ROADWAY DESIGN DIVISION.

INDEX OF SHEETS

SHEET NO.

STANDARD PLANS

301-R12	(3 SHEETS) PAVEMENT DETAILS
329-R10	(4 SHEETS) 8 TO 16 INCH CONCRETE PAVEMENT
501-R7	(3 SHEETS) EROSION CONTROL
502-R2	(2 SHEETS) SILT FENCE DETAILS
740-R1	(3 SHEETS) MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION
743-R2	(4 SHEETS) GUARDRAIL DETAILS
920-R7	(3 SHEETS) TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE
923-R2	TRAFFIC CONTROL ROAD CLOSURE

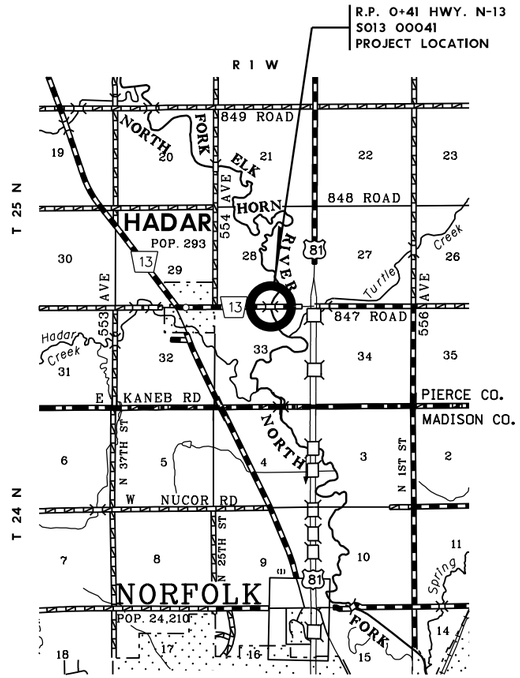
STATE OF NEBRASKA

DEPARTMENT OF TRANSPORTATION

PLANS FOR CONSTRUCTION

N FK ELKHORN RIVER BRIDGE

PIERCE COUNTY



PROJECT NO.	SHEET NO.
ER-13-4(113)	A1
◣ CONTROL NO. 32321	
▲ CONTROL NO.	
■ CONTROL NO.	

THE 2017 EDITION OF THE NEBRASKA STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS APPLY TO THIS PROJECT.

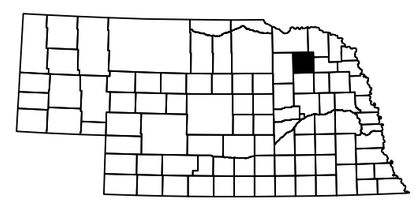
THE WORK ON THIS PROJECT CONSISTS OF GROUPS
1-GRADING, 3-PAVEMENT, 5-SEEDING, 6-BRIDGE,
7-GRUARDRAIL & 10-GENERAL

◣ GROUPS 1, 3, 5, 6, 7 & 10 ARE INCLUDED
IN THE LETTING OF MAY 24, 2019

▲ GROUPS _____ ARE INCLUDED
IN THE LETTING OF _____

■ GROUPS _____ ARE INCLUDED
IN THE LETTING OF _____

DESIGN DESIGNATION
MINIMUM MAINTENANCE
TRAFFIC
YEAR: 2019
ADT: 3,970



CONVENTIONAL SIGNS

FENCE R.O.W. OR WIRE	
GUARDRAIL	
TRAVELED WAY	
DIKE	
CULVERT	
POWER POLE	
TELEPHONE POLE	
MAILBOX	
RAILROAD TRACKS	
MARSH	
TREE - CONIFEROUS	
TREE - DECIDUOUS	

R.O.W. LEGEND

NEW CONTROLLED ACCESS	
PREVIOUS CONTROLLED ACCESS	
LIMITS OF CONSTRUCTION	
PREVIOUS R.O.W.	
NEW R.O.W.	
EXISTING PERMANENT EASEMENT	
TEMPORARY EASEMENT	
EXCESS TAKING	
PERMANENT EASEMENT	
EXISTING RAILROAD EASEMENT	
NEW RAILROAD PERMANENT EASEMENT	
NEW RAILROAD TEMPORARY EASEMENT	

REFERENCE POST NO. TO REFERENCE POST NO.

EXCEPTIONS: FROM STA. TO STA.

TOTAL NET LENGTH OF PROJECT: FEET MILES

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
STATE OF NEBRASKA
May 16 2019
COORDINATING PROFESSIONAL

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. STOCKENBERG
E-6505
STATE OF NEBRASKA
May 16 2019

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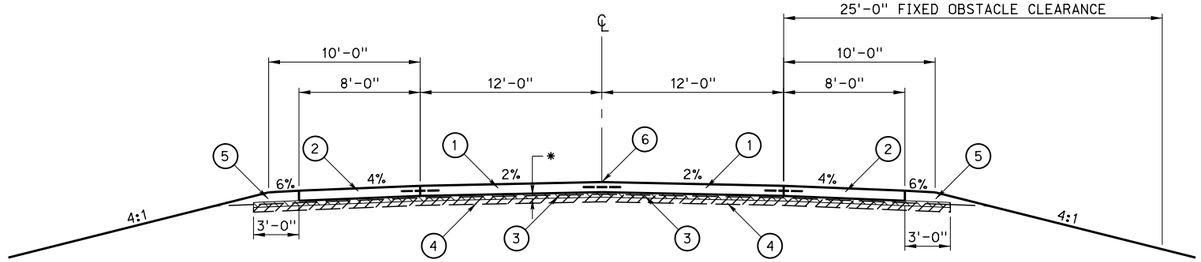
TYPICAL CROSS SECTIONS



HWY. N-13

STATION	TO	STATION
981+25	-	986+40

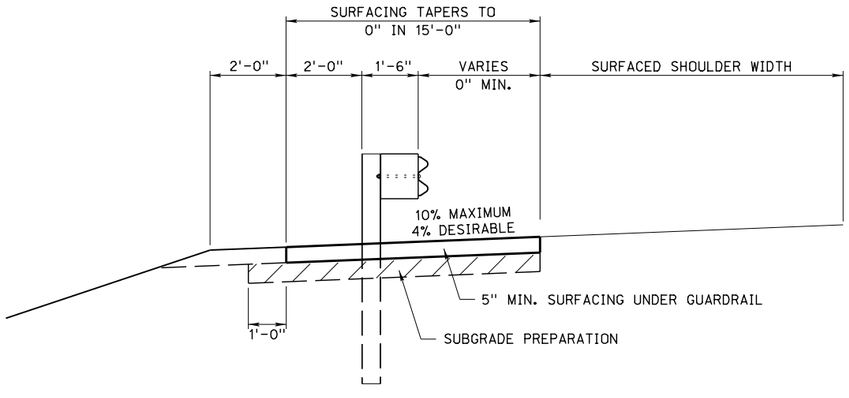
BRIDGE & APPROACH PAVING SECTION EXCEPTION: STA. 981+81.80 TO STA. 984+99.00

LEGEND

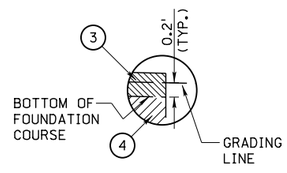
1. 9" DOWELED CONCRETE PAVEMENT
2. 9" CONCRETE PAVEMENT
3. 4" FOUNDATION COURSE
4. SUBGRADE PREPARATION
5. EARTH SHOULDER CONSTRUCTION
6. PROFILE GRADE POINT

FOR DETAILS NOT SHOWN SEE PLANS 301 & 329

*THIS MATERIAL TO BE REMOVED BY THE SURFACING CONTRACTOR AND INCORPORATED INTO THE SHOULDERS.



SURFACED SHOULDER AT GUARDRAIL LOCATIONS



DETAIL "A"

GRADING LINE UNDERCUT DETAIL. APPLIES TO ALL CONCRETE PAVED TYPICAL SECTIONS.

ROADWAY DESIGN DIVISION
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SUMMARY OF QUANTITIES

PROJECT NO.	SHEET NO.
ER-13-4(113)	C1

C.N. 32321

GRADING ITEMS
GROUP 1

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
GENERAL CLEARING AND GRUBBING	1.000	LS
WATER	1.000	MGAL
EARTHWORK MEASURED IN EMBANKMENT	79.000	CY
REMOVE ASPHALT SURFACE	1,440.000	SY
REMOVE GUARDRAIL	509.000	LF

COMPACTION REQUIREMENTS
Class III (See Specifications)

	SOIL TYPE	DEPTH BELOW FINISH SUBGRADE	PERCENT DENSITY	MOISTURE REQUIREMENTS MINIMUM	MAXIMUM
Embankment / Roadway Grading, including driveways, to receive concrete pavement	Silt-Clay	Upper 3 feet	98 Min.	Opt. -3%	Opt. +2%
	Silt-Clay	At depths greater than 3 feet	95 Min.	Opt. -3%	Opt. +2%
	Granular	All depths	100 Min.	**	**
Embankment / Roadway Grading, including detours, temporary roads, and driveways, to receive flexible pavement	Silt-Clay	Upper 3 feet	100 Min.	Opt. -2%	Opt. +1%
	Silt-Clay	At depths greater than 3 feet	95 Min.	Opt. -3%	Opt. +2%
	Granular	All depths	100 Min.	**	**
Embankment / Roadway Grading not to be surfaced	All	All depths	95 Min.	Opt. -3%	Opt. +2%
Embankment / Roadway Grading to receive gravel surfacing / crushed rock embedment	All	All depths	95 Min.	**	**
Subgrade Preparation, Shoulder Subgrade Preparation (Concrete Pavement)	Silt-Clay	The upper 6 inches of subgrade soil	98 Min.	Opt. -3%	Opt. +2%
	Granular	The upper 6 inches of subgrade soil	100 Min.	**	**
Subgrade Preparation, Shoulder Subgrade Preparation (Flexible Pavement)	Silt-Clay	The upper 6 inches of subgrade soil	100 Min.	Opt. -2%	Opt. +1%
	Granular	The upper 6 inches of subgrade soil	100 Min.	**	**
Trench Widening	--	--		(See Special Provisions)	
Bituminous Pavement Patching	All	Underlying Material	100 Min.	(See Specifications)	
Foundation Course / Subgrade Stabilization	--	--	100 Min.	(See Specifications)	
Stabilized Subgrade (ie Lime, Flyash, etc.)	--	--	100 Min.	(See Special Provisions)	
Granular Structural Fill (MSE Walls, Granular Fill for bridges, Culverts, etc)	Granular	All depths	100 Min.	Opt. -3%	Opt. +3%

** Moisture as necessary to obtain density.
(A moisture target value at maximum density shall be established in the field by the Contractor during the compaction process. The acceptable moisture content shall be ± 2% of the target value.)

CONCRETE PAVEMENT ITEMS
GROUP 3

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
9" CONCRETE PAVEMENT, CLASS 47B-3500	356.000	SY
9" DOWELED CONCRETE PAVEMENT, CLASS 47B-3500	527.000	SY
FOUNDATION COURSE 4"	883.000	SY
GRANULAR SUBDRAIN	6.000	EACH
WATER	4.000	MGAL
EARTH SHOULDER CONSTRUCTION	1.850	STA
SUBGRADE PREPARATION	883.000	SY
SURFACING UNDER GUARDRAIL	292.000	SY

SEEDING ITEMS
GROUP 5

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
COVER CROP SEEDING	1.000	ACRE
EROSION CONTROL, CLASS 1D	1,960.000	SY
FABRIC SILT FENCE-LOW POROSITY	706.000	LF
SILT CHECK, TYPE 2-HIGH	10.000	LF
MULCH	2.000	TON

BRIDGE AT STATION 983+40.40 ITEMS
GROUP 6

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
EXCAVATION (ESTABLISHED QUANTITY)	2,515.000	CY
ROCK RIPRAP, TYPE B	920.000	TON
RIPRAP FILTER FABRIC	1,030.000	SY
CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	192.700	CY
EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	36,853.000	LB
INSTALL EXPANSION BEARING, PTFE TYPE	12.000	EACH
INSTALL FIXED BEARING	12.000	EACH
ABUTMENT NO.1 EXCAVATION	1.000	LS
ABUTMENT NO.2 EXCAVATION	1.000	LS
BENT NO.1 EXCAVATION	1.000	LS
BENT NO.2 EXCAVATION	1.000	LS
PREFORMED EXPANSION JOINT, TYPE A	98.200	LF
BRIDGE DECK GROOVING	1,198.000	SY
CLASS 47B-3000 CONCRETE FOR BRIDGE	409.800	CY
CLASS 47BD-4000 CONCRETE FOR BRIDGE	300.700	CY
INSTALL STEEL SUPERSTRUCTURE AT STATION 983+40.40	1.000	LS
STRUCTURAL STEEL FOR SUBSTRUCTURE	15,828.000	LB
EPOXY COATED REINFORCING STEEL	93,070.000	LB
SUBSURFACE DRAINAGE MATTING	58.000	SY
PIPE PILING	4,550.000	LF
STEEL SHEET PILING	4,732.000	SF
GRANULAR BACKFILL	295.000	CY

GUARDRAIL ITEMS
GROUP 7

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
W-BEAM GUARDRAIL	100.000	LF
BRIDGE APPROACH SECTIONS	4.000	EACH
GUARDRAIL END TREATMENT, TYPE II	4.000	EACH

GENERAL ITEMS
GROUP 10

ITEM	QUANTITY	UNITS
BARRICADE, TYPE II	125.000	BDAY
BARRICADE, TYPE III	40.000	BDAY
TEMPORARY SIGN DAY	50.000	EACH
SIGN DAY	240.000	EACH
FLAGGING	10.000	DAY
FIELD OFFICE	1.000	EACH
TRAINING	100.000	HOUR
MOBILIZATION	1.000	LS
RENTAL OF LOADER, FULLY OPERATED	10.000	HOUR
RENTAL OF DUMP TRUCK, FULLY OPERATED	10.000	HOUR
RENTAL OF SKID LOADER, FULLY OPERATED	10.000	HOUR
RENTAL OF CRAWLER MOUNTED HYDRAULIC EXCAVATOR, FULLY OPERATED	5.000	HOUR
TEMPORARY SEEDING	1.000	ACRE
TEMPORARY EROSION CONTROL BLANKET	3,000.000	SY
TEMPORARY SILT CHECK	800.000	LF
TEMPORARY SILT FENCE	1,000.000	LF
ENVIRONMENTAL COMMITMENTS - CONTRACTOR COMPLIANCE	1.000	LS

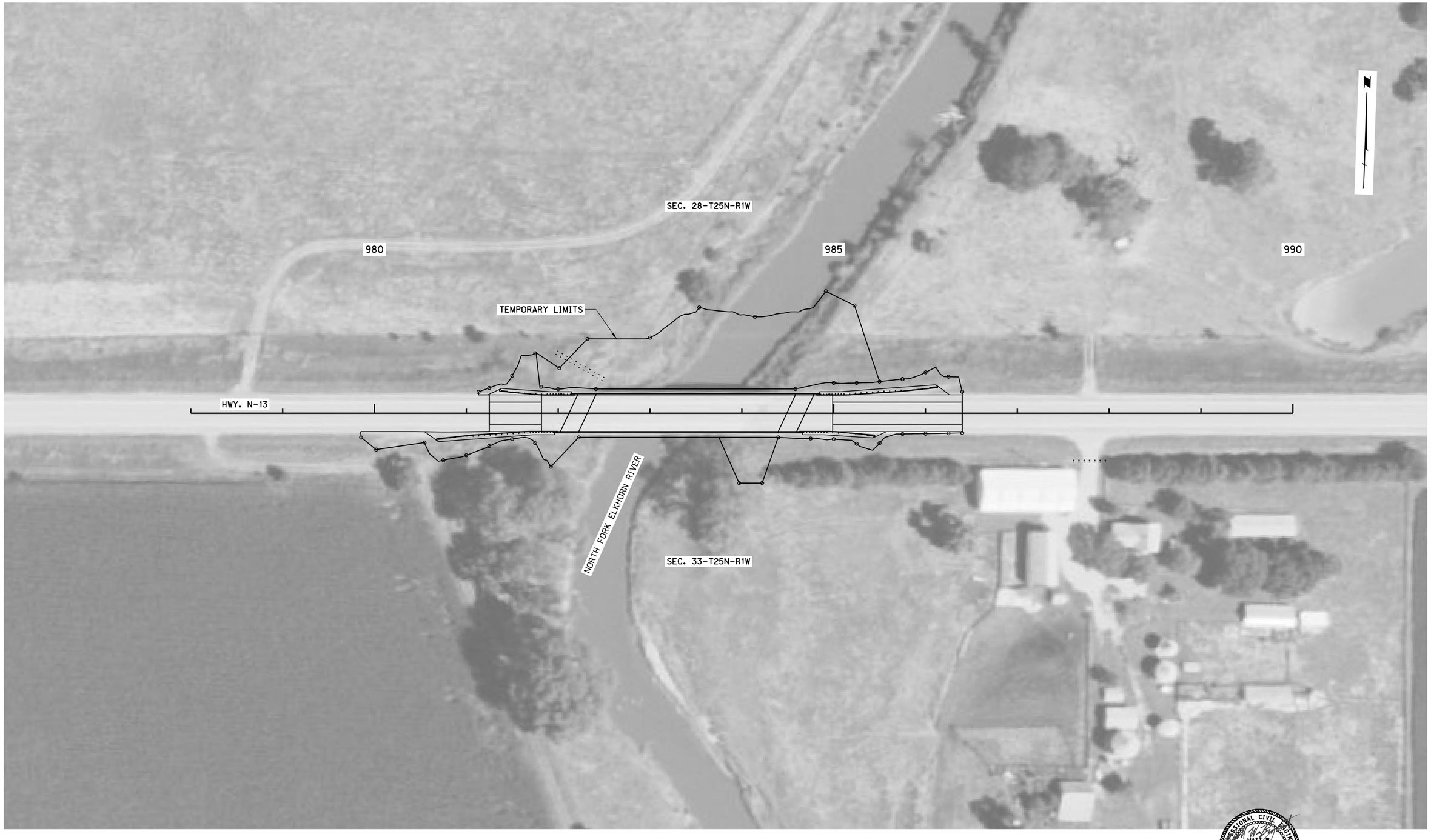
PROFESSIONAL CIVIL ENGINEER
MICHAEL H. STOCKENBERG
6505
STATE OF NEBRASKA

May 16 2019 DocuSign

WILSON & COMPANY

PROJECT NO.	SHEET NO.
ER-13-4(113)	E1

C.N. 32321



NORTH FORK OF ELKHORN RIVER BRIDGE (HADAR)

PIERCE COUNTY

PROFESSIONAL CIVIL ENGINEER
MATT W. BRYANT
E-10936
5-14-19
STATE OF NEBRASKA

DATE: 07/20/2016
FLIGHT: NAIP 2016
SCALE: 1" = 50'

ROADWAY DESIGN DIVISION

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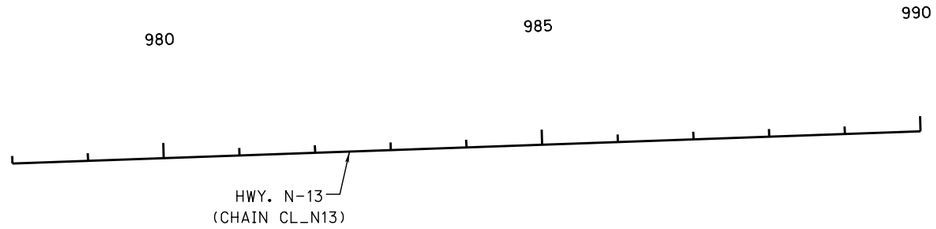

GEOPAK ALIGNMENT INFORMATION		
ALIGNMENT	CHAIN	PROFILE
HWY. N-13	CL_N13	PRO_N13

* ALIGNMENT HAS BEEN CREATED FROM ASBUILT INFORMATION, AND MODIFIED TO REPRESENT THE FIELD SURVEY DATA COLLECTED.

Beginning chain CL_N13 description
Feature: Mainline

Point 1	X	837,915.0494	Y	2,335,857.9882	Sta 978+00.00
Course from 5 to 6 87° 58' 23.16" Dist 1200.0000					
Point 2	X	837,957.4919	Y	2,337,057.2374	Sta 990+00.00

Ending chain CL_N13 description

N-13 CONTROL POINT & BENCH MARK DATA					
DESCRIPTION	X	Y	Z	STATION	OFFSET
CP-1 ALUM. CAP	2336866.77	837917.31	1546.66	988+08.23	33.43'
CP-2 ALUM. CAP	2336525.98	837967.22	1548.55	984+69.41	-28.51'
CP-3 ALUM. CAP	2336227.60	837900.34	1549.02	981+68.86	27.77'
CP-4 ALUM. CAP	2335458.85	837943.76	1543.99	-	-
BM STATE BRASS CAP	2336235.97	837907.59	1552.43	981+77.48	20.82'

HORIZONTAL ALIGNMENT & ORIENTATION

ROADWAY DESIGN DIVISION
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GENERAL INFORMATION

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Computer: A13433
User: KMEvans
Date: 15-MAY-2019 14:57
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NOTES

- The locations of all aerial and underground utility facilities may not be indicated in these plans. Underground utilities, whether indicated or not will be located and flagged by the Utilities at the request of the Contractor.

  No excavation will be permitted in the area of underground utility facilities until all such facilities have been located and identified to the satisfaction of all parties. The excavation must be accomplished with extreme care in order to avoid any possibility of damage to the utility facility.

FOR INFORMATION ONLY

- As indicated by the Typical Section, Embankment will be required to construct the earth portion of the shoulder. This material will be furnished by the Contractor from sources other than State Right-of-Way.

- The Contractor will be required to furnish Borrow on this Project.

- RESTRICTED USE AREAS
  Restricted Use Areas are designated on the Erosion and Sediment Control Plans at the Station Range Shown; from the edge of pavement to the ROW Line. This will protect waters of the state, Critical Habitat, and/or other sensitive resources. Construction Activities in these areas are limited to those required to build the Project as specified in the Contract.

  Restricted Use Areas May Not Be Used For:
  1. Equipment Storage and Maintenance, with the Exception of Cranes
  2. Stockpile of Construction and Excavated Materials, unless they are protected with adequate BMPs and kept back from waters of the state.
  3. Sanitary Facilities
  4. Mixing or Storage of any Hazardous Materials
  5. Concrete Washout

EARTHWORK QUANTITIES

STATION TO STATION	EXCAVATION AVAILABLE (CU. YDS.)	EARTHWORK MEASURED IN EMBANKMENT (CU. YDS.)
979+85 - 981+82	13	47
984+99 - 986+40	4	32
TOTAL	17	79

EARTHWORK QUANTITIES FOR CHANNEL SHAPING

STATION TO STATION	*EXCAVATION (ESTABLISHED QUANTITY) (CU. YDS.)
Abutment No. 1	74
Abutment No. 2	2,441
TOTAL	2,515

*GROUP 6

LEGEND

- GAS LINE
- ELECTRICAL SERVICE
- POWER LINE
- OVERHEAD POWER LINE
- SANITARY SEWER
- STORM SEWER
- TELEPHONE LINE
- FIBER OPTIC TELE. LINE
- OVERHEAD TELEPHONE LINE
- CABLE TV LINE
- OVERHEAD CABLE TV LINE
- WATER LINE
- FENCE - CHAIN LINK
- FENCE - R.O.W. OR WIRE
- FENCE - WOOD
- FLOWLINE
- CENTER LINE DRIVE
- BENCH MARK
- CENTER PIVOT
- CONTROL POINT
- DIKE
- GAS METER
- GAS VALVE
- GRID TICK
- GUARDRAIL
- GUARD POST
- GUY POLE
- GUY WIRE
- LIGHT POLE
- MAILBOX
- MANHOLE
- MARSH
- OIL WELL
- PHOTO CODE POINT
- POWER BOX
- POWER POLE
- POWER PULL BOX
- PROPANE TANK
- R.O.W. MARKER
- ADVANCED R.R. WARNING SIGN
- RAILROAD WARNING
- RAILROAD TRACKS
- RETAINING WALL
- SATELLITE DISH
- SIGN
- TRAFFIC SIGNAL
- TRAFFIC SIGNAL/ST. LIGHT
- TELEPHONE BOX
- TELE. FIBER OPTICS BOX
- TELEPHONE PULL BOX
- TELEPHONE POLE
- TELEVISION BOX
- TREE - CONIFEROUS
- TREE - DECIDUOUS
- TREE STUMP
- WATER (FIRE) HYDRANT
- WATER VALVE
- WATER METER
- WELL
- WINDMILL

PROFESSIONAL CIVIL ENGINEER
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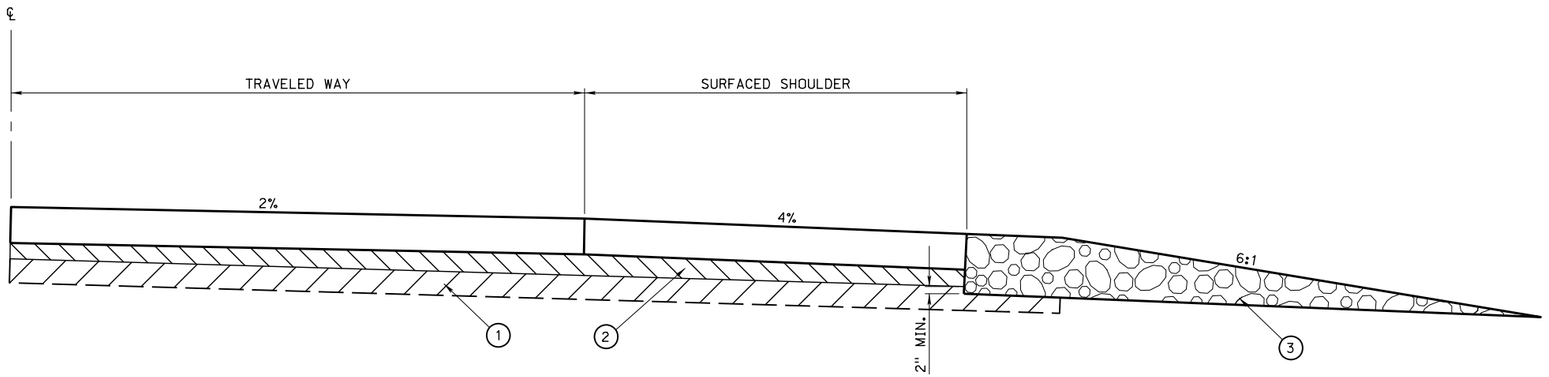
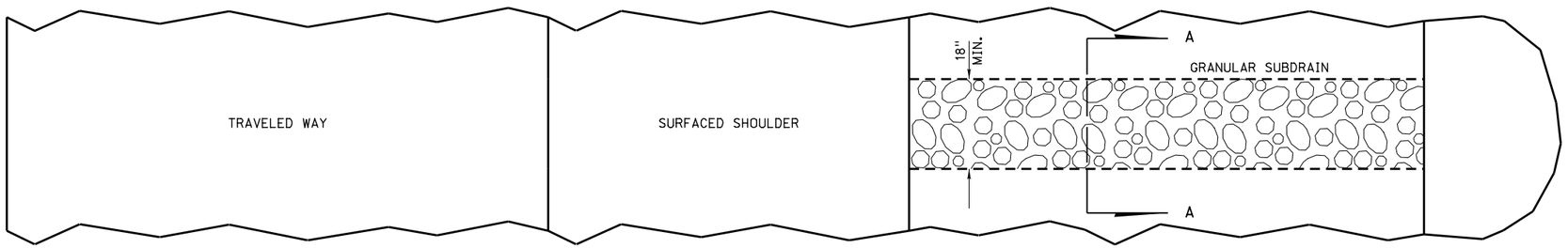
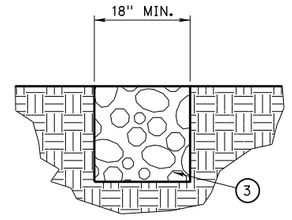
E-10936
5-15-19
STATE OF NEBRASKA

G E N E R A L I N F O R M A T I O N



GRANULAR SUB-DRAIN DETAILS





SECTION A-A

GRANULAR SUB-DRAIN DETAILS

(1) SUBGRADE PREPARATION
(2) FOUNDATION COURSE
(3) GRANULAR SUBDRAIN

CONSTRUCTION NOTES:

THE GRANULAR SUB-DRAIN SHALL BE CONSTRUCTED WITH POSITIVE DRAINAGE.

GRANULAR SUB-DRAIN SHALL BE INSTALLED AFTER ALL SHOULDERING & EARTH WORK IS COMPLETED AND PRIOR TO SEEDING.

GRANULAR SUB-DRAINS SHALL BE CONSTRUCTED AT INTERVALS OF 200'-0" WHERE THE GRADE IS 1% OR OVER AND AT INTERVALS OF 100'-0" ON GRADES UNDER 1%.

GRANULAR SUB-DRAINS SHALL BE BUILT PERPENDICULAR TO THE CENTER LINE.

BUILD GRANULAR SUB-DRAIN

STATION	TO	STATION	SIDE	EACH	SPACING
981+25	-	981+82	Rt.	1	100'
981+25	-	981+82	Lt.	1	100'
984+99	-	986+40	Rt.	2	100'
984+99	-	986+40	Lt.	2	100'

PROFESSIONAL CIVIL ENGINEER
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E-10936
STATE OF NEBRASKA

ROADWAY DESIGN DIVISION
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User: KMEvans
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GENERAL INFORMATION

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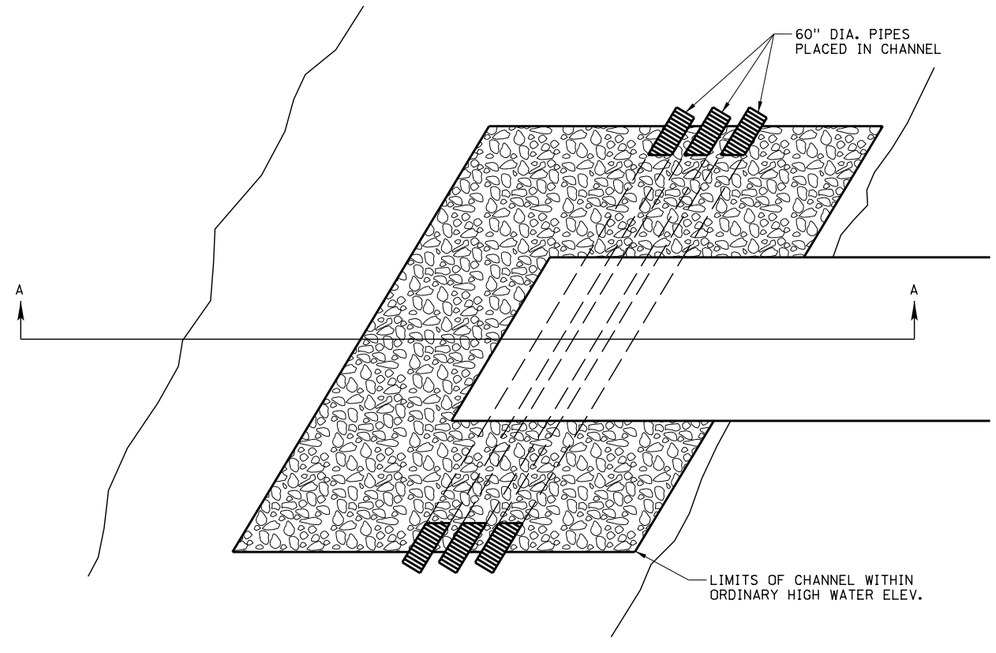
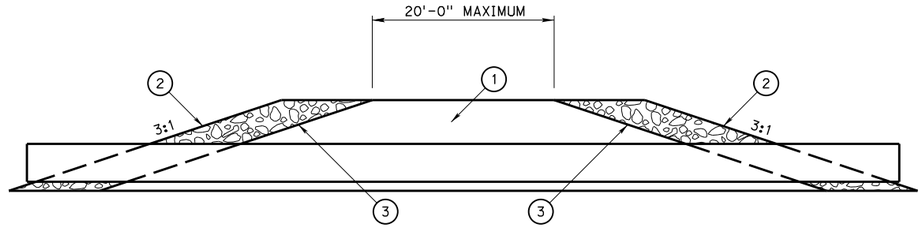
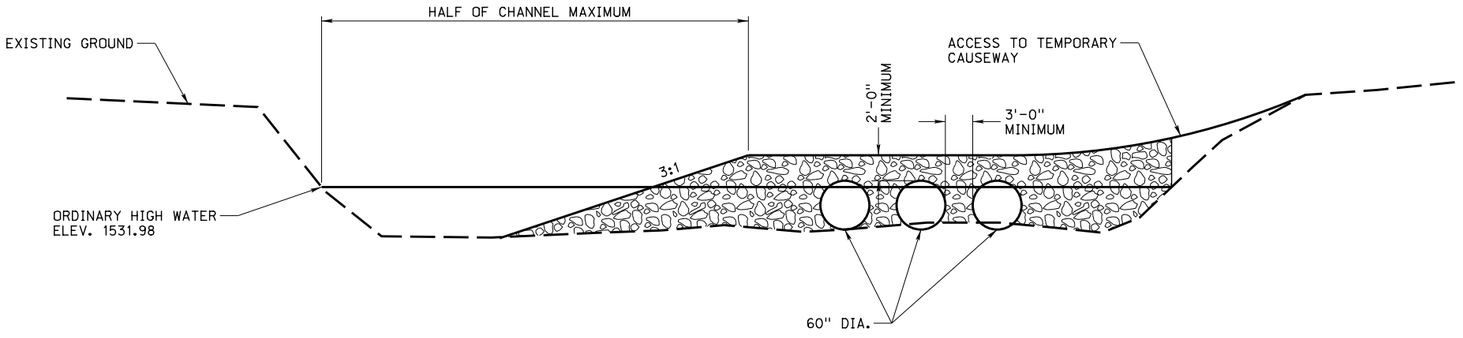


PLAN CROSSING



TYPICAL SECTION OF CROSSING



NORTH FORK ELKHORN RIVER

SECTION A-A

NOTE:
Access crossing must be constructed to pass the ordinary high water flow, and will not restrict or impede the passage of normal flows.

LEGEND

1. MATERIAL SHALL BE CLEAN EARTHEN FILL.
2. MINIMUM 2'-0" CLASS B ROCK RIPRAP OR BROKEN CONCRETE RIPRAP THAT MEETS THE REQUIREMENTS OF THE NDOR STANDARD SPECIFICATIONS.
3. FILTER FABRIC

PROFESSIONAL CIVIL ENGINEER
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5-14-19
STATE OF NEBRASKA

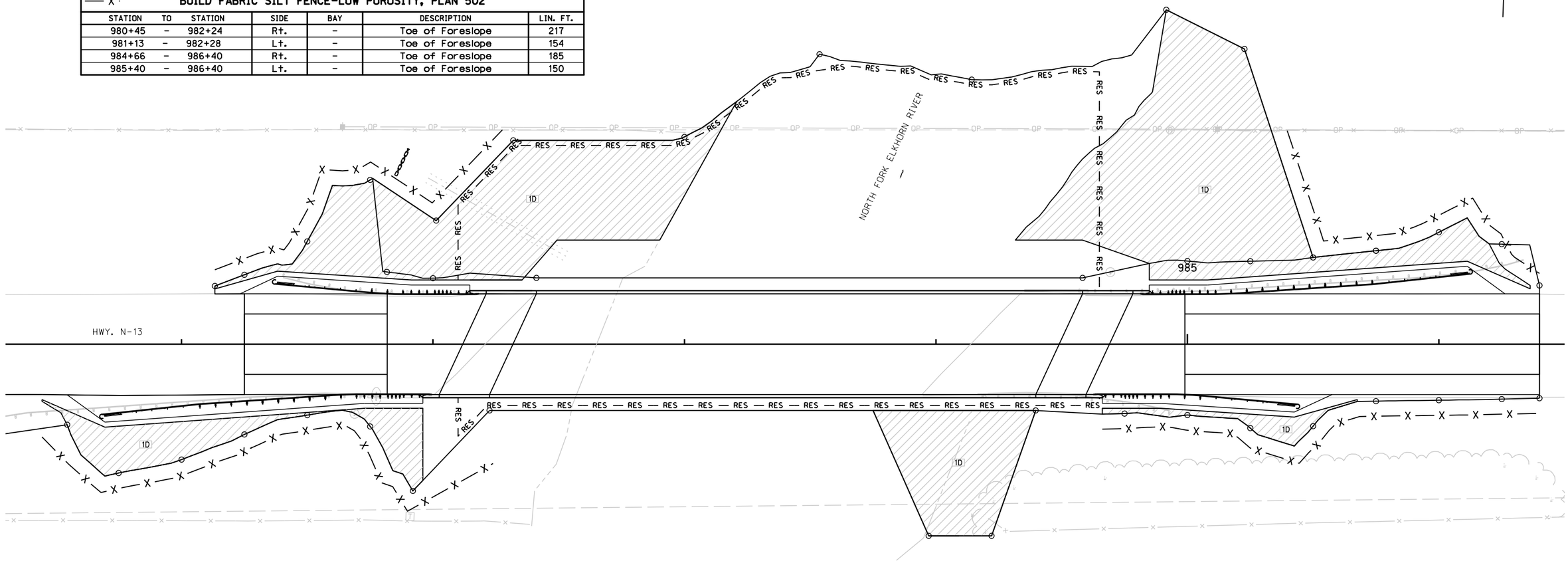
ACCESS CROSSING

1D	BUILD EROSION CONTROL-CLASS 1D, PLAN 501					
STATION	TO	STATION	SIDE	DESCRIPTION	WIDTH	SQ. YDS.
980+45	-	981+96	Rt.	Foreslope	-	183
981+13	-	983+21	Lt.	Foreslope	-	662
983+75	-	984+40	Rt.	Foreslope	-	248
984+32	-	986+36	Lt.	Foreslope	-	823
984+66	-	985+68	Rt.	Foreslope	-	44

— X ·	BUILD FABRIC SILT FENCE-LOW POROSITY, PLAN 502					
STATION	TO	STATION	SIDE	BAY	DESCRIPTION	LIN. FT.
980+45	-	982+24	Rt.	-	Toe of Foreslope	217
981+13	-	982+28	Lt.	-	Toe of Foreslope	154
984+66	-	986+40	Rt.	-	Toe of Foreslope	185
985+40	-	986+40	Lt.	-	Toe of Foreslope	150

BUILD SILT CHECKS, SPECIAL PLAN 2C					
STATION	SIDE	SPACING	TYPE	LIN. FT. EACH	TOTAL LIN. FT.
981+85	Lt.	-	2, HIGH	10	10

SEC. 28-T25N-R1W



Restricted Use Area
Sta. 982+10 Lt./Rt. to
Sta. 984+65 Lt./Rt.
See Sheet G

SEC. 33-T25N-R1W

LEGEND

- LIMITS OF CONSTRUCTION
- WETLANDS - DO NOT DISTURB UNIMPACTED WETLANDS, SEE SHEET E
- RES - RESTRICTED USE AREAS

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EROSION & SEDIMENT CONTROL

ROADWAY DESIGN DIVISION
Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:18
File: 323210cx01
Scale: 1:40

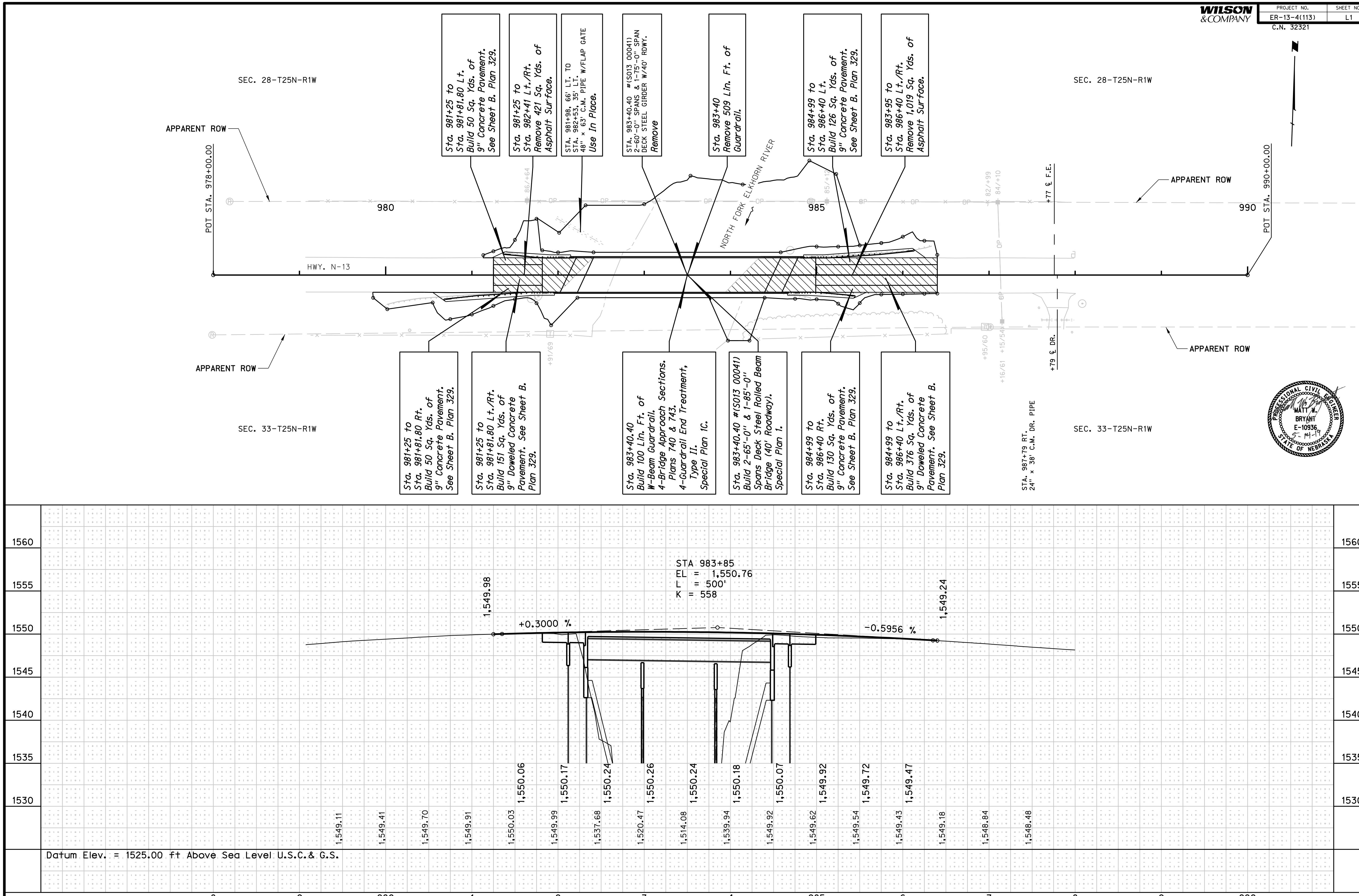
ROADWAY DESIGN DIVISION

Computer: A13433

User: KMEvans

Date: 14-MAY-2019 16:18

File: 323210cp01
Scale: 1:100



N FK ELKHORN RIVER BRIDGE

- NOTES -

This structure is designed in accordance with the AASHTO LRFD Bridge Design Specifications, Eighth Edition, including subsequent interim revisions.

The concrete bridge deck is designed by the empirical design method.

The superstructure is designed for the allowance of stay-in-place forms (5 lb./ft^2) between girders.

All structural steel for rolled beams, stiffeners, separators and splice materials shall conform to the to the requirements of ASTM A709/A709M, Grade 50W weathering steel.

All other structural steel shall conform to the requirements of ASTM A709/A709M, Grade 36.

All fasteners shall be 7/8" Φ high strength bolts, ASTM A325.

Nuts, bolts, and washers used in the assembly of weathering steel shall be Type 3.

During girder fabrication, the final camber tolerance shall not exceed those in Table 3.3 of A.W.S. "S" is the length of girder between splices.

During girder fabrication, the flanges at the splice must line up within 1/8" of parallel to the adjacent flanges without applying external force, before the splice is drilled.

Field splices shall be clean and free of all foreign matter before field assembly. The plates shall be in full contact when the bolts are tightened to a snug-tight condition.

When assembling the girders, they shall be set according to the blocking diagram before any bolts are tightened to a snug-tight condition.

Butt splices will be permitted for flange plates exceeding 60 feet in length. The locations of the splice shall be shown on the shop plans and will be subject to approval by the Engineer.

The girders for this bridge are not designed to resist any torsional or lateral forces due to temporary construction loads. The Contractor must provide any temporary bracing necessary to support the girder web and flanges against all torsional or lateral forces resulting from construction loads.

Field tack welding of form hangers or miscellaneous hardware to any part of the steel girder, with the exception of the shear connectors, shall be prohibited.

All bearing stiffeners and girder ends, except at field splices, shall be vertical after final erection. All other stiffeners and all field splices shall be normal to the top flange.

Concrete for slab, approach slabs, turndowns, and rails shall be Class "47BD", with a 28-day strength of 4,000 psi.

All other cast-in-place concrete shall be Class "47B" concrete, with a 28-day strength of 3,000 psi.

All reinforcing steel shall be epoxy coated and conform to the requirements of ASTM A615/A615M, Grade 60 steel.

Girder shims that will be provided to the Contractor account for the dead load deflection due to weight of the slab, rail or barrier, and median (if present) only. The Contractor is responsible for making the necessary adjustments for the particular forming system used to achieve the slab grades and elevations shown on the plans.

All plastic pipe, galvanized wire screen, and miscellaneous drainage items at the abutments shall be considered subsidiary to the Pay Item "SUBSURFACE DRAINAGE MATTING".

All dimensions shown are in horizontal plane only. No allowances have been made for vertical curve or roadway cross slope.

Unless noted as "Optional" all construction joints shown are mandatory.

7/8" Φ x 0'-5" end welded studs have an in-place weight of 98.0 lb./100 studs.

Steel (weight) quantities are based upon 490 pcf and 1 lb. per bolt.

Where the entire slab is not expected to be placed in one day, the Contractor may submit an alternate proposed slab pouring sequence to the Bridge Division at the preconstruction conference so that the new camber and shims may be calculated.

No form work, reinforcing steel, or construction loads shall be placed on the girders until the abutment concrete has set for 72 hours or reached a minimum compressive strength of 2,000 psi.

All exposed pipe piles shall be filled with concrete. This concrete shall be Class "47B" with a minimum 28-day compressive strength of 3,000 psi. This concrete shall be subsidiary to the Pay Item, "PIPE PILING".

The minimum clearance, measured from the face of the concrete to the surface of any reinforcing bar shall be 3'', except where otherwise noted.

Structural steel for all "Pipe" piles shall conform to ASTM A709/A709M, Grade 36.

The Pay Item " STRUCTURAL STEEL FOR SUBSTRUCTURE" shall include the nose armor angle at the bents and tie rods at the abutments.

Tie rods shall conform to ASTM A709/A709M, Grade 36 steel. Turnbuckles shall conform to ASTM A668/A668M, Class C.

After fabrication, tie rods, turnbuckles, and all other hardware shall be galvanized according to ASTM A123/A123M.

- QUANTITIES -

GROUP 6

ABUTMENT NO. 1 EXCAVATION		1	LS
BENT NO. 1 EXCAVATION		1	LS
BENT NO. 2 EXCAVATION		1	LS
ABUTMENT NO. 2 EXCAVATION		1	LS
CLASS 47B-3000 CONCRETE FOR BRIDGE		409.8	CY
ABUTMENTS	176.7 CY		
BENTS	233.1 CY		
CLASS 47BD-4000 CONCRETE FOR BRIDGE		300.7	CY
SLAB	252.6 CY		
HAUNCHES	8.7 CY		
CONCRETE RAILS	39.4 CY		
INSTALL STEEL SUPERSTRUCTURE AT STA. 983+40.40		1	LS
EPOXY COATED REINFORCING STEEL		93,070	LB
SLAB	48,644 LB		
CONCRETE RAILS	8,352 LB		
ABUTMENTS	15,264 LB		
BENTS	20,810 LB		
STEEL SHEET PILING		4,732	SF
STRUCTURAL STEEL FOR SUBSTRUCTURE		15,828	LB
PIPE PILING		4,550	LF
INSTALL FIXED BEARING		12	EA
INSTALL EXPANSION BEARING, PTFE TYPE		12	EA
GRANULAR BACKFILL		295	CY
SUBSURFACE DRAINAGE MATTING		58	SY
CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000		192.7	CY
SLABS	183.2 CY		
CONCRETE RAILS	9.5 CY		
EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES		36,853	LB
SLABS	32,560 LB		
CONCRETE RAILS	4,293 LB		
ROCK RIPRAP, TYPE B		920	TON
RIPRAP FILTER FABRIC		1030	SY
PREFORMED EXPANSION JOINT, TYPE A		98.2	LF
BRIDGE DECK GROOVING		1198.0	SY

- INDEX -

FOR INFORMATION ONLY

STEEL SUPERSTRUCTURE AT STA. 983+40.40		1	LS
GIRDERS	247,536 LB		
SEPARATORS & MISC.	13,580 LB		
SPLICE PLATES	9,070 LB		
SHEAR CONNECTORS	4,657 LB		
BOLTS	1,422 LB		
TOTAL	276,265 LB		
FIXED BEARING		12	EA
EXPANSION BEARING, PTFE TYPE		12	EA

Steel Superstructure, Expansion Bearings, and Fixed Bearings to be furnished by NDOT. Shop drawings are available from the NDOT Bridge Division upon request. The CONTRACTOR shall coordinate delivery of Superstructure and Bearings with CAPITAL CONTRACTORS, INC. Contact CHUCK SIDLES or DAVID CRIST at (402) 476-1021.

Shop plans for review
- Steel Superstructure
- Substructure Steel (Tie Rods, etc.)
- Bearing Devices
- Steel Sheet Piling

Shop plans for records
- Stay-In-Place Forms

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S1

C.N. 32321

STRUCTURE NUMBER S013 00041

PROFESSIONAL CIVIL ENGINEER — MARK J. TRAYNOWICZ E-8119 — STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

GENERAL NOTES, QUANTITIES, & INDEX

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER — STEVEN D. KNEIP E-6287 — 5-14-19 — STATE OF NEBRASKA

SPECIAL PLAN NO. 1

1 / 20

Computer: A13433 User: KMEvans Date: 14-MAY-2019 16:33 File: 1 General Notes, Quantities, and Index

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S2

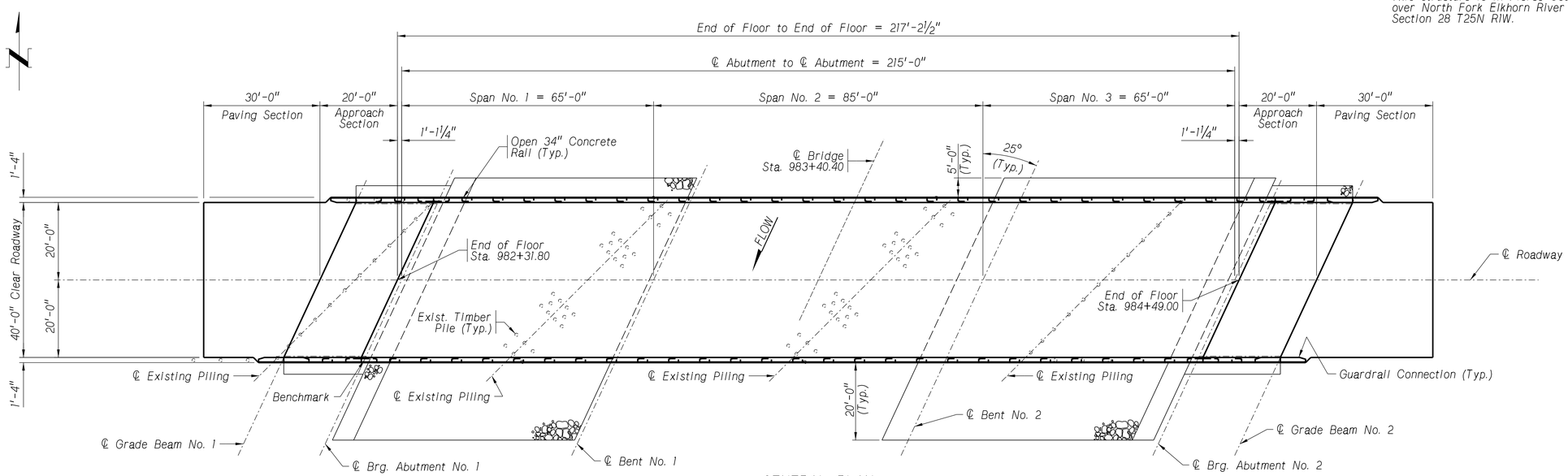
C.N. 32321

STRUCTURE NUMBER
S013 00041

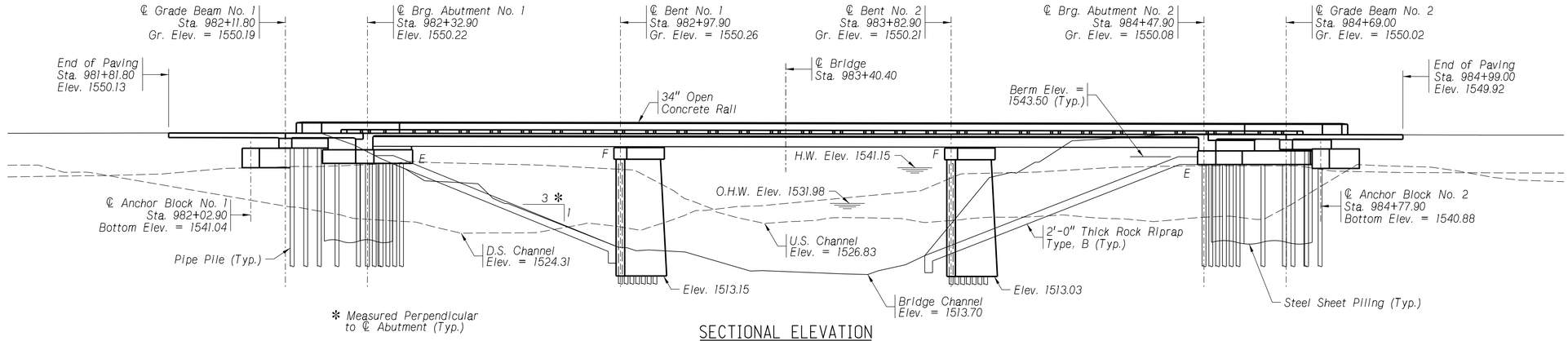
PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

This structure is in Pierce County over North Fork Elkhorn River in Section 28 T25N R1W.

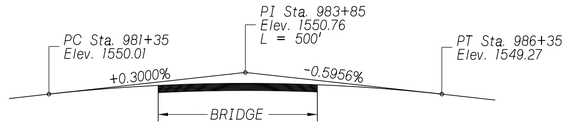


GENERAL PLAN
Scale: 1" = 15'-0"



✻ Measured Perpendicular to ℄ Abutment (Typ.)

SECTIONAL ELEVATION
Scale: 1" = 15'-0"



PROFILE GRADE
Not to Scale

BRIDGE HYDRAULIC INFORMATION

STREAM: NORTH FORK ELKHORN RIVER
D.A. = 569 SQ. MI.
Q100 = 12,200 CFS (DESIGN FLOOD)
H.W. ELEV. = 1541.15 (D.S. SIDE)
W.W.A. BELOW H.W. = 1,710 SQ. FT.
Q (OHW) = ±1,365 CFS
ORDINARY HIGH WATER ELEV. = 1531.98
Q100 GENERAL SCOUR = 13.54 FT
Q100 LOCAL SCOUR = 14.61 FT (PIER)
Q100 LOCAL SCOUR = 16.33 FT (ABUTMENT)
Q500 SCOUR ELEV. = 1500.98

WILSON &COMPANY

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

GENERAL PLAN & ELEVATION

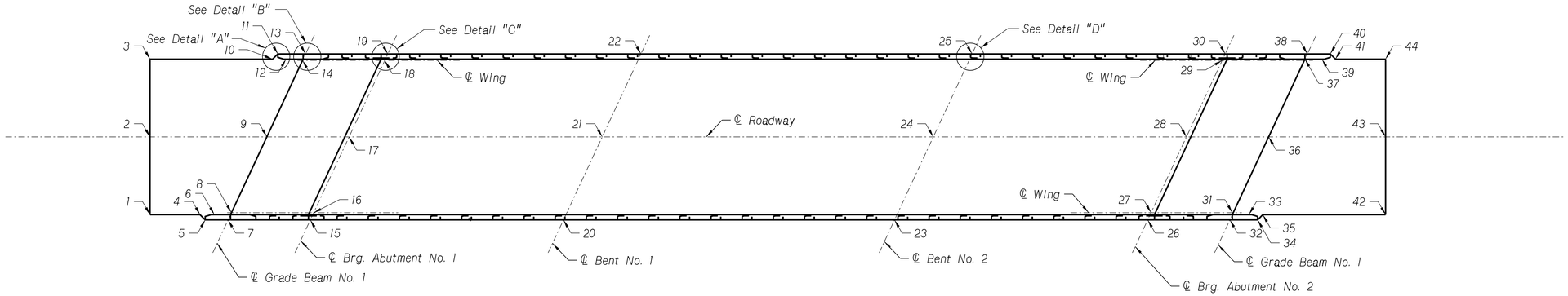
LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

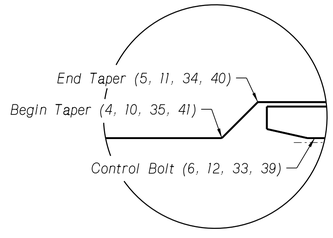
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	
1	2/20



COORDINATE LAYOUT

Scale: 1" = 15'-0"



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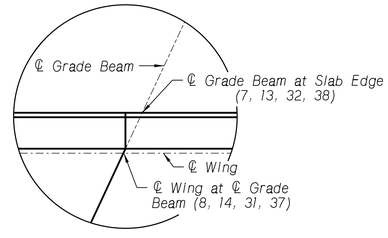

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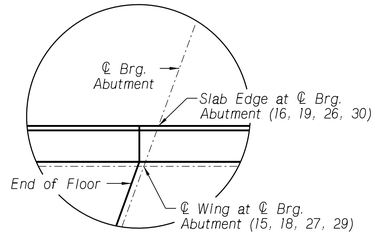

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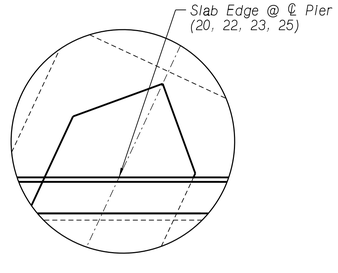


DETAIL "D"

COORDINATES, STATIONING & OFFSETS					
POINT	STATION	OFFSET TO STA. (FT)	LT/RT	X COORDINATE	Y COORDINATE
1	981+81.80	20.00	RT	2336240.26	837908.57
2	981+81.80	0.00	-	2336239.55	837928.55
3	981+81.80	20.00	LT	2336238.85	837948.54
4	981+94.64	20.00	RT	2336253.09	837909.02
5	981+95.97	21.33	RT	2336254.47	837907.73
6	981+97.72	20.00	RT	2336256.17	837909.13
7	982+01.85	21.33	RT	2336260.35	837907.94
8	982+01.85	19.50	RT	2336260.28	837909.77
9	982+11.80	0.00	-	2336269.53	837929.61
10	982+13.29	20.00	LT	2336270.32	837949.65
11	982+14.63	21.33	LT	2336271.60	837951.03
12	982+16.38	20.00	LT	2336273.40	837949.76
13	982+21.75	21.33	LT	2336278.72	837951.29
14	982+20.89	19.50	LT	2336277.93	837949.42
15	982+22.95	21.33	RT	2336281.43	837908.69
16	982+23.81	19.50	RT	2336282.22	837910.55
17	982+32.90	0.00	-	2336290.62	837930.36
18	982+41.99	19.50	LT	2336299.02	837950.17
19	982+42.85	21.33	LT	2336299.81	837952.03
20	982+87.95	21.33	RT	2336346.39	837910.99
21	982+97.90	0.00	-	2336355.58	837932.66
22	983+07.85	21.33	LT	2336364.77	837954.33
23	983+72.95	21.33	RT	2336431.34	837913.99
24	983+82.90	0.00	-	2336440.53	837935.67

COORDINATES, STATIONING & OFFSETS					
POINT	STATION	OFFSET TO STA. (FT)	LT/RT	X COORDINATE	Y COORDINATE
25	983+92.85	21.33	LT	2336449.71	837957.34
26	984+37.95	21.33	RT	2336496.30	837916.29
27	984+38.81	19.50	RT	2336497.09	837918.16
28	984+47.90	0.00	-	2336505.49	837937.96
29	984+56.99	19.50	LT	2336513.88	837957.77
30	984+57.85	21.33	LT	2336514.67	837959.64
31	984+59.91	19.50	RT	2336518.18	837918.90
32	984+59.05	21.33	RT	2336517.39	837917.04
33	984+51.52	20.00	RT	2336509.82	837918.11
34	984+66.17	21.33	RT	2336524.50	837917.29
35	984+67.51	20.00	RT	2336525.79	837918.67
36	984+69.00	0.00	-	2336526.57	837938.71
37	984+78.09	19.50	LT	2336534.97	837958.52
38	984+78.95	21.33	LT	2336535.76	837960.38
39	984+83.08	20.00	LT	2336539.93	837959.20
40	984+84.83	21.33	LT	2336541.64	837960.59
41	984+86.16	20.00	LT	2336543.01	837959.31
42	984+99.00	20.00	RT	2336557.26	837919.78
43	984+99.00	0.00	-	2336556.55	837939.77
44	984+99.00	20.00	LT	2336555.85	837959.76

ALIGNMENT CONTROL POINTS				
POINT	STATION	OFFSET TO STA. (FT)	X COORDINATE	Y COORDINATE
A	981+26.40	0.00	2336184.19	837926.59
B	985+88.18	0.00	2336645.67	837942.93

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S3

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

COORDINATE LAYOUT

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

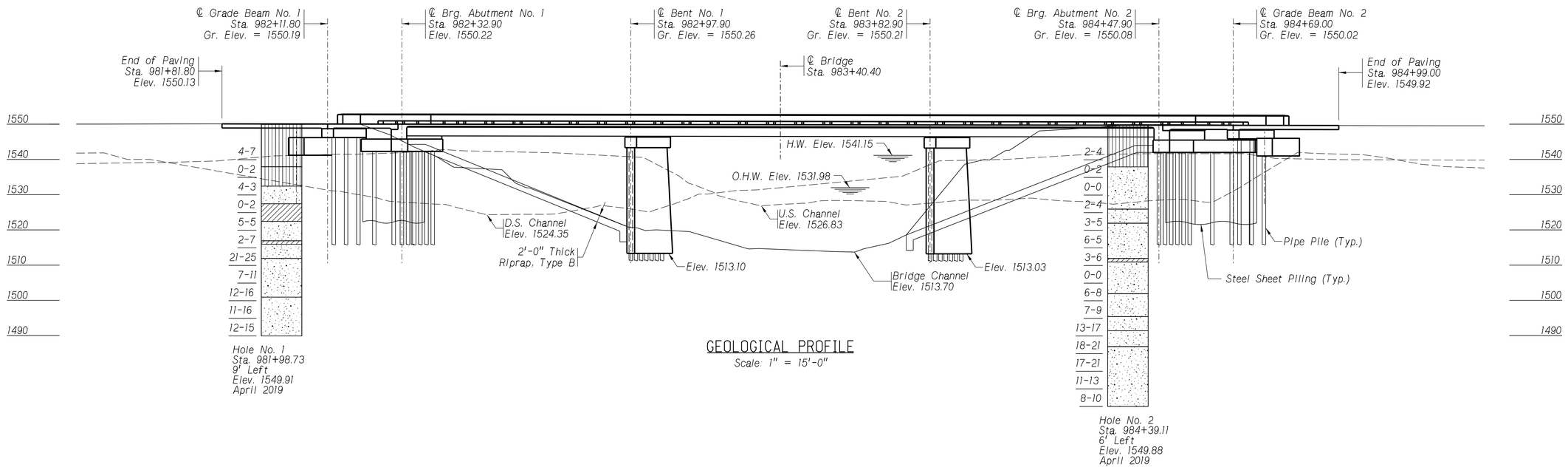
NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
STATE OF NEBRASKA

SPECIAL PLAN NO. 1

3 / 20

File: 3 Coordinate Layout Date: 14-MAY-2019 16:33 User: KMEvans Computer: A13433



GEOLOGICAL PROFILE

Scale: 1" = 15'-0"

Notes:

The borings, as logged on the plans, represent the character of the subsoil at the location indicated. No guarantee is made that the subsoil conditions vary uniformly between or outside the given location.

Figures beside the column of borings indicate the number of blows required to drive a standard penetrometer, of 2" O.D., the second and third 6 inches using a 140 lb. weight falling 30 inches, in accordance with ASTM D1586 procedures.

LEGEND

SAND CLAY TILL SHALE FILL GRAVEL TOPSOIL

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S4

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

GEOLOGICAL PROFILE

DATE APRIL 2019

CHECKED BY SDK

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO

COUNTY Pierce
HWY. NO. N-13
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NEBRASKA DEPARTMENT OF TRANSPORTATION

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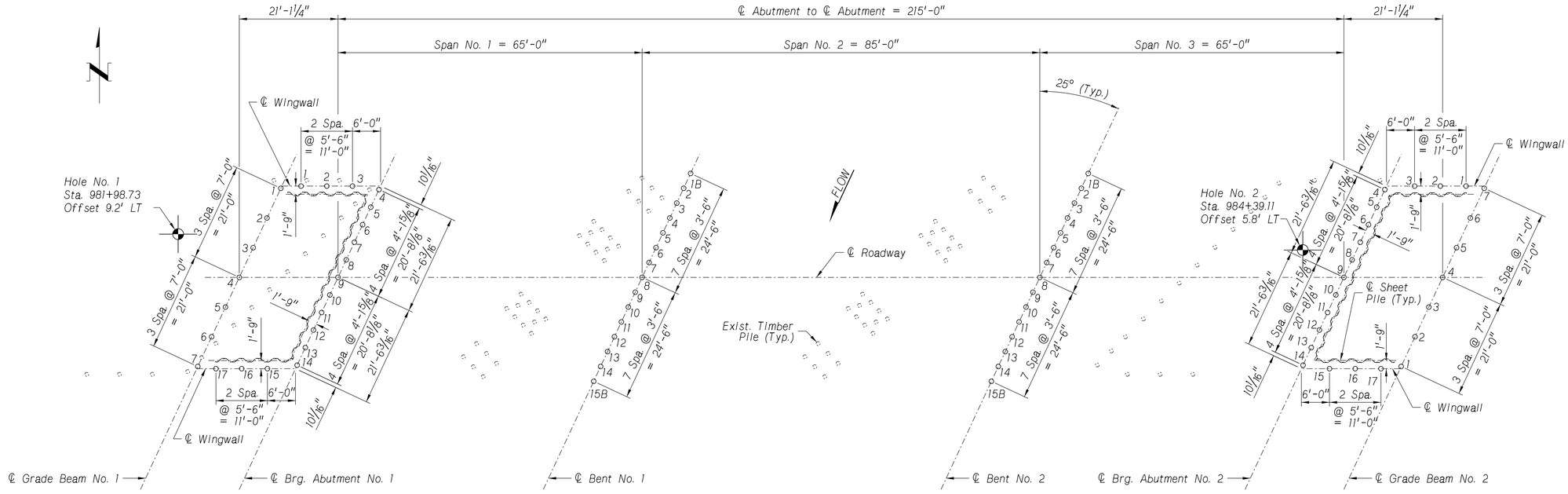
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	4 / 20
1	

File: 4 Geologic Profile Date: 14-MAY-2019 16:33 User: KMEvans Computer: A13433



PILE LAYOUT
Not to Scale

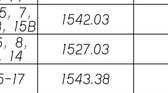
PILE DATA

LOCATION	PILE NUMBER	CUT-OFF ELEVATION	MINIMUM PENETRATION BELOW CUT-OFF (feet)	PILE ORDER LENGTH (feet)	DESIGN PILE BEARING (kips/pile)	PILE TYPE
Grade Beam No. 1	1-7	1547.37	60	65	90	Pipe
Abutment No. 1	1-3, 15-17	1543.54	35	40	25	Pipe
	4-14	1543.54	60	65	120	Pipe
Bent No. 1	1B, 3, 5, 7, 9, 11, 13, 15B	1542.10	65	70	165	Pipe
	2, 4, 6, 8, 10, 12, 14	1527.10	50	55	165	Pipe
Bent No. 2	1B, 3, 5, 7, 9, 11, 13, 15B	1542.03	65	70	165	Pipe
	2, 4, 6, 8, 10, 12, 14	1527.03	50	55	165	Pipe
Abutment No. 2	1-3, 15-17	1543.38	35	40	25	Pipe
	4-14	1543.38	60	65	120	Pipe
Grade Beam No. 2	1-7	1547.19	60	65	90	Pipe

All pile spacing is given at the bottom of concrete.

As a minimum, all steel sheet piling shall conform to ASTM A328/A328M steel and shall meet the following requirements:

Section Length	33 ft.
Maximum Section Depth	13 in.
Minimum Section Thickness	0.3125 in.
Elastic Section Modulus	18.1 in^3/ft

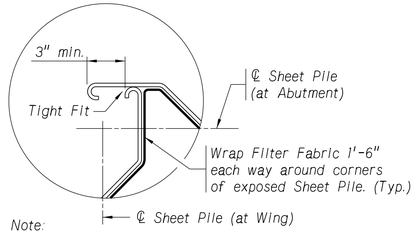


The Contractor shall submit for approval a shop plan of the sheet pile layout showing all pertinent dimensions, details, and section properties.

The pay quantity will be based on the sheet pile wall dimensions shown. The constructed wall length will be within ± 2'-0" of the sheet pile wall dimensions shown.

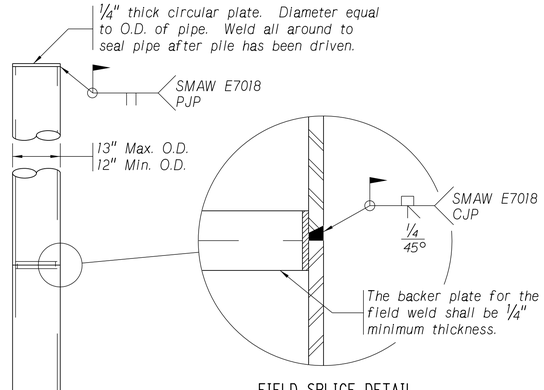
Pier/Bent piling followed by the letter "B" shall be battered at 1.5: 12.

All exposed pipe piles shall be filled with concrete. This concrete shall be Class "47B" with a minimum 28-day compressive strength of 3,000 psi. This concrete shall be subsidiary to the Pay Item, "PIPE PILING".



Note:
Corner Filter Fabric shall be Subsidiary to the pay item "STEEL SHEET PILING".

SHEET PILE CORNER DETAIL (TYP.)
Not to Scale



FIELD SPLICE DETAIL

NOTE:
Pipe for piles shall conform to the requirements of ASTM A252, Grade 2. Nominal shell thickness shall be not less than ⅜".

PIPE PILE DETAIL
Not to Scale

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S5

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
PILE LAYOUT & PILE DATA

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SKEW 25° (RHB)
ROADWAY 40'-0"
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NEBRASKA
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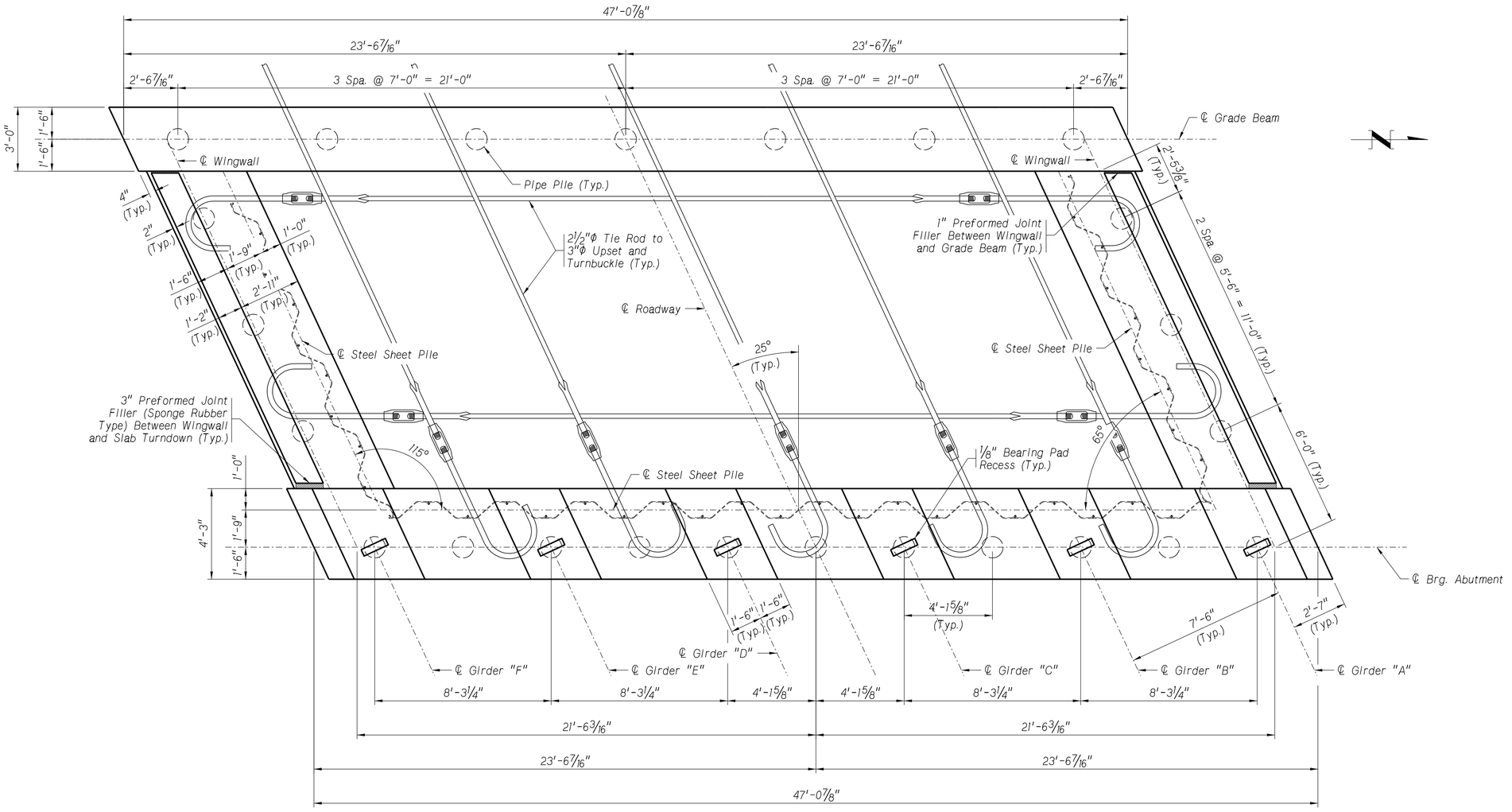
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
STATE OF NEBRASKA

SPECIAL PLAN NO.	5 / 20
1	

File: 5 Pile Layout & Pile Data Date: 14-MAY-2019 16:33 User: KMEvans Computer: A13433

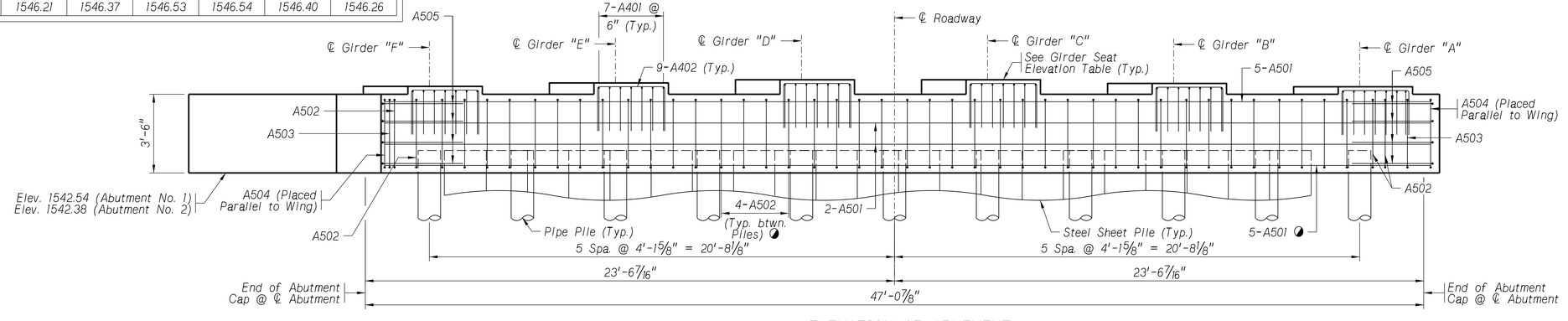


PLAN OF ABUTMENT

(Abutment No. 1 Shown; Abutment No. 2 Similar)

Scale: 3/8" = 1'-0"

GIRDER SEAT ELEVATIONS						
Girder	"A"	"B"	"C"	"D"	"E"	"F"
Abutment No. 1	1546.39	1546.54	1546.68	1546.68	1546.52	1546.37
Abutment No. 2	1546.21	1546.37	1546.53	1546.54	1546.40	1546.26



ELEVATION OF ABUTMENT

(Abutment No. 1 Shown; Abutment No. 2 Similar)

Scale: 3/8" = 1'-0"

◑ Burn 1.5" Φ holes in steel sheet piling for bars.

See "Abutment Details" Sheet for additional details.

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S6

C.N. 32321

STRUCTURE NUMBER S013 00041

PROFESSIONAL CIVIL ENGINEER — MARK J. TRAYNOWICZ E-8119 — STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

ABUTMENT PLAN & ELEVATION

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
DATE APRIL 2019
CHECKED BY SDK

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

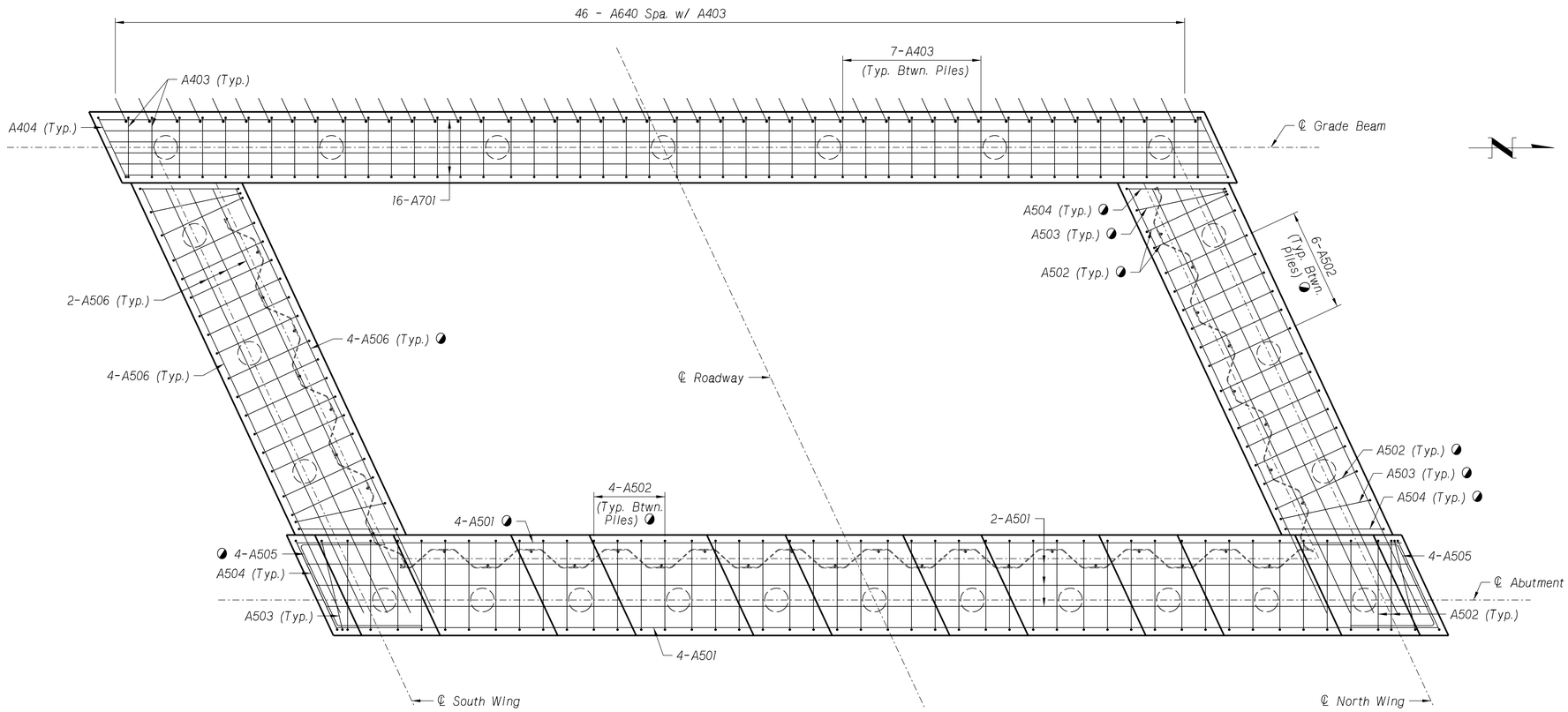
NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA Good Life. Great Journey. DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER — STEVEN D. KNEIP E-6287 5-14-19 — STATE OF NEBRASKA

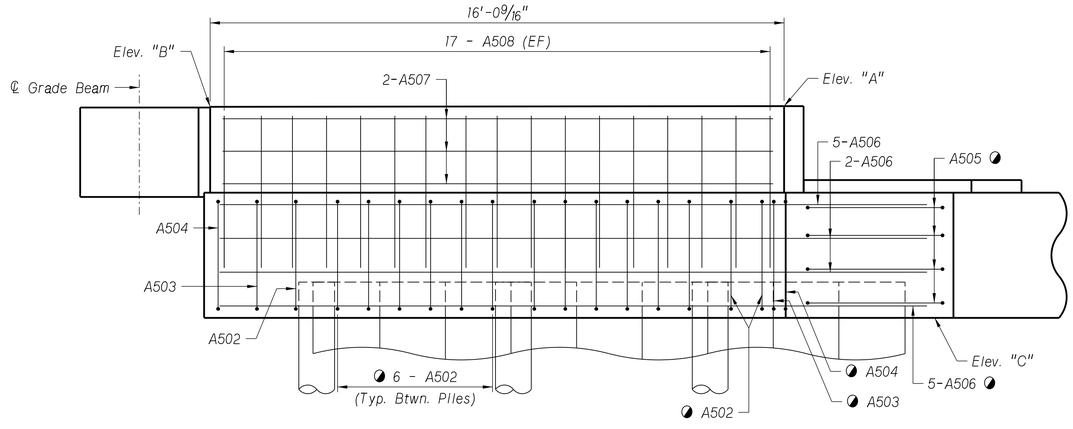
SPECIAL PLAN NO.	
1	6/20

File: 6 Abutment Plan & Elevation Date: 14-MAY-2019 16:33 User: KMEvans Computer: A13433



Note: Tie Rods not shown for clarity.

TOP OF WING ELEVATIONS (TOP OF CONCRETE)				
Location	Abutment No. 1		Abutment No. 2	
	North Wing	South Wing	North Wing	South Wing
Elev. "A"	1548.48	1548.45	1548.29	1548.34
Elev. "B"	1548.46	1548.43	1548.24	1548.30
Elev. "C"	1542.54	1542.54	1542.38	1542.38



ELEVATION OF WINGWALL

(South Wing Abutment No. 1 Shown, all Wings Similar)
Scale: 1/2" = 1'-0"

PLAN OF ABUTMENT

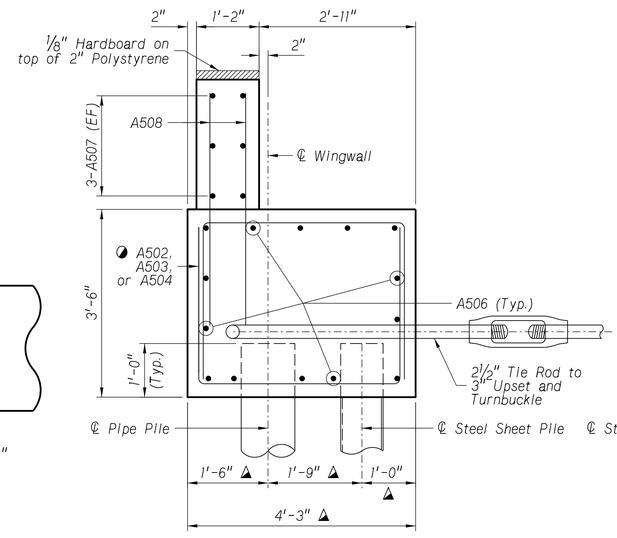
(Abutment No. 1 Shown; Abutment No. 2 Similar)
(Showing Reinforcement)
Scale: 3/8" = 1'-0"

◑ Burn 1.5" Φ holes in steel sheet piling for bars.

◪ Measured Perpendicular to ℄ Abutment

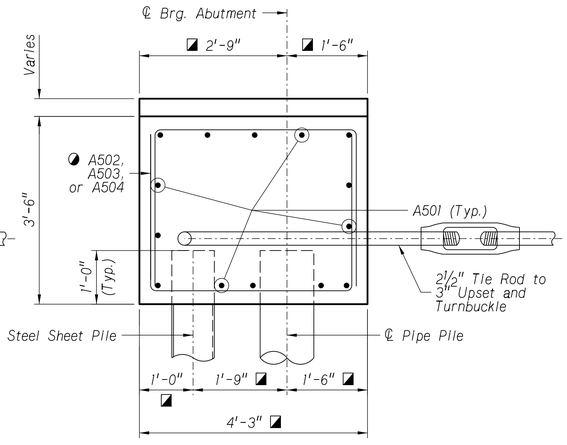
◭ Measured Perpendicular to ℄ Wingwall

EF = Each Face



WING SECTION

Scale: 3/4" = 1'-0"



ABUTMENT SECTION

Scale: 3/4" = 1'-0"

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S7

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
ABUTMENT DETAILS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO DATE APRIL 2019
DESIGNED BY WAO CHECKED BY SDK
COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40

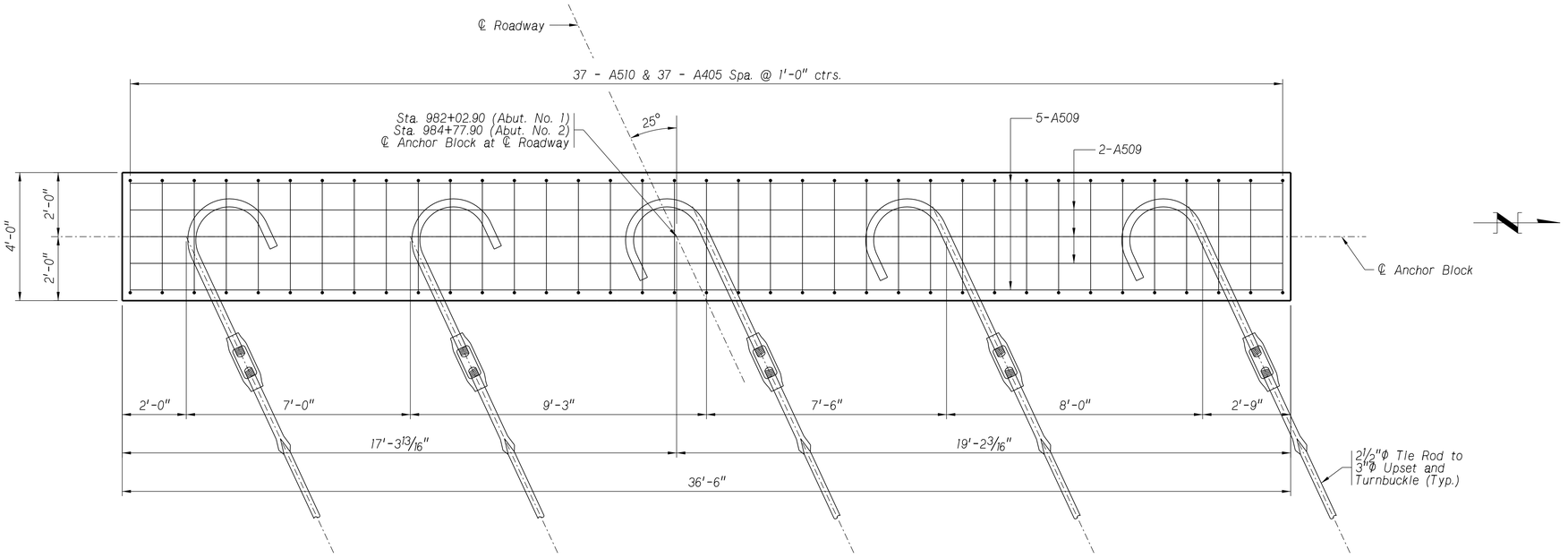
NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

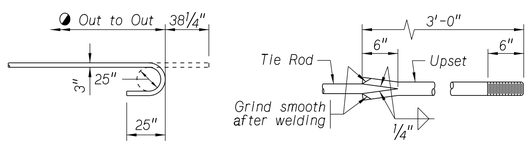
SPECIAL PLAN NO.	
1	7/20

Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:33
File: 7 Abutment Details



PLAN OF ANCHOR BLOCK

(Anchor Block at Abutment No. 1 Shown; Abutment No. 2 Similar)
Scale: 1/2" = 1'-0"



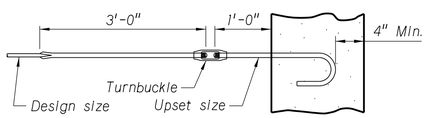
TIE ROD HOOK DETAIL

Not to Scale

TIE ROD UPSET DETAIL

Not to Scale

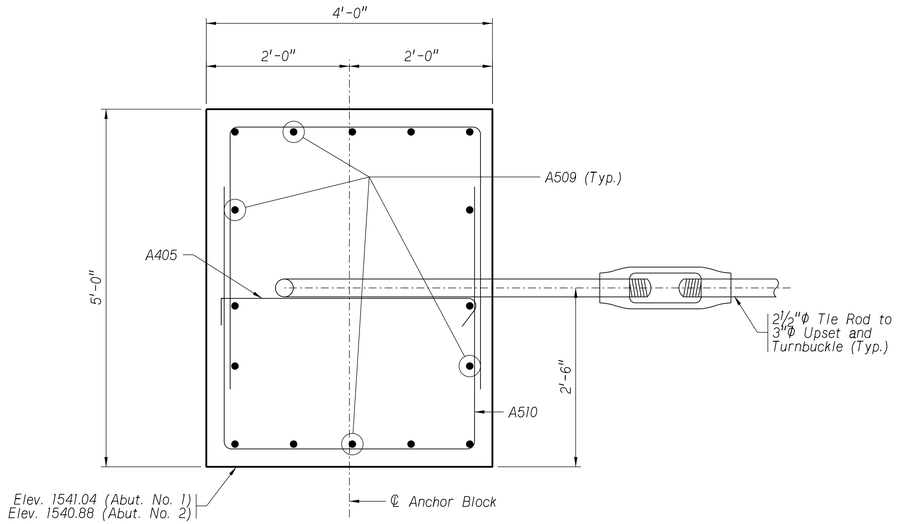
Note: As an alternate, the entire tie rod may be of the size shown for the upset.



DETAIL FOR TURNBUCKLES

Not to Scale

Out to Out Tie Rod Lengths:
33'-6" Abutment to Anchor Block
44'-9" Wing to Wing



SECTION OF ANCHOR BLOCK

Scale: 1" = 1'-0"

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S8

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
ANCHOR BLOCK DETAILS

LOCATION N FK ELKHORN RIVER BRIDGE
COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
SKEW 25°(RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DESIGNED BY WAO
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

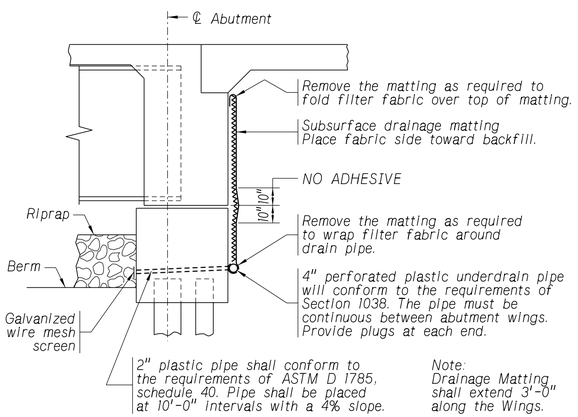
SPECIAL PLAN NO.	8 / 20
1	

Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:33
File: 8 Anchor Block Details

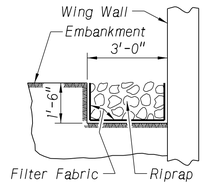
BILL OF BARS

	MARK	NO.	LENGTH	TYPE	"A"	"B"	"C"	"D"	"E"	"F"		PIN	HOOK	WEIGHT LB
ABUTMENT NO. 1	A740	16	46'-6"	STR										1521
	A640	46	3'-0"	101	1'-6"	1'-6"	1'-1"					4½"		207
	A501	14	46'-6"	STR										679
	A502	86	19'-6"	108	3'-0"	3'-9"	3'-0"	3'-0"				2½"		1749
	A503	6	19'-8"	108	3'-0"	3'-10"	3'-0"	3'-0"				2½"		123
	A504	6	20'-4"	108	3'-0"	4'-2"	3'-0"	3'-0"				2½"		127
	A505	8	11'-4"	133	3'-7"	4'-2"	3'-7"	1'-8"				2½"		95
	A506	14	19'-9"	STR										288
	A507	12	15'-5"	STR										193
	A508	68	4'-3"	STR										301
	A509	16	36'-0"	STR										601
	A510	37	21'-8"	108	3'-8"	3'-6"	3'-8"	2'-10"				2½"		836
	A401	54	8'-2"	103	2'-0"	4'-2"	2'-0"					2"		295
	A402	42	7'-0"	103	2'-0"	3'-0"	2'-0"					2"		196
	A403	46	9'-9"	107	2'-0"	2'-6"						2"	4½"	300
	A404	2	10'-3"	107	2'-0"	2'-9"						2"	4½"	14
	A405	37	4'-4"	113		3'-7"						2"	4½"	107
												SUBTOTAL =		7,632 LB
ABUTMENT NO. 2	A740	16	46'-6"	STR										1521
	A640	46	3'-0"	101	1'-6"	1'-6"	1'-1"					4½"		207
	A501	14	46'-6"	STR										679
	A502	86	19'-6"	108	3'-0"	3'-9"	3'-0"	3'-0"				2½"		1749
	A503	6	19'-8"	108	3'-0"	3'-10"	3'-0"	3'-0"				2½"		123
	A504	6	20'-4"	108	3'-0"	4'-2"	3'-0"	3'-0"				2½"		127
	A505	8	11'-4"	133	3'-7"	4'-2"	3'-7"	1'-8"				2½"		95
	A506	14	19'-9"	STR										288
	A507	12	15'-5"	STR										193
	A508	68	4'-3"	STR										301
	A509	16	36'-0"	STR										601
	A510	37	21'-8"	108	3'-8"	3'-6"	3'-8"	2'-10"				2½"		836
	A401	54	8'-2"	103	2'-0"	4'-2"	2'-0"					2"		295
	A402	42	7'-0"	103	2'-0"	3'-0"	2'-0"					2"		196
	A403	46	9'-9"	107	2'-0"	2'-6"						2"	4½"	300
	A404	2	10'-3"	107	2'-0"	2'-9"						2"	4½"	14
	A405	37	4'-4"	113		3'-7"						2"	4½"	107
												SUBTOTAL =		7,632 LB
												TOTAL =		15,264 LB

NOTES:
FOR PIN DIAMETERS, HOOK LENGTHS, & BENDING DIAGRAMS SEE SHEET 20 OF 20.

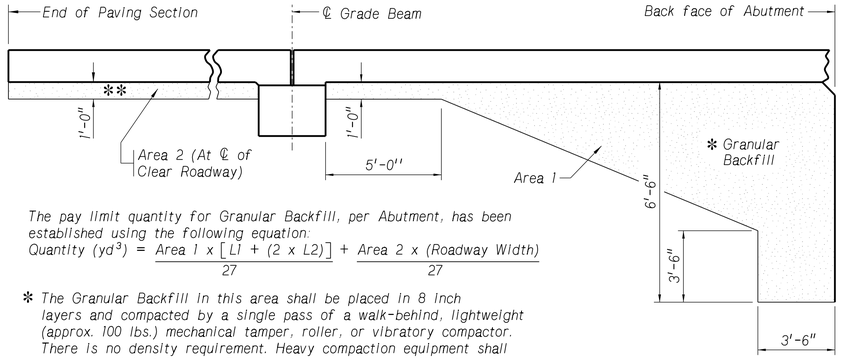


DRAINAGE DETAIL
Not to Scale



NOTE:
The average size of riprap shall be .25 cu. ft., or 35 lbs.

WING RIPRAP DETAIL
Not to Scale



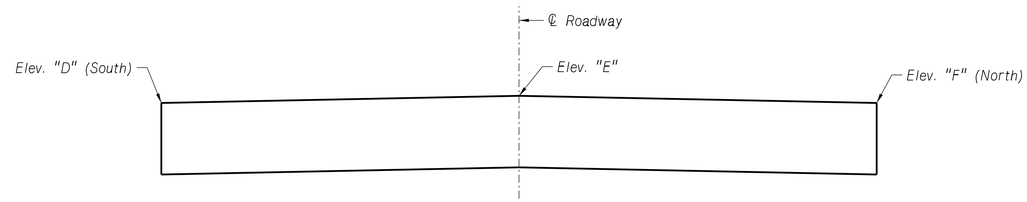
The pay limit quantity for Granular Backfill, per Abutment, has been established using the following equation:

$$\text{Quantity } (yd^3) = \frac{\text{Area 1} \times [L1 + (2 \times L2)]}{27} + \frac{\text{Area 2} \times (\text{Roadway Width})}{27}$$

* The Granular Backfill in this area shall be placed in 8 inch layers and compacted by a single pass of a walk-behind, lightweight (approx. 100 lbs.) mechanical tamper, roller, or vibratory compactor. There is no density requirement. Heavy compaction equipment shall not be used in this area. Flooding the granular backfill with water is not allowed.

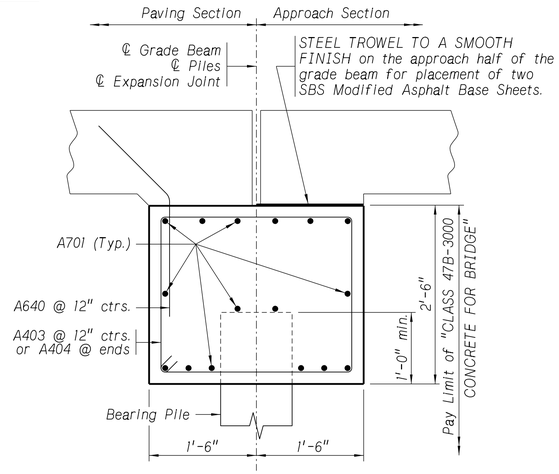
** The Granular Backfill in this area shall be compacted in accordance with the Standard Specifications.

SECTION A-A
Not to Scale

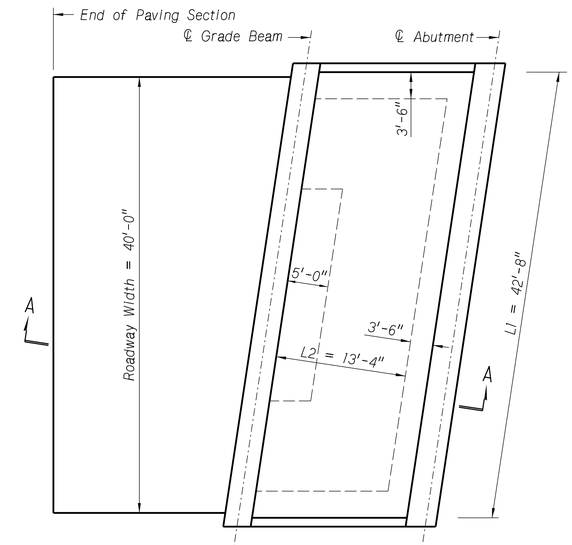


GRADE BEAM ELEVATION
Not to Scale

TOP OF GRADE BEAM ELEVATIONS			
Location	Elev. "D"	Elev. "E"	Elev. "F"
Grade Beam No. 1	1548.45	1548.86	1548.41
Grade Beam No. 2	1548.23	1548.69	1548.29



GRADE BEAM SECTION
Not to Scale



PLAN OF GRANULAR BACKFILL
Not to Scale

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S9

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
GRANULAR BACKFILL & ABUTMENT BILL OF BARS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

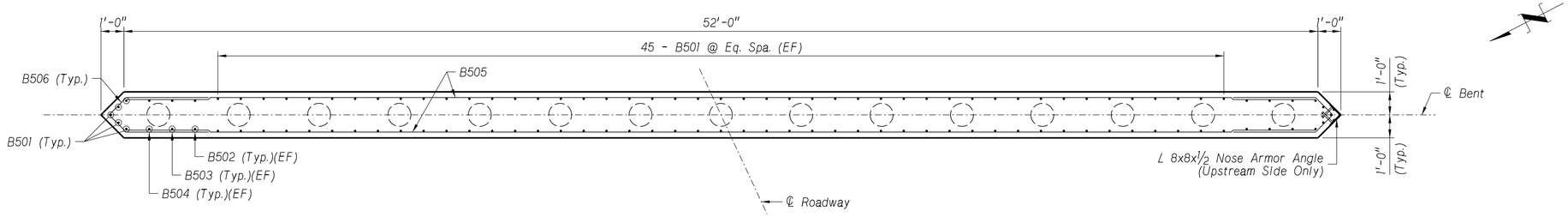
NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

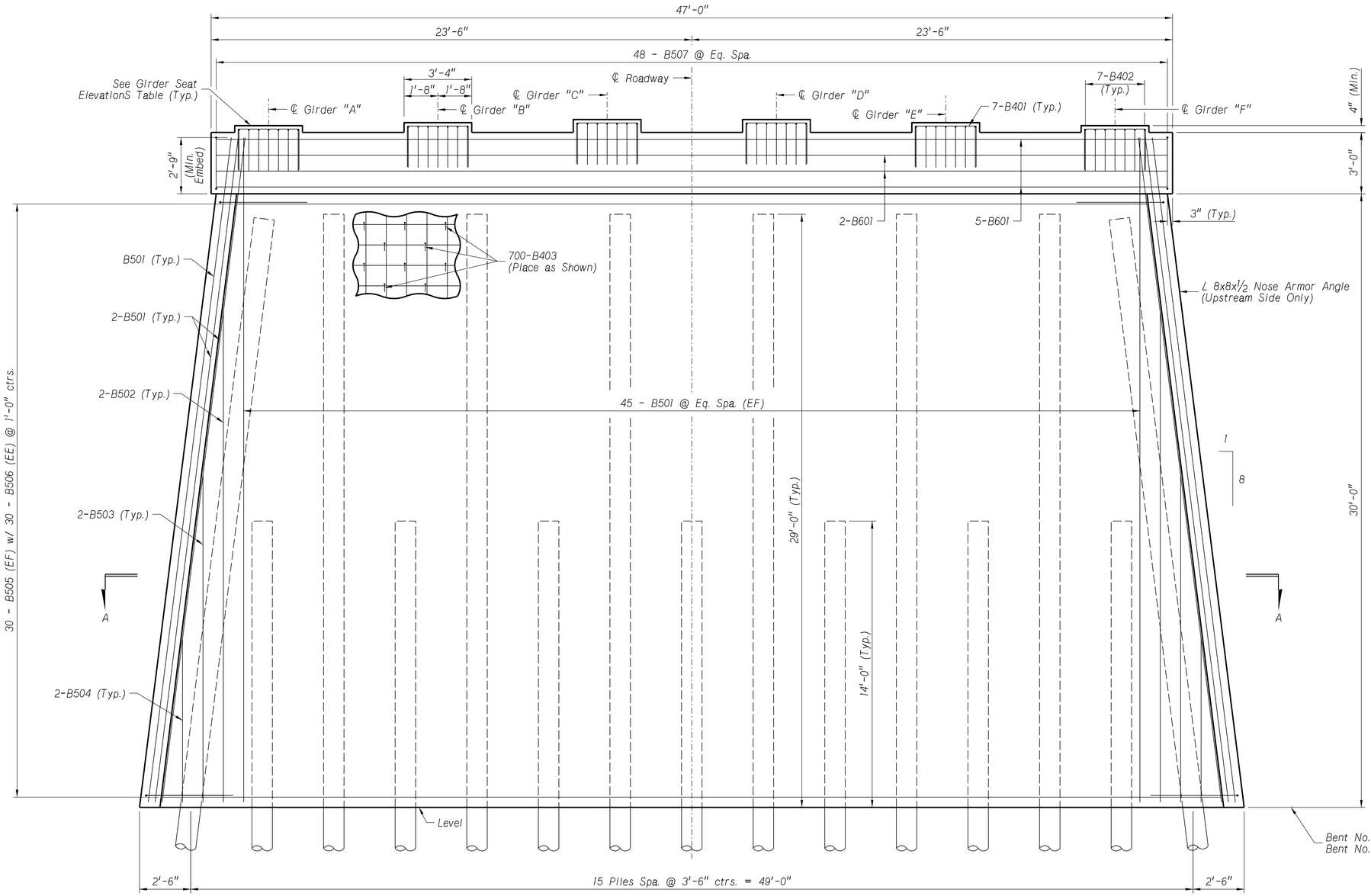
WILSON & COMPANY

SPECIAL PLAN NO.	9 / 20
1	

Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:33
File: 9 Granular Backfill & Bill of Bars



SECTION A-A
Scale: 3/8" = 1'-0"



ELEVATION OF BENT
Scale: 3/8" = 1'-0"

Note:
For Girder Seat Elevations Table, Section of Bent, Plan of Bent Cap, and additional bent details, see sheet 11 of 20.

EF = Each Face
EE = Each End

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S10

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
BENT PLAN & ELEVATION

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
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DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	
1	10 / 20

Computer: A13433
Date: 14-MAY-2019 16:33
User: KMEvans
File: 10 Bent Plan & Elevation

BILL OF BARS

	MARK	NO.	LENGTH	TYPE	"A"	"B"	"C"	"D"	"E"	"F"		PIN	HOOK	WEIGHT LB
BENT NO. 1	B601	14	46'-6"	STR										978
	B501	100	32'-6"	STR										3390
	B502	4	24'-0"	STR										100
	B503	4	16'-0"	STR										67
	B504	4	8'-0"	STR										33
	B505	60	48'-1"	STR										3009
	B506	60	9'-4"	122	3'-7"	1'-1"	1'-1"	9"	9"			2½"		584
	B507	48	15'-4"	108	2'-7"	2'-6"	2'-7"	2'-7"				2½"		768
	B401	42	7'-0"	103	2'-0"	3'-0'	2'-0"					2"		196
	B402	42	6'-9"	103	2'-0"	2'-9"	2'=0"					2"		189
	B403	700	2'-4"	113		1'-7"						2"	4½"	1091
											SUBTOTAL =			10,405 LB
BENT NO. 2	B601	14	46'-6"	STR										978
	B501	100	32'-6"	STR										3390
	B502	4	24'-0"	STR										100
	B503	4	16'-0"	STR										67
	B504	4	8'-0"	STR										33
	B505	60	48'-1"	STR										3009
	B506	60	9'-4"	122	3'-7"	1'-1"	1'-1"	9"	9"			2½"		584
	B507	48	15'-4"	108	2'-7"	2'-6"	2'-7"	2'-7"				2½"		768
	B401	42	7'-0"	103	2'-0"	3'-0'	2'-0"					2"		196
	B402	42	6'-9"	103	2'-0"	2'-9"	2'=0"					2"		189
	B403	700	2'-4"	113		1'-7"						2"	4½"	1091
											SUBTOTAL =			10,405 LB
											TOTAL =			20,810 LB

NOTES:
FOR PIN DIAMETERS, HOOK LENGTHS, & BENDING DIAGRAMS SEE SHEET 20 OF 20.

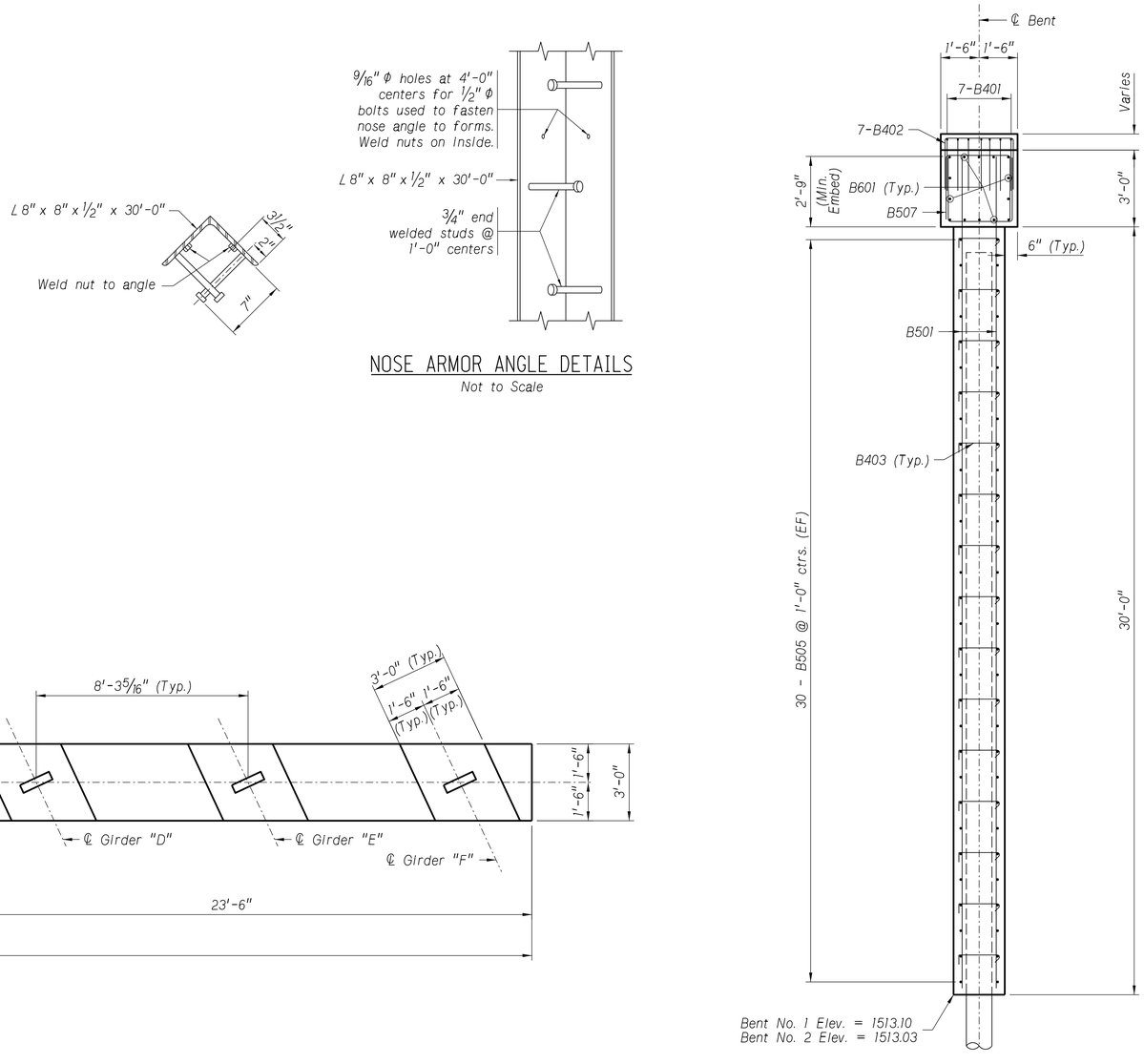
BAR SETS

MARK	MAX. LENGTH	MIN. LENGTH	NO. OF SETS	BARS PER SET
B505	51'-8"	44'-6"	2	30

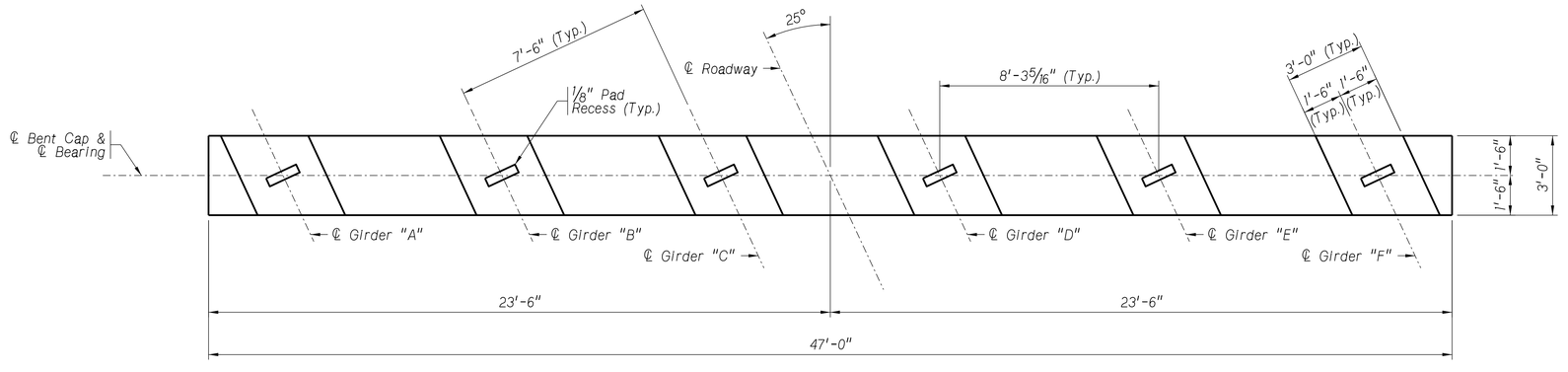
GIRDER SEAT ELEVATIONS

Girder	"A"	"B"	"C"	"D"	"E"	"F"
Bent No. 1	1546.43	1546.58	1546.73	1546.73	1546.58	1546.43
Bent No. 2	1546.36	1546.52	1546.67	1546.68	1546.53	1546.39

NOSE ARMOR ANGLE DETAILS
Not to Scale



SECTION OF BENT
Scale: 3/8" = 1'-0"



PLAN OF BENT CAP
Scale: 3/8" = 1'-0"

Note:
EF = Each Face

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S11

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
BENT DETAILS & BILL OF BARS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

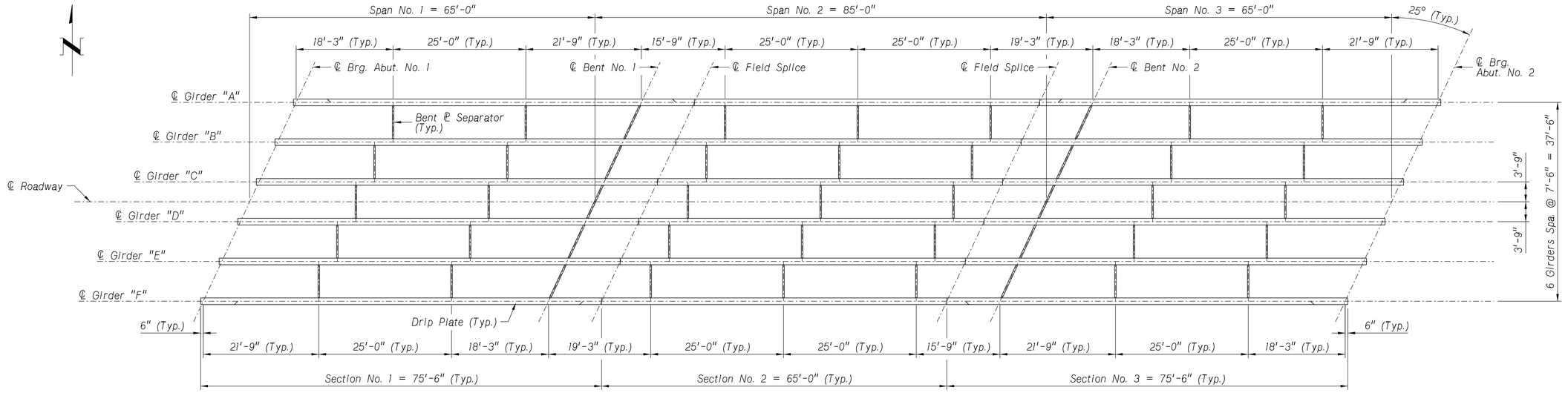
NEBRASKA DEPARTMENT OF TRANSPORTATION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

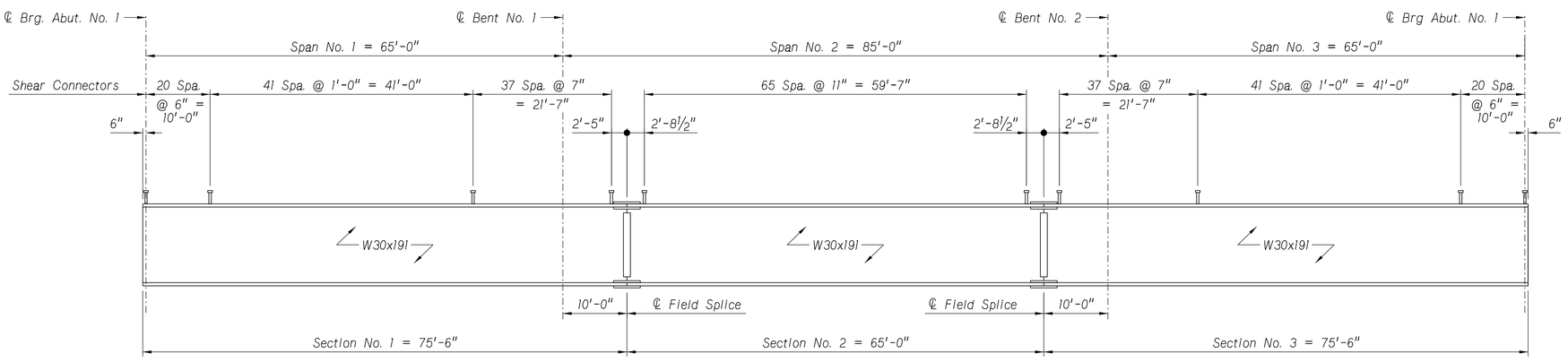
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	
1	11 / 20

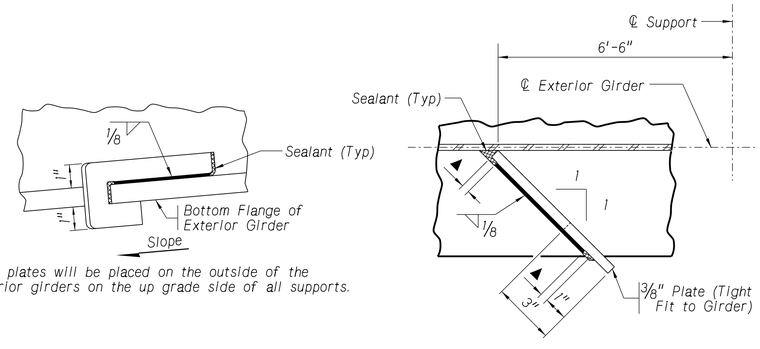
File: 11 Bent Details & Bill of Bars Date: 14-MAY-2019 16:33 User: KMEvans Computer: A13433



GIRDER LAYOUT
Not to Scale



GIRDER ELEVATION
Not to Scale



Drip plates will be placed on the outside of the exterior girders on the up grade side of all supports.

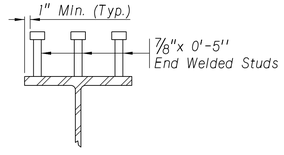
▲ *Stop weld ½" from end of drip plate and from edge of girder. Fill with 100 % silicone sealant as manufactured by GE, DAP, Dow Corning, DuPont, or Titebond as shown.*

TYPICAL DRIP PLATE DETAIL FOR EXTERIOR GIRDERS
Not to Scale

CHARPY IMPACT TEST REQUIREMENTS FOR MAIN TENSION MEMBERS

For the purpose of impact test the following material shall be classified as main tension members:

All girders
All field splice plates



SHEAR CONNECTOR DETAIL
Not to Scale

When Shear Connectors (Studs) are field applied, the following notes shall apply:

The Bridge Office shall be notified a minimum of one week prior to the application of the field welded studs.

Stud welding shall be accomplished in accordance with the AWS D1.5 Standard Specifications, Section 7.

All stud welding shall be done by a certified stud welder. At the time of stud welding, the studs and base metal shall be free from rust, rust pits, scale, oil, moisture, falling rain or snow, and any other foreign material. Areas must be wire brushed or cleaned by grinding before any welding can occur.

Any studs that do not exhibit a 360° collar must be repaired by a SMAW fillet weld (E8018-C3 Electrode) and the repair shall extend ⅜" beyond each end of the missing collar.

Mill Certification for the studs shall be submitted to the Engineer.

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S12

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
GIRDER LAYOUT & ELEVATION

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO **CHECKED BY**
DESIGNED BY WAO **DATE** APRIL 2019
COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

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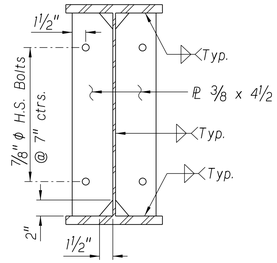
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	12 / 20
1	

Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:33
Files: 12 Girder Layout & Elevation

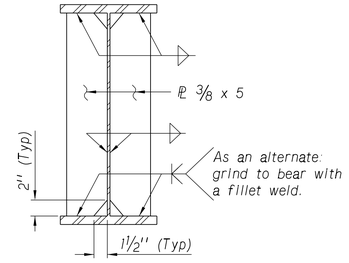
DEFLECTION AND BLOCKING			
ALL GIRDERS			
	Tenth Point	DL Deflection for Shims (in.)	Blocking Ordinate (in.)
Abutment No. 1	1.0	0.000	2 1/16"
	1.1	0.168	
	1.2	0.309	
	1.3	0.401	
	1.4	0.436	
	1.5	0.411	
	1.6	0.336	
	1.7	0.226	
	1.8	0.108	
	1.9	0.018	
Bent No. 1	2.0	0.000	
	2.1	0.132	
Field Splice No. 1	2.12	0.169	2 1/2"
	2.2	0.360	
	2.3	0.590	
	2.4	0.755	
	2.5	0.815	
	2.6	0.755	
	2.7	0.590	
	2.8	0.360	
Field Splice No. 2	2.88	0.169	2"
	2.9	0.132	
Bent No. 2	3.0	0.000	
	3.1	0.018	
	3.2	0.108	
	3.3	0.226	
	3.4	0.336	
	3.5	0.411	
	3.6	0.436	
	3.7	0.401	
	3.8	0.309	
	3.9	0.168	
Abutment No. 2	4.0	0.000	0



STIFFENER PLATES AT SEPARATORS

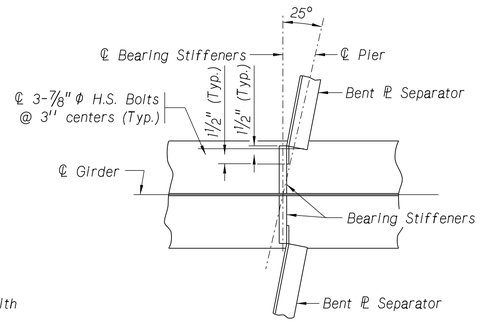
Not to Scale

Note: Stiffener plates not required on exterior face of exterior girders.



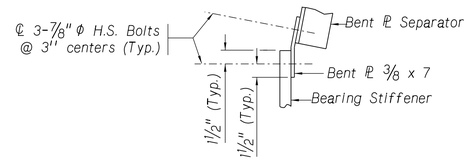
ANCHORAGE STIFFENERS AT ABUTMENTS

Not to Scale



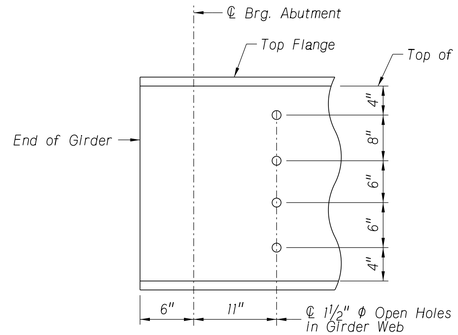
PLAN OF BEARING STIFFENER AT PIERS

Not to Scale



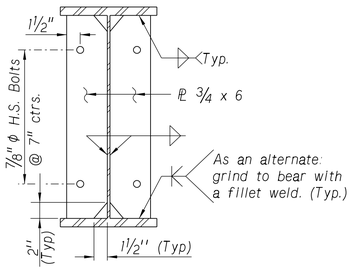
ALTERNATE SEPARATOR CONNECTION

Not to Scale



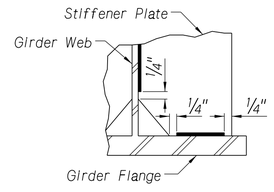
HOLE LOCATION DETAIL

Not to Scale



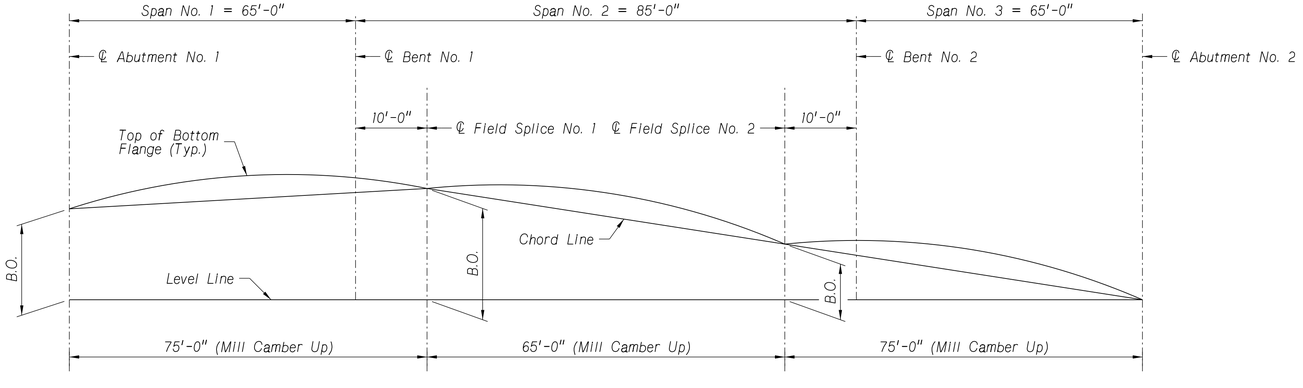
BEARING STIFFENERS AT ABUTMENTS AND BENTS

Not to Scale



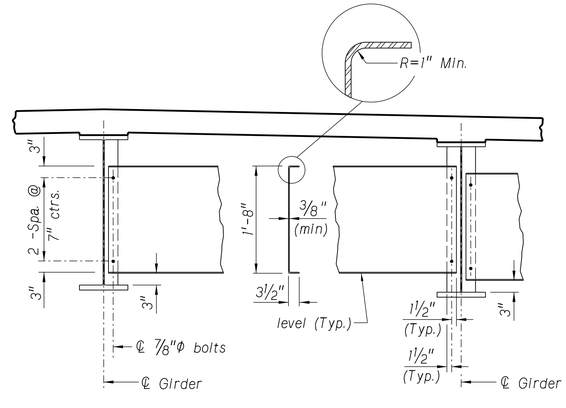
TYPICAL STIFFENER WELD DETAIL

Not to Scale



CAMBER & BLOCKING DIAGRAM

Not to Scale



BENT PLATE SEPARATOR

Not to Scale

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S13

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
GIRDER DETAILS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

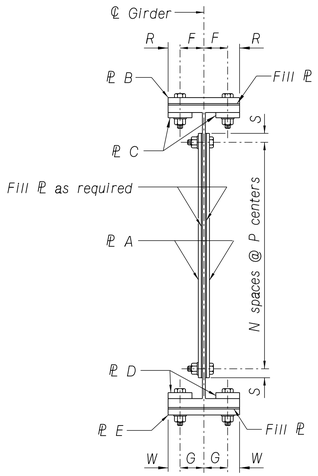
NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

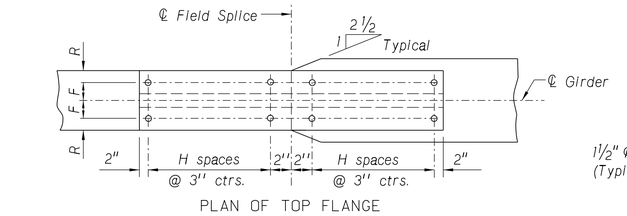
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	13 / 20
1	

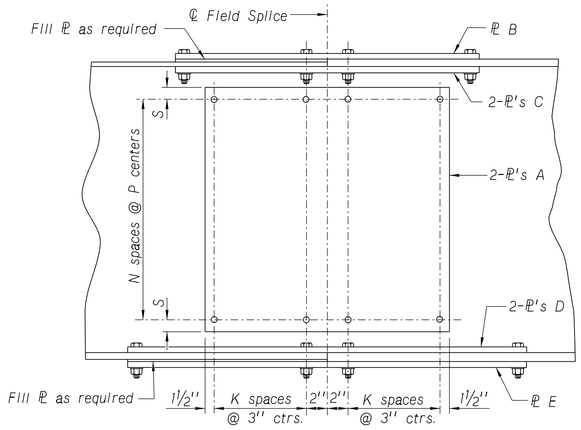
Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:33
File: 13 Girder Details



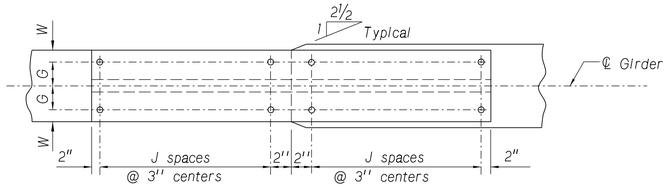
SECTION



PLAN OF TOP FLANGE



ELEVATION

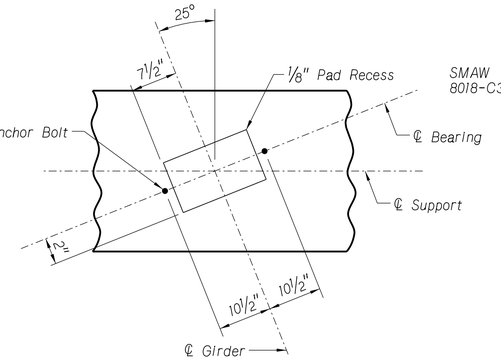


PLAN OF BOTTOM FLANGE

FIELD SPLICE DETAILS

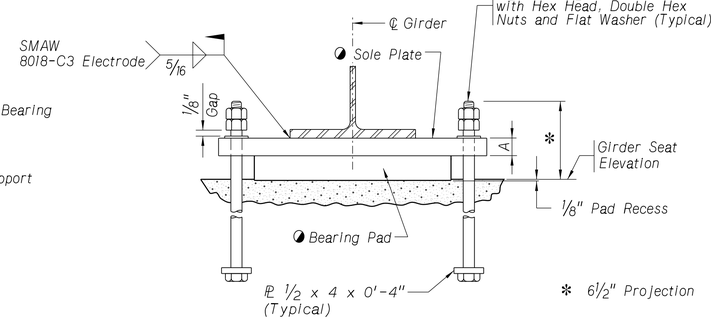
Not to Scale

FIELD SPLICE DATA										
Field Splice No. *1 & 2*										
	Thickness		Width		Length					
Plate A	5/8"		13"		24"					
Plate B	3/4"		15"		4'-2"					
Plate C	1"		5 3/4"		4'-2"					
Plate D	1"		5 3/4"		4'-2"					
Plate E	3/4"		15"		4'-2"					
No. of Bolt Spaces					Bolt Spacing					
H	J	K	N	P	S	F	R	G	W	
7	7	1	7	3"	1½"	4"	3½"	4"	3½"	



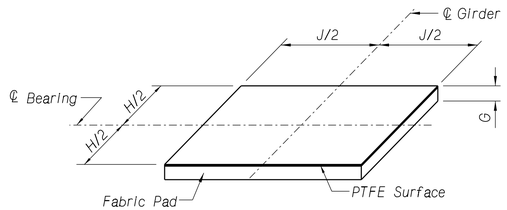
ANCHOR BOLT LAYOUT

Not to Scale



SECTION AT FIXED BEARING

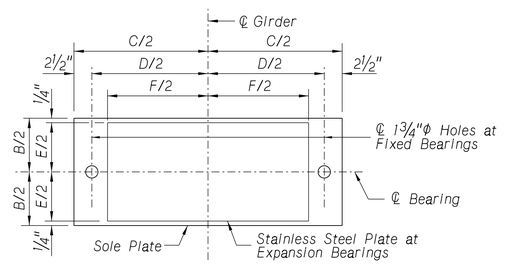
(At Bents)
Not to Scale



Omit TFE low friction surface at fixed bearing devices.

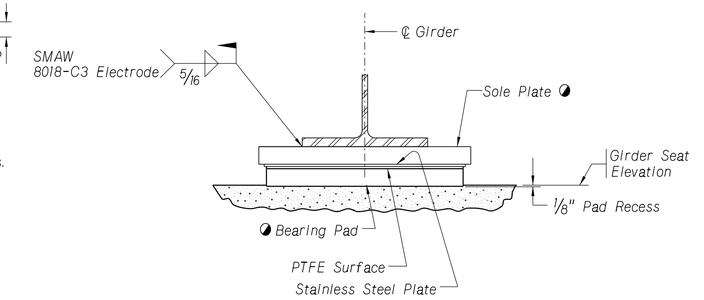
FABRIC PAD

Not to Scale



SOLE PLATE

Not to Scale



SECTION AT EXPANSION BEARING (PTFE TYPE)

(At Abutments)
Not to Scale

DIMENSIONS FOR BEARING DEVICES									
LOCATION	SOLE PLATE				STAINLESS STEEL		FABRIC PAD		
	A	B	C	D	E	F	G	H	J
Abutment No. 1	1½"	12"	17½"	--	11"	16"	1"	4"	15"
Bent No. 1	1½"	12"	26"	21"	--	--	1"	4"	15"
Bent No. 2	1½"	12"	26"	21"	--	--	1"	4"	15"
Abutment No. 2	1½"	12"	17½"	--	11"	16"	1"	4"	15"

◑ *Sole Plates and Fabric Pads need to be inspected prior to installation.*

Contact the Bridge Office a minimum of three weeks before contractor's scheduled installation for Inspection.

Sole plates shall be centered over the anchor bolts.

WILSON &COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S14

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
FIELD SPLICE & BEARING DETAILS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

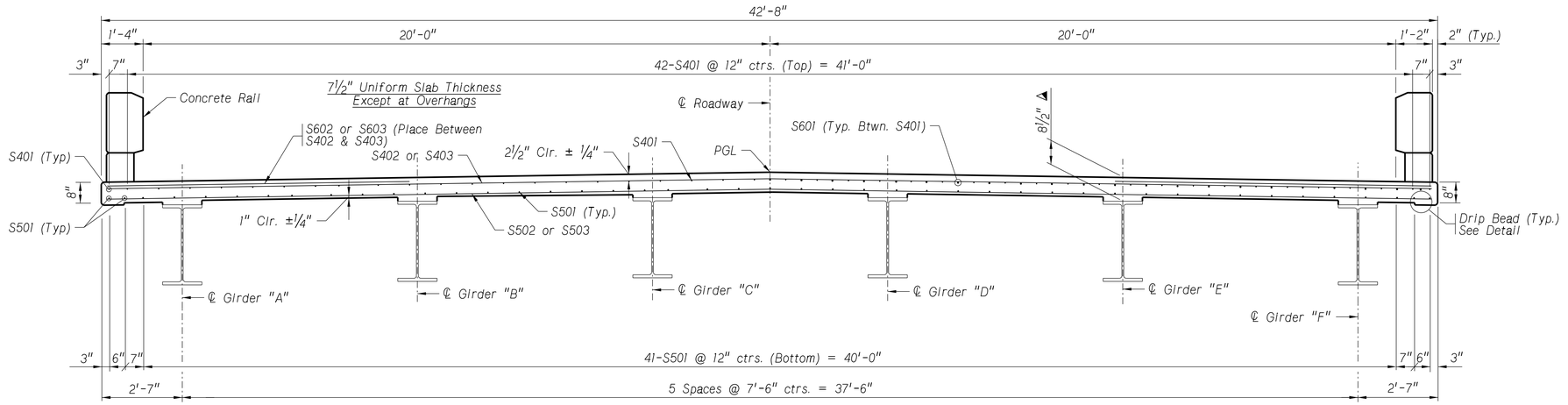
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO. 1

14/20

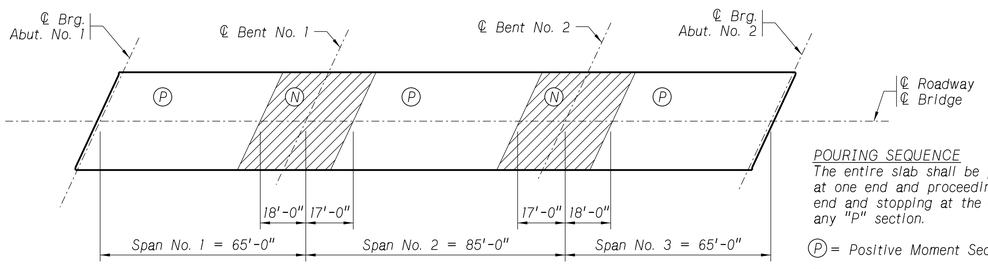
Computer: A13433
Date: 14-MAY-2019 16:34
User: KMEvans
File: 14 Field Splice and Bearing Details

▲ Top of Slab to Top of Flange at Supports (Typ.)



ROADWAY CROSS SECTION

Scale: ½" = 1'-0"



POURING SEQUENCE

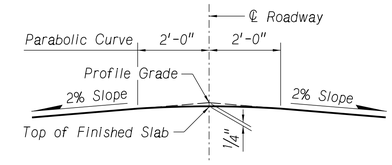
Not to Scale

POURING SEQUENCE

The entire slab shall be poured starting at one end and proceeding to the other end and stopping at the completion of any "P" section.

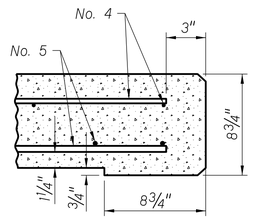
Ⓟ = Positive Moment Section

Ⓝ = Negative Moment Section



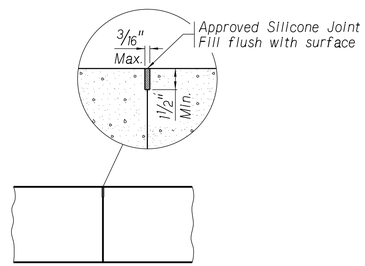
CROWN TEMPLET

Not to Scale



DRIP BEAD DETAIL

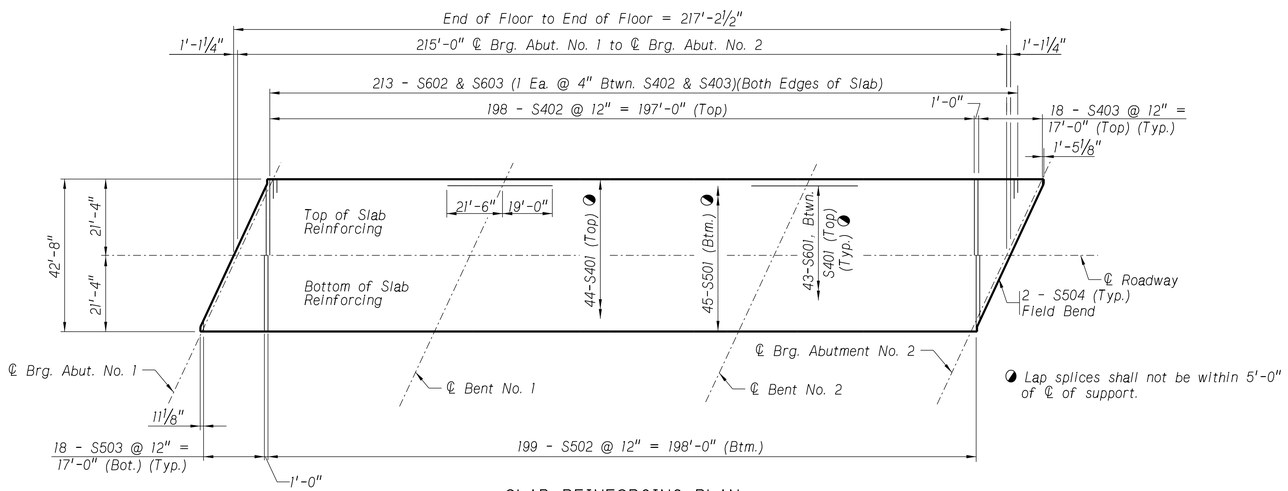
Not to Scale



SLAB CONSTRUCTION JOINT

Not to Scale

The Contractor shall prepare and seal the joint according to the manufacturer's recommendation. Before sealing the joint wall surfaces shall be sandblasted to remove any deleterious material. After sandblasting the entire joint shall be cleaned with compressed air having a minimum pressure of 90 psi. The compressed air shall be free of any contaminates. The joint shall be dry at the time of sealing.



SLAB REINFORCING PLAN

Scale: 1" = 20'-0"

◕ Lap splices shall not be within 5'-0" of ℄ of support.

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S15

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

SLAB REINFORCING LAYOUT

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25°(RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

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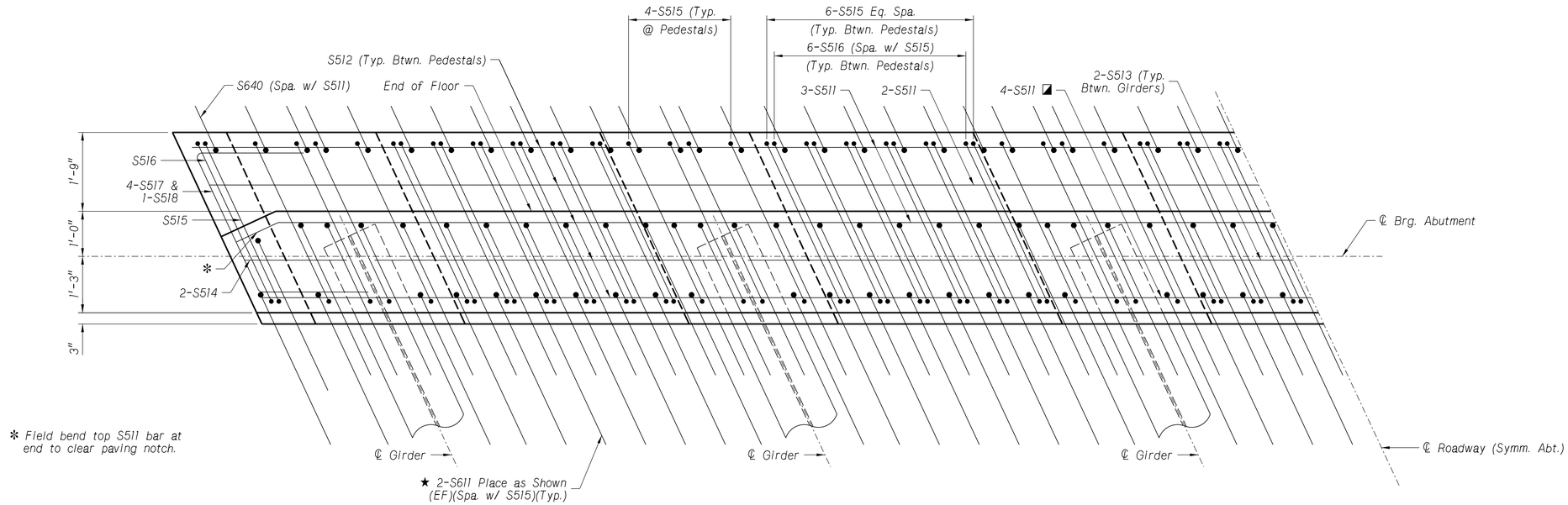
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6281
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	
1	15/20

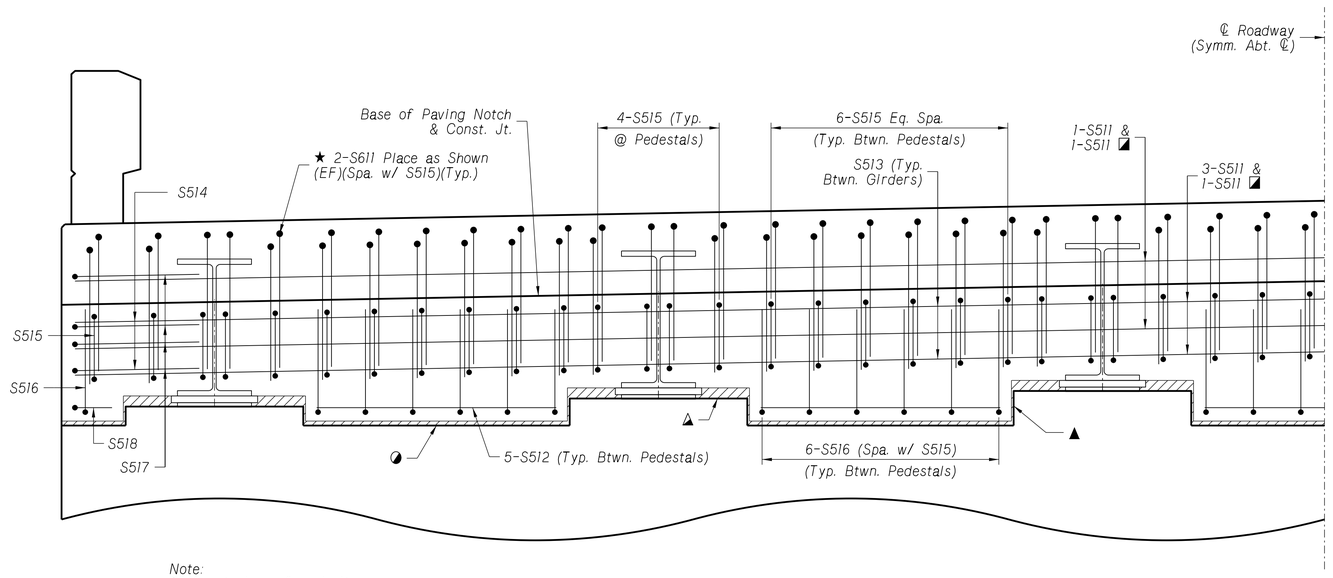
Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:34
File: 15 Slab Reinforcing Layout



✻ Field bend top S511 bar at end to clear paving notch.

PARTIAL PLAN OF SLAB TURNDOWN

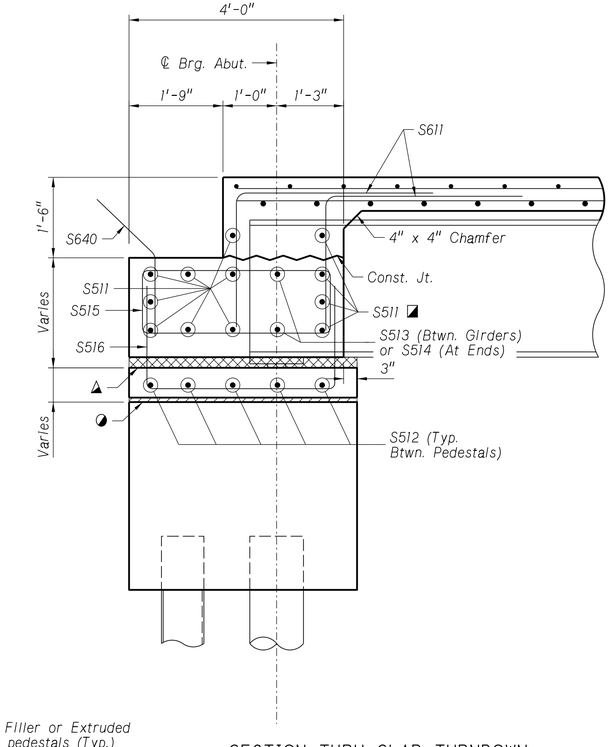
Scale: 3/4" = 1'-0"



Note:
S640 not shown for clarity.

PARTIAL ELEVATION OF SLAB TURNDOWN

Scale: 3/4" = 1'-0"



SECTION THRU SLAB TURNDOWN

Scale: 3/4" = 1'-0"

▲ 1/2" Preformed Joint Filler or Extruded Polystyrene on sides of pedestals (Typ.)
◪ Thru 1/4" open holes in girder webs
★ Omit front face S611 at Girders

◑ 1" Preformed Joint Filler or Extruded Polystyrene between pedestals (Typ.)
◭ 2 3/8" Preformed Joint Filler or Extruded Polystyrene on Pedestals (Typ.)

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S16

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER ★ MARK J. TRAYNOWICZ E-8119 ★ STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
SLAB TURNDOWN DETAILS

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25°(RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93

DESIGNED BY WAO
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

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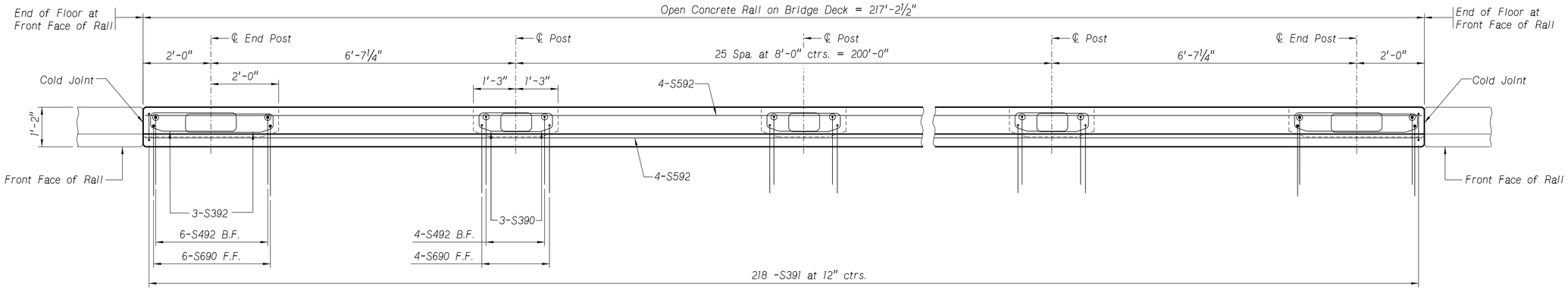
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER ★ STEVEN D. KNEIP E-6287 ★ STATE OF NEBRASKA 5-14-19

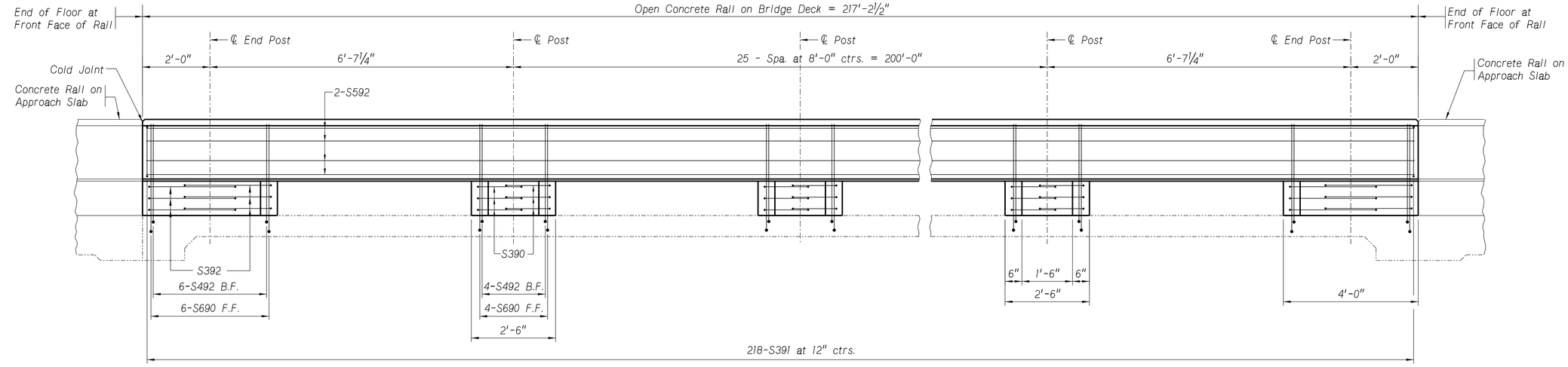
SPECIAL PLAN NO.	16 / 20
1	

File: 16 Slab Turndown Date: 14-MAY-2019 16:34 User: KMEvans Computer: A13433



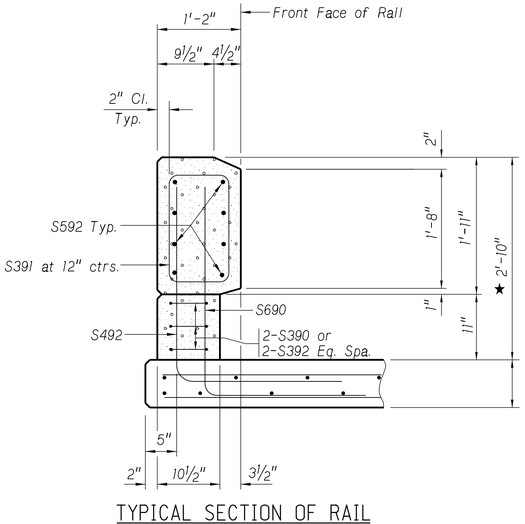
PARTIAL PLAN OF OPEN CONCRETE RAIL ON BRIDGE

Not to Scale



PARTIAL ELEVATION OF OPEN CONCRETE RAIL ON BRIDGE

Not to Scale



TYPICAL SECTION OF RAIL

Scale: 1" = 1'-0"

NOTES:

Posts must be plumb.

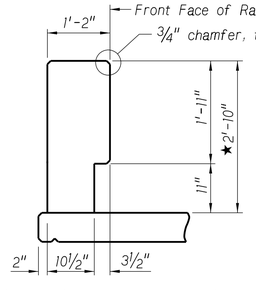
★ *Measured at front face of rail.*

For Bill of Bars see sheet 20 of 20.

Steel forms are required when using the 4½" rail chamfer.

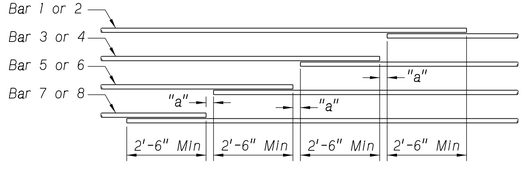
(EF) = Each Face
(FF) = Front Face
(BF) = Back Face

⊙ *Circled bars indicate placement in the top layer of slab reinforcement. Concrete Rail will be built plumb.*



ALTERNATE CHAMFER DETAIL

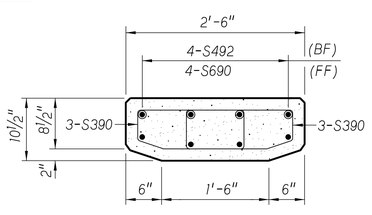
Scale: ¾" = 1'-0"



"a" ≥ Zero

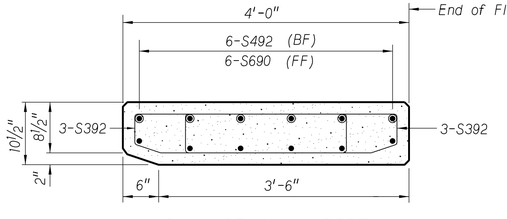
LAP DETAIL

Not to Scale



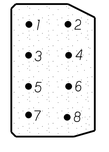
PLAN OF 2'-6" POST

Scale: 1" = 1'-0"



PLAN OF 4'-0" POST

Scale: 1" = 1'-0"



RAIL SECTION

See Lap Detail
Scale: 1" = 1'-0"

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S17

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
CONCRETE RAIL ON BRIDGE

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

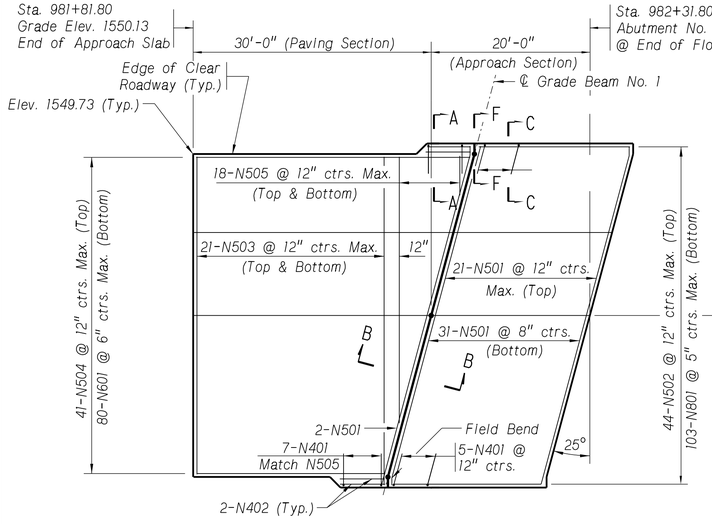
NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

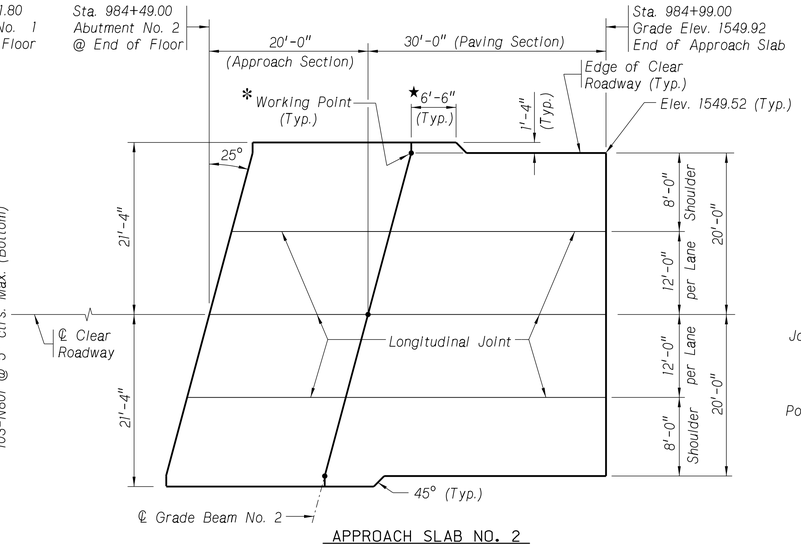
PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	17 / 20
1	

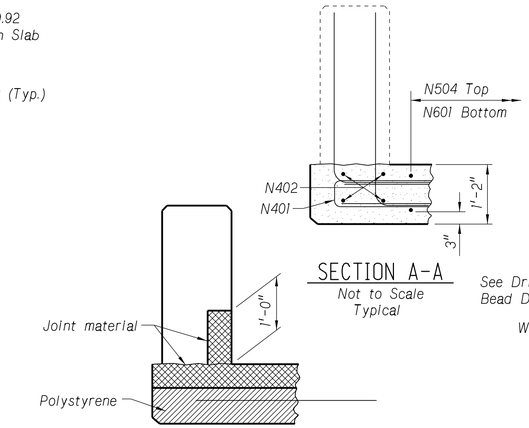
WILSON & COMPANY

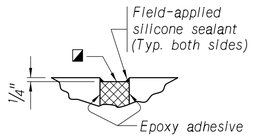


APPROACH SLAB NO. 1
SHOWING REINFORCING



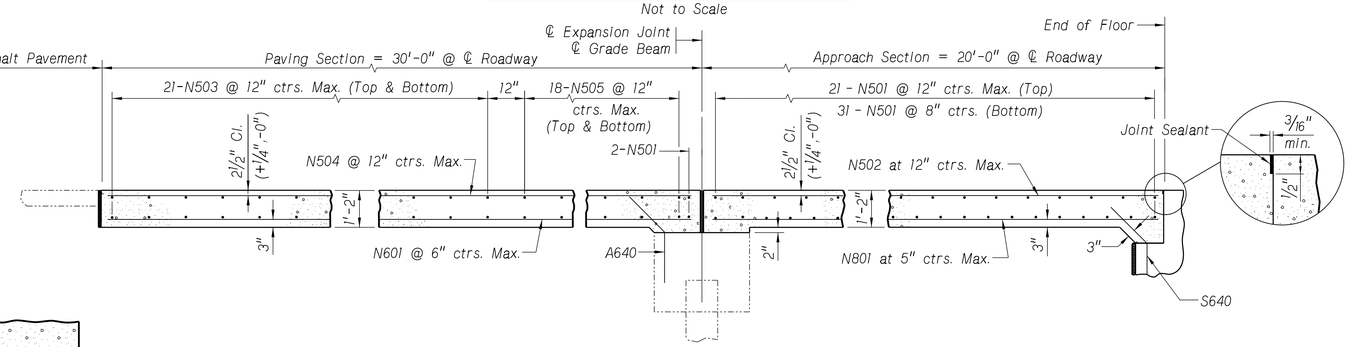
APPROACH SLAB NO. 2
SHOWING DIMENSIONS





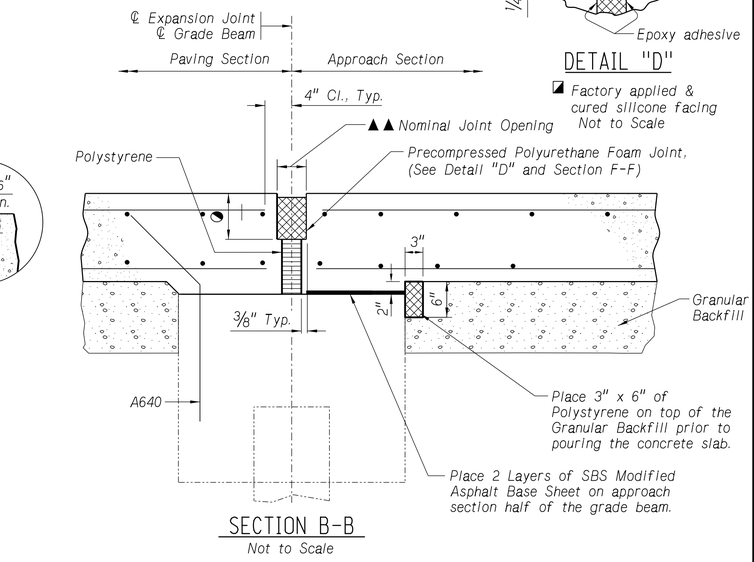
GENERAL PLAN OF APPROACH SLABS

Not to Scale



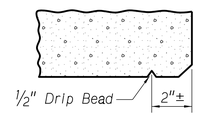
LONGITUDINAL SECTION

Not to Scale



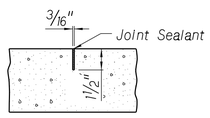
SECTION B-B

Not to Scale



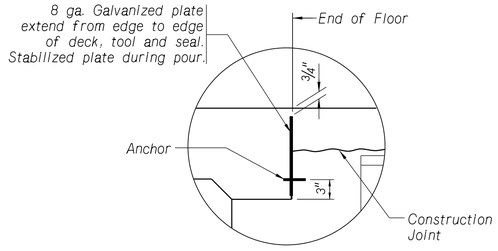
DRIP BEAD DETAIL

Not to Scale



LONGITUDINAL JOINT

Not to Scale



ALTERNATE JOINT DETAIL
AT END OF FLOOR

To be used if approach slab is
poured continuous with bridge deck.
Not to Scale

(Preformed Silicone Joint Substitution for Precompressed Polyurethane Foam)

PPF ORDER SIZE ▲	2.25"		
AMBIENT TEMPERATURE RANGE DURING POUR	PPF ▲▲	SilicaFlex ▲▲	Wabo ▲▲
35°- 40°	2.25"	3.00"	2.75"
40°- 60°	2.00"	2.75"	2.50"
60°- 85°	1.75"	2.50"	2.25"

APPROACH SLAB NOTES:

Concrete Rail Width = 1'-2". See sheet 19 of 20 for placement of rail reinforcement.

See Standard Specifications for tining and finishing of approach slabs.

SBS Modified Asphalt base sheets and all other miscellaneous items shall be considered subsidiary to the Pay Item, CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000.

SBS Modified Asphalt base sheets shall be modified bitumen roofing material, with a minimum thickness of 0.090 inch and a minimum weight of 60 lbs. per 100 sq. feet.

Longitudinal Joints shall be 1½" deep and placed in the paving and approach slabs in accordance with section 603.03 paragraph 12 of the Standard Specifications. Contractor shall exercise care not to damage reinforcing steel placed in the top layer of the slabs.

The expansion gap between approach section and paving section shall be cleaned of all foreign matter before the installation of the expansion device or the filler material.

◕ This depth is to be determined by the preformed joint manufacturer.

▲ PPF Joint material, size to be ordered for a 50° opening + ¼".

▲▲ Nominal Joint Opening at time of pour.

✻ Working points are located at the intersection of the edge of clear roadway and ℄ Grade Beam.

★ Dimensions measured at edge of clear roadway.

WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S18

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER
MARK J. TRAYNOWICZ
E-8119
STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
APPROACH SLAB DETAILS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

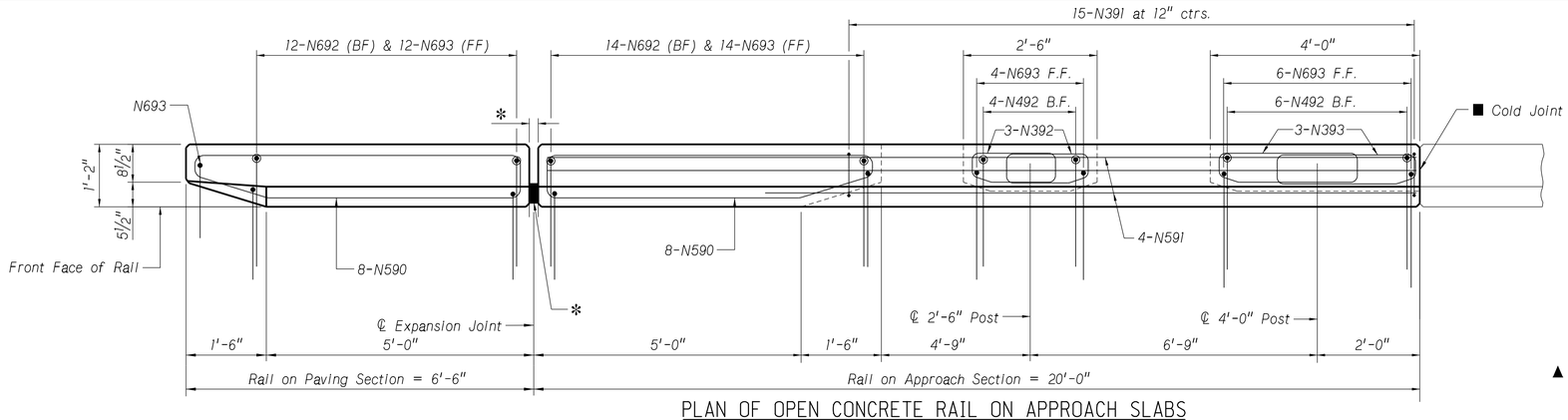
NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER
STEVEN D. KNEIP
E-6287
5-14-19
STATE OF NEBRASKA

SPECIAL PLAN NO.	
1	18/20

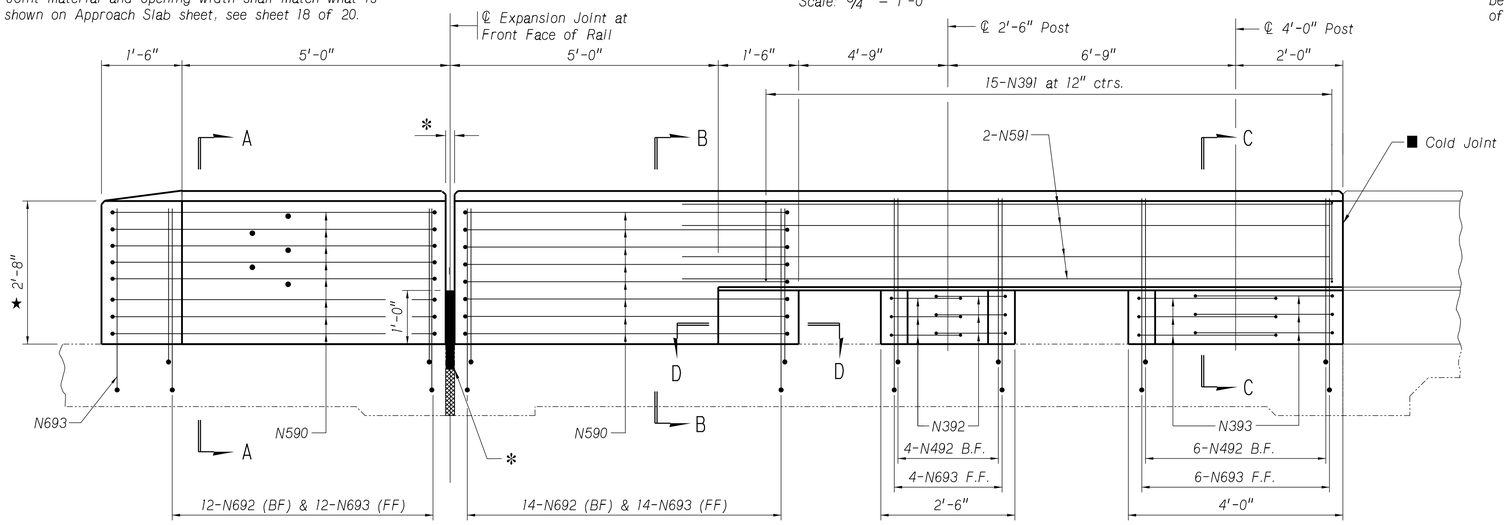
File: 18 Approach Slab Details Date: 14-MAY-2019 16:34 User: KMEvans Computer: A13433



PLAN OF OPEN CONCRETE RAIL ON APPROACH SLABS

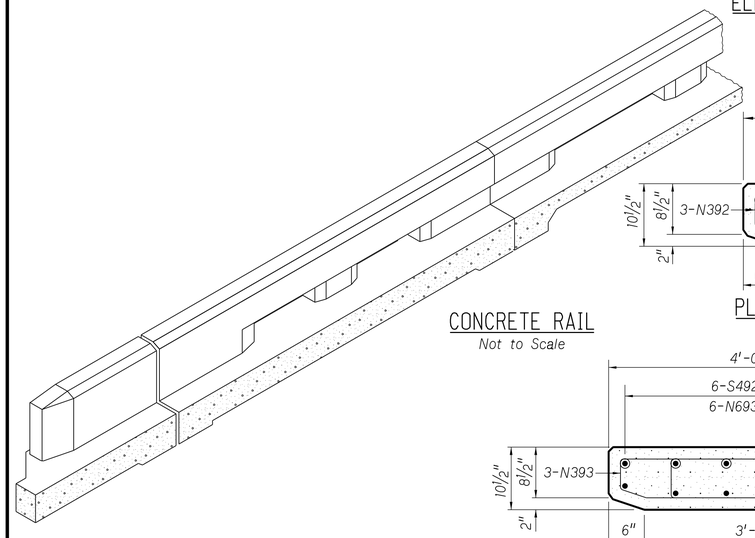
Scale: ¾" = 1'-0"

✻ Joint material and opening width shall match what is shown on Approach Slab sheet, see sheet 18 of 20.



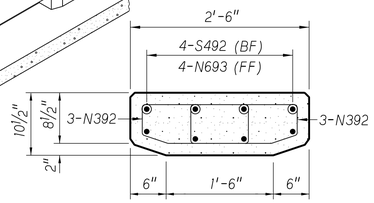
ELEVATION OF OPEN CONCRETE RAIL ON APPROACH SLABS

Scale: ¾" = 1'-0"



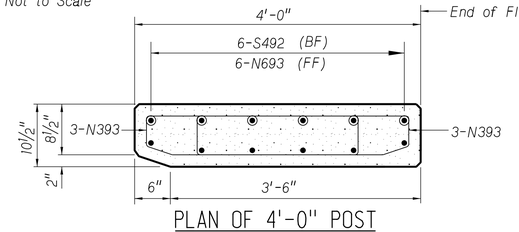
CONCRETE RAIL

Not to Scale



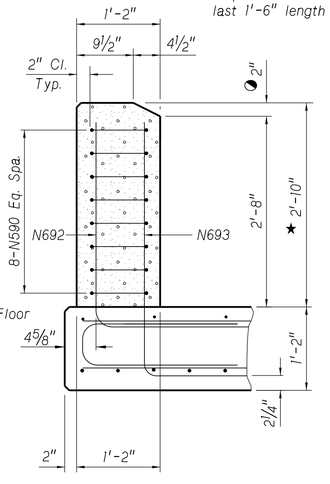
PLAN OF 2'-6" POST

Scale: 1" = 1'-0"



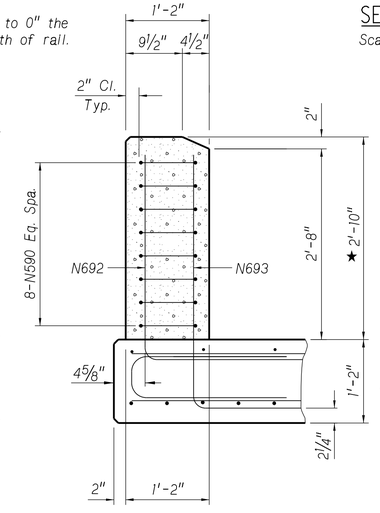
PLAN OF 4'-0" POST

Scale: 1" = 1'-0"



SECTION A-A

Scale: 1" = 1'-0"

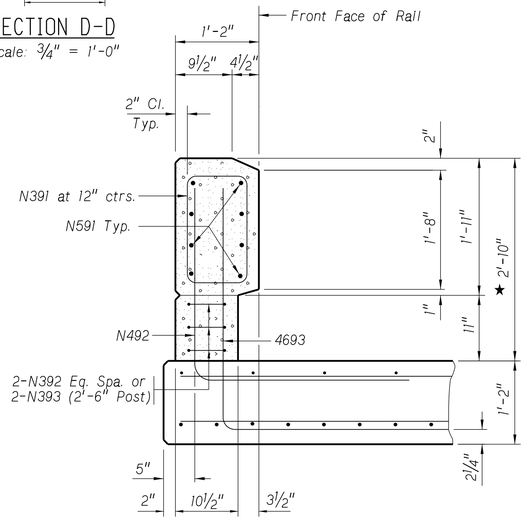


SECTION B-B

Scale: 1" = 1'-0"

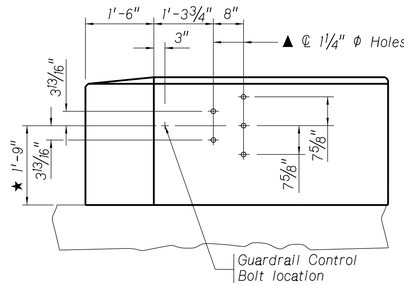
SECTION D-D

Scale: ¾" = 1'-0"



SECTION C-C

Scale: 1" = 1'-0"



THRIE BEAM TERMINAL CONNECTION DETAIL

Not to Scale

▲ As an alternate method, the contractor shall furnish and cast into the concrete an approved welded assembly consisting of threaded inserts, held accurately to the template of the holes shown. Inserts are to be complete with galvanized plate washers and galvanized ⅞" x 2" cap screws. The insert assembly shall be a standard product of a reputable manufacturer of such items and be capable of resisting a shear load of 80,000 lbs.

NOTES

⊙ Circled bars indicate placement in the top layer of slab reinforcement. Concrete Rail will be built plumb.

★ Measured at front face of rail.

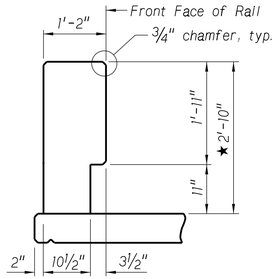
For Bill of Bars see sheet 20 of 20.

Steel forms are required when using the 4½" rail chamfer.

(FF) = Front Face

(BF) = Back Face

■ When pouring concrete rails, a mandatory chamfered cold joint must be formed at the End of Floor.



ALTERNATE CHAMFER DETAIL

Scale: ¾" = 1'-0"

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S19

C.N. 32321

STRUCTURE NUMBER S013 00041

PROFESSIONAL CIVIL ENGINEER ★ MARK J. TRAYNOWICZ E-8119 ★ STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE

RAIL ON APPROACH SLAB

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO
CHECKED BY SDK
DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA Good Life. Great Journey. DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER ★ STEVEN D. KNEIP E-6287 ★ STATE OF NEBRASKA 5-14-19

WILSON & COMPANY

SPECIAL PLAN NO.	
1	19 / 20

Computer: A13433 User: KMEvans Date: 14-MAY-2019 16:34 File: 19 Rail on Approach Slab

BILL OF BARS

	MARK	NO.	LENGTH	TYPE	"A"	"B"	"C"	"D"	"E"	"F"	PIN	HOOK	WEIGHT LB
SLABS	S601	86	40'-6"	STR									5,231
	S602	213	5'-11"	STR									1,893
	S603	213	8'-5"	STR									2,693
	S501	45	225'-9"	STR		(INCLUDES 3 - 3'-0" LAPS)							10,596
	S502	199	42'-2"	STR									8,752
	S503	36	20'-9"	STR									779
	S504	4	46'-6"	STR									194
	S401	44	222'-6"	STR		(INCLUDES 3 - 1'-11" LAPS)							6,540
	S402	198	42'-2"	STR									5,577
	S403	36	21'-9"	STR									523
											SUBTOTAL =		42,778LB
SLAB TURNDOWN	S611	200	6'-2"	104	2'-6"	3'-8"					4½"		1,852
	S640	112	3'-0"	101	1'-6"	1'-6"	1'-1"				4½"		505
	S511	24	46'-7"	STR									1,166
	S512	50	4'-6"	STR									235
	S513	20	7'-8"	STR									160
	S514	8	2'-3"	STR									19
	S515	112	10'-9"	107	1'-2"	3'-10"					2½"	4½"	1,256
	S516	64	7'-8"	103	1'-11"	3'-10"	1'-11"				2½"		512
	S517	16	8'-4"	133	2'-4"	3'-8"	2'-4"	1'-6"			2½"		139
	S518	4	5'-2"	133	8"	3'-10"	8"	1'-6"			2½"		22
											SUBTOTAL =		5,866 LB
APPROACH SLABS	N801	206	19'-6"	STR									10,725
	N601	160	29'-5"	STR									7,069
	N501	108	46'-6"	STR									5,238
	N502	88	19'-6"	STR									1,790
	N503	84	39'-6"	STR									3,461
	N504	82	29'-5"	STR									2,516
	N505	72	19'-9"	STR									1,483
	N401	48	6'-8"	103	3'-0"	8"	3'-0"				2"		214
	N402	16	6'-0"	STR									64
											SUBTOTAL =		32,560LB
CONCRETE RAIL ON BRIDGE	S690	232	6'-4"	104	3'-2"	3'-2"					4½"		2,207
	S592	16	226'-0"	STR		(INCLUDES 3 - 3'-1" LAPS)							3,771
	S492	232	5'-10"	104	2'-11"	2'-11"					3"		904
	S390	316	4'-8"	130	1'-1½"	6½"	1'-6"	5"	5"	4½"	1½"	4"	554
	S391	436	5'-2"	107	1'-5"	10"					1½"	4"	847
	S392	24	7'-8"	130	2'-7½"	6½"	3'-0"	5"	5"	4½"	1½"	4"	69
											SUBTOTAL =		8,352LB
CONCRETE RAIL ON APPR. SLABS	N692	104	5'-10"	104	2'-11"	2'-11"					4½"		911
	N693	148	6'-10"	104	3'-5"	3'-5"					4½"		1,519
	N590	64	14'-5"	130	4'-8"	10"	6'-1"	5"	1'-6"	1'-5"	2½"	5½"	962
	N591	32	15'-6"	STR.									517
	N492	40	5'-10"	104	2'-11"	2'-11"					3"		156
	N391	60	5'-2"	107	1'-5"	10"					1½"	4"	117
	N392	24	4'-8"	130	1'-1½"	6½"	1'-6"	5"	5"	4½"	1½"	4"	42
	N393	24	7'-8"	130	2'-7½"	6½"	3'-0"	5"	5"	4½"	1½"	4"	69
											SUBTOTAL =		4,293 LB
											TOTAL =		93,849 LB

BAR MARK

A413 — A 4 13

- 13 — BAR NUMBER:
  - 01 THRU 49, GENERAL REINFORCING
  - 70 THRU 79, LIGHT POLE REINFORCING
  - 90 THRU 99, CURB OR RAIL REINFORCING
- 4 — BAR SIZE
- A — TYPE OF BRIDGE ELEMENT- A=ABUTMENT (P=PIER, B=BENT, S=SLAB, N=APPROACH SLAB)

THE NUMBER OF LAP SPLICES ARE CALCULATED BASED ON 60'-0" LENGTHS OF REINFORCING STEEL BARS.
SPLICES ON BARS SHORTER THAN 60'-0" WILL REQUIRE ADDITIONAL LAP SPLICES AT NO ADDITIONAL EXPENSE TO NDOT.

BAR SETS

MARK	MAX. LENGTH	MIN. LENGTH	NO. OF SETS	BARS PER SET
N601	38'-8"	20'-2"	2	80
N504	38'-8"	20'-2"	4	41
N505	38'-0"	1'-6"	4	18
S503	39'-0"	2'-6"	2	18
S403	40'-0"	3'-6"	2	18

BAR SETS

MARK	MAX. LENGTH	MIN. LENGTH	NO. OF SETS	BARS PER SET

STANDARD HOOK LENGTH

PRIMARY STRESS BARS			STIRRUPS & TIES		
BAR SIZE	HOOK H 90°	HOOK H 180°	BAR SIZE	HOOK H 90°	HOOK H 135°
4	8"	6"	3	4"	4"
5	10"	7"	4	4½"	4½"
6	12"	8"	5	6"	5½"
7	15"	10"	6	12"	8"
8	17"	11"	7	14"	9"
9	19"	15"	8	16"	10½"
10	23"	17"			
11	24"	19"			

d = BAR SIZE
Dp = PIN DIAMETER

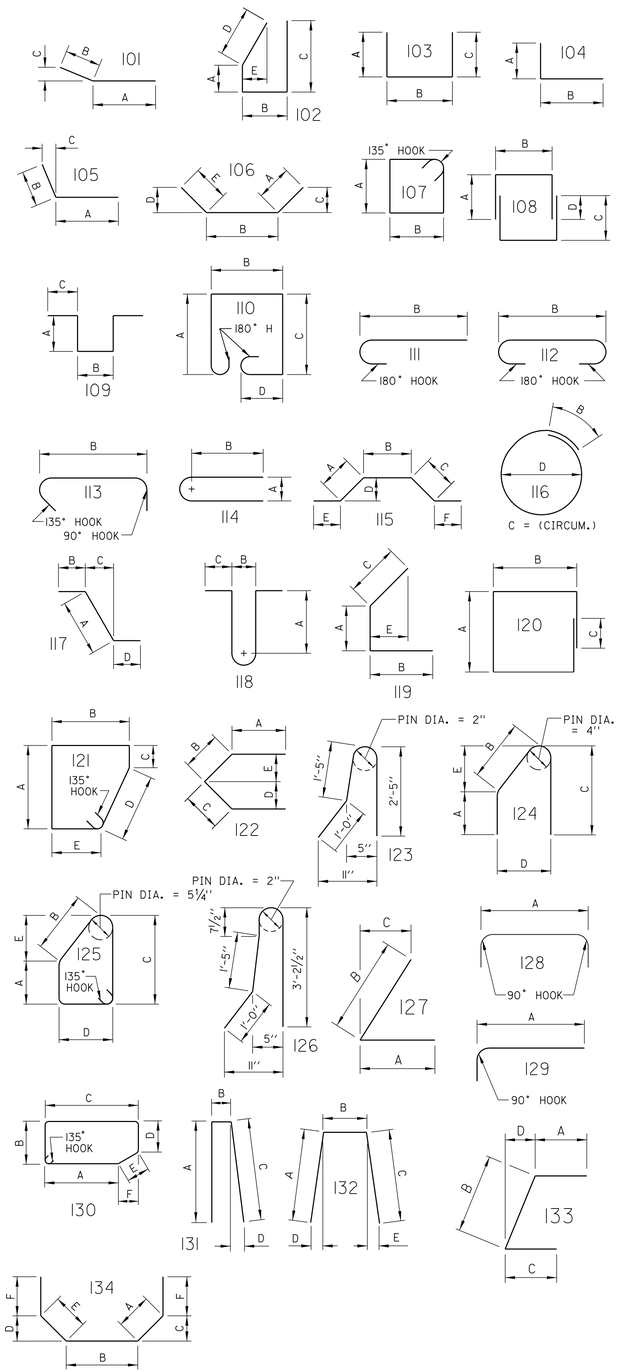
PIN DIAMETER

PRIMARY STRESS		STIRRUPS & TIES	
BAR SIZE	Dp	BAR SIZE	Dp
4	3"	3	1½"
5	3¾"	4	2"
6	4½"	5	2½"
7	5¼"	6	4½"
8	6"	7	5¼"
9	9½"	8	6"
10	11"		
11	12"		

DETAILING HOOK DIMENSION H — 90°
DETAILING HOOK DIMENSION H — 135°
DETAILING HOOK DIMENSION H — 180°

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT & NOT TO SCALE
ALL REINFORCING STEEL SHALL BE EPOXY COATED



WILSON & COMPANY

PROJECT NUMBER	SHEET NO.
ER-13-4(113)	S20

C.N. 32321

STRUCTURE NUMBER
S013 00041

PROFESSIONAL CIVIL ENGINEER — MARK J. TRAYNOWICZ E-8119 — STATE OF NEBRASKA

BRIDGE ENGINEER

215'-0" 3-SPAN STEEL ROLLED BEAM BRIDGE
BILL OF BARS

LOCATION N FK ELKHORN RIVER BRIDGE
SKEW 25° (RHB)
ROADWAY 40'-0"
DESIGN LIVE LOAD HL-93
DETAILED BY WAO — CHECKED BY SDK — DATE APRIL 2019

COUNTY Pierce
HWY. NO. N-13
REF. POST. 0.41
STA. 983+40.40
DESIGNED BY WAO

NEBRASKA DEPARTMENT OF TRANSPORTATION - BRIDGE DIVISION

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

PROFESSIONAL CIVIL ENGINEER — STEVEN D. KNEIP E-6287 — 5-14-19 — STATE OF NEBRASKA

SPECIAL PLAN NO.	
1	20/20

Computer: A13433
User: KMEvans
Date: 14-MAY-2019 16:34
File: 20 Bill of Bars

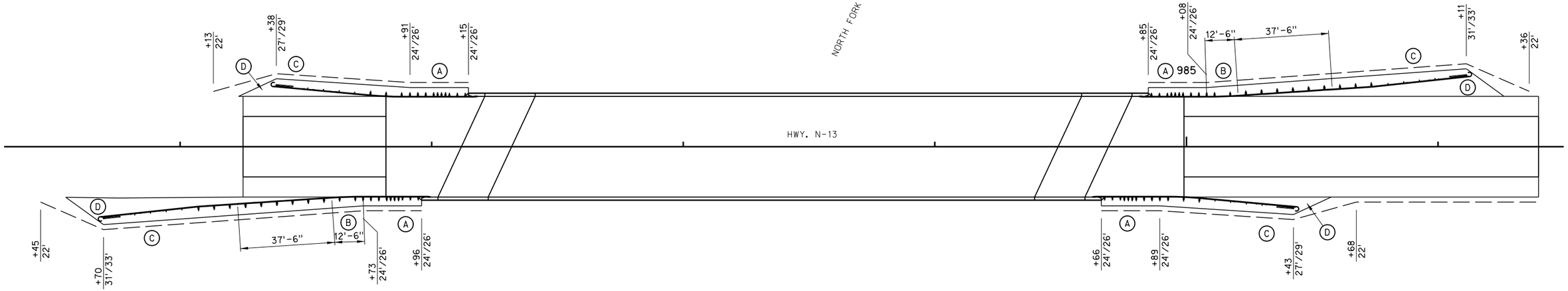
WILSON & COMPANY

PROJECT NO.	SHEET NO.
ER-13-4(113)	U1

C.N. 32321

SEC. 28-T25N-R1W

NORTH FORK ELKHORN RIVER



SEC. 33-T25N-R1W

GUARDRAIL INSTALLATION AT STA. 983+40.40

BRIDGE #(S013 00041)

LEGEND

- (A) BRIDGE APPROACH SECTION (25'-0")
- (B) R=187.77' (TABLE "D")
- (C) END TREATMENT, TYPE II (53'-1½")
- (D) SURFACING UNDER GUARDRAIL
- —— —— GRADING LINE

PROFESSIONAL CIVIL ENGINEER
MATT W. BRYANT
E-10936
5-31-19
STATE OF NEBRASKA

SHEET 1 OF 1

SPECIAL PLAN 1C

ROADWAY DESIGN DIVISION

Computer: A13433
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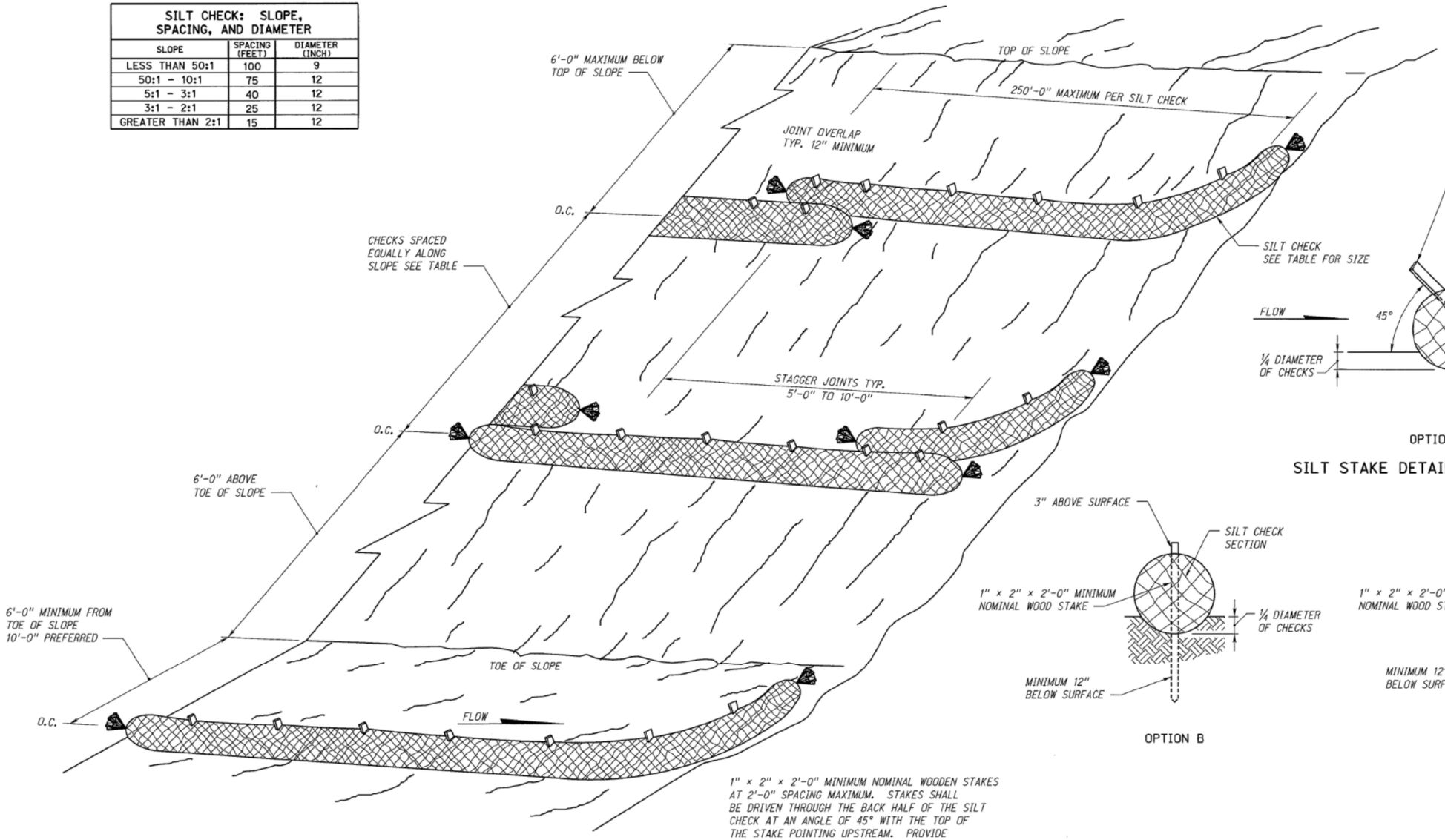
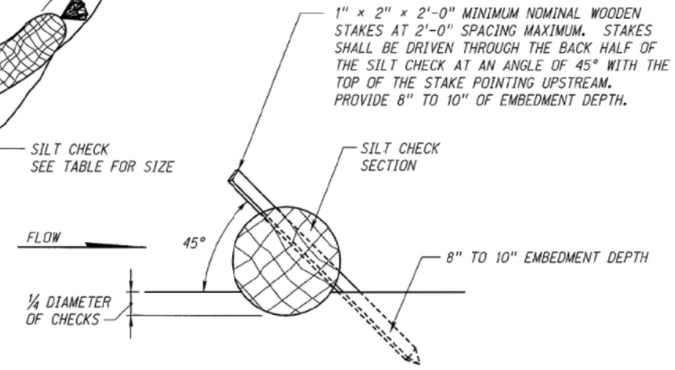
Date: 14-MAY-2019 16:18
File: 323210sp01
Scale: 1:40

PROJECT NO.	SHEET NO.
13-4(113)	U2
C.N. 32321	

SILT CHECK: SLOPE, SPACING, AND DIAMETER		
SLOPE	SPACING (FEET)	DIAMETER (INCH)
LESS THAN 50:1	100	9
50:1 - 10:1	75	12
5:1 - 3:1	40	12
3:1 - 2:1	25	12
GREATER THAN 2:1	15	12



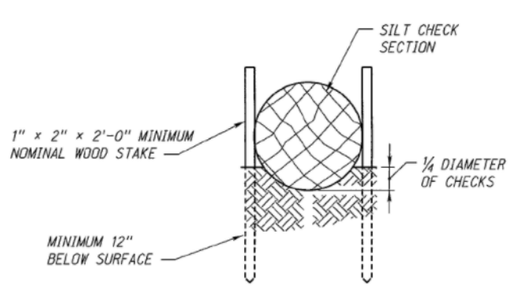
SLOPE APPLICATION
PERSPECTIVE VIEW



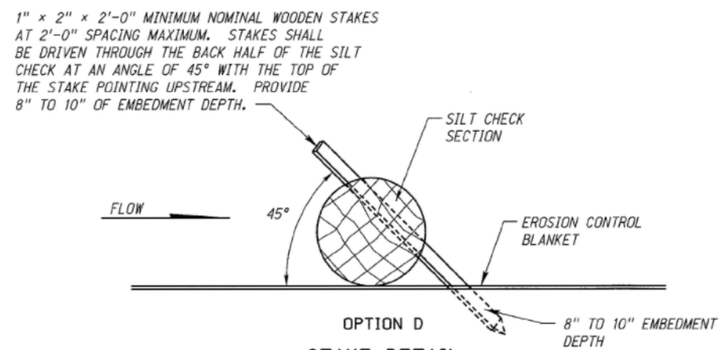
OPTION A

SILT STAKE DETAIL (WITH TRENCH)

OPTION B



OPTION C



OPTION D

STAKE DETAIL
(NO TRENCH)

NOTE:

TRENCHING IS OPTIONAL FOR CHECKS ON BACKSLOPES & FORESLOPES

PROFESSIONAL LANDSCAPE ARCHITECT RONALD C. PIPE 13 L.A. 275 REGISTERED STATE OF NEBRASKA

SILT CHECKS ALL TYPES

SHEET 1 OF 4

SPECIAL PLAN 2C

ROADWAY DESIGN DIVISION

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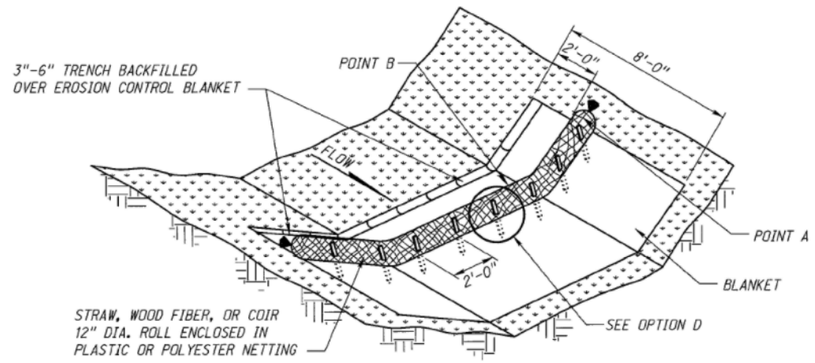
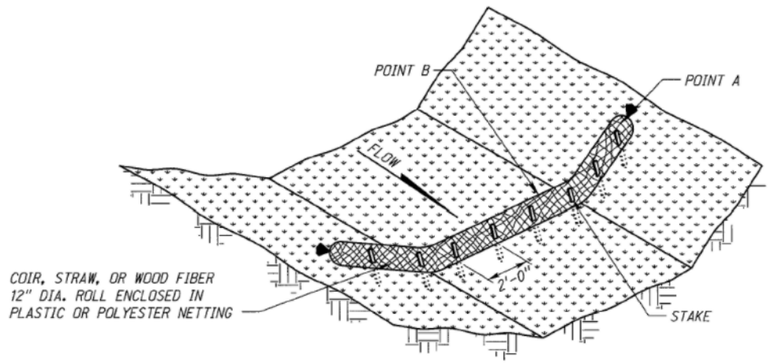
SHEET 1 OF 4

PROJECT NO.	SHEET NO.
13-4(113)	U3

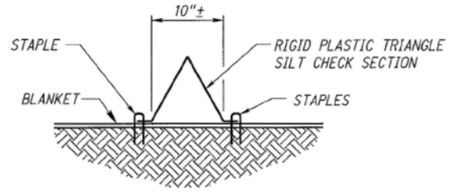
C.N. 32321



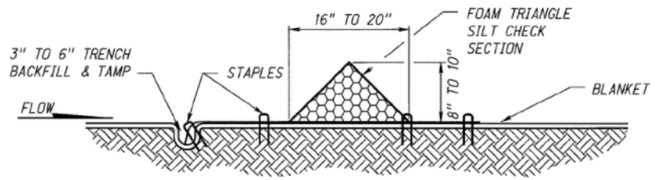
TYPE 2 & 3: HIGH & LOW
WITH EROSION CONTROL



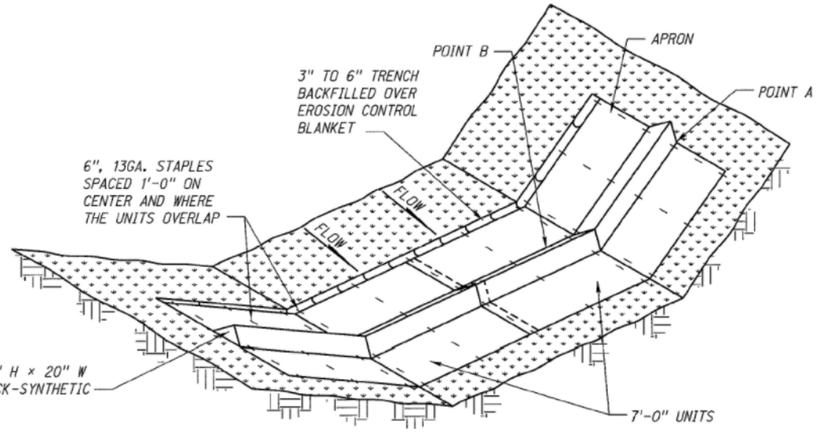
TYPE 1, 2 & 3: HIGH & LOW
USE ON ROUGH GRADED & BARE SOIL AREAS



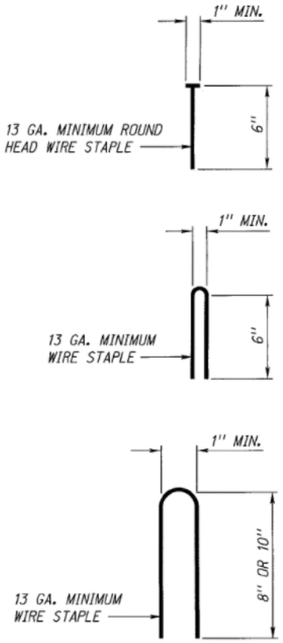
TYPE 4 SECTION



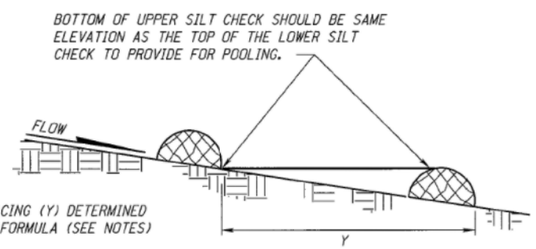
TYPE 4 SECTION



SILT CHECK: TYPE 4



WIRE STAPLE DETAIL



SILT CHECK SPACING-DITCH

NOTES:

APPROXIMATE SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM THE FOLLOWING SPACING FORMULA:

$$\text{APPROXIMATE SPACING OF DITCH CHECKS (FT.)} = Y = \frac{\text{SILT CHECK HEIGHT (FT.)}}{\%\ \text{CHANNEL SLOPE}} \times 100$$

POINT A MUST BE A MINIMUM OF 6" HIGHER THAN POINT B TO ENSURE THAT WATER FLOWS OVER THE CHECK AND NOT AROUND THE ENDS.

PERMANENT ROCK CHECKS PLACED WITHIN THE CLEAR ZONE WILL NEED TO BE 18" OR LESS IN HEIGHT. A 10:1 APPROACH AND DEPARTURE SLOPE SHALL BE PROVIDED.

THE TRENCH ON THE UPSTREAM SIDE OF THE SILT CHECK IS NOT REQUIRED IF THE EROSION CONTROL BLANKET CONTINUES IN THE ENTIRE LENGTH OF THE DITCH.

THE MANUFACTURERS RECOMMENDED INSTALLATION DETAILS SHALL GOVERN OVER THE PLANS.

SEE STAKING DETAIL SHEET 1 OF 4

PROFESSIONAL LANDSCAPE ARCHITECT
REGISTERED
STATE OF NEBRASKA

SILT CHECKS ALL TYPES

SHEET 2 OF 4

SPECIAL PLAN 2C

ROADWAY DESIGN DIVISION

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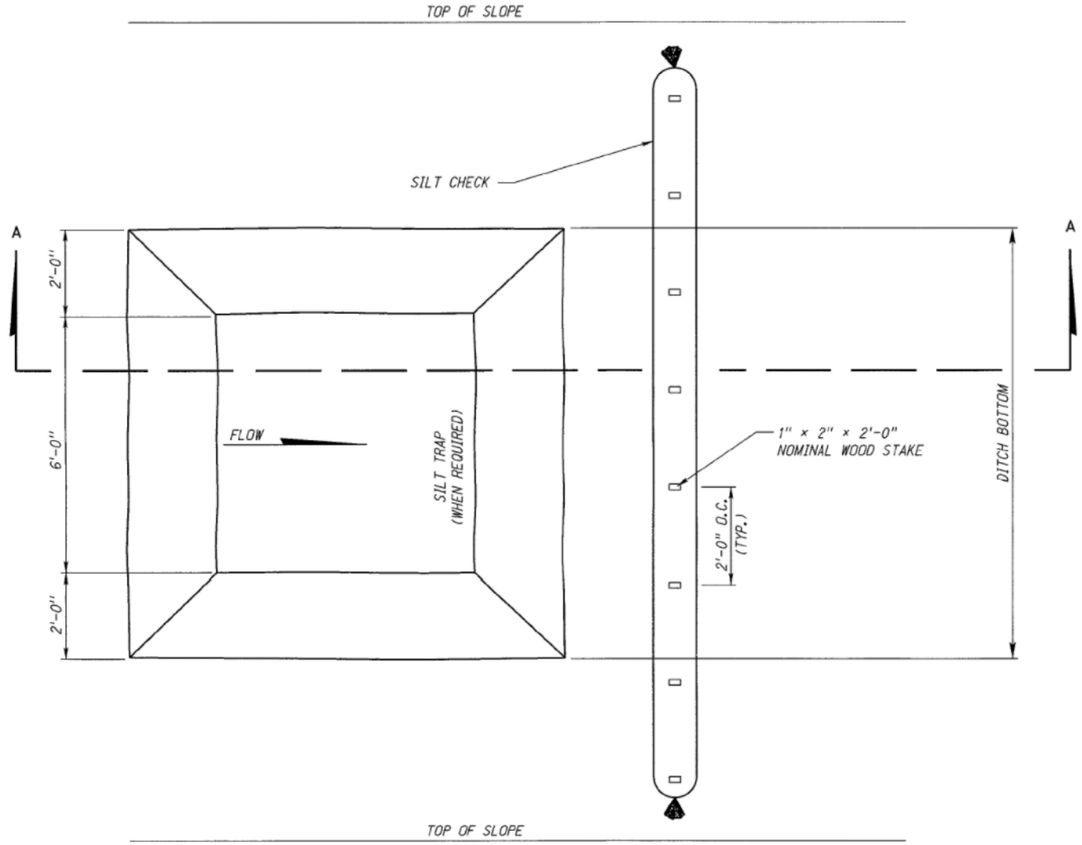
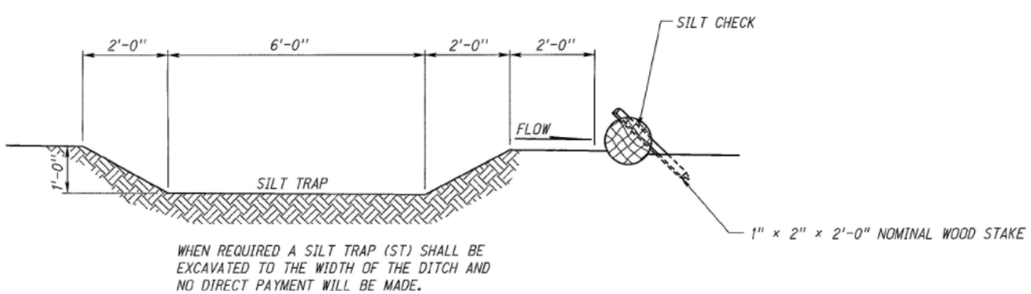
SHEET 2 OF 4
Date: 30-APR-2019 13:05
Computer: NDOTDESIGN13

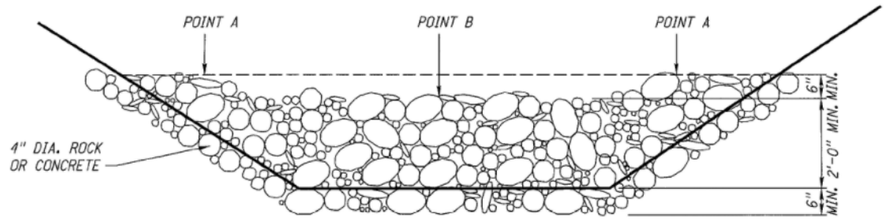


PLAN VIEW

FOR FLAT BOTTOM DITCH

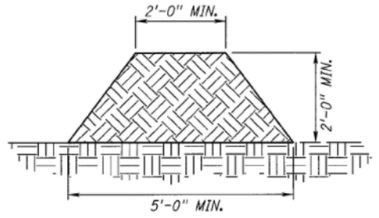


SECTION A-A



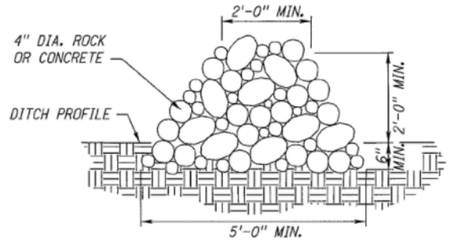
ROCK CHECK

ELEVATION VIEW



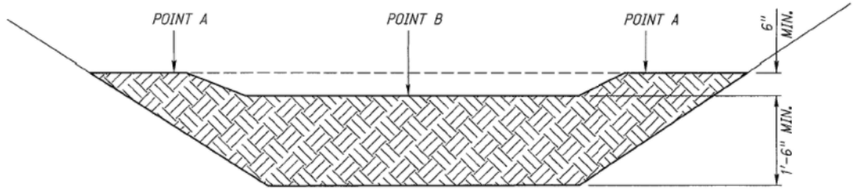
EARTH-SLASH MULCH PERIMETER BERM

CROSS SECTION



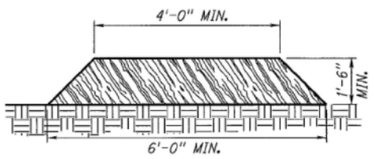
ROCK CHECK

CROSS SECTION



EARTH-SLASH MULCH CHECK

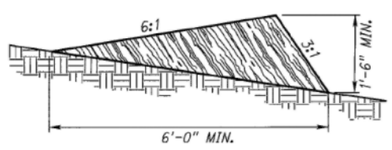
ELEVATION VIEW



CROSS SECTION

SILT CHECK-SLASH MULCH

OPTION A



CROSS SECTION

SILT CHECK-SLASH MULCH

OPTION B

SEE STAKING DETAIL SHEET 1 OF 4

SILT CHECKS ALL TYPES

SHEET 3 OF 4

SPECIAL PLAN 2C

ROADWAY DESIGN DIVISION

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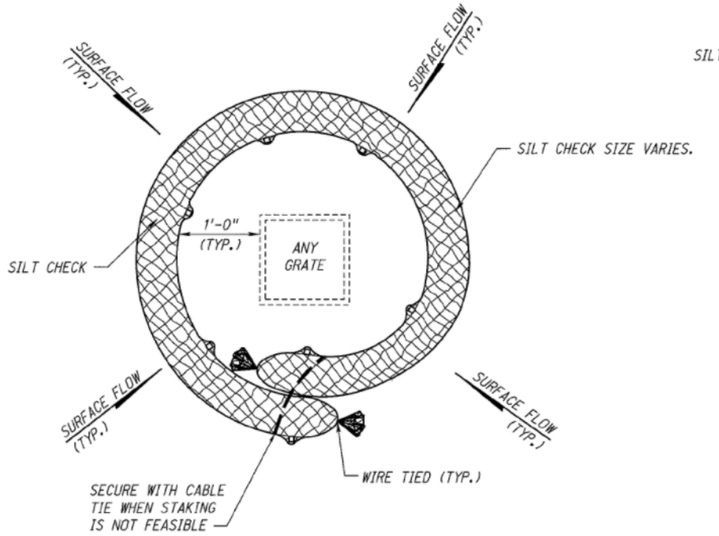
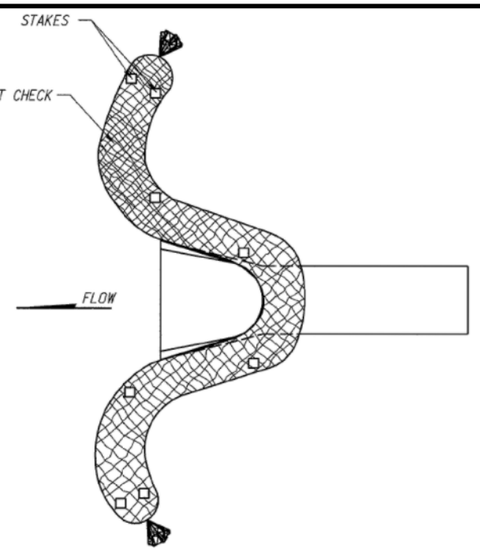
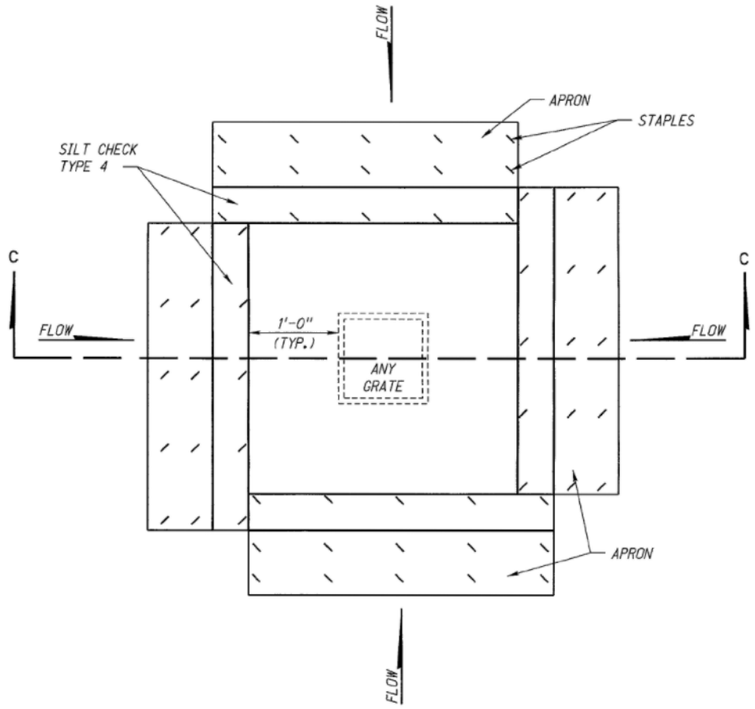
SHEET 3 OF 4



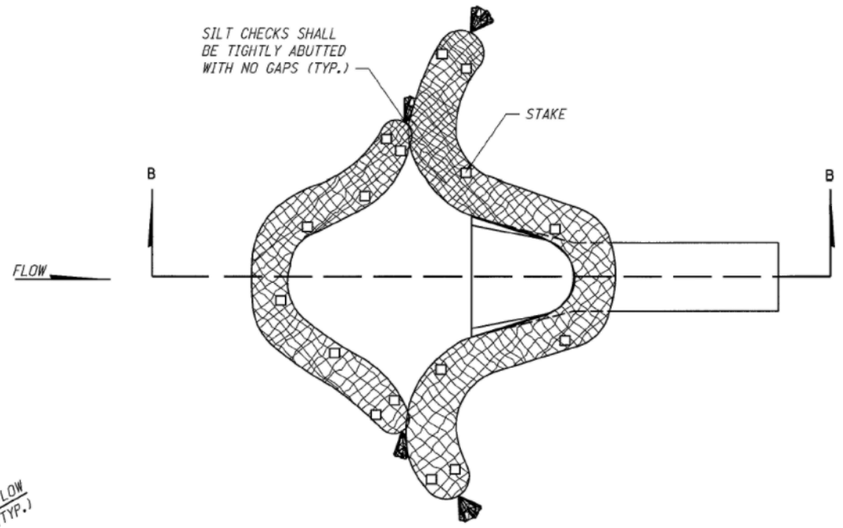
PLAN VIEW



SILT CHECK OUTLET PROTECTION

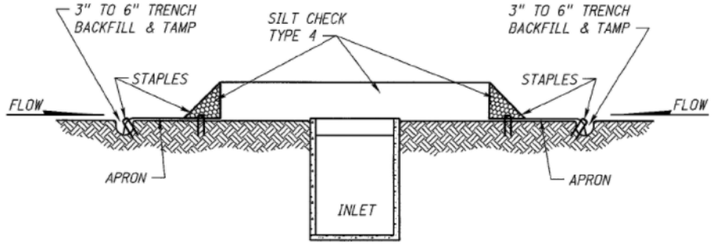


PLAN VIEW



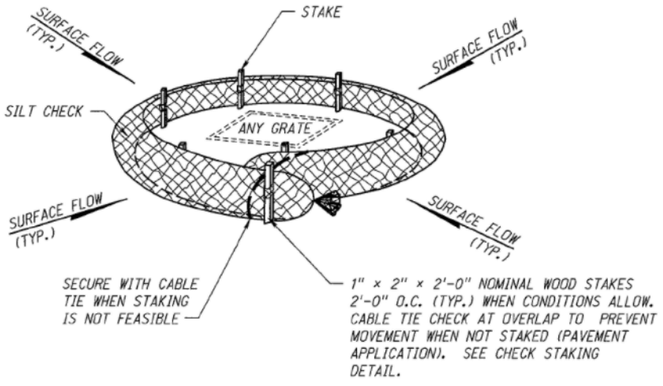
PLAN VIEW

SILT CHECK INLET PROTECTION

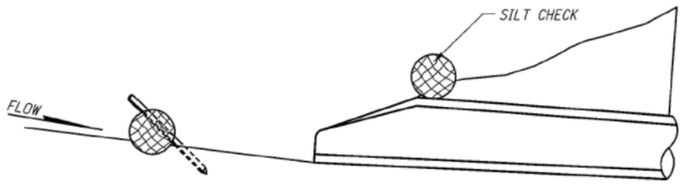


SECTION C-C

SILT CHECK TYPE 4 AT INLET



SILT CHECK INLET FILTER
PERSPECTIVE VIEW



SECTION B-B

SEE STAKING DETAIL SHEET 1 OF 4

SILT CHECKS ALL TYPES

SHEET 4 OF 4

SPECIAL PLAN 2C

ROADWAY DESIGN DIVISION

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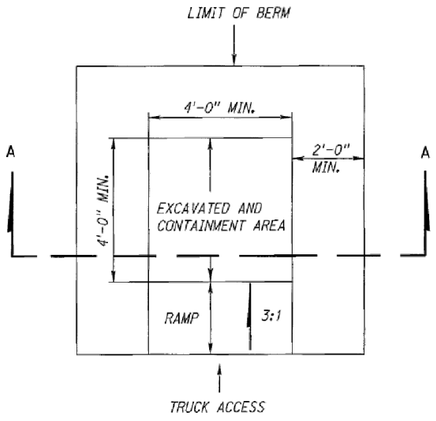
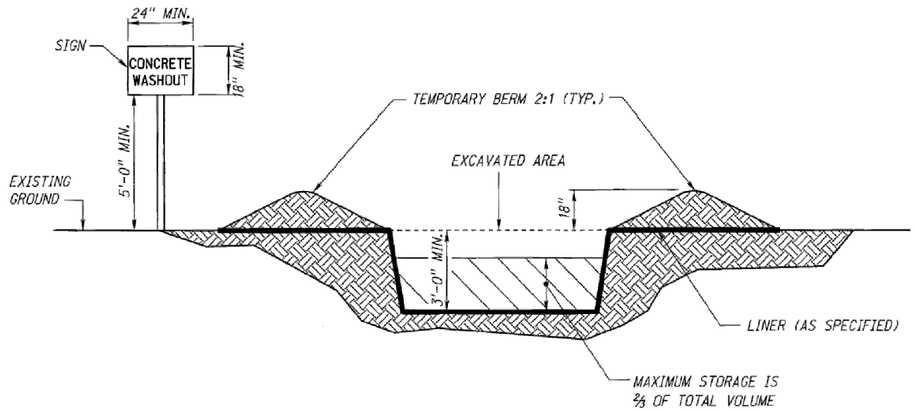
SHEET 4 OF 4 5104 1 e 00

PROJECT NO.	SHEET NO.
13-4(113)	U6

C.N. 32321



PLAN VIEW



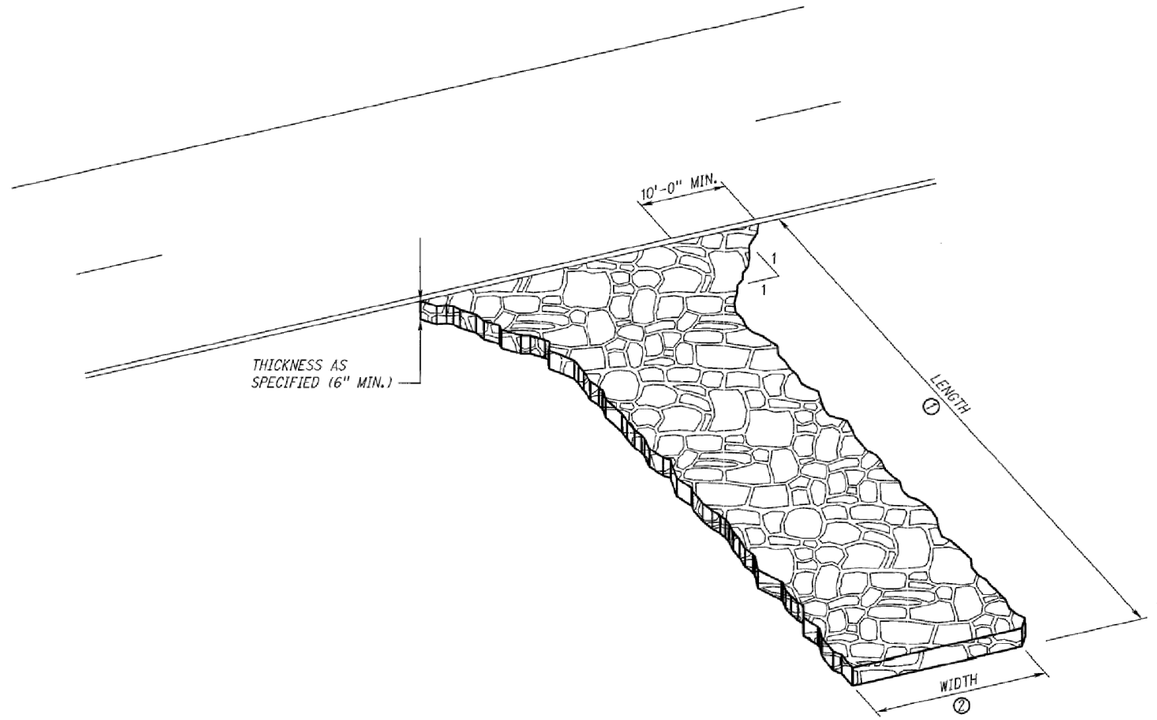
SECTION A-A

NOTES:
EROSION BALES MAY BE USED AS AN ALTERNATIVE FOR THE BERM AREA, EXCEPT AT THE OPENING.

THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH.

STRUCTURE MUST BE LINED WITH MATERIAL NOTED IN SPECIAL PROVISIONS.

CONCRETE WASHOUT STRUCTURE



NOTES:

REMOVE VEGETATION AND EXCAVATE SOFT SOILS FROM EXIT AREA. THOROUGHLY COMPACT SUBGRADE PRIOR TO PLACING STONE.

INSTALL CULVERT UNDER EXIT IF NECESSARY TO MAINTAIN DRAINAGE.

GRADE EXIT TO PREVENT RUNOFF FROM FLOWING ONTO STREET. DIRECT ALL RUNOFF FROM EXIT TO A SEDIMENT RETENTION DEVICE.

WHEN SPECIFIED, INSTALL SUBGRADE STABILIZATION FABRIC PRIOR TO PLACING CRUSHED STONE.

INSTALL LAYER OF CRUSHED STONE TO THE THICKNESS (6 INCH MINIMUM) AND DIMENSIONS SPECIFIED.

① EXIT LENGTH: 30 FT. MINIMUM OR AS SPECIFIED. LENGTH OF EXIT MAY BE INCREASED IF SEDIMENT TRACK-OUT OCCURS.

② EXIT WIDTH: 20 FT. MINIMUM.

STABILIZED CONSTRUCTION EXIT

CONCRETE WASHOUT & CONSTRUCTION EXIT

SHEET 1 OF 1

SPECIAL PLAN 3C

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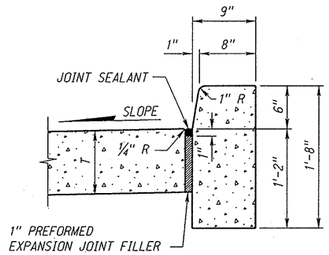
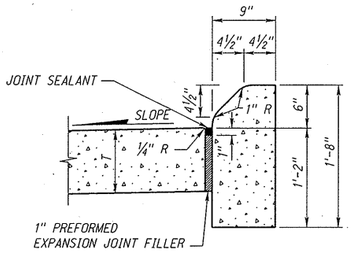
SHEET 1 OF 1



CONCRETE BARRIER CURB *

QUANTITIES

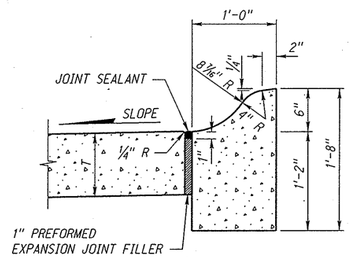
CONCRETE	*4.55 CU. YDS./STA.*
AREA	*1.228 SQ. FT.*



CONCRETE MEDIAN CURB *

QUANTITIES

CONCRETE	*4.42 CU. YDS./STA.*
AREA	*1.192 SQ. FT.*

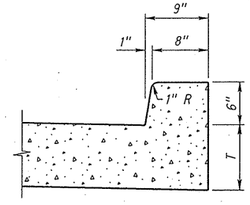


CONCRETE CURB, * TYPE I

QUANTITIES

CONCRETE	*5.22 CU. YDS./STA.*
AREA	*1.408 SQ. FT.*

*NOTE: * ONE INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED AT INTERVALS OF NOT MORE THAN 100 FEET THRU CONCRETE BARRIER CURB, CONCRETE MEDIAN CURB, AND CONCRETE CURB, TYPE I.*

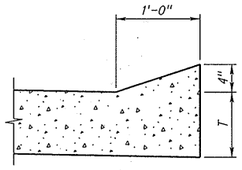


NOTE: MAY BE USED WHEN T IS LESS THAN 1 FOOT.

INTEGRAL CONCRETE BARRIER CURB

QUANTITIES

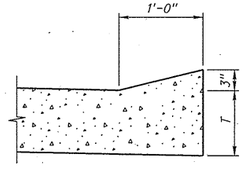
CONCRETE	*1.33 CU. YDS./STA.*
AREA	*0.359 SQ. FT.*



INTEGRAL CONCRETE SLOPING CURB

QUANTITIES

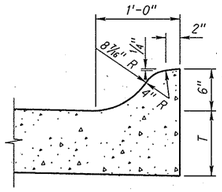
CONCRETE	*0.62 CU. YDS./STA.*
AREA	*0.167 SQ. FT.*



INTEGRAL CONCRETE SLOPING CURB

QUANTITIES

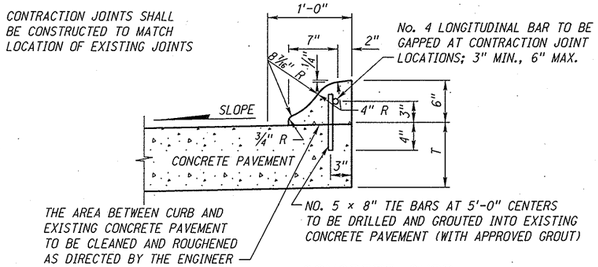
CONCRETE	*0.46 CU. YDS./STA.*
AREA	*0.123 SQ. FT.*



INTEGRAL CONCRETE CURB

QUANTITIES

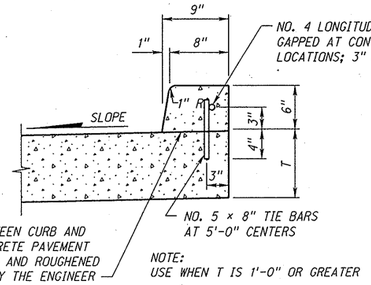
CONCRETE	*0.89 CU. YDS./STA.*
AREA	*0.239 SQ. FT.*



CONCRETE CURB, TYPE II

QUANTITIES

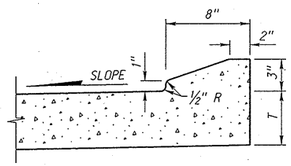
CONCRETE	*0.87 CU. YDS./STA.*
AREA	*0.234 SQ. FT.*



CONCRETE BARRIER CURB ALTERNATE

QUANTITIES

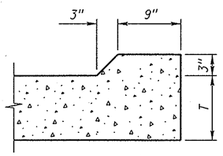
CONCRETE	*1.33 CU. YDS./STA.*
AREA	*0.359 SQ. FT.*



INTEGRAL CONCRETE TRUCK APRON CURB

QUANTITIES

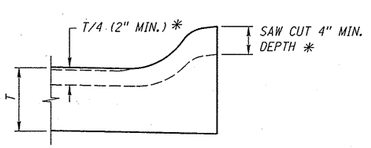
CONCRETE	*0.47 CU. YDS./STA.*
AREA	*0.127 SQ. FT.*



EROSION CONTROL CURB

QUANTITIES

CONCRETE	*0.81 CU. YDS./STA.*
AREA	*0.219 SQ. FT.*



CONTRACTION JOINT THRU CURB

* *FOR NON-INTEGRAL CURB THE CONTRACTION JOINTS MAY BE MADE WITH A DOUBLE EDGER WHILE THE CONCRETE IS STILL PLASTIC.*

NOTE: T = PAVEMENT THICKNESS

REV. NO.	DATE	DESCRIPTION OF REVISION
R12	JAN 18	NDOR BORDER TO NDOT BORDER
R11	JUL 15	ADDED TRUCK APRON CURB
R10	FEB 09	MULTIPLE REVISIONS

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 301-R12

PAVEMENT DETAILS

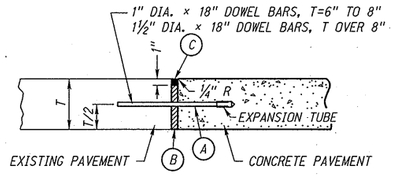
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

MARY BURROUGHS

12/6/2017
DATE

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
STATE OF NEBRASKA

ORIGINAL:
JANUARY 31, 1974
DATE



(A) GREASE DOWEL BAR ON EXPANSION TUB SIDE
(B) 1" PREFORMED EXPANSION JOINT FILLER
(C) JOINT SEALANT

NOTES:

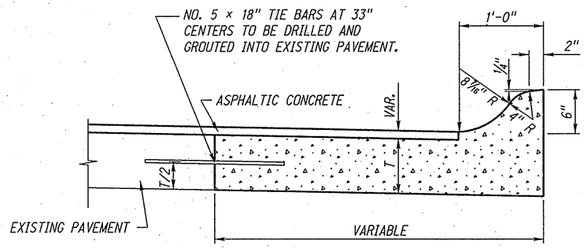
DOWEL BARS SHALL BE DRILLED TO A DEPTH OF 8" INTO EXISTING PAVEMENT AND GROUTED.

DOWEL BARS SHALL BE PLACED AT 1 FOOT CENTERS. THE OUTSIDE DOWEL BAR SHALL BE PLACED 6" FROM THE EDGE OF THE PAVEMENT.

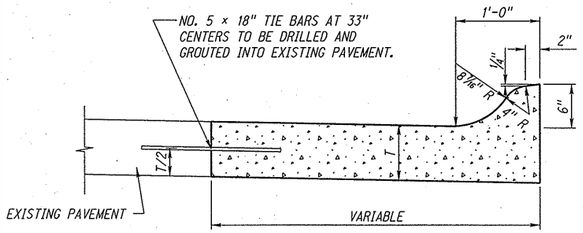
THIS JOINT SHALL BE CONSTRUCTED TRANSVERSE TO THE ROADWAY WHERE THE NEW CONCRETE ABUTS THE EXISTING CONCRETE.

DOWEL BARS SHALL BE PLACED PARALLEL TO THE ROADWAY ℄ AND TO THE ROAD BED.

EXPANSION JOINT (SUBSIDIARY)

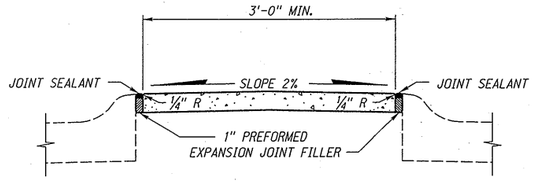


CONCRETE BASE COURSE W/INTEGRAL CURB



THE FOLLOWING NOTE IS TYPICAL FOR CONCRETE BASE COURSE WITH INTEGRAL CURB AND CONCRETE PAVEMENT WIDENING: CONTRACTION AND EXPANSION JOINTS SHALL BE CONSTRUCTED TO MATCH LOCATIONS OF EXISTING JOINTS.

CONCRETE PAVEMENT WIDENING



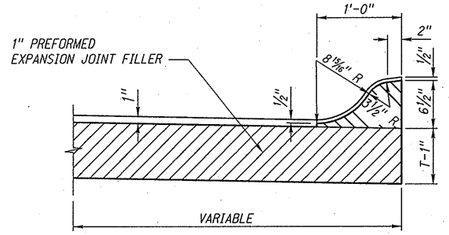
CONCRETE MEDIAN SURFACING

ONE INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED ACROSS THE FULL WIDTH OF THE MEDIAN SURFACING AT INTERVALS OF NOT MORE THAN 49 FEET.

LONGITUDINAL JOINTS ONE INCH DEEP SHALL BE MADE IN ALL MEDIANS WHEN SURFACING WIDTH IS 16 FEET OR GREATER.

TRANSVERSE JOINTS ONE INCH DEEP SHALL BE MADE IN ALL MEDIANS AT INTERVALS OF NOT MORE THAN 8 FEET.

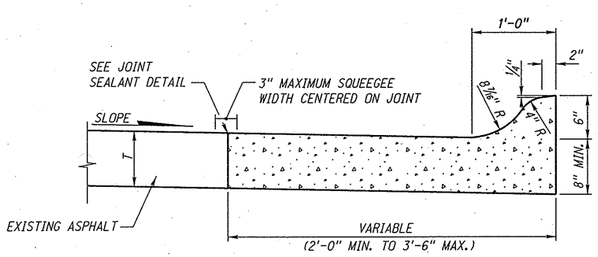
TRANSVERSE AND LONGITUDINAL JOINTS SHALL NOT BE FILLED.



ONE INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED AT INTERSECTION RETURNS AND WHERE SHOWN ON THE PLANS. TRANSVERSE JOINTS SHALL BE PLACED EVERY 8 FEET OR WHERE SHOWN ON THE PLANS.

NOTE:
RECESS THE EXPANSION JOINT FILLER 1/2" FROM THE TOP SURFACE OF THE CURB UNDER CONSTRUCTION

DETAIL FOR CUTTING & PLACEMENT OF EXPANSION JOINT FILLER

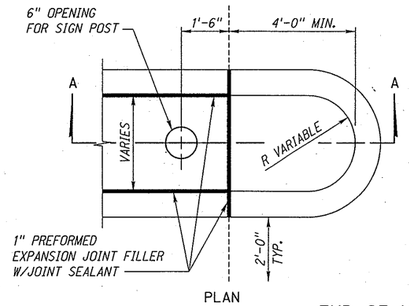


COMBINATION CONCRETE CURB & GUTTER

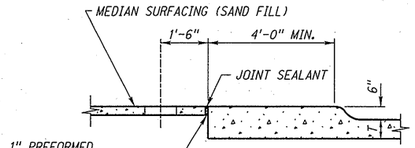
NOTE:

TRANSVERSE JOINTS SHALL BE PLACED EVERY 8 FEET AND JOINTS SHALL BE PLACED AT EACH HEADER, 2-NO. 5 x 18" TIE BARS ARE TO BE USED.

PLACE 1" PREFORMED EXPANSION JOINT FILLER AND SEAL AT THE RETURN OF RADIUS AT INTERSECTIONS.

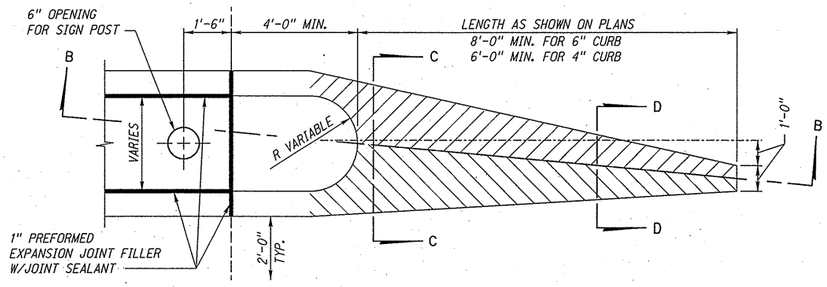


PLAN

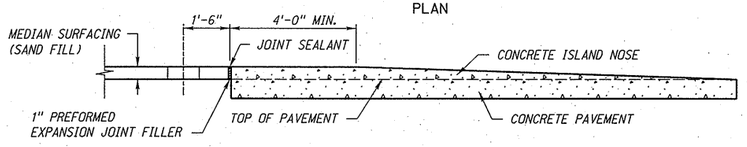


SECTION A-A

END OF MEDIAN ISLAND



PLAN



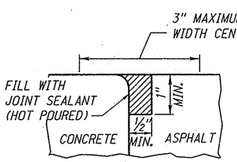
SECTION B-B

SECTION C-C

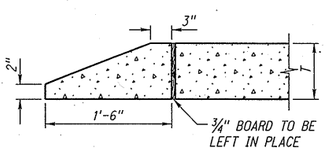
SECTION D-D

CONCRETE ISLAND NOSE

NOTE:
EXISTING CONCRETE PAVEMENT IS TO BE REMOVED TO BUILD CONCRETE ISLAND NOSE.



JOINT SEALANT DETAIL



CONCRETE HEADER

NOTE: T = PAVEMENT THICKNESS

REV. NO.	DATE	DESCRIPTION OF REVISION
R12	JAN 18	NDOR BORDER TO NDOT BORDER
R11	JUL 15	ADDED TRUCK APRON CURB
R10	FEB 09	MULTIPLE REVISIONS

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 301-R12

PAVEMENT DETAILS

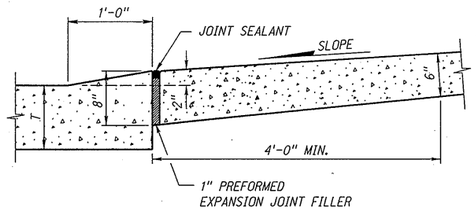
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

MARY BURROUGHS
12/6/2017
DATE

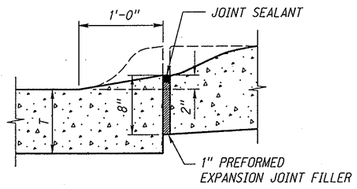
PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
12-4-17
STATE OF NEBRASKA

ORIGINAL:
JANUARY 31, 1974
DATE

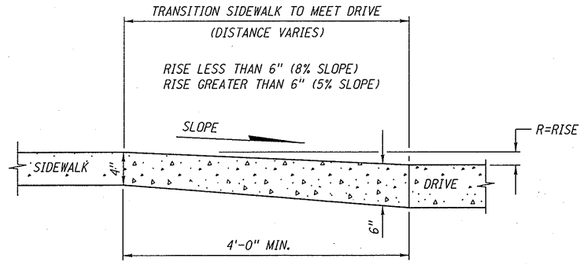
2/3



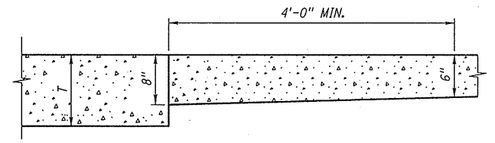
SECTION E-E



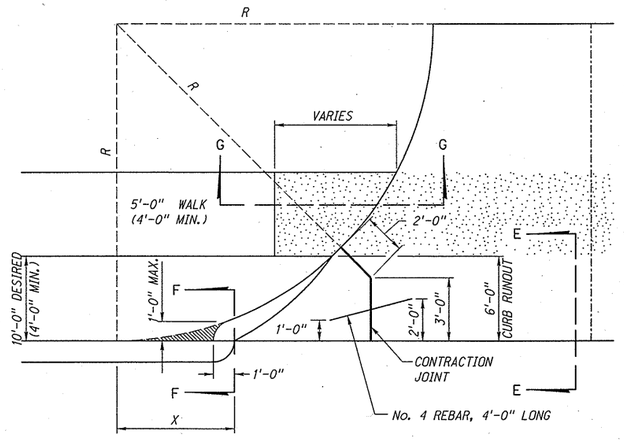
SECTION F-F



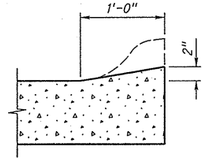
SECTION G-G



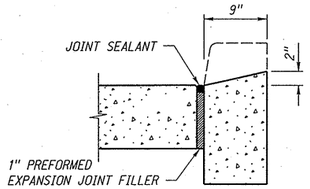
(RURAL DRIVEWAY)



URBAN DRIVEWAY PLAN

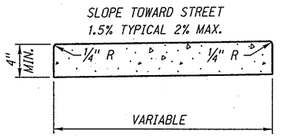


INTEGRAL CURB

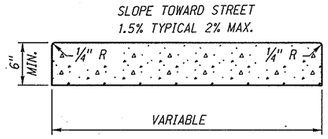


BARRIER CURB

DETAILS OF CURB DROPS



SIDEWALK



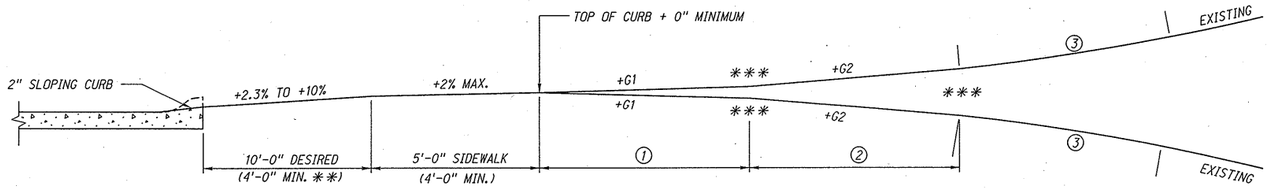
SIDEWALK AT
DRIVEWAY

NOTE:

1 INCH PREFORMED EXPANSION JOINT FILLER SHALL BE PLACED IN ALL SIDEWALKS OR CROSSWALKS AT INTERVALS OF NOT MORE THAN 50 FOOT, AND AT ALL POINTS WHERE SIDEWALKS OR CROSSWALKS ARE ADJACENT TO CURB. IF SIDEWALK OR CROSSWALK TO BE CONSTRUCTED IS LESS THAN 50 FOOT IN LENGTH, ONE SUCH EXPANSION JOINT SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

R	X
10'-0"	4.6'
15'-0"	5.6'
20'-0"	6.0'
25'-0"	7.0'
30'-0"	8.0'
35'-0"	8.6'
40'-0"	9.0'

R = RADIUS
X = $\sqrt{(2R-1)}$
(X & R IN FEET)



DRIVEWAY TYPE	G1 (MAX.)	G2 (MAX.)
COMMERCIAL, INDUSTRIAL	±5%	±8%
DWELLINGS (RESIDENTIAL)	±8%	±15%

PROFILE URBAN DRIVEWAY WITH SIDEWALK
(MAXIMUM PERCENT OF GRADE)

① 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±8%
② 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±15%
③ 10'-0" MINIMUM ROUNDING IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±22%

***0 FEET IS ALLOWED IN URBAN BUSINESS DISTRICTS WITH SIDEWALKS OF 6 FEET MINIMUM WIDTH.*
**** 10 FEET MINIMUM ROUNDING DESIRABLE FOR THE FOLLOWING GRADE CHANGES.*

NOTE: T = PAVEMENT THICKNESS

REV. NO.	DATE	DESCRIPTION OF REVISION
R12	JAN 18	NDOR BORDER TO NDOT BORDER
R11	JUL 15	ADDED TRUCK APRON CURB
R10	FEB 09	MULTIPLE REVISIONS

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 301-R12

PAVEMENT DETAILS

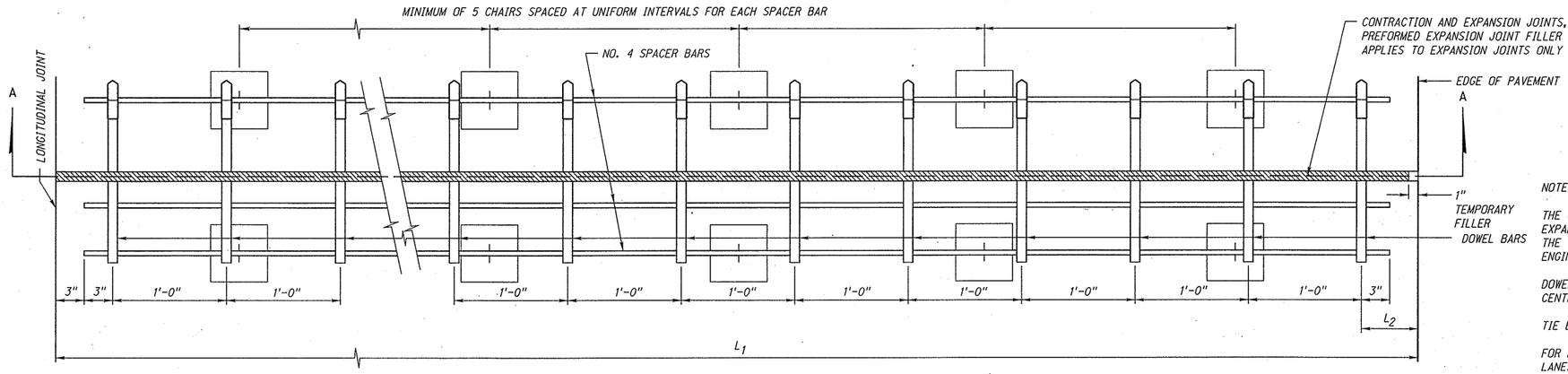
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
STATE OF NEBRASKA

Mary Burroughs
MARY BURROUGHS
12/6/2017
DATE

ORIGINAL:
JANUARY 31, 1974
DATE

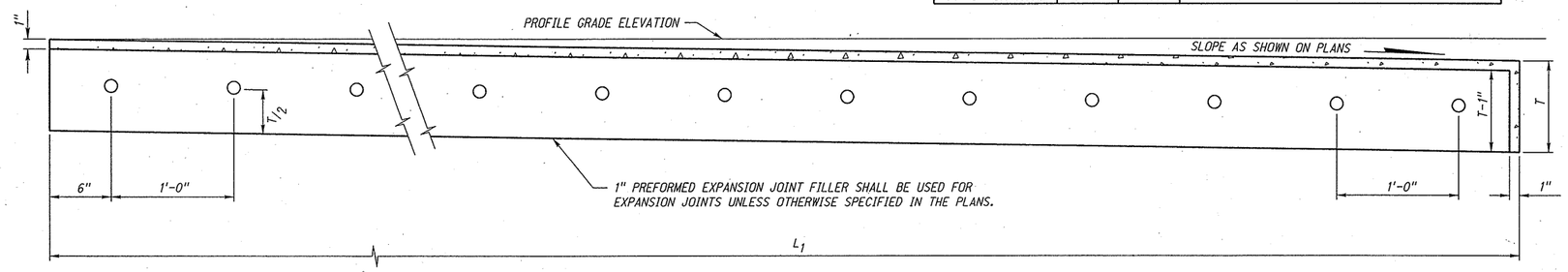
3
3



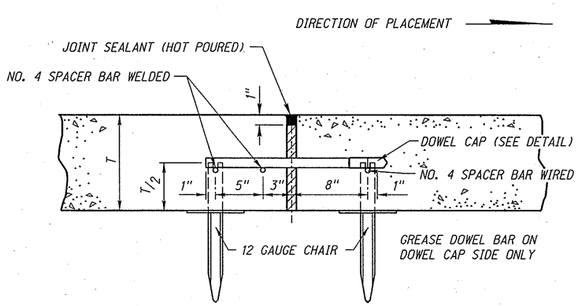
ASSEMBLY PLAN

DOWEL BAR HEIGHT AND DIAMETER			
PAVEMENT THICKNESS (T)	MINIMUM BAR DIA.	DOWEL BAR HEIGHT (T/2)	SKEW TOLERANCE
LESS THAN 10"	1¼"	T/2 ± ½"	¼"
10" OR MORE	1½"	T/2 ± ½"	¼"

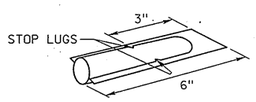
DOWEL BAR LOCATION TABLE			
L_1	L_2	#BARS	DESCRIPTION
* LESS THAN 12'-0'	6"	VARIES	IRREGULAR AREAS (WIDEN, FILLETS, GORE....)
12'-0"	6"	12	12'-0" PAVEMENT
14'-0"	2'-6"	12	14'-0" PAVEMENT
15'-0"	2'-6"	13	15'-0' PAVEMENT (INCLUDES 3'-0" SHOULDER)
16'-0"	3'-6"	13	16'-0" PAVEMENT (INCLUDES 4'-0" SHOULDER)
16'-0"	6"	16	16'-0" RAMP & LOOPS
LESS THAN 14'-6"	1'-6"	VARIES	PAVEMENT WITH CURB
14'-6" OR MORE	2'-6"	VARIES	



SECTION A-A
CONTRACTION AND EXPANSION JOINTS
(PREFORMED EXPANSION JOINTS FILLER APPLIES TO EXPANSION JOINTS ONLY)

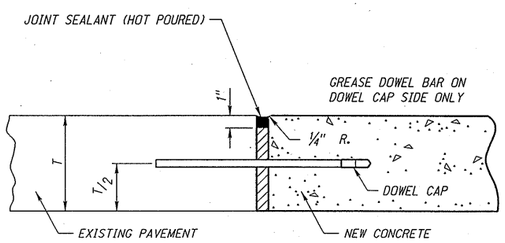


SECTION



DOWEL CAP

EXPANSION JOINT
(SUBSIDIARY)



NOTES:
DOWEL BARS SHALL BE DRILLED TO A DEPTH OF 8" INTO EXISTING PAVEMENT AND GROUTED.

SECTION

NOTES:

THE CONTRACTOR MAY SUBSTITUTE OTHER DESIGNS FOR EXPANSION AND CONTRACTION JOINT SUPPORTS IN LIEU OF THE TYPE SHOWN WITH PRIOR WRITTEN APPROVAL BY THE ENGINEER.

DOWEL BARS SHALL BE A MINIMUM OF 17¾" IN LENGTH, CENTERED ON JOINTS AND BE SMOOTH BARS.

TIE BARS SHALL BE DEFORMED BARS.

FOR LOAD TRANSFER DEVICES AT EXPANSION JOINTS IN LANES OTHER THAN THE LANES SHOWN, MAINTAIN THE SPACING OF THE 1'-6" DOWEL BARS AT 1'-0" INTERVALS.

THE ENDS OF THE NO. 4 SPACER BARS SHALL NOT BE LESS THAN 3" FROM THE EDGES OF THE PAVEMENT OR THE LONGITUDINAL JOINT.

THE CONTRACTOR MAY USE A MACHINE FOR PLACING THE LONGITUDINAL TIE BARS IN LIEU OF THE TIE BAR PINS. IF A MECHANICAL TIE BAR PLACEMENT MACHINE IS NOT USED, TIE BAR PINS AS SHOWN SHALL BE USED.

TIE, DOWEL & SPACER BARS SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.

KEY TYPE LONGITUDINAL JOINTS AND TRANSVERSE CONSTRUCTION JOINTS SHALL BE EDGED WITH ¼" R. AT TIME OF CONCRETE PLACEMENT.

CONCRETE PAVEMENT SHALL BE TINED UNLESS OTHERWISE SHOWN IN THE PLANS.

EXPANSION JOINTS SHALL BE INSTALLED AT LOCATIONS SHOWN IN THE PLANS.

PAVEMENT PLACED ADJACENT TO R.R. TRACKS REQUIRES 3-EXPANSION JOINTS SPACED AT APPROXIMATELY 49'-6" INTERVALS.

EXPANSION JOINTS SHALL NOT BE SKEWED.

T= PAVEMENT THICKNESS

* THE DEPARTMENT REQUIRES THAT DOWEL BASKETS BE PLACED IN ALL CONTRACTION JOINTS WHICH ARE 6'-0" OR WIDER. THE DOWEL BASKETS SHALL BE PLACED TRANSVERSE TO THE DIRECTION OF THE PREDOMINANT TRAFFIC DIRECTION.

REV. NO.	DATE	DESCRIPTION OF REVISION
R10	JAN 18	CHANGED DOWEL BAR LOCATION TABLE
R9	JUL 11	JOINT: EARLY SAW CUT
R8	OCT 10	CHANGED TINING INFORMATION

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 329-R10

8 TO 16 INCH CONCRETE PAVEMENT

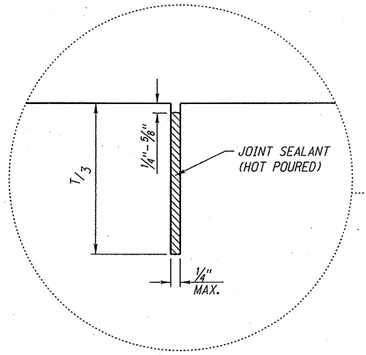
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
NICK S. SYSLO
E-10043
STATE OF NEBRASKA

MARY DARROUGHS
12/6/2017
DATE

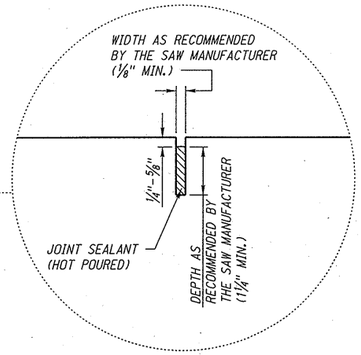
ORIGINAL:
OCTOBER 25, 1994
DATE

1/4



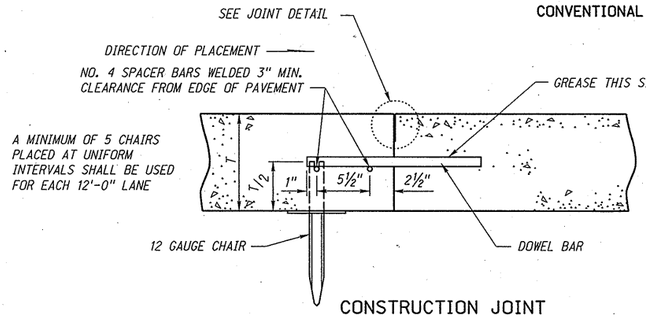
CONVENTIONAL SAWING

OR



EARLY-SAW CUT

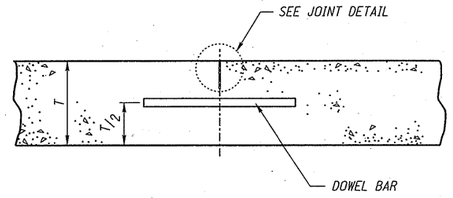
JOINT DETAIL



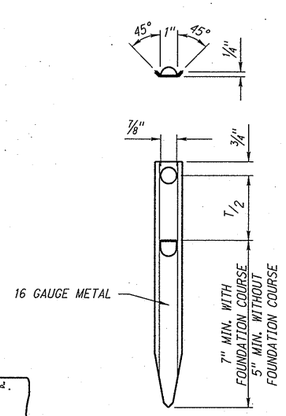
CONSTRUCTION JOINT

(BARS ARE SUBSIDIARY)
TO PAVEMENT

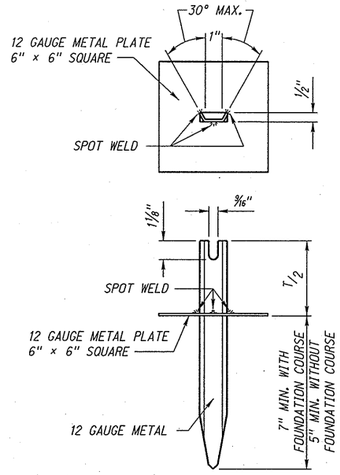
THE DOWEL BAR SPACING SHALL BE THE SAME AS SHOWN FOR THE EXPANSION JOINT. REFER TO DOWEL BAR LOCATION TABLE AND THE DOWEL BAR HEIGHT AND DIAMETER TABLE ON SHEET 1 OF 4.



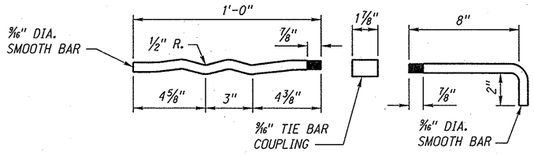
CONTRACTION JOINT



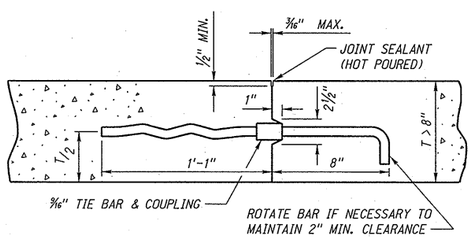
TIE BAR PIN



CHAIR

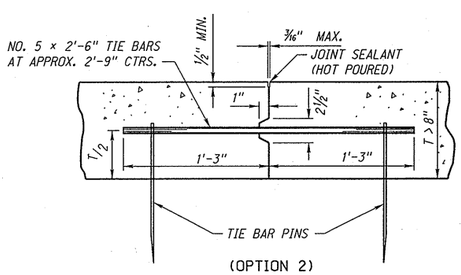


DETAILS OF "W" BAR



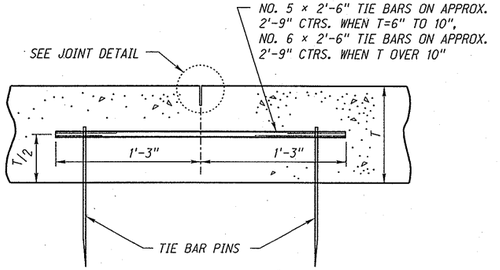
(OPTION 1)
KEY TYPE

NO. 5 HOOK AND W-BARS AT APPROX. 2'-9" CTRS.
OR 3/16" HOOK AND W-BARS AT APPROX. 2'-9" CTRS.



(OPTION 2)
KEY TYPE

KEY TYPE JOINT SHALL BE USED ON ALL LONGITUDINAL CONSTRUCTION JOINTS WHEN THE ADJACENT LANE IS NOT PLACED AT THE SAME TIME

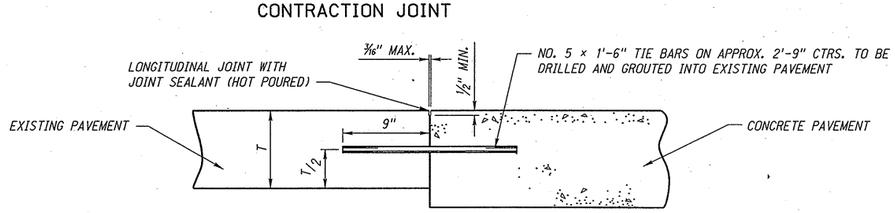


SAWED

WHEN TWO ADJACENT LANES ARE PLACED AT THE SAME TIME, THE LONGITUDINAL JOINT COMMON TO THE LANES SHALL BE SAWED

LONGITUDINAL JOINTS

NOTE:
NO TIE BARS SHALL BE CLOSER THAN 1'-3" TO A TRANSVERSE JOINT. ALL LONGITUDINAL JOINTS BETWEEN LANES AND BETWEEN LANES AND SHOULDERS MUST BE TIED. MEDIAN SHOULD NOT BE TIED.



TIE BARS ARE TO BE INSTALLED WHERE NEW CONCRETE PAVEMENT IS PLACED ADJACENT TO EXISTING CONCRETE PAVEMENT

DETAILS OF TIE BAR

NOTE: T = PAVEMENT THICKNESS

REV. NO.	DATE	DESCRIPTION OF REVISION
R10	JAN 18	CHANGED DOWEL BAR LOCATION TABLE
R9	JUL 11	JOINT: EARLY SAW CUT
R8	OCT 10	CHANGED TINING INFORMATION

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 329-R10

8 TO 16 INCH CONCRETE PAVEMENT

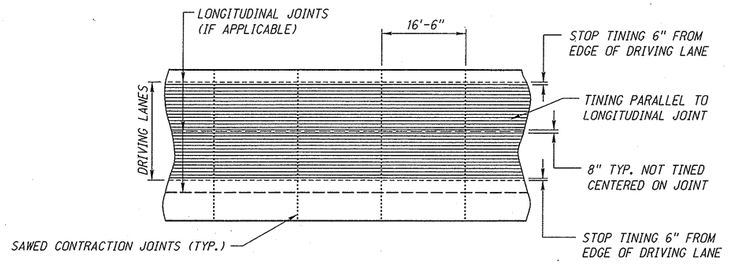
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
NICK S. SYSLO
E-10093
12-12-17
STATE OF NEBRASKA

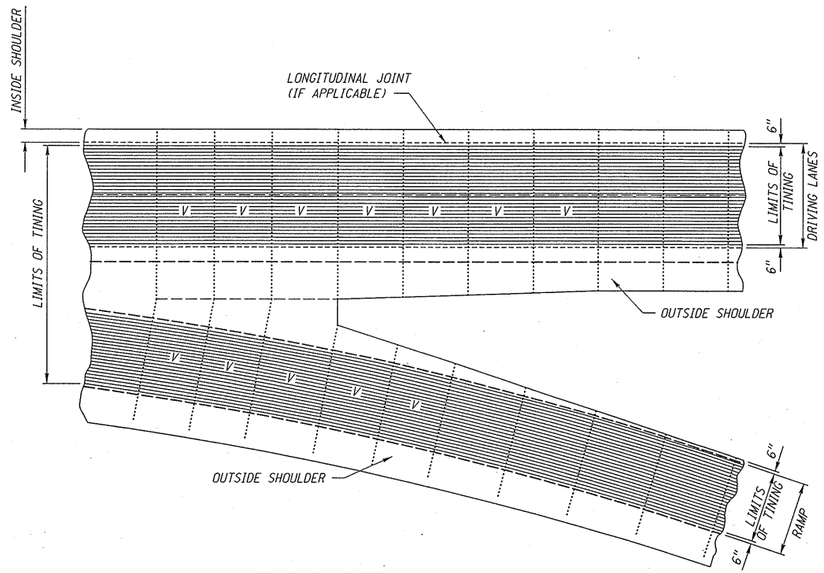
MARY BURROUGHS
12/6/2017
DATE

ORIGINAL:
OCTOBER 25, 1994
DATE

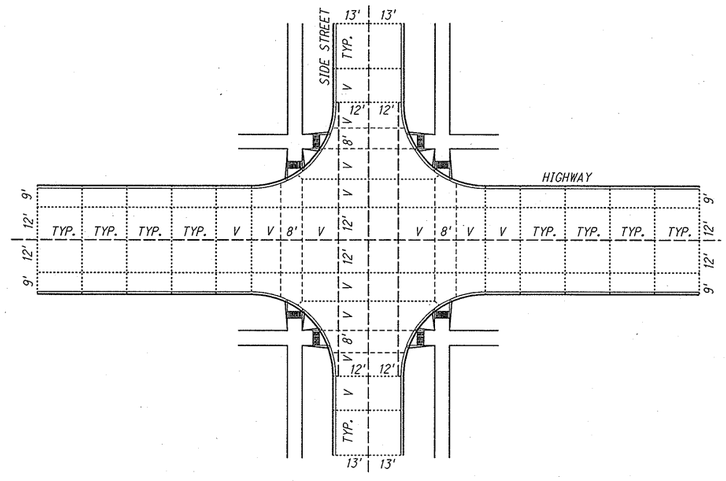
ROADWAY DESIGN DIVISION
Computer: NDOTDESIGN147
User: dor13017
Date: 17-NOV-2017 09:05
File: 32906e10.dgn
SHEET SCALE: 1:100



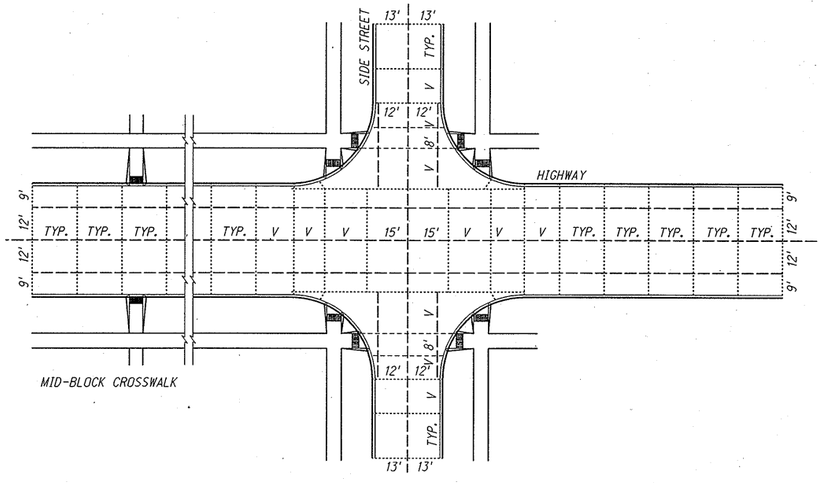
TINING WITH CONCRETE SHOULDER



TINING LIMITS GORE AREA



STOP OR YIELD CONTROL ON ALL FOUR LEGS



STOP OR YIELD CONTROL ON THE SIDE STREETS ONLY

NOTES:

TINING REQUIRED FOR POSTED SPEEDS GREATER THAN 40 MPH.

16'-6" TRANSVERSE JOINT SPACING IS THE STANDARD JOINT SPACING REGARDLESS OF THE PAVEMENT THICKNESS.

V VARIES FROM 10'-0" TO MAX. 16'-6".

THE LONGITUDINAL JOINT BETWEEN THE SHOULDER AND THE 12'-0" DRIVING LANE IS NOT REQUIRED FOR SHOULDER WIDTHS OF 4'-0" OR LESS.

TRANSVERSE JOINTS FOR DOWELED CONCRETE PAVEMENT SHALL BE CONSTRUCTED PERPENDICULAR TO THE ROADWAY.

ALL CONCRETE SURFACES, NOT TINED, WILL REQUIRE TRANSVERSE BROOMING OR BURLAP DRAG. (NOT APPLICABLE TO SHOULDERS)

REV. NO.	DATE	DESCRIPTION OF REVISION
R10	JAN 18	CHANGED DOWEL BAR LOCATION TABLE
R9	JUL 11	JOINT: EARLY SAW CUT
R8	OCT 10	CHANGED TINING INFORMATION

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 329-R10

8 TO 16 INCH CONCRETE PAVEMENT

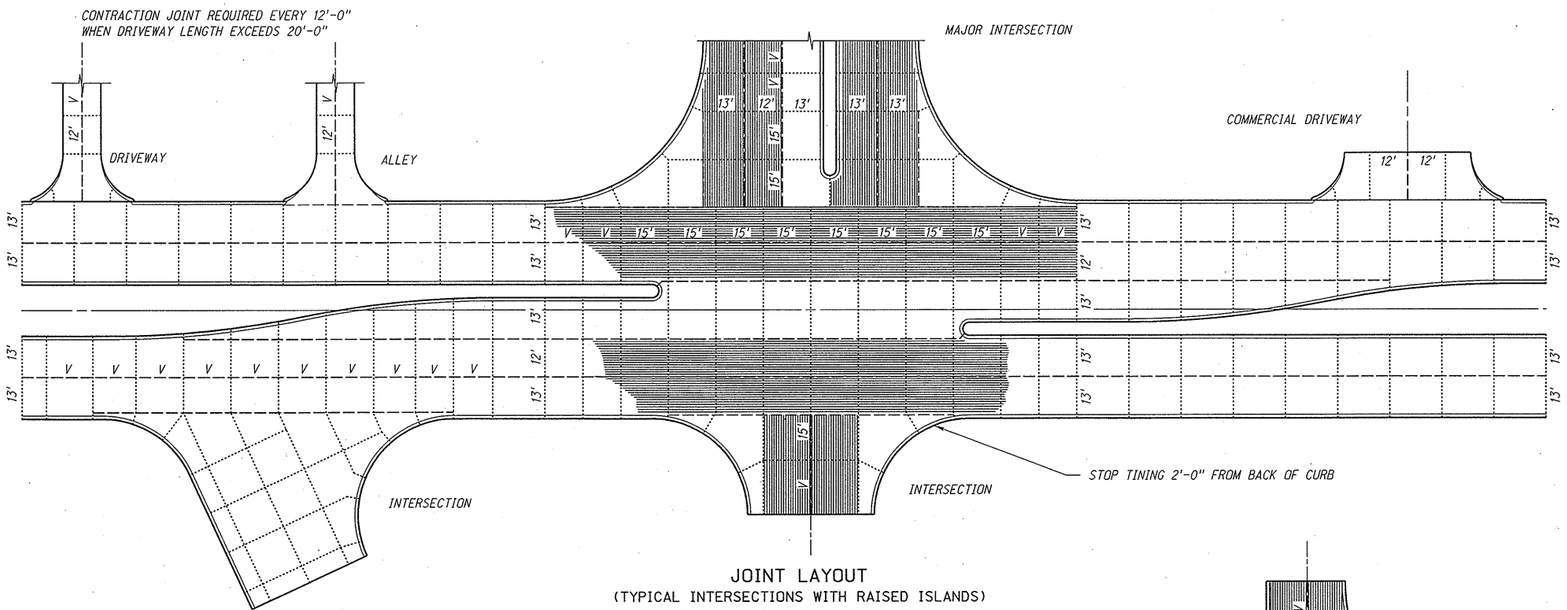
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
MICK S. SYSLO
E-10043
STATE OF NEBRASKA

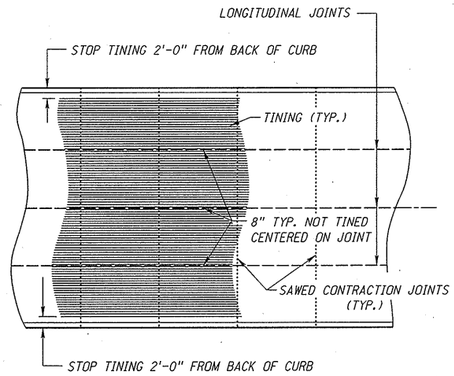
MARY BURROUGHS

12/6/2017
DATE

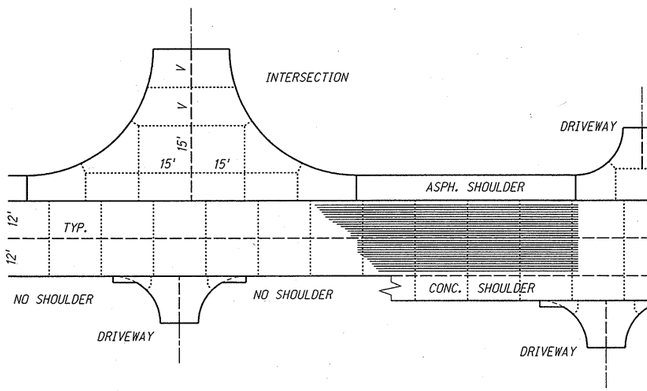
ORIGINAL:
OCTOBER 25, 1994
DATE

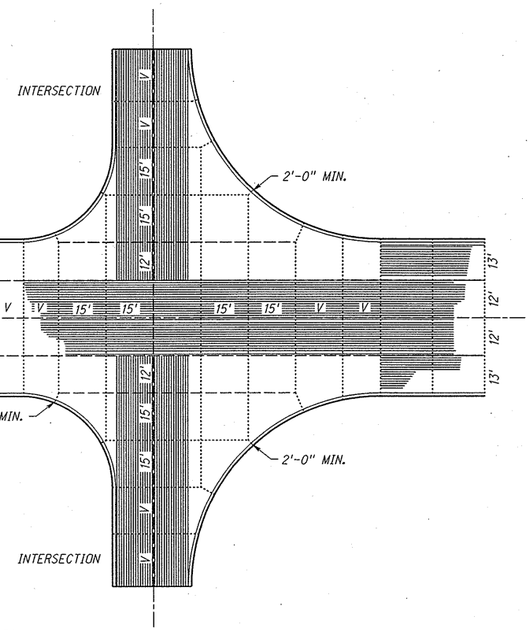


JOINT LAYOUT
(TYPICAL INTERSECTIONS WITH RAISED ISLANDS)

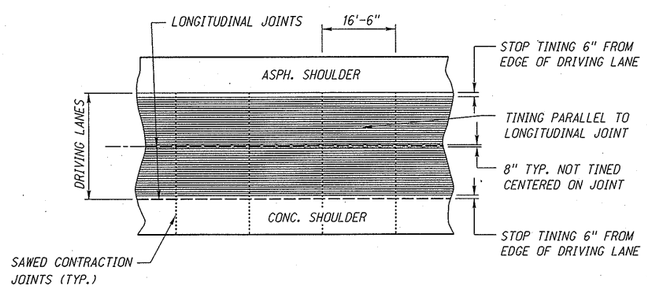


TINING LIMITS





JOINT LAYOUT
(TYPICAL INTERSECTIONS & DRIVES)



RURAL TINING LIMITS WITH SURFACED SHOULDERS

LEGEND

..... SAWED CONTRACTION JOINT

———— LONGITUDINAL JOINT

NOTES:

TINING REQUIRED FOR POSTED SPEEDS GREATER THAN 40 MPH.

16'-6" TRANSVERSE JOINT SPACING IS THE STANDARD JOINT SPACING REGARDLESS OF THE PAVEMENT THICKNESS.

V VARIES FROM 10'-0" TO MAX. 16'-6".

VARIABLE SPACING IS USED AROUND INTERSECTIONS AND LARGE DRIVEWAYS WHICH IS TIED TO THE CONCRETE LANES OR SHOULDERS TO MATCH THE JOINTS.

ALL CONCRETE SURFACES, NOT TINED, WILL REQUIRE TRANSVERSE BROOMING OR BURLAP DRAG. (NOT APPLICABLE TO SHOULDERS)

REV. NO.	DATE	DESCRIPTION OF REVISION
R10	JAN 18	CHANGED DOWEL BAR LOCATION TABLE
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NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 329-R10

8 TO 16 INCH CONCRETE PAVEMENT

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

MARK S. SYSLO E-10043 PROFESSIONAL CIVIL ENGINEER STATE OF NEBRASKA

Mary Buroughs
MARY BUROUGHS
12/16/2017
DATE

ORIGINAL:
OCTOBER 25, 1994
DATE

4
4

ROADWAY DESIGN DIVISION
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User: dor13017
Date: 25-JUL-2017 09:48
File: 50100e07.dgn
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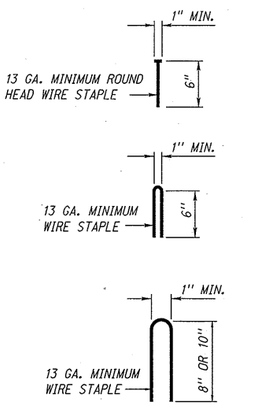
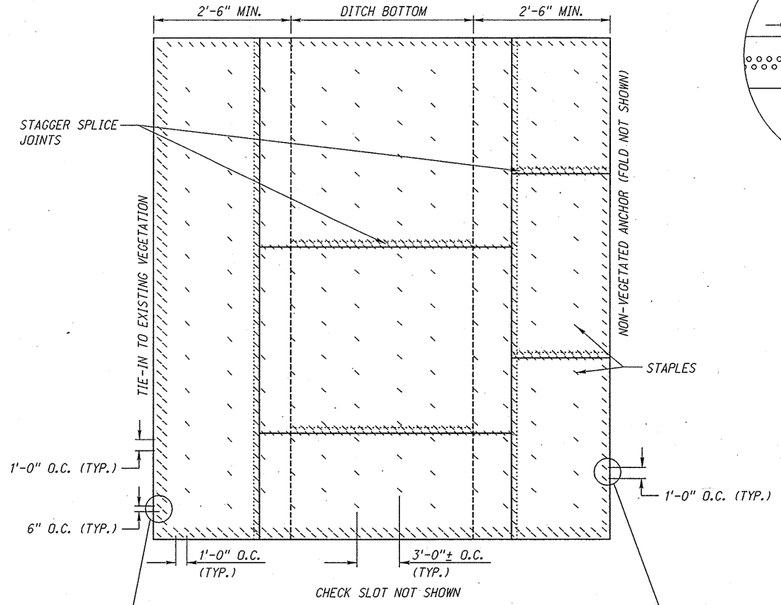
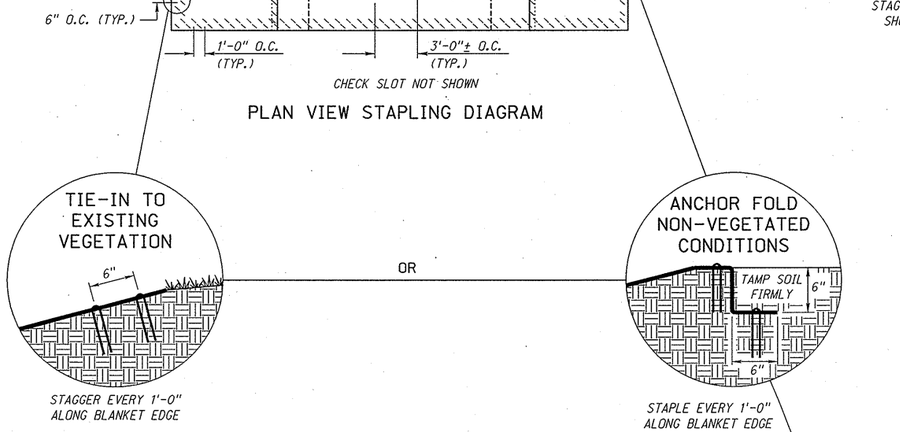
SHEET 1 OF 3

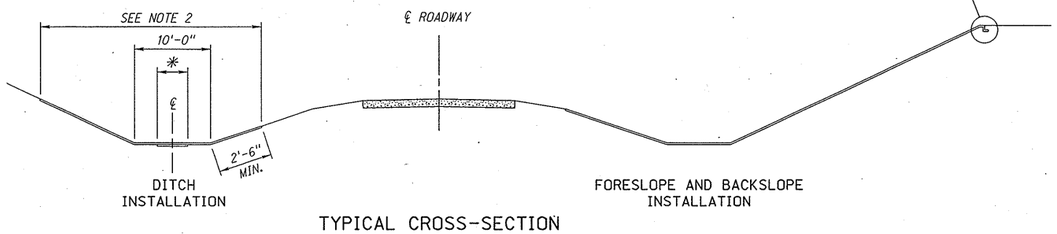


WIRE STAPLE DETAIL



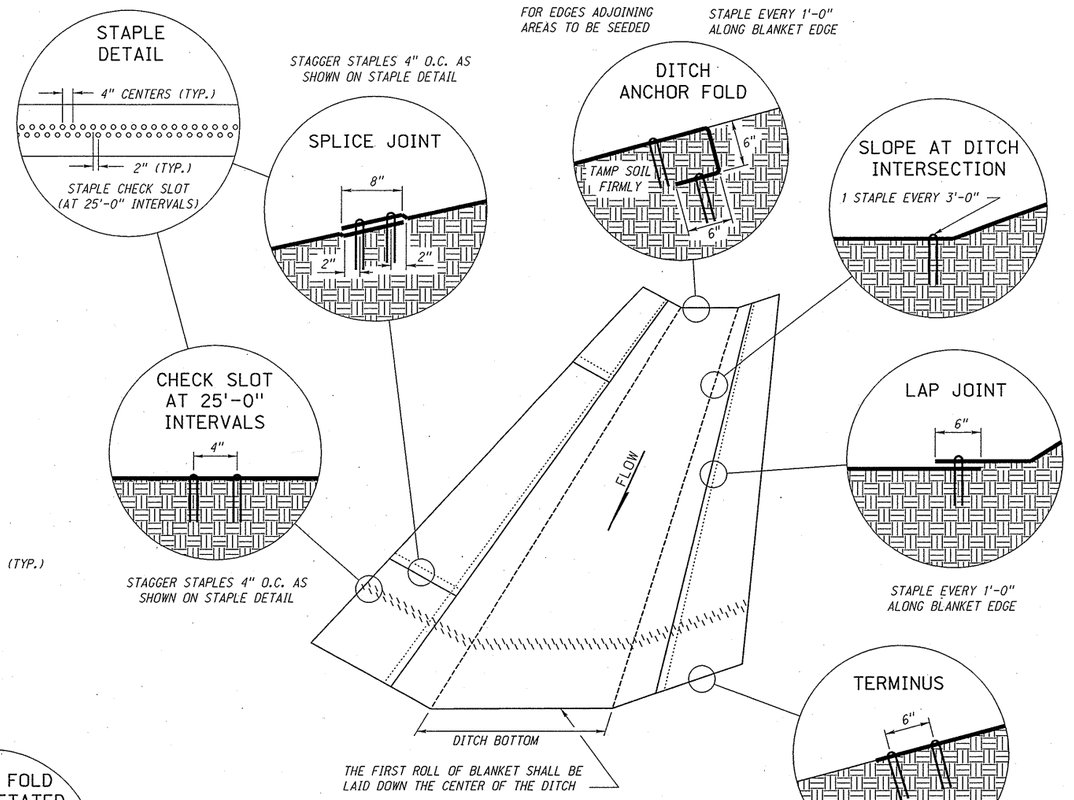
PLAN VIEW STAPLING DIAGRAM





TYPICAL CROSS-CROSS-SECTION

* THE FIRST ROLL OF BLANKET SHALL BE LAID DOWN THE CENTER OF THE DITCH



TYPICAL EROSION CONTROL BLANKET INSTALLATION

NOTES:

1. THIS PLAN IS APPLICABLE FOR THE FOLLOWING: EROSION CONTROL CLASS 1B, 1C, 1D, 1E, 1F, 2A, 2B & 2C.
2. SOIL RETENTION BLANKET SHALL BE LAID A MINIMUM OF 2'-6" UP THE BACKSLOPE AND FORESLOPE.
3. CHECK SLOTS ARE PLACED PERPENDICULAR TO DITCH CENTER LINE ON 25'-0" INTERVALS.
4. THE MANUFACTURERS' RECOMMENDED STAPLING PATTERNS SHALL GOVERN OVER THE PLANS.

REV. NO.	DATE	DESCRIPTION OF REVISION
R7	JAN 18	NDOR BORDER TO NDOT BORDER
R6	APR 14	UPDATE INSTALLATION METHOD
R5	OCT 07	EROSION CONTROL AT SPLASH BASIN

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 501-R7

EROSION CONTROL

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

David Mray
8-16-2017
DATE

PROFESSIONAL CIVIL ENGINEER — JEROME M. FEEMAN, JR. — E-11829 — STATE OF NEBRASKA

ORIGINAL:
NOVEMBER 14, 1973
DATE

1/3

ROADWAY DESIGN DIVISION
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User: dor13017
Date: 25-JUL-2017 09:48
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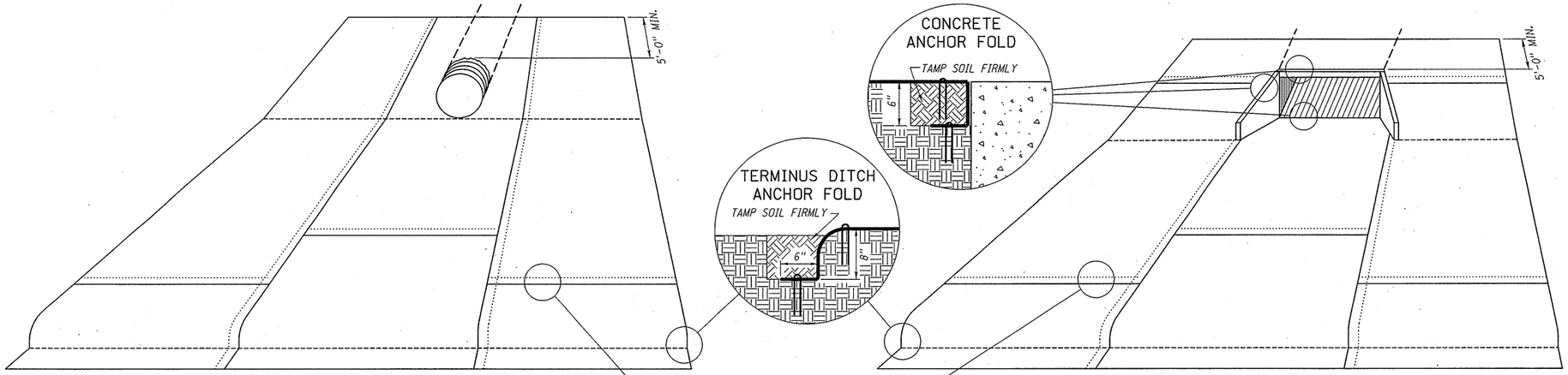
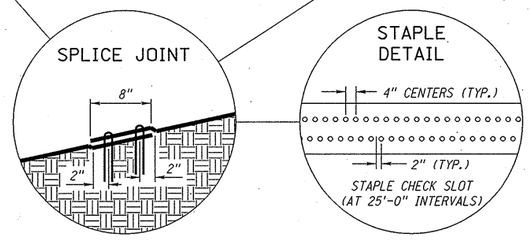
SHEET 2 OF 3

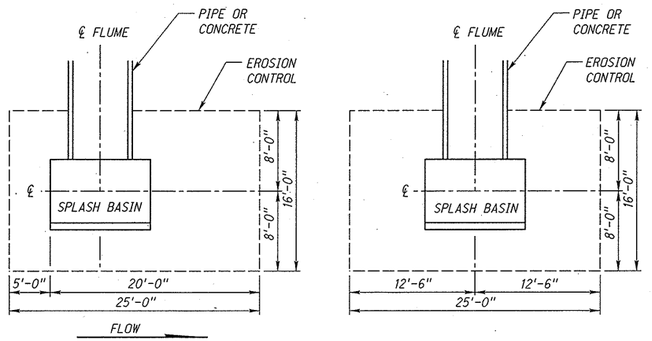


TYPICAL INSTALLATION AT PIPE CULVERT

(SHOWING STRAIGHT PIPE)

TYPICAL INSTALLATION AT BOX CULVERT

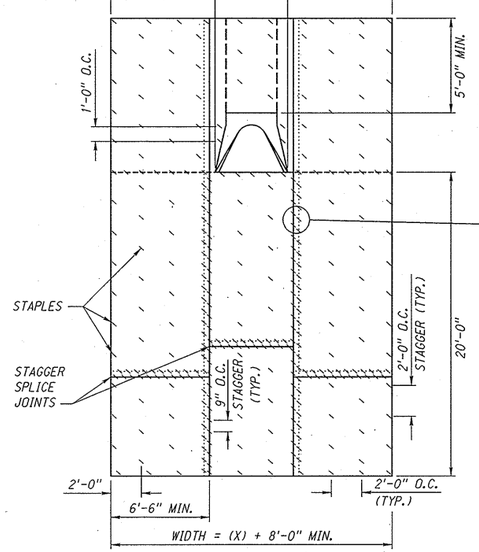




NOTE:
OFFSET EROSION CONTROL PLACEMENT ALONG THE DRAINAGE PATH

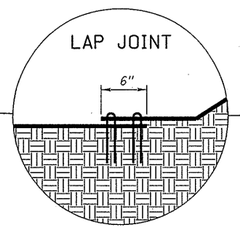
NOTE:
CENTER EROSION CONTROL ON FLUME WHERE THERE IS NO DEFINED DRAINAGE PATH

EROSION CONTROL BLANKET PLACEMENT AT SPLASH BASIN

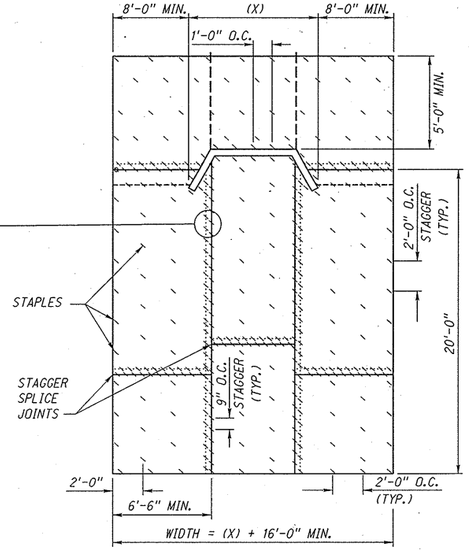


PLAN VIEW STAPLING DIAGRAM

(X) IS EQUAL TO THE OUTSIDE WIDTH OF THE FLARED END SECTION



STAGGER STAPLES EVERY 1'-0" O.C. WITHIN 20'-0" OF PIPE



PLAN VIEW STAPLING DIAGRAM

(X) IS EQUAL TO THE OUTSIDE WIDTH OF THE WING WALLS

REV. NO.	DATE	DESCRIPTION OF REVISION
R7	JAN 18	NDOR BORDER TO NDOT BORDER
R6	APR 14	UPDATE INSTALLATION METHOD
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NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 501-R7

EROSION CONTROL

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

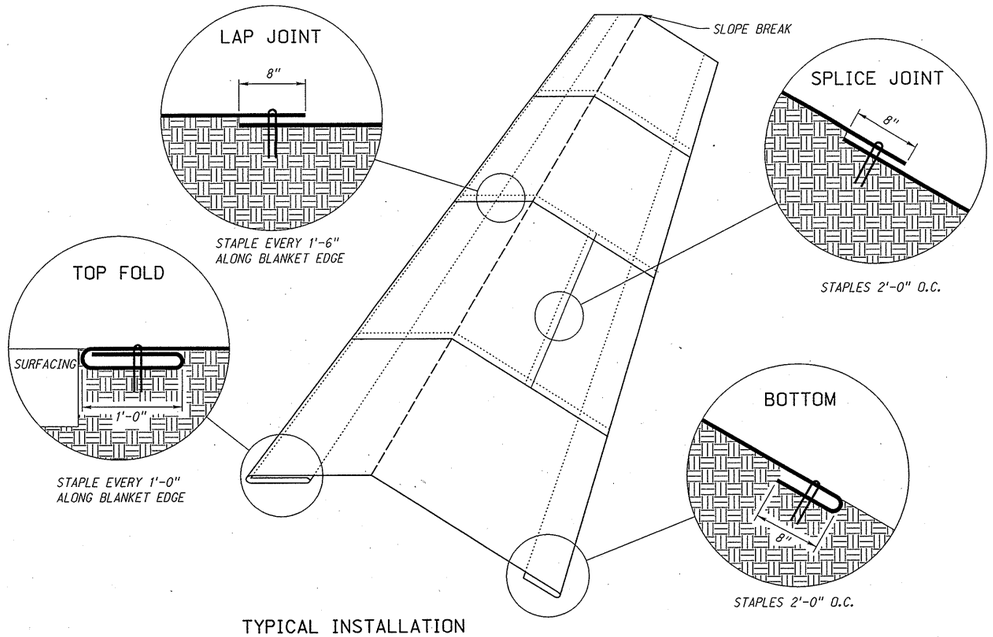
David May

8-16-2017

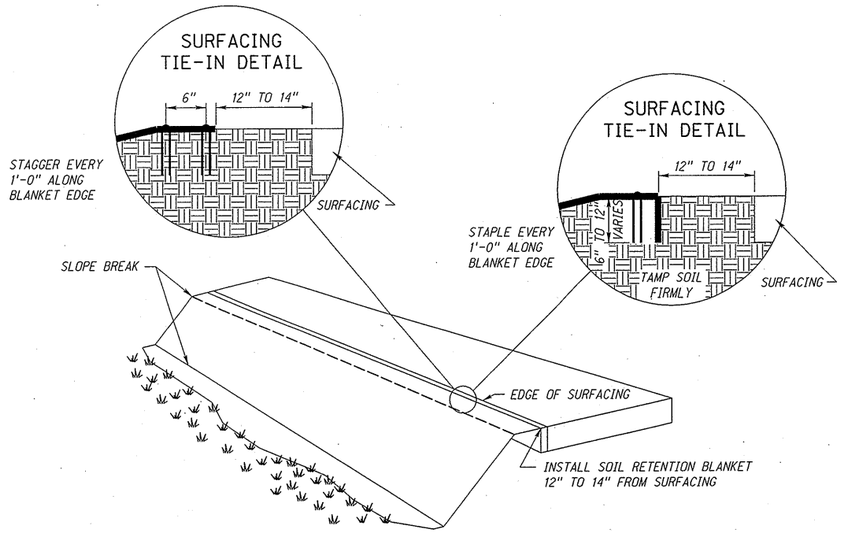
DATE

PROFESSIONAL CIVIL ENGINEER
DAVID S. MAY
NEBRASKA
E-11829
STATE OF NEBRASKA

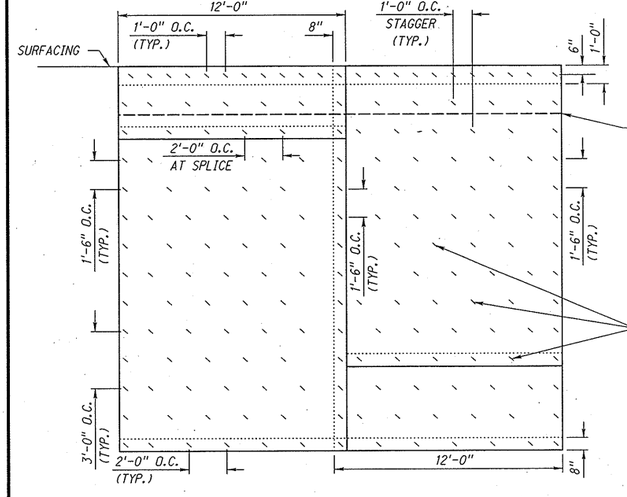
ORIGINAL:
NOVEMBER 14, 1973
DATE



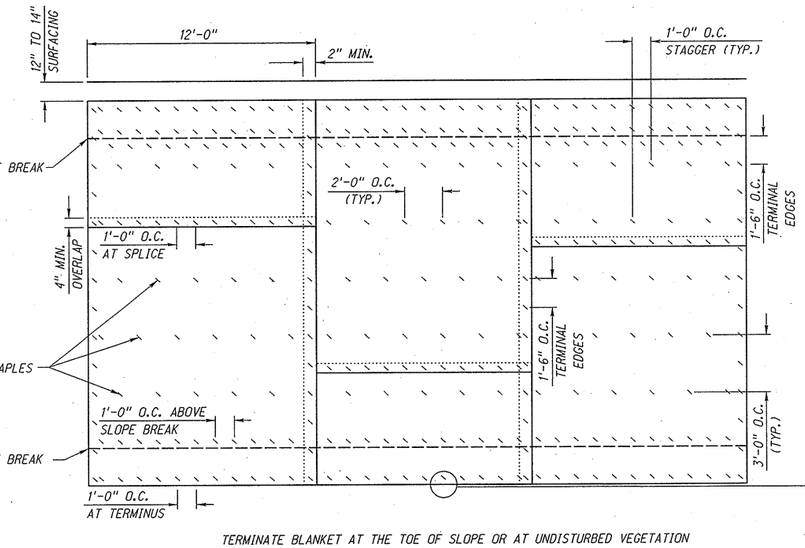
TYPICAL INSTALLATION
CLASS 1A (SLOPE PROTECTION, SAND)



SURFACING INSTALLATION



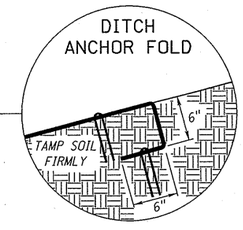
PLAN VIEW STAPLING DIAGRAM FOR
CLASS 1A (SLOPE PROTECTION, SAND)



TERMINATE BLANKET AT THE TOE OF SLOPE OR AT UNDISTURBED VEGETATION

PLAN VIEW STAPLING DIAGRAM FOR
CLASS 1B, 1C, 1D, 1E, 1F, 2A, 2B, & 2C

FOR EDGES ADJOINING AREAS TO BE SEEDED



STAPLE EVERY 1'-0" ALONG BLANKET EDGE

NOTES:

1. THE MANUFACTURERS' RECOMMENDED STAPLING PATTERNS SHALL GOVERN OVER THE PLANS.
2. SURFACING INSTALLATION IS APPLICABLE FOR ASPHALT, CONCRETE, OR BEVELLED EDGE.

REV. NO.	DATE	DESCRIPTION OF REVISION
R7	JAN 18	NDOR BORDER TO NDOT BORDER
R6	APR 14	UPDATE INSTALLATION METHOD
R5	OCT 07	EROSION CONTROL AT SPLASH BASIN

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 501-R7

EROSION CONTROL

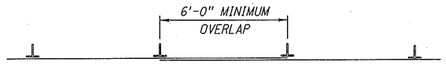
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

David Mray
8-16-2017
DATE

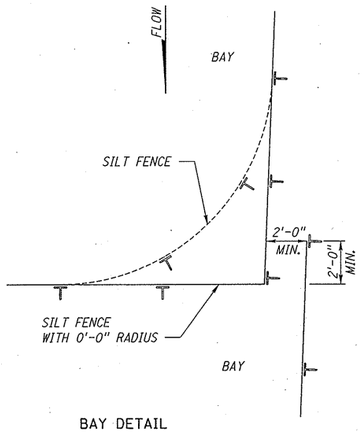
PROFESSIONAL CIVIL ENGINEER — JEANETTE A. WIEMAN — E-11829 — 8/9/17 — STATE OF NEBRASKA

ORIGINAL:
NOVEMBER 14, 1973
DATE

3
3

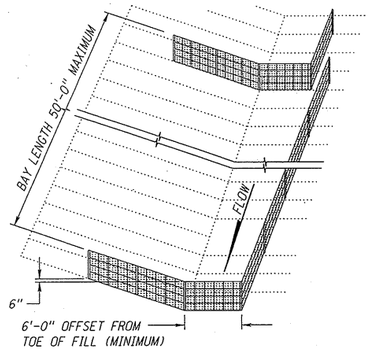


SILT FENCE SPLICE

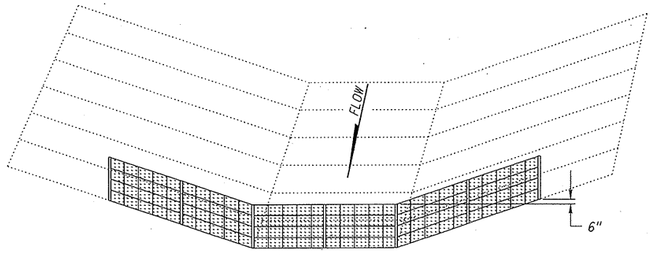


BAY DETAIL

NOTE:
SILT FENCE AT CORNERS SHALL HAVE A RADIUS OF 0'-0" MINIMUM TO 10'-0" MAXIMUM

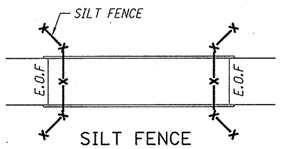


SILT FENCE BAYS

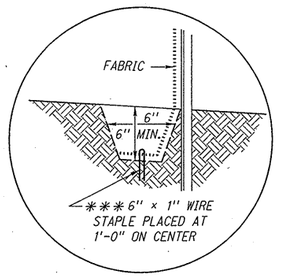


HIGH POROSITY SILT FENCE
(ACROSS DITCH)

NOTE:
POST SPACING 6'-0" MAXIMUM MULTIPLE BAYS MAY BE USED

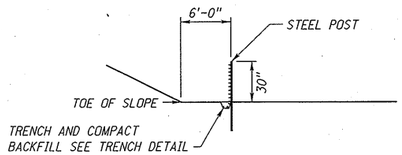


SILT FENCE
(UNDER BRIDGE)

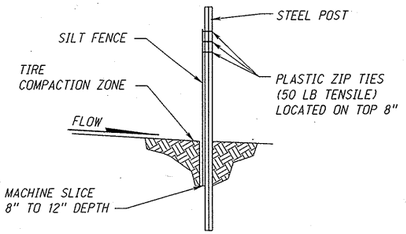


TRENCH DETAIL

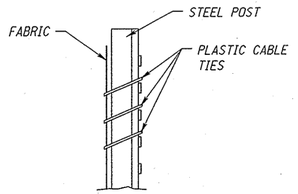
***SILT FENCE MAY ALSO BE INSTALLED WITH A SILT FENCE PLOW. NO STAPLING IS REQUIRED WHEN THE SILT FENCE PLOW IS USED.



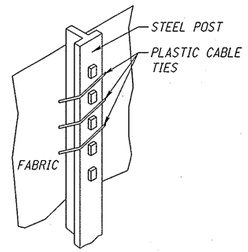
OPTION ONE (PREFERED)
SILT FENCE
(6'-0" OFFSET FROM TOE OF FILL)



SILT FENCE MACHINE SLICED



PROFILE VIEW
ATTACHMENT TO POST



BACK VIEW
ATTACHMENT TO POST

NOTES:

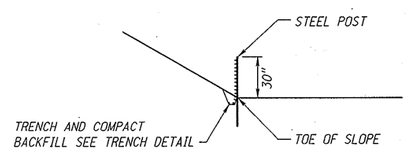
SILT FENCE SHOULD BE 30" ABOVE GRADE (MAY VARY)

SILT FENCE MINIMUM ROLL WIDTH:
- LOW POROSITY = 42"
- HIGH POROSITY = 42"
- LOW PROFILE = 36"
- COIR SILT FENCE = 36"

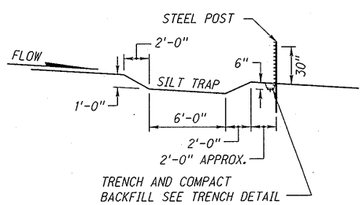
STEEL STUDDED "T" LINE POSTS 5'-6" LENGTH; 6'-0" MAXIMUM SPACING.

FOR EACH STEEL STUDDED "T" LINE POST, 3 PLASTIC CABLE TIES ARE REQUIRED.

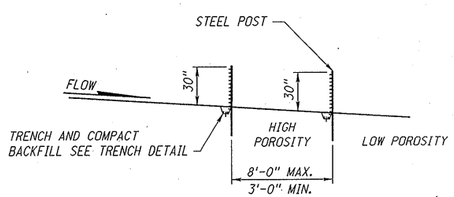
2" x 2" x 6'-0" NOMINAL WOOD STAKES SPACING, 6'-0" MAXIMUM ON CENTER DRIVEN UNTIL FIRM.



OPTION TWO (WITH LIMITED R.O.W.)
SILT FENCE
(AT TOE OF FILL)



HIGH POROSITY SILT
FENCE WITH SILT TRAP
(ACROSS DITCH)



SILT FENCE
(ACROSS DITCH)

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	APR 14	STEEL POST INSTALLATION

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 502-R2

SILT FENCE DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

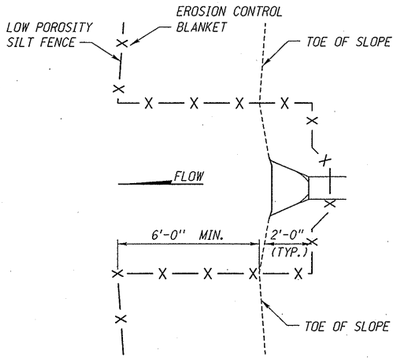
PROFESSIONAL CIVIL ENGINEER
BRANDIE S. HEIMAN
P-11829
STATE OF NEBRASKA

David May
8-16-2017
DATE

ORIGINAL:
DECEMBER 18, 2006
DATE

1/2

ROADWAY DESIGN DIVISION
Computer: DRDESIGN47
User: dor13017
Date: 25-JUL-2017 10:27
File: 50200e02.dgn
Scale: 1:100
SHEET 1 OF 2



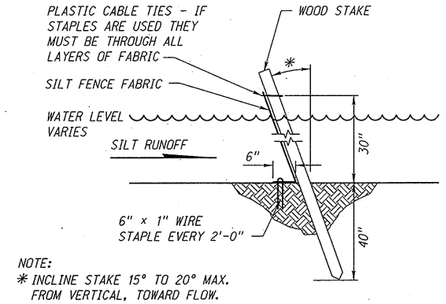
SILT FENCE OUTLET PROTECTION

NOTES:

1. SILT FENCE SHOULD BE BROUGHT FLUSH WITH WING WALLS ON BOX CULVERTS IF IT CAN NOT BE INSTALLED ABOVE THE BOX CULVERT.

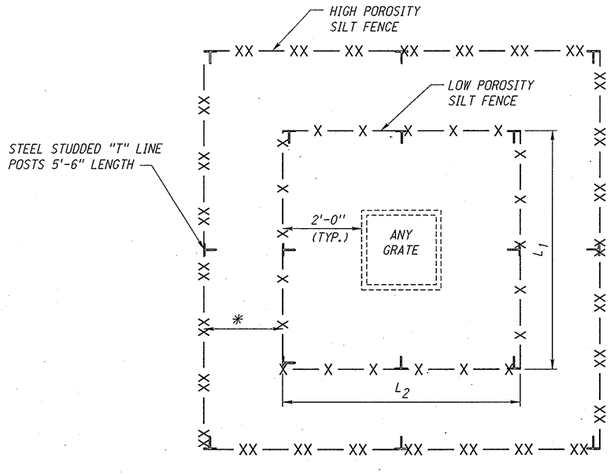
2. IF APPLICABLE, SILT FENCE AROUND THE CULVERT SHOULD BE ADJUSTED TO ALLOW FOR THE INSTALLATION OF EROSION CONTROL AS SHOWN IN STANDARD PLAN 501.

3. SILT CHECKS MAY USED IN PLACE OF SILT FENCE ABOVE THE OPENING OF A CULVERT, AS SHOWN IN SPECIAL PLAN C.



NOTE:
* INCLINE STAKE 15° TO 20° MAX. FROM VERTICAL, TOWARD FLOW.

SILT FENCE
(WET & BELOW WATER INSTALLATION)

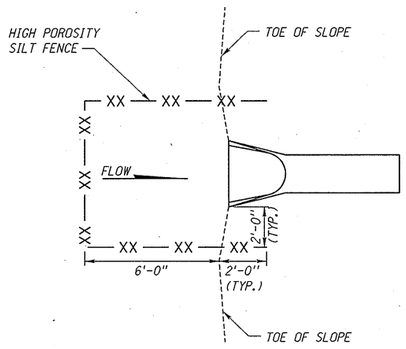


L_1 & L_2 = OUTSIDE OF WALL + 4'-0"

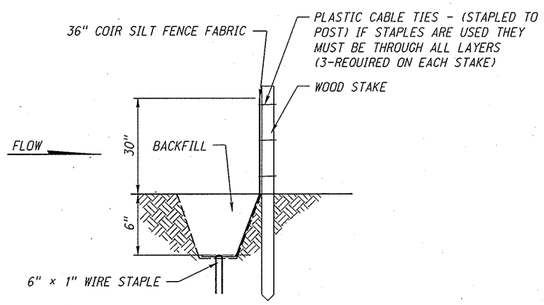
PLAN VIEW

SILT FENCE FOR GRATE, AREA, MEDIAN INLETS OR JUNCTION BOXES

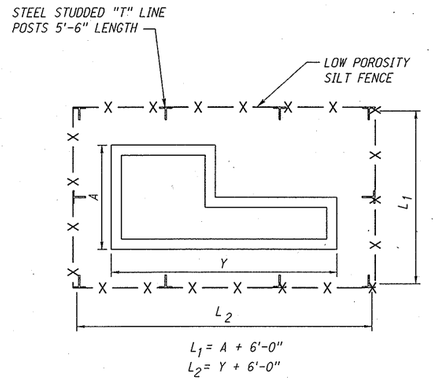
** 3'-0" IF POSSIBLE (MAY VARY)*



SILT FENCE INLET PROTECTION



COIR SILT FENCE - ON WOOD POSTS - DRY INSTALLATION



L_1 = A + 6'-0"
L_2 = Y + 6'-0"

PLAN VIEW

SILT FENCE CURB INLET

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	APR 14	STEEL POST INSTALLATION

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 502-R2

SILT FENCE DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER BRANDON R. NEEMANN NE 11629 STATE OF NEBRASKA

David May
8-16-2017
DATE

ORIGINAL:
DECEMBER 18, 2006
DATE

CONNECTION NOTES:

FOR DIVIDED ROADWAY

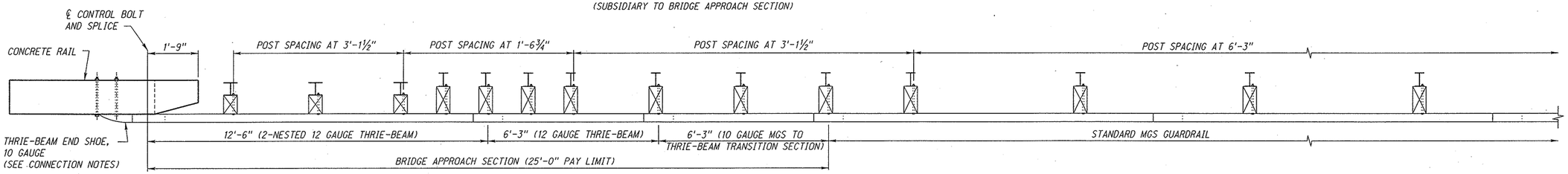
INSTALL THRIE-BEAM END SHOE, BETWEEN NESTED GUARDRAIL ELEMENTS. (SUBSIDIARY TO BRIDGE APPROACH SECTION)

TRAFFIC FLOW ➡

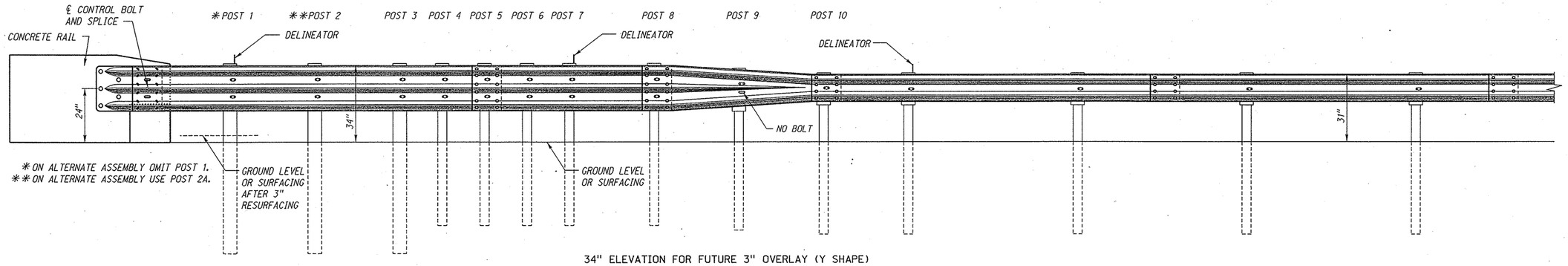
FOR 2-LANE ROADWAY

FOR APPROACHING TRAFFIC INSTALL THRIE-BEAM END SHOE, BETWEEN NESTED GUARDRAIL ELEMENTS. (SUBSIDIARY TO BRIDGE APPROACH SECTION)

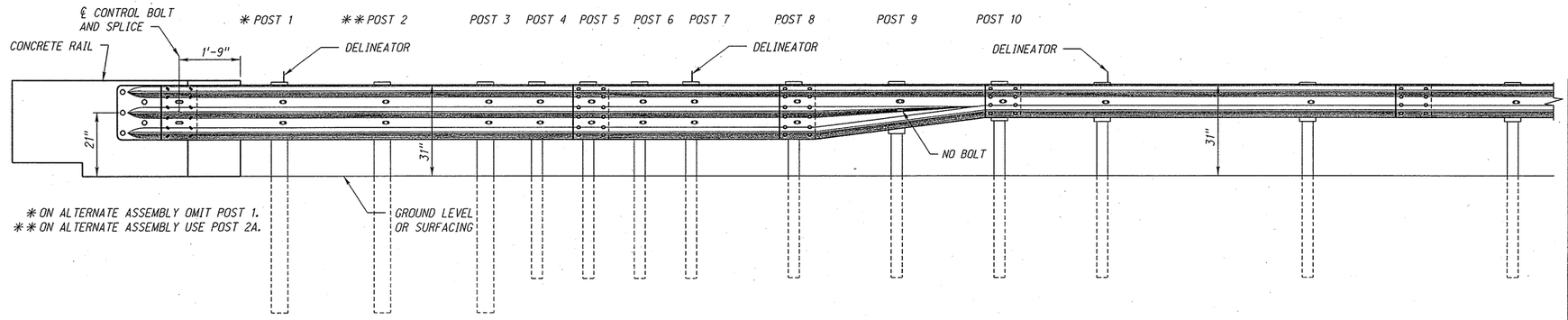
FOR DEPARTING TRAFFIC INSTALL THRIE-BEAM END SHOE, OUTSIDE OF THE NESTED GUARDRAIL ELEMENTS. (SUBSIDIARY TO BRIDGE APPROACH SECTION)



PLAN VIEW



34" ELEVATION FOR FUTURE 3" OVERLAY (Y SHAPE)



31" ELEVATION STANDARD INSTALLATION (ASYMMETRICAL SHAPE)

REV. NO.	DATE	DESCRIPTION OF REVISION
R1	JAN 18	NEW 34 INCH B.A.S.

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 740-R1

MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER — MICHAEL H. OWEN E-6515 — STATE OF NEBRASKA

MARY BURROUGHS 12/15/17 DATE

ORIGINAL: AUGUST 2011 DATE

1/3

ROADWAY DESIGN DIVISION

Computer: NDOTDESIGN61

User: dor13199

Date: 15-DEC-2017 09:01

File: 74000e01.dgn

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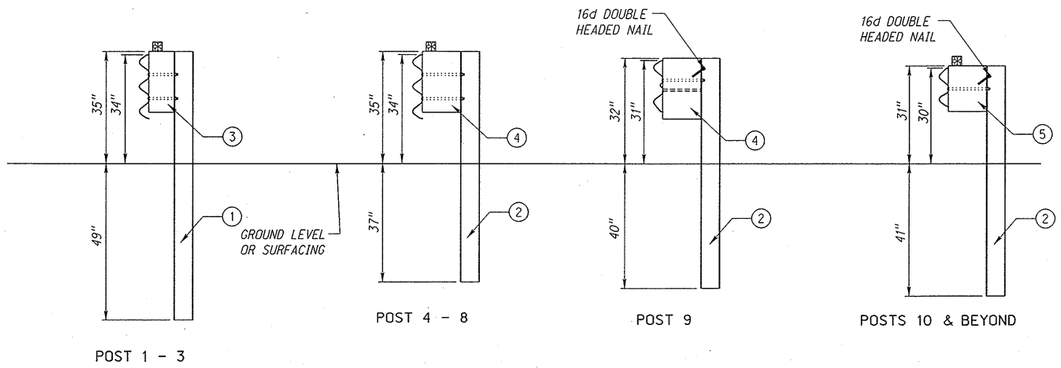
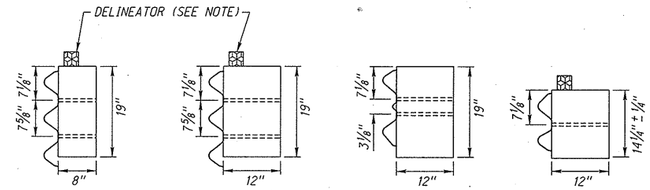


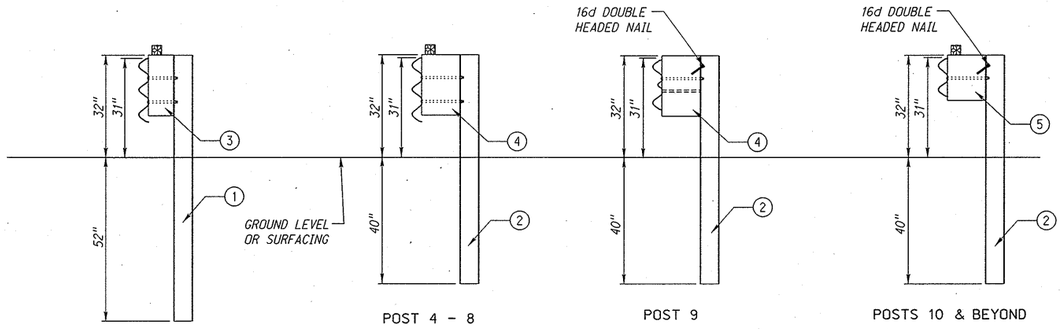
LEGEND

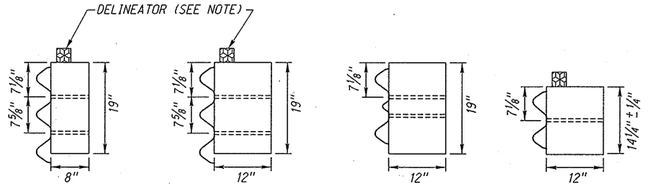
1. W6 × 15 × 7' POST
2. W6 × 9 × 6' POST OR W6 × 8.5 × 6' POST
3. 6" × 8" × 19" OFFSET BLOCK
4. 6" × 12" × 19" OFFSET BLOCK
5. 6" × 12" × 14¼" ± ¼" OFFSET BLOCK



BLOCK DETAILS

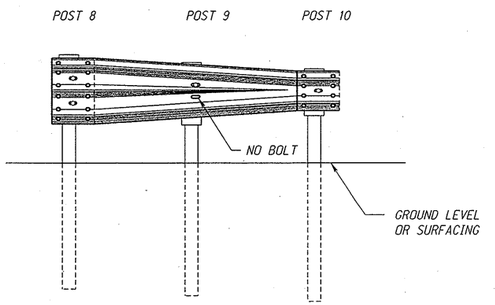
POSTS FOR FUTURE 3" OVERLAY PLACEMENT PRIOR TO 3" OVERLAY USING Y SHAPE W-BEAM



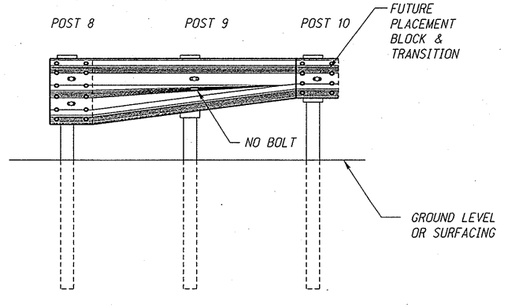


BLOCK DETAILS

POSTS FOR ASYMMETRICAL SHAPE



INSTALLATION PRIOR TO 3" OVERLAY USING Y SHAPE TRANSITION



STANDARD 31" INSTALLATION USING ASYMMETRICAL SHAPE TRANSITION

NOTES:

DELINEATORS SUBSIDIARY TO BRIDGE APPROACH SECTION.

BUTTON HEAD BOLT ⅝" DIA. × LENGTH AS REQUIRED, SECURED WITH HEX NUT.

ALL STEEL MEMBERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

REV. NO.	DATE	DESCRIPTION OF REVISION
R1	JAN 18	NEW 34 INCH B.A.S.

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 740-R1

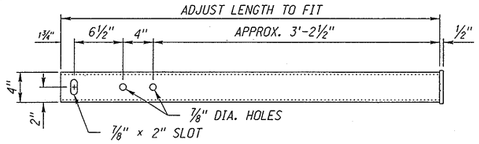
MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

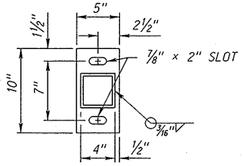
PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
STATE OF NEBRASKA

MARY BURROUGHS
12/15/17
DATE

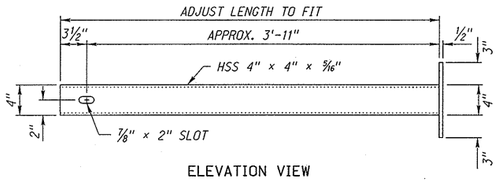
ORIGINAL:
AUGUST 2011
DATE



PLAN VIEW

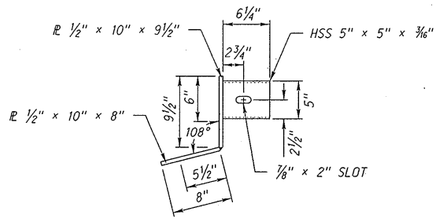


SIDE VIEW
℄ ½" x 10" x 5"

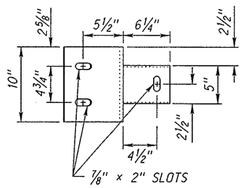


ELEVATION VIEW

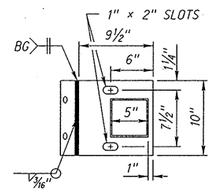
RAIL DETAIL



TOP VIEW

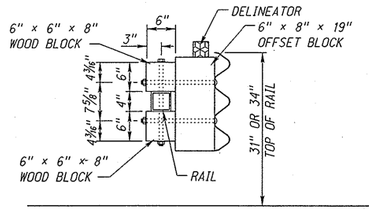


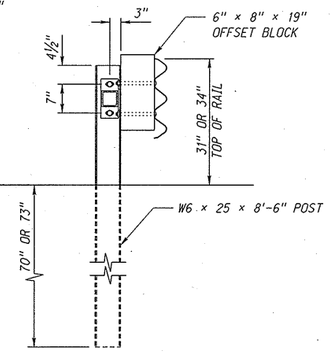
ELEVATION VIEW



SIDE VIEW

END BRACKET DETAIL





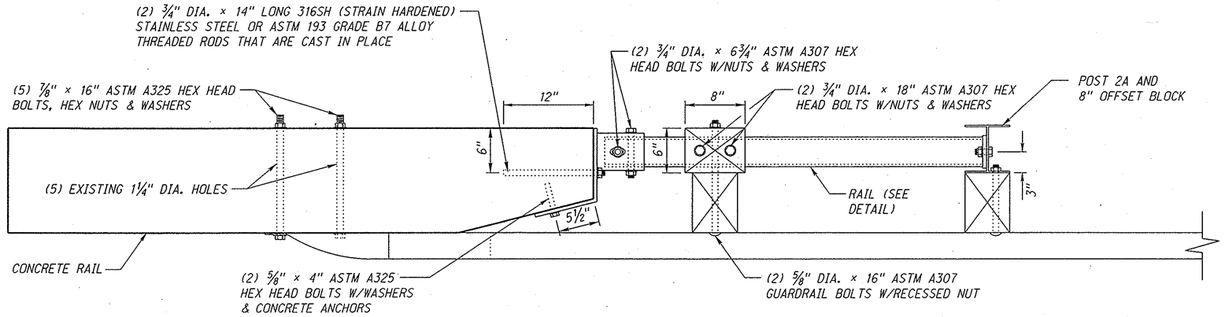
MIDSPAN RAIL SUPPORT

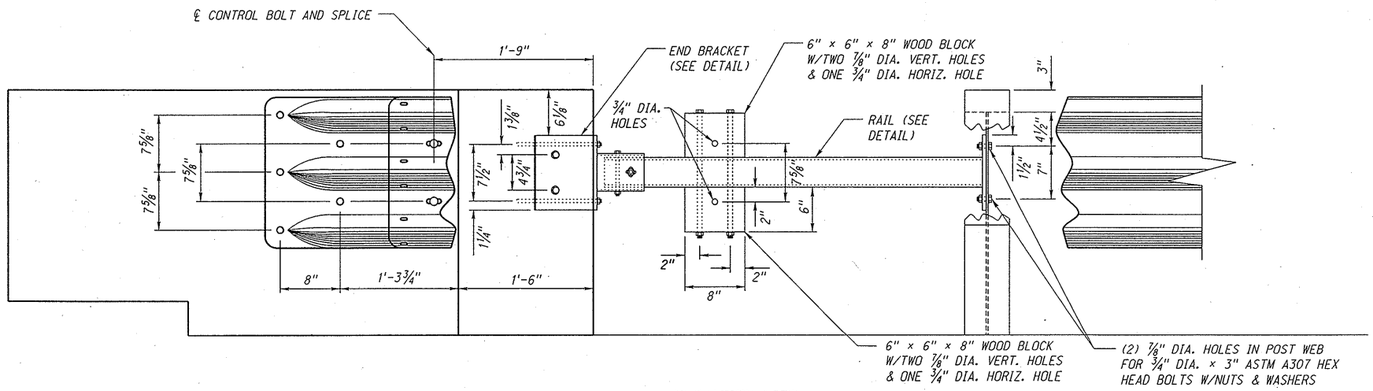
NOTE:

OFFSET BLOCK LISTED ON THE APPROVED PRODUCTS LIST MAY ALSO BE USED.

POST 2A

SIDE VIEW





ELEVATION VIEW

MIDSPAN RAIL SUPPORT DETAIL

MUST USE POST 2A (W6 x 25 x 8'-6")

NOTE:

ALL STEEL MEMBERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

IN LIEU OF THE CAST IN PLACE ¾" DIA. x 14" ANCHOR BOLTS, THE CONTRACTOR MAY GROUT ¾" DIA. x 12" BOLTS INTO ⅞" DIA. x 12" DRILLED HOLES. ALL GROUT USED SHALL BE AN APPROVED NON-SHRINK GROUT. FOR ⅝" DIA. BOLTS USE ¾" DIA. HOLES. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR THIS OPTION.

REV. NO.	DATE	DESCRIPTION OF REVISION
R1	JAN 18	NEW 34 INCH B.A.S.

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 740-R1

MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
STATE OF NEBRASKA

Mary Burroughs
MARY BURROUGHS
12/15/17
DATE

ORIGINAL:
AUGUST 2011
DATE

3
3

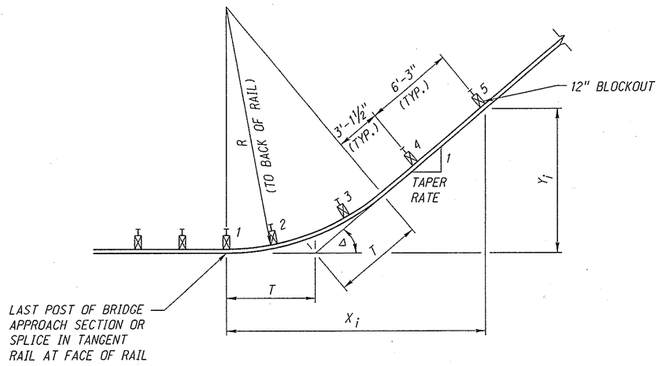
POST SPACING = 6.25'
POST NO. 1: X = 0 & Y = 0

TABLE A		
DEFLECTION, Δ = 1°54'33"		
TAPER = 30:1		
RADIUS, R = 375.10'		
TANGENT, T = 6.25'		
POST NUMBER	X_i	Y_i
1	0.0	0.0
2	3.1	0.0
3	9.4	0.1
4	15.6	0.3
5	21.8	0.5
6	28.1	0.7
7	34.3	0.9
8	40.6	1.1
9	46.8	1.4
10	53.1	1.6
11	59.3	1.8
12	65.6	2.0
13	71.8	2.2
14	78.1	2.4
15	84.3	2.6
16	90.6	2.8
17	96.8	3.0
18	103.1	3.2
19	109.3	3.4
20	115.6	3.6
21	121.8	3.9
22	128.1	4.1
23	134.3	4.3
24	140.6	4.5
25	146.8	4.7
26	153.1	4.9
27	159.3	5.1
28	165.5	5.3
29	171.8	5.5
30	178.0	5.7
31	184.3	5.9
32	190.5	6.1
33	196.8	6.4
34	203.0	6.6
35	209.3	6.8
36	215.5	7.0
37	221.8	7.2
38	228.0	7.4
39	234.3	7.6
40	240.5	7.8
41	246.8	8.0
42	253.0	8.2
43	259.2	8.4
44	265.5	8.7
45	271.7	8.8
46	278.0	9.1
47	284.2	9.3
48	290.5	9.5
49	296.7	9.7
50	303.0	9.9
51	309.2	10.1
52	315.5	10.3
53	321.7	10.5
54	328.0	10.7
55	334.2	10.9
56	340.4	11.1
57	346.7	11.3
58	352.9	11.6
59	359.2	11.8
60	365.4	12.0

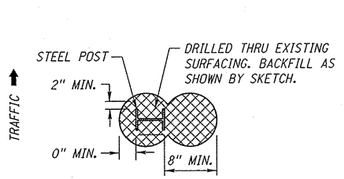
TABLE B		
DEFLECTION, Δ = 2°17'26"		
TAPER = 25:1		
RADIUS, R = 312.67'		
TANGENT, T = 6.25'		
POST NUMBER	X_i	Y_i
1	0.0	0.0
2	3.1	0.0
3	9.4	0.1
4	15.6	0.4
5	21.9	0.6
6	28.1	0.9
7	34.4	1.1
8	40.6	1.4
9	46.9	1.6
10	53.1	1.9
11	59.3	2.1
12	65.6	2.4
13	71.8	2.6
14	78.1	2.6
15	84.3	3.1
16	90.6	3.4
17	96.8	3.6
18	103.1	3.9
19	109.3	4.1
20	115.6	4.4
21	121.8	4.6
22	128.0	4.9
23	134.3	5.1
24	140.5	5.4
25	146.8	5.6
26	153.0	5.9
27	159.3	6.1
28	165.5	6.4
29	171.8	6.6
30	178.0	6.9
31	184.2	7.1
32	190.5	7.4
33	196.7	7.6
34	202.0	7.9
35	209.2	8.1
36	215.5	8.4
37	221.8	8.6
38	228.0	8.9
39	234.2	9.1
40	240.5	9.4
41	246.7	9.6
42	253.0	9.9
43	259.2	10.1
44	265.4	10.4
45	271.7	10.6
46	278.0	10.9
47	284.2	11.1
48	290.4	11.4
49	296.7	11.6
50	302.9	11.9
51	309.1	12.1
52	315.4	12.4
53	321.6	12.6
54	327.9	12.9
55	334.1	13.1
56	340.4	13.4
57	346.6	13.6
58	352.9	13.9
59	359.1	14.1
60	365.4	14.4

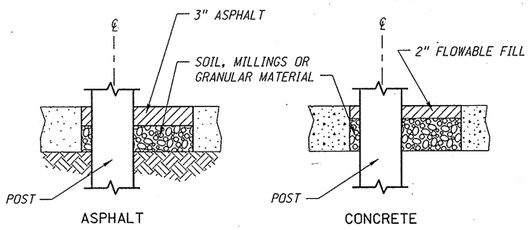
TABLE C		
DEFLECTION, Δ = 2°51'44"		
TAPER = 20:1		
RADIUS, R = 250.20'		
TANGENT, T = 6.25'		
POST NUMBER	X_i	Y_i
1	0.0	0.0
2	3.1	0.0
3	9.4	0.2
4	15.6	0.5
5	21.9	0.8
6	28.1	1.1
7	34.4	1.4
8	40.6	1.7
9	46.8	2.0
10	53.1	2.3
11	59.3	2.7
12	65.6	3.0
13	71.8	3.3
14	78.1	3.6
15	84.3	3.9
16	90.5	4.2
17	96.8	4.5
18	103.0	4.8
19	109.3	5.1
20	115.6	5.5
21	121.7	5.8
22	128.0	6.1
23	134.2	6.4
24	140.5	6.7
25	146.7	7.0
26	153.0	7.3
27	159.2	7.6
28	165.4	8.0
29	171.7	8.3
30	177.9	8.6
31	184.2	8.9
32	190.4	9.2
33	196.7	9.5
34	202.9	9.8
35	209.1	10.1
36	215.4	10.4
37	221.6	10.8
38	227.9	11.0
39	234.1	11.4
40	240.3	11.7
41	246.6	12.0
42	252.8	12.3
43	259.0	12.6
44	265.3	12.9
45	271.6	13.3
46	277.8	13.6
47	284.0	13.9
48	290.3	14.2
49	296.5	14.5
50	302.8	14.8
51	309.0	15.1
52	315.3	15.4
53	321.5	15.7
54	327.7	16.1
55	334.0	16.4
56	340.2	16.7
57	346.5	17.0
58	352.7	17.3
59	359.0	17.6
60	365.2	17.9

TABLE D		
DEFLECTION, Δ = 3°48'51"		
TAPER = 15:1		
RADIUS, R = 187.77'		
TANGENT, T = 6.25'		
POST NUMBER	X_i	Y_i
1	0.0	0.0
2	3.1	0.0
3	9.4	0.2
4	15.6	0.6
5	21.9	1.0
6	28.1	1.5
7	34.3	1.9
8	40.6	2.3
9	46.8	2.7
10	53.0	3.1
11	59.3	3.5
12	65.5	4.0
13	71.8	4.4
14	78.0	4.8
15	84.2	5.2
16	90.5	5.6
17	96.7	6.0
18	102.9	6.4
19	109.2	6.9
20	115.4	7.3
21	121.6	7.7
22	127.9	8.1
23	134.1	8.5
24	140.4	8.9
25	146.6	9.3
26	152.8	9.8
27	159.0	10.2
28	165.3	10.6
29	171.5	11.0
30	177.8	11.4
31	184.0	11.8
32	190.2	12.2
33	196.5	12.7
34	202.7	13.1
35	209.0	13.5
36	215.2	13.9
37	221.4	14.3
38	227.7	14.7
39	233.9	15.1
40	240.1	15.6
41	246.4	16.0
42	252.6	16.4
43	258.8	16.8
44	265.0	17.2
45	271.3	17.6
46	277.5	18.1
47	283.8	18.5
48	290.0	18.9
49	296.3	19.3
50	302.5	19.7
51	308.7	20.1
52	315.0	20.5
53	321.2	21.0
54	327.4	21.4
55	333.7	21.8
56	339.9	22.2
57	346.1	22.6
58	352.4	23.0
59	358.6	23.4
60	364.9	23.9

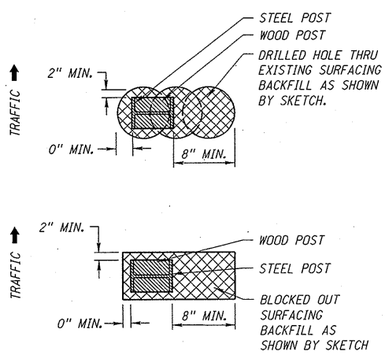


NOTE
THE X_i AND Y_i DISTANCES FOUND IN THE TABLES SHALL BE MEASURED FROM A LINE THAT PARALLELS THE EDGE OF THE PAVEMENT.





DETAIL OF BACKFILLING AROUND POST



GUARDRAIL POSTS IN SURFACING

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	DEC 16	UPDATED GUARDRAIL OFFSET TABLE

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 743-R2

GUARDRAIL DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
12-15-17
STATE OF NEBRASKA

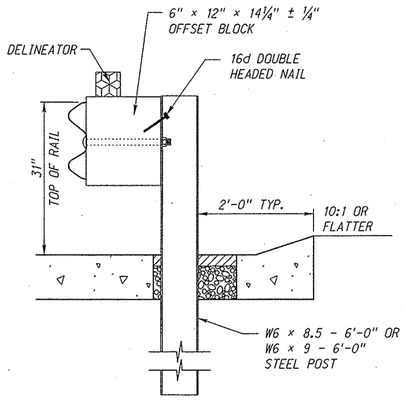
Mark Bowers for MICHAEL H. OWEN
12/15/17
DATE

ORIGINAL:
AUGUST 25, 2011
DATE

1/4

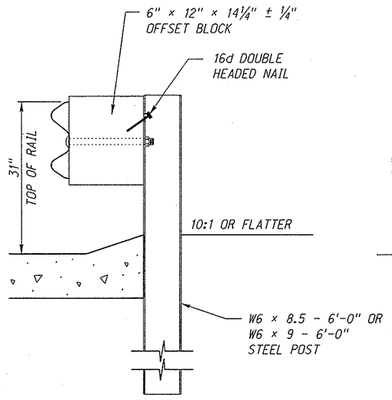
ROADWAY DESIGN DIVISION

Computer: NDOTDESIGN61
User: dor13199
Date: 15-DEC-2017 09:01
File: 74300e02.dgn
Scale: 1:100

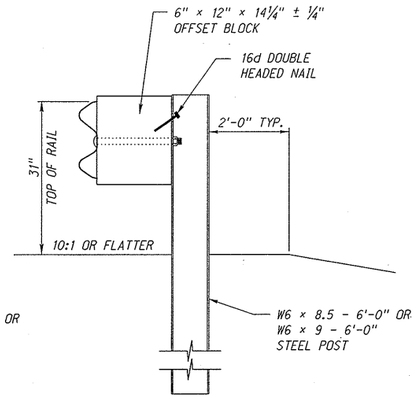


SIDE VIEW

CURBED LOCATIONS:

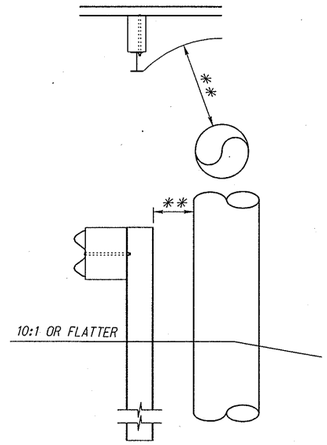


SIDE VIEW



SIDE VIEW

NON-CURBED LOCATIONS:

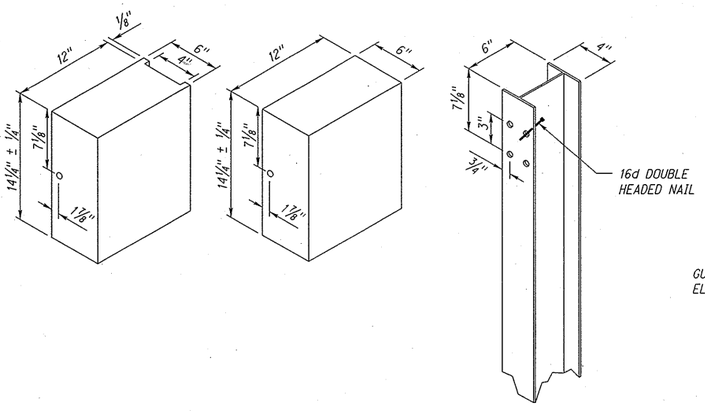


MINIMUM REQUIRED GUARDRAIL OFFSET	
FROM BACK OF POST TO A POINT OBSTACLE (e.g. PIER COLUMN)**	
GUARDRAIL INSTALLATION TYPE	MINIMUM OFFSET*
THREE STRAND CABLE GUARDRAIL (LOW-TENSION)	12'-0" (4'-0" AND 16'-0" POST SPACING)
CABLE GUARDRAIL (HIGH-TENSION)	7'-0" TO 12'-0", DEPENDING ON THE SYSTEM
MIDWEST GUARDRAIL SYSTEM (MGS) & W-BEAM GUARDRAIL*	3'-0" 10'-0" FOR NORMAL POST SPACING (6'-3") 3'-5" FOR ½ POST SPACING 3'-1½") 2'-6" FOR ¼ POST SPACING (1'-6¾")
THRIE-BEAM GUARDRAIL	2'-3" FOR NORMAL POSTS SPACING 6'-3")
FROM BACK OF POST TO A LINEAR OBSTRUCTION (e.g. MSE WALL)	
MGS & W-BEAM GUARDRAIL	4'-1" FROM NORMAL POST SPACING (6'-3") 3'-5" FOR ½ POST SPACING (3'-1½") 2'-6" FOR ¼ POST SPACING (1'-6¾")
THRIE-BEAM GUARDRAIL	2'-10" FOR NORMAL POST SPACING (6'-3")

* BASED ON THE DYNAMIC DEFLECTIONS FROM THE NCHRP REPORT 350 STANDARD STRENGTH TEST FOR THE 4,400 LB. PICKUP TRUCK IMPACTING A BARRIER AT AN ANGLE OF 25° AT A VELOCITY OF 60 MPH.

** ADJUST THE POSTS LONGITUDINALLY SO THAT THEY WILL NOT BE PLACED DIRECTLY OPPOSITE A POINT OBSTACLE (E.G. PIER COLUMN, TREE). THE MINIMUM OFFSET BETWEEN THE BACK OF THE GUARDRAIL POST AND THE POINT OBSTACLE MAY BE FOUND IN THE TABLE ABOVE.

MINIMUM GUARDRAIL OFFSETS WHEN ADJACENT TO A FIXED OBSTACLE



NOTES:

ALL HOLE DIAMETERS ARE ¾"

W6 x 8.5 OR W6 x 9 POST & 14¼" ± ¼" OFFSET BLOCKS, TO BE USED WITH MGS INSTALLATIONS.

OFFSET BLOCKS LISTED ON THE APPROVED PRODUCTS LIST MAY ALSO BE USED.

16d NAIL NEEDS TO BE PUT IN OFFSET BLOCK AGAINST POST IN EMPTY HOLE AS NEEDED TO PREVENT ROTATION WHEN NO RIBS ARE PRESENT.

ALTERNATE OFFSET BLOCK & STEEL POST
(FOR W-BEAM)

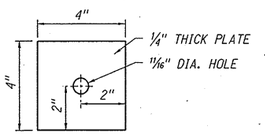
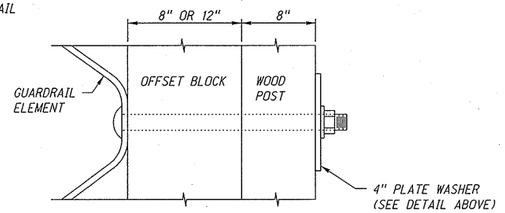
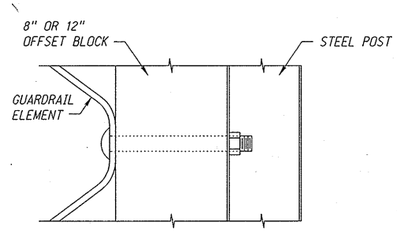


PLATE WASHER



WOOD POST BOLT ASSEMBLY



STEEL POST BOLT ASSEMBLY

DELINEATOR NOTES:

4 LANE: YELLOW ON LEFT AND WHITE ON RIGHT.
2 LANE: WHITE ON BOTH SIDES.

DELINEATORS ARE A MINIMUM OF 3" HIGH AND ARE DOUBLE-FACED HIGH INTENSITY DELINEATORS ON 2 LANE ROADWAYS, SINGLE-FACED HIGH INTENSITY DELINEATORS ON 4 LANE ROADWAYS.

WHEN GUARDRAIL IS ATTACHED TO A BRIDGE APPROACH SECTION: GUARDRAIL DELINEATION AT 12'-6" SPACING FOR THE FIRST 50', THEN 25' SPACING WHEN THE REMAINING GUARDRAIL LENGTH IS 150' OR LESS; USE 50' SPACING WHEN THE REMAINING GUARDRAIL LENGTH IS GREATER THAN 150'.

WHEN GUARDRAIL IS INDEPENDENT OF A BRIDGE: GUARDRAIL DELINEATION AT 25' SPACING WHEN THE GUARDRAIL LENGTH IS 200' OR LESS; USE 50' SPACING WHEN THE GUARDRAIL LENGTH IS GREATER THAN 200'.

DELINEATORS SUBSIDIARY TO GUARDRAIL.

NOTES:

BUTTON HEAD BOLT ⅝" DIA. × LENGTH AS REQUIRED, SECURED WITH HEX NUT.

ALL STEEL MEMBERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

POST SPACING SHALL BE 6'-3" UNLESS OTHERWISE NOTED IN THE PLANS.

GUARDRAIL LAPPING PROCEDURE ..... TRAFFIC FLOW ➡

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	DEC 16	UPDATED GUARDRAIL OFFSET TABLE

NEBRASKA DEPARTMENT OF TRANSPORTATION
STANDARD PLAN NO. 743-R2

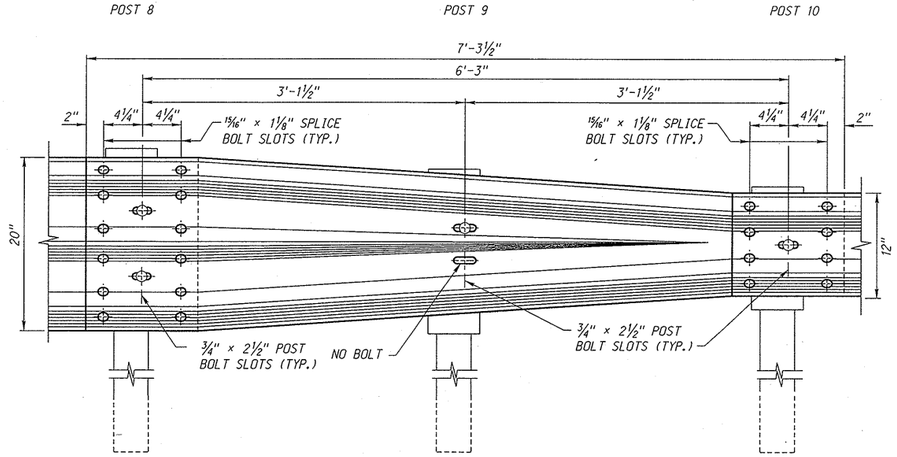
GUARDRAIL DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

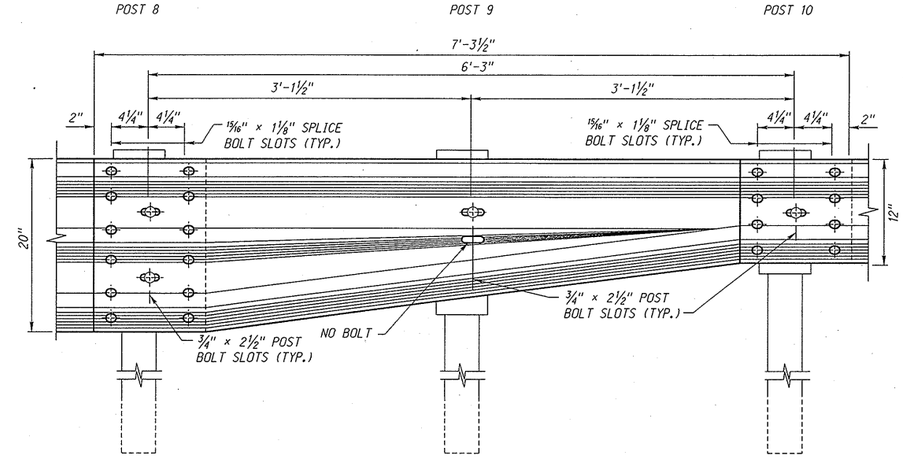
PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
12-15-17
STATE OF NEBRASKA

MARK BOHAC
12/15/17
DATE

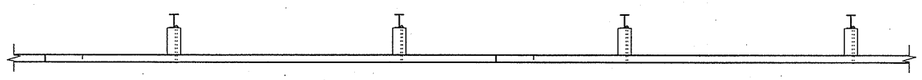
ORIGINAL:
AUGUST 25, 2011
DATE



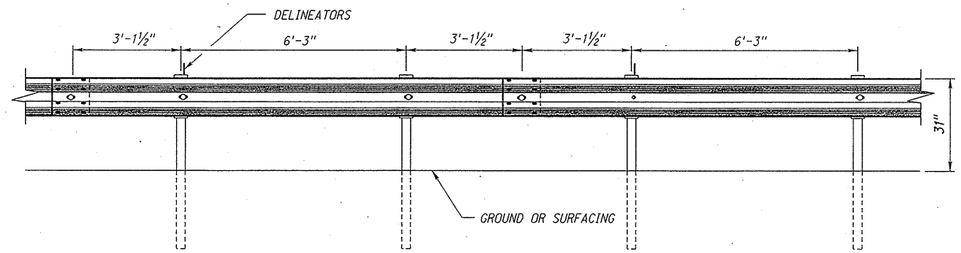
W-THRIE BEAM TRANSITION (10 GAUGE)
(34" ELEVATION FOR FUTURE 3" OVERLAY Y SHAPE)



W-THRIE BEAM TRANSITION (10 GAUGE)
31" ELEVATION (ASYMMETRICAL SHAPE)

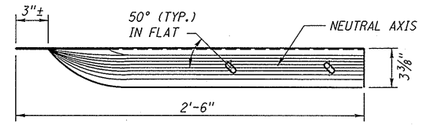


PLAN

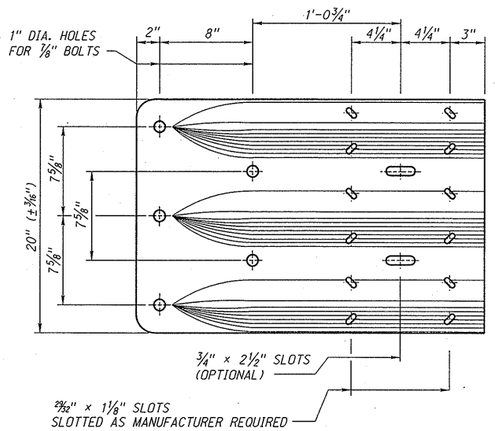


ELEVATION

MIDWEST GUARDRAIL SYSTEM (MGS) INSTALLATION
(PAID FOR AS W-BEAM GUARDRAIL)



PLAN



ELEVATION

THRIE-BEAM END SHOE

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	DEC 16	UPDATED GUARDRAIL OFFSET TABLE

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 743-R2

GUARDRAIL DETAILS

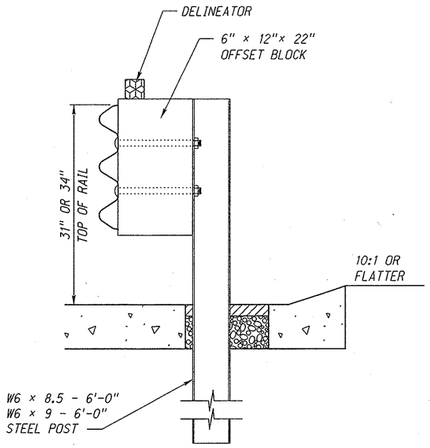
ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER — MICHAEL H. OWEN E-6515 — 12-6-17 — STATE OF NEBRASKA

MARY BURROWS
12/15/17
DATE

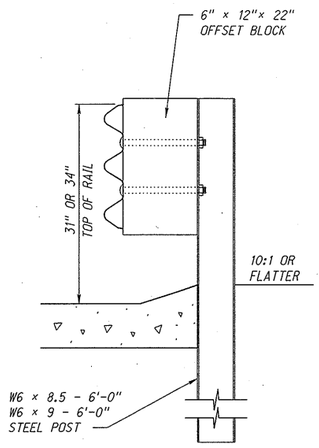
ORIGINAL:
AUGUST 25, 2011
DATE

3
4

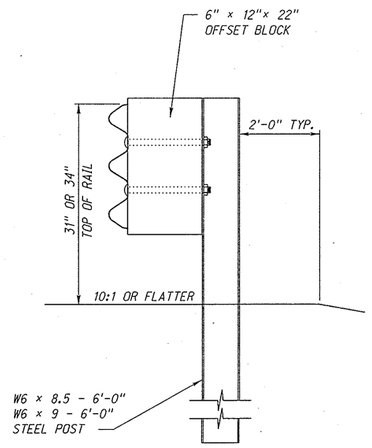


SIDE VIEW

TRHIE-BEAM (CURBED LOCATIONS)

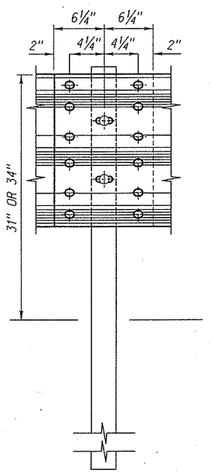


SIDE VIEW

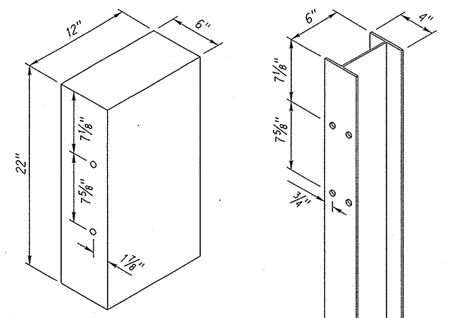


SIDE VIEW

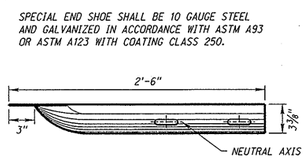
THRIE-BEAM (NON-CURBED LOCATIONS)



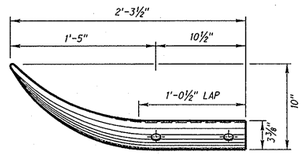
RAIL ELEMENT SPLICING AND POST MOUNTING DETAIL FOR ¼ OR ½ POST SPACING



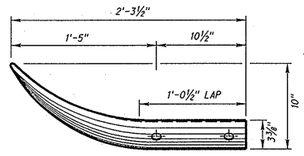
OFFSET BLOCK & STEEL POST
(FOR THRIE-BEAM)



PLAN



PLAN



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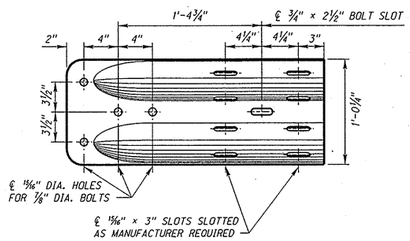
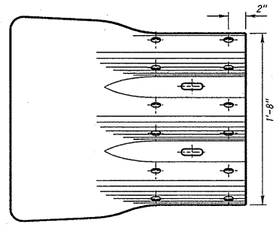


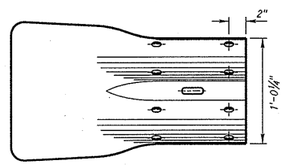
ELEVATION

W-BEAM END SHOE



ELEVATION

THRIE-BEAM TERMINAL SECTION



ELEVATION

W-BEAM TERMINAL SECTION

NOTES:

ALL HOLE DIAMETERS ARE ¾"

W6 x 8.5 POST & W6 x 9 & 22" OFFSET BLOCK, TO BE USED WITH THRIE-BEAM GUARDRAIL INSTALLATIONS.

OFFSET BLOCKS LISTED ON THE APPROVED PRODUCTS LIST MAY ALSO BE USED.

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	DEC 16	UPDATED GUARDRAIL OFFSET TABLE

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 743-R2

GUARDRAIL DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER
MICHAEL H. OWEN
E-6515
12-15-17
STATE OF NEBRASKA

MARY BUHRMESTER
12/15/17
DATE

ORIGINAL:
AUGUST 25, 2011
DATE

4
4

ROADWAY DESIGN DIVISION
Computer: DRDESIGN147
User: dor13017
Date: 17-AUG-2017 15:54
File: 92000e07.dgn
Scale: 1:100
SHEET 1 OF 3

CHANNELIZATION DEVICES

THE FUNCTION OF CHANNELIZATION DEVICES IS TO WARN ROAD USERS OF CONDITIONS CREATED BY WORK ACTIVITIES IN OR NEAR THE TRAVELED WAY, TO PROTECT WORKERS IN THE TEMPORARY TRAFFIC CONTROL ZONE, AND TO GUIDE DRIVERS AND PEDESTRIANS SAFELY. CHANNELIZING DEVICES INCLUDE BUT ARE NOT LIMITED TO CONES, TUBULAR POSTS, VERTICAL PANELS, DRUMS, BARRICADES, TRAFFIC LANE DIVIDERS, TEMPORARY RAISED ISLANDS, AND BARRIERS.

DEVICES USED FOR CHANNELIZATION SHOULD PROVIDE FOR SMOOTH AND GRADUAL TRAFFIC MOVEMENT FROM ONE LANE TO ANOTHER, ONTO A BYPASS OR DETOUR, OR TO REDUCE THE WIDTH OF THE TRAVELED WAY. THEY MAY ALSO BE USED TO SEPARATE TRAFFIC FROM THE WORK SPACE, PAVEMENT DROP-OFFS, PEDESTRIAN PATHS, OR OPPOSING DIRECTIONS OF TRAFFIC.

CHANNELIZING DEVICES SHALL MEET THE CRASHWORTHY PERFORMANCE CRITERIA CONTAINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH). THEY SHOULD BE CONSTRUCTED AND BALLASTED TO PERFORM IN A PREDICTABLE MANNER WHEN INADVERTENTLY STRUCK BY A VEHICLE. IF STRUCK, THE DEVICE SHOULD YIELD OR BREAK AWAY, FRAGMENTS OR OTHER DEBRIS FROM THE DEVICE SHOULD NOT PENETRATE THE PASSENGER COMPARTMENT OF THE VEHICLE OR BE A POTENTIAL HAZARD TO WORKERS OR PEDESTRIANS IN THE IMMEDIATE AREA.

SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO THE SPEED WHEN USED FOR THE TAPER CHANNELIZATION, AND A DISTANCE IN FEET OF TWICE THE SPEED WHEN USED FOR TANGENT CHANNELIZATION.

SPACING OF CHANNELIZATION DEVICES		
SPEED (MPH) S	SPACING OF DEVICES (FEET)	
	TAPER	TANGENT
25	25	50
35	35	70
45	45	90
55	55	110
60	60	120
65	65	130
75	75	150

WARNING LIGHTS MAY BE ADDED TO CHANNELIZING DEVICES IN AREAS WITH FREQUENT FOG, SNOW, OR SEVERE ROADWAY CURVATURE, OR WHERE VISUAL DISTRACTIONS ARE PRESENT, EXCEPT FOR THE SEQUENTIAL FLASHING WARNING LIGHTS, WARNING LIGHTS PLACED ON CHANNELIZING DEVICES USED IN A SERIES TO CHANNELIZE ROAD USERS SHALL BE STEADY-BURN.

THE RETROREFLECTIVE MATERIAL USED ON CHANNELIZING DEVICES SHALL HAVE A SMOOTH, SEALED OUTER SURFACE, MEETING THE REQUIREMENTS OF THE ASTM SPECIFICATION D4956, FOR TYPE IV SHEETING OR TYPE V REBOUNDABLE SHEETING (OR GREATER).

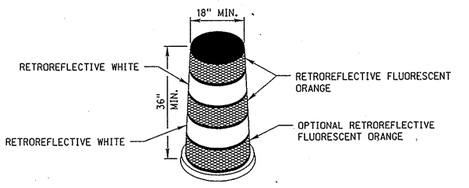
COEFFICIENT OF RETROREFLECTION (CD/LUX/M^2)			
WHITE	ORANGE	RED	YELLOW
250	100	45	170

THE AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) "QUALITY GUIDELINES FOR WORK ZONE TRAFFIC CONTROL DEVICES" SHALL BE USED AS A VISUAL GUIDE FOR DETERMINING IF A TRAFFIC CONTROL DEVICE/OR SIGN IS ACCEPTABLE, MARGINAL OR UNACCEPTABLE.

THE NAME AND TELEPHONE NUMBER OF THE AGENCY, CONTRACTOR, OR SUPPLIER MAY BE SHOWN ON THE CHANNELIZING DEVICE BACK OR SUPPORT, BUT NOT ON THE DEVICE FACE. THE LETTERS AND NUMBERS SHALL BE A NON-REFLECTIVE COLOR AND NOT OVER 15 SQUARE INCHES IN TOTAL AREA.

PARTICULAR ATTENTION SHOULD BE GIVEN TO MAINTAINING THE CHANNELIZING DEVICES TO KEEP THEM CLEAN, VISIBLE, AND PROPERLY POSITIONED. DEVICES SHALL BE REPLACED THAT ARE DAMAGED AND/OR HAVE LOST A SIGNIFICANT AMOUNT OF THEIR RETROREFLECTIVITY AND EFFECTIVENESS.

REFLECTORIZED PLASTIC DRUMS



DESIGN

REFLECTORIZED PLASTIC DRUMS USED FOR TRAFFIC WARNING OR CHANNELIZATION SHALL BE CONSTRUCTED OF LIGHTWEIGHT, FLEXIBLE, AND DEFORMABLE MATERIALS AND BE A MINIMUM OF 36 INCHES IN HEIGHT AND HAVE A MINIMUM WIDTH OF AT LEAST A 18 INCHES, REGARDLESS OF ORIENTATION. THE PREDOMINANT COLOR OF THE DRUM SHALL BE ORANGE. METAL DRUMS SHALL NOT BE USED. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, SHALL BE CIRCUMFERENTIAL, AND SHALL DISPLAY FOUR 6 INCH WIDE BANDS OF RETROREFLECTIVE SHEETING, ALTERNATING FLUORESCENT ORANGE-WHITE-FLUORESCENT ORANGE-WHITE. DRUMS SHALL HAVE CLOSED TOPS THAT WILL NOT ALLOW COLLECTION OF CONSTRUCTION OR OTHER DEBRIS.

APPLICATION

DRUMS ARE MOST COMMONLY USED TO CHANNELIZE OR DELINEATE TRAFFIC FLOW BUT MAY ALSO BE USED INDIVIDUALLY OR IN GROUPS TO MARK SPECIFIC LOCATIONS. DRUMS ARE HIGHLY VISIBLE AND HAVE GOOD TARGET VALUE; THEY GIVE THE APPEARANCE OF BEING FORMIDABLE OBSTACLES AND, THEREFORE, COMMAND THE RESPECT OF ROAD USERS.

BALLAST SHALL NOT BE PLACED ON TOP OF THE DRUM. DRUMS SHOULD NOT BE WEIGHTED WITH SAND, WATER, OR ANY MATERIAL.

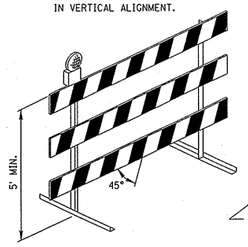
BARRICADES

BARRICADE TYPE	TYPE II	TYPE III
WIDTH OF RAIL ✱	8 INCHES MIN. - 12 INCHES MAX.	8 INCHES MIN. - 12 INCHES MAX.
LENGTH OF RAIL	36 INCHES	8 FEET ✱✱
WIDTH OF STRIPES	6 INCHES	6 INCHES
HEIGHT	36 INCHES	5 FEET
REFLECTIVE SHEETING	TYPE IV	TYPE IV
NUMBER OF REFLECTORIZED RAIL FACES	4 (TWO EACH DIRECTION)	6 (THREE EACH DIRECTION)

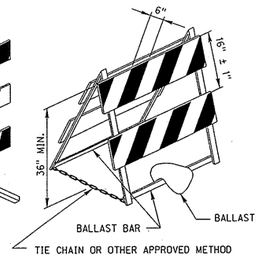
✱NOMINAL DIMENSIONS ARE PERMISSIBLE WHEN CONSTRUCTED FROM LUMBER.
✱✱WHEN LATERAL SPACE IS LIMITED, SOME TYPE III BARRICADES WITH A 4 FOOT LENGTH OF RAIL, MAY BE ALLOWED WHEN APPROVED BY THE ENGINEER.

TYPE III BARRICADE

TYPICAL MOUNTING OF FLASHING WARNING LIGHTS. LIGHTS SHALL ALWAYS BE IN VERTICAL ALIGNMENT.



TYPE II BARRICADE



BALLAST SHALL NOT BE PLACED OVER ANY REFLECTIVE DEVICE

DESIGN

A BARRICADE IS A PORTABLE OR FIXED DEVICE HAVING TWO OR THREE RAILS WITH APPROPRIATE MARKINGS. IT IS USED TO CONTROL ROAD USERS BY CLOSING, RESTRICTING, OR DELINEATING ALL OR A PORTION OF THE RIGHT-OF-WAY.

BARRICADES SHALL BE ONE OF TWO TYPES: TYPE II OR TYPE III.

STRIPES ON BARRICADE RAILS SHALL BE ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION ROAD USERS ARE TO PASS. THE STRIPES SHALL BE 6 INCHES WIDE. THE MINIMUM RAIL LENGTH FOR A TYPE II BARRICADE IS 36 INCHES.

WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN. WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, THE STRIPES MAY SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES. WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

BARRICADE RAILS SHOULD BE SUPPORTED IN A MANNER THAT WILL ALLOW THEM TO BE SEEN BY THE ROAD USER, AND IN A MANNER THAT PROVIDES A STABLE SUPPORT THAT IS NOT EASILY BLOWN OVER OR DISPLACED.

ON HIGH-SPEED ROADWAYS OR IN OTHER SITUATIONS WHERE BARRICADES MAY BE SUSCEPTIBLE TO OVERTURNING IN THE WIND, SANDBAGS SHOULD BE USED FOR BALLASTING. SANDBAGS MAY BE PLACED ON LOWER PARTS OF THE FRAME OR STAYS TO PROVIDE THE REQUIRED BALLAST BUT SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY HEAVY OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE.

THE BARRICADE OWNERS NAME, NOT TO EXCEED 15 SQUARE INCHES SHALL BE SHOWN ON THE BARRICADE BACK OR SUPPORT BUT NOT ON ITS FACE.

✱✱ WHEN LATERAL SPACE IS LIMITED, SOME TYPE III BARRICADES WITH A 4 FOOT LENGTH OF RAIL, MAY BE ALLOWED WHEN APPROVED BY THE ENGINEER.

APPLICATION

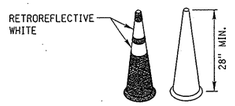
TYPE II BARRICADES ARE INTENDED FOR USE IN SITUATIONS WHERE TRAFFIC IS MAINTAINED THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE. THEY MAY BE USED INDIVIDUALLY OR IN GROUPS TO MARK A SPECIFIC CONDITION, OR THEY MAY BE USED IN A SERIES FOR CHANNELIZING TRAFFIC. ON THE INTERSTATE, FREEWAY AND EXPRESSWAY SYSTEM, TYPE II BARRICADES SHALL NOT BE USED FOR CHANNELIZATION.

TYPE III BARRICADES USED AT A ROAD CLOSURE MAY EXTEND COMPLETELY ACROSS A ROADWAY FROM CURB TO CURB. WHERE PROVISION IS MADE FOR ACCESS OF AUTHORIZED EQUIPMENT AND VEHICLES, THE RESPONSIBILITY FOR THE TYPE III BARRICADES SHOULD BE ASSIGNED TO A PERSON WHO SHALL PROVIDE PROPER CLOSURE AT THE END OF EACH WORK DAY.

WHEN A HIGHWAY IS LEGALLY CLOSED BUT ACCESS MUST STILL BE ALLOWED FOR LOCAL TRAFFIC, THE TYPE III BARRICADES MAY NOT BE EXTENDED COMPLETELY ACROSS A ROADWAY. A SIGN WITH THE APPROPRIATE LEGEND CONCERNING PERMISSIBLE USE BY LOCAL TRAFFIC SHALL BE MOUNTED.

NORMALLY PERMANENT SIGNS MOUNTED ON BARRICADES SHALL BE ERECTED ABOVE THE BARRICADE. THE SIGNS "ROAD CLOSED", OR "ROAD WORK AHEAD", FOR EXAMPLE CAN EFFECTIVELY BE MOUNTED ABOVE THE BARRICADE THAT CLOSES THE ROADWAY. TYPE III BARRICADES SHALL BE SUPPLEMENTED WITH A LIGHTING DEVICE UNLESS SPECIFICALLY OMITTED BY THE ENGINEER. DETOUR ARROW AND LARGE WARNING ARROW SIGNS SHOULD BE PLACED ON THE FACE OF BARRICADE.

CONES



DESIGN

CONES SHALL BE PREDOMINANTLY ORANGE, FLOURESCENT RED-ORANGE, OR FLOURESCENT YELLOW/ORANGE, NOT LESS THAN 28 INCHES IN HEIGHT, AND SHALL BE MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING VEHICLES ON IMPACT. CONES WHEN ALLOWED ON THE INTERSTATE, FREEWAY OR EXPRESSWAY SYSTEM SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.

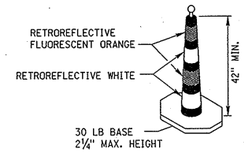
FOR NIGHTTIME USE, CONES SHALL BE RETROREFLECTIVE OR EQUIPPED WITH LIGHTING DEVICES FOR MAXIMUM VISIBILITY. RETROREFLECTION OF 28 INCH OR 36 INCH CONES SHALL BE PROVIDED BY A WHITE BAND 6 INCHES WIDE, NO MORE THAN 4 INCHES FROM THE TOP OF THE CONE, AND AN ADDITIONAL 4 INCH WIDE WHITE BAND A MINIMUM OF 2 INCHES BELOW THE 6 INCH BAND.

APPLICATION

TRAFFIC CONES ARE USED TO CHANNELIZE TRAFFIC, DIVIDE OPPOSING TRAFFIC LANES, DIVIDE TRAFFIC LANES WHEN TWO OR MORE LANES ARE KEPT OPEN IN THE SAME DIRECTION, AND DELINEATE SHORT-DURATION MAINTENANCE AND UTILITY WORK. CONES SHALL NOT BE USED FOR LANE CLOSURE TAPERS OR SHIFTS, CONES SMALLER THAN 42 INCHES SHALL NOT BE USED AT NIGHT ON RURAL HIGHWAYS, UNLESS SHOWN ON THE PLANS OR AS APPROVED OR DIRECTED BY THE ENGINEER.

STEPS SHOULD BE TAKEN TO ENSURE THAT CONES WILL NOT BE BLOWN OVER OR DISPLACED BY WIND OR MOVING TRAFFIC. CONES CAN BE DOUBLED UP TO INCREASE THEIR WEIGHT. SOME CONES ARE CONSTRUCTED WITH BASES THAT CAN BE FILLED WITH BALLAST. OTHERS HAVE SPECIAL WEIGHTED BASES, OR WEIGHTS SUCH AS SANDBAG RINGS THAT CAN BE DROPPED OVER THE CONES AND ONTO THE BASE TO PROVIDE ADDED STABILITY. BALLAST, HOWEVER, SHOULD NOT PRESENT A HAZARD IF THE CONES ARE INADVERTENTLY STRUCK.

42 INCH CONES



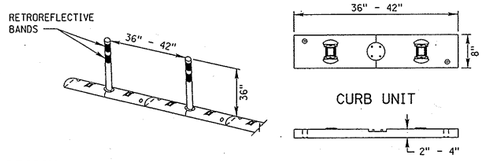
DESIGN

42 INCH CONES SHALL INCLUDE A 30 POUND RUBBER BASE AND DISPLAY FOUR 6 INCH WIDE BANDS OF RETROFFELECTIVE SHEETING, ALTERNATING FLUORESCENT ORANGE-WHITE-FLOURESCENT ORANGE-WHITE.

APPLICATION

WHEN APPROVED BY THE ENGINEER OR SHOWN IN THE PLANS, 42 INCH REFLECTIVE CONES MAY BE USED IN LIEU OF TYPE II BARRICADES OR REFLECTORIZED DRUMS. 42 INCH CONES SHALL NOT BE USED FOR LANE-CLOSURE TAPERS OR SHIFTS. IF A RECTANGULAR BASE IS USED, THE LONG SIDE OF THE BASE SHOULD BE ORIENTED PARALLEL TO THE DIRECTION OF TRAFFIC.

TUBULAR POST AND CURB SYSTEM



DESIGN

TUBULAR POSTS USED IN THE SYSTEM SHALL BE 36 INCHES HIGH AND A MINIMUM OF 2 INCHES WIDE WHEN FACING TRAFFIC. THE TUBULAR POST AND CURB SYSTEM SHALL BE MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING IMPACTING VEHICLES. THE COLOR SHALL BE AS SHOWN IN THE PLANS.

THE TUBULAR POSTS SHALL BE RETROREFLECTIVE. RETROREFLECTION OF TUBULAR POSTS SHALL BE PROVIDED BY TWO 3-INCH WIDE RETROREFLECTIVE BANDS PLACED A MAXIMUM OF 2 INCHES FROM THE TOP WITH A MAXIMUM OF 6 INCHES BETWEEN THE BANDS. EACH CURB SECTION SHALL CONTAIN ONE RETROREFLECTIVE MARKER FACING EACH DIRECTION OF TRAFFIC. THE COLOR OF THE RETROREFLECTIVE BANDS AND MARKERS SHALL MATCH THE POST/CURB COLOR.

THE CURB SECTIONS SHALL BE CONFIGURED TO ALLOW FOR DRAINAGE FROM THE PAVEMENT SURFACE.

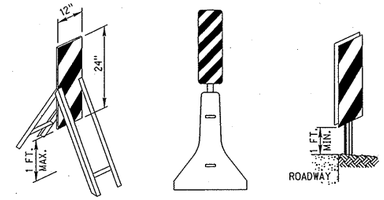
APPLICATION

TUBULAR POST AND CURB SYSTEMS MAY BE USED TO DIVIDE OPPOSING LANES OF TRAFFIC OR TO DIVIDE TRAFFIC LANES WHEN TWO OR MORE LANES ARE KEPT OPEN IN THE SAME DIRECTION.

FASTENING THE CURBS TO THE PAVEMENT WITH ANCHOR BOLTS OR OTHER SUITABLE METHODS AS DIRECTED BY THE MANUFACTURER IS REQUIRED TO MINIMIZE THE CHANCE OF BEING MOVED BY TRAFFIC.

TUBULAR POST AND CURB SYSTEMS SHALL BE INSTALLED IN THE LOCATIONS SHOWN IN THE PLANS OR DIRECTED BY THE ENGINEER.

VERTICAL PANELS



DESIGN

RETROREFLECTIVE MATERIAL ON VERTICAL PANELS SHALL BE 12 INCHES WIDE AND AT LEAST 24 INCHES HIGH. THEY SHALL HAVE ALTERNATING ORANGE AND WHITE STRIPES, WHERE THE HEIGHT OF THE RETRROREFLECTIVE MATERIAL ON THE VERTICAL PANEL IS MORE THAN 36 INCHES, A PANEL STRIPE WIDTH OF 6 INCHES SHALL BE USED. WHERE THE HEIGHT OF THE RETROREFLECTIVE MATERIAL ON THE VERTICAL PANEL IS 36 INCHES OR LESS, A PANEL STRIPE WIDTH OF 4 INCHES SHALL BE USED. IF USED FOR TWO-WAY TRAFFIC, BACK-TO-BACK PANELS SHALL BE USED.

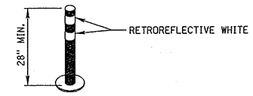
MARKINGS FOR VERTICAL PANELS SHALL BE ALTERNATING ORANGE AND WHITE RETROREFLECTORIZED STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS.

POST MOUNTED VERTICAL PANELS SHALL BE MOUNTED WITH THE BOTTOM A MINIMUM OF 1 FOOT ABOVE THE ROADWAY. VERTICAL PANELS ON A TEMPORARY STAND SHALL BE MOUNTED WITH THE BOTTOM A MAXIMUM OF 1 FOOT ABOVE THE ROADWAY.

APPLICATION

WHERE SPACE IS LIMITED VERTICAL PANELS MAY BE USED TO CHANNEL TRAFFIC, DIVIDE OPPOSING LANES OF TRAFFIC, DIVIDE TRAFFIC LANES OR REPLACE BARRICADES. WHEN APPROVED BY THE ENGINEER, VERTICAL PANELS MAY BE POST-MOUNTED ALONG THE SIDE OF THE ROADWAY.

TUBULAR POSTS



DESIGN

TUBULAR POSTS SHALL BE PREDOMINANTLY ORANGE, NOT LESS THAN 28 INCHES HIGH, BE A MINIMUM OF 2 INCHES WIDE WHEN FACING TRAFFIC, AND MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING IMPACTING VEHICLES.

TUBULAR POSTS SHALL BE RETROREFLECTIVE. RETROREFLECTION OF TUBULAR POSTS SHALL BE PROVIDED BY TWO 3 INCHES WIDE WHITE BANDS PLACED A MAXIMUM OF 2 INCHES FROM THE TOP, WITH A MAXIMUM OF 6 INCHES BETWEEN THE BANDS. THE BASE SHALL NOT BE WIDER THAN 12 INCHES OR HIGHER THAN 2 INCHES.

APPLICATION

TUBULAR POSTS HAVE LESS VISIBLE AREA THAN OTHER DEVICES AND SHOULD BE USED ONLY WHERE SPACE RESTRICTIONS DO NOT ALLOW FOR THE USE OF OTHER MORE VISIBLE DEVICES. THEY MAY BE USED EFFECTIVELY TO DIVIDE OPPOSING LANES OF TRAFFIC OR TO DIVIDE TRAFFIC LANES WHEN TWO OR MORE LANES ARE KEPT OPEN IN THE SAME DIRECTION.

STEPS SHOULD BE TAKEN TO ASSURE THAT TUBULAR POSTS WILL NOT BE BLOWN OVER OR DISPLACED BY TRAFFIC BY EITHER AFFIXING THEM TO THE PAVEMENT WITH ANCHOR BOLTS OR ADHESIVE. IF A NONCYLINDRICAL DEVICE IS USED, IT SHALL BE ATTACHED TO THE PAVEMENT TO ENSURE THAT THE WIDTH FACING TRAFFIC MEETS THE MINIMUM REQUIREMENTS.

TUBULAR POSTS SHOULD NOT BE USED FOR PEDESTRIAN CHANNELIZATION OR A PEDESTRIAN BARRIERS IN TEMPORARY TRAFFIC CONTROL ZONES ON OR ALONG SIDEWALKS.

REV. NO.	DATE	DESCRIPTION OF REVISION
R7	JAN 18	NDOR BORDER TO NDOT BORDER
R6	JUN 14	2009 MUTCD UPDATE
R5	OCT 98	REVISE CHANNELIZATION DEVICES, TAPER

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 920-R7

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

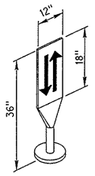
PROFESSIONAL ENGINEER — DANIEL J. WADDLE E-6289 — STATE OF NEBRASKA

David Nrosz
9-1-2017
DATE

ORIGINAL:
OCTOBER 1998
DATE

1/3

OPPOSING TRAFFIC LANE DIVIDERS



DESIGN

OPPOSING TRAFFIC LANE DIVIDERS SHALL BE A TWO SIDED UPRIGHT RETROREFLECTORIZED ORANGE PANEL, WITH A WIDTH OF 12 INCHES AND A HEIGHT OF 18 INCHES. THE TOP OF THE PANEL SHALL BE 36 INCHES ABOVE THE PAVEMENT. THE SYMBOL ON EACH SIDE SHALL BE TWO OPPOSING BLACK ARROWS. THE LANE DIVIDER SHALL BE MADE OF LIGHTWEIGHT MATERIAL THAT WILL YIELD UPON IMPACT BY A VEHICLE. THE LANE DIVIDER BASE SHALL NOT BE WIDER THAN 12 INCHES OR HIGHER THAN 4 INCHES. THE BASE SHALL BE ATTACHED TO THE EXISTING SURFACE BY EPOXY OR OTHER SUITABLE ADHESIVE, TO ENSURE THAT THE PANEL REMAINS FACING TRAFFIC.

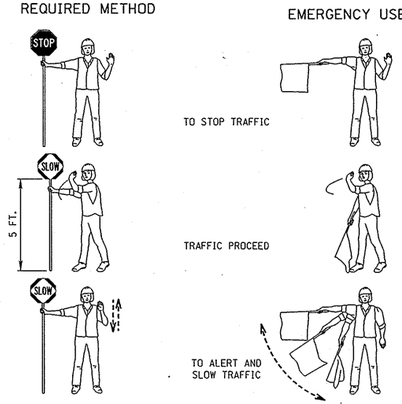
APPLICATION

OPPOSING TRAFFIC LANE DIVIDERS ARE DELINEATION DEVICES USED AS CENTER LANE DIVIDERS TO SEPARATE OPPOSING TRAFFIC ON A TWO-LANE, TWO-WAY OPERATION.

FLAGGERS

REQUIRED METHOD

EMERGENCY USE ONLY



FLAGGER PADDLE

THE STOP/SLOW PADDLE SHALL HAVE AN OCTAGONAL SHAPE ON A RIGID HANDLE. STOP/SLOW PADDLES SHALL BE AT LEAST 18 INCHES WIDE WITH LETTERS AT LEAST 6 INCHES HIGH. IF THE STOP/SLOW PADDLE IS PLACED ON A RIGID STAFF, THE MINIMUM LENGTH OF THE STAFF, MEASURED FROM THE BOTTOM OF THE SIGN TO THE END OF THIS STAFF THAT RESTS ON THE GROUND, SHOULD BE 5 FEET. THE STOP/SLOW PADDLE SHOULD BE THE PRIMARY AND PREFERRED HAND-SIGNALING DEVICE BECAUSE THE STOP/SLOW PADDLE GIVES ROAD USERS MORE POSITIVE GUIDANCE THAN RED FLAGS. USE OF FLAGS SHOULD BE LIMITED TO EMERGENCY SITUATIONS.

FLAGGERS

A FLAGGER MUST BE DRESSED FOR SAFETY. IN ADDITION TO THE REQUIREMENTS OF THE "WORKER VISIBILITY" SECTION LISTED BELOW, FLAGGERS SHALL WEAR:

1. AN ORANGE OR YELLOW/GREEN CAP OR HARD HAT.
2. A SHIRT WITH SLEEVES, PANTS AND SHOES (TANK TOPS, SHORTS OR SANDALS SHALL NOT BE WORN).

FLAGGERS SHALL BE INSTRUCTED IN THE PROPER LOCATION, DUTIES AND PROCEDURES FOR FLAGGING AS OUTLINED IN THE CURRENT MUTCD AND THE DEPARTMENT OF ROADS FLAGGER'S HANDBOOK. AS REQUIRED BY THE DEPARTMENT OF ROADS, THE FLAGGER SHALL BE CERTIFIED, AND HAVE IN THEIR POSSESSION, A VALID FLAGGER CERTIFICATION CARD.

WORKER VISIBILITY

ALL WORKERS WITHIN THE RIGHT-OF-WAY WHO ARE EXPOSED EITHER TO TRAFFIC (VEHICLES USING THE HIGHWAY FOR PURPOSES OF TRAVEL) OR TO CONSTRUCTION EQUIPMENT WITHIN THE WORK AREA SHALL WEAR HIGH-VISIBILITY SAFETY APPAREL. HIGH-VISIBILITY SAFETY APPAREL IS DEFINED TO MEAN PERSONAL PROTECTIVE SAFETY CLOTHING THAT;

1. IS INTENDED TO PROVIDE CONSPICUITY DURING BOTH DAYTIME AND NIGHTTIME USAGE, AND
2. MEETS THE PERFORMANCE CLASS 2 OR CLASS 3 REQUIREMENTS OF THE ANSI/ISEA 107-2004 PUBLICATION ENTITLED "AMERICAN NATIONAL STANDARDS FOR HIGH-VISIBILITY SAFETY APPAREL AND HEADWEAR"

LIGHTING DEVICES

FUNCTION

CONSTRUCTION AND MAINTENANCE ACTIVITIES OFTEN CREATE CONDITIONS ON OR NEAR THE TRAVELED WAY THAT ARE PARTICULARLY HAZARDOUS AT NIGHT. IT IS OFTEN DESIRABLE AND NECESSARY TO SUPPLEMENT THE REFLECTORIZED SIGNS, BARRIERS, AND CHANNELIZING DEVICES WITH LIGHTING DEVICES. STROBE TYPE LIGHTS ARE NOT PERMITTED.

BARRICADE WARNING LIGHTS DESIGN (BATTERY OPERATED)

TYPE "A" LOW INTENSITY FLASHING WARNING LIGHTS ARE MOST COMMONLY MOUNTED ON BARRICADES, OR WITH SIGNS AND ARE INTENDED TO WARN THE DRIVER THAT THEY ARE PROCEEDING IN A HAZARDOUS AREA. THESE LIGHTS SHALL NOT BE USED FOR DELINEATION, AS A SERIES OF FLASHING LIGHTS IN A ROW WOULD TEND TO OBSCURE THE DESIRED PATH.

TYPE "A" HIGH INTENSITY FLASHING WARNING LIGHTS ARE NORMALLY MOUNTED ON THE TYPE III BARRICADE THAT ACCOMPANIES THE ADVANCE WARNING SIGNS.

TYPE "C" STEADY BURN LIGHTS AS USED HEREIN, SHALL MEAN A SERIES OF LOW WATTAGE YELLOW ELECTRIC LIGHTS. WHERE LIGHTS ARE NEEDED TO DELINEATE OR MARK THE TRAVELED WAY THROUGH AND AROUND OBSTRUCTIONS IN A CONSTRUCTION MAINTENANCE AREA, THE DELINEATION SHALL BE ACCOMPLISHED BY USE OF STEADY BURNING LIGHTS. WHEN USED TO SUPPLEMENT CHANNELIZATION, THE MAXIMUM SPACING FOR WARNING LIGHTS SHOULD BE IDENTICAL TO THE CHANNELIZING DEVICE SPACING REQUIREMENTS. WHEN USED TO DELINEATE A CURVE, TYPE "C" WARNING LIGHTS SHOULD ONLY BE USED ON DEVICES ON THE OUTSIDE OF THE CURVE, AND NOT ON THE INSIDE OF THE CURVE.

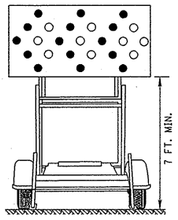
FLASHING ARROW PANEL (DISPLAY)

AN ARROW PANEL IS A SIGN WITH A MATRIX OF ELEMENTS, CAPABLE OF EITHER FLASHING OR SEQUENTIAL DISPLAYS. THIS SIGN SHALL PROVIDE ADDITIONAL WARNING AND DIRECTIONAL INFORMATION TO ASSIST IN MERGING AND CONTROLLING ROAD USERS THROUGH OR AROUND A TEMPORARY TRAFFIC CONTROL ZONE. AN ARROW PANEL SHOULD BE USED IN COMBINATION WITH APPROPRIATE SIGNS, CHANNELIZING DEVICES OR OTHER TRAFFIC CONTROL DEVICES.

DESIGN

ARROW PANELS SHALL MEET THE SIZE AND SPECIFICATIONS OF THE MUTCD FOR TYPE "C" ARROW DISPLAYS.

FLASHING ARROW PANEL SHALL BE RECTANGULAR, OF SOLID APPEARANCE AND FINISHED IN NON-REFLECTIVE BLACK. THE PANEL SHALL BE MOUNTED ON A VEHICLE, TRAILER OR OTHER SUITABLE SUPPORT. MINIMUM MOUNTING HEIGHT MEASURED VERTICALLY FROM THE BOTTOM OF THE PANEL TO THE ROADWAY BELOW IT OR TO THE ELEVATION OF THE NEAR EDGE OF THE ROADWAY, SHALL BE 7 FEET EXCEPT ON VEHICLE-MOUNTED PANELS, WHICH SHOULD BE AS HIGH AS PRACTICAL.



THE ARROW PANEL SHALL HAVE A MINIMUM SIZE OF 96 INCHES WIDE AND 48 INCHES HIGH. THE MINIMUM LEGIBILITY DISTANCE SHALL BE 1 MILE. THE PANEL SHALL CONTAIN 25 LAMP ELEMENTS. ARROW PANEL ELEMENTS SHALL BE CAPABLE OF A MINIMUM 50 PERCENT DIMMING, AUTOMATICALLY WHEN AMBIENT LIGHT FALLS BELOW 50 LUX.

THE MINIMUM ELEMENT "ON TIME" SHALL BE 50 PERCENT FOR THE FLASHING MODE AND EQUAL INTERVALS OF 25 PERCENT FOR EACH SEQUENTIAL CHEVRON PHASE. THE FLASHING RATE SHALL BE NO FEWER THAN 25 NOR MORE THAN 40 FLASHES PER MINUTE.

APPLICATION

A FLASHING ARROW OR SEQUENTIAL CHEVRON MODE SHALL ONLY BE USED FOR STATIONARY OR MOVING LANE CLOSURES.

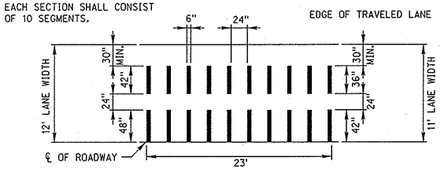
FOR SHOULDER WORK BLOCKING THE SHOULDER, FOR ROADSIDE WORK NEAR THE SHOULDER, OR FOR TEMPORARILY CLOSING ONE LANE ON A TWO-LANE, TWO-WAY ROADWAY, AN ARROW PANEL SHALL BE USED ONLY IN THE CAUTION MODE.

AN ARROW DISPLAY MODE SHALL NOT BE USED ON A TWO-LANE TWO-WAY ROADWAY FOR TEMPORARY ONE-LANE OPERATION OR LANE SHIFTS. AN ARROW DISPLAY SHALL NOT BE USED TO LATERALLY SHIFT TRAFFIC.

THE FOLLOWING SELECTIONS SHALL BE PROVIDED ON THE ARROW PANEL	
OPERATING MODE	PANEL DISPLAY
FLASHING ARROW	RIGHT SHOWN; LEFT OPPOSITE
SEQUENTIAL ARROW	RIGHT SHOWN; LEFT OPPOSITE
SEQUENTIAL CHEVRON	RIGHT SHOWN; LEFT OPPOSITE
FLASHING DOUBLE ARROW	
FLASHING OR ALTERNATING CAUTION	FLASHING LINE OR FLASHING CORNERS OR ALTERNATING DIAMOND CAUTION

TEMPORARY RUMBLE STRIPS

EACH SECTION SHALL CONSIST OF 10 SEGMENTS.



DESIGN

TEMPORARY RUMBLE STRIPS MAY BE MADE OF ASPHALT PAVING MATERIAL, EPOXY AND AGGREGATE OR OTHER SUITABLE MATERIAL WHICH WILL MAINTAIN A DESIRABLE RUMBLE EFFECT. THE TEMPORARY RUMBLE STRIP SHOULD HAVE AN INSTALLED HEIGHT OF 5/8". PREFORMED RUMBLE STRIPS MAY BE USED PROVIDED THEY HAVE A MINIMUM ½" HEIGHT.

TRAFFIC SIGNALS

TRAFFIC SIGNALS MAY BE ALLOWED AT CERTAIN EQUIPMENT CROSSINGS WHERE THE VOLUME OF FILL MATERIAL AND THE NUMBER OF EQUIPMENT CROSSINGS PER HOUR IS HIGH. TRAFFIC SIGNALS MAY BE ALLOWED AT CERTAIN BRIDGE CONSTRUCTION SITES WHERE A COMBINATION OF ONE-WAY TRAFFIC AND HIGH TRAFFIC VOLUMES WOULD BE BEST SERVED WITH THIS TYPE OF TRAFFIC CONTROL.

ALL TRAFFIC SIGNAL REQUESTS AND METHOD OF INSTALLATION ON THE STATE HIGHWAY SYSTEM SHALL BE IN COMPLIANCE WITH THE MUTCD AND MUST BE APPROVED BY THE STATE TRAFFIC ENGINEER.

IF, AFTER THE SIGNAL ASSEMBLIES ARE ERECTED AND THE ROAD IS OPEN TO PUBLIC TRAVEL, THE SIGNAL SYSTEM IS NOT PUT IMMEDIATELY INTO OPERATION, THE SIGNAL FACES SHALL BE COVERED WITH BURLAP OR OTHER OPAQUE MATERIAL SUBJECT TO THE APPROVAL OF THE ENGINEER, INOPERATIVE SIGNALS ON ROADS OPEN TO THE PUBLIC SHALL ALWAYS BE COVERED. TILTING THE SIGNALS UPWARD IS NOT AN ACCEPTABLE ALTERNATIVE TO COVERING THE HEADS.

FLOODLIGHTS

WHEN NIGHTTIME WORK IS REQUIRED, FLOODLIGHTS SHALL BE USED TO ILLUMINATE FLAGGER STATIONS. FLOODLIGHTS SHOULD BE USED TO ILLUMINATE EQUIPMENT CROSSINGS, AND OTHER AREAS WHERE EXISTING LIGHT IS NOT ADEQUATE FOR THE WORK TO BE PERFORMED SAFELY.

IN NO CASE SHALL FLOODLIGHTING BE PERMITTED TO CREATE A DISABLING GLARE FOR DRIVERS. THE ADEQUACY OF THE FLOODLIGHT PLACEMENT AND ELIMINATION OF POTENTIAL GLARE SHOULD BE CHECKED BY DRIVING THROUGH THE PROJECT.

PAVEMENT MARKING

IT IS INTENDED TO THE EXTENT POSSIBLE, THAT MOTORISTS BE PROVIDED MARKINGS WITHIN A WORK AREA COMPARABLE TO THE MARKINGS NORMALLY MAINTAINED ALONG ADJACENT ROADWAYS, PARTICULARLY AT EITHER END OF THE WORK AREA.

ALL MARKINGS AND DEVICES USED TO DELINEATE VEHICLE AND PEDESTRIAN PATHS SHALL BE CAREFULLY REVIEWED DURING DAYTIME AND NIGHTTIME PERIODS TO AVOID INADVERTENTLY LEADING DRIVERS OR PEDESTRIANS FROM THE INTENDED PATH.

PAVEMENT MARKINGS NO LONGER APPLICABLE SHALL BE REMOVED UNLESS OTHERWISE APPROVED BY THE ENGINEER.

TAPERS

TAPERS ARE CREATED USING A SERIES OF CHANNELIZING DEVICES OR PAVEMENT MARKINGS TO MOVE TRAFFIC OUT OF OR INTO ITS NORMAL PATH.

MERGING TAPER

A MERGING TAPER REQUIRES THE LONGEST DISTANCE BECAUSE DRIVERS ARE REQUIRED TO MERGE INTO COMMON ROAD SPACE. THE TAPER SHOULD BE LONG ENOUGH TO ENABLE MERGING DRIVERS TO HAVE ADEQUATE ADVANCE WARNING AND SUFFICIENT LENGTH TO ADJUST THEIR SPEEDS AND MERGE INTO A SINGLE LANE BEFORE THE DOWNSTREAM END OF THE TRANSITION.

SHIFTING TAPER

A SHIFTING TAPER IS USED WHEN MERGING IS NOT REQUIRED, BUT A LATERAL SHIFT IS NEEDED. APPROXIMATELY ONE-HALF "L" HAS BEEN FOUND TO BE ADEQUATE. WHERE MORE SPACE IS AVAILABLE, IT MAY BE BENEFICIAL TO USE LONGER TAPERS. GUIDANCE FOR CHANGES IN ALIGNMENT MAY ALSO BE ACCOMPLISHED BY USING HORIZONTAL CURVES DESIGNED FOR NORMAL HIGHWAY SPEEDS.

SHOULDER TAPERS

A SHOULDER TAPER MAY BE BENEFICIAL ON HIGH-SPEED ROADWAYS WHERE SHOULDERS ARE PART OF THE ACTIVITY AREA AND ARE CLOSED, OR WHEN IMPROVED SHOULDERS MIGHT BE MISTAKEN AS A DRIVING LANE IN THESE INSTANCES, THE SAME TYPE, BUT ABBREVIATED, CLOSURE PROCEDURES USED ON A NORMAL PORTION OF THE ROADWAY CAN BE USED. IF USED, SHOULDER TAPERS APPROACHING THE ACTIVITY AREA SHOULD HAVE A LENGTH OF ABOUT ONE-THIRD "L".

DOWNSTREAM TAPERS

THE DOWNSTREAM TAPER MAY BE USEFUL IN TERMINATION AREAS TO PROVIDE A VISUAL CUE TO THE DRIVER THAT ACCESS IS AVAILABLE TO THE ORIGINAL LANE OR PATH THAT WAS CLOSED. WHEN USED, IT SHOULD HAVE A MINIMUM LENGTH OF ABOUT 100 FEET PER LANE, WITH DEVICES SPACED ABOUT 20 FEET APART.

ONE LANE, TWO WAY TAPER

THE ONE-LANE, TWO-WAY TAPER IS USED IN ADVANCE OF AN ACTIVITY AREA THAT OCCUPIES PART OF A TWO-WAY ROADWAY IN SUCH A WAY THAT A PORTION OF THE ROAD IS USED ALTERNATELY BY TRAFFIC IN EACH DIRECTION. A SHORT TAPER HAVING A MINIMUM LENGTH OF 50 FEET AND A MAXIMUM LENGTH OF 100 FEET WITH CHANNELIZING DEVICES AT APPROXIMATELY 20 FOOT SPACINGS SHOULD BE USED TO GUIDE TRAFFIC INTO THE ONE-LANE-SECTION AND A DOWNSTREAM TAPER WITH A LENGTH OF APPROXIMATELY 100 FEET SHOULD BE USED TO GUIDE TRAFFIC BACK INTO THEIR ORIGINAL LANE.

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES	
TYPE OF TAPER	TAPER LENGTH (FEET)
MERGING TAPER	L MINIMUM
SHIFTING TAPER	1/2 L MINIMUM
SHOULDER TAPER	1/3 L MINIMUM
TWO-WAY TAPER	100 FEET MAXIMUM

FORMULAS FOR L	
SPEED	FORMULA
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR GREATER	$L = WS$

L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED LIMIT PRIOR TO WORK IN MPH

TAPER LENGTH L (FEET)			
SPEED (MPH)	LANE WIDTH		
S	10 FT.	11 FT.	12 FT.
25	105	115	125
30	150	165	180
35	205	225	245
40	270	295	320
45	450	495	540
50	500	550	600
55	550	605	660
60	600	660	720
65	650	715	780
75	750	825	900

REV. NO.	DATE	DESCRIPTION OF REVISION
R7	JAN 18	NDOR BORDER TO NDOT BORDER
R6	JUN 14	2009 MUTCD UPDATE
R5	OCT 98	REVISE CHANNELIZATION DEVICES, TAPER

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 920-R7

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER — DANIEL J. WADDLE — E-6289 — STATE OF NEBRASKA

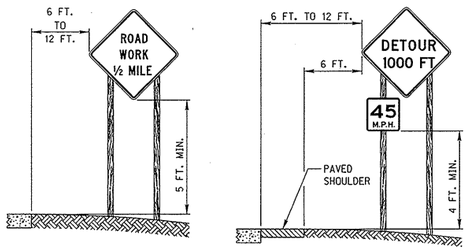
David Murray
9-1-2017
DATE

ORIGINAL:
OCTOBER 1998
DATE

ROADWAY DESIGN DIVISION
Computer: DROESIGN147
User: dor13017
Date: 17-AUG-2017 15:56
File: 92000e07.dgn
Scale: 1:100
SHEET 3 OF 3

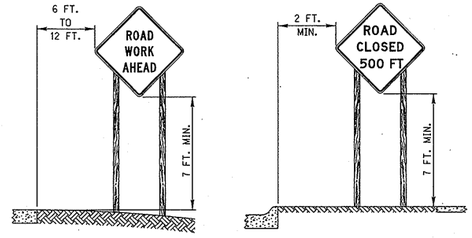
ROADSIDE SIGNS

HEIGHT AND LATERAL LOCATION OF SIGNS RURAL AREA



WITH SPEED ADVISORY PLATE

URBAN AREA



TYPICAL FIRST SIGN AT CONSTRUCTION SITE

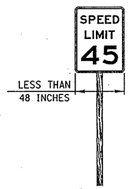
WITH TYPE "A" FLASHING WARNING LIGHT MOUNTED ABOVE TYPE III BARRICADE

PORTABLE AND TEMPORARY MOUNTING

TYPICAL SIGN MOUNTINGS

POST MOUNTED

SIGNS 48 INCHES OR WIDER REQUIRE TWO POSTS



SIGN WIDTHS LESS THAN 48 INCHES MAY BE MOUNTED WITH ONE POST

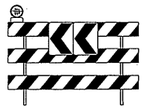
TYPICAL SIGN MOUNTINGS

OTHER THAN POST MOUNTED

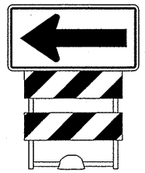
TYPE III BARRICADE WITH SIGN

PORTABLE AND TEMPORARY MOUNTING

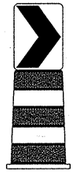
TYPE III BARRICADE WITH SIGN AND DETOUR ARROW



TYPE III BARRICADE WITH CHEVRONS



TYPE II BARRICADE WITH DETOUR ARROW OR SIGN



PLASTIC DRUM WITH CHEVRON OR SIGN

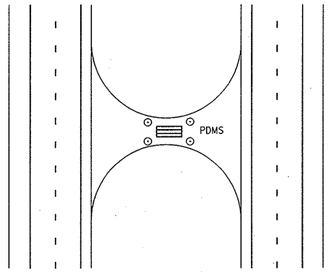
TEMPORARY SIGN SUPPORTS

ALL "TEMPORARY SIGN" SUPPORTS (BASES) SHALL BE NCHRP 350 OR MASH (TL-3) APPROVED.

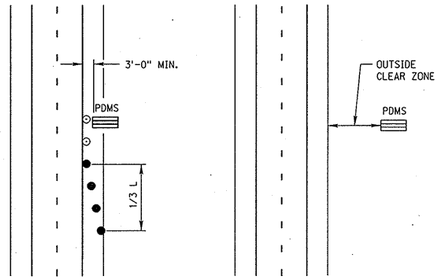
"TEMPORARY SIGNS" ARE ALL TEMPORARILY MOUNTED WORK ZONE SIGNS THAT ARE NOT POST MOUNTED IN THE GROUND AT THE TYPICAL 5 FOOT MOUNTING HEIGHT. TEMPORARY SIGNS ARE CONSIDERED NCHRP 350 OR MASH CATEGORY 2 DEVICES AND ARE MOUNTED ON TEMPORARY SIGN STANDS. TEMPORARY SIGNS SHALL BE MOUNTED A MINIMUM OF 1 FOOT ABOVE THE GROUND, UNLESS OTHERWISE REQUIRED TO BE MOUNTED AT A HIGHER HEIGHT.

TEMPORARY SIGNS AND THEIR SUPPORTS SHALL NOT BE IN PLACE LONGER THAN 3 DAYS. ANY SIGN THAT IS TO BE IN PLACE LONGER THAN 3 DAYS SHALL BE POST MOUNTED OR MOUNTED TO A DRUM, BARRICADE, OR BARRIER, AS REQUIRED BY THE PLANS OR SPECIFICATIONS.

PORTABLE DYNAMIC MESSAGE SIGN DELINEATION



IN MEDIAN



ON SHOULDER OFF SHOULDER

PORTABLE DYNAMIC MESSAGE SIGNS (PDMS)

THE PLACEMENT OF PDMS SHOULD BE IN THE FOLLOWING ORDER:

WHENEVER POSSIBLE, PDMS SHOULD BE PLACED OFF OF ANY USABLE PORTION OF THE ROADWAY ON THE RIGHT SIDE OF THE ROADWAY. WHEN PLACED OUTSIDE THE CLEAR ZONE OR BEHIND GUARDRAIL OR CONCRETE PROTECTION BARRIERS, DELINEATION IS NOT REQUIRED.

WHERE FIELD CONDITIONS DO NOT ALLOW FOR THIS PLACEMENT, THE SIGNS MAY BE LOCATED ON THE OUTSIDE SHOULDER OF THE ROADWAY OR WITHIN THE MEDIAN.

A. A MINIMUM CLEARANCE OF 3 FEET MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF THE TRAVELED WAY IS RECOMMENDED.
B. THE PDMS SHOULD HAVE A MINIMUM MOUNTED HEIGHT OF 7 FEET ON FREEWAYS, EXPRESSWAYS AND IN URBAN AREAS.
C. ALL OTHER RURAL APPLICATIONS SHOULD HAVE A MINIMUM HEIGHT OF 5 FEET.

THESE HEIGHTS ARE MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE ELEVATION OF THE NEAR EDGE OF THE PAVEMENT.

REFLECTORIZED PLASTIC DRUMS SHOULD BE USED TO DELINEATE EACH SIGN USING A 1/3 L TAPER. THESE DRUMS SHOULD BE POSITIONED ON THE UPSTREAM END OF THE SIGN TO FORM A TAPER LEADING UP TO THE TRAFFIC SIDE OF THE SIGN. FOR A SIGN LOCATED IN THE MEDIAN, THE SIGN SHOULD BE DELINEATED WITH A 42 INCH CONE ON ALL FOUR CORNERS.

WHEN DEPLOYED, THE SIGN SHALL BE SIGHTED AND ALIGNED WITH APPROACHING TRAFFIC TO ENSURE VISIBILITY OF THE MESSAGE. IF MULTIPLE SIGNS ARE USED, THE SIGNS SHOULD BE LOCATED ON THE SAME SIDE OF THE ROAD AND SEPARATED ACCORDING TO PROPER SIGN SPACING.

WHEN PRACTICAL, PDMS SHOULD NOT BE USED TO REPLACE STATIC SIGNS FOR LONG TERM USAGE (OVER 10 DAYS).

WHEN PDMS ARE TO BE DEPLOYED FOR LONG PERIODS, SUCH AS INCIDENT MANAGEMENT ROLES, CONCRETE PADS WITH APPROPRIATE TIE DOWNS SHOULD BE CONSTRUCTED FOR THEIR PLACEMENT.

PDMS NOT ACTIVELY BEING USED IN A CONSTRUCTION OR INCIDENT MANAGEMENT ROLE SHOULD BE REMOVED.

REFER TO NDOR "DMS GUIDELINES" FOR PROPER PDMS MESSAGE INFORMATION.

NOTES

1. ALL TRAFFIC CONTROL DEVICES SHALL MEET THE APPLICABLE STANDARDS AND SPECIFICATIONS PRESCRIBED IN PART 6 OF THE LATEST ADOPTED EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD)" AND THE STATE OF NEBRASKA SUPPLEMENT TO THE MUTCD. ALL TRAFFIC CONTROL DEVICES SHALL BE CRASHWORTHY AND QUALIFY AS SUCH ACCORDING TO THE TESTING AND ACCEPTANCE GUIDELINES OF THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
2. TRAFFIC CONTROL PLANS AND DEVICES SHOULD FOLLOW THE PRINCIPLES SET FORTH, BUT MAY DEVIATE FROM THE TYPICAL DRAWINGS TO ALLOW FOR CONDITIONS AND REQUIREMENTS OF THE PROJECT.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SO AS NOT TO OBSTRUCT THE VIEW OF OTHER TRAFFIC CONTROL DEVICES.
4. THE ENGINEER SHALL HAVE THE AUTHORITY TO REQUIRE THE USE, AND APPROVE THE LOCATION OF ANY OF THE DEVICES SHOWN IN THESE PLANS.

WORK ZONE SPEED LIMIT NOTES

A. WORK ZONE SPEED LIMITS SHALL NOT BE INSTALLED WITHOUT A SPEED ZONE AUTHORIZATION COMPLETED BY THE DEPARTMENT.

B. REDUCED SPEED LIMITS SHOULD BE USED ONLY IN THE SPECIFIC PORTION OF THE WORK ZONE WHERE CONDITIONS OR RESTRICTIVE FEATURES ARE PRESENT. HOWEVER, FREQUENT CHANGES IN THE SPEED LIMIT SHOULD BE AVOIDED. THE REDUCTION OF SPEED SHOULD BE DESIGNED SO VEHICLES CAN SAFELY TRAVEL THROUGH THE WORK ZONE WITH A SPEED LIMIT REDUCTION OF NO MORE THAN 10 MPH UNLESS OTHERWISE NOTED IN THE PLANS.

C. WORK ZONE SPEED LIMITS SHOWN ARE TYPICAL APPLICATIONS ONLY AND ARE NOT TO BE ASSUMED AS THE SPEED LIMITS REQUIRED FOR THE WORK.

D. EXISTING SPEED LIMIT SIGNS SHALL BE REMOVED OR COVERED WHEN A REDUCED WORK ZONE SPEED LIMIT IS IN EFFECT IN THE SAME AREA.

E. WORK ZONE SPEED LIMIT SIGNS SHALL BE INSTALLED EVERY MILE THROUGH THE WORK AREA WHEN SPEED ZONE IS REDUCED.

F. A SPEED LIMIT SIGN ENDING THE REDUCED SPEED ZONE SHALL BE INSTALLED AT THE END OF EACH ZONE.

G. DOUBLE FINES AND REDUCED SPEED ZONE SIGNING ARE NOT REQUIRED FOR SHORT-DURATION WORK LESS THAN 12 HOURS.

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE

$L = \frac{WS^2}{80}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

LEGEND

- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- REFLECTORIZED PLASTIC DRUM OR 42" CONE
- PORTABLE DYNAMIC MESSAGE SIGN

REV. NO.	DATE	DESCRIPTION OF REVISION
R7	JAN 18	NDOR BORDER TO NDOT BORDER
R6	JUN 14	2009 MUTCD UPDATE
R5	OCT 98	REVISE CHANNELIZATION DEVICES, TAPER

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 920-R7

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

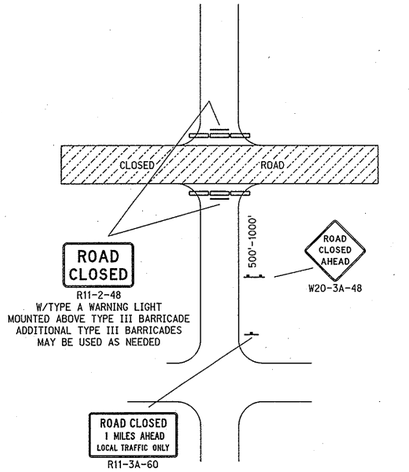
PROFESSIONAL CIVIL ENGINEER
DANIEL J. WADDLE
E-6289
STATE OF NEBRASKA

David Murray
9-1-2017
DATE

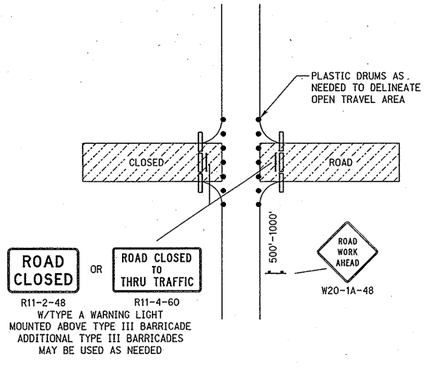
ORIGINAL:
OCTOBER 1998
DATE

3
3

CROSS ROAD INTERSECTING CLOSED ROAD

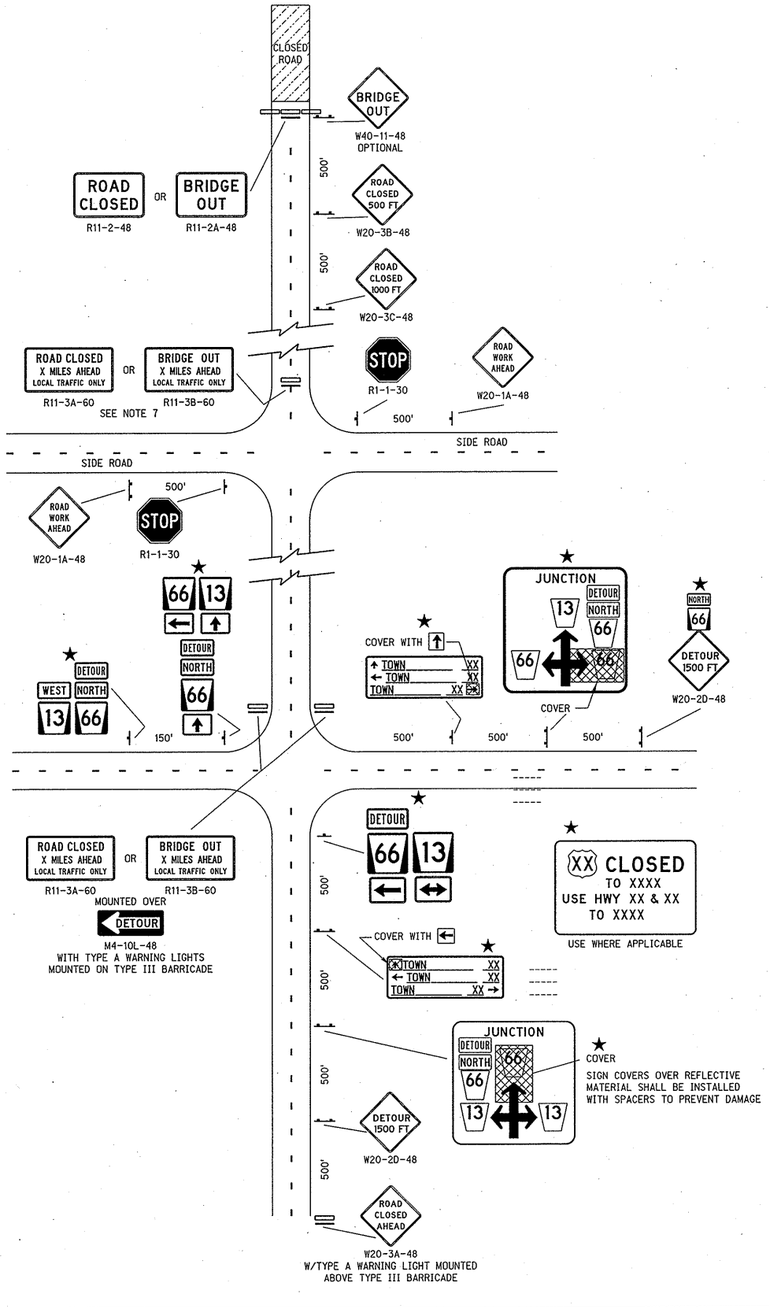


TRAFFIC NOT ALLOWED TO CROSS CLOSED ROAD



TRAFFIC ALLOWED TO CROSS CLOSED ROAD

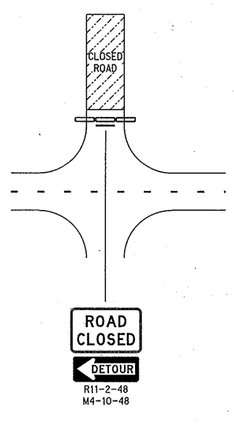
ROAD CLOSED BEYOND JUNCTION



NOTES

1. SIGNS SHOWN ARE USUALLY FOR ONE DIRECTION OF TRAVEL ONLY.
2. THE CONTRACTOR SHALL INSTALL, MAINTAIN, AND REMOVE ALL SIGNS IN ACCORDANCE WITH THE DETAILS OF AND AT THE LOCATIONS SHOWN IN THE PLANS. SIGNS INSTALLED BY THE DEPARTMENT OR OTHER GOVERNMENT AGENCY SHALL BE MAINTAINED AND REMOVED BY THEIR FORCES.
3. WHEN MESSAGE IS NOT PERTINENT, SIGNS SHALL BE TAKEN DOWN, COVERED OR FOLDED. TAPE IS NOT PERMITTED ON THE FACE OF THE SIGN.
4. VEHICLES OR EQUIPMENT SHALL NOT BE PARKED SO AS TO OBSCURE OR DISTRACT FROM TRAFFIC CONTROL DEVICES.
5. FLAGS MAY BE USED TO CALL ATTENTION TO WARNING SIGNS.
6. WHEN APPROPRIATE THE SIGN R11-2B "BRIDGE OUT" MAY BE USED INSTEAD OF R11-2 "ROAD CLOSED".
7. BARRICADE AND SIGN MAY BE PLACED ALONG EDGE OF ROAD IF NEEDED FOR LOCAL TRAFFIC.
8. REFER TO STANDARD PLAN 920 FOR GENERAL INFORMATION NOT SHOWN.

ROAD CLOSED AT JUNCTION



LEGEND

- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM
- SINGLE POSTED SIGN
- DOUBLE POSTED SIGN
- ★ INSTALLED BY OTHERS

TAPER FORMULA

L = S x W FOR SPEEDS OF 45 MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 MPH OR LESS.

WHERE:

L = MINIMUM LENGTH OF TAPER.

S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK.

W = WIDTH OF OFFSET (LANE WIDTH).

REV. NO.	DATE	DESCRIPTION OF REVISION
R2	JAN 18	NDOR BORDER TO NDOT BORDER
R1	JUN 14	2009 MUTCD UPDATES

NEBRASKA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN NO. 923-R2

TRAFFIC CONTROL ROAD CLOSURE

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

David Mroz

11-8-2017
DATE

PROFESSIONAL CIVIL ENGINEER
DANIEL J. WADDLE
E-6289
STATE OF NEBRASKA

ORIGINAL:
AUGUST 1998
DATE

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1