

CONTENTS

LINE	STATION	PLAN	XSECTS
-L-	14+00 - 20+50	4	5-II

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

STATE OF NORTH CAROLINA

**DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

**ROADWAY
SUBSURFACE INVESTIGATION**

STATE PROJ. 33336.1.1 I.D. B-3900 F.A. PROJ. BRZ-1376(1)
 COUNTY ROCKINGHAM
 PROJECT DESCRIPTION APPROACH TO BRIDGE NO.165 ON SR 1376
 (PAW PAW RD.) OVER PAW PAW CREEK TRIBUTARY

INVENTORY

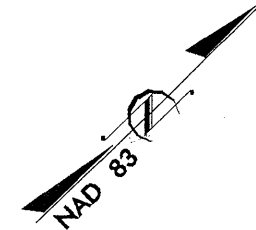
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3900	1	11
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33336.1.1	BRZ-1376(1)	P.E.	
33336.2.1	BRZ-1376(1)	R/W & UTIL	
33336.3.1	BRZ-1376(1)	CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 BY RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

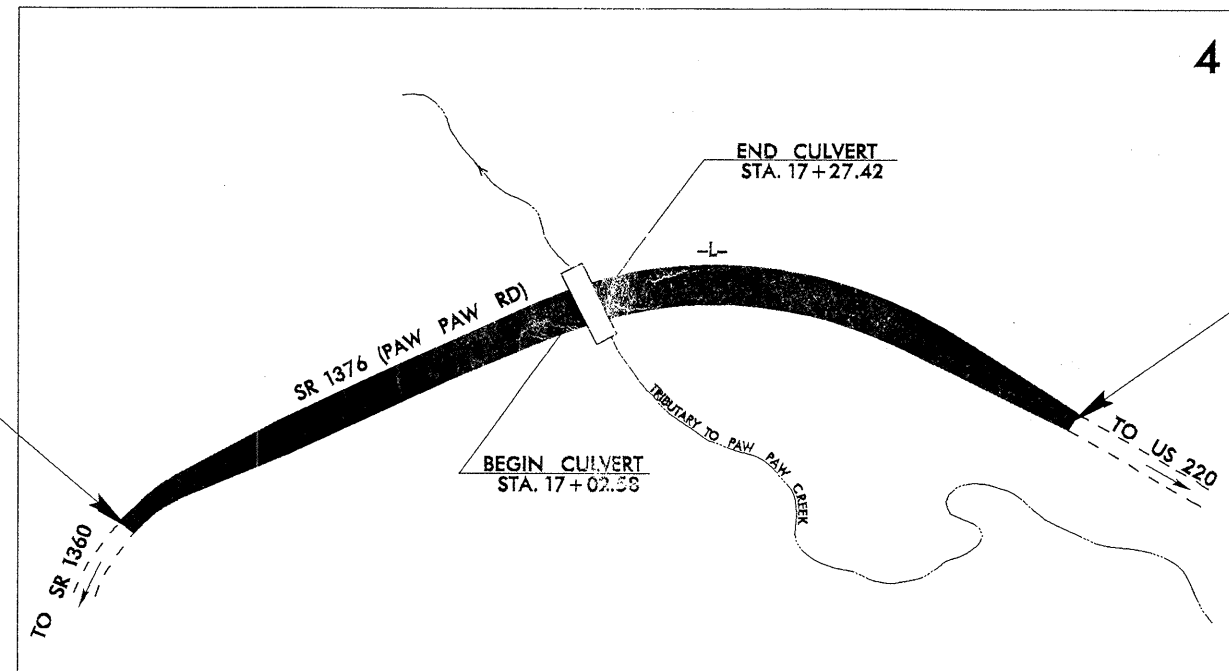
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO 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 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 OPINION 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 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 ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.



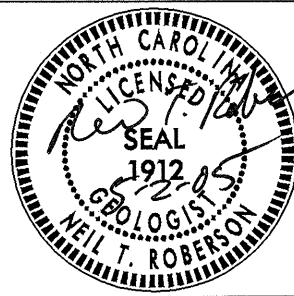
STA. 13+50.00 -L- BEGIN TIP PROJECT B-3900

STA. 20+50.00 -L- END TIP PROJECT B-3900



PERSONNEL
C.D. CZAJKA
D.W. DIXON
C.E. POPE

INVESTIGATED BY **C.D. CZAJKA**
 CHECKED BY **N.T. ROBERSON**
 SUBMITTED BY **N.T. ROBERSON**
 DATE **MAY 2005**



DRAWN BY: **T.T. WALKER**

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.

CONTRACT: ID: 33336.1.1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3900	33336.1.1	2	11

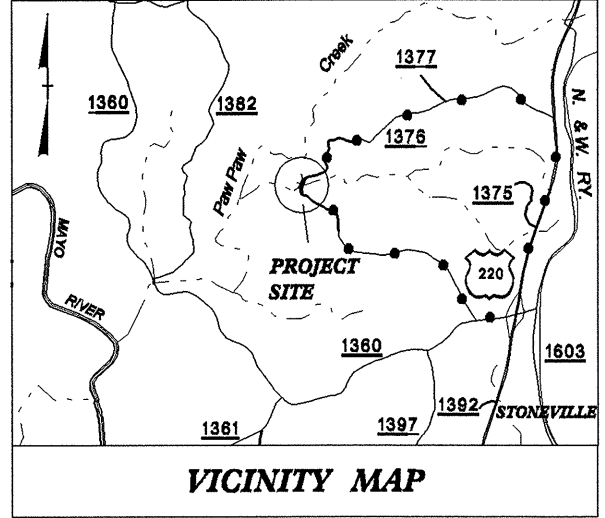
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																												
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p align="center"><i>VERY STIFF, GRAY SATY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. 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, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. 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. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																												
<p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="2">GRANULAR MATERIALS (>85% PASSING #200)</th> <th colspan="2">SILT-CLAY MATERIALS (>85% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1</td> <td>A-3</td> <td>A-2</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>50 MX</td> <td>30 MX 50 MN</td> <td>35 MX 35 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6 MX</td> <td>N.P.</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS, GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> </tr> <tr> <td>GENERAL RATING AS A SUBGRADE</td> <td colspan="2">EXCELLENT TO GOOD</td> <td colspan="2">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> </tr> </table> <p align="center">P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30</p>		GENERAL CLASS.	GRANULAR MATERIALS (>85% PASSING #200)		SILT-CLAY MATERIALS (>85% PASSING #200)		ORGANIC MATERIALS		GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	SYMBOL							% PASSING	50 MX	30 MX 50 MN	35 MX 35 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	LIQUID LIMIT	6 MX	N.P.	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	PLASTIC INDEX	0	0	4 MX	8 MX	12 MX	16 MX	GROUP INDEX	0	0	0	0	0	0	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD		FAIR TO POOR		FAIR TO POOR	POOR	<p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p align="center">COMPRESSIONIBILITY</p> <table border="1"> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LIQUID LIMIT LESS THAN 30</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td>LIQUID LIMIT 31-50</td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td>LIQUID LIMIT GREATER THAN 50</td> </tr> </table>		SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30	MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50	HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50	<p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	>10%	>20%	HIGHLY 35% AND ABOVE	<p align="center">WEATHERING</p> <table border="1"> <tr> <td>FRESH</td> <td>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</td> </tr> <tr> <td>VERY SLIGHT (V.SL.)</td> <td>ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</td> </tr> <tr> <td>SLIGHT (SL.)</td> <td>ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</td> </tr> <tr> <td>MODERATE (MOD.)</td> <td>SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</td> </tr> <tr> <td>MODERATELY SEVERE (MOD. SEV.)</td> <td>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></td> </tr> <tr> <td>SEVERE (SEV.)</td> <td>ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></td> </tr> <tr> <td>VERY SEVERE (V. SEV.)</td> <td>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></td> </tr> <tr> <td>COMPLETE</td> <td>ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</td> </tr> </table>		FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	VERY SLIGHT (V.SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>	SEVERE (SEV.)	ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i>	VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i>	COMPLETE	ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.
GENERAL CLASS.	GRANULAR MATERIALS (>85% PASSING #200)		SILT-CLAY MATERIALS (>85% PASSING #200)		ORGANIC MATERIALS																																																																																																													
GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6																																																																																																												
SYMBOL																																																																																																																		
% PASSING	50 MX	30 MX 50 MN	35 MX 35 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN																																																																																																												
LIQUID LIMIT	6 MX	N.P.	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN																																																																																																												
PLASTIC INDEX	0	0	4 MX	8 MX	12 MX	16 MX																																																																																																												
GROUP INDEX	0	0	0	0	0	0																																																																																																												
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER																																																																																																												
GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD		FAIR TO POOR		FAIR TO POOR	POOR																																																																																																												
SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30																																																																																																																	
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50																																																																																																																	
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50																																																																																																																	
ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL																																																																																																															
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																																																															
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																																																															
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																																																															
HIGHLY ORGANIC	>10%	>20%	HIGHLY 35% AND ABOVE																																																																																																															
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																																																																																																																	
VERY SLIGHT (V.SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.																																																																																																																	
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.																																																																																																																	
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.																																																																																																																	
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>																																																																																																																	
SEVERE (SEV.)	ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i>																																																																																																																	
VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i>																																																																																																																	
COMPLETE	ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																																																																																																																	
<p align="center">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.</p> <p> STATIC WATER LEVEL AFTER 24 HOURS.</p> <p> PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA</p> <p> SPRING OR SEEPAGE</p>		<p align="center">MISCELLANEOUS SYMBOLS</p> <table border="1"> <tr> <td></td> <td>ROADWAY EMBANKMENT WITH SOIL DESCRIPTION</td> <td></td> <td>SOIL SYMBOL</td> <td></td> <td>ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS</td> <td></td> <td>INFERRED SOIL BOUNDARIES</td> <td></td> <td>INFERRED ROCK LINE</td> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> <td></td> <td>DIP/DIP DIRECTION OF ROCK STRUCTURES</td> </tr> <tr> <td></td> <td>SPT TEST BORING</td> <td></td> <td>AUGER BORING</td> <td></td> <td>CORE BORING</td> <td></td> <td>MONITORING WELL</td> <td></td> <td>PIEZOMETER INSTALLATION</td> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> <td></td> <td>SPT N-VALUE</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> <td></td> <td>SPT REFUSAL</td> <td></td> <td>SAMPLE DESIGNATIONS</td> <td></td> <td>S- BULK SAMPLE</td> <td></td> <td>SS- SPLIT SPOON SAMPLE</td> <td></td> <td>ST- SHELBY TUBE SAMPLE</td> <td></td> <td>RS- ROCK SAMPLE</td> </tr> <tr> <td></td> <td>RT- RECOMPACTED TRIAXIAL SAMPLE</td> <td></td> <td>CBR- CBR SAMPLE</td> <td></td> <td>SPT REFUSAL</td> <td></td> <td>SPT REFUSAL</td> <td></td> <td>SPT REFUSAL</td> <td></td> <td>SPT REFUSAL</td> <td></td> <td>SPT REFUSAL</td> </tr> </table>			ROADWAY EMBANKMENT WITH SOIL DESCRIPTION		SOIL SYMBOL		ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS		INFERRED SOIL BOUNDARIES		INFERRED ROCK LINE		ALLUVIAL SOIL BOUNDARY		DIP/DIP DIRECTION OF ROCK STRUCTURES		SPT TEST BORING		AUGER BORING		CORE BORING		MONITORING WELL		PIEZOMETER INSTALLATION		SLOPE INDICATOR INSTALLATION		SPT N-VALUE		SOUNDING ROD		SPT REFUSAL		SAMPLE DESIGNATIONS		S- BULK SAMPLE		SS- SPLIT SPOON SAMPLE		ST- SHELBY TUBE SAMPLE		RS- ROCK SAMPLE		RT- RECOMPACTED TRIAXIAL SAMPLE		CBR- CBR SAMPLE		SPT REFUSAL		SPT REFUSAL		SPT REFUSAL		SPT REFUSAL		SPT REFUSAL																																																							
	ROADWAY EMBANKMENT WITH SOIL DESCRIPTION		SOIL SYMBOL		ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS		INFERRED SOIL BOUNDARIES		INFERRED ROCK LINE		ALLUVIAL SOIL BOUNDARY		DIP/DIP DIRECTION OF ROCK STRUCTURES																																																																																																					
	SPT TEST BORING		AUGER BORING		CORE BORING		MONITORING WELL		PIEZOMETER INSTALLATION		SLOPE INDICATOR INSTALLATION		SPT N-VALUE																																																																																																					
	SOUNDING ROD		SPT REFUSAL		SAMPLE DESIGNATIONS		S- BULK SAMPLE		SS- SPLIT SPOON SAMPLE		ST- SHELBY TUBE SAMPLE		RS- ROCK SAMPLE																																																																																																					
	RT- RECOMPACTED TRIAXIAL SAMPLE		CBR- CBR SAMPLE		SPT REFUSAL		SPT REFUSAL		SPT REFUSAL		SPT REFUSAL		SPT REFUSAL																																																																																																					
<p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</td> <td>2.0</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F. SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td>SIZE</td> <td>IN. 12"</td> <td>3"</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.76	2.0	0.42	0.25	0.075	0.053	BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)	GRAIN SIZE	MM 305	75	2.0	0.25	0.05	0.005	SIZE	IN. 12"	3"					<p align="center">ABBREVIATIONS</p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td> <td>PMT - PRESSUREMETER TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>SD. - SAND, SANDY</td> </tr> <tr> <td>CL. - CLAY</td> <td>SL. - SILT, SILTY</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>SLI. - SLIGHTLY</td> </tr> <tr> <td>CSE. - COARSE</td> <td>TCR - TRICONE REFUSAL</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>U - UNIT WEIGHT</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>U_d - DRY UNIT WEIGHT</td> </tr> <tr> <td>φ - VOID RATIO</td> <td>W - MOISTURE CONTENT</td> </tr> <tr> <td>F. - FINE</td> <td>V. - VERY</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>FRAC. - FRACTURED</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td></td> </tr> <tr> <td>MED. - MEDIUM</td> <td></td> </tr> </table>		AR - AUGER REFUSAL	PMT - PRESSUREMETER TEST	BT - BORING TERMINATED	SD. - SAND, SANDY	CL. - CLAY	SL. - SILT, SILTY	CPT - CONE PENETRATION TEST	SLI. - SLIGHTLY	CSE. - COARSE	TCR - TRICONE REFUSAL	DMT - DILATOMETER TEST	U - UNIT WEIGHT	DPT - DYNAMIC PENETRATION TEST	U _d - DRY UNIT WEIGHT	φ - VOID RATIO	W - MOISTURE CONTENT	F. - FINE	V. - VERY	FOSS. - FOSSILIFEROUS	VST - VANE SHEAR TEST	FRAC. - FRACTURED		FRAGS. - FRAGMENTS		MED. - MEDIUM																																																			
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																												
	4.76	2.0	0.42	0.25	0.075	0.053																																																																																																												
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)																																																																																																												
GRAIN SIZE	MM 305	75	2.0	0.25	0.05	0.005																																																																																																												
SIZE	IN. 12"	3"																																																																																																																
AR - AUGER REFUSAL	PMT - PRESSUREMETER TEST																																																																																																																	
BT - BORING TERMINATED	SD. - SAND, SANDY																																																																																																																	
CL. - CLAY	SL. - SILT, SILTY																																																																																																																	
CPT - CONE PENETRATION TEST	SLI. - SLIGHTLY																																																																																																																	
CSE. - COARSE	TCR - TRICONE REFUSAL																																																																																																																	
DMT - DILATOMETER TEST	U - UNIT WEIGHT																																																																																																																	
DPT - DYNAMIC PENETRATION TEST	U _d - DRY UNIT WEIGHT																																																																																																																	
φ - VOID RATIO	W - MOISTURE CONTENT																																																																																																																	
F. - FINE	V. - VERY																																																																																																																	
FOSS. - FOSSILIFEROUS	VST - VANE SHEAR TEST																																																																																																																	
FRAC. - FRACTURED																																																																																																																		
FRAGS. - FRAGMENTS																																																																																																																		
MED. - MEDIUM																																																																																																																		
<p align="center">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>		SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p align="center">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input type="checkbox"/> MOBILE B-</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> BK-51</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td>CORE SIZE:</td> </tr> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> B</td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> N</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td><input type="checkbox"/> H</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td>HAND TOOLS:</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> TRICONE _____ * STEEL TEETH</td> <td><input checked="" type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE _____ * TUNG-CARB.</td> <td><input checked="" type="checkbox"/> HAND AUGER</td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td><input checked="" type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td></td> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> OTHER _____</td> </tr> </table>		DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input type="checkbox"/> MOBILE B-	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<input type="checkbox"/> BK-51	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:	<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> B	<input type="checkbox"/> CME-550	<input checked="" type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> N	<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	<input type="checkbox"/> H	<input type="checkbox"/> OTHER _____	<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	HAND TOOLS:	<input type="checkbox"/> OTHER _____	<input type="checkbox"/> TRICONE _____ * STEEL TEETH	<input checked="" type="checkbox"/> POST HOLE DIGGER		<input type="checkbox"/> TRICONE _____ * TUNG-CARB.	<input checked="" type="checkbox"/> HAND AUGER		<input type="checkbox"/> CORE BIT	<input checked="" type="checkbox"/> SOUNDING ROD		<input type="checkbox"/> OTHER _____	<input type="checkbox"/> VANE SHEAR TEST			<input type="checkbox"/> OTHER _____																																																												
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																
OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																																																																
<input type="checkbox"/> MOBILE B-	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL																																																																																																																
<input type="checkbox"/> BK-51	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:																																																																																																																
<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> B																																																																																																																
<input type="checkbox"/> CME-550	<input checked="" type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> N																																																																																																																
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	<input type="checkbox"/> H																																																																																																																
<input type="checkbox"/> OTHER _____	<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	HAND TOOLS:																																																																																																																
<input type="checkbox"/> OTHER _____	<input type="checkbox"/> TRICONE _____ * STEEL TEETH	<input checked="" type="checkbox"/> POST HOLE DIGGER																																																																																																																
	<input type="checkbox"/> TRICONE _____ * TUNG-CARB.	<input checked="" type="checkbox"/> HAND AUGER																																																																																																																
	<input type="checkbox"/> CORE BIT	<input checked="" type="checkbox"/> SOUNDING ROD																																																																																																																
	<input type="checkbox"/> OTHER _____	<input type="checkbox"/> VANE SHEAR TEST																																																																																																																
		<input type="checkbox"/> OTHER _____																																																																																																																
<p align="center">PLASTICITY</p> <table border="1"> <tr> <th>NONPLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>LOW PLASTICITY</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MED. PLASTICITY</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGH PLASTICITY</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>		NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH	LOW PLASTICITY	0-5	VERY LOW	MED. PLASTICITY	6-15	SLIGHT	HIGH PLASTICITY	16-25	MEDIUM		26 OR MORE	HIGH	<p align="center">FRACTURE SPACING</p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table>		TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FEET	VERY CLOSE	LESS THAN 0.16 FEET																																																																																				
NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																																
LOW PLASTICITY	0-5	VERY LOW																																																																																																																
MED. PLASTICITY	6-15	SLIGHT																																																																																																																
HIGH PLASTICITY	16-25	MEDIUM																																																																																																																
	26 OR MORE	HIGH																																																																																																																
TERM	SPACING																																																																																																																	
VERY WIDE	MORE THAN 10 FEET																																																																																																																	
WIDE	3 TO 10 FEET																																																																																																																	
MODERATELY CLOSE	1 TO 3 FEET																																																																																																																	
CLOSE	0.16 TO 1 FEET																																																																																																																	
VERY CLOSE	LESS THAN 0.16 FEET																																																																																																																	
<p align="center">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>		<p align="center">BEDDING</p> <table border="1"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		TERM	THICKNESS	VERY THICKLY BEDDED	> 4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET																																																																																																	
TERM	THICKNESS																																																																																																																	
VERY THICKLY BEDDED	> 4 FEET																																																																																																																	
THICKLY BEDDED	1.5 - 4 FEET																																																																																																																	
THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																	
VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																	
THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																	
THINLY LAMINATED	< 0.008 FEET																																																																																																																	
<p align="center">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1"> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>		FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	<p align="center">BENCH MARK:</p> <p align="center">ELEVATION: _____</p> <p>NOTES:</p>																																																																																																								
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																																																																																																																	
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																																																																																																																	
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																																																																																																																	
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																																																																																																	

09/08/99

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

--- DENOTES DETOUR

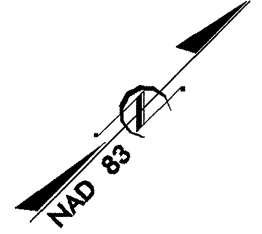
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROCKINGHAM COUNTY

LOCATION: BRIDGE NO. 165 OVER A CREEK ON SR 1376

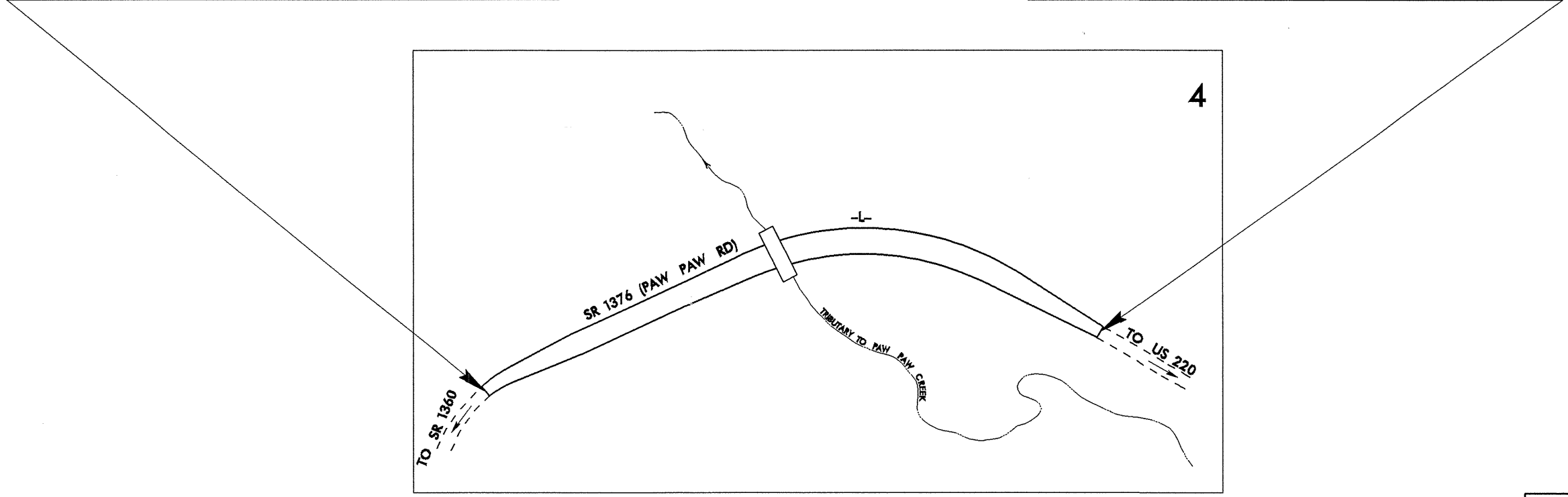
TYPE OF WORK: GRADING, DRAINAGE, PAVING,
AND CULVERT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3900	2A	11
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33336.1.1	BRZ-1376(1)	P.E.	



STA. 14+00.00 -L- BEGIN TIP PROJECT B-3900

STA. 20+50.00 -L- END TIP PROJECT B-3900



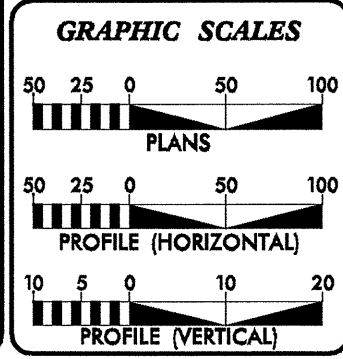
NOTE: THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
NOTE: CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD _____

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT: TIP PROJECT: B-3900

CONTRACT: TIP PROJECT: B-3900



DESIGN DATA

ADT 2005 =	117
ADT 2025 =	200
DHV =	10 %
D =	60 %
T =	3 % *
V =	60 MPH
* TTST 1%	DUAL 2%
FUNC. CLASS =	LOCAL RURAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3900	=	0.123 MILE
TOTAL LENGTH OF TIP PROJECT B-3900	=	0.123 MILE

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 16, 2005

LETTING DATE:
SEPTEMBER 19, 2006

BRENDA MOORE, P.E.
PROJECT ENGINEER

ROGER KLUCKMAN, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR

DATE

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DCN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Michael F. Easley
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

Lyndo Tippet
SECRETARY

May 2, 2005

STATE PROJECT: 33336.1.1 (B-3900)
FEDERAL PROJECT: BRZ-1376 (1)
COUNTY: Rockingham
DESCRIPTION: Bridge No. 165 on SR 1376 (Paw Paw Rd.) over Paw Paw Creek Tributary
SUBJECT: Geotechnical Report - Inventory

Project Description

This project consists of constructing a new culvert to replace the existing bridge. The total length of the roadway project is 0.123 miles.

A geotechnical investigation was conducted during March 2005. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit. The -L- alignment from station 14+00 to 20+50 was investigated using a CME-550 drill rig, hand auger, and sounding rods.

Areas of Special Geotechnical Interest

1) Highly Plastic Clays: Highly plastic clays were encountered on the project at the following intervals:

<u>Line</u>	<u>Stations</u>
-L-	14+00 to 15+75
-L-	18+75 to 20+50

2) Groundwater: Shallow groundwater was encountered in one boring at the following location:

<u>Line</u>	<u>Station</u>
-L-	19+50

Physiography and Geology

The project is located in gently rolling terrain of the Piedmont Physiographic Province. The area consists entirely of wooded land. Geologically, the site is located within the Sauratown Mountains Anticlinorium, and is underlain by mica schist.

Soil Properties

Soils present at the project site include roadway embankment and residual soils.

Roadway embankment soil is present in the embankment of the existing roadway. This soil consists primarily of brown, medium dense, moist, micaceous, silty sand with gravel (AASHTO classification A-2-4).

Residual soils are derived from the in-place weathering of the underlying mica schist. They consist primarily of brown to red-brown, medium stiff to stiff, moist, highly plastic, silty clay (A-7) and brown, gray, and orange-brown, medium dense to dense, dry to moist, clayey and silty sand (A-2-4, A-2-5). Lesser amounts of red-brown, medium stiff, moist, sandy silt (A-4) are also present. Mica content for the residual soils ranges from moderate to high.

Rock Properties

Weathered rock was encountered in three borings and is derived from the underlying mica schist. In addition, bridge rod refusal is interpreted to be indicative of weathered rock.

Crystalline rock of the Sauratown Mountains Anticlinorium underlies the project area and is present in two borings. Crystalline rock ranges in elevation from 734.5 to 737.0 feet.

Respectfully submitted,

Neil T. Roberson, LG
Project Geologist

PROJECT B-3900

COUNTY ROCKINGHAM

DATE 4-17-07

Volumes in Cubic _____

COMPILED BY: RCK

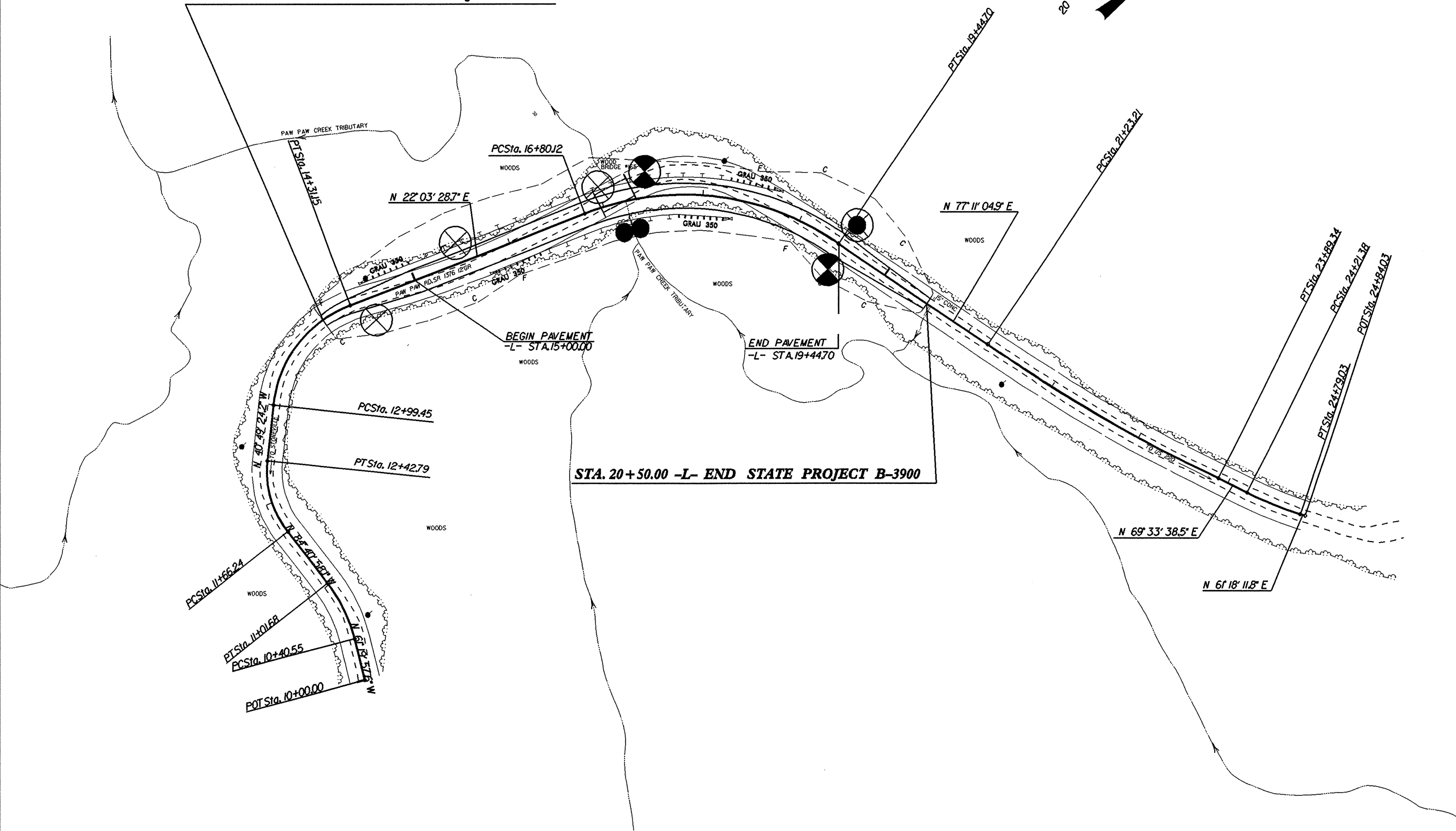
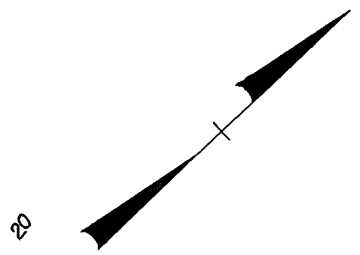
SHEET 3A OF 11 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 20%		ROCK	SUITABLE	UNSUIT.	TOTAL
13+50.00	20+50.00	1107			970	137	4776		4776	5731	5594			970	970
18+75.00	20+50.00			259			259		259	311	311			259	259
PROJECT SUBTOTAL		1107		259	970	137	5035		5035	6042	5905			1229	1229
LOSS DUE TO CLEARING AND GRUBBING		-90									90				
Est. Undercut				100			100		100	120	120			100	100
PROJECT TOTAL		1017		359	970		5135		5135	6162	6115			1329	1329
EST. 5% TO REPLACE TOPSOIL ON BORROW PITS											306				
GRAND TOTAL		1017		359							6421				
SAY		1020		365							6500				
DDE= 45 CY															
-L- PAVEMENT STRUCTURE VOLUME = 64 CY															

"EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT."

15
STA. 14+00.00 -L- BEGIN STATE PROJECT B-3900

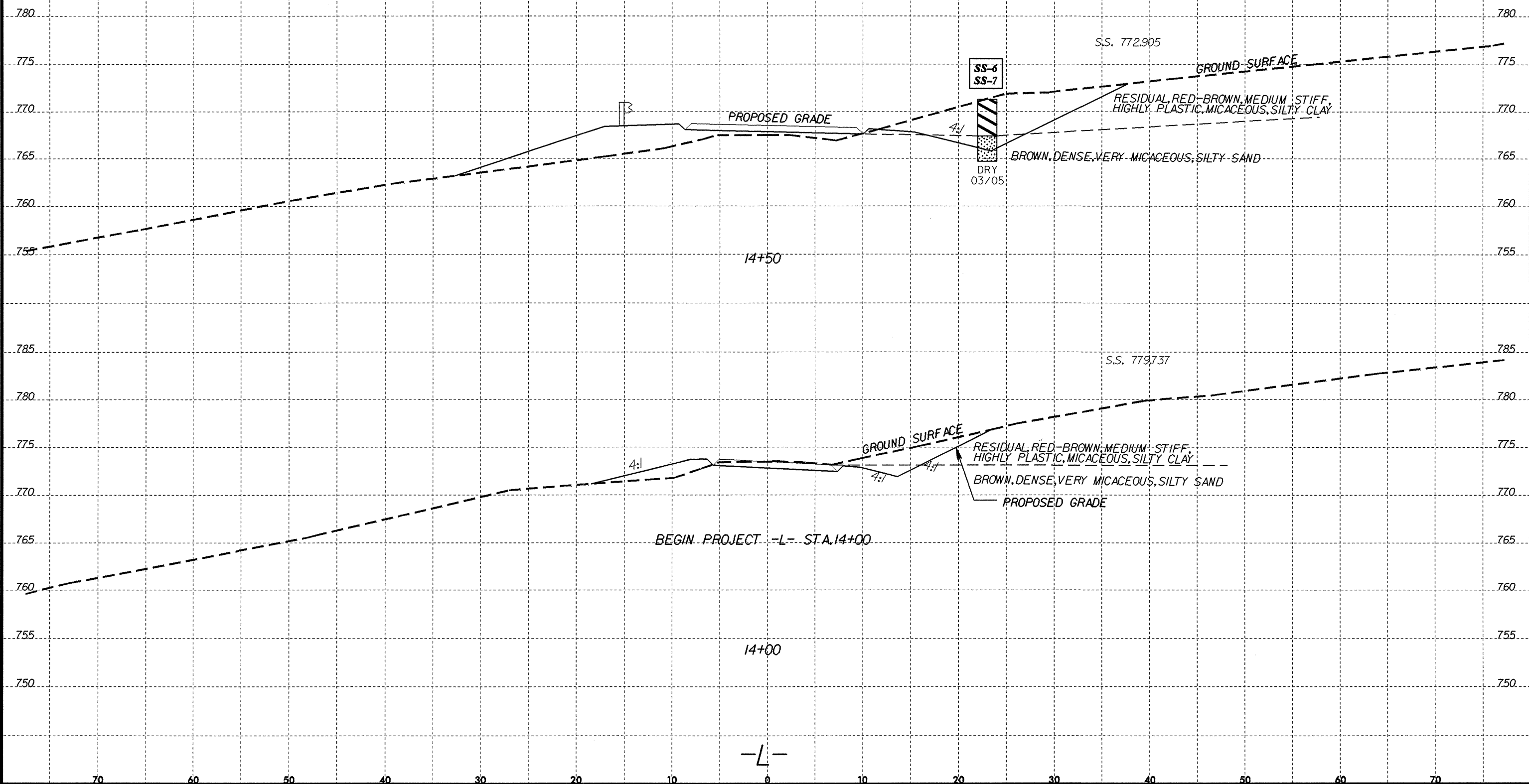
STA. 20+50.00 -L- END STATE PROJECT B-3900



FOR -L- PROFILE SEE SHEET 5

02/03/98

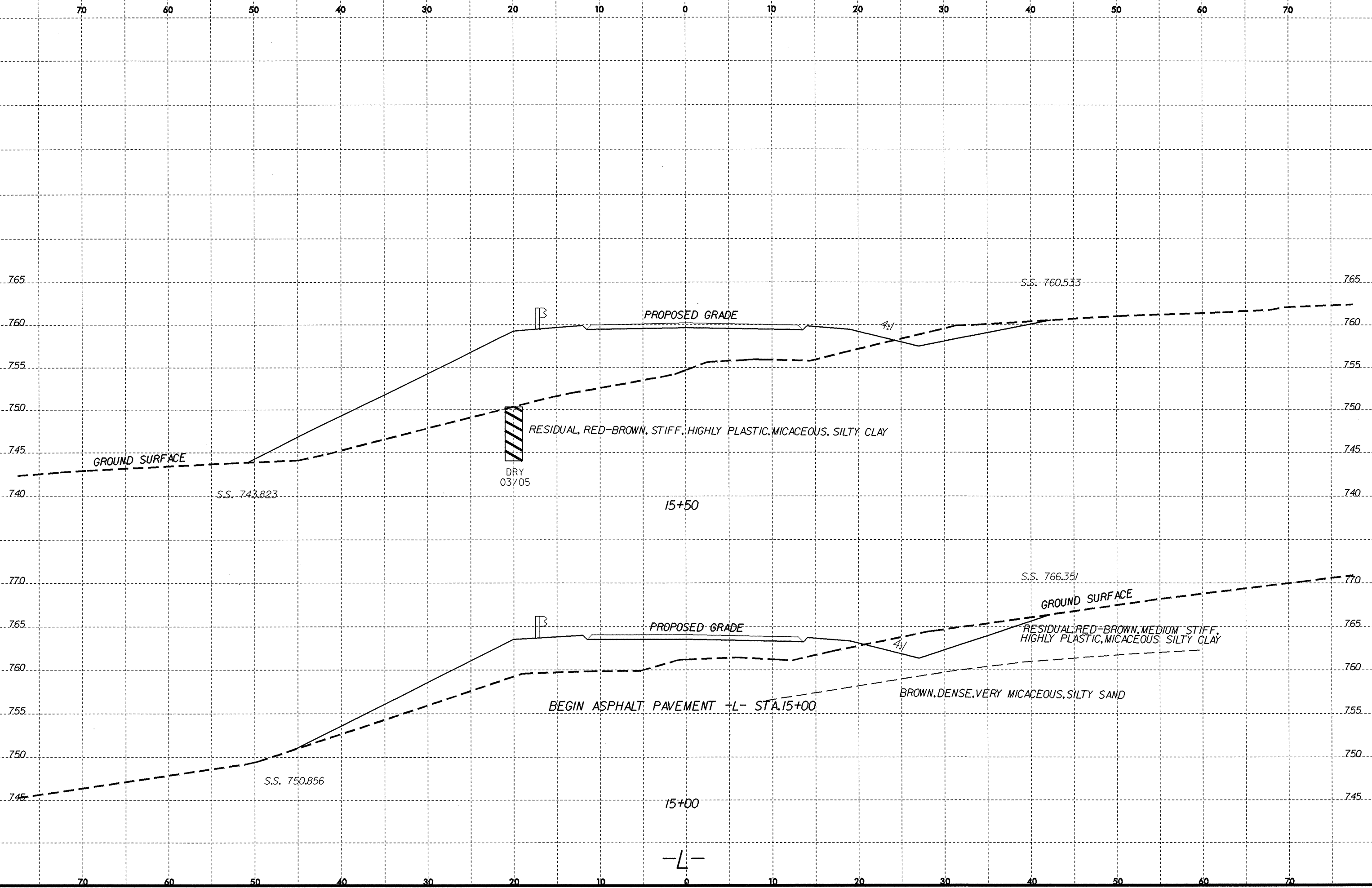
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-6	23 RT	14+50	1.5-3.0	A-7-5(27)	70	37	9.8	21.7	16.3	52.2	99	94	70		
SS-7	23 RT	14+50	4.5-6.0	A-2-5(0)	51	NP	35.9	36.1	13.9	14.1	100	84	32		



retion\tp\39900\geotech\oaddd-geotech\asc\39000_geo_xsi.i.dgn
c:\jca AT 06/21/00

02/03/98

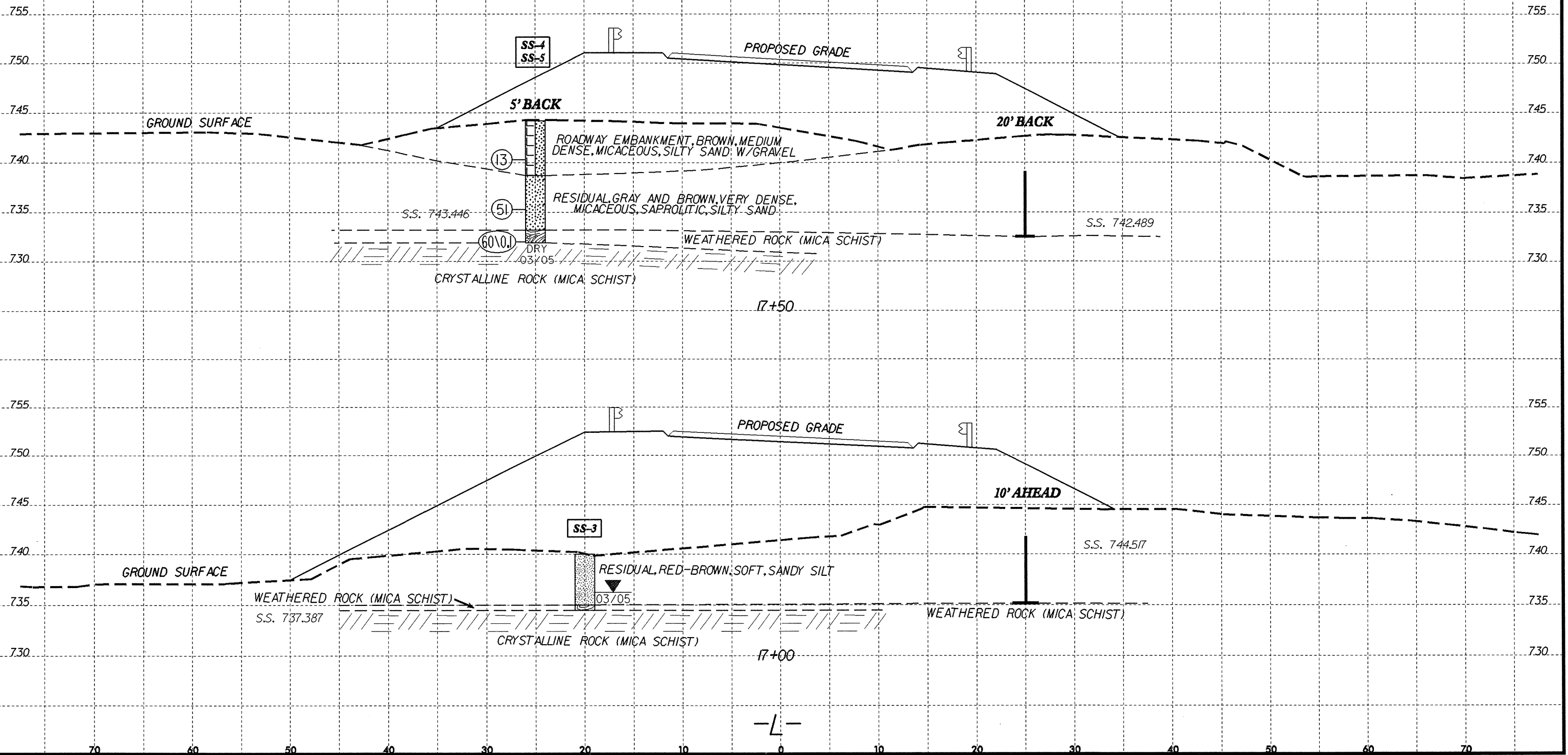
PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
33336.1.1	6	11



29-APR-2005 12:03
 jaton\trip\33336\load-geotech\yso\b39000_geo_xst1.ldgn
 czb,jke

SOIL TEST RESULTS

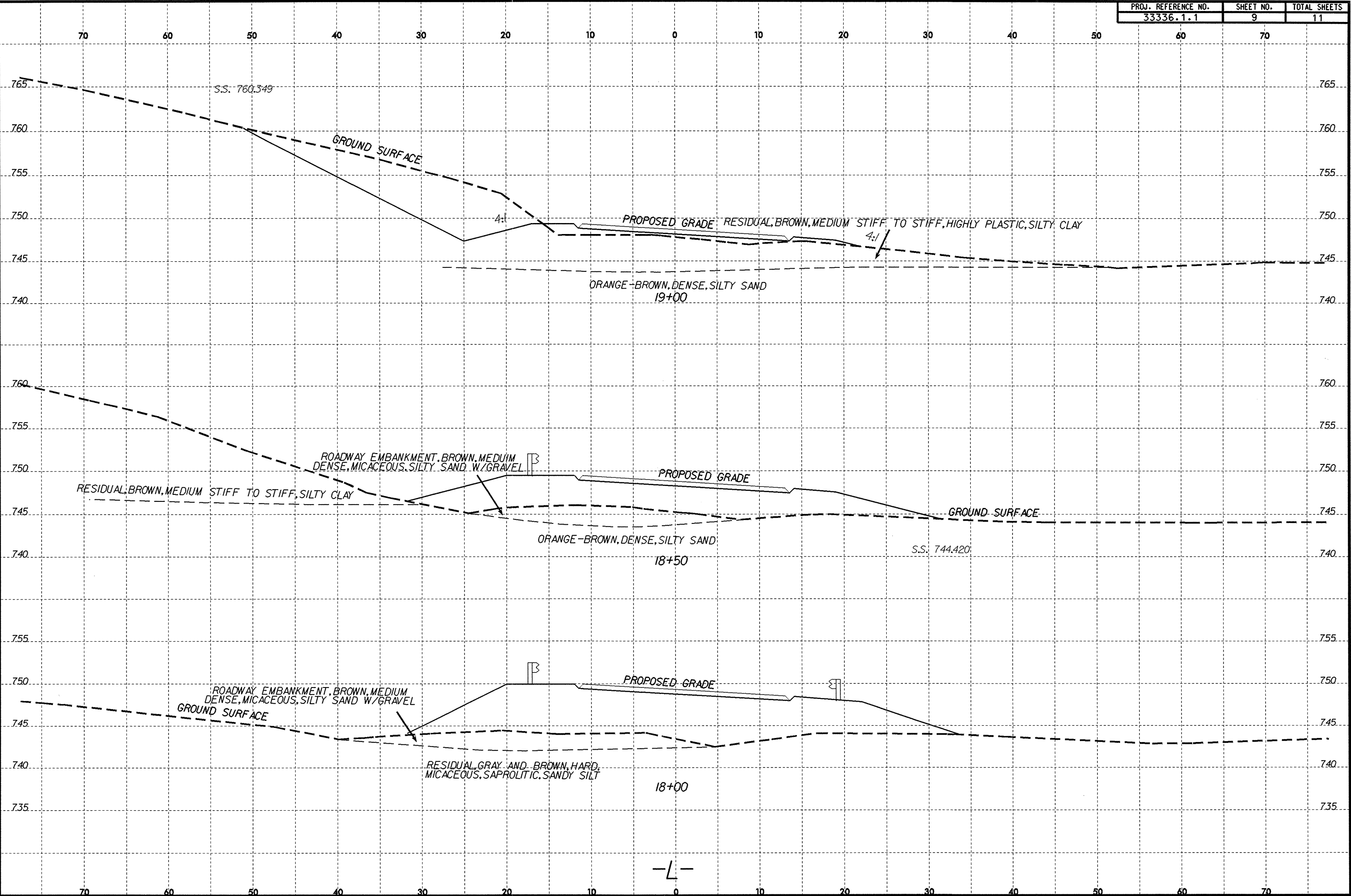
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-3	20 LT	17+00	3.7-5.2	A-4(0)	29	NP	13.9	49.0	19.1	18.1	98	94	37		
SS-4	25 LT	17+45	3.9-5.4	A-2-4(0)	24	NP	35.7	41.2	9.0	14.1	67	57	18		
SS-5	25 LT	17+45	8.9-10.4	A-2-4(0)	40	NP	39.6	43.0	13.5	4.0	86	68	20		



02.03/98
 29-APR-2005 12:02
 c:\p1\proj\33336\cadd\geotech\so\b3900-geo_xsi_1.dgn
 geojka

-L-

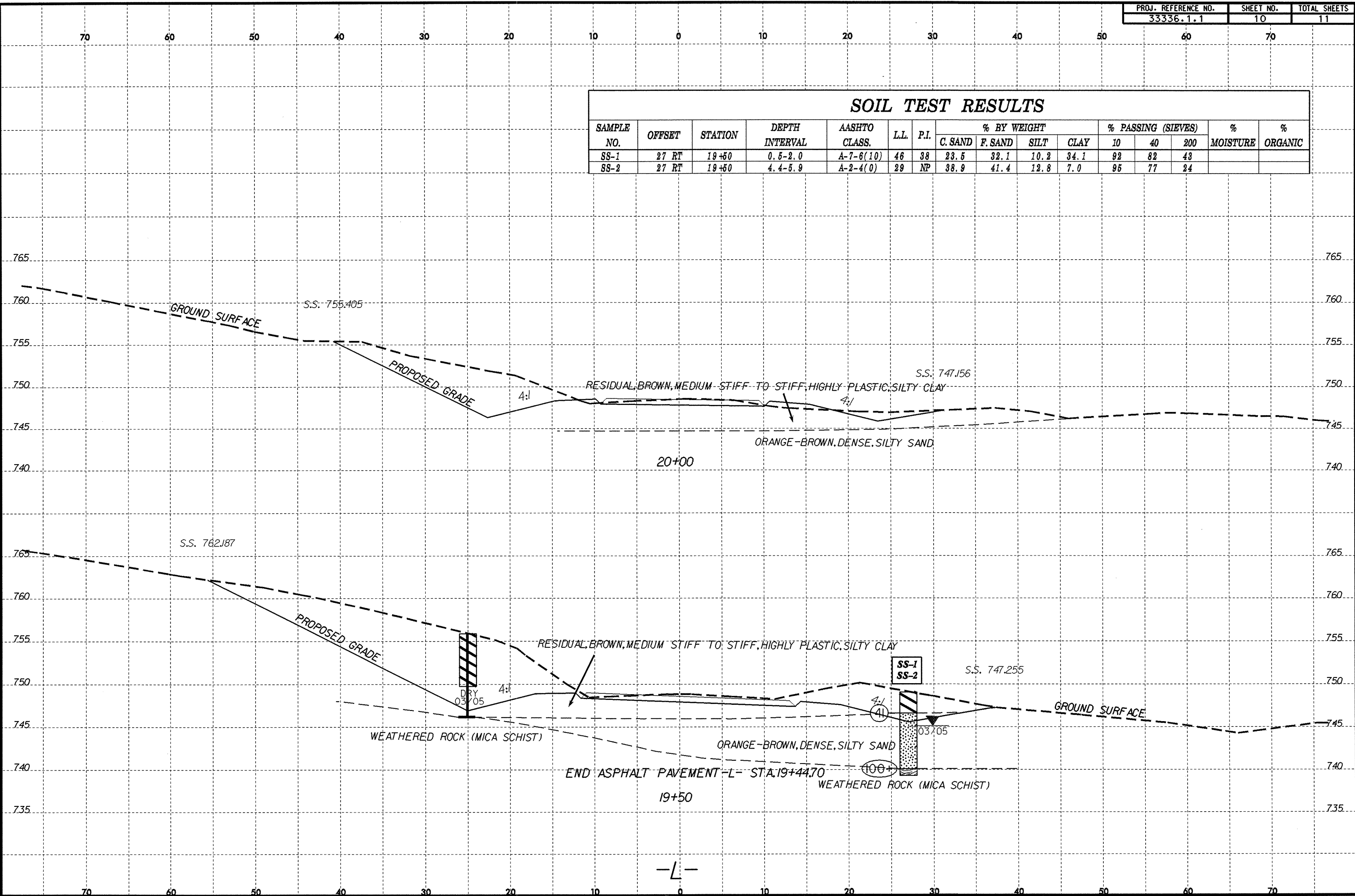
02/03/98



29-APR-2005 12:02
 revton\vip_b3300\geogrd\addr\geotech\aso_b3900_geo_xsi_1.dgn
 czs,jka

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	27 RT	19+50	0.5-2.0	A-7-6(10)	46	38	23.5	32.1	10.2	34.1	92	82	43		
SS-2	27 RT	19+50	4.4-5.9	A-2-4(0)	29	NP	38.9	41.4	12.8	7.0	95	77	24		



02/03/98
 29-APR-2005 12:01
 jettion\top_b3300\geotech\road\oadd\geotech\asc_b3900_geo_xsi_1.dgn
 ccajka AT 03/21/98

-L-

