PLAN SYMBOLS

STATE LINE
COUNTY LINE
TOWNSHIP OR RANGE LINE
SECTION LINE
QUARTER LINE
SIXTEENTH LINE
RIGHT OF WAY LINE
SLOPE EASEMENT
PRESENT RIGHT OF WAY LINE
CONTROL OF ACCESS LINE
PROPERTY LINES
VACATED PLATTED PROPERTY
CORPORATE HIGHWAY CENTER LINE
TRUNK HIGHWAY CENTER LINE
RETAINING WALL
RAILROAD
RAILROAD RIGHT OF WAY LINE
RIVER OR CREEK
DRY RUN
DRAINAGE DITCH
DRAIN TILE
CULVERT
DROP INLET
GUARD RAIL
BARBED WIRE FENCE
WOVEN WIRE FENCE
CHAIN LINK FENCE
RAILROAD SNOW FENCE
STONE WALL OR FENCE
HEDGE
RAILROAD CROSSING SIGN
RAILROAD CROSSING BELL
ELECTRIC WARNING SIGN
CROSSING GATE
MEANDER CORNER
SPRINGS
MARSH
TIMBER, ORCHARD, BRUSH, NURSERY
CATCH BASIN
FIRE HYDRANT
CATTLE GUARD
OVERPASS (HIGHWAY OVER)
UNDERPASS (HIGHWAY UNDER)
BRIDGE
BUILDING (ONE STORY FRAME) 1-S-F 75
F – FRAME C – CONCRETE
S – STONE T – TILE
B – BRICK ST – STUCCO
IRON PIPE OR ROD
MONUMENT (STONE,CONCRETE,OR MEATAL)
WOODEN HUB
GRAVEL PIT (G)
SAND PIT (S)
BORROW PIT (B)
ROCK QUARRY (Q)

UTILITIES SYMBOLS

POWER POLE LINE
TELEPHONE POLE LINE
JOINT TELEPHONE AND POWER
ON POWER POLES
ON TELEPHONE POLES
ANCHOR
STEEL TOWER
STREET LIGHT
PEDESTAL
GAS MAIN
WATER MAIN
CONDUIT
TELEPHONE CABLE IN CONDUIT
ELECTRIC CABLE IN CONDUIT
TELEPHONE MANHOLE
ELECTRIC MANHOLE
BURIED TELEPHONE CABLE T-BUR
BURIED ELECTRIC CABLE P-BUR
AERIAL TELEPHONE CABLE T-AE
SEWER (SANITARY OR STORM)
SEWER MANHOLE

SCALES

PLAN . . . . . 0 100'
PROFILE . . . . . 0 10' VERT. 0 100' HORZ.
CROSS–SECTION . . . . . 0 10'
INDEX MAP . . . . . N.T.S.

MINNESOTA DEPARTMENT OF TRANSPORTATION
LYON COUNTY

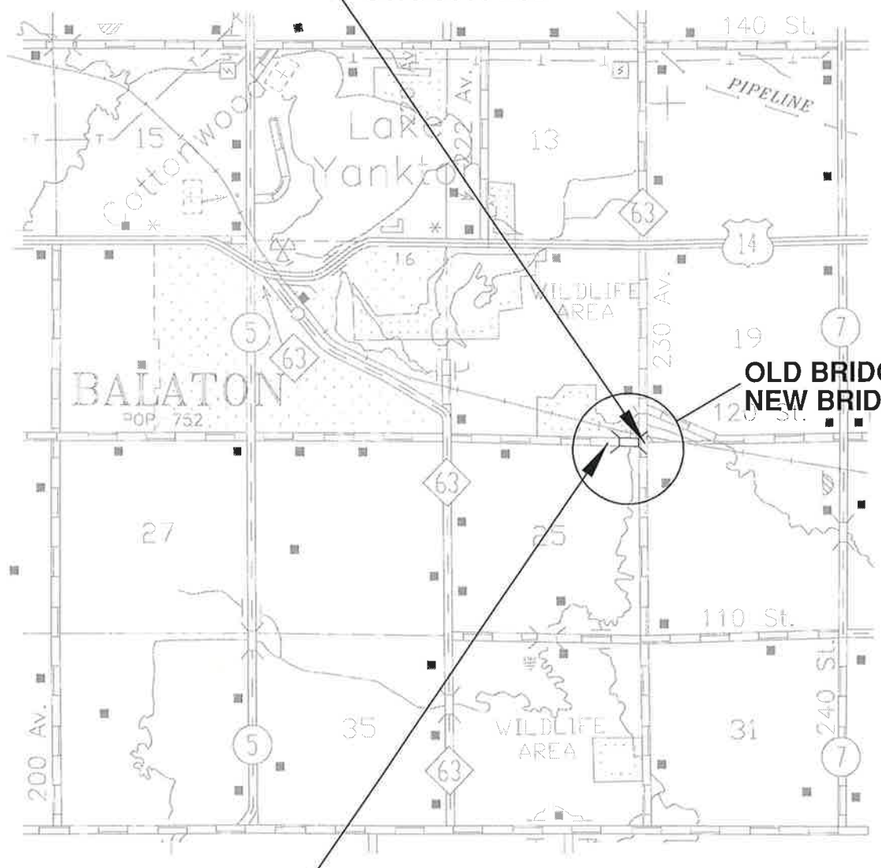
CONSTRUCTION PLAN FOR BRIDGE REPLACEMENT: BRIDGE NO. 42J35

LOCATED ON: 120th St. BETWEEN: C.R. 63 (1.0 MILE S.E. OF BALATON) AND: CSAH 7 (Geographical Description)
BEGINNING AT A PT. 5004.40' EAST OF THE N.E. COR. SEC. 26 T109N–R42W
TO A PT. 5091.60' EAST OF THE N.E. COR. SEC. 26 T109N–R42W (Legal Description)

STATE AID PROJECT NO. : 042-599-145

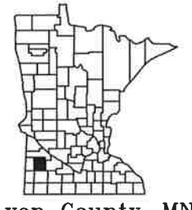
GROSS LENGTH:	87.20	FEET	0.017	MILES
BRIDGES–LENGTH:		FEET		MILES
EXCEPTIONS–LENGTH:		FEET		MILES
NET LENGTH:	87.20	FEET	0.017	MILES

END S.A.P. 042-599-145
STA. 50+91.60



OLD BRIDGE NO. L5810
NEW BRIDGE NO. 42J35

BEG. S.A.P. 042-599-145
STA. 50+04.40



Lyon County, MN

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38–.2, ENTITLED "STANDARD GUIDELINES OF THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

MINN. PROJ. NO. .....

GOVERNING SPECIFICATIONS

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATION FOR CONSTRUCTION" SHALL GOVERN.

INDEX

SHEET NO. 01	TITLE SHEET
SHEET NO. 02	ESTIMATED QUANTITIES SHEET
SHEET NO. 03	DETAIL SHEETS
SHEET NO. 04	BARREL DETAIL SHEET
SHEET NO. 05–06	END SECTION DETAIL SHEET
SHEET NO. 07	TRAFFIC CONTROL SHEET
SHEET NO. 08	BRIDGE SURVEY SHEET

THIS PLAN CONTAINS 08 SHEETS

DESIGN DESIGNATION

PROJ. SOIL FACTOR	= 100%
ADT (CURRENT YEAR) 2014	= 25
ADT (FUTURE YEAR) 2034	= 25
DESIGN LOADING	=
SOIL FACTOR:	= 100%
SHOULDER WIDTH:	= 1.0'
DESIGN SPEED:	= 55 MPH

FUNCTIONAL CLASSIFICATION: LOCAL COLLECTOR
NO. OF TRAFFIC LANES: 2 NO. OF PARKING LANES: 0

BASED ON STOPPING SIGHT DISTANCE:

HEIGHT OF EYE: 3.5' HEIGHT OF OBJECT: 2.5'
DESIGN SPEED NOT ACHIEVED AT:

STA TO STA MPH

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Signature: ..... Typed Name: Aaron VanMoer

Date: 6/20/17 License No. 50428

..... DATE: 6/20/17
Approved County Engineer

Recommened For Approval ..... DATE: 6/29/17
District State Aid Engineer: Reviewed For Compliance With State Aid Rules/Policy

..... DATE: 7/7/17
Approved for State Aid Funding – For State Aid Engineer

STATE AID PROJECT NO. 042–599–145 SHEET NO. 01 OF 08 SHEETS

ESTIMATED QUANTITIES

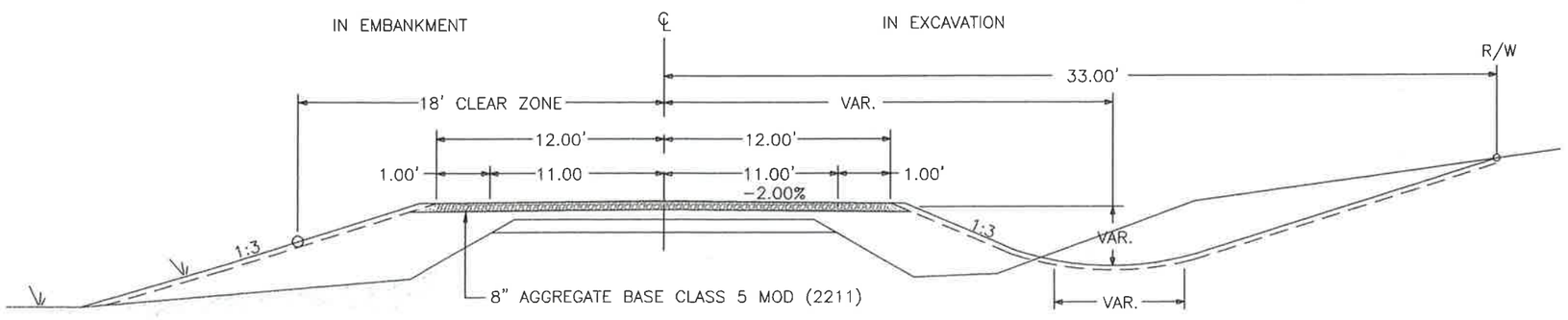
NOTES	SPECIFICATION NUMBER	ITEM	UNIT	RURAL (TWN BR)		TOTAL ESTIMATED QUANTITIES
				PARTICIPATING	NON-PARTICIPATING	
	2021 . 501	MOBILIZATION	LUMP SUM	1.00		1.00
1	2123 . 610	1.5 CU YD BACKHOE	HOUR		5.00	5.00
2	2211 . 501	AGGREGATE BASE CL. 5 MOD	TON		82.00	82.00
3,4,5	2412 . 511	12'x7' PRECAST CONCRETE BOX CULVERT	LIN FT	42.00		42.00
3,4,5	2412 . 511	12'x8' PRECAST CONCRETE BOX CULVERT	LIN FT	42.00		42.00
3,4,5	2412 . 512	12'x7' PRECAST CONC. BOX CULV END SECT	EACH	2.00		2.00
3,4,5	2412 . 512	12'x8' PRECAST CONC. BOX CULV END SECT	EACH	2.00		2.00
6	2442 . 501	REMOVE EXISTING BRIDGE	LUMP SUM		1.00	1.00
7	2451 . 515	COURSE AGGREGATE BEDDING (CV)	CU YD	162.00		162.00
8	2451 . 609	GRANULAR BACKFILL	TON	550.00		550.00
9	2511 . 502	RANDOM RIPRAP CLASS IV	TON	70.00		70.00
10	2563 . 601	TRAFFIC CONTROL	LUMP SUM	1.00		1.00
11	2573 . 533	SEDIMENT CONTROL LOG TYPE STRAW	LIN FT		80.00	80.00
12	2575 . 523	EROSION CONTROL BLANKET CATEGORY 3	SQ YD		160.00	160.00
13	2575 . 605	TURF ESTABLISHMENT	ACRE		0.30	0.30

CONSTRUCTION NOTES (ITEM SPECIFIC)

1. EQUIPMENT HOURS PROVIDED FOR ANY ADDITIONAL SHAPING OUTSIDE THE RIGHT OF WAY AND WITHIN TEMPORARY EASEMENTS. IF THE CONTRACTOR SHOULD CHOOSE TO USE A LARGER SIZED BACKHOE IT SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
2. SHALL BE MODIFIED TO 6–12% PASSING THE #200 SIEVE. SHALL BE PLACED USING THE ORDINARY COMPACTION METHOD.
3. PLACE MASTIC AND FILTER CLOTH ENTIRE JOINT. ALL JOINTS SHALL BE TIED.
4. THE TOTAL UNIT PRICE SHALL INCLUDE EXCAVATION, BACKFILLING, GROUT, COFFERDAMS, DIVERSION CHANNELS, AND DEWATERING. ANY EXCESS EXCAVATION MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR.
5. PRECAST CONCRETE BOX CULVERT SHALL BE CLASS 2. PRECAST CONC. END SECTIONS TO BE TYPE 3, 15° SKEW.
6. REMOVAL ITEMS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF ACCORDING TO SPECIFICATION 2104.3 D.3. DISPOSAL WITHIN THE RIGHT OF WAY IS STRICTLY PROHIBITED.
7. COURSE AGGREGATE BEDDING SHALL BE PLACED UNDER THE BOX CULVERT TO THE APRON SECTIONS.
8. GRANULAR BACKFILL TO BE PLACED ON SIDES AND OVER THE BOX CULVERT.
9. GEOTEXTILE FABRIC MATERIAL SHALL BE INCLUDED IN THE TOTAL BID PRICE. RIPRAP SHALL BE CLASS IV QUARRY RUN MATERIAL.
10. THE CONTRACTOR SHALL COMPLETELY CLOSE OFF ROADWAY AS TO NOT ALLOW TRAFFIC DURING CONSTRUCTION. EXACT LOCATION OF TRAFFIC CONTROL DEVICES TO BE DETERMINED BY THE ENGINEER. EXISTING ACCESS TO RESIDENCES SHALL BE MAINTAINED THROUGHOUT THE PROJECT DURATION.
11. PLACE SEDIMENT CONTROL LOGS AS DIRECTED BY THE ENGINEER.
12. PLACE EROSION CONTROL BLANKET ON ALL EXPOSED AREAS OR AS DIRECTED BY THE ENGINEER.
13. NO ADDITIONAL COMPENSATION WILL BE MADE FOR MOBILIZATIONS DUE TO THE CONTRACTOR'S SCHEDULE. SEE "BASIS OF ESTIMATED QUANTITIES" FOR TURF ESTABLISHMENT QUANTITIES AND RATES.

TYPICAL GRADING AND SURFACING SECTION

NOT TO SCALE
STA. 50+04.40 TO STA. 50+91.60



BASIS FOR ESTIMATED QUANTITIES

GRANULAR BACKFILL (2421)
GRANULAR BACKFILL: 1 C.Y. (CV) = 1.89 TONS

COURSE AGGREGATE BEDDING (CV) (2451)
COURSE AGGREGATE BEDDING: 1 C.Y. (CV) = 1.89 TONS

RANDOM RIPRAP CLASS IV (2511)
RANDOM RIP-RAP: 1 C.Y. = 1.40 TONS

AGGREGATE BASE CL. 5 MOD (2211)
AGGREGATE BASE CLASS 5 MOD: 140 LBS./CU.FT. DRY

TURF ESTABLISHMENT (2575)
SEEDING: 0.30 ACRES
SEED MIXTURE 25-142: 80 LBS./ACRE (ADJUSTED RATE) = 24.0 POUNDS
FERTILIZER TYPE 2: 200 LBS./ACRE = 60 POUNDS

STANDARD PLATES

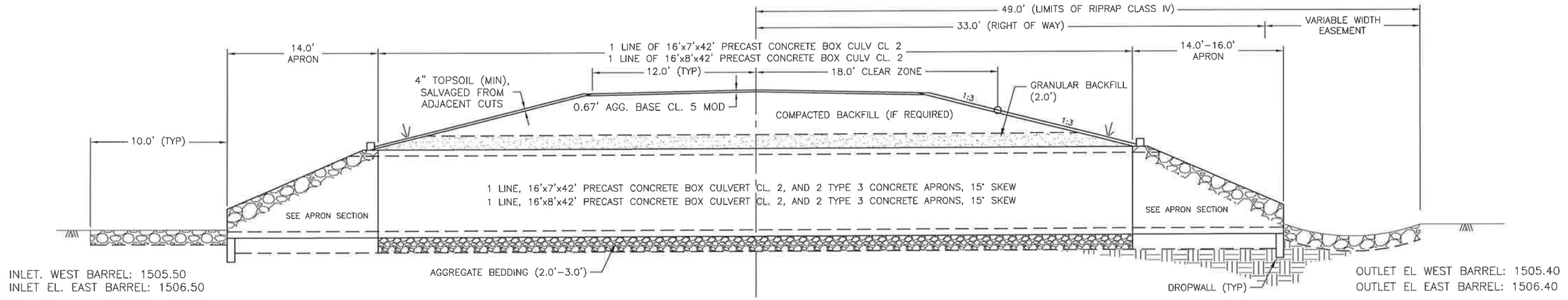
THE FOLLOWING STANDARD PLATES APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT.

PLATE NO.	DESCRIPTION
3133 D	RIPRAP AT OUTLETS
3145 G	CONCRETE PIPE OR PRECAST BOX CULVERT TIES
8000 J	CHANNELIZERS

CERTIFIED BY _____ LIC. NO. 50428 DATE 6/20/17
LICENSED PROFESSIONAL ENGINEER

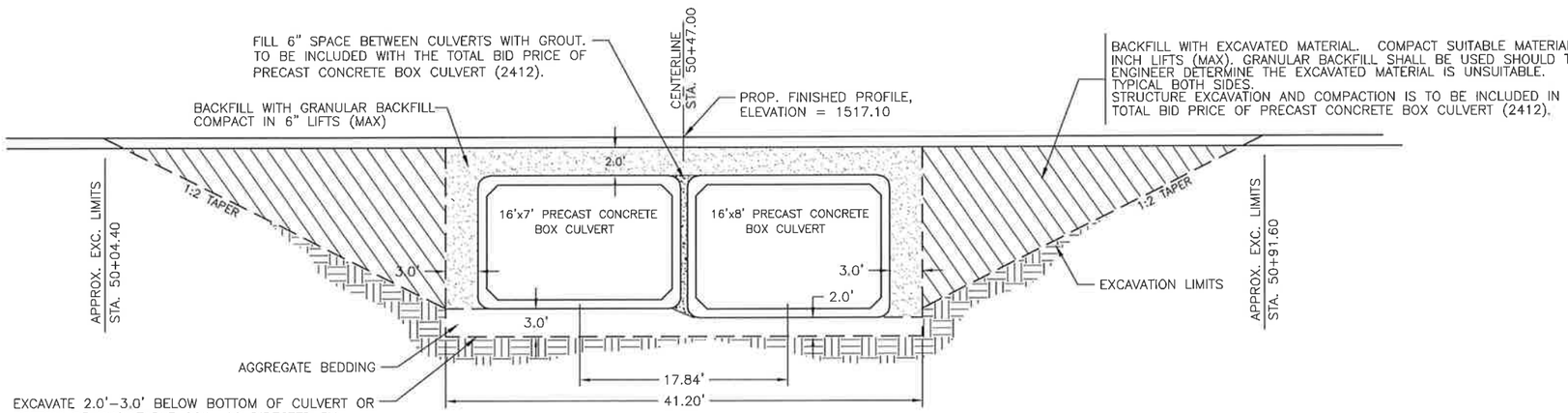
ELEVATION - BOX CULVERT SECTION

NOT TO SCALE



THRU CULVERT SECTION

NOT TO SCALE

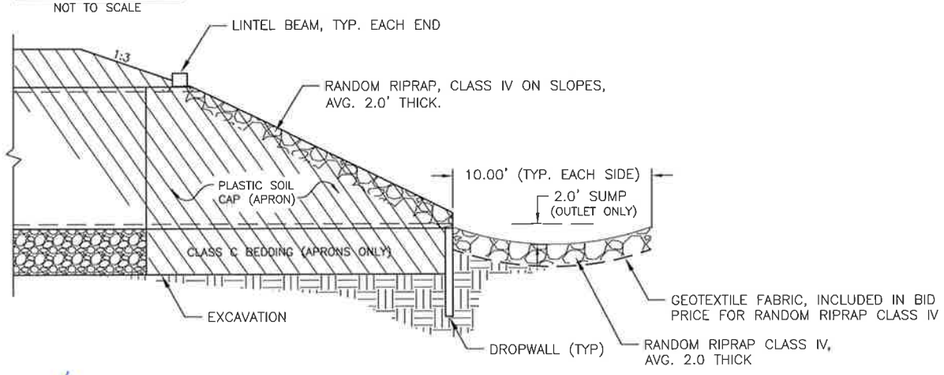


GENERAL CONSTRUCTION NOTES

1. NO VEHICLE TRAFFIC SHALL BE ALLOWED ABOVE CULVERT UNLESS 2.0' OF FILL HAVE BEEN PLACED.
2. ALL CONSTRUCTION SHALL BE COMPLETED WITHIN RIGHT OF WAY LIMITS OR EASEMENTS.
3. ALL MATERIALS, EQUIPMENT, AND LABOR REQUIRED TO CONSTRUCT COFFERDAMS, DIVERSIONARY CHANNELS, AND DEWATERING HOLES SHALL BE INCLUDED IN THE TOTAL BID PRICE OF CONCRETE BOX CULVERT.
4. SELECTED GRADING MATERIALS SHALL BE USED FOR ALL EMBANKMENT CONSTRUCTION AND SHALL CONSIST OF ALL SOILS ENCOUNTERED EXCEPT TOPSOILS, HIGHLY ORGANIC SOILS, DEBRIS, AND OTHER UNUSABLE MATERIALS. GRANULAR BACKFILL SHALL BE USED SHOULD THE ENGINEER DETERMINE THE EXCAVATED MATERIAL IS UNSUITABLE FOR EMBANKMENT.
5. THE CONTRACTOR SHALL SALVAGE TOPSOIL AND PLACE ON ALL AREAS THAT REQUIRE TURF ESTABLISHMENT. ALL SOILS SHALL BE PREPARED USING THE PROVISIONS OF MnDOT 2574.3 PRIOR TO SEEDING.
6. THE CONTRACTOR SHALL FILL THE 6" GAP BETWEEN CULVERT WITH GROUT. GROUT SHALL BE 1 PART PORTLAND CEMENT TO 3 PARTS SAND. GROUT SHALL BE TYPE 3A. ALL MATERIALS AND LABOR SHALL BE INCLUDED IN THE TOTAL BID PRICE OF THE CONCRETE BOX CULVERT (2412).
7. RIPRAP MATERIALS SHALL BE CLASS IV AND QUARRY-RUN MATERIAL. GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE ENTIRE RIPRAP AREA. GEOTEXTILE MATERIAL SHALL BE INCLUDED IN THE TOTAL BID PRICE OF RANDOM RIPRAP CLASS IV.
8. PLASTIC SOILS TREATMENT REQUIRED AT BOTH ENDS. COMPACT SELECT SOILS IN 6" (MAX) LIFTS.
9. PER D.N.R. RECOMMENDATIONS, THE WESTERLY BARREL SHALL BE BURIED 1.0' BELOW THE NATURAL CHANNEL BOTTOM. THE CULVERT ELEVATIONS SHALL BE VERIFIED AT THE TIME OF CONSTRUCTION STAKING. IF THE CULVERT POSITION OR ELEVATION IS NOT COMPATIBLE WITH THE EXISTING STREAM, THE ENGINEER SIGNING THESE PLANS SHALL BE NOTIFIED.
10. IT IS THE CONTRACTORS RESPONSIBILITY TO MAINTAIN THE TOWNSHIP ROAD AND RESTORE IT TO PRE-CONSTRUCTION CONDITION.
11. THE EXCAVATING CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE UNDERGROUND UTILITIES.
12. ALL EXPOSED SOILS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE LATER THAN SEVEN (7) DAYS AFTER CONSTRUCTION ACTIVITIES HAS TEMPORARILY OR PERMANENTLY CEASED. THE NORMAL WETTED PERIMETER MUST BE STABILIZED WITHIN 200 LINEAR FEET OF THE POINT OF DISCHARGE WITHIN 24 HOURS AFTER CONNECTING TO A SURFACE WATER.
13. DROP WALLS TO BE INCLUDED IN THE TOTAL BID PRICE FOR PRECAST CONCRETE BOX CULVERT (2412).

APRON SECTION

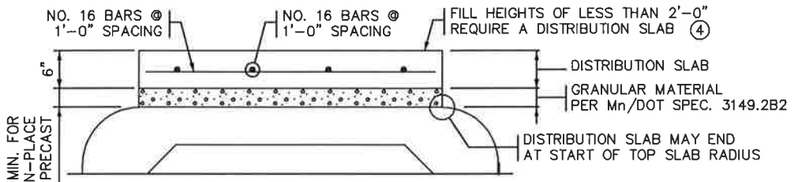
NOT TO SCALE



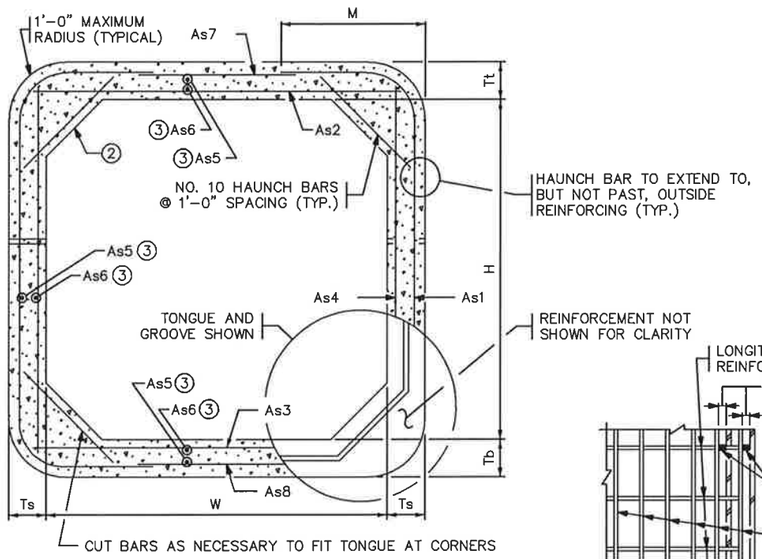
CERTIFIED BY _____ LIC. NO. 50428 DATE 6/20/17
LICENSED PROFESSIONAL ENGINEER

SECTION DETAILS

STATE AID PROJECT NO. 042-599-145

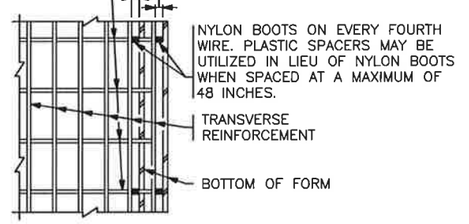


DISTRIBUTION SLAB SECTION

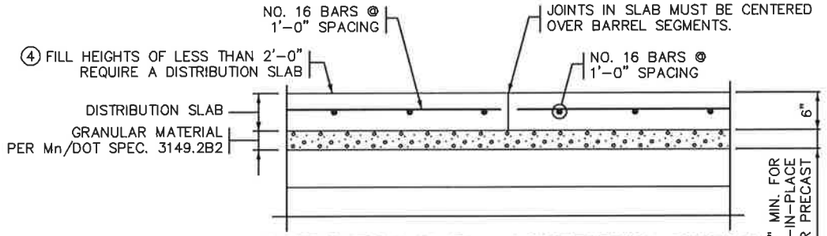


TRANSVERSE BARREL SECTION

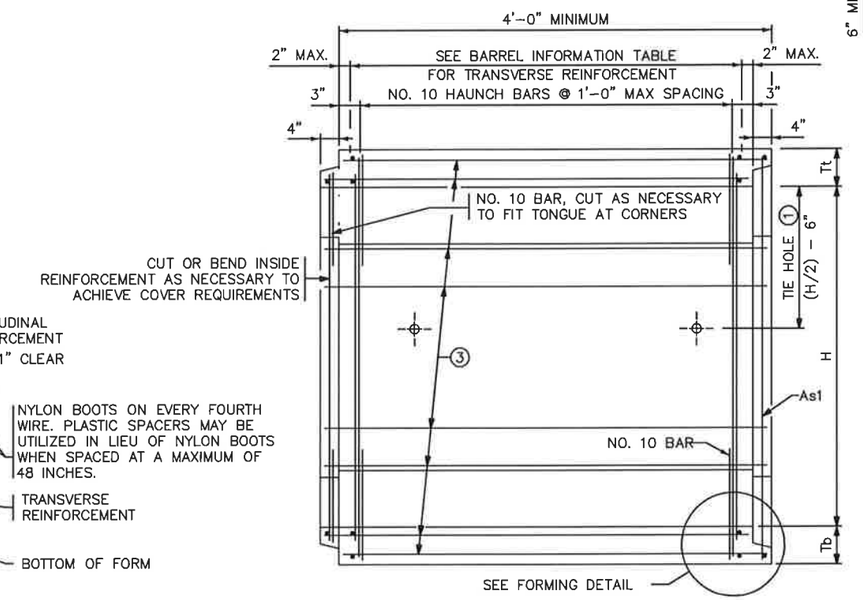
BAR REINFORCEMENT OPTION SHOWN



PLAN

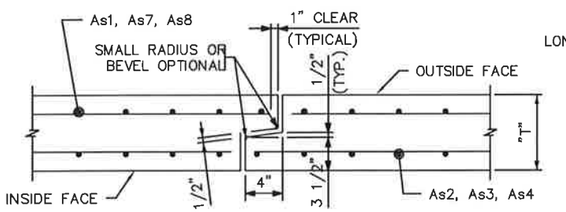


DISTRIBUTION SLAB – LONGITUDINAL SECTION

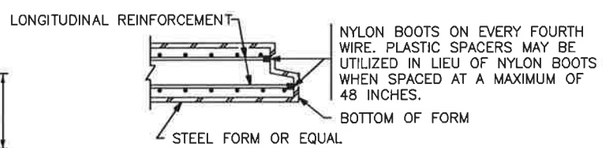


LONGITUDINAL BARREL SECTION

BAR REINFORCEMENT OPTION SHOWN

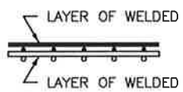


TONGUE AND GROOVE JOINT DETAIL



SECTION

FORMING DETAIL



FABRIC LAYER DETAIL

WHEN MORE THAN ONE LAYER OF WELDED WIRE FABRIC IS USED TO OBTAIN THE REQUIRED REINFORCEMENT AREAS, THE WIRES OF THE WELDED WIRE FABRIC SHALL BE PLACED AS SHOWN

CONSTRUCTION NOTES

CULVERTS TO BE CONSTRUCTED AS PER Mn/DOT SPEC. 2412 EXCEPT AS NOTED.

IF THE DISTANCE BETWEEN DOUBLE BARRELS IS LESS THAN 2'-0" USE EITHER PEA ROCK OR LEAN MIX BACKFILL(Mn/DOT SPEC. 2520) BETWEEN THE CULVERTS AS APPROVED BY THE ENGINEER. IF PEA ROCK IS USED PROVIDE APPROVED GROUT SEEPAGE CUTOFF CORE, MINIMUM 12" THICK, BETWEEN THE CULVERT'S TWO ENDS. SEE STANDARD FIGURE 5-395.115 FOR DETAILS. MINIMUM DISTANCE BETWEEN THE BARRELS IS 6".

THE WELDED WIRE FABRIC, SHEAR REINFORCEMENT AND REINFORCEMENT BARS SHALL CONFORM TO APPLICABLE REQUIREMENTS OF AASHTO M259.

1?" MIN. AND 2" MAX. CONCRETE COVER ON ALL REINFORCEMENT, INCLUDING SHEAR REINFORCEMENT, EXCEPT FOR TONGUE AND GROOVE DETAIL.

ANY OF THE FOLLOWING COMBINATIONS OF STEEL REINFORCEMENT MAY BE USED:
- (a) 1 OR 2 LAYERS OF WELDED WIRE FABRIC OR
- (b) 1 LAYER OF WELDED WIRE FABRIC AND 1 LAYER OF REINFORCEMENT BARS O
- (c) 1 LAYER OF REINFORCEMENT BARS.

THE REINFORCEMENT SHALL BE DEVELOPED IN ACCORDANCE WITH AASHTO "LRFD BRIDGE DESIGN SPECIFICATIONS". IF BAR REINFORCEMENT IS SUBSTITUTED FOR WELDED WIRE FABRIC, THE AREAS OF REINFORCEMENT SHALL BE INCREASED BY 8%.

THE MAXIMUM SIZE OF REINFORCEMENT BARS SHALL BE NO. 19. THE MAXIMUM WELDED WIRE FABRIC SIZE SHALL BE A W23 PER LAYER (MAXIMUM OF 2 LAYERS).

THE SPACING CENTER TO CENTER OF THE TRANSVERSE WIRES SHALL NOT BE LESS THAN 2" NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8".

WELDING WILL NOT BE ALLOWED ON REINFORCEMENT BARS OR WELDED WIRE FABRIC, EXCEPT THAT THE ORIGINAL WELDING REQUIRED TO MANUFACTURE WIRE FABRIC IS ACCEPTABLE.

WHEN REINFORCEMENT IS CUT, ADDITIONAL REINFORCEMENT SHALL BE ADDED ON BOTH SIDES OF THE CUT MEMBER TO REPLACE OR EXCEED THE CUT STEEL.

CONCRETE SHALL BE MIX NO. 3W36 WITH NO CALCIUM CHLORIDE ALLOWED.

SHOP DRAWING APPROVAL PER Mn/DOT SPEC. 3238.2A IS NOT REQUIRED UNLESS OPENINGS OR ATTACHMENTS ARE PLACED ON A BARREL SEGMENT.

COMPACT THE FIRST 1.5' (LOOSE) OF FILL ABOVE THE BOX WITH LIGHT COMPACTION EQUIPMENT SUCH AS PLATE COMPACTORS OR WALK BEHIND ROLLERS.

TRANSVERSE REINFORCEMENT IS PARALLEL TO THE CULVERT SPAN. LONGITUDINAL REINFORCEMENT IS PERPENDICULAR TO THE CULVERT SPAN.

(1) CULVERT TIES ARE TO BE 1" DIAMETER RODS. SEE STANDARD PLATE NO. 3145 FOR CONNECTION DETAILS.

(2) HAUNCH SIZES ARE TO BE 12" VERTICAL, 12" HORIZONTAL ON ALL BOX SIZES.

(3) LONGITUDINAL REINFORCEMENT DENOTED AS As5 AND As6 MUST BE PLACED IN ALL SLABS AND WALLS AND MUST BE 0.06 SQ. IN./FT. MIN.

(4) FILL HEIGHTS OF LESS THAN 2'-0" REQUIRE A DISTRIBUTION SLAB.

USE 3Y43 CONCRETE FOR THE DISTRIBUTION SLAB.

CAST-IN-PLACE DISTRIBUTION SLABS SHALL BE 6" THICK. PROVIDE 3" MINIMUM GRANULAR MATERIAL PER Mn/DOT SPEC. 3149.2B2 BETWEEN BARREL AND DISTRIBUTION SLAB.

PRECAST DISTRIBUTION SLABS SHALL BE 6" THICK AND MAY BE USED FOR FILL HEIGHTS OVER 1'-0". PROVIDE 6" MINIMUM GRANULAR MATERIAL PER Mn/DOT SPEC 3149.2B2 BETWEEN BARREL AND DISTRIBUTION SLAB.

IF DISTRIBUTION SLAB IS USED AS PAVEMENT SURFACE IT MUST BE REDESIGNED PER THE Mn/DOT PAVEMENT DESIGN MANUAL.

BARREL INFORMATION TABLE ***

LOCATION	SIZE	CLASS	f'c (P.S.I.)	FILL HEIGHT RANGE (FT.)	DISTRUBUTION SLAB REQUIRED *	RECESSED TIE RODS REQUIRED **	DIMENSIONS W (FT.)	H (FT.)	Tt (IN.)	Tb (IN.)	Ts (IN.)	WEIGHT (LBS./FT.)	WELDED WIRE FABRIC REINFORCEMENT As1 AREA (IN.!/FT.)	As1 LENGTH (FT.)	As1 M (FT.)	As2 AREA (IN.!/FT.)	As2 LENGTH (FT.)	As3 AREA (IN.!/FT.)	As3 LENGTH (FT.)	As4 AREA (IN.!/FT.)	As4 LENGTH (FT.)	As7 AREA (IN.!/FT.)	As7 LENGTH (FT.)	As8 AREA (IN.!/FT.)	As8 LENGTH (FT.)
STA. 50+38	16'x8'	2	5000	3'-7'	NO	NO	16'	8'	10"	11"	8"	6450	0.97	17'-2"	4'-0"	1.20	16'-6"	1.26	16'-6"	0.20	8'-6"	0.27	12'-9"	0.27	12'-9"
STA. 50+56	16'x7'	2	5000	3'-7'	NO	NO	16'	7'	10"	11"	8"	6250	1.05	16'-6"	4'-2"	1.14	16'-6"	1.16	16'-6"	0.20	7'-6"	0.27	12'-10"	0.27	12'-10"

* ALL CLASS 1 CULVERTS WITH FILL HEIGHTS OF LESS THAN 2'-0" REQUIRE A DISTRIBUTION SLAB. IF A DISTRIBUTION SLAB IS NOT REQUIRED, INDICATE "NO" IN THIS BOX.

** FOR PEDESTRIAN CULVERT APPLICATIONS HIDE-AWAY OR RECESSED TIE CONNECTIONS ARE REQUIRED, SEE MnDOT STANDARD PLATE 3145F. IF REQUIRED, INDICATE "YES" IN THIS BOX.

*** BOX CULVERTS WITH SPANS FROM 6 TO 14 FT. ARE DESIGNED FOR HL-93 LIVE LOADS (AASHTO LRFD 3.6.2.1) NOT INCLUDING THE DESIGN LANE LOAD. BOXES WITH SPANS OF 16 FT. ARE DESIGNED FOR HL-93 LIVE LOADS INCLUDING THE DESIGN LANE LOAD.

REVISION:

APPROVED: MARCH 24, 2011
Nancy Daubenberger
STATE BRIDGE ENGINEER

STATE AID PROJ. NO. 042-599-145

CERTIFIED BY _____ PROFESSIONAL ENGINEER
REG. NO. 50428 6/20 ,2017

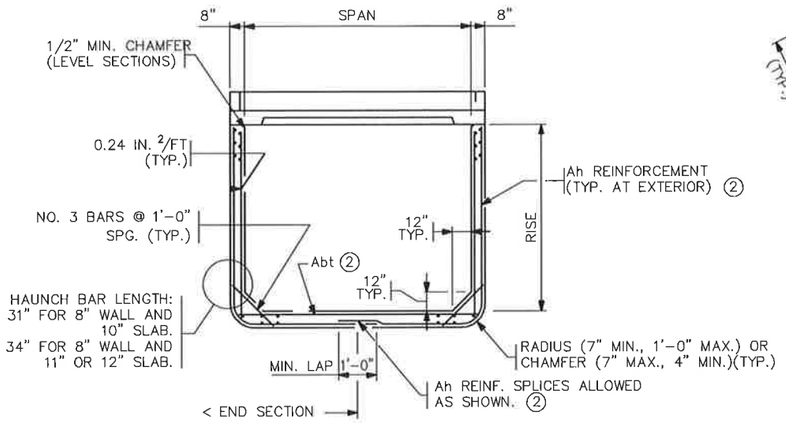
TITLE: BARREL DETAILS

DES: _____ DR: _____ APPROVED:
CHK: _____ CHK: _____

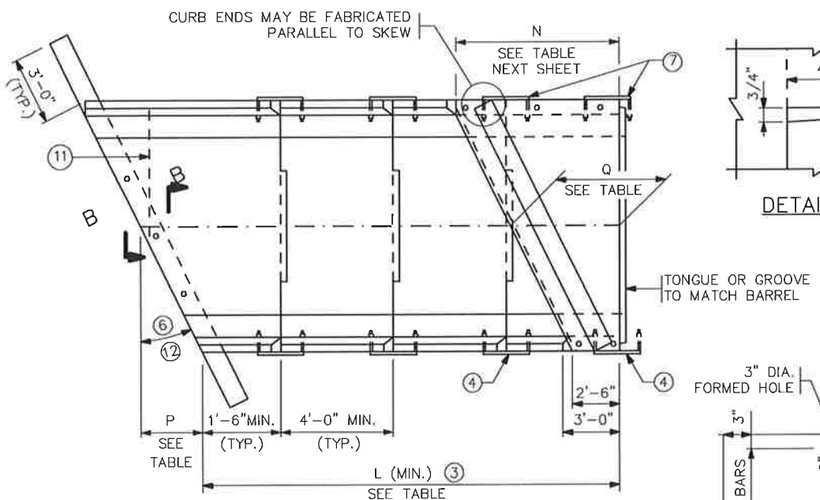
SHEET NO. 04 OF 08 SHEETS

FIG. 5-395.101(A)

BRIDGE NO. 42J35

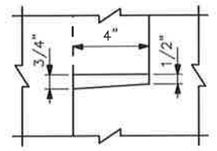


END VIEW

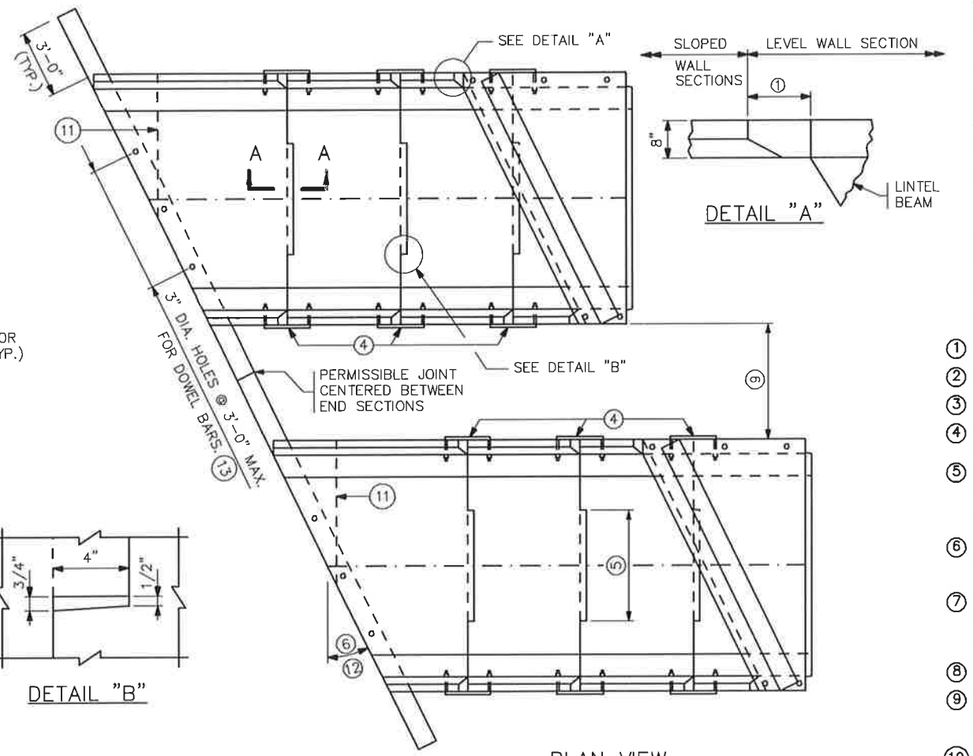


PLAN VIEW

SINGLE BARREL OPTION



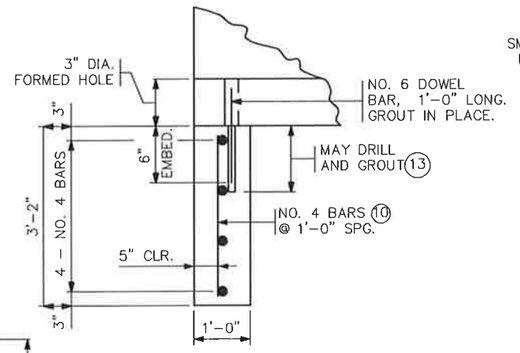
DETAIL "B"



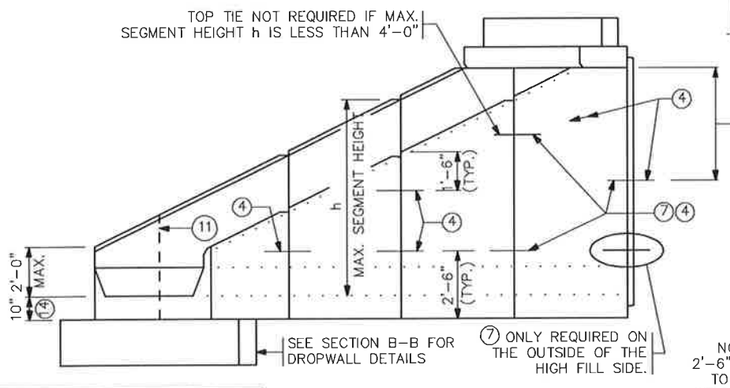
PLAN VIEW

DOUBLE-BARREL OPTION

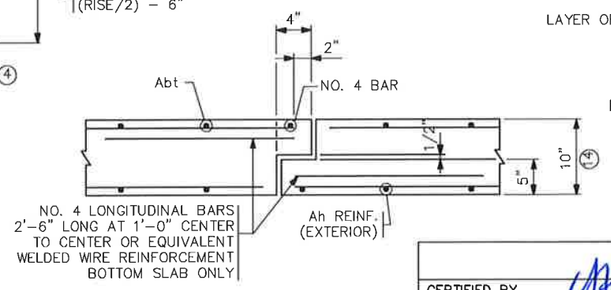
DETAIL "A"



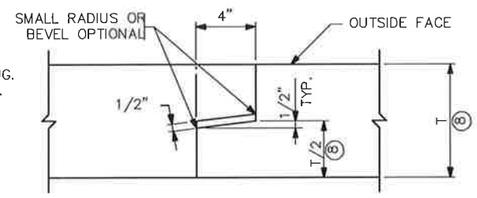
SECTION B-B



ELEVATION

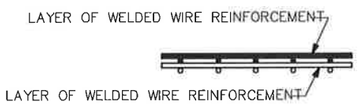


SECTION A-A



TONGUE AND GROOVE JOINT

MAKE DIMENSION OF TONGUE OR GROOVE ON ADJACENT PRECAST BARREL SECTIONS SO INSIDE WALLS ARE FLUSH.



REINFORCEMENT LAYER DETAIL

WHEN MORE THAN ONE LAYER OF WELDED WIRE REINFORCEMENT IS USED TO OBTAIN THE REQUIRED REINFORCEMENT AREAS, PLACE THE WIRES OF THE WELDED WIRE REINFORCEMENT AS SHOWN

CONSTRUCTION NOTES

SEE STANDARD FIG. 5-395.101(A) AND FIG. 5-395.101(B) FOR ADDITIONAL DIMENSIONS AND CONSTRUCTION NOTES.

ON ALL END SECTIONS FOR WATERWAYS, USE DROPWALLS ON INLET AND OUTLET ENDS.

FINISH ALL EXPOSED EDGES OF CONCRETE WITH 1/2" OR 3/4" CHAMFER OR RADIUS UNLESS OTHERWISE NOTED.

USE CONCRETE MIX 3W82 WITH NO CALCIUM CHLORIDE ALLOWED.

USE DROPWALL CONCRETE MIX 3S52, OR 3Y82 IF PRECAST. LIMITS FOR DROPWALL EXCAVATION TO BE APPROXIMATELY THE SAME AS DROPWALL DIMENSIONS. FURNISHING AND INSTALLATION OF DROPWALL IS INCLUDED IN PRICE BID FOR END SECTIONS.

PLACE LONGITUDINAL REINFORCEMENT WITH A MINIMUM OF 0.06 SQ. IN. PER FT. ON BOTH FACES.

NO TONGUE OR GROOVE REQUIRED IN WALLS BETWEEN END SECTIONS.

SEE STANDARD FIG. 5-395.115 FOR EMBANKMENT PROTECTION.

(1) 81/8" @ 15°; 105/8" @ 30°; 1'-2" @ 45°

(2) SEE STANDARD FIG. 5-395.110(B) FOR REINFORCEMENT TABLES.

(3) NUMBER OF SECTIONS VARIES WITH CULVERT RISE.

(4) EXCEPT AS NOTED, USE 1" DIA. CULVERT TIES. SEE STANDARD PLATE NO. 3145 FOR DETAILS. TWO TIES ARE REQUIRED PER JOINT WHERE h IS GREATER THAN 4'.

(5) 3'-6" MIN. TONGUE AND 3'-7" MIN. GROOVE FOR CULVERTS WITH 6'-0" SPANS. 5'-0" MIN. TONGUE AND 5'-1" MIN. GROOVE FOR CULVERTS WITH SPANS GREATER THAN 6'-0". CENTER TONGUE AND GROOVE ON < OF EACH APRON JOINT. TONGUE AND GROOVE JOINT ON ALL THREE SIDES OF APRON IS PERMISSIBLE.

(6) FOR SKEW ANGLES OVER 71/2° UP TO 221/2°, USE A 15° SKEW END SECTION. FOR SKEW ANGLES OVER 221/2° UP TO 371/2°, USE A 30° SKEW END SECTION. FOR SKEW ANGLES OVER 371/2° UP TO 45°, USE A 45° SKEW END SECTION.

(7) PROVIDE EXTRA STRONG CONNECTION AT LOCATION SHOWN; REQUIRED ONLY ON HIGH FILL SIDE FOR 45° SKEW END SECTIONS OVER 6'-0" HIGH. FOR MULTIPLE BARREL OPTION, ONLY INCLUDE EXTRA STRONG TIES ON THE OUTSIDE OF THE HIGH FILL SIDE. SEE STANDARD FIG. 5-395.110(B) FOR DETAILS.

(8) DIMENSION "T" IS EQUAL TO Tt, Tb OR Ts.

(9) REFER TO THE GENERAL PLAN AND ELEVATION SHEET FOR THE DISTANCE BETWEEN BARRELS OF ADJACENT BOXES AND TO STANDARD FIGURE 5-395.115 FOR MATERIAL REQUIREMENTS FOR FILL BETWEEN ADJACENT BOXES.

(10) AS AN ALTERNATE TO THE ONE LAYER OF WELDED WIRE REINFORCEMENT CONTRACTOR MAY PROVIDE TWO LAYERS OF REBAR OR WELDED WIRE REINFORCEMENT WITH THE STEEL AREA EQUAL TO HALF OF THE TEMPERATURE STEEL PER CODE REQUIREMENTS IN EACH FACE OF THE DROPWALL.

(11) ON THE LAST SEGMENT OF THE 45° SKEWED APRONS, A TRANSVERSE JOINT IN THE BOTTOM IS PERMITTED. A SPECIAL TIE, SIMILAR TO THE SIDE TIE, MUST BE PROVIDED. THE TIE SHALL BE INSET AND THE SPACE FILLED WITH AN APPROVED GROUT.

(12) FOR BOX CULVERTS WITH SPANS OF 16' THE MAXIMUM SKEW SHALL BE 30°.

(13) FILL HOLE WITH GROUT. GROUT CONSISTS OF 1 PART CEMENT AND 2 PARTS SAND. USE TYPE 1A AIR ENTRAINED PORTLAND CEMENT. GROUT MIX MAXIMUM SLUMP IS 4".

(14) APRON BOTTOM SLAB THICKNESS MAY BE 8" FOR CULVERTS WITH 6' SPANS ONLY. BOTTOM SLAB THICKNESS MAY BE INCREASED UP TO 2" MAX. PROVIDED COVER IS 11/2" MIN., 2" MAX.

MIN. LENGTH L

RISE (FT.)	15° SKEW	30° SKEW	45° SKEW
4	7'-13/4"	7'-73/8"	8'-77/8"
5	9'-21/2"	9'-111/8"	11'-57/8"
6	11'-33/8"	12'-27/8"	14'-33/4"
7	13'-41/4"	14'-65/8"	17'-13/4"
8	15'-51/8"	16'-101/4"	19'-115/8"
9	17'-57/8"	19'-2"	22'-95/8"
10	19'-63/4"	21'-53/4"	25'-71/2"
11	21'-75/8"	23'-93/8"	28'-51/2"
12	23'-81/2"	26'-11/8"	31'-33/8"
13	25'-93/8"	28'-47/8"	34'-13/8"
14	27'-101/8"	30'-81/2"	36'-111/4"

LENGTH P

SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW
6	0'-113/4"	2'-13/8"	3'-8"
8	1'-3"	2'-83/8"	4'-8"
10	1'-61/4"	3'-31/4"	5'-8"
12	1'-93/8"	3'-101/4"	6'-8"
14	2'-05/8"	4'-51/8"	7'-8"
16	2'-37/8"	5'-0"	(12)

LENGTH Q

SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW
6	3'-53/4"	4'-73/8"	6'-2"
8	3'-9"	5'-23/8"	7'-2"
10	4'-0"	5'-91/4"	8'-2"
12	4'-33/8"	6'-41/8"	9'-2"
14	4'-65/8"	6'-111/8"	10'-2"
16	4'-97/8"	7'-61/8"	(12)

REVISION: 10-09-2015

APPROVED: MARCH 24, 2011
Nancy Daubenberger
STATE BRIDGE ENGINEER

STATE AID PROJ. NO: 042-599-145

CERTIFIED BY _____ 6/20/17
LICENSED PROFESSIONAL ENGINEER DATE

NAME: Aaron VanMoer LIC. NO: 50428

TITLE: PRECAST CONCRETE END SECTION TYPE III - SINGLE OR DOUBLE BARREL FOR SKEWS 7 1/2° TO 45°

FIG. 5-395.110(A)

DES:	DR:	APPROVED:
CHK:	CHK:	

SHEET NO. 05 OF 08 SHEETS

BRIDGE NO. 42J35

Ah REINFORCEMENT		
HEIGHT h (FT.)	Ah (IN^2/FT.)	
	15° & 30° SKEW	45° SKEW
7 OR LESS	0.192	0.192
8	0.20	0.24
9	0.29	0.36
10	0.42	0.53
11	0.60	0.75
12	0.78	0.98
13	1.03	1.36
14	1.38	1.85

NOTE: h IS THE LARGEST VERTICAL DIMENSION OF THE SEGMENT.

Abt REINFORCEMENT	
SPAN (FT.)	Abt (IN!/FT.)
6–10	0.20
12	0.30
14	0.39
16	0.39

LINTEL BEAM REINFORCEMENT		
SPAN (FT.)	BOTTOM REINFORCEMENT	
	A1	A2
6	NO. 4 @ 1'–0"	NO. 4 @ 9"
8	NO. 4 @ 1'–1"	NO. 4 @ 6"
10	NO. 4 @ 9"	NO. 5 @ 6"
12	NO. 5 @ 9"	NO. 6 @ 6"
14	NO. 6 @ 9"	NO. 8 @ 6"
16	NO. 6 @ 9"	NO. 8 @ 6"

LENGTH N			
SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW
6	4'–33/8"	6'–41/4"	9'–2"
8	4'–97/8"	7'–6"	11'–2"
10	5'–41/4"	8'–77/8"	13'–2"
12	5'–103/4"	9'–93/4"	15'–2"
14	6'–51/8"	10'–115/8"	17'–2"
16	6'–115/8"	12'–11/2"	NA (7)

LINTEL BEAM THICKNESS			
SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW
≤12	9"	9"	9"
14	10"(8)	10"(8)	10"(8)
16	10"(8)	10"(8)	NA (7)

CONSTRUCTION NOTES

SEE STANDARD FIG. 5–395.101(A) AND FIG. 5–395.101(B) FOR ADDITIONAL DIMENSIONS AND CONSTRUCTION NOTES.

ALL END SECTIONS REQUIRE CURB ON LINTEL BEAM.

GROUT CONSISTS OF 1 PART CEMENT AND 2 PARTS SAND. USE TYPE 1A AIR ENTRAINED PORTLAND CEMENT. GROUT MIX MAXIMUM SLUMP IS 4".

STRUCTURAL STEEL PER SPEC. 3306.

WELDING PER SPEC. 2471.

GALVANIZE STRUCTURAL STEEL PER SPEC. 3394.

GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.

(1) NO. 8 DOWEL, 1'–0" LONG, 2" DIA. HOLE IN THE TOP OF THE WALL SECTION AND 3" DIA. HOLE IN THE LINTEL. FILL HOLE WITH GROUT.

(2) PROVIDE ADDITIONAL 3" HOLES AT 4'–0" MAXIMUM SPACING WHEN SIDE OF LINTEL BEAM IS OVER 6 FT.

(3) CHECK THE LOCATION TO DETERMINE WHETHER A TONGUE OR A GROOVE IS USED. TONGUE AND GROOVE TO TERMINATE AT CULVERT RADIUS.

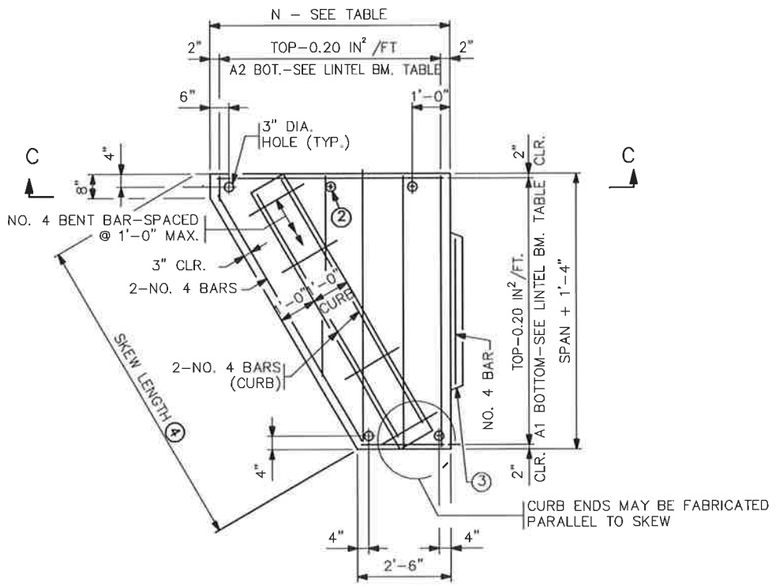
(4) FOR SKEW LENGTH UNDER 10' USE NO. 8 BARS. FOR SKEW LENGTH OF 10' TO 14' USE NO. 9 BARS. FOR SKEW LENGTH OVER 14' TO 18' USE NO. 10 BARS. FOR SKEW LENGTH OVER 18' TO 22' USE NO. 11 BARS OR EQUAL. SKEW LENGTH IS DISTANCE BETWEEN OUTSIDE FACES OF END SECTION ALONG LINTEL BEAM.

(5) SEE LINTEL BEAM THICKNESS TABLE ON THIS SHEET. USE LINTEL BEAMS WITH 5000 PSI 3W82 CONCRETE UNLESS OTHERWISE SPECIFIED.

(6) ALTERNATE BAR BEND MAY BE USED FOR NO. 4 BENT BARS.

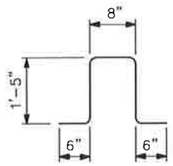
(7) FOR CULVERTS WITH SPANS OF 16' THE MAXIMUM SKEW IS 30°.

(8) ALTERNATIVELY A 9" THICKNESS MAY BE USED WITH 6500 PSI 3W82 CONCRETE.

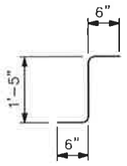


PLAN VIEW

LINTEL BEAM WITH INTEGRAL CURB

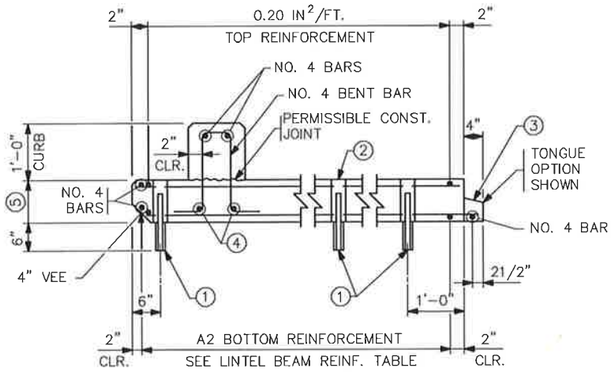


NO. 4 BENT BAR



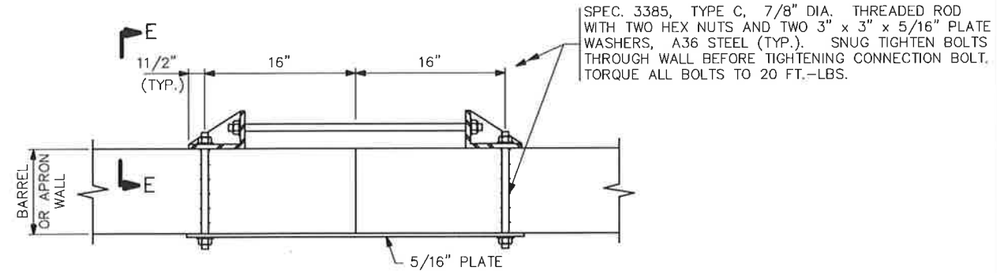
NO. 4 BENT BAR ALTERNATE

(6) 2 REQUIRED

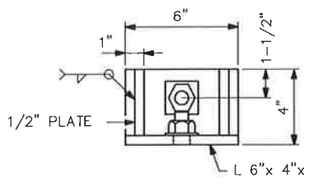


SECTION C–C

LINTEL BEAM WITH INTEGRAL CURB



PLAN VIEW



SECTION E–E

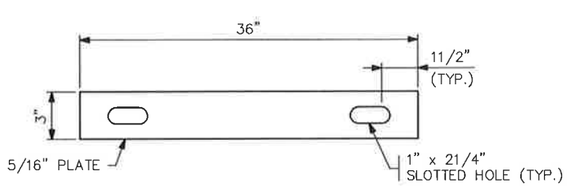


PLATE DETAIL

EXTRA STRONG CONNECTION DETAILS

REVISION: 10–09–2015

APPROVED: MARCH 24, 2011

Nancy Dorbenberger
STATE BRIDGE ENGINEER

STATE PROJ. NO: 042–599–145

CERTIFIED BY _____ LICENSED PROFESSIONAL ENGINEER DATE 6/20/17

NAME: Aaron VanMoer LIC. NO: 50428

PRECAST CONCRETE END SECTION TYPE III – SINGLE OR DOUBLE BARREL FOR SKEWS 7 1/2°TO 45°

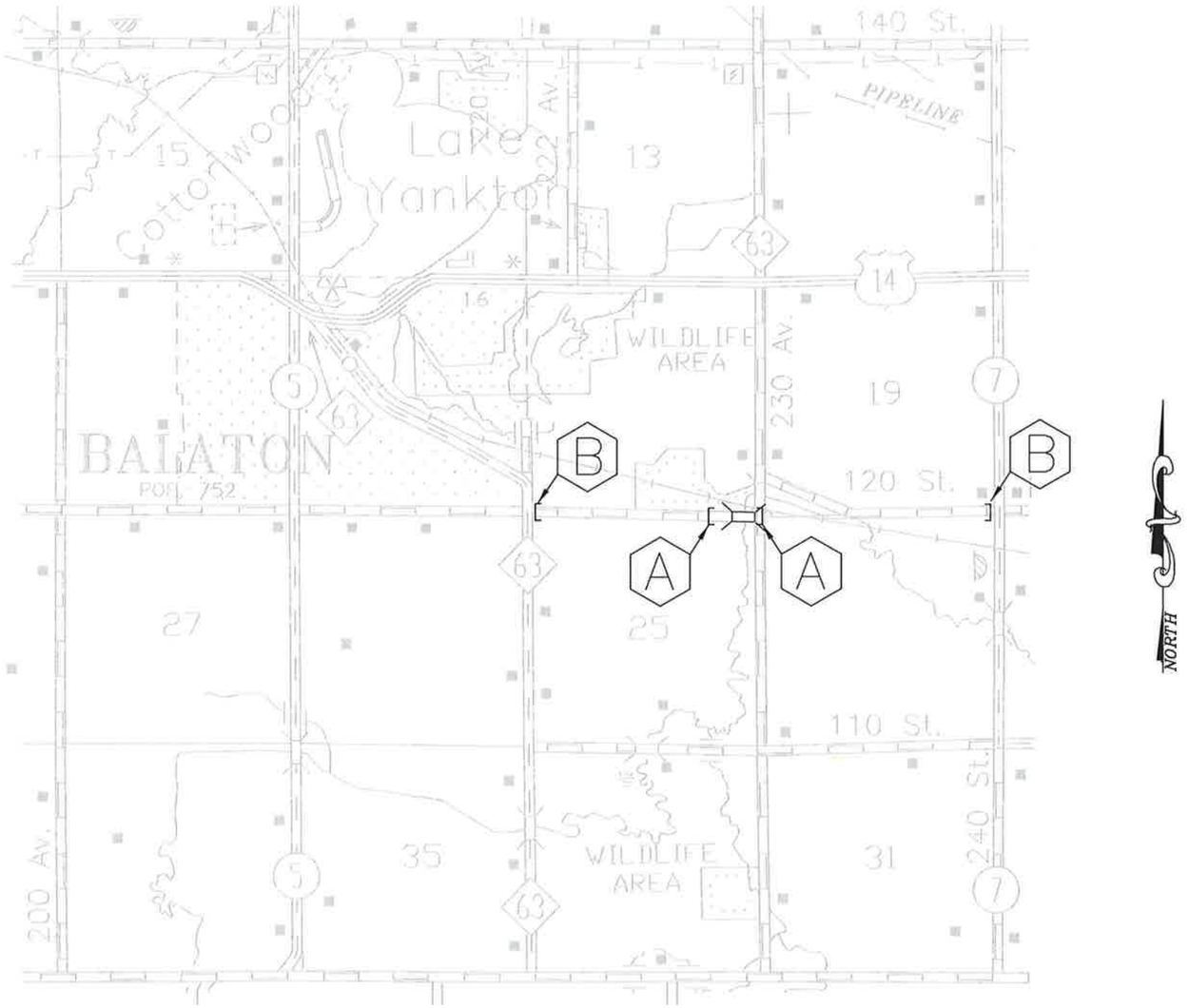
DES: DR: APPROVED:

CHK: CHK:

SHEET NO. 06 OF 08 SHEETS

FIG. 5–395.110(B)

BRIDGE NO. 42J35



SIGN TABLE					
SIGN	SIGN NO.	QUANTITY	SIZE	COLOR	FLASHERS
	TYPE III BARRICADE	8	60"x48"	ORANGE ON WHITE	4
BRIDGE CLOSED	R11–2A	4	48"x30"	BLACK ON WHITE	
BRIDGE CLOSED 1.0 MILES AHEAD LOCAL TRAFFIC ONLY	R11–3C	2	60"x30"	BLACK ON WHITE	

TRAFFIC CONTROL PLAN

ALL COSTS INCURRED FOR MATERIALS, INSTALLATION, MAINTENANCE AND REMOVAL OF TRAFFIC CONTROL DEVICES AS SHOWN ON THIS SHEET AND RELATED WORK DURING CONSTRUCTION SHALL BE INCLUDED IN PRICE BID FOR ITEM "TRAFFIC CONTROL".

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE CURRENT EDITION OF THE MN MUTCD INLUDING THE CURRENT TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS FIELD MANUAL.

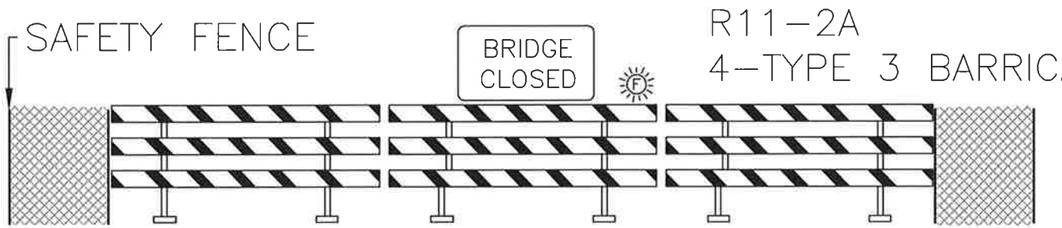
BARRICADE PLACEMENT TO BE DETERMINED IN THE FIELD SO AS NOT TO OBSTRUCT VISION TO OR FROM ROADWAY ENTRANCES.

EXACT LOCATIONS OF TRAFFIC CONTROL DEVICES TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

ALL TRAFFIC CONTROL DEVICES SHALL HAVE REFLECTIVE SHEETING.

THE USE OF TEMPORARY ORANGE CONSTRUCTION FENCING IS REQUIRED BY THE ENGINEER TO COMPLETELY CLOSE OFF ANY SPECIFIC WORK AREA.

A



R11–2A
4–TYPE 3 BARRICADES

B

R11–3C
1–TYPE 3 BARRICADE

CERTIFIED BY _____ LIC. NO. 50428 DATE 6/20/17
LICENSED PROFESSIONAL ENGINEER

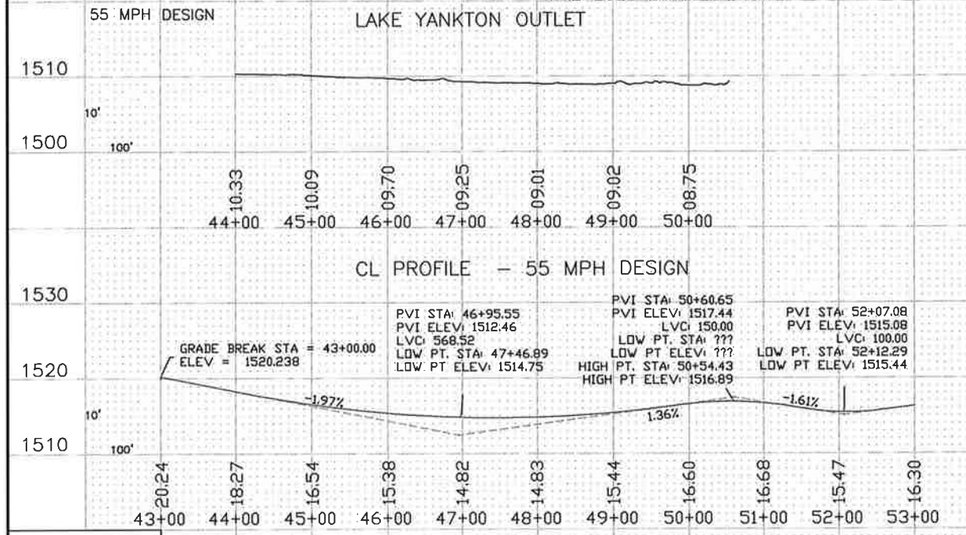
TRAFFIC CONTROL PLAN

STATE AID PROJECT NO. 042–599–145

CONTRACTED PROFILE

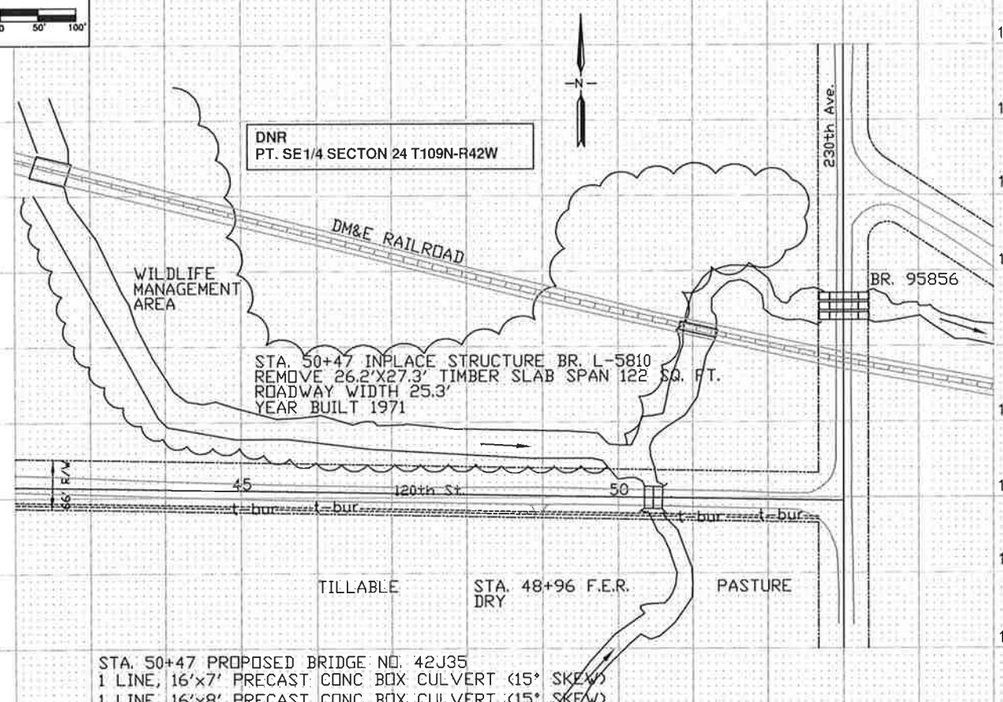
SCALE:HOR. 0 50' 100' VER. 0 5' 10'

INPLACE INLET 1506.57
INPLACE OUTLET 1506.49
LOW TIMBER 1515.35
PROPOSED INLET: 1506.50
PROPOSED OUTLET: 1506.40

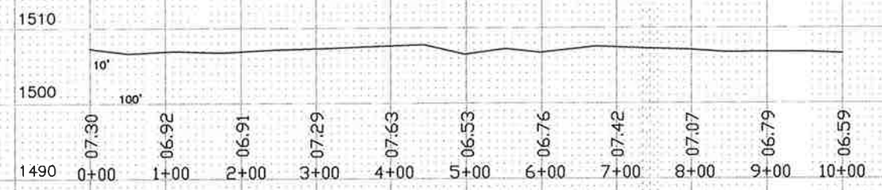


PLAT

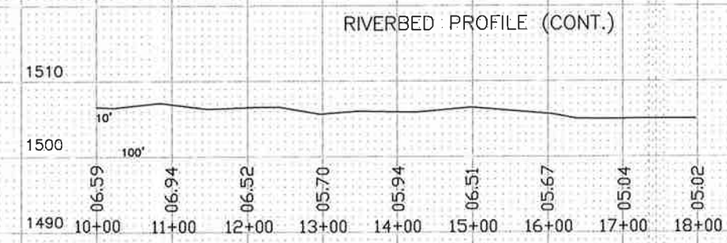
SCALE: 0 50' 100'



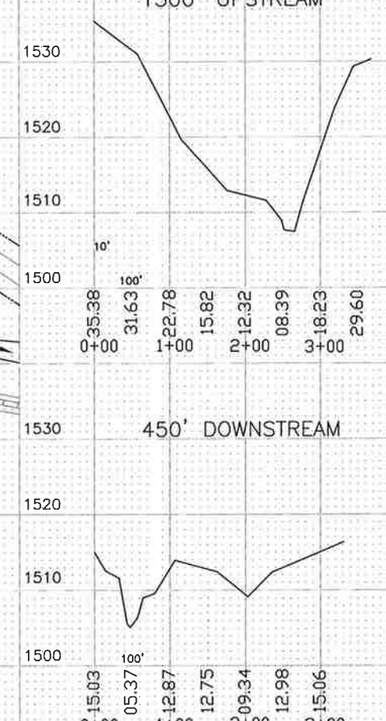
RIVERBED PROFILE



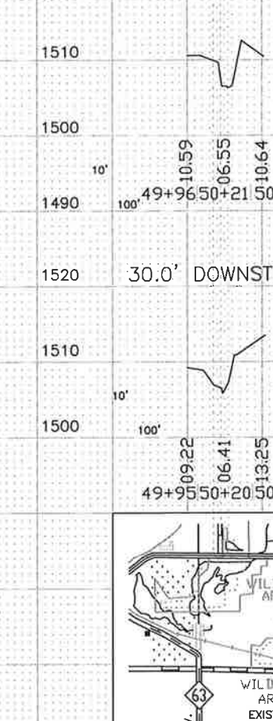
RIVERBED PROFILE (CONT.)

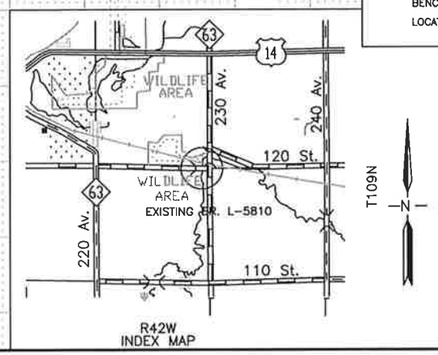


1300' UPSTREAM



30.0' UPSTREAM





LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

1. Special features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating.

2. Other bridges or culverts over the same stream (particulary structures which carry high water without overflow of roadway) Given location, type, length, height above high water, cross-sectional area ect.

UPSTREAM: SEC. 36 T109N-R42W BR. NO. 96283 1-LINE 12'x6' PRECAST CONCRETE BOX CULVERT 72 SQ. FT.

UPSTREAM: SEC. 36 T109N-R42W BR. NO. 42J12 2-LINES 14'x8' PRECAST CONCRETE BOX CULVERT 224 SQ. FT.

DOWNSTREAM: SEC. 19 T109N-R42W BR. NO. 95856 3-LINE 10'X7' PRECAST CONCRETE BOX CULVERT 210 SQ. FT.

3. Apparent highwater elevation: 1516.00 Obtained from: Local (Township)

4. Other data: Approx. velocity of water at time of survey

HYDRAULIC ENGINEER'S RECOMMENDATION

DATE 5-23-2017

Stream or ditch designation TRIBUTARY, DES MOINES RIVER
Drainage area 43.5 SQUARE MILES
Max. discharge on record UKN Design discharge (50 yr. freq.) 1370 C.F.S.
Max. observed highwater elevation 1516.00 Design highwater elevation 1514.8
Design mean velocity through structure 6.1 F.P.S.
Low superstructure at or above elevation
Flowline elevation 1506.5 (INLET) 1506.4 (OUTLET) Skew angle 15 DEGREES
Water area req'd. below elevation Sq. Ft. at Rt. angles to channel

In the interest of flood plain zoning the regional flood (100 yr. freq.) is 1710 C.F.S. at stage 1514.6 and mean velocity of 6.8 F.P.S. with 0.8 Ft. swellhead
The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Dept. of Natural Resources.

FOUNDATION ENGINEER'S RECOMMENDATION

DATE

Bridge survey sheets made from

BENCH mark elevation 1517.15 (NAVD 88)
LOCATION NORTHWEST CORNER OF NORTH CURB

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

AT MILE POINT ON 120th St. (T.H.,C.S.A.H.,C.R. act.)
PROPOSED BRIDGE LOCATED 1.0 MILES SE OF
BALATON
SEC. 24/25 TWP. T109N R R42W
TOWNSHIP ROCK LAKE COUNTY LYON

BRIDGE NO.
42J35

CERTIFIED BY _____ LIC. NO. 50428 DATE 6/20/17
LICENSED PROFESSIONAL ENGINEER

BRIDGE SURVEY

STATE AID PROJECT NO. 42-599-145 (120th St.) SHEET 08 OF 08 SHEETS