CON	TEN'	TS

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SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
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10	SCOUR REPORT

SITE PHOTOGRAPH

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33638.1.1 (B-4301) F.A. PROJ. BRSTP-1007(9)
COUNTY WAKE

PROJECT DESCRIPTION BRIDGE NO. 229 ON -L- (SR 1007) OVER
POPLAR CREEK AT STA. 21+68.5

 STATE
 STATE PROJECT REFERENCE NO.
 SHEET SHEETS
 TOTAL SHEETS

 N.C.
 33638.1.1 (B-4301)
 1
 11

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919/250-4088, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A COTTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNISS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE GERGEE OF RELIBBLITY INNERTENT 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 OF CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE FRELMMARY 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 GLARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF 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 ENCOUNTEED AT THE SITE DIFFERING FROM THOSE MOICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

__J. L. PEDRO

J. I. MILKOVITS

H. R. CONLEY

D. W. DIXON

M. L. REEDER

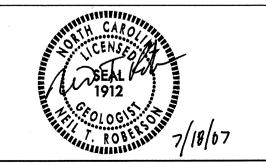
INVESTIGATED BY J. L. PEDRO

ANESTIGATED DI DI TOTAL

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.

3638.1.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

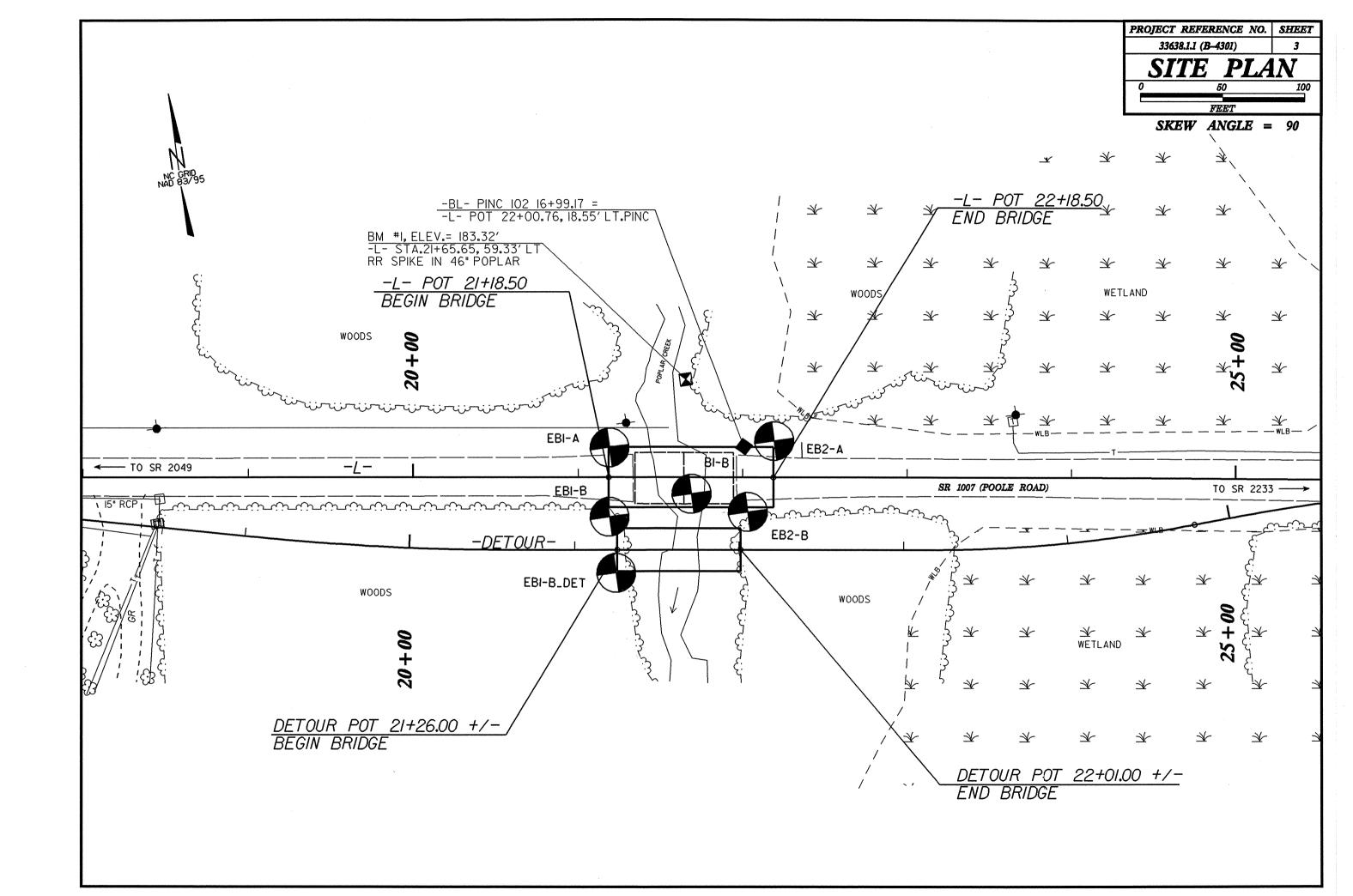
SUBSURFACE INVESTIGATION

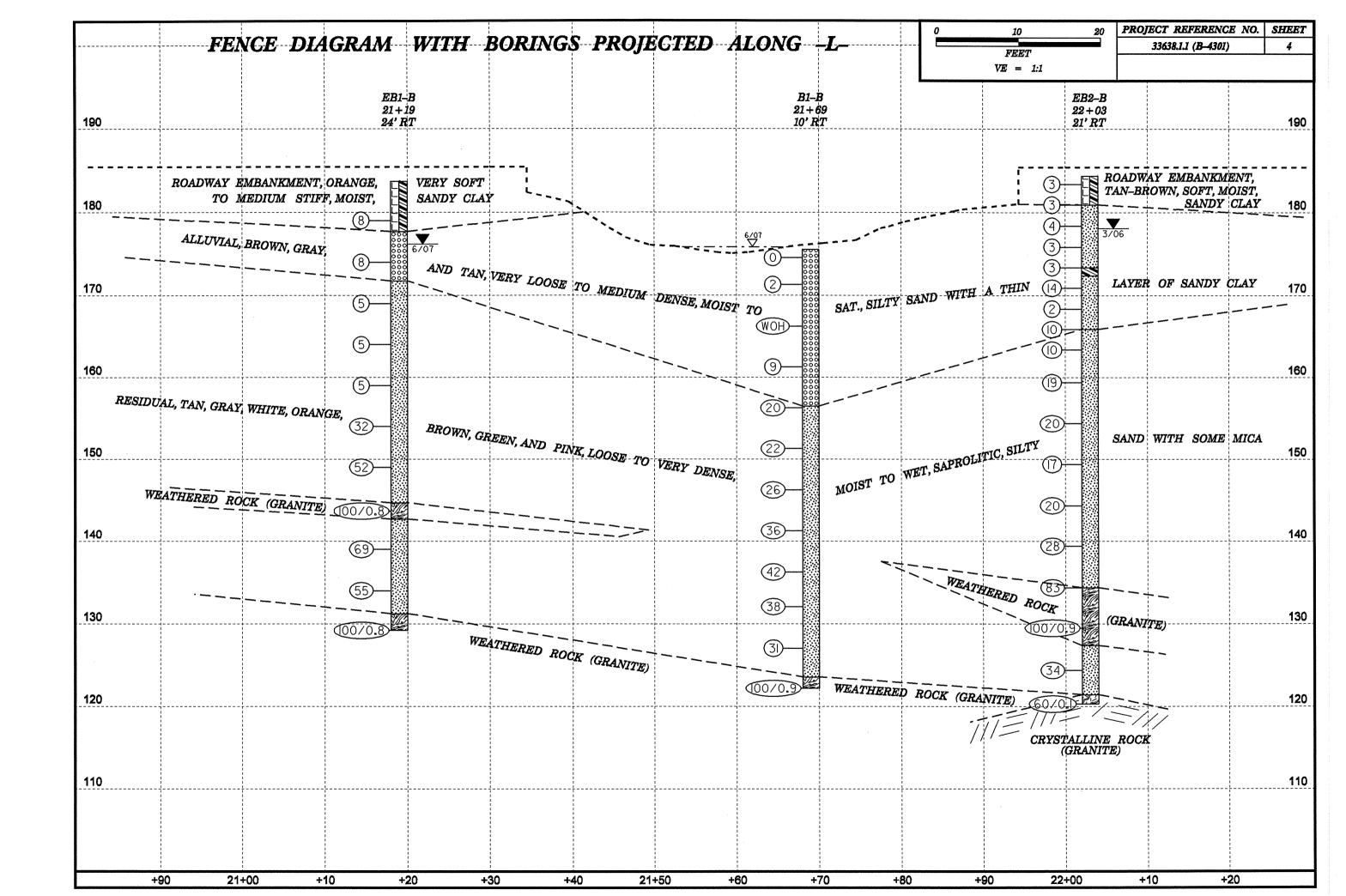
	SOIL AND ROC	A LEGEND, TERMS	S, SYMBOLS, AND ABBR	EVIATIONS	
SOIL DESCRIPTION	GRADATION			OCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FF UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE	RUM FINE TO COARSE. SAME SIZE. (ALSO	ROCK LINE INDICATES THE LEVEL AT WHICH	IAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED H NON-COASTAL 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 180 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL	POORLY GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MI			T SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. RANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZON	ADVISER - 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		ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE T	TERMS: ANGULAR.	5///8////8	ASTAL PLAIN MATERIAL THAT WOULD VIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
YERY STIFF, GRAY, SULTY CLAY, MOST WITH INTERBEDOED FINE SAMO LINERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED, MINISPAL OCICAL COMPOSITIO	N	ROCK (WR) BLOWS (PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERAL DGICAL COMPOSITIO MINERAL NAMES SUCH AS DUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE U		COVETALLINE MILE TO	COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤35% PASSING *200) (>35% PASSING *200) ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		J. J. GNEISS.	GABBRO, SCHIST, ETC.	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	COMPRESSIBILITY		NUN-LKTSTALLINE SEDIMEN	COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN ITARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7		LESS THAN 31 EQUAL TO 31-50	INCLUDE	S PHYLLITE, SLATE, SANDSTONE, ETC PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	HIGHLY COMPRESSIBLE LIQUID LIMIT	GREATER THAN 50	SEDIMENTARY ROCK SPT REF	USAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
χ PASSING SILT-	PERCENTAGE OF MATERIAL	-	(CP) SHELL B	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 10 56 MX GRANULAR CLAY MOUN,	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS	OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT	FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	PROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
4 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE		HAMMER IF CRYSTALLINE.	, and the second statement with the statement	HORIZONTAL.
LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOM	E 20 - 35%		IS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, IMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 18 MX 11 MN 11 MN 11 MN 18 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY		HLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	THE CHARLE SHOTTER FOUR PRINCE CHURCH CHURCH DEURS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
CHOOL HOCK & 6 4 MY 6 MY ITS HALLO IN 10 MY ITS OF CHOOLING	GROUND WATER	DILL TNC		IS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO ITAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STUNE FRANCE FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER D	NITETIAR		COLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND OTHVEL AND SAND SOLES	STATIC WATER LEVEL AFTER 24 HOURS		The contract of the contract o	CK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN SPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE	$ abla_{PW} $ PERCHED WATER, SATURATED ZONE, OR WATER BEARIN	NG STRATA	DULL SOUND UNDER HAMMER B	LOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP		WITH FRESH ROCK.	COLODED OD CTAINED IN COMMITTIE BOOKS ALL FELBORASS SILL	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)	SEVERE AND DISCOLORED AND A MAJOR	SCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL RITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
COMPACTNESS OF RANGE OF STANDARD RANGE OF UNCONFINED	ROADWAY EMBANKMENT (RE) PI ROADWAY EMBANKMENT (RE) SPT CPT DET ONT TEST BORIN		(MOD. SEV.) AND CAN BE EXCAVATED WITH IF TESTED, WOULD YIELD SPT.	A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. REFUSAL	THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT2)	WITH SOIL DESCRIPTION DAY THE TEST BURIN			SCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCE	s I
GENERALLY VERY LOOSE 44	SOIL SYMBOL AUGER BORING	S - BULK SAMPLE	(SEV.) IN STRENGTH TO STRONG SOIL	. IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME STRONG ROCK USUALLY REMAIN.	' <u>LEDGE</u> - 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	SS - SPLIT SPOON SAMPLE	IF TESTED, YIELDS SPT N VAL		LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL DENSE 30 TO 50	THAN ROADWAY EMBANKMENT - CORE BORING	ST - SHELBY TUBE		SCOLDRED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE >50	INFERRED SOIL BOUNDARY MN MONITORING WEL	SAMPLE	REMAINING, SAPROLITE IS AN	DUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK EXAMPLE 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	MONITORING WEI	KS - HUCK SAMPLE	VESTIGES OF THE ORIGINAL RE	OCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	ALLUVIAL SOIL BOUNDARY	RT - RECOMPACTED TRIAXIAL SAMPLE		FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SLOPE INDICATO	OR CBR - CALIFORNIA BEARING	ALSO AN EXAMPLE.	The state of the s	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
HARD 330 34	25/925 DIP & DIP DIRECTION OF INSTALLATION ROCK STRUCTURES	RATIO SAMPLE		ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	SOUNDING ROD SEE SPT REFLICAL			NIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	NEP ST NEI SSILE		SEVERAL HARD BLOWS OF TH	E GEOLOGIST'S PICK. E OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
COARSE FINE	ABBREVIATIONS	- MOTOTION CONTENT	HARD CAN BE SCRATCHED BY KNIFE TO DETACH HAND SPECIMEN.	C OU 1700 OUT! WILL DILLIFOFT!! UNUN UNILLED DEDMO MEMORIED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY (BLDR.) (COB.) (GR.) (CSE, SD.) (F SD.) (SL.) (CL.)	AR - AUGER REFUSAL HI HIGHLY BT - BORING TERMINATED MED MEDIUM	# - MOISTURE CONTENT V - VERY		E OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MICA MICACEOUS CPT - CONE PENETRATION TEST MOD MODERATELY	VST - VANE SHEAR TEST WEA WEATHERED	HARD EXCAVATED BY HARD BLOW O BY MODERATE BLOWS.	OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLIP PLANE.
SIZE IN. 12 3	CSE CDARSE NP - NON PLASTIC	7 - UNIT WEIGHT		0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. L CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST ORG ORGANIC DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST	$\gamma_{\rm d}$ - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL POINT OF A GEOLOGIST'S PIC		A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	• - VOID RATIO SAP SAPROLITIC			READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
	F - FINE SD SAND, SANDY FOSS, - FOSSILIFEROUS SL SILT, SILTY		FROM CHIPS TO SEVERAL INC PIECES CAN BE BROKEN BY I	CHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES SLI SLIGHTLY			CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
LL LIQUID LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL		SOFT OR MDRE IN THICKNESS CAN FINGERNAIL.	BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE < - WET - (W) SEMISOLIDE REGULARS DATING TO	EQUIPMENT USED ON SUBJECT P	PROJECT	FRACTURE SPACING	BEDDING	<u>IOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS:	HAMMER TYPE:	TERM SPACING	TERM THICKNESS VERY THICKLY BEDDED > 4 FEET	BENCH MARK: BL-102 at -L- Sta. 22+00.76, 18.55' LT
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		X AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 F WIDE 3 TO 10 FEET	THICKLY BEDDED 1.5 - 4 FEET	ELEVATION, IQAIO ET
OM DPTIMUM MUISTURE SL SHRINKAGE LIMIT	MOBILE B- X CLAY BITS		MODERATELY CLOSE 1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	ELEVATION: 184,10 FT.
PRY - (D) REQUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16	THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
HITHER OF LINON MODSTONE	BK-51 X 8" HOLLOW AUGERS	□-в	See See See See See See See See See	THINLY LAMINATED < 0.008 FEET INDURATION	-
PLASTICITY	CME-45C X HARD FACED FINGER BITS		FOR SEDIMENTARY ROCKS, INDURATION IS THE	HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	┪
PLASTICITY INDEX (PI) DRY STRENGTH	TUNG,-CARBIDE INSERTS	Пн		RUBBING WITH FINGER FREES NUMEROUS GRAINS	
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT	X CME-550 X CASING W/ ADVANCER	HAND TOOLS:	FRIABLE	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST TRICONESTEEL TEETH	POST HOLE DIGGER	MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
TROTT ETOTICATE	TRICONE TUNGCARB.	HAND AUGER		BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	CORE BIT	SOUNDING ROD	INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).		VANE SHEAR TEST	EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			EXINEMEL! INDUNATED	SAMPLE BREAKS ACROSS GRAINS.	

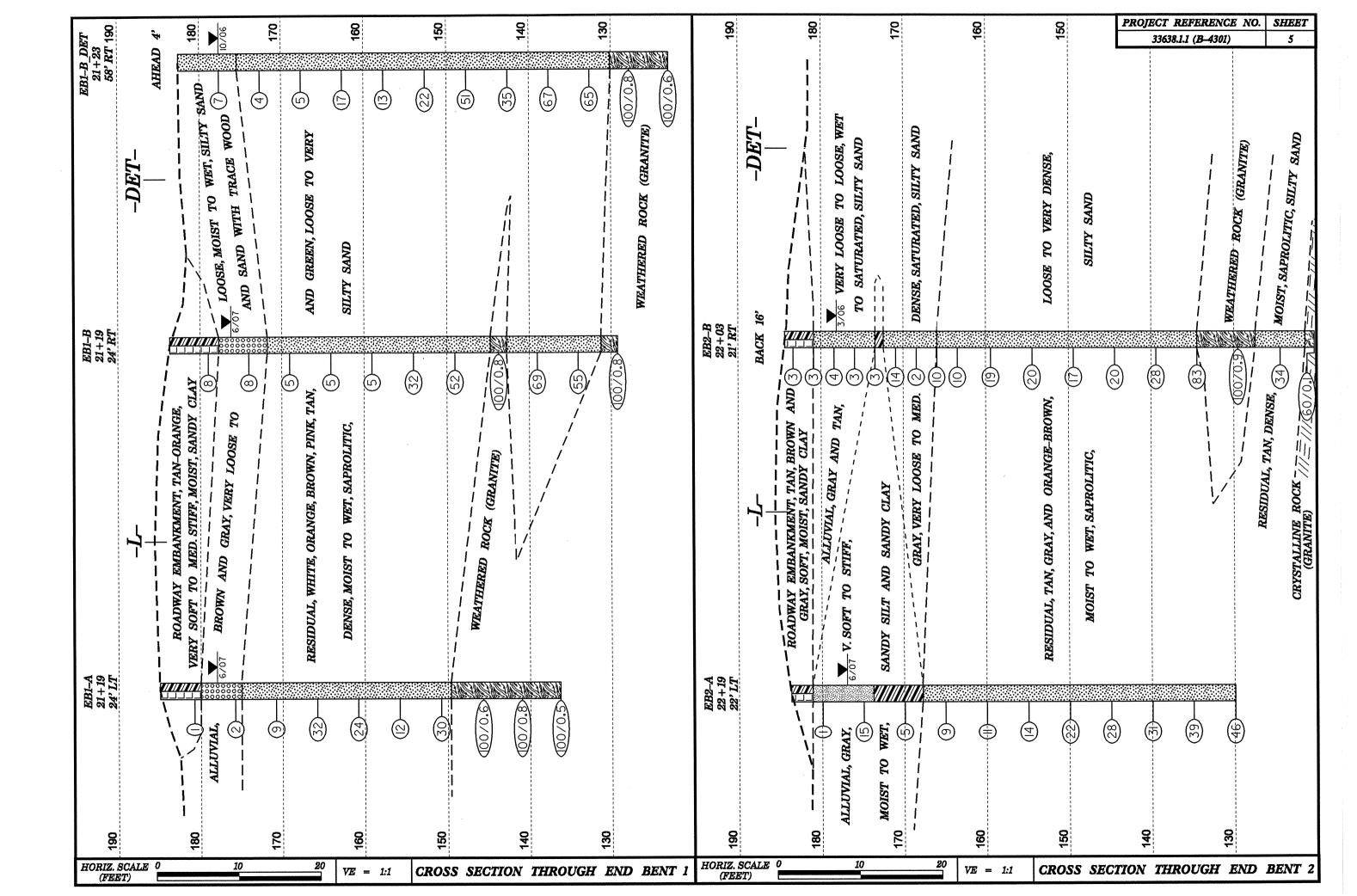
PROJECT REFERENCE NO. 33638.I.I (B-430I)

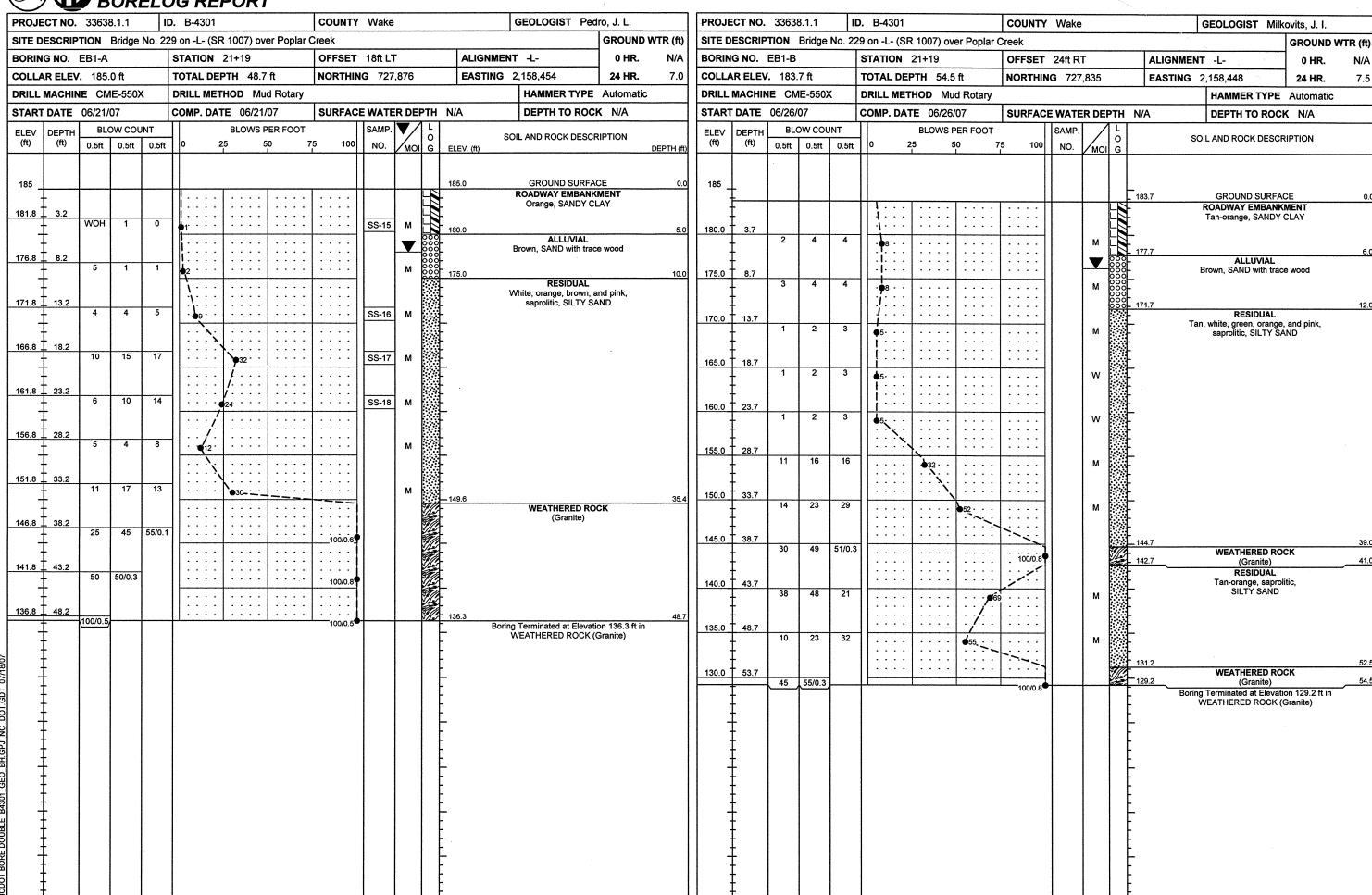
SHEET NO.

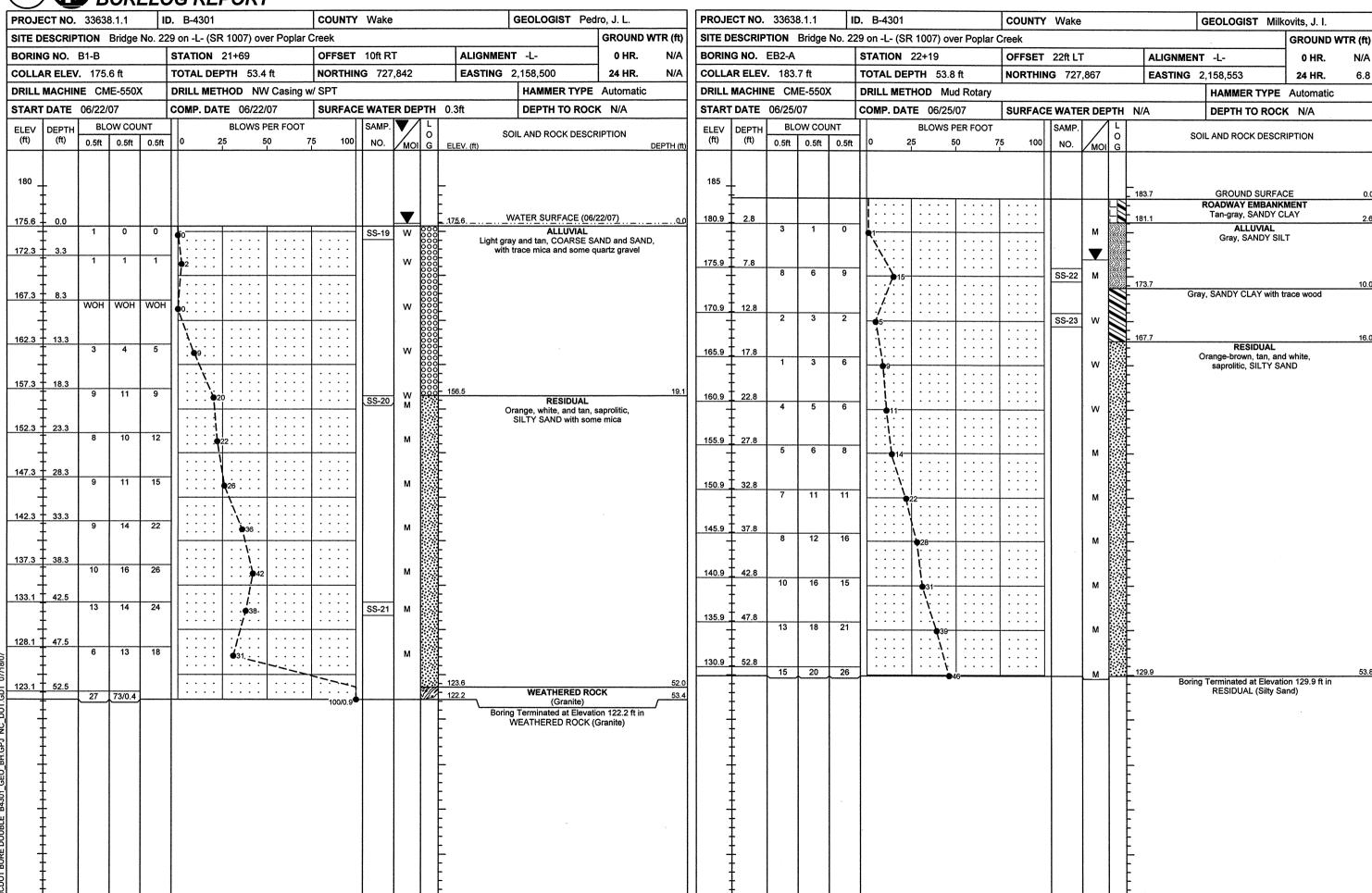
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	ECT NO.				. B-430′				TY Wa	ke			GEOLOGIST Mo				ECT NO.				B-430			COUNTY	Y Wak	9			G	EOLOGIST M		
SITE	DESCRIP	TION	Bridge	No. 22	on -L- (SR 1007)	over Popl							GROUND WTR	· 1 F					No. 229	on -L- (SR 1007)	over Poplar								GROUND	WTR (f
BORII	IG NO.	EB2-B			STATION	22+03		OFFSI	ET 21ft	RT		ALIG	NMENT -L-	0 HR.	6.7	BORIN	IG NO.	EB1-B	_Det	!	STATION	21+23		OFFSET	58ft F	RT.		ALIC	GNMENT	-L-	0 HR.	6.0
COLL	AR ELEV	. 184	.4 ft		TOTAL D	EPTH 6	4.1 ft	NORTI	HING 7	27,826		EAS	TING 2,158,532	24 HR.	6.3	COLLA	AR ELEV	. 182	.6 ft		TOTAL D	EPTH 59	.6 ft	NORTHI	NG 72	7,800		EAS	TING 2,	158,447	24 HR.	5.0
DRILL	MACHIN	NE CN	/E-550)	<u> </u>	DRILL MI	ETHOD I	H.S. Auge	rs					HAMMER TYPE	Automatic		DRILL	MACHIN	IE CI	/E-550	<u> </u>	ORILL MI	THOD H	I.S. Augers							HAMMER TYP	E Automatic	;
STAR	T DATE	03/14/	/06		COMP. D	ATE 03/	14/06	SURF	ACE WA			N/A	DEPTH TO ROO	63.0 ft		START	DATE	10/11	/06		COMP. D.	ATE 10/1	1/06	SURFAC	CE WAT	ER DE	PTH	N/A		DEPTH TO RO	CK N/A	
ELEV	DEPTH		ow cou				S PER FOC		1 1	IP.			SOIL AND ROCK DESC	RIPTION			DEPTH		OW COL				S PER FOOT		SAMP	$/$			SOIL	. AND ROCK DES	CRIPTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	10	25 1	50 	75 1	00 NC). MC	OI G	ELEV. (ft)		DEPT	г н (ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	10	25	50 7	75 100	NO.	MO	II G					
															- 11																	
185 184.4	0.0											— 184.4	GROUND SURFA		0.0	185 _	+											-				
181.9	† 2.5	1	1	2	3				: ss	-1 M		‡	ROADWAY EMBANI Tan-brown, SANDY				<u> </u>	<u> </u>			<u> </u>					<u> </u>	<u> </u>	182.6		GROUND SURF		
	Ŧ T	2	1	2	•3 · ·	: : : :		i	1 1	м		180.9	ALLUVIAL		3.5		‡				: : :			: : : :		1		F		ALLUVIAL Brown-gray, SILT\		
179.4	+ 5.0 +	2	2	2	1	.		-	· ss	2 W	,	;	Gray and tan, SILTY	SAND		178.6	4.0				1:				1	│		-				
176.9	7.5				 							‡					‡	2	2	5	• 7		: : : : :		SS-9			-				
174.4	10.0	1	1	2	3 · ·		-		· ss	-3 Sat		1				-	‡				1		<u> </u>		41			175.4		RESIDUAL		
	Ī	3	2	1	3				: <u>ss</u>	M		173.4 172.4	Gray, SANDY CL		11.0	173.6 -	+ 9.0 +	2	2	2	4 · ·				SS-10	l w		-	Tan-or	agne, gray, and w	nite, saprolitic, O	
171.9	12.5	3	6	8		.			·			-	Gray, SILTY SAI				‡				ţ:::					1		-				
169.4	15.0	1	1	1	1		- 		7	Sat		-				168.6	14.0				 							-				
166.9	17.5	ļ		'	Q ²	: : : :	: : : :		1 1			<u> </u>			40.5		‡	1	2	3	5	: : : :				М		-				
164.4	20.0	2	5	5	• ●10		<u> </u>	<u> </u>	SS	Sat 6 M		165.9	RESIDUAL		18.5	-	‡				.,.	<u> </u>	<u> </u>	<u> </u>	41			_				
104.1	<u> </u>	2	4	6	. 10	: : : :			1 1	М		1	Tan, gray, and orange, SILTY SAND	saprolitic,		163.6	19.0	3	7	10	:: /			: : : :	SS-11	М		t				
160.4	24.0				· · \	: : : :		: : : :	1 1			1					‡				1 : : : 7	!' : : :				┨‴		t				
100.4	± 24.0	5	10	9	 ` ` `	19		- 	-11	м		-				158.6	24.0				;			 	-			-				
	$\frac{1}{1}$					¦	: : : :		:			1					1	5	6	7	13		: : : : :			М		È				
155.4	29.0		<u> </u>	11						l		£					Ī]			L				
	Ŧ	9	9	11	'	20) I	M]				153.6	29.0	5	8	14		<u> </u>			1	۱.,		ŧ				
	Ŧ								.			F					Ŧ		"	"		22			SS-12	M		-				
150.4	+ 34.0 +	8	8	9	 	17				М		<u>-</u>				148.6	34.0							 	$\{ \}$			-				
	Ŧ				[] : : : []				-			Ŧ				140.0	T 04.0	8	19	32			51			м		F				
145.4	39.0								· L			Ŧ					Ŧ						<i>y</i>] :::::	: : : :				-			*	
	Ŧ	8	9	11	'	20			ss	-7 M		F				143.6	39.0		47	40		/]	1		F				
	Ŧ					:\ : : :			.			Ŧ					Ŧ	9	17	18	: : :			::::		М		Ŧ				
140.4	+ 44.0	11	13	15		<u>\</u>				М		-				- 138.6	44.0				ļ				-{			1				
	‡					. . :>			: []			-				130.0	+ 44.0	19	22	45	: : :				1 1 00-1	м		;				
135.4	49.0						: [75:		:			+					‡				: : :		: : : ; ; ;	: : : :		1		‡				
	‡	22	23	60		1			7	М	111	134.4	WEATHERED RO	оск	50.0	133.6	49.0											-				
	‡					1			1 1			#	(Granite)				‡	23	29	36		.	•65	: : : :		М		‡				
130.4	54.0	41	59/0.4	1								1				_	‡					• • • •	· · · · <u> ·</u>	<u> </u>	41		777	130.1		WEATHERED I	OCK	5
	‡					1	ı	1	0.9			127.4			57.0	128.6	54.0	40	60/0.3		: : :			100/0.8				1		(Granite)		
125.4	59.0						1		<u>- </u>				RESIDUAL Tan, saprolitic, SILT)	/ SAND			‡				: : :		3		' 			1				
	‡	11	16	18		•34,			:	М			,,,,	. •		123.6	‡ _{59.0}					-		 	11	l		123.0				5
	‡					1			:			121.4 120.3			63.0		_	65	35/0.1	 	1	L		100/0.6	•	1	100	- 123.0	Boring	Terminated at Elev	ation 123.0 ft in	,
120.4	64.0	60/0.1			<u> </u>	<u>· </u>	<u> </u>	60/0	,1			120.3	CRYSTALLINE R (Granite)	оск	64.1	_	‡											L	W	EATHERED ROC	(Granite)	
	İ	60/0.1	1					00/1				£ '	Boring Terminated with Stand				‡											ţ				
1	‡											t	Test Refusal at Elevation CRYSTALLINE ROCK				‡											<u> </u>				
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PROJ. NO. - 33638.1.1 ID NO. - B-4301 COUNTY - Wake

SHEET 9 OF11

EB1-A

	SOIL TEST RESULTS														
SAMPLE			DEPTH	AASHTO				% BY W	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-15	18 LT	21+19	3.2-4.7	A-6(5)	38	15	22.4	28.6	16.9	32.0	95	80	53	•	•
SS-16	18 LT	21+19	13.2-14.7	A-2-4(0)	36	4	50.8	24.3	14.9	10.0	93	55	28	-	-
SS-17	18 LT	21+19	18.2-19.7	A-2-4(0)	33	3	52.6	23.9	13.5	10.0	97	58	27	-	•
SS-18	18 LT	21+19	23.2-24.7	A-2-4(0)	31	4	48.2	22.5	15.3	14.1	90	57	31		•

B1-B

			S	OIL 7	TE:	ST	RE	SUI	TS						
SAMPLE			DEPTH	AASHTO		_		% BY W			% 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-19	10 RT	21+69	0.0-1.5	A-1-b(0)	40	NP	85.9	11.4	0.6	2.0	81	25	3	-	•
SS-20	10 RT	21+69	19.1-19.8	A-1-b(0)	27	NP	57.4	23.7	10.8	8.0	95	50	23	-	•
SS-21	10 RT	21+69	42.5-44.0	A-2-4(0)	32	NP	50.8	32.1	11.0	6.0	96	62	21	•	-

EB2-A

1111															
			S	OIL 7	TE.	ST	RE	SUL	TS						
SAMPLE			DEPTH	AASHTO				% BY W	/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-22	22 LT	22+19	7.8-9.3	A-4(0)	19	NP	13.7	56.4	13.9	16.1	100	98	38	-	-
SS-23	22 LT	22+19	12.8-14.3	A-6(8)	33	14	4.0	34.5	27.3	34.1	100	98	70	•	•

ER2.R

EBZ-B															
			S	OIL 7	TE.	ST	RE	SUL	TS						
SAMPLE			DEPTH	AASHTO				% BY W	/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	21 RT	22+03	0.0-1.5	A-6(2)	30	13	41.7	20.1	14.0	24.2	96	66	40	-	-
SS-2	21 RT	22+03	5.0-6.5	A-2-4(0)	21	4	51.5	25.7	10.8	12.1	97	65	25	-	-
SS-3	21 RT	22+03	7.5-9.0	A-2-4(0)	22	NP	32.8	44.7	16.4	6.0	97	78	29	•	-
SS-4	21 RT	22+03	11.0-11.5	A-6(9)	32	16	9.7	24.8	27.3	38.3	99	94	72		•
SS-5	21 RT	22+03	12.5-14.0	A-2-4(0)	21	NP	64.5	23.0	6.5	6.0	95	53	14	•	•
SS-6	21 RT	22+03	18.5-19.0	A-2-4(0)	34	NP	58.8	23.8	15.4	2.0	99	56	21	•	-
SS-7	21 RT	22+03	39.0-40.5	A-2-4(0)	32	NP	53.6	27.4	17.0	2.0	99	61	23	-	•

EB1-B -Detour-

	SOIL TEST RESULTS														
SAMPLE									% 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-9	58 RT	21+23	4.0-5.5	A-2-4(0)	20	3	56.7	18.1	9.1	16.1	100	66	27	•	-
SS-10	58 RT	21+23	9.0-10.5	A-2-4(0)	29	NP	47.2	31.6	13.2	8.0	100	71	26	-	-
SS-11	58 RT	21+23	19.0-20.5	A-2-4(0)	26	NP	51.5	29.3	13.2	6.0	100	65	25	-	-
SS-12	58 RT	21+23	29.0-30.5	A-2-4(0)	29	NP	52.1	30.2	11.8	6.0	100	65	22	-	•
SS-13	58 RT	21+23	44.0-45.5	A-2-4(0)	30	NP	56.7	25.1	10.2	8.0	100	55	23	•	-



FIELD SCOUR REPORT

WBS:	33638.1.1	TIP:	B-4301	C	OUNTY: W	/ake		
DESCRIPTION(1):					ek at Sta. 21	+68.5		
			EXISTING	G BRIDO	3E			
Information from:		spection (explain)	<u> </u>	icrofilm	(reel	po:	S:	_)
Bridge No.: Foundation Type:		60T	otal Bents:	3 Ber	nts in Chanr	nel:1	Bents in	Floodplain: 2
EVIDENCE OF S Abutments or E	SCOUR(2) End Bent Slopes:	Large scou	ır hole is pre	sent betw	een the exis	sting and p	orevious w	ing walls
	•							
Interior Bents:	None visible							
Channel Bed:	None visible							
Channel Bank:	None							
EXISTING SCO	UR PROTECTIO	N						
	Wing walls							
Extent(4):	35'L x 8'H							
Effectiveness(5):	Effective							
Obstructions(6):	Beaver dam 125	i' upstream,	several larg	e trees in	and across	stream bo	oth up and	downstream

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

				FORMATIC			
Channel E	Bed Material(7	'): Alluvial, gra	ay, very loose,	coarse sand a	and gravel w	vith some wood	debris (SS-19)
Channel Ba	ank Material(8	B): Residual, v	vhite and oran	ge-brown, loos	se to dense,	saprolitic, silty	sand (SS-16)
Channel	Bank Cover(9): Grass, tree	s and brush				
Flood	olain Width(10): <u>200-300 fe</u>	et				
Floodp	olain Cover(11): Grass, tree	s and brush				
	Stream is(12	?): Aggr	ading	Degrading	X	Static	
Channel Migra	ation Tend.(13	3): West towa	rds End Bent 1				
bservations a	nd Other Con	nments:					
DESIGN SCOU	JR ELEVATION	DNS(14)		Fe	eet X	Meters	
		BENT 1 =	162.2				
Comparison of	DSE to Hydra	aulics Unit the	oretical scour:				
he Geotchnic	al Engineering	g Unit agrees	with the Hydra	ulic Unit's the	oretical scou	ır elevation.	
SOIL ANALYS	SIS RESULTS	FROM CHAI	NNEL BED AN	ID BANK MA	TERIAL		
Sample No.							
Retained #4			-				
Passed #10 Passed #40			-			-	
Passed #40	See Shee	at Q	-				
Coarse Sand		t Results",	-				
Fine Sand	for samp		-				
Silt	SS-19 (B		-				
Clay	SS-16 (B		-				
LL	(2	<i>-</i>	F				
PI			-				
AASHTO			,	<u></u>			
Station							
Offset							

Template Revised 02/07/06

Reported by:	Jame Love Pedro
	U laima Lava Dadra

Depth

Date: 4/3/2007

SITE PHOTOGRAPH

Bridge No. 229 on -L- (SR 1007) over Poplar Creek

