

# STATE OF NORTH CAROLINA

## DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

### GEOTECHNICAL UNIT

# SUBSURFACE INVESTIGATION

STATE PROJECT 34953.1.1 I.D. NO. U-3462

F.A. PROJECT STP-1357(2)

COUNTY BRUNSWICK

DESCRIPTION EXTENSION OF SR 1357 FROM WEST OF  
US 17 BUSINESS TO NC 130 IN SHALLOTTE  
(REVISED INVENTORY)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3462	1	15
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34953.1.1	STP-1357(2)	PE	
34953.2.2	STP-1357(2)	R/W & UTIL	
34953.3.2	STP-1357(2)	CONST.	

### CAUTION NOTICE

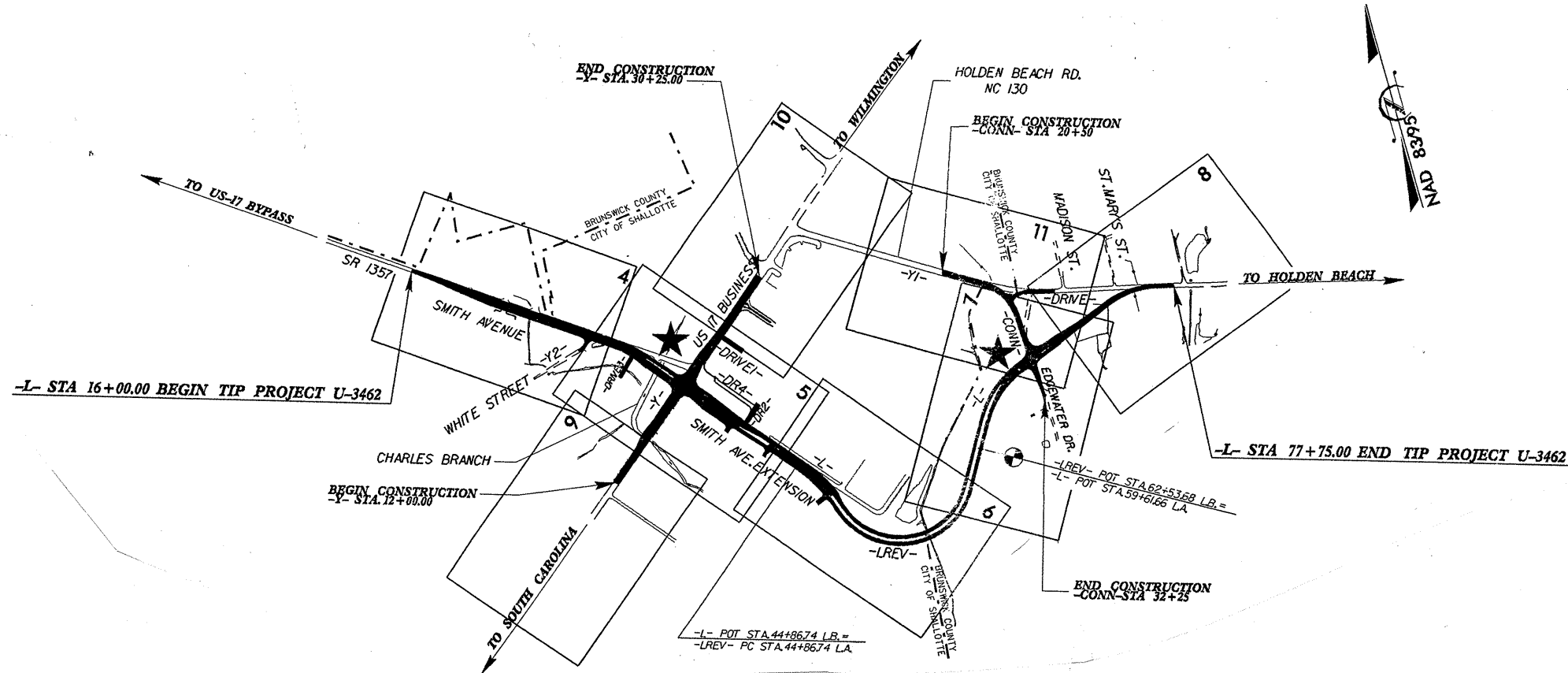
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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 (ON-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.

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LINE	STATION	SHEET NO.
-L-	16+00 TO 44+86	4-6, 12-13
-L-	59+61 TO 77+75	7-8, 13, 14
-LREV-	44+86 TO 62+59	6-7, 13
-CONN-	24+00 TO 32+25	7-11, 14
-DRIVE-	10+18 TO 12+00	11, 15
-Y2REV-	13+50 TO 14+49	4, 15



INVESTIGATED BY FMW PERSONNEL KBQ  
 CHECKED BY FMW JAH  
 SUBMITTED BY DNA LWD  
 DATE DECEMBER, 2004 JLS

12-21-04

SEAL

D. N. ARGENBRIGHT

SIGNATURE

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.

DRAWN BY: FMW

ID: U-3462

CONTRACT: C202027

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS  
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
U-3462	34953.1.1	2	15

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>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</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)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>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.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>				<p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>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.</p> <p>CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>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.</p> <p>SAPROLITE (SAP) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>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.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN 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.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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.</p> <p>TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																				
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (&gt;5% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (&gt;5% PASSING #200)</th> <th colspan="4">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-3</th> <th>A-6, A-7</th> <th colspan="2"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="2"></td> </tr> <tr> <th>% PASSING</th> <td>50 MM</td> <td>10 MM</td> <td>4.75 MM</td> <td>2.0 MM</td> <td>0.85 MM</td> <td>0.425 MM</td> <td>0.25 MM</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <th>LIQUID LIMIT INDEX</th> <td>6</td> <td>N.P.</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> <td>30</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS, GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>4 MX</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <th>GEN. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30</p> <p>MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50</p> <p>HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p>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</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt;10%</td> <td>&gt;20%</td> <td>HIGHLY</td> </tr> </table> <p>GROUND WATER</p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.</p> <p>▽ STATIC WATER LEVEL AFTER 24 HOURS.</p> <p>▽ PW PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA</p> <p>○ SPRING OR SEEPAGE</p>				ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p>WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V. SLT.) 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.</p> <p>SLIGHT (SLT.) 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.</p> <p>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.</p> <p>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. IF TESTED, WOULD YIELD SPT REFUSAL.</p> <p>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. IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF.</p> <p>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. IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF.</p> <p>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>			
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<p>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></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		IN. 12"	3"					<p>ABBREVIATIONS</p> <p>AR - AUGER REFUSAL</p> <p>BT - BORING TERMINATED</p> <p>CL - CLAY</p> <p>CPT - CONE PENETRATION TEST</p> <p>CSE - COARSE</p> <p>DMT - DILATOMETER TEST</p> <p>DPT - DYNAMIC PENETRATION TEST</p> <p>ε - VOID RATIO</p> <p>F - FINE</p> <p>FOSS - FOSSILIFEROUS</p> <p>FRAC. - FRACTURED</p> <p>FRAGS. - FRAGMENTS</p> <p>MED. - MEDIUM</p> <p>PMT - PRESSUREMETER TEST</p> <p>SD. - SAND, SANDY</p> <p>SL. - SILT, SILTY</p> <p>SLI. - SLIGHTLY</p> <p>TCR - TRICONE REFUSAL</p> <p>γ - UNIT WEIGHT</p> <p>γ<sub>d</sub> - DRY UNIT WEIGHT</p> <p>w - MOISTURE CONTENT</p> <p>v - VERY</p> <p>VST - VANE SHEAR TEST</p>																																																																																																									
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

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

LYNDO TIPPETT  
SECRETARY

December 21, 2004

STATE PROJECT: 34953.1.1 U-3462  
FEDERAL PROJECT: STP-1357(2)  
COUNTY: Brunswick  
DESCRIPTION: Extension of SR 1357 from West of US 17 Business to NC 130 in Shallotte  
SUBJECT: Geotechnical Report –Revised Inventory

**Project Description**

**This report supercedes the Inventory report dated May 25, 2004.**

The project consists of upgrading SR 1357 to a 4-lane median divided and 5-lane facility from 0.4 miles west of the existing SR 1375/US 17 Business intersection to NC 130. Construction from just west of US 17 Business to NC 130 will be along a new location. Length of the project is 1.17 miles. The geotechnical investigation of subsurface conditions was confined to the corridor of proposed new construction.

The following survey lines were investigated for this project:

<u>Line</u>	<u>Station(±)</u>
-L-	16+00 to 44+86
-L-	59+61 to 77+75
-LREV-	44+86 to 62+59
-CONN-	24+00 to 32+25
-DRIVE-	10+18 to 12+00
-Y2REV-	13+50 to 14+49

**Areas of Special Geotechnical Interest**

1) A high water table, seasonal high ground water or the potential for ground water related construction problems occur through the following sections:

<u>Line</u>	<u>Station (±)</u>
-L-	16+00 to 42+00
-L-	59+61 to 77+75
-LREV-	61+00 to 62+53
-CONN-	24+50 to 32+25
-DRIVE-	10+18 to 12+00
-Y2REV-	13+50 to 14+49

2) The following sections contain cohesive soils which have the potential to cause subgrade failure during construction. Typically, the cohesive soils exhibit medium to high plasticity indices and relatively high moisture contents:

<u>Line</u>	<u>Station (±)</u>
-L-	20+50 to 23+50
-L-	30+50 to 31+50
-L-	32+50 to 33+25
-L-	37+00 to 44+00
-L-	68+50 to 70+50
-L-	75+00 to 77+75
-LREV-	46+00 to 55+50
-LREV-	60+50 to 62+53
-CONN-	26+50 to 32+25

3) Flood plain soils primarily occur from -L- station 33+50 to 34+80(±).

**Physiography and Geology**

The project is located within the Lower Coastal Plain Physiographic Province. Topography is gently sloping to level and typical of the region. Elevations range from a high of 35± feet at the beginning of the project to mean sea level in the channel of Charles Branch located near US 17 Business. The remainder of the project from US 17 Business to NC 130 typically lies at elevations ranging between 10 and 20 feet above sea level.

The geology of the project area basically consists of Pleistocene to Recent age fluvial and coastal plain sediments. Natural drainage is provided by tributaries of the Shallotte River.

**Ground Water**

Ground water data was collected in March and November 2004 during below average rainfall conditions. Ground water depths generally range from 2 to 6± feet or more along the majority of the upland portions of the project. However, in nearly level sections with poor natural drainage, ground water typically occurs at depths of 1 to 2 feet or less.

Water levels in the flood plain sections typically occur at or near the natural ground surface.

### Soils

Soils encountered along the project corridor are derived from marine, eolian and fluvial sediments deposited in the geologic past.

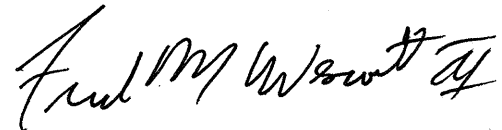
Upland soils typically consist of a veneer of very loose to loose fine sand (A-2-4) underlain by beds of very loose to medium dense fine to coarse sand (A-2-4, A-3), clayey sand (A-2-6), medium stiff to stiff sandy to silty clay (A-6, A-7-6) and soft to medium stiff clayey sandy silt (A-4) interbedded with silty sandy clay (A-6).

Engineering properties of the cohesive upland soils range from fair to poor with the poor quality clay soils typically exhibiting plasticity indices of 20 to 30 or more and natural moisture contents of 24 to 29 percent. The granular soils exhibit good to excellent engineering properties.

Flood plain soils primarily occur adjacent to Charles Branch and are typically covered by 5± feet of very loose to loose granular fill (A-2-4). The flood plain soils generally consist of 0.5 to 1.0± foot of very soft slightly organic sandy silt (A-4, A-5) and exhibit poor engineering properties.

Root mat occurs in wooded upland areas with a typical thickness of 0.2 feet.

Respectfully submitted,



Fred M. Wescott III  
Project Engineering Geologist

NWW/FMW

**EARTHWORK BALANCE SHEET**

PROJECT NO. :

**U-3462**

COUNTY:

**BRUNSWICK**

PREPARED: JBT 5/21/2008

CHECKED: CJT 7/7/2008 iy

LOCATION	EXCAVATION CU. YDS					EMBANKMENT CU. YDS					WASTE CU. YDS		
	TOTAL UNCL EXCA	EARTH EXCAVATION	EARTH SUITABLE	EARTH UNSUIT.	UNDERCUT	TOTAL EMBANKMENT	EARTH EMBANKMENT	EMBANKMENT PLUS 25%	BORROW (CY.)	SUITABLE	UNSUITABLE	TOTAL WASTE	
<b>SUMMARY NO. 1</b>													
L 29+50 to 33+00 LT (temp widen)	92	92	83	9		20	20	25		58	9	67	
L 16+00 to 33+50 LT	819	819	737	82		795	795	994	257		82	82	
L 16+00 to 33+50 RT	4916	4916	4424	492	738	2633	2633	3291		1133	1230	2363	
L 33+50 to 35+00	2198	2198	1978	220		647	647	809		1169	220	1389	
Y2rev 13+00 to 14+00	131	131	118	13		19	19	24		94	13	107	
DRIVE3 10+40 TO 12+00	395	395	356	40		163	163	204		152	40	191	
<b>SUMMARY NO. 1 TOTAL</b>	<b>8551</b>	<b>8551</b>	<b>7696</b>	<b>855</b>	<b>738</b>	<b>4277</b>	<b>4277</b>	<b>5346</b>	<b>257</b>	<b>2606</b>	<b>1593</b>	<b>4199</b>	
<b>SUMMARY NO. 2</b>													
L 36+50 to LREV 62+53.68 L.B.	13464	13464	12118	1346	3724	18580	18580	23225	11107		5070	5070	
Y 11+50 TO 29+50	3106	3106	2795	311		474	474	593		2203	311	2514	
DR2 10+50 TO 11+75	14	14	13	1		101	101	126	114		1	1	
<b>SUMMARY NO. 2 TOTAL</b>	<b>16584</b>	<b>16584</b>	<b>14926</b>	<b>1658</b>	<b>3724</b>	<b>19155</b>	<b>19155</b>	<b>23944</b>	<b>11221</b>	<b>2203</b>	<b>5382</b>	<b>7585</b>	
<b>SUMMARY NO. 3</b>													
L 59.61+66 L.A. TO 77+75	3238	3238	2914	324		9524	9524	11905	8991		324	324	
CONN 20+50 TO 28+50	241	241	217	24		1842	1842	2303	2086		24	24	
CONN 30+50 TO 32+25	163	163	147	16		79	79	99		48	16	64	
DRIVE 10+50 TO 12+00	85	85	77	9		122	122	153	76		9	9	
<b>SUMMARY NO. 3 TOTAL</b>	<b>3727</b>	<b>3727</b>	<b>3354</b>	<b>373</b>		<b>11567</b>	<b>11567</b>	<b>14459</b>	<b>11152</b>	<b>48</b>	<b>373</b>	<b>421</b>	
<b>PROJ SUMMARY TOTALS</b>	<b>28862</b>	<b>28862</b>	<b>25976</b>	<b>2886</b>	<b>4462</b>	<b>34999</b>	<b>34999</b>	<b>43749</b>	<b>22630</b>	<b>4857</b>	<b>7348</b>	<b>12205</b>	
WASTE IN LIEU OF BORROW									-4857	-4857		-4857	
Additional Est Undercut					1850	1850	1850	2313	2313		1850	1850	
EST. SHOULDER MATERIAL						2460	2460	3075	3075				
<b>PROJECT TOTAL</b>	<b>28862</b>			<b>2886</b>	<b>6312</b>	<b>39309</b>	<b>39309</b>	<b>49136</b>	<b>23160</b>		<b>9198</b>	<b>9198</b>	
EST 5% TO REPL. SOIL AT BORR PIT									1158				
<b>GRAND TOTAL</b>	<b>28862</b>				<b>6312</b>				<b>24318</b>		<b>9198</b>	<b>9198</b>	
<b>SAY</b>	<b>29,000</b>				<b>6350</b>				<b>24,500</b>				
APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".													
ESTIMATED DDE = 875 CY	Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface date provided by the Geotechnical Engineering Unit.												

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3462	3	15
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
34953.1.1	STP-1357(2)	PE	



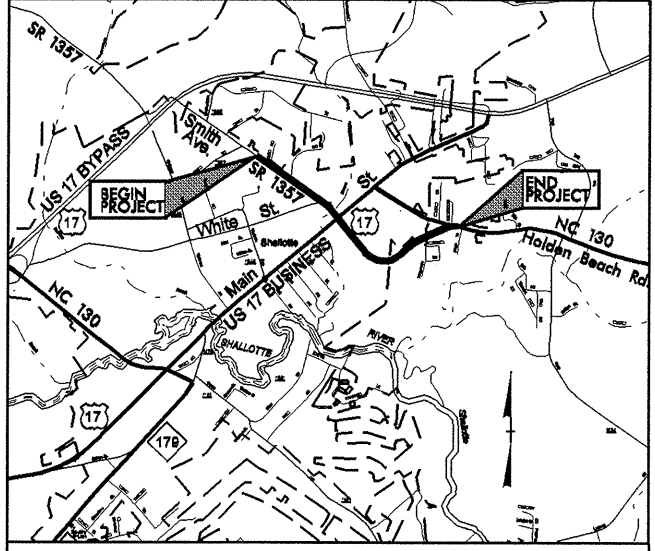
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BRUNSWICK COUNTY**

LOCATION: EXTENSION OF SR 1357 FROM WEST OF  
US 17 BUSINESS TO NC 130 IN SHALLOTTE

TYPE OF WORK: GRADING, WIDENING, DRAINAGE, PAVING, CURB AND  
GUTTER, CULVERTS, AND TRAFFIC SIGNALS

See Sheet 1-A For Index of Sheets

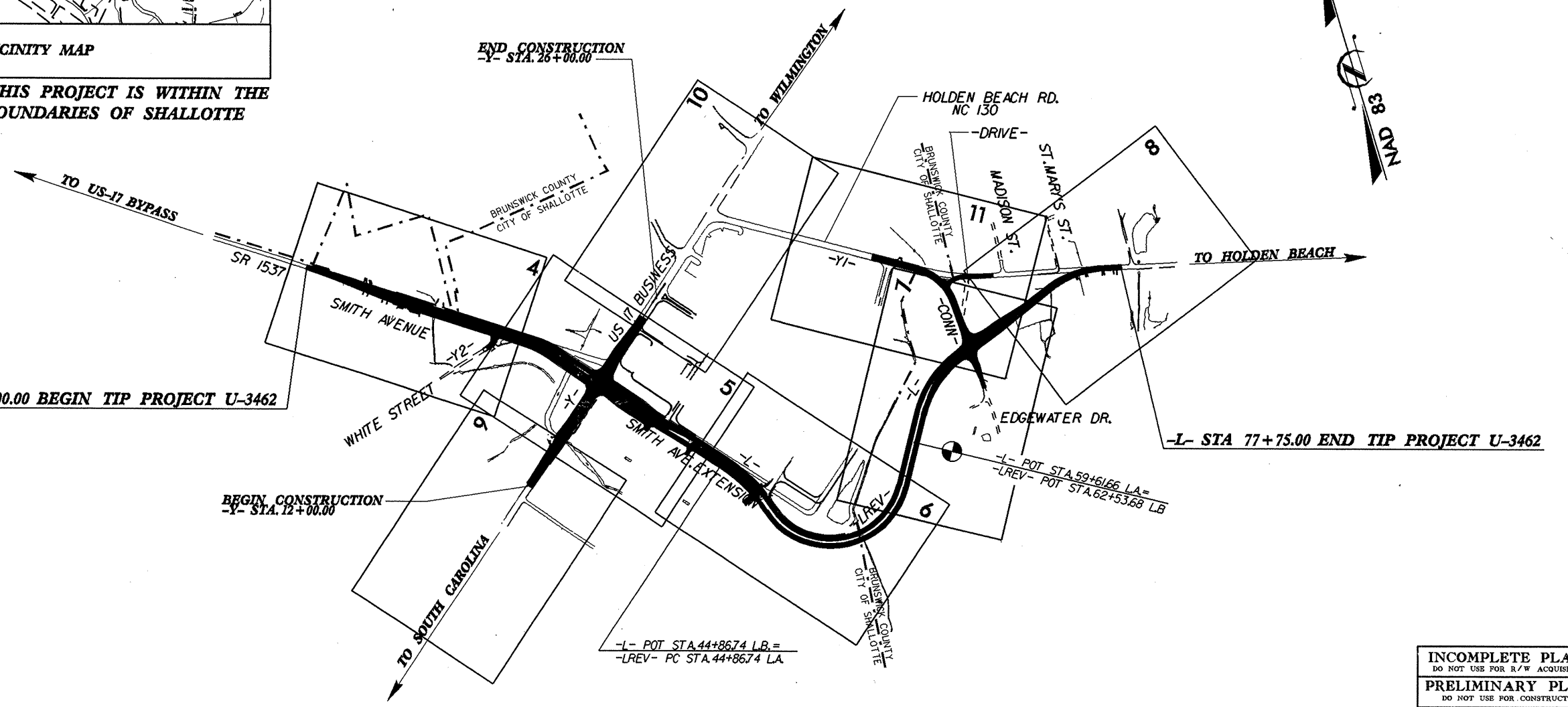


VICINITY MAP

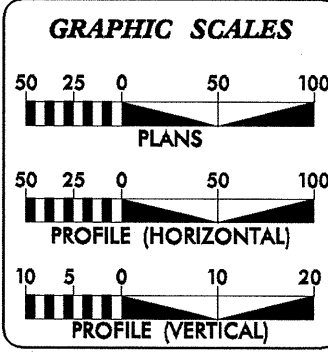
A PORTION OF THIS PROJECT IS WITHIN THE  
MUNICIPAL BOUNDARIES OF SHALLOTTE

CONTRACT: TIP PROJECT: U-3462

CONTRACT:



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



**DESIGN DATA**

ADT 2003 =	11,776
ADT 2025 =	18,800
DHV =	10 %
D =	55 %
T =	3 % *
V =	40 MPH
* TTST 1%	DUAL 2%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-3462 =	1.225 MILES
TOTAL LENGTH OF TIP PROJECT U-3462 =	1.225 MILES

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 17, 2005	G. E. BREW, PE PROJECT ENGINEER
LETTING DATE: JUNE 19, 2007	I.T. YOUNIS 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

13-DEC-2004 08:31  
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JBThompson AT









8/17/09

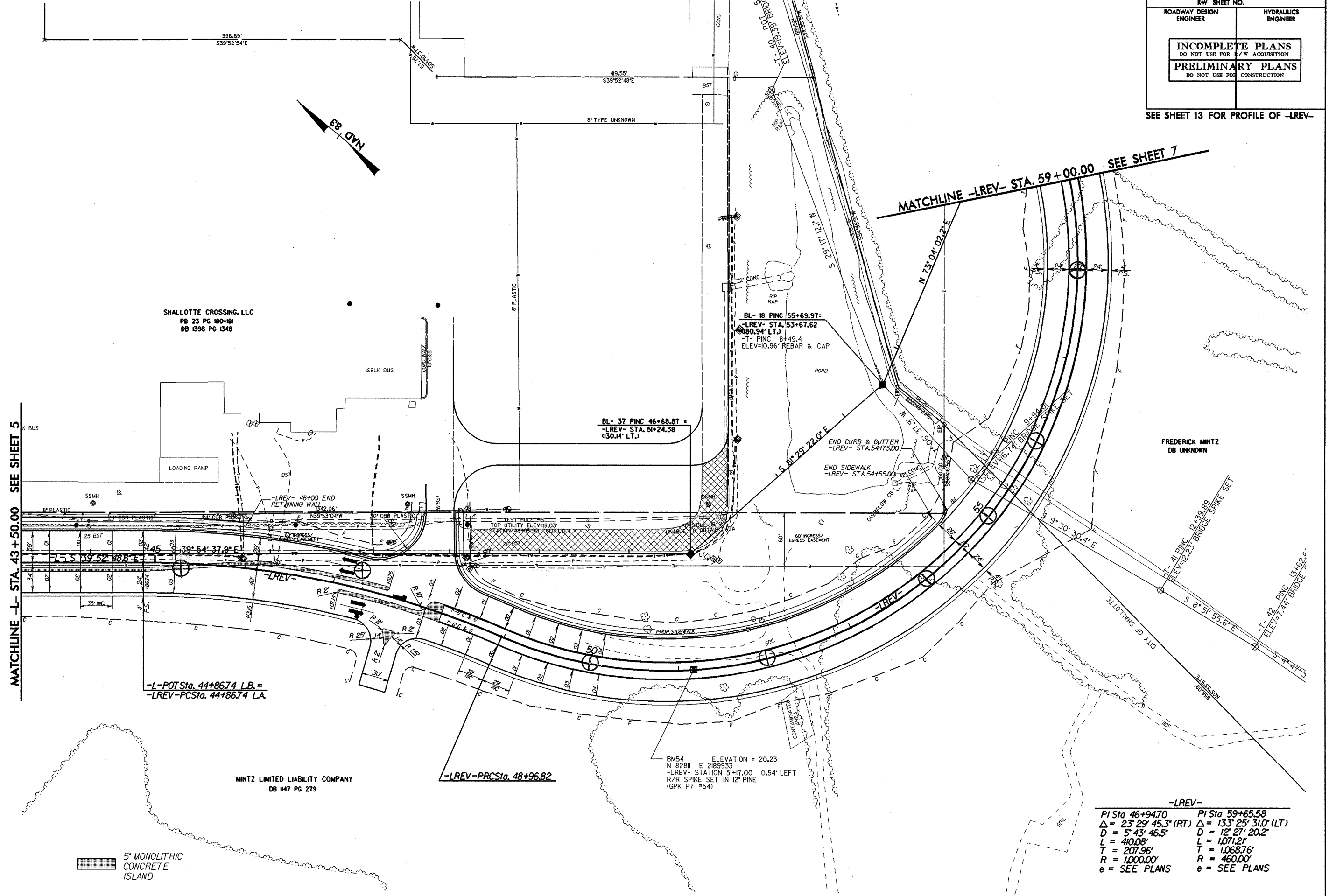
PROJECT REFERENCE NO. U-3462	SHEET NO. 6
R/W SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

SEE SHEET 13 FOR PROFILE OF -LREV-

REVISIONS

MATCHLINE -L- STA. 43+50.00 SEE SHEET 5

MATCHLINE -LREV- STA. 59+00.00 SEE SHEET 7



SHALLOTTE CROSSING, LLC  
 PB 23 PG 180-181  
 DB 1398 PG 1348

LOADING RAMP

MINTZ LIMITED LIABILITY COMPANY  
 DB #47 PG 279

FREDERICK MINTZ  
 DB UNKNOWN

5' MONOLITHIC  
 CONCRETE  
 ISLAND

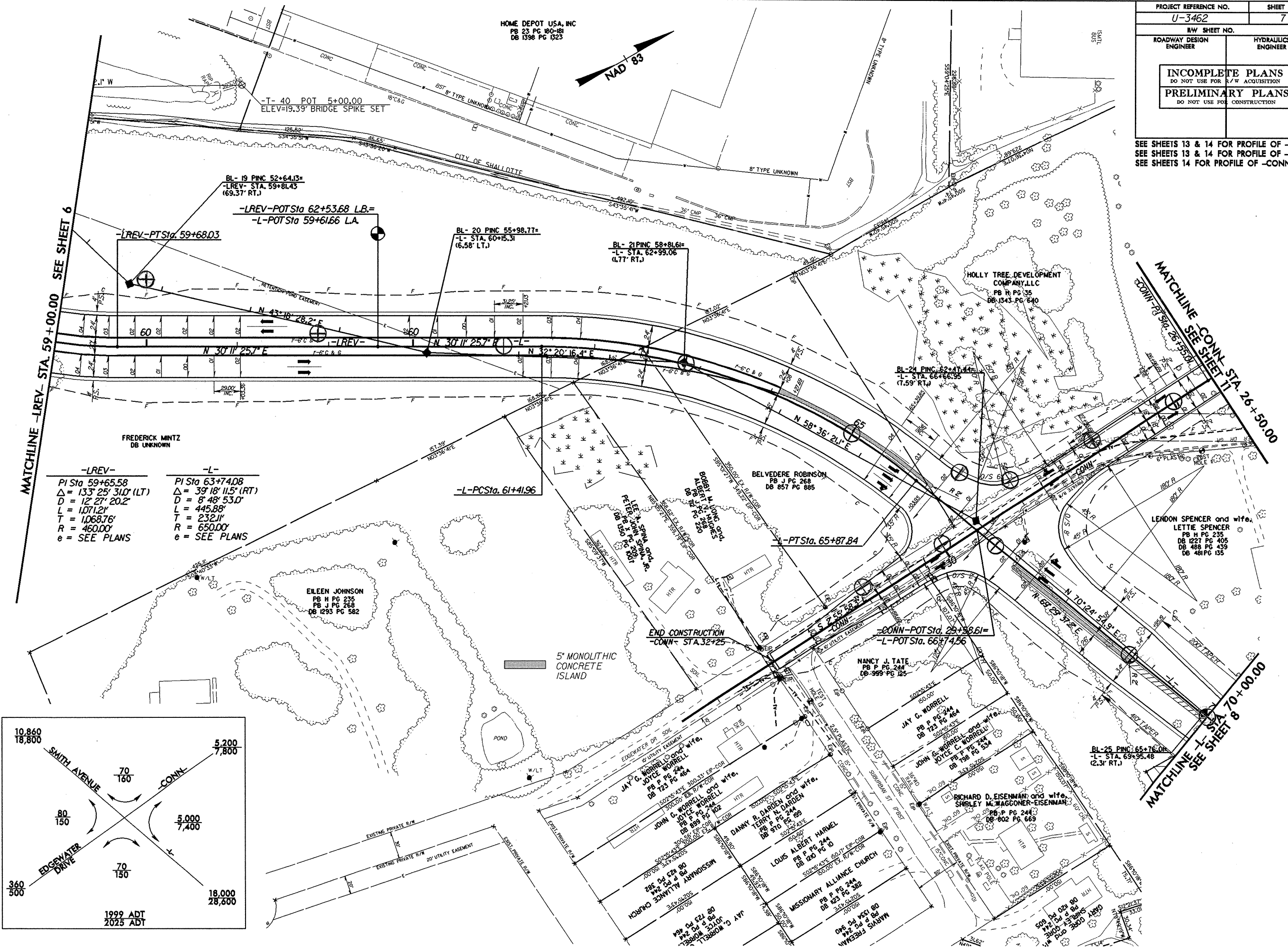
-LREV-	
PI Sta 46+94.70	PI Sta 59+65.58
$\Delta = 23' 29' 45.3" (RT)$	$\Delta = 133' 25' 31.0" (LT)$
$D = 5' 43' 46.5"$	$D = 12' 27' 20.2"$
$L = 410.08'$	$L = 1,071.21'$
$T = 207.96'$	$T = 1,068.76'$
$R = 1,000.00'$	$R = 460.00'$
$e = \text{SEE PLANS}$	$e = \text{SEE PLANS}$

DEC-2004 08:33  
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 B.T. Thompson

8/17/99

PROJECT REFERENCE NO. U-3462	SHEET NO. 7
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

SEE SHEETS 13 & 14 FOR PROFILE OF -LREV-  
 SEE SHEETS 13 & 14 FOR PROFILE OF -L-  
 SEE SHEETS 14 FOR PROFILE OF -CONN-

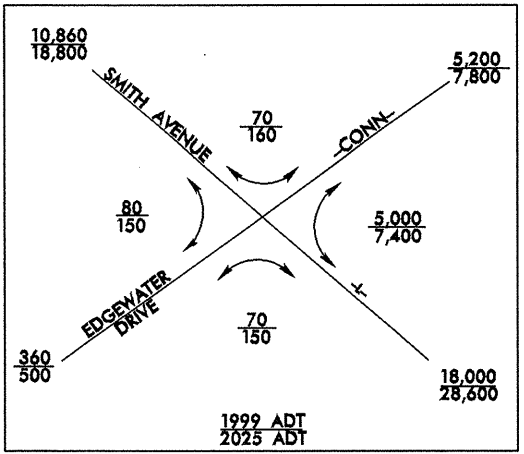


MATCHLINE -LREV- STA. 59+00.00 SEE SHEET 6

MATCHLINE -L- STA. 26+50.00 SEE SHEET 11

MATCHLINE -L- STA. 70+00.00 SEE SHEET 8

-LREV-	-L-
PI Sta 59+65.58	PI Sta 63+74.08
$\Delta = 133' 25' 31.0''$ (LT)	$\Delta = 39' 18' 11.5''$ (RT)
$D = 12' 27' 20.2''$	$D = 8' 48' 53.0''$
$L = 1,071.21'$	$L = 445.88'$
$T = 1,068.76'$	$T = 232.11'$
$R = 460.00'$	$R = 650.00'$
$e = \text{SEE PLANS}$	$e = \text{SEE PLANS}$



REVISIONS

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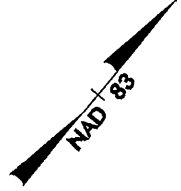
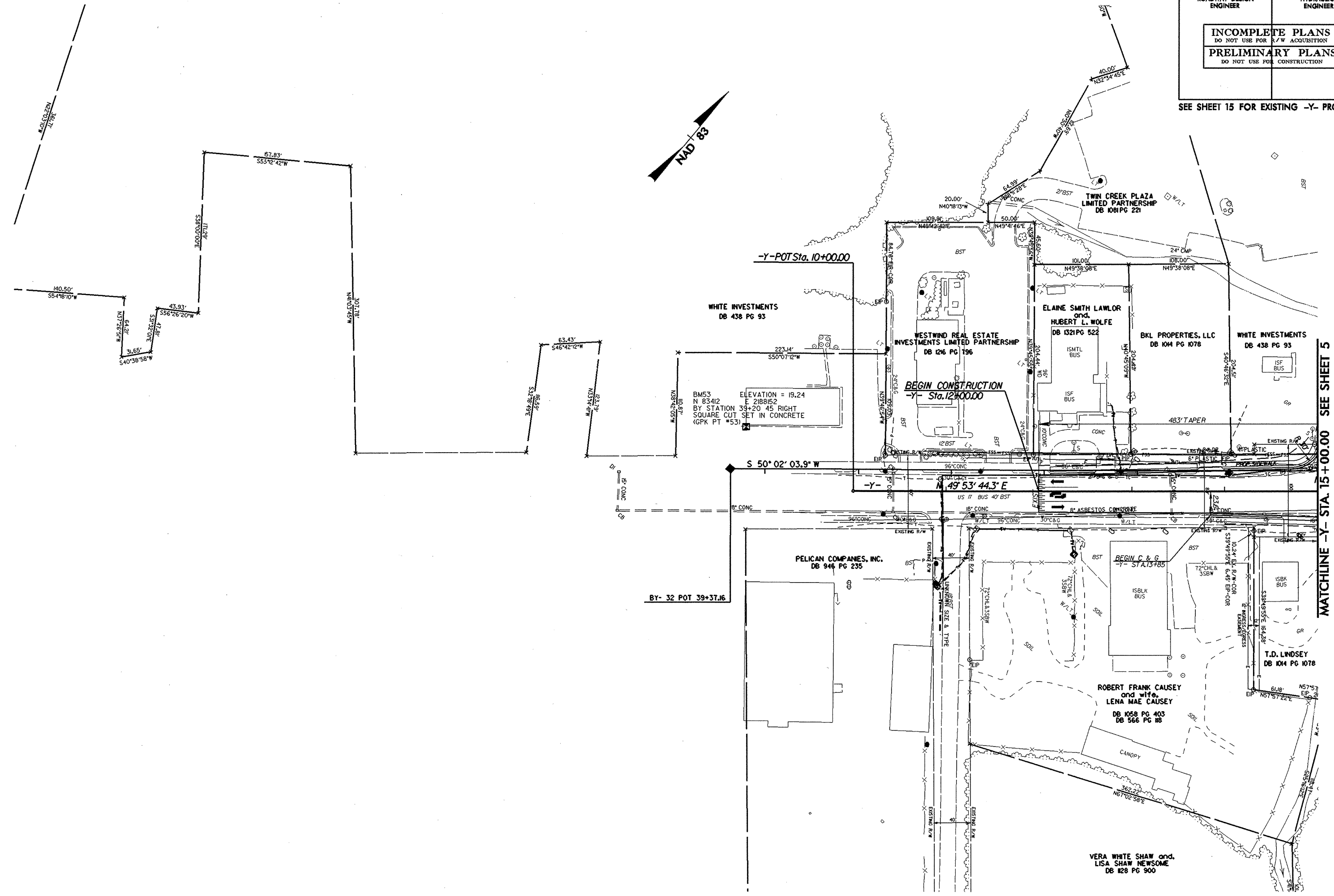
8/17/99

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I:\Roadway\Proj\U3462\_rdu\_psh09.dgn  
B Thomason - H

REVISIONS

PROJECT REFERENCE NO. U-3462	SHEET NO. 9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

SEE SHEET 15 FOR EXISTING -Y- PROFILE



MATCHLINE -Y- STA. 15+00.00 SEE SHEET 5

-Y- POT Sta. 10+00.00

BEGIN CONSTRUCTION  
-Y- Sta. 12+00.00

BY- 32 POT 39+37.16

VERA WHITE SHAW and  
LISA SHAW NEWSOME  
DB #28 PG 900

PELICAN COMPANIES, INC.  
DB 946 PG 235

ROBERT FRANK CAUSEY  
and wife,  
LENA MAE CAUSEY  
DB 1058 PG 403  
DB 566 PG 18

T.D. LINDSEY  
DB 1014 PG 1078

ELAINE SMITH LAWLOR  
and  
HUBERT L. WOLFE  
DB 1321 PG 522

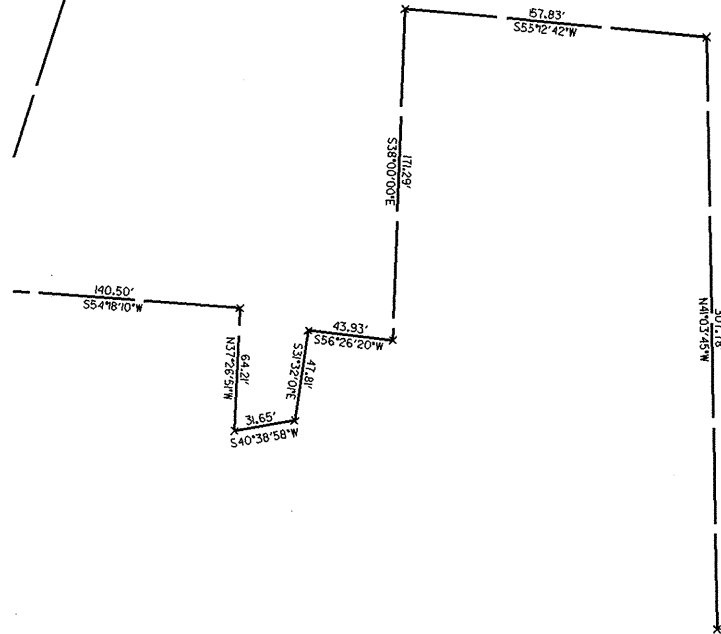
BKL PROPERTIES, LLC  
DB 1014 PG 1078

WHITE INVESTMENTS  
DB 438 PG 93

WESTWIND REAL ESTATE  
INVESTMENTS LIMITED PARTNERSHIP  
DB 1216 PG 796

WHITE INVESTMENTS  
DB 438 PG 93

TWIN CREEK PLAZA  
LIMITED PARTNERSHIP  
DB 1081 PG 221



BM53 ELEVATION = 19.24  
N 83.412 E 2188152  
BY STATION 39+20.45 RIGHT  
SQUARE CUT SET IN CONCRETE  
(GPK PT \*53)

S 50° 02' 03.9\"/>

N 49° 53' 44.3\"/>

US 11 BUS 40' BST

18\"/>

96\"/>

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING R/W

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EXISTING R/W

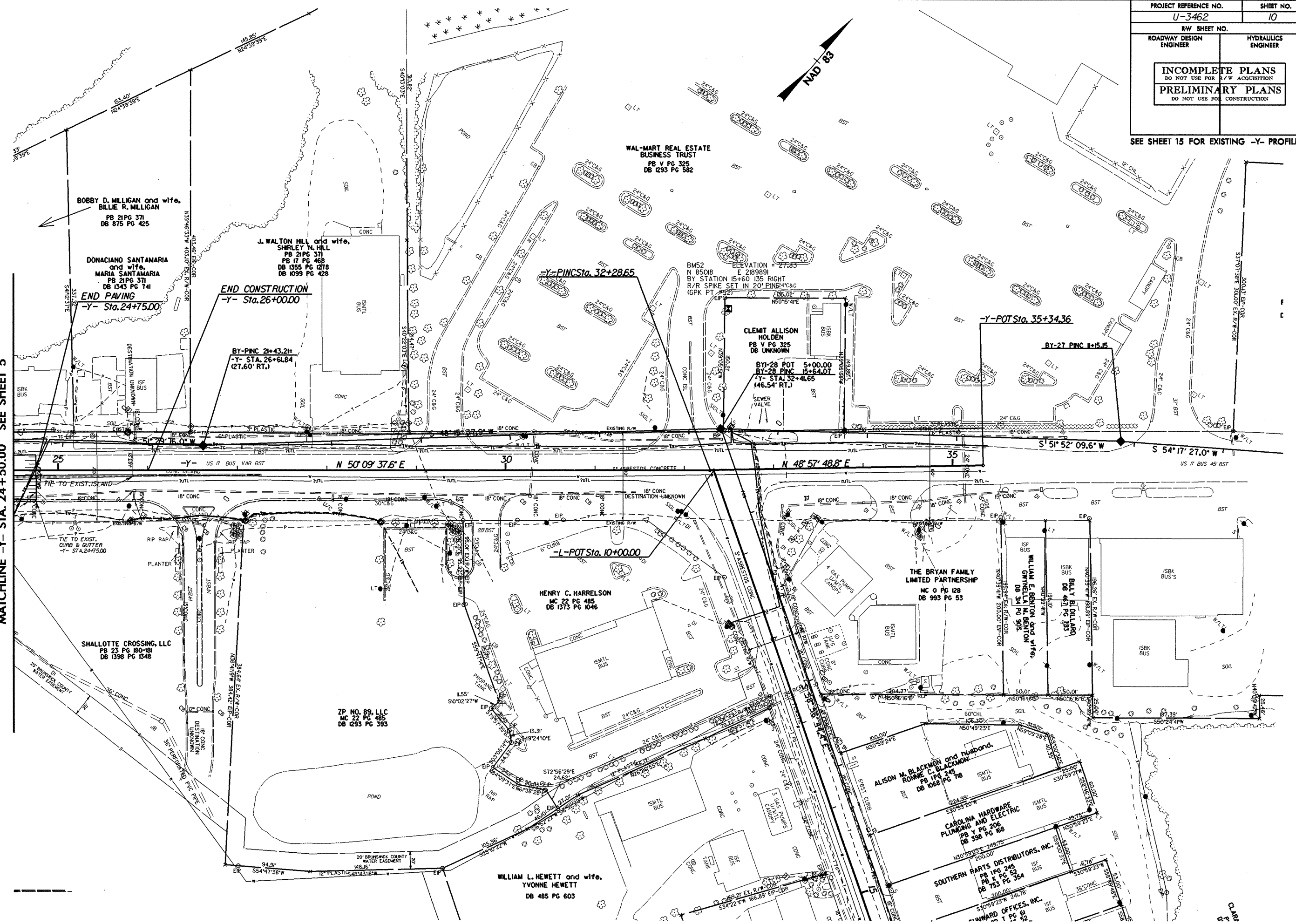
EXISTING R/W

8/17/99

PROJECT REFERENCE NO. U-3462	SHEET NO. 10
R/W SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

SEE SHEET 15 FOR EXISTING -Y- PROFILE

MATCHLINE -Y- STA. 24+50.00 SEE SHEET 5



REVISIONS

3-DEC-2004 08:36  
 Roadway Proj...  
 ...

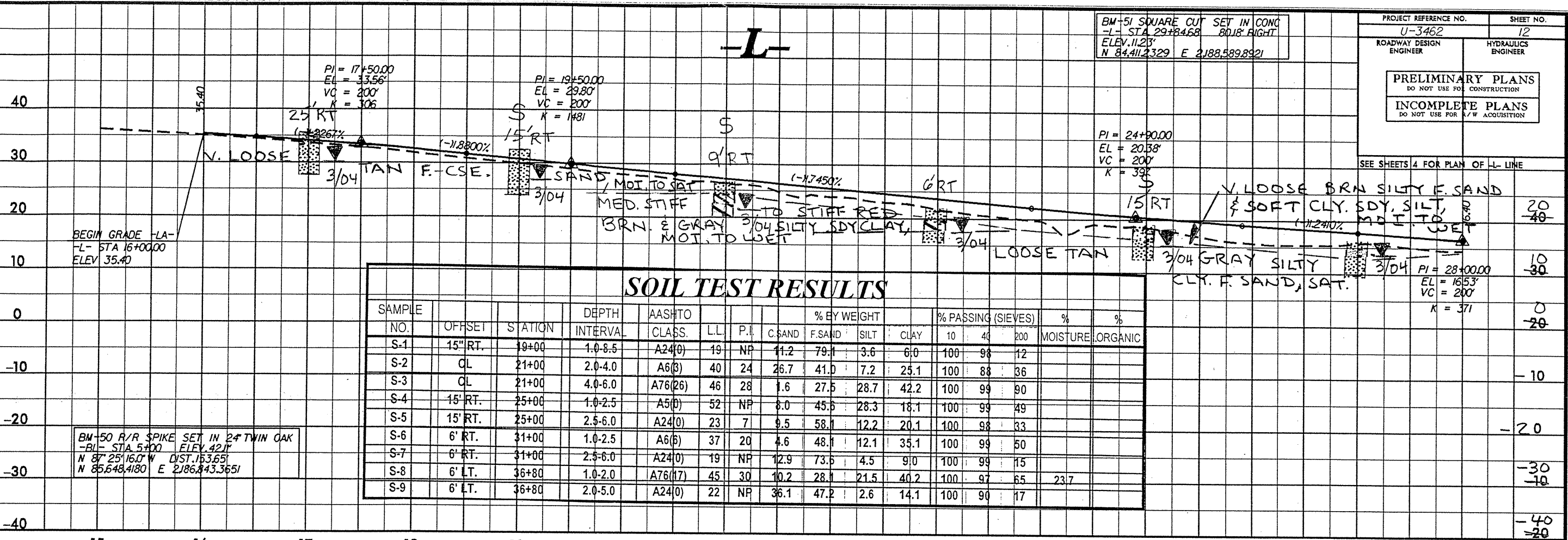




BM-51 SQUARE CUT SET IN CONG  
 -L- STA 29+84.68 80.18' RIGHT  
 ELEV. 11.23'  
 N 84.4112329 E 2188.5898921

PROJECT REFERENCE NO. U-3462 SHEET NO. 12  
 ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION  
**INCOMPLETE PLANS**  
 DO NOT USE FOR A/W ACQUISITION

SEE SHEETS 4 FOR PLAN OF -L- LINE

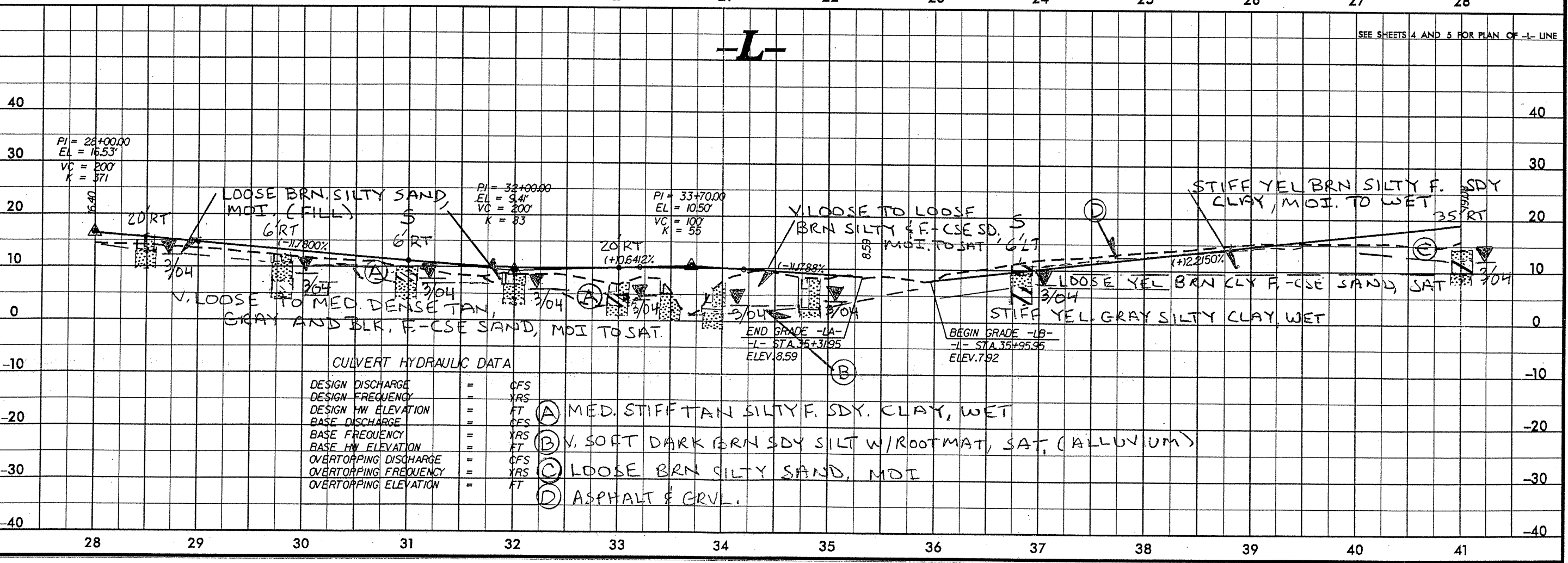


### SOIL TEST RESULTS

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		
S-1	15" RT.	19+00	1.0-8.5	A24(0)	19	NP	11.2	79.1	3.6	6.0	100	98	12		
S-2	CL	21+00	2.0-4.0	A6(B)	40	24	26.7	41.0	7.2	25.1	100	88	36		
S-3	CL	21+00	4.0-6.0	A76(26)	46	28	1.6	27.5	28.7	42.2	100	99	90		
S-4	15' RT.	25+00	1.0-2.5	A5(D)	52	NP	8.0	45.5	28.3	18.1	100	99	49		
S-5	15' RT.	25+00	2.5-6.0	A24(0)	23	7	9.5	58.1	12.2	20.1	100	98	33		
S-6	6' RT.	31+00	1.0-2.5	A6(B)	37	20	4.6	48.1	12.1	35.1	100	99	50		
S-7	6' RT.	31+00	2.5-6.0	A24(0)	19	NP	12.9	73.5	4.5	9.0	100	99	15		
S-8	6' LT.	36+80	1.0-2.0	A76(17)	45	30	10.2	28.1	21.5	40.2	100	97	65	23.7	
S-9	6' LT.	36+80	2.0-5.0	A24(0)	22	NP	36.1	47.2	2.6	14.1	100	90	17		

BM+50 R/R SPIKE SET IN 2" TWIN OAK  
 -BL- STA 5+00 ELEV. 42.11'  
 N 87° 25' 16.0" W DIST. 153.65'  
 N 85.6484180 E 2186.8433651

SEE SHEETS 4 AND 5 FOR PLAN OF -L- LINE



**CULVERT HYDRAULIC DATA**

DESIGN DISCHARGE	=	CFS
DESIGN FREQUENCY	=	YRS
DESIGN HW ELEVATION	=	FT
BASE DISCHARGE	=	CFS
BASE FREQUENCY	=	YRS
BASE HW ELEVATION	=	FT
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING ELEVATION	=	FT

- (A) MED. STIFF TAN SILTY F. SDY. CLAY, WET
- (B) V. SOFT DARK BRN SDY SILT W/ROOTMAT, SAT. (ALLUVIUM)
- (C) LOOSE BRN SILTY SAND, MOI
- (D) ASPHALT & GRVL.

5/28/99

SEE SHEETS 5 & 6 FOR PLAN OF -- LINE

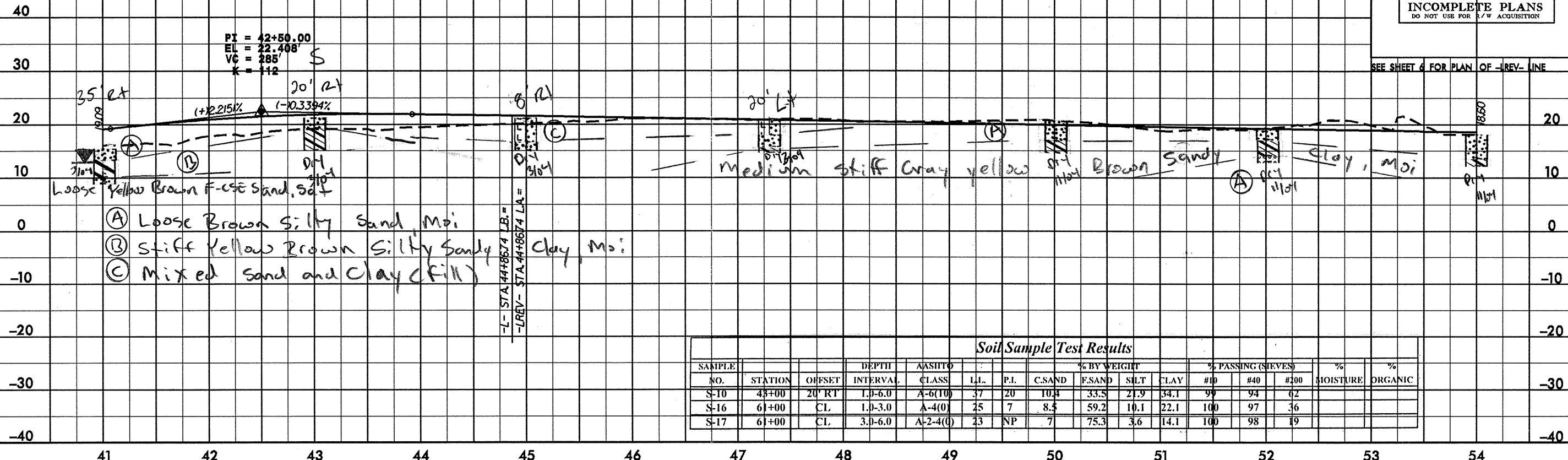
-L-

-LREV-

BM-54 R/R SPIKE SET IN 12" PINE  
-LREV- STA. 51+7.00 0.54' LEFT  
ELEV. 20.23'  
N 82.8114102 E 2189.9329885

PROJECT REFERENCE NO. U-3462  
ROADWAY DESIGN ENGINEER  
HYDRAULICS ENGINEER  
SHEET NO. 13  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION  
INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

SEE SHEET 6 FOR PLAN OF -LREV- LINE

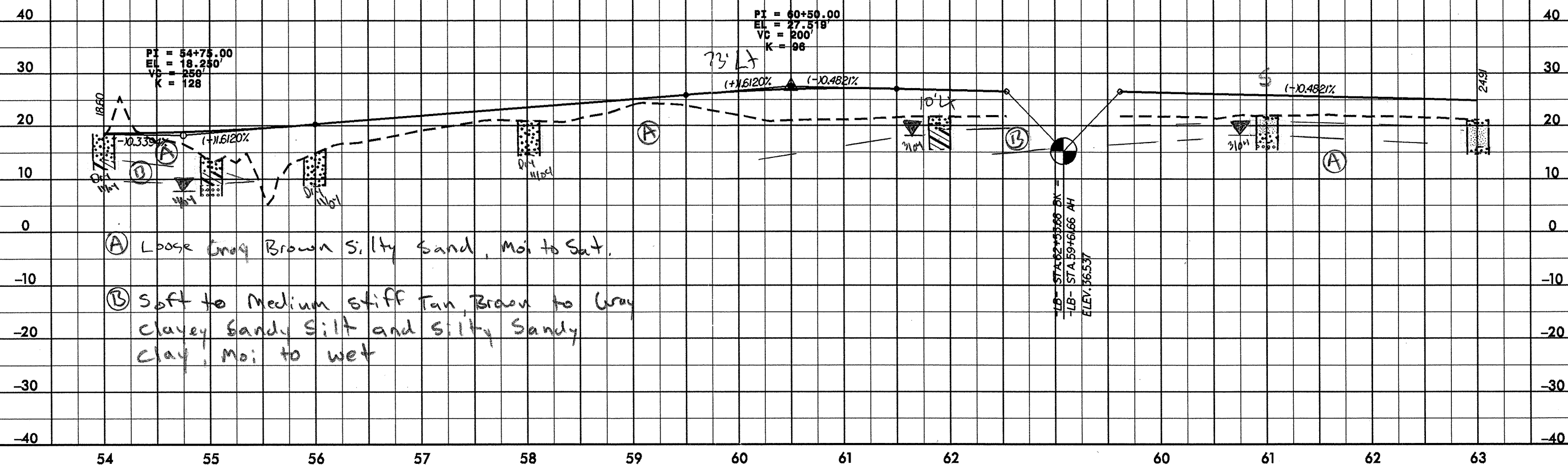


SEE SHEETS 6 & 7 FOR PLAN OF -REV- LINE

-LREV-

-L-

SEE SHEET 7 FOR PLAN OF -L- LINE



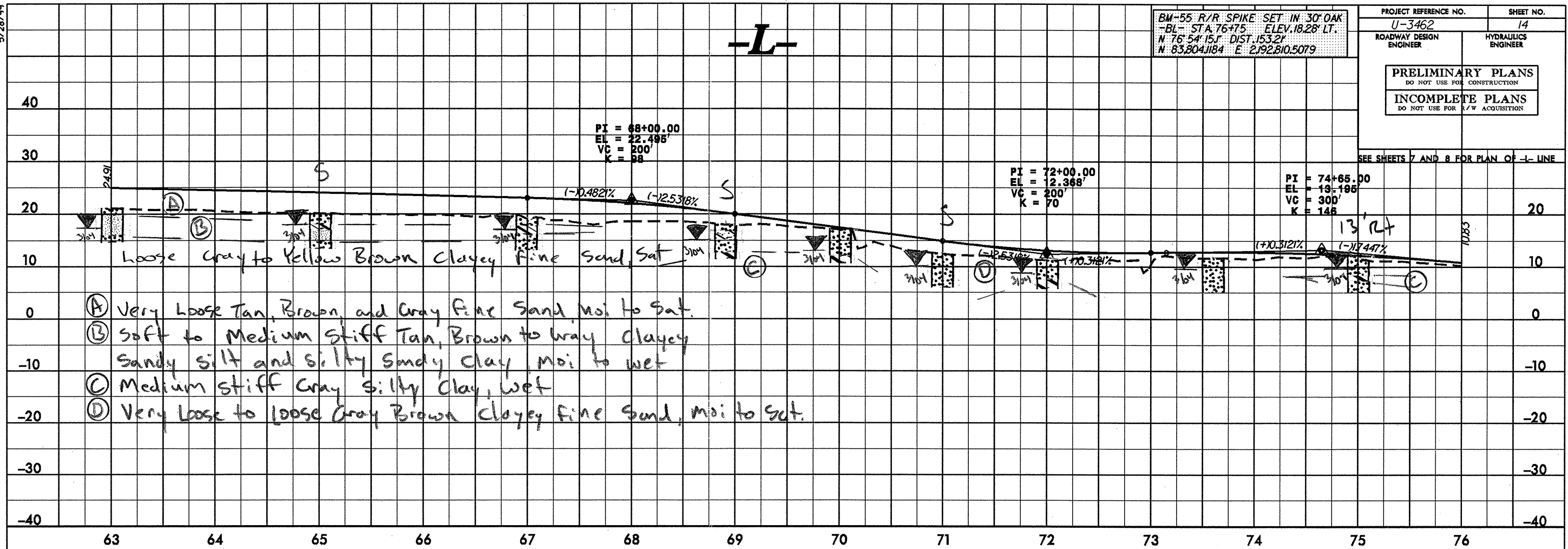
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5/28/99

BM-55 R/R SPIKE SET IN 30' OAK  
 -BL- STA. 76+75 ELEV. 18.28' LT.  
 N 76° 54' 15.1" DIST. 153.21'  
 N 83.8041184 E 2192.8105079

PROJECT REFERENCE NO. U-3462  
 SHEET NO. 14  
 ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION  
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION

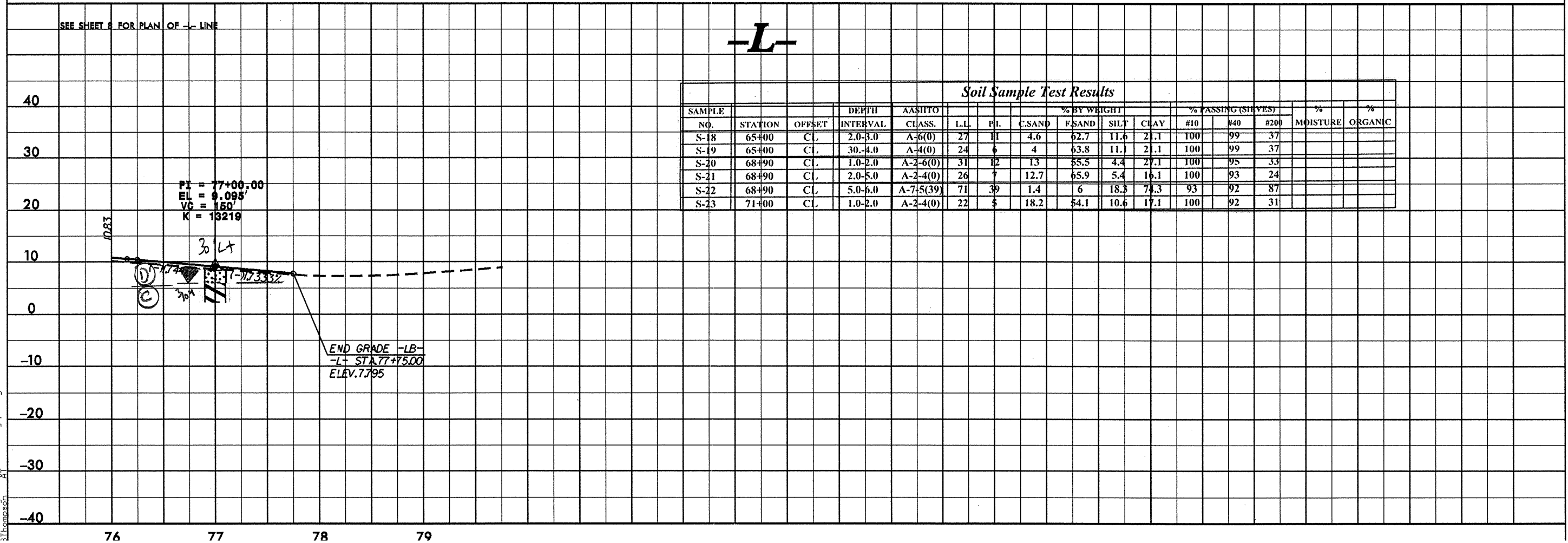
SEE SHEETS 7 AND 8 FOR PLAN OF -L- LINE



- Ⓐ Very Loose Tan, Brown, and Gray fine Sand, moi to Sat.
- Ⓑ soft to Medium stiff Tan, Brown to gray Clayey sandy silt and silty sandy clay, moi to wet
- Ⓒ Medium stiff Gray silty clay, wet
- Ⓓ Very loose to loose Gray Brown clayey fine Sand, moi to Sat.

SEE SHEET 8 FOR PLAN OF -L- LINE

-L-



SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	% BY WEIGHT					% PASSING (SIEVES)			% MOISTURE ORGANIC		
					L.L.	PL	C.SAND	F.SAND	SILT	CLAY	#10	#40	#200	MOISTURE	ORGANIC
S-18	65+00	CL	2.0-3.0	A-6(0)	27	11	4.6	62.7	11.6	21.1	100	99	37		
S-19	65+00	CL	3.0-4.0	A-4(0)	24	6	4	63.8	11.1	21.1	100	99	37		
S-20	68+90	CL	1.0-2.0	A-2-6(0)	31	12	13	55.5	4.4	27.1	100	95	33		
S-21	68+90	CL	2.0-5.0	A-2-4(0)	26	7	12.7	65.9	5.4	16.1	100	93	24		
S-22	68+90	CL	5.0-6.0	A-7-5(39)	71	39	1.4	6	18.3	74.3	93	92	87		
S-23	71+00	CL	1.0-2.0	A-2-4(0)	22	5	18.2	54.1	10.6	17.1	100	92	31		

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 Roadway\Proj\U3462\_rdu.pfl.dgn  
 3/11/2004

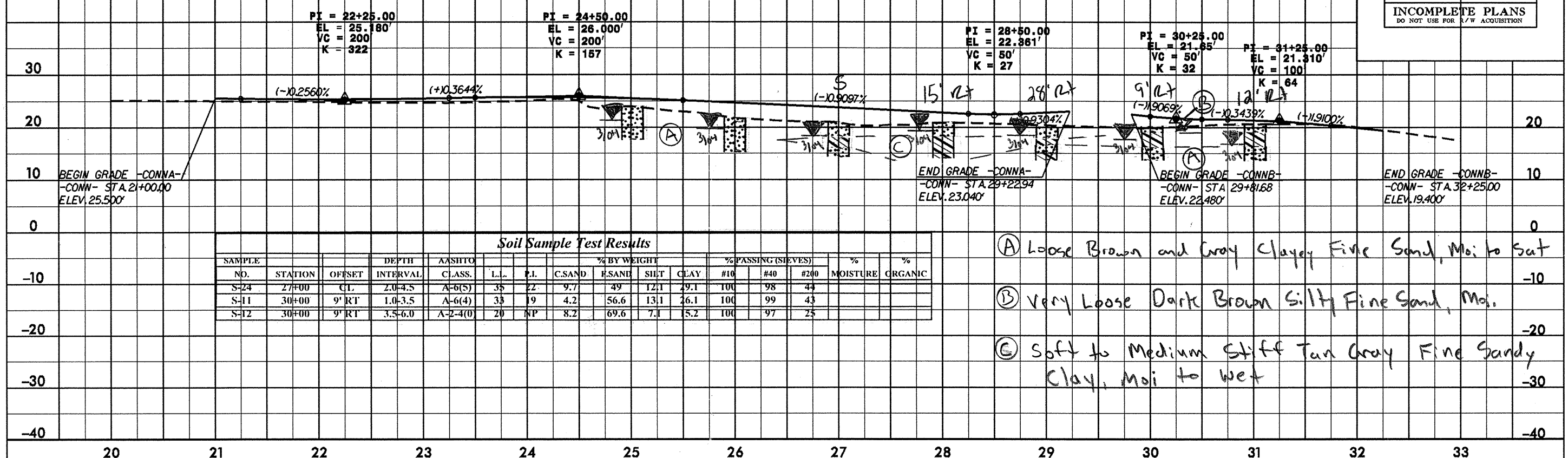


5/28/99

# -CONN-

SEE SHEETS 7 AND 10 FOR PLAN OF -CONN- LINE

PROJECT REFERENCE NO. U-3462	SHEET NO. 15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	



**Soil Sample Test Results**

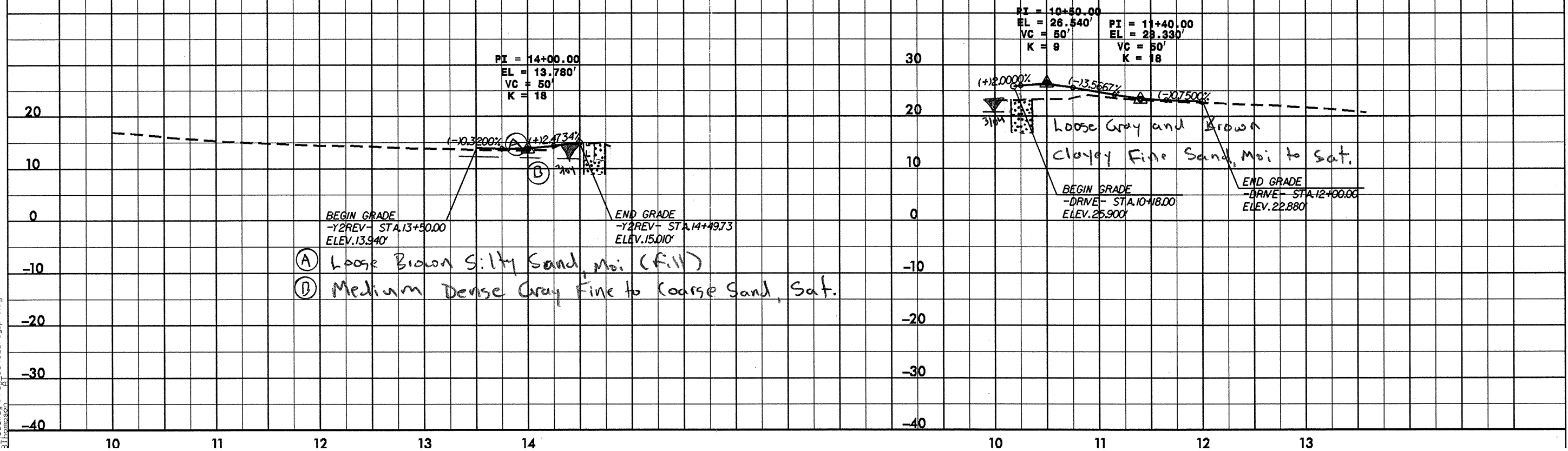
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	% BY WEIGHT						% PASSING (SIEVES)			% MOISTURE	% ORGANIC
					L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	#10	#40	#200		
S-24	27+00	CL	2.0-4.5	A-6(5)	35	22	9.7	49	12.1	49.1	100	98	44		
S-11	30+00	9' RT	1.0-3.5	A-6(4)	33	19	4.2	56.6	13.1	26.1	100	99	43		
S-12	30+00	9' RT	3.5-6.0	A-2-4(0)	20	NP	8.2	69.6	7.1	5.2	100	97	25		

- Ⓐ Loose Brown and Gray Clayey Fine Sand, Moi to Sat
- Ⓑ Very Loose Dark Brown Silty Fine Sand, Moi.
- Ⓒ Soft to Medium Stiff Tan Gray Fine Sandy Clay, Moi to Wet

# -Y2REV-

# -DRIVE-

SEE SHEET 8 FOR PLAN OF -Y2REV- LINE  
SEE SHEET 10 FOR PLAN OF -DRIVE- LINE



- Ⓐ Loose Brown Silty Sand, Moi (Fill)
- Ⓑ Medium Dense Gray Fine to Coarse Sand, Sat.

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