

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	1	34

CASS COUNTY HIGHWAY DEPARTMENT

PLANS

FOR COUNTY PROJECT NO. CB1302 BRIDGE NO. 09-136-37.1

GOVERNING SPECIFICATIONS:
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION ADOPTED BY THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION, OCTOBER 2008; STANDARD DRAWINGS CURRENTLY IN EFFECT; AND OTHER CONTRACT PROVISIONS SUBMITTED HEREIN.

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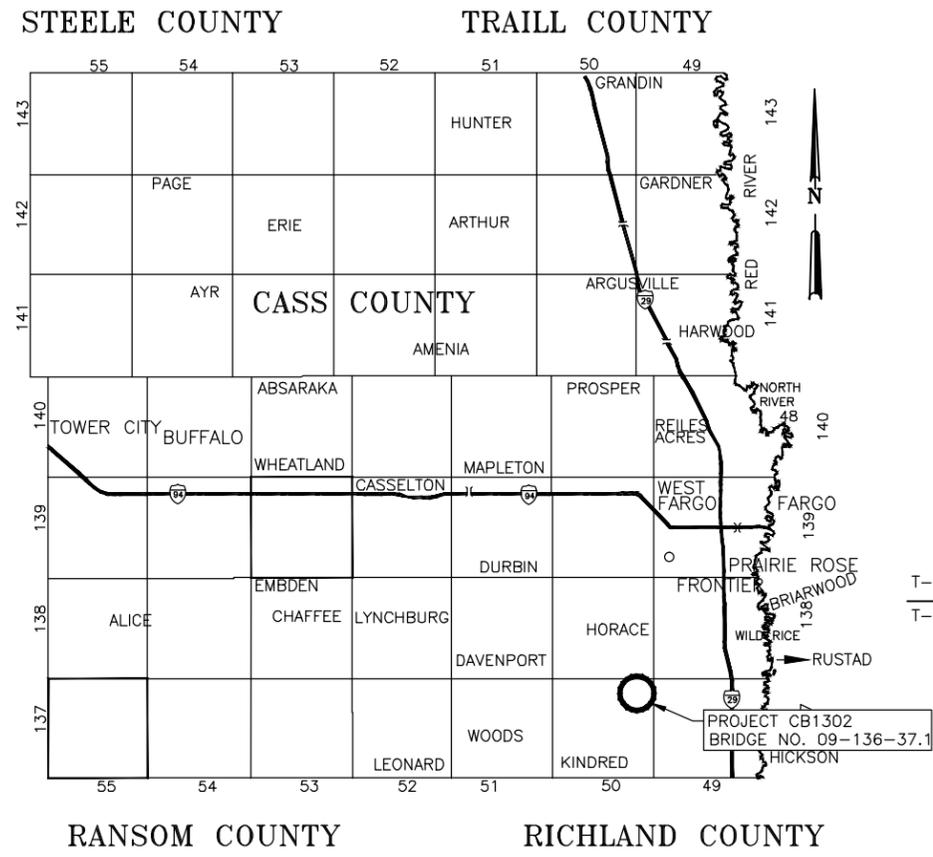
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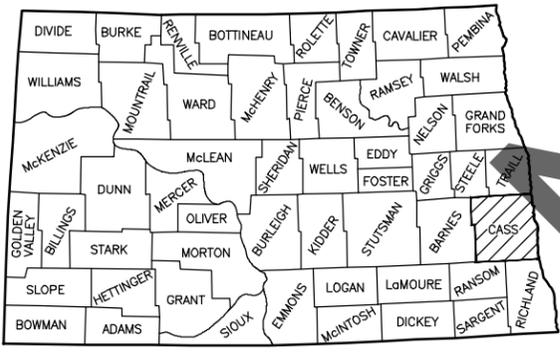
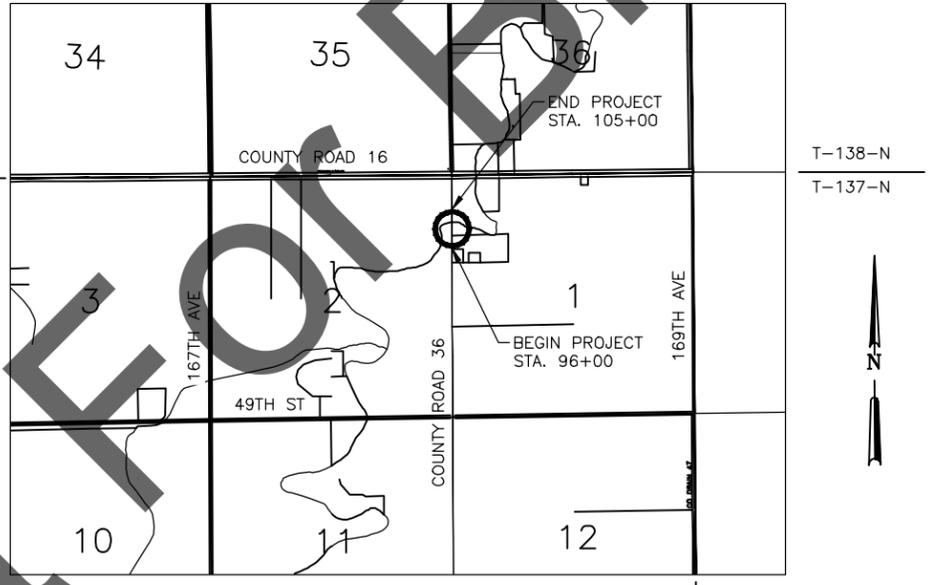
THE STANDARD DRAWINGS ARE INCLUDED IN THE BACK OF THE PLANS

LENGTH OF PROJECT = 0.170 MILES

SURVEY MAY, 2013
DESIGN FEBRUARY, 2014



PROJECT CONSISTS OF CONSTRUCTION OF A 169'-0" LONG PRESTRESSED BOX BEAM BRIDGE WITH A CAST-IN-PLACE DECK ON COUNTY ROAD 36, ROAD GRADING AND INCIDENTALS.



SKETCH MAP OF NORTH DAKOTA SHOWING COUNTIES

DESIGN DATA FOR BRIDGE 09-136-37.1				
Traffic	Average Daily			Max.Hr.
Current 2014	Pass: 51	Trucks:	Total: 51	
Forecast 2034	Pass: 56	Trucks:	Total: 56	
Clear Zone Distance: 10 FT		Design Speed: 55 MPH		
Minimum Sight Dist. for Stopping: 495 FT				
Minimum Sight Dist. for Safe Passing:				
Sight Dist. for No Passing Zone: 900 FT				
Pavement Design Life 20 (years)				

APPROVED BY CASS COUNTY ENGINEER:

JASON BENSON /S/
JASON BENSON N.D. REG. NO. PE-7490
DATE: 02/28/14



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This document was originally issued and sealed by
Jeremy L. McLaughlin,
Registration Number
PE- 4883,
on 02/28/14 and the original document is stored at
Cass County Highway Department

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NOTES:

100 DESIGN DATA:
 HL-93 LOADING
 INCLUDES 15 P.S.F. FOR FUTURE WEARING SURFACE
 CLASS AE-3 CONCRETE - f'c = 3,000 P.S.I.
 CLASS AAE-3 CONCRETE - f'c = 4,000 P.S.I.
 REINFORCING STEEL (GRADE 60) - Fy = 60,000 P.S.I.

100-P01 INDIVIDUAL ITEMS: THE COST OF THOSE ITEMS SHOWN ON PLANS BUT NOT LISTED IN THE ESTIMATE OF QUANTITIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR VARIOUS PAY ITEMS.

100-P02 SURVEY & CONSTRUCTION TESTING: ALL SURVEYING AND CONSTRUCTION TESTING SHALL BE PROVIDED BY THE OWNER.

102-P01 GEOTECHNICAL REPORT: THE FULL GEOTECHNICAL REPORT IS AVAILABLE UPON REQUEST.

105-P01 UTILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY UTILITY RELOCATION NECESSARY DURING CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR VERIFYING UTILITY LOCATIONS, CONTACTING THE UTILITY COMPANIES, AND HAVING UTILITIES MARKED AND FLAGGED PRIOR TO CONSTRUCTION. FOR THE STATE OF NORTH DAKOTA, THE LOCATE NUMBER IS 1-800-795-0555.

105-P02 PLAN LOCATION: PLAN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE VERIFIED BY THE CONTRACTOR.

107-P01 HAUL ROAD RESTRICTIONS: THE CONTRACTOR SHALL CONTACT THE APPROPRIATE COUNTY, TOWNSHIP, NDDOT AND CITY OFFICIALS TO DETERMINE IF THERE ARE ANY "NO HAUL ROUTES" PRIOR TO PREPARING A BID FOR THIS PROJECT.

202-P01 REMOVAL OF EXISTING STRUCTURE: THE CONTRACTOR IS TO REMOVE THE EXISTING 112' 3 - SPAN STEEL GIRDER BRIDGE WITH CAST IN PLACE CONCRETE DECK ALONG WITH THE 2 ADDITIONAL EXISTING CONCRETE ABUTMENTS FROM PREVIOUS BRIDGE AS NOTED ON SHEET 8. THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVAL AND PROPER DISPOSAL OF ALL PORTIONS OF THE STRUCTURE. THE DISPOSAL SITE SHALL BE AT A LOCATION OFF SITE AND APPROVED BY THE ENGINEER. THE ABUTMENT & PIER PILING SHALL BE REMOVED TO TWO FEET BELOW THE FINAL GRADE LINE AND SHALL BE INCLUDED IN THE BID FOR "REMOVAL OF STRUCTURE."

202-P02 REMOVAL OF CULVERTS - ALL TYPES AND SIZES: THE "REMOVAL OF CULVERTS - ALL TYPES AND SIZES" ITEM SHALL BE FULL COMPENSATION FOR ALL LABOR AND MATERIALS NECESSARY TO REMOVE ANY SURFACING, EXCAVATE AND REMOVE ANY TYPE OF PIPE, BACKFILL TRENCH, AND RESTORE EXISTING ROAD TO ITS ORIGINAL CONDITIONS. ANY SURFACING USED SHALL BE PAID FOR UNDER THE PARTICULAR SURFACING MATERIAL USED. ALL REMOVALS SHALL BECOME PROPERTY OF THE CONTRACTOR, UNLESS NOTED OTHERWISE. DISPOSAL SHALL BE AT A LOCATION OFF SITE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

REMOVAL OF FLARED END SECTIONS AND/OR FLAP GATES SHALL BE INCLUDED IN THE BID FOR "REMOVAL OF PIPE - ALL TYPES AND SIZES."

203-P01 SHRINKAGE: 30 PERCENT ADDITIONAL VOLUME IS INCLUDED FOR SHRINKAGE IN EMBANKMENT QUANTITIES.

203-P02 EMBANKMENT: EMBANKMENT QUANTITIES ARE LISTED FOR INFORMATIONAL PURPOSES ONLY. COSTS TO HAUL, PLACE AND COMPACT EMBANKMENT SHALL BE INCLUDED IN THE PRICE BID FOR "BORROW-EXCAVATION".

203-P03 SCARIFYING AND RECOMPACTION OF EMBANKMENT AREAS: UNDER ALL EMBANKMENT AREAS, AN ADDITIONAL 12" (BEYOND ANY TOPSOIL STRIPPING IF REQUIRED) SHALL BE SCARIFIED AND RECOMPACTED. THIS WORK SHALL BE INCLUDED IN THE BID ITEM FOR "BORROW-EXCAVATION" ALL AREAS UNDER THE ROADWAY SHALL BE COMPACTED BEFORE PLACEMENT OF AGGREGATE SURFACING.

203-P04 EMBANKMENT CONSTRUCTION: ALL CHANNEL AND ROADWAY EMBANKMENT SHALL BE COMPACTED TO THE REQUIREMENTS OF SECTIONS 203.02 A AND 203.02 G.

THE SUITABILITY OF THE MATERIAL FROM ON-SITE EXCAVATIONS FOR USE IN EMBANKMENTS WILL BE DETERMINED BY THE FIELD ENGINEER. EMBANKMENT CONSTRUCTED FROM MATERIAL EXCAVATED ON-SITE WILL NOT BE MEASURED FOR PAYMENT, BUT WILL BE CONSIDERED INCLUDED IN THE BID ITEM "BORROW EXCAVATION". EMBANKMENT WILL BE REQUIRED FOR THE CONSTRUCTION OF APPROACHES AND ROADWAY. IF MATERIAL IS NOT SUITABLE FOR THE ROADBED ITSELF, IT MAY BE USED ON SLOPE AREAS AS DETERMINED BY THE ENGINEER.

203-P05 COMPACTION AND DENSITY CONTROL: SUB-SURFACE MATERIAL SHALL BE COMPACTED WITH A SHEEPS FOOT ROLLER.

MOISTURE AND DENSITY CONTROLS SHALL BE IN ACCORDANCE WITH SECTION 203.02 G OF THE STANDARD SPECIFICATIONS AASHTO T-99 EXCEPT AS STATED BELOW.

FILL MATERIAL SHALL BE SPREAD AND COMPACTED IN LOOSE LIFTS OF 4-8 INCHES. COMPACTION SHALL MEET THE FOLLOWING REQUIREMENTS:

REFERENCE	RELATIVE COMPACTION, PERCENT (ASTM D 698 STANDARD PROCTOR)	MOISTURE CONTENT VARIANCE FROM OPTIMUM, PERCENTAGE POINTS
GRANULAR MATERIALS	> 95	SANDS (+/- 3)
CLAY MATERIALS	> 95	CLAYS (-1 TO +3)

ALL COSTS ASSOCIATED WITH SUBGRADE COMPACTION SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

203-P06 EXCAVATION AND FILL ELEVATIONS: ALL DITCH GRADES AND CONTOURS ARE GIVEN AT THE TOP OF THE TOPSOIL. A FINISHED GROUND SURFACE FOR GRADING IS AVAILABLE UPON REQUEST.

203-P07 BORROW: BORROW FOR THE ROADWAY AND EMBANKMENTS SHALL BE OBTAINED BY THE CONTRACTOR PER THE REQUIREMENTS OF SECTIONS 203.02 E.3. THE CONTRACTOR SHALL SUBMIT MATERIAL SOURCE APPROVALS TO THE ENGINEER FOR SITE APPROVAL PRIOR TO UTILIZING ANY BORROW MATERIAL. BORROW SHALL CONFORM TO THE REQUIREMENTS OF SECTION 203.02E. PAY QUANTITY SHALL BE DETERMINED FROM CROSS SECTIONING, PER SECTION 203.03A. ALL COSTS ASSOCIATED WITH OBTAINING THE SITE AND THE BORROW, INCLUDING BUT NOT LIMITED TO THE CULTURAL RESOURCE INVENTORY AND THE UTILITY ADJUSTMENT OR RELOCATIONS, SHALL BE INCLUDED IN THE PRICE BID FOR "BORROW-EXCAVATION".

203-P08 TOPSOIL: ALL DISTURBED EMBANKMENT AREAS SHALL REQUIRE REMOVAL AND REPLACEMENT OF THE TOPSOIL (QUANTITY ESTIMATED AT 4"). REMOVED TOPSOIL SHALL BE STOCKPILED WITHIN THE RIGHT-OF-WAY AT DESIGNATED OR ACCEPTABLE LOCATIONS OUTSIDE THE GRADING LIMITS. THIS WORK SHALL BE INCLUDED IN THE BID ITEM FOR TOPSOIL.

210-P01 SELECT BACKFILL: SELECT BACKFILL SHALL BE PLACED, MOISTENED OR DRIED AS REQUIRED, AND THOROUGHLY COMPACTED WITH MECHANICAL TAMPING EQUIPMENT IN MAXIMUM 6" LIFTS. MOISTURE CONTENT OF MATERIAL SHALL BE NEAR OPTIMUM MOISTURE AS DETERMINED BY THE ENGINEER. SELECT BACKFILL SHALL MEET THE REQUIREMENTS OF SECTION 816.03 - CLASS 5 MATERIAL.

MATERIAL SHALL BE PAID PER PLAN QUANTITY BASED ON LIMITS SHOWN.

210-P02 CHANNEL EXCAVATION: THE TYPICAL CHANNEL CROSS-SECTION IS TO EXTEND 50 FEET EITHER SIDE OF THE BRIDGE CENTERLINE AND TRANSITION TO MEET EXISTING GRADE AT 100 FEET FROM CENTERLINE. EXISTING ELEVATIONS WILL BE MAINTAINED AND EXTENDED AS NEEDED TO CONNECT TO GRADES AT WING WALLS. ITEM SHALL BE INCLUDED IN THE BID PRICE FOR "CHANNEL EXCAVATION." DISPOSAL OF EXCESS EXCAVATED OR WASTE MATERIALS SHALL BE IN AREAS ARRANGED BY THE COUNTY. THE DISPOSAL SITE SHALL BE ROUGH GRADED AS DIRECTED BY THE ENGINEER. 3,500 CY HAS BEEN APPROXIMATED FOR CHANNEL EXCAVATION. NO ADJUSTMENT WILL BE MADE FOR VARIATION IN QUANTITY.

210-P03 FOUNDATION PREPARATION: THE LUMP SUM PAY ITEM FOR "FOUNDATION PREPARATION" SHALL INCLUDE THOSE ITEMS LISTED IN SECTION 210.04 B. ROOTS OR OTHER VEGETATION MORE THAN 1" IN THICKNESS BELOW THE FINISHED SURFACE OF EXCAVATED SECTIONS SHALL BE REMOVED TO A DEPTH OF 6" BELOW THE FINISHED SURFACE. ALL COST TO DEWATER SHALL BE INCLUDED IN THE PRICE BID FOR "FOUNDATION PREPARATION".

210-P04 CLASS 1 EXCAVATION: EXCAVATION SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE UPPER LIMITS AS SHOWN ON THE BRIDGE LAYOUT SHEET AT THE ABUTMENTS. EXCAVATION IS ABOVE THE DATUM LINE OF 914.00.

210-P05 CLASS 2 EXCAVATION: EXCAVATION SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE UPPER LIMITS AS SHOWN ON THE BRIDGE LAYOUT SHEET AT THE PIERS. EXCAVATION IS BELOW THE DATUM LINE OF 914.00.

<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT SHEYENNE RIVER BRIDGE NO. 09-136-37.1 NOTES PROJECT NO. CB1302 5 MILES NE OF KINDRED CASS COUNTY</p>
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NOTES:

302-P01 SURFACE TOLERANCE: SURFACE TOLERANCE TYPE A (MAX. VARIANCE 0.08') SHALL BE USED ON AGGREGATE SURFACE MATERIAL.

602-P01 CONCRETE: ALL SUPERSTRUCTURE CONCRETE SHALL BE CLASS AAE-3 CONCRETE. CONCRETE FOR ABUTMENTS AND PIERS SHALL BE CLASS AE-3 CONCRETE.

SURFACE FINISH "D" (SECTION 602.03 I-5) WILL BE REQUIRED FOR ALL EXPOSED WING SURFACES OR OTHER SURFACES THAT ARE VISIBLE TO THE MOTORING PUBLIC. THE COST OF SURFACE FINISH "D" SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AAE-3 CONCRETE.

BEAMS AND GIRDERS HAVE SLIGHT VARIATIONS IN THE ANTICIPATED CAMBER. TO BUILD THE DECK TO THE DESIGNATED THICKNESS WILL REQUIRE SLIGHT ADJUSTMENTS IN DECK ELEVATION AND/OR RISER DIMENSIONS. THESE ADJUSTMENTS RESULT IN MINOR CONCRETE QUANTITY DISCREPANCIES. THE CONTRACTOR SHALL CONSIDER THE QUANTITY DISCREPANCY WHEN HE/SHE BIDS THE UNIT PRICE FOR SUPERSTRUCTURE CONCRETE.

IF THE DEPTH OF THE CONCRETE RISERS BETWEEN THE TOPS OF THE GIRDERS AND THE BOTTOM OF THE DECK SLAB EXCEEDS THE THEORETICAL DIMENSIONS, THE ADDITIONAL CONCRETE SHALL BE CONSIDERED INCIDENTAL.

DEFLECTION OF THE DECK SHORING SHALL BE COMPUTED USING THE TOTAL DEAD LOAD PLUS THE WEIGHT OF THE FINISHING MACHINE. THE FORMING SHALL BE ADJUSTED PROPERLY TO ACCOMMODATE THE DEFLECTION AND THEREBY MAINTAIN THE TOTAL SLAB THICKNESS SPECIFIED IN THE PLANS.

THE COST OF FURNISHING AND PLACING CONCRETE INSERTS, TIE WIRE, BAR SPACERS, BAR SUPPORTS, AND OTHER MISCELLANEOUS ITEMS SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AE-3 CONCRETE OR CLASS AAE-3 CONCRETE.

602-P02 END BEAMS AND PIER DIAPHRAGMS: END BEAM AND PIER DIAPHRAGM CONCRETE SHALL BE PLACED AT THE SAME TIME AS THE DECK.

602-P03 DECK CURING: NO WORK SHALL BE DONE ON THE DECK WHILE THE WET CURE IS IN PROGRESS, INCLUDING RAIL WORK.

602-P04 PENETRATING WATER REPELLENT TREATMENT: PENETRATING WATER REPELLENT SHALL BE APPLIED TO THE DRIVING SURFACE OF THE CONCRETE DECK.

612-P01 STRUCTURAL STEEL: STRUCTURAL STEEL SHALL BE AASHTO M 270, GRADE 36, EXCEPT THE REQUIREMENTS FOR CHARPY V-NOTCH TEST IS WAIVED FOR THE ICE NOSE AND ARMOR ANGLE. THE ICE NOSE AND ARMOR ANGLE SHALL BE GALVANIZED ACCORDING TO AASHTO M 111.

612-P02 REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE GRADE 60. BARS ENDING WITH THE SUFFIX "E" SHALL BE EPOXY COATED. BARS ENDING WITH THE SUFFIX "S" INDICATE A SERIES.

DIMENSIONS FOR REINFORCING STEEL BARS ARE GIVEN AS OUT TO OUT UNLESS OTHERWISE NOTED.

THE FIRST DIGIT OR THE FIRST TWO DIGITS OF EACH BAR INDICATES THE BAR SIZE.

616-P01 SHOP DRAWINGS: SHOP DRAWINGS, INCLUDING THOSE FOR THE PRESTRESSED BOX BEAMS, METAL PROTECTION ANGLE AND METAL ICE NOSE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

622-P01 PILING: THE CONTRACTOR WILL CHECK TO SEE IF EXISTING PILING OR SPREAD FOOTINGS WILL INTERFERE WITH PILING TO BE DRIVEN. IF AN INTERFERENCE WILL RESULT, THEN IT MAY REQUIRE THE RESPACING OF PILING AS DETERMINED BY THE ENGINEER IN THE FIELD AND ENGINEERING FIRM.

PILING SHALL BE DRIVEN WITH A STEAM, AIR, OR DIESEL HAMMER WITH A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 45,581 FOOT-POUND-TONS, AS COMPUTED BY THE FORMULA $W(E - 14,014) + 0.651E$, WHERE W IS THE WEIGHT OF THE RAM IN TONS, AND E IS THE RATED HAMMER ENERGY. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 3,500 POUNDS.

NO PILING SHALL BE DRIVEN ON THE PROJECT SITE WITHIN 72 HOURS OF CONCRETE PLACEMENT OR UNTIL 70% OF THE DESIGN STRENGTH OF THE CONCRETE IS REACHED.

PILE TIPS SHALL BE REQUIRED FOR ALL PILE.

708-P01 LOOSE ROCK RIPRAP: RIPRAP SHALL BE PLACED ON PREPARED SLOPES. EXACT PLACEMENT LIMITS SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.

RIPRAP SHALL CONFORM TO SECTION 708.04 OF THE STANDARD SPECIFICATIONS.

500 CUBIC YARDS OF RIPRAP HAVE BEEN INCLUDED TO BE PLACED AT THE DIRECTION OF THE ENGINEER IN THE FIELD.

708-P02 SEEDING: CONTRACTOR WILL SEED AND MULCH AREAS DISTURBED BY CONSTRUCTION ACTIVITY. CONTRACTOR SHALL PROVIDE EROSION CHECKS UNTIL TURF IS ESTABLISHED AS DIRECTED BY THE ENGINEER IN THE FIELD.

MATERIALS FOR MULCHING SHALL CONSIST OF HAY OR THE STRAW FROM OATS OR BARLEY AS NOTED IN SECTION 708.02.B.3.b.

PLAN QUANTITY FOR SEEDING SHALL BE PAY QUANTITY.

SEEDING - TYPE B CLASS V SHALL BE USED AS SHOWN IN THE TURF ESTABLISHMENT AND EROSION CONTROL PLANS. THE CONTRACTOR MAY CHOOSE TO APPLY SEEDING AS STATED IN THE STANDARD SPECIFICATIONS OR AS STATED IN THIS PLAN NOTE. THE SEED MIXTURE SHALL BE AS FOLLOWS:

CLASS V	PERCENT OF LIVE SEEDS PER ACRE
MEADOW BROMEGRASS	25%
INTERMEDIATE WHEATGRASS	25%
CRESTED WHEATGRASS	25%
TETRAPLOID INT. RYEGRASS	10%
CREeping ALFALFA	15%

80 LBS OF SEED AND 20 LBS OF RYE PER ACRE.

A GRASS DRILL USED TO SEED LAWNS SHALL BE USED TO APPLY THE SEED INTO THE SEEDBED. FERTILIZER SHALL BE A MIXTURE OF 5-10-5 APPLIED AT THE RATE OF 100 LBS PER ACRE. SEED APPLICATION RATE SHALL BE AS SHOWN IN STANDARD SPECIFICATIONS 708.02 B.3.a. ALL COST FOR LABOR, EQUIPMENT, AND MATERIALS NECESSARY TO COMPLETE THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "SEEDING-TYPE B-CLASS V".

708-P03 TEMPORARY EROSION CONTROL: THE CONTRACTOR SHALL SUBMIT A TEMPORARY EROSION CONTROL PLAN IN ACCORDANCE WITH SECTION 110 OF THE STANDARD SPECIFICATIONS AND STANDARD DRAWING D-708-2. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.

710-P01 DETOUR: THE BRIDGE SHALL BE CLOSED DURING CONSTRUCTION. NO OFFICIAL DETOUR SHALL BE MARKED. TEMPORARY LOCAL ACCESS SHALL BE MAINTAINED AT ALL TIMES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE ROADWAY AND DRIVEWAYS SO THAT THEY REMAIN ACCESSIBLE TO LOCAL RESIDENTS AND EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A MEANS OF MAINTAINING LOCAL TRAFFIC DURING THE INSTALLATION OF CULVERTS.

714-P01 CULVERTS: ALL ITEMS ASSOCIATED WITH PLACEMENT OF NEW CULVERTS, EXCLUDING REPLACEMENT OF SURFACING MATERIALS, SHALL BE INCLUDED IN THE BID PRICE FOR PIPE CORR STEEL .064IN _IN.

CULVERT LENGTHS GIVEN ON THE PLAN AND PROFILE SHEETS ARE ACTUAL CULVERT LENGTH. FLARED END SECTIONS ARE NOT INCLUDED IN TOTAL LENGTH.

714-P02 FLAP GATE: A 42" WATERMAN CAST IRON FLAP GATE SHALL BE INSTALLED ON THE NORTH END OF THE CULVERT TO THE SOUTHWEST OF THE BRIDGE AS SHOWN ON THE ROADWAY PLAN AND PROFILE SHEET. ALL COSTS ASSOCIATED WITH SUPPLYING AND INSTALLING THE FLAP GATE SHALL BE INCLUDED IN THE PRICE BID FOR 42IN FLAP GATE.

754-P01 SIGNS AND DELINEATORS: ANY EXISTING SIGNS AND DELINEATOR POSTS SHALL BE REMOVED AND RESET BY THE CONTRACTOR. THIS ITEM OF WORK IS NOT A SEPARATE PAY ITEM BUT IS INCIDENTAL TO OTHER ITEMS.

764-P01 GUARDRAIL: THE GUARDRAIL CONNECTION TO THE CONCRETE BARRIER AT THE BRIDGE ENDS SHALL BE INCLUDED IN THE BID FOR W-BEAM GUARDRAIL.

FLARED END TERMINALS WILL NOT BE ACCEPTABLE. REFER TO THE STANDARD DETAILS LISTED ON THE COVER SHEET FOR ALLOWABLE GUARDRAIL TERMINALS.

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	4	34

SUMMARY OF QUANTITIES				
SPEC	CODE	DESCRIPTION	QUANTITY	UNIT
103	0100	CONTRACT BOND	1	L SUM
201	0330	CLEARING & GRUBBING	1	L SUM
202	0104	REMOVAL OF STRUCTURE	1	EA
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	64	LF
203	0109	TOPSOIL	570	CY
203	0140	BORROW-EXCAVATION	1,826	CY
210	0101	CLASS 1 EXCAVATION (300 C.Y.)	1	L SUM
210	0111	CLASS 2 EXCAVATION (100 C.Y.)	1	L SUM
210	0127	CHANNEL EXCAVATION (3,500 C.Y.)	1	L SUM
210	0198	SELECT BACKFILL	400	TON
210	0411	FOUNDATION PREPARATION	1	L SUM
216	0100	WATER	40	M GAL
302	0320	AGGREGATE SURFACE COURSE CL 5	467	TON
602	0130	CLASS AAE-3 CONCRETE	151.1	CY
602	1130	CLASS AE-3 CONCRETE	152.0	CY
602	1208	CONCRETE BRIDGE BARRIER	338.0	LF
602	1250	PENETRATING WATER REPELLENT TREATMENT	552.9	SY
604	9610	PRESTRESSED BOX BEAM-27IN	658.0	LF
612	0115	REINFORCING STEEL-GRADE 60	12,880	LBS
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	31,894	LBS
616	5890	STRUCTURAL STEEL	1	L SUM
622	0012	STEEL H-PILE TIPS 10 X 42	10	EA
622	0020	STEEL PILING HP 10 X 42	750	LF
622	0040	STEEL PILING HP 12 X 53	550	LF
622	99999	STEEL H-PILE TIPS 12 X 53	10	EA
702	0100	MOBILIZATION	1	L SUM
704	1000	TRAFFIC CONTROL SIGNS	458	UNITS
704	1052	TYPE III BARRICADE	10	EA
708	1020	RIPRAP-LOOSE ROCK	997	CY
708	1375	FLOTATION SILT CURTAIN	180	LF
708	1376	REMOVAL FLOTATION SILT CURTAIN	180	LF
708	1430	FIBER ROLLS 12IN	1,830	LF
708	1431	REMOVAL FIBER ROLLS 12IN	915	LF
708	2260	SEEDING-TYPE B-CL IV (P)	1.06	ACRE
708	2280	SEEDING-TYPE B-CL V (P)	1.06	ACRE
708	5500	MULCHING (P)	2.12	ACRE
714	3150	HEADWALL - PRECAST CONCRETE 4IN	2	EA
714	5035	PIPE CORR STEEL .064IN 24IN	68	LF
714	5315	PIPE CORR STEEL .109IN 42IN	76	LF
714	5820	END SECT CORR STEEL .064IN 24IN	4	EA
714	5835	END SECT CORR STEEL .109IN 42IN	3	EA
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	65	LF
714	9770	UNDERDRAIN PIPE PVC NON-PERFORATED 4IN	84	LF
714	9917	FLAP GATE 42IN	1	EA
764	0131	W-BEAM GUARDRAIL	308	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL	4	EA

NOTES:

- WHERE A SPEC AND CODE ITEM DESCRIPTION IS FOLLOWED BY A (P), THE PLAN QUANTITY SHALL BE THE FINAL PAY QUANTITY.

BASIS OF ESTIMATE

MATERIAL

SELECT BACKFILL 1.875 TON/CY
 AGGREGATE CL 5 1.875 TON/CY
 SEEDING ALL DISTURBED AREAS OUTSIDE OF ROADBED

TOPSOIL QUANTITY BASED ON 4" DEPTH

WATER FOR COMPACTION

EMBANKMENT 10 GAL/CY
 AGGREGATE BASE CLASS 5 20 GAL/TON
 ADDITIONAL INCLUDED AS DUST PALLIATIVE 10 M GAL/MILE

EARTHWORK

TOTAL EMBANKMENT* = 2,078 CY
 LOOSE VOLUME REQUIRED* = 2,701 CY
 (BASED ON 130% COMPACTION)
 COMMON EXCAVATION VOLUME = 0 CY
 CHANNEL EXCAVATION VOLUME = 3,500 CY
 USABLE CHANNEL EXCAVATION = 875 CY
 (BASED ON 25% USABLE)
 BORROW EXCAVATION REQUIRED = 1,826 CY
 (BORROW EXCAVATION)

*NOT A PAY ITEM (INCIDENTAL TO OTHER ITEMS)

ENVIRONMENTAL COMMITMENTS

COMMITMENT NO. 1: A CONCRETE STRUCTURE OR BRIDGE WILL BE DEMOLISHED AS A PART OF THIS PROJECT. SFN 17987 ASBESTOS NOTIFICATION OF DEMOLITION AND RENOVATION IS REQUIRED.

ACTION TAKEN/REQUIRED: THE CONTRACTOR WILL COMPLETE AND SUBMIT SFN 17987 TO THE NORTH DAKOTA DEPARTMENT OF HEALTH 10 DAYS PRIOR TO BEGINNING THE ACTIVITY.

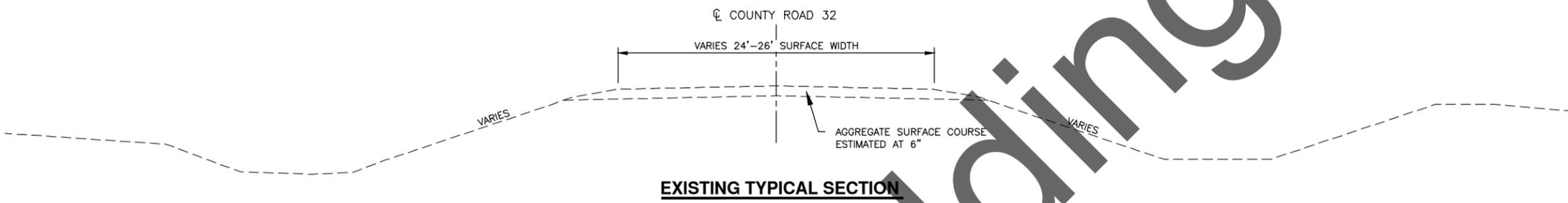
COMMITMENT NO. 2: ACTIVE MIGRATORY BIRD NESTS WITH EGGS OR CHICKS ARE PROTECTED BY THE FEDERAL MIGRATORY BIRD TREATY ACT. DEMOLITION ON BRIDGES OR BOX CULVERTS WITH ACTIVE NESTING CAN NOT START UNTIL NESTING SEASON IS OVER UNLESS MEASURES ARE TAKEN TO PREVENT NESTING.

ACTION TAKEN/REQUIRED: THE CONTRACTOR SHALL NOT REMOVE ANY EXISTING BRIDGE OR BOX CULVERT IF ACTIVE NESTS ARE PRESENT. THE CONTRACTOR CAN LEGALLY REMOVE INACTIVE NESTS PRIOR TO THE NESTING SEASON. AFTER INACTIVE NESTS ARE REMOVED THE CONTRACTOR CAN USE NETS OR TARPS SECURED TO THE STRUCTURE TO DISCOURAGE NESTING. PLEASE ALSO REFER TO THE BRIDGE NOTE SECTION OF THE PLANS.

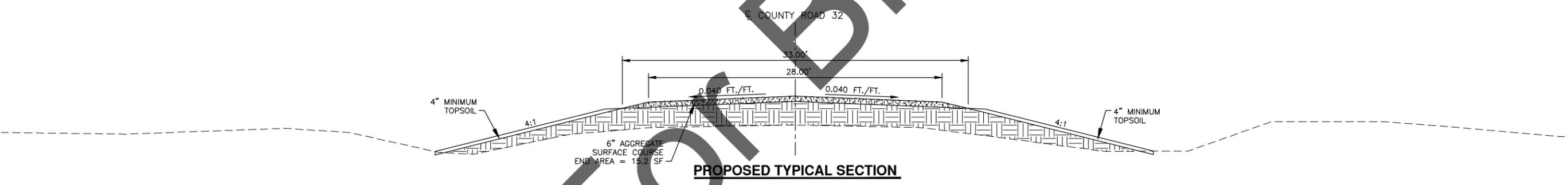
Not For Bidding

<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT SHEYENNE RIVER BRIDGE NO. 09-136-37.1 BASIS OF ESTIMATE PROJECT NO. CB1302 5 MILES NE OF KINDRED CASS COUNTY</p>
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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	5	34



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

Not For Bidding

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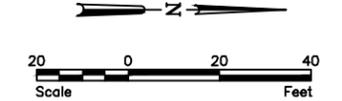
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LEGEND

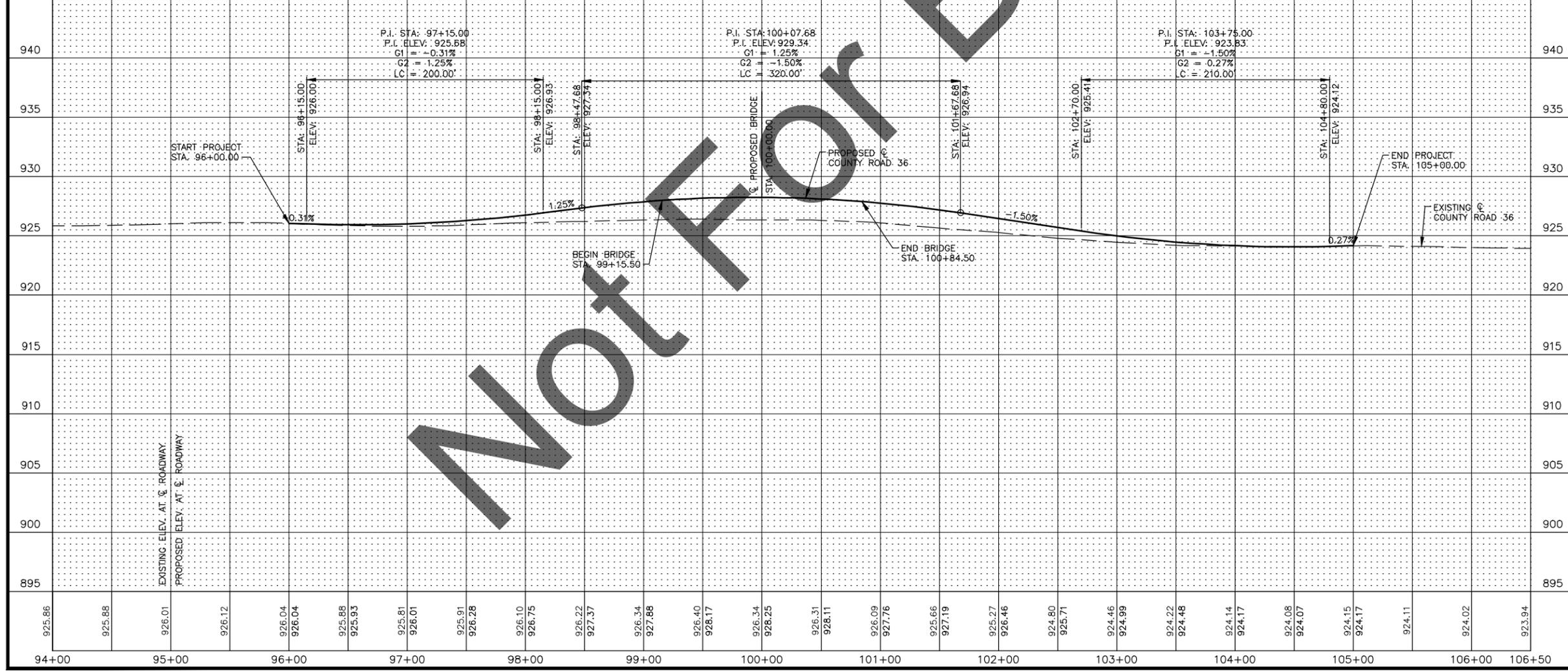
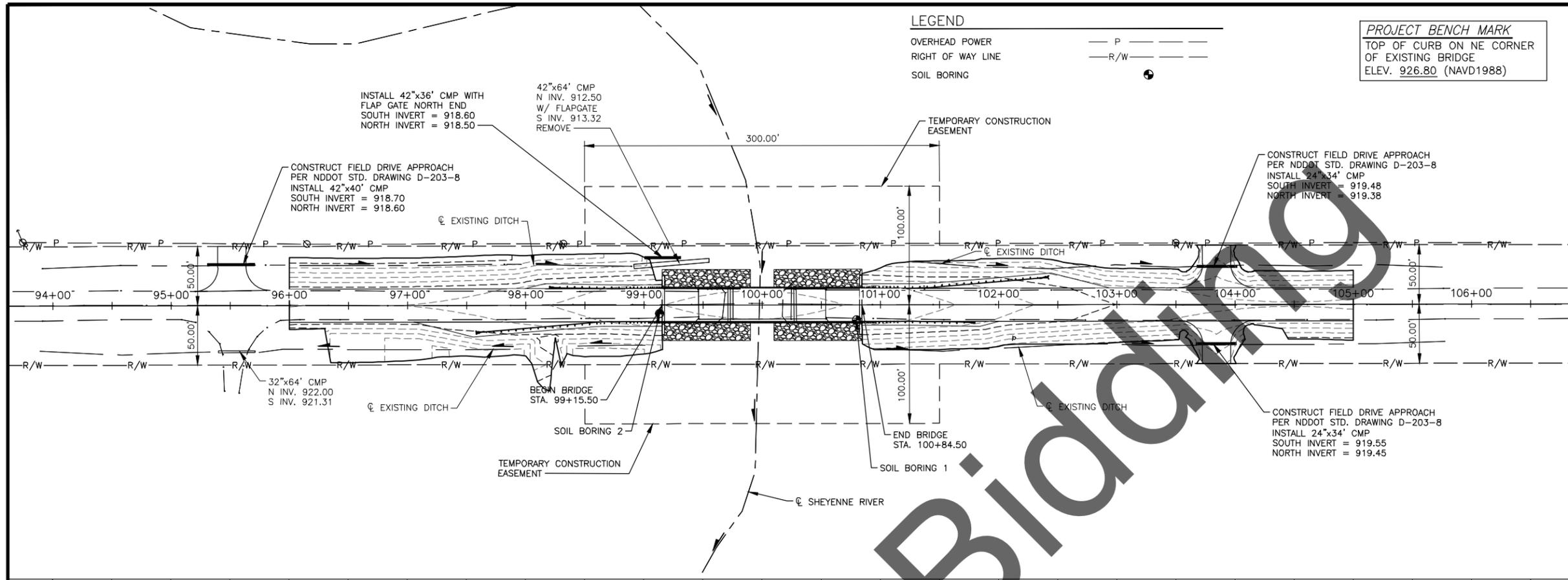
- OVERHEAD POWER — P —
- RIGHT OF WAY LINE — R/W —
- SOIL BORING —

PROJECT BENCH MARK
 TOP OF CURB ON NE CORNER
 OF EXISTING BRIDGE
 ELEV. 926.80 (NAVD1988)

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	6	34



Item	Description	Quantity	Unit
202-0174	REMOVAL OF PIPE ALL TYPES AND SIZES	64	LF
714-5035	PIPE CORR STEEL .064IN 24IN	68	LF
714-5315	PIPE CORR STEEL .109IN 42IN	76	LF
714-5820	END SECT CORR STEEL .064IN 24IN	4	EA
714-5835	END SECT CORR STEEL .109IN 42IN	3	EA
714-9917	FLAP GATE 42IN	1	EA



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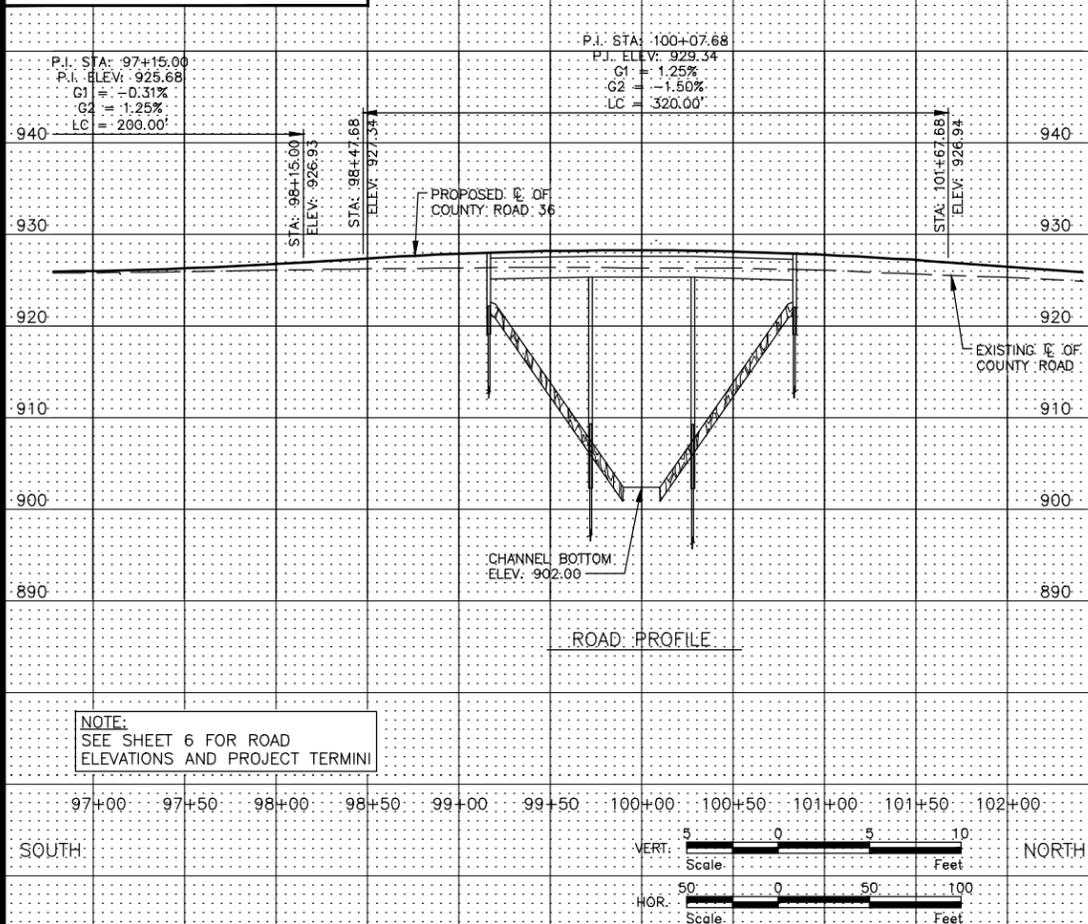
CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
ROAD PLAN AND PROFILE

 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

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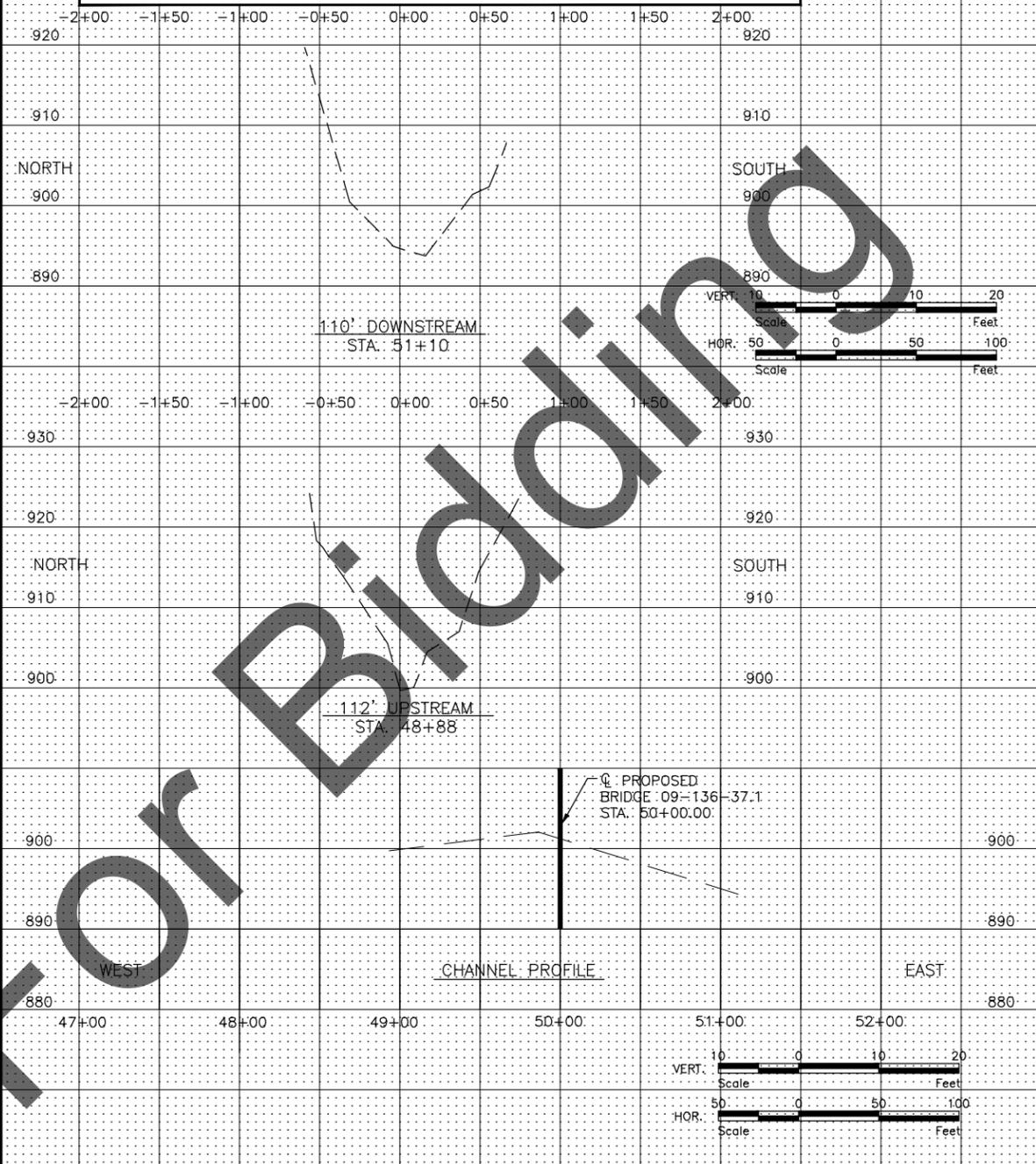
CONTRACTED PROFILE

SCALES AS SHOWN



TYPICAL SECTIONS & PERTINENT DATA

SCALES AS SHOWN



LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

- Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating. NONE
- Other bridges or culverts over the same stream (particularly structures which carry highwater without overflow of roadway): Given locations, type, length, height above highwater, cross-sectional area, etc. APPROX. 3 MILES UPSTREAM, 180' LONG 3-SPAN BRIDGE
TOTAL WATERWAY AREA = 1900 SQ. FT.
APPROX. 1/4 MILE DOWNSTREAM 175' LONG 3-SPAN BRIDGE
TOTAL WATERWAY AREA = 1818 SQ. FT.
- Apparent highwater elevation N/A Obtained from _____
- Other data: Approx. velocity of water at time of survey N/A

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE JAN 30, 2014

STREAM OR DITCH DESIGNATION SHEYENNE RIVER
 DRAINAGE AREA 5,070 SQ. MILES
 MAX FLOOD OF RECORD UNKNOWN DESIGN FLOOD 923.40
 MAX OBSERVED HIGHWATER ELEVATION N/A DESIGN HIGH WATER N/A
 DESIGN MEAN VELOCITY THROUGH STRUCTURE 2.4 F.P.S.
 LOW SUPERSTRUCTURE AT OR ABOVE ELEVATION 924.50
 FLOWLINE ELEVATION 902.00 SKEW ANGLE NONE
 WATERWAY AREA REQUIRED BELOW ELEVATION 924.50 = 2125.0 SQ. FT. AT RIGHT ANGLES TO CHANNEL
 IN THE INTEREST OF FLOOD PLAIN ZONING THE REGIONAL FLOOD (100 YR.) IS 4,600 C.F.S. AT STAGE 923.4 AND MEAN VELOCITY OF 2.4 F.P.S. WITH N/A FT. SWELLHEAD. THE ABOVE RECOMMENDATION WILL PROVIDE A STRUCTURE OF ADEQUATE WATERWAY TO PASS THE REGIONAL FLOOD WITHIN CRITERIA ESTABLISHED BY THE DEPARTMENT OF NATURAL RESOURCES.

FOUNDATION ENGINEER'S RECOMMENDATION

DATE JAN 31, 2014

FROM MIDWEST TESTING LAB REPORT NO. M1135015 RECOMMEND THE PROPOSED BRIDGE BE SUPPORTED BY A DEEP PILE FOUNDATION SYSTEM, SUGGEST USING H-PILE DRIVEN TO REFUSAL IN THE HARD, SANDY, LEAN CLAYS FIRST ENCOUNTERED AT DEPTHS OF APPROXIMATELY 72 TO 74 FEET BELOW EXISTING GRADE. RECOMMEND USING ROCK TIPS ON ALL PILE. RECOMMEND THE SLOPES OF THE CHANNEL BELOW THE BRIDGE BE A MINIMUM OF 3H:1V.

Bridge survey sheets made from: HOUSTON ENGINEERING INC.

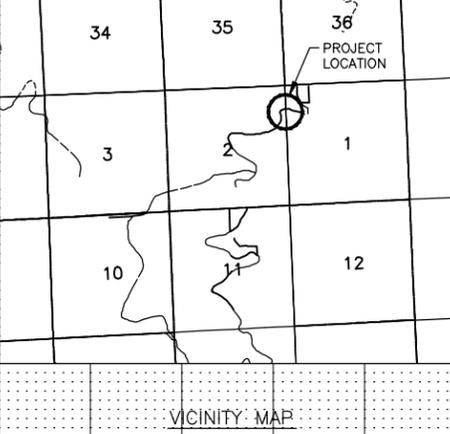
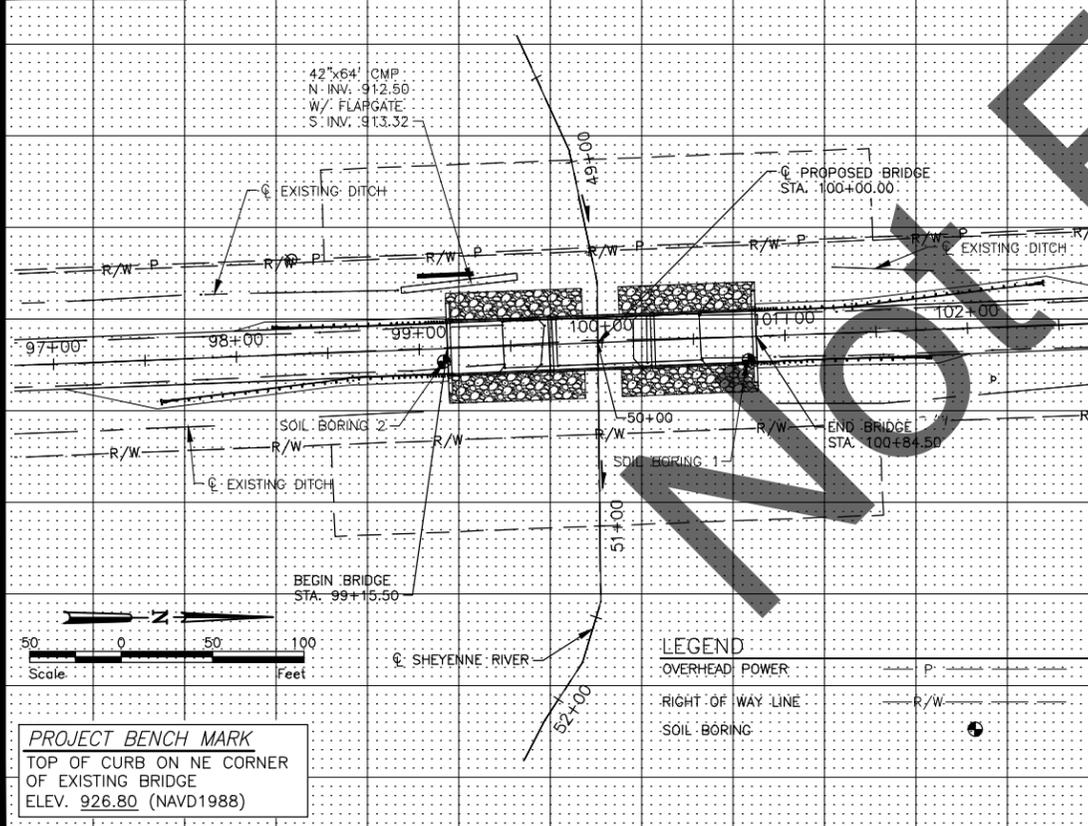
Bench mark elevation 926.80 (NAVD 1988 DATUM)
 Location: TOP OF CURB ON NE CORNER OF EXISTING BRIDGE

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NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
BRIDGE SURVEY
 OVER SHEYENNE RIVER
 (T.H., C.S.A.H., C.R. etc.)
 PROPOSED BRIDGE LOCATED 5 MILES NORTHEAST OF KINDRED
 SEC. 1/2 TWP. 137 N R. 50 W
 TOWNSHIP NORMANNA COUNTY CASS
BRIDGE NO. 09-136-37.1

PLAT

SCALES AS SHOWN



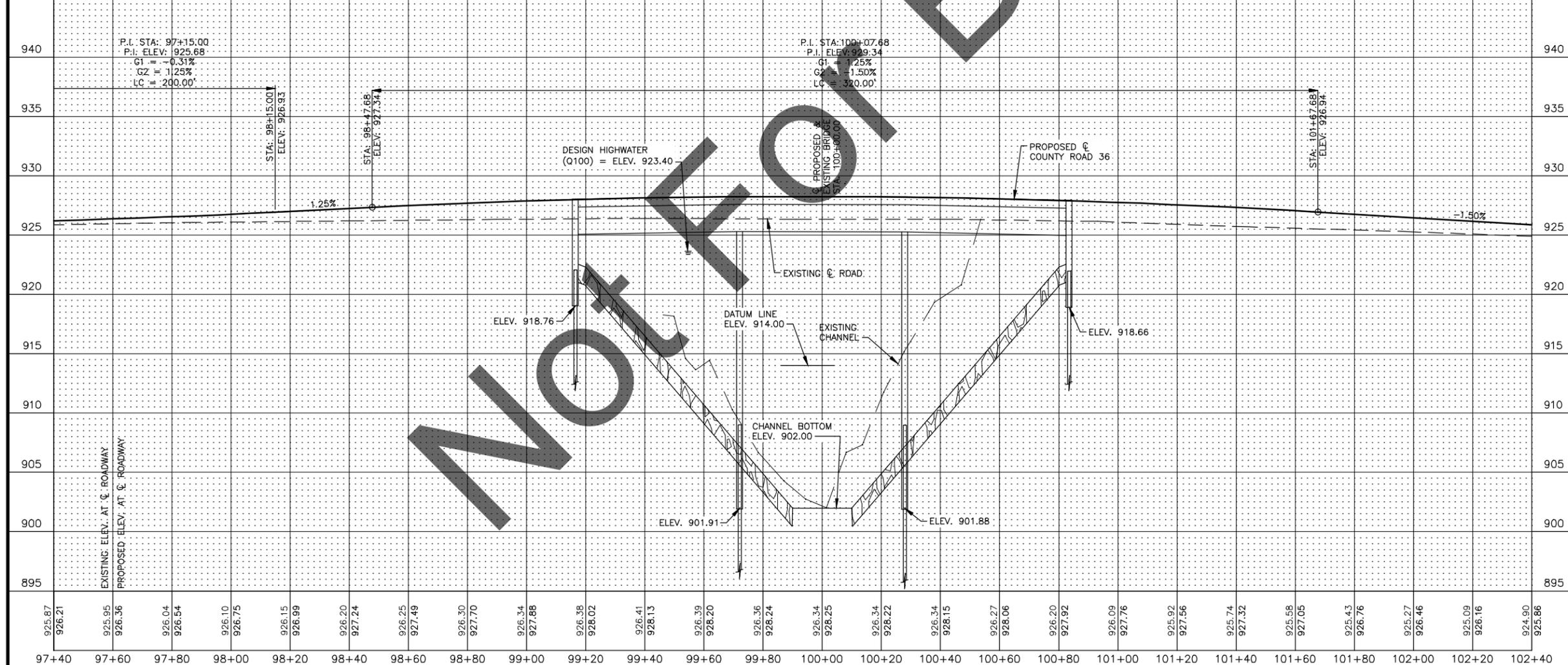
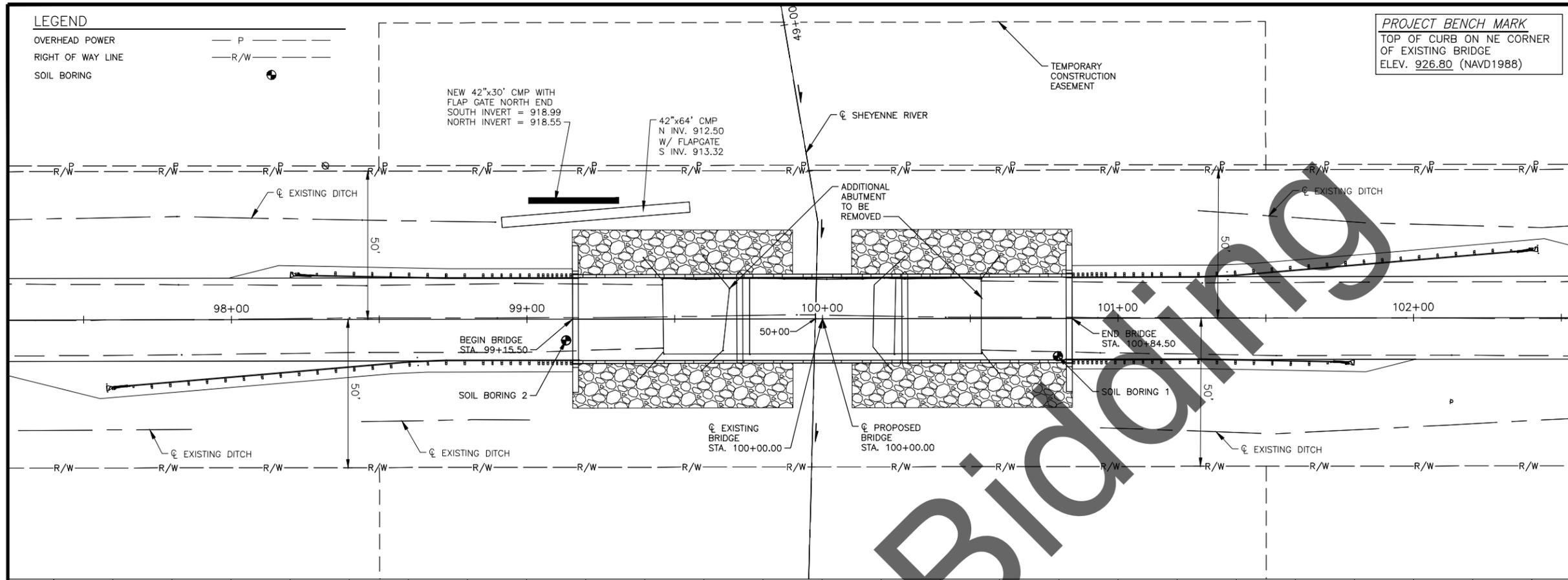
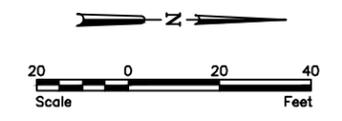
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LEGEND

OVERHEAD POWER	— P —
RIGHT OF WAY LINE	— R/W —
SOIL BORING	⊙

PROJECT BENCH MARK
 TOP OF CURB ON NE CORNER
 OF EXISTING BRIDGE
 ELEV. 926.80 (NAVD1988)

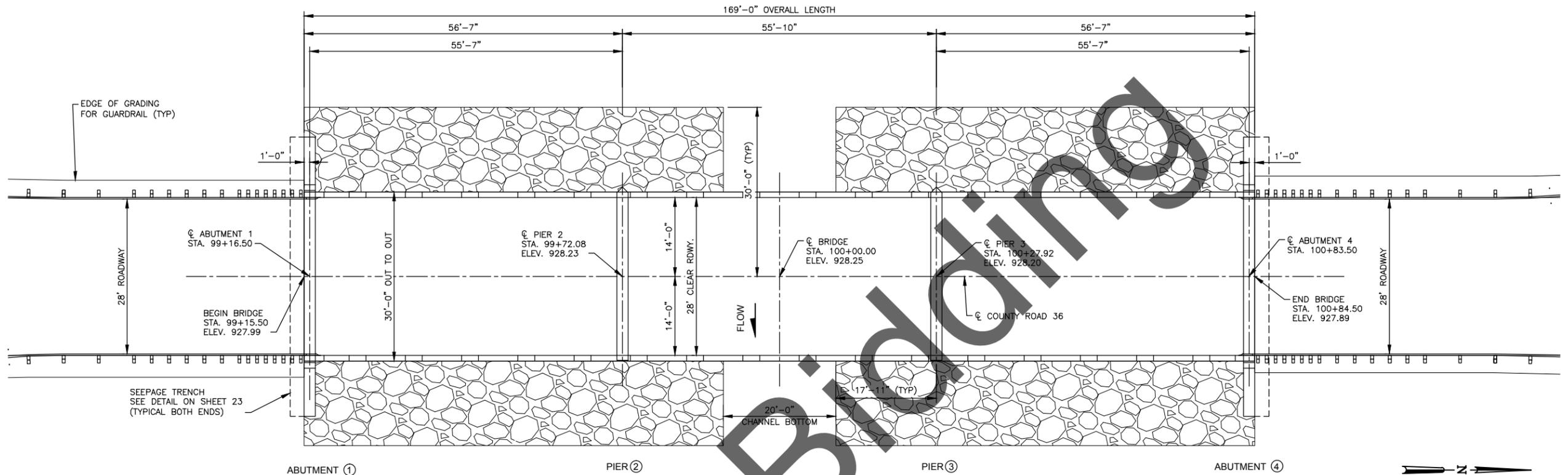
PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	8	34



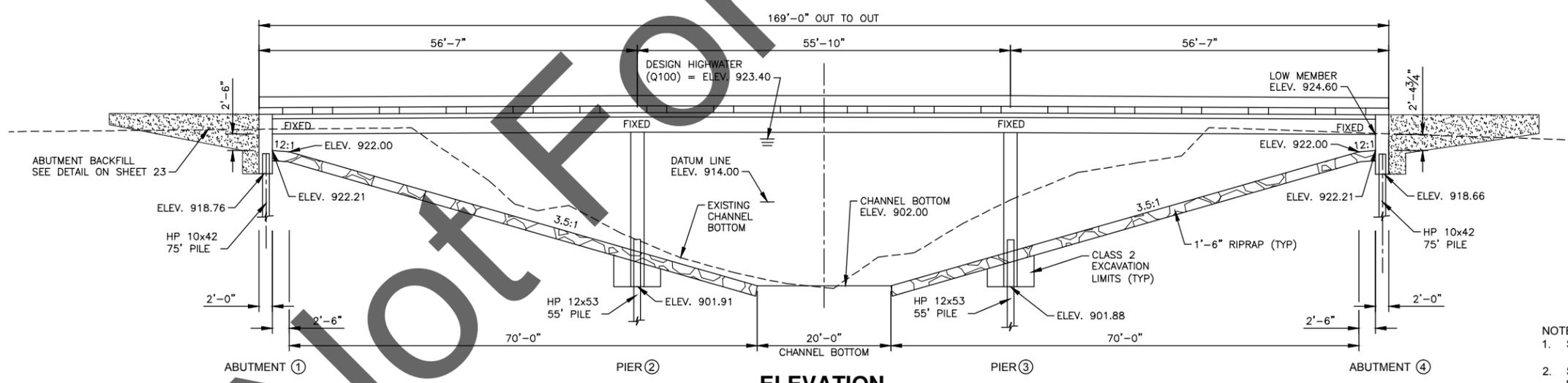
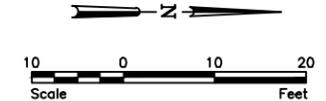
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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
BRIDGE PLAN AND PROFILE
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY



PLAN VIEW



ELEVATION

- NOTES:
- SEE SHEET 13 FOR PILING LOCATIONS.
 - SEE SHEET 28 FOR GUARDRAIL TRANSITION DETAILS.

HYDRAULIC DESIGN DATA		GIRDER DATA												
DRAINAGE AREA	5,070 SQ. MI.	LENGTH "L"	SPACE BETWEEN BEAMS	THICKNESS OF SLAB BETW. BMS	THICKNESS OF SLAB ON TOP BMS	BOX BEAM DEPTH	LIVE LOAD	FINAL STRESSING FORCE AT MIDSPAN						
50 YR DESIGN DISCHARGE	4,175 CFS							A	KIPS	A	KIPS	A	KIPS	WEIGHT TONS
STREAM GRADIENT	0.024%	54'-10"	8'-3"	8"	9"	27"	HL-93	2.00	587.9	2.25	596.5	2.50	605.4	15.7
50 YR DESIGN STAGE	922.5	DETENSIONING STRENGTH 4,500 PSI					ACCEPTANCE STRENGTH 5,500 PSI							
50 YR STREAM VELOCITY AT BRIDGE	2.3 FPS	BENCH MARKS												
100 YR DESIGN DISCHARGE	4600 CFS	NO.	DESCRIPTION	LOC.	ELEV.									
100 YR FLOOD STAGE	923.4	1	TOP OF CURB	NE CORNER OF EXISTING BRIDGE	926.80									
100 YR VELOCITY AT BRIDGE	2.4 FPS													

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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
BRIDGE LAYOUT
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

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BORING LOG NO. B-1												Page 1 of 3	
PROJECT: Proposed Structure Replacement						CLIENT: Cass County Commission Fargo							
SITE: CB 1302, Normanna Township Cass County, North Dakota						North Dakota							
DEPTH (FT.)	ELEVATION (FT.)	DESCRIPTION	WATER LEVEL OBSERVATIONS	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	LL-PL-PI		
0.0	91.5	FILL - MIXTURE OF TOPSOIL AND LEAN CLAY, black and brown, frozen to 4'											
8.0	91.5	TOPSOIL (CL), black, stiff											
10.0	89.5	LEAN CLAY (CL), dark grayish brown, stiff											
12.0	87.5	SILT WITH SAND (ML), grayish brown, loose, wet											
14.0	85.5	SILTY SAND (SM), brown, fine, loose, wet						30					
18.0	81.5	LEAN CLAY WITH SAND (CL), grayish brown, soft											
28.0	71.5	POORLY GRADED SAND (SP), light grayish brown, fine, medium dense, wet											
Stratification lines are approximate. In-situ, the transition may be gradual.													
Advancement Method: Hollow Stem Auger 0-19 1/2" Tricone & Drilling Mud 19 1/2-175'				See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.				Notes: Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-4					
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.				See Appendix C for explanation of symbols and abbreviations.				Notes: Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-4					
WATER LEVEL OBSERVATIONS 14.3' initially observed before HSA removal. Water level influenced by drilling fluid.								Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-4					

BORING LOG NO. B-1												Page 2 of 3	
PROJECT: Proposed Structure Replacement						CLIENT: Cass County Commission Fargo							
SITE: CB 1302, Normanna Township Cass County, North Dakota						North Dakota							
DEPTH (FT.)	ELEVATION (FT.)	DESCRIPTION	WATER LEVEL OBSERVATIONS	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	LL-PL-PI		
32.0	67.5	POORLY GRADED SAND (SP), light grayish brown, fine, medium dense, wet (continued)											
		FAT CLAY (CH), gray, soft											
35.0													
35.0													
40.0													
45.0													
55.0													
60.0													
Stratification lines are approximate. In-situ, the transition may be gradual.													
Advancement Method: Hollow Stem Auger 0-19 1/2" Tricone & Drilling Mud 19 1/2-175'				See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.				Notes: Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-5					
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.				See Appendix C for explanation of symbols and abbreviations.				Notes: Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-5					
WATER LEVEL OBSERVATIONS 14.3' initially observed before HSA removal. Water level influenced by drilling fluid.								Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-5					

BORING LOG NO. B-1												Page 3 of 3	
PROJECT: Proposed Structure Replacement						CLIENT: Cass County Commission Fargo							
SITE: CB 1302, Normanna Township Cass County, North Dakota						North Dakota							
DEPTH (FT.)	ELEVATION (FT.)	DESCRIPTION	WATER LEVEL OBSERVATIONS	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	LL-PL-PI		
		FAT CLAY (CH), gray, soft (continued)											
65.0													
72.0	27.5	SANDY LEAN CLAY WITH GRAVEL (CL), dark gray, with cobbles or boulders											
75.0	24.5	Sampler and tricone refusal on boulder @ 75' Boring Terminated at 75 Feet											
Stratification lines are approximate. In-situ, the transition may be gradual.													
Advancement Method: Hollow Stem Auger 0-19 1/2" Tricone & Drilling Mud 19 1/2-175'				See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.				Notes: Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-6					
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.				See Appendix C for explanation of symbols and abbreviations.				Notes: Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-6					
WATER LEVEL OBSERVATIONS 14.3' initially observed before HSA removal. Water level influenced by drilling fluid.								Boring Started: 4/17/2013 Boring Completed: 4/17/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-6					

NOTE:
SEE SHEET 6 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
SOIL BORING 1
PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

BORING LOG NO. B-2												Page 1 of 3	
PROJECT: Proposed Structure Replacement						CLIENT: Cass County Commission Fargo							
SITE: CB 1302, Normanna Township Cass County, North Dakota						North Dakota							
DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	GRAPHIC LOG			
LOCATION See Exhibit A-2 Latitude: 46.71424° Longitude: -96.94711° Surface Elev.: 99.5 (Fl.)													
0.0										FILL - LEAN CLAY, dark gray and dark brown, frozen			
5.0		X	10	9-5-6 N=11						SILTY SAND (SM), dark brown, fine, medium dense, moist, trace of organics			
7.0		X	14	5-5-6 N=11						SILT WITH SAND (ML), brown, medium dense, moist			
9.0		X	16	3-3-3 N=6						LEAN CLAY (CL), brown, medium stiff to soft			
16.0		X	10	1-2-2 N=4			26		31-20-11	SILTY SAND (SM), brown, fine, loose, wet, lenses and layers of lean clay			
23.0		X	16	4-5-6 N=11			22			SILTY SAND (SM), gray, fine, medium dense to very loose, wet, trace of small aquatic shells and organics			
Stratification lines are approximate. In-situ, the transition may be gradual.												Hammer Type: Mobile Downhole	
Advancement Method: Hollow Stem Auger 0-34 1/2" Tricone & Drilling Mud 34 1/2"-74 1/2"				See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).				Notes:					
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.				See Appendix C for explanation of symbols and abbreviations.									
WATER LEVEL OBSERVATIONS 14.6' initially observed before HSA removal. Water level influenced by drilling fluid.				Midwest Testing				Boring Started: 4/18/2013 Boring Completed: 4/18/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-7					

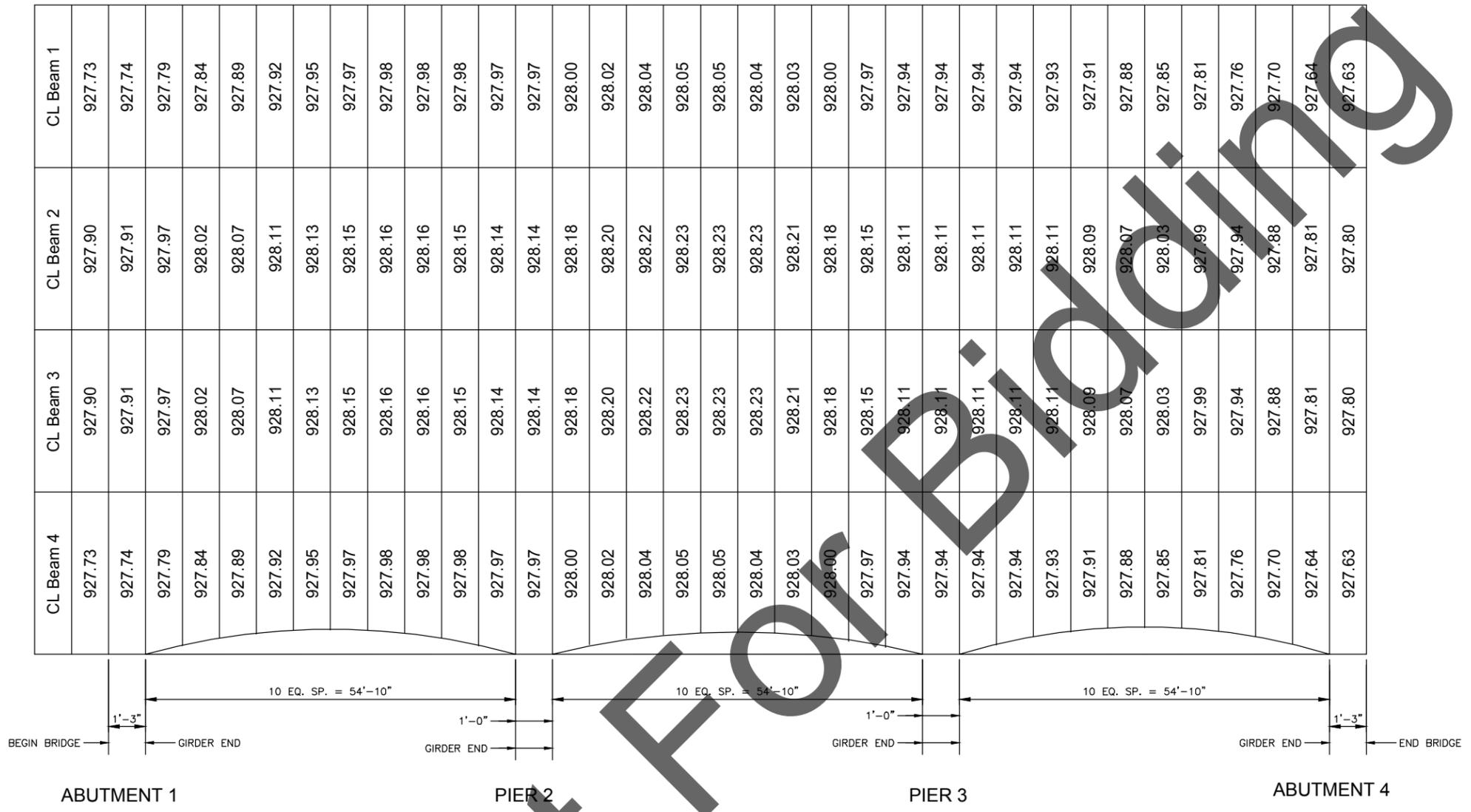
BORING LOG NO. B-2												Page 2 of 3	
PROJECT: Proposed Structure Replacement						CLIENT: Cass County Commission Fargo							
SITE: CB 1302, Normanna Township Cass County, North Dakota						North Dakota							
DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	GRAPHIC LOG			
LOCATION See Exhibit A-2 Latitude: 46.71424° Longitude: -96.94711° Surface Elev.: 99.5 (Fl.)													
33.0		X	16	1-1-2 N=3						SILTY SAND (SM), gray, fine, medium dense to very loose, wet, trace of small aquatic shells and organics (continued)			
33.0										FAT CLAY (CH), gray, soft			
35.0						1680	46	74	74-31-43				
45.0		X	18	2-2-2 N=4	2200 (HP)		42			SANDY LEAN CLAY WITH GRAVEL (CL), dark gray, hard, with cobbles and boulders			
55.0		X	18	1-2-2 N=4	1600 (HP)		44			Boring terminated on boulder at 75.5 feet. Boring Terminated at 75.5 Feet			
Stratification lines are approximate. In-situ, the transition may be gradual.												Hammer Type: Mobile Downhole	
Advancement Method: Hollow Stem Auger 0-34 1/2" Tricone & Drilling Mud 34 1/2"-74 1/2"				See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).				Notes:					
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.				See Appendix C for explanation of symbols and abbreviations.									
WATER LEVEL OBSERVATIONS 14.6' initially observed before HSA removal. Water level influenced by drilling fluid.				Midwest Testing				Boring Started: 4/18/2013 Boring Completed: 4/18/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-8					

BORING LOG NO. B-2												Page 3 of 3	
PROJECT: Proposed Structure Replacement						CLIENT: Cass County Commission Fargo							
SITE: CB 1302, Normanna Township Cass County, North Dakota						North Dakota							
DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	GRAPHIC LOG			
LOCATION See Exhibit A-2 Latitude: 46.71424° Longitude: -96.94711° Surface Elev.: 99.5 (Fl.)													
65.0		X	18	1-1-2 N=3	1600 (HP)		27			FAT CLAY (CH), gray, soft (continued)			
75.0		X	4	N=35/4*	4200 (HP)		17			SANDY LEAN CLAY WITH GRAVEL (CL), dark gray, hard, with cobbles and boulders Boring terminated on boulder at 75.5 feet. Boring Terminated at 75.5 Feet			
Stratification lines are approximate. In-situ, the transition may be gradual.												Hammer Type: Mobile Downhole	
Advancement Method: Hollow Stem Auger 0-34 1/2" Tricone & Drilling Mud 34 1/2"-74 1/2"				See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any).				Notes:					
Abandonment Method: Borings backfilled with soil cuttings. Reversed auger upon completion.				See Appendix C for explanation of symbols and abbreviations.									
WATER LEVEL OBSERVATIONS 14.6' initially observed before HSA removal. Water level influenced by drilling fluid.				Midwest Testing				Boring Started: 4/18/2013 Boring Completed: 4/18/2013 Drill Rig: Mobile B-53 Driller: DW Project No.: M1135015 Exhibit: A-9					

NOTE:
SEE SHEET 6 FOR BORING LOCATIONS

CASS COUNTY
HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
SOIL BORING 2

PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

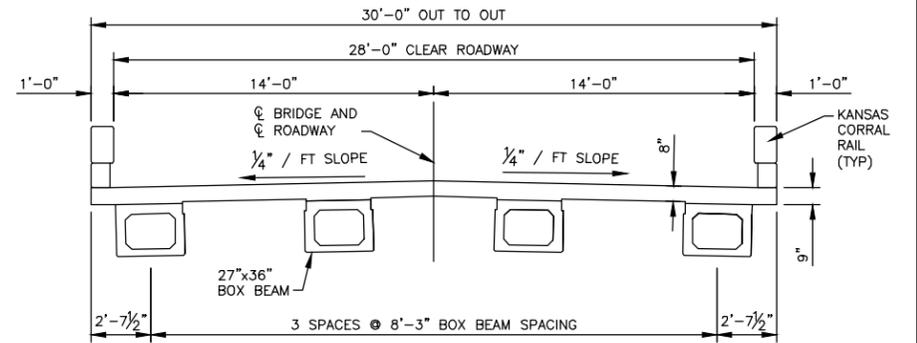
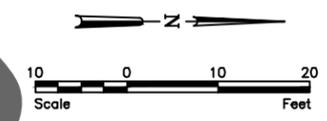
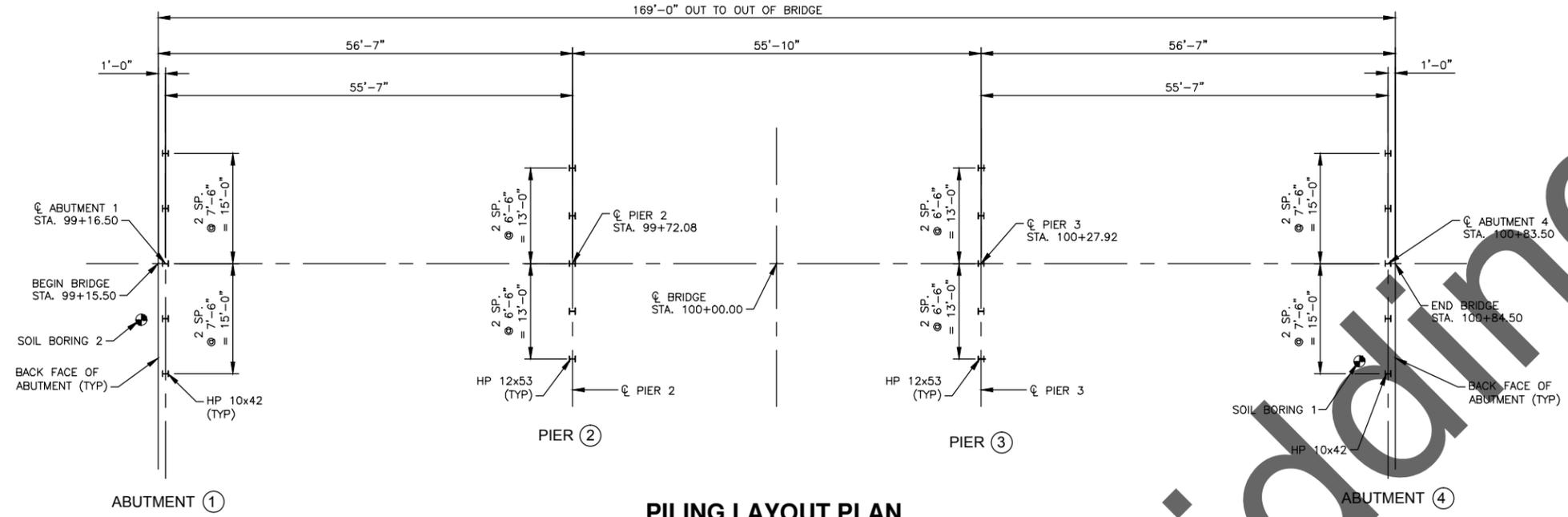


SCREED ELEVATIONS
NOT TO SCALE

- NOTES:
- ELEVATIONS ARE TO TOP OF FINISHED ROADWAY.
 - WEIGHT OF SCREED NOT INCLUDED IN CALCULATION OF DEFLECTIONS.
 - BEAM 1 IS WEST EXTERIOR BEAM.

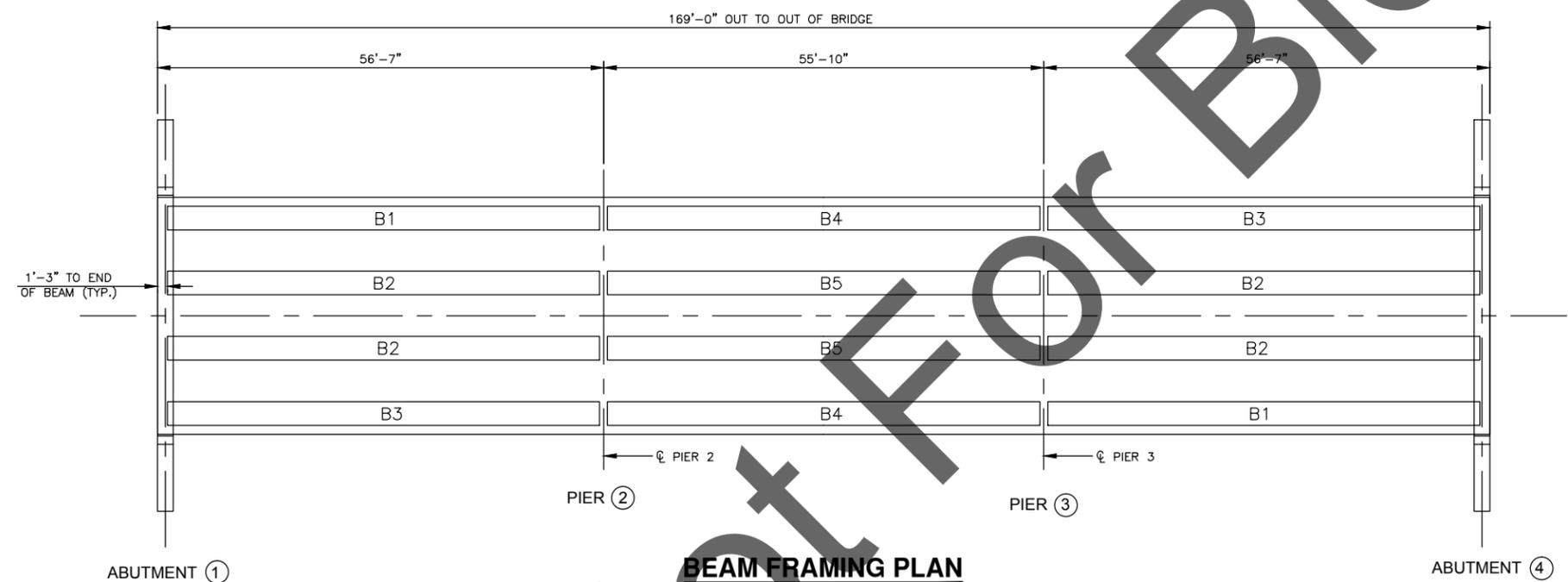
<p>This document was originally issued and sealed by Jeremy L. McLaughlin, Registration Number PE- 4883, on 02/28/14 and the original document is stored at Cass County Highway Department</p>	<p>CASS COUNTY HIGHWAY DEPARTMENT SHEYENNE RIVER BRIDGE NO. 09-136-37.1 SCREED ELEVATIONS PROJECT NO. CB1302 5 MILES NE OF KINDRED CASS COUNTY</p>
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Z:\6000\6006\12_6006_054_CB1302\CAD\Plans\SCREED ELEVATIONS.dwg -SCREED ELEVATIONS -2/27/2014 4:24 PM -(cwagner)



- NOTES:
- FOR DOUBLE OR SINGLE ACTING DIESEL HAMMERS, THE SAFE BEARING SHALL BE DETERMINED BY THE FOLLOWING FORMULA:

$$P = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$
 - SEE STANDARD DRAWING D-622-1 FOR PILE SPLICE DETAILS.
 - PILES SHALL BE DRIVEN TO THE FOLLOWING LOADING
 HP10x42 ~ 105 TONS
 HP12x53 ~ 130 TONS



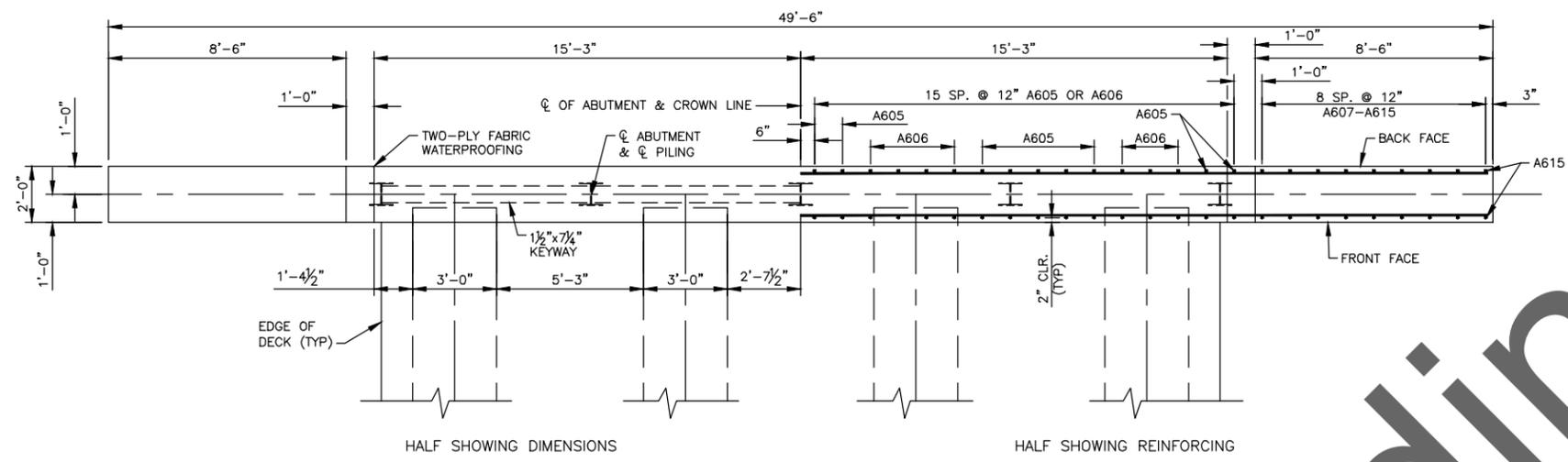
BEARING SEAT ELEVATIONS				
GIRDER HT. = 27"	POSI-RISER = 1 1/2"	DECK = 8"		
	FILLER = 3/8"	TOTAL = 3.07'		
BEAM LOCATION	WEST FACIA	WEST INTERIOR	EAST INTERIOR	EAST FACIA
ABUTMENT 1	924.67	924.84	924.84	924.67
PIER 2	924.90	925.08	925.08	924.90
PIER 3	924.87	925.04	925.04	924.87
ABUTMENT 4	924.57	924.74	924.74	924.57

PILE LOADING (TONS)			
LOCATION	DEAD LOAD	LIVE LOAD	DESIGN LOAD
ABUTMENT 1	36.9	25.6	62.5
PIER 2	55.8	39.2	95.0
PIER 3	55.8	39.2	95.0
ABUTMENT 4	36.9	25.6	62.5

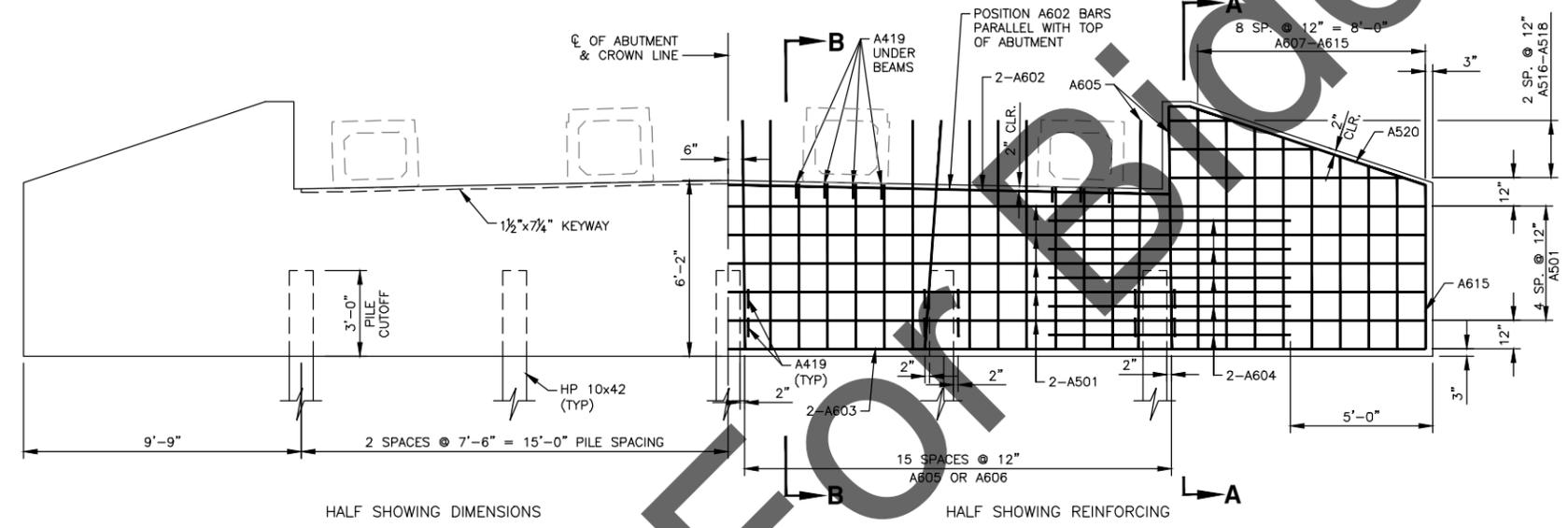
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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
**BEAM FRAMING AND
 PILING LAYOUT**
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

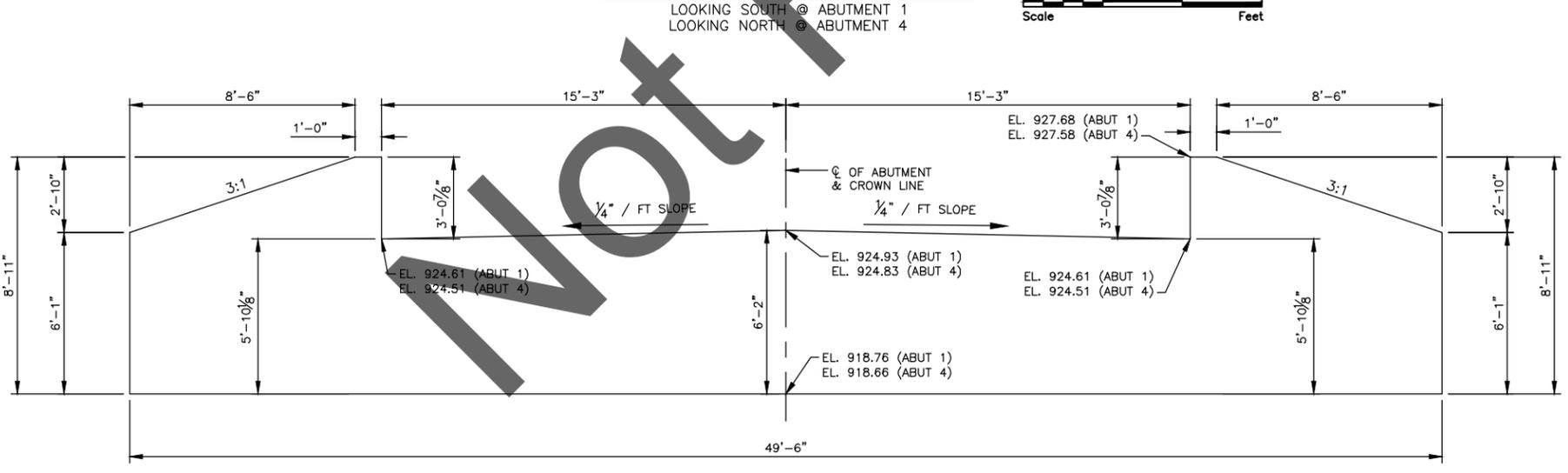
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ABUTMENT PLAN VIEW



ABUTMENT ELEVATION VIEW



ABUTMENT ELEVATION VIEW - SHOWING DIMENSIONS

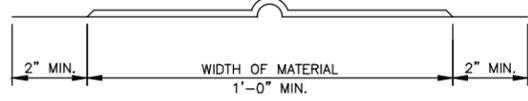
QUANTITIES & PROPERTIES ABUTMENT 1 & 4 (PER ABUTMENT)	
CLASS AE-3 CONCRETE	24.3 C.Y.
CONCRETE STRENGTH	3,000 PSI
REINFORCING STEEL	2,438 LBS
REINFORCEMENT STRENGTH	60,000 PSI
PILING (SEE LAYOUT - SHEET 13)	

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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
**ABUTMENT DETAILS AND
 REINFORCEMENT**
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

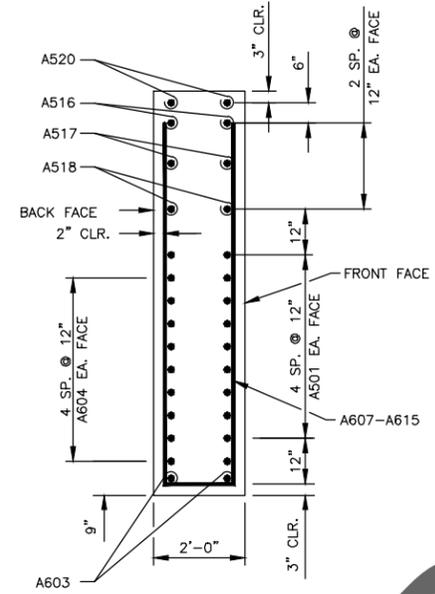
BILL OF REINFORCEMENT (PER ABUTMENT)				
MARK	NO.	SIZE	LENGTH	SHAPE
A501	10	5	49' - 2"	STRT.
A602	2	6	31' - 1"	STRT.
A603	2	6	49' - 2"	STRT.
A604	20	6	8' - 6"	STRT.
A605	18	6	18' - 8"	BENT
A606	14	6	15' - 7"	BENT
A607-A615	2 SETS	6	142' - 6"	BENT
A516-A518	4 SETS	5	15' - 6"	STRT.
A419	34	4	2' - 8"	BENT
A520	4	5	9' - 6"	STRT.

NOTE:
SEE PLAN & ELEVATION VIEW ON SHEET 14 FOR
BAR LOCATION & SPACING

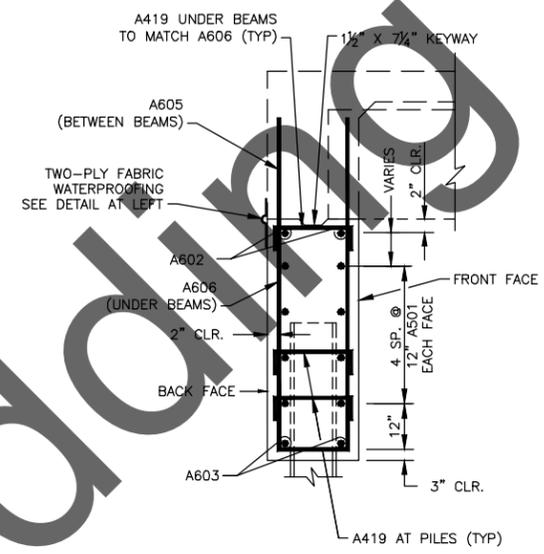


NOTE: ALL MATERIAL AND WORK SHALL BE INCLUDED IN THE BID ITEM OF CLASS AE-3 CONCRETE.

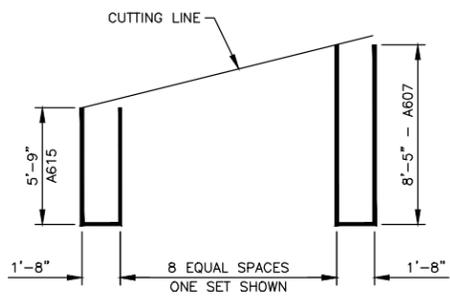
TWO-PLY FABRIC WATERPROOFING DETAIL
NOT TO SCALE



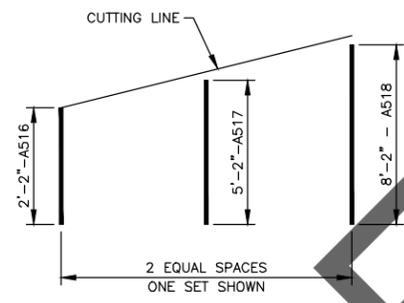
SECTION A-A
NOT TO SCALE



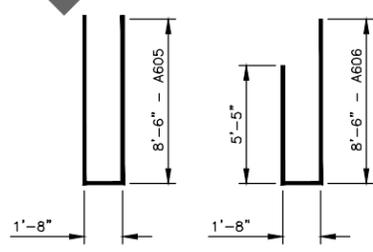
SECTION B-B
NOT TO SCALE



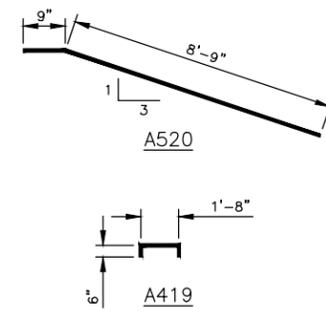
A607-A615



A516-A518



A605 & A606



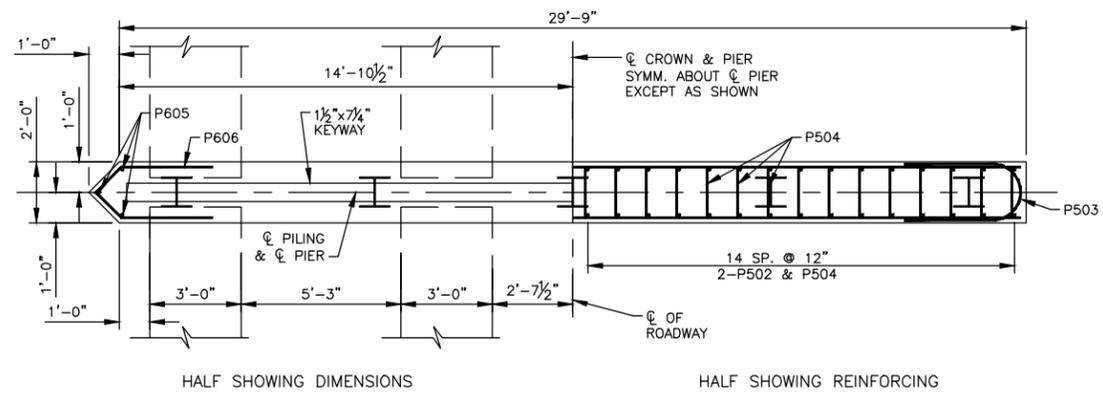
A520
A419

BAR CUTTING DETAIL
NOT TO SCALE

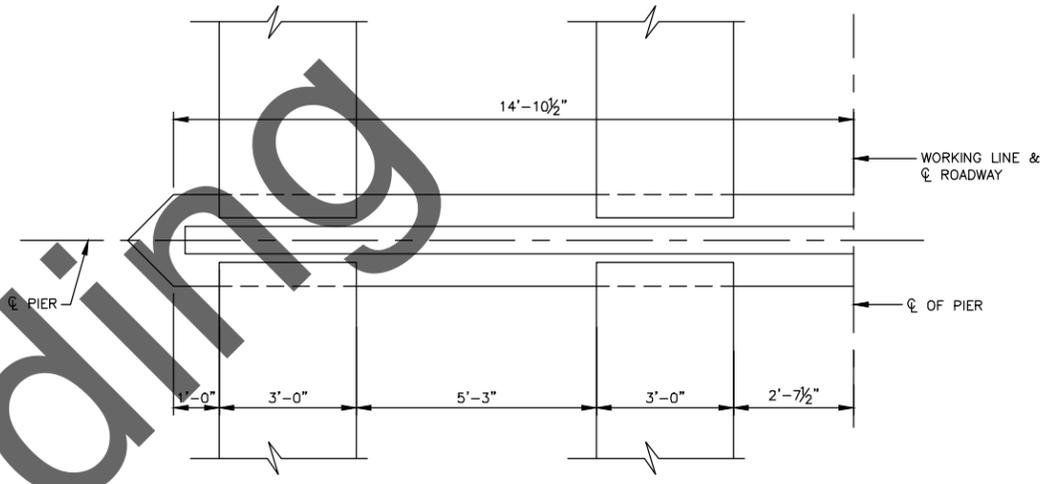
BENT BAR DETAILS
NOT TO SCALE - DIMENSIONS ARE OUT TO OUT

Not For Bid

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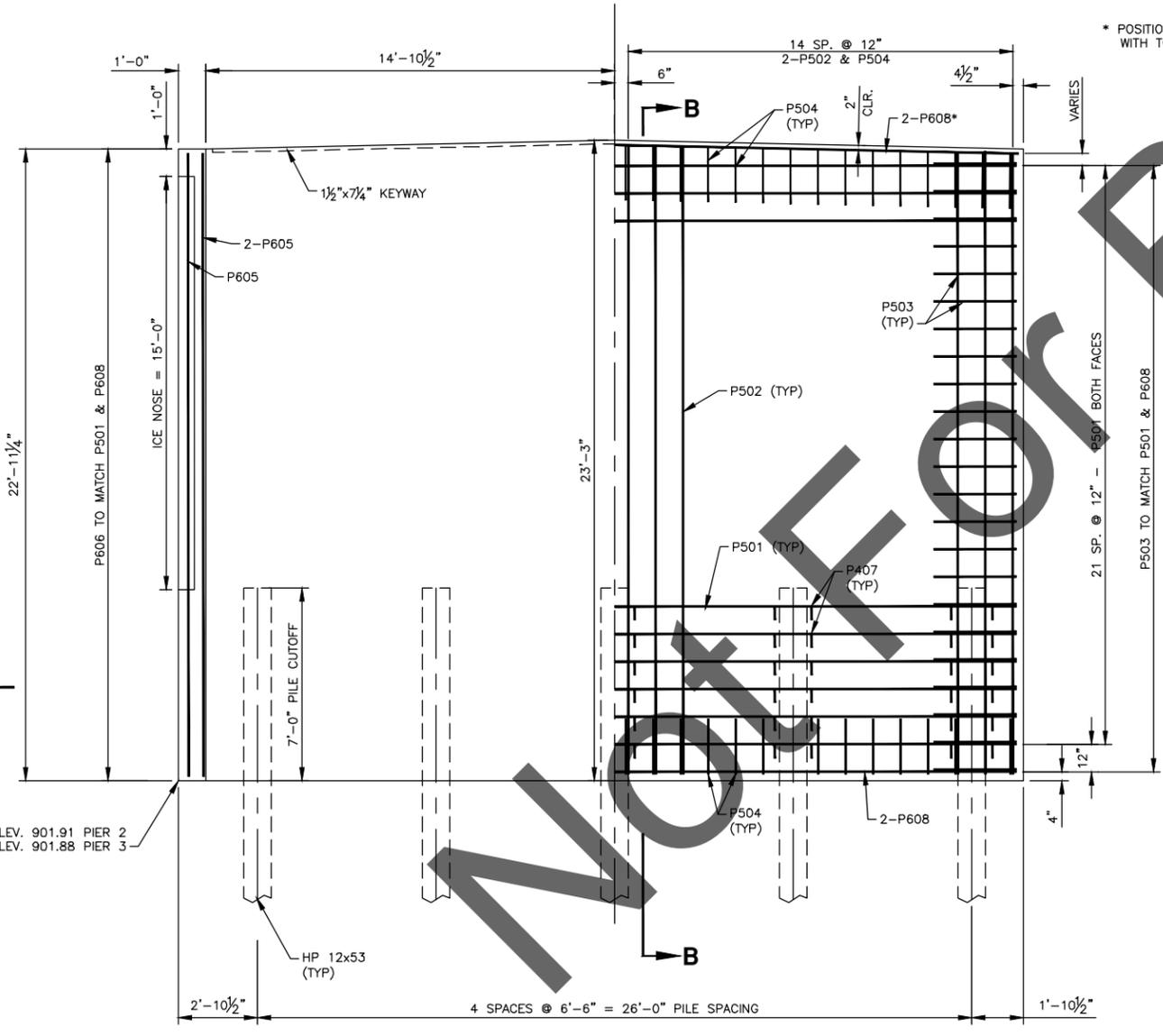


PIER PLAN VIEW

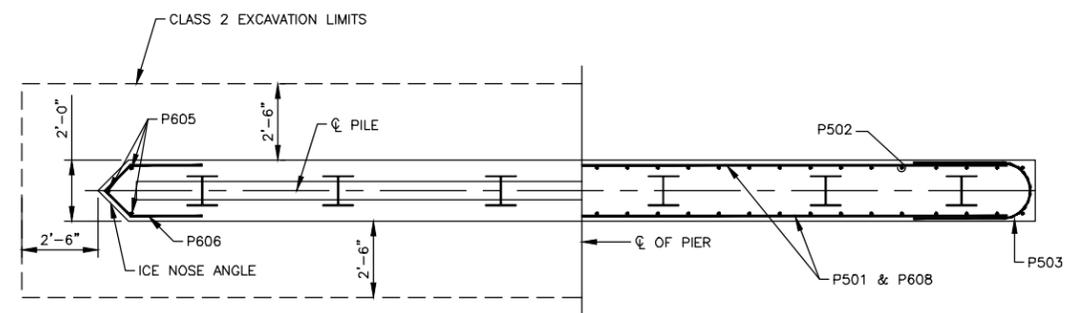
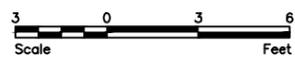


BOX BEAM DIMENSIONING DETAIL

NOT TO SCALE



PIER ELEVATION VIEW



SECTION A-A

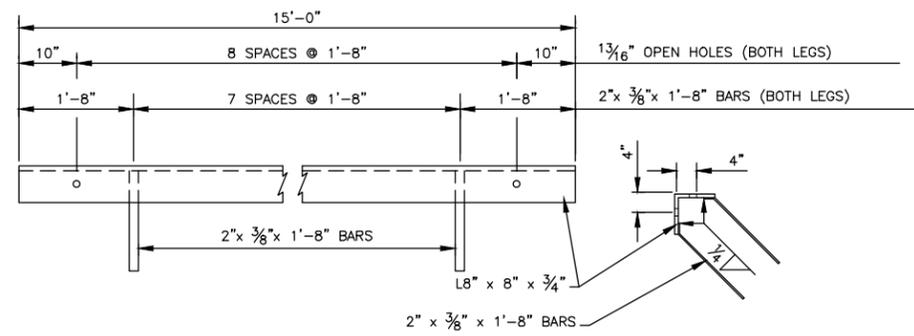


QUANTITIES & PROPERTIES (PER PIER)	
CLASS AE-3 CONCRETE	51.7 C.Y.
CONCRETE STRENGTH	3,000 PSI
REINFORCING STEEL	4,002 LBS
REINFORCEMENT STRENGTH	60,000 PSI
PILING (SEE LAYOUT - SHEET 13)	

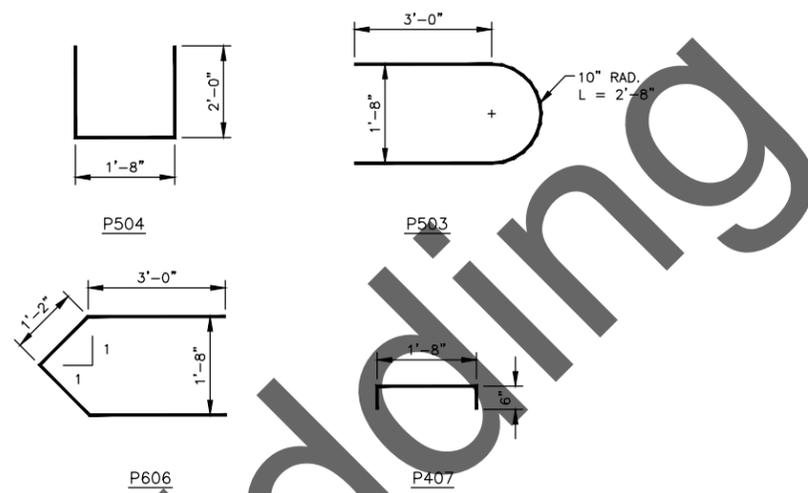
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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
PIERS 2 & 3 DETAILS AND REINFORCEMENT
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

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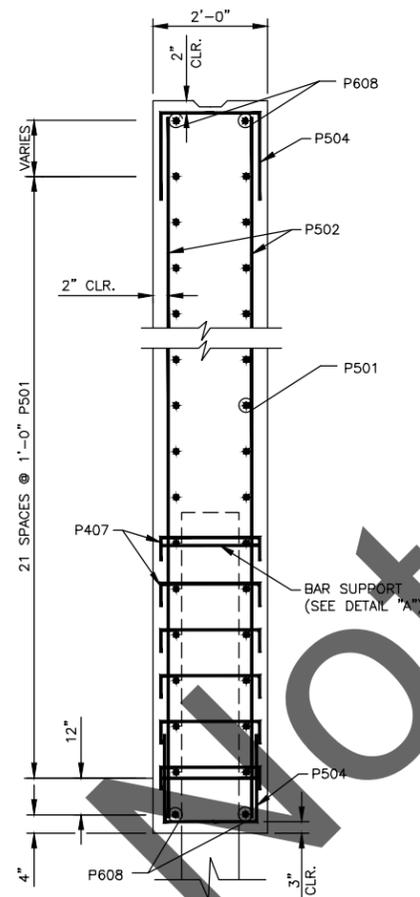


ICE NOSE DETAIL
NOT TO SCALE

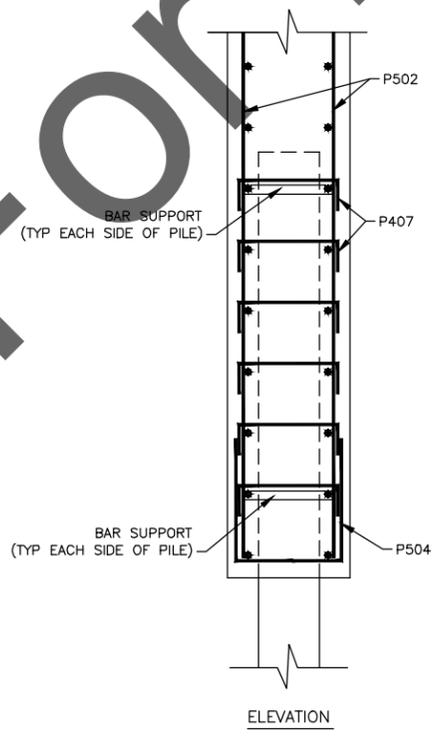


BENT BAR DETAILS
DIMENSIONS SHOWN ARE OUT TO OUT
NOT TO SCALE

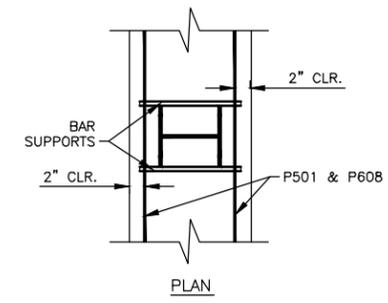
BILL OF REINFORCEMENT (PER PIER)				
MARK	NO.	SIZE	LENGTH	SHAPE
P501	44	5	29' - 7"	STRT.
P502	60	5	22' - 6"	STRT.
P503	23	5	8' - 8"	BENT
P504	60	5	5' - 8"	BENT
P605	3	6	22' - 6"	STRT.
P606	23	6	8' - 4"	BENT
P407	60	4	2' - 8"	BENT
P608	4	6	29' - 7"	STRT.



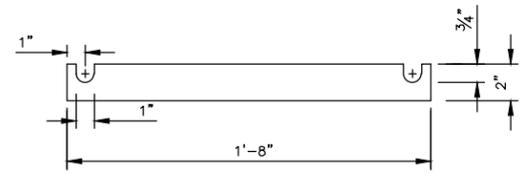
SECTION B-B
NOT TO SCALE



ELEVATION



PLAN

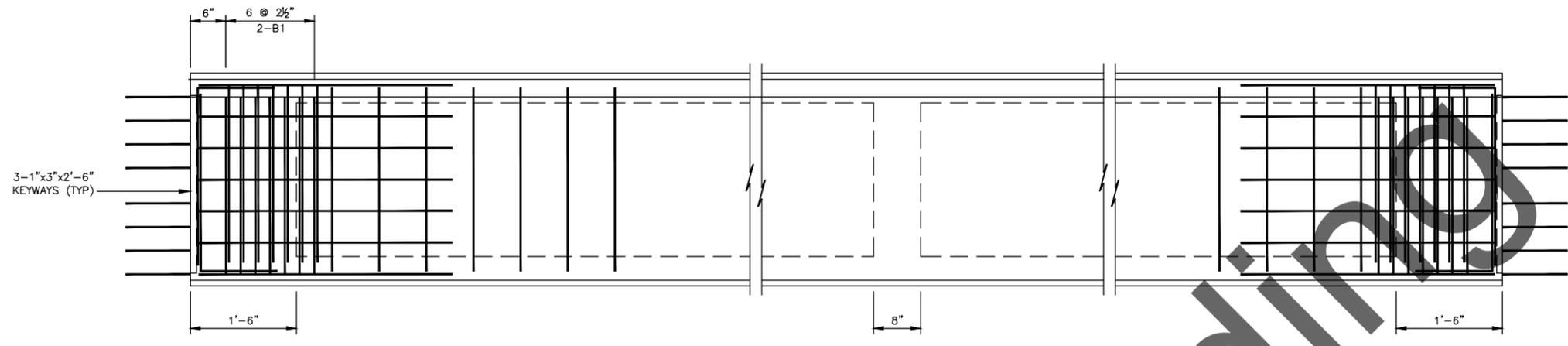


NOTE:
2" x 3/8" FLAT BAR TO BE INCIDENTAL TO REINFORCING STEEL.

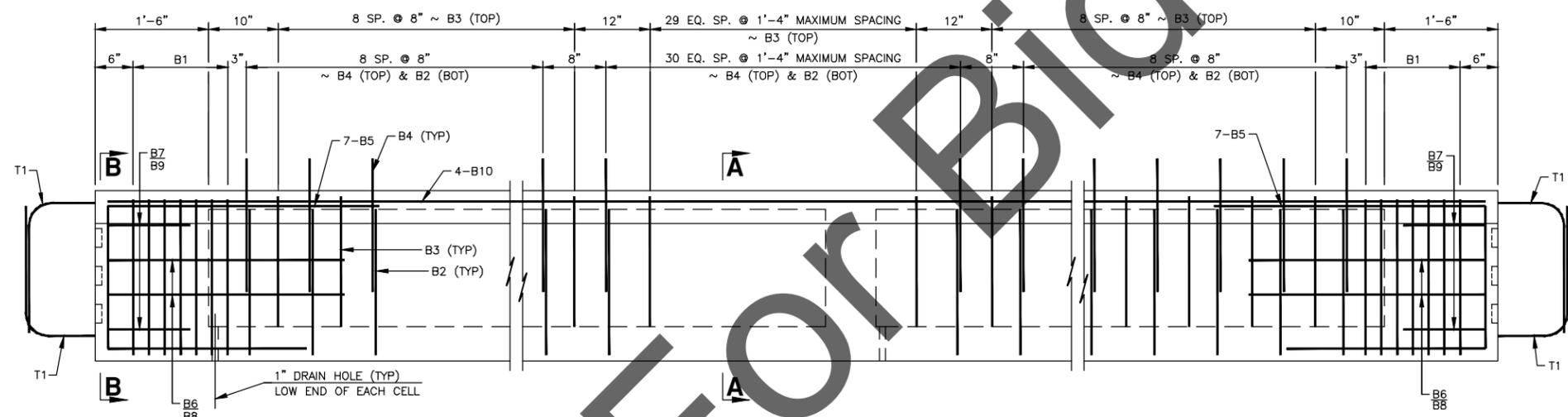
BAR SUPPORT DETAIL
NOT TO SCALE

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	<p>PROJECT NO. CB1302 5 MILES NE OF KINDRED CASS COUNTY</p>

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PLAN



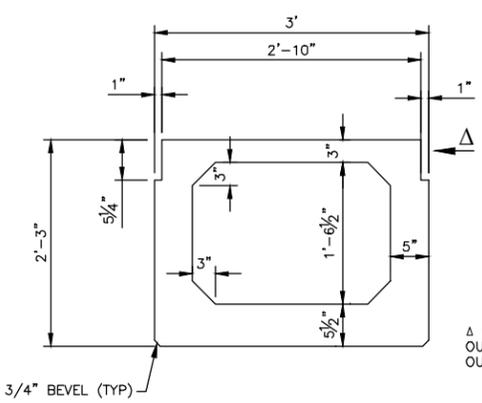
ELEVATION

BEAM SECTION DATA	
WT =	536 LBS/FT + 2100 LBS
CROSS SECTIONAL AREA =	498.0 IN ²
C.G. (FROM BOTTOM) =	12.12 IN
I =	4,3,533 IN ⁴
SB =	3,592 IN ³

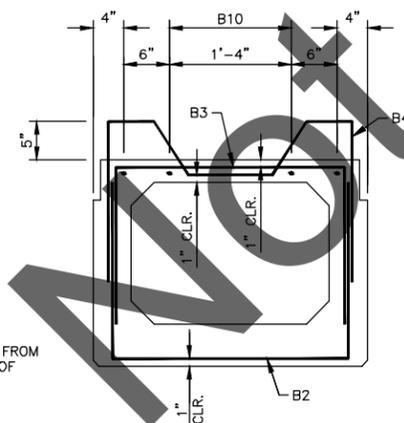
BILL OF REINFORCEMENT (PER BEAM)				
MARK	NO.	SIZE	LENGTH	SHAPE
B1	28	4	5' - 10.5"	BENT
B2*	49	4	6' - 5"	BENT
B3*	48	4	6' - 0"	BENT
B4	49	4	6' - 9"	BENT
B5	14	5	8' - 1"	BENT
B6	4	4	5' - 7"	BENT
B7	4	4	3' - 7"	BENT
B8	4	4	5' - 7"	BENT
B9	4	4	3' - 7"	BENT
B10	4	4	41' - 2"	STRT.
T1**	32	4	4' - 3"	STRT.

* WELDED WIRE REINFORCING WITH MINIMUM CIRCUMFERENTIAL STEEL AREA OF 0.15 SQ IN PER FT MAY BE SUBSTITUTED FOR B2 AND B3 BARS.

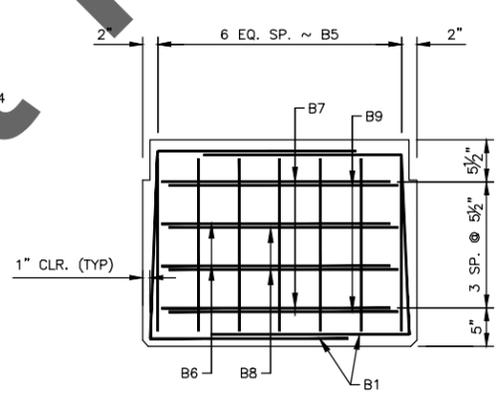
** FIELD BEND AS SHOWN (GRADE 40).



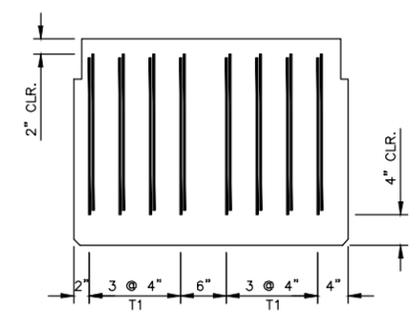
(SHOWING DIMENSIONS)
A - A



(SHOWING REINFORCING)
A - A



B - B



END VIEW

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CASS COUNTY
HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
27IN BOX BEAM DETAIL
PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

NOTES:

AT LEAST 14 DAYS PRIOR TO THE FORMING AND POURING OF ANY BEAMS, THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW. THE SHOP DRAWINGS SHALL INCLUDE THE TOTAL INITIAL PRESTRESS FORCE AND THE LOSSES IN THE PRESTRESS DUE TO ELASTIC SHORTENING, SHRINKING OR CREEPING OF CONCRETE AND THE RELAXATION OF STEEL STRESS AS DETERMINED BY THE CONTRACTOR FOR HIS METHOD OF STRESSING.

SHOP DRAWINGS SHALL SHOW STRAND LAYOUT, PULL DOWN LOCATIONS, TENSIONING FORCES, ELONGATION AND ANY PROPOSED CHANGES IN REINFORCING STEEL.

THE FINAL PRESTRESS FORCE (REMAINING AFTER ALL LOSSES HAVE BEEN ACCOUNTED FOR) AND ITS CORRESPONDING CENTER OF GRAVITY, SHALL BE SELECTED FROM THOSE ON A CURVE DETERMINED BY THE THREE VALUES SHOWN.

THE BEAMS SHALL BE POURED IN ALL STEEL FORMS.

ALL REINFORCING STEEL SHALL HAVE A CLEARANCE OF 1" UNLESS OTHERWISE NOTED.

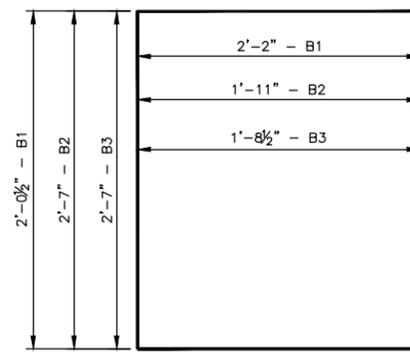
MINOR CHANGES TO THE SHAPE OF THE BEAM AND TO REINFORCING STEEL MAY BE MADE TO ACCOMMODATE THE FORMS OF VARIOUS CONTRACTORS AND THEIR CONSTRUCTION METHODS WITH THE APPROVAL OF THE ENGINEER.

THE TOPS OF THE BEAMS SHALL BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BOND.

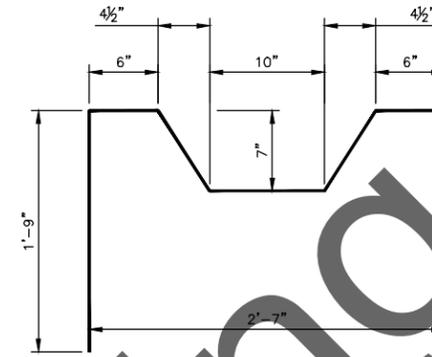
PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY THE CONTRACTOR. HOOKS OR DEVICES PROVIDED WILL BE SUBJECT TO APPROVAL BY THE ENGINEER AND SHALL BE INSTALLED WITHIN 4'-0" OF THE END OF BEAM.

HOLES AND INSERTS TO ACCOMMODATE THE DIAPHRAGM BARS SHALL BE PROVIDED IN THE BEAMS AT LOCATIONS AS SHOWN AT NO ADDITIONAL COST TO OWNER.

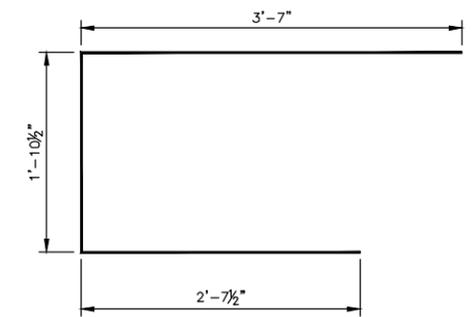
BEAMS SHALL BE CAST NO MORE THAN 6 MONTHS BEFORE BEAM PLACEMENT ON THE PROJECT.



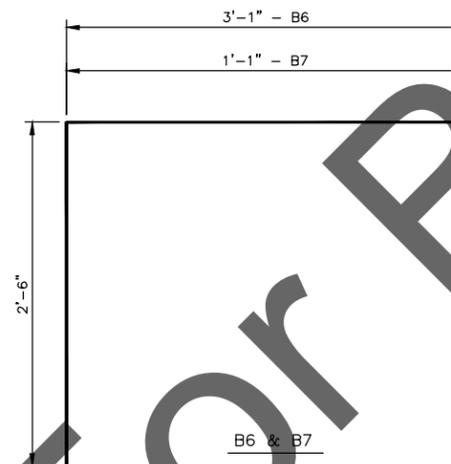
B1, B2, & B3



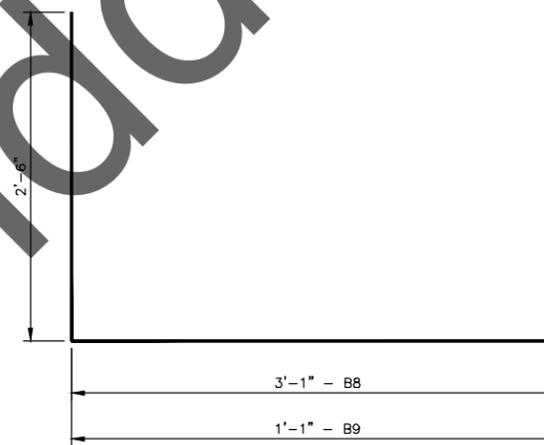
B4



B5



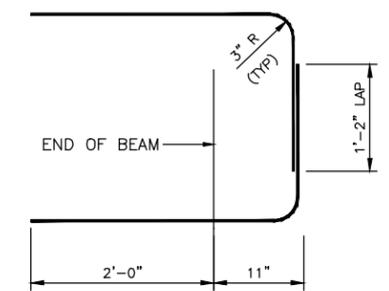
B6 & B7



B8 & B9

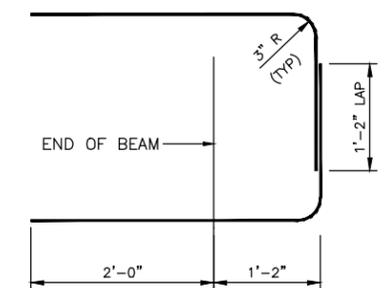
(DIMENSIONS SHOWN ARE OUT TO OUT)

BENT BAR DETAILS



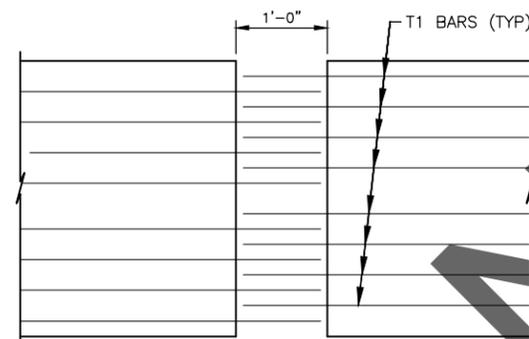
(AT PIERS)

T1



(AT ABUTMENTS)

T1



BEAM END PLAN AT PIER

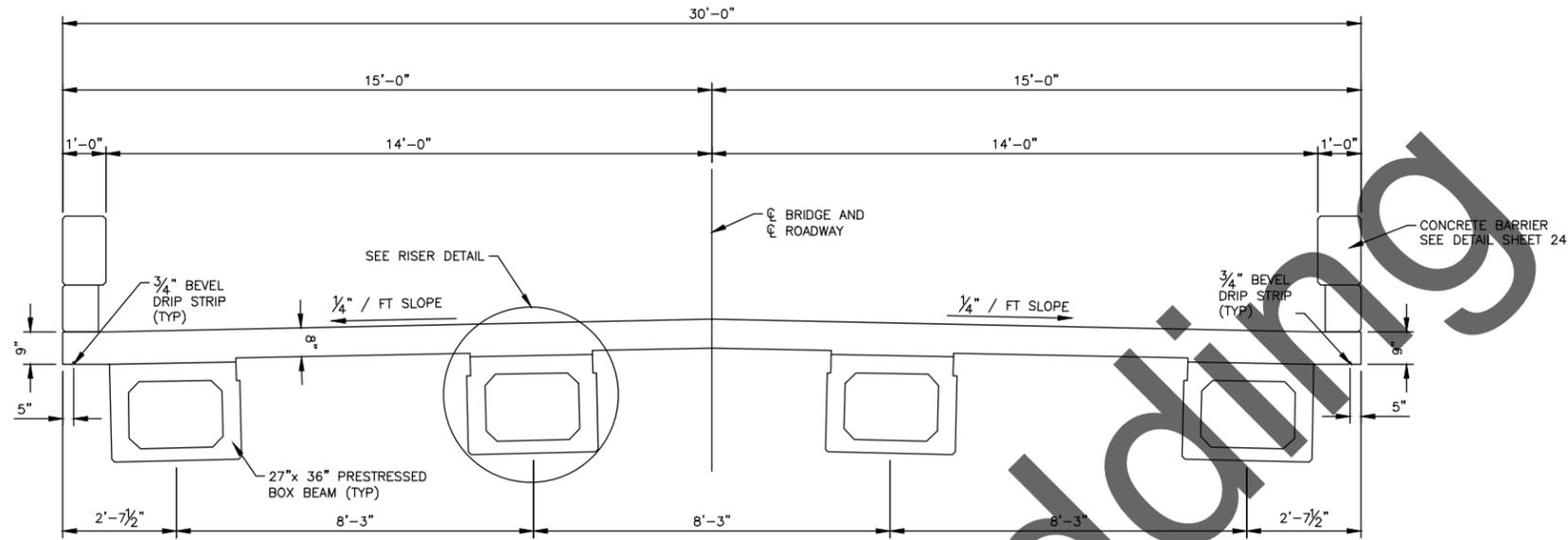
PRESTRESSING DATA					
C.G.	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT (TONS)	BEAM LENGTH
2.00	587.9 k	4500 psi (Min)	5500 psi (Min)	15.7	54'-10"
2.25	596.5 k				
2.50	605.4 k				

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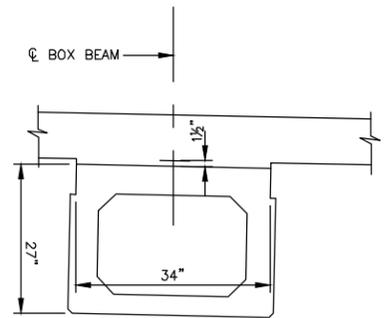
CASS COUNTY HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
BOX BEAM REBAR

PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	20	34

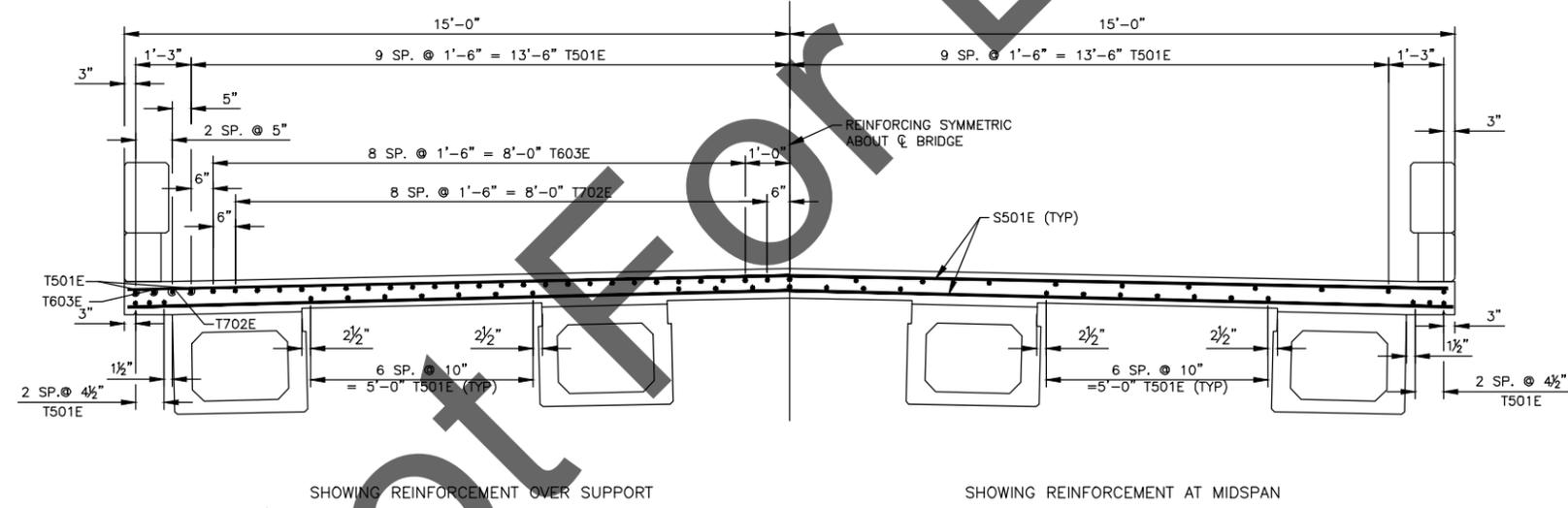


SLAB ELEVATION VIEW
(SHOWING DIMENSIONS)



THE 1/2" DIMENSION SHOWN IS LOCATED AT THE SUPPORTS. THE ANTICIPATED MIDSPAN RISER IS 1". THE RISER SHALL BE ADJUSTED TO MAINTAIN THE 8" SLAB THICKNESS.

RISER DETAIL
NOT TO SCALE



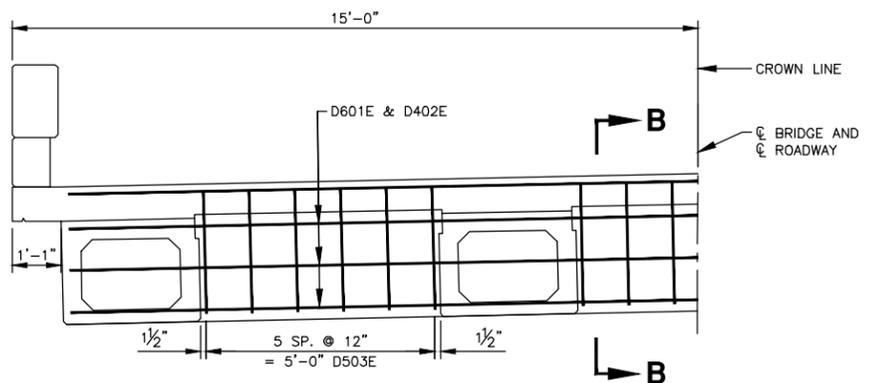
SLAB ELEVATION VIEW
(SHOWING REINFORCEMENT)



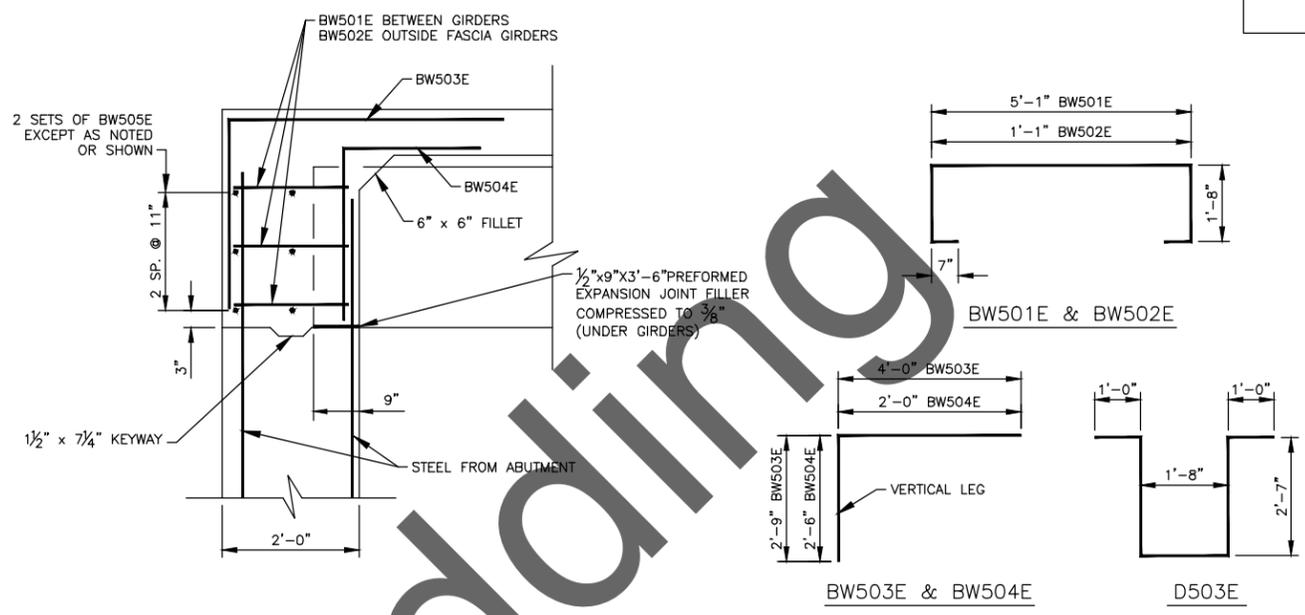
- NOTES:
1. RAIL REINFORCING IN DECK OMITTED FOR CLARITY.
 2. SEE SHEETS 24 & 25 FOR RAIL REINFORCING DETAILS.

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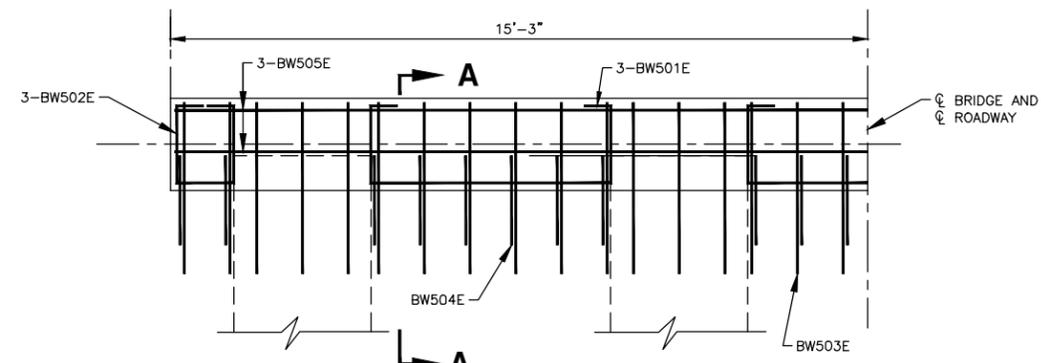
HALF SLAB SECTION AT PIER



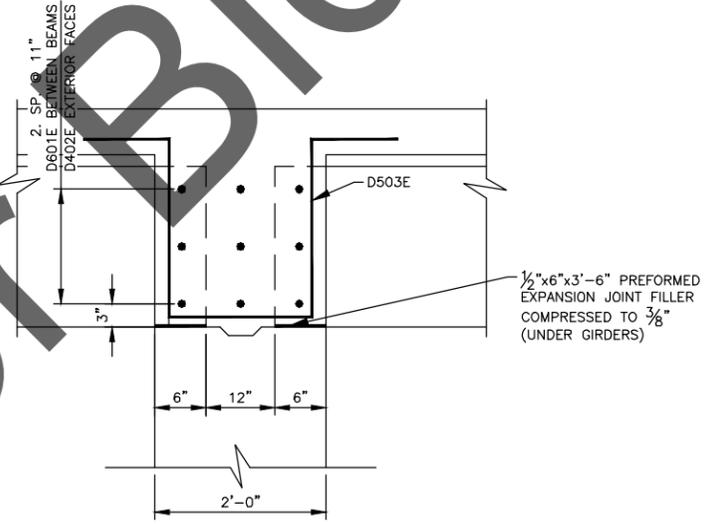
SECTION A-A
NOT TO SCALE

BENT BAR DETAILS
NOT TO SCALE

- NOTES:
- FABRICATION AND TOLERANCES SHALL BE IN ACCORDANCE WITH THE C.R.S.I. MANUAL OF STANDARD PRACTICE.
 - ALL DIMENSIONS ARE OUT TO OUT OF BARS.
 - NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.
 - AN "E" FOLLOWING A BAR DESIGNATION INDICATES AN EPOXY COATED BAR.



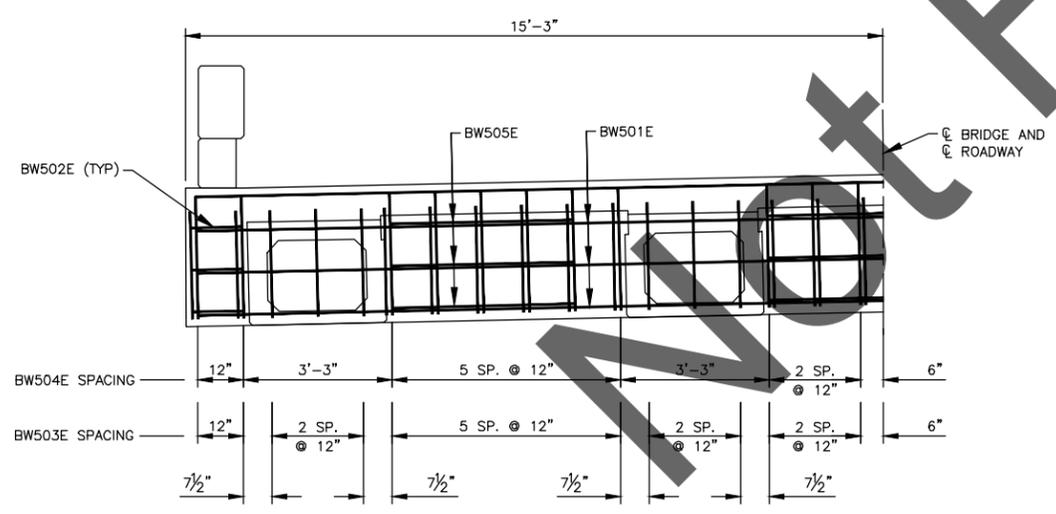
HALF END BEAM - PLAN VIEW



SECTION B-B
NOT TO SCALE

SUPERSTRUCTURE				
BILL OF REINFORCEMENT				
MARK	NO.	SIZE	LENGTH	SHAPE
BW501E	18	5	9' - 7"	BENT
BW502E	12	5	5' - 7"	BENT
BW503E	68	5	6' - 9"	BENT
BW504E	44	5	3' - 11"	BENT
BW505E	12	5	30' - 2"	STRT.
D601E	6	6	27' - 5"	STRT.
D402E	36	4	4' - 6"	STRT.
D503E	36	5	8' - 10"	BENT
S501E	580	5	29' - 8"	STRT.
T501E	48	5	172' - 8"	STRT.
T702E	40	7	13' - 8"	STRT.
T603E	40	6	36' - 10"	STRT.

- ① 2'-0" SPLICE LENGTH
② SEE SHEET 22 FOR DETAIL



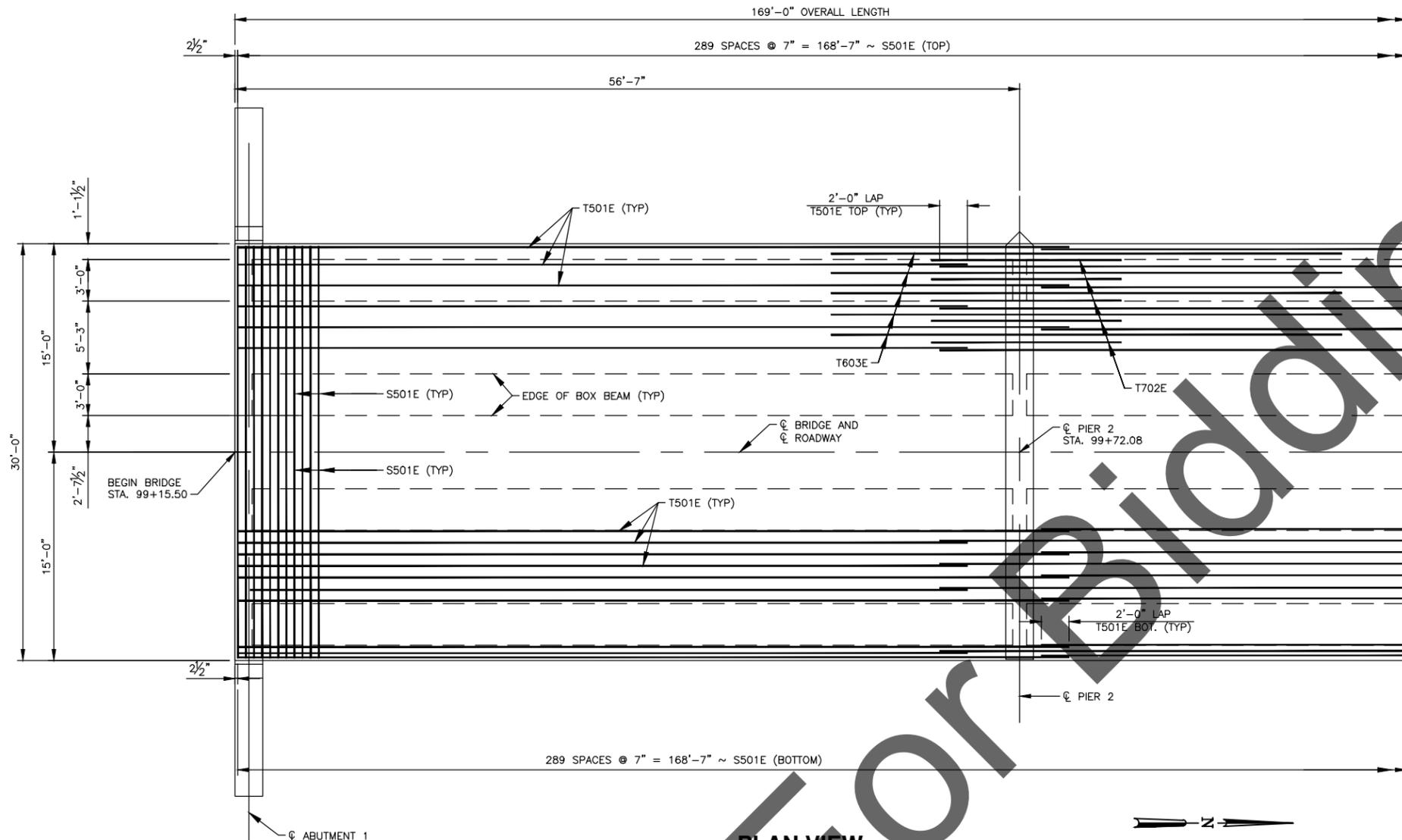
HALF END BEAM - ELEVATION VIEW

QUANTITIES & PROPERTIES	
CLASS AAE-3 CONCRETE	151.1 C.Y.
CONCRETE STRENGTH	4,000 PSI
REINFORCING STEEL - EPOXY	31,894 LBS
REINFORCEMENT STRENGTH	60,000 PSI

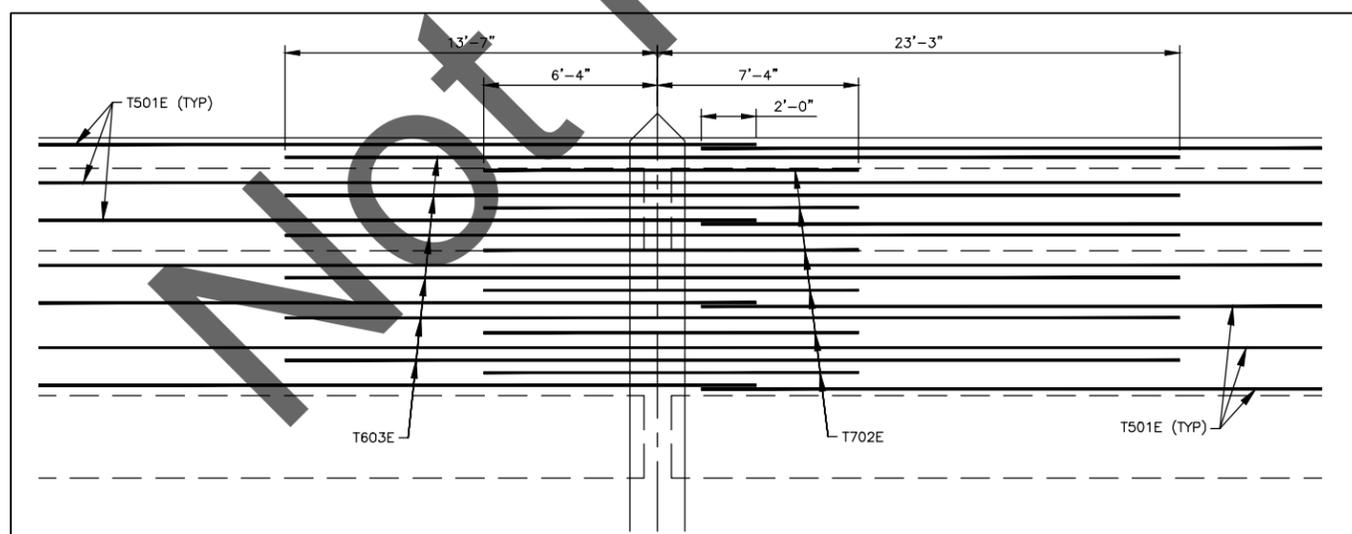
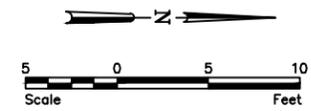
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CASS COUNTY
HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
SUPERSTRUCTURE DETAILS
PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

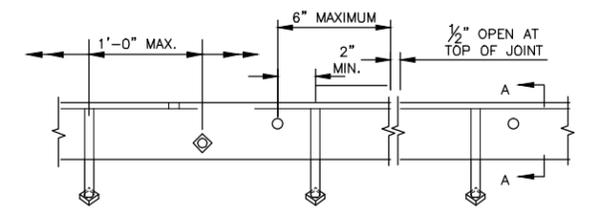
PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	22	34



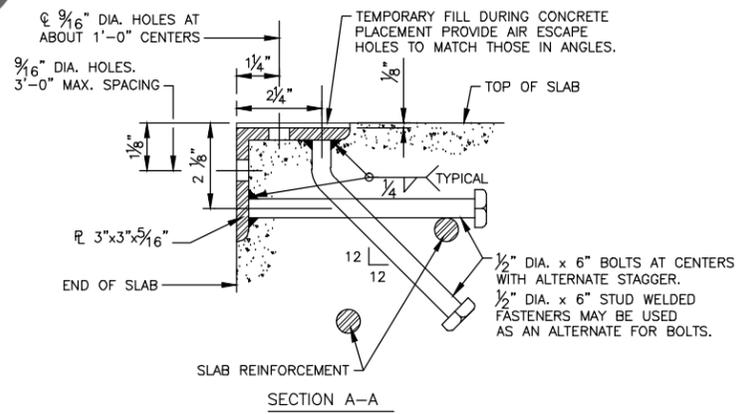
PLAN VIEW



PIER 2 DETAIL
(SYMMETRIC BY 180° ROTATION @ PIER 3)



ELEVATION
(CONCRETE NOT SHOWN)

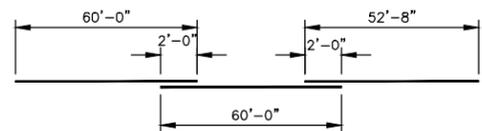


HALF SHOWING TYPICAL TOP REBAR SPACING

HALF SHOWING TYPICAL BOTTOM REBAR SPACING

PROTECTION PLAN DETAIL
NOT TO SCALE

- NOTES:
1. ANGLES SHALL EXTEND FULL WIDTH OF ROADWAY WITH A 1/2" OPEN JOINT AT EACH BREAK IN CROWN PROFILE.
 2. ANGLES SHALL BE STRAIGHTENED TO A TOLERANCE OF 1/8" IN 10 FEET AFTER GALVANIZING.
 3. MATERIAL: STRUCTURAL STEEL PER NDDOT 834, GALVANIZED AFTER FABRICATION PER AASHTO M111 (ASTM A123).
 4. SET ANGLE TO PROPER GRADE AND CROWN.
 5. ALL MATERIAL WILL BE PAID FOR AS STRUCTURAL STEEL.



T501E DETAIL
NOT TO SCALE

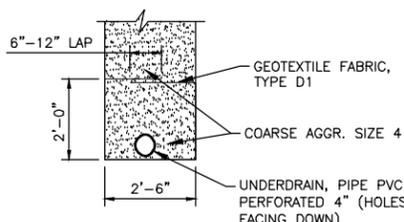
NOTE:
TURN END FOR END SO THAT SPLICE LOCATIONS ARE STAGGERED.

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CASS COUNTY
HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
SLAB LAYOUT

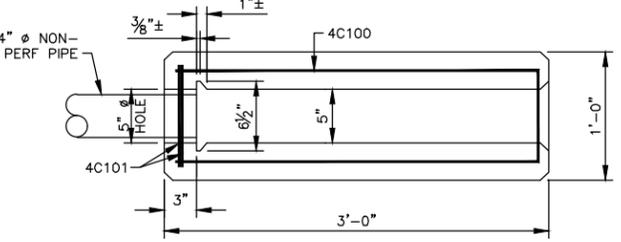
PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

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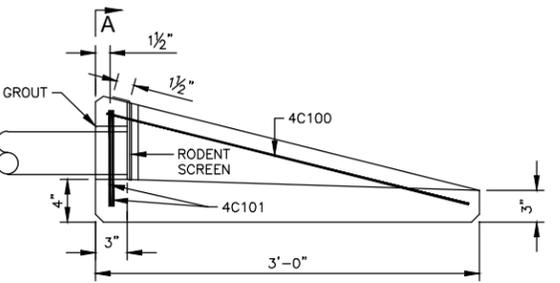


NOTE:
 GEOTEXTILE FABRIC - TYPE D1,
 COARSE AGGR SIZE 4 AND
 INSULATION BOARD SHALL BE
 INCIDENTAL TO THE PRICE BID
 SELECT BACKFILL.

TRENCH DETAIL
 NOT TO SCALE

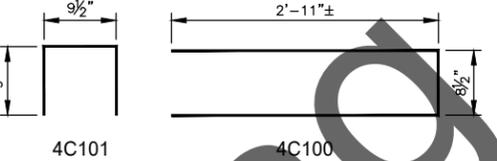


PLAN

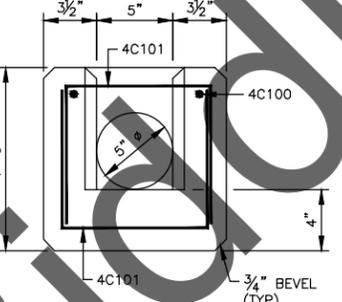


ELEVATION

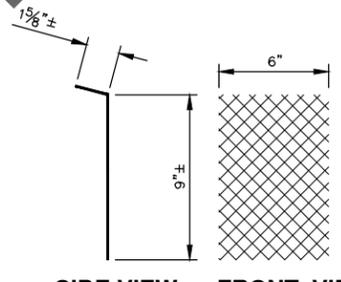
PRECAST CONCRETE HEADWALL DETAILS



BENT BAR DETAILS



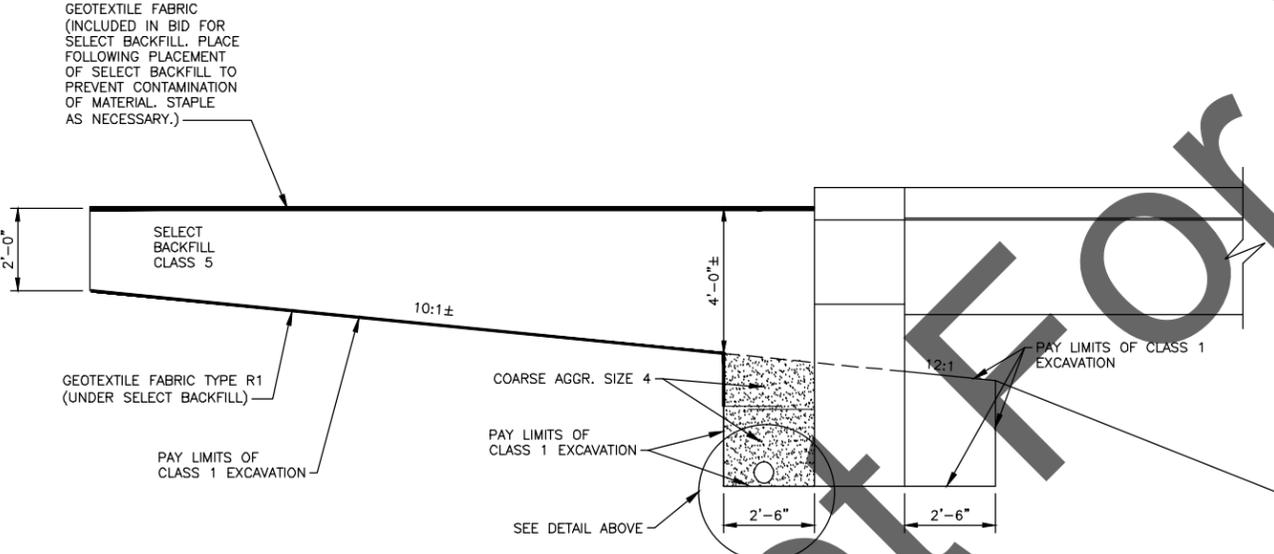
SECTION A-A



SIDE VIEW FRONT VIEW

RODENT SCREEN DETAILS

NOTES:
 THE DIMENSIONS FOR THE RODENT SCREEN ARE APPROXIMATE TO ALLOW FOR BENDING AND A SNUG FIT INTO THE SLOT IN THE HEADWALL.
 THE RODENT SCREEN SHALL BE FABRICATED FROM FLATTENED, EXPANDED METAL WITH SCREEN OPENINGS OF APPROXIMATELY 0.25 SQUARE INCHES. THE SCREEN SHALL BE 16 GAGE METAL AND BE HOT DIP GALVANIZED AFTER FABRICATION.

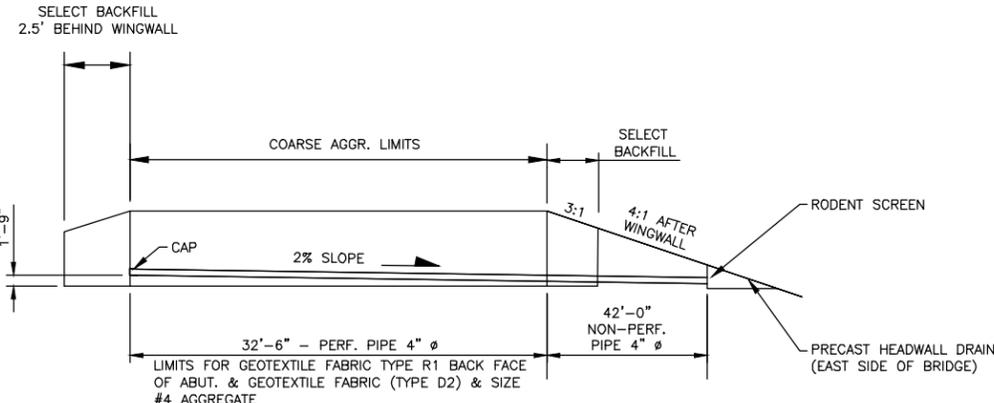


DETAIL AT ABUTMENT

SEEPAGE TRENCH DETAILS

NOT TO SCALE

NOTE:
 ALL MATERIAL, EQUIPMENT, AND LABOR REQUIRED TO PLACE THE SELECT BACKFILL, COARSE AGGREGATE, AND GEOTEXTILE FABRIC SYSTEM SHALL BE INCLUDED IN THE BID FOR SELECT BACKFILL.
 PAY QUANTITY = PLAN QUANTITY



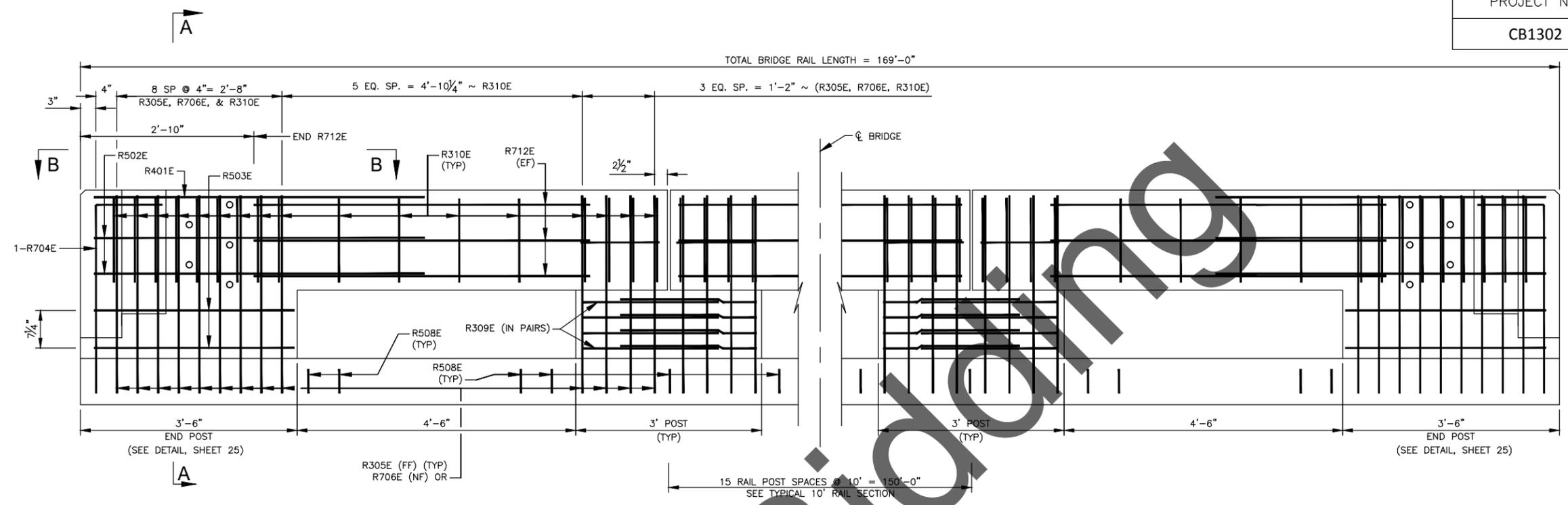
BACK FACE OF ABUTMENT

NOT TO SCALE

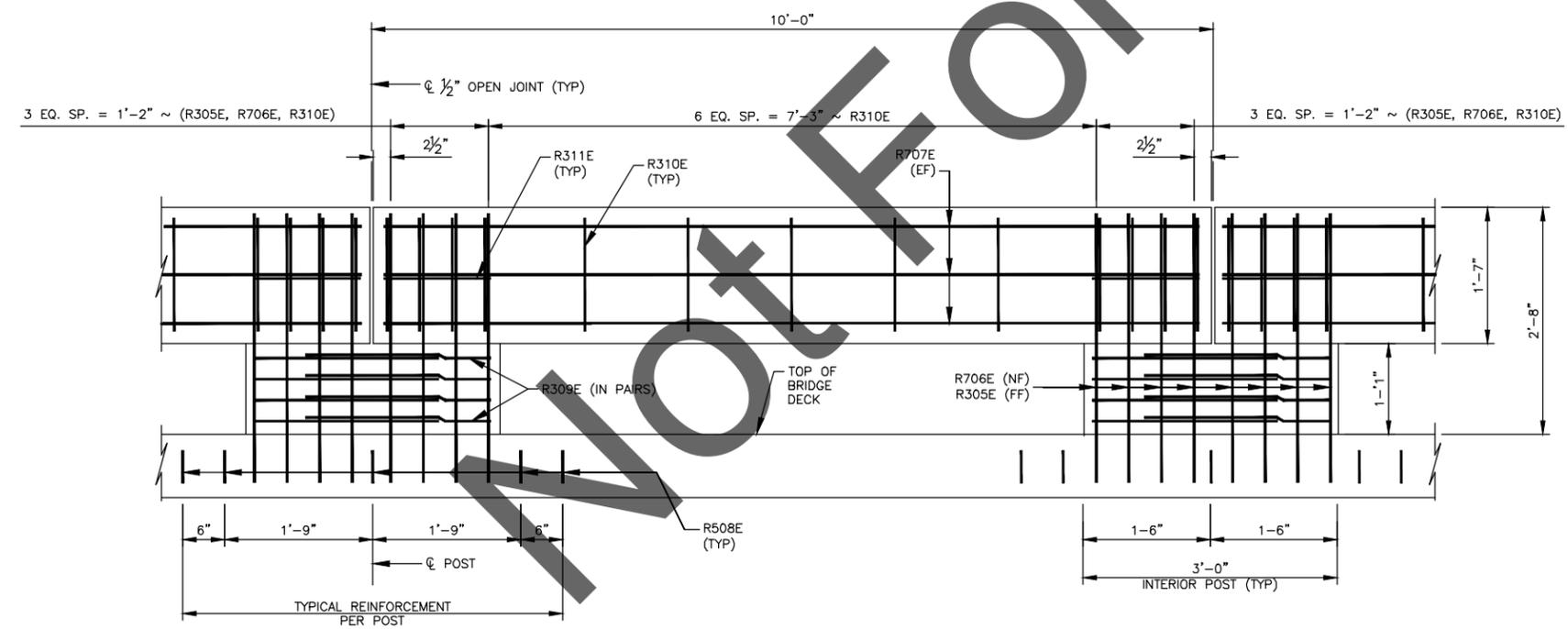
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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	24	34



BRIDGE RAIL ELEVATION VIEW
NOT TO SCALE



TYPICAL 10' RAIL SECTION
NOT TO SCALE

LEGEND	
NF	= NEAR FACE
FF	= FAR FACE
EF	= EACH FACE

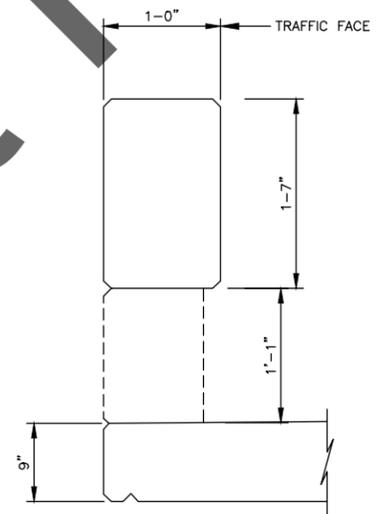
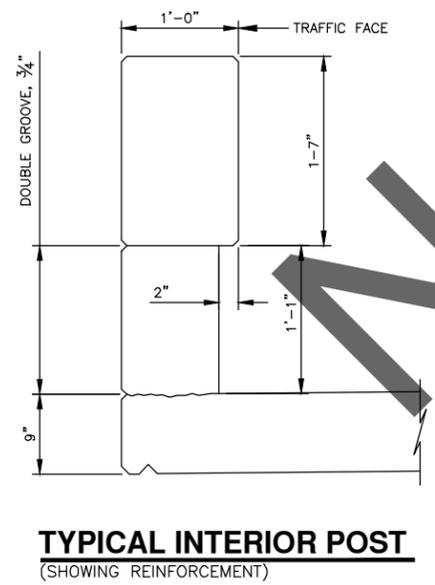
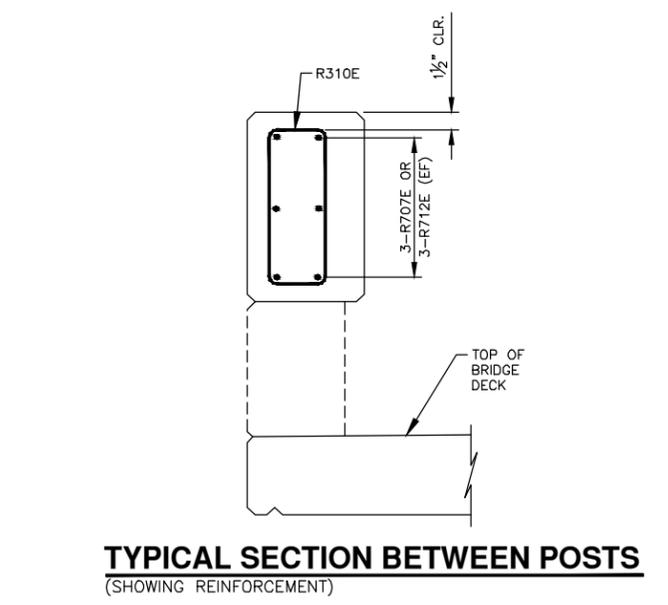
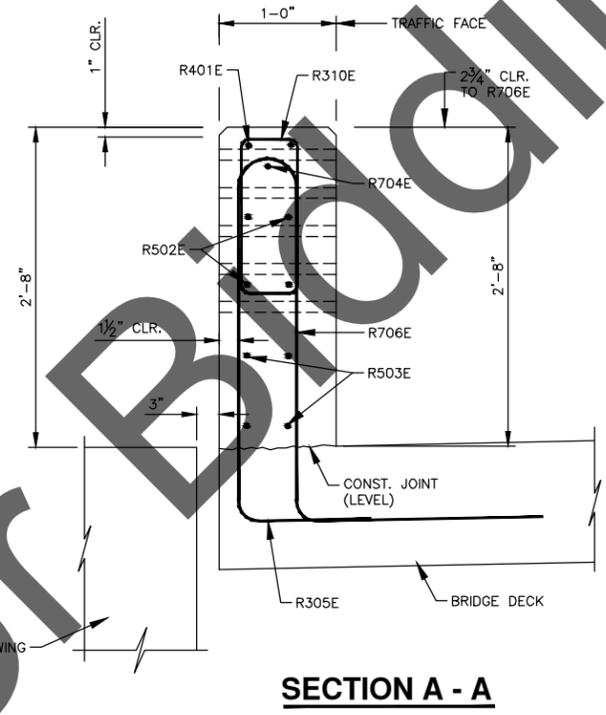
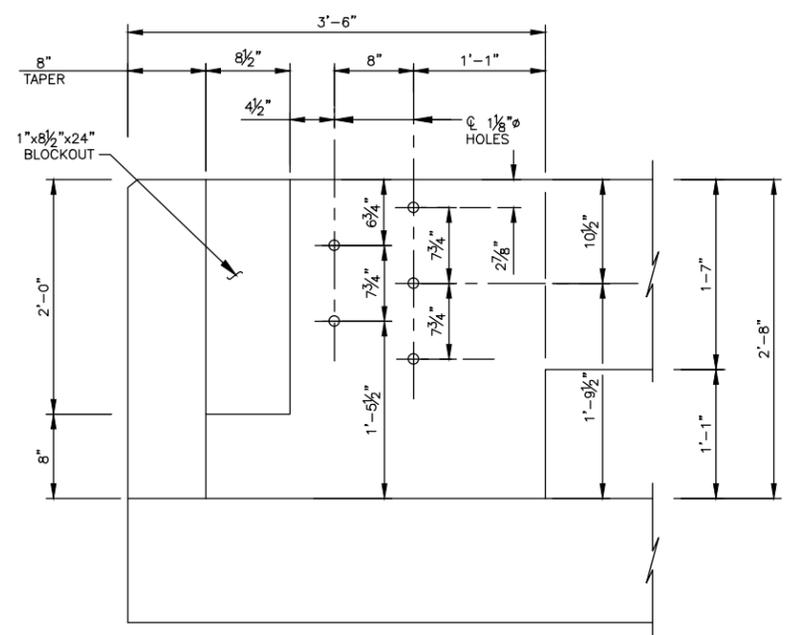
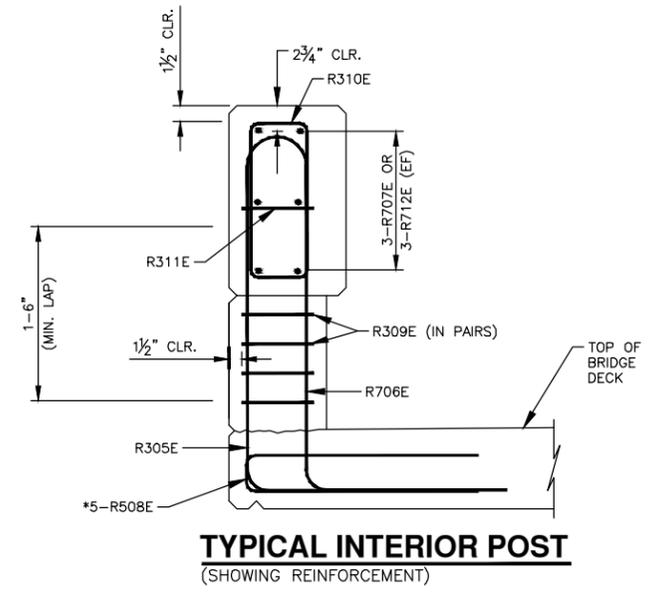
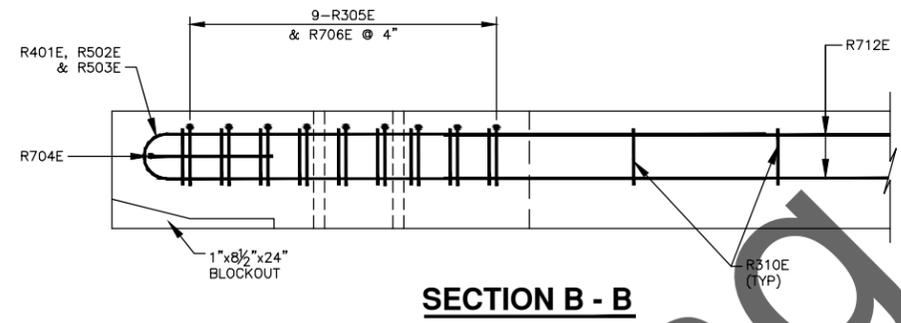
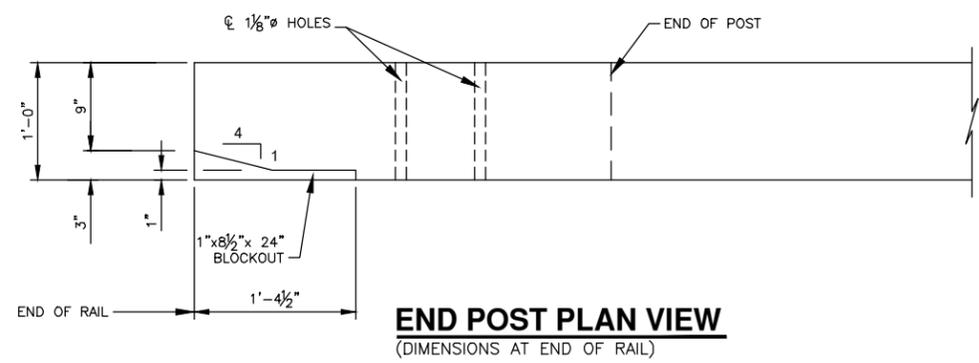
- NOTES:
1. REINFORCING STEEL AND CONCRETE FOR KANSAS CORRAL RAIL ARE QUANTIFIED ON SHEET 26.
 2. VIEWS A-A, AND B-B ARE SHOWN ON SHEET 25.
 3. REINFORCING SYMMETRIC ABOUT BRIDGE ϕ UNLESS OTHERWISE NOTED.

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CASS COUNTY
HIGHWAY DEPARTMENT
SHEYENNE RIVER
BRIDGE NO. 09-136-37.1
**CONCRETE BARRIER
DETAILS**
PROJECT NO. CB1302
5 MILES NE OF KINDRED
CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	25	34



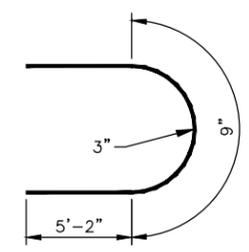
- NOTES:
1. REINFORCING STEEL AND CONCRETE FOR KANSAS CORRAL RAIL ARE QUANTIFIED ON SHEET 26.
 2. * THE HOOK MAY BE CANTED TO PROVIDE CLEARANCE AND/OR FIT BETWEEN REINFORCING.

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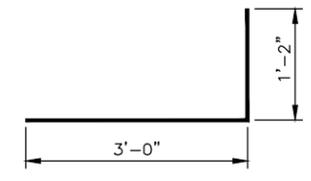
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BILL OF REINFORCEMENT (ONE RAIL)				
MARK	NO.	SIZE	LENGTH	SHAPE
R401E	2	4	11' - 1"	BENT
R502E	4	5	11' - 2"	BENT
R503E	4	5	6' - 10"	BENT
R704E	2	7	4' - 2"	BENT
R305E	146	3	3' - 4"	BENT
R706E	146	7	7' - 7"	BENT
R707E	90	7	9' - 8"	STRT.
R508E	84	5	4' - 5"	BENT
R309E	128	3	4' - 6"	BENT
R310E	229	3	4' - 4"	BENT
R311E	32	3	4' - 6"	BENT
R712E	12	7	5' - 5"	STRT.

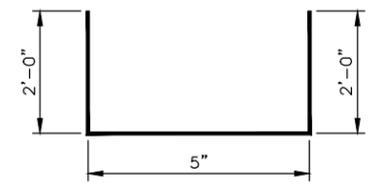
- NOTES:
1. THE ESTIMATED MATERIAL QUANTITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY. ALL MATERIALS, INCLUDING CONCRETE & REINFORCING BARS, AND ALL LABOR REQUIRED TO BUILD THE KANSAS CORRAL RAIL OVER THE DECK SHALL BE INCLUDED IN THE PAY ITEM, "CONCRETE BRIDGE BARRIER". ESTIMATED REINFORCING AND CONCRETE QUANTITIES LISTED ARE FOR BOTH RAILS AND INFORMATIONAL PURPOSES ONLY.
 2. FABRICATION AND TOLERANCES SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE.
 3. ALL DIMENSIONS ARE OUT TO OUT OF BARS.
 4. NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF THE DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.
 5. THE GIVEN DIMENSION FOR ALL BENDS ARE THE BEND RADII.
 6. AN "E" FOLLOWING A BAR DESIGNATION INDICATES AN EPOXY COATED BAR.
 7. THE CONCRETE FOR BRIDGE BARRIER SHALL BE CLASS AAE-3 AND THE REINFORCING STEEL SHALL BE GRADE 60.



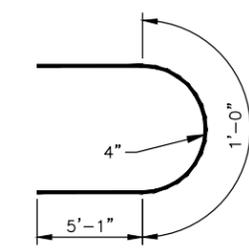
R401E



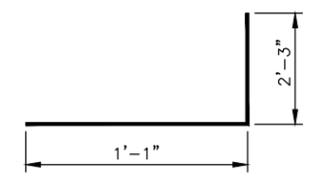
R704E



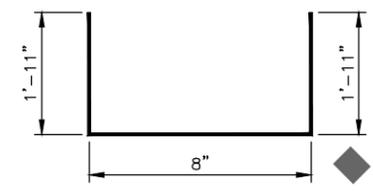
R508E



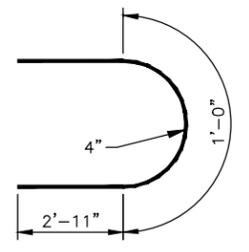
R502E



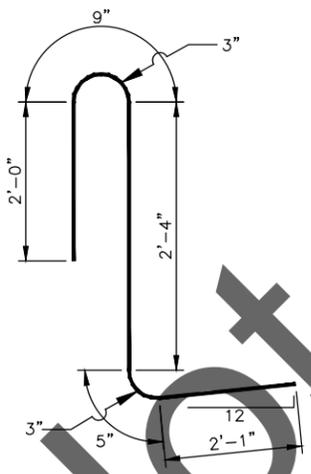
R305E



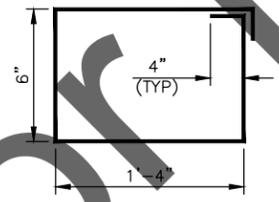
R309E



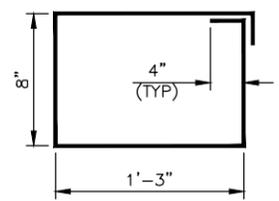
R503E



R706E



R310E



R311E

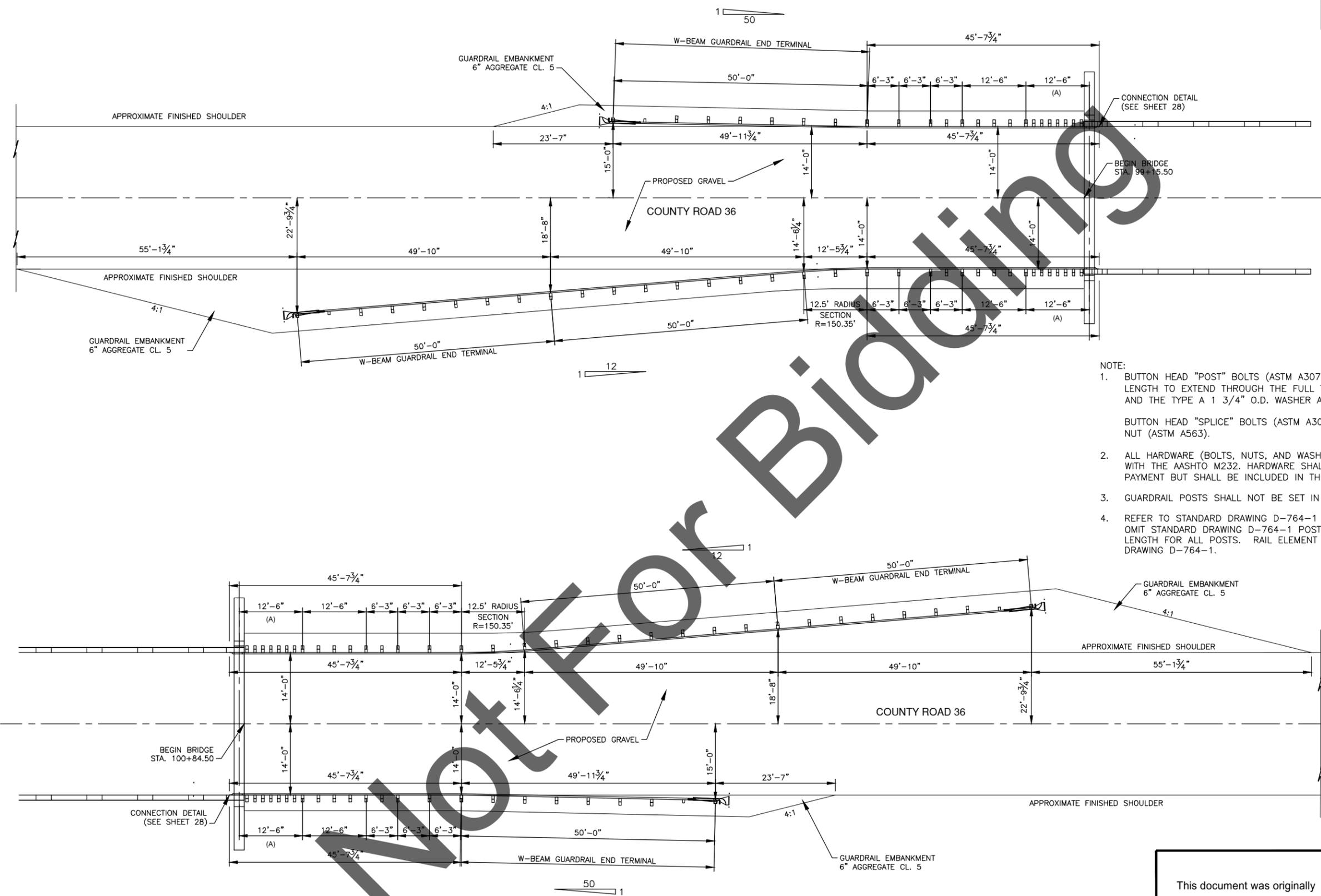
BENT BAR DETAILS

QUANTITIES & PROPERTIES (PER RAIL) (FOR INFORMATION PURPOSES ONLY)	
CLASS AAE-3 CONCRETE	11.8 CY
CONCRETE STRENGTH	4,000 PSI
REINFORCING STEEL	5,495 LBS
REINFORCEMENT STRENGTH	60,000 PSI

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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
**CONCRETE BARRIER REBAR
 DETAILS**
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	27	34



- NOTE:
- BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND THE TYPE A 1 3/4" O.D. WASHER AND NOT MORE THAN 1" BEYOND IT.

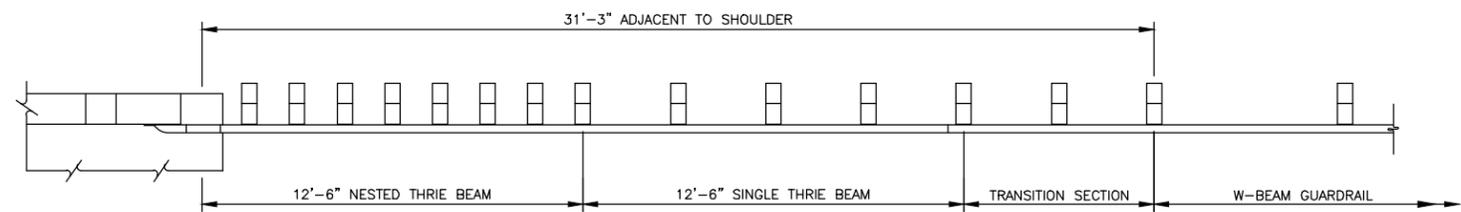
BUTTON HEAD "SPlice" BOLTS (ASTM A307) ARE 5/8"Ø WITH A 5/8"Ø RECESSED NUT (ASTM A563).
 - ALL HARDWARE (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH THE AASHTO M232. HARDWARE SHALL NOT BE MEASURED FOR SEPARATE PAYMENT BUT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "W-BEAM GUARDRAIL".
 - GUARDRAIL POSTS SHALL NOT BE SET IN CONCRETE.
 - REFER TO STANDARD DRAWING D-764-1 FOR ADDITIONAL DETAILS EXCEPT AS FOLLOWS. OMIT STANDARD DRAWING D-764-1 POST LENGTH OF 6'-0" AND USE 6'-6" POST LENGTH FOR ALL POSTS. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF STANDARD DRAWING D-764-1.

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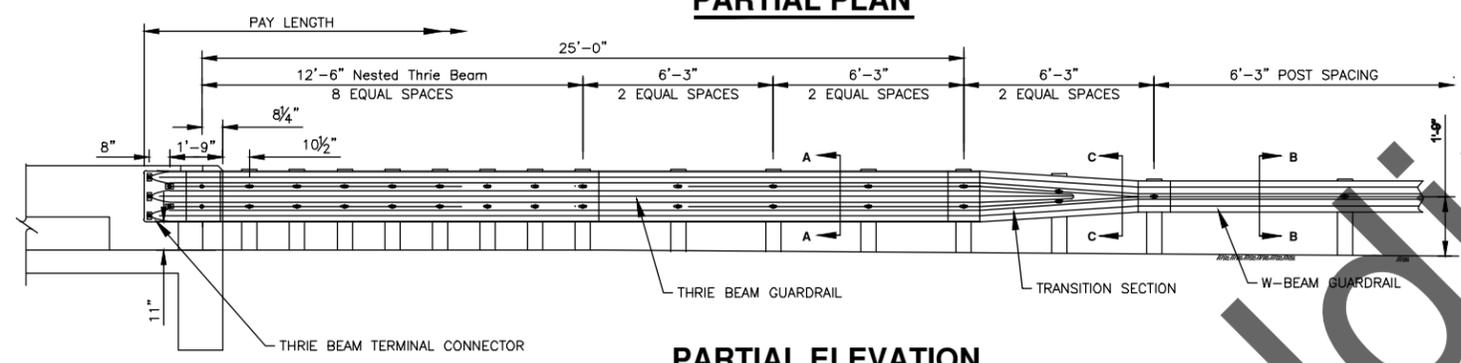
CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
GUARDRAIL DETAILS
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

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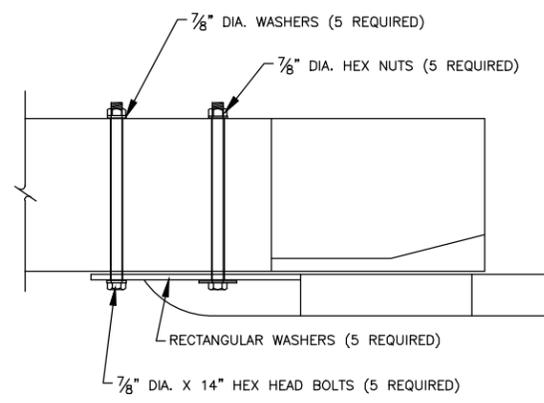
PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	28	34



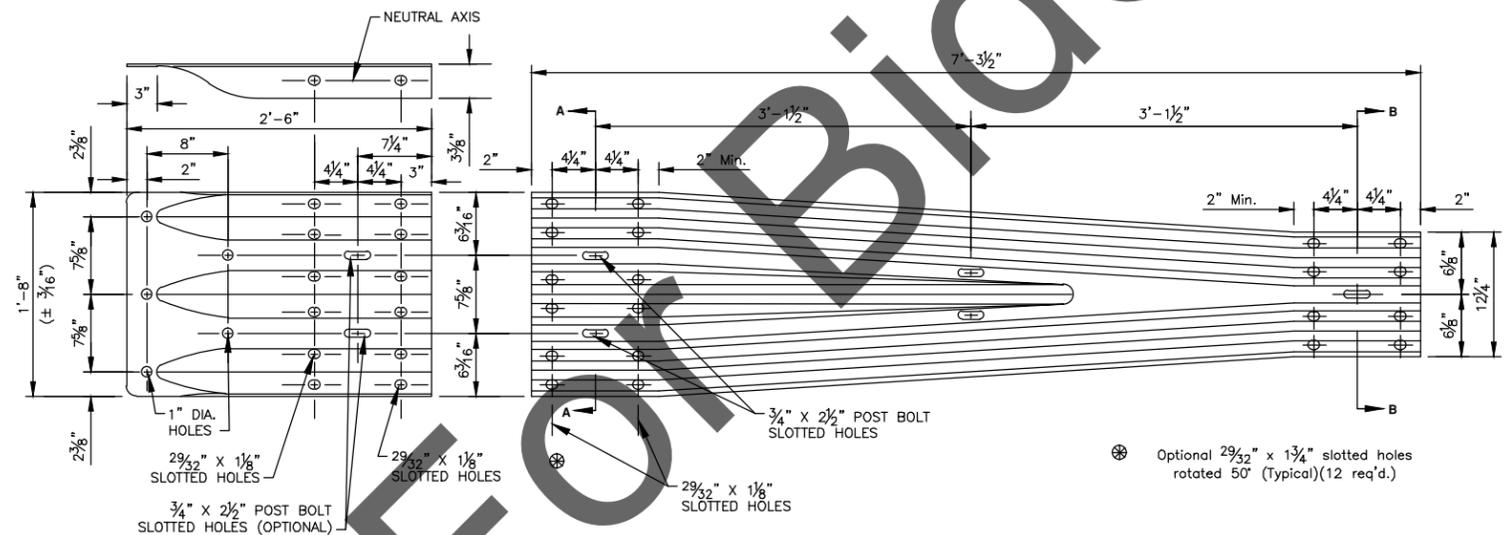
PARTIAL PLAN



PARTIAL ELEVATION

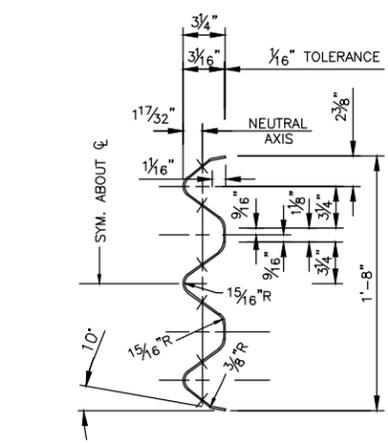


DETAIL BRIDGE ATTACHMENT

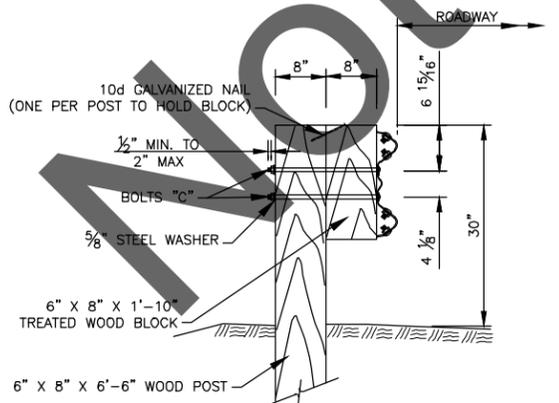


ELEVATION - TRANSITION SECTION
(FROM THRIE BEAM TO W-BEAM RAIL)

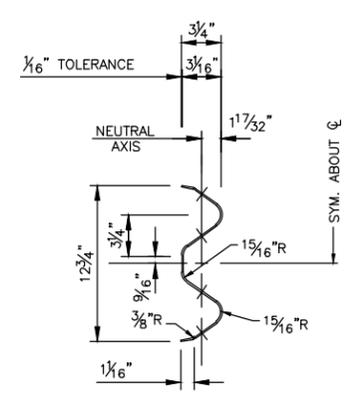
TERMINAL CONNECTOR



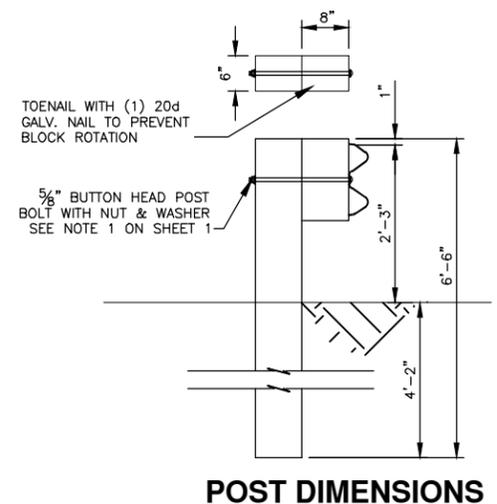
SECTION A-A THRU RAIL ELEMENT
TYPICAL THRIE BEAM



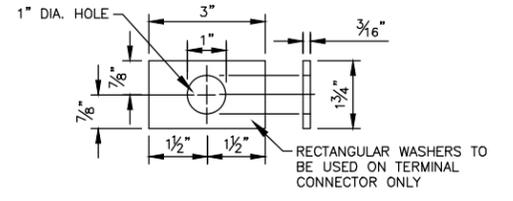
SECTION C-C (WOOD POST)



SECTION B-B THRU RAIL ELEMENT
TYPICAL W-BEAM



POST DIMENSIONS



RECTANGULAR WASHER
(Other Approved Washer May Be Used)

GENERAL NOTES:

RAIL ELEMENT SHALL BE #10 OR #12 U.S. STANDARD GAUGE EXCEPT WHERE SPECIFIC GAUGE IS REQUIRED, SUCH AS AT END TERMINAL OR BULLNOSE SECTIONS.

GALVANIZED STEEL RAIL ELEMENTS SHALL BE USED. ALL POST RAIL FITTINGS AND ANCHOR BOLTS SHALL BE GALVANIZED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

GUARDRAIL PARTS FURNISHED UNDER THIS SPECIFICATION SHALL BE INTERCHANGEABLE WITH SIMILAR PARTS REGARDLESS OF THE SOURCE OR MANUFACTURER.

WHEN RADIUS IS LESS THAN 150', RAILS ARE TO BE SHOP CURVED.

TERMINAL CONNECTOR SHALL BE 10 GAUGE STEEL. THE CONNECTOR HAS THE SAME SECTION AS THRIE BEAM GUARDRAIL. TERMINAL CONNECTOR SHALL BE SUBSIDIARY TO THE BID ITEM "W-BEAM GUARDRAIL".

ALL GUARDRAIL SPLICES, INCLUDING SPECIAL END SHOES, SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC. WHERE TRAFFIC IS TEMPORARILY CARRIED IN THE DIRECTION OPPOSITE OF THE FINAL CONFIGURATION, THE RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF THE PERMANENT TRAFFIC.

BRIDGE RAIL TRANSITION SHALL CONSIST OF ONE 25'-0" THRIE BEAM SECTION, ONE 12'-6" THRIE BEAM SECTION NESTED IN BACK OF 25'-0" SECTION, AND ONE THRIE BEAM TO W-BEAM TRANSITION SECTION, POSTS LOCATED AS SHOWN, AND ALL ASSOCIATED HARDWARE. THE REMAINDER OF THE GUARDRAIL SHALL BE W-BEAM WITH 6'-3" POST SPACING AND MAY BE FURNISHED IN EITHER 12'-6" OR 25'-0" SECTIONS.

ALL MATERIAL AND WORK REQUIRED FOR THIS CONSTRUCTION SHALL BE INCLUDED IN THE PAY ITEM "W-BEAM GUARDRAIL."

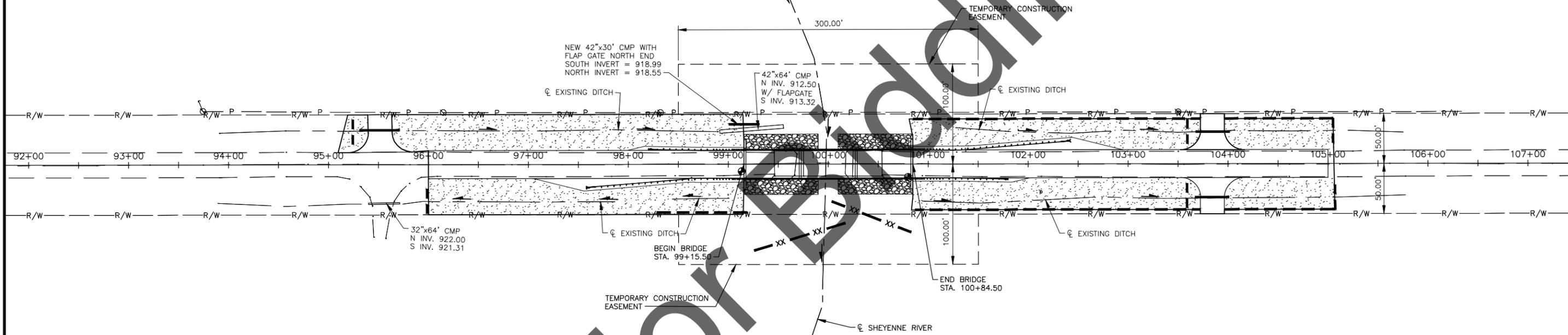
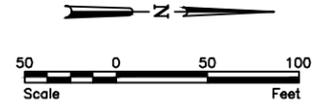
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 Registration Number
 PE- 4883,
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 Cass County Highway Department

CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
GUARDRAIL TRANSITION
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	29	34

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1375	FLOATATION SILT CURTAIN	180	LF
708-1376	REMOVAL FLOATATION SILT CURTAIN	180	LF
708-1430	FIBER ROLLS 12IN	915	LF
708-1431	REMOVAL FIBER ROLLS 12IN	915	LF
708-2260	SEEDING - TYPE B CL IV	1.06	ACRE
708-5500	MULCHING	1.06	ACRE



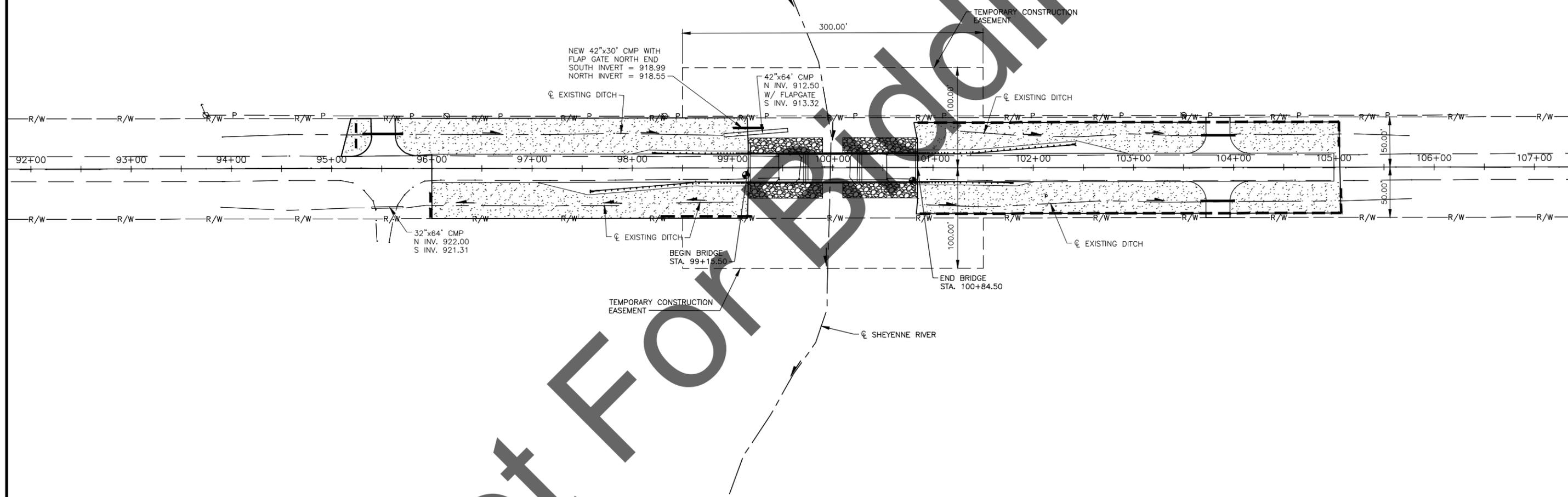
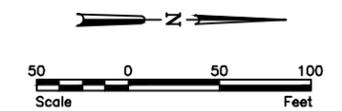
LEGEND	
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
TEMPORARY SEEDING & MULCHING	
TEMPORARY FLOATATION SILT CURTAIN	
TEMPORARY FIBER ROLLS	

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	<p>TEMPORARY EROSION CONTROL</p> <p>PROJECT NO. CB1302 5 MILES NE OF KINDRED CASS COUNTY</p>

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	30	34

ITEM	DESCRIPTION	QUANTITY	UNIT
708-1430	FIBER ROLLS 12IN	915	LF
708-2280	SEEDING - TYPE B CL IV	1.06	ACRE
708-5500	MULCHING	1.06	ACRE



LEGEND

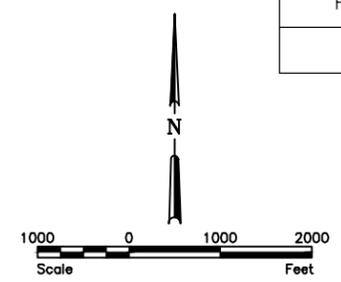
PERMANENT WETLAND IMPACT	
TEMPORARY WETLAND IMPACT	
PERMANENT SEEDING & MULCHING	
PERMANENT FIBER ROLLS	

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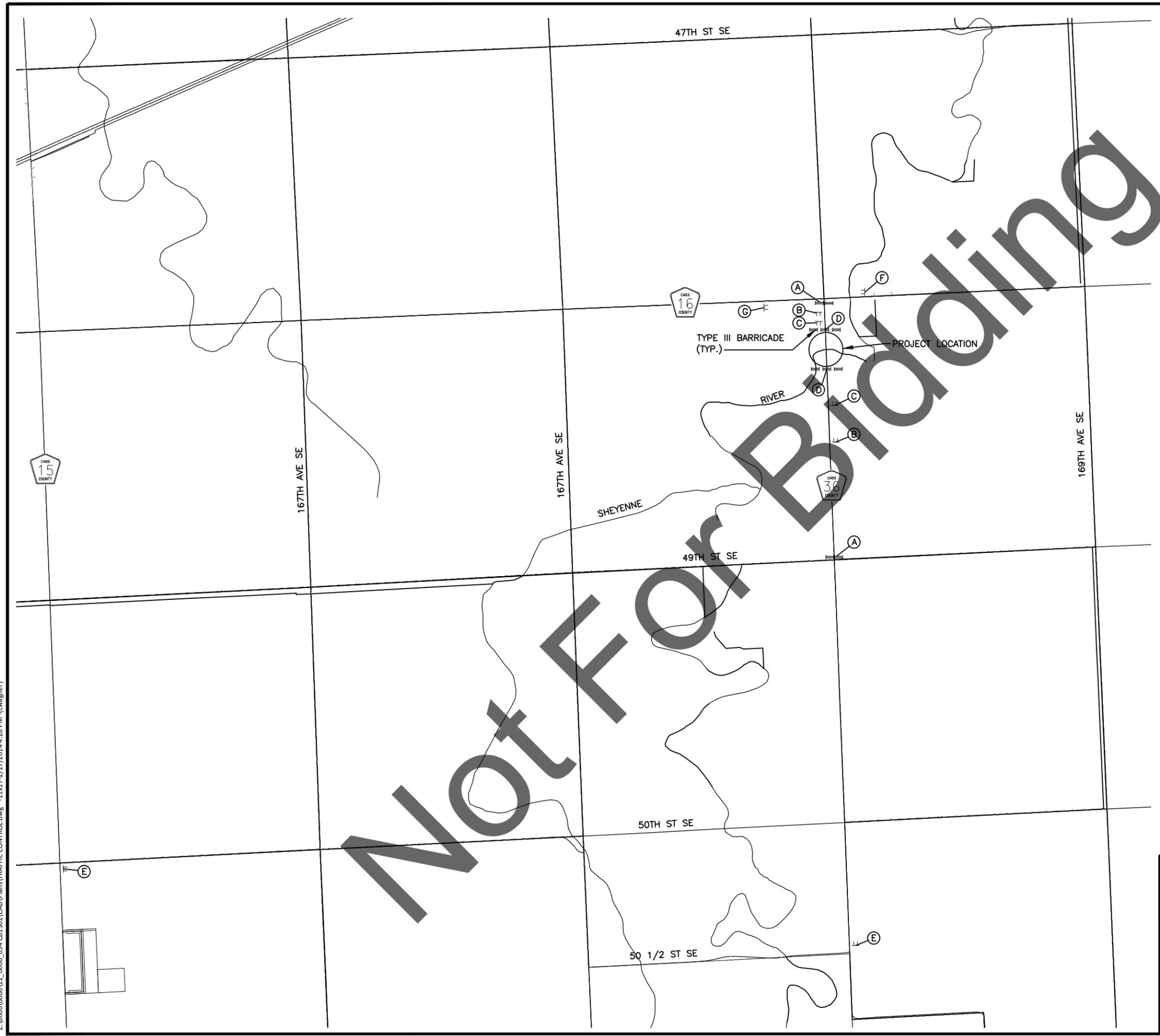
CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
**PERMANENT EROSION
 CONTROL**
 PROJECT NO. **CB1302**
 5 MILES NE OF KINDRED
 CASS COUNTY

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PROJECT NO.	SHEET NO.	TOTAL SHEETS
CB1302	31	34



- (A) - 2
R11-3a-60
BARRICADE MOUNTED
- (B) - 2
W20-3-48
POST MOUNTED
- (C) - 2
W20-3-48
POST MOUNTED
- (D) - 2
R11-2-48
BARRICADE MOUNTED
- (E) - 2
W20-3-48
W16-2-24
POST MOUNTED
- (F) - 1
G20-52dL-72
POST MOUNTED
- (G) - 1
G20-52aR-72
POST MOUNTED



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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
TRAFFIC CONTROL

 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY

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SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1a-60	60"x24"	ROAD WORK NEXT ___ MILES		34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2a-48	48"x24"	END ROAD WORK		19	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS		37	
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW	2	30	60
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT (Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back		5	
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT ___		39	
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED	2	28	56
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY	2	31	62
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT.		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	___ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W16-2-24	24"x18"	SUPPLEMENTAL MILE	2	35	70
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE		35	
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT	6	35	210
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.		35	
W20-7a-48	48"x48"	FLAGGING SYMBOL		35	
W20-7k-24	24"x18"	___ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT ___ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ___ FT		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or ___ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

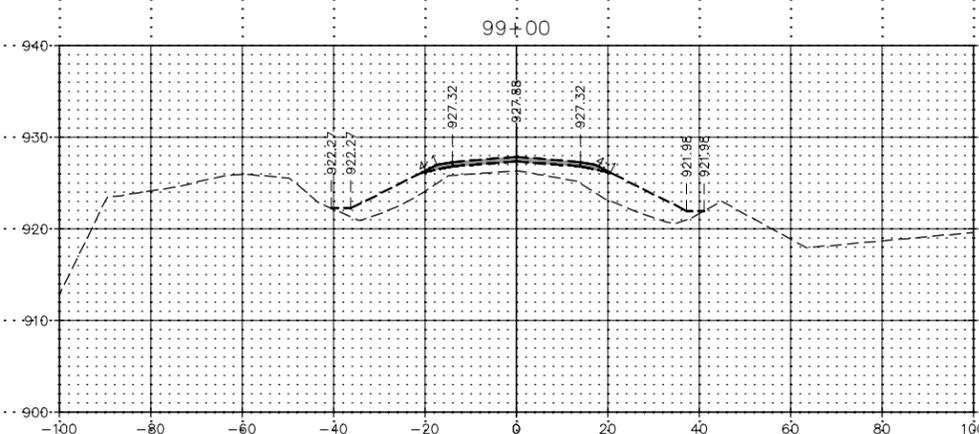
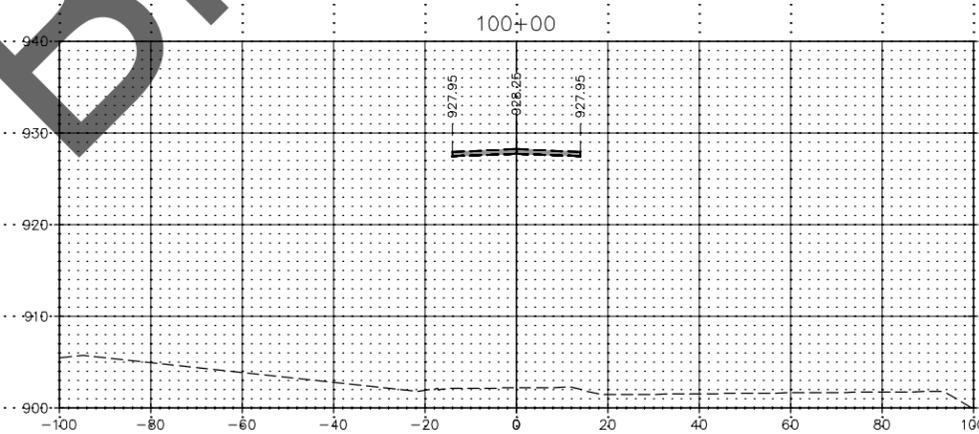
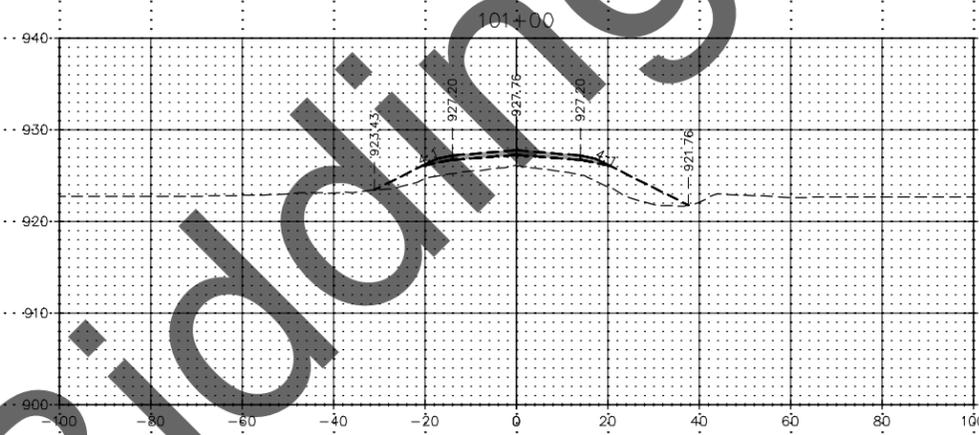
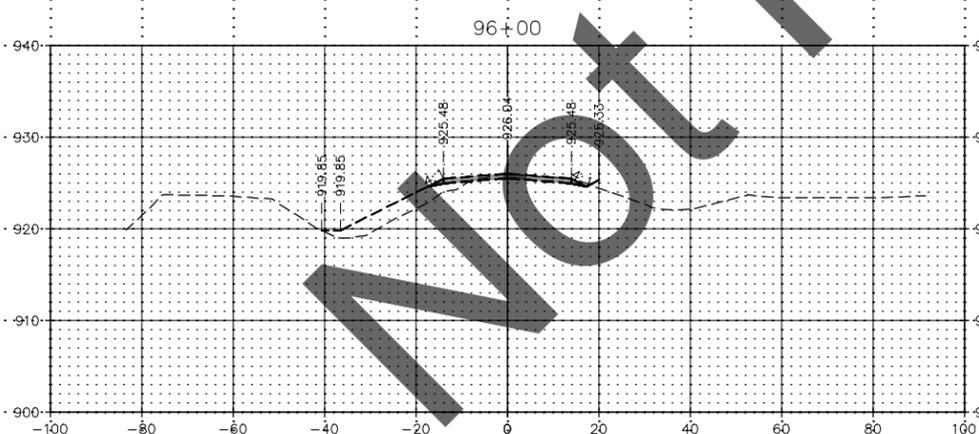
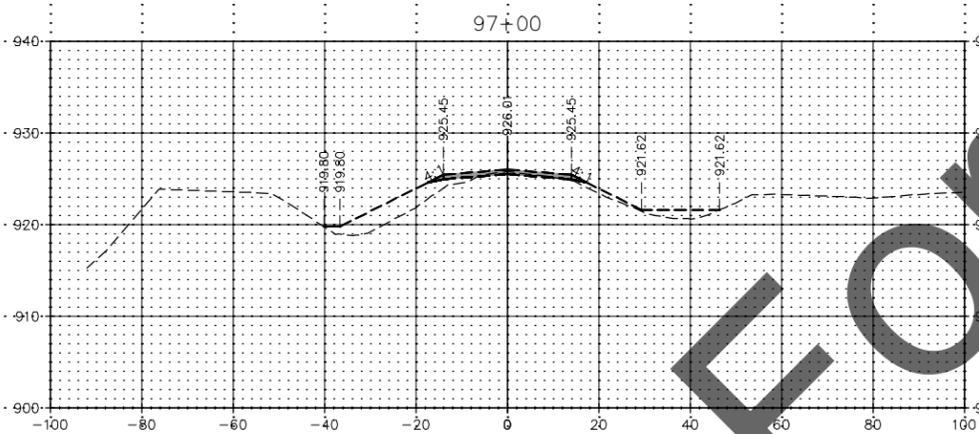
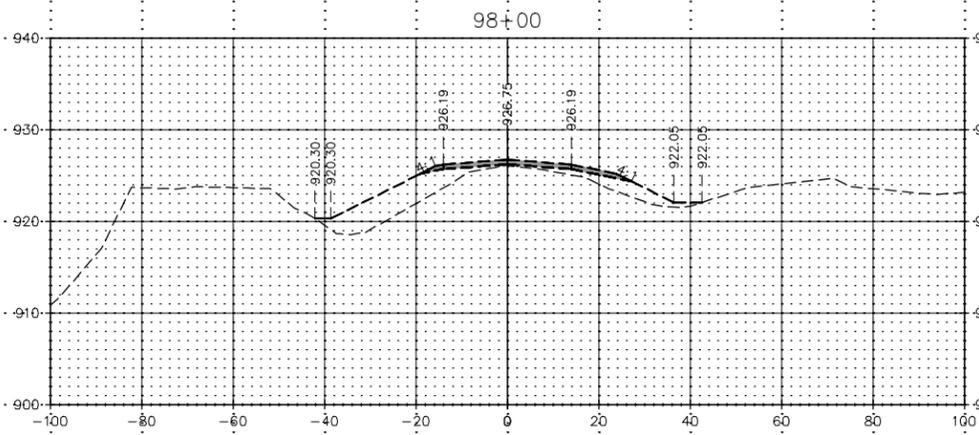
SPECIAL SIGNS	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL

SPEC & CODE	DESCRIPTION	QUANTITY
704-1000	TRAFFIC CONTROL SIGNS	458

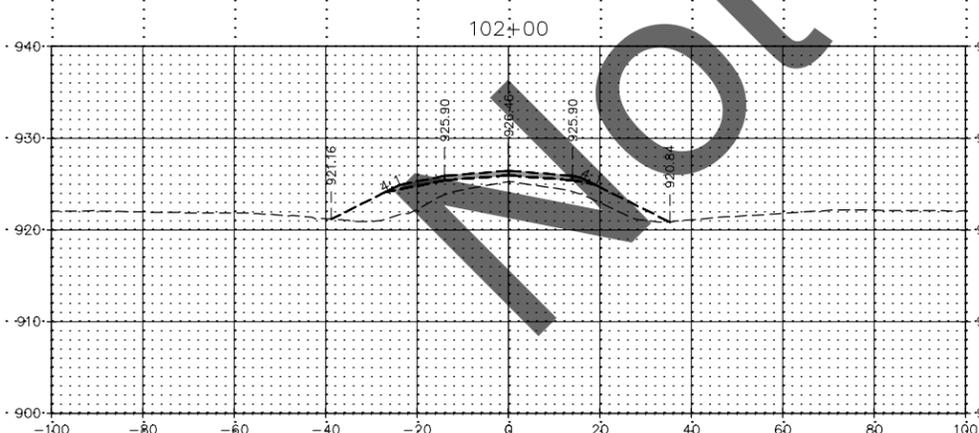
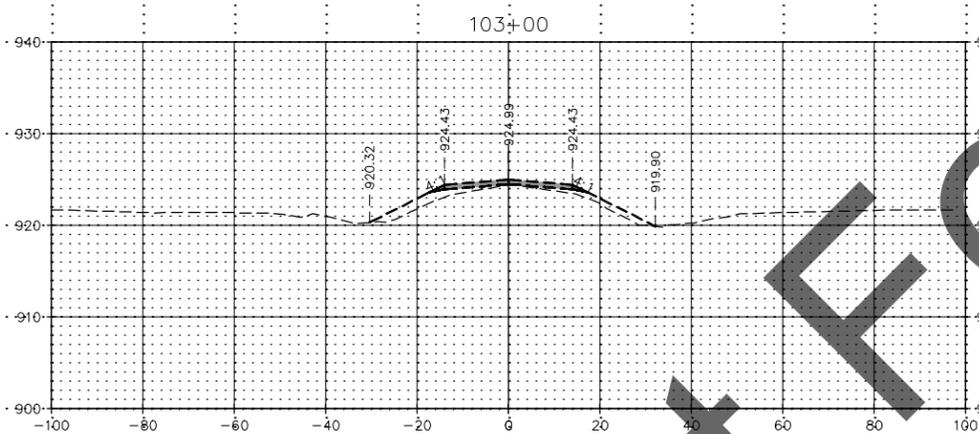
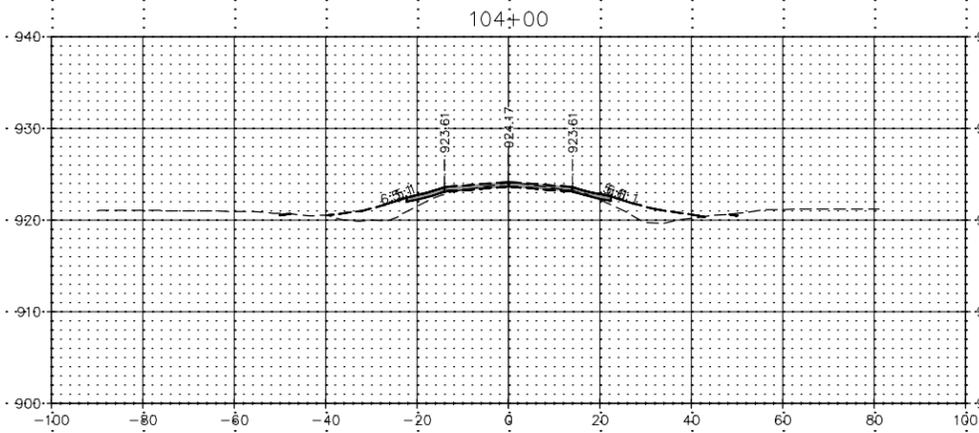
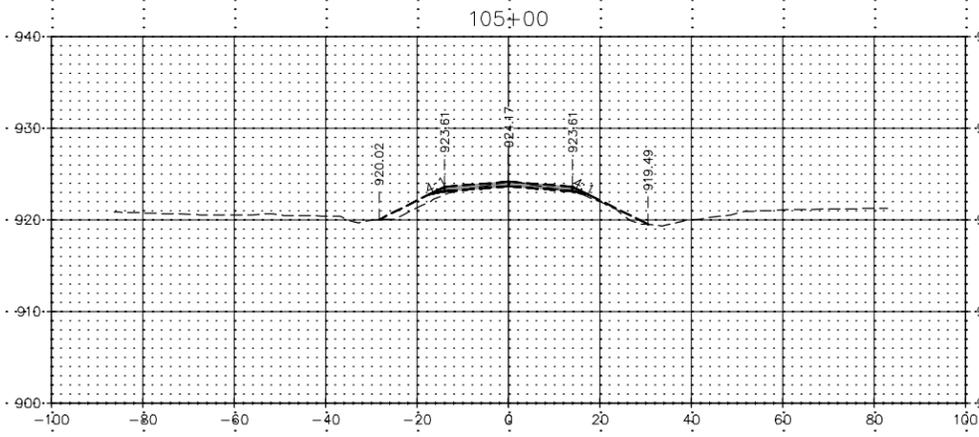
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	10
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

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CASS COUNTY
 HIGHWAY DEPARTMENT
 SHEYENNE RIVER
 BRIDGE NO. 09-136-37.1
TRAFFIC CONTROL DEVICE LIST
 PROJECT NO. CB1302
 5 MILES NE OF KINDRED
 CASS COUNTY



NOT FOR BIDDING



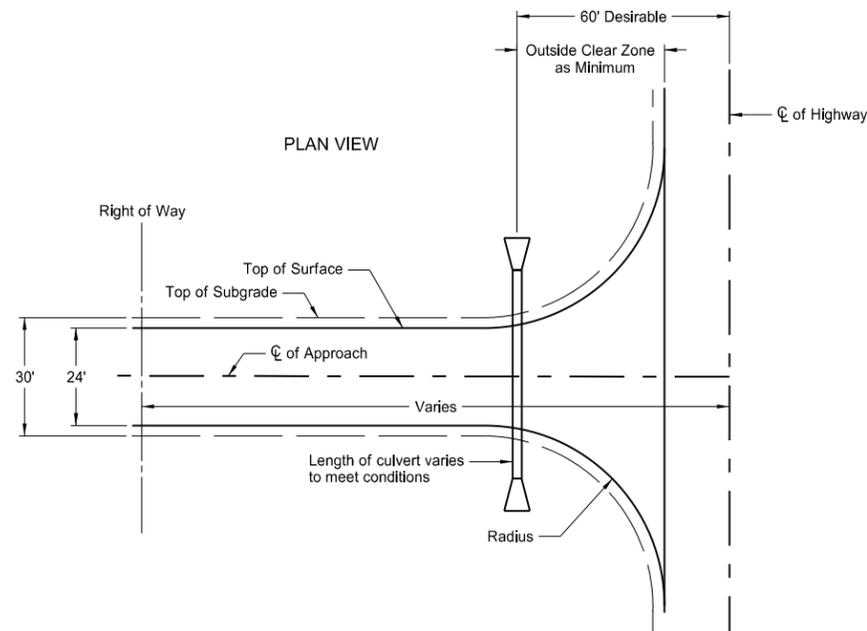
NOT FOR BIDDING

STANDARD RURAL APPROACHES

D-203-8

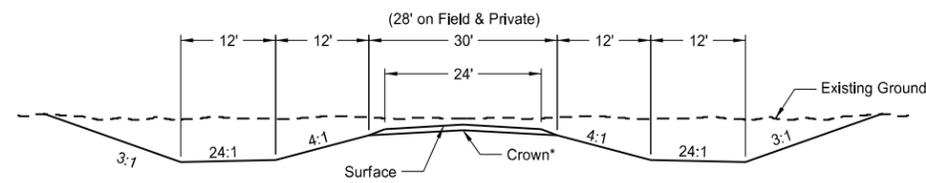
NOTES:

1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.



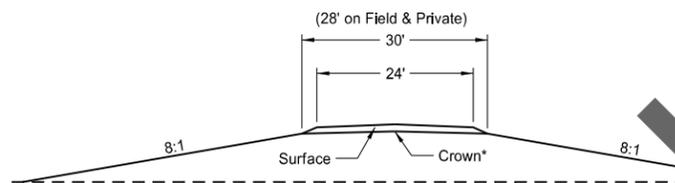
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=24 ft	R=30 ft	R=40 ft
Maximum Grade	10%	7%	7%
Storage Platform	20 ft	24 ft	30 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

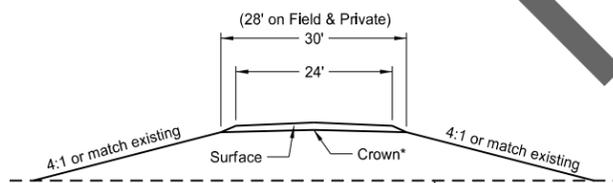


SECTION A-A

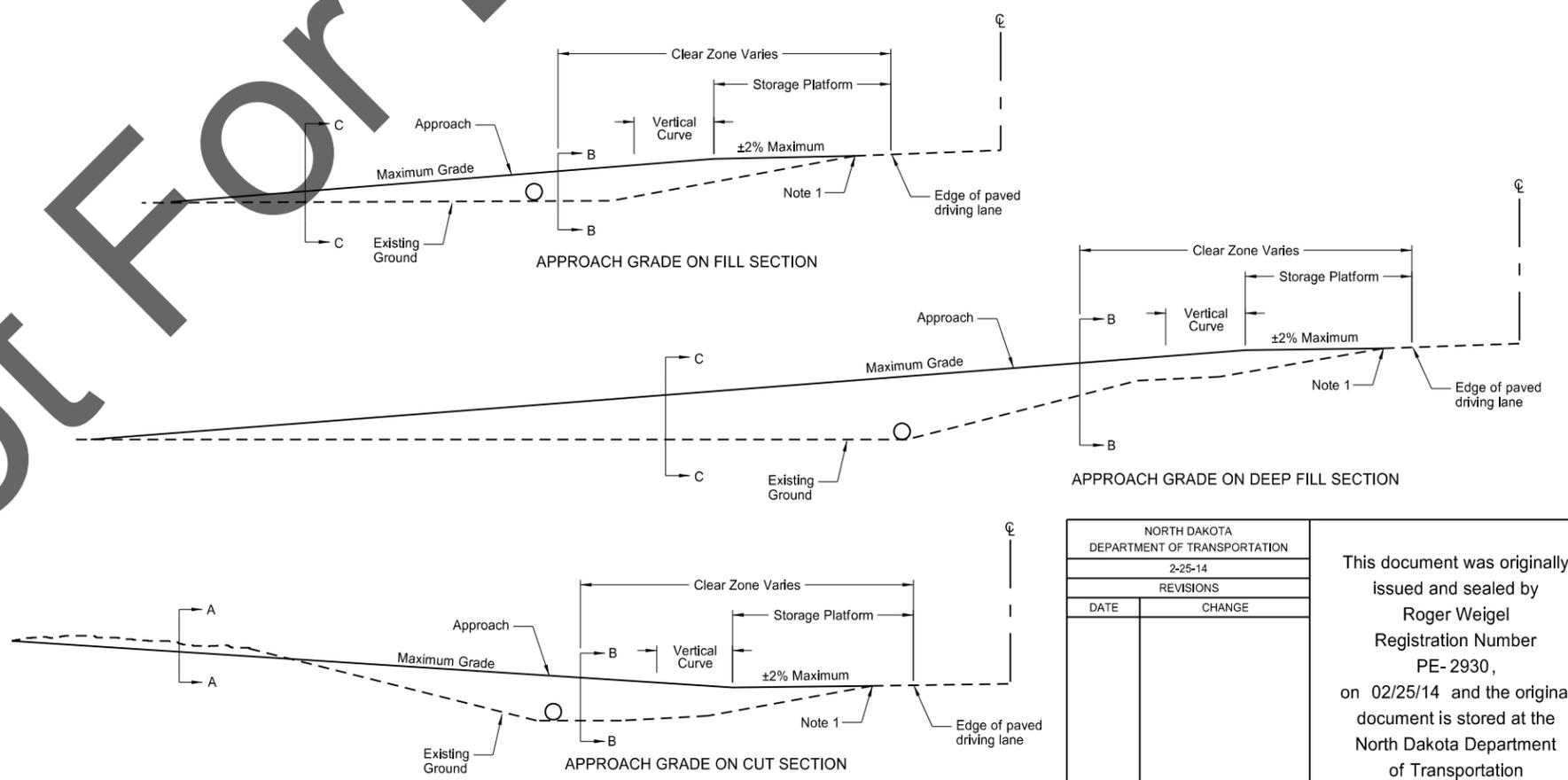
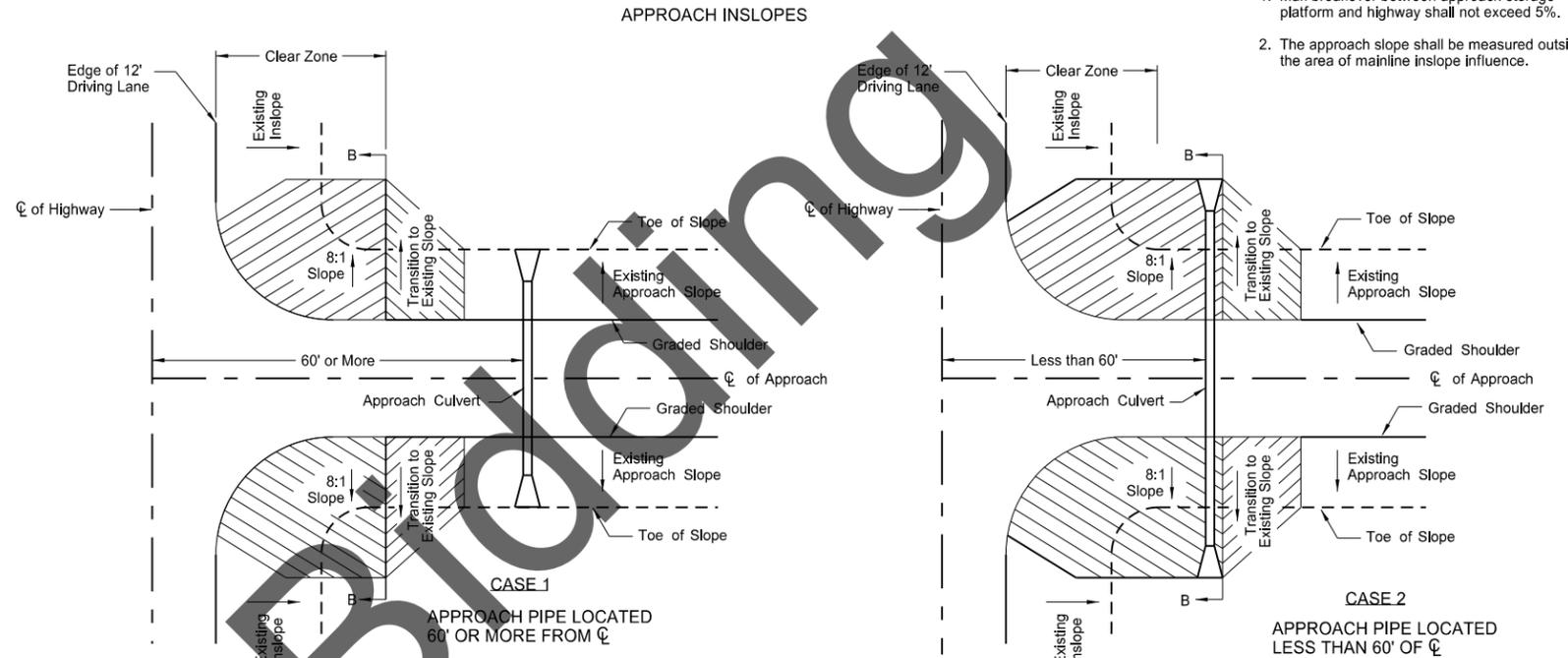
*2.1% crown for paved surface
*3.0% crown for gravel surface



SECTION B-B



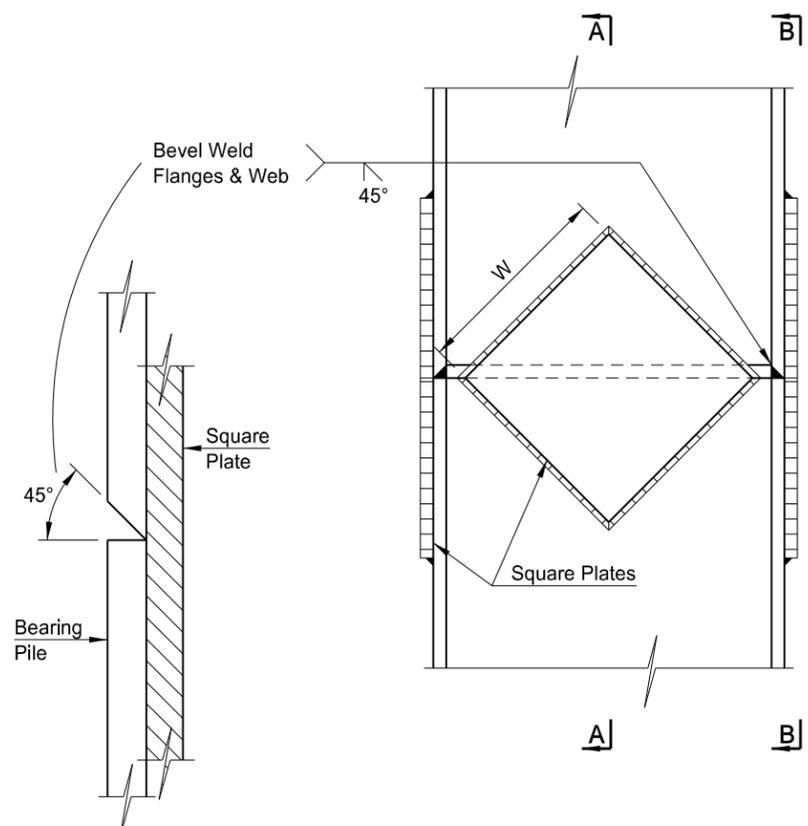
SECTION C-C



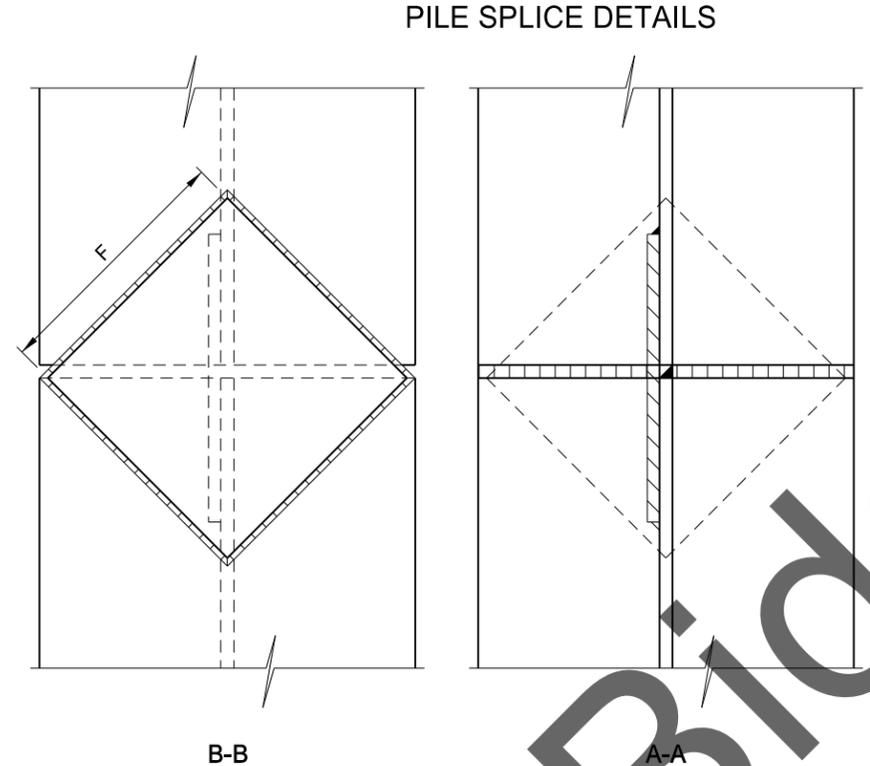
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE

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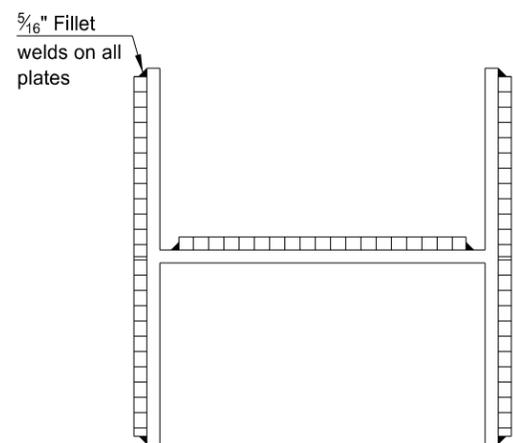
PILE SPLICE DETAILS



ENLARGED VIEW

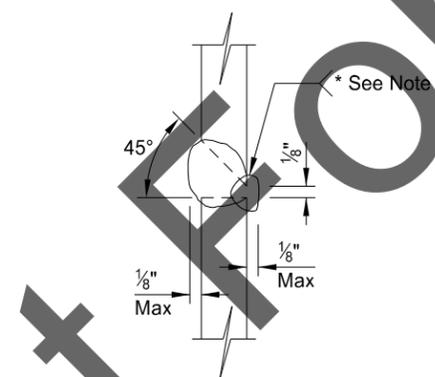


Flame scarf inside of both flanges and one side of web of upper section.



PILE	8"	10"	12"	14"
"F" FLANGE	5"	6 1/2"	8"	10"
"W" WEB	4"	5 1/2"	6 1/2"	8"

H-PILE SPLICE DETAIL



ALTERNATE H-PILE SPLICE DETAIL

NOTES:

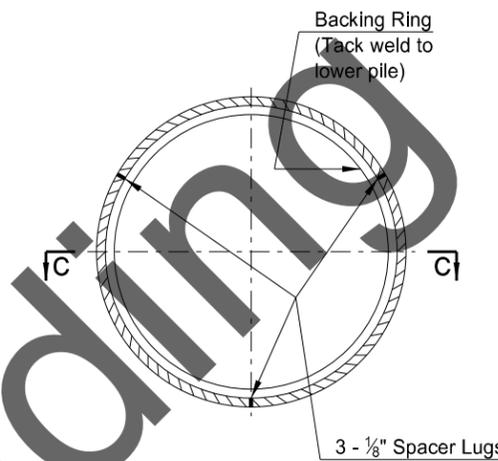
Steel H-Pile may be spliced with complete penetration groove welds in both flanges and web in lieu of using the reinforcing plates.

AWS classification E70XX Low Hydrogen Electrodes shall be used.

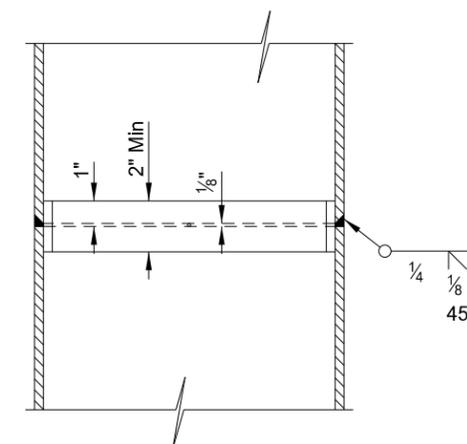
* Welds made without the use of backing material shall have the root gouged to sound metal and welded from the second side.

All welding shall conform to the current AASHTO/AWS D1.5 Bridge Welding Code.

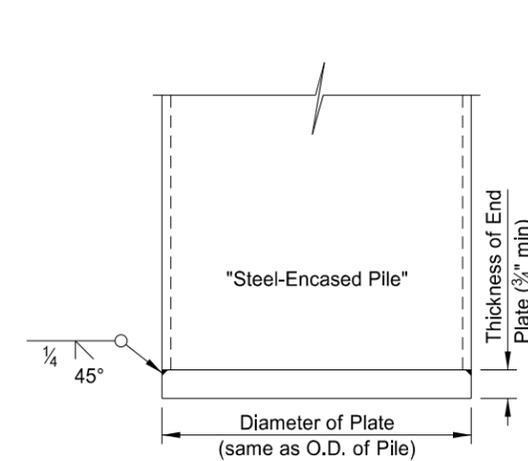
The thickness of the steel square plates shall at a minimum be as thick as the flanges and web of the pile being spliced.



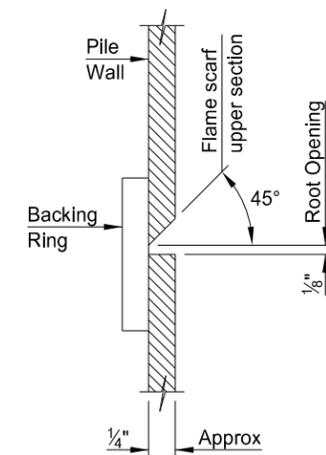
Backing Ring may be made from pile cut-offs or other material of a like quality.



STEEL-ENCASED CONCRETE PILE SPLICE DETAIL



END PLATE DETAIL



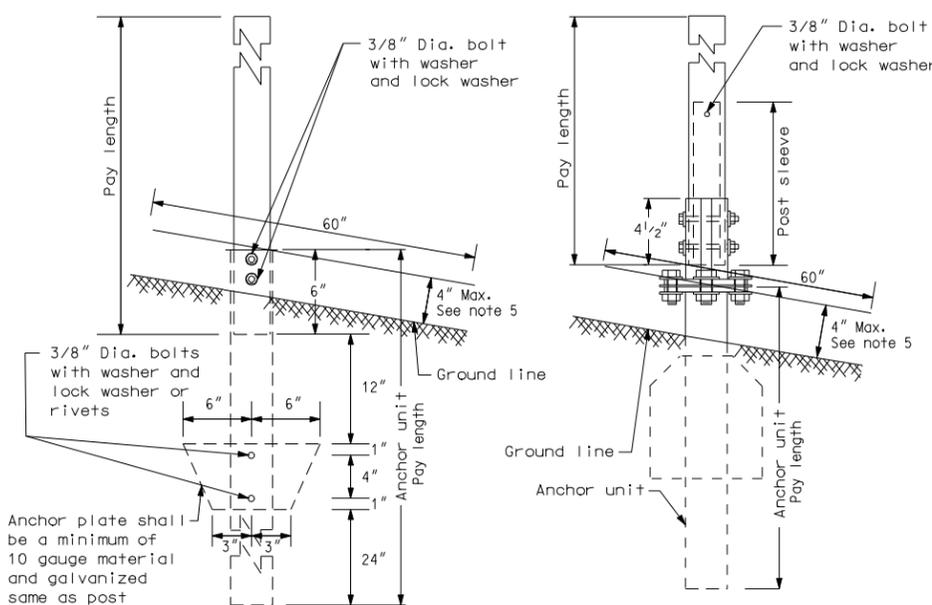
ENLARGED VIEW

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09/14/11	
REVISIONS	
DATE	CHANGE

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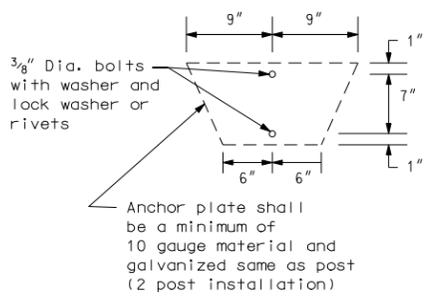
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

PERFORATED TUBE

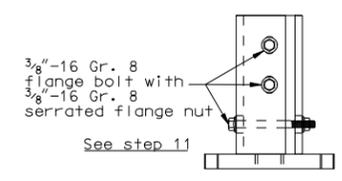


ANCHOR UNIT AND POST ASSEMBLY

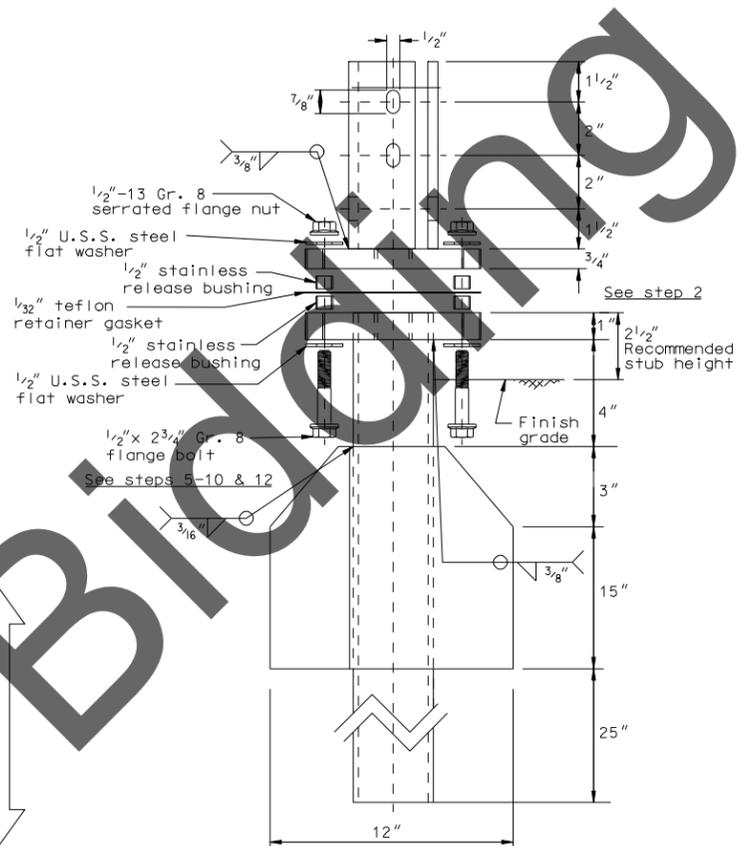
SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY



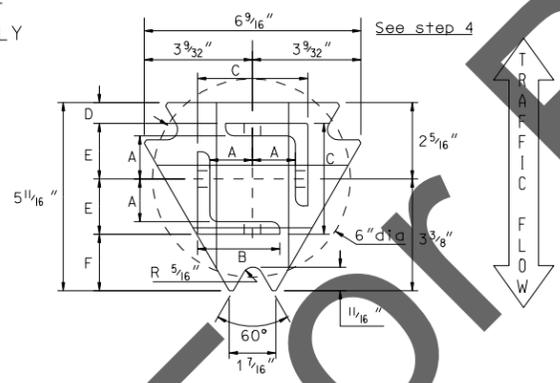
ANCHOR UNIT AND POST ASSEMBLY (2 post installation)



See step 11



MULTI-DIRECTIONAL SLIP BASE ASSEMBLY

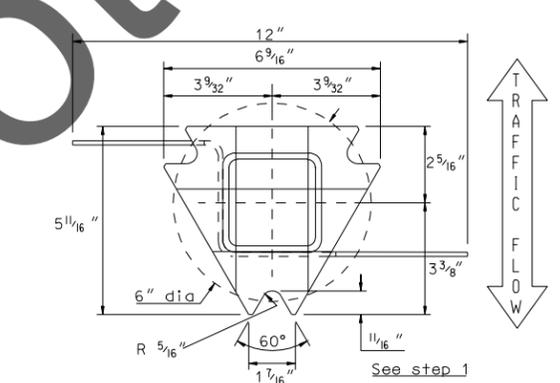


TOP POST RECEIVER

Materials: Plate - ASTM A572 grade 50
Angle receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle

TOP POST RECEIVER DATA TABLE						
Square Post Sizes	A	B	C	D	E	F
2 3/16" x 10 Ga. Square Post	1 3/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2" x 10 Ga. Square Post	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

2 3/16" x 10 gauge may be inserted into 2 1/2" x 10 gauge for additional wind load.



BOTTOM SOIL STUB

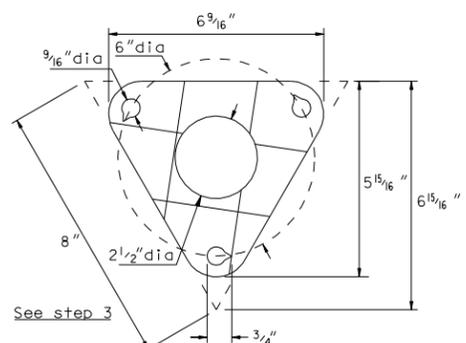
Materials: Tube - 3" x 3" x 7 gauge ASTM A500 Gr B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
Plate - ASTM A572 grade 50

- Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
 2. The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size 10 gauge is shown as 2.51" size on the plans.
 3. Anchor for 2", 2 1/4", and 2 1/2" posts.
 4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3" x 3" x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
 5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
 6. When used in concrete sidewalk, anchor shall be the same except without the wings.
 7. Four post signs shall have over 8' between the first and fourth posts.

MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave 2 1/2" from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each 1/2" flat washer on to 1 each inverted 1/2"-13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading 1/2"-13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out.
	*NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48", not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each 3/8"-16 gr. 8 flange bolts and 3 each 3/8"-16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three 1/2"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque.
	*NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.

Number of Posts	Telescoping Perforated Tube					
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			B	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	10			Yes	
2	2 1/4	12	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

B - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.



BOLT RETAINER FOR BASE CONNECTION
Materials: 1/32" reprocessed Teflon

Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. 4	Cross Sect. Area In. 2	Section Modulus In. 3
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

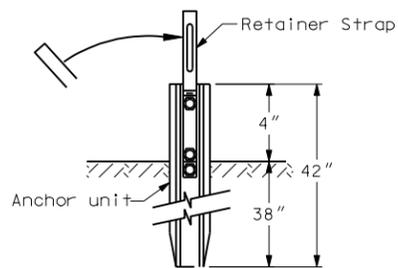
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BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

FLANGED CHANNEL

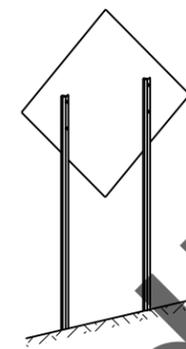
3 LB/FT U POSTS



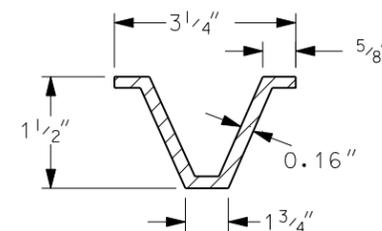
Anchor Unit & Strap Assembly Detail

STEPS OF INSTALLATION

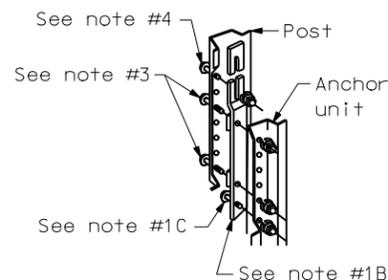
1. A) Drive anchor unit to within 12" of ground level.
B) Proper assembly established by lining up the top 3/4" slot of retainer spacer strap with top hole of anchor unit.
C) Assemble strap to back of anchor unit using 3/8"-16 UNC x 2.0" long bolt, lock washer and nut.
D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4" dimension.
B) Rotate strap to vertical position.
3. A) Place 3/8"-16 UNC x 2" bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom 3/4" slot in the strap).
B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening 3/8"-16 UNC x 2" long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap and sign post at the bolts have full contact across the entire width.



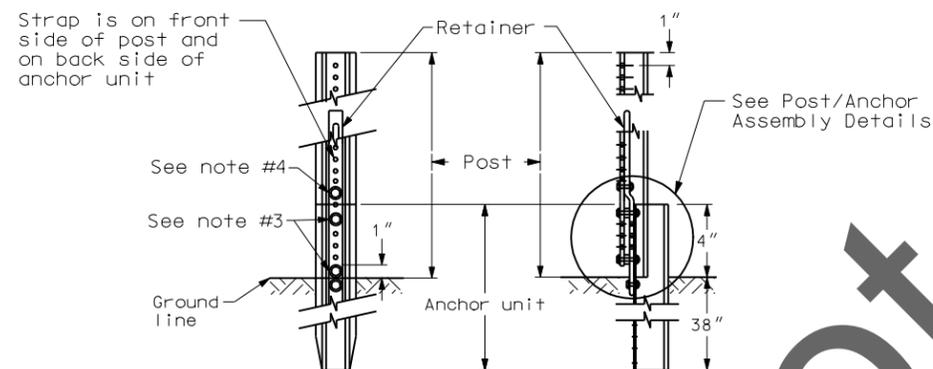
Typical Installation



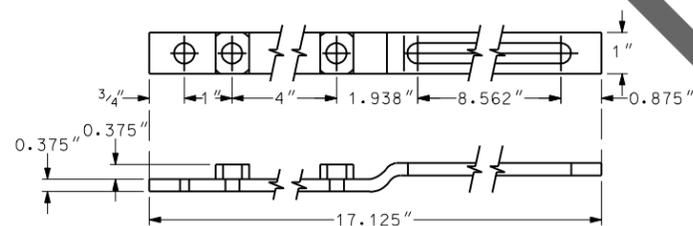
U-Post Detail (3 lb/ft)



Post/Anchor Assembly Details

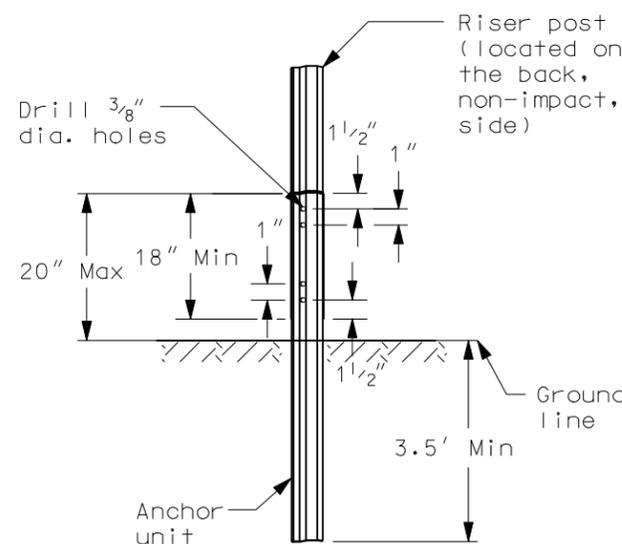


Front View Side View Sign Post Assembly Detail

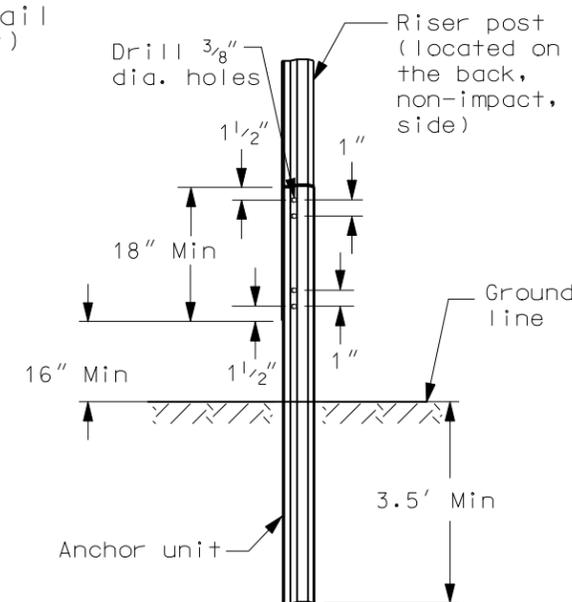


Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN. 3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560



U-Channel Splice Option 1



U-Channel Splice Option 2

Notes

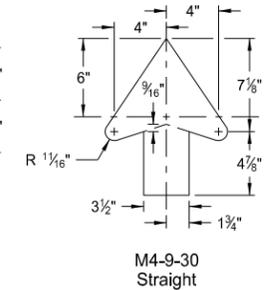
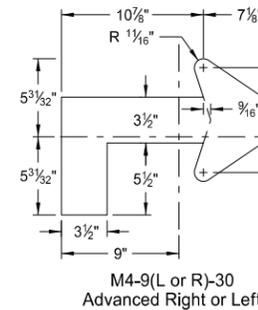
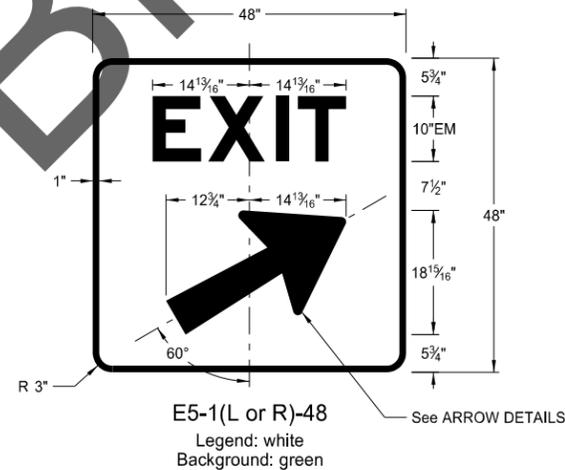
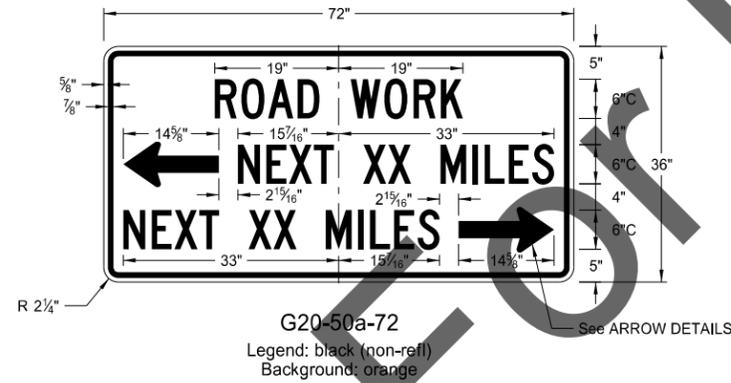
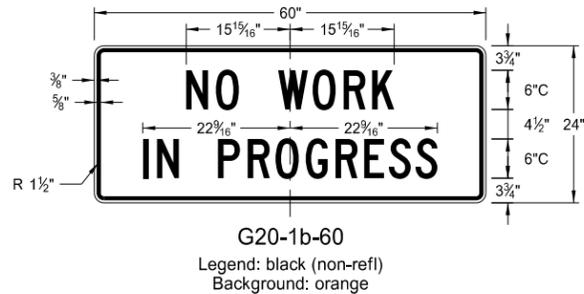
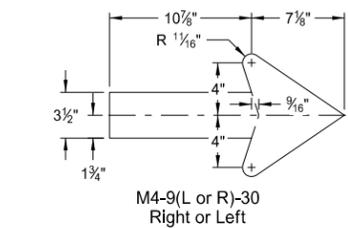
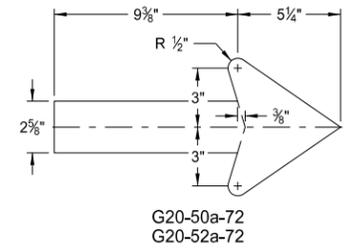
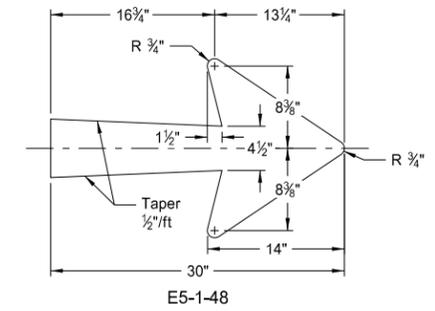
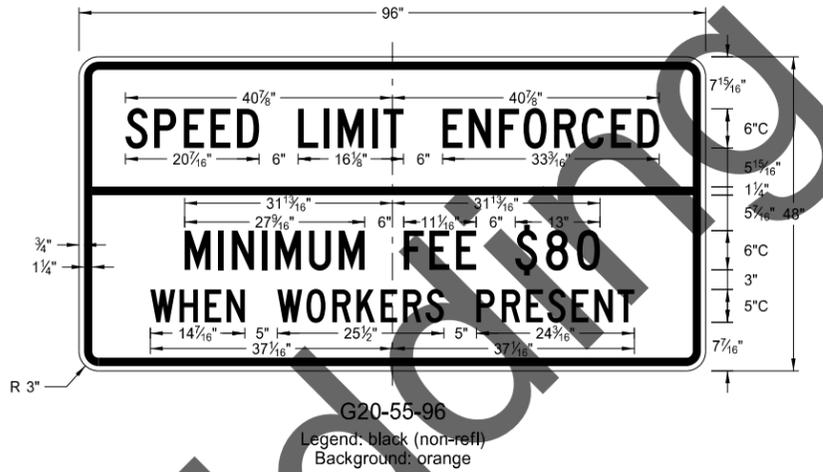
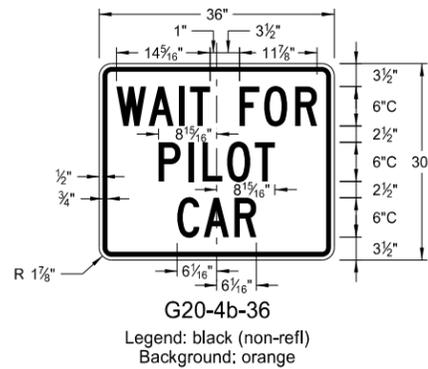
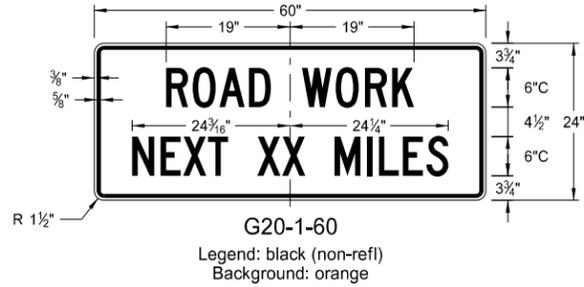
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7' long and embedded at least 3.5'.
3. A splice shall overlap a minimum of 18".
4. Use 4 bolts 5/16" diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4" above ground and embedded at least 3.5'.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

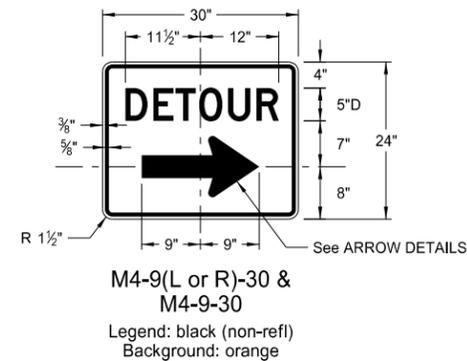
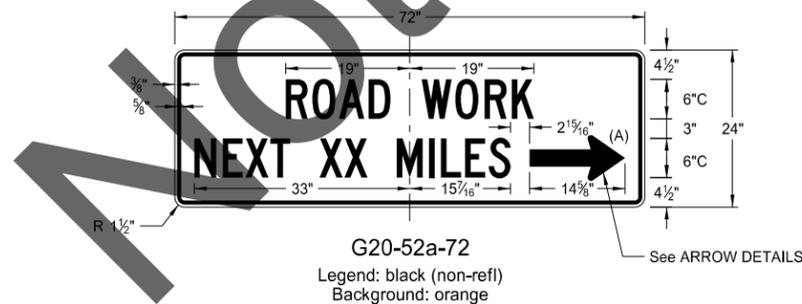
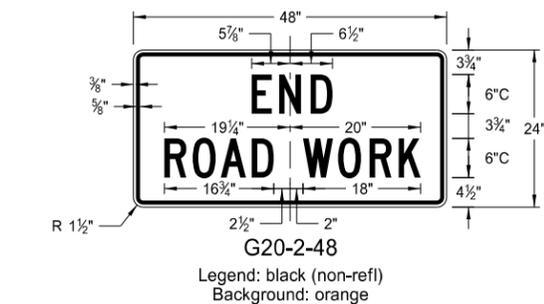
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

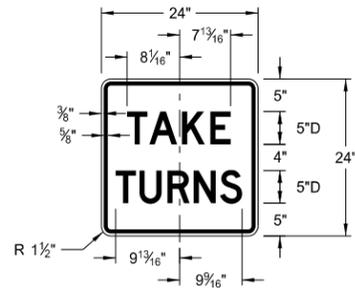
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

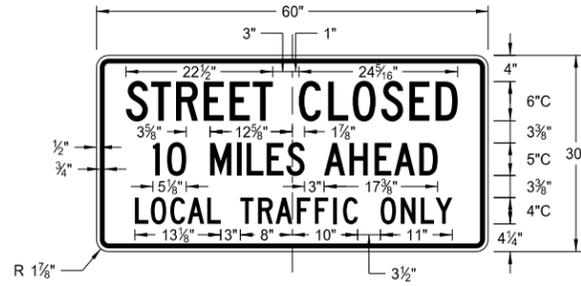
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

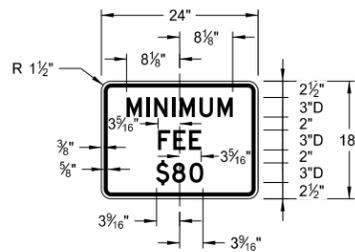
D-704-10



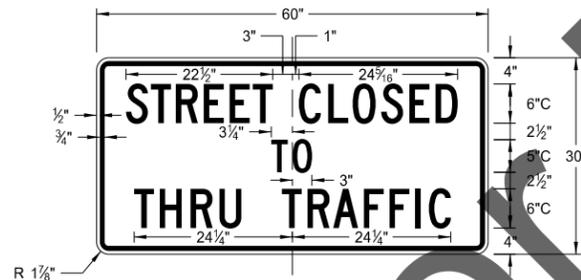
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Background: white



R11-3c-60
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Background: white



R2-1a-24
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R11-4a-60
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R11-2a-48
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Not For Bidding

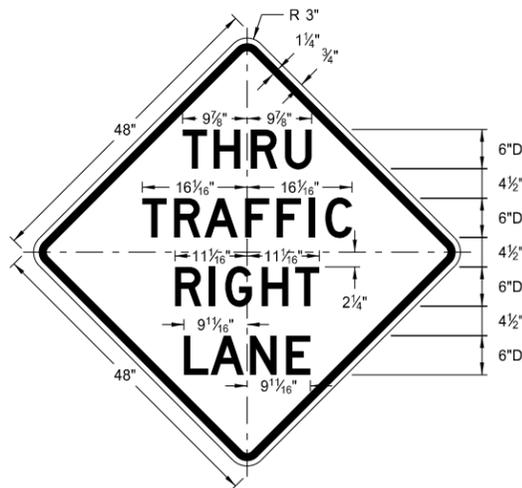
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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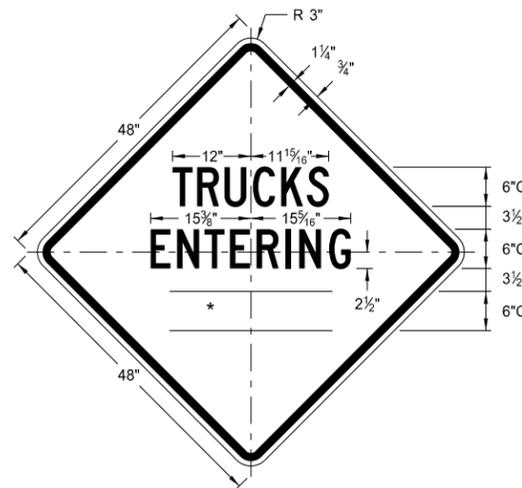
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

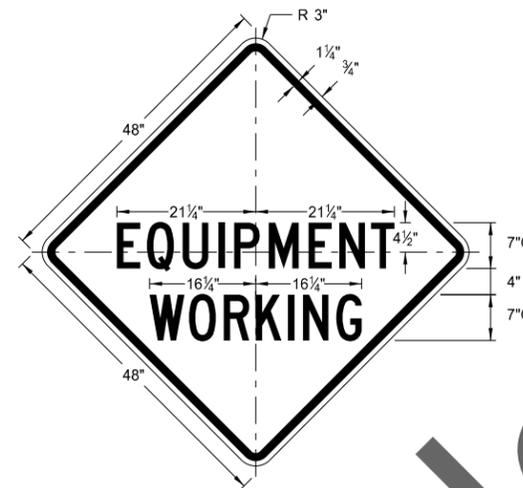
* DISTANCE MESSAGES



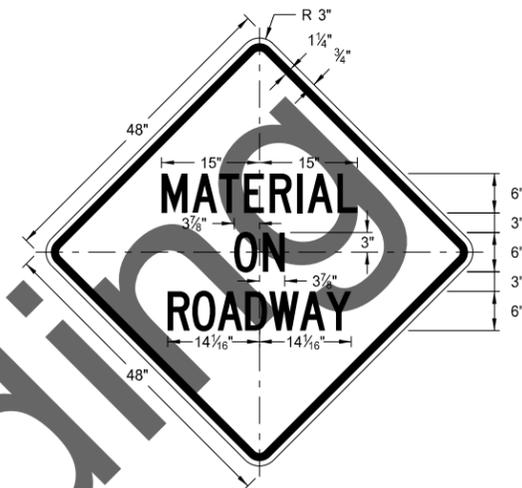
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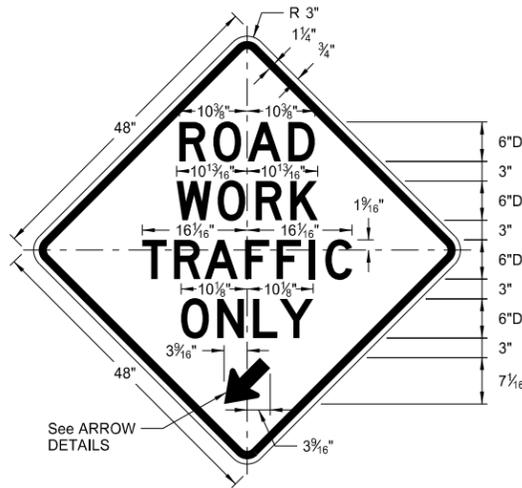
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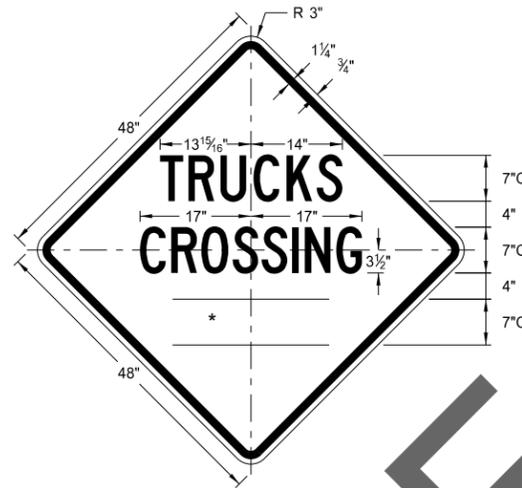
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W21-51-48
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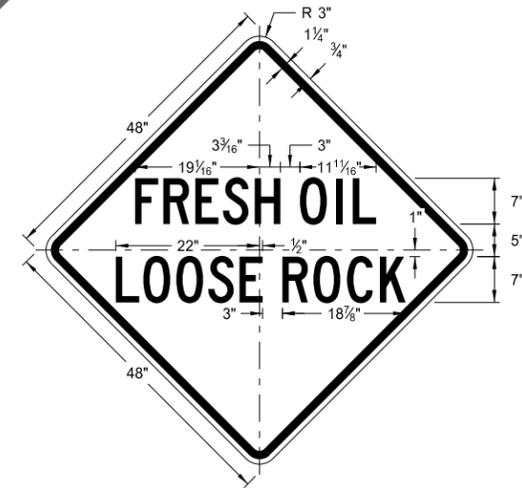
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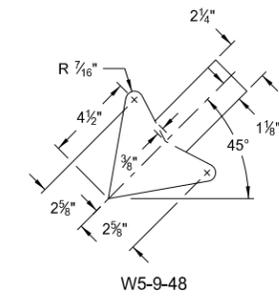
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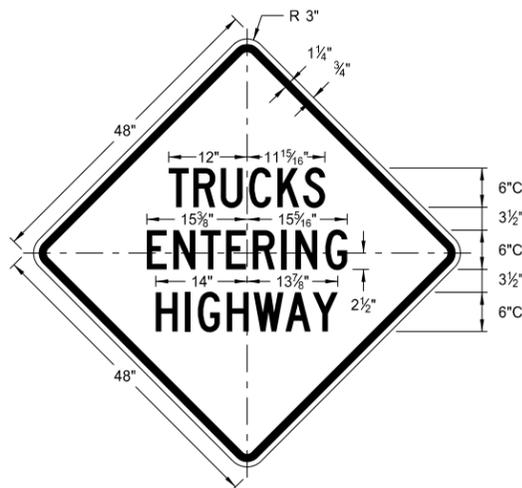
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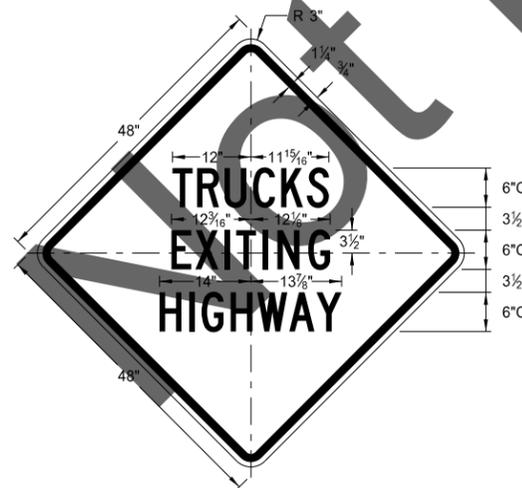
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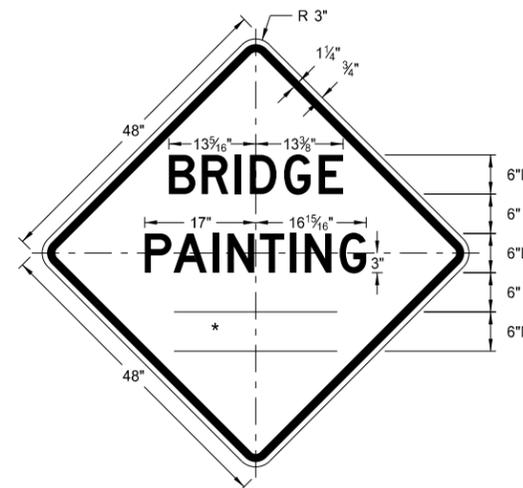
W5-9-48
ARROW DETAILS



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W8-56-48
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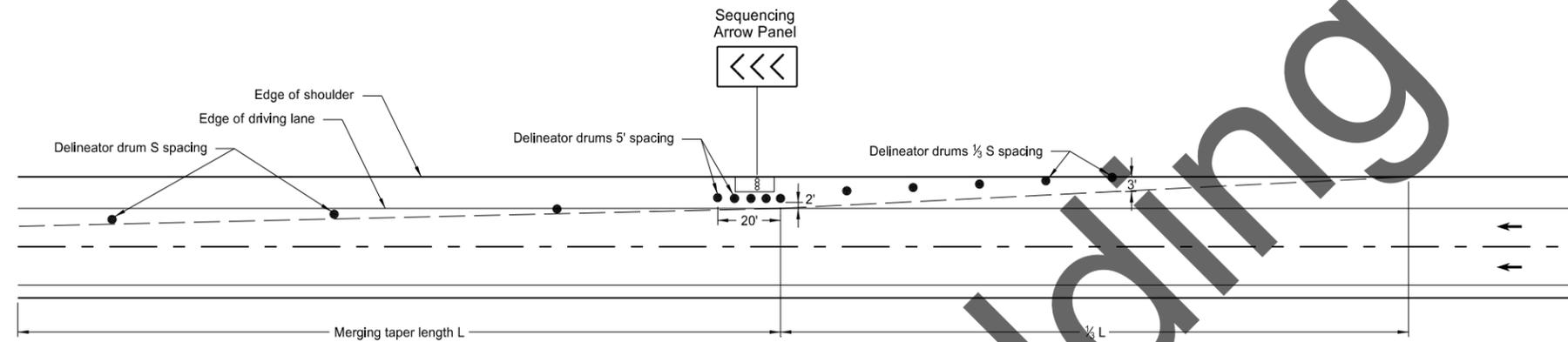
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

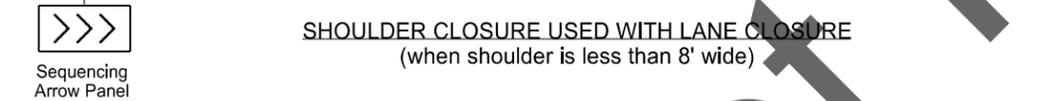
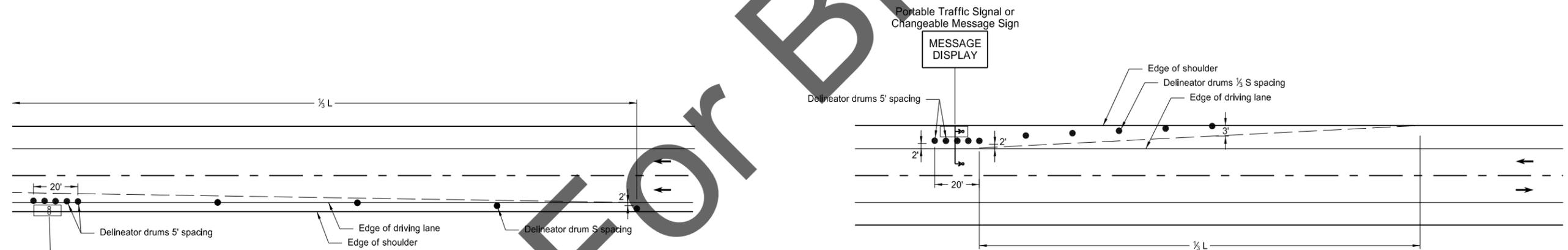
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SHOULDER CLOSURE TAPERS

D-704-12



SHOULDER CLOSURE WITH LANE CLOSURE (when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE (when shoulder is less than 8' wide)

PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

● Delineator Drum	∞ Sequencing Arrow Panel
• Message Display	↳ Portable Traffic Signal

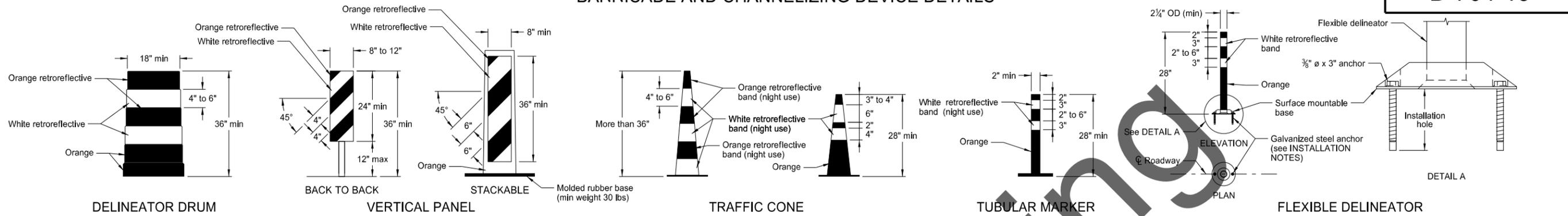
Notes:

- S = Posted Speed Limit in mph
W = Width of offset in feet
L = Taper length in feet
L = $WS^2/60$ (40mph or less)
L = WS (45mph or more)
- If a shoulder taper is used, it should have a length of approximately $1/3L$. If a shoulder is used as a travel lane, a normal merging or shifting taper should be used.
- When paved shoulders of 8 foot width or more are closed, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

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BARRICADE AND CHANNELIZING DEVICE DETAILS



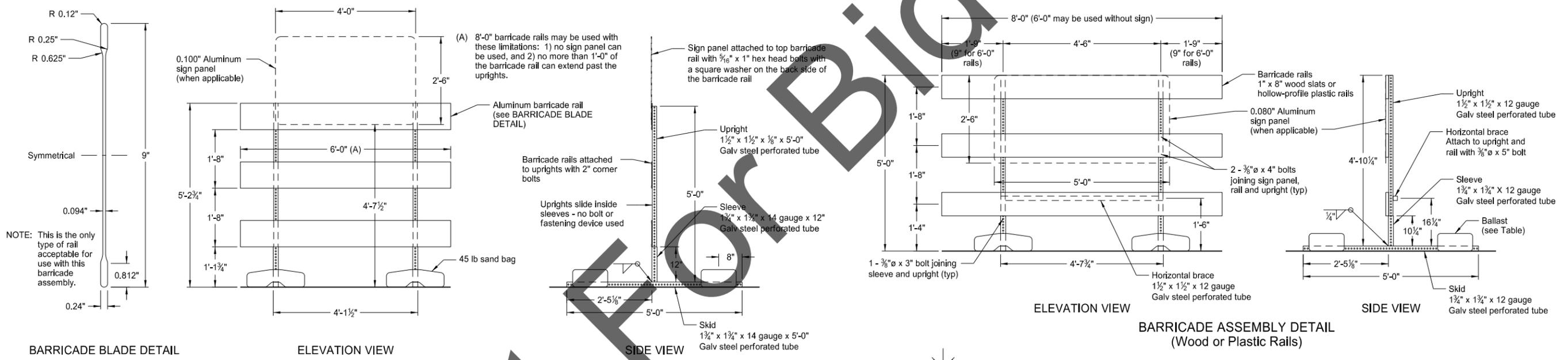
- INSTALLATION NOTES:**
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.

RetroreflectORIZATION of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED space between the orange and white stripes shall not exceed 3" wide.

RetroreflectORIZATION of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.

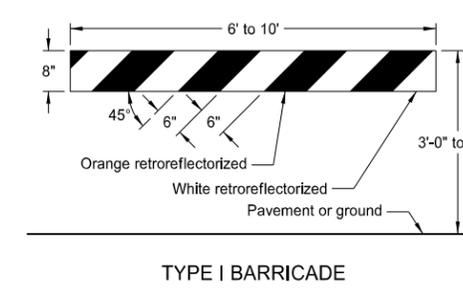


BARRICADE BLADE DETAIL

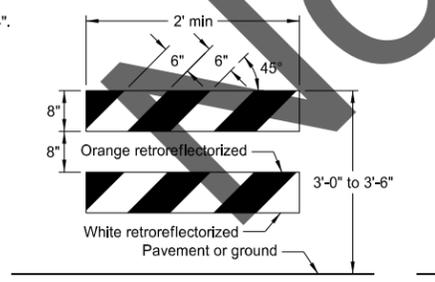
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

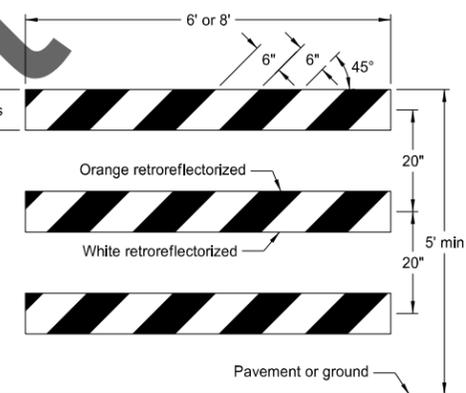
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".



TYPE I BARRICADE

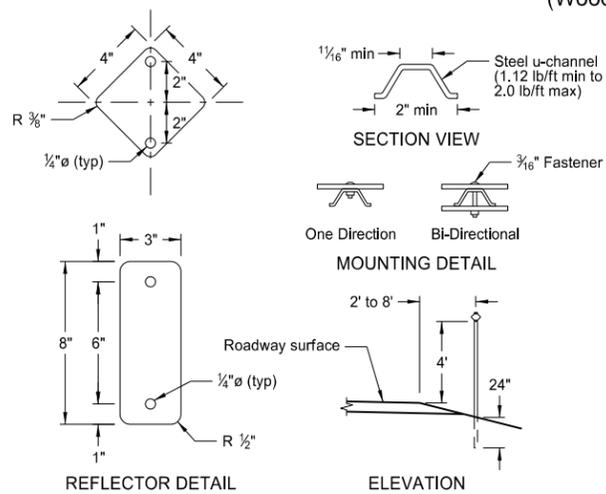


TYPE II BARRICADE



TYPE III BARRICADE

BARRICADE RAIL DETAILS



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

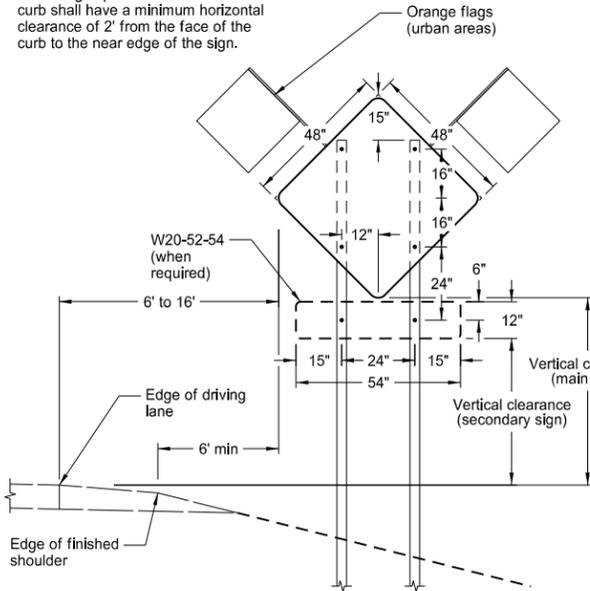
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

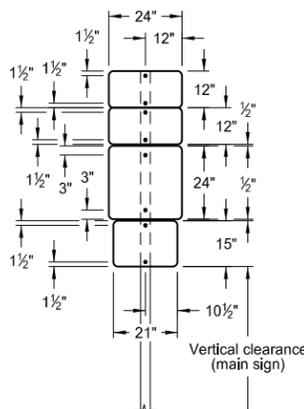
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

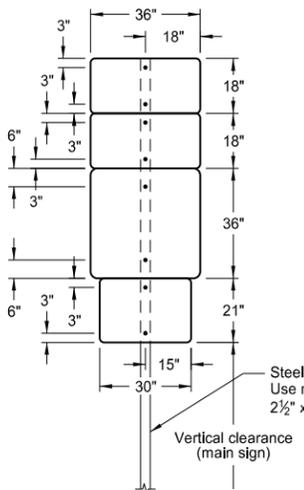
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



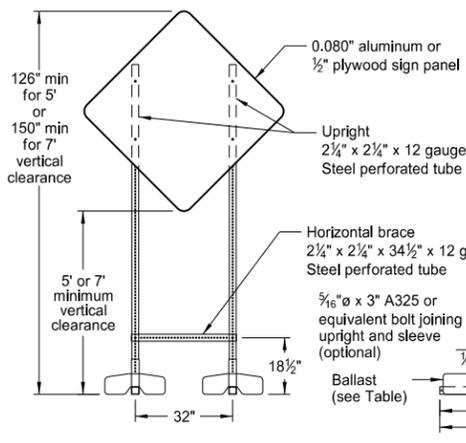
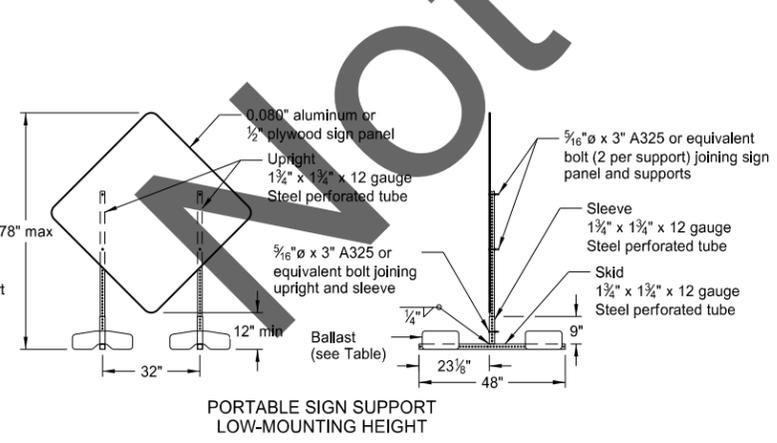
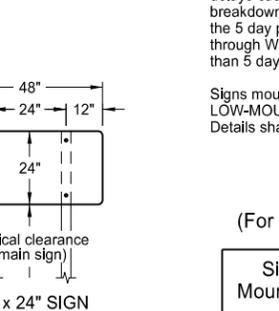
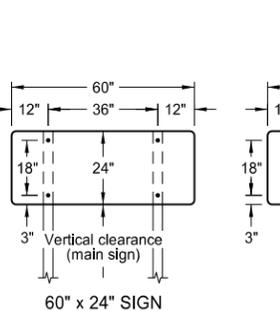
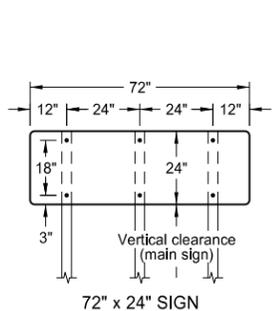
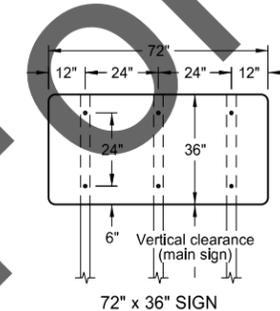
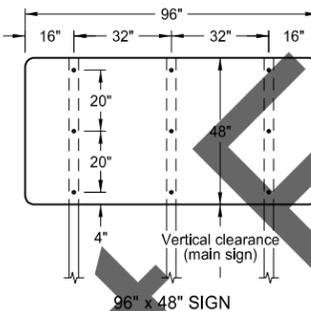
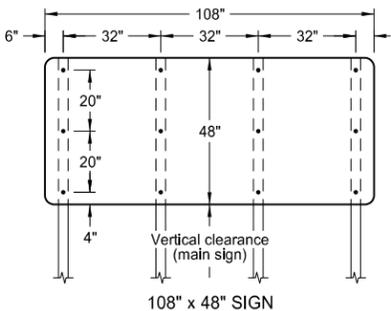
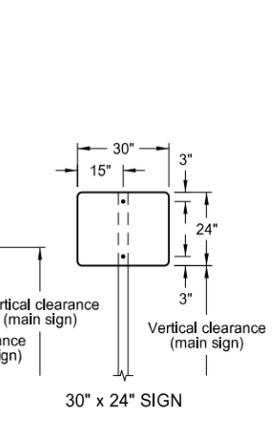
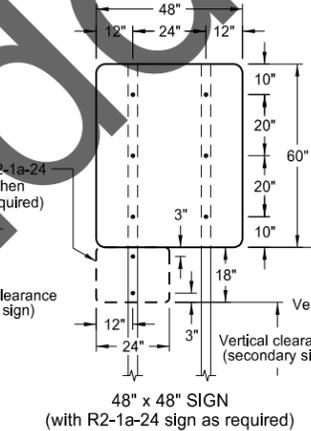
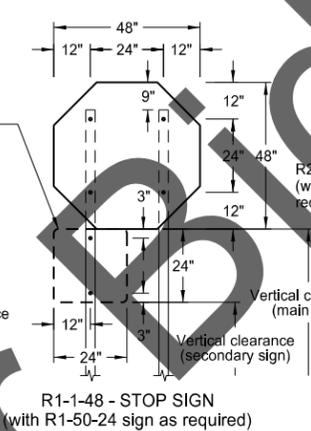
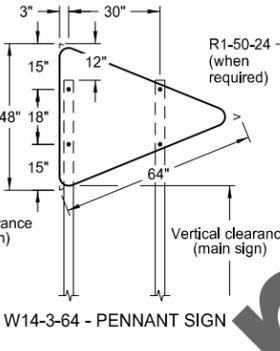
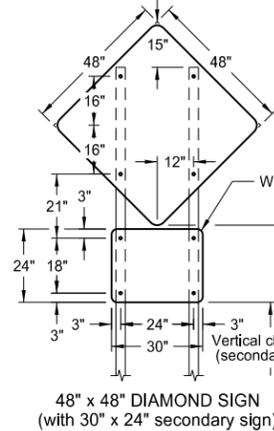
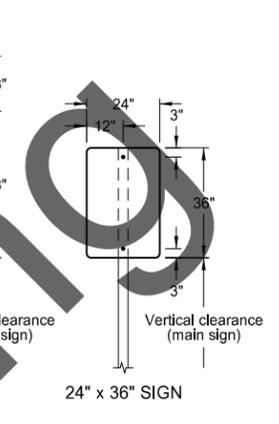
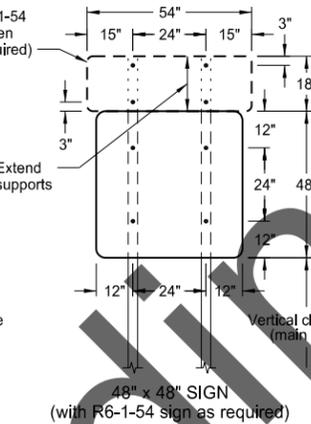
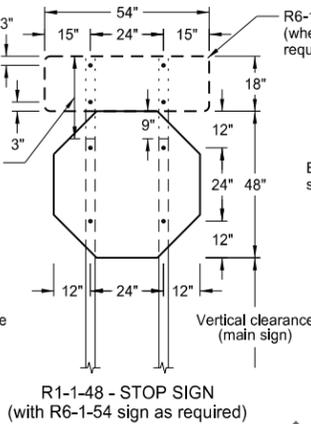
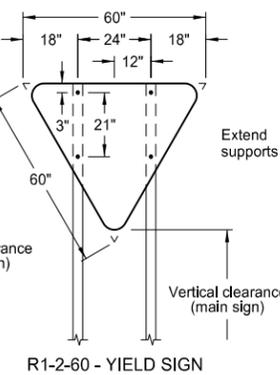
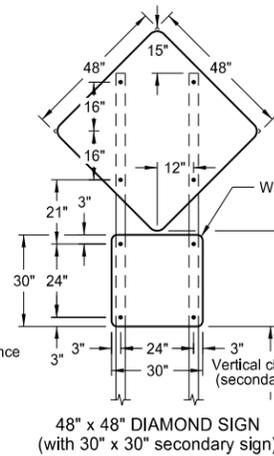
TYPICAL SECTION (48" x 48" diamond warning sign shown)



24" x 24" ROUTE MARKER ASSEMBLY



36" x 36" ROUTE MARKER ASSEMBLY



- NOTES:
- Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.
Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.
Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.
 - Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.
 - Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)
 - Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:
Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background
 - Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.
The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.
Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.
 - Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.
When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-5 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.
Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST (For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

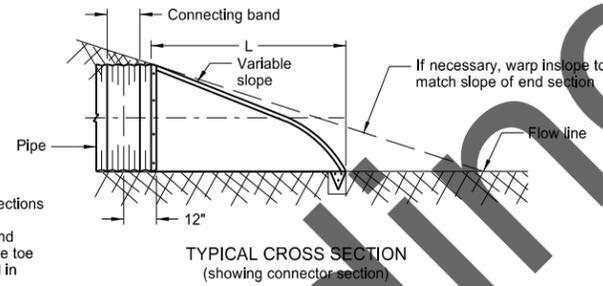
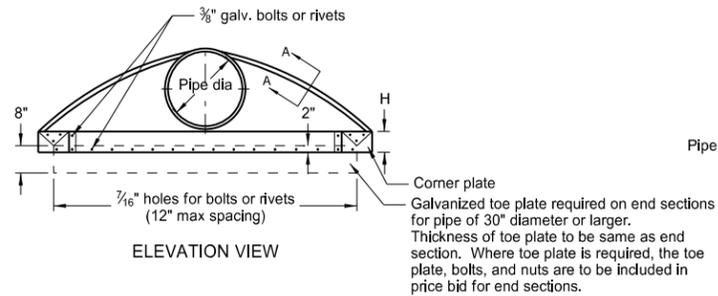
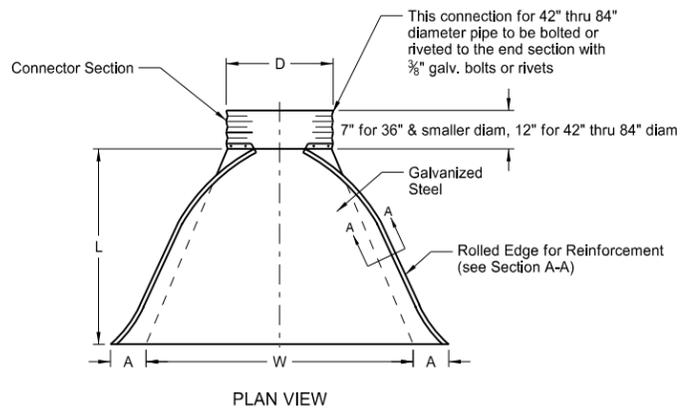
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

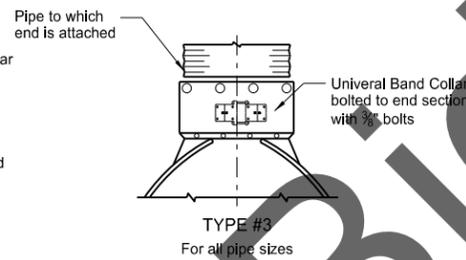
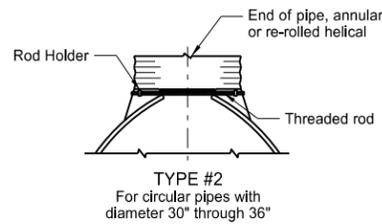
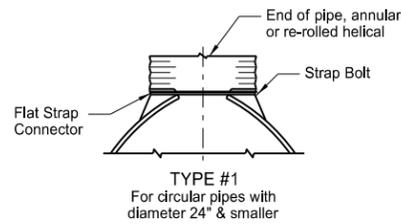
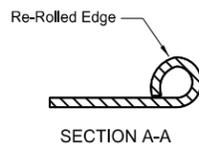
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ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



PIPE DIA.	GALV. THICK.	END SECTION DIMENSIONS					APPROX. SLOPE	BODY PIECE
		A	B	H	L	W		
15	0.064	7	8	6	26	30	2 1/2:1	1
18	0.064	8	10	6	31	36	2 1/2:1	1
24	0.064	10	13	6	41	48	2 1/2:1	1
30	0.079	12	16	8	51	60	2 1/2:1	1 or 2
36	0.079	14	19	9	60	72	2 1/2:1	2
42	0.109	16	22	11	69	84	2 1/2:1	2
48	0.109	18	27	12	78	90	2 1/2:1	2
64	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1 1/2:1	3
* 66	0.109	18	36	12	87	120	1 1/2:1	3
* 72	0.109	18	39	12	87	126	1 1/3 :1	3
* 78	0.109	18	42	12	87	132	1 1/2:1	3
* 84	0.109	18	45	12	87	138	1 1/6 :1	3



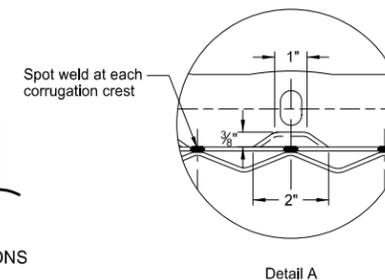
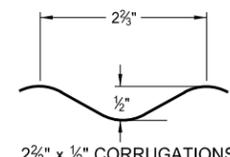
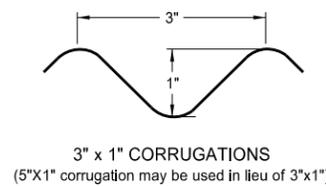
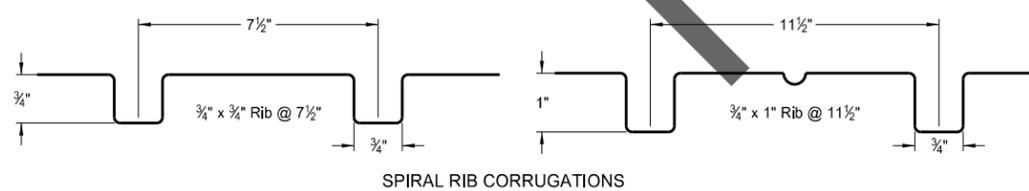
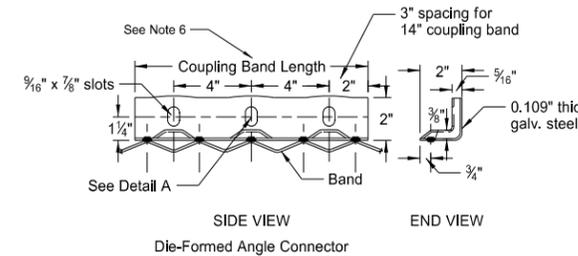
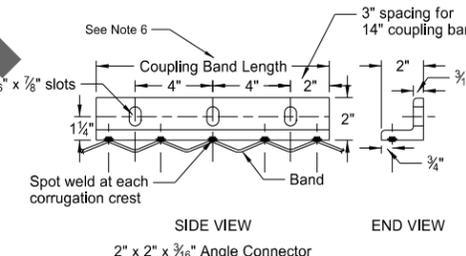
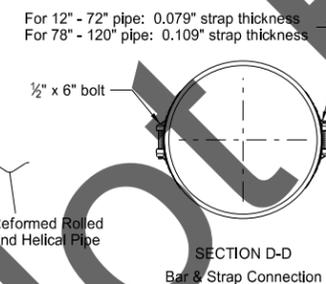
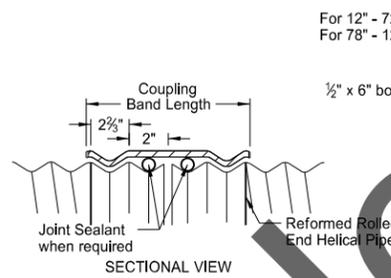
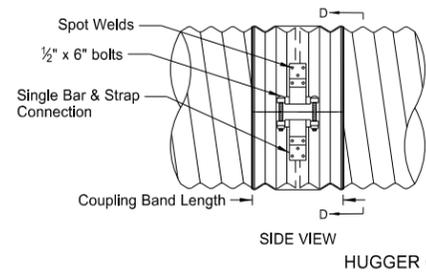
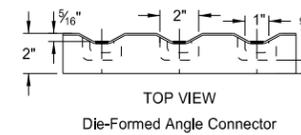
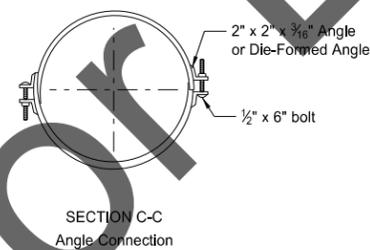
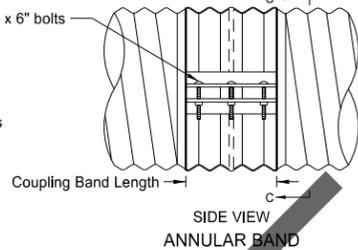
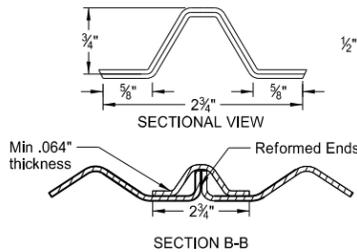
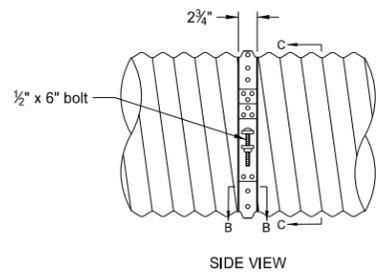
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
		12" - 72"	12"	.052"
Annular Band	2 3/8" x 1/2"	78" - 84"	12"	.079"
		48" - 120"	14"	.052"
Hugger Band	2 5/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1" Rerolled End	48" - 120"	10 1/2"	.052"
		5" x 1" Rerolled End	48" - 120"	12"

- These sizes have 0.109" sides and 0.138" center panels.
 - Pipe diameter is equal to dimension "D" of end section.
- Manufacturers tolerances of above dimensions will be allowed.
- Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

NOTES:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
3. Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
4. Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
5. 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
7. Length of spot welds shall be minimum 1/2".

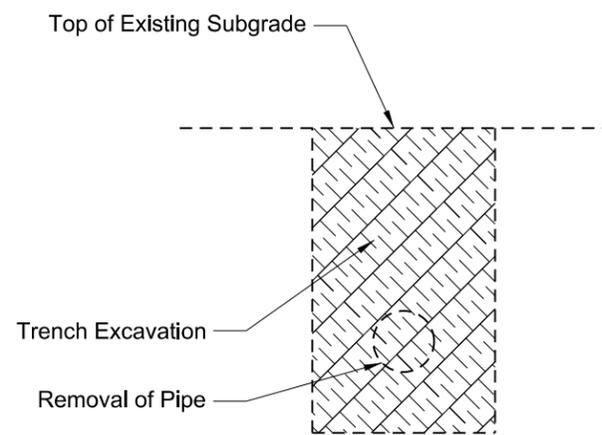


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-06-13	
REVISIONS	
DATE	CHANGE

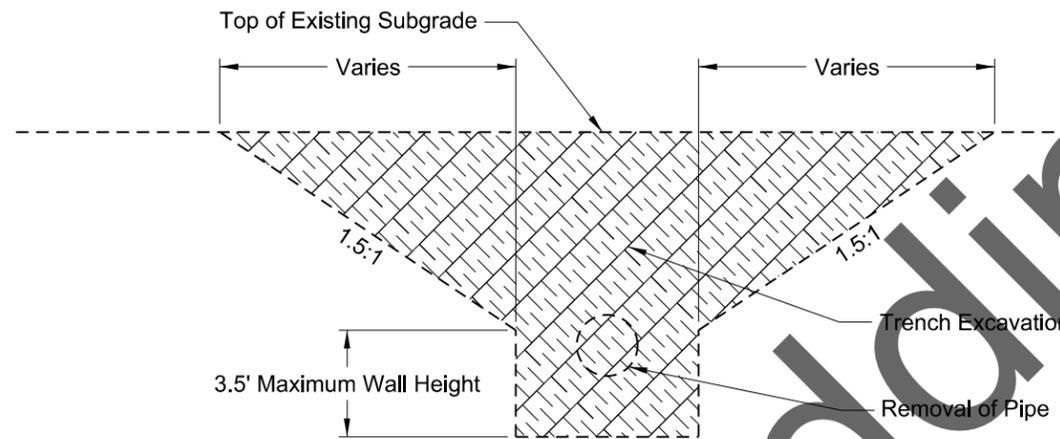
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PIPE EXCAVATION AND INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE
OR PIPE NOT UNDER THE ROADWAY

D-714-27



EXCAVATION DETAIL A



EXCAVATION DETAIL B

Pay Items

- 1) Pipe*
- 2) Removal of Pipe (if required)

*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Aggregate base course CI 3 or CI 5
- 4) Common Excavation - Type A
- 5) Common Excavation - Type B

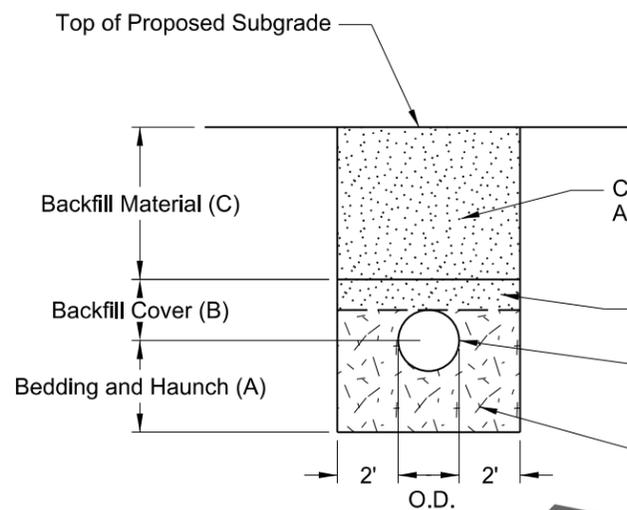
NOTES:

- 1) This drawing does not apply to pipes in approaches.
- 2) It is the contractor's option to select Detail A or B.

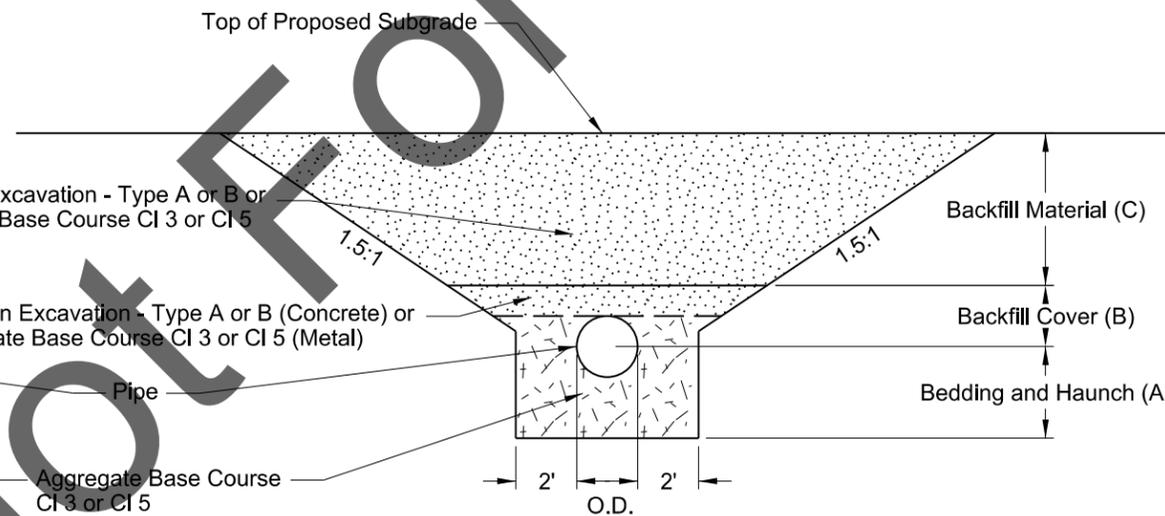
Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 4 Inches
Pipes Under the Roadway = 0.5 O.D. + 2 Feet

Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal Pipe = 0.5 O.D. + 1 Foot
PVC/HDPE = 0.5 O.D. + 1 Foot

Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI 3 or CI 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B



BACKFILL DETAIL A



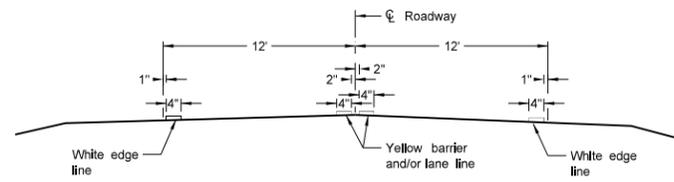
BACKFILL DETAIL B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting

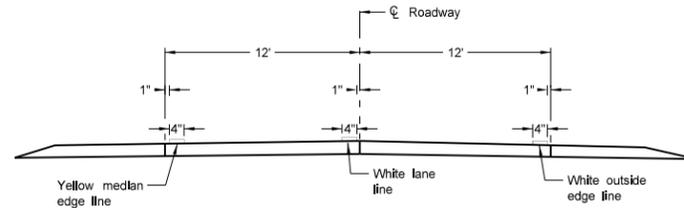
This document was originally issued and sealed by
Ron Horner,
Registration Number
PE-2087,
on 10/15/13 and the original document is stored at the
North Dakota Department
of Transportation

PAVEMENT MARKING

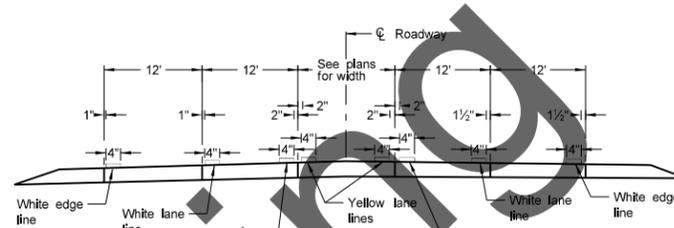
D-762-4



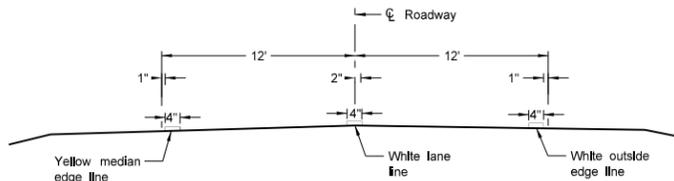
Two Lane Two Way
RURAL ROADWAY



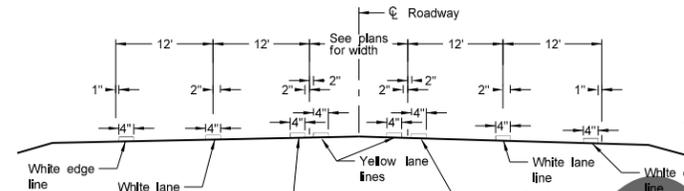
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



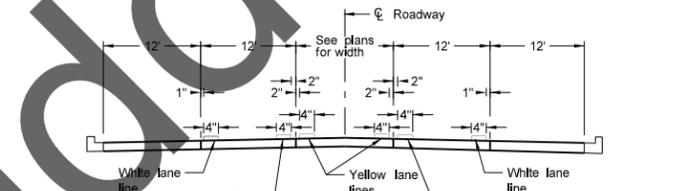
RURAL FIVE LANE ROADWAY
Concrete Section



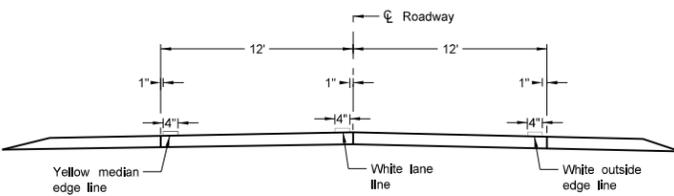
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



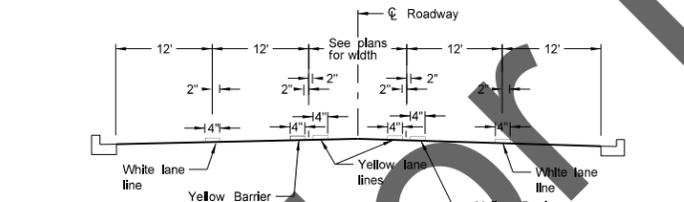
RURAL FIVE LANE ROADWAY
Asphalt Section



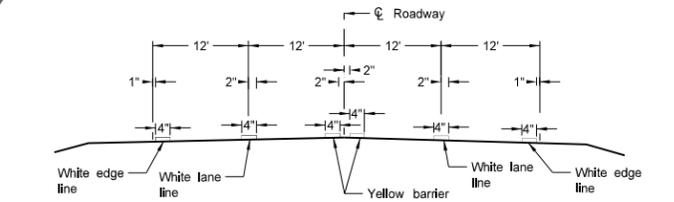
URBAN FIVE LANE SECTION
Concrete Section



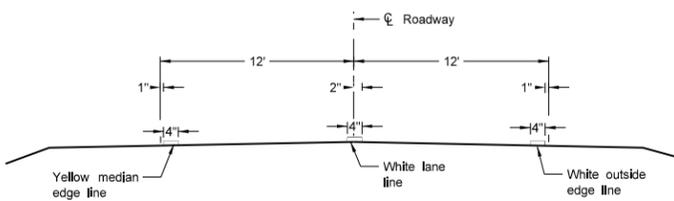
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



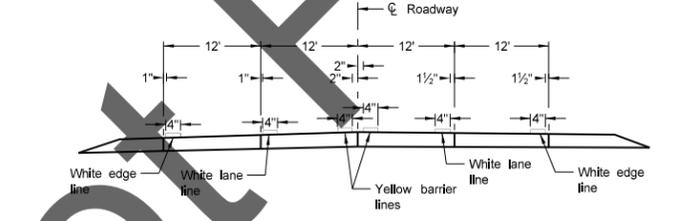
URBAN FIVE LANE SECTION
Asphalt Section



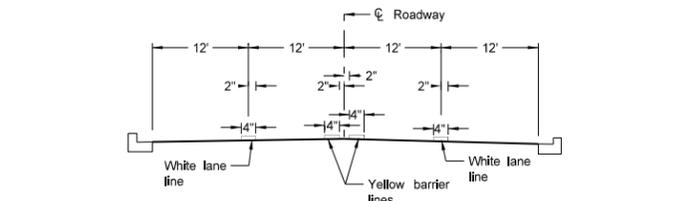
RURAL FOUR LANE ROADWAY
Asphalt Section



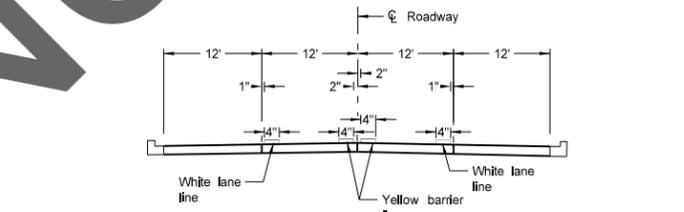
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



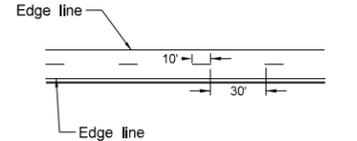
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:
1. Edge lines shall be continued through private drives and field drives and broken for intersections.

NOT FOR BIDDING

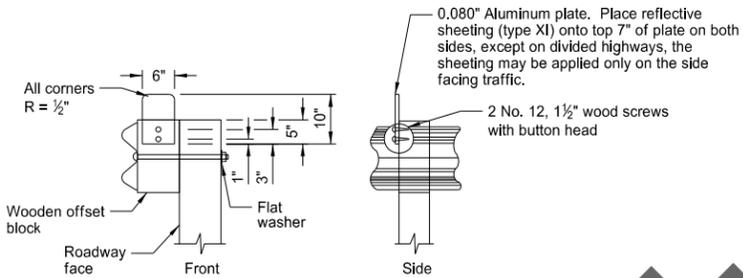
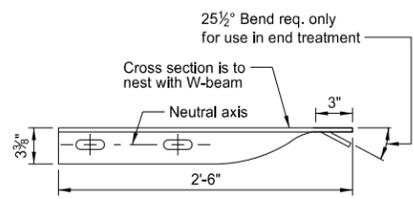
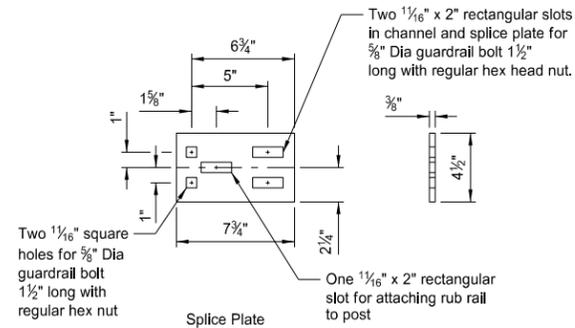
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12-1-10	
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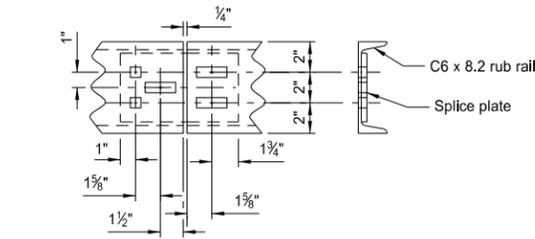
W-BEAM GUARDRAIL GENERAL DETAILS

NOTES:

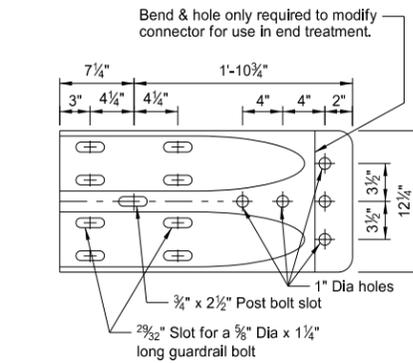
1. ReflectORIZED plates: Reflector plates shall begin at the first post and be spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. The reflector shall be the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Manner of replacing bituminous material at guardrail post: All excess earth from excavations for guard posts shall be disposed of as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. The Object Marker shall fit within the vertical edges of the Impact Plate. The retroreflective sheeting shall be type XI sheeting meeting the requirements of Section 894.02.B of the standard specifications. The sheeting shall be applied to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. The Object Marker shall attach to the Impact Head Plate with rivets or some other attachment device. The rivets or attachment device shall be non-rust. The stripes shall slope downward toward the roadway side.
4. Guardrail installation height tolerance = $-\frac{1}{4}"$, $+1"$.



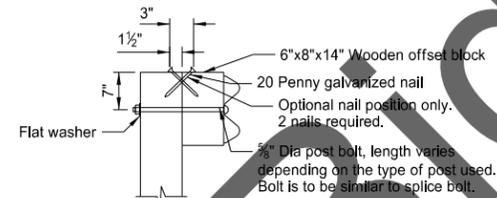
REFLECTORIZED PLATE DETAIL
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



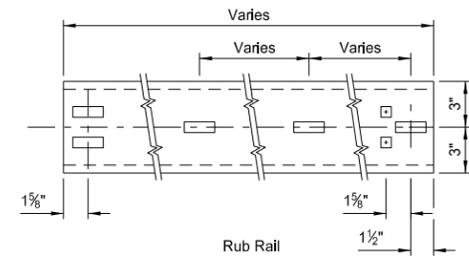
Splice Detail



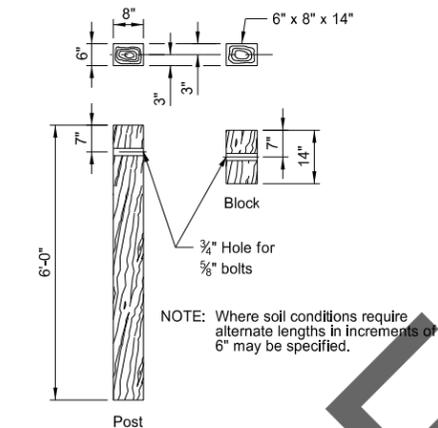
W BEAM TERMINAL CONNECTOR



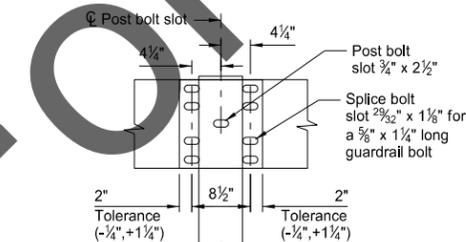
TYPICAL POST ATTACHMENT DETAIL



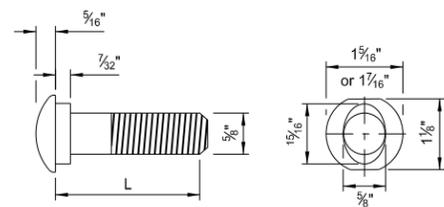
C6x8 RUB RAIL AND SPLICE PLATE



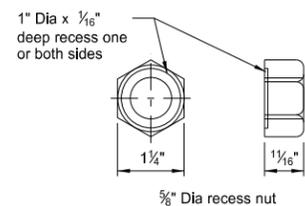
6"x8" TIMBER POST & BLOCK



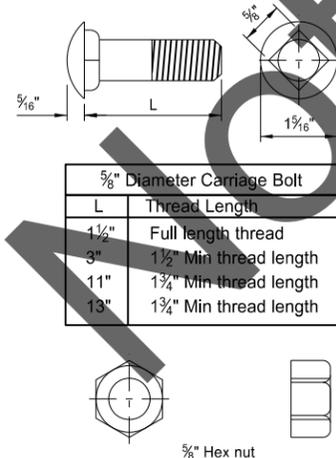
SPLICE DETAIL



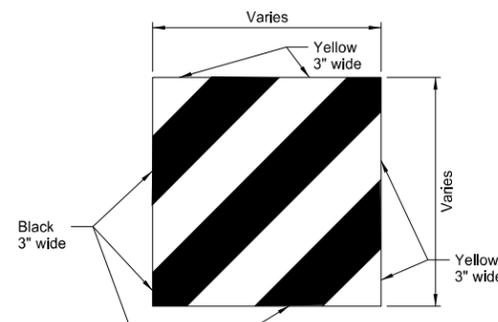
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



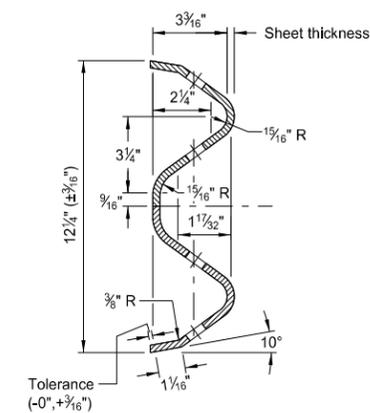
5/8" GUARDRAIL BOLT & RECESS NUT



5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



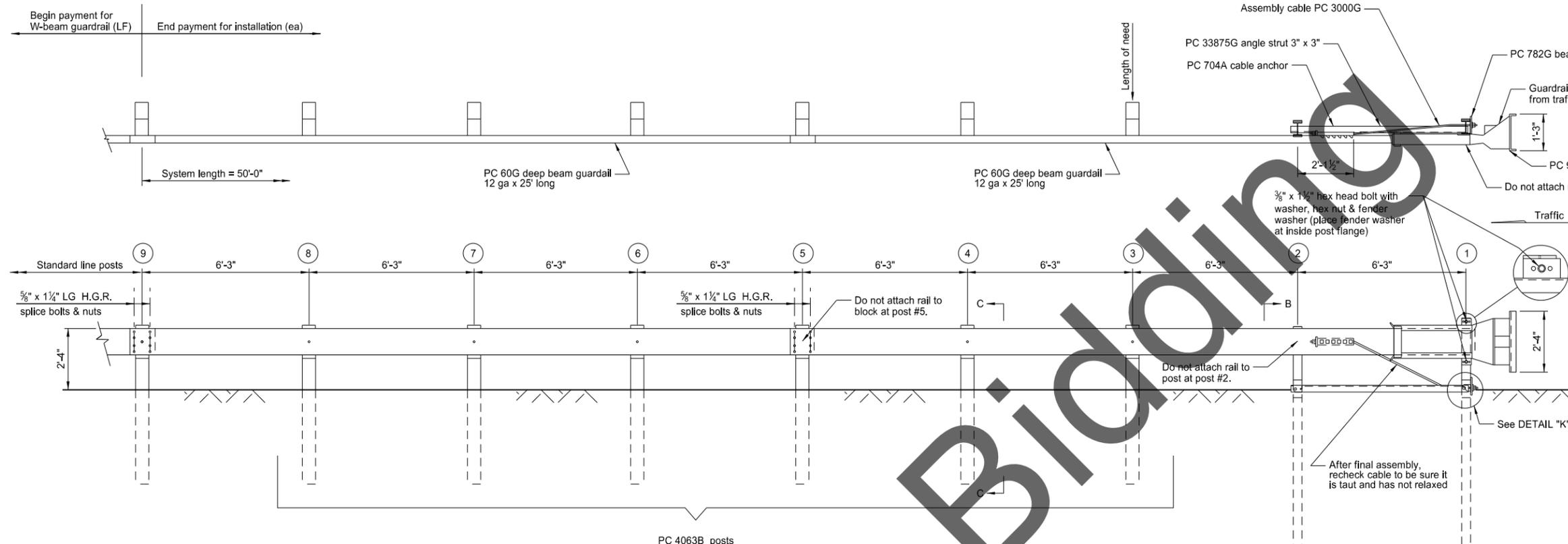
W-BEAM CROSS SECTION

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ET-PLUS

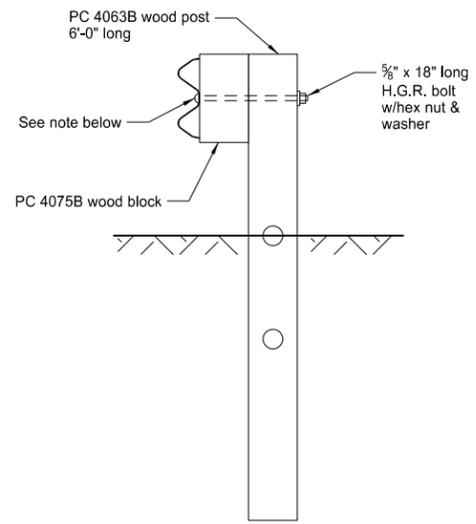
D-764-4



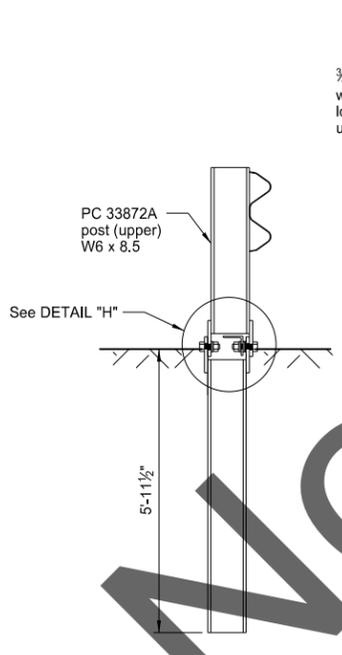
BILL OF MATERIAL		
PC	QTY	DESCRIPTION
60G	1	12/25/6'3"/S (guardrail)
62G	1	12/25/6'3"/S ANC (guardrail)
704A	1	Cable anchor bracket
782G	1	5/8" x 8" x 8" bearing plate
995A	1	ET-plus extruder
3000G	1	Cable 3/4 x 6'-6"
3300G	6	5/8" washer
3340G	22	5/8" hex nut
3360G	16	5/8" x 1 1/4" splice bolt
3580G	6	5/8" x 18" post bolt
3701G	7	3/4" washer
3704G	4	3/4" hex nut
3717G	3	3/4" x 2 1/2" hex head bolt
3718G	1	3/4" x 3" hex head bolt
3900G	2	1" washer
3910G	2	1" hex nut
4063B	6	WD 6'-0" post 6" x 8"
4075B	6	WD block 1'-2" x 6" x 8" DR
4254G	6	3/8" washer
4255G	2	3/8" fender washer (1 1/2 OD)
4258G	4	3/8" lockwasher
4261G	2	3/8" x 1 1/2" hex head bolt
4699G	4	3/4" lockwasher
6321G	4	3/8" x 2" hex head bolt
6405G	6	3/8" hex nut
33871A	1	HBA post #1 top
33872A	1	HBA post #2 top
33873A	2	HBA post #1-#2 bottom
33875G	1	6'-6" angle strut ET HBA

NOTES:

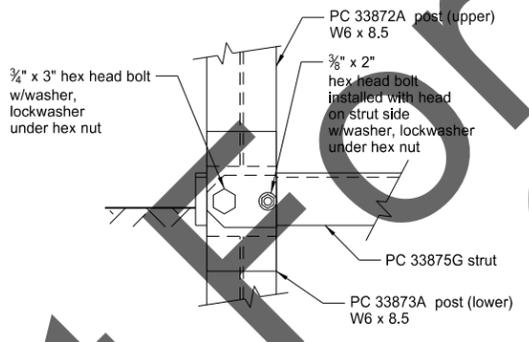
- Wood posts are required from post #3 to post #9.
- All bolts, nuts, cable assembly, cable anchors, and bearing plates shall be galvanized.
- This end terminal shall only be installed at locations where the flare rate is 25:1 or flatter, relative to the traveled way. The end terminal can be flared at a rate of 50:1 for the first 50' of the system to prevent the impact head from encroaching on the shoulder. The 25:1 flare rate is recommended with curb installations. See plans for when taper is used or not.
- Do not attach guardrail to post #1 or post #2.
- Do not attach guardrail to post block at post #5.
- The 5/8" flat washer is used under the nut, behind the post only, no washer is used at the rail.
- An impact head object marker shall be placed.
- The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when wood shrinks. The nails shall be 20 penny and galvanized.



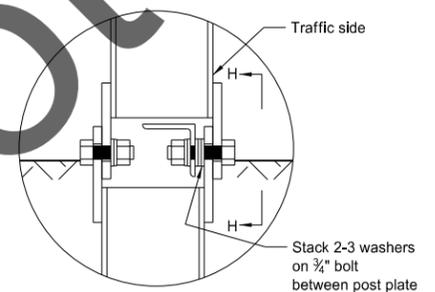
Note:
Section "C-C" is similar at post #5, but the rail is not attached.
SECTION "C-C"
(TYP @ POSTS #3, 4, 6, 7 & 8)



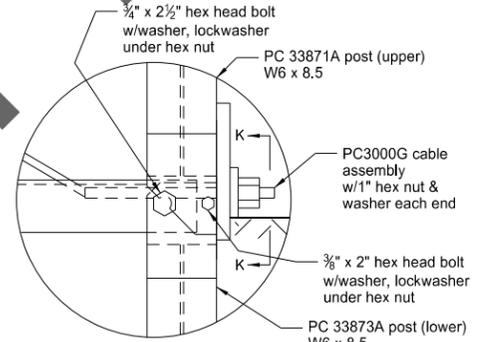
SECTION "B-B"
(POST #2)



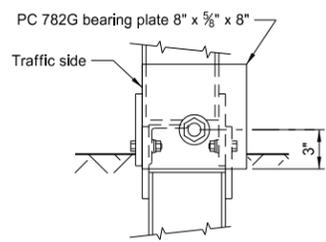
VIEW "H-H"



DETAIL "H"
(POST #2)



DETAIL "K"
(POST #1)



VIEW "K-K"

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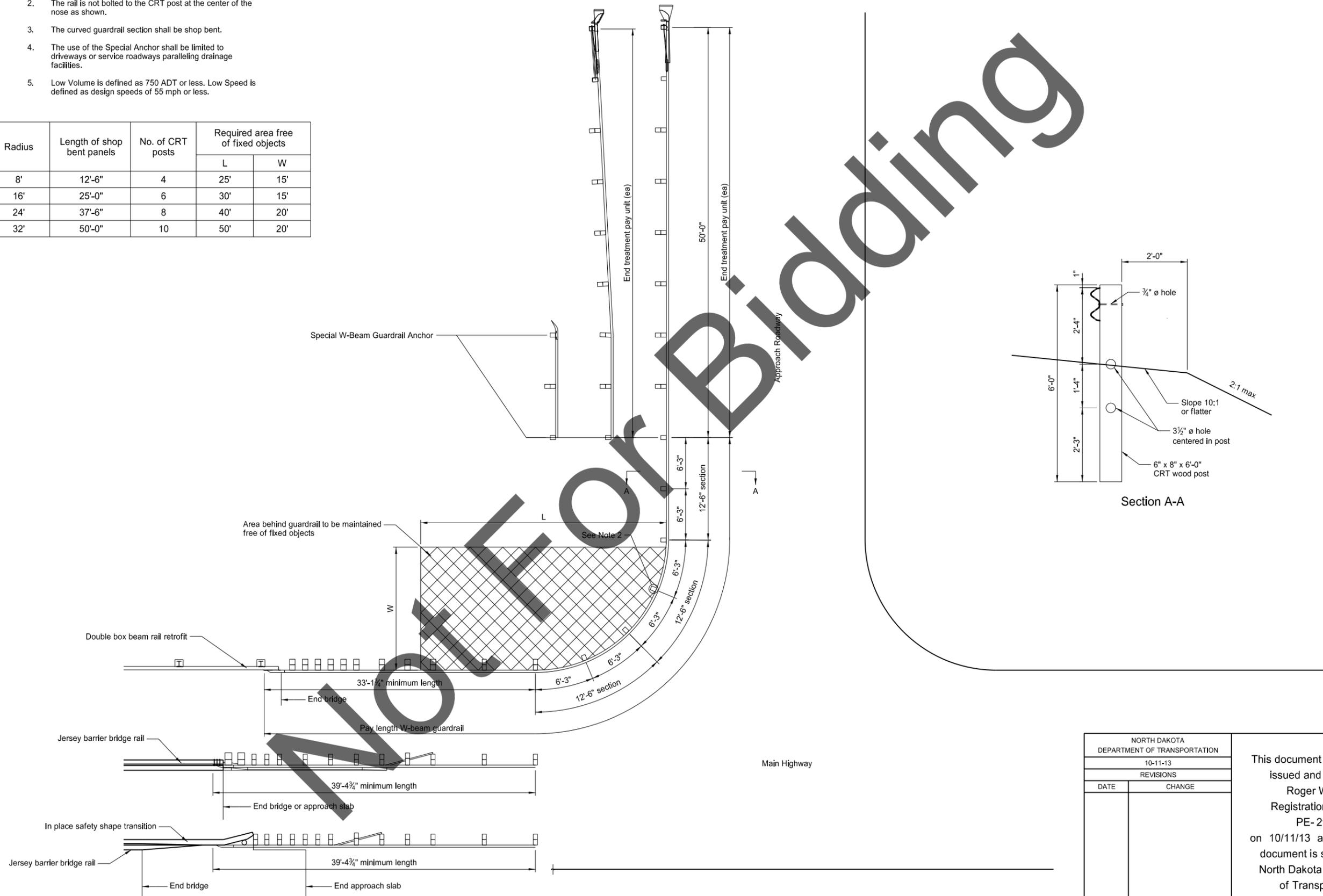
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W-BEAM GUARDRAIL WITH APPROACHES NEAR BRIDGE
FOR LOW VOLUME LOW SPEED ROADWAYS

NOTES:

1. No washers are used on the 5/8" guardrail bolts connecting the rail to the Controlled Release Terminal (CRT) posts.
2. The rail is not bolted to the CRT post at the center of the nose as shown.
3. The curved guardrail section shall be shop bent.
4. The use of the Special Anchor shall be limited to driveways or service roadways paralleling drainage facilities.
5. Low Volume is defined as 750 ADT or less. Low Speed is defined as design speeds of 55 mph or less.

Radius	Length of shop bent panels	No. of CRT posts	Required area free of fixed objects	
			L	W
8'	12'-6"	4	25'	15'
16'	25'-0"	6	30'	15'
24'	37'-6"	8	40'	20'
32'	50'-0"	10	50'	20'

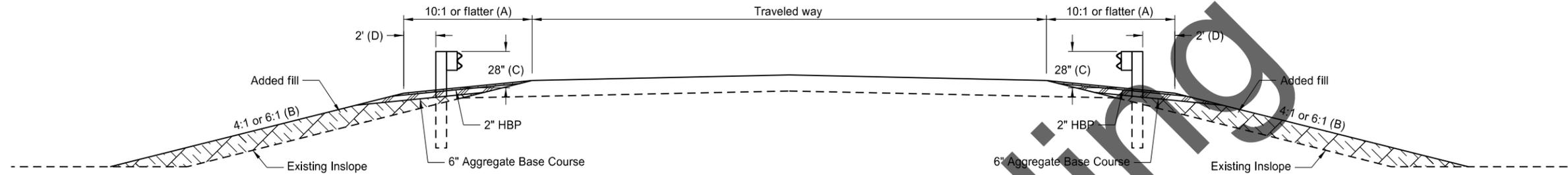


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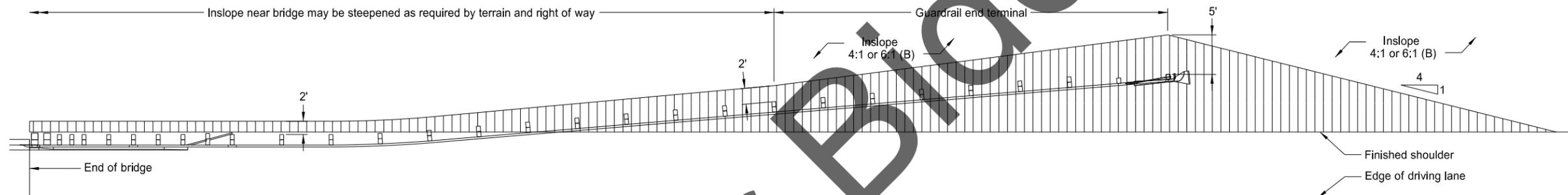
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TYPICAL GRADING AT BRIDGE ENDS
WITH W-BEAM GUARDRAIL

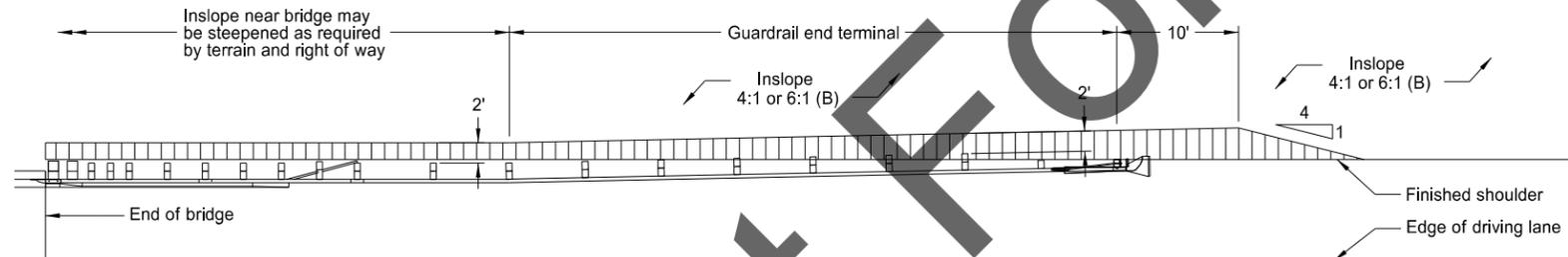
D-764-22



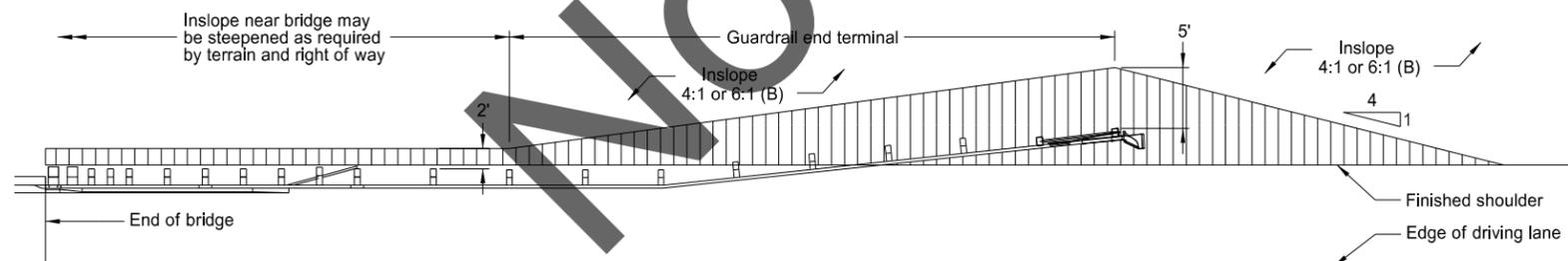
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

- (A) Slope flatter than 10:1 may be required to provide proper guardrail height.
- (B) Where normal inslope is 4:1 the added fill shall be 4:1. Where normal inslope is 6:1 the added fill shall be 6:1.
- (C) Measured from top of guardrail to top of surfacing at front face of guardrail.
- (D) Dimension at end terminals may vary per Plan Layouts shown on this sheet.

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