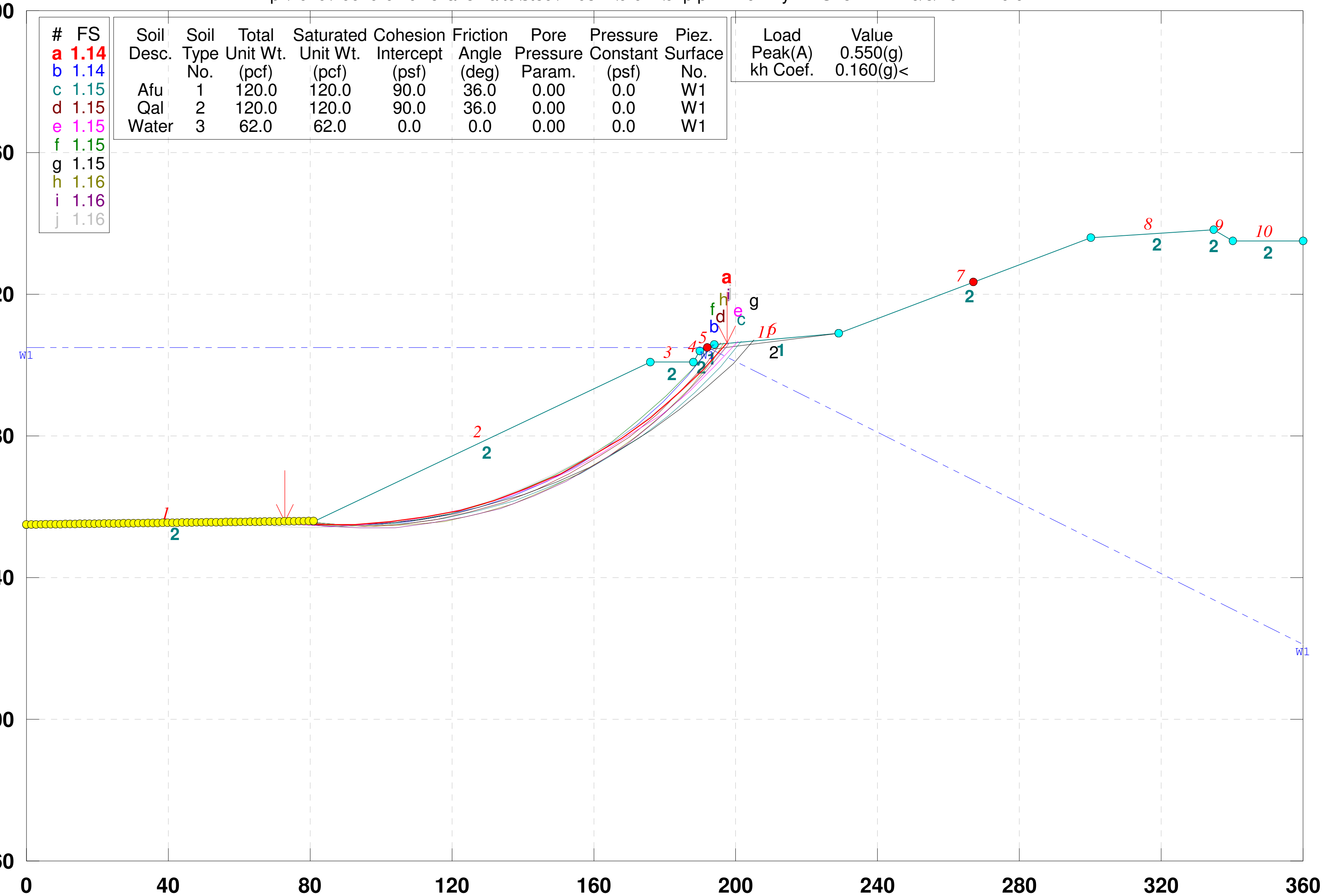
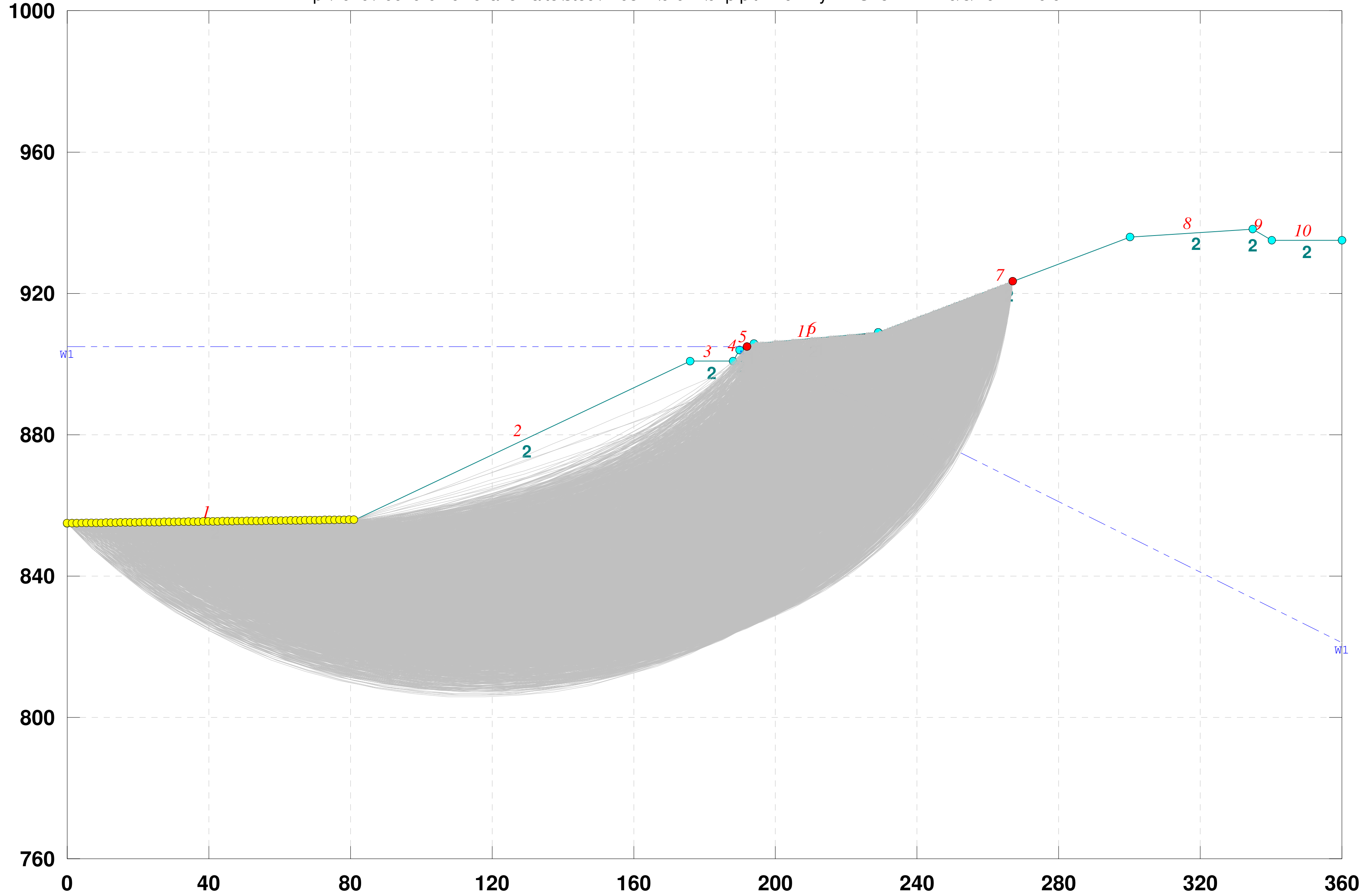


GSTABL7 v.2 FSmin=1.14

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' N; Design; P-Static

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' n\01p.plt   Run By: TAC for TM   10/5/2022   10:07PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 10:07PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\01p.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\01p.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\01p.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; B-B' N; Design; P-Sta
tic

BOUNDARY COORDINATES
10 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	855.00	81.00	856.00	2
2	81.00	856.00	176.00	901.00	2
3	176.00	901.00	188.00	901.00	2
4	188.00	901.00	190.00	904.00	2
5	190.00	904.00	194.00	906.00	1
6	194.00	906.00	229.00	909.00	1
7	229.00	909.00	300.00	936.00	2
8	300.00	936.00	335.00	938.00	2
9	335.00	938.00	340.00	935.00	2
10	340.00	935.00	360.00	935.00	2
11	190.00	904.00	229.00	909.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	90.0	36.0	0.00	0.0	1
2	120.0	120.0	90.0	36.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	905.00
2	192.00	905.00
3	360.00	821.00

Specified Peak Ground Acceleration Coefficient (A) = 0.550(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.160(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 81.00(ft)
Each Surface Terminates Between X = 192.00(ft)
and X = 267.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y =   0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max =   2.263   FS Min =   1.141   FS Ave =   1.641
Standard Deviation =   0.250   Coefficient of Variation =   15.22 %
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	72.763	855.898
2	82.734	855.135
3	92.733	855.080
4	102.712	855.732
5	112.620	857.089
6	122.406	859.145
7	132.023	861.887
8	141.421	865.304
9	150.554	869.377
10	159.375	874.087
11	167.841	879.409
12	175.909	885.317
13	183.539	891.782
14	190.692	898.770
15	197.332	906.247
16	197.364	906.288

Circle Center At X =   88.517 ; Y =   996.190 ; and Radius =   141.173
Factor of Safety
***   1.141   ***
Individual data on the   24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.2	361.9	25214.3	25474.9	0.	0.	57.9	0.0	0.0
2	1.7	251.5	5816.0	5402.7	0.	0.	40.2	0.0	0.0
3	10.0	4898.4	31630.1	31133.0	0.	0.	783.7	0.0	0.0
4	10.0	10196.8	28303.0	30946.7	0.	0.	1631.5	0.0	0.0
5	9.9	14528.8	24879.1	30319.7	0.	0.	2324.6	0.0	0.0
6	9.8	17825.4	21423.6	29255.0	0.	0.	2852.1	0.0	0.0
7	9.6	20050.5	18000.0	27758.0	0.	0.	3208.1	0.0	0.0
8	9.4	21201.2	14669.1	25836.3	0.	0.	3392.2	0.0	0.0
9	9.1	21308.2	11487.2	23499.5	0.	0.	3409.3	0.0	0.0
10	8.8	20434.7	8505.6	20759.2	0.	0.	3269.5	0.0	0.0
11	8.5	18675.1	5769.4	17629.3	0.	0.	2988.0	0.0	0.0
12	8.1	16152.1	3316.7	14125.5	0.	0.	2584.3	0.0	0.0
13	0.1	169.9	25.2	145.6	0.	0.	27.2	0.0	0.0
14	7.5	11229.2	1881.7	10119.6	0.	0.	1796.7	0.0	0.0
15	4.5	3768.3	1113.5	4296.1	0.	0.	602.9	0.0	0.0
16	2.0	1291.9	562.5	1375.4	0.	0.	206.7	0.0	0.0
17	0.7	476.7	39.9	396.4	0.	0.	76.3	0.0	0.0
18	1.3	811.0	29.8	675.3	0.	0.	129.8	0.0	0.0
19	1.2	623.1	0.0	379.9	0.	0.	99.7	0.0	0.0
20	0.8	368.4	0.0	149.7	0.	0.	58.9	0.0	0.0
21	0.9	335.9	0.0	58.9	0.	0.	53.7	0.0	0.0
22	1.1	259.5	0.0	0.0	0.	0.	41.5	0.0	0.0
23	1.3	113.2	0.0	0.0	0.	0.	18.1	0.0	0.0
24	0.0	0.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.222	855.158
3	98.222	855.150
4	108.190	855.943

5	118.063	857.531
6	127.778	859.903
7	137.271	863.046
8	146.482	866.938
9	155.353	871.555
10	163.825	876.867
11	171.845	882.841
12	179.362	889.436
13	186.326	896.612
14	192.694	904.323
15	193.795	905.897

Circle Center At X = 93.319 ; Y = 979.908 ; and Radius = 124.854

Factor of Safety

*** 1.144 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.217	855.107
3	98.216	854.981
4	108.198	855.590
5	118.108	856.930
6	127.892	858.995
7	137.499	861.772
8	146.875	865.248
9	155.972	869.402
10	164.738	874.214
11	173.127	879.656
12	181.095	885.699
13	188.596	892.312
14	195.592	899.457
15	201.674	906.658

Circle Center At X = 94.925 ; Y = 991.022 ; and Radius = 136.081

Factor of Safety

*** 1.148 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.508	855.932
2	85.449	854.845
3	95.445	854.549
4	105.432	855.046
5	115.349	856.334
6	125.133	858.403
7	134.722	861.241
8	144.055	864.831
9	153.075	869.148
10	161.724	874.168
11	169.948	879.857
12	177.696	886.179
13	184.917	893.096
14	191.568	900.564
15	195.803	906.155

Circle Center At X = 94.174 ; Y = 980.610 ; and Radius = 126.067

Factor of Safety

*** 1.149 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.898	855.814
2	75.853	854.862
3	85.848	854.559
4	95.842	854.908
5	105.792	855.906
6	115.657	857.549
7	125.393	859.830
8	134.960	862.739
9	144.318	866.265
10	153.427	870.391
11	162.248	875.102

12	170.744	880.376
13	178.879	886.192
14	186.618	892.525
15	193.929	899.347
16	200.730	906.577

Circle Center At X = 85.494 ; Y = 1008.209 ; and Radius = 153.650

Factor of Safety

*** 1.150 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.017	855.864
2	79.963	854.824
3	89.959	854.535
4	99.948	854.999
5	109.874	856.213
6	119.681	858.169
7	129.312	860.858
8	138.714	864.264
9	147.834	868.367
10	156.619	873.145
11	165.020	878.569
12	172.989	884.611
13	180.481	891.234
14	187.453	898.402
15	193.665	905.832

Circle Center At X = 88.798 ; Y = 987.391 ; and Radius = 132.861

Factor of Safety

*** 1.151 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	71.390	855.881
2	81.357	855.066
3	91.355	854.893
4	101.344	855.361
5	111.283	856.469
6	121.129	858.212
7	130.844	860.584
8	140.387	863.574
9	149.718	867.170
10	158.799	871.358
11	167.592	876.119
12	176.062	881.435
13	184.174	887.284
14	191.893	893.640
15	199.189	900.479
16	205.275	906.966

Circle Center At X = 89.076 ; Y = 1010.515 ; and Radius = 155.642

Factor of Safety

*** 1.153 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.179	854.742
3	98.171	854.346
4	108.162	854.782
5	118.081	856.047
6	127.862	858.131
7	137.435	861.021
8	146.735	864.696
9	155.698	869.131
10	164.261	874.295
11	172.366	880.153
12	179.956	886.664
13	186.978	893.783
14	193.385	901.461
15	196.737	906.235

Circle Center At X = 97.928 ; Y = 974.604 ; and Radius = 120.258

```
       Factor of Safety
      ***    1.157   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         74.136      855.915
    2         84.043      854.555
    3         94.027      853.990
    4        104.024      854.224
    5        113.971      855.254
    6        123.804      857.075
    7        133.460      859.675
    8        142.878      863.036
    9        151.997      867.139
   10        160.761      871.956
   11        169.112      877.457
   12        176.997      883.607
   13        184.367      890.367
   14        191.173      897.692
   15        197.374      905.538
   16        197.906      906.335
Circle Center At X =    96.116 ; Y =   979.083 ; and Radius =   125.114
       Factor of Safety
      ***    1.157   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         60.407      855.746
    2         70.342      854.612
    3         80.330      854.125
    4         90.329      854.289
    5        100.296      855.101
    6        110.189      856.559
    7        119.967      858.657
    8        129.587      861.385
    9        139.010      864.733
   10        148.196      868.686
   11        157.105      873.227
   12        165.701      878.337
   13        173.947      883.994
   14        181.808      890.176
   15        189.250      896.855
   16        196.243      904.003
   17        198.272      906.366
Circle Center At X =    82.817 ; Y =  1007.972 ; and Radius =   153.867
       Factor of Safety
      ***    1.160   ***
          **** END OF GSTABL7 OUTPUT ****
```

DWC / Lake Rialto; B-B' N; Rapid Drawdown

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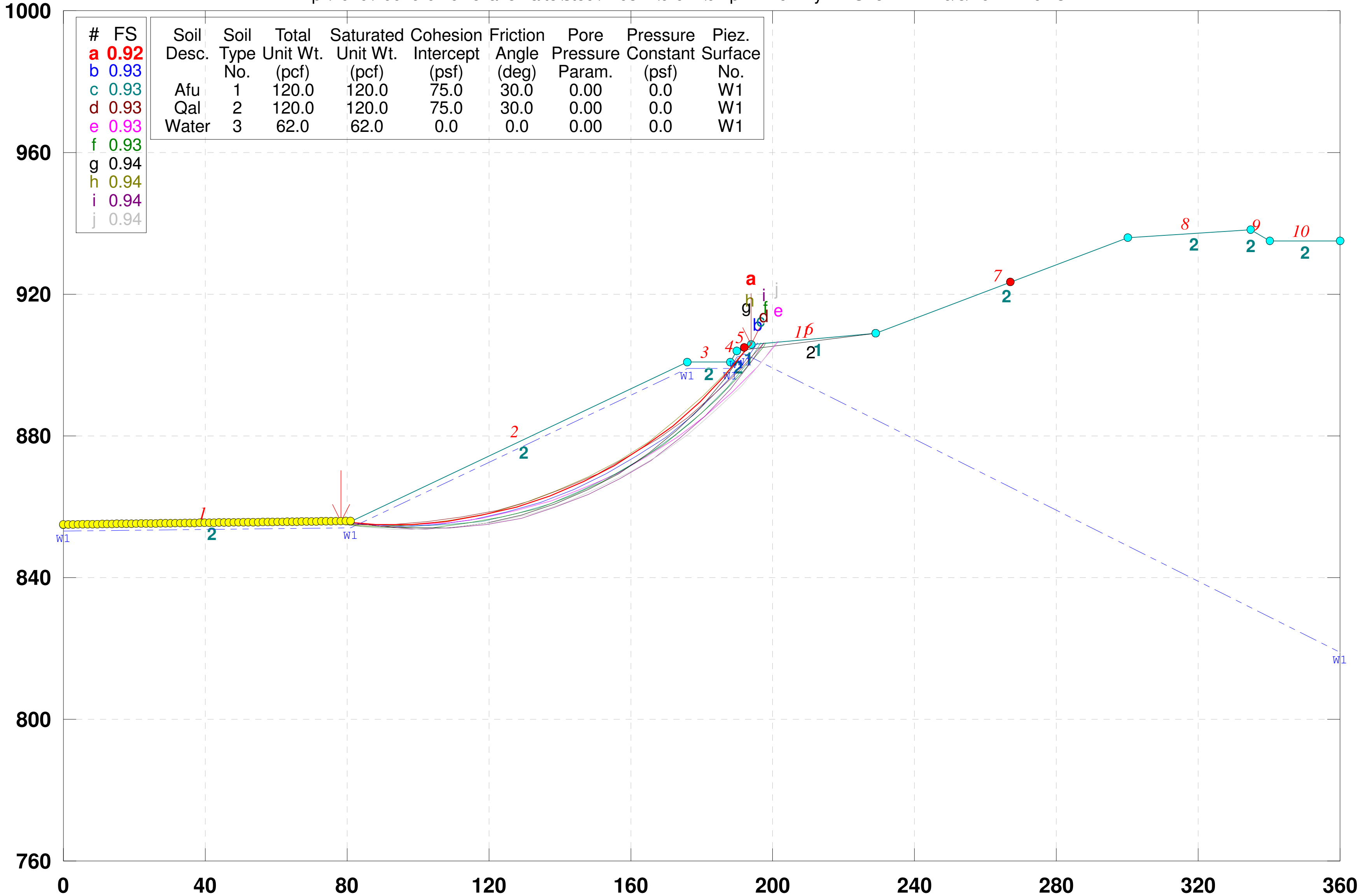
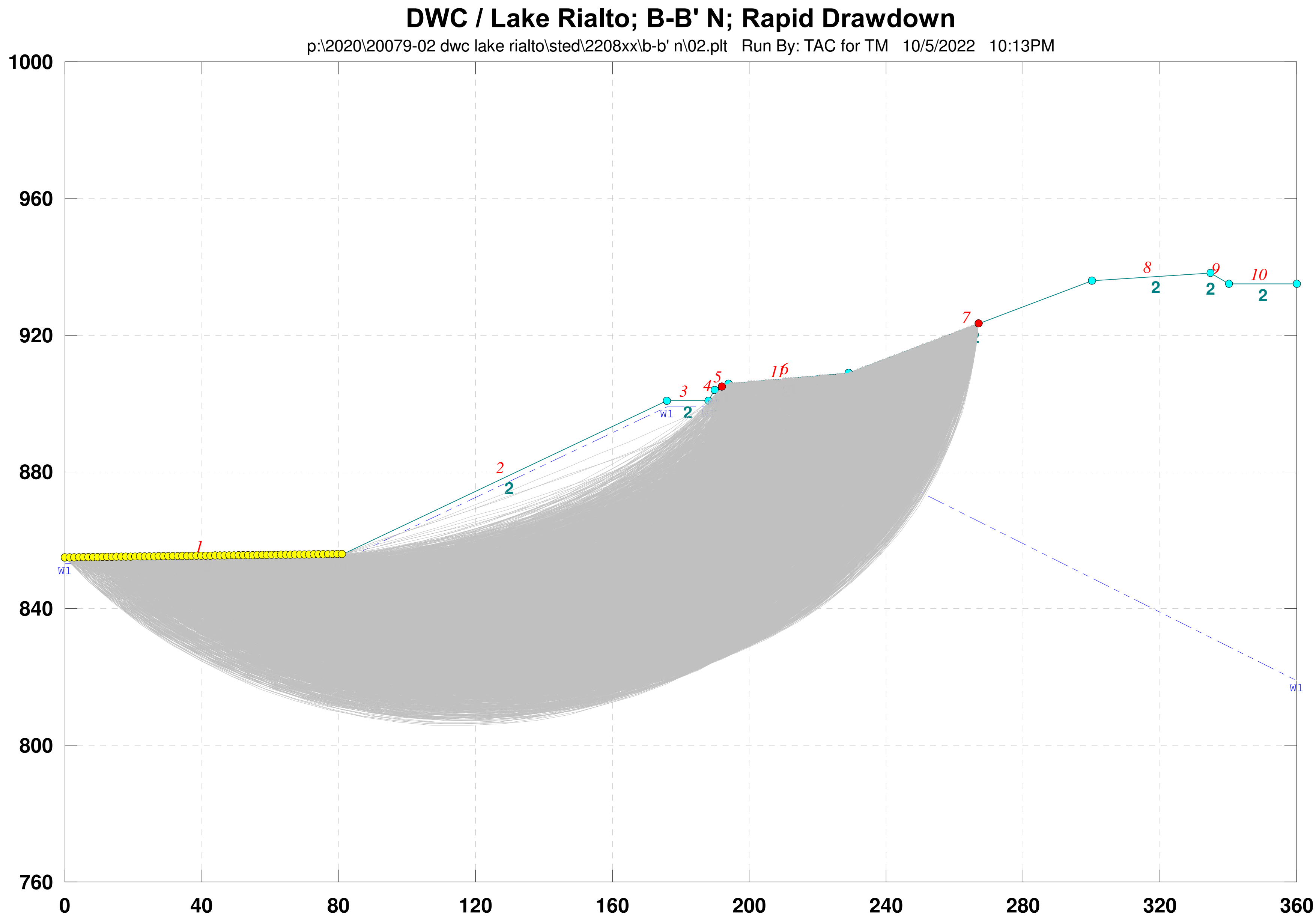


GSTABL7 v.2 FSmin=0.92

Safety Factors Are Calculated By The Modified Bishop Method


DWC / Lake Rialto; B-B' N; Rapid Drawdown
p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' n\02.plt Run By: TAC for TM 10/5/2022 10:13PM
1000
960
920
880
840
800
760
0
40
80
120
160
200
240
280
320
360
1
2
3
4
5
7
8
9
10
W1

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 10:13PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\02.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\02.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\02.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; B-B' N; Rapid Drawdow
n

BOUNDARY COORDINATES
10 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	855.00	81.00	856.00	2
2	81.00	856.00	176.00	901.00	2
3	176.00	901.00	188.00	901.00	2
4	188.00	901.00	190.00	904.00	2
5	190.00	904.00	194.00	906.00	1
6	194.00	906.00	229.00	909.00	1
7	229.00	909.00	300.00	936.00	2
8	300.00	936.00	335.00	938.00	2
9	335.00	938.00	340.00	935.00	2
10	340.00	935.00	360.00	935.00	2
11	190.00	904.00	229.00	909.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	853.00
2	81.00	854.00
3	176.00	899.00
4	188.00	899.00
5	190.00	902.00
6	192.00	903.00
7	360.00	819.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 81.00(ft)
Each Surface Terminates Between X = 192.00(ft)
and X = 267.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 1.999 FS Min = 0.924 FS Ave = 1.419
Standard Deviation = 0.215 Coefficient of Variation = 15.16 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.222	855.158
3	98.222	855.150
4	108.190	855.943
5	118.063	857.531
6	127.778	859.903
7	137.271	863.046
8	146.482	866.938
9	155.353	871.555
10	163.825	876.867
11	171.845	882.841
12	179.362	889.436
13	186.326	896.612
14	192.694	904.323
15	193.795	905.897

Circle Center At X = 93.319 ; Y = 979.908 ; and Radius = 124.854
Factor of Safety
*** 0.924 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	42.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.1	425.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.1	1532.6	0.0	262.4	0.	0.	0.0	0.0	0.0
4	10.0	7961.9	0.0	2627.2	0.	0.	0.0	0.0	0.0
5	10.0	13125.0	0.0	5085.5	0.	0.	0.0	0.0	0.0
6	9.9	17156.9	0.0	7074.6	0.	0.	0.0	0.0	0.0
7	9.7	19980.6	0.0	8581.7	0.	0.	0.0	0.0	0.0
8	9.5	21566.8	0.0	9597.2	0.	0.	0.0	0.0	0.0
9	9.2	21935.0	0.0	10114.4	0.	0.	0.0	0.0	0.0
10	8.9	21152.5	0.0	10130.2	0.	0.	0.0	0.0	0.0
11	8.5	19332.2	0.0	9644.5	0.	0.	0.0	0.0	0.0
12	8.0	16629.0	0.0	8660.2	0.	0.	0.0	0.0	0.0
13	4.2	7654.2	0.0	4183.5	0.	0.	0.0	0.0	0.0
14	3.4	5259.7	0.0	3080.6	0.	0.	0.0	0.0	0.0
15	7.0	6665.4	0.0	3728.8	0.	0.	0.0	0.0	0.0
16	1.7	677.8	0.0	225.4	0.	0.	0.0	0.0	0.0
17	2.0	635.9	0.0	83.3	0.	0.	0.0	0.0	0.0
18	1.3	391.4	0.0	54.7	0.	0.	0.0	0.0	0.0
19	1.4	249.1	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.0	2.1	0.0	0.0	0.	0.	0.0	0.0	0.0
21	1.1	65.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.508	855.932
2	85.449	854.845
3	95.445	854.549
4	105.432	855.046
5	115.349	856.334
6	125.133	858.403
7	134.722	861.241
8	144.055	864.831

9	153.075	869.148
10	161.724	874.168
11	169.948	879.857
12	177.696	886.179
13	184.917	893.096
14	191.568	900.564
15	195.803	906.155

Circle Center At X = 94.174 ; Y = 980.610 ; and Radius = 126.067

Factor of Safety

*** 0.926 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.179	854.742
3	98.171	854.346
4	108.162	854.782
5	118.081	856.047
6	127.862	858.131
7	137.435	861.021
8	146.735	864.696
9	155.698	869.131
10	164.261	874.295
11	172.366	880.153
12	179.956	886.664
13	186.978	893.783
14	193.385	901.461
15	196.737	906.235

Circle Center At X = 97.928 ; Y = 974.604 ; and Radius = 120.258

Factor of Safety

*** 0.928 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	72.763	855.898
2	82.734	855.135
3	92.733	855.080
4	102.712	855.732
5	112.620	857.089
6	122.406	859.145
7	132.023	861.887
8	141.421	865.304
9	150.554	869.377
10	159.375	874.087
11	167.841	879.409
12	175.909	885.317
13	183.539	891.782
14	190.692	898.770
15	197.332	906.247
16	197.364	906.288

Circle Center At X = 88.517 ; Y = 996.190 ; and Radius = 141.173

Factor of Safety

*** 0.929 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.217	855.107
3	98.216	854.981
4	108.198	855.590
5	118.108	856.930
6	127.892	858.995
7	137.499	861.772
8	146.875	865.248
9	155.972	869.402
10	164.738	874.214
11	173.127	879.656
12	181.095	885.699
13	188.596	892.312
14	195.592	899.457

```
  15        201.674      906.658
Circle Center At X =    94.925 ; Y =   991.022 ; and Radius =   136.081
       Factor of Safety
      ***    0.930   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         74.136      855.915
    2         84.043      854.555
    3         94.027      853.990
    4        104.024      854.224
    5        113.971      855.254
    6        123.804      857.075
    7        133.460      859.675
    8        142.878      863.036
    9        151.997      867.139
   10        160.761      871.956
   11        169.112      877.457
   12        176.997      883.607
   13        184.367      890.367
   14        191.173      897.692
   15        197.374      905.538
   16        197.906      906.335
Circle Center At X =    96.116 ; Y =   979.083 ; and Radius =   125.114
       Factor of Safety
      ***    0.931   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         79.627      855.983
    2         89.515      854.493
    3         99.499      853.921
    4        109.493      854.273
    5        119.412      855.545
    6        129.171      857.727
    7        138.687      860.800
    8        147.879      864.738
    9        156.668      869.507
   10        164.980      875.066
   11        172.744      881.369
   12        179.893      888.362
   13        186.366      895.984
   14        192.109      904.170
   15        192.817      905.408
Circle Center At X =   100.692 ; Y =   962.188 ; and Radius =   108.274
       Factor of Safety
      ***    0.936   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         70.017      855.864
    2         79.963      854.824
    3         89.959      854.535
    4         99.948      854.999
    5        109.874      856.213
    6        119.681      858.169
    7        129.312      860.858
    8        138.714      864.264
    9        147.834      868.367
   10        156.619      873.145
   11        165.020      878.569
   12        172.989      884.611
   13        180.481      891.234
   14        187.453      898.402
   15        193.665      905.832
Circle Center At X =    88.798 ; Y =   987.391 ; and Radius =   132.861
       Factor of Safety
      ***    0.936   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
```

No.	(ft)	(ft)
1	79.627	855.983
2	89.501	854.402
3	99.477	853.704
4	109.475	853.893
5	119.417	854.969
6	129.224	856.922
7	138.820	859.738
8	148.127	863.395
9	157.074	867.863
10	165.588	873.107
11	173.604	879.086
12	181.058	885.752
13	187.891	893.054
14	194.049	900.933
15	197.525	906.302

Circle Center At X = 102.346 ; Y = 966.257 ; and Radius = 112.590

Factor of Safety

*** 0.939 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	72.763	855.898
2	82.644	854.359
3	92.614	853.595
4	102.614	853.611
5	112.583	854.406
6	122.459	855.975
7	132.182	858.310
8	141.694	861.396
9	150.937	865.214
10	159.854	869.741
11	168.390	874.949
12	176.495	880.806
13	184.119	887.278
14	191.214	894.324
15	197.739	901.902
16	201.197	906.617

Circle Center At X = 97.439 ; Y = 981.386 ; and Radius = 127.891

Factor of Safety

*** 0.940 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; B-B' N; Rapid Drawdown

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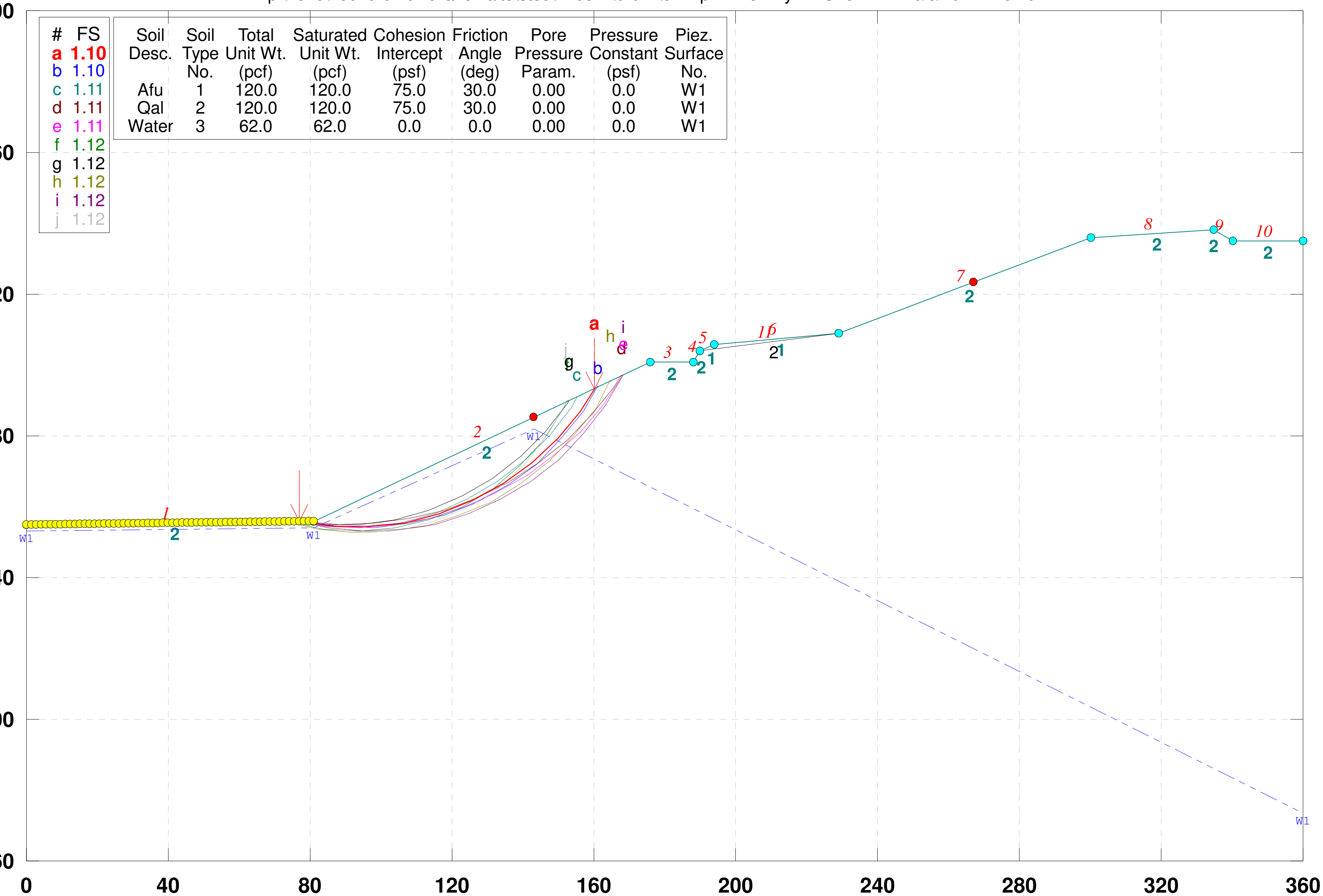
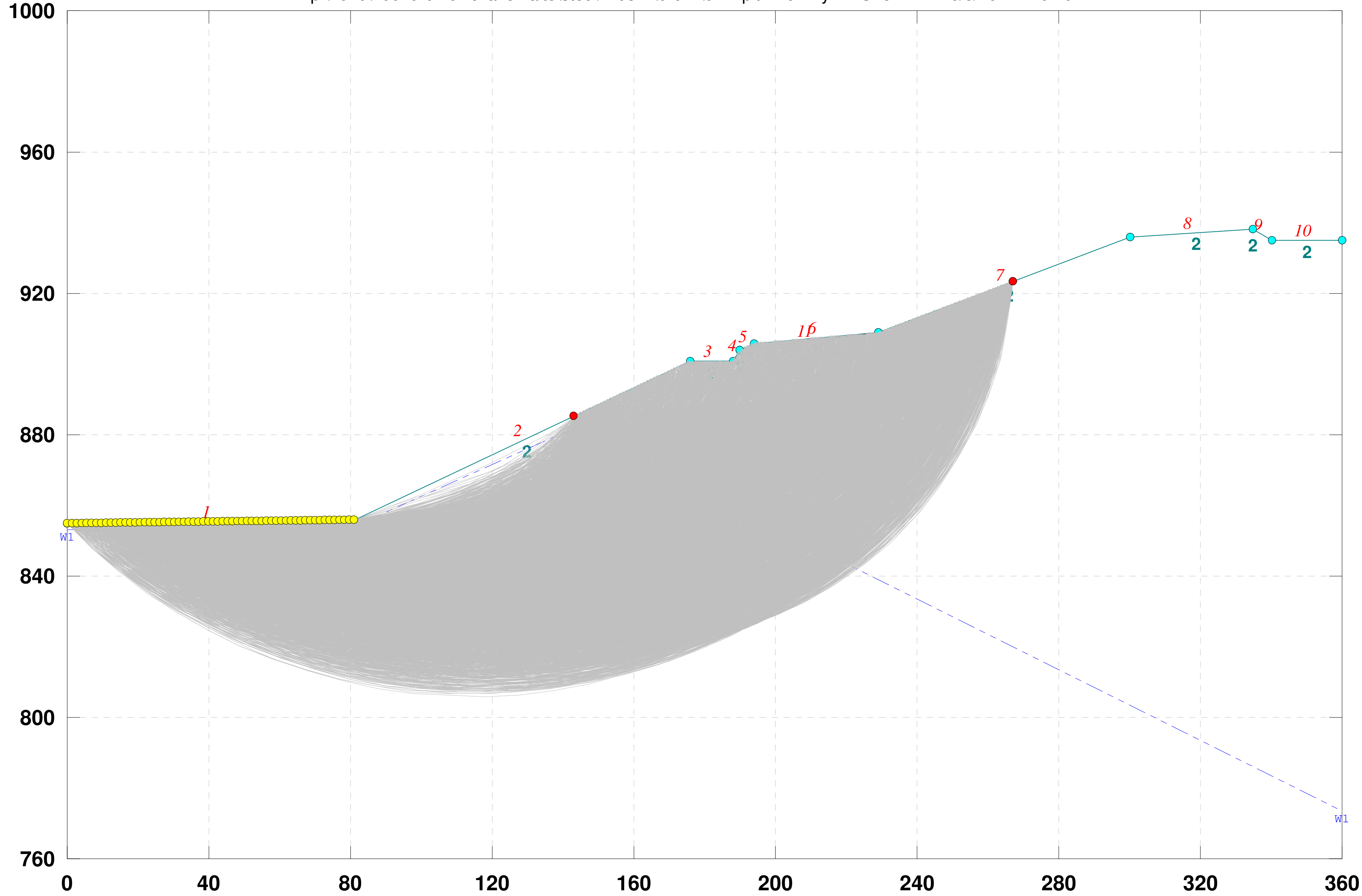


GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; B-B' N; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\b-b' n\02m.plt   Run By: TAC for TM   10/5/2022   10:20PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 10:20PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\02m.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\02m.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\B-B' N\02m.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; B-B' N; Rapid Drawdow
n

BOUNDARY COORDINATES
10 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	855.00	81.00	856.00	2
2	81.00	856.00	176.00	901.00	2
3	176.00	901.00	188.00	901.00	2
4	188.00	901.00	190.00	904.00	2
5	190.00	904.00	194.00	906.00	1
6	194.00	906.00	229.00	909.00	1
7	229.00	909.00	300.00	936.00	2
8	300.00	936.00	335.00	938.00	2
9	335.00	938.00	340.00	935.00	2
10	340.00	935.00	360.00	935.00	2
11	190.00	904.00	229.00	909.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	853.00
2	81.00	854.00
3	143.00	882.00
4	360.00	773.50

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 81.00(ft)
Each Surface Terminates Between X = 143.00(ft)
and X = 267.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 2.861 FS Min = 1.101 FS Ave = 1.709
Standard Deviation = 0.274 Coefficient of Variation = 16.05 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	76.881	855.949
2	86.782	854.540
3	96.781	854.416
4	106.713	855.578
5	116.414	858.007
6	125.721	861.663
7	134.482	866.485
8	142.549	872.394
9	149.791	879.291
10	156.085	887.061
11	160.002	893.422

Circle Center At X = 92.746 ; Y = 931.935 ; and Radius = 77.624
Factor of Safety
*** 1.101 ***
Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.1	157.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.3	370.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.5	1307.3	0.0	208.3	0.	0.	0.0	0.0	0.0
4	10.0	7954.1	0.0	2507.9	0.	0.	0.0	0.0	0.0
5	9.9	12909.1	0.0	4782.2	0.	0.	0.0	0.0	0.0
6	9.7	15930.3	0.0	6288.7	0.	0.	0.0	0.0	0.0
7	9.3	16915.2	0.0	7002.3	0.	0.	0.0	0.0	0.0
8	8.8	15962.6	0.0	6911.3	0.	0.	0.0	0.0	0.0
9	8.1	13364.7	0.0	6017.1	0.	0.	0.0	0.0	0.0
10	0.5	684.2	0.0	330.2	0.	0.	0.0	0.0	0.0
11	6.3	8365.2	0.0	2248.5	0.	0.	0.0	0.0	0.0
12	0.5	533.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	6.3	5211.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.9	1058.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.135	854.424
3	98.132	854.203
4	108.071	855.307
5	117.776	857.716
6	127.077	861.389
7	135.811	866.261
8	143.822	872.246
9	150.971	879.238
10	157.132	887.115
11	161.158	893.969

Circle Center At X = 94.796 ; Y = 929.522 ; and Radius = 75.393
Factor of Safety
*** 1.103 ***
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.508	855.932
2	85.403	854.481
3	95.402	854.372
4	105.325	855.609
5	114.992	858.168

6	124.227	862.004
7	132.863	867.045
8	140.743	873.202
9	147.724	880.363
10	153.679	888.396
11	155.191	891.143

Circle Center At X = 91.205 ; Y = 928.483 ; and Radius = 74.229

Factor of Safety

*** 1.105 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.254	855.966
2	88.221	855.148
3	98.217	855.413
4	108.126	856.760
5	117.831	859.171
6	127.218	862.618
7	136.176	867.062
8	144.601	872.450
9	152.393	878.718
10	159.460	885.793
11	165.720	893.591
12	168.042	897.230

Circle Center At X = 90.831 ; Y = 946.917 ; and Radius = 91.816

Factor of Safety

*** 1.107 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	74.136	855.915
2	84.022	854.415
3	94.016	854.044
4	103.986	854.807
5	113.807	856.695
6	123.350	859.682
7	132.494	863.731
8	141.120	868.789
9	149.118	874.792
10	156.385	881.662
11	162.827	889.310
12	168.112	897.264

Circle Center At X = 92.289 ; Y = 942.127 ; and Radius = 88.102

Factor of Safety

*** 1.112 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	74.136	855.915
2	83.896	853.738
3	93.872	853.055
4	103.838	853.880
5	113.567	856.195
6	122.836	859.948
7	131.435	865.053
8	139.168	871.393
9	145.859	878.825
10	151.356	887.178
11	152.619	889.925

Circle Center At X = 93.402 ; Y = 919.327 ; and Radius = 66.274

Factor of Safety

*** 1.117 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	74.136	855.915
2	84.066	854.734
3	94.065	854.852
4	103.964	856.267
5	113.596	858.955

6	122.798	862.871
7	131.413	867.947
8	139.297	874.100
9	146.315	881.223
10	152.349	889.197
11	152.817	890.018

Circle Center At X = 88.161 ; Y = 931.499 ; and Radius = 76.874

Factor of Safety

*** 1.120 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	72.763	855.898
2	82.513	853.676
3	92.466	852.714
4	102.461	853.028
5	112.335	854.613
6	121.926	857.442
7	131.079	861.471
8	139.644	866.632
9	147.482	872.843
10	154.465	880.001
11	160.479	887.991
12	164.888	895.736

Circle Center At X = 95.014 ; Y = 930.881 ; and Radius = 78.215

Factor of Safety

*** 1.120 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	75.508	855.932
2	85.294	853.874
3	95.261	853.055
4	105.251	853.487
5	115.110	855.164
6	124.681	858.059
7	133.816	862.128
8	142.371	867.306
9	150.212	873.513
10	157.216	880.650
11	163.274	888.607
12	168.290	897.258
13	168.337	897.370

Circle Center At X = 96.811 ; Y = 932.922 ; and Radius = 79.882

Factor of Safety

*** 1.122 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	76.881	855.949
2	86.594	853.569
3	96.565	852.810
4	106.526	853.693
5	116.209	856.193
6	125.351	860.244
7	133.708	865.736
8	141.054	872.521
9	147.191	880.417
10	151.953	889.210
11	152.118	889.688

Circle Center At X = 96.187 ; Y = 913.727 ; and Radius = 60.918

Factor of Safety

*** 1.122 ***

**** END OF GSTABL7 OUTPUT ****

Summary of Slope Stability Analysis

Cross-Section D-D’

Filename	Description	Factor of Safety (FS)	
		Static	*Pseudostatic*
01, 01p	Design Condition	1.72	1.13
02	Rapid Drawdown Condition-Operating Lake Level El 905’	0.90	--
02m	Rapid Drawdown-Maximum Groundwater El 879’ (26 feet bgs)	1.10	--

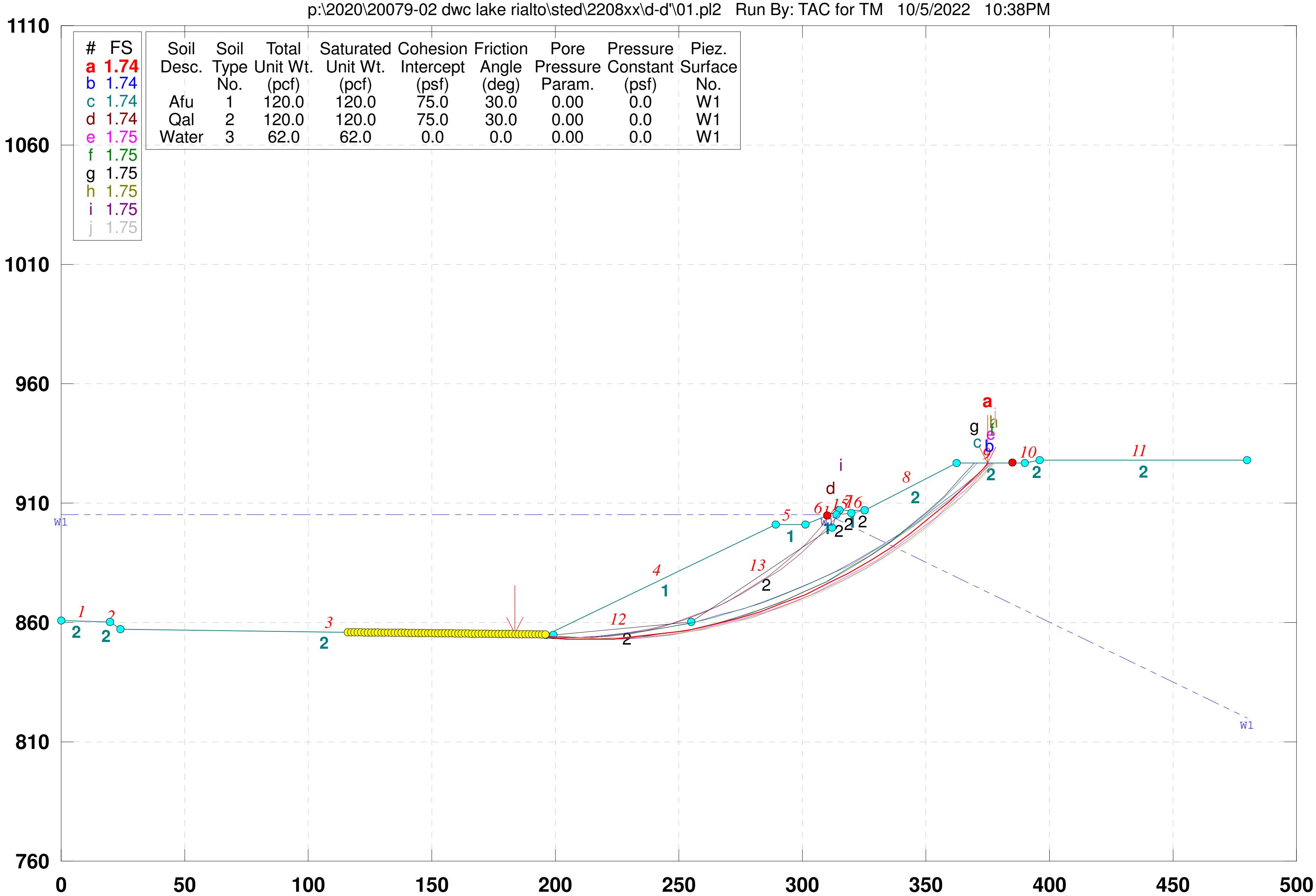
Project No.: 20079-02

Project Name: DWC / Lake Rialto

NMG

DWC / Lake Rialto; D-D'; Design

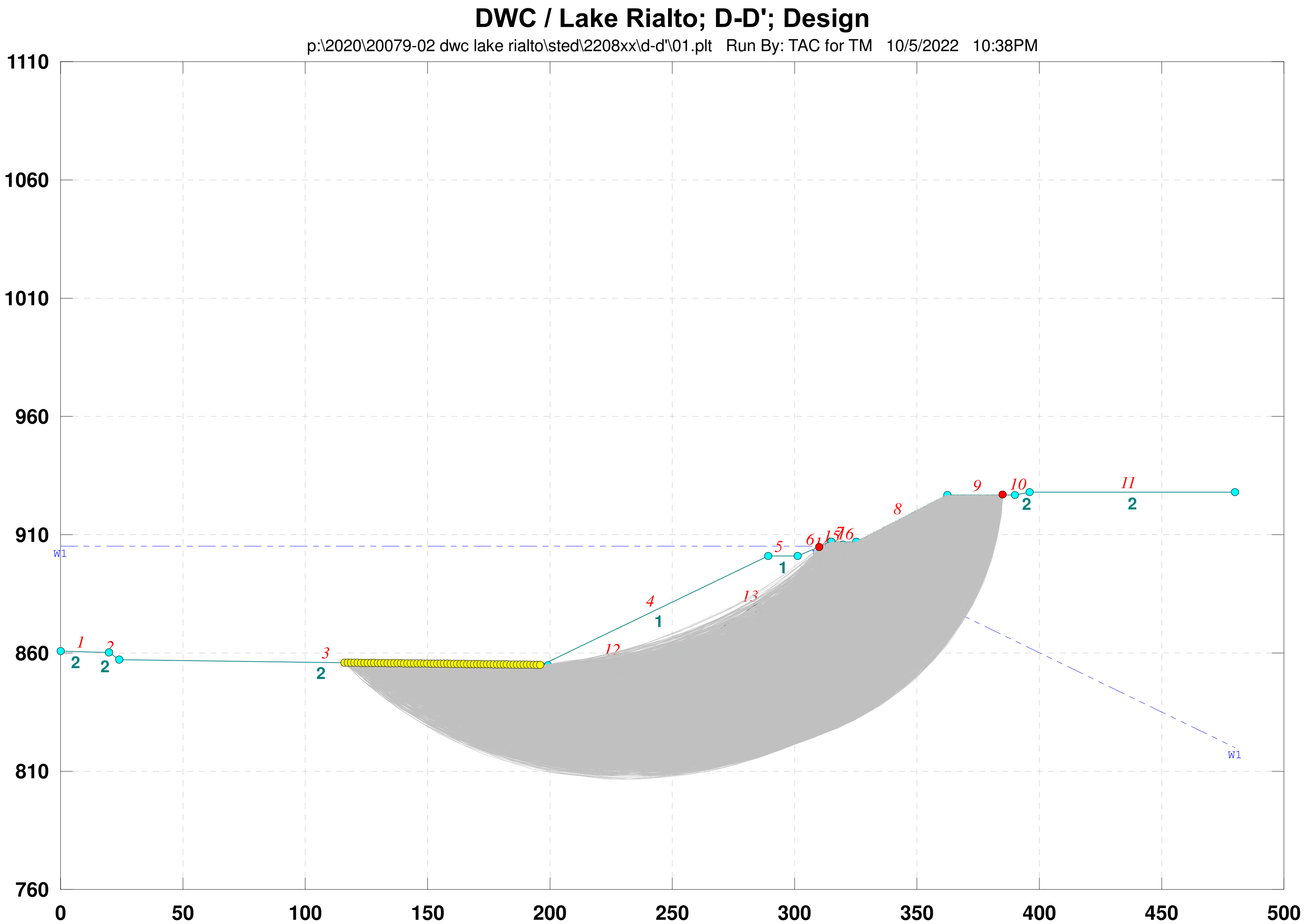
p:\2020\20079-02 dwc lake rialto\sted\2208xx\d-d'\01.pl2 Run By: TAC for TM 10/5/2022 10:38PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Afu	1	120.0	120.0	75.0	30.0	0.00	0.0	W1
Qal	2	120.0	120.0	75.0	30.0	0.00	0.0	W1
Water	3	62.0	62.0	0.0	0.0	0.00	0.0	W1

GSTABL7 v.2 FSmin=1.74

Safety Factors Are Calculated By The Modified Bishop Method


DWC / Lake Rialto; D-D'; Design
p:\2020\20079-02 dwc lake rialto\sted\2208xx\d-d'\01.plt Run By: TAC for TM 10/5/2022 10:38PM
1110
1060
1010
960
910
860
810
760
0
50
100
150
200
250
300
350
400
450
500
W1

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 10:38PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\01.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\01.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\01.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; D-D'; Design
BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	861.00	20.00	860.00	2
2	20.00	860.00	24.00	857.00	2
3	24.00	857.00	196.00	855.00	2
4	196.00	855.00	289.00	901.00	1
5	289.00	901.00	301.00	901.00	1
6	301.00	901.00	315.00	907.00	1
7	315.00	907.00	325.00	907.00	1
8	325.00	907.00	362.50	927.00	2
9	362.50	927.00	390.00	927.00	2
10	390.00	927.00	396.00	928.00	2
11	396.00	928.00	480.00	928.00	2
12	199.00	855.00	255.00	860.00	2
13	255.00	860.00	312.00	900.00	2
14	312.00	900.00	314.00	905.00	2
15	314.00	905.00	320.00	906.00	2
16	320.00	906.00	325.00	907.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	905.00
2	310.00	905.00
3	480.00	820.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 116.00(ft)
and X = 196.00(ft)
Each Surface Terminates Between X = 310.00(ft)
and X = 385.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 3.143 FS Min = 1.739 FS Ave = 2.351
Standard Deviation = 0.337 Coefficient of Variation = 14.33 %
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	183.796	855.142
2	193.728	853.978
3	203.704	853.281
4	213.702	853.052
5	223.699	853.292
6	233.674	854.000
7	243.604	855.175
8	253.469	856.813
9	263.246	858.912
10	272.915	861.467
11	282.453	864.471
12	291.839	867.920
13	301.054	871.804
14	310.076	876.116
15	318.887	880.846
16	327.467	885.984
17	335.796	891.517
18	343.857	897.435
19	351.631	903.725
20	359.103	910.371
21	366.255	917.360
22	373.071	924.677
23	375.041	927.000

Circle Center At X = 213.585 ; Y = 1066.429 ; and Radius = 213.377
Factor of Safety
*** 1.739 ***
Individual data on the 36 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.9	624.7	30938.0	31474.5	0.	0.	0.0	0.0	0.0
2	2.3	303.7	7085.8	7261.0	0.	0.	0.0	0.0	0.0
3	3.0	729.8	10287.4	9624.0	0.	0.	0.0	0.0	0.0
4	4.7	2371.8	15507.2	15170.1	0.	0.	0.0	0.0	0.0
5	10.0	9737.0	30425.9	32343.9	0.	0.	0.0	0.0	0.0
6	10.0	15662.4	26983.8	32340.5	0.	0.	0.0	0.0	0.0
7	10.0	20972.7	23493.9	32044.8	0.	0.	0.0	0.0	0.0
8	9.9	25624.8	19986.5	31457.5	0.	0.	0.0	0.0	0.0
9	9.9	29585.1	16491.7	30579.8	0.	0.	0.0	0.0	0.0
10	1.5	4928.0	2258.8	4691.7	0.	0.	0.0	0.0	0.0
11	8.2	27901.4	10780.0	24722.1	0.	0.	0.0	0.0	0.0
12	9.7	35343.1	9656.5	27961.9	0.	0.	0.0	0.0	0.0
13	9.5	37121.6	6372.5	26227.3	0.	0.	0.0	0.0	0.0
14	6.5	26483.2	2561.3	17117.0	0.	0.	0.0	0.0	0.0
15	2.8	11447.8	708.6	7096.8	0.	0.	0.0	0.0	0.0
16	9.2	34242.6	2286.6	21804.9	0.	0.	0.0	0.0	0.0
17	0.1	188.8	14.6	121.1	0.	0.	0.0	0.0	0.0
18	8.9	31130.6	1251.1	19216.0	0.	0.	0.0	0.0	0.0
19	0.1	264.0	0.0	137.4	0.	0.	0.0	0.0	0.0
20	1.9	6617.7	0.0	3414.5	0.	0.	0.0	0.0	0.0
21	1.3	4559.0	0.0	2223.3	0.	0.	0.0	0.0	0.0
22	0.7	2270.8	0.0	1067.6	0.	0.	0.0	0.0	0.0
23	1.0	3395.4	0.0	1546.3	0.	0.	0.0	0.0	0.0
24	3.9	12686.4	0.0	5382.9	0.	0.	0.0	0.0	0.0

25	1.1	3448.2	0.0	1391.3	0.	0.	0.0	0.0	0.0
26	5.0	14394.3	0.0	5151.8	0.	0.	0.0	0.0	0.0
27	2.5	6633.9	0.0	1879.1	0.	0.	0.0	0.0	0.0
28	8.3	21775.5	0.0	3051.7	0.	0.	0.0	0.0	0.0
29	0.5	1204.8	0.0	9.6	0.	0.	0.0	0.0	0.0
30	7.6	18558.1	0.0	0.0	0.	0.	0.0	0.0	0.0
31	7.8	17306.8	0.0	0.0	0.	0.	0.0	0.0	0.0
32	7.5	14478.1	0.0	0.0	0.	0.	0.0	0.0	0.0
33	3.4	5732.7	0.0	0.0	0.	0.	0.0	0.0	0.0
34	3.8	5170.2	0.0	0.0	0.	0.	0.0	0.0	0.0
35	6.8	4892.7	0.0	0.0	0.	0.	0.0	0.0	0.0
36	2.0	274.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.525	855.331
2	177.472	854.303
3	187.452	853.673
4	197.450	853.442
5	207.448	853.611
6	217.432	854.179
7	227.385	855.146
8	237.292	856.509
9	247.136	858.267
10	256.902	860.417
11	266.575	862.956
12	276.138	865.878
13	285.577	869.181
14	294.877	872.858
15	304.022	876.903
16	312.998	881.311
17	321.791	886.073
18	330.387	891.183
19	338.772	896.633
20	346.932	902.413
21	354.855	908.514
22	362.528	914.927
23	369.938	921.642
24	375.397	927.000

Circle Center At X = 198.241 ; Y = 1103.534 ; and Radius = 250.097

Factor of Safety

*** 1.740 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.152	855.126
2	195.085	853.966
3	205.062	853.295
4	215.061	853.115
5	225.056	853.426
6	235.024	854.228
7	244.940	855.519
8	254.781	857.295
9	264.523	859.552
10	274.142	862.286
11	283.615	865.488
12	292.920	869.153
13	302.033	873.269
14	310.933	877.829
15	319.598	882.820
16	328.008	888.231
17	336.142	894.048
18	343.980	900.258
19	351.503	906.846
20	358.694	913.795
21	365.535	921.089
22	370.556	927.000

Circle Center At X = 213.742 ; Y = 1056.446 ; and Radius = 203.339

Factor of Safety

*** 1.741 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	191.932	855.047
2	201.877	854.004
3	211.874	853.754
4	221.859	854.300
5	231.769	855.638
6	241.542	857.759
7	251.115	860.651
8	260.427	864.294
9	269.421	868.666
10	278.039	873.739
11	286.226	879.482
12	293.930	885.856
13	301.104	892.823
14	307.701	900.339
15	311.575	905.532

Circle Center At X = 210.011 ; Y = 979.441 ; and Radius = 125.700

Factor of Safety

*** 1.743 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	186.508	855.110
2	196.435	853.901
3	206.408	853.167
4	216.405	852.911
5	226.402	853.132
6	236.378	853.832
7	246.308	855.007
8	256.172	856.655
9	265.945	858.773
10	275.606	861.355
11	285.132	864.397
12	294.502	867.890
13	303.694	871.826
14	312.688	876.198
15	321.463	880.995
16	329.998	886.205
17	338.275	891.817
18	346.274	897.818
19	353.977	904.195
20	361.367	910.933
21	368.426	918.016
22	375.138	925.428
23	376.430	927.000

Circle Center At X = 216.767 ; Y = 1062.102 ; and Radius = 209.192

Factor of Safety

*** 1.745 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	164.813	855.363
2	174.756	854.288
3	184.732	853.603
4	194.728	853.308
5	204.727	853.403
6	214.715	853.890
7	224.677	854.766
8	234.597	856.030
9	244.459	857.681
10	254.250	859.717
11	263.954	862.133
12	273.556	864.926
13	283.041	868.092
14	292.396	871.627
15	301.605	875.524
16	310.655	879.778
17	319.532	884.383

18	328.222	889.330
19	336.713	894.614
20	344.990	900.225
21	353.042	906.155
22	360.856	912.395
23	368.420	918.936
24	375.723	925.767
25	376.942	927.000

Circle Center At X = 197.280 ; Y = 1109.216 ; and Radius = 255.921
Factor of Safety
*** 1.745 ***
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	183.796	855.142
2	193.718	853.893
3	203.690	853.140
4	213.686	852.884
5	223.683	853.126
6	233.656	853.866
7	243.580	855.101
8	253.429	856.829
9	263.181	859.045
10	272.809	861.744
11	282.292	864.918
12	291.605	868.561
13	300.725	872.663
14	309.629	877.214
15	318.296	882.203
16	326.704	887.617
17	334.831	893.443
18	342.659	899.667
19	350.167	906.272
20	357.337	913.243
21	364.150	920.562
22	369.571	927.000

Circle Center At X = 213.836 ; Y = 1053.552 ; and Radius = 200.671
Factor of Safety
*** 1.746 ***
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.576	855.063
2	200.513	853.942
3	210.493	853.303
4	220.491	853.147
5	230.486	853.474
6	240.453	854.284
7	250.369	855.575
8	260.212	857.344
9	269.957	859.587
10	279.583	862.297
11	289.066	865.470
12	298.385	869.098
13	307.517	873.172
14	316.442	877.682
15	325.139	882.619
16	333.587	887.970
17	341.766	893.724
18	349.657	899.865
19	357.243	906.382
20	364.504	913.257
21	371.425	920.475
22	377.102	927.000

Circle Center At X = 218.731 ; Y = 1059.851 ; and Radius = 206.715
Factor of Safety
*** 1.746 ***
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	187.864	855.095
2	197.814	854.093
3	207.810	853.811
4	217.800	854.250
5	227.733	855.407
6	237.557	857.277
7	247.220	859.850
8	256.673	863.112
9	265.866	867.047
10	274.752	871.634
11	283.285	876.849
12	291.419	882.665
13	299.114	889.052
14	306.328	895.977
15	313.024	903.404
16	315.825	907.000

Circle Center At X = 206.762 ; Y = 992.188 ; and Radius = 138.390

Factor of Safety

*** 1.747 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	193.288	855.032
2	203.235	854.001
3	213.220	853.453
4	223.219	853.387
5	233.211	853.805
6	243.170	854.705
7	253.074	856.086
8	262.900	857.943
9	272.625	860.273
10	282.226	863.070
11	291.681	866.327
12	300.967	870.038
13	310.062	874.193
14	318.947	878.783
15	327.599	883.796
16	335.999	889.222
17	344.128	895.048
18	351.965	901.259
19	359.492	907.841
20	366.693	914.780
21	373.551	922.059
22	377.774	927.000

Circle Center At X = 219.598 ; Y = 1060.032 ; and Radius = 206.682

Factor of Safety

*** 1.747 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; D-D'; Design; P-Static

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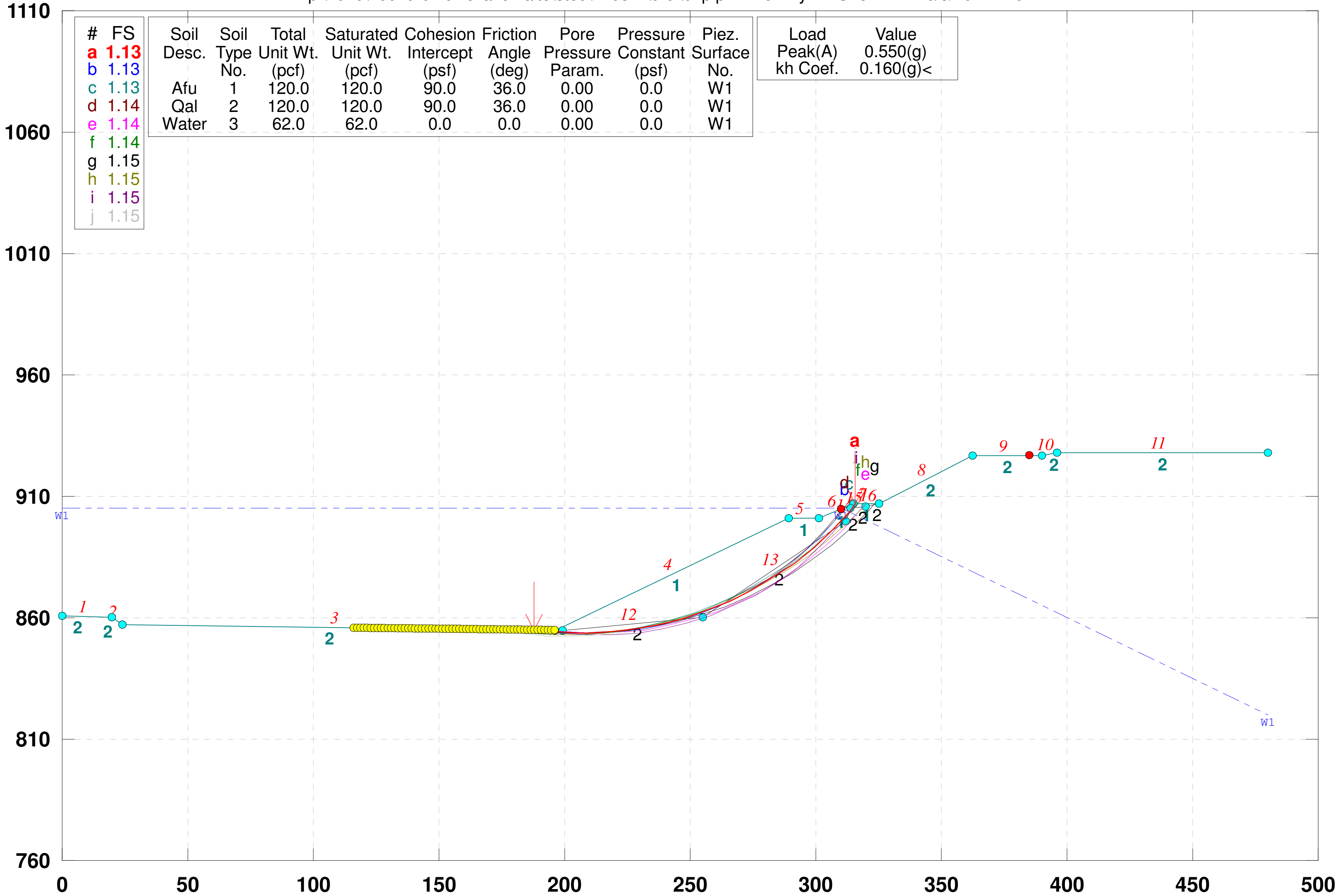

GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; D-D'; Design; P-Static

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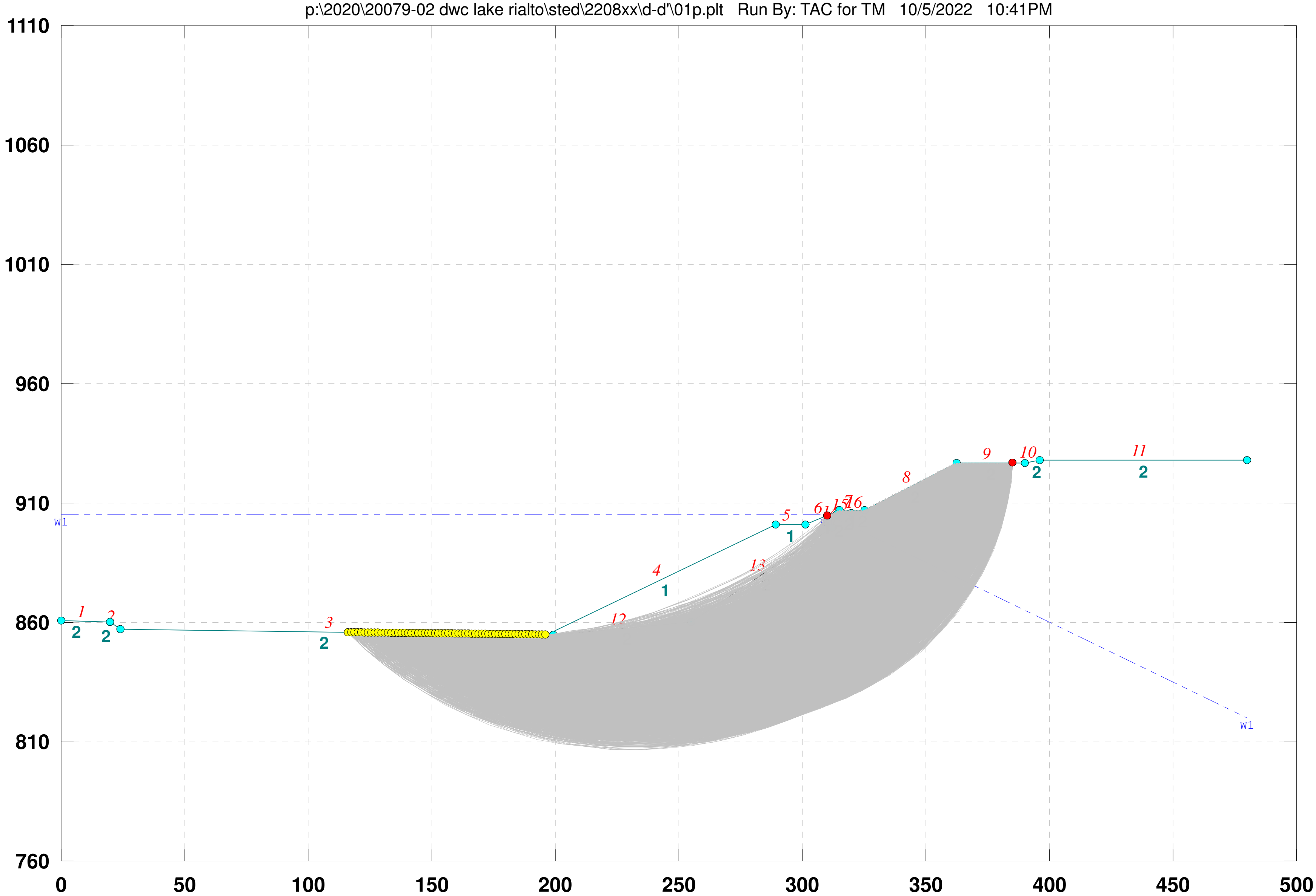

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

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Analysis Run Date:        10/5/2022
Time of Run:              10:41PM
Run By:                   TAC for TM
Input Data Filename:      P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\01p.in
Output Filename:          P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\01p.OUT
Unit System:              English
Plotted Output Filename:  P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\01p.PLT
PROBLEM DESCRIPTION:  DWC / Lake Rialto; D-D'; Design; P-Stati
                      c
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BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	861.00	20.00	860.00	2
2	20.00	860.00	24.00	857.00	2
3	24.00	857.00	196.00	855.00	2
4	196.00	855.00	289.00	901.00	1
5	289.00	901.00	301.00	901.00	1
6	301.00	901.00	315.00	907.00	1
7	315.00	907.00	325.00	907.00	1
8	325.00	907.00	362.50	927.00	2
9	362.50	927.00	390.00	927.00	2
10	390.00	927.00	396.00	928.00	2
11	396.00	928.00	480.00	928.00	2
12	199.00	855.00	255.00	860.00	2
13	255.00	860.00	312.00	900.00	2
14	312.00	900.00	314.00	905.00	2
15	314.00	905.00	320.00	906.00	2
16	320.00	906.00	325.00	907.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	90.0	36.0	0.00	0.0	1
2	120.0	120.0	90.0	36.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	905.00
2	310.00	905.00
3	480.00	820.00

Specified Peak Ground Acceleration Coefficient (A) = 0.550(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.160(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.

80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 116.00(ft)
and X = 196.00(ft)
Each Surface Terminates Between X = 310.00(ft)
and X = 385.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 2.085 FS Min = 1.130 FS Ave = 1.564
Standard Deviation = 0.231 Coefficient of Variation = 14.79 %
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	187.864	855.095
2	197.814	854.093
3	207.810	853.811
4	217.800	854.250
5	227.733	855.407
6	237.557	857.277
7	247.220	859.850
8	256.673	863.112
9	265.866	867.047
10	274.752	871.634
11	283.285	876.849
12	291.419	882.665
13	299.114	889.052
14	306.328	895.977
15	313.024	903.404
16	315.825	907.000

Circle Center At X = 206.762 ; Y = 992.188 ; and Radius = 138.390
Factor of Safety
*** 1.130 ***
Individual data on the 28 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.1	353.6	25361.5	25672.7	0.	0.	56.6	0.0	0.0
2	1.8	275.2	6257.1	5780.7	0.	0.	44.0	0.0	0.0
3	1.2	300.9	4030.3	3770.5	0.	0.	48.1	0.0	0.0
4	8.8	4997.7	28419.1	28083.4	0.	0.	799.6	0.0	0.0
5	10.0	11127.5	28993.4	31805.1	0.	0.	1780.4	0.0	0.0
6	9.9	15985.1	25419.2	31307.1	0.	0.	2557.6	0.0	0.0
7	9.8	19784.8	21798.4	30362.6	0.	0.	3165.6	0.0	0.0
8	6.6	15040.8	12754.2	19924.1	0.	0.	2406.5	0.0	0.0
9	3.1	7433.9	5446.4	9052.3	0.	0.	1189.4	0.0	0.0
10	9.5	24038.5	14693.1	27155.8	0.	0.	3846.2	0.0	0.0
11	7.1	18805.0	8989.5	19401.4	0.	0.	3008.8	0.0	0.0
12	2.1	5690.9	2348.8	5509.0	0.	0.	910.5	0.0	0.0
13	8.9	23901.2	8193.3	22251.6	0.	0.	3824.2	0.0	0.0
14	8.5	22342.7	5308.6	19193.3	0.	0.	3574.8	0.0	0.0
15	5.7	14193.0	2153.9	11446.3	0.	0.	2270.9	0.0	0.0
16	2.4	5573.6	603.8	4305.2	0.	0.	891.8	0.0	0.0
17	7.7	13980.2	1920.5	11944.0	0.	0.	2236.8	0.0	0.0
18	1.9	2499.7	470.9	2454.4	0.	0.	399.9	0.0	0.0
19	5.3	5575.8	1033.9	5336.2	0.	0.	892.1	0.0	0.0
20	0.1	90.1	11.9	86.3	0.	0.	14.4	0.0	0.0
21	3.6	2578.8	219.9	2304.3	0.	0.	412.6	0.0	0.0
22	3.0	1371.2	0.0	638.3	0.	0.	219.4	0.0	0.0
23	0.0	15.4	0.0	0.2	0.	0.	2.5	0.0	0.0
24	0.6	188.7	0.0	0.0	0.	0.	30.2	0.0	0.0
25	0.3	68.9	0.0	0.0	0.	0.	11.0	0.0	0.0
26	0.3	65.7	0.0	0.0	0.	0.	10.5	0.0	0.0

```
27      0.7     112.7     0.0     0.0       0.      0.    18.0     0.0      0.0
28      0.8      52.4     0.0     0.0       0.      0.     8.4     0.0      0.0
        Failure Surface Specified By 15 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        191.932     855.047
            2        201.877     854.004
            3        211.874     853.754
            4        221.859     854.300
            5        231.769     855.638
            6        241.542     857.759
            7        251.115     860.651
            8        260.427     864.294
            9        269.421     868.666
           10        278.039     873.739
           11        286.226     879.482
           12        293.930     885.856
           13        301.104     892.823
           14        307.701     900.339
           15        311.575     905.532
        Circle Center At X =   210.011 ; Y =   979.441 ; and Radius =   125.700
               Factor of Safety
              ***    1.132   ***
        Failure Surface Specified By 16 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        182.440     855.158
            2        192.371     853.978
            3        202.360     853.511
            4        212.357     853.760
            5        222.310     854.724
            6        232.169     856.397
            7        241.883     858.772
            8        251.402     861.835
            9        260.678     865.571
           10        269.663     869.962
           11        278.310     874.984
           12        286.577     880.611
           13        294.419     886.816
           14        301.797     893.566
           15        308.674     900.826
           16        313.050     906.164
        Circle Center At X =   203.906 ; Y =   992.917 ; and Radius =   139.422
               Factor of Safety
              ***    1.134   ***
        Failure Surface Specified By 16 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        185.152     855.126
            2        195.072     853.858
            3        205.059     853.348
            4        215.055     853.601
            5        225.004     854.613
            6        234.847     856.380
            7        244.526     858.891
            8        253.987     862.132
            9        263.173     866.084
           10        272.031     870.723
           11        280.511     876.023
           12        288.563     881.954
           13        296.140     888.480
           14        303.198     895.564
           15        309.696     903.165
           16        311.358     905.439
        Circle Center At X =   206.776 ; Y =   984.330 ; and Radius =   131.001
               Factor of Safety
              ***    1.136   ***
        Failure Surface Specified By 16 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
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    1        191.932      855.047
    2        201.872      853.955
    3        211.866      853.595
    4        221.859      853.969
    5        231.797      855.076
    6        241.628      856.908
    7        251.298      859.456
    8        260.755      862.707
    9        269.948      866.643
   10        278.827      871.242
   11        287.345      876.481
   12        295.456      882.330
   13        303.116      888.758
   14        310.284      895.731
   15        316.921      903.211
   16        319.815      907.000
Circle Center At X =   211.806 ; Y =   989.497 ; and Radius =   135.910
       Factor of Safety
      ***    1.142   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        175.661      855.237
    2        185.568      853.877
    3        195.543      853.176
    4        205.543      853.137
    5        215.524      853.758
    6        225.442      855.038
    7        235.253      856.971
    8        244.915      859.549
    9        254.386      862.760
   10        263.623      866.590
   11        272.587      871.023
   12        281.238      876.038
   13        289.539      881.615
   14        297.453      887.728
   15        304.945      894.352
   16        311.983      901.456
   17        316.792      907.000
Circle Center At X =   201.145 ; Y =  1004.218 ; and Radius =   151.145
       Factor of Safety
      ***    1.144   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        185.152      855.126
    2        195.097      854.075
    3        205.089      853.668
    4        215.086      853.909
    5        225.046      854.795
    6        234.929      856.323
    7        244.692      858.487
    8        254.295      861.277
    9        263.697      864.683
   10        272.860      868.689
   11        281.744      873.279
   12        290.313      878.433
   13        298.531      884.131
   14        306.364      890.348
   15        313.778      897.058
   16        320.743      904.234
   17        323.101      907.000
Circle Center At X =   206.372 ; Y =  1008.280 ; and Radius =   154.617
       Factor of Safety
      ***    1.145   ***
Failure Surface Specified By 18 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        174.305      855.252
    2        184.218      853.935
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    3        194.194      853.240
    4        204.193      853.169
    5        214.178      853.723
    6        224.109      854.899
    7        233.946      856.693
    8        243.653      859.098
    9        253.190      862.105
   10        262.521      865.702
   11        271.609      869.874
   12        280.419      874.605
   13        288.916      879.878
   14        297.067      885.671
   15        304.840      891.962
   16        312.205      898.726
   17        319.134      905.937
   18        320.034      907.000
Circle Center At X =   200.341 ; Y =  1013.002 ; and Radius =   159.884
       Factor of Safety
      ***    1.148   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        189.220      855.079
    2        199.095      853.505
    3        209.065      852.731
    4        219.065      852.761
    5        229.031      853.595
    6        238.896      855.228
    7        248.599      857.650
    8        258.075      860.843
    9        267.264      864.789
   10        276.105      869.461
   11        284.543      874.829
   12        292.521      880.858
   13        299.988      887.509
   14        306.896      894.739
   15        313.201      902.502
   16        316.289      907.000
Circle Center At X =   213.717 ; Y =   976.577 ; and Radius =   123.943
       Factor of Safety
      ***    1.153   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        172.949      855.268
    2        182.810      853.607
    3        192.762      852.627
    4        202.758      852.335
    5        212.750      852.731
    6        222.691      853.814
    7        232.534      855.578
    8        242.233      858.015
    9        251.741      861.113
   10        261.013      864.858
   11        270.006      869.232
   12        278.676      874.214
   13        286.983      879.782
   14        294.887      885.907
   15        302.352      892.562
   16        309.341      899.714
   17        315.540      907.000
Circle Center At X =   202.003 ; Y =   997.607 ; and Radius =   145.274
       Factor of Safety
      ***    1.153   ***
          **** END OF GSTABL7 OUTPUT ****
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DWC / Lake Rialto; D-D'; Rapid Drawdown

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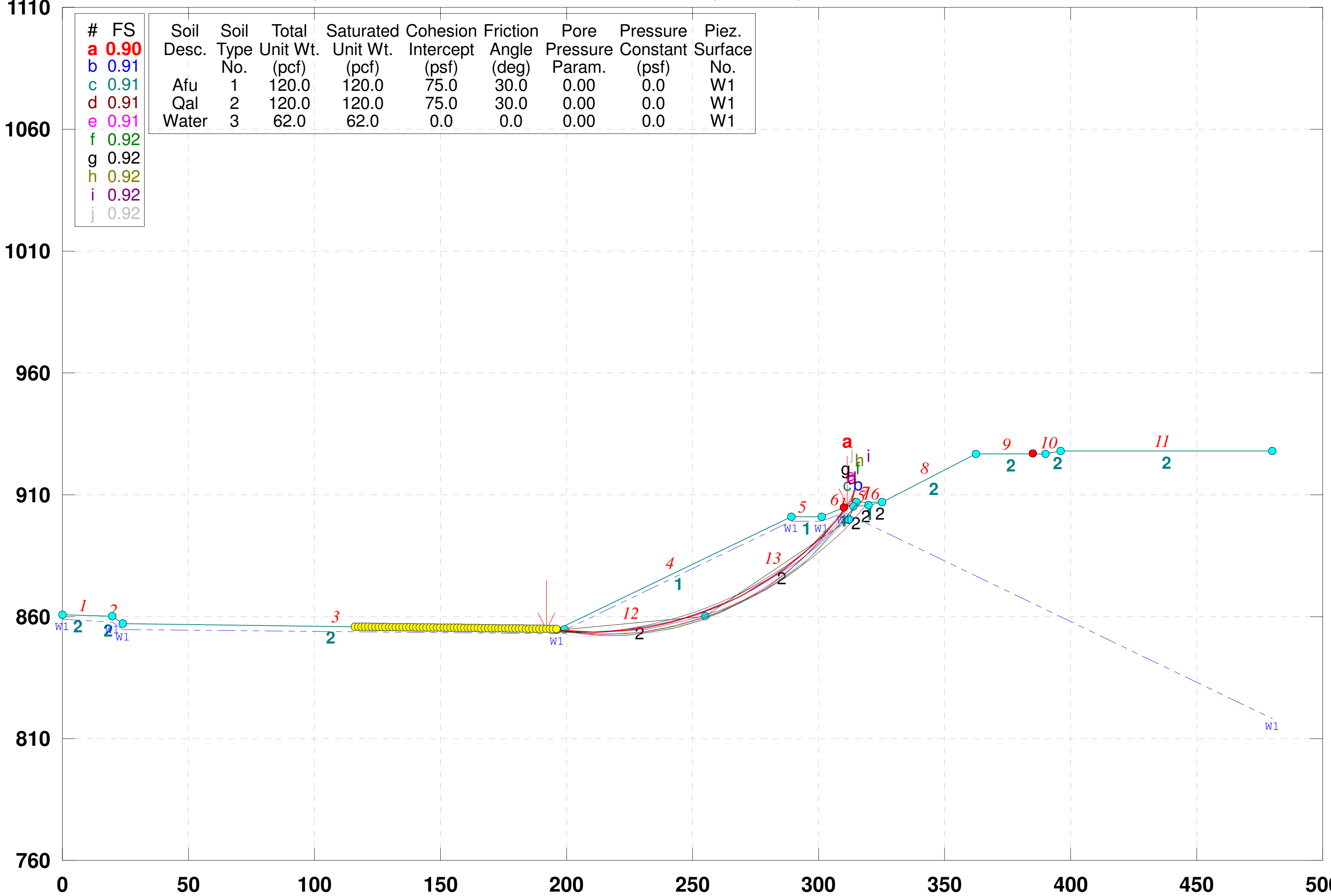
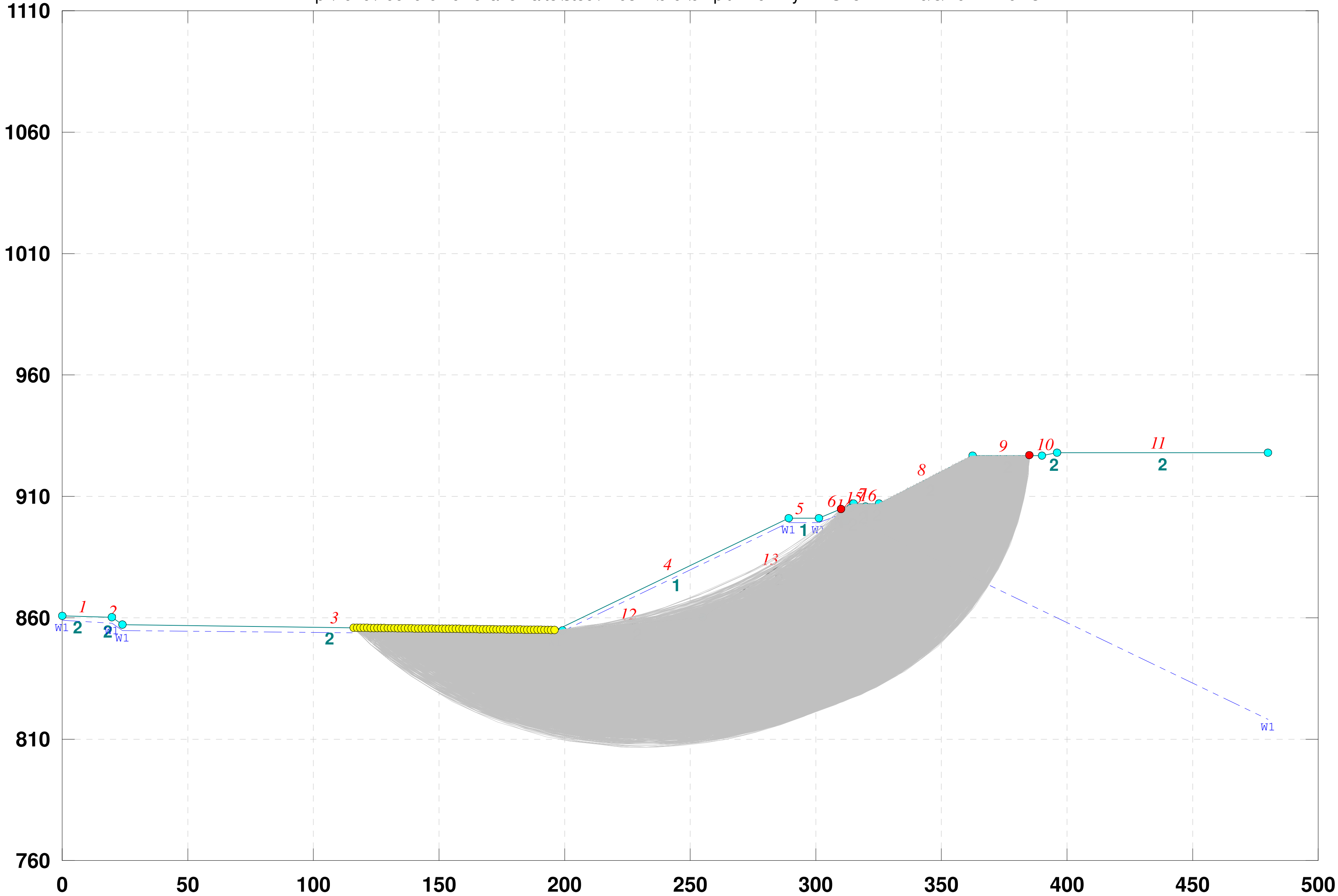


GSTABL7 v.2 FSmin=0.90

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; D-D'; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\d-d'\02.plt   Run By: TAC for TM   10/5/2022   10:43PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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Analysis Run Date: 10/5/2022
Time of Run: 10:43PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\02.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\02.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\02.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; D-D'; Rapid Drawdown

BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	861.00	20.00	860.00	2
2	20.00	860.00	24.00	857.00	2
3	24.00	857.00	196.00	855.00	2
4	196.00	855.00	289.00	901.00	1
5	289.00	901.00	301.00	901.00	1
6	301.00	901.00	315.00	907.00	1
7	315.00	907.00	325.00	907.00	1
8	325.00	907.00	362.50	927.00	2
9	362.50	927.00	390.00	927.00	2
10	390.00	927.00	396.00	928.00	2
11	396.00	928.00	480.00	928.00	2
12	199.00	855.00	255.00	860.00	2
13	255.00	860.00	312.00	900.00	2
14	312.00	900.00	314.00	905.00	2
15	314.00	905.00	320.00	906.00	2
16	320.00	906.00	325.00	907.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	859.00
2	20.00	858.00
3	24.00	855.00
4	196.00	853.00
5	289.00	899.00
6	301.00	899.00
7	310.00	903.00
8	480.00	818.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.

80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 116.00(ft)
and X = 196.00(ft)
Each Surface Terminates Between X = 310.00(ft)
and X = 385.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 1.857 FS Min = 0.902 FS Ave = 1.354
Standard Deviation = 0.193 Coefficient of Variation = 14.25 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	191.932	855.047
2	201.877	854.004
3	211.874	853.754
4	221.859	854.300
5	231.769	855.638
6	241.542	857.759
7	251.115	860.651
8	260.427	864.294
9	269.421	868.666
10	278.039	873.739
11	286.226	879.482
12	293.930	885.856
13	301.104	892.823
14	307.701	900.339
15	311.575	905.532

Circle Center At X = 210.011 ; Y = 979.441 ; and Radius = 125.700
Factor of Safety
*** 0.902 ***
Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.1	92.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.7	385.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.3	74.5	0.0	1.5	0.	0.	0.0	0.0	0.0
4	1.3	391.1	0.0	40.3	0.	0.	0.0	0.0	0.0
5	1.6	658.7	0.0	129.1	0.	0.	0.0	0.0	0.0
6	10.0	7798.0	0.0	2532.3	0.	0.	0.0	0.0	0.0
7	10.0	13532.6	0.0	5229.5	0.	0.	0.0	0.0	0.0
8	9.9	18162.2	0.0	7468.0	0.	0.	0.0	0.0	0.0
9	9.8	21589.8	0.0	9233.8	0.	0.	0.0	0.0	0.0
10	4.9	11858.5	0.0	5234.5	0.	0.	0.0	0.0	0.0
11	4.7	11907.0	0.0	5281.0	0.	0.	0.0	0.0	0.0
12	9.3	24687.9	0.0	11305.0	0.	0.	0.0	0.0	0.0
13	2.3	6102.0	0.0	2899.6	0.	0.	0.0	0.0	0.0
14	6.7	18300.9	0.0	8697.8	0.	0.	0.0	0.0	0.0
15	8.6	23003.0	0.0	11390.8	0.	0.	0.0	0.0	0.0
16	8.2	20624.0	0.0	10686.6	0.	0.	0.0	0.0	0.0
17	2.8	6553.5	0.0	3583.1	0.	0.	0.0	0.0	0.0
18	4.9	10166.4	0.0	6062.8	0.	0.	0.0	0.0	0.0
19	5.4	8150.3	0.0	4963.2	0.	0.	0.0	0.0	0.0
20	1.6	1784.6	0.0	1008.5	0.	0.	0.0	0.0	0.0
21	0.1	102.9	0.0	51.9	0.	0.	0.0	0.0	0.0
22	6.6	4652.8	0.0	2250.8	0.	0.	0.0	0.0	0.0
23	1.8	592.5	0.0	143.6	0.	0.	0.0	0.0	0.0
24	2.0	228.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	187.864	855.095
2	197.814	854.093
3	207.810	853.811
4	217.800	854.250
5	227.733	855.407
6	237.557	857.277
7	247.220	859.850
8	256.673	863.112
9	265.866	867.047
10	274.752	871.634
11	283.285	876.849
12	291.419	882.665
13	299.114	889.052
14	306.328	895.977
15	313.024	903.404
16	315.825	907.000

Circle Center At X = 206.762 ; Y = 992.188 ; and Radius = 138.390

Factor of Safety

*** 0.907 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.152	855.126
2	195.072	853.858
3	205.059	853.348
4	215.055	853.601
5	225.004	854.613
6	234.847	856.380
7	244.526	858.891
8	253.987	862.132
9	263.173	866.084
10	272.031	870.723
11	280.511	876.023
12	288.563	881.954
13	296.140	888.480
14	303.198	895.564
15	309.696	903.165
16	311.358	905.439

Circle Center At X = 206.776 ; Y = 984.330 ; and Radius = 131.001

Factor of Safety

*** 0.909 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	182.440	855.158
2	192.371	853.978
3	202.360	853.511
4	212.357	853.760
5	222.310	854.724
6	232.169	856.397
7	241.883	858.772
8	251.402	861.835
9	260.678	865.571
10	269.663	869.962
11	278.310	874.984
12	286.577	880.611
13	294.419	886.816
14	301.797	893.566
15	308.674	900.826
16	313.050	906.164

Circle Center At X = 203.906 ; Y = 992.917 ; and Radius = 139.422

Factor of Safety

*** 0.914 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.576	855.063
2	200.444	853.446
3	210.415	852.678
4	220.414	852.766

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    5        230.370      853.708
    6        240.208      855.499
    7        249.858      858.124
    8        259.247      861.565
    9        268.308      865.796
   10        276.973      870.787
   11        285.181      876.500
   12        292.869      882.894
   13        299.983      889.923
   14        306.469      897.534
   15        312.281      905.671
   16        312.411      905.890
Circle Center At X =   214.393 ; Y =   969.408 ; and Radius =   116.799
       Factor of Safety
      ***    0.914   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        193.288      855.032
    2        203.183      853.589
    3        213.165      852.980
    4        223.162      853.208
    5        233.105      854.271
    6        242.925      856.163
    7        252.552      858.869
    8        261.919      862.371
    9        270.960      866.644
   10        279.612      871.658
   11        287.814      877.379
   12        295.509      883.765
   13        302.642      890.773
   14        309.165      898.353
   15        315.030      906.452
   16        315.361      907.000
Circle Center At X =   215.453 ; Y =   972.323 ; and Radius =   119.368
       Factor of Safety
      ***    0.915   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        193.288      855.032
    2        203.145      853.348
    3        213.114      852.564
    4        223.114      852.686
    5        233.061      853.713
    6        242.874      855.637
    7        252.473      858.442
    8        261.778      862.104
    9        270.713      866.594
   10        279.205      871.875
   11        287.184      877.903
   12        294.584      884.629
   13        301.345      891.997
   14        307.411      899.947
   15        310.679      905.148
Circle Center At X =   216.768 ; Y =   962.812 ; and Radius =   110.309
       Factor of Safety
      ***    0.917   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        189.220      855.079
    2        199.095      853.505
    3        209.065      852.731
    4        219.065      852.761
    5        229.031      853.595
    6        238.896      855.228
    7        248.599      857.650
    8        258.075      860.843
    9        267.264      864.789
```

10	276.105	869.461
11	284.543	874.829
12	292.521	880.858
13	299.988	887.509
14	306.896	894.739
15	313.201	902.502
16	316.289	907.000

Circle Center At X =   213.717 ; Y =   976.577 ; and Radius =   123.943

Factor of Safety

*** 0.917 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	191.932	855.047
2	201.872	853.955
3	211.866	853.595
4	221.859	853.969
5	231.797	855.076
6	241.628	856.908
7	251.298	859.456
8	260.755	862.707
9	269.948	866.643
10	278.827	871.242
11	287.345	876.481
12	295.456	882.330
13	303.116	888.758
14	310.284	895.731
15	316.921	903.211
16	319.815	907.000

Circle Center At X =   211.806 ; Y =   989.497 ; and Radius =   135.910

Factor of Safety

*** 0.917 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	186.508	855.110
2	196.315	853.155
3	206.253	852.042
4	216.250	851.779
5	226.232	852.369
6	236.128	853.806
7	245.866	856.081
8	255.375	859.177
9	264.586	863.071
10	273.431	867.735
11	281.848	873.135
12	289.774	879.233
13	297.152	885.983
14	303.928	893.337
15	310.053	901.242
16	313.309	906.275

Circle Center At X =   214.348 ; Y =   968.822 ; and Radius =   117.070

Factor of Safety

*** 0.923 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; D-D'; Rapid Drawdown

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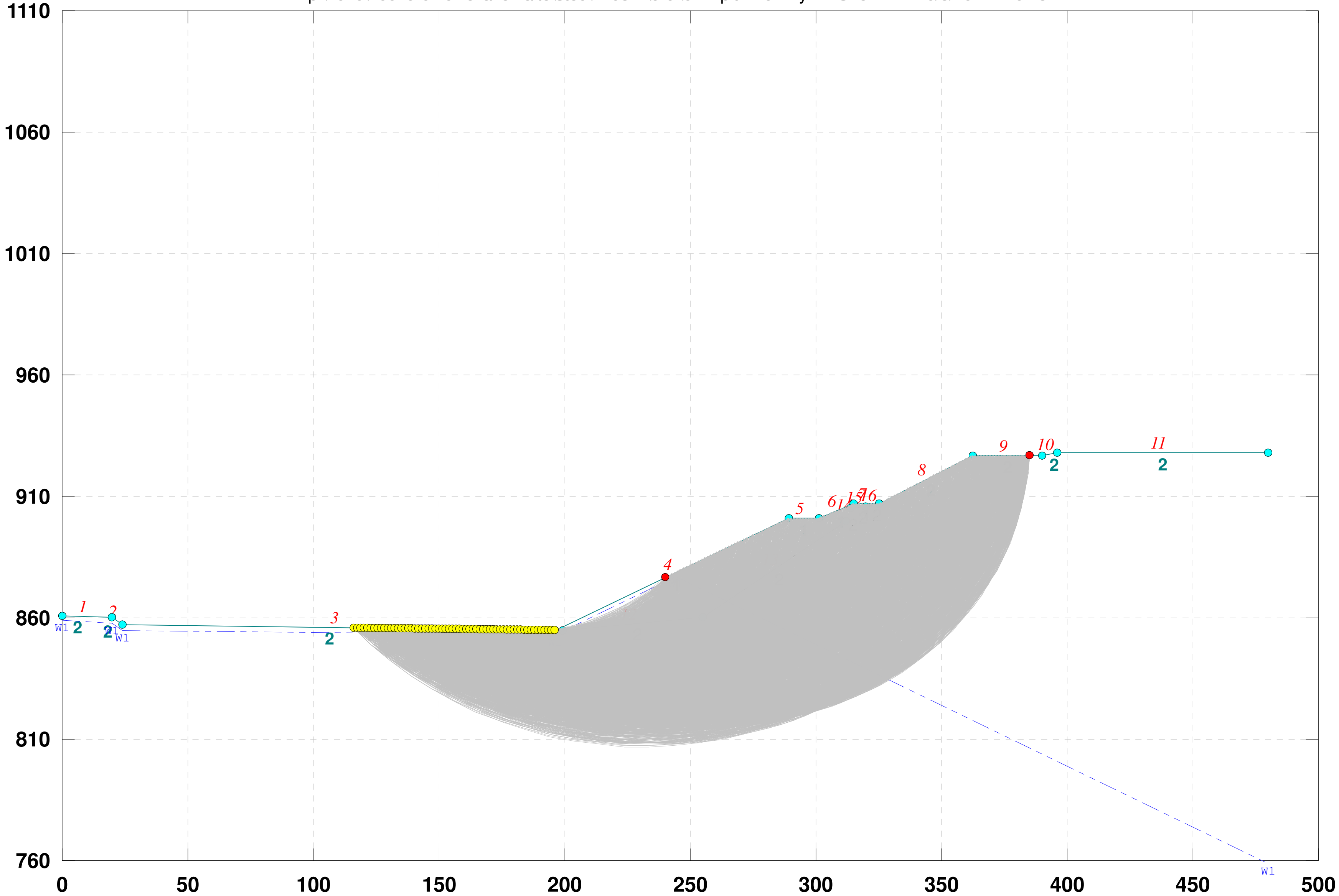
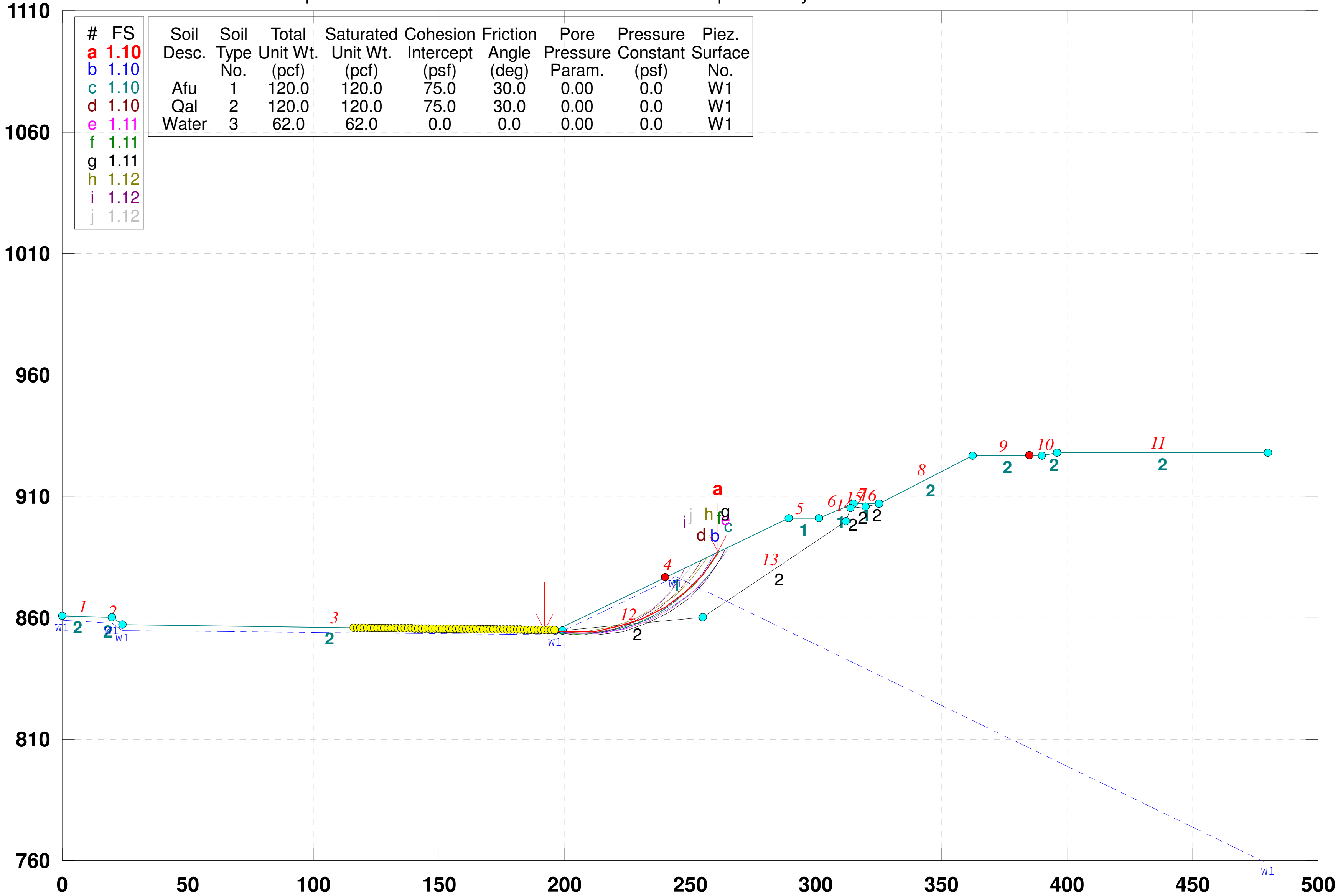


DWC / Lake Rialto; D-D'; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\d-d'\02m.pl2 Run By: TAC for TM 10/5/2022 10:48PM



GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 10:48PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\02m.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\02m.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\D-D'\02m.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; D-D'; Rapid Drawdown
BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	861.00	20.00	860.00	2
2	20.00	860.00	24.00	857.00	2
3	24.00	857.00	196.00	855.00	2
4	196.00	855.00	289.00	901.00	1
5	289.00	901.00	301.00	901.00	1
6	301.00	901.00	315.00	907.00	1
7	315.00	907.00	325.00	907.00	1
8	325.00	907.00	362.50	927.00	2
9	362.50	927.00	390.00	927.00	2
10	390.00	927.00	396.00	928.00	2
11	396.00	928.00	480.00	928.00	2
12	199.00	855.00	255.00	860.00	2
13	255.00	860.00	312.00	900.00	2
14	312.00	900.00	314.00	905.00	2
15	314.00	905.00	320.00	906.00	2
16	320.00	906.00	325.00	907.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 6 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	859.00
2	20.00	858.00
3	24.00	855.00
4	196.00	853.00
5	244.00	877.00
6	480.00	759.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 116.00(ft)

```
                              and  X = 196.00(ft)
  Each Surface Terminates Between   X = 240.00(ft)
                              and   X = 385.00(ft)
  Unless Further Limitations Were Imposed, The Minimum Elevation
  At Which A Surface Extends Is  Y =      0.00(ft)
  10.00(ft) Line Segments Define Each Trial Failure Surface.
  Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Evaluated. They Are
        Ordered - Most Critical First.
        * * Safety Factors Are Calculated By The Modified Bishop Method * *
        Total Number of Trial Surfaces Attempted =  4800
        Number of Trial Surfaces With Valid FS = 4800
        Statistical Data On All Valid FS Values:
           FS Max =   5.180   FS Min =   1.095   FS Ave =   1.766
           Standard Deviation =    0.340   Coefficient of Variation =   19.25 %
        Failure Surface Specified By 10 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        191.932      855.047
            2        201.876      853.994
            3        211.866      854.453
            4        221.672      856.413
            5        231.070      859.830
            6        239.845      864.625
            7        247.797      870.689
            8        254.743      877.883
            9        260.525      886.042
           10        261.107      887.204
        Circle Center At X =   203.875 ; Y =   919.838 ; and Radius =    65.882
               Factor of Safety
              ***    1.095   ***
             Individual data on the    16  slices
                       Water  Water     Tie     Tie     Earthquake
                       Force  Force    Force   Force      Force   Surcharge
Slice  Width   Weight   Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)  (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      4.1      93.6    0.0     0.0       0.      0.     0.0     0.0      0.0
  2      2.7     379.2    0.0     0.0       0.      0.     0.0     0.0      0.0
  3      0.3      83.1    0.0     1.9       0.      0.     0.0     0.0      0.0
  4      1.2     372.6    0.0    39.2       0.      0.     0.0     0.0      0.0
  5      1.7     679.7    0.0   135.0       0.      0.     0.0     0.0      0.0
  6     10.0    7376.4    0.0  2365.4       0.      0.     0.0     0.0      0.0
  7      9.8   11578.4    0.0  4465.4       0.      0.     0.0     0.0      0.0
  8      2.2    3055.3    0.0  1274.4       0.      0.     0.0     0.0      0.0
  9      7.2   10365.7    0.0  4377.4       0.      0.     0.0     0.0      0.0
 10      8.8   12940.6    0.0  5897.4       0.      0.     0.0     0.0      0.0
 11      4.2    5736.0    0.0  2861.5       0.      0.     0.0     0.0      0.0
 12      3.8    4756.5    0.0  1826.0       0.      0.     0.0     0.0      0.0
 13      2.9    3156.0    0.0   512.5       0.      0.     0.0     0.0      0.0
 14      4.1    3555.3    0.0     0.0       0.      0.     0.0     0.0      0.0
 15      5.8    2444.1    0.0     0.0       0.      0.     0.0     0.0      0.0
 16      0.6      30.5    0.0     0.0       0.      0.     0.0     0.0      0.0
        Failure Surface Specified By  9 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        193.288      855.032
            2        203.178      853.551
            3        213.175      853.766
            4        222.992      855.670
            5        232.345      859.209
            6        240.964      864.280
            7        248.600      870.737
            8        255.033      878.393
            9        259.802      886.558
        Circle Center At X =   206.916 ; Y =   912.290 ; and Radius =    58.858
               Factor of Safety
              ***    1.097   ***
        Failure Surface Specified By 10 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
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     1        194.644      855.016
     2        204.580      853.887
     3        214.572      854.280
     4        224.389      856.186
     5        233.802      859.560
     6        242.595      864.324
     7        250.561      870.368
     8        257.518      877.552
     9        263.303      885.708
    10        265.023      889.141
Circle Center At X =   207.056 ; Y =   919.055 ; and Radius =    65.231
       Factor of Safety
      ***    1.099   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        190.576      855.063
     2        200.445      853.449
     3        210.444      853.616
     4        220.253      855.557
     5        229.562      859.211
     6        238.072      864.462
     7        245.514      871.142
     8        251.649      879.038
     9        254.109      883.742
Circle Center At X =   204.516 ; Y =   909.328 ; and Radius =    56.027
       Factor of Safety
      ***    1.103   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        194.644      855.016
     2        204.540      853.577
     3        214.538      853.751
     4        224.378      855.533
     5        233.803      858.876
     6        242.566      863.694
     7        250.438      869.860
     8        257.215      877.213
     9        262.719      885.562
    10        264.122      888.695
Circle Center At X =   208.508 ; Y =   914.919 ; and Radius =    61.487
       Factor of Safety
      ***    1.105   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        187.864      855.095
     2        197.717      853.384
     3        207.715      853.187
     4        217.627      854.508
     5        227.225      857.317
     6        236.286      861.548
     7        244.600      867.104
     8        251.977      873.855
     9        258.244      881.648
    10        261.607      887.451
Circle Center At X =   204.029 ; Y =   918.464 ; and Radius =    65.399
       Factor of Safety
      ***    1.111   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        193.288      855.032
     2        203.115      853.178
     3        213.113      852.980
     4        223.005      854.443
     5        232.518      857.526
     6        241.388      862.144
     7        249.369      868.169
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    8        256.241      875.434
    9        261.813      883.738
   10        264.033      888.651
Circle Center At X =   209.326 ; Y =   912.527 ; and Radius =    59.690
       Factor of Safety
      ***    1.114   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        187.864      855.095
    2        197.777      853.775
    3        207.775      853.982
    4        217.624      855.712
    5        227.094      858.923
    6        235.964      863.540
    7        244.026      869.457
    8        251.092      876.533
    9        256.996      884.604
   10        257.391      885.365
Circle Center At X =   201.441 ; Y =   918.893 ; and Radius =    65.227
       Factor of Safety
      ***    1.115   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        196.000      855.000
    2        205.885      853.488
    3        215.854      854.267
    4        225.385      857.296
    5        233.975      862.416
    6        241.173      869.357
    7        246.601      877.756
    8        247.590      880.518
Circle Center At X =   207.532 ; Y =   896.596 ; and Radius =    43.165
       Factor of Safety
      ***    1.122   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        189.220      855.079
    2        199.082      853.420
    3        209.080      853.622
    4        218.866      855.678
    5        228.100      859.516
    6        236.461      865.002
    7        243.657      871.946
    8        249.437      880.106
    9        250.223      881.820
Circle Center At X =   203.003 ; Y =   906.875 ; and Radius =    53.598
       Factor of Safety
      ***    1.123   ***
          **** END OF GSTABL7 OUTPUT ****
```

Summary of Slope Stability Analysis

Cross-Section E-E'

Filename	Description	Factor of Safety (FS)	
		Static	***Pseudostatic***
01, 01p	Design Condition	1.50	1.09
02	Rapid Drawdown Condition-Operating Lake Level El 905'	0.91	--
02m	Rapid Drawdown-Maximum Groundwater El 883' (22' feet bgs)	1.10	--

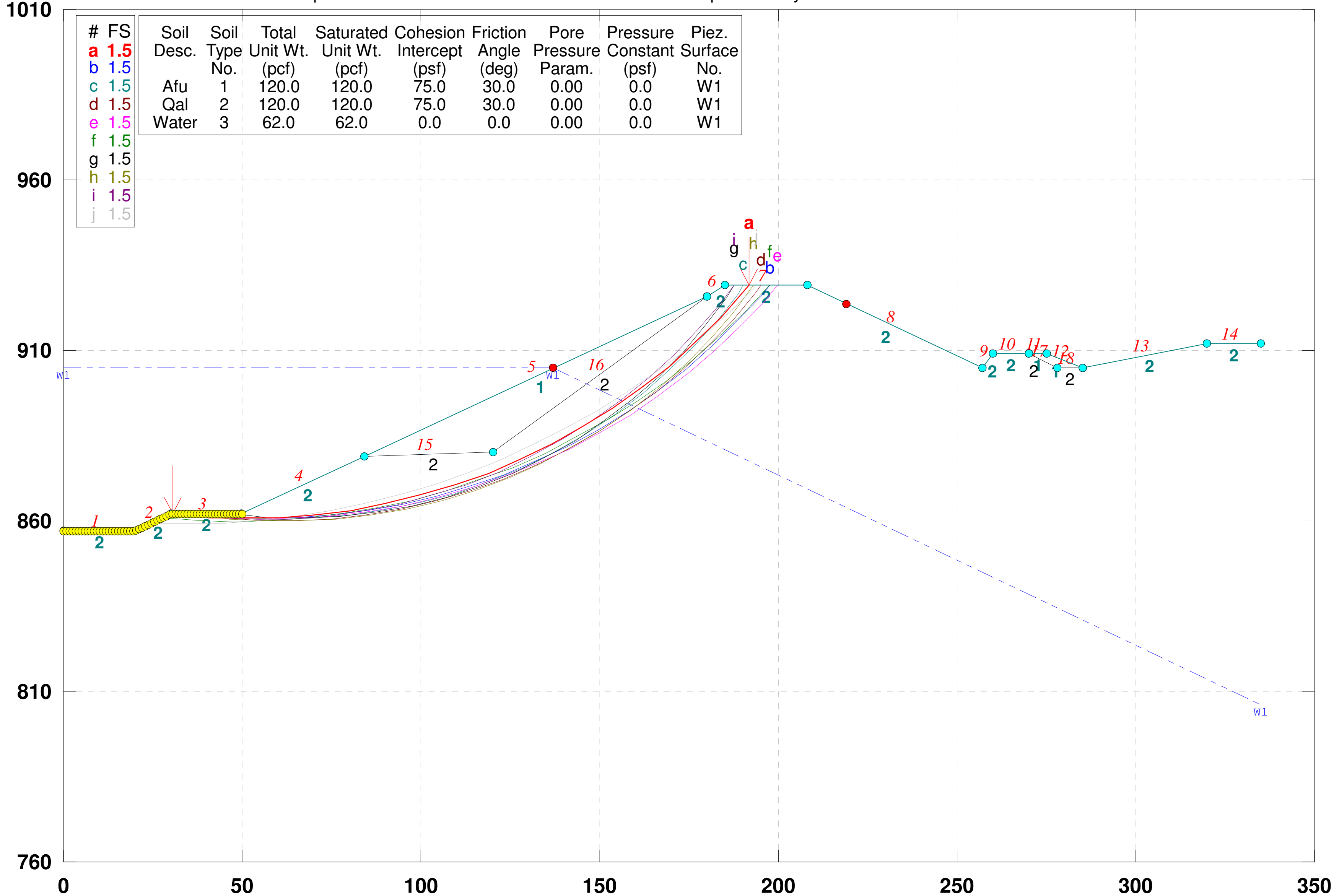
Project No.: 20079-02

Project Name: DWC / Lake Rialto

NMG

DWC / Lake Rialto; E-E'; Design

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\01.pl2   Run By: TAC for TM   10/5/2022   11:21PM

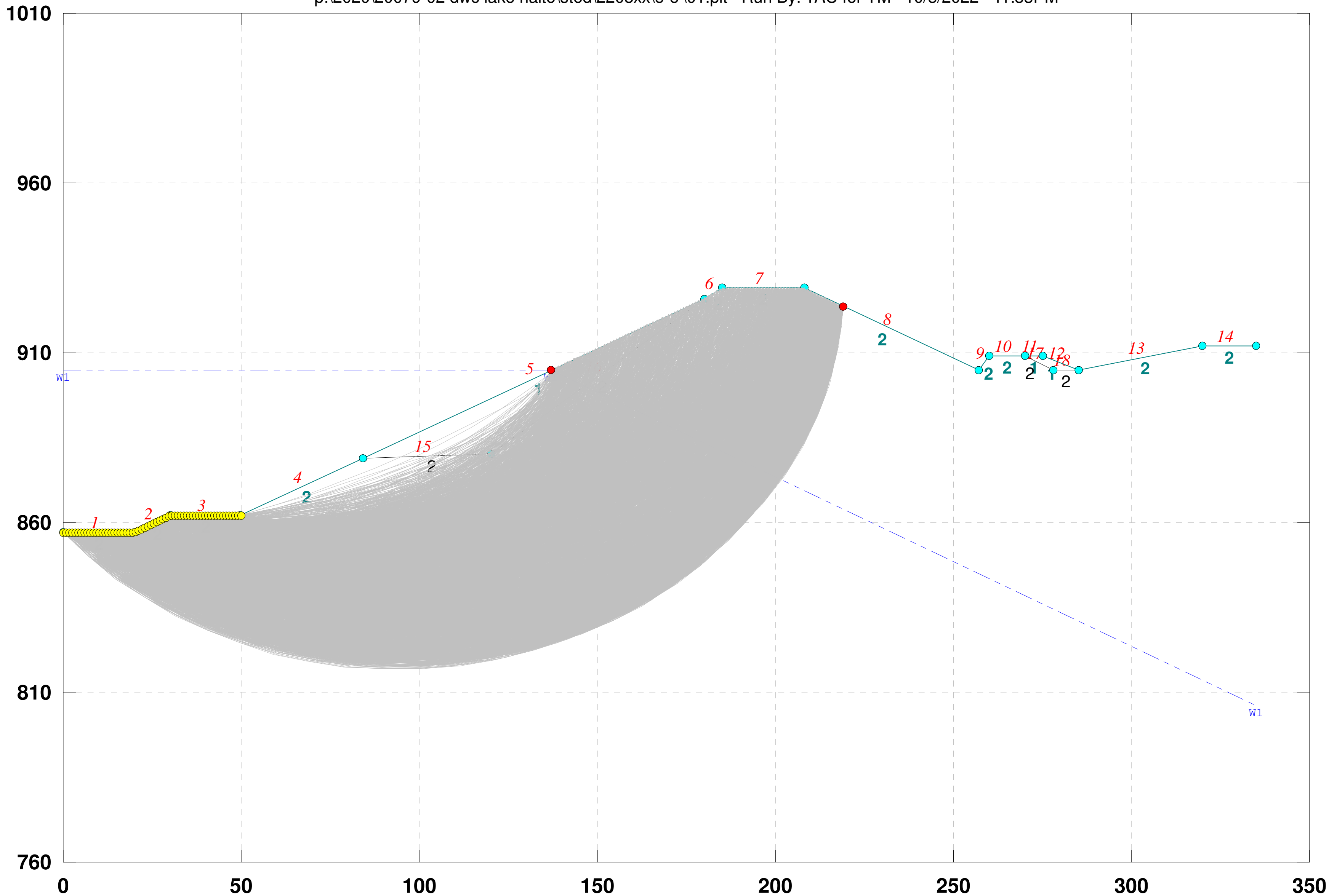


GSTABL7 v.2 FSmin=1.5

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; E-E'; Design

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\01.plt   Run By: TAC for TM   10/5/2022   11:33PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 11:21PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\01.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\01.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\01.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; E-E'; Design
BOUNDARY COORDINATES
14 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	857.00	20.00	857.00	2
2	20.00	857.00	30.00	862.00	2
3	30.00	862.00	50.00	862.00	2
4	50.00	862.00	84.00	879.00	2
5	84.00	879.00	180.00	926.00	1
6	180.00	926.00	185.00	929.00	2
7	185.00	929.00	208.00	929.00	2
8	208.00	929.00	257.00	905.00	2
9	257.00	905.00	260.00	909.00	2
10	260.00	909.00	270.00	909.00	2
11	270.00	909.00	275.00	909.00	1
12	275.00	909.00	285.00	905.00	1
13	285.00	905.00	320.00	912.00	2
14	320.00	912.00	335.00	912.00	2
15	84.00	879.00	120.00	880.00	2
16	120.00	880.00	180.00	926.00	2
17	270.00	909.00	278.00	905.00	2
18	278.00	905.00	285.00	905.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	905.00
2	137.00	905.00
3	335.00	806.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 50.00(ft)

Each Surface Terminates Between X = 137.00(ft)
and X = 219.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 2.884 FS Min = 1.484 FS Ave = 2.120
Standard Deviation = 0.329 Coefficient of Variation = 15.51 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	30.508	862.000
2	40.468	861.097
3	50.462	860.755
4	60.459	860.975
5	70.429	861.756
6	80.339	863.095
7	90.158	864.990
8	99.855	867.432
9	109.399	870.416
10	118.761	873.931
11	127.911	877.966
12	136.820	882.508
13	145.459	887.544
14	153.802	893.058
15	161.822	899.031
16	169.494	905.445
17	176.793	912.280
18	183.698	919.514
19	190.184	927.125
20	191.609	929.000

Circle Center At X = 51.578 ; Y = 1038.521 ; and Radius = 177.774
Factor of Safety
*** 1.484 ***
Individual data on the 27 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	539.6	26722.4	27113.7	0.	0.	0.0	0.0	0.0
2	9.5	1219.5	25577.2	26226.7	0.	0.	0.0	0.0	0.0
3	0.5	75.0	1381.6	1275.4	0.	0.	0.0	0.0	0.0
4	10.0	4637.5	28087.5	27540.4	0.	0.	0.0	0.0	0.0
5	10.0	9997.6	24536.6	27228.1	0.	0.	0.0	0.0	0.0
6	9.9	14586.9	20953.9	26566.5	0.	0.	0.0	0.0	0.0
7	3.7	6430.5	6875.1	9668.1	0.	0.	0.0	0.0	0.0
8	6.2	11905.3	10478.3	15889.4	0.	0.	0.0	0.0	0.0
9	9.7	21152.4	13886.5	24204.5	0.	0.	0.0	0.0	0.0
10	9.5	23107.0	10544.6	22511.5	0.	0.	0.0	0.0	0.0
11	9.4	24214.0	7332.5	20484.0	0.	0.	0.0	0.0	0.0
12	1.2	3288.0	746.9	2601.8	0.	0.	0.0	0.0	0.0
13	7.9	21207.8	3538.8	15526.5	0.	0.	0.0	0.0	0.0
14	8.9	23991.0	1436.7	15452.0	0.	0.	0.0	0.0	0.0
15	0.2	483.8	1.2	292.5	0.	0.	0.0	0.0	0.0
16	8.5	22270.3	0.0	9791.1	0.	0.	0.0	0.0	0.0
17	1.0	2545.4	0.0	841.8	0.	0.	0.0	0.0	0.0
18	7.4	18309.1	0.0	3866.5	0.	0.	0.0	0.0	0.0
19	2.8	6743.7	0.0	352.8	0.	0.	0.0	0.0	0.0
20	5.2	11631.4	0.0	0.0	0.	0.	0.0	0.0	0.0
21	7.7	15411.7	0.0	0.0	0.	0.	0.0	0.0	0.0
22	7.3	12071.2	0.0	0.0	0.	0.	0.0	0.0	0.0
23	3.2	4330.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	3.7	4229.5	0.0	0.0	0.	0.	0.0	0.0	0.0
25	1.3	1302.1	0.0	0.0	0.	0.	0.0	0.0	0.0

26	5.2	3058.7	0.0	0.0	0.	0.	0.0	0.0	0.0
27	1.4	160.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.746	862.000
2	44.705	861.094
3	54.698	860.740
4	64.696	860.939
5	74.668	861.692
6	84.583	862.995
7	94.410	864.845
8	104.120	867.235
9	113.683	870.160
10	123.070	873.609
11	132.251	877.572
12	141.199	882.037
13	149.886	886.990
14	158.285	892.416
15	166.372	898.299
16	174.121	904.620
17	181.508	911.360
18	188.511	918.499
19	195.108	926.014
20	197.450	929.000

Circle Center At X = 56.126 ; Y = 1041.135 ; and Radius = 180.407

Factor of Safety

*** 1.486 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.678	862.000
2	50.624	860.959
3	60.616	860.562
4	70.613	860.810
5	80.573	861.702
6	90.455	863.235
7	100.217	865.402
8	109.819	868.194
9	119.221	871.600
10	128.384	875.605
11	137.270	880.192
12	145.841	885.344
13	154.062	891.037
14	161.899	897.249
15	169.319	903.953
16	176.290	911.122
17	182.785	918.726
18	188.776	926.732
19	190.255	929.000

Circle Center At X = 61.774 ; Y = 1015.516 ; and Radius = 154.959

Factor of Safety

*** 1.488 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.746	862.000
2	44.671	860.776
3	54.651	860.150
4	64.651	860.122
5	74.635	860.694
6	84.566	861.864
7	94.409	863.626
8	104.129	865.975
9	113.691	868.903
10	123.060	872.399
11	132.203	876.450
12	141.087	881.041
13	149.679	886.157
14	157.950	891.778

```
   15        165.868      897.885
   16        173.406      904.456
   17        180.537      911.467
   18        187.235      918.892
   19        193.476      926.706
   20        195.093      929.000
Circle Center At X =    60.132 ; Y =  1026.618 ; and Radius =   166.564
       Factor of Safety
      ***    1.493   ***
Failure Surface Specified By 20 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         34.746      862.000
    2         44.700      861.046
    3         54.692      860.637
    4         64.691      860.773
    5         74.668      861.454
    6         84.592      862.678
    7         94.436      864.441
    8        104.168      866.738
    9        113.761      869.563
   10        123.186      872.906
   11        132.414      876.758
   12        141.418      881.108
   13        150.172      885.942
   14        158.650      891.246
   15        166.825      897.005
   16        174.674      903.201
   17        182.174      909.815
   18        189.302      916.829
   19        196.037      924.221
   20        199.937      929.000
Circle Center At X =    57.231 ; Y =  1043.704 ; and Radius =   183.090
       Factor of Safety
      ***    1.496   ***
Failure Surface Specified By 21 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         27.966      860.983
    2         37.933      860.170
    3         47.929      859.871
    4         57.926      860.086
    5         67.900      860.814
    6         77.823      862.054
    7         87.669      863.802
    8         97.412      866.054
    9        107.026      868.804
   10        116.487      872.044
   11        125.768      875.766
   12        134.846      879.960
   13        143.697      884.615
   14        152.296      889.718
   15        160.622      895.257
   16        168.652      901.217
   17        176.366      907.581
   18        183.742      914.333
   19        190.761      921.456
   20        197.405      928.930
   21        197.462      929.000
Circle Center At X =    48.751 ; Y =  1054.391 ; and Radius =   194.521
       Factor of Safety
      ***    1.496   ***
Failure Surface Specified By 18 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         47.458      862.000
    2         57.417      861.097
    3         67.415      860.889
    4         77.403      861.375
    5         87.333      862.554
```

6	97.157	864.419
7	106.829	866.963
8	116.300	870.173
9	125.525	874.032
10	134.460	878.523
11	143.061	883.624
12	151.287	889.310
13	159.098	895.553
14	166.457	902.324
15	173.328	909.590
16	179.677	917.316
17	185.475	925.464
18	187.638	929.000

Circle Center At X = 65.458 ; Y = 1004.483 ; and Radius = 143.616
Factor of Safety
*** 1.497 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.441	862.000
2	46.354	860.688
3	56.331	860.002
4	66.331	859.947
5	76.314	860.522
6	86.241	861.725
7	96.073	863.551
8	105.771	865.992
9	115.295	869.040
10	124.608	872.682
11	133.673	876.903
12	142.455	881.688
13	150.917	887.015
14	159.027	892.866
15	166.752	899.216
16	174.062	906.040
17	180.928	913.311
18	187.321	921.000
19	193.162	929.000

Circle Center At X = 62.207 ; Y = 1018.532 ; and Radius = 158.638
Factor of Safety
*** 1.497 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.898	862.000
2	43.839	860.916
3	53.829	860.454
4	63.827	860.618
5	73.796	861.406
6	83.696	862.815
7	93.489	864.841
8	103.136	867.474
9	112.600	870.704
10	121.844	874.520
11	130.831	878.905
12	139.526	883.844
13	147.896	889.316
14	155.908	895.300
15	163.530	901.773
16	170.733	908.710
17	177.488	916.083
18	183.770	923.864
19	187.411	929.000

Circle Center At X = 56.210 ; Y = 1020.419 ; and Radius = 159.983
Factor of Safety
*** 1.499 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.576	859.288

```
   2        34.575      859.113
   3        44.571      859.395
   4        54.544      860.133
   5        64.472      861.325
   6        74.336      862.969
   7        84.115      865.061
   8        93.788      867.598
   9       103.335      870.574
  10       112.736      873.982
  11       121.972      877.816
  12       131.023      882.068
  13       139.871      886.728
  14       148.496      891.787
  15       156.882      897.235
  16       165.011      903.060
  17       172.865      909.250
  18       180.428      915.792
  19       187.685      922.672
  20       193.776      929.000
Circle Center At X =    33.426 ; Y =  1077.999 ; and Radius =   218.890
       Factor of Safety
      ***    1.499   ***
          **** END OF GSTABL7 OUTPUT ****
```

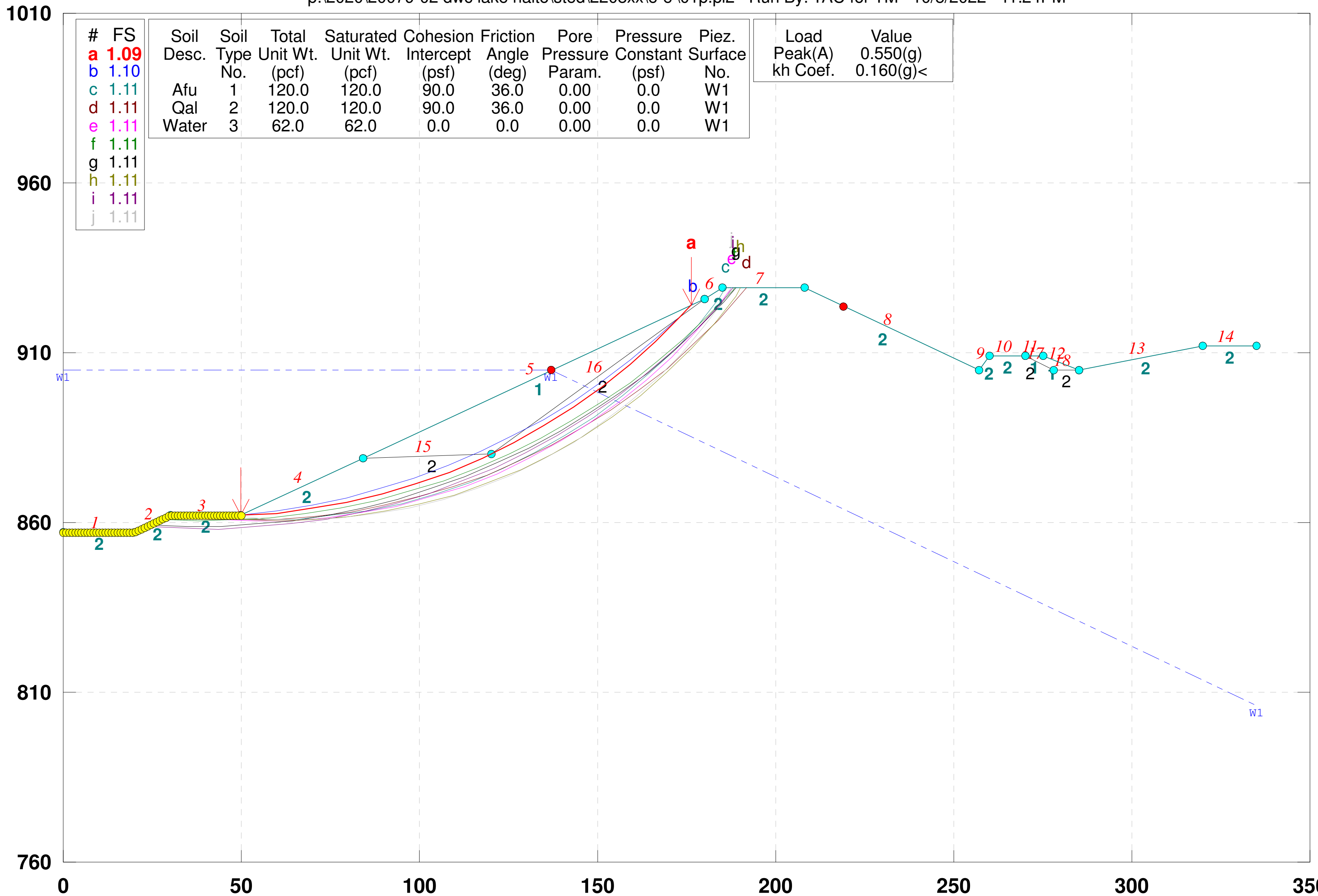
DWC / Lake Rialto; E-E'; Design; P-Static

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\01p.pl2 Run By: TAC for TM 10/5/2022 11:24PM

#	FS
a	1.09
b	1.10
c	1.11
d	1.11
e	1.11
f	1.11
g	1.11
h	1.11
i	1.11
j	1.11

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Afu	1	120.0	120.0	90.0	36.0	0.00	0.0	W1
Qal	2	120.0	120.0	90.0	36.0	0.00	0.0	W1
Water	3	62.0	62.0	0.0	0.0	0.00	0.0	W1

Load	Value
Peak(A)	0.550(g)
kh Coef.	0.160(g)<

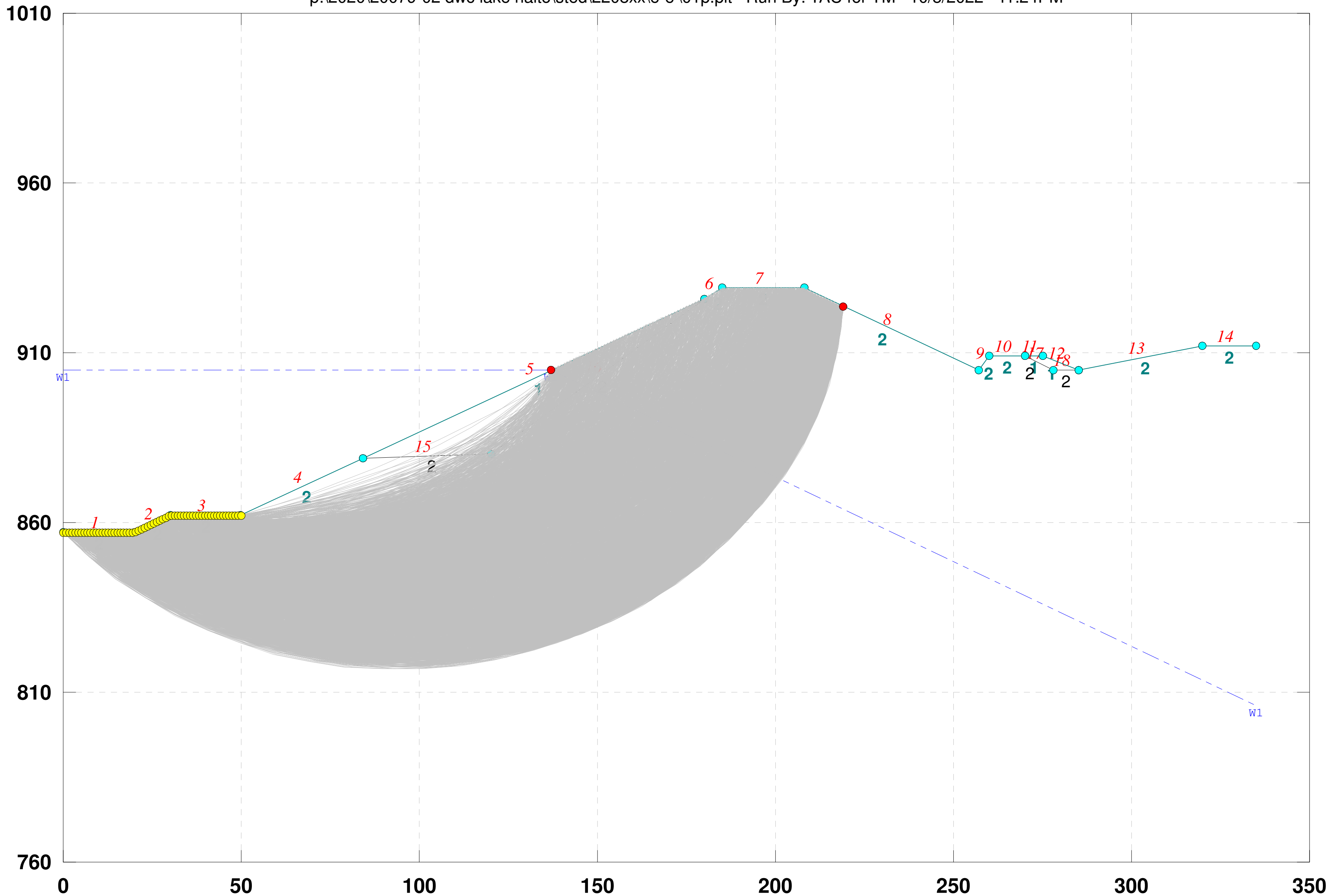


GSTABL7 v.2 FSmin=1.09

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; E-E'; Design; P-Static

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\01p.plt   Run By: TAC for TM   10/5/2022   11:24PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 11:24PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\01p.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\01p.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\01p.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; E-E'; Design; P-Stati
c

BOUNDARY COORDINATES
14 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	857.00	20.00	857.00	2
2	20.00	857.00	30.00	862.00	2
3	30.00	862.00	50.00	862.00	2
4	50.00	862.00	84.00	879.00	2
5	84.00	879.00	180.00	926.00	1
6	180.00	926.00	185.00	929.00	2
7	185.00	929.00	208.00	929.00	2
8	208.00	929.00	257.00	905.00	2
9	257.00	905.00	260.00	909.00	2
10	260.00	909.00	270.00	909.00	2
11	270.00	909.00	275.00	909.00	1
12	275.00	909.00	285.00	905.00	1
13	285.00	905.00	320.00	912.00	2
14	320.00	912.00	335.00	912.00	2
15	84.00	879.00	120.00	880.00	2
16	120.00	880.00	180.00	926.00	2
17	270.00	909.00	278.00	905.00	2
18	278.00	905.00	285.00	905.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	90.0	36.0	0.00	0.0	1
2	120.0	120.0	90.0	36.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	905.00
2	137.00	905.00
3	335.00	806.00

Specified Peak Ground Acceleration Coefficient (A) = 0.550(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.160(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random

```
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.
  80 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
Along The Ground Surface Between  X =   0.00(ft)
                             and  X =  50.00(ft)
Each Surface Terminates Between   X = 137.00(ft)
                            and   X = 219.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Attempted =  4800
      Number of Trial Surfaces With Valid FS = 4800
      Statistical Data On All Valid FS Values:
         FS Max =   2.076   FS Min =   1.086   FS Ave =   1.563
         Standard Deviation =    0.267   Coefficient of Variation =   17.07 %
      Failure Surface Specified By 16 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	50.000	862.000
2	59.972	862.748
3	69.885	864.061
4	79.708	865.935
5	89.409	868.363
6	98.957	871.337
7	108.320	874.848
8	117.469	878.885
9	126.374	883.435
10	135.006	888.482
11	143.339	894.012
12	151.344	900.005
13	158.996	906.443
14	166.270	913.304
15	173.144	920.568
16	176.130	924.105

```
      Circle Center At X =    41.910 ; Y =  1037.561 ; and Radius =   175.747
             Factor of Safety
            ***    1.086   ***
           Individual data on the    22  slices
```

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.0	2535.4	28180.6	26598.5	0.	0.	405.7	0.0	0.0
2	9.9	7208.5	24576.9	25955.4	0.	0.	1153.4	0.0	0.0
3	9.8	11080.7	20971.3	24961.2	0.	0.	1772.9	0.0	0.0
4	4.3	5899.4	8105.9	10636.0	0.	0.	943.9	0.0	0.0
5	5.4	8203.6	9273.5	12983.2	0.	0.	1312.6	0.0	0.0
6	9.5	16195.1	13939.6	21933.8	0.	0.	2591.2	0.0	0.0
7	9.4	17440.3	10659.2	19910.2	0.	0.	2790.5	0.0	0.0
8	9.1	17872.8	7534.8	17555.2	0.	0.	2859.6	0.0	0.0
9	2.2	4274.9	1364.6	3872.6	0.	0.	684.0	0.0	0.0
10	1.1	2104.9	614.8	1849.2	0.	0.	336.8	0.0	0.0
11	5.7	11151.5	2620.2	9154.4	0.	0.	1784.2	0.0	0.0
12	8.6	16471.2	1884.0	11881.8	0.	0.	2635.4	0.0	0.0
13	2.0	3663.9	74.8	2367.2	0.	0.	586.2	0.0	0.0
14	6.3	11098.7	0.0	4916.1	0.	0.	1775.8	0.0	0.0
15	3.1	5087.0	0.0	1281.9	0.	0.	813.9	0.0	0.0
16	3.2	4852.9	0.0	435.5	0.	0.	776.5	0.0	0.0
17	1.7	2550.4	0.0	0.0	0.	0.	408.1	0.0	0.0
18	7.7	9751.6	0.0	0.0	0.	0.	1560.3	0.0	0.0
19	7.3	6655.2	0.0	0.0	0.	0.	1064.8	0.0	0.0
20	6.9	3319.6	0.0	0.0	0.	0.	531.1	0.0	0.0
21	0.4	97.4	0.0	0.0	0.	0.	15.6	0.0	0.0
22	2.6	274.5	0.0	0.0	0.	0.	43.9	0.0	0.0

```
      Failure Surface Specified By 16 Coordinate Points
        Point      X-Surf      Y-Surf
```

No.	(ft)	(ft)
1	50.000	862.000
2	59.918	863.278
3	69.762	865.040
4	79.507	867.282
5	89.131	869.999
6	98.610	873.183
7	107.922	876.829
8	117.044	880.925
9	125.955	885.464
10	134.633	890.434
11	143.057	895.823
12	151.206	901.618
13	159.063	907.805
14	166.606	914.369
15	173.820	921.295
16	176.768	924.418

Circle Center At X = 29.014 ; Y = 1064.561 ; and Radius = 203.645

Factor of Safety

*** 1.095 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	35.593	862.000
2	45.548	861.053
3	55.543	860.734
4	65.538	861.043
5	75.494	861.981
6	85.372	863.542
7	95.132	865.721
8	104.735	868.509
9	114.144	871.895
10	123.322	875.866
11	132.232	880.406
12	140.839	885.497
13	149.109	891.119
14	157.009	897.250
15	164.509	903.865
16	171.577	910.938
17	178.188	918.442
18	184.313	926.346
19	186.114	929.000

Circle Center At X = 55.620 ; Y = 1019.750 ; and Radius = 159.016

Factor of Safety

*** 1.107 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	30.508	862.000
2	40.468	861.097
3	50.462	860.755
4	60.459	860.975
5	70.429	861.756
6	80.339	863.095
7	90.158	864.990
8	99.855	867.432
9	109.399	870.416
10	118.761	873.931
11	127.911	877.966
12	136.820	882.508
13	145.459	887.544
14	153.802	893.058
15	161.822	899.031
16	169.494	905.445
17	176.793	912.280
18	183.698	919.514
19	190.184	927.125
20	191.609	929.000

Circle Center At X = 51.578 ; Y = 1038.521 ; and Radius = 177.774

Factor of Safety

*** 1.109 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.898	862.000
2	43.839	860.916
3	53.829	860.454
4	63.827	860.618
5	73.796	861.406
6	83.696	862.815
7	93.489	864.841
8	103.136	867.474
9	112.600	870.704
10	121.844	874.520
11	130.831	878.905
12	139.526	883.844
13	147.896	889.316
14	155.908	895.300
15	163.530	901.773
16	170.733	908.710
17	177.488	916.083
18	183.770	923.864
19	187.411	929.000

Circle Center At X = 56.210 ; Y = 1020.419 ; and Radius = 159.983

Factor of Safety

*** 1.110 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	27.966	860.983
2	37.960	860.643
3	47.959	860.814
4	57.936	861.493
5	67.865	862.680
6	77.721	864.371
7	87.478	866.562
8	97.111	869.247
9	106.594	872.420
10	115.903	876.072
11	125.015	880.193
12	133.904	884.774
13	142.548	889.801
14	150.926	895.262
15	159.014	901.143
16	166.791	907.428
17	174.239	914.102
18	181.336	921.146
19	188.066	928.543
20	188.441	929.000

Circle Center At X = 39.635 ; Y = 1056.768 ; and Radius = 196.132

Factor of Safety

*** 1.110 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.576	859.288
2	34.568	858.877
3	44.567	858.970
4	54.550	859.566
5	64.489	860.665
6	74.360	862.264
7	84.139	864.358
8	93.799	866.943
9	103.317	870.010
10	112.668	873.554
11	121.828	877.565
12	130.775	882.032
13	139.485	886.944
14	147.937	892.289
15	156.109	898.053

16	163.979	904.222
17	171.529	910.780
18	178.738	917.709
19	185.590	924.994
20	188.994	929.000

Circle Center At X = 37.773 ; Y = 1056.910 ; and Radius = 198.062
Factor of Safety
*** 1.111 ***
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.678	862.000
2	50.624	860.959
3	60.616	860.562
4	70.613	860.810
5	80.573	861.702
6	90.455	863.235
7	100.217	865.402
8	109.819	868.194
9	119.221	871.600
10	128.384	875.605
11	137.270	880.192
12	145.841	885.344
13	154.062	891.037
14	161.899	897.249
15	169.319	903.953
16	176.290	911.122
17	182.785	918.726
18	188.776	926.732
19	190.255	929.000

Circle Center At X = 61.774 ; Y = 1015.516 ; and Radius = 154.959
Factor of Safety
*** 1.112 ***
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.729	858.864
2	33.710	858.258
3	43.710	858.178
4	53.700	858.623
5	63.653	859.593
6	73.541	861.085
7	83.337	863.095
8	93.014	865.617
9	102.545	868.644
10	111.903	872.168
11	121.063	876.180
12	130.000	880.667
13	138.688	885.618
14	147.105	891.019
15	155.225	896.854
16	163.028	903.109
17	170.490	909.765
18	177.593	916.805
19	184.316	924.208
20	188.228	929.000

Circle Center At X = 40.278 ; Y = 1048.029 ; and Radius = 189.887
Factor of Safety
*** 1.112 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	47.458	862.000
2	57.417	861.097
3	67.415	860.889
4	77.403	861.375
5	87.333	862.554
6	97.157	864.419
7	106.829	866.963
8	116.300	870.173

9	125.525	874.032
10	134.460	878.523
11	143.061	883.624
12	151.287	889.310
13	159.098	895.553
14	166.457	902.324
15	173.328	909.590
16	179.677	917.316
17	185.475	925.464
18	187.638	929.000

Circle Center At X = 65.458 ; Y = 1004.483 ; and Radius = 143.616

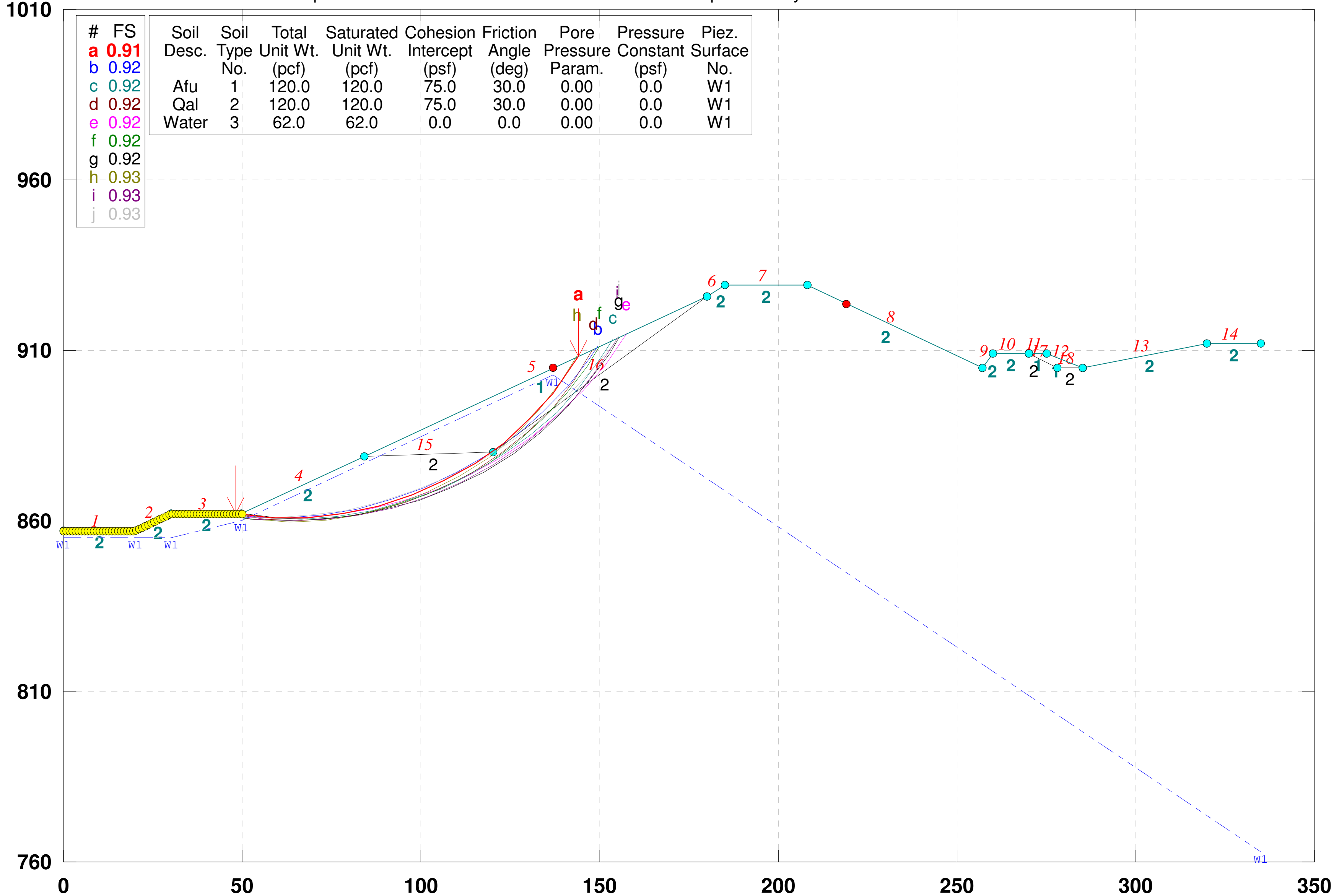
Factor of Safety

*** 1.113 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; E-E'; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\02.pl2   Run By: TAC for TM   10/5/2022   11:27PM



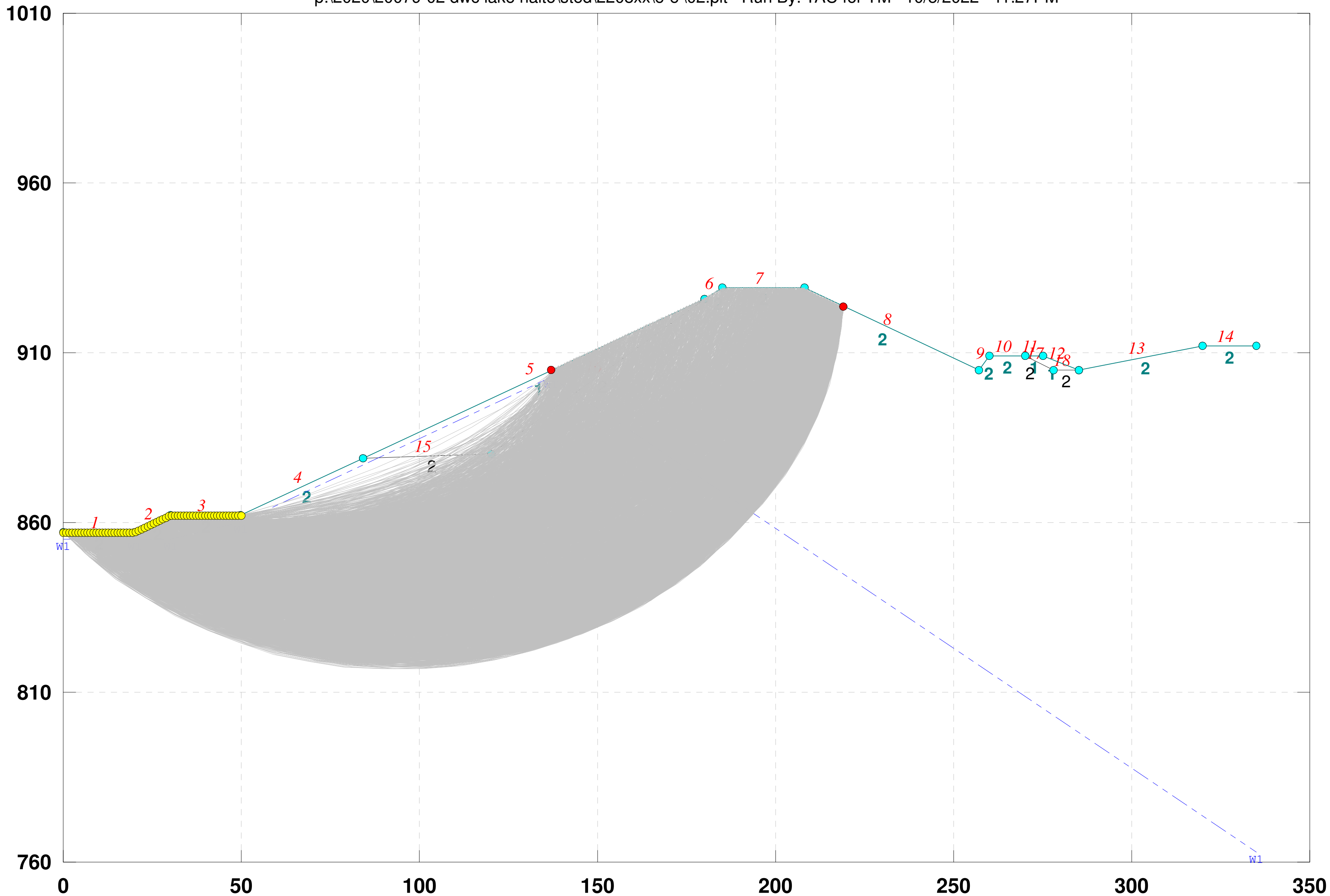
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Afu	1	120.0	120.0	75.0	30.0	0.00	0.0	W1
Qal	2	120.0	120.0	75.0	30.0	0.00	0.0	W1
Water	3	62.0	62.0	0.0	0.0	0.00	0.0	W1

GSTABL7 v.2 FSmin=0.91

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; E-E'; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\02.plt Run By: TAC for TM 10/5/2022 11:27PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 10/5/2022
Time of Run: 11:27PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\02.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\02.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\02.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; E-E'; Rapid Drawdown
BOUNDARY COORDINATES
14 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	857.00	20.00	857.00	2
2	20.00	857.00	30.00	862.00	2
3	30.00	862.00	50.00	862.00	2
4	50.00	862.00	84.00	879.00	2
5	84.00	879.00	180.00	926.00	1
6	180.00	926.00	185.00	929.00	2
7	185.00	929.00	208.00	929.00	2
8	208.00	929.00	257.00	905.00	2
9	257.00	905.00	260.00	909.00	2
10	260.00	909.00	270.00	909.00	2
11	270.00	909.00	275.00	909.00	1
12	275.00	909.00	285.00	905.00	1
13	285.00	905.00	320.00	912.00	2
14	320.00	912.00	335.00	912.00	2
15	84.00	879.00	120.00	880.00	2
16	120.00	880.00	180.00	926.00	2
17	270.00	909.00	278.00	905.00	2
18	278.00	905.00	285.00	905.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 6 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	855.00
2	20.00	855.00
3	30.00	855.00
4	50.00	860.00
5	137.00	903.00
6	335.00	763.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.

80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 50.00(ft)
Each Surface Terminates Between X = 137.00(ft)
and X = 219.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 1.941 FS Min = 0.912 FS Ave = 1.404
Standard Deviation = 0.256 Coefficient of Variation = 18.25 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.305	862.000
2	58.253	860.976
3	68.252	861.020
4	78.190	862.132
5	87.953	864.300
6	97.427	867.498
7	106.506	871.690
8	115.085	876.828
9	123.066	882.853
10	130.358	889.697
11	136.877	897.280
12	142.549	905.516
13	144.131	908.439

Circle Center At X = 62.839 ; Y = 954.335 ; and Radius = 93.472
Factor of Safety
*** 0.912 ***
Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.7	17.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.1	402.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.2	2234.7	0.0	456.1	0.	0.	0.0	0.0	0.0
4	10.0	9153.9	0.0	3124.5	0.	0.	0.0	0.0	0.0
5	9.9	14351.8	0.0	5571.8	0.	0.	0.0	0.0	0.0
6	5.8	10297.2	0.0	4216.9	0.	0.	0.0	0.0	0.0
7	4.0	7639.4	0.0	3171.7	0.	0.	0.0	0.0	0.0
8	0.8	1509.9	0.0	649.9	0.	0.	0.0	0.0	0.0
9	8.7	18222.6	0.0	7904.1	0.	0.	0.0	0.0	0.0
10	9.1	19830.5	0.0	9054.9	0.	0.	0.0	0.0	0.0
11	8.6	18386.2	0.0	8885.3	0.	0.	0.0	0.0	0.0
12	4.2	8433.5	0.0	4354.8	0.	0.	0.0	0.0	0.0
13	3.8	7208.0	0.0	3692.5	0.	0.	0.0	0.0	0.0
14	7.3	11931.9	0.0	6550.5	0.	0.	0.0	0.0	0.0
15	6.5	7669.3	0.0	4412.0	0.	0.	0.0	0.0	0.0
16	0.1	111.2	0.0	68.2	0.	0.	0.0	0.0	0.0
17	2.6	1926.4	0.0	652.1	0.	0.	0.0	0.0	0.0
18	3.0	1282.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	1.6	203.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	42.373	862.000
2	52.325	861.019
3	62.325	860.957
4	72.288	861.813
5	82.130	863.581
6	91.769	866.245
7	101.122	869.784

```
    8        110.111      874.166
    9        118.659      879.355
   10        126.694      885.308
   11        134.149      891.973
   12        140.960      899.295
   13        147.070      907.212
   14        149.523      911.079
Circle Center At X =    58.050 ; Y =   969.279 ; and Radius =   108.418
       Factor of Safety
      ***    0.915   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         46.610      862.000
    2         56.542      860.836
    3         66.540      860.636
    4         76.511      861.400
    5         86.361      863.123
    6         96.000      865.787
    7        105.336      869.369
    8        114.284      873.835
    9        122.759      879.142
   10        130.683      885.243
   11        137.982      892.079
   12        144.587      899.587
   13        150.437      907.697
   14        153.567      913.059
Circle Center At X =    63.655 ; Y =   963.849 ; and Radius =   103.265
       Factor of Safety
      ***    0.917   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         46.610      862.000
    2         56.507      860.570
    3         66.501      860.198
    4         76.477      860.887
    5         86.324      862.630
    6         95.931      865.406
    7        105.189      869.185
    8        113.995      873.924
    9        122.249      879.570
   10        129.857      886.059
   11        136.736      893.318
   12        142.806      901.264
   13        147.999      909.810
   14        148.319      910.490
Circle Center At X =    65.019 ; Y =   954.301 ; and Radius =    94.119
       Factor of Safety
      ***    0.918   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         45.763      862.000
    2         55.714      861.016
    3         65.714      860.923
    4         75.682      861.723
    5         85.539      863.408
    6         95.206      865.965
    7        104.607      869.375
    8        113.667      873.609
    9        122.312      878.633
   10        130.476      884.409
   11        138.091      890.890
   12        145.099      898.024
   13        151.442      905.755
   14        157.071      914.020
   15        157.649      915.058
Circle Center At X =    61.751 ; Y =   972.885 ; and Radius =   112.031
       Factor of Safety
```

*** 0.920 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	42.373	862.000
2	52.250	860.439
3	62.234	859.874
4	72.225	860.312
5	82.121	861.749
6	91.824	864.169
7	101.235	867.548
8	110.261	871.853
9	118.811	877.040
10	126.798	883.057
11	134.143	889.844
12	140.771	897.331
13	146.616	905.445
14	150.008	911.317

Circle Center At X = 62.891 ; Y = 959.335 ; and Radius = 99.475

Factor of Safety

*** 0.922 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	50.000	862.000
2	59.934	860.853
3	69.933	860.695
4	79.898	861.530
5	89.731	863.348
6	99.336	866.131
7	108.618	869.853
8	117.485	874.476
9	125.850	879.955
10	133.631	886.236
11	140.752	893.258
12	147.141	900.950
13	152.737	909.238
14	155.239	913.877

Circle Center At X = 66.561 ; Y = 961.087 ; and Radius = 100.462

Factor of Safety

*** 0.923 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	43.220	862.000
2	53.077	860.312
3	63.059	859.720
4	73.046	860.233
5	82.915	861.844
6	92.547	864.534
7	101.823	868.269
8	110.631	873.004
9	118.863	878.681
10	126.419	885.232
11	133.207	892.576
12	139.143	900.623
13	143.490	908.125

Circle Center At X = 63.414 ; Y = 950.275 ; and Radius = 90.555

Factor of Safety

*** 0.925 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	43.220	862.000
2	53.104	860.480
3	63.088	859.916
4	73.080	860.313
5	82.988	861.667
6	92.721	863.965
7	102.187	867.188

8	111.301	871.303
9	119.978	876.275
10	128.137	882.056
11	135.704	888.594
12	142.609	895.827
13	148.787	903.690
14	154.182	912.110
15	155.038	913.779

Circle Center At X = 63.960 ; Y = 963.985 ; and Radius = 104.073

Factor of Safety

*** 0.925 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.983	862.000
2	48.939	861.063
3	58.938	860.951
4	68.913	861.664
5	78.795	863.198
6	88.516	865.541
7	98.011	868.678
8	107.215	872.588
9	116.065	877.244
10	124.501	882.615
11	132.465	888.662
12	139.903	895.347
13	146.764	902.622
14	153.001	910.438
15	155.343	913.928

Circle Center At X = 55.297 ; Y = 982.012 ; and Radius = 121.115

Factor of Safety

*** 0.926 ***

**** END OF GSTABL7 OUTPUT ****

DWC / Lake Rialto; E-E'; Rapid Drawdown

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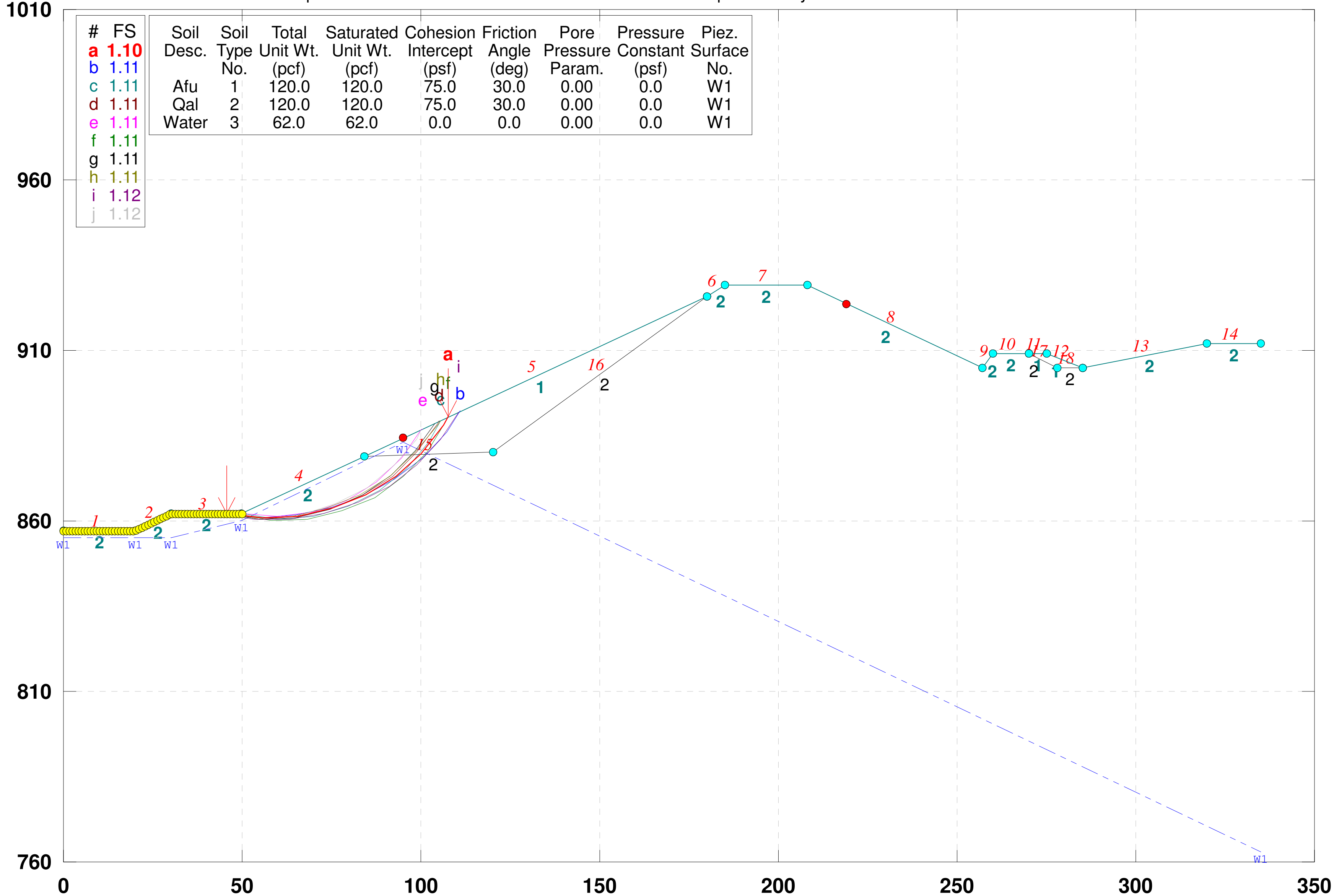
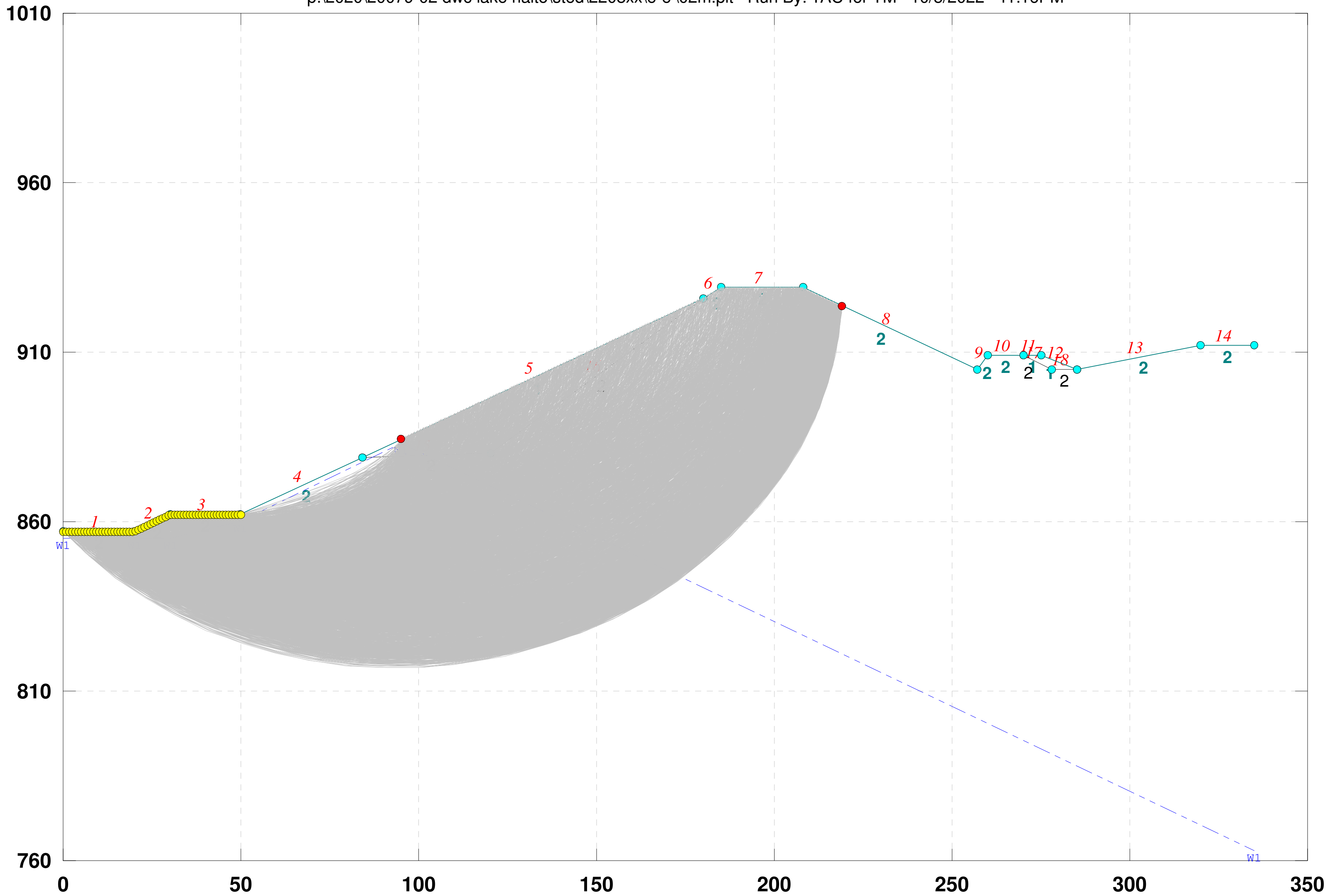


GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

DWC / Lake Rialto; E-E'; Rapid Drawdown

p:\2020\20079-02 dwc lake rialto\sted\2208xx\e-e'\02m.plt   Run By: TAC for TM   10/5/2022   11:16PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/5/2022
Time of Run: 11:16PM
Run By: TAC for TM
Input Data Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\02m.in
Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\02m.OUT
Unit System: English
Plotted Output Filename: P:\2020\20079-02 DWC Lake Rialto\Sted\2208XX\E-E'\02m.PLT
PROBLEM DESCRIPTION: DWC / Lake Rialto; E-E'; Rapid Drawdown
BOUNDARY COORDINATES
14 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	857.00	20.00	857.00	2
2	20.00	857.00	30.00	862.00	2
3	30.00	862.00	50.00	862.00	2
4	50.00	862.00	84.00	879.00	2
5	84.00	879.00	180.00	926.00	1
6	180.00	926.00	185.00	929.00	2
7	185.00	929.00	208.00	929.00	2
8	208.00	929.00	257.00	905.00	2
9	257.00	905.00	260.00	909.00	2
10	260.00	909.00	270.00	909.00	2
11	270.00	909.00	275.00	909.00	1
12	275.00	909.00	285.00	905.00	1
13	285.00	905.00	320.00	912.00	2
14	320.00	912.00	335.00	912.00	2
15	84.00	879.00	120.00	880.00	2
16	120.00	880.00	180.00	926.00	2
17	270.00	909.00	278.00	905.00	2
18	278.00	905.00	285.00	905.00	2

User Specified Y-Origin = 760.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	75.0	30.0	0.00	0.0	1
2	120.0	120.0	75.0	30.0	0.00	0.0	1
3	62.0	62.0	0.0	0.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 6 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	855.00
2	20.00	855.00
3	30.00	855.00
4	50.00	860.00
5	95.00	883.00
6	335.00	763.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4800 Trial Surfaces Have Been Generated.

80 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 50.00(ft)
Each Surface Terminates Between X = 95.00(ft)
and X = 219.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 4800
Number of Trial Surfaces With Valid FS = 4800
Statistical Data On All Valid FS Values:
FS Max = 2.400 FS Min = 1.102 FS Ave = 1.650
Standard Deviation = 0.273 Coefficient of Variation = 16.56 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	45.763	862.000
2	55.695	860.836
3	65.678	861.408
4	75.412	863.701
5	84.602	867.643
6	92.971	873.117
7	100.266	879.957
8	106.267	887.956
9	107.580	890.544

Circle Center At X = 57.404 ; Y = 918.360 ; and Radius = 57.550
Factor of Safety
*** 1.102 ***
Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.2	126.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.4	354.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.3	1185.8	0.0	192.9	0.	0.	0.0	0.0	0.0
4	10.0	7453.3	0.0	2427.7	0.	0.	0.0	0.0	0.0
5	9.7	11351.4	0.0	4445.1	0.	0.	0.0	0.0	0.0
6	8.6	11656.0	0.0	5039.4	0.	0.	0.0	0.0	0.0
7	0.6	840.5	0.0	367.1	0.	0.	0.0	0.0	0.0
8	2.8	3776.1	0.0	1812.5	0.	0.	0.0	0.0	0.0
9	5.6	7233.9	0.0	3470.4	0.	0.	0.0	0.0	0.0
10	2.0	2391.2	0.0	1309.1	0.	0.	0.0	0.0	0.0
11	4.7	4698.0	0.0	1666.2	0.	0.	0.0	0.0	0.0
12	0.6	474.9	0.0	34.6	0.	0.	0.0	0.0	0.0
13	0.2	185.7	0.0	4.3	0.	0.	0.0	0.0	0.0
14	5.8	3037.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.3	153.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.915	862.000
2	54.867	861.016
3	64.850	861.591
4	74.623	863.711
5	83.947	867.325
6	92.596	872.345
7	100.359	878.648
8	107.048	886.081
9	111.059	892.248

Circle Center At X = 56.182 ; Y = 925.128 ; and Radius = 64.126
Factor of Safety
*** 1.107 ***
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

```
     1         50.000      862.000
     2         59.906      860.633
     3         69.881      861.342
     4         79.494      864.097
     5         88.330      868.779
     6         96.009      875.185
     7        102.198      883.040
     8        105.375      889.465
Circle Center At X =    61.529 ; Y =   908.311 ; and Radius =    47.724
       Factor of Safety
      ***    1.107   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1         44.915      862.000
     2         54.825      860.658
     3         64.813      861.152
     4         74.542      863.464
     5         83.684      867.517
     6         91.930      873.174
     7         99.002      880.243
     8        104.662      888.487
     9        105.018      889.290
Circle Center At X =    57.143 ; Y =   915.045 ; and Radius =    54.437
       Factor of Safety
      ***    1.109   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1         50.000      862.000
     2         59.966      861.175
     3         69.877      862.504
     4         79.273      865.926
     5         87.718      871.282
     6         94.819      878.323
     7        100.246      886.722
     8        100.352      887.006
Circle Center At X =    58.801 ; Y =   907.476 ; and Radius =    46.320
       Factor of Safety
      ***    1.110   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1         48.305      862.000
     2         58.155      860.276
     3         68.152      860.550
     4         77.892      862.812
     5         86.987      866.970
     6         95.069      872.859
     7        101.815      880.240
     8        106.954      888.819
     9        107.559      890.534
Circle Center At X =    61.792 ; Y =   910.043 ; and Radius =    49.901
       Factor of Safety
      ***    1.112   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1         44.915      862.000
     2         54.813      860.570
     3         64.801      861.049
     4         74.516      863.419
     5         83.604      867.593
     6         91.731      873.418
     7         98.603      880.683
     8        103.647      888.619
Circle Center At X =    57.318 ; Y =   912.737 ; and Radius =    52.231
       Factor of Safety
      ***    1.112   ***
Failure Surface Specified By  9 Coordinate Points
```

```
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         44.068      862.000
    2         54.005      860.882
    3         63.987      861.485
    4         73.717      863.791
    5         82.908      867.732
    6         91.287      873.191
    7         98.605      880.005
    8        104.646      887.974
    9        105.429      889.491
Circle Center At X =    55.506 ; Y =   918.953 ; and Radius =    58.091
       Factor of Safety
      ***    1.114   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         43.220      862.000
    2         53.083      860.350
    3         63.083      860.371
    4         72.939      862.063
    5         82.374      865.378
    6         91.121      870.223
    7         98.936      876.462
    8        105.599      883.919
    9        110.736      892.090
Circle Center At X =    57.958 ; Y =   919.779 ; and Radius =    59.628
       Factor of Safety
      ***    1.115   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         46.610      862.000
    2         56.558      860.976
    3         66.509      861.965
    4         76.060      864.926
    5         84.825      869.740
    6         92.448      876.212
    7         98.622      884.079
    8         99.998      886.833
Circle Center At X =    56.700 ; Y =   910.115 ; and Radius =    49.161
       Factor of Safety
      ***    1.119   ***
          **** END OF GSTABL7 OUTPUT ****
```

APPENDIX F

APPENDIX F

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 General

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 Geotechnical Consultant: Prior to commencement of work, the owner shall employ a geotechnical consultant. The geotechnical consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing: Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation: In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas: All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General: Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 12 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning: Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).

4.3 Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes: In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.

4.5 Compaction Testing: Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing: Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

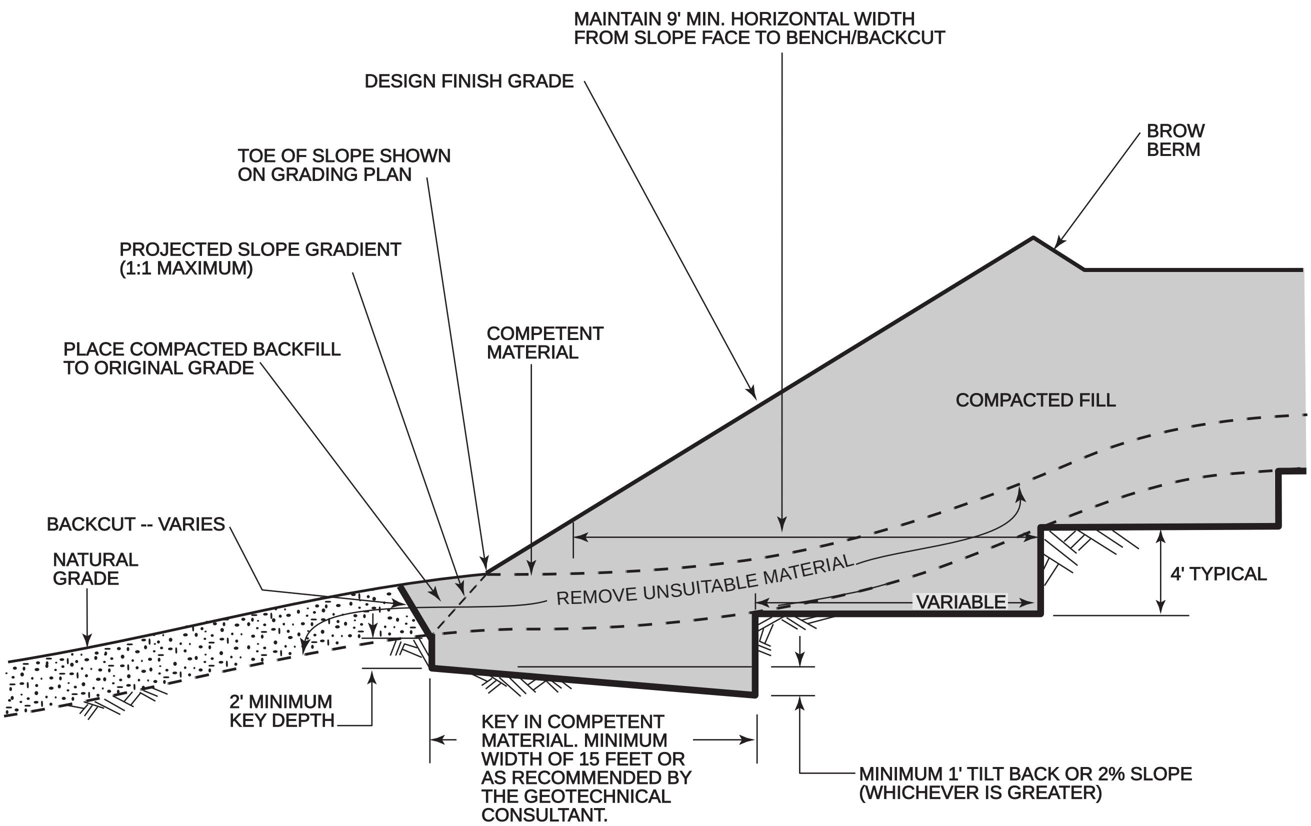
7.2 Bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum 90 percent of maximum from 1 foot above the top of the conduit to the surface, except in traveled ways (see Section 7.6 below).

7.3 Jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

7.4 Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

7.6 Trench backfill in the upper foot measured from finish grade within existing or future traveled way, shoulder, and other paved areas (or areas to receive pavement) should be placed to a minimum 95 percent relative compaction.

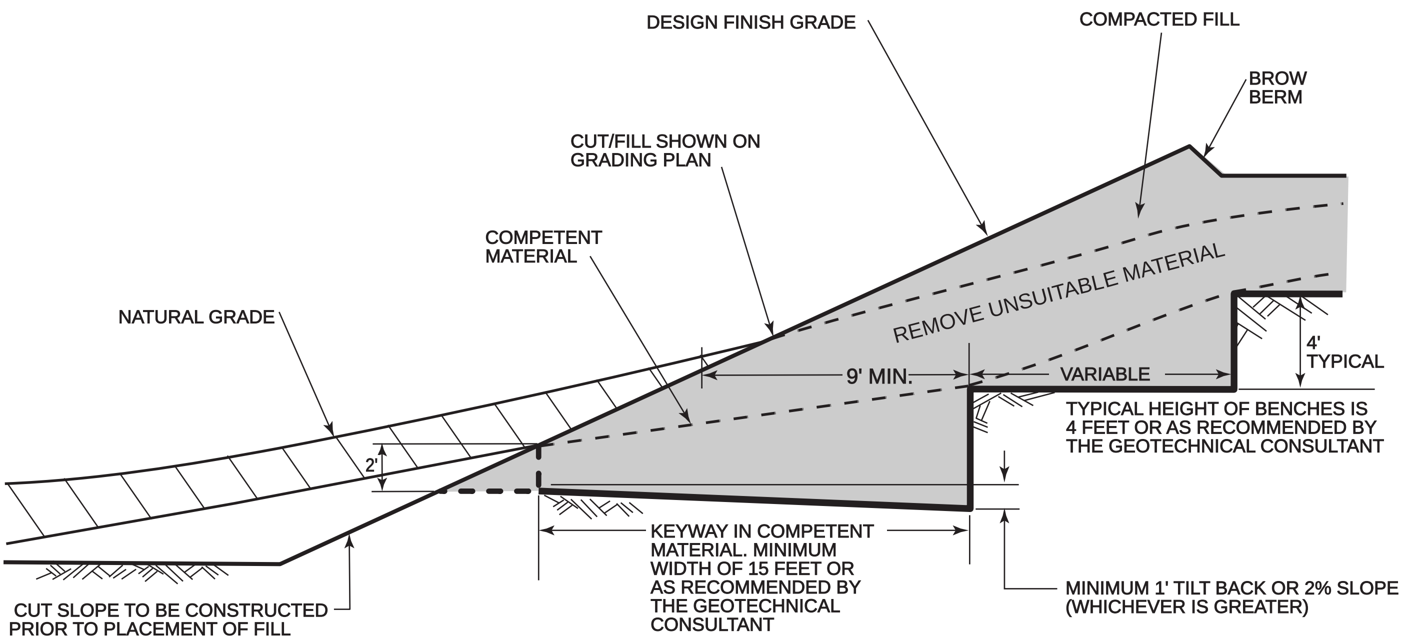


NOTE: BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE SOIL ENGINEER. WHERE THE NATURAL SLOPE APPROACHES OR EXCEEDS THE DESIGN SLOPE RATIO, SPECIAL RECOMMENDATIONS WILL BE PROVIDED BY THE GEOTECHNICAL ENGINEER.

FIGURE 1

TYPICAL FILL KEY ABOVE NATURAL SLOPE
MINIMUM STANDARD GRADING DETAILS

NMG Geotechnical, Inc.

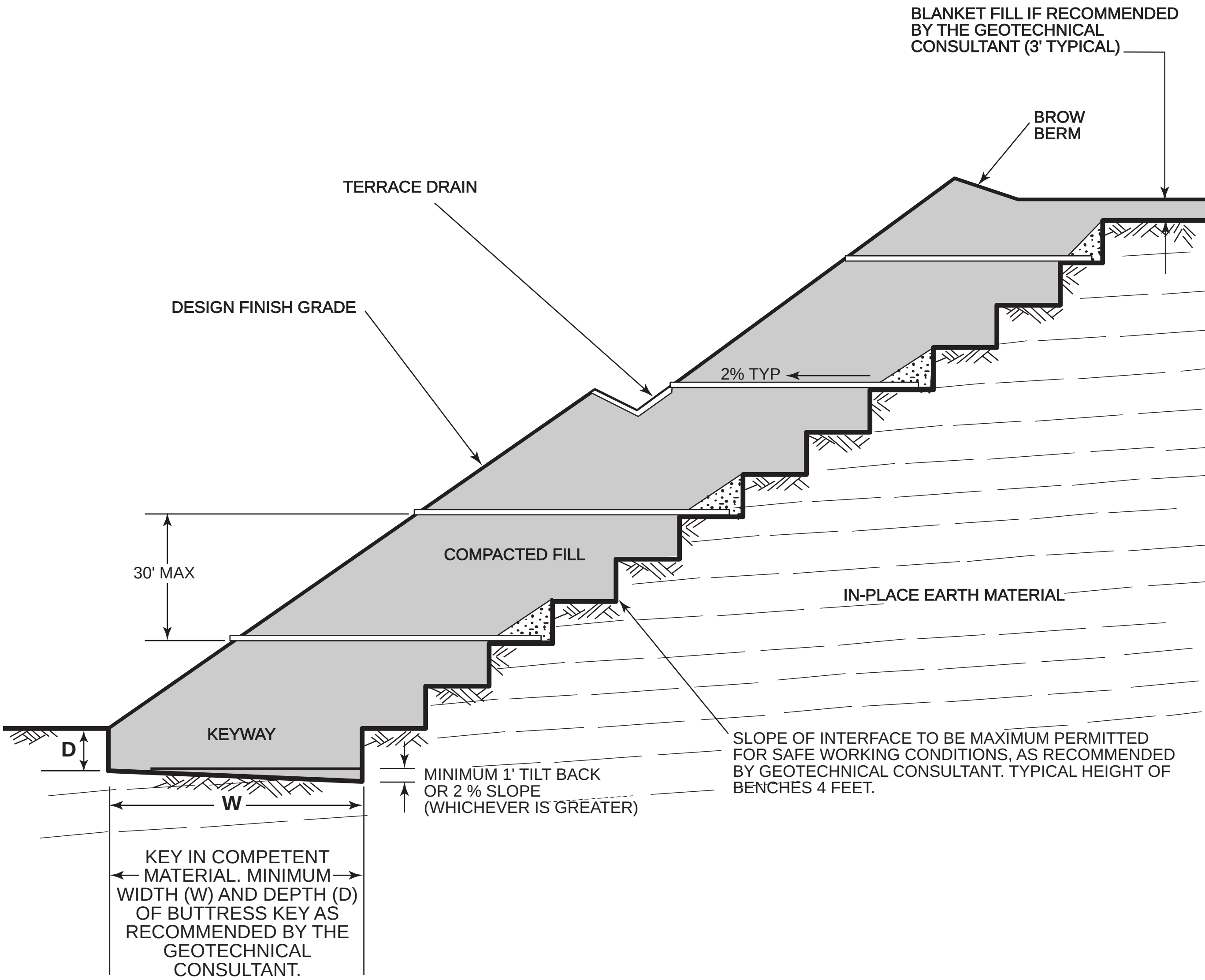


NOTE: THE FILL PORTION OF THE SLOPE SHALL BE COMPACTED AS STATED IN THE PROJECT SPECIFICATIONS.

FIGURE 2

TYPICAL FILL ABOVE CUT SLOPE
MINIMUM STANDARD GRADING DETAILS

NMG Geotechnical, Inc.



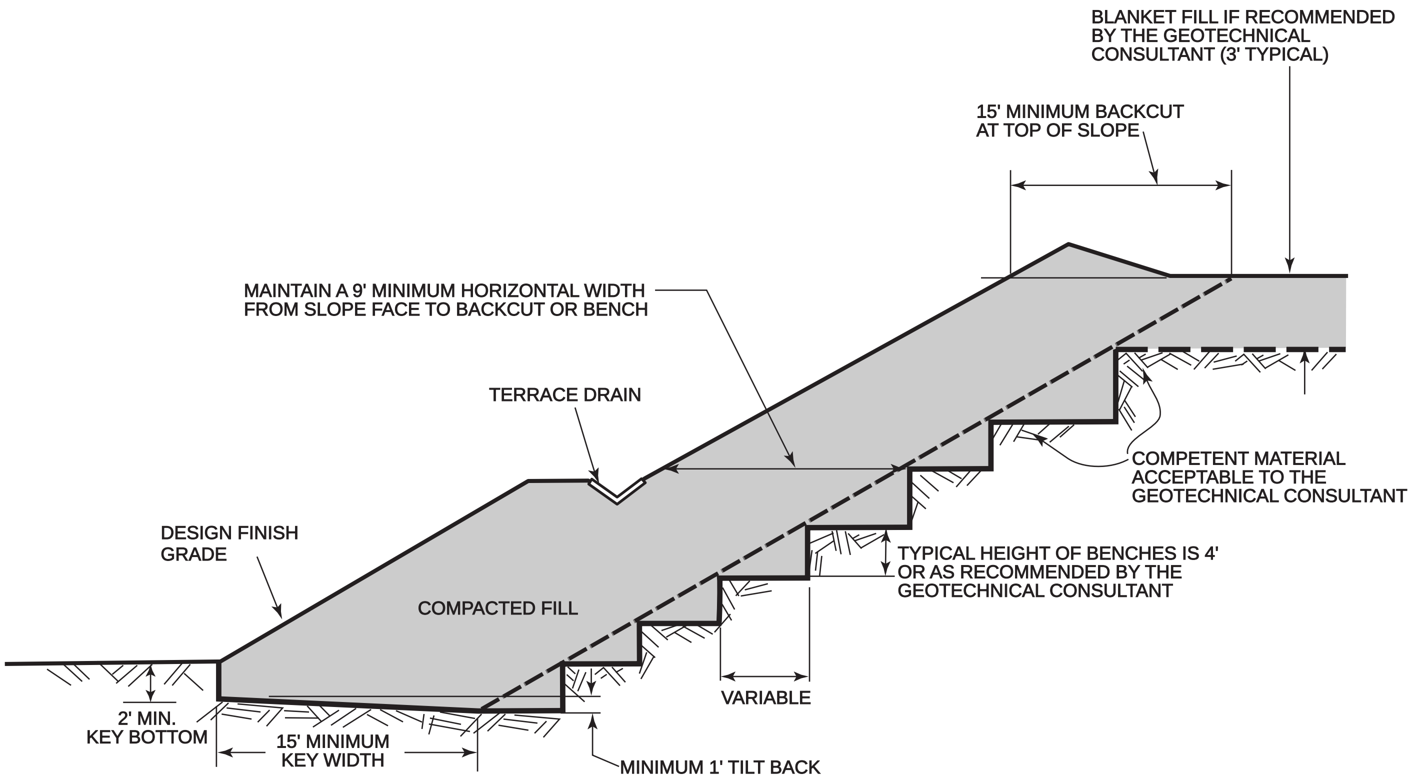
NOTE: SUBDRAIN DETAILS, SEE FIGURE 5.

FIGURE 3

TYPICAL BUTTRESS FILL
MINIMUM STANDARD GRADING DETAILS

NMG Geotechnical, Inc.

1/04 TYP BUTTRESS FILL.ai



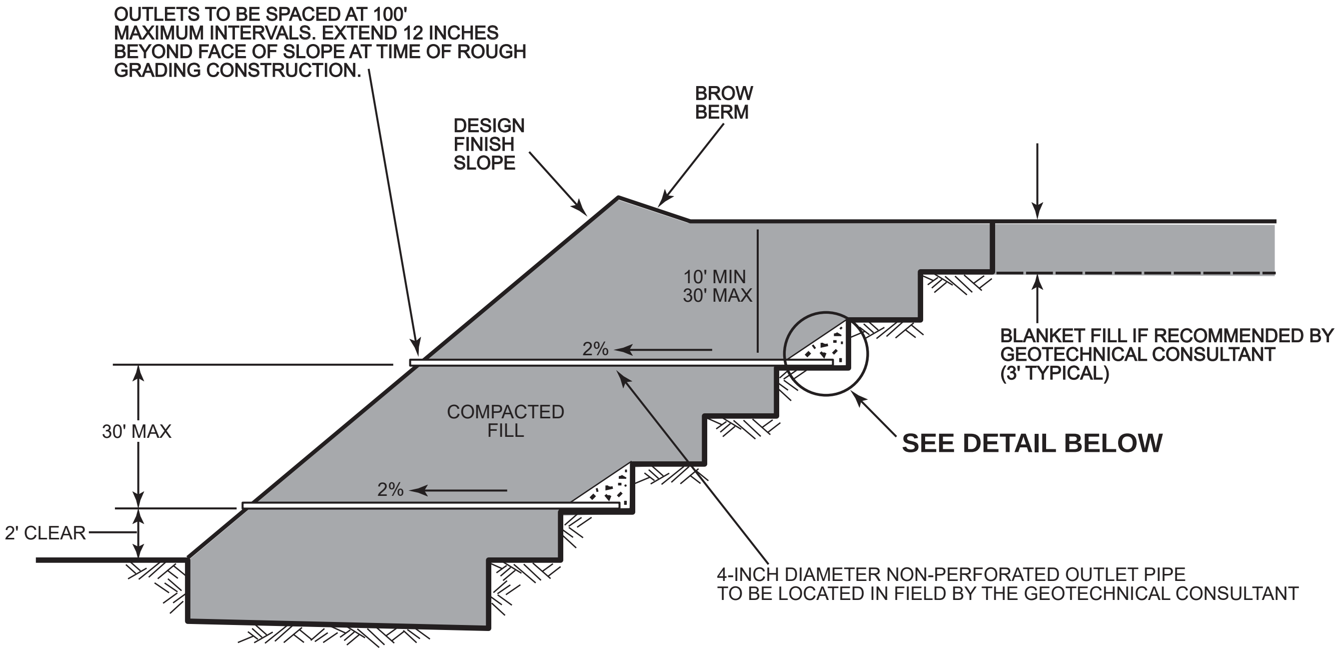
NOTE:
SEE FIGURE 5 FOR TYPICAL SUBDRAIN DETAILS FOR STABILIZATION FILLS

FIGURE 4

TYPICAL STABILIZATION FILL
MINIMUM STANDARD GRADING DETAILS

NMG Geotechnical, Inc.

9/96 STABILIZATION FILL.ai



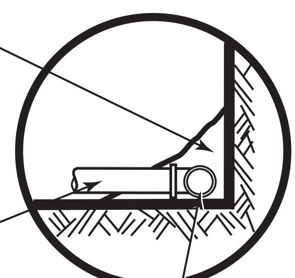
FILTER MATERIAL - MINIMUM OF THREE CUBIC FEET PER FOOT OF PIPE. SEE FILTER MATERIAL SPECIFICATION.

ALTERNATE: IN LIEU OF FILTER MATERIAL, THREE CUBIC FEET OF GRAVEL PER FOOT OF SUBDRAIN (WITHOUT PIPE) MAY BE ENCASED IN FILTER FABRIC. SEE GRAVEL SPECIFICATION, AND FIGURE 6 FOR FILTER FABRIC SPECIFICATION

"GRAVEL" TO CONSIST OF 1/2" TO 1" CRUSHED ROCK PER STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 12 INCHES ON ALL JOINTS.

DETAIL



OUTLET PIPE TO BE CONNECTED TO SUBDRAIN PIPE WITH TEE OR ELBOW

MINIMUM 4-INCH DIAMETER SCHEDULE 40 ASTM D1527 OR D1785 OR SDR 35 ASTM D2751 OR D 3034. FOR FILL DEPTH OF 90 FEET OR GREATER, USE ONLY SCHEDULE 40 OR EQUIVALENT. THERE SHALL BE A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT.

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

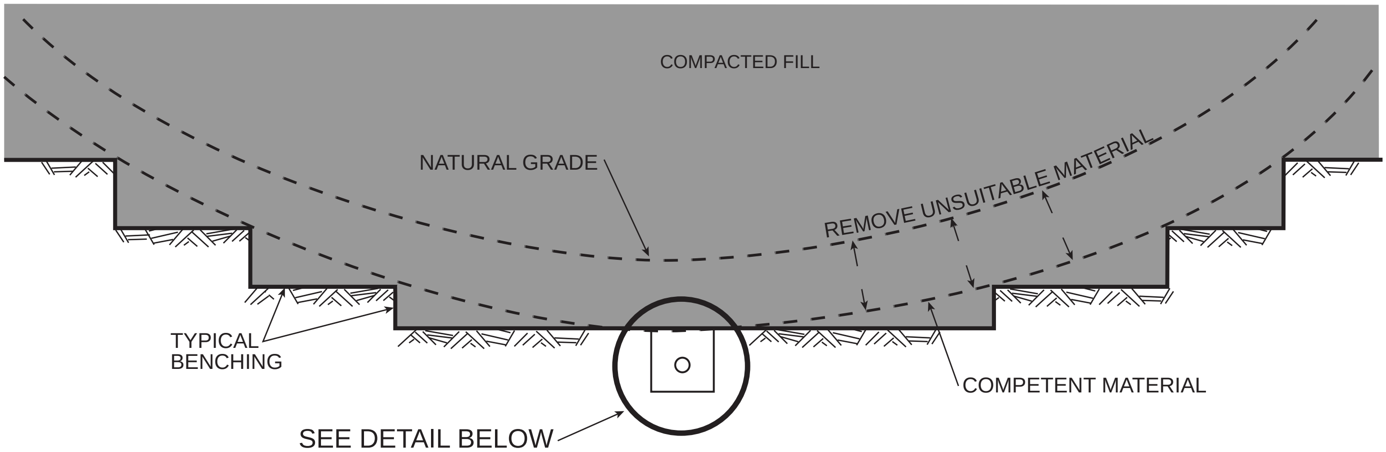
NOTE:
TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

FIGURE 5

TYPICAL STABILIZATION AND BUTTRESS FILL SUBDRAINS
MINIMUM STANDARD GRADING DETAILS

NMG Geotechnical, Inc.

8/96 STAB. BUTTRESS FILL SUBDRAINS.ai



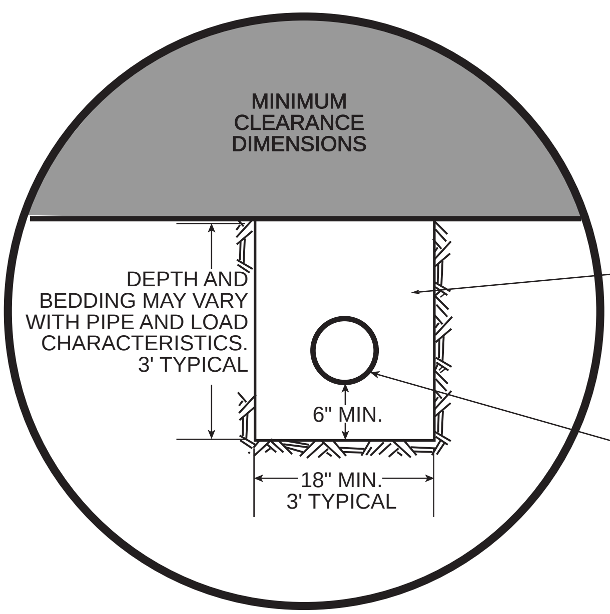
FILTER FABRICS SHALL BE PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL CONFORMING TO THE FOLLOWING:

1) GRAB TENSILE STRENGTH. POUNDS, MIN. ASTM D 4632..90
2) ELONGATION, AT PEAK LOAD, PERCENT, MIN. ASTM D 4632..50
3) PUNCTURE STRENGTH, LBS., MIN. ASTM D 3787...45
4) COEFFICIENT OF WATER PERMITTIVITY, 1/SEC. ASTM D 4491...>0.7
5) BURST STRENGTH, P.S.I., MIN. ASTM D 3786...180

NOTES: DOWNSTREAM 20' OF PIPE AT OUTLET SHALL BE NON-PERFORATED AND BACKFILLED WITH FINE-GRAINED MATERIAL

PIPE SHALL BE A MINIMUM OF 4-INCH DIAMETER. FOR RUNS OF 500 FEET OR MORE, USE 6-INCH DIAMETER PIPE, OR AS RECOMMENDED BY THE GEOTECHNICAL CONSULTANT

DETAIL



FILTER MATERIAL - MINIMUM OF NINE CUBIC FEET PER FOOT OF PIPE. SEE FIGURE 5 FOR FILTER MATERIAL SPECIFICATIONS.

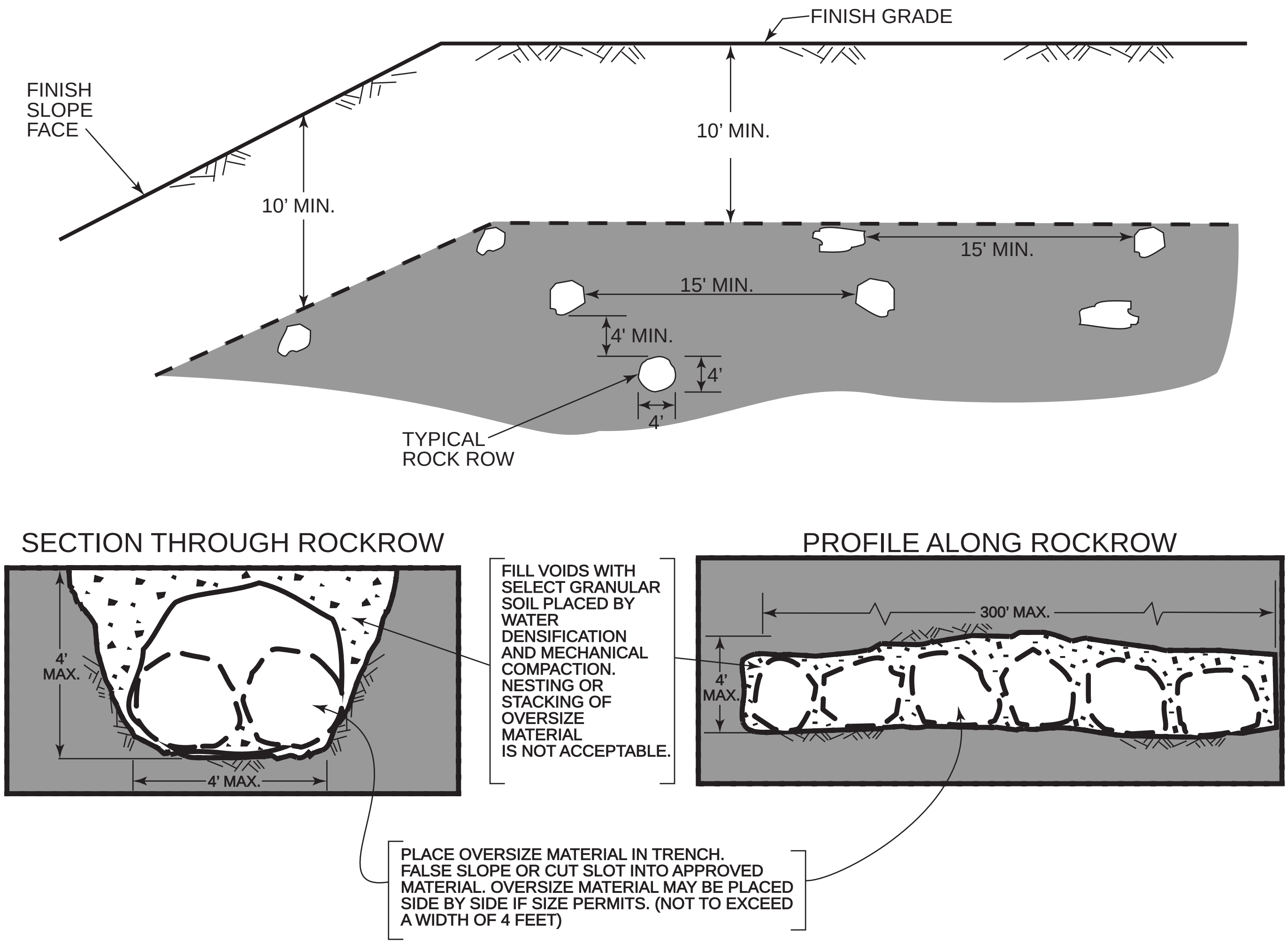
ALTERNATE: IN LIEU OF FILTER MATERIAL, NINE CUBIC FEET OF GRAVEL PER FOOT OF SUBDRAIN (WITHOUT PIPE) MAY BE ENCASED IN FILTER FABRIC. SEE FIGURE 5 TO GRAVEL SPECIFICATION. SEE ABOVE FOR FILTER FABRIC SPECIFICATION. FILTER FABRIC SHALL BE LAPPED MINIMUM OF 12 INCHES ON ALL JOINTS.

MINIMUM 4 INCH DIAMETER SCHEDULE 40 ASTM D 1527, OR D 1785, OR SDR 35 ASTM 2751 OR D 3034. FOR FILL DEPTH OF 90 FEET OR GREATER, USE ONLY SCHEDULE 40 OR APPROVED EQUIVALENT. THERE SHALL BE A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE.

FIGURE 6

TYPICAL CANYON SUBDRAIN
MINIMUM STANDARD GRADING DETAILS

NMG Geotechnical, Inc.



NOTES:

A) OVERSIZED ROCK IS DEFINED AS LARGER THAN 12" IN SIZE (IN GREATEST DIMENSION).

B) SPACE BETWEEN ROCKROWS SHOULD BE ONE EQUIPMENT WIDTH OR A MINIMUM OF 15 FEET.

C) THE WIDTH AND HEIGHT OF THE ROCKROW SHALL BE LIMITED TO FOUR FEET AND THE LENGTH LIMITED TO 300 FEET UNLESS APPROVED OTHERWISE BY THE GEOTECHNICAL CONSULTANT. OVERSIZE SHOULD BE PLACED WITH FLATEST SIDE ON THE BOTTOM.

D) OVERSIZE MATERIAL EXCEEDING FOUR FEET MAY BE PLACED ON AN INDIVIDUAL BASIS IF APPROVED BY THE GEOTECHNICAL CONSULTANT.

E) FILLING OF VOIDS WILL REQUIRE SELECT GRANULAR SOIL (SE > 20, OR LESS THAN 20 PERCENT FINES) AS APPROVED BY THE GEOTECHNICAL CONSULTANT. VOIDS IN THE ROCKROW TO BE FILLED BY WATER DENSIFYING GRANULAR SOIL INTO PLACE ALONG WITH MECHANICAL COMPACTION EFFORT.

F) IF APPROVED BY THE GEOTECHNICAL CONSULTANT, ROCKROWS MAY BE PLACED DIRECTLY ON COMPETENT MATERIALS OR BEDROCK, PROVIDED ADEQUATE SPACE IS AVAILABLE FOR COMPACTION.

G) THE FIRST LIFT OF MATERIAL ABOVE THE ROCKROW SHALL CONSIST OF GRANULAR MATERIAL AND SHALL BE PROOF-ROLLED WITH A D-8 OR LARGER DOZER OR EQUIVALENT.

H) ROCKROWS NEAR SLOPES SHOULD BE ORIENTED PARALLEL TO SLOPE FACE.

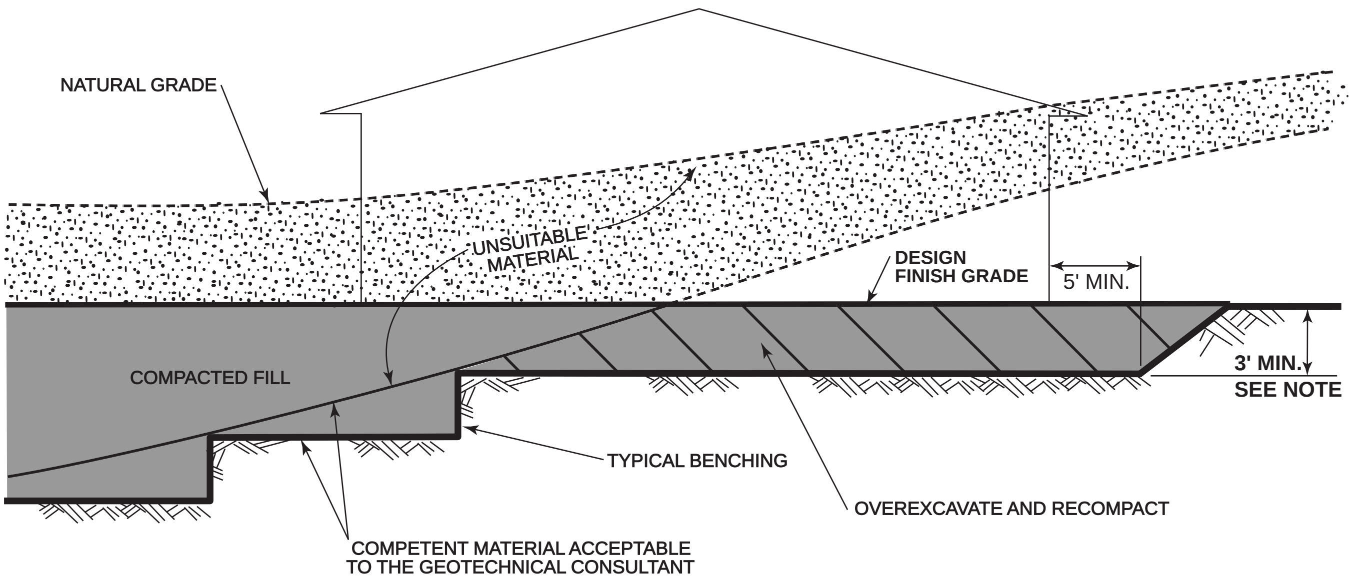
I) NESTING OR STACKING OF ROCKS IS NOT ACCEPTABLE.

FIGURE 7

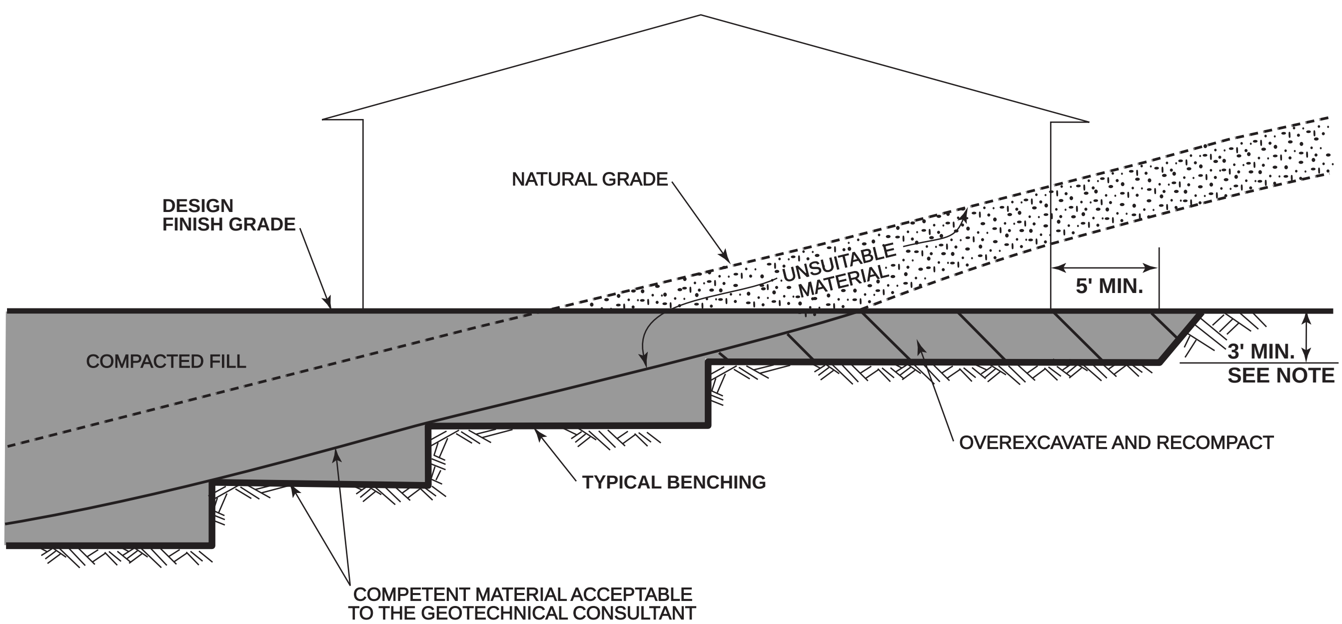
TYPICAL OVERSIZE ROCK PLACEMENT METHOD MINIMUM STANDARD GRADING DETAIL FOR STRUCTURAL FILL

NMG Geotechnical, Inc.

CUT LOT



CUT FILL LOT (TRANSITION)



NOTE: DEEPER THAN THE 3-FOOT OVEREXCAVATION MAY BE RECOMMENDED BY THE GEOTECHNICAL CONSULTANT IN STEEP TRANSITIONS.

FIGURE 8

TYPICAL OVEREXCAVATION OF DAYLIGHT LINE
MINIMUM STANDARD GRADING DETAILS

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