ID: B-4534

**CONTENTS** 

DESCRIPTION

TITLE SHEET

CROSS SECTION(S)

SOIL TEST RESULTS

SITE PHOTOGRAPH

LEGEND

**PROFILE** 

SITE PLAN

BORE LOGS

SHEET

3

5-6

7-8

OJECT: 37698.1.1

### STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>37698.1.1(B-4534)</u> F.A. PROJ. <u>BRNHS-40-3(103)219</u>
COUNTY <u>GUILFORD</u>

PROJECT DESCRIPTION BRIDGE NO. 336 ON -L- (I-40 & US 220)

OVER I-85 BUS. SBL AT -L- STATION 31+81,71

INVENTORY

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, FLANNING, AND DESIGN, AND NOT'FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FELD BORING LOGS, ROCK CORES, AND SOLI LEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING LINIT AT 1919/250-408B. NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOLI TEST DATA ARE PART OF THE CONTRACT,

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABDRATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELEED ON ONLY TO THE DEGREE OF RELABBLITY INMERENT IN THE STANDARD TEST METHOD, THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS TO CLIMATIC CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. TO CLIMATIC CONDITIONS IN VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FORTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR DRINKON OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HURSLEF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS TO BE ENCOUNTERED AT THE SITE DIFFERING FROM THOSE MODICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

J.I. MILKOVITS, JR.

H.R. CONLEY

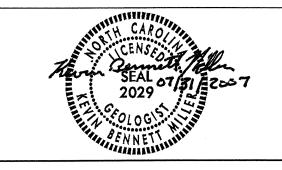
D.W. DIXON

INVESTIGATED BY K.B. MILLER

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE **JULY 2007** 



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS
FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO. 37698.I.I(B-4534)

SHEET NO.

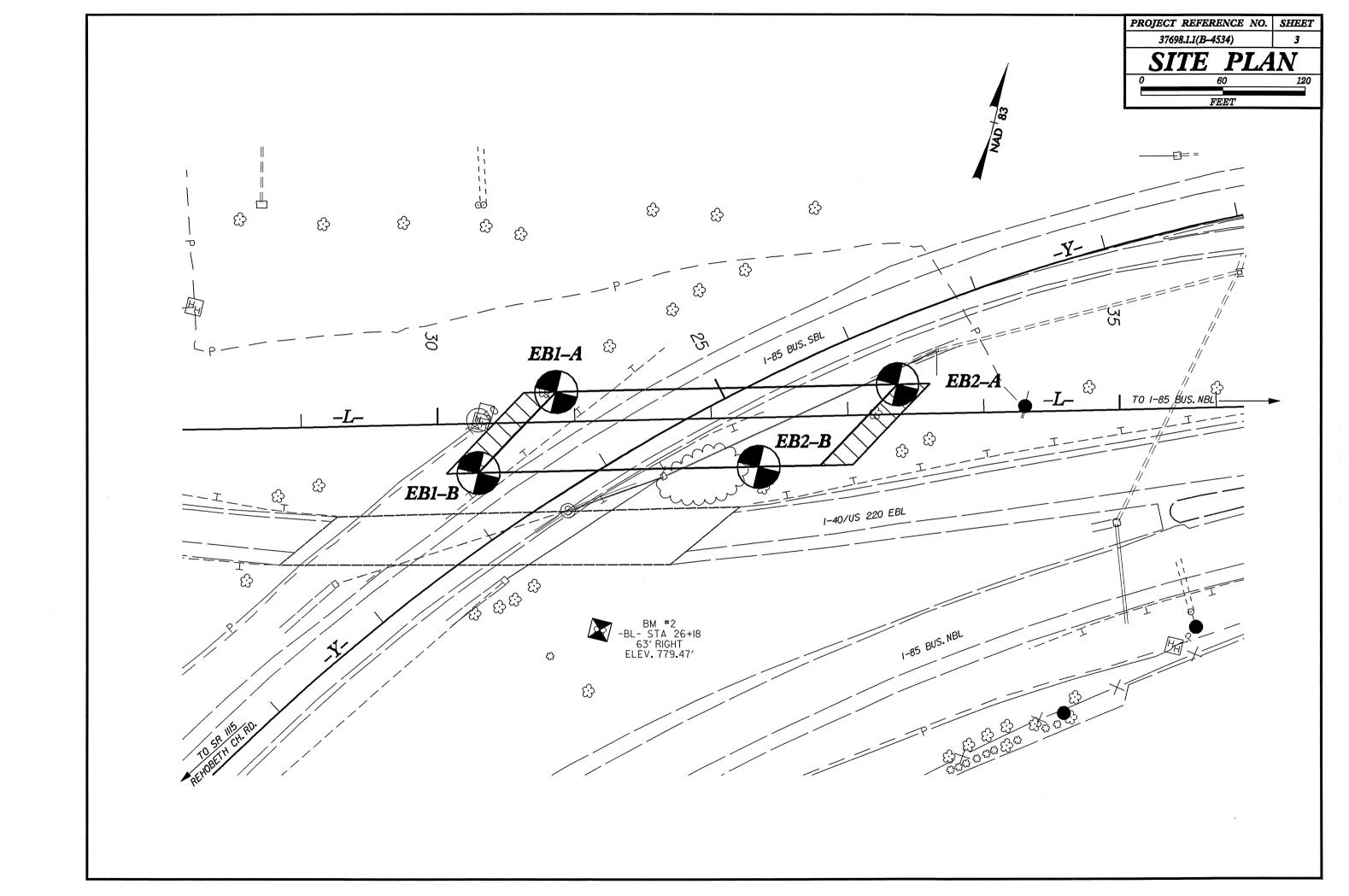
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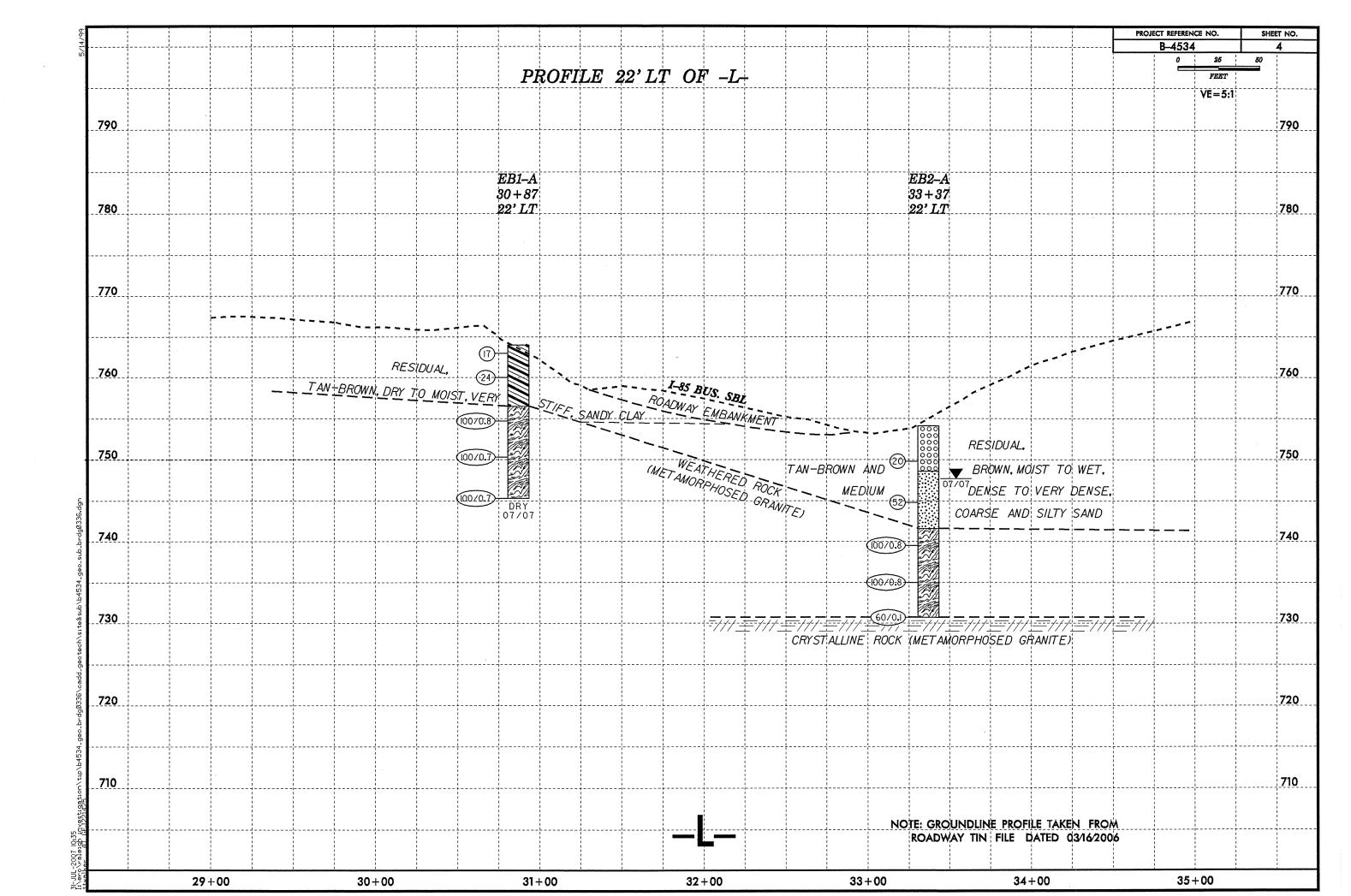
#### DIVISION OF HIGHWAYS

### GEOTECHNICAL ENGINEERING UNIT

## SUBSURFACE INVESTIGATION

	SOIL AND ROCK LI	EGEND, TERMS,	S, SYMBOLS, AND ABBREVIA	ATIONS	
SOIL DESCRIPTION	GRADATION			DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE 1 UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE		ROCK LINE INDICATES THE LEVEL AT WHICH NON-CO	IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED DASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL	POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	s.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON S IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION	SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. N BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ADUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS		OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLO		ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF BOIL GRAINS IS DESIGNATED BY THE TERMS: ANG SUBANGULAR, SUBROUNDED, OR ROUNDED.		WEATHERED WILLIAM NON-COASTAL PLA	AIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STUFF, GRAN, SETY CLAN, MOST WITH MITERBEDDED FINE SAND LAVERS, HIGHLY PLASTIC, 1-7-6	MINERALOGICAL COMPOSITION		ROCK (WR) BLOWS PER FOOT	IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS OPERANCE MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DES	ESCRIPTIONS S	CRYSTALLINE ROCK (CR) FINE TO COARSE WOULD YIELD SPT	GRAIN IGNEOUS AND METAMORPHIC ROCK THAT T REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE.	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		GNEISS, GABBRO, S		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS, A-1-a-1-b-1 A-2-a-1-a-2-5-a-2-5-a-2-7 A-3 A-6, A-7	COMPRESSIBILITY	F	POCK (NCD) SEDIMENTARY ROC	CK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLASS. A-1-b A-2-b A-2-5 A-2-5 A-2-7 A-3 A-6, A-7 SYMBOL SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO:	D 31-50 C	COASTAL PLAIN COASTAL PLAIN SE	TE, SLATE, SANDSTONE, ETC. SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
666666666	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THE PERCENTAGE OF MATERIAL		SEDIMENTARY ROCK SPT REFUSAL. ROC (CP) SHELL BEDS, ETC.	ICK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
X PASSING SILT- GRANULAR SILT- CLAY MUCK, CL	ODCANIC MATERIAL GRANULAR SILT - CLAY		WEA'	THERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
# 40 38 MX 56 MX 51 MN	SULS SULS	1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOI HAMMER IF CRYSTALLINE.	INTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LINION LINION	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 16	10 - 20%		D, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	HORIZONTAL.
PLASTIC INDEX 6 MX NP 18 HX 13 HN 10 HX 11 HN 12 HX 13 HN 14 HX 11 HN 50ILS WITH  PLASTIC INDEX 6 MX NP 18 HX 12 HX 11 HN 11 HN 12 HX 16 HX 11 HN 11 HN LITTLE OR HIGHLY	Cont.		(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE	E SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION OIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 6 6 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC	GROUND WATER		OF A CRYSTALLINE NATURE.  SLIGHT ROCK GENERALLY FRESH, JOINTS STAINE	ED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRACS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	₩ATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY	Y. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND SAND SAND SAND SOLES SOLES	STATIC WATER LEVEL AFTER 24 HOURS	1,		CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE	$ abla_{ extstyle{PW}} $ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	1 1.	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE	DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SUBGRADE	SPRING OR SEEP		WITH FRESH ROCK.	S STORY STORY LOSS OF STRENGTH HS COMPRHED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30  CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS			OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL V KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
RANGE OF STANDARD RANGE OF UNCONFINED			(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOG	SIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR COM	WITH SOIL DESCRIPTION VST PHT	DESIGNATIONS	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED	OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE <4	1 — SOIL SYMBOL — AUGER BORING	COLK OFFICE	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRAN	VITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER A	- 9PLIT SPOON  6AMPLE	EXTENT. SOME FRAGMENTS OF STRONG R IF TESTED, YIELDS SPT N VALUES > 100		LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE)  DENSE 30 TO 50  VERY DENSE >50	M   THAN PRADUAY EMPANYMENT - CORE BORING			OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AFRATION AND LACK OF GOOD DRAINAGE.
VERY SOFT <2 <0.25	INFERRED SOIL BOUNDARY MONITORING WELL	PALLE	REMAINING. SAPROLITE IS AN EXAMPLE (	D SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	INFERRED ROCK LINE PIEZOMETER	- ROCK SAMPLE		IC REMAIN. IF TESTED. YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
MATERIAL STIFF 8 TO 15 1 TO 2	ALLUVIAL SOIL BOUNDARY INSTALLATION RT -	- RECOMPACTED TRIAXIAL C SAMPLE		NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND AY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	25/825 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION CBR	R - CALIFORNIA BEARING	ALSO AN EXAMPLE.		ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AN
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES  — SPT N-VALUE	RATIO SAMPLE		HARDNESS	EXPRESSED AS A PERCENTAGE.  SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD     REF     SPT REFUSAL		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SI SEVERAL HARD BLOWS OF THE GEOLOGI	SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES IST'S PICK.	PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS			ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL HI HIGHLY # -	- MOISTURE CONTENT	TO DETACH HAND SPECIMEN.		TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)				GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE OGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA.	A WEATHERED	BY MODERATE BLOWS.	HES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS			HARD CAN BE EXCAVATED IN SMALL CHIPS TO	O PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE CHIEF FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST  • - VOID RATIO SAP SAPROLITIC		POINT OF A GEOLOGIST'S PICK,	BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTORE DESCRIPTION	F - FINE SD SAND, SANDY		FROM CHIPS TO SEVERAL INCHES IN SI	IZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIDUID; VERY WET, USUALLY  (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY		PIECES CAN BE BROKEN BY FINGER PRE VERY CAN BE CARVED WITH KNIFE. CAN BE E	RESSURE. EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	STRATA ROCK DUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL LIQUID LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL		SOFT OR MORE IN THICKNESS CAN BE BROKEN	N BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TH
PLASTIC   SEMISOLID; REQUIRES DRYING TO	EQUIPMENT USED ON SUBJECT PROJECT	·T	FINGERNAIL.	BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMITATTAIN OPTIMUM MOISTURE			FRACTURE SPACING  IERM SPACING	TERM THICKNESS	BENCH MARK: BM #2 -BL- STATION 26+I8 63'RT
OPTIMUM MOISTURE - MOIST - (M) SOLIDIAT OR NEAR OPTIMUM MOISTURE	DRILL DATISE HOWHIGHO TOOLSE	R TYPE: UTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET	VERY THICKLY BEDDED > 4 FEET	BENCH MARK: DM "Z -DL- STATION ZOTIO 65 KT
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE  SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	DIGITALIC LI PIANORE	WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET	THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: 779.47 FT.
REQUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER CORE SI	SIZE:	CLOSE 0.16 TO 1 FEET	VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 S* HOLLOW AUGERSB_		VERY CLOSE LESS THAN 0.16 FEET	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	CME-45C HARD FACED FINGER BITS	<u> </u>		JRATION	
PLASTICITY INDEX (PI) DRY STRENGTH	TUNGCARBIDE INSERTS	Įr'		NG OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC         0-5         VERY LOW           LOW PLASTICITY         6-15         SLIGHT	CME-550 CASING W/ ADVANCER HAND TO	1		WITH FINGER FREES NUMEROUS GRAINS; BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH		POST HOLE DIGGER		AN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	TOTODAY TOTODAY	HAND AUGER	BREAKS EA	ASILY WHEN HIT WITH HAMMER.	
		SOUNDING ROD		RE DIFFICULT TO SEPARATE WITH STEEL PROBE; T TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		VANE SHEAR TEST		AMMER BLOWS REQUIRED TO BREAK SAMPLE;	
				BREAKS ACROSS GRAINS.	·





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					37698.1.1(B-4534) 5
				FEET VE = 1;1	CROSS SECTION THROUGH END BENT 1
790					790
	EB1–A 30 + 87 22' LT			$EB1-B \ 30+29 \ 36'RT$	
	22' LT	E		36' RT	
/80					78
				<u>h</u>	
770					77(
	7				
760	(24)	RESIDUAL;			76
		, VERY STIFF, SANDY CLAY	RESIDUAL, GRAY-BLA	ACK, DRY, STIFF, SANDY	SIIT
	100/0,8	WEATHERED ROCK (METAMOR		(100/0.8)	<u> </u>
750	(100/0,7)				75
				10070.4	
	(100/0.7) DRY			(100/0.7)	
740	07/07			07/07	7.4
740					740
730					73
720					720
<b>7</b> 10					71

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				; ; ; ;		-		 	1	1	3 5 1 1	
780								1				78
	EB2-A 33+37 22' LT							EI 32 36	32–B + 34 '' RT			
770			<u>G</u>									7
									1 1 1 1 1 1 1 1			
760				 			·	 	          -			76
	<u> </u>											
750	(20)-					RESID	DUAL, TAN-E	BROWN, (16)	MOIST T	0		75
	000	TAN-RACWALAND		RESIDUAL,				RY STIFF,	SANDY 5	SILT		
740	(10070.8)	TAN-BROWN AND BE	ROWN, MOIST TO WET	MEDIUM DEN	SE TO VERY D	ENSE, COARSE AN	ID SILTY S	AND (70)				74
	100/0.8		WEATHERED ROCK	METAMORPHO	SED GRANITE)			100/0.8		- ‡		
730	77 = 60/0.D = 7/7/==	///=///=///	= 77					(100/0,9)				73
	CRYSTALLINE F (METAMORPHOSED (	OCK PRANITE)						100/0.3				
720												72
710												7.
710												7'
700											 	70
				1 1 1 1 1 1 1 1								
				: : : : :				; ; ; ; ; ;	† 4 1 1			

GROUND WTR (ft) 0 HR. 24 HR. Automatic

	ECT NO.				. B-4534	10 000; 0;	COUNTY				GEOLOGIST Milk	Ţ	l ———	ECT NO.				D. B-4534	0.110.55	COUNTY			)		GEOLOGIST Milk	·
					336 ON -L- (I-40 & U	JS 220) OV				T		GROUND WTR (ft)	<u> </u>					336 ON -L- (I-40						<u> </u>		GROUND WI
	IG NO.				STATION 30+87	7.0	OFFSET				ALIGNMENT -L-	0 HR. Dry	l	IG NO.				STATION 30+2		OFFSET				ALIGNMEN		0 HR.
<u></u>	AR ELEV				TOTAL DEPTH 18.		NORTHI	NG 831	,497		EASTING 1,761,501	24 HR. Dry	l	AR ELE\				TOTAL DEPTH		NORTHI	NG 831	1,426		EASTING	<del></del>	24 HR.
			1E-550X		DRILL METHOD H		<del></del>				HAMMER TYPE		l	MACHII				DRILL METHOD					****		HAMMER TYPE	
	TDATE	T			COMP. DATE 07/1		SURFAC			H N/A	DEPTH TO ROC	K N/A	l	TDATE	T			COMP. DATE 0		SURFAC		· · · · · · · · · · · · · · · · · · ·	PTH I	V/A	DEPTH TO ROCI	K N/A
ELEV (ft)	DEPTH (ft)	<b></b>	0.5ft		0 25	50	75 100	11	MOI	G ELE	SOIL AND ROCK DESCH	RIPTION DEPTH (ft)	(ff)	DEPTH (ft)		OW COL		<b>   </b>	50 50	75 100	SAMP.	1/	0 1 G	SC	OIL AND ROCK DESCR	RIPTION
765	0.0									- <sub>764.</sub>	.0 GROUND SURFA	CE 0.0	760 759 2	0.0										759.2	GROUND SURFA	ne ne
764.0	+ 0.0	5	8	9	•17	.	T		D	704.	RESIDUAL		755.2	‡	1	4	6	. •10		::::	SS-2	D			RESIDUAL GRAY-BLACK, SAND	
761.0	3.0	7	11	13							TAN-BROWN, SAND	CLAY	755.8	3.4	<u> </u>	1			· · · · · · · · · · · · · · · · · · ·	<b>┤</b> ÷÷∴.						
-	‡	'	''	13	24		<b> </b>	SS-1	M					‡	46	54/0.3				100/0.8				(1)	WEATHERED ROMETAMORPHOSED GI	CK RANITE)
756.0	† 8.0					_ — — — .				- 756.	.5	7.5	750.8	† 1 8.4												
- 100.0	+ "-	30	41 5	59/0.3	1		100/0.8				WEATHERED RO (METAMORPHOSED G	CK RANITE)	750.6	<del>† °.4</del>	100/0.4	4				100/0.4						
	‡					.					·	·		‡						3 1						
751.0	13.0	46	54/0.2										745.8	13.4	<u> </u>	150/00	1							745.0		
-	‡	1	34/0.2			1	100/0.7			756.				‡	4/	53/0.3	1			100/0.8	•		<del> </del>	Boring	Terminated at Elevati HERED ROCK (METAN GRANITE)	on 745.0 ft in
746.0	18.0					.								‡									F	VVEAT	GRANITE)	MONFHOSED
	+	40	60/0.2		1	.	100/0.7	<b>-</b>	<del>                                     </del>	745.	.3  Boring Terminated at Elevati	18.7 on 745.3 ft in	.	‡									ľF			
	‡									F	Boring Terminated at Elevati WEATHERED ROCK (META GRANITE)	MORPHOSED		‡									F			
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PROJECT NO.						3-4534								GUI		RD					GEOL	OGIST	Mill					PROJ							B-453							GUI		RD				GEO	LOGIS	T Mil	kovits,	J. I.	
SITE DESCRIP			RIDG	E NO					US 2	220) (								<del></del>						-		WTR		SITE				RIDG	E NO		*			JS 220	0) OV												GRO	DUND	WT
BORING NO.						ATION								22ft					LIGN					4	HR.	[	1	BORI						+	ATION							36ft I						NT -L			0	HR.	
COLLAR ELEV					<del> </del>	TAL DE						NOR'	THIN	<b>G</b> 83	31,56	52 		E	ASTIN	NG 1	·				HR.			COLL							TAL D						RTHIN	IG 83	1,479	9		EAS	TING	1,761	,658		24	HR.	
DRILL MACHIN	NE (	CME	-550X		DR	LL ME	THO	D H	1.S. /	Auge	rs										<del> </del> -	MER .				;		DRILL	MAC	HINE	CME	E-550>	<b>&lt;</b>	DR	RILL M	ETHO	D H.	.S. Au	ugers	<b>-</b>								НА	MMER	TYPE	Auto	matic	,
START DATE	07/	12/07	<b>'</b>		co	MP. DA	TE	07/1	2/07	, 		SURI		WA.			TH	N/A			DEP	тн то	ROC	K 23	3.3 ft			STAR	T DAT	E 07	7/12/0	7		co	MP. D	ATE	07/12	2/07		su	RFAC	E WAT	ER D	EPT	TH N	I/A		DE	PTH T	O ROC	K N/	Α	
ELEV DEPTH (ft)			0.5ft		- 0		Bl 25	LOWS	50	R FOC	75		100	SAMI NO.		/	L O G	ELEV	. (ft)	SOI	L AND	ROCK	DESC	RIPTIO	N	DEPT	H (ft)	ELEV (ft)	DEP (ft)			W COU	O.5ft	. 0	)	25 -	LOWS	PER F		75 i	100	SAMF NO.	1/	101 0	L O G			SOIL AN	D ROCK	< DESC	RIPTIO	N	
755							Т-		-	· · · · · · · · · · · · · · · · · · ·	-1					C	-	754.1				OUND S	UAL		······································		0.0	755	<u> </u> <del> </del>						• • • •	<del>-   -</del>	······································	Т.		<del>1 · ·</del>					<u></u>	'54.2		GI	ROUND RESI	SURFA	.CE		
750.8 3.3	8	-	8	12	-		20-			· · · · · ·		· · ·		SS-3	-	Ę	000-	-		TA	AN-BR	OWN, C	OARS	E SAN	D			751.3	2.9		6	8	8			.   .	: : :					SS-5	] M	1	E			TAN-I	BROWN	I, SAND	Y SILT		
745.8 8.3				A4-A-P-10-1-0-1-0-1-0-1-0-1-0-1-0-1-0-1-0-1-		· · · ·	;			· · · · · · · · ·			- 1			<b>V</b>	-	748.6			BRC	WN, SI	LTY SA	AND			5.5	746.3	† + 7.9		13	13	11			`\ `\ !			· · · · · · · · · · · · · · · · · · ·	::			J	7	ŧ								
† †	7		16	36			:		. 1	52	- 1		1	SS-4		М	#	741.6									12.5	744.2	† ! !			13				·   ·	```	· [ · ·	  							42.7		т	AN, SIL	TV SAT	ID.		
740.8 13.3	39	+	53	47/0.	╢		·		-   '		$\exists$	. 100	/0.8			47. SAII & ST		-		(M		ATHER! ORPHO			E)			141.3	† 12.9 † †		28	35	35	$\ \cdot\ $		·   · ·   ·			· · · · · · · · · · · · · · · · · · ·	70 <u> </u>		SS-6	М		-			'	, OIL	., , OAI			
735.8 18.3	35	5 6	5/0.3				<u> </u> :		.   .	· · ·	.		.			दखारद द्या												736.3	17.9		59	41/0.3				: :			- : :\	<u>                                     </u>	00/0.8				7	37.2		W (METAN	EATHEI IORPH			E)	
730,8 23,3						· · · ·	:		•   •	· · · · · · · · ·	-					اعطالاحظالة		730.8						W			23.3	731.3	22.9		40	60/0.4				: :			· · · · · · · · · · · · · · · · · · ·	: :													
‡	(60/0	2.1/										60	v0.1				-	730.7	~\_	oring Te	ETAM( ermina	STALLI ORPHO ted with al at Ele	SED G Standa	RANIT ard Per	etratio	╝	23 4	726.3	+ + 27.9			5676.4		Ш		.   .			  	: :	00/0.9												
<del>╸</del> ╏╸╸╸╸╸╸╸																			CI			ROCK GRAN	(META					120.0			0/0.3									1	00/0.3					26.0	Bori WEA	ng Term	ROCK	tt Elevat (META NITE)	ion 726.	0 ft in 10SED	

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SHEET 9

			S	OIL I	ΓΕ	ST	RE	SUI	LTS	,					
SAMPLE			DEPTH	AASHTO				% BY V	/EIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-1	22' LT	30+87	3.0'-4.5'	A-6(1)	30	11	38.9	24.3	18.5	18.3	100	75	42	-	-

			S	OIL I	TE.	$\overline{ST}$	RE	SUI	LTS	,					
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-2	36' RT	30+29	0.0'-1.5'	A-4(0)	22	NP	16.0	56.8	21.1	6.1	100	94	37	•	•

			S	OIL 7	TE.	ST	RE	SUI	LTS						
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-3	22' LT	33+37	3.3'-4.8'	A-1-b(0)	26	4	43.2	30.6	20.1	6.1	68	49	22	-	•
SS-4	22' LT	33+37	8.3'-9.8'	A-2-4(0)	21	NP	29.6	45.4	20.9	4.1	100	89	32	-	-

			S	OIL T	TE.	ST	RE	SUI	LTS	,					
SAMPLE			DEPTH	AASHTO			,	% BY W	VEIGHT		% PAS	SING (S	IEVES)	%	%
NO.			INTERVAL	CLASS.			C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-5	36' RT	32+34	2.9'-4.4'	A-4(0)	23	1	30.2	33.1	24.5	12.2	97	81	42	•	-
SS-6	36' RT	32+34	12.9'-14.4'	A-2-4(0)	22	NP	50.3	35.5	10.1	4.1	99	70	19	-	

# SITE PHOTOGRAPH

Bridge No. 336 on -L- (I-40 & US 220) over I-85 Bus. SBL Proposed EB1 Proposed EB2