PROJECT NO.	SHEET NO.
BRO-7084(10)	1
◣ CONTROL NO. 31597	
▲ CONTROL NO.	
■ CONTROL NO.	

STATE OF NEBRASKA
DEPARTMENT OF ROADS
PLANS FOR CONSTRUCTION
STANTON SOUTHEAST
STANTON COUNTY

INDEX OF SHEETS

STANDARD PLANS

410-R3	(2 SHEETS) FLARED END SECTIONS FOR CULVERT PIPES
501-R5	(3 SHEETS) EROSION CONTROL
502	SILT FENCE DETAILS
740	MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION
743	(4 SHEETS) GUARDRAIL DETAILS
920-R5	(2 SHEETS) TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE
921-R5	(2 SHEETS) TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE
923	TRAFFIC CONTROL--ROAD CLOSURE

THE 2007 EDITION OF THE NEBRASKA STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS APPLY TO THIS PROJECT.

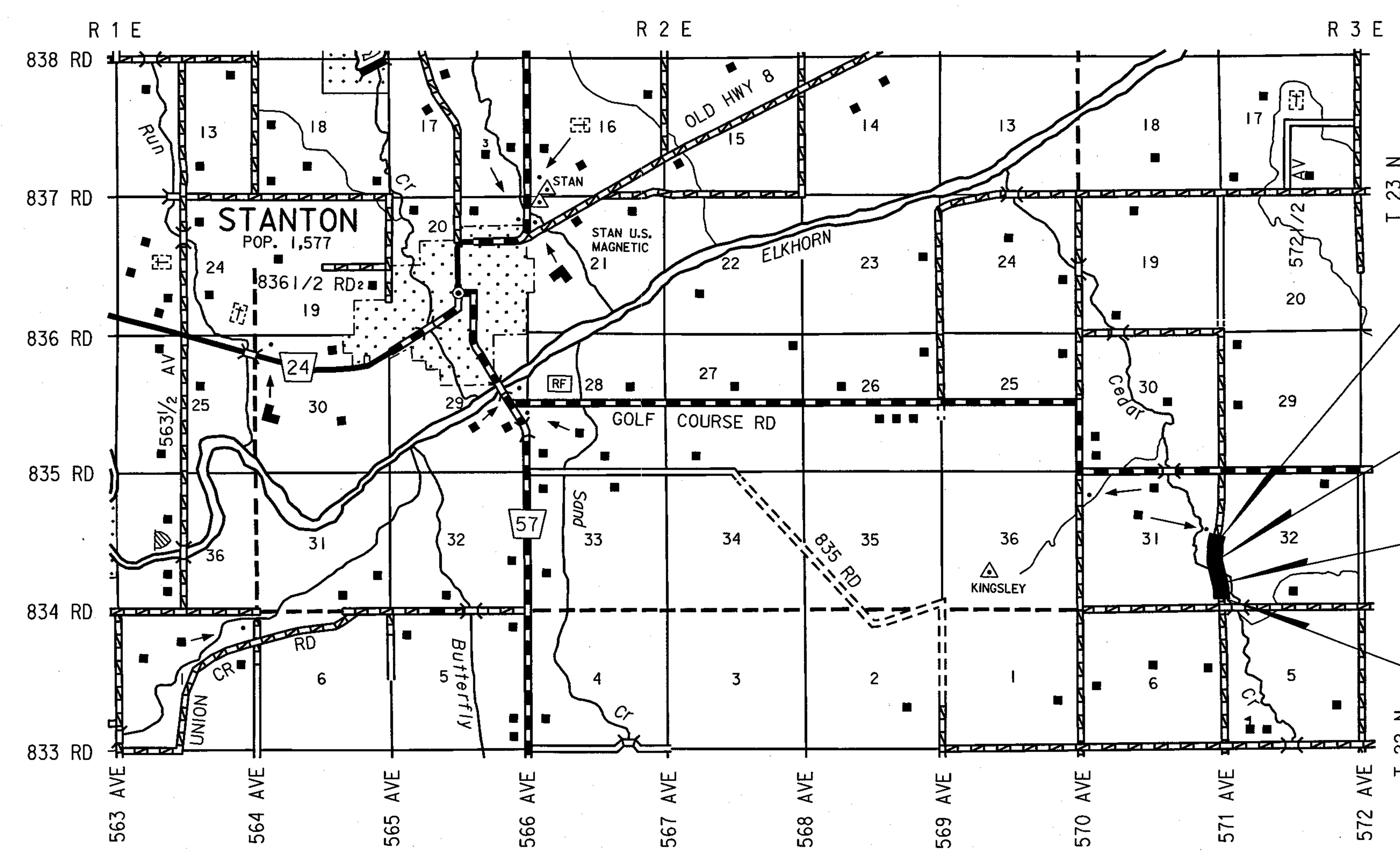
THE WORK ON THIS PROJECT CONSISTS OF GROUPS

1-GRADING, 4-CULVERTS, 6-BRIDGES, 7-GUARDRAIL, & 10-GENERAL

◣ GROUPS 1,4,6,7, & 10 ARE INCLUDED IN THE LETTING OF APRIL 18, 2013

▲ GROUPS ____ ARE INCLUDED IN THE LETTING OF ____

■ GROUPS ____ ARE INCLUDED IN THE LETTING OF ____



STA. 30+00.00
END PROJECT BRO-7084(10)
END CONSTRUCTION
END 2" X 25' CRUSHED
ROCK SURFACE COURSE

STA. 25+66.00
RESUME 2" X 25' CRUSHED
ROCK SURFACE COURSE

STA. 23+89.00
STOP 2" X 25' CRUSHED
ROCK SURFACE COURSE

STA. 12+00.00
BEGIN PROJECT BRO-7084(10)
BEGIN CONSTRUCTION
BEGIN 2" X 25' CRUSHED
ROCK SURFACE COURSE

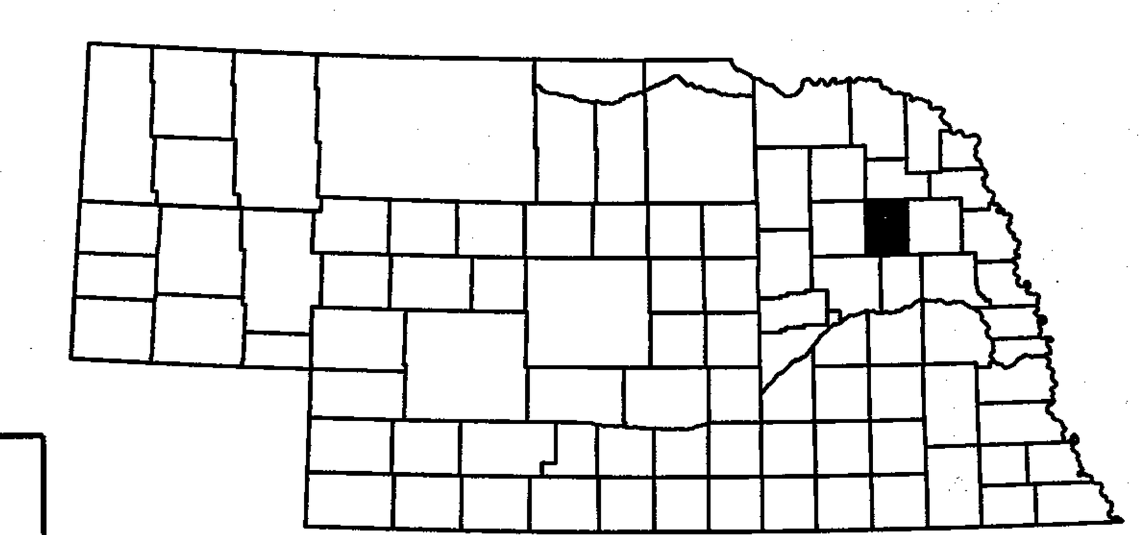
DESIGN DESIGNATION
LOCAL ROADS AND STREETS
RURAL
TRAFFIC

YEAR:	2013	2033
ADT:	65	85
DHV:	12	15

T= 15 % D= ___ %
DESIGN NO. RC2
N.F.C. RURAL LOCAL

WORK ON THIS PROJECT IN THE VICINITY OF STATION 24+77.50 AUTHORIZED PURSUANT TO THE CONDITIONS STIPULATED IN THE ARMY CORP OF ENGINEERS NATION WIDE PERMIT

MEETS OR EXCEEDS MINIMUM DESIGN STANDARDS OF THE BOARD OF PUBLIC ROADS CLASSIFICATION AND STANDARDS.



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	

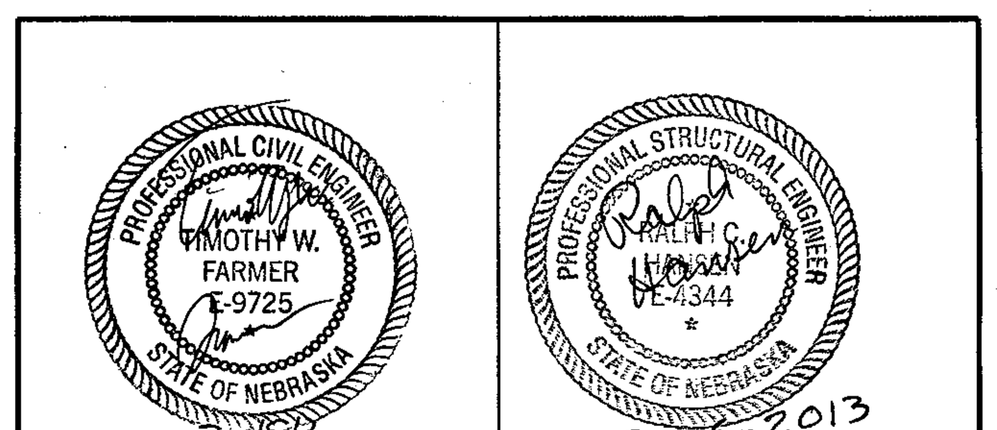
R.O.W. LEGEND

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: 1,800.00 FEET 0.341 MILES



COORDINATING PROFESSIONAL

CONSTRUCTION DIVISION

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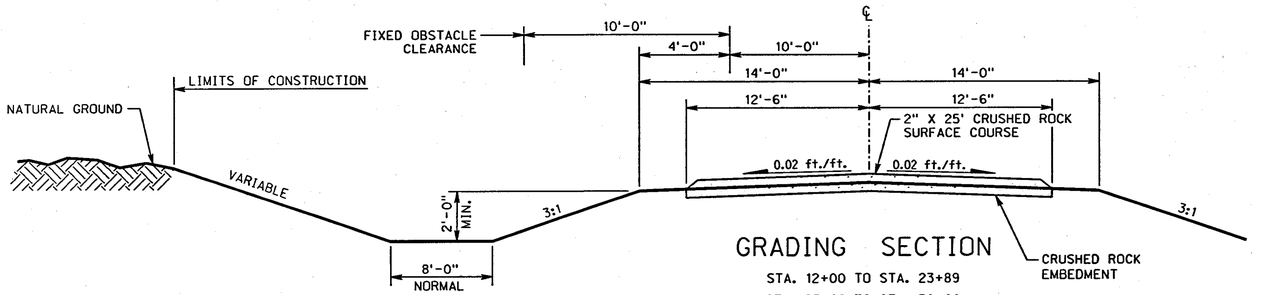
TYPICAL CROSS SECTIONS OF IMPROVEMENT

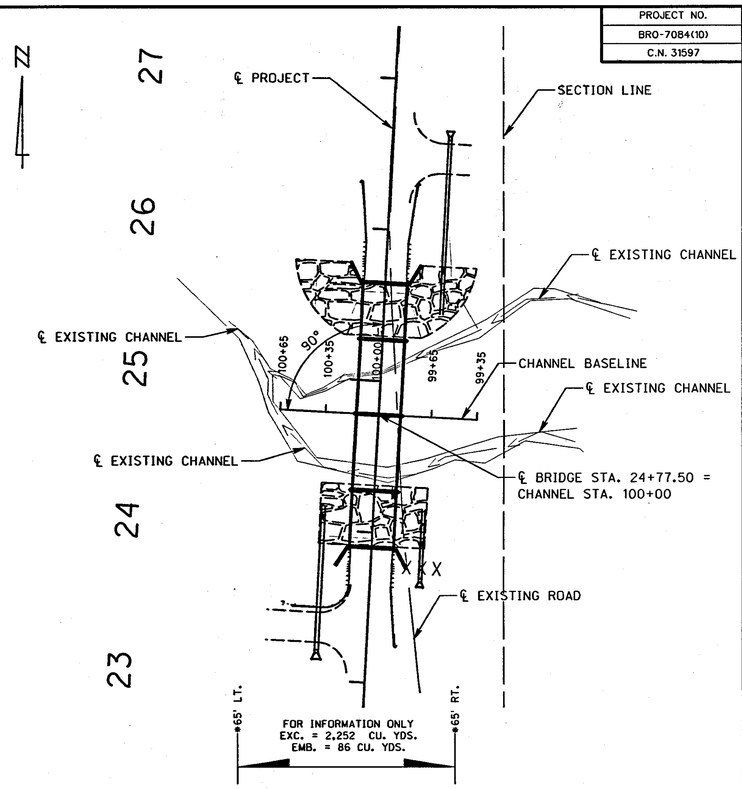


HALF CUT SECTION

GRADING SECTION

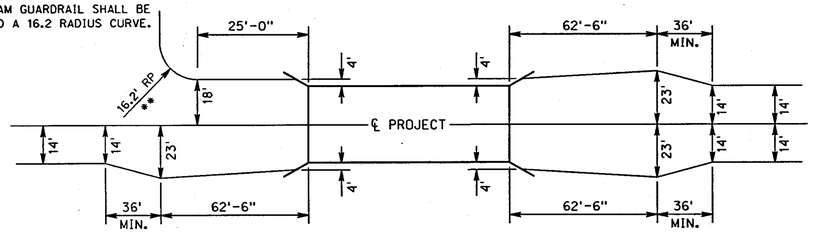
STA. 12+00 TO STA. 23+89
STA. 25+66 TO STA. 30+00
(EXCEPT AS SHOWN ON CROSS SECTIONS)

HALF FILL SECTION

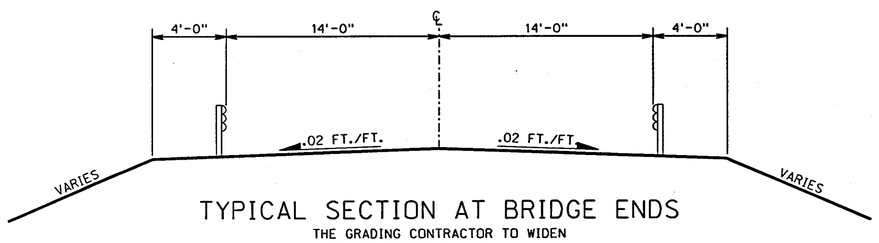


CHANNEL LAYOUT

** 44.25' OF W-BEAM GUARDRAIL SHALL BE PLACED AROUND A 16.2 RADIUS CURVE.

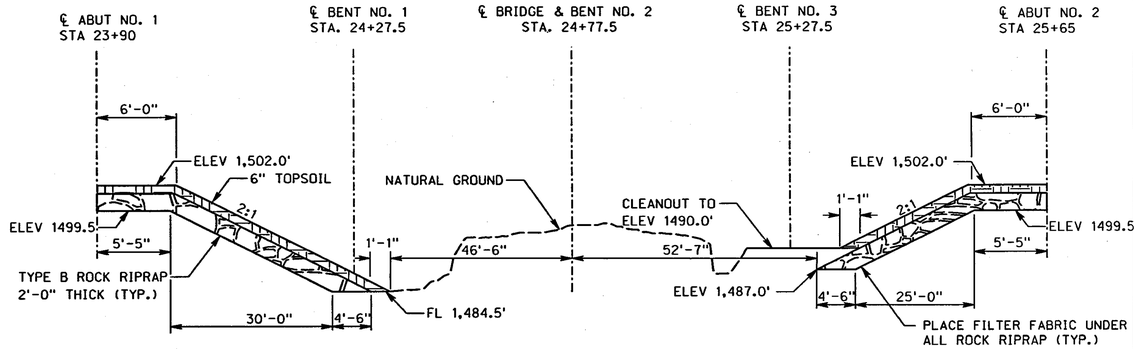


WIDEN FILL FOR GUARDRAIL
STA. 24+77.50



TYPICAL SECTION AT BRIDGE ENDS

THE GRADING CONTRACTOR TO WIDEN FILL TO ACCOMMODATE GUARDRAIL.



△ - MEASURED PERPENDICULAR TO ℄ CHANNEL
* - MEASURED ALONG ℄ OF CHANNEL

LIMITS OF GRADING THROUGH THE BRIDGE WHICH SHALL BE DONE BY THE GRADING CONTRACTOR BEFORE THE BRIDGE IS BUILT. (* LT. & * RT.)

CHANNEL EXCAVATION SHALL BE CLASSIFIED AS ROADWAY EXCAVATION.

SEE CHANNEL CROSS SECTIONS AND BRIDGE PLANS FOR ADDITIONAL DETAILS.

TYPICAL CHANNEL SECTION

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. PARMER
E-9725
5-14-13
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	2-T
C.N. 31597	

TYPICAL CROSS SECTIONS OF IMPROVEMENT

STANTON SOUTHEAST

SPEECE LEWIS ENGINEERS
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SUMMARY OF QUANTITIES

GRADING ITEMS GROUP 1

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
LARGE TREE REMOVAL	7.000	EACH
GENERAL CLEARING AND GRUBBING	1.000	LS
EXCAVATION (ESTABLISHED QUANTITY)	11,202.000	CY
WATER	45.000	MGAL
CRUSHED ROCK EMBEDMENT	16.230	STA
CRUSHED ROCK SURFACE COURSE	501.000	CY
SEEDING, TYPE A	3.000	ACRE
COVER CROP SEEDING	3.000	ACRE
EROSION CONTROL, CLASS 1D	2,694.000	SY
EROSION CHECKS, TYPE 1D	48.000	BALE
FABRIC SILT FENCE-LOW POROSITY	569.000	LF
MULCH	7.000	TON

CULVERT ITEMS GROUP 4

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
EXCAVATION FOR PIPE, PIPE-ARCH CULVERTS, AND HEADWALLS	356.000	CY
24" METAL FLARED-END SECTION	2.000	EACH
30" METAL FLARED-END SECTION	1.000	EACH
24" CULVERT PIPE, TYPE 3,4,5 OR 6	188.000	LF
30" CULVERT PIPE, TYPE 3,4,5 OR 6	110.000	LF

GUARDRAIL ITEMS GROUP 7

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
W-BEAM GUARDRAIL	44.250	LF
BRIDGE APPROACH SECTIONS	4.000	EACH
END ANCHORAGE ASSEMBLY	1.000	EACH
GUARDRAIL END TREATMENT, TYPE II	3.000	EACH

BRIDGE ITEMS GROUP 6

ITEM	QUANTITY	UNITS
MOBILIZATION	1.000	LS
RIPRAP FILTER FABRIC	840.000	SY
ABUTMENT NO.1 EXCAVATION	1.000	LS
ABUTMENT NO.2 EXCAVATION	1.000	LS
BENT NO.2 EXCAVATION	1.000	LS
BENT NO.3 EXCAVATION	1.000	LS
BENT NO.1 EXCAVATION	1.000	LS
CLASS 47B-3000 CONCRETE FOR BRIDGE	294.000	CY
CLASS 47BD-4000 CONCRETE FOR BRIDGE	336.800	CY
REINFORCING STEEL FOR BRIDGE	89,810.000	LB
REMOVE STRUCTURE	1.000	EACH
AT STA 24+81		
ACCESS CROSSING	1.000	LS
STRUCTURAL STEEL FOR SUBSTRUCTURE	3,675.000	LB
ROCK RIPRAP, TYPE B	750.000	TON
SALVAGING AND PLACING TOPSOIL ON RIPRAP	890.000	SY
HP 10 INCH X 42 LB STEEL PILING	3,810.000	LF

GENERAL ITEMS GROUP 10

ITEM	QUANTITY	UNITS
BARRICADE, TYPE III	2,338.000	BDAY
SIGN DAY	3,006.000	EACH
CONTRACTOR FURNISHED SIGN DAY	668.000	EACH
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	10.000	HOUR
TEMPORARY SILT CHECK	200.000	LF
TEMPORARY SILT FENCE	500.000	LF
TEMPORARY EARTH CHECK	200.000	LF
TEMPORARY MULCH	2.000	TON

COMPACTION REQUIREMENTS

Class III (See Specifications)

	SOIL TYPE	DEPTH BELOW FINISH SUBGRADE	PERCENT DENSITY	MOISTURE REQUIREMENTS MINIMUM	MOISTURE REQUIREMENTS MAXIMUM
Embankment / Roadway Grading to receive gravel surfacing / crushed rock embedment	All	All depths	95 Min.	**	**
Embankment of driveways which are not to be surfaced	All	All depths	Class I	(See Specifications)	
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.)

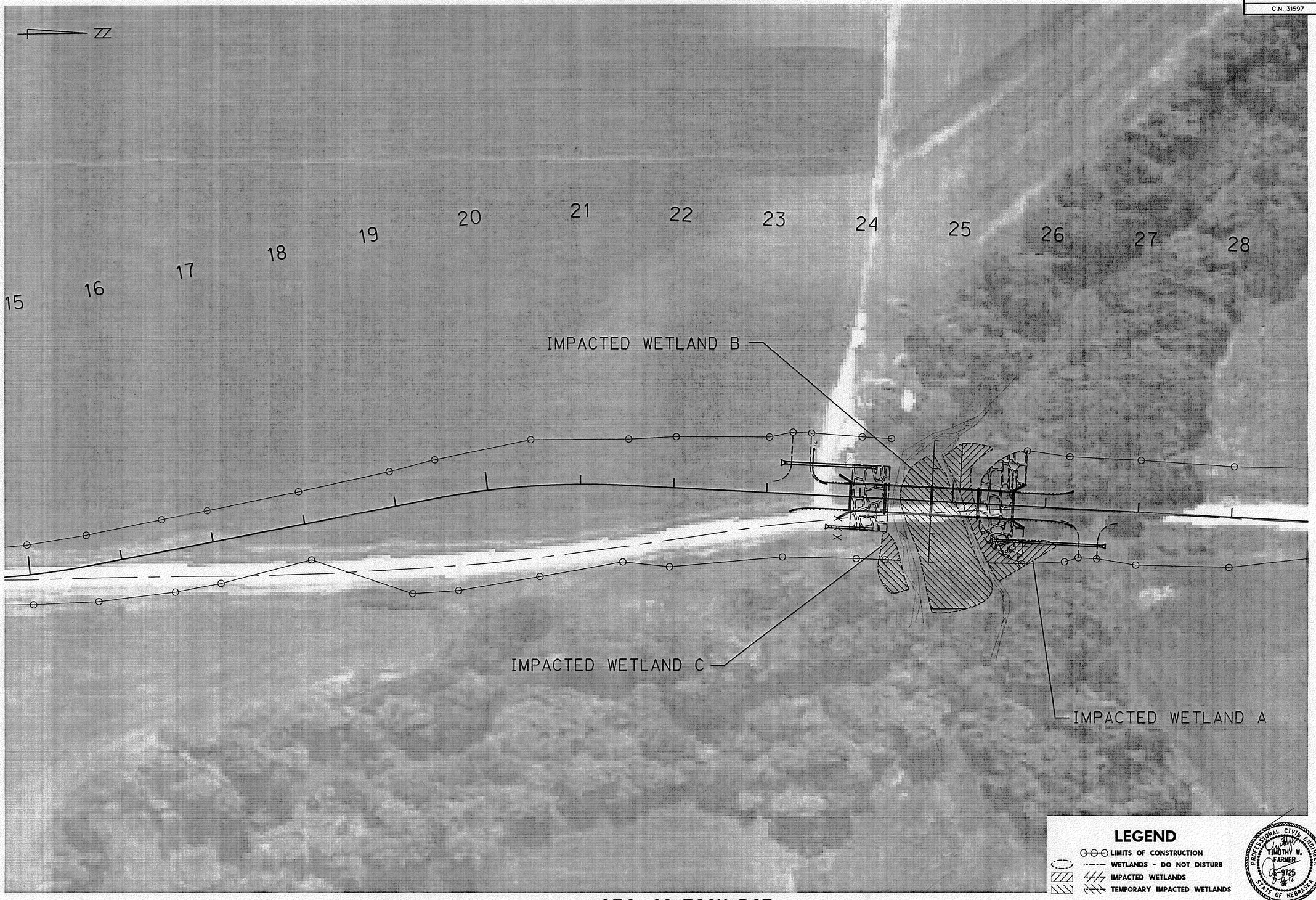
PROFESSIONAL CIVIL ENGINEER
MICHAEL H. STOLTENBERG
E-6505
3-19-13
STATE OF NEBRASKA

CONSTRUCTION DIVISION

Computer: DRCONSTRUCT24 User: dor17005 Date: 12-MAR-2013 07:53 File: 31597Opsetitle.dgn Scale: 1:100

PROJECT NO.	SHEET NO.
BRO-7084(10)	2-W
C.N. 31597	

SEC. 31-T23N-R3E



LEGEND

- LIMITS OF CONSTRUCTION
- WETLANDS - DO NOT DISTURB
- IMPACTED WETLANDS
- TEMPORARY IMPACTED WETLANDS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
9725
STATE OF NEBRASKA

SEC. 32-T23N-R3E

WETLANDS

STANTON SOUTHEAST

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SPEECE LEWIS ENGINEERS

PROJECT NO.	SHEET NO.
BRO-7084(10)	2-N1
C.N. 31597	

CULVERT PIPE LEGEND		
TYPE		DESCRIPTION
1	RCSP	Reinforced Concrete Sewer Pipe
2	RCP	Reinforced Concrete Pipe
3	GCCMP	Galvanized (zinc) Coated Corrugated Metal Pipe
4	ACCMP	Aluminum Coated Corrugated Metal Pipe
5	PCCMP	Polymer Coated Corrugated Metal Pipe
6	HDPE-CI	High Density Polyethylene (corrugated Interior)
7	HDPE-SI	High Density Polyethylene (smooth Interior)
8	PVC	Polyvinyl Chloride Pipe

Beginning chain MAINLINE description

Point 1 N 1,000.00 E 0.00 Sta 10+00.00

Course from 1 to PC MAINLINE-1 Due North Dist 406.02

Curve Data

Curve MAINLINE-1
P.I. Station 14+86.93 N 1,486.93 E 0.00
Delta = 10° 52' 28.25" (LT)
Degree = 6° 44' 26.45"
Tangent = 80.91
Length = 161.33
Radius = 850.00
External = 3.84
Long Chord = 161.08
Mid. Ord. = 3.82
P.C. Station 14+06.02 N 1,406.02 E 0.00
P.T. Station 15+67.35 N 1,566.38 E -15.26
C.C. N 1,406.02 E -850.00
Back = Due North
Ahead = N 10° 52' 28.25" W
Chord Bear = N 5° 26' 14.12" W

Course from PT MAINLINE-1 to PC MAINLINE-2 N 10° 52' 28.25" W Dist 375.34

Curve Data

Curve MAINLINE-2
P.I. Station 20+46.45 N 2,036.88 E -105.65
Delta = 13° 55' 07.71" (RT)
Degree = 6° 44' 26.45"
Tangent = 103.76
Length = 206.49
Radius = 850.00
External = 6.31
Long Chord = 205.98
Mid. Ord. = 6.26
P.C. Station 19+42.69 N 1,934.99 E -86.08
P.T. Station 21+49.18 N 2,140.49 E -100.14
C.C. N 2,095.35 E 748.66
Back = N 10° 52' 28.25" W
Ahead = N 3° 02' 39.46" E
Chord Bear = N 3° 54' 54.40" W

Course from PT MAINLINE-2 to 2 N 3° 02' 39.46" E Dist 826.24

Point 2 N 2,965.56 E -56.26 Sta 29+75.42

Course from 2 to 3 N 3° 01' 58.62" E Dist 524.36

Point 3 N 3,489.18 E -28.52 Sta 34+99.78

Ending chain MAINLINE description

Beginning chain CHANNEL description

Point 10 N 2,464.89 E -17.80 Sta 99+35.00

Course from 10 to 11 N 86° 57' 20.54" W Dist 130.00

Point 11 N 2,471.79 E -147.61 Sta 100+65.00

Ending chain CHANNEL description

*EARTHWORK QUANTITIES					
STATION TO STATION	DESCRIPTION	EXC. (cu. yds.)	EMB. (cu. yds.)	BALANCE FACTOR	(+)LONG (-)SHORT
12+00 30+00	ROADWAY	8,950	3,099	1.40	+4,611
99+35 100+65	CHANNEL	2,252	86	1.40	+2,132
	TOTALS	11,202	3,185	1.40	+6,743

* Earthwork required for drive and dike construction is not included in the embankment quantities.

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 THE 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.

UPON COMPLETION OF THE GRADING OPERATIONS PERMANENT SEEDING OF THE DISTURBED AREAS CREATED BY THE GRADING OPERATIONS AND PERMANENT SEEDING OF A 50' WIDE BUFFER STRIP ALONG EACH SIDE OF THE NEW CHANNEL WILL BE PERFORMED BY THE CONTRACTOR AS DIRECTED BY THE PROJECT MANAGER.

BACKFILL AT ABUTMENTS SHALL BE MADE AND COMPACTED BY THE GRADING CONTRACTOR, TO THE LIMITS INDICATED, AS PRESCRIBED IN PARAGRAPH 3 OF SUBSECTION 702.03 IN THE 2007 STANDARD SPECIFICATIONS AFTER THE BRIDGE HAS BEEN BUILT.

ALL SIGNING AND PAVEMENT MARKING WILL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

THE CONTRACTOR WILL NOT BE REQUIRED TO FURNISH BORROW ON THIS PROJECT.

THE CONTRACTOR MAY CLOSE THE ROAD TO ALL BUT LOCAL TRAFFIC SUBJECT TO THE CONDITIONS PRESCRIBED IN THE 2007 STANDARD SPECIFICATIONS.

THE COUNTY SHALL PROVIDE ROUTING THROUGH TRAFFIC AROUND THE PROJECT IF DEEMED NECESSARY.

THE CONTRACTOR SHALL FIND A SUITABLE LOCATION BEYOND THE LIMITS OF THE RIGHT OF WAY TO DISPOSE OF EXCESS MATERIAL.

GEOPAK ALIGNMENT INFORMATION		
ALIGNMENT	CHAIN	PROFILE
ROADWAY	MAINLINE	MAINLINE
CHANNEL	CHANNEL	*

COMPACTION REQUIREMENTS
CLASS III
(SEE SPECIFICATIONS)

LOCATION
STA. 12+00 TO STA. 30+00

	SOIL TYPE	DEPTH BELOW FINISH GRADE	PERCENT DENSITY	MOISTURE REQUIREMENTS MINIMUM	MOISTURE REQUIREMENTS MAXIMUM
EMBANKMENT/ROADWAY GRADING TO RECEIVE GRAVEL SURFACING /CRUSHED ROCK EMBEDMENT	ALL	ALL DEPTHS	95 Min.	**	**
EMBANKMENT OF DRIVEWAYS WHICH ARE NOT TO BE SURFACED	ALL	ALL DEPTHS	CLASS I	(SEE SPECIFICATIONS)	
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.)

PROFESSIONAL CIVIL ENGINEER TIMOTHY W. PARMER E-9725 STATE OF NEBRASKA

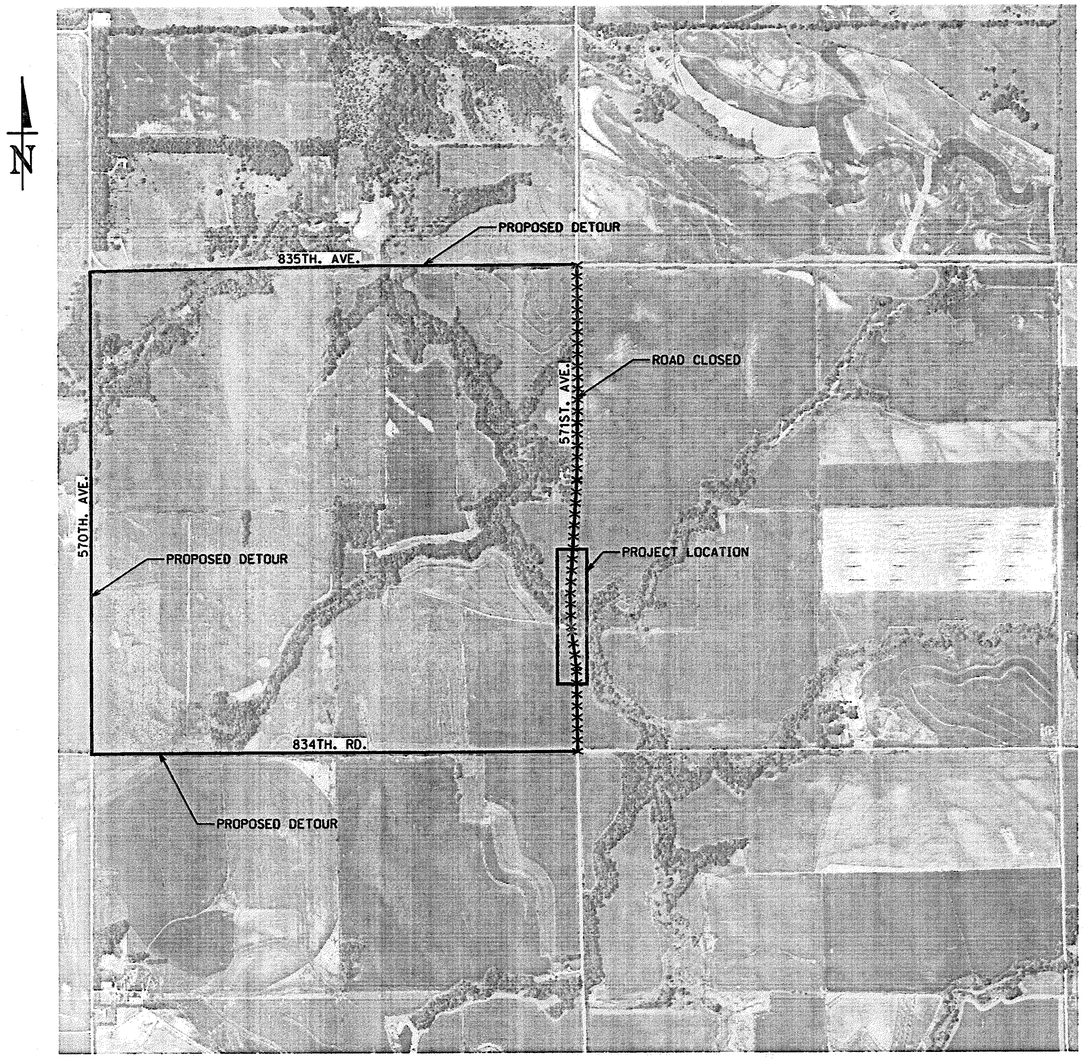
GENERAL INFORMATION

STANTON SOUTHEAST

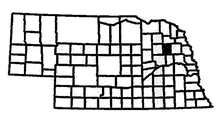
SPEECE ILEWIS ENGINEERS
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speeceilewis.com

PROJECT NO.	SHEET NO.
BRO-7084(10)	2-N2
C.N. 31597	

DETOUR MAP - STANTON SOUTHEAST
STANTON COUNTY

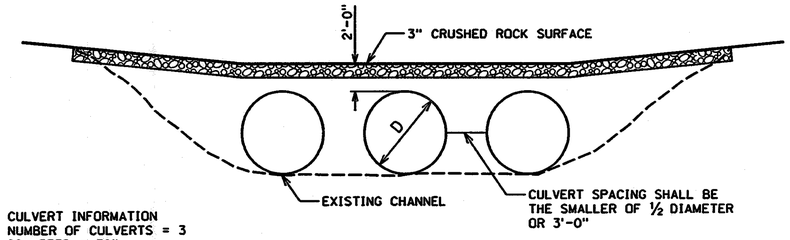


PROPOSED DETOUR
ROAD CLOSED

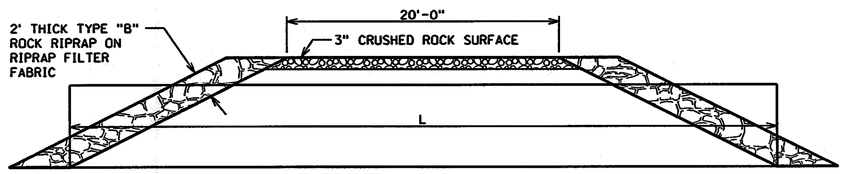


ACCESS CROSSING
STA. 24+77.50

THE CONTRACTOR, AT HIS OPTION, MAY CONSTRUCT A CONTRACTORS ACCESS CROSSING FOR USE DURING CONSTRUCTION OF THE BRIDGE. IF THE CONTRACTOR CHOOSES TO BUILD THE ACCESS CROSSING, IT MUST BE CONSTRUCTED AS SHOWN IN THE DETAIL BELOW. THE ACCESS CROSSING HAS BEEN DESIGNED TO ACCOMMODATE THE BASE FLOW. UPON COMPLETION OF THE PROJECT, THE ACCESS CROSSING SHALL BE REMOVED ENTIRELY AND THE CHANNEL SHAPED AS SHOWN IN THE PLANS. TYPE 'B' ROCK RIPRAP MAY BE SALVAGED AND INCORPORATED INTO THE PROJECT. ALL OTHER MATERIALS REQUIRED TO BUILD THE ACCESS CROSSING SHALL BE REMOVED FROM THE PROJECT BY THE CONTRACTOR AND SHALL BECOME THE PROPERTY OF THE CONTRACTOR.



CULVERT INFORMATION
NUMBER OF CULVERTS = 3
DIAMETER = 72"
LENGTH = 50'



GENERAL INFORMATION

STANTON SOUTHEAST

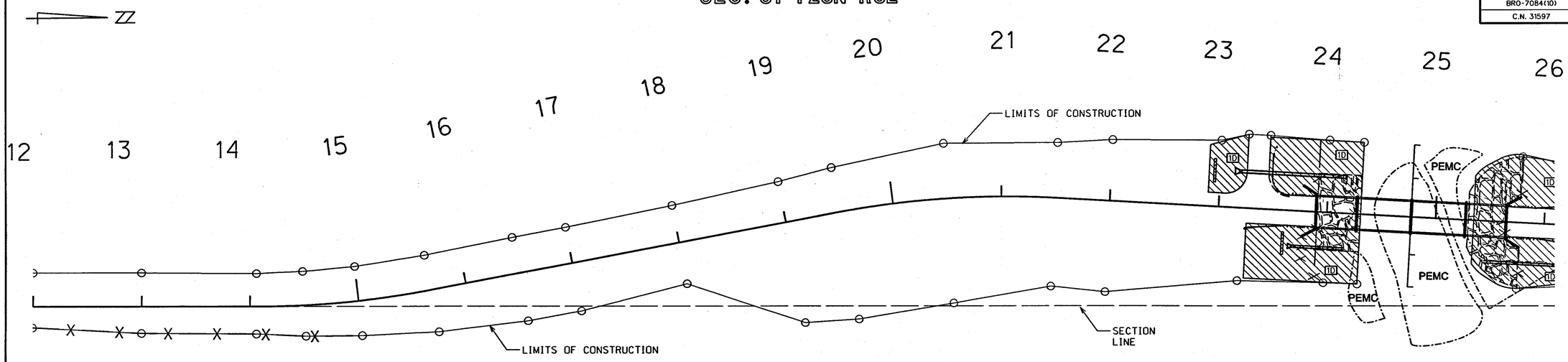
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SPEECE LEWIS ENGINEERS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. TARNER
E-9725
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	2-L
C.N. 31597	

SEC. 31-T23N-R3E



—x— BUILD FABRIC SILT FENCE-LOW POROSITY, PLAN 502

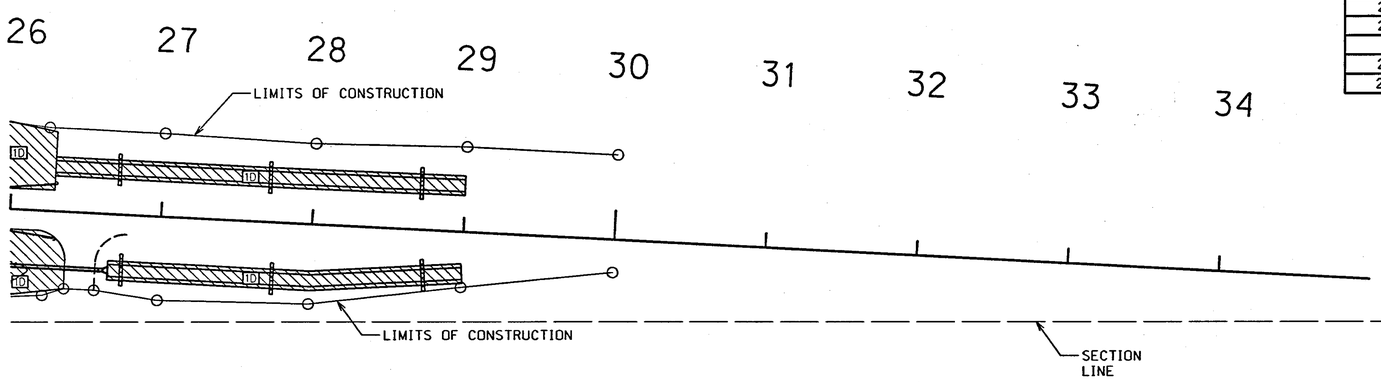
STATION	TO	STATION	SIDE	DESCRIPTION	LIN. FT.
12+00		15+00	RT.	TOE OF FILL SLOPE	300
23+91		23+91	LT./RT.	ALONG CHANNEL BANK	130
25+78		25+78	LT./RT.	ALONG CHANNEL BANK	139

BUILD EROSION CHECKS-TYPES 1D, SPECIAL PLAN 2C

STATION	TO	STATION	SIDE	SPACING	BALES EACH	BALES TOTAL
22+95			LT.	*	6	6
23+60			RT.	*	6	6
26+75		28+75	RT.	100'	6	18
26+75		28+75	LT.	100'	6	18

SEC. 32-T23N-R3E

SEC. 31-T23N-R3E



1D BUILD EROSION CONTROL-CLASS 1D, PLAN 501-R5

STATION	TO	STATION	SIDE	DESCRIPTION	WIDTH	SQ. YDS.
22+90		23+20	LT.	DRIVEWAY SLOPE	VARIES	80
23+27.50		23+90	LT.	GUARDRAIL SLOPE	VARIES	110
23+27.50		23+90	RT.	GUARDRAIL SLOPE	VARIES	86
25+65		26+27.50	LT.	GUARDRAIL SLOPE	VARIES	179
25+65		26+27.50	RT.	GUARDRAIL SLOPE	VARIES	265
ON CHANNEL BANKS			*	*	VARIES	1,240
26+27.50		29+00	LT.	IN DITCH BOTTOMS	13'	394
26+66		29+00	RT.	IN DITCH BOTTOMS	13'	340

E ¼ CORNER SEC. 31-T23N-R3E
STA. 36+64.24

LEGEND

LIMITS OF CONSTRUCTION

WETLANDS - DO NOT DISTURB UNIMPACTED WETLANDS, SEE SHEET 2-W

SEC. 32-T23N-R3E

EROSION CONTROL

STANTON SOUTHEAST

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SPEECE LEWIS ENGINEERS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9725
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	3
C.N. 31597	

PLAN | NOTEBOOK | NO.
SURVEYED | PLOTTED | GRADES CHECKED | BM'S NOTED | STRUCTURE NOTATIONS CHKD. | ALIGNMENT CHECKED | RIGHT OF WAY CHECKED
BY | DATE

PLAN AND PROFILE

STANTON SOUTHEAST

SEC. 31-T23N-R3E

SEC. 32-T23N-R3E

SE CORNER SEC. 31-T23N-R3E
STA. 10+00.00

STA. 23+20, 33' LT. TO STA. 24+15, 33' LT.
BUILD 30" × 96' CULVERT PIPE TYPE 3,4,5 OR 6
WITH FLARED END SECTION ON INLET.
2-7° ELBOWS. PLAN NO. 410-R3.
FILL= 5' EXC.= 197 CU. YDS.

STA. 23+35, LT.
BUILD EARTH DRIVE (20' WIDE)
ON +0.4% GRADE.

TIES:

SE CORNER SEC. 31-T23N-R3E
PIPE, STA. 10+00
NW 44.80' NAIL IN POWER POLE
SW 41.50' NAIL IN FENCE POST
SW 70.90' TOP TELEPHONE BOX

P.I. @ STA. 14+86.93
⅝" REBAR
SW 57.70' NAIL IN FENCE POST
WSW 33.65' NAIL IN FENCE POST
WNW 33.41' NAIL IN FENCE POST

P.I. @ STA. 20+46.45
⅝" REBAR
SE 80.50' NAIN IN FENCE POST
E 68.10' N IN FENCE POST
NE 72.03' SPIKE IN POWER POLE (BM#1)

P.O.T. STA. 29+75.49
⅝" REBAR
NW 37.10' TO NAIL IN FENCE POST
SW 62.80' TO NAIL IN FENCE POST
SE 59.20' NAIL IN POWER POLE

E ¼ CORNER SEC. 31-T23N-R3E
PIPE
SE 53.00' NAIL IN POWER POLE
W 45.20' NAIL IN FENCE POST

ALL BANDS FOR CORRUGATED METAL PIPE SHALL BE 2'-0" WIDE (MINIMUM) UNLESS APPROVED BY THE ENGINEER.

PI 1 STA 14+86.93
Δ = 10° 52' 28.25" (LT)
D = 6° 44' 26.45"
T = 80.91'
L = 161.33'
R = 850.00'
P.C. 1 STA. 14+06.02
P.T. 1 STA. 15+67.35

PI 2 STA 20+46.45
Δ = 13° 55' 07.71" (RT)
D = 6° 44' 26.45"
T = 103.76'
L = 206.49'
R = 850.00'
P.C. 2 STA. 19+42.70
P.T. 2 STA. 21+49.18

STA. 23+78, RT.
BUILD EARTH DIKE
TO ELEV.= 1505.5
SEE SHEET 4.

STA. 23+71, 33' RT. TO STA. 24+15, 33' RT.
BUILD 24" × 46' CULVERT PIPE TYPE 3,4,5 OR 6
WITH FLARED END SECTION ON INLET.
2-27° ELBOWS. PLAN NO. 410-R3.
FILL= 6' EXC.= 64 CU. YDS.

STA. 24+81, RT.
EXISTING 120'-0" STEEL GIRDER BRIDGE
3-40'-0" SPANS. 16' CLEAR ROADWAY.
REMOVE.

STA. 26+48, RT.
24" × 44' CORR. METAL DRIVE PIPE. REMOVE.
BUILD EARTH DRIVE (20' WIDE)
ON -7.9% GRADE.

STA. 25+46.5, 38' RT. TO STA. 26+60, 38' RT.
BUILD 24" × 114' CULVERT PIPE TYPE 3,4,5 OR 6
WITH FLARED END SECTION ON INLET.
2-6° ELBOWS. PLAN NO. 410-R3.
FILL = 6' EXC. =95 CU. YDS.

STA. 24+77.5
BUILD 175'-0" (2-50'-0" & 2-37'-6" SPANS) CONTINOUS
CONCRETE SLAB BRIDGE ON 0° SKEW (RHB).
28'-0" CLEAR ROADWAY. SPECIAL PLAN NO 1.

STA. 24+77.5
BUILD GUARDRAIL PROTECTION.
4-MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION
3-END TREATMENT, TYPE II & 1-END ANCHORAGE ASSEMBLY
44.25' OF W-BEAM GUARDRAIL R=15.92'
PLAN NO. 740 & 743. SPECIAL PLAN NO. 1C

E ¼ CORNER SEC. 31-T23N-R3E

POT STA. 29+75.42

POT STA. 34+99.78

PC STA. 19+42.69

PT STA. 21+49.18

B.M. #1 SPIKE IN POWER POLE, 63' RT.
STA. 20+73 ELEV. = 1512.58

B.M. #2 SPIKE IN POWER POLE, 36' RT.
STA. 26+65 ELEV. = 1505.86

STA. 12+00.00
EL = 1,512.30

STA 16+00.00
EL = 1,511.00
L = 300'
K = 878

STA 19+00.00
EL = 1,509.00
L = 300'
K = 450

STA 26+50.00
EL = 1,509.00
L = 200'
K = 167

STA 28+50.00
EL = 1,511.40
L = 200'
K = 167

STA 30+00.00
EL = 1,511.40

-0.3250 %

-0.6667 %

+0.0000 %

+1.2000 %

+0.0000 %

STA. 23+89
STOP 2" × 25' CRUSHED
ROCK SURFACE COURSE

STA. 25+66
RESUME 2" × 25' CRUSHED
ROCK SURFACE COURSE

STA. 12+00
BEGIN PROJECT BRO-7084(10)
BEGIN CONSTRUCTION
BEGIN 2" × 25' CRUSHED
ROCK SURFACE COURSE

STA. 30+00
END PROJECT BRO-7084(10)
END CONSTRUCTION
END 2" × 25' CRUSHED
ROCK SURFACE COURSE

+0.84' @ 14' RT.

+0.84' @ 14' LT.

200:1

PROFILE GRADE

BEGIN TRANSITION STA. 12+38.02

REVERSE CROWN STA. 13+50.02

P.C. STA. 14+06.02

MAX. SUPER @ STA. 14+62.09

P.T. STA. 15+67.35

REVERSE CROWN STA. 16+23.35

END TRANSITION STA. 17+35.35

BEGIN TRANSITION STA. 17+74.69

REVERSE CROWN STA. 18+86.69

P.C. STA. 19+42.69

MAX. SUPER @ STA. 19+98.69

P.T. STA. 21+49.18

REVERSE CROWN STA. 22+05.18

END TRANSITION STA. 23+17.18

1,509.00

1,509.01

Datum Elev. = 1460ft Sea Level U.S.C. & G.S.

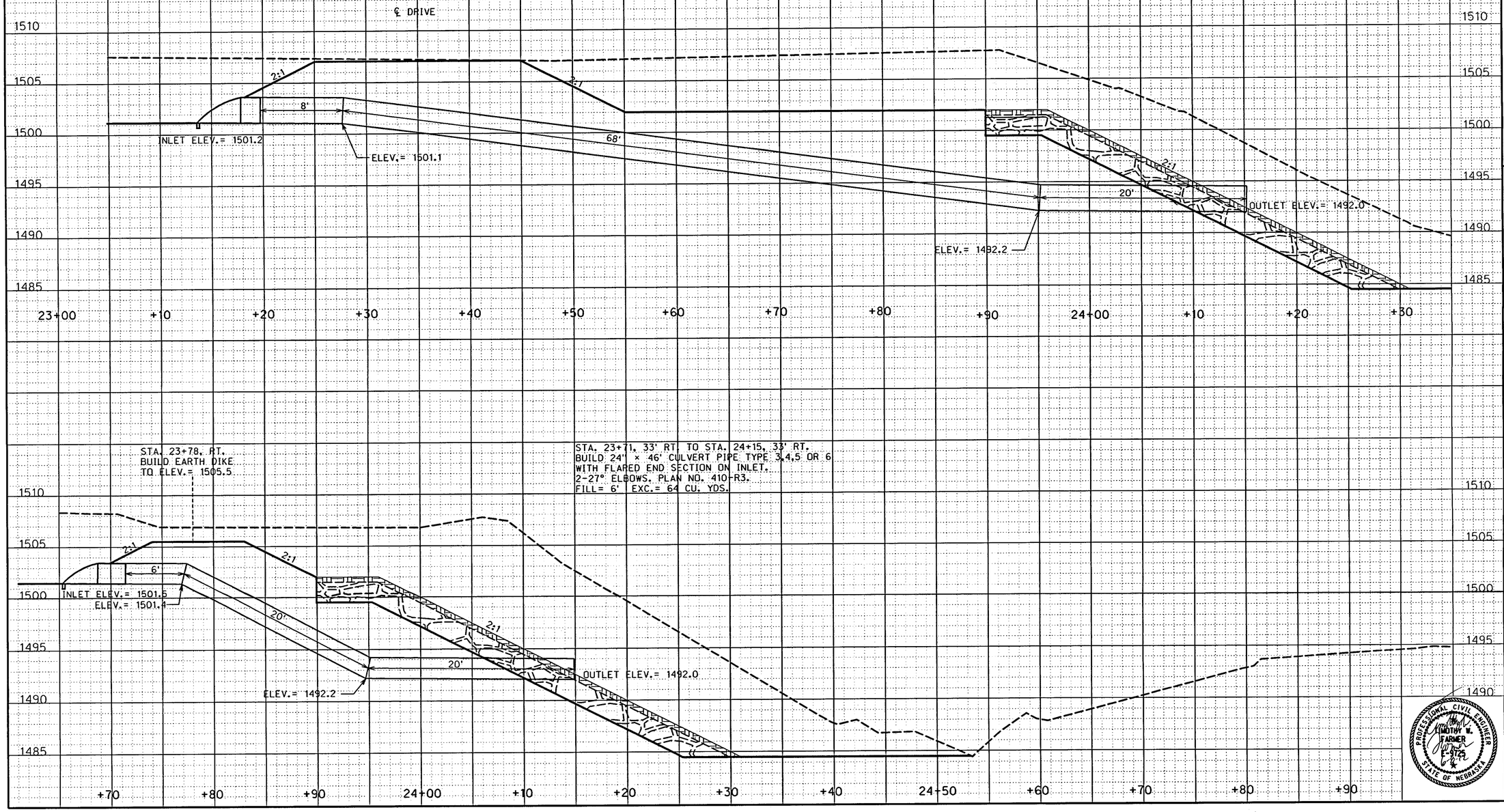
SPEECE LEWIS ENGINEERS
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. ARMER
E-9725
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	4
C.N. 31597	
HORIZONTAL SCALE: 1"=5' VERTICAL SCALE: 1"=5'	

DRAINAGE STRUCTURE CROSS SECTIONS

STA. 23+20, 33' LT. TO STA. 24+15, 33' LT.
BUILD 30' × 96' CULVERT PIPE TYPE 3,4,5 OR 6
WITH FLARED END SECTION ON INLET.
2-7° ELBOWS. PLAN NO. 410-R3.
FILL= 5' EXC.= 197 CU. YDS.



STA. 23+78, RT.
BUILD EARTH DIKE
TO ELEV.= 1505.5

STA. 23+71, 33' RT. TO STA. 24+15, 33' RT.
BUILD 24' × 46' CULVERT PIPE TYPE 3,4,5 OR 6
WITH FLARED END SECTION ON INLET.
2-27° ELBOWS. PLAN NO. 410-R3.
FILL= 6' EXC.= 64 CU. YDS.

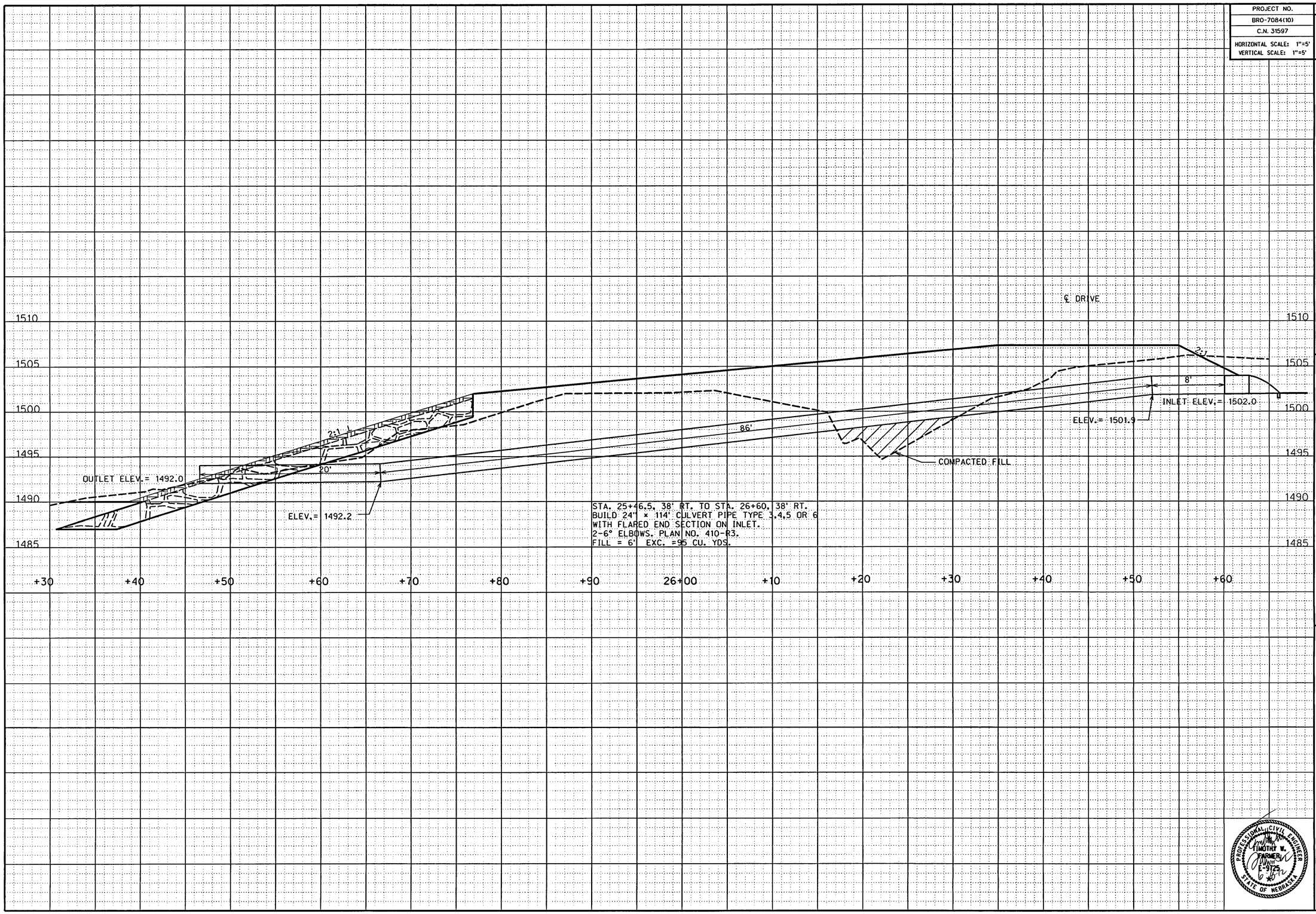
STANTON SOUTHEAST

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SPEECE LEWIS ENGINEERS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9729
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	5
C.N. 31597	
HORIZONTAL SCALE: 1"=5' VERTICAL SCALE: 1"=5'	



DRAINAGE STRUCTURE CROSS SECTIONS

STANTON SOUTHEAST

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SPEECE LEWIS
ENGINEERS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9725
STATE OF NEBRASKA

STANTON - SOUTHEAST
BRO-7084(10)

-NOTES-

This structure is designed in accordance with the AASHTO LRFD Bridge Design Specifications, Fifth Edition and subsequent interims.

The slab is designed for a future wearing surface of 20 psf.

Concrete for slab and rails shall be Class "47BD" concrete, 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 exposed edges of concrete shall be chamfered.

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

The contractor may substitute any one of the alternate designs shown on the plans for the original design. All quantities are based on the original design and no additions or deductions will be allowed for the use of an alternate design.

The item, "Structural Steel for Substructure", shall include tie rods and hardware, turnbuckles, nose angles and armor angles.

Tie rods and hardware shall conform to ASTM A709, Grade 36 Steel. Turnbuckles shall conform to ASTM A668, Class C.

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

All reinforcing steel shall conform to the requirements of ASTM A615, Grade 60 steel.

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

Contractor shall submit the proposed slab pouring sequence to the Project Manager three weeks before placing the slab concrete.

All details are not to scale unless otherwise noted.

As an alternate, after fabrication, nose angles and armor angles may be galvanized according to ASTM 123, in lieu of painting as per 2007 NDOR Standard Specification 709.03.

Shop plans required for review for Structural Steel for Substructure.

-QUANTITIES-

ABUTMENT NO. 1 EXCAVATION		1	LS
BENT NO. 1 EXCAVATION		1	LS
BENT NO. 2 EXCAVATION		1	LS
BENT NO. 3 EXCAVATION		1	LS
ABUTMENT NO. 2 EXCAVATION		1	LS
CLASS 47B-3000 CONCRETE FOR BRIDGE		294.0	CY
ABUTMENTS	116.2 CY		
BENTS	177.8 CY		
CLASS 47BD-4000 CONCRETE FOR BRIDGE		336.8	CY
SLAB	311.6 CY		
CONCRETE RAILS	25.2 CY		
REINFORCING STEEL FOR BRIDGE		89810	LB
SLAB	71620 LB		
CONCRETE RAILS	5510 LB		
ABUTMENTS	5620 LB		
BENTS	7060 LB		
STRUCTURAL STEEL FOR SUBSTRUCTURE		3675	LB
HP 10 INCH X 42 LB. STEEL PILING		3810	LF
ROCK RIPRAP, TYPE B		750	TONS
RIPRAP FILTER FABRIC		840	SY
SALVAGING AND PLACING TOPSOIL ON RIPRAP		890	SY
ACCESS CROSSING AT STA. 24+77.50		1	LS

-INDEX-

PROJECT NUMBER	SHEET NO.
BRO-7084(10)	6
C.N. 31597	
STRUCTURE NUMBER	
C008402740	

175'-0", 4-SPAN CONTINUOUS CONCRETE SLAB BRIDGE
GENERAL NOTES, QUANTITIES AND INDEX

DATE: FEBRUARY 2013

CHECKED BY: MS

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

DETAILED BY: CS

DESIGNED BY: RH

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

SPEECE-LEWIS ENGINEERS
LINCOLN, NEBRASKA

SPEECE | LEWIS
ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER
RALPH C. HANSEN
E-4344
STATE OF NEBRASKA

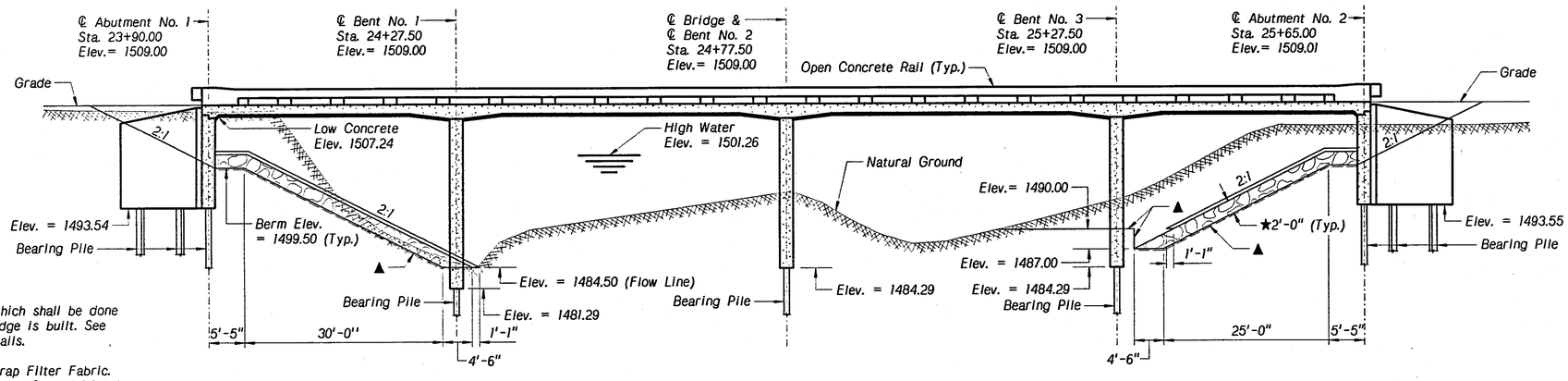
2-5-2013

SPECIAL PLAN NO. 1

1 / 9

Note: Grade Elevations shown are profile Grade Elevations at ℄ Project.

Note:
This structure is located across the Cedar Creek between Sec. 31-T23N-R3E and Sec. 32-T23N-R3E in Stanton County, Nebraska.

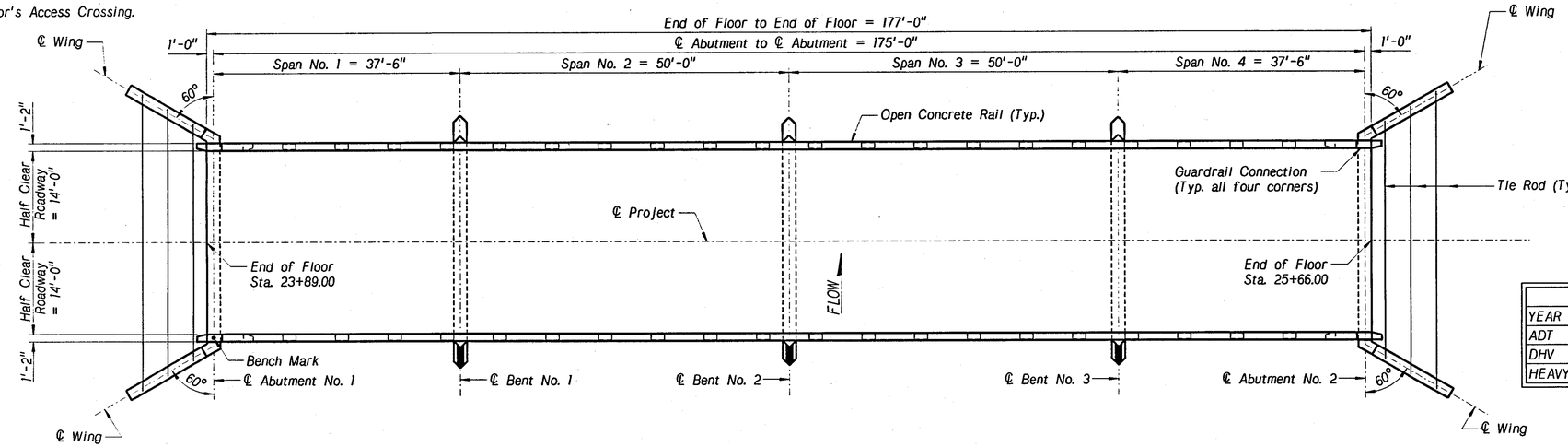


▲ Limits of channel excavation which shall be done by the Contractor before the bridge is built. See Roadway Plans for additional details.

★ Type "B" Rock Riprap and Riprap Filter Fabric. See sheet 8 of 9 and Roadway Plans for additional details. All riprap placed will be covered with 6" of native soil and seeded above the historical ordinary high water mark or approximately three (3) feet above the existing channel flow line, whichever is greater.

See Roadway plans for Contractor's Access Crossing.

SECTIONAL ELEVATION



GENERAL PLAN

TRAFFIC DATA		
YEAR	2013	2033
ADT	65	85
DHV	12	15
HEAVY TRUCKS	15 %	15 %

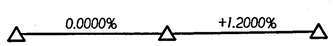
BRIDGE HYDRAULIC INFORMATION

STREAM: Cedar Creek
D.A. = 13.6 SQ. MI.
Q100 = 7,000 CFS (DESIGN FLOOD)
H.W. ELEV. = 1501.26 (D. S. SIDE)
W.W.A. BELOW H. W. = 2,472 SQ. FT.
Q (OHW) = 40 CFS
ORDINARY HIGH WATER ELEV. = 1487.00 FT.
Q100 GENERAL SCOUR = 3.0 FT.
Q100 LOCAL SCOUR = 3.7 FT.
Q500 SCOUR ELEV. = 1477.40 FT.

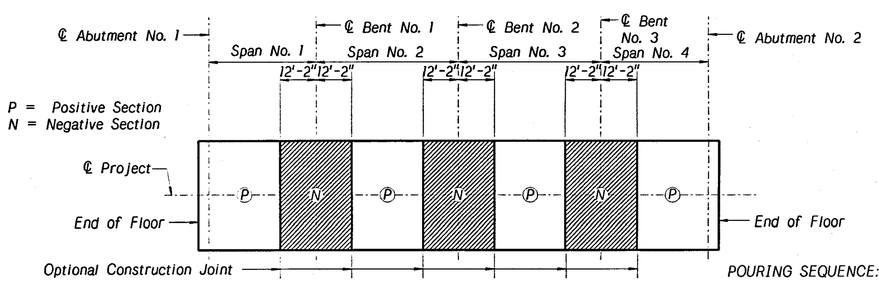
P.I. Sta. 19+00.00
P.I. Elev.= 1509.00

P.I. Sta. 26+50.00
P.I. Elev.= 1509.00
V.C.= 200'

P.I. Sta. 28+50.00
P.I. Elev.= 1511.40



PROFILE GRADE



POURING DIAGRAM

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

PROJECT NUMBER	SHEET NO.
BRO-7084(10)	7

C.N. 31597

STRUCTURE NUMBER
C008402740

175'-0", 4-SPAN
CONTINUOUS CONCRETE SLAB BRIDGE
GENERAL PLAN AND ELEVATION

DATE: FEBRUARY 2013

LINCOLN, NEBRASKA

SPEECE-LEWIS ENGINEERS

DESIGNED BY: RH
DETAILED BY: CS
CHECKED BY: MS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

SPEECE LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER
RALPH C. HANSEN
LE04344
STATE OF NEBRASKA

3-19-2013

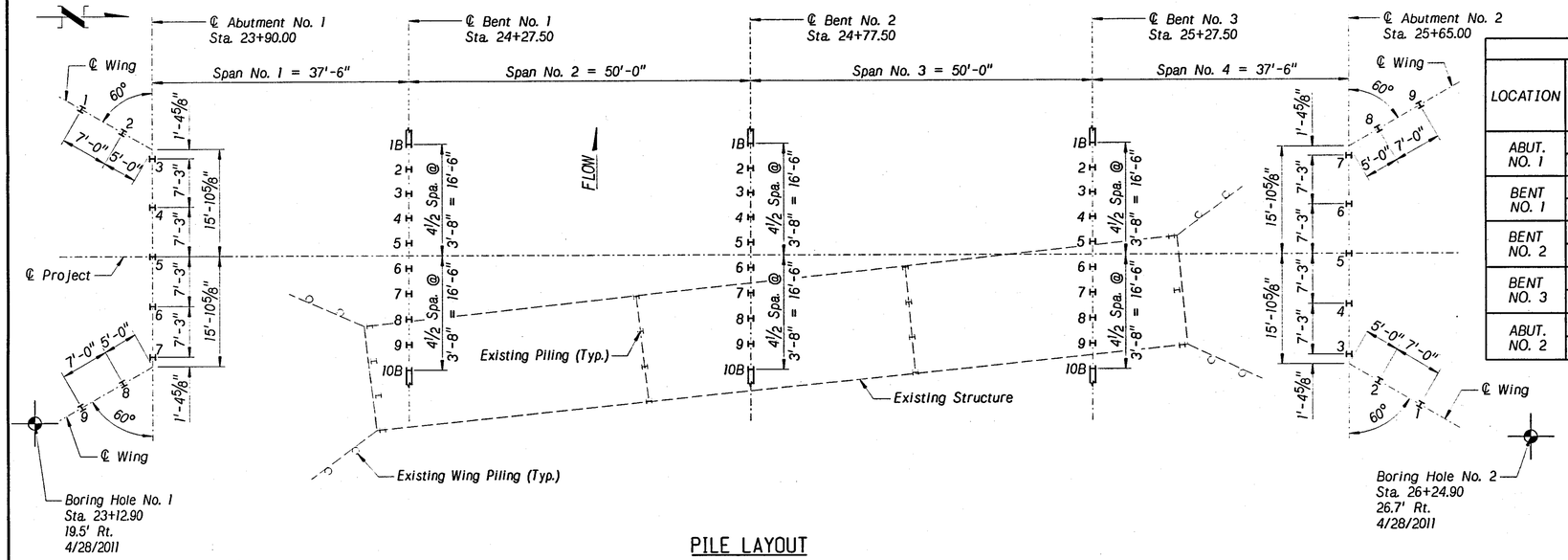
SPECIAL PLAN NO. 1

2/9

PROJECT NUMBER	SHEET NO.
BR0-7084(10)	8

C.N. 31597

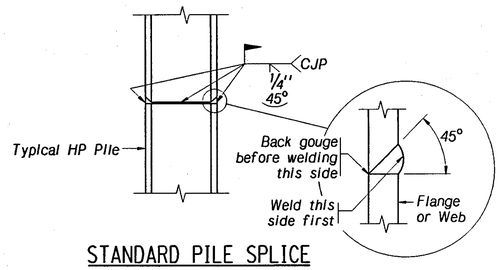
STRUCTURE NUMBER C008402740



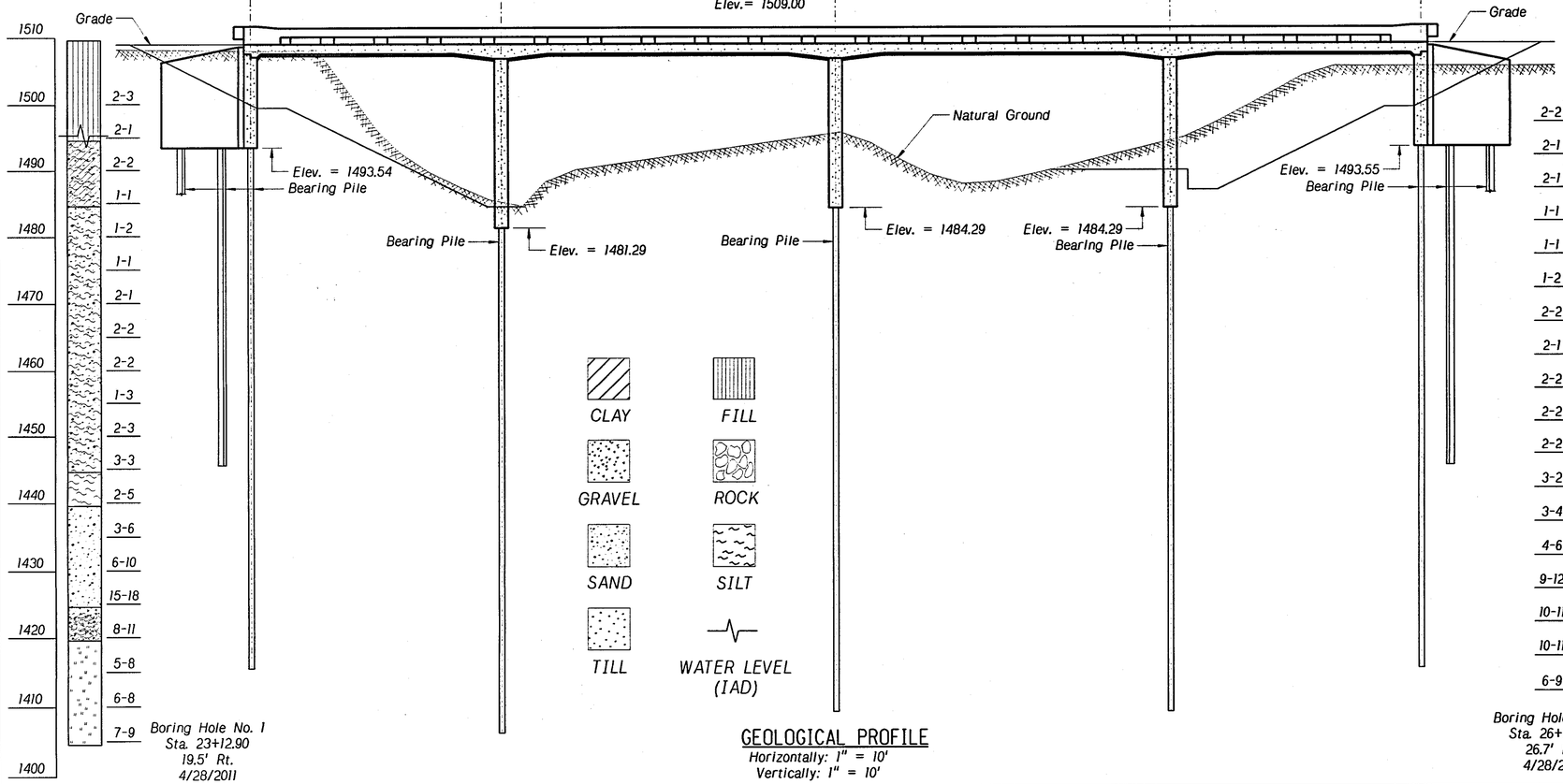
PILE LAYOUT

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
ABUT. NO. 1	1,2,8,9	1495.54	40	50	40	HP 10X42
	3 thru 7	1495.54	70	80	125	HP 10X42
BENT NO. 1	1B,3,5,6,8,10B	1501.29	85	95	145	HP 10X42
	2,4,7,9	1486.29	70	80	145	HP 10X42
BENT NO. 2	1B,3,5,6,8,10B	1499.29	80	90	145	HP 10X42
	2,4,7,9	1489.29	70	80	145	HP 10X42
BENT NO. 3	1B,3,5,6,8,10B	1499.29	80	90	145	HP 10X42
	2,4,7,9	1489.29	70	80	145	HP 10X42
ABUT. NO. 2	1,2,8,9	1495.55	40	50	40	HP 10X42
	3 thru 7	1495.55	70	80	125	HP 10X42



STANDARD PILE SPLICE



GEOLOGICAL PROFILE
Horizontally: 1" = 10'
Vertically: 1" = 10'

Bent pile lengths are designed for scour to elevation 1477.8 ft. for 100-Year Flood.
Bent pile lengths are checked for scour to elevation 1477.4 ft. for 500-Year Flood.

Pile spacing is measured at bottom of concrete.

Bent piling followed by the letter "B" shall be battered 1½ to 12.

Prefabricated cast steel points will be required on all HP piles in this structure. They shall conform to the requirements of ASTM A27 Grade 70-36 or ASTM A148 Grade 90-60 and be listed on the NDOR Approved Products List..

Structural steel for all "H" piles shall conform to ASTM A709, Grade 36.

Note:

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 six inches using a 140-pound weight falling 30 inches, in accordance with A.S.T.M. D1586 procedures.

175'-0", 4-SPAN CONTINUOUS CONCRETE SLAB BRIDGE
GEOLOGICAL PROFILE AND PILE LAYOUT

DATE: FEBRUARY 2013

LINCOLN, NEBRASKA

SPEECE-LEWIS ENGINEERS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

DESIGNED BY: RH
DETAILED BY: CS
CHECKED BY: MS

SPEECE LEWIS ENGINEERS

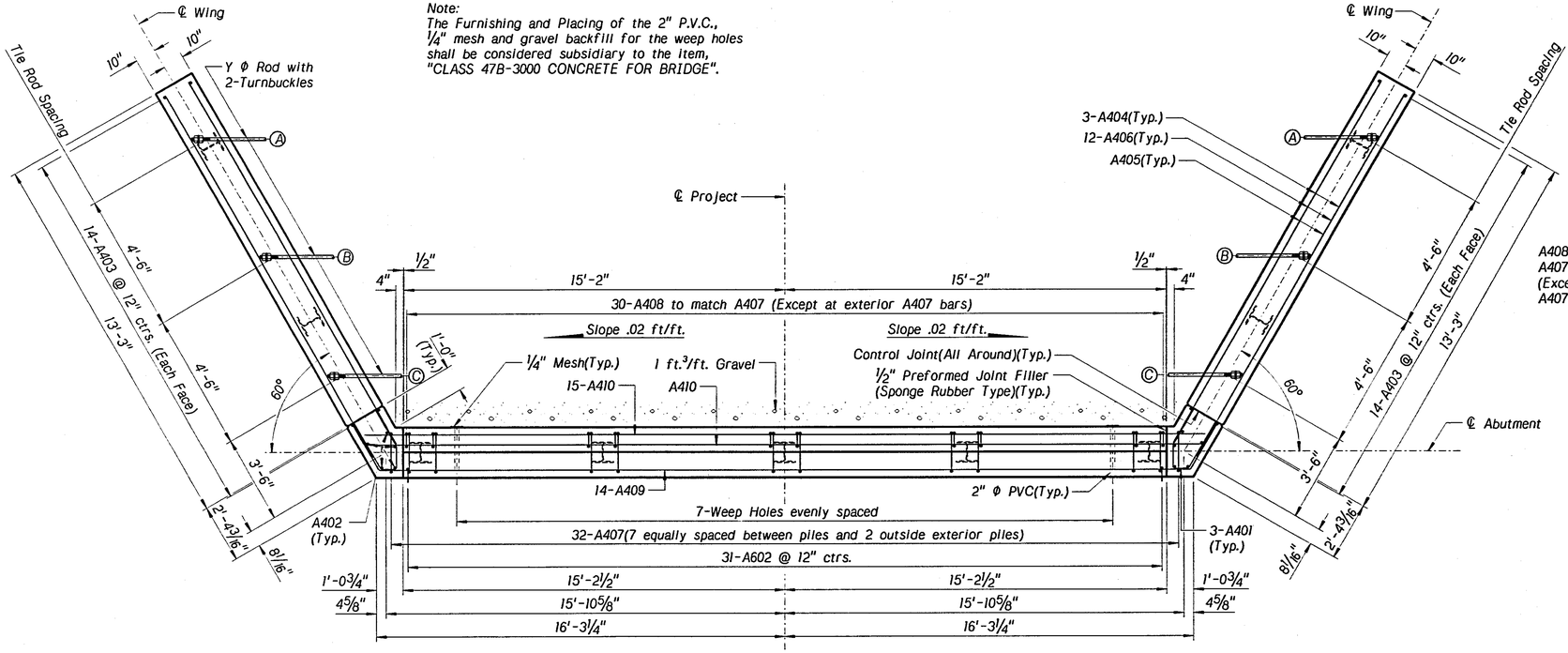
PROFESSIONAL STRUCTURAL ENGINEER
RALPH C. HANSEN
E-4344
STATE OF NEBRASKA

2-6-2013

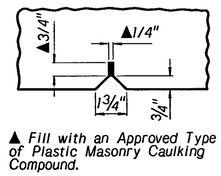
SPECIAL PLAN NO. 1

3/9

Note:
The Furnishing and Placing of the 2" P.V.C., 1/4" mesh and gravel backfill for the weep holes shall be considered subsidiary to the item, "CLASS 47B-3000 CONCRETE FOR BRIDGE".

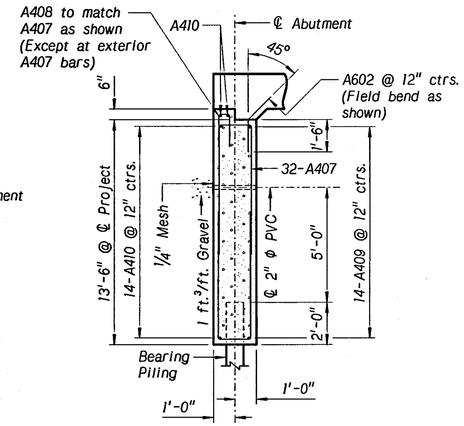


PLAN OF ABUTMENT

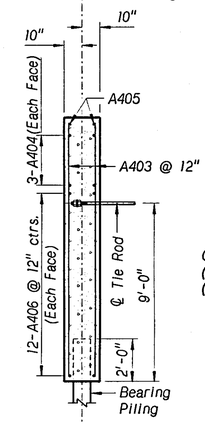


▲ Fill with an Approved Type of Plastic Masonry Caulking Compound.

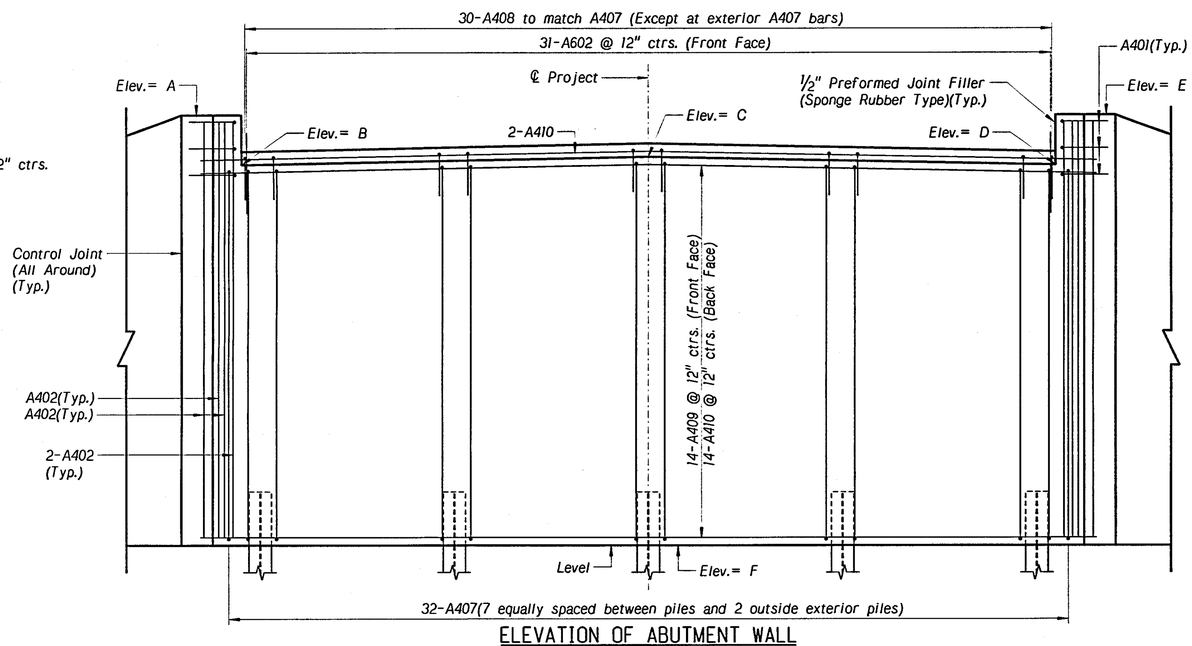
DETAIL OF CONTROL JOINT



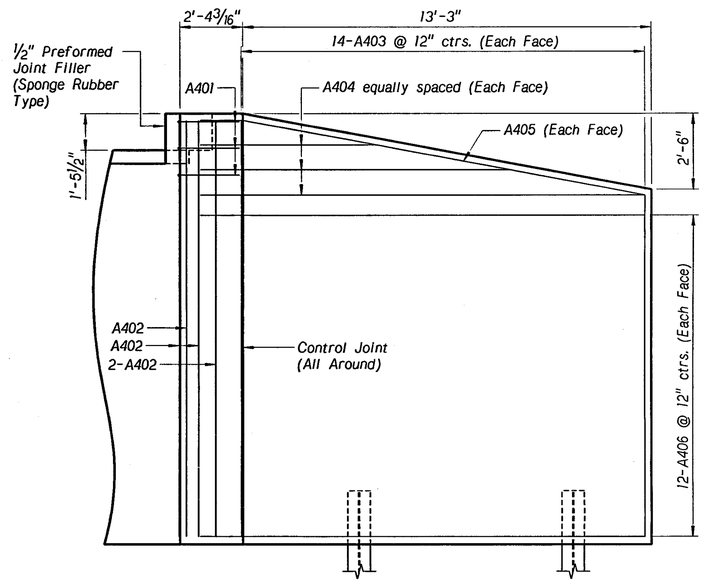
ABUTMENT SECTION



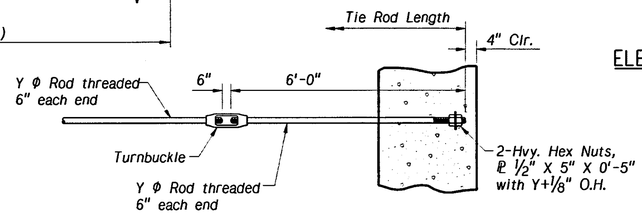
SECTION OF WING



ELEVATION OF ABUTMENT WALL



ELEVATION OF WING



DETAIL FOR TWO TURNBUCKLES

ABUTMENT ELEVATIONS						
LOCATION	A	B	C	D	E	F
ABUTMENT NO. 1	1508.70	1506.74	1507.04	1506.74	1508.70	1493.54
ABUTMENT NO. 2	1508.71	1506.75	1507.05	1506.75	1508.71	1493.55

TIE ROD TABLE		
TIE ROD	Y	LENGTH
A	1 3/8"	45'-5"
B	1 3/8"	40'-11"
C	1 3/8"	36'-5"

PROJECT NUMBER	SHEET NO.
BR0-7084(10)	9

C.N. 31597

STRUCTURE NUMBER C008402740

175'-0", 4-SPAN CONTINUOUS CONCRETE SLAB BRIDGE ABUTMENT PLAN AND ELEVATION

DATE: DECEMBER 2011

LINCOLN, NEBRASKA

SPEECE-LEWIS ENGINEERS

DESIGNED BY: IRH DETAILED BY: CS CHECKED BY: MS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 2477.50

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

SPEECE | LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER RALPH C. HANSEN No. 9344 STATE OF NEBRASKA

6-8-2012

SPECIAL PLAN NO. 1

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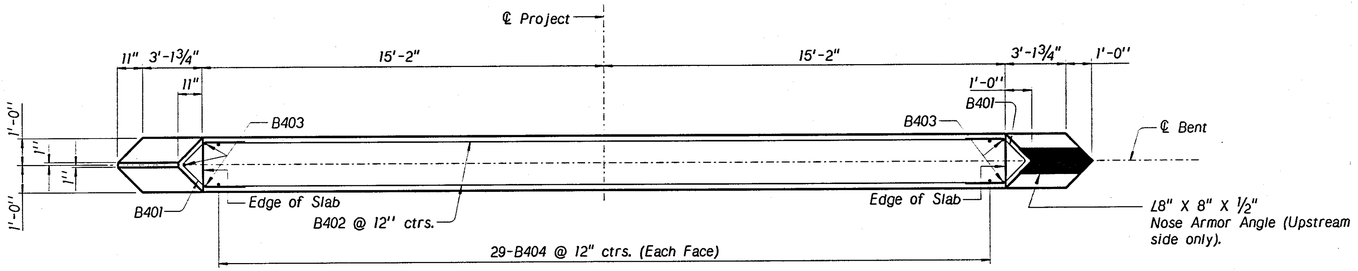
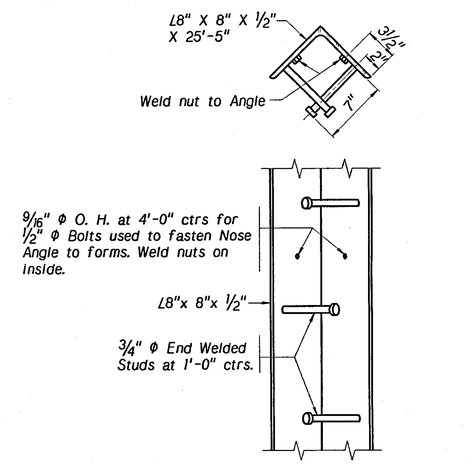
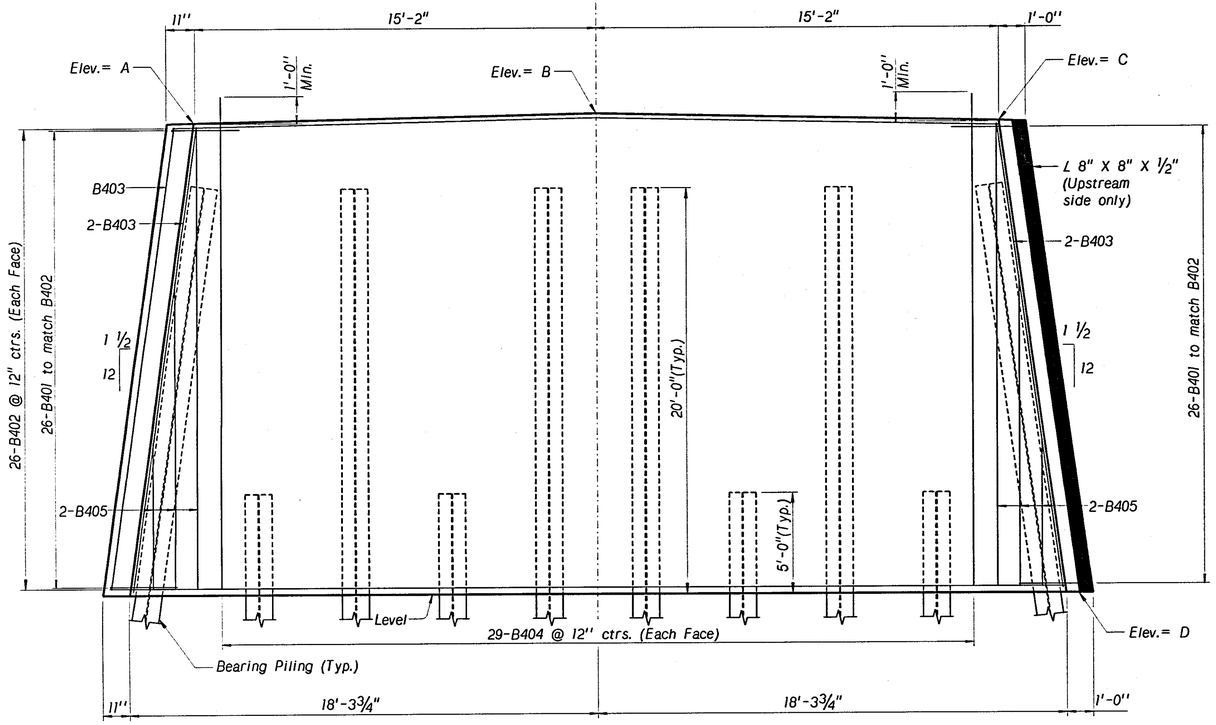


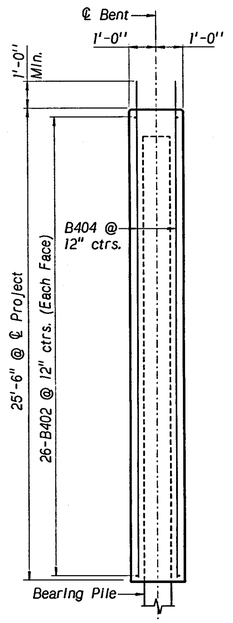
PLAN OF BENT



NOSE ARMOR ANGLE DETAILS



ELEVATION OF BENT



SECTION OF BENT

BENT ELEVATIONS				
LOCATION	A	B	C	D
Bent No. 1	1506.49	1506.79	1506.49	1481.29

PROJECT NUMBER	SHEET NO.
BR0-7084(10)	10

C.N. 31597

STRUCTURE NUMBER
C008402740

175'-0", 4-SPAN
CONTINUOUS CONCRETE SLAB BRIDGE
BENT NO.1 PLAN AND ELEVATION

DATE: DECEMBER 2011

LINCOLN, NEBRASKA

CHECKED BY: MS
DETAILED BY: CS
DESIGNED BY: RH

SPEECE-LEWIS ENGINEERS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

SPEECE | LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER
RALPH C. HANSEN
E-9344
STATE OF NEBRASKA

6-8-2012

SPECIAL PLAN NO. 1

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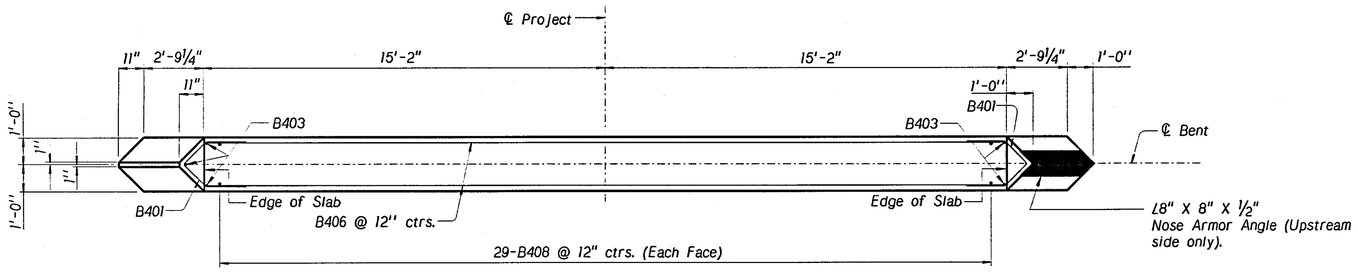
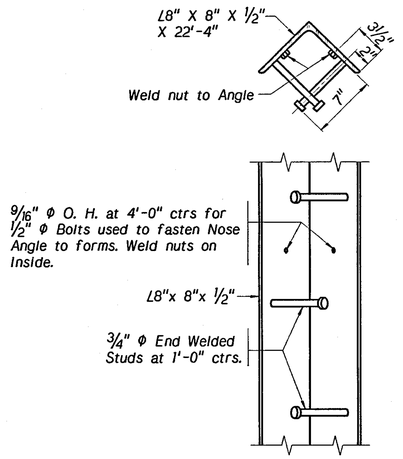
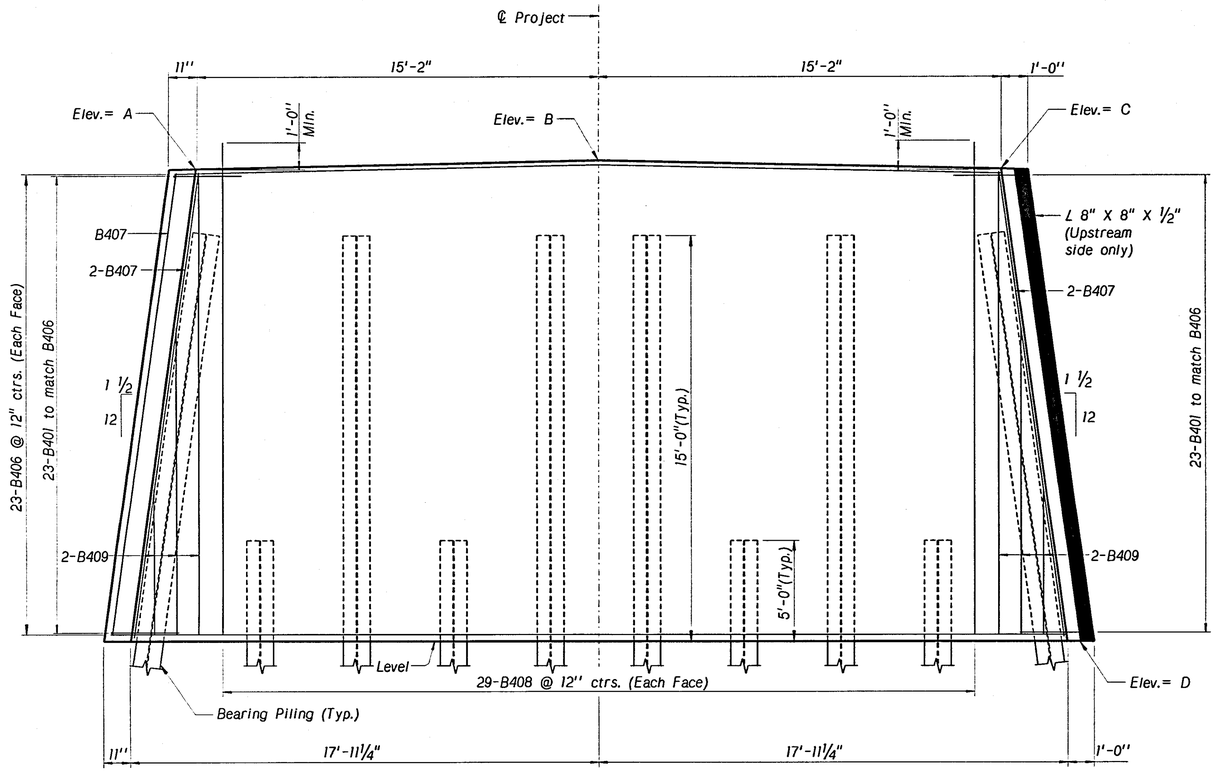


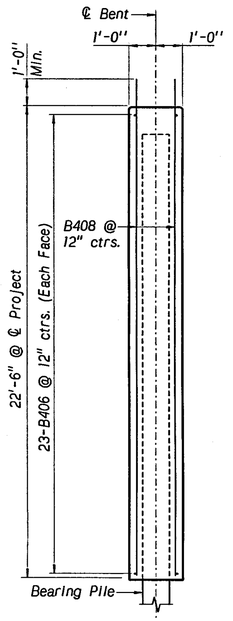
PLAN OF BENT



NOSE ARMOR ANGLE DETAILS



ELEVATION OF BENT



SECTION OF BENT

BENT ELEVATIONS				
LOCATION	A	B	C	D
Bent No. 2	1506.49	1506.79	1506.49	1484.29
Bent No. 3	1506.49	1506.79	1506.49	1484.29

PROJECT NUMBER	SHEET NO.
BRO-7084(10)	11

C.N. 31597

STRUCTURE NUMBER
C008402740

175'-0", 4-SPAN CONTINUOUS CONCRETE SLAB BRIDGE
BENT NO.2 AND NO.3 PLAN AND ELEVATION

DATE: DECEMBER 2011

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

DETAILED BY: CS
CHECKED BY: MS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

DESIGNED BY: RH

SPEECE-LEWIS ENGINEERS
LINCOLN, NEBRASKA

SPEECE LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER
RALPH C. HANSEN
No. C-4344
STATE OF NEBRASKA

6-8-2012

SPECIAL PLAN NO. 1

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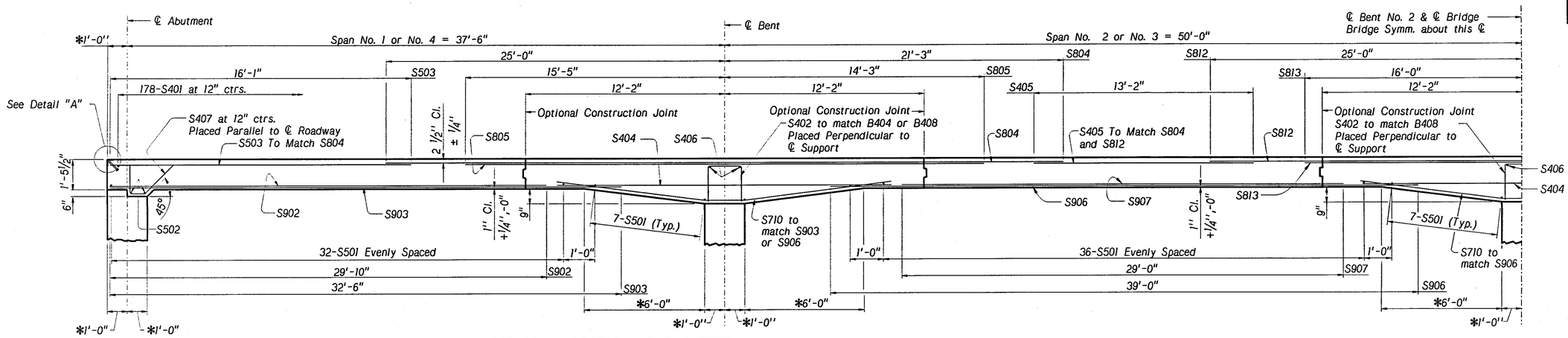
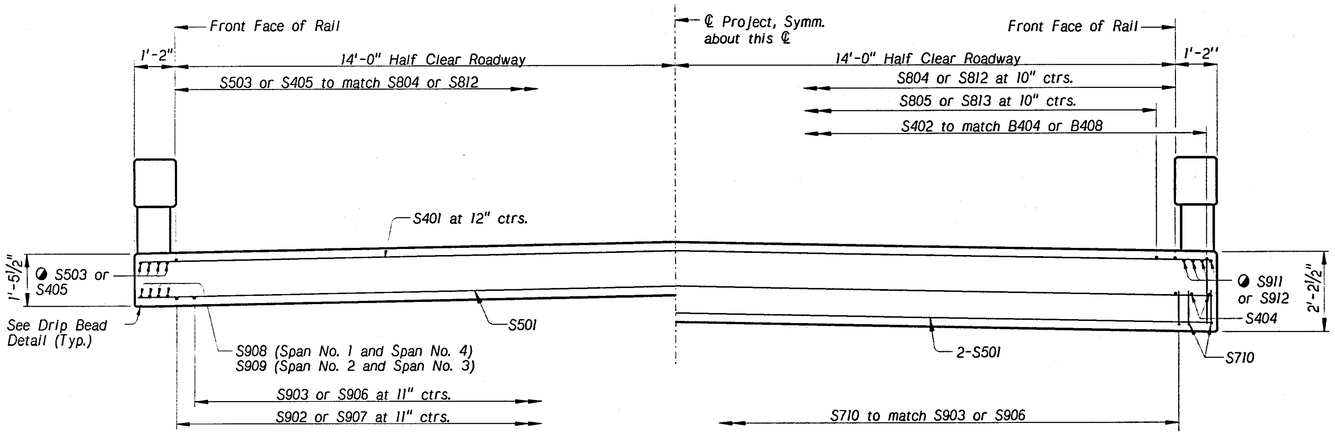


TYPICAL LONGITUDINAL SECTION NEAR GUTTER LINE

* Measured Perpendicular to ℄ Support

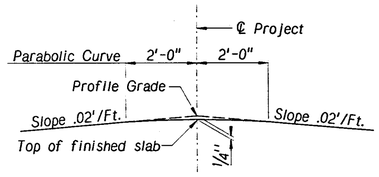


AT CENTER OF SPAN

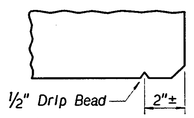
AT CENTER OF BENT

TYPICAL CROSS SECTION OF SLAB

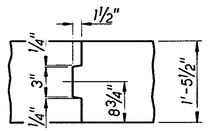
S503 (Span No. 1 and Span No. 4)
S405 (Span No. 2 and Span No. 3)
S911 (Bent No. 1 and Bent No. 3)
S912 (Bent No. 2)



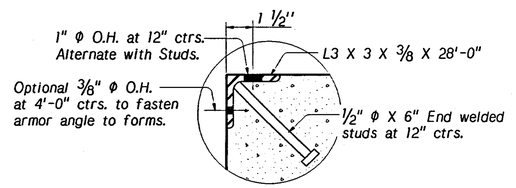
CROWN TEMPLET



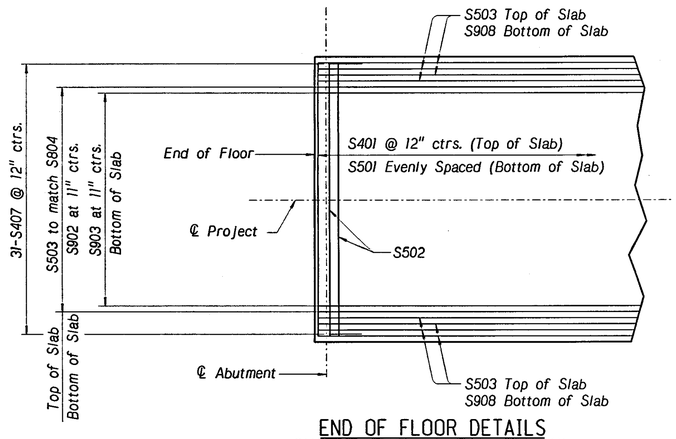
DRIP BEAD DETAIL



OPTIONAL SLAB CONSTRUCTION JOINT



DETAIL "A"



END OF FLOOR DETAILS
SHOWING REINFORCING STEEL

PROJECT NUMBER	SHEET NO.
BR0-7084(10)	12

C.N. 31597

STRUCTURE NUMBER
C008402740

I75'-0", 4-SPAN
CONTINUOUS CONCRETE SLAB BRIDGE
ROADWAY CROSS-SECTION AND END OF FLOOR PLAN

DATE: DECEMBER 2011

LINCOLN, NEBRASKA

SPEECE-LEWIS ENGINEERS

DESIGNED BY: RH
DETAILED BY: CS
CHECKED BY: MS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

SPEECE LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER
RALPH C. HANSEN
E-6544
STATE OF NEBRASKA

6-8-2012

SPECIAL PLAN NO. 1

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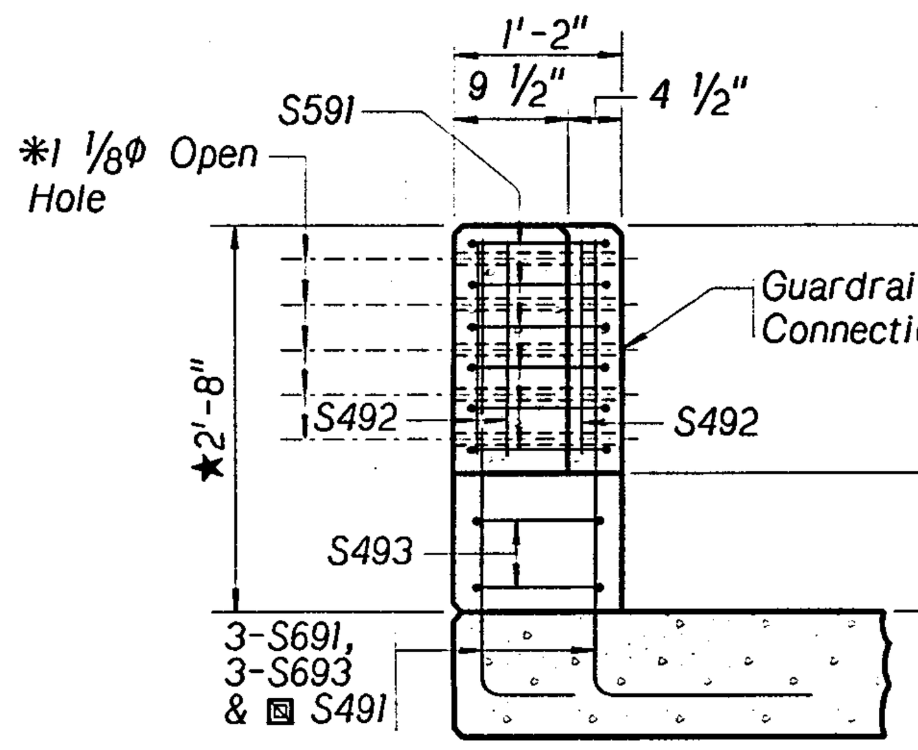
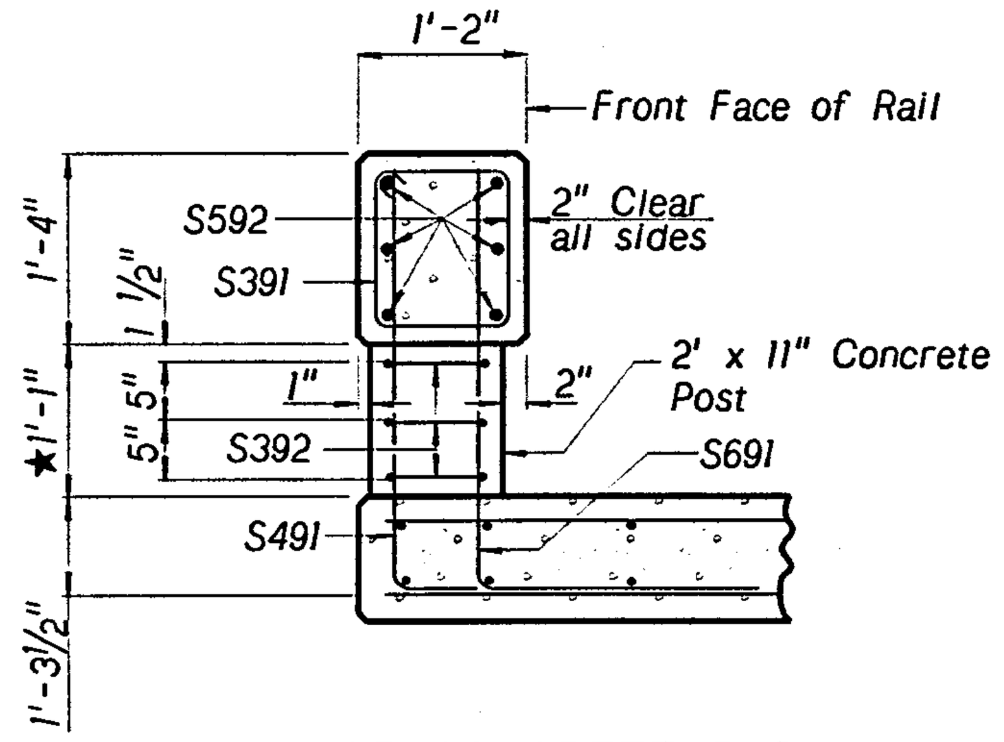
PROJECT NUMBER	SHEET NO.
BRO-7084(10)	13

C.N. 31597

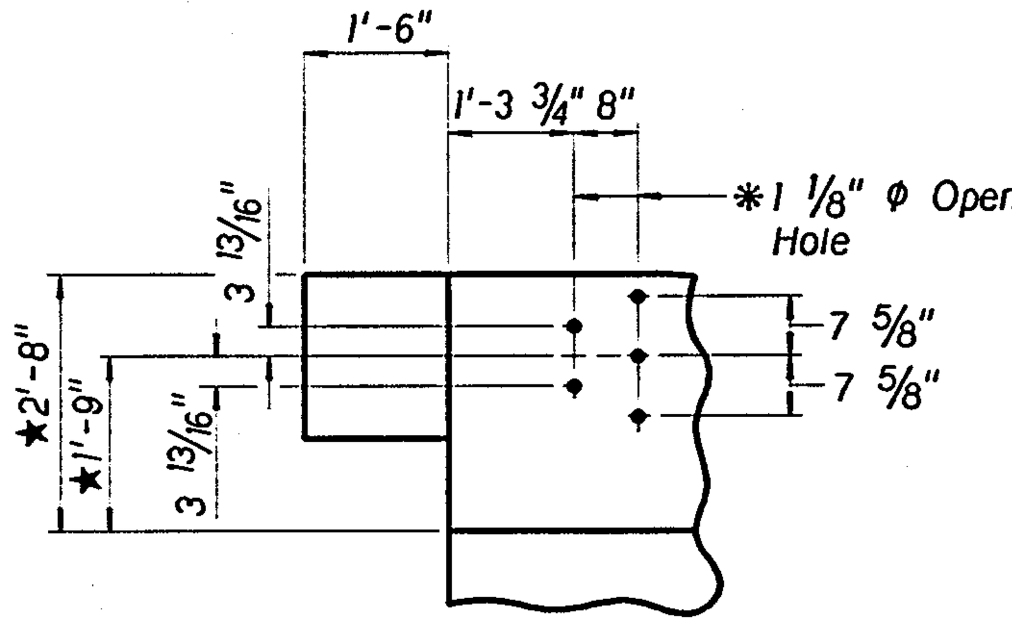
STRUCTURE NUMBER C008402740



SECTION A-A



SECTION OF CONCRETE RAIL



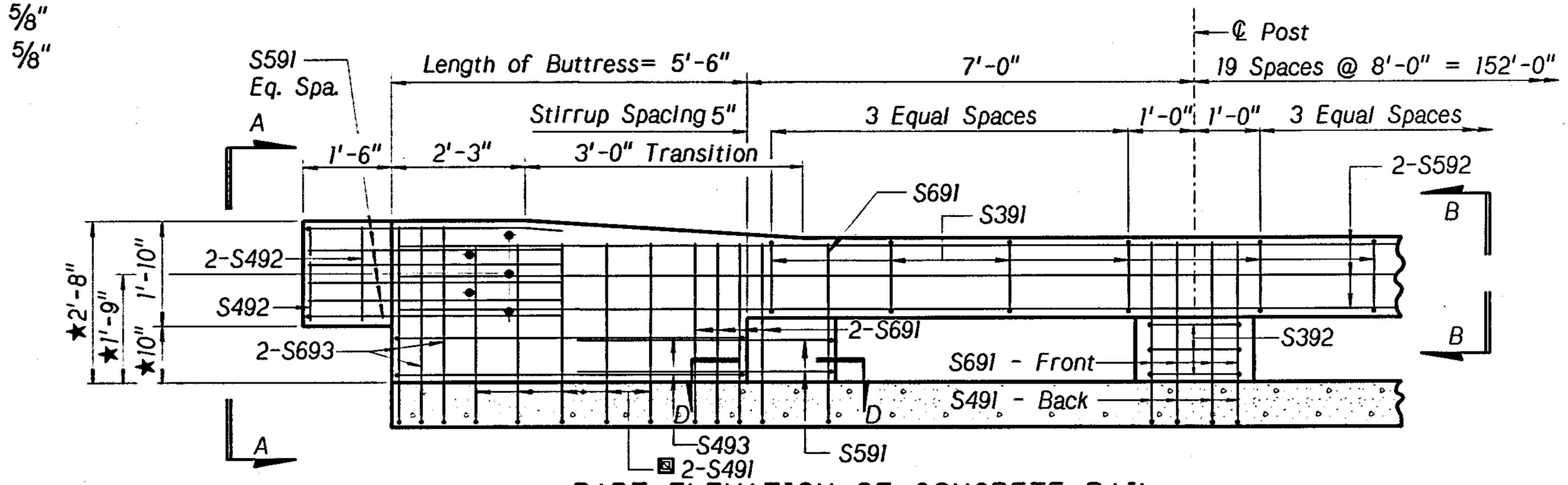
THRIE BEAM TERMINAL CONNECTION DETAIL

■ The Number of S491 Bars will depend on the length of the Buttress.

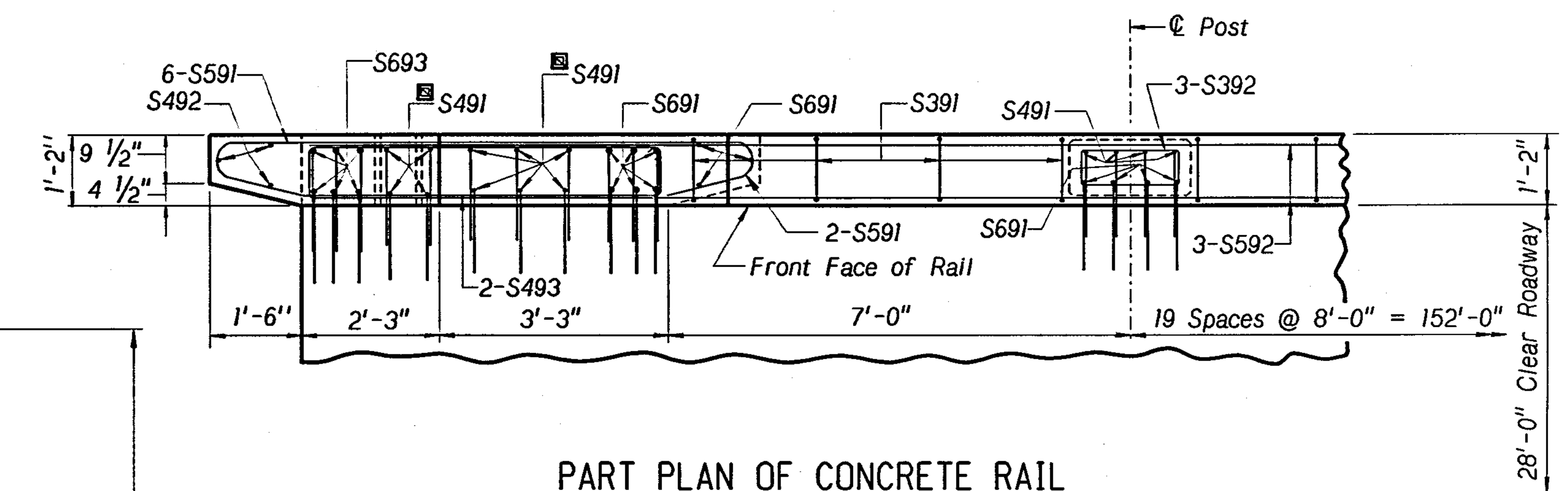
2'-3" to 3'-0"-0 Rows
3'-1" to 4'-0"-2 Rows
4'-1" to 5'-0"-3 Rows
5'-1" to 6'-6"-5 Rows

* As an alternate method, the contractor may furnish and cast into the concrete an approved welded assembly consisting of 5 threaded inserts held accurately to the template of the holes shown. Inserts to be complete with galvanized plate washers and galvanized 7/8" φ 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.

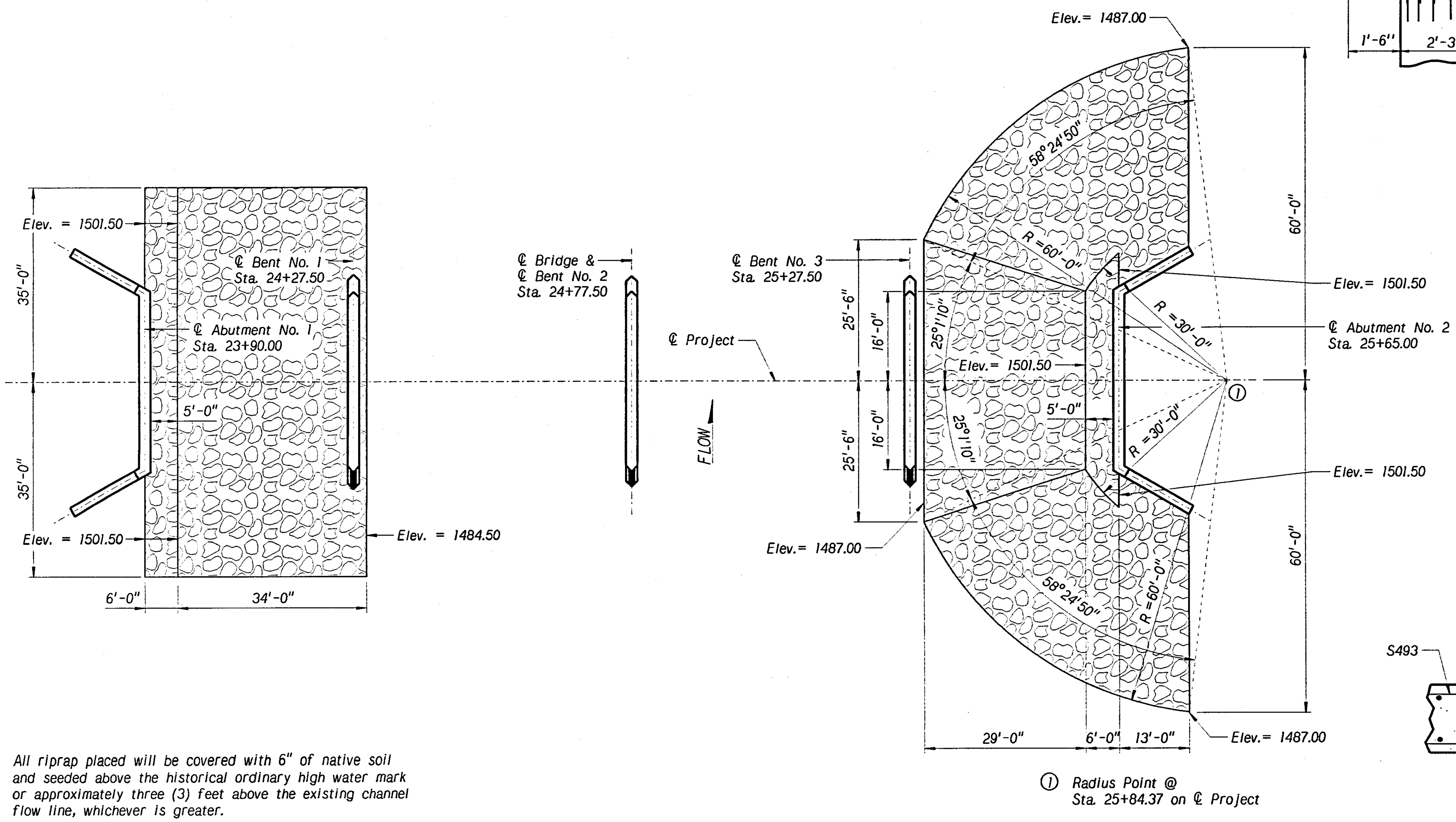
★All dimensions marked thus are measured at Front Face of Rail.



PART ELEVATION OF CONCRETE RAIL



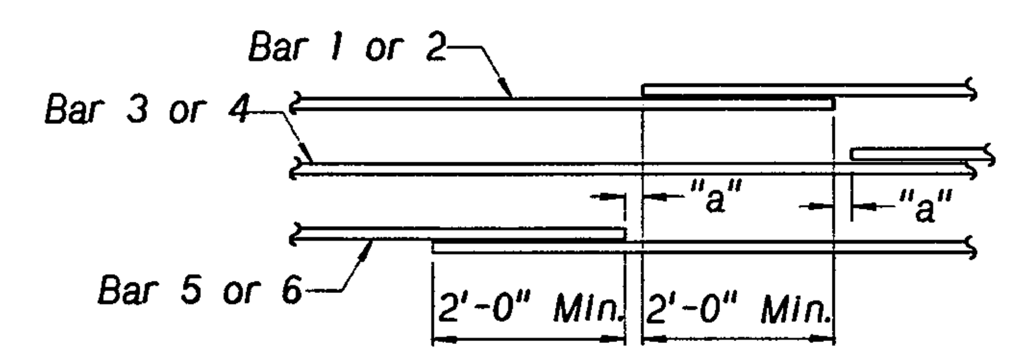
PART PLAN OF CONCRETE RAIL



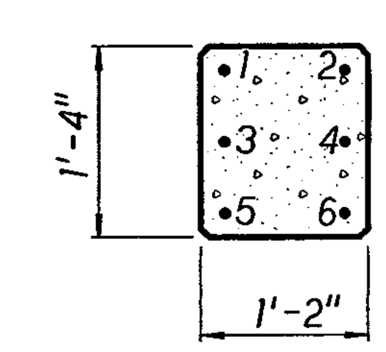
All riprap placed will be covered with 6" of native soil and seeded above the historical ordinary high water mark or approximately three (3) feet above the existing channel flow line, whichever is greater.

① Radius Point @ Sta. 25+84.37 on ℄ Project

PLAN OF ROCK RIPRAP TYPE "B" AND RIPRAP FILTER FABRIC



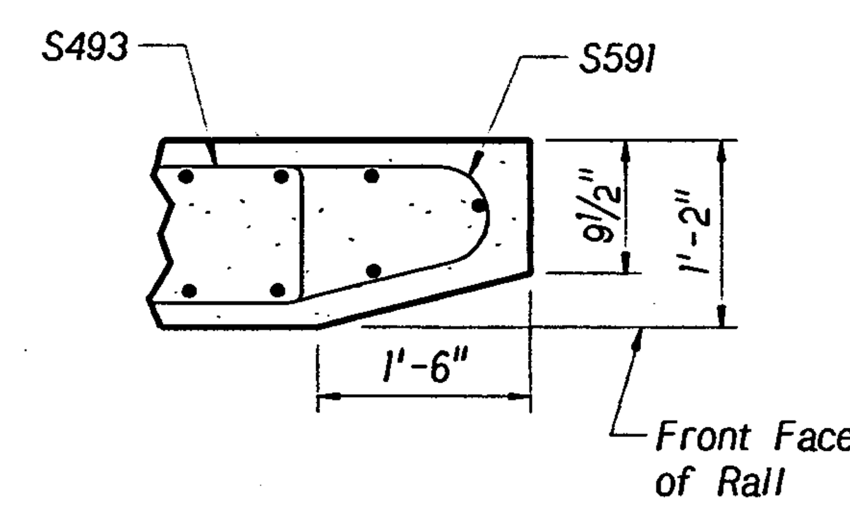
▲LAP DETAIL



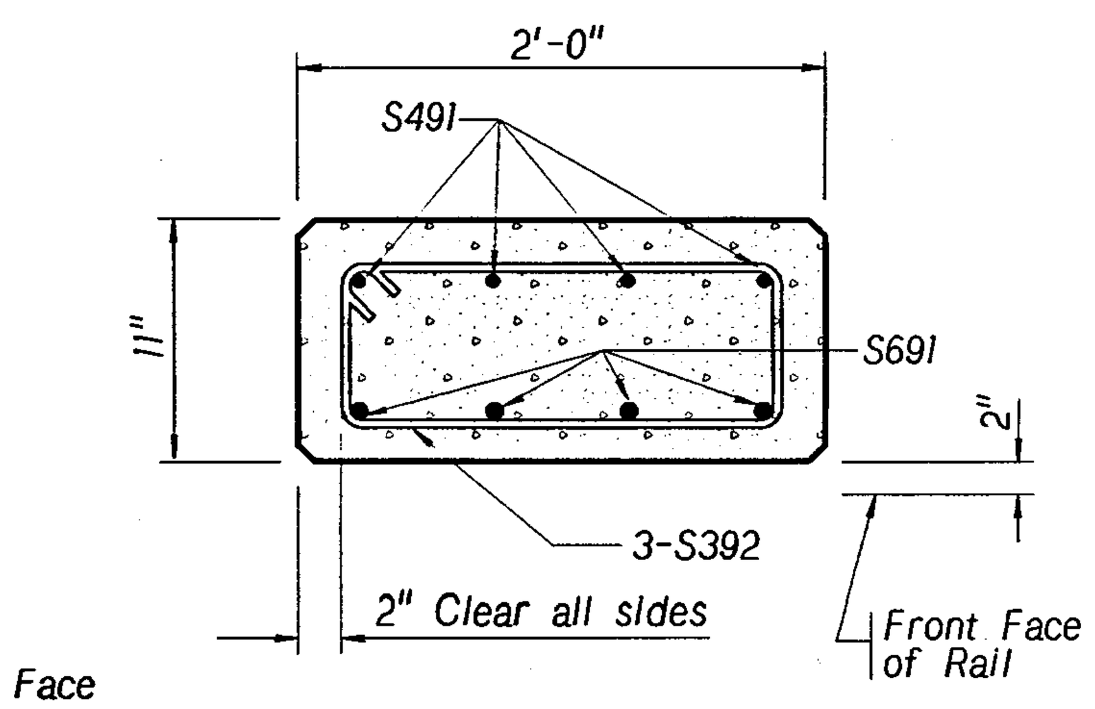
SECTION B-B

▲Laps for Bars 1 & 5 shall be staggered
Laps for Bars 2 & 6 shall be staggered
Bar 3 to be continuous through laps for Bars 1 & 5
Bar 4 to be continuous through laps for Bars 2 & 6

"a"≥Zero



SECTION D-D



SECTION OF 24" X 11" POST

175'-0", 4-SPAN CONTINUOUS CONCRETE SLAB BRIDGE RAIL DETAILS AND ROCK RIPRAP LAYOUT

COUNTY STANTON | LOCATION STANTON - SOUTHEAST
HWY. NO. | SKEW 0°
REF. POST. | CLEAR ROADWAY 28'-0"
STA. 24+77.50 | DESIGN LIVE LOAD HL93

DESIGNED BY: RH | DETAILED BY: CS | CHECKED BY: MS | DATE: DECEMBER 2011

SPEECE-LEWIS ENGINEERS LINCOLN, NEBRASKA

SPEECE LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER RALPH K. HANSEN E-0000 STATE OF NEBRASKA

6-8-2012

SPECIAL PLAN NO. 1 | 8/9

BILL OF BARS

	MARK	NO.	LENGTH	TYPE	"A"	"B"	"C"	"D"	"E"	"F"	⊕PIN	HOOK
ABUTMENT	A602	62	3'-0"	Str.	3'-0"							
	A401	12	5'-5"	127	2'-2"	0'-8"	1'-0"	1'-7"	1'-1"	0'-3⅞"	2"	
	A402	20	14'-8"	Str.								
	A403	112	13'-5" Avg.	Str.								
	A404	24	10'-3" Avg.	Str.								
	A405	8	14'-10"	105	13'-3"	1'-7"	1'-6⅝"	0'-3½"			2"	
	A406	96	14'-7"	Str.								
	A407	64	32'-4"	108	7'-4"	1'-6"	7'-4"	Varies			2"	
	A408	60	3'-6"	103	1'-6"	0'-6"	1'-6"				2"	
	A409	28	36'-6"	106	2'-2"	32'-2"	1'-10"	1'-10"	2'-2"		2"	
	A410	32	33'-4"	Str.								
BENT	B401	144	5'-2"	122	1'-6"	1'-1"	1'-1"	0'-9"	0'-9"		2"	
	B402	52	33'-2" Avg.	Str.								
	B403	5	24'-11"	Str.								
	B404	58	26'-3"	Str.								
	B405	12	16'-8" Avg.	Str.								
	B406	92	32'-9" Avg.	Str.								
	B407	10	21'-10"	Str.								
	B408	116	23'-3"	Str.								
	B409	24	13'-8" Avg.	Str.								

BILL OF BARS

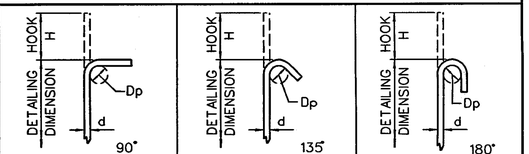
	MARK	NO.	LENGTH	TYPE	"A"	"B"	"C"	"D"	"E"	"F"	⊕PIN	HOOK
BRIDGE RAIL	S691	196	5'-0"	104	1'-6"	3'-6"					4½"	
	S693	24	5'-3"	104	1'-6"	3'-9"					4½"	
	S591	32	8'-7"	124	2'-8"	1'-6"	4'-1"	0'-10"	1'-5"		5¼"	
	S592	12	② 184'-6"	Str.								
	S491	200	5'-0"	104	1'-6"	3'-6"					3"	
	S492	12	1'-6"	Str.								
	S493	8	12'-9"	107	5'-2"	0'-10"					2"	4½"
	S391	168	4'-4"	107	1'-0"	0'-10"					1½"	4"
	S392	120	5'-2"	107	1'-8"	0'-7"					1½"	4"

SLAB BILL OF BARS

MARK	NO.	LENGTH	TYPE	"A"	"B"	"C"	"D"	"E"	"F"	⊕PIN	HOOK
S902	62	29'-10"	Str.								
S903	60	32'-6"	Str.								
S906	60	39'-0"	Str.								
S907	62	29'-0"	Str.								
S908	16	32'-6"	Str.								
S909	16	39'-0"	Str.								
S911	16	46'-3"	Str.								
S912	8	50'-0"	Str.								
S804	68	46'-3"	Str.								
S805	66	29'-8"	Str.								
S812	34	50'-0"	Str.								
S813	33	32'-0"	Str.								
S710	102	18'-0"	106	8'-0"	2'-0"	1'-0"	1'-0"	8'-0"		5¼"	
S501	178	29'-10"	Str.								
S502	4	29'-10"	Str.								
S503	84	16'-1"	Str.								
S401	178	29'-10"	Str.								
S402	87	5'-3"	103	1'-11"	1'-5"	1'-11"				2"	
S404	12	18'-0"	Str.								
S405	84	13'-2"	Str.								
S406	6	29'-10"	Str.								
S407	62	4'-11"	101	1'-8"	0'-11"	2'-4"				2"	

② Includes 4-2'-0" Laps.

STANDARD HOOKS



PRIMARY STRESS BARS			
	BAR SIZE	90° HOOK HOOK H	180° HOOK HOOK H
	4	8"	6"
	5	10"	7"
	6	12"	8"
	7	15"	10"
	8	17"	1 1"
	9	19"	15"
	10	23"	17"
	11	24"	19"

STIRRUPS AND TIES			
	BAR SIZE	90° HOOK HOOK H	135° HOOK HOOK H
	3	4"	4"
	4	4 ½"	4 ½"
	5	6"	5 ½"
	6	12"	8"
	7	14"	9"
	8	16"	10 ½"

d = BAR SIZE Dp = PIN DIAMETER

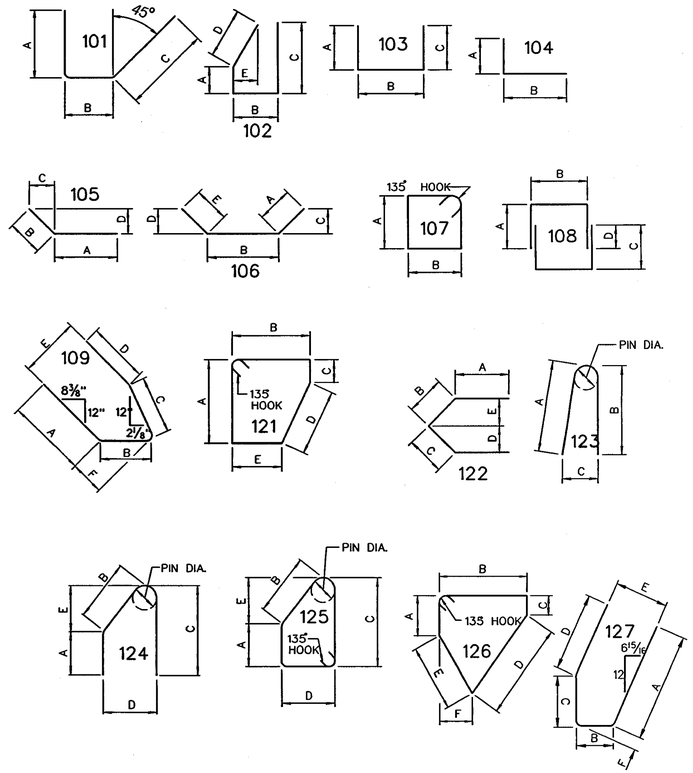
PIN DIAMETERS FOR BENDS AND HOOKS

PRIMARY STRESS BARS		
	BAR SIZE	Dp
	4	3"
	5	3 ¾"
	6	4 ½"
	7	5 ¼"
	8	6"
	9	9 ½"
	10	1 1"
	11	12"

STIRRUPS AND TIES		
	BAR SIZE	Dp
	3	1 ½"
	4	2"
	5	2 ½"
	6	4 ½"
	7	5 ¼"
	8	6"

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT NOT TO SCALE



⊕ MINIMUM DIAMETER FOR BENDS

BAR SETS

MARK	MAX. LENGTH	MIN. LENGTH	NO. OF SETS	BARS PER SET
A403	14'-8"	12'-2"	8	14
A404	14'-7"	5'-11"	8	3

BAR SETS

MARK	MAX. LENGTH	MIN. LENGTH	NO. OF SETS	BARS PER SET
B402	36'-4"	30'-0"	2	26
B405	24'-8"	8'-8"	4	3
B406	35'-6"	30'-0"	4	23
B409	21'-8"	5'-8"	8	3

BAR SETS

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

BAR SETS

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

PROJECT NUMBER	SHEET NO.
BRO-7084(10)	14

C.N. 31597

STRUCTURE NUMBER C008402740

175'-0", 4-SPAN CONTINUOUS CONCRETE SLAB BRIDGE BILL OF BARS

DATE: DECEMBER 2011

LINCOLN, NEBRASKA

SPEECE-LEWIS ENGINEERS

LOCATION STANTON - SOUTHEAST
SKEW 0°
CLEAR ROADWAY 28'-0"
DESIGN LIVE LOAD HL93

DETAILED BY: CS CHECKED BY: MS

COUNTY STANTON
HWY. NO.
REF. POST.
STA. 24+77.50

DESIGNED BY: RH

SPEECE | LEWIS ENGINEERS

PROFESSIONAL STRUCTURAL ENGINEER — RALPH C. HARSEN — STATE OF NEBRASKA

6 - 8 - 2012

SPECIAL PLAN NO. 1

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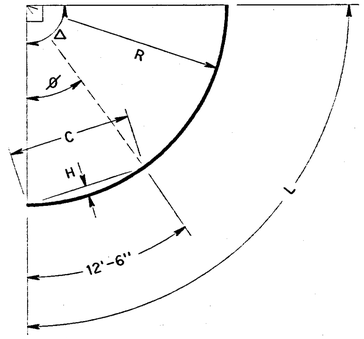
PROJECT NO.	SHEET NO.
BRO-7084(10)	15
C.N. 31597	

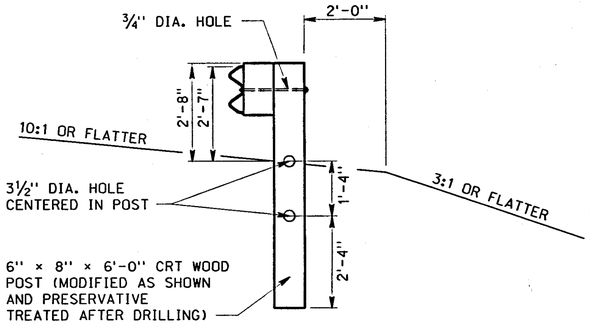
RADIUS (R) @ BACK OF RAIL	NUMBER OF CRT POSTS		CURVED BEAM INFORMATION				''W1''	''W2''
	ON CURVE (Δ= 90°)	ON TANGENT	L	C	H	ø		
15.92'	5	2	25.00'	12.18'	1.21'	45°	30'	15'
19.89'	6	2	31.25'	12.30'	0.97'	36°	40'	20'
27.85'	8	1	43.75'	12.40'	0.70'	25°45'	50'	20'
35.81'	10	1	56.25'	12.44'	0.54'	20°	50'	20'

NOTE:

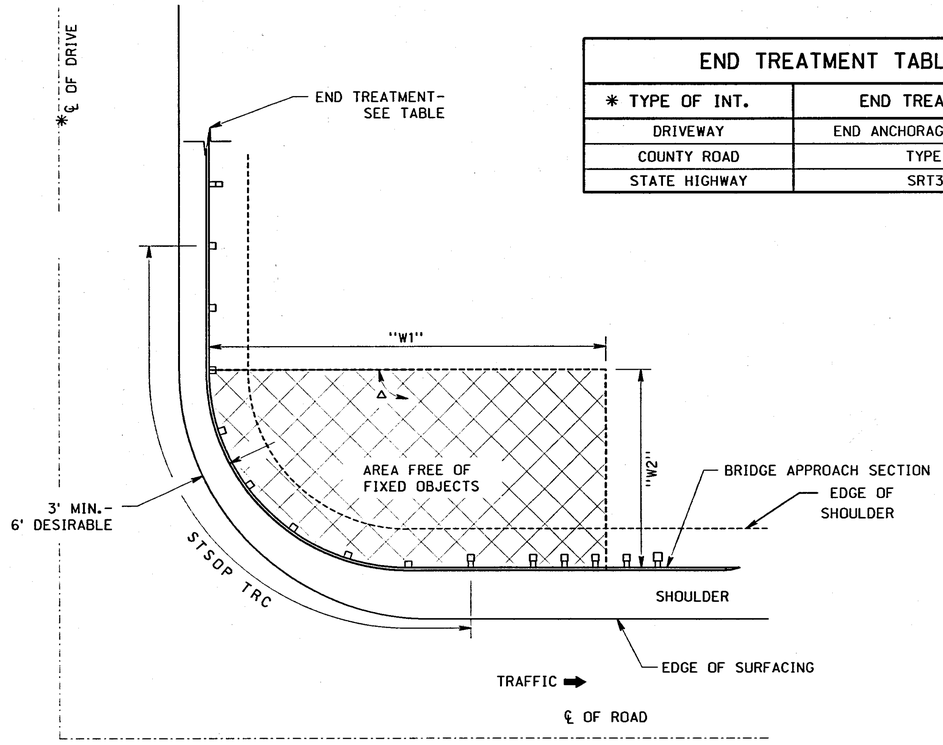
SHOP BEND GUARDRAIL WHEN RADIUS IS SHARPER THAN 150'.



DETAIL OF CURVED BEAM



DETAIL OF CONTROLLED RELEASING
TERMINAL POST (CRT)



EXAMPLE OF CURVED BEAM INSTALLATION

END TREATMENT TABLE	
* TYPE OF INT.	END TREATEMENT
DRIVEWAY	END ANCHORAGE ASSEMBLY
COUNTY ROAD	TYPE II
STATE HIGHWAY	SRT350

CURVED GUARDRAIL DETAILS

STANTON SOUTHEAST

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

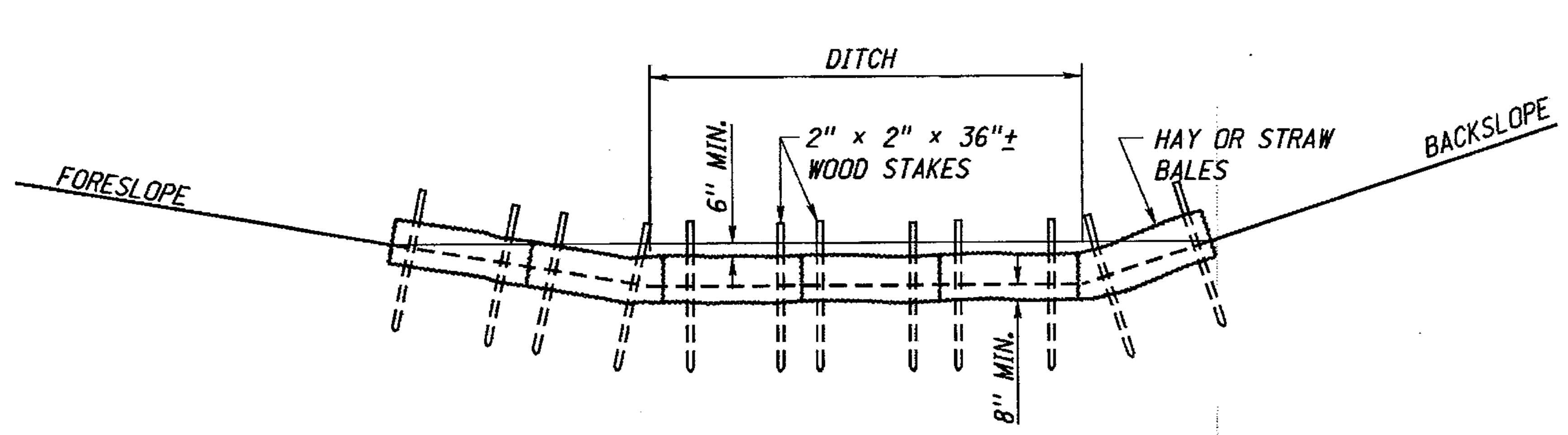
SPEECE LEWIS ENGINEERS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9725
STATE OF NEBRASKA

SPECIAL PLAN 1C

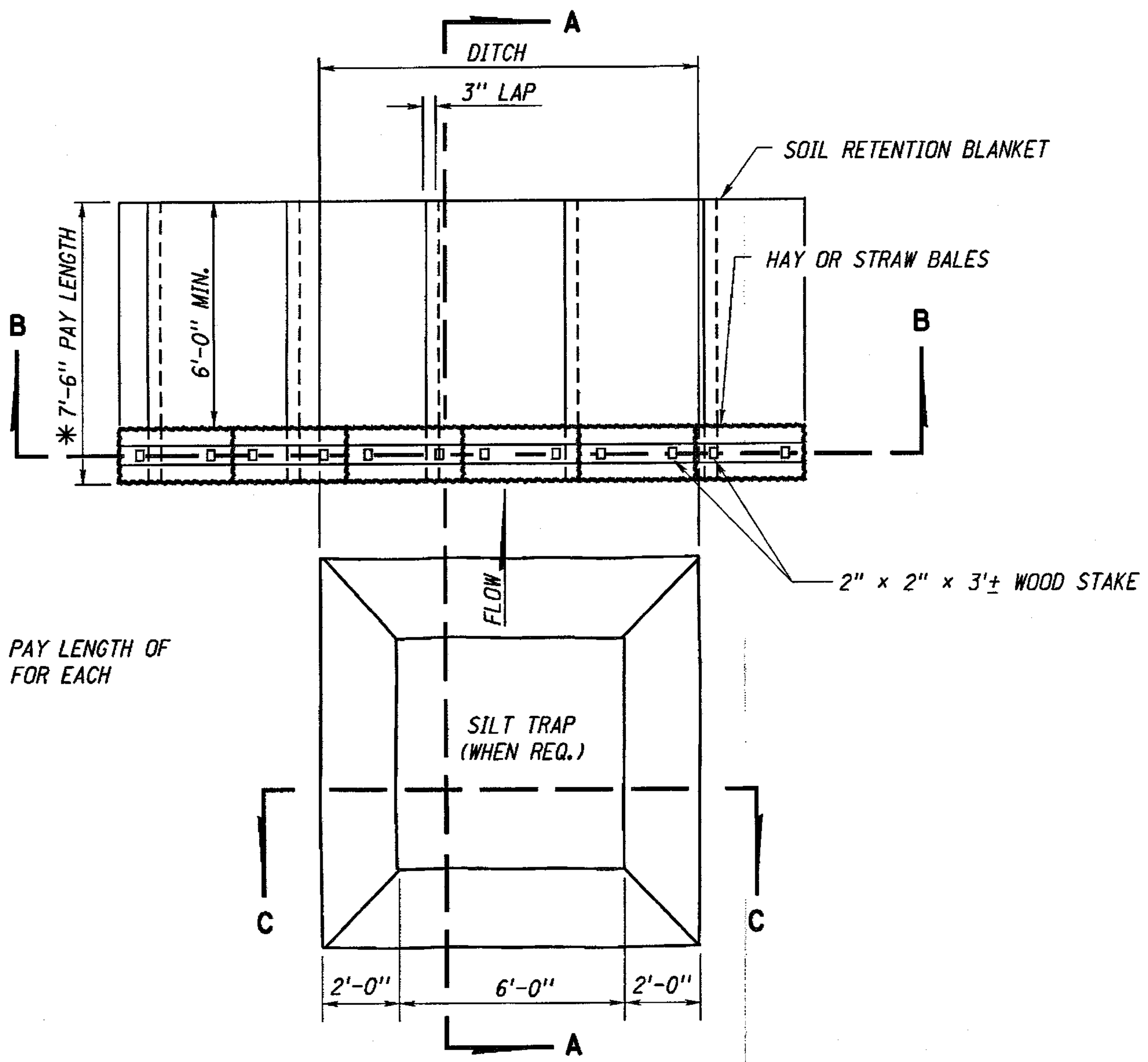
PROJECT NO.	SHEET NO.
BRO-7084(10)	16

C.N. 31597



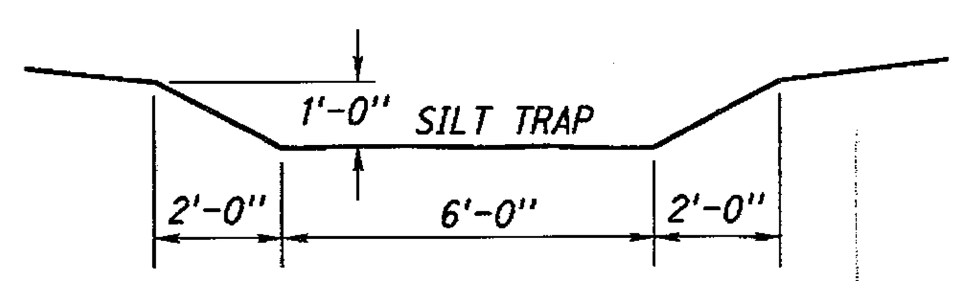
SECTION B-B

EROSION CHECKS (ALL TYPES)

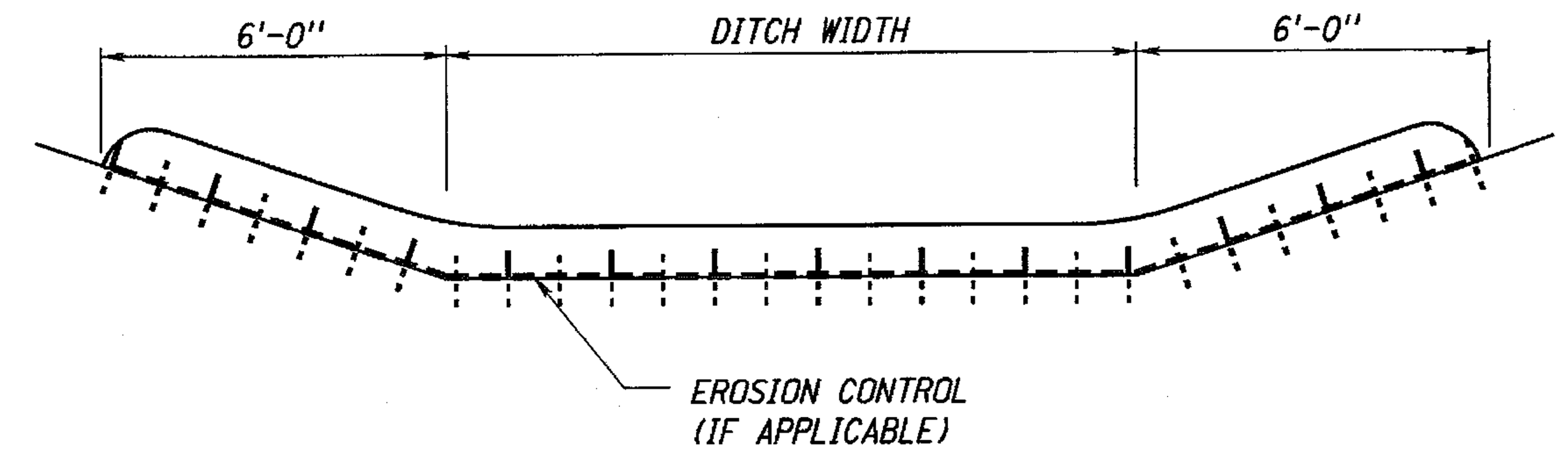


PLAN

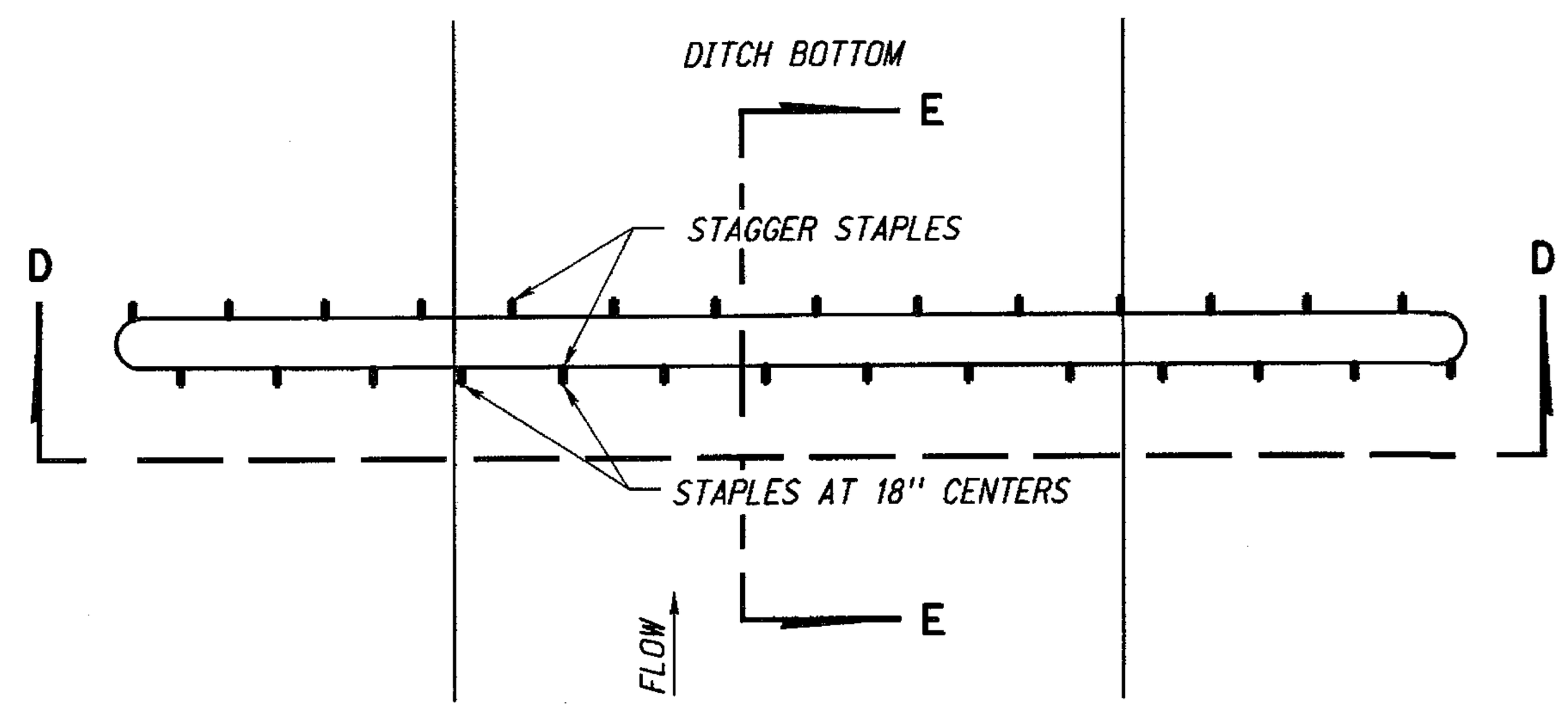
* REMOVE 7'-6" OF PAY LENGTH OF EROSION CONTROL FOR EACH EROSION CHECK.



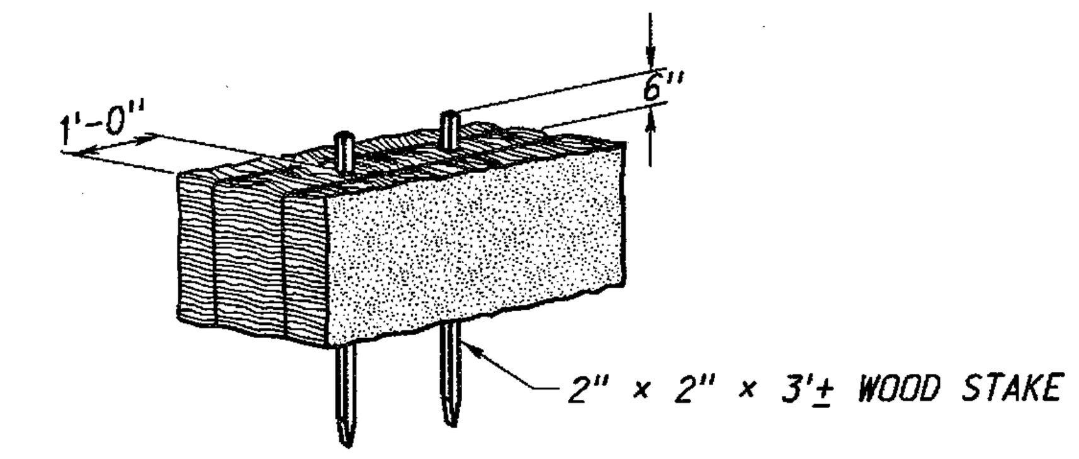
SECTION C-C



SECTION D-D

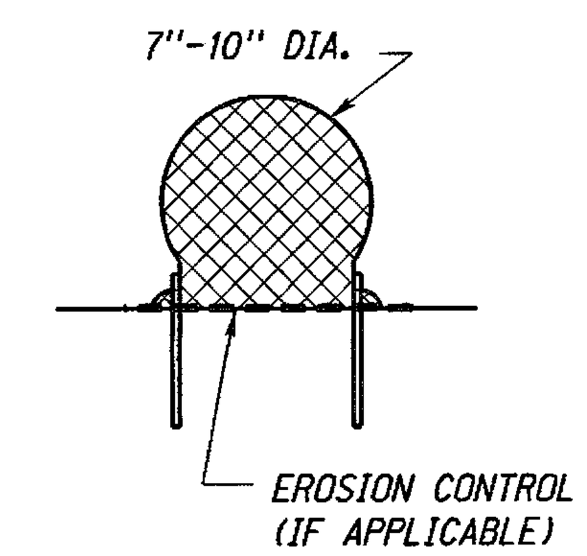


PLAN



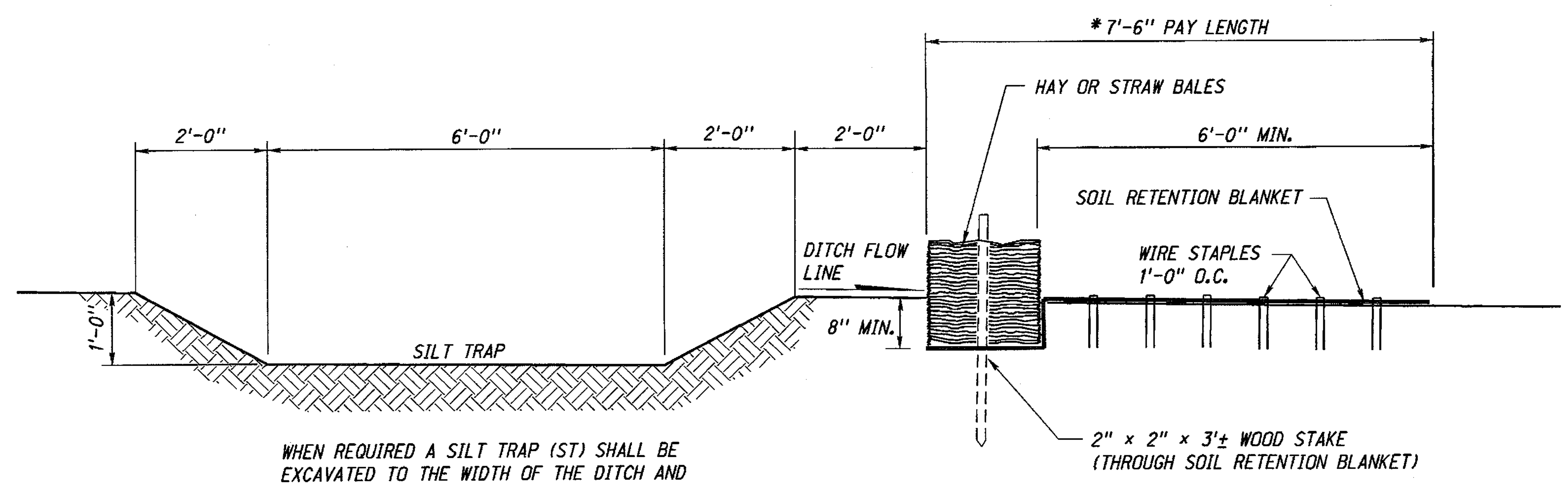
ADDITIONAL BALES MAY BE ADDED TO PREVENT EROSION AT ENDS OF CHECKS.

HAY BALE STAKING DETAIL



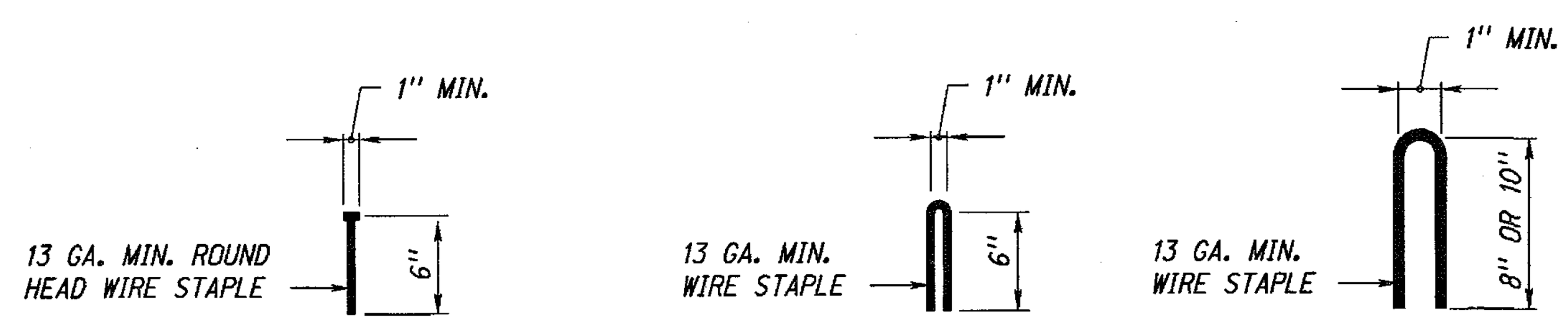
SECTION E-E

FABRIC SILT CHECKS



WHEN REQUIRED A SILT TRAP (ST) SHALL BE EXCAVATED TO THE WIDTH OF THE DITCH AND NO DIRECT PAYMENT WILL BE MADE.

SECTION A-A



STAPLE DETAIL

PROFESSIONAL CIVIL ENGINEER
Philip C. TenHulzen
E-7458
STATE OF NEBRASKA

EROSION CHECKS (ALL TYPES) AND FABRIC SILT CHECKS

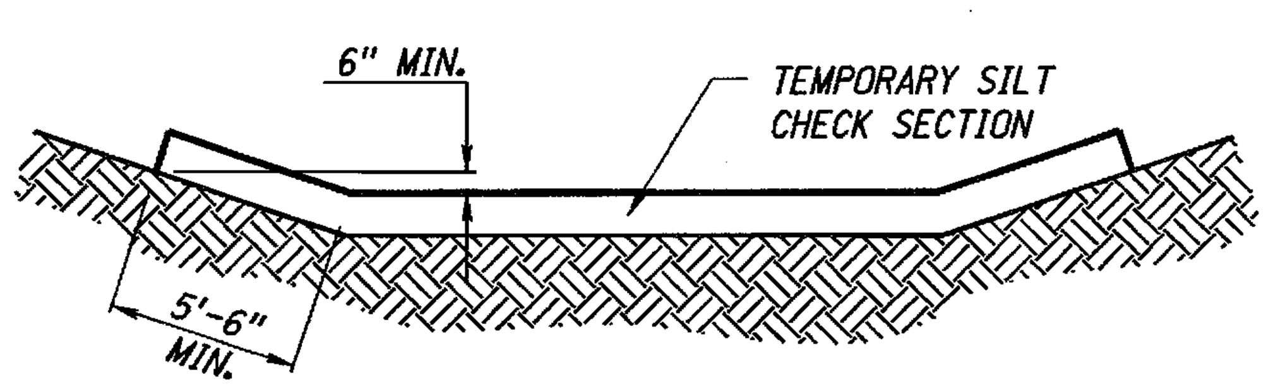
SHEET 1 OF 1

SPECIAL PLAN 2C

PROJECT NO.	SHEET NO.
BRO-7084(10)	17

C.N. 31597

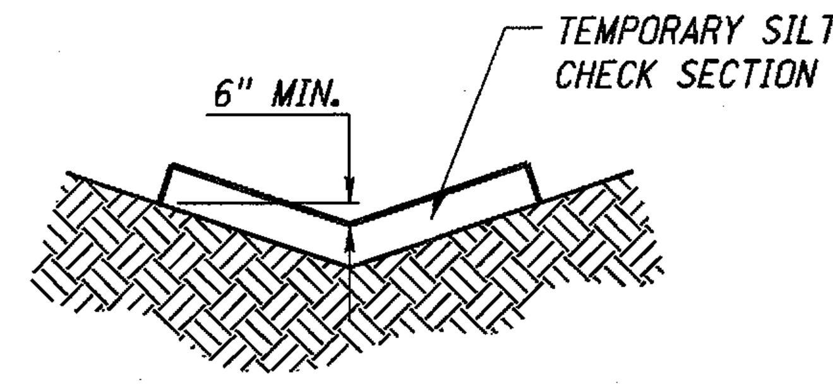
ROADWAY DESIGN DIVISION



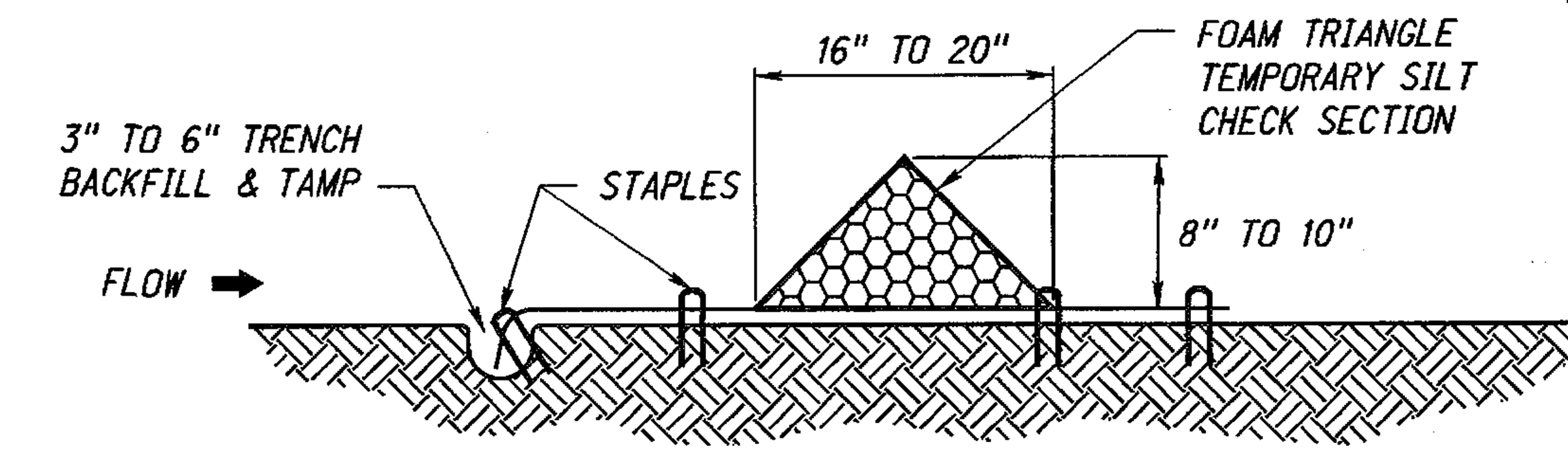
SECTION A-A

NOTE:

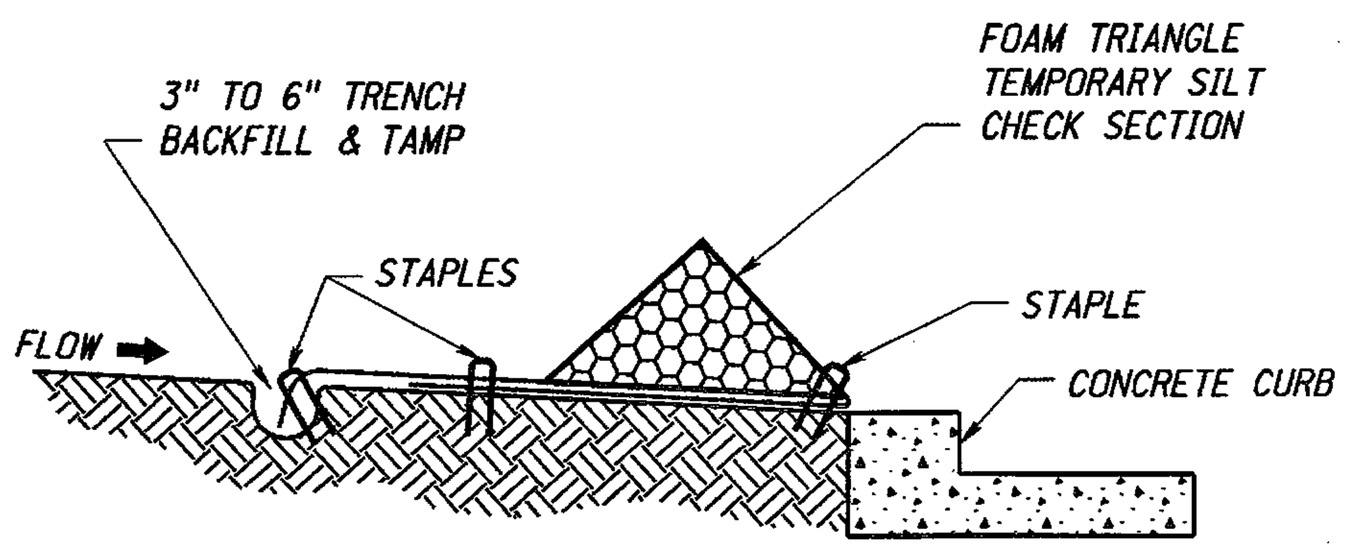
SECTION A-A & B-B ARE TYPICAL FOR FOAM TRIANGLE, WATTLE & RIGID PLASTIC TRIANGLE TEMPORARY SILT CHECKS.



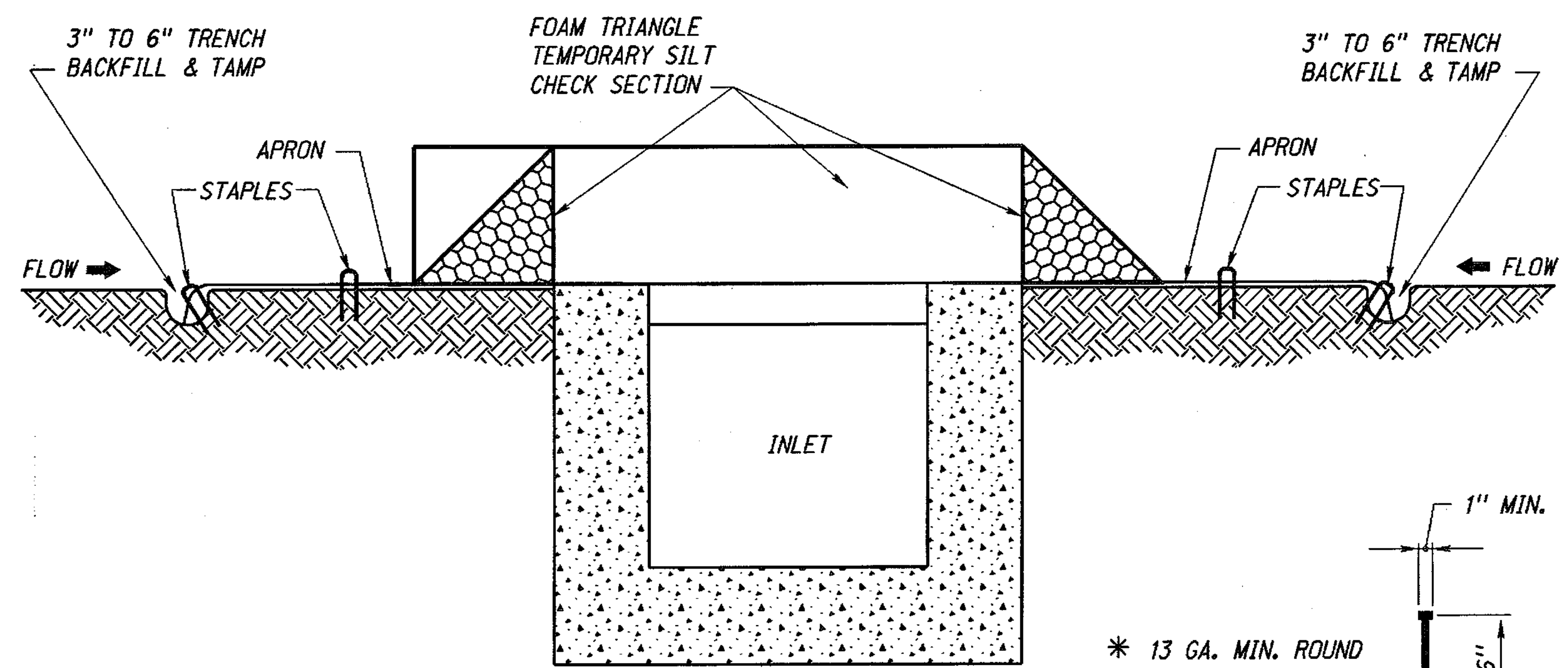
SECTION B-B



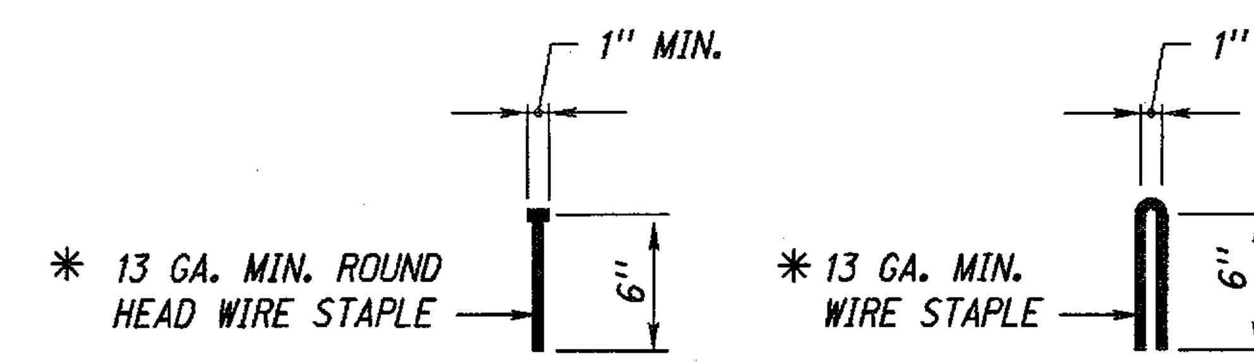
SECTION C-C



SECTION D-D



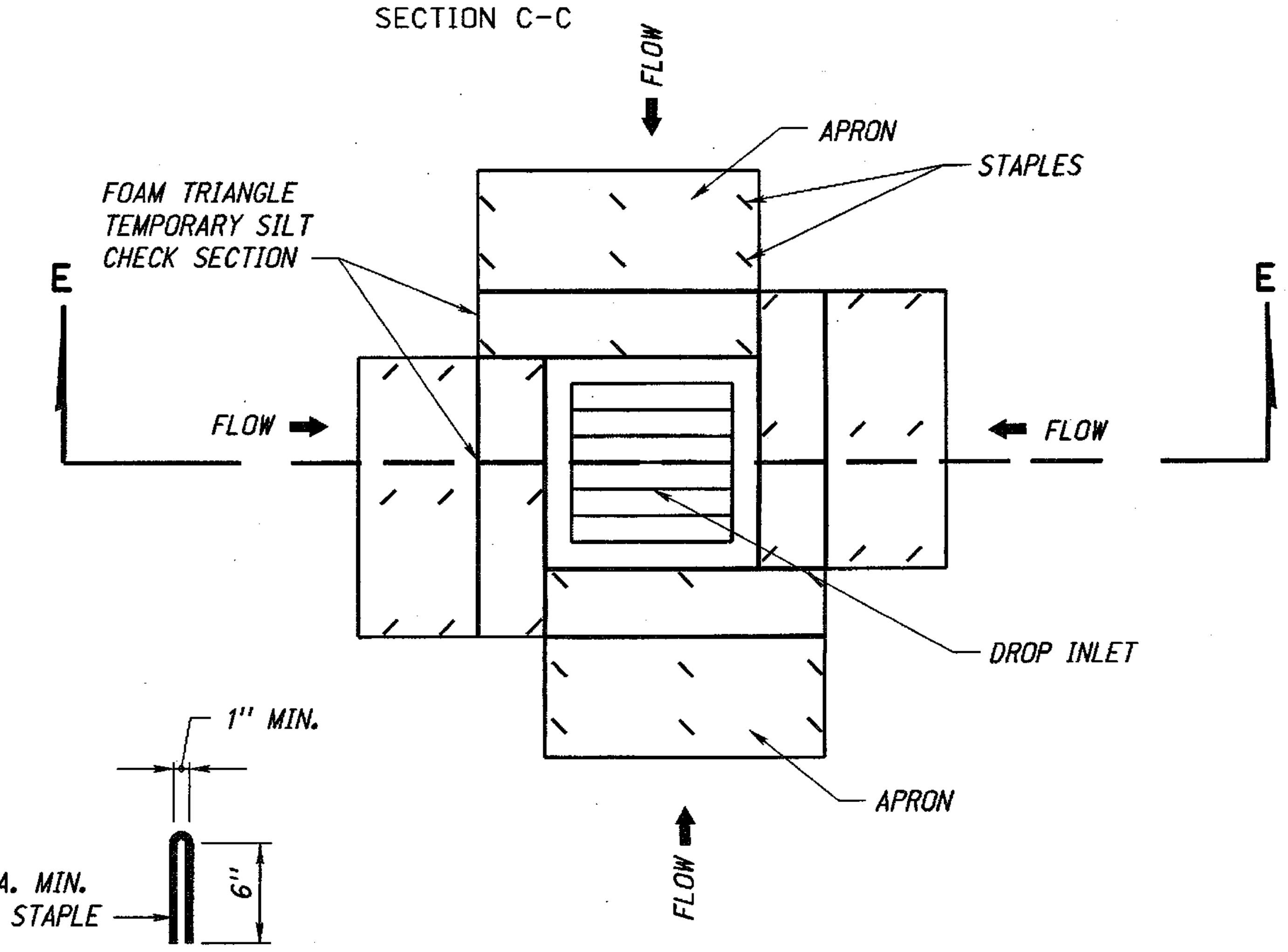
SECTION E-E



STAPLE DETAIL

NOTE:

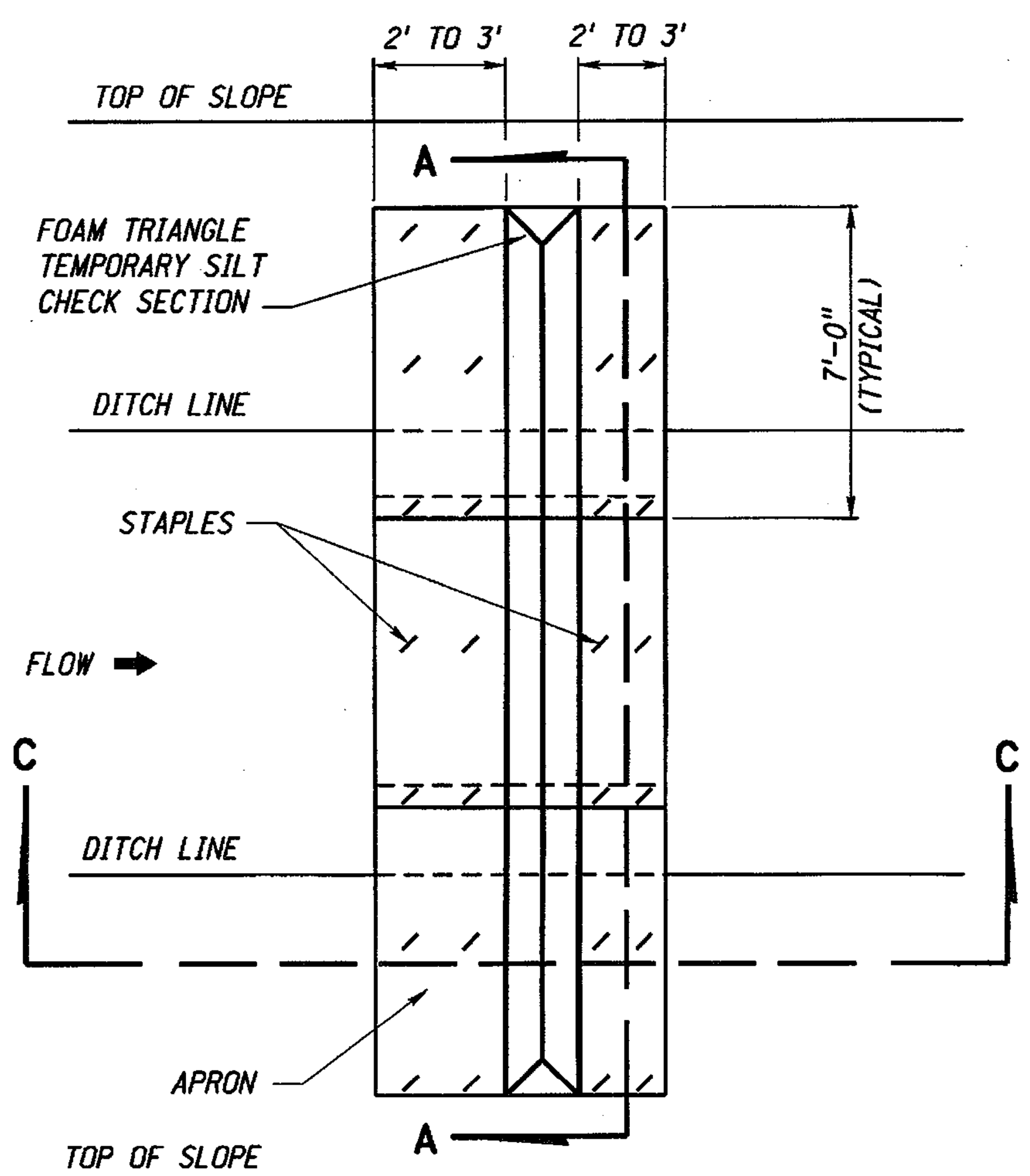
* 6"- 13 GAGE MINIMUM WIRE STAPLE OR ROUND HEAD WIRE STAPLE MAY BE USED IF 1/3 MORE STAPLES ARE USED.



PLAN VIEW

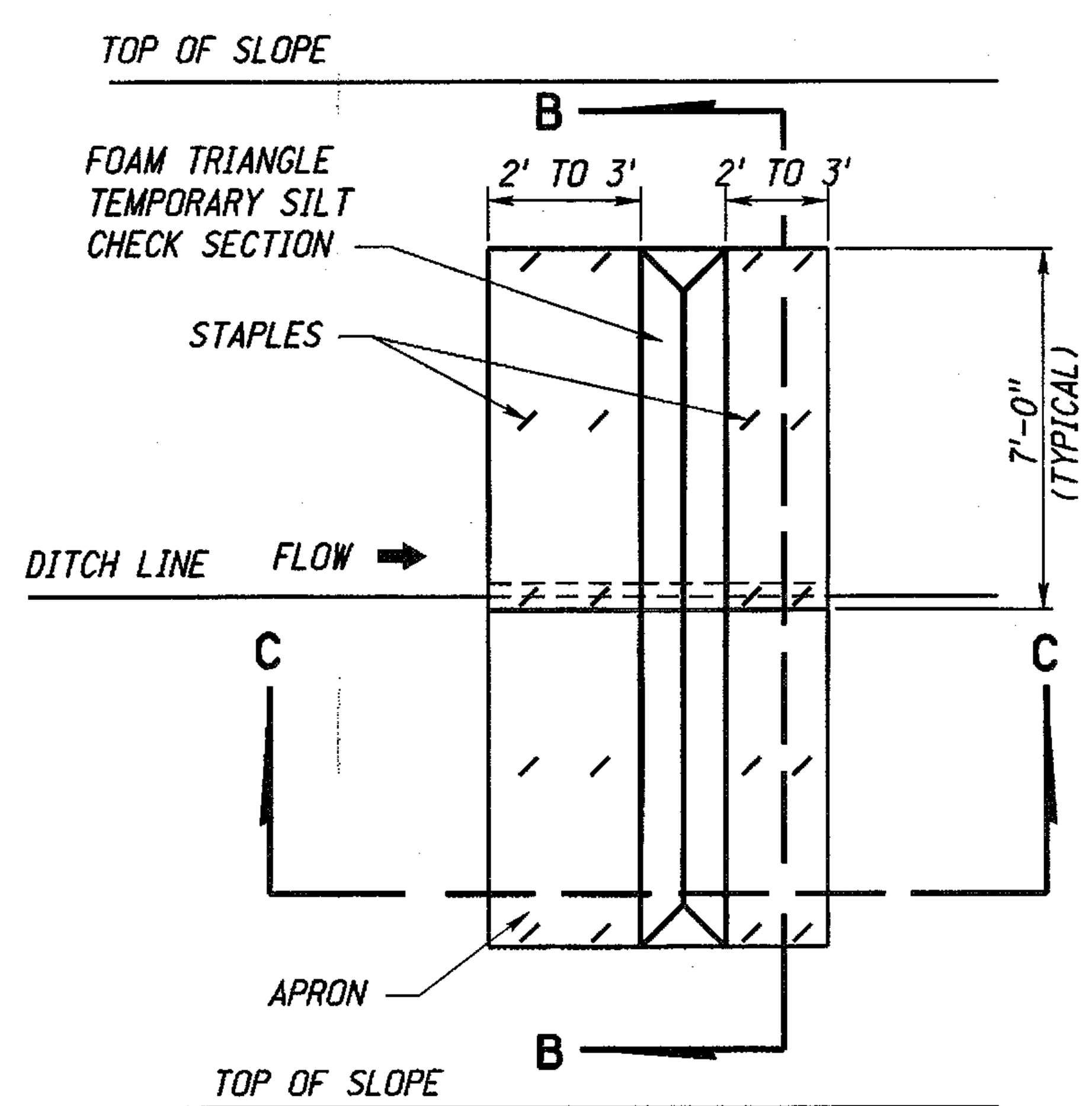
FOR INLETS

Computer: DRDESIGN55 User: dor13017 Date: 07-NOV-2012 12:24



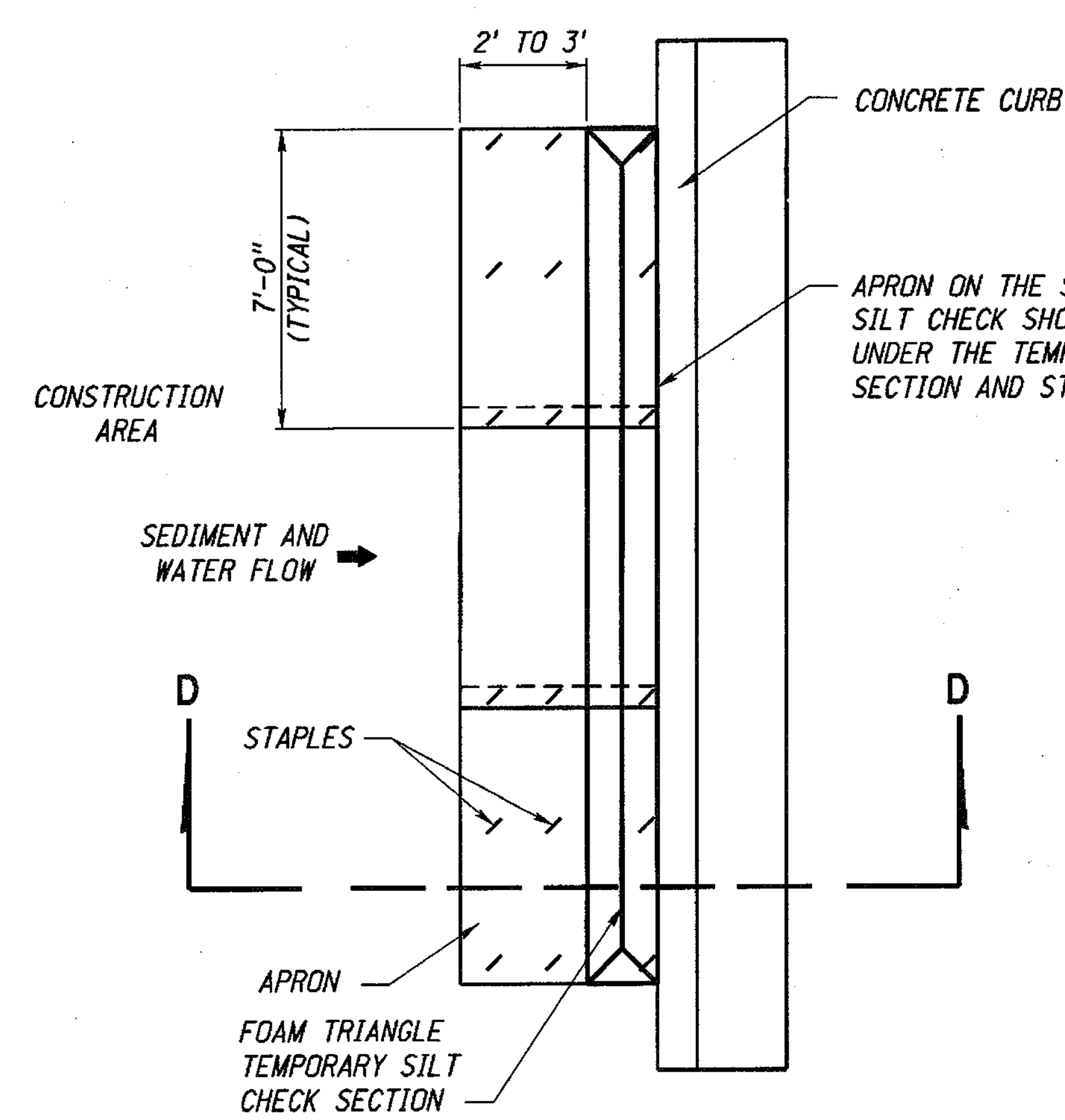
PLAN VIEW

FOR FLAT BOTTOM DITCH



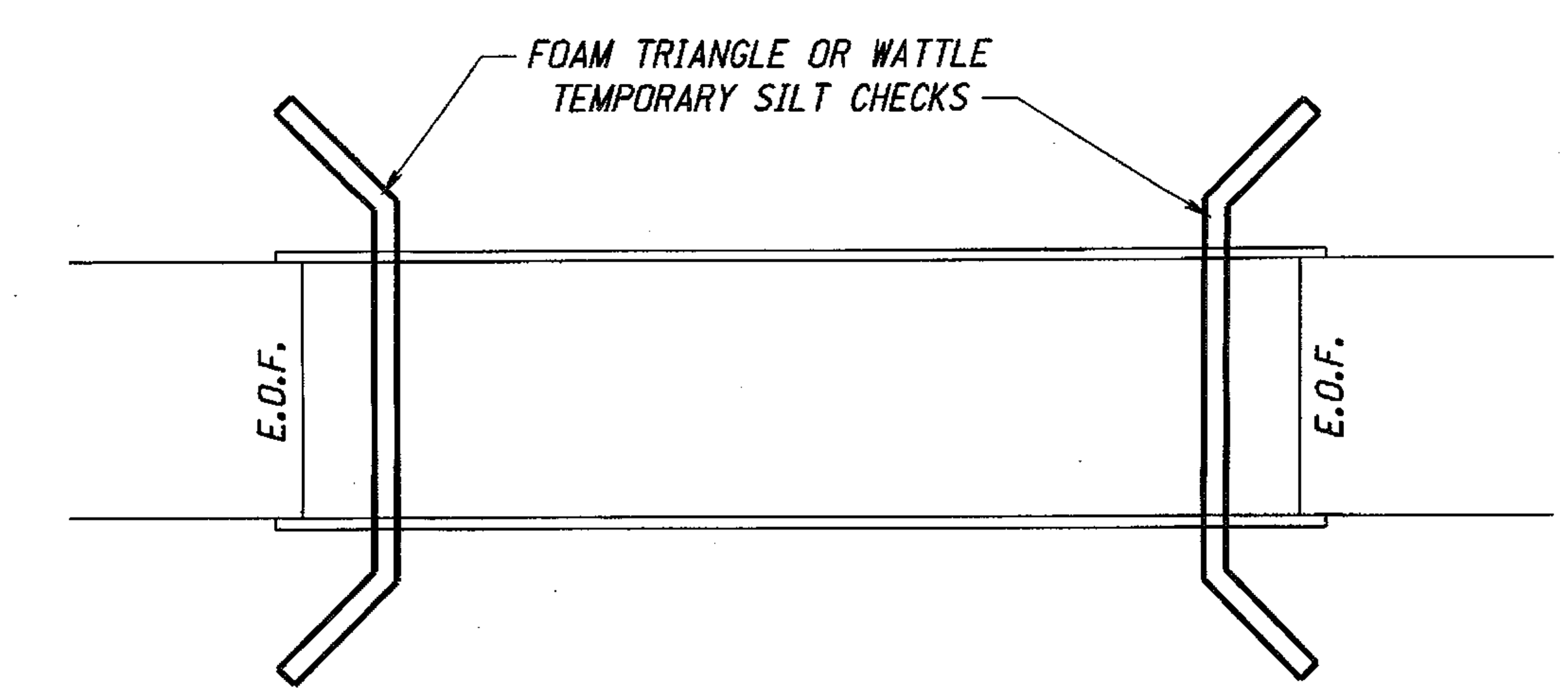
PLAN VIEW

FOR V - DITCH



PLAN VIEW

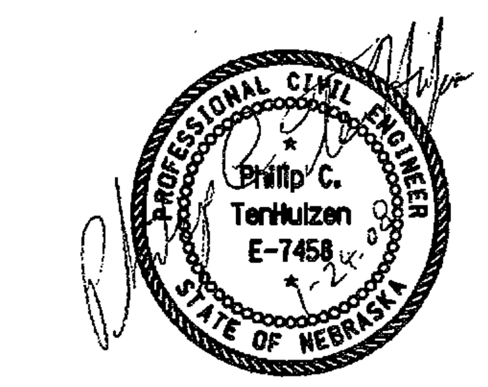
FOR CONTINUOUS BARRIER



UNDER BRIDGE

NOTES:

THE MANUFACTURER'S RECOMMENDATIONS FOR STAPLING PATTERNS SHALL BE FOLLOWED.



TEMPORARY SILT CHECKS

SHEET 1 OF 2

SPECIAL PLAN 3C

File: 51081e02_dsp.dgn Scale: 1:100 5108 1 e 02 SHEET 1 OF 2

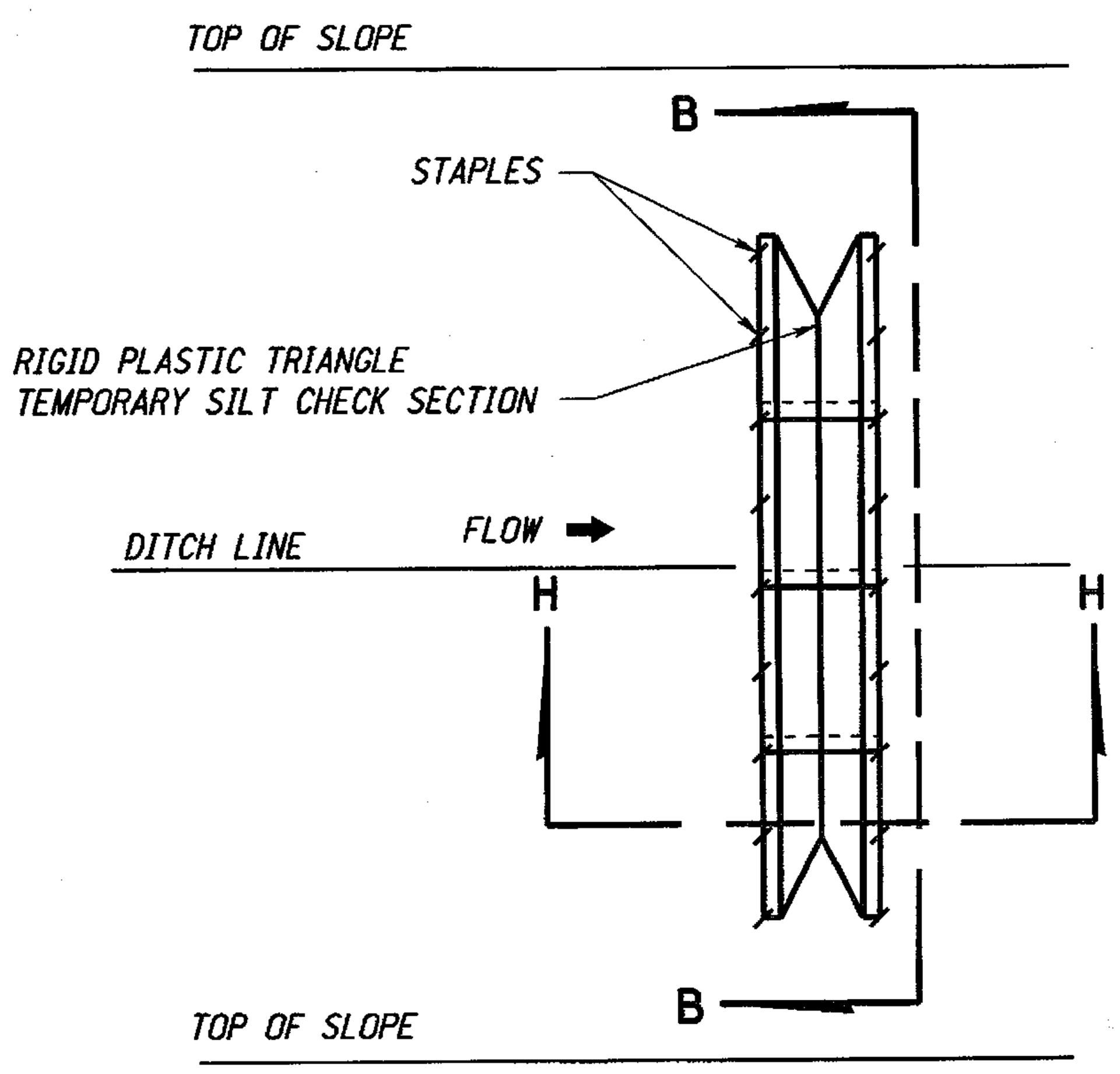
ROADWAY DESIGN DIVISION

Computer: DRDESIGN55 User: dor13017 Date: 07-NOV-2012 12:25

File: 51081e02_dsp.dgn
Scale: 1:100 5108 1 e 02
SHEET 2 OF 2

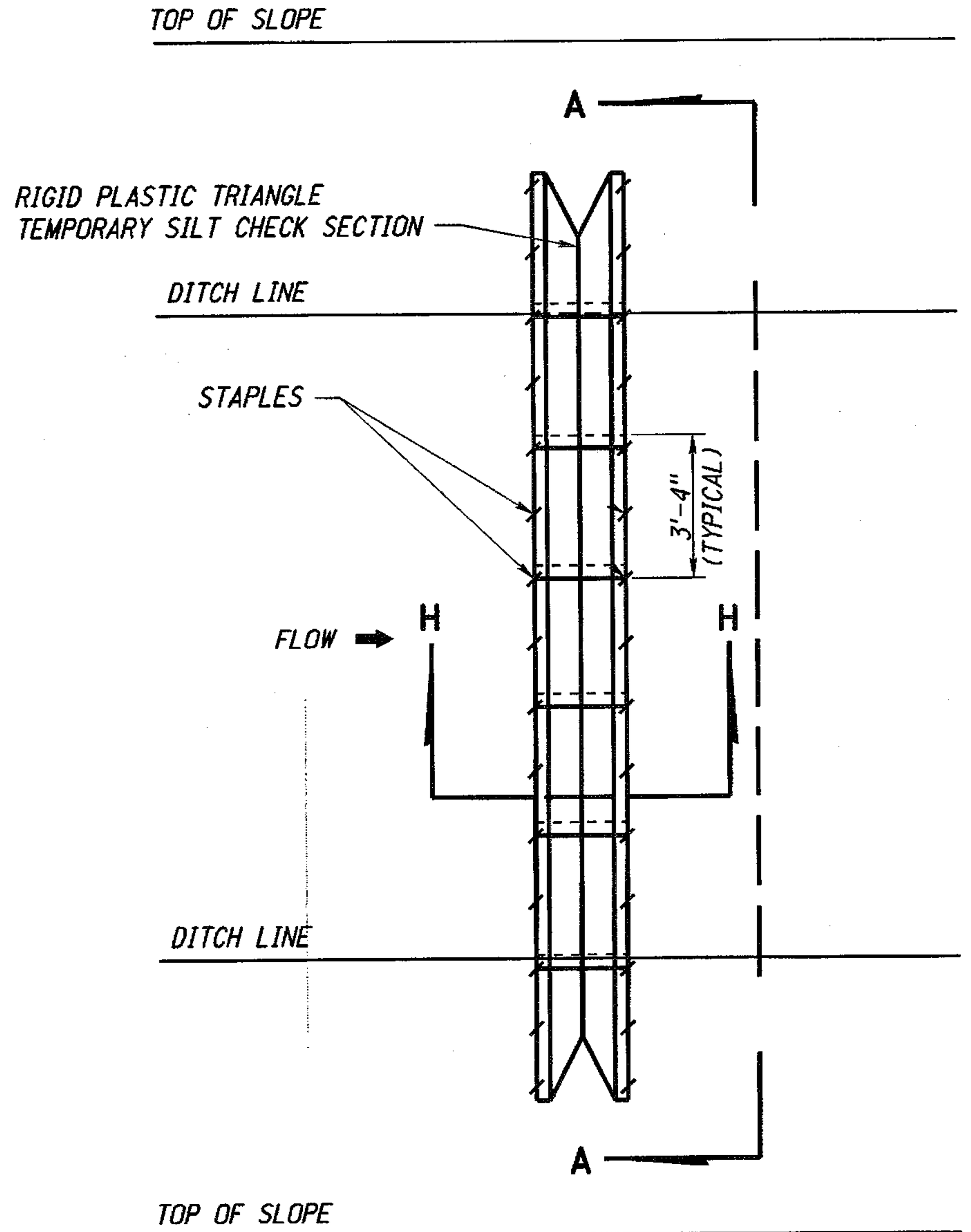
PROJECT NO.	SHEET NO.
BRO-7084(10)	18

C.N. 31597



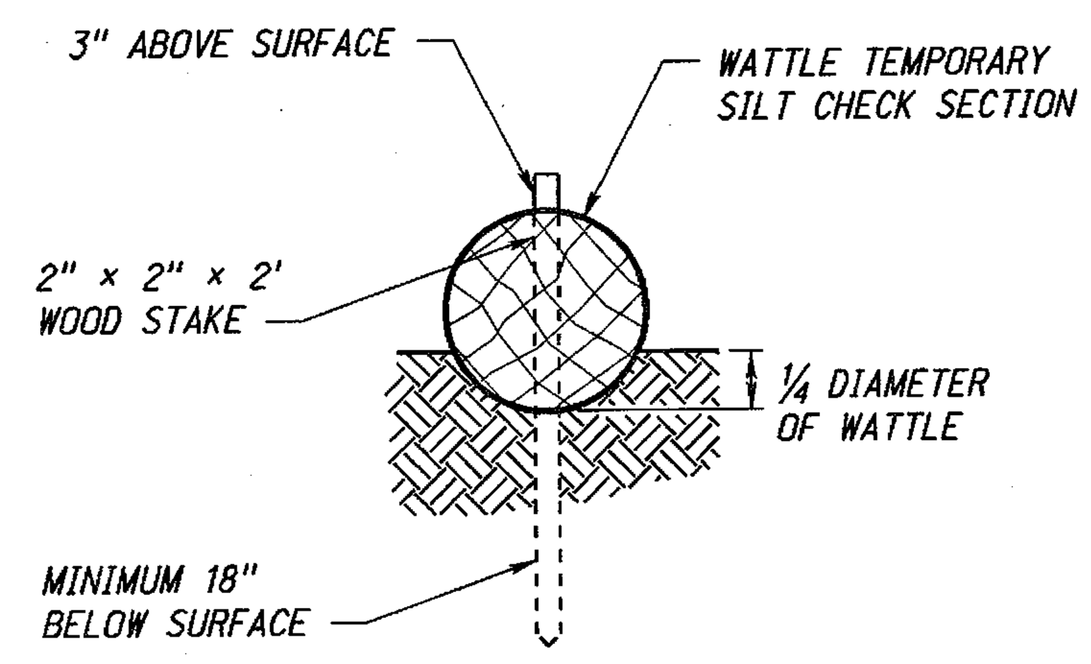
PLAN VIEW

FOR V - DITCH



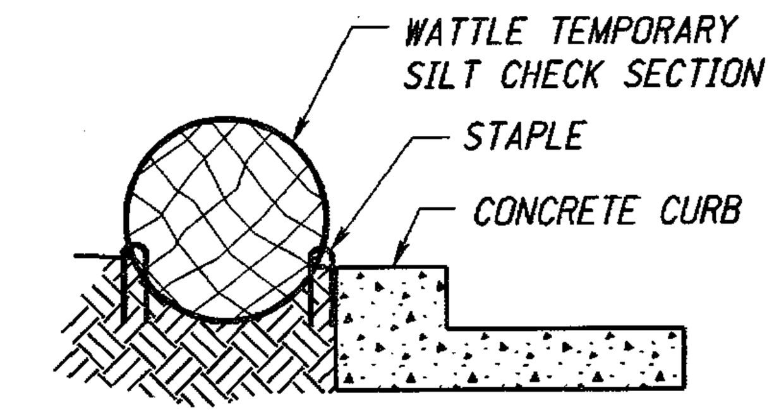
PLAN VIEW

FOR FLAT BOTTOM DITCH

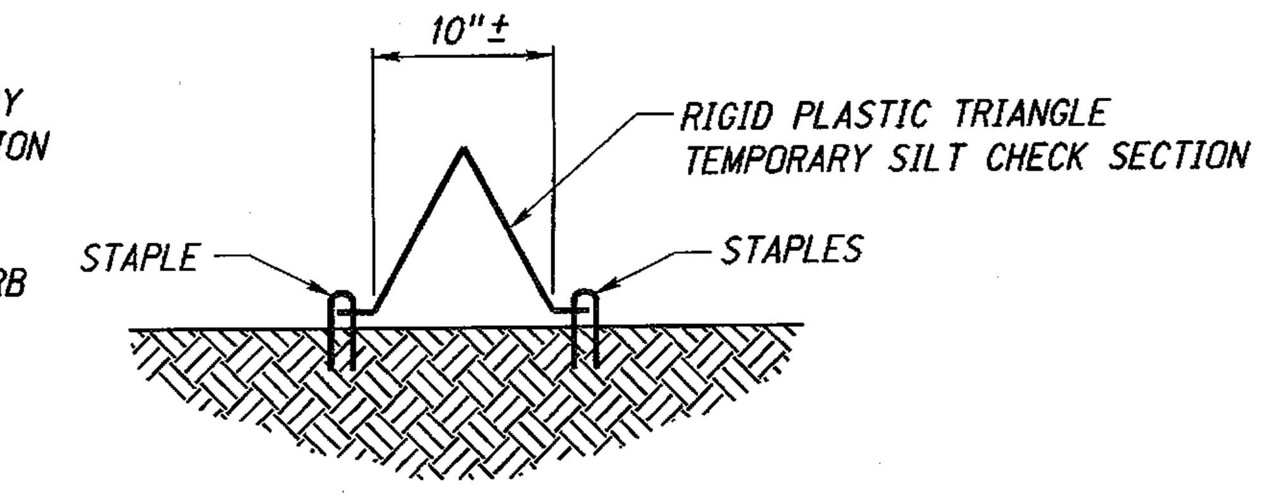


NOTE:
TRENCHING IS OPTIONAL FOR EXCELSIOR WATTLES ON BACKSLOPES & FORESLOPES

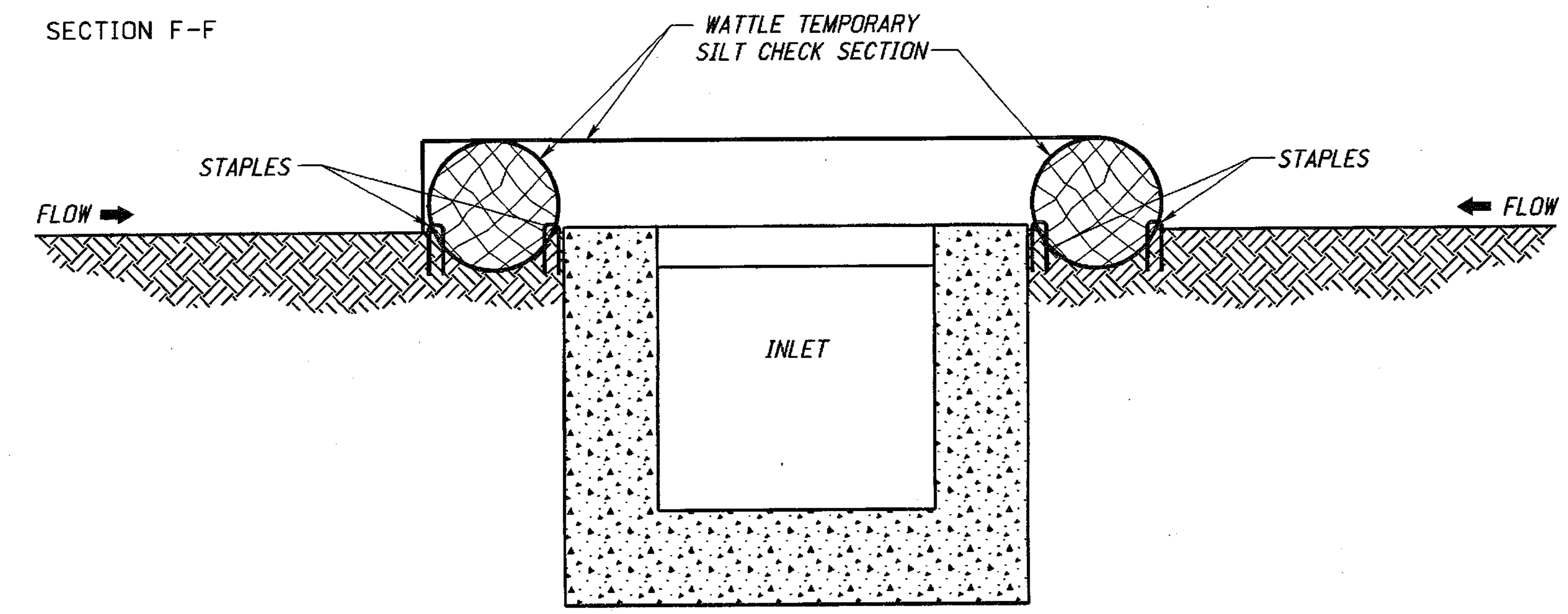
SECTION F-F



SECTION G-G

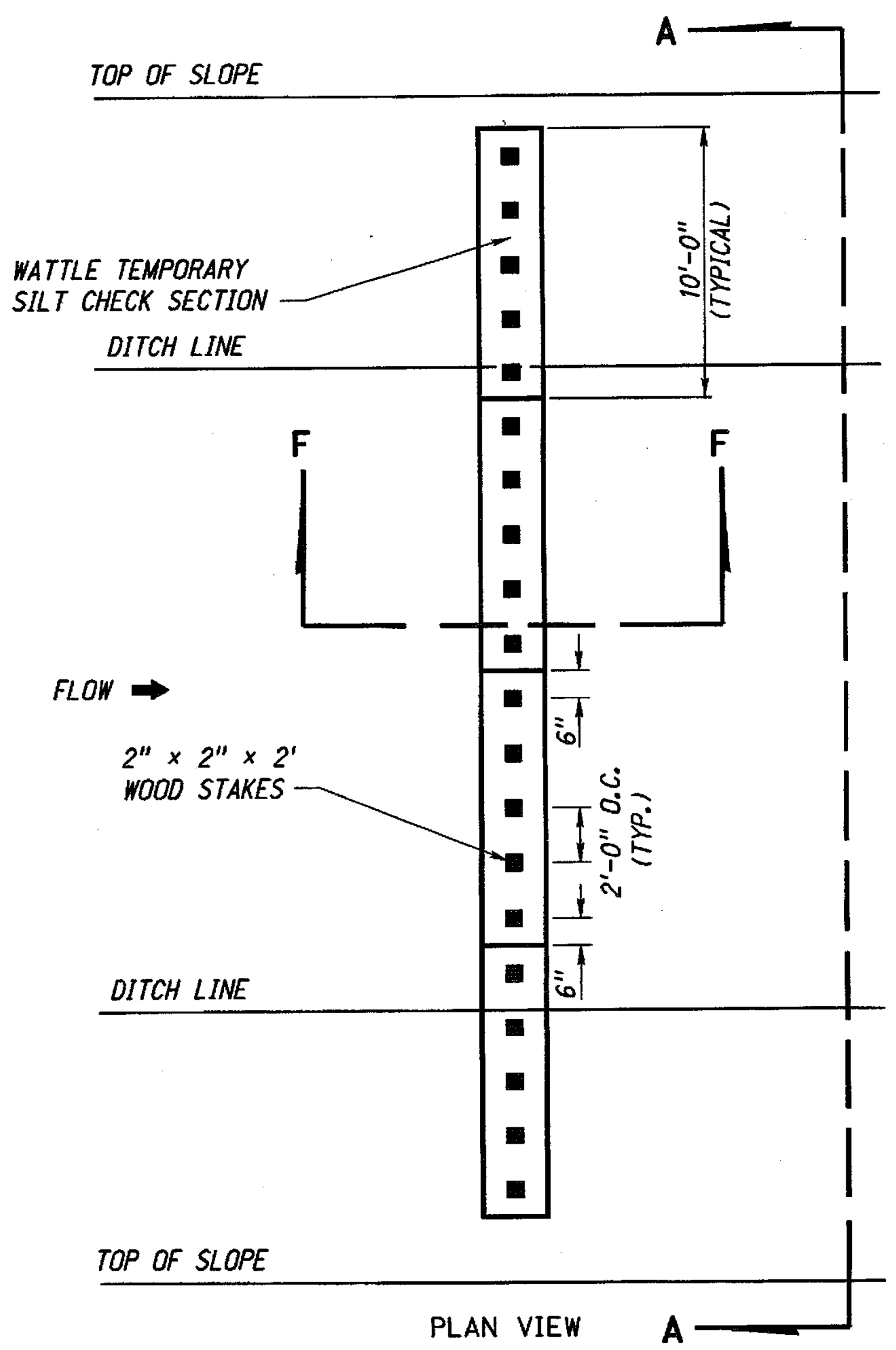


SECTION H-H



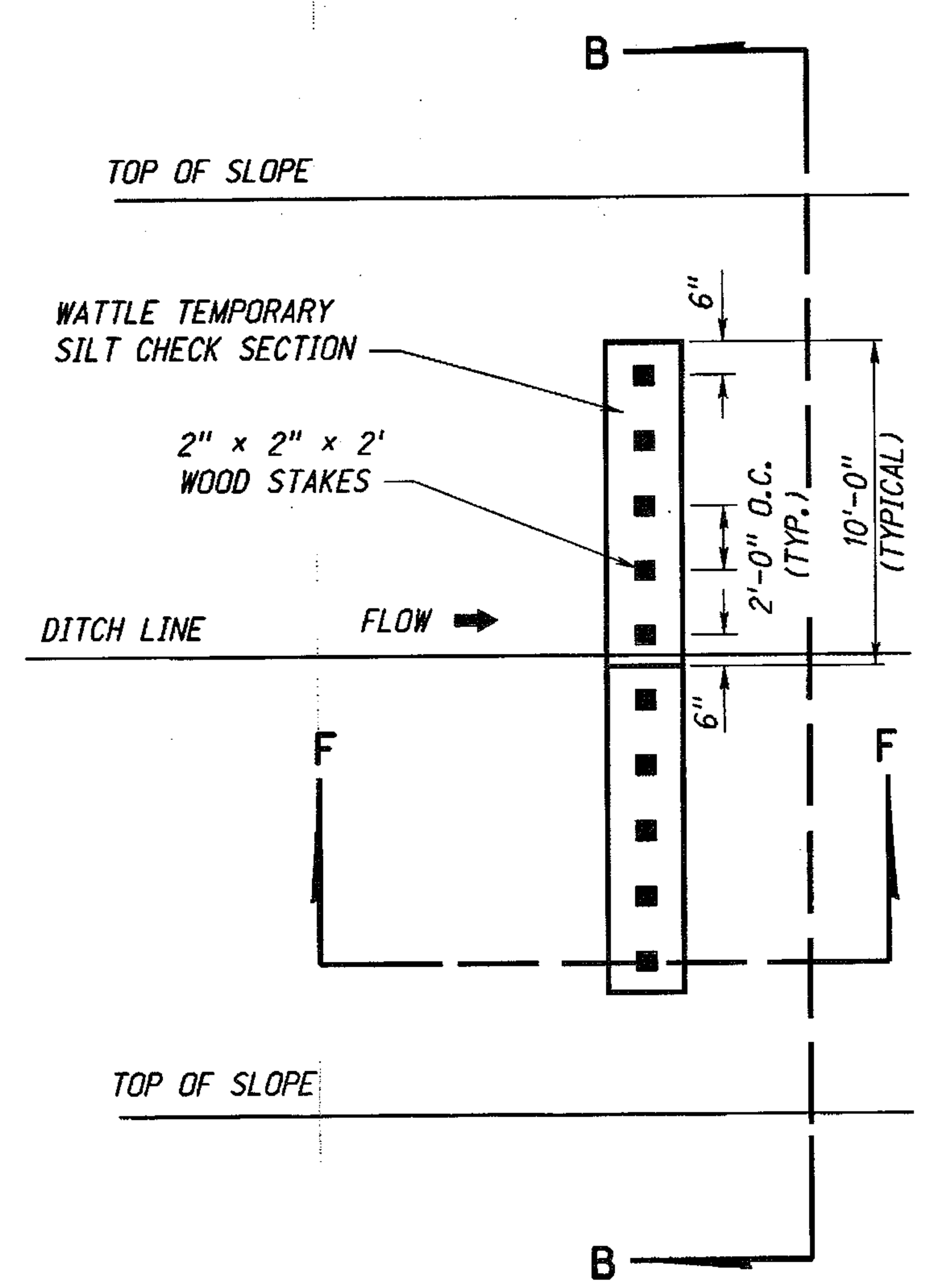
SECTION I-I

FOR INLETS



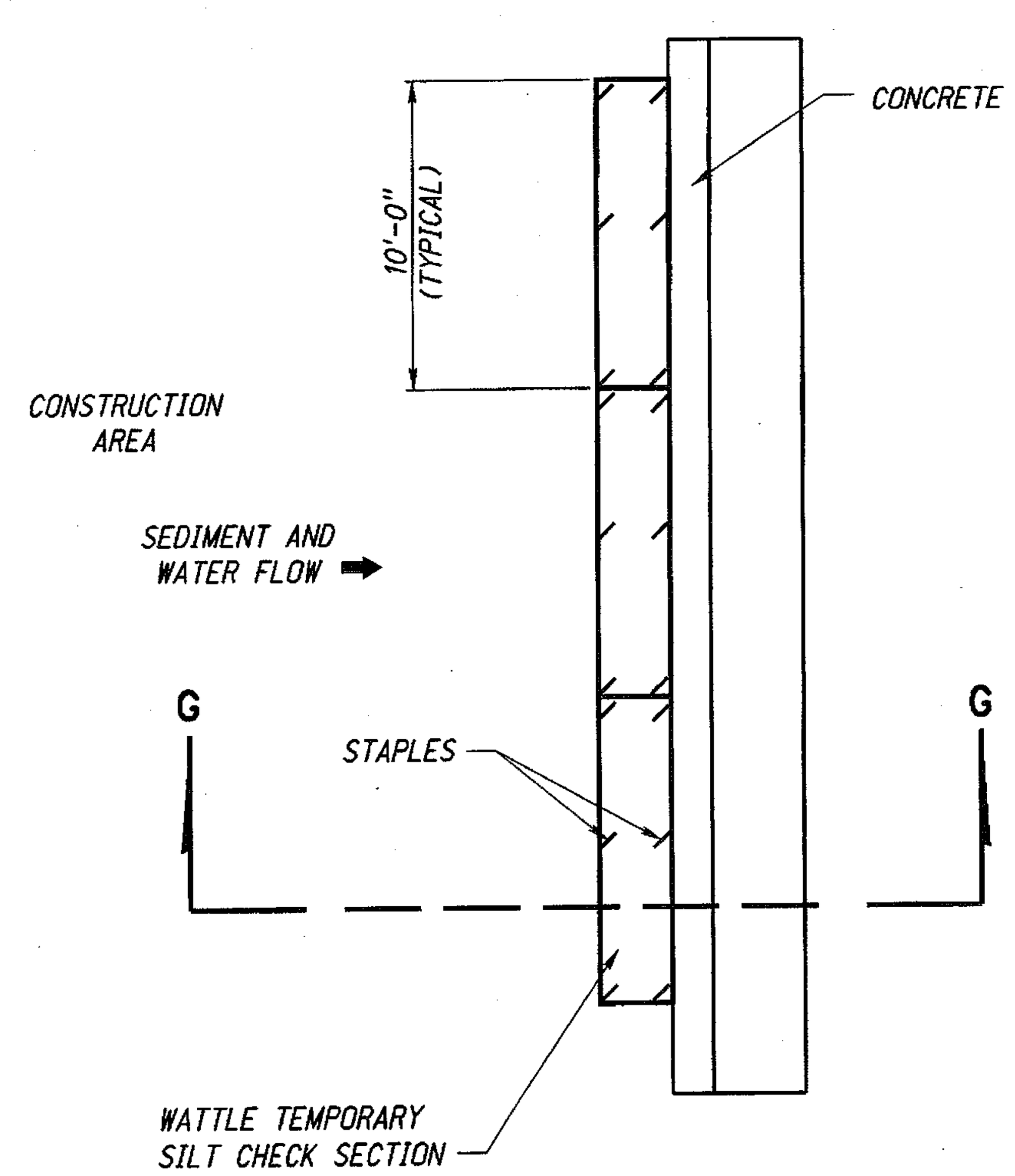
PLAN VIEW

FOR FLAT BOTTOM DITCH



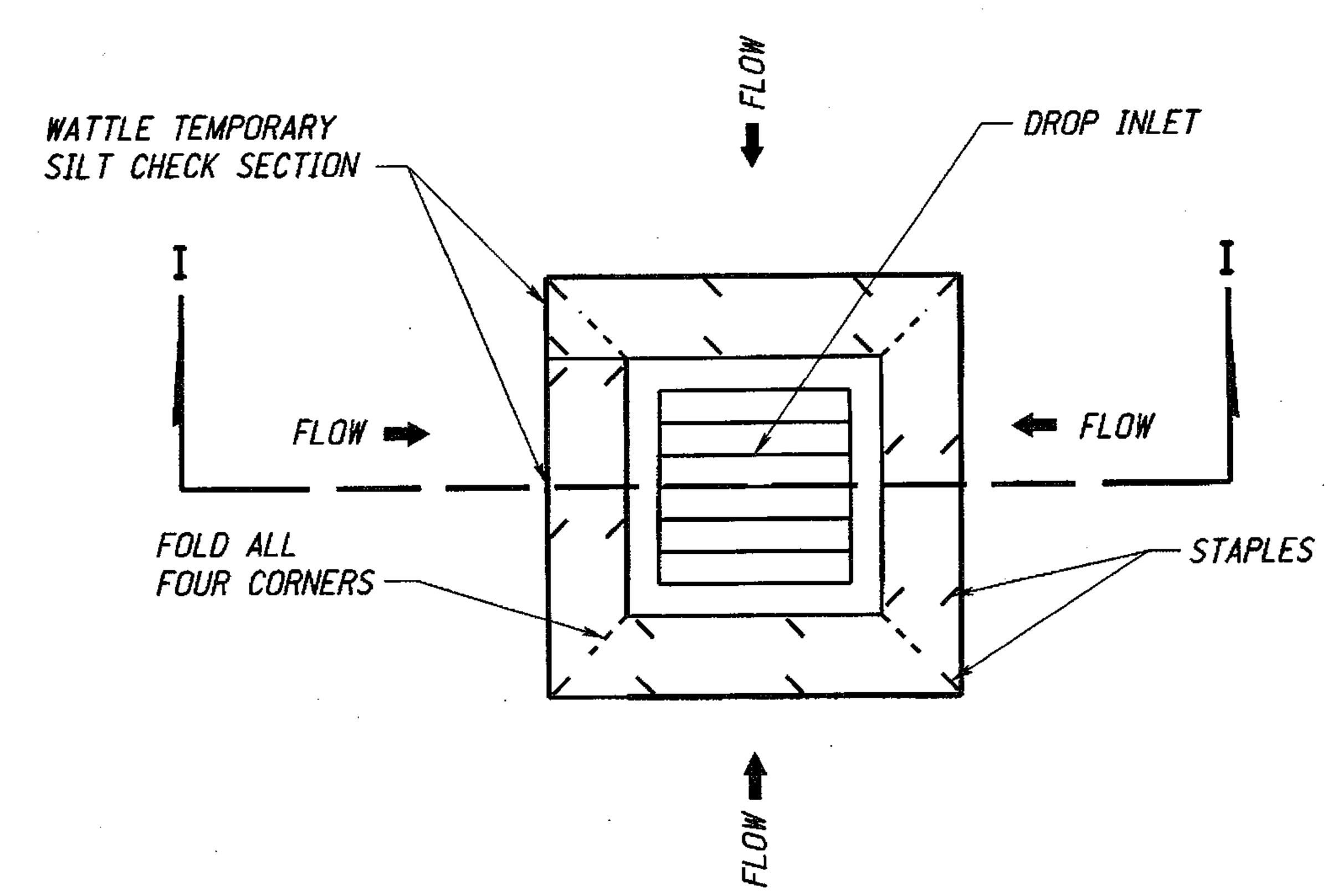
PLAN VIEW

FOR V - DITCH



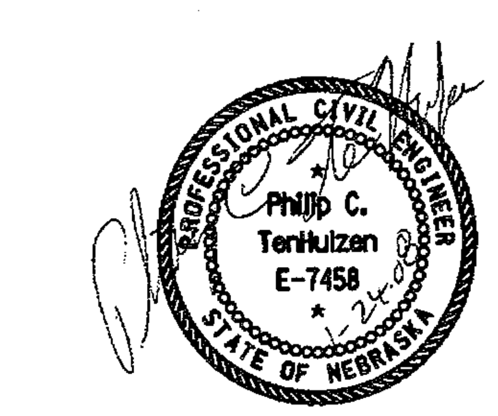
PLAN VIEW

FOR CONTINUOUS BARRIER



PLAN VIEW

FOR INLETS



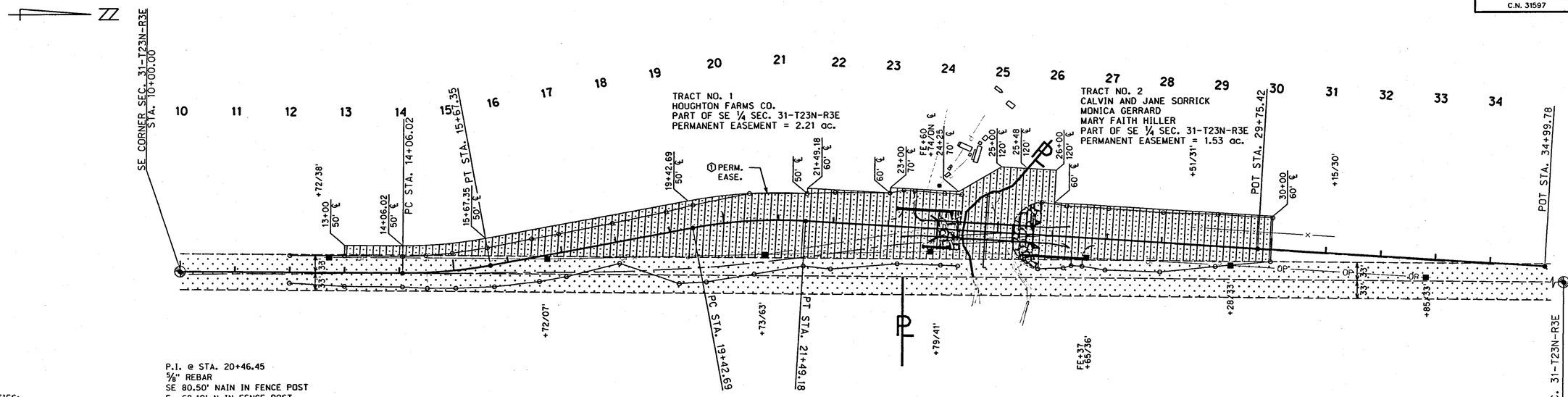
TEMPORARY SILT CHECKS

SHEET 2 OF 2

SPECIAL PLAN 3C

PROJECT NO.	SHEET NO.
BRO-7084(10)	R1
C.N. 31597	

SEC. 31-T23N-R3E



TIES:

SE CORNER SEC. 31-T23N-R3E
PIPE, STA. 10+00
NW 44.80' NAIL IN POWER POLE
SW 41.50' NAIL IN FENCE POST
SW 70.90' TOP TELEPHONE BOX

P.I. @ STA. 14+86.93
⅝" REBAR
SW 57.70' NAIL IN FENCE POST
WSW 33.65' NAIL IN FENCE POST
WNW 33.41' NAIL IN FENCE POST

ALL BANDS FOR CORRUGATED METAL PIPE SHALL BE 2'-0" WIDE (MINIMUM) UNLESS APPROVED BY THE ENGINEER.

P.I. @ STA. 20+46.45
⅝" REBAR
SE 80.50' NAIN IN FENCE POST
E 68.10' N IN FENCE POST
NE 72.03' SPIKE IN POWER POLE (BM#1)

P.O.T. STA. 29+75.49
⅝" REBAR
NW 37.10' TO NAIL IN FENCE POST
SW 62.80' TO NAIL IN FENCE POST
SE 59.20' NAIL IN POWER POLE

E ¼ CORNER SEC. 31-T23N-R3E
PIPE
SE 53.00' NAIL IN POWER POLE
W 45.20' NAIL IN FENCE POST

PI 1 STA 14+86.93
Δ = 10° 52' 28.25" (LT)
D = 6° 44' 26.45"
T = 80.91'
L = 161.33'
R = 850.00'
P.C. 1 STA. 14+06.02
P.T. 1 STA. 15+67.35

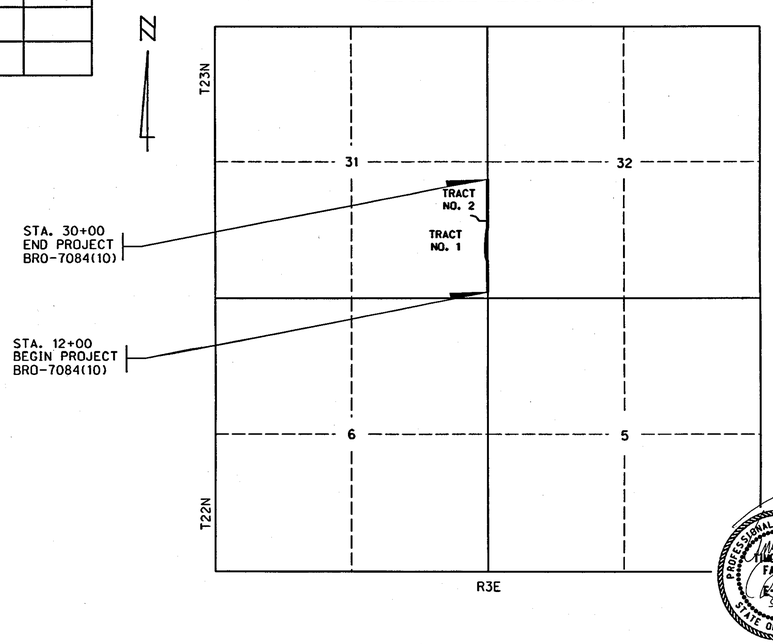
PI 2 STA 20+46.45
Δ = 13° 55' 07.71" (RT)
D = 6° 44' 26.45"
T = 103.76'
L = 206.49'
R = 850.00'
P.C. 2 STA. 19+42.70
P.T. 2 STA. 21+49.18

SEC. 32-T23N-R3E

① PERMANENT EASEMENT FOR CHANNEL CONSTRUCTION, RIPRAP PLACEMENT, CONSTRUCTION ACCESS AND BACKSLOPE CONSTRUCTION.

TRACT NO.	OWNER	DESCRIPTION	TOTAL AREA	TOTAL TAKING	NEW TAKING	EXCESS LAND	EASEMENT		REMAINDER	
							PERM.	TEMP.	LT.	RT.
1	HOUGHTON FARMS CO.	PART OF SE ¼ SEC. 31-T23N-R3E					2.21 AC.			
2	CALVIN AND JANE SORRICK, MONICA GERRARD MARY FAITH HILLER	PART OF SE ¼ SEC. 31-T23N-R3E					1.53 AC.			

GENERAL LAYOUT



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

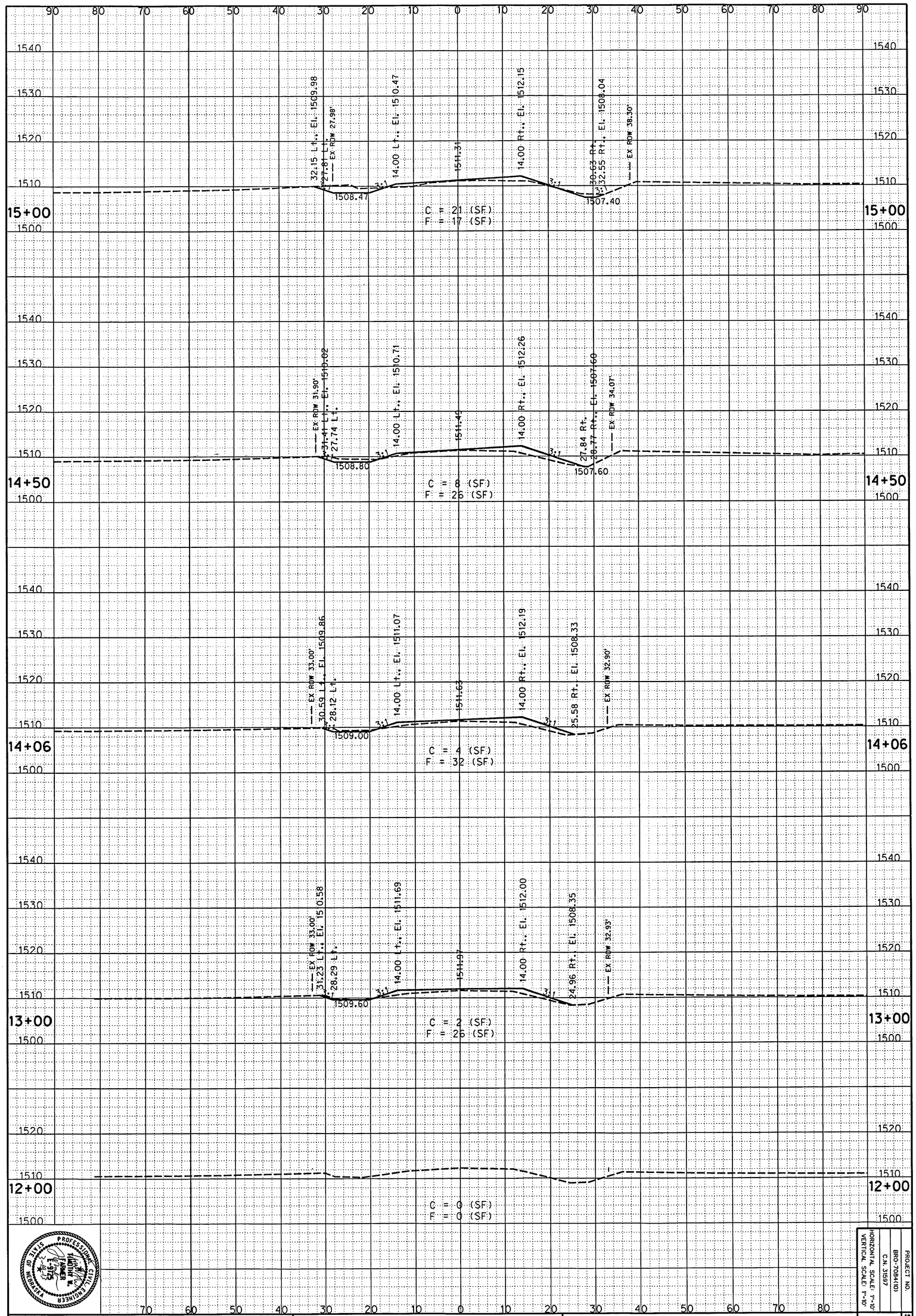
- NEW CONTROLLED ACCESS
- PREVIOUS CONTROLLED ACCESS
- LIMITS OF CONSTRUCTION
- PREVIOUS R.O.W.
- NEW R.O.W.
- EXISTING PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXCESS TAKING
- PERMANENT EASEMENT
- EXISTING RAILROAD EASEMENT
- NEW RAILROAD PERMANENT EASEMENT
- NEW RAILROAD TEMPORARY EASEMENT

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9725
12-12-13
STATE OF NEBRASKA

PLAN AND PROFILE

STANTON SOUTHEAST

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speeceelewis.com
SPEECE LEWIS ENGINEERS



PROFESSIONAL ENGINEER STATE OF NEBRASKA TANNER W. LEWIS E-9523

SPEECE LEWIS ENGINEERS

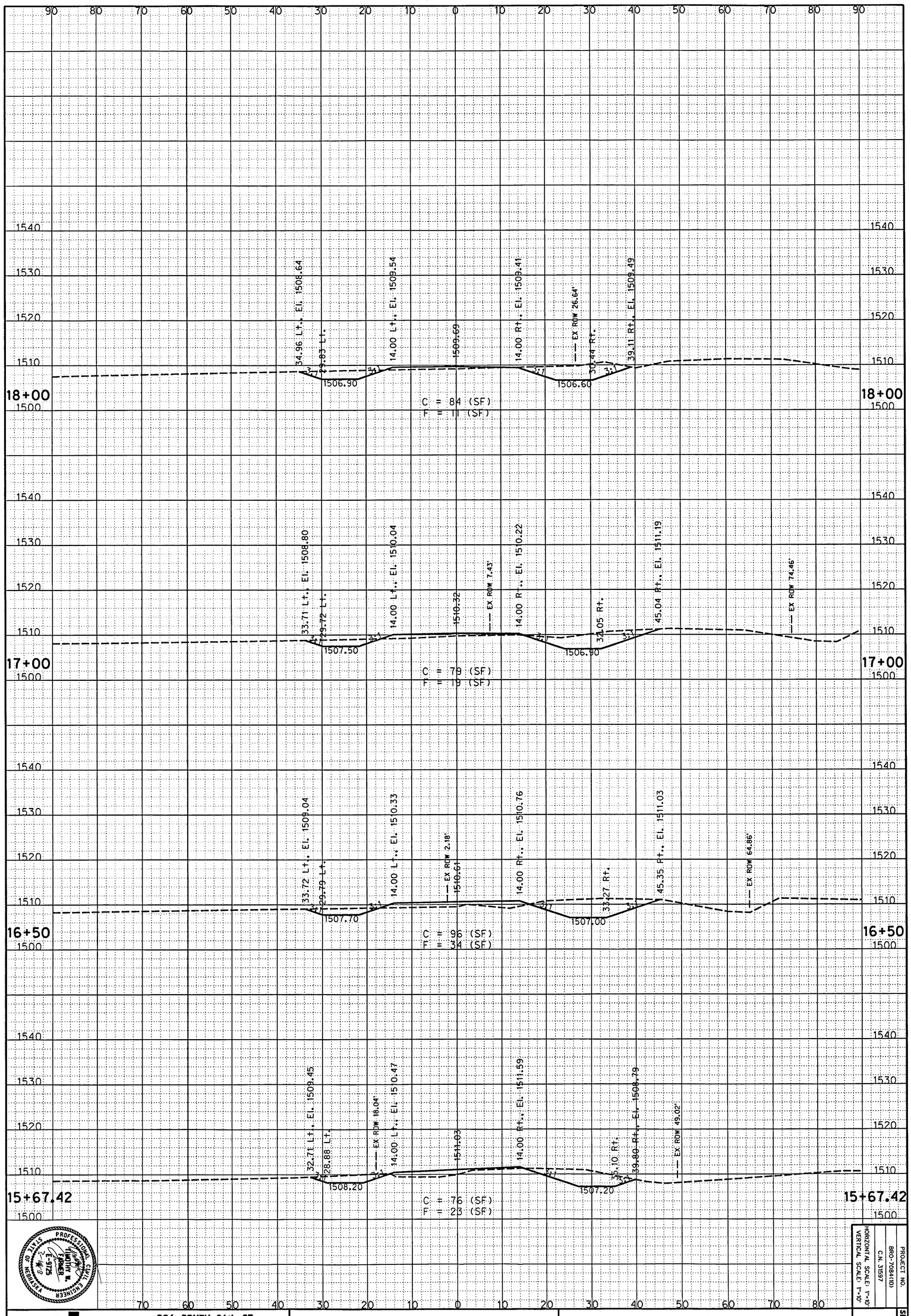
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

STANTON SOUTHEAST

CROSS SECTIONS

PROJECT NO. BRO-7084(10)
C.N. 31597
HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

SHEET NO. X1



PROFESSIONAL CIVIL ENGINEER
STATE OF NEBRASKA
TIMOTHY W. FARMER
E-9525

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

PROJECT NO.
BRO-7084(10)
C.N. 31597

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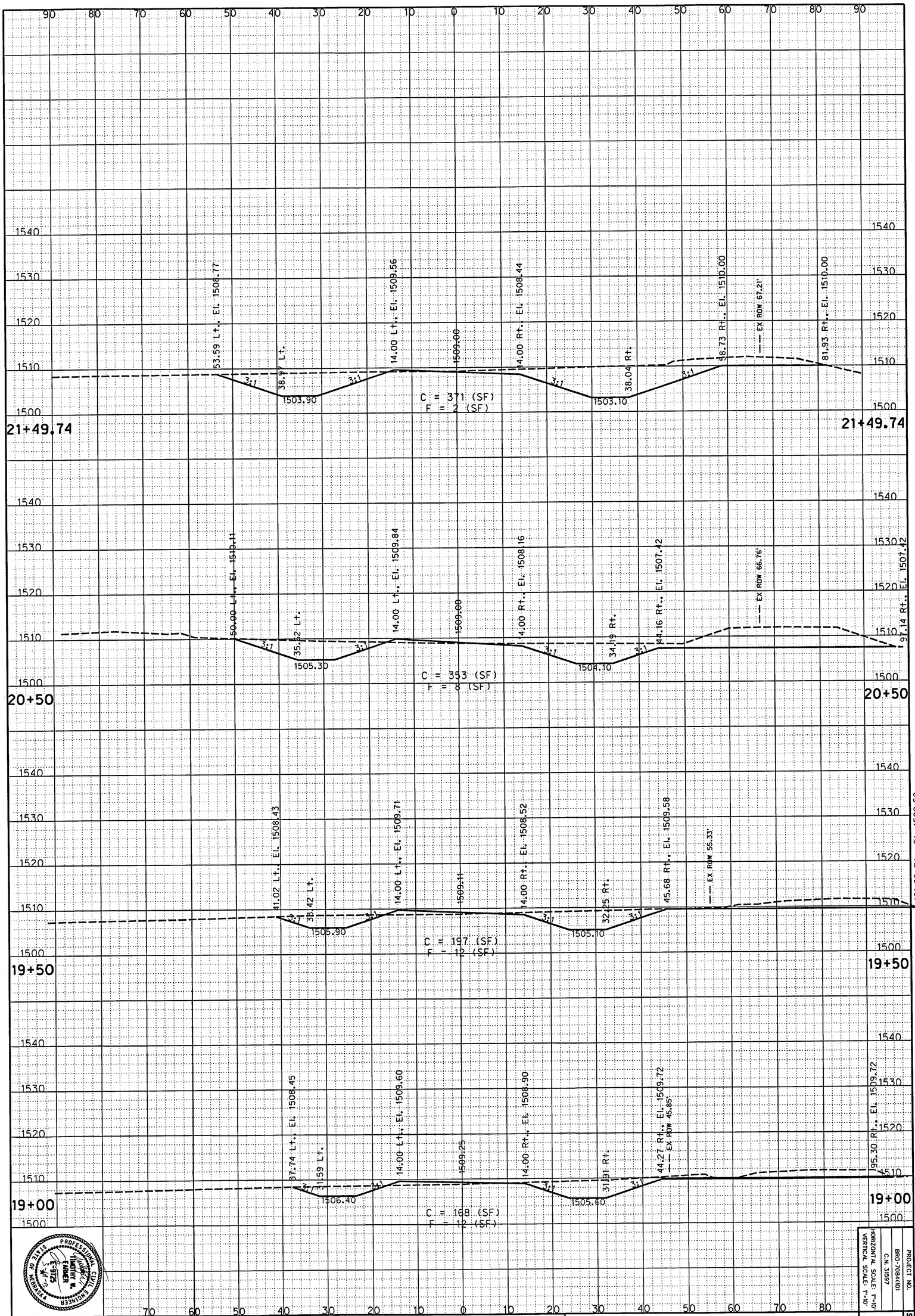
STANTON SOUTHEAST

CROSS SECTIONS

SHEET NO.
X2



PROFESSIONAL ENGINEER — STATE OF NEBRASKA — TIMOTHY W. TRAMEN — E-9215

SPEECE | LEWIS ENGINEERS

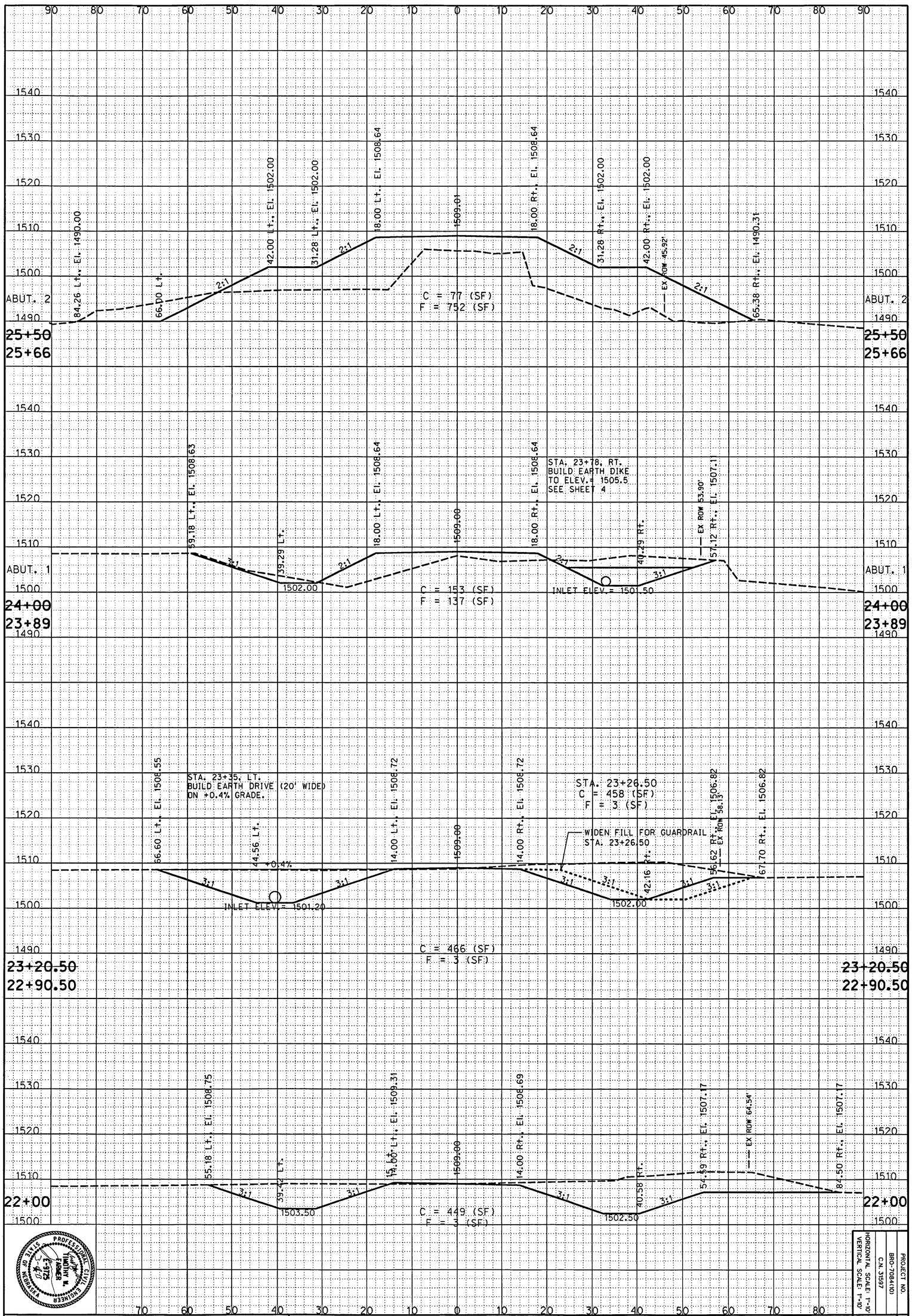
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

STANTON SOUTHEAST

CROSS SECTIONS

PROJECT NO.
BRO-7084(10)
C.N. 31597
HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

SHEET NO
X3



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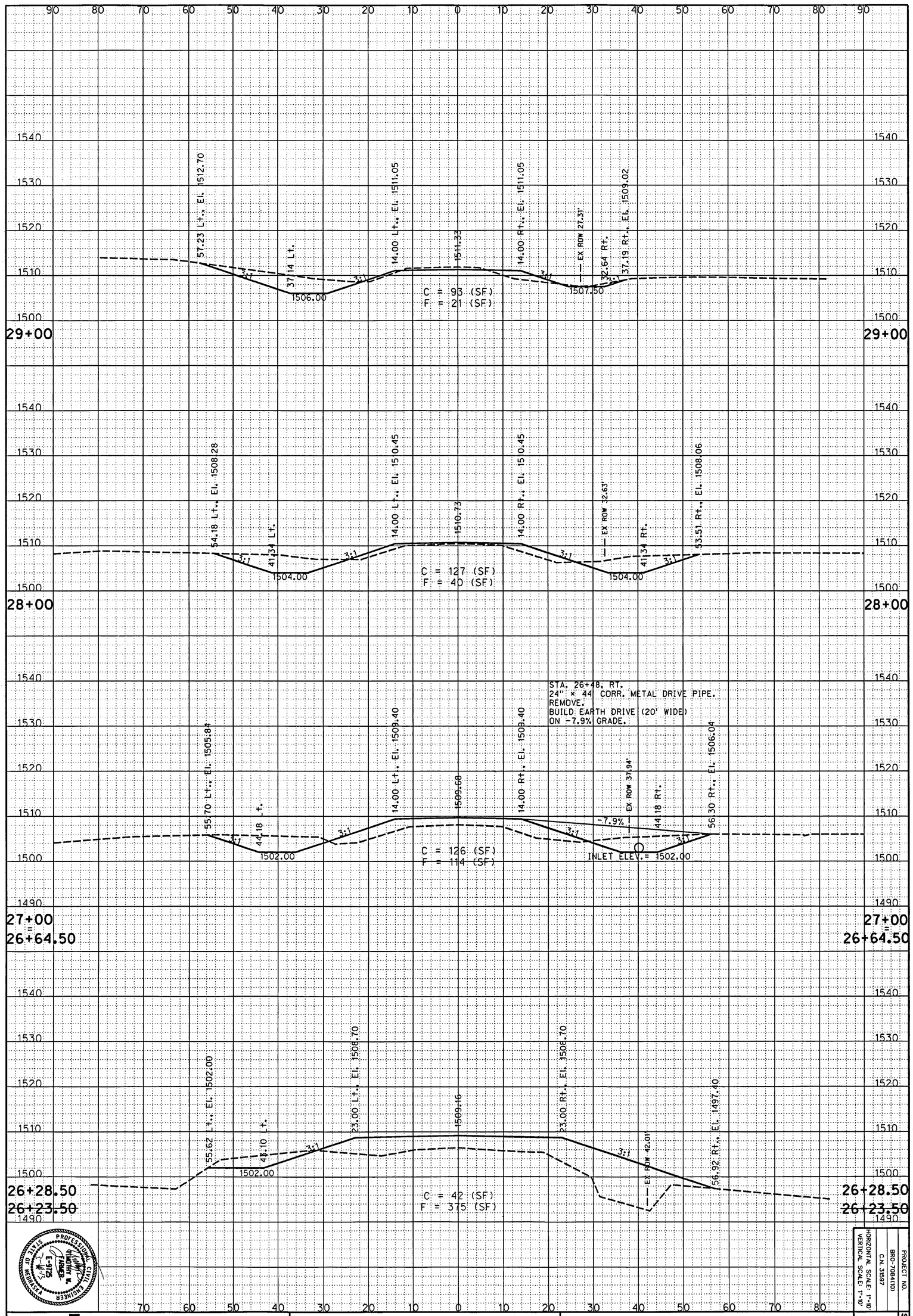
STANTON SOUTHEAST

CROSS SECTIONS

PROJECT NO. BRO-7084(10)
C.N. 31597
HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

SHEET NO. X4



PROFESSIONAL ENGINEER — STATE OF NEBRASKA — CIVIL — E-9725 — ANTHONY M. FARMER

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

PROJECT NO.
BRO-7084(10)
C.N. 31597

SPEECE | LEWIS ENGINEERS

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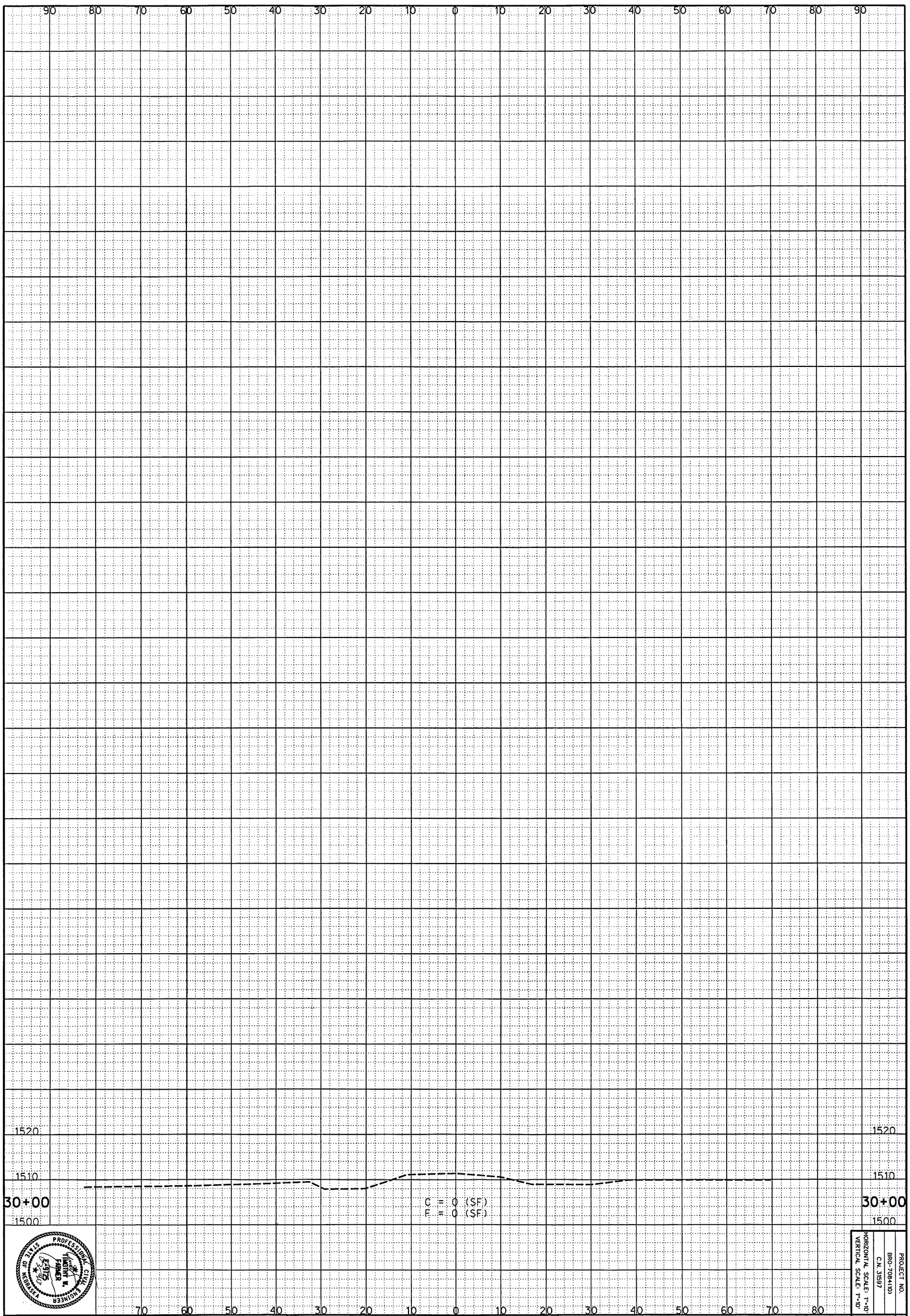
STANTON SOUTHEAST

CROSS SECTIONS

SHEET NO. X5



PROFESSIONAL CIVIL ENGINEER STATE OF NEBRASKA 5712 TIMOTHY M. FARMER

SPEECE | LEWIS ENGINEERS

906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

STANTON SOUTHEAST

CROSS SECTIONS

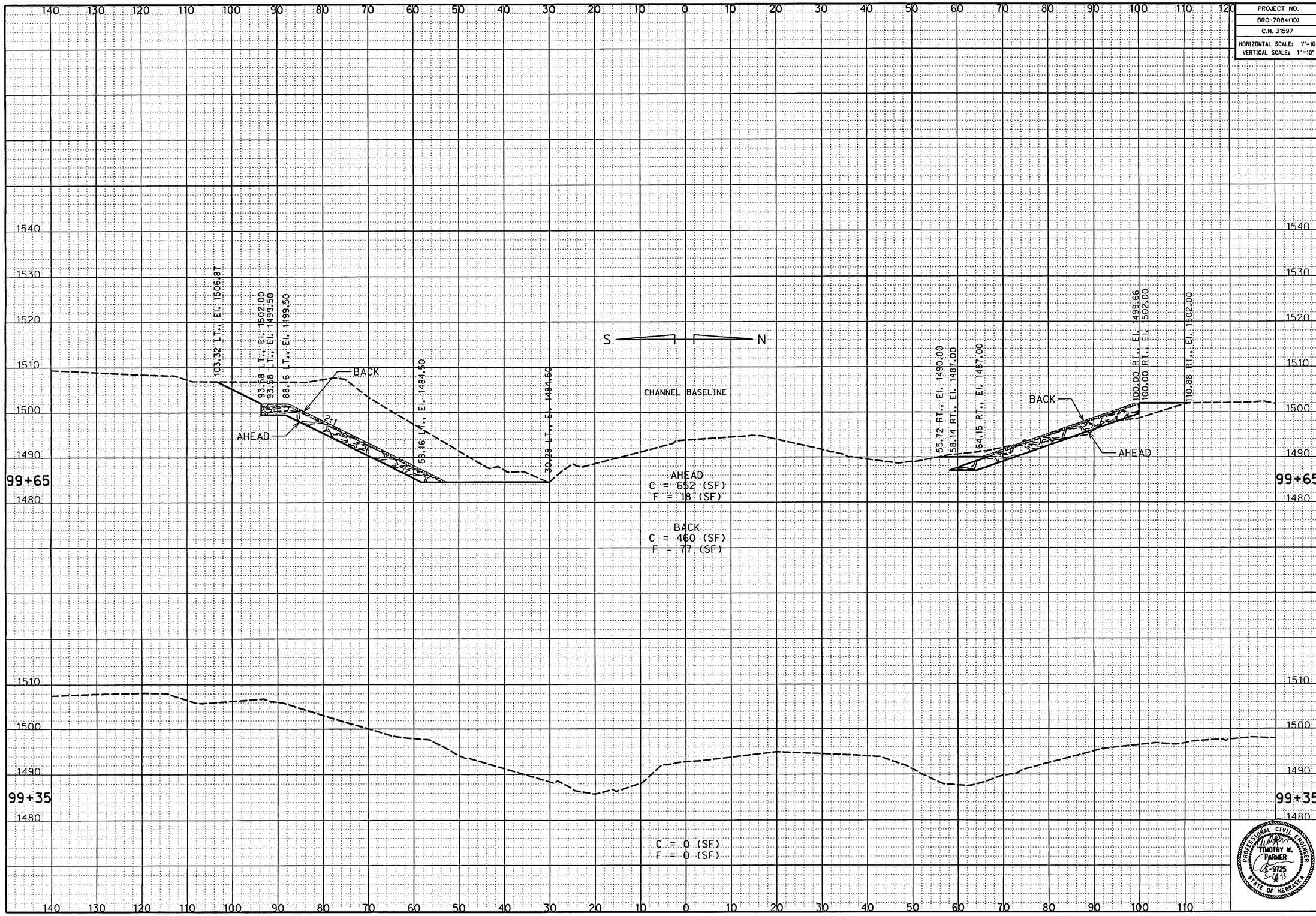
HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

C.N. 31597
BRO-7084(10)

PROJECT NO.

SHEET NO. X6

PROJECT NO.	SHEET NO.
BRO-7084(10)	X7
C.N. 31597	
HORIZONTAL SCALE: 1"=10'	
VERTICAL SCALE: 1"=10'	



CROSS SECTIONS

STANTON SOUTHEAST

SPEECE LEWIS ENGINEERS
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(402)483-5466
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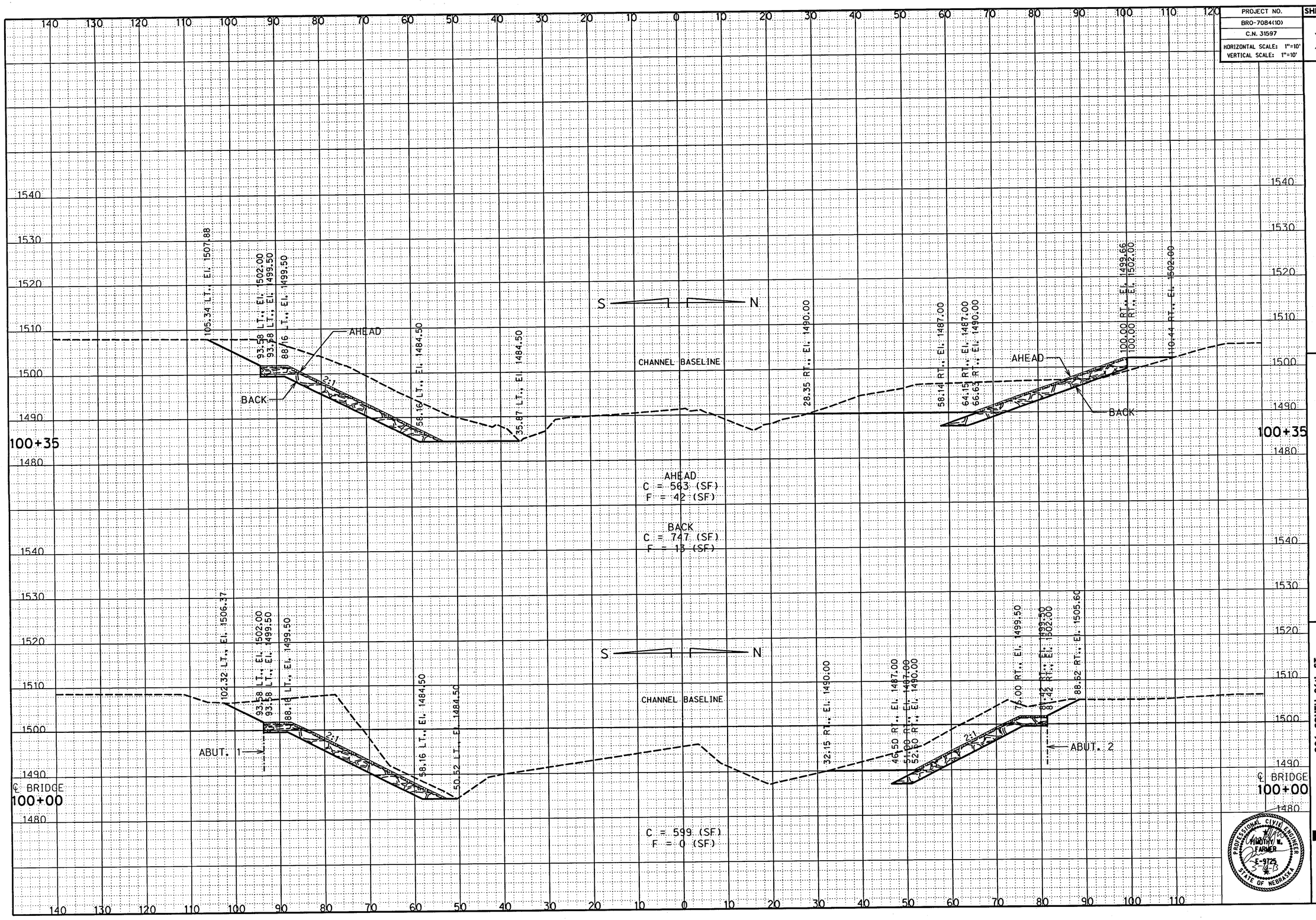
PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. PARMER
E-9725
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	X8
C.N. 31597	
HORIZONTAL SCALE: 1"=10'	
VERTICAL SCALE: 1"=10'	



CROSS SECTIONS

STANTON SOUTHEAST

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SPEECE LEWIS ENGINEERS

PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9725
STATE OF NEBRASKA

PROJECT NO.	SHEET NO.
BRO-7084(10)	X9
C.N. 31597	
HORIZONTAL SCALE: 1"=10'	
VERTICAL SCALE: 1"=10'	

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120

1510
1500
1490
100+65
1480

C = 0 (SF)
F = 0 (SF)

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110

CROSS SECTIONS

STANTON SOUTHEAST

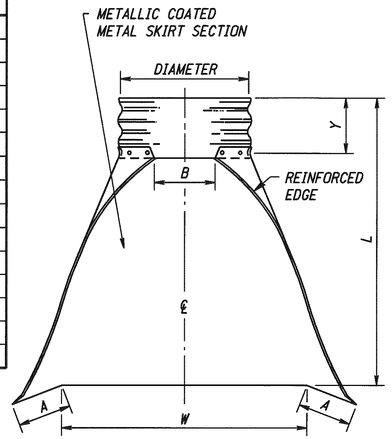
906 SOUTH 26th ST.
LINCOLN, NE 68510
(402)483-5466
www.speecelewis.com

SPEECE LEWIS ENGINEERS

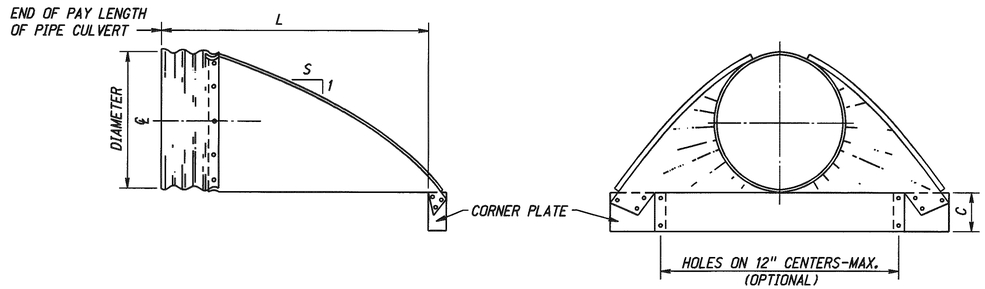
PROFESSIONAL CIVIL ENGINEER
TIMOTHY W. FARMER
E-9725
STATE OF NEBRASKA

Roadway Design Division

PIPE DIA.	GAUGE	NOMINAL DIMENSIONS						
		L ± 6"	W ± 2"	A MIN.	B MAX.	C MIN.	Y ± 4½"	S APPROX.
12"	16	6'-0⅞"	2'-0"	4¾"	6"	6"	4'-3⅞"	2½
15"	16	6'-1"	2'-6"	6"	8"	6"	3'-11"	2½
18"	16	6'-1"	3'-0"	7"	10"	6"	3'-8"	2½
21"	16	6'-1"	3'-8"	8¼"	1'-0"	6"	3'-1"	2½
24"	16	6'-1½"	4'-0"	9"	1'-1"	6"	2'-8½"	2½
30"	14	6'-1¾"	5'-0"	11"	1'-4"	6"	1'-10¾"	2½
36"	14	8'-1¾"	6'-0"	1'-2"	1'-7"	6"	3'-1¾"	2½
42"	12	8'-2"	7'-0"	1'-4"	1'-10"	6"	2'-5"	2½
48"	12	8'-2"	7'-6"	1'-6"	2'-3"	6"	1'-8"	2¼
54"	12	8'-4"	8'-6"	1'-6"	2'-6"	6"	1'-4"	2
60"	12	8'-3"	9'-6"	1'-6"	2'-9"	6"	1'-0"	1¾
66"	12	8'-3"	10'-0"	1'-6"	3'-0"	6"	1'-0"	1½
72"	12	8'-3"	10'-6"	1'-6"	3'-3"	6"	1'-0"	1⅓
78"	12	8'-3"	11'-0"	1'-6"	3'-6"	6"	1'-0"	1¼
84"	12	8'-3"	11'-6"	1'-6"	3'-9"	6"	1'-0"	1⅙

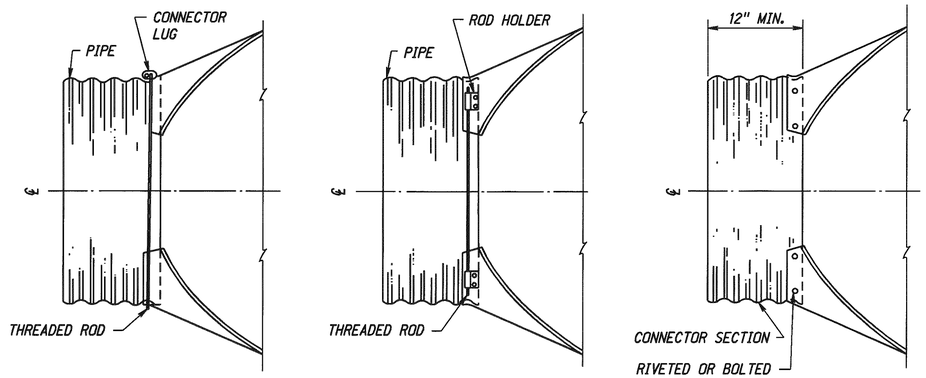


PLAN



SECTION ELEVATION

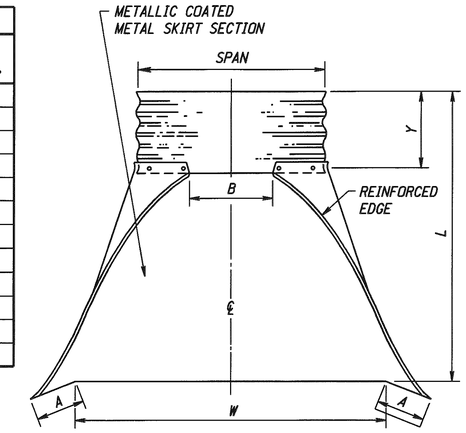
DETAILS OF METAL FLARED END SECTION
(FOR CORUGATED METAL PIPE)



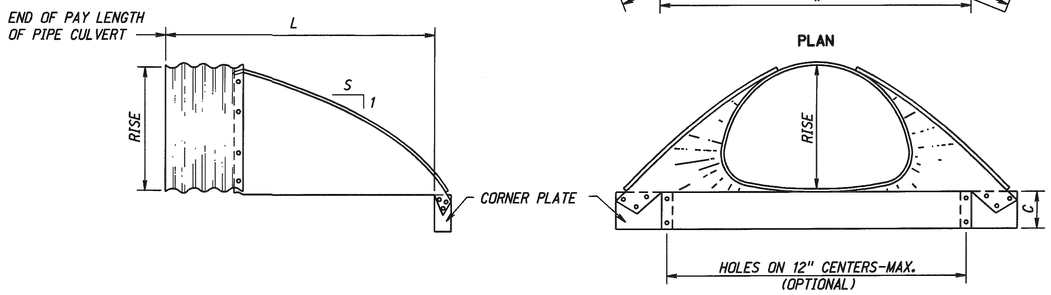
TYPICAL CONNECTIONS

FOR CORRUGATED METAL PIPE DIAMETERS OF 12" TO 24" INCLUSIVE AND CORRUGATED METAL PIPE-ARCHES WITH RISE OF 11" TO 18" INCLUSIVE, THE SKIRT SECTION MAY BE ATTACHED WITH A 1" WIDE, 12 GAUGE METAL CONNECTOR STRAP AND ½" × 6" BOLT AND NUT. THIS STRAP MAY BE USED ON PIPE WITH ANNULAR ENDS ONLY.

EQUIV. DIA.	SPAN	RISE	GAUGE	NOMINAL DIMENSIONS						
				L ± 6"	W MIN.	A MIN.	B MAX.	C MIN.	Y ± 4½"	S APPROX.
15"	17"	13"	16	6'-0"	2'-6"	4½"	9"	6"	4'-5"	2½
18"	21"	15"	16	6'-0"	3'-0"	5¼"	10"	6"	4'-1"	2½
21"	24"	18"	16	6'-0"	3'-6"	6¼"	11½"	6"	3'-8"	2½
24"	28"	20"	16	6'-0"	4'-0"	7"	1'-2"	6"	3'-4½"	2½
30"	35"	24"	14	8'-0"	5'-0"	8¾"	1'-4"	6"	4'-9½"	2½
36"	42"	29"	14	8'-0"	6'-3"	10¾"	1'-5½"	6"	4'-2"	2½
42"	49"	33"	12	8'-0"	7'-1"	1'-0¼"	1'-8"	6"	3'-7"	2½
48"	57"	38"	12	8'-0"	7'-6"	1'-2"	2'-3"	6"	2'-9"	2½
54"	64"	43"	12	8'-0"	8'-6"	1'-3¾"	2'-6"	6"	2'-2"	2¼
60"	71"	47"	12	8'-0"	9'-6"	1'-5¼"	2'-9"	6"	1'-7"	2¼
66"	77"	52"	12	8'-0"	10'-6"	1'-6"	3'-0"	6"	1'-7"	2
72"	83"	57"	12	8'-0"	11'-6"	1'-6"	3'-3"	6"	1'-7"	2



PLAN



SECTION ELEVATION

DETAILS OF METAL FLARED END SECTION
(FOR CORUGATED METAL PIPE-ARCH)

NOTES:

CONNECTOR STRAP, STIFFENER ANGLES AND MISCELLANEOUS HARDWARE SHALL BE METALLIC COATED.

THE "Y" LENGTH MAY BE FABRICATED AS PART OF THE CULVERT.

CONNECTOR SECTIONS AND CORNER PLATES FOR CORRUGATED METAL PIPE AND PIPE-ARCH FLARED END SECTIONS SHALL BE METALLIC COATED AND OF THE SAME GAUGE AS SKIRTS AND EACH SHALL BE METALLIC COATED.

SKIRT SECTION FOR CORRUGATED METAL PIPE DIA. OF 12" TO 24" INCLUSIVE SHALL BE MADE IN ONE PIECE.

SKIRT SECTION FOR CORRUGATED METAL PIPE-ARCHES WITH RISE OF 11" TO 22" INCLUSIVE SHALL BE MADE IN ONE PIECE.

SKIRT SECTION FOR CORRUGATED METAL PIPE DIA. OF 30" TO 54" INCLUSIVE AND CORRUGATED METAL PIPE-ARCHES WITH RISE OF 27" TO 40" INCLUSIVE MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTION OF CORRUGATED METAL PIPE DIA. OF 60" AND LARGER, AND CORRUGATED METAL PIPE-ARCHES WITH RISE OF 44" AND LARGER SHALL BE MADE FROM THREE SHEETS JOINED BY RIVETING OR BOLTING AT EQUAL DISTANCES FROM CENTERLINE. THE CENTER PANEL SHALL BE FURNISHED IN 10 GAUGE MATERIAL AND THE WIDTH OF THE CENTER PANEL SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY.

MULTIPLE SHEET SKIRT SECTIONS SHALL HAVE 2" MIN. LAP SEAMS. BOLTS OR RIVETS SHALL BE ⅜" DIA. (MIN.) AND ON 6" CENTERS (MAX.).

TYPICAL CONNECTIONS SHOWN MAY BE USED FOR HELICAL CORRUGATED METAL PIPE.

FOR SKIRT SECTIONS OF 60" DIA. PIPE AND LARGER, AND CORRUGATED METAL PIPE-ARCHES WITH A RISE OF 49" AND LARGER, REINFORCED EDGES TO BE SUPPLEMENTED WTH STIFFENER ANGLES PLACED JUST BELOW THE REINFORCED EDGES ON THE OUTSIDE OF THE SKIRT SECTION. THE ANGLES WILL BE 2" × 2" × ¼". THE ANGLES TO BE ATTACHED BY ⅜" DIA. (MIN.) BOLTS AND NUTS AND ON 6" CENTERS (MAX.).

REV. NO.	DATE	DESCRIPTION OF REVISION
R3	AUG.99	CHANGED NOTES
R2	MAR. 89	SPAN.RISE SIZES FOR C.M.PIPE-ARCH
R1	MAR. 85	MULTIPLE CHANGES

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 410-R3

FLARED END SECTIONS FOR CULVERT PIPES

PROFESSIONAL STRUCTURAL ENGINEER
LYMAN D. FREEMON
E-2006
STATE OF NEBRASKA

APPROVED:

FEBRUARY 22, 1974
DATE

1
2

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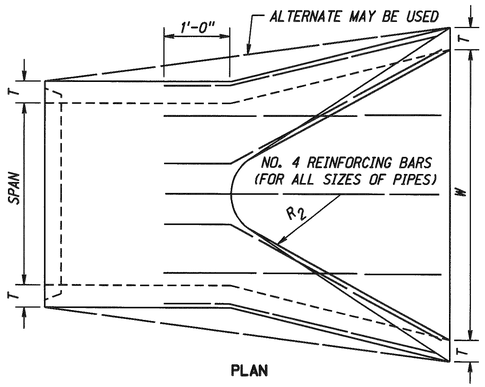
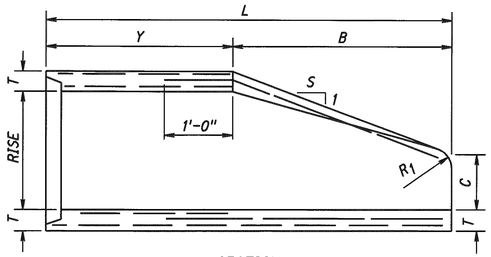
SHEET 1 OF 2

Roadway Design Division

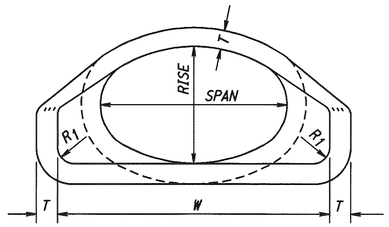


PLAN

EQUIV. DIA.	NOMINAL DIMENSIONS										
	SPAN	RISE	L ± 6"	B	Y ± 4½"	C	W ±2"	R_1	R_2	S APPROX.	T MIN.
18"	23"	14"	6'-0"	2'-3"	3'-9"	8½"	3'-0"	3"	6"	2.3	2½"
24"	30"	19"	6'-0"	3'-3"	2'-9"	9"	4'-0"	3"	7"	2.9	3"
30"	38"	24"	6'-0"	4'-6"	1'-6"	10"	5'-0"	3"	9"	3	3½"
36"	45"	29"	8'-0"	5'-0"	3'-0"	11"	6'-0"	3"	1'-0"	2.7	4"
42"	53"	34"	8'-0"	5'-0"	3'-0"	1'-4"	6'-6"	6"	1'-1"	2.6	4½"
48"	60"	38"	8'-0"	5'-0"	3'-0"	1'-9"	7'-0"	6"	1'-2"	2.7	5"
54"	68"	43"	8'-0"	5'-0"	3'-0"	2'-1"	7'-6"	6"	1'-4"	2.5	5½"
60"	76"	48"	8'-0"	5'-0"	3'-0"	2'-6"	8'-0"	6"	1'-6"	2.5	6"

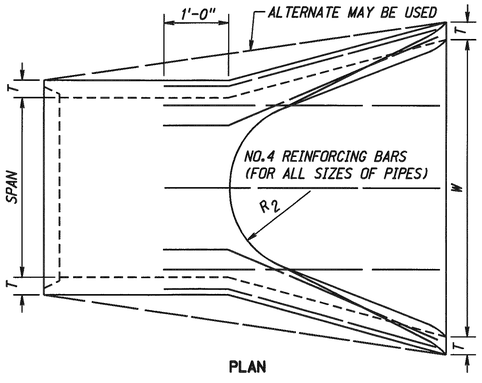


SECTION



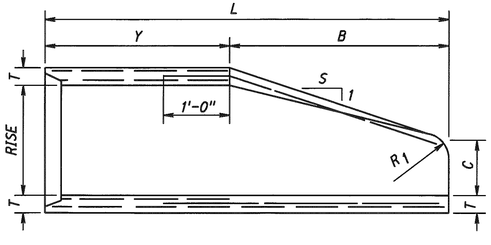
ELEVATION

DETAILS OF CONCRETE FLARED END SECTION
(FOR REINFORCED CONCRETE ELLIPTICAL PIPE)



PLAN

EQUIV. DIA.	NOMINAL DIMENSIONS										
	SPAN	RISE	L ± 6"	B	Y ± 4½"	C	W ±2"	R_1	R_2	S APPROX.	T MIN.
18"	22"	14"	6'-0"	2'-3"	3'-9"	7"	3'-0"	2"	1'-0"	2.2	2½"
24"	29"	18"	6'-0"	3'-3"	2'-9"	9"	4'-0"	3"	1'-2"	2.4	3"
30"	36"	23"	8'-0"	4'-0"	4'-0"	10"	5'-0"	3"	1'-3"	2.3	3½"
36"	44"	27"	8'-0"	5'-0"	3'-0"	11"	6'-0"	6"	1'-8"	2.4	4"
42"	51"	32"	8'-0"	5'-0"	3'-0"	1'-4"	6'-6"	6"	1'-10"	2.4	4½"
48"	59"	36"	8'-0"	5'-0"	3'-0"	1'-9"	7'-0"	6"	1'-10"	2.3	5"
54"	65"	40"	8'-0"	5'-0"	3'-0"	2'-0"	7'-6"	6"	2'-0"	2.1	5½"
60"	74"	45"	8'-0"	5'-0"	3'-0"	2'-3"	8'-0"	6"	1'-9"	2	6"
72"	88"	54"	8'-4"	6'-6"	1'-10"	2'-11"	10'-0"	6"	2'-0"	2	7"



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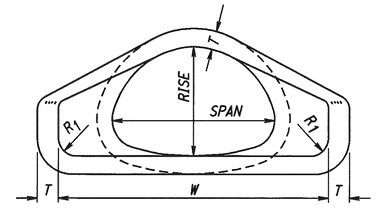
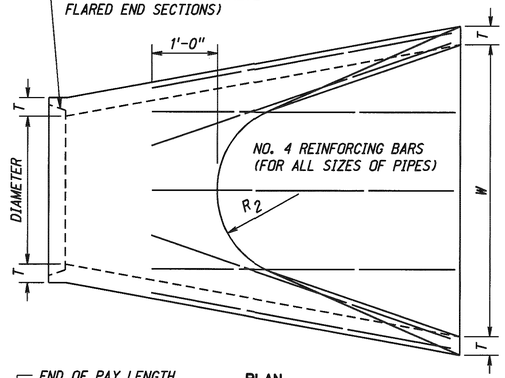


ELEVATION

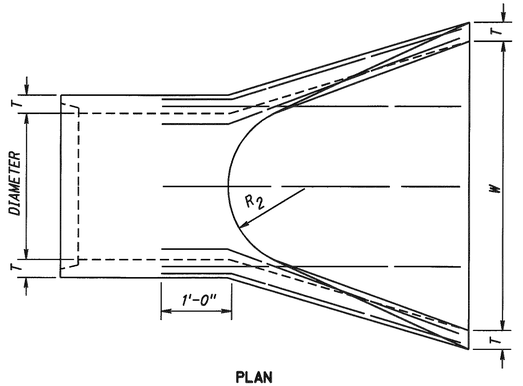
DETAILS OF CONCRETE FLARED END SECTION
(FOR REINFORCED CONCRETE PIPE-ARCH)

PIPE DIA.	NOMINAL DIMENSIONS								
	L ± 6"	B	Y ± 4½"	C	W ±2"	R_1	R_2	S APPROX.	T MIN.
12"	6'-0⅞"	2'-0"	4'-0⅞"	4"	2'-0"	1'-0⅛"	9"	3	2"
15"	6'-1"	2'-3"	3'-10"	6"	2'-6"	1'-0½"	11"	3	2¼"
18"	6'-1"	2'-3"	3'-10"	9"	3'-0"	1'-3½"	1'-0"	3	2½"
24"	6'-1½'	3'-7½"	2'-6"	9½"	4'-0"	1'-4 15/16"	1'-2"	3	3"
30"	6'-1¾"	4'-6"	1'-7¾"	1'-0"	5'-0"	1'-6½"	1'-3"	3	3½"
36"	8'-1¾"	5'-3"	2'-10¾"	1'-3"	6'-0"	2'-0 5/16"	1'-8"	3	4"
42"	8'-2"	5'-3"	2'-11"	1'-9"	6'-6"	2'-3½"	1'-10"	3	4½"
48"	8'-2"	6'-0"	2'-2"	2'-0"	7'-0"	2'-4½"	1'-10"	3	5"
54"	8'-4"	5'-5"	2'-11"	2'-3"	7'-6"	2'-9⅛"	2'-0"	2.4	5½"
60"	8'-3"	5'-0"	3'-3"	2'-6"	8'-0"	3'-0 1/16"	2'-0"	2	6"
66"	8'-3"	6'-6"	1'-9"	2'-6"	9'-0"	3'-0⅛"	2'-0"	2	6½"
72"	8'-3"	6'-6"	1'-9"	2'-6"	9'-0"	3'-2 15/16"	2'-0"	2	7"

GROOVE END ON OUTLET END SECTION
TOUNGE END ON INLET END SECTION
(TYPICAL FOR ALL CONCRETE
FLARED END SECTIONS)

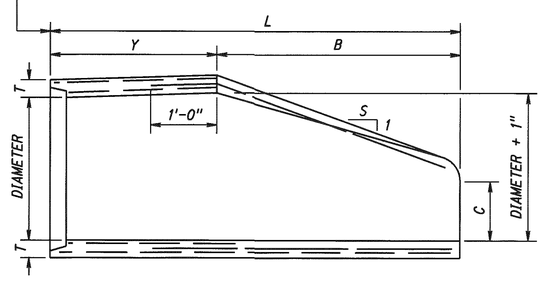


PLAN



PLAN

END OF PAY LENGTH
OF PIPE CULVERT



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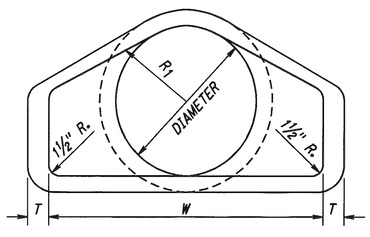

ELEVATION

DETAILS OF CONCRETE FLARED END SECTION
(FOR REINFORCED CONCRETE PIPE)

NOTES

CONCRETE FOR FLARED END SECTIONS SHALL BE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF A.A.S.H.T.O. DESIGNATION M170, M206, AND M207, FOR CLASS II PIPE.

REINFORCEMENT IN THE "Y" SECTION SHALL BE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF A.A.S.H.T.O. DESIGNATION M170, M206, AND M207, FOR CLASS II PIPE.

IN ADDITION TO THE REINFORCING BARS SHOWN, REINFORCEMENT IN THE "B" SECTION SHALL HAVE A CROSS-SECTIONAL AREA EQUAL TO THAT OF ONE LAYER OF STEEL IN THE "Y" SECTION.

REV. NO.	DATE	DESCRIPTION OF REVISION
R3	AUG.99	CHANGED NOTES
R2	MAR. 89	SPAN.RISE SIZES FOR C.M.PIPE-ARCH
R1	MAR. 85	MULTIPLE CHANGES

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 410-R3

FLARED END SECTIONS FOR CULVERT PIPES

PROFESSIONAL STRUCTURAL ENGINEER
LYMAN D. FREEMON
E-2005
STATE OF NEBRASKA

APPROVED:
FEBRUARY 22, 1974
DATE

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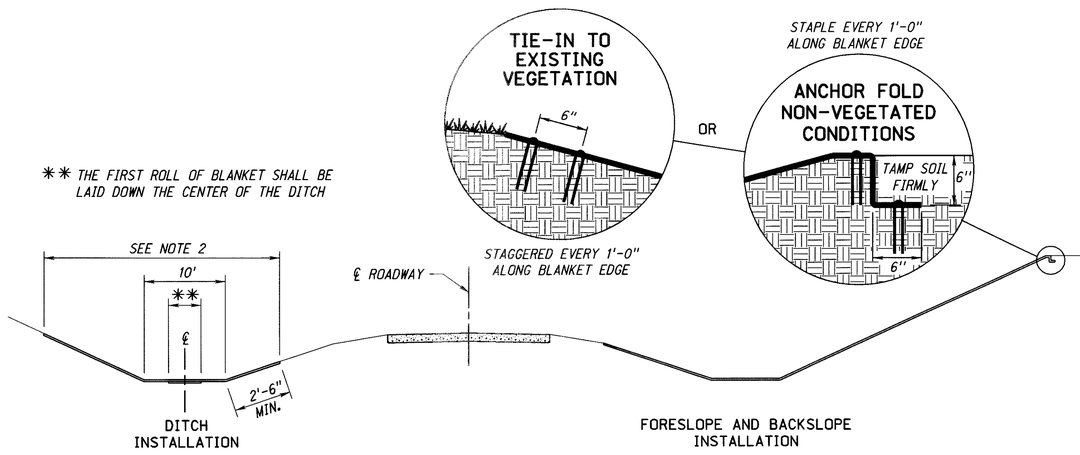
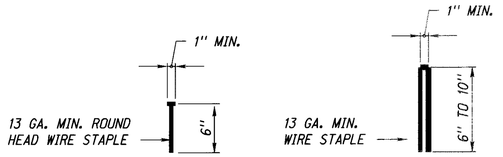
SHEET 2 OF 2

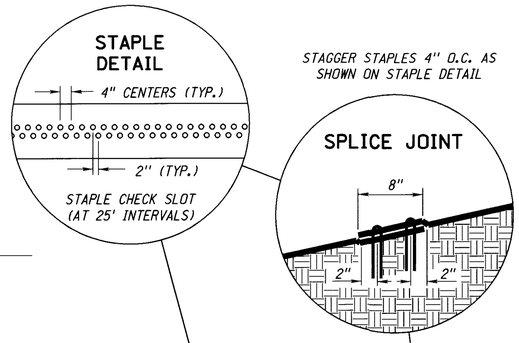
Roadway Design Division



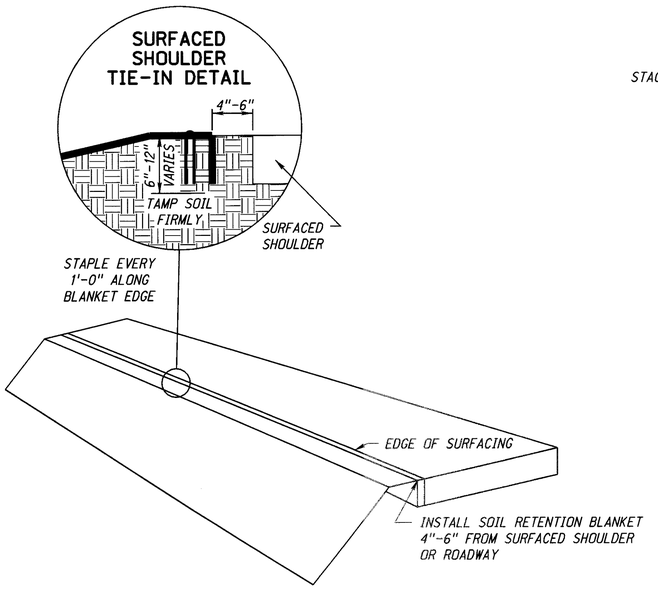
TYPICAL CROSS-SECTION



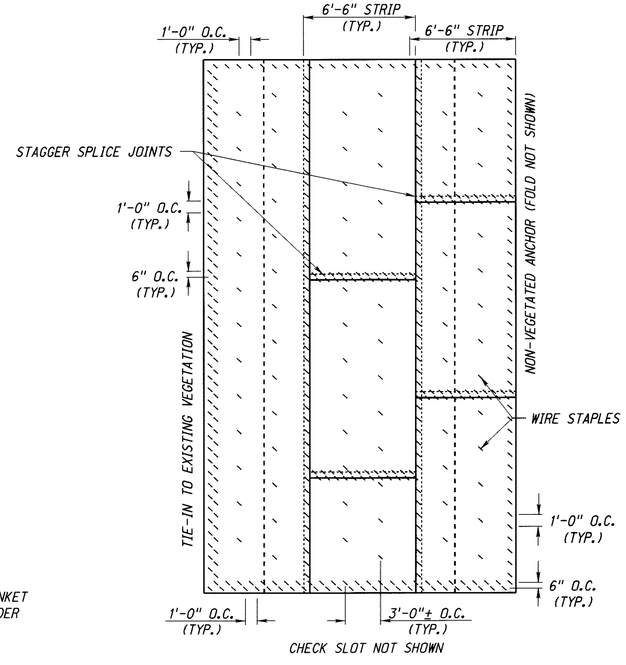
STAPLE DETAIL



TYPICAL SOIL RETENTION BLANKET INSTALLATION



SHOULDER INSTALLATION



PLAN VIEW STAPLING DIAGRAM

NOTE: FOR 8"-10", 13 GAGE STAPLES

NOTES:

1. THIS PLAN IS APPLICABLE FOR THE FOLLOWING: EROSION CONTROL, TYPE "HV", "A", "AA", "AAA" OR 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" CENTERS.
4. THE MANUFACTURERS' RECOMMENDED STAPLING PATTERN SHALL GOVERN OVER THE PLANS.
5. WHEN USED IN CONJUNCTION WITH EROSION CHECKS, REMOVE 7'-6" OF PAY LENGTH OF EROSION CONTROL FOR EACH EROSION CHECK.

REV. NO.	DATE	DESCRIPTION OF REVISION
R5	OCT.07	EROSION CONTROL AT SPLASH BASIN
R4	DEC.06	UPDATE INSTALLATION METHOD
R3	FEB.01	CHANGE STAPLE DIMENSIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 501-R5

EROSION CONTROL

PROFESSIONAL CIVIL ENGINEER — RANDALL K. PETERS E-6377 — 10/23/07 — STATE OF NEBRASKA

APPROVED:

NOVEMBER 14, 1973
DATE

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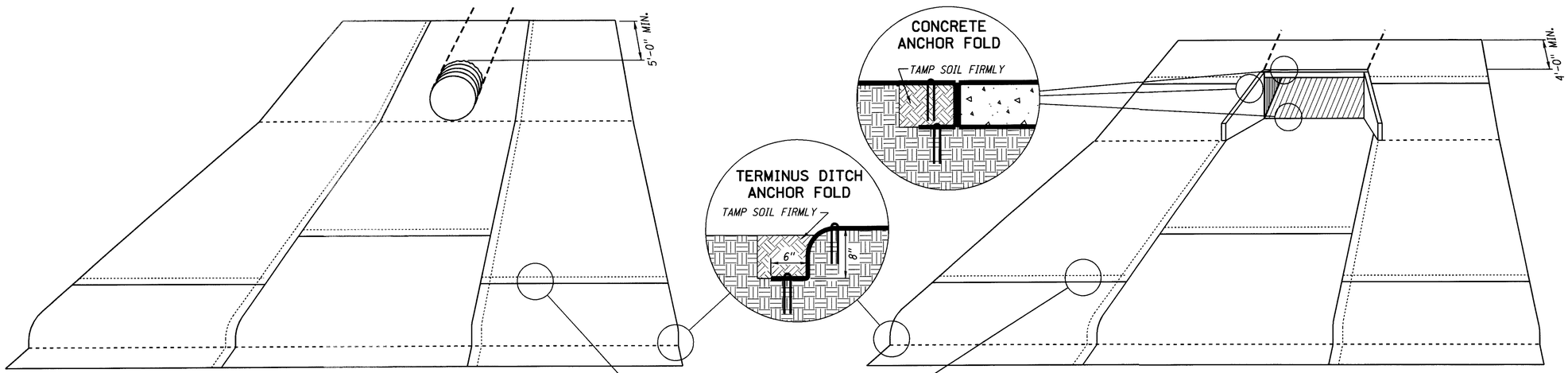
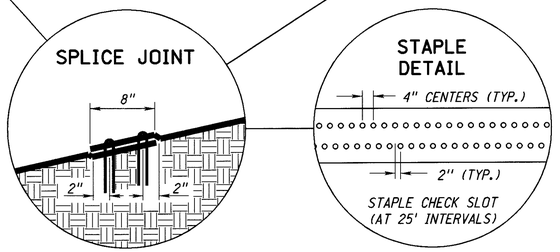
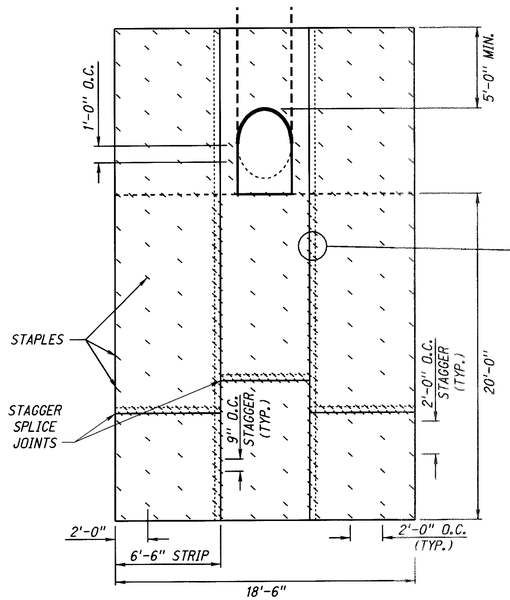
SHEET 1 OF 3



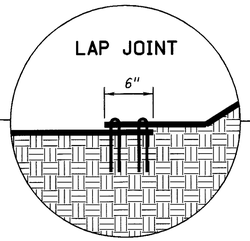
TYPICAL INSTALLATION AT PIPE CULVERT

TYPICAL INSTALLATION AT BOX CULVERT

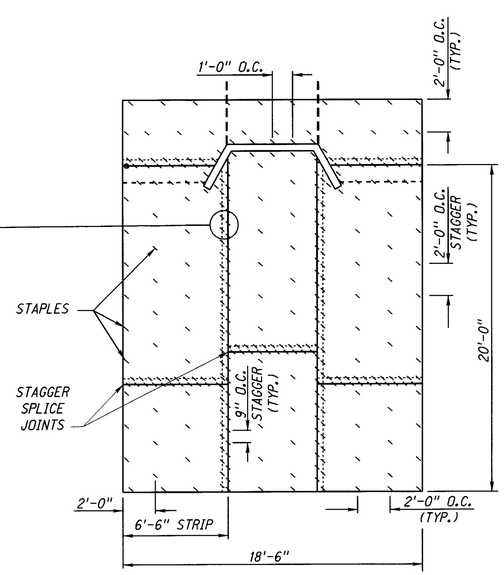




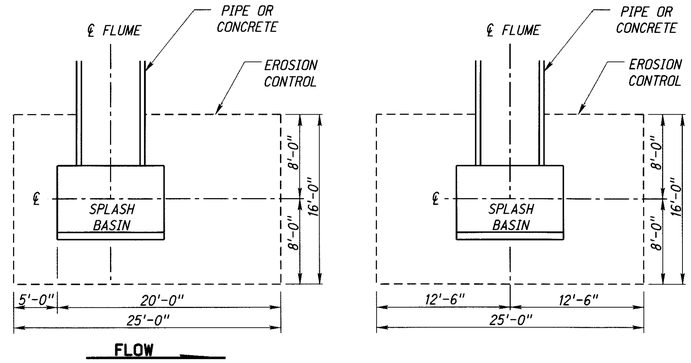
PLAN VIEW STAPLING DIAGRAM



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



PLAN VIEW STAPLING DIAGRAM



NOTE:
OFFSET EROSION CONTROL PLACEMENT ALONG THE DRAINAGE PATH

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

EROSION CONTROL PLACEMENT AT SPLASH BASIN

REV. NO.	DATE	DESCRIPTION OF REVISION
R5	OCT.07	EROSION CONTROL AT SPLASH BASIN
R4	DEC.06	UPDATE INSTALLATION METHOD
R3	FEB.01	CHANGE STAPLE DIMENSIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 501-R5

EROSION CONTROL

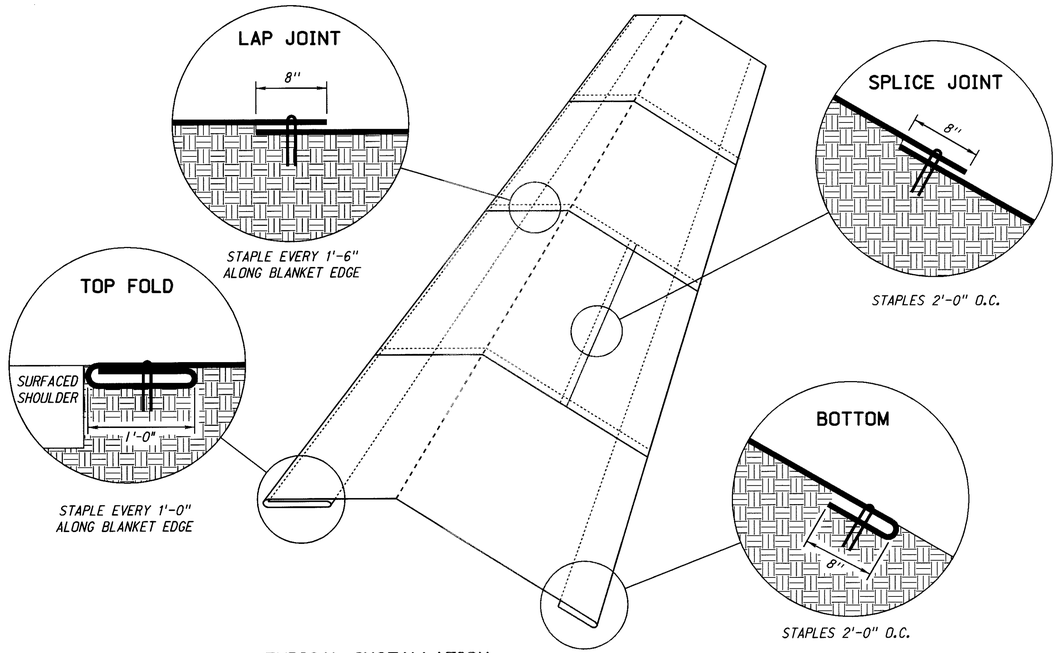
PROFESSIONAL CIVIL ENGINEER
RANDALL D. PETERS
E-6377
10/17/13
STATE OF NEBRASKA

APPROVED:

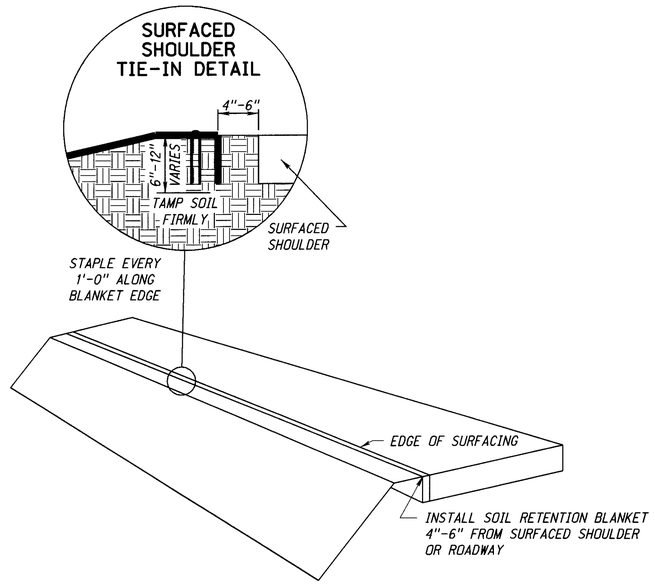
NOVEMBER 14, 1973
DATE

2
3

Roadway Design Division

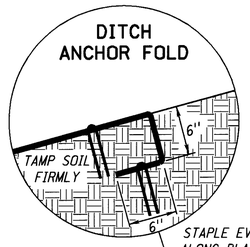


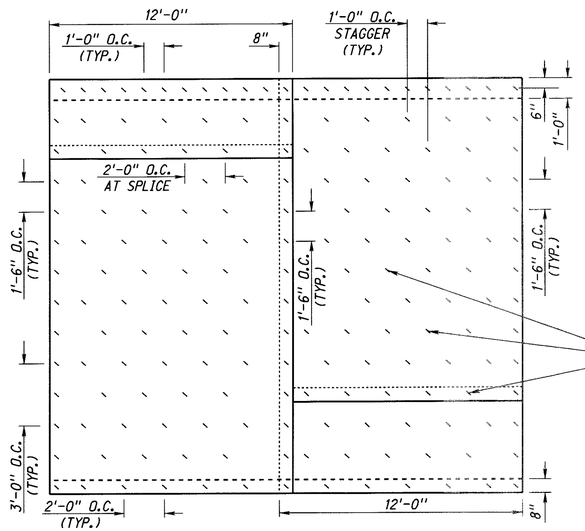
TYPICAL INSTALLATION
CLASS 1A (SLOPE PROTECTION, SAND)



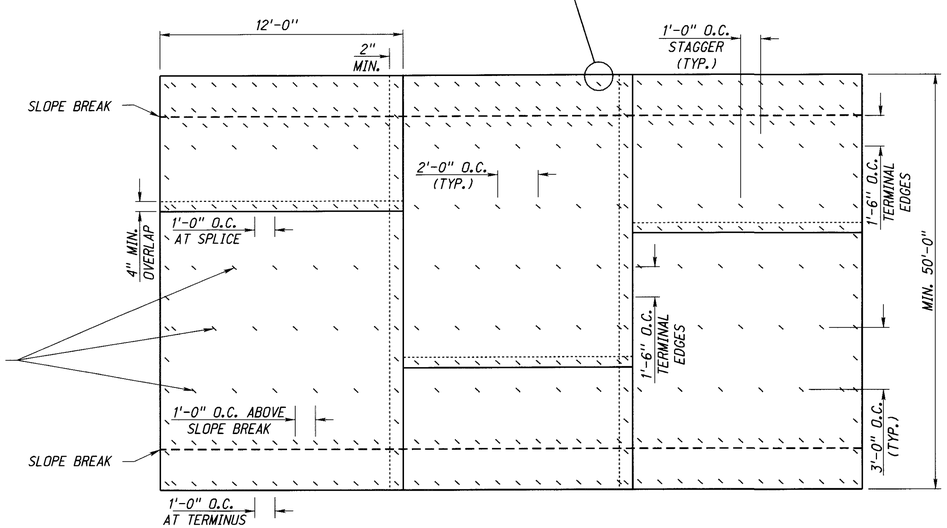
SHOULDER INSTALLATION

FOR EDGES ADJOINING AREAS TO BE SEEDED





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



TERMINATE BLANKET 2'-0" FROM TOE OF SLOPE OR AT UNDISTRUBED VEGETATION

PLAN VIEW STAPLING DIAGRAM FOR CLASS 1B, 1C, 1D, 1E
(EROSION CONTROL, B, HV, C1, C)
NOTE: ON SLOPES OVER 50' IN LENGTH (FROM TOP OF SLOPE TO TOE)

NOTES:

1. THE MANUFACTURERS' RECOMMENDED STAPLING PATTERN SHALL GOVERN OVER THE PLANS.

REV. NO.	DATE	DESCRIPTION OF REVISION
R5	OCT.07	EROSION CONTROL AT SPLASH BASIN
R4	DEC.06	UPDATE INSTALLATION METHOD
R3	FEB.01	CHANGE STAPLE DIMENSIONS

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 501-R5

EROSION CONTROL

RANDELL D. PETERS E-6377 PROFESSIONAL CIVIL ENGINEER STATE OF NEBRASKA

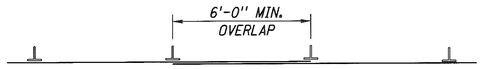
APPROVED:
NOVEMBER 14, 1973
DATE

3
3

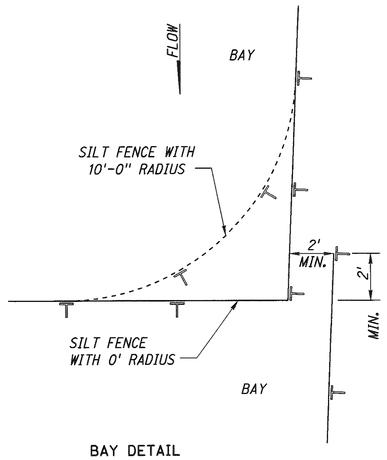
50100e05.dgn
100:1
SHEET 3 OF 3

{DRDESIGN79} dor13017 10/23/2007 8:24:44 AM

Roadway Design Division

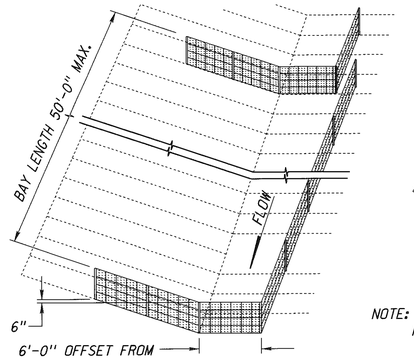


SILT FENCE SPLICE

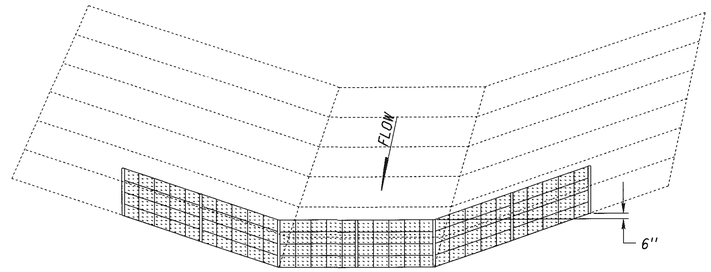


BAY DETAIL

NOTE: SILT FENCE AT CORNERS SHALL HAVE A RADIUS OF 0' MIN. TO 10'-0" MAX.

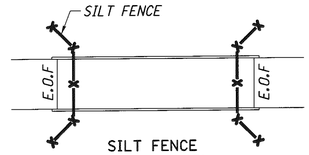


SILT FENCE

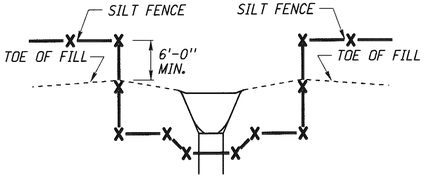


NOTE: POST SPACING 6'-0" MAX. MULTIPLE BAYS MAY BE USED

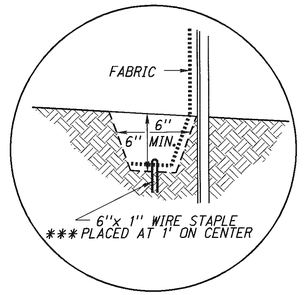
HIGH POROSITY SILT FENCE
(ACROSS DITCH)



SILT FENCE
(UNDER BRIDGE)

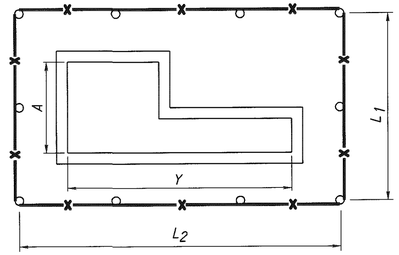


SILT FENCE
(AT DRAINAGE STRUCTURE)



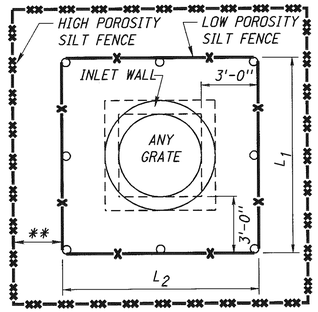
TRENCH DETAIL

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



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

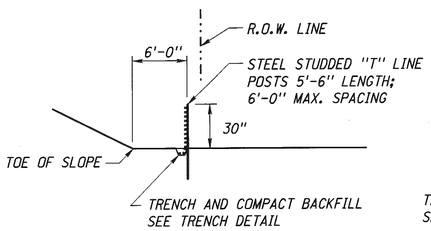
CURB INLET



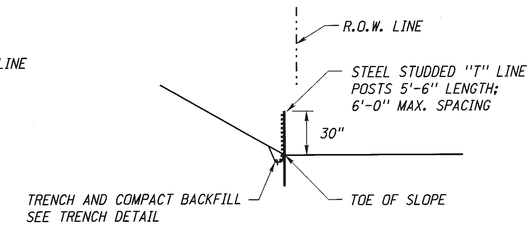
L_1 & L_2 = FACE OF INSIDE WALL + 6'-0"

GRATE, AREA, MEDIAN INLETS OR JUNCTION BOXES

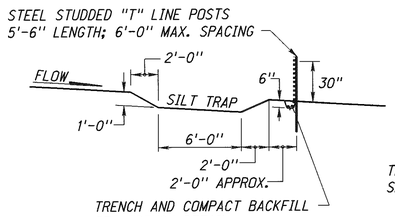
** 3'-0" IF POSSIBLE (MAY VARY)



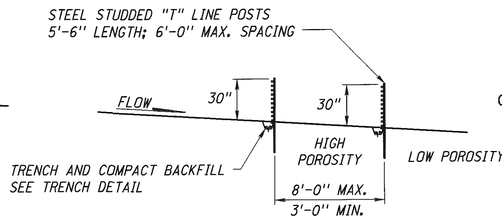
OPTION ONE (PREFERED)
SILT FENCE
(6'-0" OFFSET FROM TOE OF FILL)



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



SILT FENCE WITH SILT TRAP
(ACROSS DITCH)

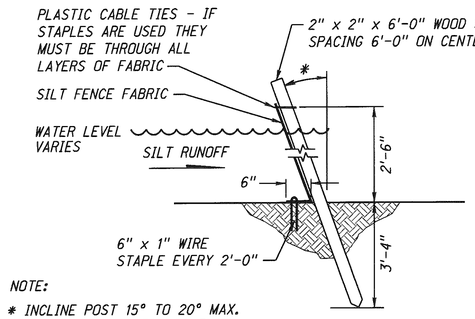


SILT FENCE
(ACROSS DITCH)

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

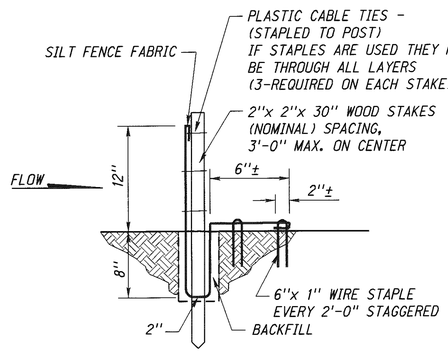
SILT FENCE MINIMUM ROLL WIDTH:
LOW POROSITY = 42"
HIGH POROSITY = 42"
LOW PROFILE = 36"
COIR SILT FENCE = 36"

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

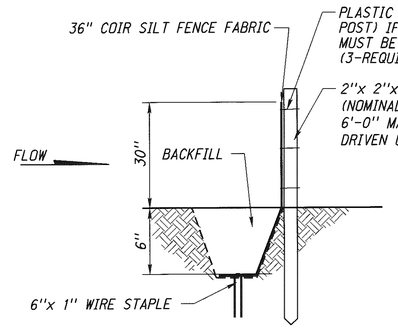


NOTE:
* INCLINE POST 15° TO 20° MAX. FROM VERTICAL, TOWARD FLOW.

SILT FENCE
(WET & BELOW WATER INSTALLATION)



SILT FENCE - LOW PROFILE
(LOW AND/OR HIGH POROSITY)



COIR SILT FENCE - ON WOOD POSTS - DRY INSTALLATION

REV. NO.	DATE	DESCRIPTION OF REVISION

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 502

SILT FENCE DETAILS

PROFESSIONAL CIVIL ENGINEER
ARTHUR B. TONKEY
E-2522
STATE OF NEBRASKA

APPROVED:
DECEMBER 18, 2006
DATE

1
1

50200e00.dgn
100:1

Roadway Design Division

CONNECTION NOTES:

FOR DIVIDED ROADWAY

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

TRAFFIC FLOW

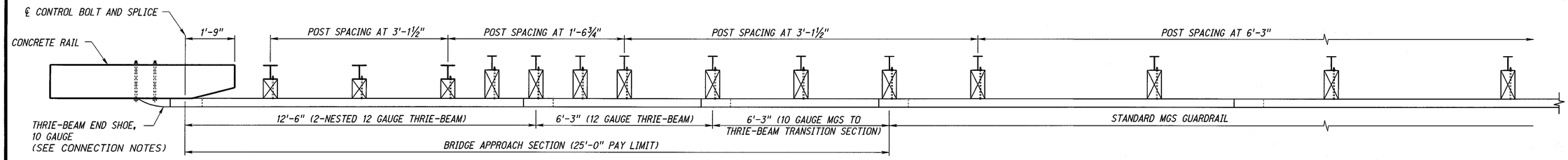
FOR 2-LANE ROADWAY

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

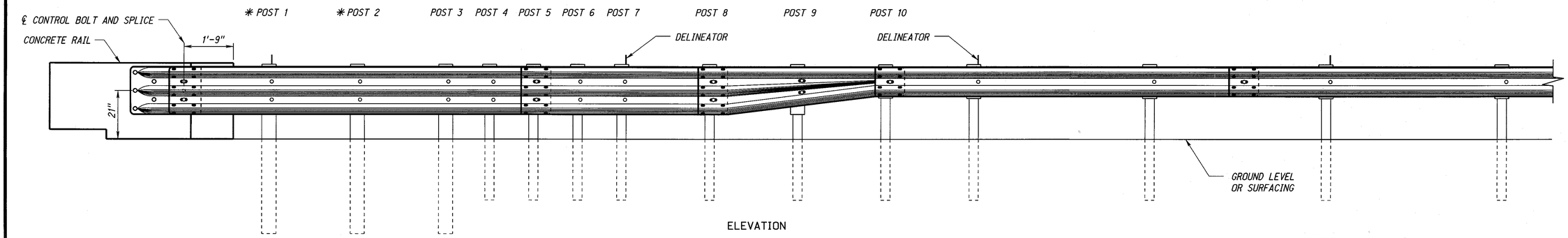
FOR OFF END CONNECTIONS INSTALL THRIE-BEAM END SHOE, OUTSIDE OF THE NESTED GUARDRAIL ELEMENTS. (SUBSIDIARY TO BRIDGE APPROACH SECTION)

LEGEND

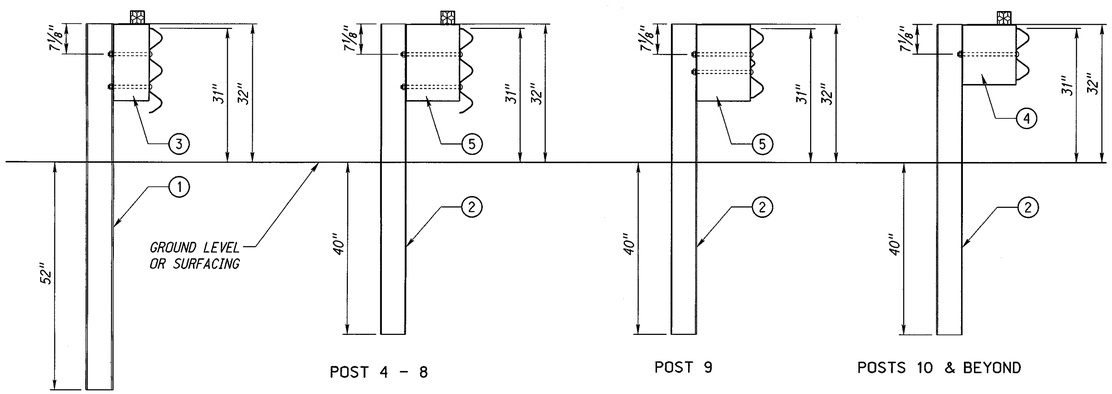
1. *W6 x 15 x 7' POST*
2. *W6 x 9 x 6' POST*
3. *6" x 8" x 19" OFFSET BLOCK*
4. *6" x 12" x 14¼" ± ¼" OFFSET BLOCK*
5. *6" x 12" x 19" OFFSET BLOCK*

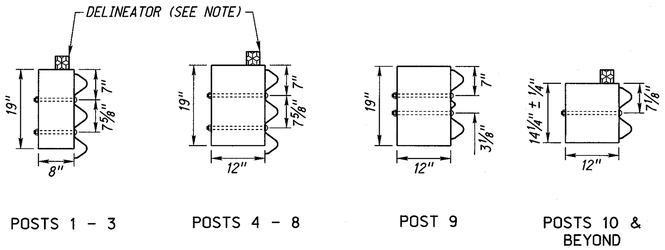


PLAN VIEW



ELEVATION





BLOCK DETAILS

NOTES:

FOR ADDITIONAL DETAILS SEE PLAN 743.

DELINEATORS SUBSIDIARY TO BRIDGE APPROACH SECTION.

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

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

REV. NO.	DATE	DESCRIPTION OF REVISION

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 740

MIDWEST GUARDRAIL SYSTEM BRIDGE APPROACH SECTION

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER — JAMES J. KNOTT E-6035 — STATE OF NEBRASKA

10/10/2011
DATE

ORIGINAL: AUGUST 25, 2011
DATE

DRDESIGN55
dgn13017
20-SEP-2011 12:33

740000e00.dgn
100:1

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_1	Y_1
1	0.00	0.00
2	3.12	0.00
3	9.37	0.10
4	15.62	0.31
5	21.87	0.52
6	28.12	0.73
7	34.36	0.94
8	40.61	1.14
9	46.86	1.35
10	53.10	1.56
11	59.35	1.77
12	65.60	1.98
13	71.84	2.19
14	78.09	2.39
15	84.34	2.60
16	90.58	2.81
17	96.83	3.02
18	103.08	3.23
19	109.32	3.43
20	115.57	3.64
21	121.81	3.85
22	128.06	4.06
23	134.31	4.27
24	140.55	4.47
25	146.80	4.68
26	153.05	4.89
27	159.29	5.10
28	165.54	5.31
29	171.79	5.51
30	178.03	5.72
31	184.28	5.93
32	190.53	6.14
33	196.77	6.35
34	203.02	6.56
35	209.27	6.76
36	215.51	6.97
37	221.76	7.18
38	228.01	7.39
39	234.25	7.60
40	240.50	7.80
41	246.75	8.01
42	252.99	8.22
43	259.24	8.43
44	265.48	8.64
45	271.73	8.84
46	277.98	9.05
47	284.22	9.26
48	290.47	9.47
49	296.72	9.68
50	302.96	9.88
51	309.21	10.09
52	315.46	10.30
53	321.70	10.51
54	327.95	10.72
55	334.20	10.93
56	340.44	11.13
57	346.69	11.34
58	352.94	11.55
59	359.18	11.76
60	365.43	11.97

TABLE B

DEFLECTION, Δ = 2°17'26"
TAPER = 25:1
RADIUS, R = 312.67'
TANGENT, T = 6.25'

POST NUMBER	X_1	Y_1
1	0.00	0.00
2	3.12	0.00
3	9.37	0.12
4	15.63	0.37
5	21.87	0.62
6	28.12	0.87
7	34.36	1.12
8	40.61	1.37
9	46.85	1.62
10	53.10	1.87
11	59.34	2.12
12	65.59	2.37
13	71.83	2.62
14	78.08	2.87
15	84.32	3.12
16	90.57	3.37
17	96.81	3.62
18	103.06	3.87
19	109.30	4.12
20	115.55	4.37
21	121.79	4.62
22	128.04	4.87
23	134.28	5.12
24	140.53	5.37
25	146.77	5.62
26	153.02	5.87
27	159.26	6.12
28	165.51	6.37
29	171.75	6.61
30	178.00	6.86
31	184.24	7.11
32	190.49	7.36
33	196.73	7.61
34	202.02	7.86
35	209.22	8.11
36	215.47	8.36
37	221.71	8.61
38	227.96	8.86
39	234.20	9.11
40	240.45	9.36
41	246.69	9.61
42	252.94	9.86
43	259.18	10.11
44	265.43	10.36
45	271.67	10.61
46	277.92	10.86
47	284.16	11.11
48	290.41	11.36
49	296.65	11.61
50	302.90	11.86
51	309.14	12.11
52	315.39	12.36
53	321.63	12.61
54	327.88	12.85
55	334.12	13.10
56	340.37	13.35
57	346.61	13.60
58	352.86	13.85
59	359.10	14.10
60	365.35	14.35

TABLE C

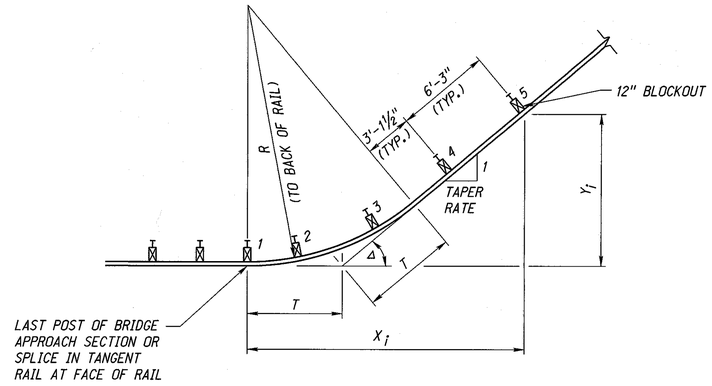
DEFLECTION, Δ = 2°51'44"
TAPER = 20:1
RADIUS, R = 250.20'
TANGENT, T = 6.25'

POST NUMBER	X_1	Y_1
1	0.00	0.00
2	3.12	0.00
3	9.36	0.16
4	15.62	0.47
5	21.87	0.78
6	28.11	1.09
7	34.35	1.40
8	40.59	1.72
9	46.84	2.03
10	53.08	2.34
11	59.32	2.65
12	65.56	2.96
13	71.80	3.27
14	78.05	3.59
15	84.29	3.90
16	90.53	4.21
17	96.77	4.52
18	103.02	4.83
19	109.26	5.14
20	115.50	5.46
21	121.74	5.77
22	127.98	6.08
23	134.23	6.39
24	140.47	6.70
25	146.71	7.01
26	152.95	7.33
27	159.20	7.64
28	165.44	7.95
29	171.68	8.26
30	177.92	8.57
31	184.16	8.88
32	190.41	9.20
33	196.65	9.51
34	202.89	9.82
35	209.13	10.13
36	215.38	10.44
37	221.62	10.75
38	227.86	11.07
39	234.10	11.38
40	240.34	11.69
41	246.59	12.00
42	252.83	12.31
43	259.07	12.63
44	265.31	12.94
45	271.55	13.25
46	277.80	13.56
47	284.04	13.87
48	290.28	14.18
49	296.52	14.50
50	302.77	14.81
51	309.01	15.12
52	315.25	15.43
53	321.49	15.74
54	327.73	16.05
55	333.98	16.37
56	340.22	16.68
57	346.46	16.99
58	352.70	17.30
59	358.95	17.61
60	365.19	17.92

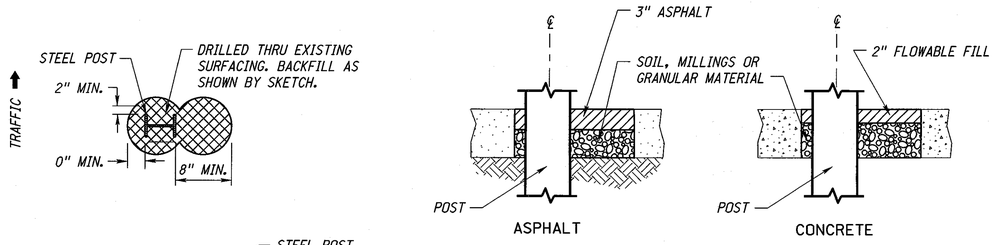
TABLE D

DEFLECTION, Δ = 3°48'51"
TAPER = 15:1
RADIUS, R = 187.77'
TANGENT, T = 6.25'

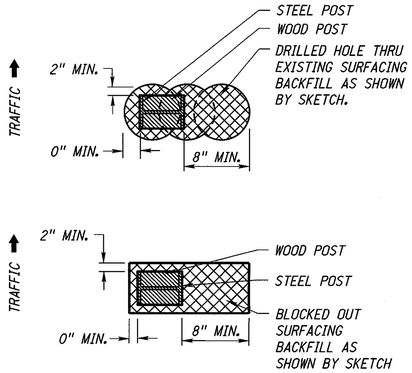
POST NUMBER	X_1	Y_1
1	0.00	0.00
2	3.12	0.00
3	9.35	0.21
4	15.62	0.62
5	21.86	1.04
6	28.10	1.45
7	34.33	1.87
8	40.57	2.28
9	46.81	2.70
10	53.04	3.11
11	59.28	3.53
12	65.51	3.94
13	71.75	4.36
14	77.99	4.77
15	84.22	5.19
16	90.46	5.60
17	96.69	6.02
18	102.93	6.43
19	109.17	6.85
20	115.40	7.26
21	121.64	7.68
22	127.88	8.09
23	134.11	8.51
24	140.35	8.92
25	146.58	9.33
26	152.82	9.75
27	159.06	10.16
28	165.29	10.58
29	171.53	10.99
30	177.76	11.41
31	184.00	11.82
32	190.24	12.24
33	196.47	12.65
34	202.71	13.07
35	208.95	13.48
36	215.18	13.90
37	221.42	14.31
38	227.65	14.73
39	233.89	15.14
40	240.13	15.56
41	246.36	15.97
42	252.60	16.39
43	258.83	16.80
44	265.07	17.22
45	271.31	17.63
46	277.54	18.05
47	283.78	18.46
48	290.02	18.88
49	296.25	19.29
50	302.49	19.71
51	308.72	20.12
52	314.96	20.54
53	321.20	20.95
54	327.43	21.36
55	333.67	21.78
56	339.90	22.19
57	346.14	22.61
58	352.38	23.02
59	358.61	23.44
60	364.85	23.85



NOTE
THE X_1 AND Y_1 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

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 743

GUARDRAIL DETAILS

ACCEPTED BY FHWA FOR USE ON THE NATIONAL HIGHWAY SYSTEM:

PROFESSIONAL CIVIL ENGINEER — JAMES J. KNOTT E-6035 — STATE OF NEBRASKA

10/14/11
DATE

ORIGINAL: AUGUST 25, 2011
DATE

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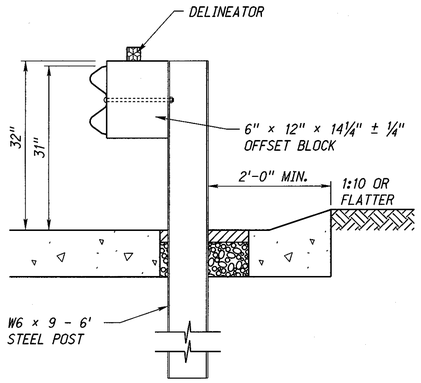
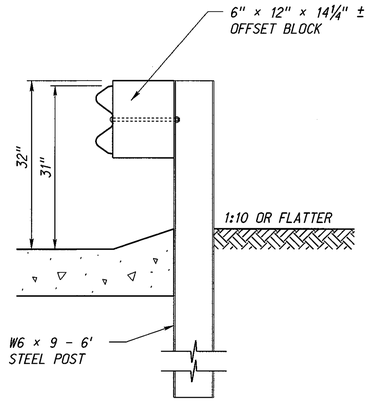
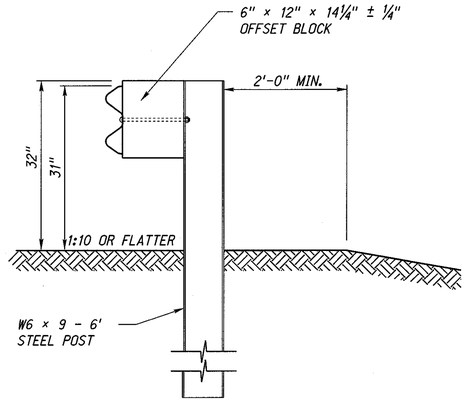


SIDE VIEW

CURBED LOCATIONS:

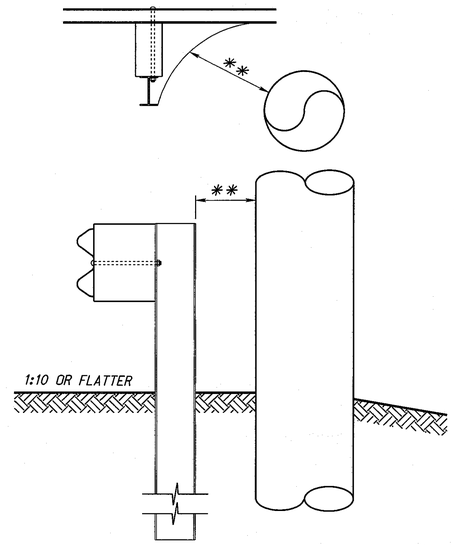


SIDE VIEW



SIDE VIEW

NON-CURBED LOCATIONS:



** ADJUST THE POSTS LONGITUDINALLY SO THAT THEY WILL NOT BE PLACED DIRECTLY OPPOSITE A PIER COLUMN. IF THIS CAN BE DONE THE MINIMUM OFFSET DISTANCE FROM BACK OF RAIL IS:

MGS

3'-10" FOR WOOD OR STEEL POSTS
3'-5" FOR ½ POST SPACING
2'-6" FOR ¼ POST SPACING

THRIE-BEAM

2'-3"

IF NOT, OR IF THE HAZARD IS A CONTINUOUS SOLID MASS, THE MINIMUM OFFSET DISTANCE IS:

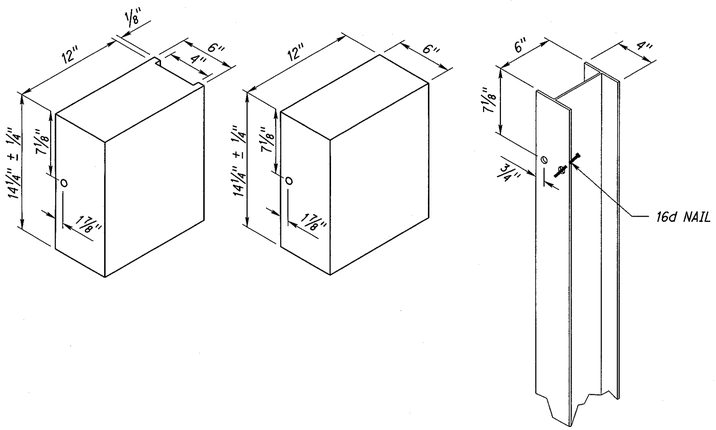
MGS

4'-1" FOR NORMAL POST SPACING
3'-5" FOR ½ POST SPACING
2'-6" FOR ¼ POST SPACING

THRIE-BEAM

2'-10"

GUARDRAIL ADJACENT TO PIER COLUMN OR FIXED OBJECT



NOTES:

ALL HOLE DIAMETERS ARE ¾"

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 MGS)

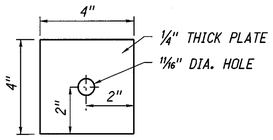
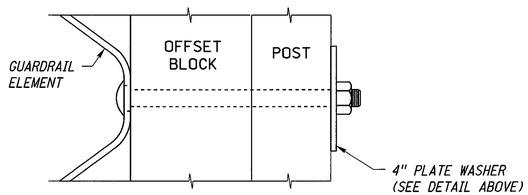
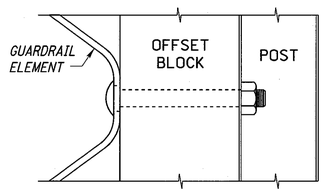


PLATE WASHER



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.

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. x LENGTH AS REQUIRED, SECURED WITH WASHER AND 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

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 743

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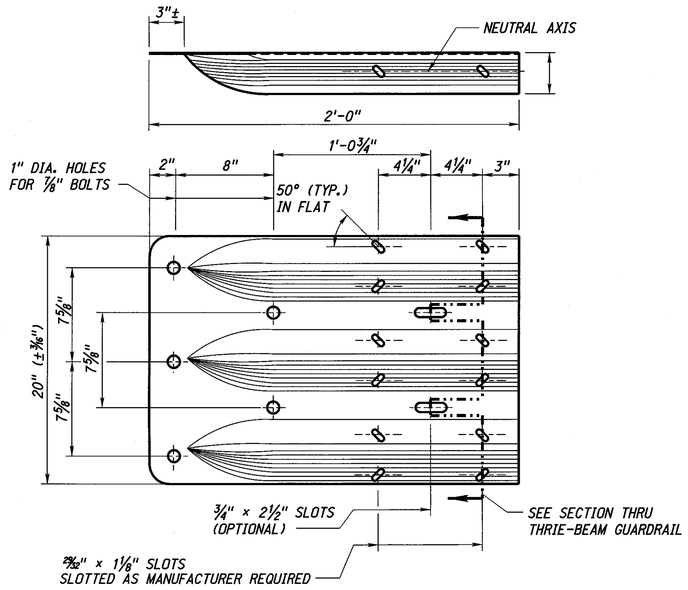
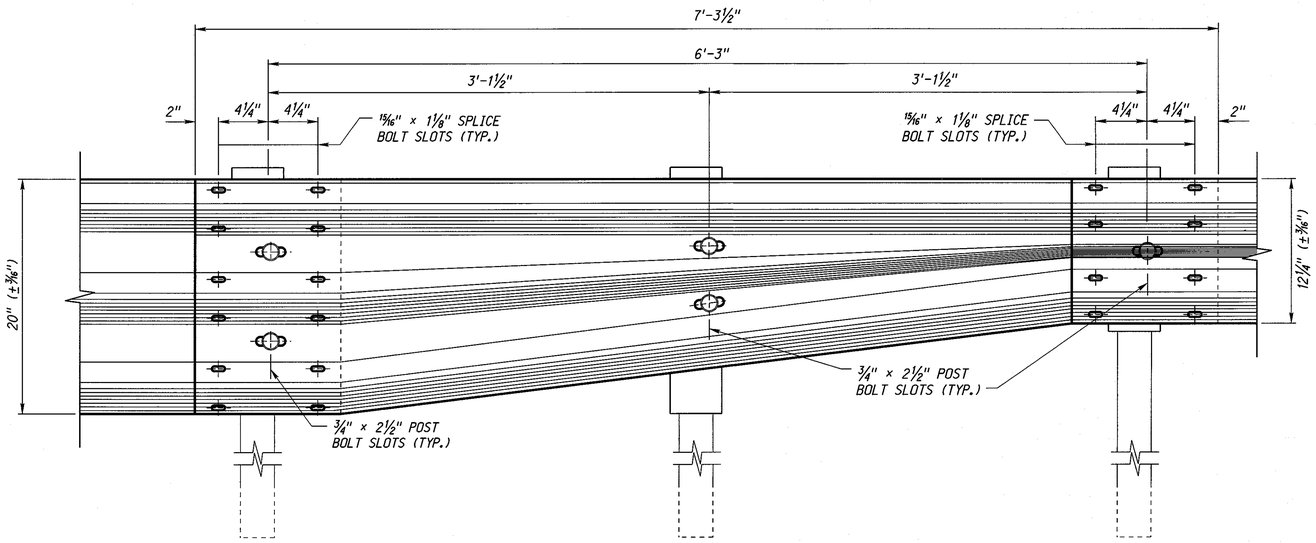
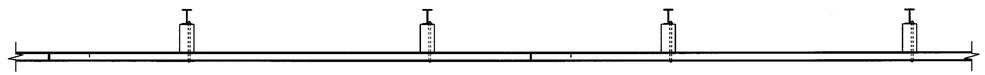


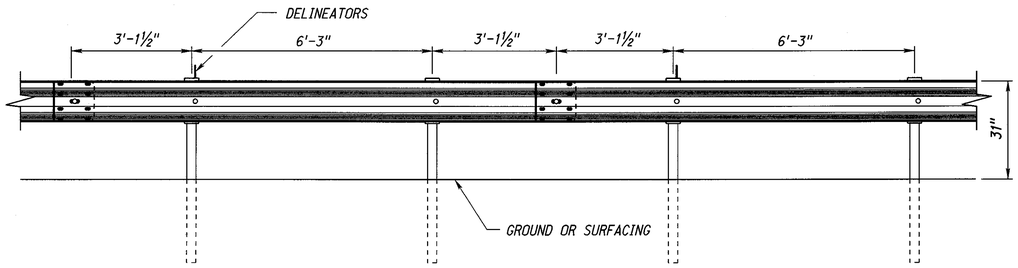
THRIE-BEAM END SHOE



MGS TO THRIE BEAM TRANSITION SECTION 10 GAUGE



PLAN VIEW



ELEVATION

MIDWEST GUARDRAIL SYSTEM (MGS) INSTALLATION

(PAID FOR AS W-BEAM GUARDRAIL)

REV. NO.	DATE	DESCRIPTION OF REVISION

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E-6035
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AUGUST 25, 2011
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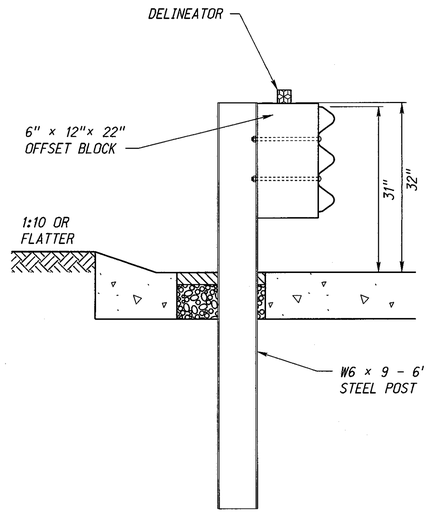
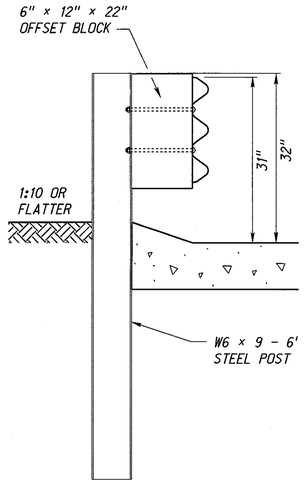
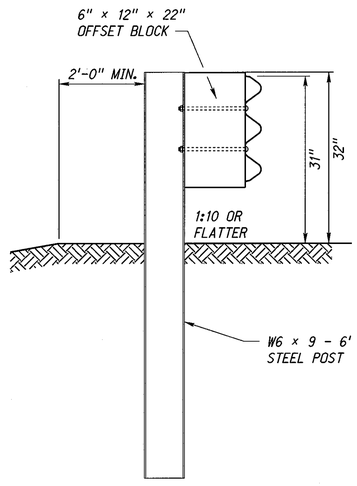


SIDE VIEW



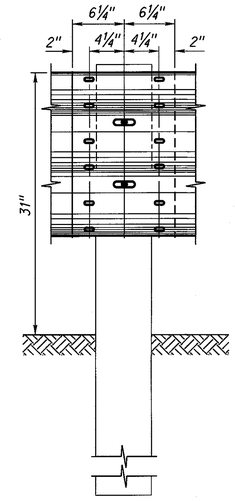
SIDE VIEW

CURBED LOCATIONS

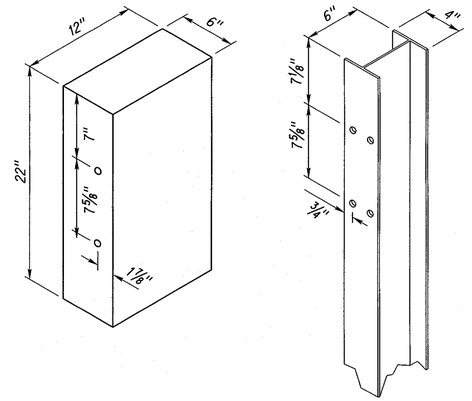


SIDE VIEW

NON-CURBED LOCATIONS

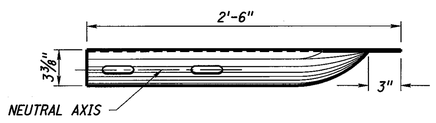


RAIL ELEMENT SPLICING AND POST MOUNTING DETAIL FOR ¼ OR ½ POST SPACING

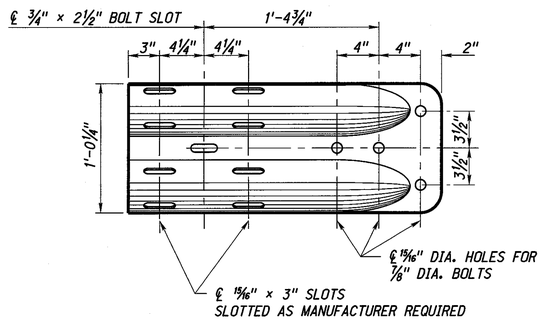


ALTERNATE OFFSET BLOCK & STEEL POST
(FOR THRIE-BEAM)

SPECIAL END SHOE SHALL BE 10 GAUGE STEEL AND GALVANIZED IN ACCORDANCE WITH ASTM A93 OR ASTM A123 WITH COATING CLASS 250.

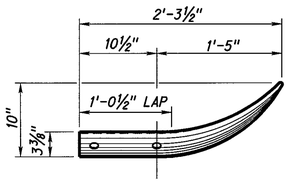


PLAN

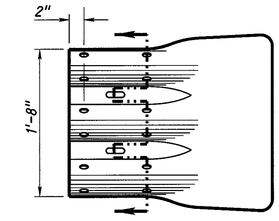


ELEVATION

W-BEAM END SHOE

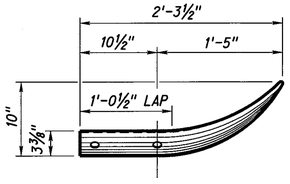


PLAN

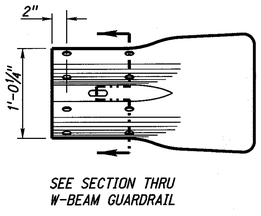


ELEVATION

THRIE-BEAM TERMINAL SECTION



PLAN



ELEVATION

W-BEAM TERMINAL SECTION

NOTES:

ALL HOLE DIAMETERS ARE ¾"

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

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

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CHANNELIZATION DEVICES

THE FUNCTION OF CHANNELIZATION DEVICES IS TO WARN DRIVERS 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 MARKERS, VERTICAL PANELS, DRUMS, BARRICADES, 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 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, AND 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 IN FEET	
	TAPER	TANGENT
25	25 FT	50 FT
35	35 FT	70 FT
45	45 FT	90 FT
55	55 FT	110 FT
65	65 FT	130 FT
70	70 FT	140 FT
75	75 FT	150 FT

WARNING LIGHTS ON CHANNELIZING DEVICES. CONSIDERATION SHOULD BE GIVEN TO FOG OR SNOW AREAS, SEVERE ROADWAY CURVATURE, AND USUALLY CLUTTERED ENVIRONMENTS. FLASHING WARNING LIGHTS SHALL BE PLACED ON CHANNELIZING DEVICES USED SINGLY OR IN GROUPS TO MARK A SPOT CONDITION. STEADY-BURN WARNING LIGHTS MAY BE USED ON CHANNELIZING DEVICES USED IN A SERIES.

THE RETROREFLECTIVE MATERIAL USED ON CHANNELIZING DEVICES SHALL HAVE A SMOOTH, SEALED OUTER SURFACE, MEETING THE REQUIREMENTS OF THE ASTM SPECIFICATION: D4956, FOR TYPE III SHEETING. THE COEFFICIENT OF RETROREFLECTION OF CHANNELIZING DEVICES SHALL HAVE THE FOLLOWING MINIMUM BRIGHTNESS VALUES MEASURED AT 0.2° OBSERVATION ANGLE AND -4° ENTRANCE ANGLE. CANDELAS PER LUX PER SQUARE METER.

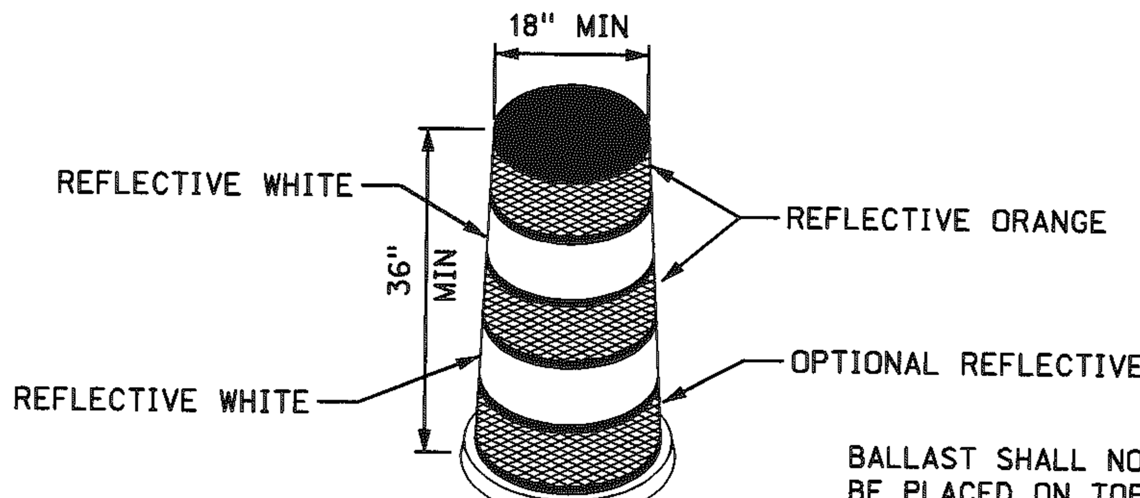
COEFFICIENT OF RETROREFLECTION			
WHITE	ORANGE	RED	YELLOW
125	50	22.5	85

IN ADDITION TO THE MINIMUM COEFFICIENT OF RETROREFLECTION, THE AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) "QUALITY STANDARD FOR WORK ZONE TRAFFIC CONTROL DEVICES" MAY BE USED AS A VISUAL GUIDE FOR DETERMINING IF A TRAFFIC CONTROL DEVICE 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 DEVICES FACE. THE LETTERS AND NUMBERS SHALL BE A NON-REFLECTIVE COLOR AND NOT OVER 100 SQUARE CENTIMETERS IN TOTAL AREA.

PARTICULAR ATTENTION SHOULD BE GIVEN TO ASSURING THAT CHANNELIZING DEVICES ARE MAINTAINED AND KEPT CLEAN, VISIBLE, AND PROPERLY POSITIONED AT ALL TIMES. DEVICES SHALL BE REPLACED THAT ARE DAMAGED AND HAVE LOST A SIGNIFICANT AMOUNT OF THEIR RETROREFLECTIVITY AND EFFECTIVENESS.

DRUMS



BALLAST SHALL NOT BE PLACED ON TOP OF ANY DRUM

DESIGN

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 AT LEAST A 18 INCHES MINIMUM WIDTH, REGARDLESS OF ORIENTATION. THE PREDOMINANT COLOR OF THE DRUM SHALL BE ORANGE. STEEL DRUMS SHALL NOT BE USED. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, CIRCUMFERENTIAL, ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES 6 INCHES TO 8 INCHES WIDE. EACH DRUM SHALL HAVE A MINIMUM OF TWO ORANGE AND TWO WHITE STRIPES. ANY NON-RETROREFLECTIVE SPACES BETWEEN THE HORIZONTAL ORANGE AND WHITE STRIPES, SHALL NOT EXCEED 2 INCHES WIDE. DRUMS SHALL HAVE CLOSED TOPS THAT WILL NOT ALLOW COLLECTION OF ROADWORK OR OTHER DEBRIS.

APPLICATION

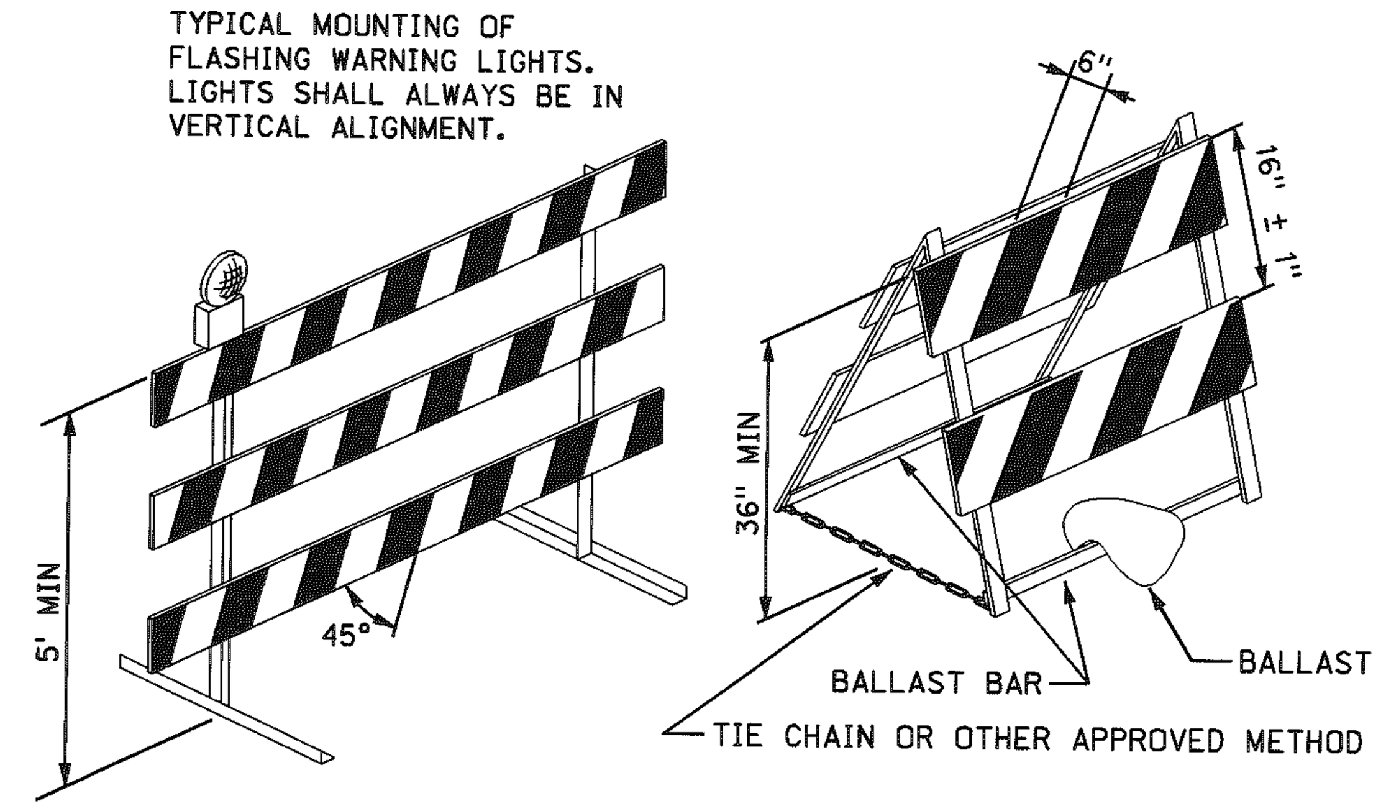
DRUMS ARE MOST COMMONLY USED TO CHANNELIZE OR DELINEATE TRAFFIC FLOW BUT MAY ALSO BE USED SINGLY OR IN GROUPS TO MARK SPECIFIC LOCATIONS. DRUMS ARE HIGHLY VISIBLE AND HAVE GOOD TARGET VALUE, GIVEN THE APPEARANCE OF BEING FORMIDABLE OBSTACLES AND, THEREFORE, COMMAND THE RESPECT OF DRIVERS.

DRUMS SHOULD NOT BE WEIGHTED WITH SAND, WATER, OR ANY MATERIAL TO AN EXTENT THAT WOULD MAKE THEM HAZARDOUS TO MOTORISTS, PEDESTRIANS, OR WORKERS. WHEN THEY ARE USED IN REGIONS SUSCEPTIBLE TO FREEZING, THEY SHOULD HAVE DRAINAGE HOLES IN THE BOTTOM SO WATER WILL NOT ACCUMULATE AND FREEZE, CAUSING A HAZARD IF STRUCK BY A MOTORIST. BALLAST SHALL NOT BE PLACED ON TOP OF THE DRUM.

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 III	TYPE III
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.



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 TRAFFIC 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 TRAFFIC IS TO PASS). THE STRIPES SHALL BE 6 INCHES WIDE. THE MINIMUM RAIL LENGTH IS 36 INCHES.

WHERE A BARRICADE EXTENDS ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC 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 MOTORIST AND PROVIDE A STABLE SUPPORT NOT EASILY BLOWN OVER BY THE WIND OR TRAFFIC.

BARRICADES ARE LOCATED ADJACENT TO TRAFFIC AND ARE THEREFORE SUBJECT TO IMPACT BY ERRANT VEHICLES. BECAUSE OF THEIR VULNERABLE POSITION AND THE HAZARD THEY CREATE, THEY SHOULD BE CONSTRUCTED OF LIGHTWEIGHT MATERIALS AND HAVE NO RIGID STAY BRACING FOR A-FRAME DESIGNS. TYPE II BARRICADES SHALL BE BUILT WITH LEGS OR SUPPORTS THAT WILL COLLAPSE WHEN THE BARRICADE IS TIPPED OVER OR HAS BEEN LAID DOWN.

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.

ON THE INTERSTATE , FREEWAY AND EXPRESSWAY SYSTEM, TYPE II BARRICADES SHALL NOT BE USED FOR CHANNELIZATION.

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

APPLICATION

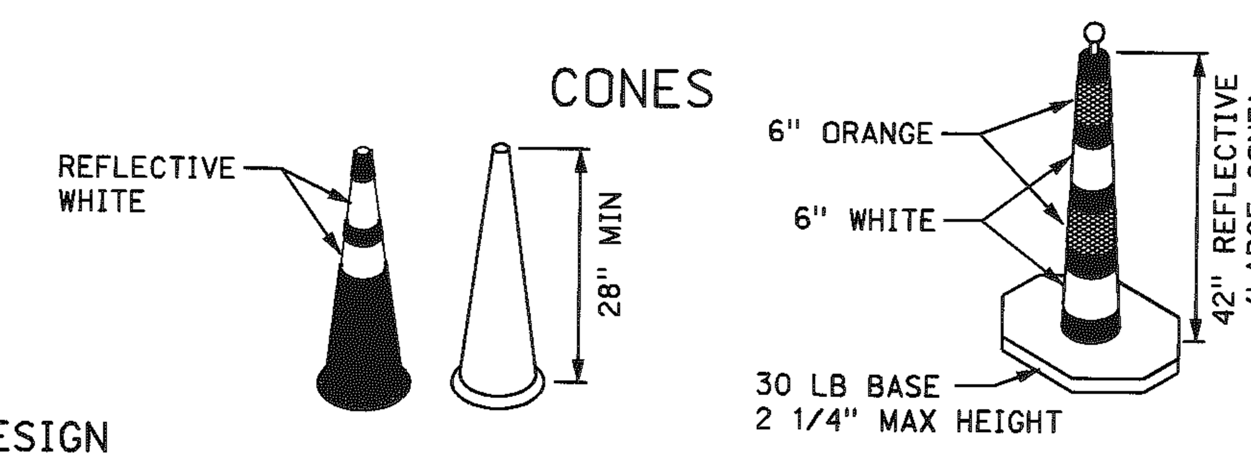
TYPE II BARRICADES ARE INTENDED FOR USE IN SITUATIONS WHERE TRAFFIC IS MAINTAINED THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE. THEY MAY BE USED SINGLY OR IN GROUPS TO MARK A SPECIFIC CONDITION, OR THEY MAY BE USED IN A SERIES FOR CHANNELIZING TRAFFIC. TYPE III BARRICADES SHALL BE SUPPLEMENTED, WITH A LIGHTING DEVICE UNLESS SPECIFICALLY DELETED BY THE ENGINEER TO USE SOME BARRICADES WITHOUT LIGHTS.

TYPE III BARRICADES USED AT A ROAD CLOSURE MAY EXTEND COMPLETELY ACROSS A ROADWAY OR 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 TO ENSURE 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 BARRICADE SHOULD 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 CONSTRUCTION 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.

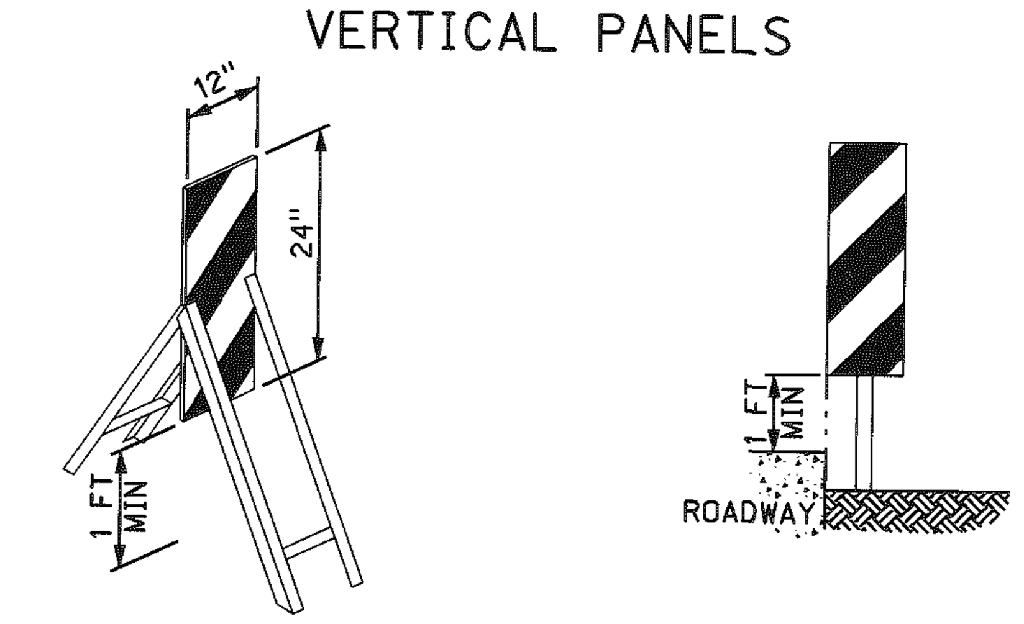
FOR NIGHTIME USE, CONES SHALL BE RETROREFLECTIVE OR EQUIPPED WITH LIGHTING DEVICES FOR MAXIMUM VISIBILITY. RETROREFLECTION OF 28 INCH OR 36 INCH CONES SHALL BE PROVIDED BY A WHITE BAND 6 INCHES WIDE, NO MORE THAN 3 INCHES TO 4 INCHES FROM THE TOP OF THE CONE, AND AN ADDITIONAL 4 INCHES WIDE WHITE BAND A MINIMUM OF 2 INCHES BELOW THE 6 INCHES BAND. LARGE REFLECTIVE CONES SHALL BE PROVIDED WITH FOUR REFLECTIVE BANDS 6 INCHES EACH. ALTERNATING FROM THE TOP, ORANGE, WHITE, ORANGE, WHITE, WITH A TWO INCH SEPARATION BETWEEN BANDS. WHEN APPROVED BY THE ENGINEER, LARGE CONES MAY BE USED IN PLACE OF VERTICAL PANELS. LARGE CONES SHALL NOT BE USED IN PLACE OF DRUMS OR TYPE II BARRICADES.

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 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.

VERTICAL PANELS



DESIGN

VERTICAL PANELS SHALL BE 12 INCHES WIDE AND AT LEAST 24 INCHES HIGH. THEY SHALL HAVE ORANGE AND WHITE STRIPES, AND BE RETROREFLECTIVE. PANEL STRIPE WIDTHS SHALL BE 6 INCHES, EXCEPT WHERE PANEL HEIGHTS ARE LESS THAN 36 INCHES, THEN 4 INCHES STRIPES MAY BE USED. IF USED FOR TWO-WAY TRAFFIC, BACK-TO-BACK PANELS SHALL BE USED.

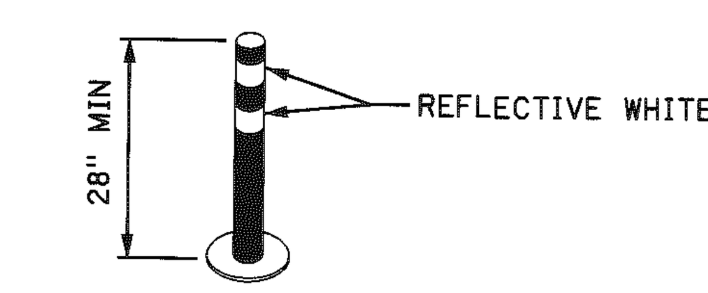
MARKINGS FOR VERTICAL PANELS SHALL BE ALTERNATING ORANGE AND WHITE RETROREFLECTORIZED STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS).

VERTICAL PANELS SHALL BE MOUNTED UPRIGHT WITH THE TOP A MINIMUM OF 36 INCHES ABOVE THE ROADWAY. VERTICAL PANELS NOT MOUNTED ABOVE CONCRETE BARRIERS SHALL HAVE LEGS OR SUPPORTS THAT WILL BREAK AWAY UPON IMPACT.

APPLICATION

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

TUBULAR MARKERS



DESIGN

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

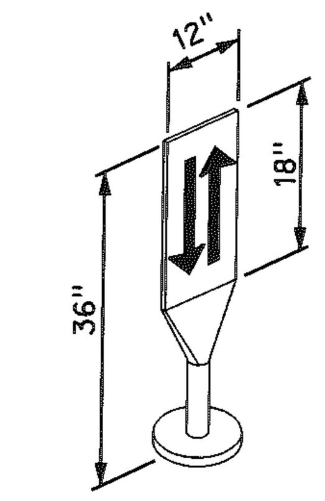
FOR NIGHTTIME USE, TUBULAR MARKERS SHALL BE RETROREFLECTIVE. RETROREFLECTION OF TUBULAR MARKERS SHALL BE PROVIDED BY TWO 3 INCHES WIDE WHITE BANDS PLACED A MAXIMUM OF 2 INCHES FROM THE TOP, WITH A MAXIMUM OF 6 INCHES BETWEEN THE BANDS. THE BASE SHALL NOT BE WIDER THAN 12 INCHES OR HIGHER THAN 2 INCHES.

APPLICATION

TUBULAR MARKERS 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 MARKERS WILL NOT BE BLOWN OVER OR DISPLACED BY TRAFFIC BY EITHER AFFIXING THEM TO THE PAVEMENT WITH ANCHOR BOLTS OR ADHESIVE, USING WEIGHTED BASES, OR WEIGHTS THAT CAN BE DROPPED OVER THE TUBULAR MARKERS AND ONTO THE BASE TO PROVIDE ADDED STABILITY. BALLAST, HOWEVER, SHOULD NOT BE ALLOWED TO PRESENT A HAZARD IF THE TUBULAR MARKERS ARE INADVERTENTLY STRUCK. IF A NONCYLINDRICAL DEVICE IS USED, AND IT COULD BE DISPLAYED WITH A WIDTH LESS THAN THE MINIMUM FACING TRAFFIC, IT SHALL BE ATTACHED TO THE PAVEMENT TO ENSURE THAT THE WIDTH FACING TRAFFIC MEETS THE MINIMUM REQUIREMENTS.

OPPOSING TRAFFIC LANE DIVIDERS



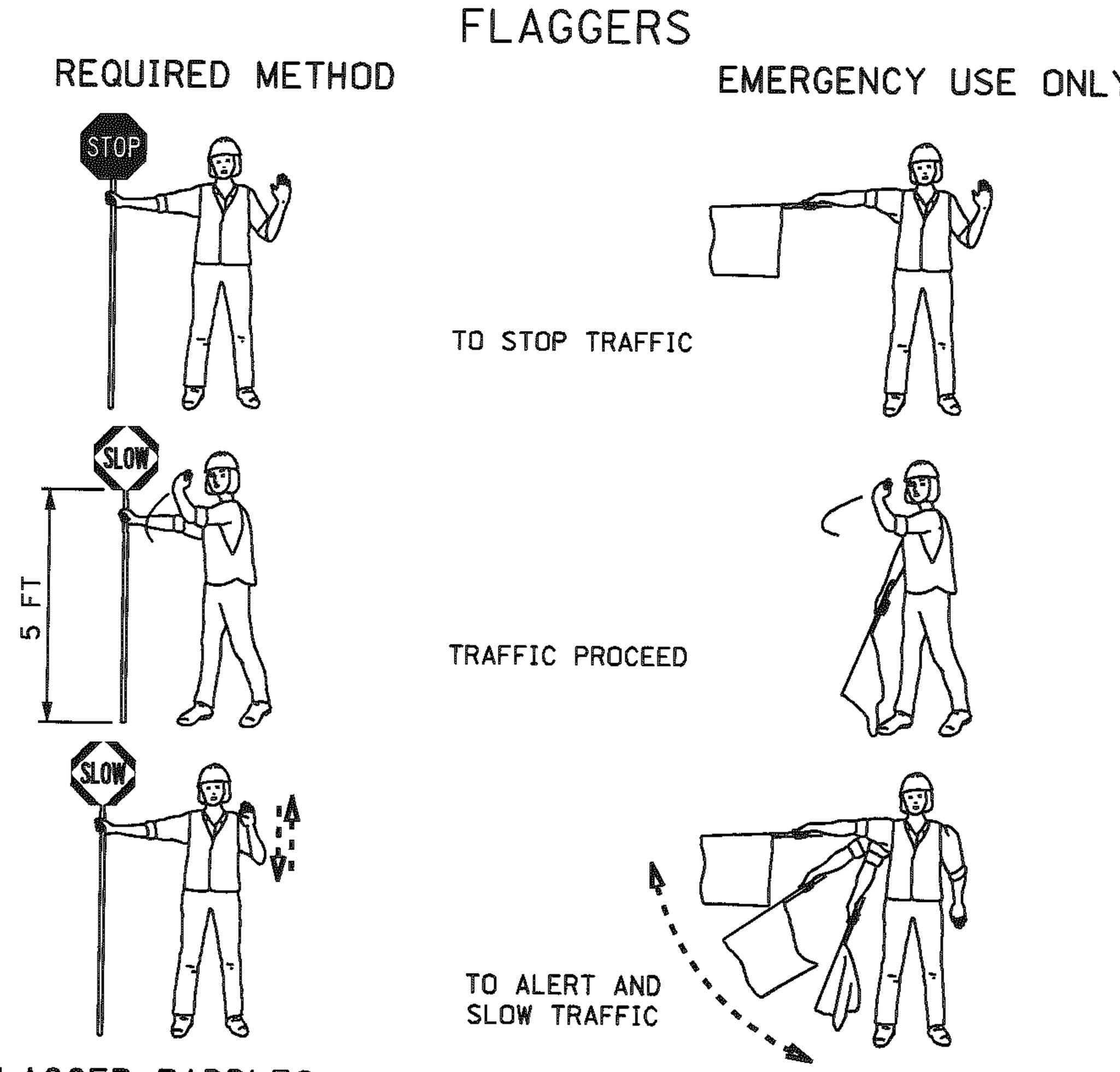
DESIGN

OPPOSING TRAFFIC LANE DIVIDER SHALL BE A TWO SIDED UPRIGHT REFLECTORIZED ORANGE PANEL, WITH A 12 INCHES WIDTH AND 18 INCHES HEIGHT. 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 2 INCHES. THE BASE SHALL BE ATTACHED TO THE EXISTING SURFACE BY EPOXY OR OTHER SUITABLE ADHESIVE, TO ENSURE THAT THE PANEL REMAINS FACING TRAFFIC.

APPPLICATION

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

FLAGGERS



FLAGGER PADDLES

FLAGGER PADDLES SHALL BE A MINIMUM 18 INCH WIDE OCTAGON WITH LETTERS AT LEAST 6 INCHES HIGH, WITH A 5 FOOT RIGID HANDLE. FLAGS AND PADDLES SHALL NOT BE USED AT THE SAME TIME. IN EMERGENCIES WHERE THE STANDARD SIGN IS NOT AVAILABLE, A RED FLAG MAY BE USED BY FLAGGERS IN ACCORDANCE WITH THE FLAGGERS HANDBOOK. TO IMPROVE CONSPICUITY, THE STOP/SLOW PADDLES MAY BE SUPPLEMENTED BY ONE OR TWO SYMMETRICALLY POSITIONED FLASHING WHITE HIGH-INTENSITY LAMPS.

FLAGGERS

A FLAGGER MUST BE DRESSED FOR SAFETY. TO BE EASILY VISIBLE A FLAGGER MUST WEAR A VEST, SHIRT, OR JACKET, AND A CAP OR HARD HAT THAT IS BRIGHT ORANGE, YELLOW, YELLOW GREEN OR FLUORESCENT VERSIONS OF THESE COLORS (FADED OR SOILED GARMENT WILL NOT BE ALLOWED). FOR NIGHTTIME FLAGGING THE GARMENT SHALL BE REFLECTORIZED.

FLAGGERS SHALL BE INSTRUCTED IN THE PROPER LOCATION, DUTIES AND PROCEDURES FOR FLAGGERS 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.

REV. NO.	DATE	DESCRIPTION OF REVISION
R5	OCT.98	REVISE CHANNELIZATION DEVICES,TAPER
R4	JAN.95	REWRITE
R3	AUG.88	WORDING,REFLECTIVITY

NEBRASKA DEPARTMENT OF ROADS
STANDARD PLAN NO. 920-R5

TRAFFIC CONTROL CONSTRUCTION AND MAINTENANCE

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

ORIGINAL: OCTOBER 1998
DATE

1
2

Roadway Design Division

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 "B" HIGH INTENSITY FLASHING WARNING LIGHTS ARE NORMALLY MOUNTED ON THE ADVANCE WARNING SIGNS. EXTREMELY HAZARDOUS SITE CONDITIONS WITHIN THE CONSTRUCTION AREA MAY REQUIRE THAT THE LIGHTS BE MOUNTED ON TYPE III BARRICADES, SIGNS, OR OTHER SUPPORTS. AS THESE LIGHTS ARE EFFECTIVE IN DAYLIGHT, THEY ARE DESIGNED TO OPERATE 24 HOURS PER DAY.

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.

FLASHING ARROW PANEL (DISPLAY)

AN ARROW PANEL IS A SIGN WITH A MATRIX OF ELEMENTS. THE MATRIX, CAPABLE OF EITHER FLASHING OR SEQUENTIAL DISPLAYS, IS INTENDED TO PROVIDE ADDITIONAL WARNING AND DIRECTIONAL INFORMATION TO ASSIST IN MERGING AND CONTROLLING TRAFFIC THROUGH OR AROUND A TEMPORARY TRAFFIC CONTROL ZONE. AN ARROW PANEL SHOULD BE USED IN COMBINATION WITH APPROPRIATE SIGNS, BARRICADES, 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 NONREFLECTIVE BLACK. THE PANEL SHALL BE MOUNTED ON A VEHICLE, TRAILER OR OTHER SUITABLE SUPPORT. MINIMUM MOUNTING HEIGHT SHALL BE 7 FEET FROM THE ROADWAY TO THE BOTTOM OF THE PANEL. EXCEPT ON VEHICLE-MOUNTED PANELS, WHICH SHOULD BE AS HIGH AS PRACTICABLE.

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

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 MAY BE USED FOR STATIONARY OR MOVING LANE CLOSURES. AN ARROW DISPLAY IN THE CAUTION MODE SHALL BE USED ONLY FOR SHOULDER WORK, BLOCKING THE SHOULDER, OR ROADSIDE WORK NEAR THE SHOULDER. AN ARROW DISPLAY 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 ON A MULTILANE ROADWAY TO LATERALLY SHIFT ALL LANES OF TRAFFIC, BECAUSE UNNECESSARY LANE CHANGING MAY RESULT.

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.

FLOOD LIGHTS

WHEN NIGHTTIME WORK IS REQUIRED, FLOODLIGHTS SHOULD BE USED TO ILLUMINATE FLAGGER STATIONS, 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

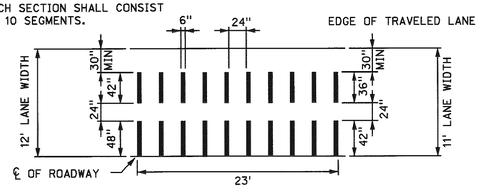
IT IS INTENDED TO THE EXTENT POSSIBLE, THAT MOTORISTS BE PROVIDED MARKINGS WITHIN A WORK AREA COMPARABLE TO THE MARKINGS NORMALLY MAINTAINED ALONG ADJACENT ROADWAYS, PARTICULARLY AT EITHER END OF THE WORK AREA.

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.

RUMBLE STRIPS

EACH SECTION SHALL CONSIST OF 10 SEGMENTS.



DESIGN

RUMBLE STRIPS MAY BE MADE OF ASPHALT PAVING MATERIAL, EPOXY AMD AGGREGATE OR OTHER SUITABLE MATERIAL WHICH WILL MAINTAIN A DESIRABLE RUMBLE EFFECT. THE RUMBLE STRIP SHOULD HAVE AN INSTALLED HEIGHT OF 5/8". PREFORMED RUMBLE STRIPS MAY BE USED PROVIDED THEY HAVE A MINIMUM 1/2" HEIGHT.

TAPERS

TAPERS ARE CREATED USING A SERIES OF CHANNELIZING DEVICES OR PAVEMENT MARKINGS PLACED 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 WITH AN ADJACENT LANE OF TRAFFIC AT THE PREVAILING SPEED. THE TAPER SHOULD BE LONG ENOUGH TO ENABLE MERGING DRIVERS TO ADJUST THEIR SPEEDS AND MERGE INTO A SINGLE LANE BEFORE THE 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 WITH IMPROVED SHOULDERS THAT MAY BE MISTAKEN FOR DRIVING LANES (WHEN WORK IS OCCURING IN THE SHOULDER AREAS). 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/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 TRAFFIC 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 MAXIMUM LENGTH OF 100 FEET WITH CHANNELZING DEVICES AT APPROXIMATELY 20-FOOT SPACINGS SHOULD BE USED TO GUIDE TRAFFIC INTO THE ONE-WAY SECTION.

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

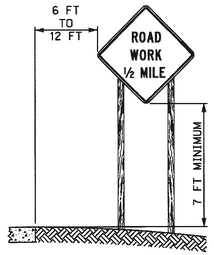
L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED LIMIT PRIOR TO WORK IN MPH

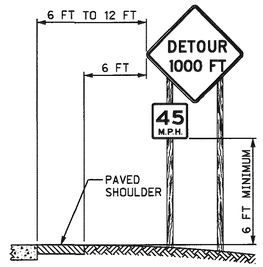
TAPER LENGTH L (FEET)			
SPEED (MPH) S	LANE WIDTH		
	10 FT	11 FT	12 FT
25	105	115	125
30	150	165	180
35	205	225	245
40	270	295	320
45	450	495	540
50	500	550	600
55	550	605	660
65	650	715	780
70	700	770	840
75	750	825	900

ROADSIDE SIGNS

HEIGHT AND LATERAL LOCATION OF SIGNS

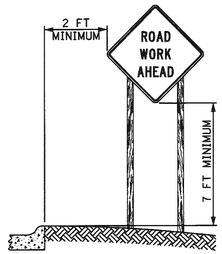
RURAL AREA

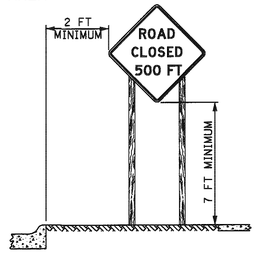




WITH SPEED ADVISORY PLATE

URBAN AREA





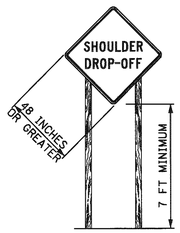
TYPICAL FIRST SIGN AT CONSTRUCTION SITE

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

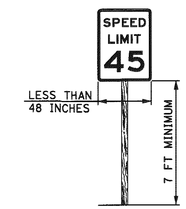
PORTABLE AND TEMPORARY MOUNTING

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

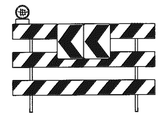
TYPICAL SIGN MOUNTINGS

OTHER THAN POST MOUNTED

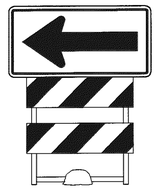
TYPE III BARRICADE WITH SIGN

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

GENERAL NOTES

1. ALL TRAFFIC CONTROL DEVICES SHALL MEET THE APPLICABLE STANDARDS AND SPECIFICATIONS PRESCRIBED IN PART VI OF THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD)" AND THE STATE OF NEBRASKA SUPPLEMENT TO THE MUTCD.
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.
5. UNPROTECTED TEMPORARY AND POST MOUNTED SIGNS SHOULD BE CRASHWORTHY (REFER TO THE ROADSIDE DESIGN GUIDE, CHAPTER NINE, FOR ADDITIONAL GUIDANCE).

REV. NO.	DATE	DESCRIPTION OF REVISION
R5	OCT.98	REVISE CHANNELIZATION DEVICES,TAPER
R4	JAN.95	REWRITE
R3	AUG.88	WORDING,REFLECTIVITY

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 920-R5

TRAFFIC CONTROL CONSTRUCTION AND MAINTENANCE

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

ORIGINAL:
OCTOBER 1998
DATE

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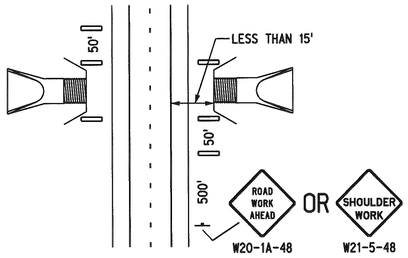
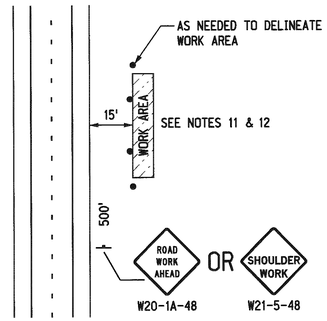
SHEET 2 OF 2



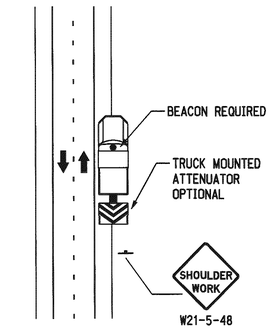
CULVERT PROTECTION

WHEN GUARDRAIL IS REMOVED AND/OR EXCAVATION IS LESS THAN 15 FEET FROM SHOULDER



WORK BEYOND THE SHOULDER

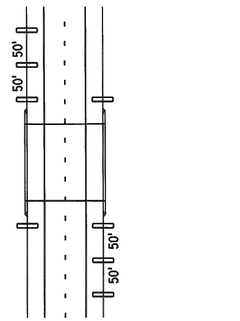
TA-1



MOBILE OPERATION ON SHOULDER

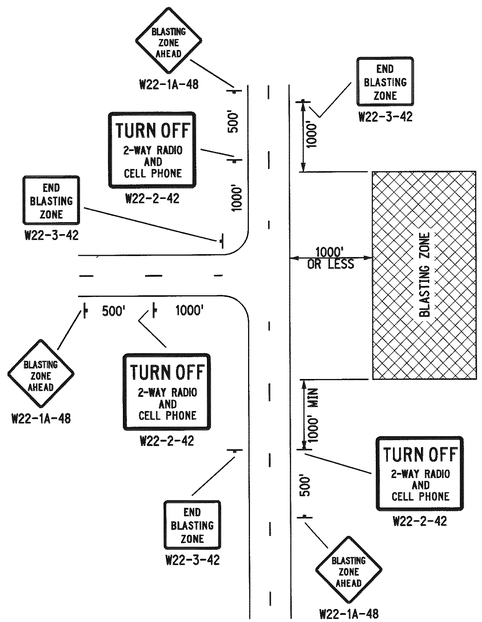
NO ENCROACHMENT ON TRAVEL LANE

TA-4



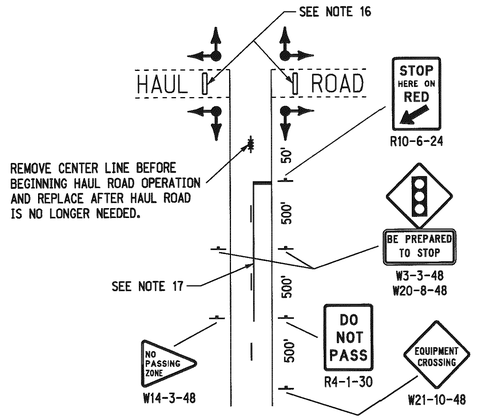
BRIDGE RAIL END PROTECTION

WHEN GUARDRAIL IS REMOVED



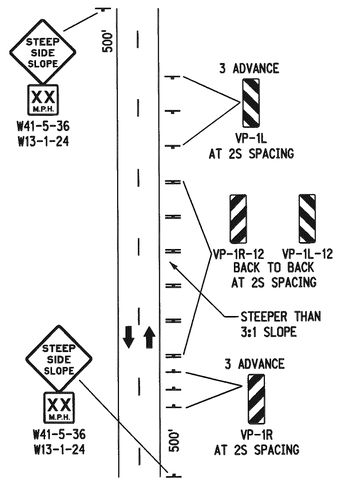
BLASTING ZONE

TA-2



HAUL ROAD CROSSING IN CONSTRUCTION AREA USING TEMPORARY TRAFFIC SIGNAL

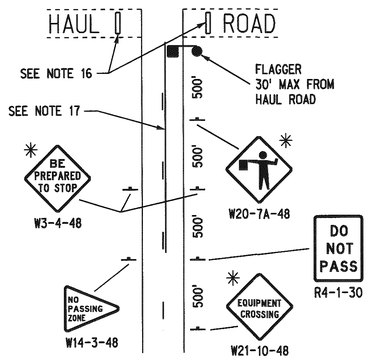
TA-14



SLOPE PROTECTION

LEGEND

- TYPE III BARRICADE
- TYPE II BARRICADE OR REFLECTORIZED PLASTIC DRUM
- SIGN
- FLAGGER
- CONE
- CMS — CHANGEABLE MESSAGE SIGN
- TRAFFIC SIGNAL



HAUL ROAD CROSSING IN CONSTRUCTION AREA USING FLAGGERS

TA-14

✳ SIGNS ARE SUBSIDIARY TO THE FLAGGING OPERATION.

NOTES

1. SIGNS SHOWN ARE USUALLY FOR ONE DIRECTION OF TRAVEL ONLY.
2. DESIGNATION OF SPEED SHOWN ON ADVISORY SPEED SIGNS W13-1 SHALL BE DETERMINED BY THE ENGINEER IN ACCORDANCE WITH MUTCD. THE SPEED DESIGNATION SHALL BE AS HIGH AS PRACTICAL AND FEASIBLE.
3. "FLAGGER AHEAD SYMBOL" SIGN (W20-7A) SHALL BE USED WHEN A FLAGGER IS PRESENT, AND REMOVED WHEN NOT APPLICABLE.
4. ALL SIGNS SHALL BE INSTALLED, MAINTAINED IN A CLEAN CONDITION AND REMOVED BY THE CONTRACTOR EXCEPT SIGNS WHICH SHALL BE INSTALLED AND MAINTAINED BY THE DEPARTMENT OF ROADS OR APPROPRIATE GOVERNMENT AGENCY.
5. G20-1 "ROAD WORK NEXT X MILES" SHALL BE USED ON ANY CONSTRUCTION OR MAINTENANCE PROJECT LONGER THAN 2 MILES.
6. WHEN MESSAGE IS NOT PERTINENT, SIGNS SHALL BE TAKEN DOWN, COVERED OR FOLDED. TAPE IS NOT PERMITTED ON THE FACE OF THE SIGN.
7. VEHICLES OR EQUIPMENT SHALL NOT BE PARKED SO AS TO OBSCURE OR DISTRACT FROM TRAFFIC CONTROL DEVICES.
8. ORANGE FLAGS MAY BE USED TO CALL ATTENTION TO WARNING SIGNS.
9. DOUBLE FINE AND REDUCED SPEED ZONE SIGNING NOT REQUIRED FOR SHORT-DURATION WORK LESS THAN 1/2 WORK DAY.
10. CULVERT, BRIDGE AND SLOPE PROTECTION.
    EXISTING GUARDRAIL SHOULD REMAIN IN PLACE AS LONG AS PRACTICAL FOR THE PROTECTION IT PROVIDES, AND REINSTALLED AS SOON AS PRACTICAL.
11. TA-1 AND CULVERT PROTECTION
    SIGNING IS NOT REQUIRED IF THE WORK SPACE IS 15 FEET OR MORE BEYOND THE EDGE OF THE SHOULDER.
12. TA-1 AND TA-3
    FOR SHORT-DURATION OPERATIONS 60 MINUTES OR LESS, ALL SIGNS AND CHANNELIZING DEVICES MAY BE ELIMINATED IF A VEHICLE WITH AN ACTIVATED HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING OR AMBER STROBE LIGHTS ARE USED, AND THE WORK DOES NOT ENCROACH ONTO THE OPEN TRAVEL LANE.
13. TA-3
    WHEN PAVED SHOULDERS HAVING A WIDTH OF 8 FEET OR MORE ARE CLOSED, AT LEAST ONE ADVANCE WARNING SIGN SHALL BE USED. IN ADDITION, CHANNELIZING DEVICES SHALL BE USED TO CLOSE THE SHOULDER IN ADVANCE TO DELINEATE THE BEGINNING OF THE WORK SPACE AND DIRECT VEHICULAR TRAFFIC TO REMAIN WITHIN THE TRAVELED WAY.
14. TA-4
    VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY ROTATING, FLASHING OR AMBER STROBE LIGHTS.
15. TA-10
    IF THE QUEUING OF VEHICLES ACROSS ACTIVE RAILROAD TRACKS CANNOT BE AVOIDED, A FLAGGER SHALL BE PROVIDED AT THE RAILROAD CROSSING TO PREVENT VEHICLES FROM STOPPING WITHIN THE RAILROAD CROSSING EVEN IF AUTOMATIC WARNING DEVICES ARE IN PLACE.
16. TA-14
    WHEN THE HAUL ROAD IS NOT IN USE, TYPE III BARRICADES SHALL BE IN PLACE. THE "FLAGGER", "SIGNAL AHEAD", AND "BE PREPARED TO STOP" SIGNS SHALL BE COVERED OR REMOVED, AND THE TRAFFIC SIGNAL SHALL BE PUT INTO FLASH YELLOW ON THE HIGHWAY, RED ON THE HAUL ROAD.
17. TA-14
    THE "NO PASSING" SIGNS AND PAVEMENT MARKINGS ARE NOT REQUIRED IF HAULING OPERATION IS IN EFFECT ONLY DURING DAYLIGHT HOURS.
18. A TYPE III BARRICADE IS REQUIRED WHEN THE CHANGEABLE MESSAGE IS WITHIN 15' OF THE SHOULDER.
19. BARRELS ARE REQUIRED WHEN THE CHANGEABLE MESSAGE SIGN IS INSTALLED ON OR NEAR A PAVED SHOULDER.
20. APPLICATIONS SHOWN ARE FOR LOCAL SITUATIONS IN PROPERLY MARKED CONSTRUCTION ZONES AND DO NOT INCLUDE LEAD SIGNS WHICH ARE INSTALLED AT THE BEGINNING OF THE PROJECT.
21. THE LEAD SIGNS ARE NOT NEEDED IF TWO PROJECTS ARE LESS THAN 1 MILE APART. THE "END CONSTRUCTION" SIGN (G20-2B-48) SHOULD NOT BE INSTALLED BETWEEN THE PROJECTS.
22. REFER TO STANDARD PLAN NO. 920 FOR GENERAL INFORMATION NOT SHOWN.

REV. NO.	DATE	DESCRIPTION OF REVISION
R5	DEC.05	2003 MUTCD UPDATE
R4	AUG.98	SIGN CHANGES, ADDITIONS
R3	MAY 83	ADDITIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 921-R5

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

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

ORIGINAL:
JUNE 3, 1980
DATE

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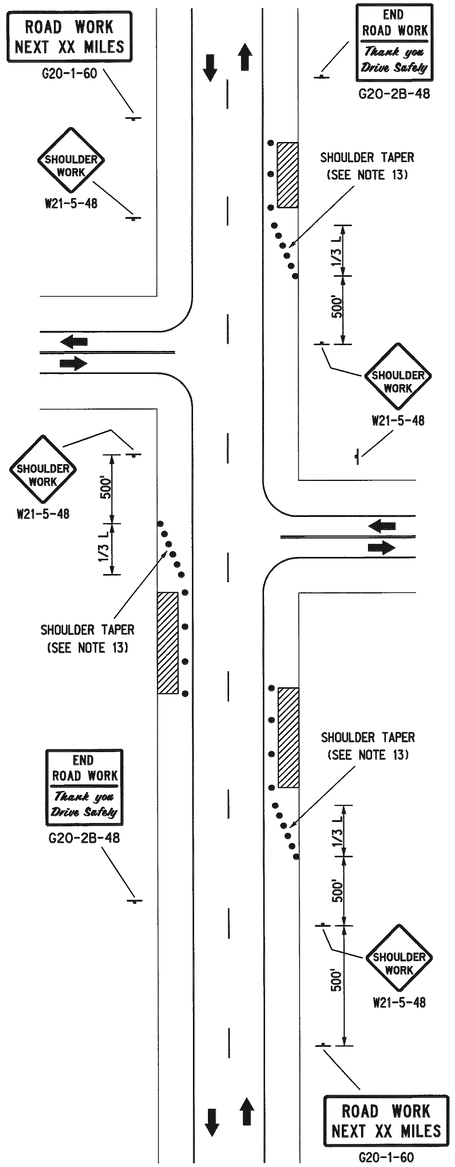
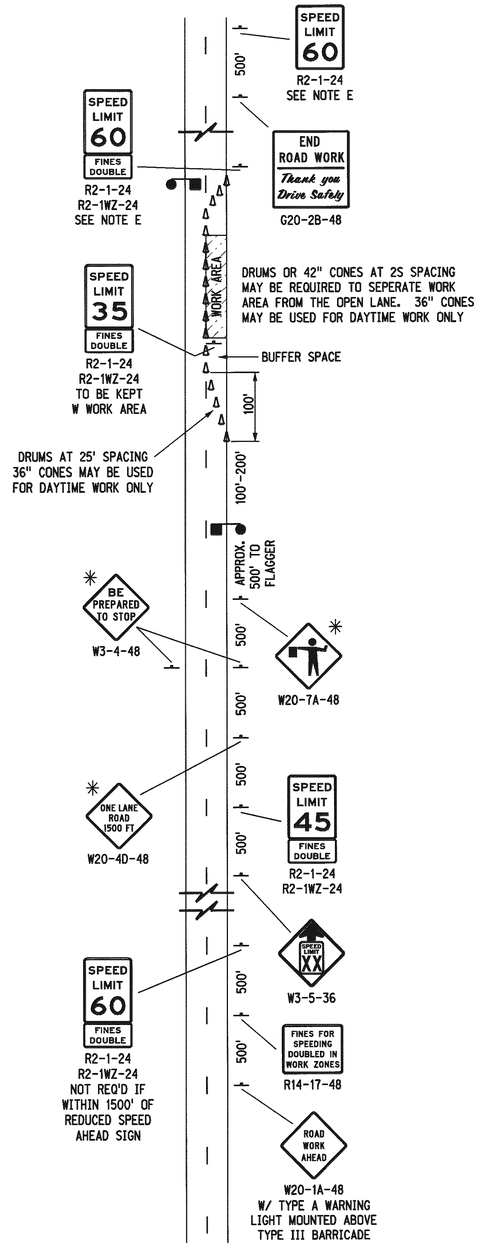


WORK ON SHOULDERS
TA-3

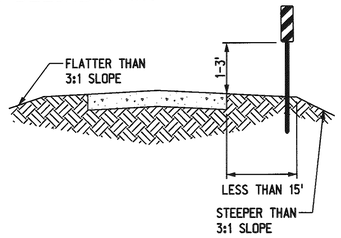


LANE CLOSURE
TA-10

✳ SIGNS ARE SUBSIDIARY TO THE FLAGGING OPERATION.

STEEP SLOPE DELINEATION

VERTICAL PANELS SHOULD BE USED FOR AREAS WHERE GUARD RAIL IS REMOVED, OR PROJECT GRADING HAS CREATED A DROP-OFF SLOPE STEEPER THAN 3:1, AND WITHIN 15 FEET OF THE TRAVEL LANE. NOT USED FOR CULVERT OR BRIDGE END PROTECTION. VERTICAL PANEL SPACING MAY BE REDUCED FOR HORIZONTAL CURVES.



WORK ZONE SPEED LIMIT NOTES

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

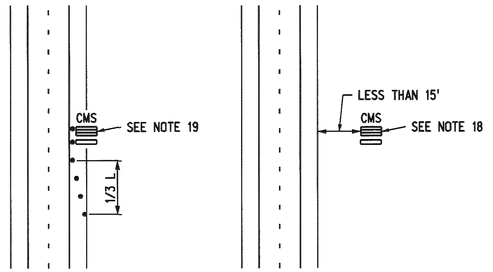
B. REDUCED SPEED LIMITS SHOULD BE USED ONLY IN THE SPECIFIC PORTION OF THE WORK ZONE WHERE CONDITIONS OR RESTRICTIVE FEATURES ARE PRESENT. HOWEVER, FREQUENT CHANGES IN THE SPEED LIMIT SHOULD BE AVOIDED. THE REDUCTION OF SPEED SHOULD BE DESIGNED SO VEHICLES CAN SAFELY TRAVEL THROUGH THE WORK ZONE WITH 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.



CHANGEABLE MESSAGE SIGN PROTECTION

LEGEND

- TYPE III BARRICADE
- TYPE II BARRICADE OR REFLECTORIZED PLASTIC DRUM
- SIGN
- FLAGGER
- CONE
- CMS — CHANGEABLE MESSAGE SIGN
- TRAFFIC SIGNAL

TAPER FORMULA

$L = S \times W$ 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
R5	DEC.05	2003 MUTCD UPDATE
R4	AUG.98	SIGN CHANGES, ADDITIONS
R3	MAY 83	ADDITIONS

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 921-R5

TRAFFIC CONTROL, CONSTRUCTION AND MAINTENANCE

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

ORIGINAL:
JUNE 3, 1980
DATE

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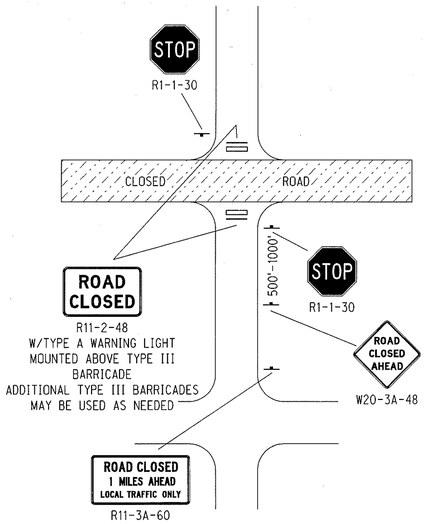
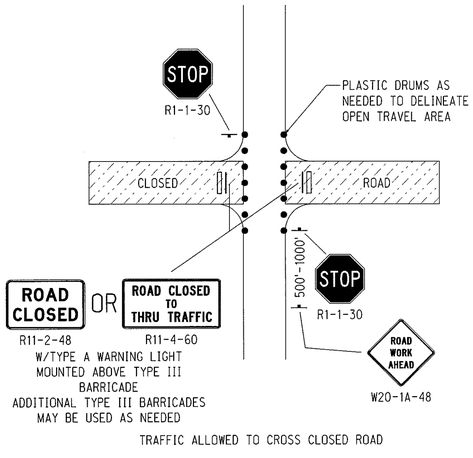
Roadway Design Division

CROSS ROAD INTERSECTING CLOSED ROAD

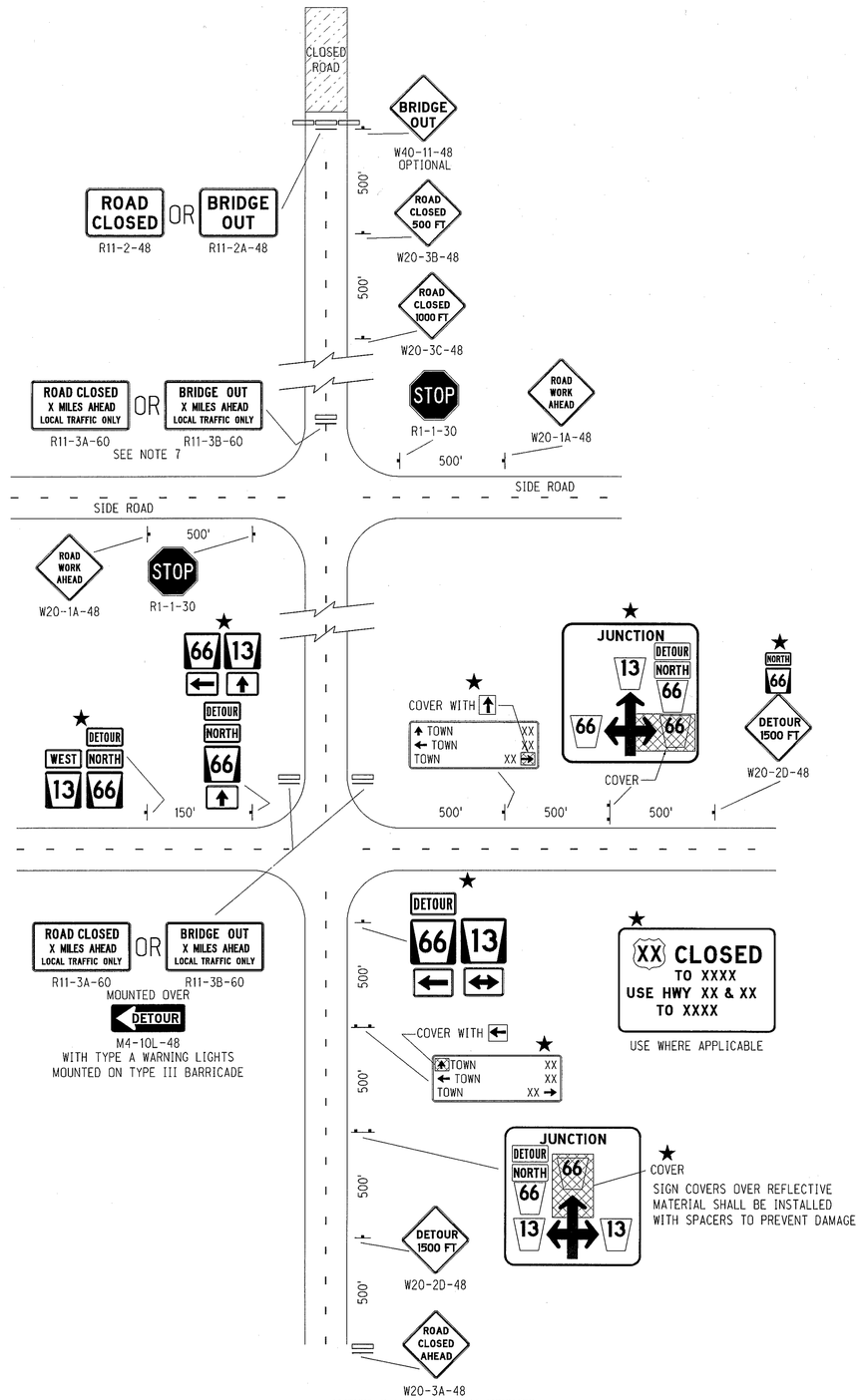


TRAFFIC NOT ALLOWED TO CROSS CLOSED ROAD



TRAFFIC ALLOWED TO CROSS CLOSED ROAD

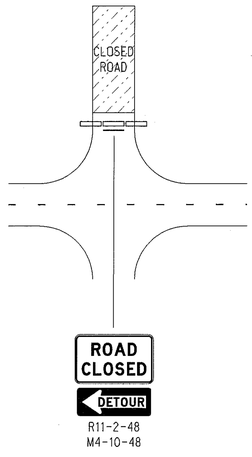
ROAD CLOSED BEYOND JUNCTION



NOTES

1. SIGNS SHOWN ARE USUALLY FOR ONE DIRECTION OF TRAVEL ONLY.
2. ALL SIGNS SHALL BE INSTALLED, MAINTAINED IN A CLEAN CONDITION AND REMOVED BY THE CONTRACTOR EXCEPT SIGNS WHICH SHALL BE INSTALLED AND MAINTAINED BY THE DEPARTMENT OF ROADS OR APPROPRIATE GOVERNMENT AGENCY.
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 NO. 920 FOR GENERAL INFORMATION NOT SHOWN.

ROAD CLOSED AT JUNCTION



LEGEND

- TYPE III BARRICADE
- TYPE II BARRICADE OR REFLECTORIZED PLASTIC DRUM
- SIGN
- FLAGGER
- CONE
- ★ INSTALLED BY OTHERS

TAPER FORMULA

$L = S \times W$ 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

NEBRASKA DEPARTMENT OF ROADS

STANDARD PLAN NO. 923

TRAFFIC CONTROL ROAD CLOSURE

PROFESSIONAL CIVIL ENGINEER
RANDALL K. DAVIS
E-6377
5/24/07
STATE OF NEBRASKA

APPROVED:

AUGUST 1998
DATE

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