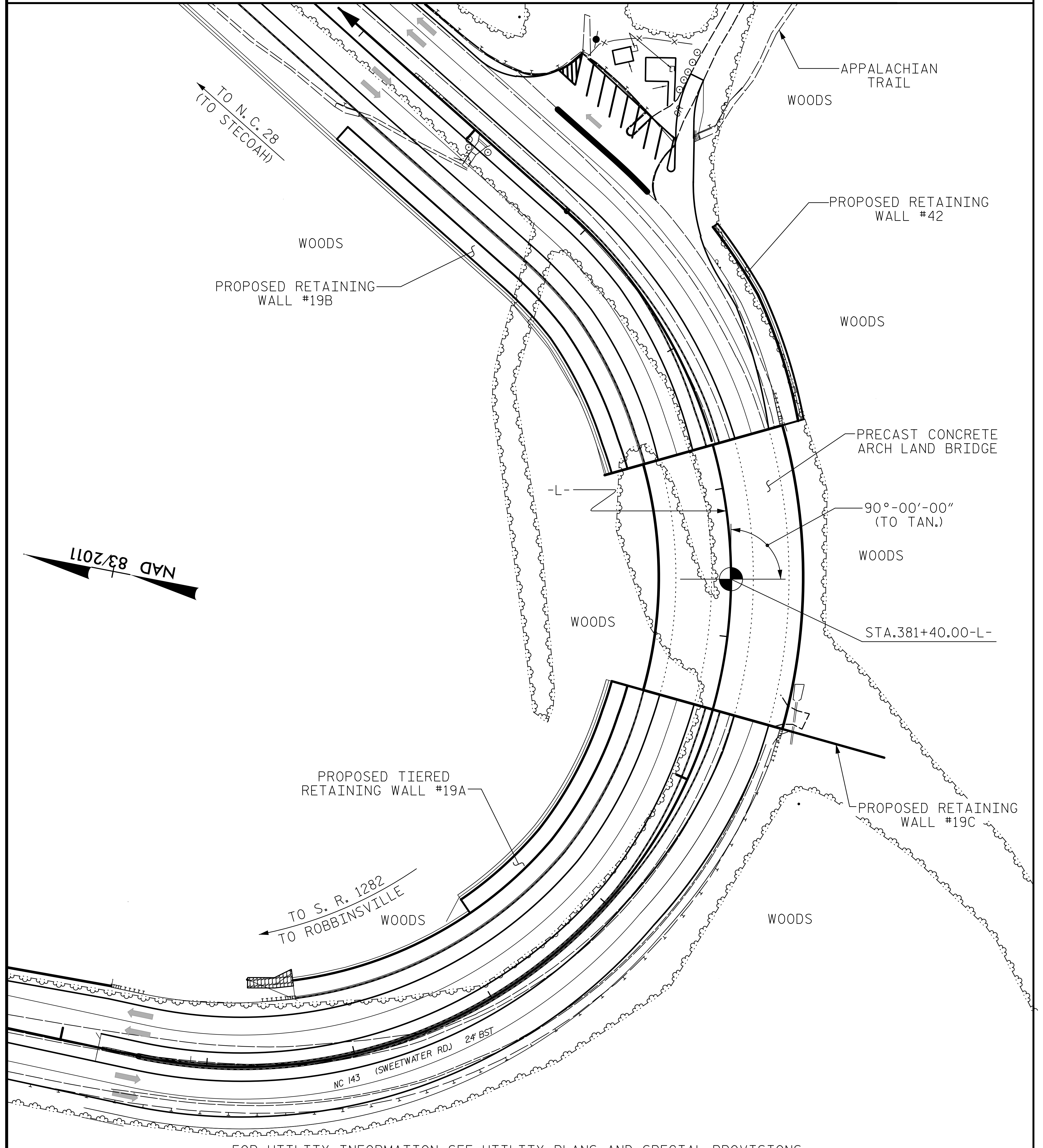
F. A. PROJECT NO.: 0129008

BENCHMARK: BM#19 SPIKE NAIL IN BASE OF 24″ MAPLE; 75′
RT. OF STA. 388+98.00 -BL-; ELEV. 3094.55



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

TOTAL STRUCTURE QUANTITIES

PRECAST CONCRETE ARCH BRIDGE	LUMP SUM
MEMBRANE WATERPROOFING SYSTEM	LUMP SUM
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3000 SQ. FT.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6′-2″
#4	7′-4″
#5	8′-6″
#6	9′-8″
#7	10′-10″
#8	12′-0″
#9	13′-2″
#10	14′-6″
#11	15′-10″

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30″ (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

NOTES

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 381+40.00 -L-, SEE SPECIAL PROVISIONS.

FOR PRECAST CONCRETE ARCH BRIDGE, SEE SPECIAL PROVISIONS.

FOR MEMBRANE WATERPROOFING SYSTEM, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE DETAILS SHOWN HERE ARE FOR GENERAL LAYOUT ONLY. THE CONTRACTOR SHALL SUPPLY DESIGNS AND DETAILS FOR REVIEW AND APPROVAL THAT MEET THE REQUIREMENTS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND SHALL BE SEALED BY A NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER.

THESE PLANS SHALL BE USED IN CONJUNCTION AND COORDINATE WITH THE PRECAST CONCRETE ARCH BRIDGE MANUFACTURER'S PLANS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WITH CONSTRUCTION.

ARCHITECTURAL CONCRETE SURFACE TREATMENT SHALL BE APPLIED TO THE OUTSIDE FACES OF THE CONCRETE ARCH LAND BRIDGE, CONCRETE BENTS AND CONCRETE PARAPETS AS DETAILED ON THE PLANS. FOR ARCHITECTURAL CONCRETE SURFACE TREATMENT, SEE SPECIAL PROVISIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

FOR PAYMENT FOR WILDLIFE FENCE, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

THE WILDLIFE FENCE ON THE PRECAST CONCRETE ARCH BRIDGE SHALL BE INSTALLED PRIOR TO FILL BEING PLACED ON THE UNITS.

FINAL ELEVATIONS OF THE PRECAST REINFORCED ARCH BRIDGE, INCLUDING TOP OF PARAPET ELEVATIONS, ARCH PEDESTAL ELEVATIONS AND FOOTING ELEVATIONS SHALL BE DETERMINED BY THE CONTRACTOR IN ACCORDANCE WITH THE REQUIRED MINIMUM VERTICAL AND HORIZONTAL CLEARANCES, FIELD CONDITIONS AND DIMENSIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

ALL PRECAST CONCRETE ARCH UNITS SHALL BE INSTALLED IN PLACE BEFORE ANY FILL CAN BE PLACED ON THE UNITS.

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 381+40.00 -L-

SHEET 1 OF 6

SEAL 20125
MARSHALL G. CHEEK, JR.
DocuSigned by:
Marshall G. Cheek, Jr.
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9/13/2022 | 9:27 AM EDT

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRECAST CONCRETE
ARCH LAND BRIDGE

OVER NC 143 BETWEEN
SR 1282 AND NC 28

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

SHEET NO.
S-1
TOTAL SHEETS
6

DRAWN BY : S. B. WILLIAMS DATE : 3-22
CHECKED BY : MGC DATE : 3-22

9/13/2022
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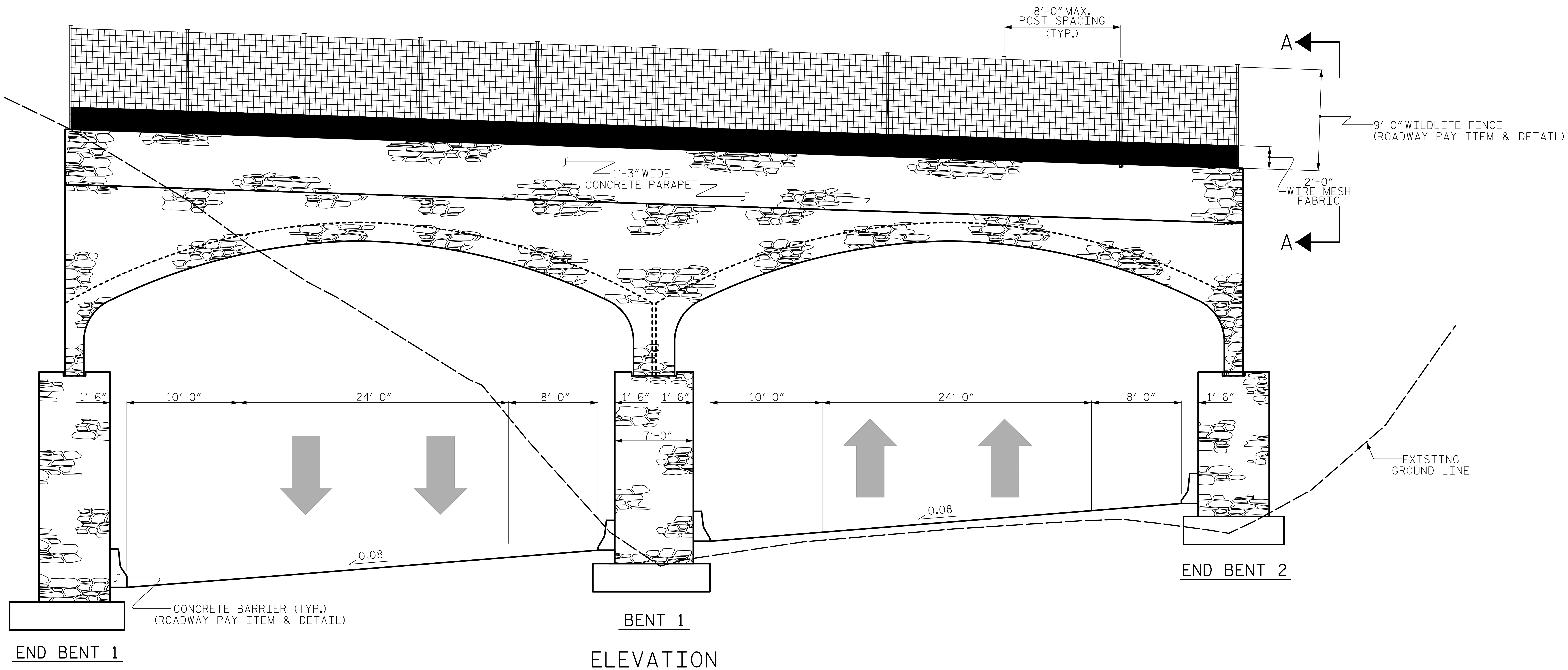
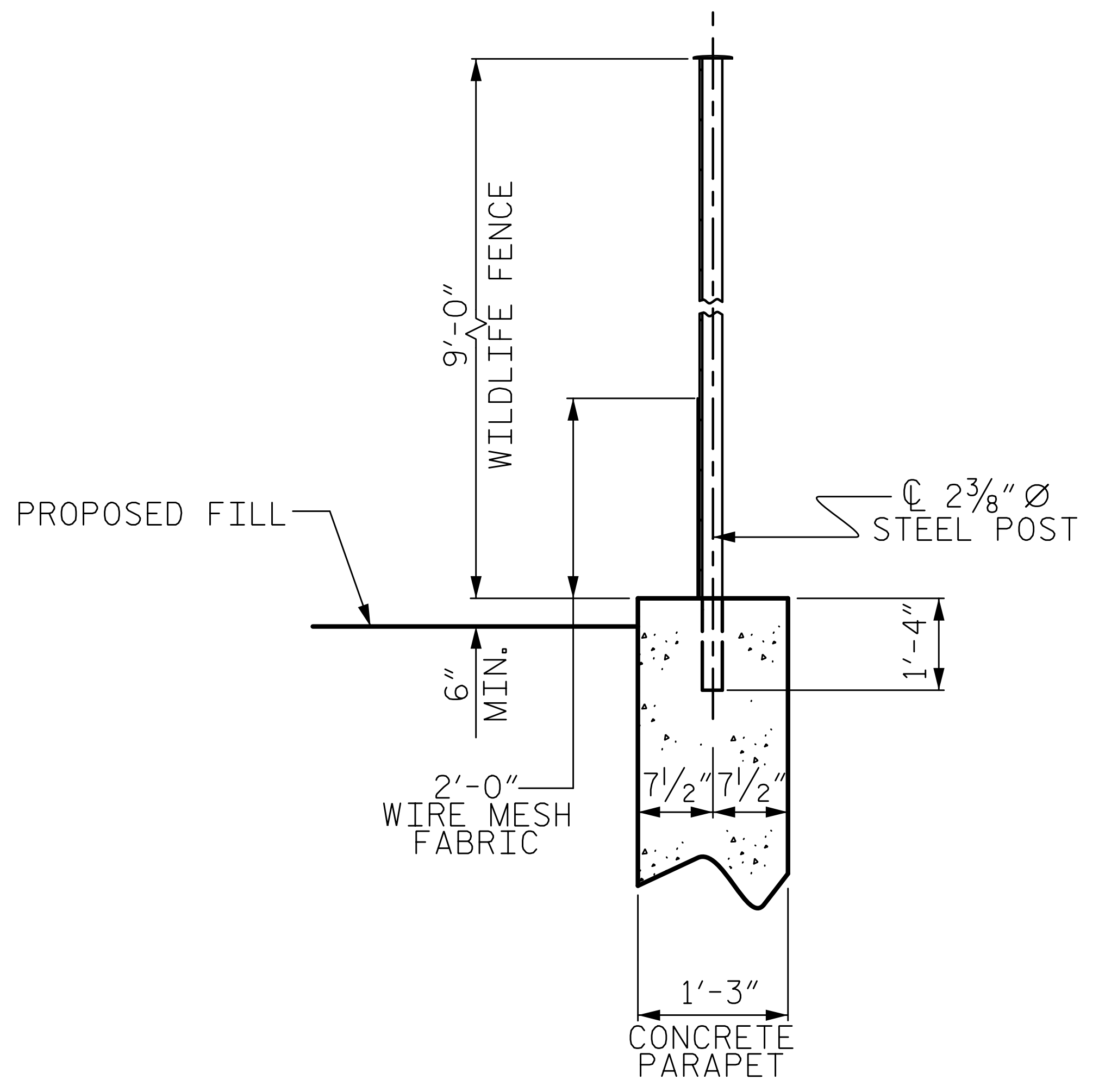
User:ZSmith

STR #1



ELEVATION

(LOOKING UPSTATION)



SECTION A-A

NOTES

THE WILDLIFE FENCE POST SHALL BE EMBEDDED INTO THE PARAPET IN A SLEEVE OR BLOCKOUT AND ANCHORED WITH AN EPOXY OR CONCRETE GROUT ANCHORING SYSTEM. THE POST HOLE OPENING SHALL BE A MINIMUM OF ½" LARGER THAN THE OUTER DIAMETER OF THE POST. FOR WILDLIFE FENCE, SEE ROADWAY SPECIAL PROVISIONS.

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 381+40.00 -L-

SHEET 3 OF 6

SEAL 20125
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Marshall G. Cheek, Jr.
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706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRECAST CONCRETE
ARCH LAND BRIDGE

OVER NC 143 BETWEEN
SR 1282 AND NC 28

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

SHEET NO. S-3
TOTAL SHEETS 6

STR #1

DRAWN BY : S. B. WILLIAMS DATE : 2-22
CHECKED BY : MGC DATE : 3-22

9/13/2022
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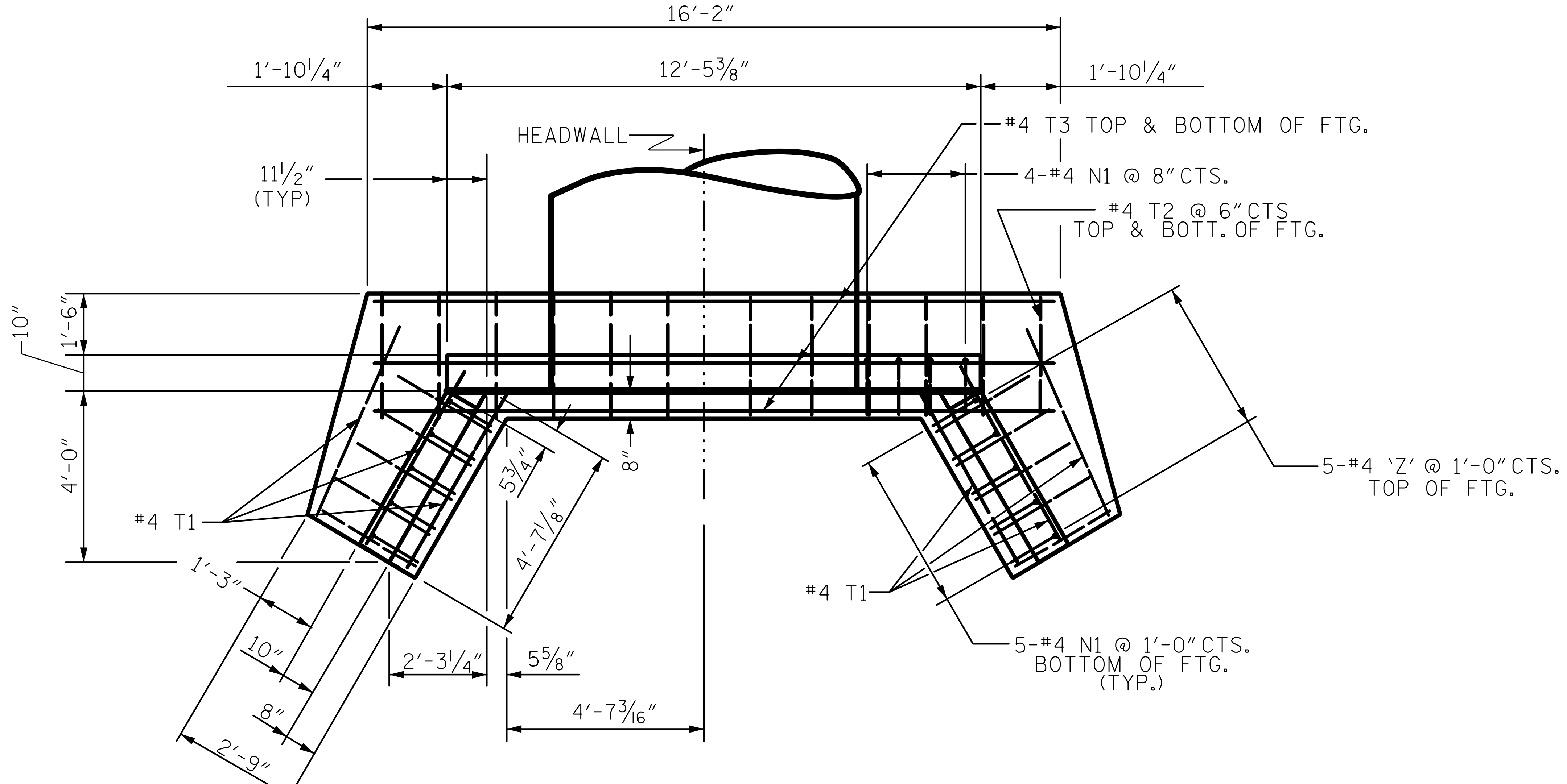
User:ZSmith



INLET PLAN

NOTES:

ALL CONCRETE TO BE CLASS "A".

ALL REINFORCING STEEL SHALL BE ASTMA615-GRADE 60.

ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCEMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.

THE FOOTING, CURTAIN WALL AND 4" OF WALL ARE TO BE POURED IN ONE OPERATION ALLOWING NO TIME FOR INITIAL SET TO TAKE PLACE BETWEEN THEM. THE REMAINING WALL SHALL THEN BE POURED IN ONE OPERATION.

ALL EXPOSED CORNERS ARE TO BE CHAMFERED 1".

3" DIAMETER DRAINS SHALL BE PLACED IN WALL AS SHOWN AND BE 6" ABOVE NORMAL FLOW LINE.

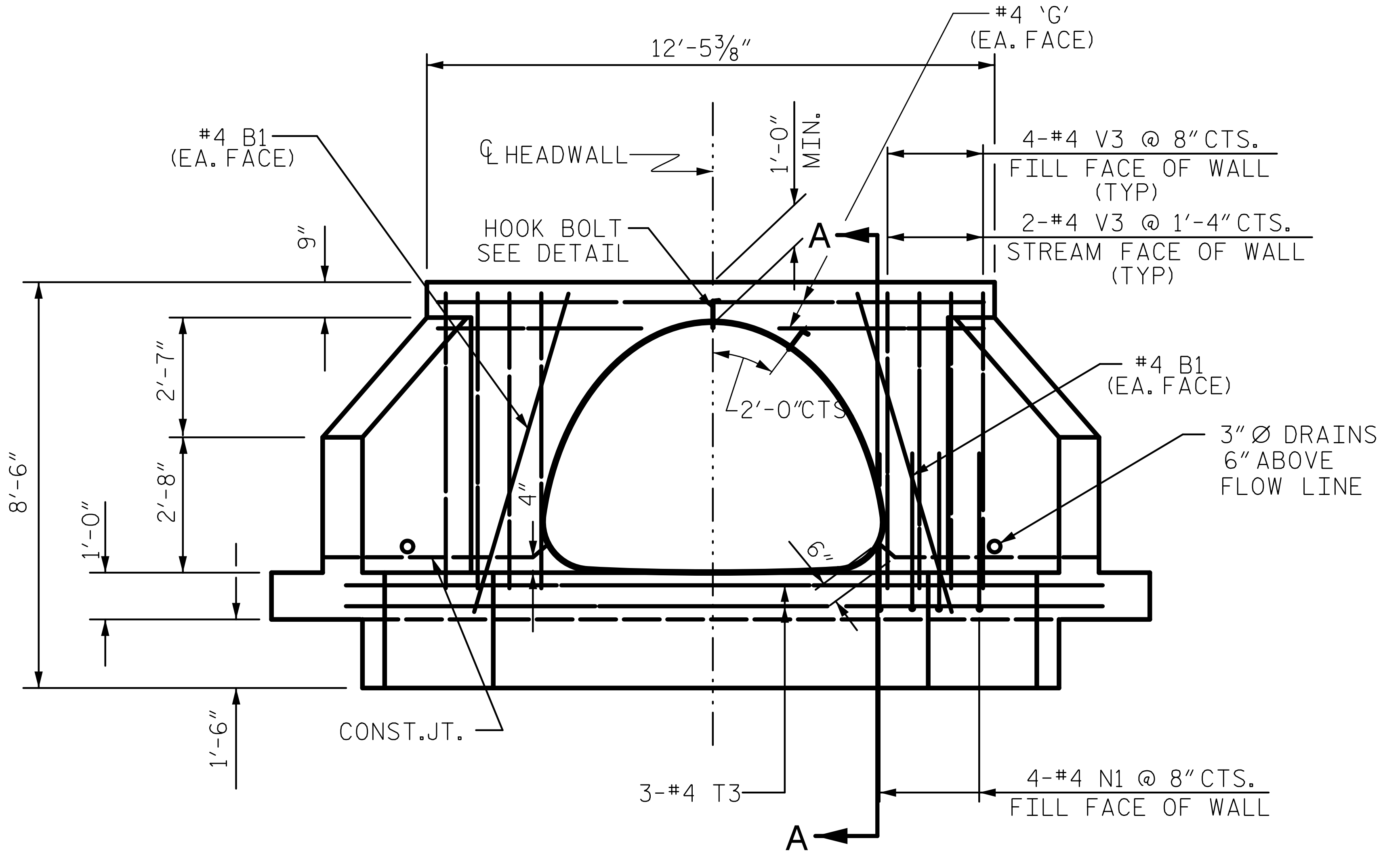
ALL MATERIAL AND WORKMANSHIP AS PER N.C. DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

THE EXTRA BARS ARE PROVIDED FOR HOLDING REINFORCING STEEL IN CORRECT POSITION IN WING.

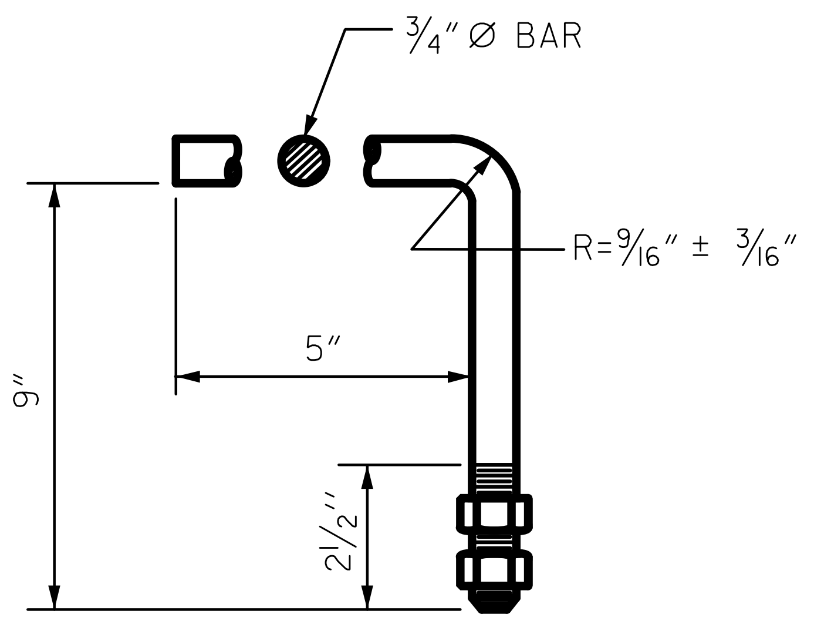
NO SEPARATE PAYMENT WILL BE MADE FOR REINFORCING STEEL OR CLASS A CONCRETE. THE ENTIRE COST OF THESE ITEMS SHALL BE PAID FOR UNDER THE LUMP SUM PRICE BID FOR CORRUGATED ALUMINUM PIPE CULVERT.

BILL OF MATERIAL

BAR	NO.	SIZE	LENGTH	WEIGHT
B1	4	#4	7'-0"	19
G1	2	#4	12'-1"	16
G2	4	#4	4'-3"	11
H1	10	#4	7'-0"	47
H2	2	#4	5'-6"	7
H3	4	#4	4'-0"	11
N1	18	#4	4'-1"	49
T1	6	#4	5'-0"	20
T2	64	#4	2'-8"	114
T3	6	#4	15'-10"	63
V1	12	#4	4'-6"	36
V2	12	#4	3'-0"	24
V3	12	#4	6'-2"	49
Z1	6	#4	3'-6"	14
Z2	4	#4	4'-1"	11
REINFORCING STEEL				491 LBS
CLASS A CONCRETE				5.9 CY

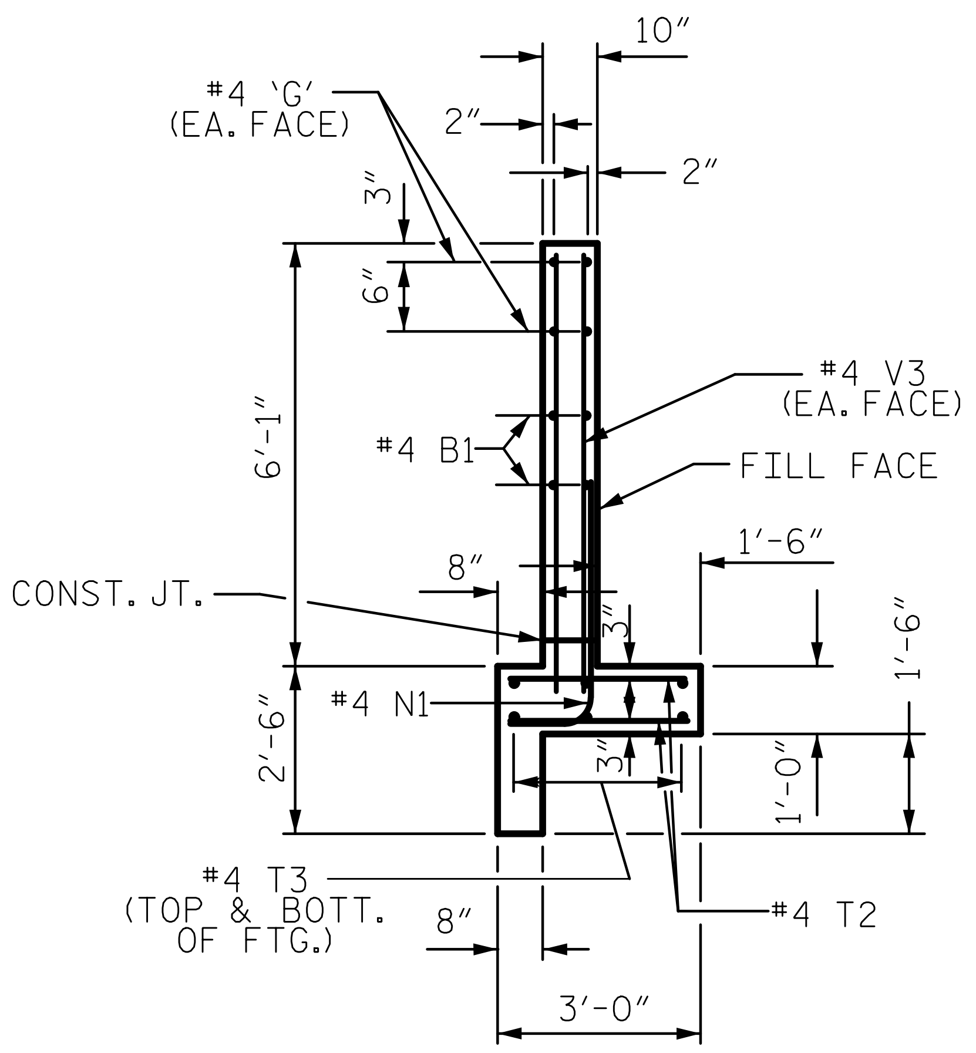


INLET ELEVATION

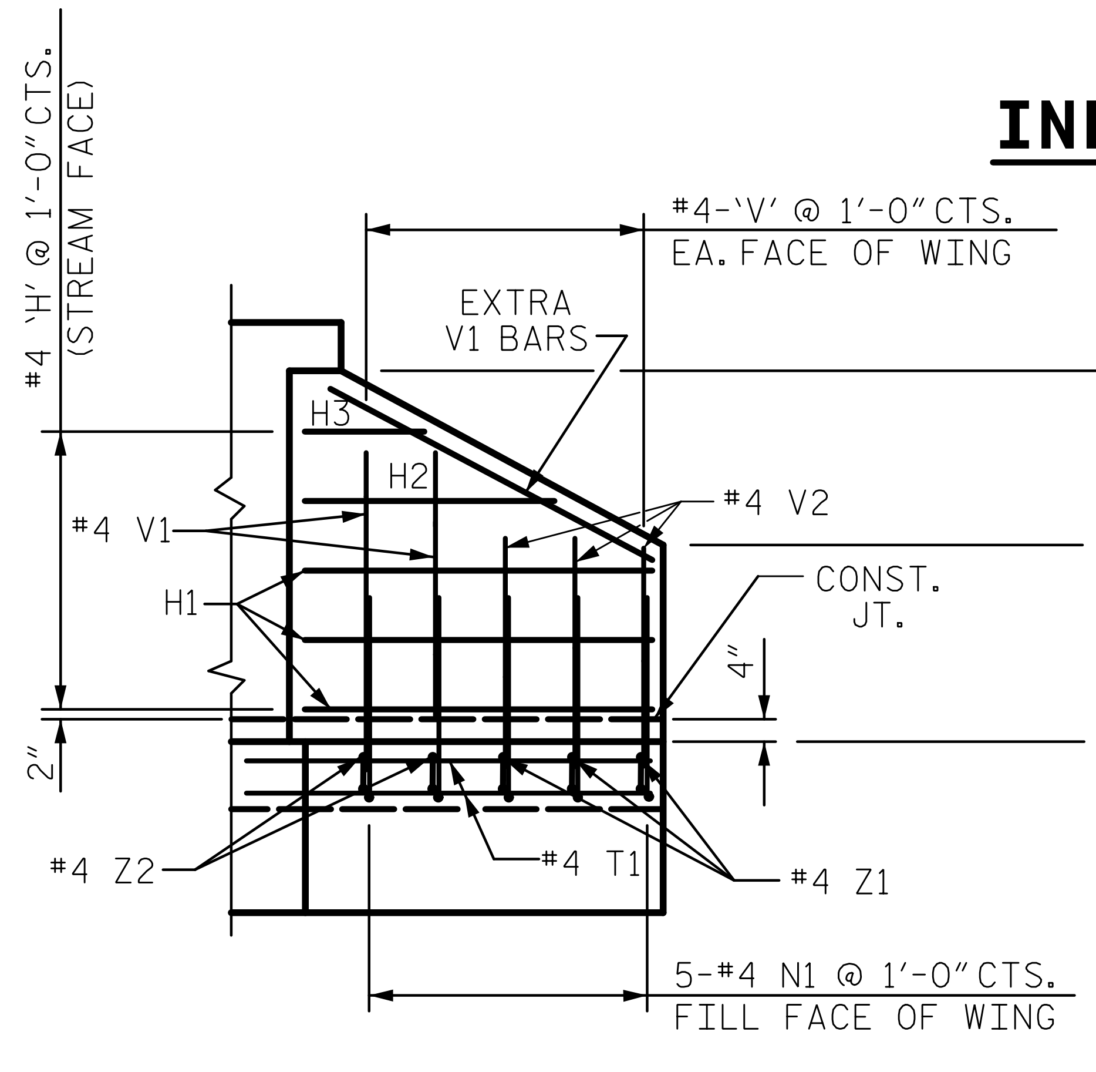


HOOK BOLT

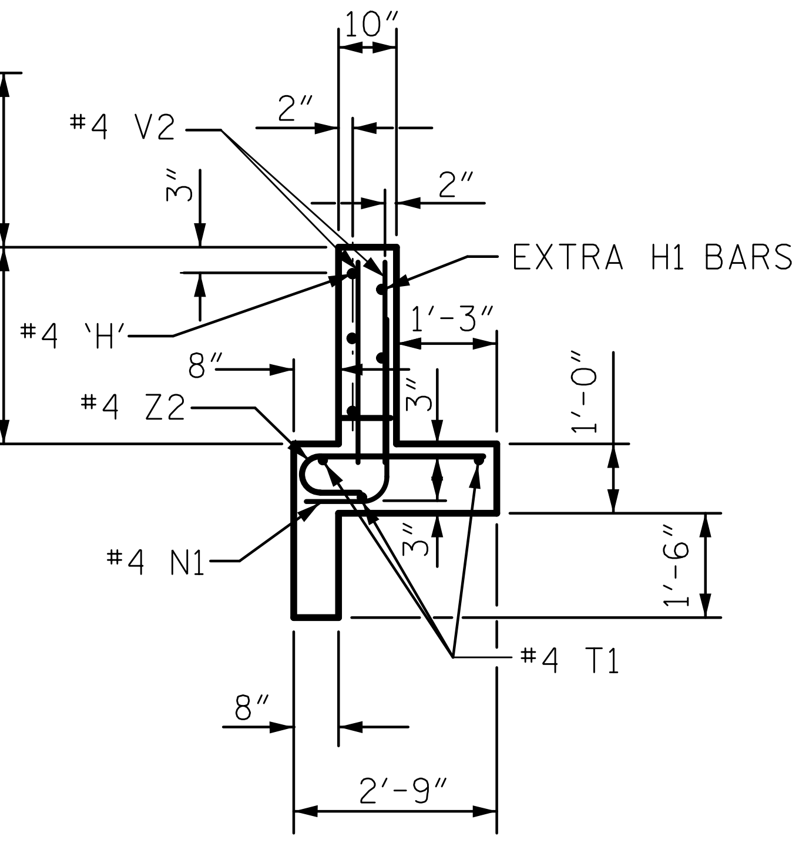
NOTE: CONSTRUCT HOOK BOLTS (ANCHORS) AT 2'-0" CTS. ALONG THE CIRCUMFERENCE OF THE 95"X 67" CMP. EMBED THE HOOK BOLTS 6" IN DEPTH. THE GALVANIZED ¾" DIA. HOOK BOLTS MUST MEET ASTM A-307 OR ASTM A-836. BOTH BOLTS AND NUTS MUST BE IN ACCORDANCE WITH ASTM A-153 FOR GALVANIZING.



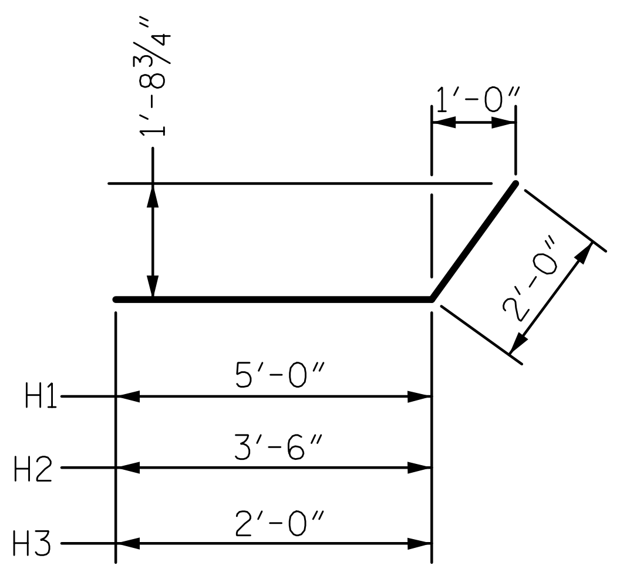
SECTION A-A



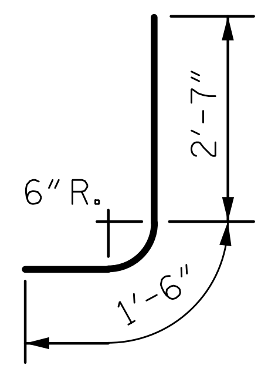
WING ELEVATION



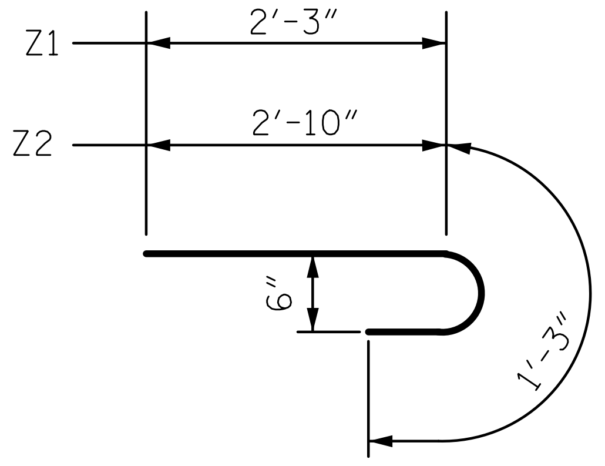
END OF WING



"H" BARS



"N" BARS



"Z" BARS

"H", "N", & "Z" BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 250+00.00 -L-

SHEET 2 OF 3

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Marshall G. Cheek, Jr.
5FBC02F3A4DC41B...
SEAL 20125
MARSHALL G. CHEEK, JR.
7/27/2022

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

7'-11" X 5'-7"
CORRUGATED ALUMINUM PIPE ARCH CULVERT
INLET HEADWALL

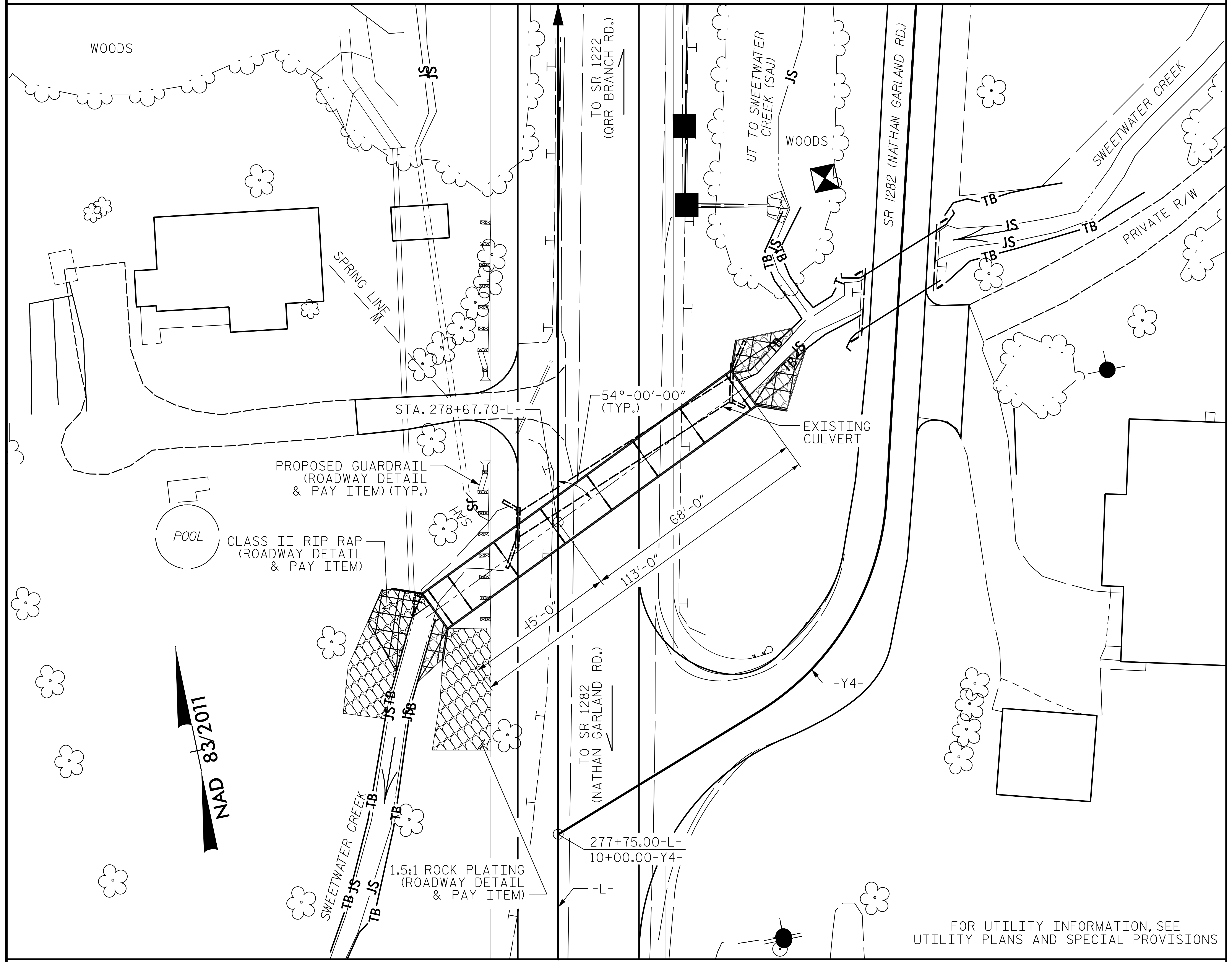
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C1-2
1			3			TOTAL SHEETS
2			4			3

STR. #2

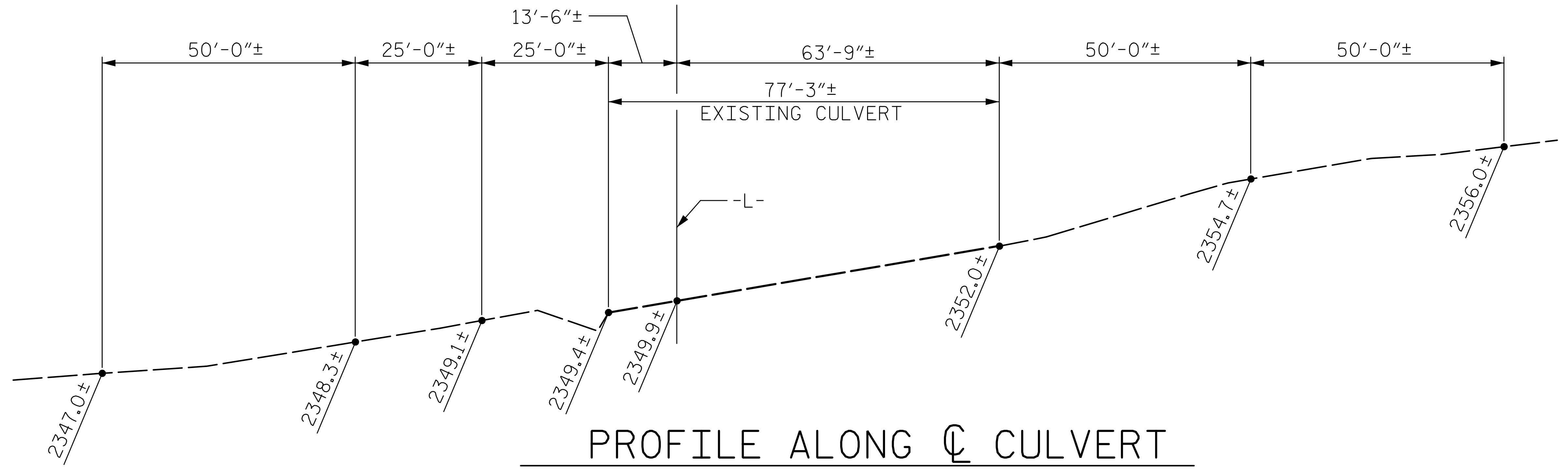
DRAWN BY :	ZCS	DATE :	4/22
CHECKED BY :	MGC	DATE :	5/22

BM#28 RAILROAD SPIKE IN 14" POPLAR TREE; 79' RT OF STA. 279+70.00-L-; ELEV. = 2360.04'

F.A. PROJECT NO.: 0129008



LOCATION SKETCH



PROFILE ALONG ℄ CULVERT

NOTES:

ASSUMED LIVE LOAD - HL-93 OR ALTERNATE.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

CULVERT SHALL BE DESIGNED FOR A MAXIMUM FILL DEPTH OF 6'-9"

FOR CULVERT DIVERSION DETAILS, SEE EROSION CONTROL PLANS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF THE CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

FOR ALUMINUM PIPE ARCH CULVERT, SEE SPECIAL PROVISIONS.

THE DETAILS SHOWN HERE ARE FOR GENERAL LAYOUT ONLY. THE SUPPLIER SHALL SUPPLY DESIGNS AND DETAILS FOR REVIEW AND APPROVAL THAT MEET THE REQUIREMENTS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12, AND ARE SEALED BY A NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER.

UNLESS OTHERWISE INDICATED, THE SUPPLIER SHALL DESIGN, DETAIL AND FURNISH ALL STRUCTURAL ELEMENTS AND HARDWARE.

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

EXCAVATE AT LEAST 1 FOOT BELOW THE CULVERT AND REPLACE EXCAVATED MATERIAL WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414-4 OF THE STANDARD SPECIFICATIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

EXCAVATE 1 FOOT BELOW THE BOTTOM OF THE CULVERT AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414 OF THE STANDARD SPECIFICATIONS. FOUNDATION CONDITIONING MATERIAL SHOULD CONSIST OF SELECT MATERIAL CLASS V OR VI FOR CULVERTS.

IF REQUIRED, UNDERCUT LOOSE SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

TOTAL STRUCTURE QUANTITIES

ALUMINUM PIPE ARCH CULVERT	LUMP SUM
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	139 TONS

ROADWAY DATA:

GRADE POINT ELEV. @ STA. 278+67.70-L-	2364.34'
BED ELEV. @ STA. 278+67.70-L-	2349.2'
ROADWAY SLOPES	2:1

HYDRAULIC DATA:

DESIGN DISCHARGE	500 CFS
FREQUENCY OF DESIGN FLOOD	50 YRS.
DESIGN HIGH WATER ELEVATION	2358.6'
DRAINAGE AREA	1.09 SQ. MI.
BASE DISCHARGE	600 CFS
FREQUENCY OF BASE DISCHARGE	100 YRS.
BASE HIGH WATER ELEVATION	2359.6'

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	600 CFS
FREQUENCY OF OVERTOPPING FLOOD	100 YRS.
OVERTOPPING FLOOD ELEVATION	2359.6'

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 278+67.70 -L-

SHEET 1 OF 3

DocuSigned by:
Marshall G. Cheek, Jr.
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SEAL 20125
MARSHALL G. CHEEK, JR.
7/27/2022

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

12'-10" X 8'-4"
ALUMINUM
PIPE ARCH CULVERT
54° SKEW

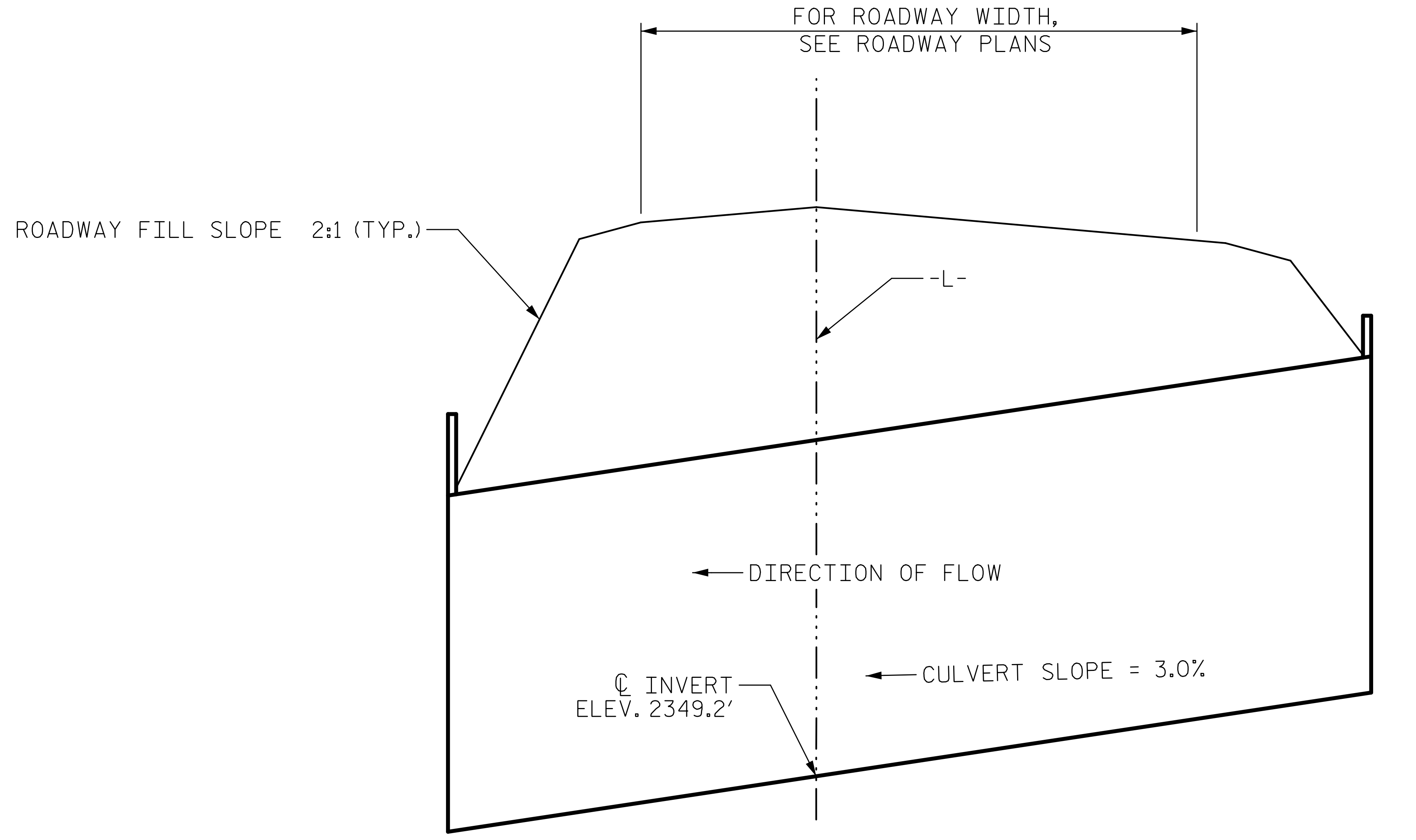
REVISIONS

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

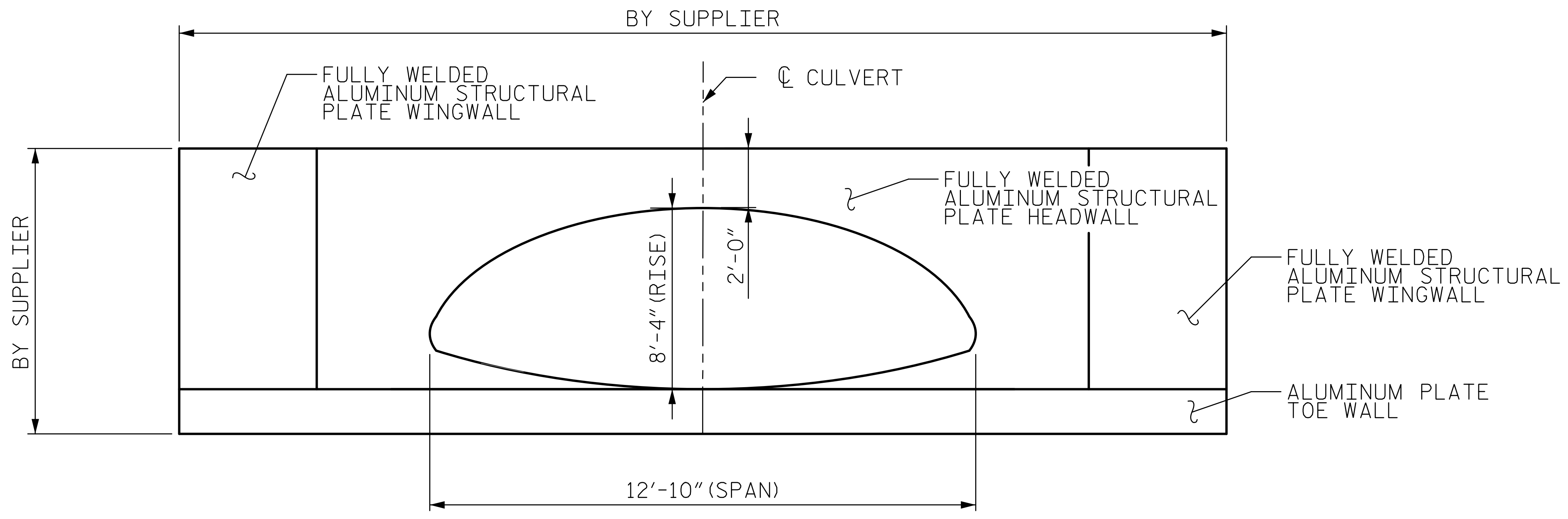
SHEET NO. C2-1
TOTAL SHEETS 3

DRAWN BY : ZCS DATE : 9/21
CHECKED BY : MGC DATE : 9/21

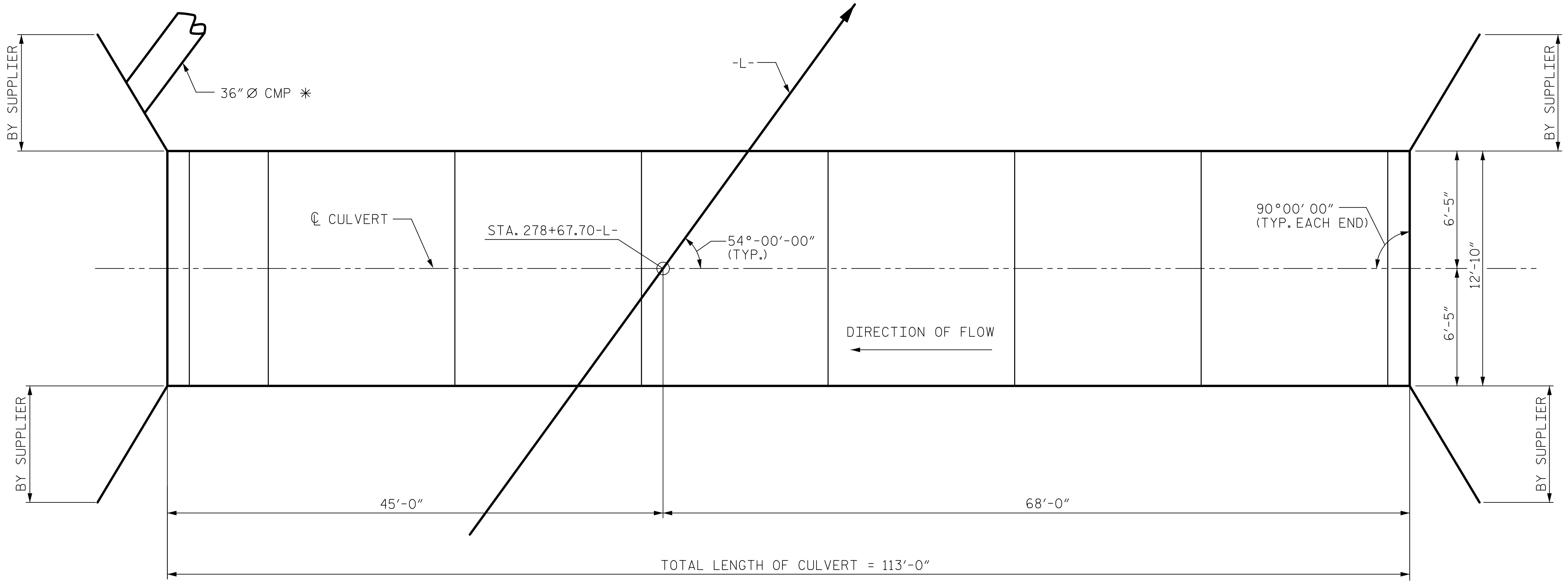
STR. #3



CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION
(INLET & OUTLET)



PLAN VIEW

✳ NOTE: WING SHALL BE DESIGNED TO ACCOMMODATE 36″ Ø CMP

DRAWN BY :	ZCS	DATE :	9/21
CHECKED BY :	MGC	DATE :	9/21

5/10/2022
X:\NCDOT\A-0009\Structures\A-0009CB\STR. #3 278+67.70 -L-\FinalPlans\DGNs\411_003_A-0009CB_SMU_CU02.dgn
User:ZSmith

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 278+67.70 -L-

SHEET 2 OF 3

DocuSigned by:
Marshall G. Cheek, Jr.
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SEAL
20125
MARSHALL G. CHEEK, JR.
7/27/2022

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SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

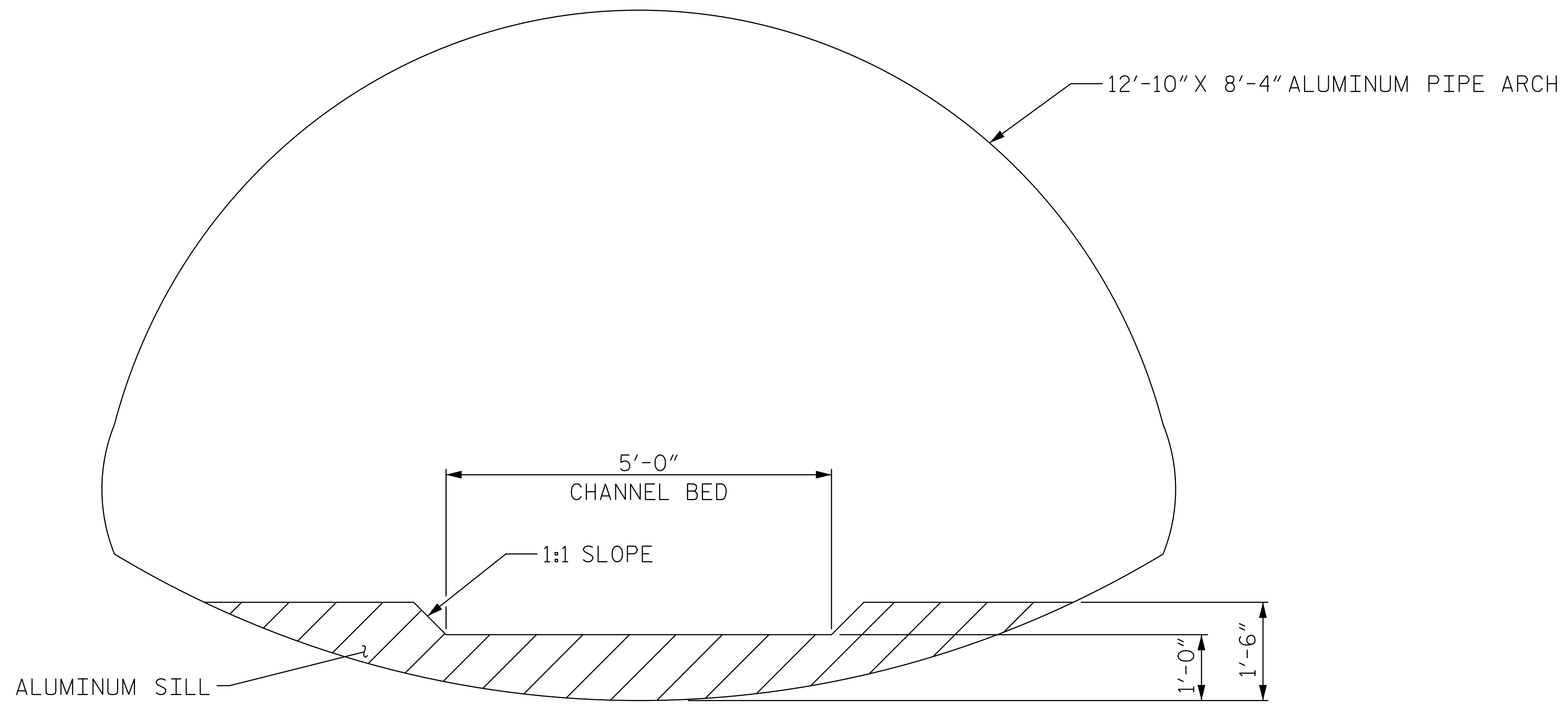
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

12′-10″ X 8′-4″
ALUMINUM
PIPE ARCH CULVERT
54° SKEW

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

SHEET NO.
C2-2
TOTAL SHEETS
3

STR. #3



ELEVATION NORMAL TO SILL

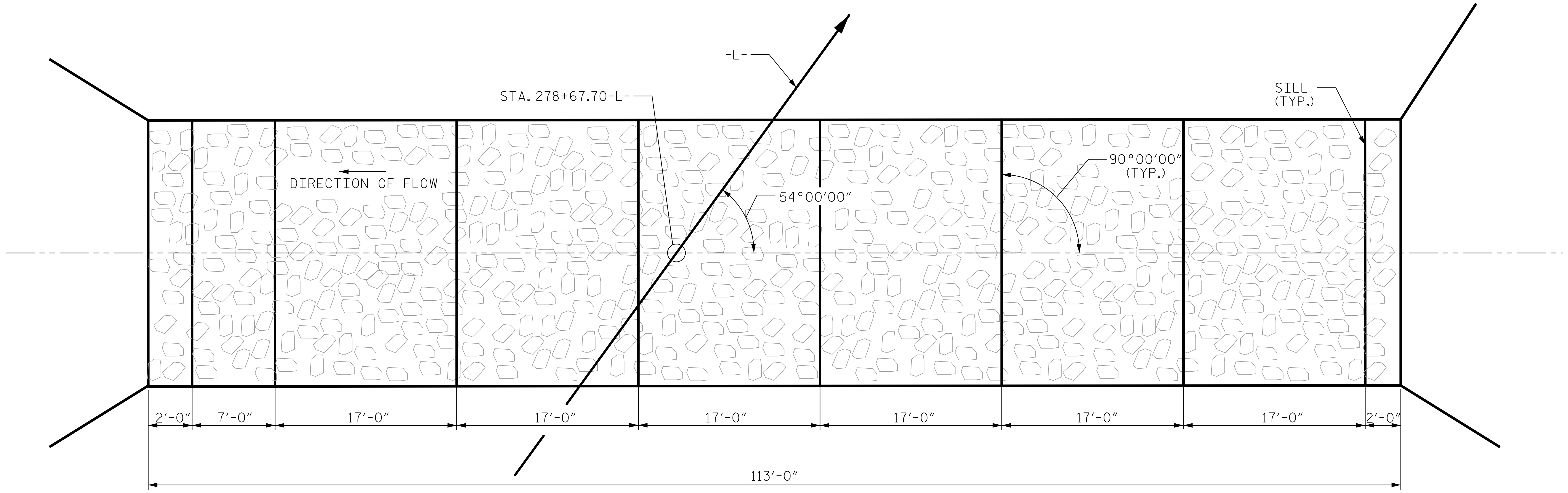
NOTES:

NATIVE MATERIAL EXCAVATED FROM THE EXISTING STREAM BED OR FLOOD PLAIN SHALL BE STOCKPILED AND LATER PLACED IN THE PROPOSED CULVERT BETWEEN SILLS TO PROVIDE A CONTINUOUS FLOW CHANNEL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL SHALL BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A LEVEL SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

THE ENTIRE COST OF WORK REQUIRED TO PLACE THE EXCAVATED MATERIAL SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR CULVERT EXCAVATION.

THE SILLS SHALL BE ALUMINUM AND BOLTED INTO THE CULVERT.

THE ENTIRE COST OF THE ALUMINUM SILLS SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE ALUMINUM PIPE ARCH CULVERT.



FLOOR SILL LAYOUT

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 278+67.70 -L-

SHEET 3 OF 3

Marshall G. Cheek, Jr.
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SEAL 20125
7/27/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

12′-10″ X 8′-4″
ALUMINUM
PIPE ARCH CULVERT
54° SKEW

REVISIONS

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

SHEET NO. C2-3
TOTAL SHEETS 3

DRAWN BY :	ZCS	DATE :	9/21
CHECKED BY :	MGC	DATE :	9/21

6/2/2022
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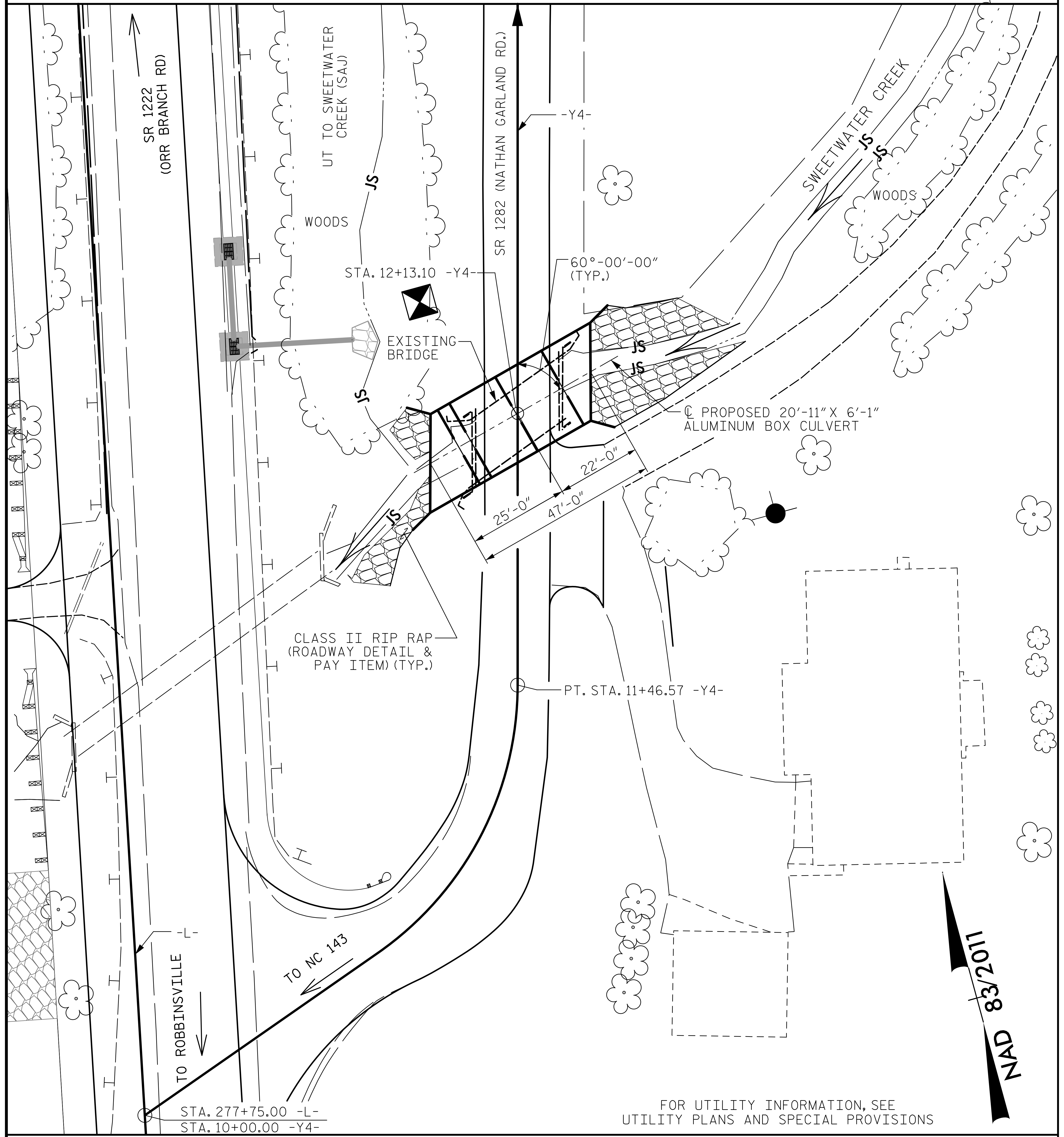
User:ZSmith

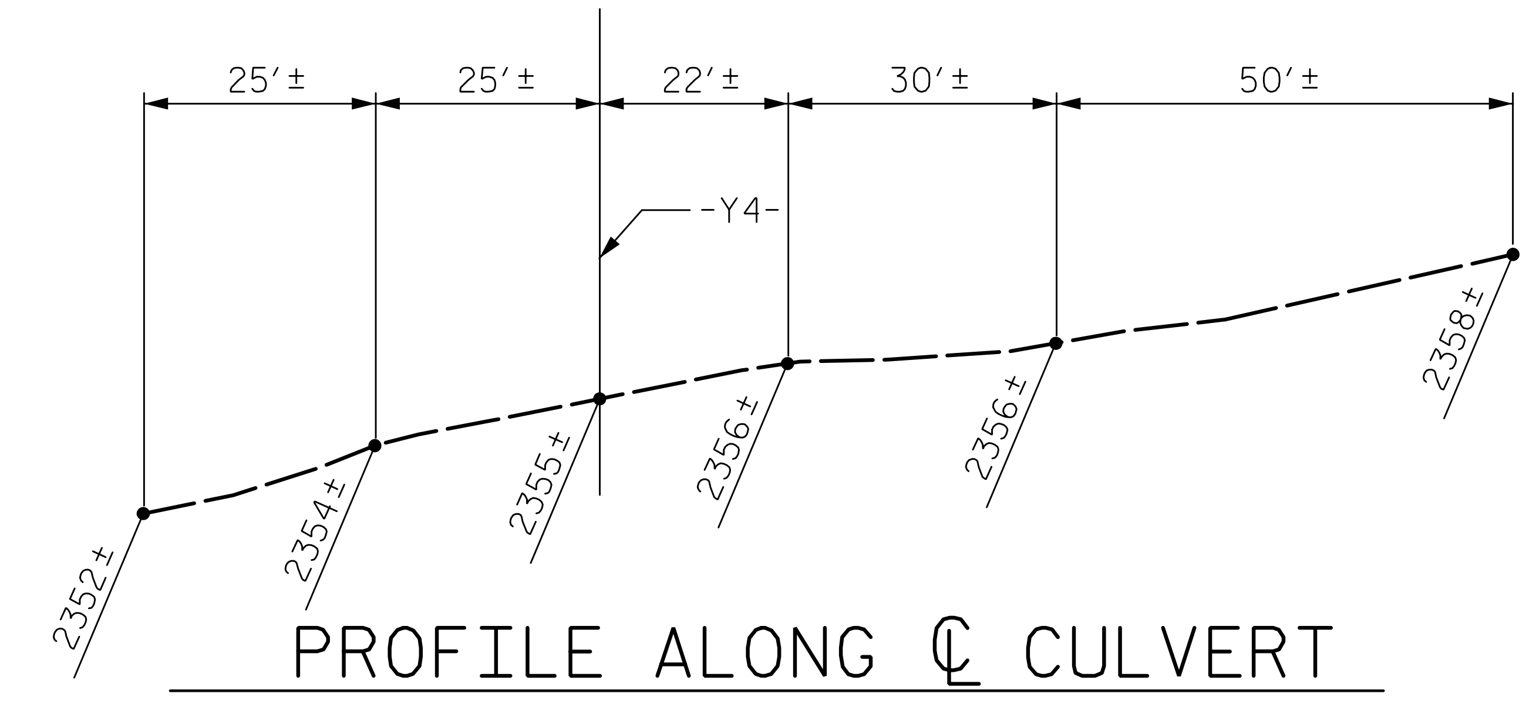
STR. #3

F.A. PROJECT NO.: 0129008

BM#28: SPIKE NAIL IN 14" POPLAR TREE; 24' LT OF STA. 12+40.00 -Y4-; ELEV. = 2360.04'



LOCATION SKETCH



PROFILE ALONG ℄ CULVERT

DRAWN BY : ZCS DATE : 9/21
CHECKED BY : MGC DATE : 11/21

ROADWAY DATA:	
GRADE POINT ELEV. @ STA. 12+13.10 -Y4-	2362.32'
BED ELEV. @ STA. 12+13.10 -Y4-	2353.8'
ROADWAY SLOPES	4:1
HYDRAULIC DATA:	
DESIGN DISCHARGE	420 CFS
FREQUENCY OF DESIGN FLOOD	25 YRS.
DESIGN HIGH WATER ELEVATION	2360.2'
DRAINAGE AREA	1.09 SQ. MI.
BASE DISCHARGE	600 CFS
FREQUENCY OF BASE DISCHARGE	100 YRS.
BASE HIGH WATER ELEVATION	2361.0'
OVERTOPPING FLOOD DATA:	
OVERTOPPING DISCHARGE	525 CFS
FREQUENCY OF OVERTOPPING FLOOD	50+ YRS.
OVERTOPPING FLOOD ELEVATION	2360.7'

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

TOTAL STRUCTURE QUANTITIES

ALUMINUM BOX CULVERT	LUMP SUM
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	83 TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
ASBESTOS ASSESSMENT	LUMP SUM

NOTES:

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

ASSUMED LIVE LOAD - HL-93 OR ALTERNATE.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

CULVERT SHALL BE DESIGNED FOR A MAXIMUM FILL DEPTH OF 2'-6".

FOR CULVERT DIVERSION DETAILS, SEE EROSION CONTROL PLANS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF THE CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

FOR ALUMINUM BOX CULVERT, SEE SPECIAL PROVISIONS.

THE DETAILS SHOWN HERE ARE FOR GENERAL LAYOUT ONLY. THE CONTRACTOR SHALL SUPPLY DESIGNS AND DETAILS FOR THE ALUMINUM BOX CULVERT AND CONCRETE HEADWALLS & CONCRETE WINGWALLS FOR REVIEW AND APPROVAL THAT MEET THE REQUIREMENTS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12, AND ARE SEALED BY A NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER.

UNLESS OTHERWISE INDICATED, THE SUPPLIER SHALL DESIGN, DETAIL AND FURNISH ALL STRUCTURAL ELEMENTS AND HARDWARE.

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE EXISTING 1 SPAN STRUCTURE (1 @ 19'-11") CONSISTING OF A TIMBER DECK ON TIMBER BEAMS WITH A 1½" ASPHALT WEARING SURFACE AND A CLEAR ROADWAY WIDTH OF 21'-1" AND WITH A SUBSTRUCTURE CONSISTING OF TIMBER CAPS ON RUBBLE MASONRY ABUTMENTS SHALL BE REMOVED.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE ENTIRE AREA OF THE ALUMINUM BOX CULVERT IN CONTACT WITH THE CONCRETE HEADWALL SHALL BE THOROUGHLY COATED WITH NEOPRENE SEALANT FOR CORROSION PROTECTION AT THE DIRECTION OF THE ENGINEER. THE COST OF THE NEOPRENE SEALANT SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE ALUMINUM BOX CULVERT.

EXCAVATE 1 FOOT BELOW THE BOTTOM OF THE CULVERT AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414 OF THE STANDARD SPECIFICATIONS. FOUNDATION CONDITIONING MATERIAL SHOULD CONSIST OF SELECT MATERIAL CLASS V OR VI FOR CULVERTS.

IF REQUIRED, UNDERCUT LOOSE SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL.

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 12+13.10 -Y4-

SHEET 1 OF 3 REPLACES BRIDGE #26

DocuSigned by:
Marshall G. Cheek, Jr.
5EBCC2F3A4DC413...
SEAL 20125
MARSHALL G. CHEEK, JR.
7/27/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

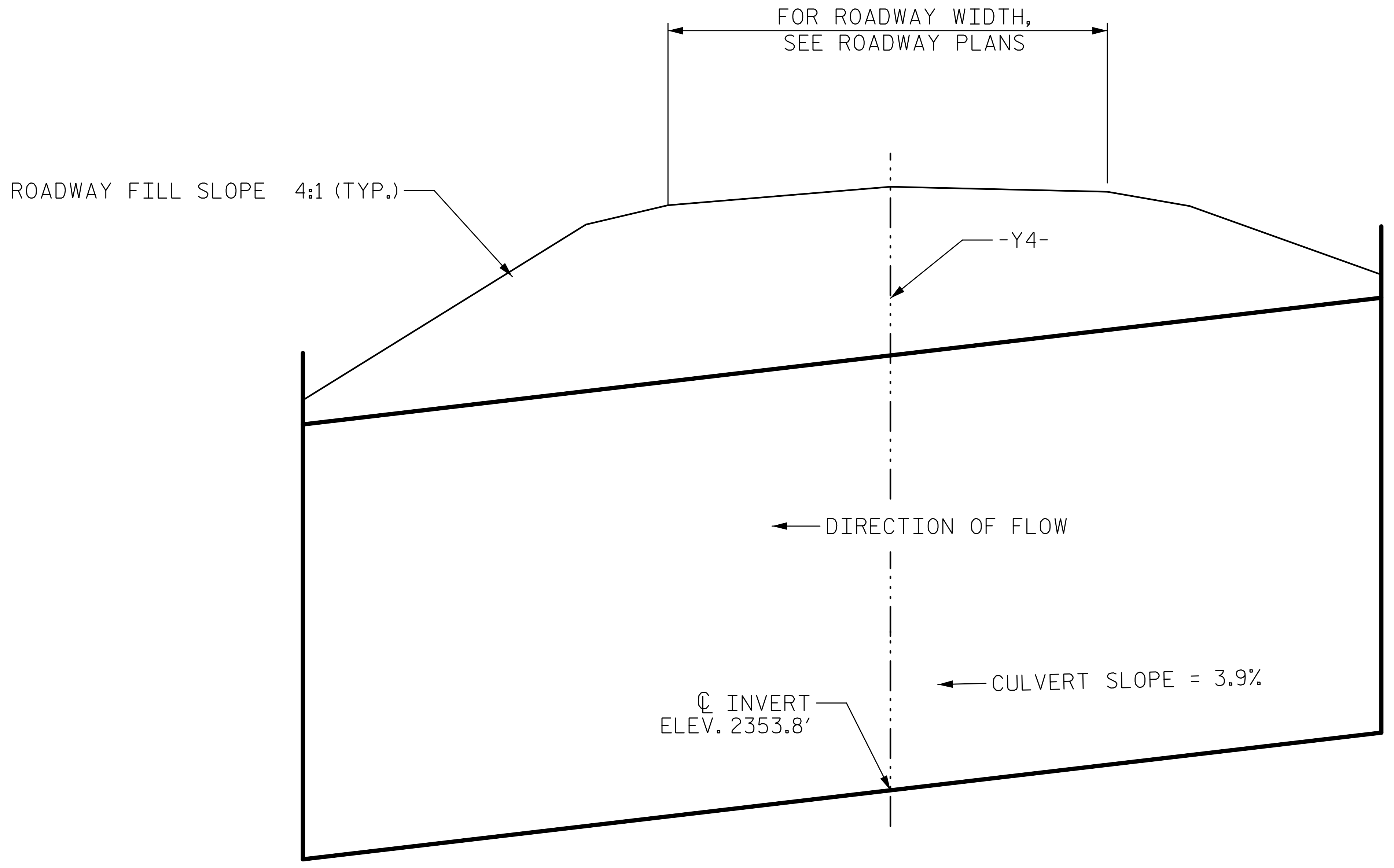
20'-11" X 6'-1" ALUMINUM BOX CULVERT 60° SKEW

REVISIONS

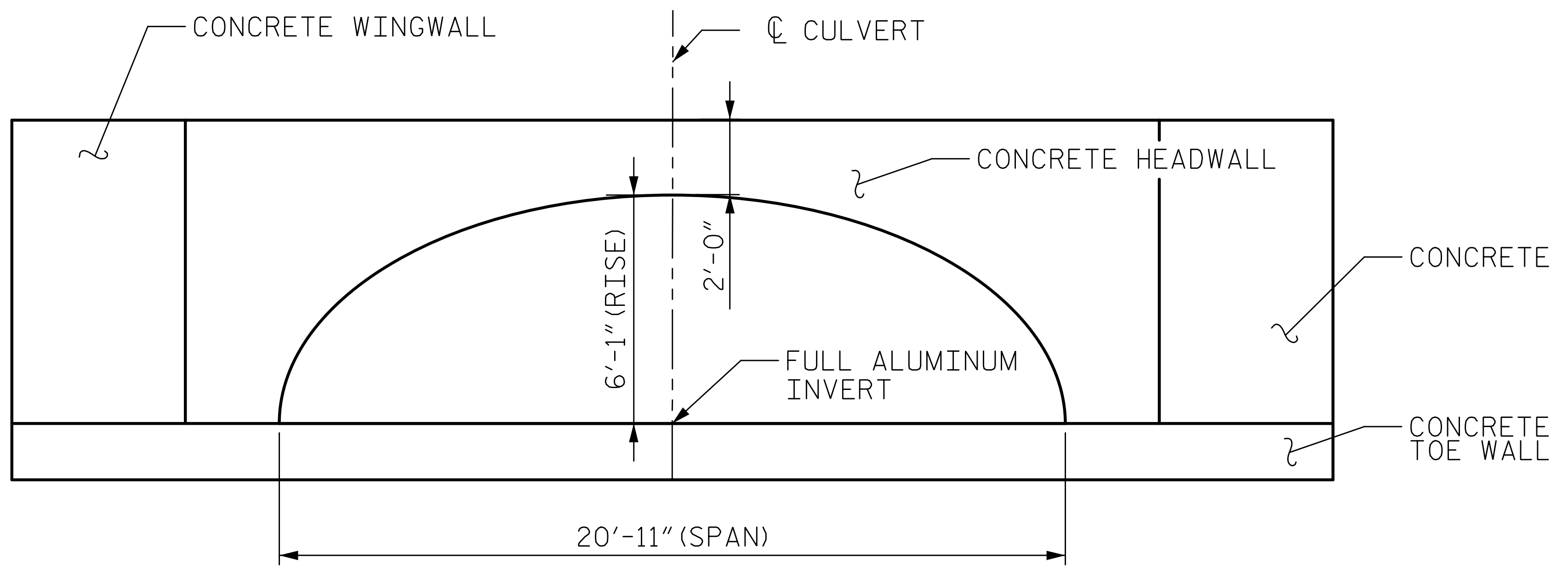
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. C3-1
TOTAL SHEETS 3

STR. #4

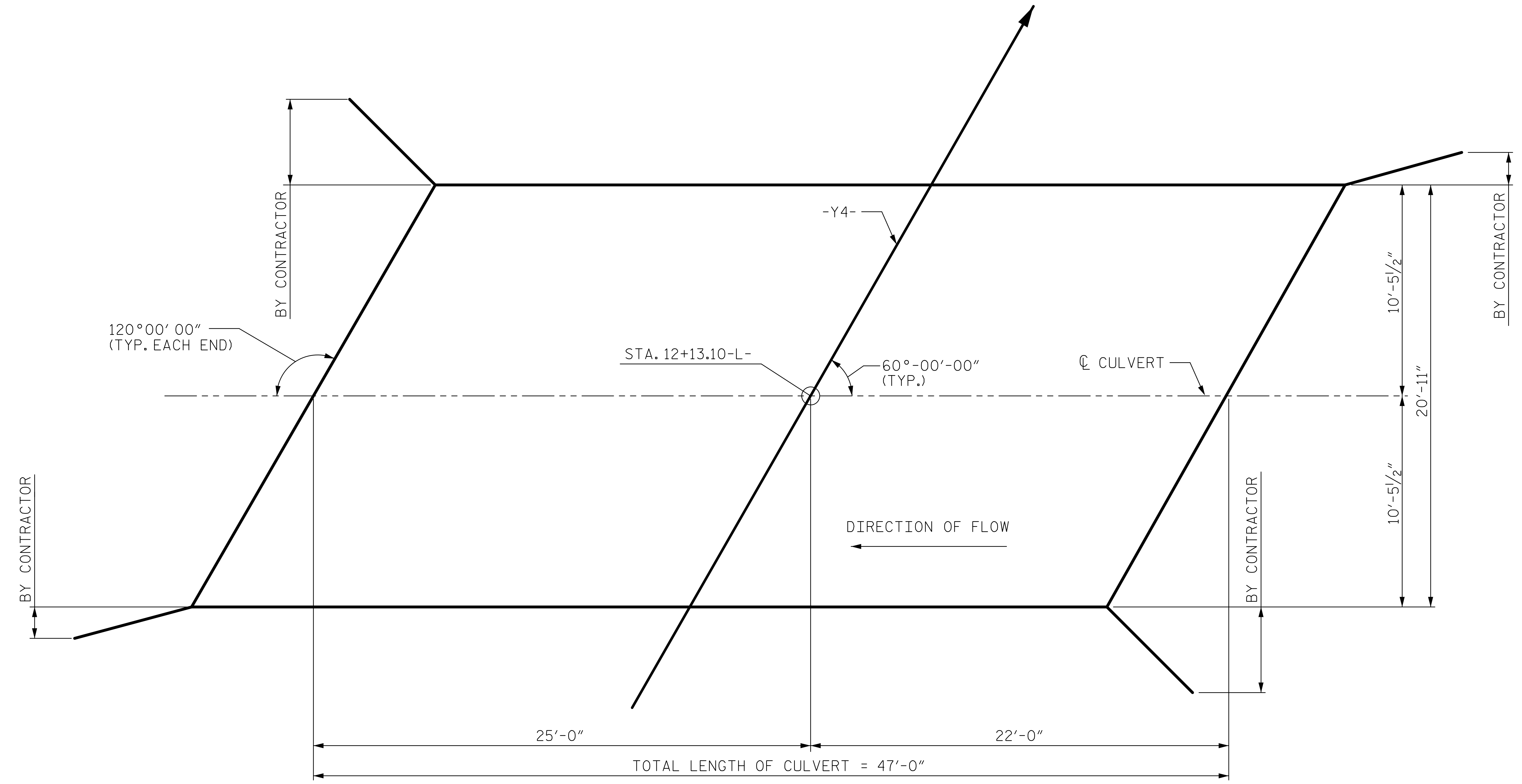


CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION

(INLET & OUTLET)



PLAN VIEW

FOR SILL LAYOUT, SEE SHEET 3 OF 3

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 12+13.10 -Y4-

SHEET 2 OF 3

SEAL 20125
MARSHALL G. CHEEK, JR.
DocuSigned by:
Marshall G. Cheek, Jr.
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7/27/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

20′-11″ X 6′-1″
ALUMINUM
BOX CULVERT
60° SKEW

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REVISIONS

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

SHEET NO. C3-2
TOTAL SHEETS 3

STR. #4

DRAWN BY : ZCS DATE : 10/21
CHECKED BY : MGC DATE : 11/21

5/23/2022
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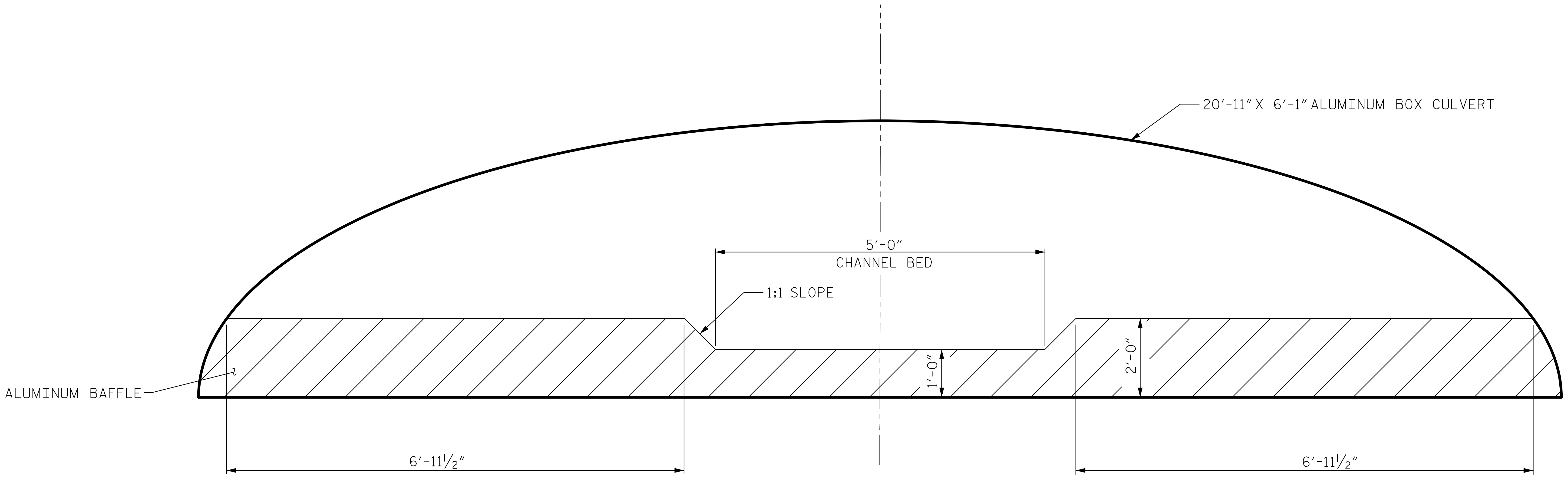


ELEVATION NORMAL TO SILL

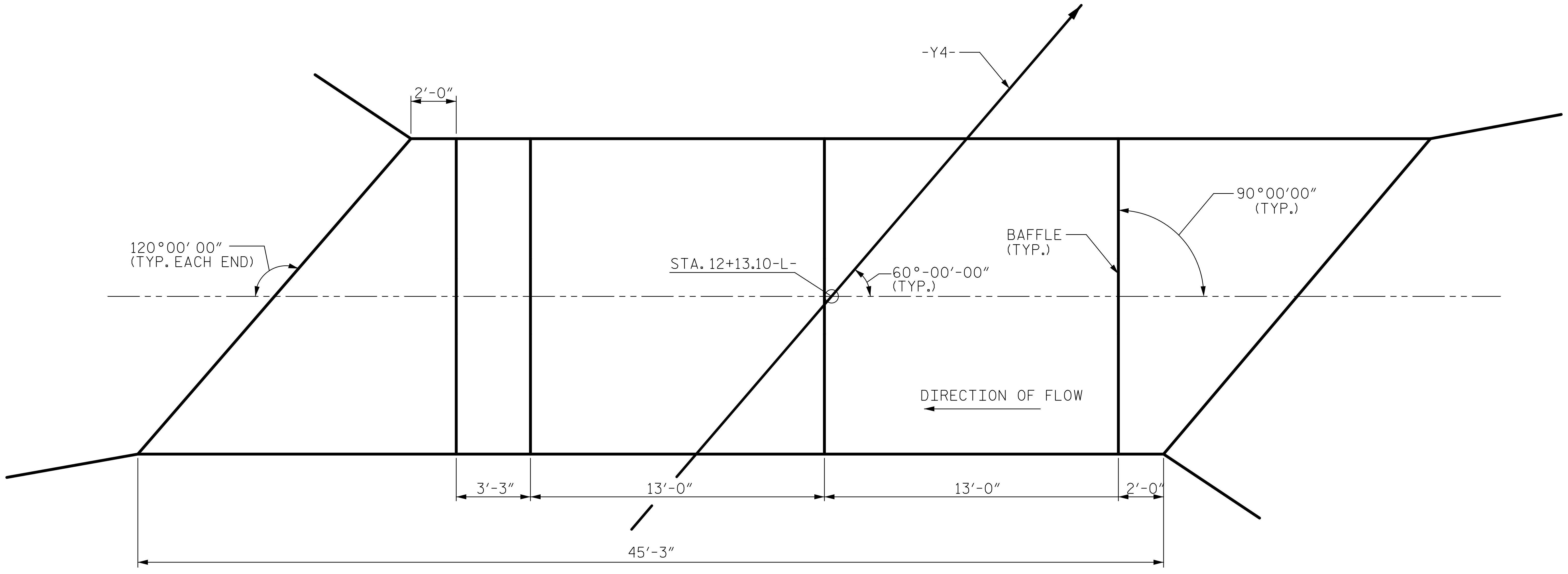
NOTES:

NATIVE MATERIAL EXCAVATED FROM THE EXISTING STREAM BED OR FLOOD PLAIN SHALL BE STOCKPILED AND LATER PLACED IN THE PROPOSED CULVERT BETWEEN SILLS TO PROVIDE A CONTINUOUS FLOW CHANNEL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL SHALL BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A LEVEL SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

THE ENTIRE COST OF WORK REQUIRED TO PLACE THE EXCAVATED MATERIAL SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR CULVERT EXCAVATION.

THE BAFFLES SHALL BE ALUMINUM AND BOLTED INTO THE CULVERT.

THE ENTIRE COST OF THE ALUMINUM BAFFLES SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE ALUMINUM BOX CULVERT.



FLOOR SILL LAYOUT

PROJECT NO. A-0009CB
GRAHAM COUNTY
STATION: 12+13.10 -Y4-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR.
DocuSigned by:
Marshall G. Cheek, Jr.
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7/27/2022

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

20′-11″ X 6′-1″ ALUMINUM BOX CULVERT 60° SKEW

REVISIONS

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

SHEET NO. C3-3
TOTAL SHEETS 3

STR. #4

DRAWN BY :	ZCS	DATE :	10/21
CHECKED BY :	MGC	DATE :	11/21

5/23/2022
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User:ZSmith

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
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PH (919) 773-8887
CORP. LICENSE NO.: C-0275

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (✓) RGW
REV. 8-16-99 RWW (✓) LES
REV. 5-7-03 RWW (✓) JTE
REV. 5-1-06 TLA (✓) GM
REV. 10-1-11 MAA (✓) GM
REV. 12-17 MAA (✓) THC

6/6/2019
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User:smassinople