March 26, 2015

Preliminary

Geotechnical Investigation

Capitol Mall Project

Prepared For:

Carson City Center Partners, LLC
c/o Manhard Consulting, Ltd.
3476 Executive Pointe Way, Suite 12
Carson City, Nevada 89706

Prepared By:

Resource Concepts, Inc.
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(RCI # 15-104.1)

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Resource Concepts Inc

March 26, 2015

Mr. Mark Rotter
Manhard Consulting, Ltd.
3476 Executive Pointe Way, Suite 12
Carson City, Nevada 89706

SUBJECT: Capitol Mall Project, Carson City, Nevada
Geotechnical Investigation Report

Dear Mr. Rotter:

In accordance with your request, we are submitting our Preliminary Geotechnical Investigation Report for the Capitol Mall Project bounded on the north by Robinson Street, on the south by Musser Street, on the east by Stewart Street, and on the West by Carson Street in Carson City, Nevada. Our work is intended for the sole and exclusive use of Manhard Consulting, Ltd., Carson City Center Partners, LLC, their agents, or designated representatives. This report is considered preliminary due to the lack of structural loads and details being available to us. When that information becomes available an addendum to this report will be necessary. In our opinion, there are no significant geotechnical constraints, which would preclude the proposed construction of the project, provided the recommendations of this report are incorporated by design into the final plans and specifications.

The most significant geotechnical considerations that affect the project are the presence of locally liquefiable thin sandy layers and relatively loose near surface thinly stratified silty sands to clayey sands. These conditions will most likely require deep or reinforced concrete mat foundations for some of the structures.

We appreciate the opportunity to work with you on this project. Should you have questions concerning the contents of this report, or if we may be of further service, please contact the undersigned at your convenience.

Sincerely,
RESOURCE CONCEPTS, INC.

Gary C. Luce, P. E.
Senior Geotechnical Engineer/Geologist

David Edgington, EI
Geotechnical Engineering Intern

(5) Addressee (1) File

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1.0 PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the proposed Capitol Mall Project, Carson City, Nevada. The project area is bounded on the north by Robinson Street, on the south by Musser Street, on the east by Stewart Street, and on the West by N. Curry Street as shown on the Vicinity Map, Figure 1. Internal streets include Fall Street, running north-south, and both Spear Street and Proctor Street running east-west.

To aid in preparing this report, we discussed the project with the project Civil Engineer and reviewed the following documents:

- *Conceptual Site Plan*, DLR Architects, February 2015
- *Geotechnical Report for Capitol Mall Project Preliminary Summary of Geotechnical Investigation and Shallow vs. Deep Foundation Feasibility Analysis, Carson City, Nevada* dated September 1, 2010, prepared by Geocon Consultants, Inc.
- U.S. Geological Survey and Nevada Bureau of Mines and Mineral Resources, 2008, Quaternary fault and fold database for the United States, accessed February, 2015 from USGS web site: http://earthquake.usgs.gov/regional/qfaults/
- *Carson City Quadrangle Geologic Map, Carson City, Nevada.*, Nevada Bureau of Mines and Geology, 1977
- *Carson City Quadrangle Earthquake Hazard Map, Carson City, Nevada*, Nevada Bureau of Mines and Geology, 1979, Scale 1:24,000
- *Carson City Quadrangle General Groundwater Map, Carson City, Nevada*, Nevada Bureau of Mines and Geology, 1980, Scale 1:24,000
- *Carson City Quadrangle Flood and Related Debris Flow Hazards Map, United States Geological Survey, Water Resources Division, 1981, Scale 1:24,000*
- *Soil Survey of Carson City Area, Nevada*, Natural Resources Conservation Service Website (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

The purpose of our geotechnical investigation was to observe the existing geology and soil layers at the site, and based on existing conditions provide site-specific recommendations relative to the geotechnical aspects of the project as currently proposed.

We performed the following scope of geotechnical services:

- Reviewed the referenced site plan to determine exploratory excavation locations.
- Performed a site reconnaissance, marked the proposed exploratory test pit and boring locations with white paint and flagging for subsequent underground utility location purposes.
- As required by law, notified local utility subscribers via Underground Service Alert (USA) at least 48 hours prior to performing subsurface excavations.

- Observed the advancement of ten soil borings, BH-1 through BH-10 to depths ranging of 21.5 to 61.5 feet below existing surface.
- Observed the advancement of five (5) Cone Penetrometer Tests (CPT).
- Logged the soil borings and test pits in accordance with the Unified Soil Classification System (USCS). Logs of the soil borings and CPT work and other details of the field investigation are included in Appendix A.
- Obtained soil samples from the soil borings. Transported selected soil samples to our geotechnical laboratory for testing. Appendix B presents the details of the laboratory-testing program and test results.
- Prepared this report presenting our findings, conclusions, and recommendations regarding the geotechnical aspects of constructing the project as currently proposed.

2.0 SITE AND PROJECT DESCRIPTION

The project as currently proposed includes a number of multi-story buildings, including two mixed-use retail/office buildings, two parking structures, and a proposed hotel. The site area consists of eight city blocks. Most of the project area will be located in what are existing parking lots for the existing Nugget Casino on the east side of Carson Street. The exception is a single block on the west side of Carson Street, which is currently a parking lot for the Nugget Casino which is used as an ice rink during the winter months. The current Exploration Location Map, Figure 2 which shows the proposed buildings, overall layout of the project as well as our exploration locations.

3.0 REGIONAL GEOLOGY

The geology of the site is referenced from Carson City Folio Geologic Map (Trexler, 1977, Figure 3). The Eagle Valley area in Carson City is a large fault bounded valley typical of the western edge of the Great Basin geomorphic province. The geologic map indicates the project site is predominantly underlain by Quaternary alluvial plain deposits of Eagle Valley. These deposits are described by Trexler (1977) as yellowish brown to gray, unstratified to poorly bedded, poorly to moderately sorted fine silty sand, sandy silt, granular clayey coarse sand, and minor sandy gravel. The alluvial plain deposits are on the order of 2,000 feet deep in the Eagle Valley basin based on geophysical data.

4.0 SOIL AND GROUNDWATER CONDITIONS

4.1 General

The following soil descriptions include the USCS symbol where applicable. Appendix A contains the soil boring and test pit logs for reference to the vertical extents of the materials encountered at each location. Figure 3, the Site Plan shows the locations of our boring and test pit explorations.

4.2 Soil Conditions

According to data from the Soil Survey of Carson City Area, Nevada accessed on January 15, 2015, (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.) the surface soils are entirely mapped "Urban Land (Unit 71)." This simply means that they are in an entirely developed area and not mapped.

Near surface soil conditions on the site consist of sands directly below the asphalt paving underlain by multiple thin layers of clayey sand, silty sand and sandy clay extending to approximately five to eight feet across the site. The CPT logs in Appendix A show very well the highly variable range of soils in this interval. The finer grained clayey soils are frost susceptible; provide poor foundation or pavement support.

Findings from the borings indicate that the deeper alluvial soils consist of interbedded poorly graded sand (SP), silty sand (SM), sand and clayey sand (SC). These deposits are thinly bedded (2 to 6 inches) in some depth intervals to several feet at greater depths. Overall, the deeper alluvial deposits are medium dense to very dense.

4.3 Groundwater

Groundwater depths within the downtown area have been mapped on the Carson City Quadrangle by Katzer, 1980. Mapping shows the groundwater surface to be from approximately 10 to 20 feet below the existing surface. Groundwater depths are known to increase from northwest to southeast.

Groundwater depth in our soil borings (BH-1 through BH-10) ranged from approximately 16 to 25 feet. The groundwater in this interval is "perched" in the form of sand aquifers ranging from a few inches to approximately 10 feet and confined by clayey sands to clays. The groundwater depths dropped to 30 or more feet below the surface at the time of completion of some of the borings further indicating the perched nature of the shallow aquifer.

Review of the General Groundwater Map of the Carson City Quadrangle indicates groundwater levels of 20 to 30 feet below existing grade for the May to June 1976 period. Variations in rainfall, snowmelt, temperature, and other factors can cause fluctuations in the level of groundwater. Groundwater flow in the project site area is generally to the southeast toward the Carson River.

4.4 Field and Laboratory Test Results

Laboratory tests are in general conformance with accepted test methods of the American Society for Testing and Materials (ASTM). Appendix B presents moisture content, unit weight, grain-size distribution, direct shear, and Atterberg limit results. Moisture content, dry density, and fines content (percent passing #200 sieve) are also on the test pit and boring logs.

The types and numbers of the tests performed are summarized in Table 4.4:

Table 4.4 Summary of Laboratory Tests

Test	Procedure	Number of Tests
Moisture Content	ASTM D 2216	60
Unit Weight	ASTM D 2937	47
Grain Size Analysis	ASTM D 422	60
Direct Shear	ASTM D 6528	3
# 200 Wash	ASTM D 1140	60
pH, Chloride, Sulfate	CAL 643, CAL 422	3
R-value	ASTM D2844	1
Atterberg Limits	ASTM D 4318	5

5.0 GEOLOGIC HAZARDS

5.1 Faulting

The Carson City is located near active faults, which are capable of producing significant ground motions due to seismic events. Figure 4, the Fault Map for the site vicinity shows the distribution of active faults in the area. Based on the U.S. Geological Survey, 2008 Quaternary fault and fold database for the United States (http//earthquake.usgs.gov/regional/qfaults), Faults considered active for the type of development planned are located near the project site. The nearest faults to the site are located approximately one quarter mile northeast and one mile northwest of the site. However, for design purposes the Carson City fault should be considered. The Carson City fault located approximately one and one half mile west of the site (as shown on Figure 4) is actually a series of sub parallel fault segments referred to by geologists as a “distributed” fault zone. The Carson City fault is considered by the Nevada Bureau of Mines and Geology to be capable of a Richter Magnitude earthquake of approximately 7.3.

Site-specific fault studies performed by Nevada Bureau of Mines and Geology and local geotechnical consultants indicate that segments of the Carson City fault have experienced Holocene displacements and thus are therefore active for residential and commercial type developments. Where faults are located near structures, the standard of practice in Northern

Nevada is to offset the structures at least 50 feet each side of the fault. No faults are known on or directly adjacent to the project site.

5.2 Seismicity

The Nevada Bureau of Mines has evaluated faulting along the Carson Range and Geology to be capable of producing earthquake Richter Magnitudes of approximately 7.3 with peak ground accelerations of approximately 2.0g. These values are equivalent to Modified Mercalli Intensities of X (ten) or greater. The seismic risk at the site is not significantly greater than that of the surrounding developments and the Carson City area in general. We recommend that seismic design of the structures be in accordance with the latest version of the International Building Code (IBC) and the American Society of Civil Engineers (ASCE) Standard 7-10. Site-specific acceleration information presented in Table 5.2 below is from the USGS Earthquake Hazards Program website (http://earthquake.usgs.gov/designmaps/us/application.php) which reflects the 2012 version of the IBC as well as the ASCE Standard. Seismic design information from the USGS website is as follows:

Table 5.2 ASCE 7-10 Seismic Design Parameters

Parameter	Factors	IBC Reference
Site Class	E*	Table 20.3-1
Spectral Acceleration	S_s = 2.369 S_1= 0.855*	Figure 22-1 Figure 22-2
Seismic Coefficient, F_a	F_a = 0.900	Table 11.4-1
Seismic Coefficient, F_v	F_v = 2.400	Table 11.4-2
Adjusted Spectral Response, S_{MS}, S_{M1}	S_{MS} = 2.132 S_{M1} = 2.052	Equation 11.4-1 Equation 11.4-2
Design Spectral Acceleration, S_{DS}, S_{D1}	S_{DS} = 1.421 S_{D1} = 1.368	Equation 11.4-3 Equation 11.4-4

* ASCE 7-10 requires all sites with S1 accelerations over 0.75g to be designed for Site Class E.

5.3 Liquefaction

Strong vibratory motions such as those generated by earthquakes may cause liquefaction of granular soils. Soils that are highly susceptible to liquefaction are loose, granular and saturated. Liquefaction of soils may cause surface distress, loss of bearing capacity, and settlement of structures. Liquefaction generally is restricted to within 50 feet of the surface due to confining pressures.

The subject property exhibits some subsurface geologic conditions that indicate susceptibility to liquefaction including relatively low blow counts and high groundwater. Specifically, the thin, loose to medium dense, saturated sandy soil layers found from approximately 16 to 30 feet below the surface. Based on the high density of soils overlying these sand layers and cohesive intervening layers in our opinion the risk of significant liquefaction and related settlement is low

over the majority of the site. The exception to this is the area designated for Buildings D and C. Thin liquefiable layers are present for which we calculated 2 to 5 inches of potential settlement during a design event. Preliminary mitigation measures for these buildings are provided in Section 6.0. The results of our liquefaction analyses are included in Appendix C.

Surface manifestations such as sand boils and ground fissures can occur in association with liquefaction. However, using the methodology of Ishihara (1985) the potential for surface manifestations to occur in the project area is low.

Lateral spreading is a ground-failure phenomenon that can also occur in association with liquefaction, whereby lateral displacements occur at the ground surface. Conditions required for lateral spreading include gently sloping terrain, and in particular, where a "free-face" (such as a creek bank) is nearby. Based on our review of the site topography and depth to the liquefiable layers, the potential for lateral spreading to occur is low.

5.4 Landslides and Slope Stability

Topographically, the site is relatively flat. No landslides features are present at the site or on adjacent properties that may affect the site, and we do not consider the potential for landsliding to be a hazard to this project.

5.5 Expansive Soil

No highly expansive soils were identified on the site during our investigation. Clayey sand (SC) with a low to moderate expansive potential were encountered at varied depths during our borehole and Cone Penetration Testing. Due to the thin random nature of these layers we recommend overexcavating beneath footings and floor slabs a minimum of 24 inches and replacement with structural fill to provide uniform support and reduce the potential for differential settlements.

5.6 Flood and Debris Flow Hazards

Review of the FIRM map 3200010092F issued on February 19, 2015 indicates that the site is located within areas outside the 0.2 percent annual chance of flooding. Figure 5 shows the FIRM mapping for the area of the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Our conclusions and recommendations, based on our investigation conducted in January and February of 2015 follow:

6.1 General

6.1.1 Based on the results of our investigation, the proposed development of the site for the proposed structures and parking areas is feasible from a geotechnical perspective, provided the recommendations presented herein are implemented in the design and construction of the project.

6.1.2 Groundwater was present at depths of approximately 16 to 26 feet at the time of exploration. Groundwater is not anticipated to adversely affect grading or utility installation operations in the near future. Nevada is in an extended draught and conditions can change rapidly if normal precipitation returns. Based on soil mottling groundwater levels may rise to as little as 12 feet below the existing surface. We recommend potholing of the site prior to bidding each phase of construction if more normal wetter conditions should occur.

6.1.3 Seismic concerns for the site are not unusual for this portion of Carson City. Deep foundations may be required for the areas of the site where settlement from significant liquefaction potential has been identified or where large structural loads may require additional support (such as elevator shafts or column support for large building spans).

6.1.4 Soil Conservation Service data and our local experience indicate that site soils are not aggressive for either Type II or Type IP concrete. However, site soils are moderately aggressive (corrosive) to very aggressive for uncoated steel. The project structural engineer should consider the use of coatings or other cathodic protection where uncoated steel may be in contact with saturated or very moist soils.

6.2 Seismic Design Criteria

6.2.1 The site is located near faults capable of generating strong seismic shaking during the life of the project.

6.2.2 The site is Site Class D or “stiff soil profile” as defined by the 2012 IBC and as indicated by the blow counts obtained during our investigation.

6.2.3 Structures should be designed in accordance with 2012 IBC Seismic requirements. Seismic design criteria obtained in accordance with the 2012 IBC/ASCE 7-10 are presented in Section 5.2 of this report.

6.2.4 Liquefaction at the site is possible but at depths and in thin layers that are not continuous across the site. Total liquefaction settlement is estimated to range from one to three inches in the area of Building C and Building D. Liquefaction induced settlement on the other building sites is estimated to be less than two-inches. Differential liquefaction settlement is commonly assumed one-half to two-thirds of the total liquefaction settlement. This predicted liquefaction settlement is relatively minor, and in our opinion,

can be mitigated on Building C and Building D through the use of reinforced mat foundations, deep foundations or soil improvement or reinforcement. These estimates may overstate the differential settlement since some of the suspect layers are discontinuous across the project area.

6.3 Soil Handling, Excavation and Grading

6.3.1 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer and geotechnical engineer in attendance. Clearing and grubbing, soil handling, and grading requirements can be discussed at that time. Potholing of the site should be conducted prior to the preconstruction conference to ensure an understanding the impacts that imported uncontrolled fill and wet soils may have to the proposed construction process.

6.3.2 In our opinion, grading and excavations will require light to moderate effort with conventional heavy-duty grading/excavation equipment.

6.3.3 Near surface native soils are not anticipated to be suitable for re-use as engineered fill or utility trench backfill due to the amount of cohesive fines in the random thin clayey sand and sandy silts layers. The CPT test data included in Appendix A best illustrates the distribution of these layers.

6.3.4 Imported structural fill material should meet the Standard Specifications for Public Works specifications (304.03). Structural fill is defined herein as all fill placed within two feet of foundations and all fill placed beneath pavement and flatwork sections. Import structural fill material should be sampled and approved by us prior to its transportation to the site.

6.3.5 Temporary excavations, such as utility trench sidewalls excavated within undisturbed, unsaturated native soils or structural fill should remain near-vertical to depths of five feet. Some minor sloughing should be expected within some of the cleaner sand lenses or during periods of high precipitation. On-site imported or native soils and structural fill soils should be considered Type C by OSHA Standards in light of their sandy, locally cohesionless nature. It is the contractor's responsibility to provide sufficient and safe excavation support per OSHA Standards as well as protecting nearby utilities, structures, and other improvements, which may be damaged by earth movements.

6.3.6 Earthwork operations should be observed and compacted fill tested by our representative.

6.3.7 All references to relative compaction and optimum moisture content in this report are based on the ASTM D1557-02 Test Procedure.

6.3.8 During or immediately following wet weather, the near-surface soil or the bottom of overexcavated areas may deflect or pump under heavy equipment loads. Yielding soil

conditions can typically be stabilized using one of the methods listed below. However, soil conditions and mitigation methods should be reviewed and approved by us when encountered.

- **Option 1.** Deeply scarify (10 to 12 inches) allow to air dry to near optimum moisture content and re-compact.
- **Option 2**. Remove unstable (wet) soils to a firm base and allow the wet subgrade soil to dry to near optimum moisture content and re-compact. Replace the removed soils with drier soil meeting the structural fill specifications.
- Other stabilization alternatives may be appropriate depending on the situation. Consultation with us is crucial for expedient and appropriate mitigation.

6.4 Building Pad and Parking Lot Preparation and Fill Placement

6.4.1 For the purposes of this report, structural building pad areas extend a minimum of five feet beyond the outside dimensions of the building.

6.4.2 Soils utilized as fill within the building, flatwork, and parking areas should meet the *Standard Specifications for Public Works Construction* minimum requirements for structural fill.

6.4.3 Prior to fill placement, exposed surfaces should be scarified at least 8 inches, moisture-conditioned to near optimum moisture content, and compacted to at least 90% relative compaction.

6.4.4 Structural fill should be placed in thin lifts (uncompacted thickness of 8 inches or less), moisture-conditioned to near optimum moisture content, and compacted to at least 90% relative compaction prior to placement of the next lift. Thicker lifts may be allowed by the project geotechnical engineer, depending on the type of equipment and number of passes.

6.5 Treatment of Cut-Fill Transitions

6.5.1 Conventional spread footings for the proposed buildings should bear on structural fill, not a combination of the two materials. While information with respect to the finish grades and finish floor elevations are not currently available, we anticipate that cut fill transitions will not occur beneath the structures due to the flat lying topography of the site.

6.6 Foundation Design Criteria

At the time of this report, no information on structural systems was available and therefore these recommendations should be considered preliminary.

6.6.1 Conventional foundations should consist of continuous perimeter strip (or spread) footings and isolated interior spread footings. Minimum strip footing width should not be less than 15 inches; isolated spread footings should be at least 24 inches square.

6.6.2 Perimeter continuous footings should extend at least 24 inches below lowest adjacent exterior grade bearing on a minimum of 24 inches of structural fill. Interior footings should extend at least 12 inches below lowest adjacent grade. These embedment recommendations are crucial for frost protection, minimizing surface water intrusion, to develop bearing capacity, and to provide lateral force resistance. Final surface grading should provide for positive drainage away from the structure per the 2012 IBC. Footing and retaining wall foundation backfill should be compacted to at least 90% relative compaction.

6.6.3 It is assumed that based on the size and height of buildings considered that large column footing will be necessary to support typical loads. Column footings extending at least thirty inches below grade and confined on all sides may be designed based on an allowable bearing pressure of 5,000 psf.

6.6.4 Shallow perimeter foundations proportioned as recommended above may be designed for allowable soil bearing pressures of 2,500 psf when founded on compacted structural fill.

6.6.5 All allowable bearing values may be increased by one-third when considering transient loading due to wind or seismic forces.

6.6.6 Adjacent utilities should not be constructed in the zone of influence parallel to footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom of the footing. Utility penetrations into the building envelope should be made perpendicular to the building stem wall if possible.

6.6.7 Post-construction total and differential settlements under static loading conditions are estimated to be less than 1 inch and 3/4 inch respectively.

6.6.8 The passive pressure used to resist lateral movement of conventional footings may be assumed to be equal to a fluid weighing 300 pounds per cubic foot (pcf). The coefficient of friction to resist sliding is 0.35 for concrete against structural fill soils. Combined passive resistance and friction may be utilized for design provided that the frictional resistance is reduced by 20%. For shallow footings near the ground surface (if any), the upper 10 inches of exterior embedment should not be included in calculations for resistance to lateral loads.

6.6.9 Foundation reinforcement should be designed by the project structural engineer.

6.6.10 Should deep foundations be considered recommendations can be provided when loading conditions are known. We would recommend consideration of rammed aggregate piers or vibration compacted stone columns. These types of foundations are well suited to the

types of loads generally associated with the size of buildings considered. Target depths for these foundation would range from approximately 25 to 35 feet below the existing surface. Typical allowable bearing values on these types of foundation are in the range of 6,000 psf. If driven piles are necessary target depths for tip elevations would range from 35 to 45 feet below the existing surface.

6.7 Retaining Wall Recommendations

6.7.1 At the time of this report, we are not aware of any need for retaining walls on the project. Should short (less than 8 foot) retaining walls be necessary the following values are provided assuming level backfill (grade) behind the top of the wall. Should any conditions requiring either taller walls or walls with inclined slopes above them, we should be contacted to provide additional recommendations.

6.7.2 For design purposes, the soil pressure exerted against a wall may be assumed to be equal to the pressure exerted by an equivalent fluid. The unit weight of this equivalent fluid would depend on the actual design conditions. The following values are presented for the design of retaining walls or structures with level backfill conditions, such as that associated with the half-basements and site walls. Should different backfill configurations or surcharges be anticipated, our office should be contacted for supplemental recommendations.

LATERAL EARTH PRESSURES –LEVEL BACKFILL
(assuming no hydrostatic pressure)

Condition	Equivalent Fluid Pressure (pcf)
Active Lateral Earth Pressure	40
Passive Lateral Earth Pressure	350
At-Rest Lateral Earth Pressure	60

6.7.3 Positive drainage is essential behind any earth retaining structure to prevent the backfill from becoming saturated. Saturated backfill can result in significant (a factor of 2 or more) increases in the lateral wall pressures above the previously recommended values. Under such high water conditions, this could result in hydrostatic pressures on retaining walls if backdrainage is not provided as outlined herein.

6.7.4 Positive drainage for retaining walls should consist of a vertical layer of permeable material (minimum 12 inches wide) positioned between the retaining wall and the soil backfill. A minimum 3-inch diameter perforated pipe backdrain should be installed as low as possible around the retaining walls, with gravity flow outletting (minimum 1%) provided to an appropriate sump location.

6.7.5 The permeable material may be composed of a composite drainage fabric, or a natural permeable material, such as coarse sand or pea gravel at least 12 inches in thickness, with a synthetic, geotextile filter fabric between it and the soil backfill. The perforated pipe should also be wrapped within the filter fabric and permeable material. The permeable material should be continued to within 18 inches of the finish grade behind the wall. The uppermost section of backfill may be comprised of non-expansive on-site materials.

6.7.6 At a minimum, damp-proofing measures should be included for those retaining walls associated with buildings to minimize the occurrence of moisture transmission through the walls and joints and unsightly efflorescence. Installation of damp-proofing of site retaining walls may also desired to avoid such cosmetic issues. We defer the selection of a damp-proofing or water-proofing material to the project architect or structural engineer. Care should be taken by the contractor to avoid any damage to the damp or water-proofing materials during the backfilling process.

6.8 Grading – Underground Utilities

6.8.1 Underground utility trenches within structural areas (building pads, parking lots, and streets) should be backfilled with properly compacted qualified material for use as bedding or backfill.

6.8.2 For cost estimating, it is recommended that importation of bedding and backfill be assumed. The material excavated from the trenches may be adequate for on-site use as backfill provided it does not contain deleterious matter, vegetation or rock larger than six inches in maximum dimension. Suitability of native soils should be verified as clayey sand layers may result in an excessive fines content.

6.8.3 Trench backfill should be placed in loose lifts not exceeding eight inches. The lifts should be compacted to a minimum of 90% relative compaction at or near optimum moisture content.

6.8.4 Bedding and pipe zone backfill should extend from the bottom of the trench excavation to a minimum of 6 inches above the crown of the pipe. Pipe bedding material should consist of Class A Backfill material as defined by the Standard Specifications for Public Works (Orange Book). Bedding and pipe zone material should be hand compacted in 6 inch maximum lifts.

6.9 Grading – Pavement and Flatwork Areas

6.9.1 For the purposes of cost estimating we recommend that the both pavements and flatwork be underlain by a minimum of eight inches of aggregate base or structural fill to provide support and frost protection.

6.9.2 Soils exposed at the bottom of the excavation should be scarified and compacted to a minimum of 90% relative compaction at or near optimum moisture content. If the surface has become dry and loose, it should be moisture conditioned and lightly compacted to a firm surface prior to the placement of additional fill or aggregate base.

6.9.3 The subgrade soils for pavements should be finished to a compacted smooth unyielding surface. We recommend proof-rolling the subgrade with a loaded water truck (or similar equipment) to verify the stability of the subgrade prior to placing aggregate base.

6.9.4 Aggregate base used to support pedestrian and vehicular pavements should be compacted to a minimum of 95% relative compaction.

6.10 Slabs-on-Grade

Conventional concrete slab-on-grade Recommendations presented herein are intended to reduce the potential for cracking of slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of concrete, the use of crack control joints and proper concrete placing and curing. Adherence to ACI and Portland Concrete Association (PCA) recommendations including those for low humidity and wind, if applicable, should be incorporated into project construction practices.

6.10.1 Slab floors are suitable for the buildings if prepared as recommended in Section 6.5. A minimum 10-mil-thick vapor retarder meeting ASTM E1745-97 Class C requirements shall be placed below the slab where interior moisture is considered undesirable. At a minimum, one-inch (minimum) layers of clean sand should be provided above and below the vapor barrier material so as to protect it from puncture or damage. To reduce the potential for punctures, a higher quality vapor retarder (15 mil. Class A or B) may be used. The vapor retarder, if used, should extend to the edges of the slab, and should be sealed at all seams and penetrations. In any case, care should be taken to avoid any disturbance or rupture to the water-proofing measures throughout the construction process.

6.10.2 Slabs should be underlain by a minimum of 6 inches of compacted (95% minimum relative density) aggregate base. Slab thickness and reinforcement should be determined by the structural engineer based on the anticipated loading.

6.10.3 If a significant amount of time has passed since building pad grading and the soil surface of the building pad has become dry, then it should be re-moistened prior to placing the moisture retarding system. The building pad should be moistened by soaking or sprinkling such that the upper 12 inches of soil is near optimum moisture, as determined by our representative at least 48 hours before concrete placement.

6.10.4 Some floor coverings, such as tile or linoleum, are sensitive to moisture that can be transmitted from and through the slab. Slab floors should be moist cured for a minimum of 7 days prior to placing any floor coverings. Floor coverings should be installed in accordance with the manufacturer's recommendations including any moisture transmissivity testing requirements.

6.10.5 A modulus of subgrade reaction (k) of 250 pounds per cubic inch (pci) is recommended for the structural design of slabs. This value assumes contact with the sand or aggregate base materials.

6.10.6 Crack control spacing should be determined by the project structural engineer based on slab thickness and intended usage.

6.10.7 All exterior concrete should be air entrained with from 4.5% to 7.0% air content. The water cement ratio for all exterior concrete should be 0.45 or less. The use of mid-range plasticizer is recommended to facilitate the finishing process while maintaining the desired water cement ratio.

6.10.8 Exterior concrete should be placed and finished in accordance with American Concrete Institute (ACI) recommendations for concrete placed in areas subject to freeze-thaw environments.

6.11 Pavement

6.11.1 Pavement sections are intended for on-site use only. Pavement sections are based on Asphalt Institute recommendations for parking areas subject to automobile and truck traffic. Street pavement sections can be provided when a site specific traffic study(s) is available. Based on our laboratory testing the clayey soils will provide moderate support for the roadway section. While these streets are currently local streets, based on the increased usage they should be considered Urban Collectors in our opinion which would require a minimum of four inches of asphalt concrete over eight inches of aggregate base. We recommend that preliminary planning assume ten inches of minimum section for quantity and cost estimates.

6.11.2 The following preliminary Asphalt Concrete pavement section is recommended for design to establish subgrade elevations for parking and driveways.

Table 6.11.2 Preliminary Flexible Pavement Sections

	AC Thickness (inches)	AB Thickness (inches)
Urban Streets	4.0	10.0
Automobile Parking Areas	3.0	8.0
Driveways Subject to Truck Traffic and Dumpster Areas	4.0	8.0

The preliminary pavement section is based on the following assumptions:

- The subgrade soil has an R-Value of 35 or higher.
- The Type 2, Class B Aggregate Base (AB) has a minimum R-Value of 70 and meets the requirements of the *Standard Specifications for Public Works Construction*.
- The aggregate base is compacted to 95% or higher relative compaction at or near optimum moisture content.
- Soil subgrade has been prepared as previously recommended.
- Asphalt concrete should conform to Section 320.02 of the *Standard Specifications for Public Works Construction* ("Orange Book").

It is recommended that the use of 64PG-NV (polymerized asphalt oil or equivalent) be considered as we have found that it substantially reduces cracking due to thermal stresses prevalent in the freeze thaw environment of this area. The savings in long-term maintenance of the pavement including crack sealing is in our opinion worth the extra expense. However, this recommendation is optional in that it is relative to frequency of maintenance only and does not affect structural calculations.

6.11.3 If Portland Concrete Cement (PCC) driveways are required, they should be constructed as shown in Table 6.8 below.

Table 6.11.3 PCC Pavement Sections

Alternate	PCC Thickness (inches)	AB Thickness (inches)
Automobile Parking Areas and Driveways	5.0	6.0

- Subgrade soils should be compacted to a minimum of 90% of maximum dry density. Aggregate base should be compacted to at least 95% of maximum dry density.
- The minimum compressive strength (28 day) should be at least 3,000 psi and meet the requirements stated in Section 6.10 as appropriate. Traffic on the slab should be avoided until at least 80% of the design strength has been verified by testing.
- Reinforcement of the PCC driveways should be specified by the project structural (or civil) engineer.
- Construction (or crack control) joints should also be as recommended by the project structural (or civil) engineer.

6.12 Site Drainage

6.12.1 Adequate drainage is crucial to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to

pond adjacent to footings or retaining walls. The site should be graded and maintained such that surface drainage is directed away from structures and the top of slopes into swales or other controlled drainage devices. The percent fall of slopes around structures should be as per the most current version of the IBC as adopted by the local governing agency.

6.12.2 Roof and pavement drainage should be directed into conduits to carry runoff away from the structures. Landscape irrigation should be kept at least three feet away from all foundations. We recommended that drip irrigation be installed within six feet of foundations wherever feasible.

7.0 FURTHER GEOTECHNICAL SERVICES

7.1 Plan and Specification Review

7.1.1 We should review the improvement plans, foundation plans, and specifications prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

7.2 Testing and Observation Services

7.2.1 The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer-of-Record throughout each construction phase. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. In accordance with 2012 IBC, testing and observation services by the Geotechnical Engineer-of-Record are required to verify that construction has been performed in accordance with this report, approved plans and specifications. If we are not retained for these services, we cannot assume any responsibility for other's interpretation of our recommendations or the future performance of the project.

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, we should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials or environmental contamination was not part of our scope of services.

This report is issued with the understanding that it is the responsibility of the owner or their

representative to ensure that the information and recommendations contained herein are brought to the attention of the design team for the project and incorporated into the plans and specifications, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The recommendations contained in this report are preliminary until verified during construction by representatives of our firm. Changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. Additionally, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated partially or wholly by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices used in the Carson City at this time. No warranty is expressed or implied.

9.0 REFERENCES

ASCE/SEI 7-10 Standard with March 2013 erata, Minimum Design Loads for Buildings and Other Structures American Society of Civil Engineers

Carson City Folio Geologic Map, Nevada Bureau of Mines and Geology, Scale 1:24,000, 1977

Carson City Quadrangle General Groundwater Map, Nevada Bureau of Mines and Geology, Scale 1:24,000, 1980

Carson City Quadrangle Earthquake Hazards Map, Nevada Bureau of Mines and Geology, Scale 1:24,000, 1979

Flood and Related Debris Flow Hazard Map, Carson City Quadrangle, Nevada Bureau of Mines and Geology, Scale 1:24,000, 1981

Flood Insurance Rate Map for Carson City Nevada, Panel 80 of 190, Federal Emergency Management Agency, March 16, 1989

NEHRP Selecting and Scaling Earthquake Ground Motions for Performing Response-History Analyses NIST GCR 11-917-15, November 2011

Proceedings from the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils, Technical Report NCEER 97-0022, edited by T.L. Youd and I.M Idriss, dated December 31, 1997

Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Potential in California, Southern California Earthquake Center, March 1999

Quaternary fault and fold database for the United States, U.S. Geological Survey and Nevada Bureau of Mines and Mineral Resources, accessed January, 2009, from USGS web site: http://earthquake.usgs.gov/regional/qfaults/

Geotechnical Report for Capitol Mall Project Preliminary Summary of Geotechnical Investigation and Shallow vs. Deep Foundation Feasibility Analysis, Carson City, Nevada dated September 1, 2010, prepared by Geocon Consultants, Inc.

Soil Survey of Carson City Area, Nevada, Natural Resources Conservation Service Website (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Figures

Figure 1
Vicinity Map
Capitol Mall Project

0 500 1,000 Feet

Date: 3/25/2015

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Document Path: R:\projects\City_Center_Development\MXDs\Location_Map.mxd

FIGURE 2

CAPITOL MALL PROJECT
Carson City, Nevada

EXPLORATION LOCATION MAP

JOB NO.:	15-1013
DATE:	3/24/15
DESIGNED:	GDL
DRAWN:	
CHECKED:	GDL

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Engineering • Surveying • Water Rights
Resources & Environmental Services
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340 N. Minnesota St.
Carson City, NV 89703-4152
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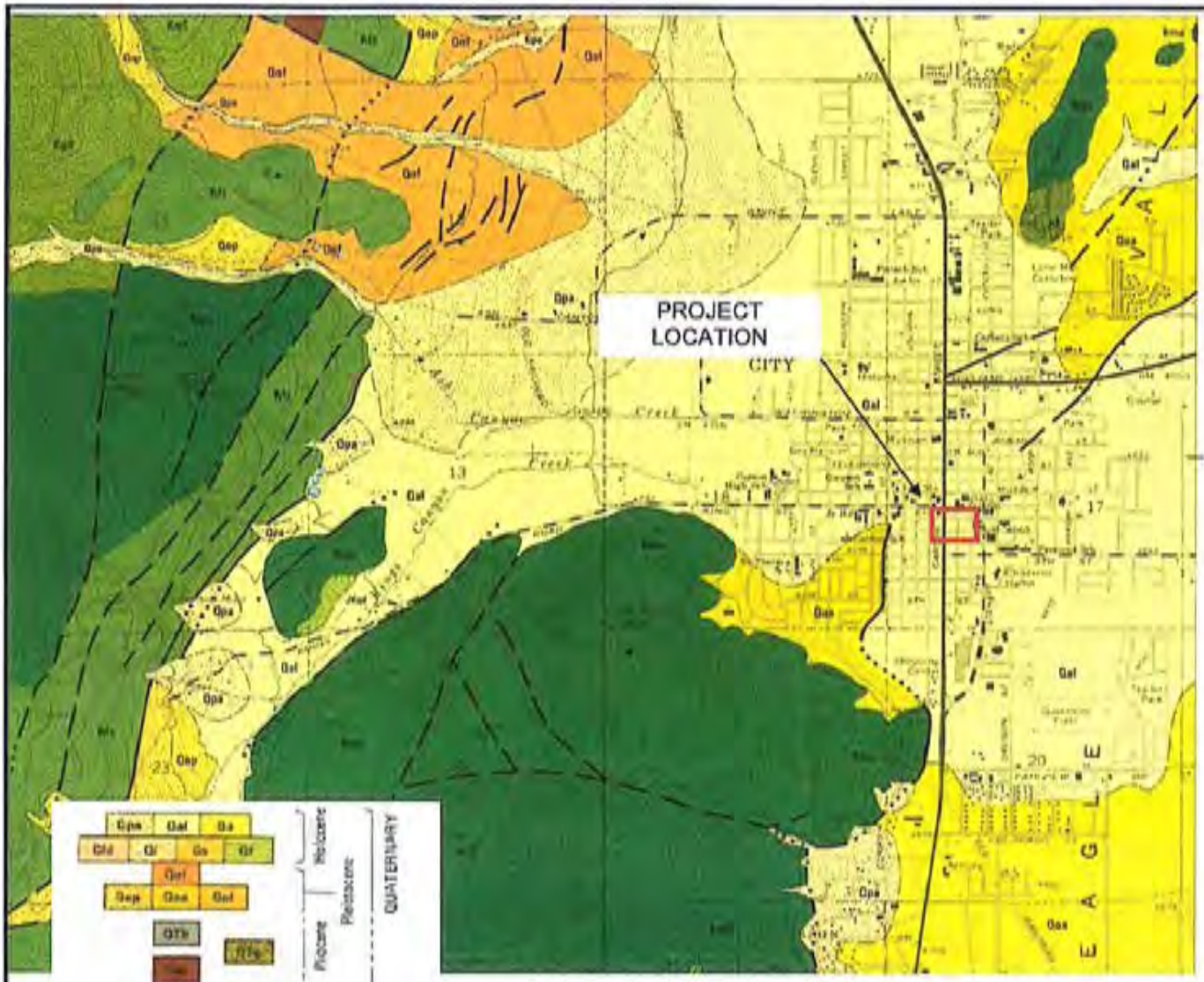
Zephyr Cove
212 Elks Point Rd., Ste. 443
Zephyr Cove, NV 89448-8020
775-588-7500



SELECTED GEOLOGIC UNITS NEAR THE SITE

Qa Quaternary Alluvium
Qoa Quaternary Pediment and Fan Deposits
Trmu Triassic Meta-volcanic rocks.

Dennis Trexler, NBMG 1977

GEOLOGY MAP

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CAPITOL MALL PROJECT

Carson City
Nevada

14-296.1	MARCH 2015	FIGURE 3

AGE OF YOUNGEST FAULT DISPLACEMENT

- Historic (less than 150 years)
- Holocene (less than 15,000 years)
- Late Quaternary (130,000 to 15,000 years)
- Quaternary (1,600,000 to 130,000 years)
- Mid-Late Quaternary (<750,000 years)

Map Reference:
U.S. Geological Survey and Nevada Bureau of Mines and Geology, 2006, Quaternary fault and fold database for the United States, accessed March, 2015, from USGS web site: http//earthquake.usgs.gov/regonal/qfaults/

FAULT MAP

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Nevada

15.104.1	MARCH 2015	FIGURE 4

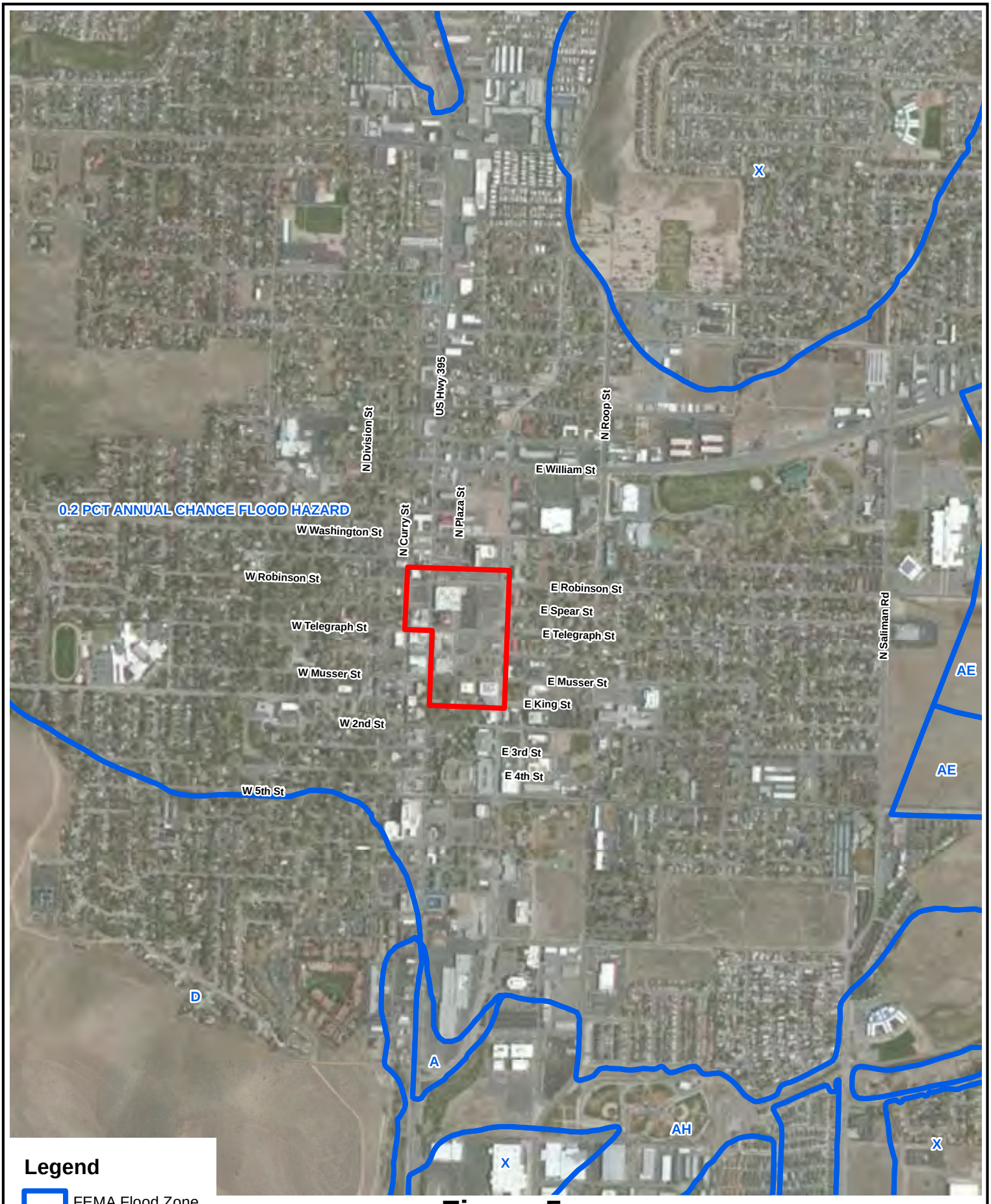

Figure 5
Flood Zone Map
Capitol Mall Project

Date: 3/25/2015

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Document Path: R:\projects\City_Center_Development\MXDs\FEMA_Map.mxd

Photograph #1
Boring BH-2 Cascade Drilling NE Corner of Building B.

Photograph #2
Boring BH-9 Andresen Drilling SW Corner of Building A.

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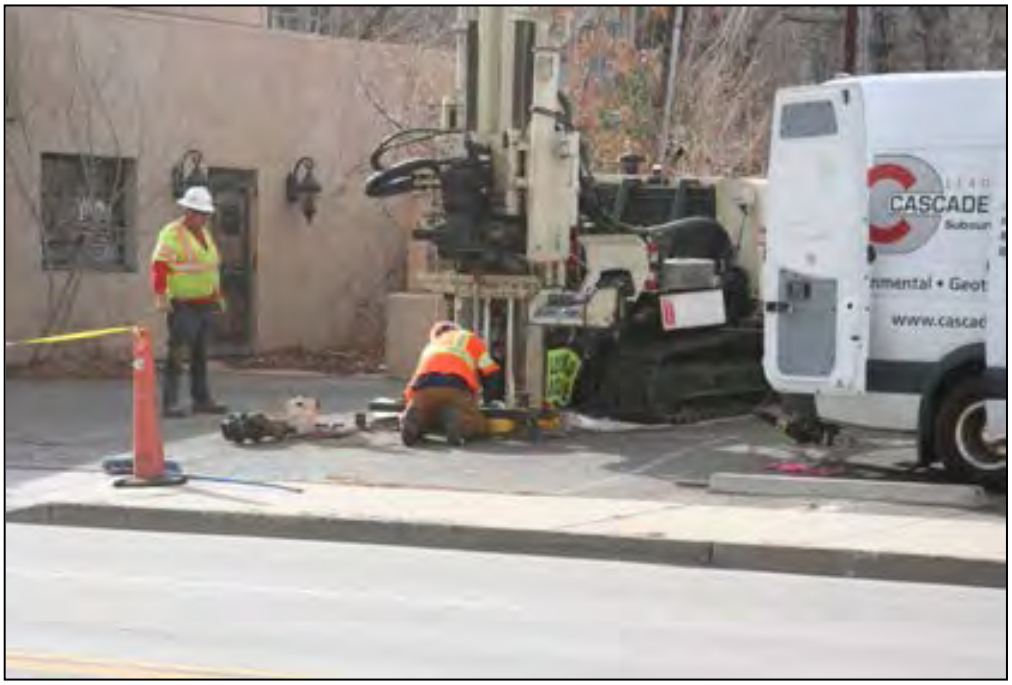
SITE PHOTOGRAPHS 1 and 2

CAPITOL MALL PROJECT
CARSON CITY, NEVADA

PROJECT NO. 15-104.1 **FIGURE 6**

Photograph #3
Cone Penetration Test 1 Between Building B and Building C.



Photograph #4
Cone Penetration Test 2 Near SE Corner of Building E.

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SITE PHOTOGRAPHS 3 and 4

CAPITOL MALL PROJECT
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PROJECT NO. 15-104.1 **FIGURE 7**

PHOTOGRAPH #5
Typical Mottling Above Saturated Zone at 17 Feet Below Existing Surface.

Photograph #6
"Gleyed" Soil Indicating Soil Saturation Below Groundwater Surface.

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SITE PHOTOGRAPHS 5 and 6

CAPITOL MALL PROJECT
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PROJECT NO. 15-104.1 **FIGURE 8**

Appendix A

Field Investigation

Appendix A

Field Investigation

Our field investigation was performed on January 14, and February 25, 2015, and consisted of the excavation of ten hollow-stem borings (BH-01-BH-10) and 5 Cone Penetration Tests (CPT-1 through CPT-5) at the approximate locations shown on the Site Map, Figure 2. The borings were drilled with a truck mounted CME 95 utilizing a 4.0-inch I.D. hollow stem auger. Bulk soil samples were collected from the cuttings generated while drilling. Relatively undisturbed soil samples were collected at regular intervals utilizing a Modified California Sampler and a Standard Penetration Test sampler. Samplers were advanced with an auto-hammer. Upon completion of sampling and logging, the soil borings were backfilled with native soil.

The soil conditions encountered in the borings were visually examined, classified, and logged in general accordance with the Unified Soil Classification System. The logs of the borings are presented herein.

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UNIFIED SOIL CLASSIFICATION ANS SYMBOL CHART

COARSE-GRAINED SOILS

(more than 50% of material is larger than No. 200 sieve size.)

GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		**GW**	**Well-graded gravels, gravel-sand mixtures, little or no fines**
		**GP**	**Poorly-graded gravels, gravel-sand mixtures, little or no fines**
	Gravels with fines (More than 12% fines)		
		**GM**	**Silty gravels, gravel-sand-silt mistures**
		**GC**	**Clayey gravels, gravel-sand-clay mixtures**
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		**SW**	**Well-graded gravels, gravel-sand mixtures, little or no fines**
		**SP**	**Poorly-graded gravels, gravel-sand mixtures, little or no fines**
	Sands with fines (More than 12% fines)		
		**SM**	**Silty gravels, gravel-sand-silt mistures**
		**SC**	**Clayey gravels, gravel-sand-clay mixtures**

FINE-GRAINED SOILS

(50% or more of material is smaller than No. 200 sieve size.)

SILTS AND CLAYS Liquid limit less than 50%		**ML**	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		**CL**	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		**OL**	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		**MH**	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		**CH**	Inorganic clays of high plasticity, fat clays
		**OH**	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		**PT**	Peat and other highly organic soils

☒ Bulk / Bag Sample

▼ Stabilized Ground water

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-01	Coordinates:	Started Time: 8:50 am Date: 1/14/2015
Elevation: UK Total Depth: 51.5'	GWL: Depth:	Completed Time: 11:02 am Date: 1/14/2015
Engineer/Geologist: G. Luce	Date/Time: January 14, 2015	Backfilled Time: 11:45 am Date: 1/14/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.15 AC 2 inches	
							1						0.15-1.5 Moist, Loose to Medium Dense	SM
													SILTY SAND (SM)	
							2							
							3							
							4							
										7				
5	MC			111.3	8.6	31.5	5			8	18		5.0-6.5 Moist, Medium Dense Greenish Brown	SM
										10			SILTY to CLAYEY SAND (SM)	
							6						FeOx Mottling 6.0-6.5 feet bgs	
							7			5				
7.5	SPT									7	16			
							8			9			7.9-9.0 Dense, Moist, Dense Light Gray	SC
													SILTY to CLAYEY SAND (SC)	
							9						Light FeOx Mottling	
										8				
10	MC			108.3	6.6	13.6	10			11	24		10.0-11.5 Moist, Medium, Coarse-Fine Grayish	SM
										13			Brown to Reddish Brown SILTY SAND (SM)	
							11						Strong FeOx Mottling	
							12							
							13							
							14							
										5				
15	SPT						15			7	17		15.30-16.5 Moist, Medium, Coarse-Fine Reddish	SM
										10			brown SILTY SAND (SM)	
							16						Strong FeOx Mottling	
							17							
							18							
							19							
										6			20.0-21.5 Moist, Medium, Coarse-Fine Reddish	SM
20	MC			117.9	17.2	39.5	20			8	17		Brown to Yellowish Brown SILTY SAND (SM)	
										9			Strong FeOx Mottling	

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Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
										5			25.0-25.4 Saturated, Medium Dense, Olive Gray	SM
25	SPT		NP		20	53.3	25			5	14		SILTY SAND (SM)	
										9			25.4-26.5 Very Moist, Dense, Olive Gray	SC
							26						CLAYEY SAND (SC)	
													Saturated at 27.0 ft.	
							27							
							28							
							29							
										10				
30	MC			130.2	9.6	23.2	30			27	59		30.0-31.0 Moist, Dense Gray to Light Gray	SM
										32			SILTY SAND (SM) with gravel	
							31							
							32							
							33							
							34							
										7				
35	SPT						35			10	31		35.0-36.5 Saturated, Dense, Brown	SP
										21			SAND (SP) with gravel	
							36							
							37							
							38							
							39							
										8				
40	MC		25/16	110.7	21	46	40			11	28		40.0-41.0 Saturated, Olive Green	SC
										17			CLAYEY SAND (SC)	
							41						41.0-41.5 Gleyed Olive Green CLAY (SC)	SC

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Engineer/Geologist: G. Luce	Date/Time: January 14, 2015	Backfilled Time: 11:45 pm Date: 1/14/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							42							
							43							
							44							
45	SPT						45						45.0-45.5 Saturated, Dense, Olive Green	SC
													CLAYEY SAND (SC)	
							46						45.5-46.5 Saturated, Medium Dense, Olive Green,	SM
													Medium-Fine, SILTY SAND (SM)	
							47							
							48							
							49							
50	MC			128.1	12.4	22.8	50						50.0-51.5 Saturated, Medium Dense Dark Grayish	SM
													Brown CF-MF SAND with SILT (SM)	
							51							
							52							
							53							
							54							
							55							
							56							
							57							
							58							
							50							
							60							
							61							

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-02	Coordinates:	Started Time: 12:33 pm Date: 1/14/2015
Elevation: UK Total Depth: 51.5'	GWL: Depth:	Completed Time: 2:30 pm Date: 1/14/2015
Engineer/Geologist: G. Luce	Date/Time: January 14, 2015	Backfilled Time: 2:45 pm Date: 1/14/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.1 AC 2 inches	
							1						0.1-5.0 Moist, Loose to Medium Dense, Grayish Brown SILTY SAND (SM)	SM
							2							
							3							
							4			5				
5	MC			115.2	7.1	25.4	5			7	18		5.0-7.5 Moist, Loose to Medium Dense Greenish Brown SILTY SAND (SM)	SM
							6			11				
							7			6				
7.5	SPT						8			8	19		7.9-9.0 Dense, Moist, Dense Light Gray SILTY to CLAYEY SAND (SM-SC)	SM-SC
							9			11			Light FeOx Mottling	
							10			10				
10	MC			117.9	7.4	28.3	11			12	26		10.0-11.5 Dense, Moist, Dense Light Gray to Dark Brown SILTY TO CLAYEY SAND (SM-SC)	SM-SC
							12			14			Light FeOx Mottling	
							13							
							14			9				
15	SPT						15			9	18		15.0-15.2 Same as Above	SM-SC
							16			10			15.2-15.4 Moist, Dense, Gray, Fine SAND Lense (SM)	SM
							17						15.5-16.3 Moist, Dense, Brown to Reddish Brown CLAYEY SAND (SC)	SC
							18						16.3-16.5 Moist, Dense, Brown to Red Brown SILTY SAND (SM)	SM
							19			6			20.0-20.5 Saturated, Loose Grayish Brown CLAYEY SAND (SC)	SC
20	MC			113.9	19.2	40.7	20			7	18			
										11				

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Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21						20.5-21.5 Moist, Dense, Grayish Brown	SM
													SILTY SAND (SM)	
							22							
							23							
							24							
										8			25.0-25.9 Moist, Dense Grayish Brown	SM
25	SPT						25			12	25		SILTY SAND (SM)	
										13			25.9-26.5 Moist, Loose, Grayish Brown, Silty	SC
													Coarse SAND (SC) with gravel	
							26						FeOx Mottling at 26.5 bgs	
							27							
							28							
							29							
										14				
30	MC			126.5	13.6	22.2	30			15	33		30.0-31.5 Moist, Dense, Brown Gray	SM
										18			SILTY MEDIUM SAND (SM) with gravel	
													FeOx Mottling	
							31							
							32							
							33							
							34							
										11				
35	SPT						35			12	41		35.0-36.7 Saturated, Dense, Brownish Gray	SP
										29			Coarse SAND (SP) with gravel	
							36						35.7-35.9 Grades to Fine SAND	
													35.9-36.5 Saturated, Dense, Gray Fine SAND	
							37							
							38							
							39							
										11				
40	MC			126.8	12.2	23.4	40			17	38		40.0-41.0 Saturated, Dense, Olive Brown to Brown	SM
										21			SILTY COURSE SAND (SM) with gravel	
							41							

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SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
45	SPT						45			22 27 36	63		45.0-46.5 Moist, Dense, Olive Gray, Medium to Coarse SILTY SAND (SM) with gravel	SM
50	MC			129.3	10.4	20.8	50			27 36 42	72		50.0-51.5 Saturated, Dense, Olive Brown, Fine, SILTY SAND (SM)	SM

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-03	Coordinates:	Started Time: 2:55 pm Date: 1/14/2015
Elevation: UK Total Depth: 46.5'	GWL: Depth:	Completed Time: 4:15 pm Date: 1/14/2015
Engineer/Geologist: G. Luce	Date/Time: January 14, 2015	Backfilled Time: 4:45 pm Date: 1/14/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.2 AC 2.5 inches	
													0.2-0.8 AB	
							1						0.9-2.5 Moist, Loose, Brown SILTY SAND (SM)	SM
													2.5-5.0 Moist, Dense, Greenish Brown	SC
							2						CLAYEY SAND (SC)	
							3							
							4							
										7				
5	MC			111.3	10.7	31.2				8	17		5.0-7.5 Moist, Loose to Medium Dense Grayish	SM
							5			9			Brown SILTY SAND (SM)	
													Strong FeOx Mottling	
							6							
										6				
							7							
7.5	SPT									7	17			
										10			7.9-9.0 Dense, Moist, Dense Light Gray to Dark	SM
							8						Brown SILTY with Trace Clay (SM)	
													Strong FeOx Mottling	
							9							
										10				
10	MC			102.1	20.6	39.2	10			10	21		10.0-11.5 Dense, Moist, Dense Light Gray to	SM
										11			Dark Brown SILTY with Trace Clay (SM)	
							11						Light FeOx Mottling	
							12							
							13							
							14							
										9				
15	SPT						15			10	21		15.0-16.5 Moist, Medium Dense, Olive Brown to	
										11			Red Brown SILTY SAND with Trace gravel	SM
							16						FeOx Mottling	
							17							
							18							
							19							
										7				
20	MC			114.9	16.6	29.3	20			13	25		20.0-20.5 Same as Above	SM
										12				

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-03	Coordinates:	Started Time: 2:55 pm Date: 1/14/2015
Elevation: UK Total Depth: 46.5'	GWL: Depth:	Completed Time: 4:15 pm Date: 1/14/2015
Engineer/Geologist: G. Luce	Date/Time: January 14, 2015	Backfilled Time: 4:45 pm Date: 1/14/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
													25.0-26.3 Saturated, Medium Dense, Olive Gray	SP
										9			Course-Fine SAND (SP)	
25	SPT						25			12	23		26.3-26.5 Saturated, Medium Dense, Olive Gray	SM
										11			SILTY SAND (SM)	
							26							
							27							
							28							
							29							
							30						Same as Above	SM
30	MC												At 30.0-1.3 ft. Heave Occurred	
							31							
							32							
							33							
							34							
										12				
							35			13	52			
35	SPT			114.6	17.8	34.4				39			Not Saturated at 35.5 ft.	
							36							
							37							
							38							
							39							
							40						40.0-41.5 Moist, Medium Dense, Dark Greenish	SM
40	MC				12.4	23.1							Gray Silty Medium Coarse SAND (SM) with gravel	
													At 45.0 ft. 2.0 ft. Heave, Called off Rig	

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-04	Coordinates:	Started Time: 8:05 am Date: 1/15/2015
Elevation: UK Total Depth: 31.5'	GWL: Depth:	Completed Time: 9:10 am Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 9:30 am Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.2 AC 2.5 inches	
													0.2-0.8 AB	
							1						0.9-2.5 Moist, Loose, Brown SILTY SAND (SM)	SM
													2.5-5.0 Moist, Dense, Brown SILTY SAND (SM)	SM
							2							
							3							
							4							
										5				
5	MC			114.4	11.1	37.8				7	16		5.0-7.5 Moist, Medium Dense Greenish Gray	SC
							5			9			CLAYEY SAND (SC) with trace gravel	
							6							
										9				
							7							
7.5	SPT				10.8	40.7				8	17		Same as Above	SC
							8			9			FeOx Mottling at 8.0-8.5 ft.	
							9							
										9				
10	MC			116.3	7.6	22.7	10			12	26		10.0-11.3 Moist, Medium Dense, Gray to Red Brown	SM
										14			SILTY SAND (SM)	
							11						Strong FeOx Mottling	
							12							
							13							
							14							
										9				
15	SPT						15			11	24		15.3-16.5 Moist, Medium Dense, Gray to Red Brown	SM
										13			SILTY SAND (SM)	
							16						Clayey Sand lens at 11.3-11.5 (SC)	SC
							17							
							18							
							19							
										12				
20	MC		22/21		13.3	19	20			12	25		20.0-21.0 Perched Water	SM
										13				

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-04	Coordinates:	Started Time: 8:05 am Date: 1/15/2015
Elevation: UK Total Depth: 31.5'	GWL: Depth:	Completed Time: 9:10 am Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 9:30 am Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
							25			9				
25	SPT				20.3	35.7				10	30		25.0-26.5 Moist, Medium Dense, Very Dark Grayish	SM
							26			20			Brown SILTY Medium SAND (SM)	
							27							
							28							
							29							
							30			25				
										28	65		Same as Above	SM
30	MC			122.9	14	23.6				37				
							31							
							32							
							33							
							34							
							35							
							36							
							37							
							38							
							39							
							40							

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-05	Coordinates:	Started Time: 9:55 am Date: 1/15/2015
Elevation: UK Total Depth: 41.5'	GWL: Depth:	Completed Time: 11:05 am Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 11:30 am Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.2 AC 2.5 inches	
													0.2-0.8 AB	
							1						0.9-5.0 Moist, Dense, Brown SILTY SAND (SM)	SM
							2							
							3							
							4							
										8				
5	MC				9.1	26.8				8	19		5.0-7.5 Moist, Medium Dense Brown with Greenish	SC
							5			11			Gray Mottling CLAYEY SAND (SC) with trace gravel	
							6							
										9				
							7							
7.5	SPT				7.3	28.8				8	17		7.5-9.0 Moist, Medium Dense, Greenish Gray	SM
										9			SILTY SAND (SM) with gravel	
							8							
							9							
										9				
10	MC			115	9.5	33.2	10			11	25		10.0-11.5 Moist, Medium Dense, Greenish Gray	SM
										14			SILTY SAND (SM)	
													FeOx Mottling	
							11							
							12							
							13							
							14							
										10				
15	SPT						15			11	24		15.0-16.5 Moist, Medium Dense, Grayish Brown	SM
										13			SILTY SAND (SM)	
													Strong FeOx Mottling	
							16							
							17							
							18							
							19							
										14			20.0-21.0 Moist to Saturated, Medium Dense Gray	SP
20	MC			109.5	14.5	19.9				15	32		to Brown Course-Fine to Meidum-Fine SAND (SP)	
							20			17			with gravel	

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-05	Coordinates:	Started Time: 9:55 am Date: 1/15/2015
Elevation: UK Total Depth: 41.5'	GWL: Depth:	Completed Time: 11:05 am Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 11:30 am Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
							25			12			25.0-26.5 Saturated, Dense, Grayish Black	SM
25	SPT				14.7	23.5				17	41		SILTY SAND (SM) with gravel	
							26			24				
							27							
							28							
							29							
							30			12			30.0-31.0 Moist, Medium Dense, Very Dark Greenish	SM
30	MC			112.7	16.8	21.1				18	72		Gray, Medium, SILTY SAND (SM) with gravel	
							31			54				
							32							
							33							
							34							
										39				
35	SPT						35			39	78		35.0-36.5 Saturated, Medium Dense, Dark Gray	SP
										52			Course-Fine SAND (SP) with gravel	
							36							
							37							
							38							
							39							
										22				
40	MC			121.1	13	24.7	40			36	72		40.0-41.5 Moist, Medium Dense, Greenish Black,	SM
										46			Medium, SILTY SAND (SM)	

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-06	Coordinates:	Started Time: 12:17 pm Date: 1/15/2015
Elevation: UK Total Depth: 31.5'	GWL: Depth:	Completed Time: 1:08 pm Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 1:30 pm Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.2 AC 2.5 inches	
													0.2-0.8 AB	
							1						0.9-5.0 Moist, Dense, Grayish Brown	SM
													SILTY SAND (SM)	
							2							
							3							
							4							
										6				
5	MC			112.7	9.1	12.3				11	21		5.0-7.5 Moist, Medium Dense Brown with Greenish	SC
							5			10			Gray Mottling CLAYEY SAND (SC) with trace gravel	
													Strong FeOx Mottling at 6.0 ft. bgs	
							6							
										7				
							7							
7.5	SPT				6.6	20.6				8	16		7.5-8.0 Moist, Medium Gray CLAYEY SAND (SC)	SC
							8			8				
							9							
										7				
10	MC			105.7	20.4	54	10			13	31		10.0-11.5 Moist, Medium Dense, Greenish Gray	SM
										18			SILTY SAND (SM)	
							11							
							12							
							13							
							14							
										7				
15	SPT						15			8	19		15.0-16.5 Moist, Medium Dense, Grayish Brown to	SM
										11			Red SILTY SAND (SM)	
							16						Strong FeOx Mottling	
							17							
							18							
							19							
										18			20.0-21.0 Moist to Saturated, Medium Dense, Olive	SM
20	MC			137.7	7.2	12.4	20			22	50		Gray to Brown Course-Fine SILTY SAND (SM)	
										28				

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-06	Coordinates:	Started Time: 12:17 pm Date: 1/15/2015
Elevation: UK Total Depth: 31.5'	GWL: Depth:	Completed Time: 1:08 pm Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 1:30 pm Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
							25			13				
25	SPT									15	39		25.0-26.5 Moist, Medium Dense, Grayish	SM
							26			24			Brown SILTY SAND (SM) with gravel	
							27							
							28							
							29							
							30			13			30.0-31.0 Moist to Saturated, Medium Dense	SM
30	MC			123.3	13.2	26.9				26	52		Grayish Brown, Medium, SILTY SAND (SM)	
							31			40			with gravel	
							32							
							33							
							34							
							35							
							36							
							37							
							38							
							39							
							40							

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-07	Coordinates:	Started Time: 2:10 pm Date: 1/15/2015
Elevation: UK Total Depth: 36.5'	GWL: Depth:	Completed Time: 3:10 pm Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 3:30 pm Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.2 AC 2.5 inches	
													0.2-0.8 AB	
							1						0.9-5.0 Moist, Loose, Grayish Brown	SM
													SILTY SAND (SM)	
							2							
3					20.8	72.2							3.0-4.0 Moist, Loose, Dark Brown, Fine	SM
							3						SILTY SAND (SM)	
							4							
										7				
5	MC			108.4	10.5	33.1				8	17		5.0-7.5 Moist, Medium Dense, Brown with Greenish	SC
							5			9			Gray Mottling CLAYEY SAND (SC) with trace gravel	
													FeOx Mottling at 7.0 ft. bgs	
							6							
										7				
							7							
7.5	SPT				6.6	20.6				9	20		7.5-8.9 Moist, Gray Silty CLAYEY SAND (SC)	SC
										11			Moderate FeOx Mottling	
							8							
													8.9-10.0 Moist, Medium Dense, Gray to Reddish	SM
							9						Brown, Course-Fine SILTY SAND (SM)	
										9				
10	MC			11.4	8.6	22.3	10			10	26		10.0-11.5 Moist, Medium Dense, Greenish Gray	SM
										16			SILTY SAND (SM)	
							11							
							12							
							13							
							14							
										11				
15	SPT						15			12	26		15.0-15.5 Moist, Medium Dense, Dark Yellow Brown	SC
										14			to Light Yellow Brown CLAYEY SAND (SC)	
							16						15.5-16.5 Moist, Medium Dense, Reddish Brown	SC
													CLAYEY SAND (SC)	
							17							
							18							
							19							
										6				
20	MC			120.2	15.4	28.7	20			12	27		Same as Above	SC
										15			Saturated at 20.0 ft. bgs	SC

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-07	Coordinates:	Started Time: 2:10 pm Date: 1/15/2015
Elevation: UK Total Depth: 36.5'	GWL: Depth:	Completed Time: 3:10 pm Date: 1/15/2015
Engineer/Geologist: G. Luce	Date/Time: January 15, 2015	Backfilled Time: 3:30 pm Date: 1/15/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
							25			4				
25	SPT				22.9	31.6				8	40		25.0-26.0 Moist, Medium Dense, Grayish	SM
							26			20			Brown SILTY SAND (SM) with gravel	
													26.0-26.5 Saturated, Medium Dense, Black Reddish	SC
							27						Brown, Coarse-Fine, CLAYEY SAND (SC)	
							28							
							29							
										30				
							30			32	64		30.0-31.0 Moist to Saturated, Medium Dense	SP
30	MC			129.5	10.4	19.2				40			Medium SAND (SP) with gravel	
							31							
							32							
							33							
							34							
										12				
35	SPT						35			14	39		35.0-36.5 Moist, Medium Dense, Very Dark	SM
										25			Greenish Brown Medium SILTY SAND (SM)	
							36						with gravel	
							37							
							38							
							39							
							40							

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-08	Coordinates:	Started Time: 8:16 am Date: 1/16/2015
Elevation: UK Total Depth: 51.5'	GWL: Depth:	Completed Time: 9:50 am Date: 1/16/2015
Engineer/Geologist: G. Luce	Date/Time: January 16, 2015	Backfilled Time: 10:15 am Date: 1/16/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.15 AC 1.5 inches	
													0.15-1.0 Moist, Medium Dense, Very Dark, Grayish	SM
							1							
1.5					14.2	47.0							Brown Sandy, SILTY SAND (SM)	
							2							
													2.5-5.0 Moist, Loose, Grayish Brown SILTY SAND	SC
							3						to CLAYEY SAND (SC)	
							4							
										6				
5	MC		31/26	114	11.9	37.0	5			5	12		5.0-7.0 Moist, Stiff, Dark Gray to Brown	CL
										7			SILTY CLAY (CL)	
							6							
										3			7.0-10.0 Moist, Loose, Dark Yellow Brown	SC
							7							
7.5	SPT									5	12		CLAYEY SAND (SC)	
							8			7				
							9							
										6				
10	MC			108.5	10.5	31.0	10			8	18		10.0-15.0 Moist, Dense, Gray to Brown	SM
										10			SILTY SAND (SM) with gravel	
							11						FeOx Mottling at 11.0 ft. bgs	
							12							
							13							
							14							
										7				
15	SPT				12.4	34.0	15			10	21		15.0-15.5 Moist, Medium Dense, Dark Yellow Brown	SC
										11			to Reddish Brown CLAYEY SAND (SC)	
							16							
							17							
							18							
							19							
										6			20.0-21.0 Moist, Stiff, Dark Yellow Brown	SC
20	MC			120.2	15.4	28.7	20			12	27		CLAYEY SAND (SC)	
										15			Strong FeOx Mottling	

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-08	Coordinates:	Started Time: 8:16 am Date: 1/16/2015
Elevation: UK Total Depth: 51.5'	GWL: Depth:	Completed Time: 9:50 am Date: 1/16/2015
Engineer/Geologist: G. Luce	Date/Time: January 16, 2015	Backfilled Time: 10:15 am Date: 1/16/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21							
							22							
							23							
							24							
							25							
25	SPT				12.2	18.0				12 14 18	32		25.0-35.3 Saturated, Dense, Gray, Poorly Graded	SP
							26						SAND (SP) with gravel	
							27							
							28							
							29							
							30			8 15 21	36		Same as Above	SP
30	MC			132.9	10	22.3								
							31							
							32							
							33							
							34							
35	SPT						35			9 10 16	26		35.3-36.5 Wet, Medium Dense, Dark Olive Gray	SC
													SANDY CLAY to CLAYEY SAND (SC)	
							36							
							37							
							38							
							39							
40	MC			116.3	17.5	37.5	40			12 16 30	46		40.0-45.0 Moist, Medium Dense, Olive Green	SM
													Medium-Fine SILTY SAND (SM)	

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-08	Coordinates:	Started Time: 8:16 am Date: 1/16/2015
Elevation: UK Total Depth: 51.5'	GWL: Depth:	Completed Time: 9:50 am Date: 1/16/2015
Engineer/Geologist: G. Luce	Date/Time: January 16, 2015	Backfilled Time: 10:15 am Date: 1/16/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Tory

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							42							
							43							
							44							
45	SPT						45			8 13 20	33		45.0-46.5 Moist, Medium Dense, Olive Green Medium to Coarse SILTY SAND (SM)	SM
							46							
							47							
							48							
							49							
50	MC		26/17	129.3	10.4	37.9	50			8 12 15	33		Same as Above	SM
							51							
							52							
							53							
							54							
							55							
							56							
							57							
							58							
							50							
							60							
							61							

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-09	Coordinates:	Started Time: 8:30 am Date: 2/25/2015
Elevation: UK Total Depth: 36.5'	GWL: Depth:	Completed Time: 12:30 pm Date: 2/25/2015
Engineer/Geologist: G. Luce	Date/Time: February 25, 2015	Backfilled Time: 12:15 pm Date: 2/25/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Jose

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.3 AC 4 inches	
													0.3-6.1 Dence, Moist, Very Dark, Greenish Gray	SM-SC
							1						to Brownish Gray SILTY to CLAYEY SAND (SM-SC)	
										3				
							2			5	15			
2.5	MC			107.7	20.4	67.5				10				
							3							
							4							
										6				
5	SPT			108.4	10.5	33.1	5			6	14			
										8				
							6						6.1-6.5 Moist, Medium Dense, Brownish Gray	SM
													Medium SILTY SAND (SM) with gravel	
							7			7			FeOx Mottling 6.1 ft. bgs	
7.5	MC									8	19		7.5-7.9 Same as above	
										11			7.9-9.0 Dense, Moist, Grayish Brown, Silty	SC
							8						CLAYEY SAND (SC)	
							9							
										7				
10	SPT						10			8	19		10.0-11.5 Moist, Dense, Grayish Brown to Reddish	SM
										11			Brown SILTY SAND (SM)	
							11						Strong FeOx Mottling	
							12							
12.5	MC			113.2	6.4	15.1				12			12.5-14.0 Moist, Very Dense, Grayish Brown to	SM
							13			21	60			
										39			Dark Brown SILTY SAND (SM) with trace gravel	
													Slight FeOx Mottling	
							14							
										7				
15	SPT						15			16	35		15.7-16.5 Slightly Moist, Medium Dense, Grayish	SM
										19			Brown to Light Brown SILTY SAND (SM)	
													with trace gravel	
							16							
							17							
							18							
							19							
										16				
20	MC			119.3	15.8	28.9				16	36		20.0-21.0 Very Moist, Loose, Grayish Brown to	SM
							20			20			Brown Medium-Coarse SAND with SILT (SM)	

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Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-09	Coordinates:	Started Time: 8:30 am Date: 2/25/2015
Elevation: UK Total Depth: 36.5'	GWL: Depth:	Completed Time: 12:30 pm Date: 2/25/2015
Engineer/Geologist: G. Luce	Date/Time: February 25, 2015	Backfilled Time: 12:15 pm Date: 2/25/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Jose

SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
							21						21.0-21.5 Wet, Dense, Silty CLAYEY SAND (SC)	SC
							22							
							23							
							24							
							25			6				
25	SPT									7	18		25.0-26.5 Dense, Moist, Dark Greenish Gray	SM
							26			11			Fine SILTY SAND (SM)	▼
													26.0 Groundwater	—
							27							
							28							
							29							
							30			3			30.0-30.8 Wet, Coarse SAND (SP) with gravel	SP
30	MC			118.4	12.3	15.1				7	36		Dark Bluish Gray to Gray	
							31			29			30.0 - 1 ft. Heave	
							32							
							33							
							34							
35	SPT						35			8			35.0-36.5 Same as above	SP
										21	63			
							36			42				
							37							
							38							
							39							
							40							

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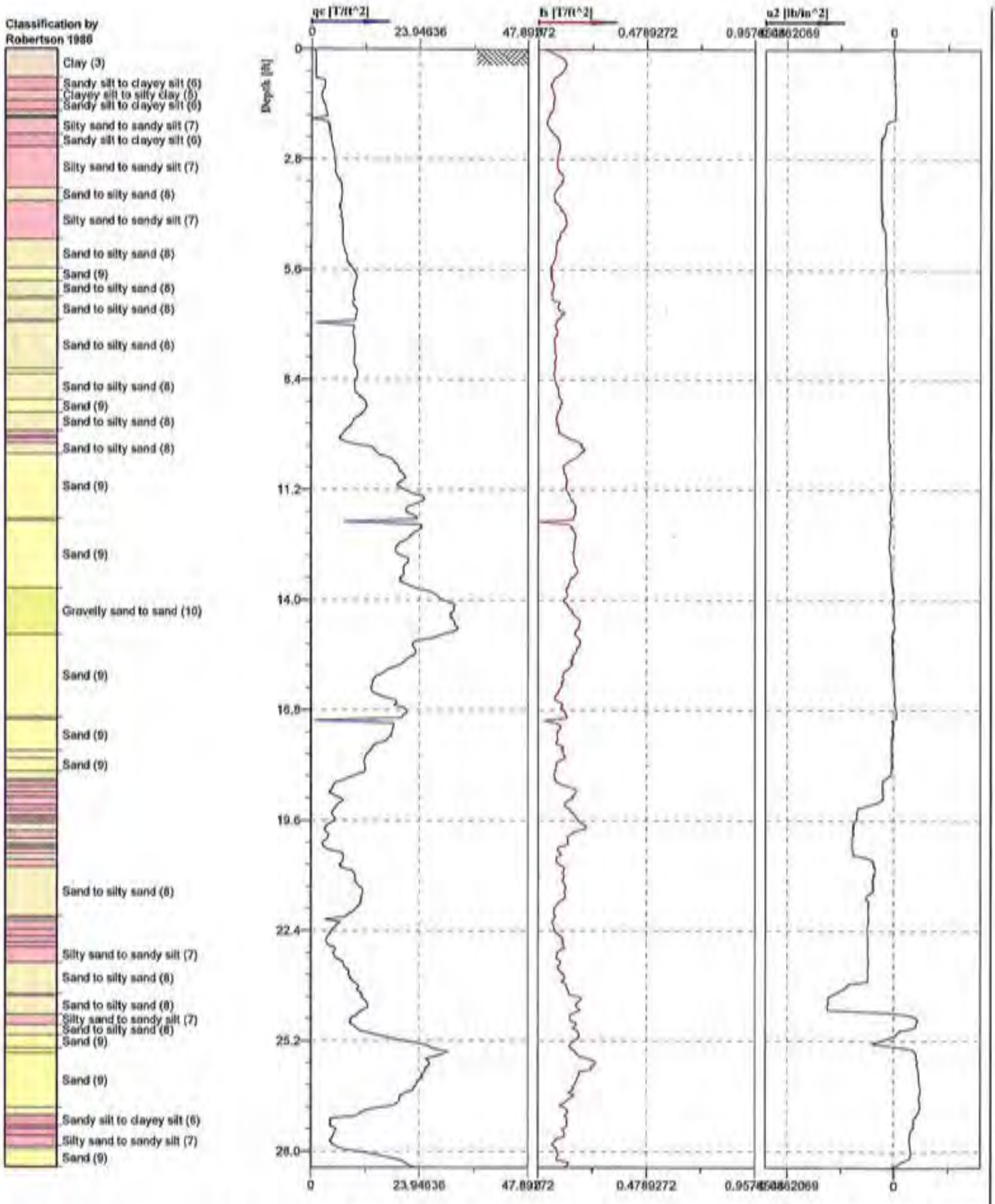
Location of Boring: See Appendix

Project No: 15-104.1	Project Name: Capitol Mall Project	Location: See Appendix
Boring No: BH-10	Coordinates:	Started Time: 12:15 pm Date: 2/25/2015
Elevation: UK Total Depth: 21.5'	GWL: Depth:	Completed Time: 1:45 pm Date: 2/25/2015
Engineer/Geologist: G. Luce	Date/Time: February 25, 2015	Backfilled Time: 2:00 pm Date: 2/25/2015
Drill Rig Type: CME 95	Drilling Contractor: Cascade	Driller: Jose

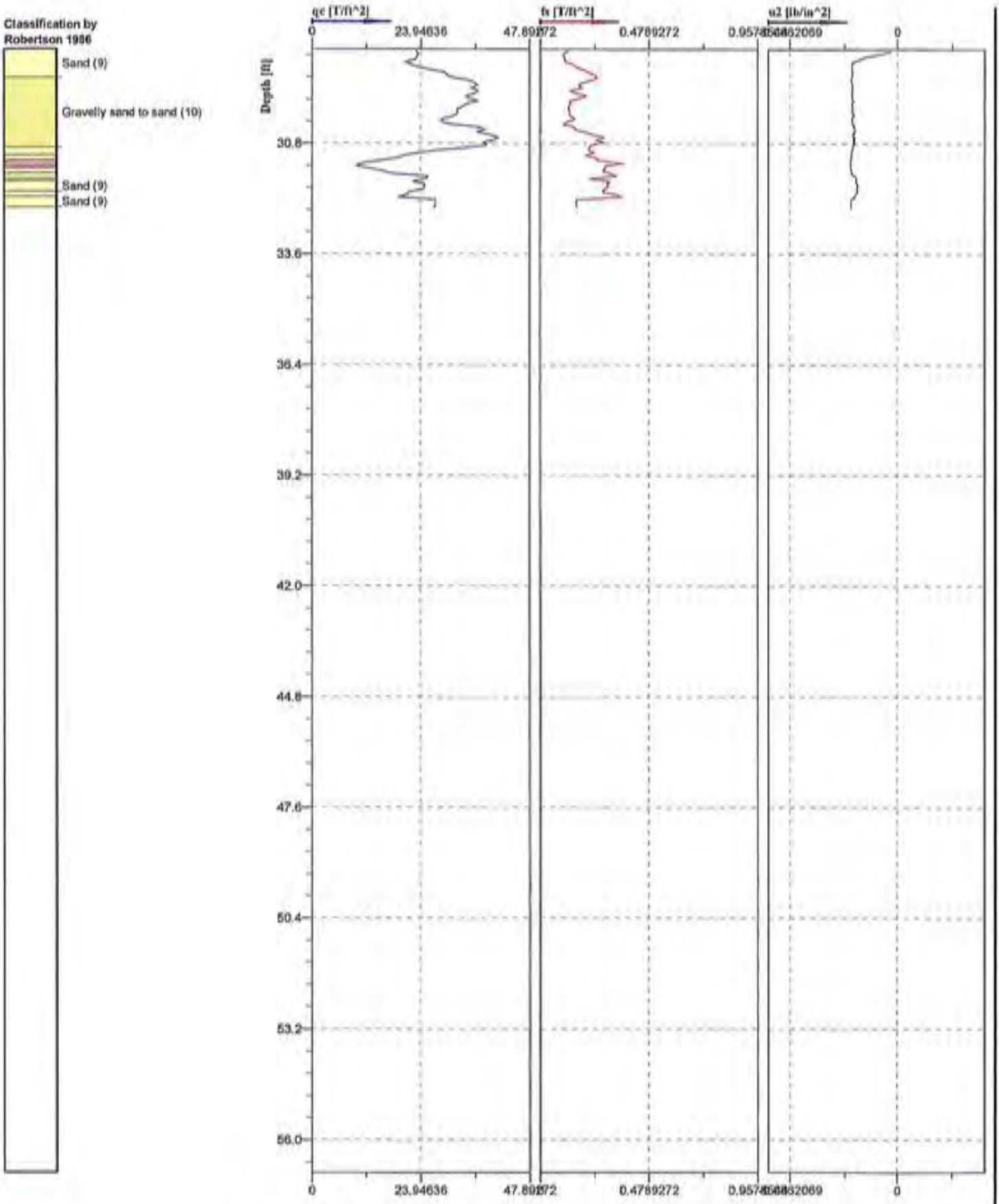
SAMPLE DEPTH	SAMPLE TYPE	DRILLING RATE	LL/PI	DD	%M	-200	DEPTH	SAMPLE	GRAPHIC LOG	BLOWS	N	RECOVERY	DESCRIPTION	USCS
													0-0.35 AC 4 inches	
							1						0.35-5.0 Hand Auger	SM
													Medium Dense, Moist, SILTY SAND (SM)	
							2							
2.5	SPT													
							3							
							4							
										5				
5	MC			111.6	10.7	30	5			8	19		5.0-12.5 Medium Dense to Dense, Moist, Grayish	SC
										11			Brown to Olive Brown, Silty Medium-Fine	
							6						CLAYEY SAND (SC)	
							7			5				
7.5	MC									5	14			
										9				
							8							
							9							
										9				
10	MC			120.4	13	35.9	10			18	39			
										21				
							11							
							12			9				
12.5	SPT									12	25		12.5-14.0 Medium Dense, Moist, Olive Brown to	SM
							13			13			Dark Brown SILTY SAND (SM)	
							14							
										13				
15	MC			113.5	7.5	18.8	15			29	59		15.0-16.5 Medium Dense to Dense, Moist, Grayish	SM
										30			Brown to Dark Yellowish Brown, Fine to Medium	
							16						SILTY SAND (SM)	
													Strong Mottling	
							17							
							18							
							19							
										7				
20	SPT						20			16	31		20.0-21.5 Medium Coarse SILTY SAND (SM) with	SM
										17			gravel, Saturated, Gray Brown with Dark Red Staining	



Location:	Position:	Ground level:	Test no: CPT-1
Project ID:	Client:	Date:	Scale: 1 : 40
Project: CAPITOL MALL		Page: 1/2	Fig:
		File: CPT-log live data	

CASCADE DRILLING, LP

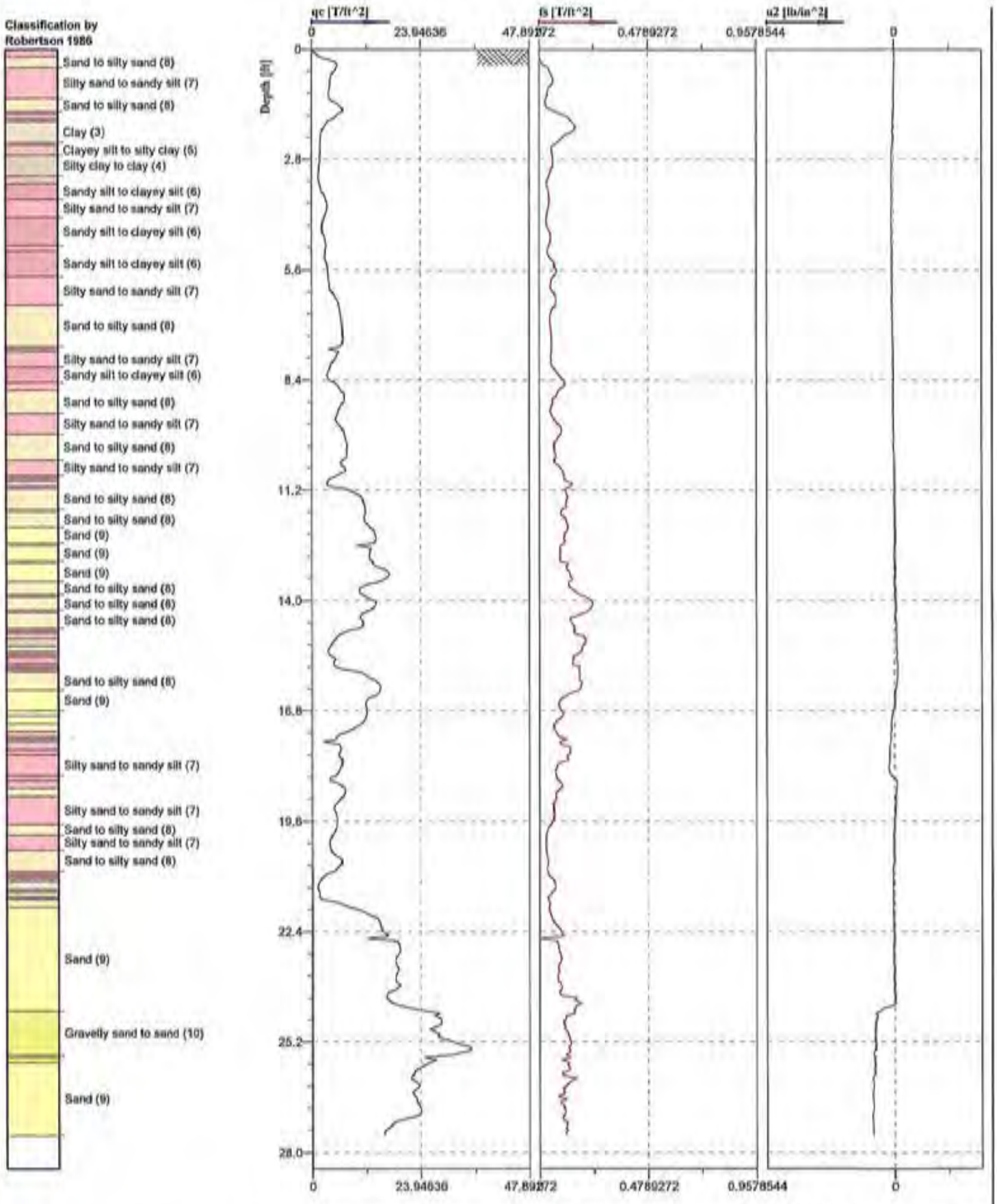
Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Location:	Position:	Ground level:	Test no: CPT-1
Project ID:	Client:	Date:	Scale: 1 : 40
Project:		Page: 2/2	Fig:
		File: CPT-log live data	

CASCADE DRILLING, LP

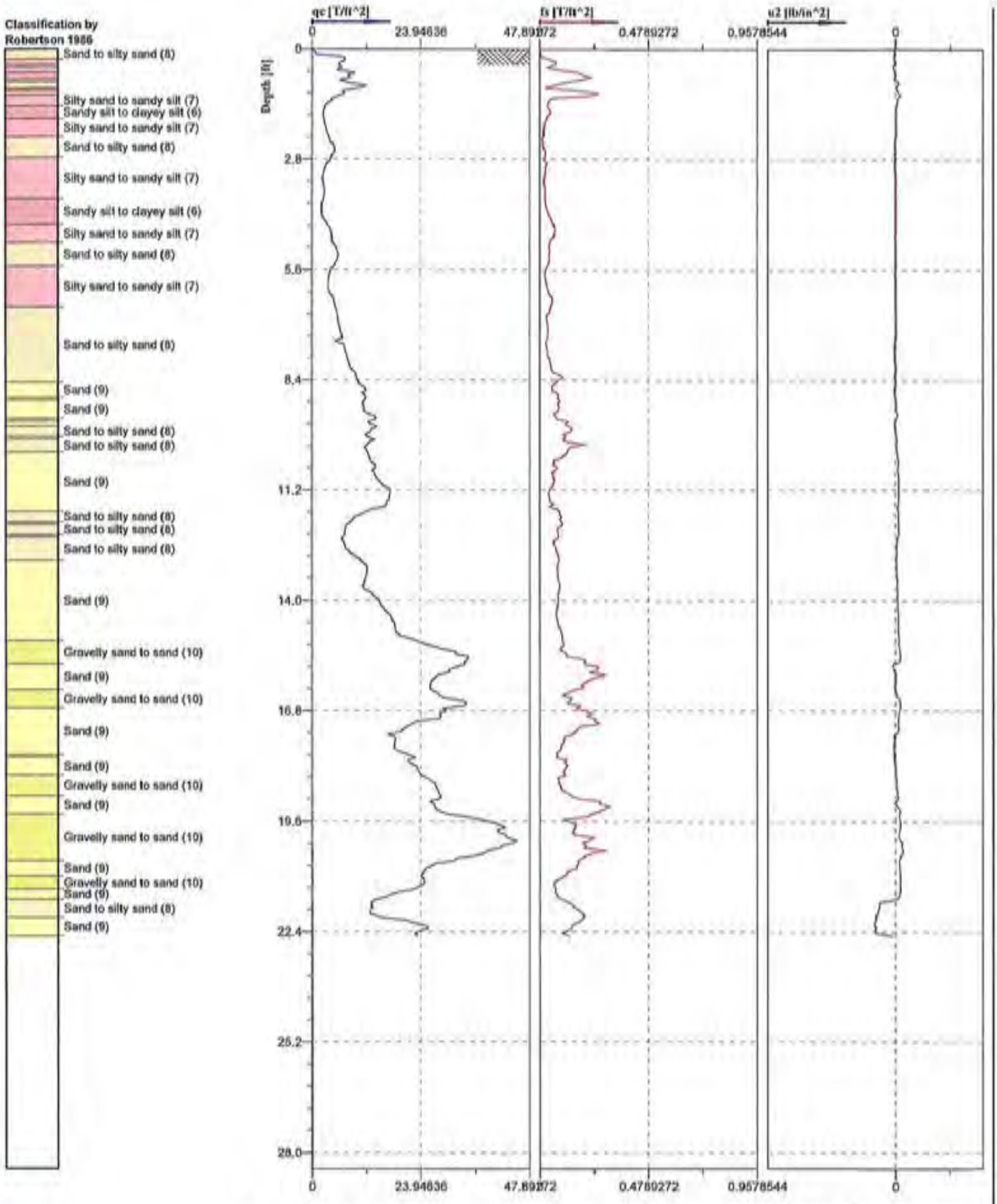
Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Location:	Position: X: 0.00 ft, Y: 0.00 ft	Ground level: 0.00	Test no: CPT-2
Project ID:	Client:	Date: 2/3/2015	Scale: 1 : 40
Project: S573B/109		Page: 1/1	Fig:
		File: CPT-2.cpt	

CASCADE DRILLING, L.P.

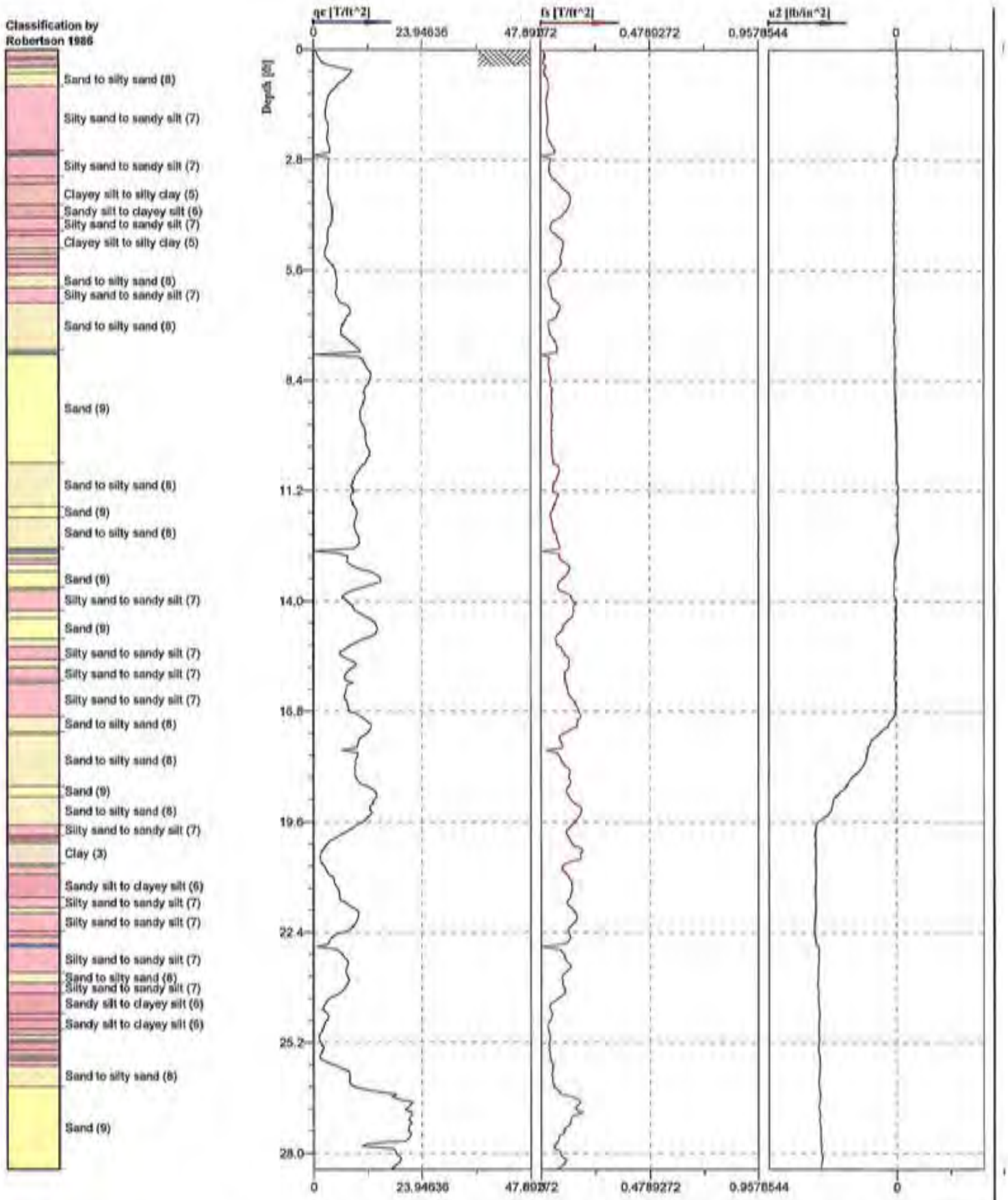
Cone No: 4427
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Location:	Position:	Ground level:	Test no: CPT-3
Project ID:	Client:	Date:	Scale: 1 : 40
Project:		Page: 1/1	Fig:
		File: CPT-log live data	

CASCADE DRILLING, LP

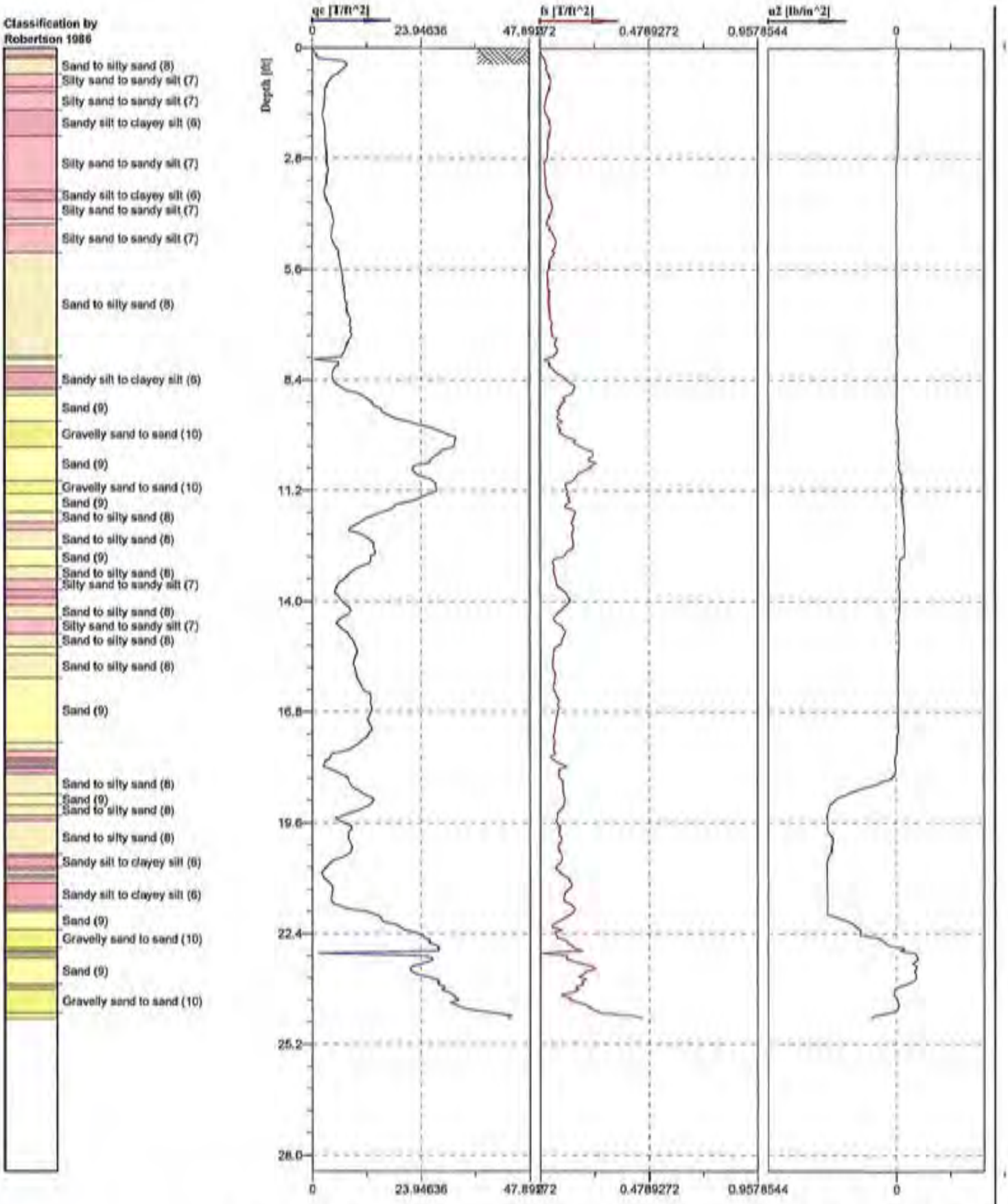
Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Location:	Position:	Ground level:	Test no: CPT-4
Project ID:	Client:	Date:	Scale: 1 : 40
Project:		Page: 1/2	Fig:
		File: CPT-log live data	

CASCADE DRILLING, L.P.

Cone No: 6
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Location:	Position:	Ground level:	Test no: CPT-5
Project ID:	Client:	Date:	Scale: 1 : 40
Project:		Page: 1/1	Fig:
		File: CPT-log live data	

CASCADE DRILLING, LP

Cone No: 0
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Appendix B

Laboratory Testing Program

Appendix B

Laboratory Testing Program

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their moisture content, grain-size distribution, and density characteristics. The types and numbers of the tests performed are listed below:

TABLE B-I
SUMMARY OF LABORATORY TESTS

Test	Procedure	Number of Tests
Moisture Content	ASTM D 2216	60
Unit Weight	ASTM D 2937	47
Grain Size Analysis	ASTM D 422	60
Direct Shear	ASTM D 6528	3
# 200 Wash	ASTM D 1140	1
R-value	ASTM D2844	1
Atterberg Limits	ASTM D 4318	5

The remaining soil samples are stored in our laboratory for future reference and analysis if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.

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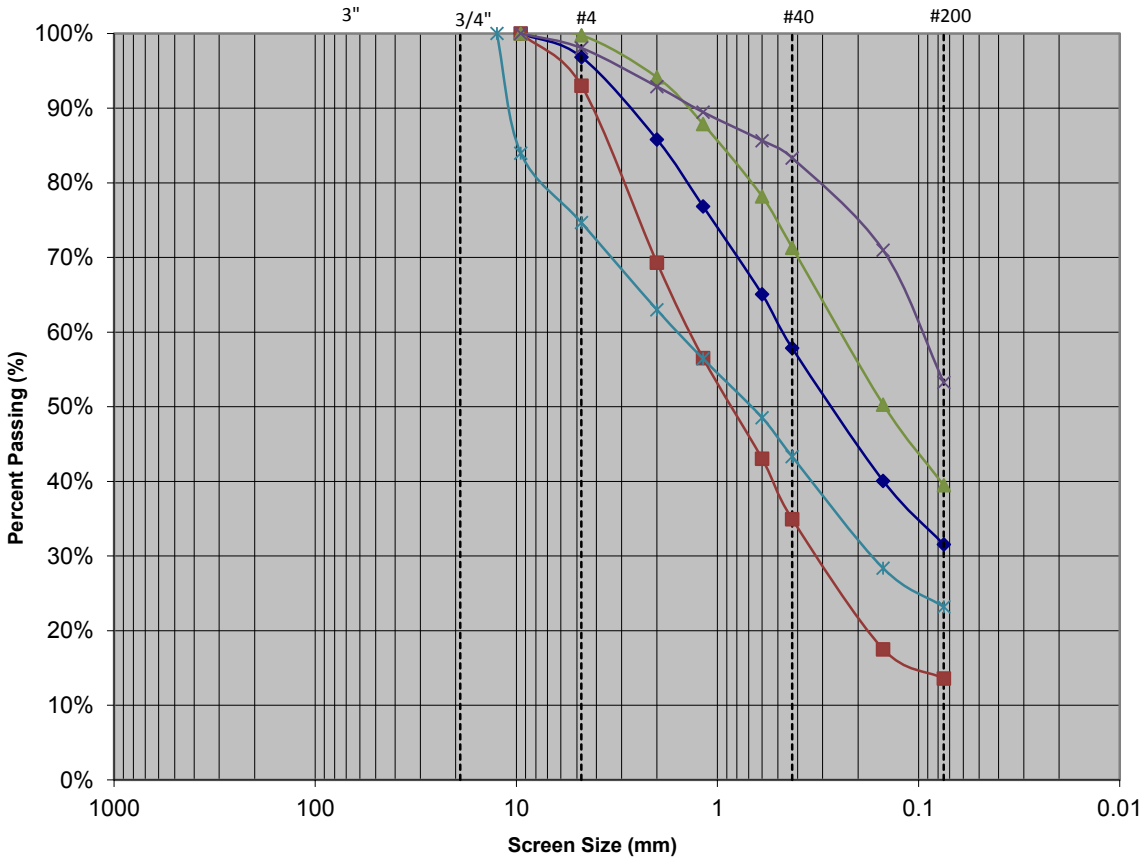
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-01 @ 5.5-6.0	Silty Clayey Sand (SM-SC)				
BH-01 @ 11.0-11.5	Silty Sand (SM) (Strong Mottling)				
BH-01 @ 21.0-21.5	Clayey Sand (SC) (Light Mottling)	24	24		
BH-01 @ 25.4-26.5	Silty to Clayey Sand (SM-SC)				
BH-01 @ 31.0-31.5	Sandy Gravel				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-01 @ 5.5-6.0					8.6%	3.1%	65.3%	31.5%
BH-01 @ 11.0-11.5					6.6%	7.0%	79.4%	13.6%
BH-01 @ 21.0-21.5					17.2%	0.2%	60.3%	39.5%
BH-01 @ 25.4-26.5					20.0%	1.9%	44.8%	53.3%
BH-01 @ 31.0-31.5					9.6%	25.3%	51.5%	23.2%

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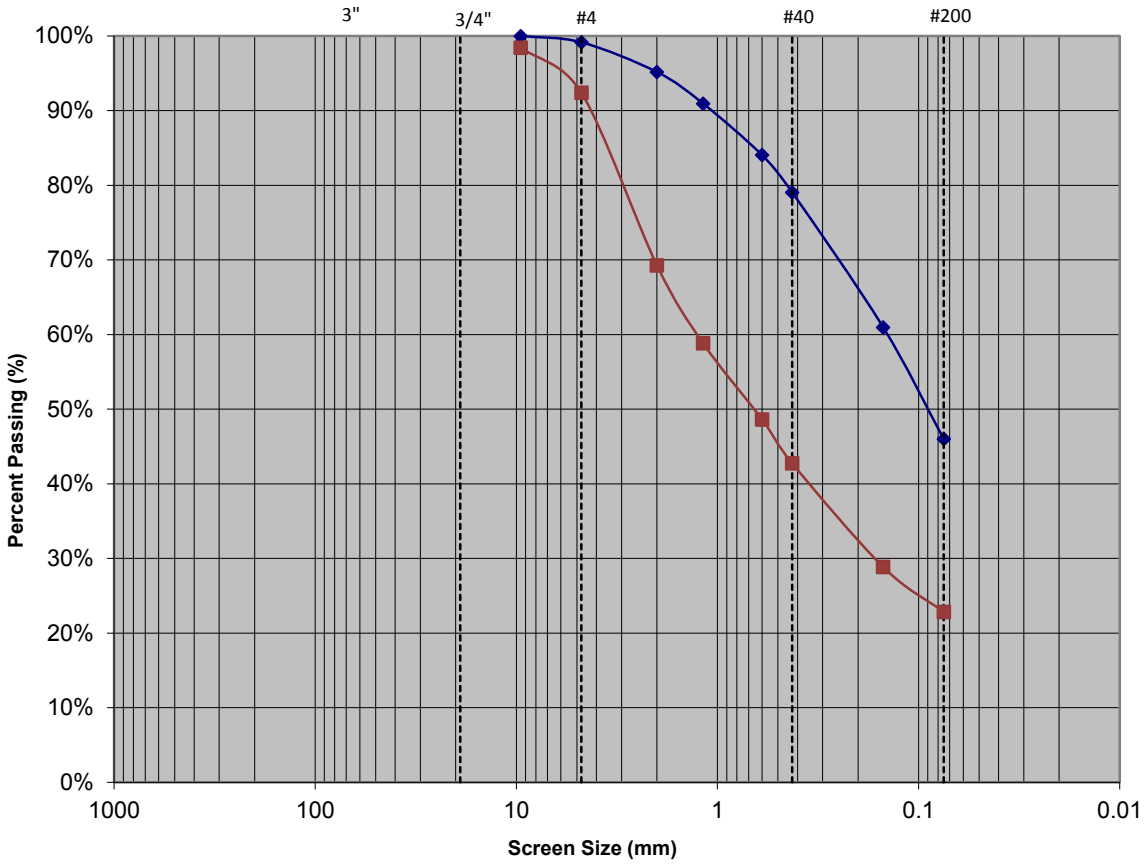
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-01 @ 41.0-41.5	Clayey Sand (SC)	25	16		
BH-01 @ 50.5-51.0	Medium to Coarse Sand (SP)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-01 @ 41.0-41.5					21.0%	0.9%	53.2%	46.0%
BH-01 @ 50.5-51.0					12.3%	7.6%	69.6%	22.8%

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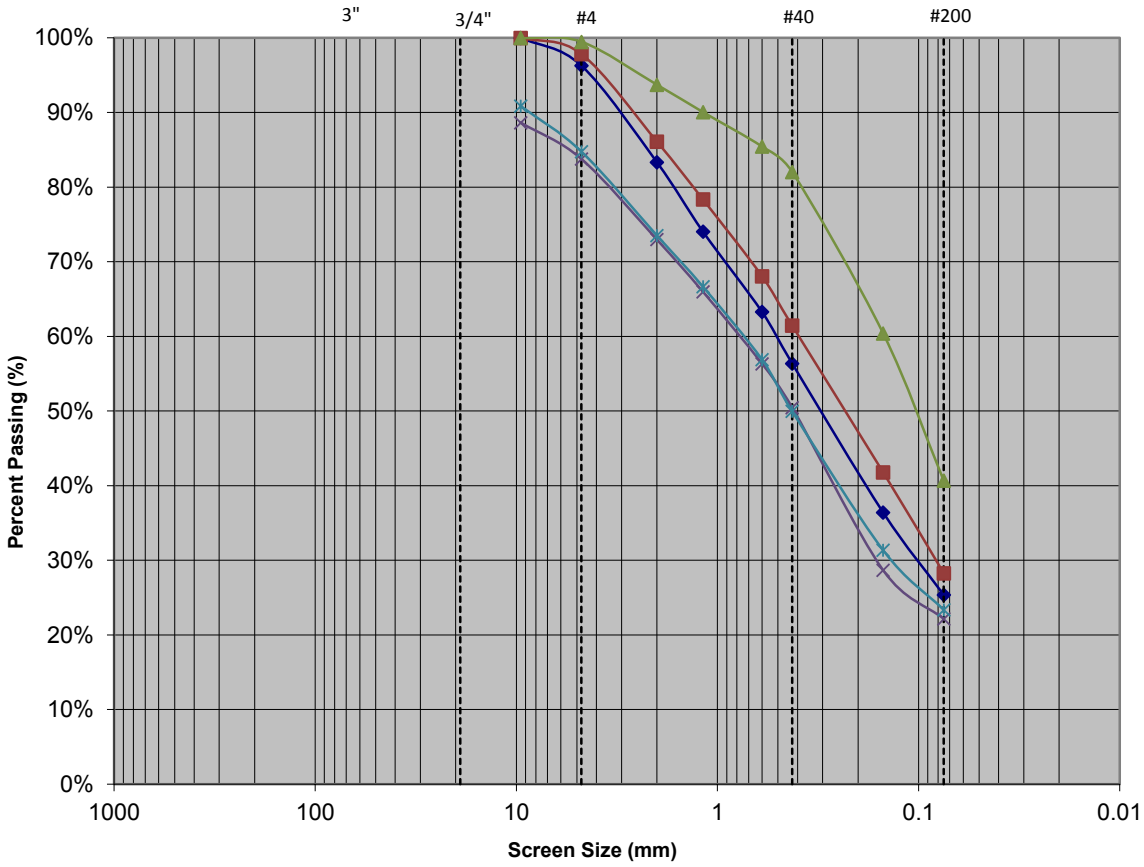
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-02 @ 6.0-6.5	Silty Sand (SM) (Slight Mottling)				
BH-02 @ 10.5-11.0	Silty Sand (SM) (Slight Mottling)				
BH-02 @ 21.0-21.5	Silty Sand (SM) (Slight Mottling)				
BH-02 @ 30.5-31.0	Silty Medium Sand (SM) with Gravel				
BH-02 @ 40.0-40.5	Silty Coarse Sand (SM) with Gravel				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-02 @ 6.0-6.5					7.1%	3.7%	70.9%	25.4%
BH-02 @ 10.5-11.0					7.4%	2.2%	69.6%	28.3%
BH-02 @ 21.0-21.5					19.2%	0.5%	58.8%	40.7%
BH-02 @ 30.5-31.0					13.6%	16.2%	61.6%	22.2%
BH-02 @ 40.0-40.5					12.2%	15.2%	61.4%	23.4%

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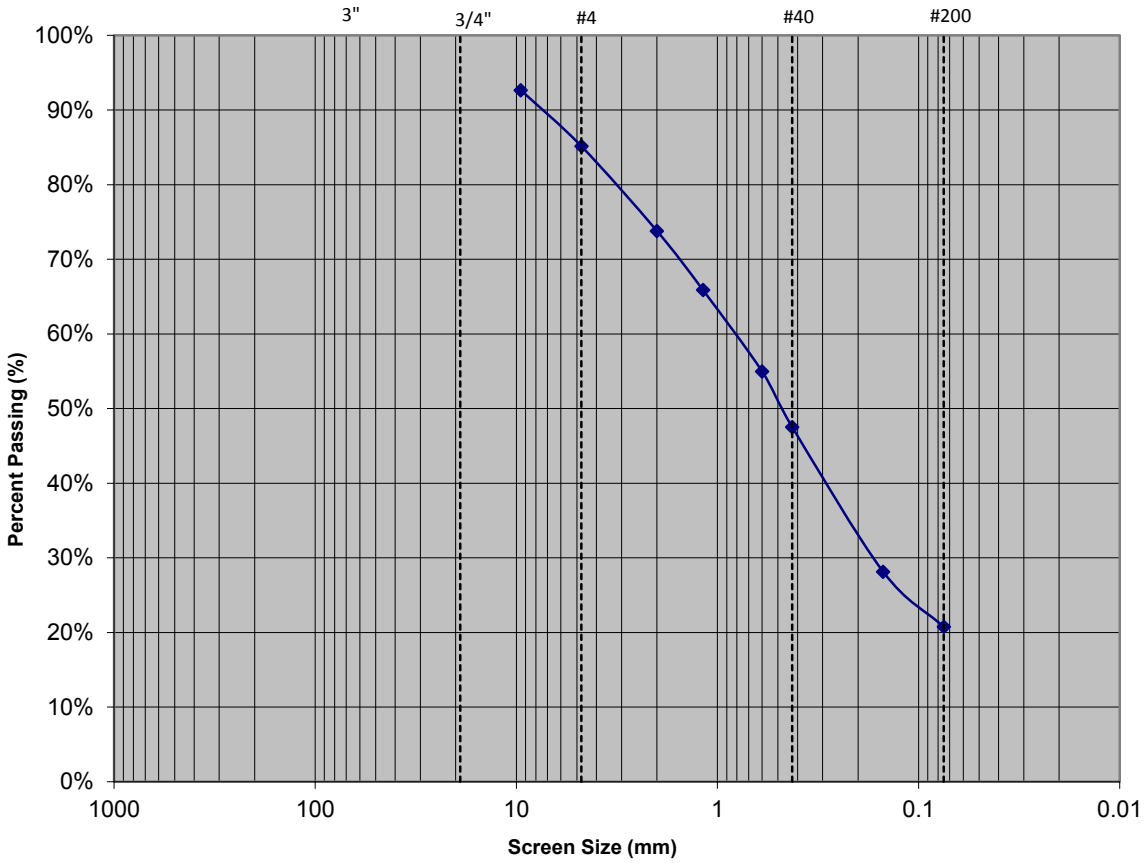
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-02 @ 50.0-50.5	Silty Coarse Sand (SM)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-02 @ 50.0-50.5					10.4%	14.8%	64.4%	20.8%

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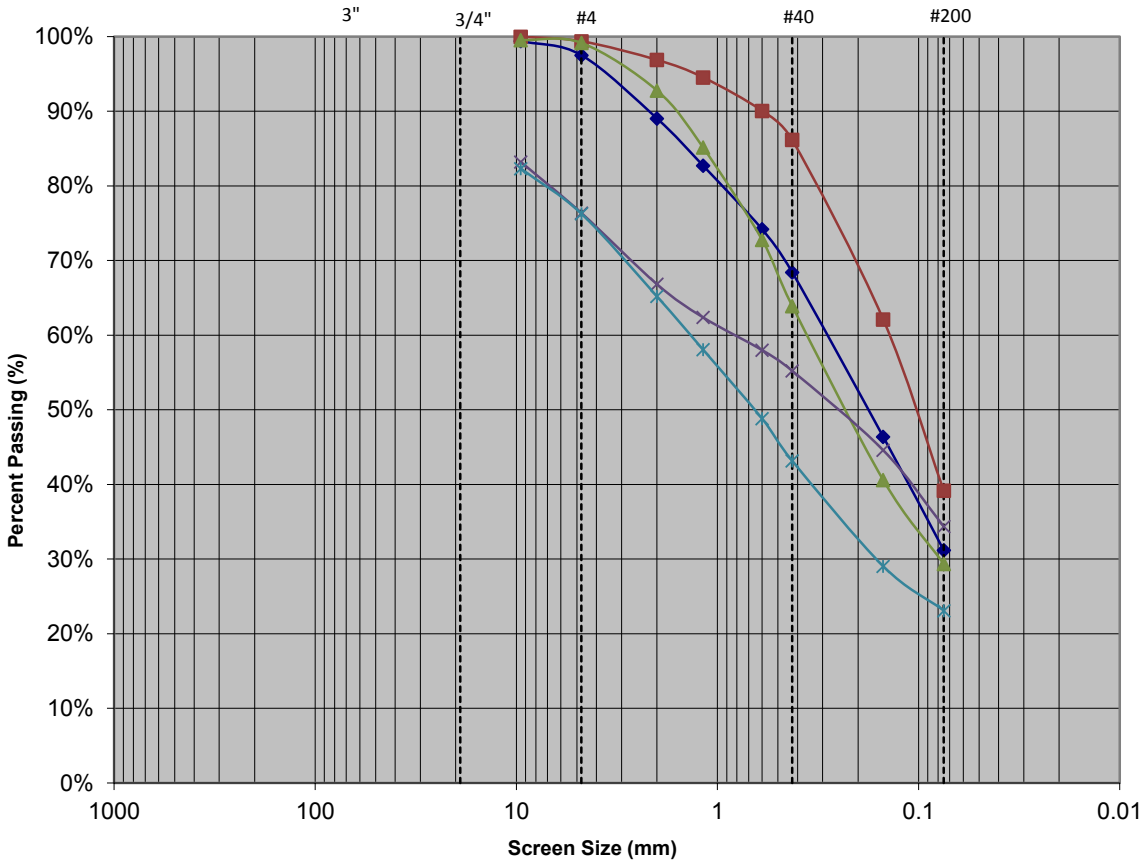
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-03 @ 6.0-6.5	Silty Sand (SM) (Slight Mottling)				
BH-03 @ 11.0-11.5	Silty to Clayey Sand (SM-SC) (Mottling)				
BH-03 @ 21.0-21.5	Silty to Clayey Sand (SM-SC) (Mottling)				
BH-03 @ 35.5-36.0	Silty Medium Sand (SM) with Gravel				
BH-03 @ 40.0-40.5	Silty Med/Coarse Sand (SM) with Gravel				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-03 @ 6.0-6.5					10.7%	2.5%	66.3%	31.2%
BH-03 @ 11.0-11.5					20.6%	0.6%	60.2%	39.2%
BH-03 @ 21.0-21.5					16.5%	0.8%	69.8%	29.3%
BH-03 @ 35.5-36.0					17.8%	23.6%	42.0%	34.4%
BH-03 @ 40.0-40.5					12.4%	23.7%	53.2%	23.1%

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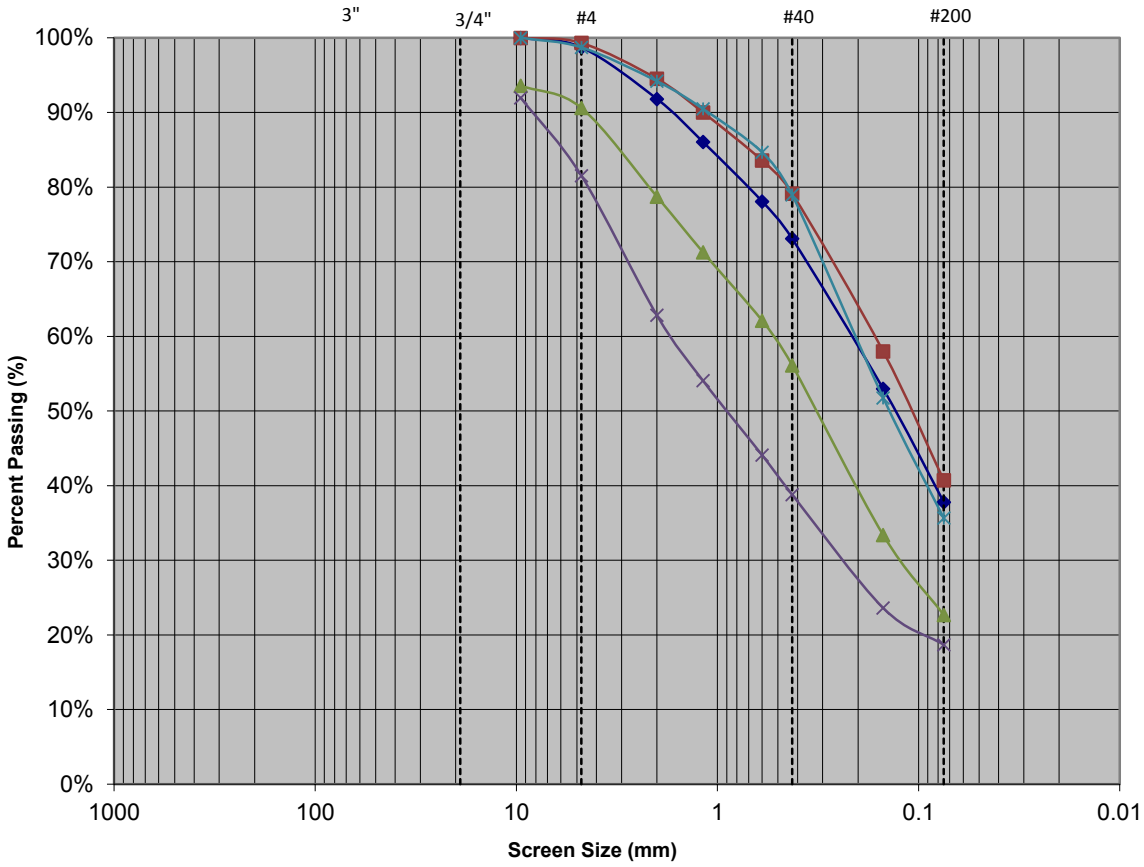
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-04 @ 6.0-6.5	Silty to Clayey Sand (SM-SC)				
BH-04 @ 7.6-9.0	Silty to Clayey Sand (SM-SC)				
BH-04 @ 11.0-11.5	Silty Sand (SM)				
BH-04 @ 21.0-21.5	Silty to Clayey Sand (SM-SC)	22	21		
BH-04 @ 25.8-26.5	Silty Medium Sand (SM)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-04 @ 6.0-6.5					11.1%	1.3%	60.9%	37.8%
BH-04 @ 7.6-9.0					10.8%	0.7%	58.6%	40.7%
BH-04 @ 11.0-11.5					7.6%	9.4%	67.9%	22.7%
BH-04 @ 21.0-21.5					13.3%	18.5%	62.9%	18.7%
BH-04 @ 25.8-26.5					20.3%	1.3%	63.1%	35.7%

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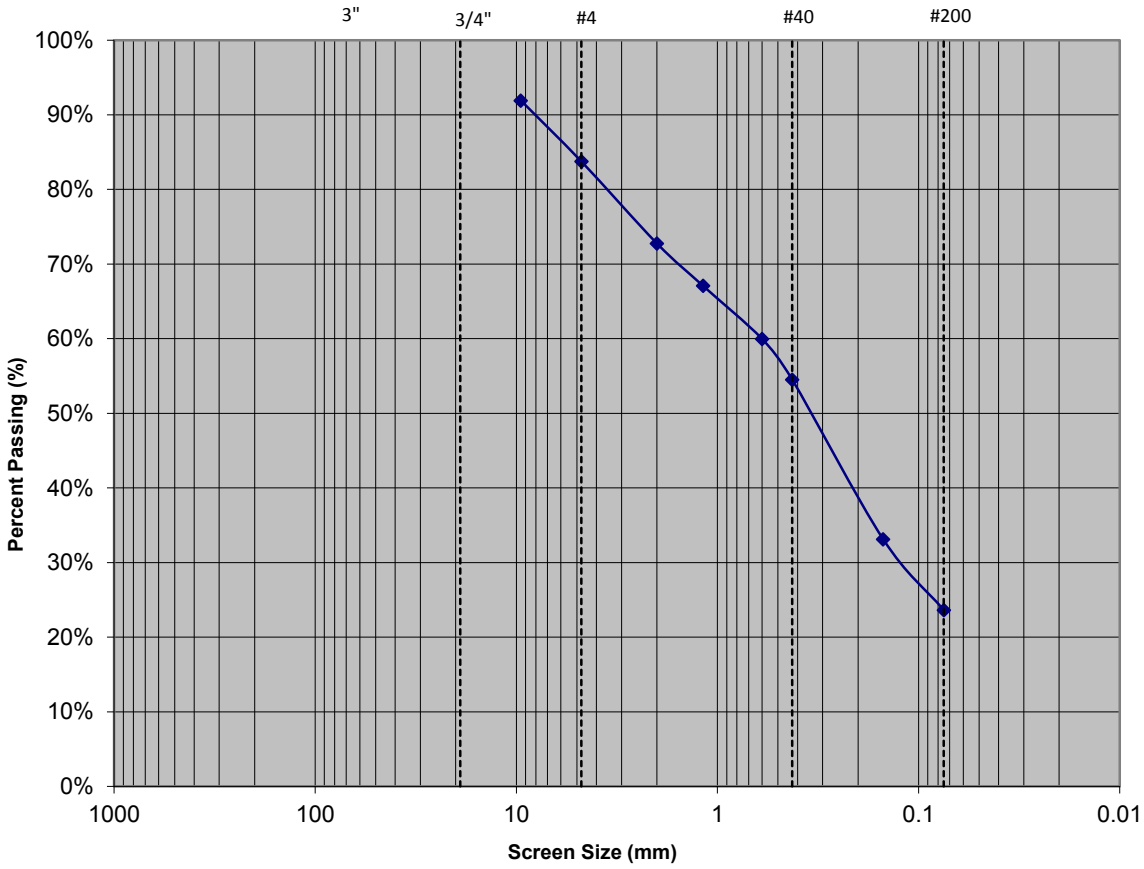
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-04 @ 31.0-31.5	Silty to Clayey Sand (SM-SC)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-04 @ 31.0-31.5					14.0%	16.2%	60.1%	23.6%

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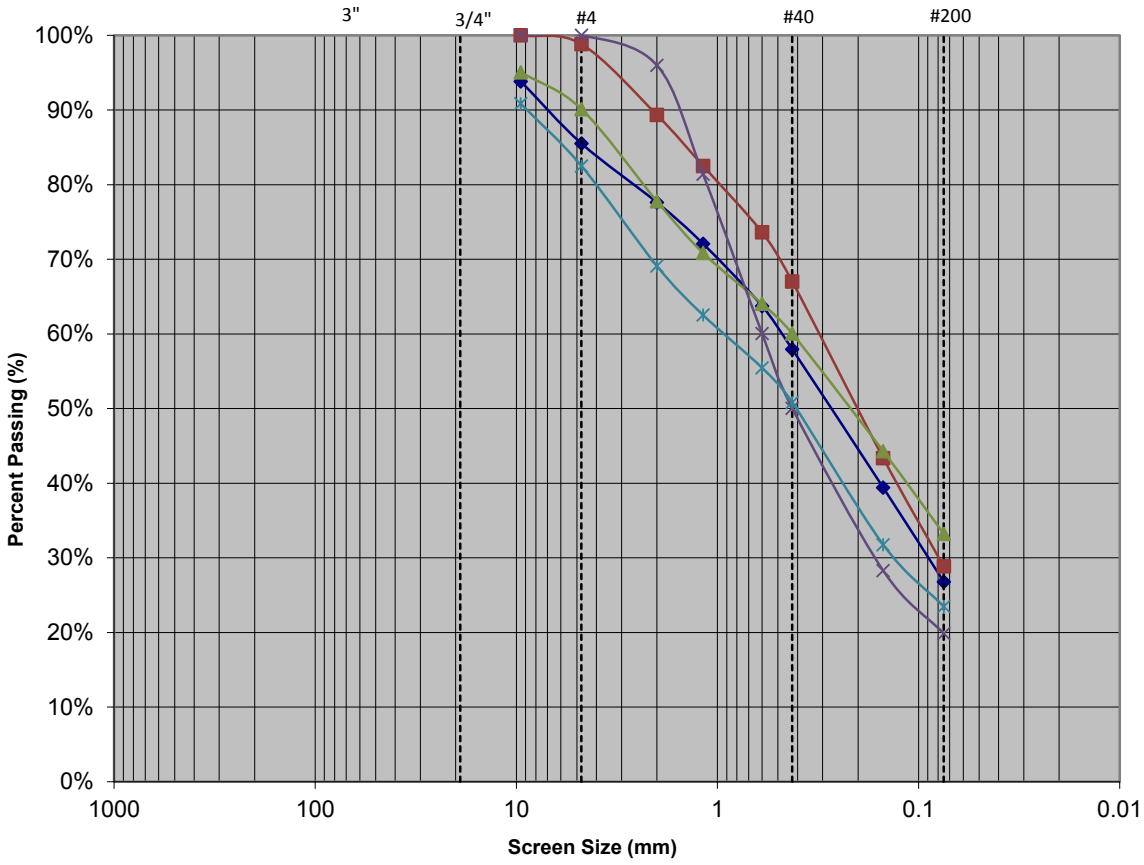
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



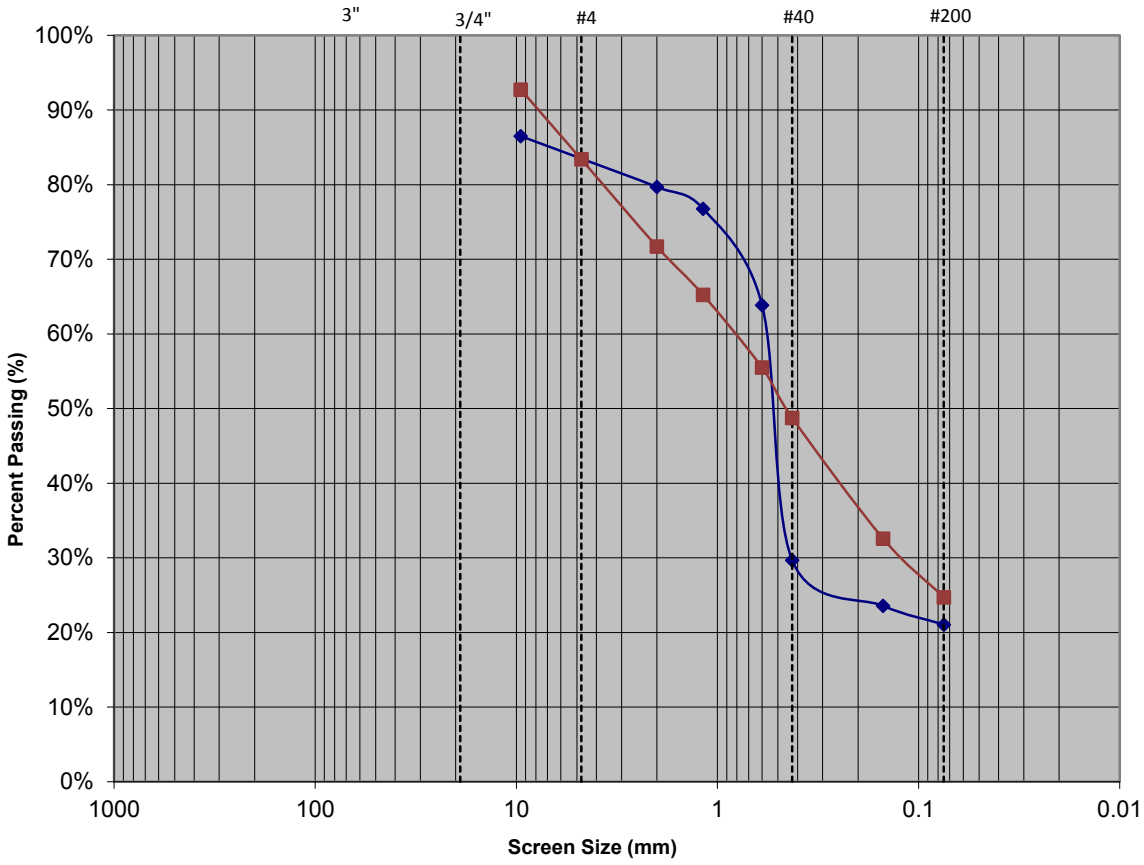
Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-05 @ 5.5-6.0	Silty to Clayey Sand (SM-SC) with Gravel				
BH-05 @ 7.5-8.9	Silty Sand (SM)				
BH-05 @ 10.5-11.0	Silty Med-Fine Sand with Gravel (SM)				
BH-05 @ 20.5-21.0	Silty Medium Sand (SM) with Gravel				
BH-05 @ 25.5-26.5	Silty Sand (SM) with Gravel				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-05 @ 5.5-6.0					9.1%	14.5%	58.7%	26.8%
BH-05 @ 7.5-8.9					7.3%	1.2%	70.0%	28.8%
BH-05 @ 10.5-11.0					9.5%	9.9%	56.9%	33.2%
BH-05 @ 20.5-21.0					14.5%	0.0%	80.1%	19.9%
BH-05 @ 25.5-26.5					14.7%	17.5%	59.0%	23.5%

Resource Concepts Inc
4010 Technology, Unit D Carson City, NV
775-883-1600 ofc/775/888-9904 fax

Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-05 @ 31.0-31.5	Silty Medium Sand (SM) with Gravel				
BH-05 @ 40.5-40.0	Silty Medium Sand (SM) with Gravel				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-05 @ 31.0-31.5					16.8%	16.5%	62.4%	21.1%
BH-05 @ 40.5-40.0					13.0%	16.6%	58.7%	24.7%

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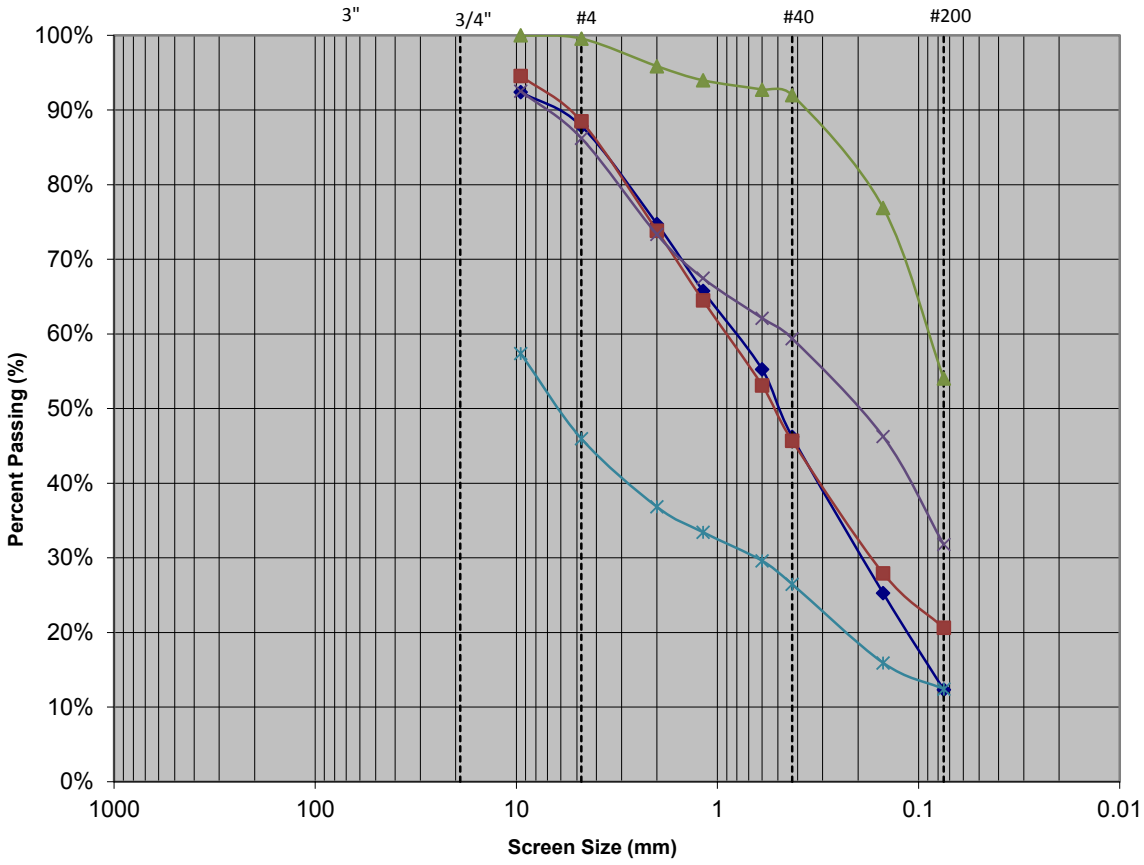
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-06 @ 5.5-6.0	Silty Sand with Gravel (SM)				
BH-06 @ 8.1-9.0	Silty Sand with Gravel (SM)				
BH-06 @ 10.5-11.0	Silty to Clayey Sand (SM-SC)				
BH-06 @ 11.0-11.5	Silty Sand (SM)				
BH-06 @ 20.5-21.0	Silty Medium Sand with Gravel (SM)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-06 @ 5.5-6.0					9.1%	12.2%	75.5%	12.3%
BH-06 @ 8.1-9.0					6.6%	11.5%	67.9%	20.6%
BH-06 @ 10.5-11.0					20.4%	0.4%	45.5%	54.0%
BH-06 @ 11.0-11.5					10.2%	13.8%	54.5%	31.8%
BH-06 @ 20.5-21.0					7.2%	54.0%	33.5%	12.4%

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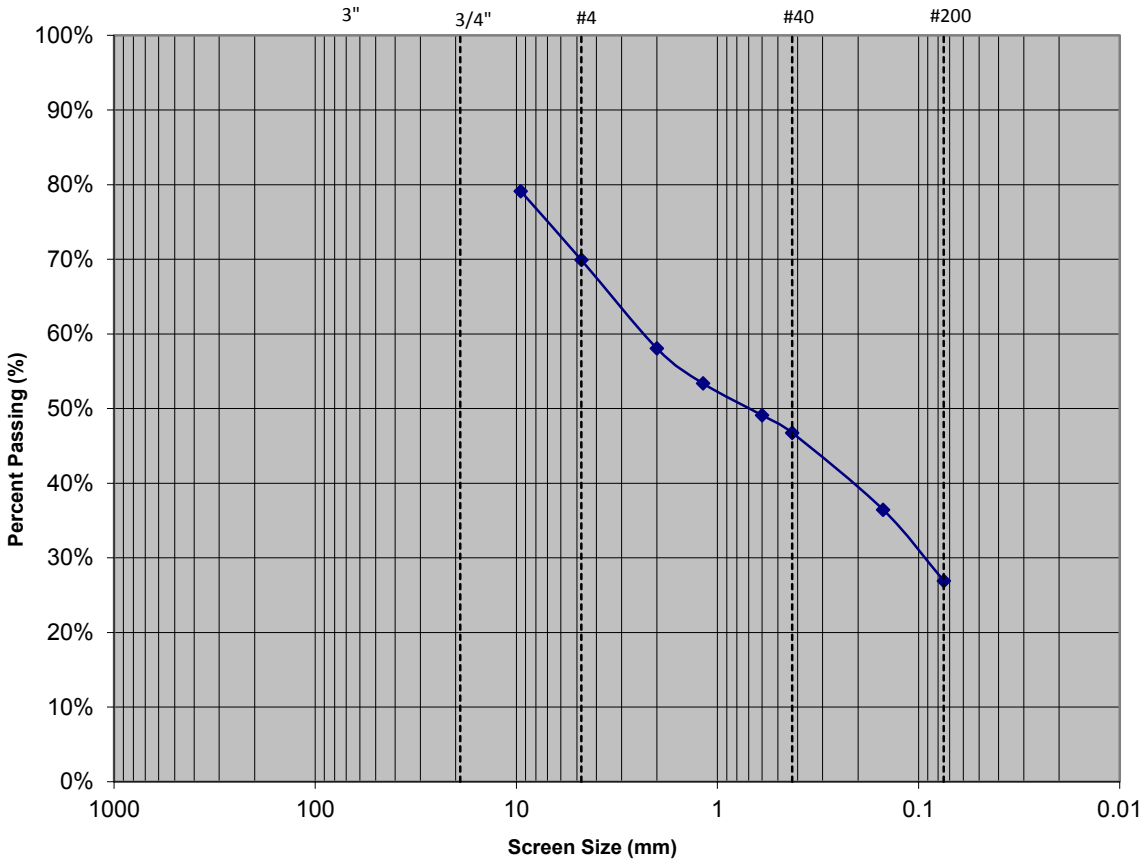
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-06 @ 30.0-30.5	Silty to Clayey Sand with Gravel (SM-SC)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-06 @ 30.0-30.5					13.2%	30.1%	43.0%	26.9%

Resource Concepts Inc
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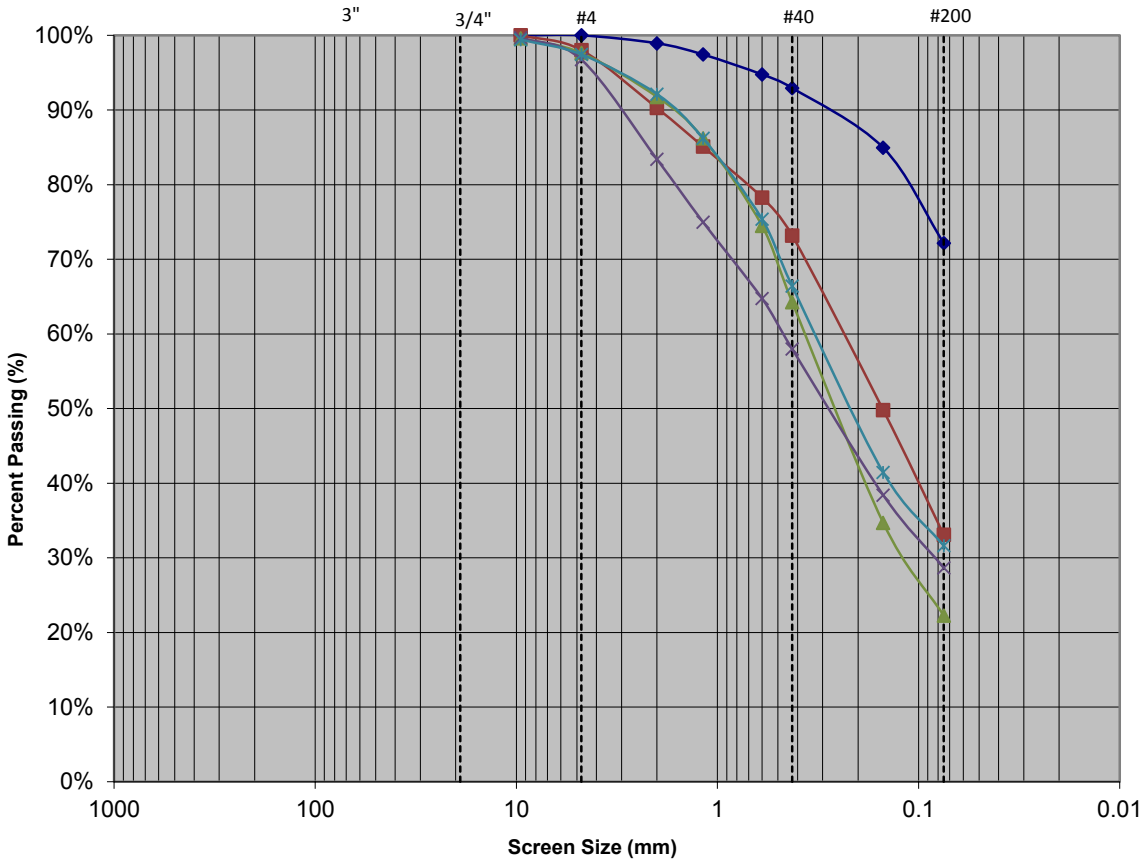
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-07 @ 3.0-4.0	Silty Sand (SM)				
BH-07 @ 5.5-6.0	Silty Sand (SM)				
BH-07 @ 11.0-11.5	Silty Sand (SM)				
BH-07 @ 20.5-21.0	Silty Medium Sand (SM)				
BH-07 @ 25.0-26.0	Silty Sand (SM)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-07 @ 3.0-4.0					20.8%	0.0%	27.8%	72.2%
BH-07 @ 5.5-6.0					10.5%	2.0%	64.9%	33.1%
BH-07 @ 11.0-11.5					8.6%	2.4%	75.4%	22.3%
BH-07 @ 20.5-21.0					15.5%	3.2%	68.1%	28.7%
BH-07 @ 25.0-26.0					22.9%	2.6%	65.8%	31.6%

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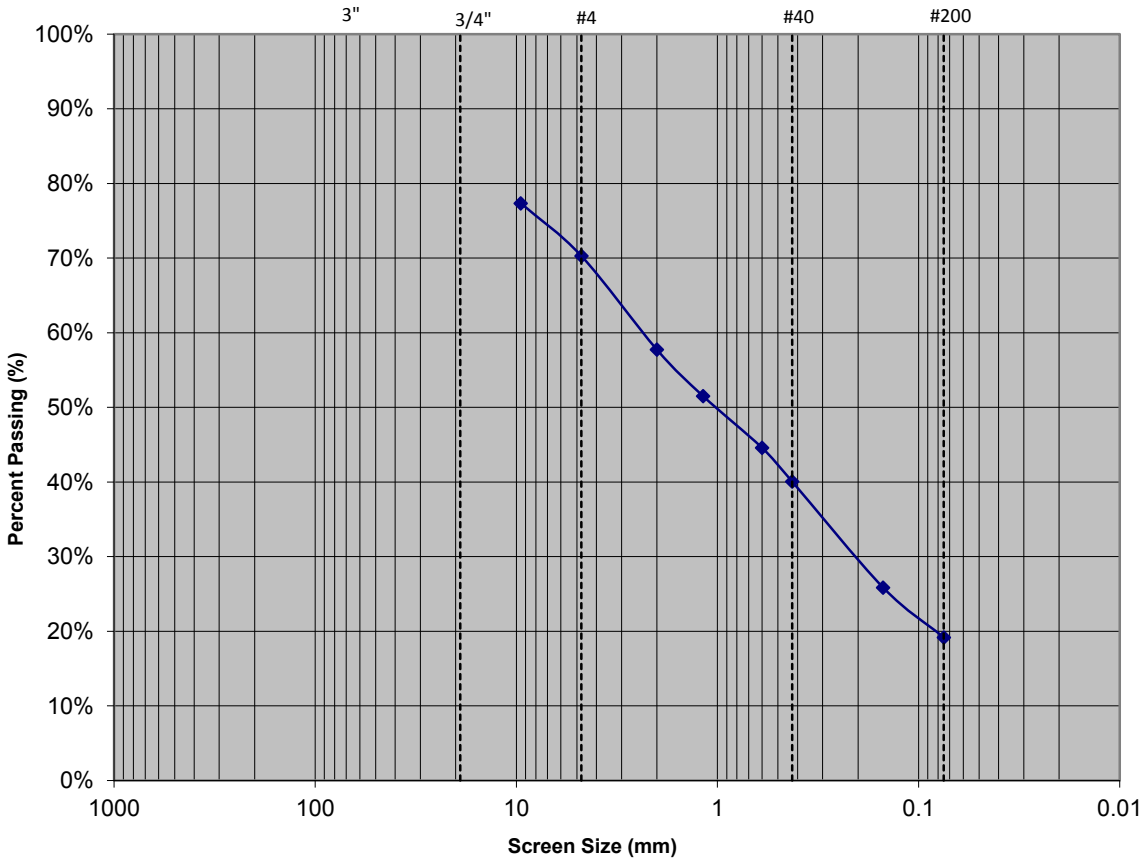
Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-07 @ 30.0-30.5	Medium Sand with Gravel (SP)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-07 @ 30.0-30.5					10.4%	29.7%	51.1%	19.2%

Resource Concepts Inc
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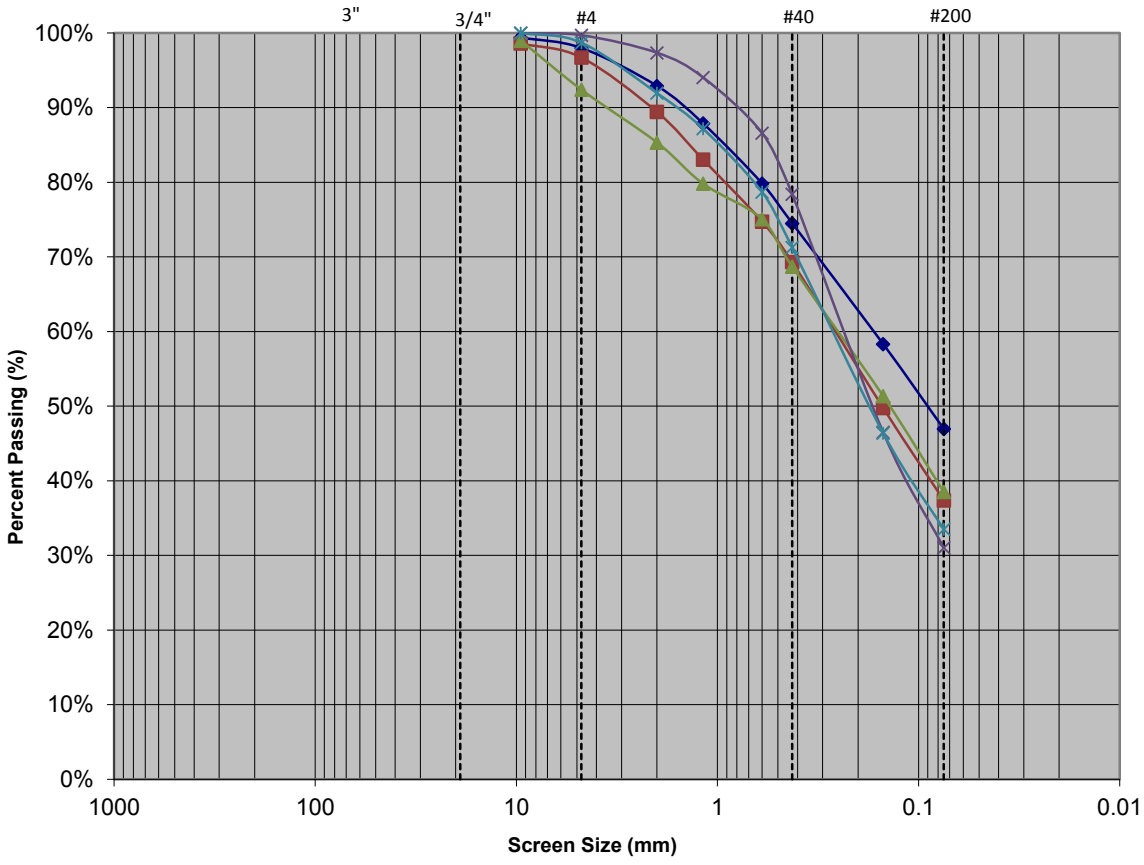
775-883-1600 ofc/775/888-9904 fax

Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-08 @ 1.0-2.0	Silty Sand (SM)				
BH-08 @ 4.0-5.0	Silty to Clayey Sand (SM-SC)				
BH-08 @ 6.0-6.5	Silty to Clayey Sand (SM-SC)	31	26		
BH-08 @ 10.5-11.0	Silty Sand (SM)				
BH-08 @ 15.5-16.5	Silty to Clayey Sand (SM-SC)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-08 @ 1.0-2.0					14.2%	2.0%	51.0%	47.0%
BH-08 @ 4.0-5.0					11.9%	3.3%	59.3%	37.4%
BH-08 @ 6.0-6.5					11.9%	7.6%	53.9%	38.5%
BH-08 @ 10.5-11.0					10.5%	0.3%	68.7%	31.0%
BH-08 @ 15.5-16.5					12.4%	1.3%	65.2%	33.5%

Resource Concepts Inc
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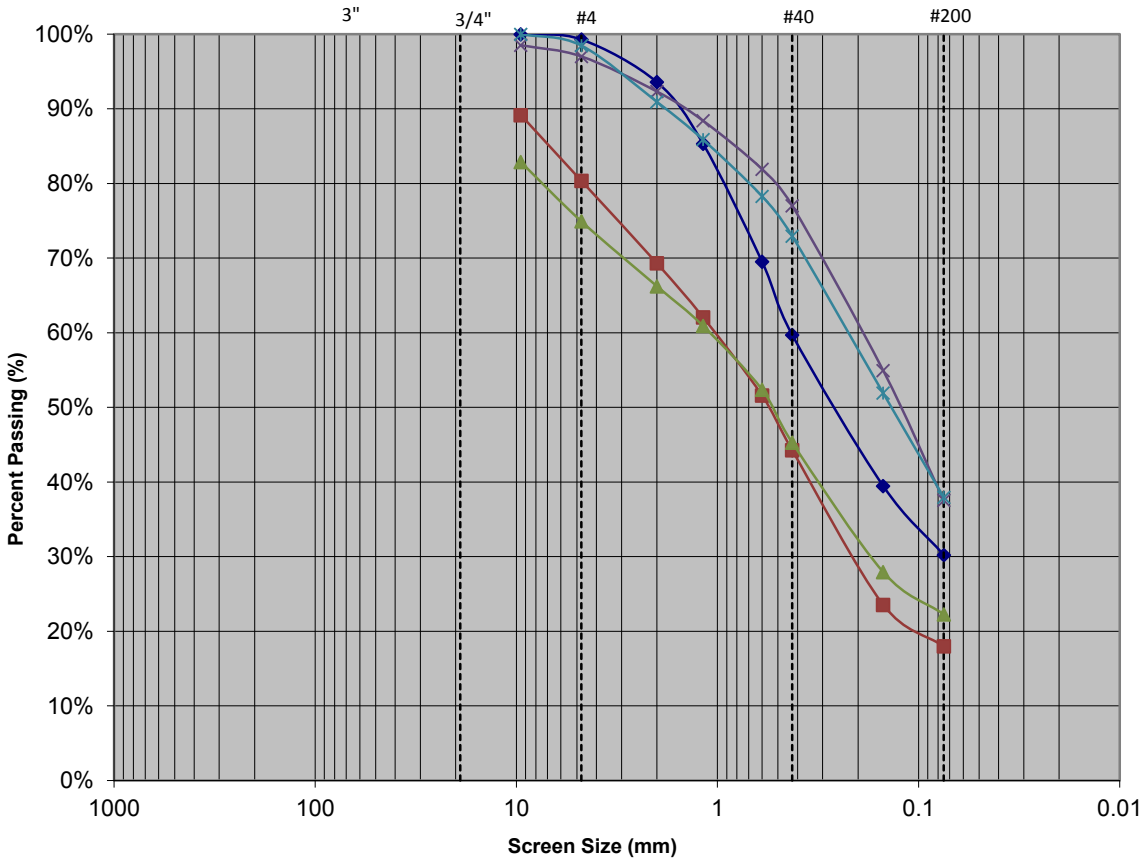
775-883-1600 ofc/775/888-9904 fax

Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 1/20/2015

GRAIN SIZE DISTRIBUTION



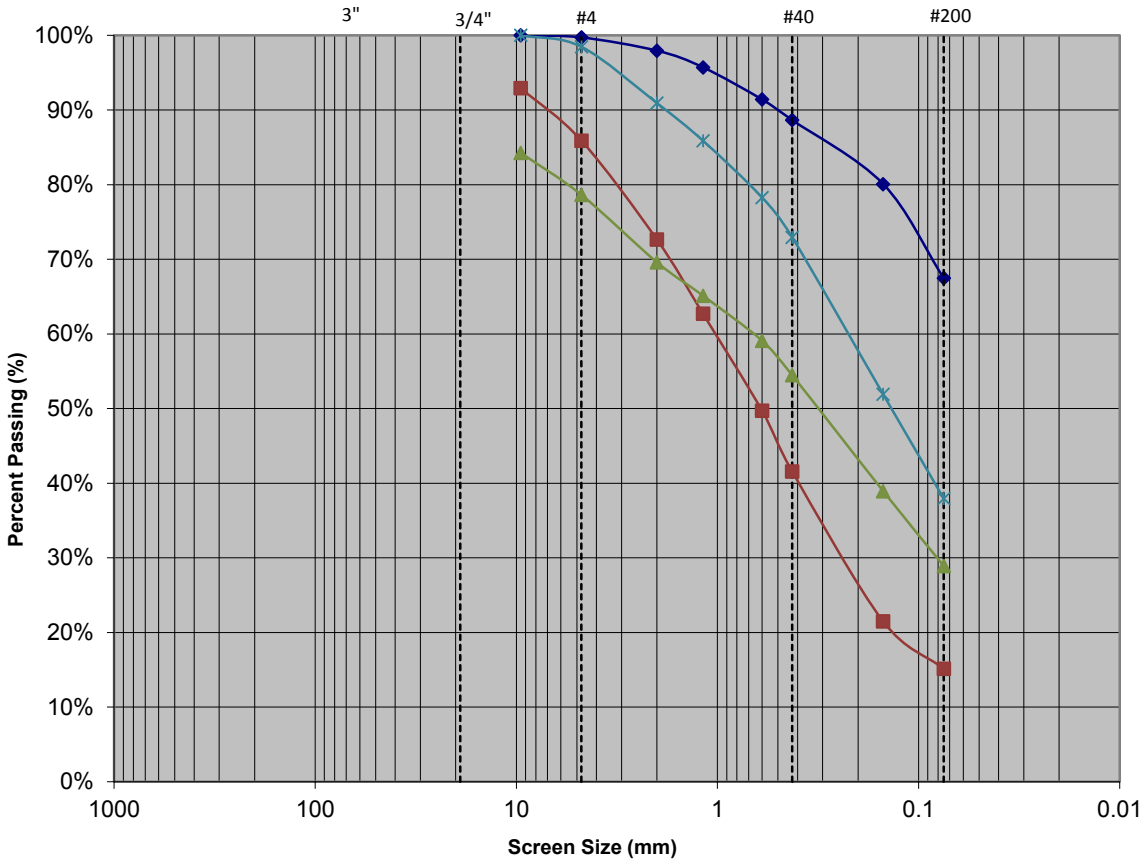
Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-08 @ 21.0-21.5	Silty to Clayey Medium Sand (SM-SC)				
BH-08 @ 25.3-26.5	Sand with Gravel (SP)				
BH-08 @ 31.0-31.5	Medium to Coarse Sand with Gravel (SP)				
BH-08 @ 40.5-41.0	Silty Sand with Trace Gravel (SM)				
BH-08 @ 50.5-51.0	Clayey Sand (SC)	26	17		

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-08 @ 21.0-21.5					17.3%	0.7%	69.1%	30.2%
BH-08 @ 25.3-26.5					12.2%	19.7%	62.4%	18.0%
BH-08 @ 31.0-31.5					10.0%	25.1%	52.7%	22.3%
BH-08 @ 40.5-41.0					17.5%	3.0%	59.5%	37.5%
BH-08 @ 50.5-51.0					16.7%	1.5%	60.5%	37.9%

Resource Concepts Inc
4010 Technology, Unit D Carson City, NV
775-883-1600 ofc/775/888-9904 fax

Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 2/25/2015

GRAIN SIZE DISTRIBUTION



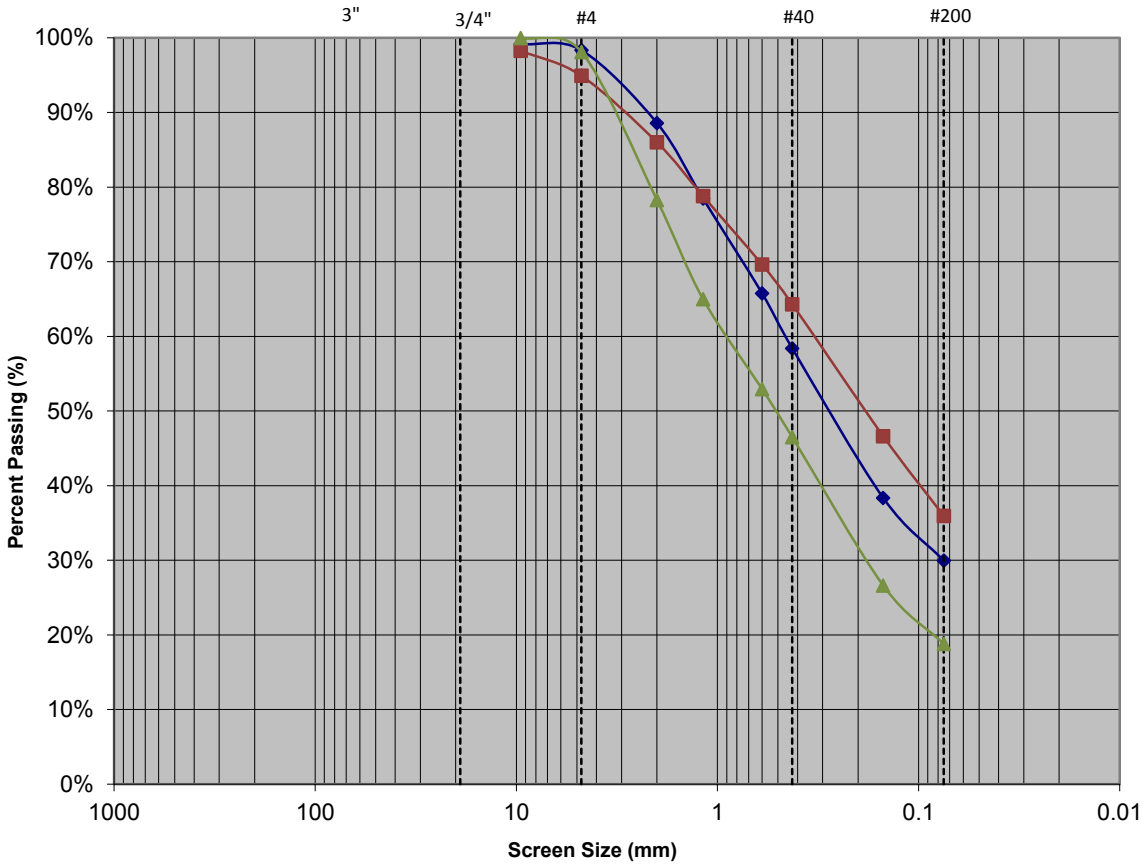
Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-09 @ 3.5-4.0	Silty to Clayey Sand (SM-SC)				
BH-09 @ 13.0-13.5	Silty Sand with Gravel (SM)				
BH-09 @ 20.5-21.0	Silty Medium-Fine Sand with Gravel (SM)				
BH-08 @ 50.5-51.0	Coarse Gray Sand (SP)				

Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-09 @ 3.5-4.0					20.5%	0.3%	32.3%	67.5%
BH-09 @ 13.0-13.5					6.4%	14.1%	70.8%	15.1%
BH-09 @ 20.5-21.0					15.8%	21.4%	49.7%	28.9%
BH-09 @ 30.0-31.5					12.3%	6.0%	78.9%	15.1%

Resource Concepts Inc
4010 Technology, Unit D Carson City, NV
775-883-1600 ofc/775/888-9904 fax

Project: Carson City Center Development
Project No: 15-104.1
Location: Carson City, Nevada
Date Sampled: 2/25/2015

GRAIN SIZE DISTRIBUTION



Sample Number	USCS Classification	LL	PL	Cc	Cu
BH-10 @ 5.5-6.0	Silty Medium-Fine Sand (SM)				
BH-10 @ 11.0-11.5	Silty/Clayey Med-Fine Sand (SM-SC)				
BH-10 @ 15.5-16.0	Silty Medium-Fine Sand (SM)				

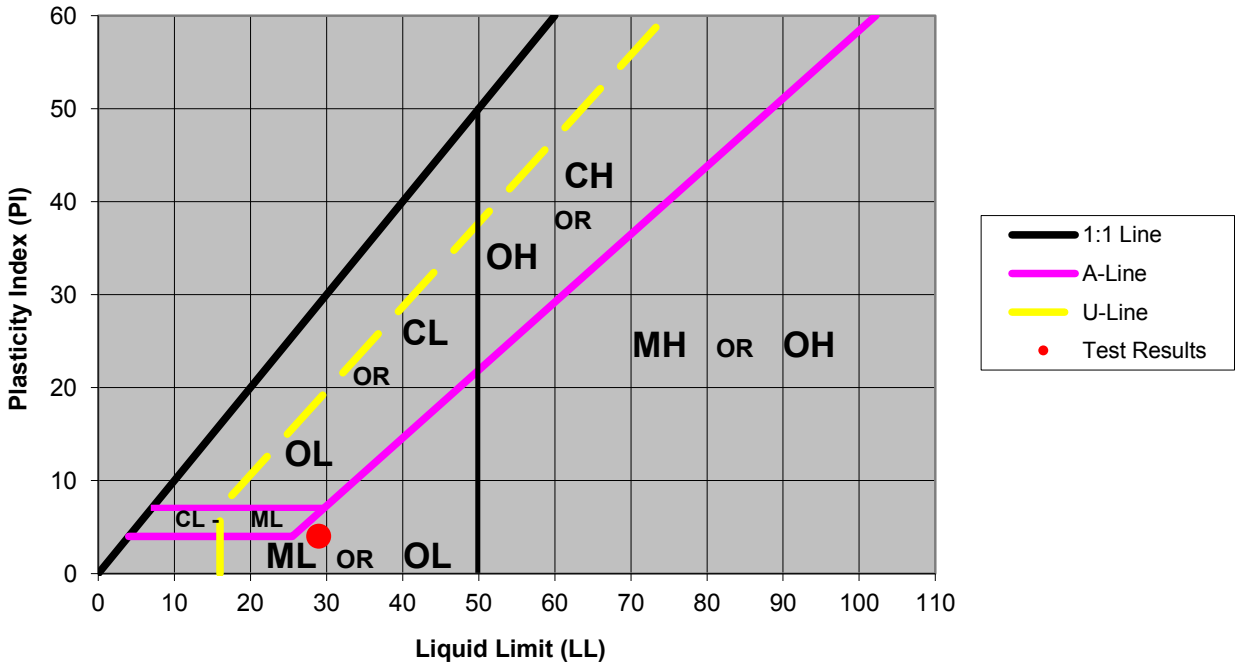
Sample Number	D100	D60	D30	D10	% Moisture	% Gravel	% Sand	% Silt/Clay
BH-10 @ 5.5-6.0					10.7%	1.7%	68.4%	30.0%
BH-10 @ 11.0-11.5					13.0%	5.1%	59.0%	35.9%
BH-10 @ 15.5-16.0					7.6%	1.9%	79.3%	18.8%

RESOURCE CONCEPTS INC

PLASTICITY INDEX

Project Name:		Carson City Center	
Project Number:		15.104.1	
Sample Number:		BH-01 @ 25.4-26.5	
Date:	3/9/2015	By:	DE

Plasticity Chart (ASTM D2487)



LIQUID LIMIT	29
PLASTIC LIMIT	25
PLASTICITY INDEX	4

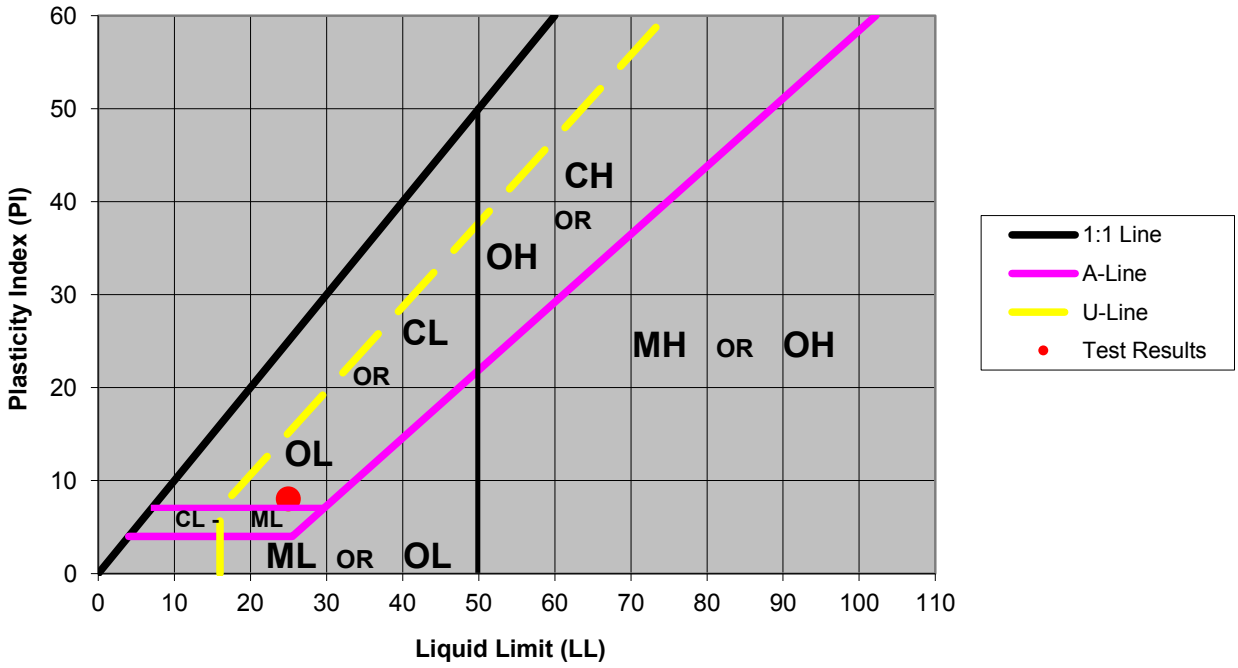
USCS Classification:
SM

RESOURCE CONCEPTS INC

PLASTICITY INDEX

Project Name:		Carson City Center	
Project Number:		15.104.1	
Sample Number:		BH-01 @ 40.5-41.0	
Date:	3/9/2015	By:	DE

Plasticity Chart (ASTM D2487)



LIQUID LIMIT	25
PLASTIC LIMIT	17
PLASTICITY INDEX	8

USCS Classification:

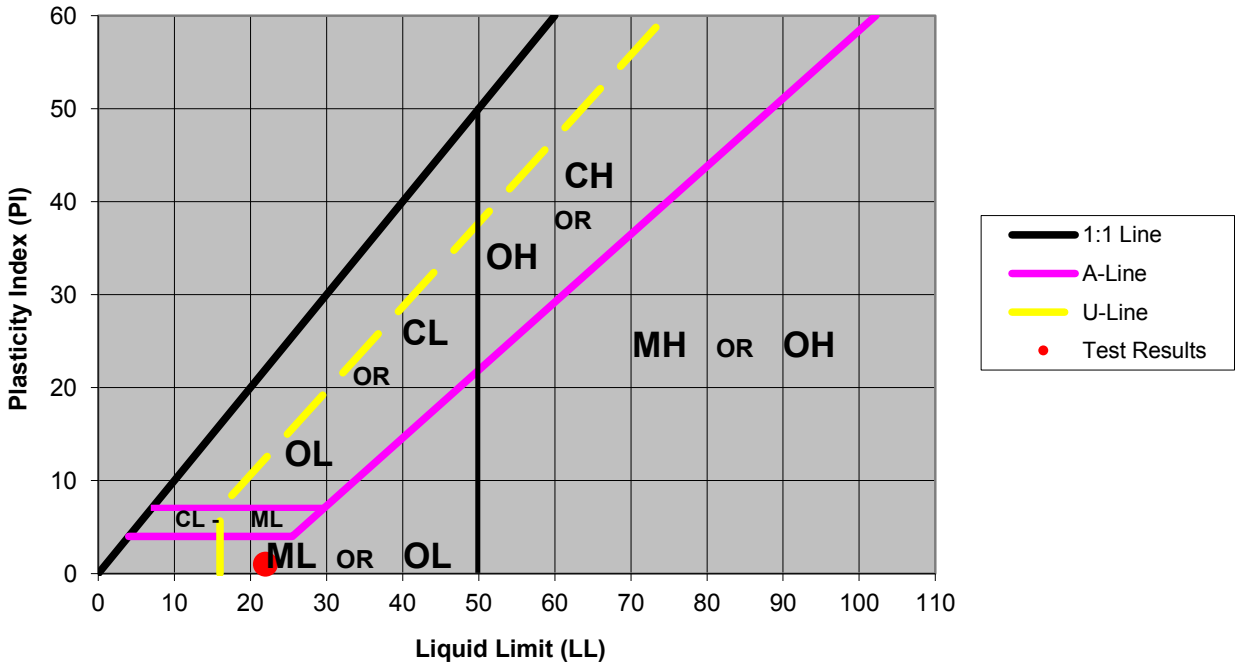
SC

RESOURCE CONCEPTS INC

PLASTICITY INDEX

Project Name:		Carson City Center	
Project Number:		15.104.1	
Sample Number:		BH-04 @ 21.0-21.5	
Date:	3/9/2015	By:	DE

Plasticity Chart (ASTM D2487)



LIQUID LIMIT	22
PLASTIC LIMIT	21
PLASTICITY INDEX	1

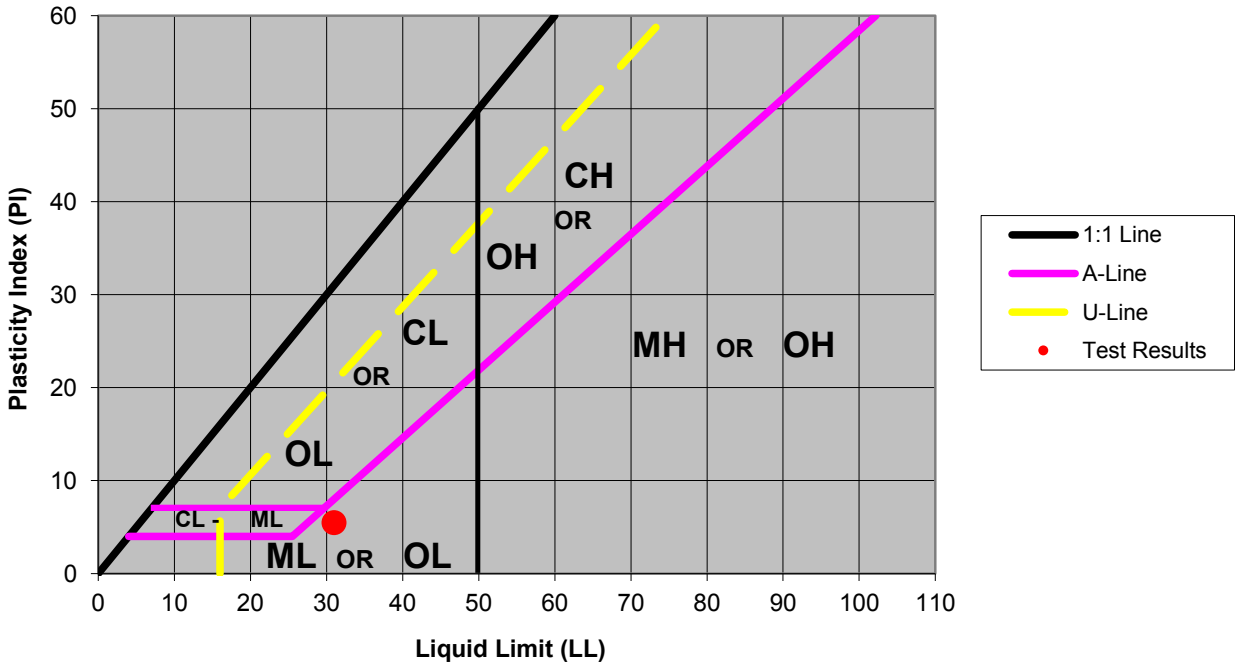
USCS Classification:
SM

RESOURCE CONCEPTS INC

PLASTICITY INDEX

Project Name:	Carson City Center		
Project Number:	15.104.1		
Sample Number:	BH-08 @ 5.5-6.0		
Date:	3/5/2015	By:	DE

Plasticity Chart (ASTM D2487)



LIQUID LIMIT	31
PLASTIC LIMIT	26
PLASTICITY INDEX	5

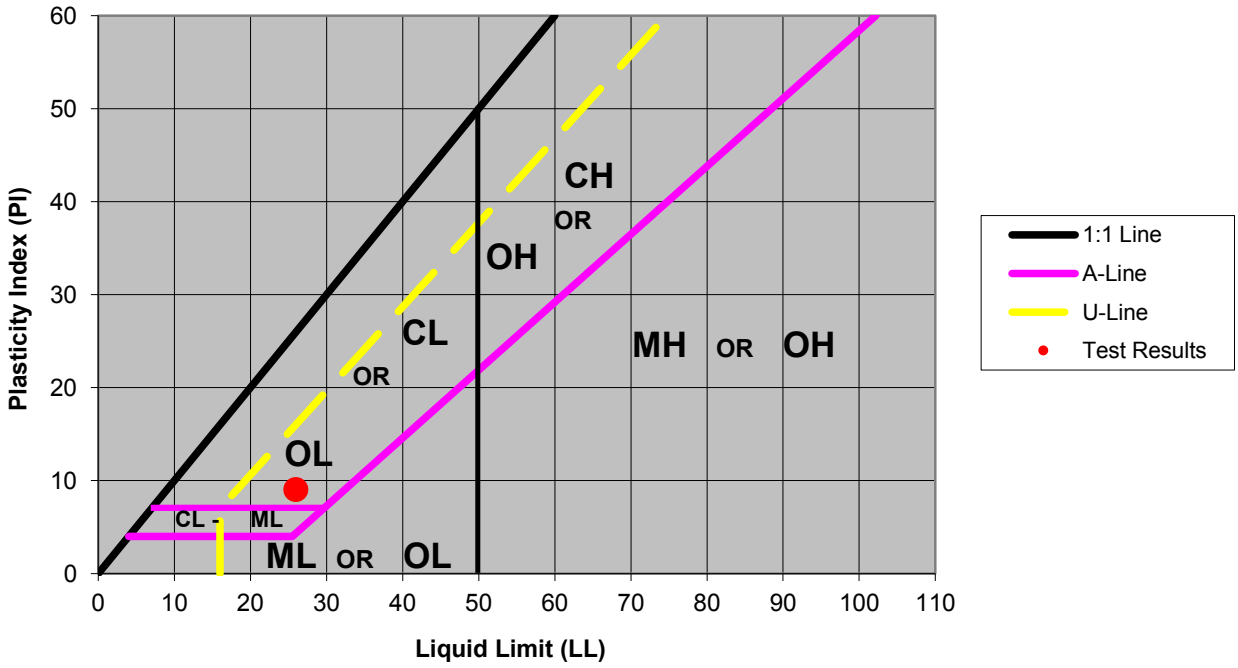
USCS Classification:
SM

RESOURCE CONCEPTS INC

PLASTICITY INDEX

Project Name:		Carson City Center	
Project Number:		15.104.1	
Sample Number:		BH-08 @ 51.0-51.5	
Date:	3/9/2015	By:	DE

Plasticity Chart (ASTM D2487)

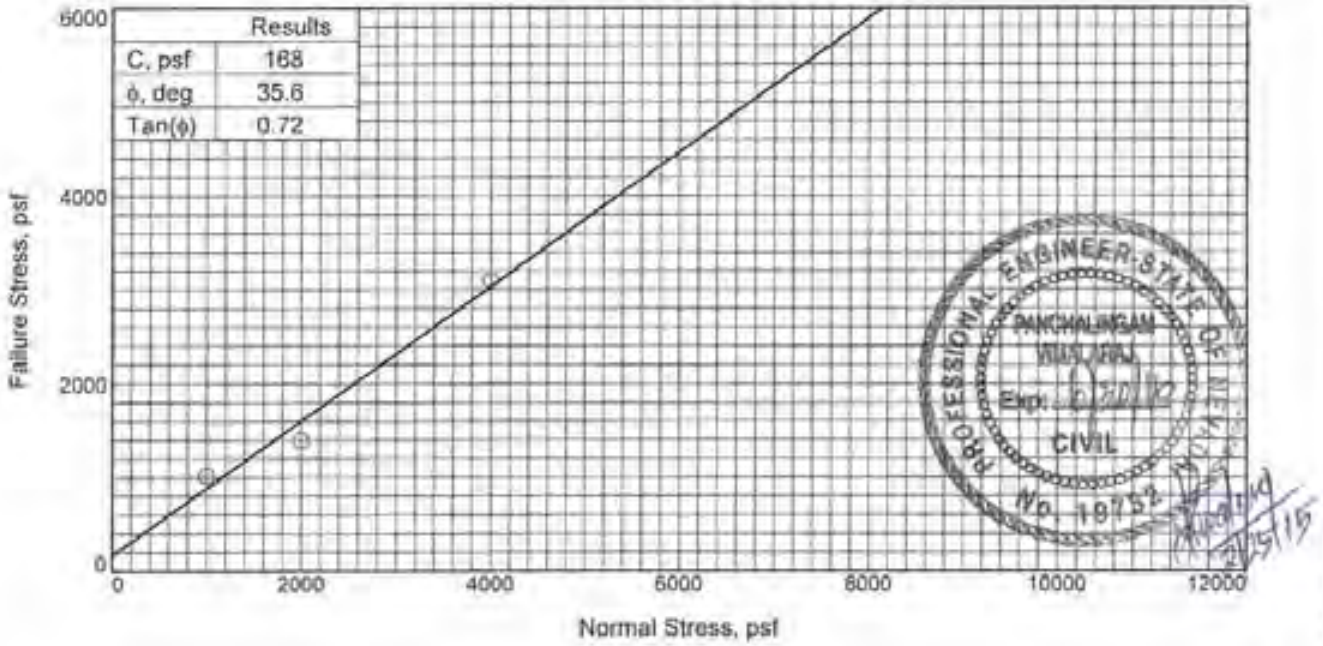


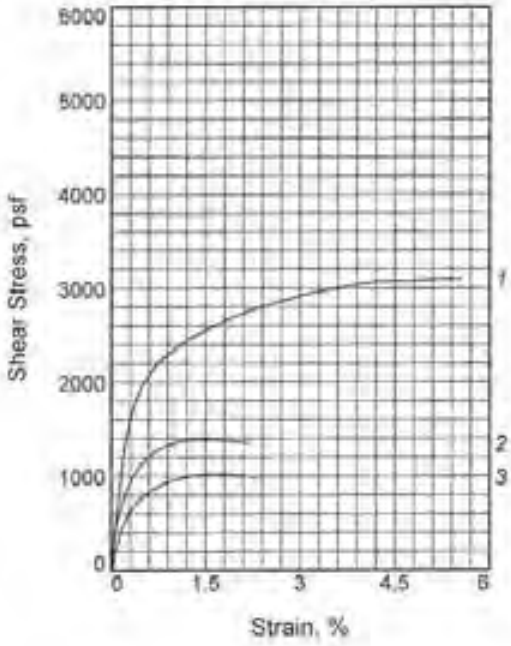
LIQUID LIMIT	26
PLASTIC LIMIT	17
PLASTICITY INDEX	9

USCS Classification:

SC

Results	
C, psf	168
ϕ, deg	35.6
Tan(ϕ)	0.72





Sample No.		1	2	3
Initial	Water Content, %	12.7	12.7	12.7
	Dry Density, pcf	117.5	117.3	116.5
	Saturation, %	78.9	78.4	76.6
	Void Ratio	0.4343	0.4371	0.4472
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.98	0.97	0.98
At Test	Water Content, %	16.0	16.1	16.2
	Dry Density, pcf	117.5	117.3	117.0
	Saturation, %	99.3	99.2	99.4
	Void Ratio	0.4343	0.4371	0.4410
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.98	0.97	0.98
Normal Stress, psf		4000	2000	1000
Failure Stress, psf		3100	1393	1022
Strain, %		5.4	1.6	1.5
Ult. Stress, psf				
Strain, %				
Strain rate, in./min.		0.02	0.02	0.02

Sample Type: Remolded
Description:

LL= N/A **PI=** N/A
Assumed Specific Gravity= 2.7
Remarks: Laboratory Log 4249

Figure _____

Client: RCI

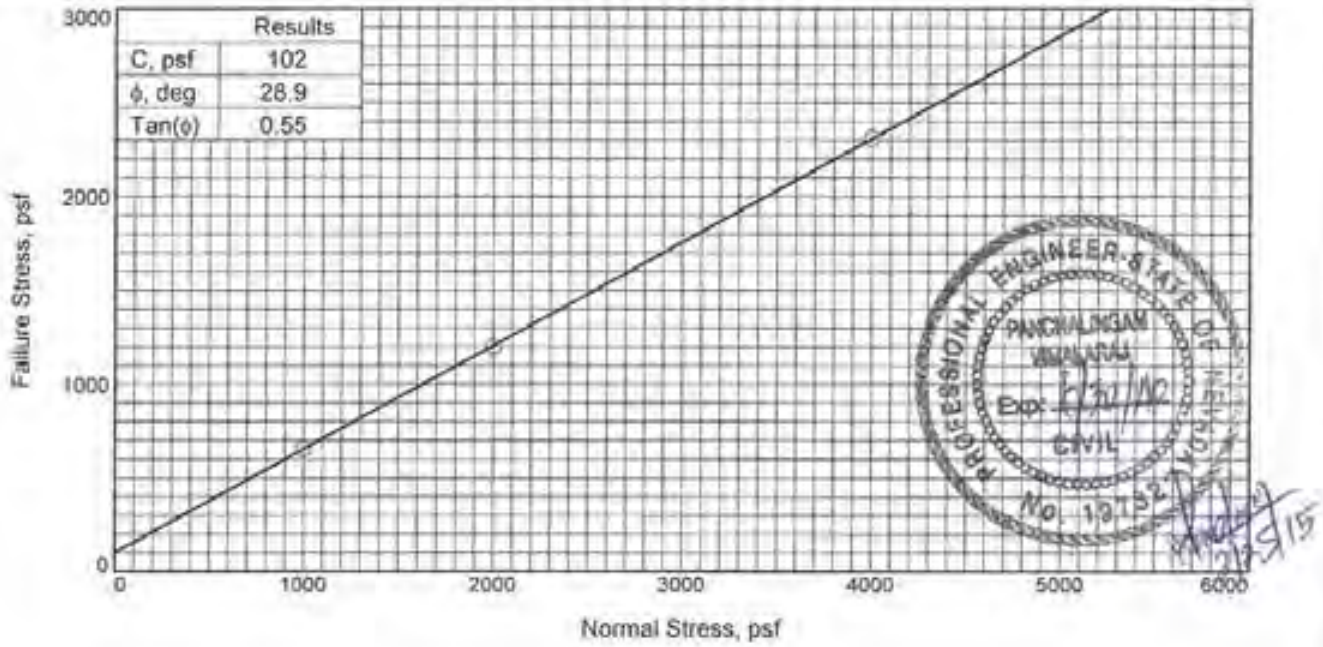
Project: Testing As Ordered

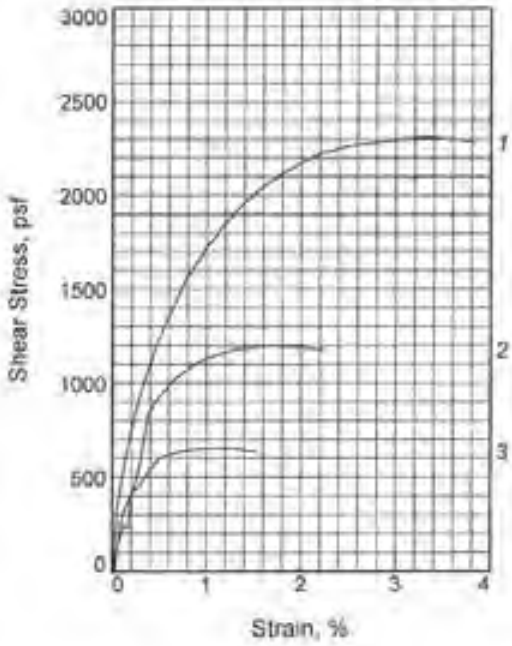
Source of Sample: Carson City Center **Depth:** 5.5-6'
Sample Number: BH-02
Proj. No.: 0086-15-1 **Date Sampled:** N/A

DIRECT SHEAR TEST REPORT

BLACK EAGLE CONSULTING, INC.

Tested By: A. Dapra **Checked By:** A. Dapra





Sample No.		1	2	3
Initial	Water Content, %	10.3	10.3	10.3
	Dry Density, pcf	115.6	115.0	116.4
	Saturation, %	60.5	59.5	61.8
	Void Ratio	0.4581	0.4657	0.4486
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	16.1	16.6	16.5
	Dry Density, pcf	117.3	116.3	116.4
	Saturation, %	99.8	100.0	99.6
	Void Ratio	0.4365	0.4494	0.4486
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.99	1.00
Normal Stress, psf		4000	2000	1000
Failure Stress, psf		2309	1199	657
Strain, %		3.3	1.6	1.1
Ult. Stress, psf				
Strain, %				
Strain rate, in./min.		0.02	0.02	0.02

Sample Type: Remolded
Description:

LL= N/A **PI=** N/A
Assumed Specific Gravity= 2.7
Remarks: Laboratory Log 4249

Client: RCI

Project: Testing As Ordered

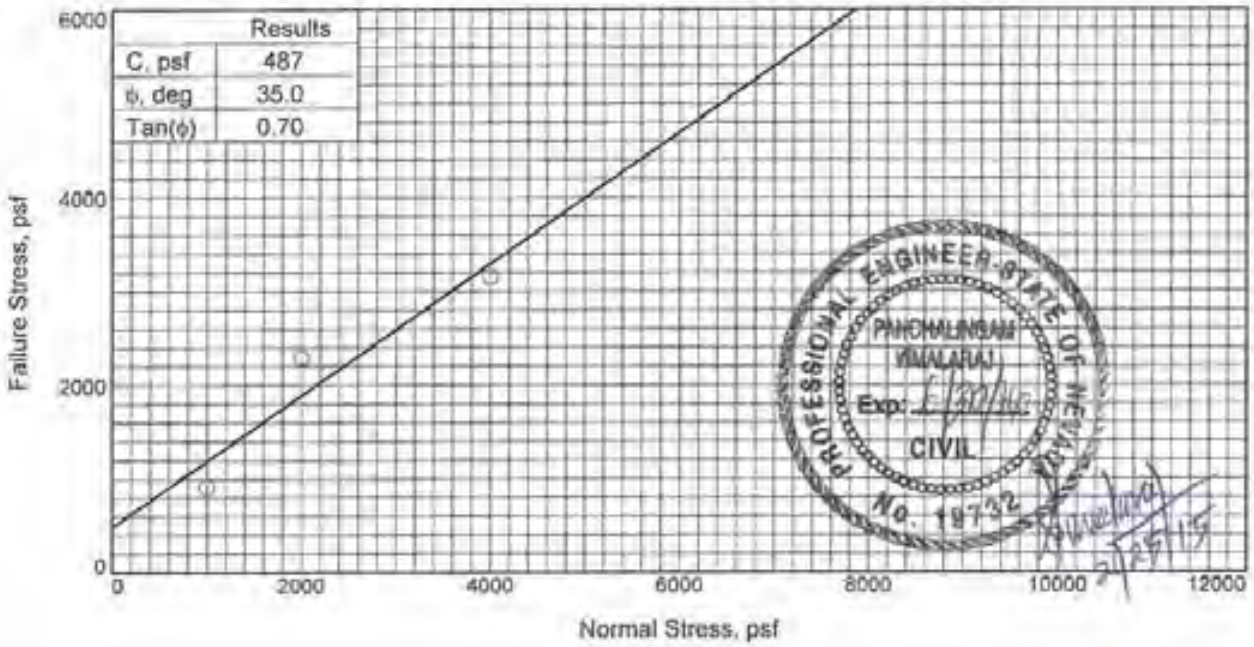
Source of Sample: Carson City Center **Depth:** 10-10.5'
Sample Number: BH-02
Proj. No.: 0086-15-1 **Date Sampled:** N/A

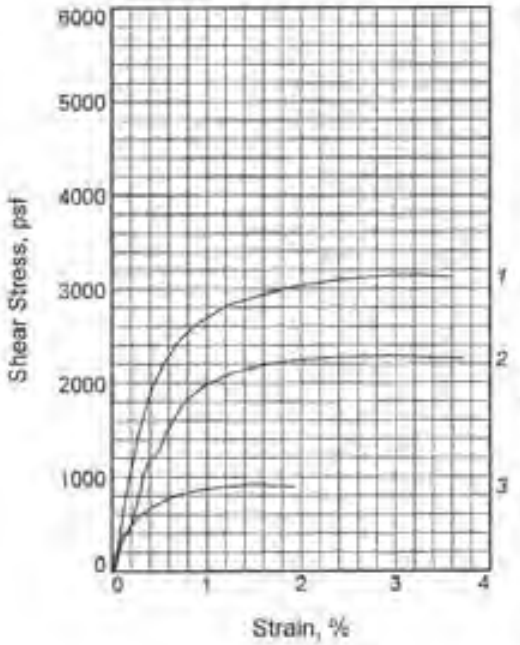
DIRECT SHEAR TEST REPORT

Figure _____

BLACK EAGLE CONSULTING, INC.

Tested By: A. Dapra **Checked By:** A. Dapra





Sample No.		1	2	3
Initial	Water Content, %	11.3	11.3	11.3
	Dry Density, pcf	120.4	120.1	120.4
	Saturation, %	76.0	75.5	76.2
	Void Ratio	0.4003	0.4029	0.3994
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.99	0.99
At Test	Water Content, %	13.1	14.9	14.8
	Dry Density, pcf	121.6	120.1	120.4
	Saturation, %	91.7	99.9	99.8
	Void Ratio	0.3863	0.4029	0.3994
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.98	0.99	0.99
Normal Stress, psf		4000	2000	1000
Failure Stress, psf		3154	2293	918
Strain, %		3.2	3.0	1.4
Ult. Stress, psf				
Strain, %				
Strain rate, in./min.		0.02	0.02	0.02

Sample Type: Remolded
Description:

LL= N/A **PI=** N/A
Assumed Specific Gravity= 2.7
Remarks: Laboratory Log 4249

Client: RCI

Project: Testing As Ordered

Source of Sample: Carson City Center **Depth:** 11-11.5
Sample Number: B-02
Proj. No.: 0086-15-1 **Date Sampled:** N/A

DIRECT SHEAR TEST REPORT

BLACK EAGLE CONSULTING, INC.

Figure _____

Tested By: A. Dapra **Checked By:** A. Dapra

3/13/2015

Resource Concepts Inc.
340 North Minnesota Street
Carson City, NV 89703
Attn: Jim Koch

OrderID: *1502147*
Amended

Dear: Jim Koch

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 2/5/2015. Additional comments are located on page 2 of this report.

This amended report was issued to correct the project name and number.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Andy Smith
Laboratory Manager

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Western Environmental Testing Laboratory
Report Comments

Resource Concepts Inc. - 1502147 Amended

General Comments

None

Specific Comments

None

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

Report Legend

B	–	Blank contamination; Analyte detected above the method reporting limit in an associated blank
HT	–	Sample analyzed beyond the accepted holding time
J	–	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
M	–	Reported value is estimated; The sample matrix interfered with the analysis
N	–	There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
NC	–	Not calculated due to matrix interference
Q	–	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
S	–	Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
SC	–	Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
U	–	The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit

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Western Environmental Testing Laboratory
Analytical Report

Resource Concepts Inc.
340 North Minnesota Street
Carson City, NV 89703
Attn: Jim Koch
Phone: (775) 883-1600 **Fax:** (775) 883-1656
PO\Project: *Carson City Development Center / 15-104.1*

Date Printed: 3/13/2015
OrderID: *1502147*
Amended

Customer Sample ID: BH-02 7.5-8.9
WETLAB Sample ID: 1502147-001

Collect Date/Time: 1/14/2015
Receive Date: 2/5/2015 16:43

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Paste pH	SW846 9045D	7.87	pH Units	1		2/9/2015	NV00925
Resistivity	SM 2510B	3500	ohms.cm	1	1.0	2/17/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sulfate	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sample Preparation							
Saturated Paste Preparation	CSTPM S:1.0	Complete		1		2/6/2015	NV00925
3:1 DI Water Extraction	WL 3.0	Complete		1		2/6/2015	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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fax (702) 622-2868
EPA LAB ID: NV00932

Customer Sample ID: BH-04 3.0-4.0
WETLAB Sample ID: 1502147-002
Collect Date/Time: 1/14/2015
Receive Date: 2/5/2015 16:43

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Paste pH	SW846 9045D	7.68	pH Units	1		2/9/2015	NV00925
Resistivity	SM 2510B	15000	ohms.cm	1	1.0	2/17/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sulfate	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sample Preparation							
Saturated Paste Preparation	CSTPM S:1.0	Complete		1		2/6/2015	NV00925
3:1 DI Water Extraction	WL 3.0	Complete		1		2/6/2015	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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EPA LAB ID: NV00932

Customer Sample ID: BH-06 11.0-11.5
WETLAB Sample ID: 1502147-003
Collect Date/Time: 1/15/2015
Receive Date: 2/5/2015 16:43

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Paste pH	SW846 9045D	7.70	pH Units	1		2/9/2015	NV00925
Resistivity	SM 2510B	41000	ohms.cm	1	1.0	2/17/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sulfate	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sample Preparation							
Saturated Paste Preparation	CSTPM S:1.0	Complete		1		2/6/2015	NV00925
3:1 DI Water Extraction	WL 3.0	Complete		1		2/6/2015	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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EPA LAB ID: NV00932

Customer Sample ID: BH-06 15.0-16.5
WETLAB Sample ID: 1502147-004

Collect Date/Time: 1/15/2015
Receive Date: 2/5/2015 16:43

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Paste pH	SW846 9045D	7.99	pH Units	1		2/9/2015	NV00925
Resistivity	SM 2510B	4700	ohms.cm	1	1.0	2/17/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sulfate	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sample Preparation							
Saturated Paste Preparation	CSTPM S:1.0	Complete		1		2/6/2015	NV00925
3:1 DI Water Extraction	WL 3.0	Complete		1		2/6/2015	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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fax (702) 622-2868
EPA LAB ID: NV00932

Customer Sample ID: BH-08 1.0-2.0
WETLAB Sample ID: 1502147-005
Collect Date/Time: 1/16/2015
Receive Date: 2/5/2015 16:43

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
Paste pH	SW846 9045D	8.11	pH Units	1		2/9/2015	NV00925
Resistivity	SM 2510B	5400	ohms.cm	1	1.0	2/17/2015	NV00925
Anions by Ion Chromatography							
Chloride	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sulfate	EPA 300.0	ND	mg/kg	15	15	2/9/2015	NV00925
Sample Preparation							
Saturated Paste Preparation	CSTPM S:1.0	Complete		1		2/6/2015	NV00925
3:1 DI Water Extraction	WL 3.0	Complete		1		2/6/2015	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC15020374	Blank 1	Chloride	EPA 300.0	ND	mg/L
QC15020376	Blank 1	Sulfate	EPA 300.0	ND	mg/L
QC15020663	Blank 1	Resistivity	SM 2510B	ND	ohms.cm

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC15020374	LCS 1	Chloride	EPA 300.0	10.3	10.0	103	mg/L
QC15020376	LCS 1	Sulfate	EPA 300.0	26.3	25.0	105	mg/L
QC15020390	LCS 1	Paste pH	SW846 9045D	6.97	7.00	100	ph Units
QC15020663	LCS 1	Resistivity	SM 2510B	1405	1412	100	ohms.cm

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC15020390	Duplicate	Paste pH	SW846 9045D	1502147-001	7.87	8.05	pH Units	2 %
QC15020663	Duplicate	Resistivity	SM 2510B	1502147-001	3472	3378	ohms.cm	3 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result	MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC15020374	MS 1	Chloride	EPA 300.0	1502192-003	14.9	20.3	20.4	5.00	mg/L	108	111	<1%
QC15020374	MS 2	Chloride	EPA 300.0	1502200-002	10.4	15.6	15.6	5.00	mg/L	104	106	<1%
QC15020376	MS 1	Sulfate	EPA 300.0	1502192-003	ND	10.6	10.7	10.0	mg/L	106	107	1%
QC15020376	MS 2	Sulfate	EPA 300.0	1502200-002	29.3	39.1	40.4	10.0	mg/L	98	111	3%

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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Appendix C

Engineering Analyses

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: CC Center
Project No: 15-104.1
Location: BDLG A

Strip Footing

Bearing Capacity Calculation

Peck, Hanson, and Thornburn

Calculated By: GL

Loading Variables and Capacities

Horizontal Load, H	0
Vertical Load, V	1
Ultimate Bearing Capacity, q_{ult}	
Allowable Bearing Capacity, q_{allow}	
Safety Factor, SF	3

Footing Properties

Width, B	2
Embed. Depth, D	2
Length, L	50

Soil Properties

Unit Weight, γ_x	115
Unit Weight, γ_y	115
Phi Angle Φ	32
Cohesion, C	0
N_{gamma}	22.02
N c	35.49
N_q	23.18
Surcharge, W	0

Meyerhof Factors

Notes: No surcharge loads or inclined loads considered.

Comments:

Bearing Capacity Equation

$$qult = [1/2\ B\gamma_y N\gamma\ (1- 0.3\ (B/L))\ (1-1.5\ (H/V))^2] + [CNc\ (1+0.2\ B/L)\ (1+0.2D/B)\ (1- 1.3\ H/V)] + [(w + D\gamma_x)\ (Nq - 1)\ (1 + 0.2\ B/L)\ (1 + 0.1\ D/B)\ (1 - 1.5\ H/V)] + (w + D\gamma_x)$$

Ultimate Bearing Capacity **8,388.3 psf**

Safety Factor **3**

Allowable Bearing Capacity **2,796.1 psf**

Use 2,500 pounds per squarefoot

Components of PHT Equation	
1st Term	2501.9
2nd Term	0.0
3rd Term	5656.4
4th Term	230.0
Total	**8,388.3 psf**

Figure BC

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: CC Center
Project No: 15-104.1
Location: BDLG A

Bearing Capacity Calculation

Peck, Hanson, and Thornburn

Calculated By: DS

Loading Variables and Capacities

Horizontal Load, H	0
Vertical Load, V	1
Ultimate Bearing Capacity, q_{ult}	
Allowable Bearing Capacity, q_{allow}	
Safety Factor, SF	3

Footing Properties

Width, B	4
Embed. Depth, D	4
Length, L	100

Soil Properties

Unit Weight, γ_x	120
Unit Weight, γ_y	120
Phi Angle Φ	34
Cohesion, C	0
N_{gamma}	31
N c	42
N_q	29
Surcharge, W	0

Notes: No surcharge loads or inclined loads considered.

Comments:

Bearing Capacity Equation

$$qult = [1/2\ B\gamma_y N\gamma\ (1- 0.3\ (B/L))\ (1-1.5\ (H/V))^2] + [CNc\ (1+0.2\ B/L)\ (1+0.2D/B)\ (1- 1.3\ H/V)] + [(w + D\gamma_x)\ (Nq - 1)\ (1 + 0.2\ B/L)\ (1 + 0.1\ D/B)\ (1 - 1.5\ H/V)] + (w + D\gamma_x)$$

Ultimate Bearing Capacity **22,733.0 psf**

Safety Factor **3 psf** **Limit to 6,000 psf Due to Settlement**

Allowable Bearing Capacity **7,577.7 psf**

Components of PHT Equation

1st Term	7350.7
2nd Term	0.0
3rd Term	14902.3
4th Term	480.0
Total	**22,733.0 psf**

Figure BC

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: CC Center
Project No: 15-104.1
Location: BDLG A

Bearing Capacity Calculation

Peck, Hanson, and Thornburn

Calculated By: GL

Loading Variables and Capacities

Horizontal Load, H	0
Vertical Load, V	1
Ultimate Bearing Capacity, q_{ult}	
Allowable Bearing Capacity, q_{allow}	
Safety Factor, SF	3

Footing Properties

Width, B	6
Embed. Depth, D	5
Length, L	6

Soil Properties

Unit Weight, γ_x	115
Unit Weight, γ_y	115
Phi Angle Φ	32
Cohesion, C	0
N_{gamma}	22.02
N c	35.49
N_q	23.18
Surcharge, W	0

Meyerhof Factors

Notes: No surcharge loads or inclined loads considered.

Comments:

Bearing Capacity Equation

$$qult = [1/2\ B\gamma_y N\gamma\ (1- 0.3\ (B/L))\ (1-1.5\ (H/V))^2] + [CNc\ (1+0.2\ B/L)\ (1+0.2D/B)\ (1- 1.3\ H/V)] + [(w + D\gamma_x)\ (Nq - 1)\ (1 + 0.2\ B/L)\ (1 + 0.1\ D/B)\ (1 - 1.5\ H/V)] + (w + D\gamma_x)$$

Ultimate Bearing Capacity **22,472.4 psf**

Safety Factor **3**

Allowable Bearing Capacity **7,490.8 psf**

Use 2,500 pounds per squarefoot

Components of PHT Equation	
1st Term	5317.8
2nd Term	0.0
3rd Term	16579.6
4th Term	575.0
Total	**22,472.4 psf**

Figure BC

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: CC Center
Project No: 15-104.1
Location: BDLG A

Bearing Capacity Calculation

Peck, Hanson, and Thornburn

Calculated By: DS

Loading Variables and Capacities

Horizontal Load, H	0
Vertical Load, V	1
Ultimate Bearing Capacity, q_{ult}	
Allowable Bearing Capacity, q_{allow}	
Safety Factor, SF	3

Footing Properties

Width, B	8
Embed. Depth, D	8
Length, L	100

Soil Properties

Unit Weight, γ_x	120
Unit Weight, γ_y	120
Phi Angle Φ	34
Cohesion, C	0
N_{gamma}	31
N c	42
N_q	29
Surcharge, W	0

Notes: No surcharge loads or inclined loads considered.

Comments:

Bearing Capacity Equation

$$qult = [1/2\ B\gamma_y N\gamma\ (1- 0.3\ (B/L))\ (1\text{-}1.5\ (H/V))^2] + [CNc\ (1+0.2\ B/L)\ (1+0.2D/B)\ (1- 1.3\ H/V)] + [(w + D\gamma_x)\ (Nq - 1)\ (1 + 0.2\ B/L)\ (1 + 0.1\ D/B)\ (1 - 1.5\ H/V)] + (w + D\gamma_x)$$

Ultimate Bearing Capacity	**45,524.0**	**psf**
Safety Factor	**3**	**psf**
Allowable Bearing Capacity	**15,174.7**	**psf**

Limit to 7,000 due to Settlement

Components of PHT Equation

1st Term	14522.9
2nd Term	0.0
3rd Term	30041.1
4th Term	960.0
Total	**45,524.0 psf**

Figure BC

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: Carson City Center
Project No: 15-104.1

Date: 3/20/2015

Run # BDLG A
Calculated By: G. Luce

Settlement Computation For Cohesionless Soils

FHWA Soils and Foundations

***B*=**	2	
D=	2	
***Q allow* =**	2,500	**psf**

$$\Delta H = H \, 1/C' \log \frac{Po + \Delta P}{Po}$$

Thickness of soil Layer considered, H	4	Blow Count	12
Bearing Capacity Index, C'	50	SPT Corr. Factor	1.3
Existing Overburden Pressure, psf, P_o	460	Corrected Blow Count	15.6
Distributed Embank. Pressure, psf, P	1000		
Final Pressure, PF	1460		

Note: $PF = P_o + P$

$C' = \frac{1 + e_o}{1}$

Comments:

Settlement **0.040 ft. = 0.482 inches**

NOTES: 2 B thickness considered for Strip Ftg. Westergaard stress distribution assumed.

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: Carson City Center
Project No: 15-104.1

Date: 3/20/2015

Run # BDLG A
Calculated By: G. Luce

Settlement Computation For Cohesionless Soils

FHWA Soils and Foundations

***B*=**	2	
D=	5	
***Q allow* =**	6,000	**psf**

$$\Delta H = H \frac{1}{C'} \log \frac{Po + \Delta P}{Po}$$

Thickness of soil Layer considered, H	6.5	Blow Count	12
Bearing Capacity Index, C'	50	SPT Corr. Factor	1.3
Existing Overburden Pressure, psf, P_o	750	Corrected Blow Count	15.6
Distributed Embank. Pressure, psf, P	1800		
Final Pressure, PF	2550		

Note: $PF = P_o + P$

$C' = \frac{1 + e_o}{1}$

Comments:

Settlement **0.069 ft. = 0.829 inches**

NOTES: 1.5 B thickness considered for Square Ftg. Westergaard stress distribution assumed.

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: Carson City Center
Project No: 15-104.1

Date: 3/20/2015

Run # BDLG B
Calculated By: G. Luce

Settlement Computation For Cohesionless Soils

FHWA Soils and Foundations

***B*=**	4	
D=	5	
***Q allow* =**	6,500	**psf**

$$\Delta H = H \frac{1}{C'} \log \frac{Po + \Delta P}{Po}$$

Thickness of soil Layer considered, H	6	Blow Count	12
Bearing Capacity Index, C'	50	SPT Corr. Factor	1.3
Existing Overburden Pressure, psf, P_o	920	Corrected Blow Count	15.6
Distributed Embank. Pressure, psf, P	1950		
Final Pressure, PF	2870		

Note: $PF = P_o + P$

$C' = \frac{1 + e_o}{1}$

Comments:

Settlement **0.059 ft. = 0.711 inches**

NOTES: 1.5 B thickness considered for Square Ftg. Westergaard stress distribution assumed.

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: Carson City Center
Project No: 15-104.1

Date: 3/20/2015

Run # BDLG A
Calculated By: G. Luce

Settlement Computation For Cohesionless Soils

FHWA Soils and Foundations

***B*=**	6	
D=	5	
***Q allow* =**	7,000	**psf**

$$\Delta H = H \, 1/C' \log \frac{Po + \Delta P}{Po}$$

Thickness of soil Layer considered, H	9	Blow Count	12
Bearing Capacity Index, C'	50	SPT Corr. Factor	1.3
Existing Overburden Pressure, psf, P_o	1092	Corrected Blow Count	15.6
Distributed Embank. Pressure, psf, P	2100		
Final Pressure, PF	3192		

Note: $PF = P_o + P$

$C' = \frac{1 + e_o}{1}$

Comments:

Settlement **0.084 ft. = 1.006 inches**

NOTES: 1.5 B thickness considered for Square Ftg. Westergaard stress distribution assumed.

Resource Concepts Inc
4010 Technology Way Ste D Carson City, NV
775 883 776 883-1600 ofc/775-888-9904 fax

Project: Carson City Center
Project No: 15-104.1

Date: 3/20/2015

Run # BDLG A
Calculated By: G. Luce

Settlement Computation For Cohesionless Soils

FHWA Soils and Foundations

***B*=**	8	
D=	10	
***Q allow* =**	7,000	**psf**

$$\Delta H = H \; 1/C' \log \frac{Po + \Delta P}{Po}$$

Thickness of soil Layer considered, H	12	Blow Count	21
Bearing Capacity Index, C'	50	SPT Corr. Factor	0.95
Existing Overburden Pressure, psf, P_o	1840	Corrected Blow Count	19.95
Distributed Embank. Pressure, psf, P	2100		
Final Pressure, PF	3940		

Note: $PF = P_o + P$

$C' = \frac{1 + e_o}{1}$

Comments:

Settlement **0.079 ft. = 0.952 inches**

NOTES: 1.5 B thickness considered for Square Ftg. Westergaard stress distribution assumed.

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775 883 776 883-1600 ofc/775-888-9904 fax

Project: Carson City Center
Project No: 15-104.1

Date: 3/20/2015

Run # BDLG A
Calculated By: G. Luce

Settlement Computation For Cohesionless Soils

FHWA Soils and Foundations

***B*=**	10	
D=	10	
***Q allow* =**	7,000	**psf**

$$\Delta H = H \frac{1}{C'} \log \frac{Po + \Delta P}{Po}$$

Thickness of soil Layer considered, H	15	Blow Count	21
Bearing Capacity Index, C'	60	SPT Corr. Factor	0.95
Existing Overburden Pressure, psf, P_o	2012	Corrected Blow Count	19.95
Distributed Embank. Pressure, psf, P	2100		
Final Pressure, PF	4112		

Note: $PF = P_o + P$

$C' = \frac{1 + e_o}{1}$

Comments:

Settlement **0.078 ft. = 0.931 inches**

NOTES: 1.5 B thickness considered for Square Ftg. Westergaard stress distribution assumed.

Liquefaction Analysis Using SPT

Project Name: City Center BDLG A WORST CASE
Project Number: 15.104.1
Boring: SH-8,9,10

a_{max}/g	0.61	Include Kσ (Y/N)	N
Magnitude	7.00	Use NCEER $CRR_{7.5}$ (1) or Rauch $CRR_{7.5}$ (2)	2
Groundwater Depth, Ft	16.0	Minimum Factor of Safety for Liquefaction	1.3
Reference Pressure, p_a	2000		
Unit Weight of Water	62.4		
Soil Unit Weight, pcf	115		

MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ From Graph

Depth, ft	$N_1/_{60}$	Fines Content, FC (%)	$N_1/_{60}$, Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
3.5	5	47	11.0	402.5	402.5	0.99	1.00	0.120	0.122	0.438	Above GWT	0.279		
6	5	37	11.0	690.0	690.0	0.99	1.00	0.120	0.122	0.435	Above GWT	0.281		
8.5	5	39	11.0	977.5	977.5	0.98	1.00	0.120	0.122	0.433	Above GWT	0.282		
11	8	31	14.1	1265.0	1265.0	0.98	1.00	0.154	0.151	0.430	Above GWT	0.351		
13.5	16	25	24.4	1552.5	1552.5	0.97	1.00	0.275	0.280	0.428	Above GWT	0.654		
16	18	34	26.2	1840.0	1540.0	0.97	1.00	0.308	0.318	0.426	LIQUEFIABLE	0.748	1.1	0.33
18.5	18	30	25.5	2127.5	1971.5	0.96	1.00	0.294	0.302	0.456	LIQUEFIABLE	0.661	1.1	0.33
21	18	30	25.5	2415.0	2103.0	0.95	1.00	0.294	0.302	0.462	LIQUEFIABLE	0.625	1.1	0.33
26	30	19	35.5	2990.0	2366.0	0.94	1.00	0.800	0.800	0.522	NL	1.533		
31	30	22	36.8	3565.0	2629.0	0.92	1.00	0.800	0.800	0.546	NL	1.464		
36	30	26	38.7	4140.0	2892.0	0.88	1.00	0.800	0.800	0.557	NL	1.437		
41	30	36	41.0	4715.0	3155.0	0.84	1.00	0.800	0.800	0.554	NL	1.444		
46	30	33	40.3	5290.0	3418.0	0.79	1.00	0.800	0.800	0.541	NL	1.480		
51	31	36	42.2	5865.0	3681.0	0.74	1.00	0.800	0.800	0.521	NL	1.536		
													TOTAL	0.99

Liquefaction Analysis Using SPT

Project Name: City Center BDLG B WORST CASE
Project Number: 15-104.1
Boring: B-1-2-7

a_{max}/g	0.81	Include K_σ (Y/N)	N
Magnitude	7.00	Use NCEER $CRR_{7.5}$ (1) or Rauch $CRR_{7.5}$ (2)	2
Groundwater Depth, Ft	16.0	Minimum Factor of Safety for Liquefaction	1.3
Reference Pressure, p_a	2000		
Unit Weight of Water	62.4		
Soil Unit Weight, pcf	115		

MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ From Graph

Depth, ft	$N_{1,60}$	Fines Content, FC (%)	$N_{1,60}$, Adj. for Fines	σ_v, psf	σ'_v, psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
3.5	28.72	30	37.9	402.5	402.5	0.99	1.00	0.800	0.800	0.438	Above GWT	1.828		
6	13.37	32	20.5	690.0	690.0	0.99	1.00	0.224	0.222	0.435	Above GWT	0.509		
8.5	26.37	36	35.1	977.5	977.5	0.98	1.00	0.800	0.800	0.433	Above GWT	1.849		
11	22.39	14	25.5	1265.0	1265.0	0.98	1.00	0.295	0.303	0.430	Above GWT	0.704		
13.5	27.79	25	35.3	1552.5	1552.5	0.97	1.00	0.800	0.800	0.428	Above GWT	1.870		
16	21.70	30	29.8	1840.0	1840.0	0.97	1.00	0.445	0.451	0.426	LIQUEFIABLE	1.060		
18.5	22.55	39	30.7	2127.5	1971.5	0.96	1.00	0.800	0.800	0.456	NL	1.753		
21	12.83	40	20.4	2415.0	2103.0	0.95	1.00	0.222	0.220	0.482	LIQUEFIABLE	0.457	1.2	0.39
26	7.37	53	13.8	2990.0	2366.0	0.94	1.00	0.151	0.149	0.522	LIQUEFIABLE	0.285	1	0.6
31	22.70	23	29.0	3565.0	2629.0	0.92	1.00	0.368	0.412	0.546	LIQUEFIABLE	0.754	0.9	0.54
36	20.43	12	22.6	4140.0	2892.0	0.88	1.00	0.250	0.251	0.557	LIQUEFIABLE	0.451	1.3	0.78
41	17.74	46	26.3	4715.0	3155.0	0.84	1.00	0.309	0.320	0.554	LIQUEFIABLE	0.577	1.1	0.66
46	20.16	30	28.0	5290.0	3418.0	0.79	1.00	0.349	0.369	0.541	LIQUEFIABLE	0.662	0.9	0.54
51	36.01	23	43.7	5865.0	3681.0	0.74	1.00	0.800	0.800	0.521	NL	1.536		
													TOTAL	4.32

Liquefaction Analysis Using SPT

Project Name: City Center BDLG C WORST CASE
Project Number: 15-104.1
Boring: BH-3-4-7

a_{max}/g	0.81	include K_σ (Y/N)	N
Magnitude	7.00	Use NCEER $CRR_{7.5}$ (1) or Rauch $CRR_{7.5}$ (2)	2
Groundwater Depth, Ft	16.0	Minimum Factor of Safety for Liquefaction	1.3
Reference Pressure, p_a	2000		
Unit Weight of Water	62.4		
Soil Unit Weight, pcf	115		

MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ From Graph

Depth, ft	$N_{1,60}$	Fines Content, FC (%)	$N_{1,60}$, Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
3.5	30.63	30	40.1	402.5	402.5	0.99	1.00	0.800	0.800	0.438	Above GWT	1.828		
6	17.83	30	25.3	690.0	690.0	0.99	1.00	0.290	0.295	0.435	Above GWT	0.684		
8.5	28.02	30	37.0	977.5	977.5	0.98	1.00	0.800	0.800	0.433	Above GWT	1.849		
11	32.32	30	42.0	1265.0	1265.0	0.96	1.00	0.800	0.800	0.430	Above GWT	1.860		
13.5	13.60	25	19.5	1552.5	1552.5	0.97	1.00	0.212	0.209	0.428	Above GWT	0.488		
16	26.80	25	34.2	1840.0	1840.0	0.97	1.00	0.800	0.800	0.426	NL	1.880		
18.5	18.88	25	25.3	2127.5	1971.5	0.96	1.00	0.291	0.299	0.456	LIQUEFIABLE	0.654	1.1	0.33
21	19.83	25	26.4	2415.0	2103.0	0.95	1.00	0.311	0.323	0.482	LIQUEFIABLE	0.669	1.1	0.33
26	13.19	12	15.2	2990.0	2366.0	0.94	1.00	0.165	0.162	0.522	LIQUEFIABLE	0.310	1.3	0.78
31	47.54	12	50.6	3565.0	2629.0	0.92	1.00	0.800	0.800	0.546	NL	1.464		
36	27.57	12	30.0	4140.0	2892.0	0.88	1.00	0.496	0.467	0.557	LIQUEFIABLE	0.839	0.7	0.42
41	31.08	12	33.6	4715.0	3155.0	0.84	1.00	0.800	0.800	0.554	NL	1.444		
46	35.30	12	38.0	5290.0	3418.0	0.79	1.00	0.800	0.800	0.541	NL	1.480		
51	16.85	12	18.9	5865.0	3681.0	0.74	1.00	0.206	0.203	0.521	LIQUEFIABLE	0.389	1.3	0.78
													Total	2.64

Liquefaction Analysis Using SPT

Project Name:	City Center	BDLG D WORST CASE
Project Number:	15-104.1	
Boring:	BH-3-4-7	

a_{max}/g	0.81	Include K_σ (Y/N)	N
Magnitude	7.00	Use NCEER $CRR_{7.5}$ (1) or Rauch $CRR_{7.5}$ (2)	2
Groundwater Depth, Ft	16.0	Minimum Factor of Safety for Liquefaction	1.3
Reference Pressure, p_a	2000		
Unit Weight of Water	62.4		
Soil Unit Weight, pcf	115		

MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ From Graph

Depth, ft	$N_1]_{60}$	Fines Content, FC (%)	$N_1]_{60}$ Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
3.5	23.56	30	31.90	402.5	402.5	0.99	1.00	0.800	0.800	0.436	Above GWT	1.828		
6	17.83	12	19.95	690.0	690.0	0.99	1.00	0.217	0.215	0.435	Above GWT	0.494		
8.5	21.55	23	27.77	977.5	977.5	0.98	1.00	0.343	0.362	0.433	Above GWT	0.836		
11	19.59	23	25.61	1265.0	1265.0	0.98	1.00	0.296	0.305	0.430	Above GWT	0.708		
13.5	21.38	25	28.12	1552.5	1552.5	0.97	1.00	0.353	0.374	0.428	Above GWT	0.874		
16	18.65	25	25.09	1840.0	1840.0	0.97	1.00	0.287	0.294	0.426	LIQUEFIABLE	0.690	1.05	0.315
18.5	19.79	25	26.36	2127.5	1971.5	0.96	1.00	0.310	0.322	0.456	LIQUEFIABLE	0.705	1.05	0.315
21	19.83	19	24.71	2415.0	2103.0	0.95	1.00	0.281	0.266	0.482	LIQUEFIABLE	0.593	1.05	0.315
26	21.77	24	28.29	2990.0	2366.0	0.94	1.00	0.358	0.380	0.522	LIQUEFIABLE	0.728	1	0.6
31	40.11	28	50.22	3565.0	2629.0	0.92	1.00	0.800	0.800	0.546	NL	1.464		
36	51.14	34	65.70	4140.0	2892.0	0.88	1.00	0.800	0.800	0.557	NL	1.437		
41	55.41	23	65.02	4715.0	3155.0	0.84	1.00	0.800	0.800	0.554	NL	1.444		

Total 3.95

Liquefaction Analysis Using SPT

Project Name:	City Center	BDLG E WORST CASE
Project Number:	15-104.1	
Boring:	BH- 5 R	

a_{max}/g	0.81	Include Kσ (Y/N)	N
Magnitude	7.00	Use NCEER $CRR_{7.5}$ (1) or Rauch $CRR_{7.5}$ (2)	2
Groundwater Depth, Ft	16.0	Minimum Factor of Safety for Liquefaction	1.3
Reference Pressure, p_a	2000		
Unit Weight of Water	62.4		
Soil Unit Weight, pcf	115		

MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ From Graph

Depth, ft	$N_{1(60)}$	Fines Content, FC (%)	$N_{1(60)}$, Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
3.5	23.56	30	31.90	402.5	402.5	0.99	1.00	0.800	0.800	0.438	Above GWT	1.828		
6	21.15	21	26.78	690.0	690.0	0.99	1.00	0.319	0.332	0.435	Above GWT	0.764		
8.5	26.62	21	32.70	977.5	977.5	0.98	1.00	0.800	0.800	0.433	Above GWT	1.849		
11	23.32	32	32.14	1265.0	1265.0	0.98	1.00	0.800	0.800	0.430	Above GWT	1.860		
13.5	20.31	32	28.61	1552.5	1552.5	0.97	1.00	0.369	0.393	0.428	Above GWT	0.918		
16	18.65	20	23.75	1840.0	1840.0	0.97	1.00	0.266	0.269	0.426	LIQUEFIABLE	0.632	1.1	0.33
18.5	19.79	20	24.98	2127.5	1971.5	0.96	1.00	0.285	0.291	0.456	LIQUEFIABLE	0.639	1.1	0.33
21	25.38	20	31.02	2415.0	2103.0	0.95	1.00	0.800	0.800	0.482	NL	1.658		
26	36.91	21	43.87	2990.0	2366.0	0.94	1.00	0.800	0.800	0.522	NL	1.533		
31	49.89	23	58.95	3565.0	2629.0	0.92	1.00	0.800	0.800	0.546	NL	1.464		
36	64.87	23	97.44	4140.0	2892.0	0.88	1.00	0.800	0.800	0.557	NL	1.437		
41	65.87	25	77.73	4715.0	3155.0	0.84	1.00	0.800	0.800	0.554	NL	1.444		

Total 0.66

USGS Design Maps Summary Report

User-Specified Input

Report Title City Center
Tue March 24, 2015 14:30:58 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 39.16704°N, 119.76573°W

Site Soil Classification Site Class E – "Soft Clay Soil"

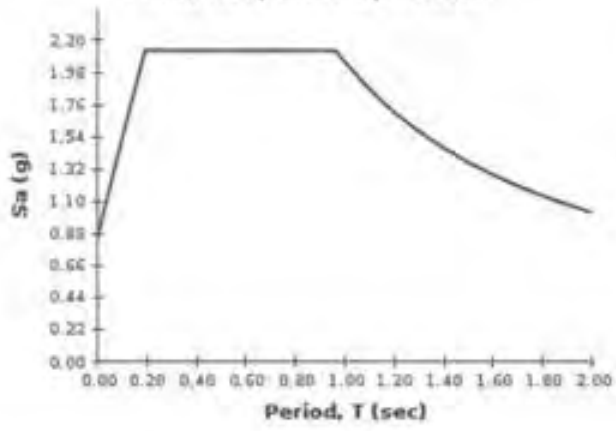
Risk Category I/II/III

USGS-Provided Output

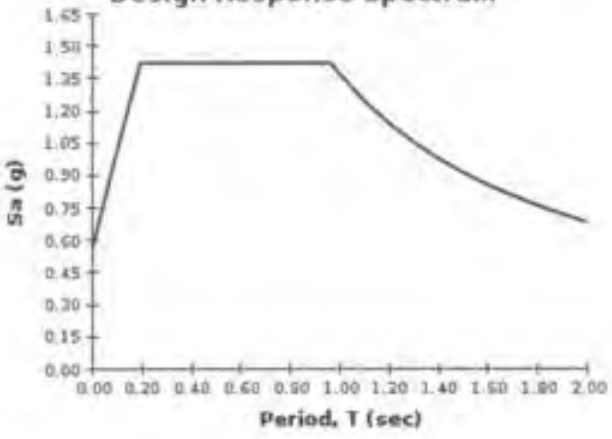
S_S =	2.369 g	S_{MS} =	2.132 g	S_{DS} =	1.421 g
S_1 =	0.855 g	S_{M1} =	2.052 g	S_{D1} =	1.368 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

MCE_R Response Spectrum



Design Response Spectrum



For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (39.16704°N, 119.76573°W)

Site Class E - "Soft Clay Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_s = 2.369 g
From Figure 22-2 [2]	S_1 = 0.855 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class E, based on the site soil properties in accordance with Chapter 20.

Table 20.3-1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = E and S_S = 2.369 g, F_a = 0.900

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = E and S_1 = 0.855 g, F_v = 2.400

Equation (11.4-1): $S_{MS} = F_a S_S = 0.900 \times 2.369 = 2.132$ g

Equation (11.4-2): $S_{M1} = F_v S_1 = 2.400 \times 0.855 = 2.052$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

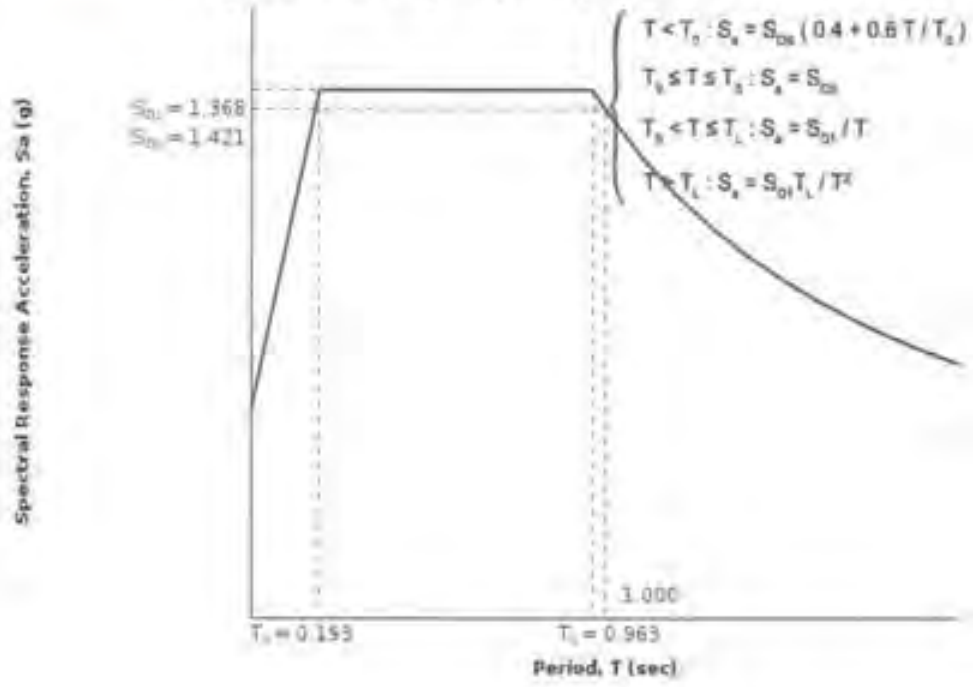
Equation (11.4-3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.132 = 1.421$ g

Equation (11.4-4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 2.052 = 1.368$ g

Section 11.4.5 — Design Response Spectrum

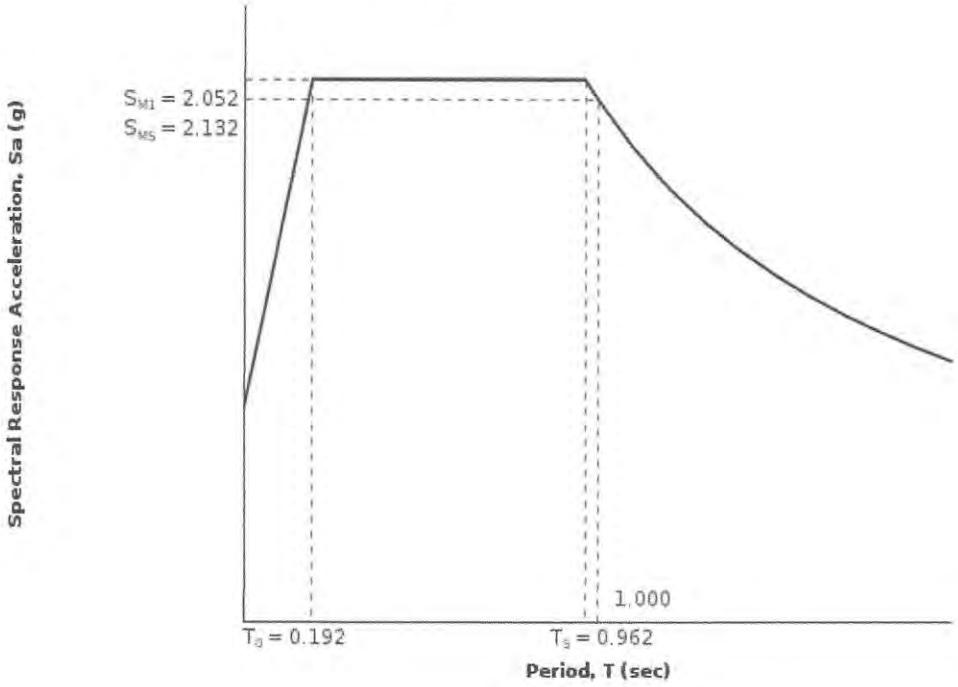
From Figure 22-12 [3] $T_L = 6$ seconds

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.898

Equation (11.8-1): $PGA_M = F_{PGA}PGA = 0.900 \times 0.898 = 0.808$ g

Table 11.8-1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = E and PGA = 0.898 g, F_{PGA} = 0.900

Section 21.2.1.1 — Method 1 (from Chapter 21 - Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.900

From Figure 22-18 [6] C_{R1} = 0.878

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.421 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 1.368 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

Appendix D

Geocon 2010 Geotechnical Report

GEOCON
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GEOTECHNICAL ● ENVIRONMENTAL ● MATERIALS

Project No. R8688-06-02
September 1, 2010

Mr. Mark Rotter
Manhard Consultants, Ltd.
3476 Executive Pointe Way, Suite 12
Carson City, Nevada, 89706

Subject: CITY CENTER PROJECT
CARSON CITY, NEVADA
PRELIMINARY SUMMARY OF GEOTECHNICAL INVESTIGATION AND SHALLOW VS. DEEP FOUNDATION FEASABILITY ANALYSIS

Dear Mr. Rotter:

We are pleased to submit the results of our preliminary geotechnical engineering investigation and shallow vs. deep foundation analysis for the proposed Carson City Center project, Carson City, Nevada. The project area is bounded on the north by Robinson Street, on the South by Musser Street, on the east by Stuart Street and on the west by Carson Street as shown on the vicinity map Figure 1. Internal streets include Fall Street, running north-south and Spear Street and Proctor Street running east-west.

Introduction

Geocon Consultants was retained to perform a geotechnical investigation for the proposed City Center Project to determine the general soil and groundwater conditions as they relate to possible foundation construction in this area. The project as currently proposed includes a number of multi story buildings including office buildings some of which may be combined use with retail or residential, a parking structure, and Carson City Library. Most of the project area will be located in what are now parking lots for the existing Nugget Casino. The current Conceptual Site Plan, Figure 2 shows the proposed buildings and layout of the project.

Site Geology, Faulting and Liquefaction Potential

The geology of the site is referenced from *Carson City Folio Geologic Map* (Trexler, 1977, Figure 3). The Eagle Valley area in Carson City is a large fault bounded valley typical of the western edge of the Great Basin geomorphic province. The geologic map indicates the project site is predominantly underlain by Quaternary alluvial plain deposits of Eagle Valley. These deposits are described by Trexler (1977) as yellowish brown to gray, unstratified to poorly bedded, poorly to moderately sorted fine silty sand, sandy silt, granular clayey coarse sand, and minor sandy gravel. The alluvial plain deposits are on the order of 2,000 feet deep in the Eagle Valley basin based on geophysical data.

Groundwater depths within the downtown area have been mapped on the Carson City Quadrangle by Katzer, 1980. Mapping shows the groundwater surface to be from approximately 10 to 20 feet below the existing surface. Groundwater depths increase from northwest to southeast.

Faults considered active for the type of development planned are located near the project site. The nearest faults to the site are located approximately one quarter mile northeast and one mile northwest of

the site. However, for design purposes the Carson City fault should be considered. The Carson City fault located approximately one and one half mile west of the site (as shown on Figure 3) is actually a series of sub parallel fault segments referred to by geologists as a "distributed" fault zone. The Carson City fault is considered by the Nevada Bureau of Mines and Geology to be capable of a Richter Magnitude earthquake of 6.8.

Liquefaction potential is widely recognized as a geologic hazard in Northern Nevada especially along the Eastern Sierra (Carson Range). Liquefaction of saturated or near saturated soils can be caused by strong vibratory motion typically due to strong earthquakes which cause increased pore pressures that can result in the loss of strength. Soils that are highly susceptible to liquefaction are typically near surface, granular, loose, sands, silts and in some cases gravel. Confining pressures at depths below 50 feet in depth usually preclude the occurrence of liquefaction. Liquefaction may cause surface distress, loss of bearing capacity, and settlement of structures.

Existing Site Conditions

Topography of the site is generally flat lying with only a gentle slope to the east. The majority of the site is either covered by existing structures or paved for parking use or streets. Associated improvements observed on various streets (but not all) include sidewalks, curb and gutter, street lighting and various signs, parking meters and fences. Landscaping is present along some of the streets and ranges from shrubs and flowers to mature trees. Utilities include both underground and overhead lines. Sewer, gas, electric, and water facilities were observed at a minimum. Overhead power, phone and cable are present in some areas. An abandoned house and the De Vine restaurant front Stewart Street. The Carson Nugget Casino, old Carson Federal Building (Children's Museum) and other structures front Carson Street.

Stewart Street is considered a minor arterial; Musser Street and Robinson are collectors and the remaining streets are considered local.

Field Investigation

Our field investigation was performed on August 4 and 5 of 2010. The borings were located on Spear Street, Fall Street and North Plaza Street; BH-1, BH-2, and BH-3 respectively as shown on Figure 2. The borings were advanced by a truck-mounted CME 75 drill rig employing mud rotary methods. Boring BH-1N was drilled to 51.5 feet below the existing ground surface (begs). Borings BH-2N and BH-3N were drilled to depths of 31.5 feet begs. Soil samples were obtained from each boring on five foot intervals utilizing a Standard Penetration Test (SPT) with a 1.4 inch inside diameter split barrel (spoon) sampler. Representative samples were returned to our Carson City laboratory for testing and additional analysis. The borings were backfilled with grout upon completion. The street penetrations were repaired with cold patch pursuant to Carson City Public Works standards.

The soil conditions encountered in the borings were visually examined, classified, and logged in general accordance with the Unified Soil Classification System. The logs of the soil borings are attached as Figures 4 through 6.

Subsurface Geologic and Groundwater Conditions

The site is generally underlain by silty sands, poorly graded sands and well graded sands or combinations thereof. The soils found beneath the groundwater surface are stratified with thin lenses of coarser sands and sandy gravel. Soil density generally increases with depth and from east to west on the site. SPT data range from 10 to 15 blows per foot from the surface down to approximately 8 feet bgs which corresponds to loose to medium dense condition. From 8 feet to approximately 20 to 25 feet,

blow counts gradually increase to 40 blow counts or medium dense to dense conditions. In borings BH-2N and BH-3N the density of soils below 25 feet increases to dense to very dense. Dense conditions were not encountered in boring BH-1N until a depth of approximately 35 feet.

Groundwater was encountered across the site at a depth of approximately 16 feet (unstablilized measurements). Mottling of soils suggest that the water level may rise periodically to a depth of approximately 12 feet below the surface.

Conclusions

The following conclusions are based on limited exploration and published data only. While the data may support future exploration efforts, it is not intended to take the place of a thorough site specific geotechnical investigation. It is solely intended to aid in future site planning and preliminary cost estimates for the project.

From a geotechnical perspective soil strength conditions vary considerably across the site. The following is a summary of our conclusions regarding the site geology from an engineering standpoint:

- The soils to the depths explored are entirely sands with or without fine gravel.
- Thin lenses of coarser sands and gravels are present especially below the groundwater surface
- The soil density across the site generally increases with depth
- Groundwater depths were measured or estimated based on sample descriptions to be approximately 16 to 17 feet below the surface
- High groundwater was estimated based on soil mottling at approximately 12 to 14 feet below the surface
- Liquefaction is likely to occur beneath portions of the site during a design earthquake event
- The thickness of potentially liquefiable soils generally increases to the northeast
- Liquefaction induced settlements are preliminarily estimated to be on the order of one to three inches in the northeasterly portion of the site. This amount of settlement is marginal for the need for mitigation for light structures.
- Surface blow outs or "sand boils" are unlikely based on the data thus far accumulated. Site settlements are likely occur over broad areas of the surface rather than differentially except where soils may transition from liquefiable to non-liquefiable. The range of soil conditions and inference of surface features being likely is based on empirical data summarized on Figure 7.
- Large scale lateral spreading is unlikely to be significant due to the lack of topographic relief

The following are our conclusions regarding foundation construction:

- Deep foundations are likely to be necessary on much of the site for larger structures or critical facilities.
- On the northeast portion of the site pile foundations **may** be necessary
- On the central portion of the site where the thickness of potentially liquefiable soils decreases such that dense soils are approximately 25 feet deep or less, conditions may allow for the use of stone columns or possibly overexcavation with reinforced structural soil rather than piles.
- The geology underlying the westerly most portion of the site may allow for conventional foundations

Recommendations

A thorough geotechnical exploration program should be performed to further define the depth and extent of liquefiable soils. Site specific explorations should be performed for multi-story buildings,

buildings with basements or elevator pits, or other structures with large concentrated loads. Due to the variability of site conditions, we recommend that exploration be more detailed than is common for this size of site which will help to ensure efficient design and related cost control.

Exploration should be performed with a combination of drilling and cone penetrometer (cpt) equipment which will provide the most reliable assessment of liquefaction potential. Site specific liquefaction analyses should be performed based on the field data collected to determine more accurately the estimated strain for the design earthquake event in order to properly select a foundation alternative. This information could be used to possibly relocate on the site one or more of the large structures which could have significant construction cost ramifications.

We would like to thank you for selecting Geocon Consultants to provide services on this project. If you have any questions or comments regarding any of the information contained within this report, please do not hesitate to contact our office at (775) 888-9900, or any of the undersigned at any time for assistance.

Sincerely,

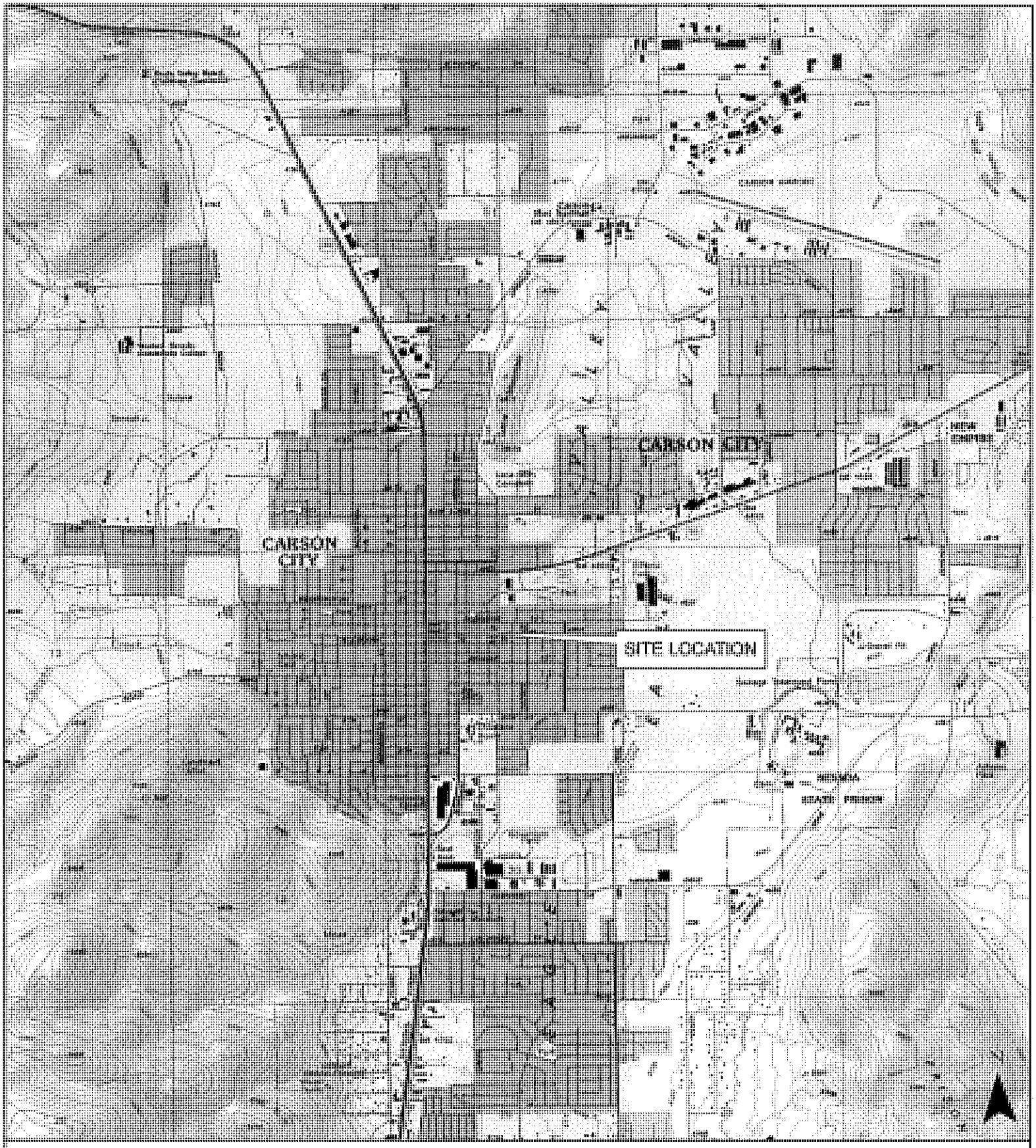
GEOCON CONSULTANTS, INC.

Gary Luce, PE
Senior Engineer

GL:sf

Attachments: Vicinity Map
Site Plan
Fault Location Map
Boring Logs
Potential for Liquefaction Induced Surface Features
Laboratory Data

Distribution:
(2) Addressee Originals
(3) Addressee Copies
(1) File



VICINITYMAP - CARSON CITY CENTER PROJECT
CARSON CITY, NEVADA

GEOCON

JOB NO. R8588-06-02
SEPTEMBER 2010
FIGURE 1

SITE MAP - CITY CENTER PROJECT
CARSON CITY, NEVADA

GEOCON

JOB NO. R8688-06-01
SEPTEMBER 2010
FIGURE 2

AGE OF YOUNGEST FAULT DISPLACEMENT

- Historic (less than 150 years)
- Holocene (less than 15,000 years)
- Late Quaternary (130,000 to 15,000 years)
- Middle to Late Quaternary (750,000 to 130,000 years)
- Quaternary (1,600,000 to 750,000 years)

Map Reference:
U.S. Geological Survey and Nevada Bureau of Mines and Geology, 2006, Quaternary fault and fold database for the United States, accessed August, 2010, from USGS web site: http//earthquake.usgs.gov/regonal/qfaults/

FAULT MAP

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Carson City Center

Carson City
Nevada

R8688-06-02	September 2010	FIGURE 3

COMMENTS:
Estimated Groundwater(GW) depth base on sample

LOG OF BORING No. BH-1N

LOGGED BY: G. Luce DATE: 8/4/10

EQUIPMENT: CME 75

TOTAL DEPTH: 51.5 WATER DEPTH: 16.2

MISC. TESTS	R VALUE	UNIT DRY WEIGHT, PCF	WATER CONTENT, %	LIQUID LIMIT, %	PLASTICITY INDEX, %	PASSING NO. 200 SIEVE, %	DEPTH, FT	SYMBOL	SAMPLE	BLOWS PER FOOT	DESCRIPTION / CLASSIFICATION	LAYER ELEV./ DEPTH
											SURFACE ELEVATION:	
			4								ASPHALT CONCRETE- 4 Inches	0.4
											FILL- SILTY SAND (SM)-6 inches of clean sand fill- medium dense, moist, gray brown	0.8
							5				FILL-SILTY SAND (SM)- Medium dense, moist, brown with occasional fine gravel	
		86	16							10		
							10				POORLY GRADED SILTY SAND (SM-SP)- Medium dense, moist to saturated, dark yelowish brown with occasional coarse to fine gravel	7.5
		85	12							19		
											w/FeOx mottling 10.5' -15.0'	
		104	18				15			22		
							20				POORLY GRADED SAND (SP)- Medium dense to dense, saturated, dark yellowish brown	18.0
		94	15							29		
											With lenses of fine gravel	
		79	17				25			15		
		93	18								SILTY SAND (SM)- Loose,saturated, yellowish brown	25.8
											POORLY GRADED GRAVEL (GP)- Medium dense, saturated, light grayish brown	28.0
		79	13				30			25	SILTY SAND (SM)- Loose,saturated, brown	30.7
		95	16									
							35			14		
							40				SILTY SAND (SM)- Medium dense to very dense, saturated, bluish gray (gleyed) with some fine gravel	38.0
		90	14							29		
							45					
		102	12							56		
							50				SILTY SAND (SM)- Very dense, saturated, yellowish brown, with some FeOx mottling	48.0
		87	18							51		
												51.5

LOG OF BORING R8688-06-02 CITY CENTER.GPJ GEOCON NV.GDT 8/30/10

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PROJECT:

CITY CENTER
Carson City, Nevada

JOB NO.: R8688-06-02 DATE: 9/1/20

Figure-4

COMMENTS:
Measured GW depth (unstabilized)

LOG OF BORING No. BH-2N

LOGGED BY: G. Luce DATE: 8/4/10

EQUIPMENT: CME 75

TOTAL DEPTH: 31.5 WATER DEPTH: 16.3

MISC. TESTS	R VALUE	UNIT DRY WEIGHT, PCF	WATER CONTENT, %	LIQUID LIMIT, %	PLASTICITY INDEX, %	PASSING NO. 200 SIEVE, %	DEPTH, FT	SYMBOL	SAMPLE	BLOWS PER FOOT	DESCRIPTION / CLASSIFICATION	LAYER ELEV./ DEPTH
											SURFACE ELEVATION:	
											ASPHALT CONCRETE- 4 Inches	0.4
											FILL- SILTY SAND (SM)-6 inches of clean sand fill- medium dense, moist, gray brown	0.9
							5			14	CLAYEY SAND (SC)- Loose, moist, very dark gray	4.0
											SILTY SAND (SM)- Medium dense, moist, yellowish brown w/ FeOx mottling	7.5
							10		B	15	POORLY GRADED SILTY SAND (SP-SM)- Medium dense, moist to saturated, greenish gray to yellowish brown, with gravel lenses (GP) with FeOx mottling from approximately 10'-16'	
							15			17		
							20			34		
											SILTY SAND (SM)- Dense to very dense, saturated, bluish gray (gleyed) with some fine gravel lenses	22.0
							25			40		
							30			68		
												31.5

LOG OF BORING R8688-06-02 CITY CENTER.GPJ GEOCON NV.GDT 8/30/10

GEOCON CONSULTANTS, INC

PROJECT:

CITY CENTER
Carson City, Nevada

JOB NO.: R8688-06-02 DATE: 9/1/20

Figure-5

COMMENTS:
Estimated GW depth based on sample

LOG OF BORING No. BH-3N

LOGGED BY: S. Flores DATE: 8/5/10

EQUIPMENT: CME 75

TOTAL DEPTH: 31.5 WATER DEPTH: 16.5

MISC. TESTS	R VALUE	UNIT DRY WEIGHT, PCF	WATER CONTENT, %	LIQUID LIMIT, %	PLASTICITY INDEX, %	PASSING NO. 200 SIEVE, %	DEPTH, FT	SYMBOL	SAMPLE	BLOWS PER FOOT	DESCRIPTION / CLASSIFICATION	LAYER ELEV./ DEPTH
											SURFACE ELEVATION:	
											ASPHALT CONCRETE- 4 Inches	0.4
											FILL- SILTY SAND (SM)-6 inches of clean sand fill- medium dense, moist, gray brown	0.7
							5			14	SILTY SAND (SM)- Medium dense, moist, grayish brown w/ weak FeOx mottling	
							10			28	SILTY SAND (SM)- Medium dense, moist, greenish gray (weak gleying)	7.5
							15			40	POORLY GRADED SILTY SAND (SP-SM)-Dense, moist to saturated, yellowish brown, with gravel lenses (GP) and FeOx mottling	12.5
							20			30		
							25			49		
							30			38	SILTY SAND (SM)- Dense, saturated, bluish gray (gleyed) with some fine gravel lenses	27.5
												31.5

LOG OF BORING R8688-06-02 CITY CENTER.GPJ GEOCON NV.GDT 8/30/10

GEOCON CONSULTANTS INC

PROJECT:

CITY CENTER
Carson City, Nevada

JOB NO.: R8688-06-02 DATE: 9/1/20

Figure-6

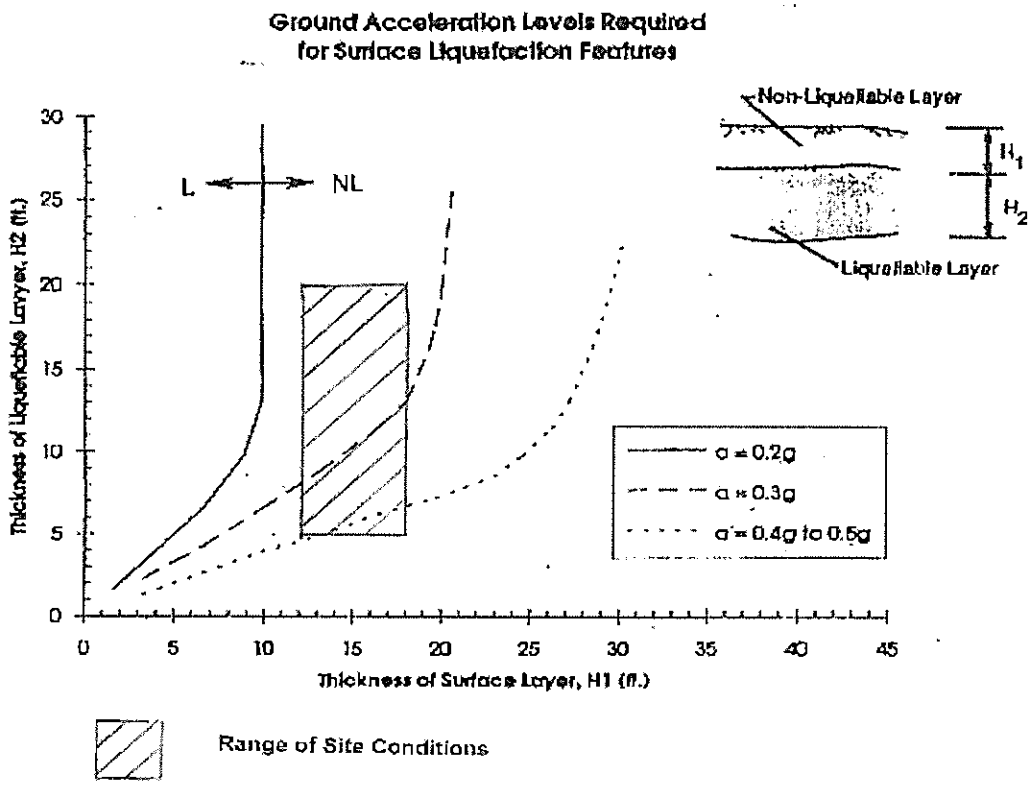

CHART FOR EVALUATION OF GROUND ACCELERATION LEVELS REQUIRED FOR APPEARANCE OF SURFACE LIQUEFACTION FEATURES BASED ON LIQUEFIABLE LAYER THICKNESS AND OVERLYING LAYER THICKNESS. (DATA TAKEN FROM ISHIHARA, 1985)

Estimated design earthquake acceleration > 0.4 g at City Center Site

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GL

City Center Project

POTENTIAL FOR LIQUEFACTION INDUCED SURFACE FEATURES

PROJECT NO. R8866-06-02 Figure 7

GEOCON, INC.
4010 Technology, Unit Dcarson City, NV
775-888-9900 ofc/775/888-9904 fax

Project: CC Center - Liquefaction Invest.
Project No: R8688-06-02
Lab No: CC583
Date Sampled: 8/4/2010
Date Tested: 8/5/2010
Sample No: Varies
Material Desc: Varies

Water Content and Dry Density - ASTM C566/D2216/D2937 or AASHTO T255/T265

Sample #	0.3 - 0.8	Sample #	5.6 - 6.5	Sample #	10.5 - 11.5	Sample #	15.0 - 16.0
Tare #	Kappa	Tare #	Nugget	Tare #	Chi	Tare #	1007
Tare Wt.	225.9	Tare Wt.	232.9	Tare Wt.	228.8	Tare Wt.	271.0
Wet + Tare	1205.6	Wet + Tare	727.8	Wet + Tare	756.4	Wet + Tare	955.0
Dry + Tare	1167.8	Dry + Tare	661.3	Dry + Tare	700.6	Dry + Tare	851.3
Wt. of Water	37.8	Wt. of Water	66.5	Wt. of Water	55.8	Wt. of Water	103.7
Dry Wt.	941.9	Dry Wt.	428.4	Dry Wt.	471.8	Dry Wt.	580.3
Height (ft.)	GRAB	Height	0.9	Height	1.0	Height	1.0
Diameter (in.)	GRAB	Diameter	1.5	Diameter	1.5	Diameter	1.5
Wet Density	-	Wet Density	**98.8**	Wet Density	**94.8**	Wet Density	**122.9**
Dry Density	-	Dry Density	**85.5**	Dry Density	**84.8**	Dry Density	**104.2**
% Moisture	**4.0%**	% Moisture	**15.5%**	% Moisture	**11.8%**	% Moisture	**17.9%**

Sample #	20.3 - 21.5	Sample #	25.4 - 25.8	Sample #	25.8 - 26.5	Sample #	30.2 - 30.7
Tare #	1014	Tare #	1002	Tare #	Gamma	Tare #	1001
Tare Wt.	229.6	Tare Wt.	233.2	Tare Wt.	231.2	Tare Wt.	234.4
Wet + Tare	950.3	Wet + Tare	440.1	Wet + Tare	656.8	Wet + Tare	481.7
Dry + Tare	856.0	Dry + Tare	410.1	Dry + Tare	592.3	Dry + Tare	454.3
Wt. of Water	94.3	Wt. of Water	30.0	Wt. of Water	64.5	Wt. of Water	27.4
Dry Wt.	626.4	Dry Wt.	176.9	Dry Wt.	361.1	Dry Wt.	219.9
Height	1.2	Height	0.4	Height	0.7	Height	0.5
Diameter	1.5	Diameter	1.5	Diameter	1.5	Diameter	1.5
Wet Density	**107.9**	Wet Density	**92.9**	Wet Density	**109.2**	Wet Density	**88.9**
Dry Density	**93.8**	Dry Density	**79.4**	Dry Density	**92.7**	Dry Density	**79.0**
% Moisture	**15.1%**	% Moisture	**17.0%**	% Moisture	**17.9%**	% Moisture	**12.5%**

Sample #	30.7 - 31.5	Sample #	40.8 - 41.5	Sample #	45.3 - 46.5	Sample #	50.5 - 51.5
Tare #	1006	Tare #	1009	Tare #	Sigma	Tare #	Phi
Tare Wt.	269.8	Tare Wt.	232.1	Tare Wt.	235.7	Tare Wt.	223.7
Wet + Tare	761.1	Wet + Tare	634.4	Wet + Tare	996.5	Wet + Tare	794.6
Dry + Tare	694.5	Dry + Tare	584.4	Dry + Tare	916.6	Dry + Tare	708.7
Wt. of Water	66.6	Wt. of Water	50.0	Wt. of Water	79.9	Wt. of Water	85.9
Dry Wt.	424.7	Dry Wt.	352.3	Dry Wt.	680.9	Dry Wt.	485.0
Height	0.8	Height	0.7	Height	1.2	Height	1.0
Diameter	1.5	Diameter	1.5	Diameter	1.5	Diameter	1.5
Wet Density	**110.3**	Wet Density	**103.2**	Wet Density	**113.9**	Wet Density	**102.6**
Dry Density	**95.4**	Dry Density	**90.4**	Dry Density	**101.9**	Dry Density	**87.1**
% Moisture	**15.7%**	% Moisture	**14.2%**	% Moisture	**11.7%**	% Moisture	**17.7%**

Notes: All samples are from BH-1N, located east of the Nugget Casino in Carson City, NV. Reference the boring logs for more detailed bore hole and location information.

** All densities noted are in pounds per cubic foot (pcf)

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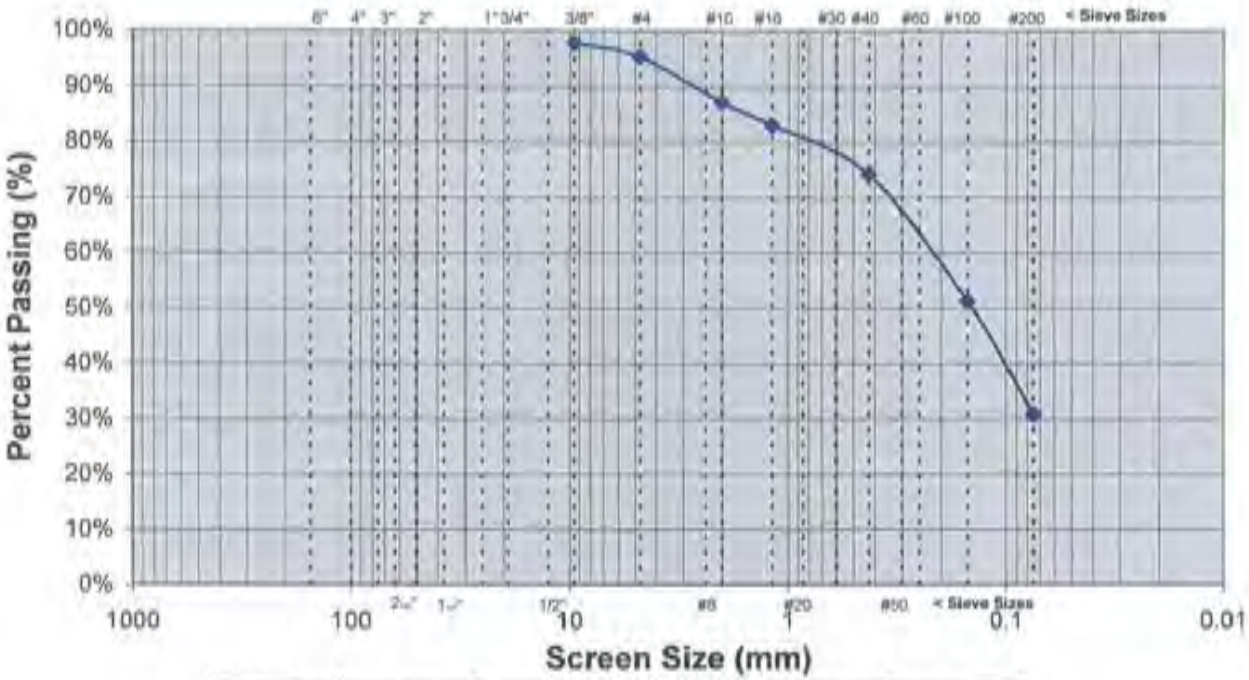
775-888-9900 ofc/775/888-9904 fax

Project:	City Center Project
Project No:	R8688-06-02
Lab No:	CC583
Date Sampled:	8/5/2010
Date Tested:	8/30/2010
Sample No:	BH-1N 15.0-16.0
Material Desc:	Silty Sand
	Light Olive Brn

Sieve Analysis-ASTM C136/AASHTO T27

Soil Gradation



Tr & Wt Samp:	0
Tr & Dry Samp:	0
Water Loss	0
Tare Weight	0
Dry Weight	578
% Moisture	17.0%

Sample Length (in)	0.4
Sample Diameter (in)	1.4
Sample Volume (cu. ft)	0.0
Dry Unit Weight (pcf)	79.4
Wet Unit Weight (pcf)	92.9

Pocket Penetrometer Results	

Sieve Size	Percent Passing	Specification	
6"			GRAVEL %
4"			
3"			
2 1/2"			
2"			
1 1/2"			
1"			
3/4"			
1/2"			
3/8"	98%		
#4	95%		
#8			SAND %
#10	87%		
#16	83%		
#20			
#30			
#40	74%		
#50			
#60			
#100	51%		
#200	31%		
			FINES %

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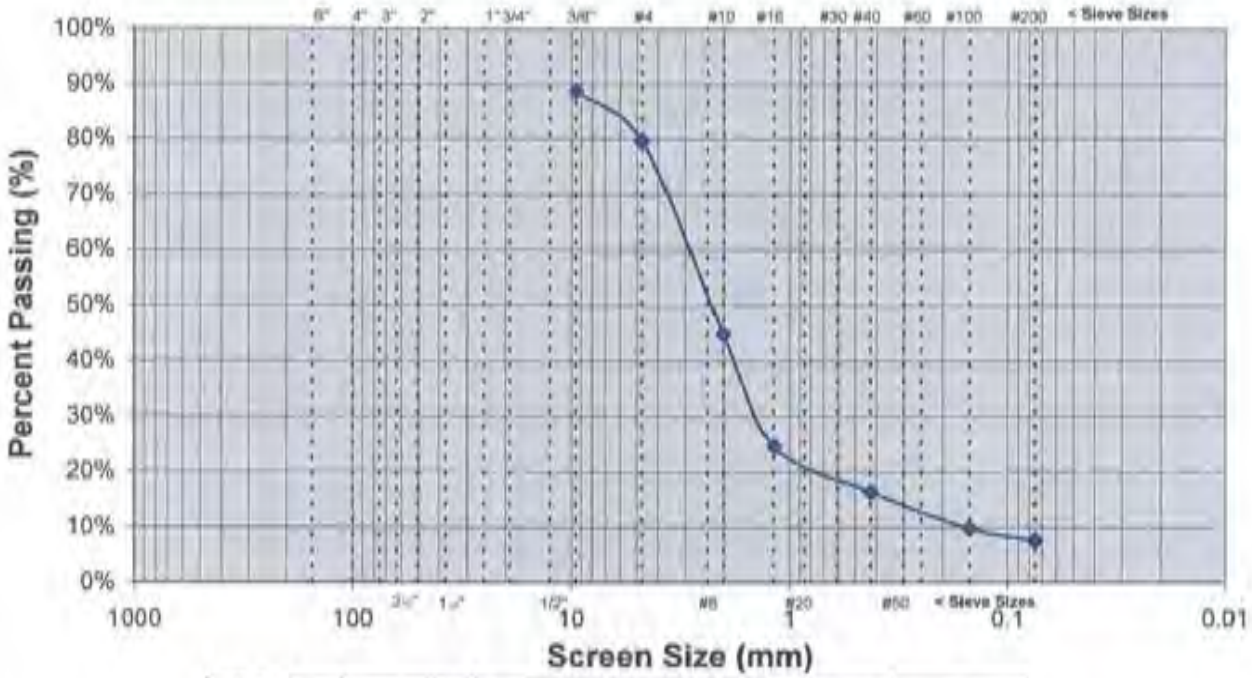
Project:	City Center Project
Project No:	R8688-06-02
Lab No:	CC583
Date Sampled:	8/5/2010
Date Tested:	8/30/2010
Sample No:	BH-1N 25.4-25.8
Material Desc:	Poorly Graded Silty Sand
	Light Olive Brn

Sieve Analysis-ASTM C136/AASHTO T27

Soil Gradation



Tr & Wt Samp	0
Tr & Dry Samp	0
Water Loss	0
Tare Weight	0
Dry Weight	176.2
% Moisture	17.0%

Sample Length (in)	0.4
Sample Diameter (in)	1.4
Sample Volume (cu. ft)	0.0
Dry Unit Weight (pcf)	79.4
Wet Unit Weight (pcf)	92.9

Pocket Penetrometer Results	

Sieve Size	Percent Passing	Specification	
6"			GRAVEL %
4"			
3"			
2 1/2"			
2"			
1 1/2"			
1"			
3/4"			
1/2"			
3/8"	89%		
#4	80%		
#8			SAND %
#10	45%		
#16	25%		
#20			
#30			
#40	16%		
#50			
#60			
#100	10%		
#200	7%		
			FINES %