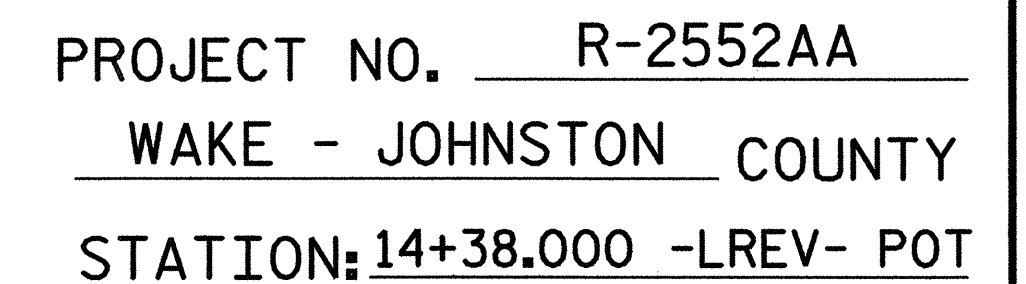
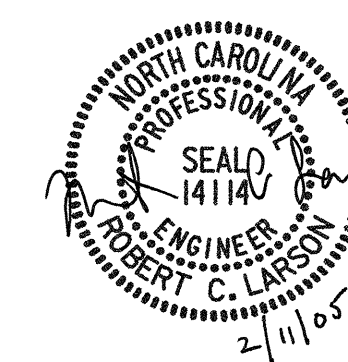


02/04/2005 01:04:46 PM G:\project\2004\213.0(R-2552)\Structures\Site 4\Left Lane\R2552AA_SD_GD_02.dgn



GENERAL DRAWING FOR BRIDGE
ON -LREV- (US 70 BYPASS) OVER
TRIBUTARY TO SWIFT CREEK
BETWEEN I-40 AND NC 42
(LEFT LANE)

DRAWN BY : W. B. ALLEN DATE : 6/04
CHECKED BY : R. C. LARSON DATE : 7/04



REFERENCE NO. BL-3

02/11/2005 09:06:18 AM G:\p\project\2004-215\01R-2552\1\Structure\Site 4\Left Lane\R2552AA.SP.00.03.dgn

TOTAL BILL OF MATERIAL																					
	PERMANENT STEEL CASING FOR 1066mm DIA. DRILLED PIER	1066mm DIA. DRILLED PIERS IN SOIL	1066mm DIA. DRILLED PIERS NOT IN SOIL	SID INSPECTION	SPT TESTING	CROSSHOLE SONIC LOGGING	CSL TUBES	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS "A" CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 1600mm PRESTRESSED CONCRETE GIRDERS	HP 310 X 79 STEEL PILES		CONCRETE BARRIER RAIL	PLAIN RIP RAP CLASS I (600mm THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS
	METERS	METERS	METERS	EACH	EACH	EACH	METERS	SQ. METERS	SQ. METERS	CU. METERS	LUMP SUM	KG	KG	NO. METERS	NO.	METERS	METERS	METRIC TONS	SQ. METERS	LUMP SUM	LUMP SUM
SUPERSTRUCTURE								2377.2	2177.8		LUMP SUM			24 726.976			365.866			LUMP SUM	LUMP SUM
END BENT 1										33.2		2482			12	174		290	295		
BENT 1		31.3	4.5	1	3	1	153.6			25.6		6253	1487								
BENT 2	9.3	39.9	5.6	1	3	1	192.5			28.9		7426	1962								
BENT 3	8.7	23.4	6.9				131.4			29.1		6244	1493								
BENT 4	9.2	32.2	4.4	1	3	1	156.7			28.5		6673	1661								
BENT 5		29.5	5.1				148.8			26.2		6229	1479								
END BENT 2										33.2		2482			12	108		265	270		
TOTAL	27.2	156.3	26.5	3	9	3	783.0	2377.2	2177.8	204.7	LUMP SUM	37,789	8082	24 726.976	24	282	365.866	555	565	LUMP SUM	LUMP SUM

CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS – LUMP SUM

GENERAL NOTES

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

ASSUMED LIVE LOAD = MS 18 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SNSM.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 300mm BELOW THE GROUND LINE.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", NOVEMBER, 1995.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY A.

FOR TEMPORARY WORKBRIDGE, SEE CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS SPECIAL PROVISION.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

PILES AT END BENT NOS. 1 & 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 530 KN EACH.

WHEN DRIVING PILES, THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED.

THE DRILLED PIERS AT BENT NOS. 1 THROUGH 5 HAVE BEEN DESIGNED FOR BOTH SKIN FRICTION AND TIP BEARING. THE REQUIRED TIP BEARING CAPACITY IS 1400 kPa.

THE REQUIRED TIP BEARING AT BENT NOS. 1 THROUGH 5 SHALL BE VERIFIED.

DRILLED PIERS FOR BENT NOS. 1 THROUGH 5 HAVE BEEN DESIGNED FOR AN APPLIED LOAD OF 2,983 KN AT THE TOP OF THE COLUMN.

PERMANENT STEEL CASING IS NOT REQUIRED FOR DRILLED PIERS AT BENT NOS. 1 AND 5.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT NOS. 2 THROUGH 4 AND THE CASING SHALL NOT EXTEND BELOW ELEVATION 58.0 m WITHOUT THE ENGINEER'S PERMISSION.

DRILLED PIERS AT BENT NO. 1 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 51.0 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 2 (LEFT AND CENTER) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 45.2 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 2 (RIGHT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 47.4 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 3 (LEFT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 52.0 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 3 (CENTER AND RIGHT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 50.2 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 4 (LEFT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 50.6 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 4 (CENTER AND RIGHT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 48.0 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO. 5 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 50.6 m AND SATISFY REQUIRED TIP BEARING CAPACITY.

THE SCOUR CRITICAL ELEVATION FOR BENT NOS. 2 THROUGH 5 IS 60.0 m, 59.8 m, 59.6 m, AND 61.0 m, RESPECTIVELY. THE SCOUR CRITICAL ELEVATIONS ARE FOR USE BY MAINTENANCE FORCES TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

SPT TESTING IS REQUIRED TO DETERMINE THE TIP BEARING CAPACITY OF THE DRILLED PIERS AT BENT NOS. 2, AND 4.

SPT TESTING IS NOT REQUIRED TO DETERMINE THE TIP BEARING CAPACITY OF THE DRILLED PIERS AT BENT NOS. 3 AND 5.

SID INSPECTIONS MAY BE REQUIRED TO DETERMINE THE BOTTOM CLEANLINESS OF THE DRILLED PIERS AT BENT NOS. 1, 2, 3, 4 OR 5.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS AT BENT NOS. 1 THROUGH 5. SEE SPECIAL PROVISIONS FOR CROSSHOLE SONIC LOGGING.

THE CONTRACTOR HAS THE OPTION OF USING EITHER SLURRY CONSTRUCTION OR TEMPORARY CASING TO CONSTRUCT THE DRILLED PIERS.

DO NOT DEWATER THE DRILLED PIER EXCAVATIONS AT BENT NOS. 1, 2, 3, 4 OR 5. CLEAN THE BOTTOM OF THE EXCAVATION WITH A SUBMERSIBLE PUMP OR AN AIRLIFT. WET PLACEMENT OF CONCRETE IS REQUIRED. SEE DRILLED PIER SPECIAL PROVISION.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

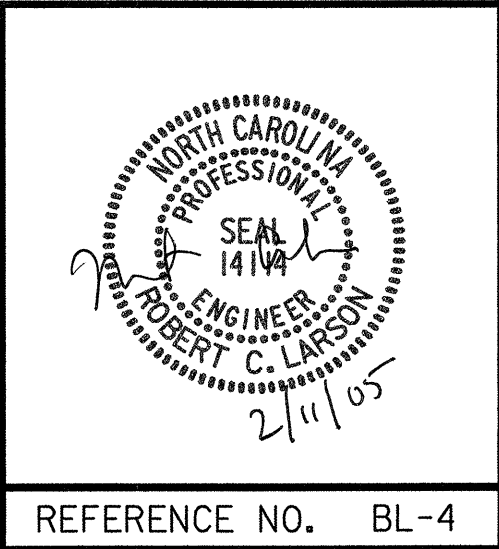
FOR FABRICATED METAL-STAY-IN-PLACE FORMS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.



PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

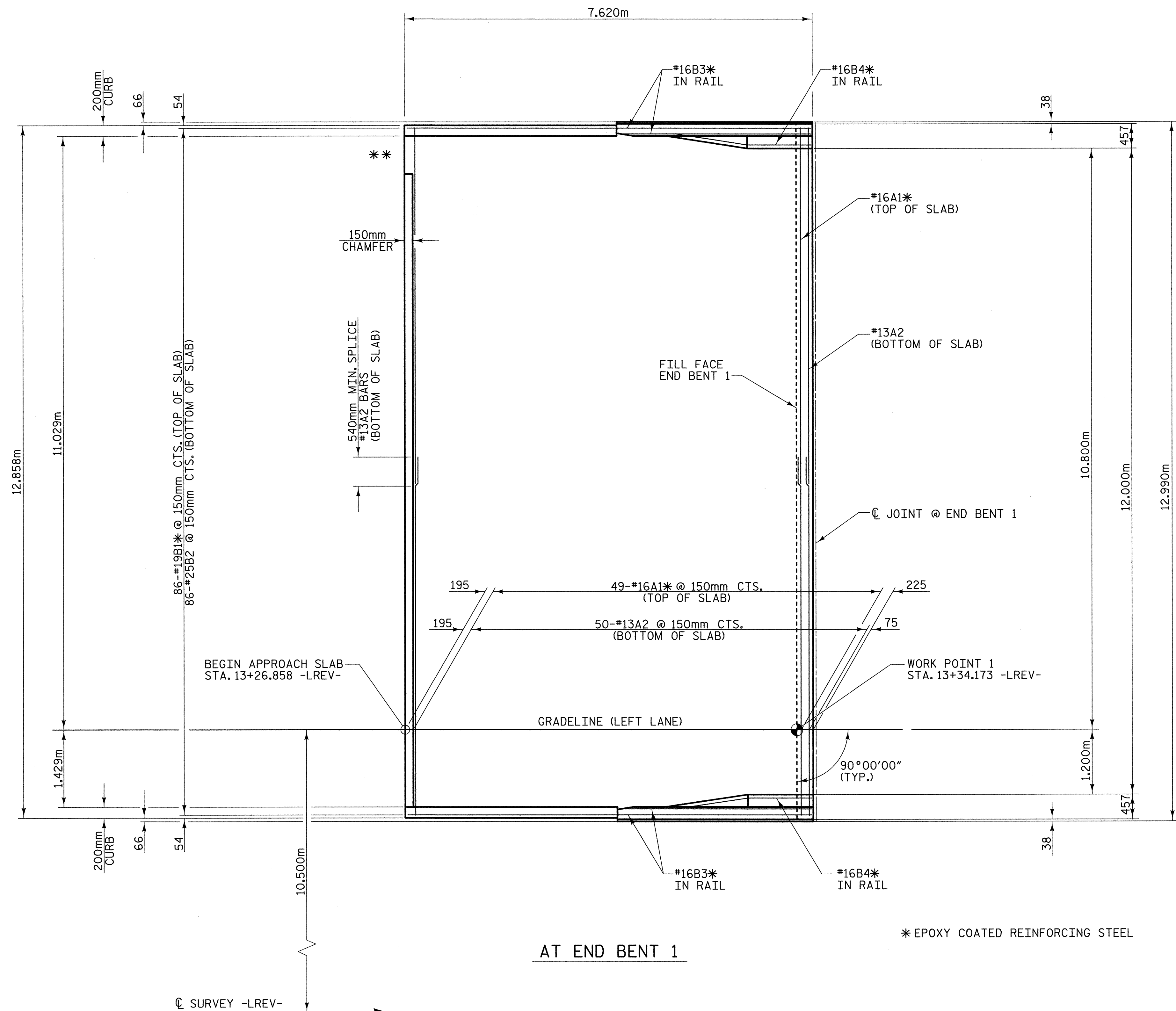
SHEET 4 OF 4



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH											
GENERAL DRAWING TOTAL BILL OF MATERIAL & GENERAL NOTES (LEFT LANE)											
REVISIONS										SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	5-143					
1			3			TOTAL SHEETS					
2			4			479					

DRAWN BY : W. B. ALLEN DATE : 12/04
CHECKED BY : R. C. LARSON DATE : 12/04

REFERENCE NO. BL-4



AT END BENT 1

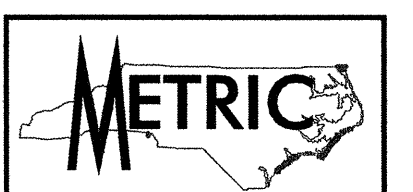
PLAN

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTE:
FOR DETAILS & BILL OF MATERIAL
SEE SHEET R.N. BL-42

** TEMPORARY BERM & SLOPE DRAIN
REQUIRED AT THIS LOCATION FOR
DETAILS SEE SHEET R.N. BL-44.

* EPOXY COATED REINFORCING STEEL



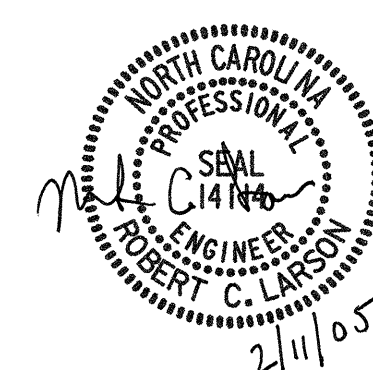
PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
 STATION: 14+38.000 -LREV- POT

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF
BRIDGE APPROACH
SLAB
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 429
1			3			
2			4			



REFERENCE NO. BL-41



02/04/2005 02:58:24 PM G:\project\2004\23.0(R-2552)\Structures\Site 4\Left Lane\2552AA-SD_AS_01.dgn

DRAWN BY : W. B. ALLEN DATE : 10/04
CHECKED BY : R. C. LARSON DATE : 12/04

02/04/2005 07:03:54 AM G:\project\2004\21301R-2552\Structures\Site 4\Left Lane\2552AA.SD AS.02.dgn

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 102mm Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE.

THE 150mm COMP. A.B.C. SHALL EXTEND 3m BEYOND THE END OF THE APPROACH SLAB AND 300mm OUTSIDE OF EACH EDGE OF THE SLAB.

THE CONTRACTOR MAY USE 100mm TYPE B-25.0B ASPHALT CONCRETE COURSE IN LIEU OF 150mm COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL EXTEND 300mm BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 125mm CLASS "A" CONCRETE BASE IN LIEU OF 150mm COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL EXTEND 300mm BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 13.6 kg. ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

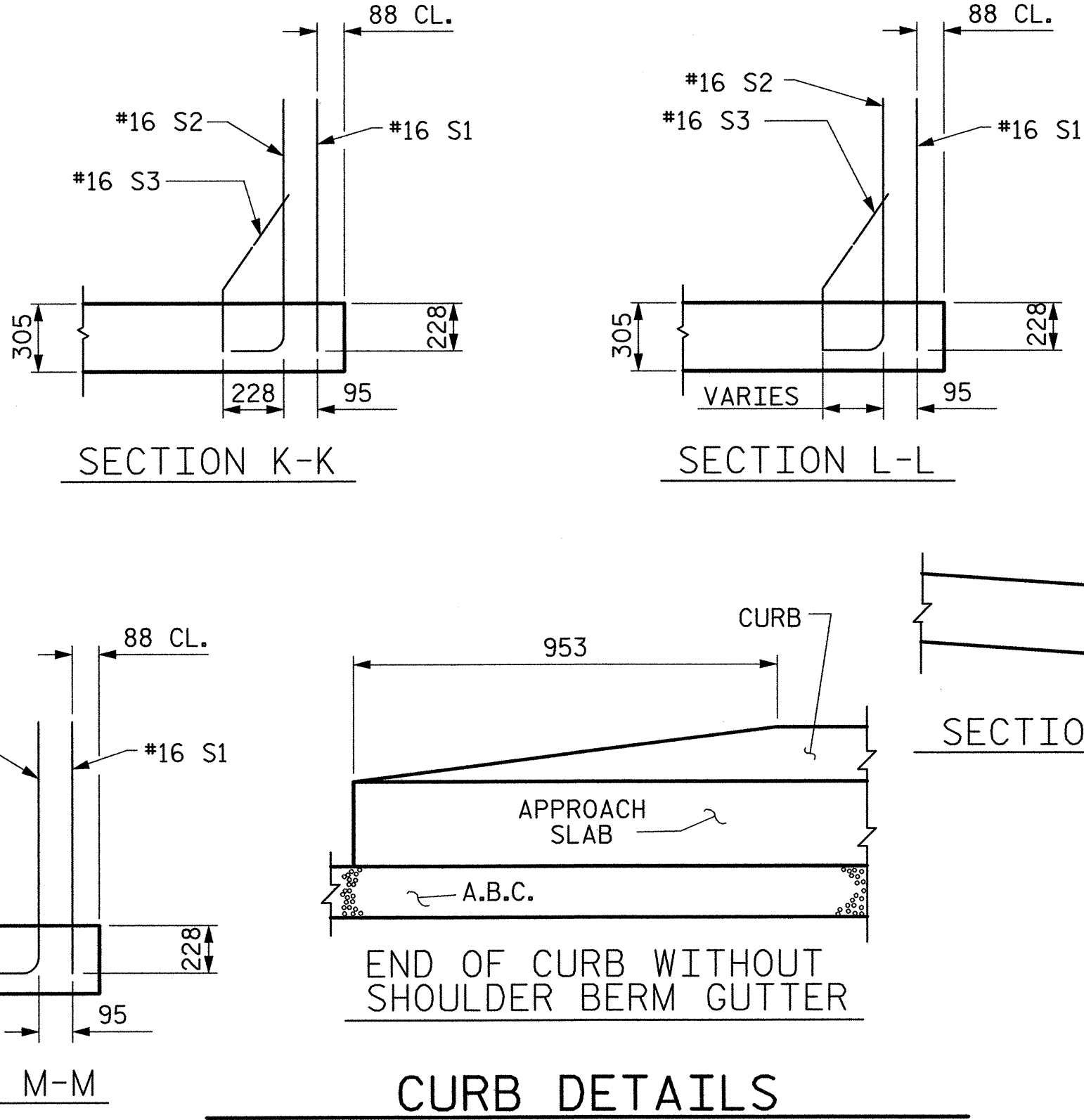
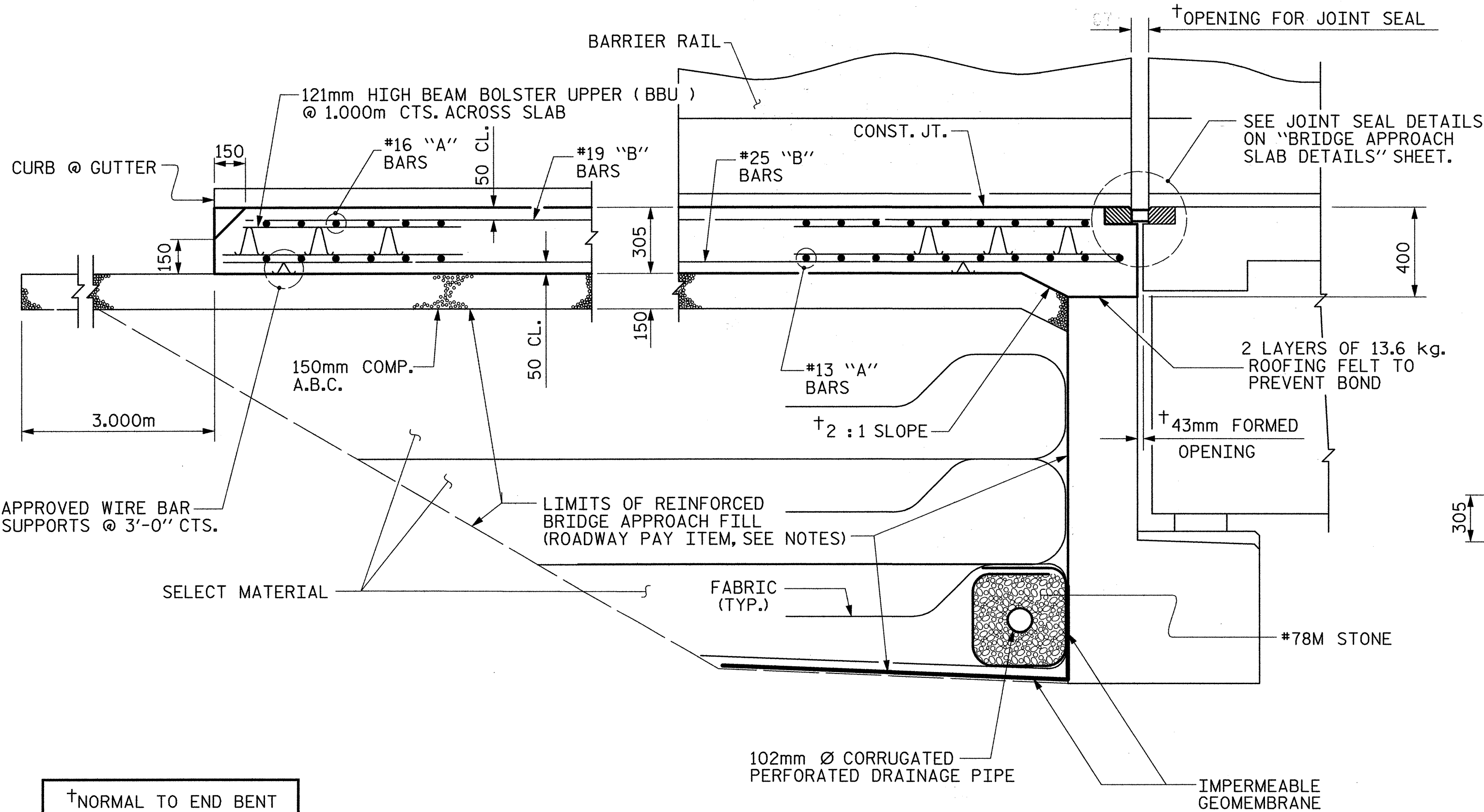
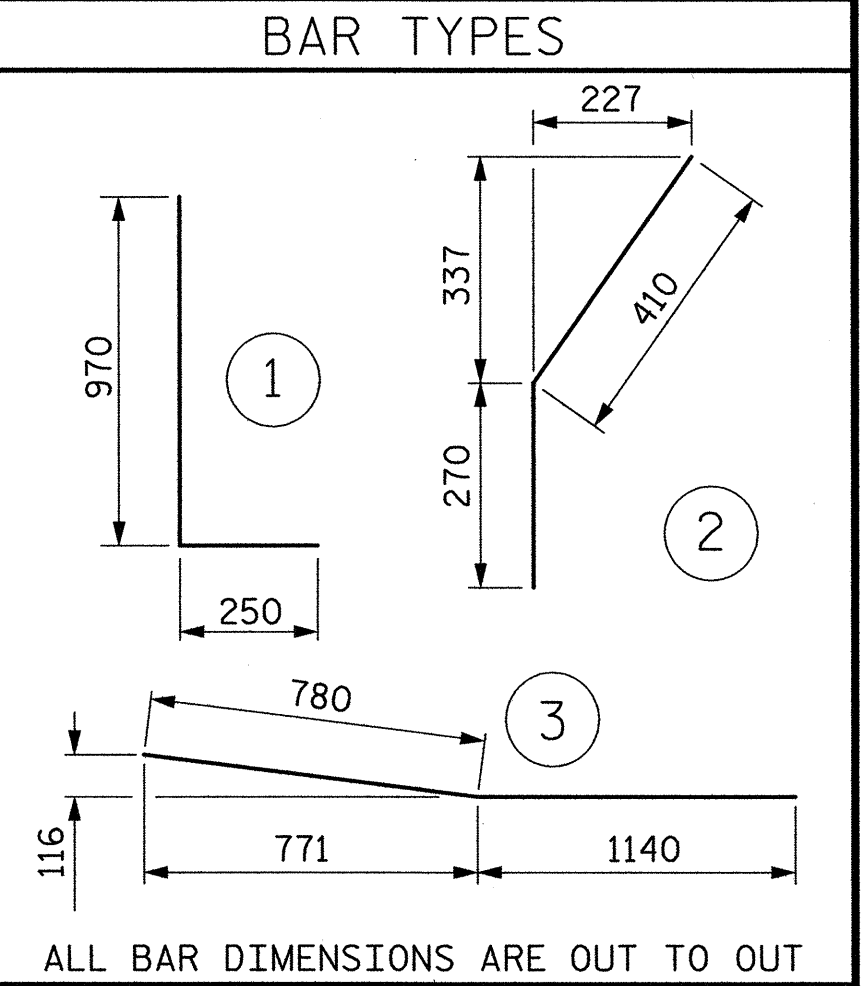
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 87mm.

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	49	#16	STR	12760	970
A2	100	#13	STR	6660	662
*B1	86	#19	STR	7240	1392
B2	86	#25	STR	7520	2569
*B3	14	#16	STR	3540	77
*B4	2	#16	3	1920	6
*S1	50	#16	STR	980	76
*S2	50	#16	1	1220	95
*S3	20	#16	2	680	21
REINFORCING STEEL				kg.	3231
*EPOXY COATED REINFORCING STEEL				kg.	2637
CLASS AA CONCRETE BREAKDOWN					
POUR 1 SLAB AND CURB				C.M.	30.5
POUR 2 RAIL				C.M.	1.6
CLASS AA CONCRETE				C.M.	32.1



PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

SHEET 2 OF 4

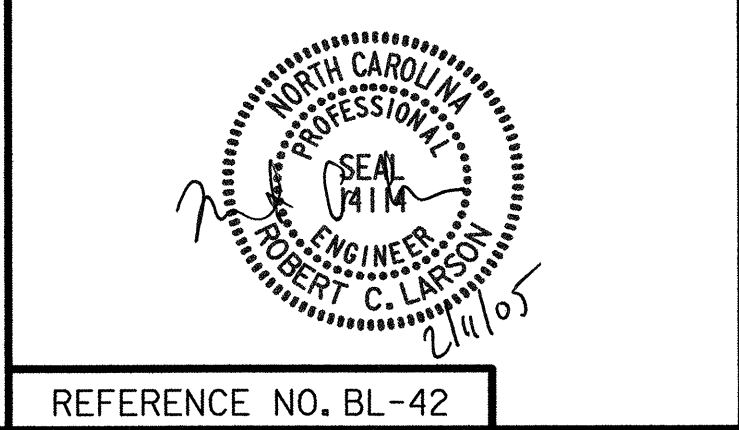
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT WITH BARRIER RAIL (LEFT LANE) STD. NO. BAS5SM					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					5-121
TOTAL SHEETS					429

ASSEMBLED BY : W. B. ALLEN	DATE : 10/04
CHECKED BY : R. C. LARSON	DATE : 12/04
DRAWN BY : RWW 8/01	ADDED 12/01
CHECKED BY : LES 8/01	REV. 5/7/03R RWW/JTE

SECTION THRU SLAB



THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



REFERENCE NO. BL-42

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 6mm HOLD DOWN PLATE AND 7 - 22.23mm Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 250. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

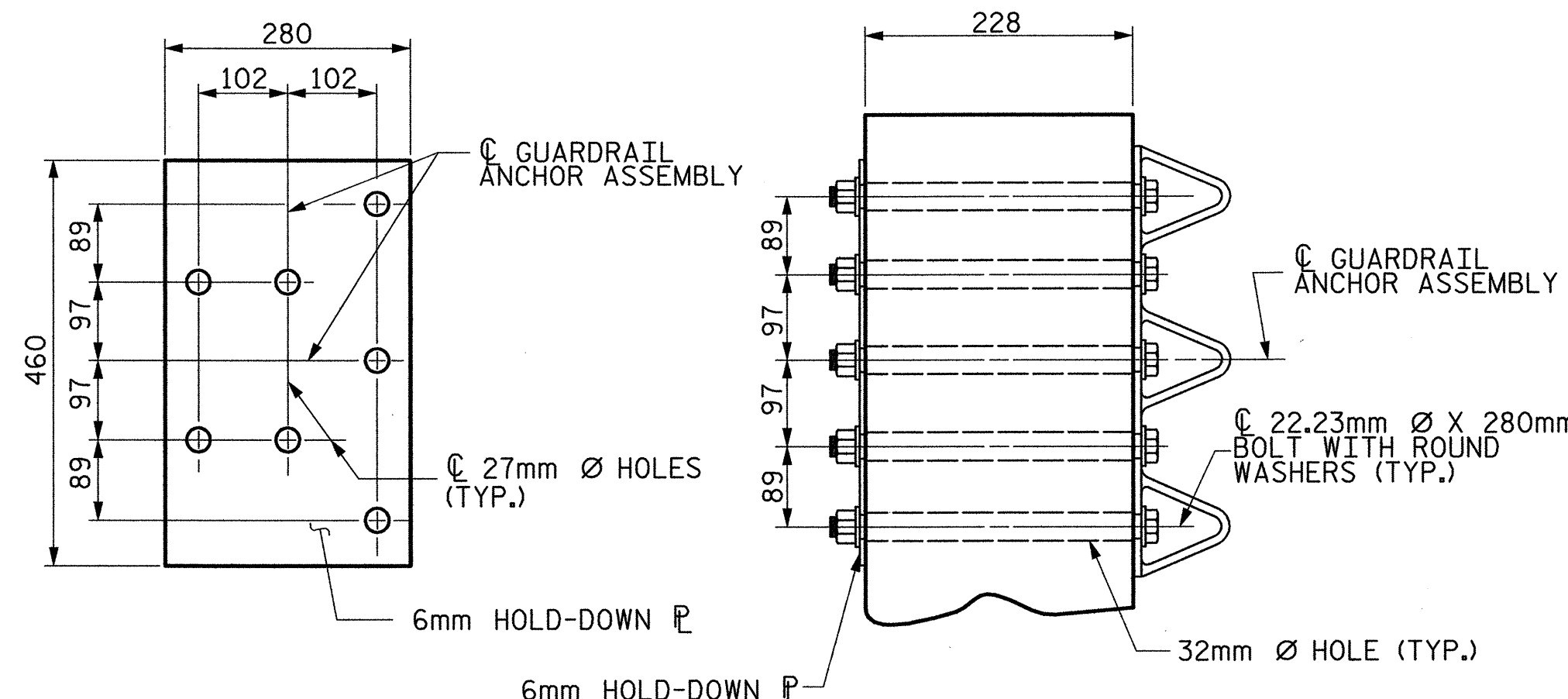
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 22.23mm Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

THE 32mm Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

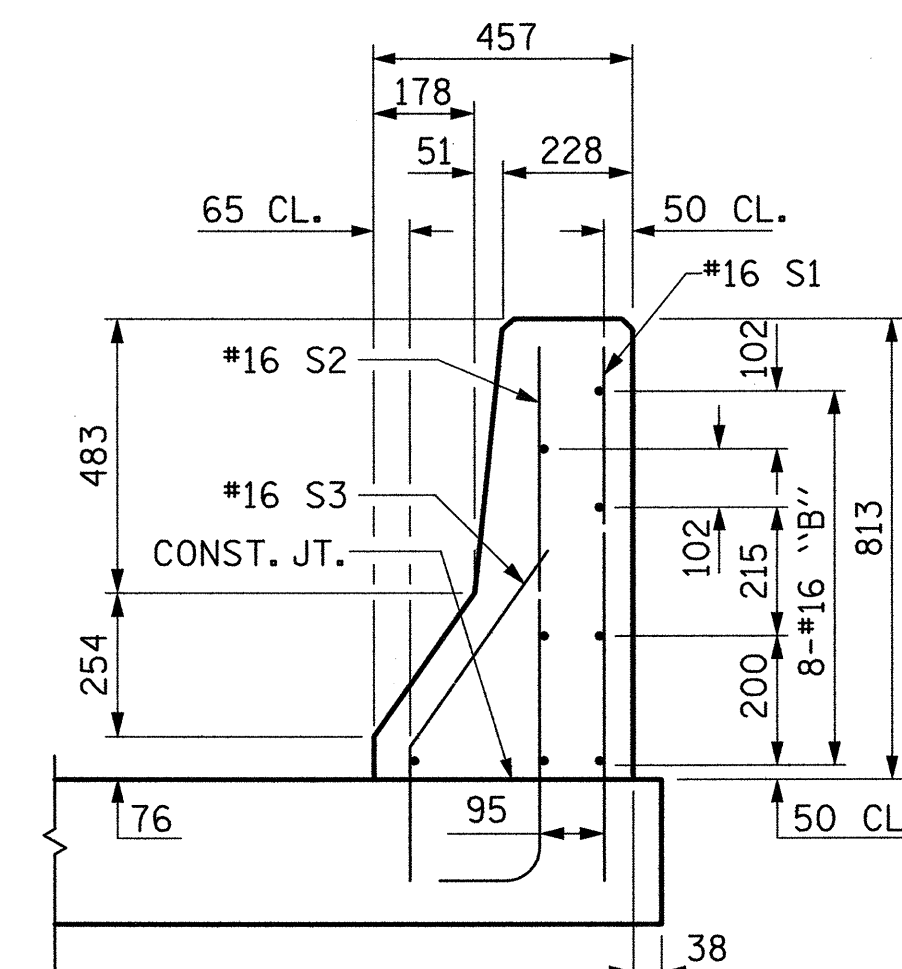
~~THE #16 S1 AND #16 S3 BARS SHALL BE INSTALLED, WHERE NOTED ON THE PLANS, USING AN ADHESIVE ANCHORING SYSTEM AFTER SAWING THE JOINT. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. THE YIELD LOAD FOR THE #16 S1 AND #16 S3 BARS IS 82.7 KN. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.~~



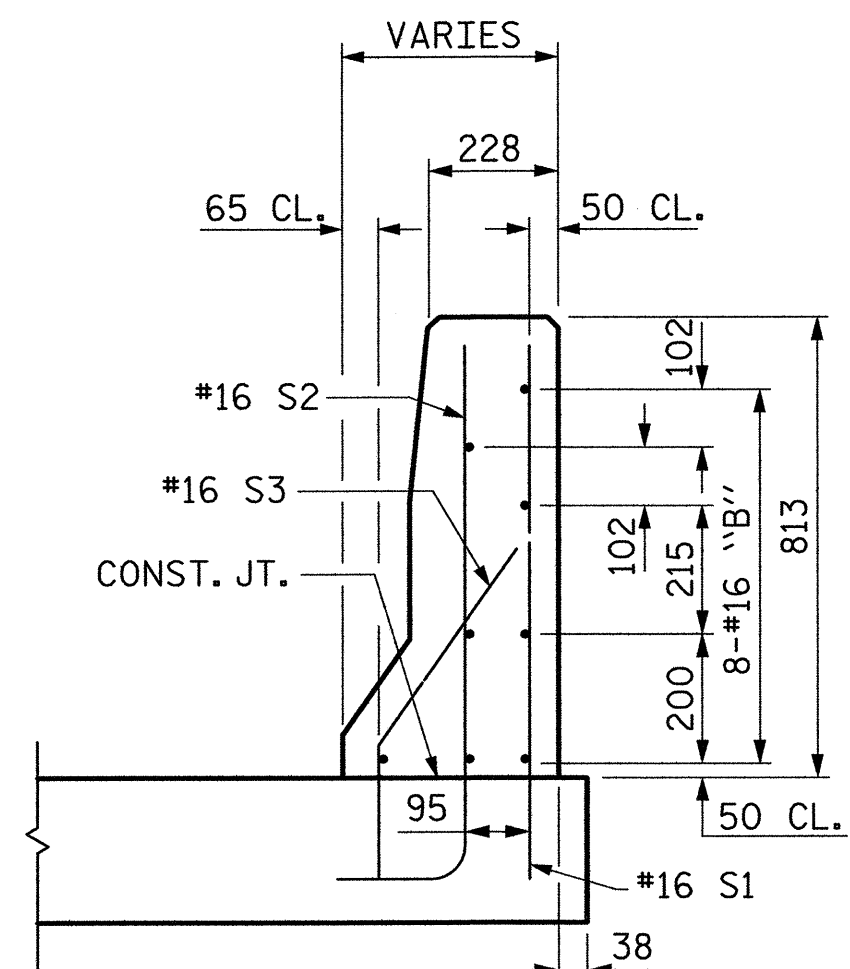
PLAN

SECTION E-E

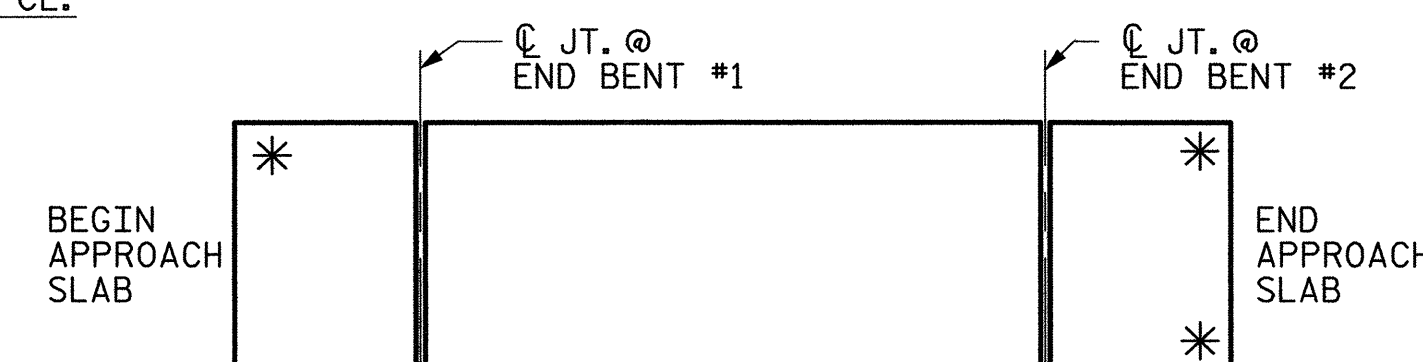
GUARDRAIL ANCHOR ASSEMBLY DETAILS



SECTION K-K

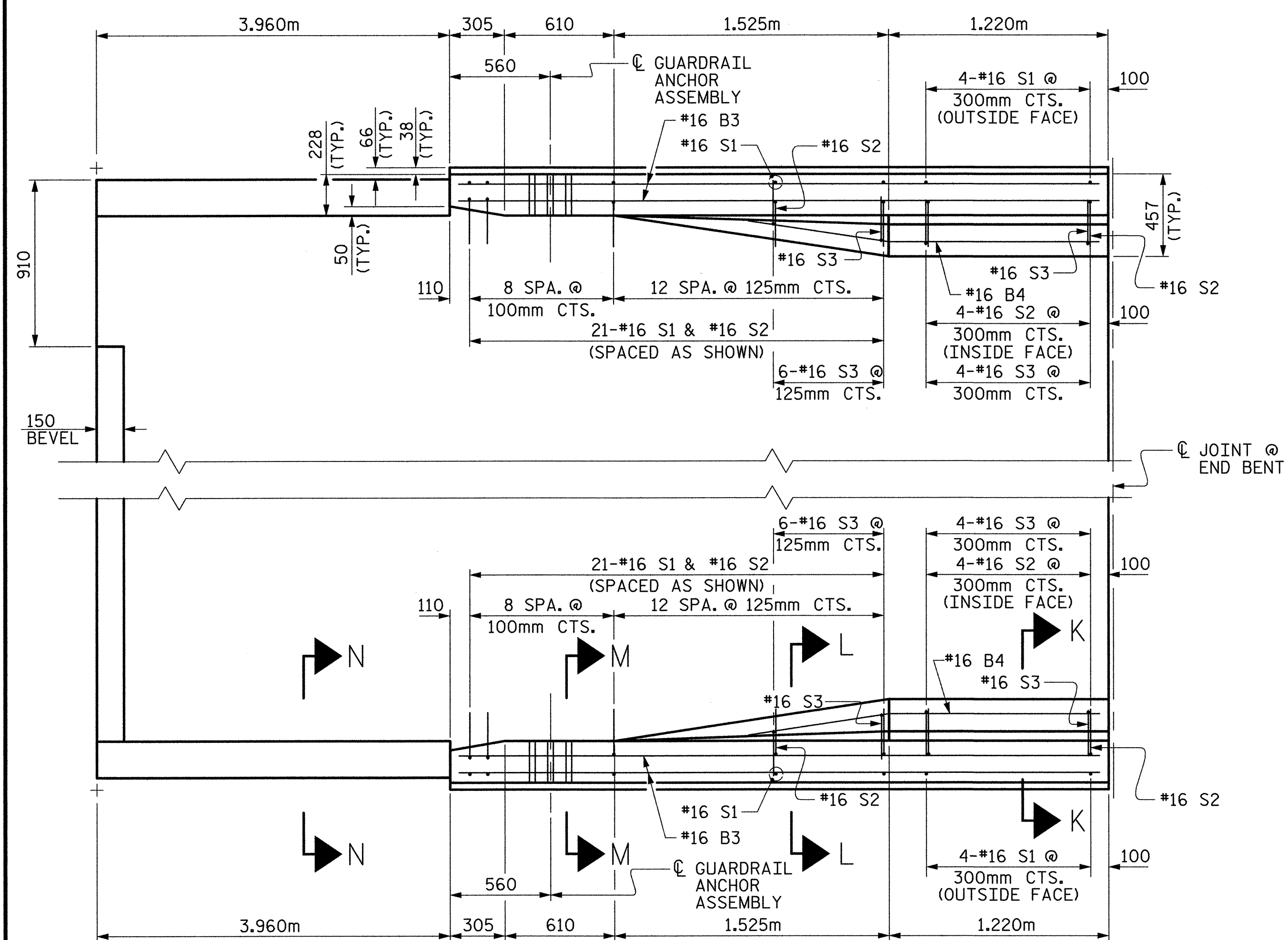


SECTION L-L



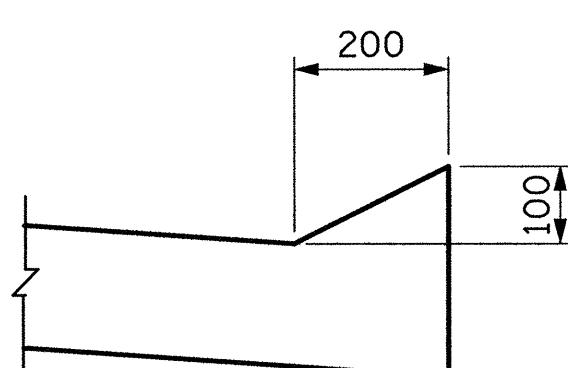
SKETCH SHOWING POINTS OF ATTACHMENT

* INDICATES POINTS OF ATTACHMENT

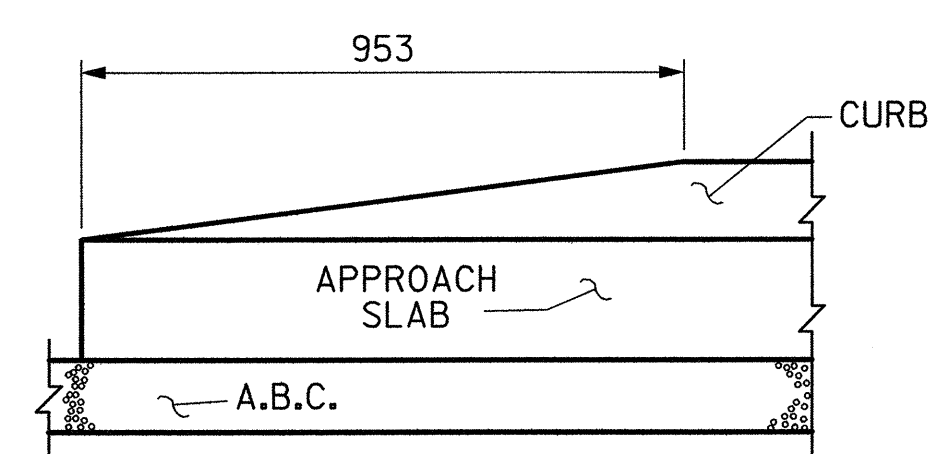


PLAN

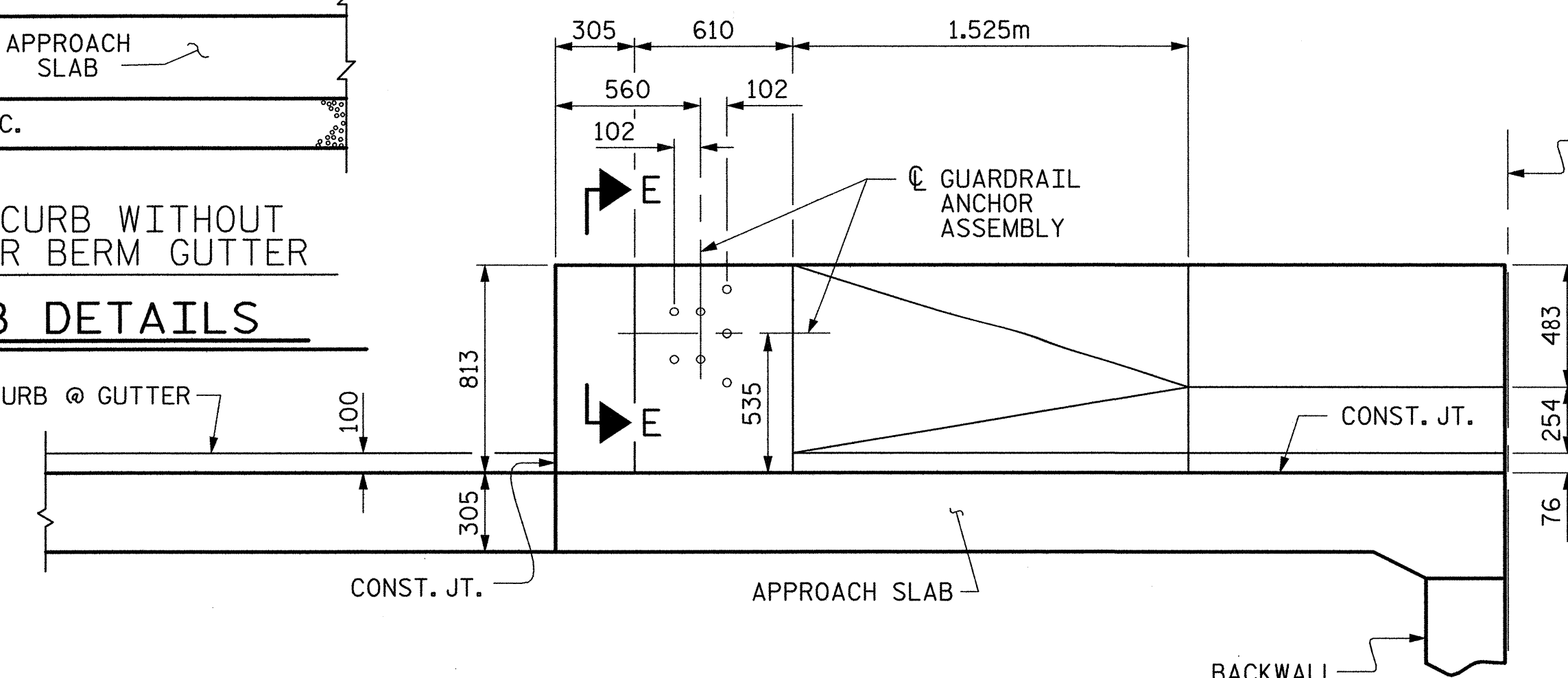
BEGIN APPROACH SLAB SHOWN,
END APPROACH SLAB SIMILAR



SECTION N-N



CURB DETAILS



ELEVATION

ASSEMBLED BY : W.B. ALLEN	DATE : 10/04
CHECKED BY : R.C. LARSON	DATE : 12/04
DRAWN BY : RWW 8/01	REV. 5/7/03R RWW/JTE
CHECKED BY : LES 8/01	



THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



REFERENCE NO. BL-43

PROJECT NO. R-2552AA

WAKE - JOHNSTON COUNTY

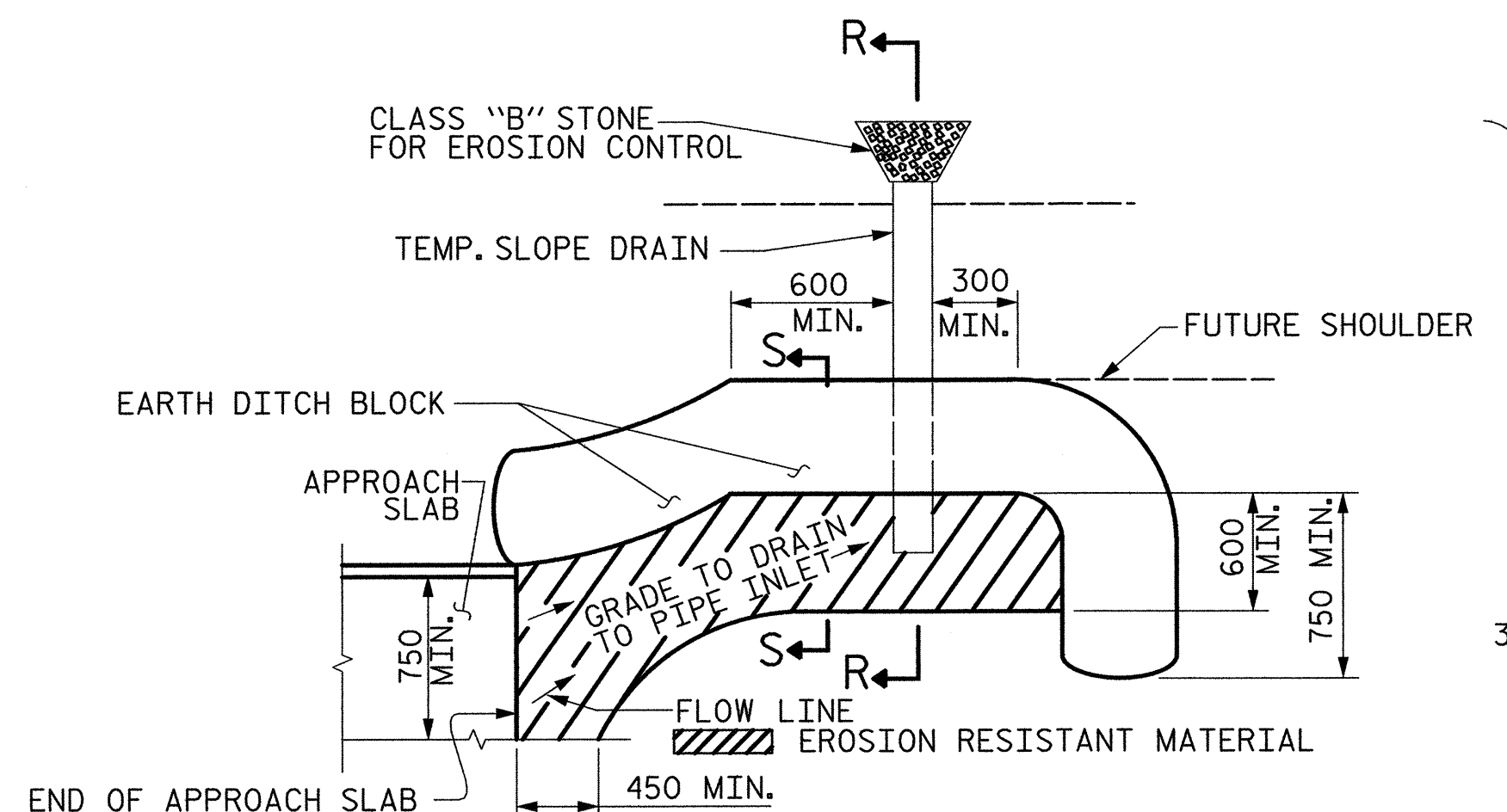
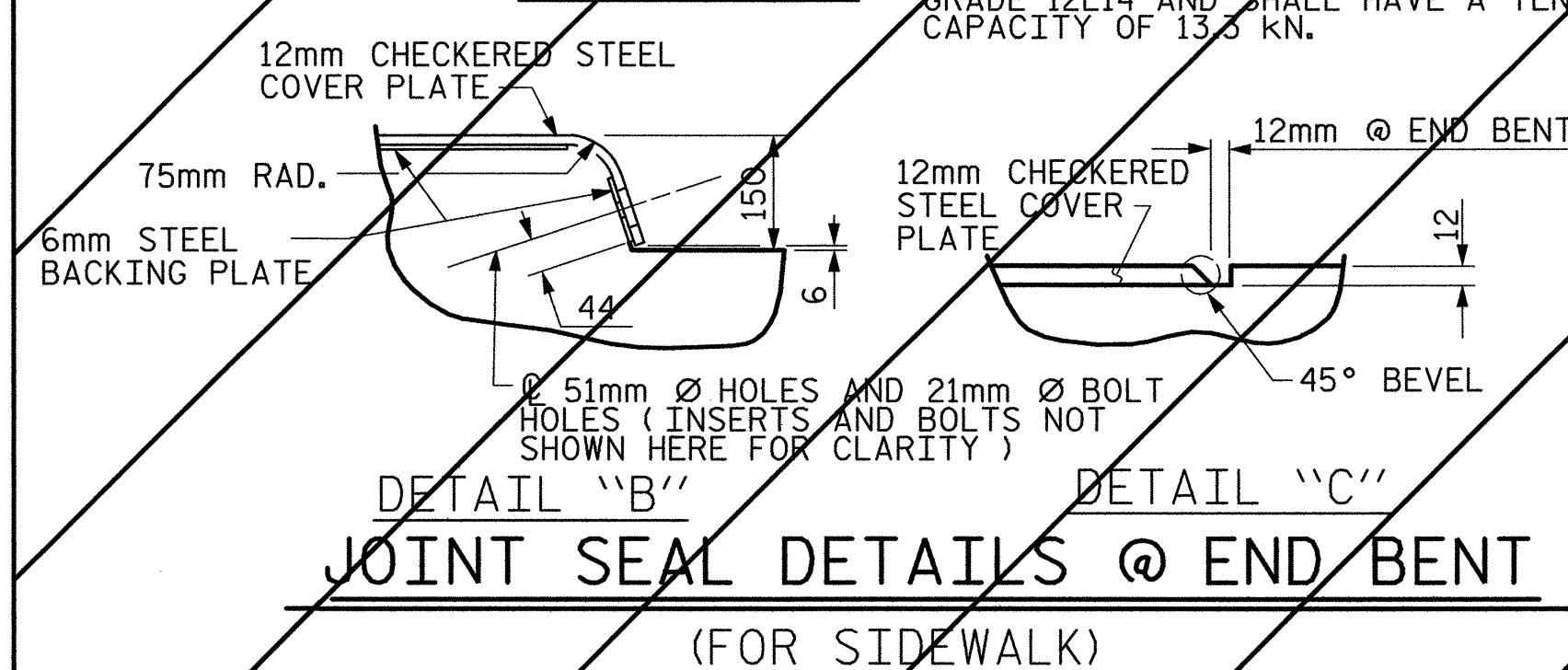
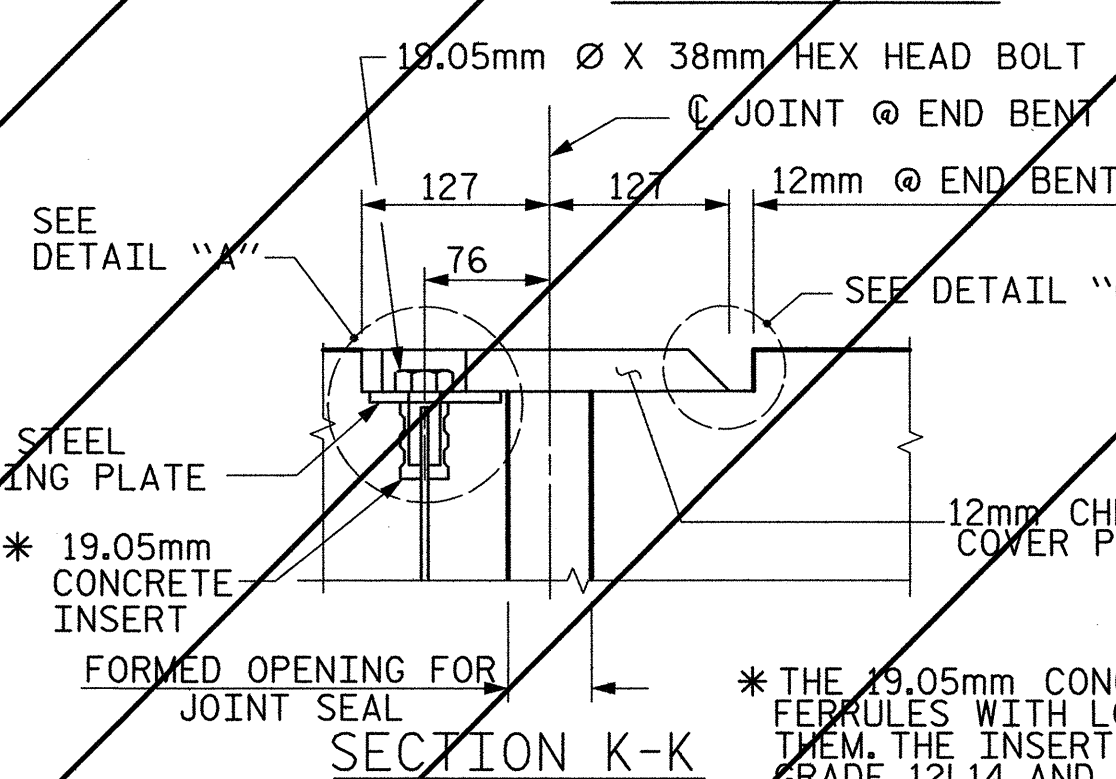
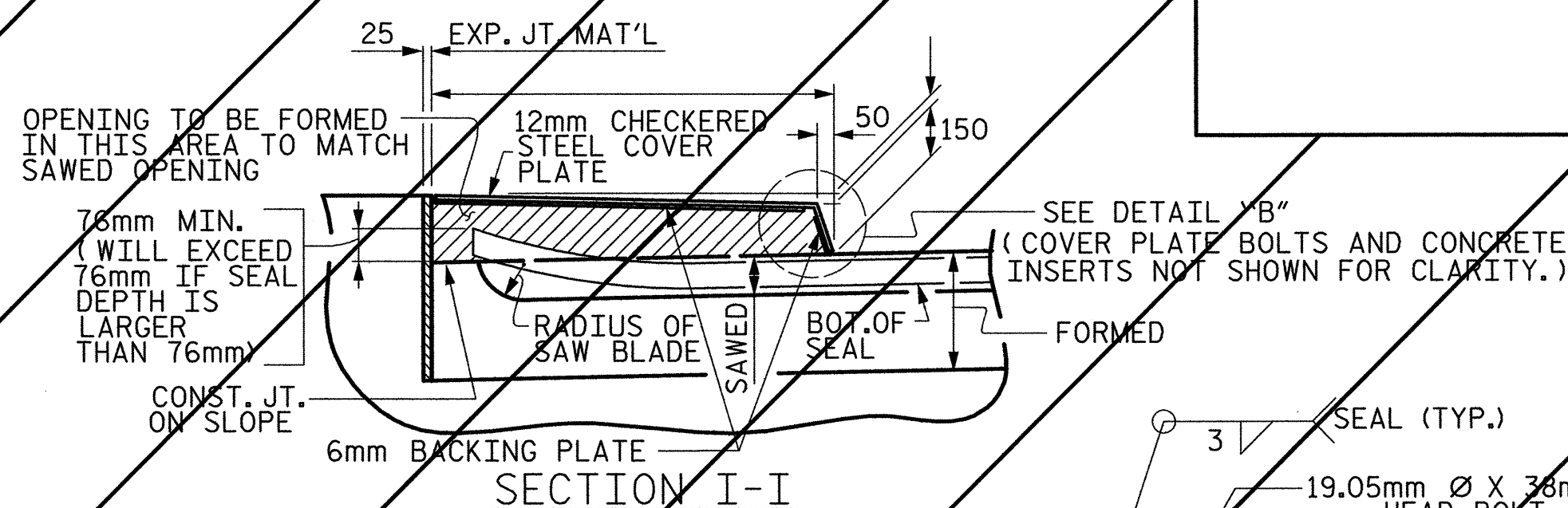
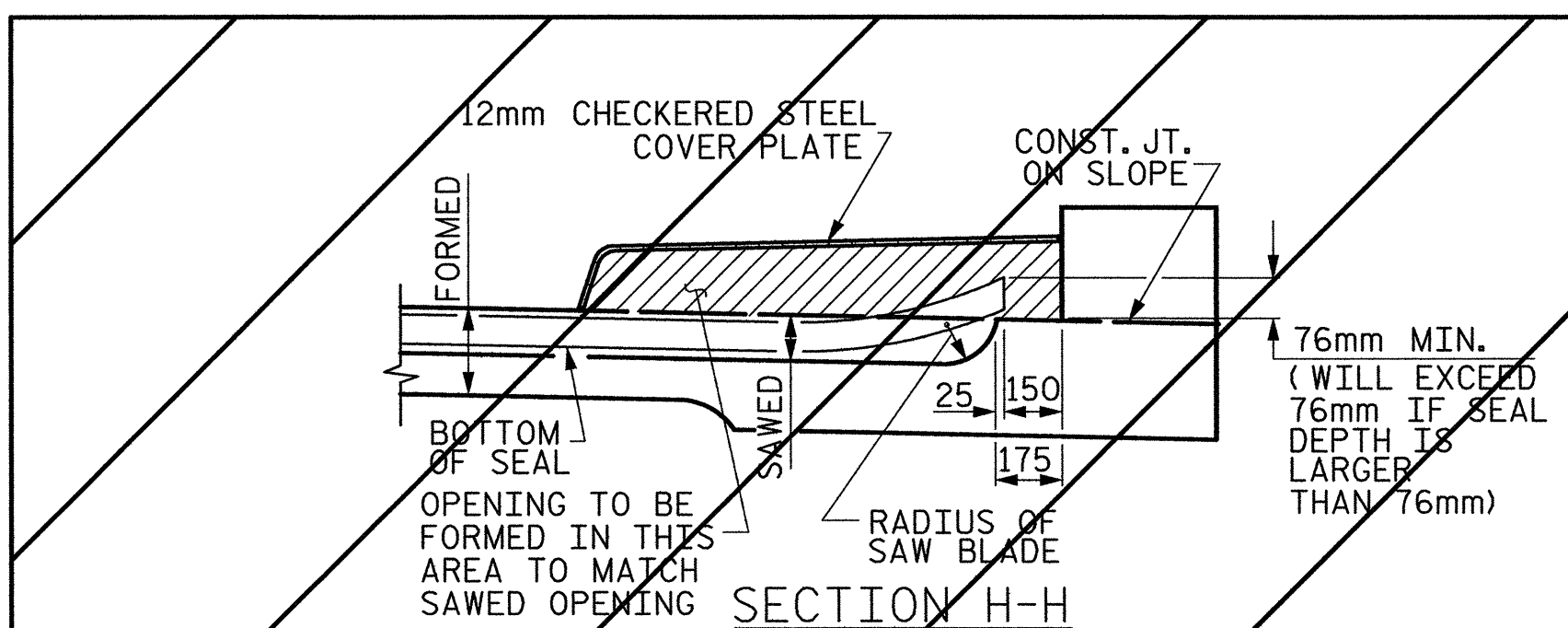
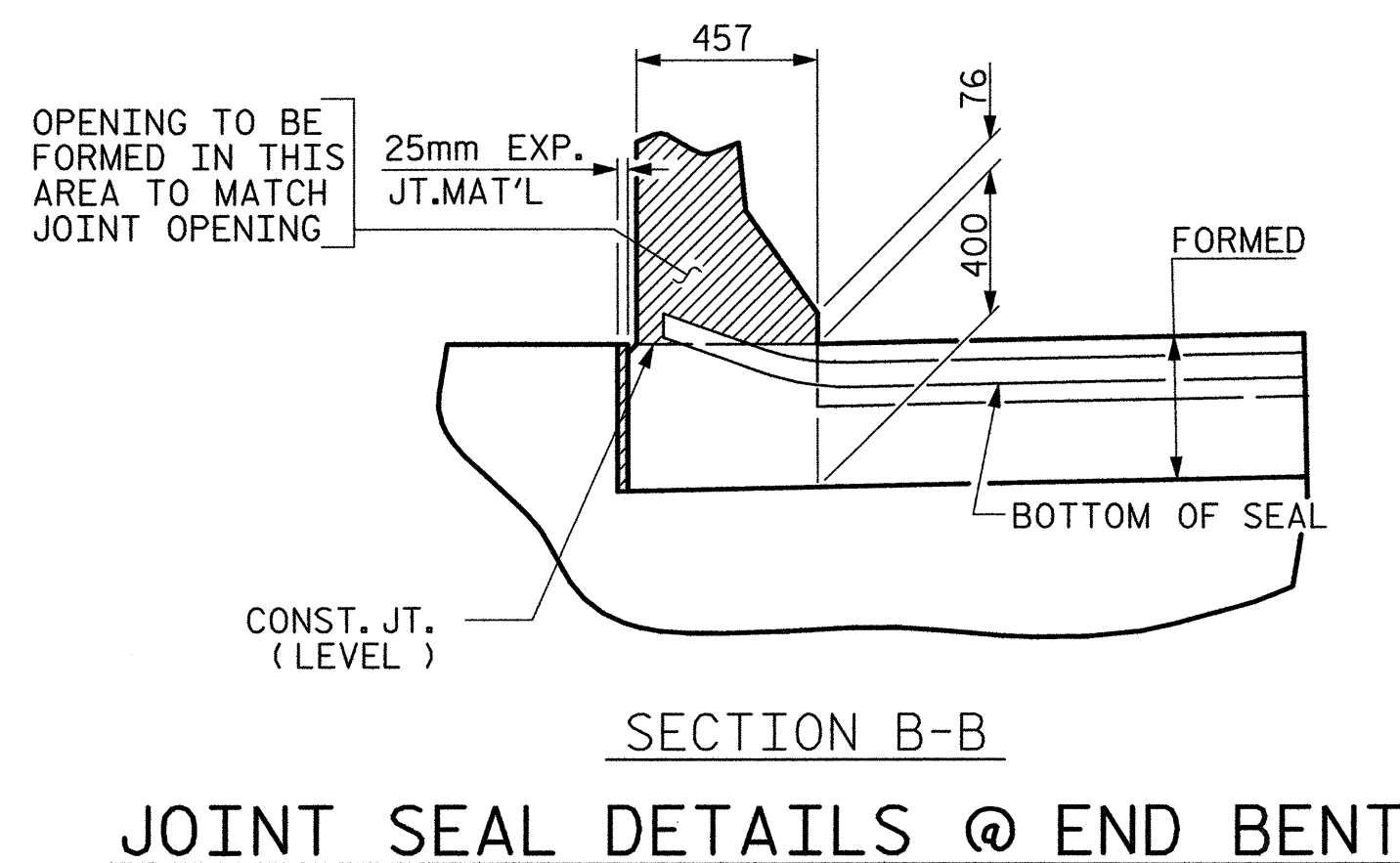
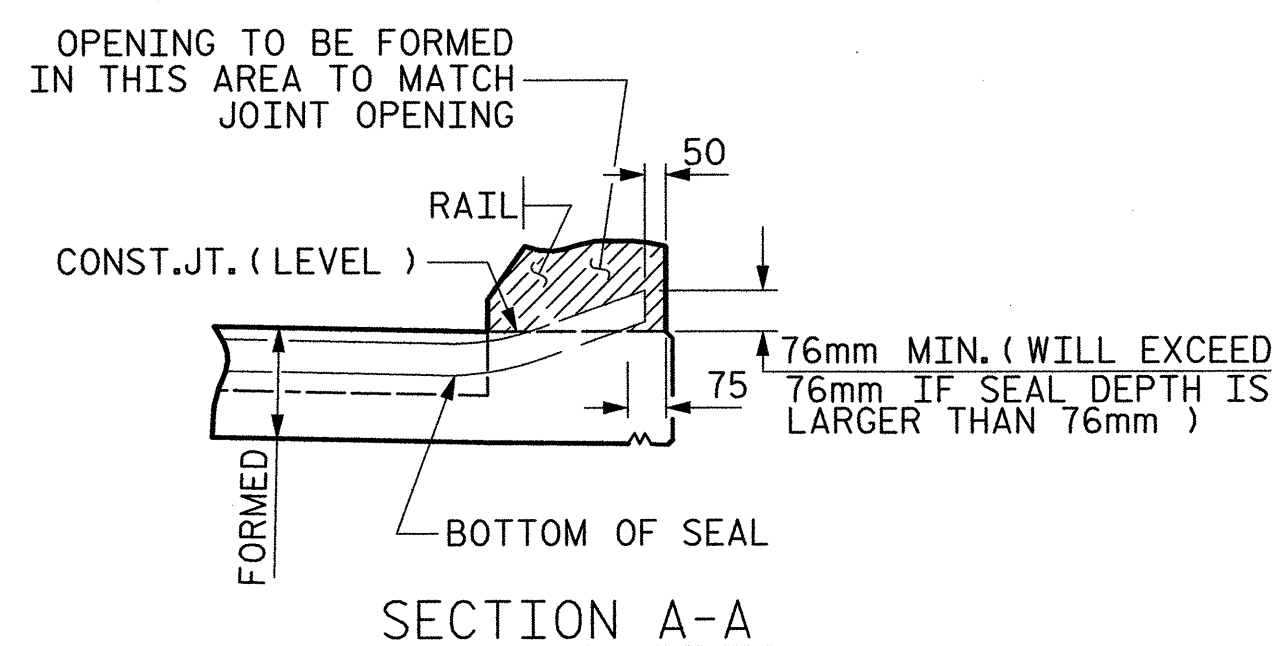
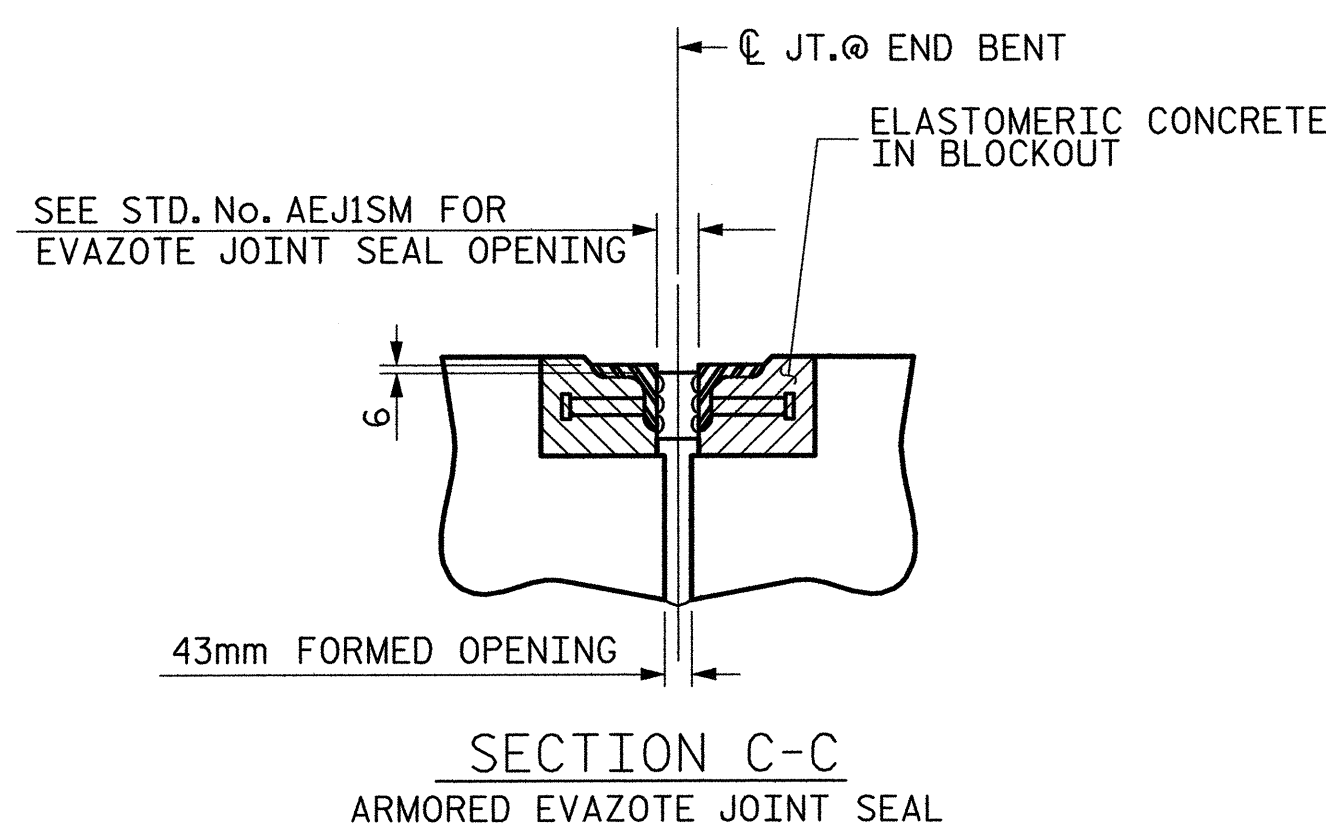
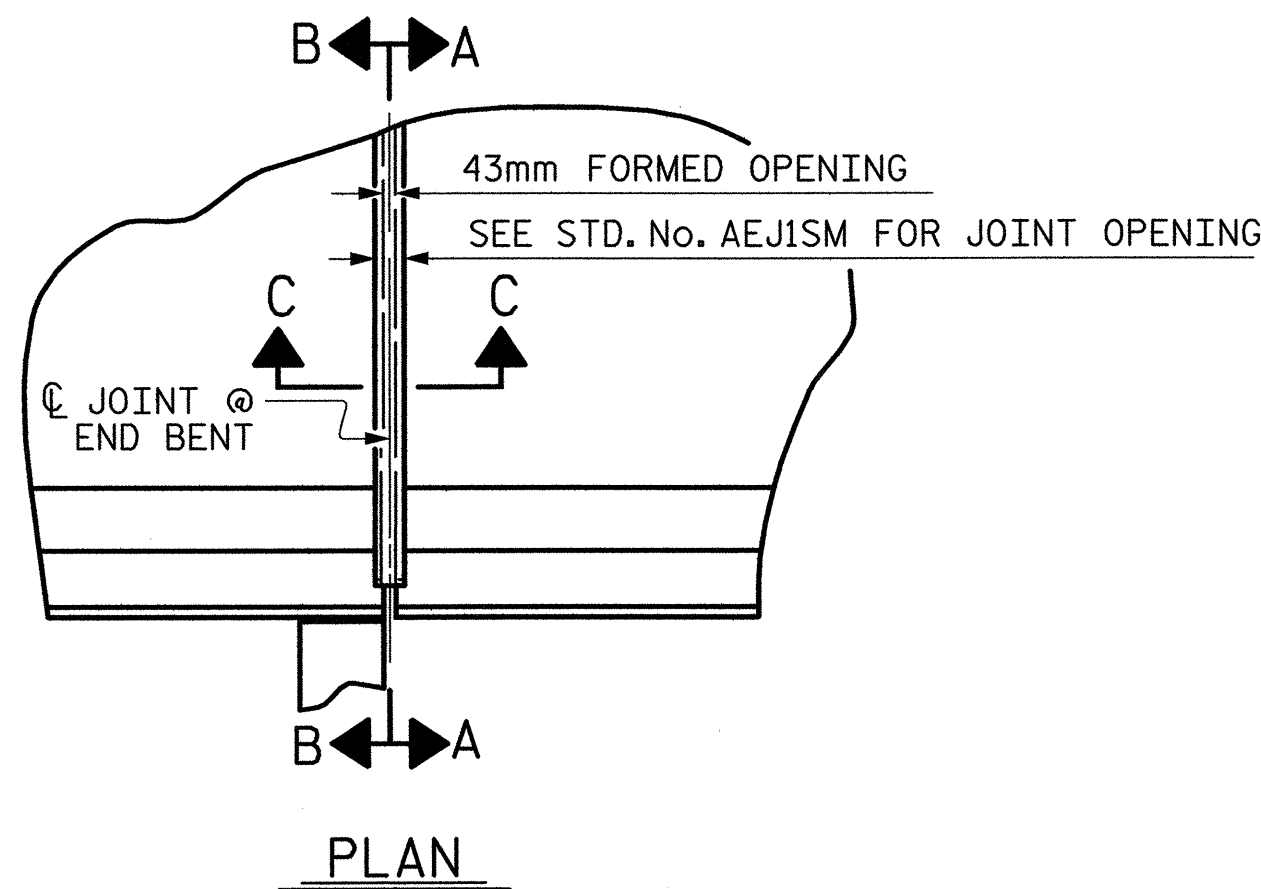
STATION: 14+38.000 -LREV- POT

SHEET 3 OF 4

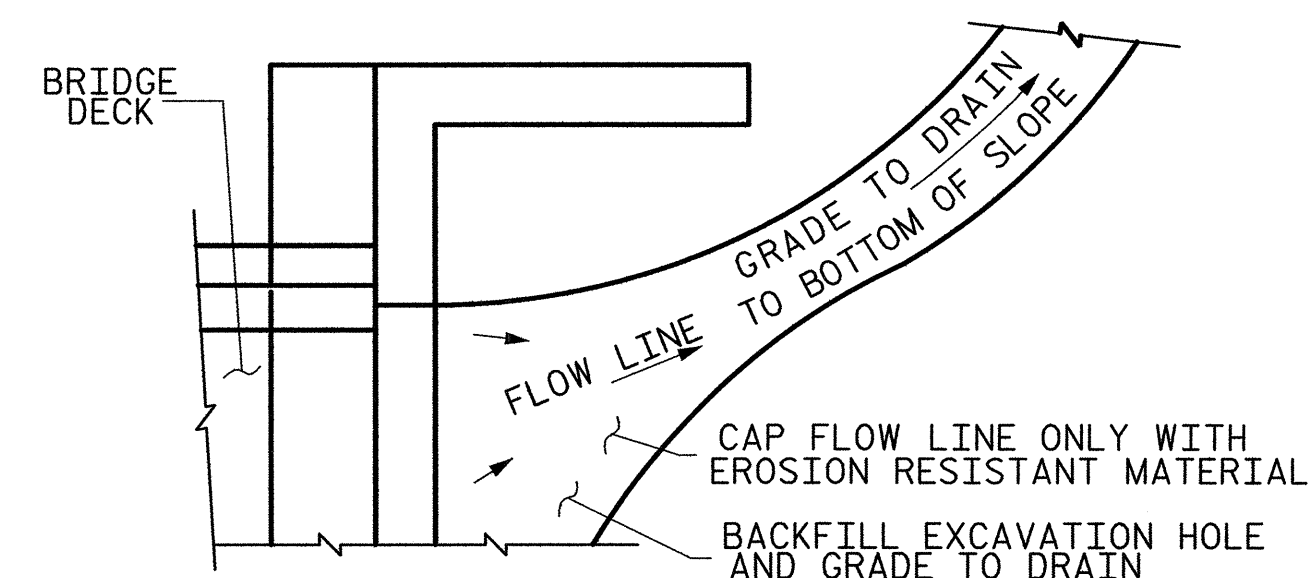
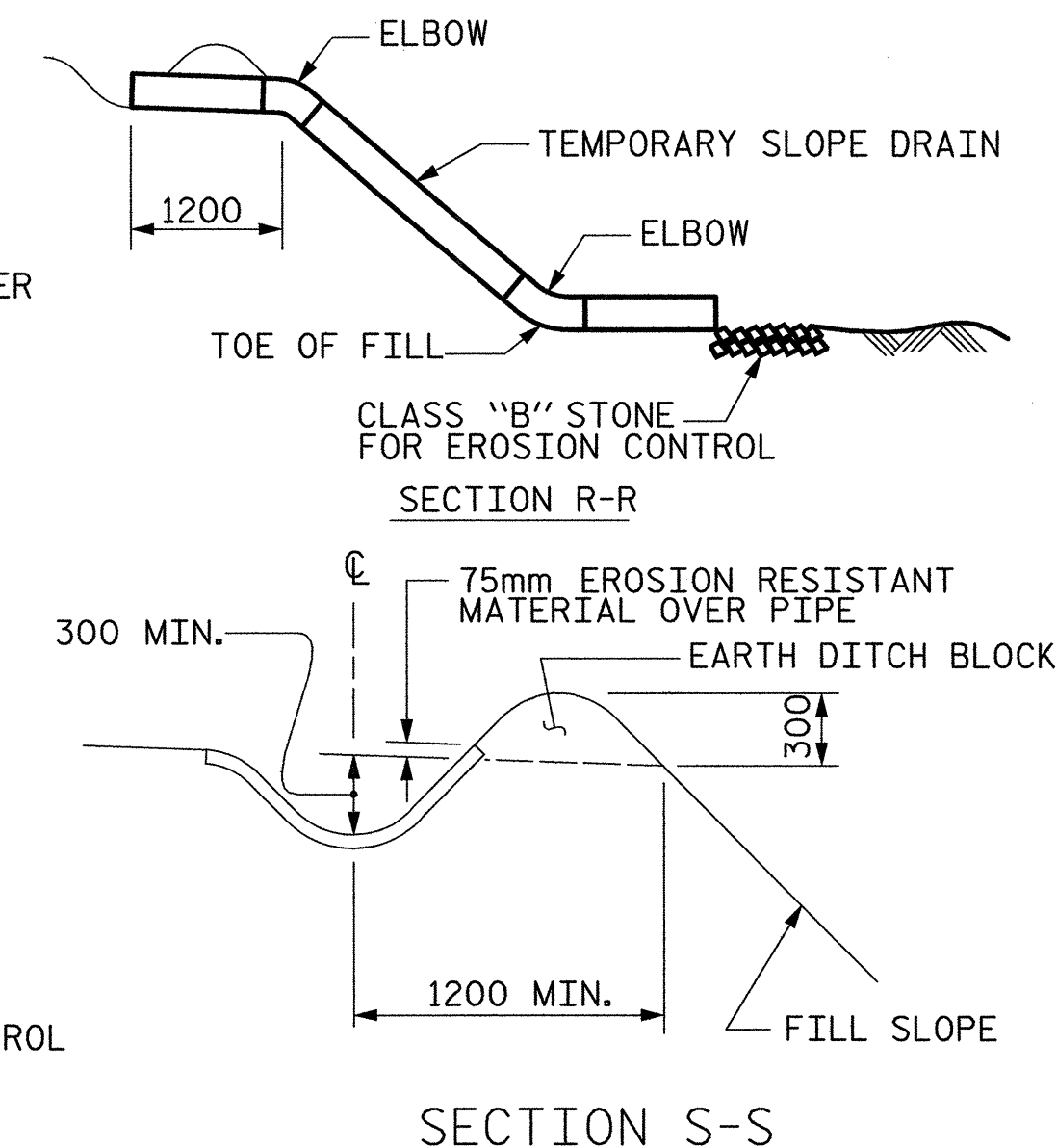
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
DETAILS FOR FLEXIBLE
PAVEMENT WITH BARRIER RAIL
(LEFT LANE)
STD. NO. BAS6SM

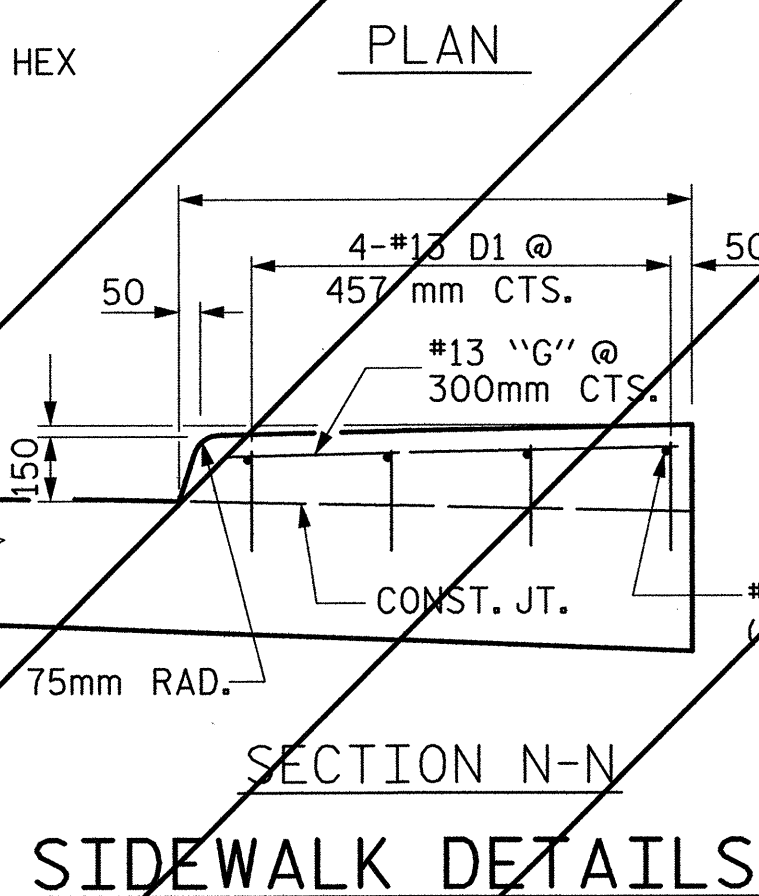
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	
1			3	5-182
2			4	429



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 50mm DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 305mm IN DIAMETER.



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.



PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH
SLAB DETAILS
(LEFT LANE)

STD. NO. BAS10SM

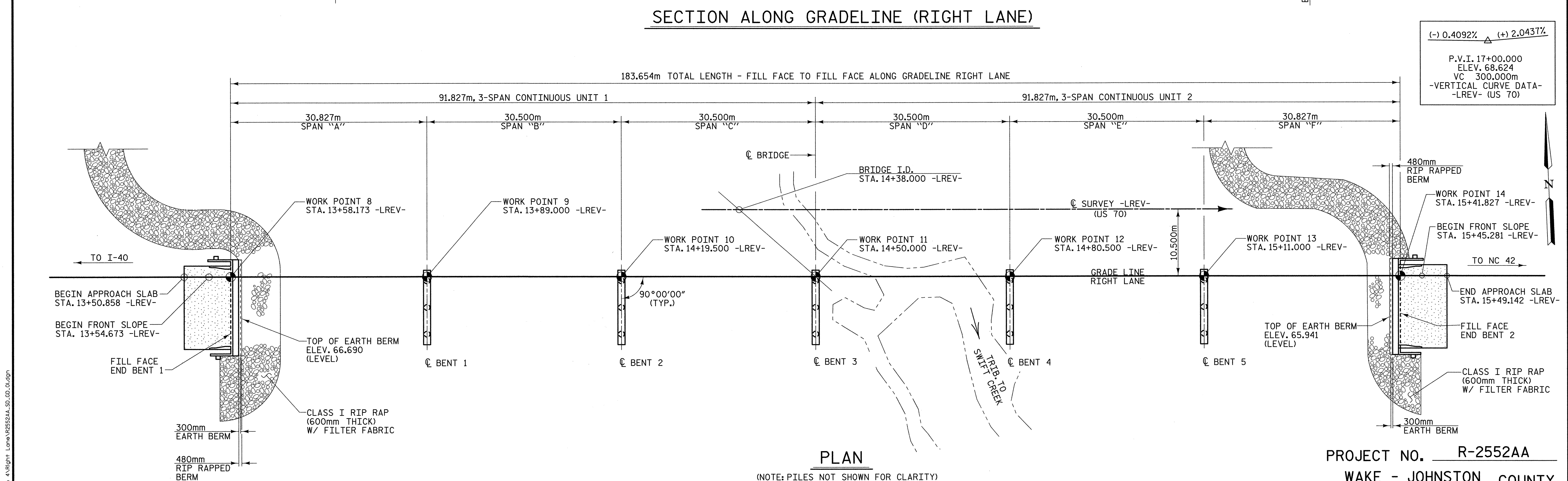
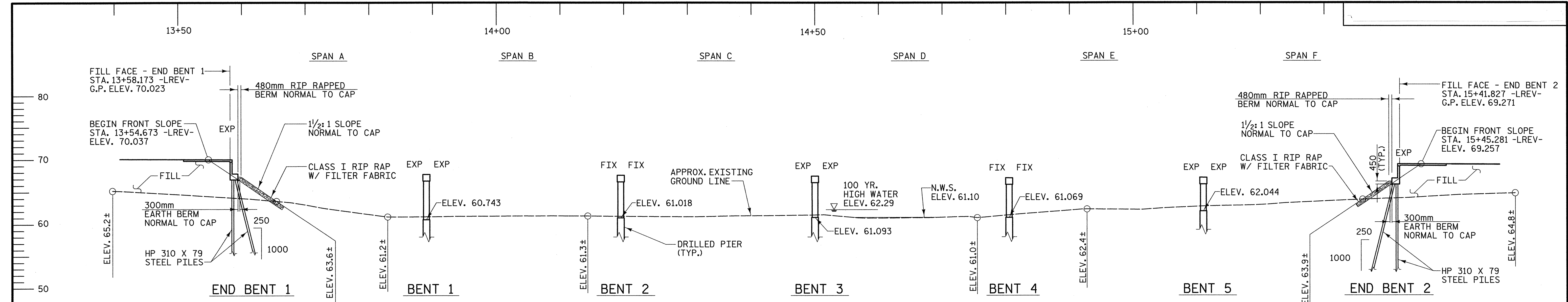
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	
1			3	5-183
2			4	429

THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



REFERENCE NO. BL-44

02/04/2005 03:07:03 PM G:\projects\2004\2552AA\Structures\Site 4\Right Lane\2552AA_S0_00.dgn



HYDROGRAPHIC DATA:

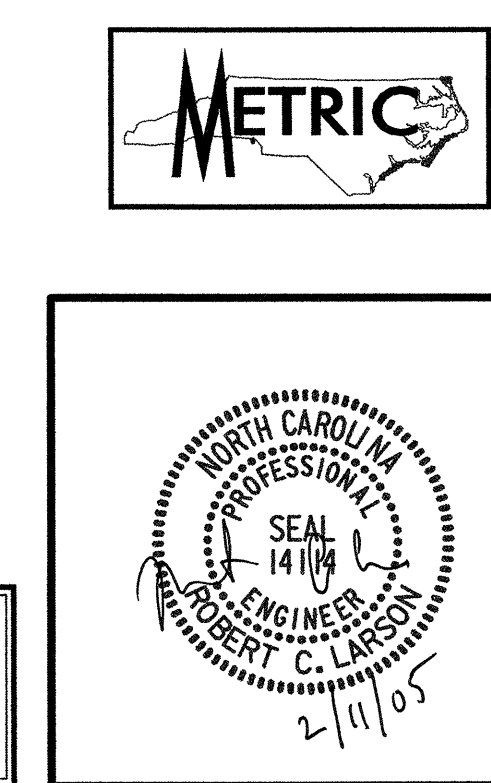
DESIGN DISCHARGE -	55 CMS
FREQUENCY OF DESIGN FLOOD -	50 YEAR
DESIGN HIGH WATER ELEVATION -	62.23
DRAINAGE AREA -	9.9 SQ. KM
BASIC DISCHARGE (Q 100) -	62 CMS
BASIC HIGH WATER ELEVATION -	62.29

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE -	N/A
FREQUENCY OF OVERTOPPING FLOOD -	500+ YEAR
OVERTOPPING FLOOD ELEVATION -	69.37

DRAWN BY: J. P. SHERMAN DATE: 6/04
CHECKED BY: R. C. LARSON DATE: 12/04

PLANS PREPARED BY:
MULKEY
ENGINEERS & CONSULTANTS
PO BOX 23127
RALEIGH, NC 27626
(919) 851-1913
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM



PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

SHEET 1 OF 4

BRIDGE NO. 598

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

GENERAL DRAWING FOR BRIDGE
ON -LREV- (US 70 BYPASS) OVER
TRIBUTARY TO SWIFT CREEK
BETWEEN I-40 AND NC 42
(RIGHT LANE)

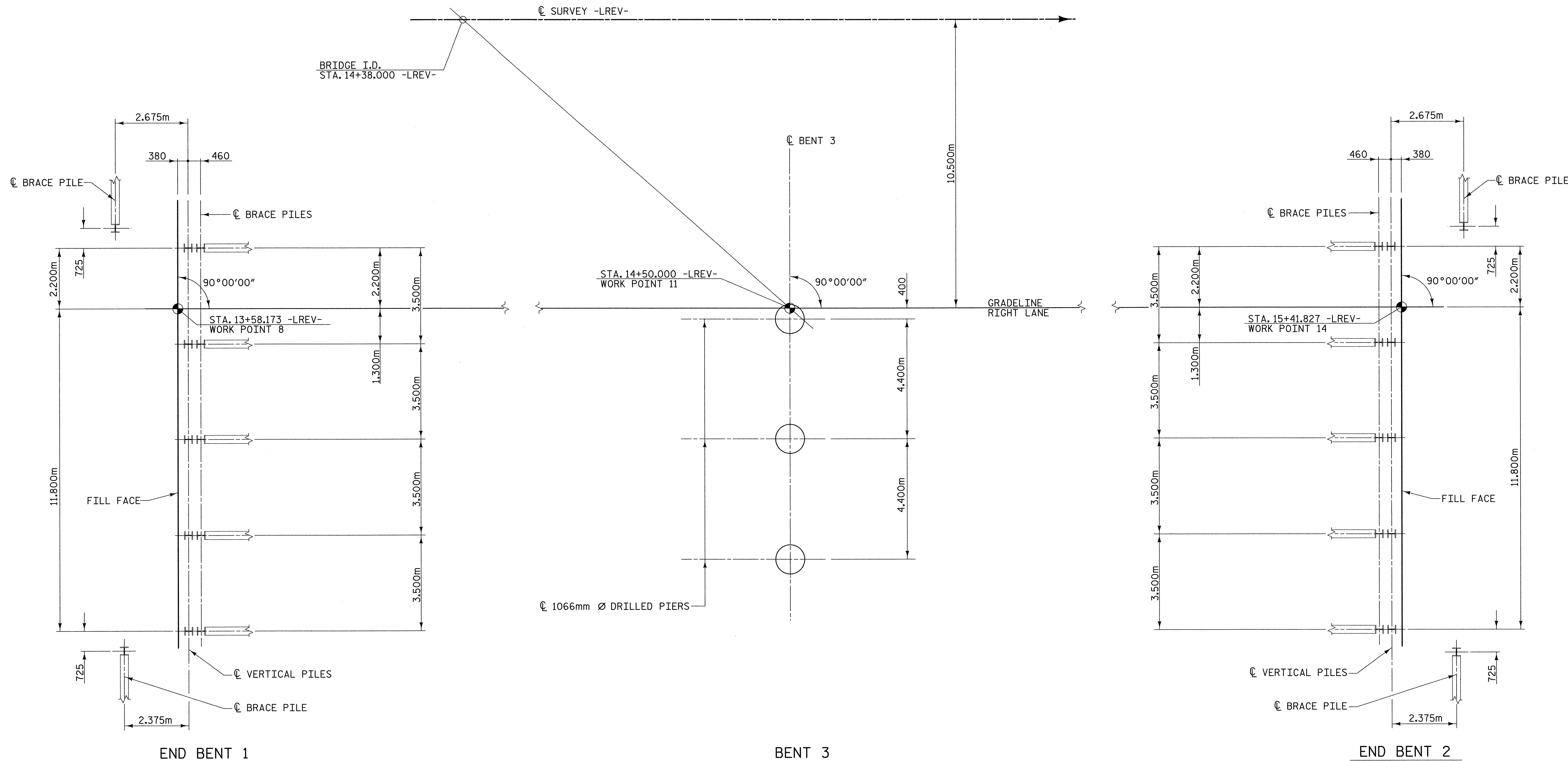
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. 5-124

TOTAL SHEETS 429

02/04/2005 07:24:45 AM G:\project\2004\23.00R-2552\Structures\Site 4\Right Lane\R2552AA.SD.FLD.dgn



PLAN

BENT 3 SHOWN, BENTS 1, 2, 4 & 5 SIMILAR
SEE "GENERAL DRAWING" SHT. R.N. BR-1
FOR ϕ BENT STATIONING.

NOTES:

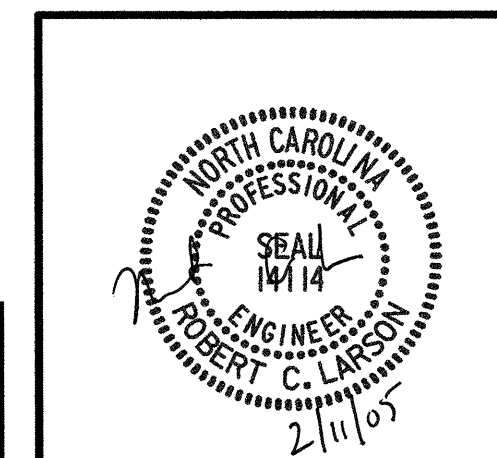
ALL PILES ARE HP 310 x 79 STEEL PILES.

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

250:1000 BATTER FOR BRACE PILES AT END BENT NO.1 AND END BENT NO.2.

PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

SHEET 2 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOUNDATION LAYOUT
(RIGHT LANE)

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

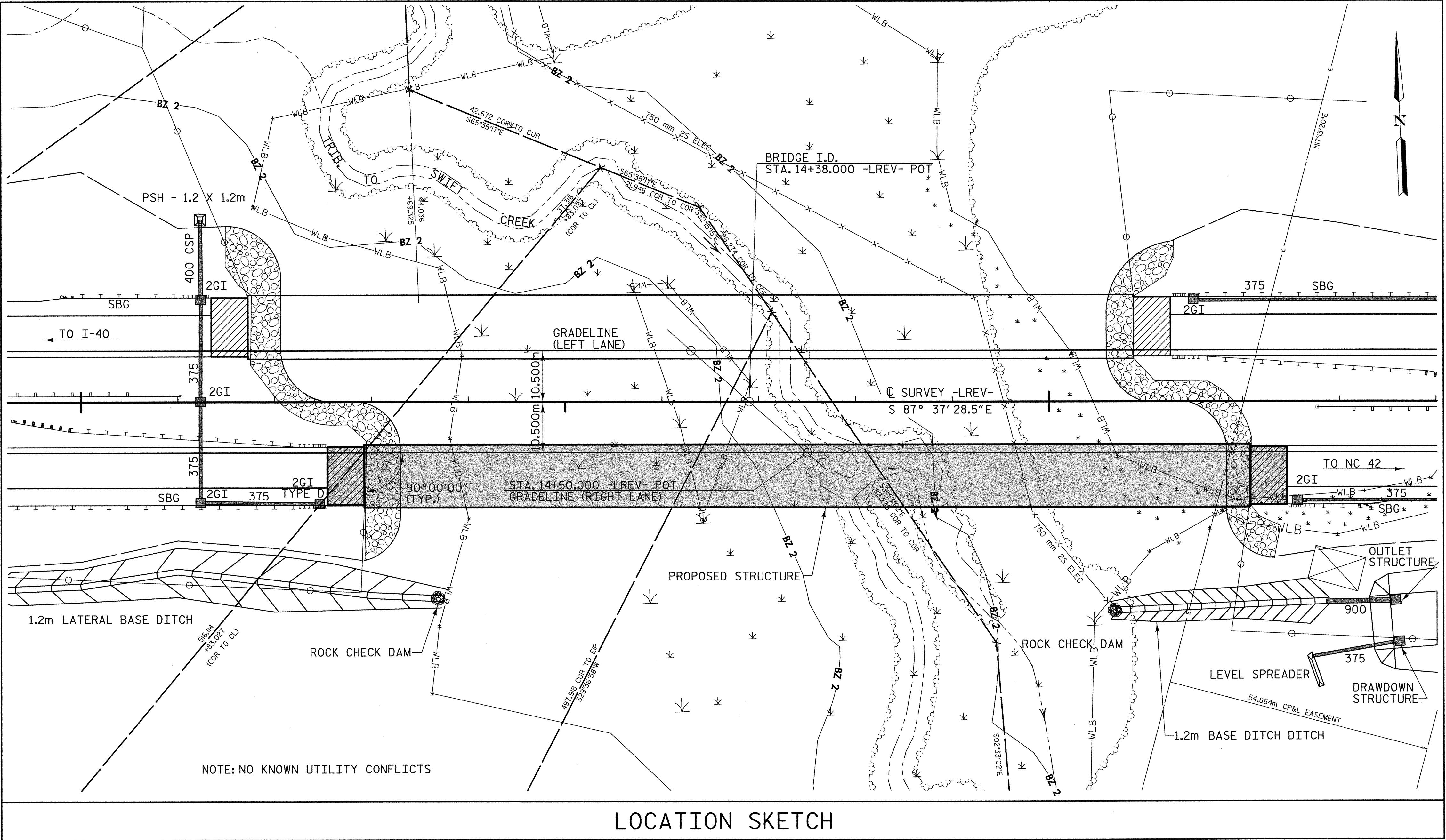
SHEET NO.

5-185
TOTAL SHEETS
429

DRAWN BY : W.B. ALLEN DATE : 12/04
CHECKED BY : R.C. LARSON DATE : 12/04

REFERENCE NO. BR-2

BENCH MARK: BL-713 -L- STA.12+22.891
1.858m LT. REBAR & CAP
ELEV. 68.144 NGVD 29



PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

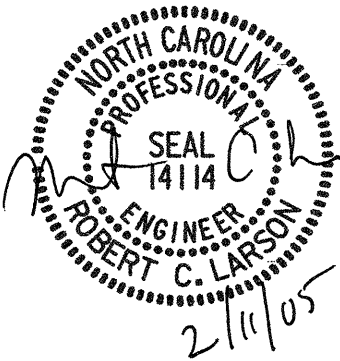
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE
ON -LREV- (US 70 BYPASS) OVER
TRIBUTARY TO SWIFT CREEK
BETWEEN I-40 AND NC 42
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-186
2			4			TOTAL SHEETS 429

REFERENCE NO. BR-3



DRAWN BY : W. B. ALLEN DATE : 6/04
CHECKED BY : R. C. LARSON DATE : 7/04

02/04/2005 07:25:40 AM G:\Project\2004\213\01R-2552\Structures\Site 4\Right Lane\2552AA SD.DWG

02/11/2005 09:24:57 AM C:\projects\2004\252AA\252AA\Structure\as\Site A Right Lane\252AA\SD_00_03.dgn

TOTAL BILL OF MATERIAL																					
	PERMANENT STEEL CASING FOR 1066mm DIA. DRILLED PIER	1066mm DIA. DRILLED PIERS IN SOIL	1066mm DIA. DRILLED PIERS NOT IN SOIL	SID INSPECTION	SPT TESTING	CROSSHOLE SONIC LOGGING	CSL TUBES	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS "A" CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 1600mm PRESTRESSED CONCRETE GIRDERS	HP 310 X 79 STEEL PILES	CONCRETE BARRIER RAIL	PLAIN RIP RAP CLASS I (600mm THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	
	METERS	METERS	METERS	EACH	EACH	EACH	METERS	SQ. METERS	SQ. METERS	CU. METERS	LUMP SUM	KG	KG	NO. METERS	NO. METERS	METERS	METRIC TONS	SQ. METERS	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE								2377.2	2177.8		LUMP SUM			24 726.976			365.866			LUMP SUM	LUMP SUM
END BENT 1										33.2		2479			12 204		360	365			
BENT 1	8.2	40.1	5.9	1	3	1	194.4			29.7		7557	2017								
BENT 2	3.6	33.7	3.6				159.3			28.9		6770	1702								
BENT 3	9.3	30.9	3.6	1	3	1	148.2			28.5		6504	1595								
BENT 4	9.2	41.6	5.4				198.3			28.3		7472	1977								
BENT 5		34.6	3.5	1	3	1	162.8			26.2		6506	1589								
END BENT 2										33.2		2479			12 108		205	210			
TOTAL	30.3	180.9	22.0	3	9	3	863.0	2377.2	2177.8	208.0	LUMP SUM	39,767	8880	24 726.976	24 312	365.866	565	575	LUMP SUM	LUMP SUM	

GENERAL NOTES

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

ASSUMED LIVE LOAD = MS 18 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES,SEE SHEET SNSM.

FOR EROSION CONTROL MEASURES,SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 300mm BELOW THE GROUND LINE.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18,"EVALUATING SCOUR AT BRIDGES",NOVEMBER, 1995.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY A.

TEMPORARY WORK BRIDGE IS PAID FOR UNDER THE LEFT LANE STRUCTURE.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

PILES AT END BENT NOS.1 & 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 530 KN EACH.

WHEN DRIVING PILES,THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED.

THE DRILLED PIERS AT BENT NOS.1 THROUGH 5 HAVE BEEN DESIGNED FOR BOTH SKIN FRICTION AND TIP BEARING.THE REQUIRED TIP BEARING CAPACITY IS 1400 KPa.

THE REQUIRED TIP BEARING AT BENT NOS.1 THROUGH 5 SHALL BE VERIFIED.

DRILLED PIERS FOR BENT NOS.1 THROUGH 5 HAVE BEEN DESIGNED FOR AN APPLIED LOAD OF 2,983 KN AT THE TOP OF THE COLUMN.

PERMANENT STEEL CASING IS NOT REQUIRED FOR DRILLED PIERS AT BENT NO. 5.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT NOS.1 THROUGH 4 AND THE CASING SHALL NOT EXTEND BELOW ELEVATION 58.0 WITHOUT THE ENGINEER'S PERMISSION.

DRILLED PIERS AT BENT NO.1 (LEFT AND CENTER) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 43.0 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.1 (RIGHT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 50.2 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.2 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 48.6 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.3 (LEFT AND CENTER) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 48.6 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.3 (RIGHT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 51.6 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.4 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 45.4 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.5 (LEFT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 50.8 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

DRILLED PIERS AT BENT NO.5 (CENTER AND RIGHT) SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 48.6 m AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

THE SCOUR CRITICAL ELEVATION FOR BENT NOS.1 THROUGH 4 IS 60.0 m, 60.0 m, 59.8 m, AND 59.8 m, RESPECTIVELY.THE SCOUR CRITICAL ELEVATIONS ARE FOR USE BY MAINTENANCE FORCES TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR DRILLED PIERS,SEE SPECIAL PROVISIONS.

SPT TESTING IS REQUIRED TO DETERMINE THE TIP BEARING CAPACITY OF THE DRILLED PIERS AT BENT NOS.1, 3, AND 5.

SPT TESTING IS NOT REQUIRED TO DETERMINE THE TIP BEARING CAPACITY OF THE DRILLED PIERS AT BENT NOS. 2 AND 4.

SID INSPECTIONS MAY BE REQUIRED TO DETERMINE THE BOTTOM CLEANLINESS OF THE DRILLED PIERS AT BENT NOS. 1, 2, 3, 4 OR 5.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS AT BENT NOS. 1 THROUGH 5. SEE SPECIAL PROVISIONS FOR CROSSHOLE SONIC LOGGING.

THE CONTRACTOR HAS THE OPTION OF USING EITHER SLURRY CONSTRUCTION OR TEMPORARY CASING TO CONSTRUCT THE DRILLED PIERS.

DO NOT DEWATER THE DRILLED PIER EXCAVATIONS AT BENT NOS. 1, 2, 3, 4 OR 5. CLEAN THE BOTTOM OF THE EXCAVATION WITH A SUBMERSIBLE PUMP OR AN AIRLIFT. WET PLACEMENT OF CONCRETE IS REQUIRED. SEE DRILLED PIER SPECIAL PROVISION.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR FABRICATED METAL-STAY-IN-PLACE FORMS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.



PROJECT NO. R-2552AA

WAKE - JOHNSTON COUNTY

STATION: 14+38.000 -LREV- POT

SHEET 4 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH											
GENERAL DRAWING TOTAL BILL OF MATERIAL & GENERAL NOTES (RIGHT LANE)											
REVISIONS											
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.					
1			3			5-127					
2			4			TOTAL SHEETS 429					

DRAWN BY : W. B. ALLEN DATE : 12/04
CHECKED BY : R. C. LARSON DATE : 12/04

REFERENCE NO. BR-4

02/04/2005 09:02:49 PM G:\project\2004\21301R-2521\Structures\She 4\Right Lane\R2521A.SD.AS.02.dgn

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 102mm Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE.

THE 150mm COMP. A.B.C. SHALL EXTEND 3m BEYOND THE END OF THE APPROACH SLAB AND 300mm OUTSIDE OF EACH EDGE OF THE SLAB.

THE CONTRACTOR MAY USE 100mm TYPE B-25.0B ASPHALT CONCRETE COURSE IN LIEU OF 150mm COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL EXTEND 300mm BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 125mm CLASS "A" CONCRETE BASE IN LIEU OF 150mm COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL EXTEND 300mm BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 13.6 kg. ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 87mm.

BILL OF MATERIAL

FOR ONE APPROACH SLAB
(2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	49	#16	STR	12760	970
A2	100	#13	STR	6660	662
*B1	86	#19	STR	7240	1392
B2	86	#25	STR	7520	2569
*B3	14	#16	STR	3540	77
*B4	2	#16	3	1920	6
*S1	50	#16	STR	980	76
*S2	50	#16	1	1220	95
*S3	20	#16	2	680	21

REINFORCING STEEL kg. 3231

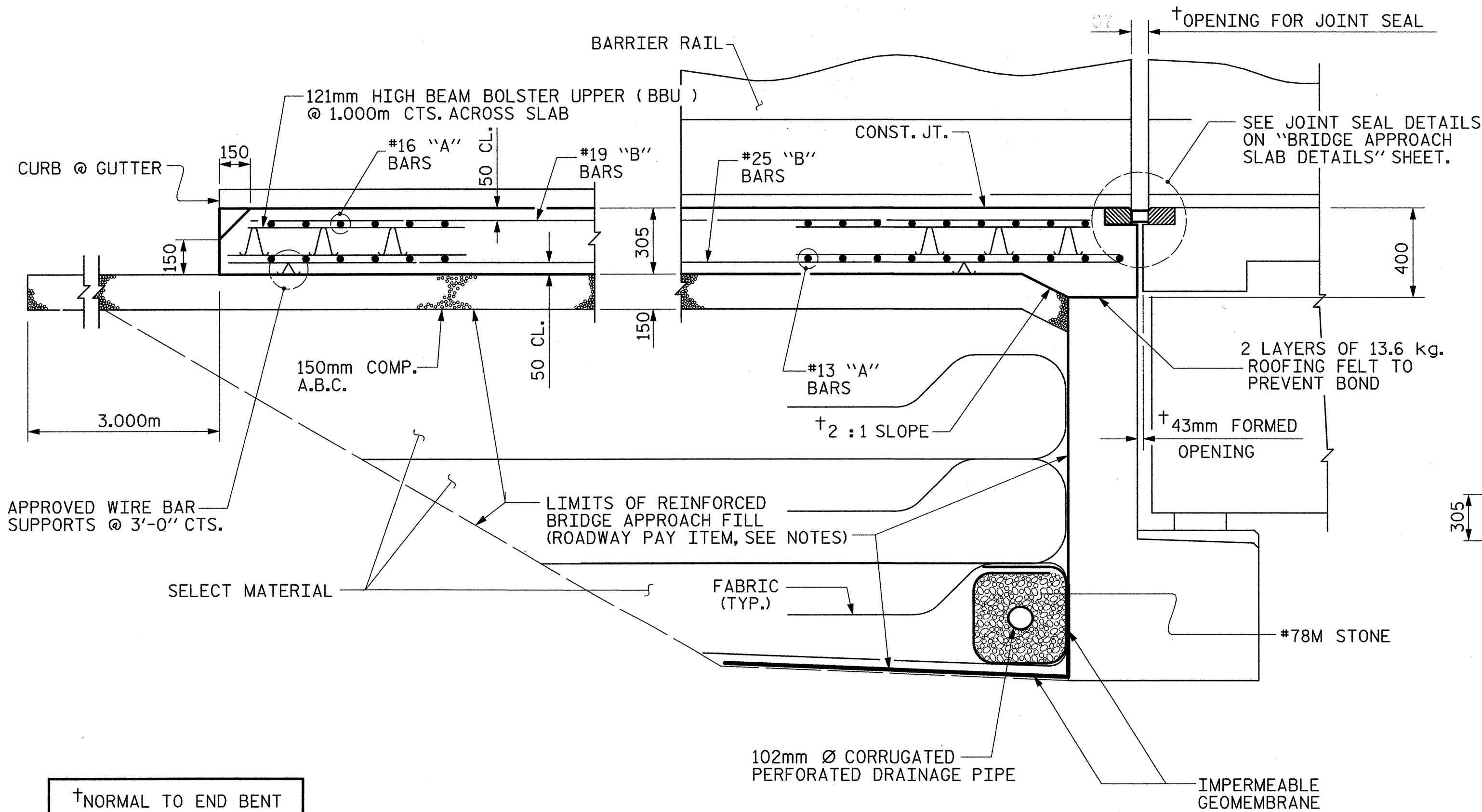
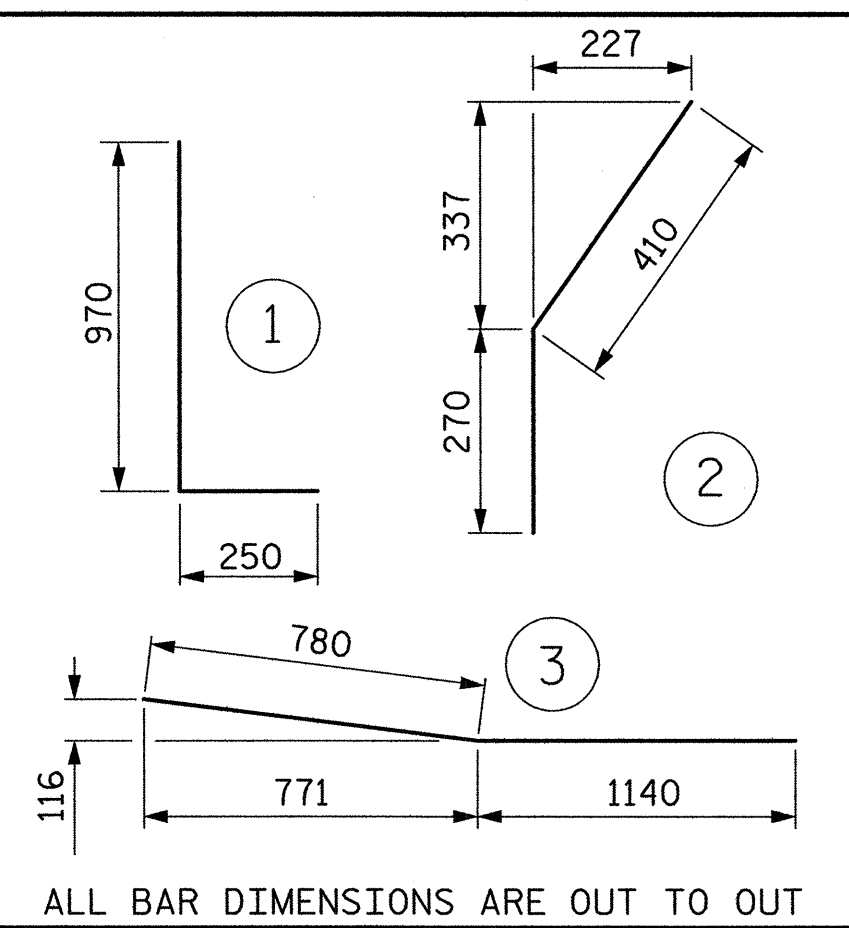
*EPOXY COATED REINFORCING STEEL kg. 2637

CLASS AA CONCRETE BREAKDOWN

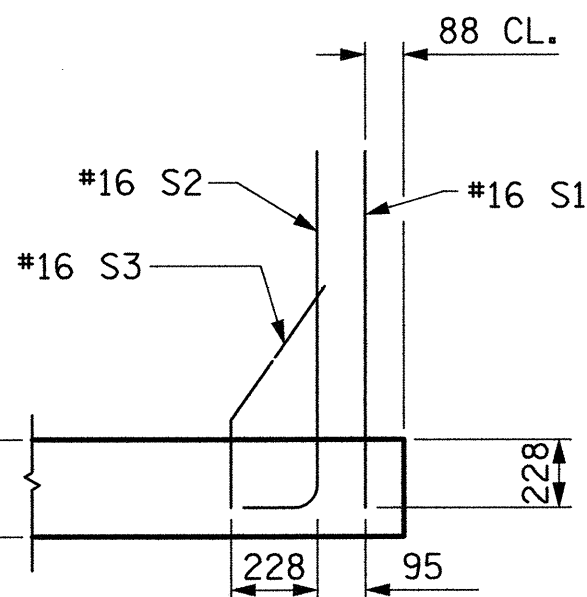
POUR 1	SLAB AND CURB	C. M.	30.5
POUR 2	RAIL	C. M.	1.6

CLASS AA CONCRETE C. M. 32.1

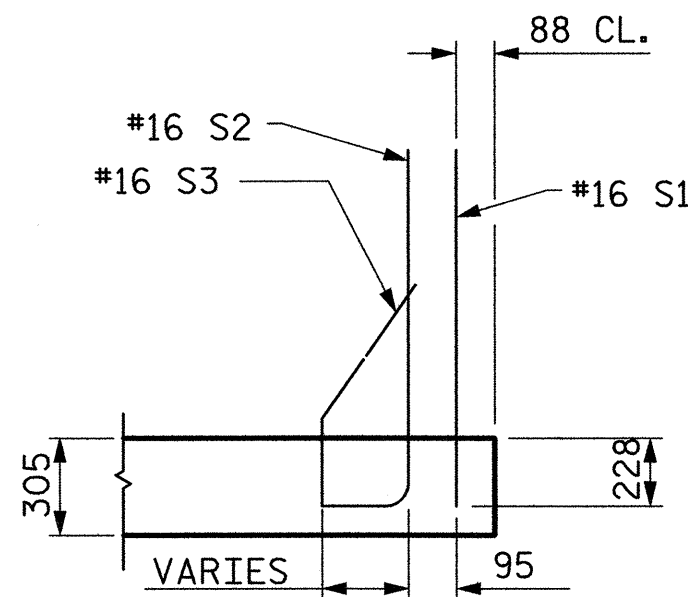
BAR TYPES



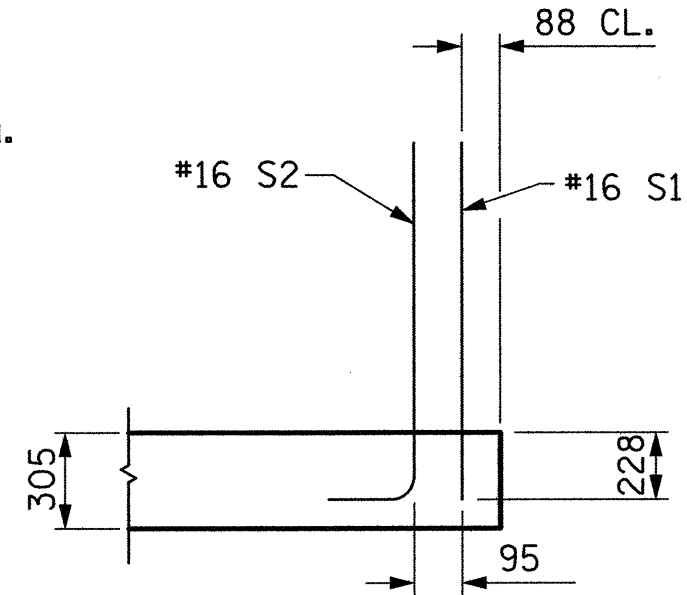
SECTION THRU SLAB



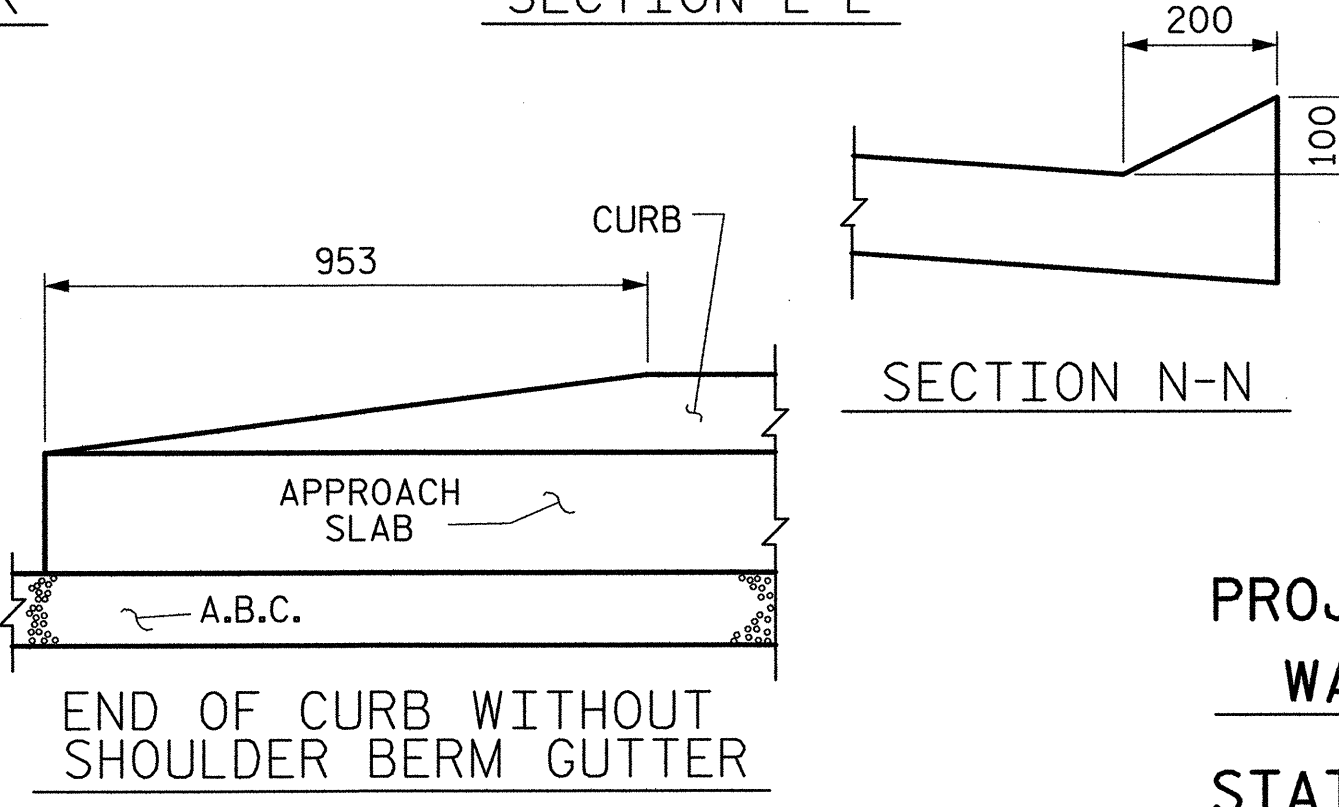
SECTION K-K



SECTION L-L



SECTION M-M



CURB DETAILS

PROJECT NO. R-2552AA
WAKE - JOHNSTON COUNTY
STATION: 14+38.000 -LREV- POT

SHEET 2 OF 4

ASSEMBLED BY :	W. B. ALLEN	DATE :	10/04
CHECKED BY :	R. C. LARSON	DATE :	12/04
DRAWN BY :	RWW 8/01	ADDED :	12/01
CHECKED BY :	LES 8/01	REV. :	5/7/03R RWW/JTE



THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



REFERENCE NO. BR-42

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT WITH BARRIER RAIL (RIGHT LANE) STD. NO. BAS55M					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-225					TOTAL SHEETS 429

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 6mm HOLD DOWN PLATE AND 7 - 22.23mm Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 250. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

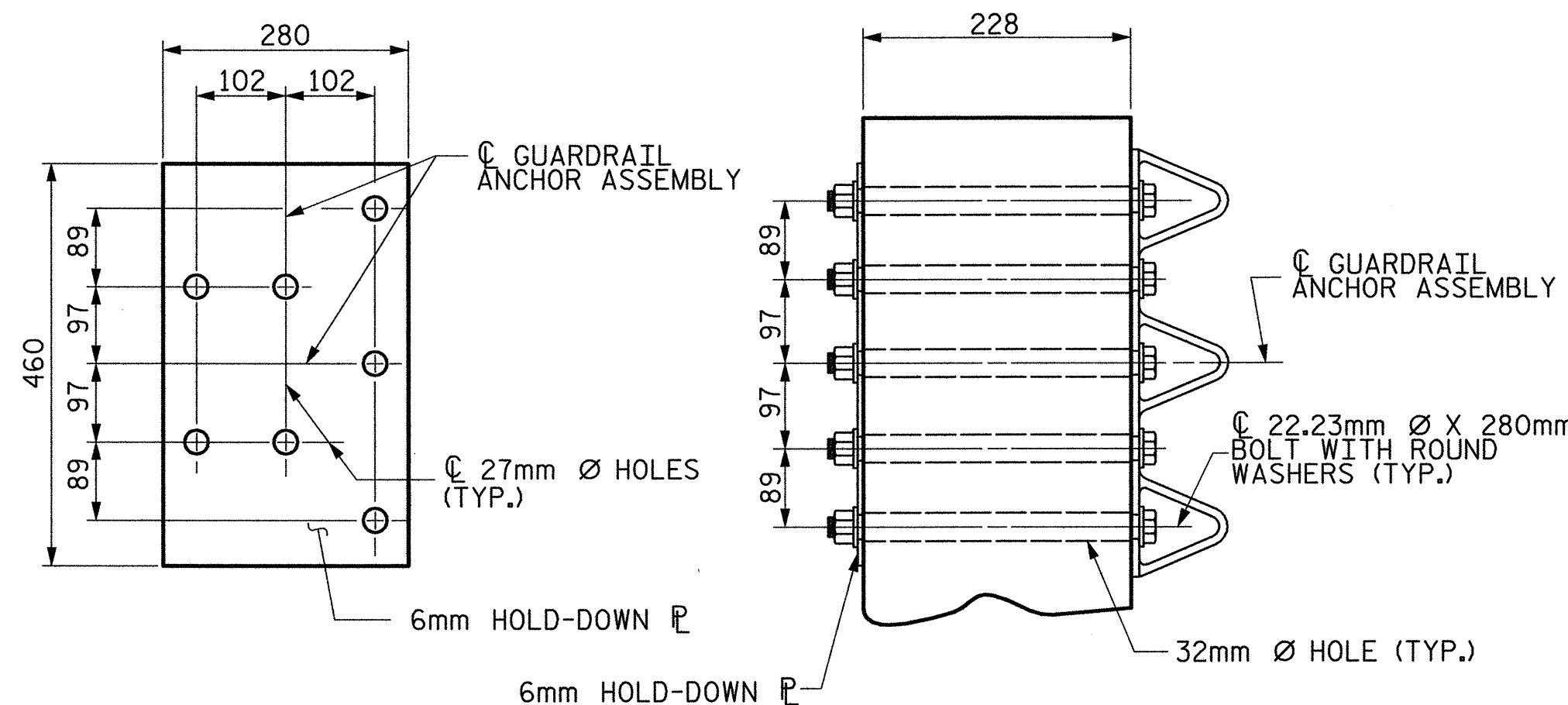
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 22.23mm Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

THE 32mm Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

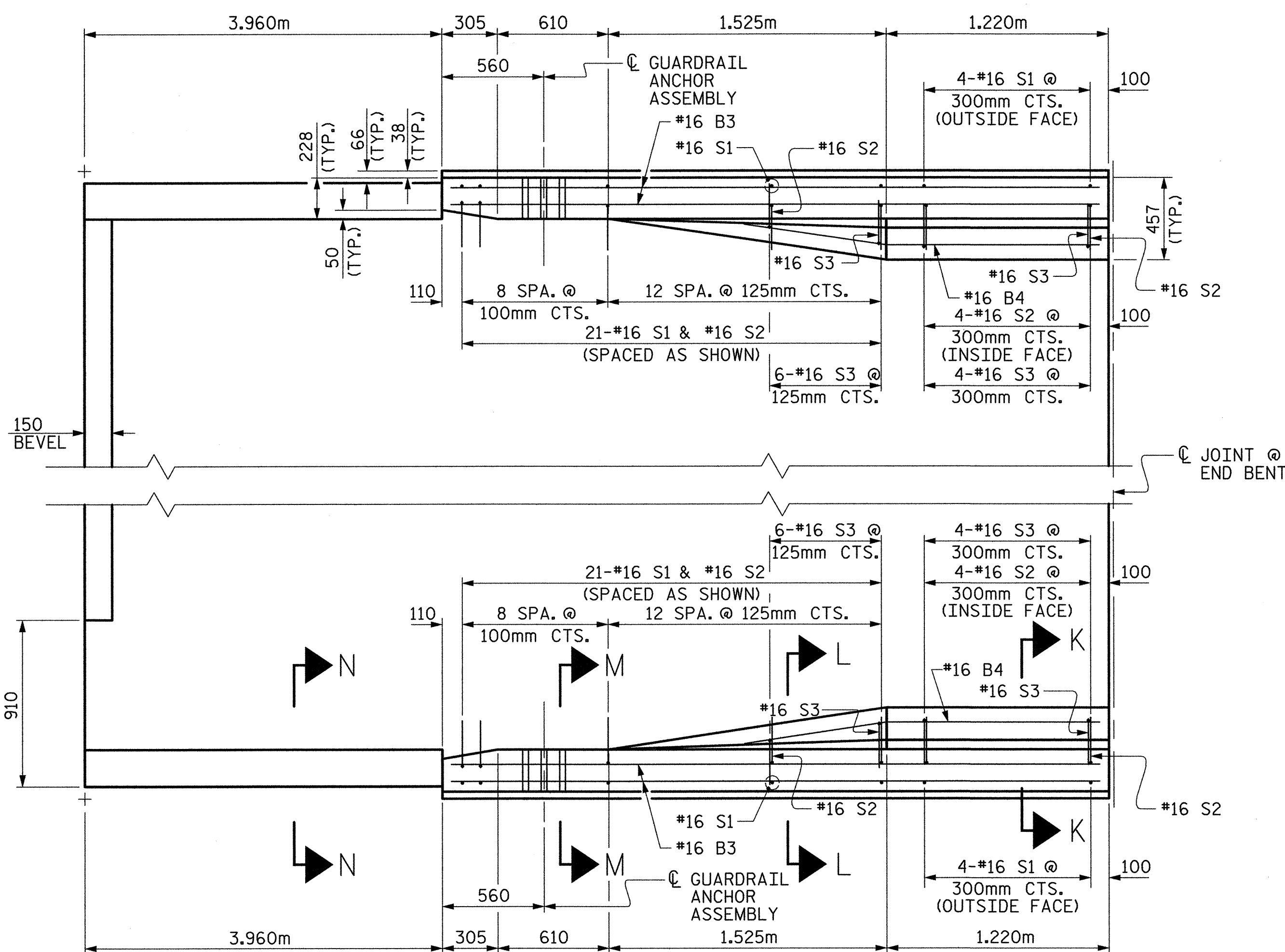
~~THE #16 S1 AND #16 S3 BARS SHALL BE INSTALLED, WHERE NOTED ON THE PLANS, USING AN ADHESIVE ANCHORING SYSTEM AFTER SAWING THE JOINT. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. THE YIELD LOAD FOR THE #16 S1 AND #16 S3 BARS IS 82.7 KN. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.~~



PLAN

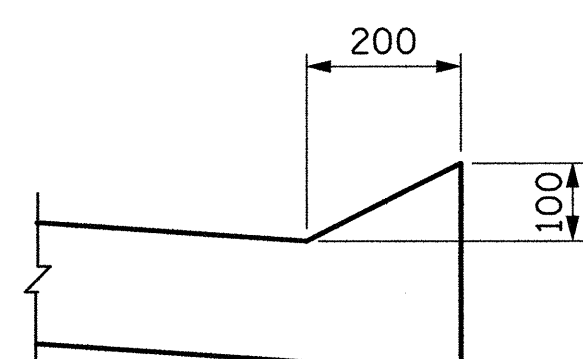
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

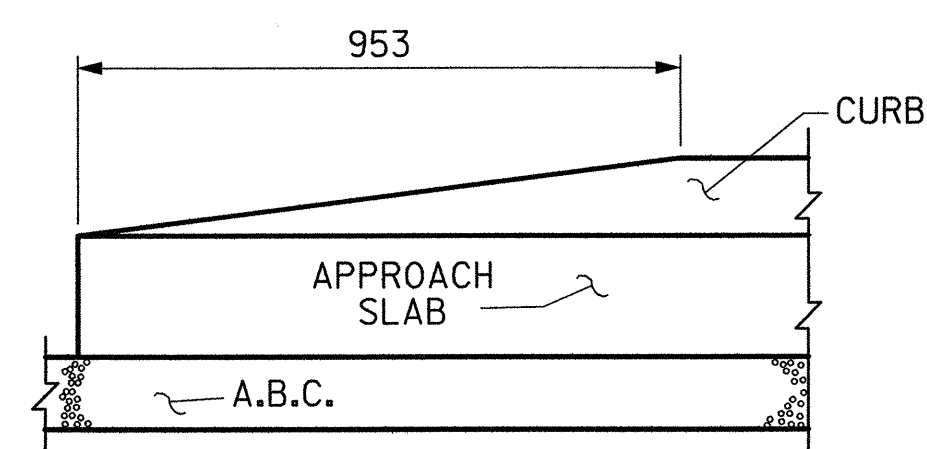


PLAN

BEGIN APPROACH SLAB SHOWN,
END APPROACH SLAB SIMILAR



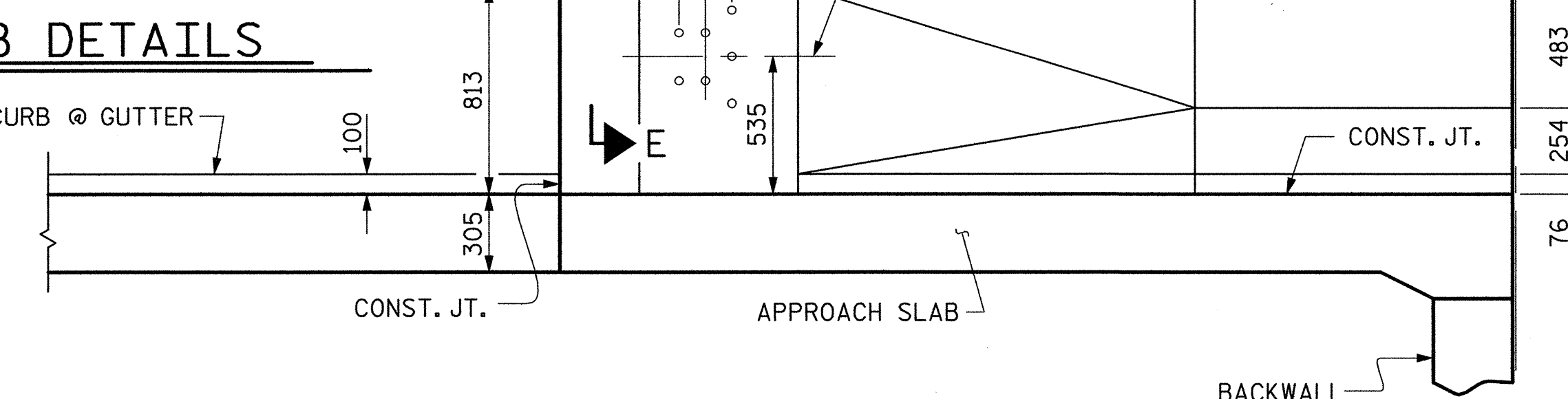
SECTION N-N



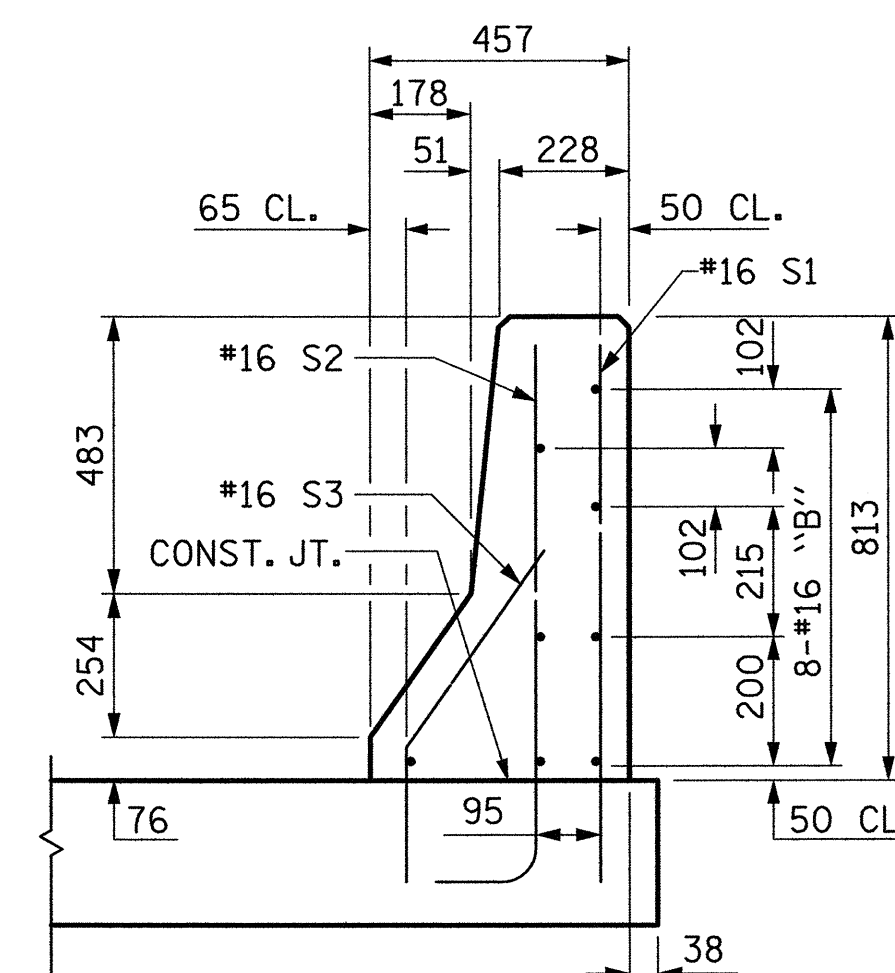
END OF CURB WITHOUT
SHOULDER BERM GUTTER

CURB DETAILS

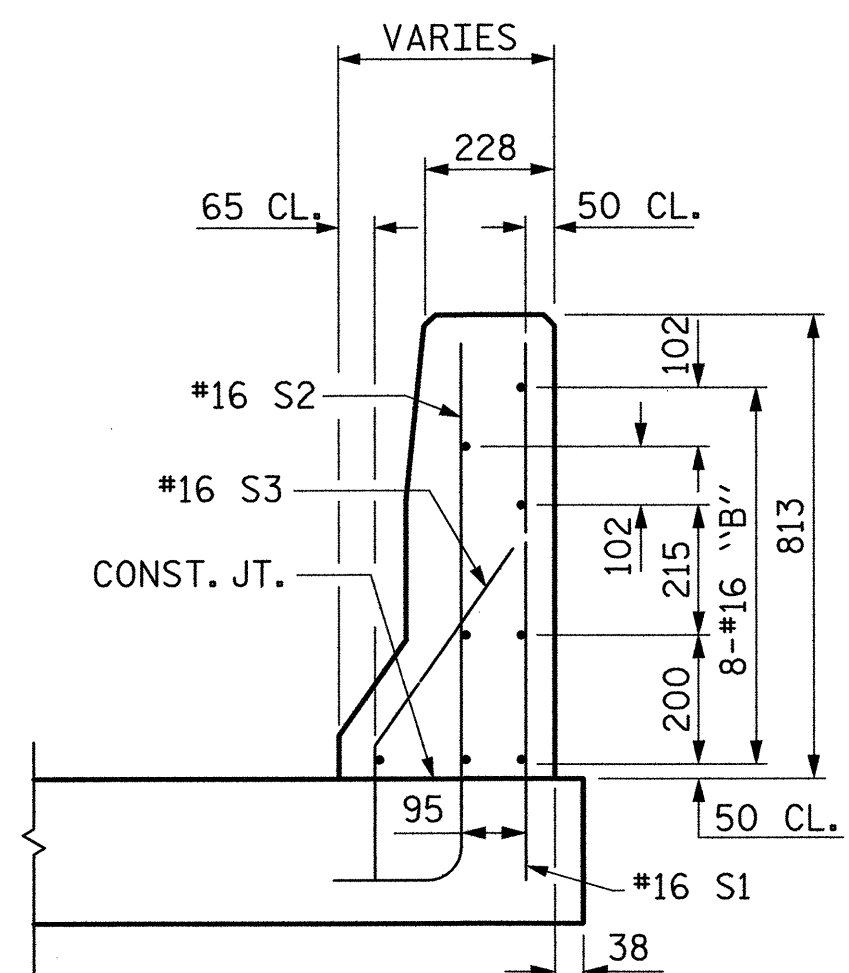
CURB @ GUTTER



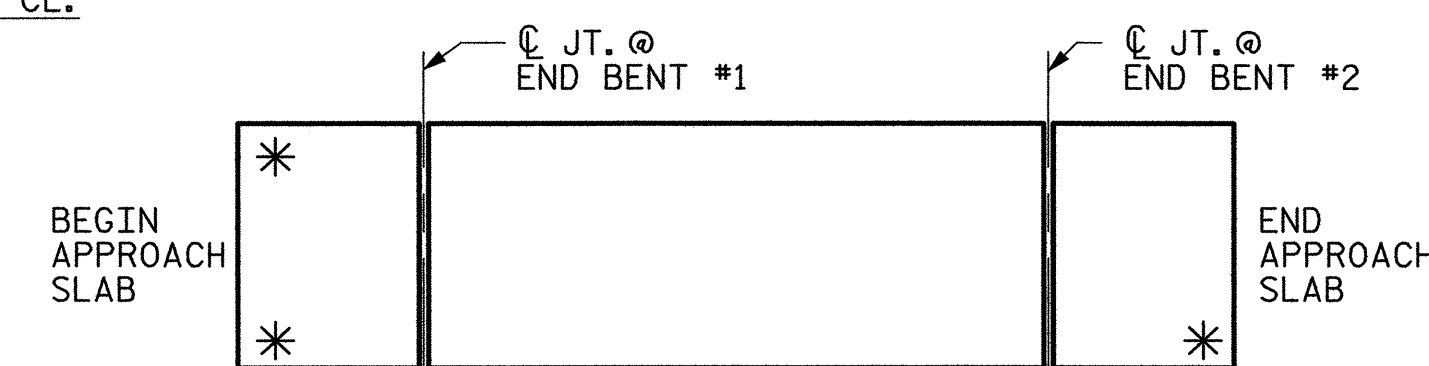
ELEVATION



SECTION K-K



SECTION L-L



SKETCH SHOWING POINTS OF ATTACHMENT

* INDICATES POINTS OF ATTACHMENT

ASSEMBLED BY : W. B. ALLEN	DATE : 10/04
CHECKED BY : R. C. LARSON	DATE : 12/04
DRAWN BY : RWW 8/01	REV. 5/7/03R RWW/JTE
CHECKED BY : LES 8/01	



THIS STANDARD DRAWING REVIEWED & ADOPTED FOR USE AT THE REFERENCED LOCATION BY THE UNDERSIGNED:



REFERENCE NO. BR-43

PROJECT NO. R-2552AA

WAKE - JOHNSTON COUNTY

STATION: 14+38.000 -LREV- POT

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
DETAILS FOR FLEXIBLE
PAVEMENT WITH BARRIER RAIL
(RIGHT LANE)
STD. NO. BAS6SM

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
				TOTAL SHEETS	429

PROJECT NO. <u>R-2552AA</u>	
WAKE - JOHNSTON	COUNTY
STATION: <u>14+38.000 -LREV- POT</u>	
SHEET 4 OF 4	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

STANDARD
BRIDGE APPROACH
SLAB DETAILS
(RIGHT LANE)

STD. NO. BAS10SM

REVISONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

5-227	TOTAL SHEETS
	429

CONTRACT: ID: R-2552AA

CONTENTS:

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	TEXT REPORT
4	SITE PLAN
5	PROFILES
6-13	CROSS SECTIONS
14-27	BORE LOG REPORTS
28	SOIL TEST RESULTS
29	SCOUR REPORT
30	SITE PHOTOGRAPH

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

**STRUCTURE
SUBSURFACE INVESTIGATION**

STATE PROJECT 34459.1.1 I.D. NO. R-2552AA
F.A. PROJECT NHF-60-1(9)
COUNTY WAKE & JOHNSTON
PROJECT DESCRIPTION US 70 (CLAYTON
BYPASS) FROM I-40 IN WAKE CO. TO
EAST OF SR 1525 (CORNWALLIS RD.)
SITE DESCRIPTION DUAL BRIDGE ON
-LREV- (US 70 BYPASS) OVER SWIFT
CREEK TRIBUTARY, AT -LREV- STA.
14+26 (WBL) AND 14+50 (EBL)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34459.1.1 (R-2552AA)	1	30
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		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 (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.

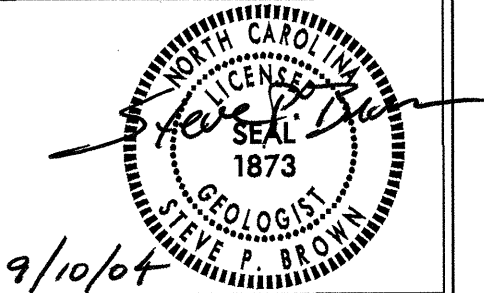
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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.

INVESTIGATED BY S. P. BROWN PERSONNEL NCDOT:
CHECKED BY D. N. ARGENBRIGHT O. B. OTI
SUBMITTED BY D. N. ARGENBRIGHT C. D. CZAJKA
DATE SEPTEMBER 2004 MACTEC:
D. A. WHITE
J. O. SMITH

DRAWN BY: C. D. CZAJKA, A. N. KARPA

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

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



NORTH CAROLINA DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT
SOIL AND ROCK CLASSIFICATION, LEGEND, AND ABBREVIATIONS

SOIL LEGEND AND AASHTO CLASSIFICATION										CONSISTENCY OR DENSENESS								
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N - VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (q _u) (kN / m ²)		
GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1,A-2 A-3	A-4,A-5 A-6,A-7				GENERALLY GRANULAR MATERIAL	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	4 10 30 > 50	N/A	
SYMBOL	A-1-a A-1-b	A-3	A-2-a A-2-b	A-2-c A-2-d	A-4	A-5	A-6	A-7	A-1,A-2 A-3	A-4,A-5 A-6,A-7								
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 30 MX 15 MX	50 MN 30 MN 15 MN	35 MX 35 MN 15 MN	35 MX 35 MN 15 MN	35 MX 35 MN 15 MN	35 MX 35 MN 15 MN	35 MN 35 MN 15 MN	35 MN 35 MN 15 MN	35 MN 35 MN 15 MN	35 MN 35 MN 15 MN	35 MN 35 MN 15 MN	35 MN 35 MN 15 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT		
(PASSING #40) LL PI	6 MX		N.P.	40 MX 10 MX	41 MN 10 MN	40 MX 10 MN	41 MN 10 MN	40 MX 10 MN	41 MN 10 MN	40 MX 10 MN	41 MN 10 MN	40 MX 10 MN	41 MN 10 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS	
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX										
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL & SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS					
* PI OF A-7-5 < (LL-30); PI OF A-7-6 > (LL-30)																		
TEXTURE OR GRAIN SIZE																		
BOULDER		COBBLE		GRAVEL		COARSE SAND		FINE SAND		SILT		CLAY						
GRAIN (mm) SIZE (IN)		305 12		75 3		2		0.25		0.075		0.0075						
SOIL MOISTURE - CORRELATION OF TERMS																		
SOIL MOISTURE SCALE (ATTERBERG LIMITS)				FIELD MOISTURE DESCRIPTION				GUIDE FOR FIELD MOISTURE DESCRIPTION										
LL PLASTIC RANGE (PI) PL OM SL				-SATURATED- (SAT.)				USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										
				-WET- (W)				SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										
				-MOIST- (M)				SOLID; AT OR NEAR OPTIMUM MOISTURE										
				-DRY- (D)				REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										
ROCK DESCRIPTION																		
IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED TO BE THAT INDURATED EARTH MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF "WEATHERED ROCK". FOR THE PURPOSE OF THIS INVESTIGATION, THESE MATERIALS ARE DIVIDED AS FOLLOWS:																		
TERM		SYMBOLS				DESCRIPTION												
HARD ROCK (HR)		CORED ROCK		INFERRED ROCK LINE ²		MATERIAL THAT CANNOT BE PENETRATED BY POWER AUGERS, EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING A SAMPLE												
WEATHERED ROCK (WR)				HARD WEATHERED ROCK (HWR)		MATERIAL THAT CAN BE PENETRATED WITH GREAT DIFFICULTY USING POWER AUGERS AND YIELDS SPT REFUSAL ¹												
				SOFT WEATHERED ROCK (SWR)		MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGERS AND YIELDS SPT VALUES > 100 BLOWS BUT < SPT REFUSAL												
¹ SPT REFUSAL ≤ 2.5 cm OF PENETRATION PER 50 BLOWS IN SPT.																		
² AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE. THE HARD ROCK SYMBOL IS SHOWN WHEN ROCK IS CORED AND ONLY TO THAT DEPTH CORED. A DESCRIPTION OF ROCK IS GIVEN, INCLUDING:																		
CORE RECOVERY (REC.) - TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.																		
ROCK QUALITY DESIGNATION (ROD) - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED THAT ARE LONGER THAN OR EQUAL TO 0.1 m DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.																		
GROUND WATER																		
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING (I.A.D.) SOON AFTER DRILLING (0 HRS.)																		
STATIC WATER LEVEL (AFTER 24 HRS.)																		
PERCHED WATER (PW), SATURATED ZONE, OR WATER BEARING STRATA																		
SPRING OR SEEPAGE																		
MISCELLANEOUS SYMBOLS AND ABBREVIATIONS																		
ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				SPT TEST BORING				SAMPLE DESIGNATIONS										
SOIL SYMBOL				AUGER BORING				S-BULK SAMPLE										
ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS				CORE BORING				SS-SPLIT SPOON SAMPLE										
INFERRED SOIL BOUNDARIES				PIEZOMETER INSTALLATION				ST-SHELBY TUBE SAMPLE										
25° STRIKE AND DIP				SLOPE INDICATOR INSTALLATION				RS-ROCK SAMPLE										
APPARENT DIP (NORMAL TO...)				SPT N-VALUE														
ROD SOUNDING				MONITORING WELL														
ABBREVIATIONS																		
ALLUV.				ALLUVIUM				MIC.				MICACEOUS						
AR				AUGER REFUSAL				MOT.				MOTTLED						
BLDR.				BOULDER				N				BLOWS / 30 CM						
CALC.				CALCAREOUS				NS				NO SAMPLE TAKEN						
CL.				CLAY				ORG.				ORGANIC						
CLY.				CLAYEY				P.P.				POCKET PENETROMETER						
COB.				COBBLE				REF.				REFER TO						
CSE.				COARSE				RES.				RESIDUAL						
DPT				DYNAMIC PENETRATION TEST				S.				SOFT						
EST.				ESTIMATED				SAT.				SATURATED						
F.				FINE				SD.				SAND						
FIAD				FILLED IMMED. AFTER DRILLING				SDY.				SANDY						
FOSS.				FOSSILIFEROUS				SED(S).				SEDIMENT(S)						
FRAC.				FRACTURED				SL.				SILT, SILTY						
FRAG(S).				FRAGMENT(S)				SLI.				SLIGHTLY						
GR.				GRAVEL				SPT				STANDARD PENETRATION TEST						
GS				SPECIFIC GRAVITY				TS.				TOPSOIL						
GW				GROUND WATER				VST				VANE SHEAR TEST						
MED.				MEDIUM				V.				VERY						
								W/				WITH						
BENCH MARK:																		
"BL-714" AT -BL- STA. 20+19.152, 62.956M																		
"BL-715" AT -BL- STA. 21+47.612, 62.894M																		
STATE PROJECT NO. 34459.1.1																		
T.I.P. NO. R-2552AA F.A. NO. NHF-60-1(9)																		
COUNTY WAKE & JOHNSTON ROUTE US 70 BYPASS																		
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY																		
PROJECT GEOLOGIST S. P. BROWN SUBMITTED BY D. N. ARGENBRIGHT																		
PERSONNEL O. B. OTI																		
C. D. CZAJKA																		
D. A. WHITE DATE SUBMITTED 09/04																		
J. O. SMITH																		
REV. 8/11/98																		

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 (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.

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.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

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

LYNDO TIPPETT
SECRETARY

September 16, 2004

STATE PROJECT: 34459.1.1 (R-2552AA)
FEDERAL PROJECT: NHF-60-1(9)
COUNTY: Wake and Johnston
DESCRIPTION: US 70 (Clayton Bypass) from I-40 in Wake County to east of SR 1525 (Cornwallis Road)

SUBJECT: Geotechnical Report - Bridge Foundation Investigation for Dual Bridge on -LREV- (US 70 Bypass) over Swift Creek Tributary, at -LREV- Stations 14+26 (WBL) and 14+50 (EBL)

Project Description

A dual bridge on new location is proposed to carry -LREV- (US 70 Clayton Bypass) over a tributary of Swift Creek. The site is 8.5 kilometers west of Clayton. The structure consists of a WBL bridge and an EBL bridge, each having 6 spans with bents on a 90° skew. Each bridge is 183 meters long and will span a swamp approximately 100 meters wide. Eight of ten interior bents fall within the swamp. Bents of the two bridges are not symmetrically aligned across -LREV-.

The site was investigated in June and July 2004, using a CME-45 drill machine with a manual hammer, mounted on a tracked platform with two pontoons. Two SPT borings were drilled at each bent location. Borings were advanced through soil, weathered rock, and hard rock using N casing, a tricone bit, and NXWL core equipment. Standard Penetration Tests were performed and representative soil samples were submitted to the Materials and Tests Unit laboratory for analysis. No rock samples were submitted for testing, as no core was recovered.

Physiography and Geology

The project is in gently rolling terrain, along the eastern edge of the Piedmont Physiographic Province. Surface water level in the creek and swamp varied approximately 0.3 meters during the investigation, related to alternating storm events and dry spells. Measured surface water elevations during the investigation ranged between 61.1 and 61.5 meters. Woodlands are present west of the swamp; open pastures are present east of the swamp. The project is underlain at depth by granite of the Raleigh Belt geologic province. Surficial soils are alluvial within the swamp, and mostly Coastal Plain terrace deposits outside the swamp. Foundation materials at the site include Coastal Plain, alluvial, and residual soils, and weathered and hard rock.

Foundation Description

Soil Properties

Alluvial soils are coincident with the large swamp that dominates the project site. Standing water is present across most of the swamp. Consequently, most alluvial soils are wet. Thickness varies between 1.5 and 5.5 meters. Alluvial soils are mostly loose to dense, silty sand and sand (A-2-4, A-3, A-1-a, A-1-b), with some gravel. Medium stiff to stiff, sandy silt (A-4) is present but less common. Stiff, slightly plastic, sandy clay (A-6) is rare.

Coastal Plain soils overlie residual soils outside the boundaries of the swamp. They are present at all end bents and at Interior Bent 1 (WBL). Except at End Bent 1 (WBL), these soils are moist and 1 to 2 meters thick. At End Bent 1 (WBL) they extend below the groundwater table. Consequently, they range from moist to wet at this bent. Coastal Plain soils are mostly loose to medium dense, silty sand (A-2-4) and medium stiff to very stiff, sandy silt (A-4, A-5). Stiff, moderately plastic, sandy clay (A-6) is rare.

Residual soils underlie Coastal Plain soils outside the limits of the swamp, and underlie the alluvial soils of the swamp. They have been derived by in-place weathering of underlying granite. They range from moist to wet, and are typically saprolitic. The most common soils are medium dense to very dense, silty sand and sand (A-2-4, A-1-b). Medium stiff to hard, sandy silt (A-4, A-5) is also common. Loose to dense, clayey sand and stiff to hard, sandy and silty clay (A-6, A-7-5, A-7-6) are rare. These soils range from slightly to moderately plastic.

Rock Properties

The site is underlain by weathered and hard granite. Residual soils grade to soft weathered rock with depth. All borings except EB1-B (EBL) and B1-A (EBL) reached soft weathered rock. Rare occurrences of hard weathered rock were encountered in borings B5-A (WBL), B5-B (EBL), and EB2-B (EBL). A maximum thickness of 7.8 meters of weathered rock was encountered in boring B4-A (WBL). Elevations for the top of weathered rock vary considerably, between 50.5 and 58.9 meters.

Two borings encountered lenses of soil or hard rock within the weathered rock column. At boring B3-A (WBL) 1.2 meters of hard rock were cored. No core was recovered from the run, suggesting the rock is highly fractured and/or mixed with weathered rock. At boring B4-A (WBL) two lenses of soil are present within the weathered rock column. The upper lens consists of 2.0 meters of dense, clayey sand (A-2-6). The deeper lens consists of 1.7 meters of very stiff, silty clay (A-7-5).

Surface Water and Groundwater

Standing water is present across most of the swamp. During our investigation water level varied an estimated 0.3 meters due to storm events. Surface water levels were measured between elevations 61.1 and 61.5 meters. A maximum water depth 1.07 meters was measured along Bent B4 (EBL).

Groundwater elevations measured in borings outside the limits of the swamp range between elevations 60.6 and 62.7 meters.

Notice

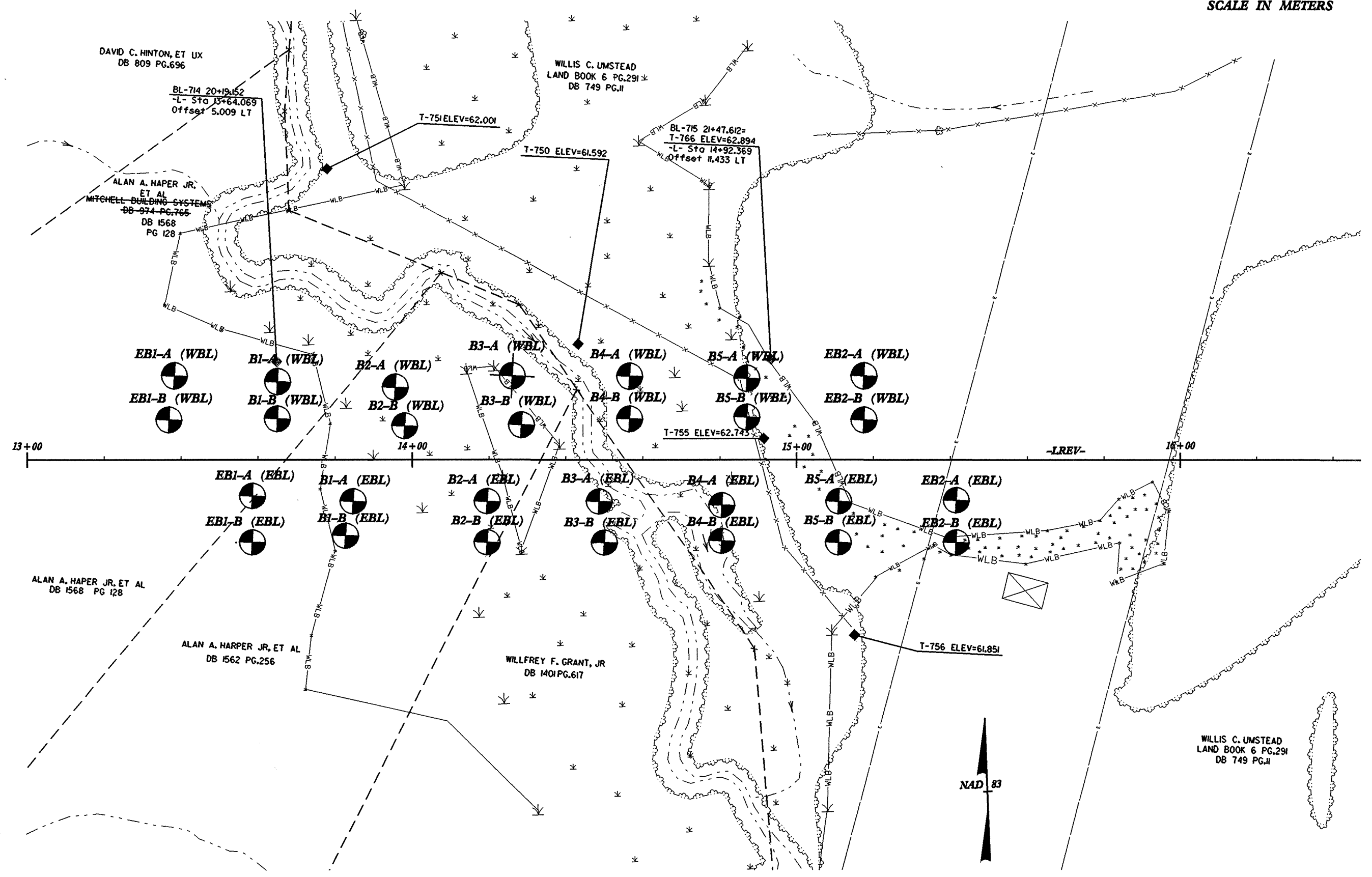
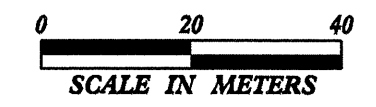
This Geotechnical Engineering Unit foundation report is based on the Bridge Survey and Hydraulic Design Report for tributary to Swift Creek, dated 04/08/04. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

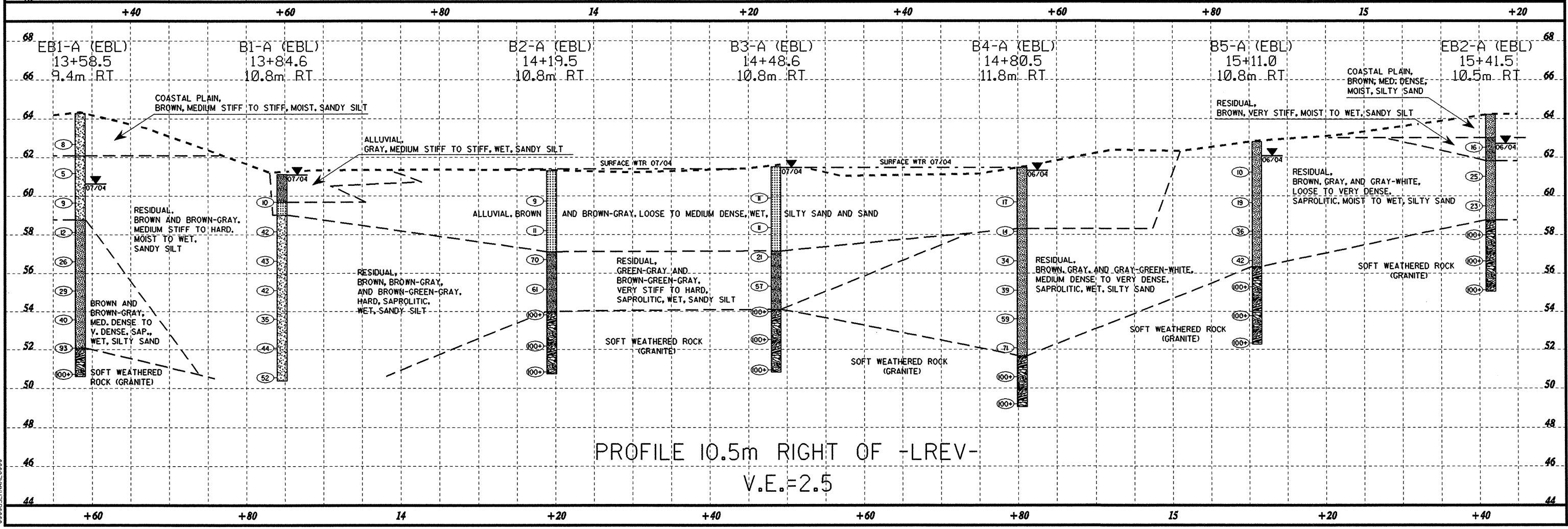
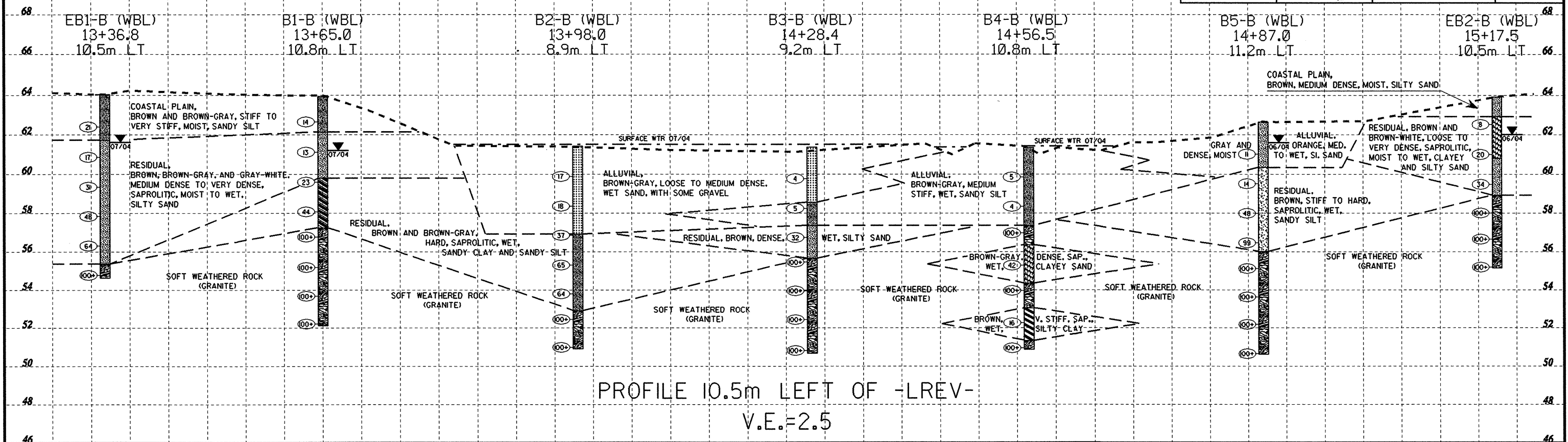
Respectfully submitted,

A handwritten signature in black ink, appearing to read "Steve P. Brown".

Steve P. Brown, LG
Project Engineering Geologist

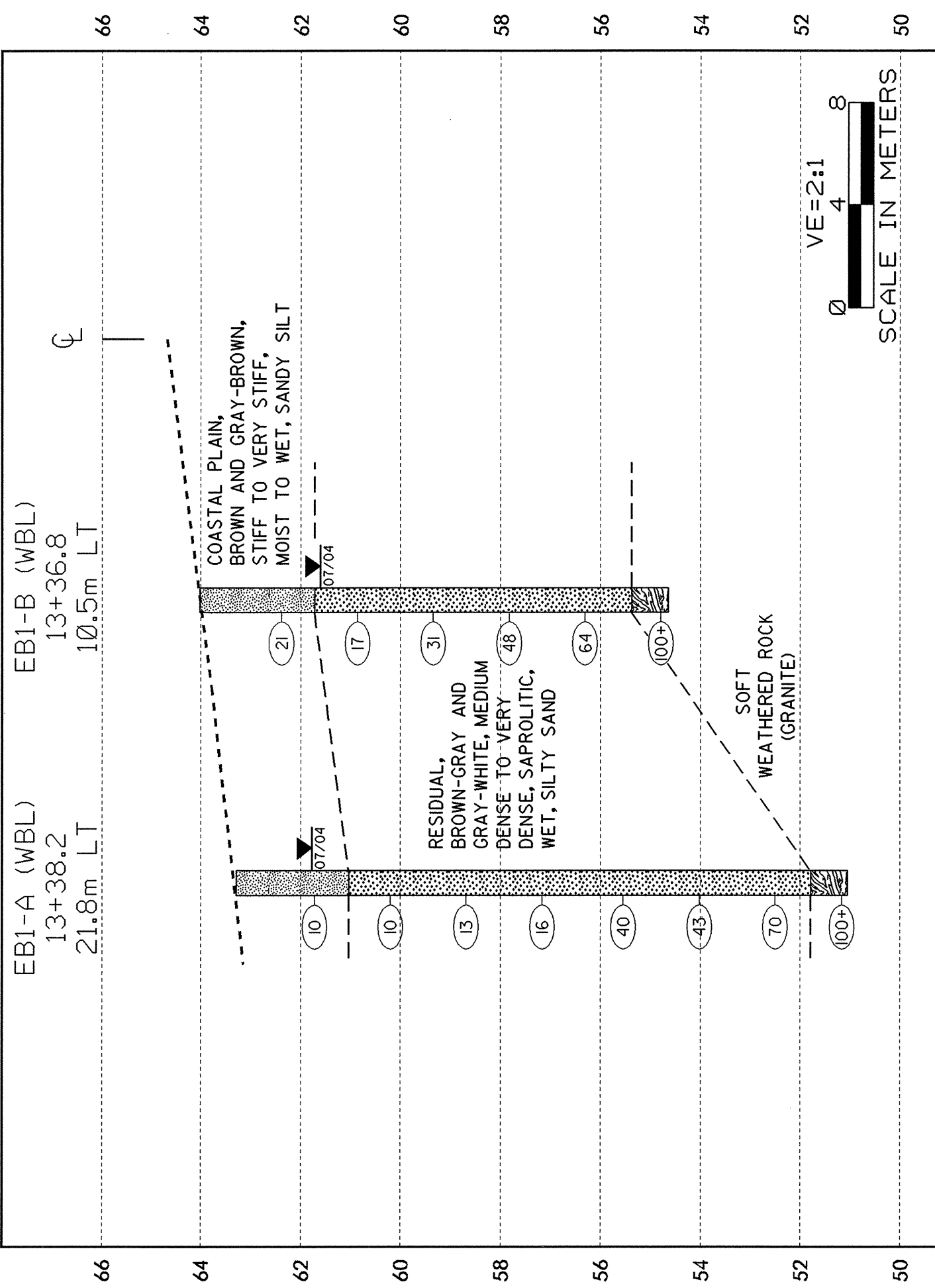
SITE PLAN





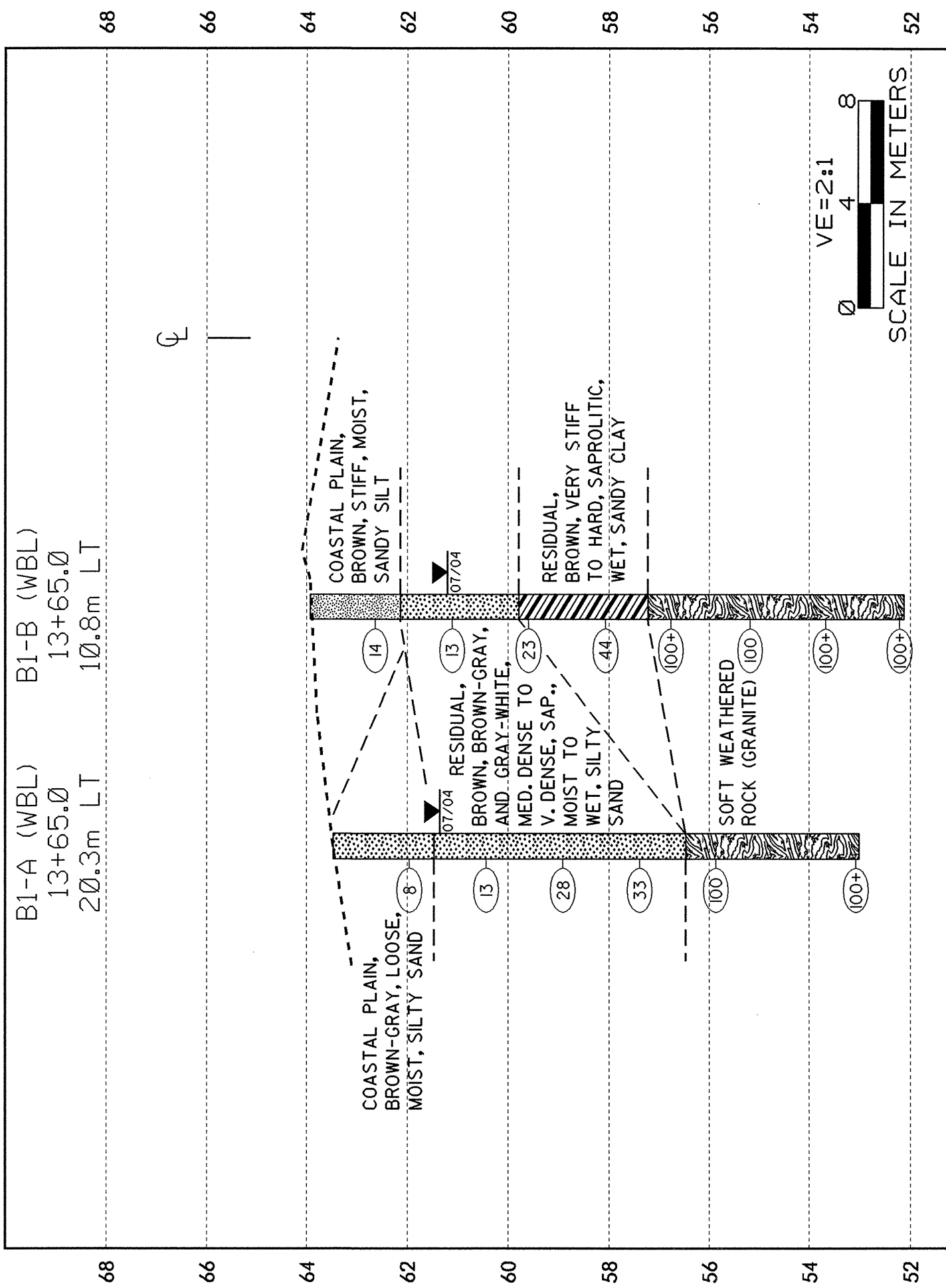
CROSS SECTION THROUGH EBI(WBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



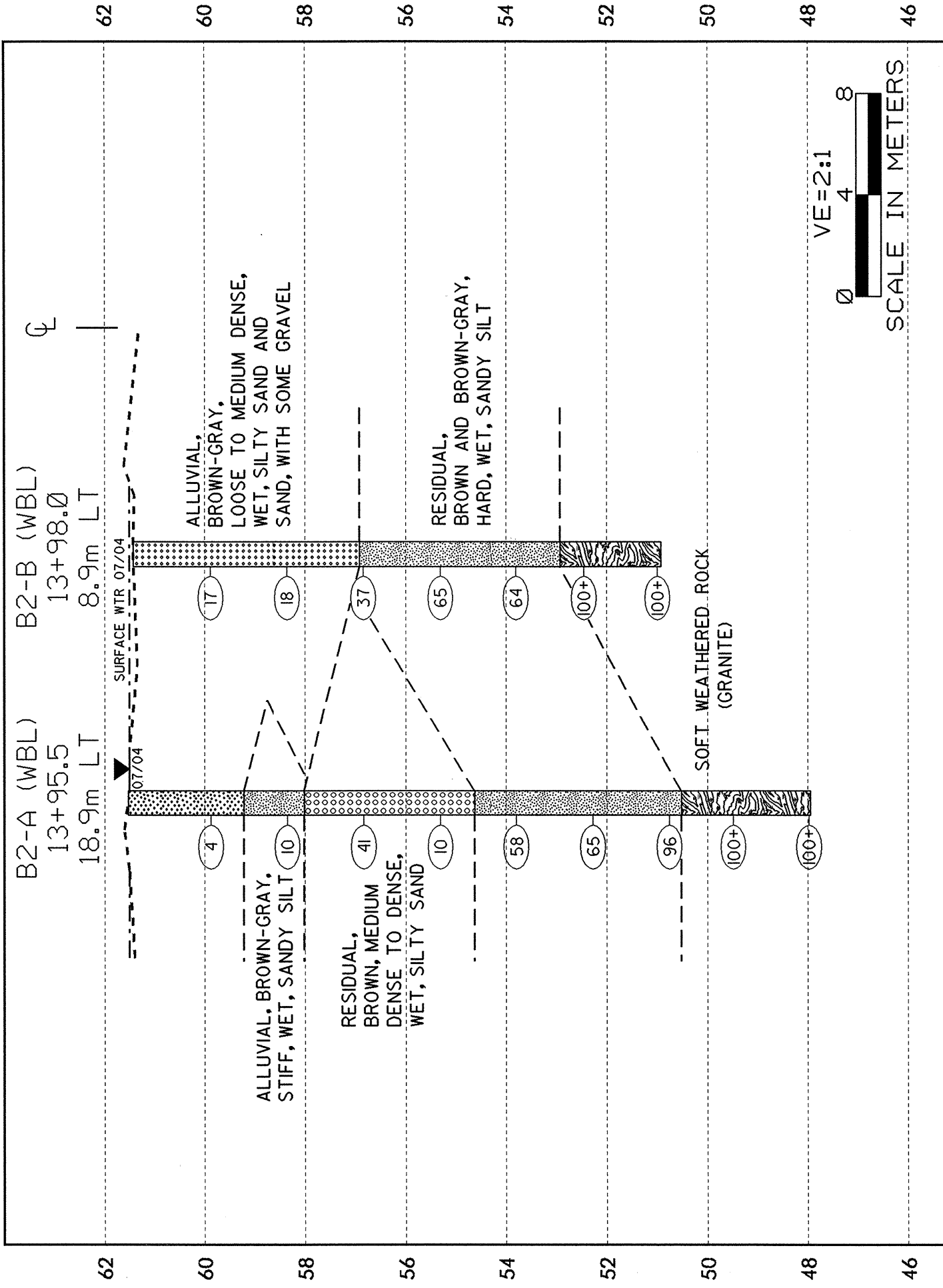
CROSS SECTION THROUGH BI(WBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



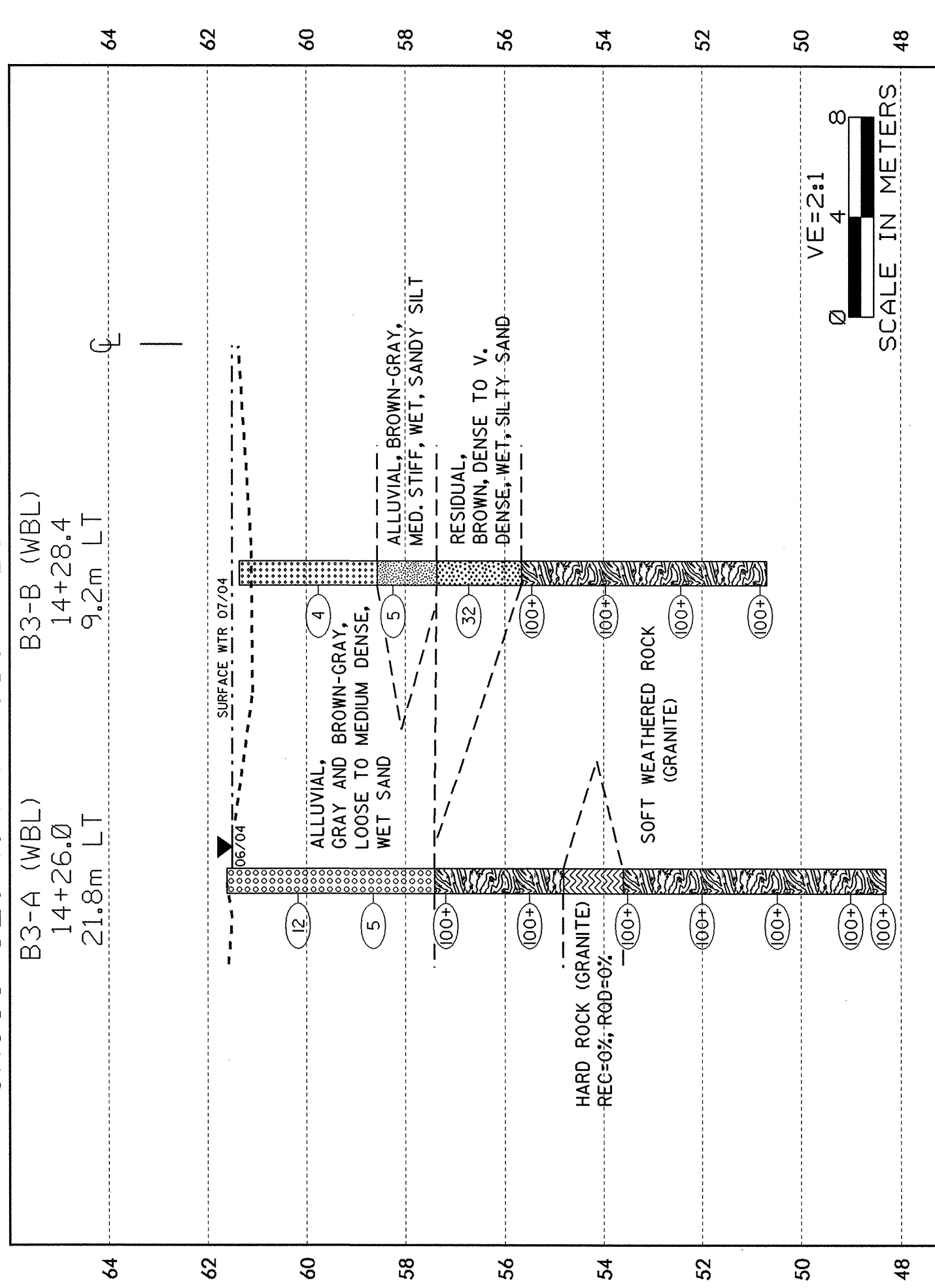
CROSS SECTION THROUGH B2 (WBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



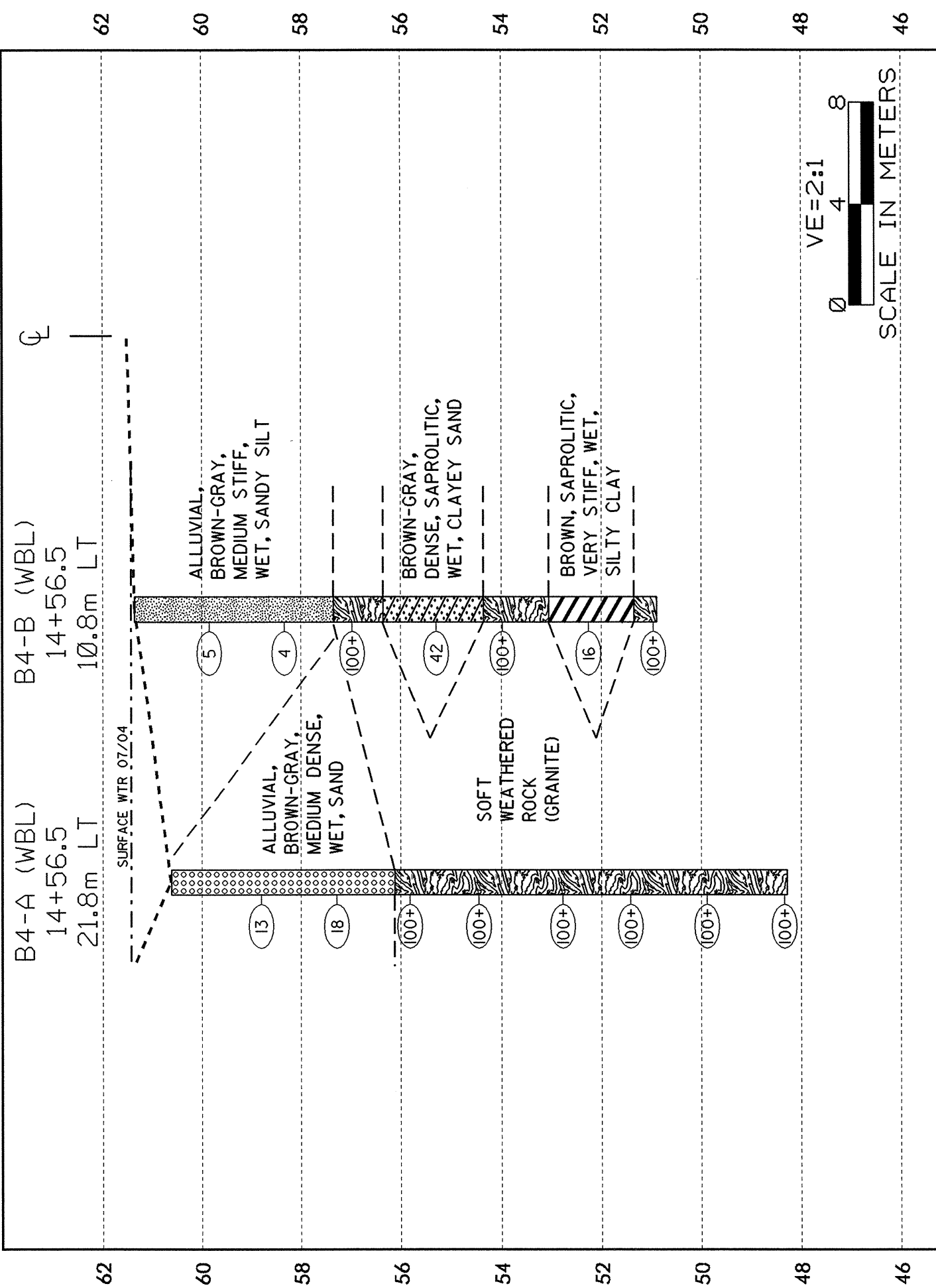
CROSS SECTION THROUGH B3 (WBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



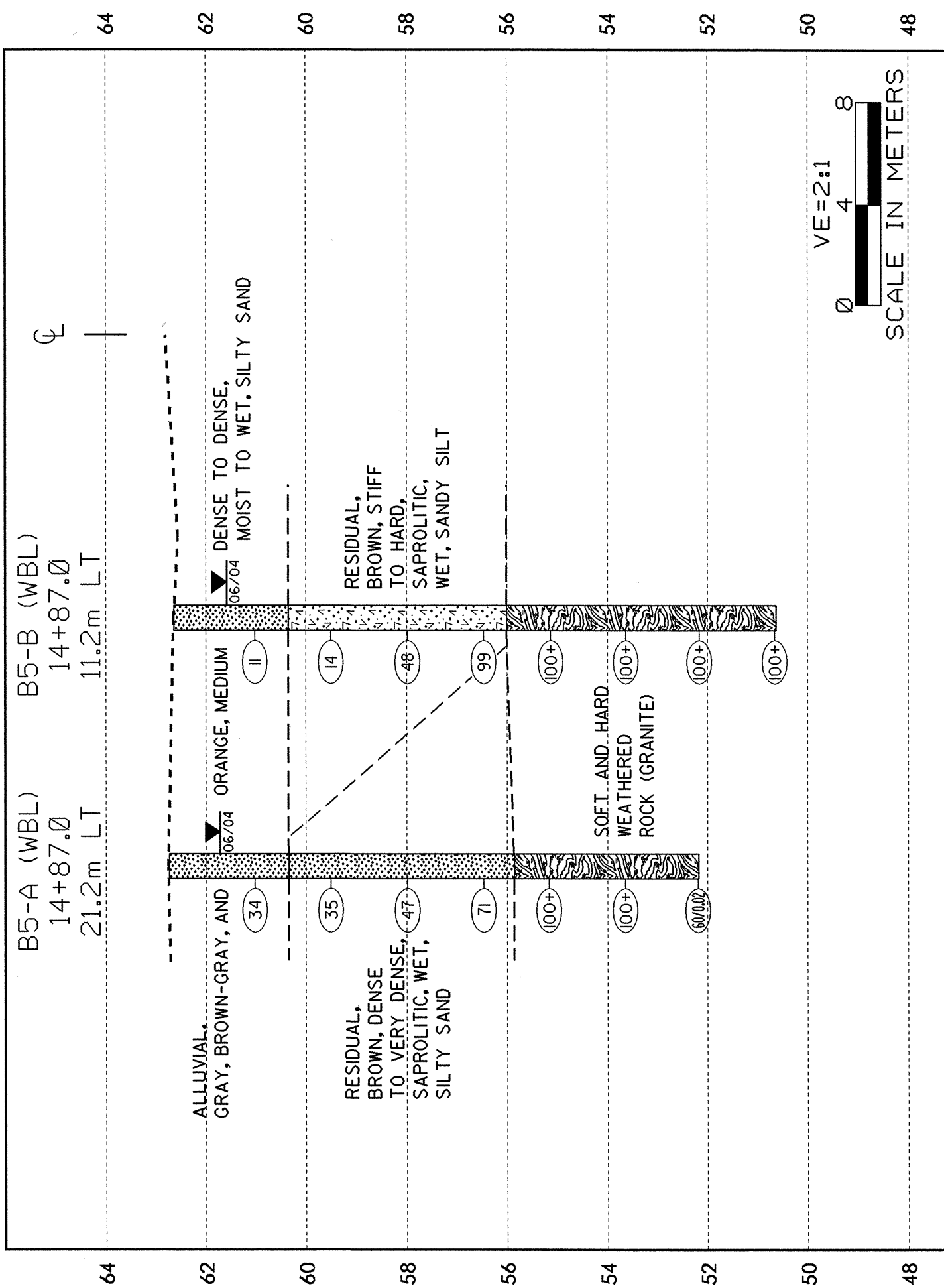
CROSS SECTION THROUGH B4 (WBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



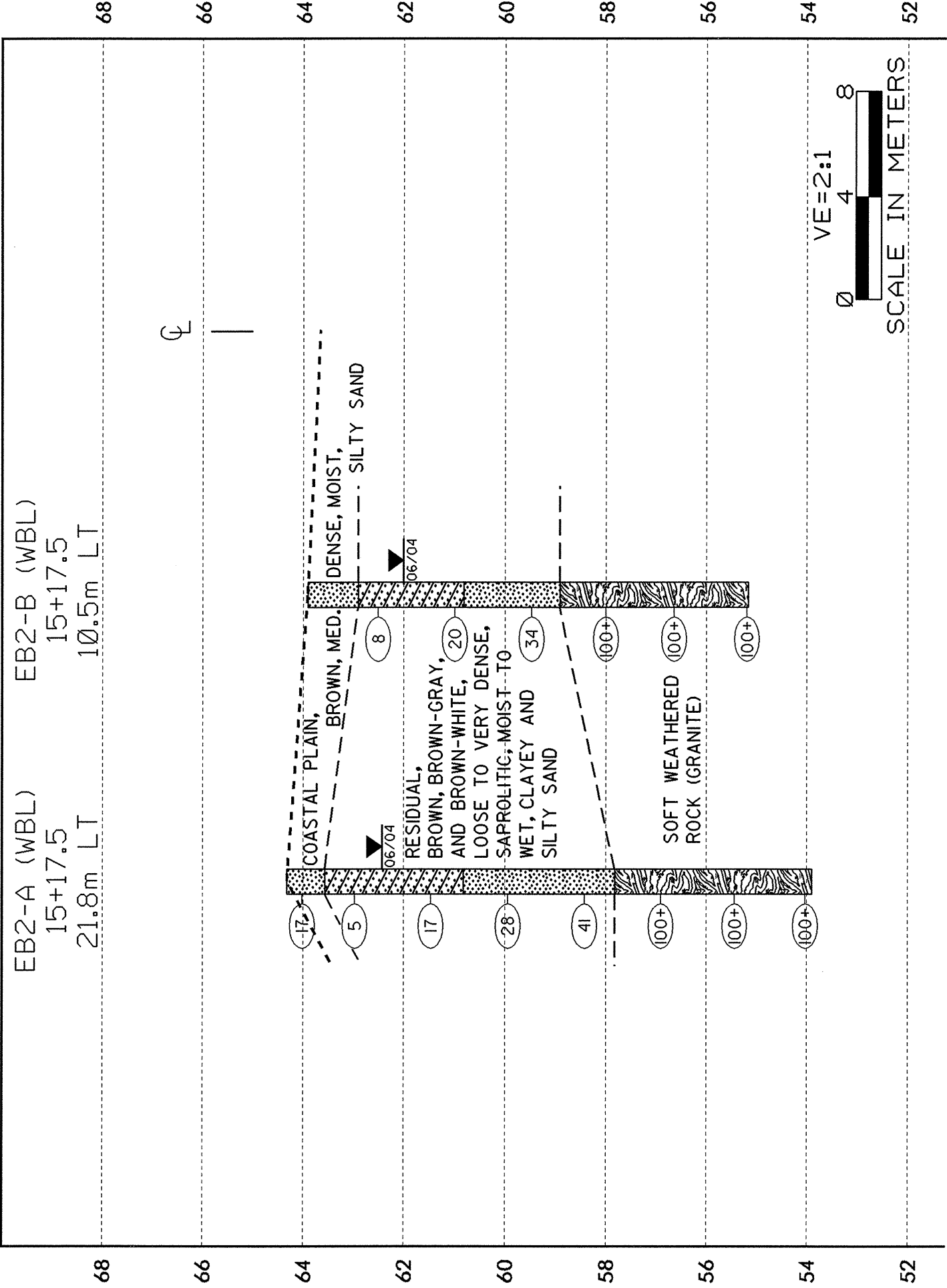
CROSS SECTION THROUGH B5 (WBL)

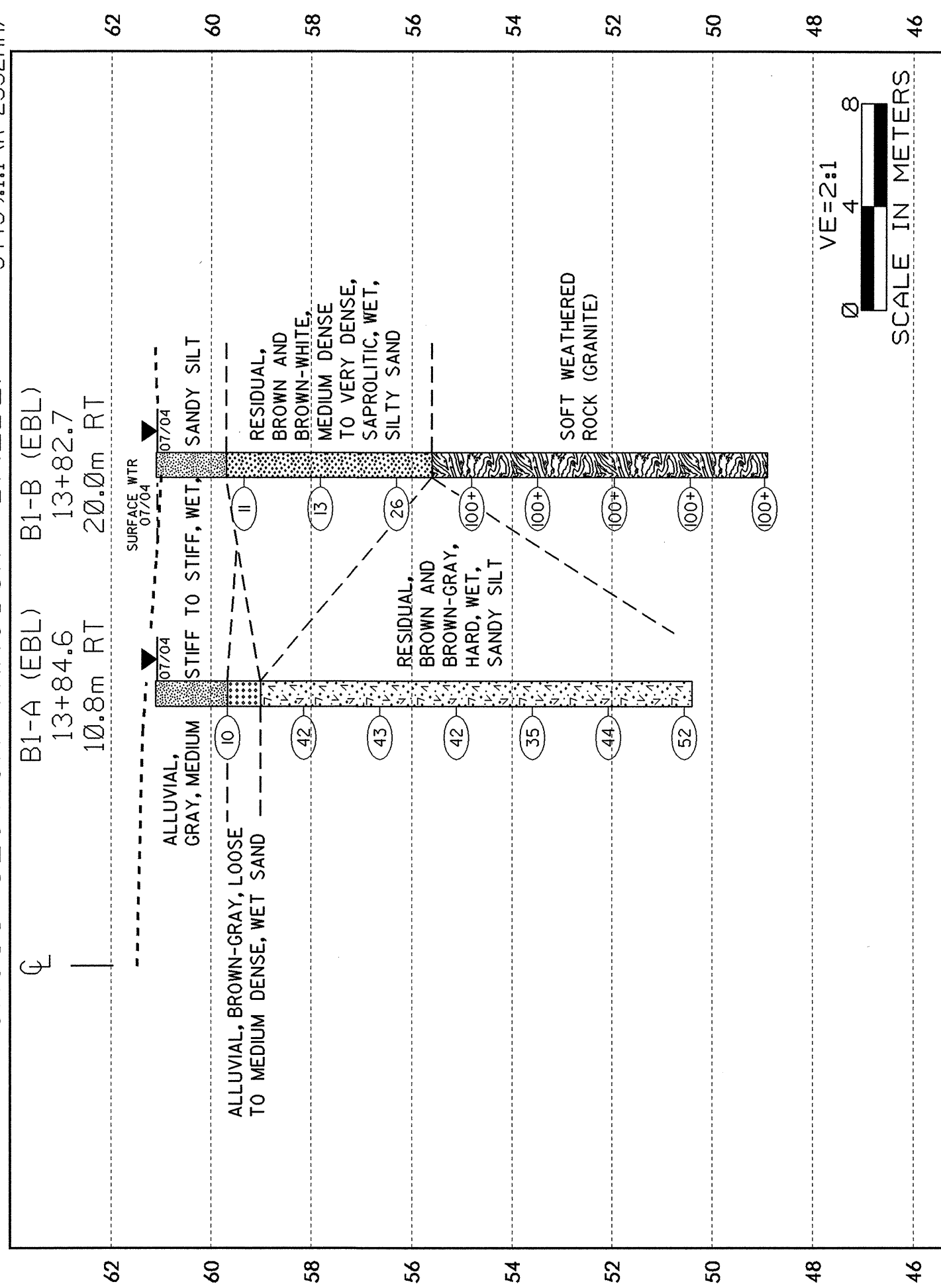
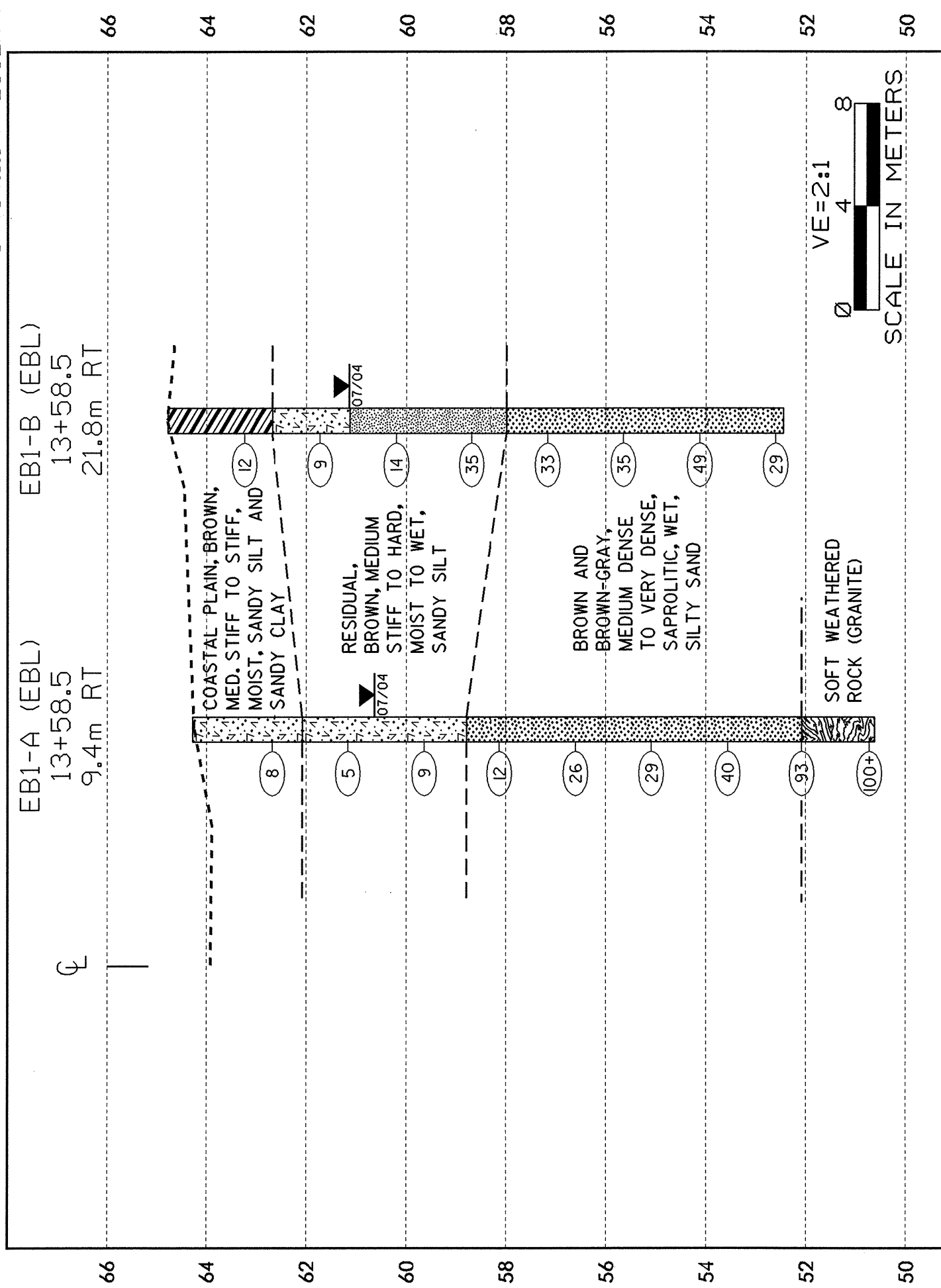
DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



CROSS SECTION THROUGH EB2 (WBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)

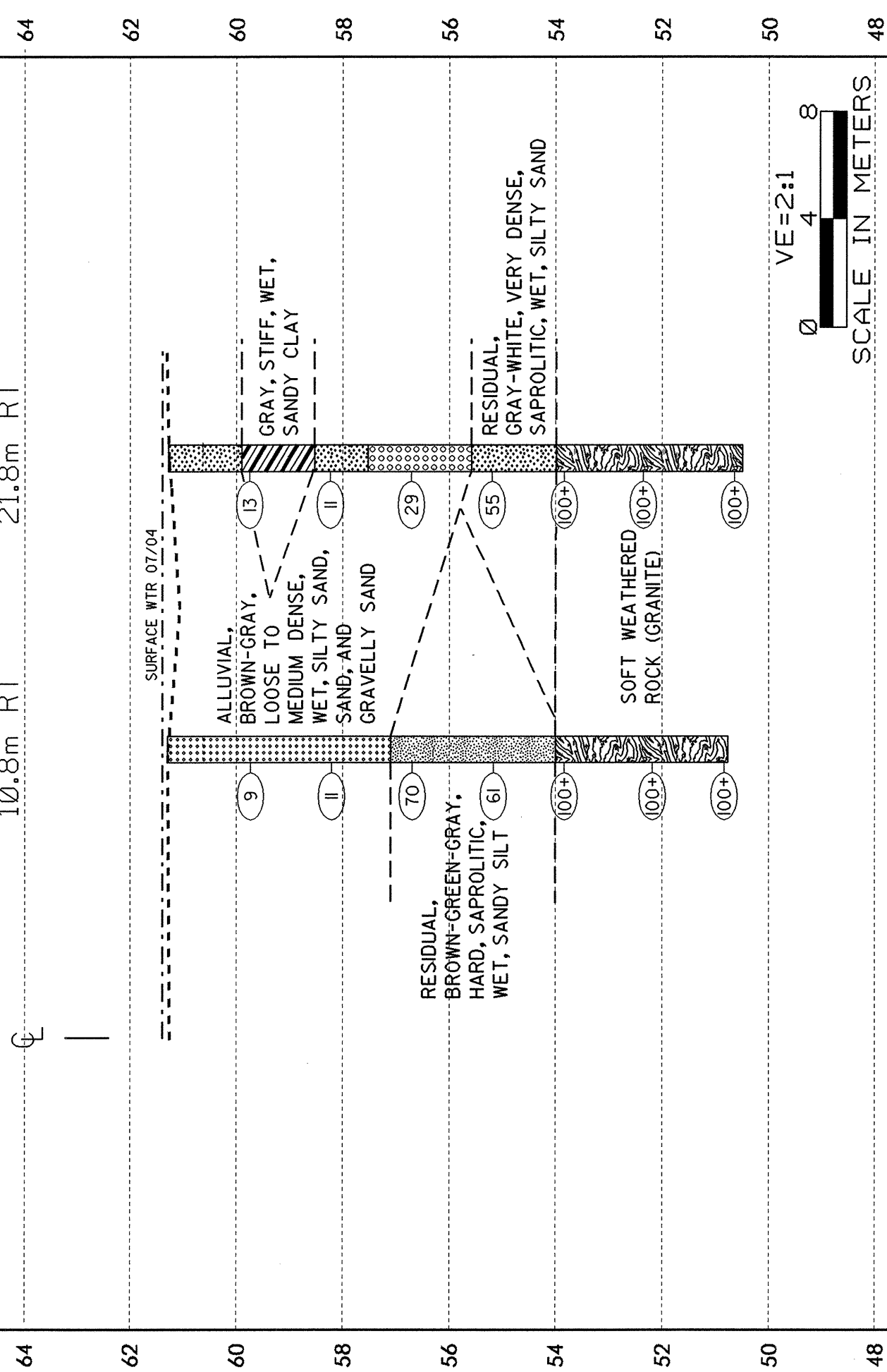




CROSS SECTION THROUGH B2 (EBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)

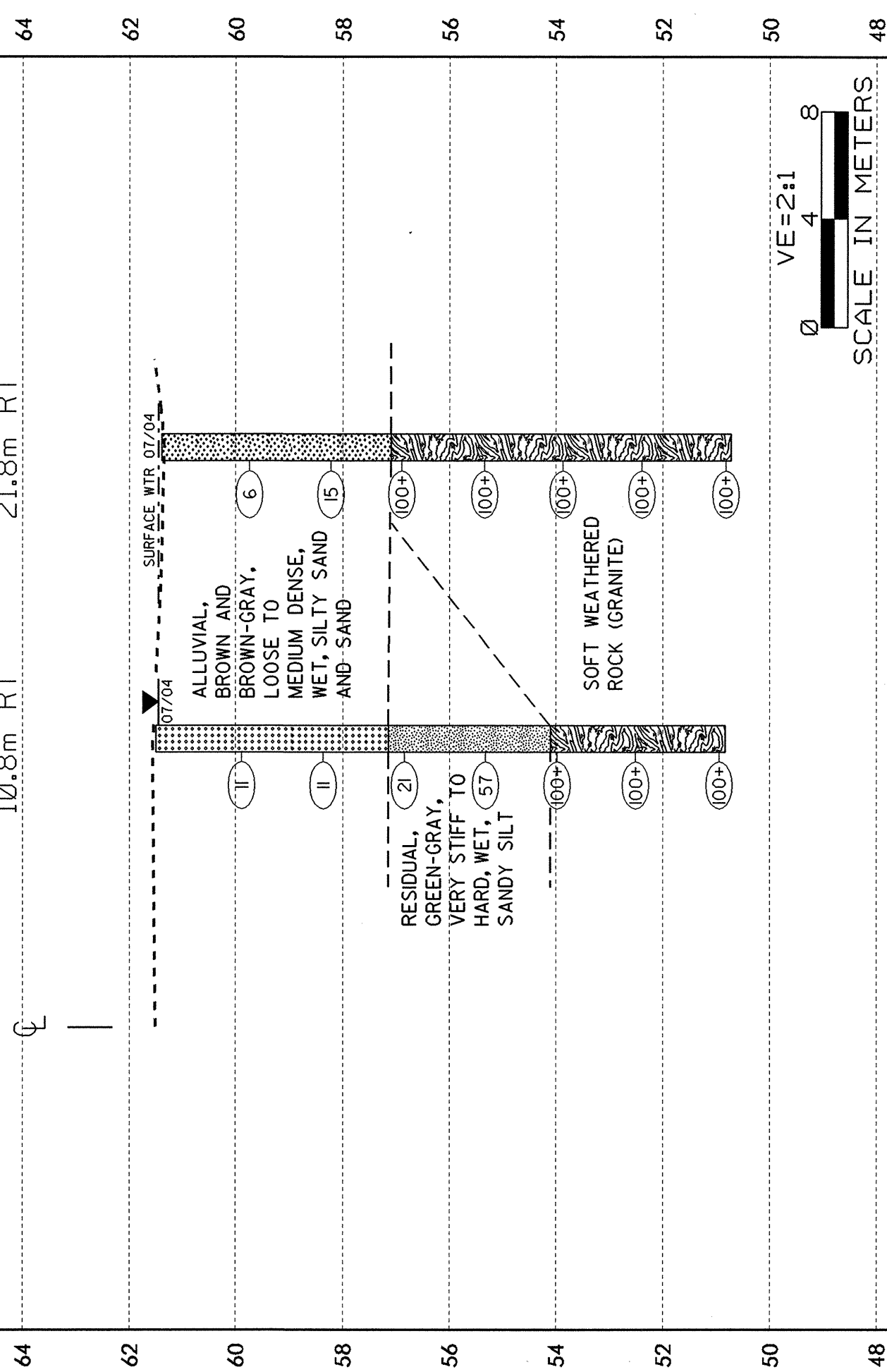
B2-A (EBL) B2-B (EBL)
14+19.5 14+19.5
10.8m RT 21.8m RT



CROSS SECTION THROUGH B3 (EBL)

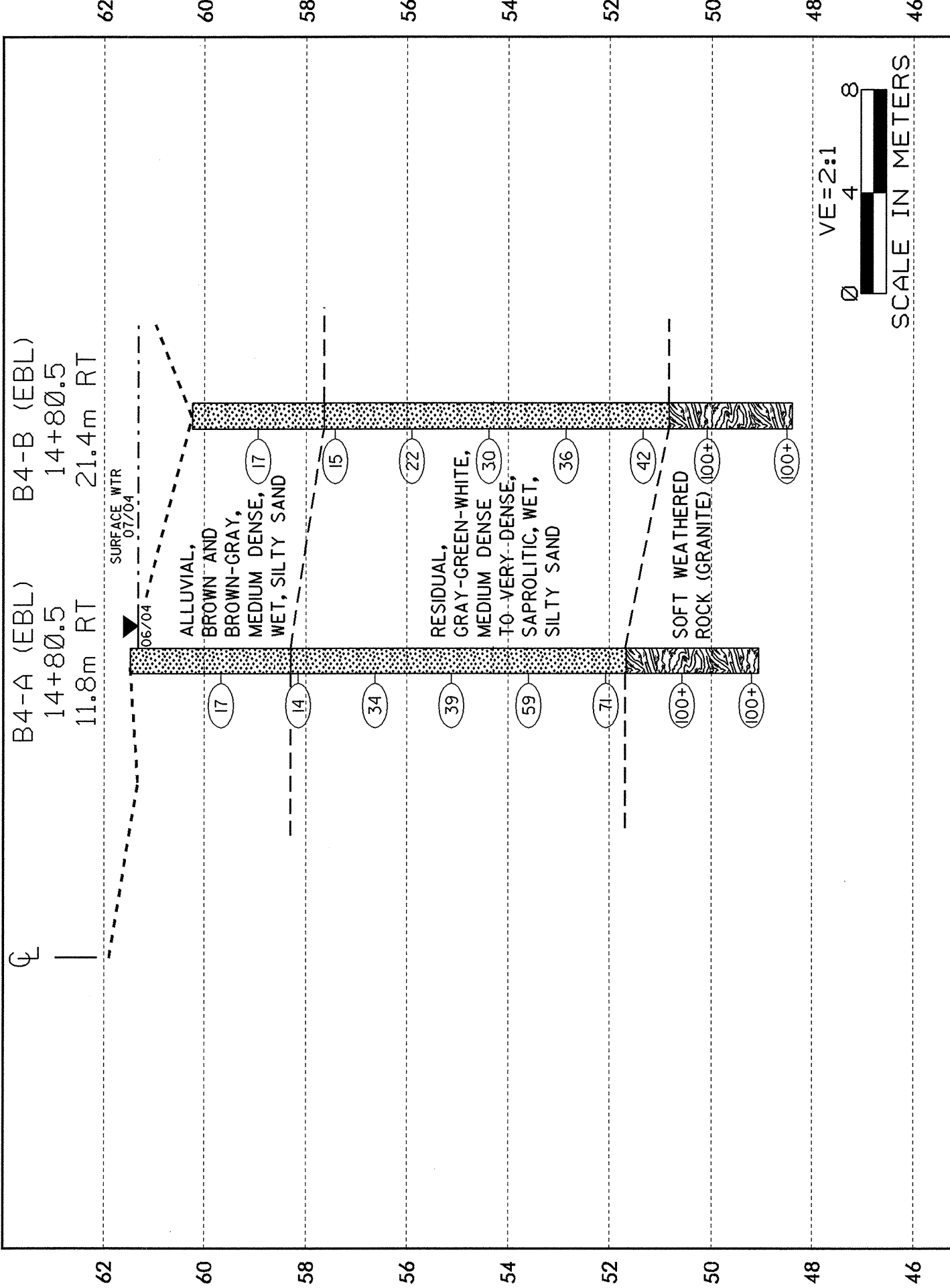
DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)

B3-A (EBL) B3-B (EBL)
14+48.6 14+50.0
10.8m RT 21.8m RT



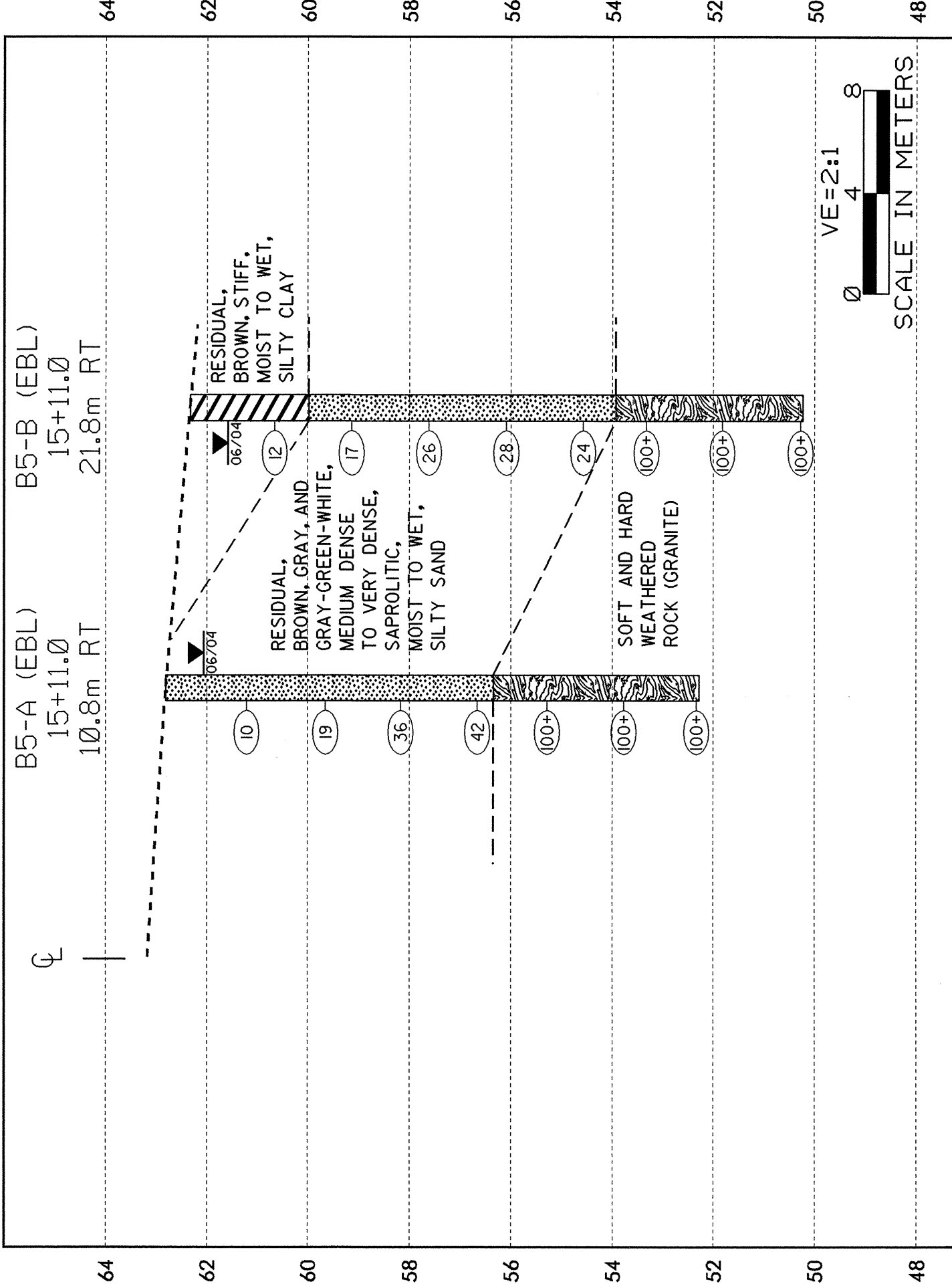
CROSS SECTION THROUGH B4 (EBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)

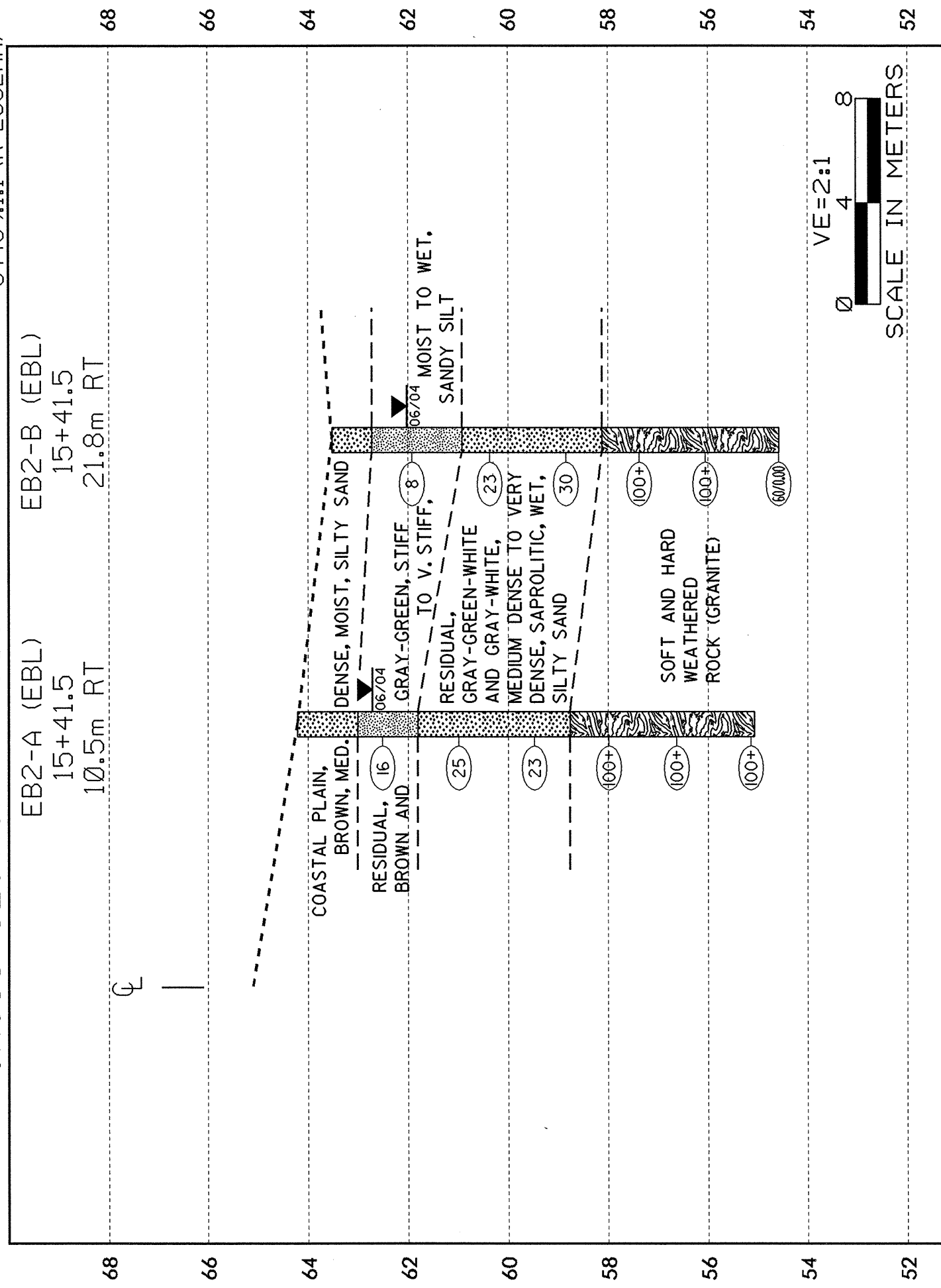


CROSS SECTION THROUGH B5 (EBL)

DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



CROSS SECTION THROUGH EB2 (EBL) DUAL BRIDGE ON -LREV-
34459.1.1 (R-2552AA)



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 14

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

[illegible][illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34459.1.1				ID. R-2552AA				COUNTY JOHNSTON				GEOLOGIST O.B. OTI							
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY												GROUND WATER							
BORING BI-A (WBL)				BORING LOCATION 13+65.0				OFFSET 20.3m LT				ALIGNMENT -LREV-				0 HR. N/A			
COLLAR ELEV. 63.47m				NORTHING 208769.9				EASTING 650225.0				24 HR. 2.12m							
TOTAL DEPTH 10.46m				DRILL MACHINE CME-45				DRILL METHOD WASH BORING				HAMMER TYPE MANUAL							
START DATE 6/30/04				COMPLETION DATE 6/30/04				SURFACE WATER DEPTH N/A				DEPTH TO ROCK N/A							
ELEV.		DEPTH		BLOW COUNT			PEN.	BLOWS PER 30cm					SAMPLE	MOI.	LOG	SOIL AND ROCK DESCRIPTION			
				15cm15cm15cm			(m)	0 25 50 75 100					NUMBER						
63.47																			
62.00		1.22		3 4 4			0.30	8					SS-22	M		COASTAL PLAIN, BROWN-GRAY, SILTY SAND			
60.00		2.74		4 6 7			0.30	13					SS-23	W					
		4.26		8 8 20			0.30	28						W		RESIDUAL, BROWN-GRAY AND GRAY-WHITE, SAPROLITIC, SILTY SAND			
58.00		5.78		16 11 22			0.30	33					SS-24	W					
56.00		7.30		45 55			0.30	100											
54.00		10.34		100			0.12	100+								SOFT WEATHERED ROCK (GRANITE)			
52.00								BORING TERMINATED AT ELEVATION 53.01 METERS IN SOFT WEATHERED ROCK (GRANITE)											
50.00																			
48.00																			
46.00																			
44.00																			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

HEET 15

PROJECT NO. 34459.1.1				ID. R-2552AA		COUNTY JOHNSTON		GEOLOGIST O.B. OTI							
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY								GROUND WATER							
BORING BI-B (WBL)		BORING LOCATION 13+65.0			OFFSET 10.8m LT		ALIGNMENT -LREV-		0 HR. N/A						
COLLAR ELEV. 63.93m		NORTHING 208760.4			EASTING 650224.6				24 HR. 2.73m						
TOTAL DEPTH 11.81m		DRILL MACHINE CME-45			DRILL METHOD WASH BORING			HAMMER TYPE MANUAL							
START DATE 7/12/04			COMPLETION DATE 7/12/04			SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A							
ELEV.	DEPTH	BLOW COUNT			PEN.	BLOWS PER 30cm				SAMPLE	LOG	SOIL AND ROCK DESCRIPTION			
		15cm	15cm	15cm	(m)	0	25	50	75	100			NUMBER	MOI.	
63.93															
	1.00	5	7	7	0.30	X	14				SS-44	M		COASTAL PLAIN, BROWN, SANDY SILT	
62.00															
	2.52	5	6	7	0.30	X	13					▼		RESIDUAL, BROWN, SAPROLITIC, SILTY SAND	
60.00															
	4.04	9	10	13	0.30		23					W			
58.00															
	5.56	16	20	24	0.30		44				SS-45	W		BROWN, SAPROLITIC, SANDY CLAY	
	7.08	80	20		0.17					100+ X					
56.00															
	8.60	27	73		0.30					100 X				SOFT WEATHERED ROCK (GRANITE)	
54.00															
	10.12	30	70		0.27					100+ X					
52.00															
	11.64	90	10		0.17					100+ X					
						BORING TERMINATED AT ELEVATION 52.12 METERS IN SOFT WEATHERED ROCK (GRANITE)									

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 16

PROJECT NO. 34459.1.1				ID. R-2552AA		COUNTY JOHNSTON		GEOLOGIST O.B. OTI						
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY								GROUND WATER						
BORING B2-A (WBL)		BORING LOCATION 13+95.5			OFFSET 18.9m LT		ALIGNMENT -LREV-		0 HR. N/A					
COLLAR ELEV. 61.52m		NORTHING 208767.2			EASTING 650255.4				24 HR. 0.02m					
TOTAL DEPTH 13.57m		DRILL MACHINE CME-45			DRILL METHOD WASH BORING		HAMMER TYPE MANUAL							
START DATE 6/29/04		COMPLETION DATE 6/29/04			SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A							
ELEV.	DEPTH	BLOW COUNT			PEN.	BLOWS PER 30cm				SAMPLE	LOG	SOIL AND ROCK DESCRIPTION		
		15cm	15cm	15cm	(m)	0	25	50	75	100			NUMBER	MOI.
61.52														
60.00	1.35	1	2	2	0.30	4					SS-18	W		ALLUVIAL, BROWN-GRAY, SILTY SAND
	2.87	3	5	5	0.30	10					SS-19	W		BROWN-GRAY, SANDY SILT
58.00	4.39	13	18	23	0.30	41					SS-20	W		RESIDUAL, BROWN SAND
56.00	5.91	4	5	5	0.30	10						W		
54.00	7.43	6	13	45	0.30	58					SS-21	W		
52.00	8.95	5	25	40	0.30	65						W		BROWN, SANDY SILT
	10.47	50	33	63	0.30	96						W		
50.00	11.99	100			0.10	100+								SOFT WEATHERED ROCK (GRANITE)
48.00	13.51	100			0.06	100+								
						BORING TERMINATED AT ELEVATION 47.95 METERS IN SOFT WEATHERED ROCK (GRANITE)								
46.00														
44.00														
42.00														

PROJECT NO. 34459.1.1		ID. R-2552AA		COUNTY JOHNSTON		GEOLOGIST O.B. OTI									
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY							GROUND WATER								
BORING B2-B (WBL)		BORING LOCATION 13+98.0		OFFSET 8.9m LT		ALIGNMENT -LREV-	0 HR. N/A								
COLLAR ELEV. 61.42m		NORTHING 208757.1		EASTING 650257.5			24 HR. N/A								
TOTAL DEPTH 10.50m		DRILL MACHINE CME-45		DRILL METHOD WASH BORING		HAMMER TYPE MANUAL									
START DATE 7/12/04		COMPLETION DATE 7/12/04		SURFACE WATER DEPTH 0.08m		DEPTH TO ROCK N/A									
ELEV.	DEPTH	BLOW COUNT			PEN.	BLOWS PER 30cm		SAMPLE	LOG	SOIL AND ROCK DESCRIPTION					
		15cm	15cm	15cm	(m)	0	25	50			75	100	NUMBER	MOI.	
61.42														WATER LEVEL 07/04	
60.00	1.24	6	6	11	0.30		17						W	ALLUVIAL, GRAY-BROWN, FINE SAND, WITH BASAL GRAVEL	
	2.76	4	9	9	0.30		18						W		
58.00	4.28	10	17	20	0.30		37						W		
56.00	5.80	17	29	36	0.30				65				W	RESIDUAL, BROWN-GRAY, SAPROLITIC, SANDY SILT	
54.00	7.32	22	32	32	0.30				64				W		
52.00	8.84	54	46		0.26				100+X					SOFT WEATHERED ROCK (GRANITE)	
	10.36	100			0.14				100+X						
50.00						BORING TERMINATED AT ELEVATION 50.92 METERS IN SOFT WEATHERED ROCK (GRANITE)									
48.00															
46.00															
44.00															
42.00															

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 17

SHEET 17

PROJECT NO. 34459.I.I						ID. R-2552AA	COUNTY JOHNSTON	GEOLOGIST O.B. OTI
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY								GROUND WATER
BORING B3-A (WBL)		BORING LOCATION 14+26.0		OFFSET 21.8m LT		ALIGNMENT -LREV-		0 HR. N/A
COLLAR ELEV. 61.61m		NORTHING 208768.8		EASTING 650286.0		24 HR. 0.11m		
TOTAL DEPTH 13.31m		DRILL MACHINE CME-45		DRILL METHOD WASH BORING, CORE		HAMMER TYPE MANUAL		
START DATE 6/30/04		COMPLETION DATE 6/30/04		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A		
ELEV.	DEPTH	BLOW COUNT			PEN.	BLOWS PER 30cm	SAMPLE NUMBER	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm	(m)	0 25 50 75 100		
61.61								
	1.14	4	6	6	0.30	12		ALLUVIAL, GRAY SAND
60.00	2.66	4	2	3	0.30	5		
58.00	4.18	12	75	25	0.20	100+		
56.00	5.70	100			0.15	100+		SOFT WEATHERED ROCK (GRANITE)
54.00	8.00	90	10		0.18	100+		HARD ROCK (GRANITE) REC=0% RQD=0%
52.00	9.52	95	5		0.17	100+		SOFT WEATHERED ROCK (GRANITE)
50.00	11.04	81	19		0.18	100+		
	12.56	100			0.10	100+		
	13.20	100			0.11	100+		
48.00								
46.00								
44.00								
42.00								

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

TT

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 19

[illegible]

PROJECT NO. 34459.1.1				ID. R-2552AA				COUNTY JOHNSTON				GEOLOGIST C.D. CZAJKA			
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY												GROUND WATER			
BORING B5-B (WBL)				BORING LOCATION 14+87.0				OFFSET 11.2m LT				ALIGNMENT -LREV-			
COLLAR ELEV. 62.64m				NORTHING 208755.7				EASTING 650346.5				24 HR. 1.06m			
TOTAL DEPTH 12.01m				DRILL MACHINE CME-45				DRILL METHOD WASH BORING				HAMMER TYPE MANUAL			
START DATE 6/24/04				COMPLETION DATE 6/24/04				SURFACE WATER DEPTH N/A				DEPTH TO ROCK N/A			
ELEV.	DEPTH	BLOW COUNT			PEN. (m)	BLOWS PER 30cm					SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION		
		15cm	15cm	15cm		0	25	50	75	100					
62.64															
62.00	1.32	3	5	6	0.30										
60.00	2.84	5	6	8	0.30										
58.00	4.36	13	20	28	0.30										
56.00	5.88	32	33	66	0.30										
	7.40	50	50		0.23										
54.00	8.92	82	18		0.17										
52.00	10.44	100			0.07										
	11.96	100			0.05										
50.00	BORING TERMINATED AT ELEVATION 50.63 METERS IN SOFT WEATHERED ROCK (GRANITE)														
48.00															
46.00															
44.00															

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34459.1.1				ID. R-2552AA		COUNTY JOHNSTON			GEOLOGIST O.B. OTI						
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY									GROUND WATER						
BORING EB2-A (WBL)		BORING LOCATION 15+17.5			OFFSET 21.8m LT		ALIGNMENT -LREV-		0 HR. N/A						
COLLAR ELEV. 64.32m		NORTHING 208765.0			EASTING 650377.4		24 HR. 1.90m								
TOTAL DEPTH 10.42m		DRILL MACHINE CME-45			DRILL METHOD WASH BORING		HAMMER TYPE MANUAL								
START DATE 6/22/04		COMPLETION DATE 6/22/04			SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A								
ELEV.	DEPTH	BLOW COUNT			PEN. (m)	BLOWS PER 30cm					SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75	100					
64.32	0.00	3	7	10	0.30										COASTAL PLAIN, BROWN, SILTY SAND
64.00	1.04	2	2	3	0.30										
	2.56	6	7	10	0.30										RESIDUAL, BROWN, CLAYEY SAND
62.00	4.08	10	13	15	0.30										
60.00	5.60	16	18	23	0.30										BROWN-GRAY, SAPROLITIC, SILTY SAND
58.00	7.12	23	42	58	0.29										
56.00	8.64	25	54	46	0.20										SOFT WEATHERED ROCK (GRANITE)
54.00	10.16	37	63		0.26										
						BORING TERMINATED AT ELEVATION 53.90 METERS IN SOFT WEATHERED ROCK (GRANITE)									
52.00															
50.00															
48.00															
46.00															

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

SHEET 20

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34459.I.I			ID. R-2552AA		COUNTY JOHNSTON		GEOLOGIST O.B. OTI								
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY							GROUND WATER								
BORING EBI-A (EBL)		BORING LOCATION 13+58.5			OFFSET 9.4m RT		ALIGNMENT -LREV-		0 HR. N/A						
COLLAR ELEV. 64.28m		NORTHING 208740.5			EASTING 650217.2			24 HR. 3.65m							
TOTAL DEPTH 13.66m		DRILL MACHINE CME-45			DRILL METHOD WASH BORING			HAMMER TYPE MANUAL							
START DATE 7/1/04		COMPLETION DATE 7/1/04			SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A							
ELEV.	DEPTH	BLOW COUNT			PEN.	BLOWS PER 30cm				SAMPLE	▼	LOG	SOIL AND ROCK DESCRIPTION		
		15cm	15cm	15cm	(m)	0	25	50	75	100	NUMBER	MOI.			
64.28 64.00															
	1.30	4	3	5	0.30	X 8					SS-28	M	7.1	COASTAL PLAIN, BROWN, SANDY SILT	
62.00	2.82	2	2	3	0.30	X 5					SS-29	M	7.1	RESIDUAL, BROWN, SANDY SILT	
60.00	4.34	3	4	5	0.30	X 9						W	7.1		
	5.86	4	4	8	0.30	X 12						W	7.1		
58.00	7.38	7	10	16	0.30	X 26						W		BROWN AND BROWN-GRAY, SAPROLITIC, SILTY SAND	
	8.90	8	12	17	0.30	X 29						W			
56.00	10.42	10	16	24	0.30	X 40						W			
	11.94	25	46	47	0.30							W			
54.00														SOFT WEATHERED ROCK (GRANITE)	
52.00	13.46	40	60		0.20										
50.00						BORING TERMINATED AT ELEVATION 50.62 METERS IN SOFT WEATHERED ROCK (GRANITE)									
48.00															
46.00															

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

SHEET 21

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 22

[illegible][illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

SHEET 23

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 24

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

SHEET 25

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

[illegible]

PROJECT NO. 34459.1.1				ID. R-2552AA		COUNTY JOHNSTON			GEOLOGIST O.B OTI						
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY								GROUND WATER							
BORING B4-B (EBL)		BORING LOCATION I4+80.5			OFFSET 21.4m RT		ALIGNMENT -LREV-		0 HR. N/A						
COLLAR ELEV. 60.24m		NORTHING 208723.4			EASTING 650338.6				24 HR. N/A						
TOTAL DEPTH 11.84m		DRILL MACHINE CME-45			DRILL METHOD WASH BORING			HAMMER TYPE MANUAL							
START DATE 6/25/04		COMPLETION DATE 6/25/04			SURFACE WATER DEPTH 1.07m			DEPTH TO ROCK N/A							
ELEV.	DEPTH	BLOW COUNT			PEN. (m)	BLOWS PER 30cm					SAMPLE NUMBER	MOL.	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75	100					
															WATER LEVEL 07/04
60.24 60.00															
	1.00	7	7	10	0.30	X 17					SS-14	W			ALLUVIAL, BROWN, SILTY SAND
58.00	2.52	5	5	10	0.30	X 15					SS-15	W			
56.00	4.04	8	9	13	0.30	X 22						W			
	5.56	11	12	18	0.30	X 30					SS-16	W			RESIDUAL, GRAY-GREEN-WHITE, SAPROLITIC, SILTY SAND
54.00	7.08	10	15	21	0.30	X 36						W			
52.00	8.60	16	19	23	0.30	X 42						W			
50.00	10.12	100			0.07				100+ X						SOFT WEATHERED ROCK (GRANITE)
	11.64	90	10		0.20				100+ X						
48.00						BORING TERMINATED AT ELEVATION 48.40 METERS IN SOFT WEATHERED ROCK (GRANITE)									
46.00															
44.00															
42.00															

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 26

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT NO. 34459.1.1	ID. R-2552AA	COUNTY JOHNSTON	GEOLOGIST O.B. OTI
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY			GROUND WATER 0 HR. N/A 24 HR. 1.50m
BORING EB2-A (EBL)	BORING LOCATION 15+41.5	OFFSET 10.5m RT	
COLLAR ELEV. 64.21m	NORTHING 208731.8	EASTING 650400.0	
TOTAL DEPTH 9.14m	DRILL MACHINE CME-45	DRILL METHOD WASH BORING	HAMMER TYPE MANUAL
START DATE 6/23/04	COMPLETION DATE 6/23/04	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

[illegible]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SHEET 27

PROJECT NO. 34459.1.1	ID. R-2552AA	COUNTY JOHNSTON	GEOLOGIST O.B. OTI	
SITE DESCRIPTION DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY			GROUND WATER 0 HR. N/A 24 HR. 1.50m	
BORING EB2-B (EBL)	BORING LOCATION 15+41.5	OFFSET 21.8m RT		ALIGNMENT -LREV-
COLLAR ELEV. 63.52m	NORTHING 208720.5	EASTING 650399.6		
TOTAL DEPTH 8.94m	DRILL MACHINE CME-45	DRILL METHOD WASH BORING	HAMMER TYPE MANUAL	
START DATE 6/23/04	COMPLETION DATE 6/24/04	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A	

[illegible]

EB1-A (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-25	21.8 LT	13+38.2	1.27-1.72	A-4(0)	39	NP	38.1	29.6	22.2	10.1	96	70	37	-	-
SS-26	21.8 LT	13+38.2	5.83-6.28	A-2-4(0)	39	NP	36.1	35.5	20.4	8.1	93	71	32	-	-
SS-27	21.8 LT	13+38.2	8.97-9.42	A-2-4(0)	31	NP	41.0	32.7	20.2	6.1	97	72	31	-	-

B1-A (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-22	20.3 LT	13+65.0	1.22-1.67	A-2-4(0)	33	NP	34.0	36.3	17.5	12.2	97	77	34	-	-
SS-23	20.3 LT	13+65.0	2.74-3.19	A-2-4(0)	36	NP	37.5	37.7	16.7	8.1	97	76	31	-	-
SS-24	20.3 LT	13+65.0	5.78-6.23	A-2-4(0)	30	NP	51.0	28.6	13.4	7.1	95	70	22	-	-

B1-B (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-44	10.8 LT	13+65.0	1.00-1.45	A-4(0)	33	NP	34.3	31.1	20.4	14.1	96	73	39	-	-
SS-45	10.8 LT	13+65.0	5.56-6.01	A-6(9)	38	17	18.2	24.2	35.4	22.2	100	90	63	-	-

B2-A (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-18	18.9 LT	13+95.5	1.35-1.80	A-2-4(0)	28	NP	48.6	37.1	8.2	6.1	94	65	16	-	-
SS-19	18.9 LT	13+95.5	2.87-3.32	A-4(0)	21	4	27.7	39.8	14.3	18.2	99	84	38	-	-
SS-20	18.9 LT	13+95.5	4.39-4.84	A-1-b(0)	24	NP	60.0	23.9	10.0	6.1	88	49	18	-	-
SS-21	18.9 LT	13+95.5	7.43-7.88	A-4(0)	34	9	41.1	21.5	23.2	14.2	91	63	38	-	-

B3-B (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-46	9.2 LT	14+28.4	2.82-3.27	A-4(0)	22	NP	13.1	49.3	17.4	20.2	100	98	45	-	-

B4-A (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-17	21.8 LT	14+56.5	1.52-1.97	A-1-b(0)	19	NP	79.0	14.2	1.7	5.1	91	30	8	-	-

B4-B (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-47	10.8 LT	14+56.5	5.76-6.21	A-2-6(1)	38	16	42.6	21.6	21.6	14.1	82	55	33	-	-
SS-48	10.8 LT	14+56.5	8.80-9.25	A-7-5(3)	46	15	34.3	28.3	23.2	14.1	96	72	42	-	-

B5-A (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-11	21.2 LT	14+87.0	1.42-1.87	A-2-4(0)	21	NP	44.2	34.2	4.4	17.2	98	74	25	-	-
SS-12	21.2 LT	14+87.0	2.94-3.39	A-2-4(0)	34	5	47.4	27.8	14.7	10.1	93	62	28	-	-

B5-B (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-13	11.2 LT	14+87.0	2.84-3.29	A-5(0)	42	NP	9.1	55.7	27.1	8.1	100	98	46	-	-

EB2-A (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	21.8 LT	15+17.5	0.00-0.45	A-2-4(0)	16	NP	39.7	33.8	14.3	12.2	82	63	26	-	-
SS-2	21.8 LT	15+17.5	1.04-1.49	A-2-6(1)	39	17	38.7	27.6	13.5	20.3	84	65	33	-	-
SS-3	21.8 LT	15+17.5	4.08-4.53	A-2-4(0)	33	NP	43.6	35.1	14.3	7.1	99	73	27	-	-

EB2-B (WBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4	10.5 LT	15+17.5	1.10-1.55	A-2-6(1)	40	14	38.7	30.2	10.8	20.3	97	74	35	-	-

EB1-A (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-28	9.4 RT	13+58.5	1.30-1.75	A-5(1)	41	7	38.3	21.9	23.6	16.2	96	70	43	-	-
SS-29	9.4 RT	13+58.5	2.82-3.27	A-5(0)	41	NP	33.0	26.1	28.7	12.2	96	74	45	-	-

EB1-B (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-30	21.8 RT	13+58.5	1.24-1.69	A-6(7)	40	17	27.0	20.7	22.0	30.4	98	81	55	-	-
SS-31	21.8 RT	13+58.5	2.76-3.21	A-5(2)	42	8	32.4	23.7	29.7	14.2	97	76	49	-	-
SS-32	21.8 RT	13+58.5	4.28-4.73	A-4(0)	32	NP	38.9	23.7	23.2	14.2	97	70	42	-	-
SS-33	21.8 RT	13+58.5	7.32-7.77	A-2-4(0)	37	6	47.6	24.7	17.5	10.1	95	61	30	-	-
SS-34A	21.8 RT	13+58.5	10.36-10.81	A-2-4(0)	33	NP	40.7	30.8	20.4	8.1	95	68	34	-	-

B1-A (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-40	10.8 RT	13+84.6	1.14-1.59	A-4(4)	27	10	12.1	27.1	28.5	32.3	100	94	66	-	-
SS-41	10.8 RT	13+84.6	2.66-3.11	A-5(0)	51	NP	38.2	22.6	25.1	14.1	96	69	42	-	-
SS-42	10.8 RT	13+84.6	4.18-4.63	A-5(0)	46	NP	39.6	24.4	25.9	10.1	100	71	41	-	-
SS-43	10.8 RT	13+84.6	8.74-9.19	A-5(0)	49	NP	32.7	26.3	30.9	10.1	100	79	46	-	-

B2-B (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-34	21.8 RT	14+19.5	1.23-1.38	A-2-4(0)	18	NP	47.9	36.6	8.4	7.1	100	71	19	-	-
SS-35	21.8 RT	14+19.5	1.38-1.68	A-6(10)	35	15	7.1	27.4	31.1	34.4	100	97	73	-	-
SS-36	21.8 RT	14+19.5	4.27-4.72	A-1-a(0)	33	NP	67.3	24.2	5.5	3.0	40	19	5	-	-
SS-37	21.8 RT	14+19.5	5.79-6.24	A-2-4(0)	30	NP	40.9	34.0	20.0	5.1	95	69	29	-	-

B3-A (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-38	10.8 RT	14+48.6	1.32-1.77	A-3(0)	22	NP	58.8	34.1	4.0	3.0	100	77	9	-	-
SS-39	10.8 RT	14+48.6	4.36-4.81	A-4(0)	32	NP	34.1	33.7	20.0	12.1	99	77	39	-	-

B4-B (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-14	21.4 RT	14+80.5	1.00-1.45	A-2-4(0)	27	8	66.0	17.6	3.2	13.2	83	42	15	-	-
SS-15	21.4 RT	14+80.5	2.60-2.97	A-2-4(0)	34	NP	43.2	29.2	19.6	8.1	96	68	32	-	-
SS-16	21.4 RT	14+80.5	5.56-6.01	A-2-4(0)	32	NP	44.6	33.0	16.3	6.1	93	67	26	-	-

B5-B (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-8	21.8 RT	15+11.0	1.38-1.83	A-7-6(6)	42	20	20.1	32.2	21.4	26.3	87	77	48	-	-
SS-10	21.8 RT	15+11.0	7.46-7.91	A-2-4(0)	32	NP	37.3	35.5	19.1	8.1	91	70	31	-	-

EB2-A (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-5	10.5 RT	15+41.5	1.40-1.85	A-4(1)	38	9	32.4	30.8	16.5	20.3	97	78	41	-	-
SS-6	10.5 RT	15+41.5	2.92-3.37	A-2-4(0)	36	NP	38.1	36.3	17.5	8.1	96	75	32	-	-

EB2-B (EBL)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	21.8 RT	15+41.5	1.30-1.75	A-4(4)	39	9	6.1	48.6	29.1	16.2	99	97	56	-	-

INFORMATION ON EXISTING BRIDGE

BR. NO.: n/a BR. LENGTH: n/a NO. BENTS: n/a NO. BENTS IN: CHANNEL: n/a FLOODPLAIN: n/a

EVIDENCE OF SCOUR(2):

INTERIOR BENTS: n/a

CHANNEL BANKS: None.

TYPE(3): n/a

EXTENT(4): n/a

EFFECTIVENESS(5): n/a

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Abundant deadfall in swamp.

CHANNEL BED MATERIAL(7): Alluvial Sand (SS-17, SS-38), Silty Sand (SS-11, SS-14, SS-18, SS-34),

and Sandy Silt (SS-19, SS-40, SS-46).

CHANNEL BANK MATERIAL(8): Residual Silty Sand (SS-6, SS-23), Clayey Sand (SS-2, SS-4),

Sandy Silt (SS-29, SS-31), and Silty Clay (SS-8).

CHANNEL BANK COVER(9): Woods.

FLOOD PLAIN WIDTH(10): 100 meters.

FLOOD PLAIN COVER(11): Swamp related weeds and brush, with some trees.

STREAM IS: DEGRADING X AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS: Main channel through swamp is difficult to define.

Beaver dams downstream of project have caused aggrading condition.

CHANNEL MIGRATION TENDENCY (13): Very low, to east.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(14):

WBL Bridge

EBL Bridge

Bent 1:	n/a	Bent 1:	59.65m
---------	-----	---------	--------

Bent 2: 59.85m Bent 2: 59.70m

Bent 3: 59.75m Bent 3: 60.00m

Bent 4: 59.55m Bent 4: 60.00m

Bent 5:	61.00m	Bent 5:	n/a
---------	--------	---------	-----

REPORTED BY: S. P. Brown
S. P. Brown

DATE: 9/10/04

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE, INCLUDING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL BASED ON OBSERVATION AND/OR SAMPLES.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL BASED ON OBSERVATION AND/OR SAMPLES.
- (9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
- (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS THE RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY, CORE RECOVERY PERCENTAGE, PERCENTAGE RQD, DIFFERENTIAL WEATHERING, SHEAR STRENGTH, OBSERVATIONS AT EXISTING STRUCTURES, OTHER TESTS DEEMED APPROPRIATE, AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

SITE PHOTOGRAPH
DUAL BRIDGE ON -LREV- (US 70 BYPASS) OVER SWIFT CREEK TRIBUTARY



View to east, from approximately -LREV- Station 14+00