GEOTECHNICAL INVESTIGATION REPORT

GRADE SEPARATION (H-2287)
KOONTZ LANE AT US-395/I-580
CARSON CITY

NEVADA DOT

GEOTECHNICAL ENGINEERING
MATERIALS DIVISION

STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

MATERIALS DIVISION

GEOTECHNICAL SECTION

GEOTECHNICAL REPORT

KOONTZ LANE GRADE SEPARATION H-2287

US-395/I-580 CARSON FREEWAY PHASE II

NOVEMBER 2004

EA 72781-1

CARSON CITY, NEVADA

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INTRODUCTION

General

This report has been prepared for the proposed grade separation located over the proposed US 395 freeway at Koontz Lane and adjoining Edmonds Drive in Carson City. Koontz Lane runs approximately east west at this location and ends to the east at Edmonds Drive, which runs approximately north south. Edmonds Drive will be maintained as a frontage road at this location. The proposed plan calls for construction of a grade separation, with both Koontz Lane and Edmonds Drive generally maintaining their vertical alignment and one lane in each direction. The proposed plan indicates US 395 freeway will be depressed approximately 25 feet below the existing ground surface and run in a north-south direction. A site plan for the project is presented in Appendix A.

Koontz Lane (ahead) at Edmonds Drive (cross-street)

View to the West

Purpose and Scope

The purpose of this report is to provide information regarding the subsurface soil conditions at the proposed project site. This report also provides geotechnical design recommendations for the grade separation bridge structure involved in this project. The scope of this report consists primarily of geotechnical investigation and analysis, and recommendations for design and construction. The investigation included gathering data from past field explorations and reports, in addition to information obtained from recent field reconnaissance, subsurface explorations, soil sampling, and analysis of field and laboratory testing data. This report includes boring logs and summaries of test results from the field investigations and the laboratory-testing regimen. These may be found in appendices B and C, respectively.

PROJECT DESCRIPTION

The project site is located in southwestern Carson City, in Section 28 of Township 15 North, Range 20 East, M.D.M., about 1.5 miles northeast of the junction of U.S. Highways 50 and 395. The Koontz Grade Separation is one of six bridge structures in Phase II of the Carson City Freeway Project. The freeway will run approximately 25 feet below the existing grade as shown in the current plans, and will pass under Koontz Lane. Preliminary plans indicate the proposed bridge will be designed as a two-span concrete structure over the freeway alignment, conveying two lanes of traffic in each direction. The structure will be supported on spread footings founded in native soils. The new structure will be approximately 60 feet in width and 220 feet in length.[1]

Koontz Lane at Proposed Grade Separation Location
View to the East, Vehicle is on Edmonds Drive

GEOLOGIC CONDITIONS and SEISMICITY

The site is founded in pediment and alluvial fan deposits (Qpa) grading to undifferentiated alluvial deposits (Qa) originating from the Prison Hill. Prison Hill consists of metavolcanic breccia, a gray to greenish-gray and greenish-black, very poorly sorted coarse andesitic mudflow breccia. The pediment and deposits are grayish-orange, tan and gray-brown granular muddy coarse sand and sandy gravel in small fans, bajadas, and minor pediment veneers.[2] According to the Earthquake Hazards Map, the depth to ground water ranges from 10 to 33 feet.[3] Water was not encountered to the 98.5 foot depth explored during the NDOT investigation.

This area lies at an elevation of approximately 4735 feet and slopes gently downward (≈3%) to the west. Boreholes were inspected for groundwater up to three months after drilling but remained dry, and unobstructed to within 4 inches of initial bottom of hole.

The site is founded within an area labeled with a moderate severity for potential of ground shaking during earthquakes. The site includes unconsolidated deposits with a low

rigidity at the 10-foot ground water depth and moderate rigidity at the 33-foot ground water depth.[3]

There are numerous faults in the general area with an age of fault displacement less than a few hundred years. Nearby faults include numerous small offshoots of the Genoa Fault that lie 1.5 miles to the west and 2.5 miles to the south-southwest. The Genoa Fault lies approximately 6.5 miles southwest of the site and has an age of last displacement of between 200 to 1000 years.[4] The Carson City Fault lies about 1.6 miles northwest[5] and the Eastern Prison Hill Fault Zone lies about 7.5 miles north-northeast.[6] These Holocene faults (<11,000 years old) are capable of producing large (magnitude 6.6 to 7.4) earthquakes.[6] The recommended peak acceleration coefficient is 0.4 g based on a 10% probability of exceedance in 50 years (AASHTO).[7]

FIELD INVESTIGATION

The Nevada Department of Transportation (NDOT) Geotechnical Section conducted a subsurface investigation at the proposed project site in June of 2002. Subsurface soil conditions were explored by drilling three boreholes (KE-1 through KE-3) to a maximum depth of 98.5 feet below ground surface, and to a minimum elevation of 4636.7 feet. The approximate locations of the boreholes are shown on the Borehole Locations sheet in Appendix A. Surface elevations were obtained for the borehole locations by surveying from known elevation points. Drilling was accomplished utilizing a Mobile B-80 drill rig equipped for soil sampling, using a bentonite drilling slurry for wet drilling. All boreholes were left open for approximately 11 to 13 weeks to monitor ground water conditions. All boreholes remained dry once initial drilling fluid dissipated. The on-site soil conditions were not suitable for using samplers other than a Standard Penetration Test (SPT) sampler, or a driven California Modified Sampler (CMS); therefore, all recovered samples were disturbed. Soil samples and standard penetration resistance values (N-Values) were obtained utilizing the SPT procedure as set forth in ASTM test number T 206. In addition, N-Values were obtained for the CMS samples through the use of an empirical correlation. All soil samples were classified using the Unified Soil Classification System (USCS) based on laboratory test results.

LABORATORY ANALYSIS

Laboratory analyses were performed on the samples collected from the three boreholes. The testing program consisted of sieve analyses, Atterberg limits, moisture and chemical analyses. Despite the high densities of the granular soils on-site, and the lack of any undisturbed or relatively undisturbed samples, direct shear and consolidation tests were performed on samples obtained by means of driven samplers. The results of the testing program showed that the soils consist primarily of very dense silty sands. Plasticity Index (PI) results ranged from non-plastic to 17, with most under 8. Liquid limits results ranged between 14 and 34, with most in the high teens and low twenties. These results indicate generally consistent soil conditions. Further information is presented in the summaries of test results in Appendix C.

DISCUSSION

Borings from the field investigation identified the soils to be primarily very dense silty sands, with occasional layers of silty and/or clayey sands with gravels and cobbles. The near surface sands were generally classified as medium dense while the sands at depths from 5 to 15 feet were dense to very dense. The sands were classified as silty sand or poorly sorted sand with silt. No clearly defined subsurface stratification was apparent from this set of borings. Most driven sampling showed the soils to be very dense, with only 4 of 34 field blow counts less than refusal (50+ blows - no progress). Adjusted field blow counts ranged from 16 blows per foot to refusal. These soils are best suited for spread footings. Deep foundations such as driven piles or drilled shafts are not recommended for this site due to the high density of the soil, presence of cobbles, and high construction costs associated with deep foundation systems. Groundwater was not encountered to the depths explored.

Based on the results of our geotechnical investigations, the project site is suitable for the proposed overpass. No geotechnical or geologic hazards were observed that would make the development of the proposed overpass unsuitable. The use of conventional spread footings are recommended to support the proposed structure.

RECOMMENDATIONS

Foundations

Use of spread footings for support of the pier and abutments is recommended. Allowable bearing capacity of 5.5 tsf using a factor of safety of 3 per AASHTO recommendations[7] was calculated for a strip footing 6 feet wide and embedded 5 feet below finished grade at the pier and abutments. A one-third increase in allowable bearing pressures for both the abutments and piers may be used for short duration loads, such as wind or seismic loads.

Total settlements of one inch or less are expected for spread footings bearing 4 tsf pressures at both abutments and pier, most of which will occur as loads are applied during construction. Differential settlements of ¼ inch or less are expected.

	EAST ABUTMENT			WEST ABUTMENT			CENTER PIER		
FOOTING DEPTH / FOOTING WIDTH	3'	4'	5'	3'	4'	5'	3'	4'	5'
6'	½"	½"	½"	½"	½"	½"	¼"	¼"	¼"
8'	½"	½"	½"	½"	½"	½"	¼"	¼"	¼"
10'	¾"	¾"	¾"	½"	½"	½"	½"	½"	½"
12'	¾"	¾"	¾"	½"	½"	½"	½"	½"	½"

Table 1. Settlement Summary

Abutment Retaining Walls

AASHTO Standard Specifications for Highway Bridges, Division 1-A, Section 3 is the source for the Acceleration Coefficient (A) of 0.40, the Type II Soil Profile, and the Site Coefficient (S) of 1.2. The structure – soil interface angle is taken as ⅔ϕ. The Horizontal Acceleration Coefficient (K_h) is obtained from AASHTO Standard Specifications for Highway Bridges, Division 1-A, Section 6. The Vertical Acceleration Coefficient (K_v) is assumed to be zero. Earth pressure coefficients are calculated using Coulombs analysis

method utilizing the Mononobe-Okabe equation for K_a, K_p, K_{ae}, and K_{pe}. Design parameters are found in Table 2:

Design Parameters	Abutment/Wall Allowed to Displace	Abutment/Wall Restrained
ϕ = soil friction angle (native)	34^o	34^o
Υ = effective soil unit weight	125 pcf	125 pcf
δ = structure/soil interface angle	22.7^o	22.7^o
K_h = Horizontal Acceleration Coefficient	0.40	0.40
K_v = Vertical Acceleration Coefficient	0.0	0.0
K_o = At-Rest Earth Pressure Coefficient	N/A	0.441
K_a = Active Earth Pressure Coefficient (Coulomb)	0.254	N/A
K_p = Passive Earth Pressure Coefficient (AASHTO after Caquot and Kerisel)	7.44	N/A
K_{ae} = Dynamic Active Earth Pressure Coefficient (Mononobe–Okabe)	0.397	N/A
K_{pe} = Dynamic Passive Earth Pressure Coefficient (Mononobe–Okabe)	7.30	N/A

Table 2. Recommended Design Parameters for Abutment Retaining Walls

Slope Stability

Slope Stability in this area of the alignment has been analyzed by Black Eagle Consulting Inc. in their "Draft Geotechnical Investigation for the Thirty Percent Design I-580/ Carson City Bypass Phase 2, Carson City Nevada, June 2003" report prepared for Louis Berger Group. All permanent slopes should be constructed to lie at a maximum of 2:1 (H:V) slope. A 2:1 slope or flatter is recommended in front of the abutments.

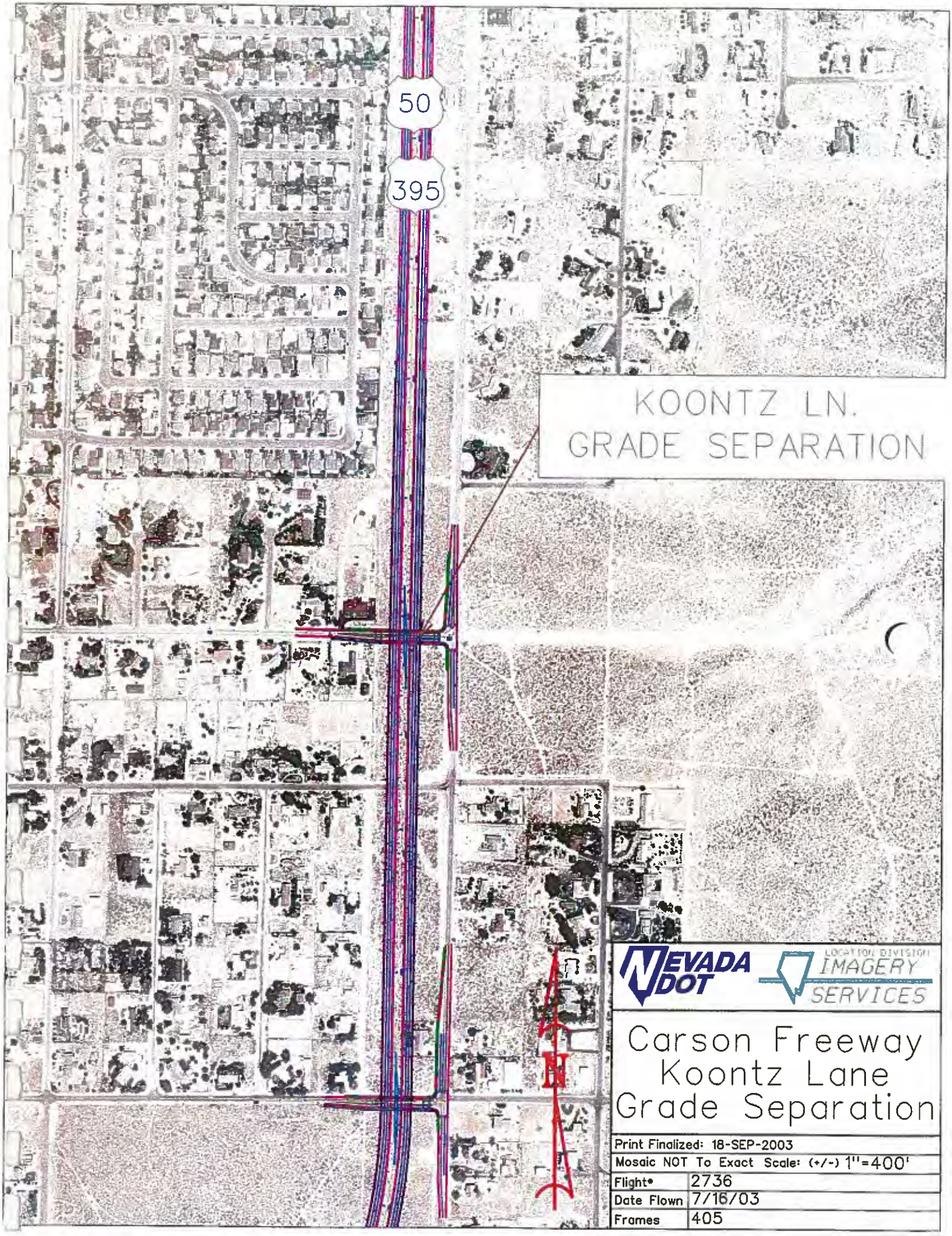
Excavation

All excavation shall be performed in accordance with the NDOT 2001 Standard Specifications for Road and Bridge Construction. The contractor shall be responsible for all necessary shoring for any excavation and/or construction. Variable site conditions include the possibility of encountering large cobbles, boulders, or other adverse soil conditions.

REFERENCES

1. Louis Berger Group, *30% Submittal, Construction Plans*, E.A. 72781-1, March 22, 2004
2. Bingler, E.C., *New Empire Geologic Map*; Nevada Bureau of Mines and Geology, 1977, Map No. 59.
3. Bell, J.W., and D.T. Trexler, *New Empire Quadrangle Earthquake Hazards Map*; Nevada Bureau of Mines and Geology, 1979, Map No. 1Bi.
4. Pease, R.C., *Genoa Quadrangle Earthquake Map*; Nevada Bureau of Mines and Geology, 1979, Map No. 1Ci.
5. Trexler, D.T. and J.W. Bell, *Carson City Quadrangle Earthquake Hazards Map*; Nevada Bureau of Mines and Geology, 1979, Map No. 1Ai.
6. dePolo, C., J.G. Anderson, D. M. dePolo, and J.G. Price, "Earthquake Occurrence in the Reno-Carson City Urban Corridor;" *Seismological Research Letters, Volume 68*, May/June, 1997, pages 401-412.
7. AASHTO, Standard Specifications For Highway Bridges; 17th Edition, 2002.
8. State of Nevada Department of Transportation, Standard Specifications for Road and Bridge Construction; 2001.
9. FHWA, Geotechnical Earthquake Engineering; FHWA HI-99-012, 1998.
10. NAVFAC (Naval Facilities Engineering Command), 1986a, *Soil Mechanics*, Design Manual 7.1.
11. NAVFAC (Naval Facilities Engineering Command), 1986b, *Foundations and Earth Structures*, Design Manual 7.2.

APPENDIX A
EXPLORATION PLAN



NEVADA DOT

LOCATION DIVISION IMAGERY SERVICES

Carson Freeway Koontz Lane Grade Separation

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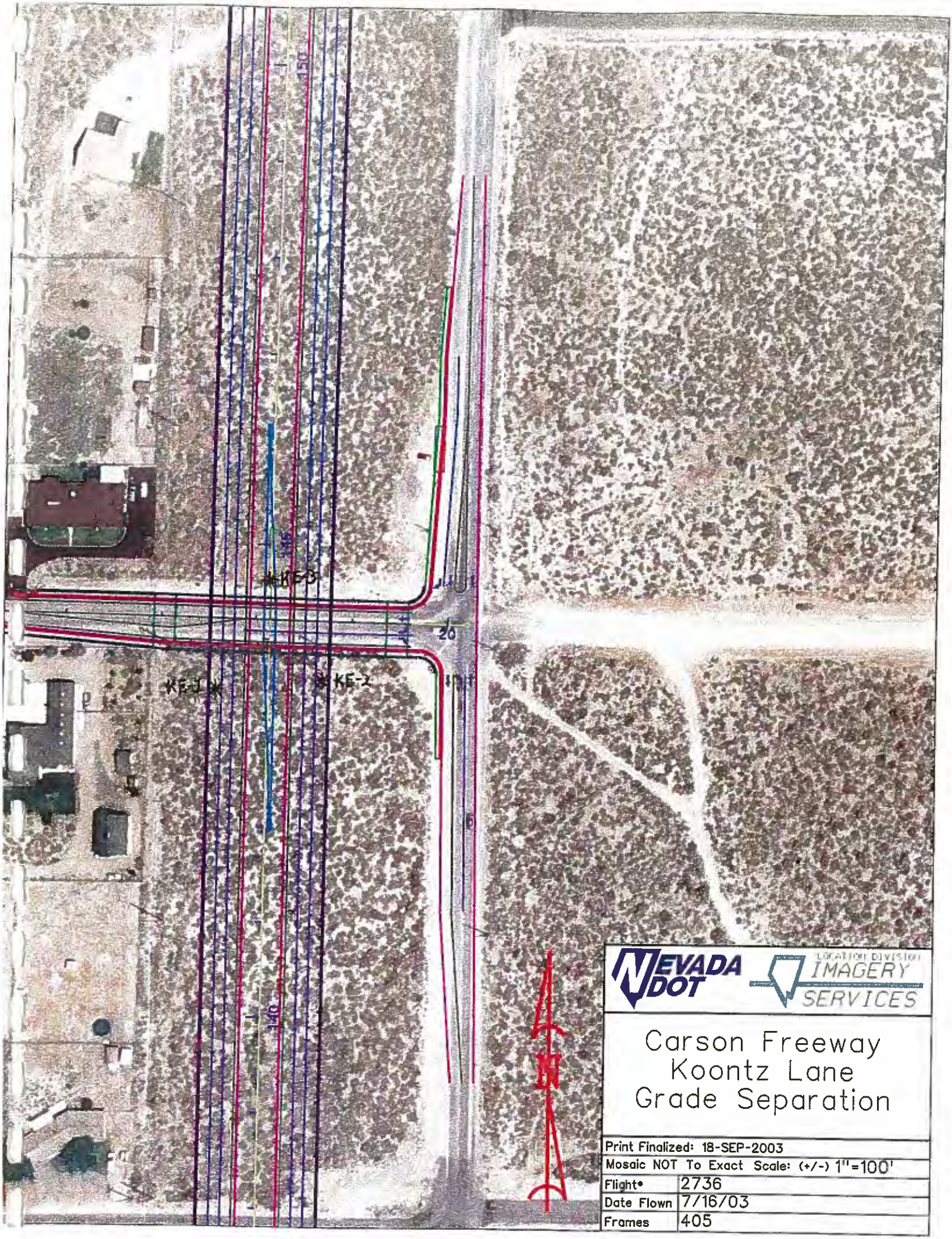
Date Flown	7/16/03
Frames	405

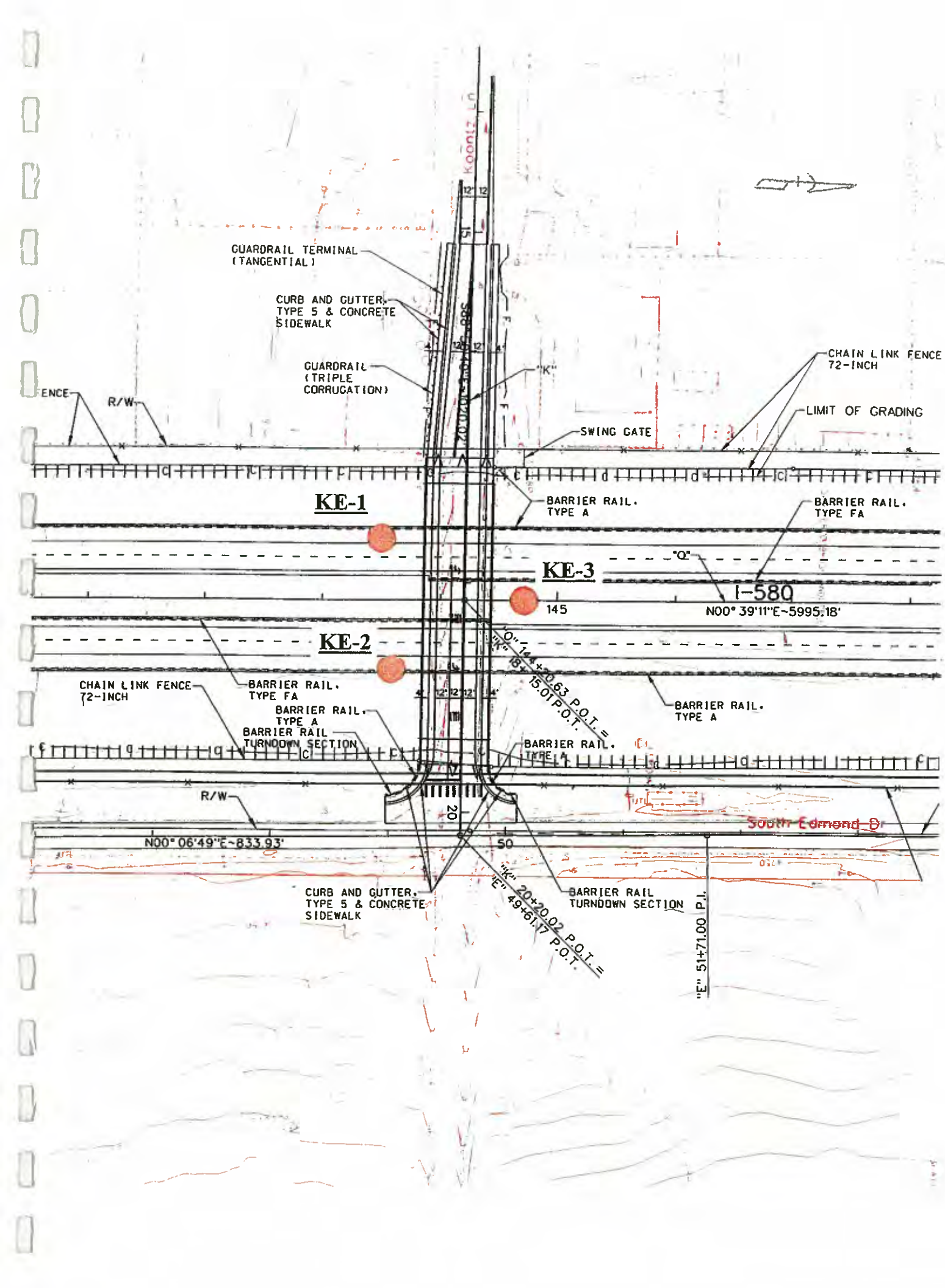


NEVADA DOT

LOCATION DIVISION
IMAGERY SERVICES

Carson Freeway
Koontz Lane
Grade Separation

Print Finalized: 18-SEP-2003	
Mosaic NOT To Exact Scale: (+/-) 1"=100'	
Flight#	2736
Date Flown	7/16/03
Frames	405


GUARDRAIL TERMINAL (TANGENTIAL)
CURB AND GUTTER, TYPE 5 & CONCRETE SIDEWALK
GUARDRAIL (TRIPLE CORRUGATION)
"K"
CHAIN LINK FENCE 72-INCH
LIMIT OF GRADING
SWING GATE
ENCE
R/W
KE-1
KE-2
KE-3
BARRIER RAIL, TYPE A
BARRIER RAIL, TYPE FA
"Q"
I-580
N00° 39'11"E-5995.18'
145
"Q" 14+20.63 P.O.T. =
"K" 18+15.01 P.O.T.
CHAIN LINK FENCE 72-INCH
BARRIER RAIL, TYPE FA
BARRIER RAIL, TYPE A
BARRIER RAIL TURNDOWN SECTION
R/W
N00° 06'49"E-833.93'
20
50
South Edmond Dr
CURB AND GUTTER, TYPE 5 & CONCRETE SIDEWALK
"K" 20+20.02 P.O.T. =
"E" 49+61.17 P.O.T.
BARRIER RAIL TURNDOWN SECTION
"E" 51+71.00 P.I.

APPENDIX B
BORING LOGS

KEY TO BORING LOGS

PARTICLE SIZE LIMITS								
CLAY	SILT	SAND			GRAVEL		COBBLES	BOULDERS
		FINE	MEDIUM	COARSE	FINE	COARSE		
.002 mm		#200	#40	#10	#4	¾ inch	3 inch	12 inch

USCS GROUP	TYPICAL SOIL DESCRIPTION
GW	Well graded gravels, gravel-sand mixtures, little or no fines
GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
GC	Clayey gravels, poorly graded gravel-sand-clay mixtures
SW	Well graded sands, gravelly sands, little or no fines
SP	Poorly graded sands, gravelly sands, little or no fines
SM	Silty sands, poorly graded sand-silt mixtures
SC	Clayey sands, poorly graded sand-clay mixtures
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL	Organic silts and organic silt-clays of low plasticity
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
CS	Claystone/Siltstone
PT	Peat and other highly organic soils

MOISTURE CONDITION CRITERIA

Description	Criteria
Dry	Absence of moisture, dusty, dry to touch.
Moist	Damp, no visible free water.
Wet	Visible free water, usually below groundwater table.
▽ ▼	Groundwater Elevation Symbols

SOIL CEMENTATION CRITERIA

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Won't break or crumble w/finger pressure

STANDARD PENETRATION CLASSIFICATION*			
GRANULAR SOIL		CLAYEY SOIL	
BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY
0 - 4	VERY LOOSE	0 - 1	VERY SOFT
5 – 10	LOOSE	2 - 4	SOFT
11 - 30	MEDIUM DENSE	5 - 8	MEDIUM STIFF
31 - 50	DENSE	9 - 15	STIFF
OVER 50	VERY DENSE	16 - 30	VERY STIFF
		31 - 60	HARD
		OVER 60	VERY HARD

*Standard Penetration Test (N) 140 lb hammer 30 inch free fall on 2 inch O.D. x 1.4 inch I.D. sampler.

Blow counts on Calif. Modified Sampler (N_{CMS}) can be converted to N_{SPT} by:

$(N_{CMS})(0.62) = N_{SPT}$

Blow counts from Automatic or Safety Hammer can be converted to Standard SPT N_{60} by:

$(N_{AUTOMATIC})(1.25) = N_{60}$

$(N_{SAFETY})(1.17) = N_{60}$

TEST ABBREVIATIONS

CD	CONSOLIDATED DRAINED	O	ORGANIC CONTENT
CH	CHEMICAL (CORROSIVENESS)	OC	CONSOLIDATION
CM	COMPACTION	PI	PLASTICITY INDEX
CU	CONSOLIDATED UNDRAINED	RQD	ROCK QUALITY DESIGNATION
D	DISPERSIVE SOILS	RV	R-VALUE
DS	DIRECT SHEAR	S	SIEVE ANALYSIS
E	EXPANSIVE SOIL	SL	SHRINKAGE LIMIT
G	SPECIFIC GRAVITY	U	UNCONFINED COMPRESSION
H	HYDROMETER	UU	UNCONSOLIDATED UNDRAINED
HC	HYDRO-COLLAPSE	UW	UNIT WEIGHT
K	PERMEABILITY	W	MOISTURE CONTENT

SOIL COLOR DESIGNATIONS ARE FROM THE MUNSELL SOIL COLOR CHART.

EXAMPLE: (7.5 YR 5/3) BROWN

SAMPLER NOTATION

CMS	CALIF. MODIFIED SAMPLER①
CPT	CONE PENETRATION TEST
CS	CONTINUOUS SAMPLER②
CSS	CALIFORNIA SPLIT SPOON
P	PUSHED (NOT DRIVEN)
PB	PITCHER BARREL
RC	ROCK CORE③
SH	SHELBY TUBE④
SPT	STANDARD PENETRATION TEST
TP	TEST PIT

① I.D.= 2.421 inch

② I.D.=3.228 inch with tube; 3.50 inch w/o tube

③ NXB I.D.= 1.875 inch

④ I.D.= 2.875 inch

LAST MODIFIED: October 11, 2004

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

EXPLORATION LOG

START DATE 6/10/02
END DATE 6/11/02
JOB DESCRIPTION Carson Freeway Phase 2
LOCATION Koontz at Edmonds
BORING KE-1
E.A. # 72781-1
GROUND ELEV. 4733.18 (ft)
HAMMER DROP SYSTEM automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft
6/14/02	dry	
9/13/02	dry	

STATION 'O4' 143+57
OFFSET 60' left
ENGINEER Callaghan
EQUIPMENT B-80
OPERATOR Marshall
DRILLING METHOD wet
BACKFILLED Yes DATE 9/13/02

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									brushy ground, few organics to 2'	4.5" diameter, tricone bit, 200 psi down pressure
	2.00									
	3.50	A	CMS	6 10 15	25	100	W, UW, S, DS, LL, PL, PI		**SILTY SAND** - Loose to med dense, dry, light-brown silty sand, gravel to 2"	voids in sample
	4.75	B	SPT	8 21 22/3"	22/3"	93	W, S, LL, PL, PI	SM	**SILTY SAND** - Dense dark yellowish brown, moist, partially cemented, minor gravel to 3/4"	300 psi
4728.2	5									CMS and SPT sample attempts, no penetration
	6.50									
	7.42	C	CMS	33 50/5"	50/5"	100	W, UW, S, LL, PL, PI		**SILTY SAND** - Very dense strong brown silty sand, micaceous, partially cemented	
									9.00	
	10.00									400 psi
4723.2	10									
	11.50	D	CMS	38 48 62	110	100	W, UW, S, LL, PL, PI, DS	SP SM	**POORLY GRADED SAND WITH SILT** - Very dense, yellowish-brown, cemented, oxidation banding, gravel	
	13.00	E	SPT	25 28 25	53	100	W, S		**POORLY GRADED SAND WITH SILT** - Very dense, yellowish-red to brown, micaceous	
									12.50	
	14.50	F	CMS	28 38 58	96	100	W, UW, S, DS	SP	**POORLY GRADED SAND** - Very dense, dark yellowish-brown to grey, heavy oxidation banding	
									14.50	
4718.2	15									
	16.00	G	SPT	31 55 55	110	100	W, S, LL, PL, PI	SM	**SILTY, CLAYEY, WELL GRADED SAND** - Very dense, medium brown sand with interbedded silt and clay	
									16.50	
	17.00									
	17.92	H	CMS	26 74/5"	74/5"	91	W, UW, S, DS	SP	**POORLY GRADED SAND** - Very dense, light brown, moist, med coarse, poorly graded sand with silt, oxidation banding	
	20.00									
									19.50	
4713.2	20									
	21.50	I	SPT	20 28 43	71	83	W, S, LL, PL, PI		**SILTY SAND** - Very dense, medium brown	
	22.00									
	23.00	J	CMS	50 71/6"	71/6"	100	W, S, LL, PL, PI		**SILTY SAND** - Very dense silty sand, light brown, moist, medium-coarse grained, oxidation banding	
4708.2	25							SM		very silty, 1 foot
	27.00									
	28.50	K	SPT	36 38 49	87	67	W, S, LL, PL, PI, H		**SILTY SAND** - Very dense, dark reddish-brown, heavy oxidation banding, minor gravel in tip	
									30.00	

NV_DOT_KOONTZ.GPJ NV_DOT.GDT 9/13/04

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

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HAMMER DROP SYSTEM automatic

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9/13/02	dry	

STATION 'O4' 143+57
OFFSET 60' left
ENGINEER Callaghan
EQUIPMENT B-80
OPERATOR Marshall
DRILLING METHOD wet
BACKFILLED Yes DATE 9/13/02

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
	32.00						W, UW, S,	SM		
	32.67	L	CMS	52 43/2"	43/2"	87	LL, PL, PI, DS		**SILTY, CLAYEY SAND** - Very dense, dark yellowish-brown	2" pocket of bentonite in sample
	33.50								33.00	
	34.75	LA	CMS	56 65 50/3"	50/3"	93	W, UW, S, LL, PL, PI, DS, H	SC SM	**SILTY, CLAYEY SAND** - Very dense, strong brown, coarse sand with lean clay and silt layers	
4698.2	35								36.50	
	37.00									
	37.83	M	SPT	41 62/4"	62/4"	90	W, S, LL, PL, PI	SM	**SILTY SAND** - Very dense, strong brown, minor gravel	
4693.2	40								40.00	
	42.00									softer drilling, muddier, 1 foot
	43.25	N	CMS	31 68 50/3"	50/3"	100	W, UW, S, LL, PL, PI, DS	SC	**CLAYEY SAND** - Very dense, reddish-brown, coarse sand and clay layers	
4688.2	45								45.00	highly oxidized cuttings
	47.00							SC SM		
	47.67	O	SPT	34 40/2"	40/2"	75	W, S, LL, PL, PI		**SILTY, CLAYEY SAND** - Very dense, dark reddish-brown, moist,	
4683.2	50								49.00	rocky
	53.50							SM		
	55.00	P	SPT	39 55 64	119	100	W, S, LL, PL, PI		**SILTY SAND** - Very dense silty sand, coarser sand with subrounded particles	soft layer
4678.2	55								55.50	
	57.00									soft layer
	58.50	Q	CMS	19 44 60	104	100	W, UW, S, LL, PL, PI, DS, H	SC SM	**SILTY, CLAYEY SAND** - Very dense, yellowish-brown to strong brown, moist, minor gravel	harder drilling

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

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OFFSET 60' left
ENGINEER Callaghan
EQUIPMENT B-80
OPERATOR Marshall
DRILLING METHOD wet
BACKFILLED Yes DATE 9/13/02

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									61.00	
	62.00									
	63.17	R	SPT	36 49 50/2"	50/2"	57	W, S, LL, PL, PI, H		**SILTY SAND** - Very dense, strong brown	
4668.2	65									
	67.00									
	67.75	S	CMS	77 50/3"	50/3"	89	W, UW, S, LL, PL, PI, DS	SM	**SILTY SAND** - Very dense, strong brown, minor gravel to 3/4"	
4663.2	70									
	72.00									
	73.50	T	SPT	40 35 30	65	89	W, S, LL, PL, PI		**SILTY SAND** - Very dense, medium brown	
									74.00	
4658.2	75							SC SM		
	77.00									
	78.33	U	CMS	32 42 50/4"	50/4"	100	W, UW, S, LL, PL, PI, DS		**SILTY, CLAYEY SAND** - Very dense, dark brown, minor gravel to 1/4"	
									78.33 **Bottom of Hole**	
4653.2	80									
4648.2	85									

NV_L... ONTZ... NV_DG... 9/13/02

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

EXPLORATION LOG

START DATE 6/12/02
END DATE 6/13/02
JOB DESCRIPTION Carson Freeway Phase 2
LOCATION Koontz at Edmonds
BORING KE-2
E.A. # 72781-1
GROUND ELEV. 4739.95 (ft)
HAMMER DROP SYSTEM automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft
6/14/02	dry	
9/13/02	dry	

STATION 'O4' 143+60
OFFSET 71' right
ENGINEER Callaghan
EQUIPMENT B-80
OPERATOR Marshall
DRILLING METHOD wet
BACKFILLED Yes DATE 9/13/02

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
										400 psi down pressure
	2.00									
	3.33	A	CMS	37 60 50/4"	50/4"	75	W, UW, S, LL, PL, PI, DS	SM	**SILTY SAND** - Brown, dry, minor gravel up to 1/2", organics to 2'	
									4.50	
4735.0	5.50									
	6.42	BA	SPT	54/5"	54/5"	80			6.00 **SILTY SAND** - Dry, hard cemented layer in sampler shoe, gravel up to 1/4"	Sampler bouncing on stroke
	7.00									
	8.50	B	SPT	22 32 36	68	89	W, S	SW SM	**WELL GRADED SAND WITH SILT** - Very dense, moist, coarse sand, easily broken apart, semi-rounded grains	
	9.50								9.00	
4730.0	10 10.75	C	CMS	30 63 50/3"	50/3"	100	W, UW, S, LL, PL, PI, DS		**SILTY SAND** - Very dense, dark yellowish brown, gravel up to 1/4"	
	12.00									
	13.50	D	SPT	28 44 57	101	89	W, S, LL, PL, PI		**SILTY SAND** - Very dense, dry, yellowish brown, heavy oxidation banding	
	15.00							SM		
4725.0	15 16.50	E	CMS	40 47 69	116	89	W, UW, S, LL, PL, PI, DS		**SILTY SAND** - Very dense, reddish-brown, damp, heavy oxidation banding, minor gravel up to 1"	
	17.00									
	18.50	F	SPT	41 51 52	103	89	W, S, LL, PL, PI		**SILTY SAND** - Very dense, moist, yellowish brown, oxidation banding, gravel up to 1/2"	
									19.00	
	20.00									
4720.0	20 21.25	G	CMS	39 58 50/3"	50/3"	80	W, UW, S, LL, PL, PI, DS	SC SM	**SILTY, CLAYEY SAND** - Very dense, more fines, cemented layers	
									22.50	
	23.50									
	24.00	H	SPT	64/6"	64/6"	83	W, S		**SILTY SAND** - Very dense, less fines, cemented layers	
4715.0	25 27.00							SM		
	28.50	I	CMS	37 40 47	87	94	W, UW, S, LL, PL, PI, DS		**SILTY SAND** - Very dense, yellowish brown	
									29.00	Softer material

NV_KOONTZ_NV_DOT_9/13/02

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

START DATE	6/12/02	STATION	'O4' 143+60
END DATE	6/13/02	OFFSET	71' right
JOB DESCRIPTION	Carson Freeway Phase 2	ENGINEER	Callaghan
LOCATION	Koontz at Edmonds	EQUIPMENT	B-80
BORING	KE-2	OPERATOR	Marshall
E.A. #	72781-1	DRILLING METHOD	wet
GROUND ELEV.	4739.95 (ft)	BACKFILLED	Yes DATE 9/13/02
HAMMER DROP SYSTEM	automatic		

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft
6/14/02	dry	
9/13/02	dry	

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
	32.00–33.50	J	CMS	10 28 54	82	94	W, UW, S, LL, PL, PI, DS	SC SM	33.00 **SILTY, CLAYEY SAND** - Very dense, dark reddish-brown, micaceous	Harder material
4705.0	35									
	37.00–38.33	K	SPT	25 57 50/4"	50/4"	88	W, S, LL, PL, PI	SM	**SILTY SAND** - Very dense, dark reddish-brown, heavy oxidation banding	Cuttings highly oxidized
4700.0	40									
	42.00–42.67	L	CMS	63 50/2"	50/2"	57	W, UW, S, LL, PL, PI	SM	44.00 **SILTY SAND** - Very dense, dark reddish-brown, heavy oxidation banding, gravel up to 1/2"	
4695.0	45									
	47.00–48.50	M	CMS	16 34 44	78	89	W, UW, S, LL, PL, PI, DS	SC	48.00 **CLAYEY SAND** - Very dense, dark red, softer, finer material, very heavy oxidation banding	
4690.0	50									
	52.00–52.25	N	SPT	50/3"	50/3"	100	W, S	SM	**SILTY SAND** - Very dense, dark yellowish brown, lighter oxidation banding	
4685.0	55									Softer layer less than 1 foot thick
	57.00–58.33	O	CMS	44 70/4"	70/4"	63	W, UW, S, LL, PL, PI, DS	SM	60.00 **SILTY SAND** - Very dense, dark reddish-brown, minor gravel to 3/8"	

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

EXPLORATION LOG

START DATE 6/25/02
END DATE 6/27/02
JOB DESCRIPTION Carson Freeway Phase 2
LOCATION Koontz at Edmonds
BORING KE-3
E.A. # 72781-1
GROUND ELEV. 4735.15 (ft)
HAMMER DROP SYSTEM automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft
7/9/02	dry	
9/13/02	dry	

STATION 'O4' 144+74
OFFSET no offset
ENGINEER Callaghan/Salazar
EQUIPMENT B-80
OPERATOR Whited
DRILLING METHOD wet
BACKFILLED Yes DATE 9/13/02

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
	62.00									
	63.50	P	SPT	22 30 51	81	100	W, S, LL, PL, PI, H, G		**SILTY SAND** - Very dense, moderately yellowish-brown, moist, silty, fine to medium sand	
4670.2	65									
	67.00									
	68.50	Q	SPT	23 30 41	71	100	W, S, LL, PL, PI	SM	**SILTY SAND** - Very dense, moderately yellowish-brown silty fine to medium sand	
4665.2	70									
	72.00									
	73.50	R	SPT	19 25 31	56	100	W, S, LL, PL, PI		**SILTY SAND** - Very dense moderate yellowish-brown with black flecks and small rare claybound pockets, moist, silty coarsesilty fine-medium sand with minor fine gravel	
4660.2	75									
	77.00								76.00	Softer material
	78.50	S	SPT	11 12 13	25	86	W, S, LL, PL, PI, H, G	ML	**SANDY SILT** - Medium dense, dark yellowish-brown, wet micaceous fine silt and sand with minor fine gravel	
4655.2	80									
	82.00								80.50	Harder drilling, chatter, 250 psi
	83.50	T	SPT	32 41 45	86	94	W, S		**SILTY SAND WITH GRAVEL** - Very dense, moderately yellowish-brown micaceous silty fine sand with gravel	300 psi
4650.2	85							SM		
	87.00									
	88.50	U	SPT	41 44 49	93	94	W, S, LL, PL, PI, H, G		**SILTY SAND WITH GRAVEL** - Very dense, mottled,moderately yellowish-brown and grayish-red silty sand with gravel	350 psi
									90.00	

APPENDIX C
LABORATORY TEST RESULTS

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** O4' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
A2	2.5 - 2.9	CMS	25	SM*			17.3*				DS*	34	2.11	33	1.31	DS*, H
A2a	2.5 - 2.6	CMS			6.0	112.3										
A2c	2.7 - 2.8	CMS			4.4	105.8										
A2d	2.8 - 2.9	CMS			4.8	107.5										
A1	3.0 - 3.5	CMS	25	SM	3.7	108.0	20.3	15	NP	NP						
B	5.0 - 6.0	SPT	22/3"	SM	12.5		25.0	18	17	1						
C	6.5 - 7.0	CMS	50/4.5"	SM	4.3	112.3	21.3	17	NP	NP						
D2a	10.5 - 10.7	CMS	110	SM	12.1		47.9	25	NP	NP	DS*	24	10.41			
D2b,c,d	10.7 - 11.0	CMS	110	SM*			13.7*	21	NP	NP	DS*	24	10.41			DS*
D2b	10.7 - 10.8	CMS			7.3	107.5										
D2c	10.8 - 10.9	CMS			5.8	102.2										
D2d	10.9 -11.0	CMS			6.4	100.8										

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RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
Φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** O4' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS pcf	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg.	C psi	Φ deg.	C psi	
												Peak		Residual		
D1	11.0 - 11.5	CMS	110	SP-SM	2.2	115.4	6.0									
E	11.5 - 13.0	SPT	53	SP-SM	20.3		6.0									
F2a	13.5 - 13.75	CMS	96	SP	1.3		2.9									
F2b	13.75 - 14.0	CMS		SP	1.4		2.5									
F1	14.0 - 14.5	CMS		SP*			3.0				DS*	45	3.26	37	1.66	DS*
F1a	14.0 - 14.1	CMS	96		11.0	108.3										
F1b	14.1 - 14.2	CMS			9.0	109.8										
F1c	14.2 - 14.5	CMS			7.9	108.7										
G2	14.5 - 15.6	CMS	110	SC-SM	17.3		29.6	26	21	5						
G1	15.6 - 16.0	CMS	110	SW-SM	16.5		6.3									
H2	17.0 - 17.2	CMS	74/5"	SP	16.8	105.7	3.9									
H1	17.2 - 17.3	CMS	74/5"	SP*			3.2*				DS*	42	6.08	34	2.07	

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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** O4' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg.	C psi	Φ deg.	C psi	
												Peak		Residual		
H1a	17.2 - 17.3	CMS	74/5"	SP*	11.9	105.1										
H1b	17.3 - 17.4	CMS			11.1	106.8										
H1c	17.4 - 17.5	CMS			9.6	105.6										
I	20.25 - 21.5	SPT	71	SM	16.6		26.5	26	22	4						
J	22.0 - 22.5	CMS	71/0"	SM	9.7		20.3	24	23	1						
K	27.3 - 28.5	SPT	87	SM	12.8		37.7	19	NP	NP						H
L1	32.3 - 32.4	CMS	43/2"	SM*			26.8*	20	NP	NP	DS*	41	4.92	38	0.61	
L1b	32.3 - 32.4	CMS		SM*	11.9	118.1										
L1c	32.4 - 32.5	CMS			11.8	120.0										
L1d	32.5 - 32.6	CMS			11.9	121.0										
LA2	33.9 - 34.2	CMS	50/3"	SM*			28.3*	19	NP	NP	DS*	40	5.53	33	1.97	
LA2a	33.9 - 34.0	CMS		SM*	10.7	120.2										

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RQD = Rock Quality Designation
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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** O4' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
LA2b	34.0 - 34.1	CMS			9.4	119.6										
LA2c	34.1 - 34.2	CMS			8.8	120.2										
LA1	34.3 - 34.7	CMS	50/3"	CL*			51.2*	27	16	11	DS*	42	2.37	35	0.75	H
LA1a	34.3 - 34.4	CMS			11.7	114.1										
LA1b	34.4 - 34.5	CMS			12.2	117.4										
LA1c	34.5 - 34.6	CMS			8.9	124.1										
LA1d	34.6 - 34.7	CMS			7.7	122.7										
M	37.0 - 37.8	SPT	62/4"	SM	11.0		33.8	21	18	3						
N2	42.2 - 42.5	CMS	50/3"	SC*			39.1*	27	17	10	DS*	31	13.2	30	2.68	
N2a	42.2 -42.3	CMS		SC*	11.1	125.3										
N2b	42.3 - 42.4	CMS			14.2	121.3										
N2c	42.4 - 42.5	CMS			13.6	121.5										

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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** O4' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg.	C psi	Φ deg.	C psi	
												Peak		Residual		
N1	42.7 - 43.0	CMS	50/3"	SC*			33.2*	27	16	11	DS*	46	2.93	33	1.62	
N1a	42.7 - 42.8	CMS			11.9	119.9										
N1b	42.8 - 42.9	CMS			11.2	126.2										
N1c	42.9 -43.0	CMS			10.7	128.4										
O	47.0 - 47.7	SPT	40/2"	SC-SM	15.9		36.2	23	19	4						H
P	53.5 - 54.5	SPT	119	SM	13.0		26.1	19	NP	NP						
Q3	57.0 - 57.3	CMS	104	SC*			40.3*	25	16	9	DS*	32	6.33	32	1.39	
Q3a	57.0 -57.1	CMS	104		13.2	121.1										
Q3b	57.1 - 57.2				13.7	118.3										
Q3c	57.2 - 57.3				11.9	119.5										
Q2	57.5 - 57.9	CMS	104	SC-SM*			36.4*	21	16	5	DS*	37	6.68	34	3.81	H
Q2a	57.5 - 57.6	CMS	104		12.8	124.0										

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RQD = Rock Quality Designation
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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** 04' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
Q2b	57.6 - 57.7	CMS			13.8	121.4										
Q2c	57.8 - 57.9	CMS			13.0	124.9										
Q1	58.0 - 58.3	CMS	104	SC-SM*			33.1*	21	17	4	DS*	36	7.97	34	1.24	
Q1a	58.0 - 58.1	CMS	104		9.6	122.2										
Q1b	58.1 - 58.2	CMS			11.5	123.9										
Q1c	58.2 - 58.3	CMS			12.7	122.2										
R	62.5 - 63.5	SPT	50/2"	SM	14.0		27.8	15	NP	NP						H
S1	67.1 - 67.4	CMS	50/3"	SM*			25.3*	17	NP	NP	DS*	42	6.55	35	0.63	
S1a	67.1 - 67.2	CMS			9.8	117.6										
S1b	67.2 - 67.3	CMS			8.7	113.5										
S1c	67.3 - 67.4	CMS			7.9	114.8										
T	72.2 - 73.5	SPT	65	SM	13.3		31.0	21	18	3						

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
Φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

*** = Average of subsamples**

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
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O = Organic Content
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RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE1 **Elevation (ft)** 4733.18 **Station** 04' 143+57

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg.	C psi	Φ deg.	C psi	
												Peak		Residual		
U2	77.2 - 77.5	CMS	50/4"	SM*			39.6*	21	18	3	DS*	34	7.60	35	0.59	
U2a	77.2 - 77.3	CMS			11.6	121.0										
U2b	77.3 - 77.4	CMS			11.9	122.7										
U2c	77.4 - 77.5	CMS			12.0	122.4										
U1	77.7 - 78.0	CMS	50/4"	SC-SM*			35.8*	25	18	7	DS*	40	3.2	34	1.67	
U1a	77.7 - 77.8	CMS			15.5	118.1										
U1b	77.8 - 77.9	CMS			12.8	121.7										
U1c	77.9 - 78.0	CMS			11.4	126.0										

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N = Field SPT $N = (N_{css})(0.62)$

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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE2 **Elevation (ft)** 4739.95 **Station** 04' 143+60

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
A1	2.3 - 2.6	CMS	50/4"	SM*			21.2*	15	NP	NP	DS*	39	2.68	34	2.02	
A1a	2.3 - 24	CMS	50/4"		4.7	119.2										
A1b	2.4 - 2.5	CMS			4.7	120.2										
A1c	2.5 - 2.6	CMS			5.1	119.6										
A2	2.8 - 3.1	CMS	50/4"	SM*			22.3*	14	NP	NP	DS*	39	2.87	34	1.46	
A2a	2.8 - 2.9	CMS	50/4"		4.1	119.1										
A2b	2.9 - 3.0	CMS			4.6	121.6										
A2c	3.0 - 3.1	CMS			4.8	119.3										
B	7.2 - 8.5	SPT	68	SW-SM	16.7		9.9									
C1	9.75 - 10.1	CMS	50/3"	ML*			75.9*	31	27	4	DS*	46	0.47	37	1.23	
C1a	9.75 - 9.9	CMS	50/3"		19.1	101.6										
C1b	9.9 - 10.0	CMS			19.8	105.1										

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CU = Consolidated Undrained
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Φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

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S = Sieve
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PI = Plasticity Index
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X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE2 **Elevation (ft)** 4739.95 **Station** O4' 143+60

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
C1c	10.0 - 10.1	CMS		SP-SM	14.6	107.0	9.1									
C2	10.25 - 10.6	SCMS	50/3"	SW-SM*			9.5*				DS*	45	2.17	37	0.67	
C2a	10.25 - 10.4	CMS	50/3"		4.3	96.4	9.5*									
C2b	10.4 - 10.5	CMS			4.5	104.7										
C2c	10.5 - 10.6	CMS			4.5	107.0										
D	12.2 - 13.5	SPT	101	SM	13.5		31.4	20	NP	NP						
E1	15.5 - 16.0	CMS	116	SM	8.6	122.9	37.9	21	19	2						
E2	16.0 - 16.3	CMS	116	SM*			36.6*	21	18	3	DS*	37	3.14	33	1.14	
E2a	16.0 - 16.1	CMS	116		8.0	116.3										
E2b	16.1 - 16.2	CMS			8.4	117.7										
E2c	16.2 - 16.3	CMS			9.4	129.3										
F	17.0 - 18.5	SPT	103	SM	12.9		27.5	17	NP	NP						

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U = Unconfined Compressive
UU = Unconsolidated Undrained
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CU = Consolidated Undrained
DS = Direct Shear
Φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

*** = Average of subsamples**

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
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Ch = Chemical
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E = Swell/Pressure on Expansive Soils
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X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE2 **Elevation (ft)** 4739.95 **Station** O4' 143+60

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
G1	20.3 - 20.6	CMS	50/3"	SC-SM*			32.3*	21	16	5	DS*	43	6.96	33	2.09	
G1a	20.3 - 20.4	CMS	50/3"		8.5	124.2										
G1b	20.4 - 20.5	CMS			8.8	126.2										
G1c	20.5 - 20.6	CMS			9.8	123.8										
G2	20.8 - 20.9	CMS	50/3"	SC-SM*			36.9*	21	17	4	DS*	38	9.00	37	-0.13	
G2a	20.8 - 20.9	CMS			8.2	124.3										
G2b	20.9 -21.0	CMS			7.7	125.2										
G2c	21.0 - 21.1	CMS			7.5	125.4										
H	23.5 - 24.0	SPT	64/6"	SM	9.3		30.1									
I1	27.5 - 27.8	CMS	87	SM*			36.4*	20	17	3	DS*	39	6.4	32	3.17	
I1a	27.5 - 27.6	CMS			8.8	121.2										
I1b	27.6 - 27.7	CMS			9.0	120.6										

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N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

*** = Average of subsamples**

H = Hydrometer
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HCpot = Hydro-Collapse Potential

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE2 **Elevation (ft)** 4739.95 **Station** O4' 143+60

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg.	C psi	Φ deg.	C psi	
												Peak		Residual		
I1c	27.7 - 27.8	CMS			9.0	123.8										
I2	28.0 - 28.3	CMS	87								DS*	33	11.87	32	1.97	
I2a	28.0 - 28.1	CMS			8.9	122.1										
I2b	28.1 - 28.2	CMS			9.1	124.0										
I2c	28.2 - 28.3	CMS			9.3	124.8										
J1	32.5 - 32.8	CMS	82	SC-SM*			36.69*	24	18	6	DS*	35	4.15	32	0.93	
J1a	32.5 - 32.6	CMS			22.1	102.2										
J1b	32.6 - 32.7	CMS			20.7	106.1										
J1c	32.7 - 32.8	CMS			15.7	113.5										
J2	33.0 - 33.3	CMS	82	SC-SM*			38.8*	22	18	4	DS*	36	8.46	32	1.39	
J2a	33.0 - 33.1	CMS			11.2	120.3										
J2b	33.1 - 33.2	CMS			10.8	122.3										

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N = No. of blows per ft., sampler

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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE2 **Elevation (ft)** 4739.95 **Station** O4' 143+60

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg. (Peak)	C psi (Peak)	Φ deg. (Residual)	C psi (Residual)	
J2c	33.2 - 33.3	CMS			10.1	124.4										
K	37.0 - 38.2	SPT	50/4"	SM	15.7		38.3	22	NP	NP						
L2	42.7 - 43.2	CMS	50/2"	SM	10.7	122.1	41.1	20	19	1						
M1	47.5 - 47.8	CMS	78	SC*			36.8*	25	17	8	DS*	41	1.66	42	-4.01	
M1a	47.5 - 47.6	CMS			13.6	119.1										
M1b	47.6 - 47.7	CMS			15.1	117.0										
M1c	47.7 - 47.8	CMS			13.2	119.4										
M2	48.0 - 48.3	CMS	78	SM*			37.4*	20	18	2	DS*	37	10.39	34	4.26	
M2a	48.0 - 48.1	CMS			11.2	123.6										
M2b	48.1 - 48.2	CMS			9.9	124.9										
M2c	48.2 -48.3	CMS			9.9	124.8										
N	52.0 - 52.25	SPT	50/3"	SM	10.0		23.3									

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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE2 **Elevation (ft)** **Station**

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Φ deg.	C psi	Φ deg.	C psi	
												Peak		Residual		
O2	57.7 - 58.0	CMS	70/4"	SM*			35.9	21	NP	NP	DS*	35	7.35	35	-0.26	
O2a	57.7 - 57.8	CMS			6.6	113.2										
O2b	57.8 - 57.9	CMS			6.5	112.0										
O2c	57.9 - 58.0	CMS			8.7	110.6										
P	62.2 - 63.5	SPT	105	SM	12.2		25.7	17	NP	NP						
Q2	67.5-67.8	CMS	65/5"	SC-SM*			37.0	21	17	4	DS*	41	4.74	33	2.2	
Q2a	67.5 -67.6	CMS			8.2	121.8										
Q2b	67.6 - 67.7	CMS			11.1	125.0										
Q2c	67.7 - 67.8	CMS			12.0	124.5										
R	72.0 - 72.9	SPT	60/4"	SM	11.2		29.3	19	NP	NP						
S2	77.0 - 77.4	CMS	60/5"	ML	8.8	123.2	51.5	21	20	1						
T	82.2 - 82.7	SPT	40/2"	ML	14.3		58.7	21	NP	NP						

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SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE3 **Elevation (ft)** 4735.15 **Station** O4" 144+74

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Peak φ deg.	Peak C psi	Residual φ deg.	Residual C psi	
A	2.0 - 3.5	CMS	103	SM*												
A1	2.5 - 3.0	CMS	103		3.3	134.8	34.0									
A2	3.0 - 3.5	CMS	103		1.9	123.5		19	17	2						
B	7.0 - 8.5	SPT	18	SM			13.9	17	NP	NP						H, G = 2.701
C	12.0 - 13.3	CMS	R	SM*												
C1	12.0 - 12.5	CMS	R		7.9	114.0	21.0									
C2	12.5 - 13.0	CMS	R		8.7	110.9		18	NP	NP						
D	17.0 - 18.5	SPT	49	SW-SM	8.3		7.1	19	NP	NP						
E	22.0 - 23.5	CMS	91	SP-SM												
E1	22.5 - 23.0	CMS	91	SP-SM	9.8	106.9	6.8									
E2	23.0 - 23.5	CMS	91	SP-SM	4.1	108.0	7.2									
F	27.0 - 28.5	SPT	82	SM			28.7	19	NP	NP						Ch, H, G = 2.703

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U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SP` N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
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RQD = Rock Quality Designation
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HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE3 **Elevation (ft)** 4735.15 **Station** O4' 144+74

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	Peak φ deg.	Peak C psi	Residual φ deg.	Residual C psi	
G	28.5 - 30.0	CMS	114	SC*												
G1	28.5 - 29.0	CMS	114		9.1	124.1	36.1									
G2	29.0 - 29.5	CMS	114		7.6	129.0		25	17	8						
H	31.0 - 32.5	SPT	R	SC-SM			35.2	23	17	6						
I	33.0 - 34.5	CMS	74	SC												
I1	33.5 - 34.0	CMS	74	SC	10.6	123.2	37.7	29	16	13						
I2	34.0 - 34.5	CMS	74	SC	12.5	119.6	41.6	34	17	17						H, G = 2.679
J	35.0 - 36.5	SPT	67	SC			24.2	26	18	8						
K	37.0 - 38.3	CMS	R		6.9	128.6										
L	42.0 - 43.5	SPT	107	SM			16.3	21	NP	NP						Ch
M	47.0 - 48.0	SPT	R	SM	5.8		27.5									
N	52.0 - 53.0	SPT	R	SM	6.4		20.1									

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

*** = Average of subsamples**

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # 72781-1 **Job Description** Carson City Freeway Bypass @ Koontz Ln.

Boring No. KE3 **Elevation (ft)** 4735.15 **Station** O4' 144+74

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS ft	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					OTHERS
											TEST TYPE	φ deg. (Peak)	C psi (Peak)	φ deg. (Residual)	C psi (Residual)	
O	57.0 - 58.5	SPT	90	SM	8.4		28.7	18	NP	NP						H, G = 2.686
P	62.0 - 63.5	SPT	81	SM	9.6		25.9	19	NP	NP						H, G = 2.671
Q	67.0 - 68.5	SPT	71	SM	10.2		30.5	21	18	3						
R	72.0 - 73.5	SPT	56	SM	8.2		31.6	20	17	3						
S	77.0 - 78.5	SPT	25	ML	12.4		50.6	22	NP	NP						H, G = 2.743
T	82.0 - 83.5	SPT	86													
T1	82.0 - 82.5	SPT	86		6.6		26.6									
T2	82.5 - 83.5	SPT	86		8.9		41.7									
U	87.0 - 88.5	SPT	93	SM	7.9		23.0	21	19	2						H, G = 2.721
V	97.0 - 98.5	SPT	90	SM	10.7		29.3	21	19	2						H, G = 2.676

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
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N = Field SPT $N = (N_{css})(0.62)$

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H = Hydrometer
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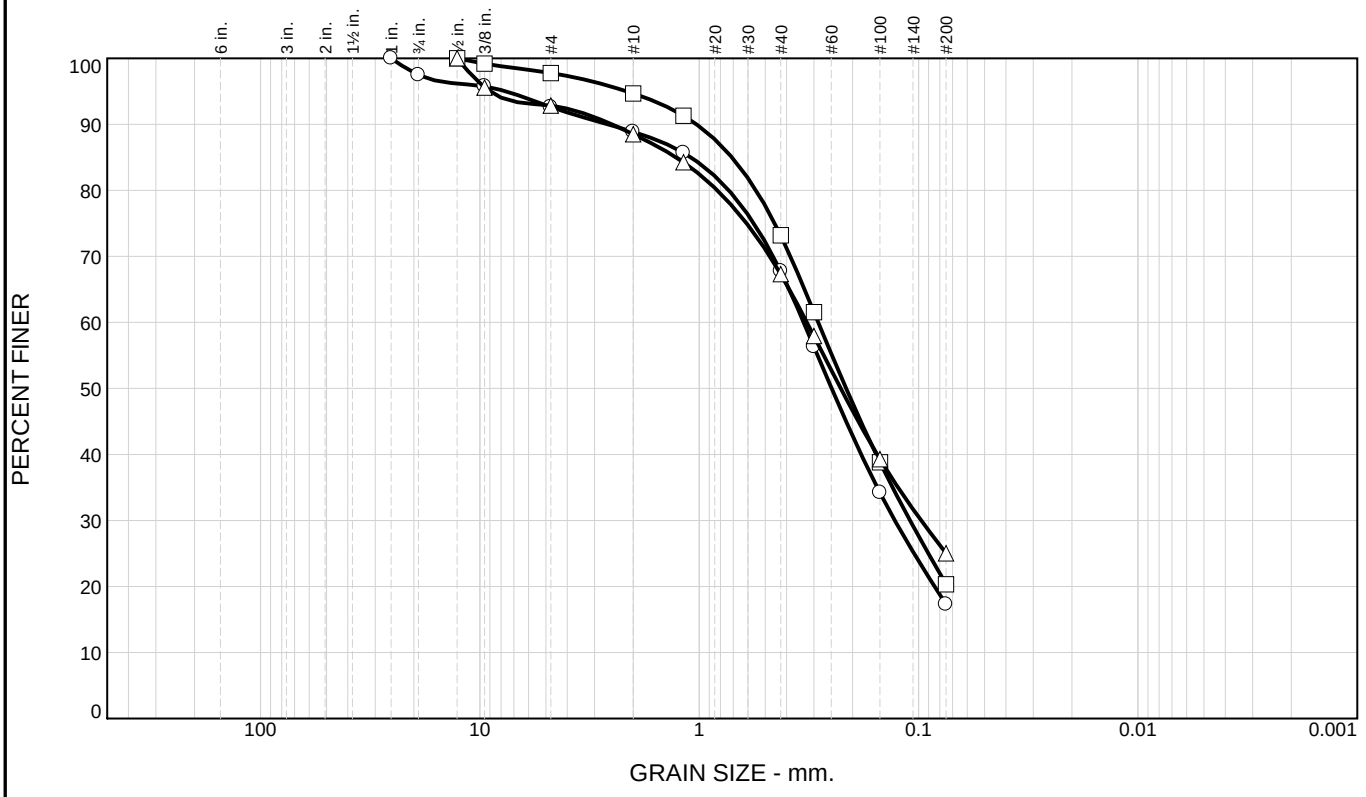
Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	7.4	75.3	17.3		SM			
□	0.0	2.2	77.5	20.3		SM		NP	15
△	0.0	7.2	67.8	25.0		SM		17	18

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0		
3/4	97.5		
1/2		100.0	100.0
3/8	95.8	99.2	95.6
	GRAIN SIZE		
D_{60}	0.3341	0.2869	0.3229
D_{30}	0.1283	0.1094	0.0972
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	92.6	97.8	92.8
#10	88.9	94.7	88.5
#16	85.7	91.3	84.2
#40	67.8	73.2	67.3
#50	56.3	61.6	57.9
#100	34.2	38.8	39.3
#200	17.3	20.3	25.0

Material Description
○ Silty sand
□ Silty sand
△ Silty sand

REMARKS:
○
□
△

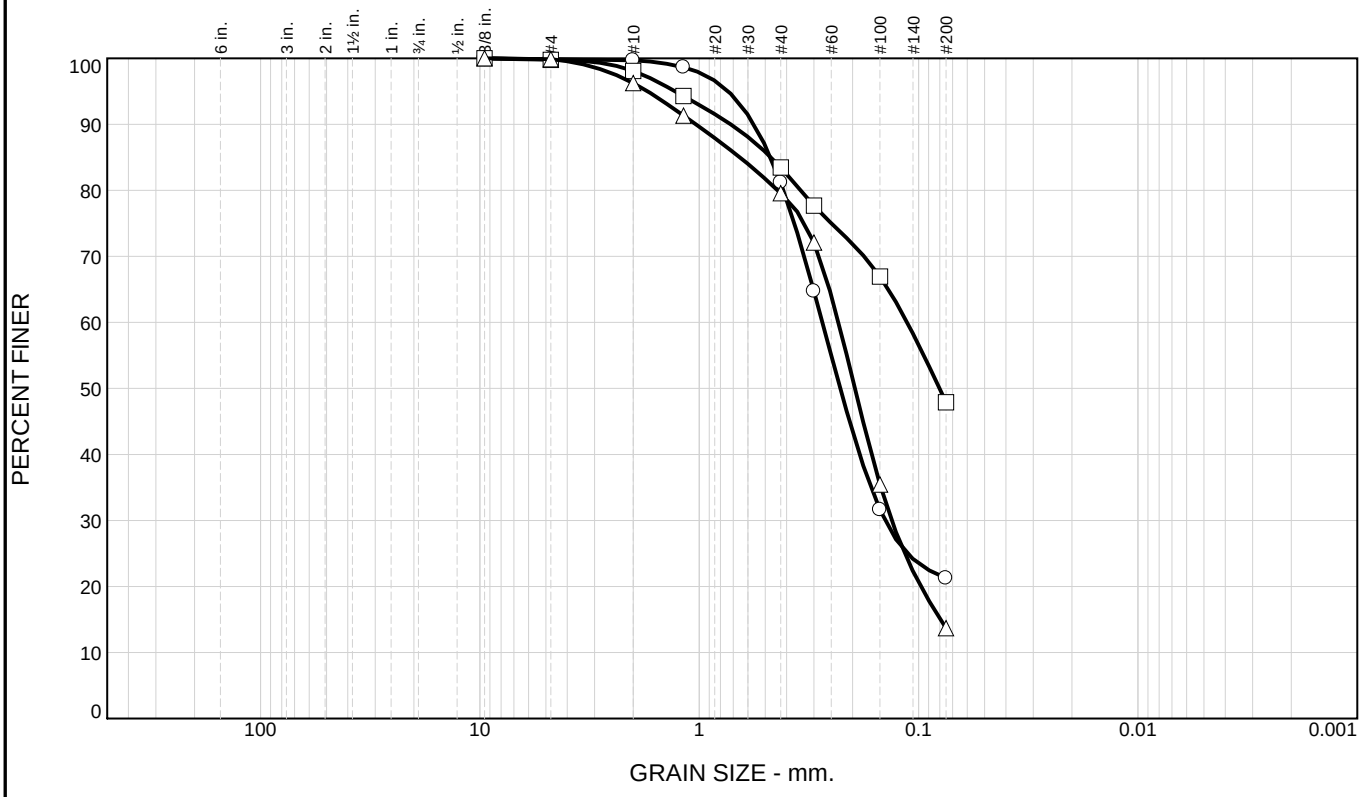
○ Source of Sample: KE1 Depth: 2.5' Sample Number: A2
□ Source of Sample: KE1 Depth: 3.0' Sample Number: A1
△ Source of Sample: KE1 Depth: 5.0' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.1	78.6	21.3		SM		NP	17
□	0.0	0.2	51.9	47.9		SM		NP	25
△	0.0	0.1	86.2	13.7		SM		NP	21

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2745	0.1127	0.2317
D_{30}	0.1423		0.1327
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.9	99.8	99.9
#10	99.7	98.1	96.2
#16	98.6	94.3	91.3
#40	81.2	83.5	79.6
#50	64.7	77.7	72.1
#100	31.6	66.9	35.4
#200	21.3	47.9	13.7

Material Description
○ Silty sand
□ Silty sand
△ Silty sand

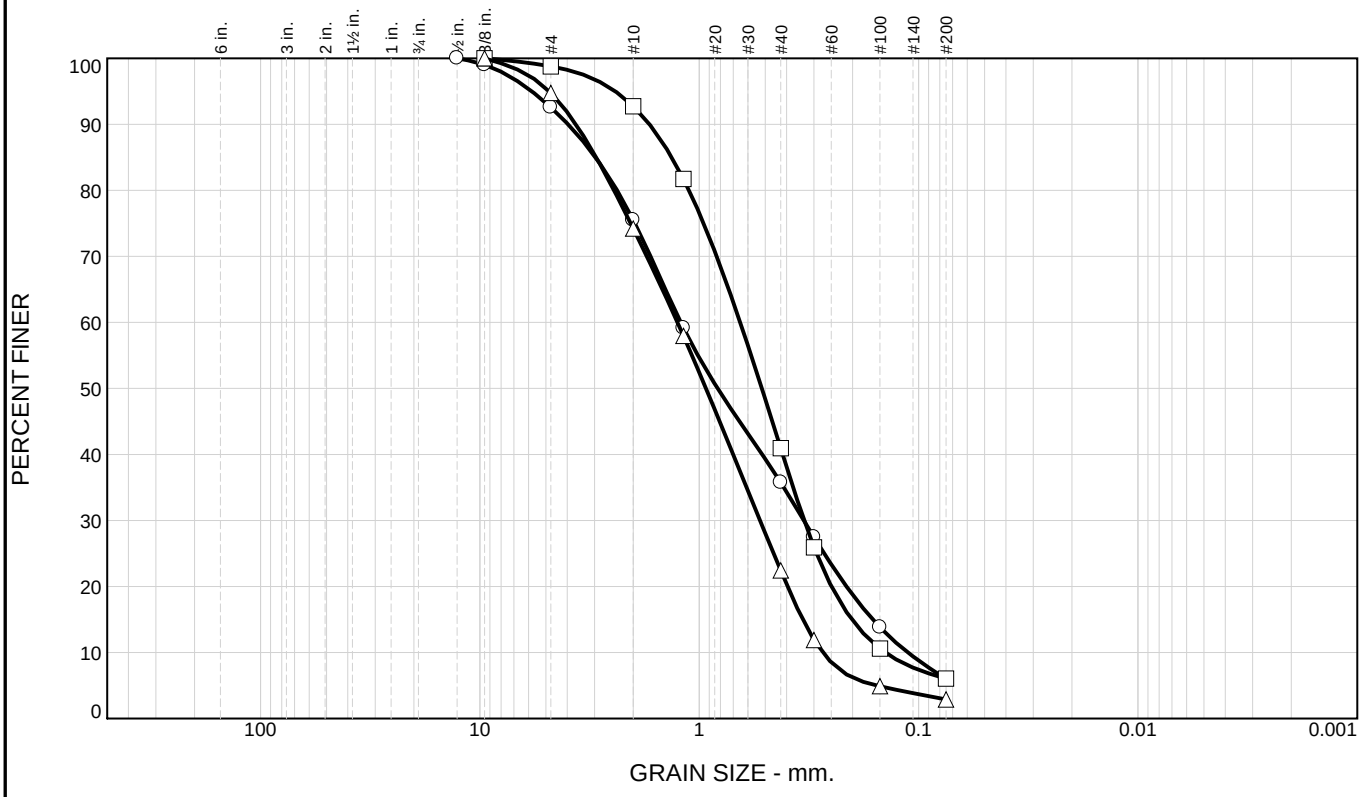
REMARKS:
○
□
△

○ Source of Sample: KE1 Depth: 6.5' Sample Number: C
□ Source of Sample: KE1 Depth: 10.5' Sample Number: D2a
△ Source of Sample: KE1 Depth: 10.7' Sample Number: D2 b,c,d

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	7.4	86.6	6.0		SP-SM			
□	0.0	1.2	92.8	6.0		SP-SM			
△	0.0	5.2	91.9	2.9		SP			

SIEVE inches size	PERCENT FINER ○	□	△
1/2	100.0		
3/8	99.0	100.0	100.0
	GRAIN SIZE		
D_{60}	1.2147	0.6503	1.2567
D_{30}	0.3336	0.3326	0.5282
D_{10}	0.1119	0.1419	0.2742
	COEFFICIENTS		
C_c	0.82	1.20	0.81
C_u	10.86	4.58	4.58

SIEVE number size	PERCENT FINER ○	□	△
#4	92.6	98.8	94.8
#10	75.5	92.7	74.2
#16	59.1	81.7	58.0
#40	35.7	40.9	22.4
#50	27.5	25.9	11.9
#100	13.8	10.6	4.9
#200	6.0	6.0	2.9

Material Description
○ Poorly graded sand with silt
□ Poorly graded sand with silt
△ Poorly graded sand

REMARKS:
○
□
△

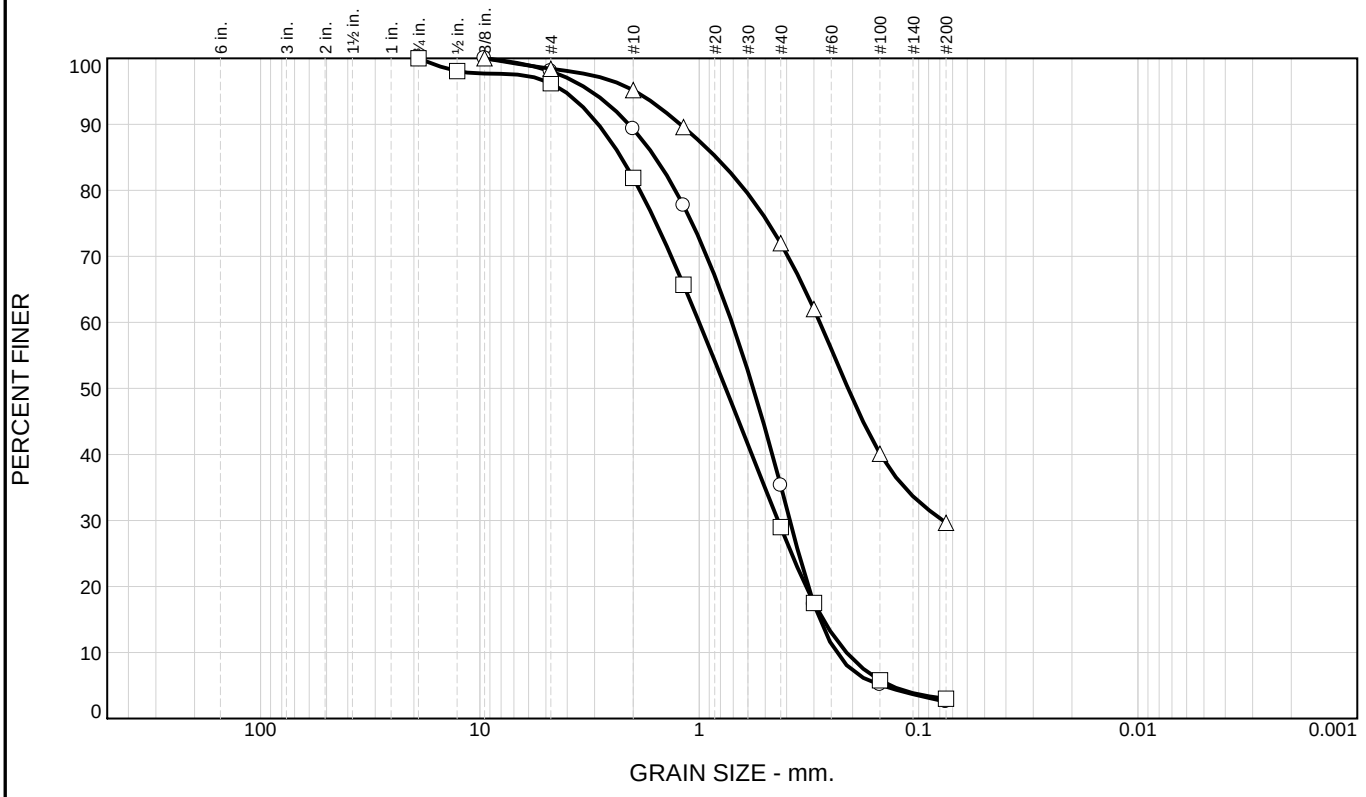
○ Source of Sample: KE1 Depth: 11.0' Sample Number: D1
□ Source of Sample: KE1 Depth: 11.5' Sample Number: E
△ Source of Sample: KE1 Depth: 13.5' Sample Number: F2a

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	2.0	95.5	2.5		SP			
□	0.0	3.8	93.2	3.0		SP			
△	0.0	1.6	68.8	29.6		SC-SM		21	26

SIEVE inches size	PERCENT FINER ○	□	△
3/4		100.0	
1/2		98.1	
3/8	100.0		100.0
	GRAIN SIZE		
D_{60}	0.7098	1.0008	0.2819
D_{30}	0.3861	0.4372	0.0776
D_{10}	0.2368	0.2132	
	COEFFICIENTS		
C_c	0.89	0.90	
C_u	3.00	4.69	

SIEVE number size	PERCENT FINER ○	□	△
#4	98.0	96.2	98.4
#10	89.3	81.9	95.2
#16	77.7	65.7	89.6
#40	35.3	29.0	72.0
#50	17.3	17.5	62.0
#100	5.1	5.8	40.1
#200	2.5	3.0	29.6

Material Description
○ Poorly graded sand
□ Poorly graded sand
△ Silty, clayey sand

REMARKS:
○
□
△

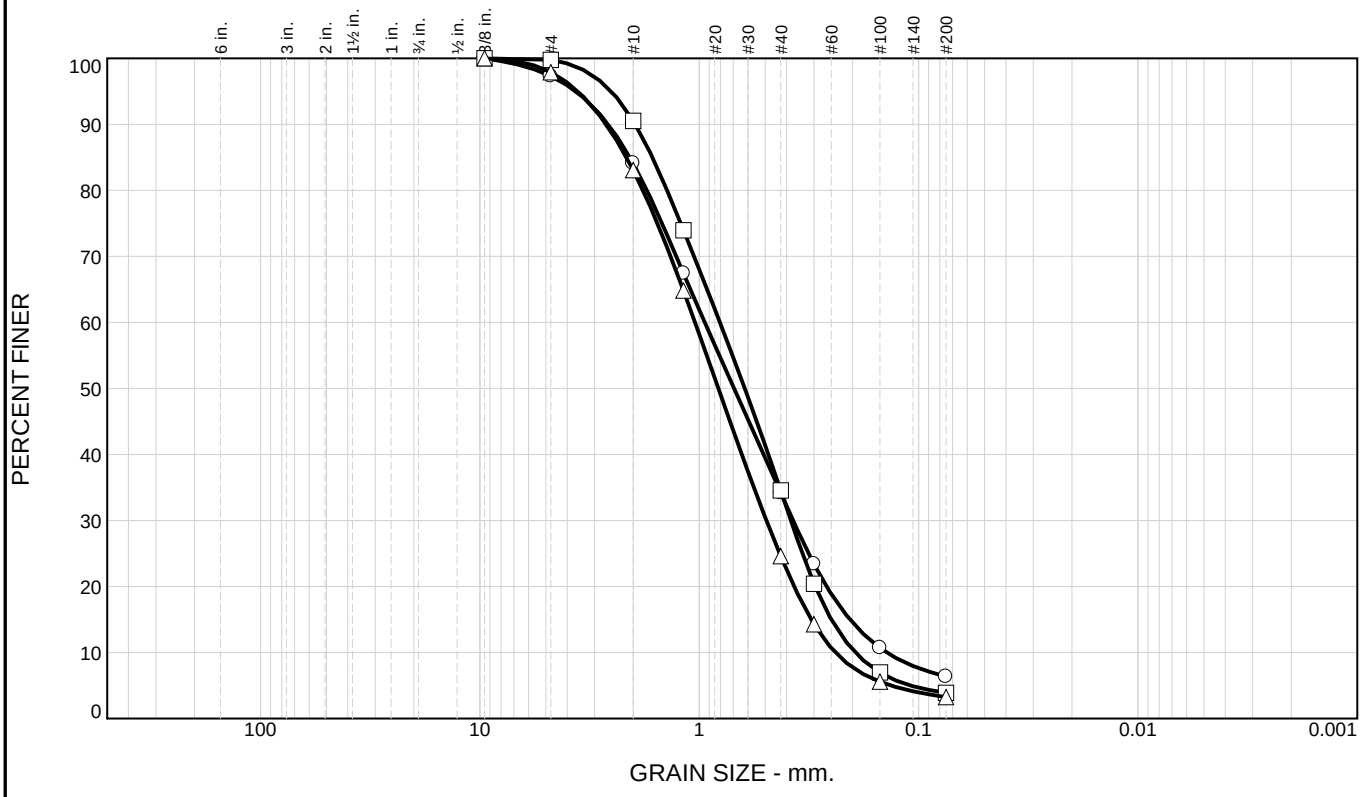
○ Source of Sample: KE1 Depth: 13.75' Sample Number: F2b
□ Source of Sample: KE1 Depth: 14.0' Sample Number: F1
△ Source of Sample: KE1 Depth: 14.5' Sample Number: G2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	2.7	91.0	6.3		SW-SM			
□	0.0	0.2	95.9	3.9		SP			
△	0.0	2.1	94.7	3.2		SP			

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.9437	0.8048	1.0452
D_{30}	0.3736	0.3822	0.4943
D_{10}	0.1399	0.1946	0.2398
COEFFICIENTS			
C_c	1.06	0.93	0.98
C_u	6.75	4.14	4.36

SIEVE number size	PERCENT FINER ○	□	△
#4	97.3	99.8	97.9
#10	84.1	90.5	83.1
#16	67.4	74.0	64.8
#40	34.2	34.6	24.6
#50	23.4	20.4	14.3
#100	10.7	7.0	5.6
#200	6.3	3.9	3.2

Material Description
○ Well-graded sand with silt

□ Poorly graded sand

△ Poorly graded sand

REMARKS:
○

□

△

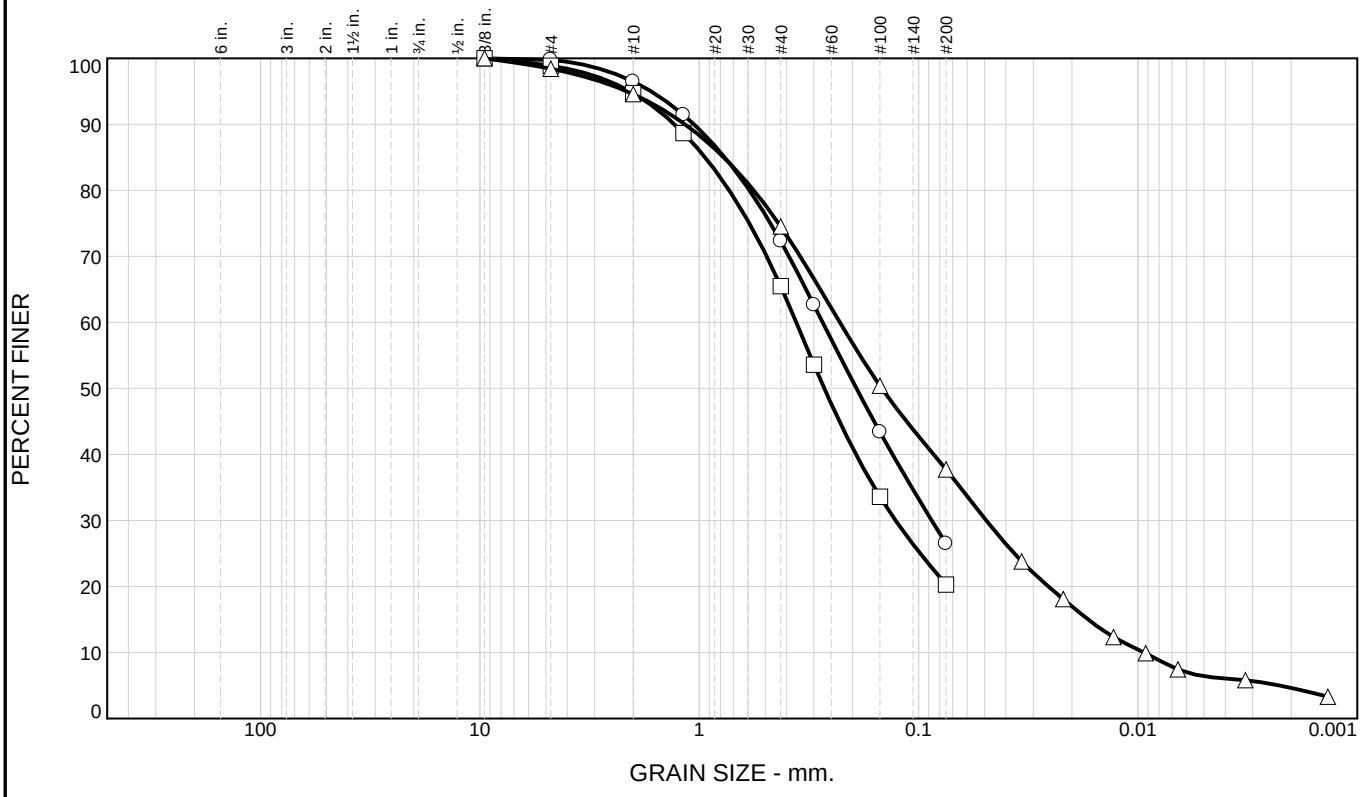
○ Source of Sample: KE1 Depth: 15.6' Sample Number: G1
□ Source of Sample: KE1 Depth: 17.0' Sample Number: H2
△ Source of Sample: KE1 Depth: 17.2' Sample Number: H1

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.2	73.3	26.5		SM		22	26
□	0.0	1.1	78.6	20.3		SM		23	24
△	0.0	1.6	60.7	31.3	6.4	SM		NP	19

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.2736	0.3610	0.2284
D_{30}	0.0871	0.1274	0.0491
D_{10}			0.0094
COEFFICIENTS			
C_c			1.13
C_u			24.38

SIEVE number size	PERCENT FINER ○	□	△
#4	99.8	98.9	98.4
#10	96.5	94.7	94.6
#16	91.4	88.7	
#40	72.3	65.5	74.5
#50	62.6	53.6	
#100	43.4	33.6	50.4
#200	26.5	20.3	37.7

Material Description
○ Silty sand
□ Silty sand
△ Silty sand

REMARKS:
○
□
△

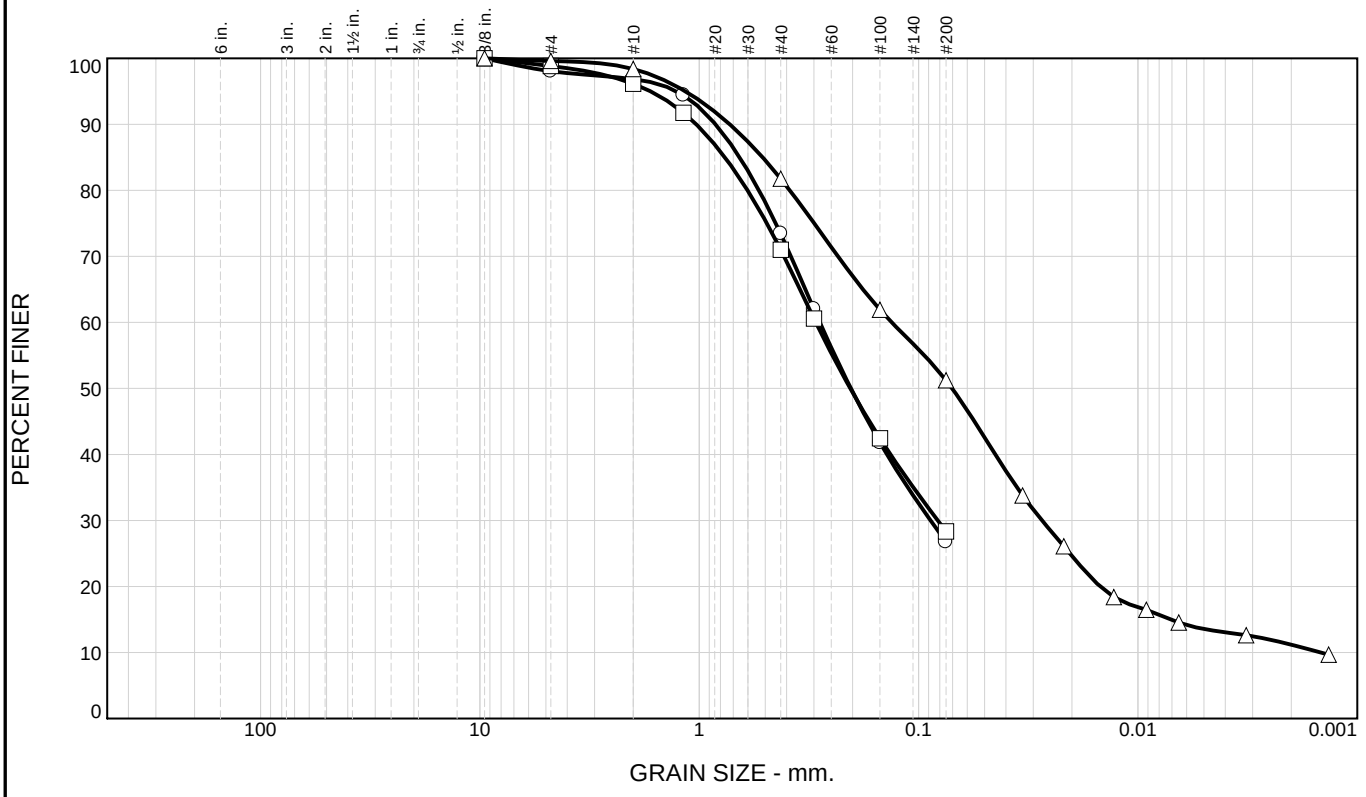
○ Source of Sample: KE1 Depth: 20.25' Sample Number: I
□ Source of Sample: KE1 Depth: 22.0' Sample Number: J
△ Source of Sample: KE1 Depth: 27.3' Sample Number: K

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	2.0	71.2	26.8		SM		NP	20
□	0.0	1.2	70.5	28.3		SM		NP	19
△	0.0	0.4	48.4	37.6	13.6	CL		16	27

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2821	0.2942	0.1325
D_{30}	0.0881	0.0818	0.0274
D_{10}			0.0015
	COEFFICIENTS		
C_c			3.86
C_u			90.38

SIEVE number size	PERCENT FINER ○	□	△
#4	98.0	98.8	99.6
#10	96.8	96.1	98.4
#16	94.4	91.8	
#40	73.4	71.0	81.8
#50	62.0	60.6	
#100	41.8	42.4	61.9
#200	26.8	28.3	51.2

Material Description
○ Silty sand
□ Silty sand
△ Sandy lean clay

REMARKS:
○
□
△

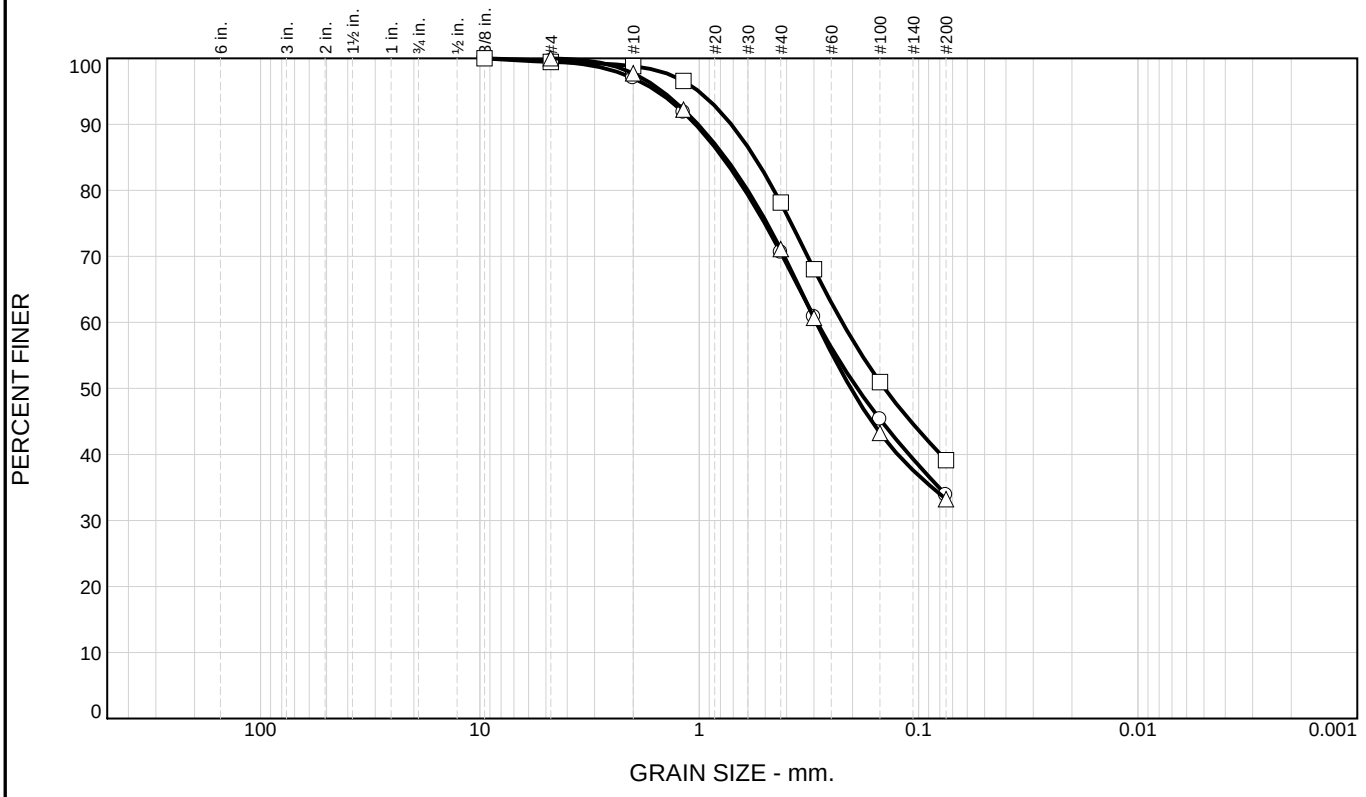
○ Source of Sample: KE1 Depth: 32.2' Sample Number: L1
□ Source of Sample: KE1 Depth: 33.9' Sample Number: LA2
△ Source of Sample: KE1 Depth: 34.25' Sample Number: LA1

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.4	65.8	33.8		SM		18	21
□	0.0	0.5	60.4	39.1		SC		17	27
△	0.0	0.0	66.8	33.2		SC		16	27

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	
GRAIN SIZE			
D_{60}	0.2906	0.2228	0.2932
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.6	99.5	100.0
#10	97.0	98.8	97.7
#16	91.8	96.6	92.2
#40	70.6	78.2	71.1
#50	60.8	68.1	60.7
#100	45.3	51.0	43.3
#200	33.8	39.1	33.2

Material Description
○ Silty sand

□ Clayey sand

△ Clayey sand

REMARKS:
○

□

△

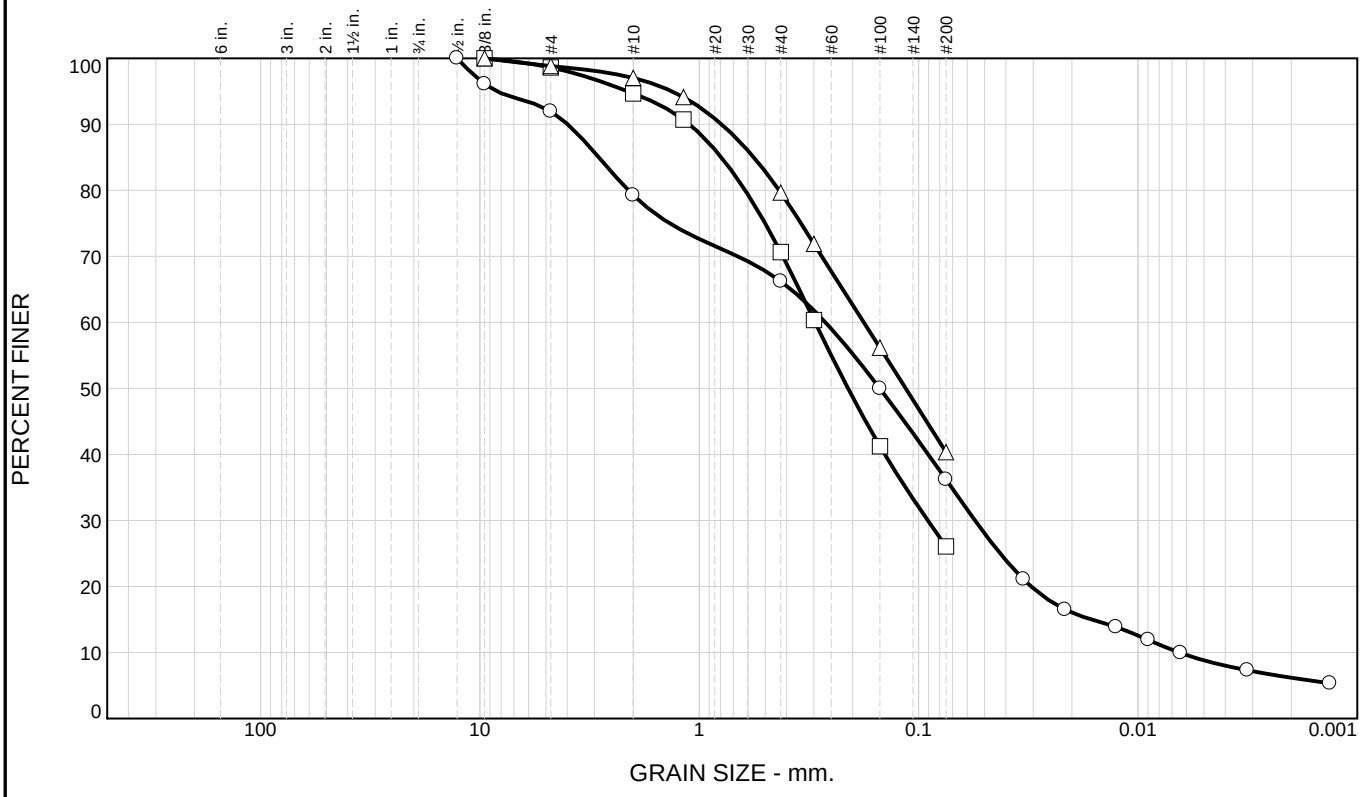
○ Source of Sample: KE1 Depth: 37.0' Sample Number: M
□ Source of Sample: KE1 Depth: 42.2' Sample Number: N2
△ Source of Sample: KE1 Depth: 42.7' Sample Number: N1

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	8.0	55.8	27.4	8.8	SC-SM		19	23
□	0.0	1.4	72.5	26.1		SM		NP	19
△	0.0	1.2	58.5	40.3		SC		16	25

SIEVE inches size	PERCENT FINER ○	□	△
1/2	100.0		
3/8	96.1	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2659	0.2964	0.1777
D_{30}	0.0553	0.0907	
D_{10}	0.0065		
	COEFFICIENTS		
C_c	1.78		
C_u	41.01		

SIEVE number size	PERCENT FINER ○	□	△
#4	92.0	98.6	98.8
#10	79.3	94.7	97.0
#16		90.7	94.1
#40	66.2	70.7	79.7
#50		60.4	71.9
#100	50.0	41.2	56.2
#200	36.2	26.1	40.3

Material Description
○ Silty, clayey sand
□ Silty sand
△ Clayey sand

REMARKS:
○
□
△

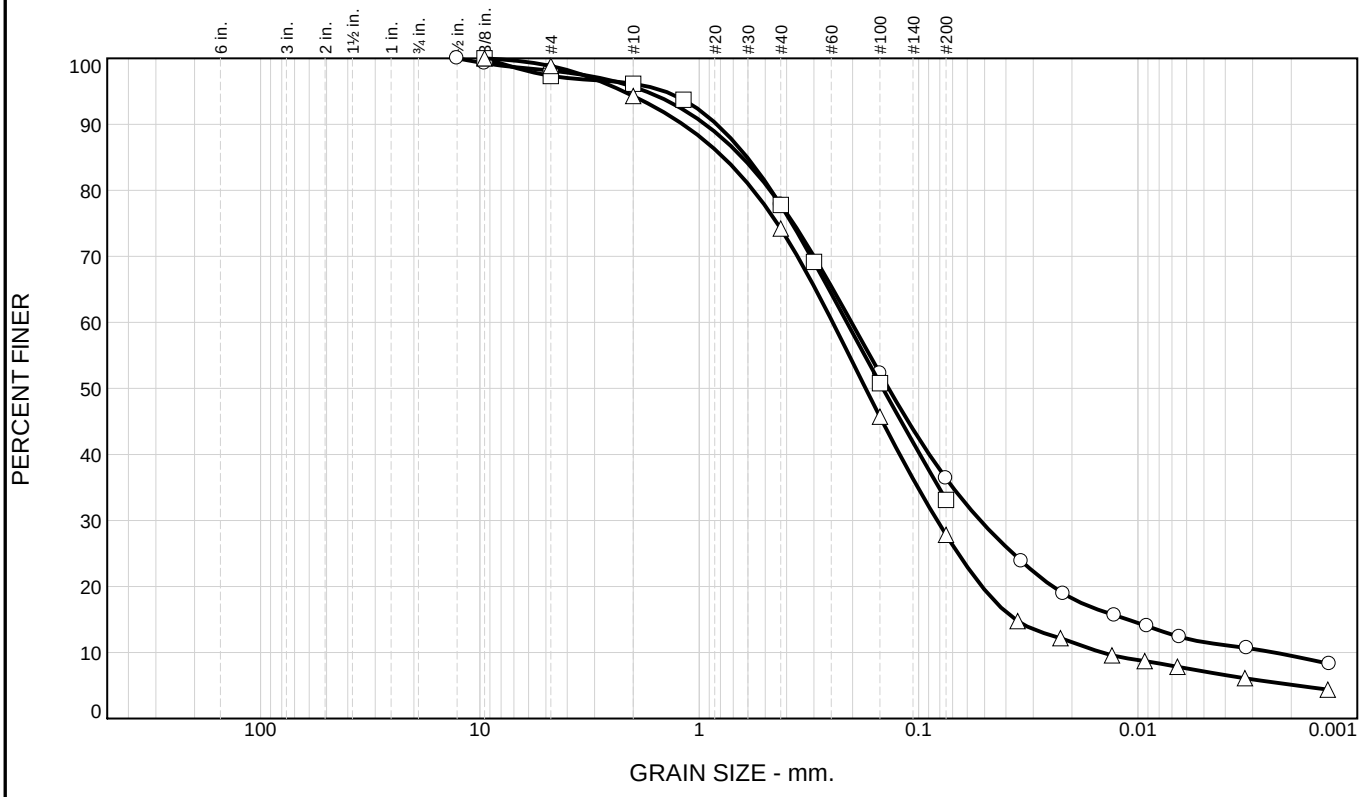
○ Source of Sample: KE1 Depth: 47.0' Sample Number: O
□ Source of Sample: KE1 Depth: 53.5' Sample Number: P
△ Source of Sample: KE1 Depth: 57.0' Sample Number: Q3

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	1.9	61.7	24.8	11.6	SC-SM		16	21
□	0.0	2.7	64.2	33.1		SC-SM		17	21
△	0.0	1.2	71.0	20.7	7.1	SM		NP	15

SIEVE inches size	PERCENT FINER ○	□	△
1/2	100.0		
3/8	99.2	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2022	0.2122	0.2463
D_{30}	0.0523		0.0823
D_{10}	0.0024		0.0146
	COEFFICIENTS		
C_c	5.67		1.88
C_u	84.73		16.83

SIEVE number size	PERCENT FINER ○	□	△
#4	98.1	97.3	98.8
#10	95.7	96.2	94.3
#16		93.7	
#40	77.9	77.8	74.2
#50		69.2	
#100	52.3	50.8	45.7
#200	36.4	33.1	27.8

Material Description
○ Silty, clayey sand
□ Silty, clayey sand
△ Silty sand

REMARKS:
○
□
△

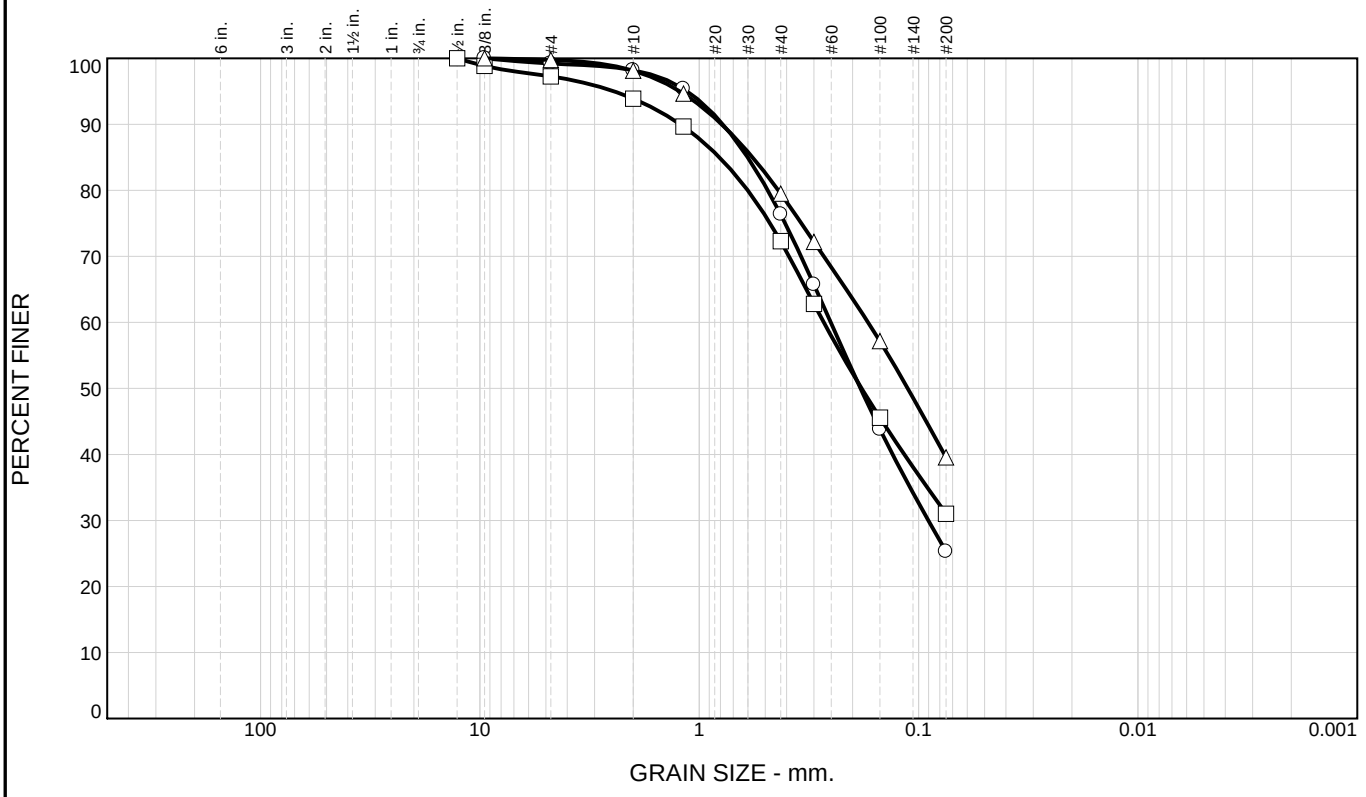
○ Source of Sample: KE1 Depth: 57.5' Sample Number: Q2
□ Source of Sample: KE1 Depth: 58.0' Sample Number: Q1
△ Source of Sample: KE1 Depth: 62.5' Sample Number: R

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.8	73.9	25.3		SM		NP	17
□	0.0	2.7	66.3	31.0		SM		18	21
△	0.0	0.2	60.2	39.6		SM		18	21

SIEVE inches size	PERCENT FINER ○	□	△
1/2		100.0	
3/8	100.0	98.8	100.0
GRAIN SIZE			
D_{60}	0.2513	0.2706	0.1698
D_{30}	0.0902		
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.2	97.3	99.8
#10	98.2	93.9	98.1
#16	95.4	89.7	94.7
#40	76.4	72.3	79.5
#50	65.7	62.8	72.2
#100	43.8	45.6	57.2
#200	25.3	31.0	39.6

Material Description
○ Silty sand
□ Silty sand
△ Silty sand

REMARKS:
○
□
△

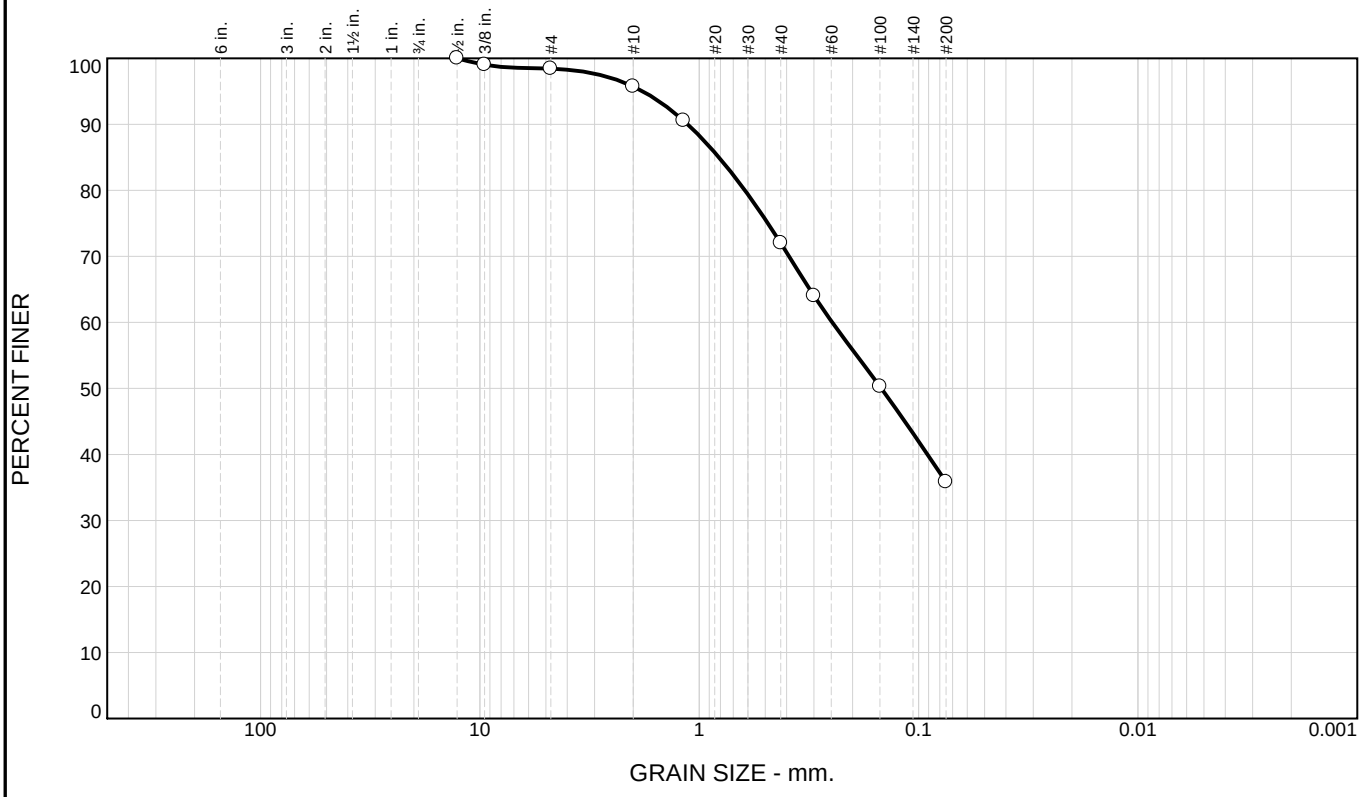
○ Source of Sample: KE1 Depth: 67.1' Sample Number: S1
□ Source of Sample: KE1 Depth: 72.2' Sample Number: T
△ Source of Sample: KE1 Depth: 77.2' Sample Number: U2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	1.6	62.6	35.8		SC-SM		18	25

SIEVE inches size	PERCENT FINER ○		
1/2	100.0		
3/8	99.0		
GRAIN SIZE			
D_{60}	0.2475		
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	98.4		
#10	95.7		
#16	90.6		
#40	72.0		
#50	64.0		
#100	50.3		
#200	35.8		

Material Description
○ Silty, clayey sand

REMARKS:
○

○ Source of Sample: KE1 Depth: 77.7' Sample Number: U1

NEVADA DEPARTMENT OF TRANSPORTATION

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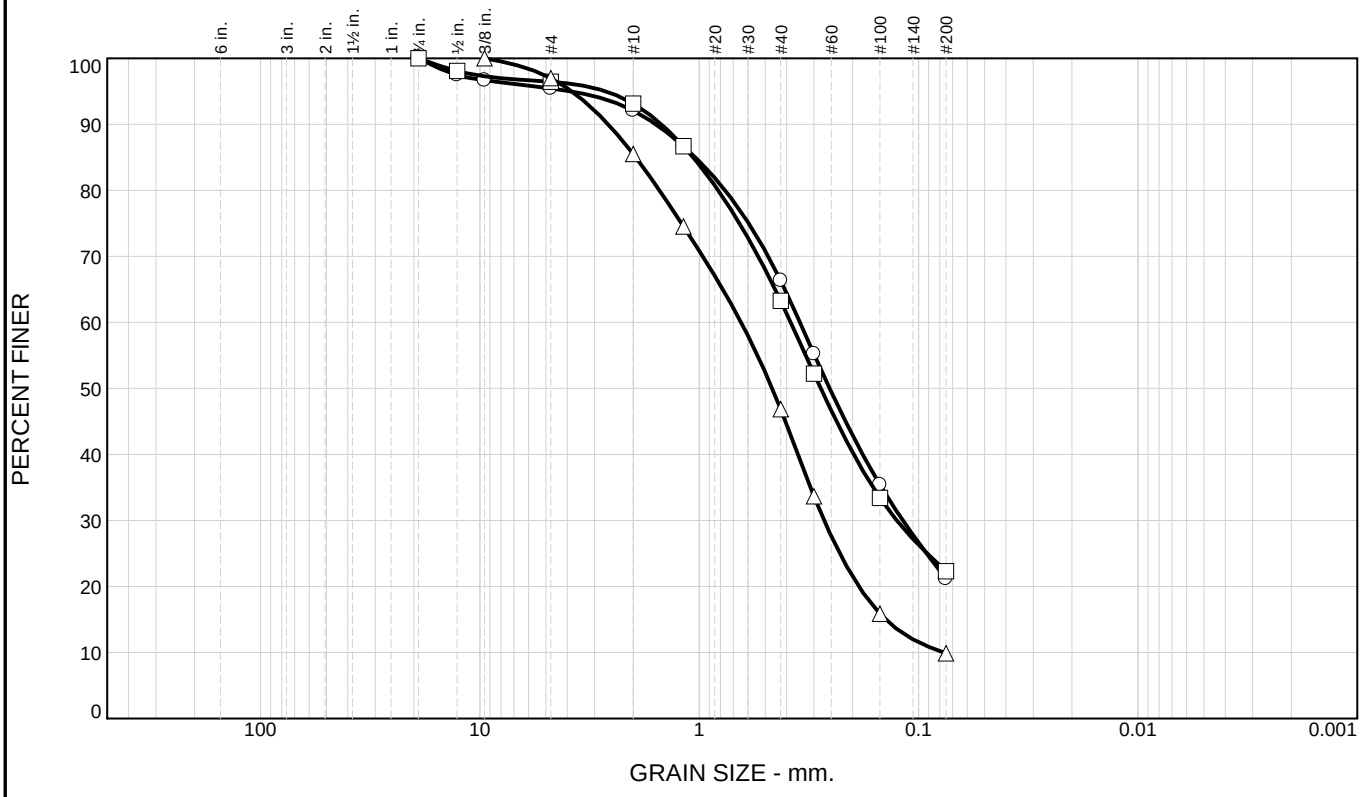
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	4.6	74.2	21.2		SM		NP	
□	0.0	3.5	74.2	22.3		SM		NP	14
△	0.0	3.0	87.1	9.9		SW-SM			

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	
1/2	97.5	98.1	
3/8	96.7		100.0
	GRAIN SIZE		
D_{60}	0.3474	0.3826	0.6439
D_{30}	0.1180	0.1257	0.2698
D_{10}			0.0768
	COEFFICIENTS		
C_c			1.47
C_u			8.39

SIEVE number size	PERCENT FINER ○	□	△
#4	95.4	96.5	97.0
#10	92.1	93.1	85.5
#16	86.7	86.7	74.5
#40	66.3	63.3	46.9
#50	55.2	52.2	33.7
#100	35.4	33.4	15.9
#200	21.2	22.3	9.9

Material Description
○ Silty sand

□ Silty sand

△ Well-graded sand with silt

REMARKS:
○

□

△

○ Source of Sample: KE2 Depth: 2.3' Sample Number: A1
□ Source of Sample: KE2 Depth: 2.8' Sample Number: A2
△ Source of Sample: KE2 Depth: 7.2' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
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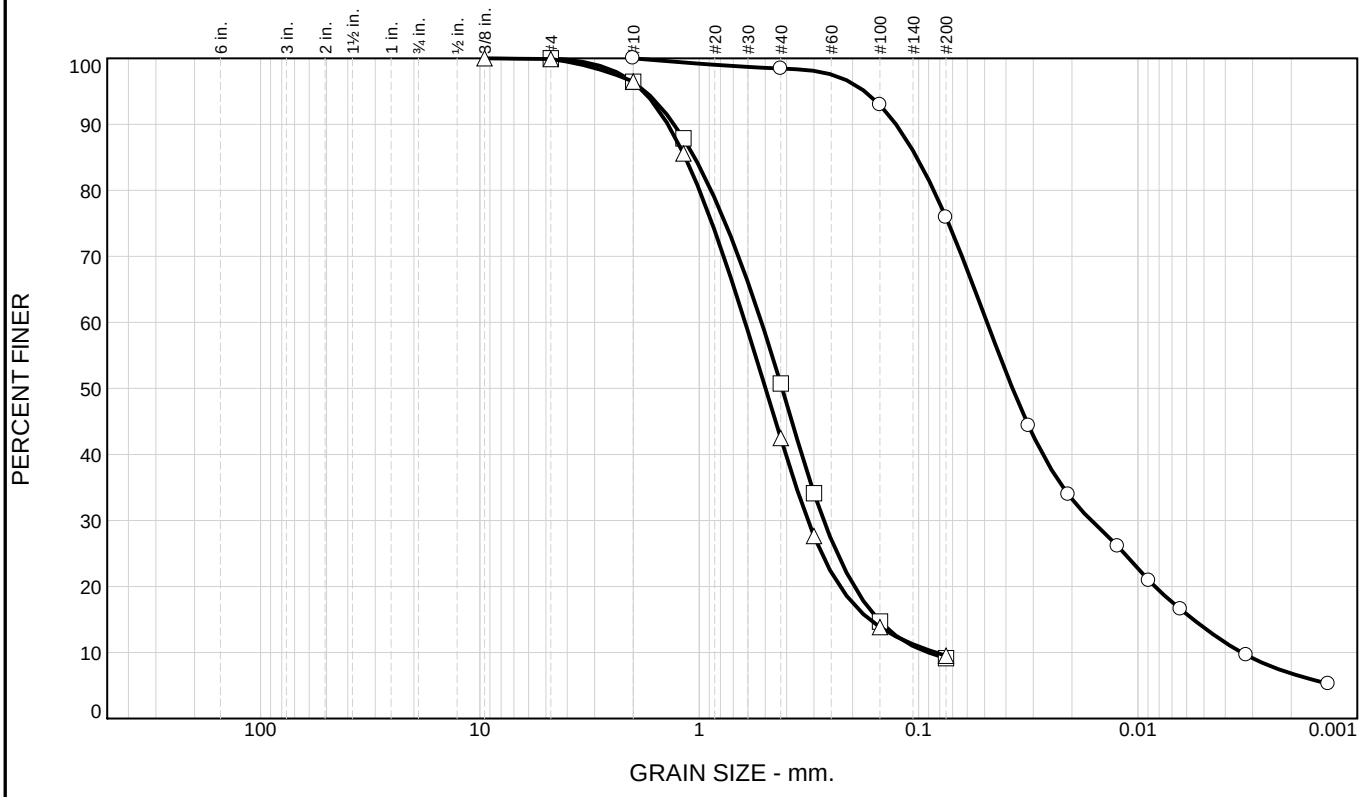
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	24.1	62.1	13.8	ML		27	31
□	0.0	0.0	90.9	9.1		SP-SM			
△	0.0	0.1	90.4	9.5		SW-SM			

SIEVE inches size	PERCENT FINER ○	□	△
3/8			100.0
GRAIN SIZE			
D_{60}	0.0488	0.5195	0.6175
D_{30}	0.0163	0.2710	0.3197
D_{10}	0.0034	0.0902	0.0834
COEFFICIENTS			
C_c	1.62	1.57	1.99
C_u	14.47	5.76	7.41

SIEVE number size	PERCENT FINER ○	□	△
#4		100.0	99.9
#10	100.0	96.4	96.5
#16		87.9	85.6
#40	98.5	50.7	42.5
#50		34.1	27.6
#100	92.9	14.7	13.8
#200	75.9	9.1	9.5

Material Description
○ Silt with sand

□ Poorly graded sand with silt

△ Well-graded sand with silt

REMARKS:
○

□

△

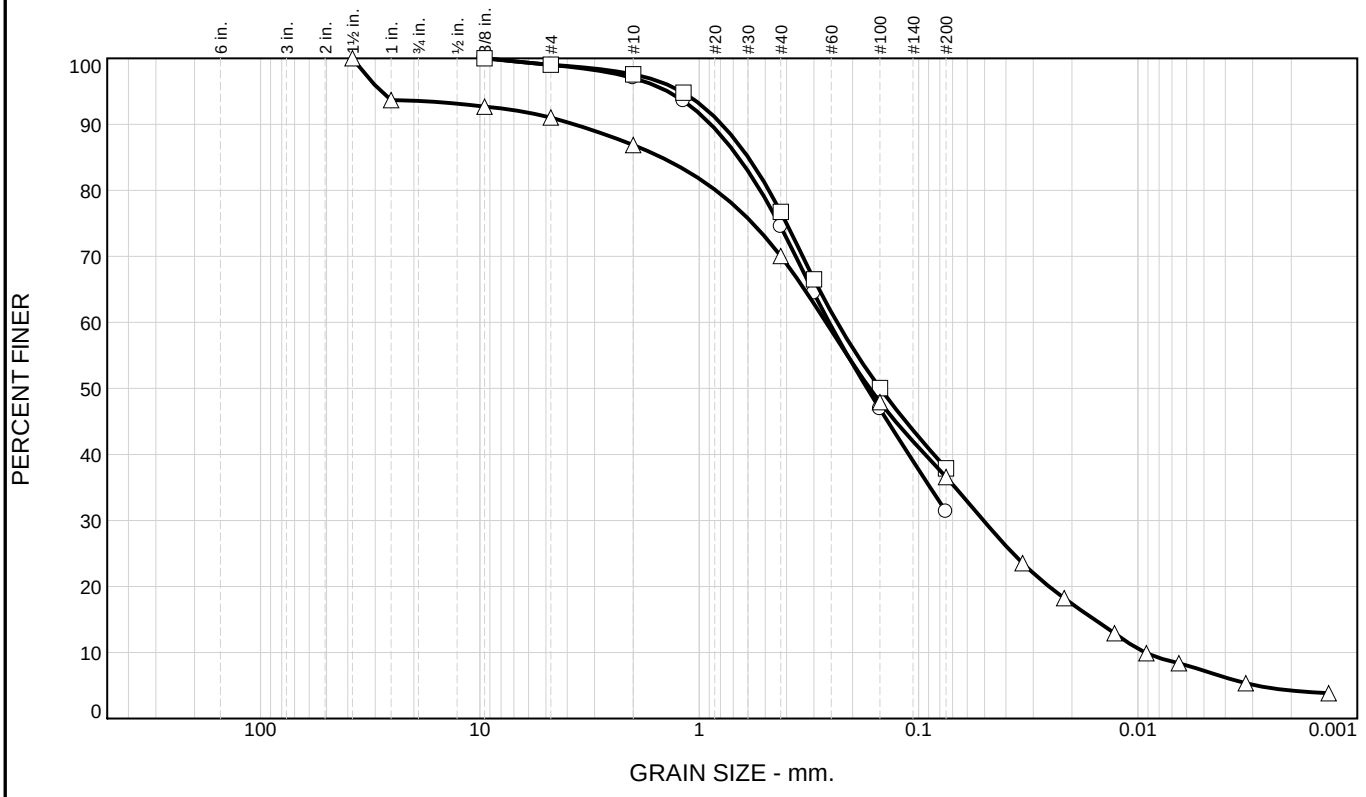
○ Source of Sample: KE2 Depth: 9.75' Sample Number: C1 a&b
□ Source of Sample: KE2 Depth: 10.1' Sample Number: C1 c
△ Source of Sample: KE2 Depth: 10.25' Sample Number: C2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	1.0	67.6	31.4		SM		NP	20
□	0.0	1.0	61.1	37.9		SM		19	21
△	0.0	9.0	54.4	29.4	7.2	SM		18	21

SIEVE inches size	PERCENT FINER ○	□	△
1.5			100.0
1			93.7
3/8	100.0	100.0	92.7
	GRAIN SIZE		
D_{60}	0.2557	0.2351	0.2640
D_{30}			0.0506
D_{10}			0.0093
	COEFFICIENTS		
C_c			1.04
C_u			28.41

SIEVE number size	PERCENT FINER ○	□	△
#4	99.0	99.0	91.0
#10	97.0	97.6	86.9
#16	93.6	94.8	
#40	74.5	76.7	70.1
#50	64.4	66.5	
#100	46.9	50.0	47.9
#200	31.4	37.9	36.6

Material Description
○ Silty sand
□ Silty sand
△ Silty sand

REMARKS:
○
□
△

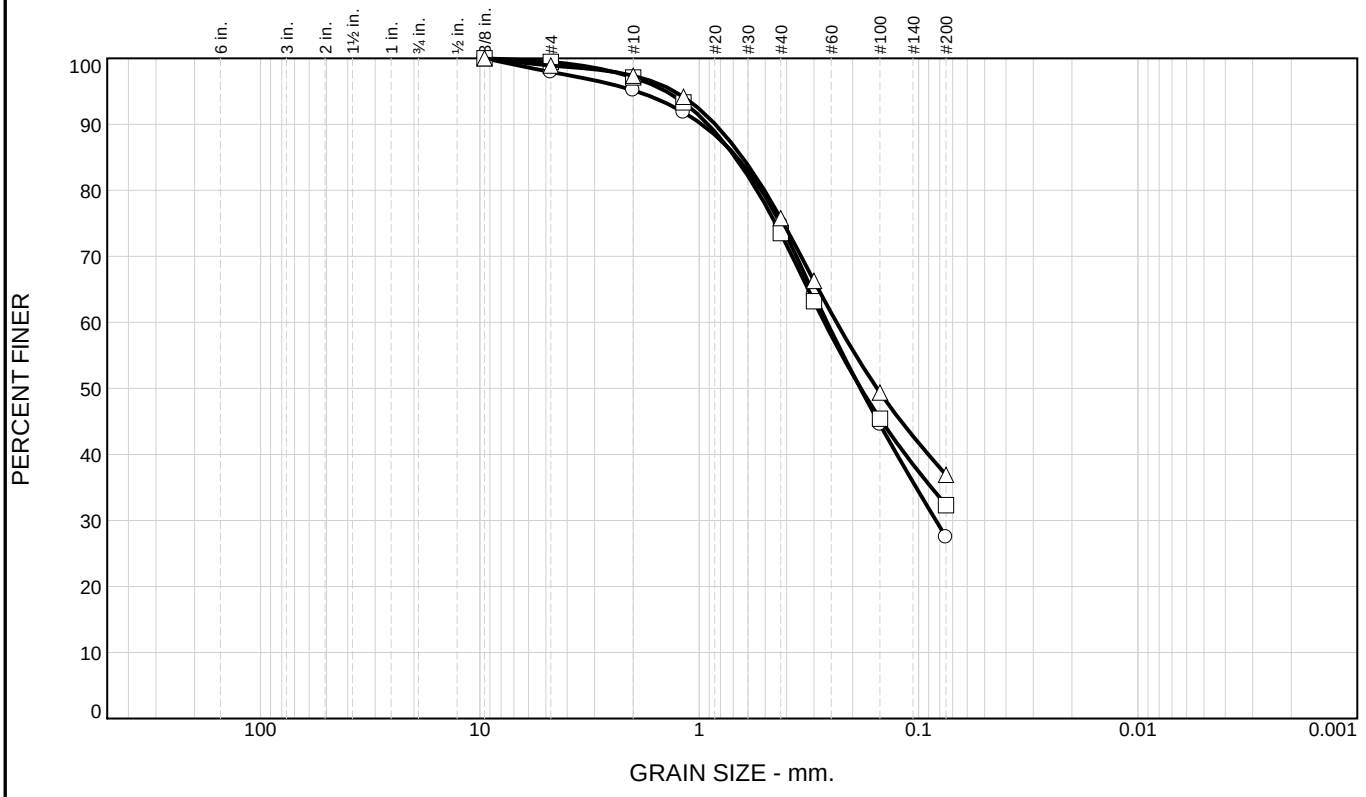
○ Source of Sample: KE2 Depth: 12.2' Sample Number: D
□ Source of Sample: KE2 Depth: 15.5' Sample Number: E1
△ Source of Sample: KE2 Depth: 16.0' Sample Number: E2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	2.1	70.4	27.5		SM		NP	17
□	0.0	0.5	67.2	32.3		SC-SM		16	21
△	0.0	1.1	62.0	36.9		SC-SM		17	21

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2613	0.2685	0.2366
D_{30}	0.0834		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	97.9	99.5	98.9
#10	95.2	97.1	97.4
#16	91.8	93.3	94.2
#40	74.9	73.5	75.8
#50	64.2	63.2	66.3
#100	44.5	45.4	49.4
#200	27.5	32.3	36.9

Material Description
○ Silty sand

□ Silty, clayey sand

△ Silty, clayey sand

REMARKS:
○

□

△

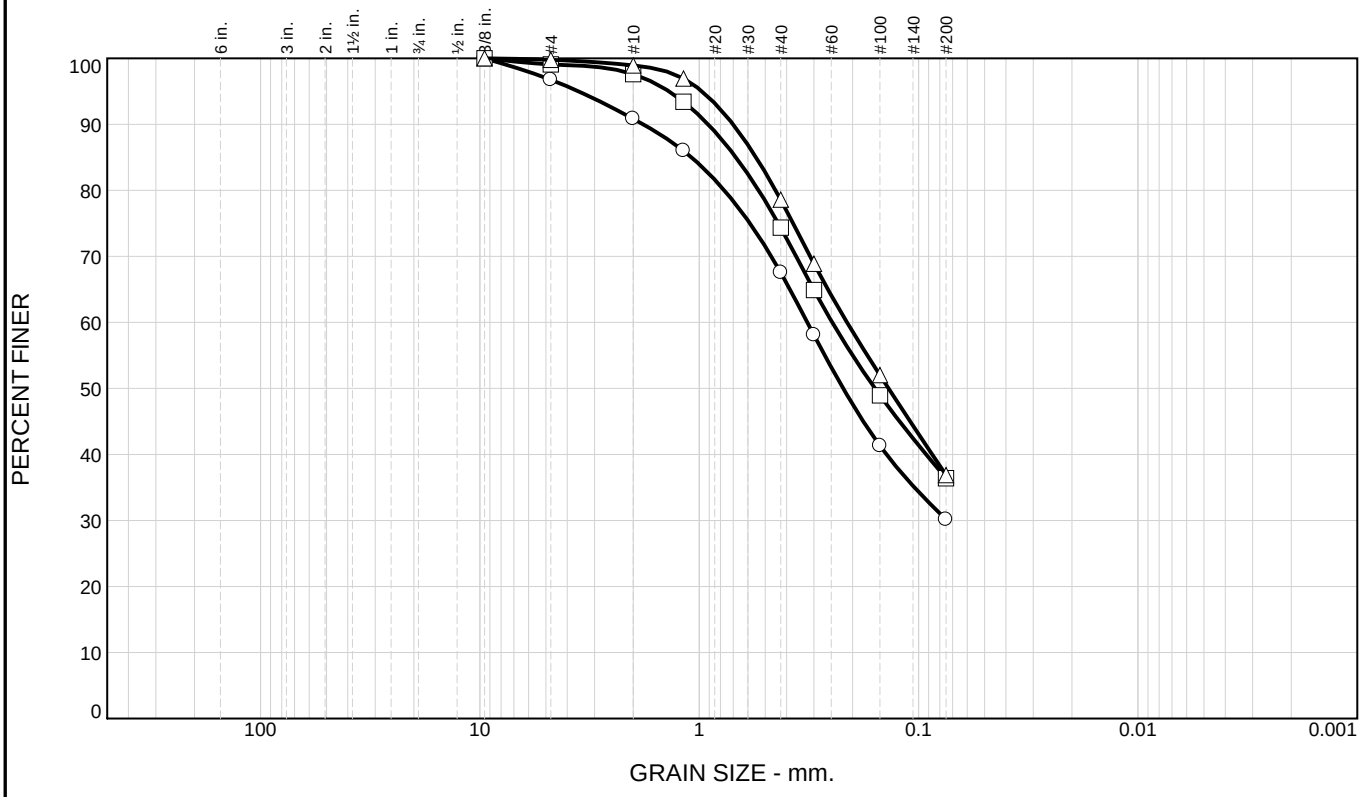
○ Source of Sample: KE2 Depth: 17.0' Sample Number: F
□ Source of Sample: KE2 Depth: 20.25' Sample Number: G1
△ Source of Sample: KE2 Depth: 20.75' Sample Number: G2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	3.2	66.7	30.1		SM			
□	0.0	0.9	62.7	36.4		SM		17	20
△	0.0	0.2	62.9	36.9		SC-SM		18	24

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.3215	0.2476	0.2119
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	96.8	99.1	99.8
#10	90.8	97.6	98.9
#16	86.0	93.4	96.9
#40	67.6	74.4	78.6
#50	58.1	64.9	68.9
#100	41.3	49.0	52.0
#200	30.1	36.4	36.9

Material Description
○ Silty sand
□ Silty sand
△ Silty, clayey sand

REMARKS:
○
□
△

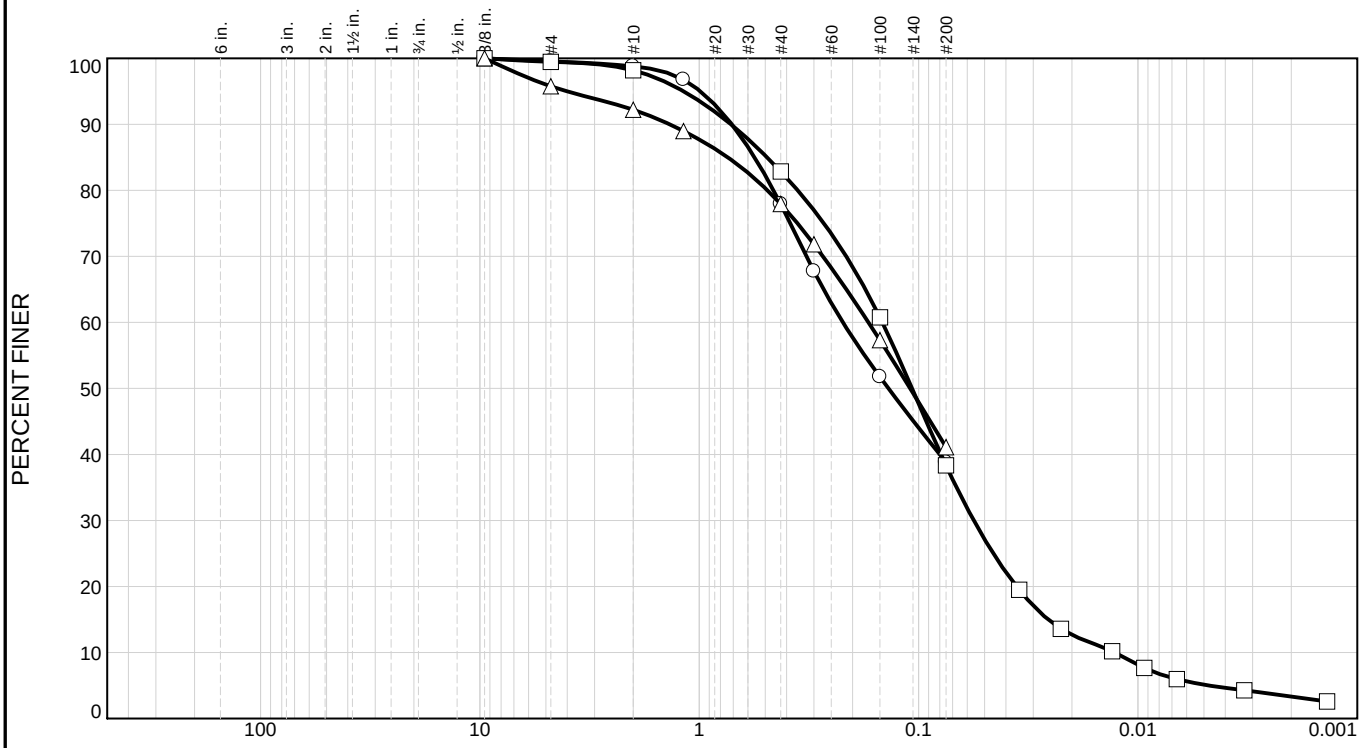
○ Source of Sample: KE2 Depth: 23.5' Sample Number: H
□ Source of Sample: KE2 Depth: 27.5' Sample Number: I1
△ Source of Sample: KE2 Depth: 32.5' Sample Number: J1

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.5	60.7	38.8		SC-SM		18	22
□	0.0	0.5	61.2	33.2	5.1	SM		NP	22
△	0.0	4.2	54.7	41.1		SM		19	20

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2214	0.1462	0.1692
D_{30}		0.0560	
D_{10}		0.0127	
	COEFFICIENTS		
C_c		1.68	
C_u		11.47	

SIEVE number size	PERCENT FINER ○	□	△
#4	99.5	99.5	95.8
#10	98.8	98.2	92.2
#16	96.8		89.0
#40	77.9	82.9	77.9
#50	67.7		71.8
#100	51.7	60.8	57.3
#200	38.8	38.3	41.1

Material Description
○ Silty, clayey sand

□ Silty sand

△ Silty sand

REMARKS:
○

□

△

○ Source of Sample: KE2 Depth: 33.0' Sample Number: J2
□ Source of Sample: KE2 Depth: 37.0' Sample Number: K
△ Source of Sample: KE2 Depth: 42.7' Sample Number: L2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
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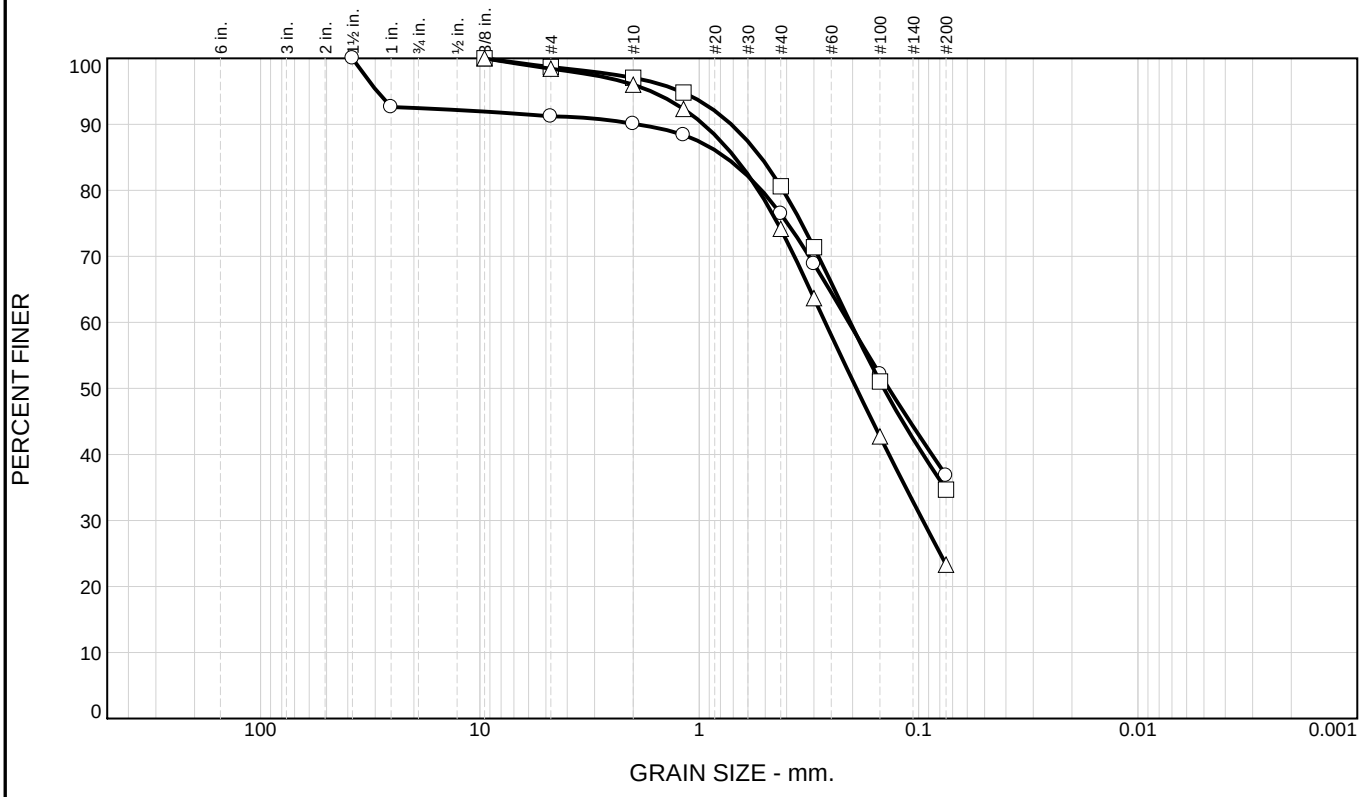
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	8.8	54.4	36.8		SC		17	25
□	0.0	1.3	64.0	34.7		SM		18	20
△	0.0	1.6	75.1	23.3		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1.5	100.0		
1	92.6		
3/8		100.0	100.0
	GRAIN SIZE		
D_{60}	0.2078	0.2048	0.2665
D_{30}			0.0956
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	91.2	98.7	98.4
#10	90.1	97.1	96.0
#16	88.4	94.8	92.3
#40	76.5	80.6	74.2
#50	68.9	71.4	63.7
#100	52.1	51.1	42.7
#200	36.8	34.7	23.3

Material Description
○ Clayey sand
□ Silty sand
△ Silty sand

REMARKS:
○
□
△

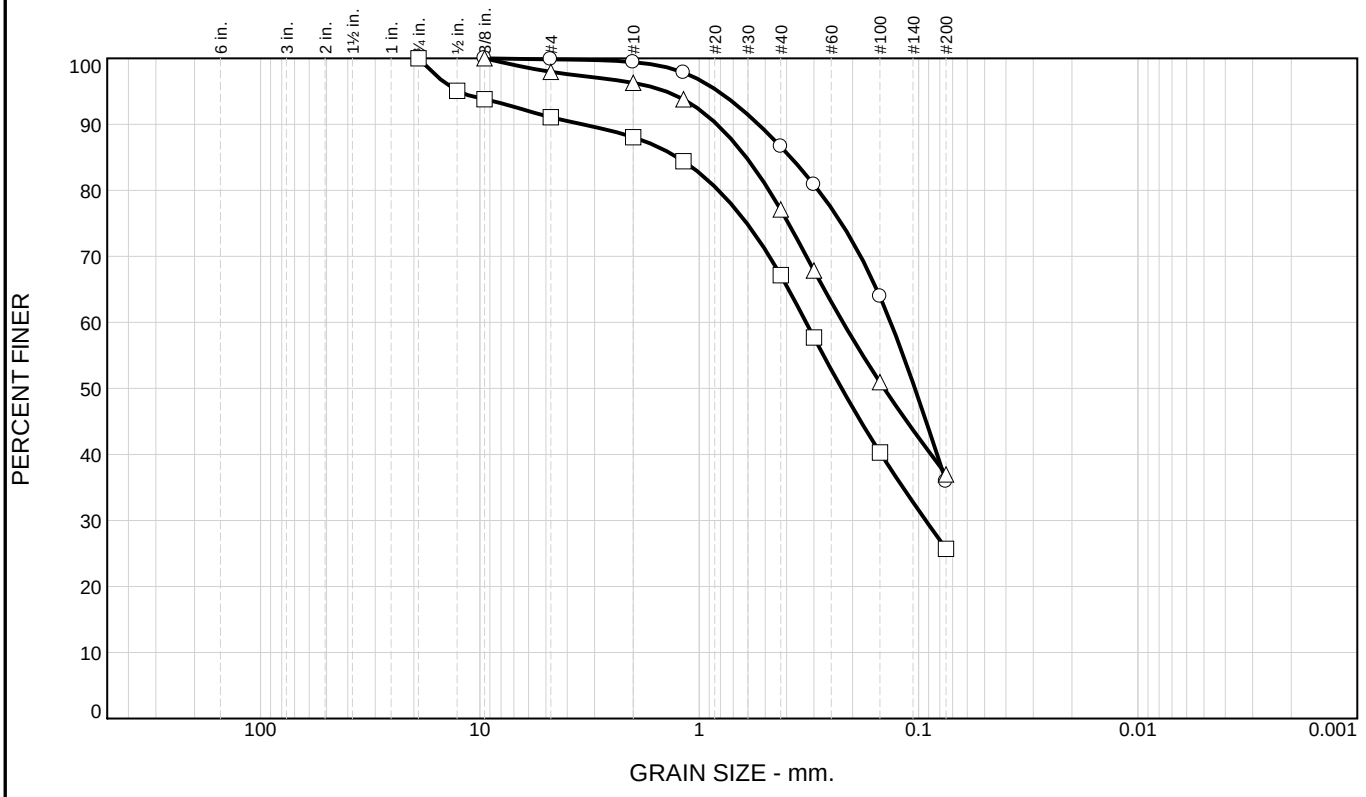
○ Source of Sample: KE2 Depth: 47.5' Sample Number: M1
□ Source of Sample: KE2 Depth: 48.0' Sample Number: M2
△ Source of Sample: KE2 Depth: 52.0' Sample Number: N

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.2	63.9	35.9		SM		NP	21
□	0.0	8.9	65.4	25.7		SM		NP	17
△	0.0	2.1	60.9	37.0		SC-SM		17	21

SIEVE inches size	PERCENT FINER ○	□	△
3/4		100.0	
1/2		95.1	
3/8	100.0	93.8	100.0
	GRAIN SIZE		
D_{60}	0.1339	0.3258	0.2211
D_{30}		0.0927	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.8	91.1	97.9
#10	99.4	88.1	96.3
#16	97.8	84.4	93.8
#40	86.6	67.2	77.1
#50	80.9	57.7	67.9
#100	63.9	40.3	50.9
#200	35.9	25.7	37.0

Material Description
○ Silty sand
□ Silty sand
△ Silty, clayey sand

REMARKS:
○
□
△

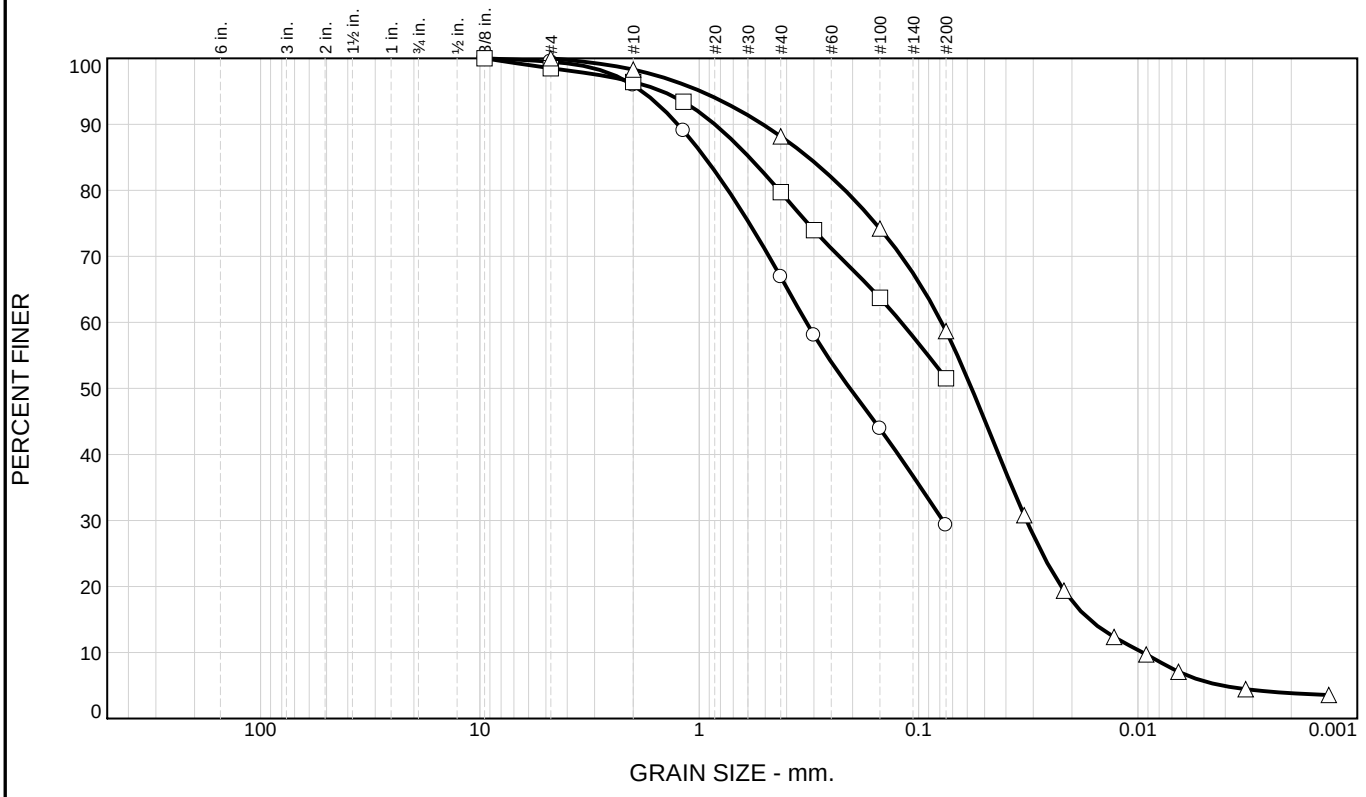
○ Source of Sample: KE2 Depth: 57.7' Sample Number: O2
□ Source of Sample: KE2 Depth: 62.2' Sample Number: P
△ Source of Sample: KE2 Depth: 67.4' Sample Number: Q2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.5	70.2	29.3		SM		NP	19
□	0.0	1.5	47.0	51.5		ML		20	21
△	0.0	0.0	41.3	53.1	5.6	ML		NP	21

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.3249	0.1197	0.0785
D_{30}	0.0775		0.0322
D_{10}			0.0095
	COEFFICIENTS		
C_c			1.39
C_u			8.25

SIEVE number size	PERCENT FINER ○	□	△
#4	99.5	98.5	100.0
#10	95.9	96.4	98.3
#16	89.0	93.4	
#40	66.9	79.7	88.2
#50	58.1	74.0	
#100	43.9	63.7	74.2
#200	29.3	51.5	58.7

Material Description
○ Silty sand
□ Sandy silt
△ Sandy silt

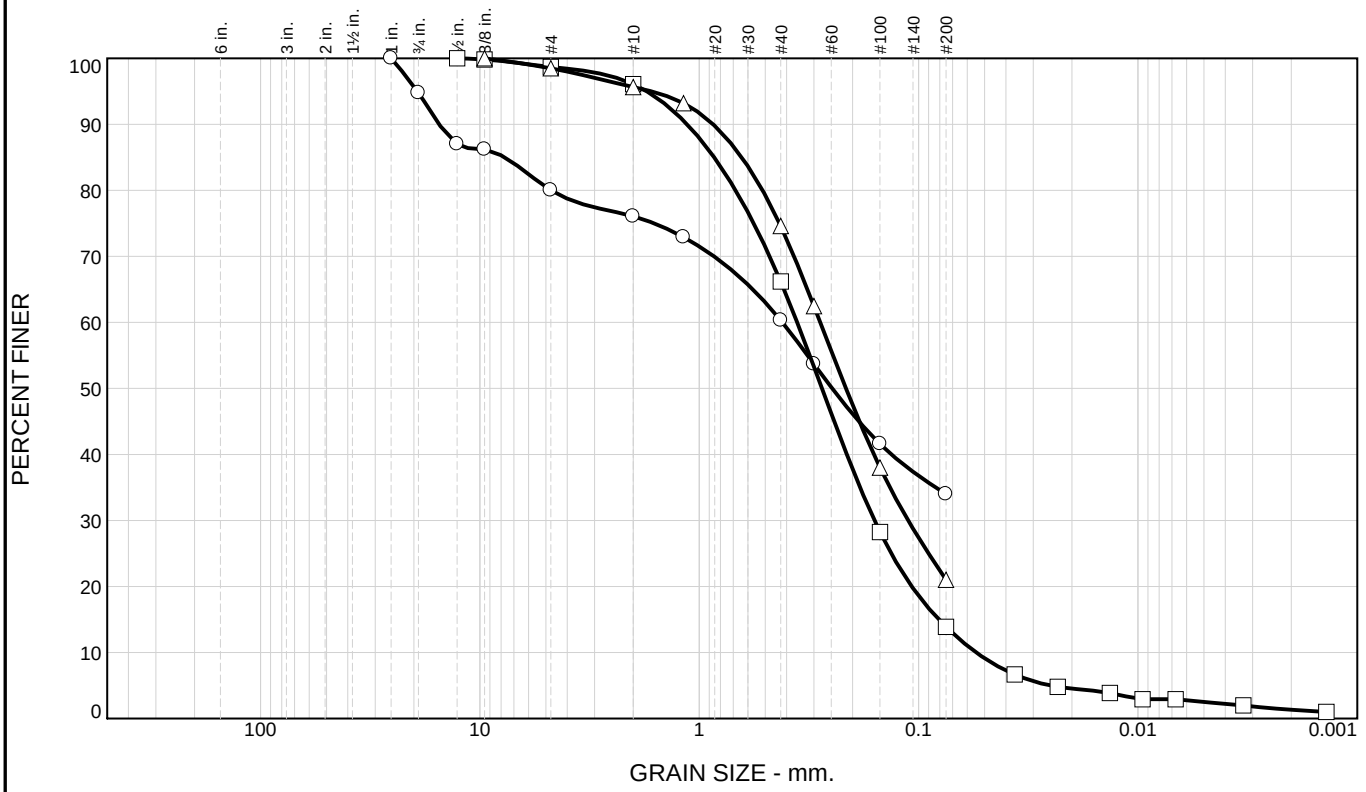
REMARKS:
○
□
△

○ Source of Sample: KE2 Depth: 72.0' Sample Number: R
□ Source of Sample: KE2 Depth: 77.0' Sample Number: S2
△ Source of Sample: KE2 Depth: 82.2' Sample Number: T

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	20.0	46.0	34.0		SM		17	19
□	0.0	1.3	84.8	11.4	2.5	SM		NP	17
△	0.0	1.5	77.5	21.0		SM		NP	18

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0		
3/4	94.8		
1/2	87.0	100.0	
3/8	86.2	99.8	100.0
	GRAIN SIZE		
D_{60}	0.4175	0.3576	0.2807
D_{30}		0.1589	0.1116
D_{10}		0.0546	
	COEFFICIENTS		
C_c		1.29	
C_u		6.55	

SIEVE number size	PERCENT FINER ○	□	△
#4	80.0	98.7	98.5
#10	76.1	96.1	95.7
#16	72.9		93.2
#40	60.3	66.2	74.6
#50	53.7		62.5
#100	41.6	28.3	38.0
#200	34.0	13.9	21.0

Material Description
○ Silty sand with gravel
□ Silty sand
△ Silty sand

REMARKS:
○ PI-LL information taken from sample A2.
□
△ PI-LL information taken from sample C2.

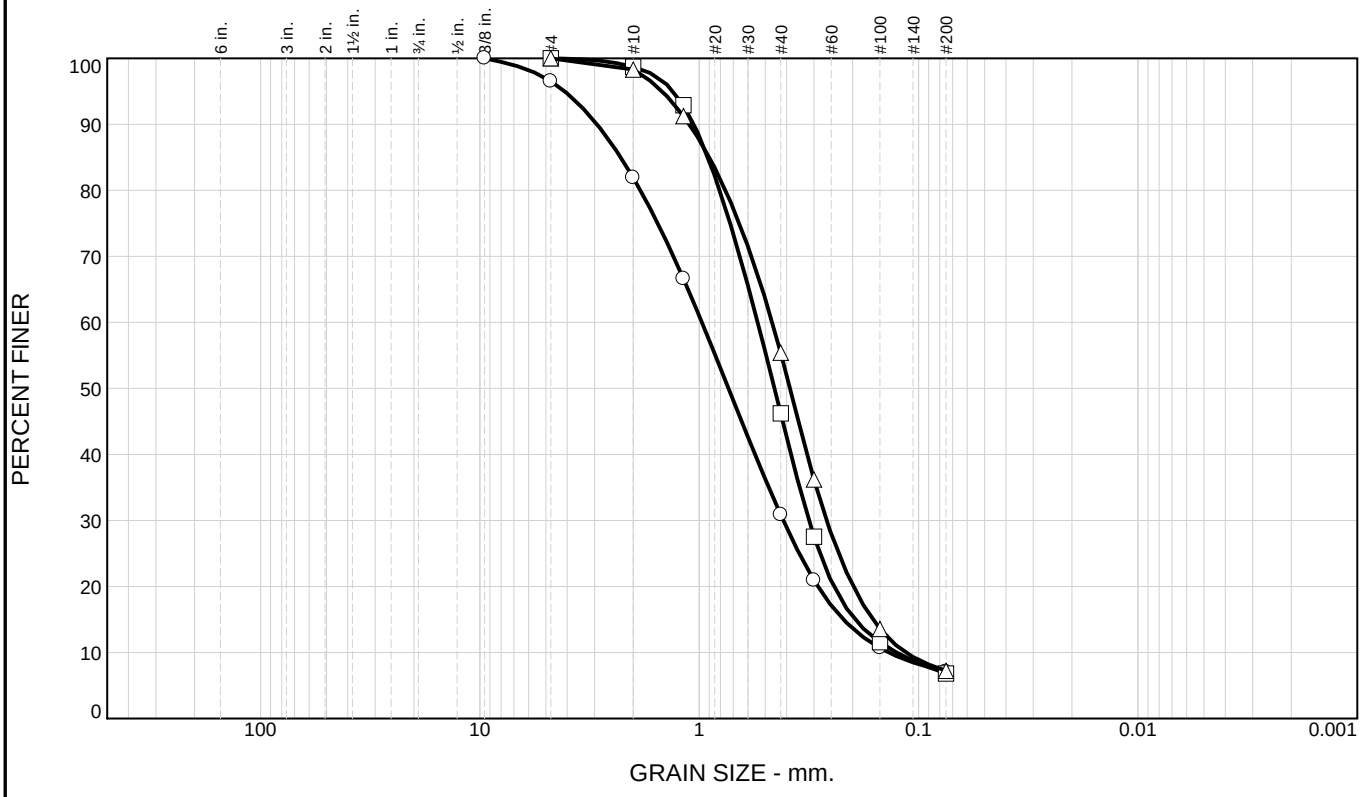
○ Source of Sample: KE3 Depth: 2.5' Sample Number: A1
□ Source of Sample: KE3 Depth: 7.0' Sample Number: B
△ Source of Sample: KE3 Depth: 12.5' Sample Number: C1

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	3.5	89.4	7.1		SW-SM		NP	19
□	0.0	0.0	93.2	6.8		SP-SM			
△	0.0	0.0	92.8	7.2		SP-SM			

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0		
	GRAIN SIZE		
D_{60}	0.9724	0.5412	0.4643
D_{30}	0.4136	0.3164	0.2628
D_{10}	0.1369	0.1260	0.1145
	COEFFICIENTS		
C_c	1.29	1.47	1.30
C_u	7.10	4.30	4.05

SIEVE number size	PERCENT FINER ○	□	△
#4	96.5	100.0	100.0
#10	81.9	98.7	98.3
#16	66.6	92.9	91.2
#40	30.9	46.2	55.4
#50	20.9	27.5	36.2
#100	10.7	11.6	13.6
#200	7.1	6.8	7.2

Material Description
○ Well-graded sand with silt

□ Poorly graded sand with silt

△ Poorly graded sand with silt

REMARKS:
○

□

△

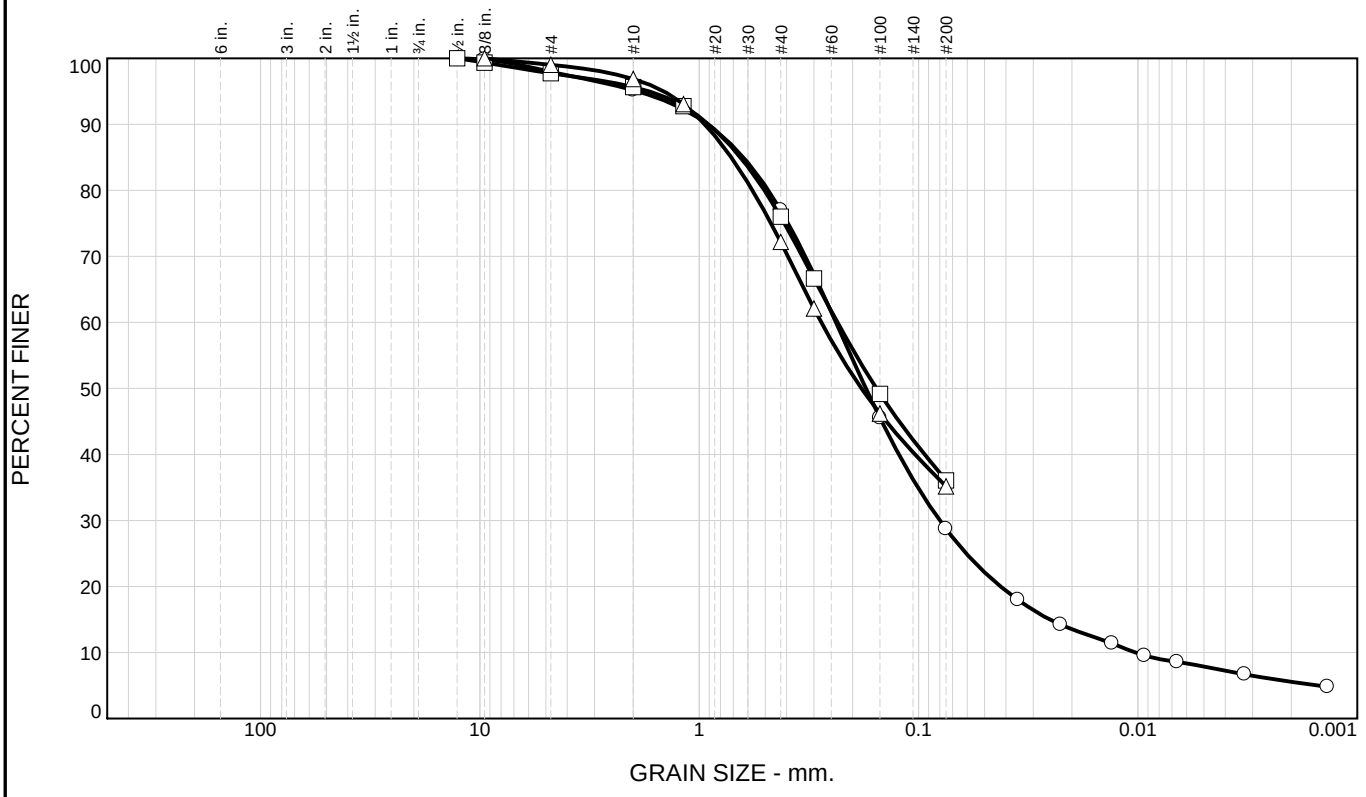
○ Source of Sample: KE3 Depth: 17.0' Sample Number: D
□ Source of Sample: KE3 Depth: 22.5' Sample Number: E1
△ Source of Sample: KE3 Depth: 23.0' Sample Number: E2

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	2.0	69.3	20.8	7.9	SM		NP	19
□	0.0	2.3	61.6	36.1		SC		17	25
△	0.0	1.0	63.8	35.2		SC-SM		17	23

SIEVE inches size	PERCENT FINER ○	□	△
1/2	100.0	100.0	
3/8	99.8	99.4	100.0
GRAIN SIZE			
D_{60}	0.2380	0.2343	0.2779
D_{30}	0.0801		
D_{10}	0.0103		
COEFFICIENTS			
C_c	2.61		
C_u	23.06		

SIEVE number size	PERCENT FINER ○	□	△
#4	98.0	97.7	99.0
#10	95.2	95.6	96.9
#16		92.8	93.1
#40	77.0	76.0	72.2
#50		66.7	62.1
#100	45.5	49.2	46.2
#200	28.7	36.1	35.2

Material Description
○ Silty sand
□ Clayey sand
△ Silty, clayey sand

REMARKS:
○
□ PI-LL information taken from sample G2.
△

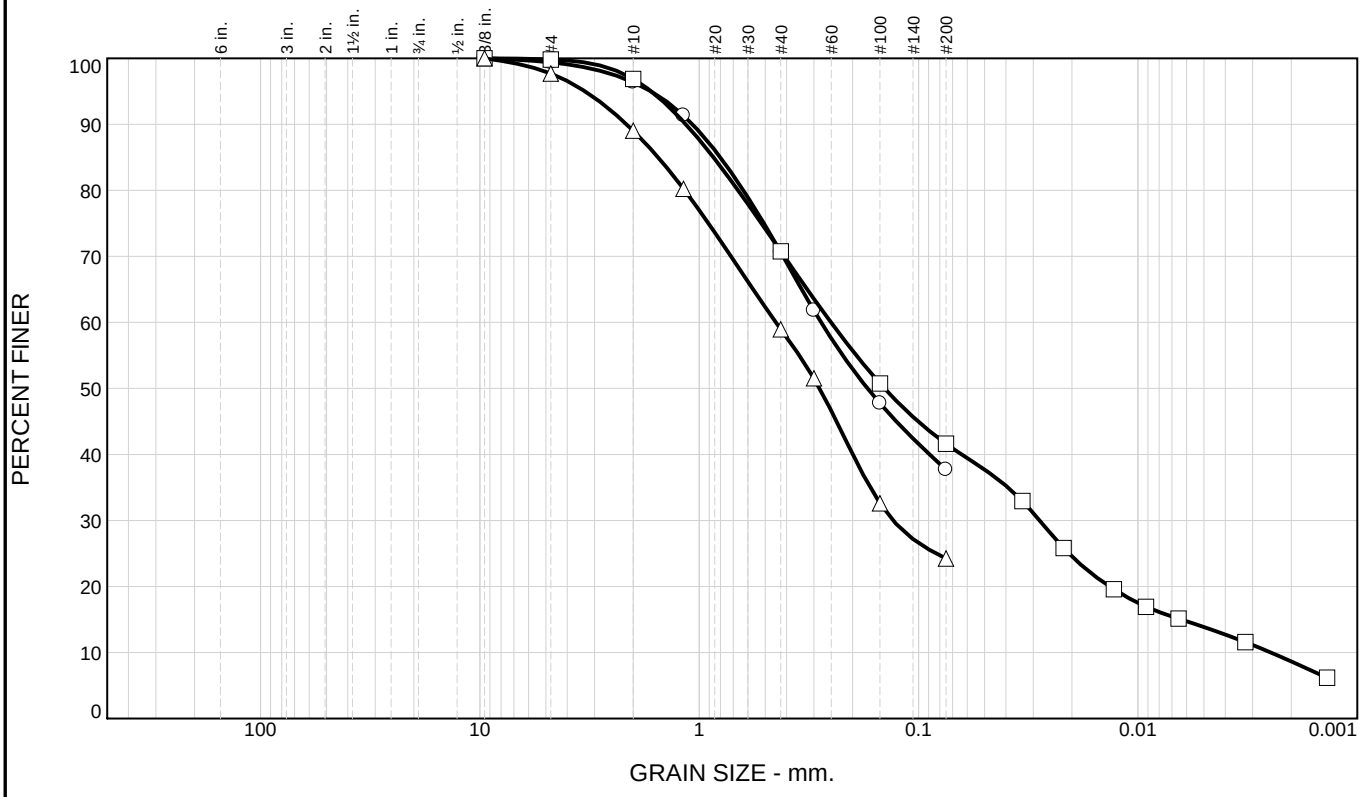
○ Source of Sample: KE3 Depth: 27.0' Sample Number: F
□ Source of Sample: KE3 Depth: 28.5' Sample Number: G1
△ Source of Sample: KE3 Depth: 31.0' Sample Number: H

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.6	61.7	37.7		SC		16	29
□	0.0	0.2	58.2	27.7	13.9	SC		17	34
△	0.0	2.3	73.5	24.2		SC		18	26

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.2783	0.2508	0.4474
D_{30}		0.0280	0.1307
D_{10}		0.0025	
COEFFICIENTS			
C_c		1.26	
C_u		101.04	

SIEVE number size	PERCENT FINER ○	□	△
#4	99.4	99.8	97.7
#10	96.4	96.9	89.0
#16	91.3		80.2
#40	70.6	70.8	59.0
#50	61.8		51.5
#100	47.7	50.8	32.6
#200	37.7	41.6	24.2

Material Description
○ Clayey sand
□ Clayey sand
△ Clayey sand

REMARKS:
○
□
△

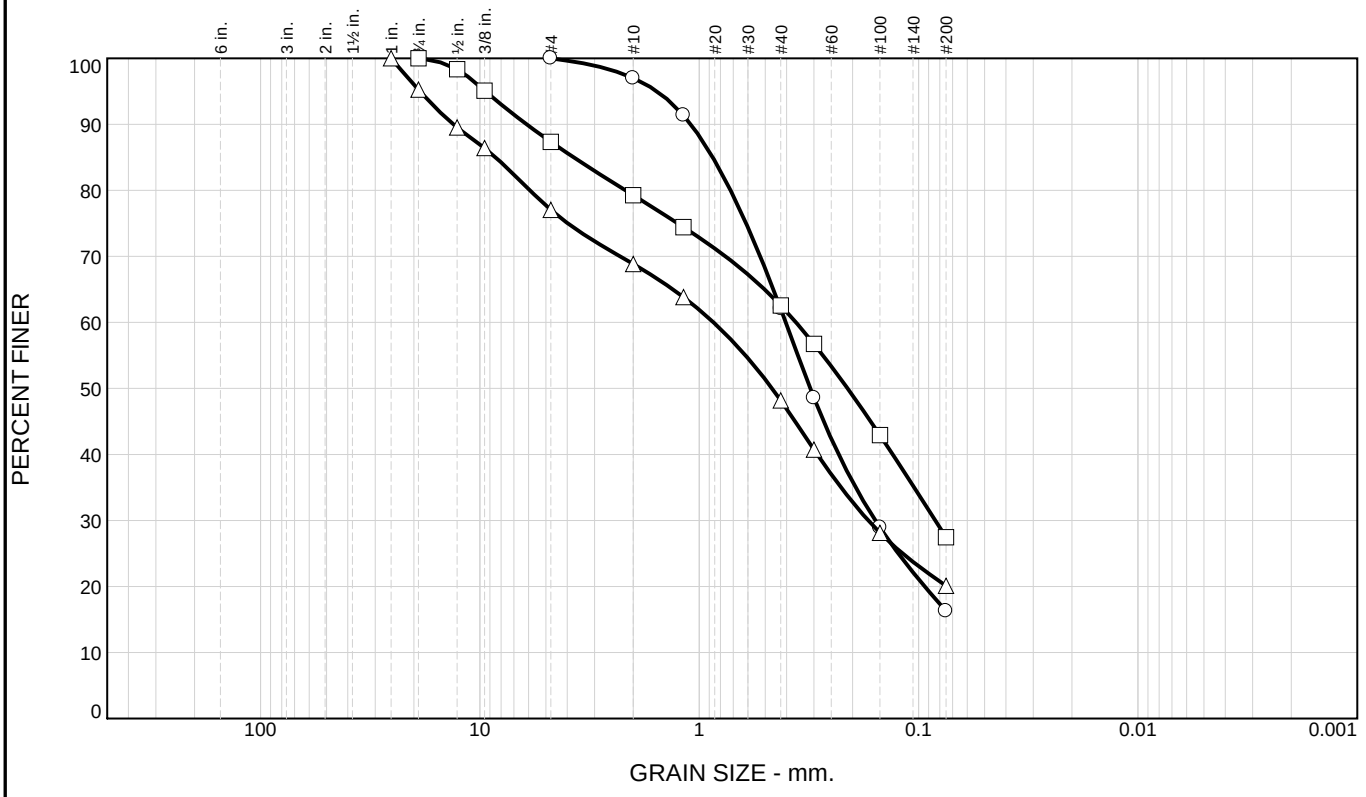
○ Source of Sample: KE3 Depth: 33.5' Sample Number: I1
□ Source of Sample: KE3 Depth: 34.0' Sample Number: I2
△ Source of Sample: KE3 Depth: 35.0' Sample Number: J

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	83.7	16.3		SM		NP	21
□	0.0	12.7	59.8	27.5		SM			
△	0.0	22.9	57.0	20.1		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1			100.0
3/4		100.0	95.3
1/2		98.3	89.5
3/8		95.1	86.4
	GRAIN SIZE		
D_{60}	0.4030	0.3619	0.8604
D_{30}	0.1575	0.0839	0.1696
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	87.3	77.1
#10	97.0	79.3	68.8
#16	91.4	74.4	63.8
#40	62.1	62.6	48.2
#50	48.6	56.7	40.7
#100	28.9	42.9	28.1
#200	16.3	27.5	20.1

Material Description
○ Silty sand
□ Silty sand
△ Silty sand with gravel

REMARKS:
○
□
△

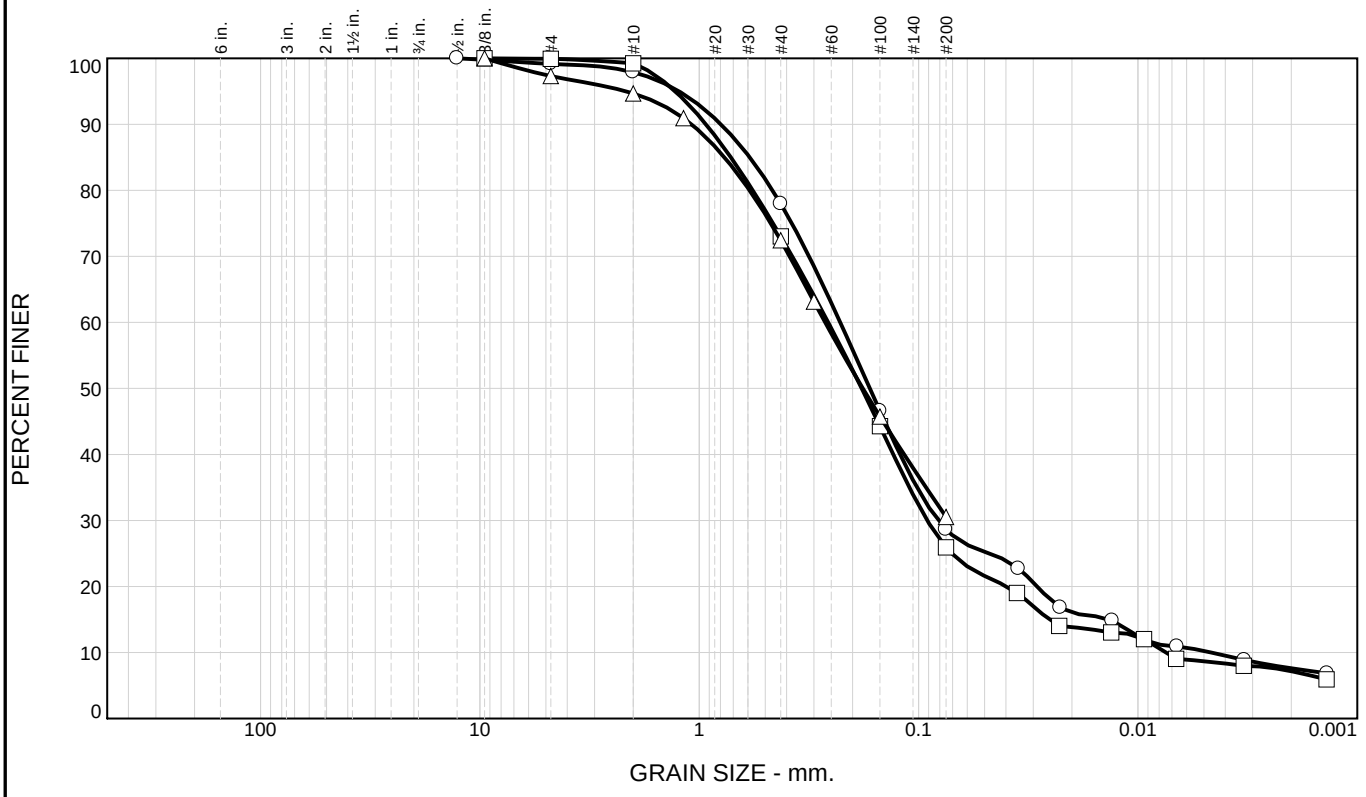
○ Source of Sample: KE3 Depth: 42.0' Sample Number: L
□ Source of Sample: KE3 Depth: 47.0' Sample Number: M
△ Source of Sample: KE3 Depth: 52.0' Sample Number: N

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.8	70.5	18.5	10.2	SM		NP	18
□	0.0	0.1	74.0	17.2	8.7	SM		NP	19
△	0.0	2.7	66.8	30.5		SM		18	21

SIEVE inches size	PERCENT FINER ○	□	△
1/2	100.0		
3/8	99.8	100.0	100.0
	GRAIN SIZE		
D_{60}	0.2275	0.2582	0.2666
D_{30}	0.0813	0.0913	
D_{10}	0.0046	0.0075	
	COEFFICIENTS		
C_c	6.28	4.31	
C_u	49.16	34.49	

SIEVE number size	PERCENT FINER ○	□	△
#4	99.2	99.9	97.3
#10	97.9	99.2	94.7
#16			90.9
#40	78.0	73.0	72.4
#50			63.1
#100	46.6	44.3	45.7
#200	28.7	25.9	30.5

Material Description
○ Silty sand
□ Silty sand
△ Silty sand

REMARKS:
○
□
△

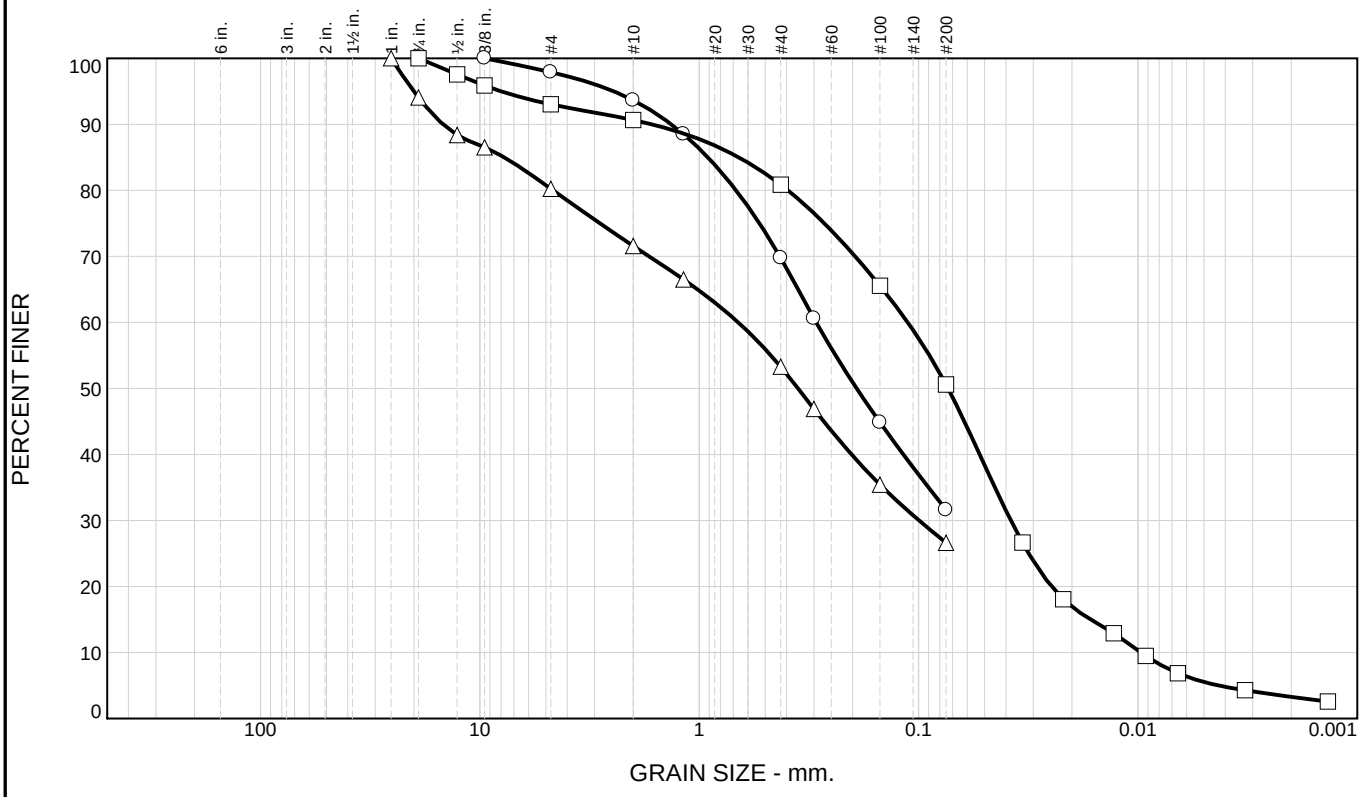
○ Source of Sample: KE3 Depth: 57.0' Sample Number: O
□ Source of Sample: KE3 Depth: 62.0' Sample Number: P
△ Source of Sample: KE3 Depth: 67.0' Sample Number: Q

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	2.1	66.3	31.6		SM		17	20
□	0.0	7.0	42.4	45.1	5.5	ML		NP	22
△	0.0	19.8	53.6	26.6		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1			100.0
3/4		100.0	94.1
1/2		97.6	88.4
3/8	100.0	95.9	86.5
GRAIN SIZE			
D_{60}	0.2931	0.1119	0.6640
D_{30}		0.0380	0.0994
D_{10}		0.0097	
COEFFICIENTS			
C_c		1.33	
C_u		11.53	

SIEVE number size	PERCENT FINER ○	□	△
#4	97.9	93.0	80.2
#10	93.6	90.7	71.6
#16	88.5		66.5
#40	69.8	80.9	53.3
#50	60.6		46.9
#100	44.9	65.5	35.4
#200	31.6	50.6	26.6

Material Description
○ Silty sand
□ Sandy silt
△ Silty sand with gravel

REMARKS:
○
□
△

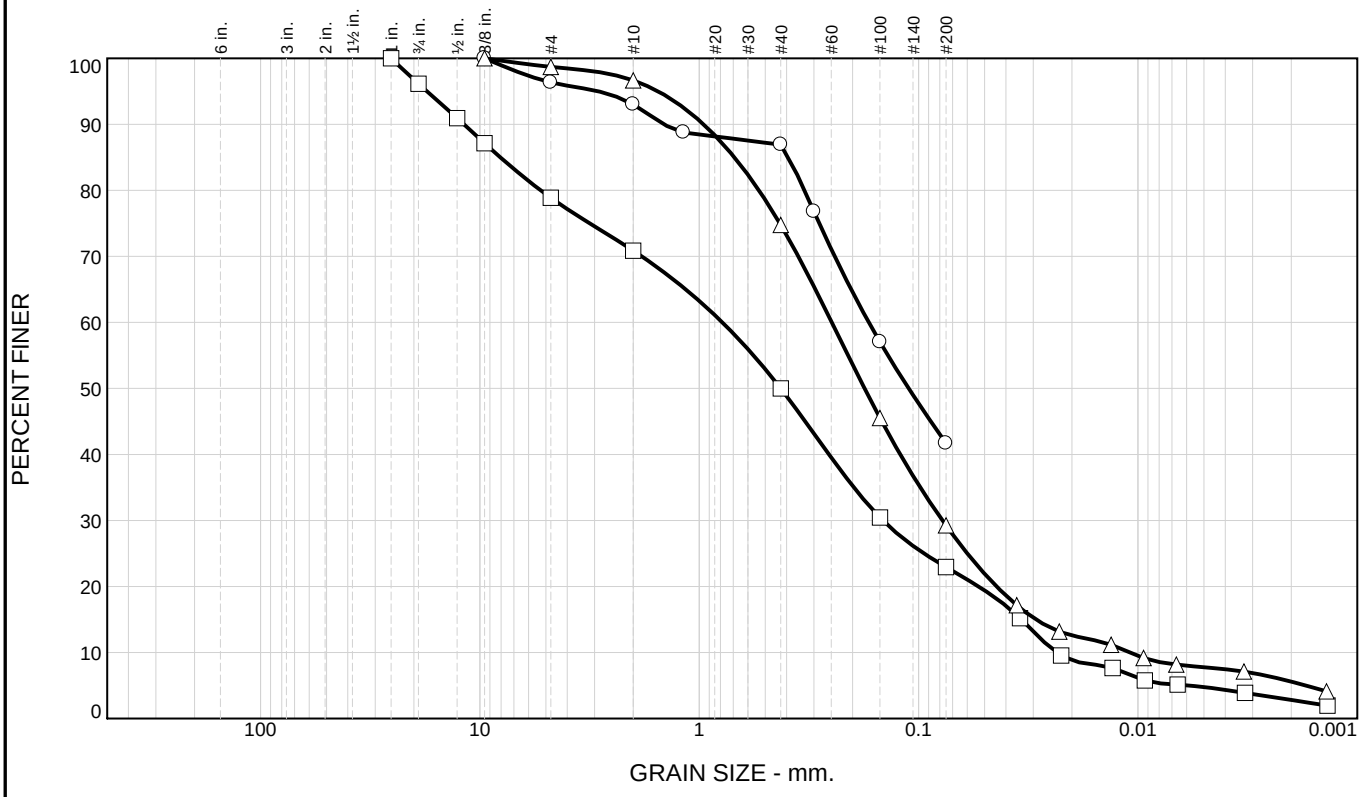
○ Source of Sample: KE3 Depth: 72.0' Sample Number: R
□ Source of Sample: KE3 Depth: 77.0' Sample Number: S
△ Source of Sample: KE3 Depth: 82.0' Sample Number: T1

NEVADA DEPARTMENT OF TRANSPORTATION

Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	3.6	54.7	41.7		SM			
□	0.0	21.1	56.0	18.1	4.8	SM		19	21
△	0.0	1.3	69.4	21.5	7.8	SM		19	21

SIEVE inches size	PERCENT FINER ○	□	△
1		100.0	
3/4		96.2	
1/2		90.9	
3/8	100.0	87.1	100.0
GRAIN SIZE			
D_{60}	0.1686	0.7844	0.2486
D_{30}		0.1454	0.0778
D_{10}		0.0235	0.0109
COEFFICIENTS			
C_c		1.15	2.24
C_u		33.38	22.84

SIEVE number size	PERCENT FINER ○	□	△
#4	96.4	78.9	98.7
#10	93.0	70.9	96.7
#16	88.8		
#40	86.9	50.0	74.8
#50	76.8		
#100	57.0	30.4	45.5
#200	41.7	22.9	29.3

Material Description
○ Silty sand
□ Silty sand with gravel
△ Silty sand

REMARKS:
○
□
△

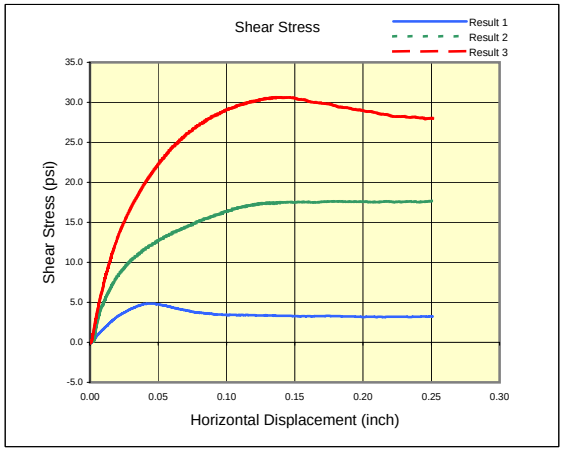
○ Source of Sample: KE3 Depth: 82.5' Sample Number: T2
□ Source of Sample: KE3 Depth: 87.0' Sample Number: U
△ Source of Sample: KE3 Depth: 97.0' Sample Number: V

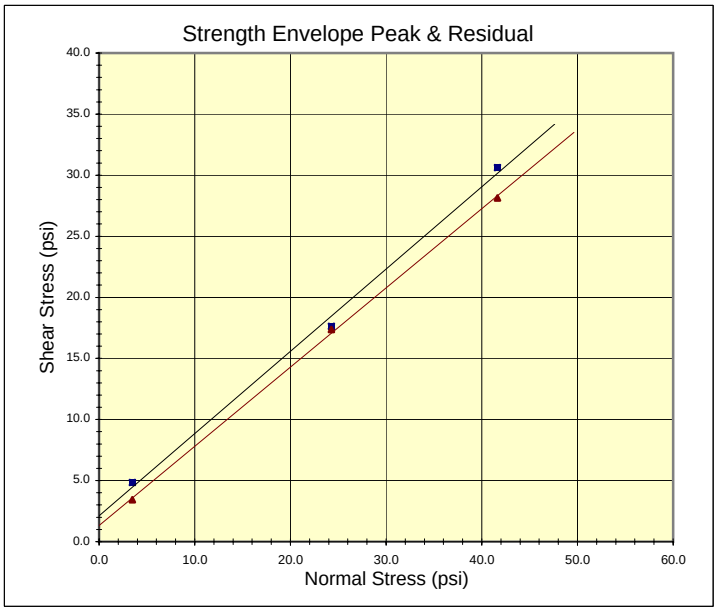
NEVADA DEPARTMENT OF TRANSPORTATION

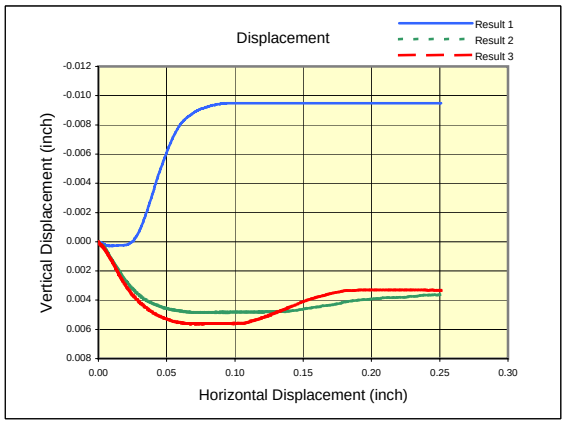
Client:
Project: CC Freeway @ Koontz Ln.
Project No.: 72781

Figure

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	34	degrees	33
Cohesion =	2.11	psi	1.31

Project: 72781 Boring: KE1 Sample: A2

	Result 1	Result 2	Result 3
Specimen:	a	b	d
Date Tested	9/3/2002	9/3/2002	9/3/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	3.00	3.10	2.80
SHEAR			
Displacement Rate(in/min)	0.0040	0.0039	0.0039
Normal Stress (psi)	3.49	24.29	41.63
Peak Shear Stress(psi)	4.85	17.62	30.61
Residual Shear Stress(psi)	3.4	17.4	28.1
Residual Point Picked @(in)	0.098	0.135	0.236
Time @ Peak Failure (min)	10.9	62.4	34.9

Specimen Comments

a Semi-lose w/voids during trimming. Inundated.

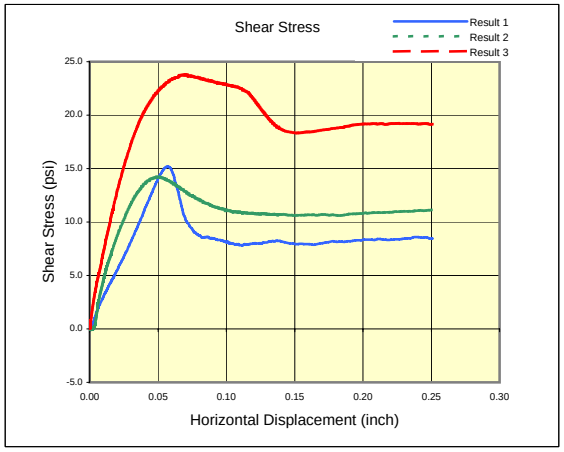
b Lose material, voids from trimming filled. Inundated.

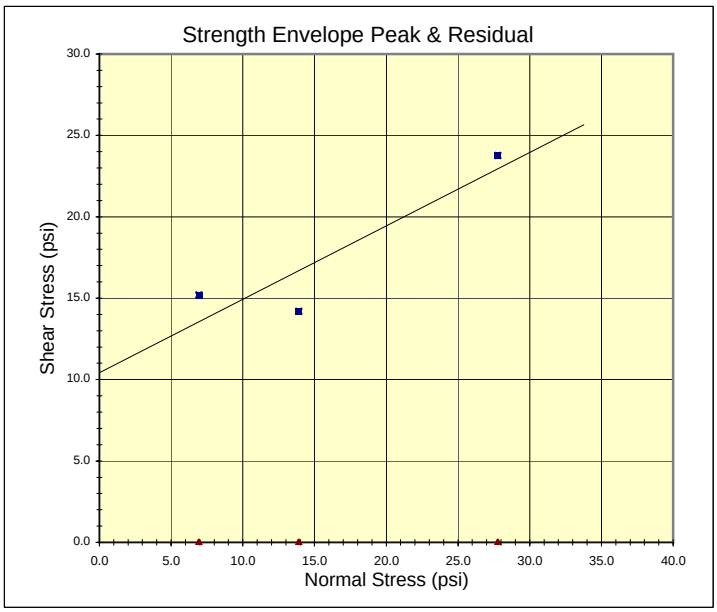
d Semi-lose, voids from cutting, filled. Inundated.

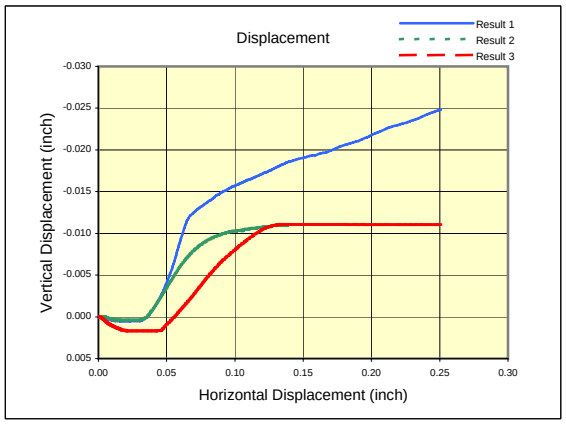
NEVADA DOT

DigiShear __ KE1-A21

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	24	degrees	0
Cohesion =	10.41	psi	0.00

Project: 72781 Boring: KE1 Sample: D2

	Result 1	Result 2	Result 3
Specimen:	b	c	d
Date Tested	9/4/2002	9/4/2002	9/4/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	10.50	10.80	10.90
SHEAR			
Displacement Rate(in/min)	0.0040	0.0040	0.0040
Normal Stress (psi)	6.95	13.89	27.77
Peak Shear Stress(psi)	15.20	14.19	23.77
Residual Shear Stress(psi)	0.0	0.0	0.0
Residual Point Picked @(in)	0.000	0.000	0.000
Time @ Peak Failure (min)	14.4	12.6	17.5

Specimen Comments

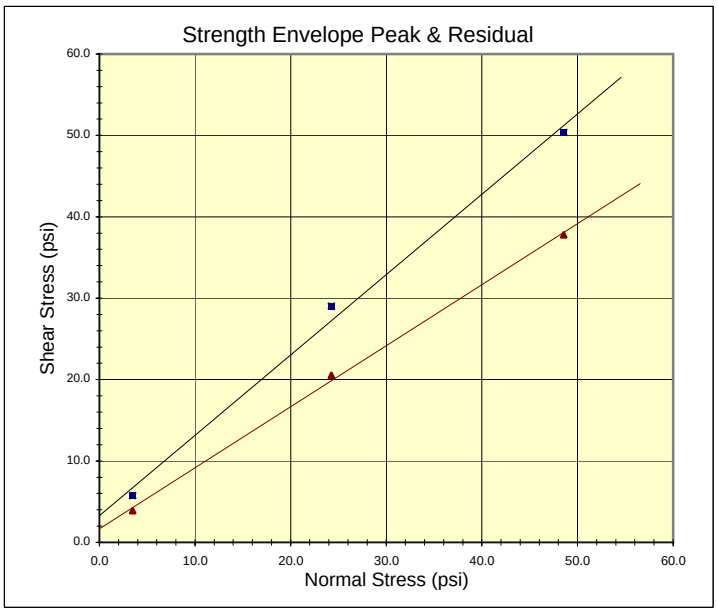
b Silty sand, inundated.

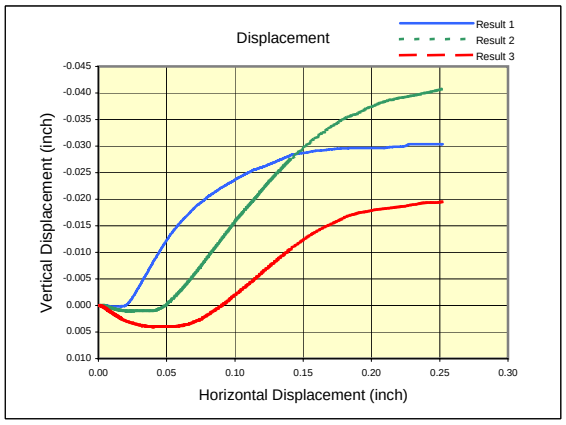
c Same, finer. Inundated.

d Coarse sand, inundated.

DigiShear __ KE1-D22

DIRECT SHEAR TEST REPORT





Strength Parameters				
	Peak		Residual
Friction Angle =	45	degrees	37
Cohesion =	3.26	psi	1.66

Project: 72781 Boring: KE1 Sample: F1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/5/2002	9/5/2002	9/5/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	14.00	14.10	14.20
SHEAR			
Displacement Rate(in/min)	0.0039	0.0039	0.0040
Normal Stress (psi)	3.48	24.27	48.56
Peak Shear Stress(psi)	5.74	29.01	50.38
Residual Shear Stress(psi)	3.9	20.5	37.8
Residual Point Picked @(in)	0.187	0.235	0.252
Time @ Peak Failure (min)	11.5	23.4	28.4

Specimen Comments

a Slightly coarse sand, inundated.

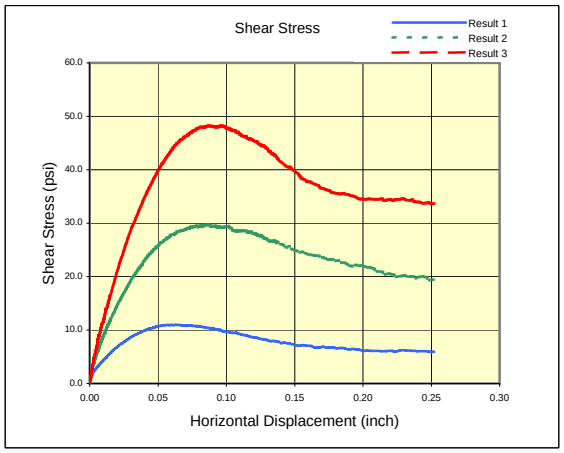
b Slightly coarse sand with some large granules, inundated.

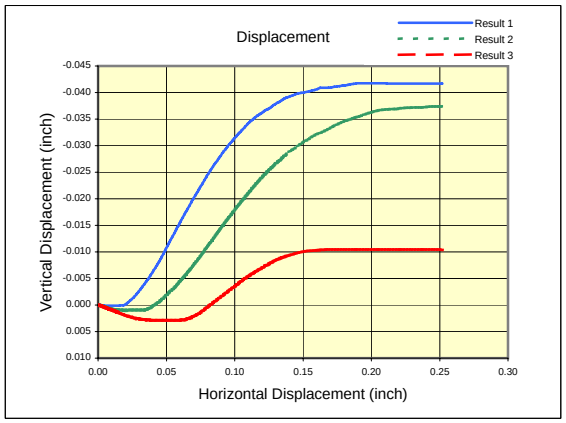
c Sand w/ some coarse, inundated.

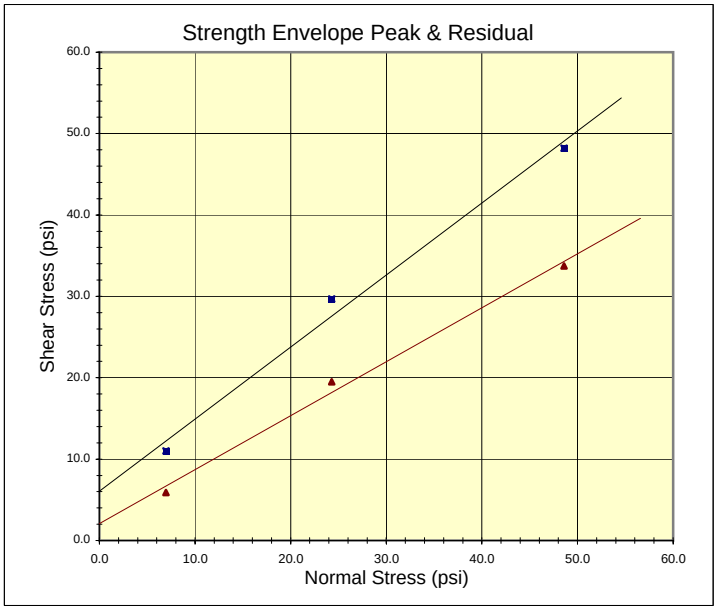
NEVADA DOT

DigiShear __ KE1-F13

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	42	degrees	34
Cohesion =	6.08	psi	2.07

Project: 72781 Boring: KE1 Sample: H1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/16/2002	10/16/2002	10/16/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	17.20	17.30	17.40
SHEAR			
Displacement Rate(in/min)	0.0049	0.0050	0.0050
Normal Stress (psi)	6.96	24.29	48.59
Peak Shear Stress(psi)	10.99	29.70	48.20
Residual Shear Stress(psi)	5.9	19.5	33.7
Residual Point Picked @(in)	0.252	0.252	0.252
Time @ Peak Failure (min)	12.5	17.2	17.3

Specimen Comments

a Coarse sand, inundated.

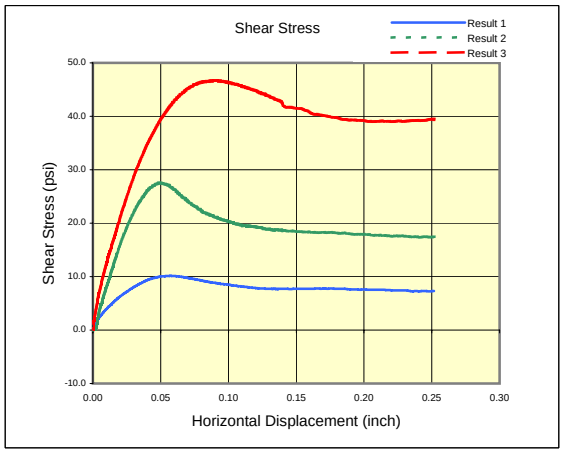
b Coarse sand, inundated.

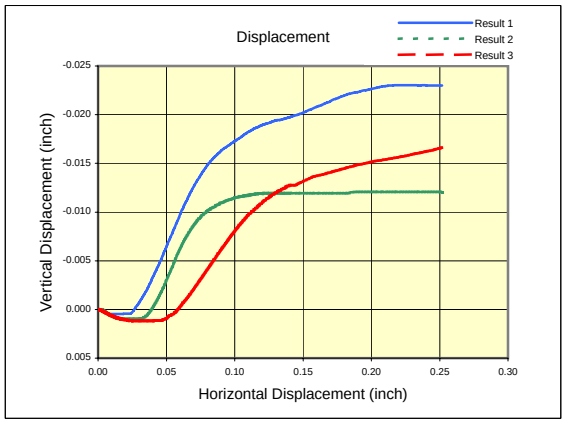
c Coarse sand, inundated.

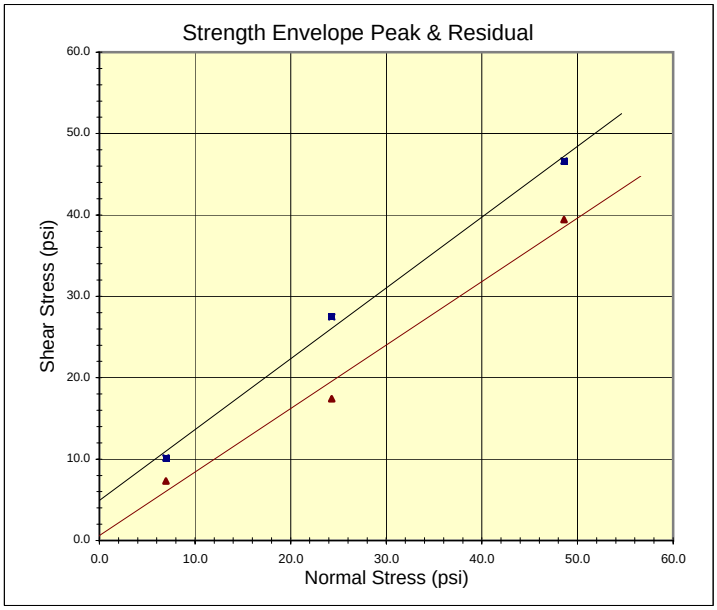
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	41	degrees	38
Cohesion =	4.92	psi	0.61

Project: 72781 Boring: KE1 Sample: L1

	Result 1	Result 2	Result 3
Specimen:	b	c	d
Date Tested	10/17/2002	10/17/2002	10/17/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	32.20	32.40	32.50
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0040
Normal Stress (psi)	6.95	24.30	48.61
Peak Shear Stress(psi)	10.15	27.49	46.65
Residual Shear Stress(psi)	7.3	17.4	39.4
Residual Point Picked @(in)	0.251	0.251	0.251
Time @ Peak Failure (min)	14.3	12.4	22.2

Specimen Comments

b Clayey sand w/some gravel, inundated.

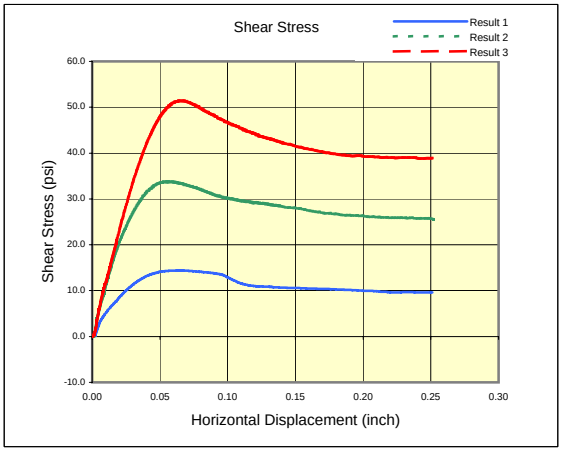
c Clayey sand w/some gravel, inundated.

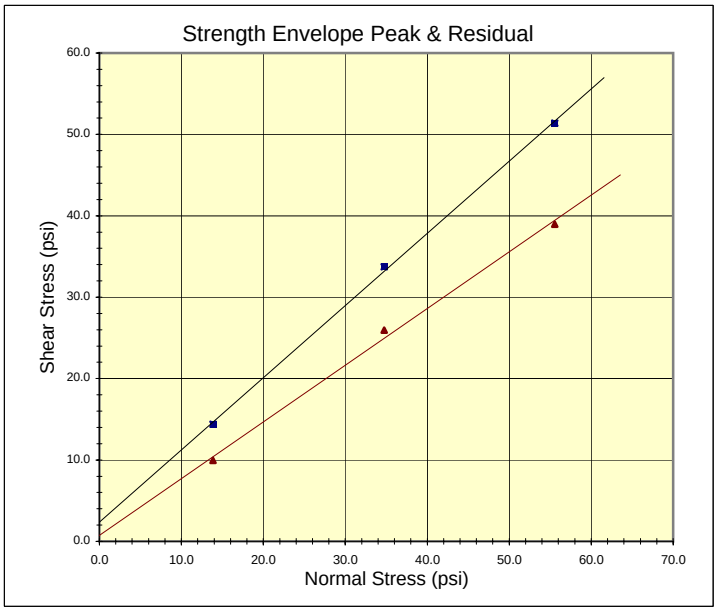
d Clayey sand w/some gravel, inundated.

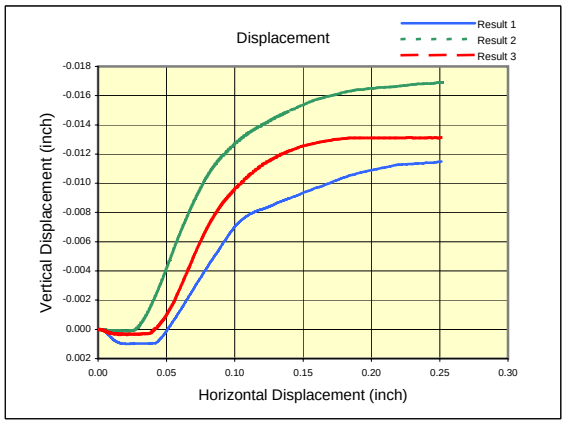
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	42	degrees	35
Cohesion =	2.37	psi	0.75

Project: 72781 Boring: KE1 Sample: LA1

	Result 1	Result 2	Result 3
Specimen:	a	d	c
Date Tested	9/16/2002	9/17/2002	9/16/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	31.90	34.60	40.10
SHEAR			
Displacement Rate(in/min)	0.0040	0.0040	0.0040
Normal Stress (psi)	13.87	34.73	55.56
Peak Shear Stress(psi)	14.40	33.73	51.38
Residual Shear Stress(psi)	9.9	25.9	39.0
Residual Point Picked @(in)	0.206	0.215	0.227
Time @ Peak Failure (min)	16.4	13.8	16.3

Specimen Comments

a Coarse sand w/clayey silt, inundated.

d Coarse sand w/clayey silt, 1/8" rocks, inundated.

c Coarse sand w/clayey silt, inundated

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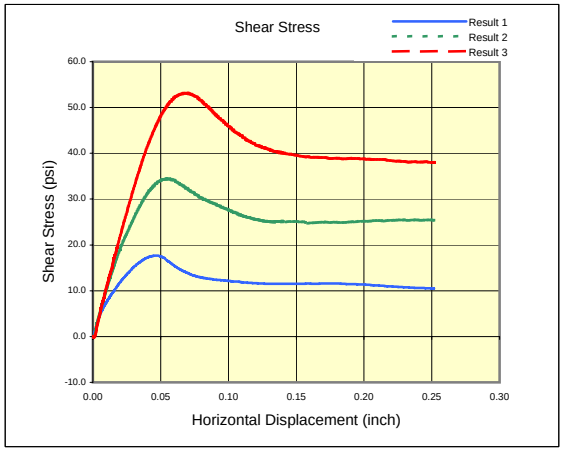
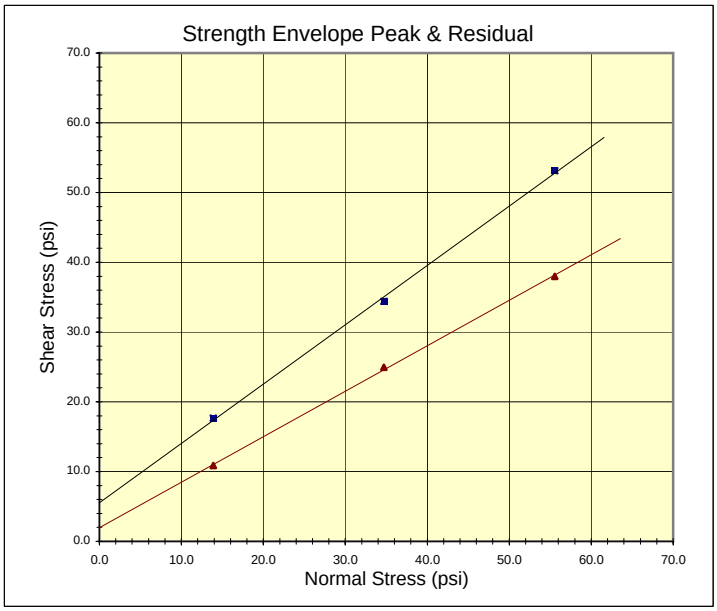
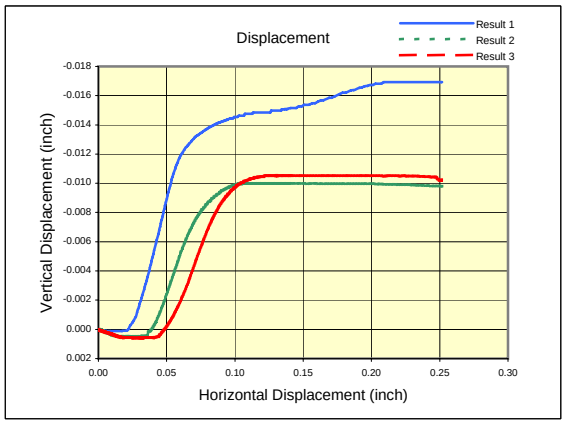
DigiShear __ KE1-LA16

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	40	degrees	33
Cohesion =	5.53	psi	1.97

Project: 72781 Boring: KE1 Sample: LA2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/13/2002	9/13/2002	9/13/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	34.30	34.40	34.50
SHEAR			
Displacement Rate(in/min)	0.0039	0.0039	0.0039
Normal Stress (psi)	13.91	34.72	55.56
Peak Shear Stress(psi)	17.68	34.40	53.11
Residual Shear Stress(psi)	10.9	24.9	38.0
Residual Point Picked @(in)	0.223	0.167	0.252
Time @ Peak Failure (min)	11.8	13.7	17.4

Specimen Comments

a Clayey silty sand, inundated.

b Same as "a" with some large sand granules, inundated.

c Same as sample "b", inundated.

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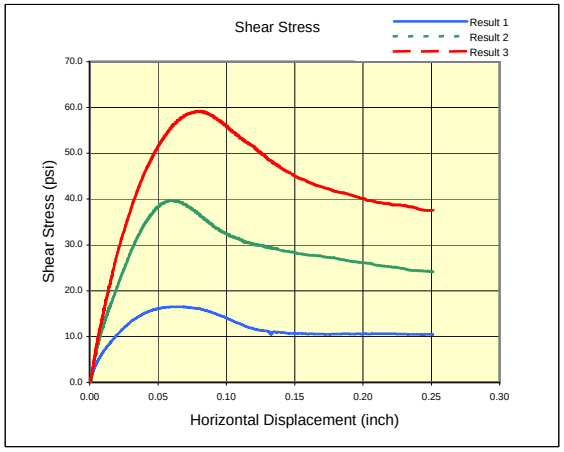
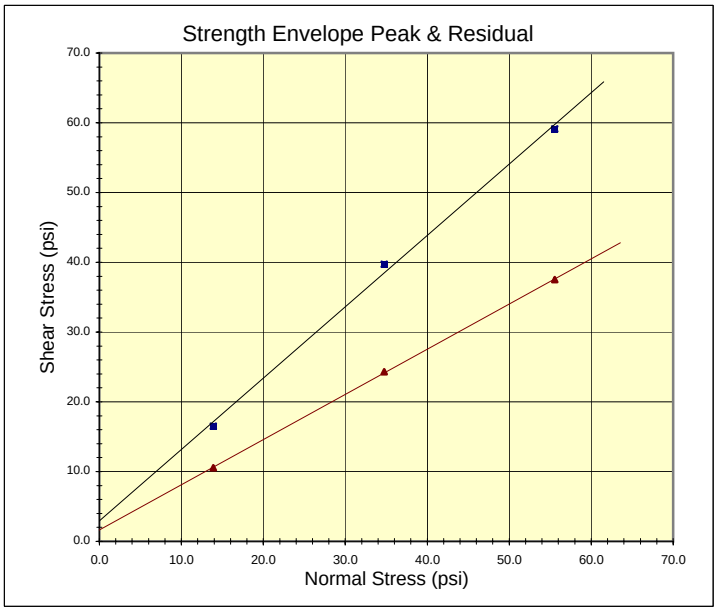
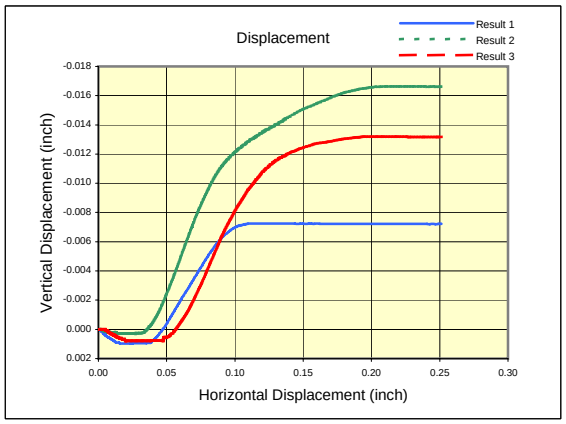
DigiShear __ KE1-LA27

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	46	degrees	33
Cohesion =	2.93	psi	1.62

Project: 72781 Boring: KE! Sample: N1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/18/2002	9/18/2002	9/18/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	42.80	42.90	43.00
SHEAR			
Displacement Rate(in/min)	0.0030	0.0030	0.0030
Normal Stress (psi)	13.89	34.73	55.54
Peak Shear Stress(psi)	16.51	39.71	59.12
Residual Shear Stress(psi)	10.5	24.3	37.5
Residual Point Picked @(in)	0.231	0.241	0.249
Time @ Peak Failure (min)	20.6	20.1	26.5

Specimen Comments

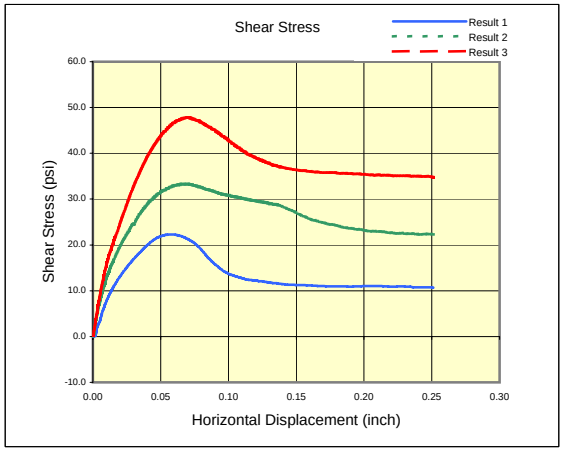
a Clayey sand w/some coarse granules, inundated.

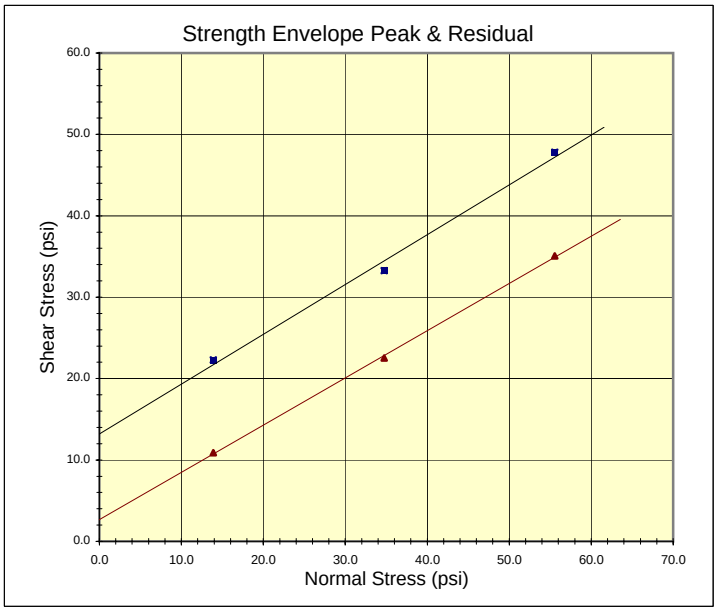
b Clayey sand w/some coarse granules, inundated.

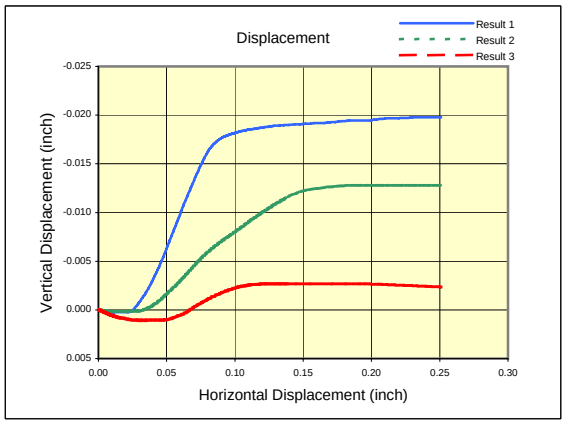
c Clayey sand w/course granules, inundated.

DigiShear __ KE1-N18

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	31	degrees	30
Cohesion =	13.20	psi	2.68

Project: 72781 Boring: KE1 Sample: N2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/17/2002	9/17/2002	9/18/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	42.20	42.30	42.40
SHEAR			
Displacement Rate(in/min)	0.0030	0.0030	0.0030
Normal Stress (psi)	13.89	34.73	55.56
Peak Shear Stress(psi)	22.30	33.26	47.80
Residual Shear Stress(psi)	10.9	22.5	35.1
Residual Point Picked @(in)	0.222	0.224	0.227
Time @ Peak Failure (min)	19.5	22.9	23.5

Specimen Comments

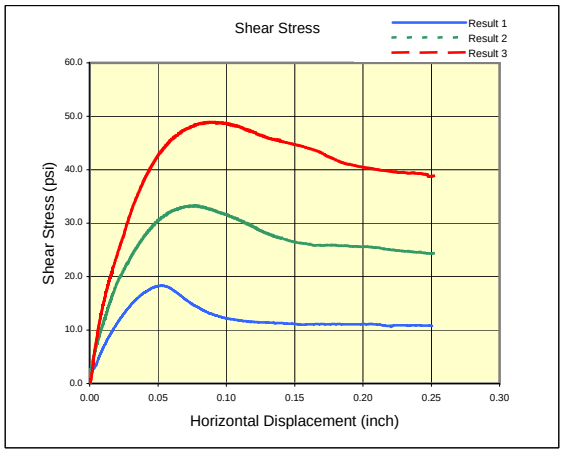
a Clayey sand w/some coarse, inundated.

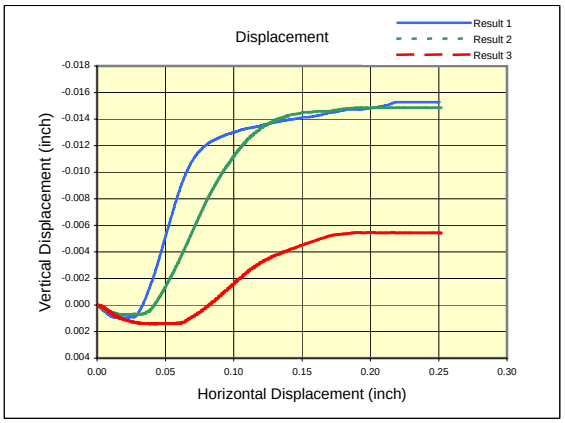
b Clayey sand w/some coarse sand granules, inundated.

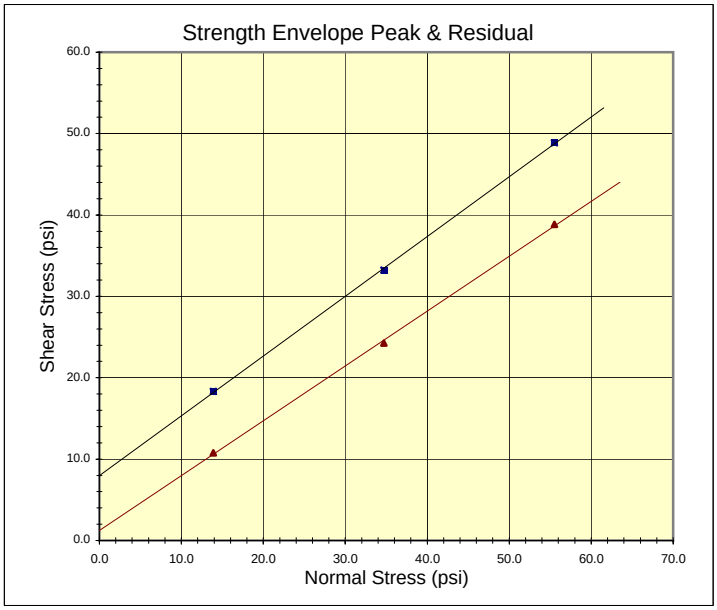
c Clayey sand w/some coarse sand granules, inundated.

DigiShear __ KE1-N29

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	36	degrees	34
Cohesion =	7.97	psi	1.24

Project: 72781 Boring: KE1 Sample: Q1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/23/2002	10/23/2002	10/24/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	56.00	56.10	56.20
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0040
Normal Stress (psi)	13.89	34.72	55.53
Peak Shear Stress(psi)	18.30	33.21	48.88
Residual Shear Stress(psi)	10.8	24.3	38.8
Residual Point Picked @(in)	0.251	0.251	0.252
Time @ Peak Failure (min)	13.2	19.3	22.2

Specimen Comments

a Clayey sand w/some gravel sized rock, inundated.

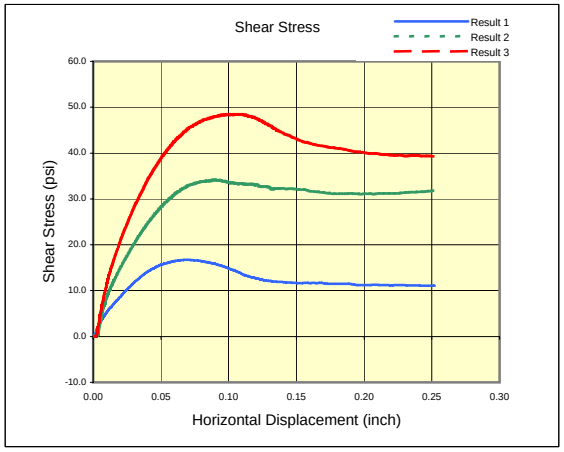
b Clayey sand w/some gravel sized rock, inundated.

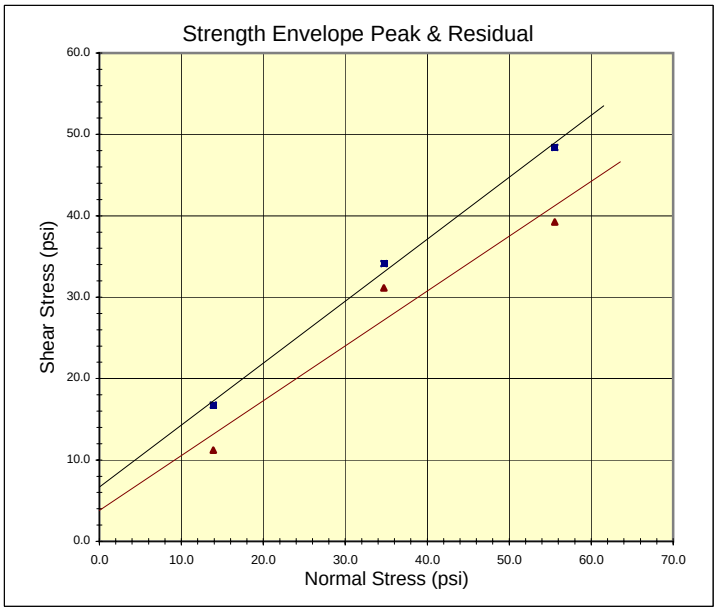
c Clayey sand w/some gravel sized rock, inundated.

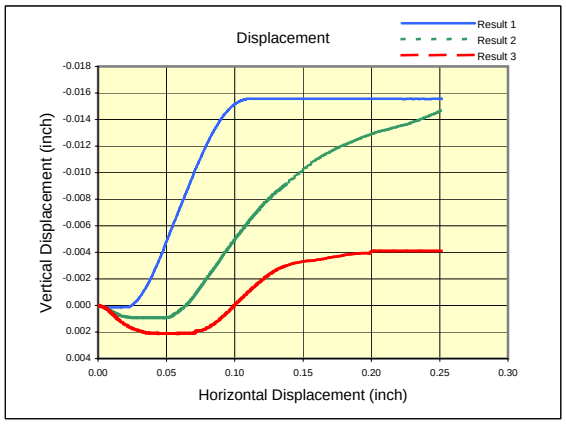
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	37	degrees	34
Cohesion =	6.68	psi	3.81

Project: 727781 Boring: KE1 Sample: Q2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/19/2002	9/19/2002	9/19/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	57.60	57.70	57.80
SHEAR			
Displacement Rate(in/min)	0.0030	0.0030	0.0030
Normal Stress (psi)	13.90	34.72	55.55
Peak Shear Stress(psi)	16.75	34.11	48.42
Residual Shear Stress(psi)	11.2	31.2	39.3
Residual Point Picked @(in)	0.199	0.212	0.235
Time @ Peak Failure (min)	23.6	29.8	35.7

Specimen Comments

a CLayey sand w/coarse & some large granules, inundated.

b Clayey sand with coarse granules. Becoming more clayey, inundated.

c Clayey sand w/coarse granules & small sized rocks, inundated.

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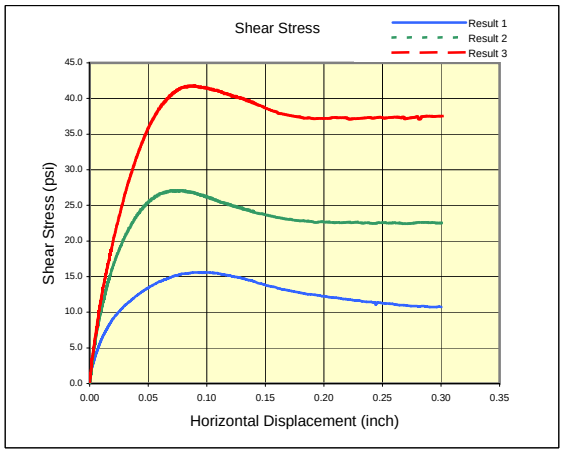
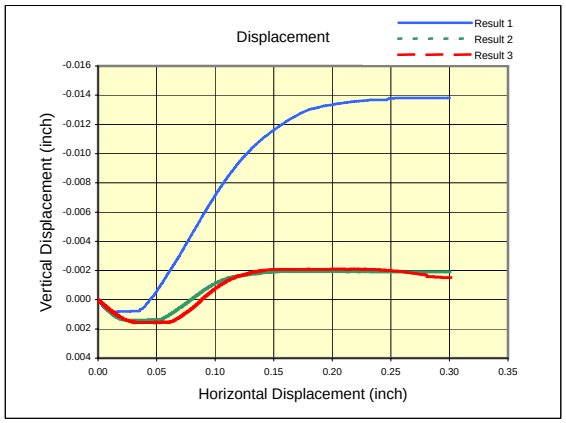
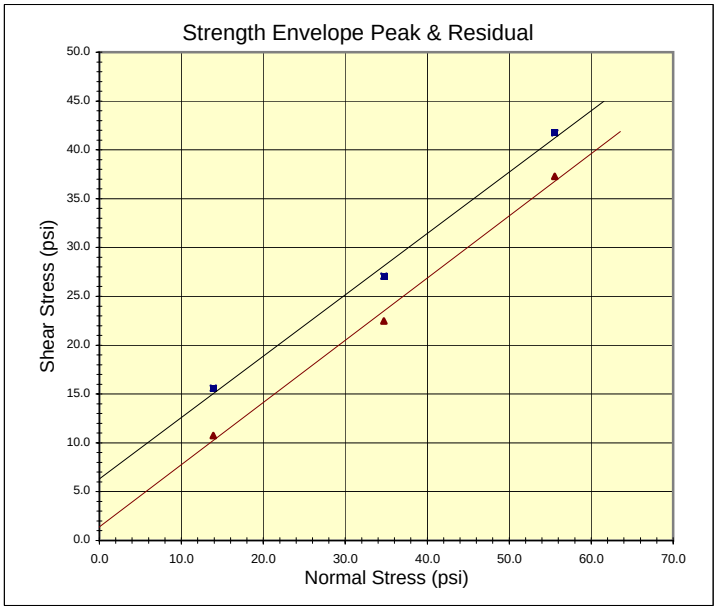
DigiShear __ KE1-Q211

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	32	degrees	32
Cohesion =	6.33	psi	1.39

Project: 72781 Boring: KE1 Sample: Q3

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/21/2002	10/21/2002	10/23/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	57.00	57.10	57.90
SHEAR			
Displacement Rate(in/min)	0.0040	0.0039	0.0039
Normal Stress (psi)	13.90	34.72	55.56
Peak Shear Stress(psi)	15.59	27.05	41.75
Residual Shear Stress(psi)	10.8	22.5	37.3
Residual Point Picked @(in)	0.301	0.301	0.301
Time @ Peak Failure (min)	25.1	19.5	22.4

Specimen Comments

a Clayey sand w/some small rock, inundated.

b Clayey sand w/some small rock, inundated.

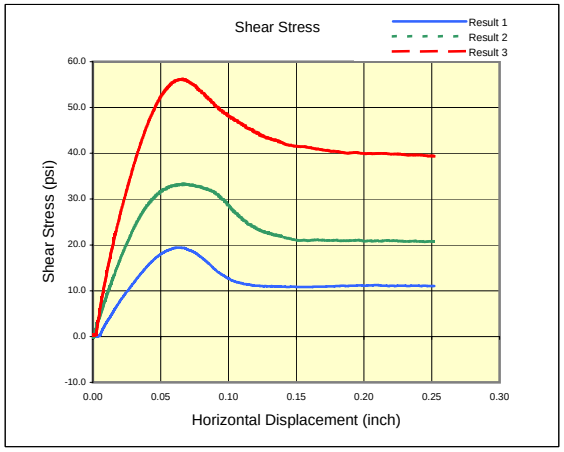
c Clayey sand w/some rocks, inundated.

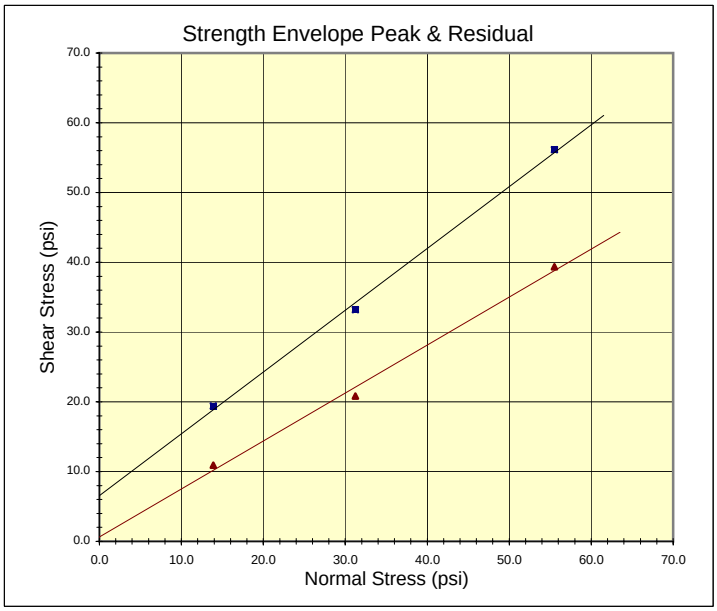
Geotechnical Section

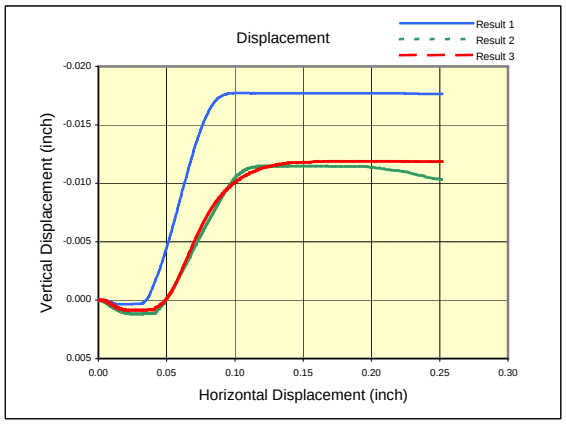
NEVADA DOT

DigiShear Report v4 __ KE1-Q312

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	42	degrees	35
Cohesion =	6.55	psi	0.63

Project: 72781 Boring: KE1 Sample: S1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/20/2002	9/20/2002	9/20/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	67.10	67.20	67.30
SHEAR			
Displacement Rate(in/min)	0.0039	0.0039	0.0040
Normal Stress (psi)	13.89	31.22	55.53
Peak Shear Stress(psi)	19.43	33.21	56.13
Residual Shear Stress(psi)	10.9	20.8	39.4
Residual Point Picked @(in)	0.172	0.213	0.252
Time @ Peak Failure (min)	15.9	16.9	16.5

Specimen Comments

a Silty sand w/ some pea gravel, inundated.

b Silty sand w/some pea gravel, inundated.

c Silty sand w/pea gravel, inundated.

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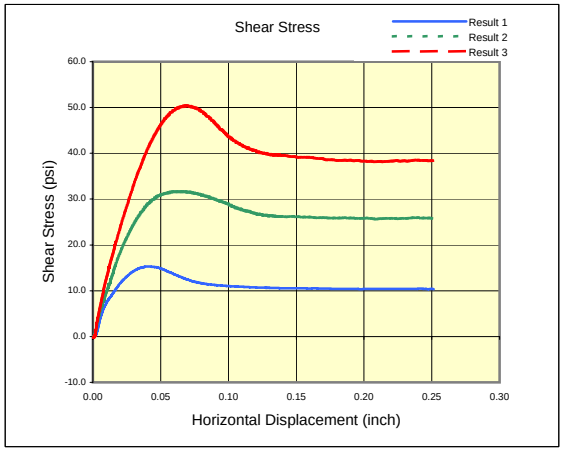
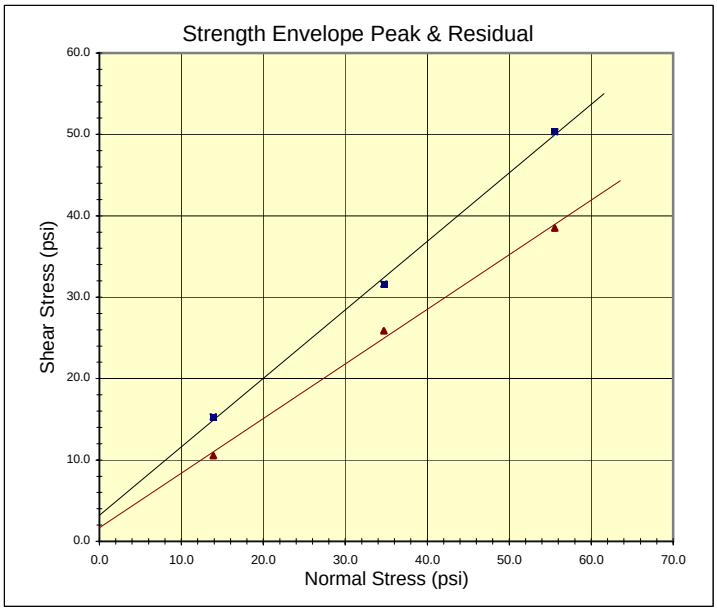
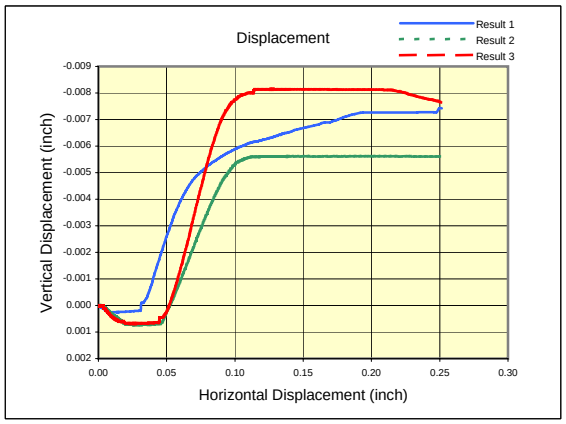
DigiShear __ KE1-S113

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	40	degrees	34
Cohesion =	3.20	psi	1.67

Project: 72781 Boring: KE1 Sample: U1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/23/2002	9/23/2002	9/23/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	77.80	77.90	78.00
SHEAR			
Displacement Rate(in/min)	0.0040	0.0040	0.0040
Normal Stress (psi)	13.90	34.72	55.55
Peak Shear Stress(psi)	15.30	31.60	50.35
Residual Shear Stress(psi)	10.5	25.9	38.5
Residual Point Picked @(in)	0.154	0.167	0.179
Time @ Peak Failure (min)	10.0	15.1	17.4

Specimen Comments

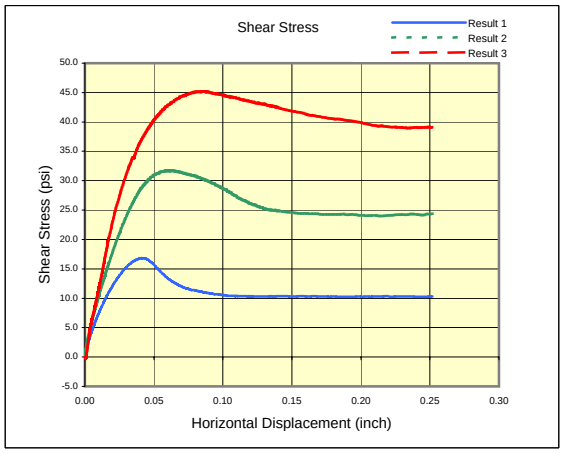
a Clayey sand w/some large granules, inundated.

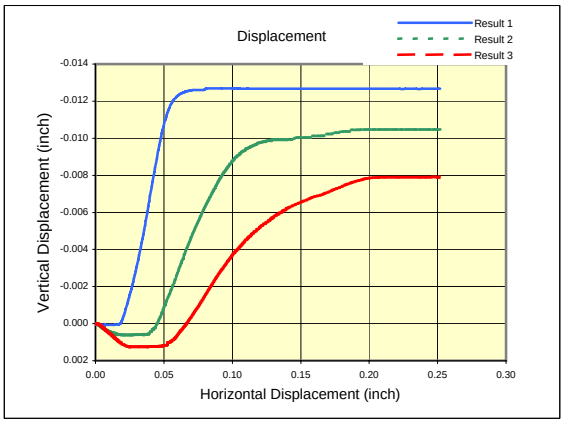
b Clayey sand w/some large granules, inundated.

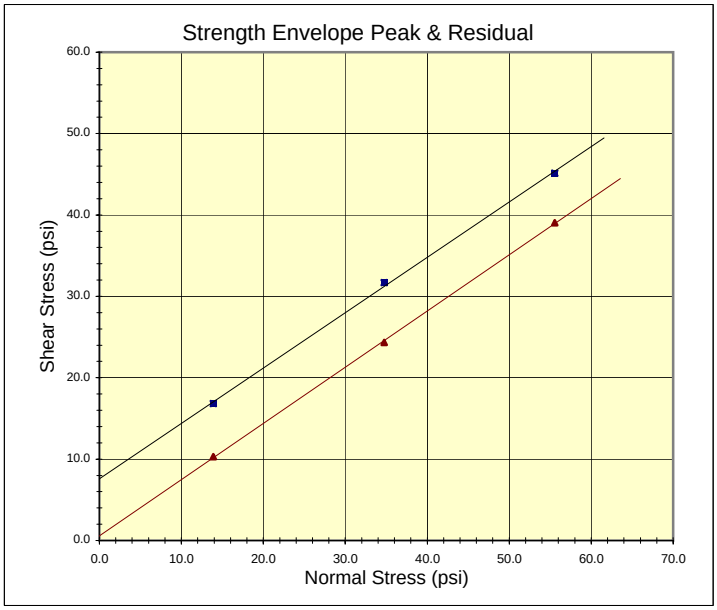
c Clayey sand w/some large granules, inundated.

DigiShear __ KE1-U114

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	34	degrees	35
Cohesion =	7.60	psi	0.59

Project: 72781 Boring: KE1 Sample: U2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/24/2002	10/24/2002	10/28/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	77.20	77.30	77.40
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0040
Normal Stress (psi)	13.90	34.73	55.55
Peak Shear Stress(psi)	16.82	31.71	45.15
Residual Shear Stress(psi)	10.3	24.4	39.1
Residual Point Picked @(in)	0.252	0.252	0.252
Time @ Peak Failure (min)	10.3	15.0	21.5

Specimen Comments

a Clayey sand w/some small gravel, inundated.

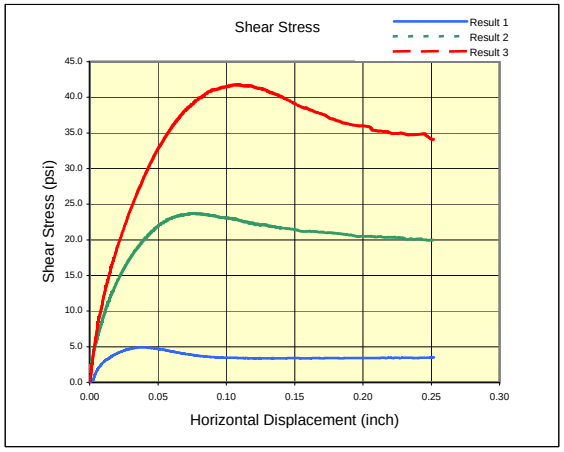
b Clayey sand w/some small gravel, inundated.

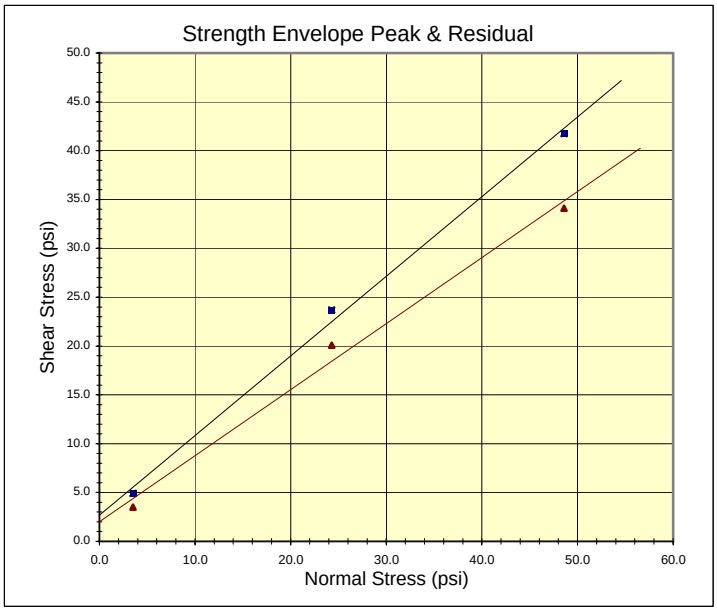
c Clayey sand w/some small gravel, inundated.

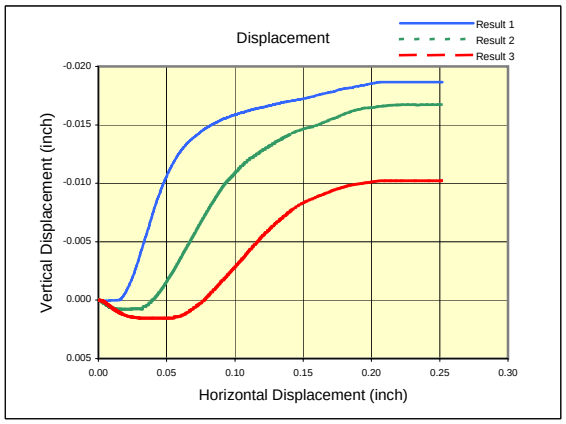
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	39	degrees	34
Cohesion =	2.68	psi	2.02

Project: 72781 Boring: KE2 Sample: A1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/24/2002	9/24/2002	9/24/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	2.40	2.50	2.60
SHEAR			
Displacement Rate(in/min)	0.0039	0.0039	0.0040
Normal Stress (psi)	3.51	24.31	48.58
Peak Shear Stress(psi)	4.91	23.68	41.76
Residual Shear Stress(psi)	3.5	20.1	34.1
Residual Point Picked @(in)	0.251	0.238	0.252
Time @ Peak Failure (min)	9.6	19.3	27.3

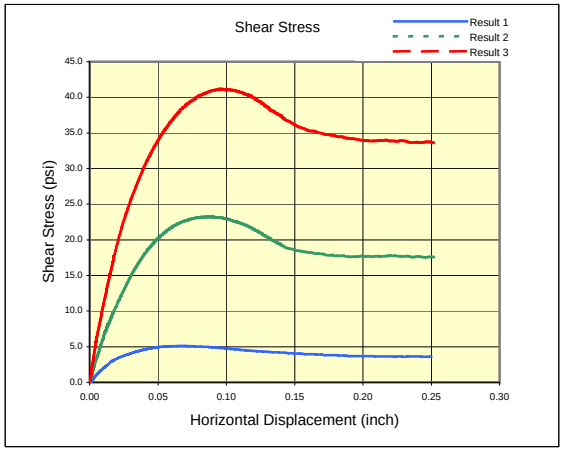
Specimen Comments

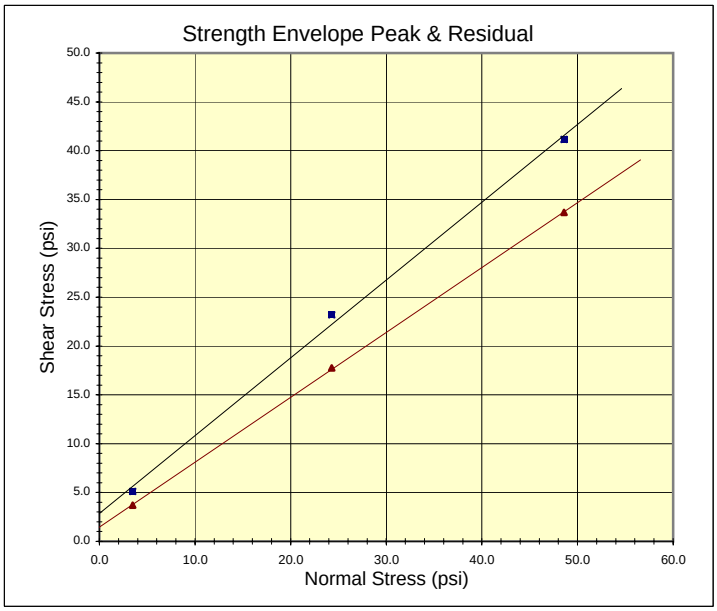
a Clayey-silty sand w/some gravel, inundated.

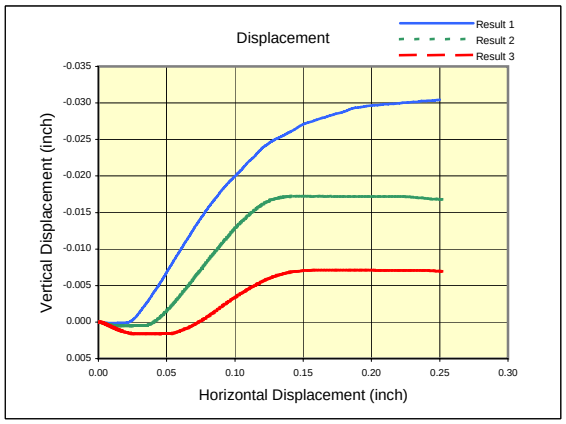
b Clayey-silty sand w/less gravel, inundated.

c Clayey silt w/sand and some large granules, inundated.

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	39	degrees	34
Cohesion =	2.87	psi	1.46

Project: 72781 Boring: KE2 Sample: A2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/24/2002	9/25/2002	9/25/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	2.10	3.00	3.10
SHEAR			
Displacement Rate(in/min)	0.0040	0.0039	0.0039
Normal Stress (psi)	3.49	24.31	48.60
Peak Shear Stress(psi)	5.12	23.21	41.15
Residual Shear Stress(psi)	3.7	17.7	33.7
Residual Point Picked @(in)	0.198	0.221	0.239
Time @ Peak Failure (min)	17.2	22.3	24.0

Specimen Comments

a Clayey fine to coarse sand w/some large granules, inundated.

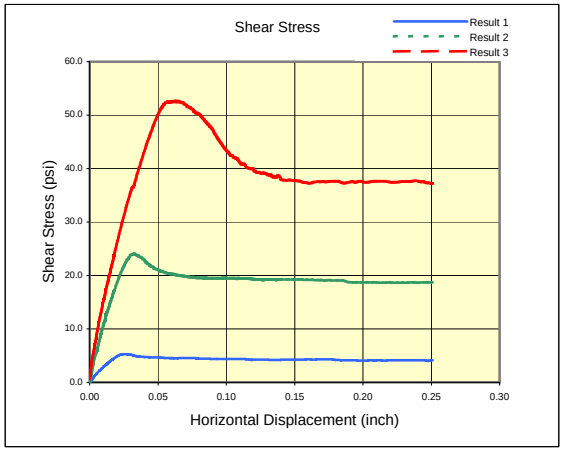
b Clayey fine to coarse sand w/some large granules, inundated.

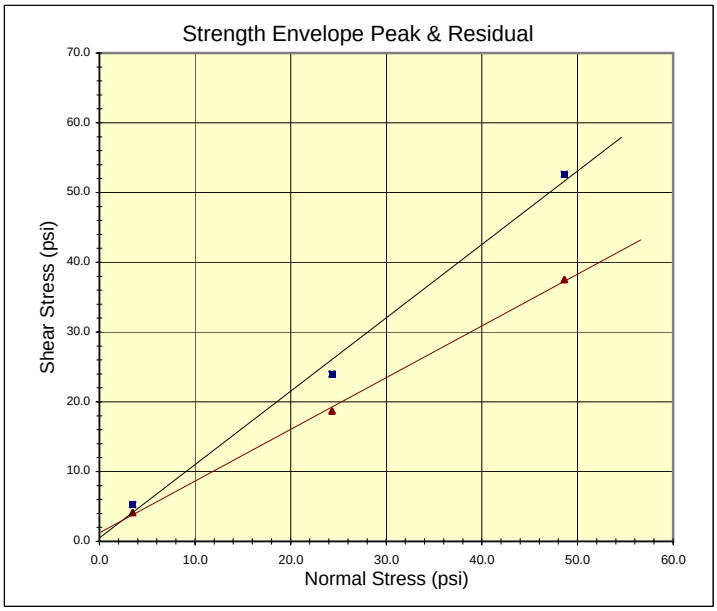
c Clayey fine to coarse sand w/some large granules, inundated.

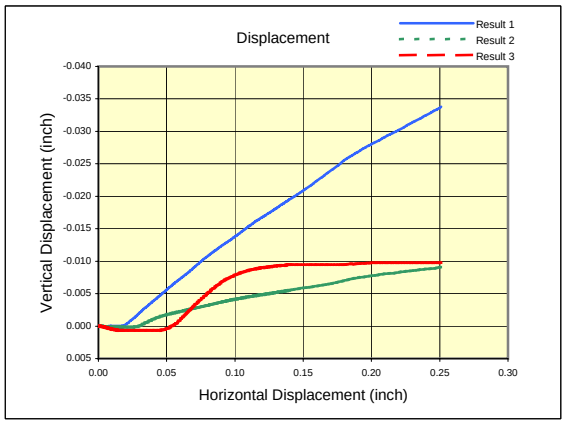
NEVADA DOT

DigiShear __ KE2-A217

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	46	degrees	37
Cohesion =	0.47	psi	1.23

Project: 72781 Boring: KE2 Sample: C1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/26/2002	9/26/2002	9/26/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	9.90	10.00	10.10
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0040
Normal Stress (psi)	3.48	24.31	48.61
Peak Shear Stress(psi)	5.26	23.99	52.59
Residual Shear Stress(psi)	4.1	18.7	37.5
Residual Point Picked @(in)	0.186	0.207	0.231
Time @ Peak Failure (min)	6.3	8.0	15.5

Specimen Comments

a Silty fine sand, inundated.

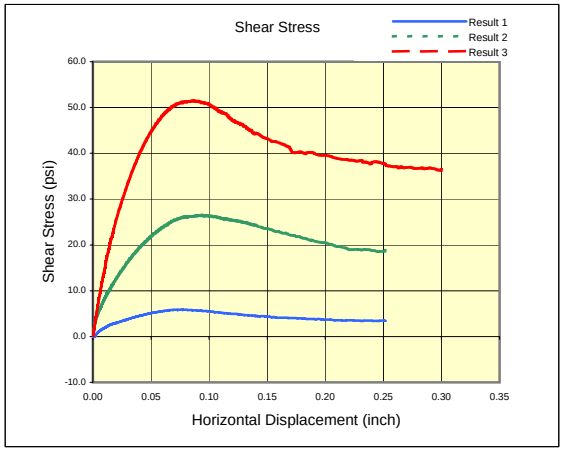
b Clayey, silty fine sand, inundated.

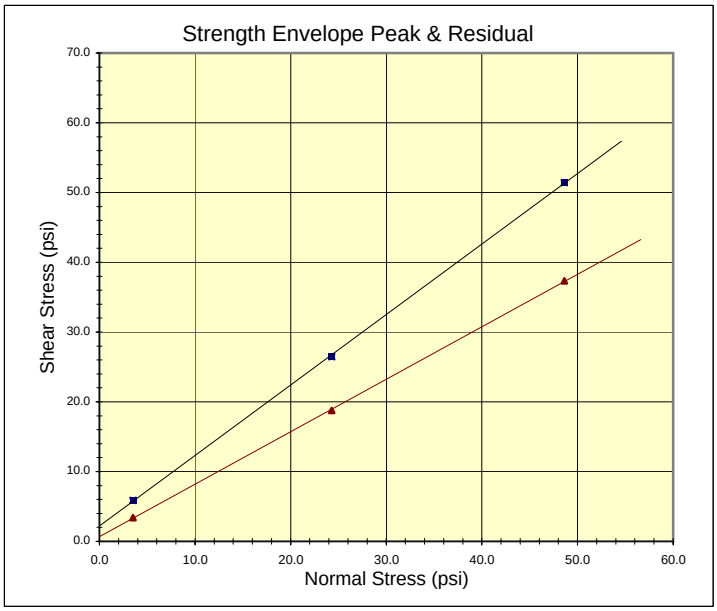
c Clayey silty sand changing to coarse sand, inundated.

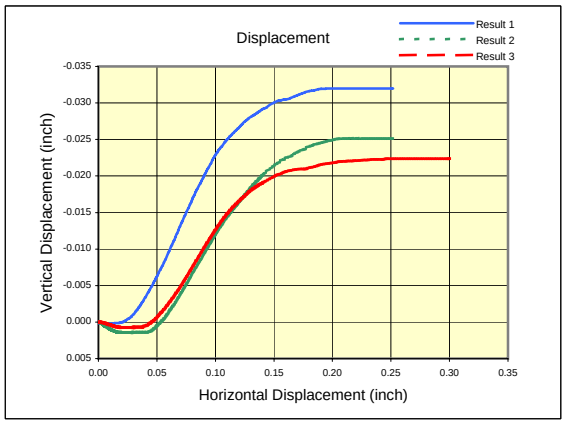
NEVADA DOT

DigiShear __ KE2-C118

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	45	degrees	37
Cohesion =	2.17	psi	0.67

Project: 72781 Boring: KE2 Sample: C2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/27/2002	9/27/2002	9/27/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	10.30	10.40	10.50
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0040
Normal Stress (psi)	3.50	24.30	48.61
Peak Shear Stress(psi)	5.86	26.45	51.44
Residual Shear Stress(psi)	3.4	18.8	37.3
Residual Point Picked @(in)	0.252	0.250	0.253
Time @ Peak Failure (min)	20.0	23.5	21.7

Specimen Comments

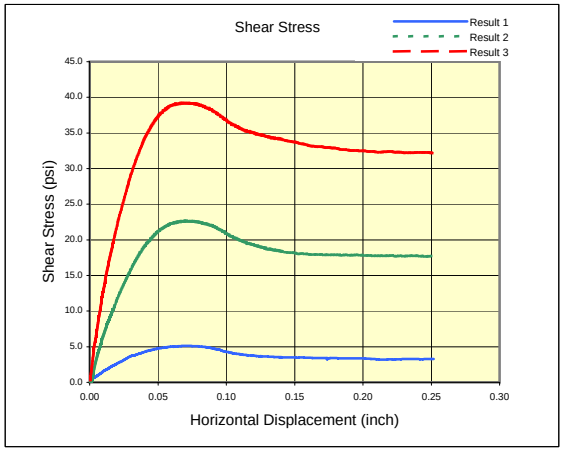
a Fine to coarse sand, inundated.

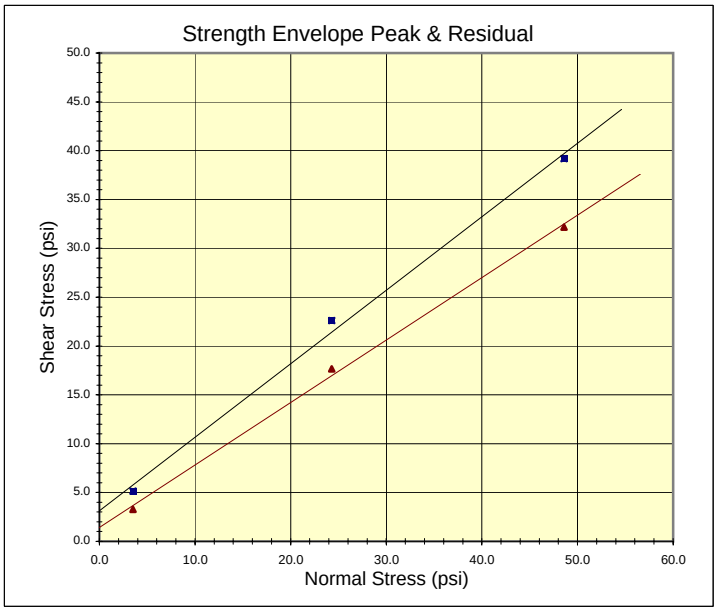
b Fine to coarse sand, inundated.

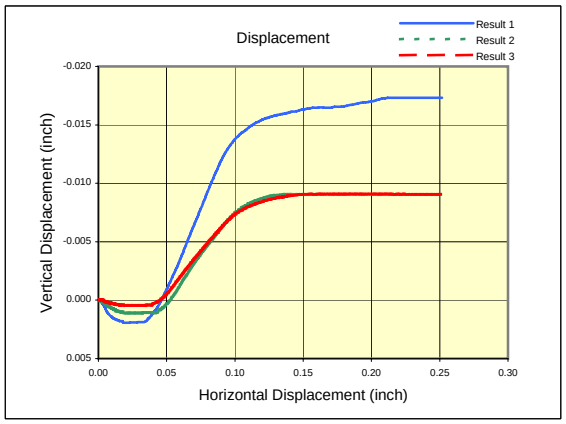
c Fine to coarse sand, inundated.

DigiShear __ KE2-C219

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	37	degrees	33
Cohesion =	3.14	psi	1.41

Project: 72781 Boring: KE2 Sample: E2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	9/30/2002	9/30/2002	9/30/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	16.00	16.10	16.20
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0039
Normal Stress (psi)	3.50	24.29	48.60
Peak Shear Stress(psi)	5.13	22.62	39.18
Residual Shear Stress(psi)	3.3	17.7	32.2
Residual Point Picked @(in)	0.252	0.251	0.251
Time @ Peak Failure (min)	18.0	17.5	17.2

Specimen Comments

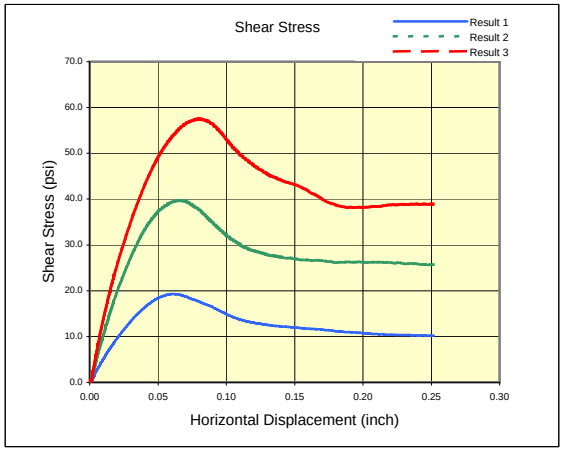
a Sand w/coarse ans some rocks, inundated.

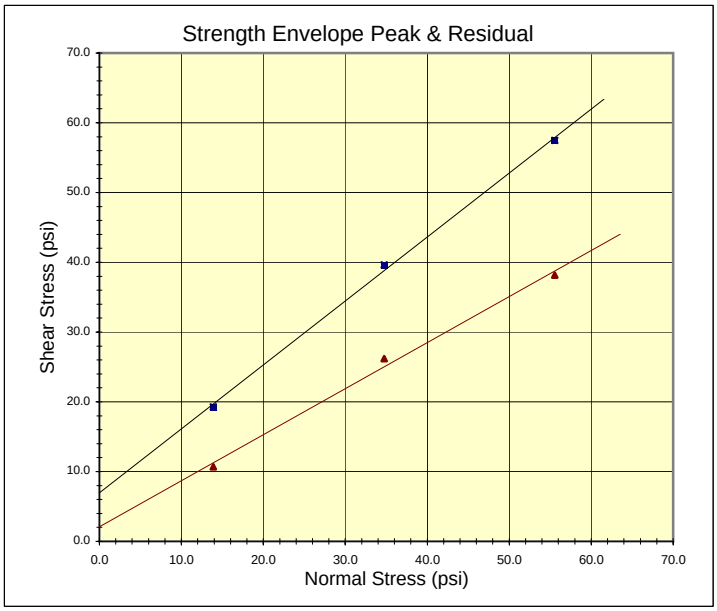
b Sand w/coarse and some small rock, inundated.

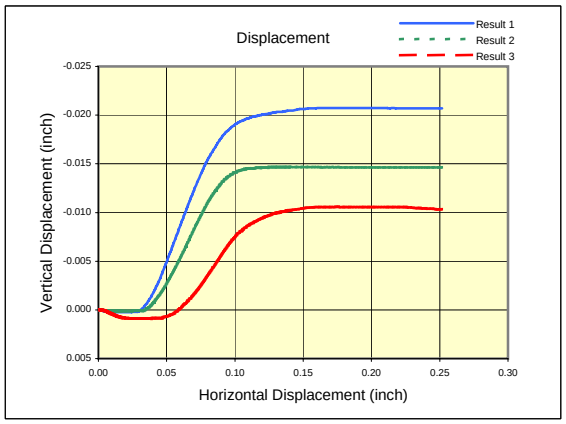
c Sand w/ coarse and some small rocks, inundated.

DigiShear __ KE2-E220

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	43	degrees	33
Cohesion =	6.96	psi	2.09

Project: 72781 Boring: KE2 Sample: G1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/1/2002	10/1/2002	10/1/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	20.30	20.40	20.50
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0039
Normal Stress (psi)	13.90	34.73	55.56
Peak Shear Stress(psi)	19.28	39.64	57.47
Residual Shear Stress(psi)	10.7	26.2	38.2
Residual Point Picked @(in)	0.204	0.205	0.203
Time @ Peak Failure (min)	15.0	16.4	20.0

Specimen Comments

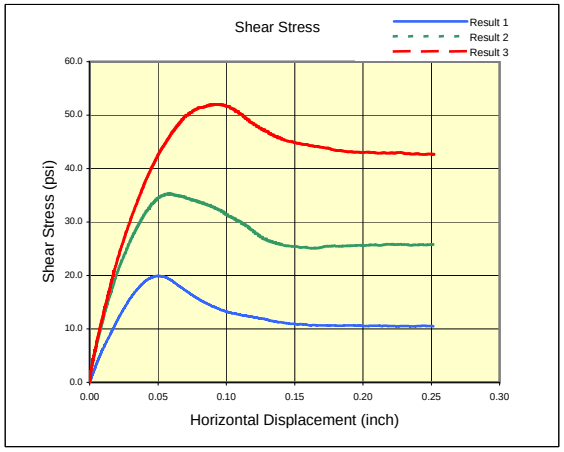
a Fine to coarse sand, inundated.

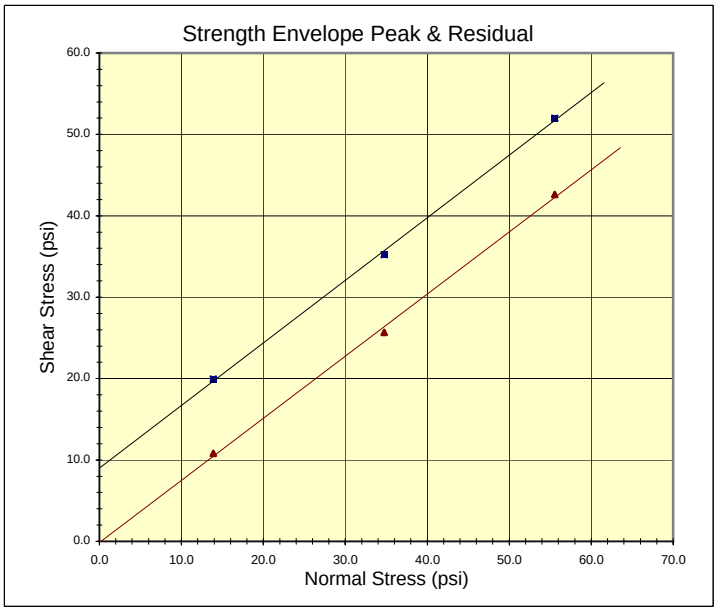
b Fine to coarse sand w/some large granules, inundated.

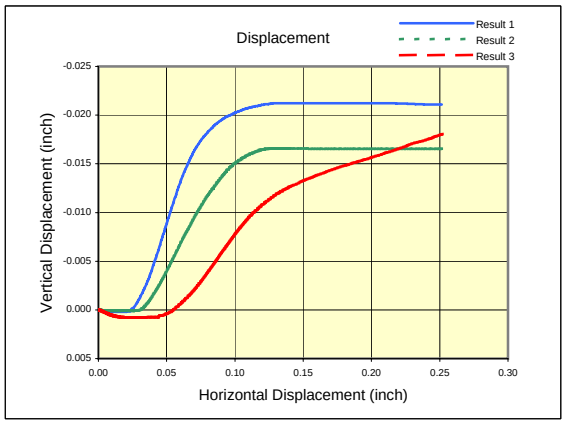
c Fine to coarse sand w/some large granules, inundated.

DigiShear __ KE2-G121

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	38	degrees	37
Cohesion =	9.00	psi	-0.13

Project: 72781 Boring: KE2 Sample: G2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/2/2002	10/2/2002	10/2/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	20.90	21.00	21.10
SHEAR			
Displacement Rate(in/min)	0.0040	0.0039	0.0040
Normal Stress (psi)	13.90	34.74	55.55
Peak Shear Stress(psi)	19.93	35.24	51.97
Residual Shear Stress(psi)	10.8	25.7	42.6
Residual Point Picked @(in)	0.156	0.205	0.252
Time @ Peak Failure (min)	12.5	14.5	22.7

Specimen Comments

a Fine to coarse sand w/some large granules, inundated.

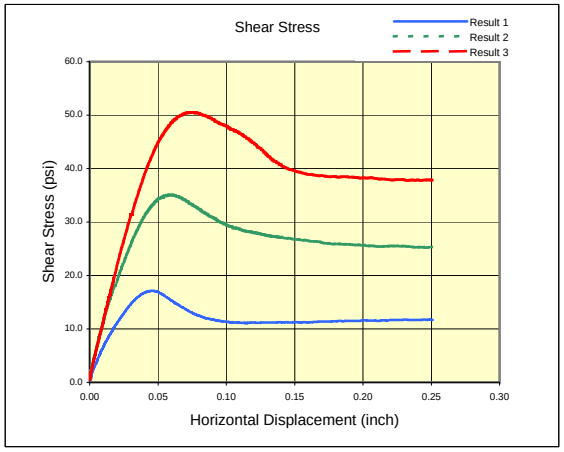
b Fine to coarse sand w/ some large granules, inundated.

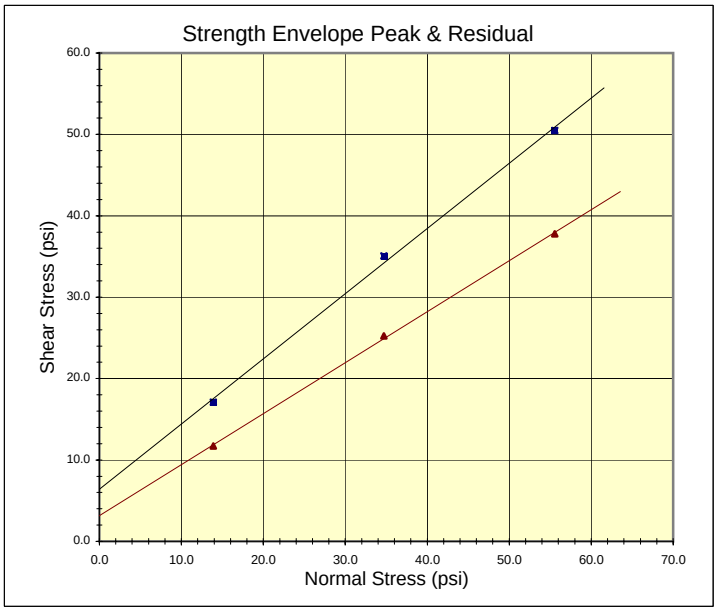
c Fine to coarse sand w/some large granules, inundated.

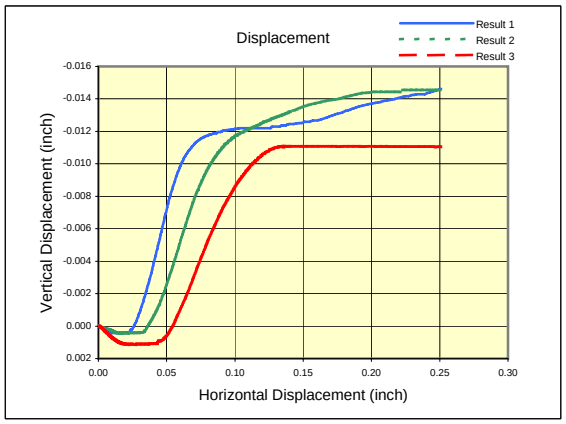
NEVADA DOT

DigiShear __ KE2-G222

DIRECT SHEAR TEST REPORT







Strength Parameters				
	Peak		Residual
Friction Angle =	39	degrees	32
Cohesion =	6.40	psi	3.17

Project: 72781 Boring: KE2 Sample: I1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/8/2002	10/8/2002	10/9/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	27.60	27.70	27.80
SHEAR			
Displacement Rate(in/min)	0.0040	0.0040	0.0040
Normal Stress (psi)	13.90	34.73	55.56
Peak Shear Stress(psi)	17.12	35.06	50.50
Residual Shear Stress(psi)	11.7	25.3	37.8
Residual Point Picked @(in)	0.251	0.251	0.251
Time @ Peak Failure (min)	11.4	15.1	18.5

Specimen Comments

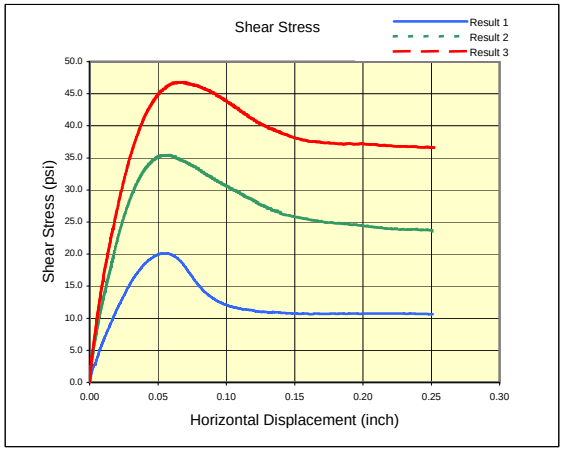
a Clayey sand w/some small gravel, inundated.

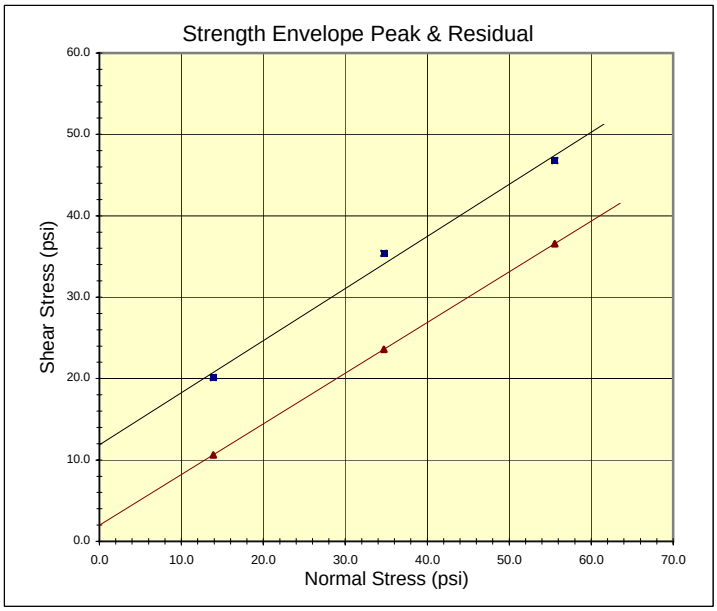
b Clayey sand w/some small gravel, inundated.

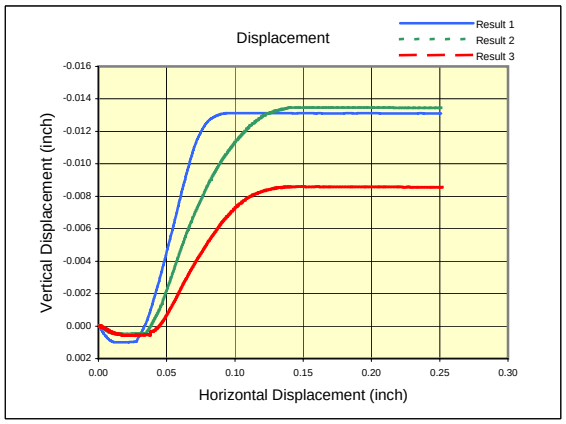
c Clayey sand w/some small gravel, inundated.

DigiShear __ KE2-I123

DIRECT SHEAR TEST REPORT







Strength Parameters	Peak		Residual
Friction Angle =	33	degrees	32
Cohesion =	11.87	psi	1.97

Project: 72781 Boring: KE2 Sample: I2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/9/2002	10/9/2002	10/10/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	28.00	28.10	28.20
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0039
Normal Stress (psi)	13.90	34.72	55.55
Peak Shear Stress(psi)	20.11	35.39	46.78
Residual Shear Stress(psi)	10.6	23.6	36.6
Residual Point Picked @(in)	0.251	0.251	0.252
Time @ Peak Failure (min)	13.7	14.2	16.6

Specimen Comments

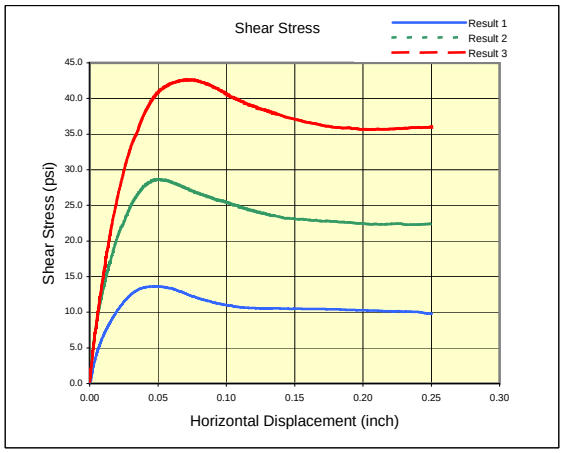
a Clayey sand w/some small gravel, inundated.

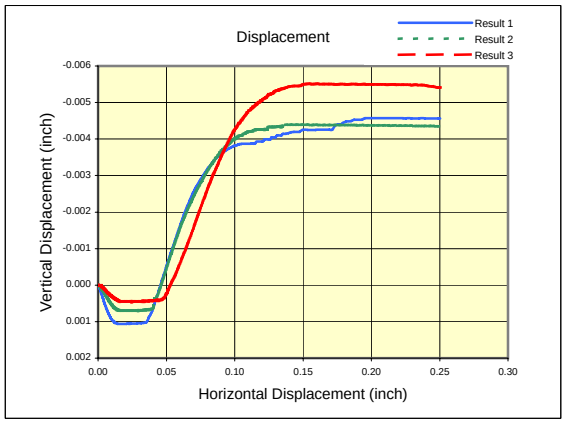
b Clayey sand w/some small gravel, inundated.

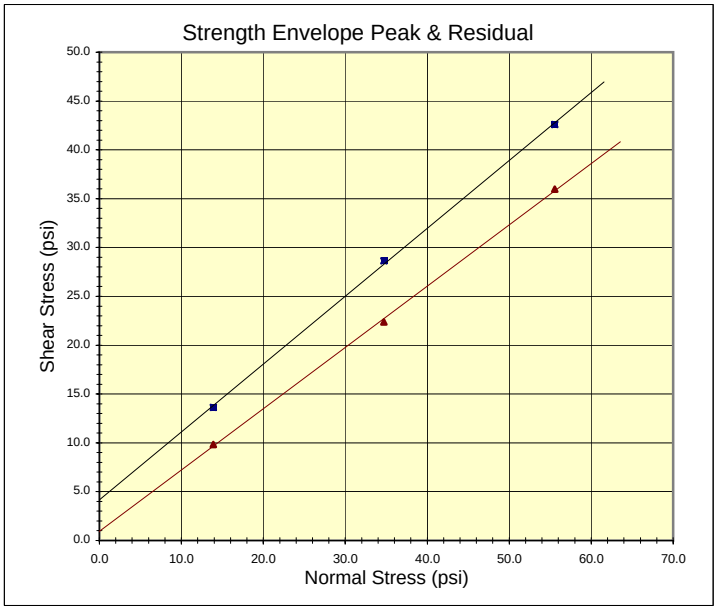
c Clayey sand w/some small gravel, inundated.

DigiShear __ KE2-I224

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	35	degrees	32
Cohesion =	4.15	psi	0.93

Project: 72781 Boring: KE2 Sample: J1

	Result 1	Result 2	Result 3
Specimen:	b	c	d
Date Tested	10/10/2002	10/10/2002	10/10/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	32.70	32.80	32.90
SHEAR			
Displacement Rate(in/min)	0.0035	0.0034	0.0034
Normal Stress (psi)	13.89	34.72	55.56
Peak Shear Stress(psi)	13.64	28.62	42.60
Residual Shear Stress(psi)	9.8	22.4	36.0
Residual Point Picked @(in)	0.249	0.249	0.251
Time @ Peak Failure (min)	14.0	14.2	20.2

Specimen Comments

b Fine sand/clay mix, inundated.

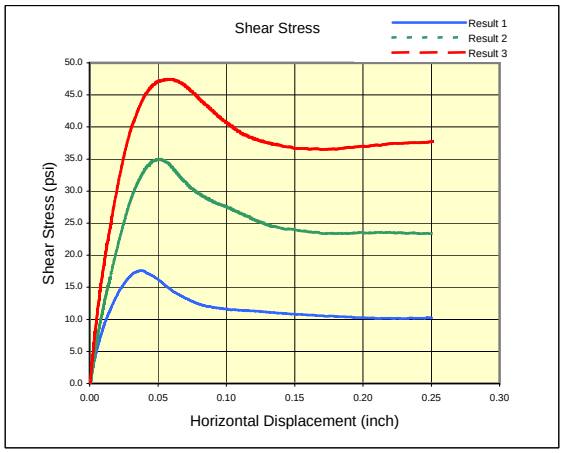
c Fine sand/clay mix, inundated.

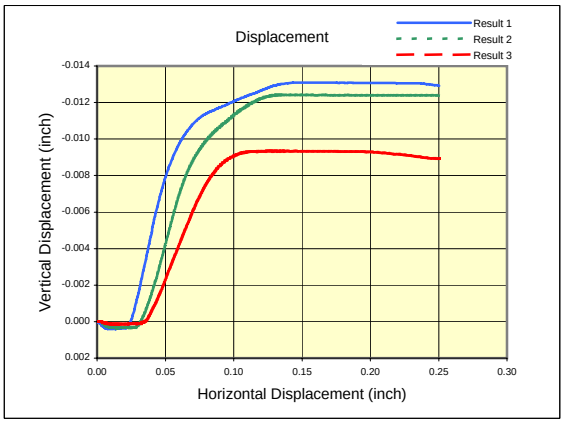
d Fine sand/clay mix, inundated.

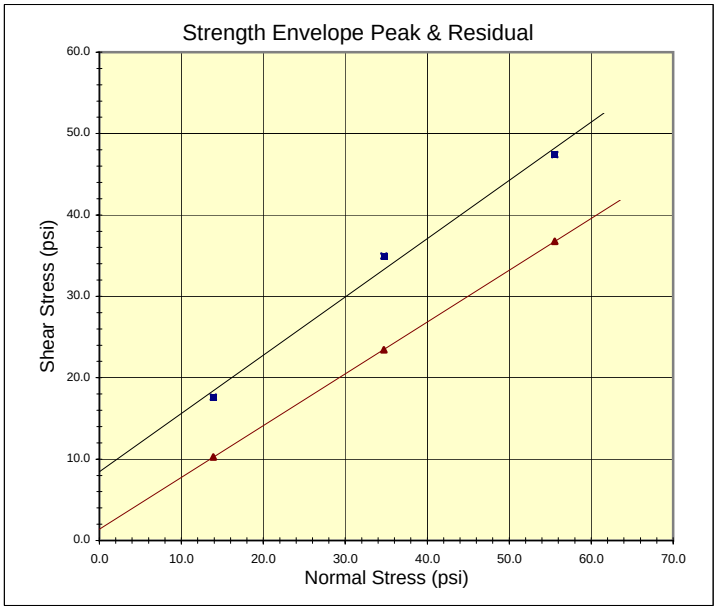
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	36	degrees	32
Cohesion =	8.46	psi	1.39

Project: 72781 Boring: KE2 Sample: J2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/11/2002	10/11/2002	10/11/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	33.00	33.10	33.20
SHEAR			
Displacement Rate(in/min)	0.0035	0.0035	0.0035
Normal Stress (psi)	13.90	34.72	55.56
Peak Shear Stress(psi)	17.60	34.95	47.42
Residual Shear Stress(psi)	10.3	23.5	36.8
Residual Point Picked @(in)	0.193	0.193	0.193
Time @ Peak Failure (min)	10.6	14.4	17.0

Specimen Comments

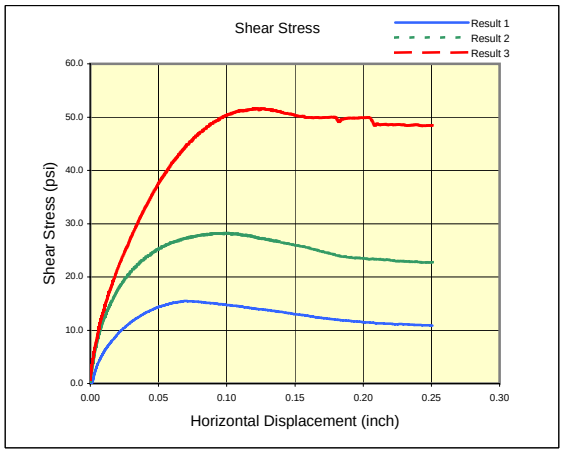
a Clayey sand, inundated.
b Clayey sand, inundated.
c Clayey sand, inundated.

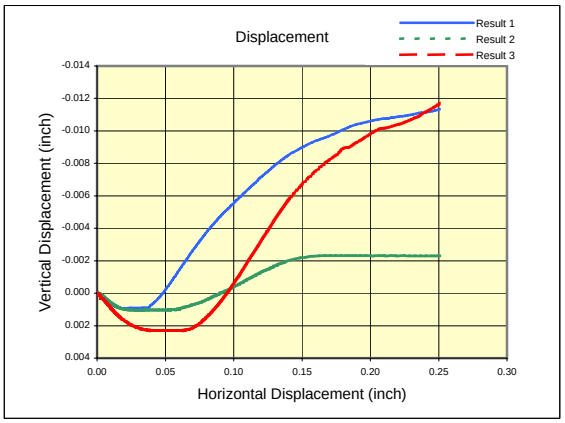
Geotechnical Section

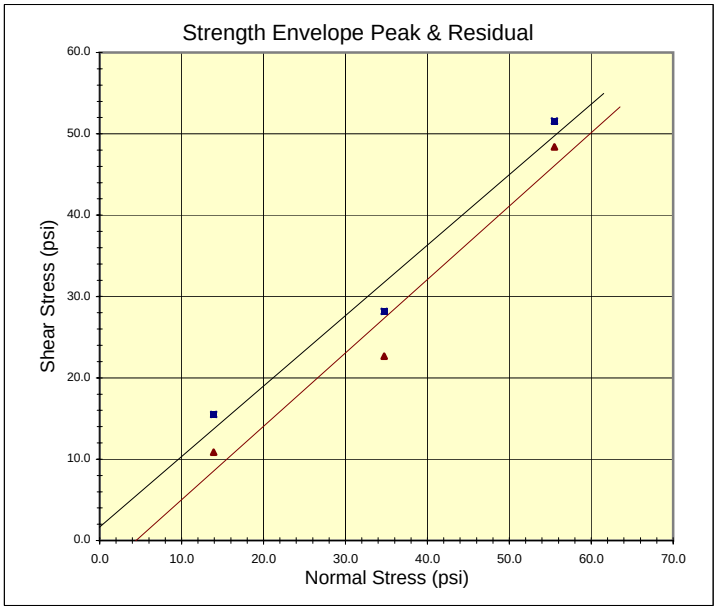
NEVADA DOT

DigiShear Report v4 __ KE2-J226

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	41	degrees	42
Cohesion =	1.66	psi	-4.01

Project: 72781 Boring: KE2 Sample: M1

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/14/2002	10/14/2002	10/14/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	47.60	47.70	47.80
SHEAR			
Displacement Rate(in/min)	0.0039	0.0039	0.0039
Normal Stress (psi)	13.89	34.71	55.52
Peak Shear Stress(psi)	15.49	28.17	51.57
Residual Shear Stress(psi)	10.8	22.7	48.4
Residual Point Picked @(in)	0.251	0.251	0.251
Time @ Peak Failure (min)	17.5	24.9	30.0

Specimen Comments

a Slightly clayey sand w/some small rock, inundated.

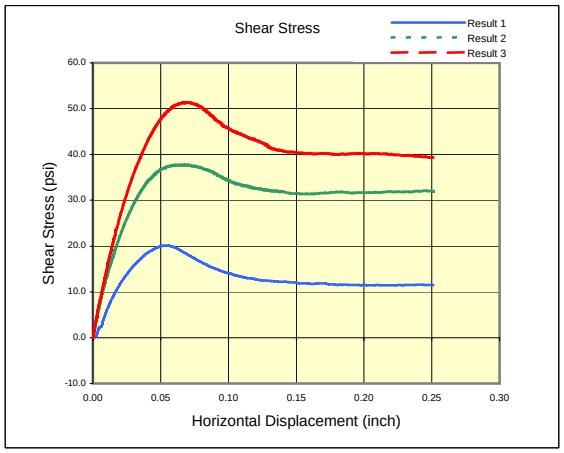
b Slightly clayey sand w/some small rock, inundated.

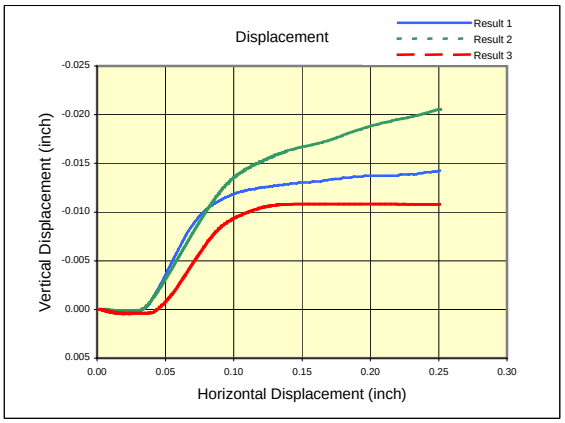
c Slightly clayey sand w/some small rock, inundated.

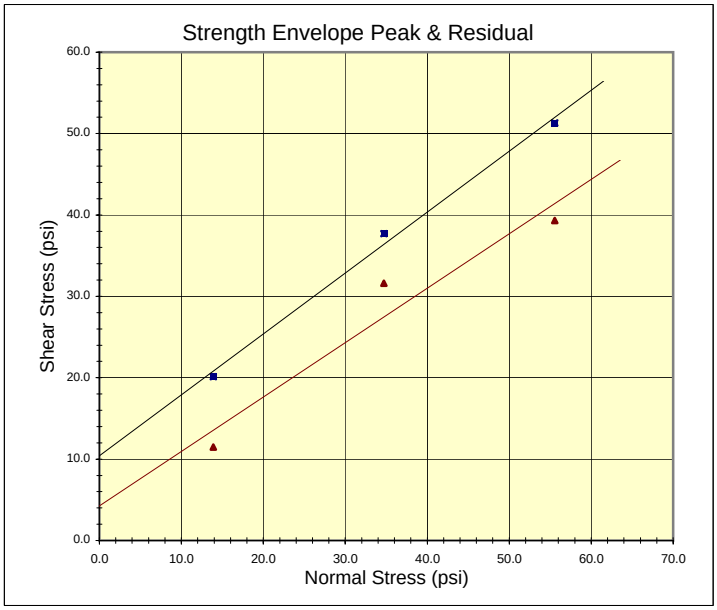
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	37	degrees	34
Cohesion =	10.39	psi	4.26

Project: 72781 Boring: KE2 Sample: M2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/15/2002	10/15/2002	10/15/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	48.00	48.10	48.20
SHEAR			
Displacement Rate(in/min)	0.0039	0.0039	0.0039
Normal Stress (psi)	13.89	34.72	55.54
Peak Shear Stress(psi)	20.14	37.69	51.33
Residual Shear Stress(psi)	11.5	31.6	39.3
Residual Point Picked @(in)	0.251	0.251	0.251
Time @ Peak Failure (min)	13.7	16.8	17.7

Specimen Comments

a Slightly calayey sand w/some small rock, inundated.

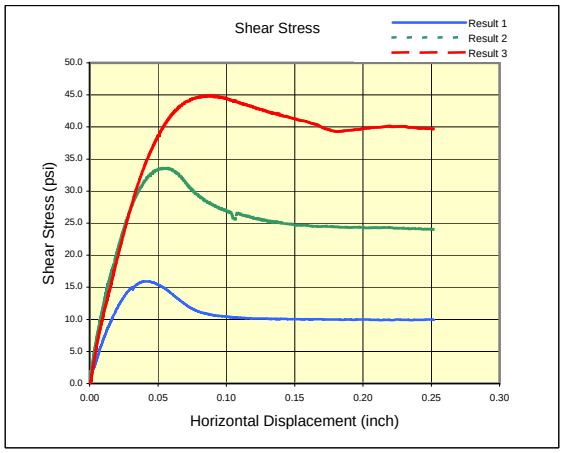
b Slightly clayey sand w/some small rock, inundated.

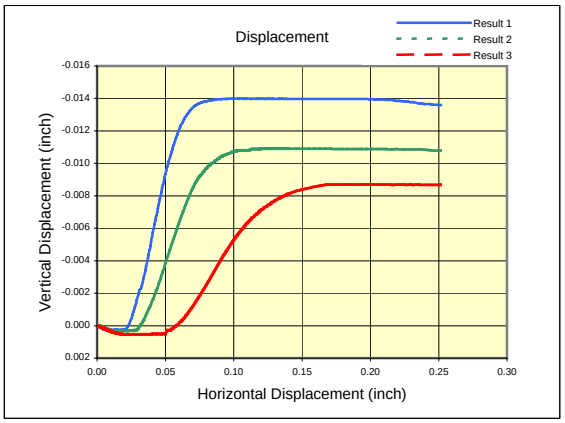
c Slightly clayey sand w/some small rock, inundated.

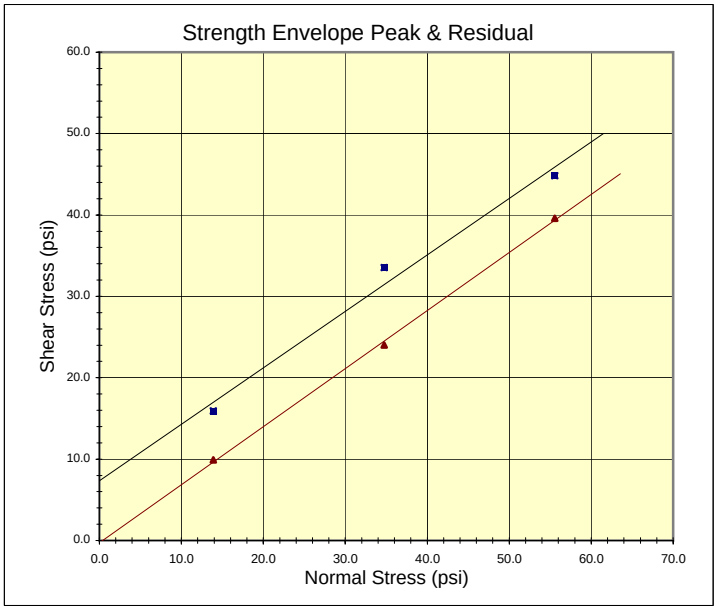
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	35	degrees	35
Cohesion =	7.35	psi	-0.26

Project: 72781 Boring: KE2 Sample: O2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/28/2002	10/28/2002	10/28/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	57.80	57.90	58.00
SHEAR			
Displacement Rate(in/min)	0.0039	0.0040	0.0040
Normal Stress (psi)	13.90	34.73	55.55
Peak Shear Stress(psi)	15.94	33.55	44.84
Residual Shear Stress(psi)	9.9	24.0	39.6
Residual Point Picked @(in)	0.251	0.251	0.251
Time @ Peak Failure (min)	10.2	13.9	22.2

Specimen Comments

a Silty sand w/some small rock, inundated.

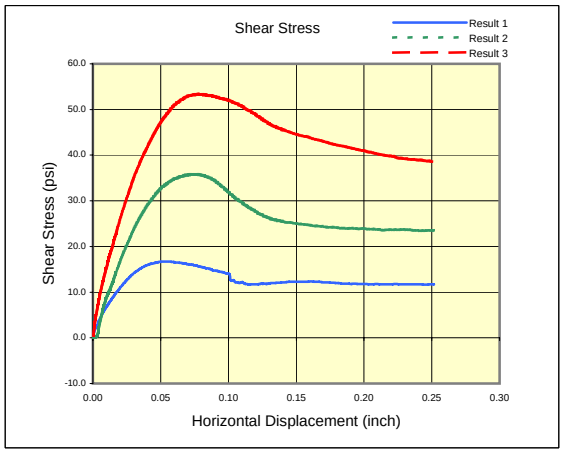
b Silty sand w/some small rock, inundated.

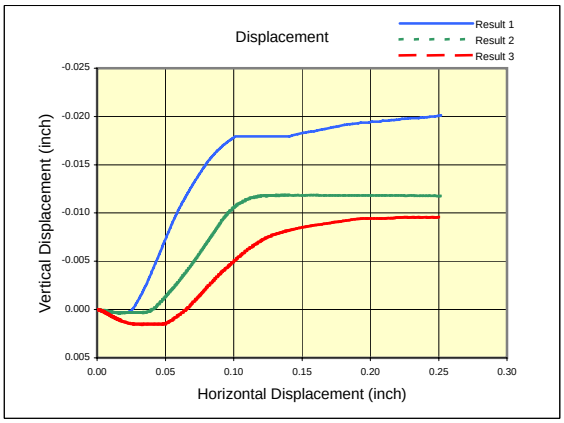
c Silty sand w/some small rock, inundated.

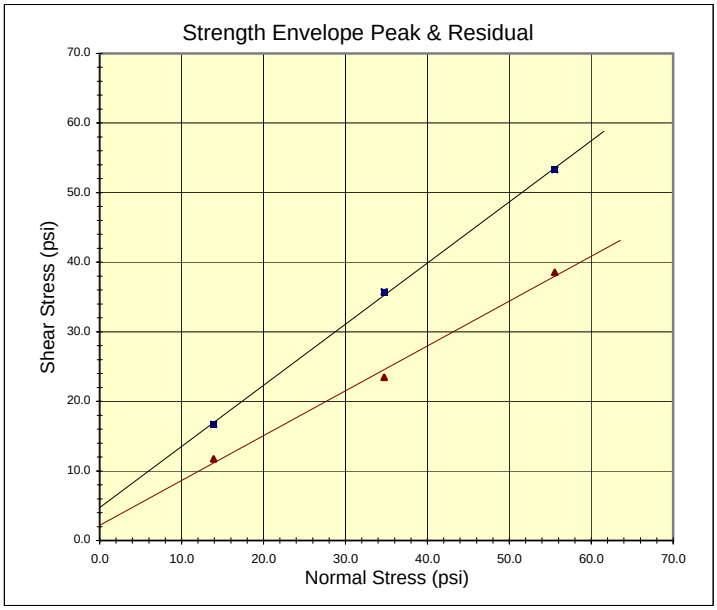
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	41	degrees	33
Cohesion =	4.74	psi	2.20

Project: 72781 Boring: KE2 Sample: Q2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	10/29/2002	10/29/2002	10/29/2002
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	67.50	67.60	67.70
SHEAR			
Displacement Rate(in/min)	0.0040	0.0039	0.0040
Normal Stress (psi)	13.90	34.72	55.55
Peak Shear Stress(psi)	16.72	35.75	53.32
Residual Shear Stress(psi)	11.7	23.4	38.6
Residual Point Picked @(in)	0.250	0.250	0.250
Time @ Peak Failure (min)	13.9	18.3	19.3

Specimen Comments

a	Silty to coarse sand w/gravel, inundated
b	Becoming more clayey, some gravel, inundated.
c	Clayey sand w/some gravel, inundated.

Geotechnical Section

NEVADA DOT

DigiShear Report v4 __ KE2-Q230

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL SECTION

CHEMICAL ANALYSIS

E.A. No. FL-12-02

PROJECT Carson City Freeway @ Koontz Ln.

BORING # KE3

Sample No.	Chlorides * ppm	Sulfates * ppm	Ph	Resistivity Ohm - cm	Conductivity
F			8.5	4,115	243
L			8.7	8,403	119

* Can be tested under special request.