

INDEX OF SHEETS

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VAOT STANDARD SHEETS

SEE SHEET 2

RECORD PLANS

CONTRACTOR: PARENT CONSTRUCTION - HINESBURG, VT
 RESIDENT ENGINEER: DAVID HOSKING
 CONSTRUCTION BEGAN: JULY 20, 2010
 CONSTRUCTION COMPLETE: OCTOBER 6, 2010
 RECORD PLANS BY: DAVID HOSKING & JENNA HYDE

I HEREBY CERTIFY THAT ALL THE CONSTRUCTION REQUIRED BY THIS SET OF DRAWINGS HAS BEEN ACCOMPLISHED AS INDICATED HEREIN.

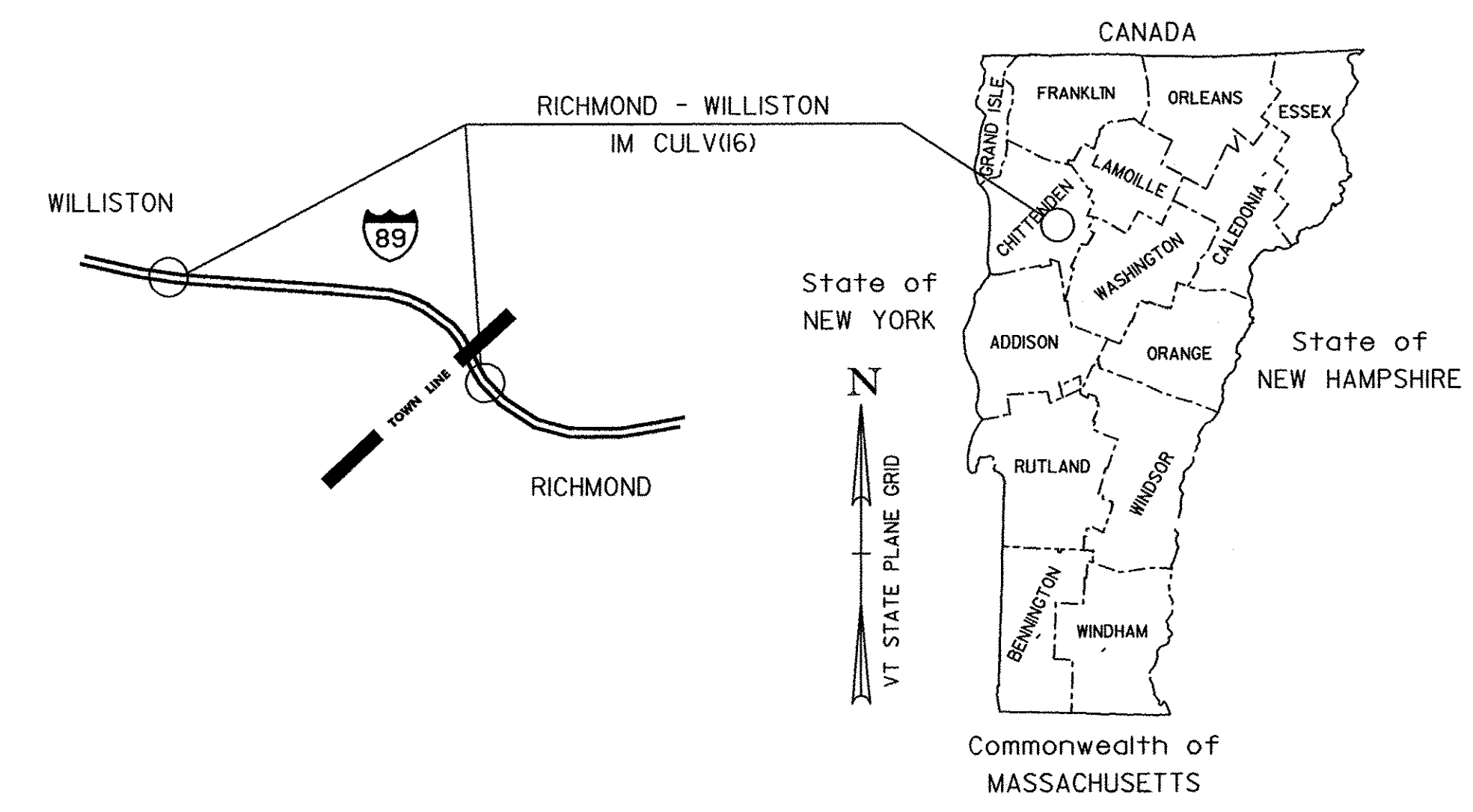
BY: *David Hosking* RESIDENT ENGINEER
 DATE: 9/5/12

NOTE: Any further information concerning final quantities, amounts or other details relative to this project may be found at Central Files in the electronic archives.

STATE OF VERMONT
 AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
 CULVERT REHABILITATION PROJECT
 TOWNS OF RICHMOND AND WILLISTON
 COUNTY OF CHITTENDEN
 BRIDGE NUMBERS 59-2 AND 59-4S CULVERTS
 ON INTERSTATE 89



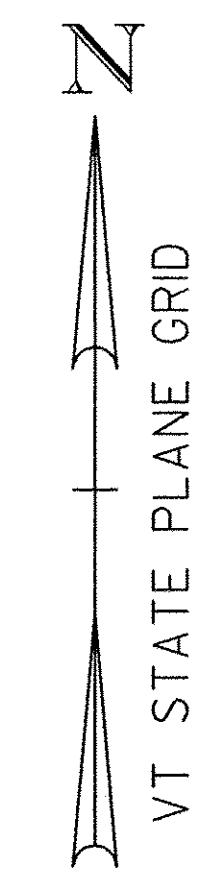
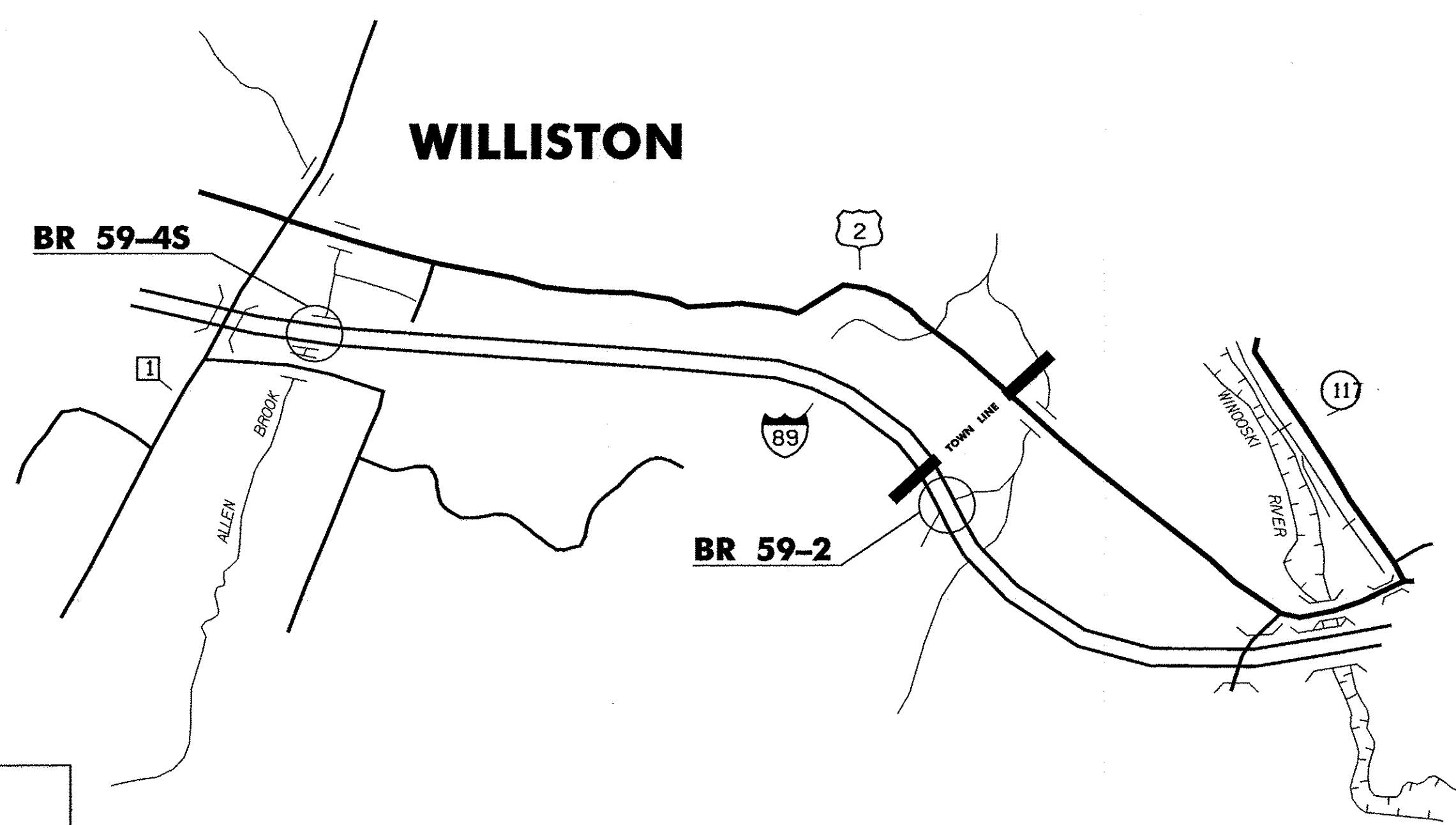
PROJECT LOCATIONS: BRIDGE 59-2 IS LOCATED ON INTERSTATE 89 IN RICHMOND AT MILE MARKER 79.5
 BRIDGE 59-4S IS LOCATED ON INTERSTATE 89 IN WILLISTON AT MILE MARKER 81.5

PROJECT DESCRIPTION: THIS PROJECT INVOLVES PREVENTATIVE MAINTENANCE TO EXISTING CULVERTS INCLUDING LINING CULVERT 59-2 AND CONCRETE PAVING THE INVERT OF CULVERT 59-4S AND ASSOCIATED CHANNEL WORK.

CONVENTIONAL SYMBOLS

COUNTY LINE	
TOWN LINE	
LIMITS OF ACCESS	
POINT OF ACCESS	
FENCE LINE	
STONE WALL	
TRAVELED WAY	
GUARD RAIL	
RAILROAD	
SURVEY LINE	
CULVERT	
POWER POLE	
TELEPHONE POLE	
TREES	
CONTROL OF ACCESS	
PROPERTY LINE	
R.O.W. TAKING LINE	
SLOPE RIGHTS	
TOP OF CUT	
TOE OF SLOPE	

SURVEYED BY : N/A
 SURVEYED DATE :
 DATUM
 VERTICAL : N/A
 HORIZONTAL : N/A



THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.
 CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2006, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JUNE 15, 2006 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

RICHMOND

Stantec Consulting Services Inc.
 55 Green Mountain Drive
 South Burlington VT U.S.A. 05403
 Tel. 802.864.0223
 Fax. 802.864.0165
 www.stantec.com

DIRECTOR OF PROGRAM DEVELOPMENT
 APPROVED: *Sherward G. Farnsworth* DATE 3-3-10
 PROJECT MANAGER: SHERWARD G. FARNSWORTH
 PROJECT NAME : RICHMOND - WILLISTON
 PROJECT NUMBER : 1M CULV (16)
 SHEET 1 OF 18 SHEETS

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2. INDEX, STANDARDS, TRAFFIC DATA AND GENERAL NOTES SHEET
3. TYPICAL SECTIONS & DETAILS
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8. EPSC NARRATIVE SHEET
9. EPSC BR 59-2 SITE PLAN
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14. HEADWALL DETAIL SHEET
15. REINFORCING STEEL SCHEDULE
- 16.-17. REFERENCE PLANS - BRIDGE 59-2
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VAOT STANDARDS FOR CONSTRUCTION

D-16	ENERGY DISSIPATOR FOR CULVERT	06-01-1994
D-34	REINFORCED CONCRETE CRADLE HEADWALL	03-12-2007
E-100	CONSTRUCTION APPROACH SIGNS	01-02-2004
E-100A	SIDE ROAD CONSTRUCTION - APPROACH SIGNS	01-02-2004
E-101	CONSTRUCTION SIGN DETAILS	05-30-2003
E-102	CONSTRUCTION SIGN DETAILS	06-30-2003
E-102A	CONSTRUCTION SIGN DETAILS	05-01-2004
E-103	MAINLINE TRAFFIC CONTROL DIVIDED HIGHWAY ONE LANE CLOSED	03-01-2004
E-106	TRAFFIC CONTROL - MISCELLANEOUS DETAILS	03-01-2004
E-107	DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS	06-30-2003
E-107A	BREAKAWAY BARRICADE DETAILS	06-08-2009
E-111	MINOR MAINTENANCE OPERATIONS	03-11-1997
E-120	STANDARD SIGN PLACEMENT EXPRESSWAY AND FREEWAY	08-08-1995
E-121	STANDARD SIGN PLACEMENT CONVENTIONAL ROAD	08-08-1995

TRAFFIC DATA

CULVERT	LOCATION	2008 AADT
RICHMOND BR. 59-2 I-89	MILE MARKER 79.5	26,900
WILLISTON BR. 59-4S I-89	MILE MARKER 81.5	26,900

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO STATE OF VERMONT AGENCY OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2006, AND ITS LATEST REVISIONS, AND THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION, DATED 2002, AND ITS LATEST REVISIONS.
2. ALL WORK AND ANY ASSOCIATED ACTIVITY ON THIS PROJECT SHALL BE PERFORMED WITHIN THE EXISTING RIGHT-OF-WAY LIMITS SHOWN ON THE PLANS.
3. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL, AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.
4. IT IS EXPECTED THAT CULVERT LINING OR PAVING, HEADWALLS AND STONE FILL WILL BE THE EXTENT OF THE WORK, AS NOTED FOR EACH SITE. DURING THE COURSE OF CONSTRUCTION IF THE CONTRACTOR SEES AN AREA OF CONCERN, SUCH AS VOIDS AROUND THE EXISTING CULVERT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. THE ENGINEER WILL MAKE A DETERMINATION AS TO THE NEED FOR FURTHER EXPLORATION. IF FURTHER EXPLORATION IS NEEDED TEST BORINGS SHALL BE CONDUCTED IN THE AREA OF CONCERN. THIS WORK SHALL BE PAID FOR UNDER ITEM 900.640, "SPECIAL PROVISION (TEST BORINGS)".
5. HAND PROBES TAKEN IN THE VICINITIES OF NEW HEADWALLS DID NOT INDICATE THE PRESENCE OF BEDROCK. IF BEDROCK IS ENCOUNTERED, IT SHALL BE BROUGHT TO THE ATTENTION OF THE RESIDENT ENGINEER BEFORE ADVANCING THE WORK.

PIPE REHABILITATION NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ACCESS TO ALL CULVERT REHABILITATION SITES. ALL RESULTING DISTURBED EARTH SHALL BE STABILIZED AND RESTORED UPON COMPLETION OF CONSTRUCTION. PAYMENT SHALL BE MADE UNDER CONTRACT ITEM 900.645, "SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS)".
2. AT EACH LOCATION SPECIFIED IN THESE PLANS, THE EXISTING CULVERT SHALL REMAIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARATION OF THE EXISTING PIPE TO THE SATISFACTION OF THE ENGINEER. IT IS ANTICIPATED THAT IT WILL BE NECESSARY FOR THE CONTRACTOR TO REMOVE SEDIMENT, LARGE STONES, AND/OR DEBRIS FROM INSIDE THE EXISTING CULVERT, AND TO FILL AND REPAIR LARGE HOLES IN THE EXISTING CULVERT PRIOR TO INSTALLING THE NEW LINER OR INVERT PAVING. PAYMENT FOR THIS WORK WILL BE MADE UNDER THE CULVERT LINER PAY ITEMS.
3. THE CONTRACTOR SHALL FILL ANY VOIDS UNDER THE CULVERT FROM WITHIN THE CULVERT BEFORE INSTALLING THE LINER OR INVERT PAVING. PAYMENT FOR THIS WORK WILL BE MADE UNDER ITEM 541.31, "CONCRETE, CLASS D".
4. THE EXISTING CONCRETE CRADLE WALL AT EACH PIPE INLET SHALL BE RETAINED AT EACH CULVERT. A NEW CONCRETE HEADWALL SHALL BE CONSTRUCTED UPSTREAM OF THE EXISTING CRADLE WALL AT CULVERT NO. 59-2. THE EXISTING CONCRETE CRADLE WALL AT THE OUTLET OF CULVERT NO. 59-2 SHALL BE REMOVED AND REPLACED. PAYMENT FOR REMOVAL OF EXISTING CRADLE WALLS WILL BE PAID FOR UNDER ITEM 529.25 "REMOVAL OF CONCRETE OR MASONRY".
5. NEW CONCRETE HEADWALLS SHALL BE CONSTRUCTED IN THE DRY. CONTROL OF WATER WILL BE PAID FOR UNDER ITEM 900.645, "SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)".

CONCRETE NOTES

1. CONCRETE PAYMENT AND CLASSIFICATION WILL BE AS FOLLOWS:
HEADWALL:
ITEM 501.34, CONCRETE, HIGH PERFORMANCE CLASS B
FILLING VOIDS BELOW PIPE FLOW LINE:
ITEM 541.31, CONCRETE CLASS D
FILLING VOIDS ABOVE PIPE FLOW LINE:
ITEM 900.608, SPECIAL PROVISION (CONTROLLED DENSITY (FLOWABLE) FILL)
2. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1 INCH BY 1 INCH, UNLESS OTHERWISE NOTED.
3. JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
4. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES. PAYMENT WILL BE MADE UNDER ITEM 514.10, "WATER REPELLENT, SILANE".

REINFORCING STEEL NOTES

1. ALL REINFORCING STEEL SHALL BE GRADE 60.
2. MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
ALONG BACK FACES OF WALLS AGAINST EARTH: 2"
ELSEWHERE UNLESS OTHERWISE INDICATED: 3"
3. REINFORCEMENT STEEL PLACEMENT TOLERANCES SHALL BE:
SPACING = +/- 1 INCH
CLEARANCE = +/- 1/4 INCH

TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL MEASURES FOR THIS PROJECT SHALL BE INSTALLED IN ACCORDANCE WITH TYPICAL APPLICATIONS TA-5, TA-33, TA-34, TA-42 AND TA-44 OF THE 2003 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE VTRANS STANDARD DRAWINGS, AS NEEDED. CONFLICTS BETWEEN THE MUTCD AND THE VTRANS STANDARD DRAWINGS WILL DEFER TO THE MUTCD.
2. TWO WEEKS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A SPECIFIC TRAFFIC CONTROL PLAN FOR EACH CONSTRUCTION SITE TO THE ROADWAY, TRAFFIC AND SAFETY ENGINEER FOR APPROVAL PER SUBSECTION 105.03. PAYMENT FOR THIS WORK WILL BE INCLUDED IN TRAFFIC CONTROL ITEMS.
3. LARGE CONSTRUCTION VEHICLES MAY BE REQUIRED TO BACK DOWN THE TEMPORARY ACCESS ROADS AT EACH CULVERT LOCATION. THESE VEHICLES WILL LIKELY NOT HAVE ADEQUATE SPACE AT THE INTERSECTION OF THE ACCESS ROADS AND THE INTERSTATE TO PERFORM THE NECESSARY TURNING MOVEMENTS. AT THE OPTION OF THE CONTRACTOR, A TEMPORARY CLOSURE OF THE INTERSTATE TRAVEL LANE AND SHOULDER WILL BE ALLOWED FOR ACCESS TO THE PROJECT SITES. THIS WORK WILL BE PAID FOR UNDER ITEM 641.10, "TRAFFIC CONTROL".
4. TEMPORARY LANE AND/OR SHOULDER CLOSURES WILL BE ALLOWED DURING WORKING HOURS ONLY. IN ADDITION, TEMPORARY LANE CLOSURES WILL NOT BE ALLOWED DURING THE HOURS OF 7 AM TO 8:30 AM AND 4 PM TO 6 PM. THE INTERSTATE SHALL BE RESTORED TO FULL CAPACITY AT THE CLOSE OF DAILY CONSTRUCTION ACTIVITIES.
5. TEMPORARY BARRIER, IF USED, SHALL MEET THE REQUIREMENTS OF SECTION 621. BARRIER ENDS FACING ONCOMING TRAFFIC SHOULD BE TAPERED BEYOND THE CLEAR ZONE. IF NECESSARY, PAYMENT FOR INSTALLING, RESETTING, AND REMOVING ANY TEMPORARY TRAFFIC BARRIER WILL BE INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL".
6. ENERGY ABSORPTION ATTENUATORS, IF USED, SHALL MEET THE REQUIREMENTS OF SECTION 621. PAYMENT FOR INSTALLING AND REMOVING ANY ENERGY ABSORPTION ATTENUATORS WILL BE INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL".
7. SIGNS, BARRICADES, AND TRAFFIC CONTROL DEVICES SHALL BE CLEANED WEEKLY AND THIS WORK SHALL BE INCLUDED IN THE BID PRICE FOR ITEM 641.10, "TRAFFIC CONTROL".
8. THE PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), ITEM 641.15, SHALL BE USED AT THE DISCRETION OF THE ENGINEER, THE PCMS SHALL BE USED IN ACCORDANCE WITH SECTION 6F.55 OF THE MUTCD. THE PCMS SHALL READ " LEFT (OR RIGHT) LANE CLOSED AHEAD, PLEASE MERGE EARLY".
9. THE ARROW BOARD, ITEM 641.16, SHALL BE PLACED ON THE SHOULDER OF THE ROADWAY, OR IF PRACTICAL FURTHER FROM THE TRAVELED LANE AT THE END OF THE SHOULDER TAPER.

PROJECT NAME: RICHMOND - WILLISTON

PROJECT NUMBER: IM CULV(16)

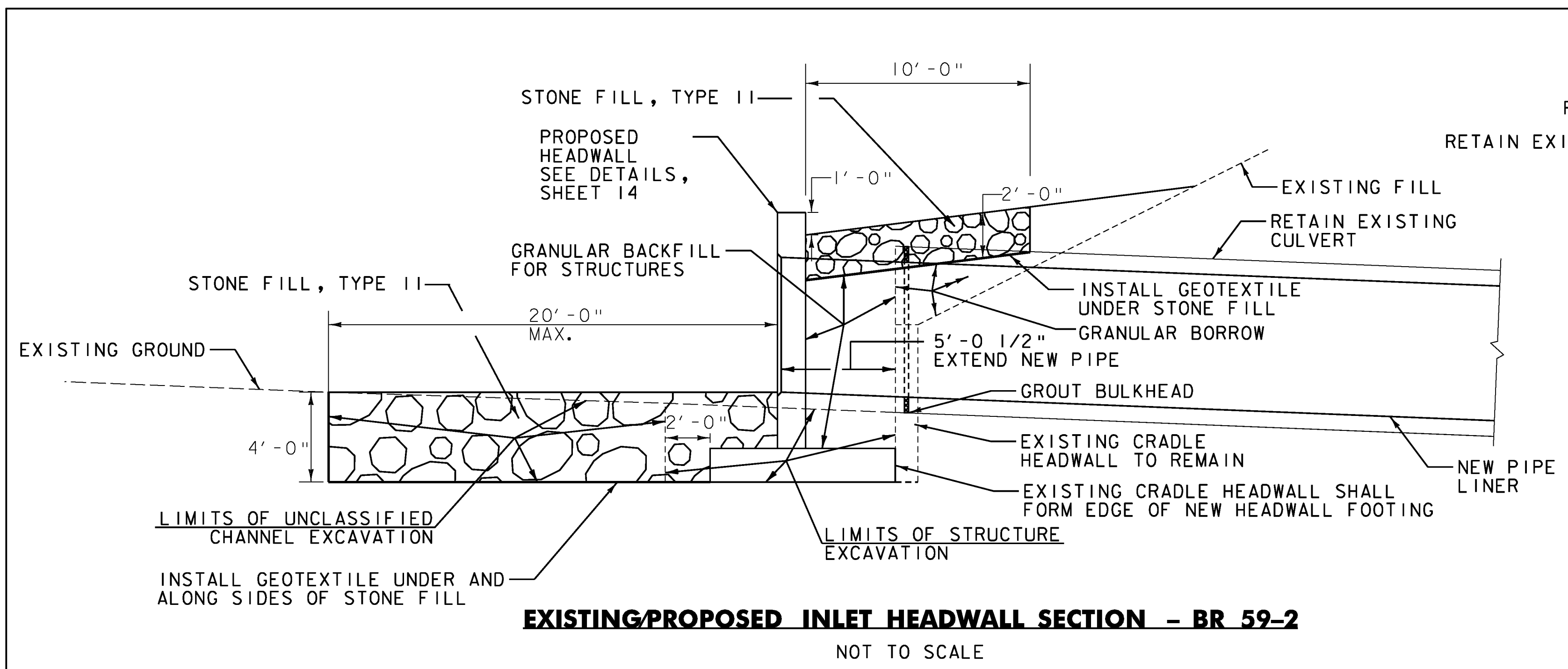
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PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING

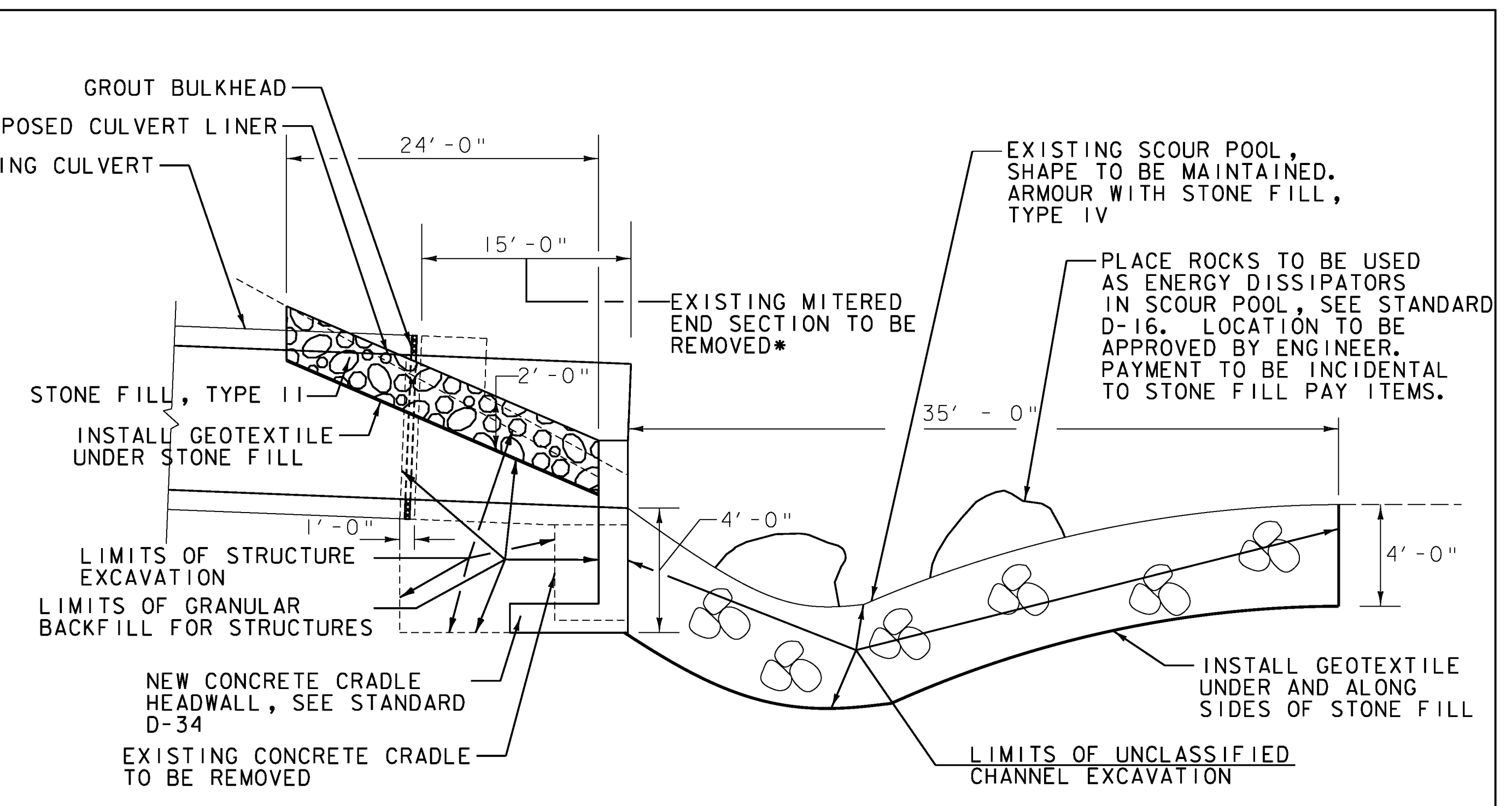
DESIGNED BY: M. CHENETTE CHECKED BY: G. BOGUE

INDEX, STD'S., TRAFFIC DATA & GEN. NOTES SHEET 2 OF 18

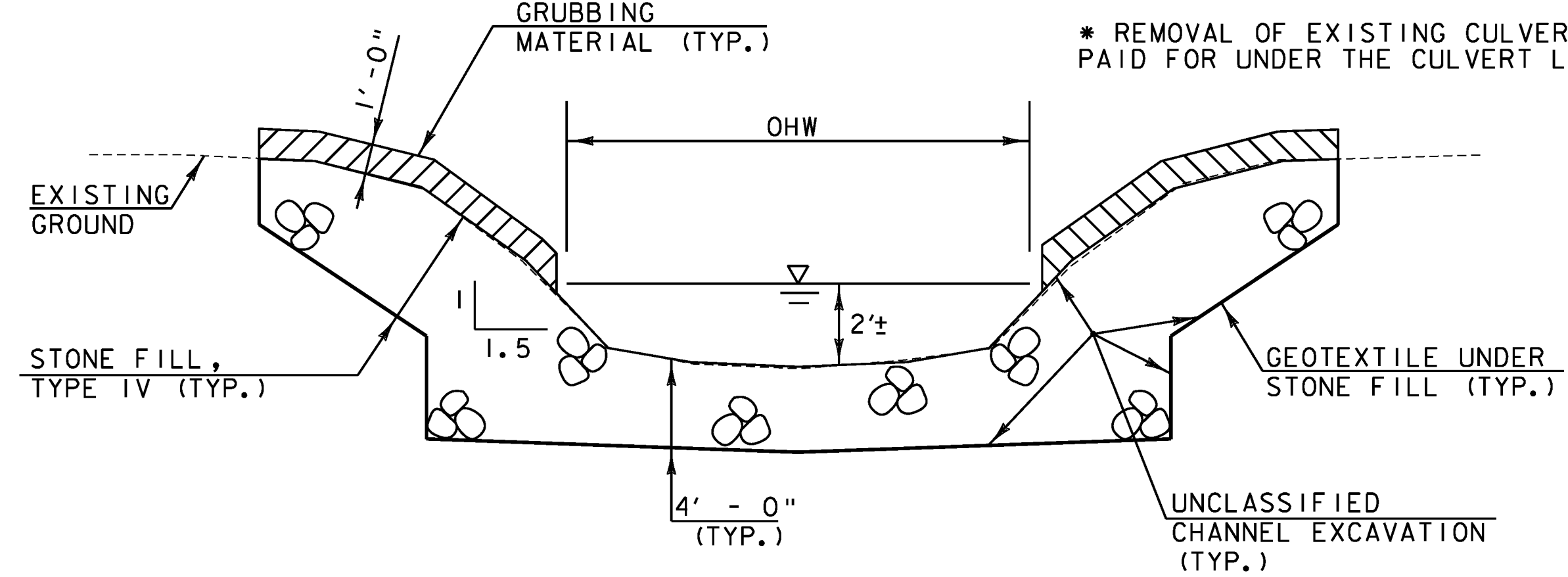




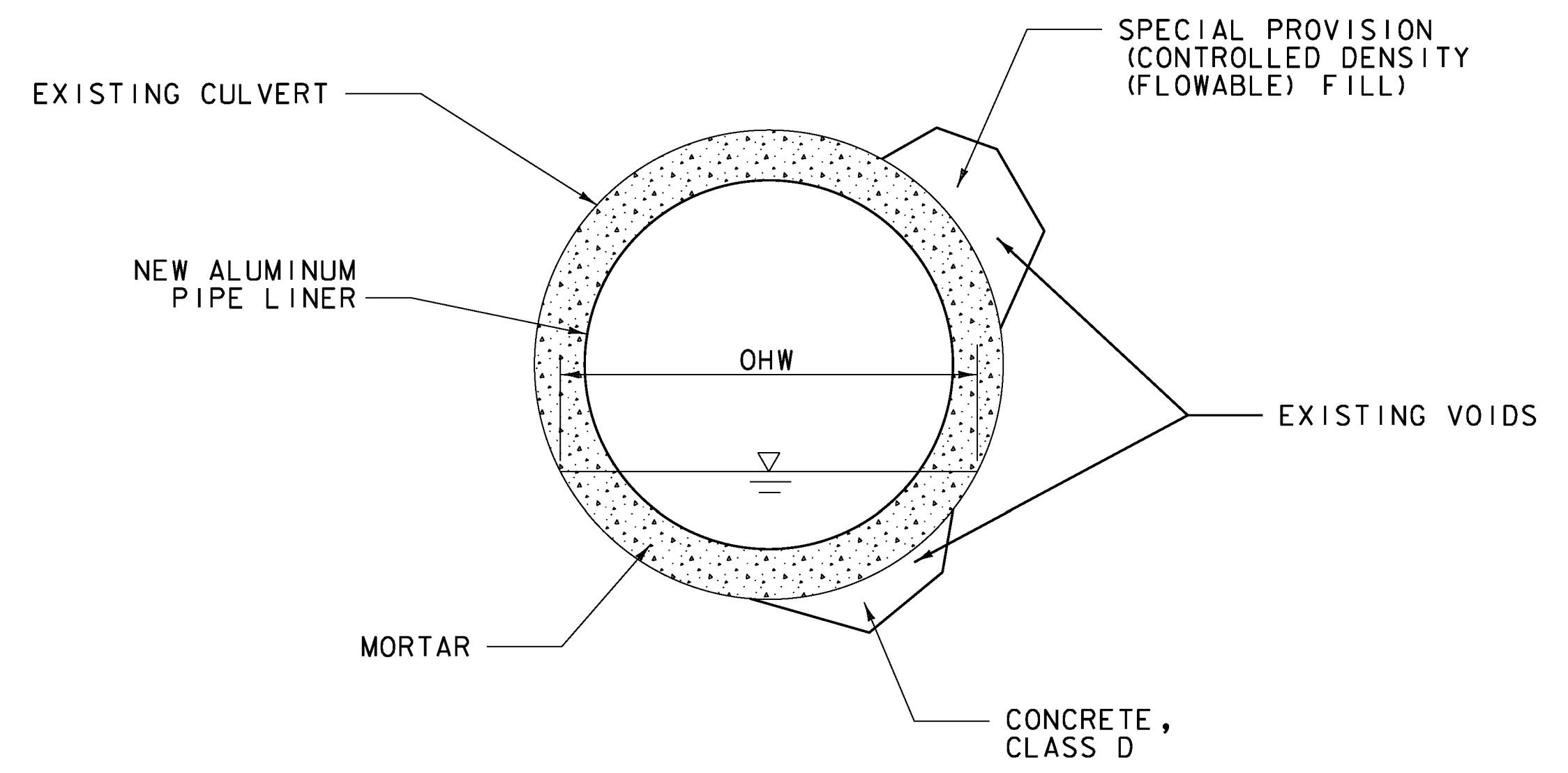
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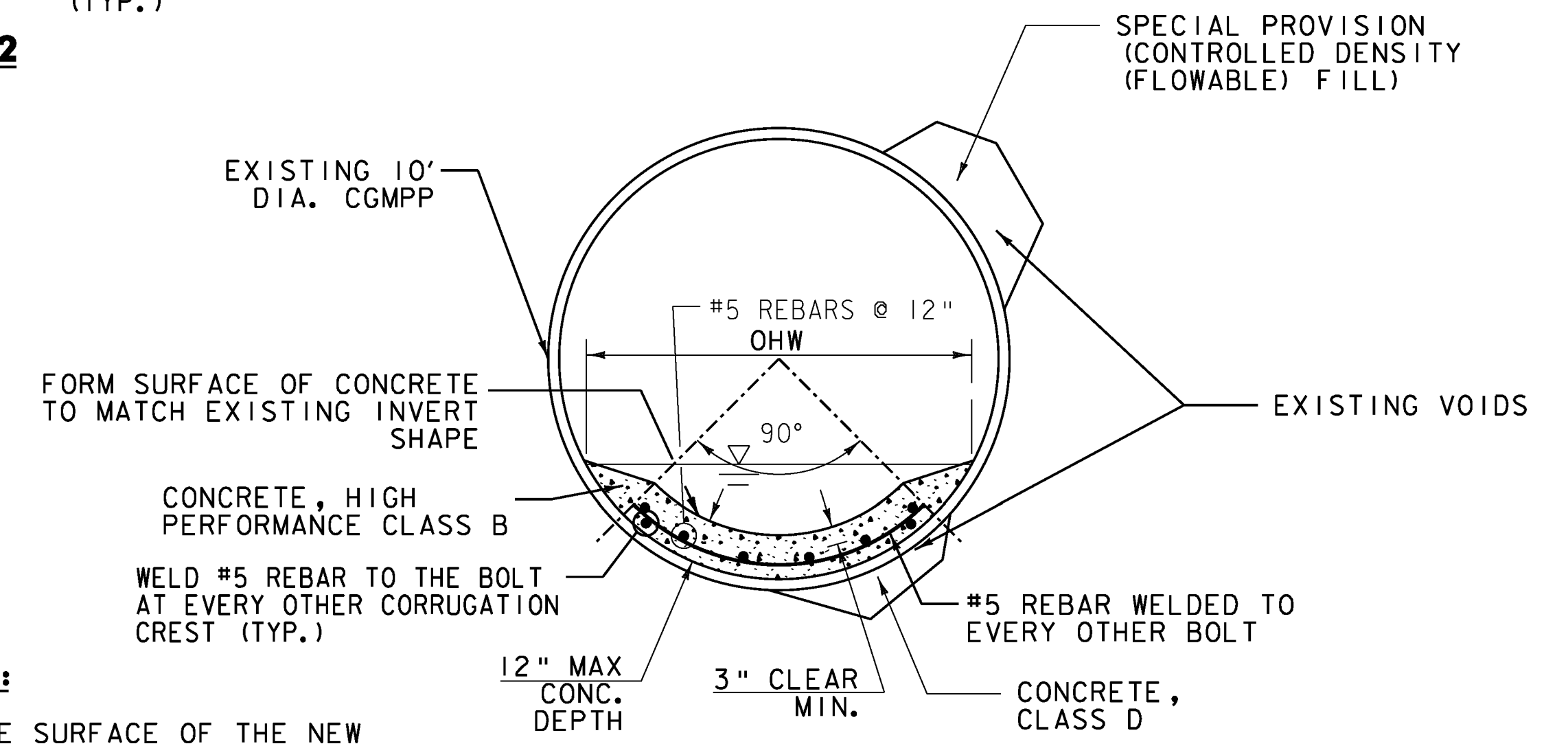
CULVERT OUTLET DETAIL - BR 59-2
NOT TO SCALE



TYPICAL CHANNEL SECTION - BR 59-2
NOT TO SCALE



TYPICAL CULVERT ALUMINUM PIPE LINER DETAIL - BR 59-2
NOT TO SCALE



INVERT REPAIR DETAIL - BR 59-4S
NOT TO SCALE

- NOTES:**
1. THE SURFACE OF THE NEW CONCRETE INVERT SHALL HAVE A ROUGHENED RAKE FINISH WITH 1/4" TO 1/2" IRREGULARITIES.
 2. NEW CONCRETE FOR INVERT, REINFORCING STEEL AND WELDING OF REINFORCING TO BOLTS SHALL BE PAID FOR UNDER ITEM 900.640, SPECIAL PROVISION (REINFORCED CONCRETE INVERT) (EXISTING 120" PIPE).



PROJECT NAME:	RICHMOND - WILLISTON
PROJECT NUMBER:	IM CULV(16)
FILE NAME: ...03-typical section.dgn	PLOT DATE: 2/25/2010
PROJECT LEADER: G. BOGUE	DRAWN BY: E. ALLING
DESIGNED BY: M. CHENETTE	CHECKED BY: G. BOGUE
TYPICAL SECTIONS & DETAILS	
SHEET 3 OF 18	

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
						EROSION CONTROL	ROADWAY	BRIDGE I-89 BR. NO. 59-4S	BRIDGE I-89 BR. NO. 59-2	FULL C.E.	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
							1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
									180		180		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				
									25		25		CY	GRANULAR BORROW	203.32				
							1				1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22				
									75		75		CY	STRUCTURE EXCAVATION	204.25				
									85		85		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				
									22		22		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34				
									3010		3010		LB	REINFORCING STEEL	507.15				
									3		3		GAL	WATER REPELLENT, SILANE	514.10				
									12		12		CY	REMOVAL OF CONCRETE OR MASONRY	529.25				
								5	5		10		CY	CONCRETE, CLASS D	541.31				
							24				24		HR	POWER BROOM RENTAL, TYPE II	608.31				
								10	125		135		CY	STONE FILL, TYPE II	613.11				
									130		130		CY	STONE FILL, TYPE IV	613.13				
							100				100		HR	UNIFORMED TRAFFIC OFFICERS	630.10				
								80			80		HR	FLAGGERS	630.15				
										1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16				
							1				1		LS	MOBILIZATION/DEMOBILIZATION	635.11				
									1		1		LS	TRAFFIC CONTROL (I89 - BR. NO. 59-2)	641.10				
								1			1		LS	TRAFFIC CONTROL (I89 - BR. NO. 59-4S)	641.10				
							2				2		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15				
							2				2		EACH	PORTABLE ARROW BOARD	641.16				
									150		150		SY	GEOTEXTILE UNDER STONE FILL	649.31				
						280					280		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
						120					120		LB	SEED	651.15				
						500					500		LB	FERTILIZER	651.18				
						2					2		TON	AGRICULTURAL LIMESTONE	651.20				
						2					2		TON	HAY MULCH	651.25				
						270					270		CY	TOPSOIL	651.35				
						125					125		SY	GRUBBING MATERIAL	651.40				
						1					1		LS	EPSC PLAN	652.10				
						40					40		HR	MONITORING EPSC PLAN	652.20				
						1					1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30				
						5350					5350		SY	TEMPORARY EROSION MATTING	653.20				
						100					100		CY	TEMPORARY STONE CHECK DAM, TYPE I	653.25				
						30					30		CY	VEHICLE TRACKING PAD	653.35				
						2					2		EACH	FILTER BAG	653.45				
						1000					1000		LF	BARRIER FENCE	653.50				
								5	5		10		CY	SPECIAL PROVISION (CONTROLLED DENSITY (FLOWABLE) FILL)	900.608				
									313		313		LF	SPECIAL PROVISION (ALUMNUM PIPE LNER)(66") (EXISTING 84" PIPE)	900.640				

PROJECT NAME: RICHMOND - WILLISTON
 PROJECT NUMBER: IM CULV(16)
 FILE NAME: ...04-quantity sheet.dgn
 PROJECT LEADER: G. BOGUE
 DESIGNED BY: M. CHENETTE
 PLOT DATE: 3/15/2010
 DRAWN BY: E. ALLING
 CHECKED BY: G. BOGUE
 SHEET 4 OF 18
QUANTITY SHEET 1

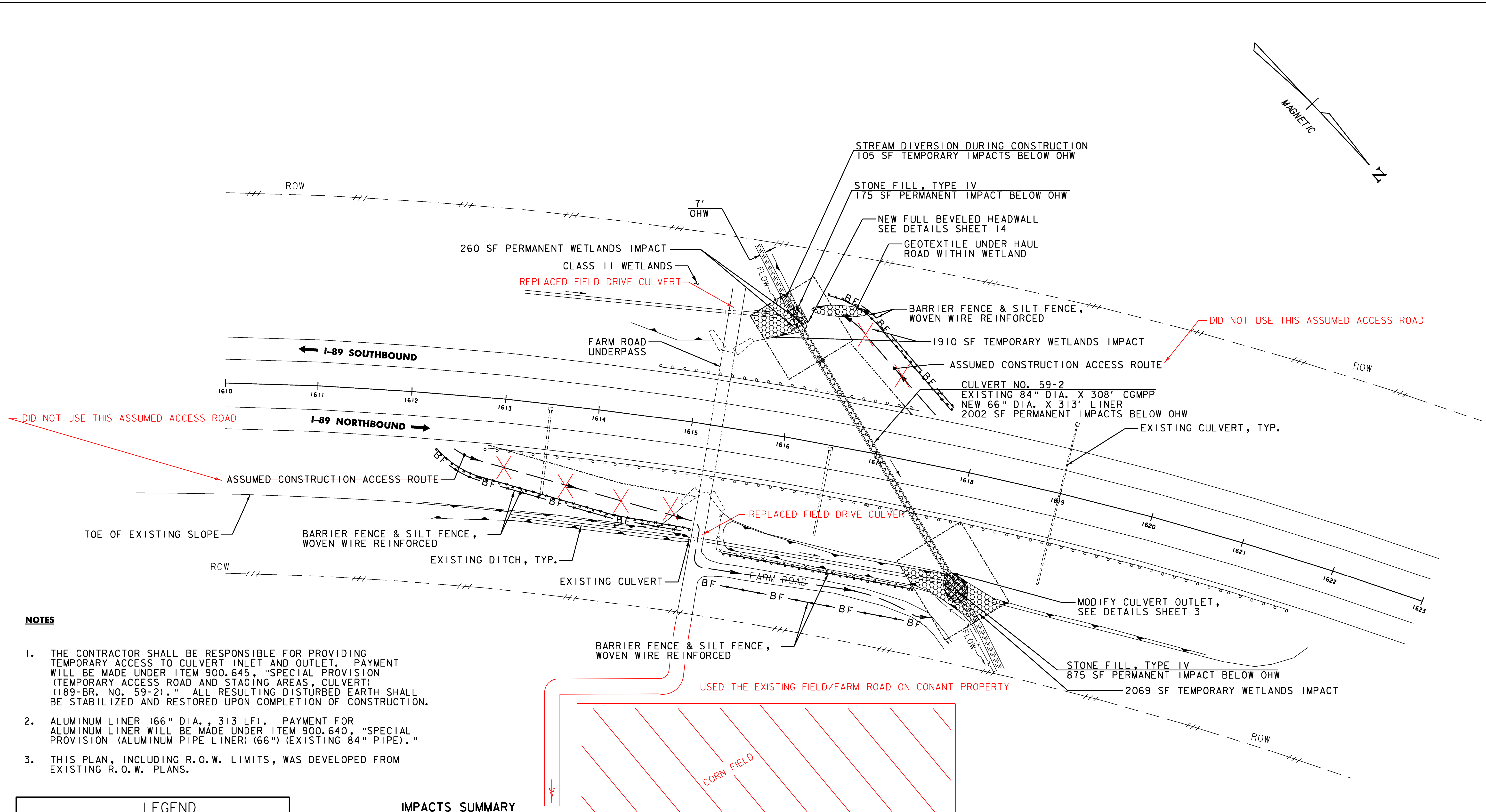
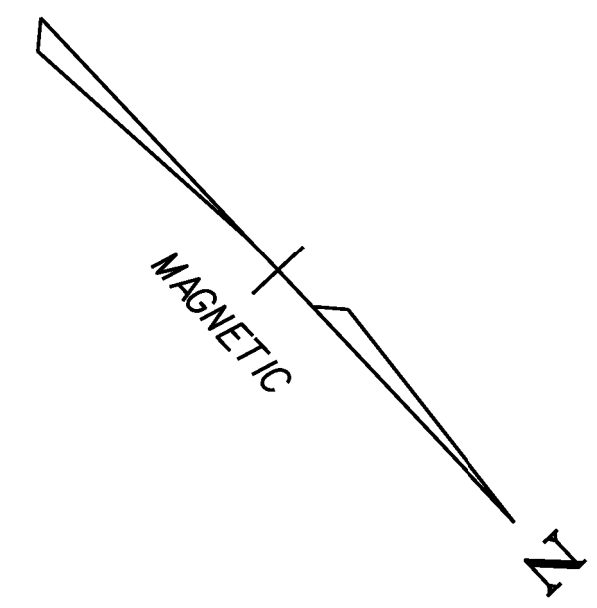


QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
						EROSION CONTROL	ROADWAY	BRIDGE I-89 BR. NO. 59-4S	BRIDGE I-89 BR. NO. 59-2	FULL C.E.	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
								210			210		LF	SPECIAL PROVISION (REINFORCED CONCRETE INVERT)(EXISTING 120" PIPE)	900.640				
								200	200		400		LF	SPECIAL PROVISION (TEST BORINGS)	900.640				
									1		1		LS	SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT)(I89 - BR. NO. 59-2)	900.645				
								1			1		LS	SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT)(I89 - BR. NO. 59-4S)	900.645				
									1		1		LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)(I89 - BR. NO. 59-2)	900.645				
								1			1		LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)(I89 - BR. NO. 59-4S)	900.645				

PROJECT NAME: RICHMOND - WILLISTON
 PROJECT NUMBER: IM CULV(16)
 FILE NAME: ...04-quantity sheet.dgn
 PROJECT LEADER: G. BOGUE
 DESIGNED BY: M. CHENETTE
 PLOT DATE: 3/15/2010
 DRAWN BY: E. ALLING
 CHECKED BY: G. BOGUE
 SHEET 5 OF 18
QUANTITY SHEET 2



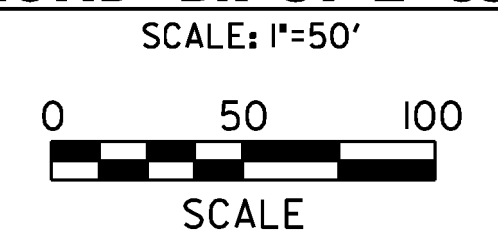


- NOTES**
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ACCESS TO CULVERT INLET AND OUTLET. PAYMENT WILL BE MADE UNDER ITEM 900.645, "SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT) (189-BR. NO. 59-2)." ALL RESULTING DISTURBED EARTH SHALL BE STABILIZED AND RESTORED UPON COMPLETION OF CONSTRUCTION.
 2. ALUMINUM LINER (66" DIA., 313 LF). PAYMENT FOR ALUMINUM LINER WILL BE MADE UNDER ITEM 900.640, "SPECIAL PROVISION (ALUMINUM PIPE LINER) (66") (EXISTING 84" PIPE)."
 3. THIS PLAN, INCLUDING R.O.W. LIMITS, WAS DEVELOPED FROM EXISTING R.O.W. PLANS.

LEGEND	
GUARD RAIL	
EDGE OF STREAM	
TOE OF EXISTING SLOPE	
RIGHT-OF-WAY	
WETLAND AREA	
WORK AREA LIMITS	
BARRIER FENCE	BF — BF
SILT FENCE, WOVEN WIRE REINFORCED	

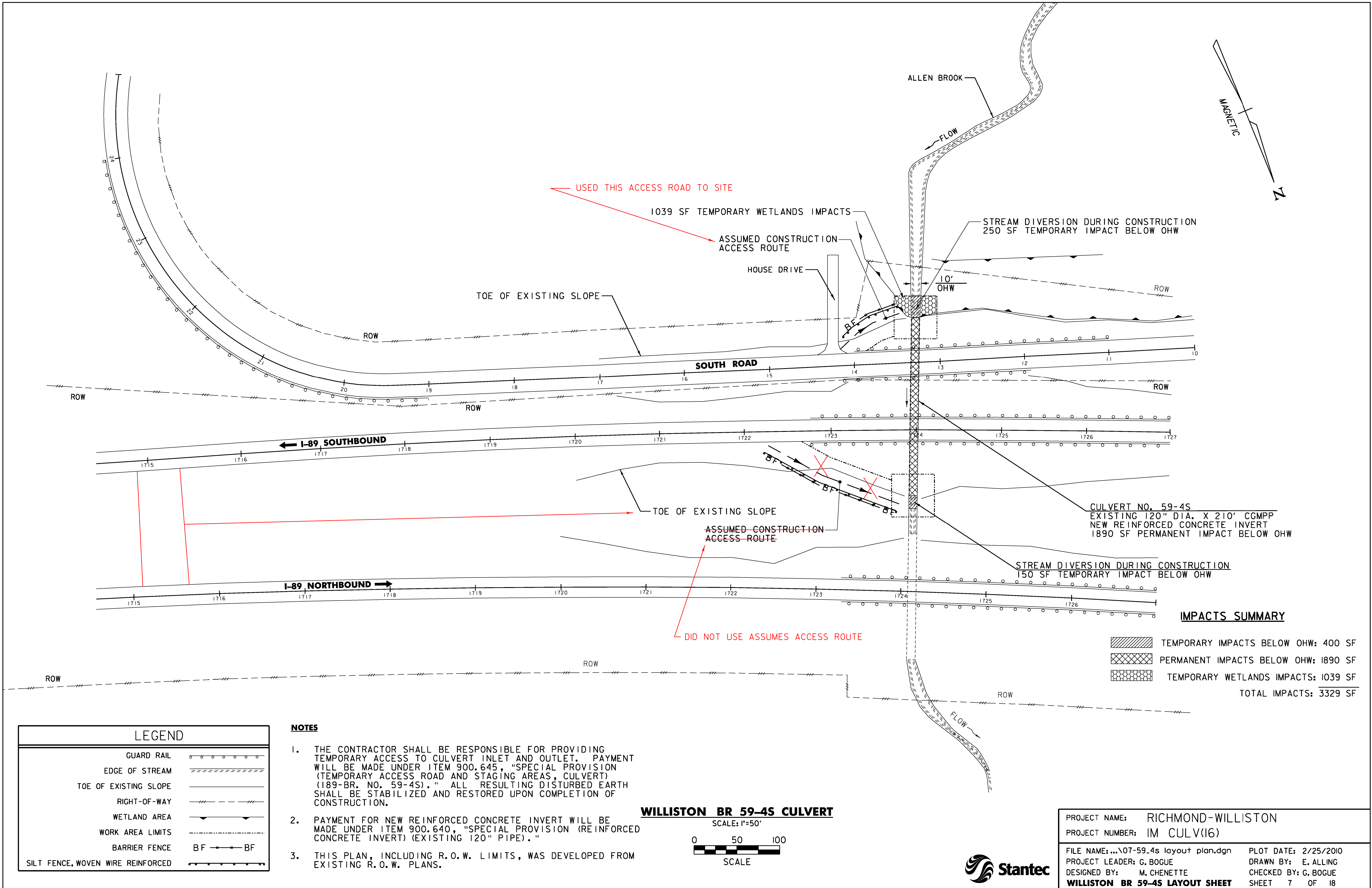
IMPACTS SUMMARY	
	TEMPORARY IMPACTS BELOW OHW: 105 SF
	PERMANENT IMPACTS BELOW OHW: 3052 SF
	TEMPORARY WETLANDS IMPACTS: 3979 SF
	PERMANENT WETLANDS IMPACTS: 260 SF
	TOTAL IMPACTS: 7396 SF

RICHMOND BR 59-2 CULVERT



PROJECT NAME: RICHMOND-WILLISTON	PLOT DATE: 2/25/2010
PROJECT NUMBER: IM CULV(16)	DRAWN BY: E. ALLING
FILE NAME: ...106-59-2 layout plan.dgn	DESIGNED BY: M. CHENETTE
PROJECT LEADER: G. BOGUE	CHECKED BY: G. BOGUE
RICHMOND BR 59-2 LAYOUT SHEET	SHEET 6 OF 18





IMPACTS SUMMARY

	TEMPORARY IMPACTS BELOW OHW: 400 SF
	PERMANENT IMPACTS BELOW OHW: 1890 SF
	TEMPORARY WETLANDS IMPACTS: 1039 SF
TOTAL IMPACTS: 3329 SF	

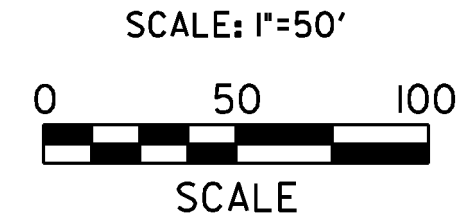
LEGEND

GUARD RAIL	
EDGE OF STREAM	
TOE OF EXISTING SLOPE	
RIGHT-OF-WAY	
WETLAND AREA	
WORK AREA LIMITS	
BARRIER FENCE	BF
SILT FENCE, WOVEN WIRE REINFORCED	

NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ACCESS TO CULVERT INLET AND OUTLET. PAYMENT WILL BE MADE UNDER ITEM 900.645, "SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT) (189-BR. NO. 59-4S)." ALL RESULTING DISTURBED EARTH SHALL BE STABILIZED AND RESTORED UPON COMPLETION OF CONSTRUCTION.
2. PAYMENT FOR NEW REINFORCED CONCRETE INVERT WILL BE MADE UNDER ITEM 900.640, "SPECIAL PROVISION (REINFORCED CONCRETE INVERT) (EXISTING 120" PIPE)."
3. THIS PLAN, INCLUDING R.O.W. LIMITS, WAS DEVELOPED FROM EXISTING R.O.W. PLANS.

WILLISTON BR 59-4S CULVERT



PROJECT NAME: RICHMOND-WILLISTON	PLOT DATE: 2/25/2010
PROJECT NUMBER: IM CULV(16)	DRAWN BY: E. ALLING
FILE NAME: ...07-59-4s layout plan.dgn	DESIGNED BY: M. CHENETTE
PROJECT LEADER: G. BOGUE	CHECKED BY: G. BOGUE
WILLISTON BR 59-4S LAYOUT SHEET	SHEET 7 OF 18

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES PREVENTATIVE MAINTENANCE TO TWO EXISTING CULVERTS INCLUDING INSTALLATION OF A PIPE LINER, REINFORCED CONCRETE INVERT AND RELATED CHANNEL WORK. CULVERT 59-2 IS IN THE TOWN OF RICHMOND AND CROSSES UNDER BOTH THE NORTHBOUND AND SOUTHBOUND LANES OF I-89 AT MILE MARKER 79.5. CULVERT 59-4S IS IN THE TOWN OF WILLISTON AND CROSSES UNDER SOUTH ROAD AND THE SOUTHBOUND LANES OF I-89 AT MILE MARKER 81.5.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA, AS WELL AS WASTE, BORROW AND STAGING AREAS, AND OTHER EARTH DISTURBING ACTIVITIES WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS AS SHOWN ON THE ATTACHED EPSC PLAN.

THE AREA OF DISTURBANCE FOR CULVERT 59-2 IS 0.83 ACRES AND THE AREA OF DISTURBANCE FOR CULVERT 59-4S IS 0.29 ACRES. THESE AREAS ARE BASED ON THE WORK AREA LIMITS PLUS AN AVERAGE 35' WIDE DISTURBED AREA ALONG THE ASSUMED CONSTRUCTION ACCESS ROUTE AS SHOWN ON THE PLANS.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE CONSTRUCTION SEASON.

1.2A SITE INVENTORY (BR 59-2)

1.2A.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA IS GRASSY INTERSTATE BACKSLOPES, BOTH THE INLET AND OUTLET ARE SURROUNDED BY SMALL WETLANDS. INTERSTATE 89 AND A FARM ROAD ARE WITHIN THE PROJECT SITE. THERE ARE NO BUILDINGS OR UTILITIES NEAR THE PROJECT SITE.

1.2A.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

AN UNNAMED BROOK IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE BROOK PASSES THROUGH THE EXISTING CULVERT. DUE TO THE NATURE OF THE SURROUNDING TERRAIN, THE PROJECT SITE WILL RECEIVE WATER FROM A FEW NEARBY SLOPES.

1.2A.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD AND SOFTWOOD TREES AND UNDERGROWTH. VEGETATION IMPACTS RESULTING FROM THIS PROJECT INCLUDE CLEARING OF VEGETATION ON EMBANKMENT SIDE SLOPES BETWEEN THE EXISTING EDGES OF PAVEMENT AND TOES OF SLOPE WITHIN THE CONSTRUCTION LIMITS SHOWN ON THE PLANS. THERE ARE NO PROPOSED TREE REPLACEMENTS AS PART OF THIS PROJECT. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED AS PART OF THIS PROJECT. UPON PROJECT COMPLETION, THE CHANNEL WILL BE ARMORED WITH STONE FILL TYPE IV AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2A.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF CHITTENDEN, VERMONT. SOILS ON THE PROJECT SITE ARE LIMERICK SILT LOAM, "K FACTOR" = 0.49. THE SOIL IS CONSIDERED HIGHLY ERODIBLE DUE TO THE HIGH K VALUE.

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:

0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2A.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: NO
PRIME AGRICULTURAL LAND: YES
THREATENED AND ENDANGERED SPECIES: NO
WATER RESOURCE: UNNAMED BROOK
WETLANDS: CLASS 2 WETLANDS ARE PRESENT AT BOTH THE INLET AND OUTLET OF THE CULVERT.

1.2B SITE INVENTORY (BR 59-4S)

1.2A.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA IS GRASSY INTERSTATE BACKSLOPES. THE INLET IS SURROUNDED BY A SMALL WETLAND. INTERSTATE 89 AND SOUTH ROAD ARE WITHIN THE PROJECT SITE. THERE ARE A FEW HOUSES NEAR THE PROJECT SITE. THERE ARE NO UTILITIES IN THE PROJECT SITE.

1.2B.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

ALLEN BROOK IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE BROOK PASSES THROUGH THE EXISTING CULVERT. DUE TO THE NATURE OF THE SURROUNDING TERRAIN, THE PROJECT SITE WILL RECEIVE WATER FROM A FEW NEARBY SLOPES.

1.2B.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD AND SOFTWOOD TREES AND UNDERGROWTH. VEGETATION IMPACTS RESULTING FROM THIS PROJECT INCLUDE CLEARING OF VEGETATION ON EMBANKMENT SIDE SLOPES BETWEEN THE EXISTING EDGES OF PAVEMENT AND TOES OF SLOPE WITHIN THE CONSTRUCTION LIMITS SHOWN ON THE PLANS. THERE ARE NO PROPOSED TREE REPLACEMENTS AS PART OF THIS PROJECT. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED AS PART OF THIS PROJECT. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2B.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF CHITTENDEN, VERMONT. SOILS ON THE PROJECT SITE ARE WINOOSKI VERY FINE SANDY LOAM, "K FACTOR" = 0.49. THE SOIL IS CONSIDERED HIGHLY ERODIBLE DUE TO THE HIGH K VALUE.

1.2B.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: NO
PRIME AGRICULTURAL LAND: YES
THREATENED AND ENDANGERED SPECIES: NO
WATER RESOURCE: ALLEN BROOK
WETLANDS: CLASS 3 WETLANDS ARE PRESENT AT THE INLET OF THE CULVERT.

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ONE OR MORE ACRES OF EARTH DISTURBANCE OR SHOULD THE PROJECT BECOME PART OF A LARGER PLAN OF DEVELOPMENT, THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

DUE TO THE PRESENCE OF WETLANDS AT THE SITES, AN ASSUMED AREA OF THE WETLANDS HAS BEEN IDENTIFIED IN THE SITE PLANS AS BEING DISTURBED AND THE PROJECT HAS BEEN PERMITTED FOR THAT DISTURBANCE. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ADDITIONAL DISTURBANCE TO THE WETLANDS THEN THE SELECTED CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL PERMITTING WITH THE APPROPRIATE REGULATORY AGENCIES. PREPERATION AND COSTS ASSOCIATED WITH ADDITIONAL PERMITTING SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND MAY NEED TO BE MODIFIED BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

1.4.1 MARK SITE BOUNDARIES

BARRIER FENCING SHALL BE USED TO DELINEATE THE LIMITS THE CONTRACTOR CAN ACCESS WITH CONSTRUCTION EQUIPMENT. THIS MEASURE LIMITS THE AREA THAT CAN BE DISTURBED AND EXPOSED TO EROSION.

1.4.2 LIMIT DISTURBANCE AREA

PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE. FOR PROJECTS WHICH FALL UNDER THE CONSTRUCTION GENERAL PERMIT, ONLY THE ACREAGE LISTED ON THE PERMIT AUTHORIZATION MAY BE EXPOSED AT ANY GIVEN TIME.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTOR'S PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN AND ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK.

WOVEN WIRE REINFORCED SILT FENCE SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

1.4.5 DIVERT UPLAND RUNOFF

DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

TEMPORARY SWALES SHALL BE UTILIZED AS NECESSARY AND AS DIRECTED BY THE ENGINEER. SEE SHEET 13 FOR DETAIL.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSION POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

STONE CHECK DAMS WILL BE INSTALLED AS NECESSARY AND AS DIRECTED BY THE ENGINEER. SEE SHEET 11 FOR DETAIL.

1.4.7 CONSTRUCT PERMANENT CONTROLS

TYPE II & IV STONE FOR SLOPE LINING AND CHANNEL PROTECTION, SEED AND MULCH.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF REACHING INTERMITTENT PHASES OF CONSTRUCTION.

SURFACE ROUGHENING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

1.4.10 STABILIZE SOIL AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

1.4.11 DE-WATERING ACTIVITIES

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

SEDIMENT CONTAINMENT BAGS (FILTER BAGS) FOR HEADWALL WORK SHALL BE USED AS NECESSARY AND AS DIRECTED BY THE ENGINEER. SEE SHEET 12 FOR DETAIL.

1.4.12 INSPECT YOUR SITE

INSPECT SITE BASED ON PERMIT AUTHORIZATION OR SPECIAL PROVISION REQUIREMENTS.

1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFF-SITE ACTIVITIES

IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTIONS 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

1.5.3 UPDATES

EPSC NARRATIVE

PROJECT NAME: RICHMOND - WILLISTON

PROJECT NUMBER: IM CULV(16)

FILE NAME: ...\\08-epsc narrative.dgn

PROJECT LEADER: G. BOGUE

DESIGNED BY: M. CHENETTE

EPSC NARRATIVE SHEET

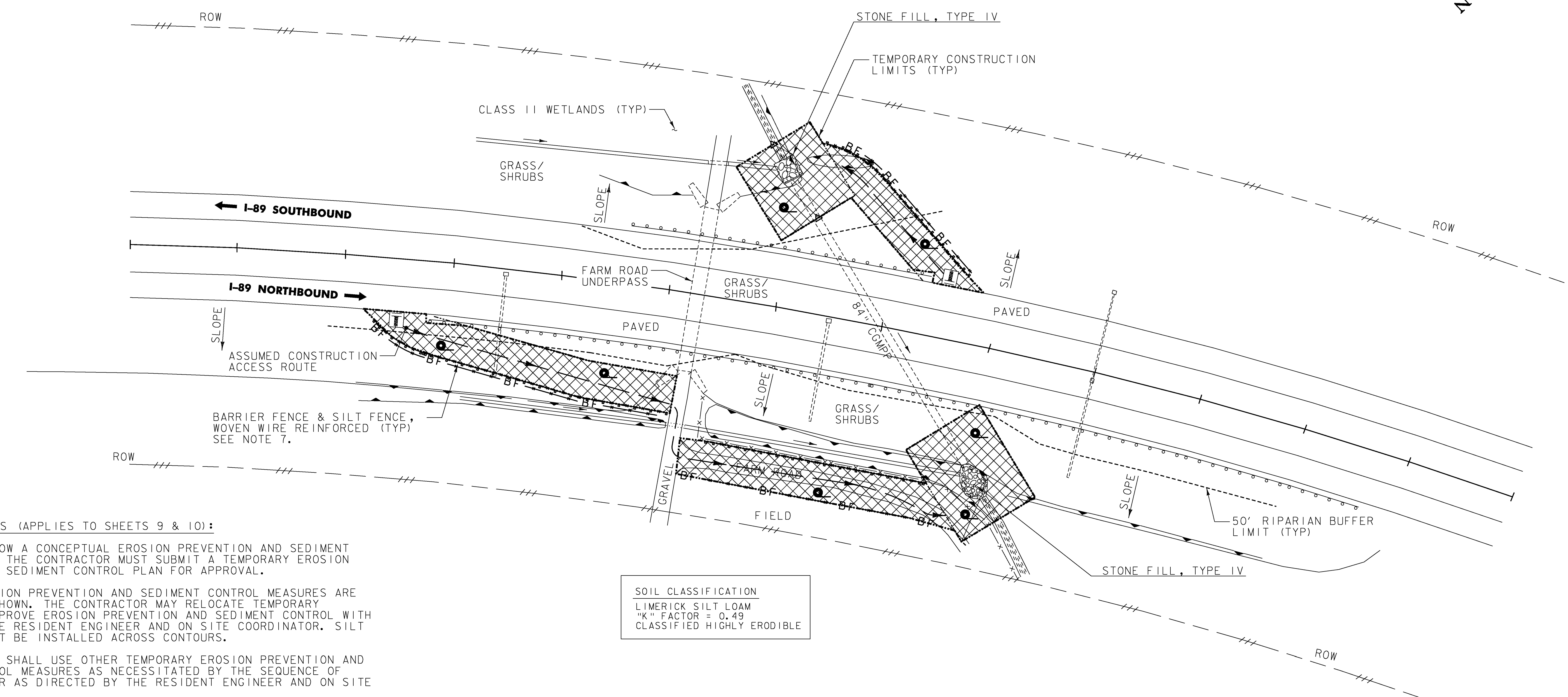
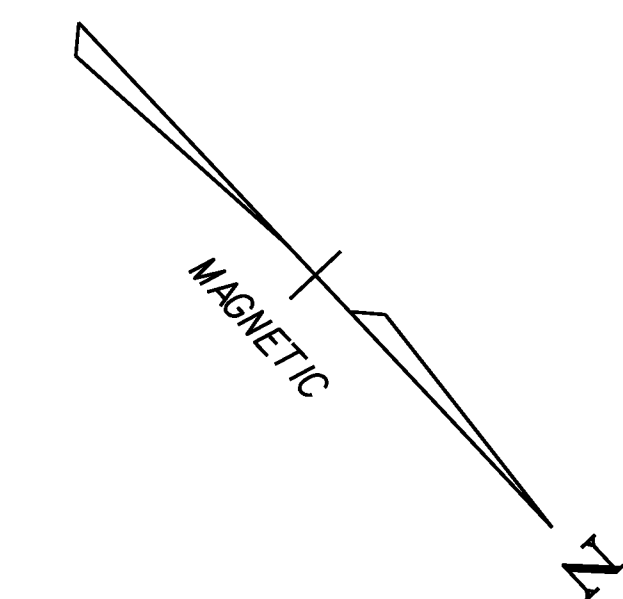
PLOT DATE: 2/25/2010

DRAWN BY: E. ALLING

CHECKED BY: G. BOGUE

SHEET 8 OF 18





SOIL CLASSIFICATION
 LIMERICK SILT LOAM
 "K" FACTOR = 0.49
 CLASSIFIED HIGHLY ERODIBLE

EPSC GENERAL NOTES (APPLIES TO SHEETS 9 & 10):

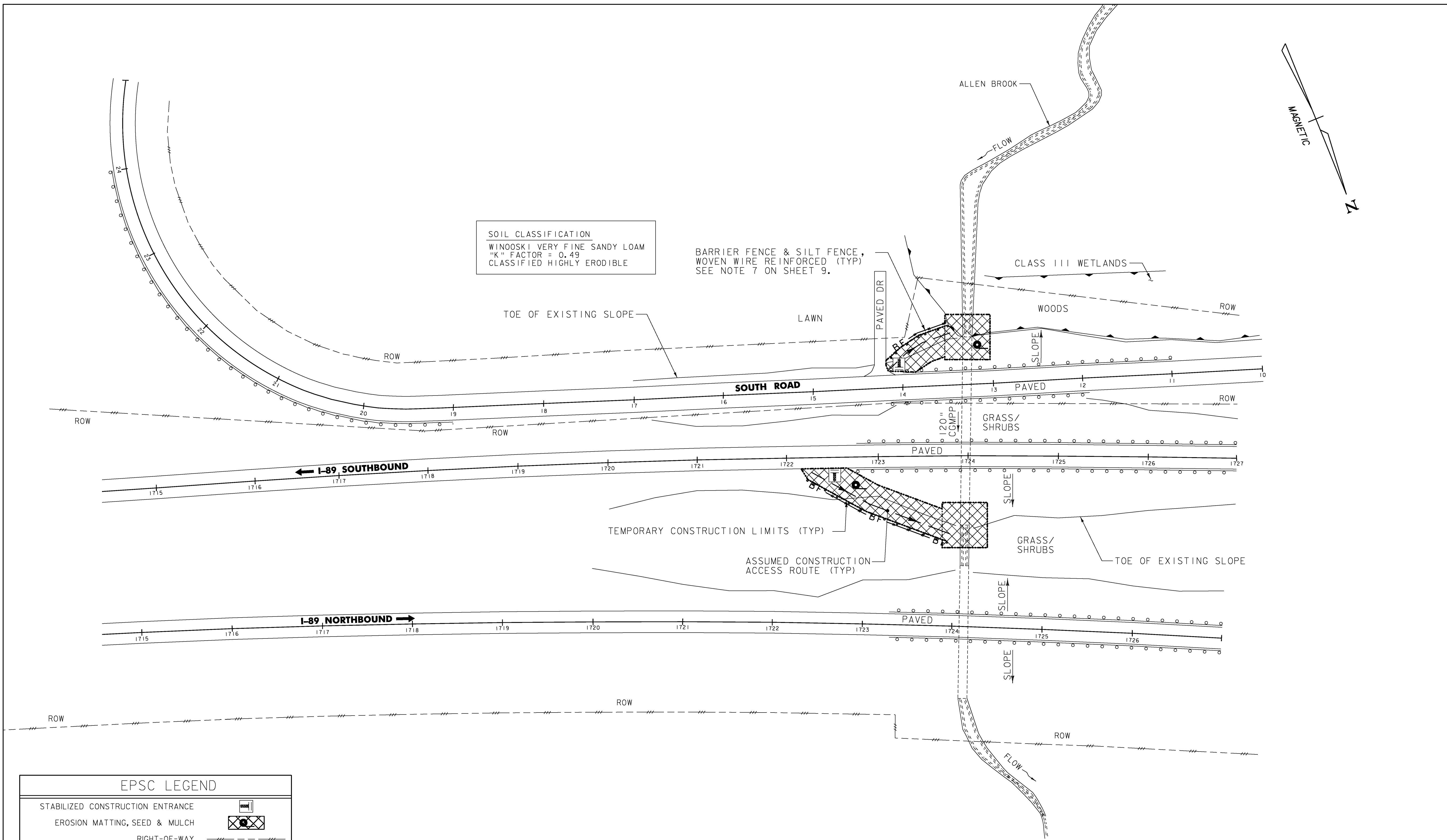
1. THESE PLANS SHOW A CONCEPTUAL EROSION PREVENTION AND SEDIMENT CONTROL PLAN. THE CONTRACTOR MUST SUBMIT A TEMPORARY EROSION PREVENTION AND SEDIMENT CONTROL PLAN FOR APPROVAL.
2. TEMPORARY EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE CONCEPTUALLY SHOWN. THE CONTRACTOR MAY RELOCATE TEMPORARY MEASURES TO IMPROVE EROSION PREVENTION AND SEDIMENT CONTROL WITH APPROVAL OF THE RESIDENT ENGINEER AND ON SITE COORDINATOR. SILT FENCE SHALL NOT BE INSTALLED ACROSS CONTOURS.
3. THE CONTRACTOR SHALL USE OTHER TEMPORARY EROSION PREVENTION AND SEDIMENT CONTROL MEASURES AS NECESSITATED BY THE SEQUENCE OF CONSTRUCTION OR AS DIRECTED BY THE RESIDENT ENGINEER AND ON SITE COORDINATOR.
4. REFER TO TEMPORARY EROSION PREVENTION AND SEDIMENT CONTROL DETAIL SHEETS FOR ADDITIONAL DETAILS.
5. GIVEN THE MINOR EARTH DISTURBANCE ACTIVITIES ASSOCIATED WITH THIS PROJECT, EPSC PLANS FOR EXISTING CONDITION, CONSTRUCTION, AND FINAL CONDITIONS HAVE BEEN COMBINED INTO A SINGLE PLAN FOR EACH CULVERT.
6. SLOPE INDICATORS ARE SHOWN IN LIEU OF CONTOURS.
7. SILT FENCE SHALL BE INSTALLED IMMEDIATELY ADJACENT TO AND ON THE UPSLOPE SIDE OF THE BARRIER FENCE.
8. TEMPORARY STONE CHECK DAMS SHALL BE INSTALLED TO SLOW DOWN CHANNELIZED RUNOFF AS DIRECTED BY THE ENGINEER.
9. FILTER BAGS SHALL BE USED FOR DEWATERING AS DIRECTED BY THE ENGINEER.

EPSC LEGEND	
STABILIZED CONSTRUCTION ENTRANCE	
RIPARIAN BUFFER LIMIT	
EROSION MATTING, SEED & MULCH	
RIGHT-OF-WAY	
CLASS 2 WETLAND LIMIT	
TEMPORARY CONSTRUCTION LIMITS	
BARRIER FENCE	
SILT FENCE, WOVEN WIRE REINFORCED	
ASSUMED CONSTRUCTION ACCESS ROUTE	

RICHMOND BR 59-2 CULVERT
 SCALE: 1"=50'

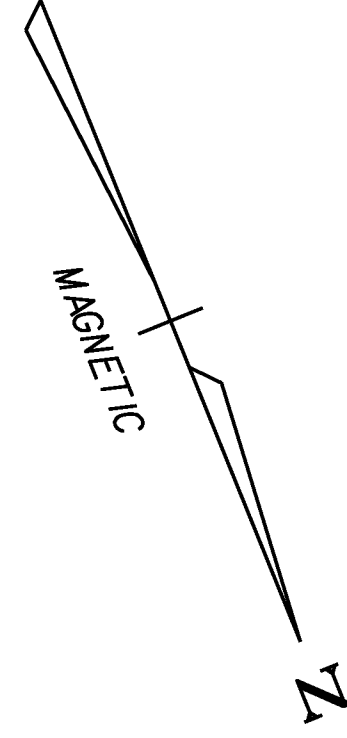
PROJECT NAME: RICHMOND-WILLISTON
 PROJECT NUMBER: IM CULV(16)
 FILE NAME: ...\\plot files\09-epsc 59.2.dgn PLOT DATE: 2/25/2010
 PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING
 DESIGNED BY: M. CHENETTE CHECKED BY: G. BOGUE
EPSC BR 59-2 SITE PLAN SHEET 9 OF 18





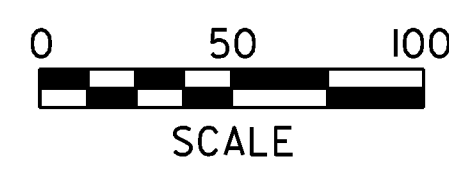
SOIL CLASSIFICATION
 WINOOSKI VERY FINE SANDY LOAM
 "K" FACTOR = 0.49
 CLASSIFIED HIGHLY ERODIBLE

BARRIER FENCE & SILT FENCE,
 WOVEN WIRE REINFORCED (TYP)
 SEE NOTE 7 ON SHEET 9.



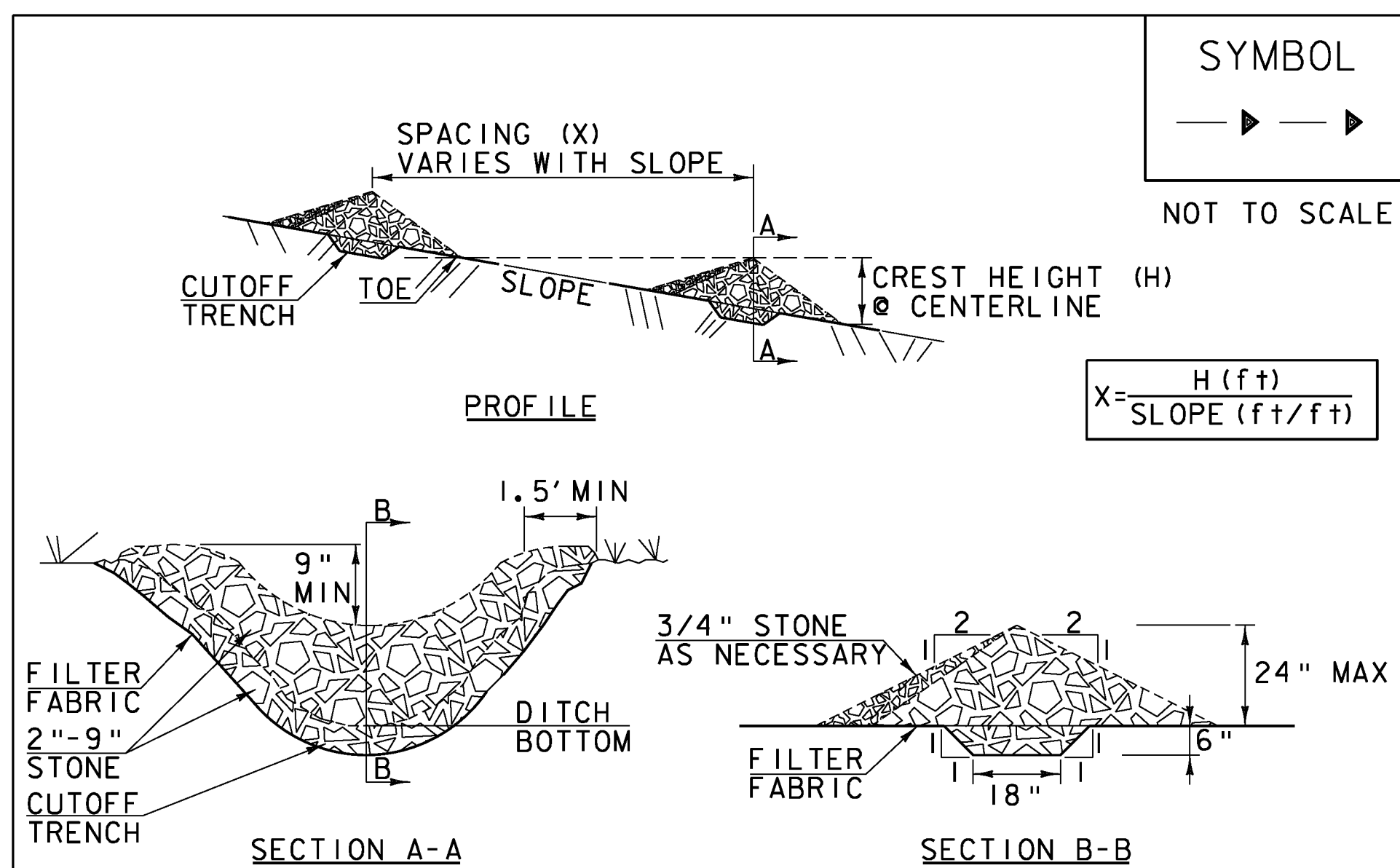
EPSC LEGEND	
STABILIZED CONSTRUCTION ENTRANCE	
EROSION MATTING, SEED & MULCH	
RIGHT-OF-WAY	
CLASS 3 WETLAND LIMIT	
TEMPORARY CONSTRUCTION LIMITS	
BARRIER FENCE	
SILT FENCE, WOVEN WIRE REINFORCED	
ASSUMED CONSTRUCTION ACCESS ROUTE	

WILLISTON BR 59-4S CULVERT
 SCALE: 1"=50'



PROJECT NAME: RICHMOND-WILLISTON
 PROJECT NUMBER: IM CULV(16)
 FILE NAME: ...plot files\10-epsc 59_4S.dgn PLOT DATE: 2/25/2010
 PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING
 DESIGNED BY: M. CHENETTE CHECKED BY: G. BOGUE
EPSC BR 59-4S SITE PLAN SHEET 10 OF 18





CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
3. 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
4. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
7. MAXIMUM DRAINAGE AREA 2 ACRES.

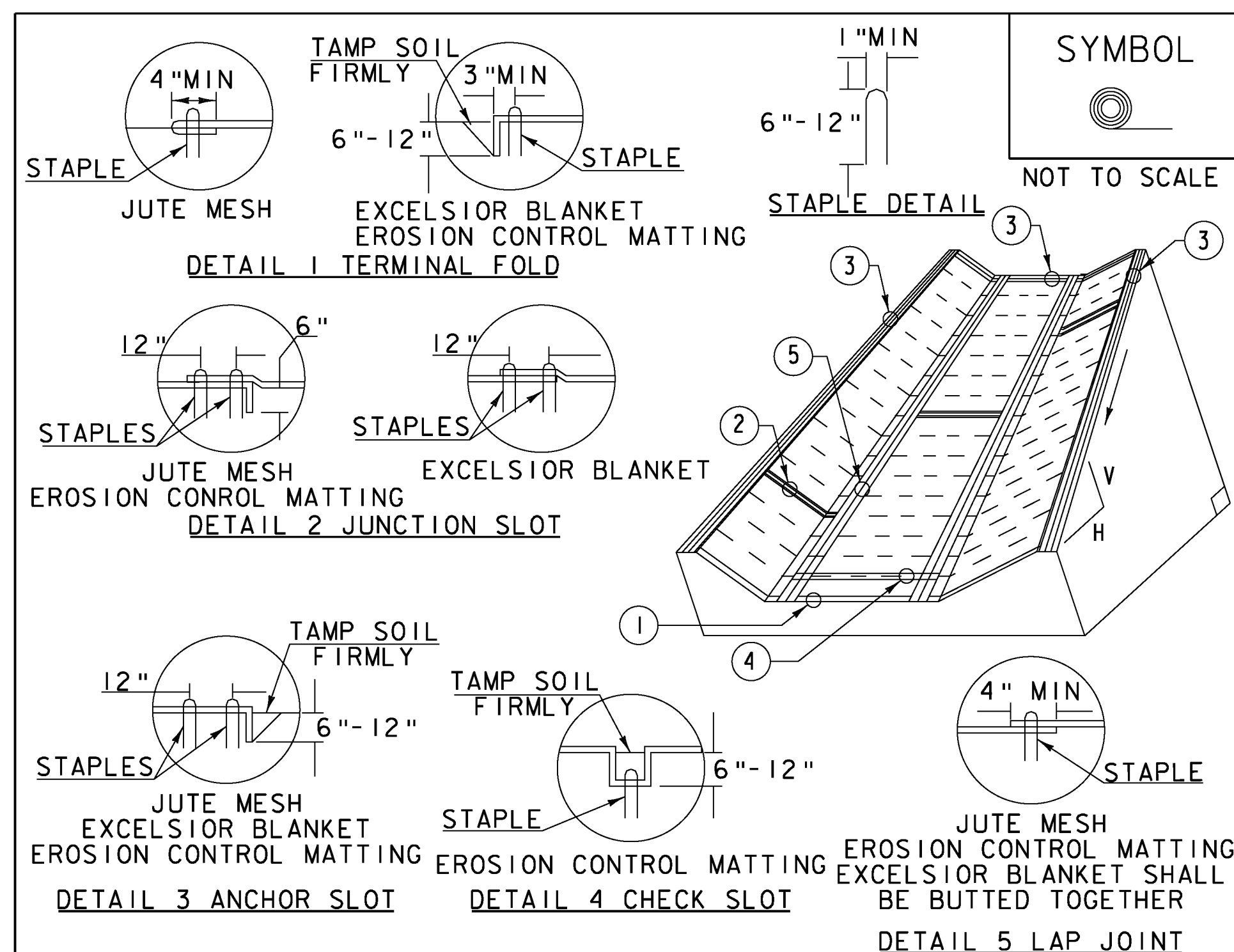
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CHECK DAM

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR TEMPORARY STONE CHECK DAM, TYPE I (PAY ITEM 653.25)

REVISIONS	
MARCH 21, 2008	WHF
JANUARY 8, 2009	WHF



CONSTRUCTION SPECIFICATIONS

1. EROSION MATTING, CHECK SLOTS, SHALL BE SPACED IN DITCH CHANNEL SO THAT ONE OCCURS WITHIN EACH 50' ON SLOPES OF MORE THAN 4% AND LESS THAN 6%. ON SLOPES OF 6% OR MORE, THEY SHALL BE SPACED SO THAT ONE OCCURS WITHIN EACH 25'.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) DITCH

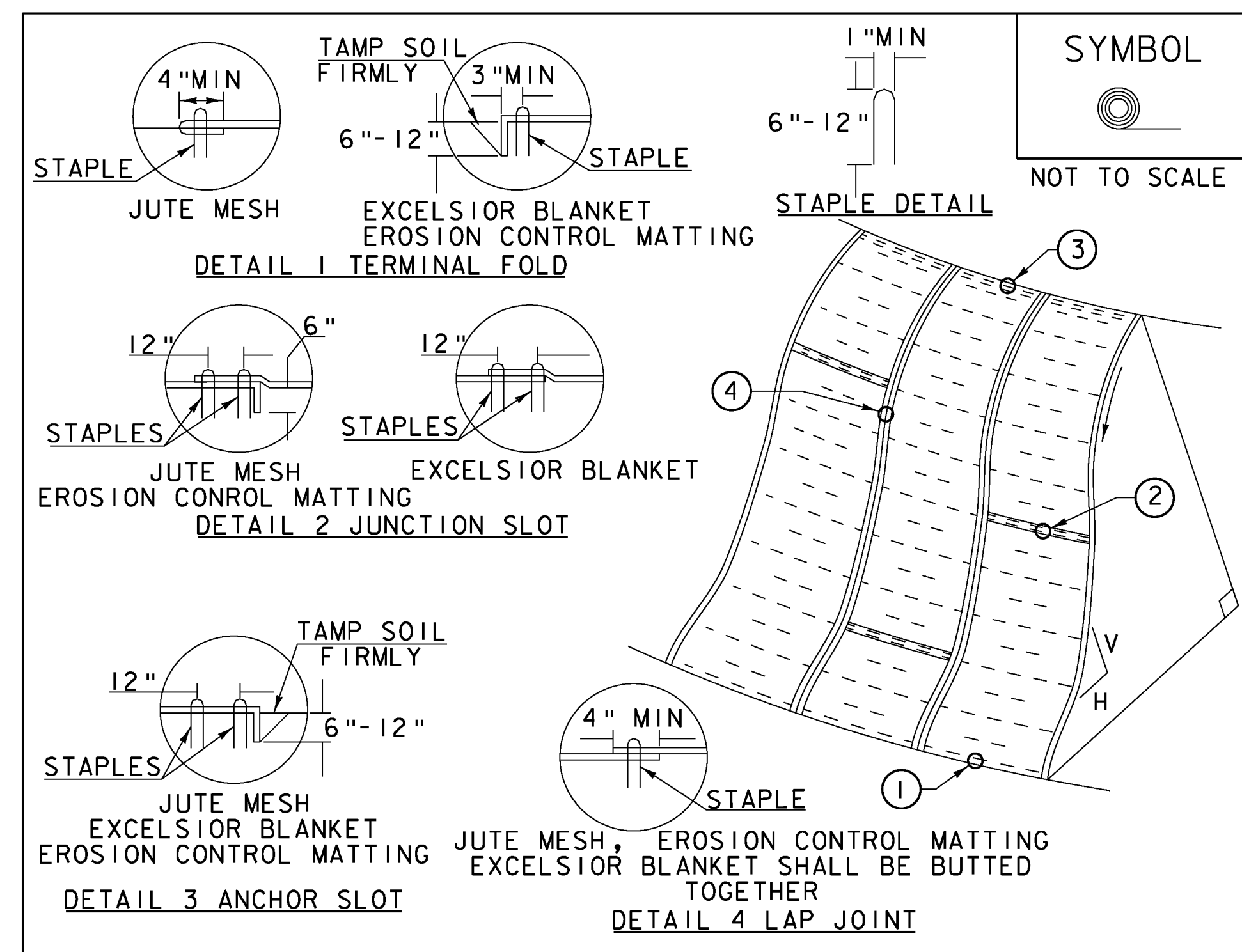
NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

REVISIONS	
MARCH 8, 2007	JMF
APRIL 16, 2007	WHF
JANUARY 13, 2009	WHF

NOTES:

1. REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
2. ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION.
3. ENGLISH UNITS RETAINED FROM ORIGINAL DETAIL.



CONSTRUCTION SPECIFICATIONS

1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

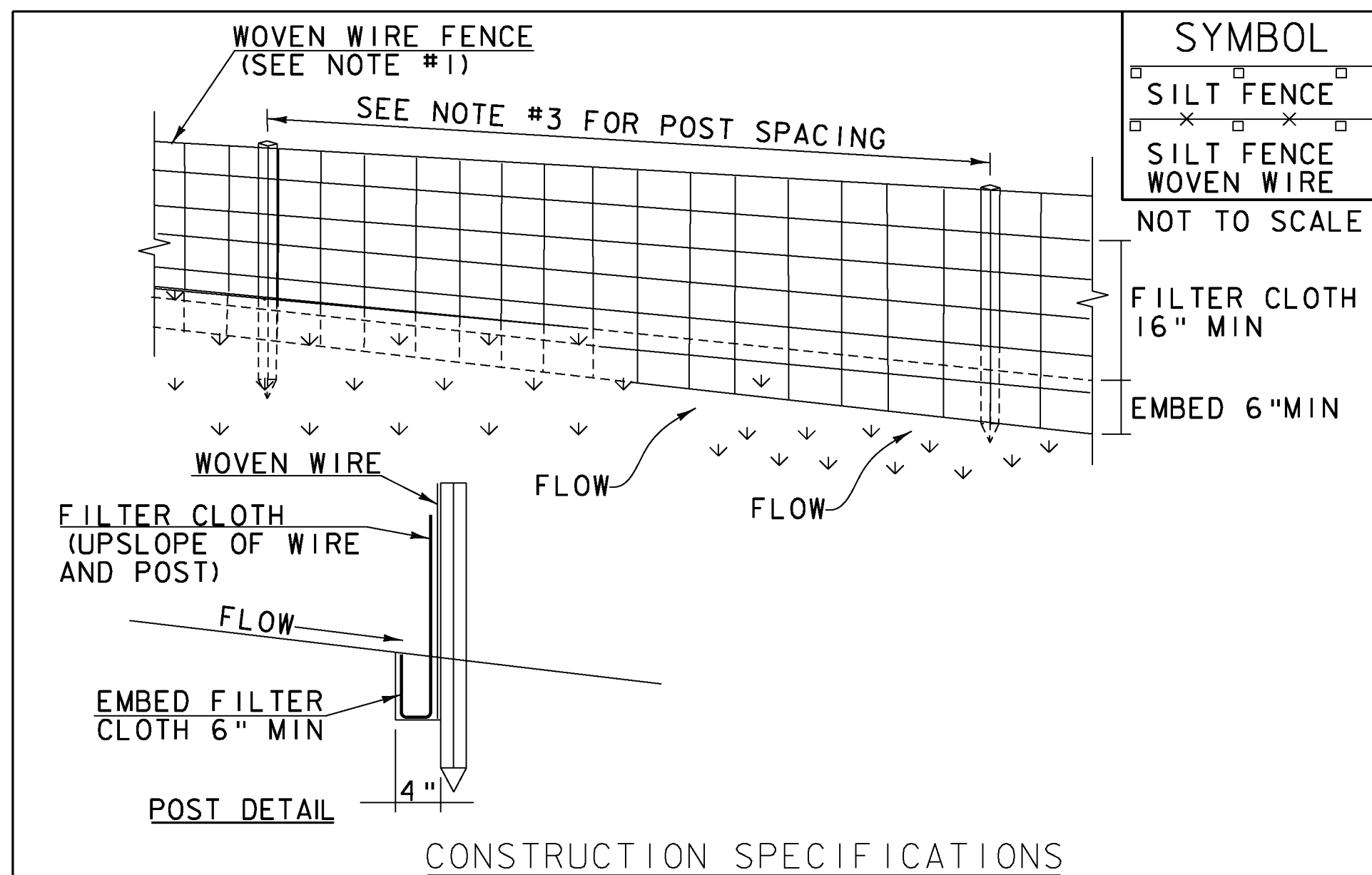
REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF

EPSC DETAILS SHEET 1

PROJECT NAME: RICHMOND - WILLISTON
PROJECT NUMBER: IM CULV(16)

FILE NAME: ...plot files\11-epsc details.dgn PLOT DATE: 2/25/2010
PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING
DESIGNED BY: M. CHENETTE CHECKED BY: M. CHENETTE
EROSION CONTROL DETAILS SHEET 1 SHEET 11 OF 18





- WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
- FILTER CLOTH SHALL BE EITHER FILTER X, MIRAF1100X, STABILINKA T140N OR APPROVED EQUIVALENT.
- POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
- WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
- WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
- MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

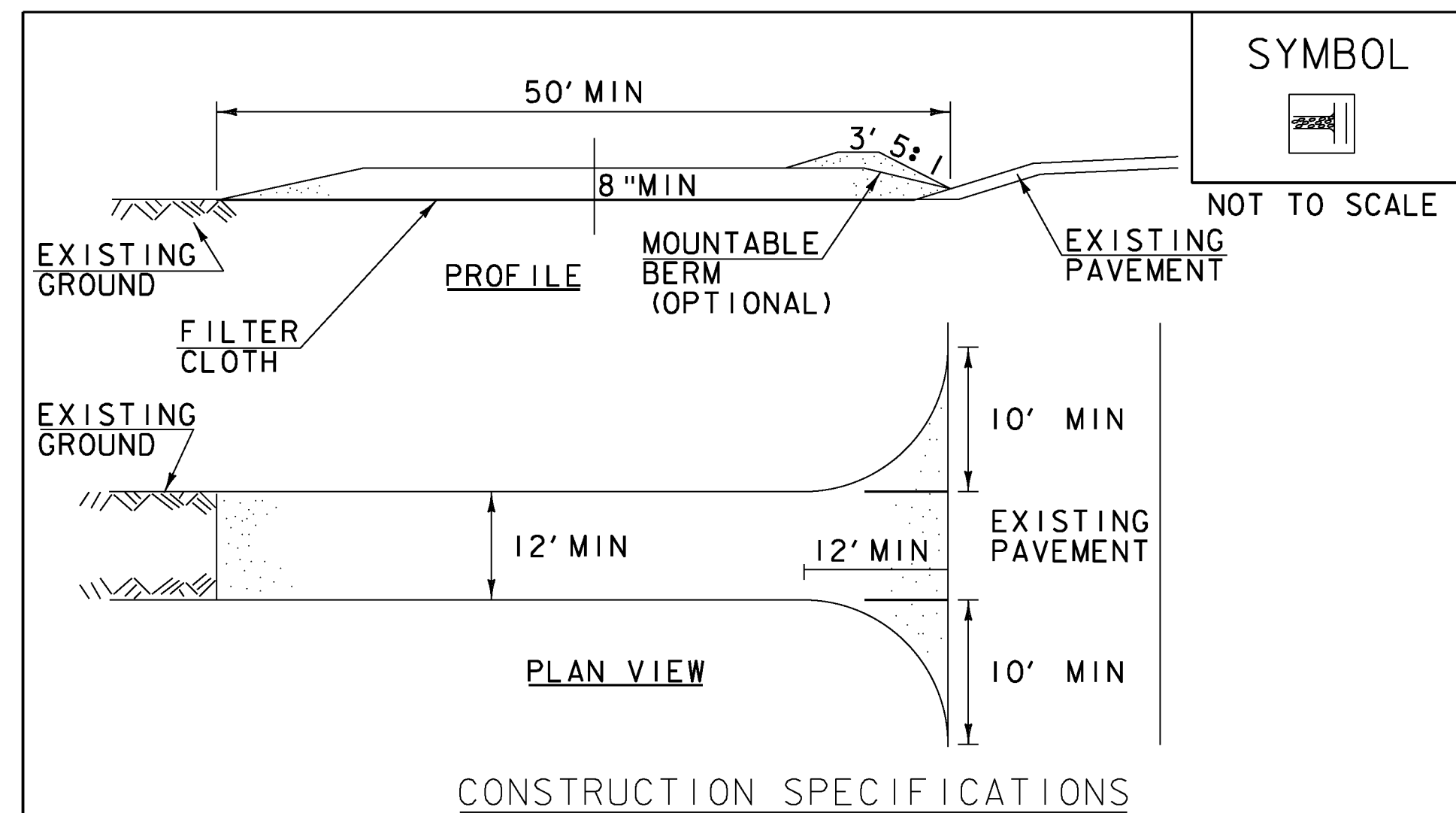
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
 ORIGINALLY DEVELOPED BY USDA-NRCS
 VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
 REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.5) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).

REVISIONS		
MARCH 21, 2008	WHF	
DECEMBER 11, 2008	WHF	
JANUARY 13, 2009	WHF	



- STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
- LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
- THICKNESS- NOT LESS THAN 8".
- WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
- GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
- SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
- MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
- WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
- PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

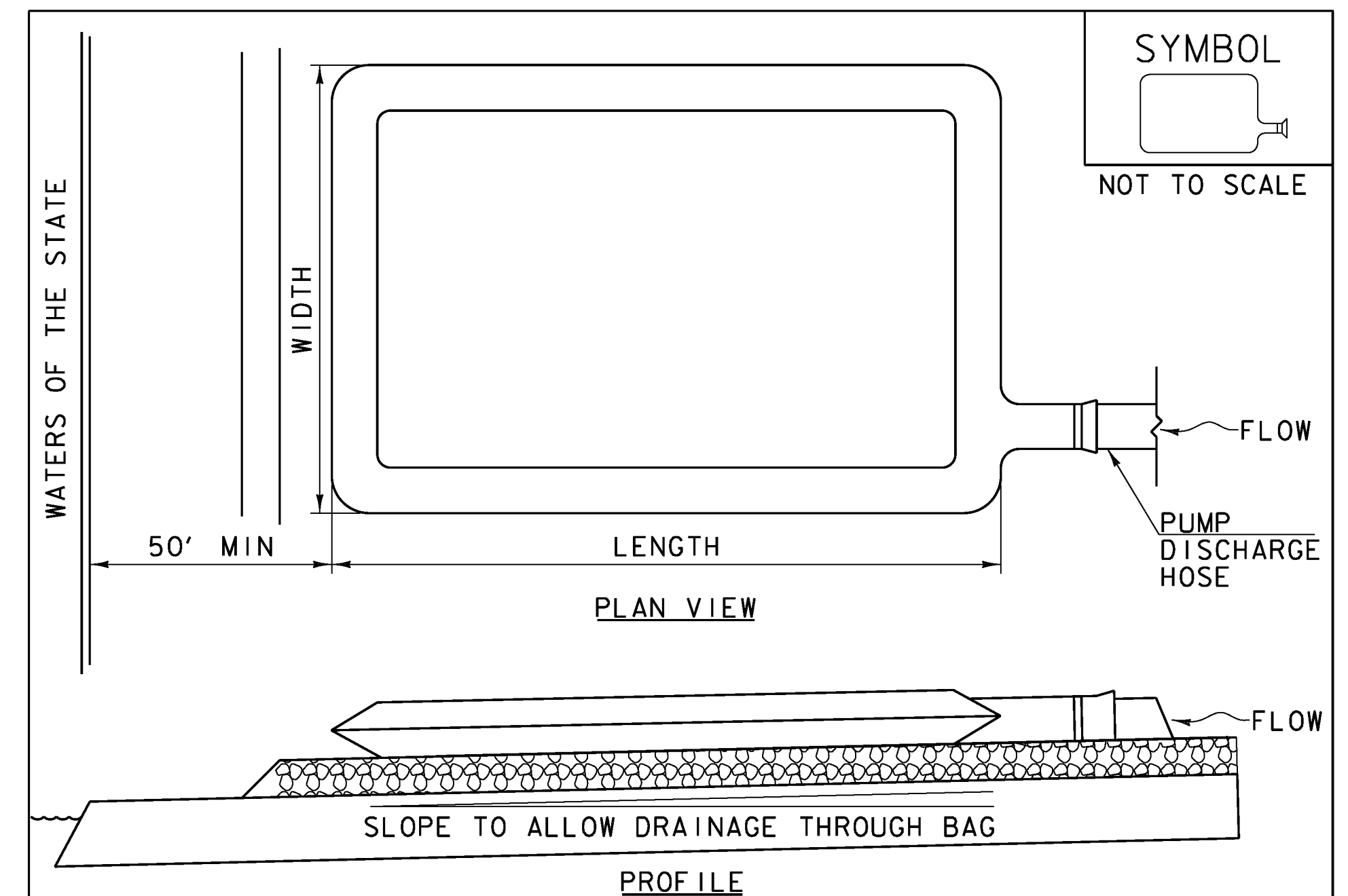
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
 ORIGINALLY DEVELOPED BY USDA-NRCS
 VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STABILIZED CONSTRUCTION ENTRANCE

NOTES:
 REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.

REVISIONS		
MARCH 24, 2008	WHF	
JANUARY 13, 2009	WHF	



- THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
- FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
- FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION EFFICIENCY.
- FILTER BAGS SHALL BE LOCATED A MINIMUM OF 50' FROM WATERS OF THE STATE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- THE NECK OF THE FILTER BAG SHALL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE.
- A FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE.
- FILTER BAG SHALL BE DISPOSED OF AS APPROVED IN THE EPSC PLAN OR AS DIRECTED BY THE ENGINEER.

FILTER BAG

NOTES:
 REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR FILTER BAG (PAY ITEM 653.45) AND AS SPECIFIED IN THE CONTRACT.

REVISIONS		
MARCH 24, 2008	WHF	
JANUARY 13, 2009	WHF	

NOTES:

- REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
- ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- ENGLISH UNITS RETAINED FROM ORIGINAL DETAIL

EPSC DETAILS SHEET 2

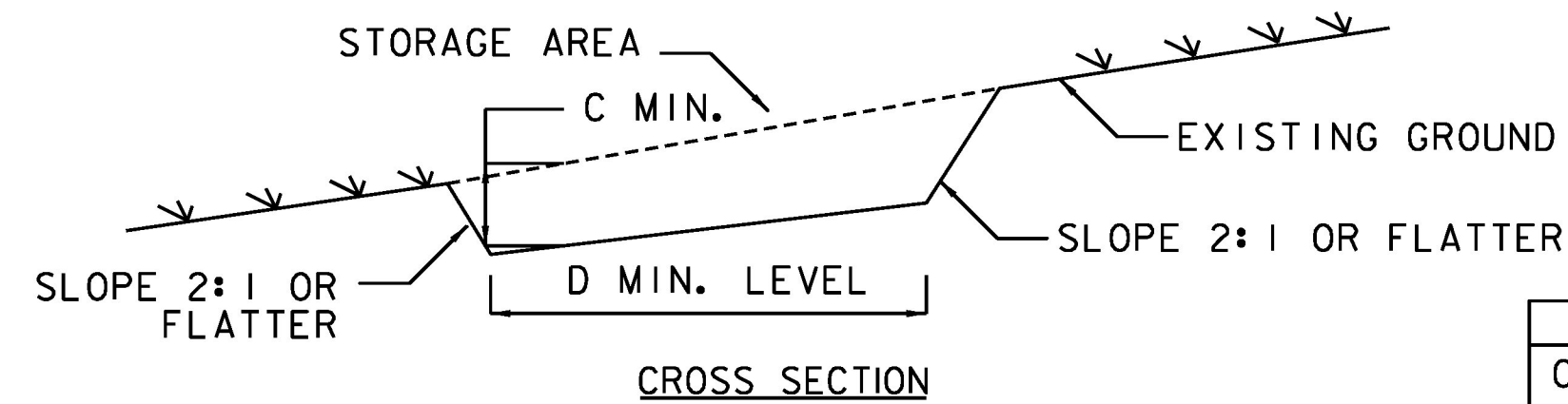
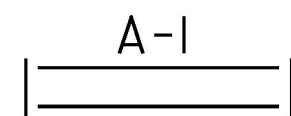
PROJECT NAME: RICHMOND-WILLISTON
 PROJECT NUMBER: IM CULV(16)

FILE NAME: ...plot files\epsc details.dgn PLOT DATE: 2/25/2010
 PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING
 DESIGNED BY: M. CHENETTE CHECKED BY: M. CHENETTE
EROSION CONTROL DETAILS SHEET 2 SHEET 12 OF 18



ENGLISH UNITS RETAINED FROM ORIGINAL DETAIL.

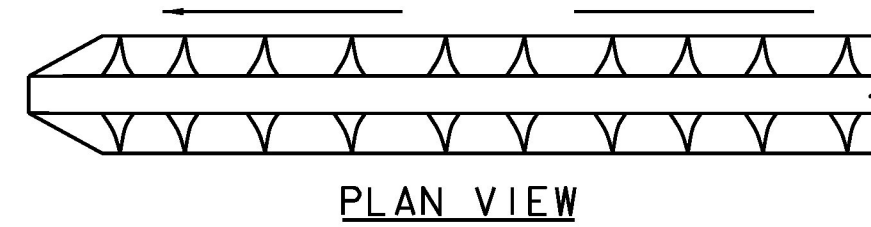
SYMBOL



	SWALE A	SWALE B
C	1'	1'
D	4'	6'

POSITIVE DRAINAGE: 0.5% OR STEEPER DEPENDENT ON TOPOGRAPHY

OUTLET AS REQUIRED SEE ITEM 8 BELOW.



TEMPORARY SWALE

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC.-10 AC.)
1	0.5%-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1%-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1%-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE
4	8.1%-20%	LINED WITH 4-8" RIP-RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

NOTE:

TEMPORARY SWALE PAYMENT WILL BE INCIDENTAL TO ITEM 900.645, SPECIAL PROVISION (TEMPORARY ACCESS ROAD AND STAGING AREAS, CULVERT)

VAOT RURAL AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
37.5%	22.5	45	CREeping RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
42.5%	34	68	CREeping RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

GENERAL GUIDANCE			
FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10/20/2010	19-19-19	PELLETIZED	LIQUID
500 LBS/AC		2 TONS/AC	4.4 GAL/AC

CONSTRUCTION GUIDANCE

1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. EROSION MATTING: TO BE PLACED IN ALL VEGETATED SWALES AND EARTH SLOPES STEEPER THAN 1:3
7. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
8. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
9. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

SEED

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.15)

EPSC DETAILS SHEET 3

PROJECT NAME: RICHMOND-WILLISTON

PROJECT NUMBER: IM CULV(16)

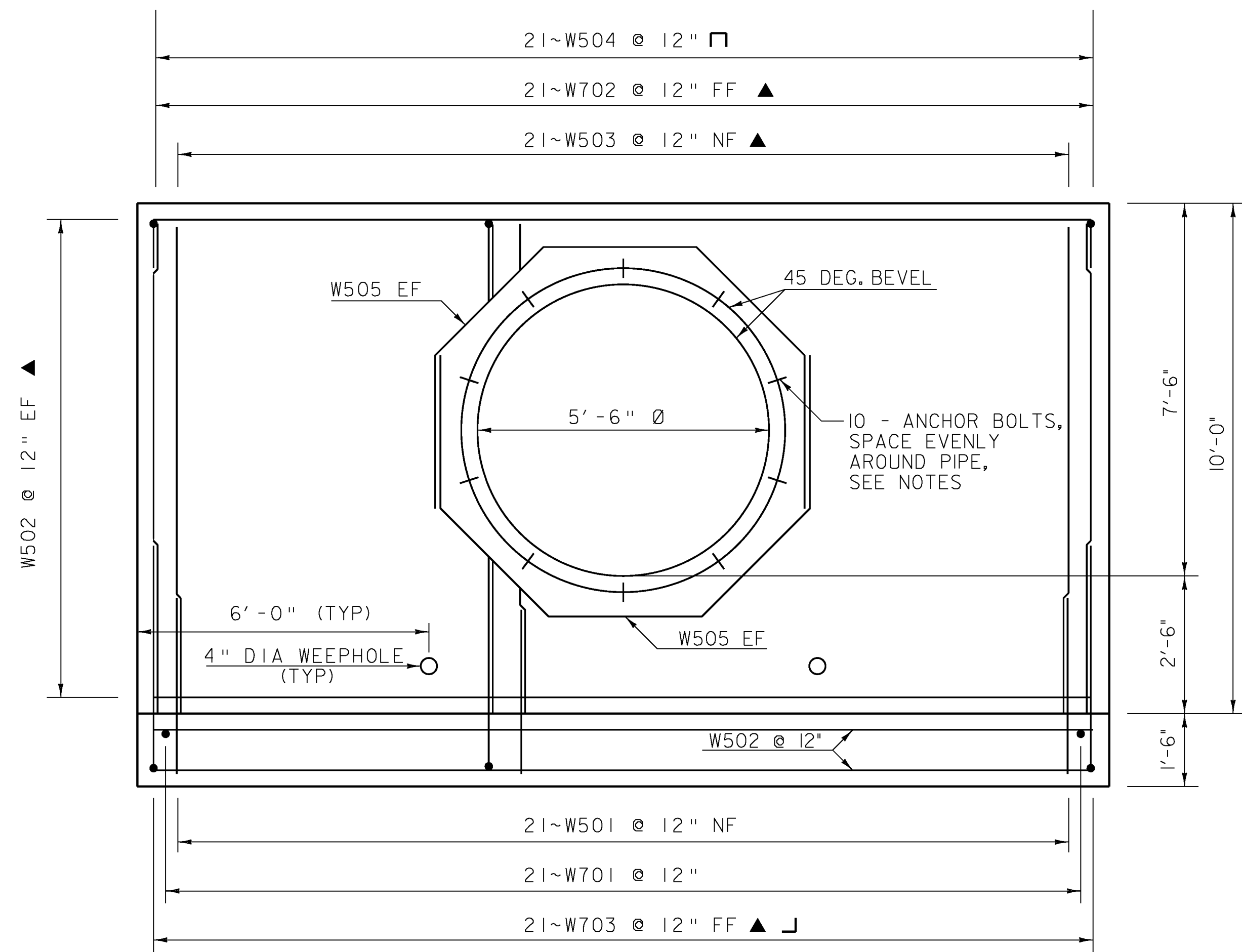
FILE NAME: ...\\plot files\\il-epsc details.dgn PLOT DATE: 2/25/2010

PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING

DESIGNED BY: M. CHENETTE CHECKED BY: M. CHENETTE

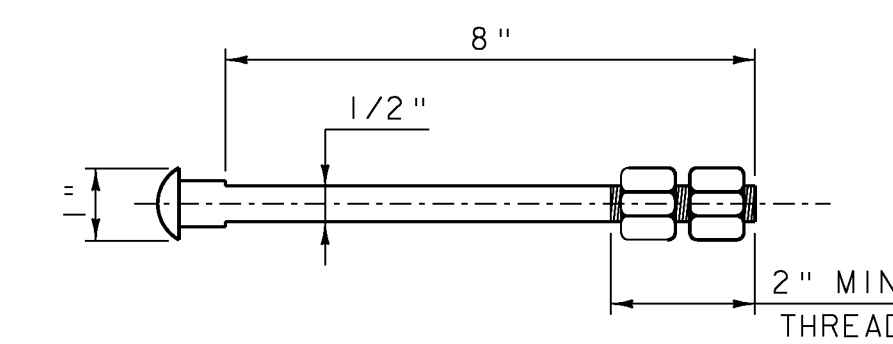
EROSION CONTROL DETAILS SHEET 3 SHEET 13 OF 18





HEADWALL ELEVATION

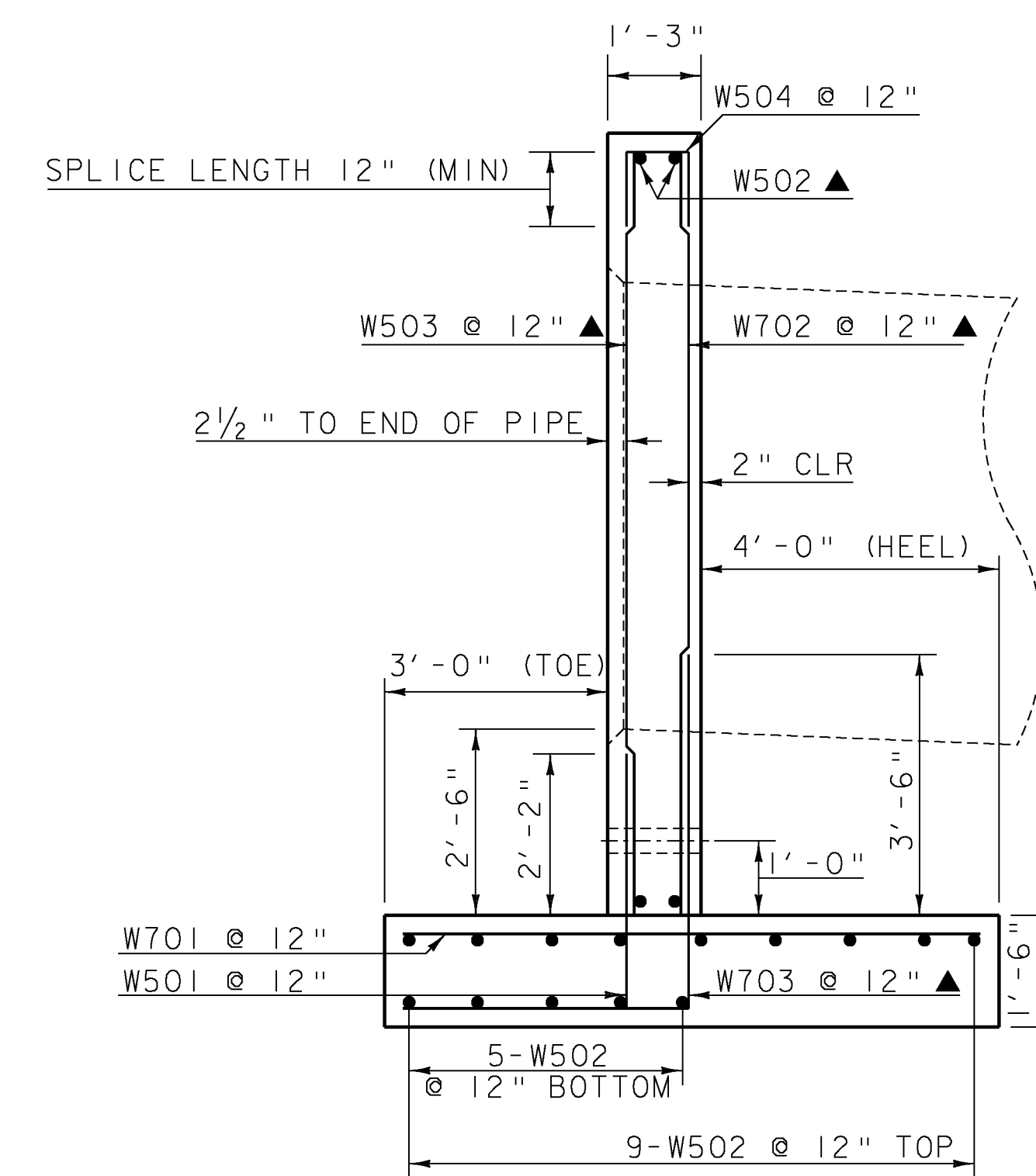
NTS



GALVANIZED ANCHOR BOLT
NTS

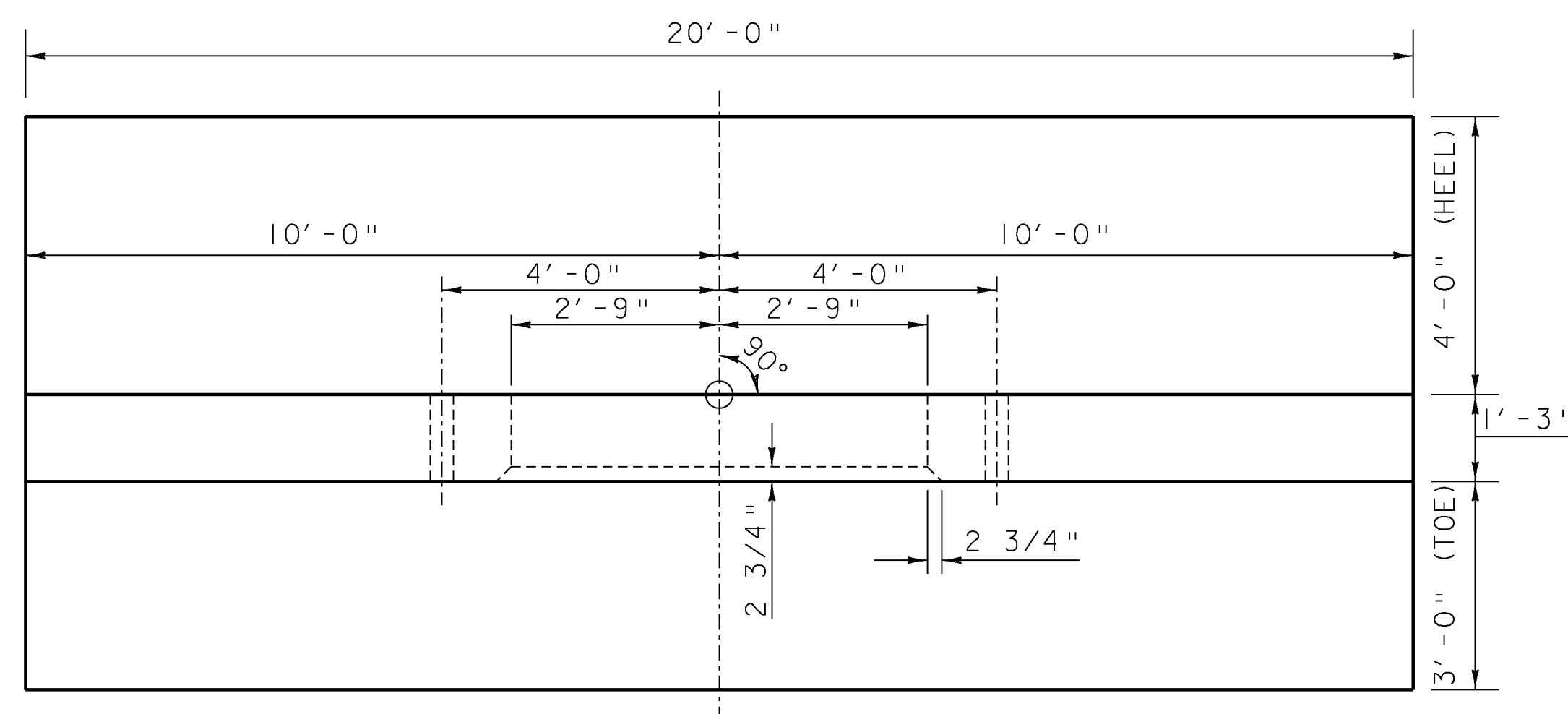
NOTES:

1. ANCHOR BOLTS WILL BE PAID FOR UNDER ITEM 900.640, SPECIAL PROVISION (ALUMINUM PIPE LINER) (66") (EXISTING 84" PIPE).
2. ANCHOR BOLTS SHALL BE 1/2" DIA. x 8" WITH TWO 3/4" HEXAGONAL NUTS, MATERIALS SHALL MEET THE REQUIREMENTS OF SUBSECTION 714.04 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. 9/16" HOLES IN PIPE TO BE DRILLED OR PUNCHED PRIOR TO COATING OF PIPE.



HEADWALL SECTION

NTS



HEADWALL PLAN

NTS

GENERAL NOTES:

1. ASSUMED ALLOWABLE BEARING PRESSURE IS 3 KSF
2. REINFORCING STEEL GRADE: 60 KSI
3. CONCRETE HIGH PERFORMANCE CLASS B: 3500 PSI
4. SOIL UNIT WEIGHT: 140 PSF
5. ASSUMED FOOTING FRICTION COEFFICIENT: 0.45
6. SOIL FRICTION ANGLE: 28°
7. ALL EXPOSED EDGES SHALL BE CHAMFERED ONE INCH.
8. MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
ALONG BACK FACES OF WALLS AGAINST EARTH: 2"
ELSEWHERE UNLESS OTHERWISE INDICATED: 3"
9. CONSTRUCTION JOINT SURFACE SHALL BE ROUGH.

NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD



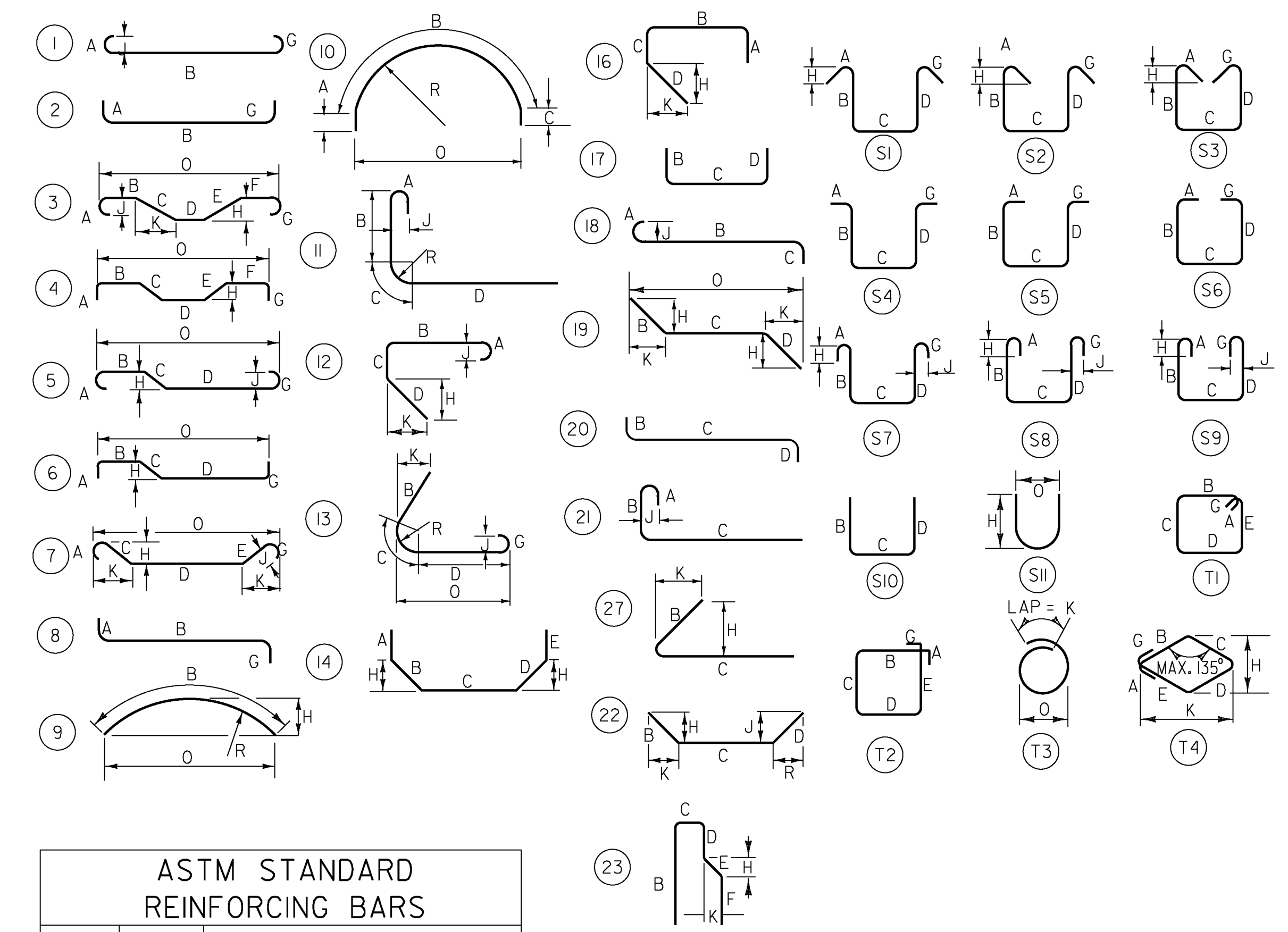
PROJECT NAME:	RICHMOND - WILLISTON
PROJECT NUMBER:	IM CULV(16)
FILE NAME: ...14-headwall detail sheet.dgn	PLOT DATE: 2/25/2010
PROJECT LEADER: G. BOGUE	DRAWN BY: E. ALLING
DESIGNED BY: M. CHENETTE	CHECKED BY: G. BOGUE
HEADWALL DETAIL SHEET	SHEET 14 OF 18

REINFORCING STEEL SCHEDULE

NO.										NO.																									
ITEM	PIECES	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O	ITEM	PIECES	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O
CULVERT 59-2 INLET HEADWALL																																			
1*	22	5	3'-5"	W501	STR.																														
2▲	40	5	19'-6"	W502	STR.																														
3▲	21	5	9'-9"	W503	STR.																														
4	21	5	2'-10"	W504	17					1'-0"	0'-10"	1'-0"																							
5	4	5	15'-0"	W505	14	2'-9"	2'-9"	2'-9"	2'-9"	2'-9"				2'-0"		2'-0"																			
6*	22	7	7'-9"	W701	STR.																														
7▲	21	7	9'-9"	W702	STR.																														
8▲	21	7	8'-7"	W703	17			3'-10"	4'-9"																										
CULVERT 59-2 OUTLET CRADLE HEADWALL																																			
12▲	24	5	10'-6"	W511	STR.																														
13▲	12	5	9'-8"	W512	17		6'-3"	3'-5"	-																										
14▲	12	5	6'-3"	W513	STR.																														
15*	23	5	4'-0"	W514	STR.																														
16	2	5	8'-11"	W515	10	-	8'-11"	-								3'-0"	6'-0"																		
17	12	5	4'-7"	W516	SIO		2'-0"	0'-7"	2'-0"																										

~ NOTES ~

1. UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATION FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", AASHTO M 31 (ASTM A 615-S1). ALL BARS SHALL BE GRADE 60, UNLESS OTHERWISE DESIGNATED.
2. FOR TYPICAL BENDING DETAILS, RECOMMENDED PIN DIAMETER "D" OF BENDS AND HOOKS, AND OTHER STANDARD PRACTICE, SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE."
3. BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
4. ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180 DEGREE AND 135 DEGREE HOOKS.
5. "J" DIMENSION ON 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE, STANDARD HOOKS ARE TO BE USED.
6. "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
7. WHERE SLOPE DIFFERS FROM 45 DEGREES, DIMENSIONS "H" AND "K" MUST BE SHOWN.
8. ▲ DENOTES BARS TO BE CUT IN FIELD
9. * DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.
10. △ DENOTES TWO EXTRA BARS ADDED FOR TESTING PURPOSES.
11. "E" IN PREFIX DENOTES EPOXY COATED REINFORCING STEEL.



ASTM STANDARD REINFORCING BARS				
BAR SIZE DESIGNATION	WEIGHT POUNDS PER FOOT	NOMINAL DIMENSIONS ROUND SECTION		
		DIAMETER INCHES	CROSS SECTIONAL AREA SQ. INCHES	PERIMETER INCHES
#3	.376	.375	.11	1.178
#4	.668	.500	.20	1.571
#5	1.043	.625	.31	1.963
#6	1.502	.750	.44	2.356
#7	2.044	.875	.60	2.749
#8	2.670	1.000	.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.65	1.693	2.25	5.32
#18	13.60	2.257	4.00	7.09



PROJECT NAME: RICHMOND - WILLISTON
 PROJECT NUMBER: IM CULV(16)
 FILE NAME: ...15-reinforcing steel schedule.rvt DATE: 2/25/2010
 PROJECT LEADER: G. BOGUE DRAWN BY: E. ALLING
 DESIGNED BY: M. CHENETTE CHECKED BY:
REINFORCING STEEL SCHEDULE SHEET 15 OF 18

Property Line Fence, Item 533 B, Mod.
 1601+00 - 1615+00 SB Lt.
 1601+00 - 1615+00 NB Rt.
 1615+50 - 1617+00 N.B. Rt.
 1615+50 - 1617+00 S.B. Lt.

SUB-BASE of SAND, ITEM 202
 1601+00 - 1602+50 SB
 1601+00 - 1604+00 NB
 1606+50 - 1607+50 NB

PAVED MEDIAN GUTTER
 1613+25 - 1613+75
 1616+50 - 1616+75

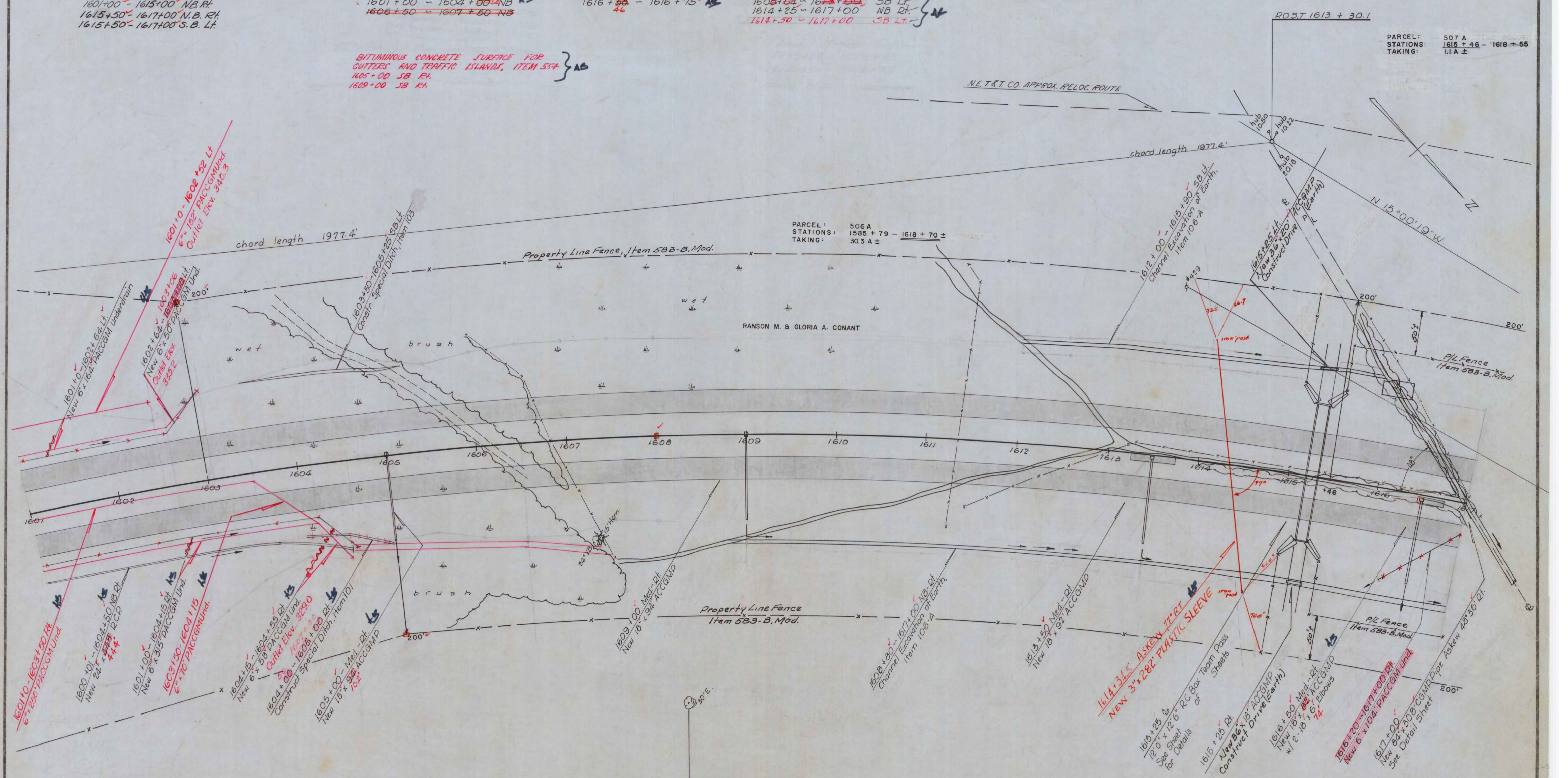
THREE CABLE GUARD RAIL
 with STEEL POSTS, Item 543
 1608+04 - 1617+00 SB Lt.
 1614+25 - 1617+00 NB Rt.
 1614+50 - 1617+00 SB Lt.

STONE FILL FOR SLOPE
 PROTECTION, Item 522.
 1612+00 - 1612+50 S.B. Lt.

BITUMINOUS CONCRETE SURFACE FOR
 GUTTERS AND TRAFFIC ISLANDS, ITEM 534
 1605+00 SB Rt.
 1609+00 SB Rt.

PARCEL: 507 A
 STATIONS: 1615 + 46 - 1618 + 55
 TAKING: 1.1 A ±

PARCEL: 506 A
 STATIONS: 1585 + 79 - 1618 + 70 ±
 TAKING: 30.3 A ±

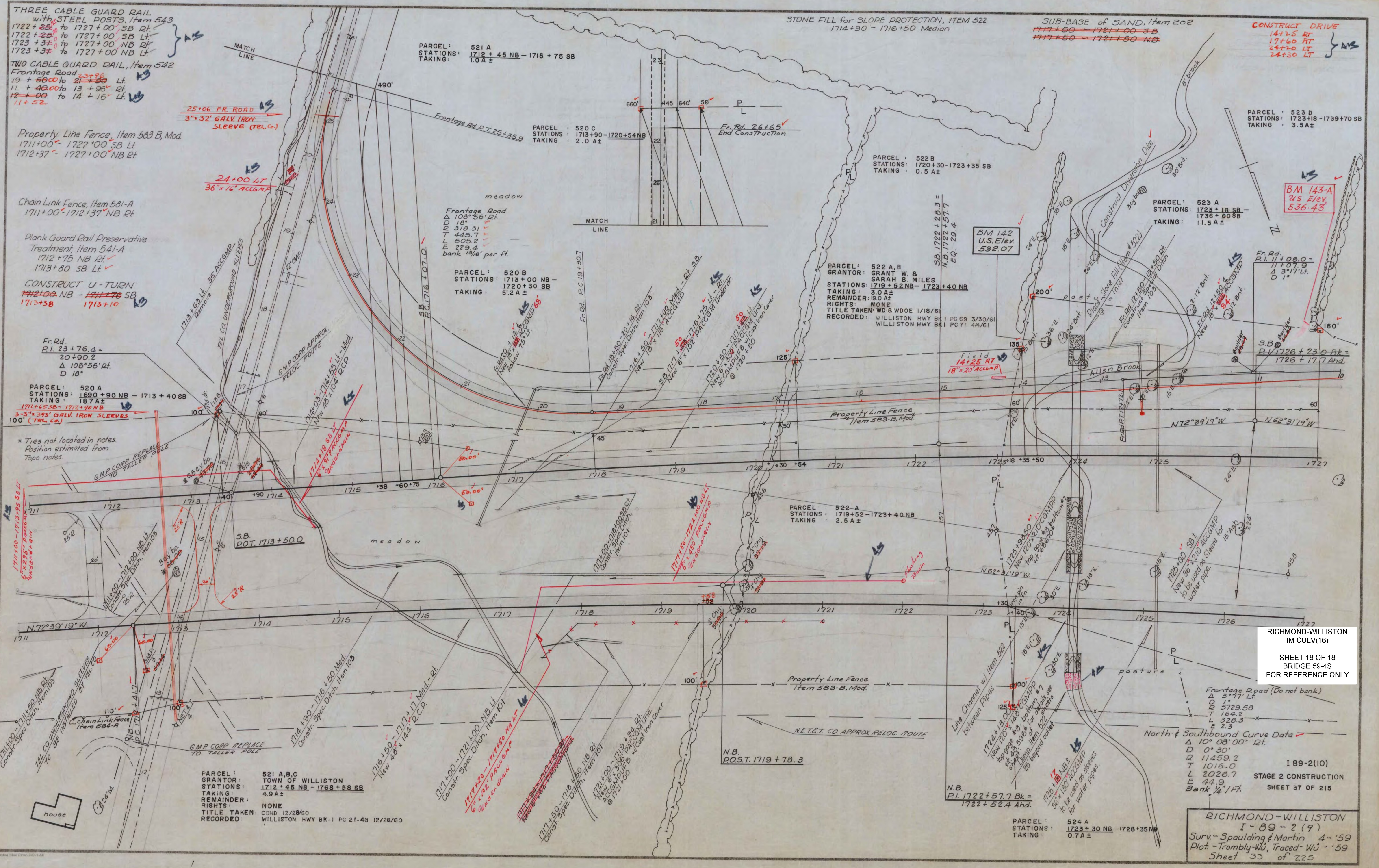


BASE LINE CURVE DATA
 Δ 75° 19' Rt.
 D 1° 30'
 R 3819.72
 T 2947.78
 L 5021.11
 E 1005.2
 Bank 1/2" per ft.

B.M. 125
 U.S.Elev.
 El. 330.24

RICHMOND-WILLISTON
 IM CULV(16)
 SHEET 16 OF 18
 BRIDGE 59-2
 FOR REFERENCE ONLY

I 89-2(10)
 STAGE 2 CONSTRUCTION
 SHEET 23 OF 215
 RICHMOND-WILLISTON
 I-89-2 (9)
 Webster-Martin, Inc. 4-57
 Plotted-Trombly-W.U. Traced - W.U. - 59
 Sheet 19 of 225
 CONTRACT II



THREE CABLE GUARD RAIL with STEEL POSTS, Item 543
 1722+25 to 1727+00 SB Rt.
 1722+25 to 1727+00 SB Lt.
 1723+37 to 1727+00 NB Rt.
 1723+37 to 1727+00 NB Lt.

TWO CABLE GUARD RAIL, Item 542
 Frontage Road
 19+50.00 to 21+50 Lt.
 11+40.00 to 13+96 Lt.
 12+00 to 14+16 Lt.
 11+52

Property Line Fence, Item 583 B, Mod.
 1711+00 - 1727+00 SB Lt.
 1712+37 - 1727+00 NB Rt.

Chain Link Fence, Item 581-A
 1711+00 - 1712+37 NB Rt.

Plank Guard Rail Preservative Treatment, Item 541-A
 1712+75 NB Rt.
 1713+80 SB Lt.

CONSTRUCT U-TURN
 1712+00 NB - 1717+75 SB
 1713+38 1713+10

Fr. Rd. P.L. 23+76.4 - 20+90.2
 Δ 108°56' Rt.
 D 18'

PARCEL: 520 A
 STATIONS: 1690+90 NB - 1713+40 SB
 TAKING: 18.7 A ±
 1711+58 - 1712+40 NB
 3" x 3" GALV. IRON SLEEVES
 100' (TEL. Co.)

* Ties not located in notes.
 Position estimated from Topo notes.

G.M.P. CORP. REPLACE TO TALLER POLE

1711+00 - 1715+50 SB Lt.
 6" x 2 1/2" GALV. IRON SLEEVES
 50' (TEL. Co.)

1711+00 - 1712+00 NB Lt.
 1711+00 - 1712+00 NB Rt.
 1712+00 - 1713+00 NB Lt.
 1712+00 - 1713+00 NB Rt.

1714+90 - 1716+50 Med.
 Constr. Spec. Ditch, Item 103

1716+50 - 1717+17 Med. - Rt.
 New 40' x 144" R.C.P.

1717+00 - 1721+00 NB Lt.
 Constr. Spec. Ditch, Item 101

1717+50 - 1718+50 NB Lt.
 6" x 2 1/2" GALV. IRON SLEEVES
 100' (TEL. Co.)

1721+00 - 1719+94 Rt.
 1721+00 - 1719+94 Lt.
 6" x 2 1/2" GALV. IRON SLEEVES
 100' (TEL. Co.)

PARCEL: 521 A,B,C
 GRANTOR: TOWN OF WILLISTON
 STATIONS: 1712+45 NB - 1768+58 SB
 TAKING: 4.9 A ±
 REMAINDER: NONE
 RIGHTS: NONE
 TITLE TAKEN: COND. 12/28/60
 RECORDED: WILLISTON HWY BK-1 PG 21-48 12/28/60

PARCEL: 521 A
 STATIONS: 1712+45 NB - 1716+75 SB
 TAKING: 1.0 A ±

PARCEL: 520 C
 STATIONS: 1713+90 - 1720+54 NB
 TAKING: 2.0 A ±

PARCEL: 520 B
 STATIONS: 1713+00 NB - 1720+30 SB
 TAKING: 5.2 A ±

STONE FILL for SLOPE PROTECTION, ITEM 522
 1714+90 - 1716+50 Median

SUB-BASE of SAND, Item 202
 1717+50 - 1721+00 SB
 1717+50 - 1721+50 NB

CONSTRUCT DRIVE
 14+25 RT
 17+60 RT
 24+20 LT
 24+30 LT

PARCEL: 523 D
 STATIONS: 1723+18 - 1739+70 SB
 TAKING: 3.5 A ±

PARCEL: 522 B
 STATIONS: 1720+30 - 1723+35 SB
 TAKING: 0.5 A ±

PARCEL: 523 A
 STATIONS: 1723+18 SB - 1736+60 SB
 TAKING: 11.5 A ±

PARCEL: 522 A,B
 GRANTOR: GRANT W. & SARAH B. MILES
 STATIONS: 1719+52 NB - 1723+40 NB
 TAKING: 3.0 A ±
 REMAINDER: 19.0 A ±
 RIGHTS: NONE
 TITLE TAKEN: WILLISTON HWY BK 1 PG 69 3/30/61
 RECORDED: WILLISTON HWY BK 1 PG 71 4/4/61

PARCEL: 522 A
 STATIONS: 1719+52 - 1723+40 NB
 TAKING: 2.5 A ±

RICHMOND-WILLISTON IM CULV(16)
 SHEET 18 OF 18
 BRIDGE 59-4S
 FOR REFERENCE ONLY

189-2(10)
 STAGE 2 CONSTRUCTION
 SHEET 37 OF 215

RICHMOND-WILLISTON I-89-2(9)
 Surv. Spaulding & Martin 4-'59
 Plot - Trombly-Wu, Traced - Wu - '59
 Sheet 33 of 225
 CONTRACT II