

MINNESOTA DEPARTMENT OF TRANSPORTATION CLEARWATER COUNTY CONSTRUCTION PLAN FOR

BRIDGE REPLACEMENT OVER RUFFY BROOK

SAP 015-599-025

MINN. PROJ. NO.

GOVERNING SPECIFICATIONS

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN

INDEX

SHEET NO.	1	TITLE SHEET
SHEET NO.	2-3	ESTIMATED QUANTITIES & TYPICAL SECTION
SHEET NO.	4	SWPPP
SHEET NO.	5	BRIDGE SURVEY SHEET
SHEET NO.	6-9	BOX CULVERT DETAILS

THIS PLAN CONTAINS 9 SHEETS

UTILITIES

CLEARWATER-POLK ELECTRIC - TELEPHONE NO. 218-694-6241 (BAGLEY)
GARDEN VALLEY TELEPHONE - TELEPHONE NO. 218-687-5251 (ERSKINE)
GOPHER STATE ONE CALL - TELEPHONE NO. 1-800-252-1166
CITY OF BAGLEY - TELEPHONE NO. 218-694-2300

NOTE: THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINES FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES".

BRIDGE DESIGN DATA

DESIGNED IN ACCORDANCE WITH 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

HL-93 LIVE LOAD
BARREL INSIDE WIDTH = 16'
BARREL INSIDE HEIGHT = 7'
BARREL LENGTH = 36'
EST. MIN. FILL DEPTH = 2'
EST. MAX. FILL DEPTH = 3'

HL-93 LRFR
BRIDGE OPERATING RATING FACTOR RF = 1.3

DESIGN SPEED 40 MPH
BASED ON STOPPING SIGHT DISTANCE
HEIGHT OF EYE 3.5' HEIGHT OF OBJECT 2.0'
DESIGN SPEED NOT ACHIEVED AT: NA

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

DANIEL SAUVE P.E. CLEARWATER CO. ENGINEER LIC. NO. 24542 DATE

REVIEWED FOR COMPLIANCE WITH STATE AID RULES/POLICY DISTRICT STATE AID ENGINEER DATE

Approved for State Aid Funding FOR STATE AID ENGINEER DATE

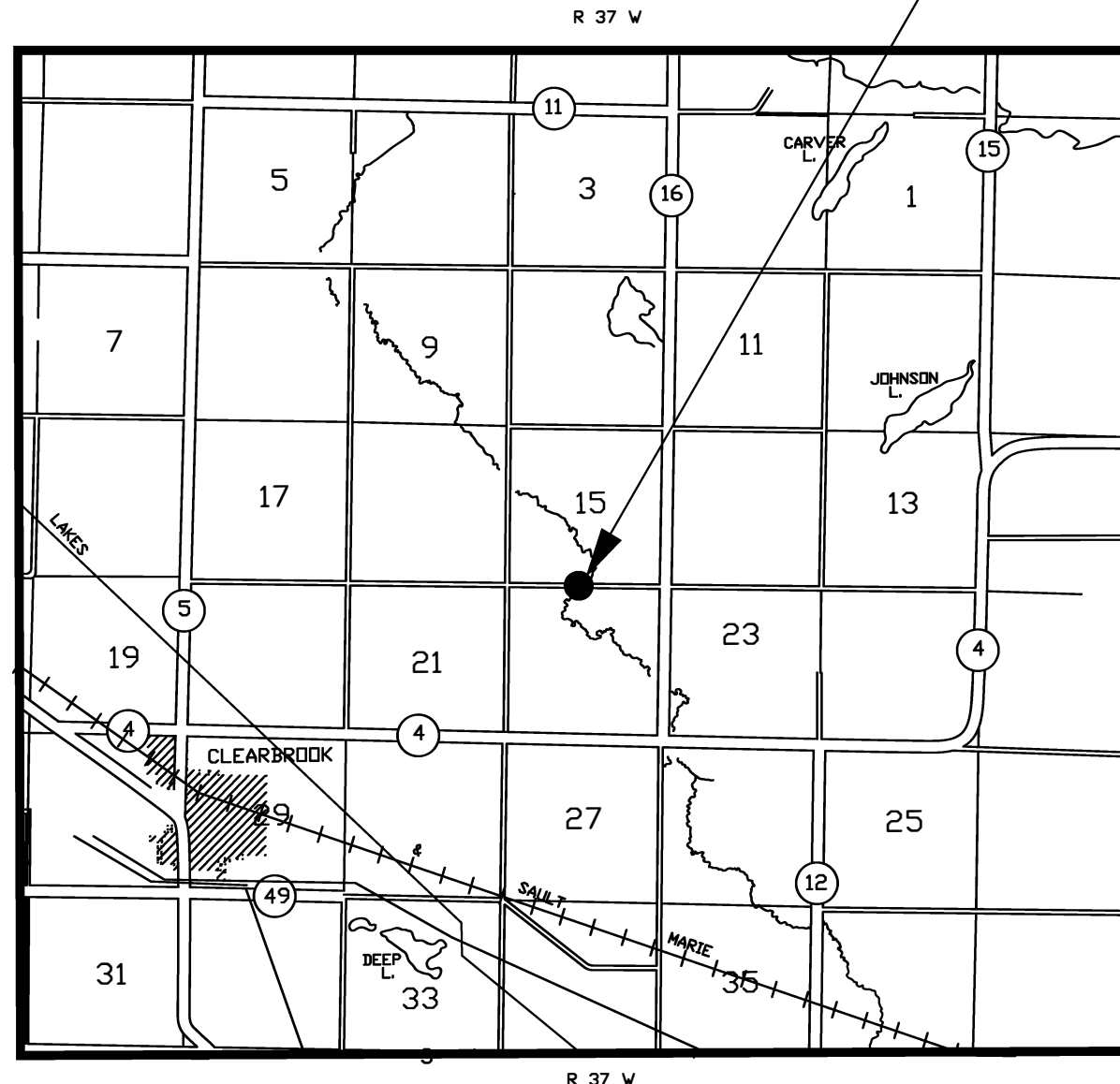
LOCATION LEON TOWNSHIP ROAD L-33 (490TH STREET), 1.0 MILES NORTH AND 2.5 MILES EAST OF CLEARBROOK (GEOGRAPHIC DESCRIPTION)

FROM 2,200' EAST OF THE NORTHWEST COR. SEC. 22 T149N R37W TO 2,600' EAST OF THE NORTHWEST COR. SEC. 22 T149N R37W (LEGAL DESC.)

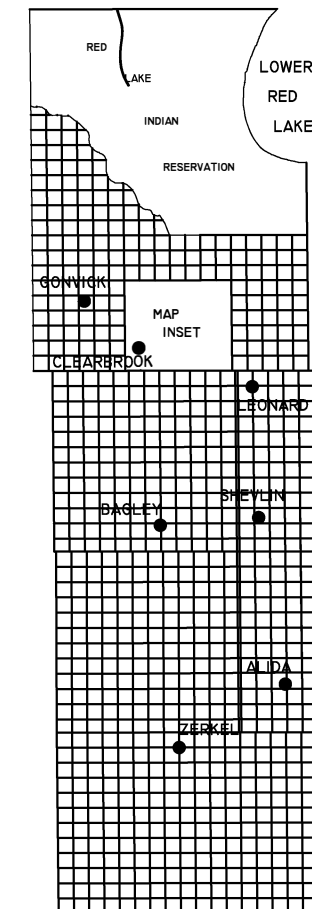
DESIGN DESIGNATION	GROSS LENGTH.....400.....FEET.....0.076.....MILES	
	BRIDGE LENGTH.....16.....FEET.....0.003.....MILES	
	EXCEPTIONS-LENGTH.....FEET.....MILES	
	NET LENGTH.....400.....FEET.....0.076.....MILES	
N18 20 = NA		
R VALUE = NA		
ADT (2022) = <50		
PROJ. ADT (2042) = <50		
PROJ. HCADT (2042) =		
SOIL FACTOR = 100		
5 TON DESIGN		

SAP 015-599-025 NEW BRIDGE 15J30

REMOVE EXISTING BRIDGE L-1669
STA. 22+00 TO STA. 26+00



PROJECT LOCATION



T 149 N

T 149 N

R 37 W

NOT TO SCALE



SAP 015-599-025

SHEET 1 OF 9 SHEETS

PLAN SYMBOLS

- STATE LINE
- COUNTY LINE
- TOWNSHIP OR RANGE LINE
- SECTION LINE
- QUARTER LINE
- SIXTEENTH LINE
- RIGHT-OF-WAY
- PRESENT RIGHT-OF-WAY
- CONTROLLED ACCESS
- PROPERTY LINE (EXCEPT LAND LINES)
- VACATED PLATTED PROPERTY
- CORPORATE OR CITY LIMITS
- TRUNK HIGHWAY CENTER LINE
- RETAINING WALL
- RAILROAD
- RAILROAD RIGHT-OF-WAY
- RIVER OR CREEK
- DRY RUN
- DRAINAGE DITCH
- DRAIN TILE
- CULVERT
- DROP LINE
- 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 LIGHTS
- 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)
- IRON PIPE OR ROD
- MONUMENT (STONE CONCRETE OR METAL)
- WOODEN HUB
- GRAVEL PIT
- SAND PIT
- BORROW PIT
- ROCK QUARRY

UTILITIES SYMBOLS

- SLOPE EASEMENT
- POWER POLE LINE
- TELEPHONE POLE LINE
- JOINT TEL/POWER ON POWER POLE
- JOINT TEL/POWER ON TEL. POLE
- ANCHOR
- STEEL TOWER
- STREET LIGHT
- PEDESTAL (TELEPHONE CABLE TERMINAL)
- GAS MAIN
- WATER MAIN
- CONDUIT
- TELEPHONE CABLE IN CONDUIT
- ELECTRIC CABLE IN CONDUIT
- TELEPHONE MANHOLE
- ELECTRIC MANHOLE
- BURIED TELEPHONE CABLE
- BURIED ELECTRICAL CABLE
- AERIAL TELEPHONE CABLE
- SEWER (SANITATION OR STORM)
- SEWER MANHOLE

ESTIMATED QUANTITIES

SPEC. NO.	ITEM	UNIT	SAP 015-599-025		TOTAL ESTIMATED QUANTITIES
			NON-PART	PART	
(6)	2104.503 REMOVE PIPE CULVERT	LIN. FT	36		36
	2118.509 SURFACING AGGREGATE, CLASS 1	TON	120		120
(2) (7)	2412.502 16' X 7' PRECAST CONCRETE BOX CULVERT END SECTION	EACH		2	2
	2412.503 16' X 7' PRECAST CONCRETE BOX CULVERT CLASS 1	LIN. FT.		36	36
(1)	2451.507 GRANULAR BACKFILL (CV)	CU. YD.		825	825 (P)
(3)	2511.507 RANDOM RIPRAP, CL. III	CU. YD		70	70 (P)
	2563.601 TRAFFIC CONTROL	LUMP SUM		1	1
(4)	2573.503 SILT FENCE TYPE PA	LIN. FT	400		400
(5)	2575.501 TURF ESTABLISHMENT	LUMP SUM	1		1

- (1) EXCAVATION FOR CULVERT AND ANY MINOR GRADING TO BE INCIDENTAL TO GRANULAR BACKFILL. ANY EXCESS MATERIAL WILL BE HAULED TO A LOCATION CHOSEN BY THE CONTRACTOR AND APPROVED BY THE ENGINEER IN THE FIELD.
- (2) EXCAVATION FOR AND GRANULAR BEDDING WILL BE INCIDENTAL TO CULVERT INSTALLATION.
- (3) GEOTEXTILE FILTER MATERIAL SHALL BE USED UNDER THE RIPRAP AND WILL BE CONSIDERED INCIDENTAL TO RIPRAP CONSTRUCTION.
- (4) TO BE INSTALLED AS DIRECTED BY ENGINEER IN THE FIELD.
- (5) APPROXIMATELY 0.5 ACRE.
- (6) EXISTING PIPE IS 190"x118"x37' C.S.P.
- (7) ANY CLEARING AND GRUBING WILL BE INCIDENTAL TO CULVERT INSTALLATION.

BASIS FOR ESTIMATED QUANTITIES

- (1) AGGREGATE SURFACING AND AGGREGATE BASE CALCULATED AT 140 LBS./CU. FT.
- (2) SEED MIXTURE TYPE 25-141: 60 LBS./ACRE
- (3) FERTILIZER 19-19-19: 200 LBS./ACRE
- (4) MULCH MATERIAL TYPE 1: 2 TONS/ACRE

UTILITIES

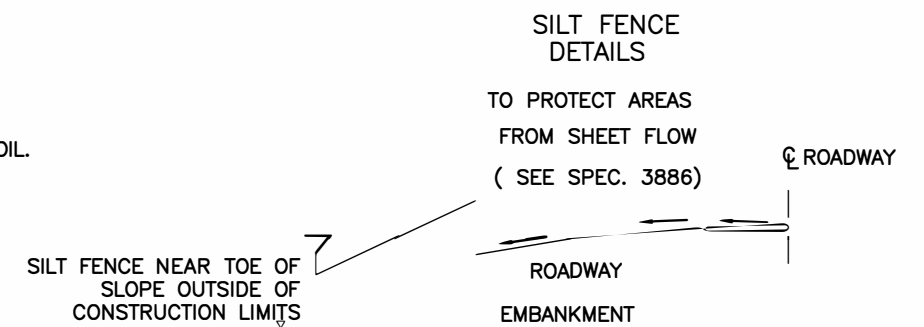
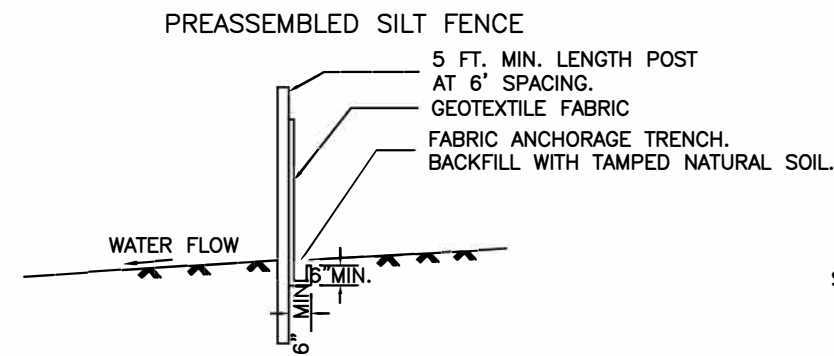
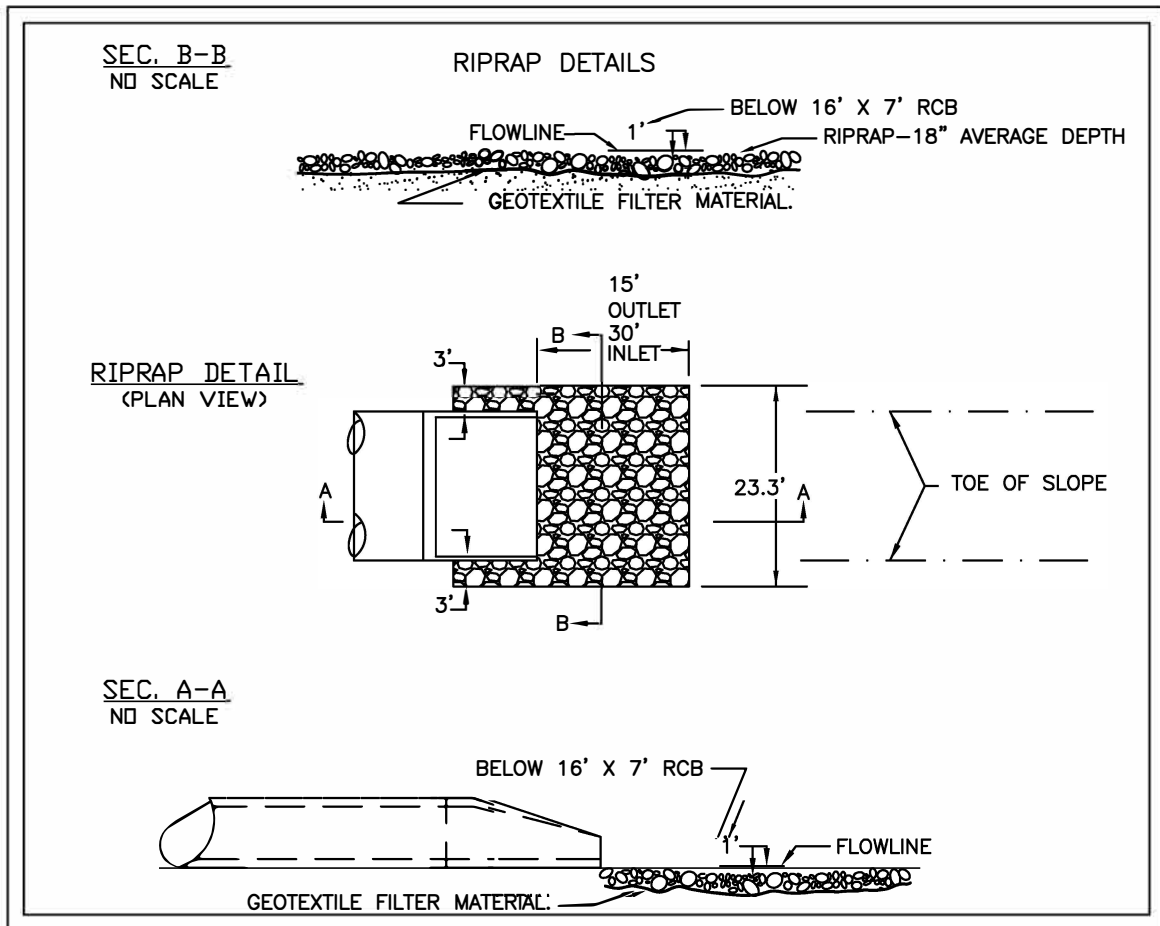
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NOTE: ANY PUBLIC UTILITIES SHOWN ON THIS PLAN ARE ONLY APPROXIMATE IN LOCATION AND MUST BE VERIFIED BY THE CONTRACTOR. OTHER UTILITIES MAY EXIST AND ITS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE LOCATIONS PRIOR TO ANY EXCAVATING.

NOTE: THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED, "STANDARD GUIDELINES FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES".

NOTES:

QUALITY COMPACTION METHOD FOR EMBANKMENT AND AGGREGATE SURFACING. ALL AVAILABLE TOPSOIL TO BE SALVAGED AND SPREAD UNIFORMLY ON SLOPES AND DITCH BOTTOMS. ALL DIMENSIONS AND SLOPES SHOWN ON TYPICAL SECTIONS ARE APPROXIMATE. ACCESS SHALL BE MAINTAINED TO ALL PROPERTIES DURING THE CONSTRUCTION PERIOD. CONTRACTOR SHALL PHASE HIS WORK AS NECESSARY TO ACCOMMODATE THIS REQUIREMENT. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL, INCLUDING ALL SIGNS AND BARRICADES NECESSARY. ALL TRAFFIC CONTROL WORK AND DEVICES SHALL CONFORM TO THE MOST CURRENT MINNESOTA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.



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

STANDARD PLATES

PLATE NO.	DESCRIPTION
3145 G	CONCRETE PIPE TIES
8000 K	TEMPORARY CHANNELIZERS TYPE C

ALL DIMENSIONS ON THIS SHEET ARE NOMINAL.

SAP 015-599-025



CLEARWATER COUNTY HIGHWAY DEPARTMENT

CERTIFIED BY: *Dan Sauvé*

Dan Sauvé, REG NO: 24542

12/29/2023

Date

CLEARWATER COUNTY COORDINATES

HORIZONTAL: NAD83 (2011 ADJ.)
 VERTICAL: NAVD88 (2011 ADJ.)

NGS CONTROL POINT:

X: Y: Z:

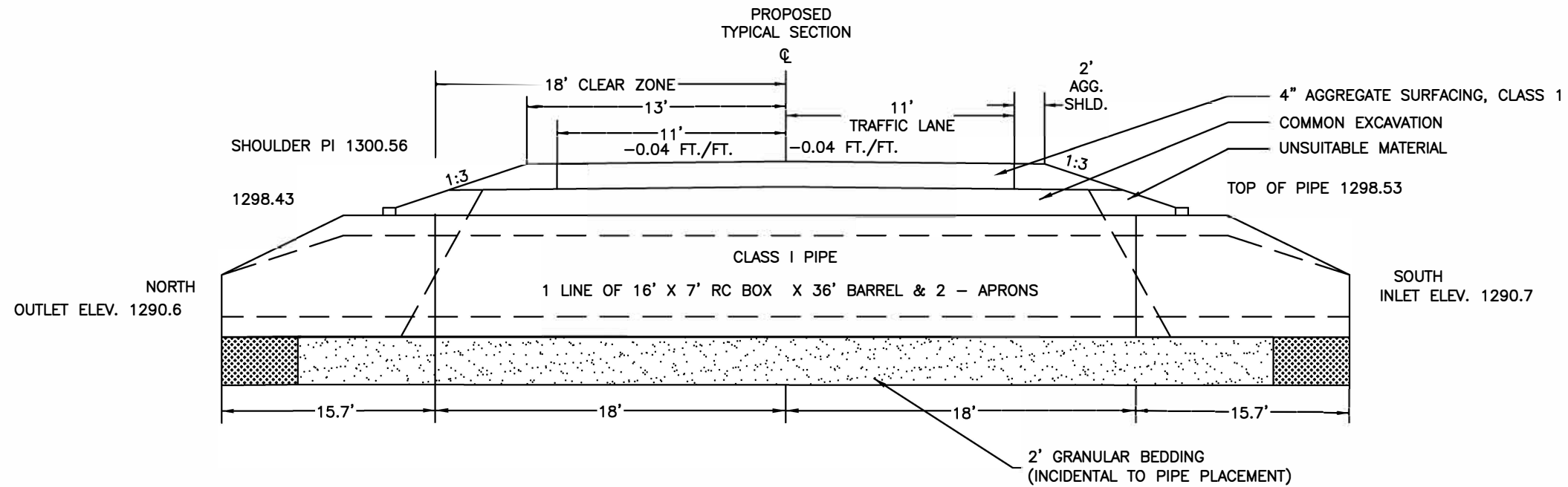
DRAWN BY: ED
 DATE: 11/16/2022

REVISION BY: PH
 REVISION DATE: 12/05/2023

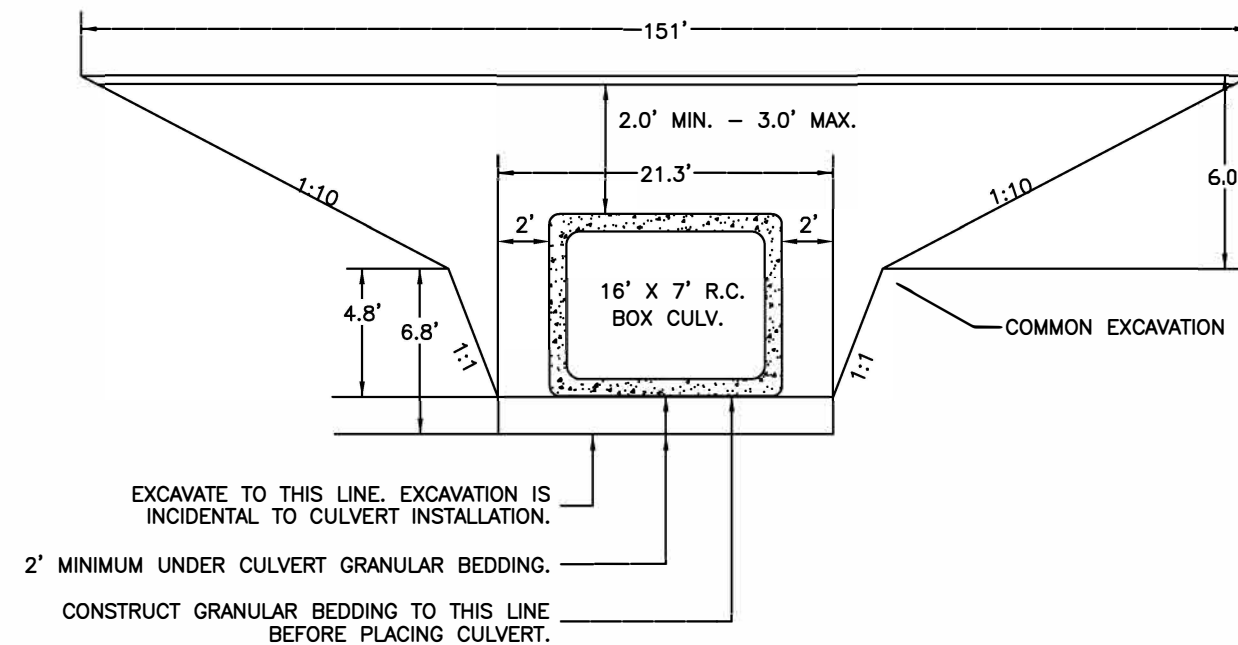
ESTIMATED QUANTITIES
 TYPICAL SECTION

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 of
 9

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DETAIL TO R.C.B. CULV.



ALL TYPICAL SECTIONS ARE NOT DRAWN TO SCALE

SAP 015-599-025



CLEARWATER COUNTY HIGHWAY DEPARTMENT
 CERTIFIED BY: Dan Sauvé 12/29/2023
 Dan Sauvé, REG NO: 24542 Date

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TYPICAL SECTION

Sheet No.
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 of
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STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

GENERAL CONSTRUCTION ACTIVITY INFORMATION

THIS SWPPP IS FOR PROJECT CP 1511-01, WHICH IS A BRIDGE REPLACEMENT PROJECT FOR L-33 (490TH STREET). THE PROJECT IS LOCATED 2.5 MILE EAST AND 1.0 MILES NORTH OF CLEARBROOK. THE PROJECT INCLUDES REMOVING THE EXISTING BRIDGE AND PUTTING IN A NEW BRIDGE AT THE RUFFY BROOK CROSSING.

TOTAL NUMBER OF ACRES TO BE DISTURBED: 0.5 ACRES
 PRE-CONSTRUCTION ACRES OF IMPERVIOUS SURFACE: 0.1 ACRES
 POST CONSTRUCTION ACRES OF IMPERVIOUS SURFACE: 0.1 ACRES
 TOTAL NEW IMPERVIOUS ACRES: 0

RECEIVING WATERS

WATER BODY ID	NAME OF WATER BODY	TYPE	SPECIAL WATER	IMPAIRED WATER
	RUFFY BROOK	STREAM	NO	YES

THIS PROJECT WILL IMPACT WELANDS INCLUDING TEMPORARY FILL AND PERMENTANT FILL/CUTS. IMPACT TO THE WETLANDS WERE ADDRESSED IN THE MN DNR PERMIT AS WELL AS THE US ARMY CORPS OF ENGINEERS PERMIT.

TEMPORARY EROSION PREVENTION PRACTICES

MECHANICALLY ANCHORED STRAW MULCH (SPREAD BY HAND OR MULCH BLOWER) OR HYDRAULIC TACKIFIERS SHALL BE USED, UNLESS THE SLOPE IS GREATER THE 2%, WHICH THEN EITHER BIOLOGS OR BLANKET SHALL BE USED AS SPECIFIED IN THE ATTACHED SHEETS.

RIP-RAP SHALL BE PLACED AT THE INLET AND OUTLET OF THE BRIDGE AT THE RUFFY BROOK CROSSING WITHIN 24 HOURS AFTER CULVERT INSTALLATION.

TIMELINE OF IMPLEMENTATION

PROJECT TIMELINE FOR THE CONSTRUCTION WILL BE DETERMINED BY THE CONTRACTOR'S OPERATION, THE FOLLOWING MAY NOT BE APPLICABLE BUT CAN BE USED AS A GUIDELINE:

1. INSTALLATION OF STABILIZED CONSTRUCTION ENTRANCES AND RELATED DRAINAGE STRUCTURES
2. INSTALLATION OF SILT FENCE AND ALL DOWN GRADIENT EROSION CONTROL DEVICES
3. CLEARING AND GRUBBING OPERATIONS
4. UP GRADIENT TOPSOIL REMOVALS AND STOCKPILING
5. SITE EXCAVATION AND GRADING
6. TOPSOIL PLACEMENT IN COMPLETED AREAS
7. TURF ESTABLISHMENT IN COMPLETED AREAS
8. INLET PROTECTION DEVICE INSTALLATION
9. INSTALL AGGREGATE BASE
10. FINAL GRADING
11. FINAL TURF ESTABLISHMENT AND FINAL EROSION CONTROL
12. REMOVE EROSION CONTROL DEVICES AFTER 70% PERMANENT VEGETATION IS ESTABLISHED.

THE RUFFY BROOK HAS BEEN IDENTIFIED AS A IMPAIRED WATER, FOR FECAL COLIFORM, STABILIZATION WILL BE COMPLETED WITH IN 7 CALENDAR DAYS AFTER CONSTRUCTION IS COMPLETED.

SILT FENCE

GEOTEXTILES SHALL BE UNIFORM IN APPEARANCE AND TEXTURE AND HAVE NO DEFECTS.

POSTS SHOULD HAVE A SHARPENED END AND SHOULD BE SET IN THE GROUND AT LEAST 2 FEET DEEP. EACH POST SHALL BE SECURELY FASTENED TO THE GEOTEXTILE BY TIES OR STAPLES SUITABLE FOR SUCH PURPOSE.

PRINCIPAL SEDIMENT BASINS AND TRAPS SHOULD BE INSTALLED AS NEEDED BEFORE ANY MAJOR GRADING TAKES PLACE. ADDITIONAL TRAPS AND SILT FENCES SHALL BE ERECTED AS GRADING TAKES PLACE TO KEEP SEDIMENT CONTAINED ON SITE.

A MINIMUM 10' VEGETATED BUFFER STRIP MUST BE MAINTAINED BETWEEN THE SILT FENCE AND THE GRADING LIMITS, EXCEPT IN THOSE AREAS WHERE THE BUFFER STRIP IS NOT PHYSICALLY AVAILABLE DUE TO WETLANDS OR OPERATING LIMITS.

TEMPORARY SEDIMENT CONTROL PRACTICES

SILT FENCE SHALL BE USED FOR DOWN GRADIENT PERIMETER CONTROL. STOCKPILES SHALL AVOID LOCATIONS NEAR SLOPES AND NATURAL DRAINAGE WAYS. SILT FENCE OR OTHER BARRIERS WHERE NECESSARY SHALL BE USED TO RETAIN SEDIMENT. ANY STOCKPILE LEFT UNDISTURBED FOR MORE THAN 30 DAYS SHALL BE SEEDED WITH A RAPID GERMINATING SEED MIXTURE AND SHAPED SUCH THAT THE EFFECTS OF EROSION ARE MINIMIZED.

STABILIZED CONSTRUCTION ENTRANCES AND EXITS SHALL BE CONSTRUCTED.

REDUNDANT SEDIMENT CONTROL SHALL BE PLACED AT LOCATIONS SPECIFIED BY THE ENGINEER. THIS SHALL CONSIST OF 2 LINES OF SILT FENCE.

THE USE OF A TEMPORARY SEDIMENT BASIN IN NOT FEASIBLE DUE TO INABILITY TO PURCHASE ADDITIONAL RIGHT OF WAY FROM THE ADJACENT LAND OWNERS.

PERMANENT STORMWATER MANAGEMENT SYSTEM

THIS PROJECT WILL NOT RESULT IN 1 OR MORE ACRES OF NEW IMPERVIOUS SURFACES.

INSPECTION AND MAINTENANCE ACTIVITIES

CHAIN OF RESPONSIBILITY

IMPLEMENTATION: PAT HALLORAN, CLEARWATER COUNTY

INSTALLATION: _____, CONTRACTOR

INSPECTION AND MAINTENANCE: _____, CONTRACTOR

INSPECTION OF ALL EROSION CONTROL MEASURES SHALL BE DONE ONCE PER WEEK OR AFTER A RAIN EVENT OF 0.5 INCHES OR GREATER.

FUEL AND CHEMICAL STORAGE AREA

GASOLINE, OIL, SANITARY FACILITIES, SUCH AS TOILETS, AND OTHER CHEMICALS OR TANKS SHALL NOT BE LOCATED NEXT TO STREAMS, WELLS, SPRINGS OR WATERS OF THE STATE. THE CONTRACTOR SHALL PROVIDE CONTAINMENT AROUND FUELING AND CHEMICAL STORAGE AREAS TO ENSURE THAT SPILLS IN THESE AREAS DO NOT REACH WATERS OF THE STATE. CONTINGENCIES SHALL BE PROVIDED FOR THE TREATMENT AND/OR DISPOSAL OF CONTAMINATED SOILS. AFTER ALL WORK IS COMPLETED ALL POLLUTANTS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS.

WASTE DISPOSAL

THE CONTRACTOR SHALL REMOVE ALL WASTE COMPOSED OF BUILDING MATERIALS FROM THE SITE FOR DISPOSAL IN LICENSED DISPOSAL FACILITIES.

NO BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED OR DISCHARGED TO WATERS OF THE STATE AT THE SITE.

EACH SITE SHALL HAVE GRAVELED ACCESS ENTRANCE AND EXIT DRIVES AND PARKING AREAS TO REDUCE THE TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS.

THE CONTRACTOR SHALL ENSURE AND DEMONSTRATE COMPLIANCE WITH THE APPLICABLE STATE DEPARTMENT OF ENVIRONMENTAL QUALITY OR LOCAL SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.

PERMIT TERMINATION CONDITONS

ALL TEMPORARY EROSION CONTROL MEASURE SHALL REMAIN IN PLACE UNTIL AT LEAST 70% OF THE PERMANENT VEGETATION IS ESTABLISHED AT WHICH TIME SILT FENCE MAY BE REMOVED.

SPECIAL INSTRUCTIONS

ANY RELEASE OF DISCHARGED SEDIMENT TO WATERS OF THE STATE MUST BE REPORTED TO THE MPCA DUTY OFFICER 1-800-422-0798 IMMEDIATELY UPON DISCOVERY OF RELEASE BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF DISCHARGED MATERIALS IN ACCORDANCE WITH NPDES PERMIT REQUIREMENTS.

SAP 015-599-025



CLEARWATER COUNTY HIGHWAY DEPARTMENT

CERTIFIED BY: Dan Sauvé

Dan Sauvé, REG NO: 24542

12/29/2023

Date

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HORIZONTAL: NAD83 (2011 ADJ.)
 VERTICAL: NAVD88 (2011 ADJ.)

NGS CONTROL POINT:

X: Y: Z:

DRAWN BY: ED
 DATE: 11/16/2022

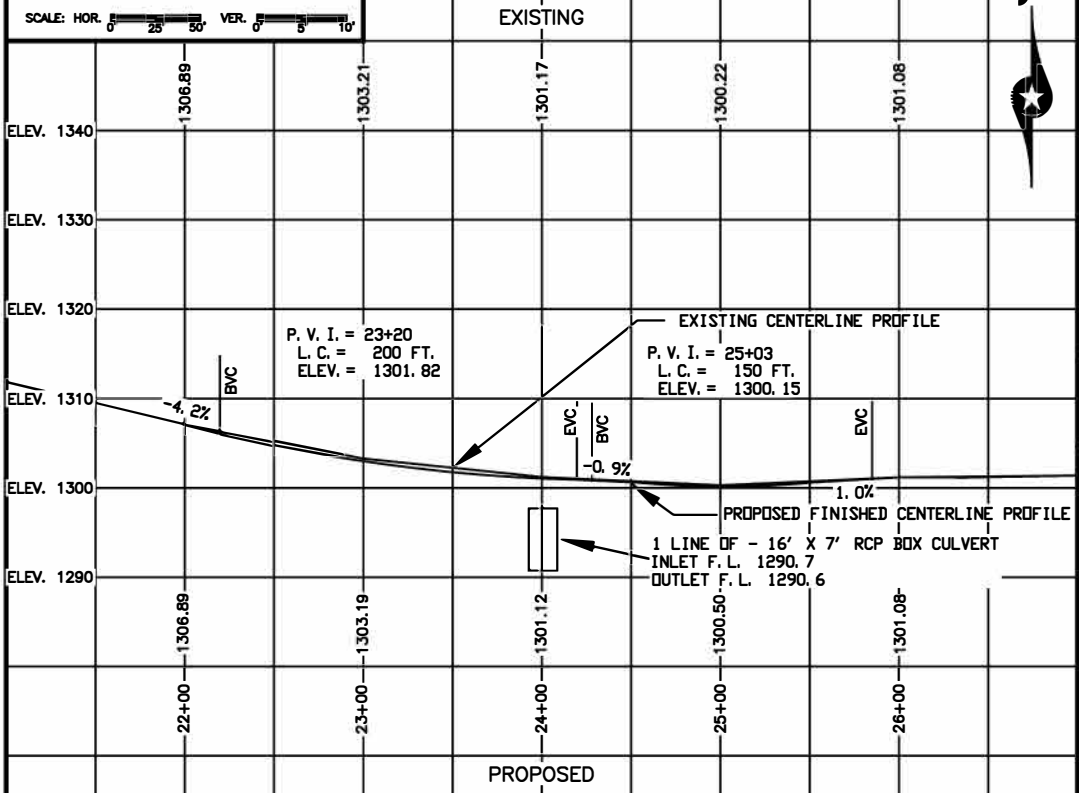
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 REVISION DATE: 12/05/2023

SWPPP

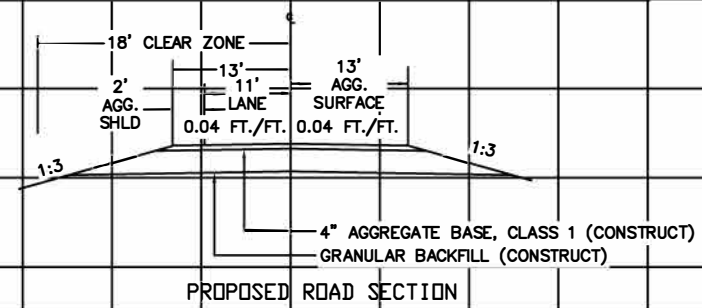
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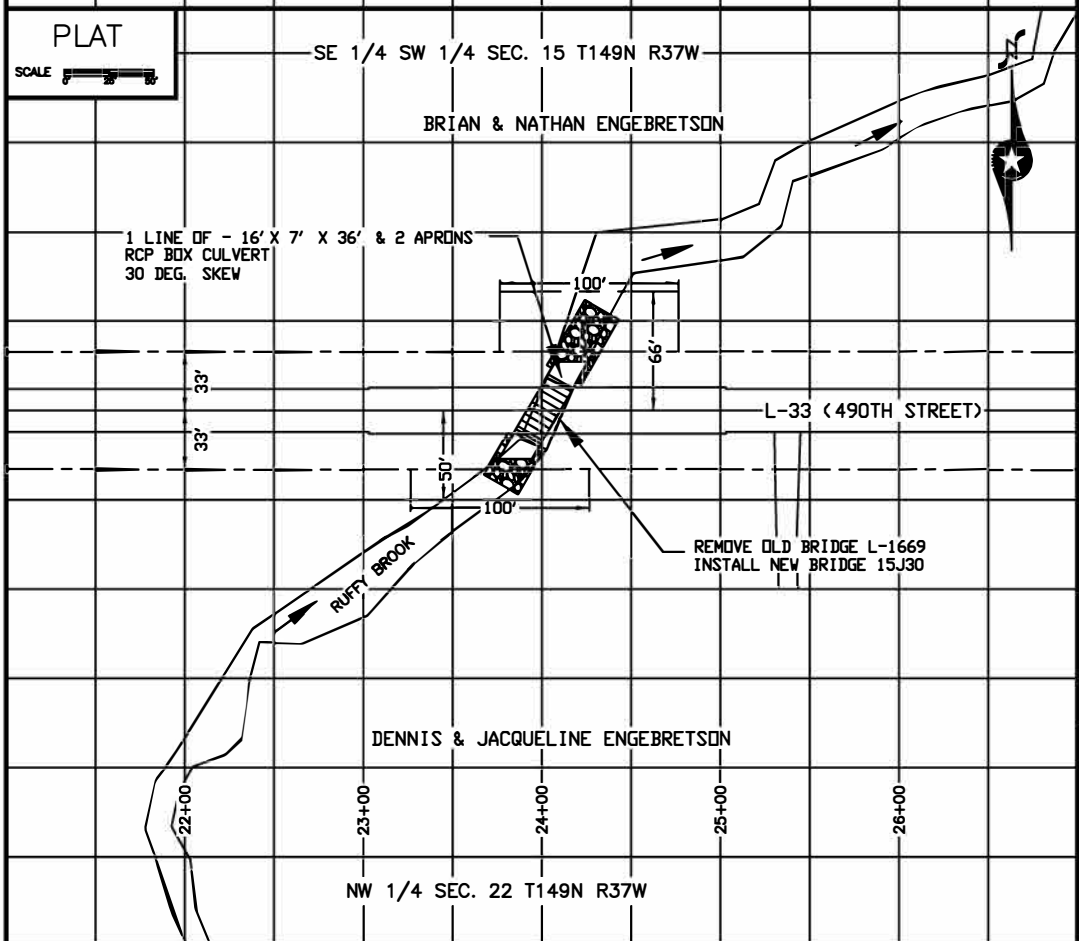
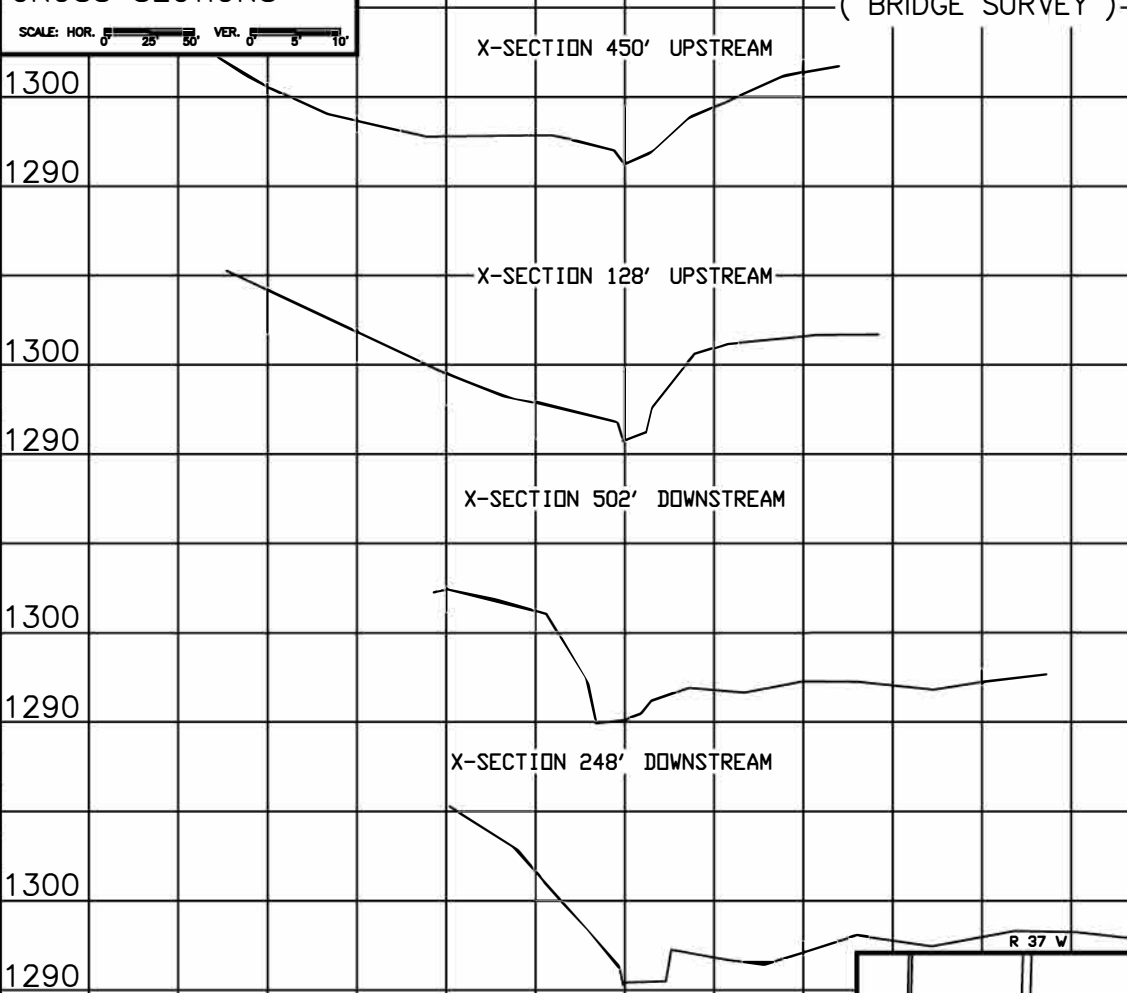
CONTRACTED PROFILE



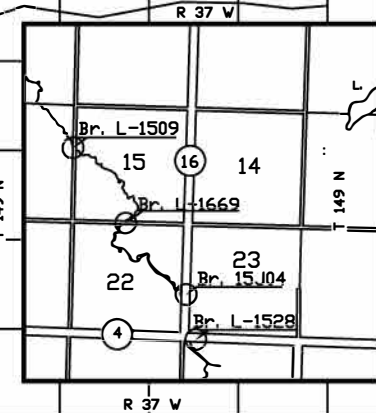
TYPICAL SECTIONS & PERTINENT DATA



CROSS SECTIONS



CHANNEL		PROFILE	
UPSTREAM	ELEV.	DOWNSTREAM	ELEV.
465'	1292.50	502'	1290.22
345'	1291.67	405'	1289.04
244'	1291.45	308'	1291.28
212'	1292.00	207'	1291.41
99'	1291.84	111'	1289.83
51'	1291.04	42'	1291.15



Fed. Proj. No.

- LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE
- Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating.
 - Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway): Given location, type, length, height above high water, cross-sectional area, etc.
UPSTREAM STRUCTURE- IS BRIDGE 15J04 THAT IS 2-LINES OF 115' X 72' X 58' AND 2 APRONS PRECAST PIPE ARCH. 7.161 FEET UPSTREAM. A WATERWAY OPENING OF 90 SQ. FT., LOCATED 0.3 MI. N. OF THE JCT. OF CSAH 4 ON CSAH 16 OVER THE RUFFY BROOK.
EXISTING STRUCTURE- IS BRIDGE L-1671, A 190' X 118' X 37' STEEL PIPE ARCH. A WATERWAY OPENING OF 100 SQ. FT., LOCATED 0.6 MI. W. OF THE JCT. OF CSAH 16 ON 490TH STREET.
DOWNSTREAM STRUCTURE- IS BRIDGE L-1509 1-LINE OF 188' X 115' X 50' STEEL PIPE ARCH 6.776 FEET DOWNSTREAM. A WATERWAY OPENING OF 118 SQ. FT., LOCATED 1.6 MI. N. OF THE JCT. OF CSAH 4 ON 189TH AVE.
 - Apparent highwater elevation _____ Obtained from _____
 - Other data: Approx. velocity of water at time of survey.

HYDRAULIC ENGINEER'S RECOMMENDATION
DATE 11/08/2022

STREAM OR DITCH DESIGNATION RUFFY BROOK

DRAINAGE AREA 42.44 SQ. MI.

MAX. FLOOD ON RECORD APRIL 22, 2022 DESIGN FLOOD (50 YR. FREQ.) 734 CFS

MAX. OBSERVED HIGHWATER ELEV. APPROX. 1301.2

DESIGN HIGHWATER 1297.8 FT.

DESIGN MEAN VELOCITY THROUGH STRUCTURE 8.32 F.P.S.

LOW SUPERSTRUCTURE AT OR ABOVE ELEVATION 1297.7

FLOWLINE ELEVATION 1290.7 SKEW ANGLE 30 DEGREES

WATERWAY AREA REQ'D. BELOW ELEVATION 1297.7 = 110 SQ. FT. AT RT. ANGLES TO CHANNEL AT STAGE 1296.1 AND MEAN VELOCITY OF 8.32 F.P.S. WITH 1.7 FT. SWELLHEAD.

OVERTOPPING FLOOD (OR GREATEST FLOOD) 1.3XQ100 CFS 1166

BASIC FLOOD 100 YR. FREQ. 865 CFS AT STAGE OF 1296.5 FT. WITH A SWELL HEAD OF 2.0 FT.

The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Department of Natural Resources

FOUNDATION ENGINEER'S RECOMMENDATION
DATE _____

VERTICAL CONTROL:
THESE ELEVATIONS ARE BASED ON SEA LEVEL DATUM OF NAVD 1988 2007 ADJUSTMENT AND TIED TO THE US LEVEL NET THROUGH HARN POINT '1507 W' BY THIRD ORDER LEVEL.

Bridge survey sheet made from COUNTY BRIDGE SURVEY DONE OCTOBER 20, 2022

Bench mark elevation 1327.425

Location HARN POINT '1507 W' LOCATED 0.15 MI. NW OF TH 92 AND CSAH 5.

MINNESOTA DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

AT MILE POINT 0.5 ON 490TH STREET

PROPOSED BRIDGE LOCATED 2.5 MILES EAST AND 1.5 NORTH OF CLEARBROOK SECTION 22 TOWNSHIP 149 N RANGE 37 W

TOWNSHIP LEON COUNTY CLEARWATER

OLD BRIDGE NO L-1669

NEW BRIDGE NO 15J30

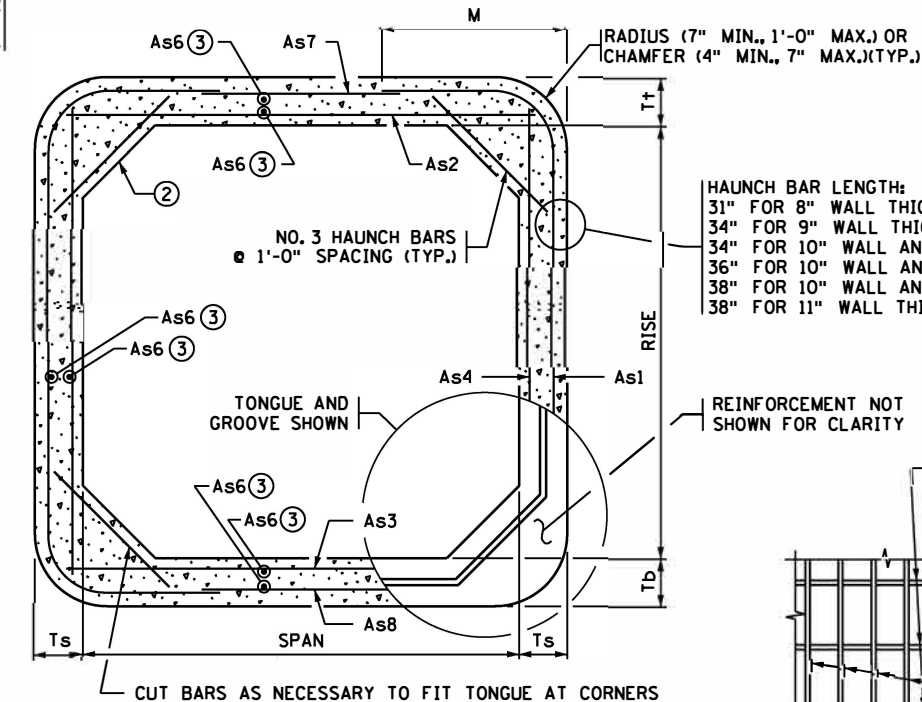
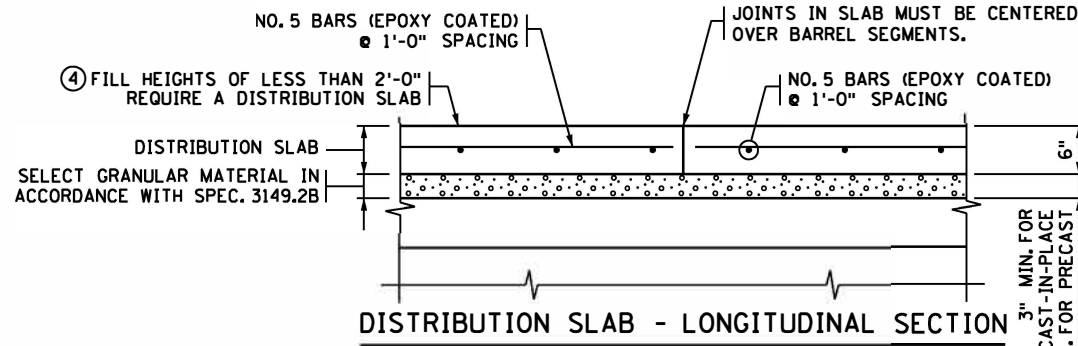
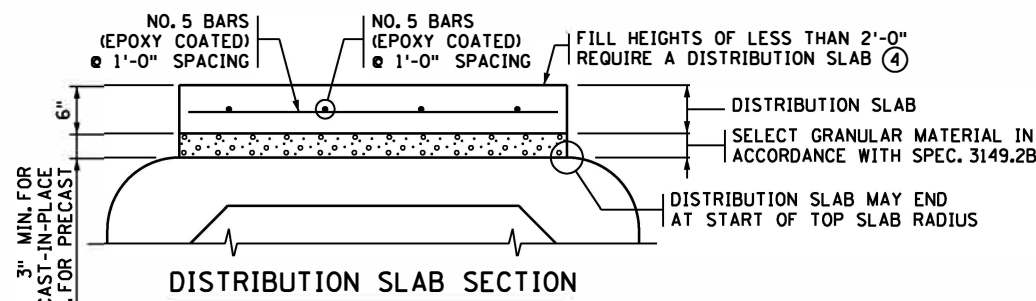
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CLEARWATER COUNTY HIGHWAY DEPARTMENT
CERTIFIED BY: Dan Sauvé, REG NO: 24542
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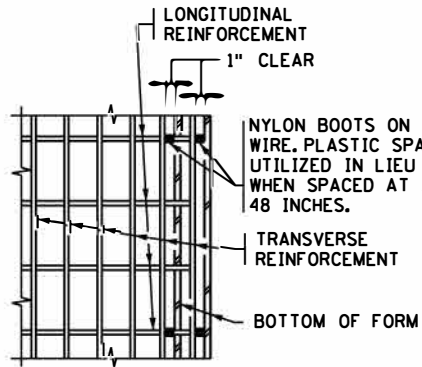
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DATE: 11/4/2022
REVISION BY: PTH
REVISION DATE: 12/05/2023

BRIDGE SURVEY
Sheet No. 5 of 9

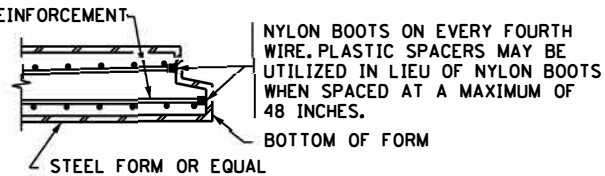


HAUNCH BAR LENGTH:

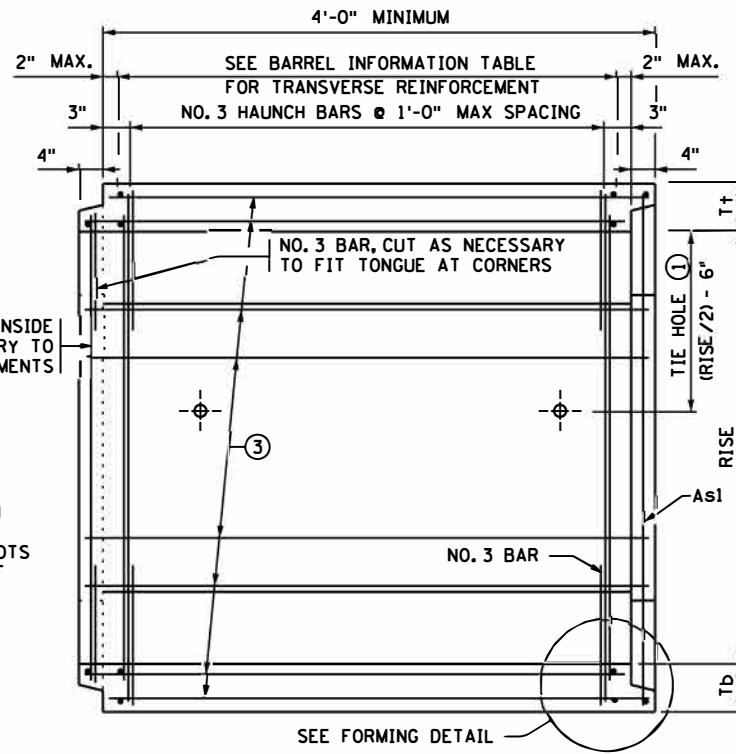
- 31" FOR 8" WALL THICKNESS
- 34" FOR 9" WALL THICKNESS
- 34" FOR 10" WALL AND 10" SLAB
- 36" FOR 10" WALL AND 11" SLAB
- 38" FOR 10" WALL AND 12" SLAB
- 38" FOR 11" WALL THICKNESS



PLAN

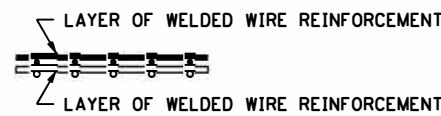


SECTION FORMING DETAIL



LONGITUDINAL BARRELS SECTION

BAR REINFORCEMENT OPTION SHOWN



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

CONSTRUCT CULVERTS IN ACCORDANCE WITH SPEC. 2412 EXCEPT AS NOTED.

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.

PROVIDE WELDED WIRE REINFORCEMENT, SHEAR REINFORCEMENT AND REINFORCEMENT BARS IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M259.

1/2" 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 REINFORCEMENT OR
- (b) 1 LAYER OF WELDED WIRE REINFORCEMENT AND 1 LAYER OF REINFORCEMENT BARS OR
- (c) 1 LAYER OF REINFORCEMENT BARS.

DEVELOP REINFORCEMENT IN ACCORDANCE WITH AASHTO "LRFD BRIDGE DESIGN SPECIFICATIONS". IF BAR REINFORCEMENT IS SUBSTITUTED FOR WELDED WIRE REINFORCEMENT, INCREASE THE AREA OF REINFORCEMENT BY 8%, AND SUBMIT DESIGN CALCULATIONS VERIFYING COMPLIANCE WITH AASHTO 5.7.3.4, "CONTROL OF CRACKING BY DISTRIBUTION OF REINFORCEMENT".

MAXIMUM SIZE OF REINFORCEMENT BARS IS NO. 6. THE MAXIMUM WELDED WIRE REINFORCEMENT SIZE IS W23 PER LAYER (MAXIMUM OF 2 LAYERS).

SPACE CENTER TO CENTER OF TRANSVERSE WIRES NOT LESS THAN 2" NOR MORE THAN 4". SPACE CENTER TO CENTER OF LONGITUDINAL WIRES NOT MORE THAN 8".

WHEN USING As1, As7, AND As8 REINFORCEMENT AS ONE CONTINUOUS CAGE WITH SPLICES OCCURRING IN THE CENTER OF THE TOP AND BOTTOM OF THE BOX SECTION, THE MIN. LAP LENGTH FOR THE As7 AND As8 IS 15".

WELDING IS NOT PERMITTED ON REINFORCEMENT BARS OR WELDED WIRE REINFORCEMENT, EXCEPT THAT THE ORIGINAL WELDING REQUIRED TO MANUFACTURE WIRE REINFORCEMENT IS ACCEPTABLE.

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

USE CONCRETE MIX NO. 3W82 WITH NO CALCIUM CHLORIDE ALLOWED.

SHOP DRAWING APPROVAL IN ACCORDANCE WITH 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 USE 1" DIAMETER CULVERT TIES. SEE STANDARD PLATE NO. 3145 FOR DETAILS.

② USE 12" VERTICAL, 12" HORIZONTAL HAUNCHES ON ALL BOX SIZES.

③ PLACE LONGITUDINAL REINFORCEMENT DENOTED AS As6 IN ALL SLABS AND WALLS WITH A MINIMUM OF 0.06 SQ. IN./FT.

④ ROADWAY OR SHOULDER FILL HEIGHTS OF LESS THAN 2'-0" REQUIRE A 6" THICK DISTRIBUTION SLAB WITH CONCRETE MIX 3552.

PLACE CAST-IN-PLACE DISTRIBUTION SLABS WITH 3" MIN. SELECT GRANULAR MATERIAL IN ACCORDANCE WITH SPEC. 3149.2B BETWEEN BARREL AND DISTRIBUTION SLAB.

PRECAST DISTRIBUTION SLABS MAY BE USED FOR FILL HEIGHTS OVER 1'-0". PROVIDE 6" MINIMUM SELECT GRANULAR MATERIAL IN ACCORDANCE WITH SPEC. 3149.2B BETWEEN BARREL AND SLAB.

EXTEND THE WIDTH OF THE DISTRIBUTION SLAB TO THE OUTSIDE EDGES OF THE ROADWAY SHOULDERS UNLESS DIRECTED BY THE ENGINEER.

REDESIGN THE DISTRIBUTION SLAB PER THE MNDOT PAVEMENT DESIGN MANUAL IF IT IS USED AS PAVEMENT SURFACE.

PAYMENT FOR THE DISTRIBUTION SLAB AND SELECT GRANULAR MATERIAL BENEATH THE SLAB IS INCLUDED IN THE PRECAST CONCRETE BOX CULVERT PAY ITEM.

⑤ REFER TO SPEC. 2412 FOR SEALANT REQUIREMENTS.

BARREL INFORMATION TABLE ***

LOCATION	SIZE	CLASS	f'c (P.S.I.)	FILL HEIGHT RANGE (FT.)	DISTRIBUTION SLAB REQUIRED *	RECESSED TIE RODS **	DIMENSIONS					WEIGHT (LBS./FT.)	WELDED WIRE REINFORCEMENT												
							SPAN (FT.)	RISE (FT.)	T+ (IN.)	Tb (IN.)	Ts (IN.)		As1		As2		As3		As4		As7		As8		
													AREA (IN. ² /FT.)	LENGTH (FT.)	AREA (IN. ² /FT.)	LENGTH (FT.)	AREA (IN. ² /FT.)	LENGTH (FT.)	AREA (IN. ² /FT.)	LENGTH (FT.)	AREA (IN. ² /FT.)	LENGTH (FT.)	AREA (IN. ² /FT.)	LENGTH (FT.)	
24+01	16'X7'	1	5000	<3	NO	NO	16	7	10	11	8	6250	1.13	16'-10"	4'-4"	1.17	16'-6"	1.16	16'-6"	0.20	7'-6"	0.27	12'-9"	0.27	12'-9"

REVISION: DECEMBER 21, 2022

APPROVED: MARCH 24, 2011

Nancy S. Benberger
STATE BRIDGE ENGINEER

* 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 STANDARD PLATE 3145. 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.

SAP 015-599-025

FIG. 5-395.101(A)

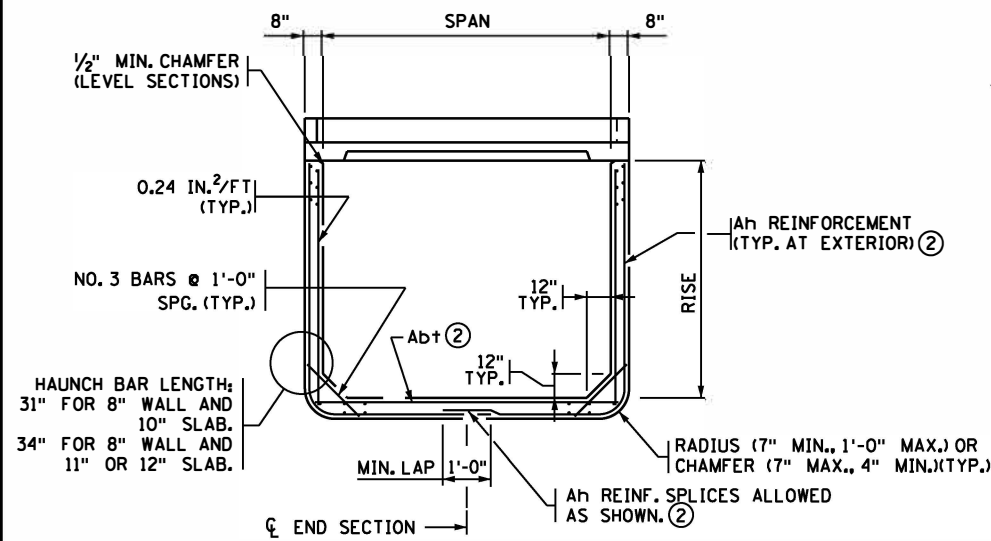
REV. NO.	DATE	REVISION DESCRIPTION	BY

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

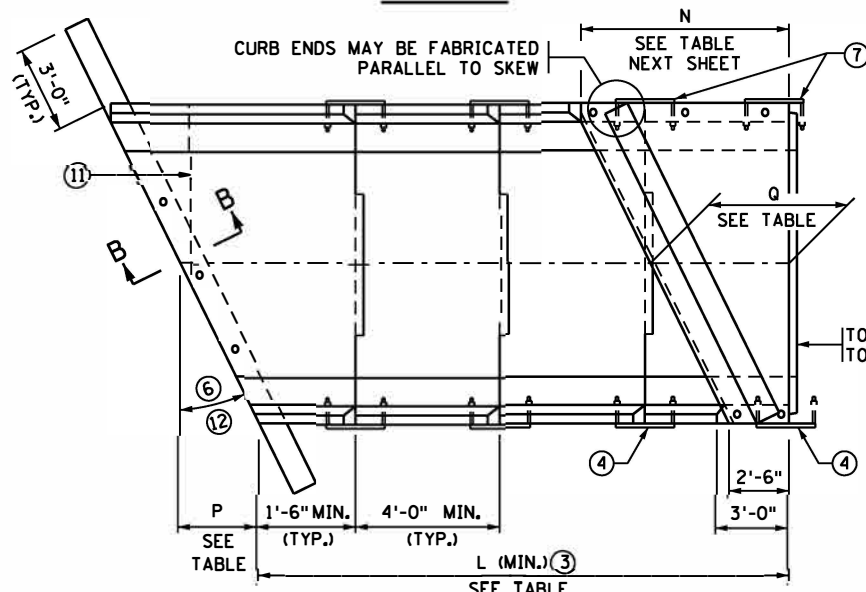
CERTIFIED BY *Dan Sauve* 12/29/2023
LICENSED PROFESSIONAL ENGINEER DATE
NAME: DAN SAUVE LIC. NO. 24542

PRECAST CONCRETE
BARREL DETAILS

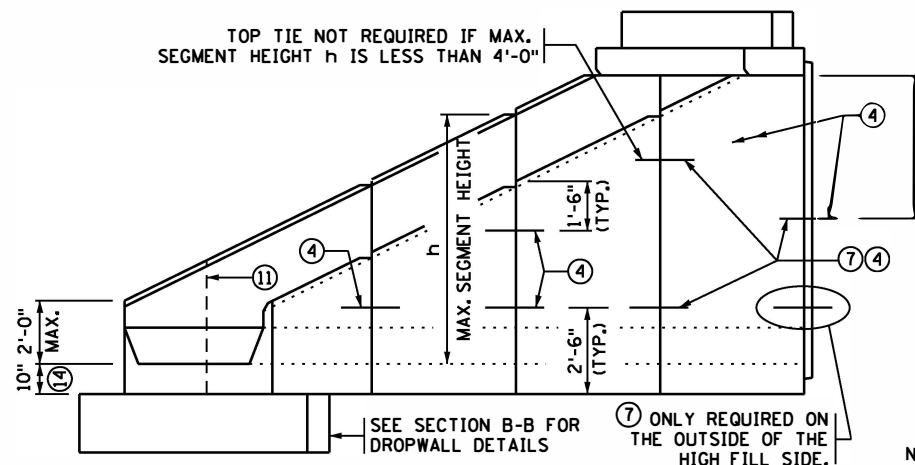
DES:	DR:	APPROVED:	BRIDGE NO. 15J30
CHK:	CHK:	SHEET NO. 6 OF 9 SHEETS	



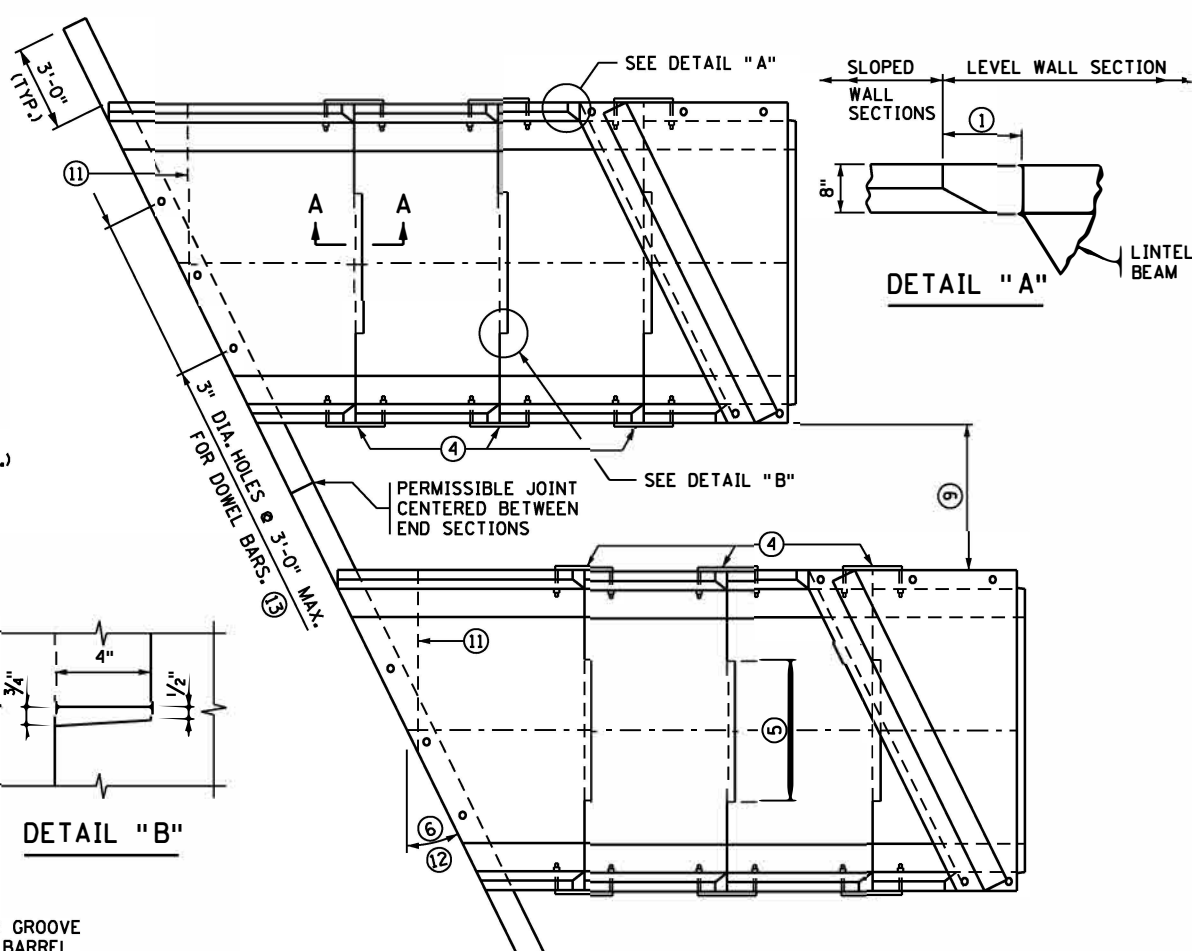
END VIEW



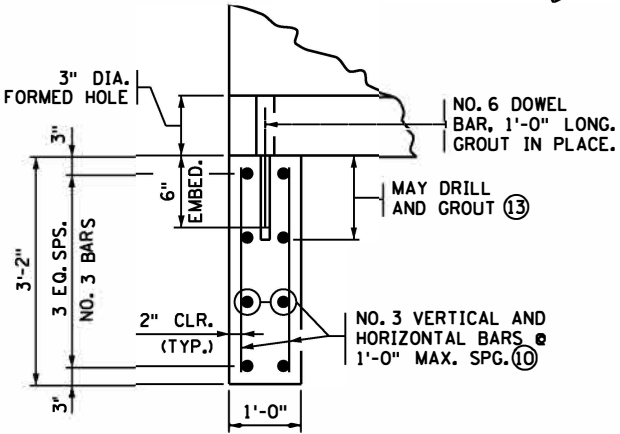
PLAN VIEW
SINGLE BARREL OPTION



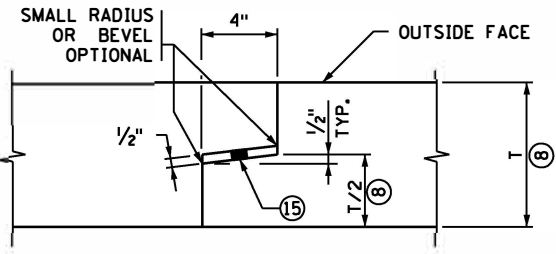
ELEVATION



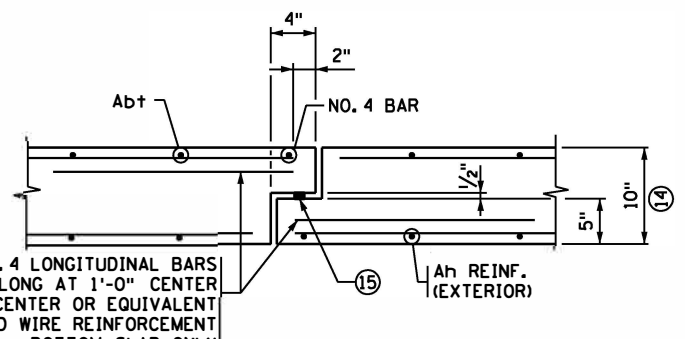
PLAN VIEW
MULTIPLE BARREL OPTION



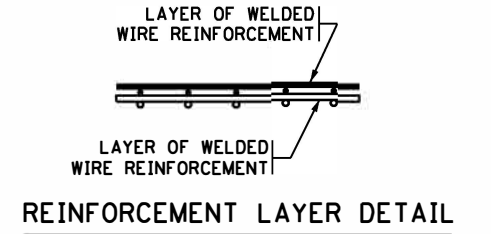
SECTION B-B



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



SECTION A-A



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) 8 1/8" @ 15"; 10 5/8" @ 30"; 1'-2" @ 45°
- 2) SEE STANDARD FIG. 5-395.110 (2 OF 2) 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 C/2 OF EACH APRON JOINT. TONGUE AND GROOVE JOINT ON ALL THREE SIDES OF APRON IS PERMISSIBLE.
- 6) FOR SKEW ANGLES OVER 7 1/2° UP TO 22 1/2°, USE A 15° SKEW END SECTION. FOR SKEW ANGLES OVER 22 1/2° UP TO 37 1/2°, USE A 30° SKEW END SECTION. FOR SKEW ANGLES OVER 37 1/2° 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 (2 OF 2) 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) WELDED WIRE REINFORCEMENT OF EQUAL AREA MAY BE SUBSTITUTED FOR REBAR.
- 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 1 1/2" MIN., 2" MAX.
- 15) REFER TO SPEC. 2412 FOR SEALANT REQUIREMENTS.

LENGTH P				
SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW	
6	0'-11 3/4"	2'-1 3/8"	3'-8"	
8	1'-3"	2'-8 3/8"	4'-8"	
10	1'-6 1/4"	3'-3 3/4"	5'-8"	
12	1'-9 3/8"	3'-10 1/4"	6'-8"	
14	2'-0 5/8"	4'-5 1/8"	7'-8"	
16	2'-3 3/8"	5'-0"	(12)	

MIN. LENGTH L			
RISE (FT.)	15° SKEW	30° SKEW	45° SKEW
4	7'-1 3/4"	7'-7 3/8"	8'-7 1/8"
5	9'-2 1/2"	9'-11 1/8"	11'-5 1/8"
6	11'-3 3/8"	12'-2 1/4"	14'-3 3/4"
7	13'-4 1/4"	14'-6 5/8"	17'-1 1/4"
8	15'-5 1/4"	16'-10 1/4"	19'-11 5/8"
9	17'-5 1/2"	19'-2"	22'-9 5/8"
10	19'-6 3/4"	21'-5 3/4"	25'-7 1/2"
11	21'-7 3/8"	23'-9 3/8"	28'-5 1/2"
12	23'-8 1/2"	26'-1 1/4"	31'-3 3/4"
13	25'-9 3/8"	28'-4 1/8"	34'-1 3/8"
14	27'-10 1/8"	30'-8 1/2"	36'-11 1/4"

LENGTH Q				
SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW	
6	3'-5 3/4"	4'-7 3/8"	6'-2"	
8	3'-9"	5'-2 3/8"	7'-2"	
10	4'-0"	5'-9 1/4"	8'-2"	
12	4'-3 3/8"	6'-4 1/8"	9'-2"	
14	4'-6 5/8"	6'-11 1/8"	10'-2"	
16	4'-9 3/8"	7'-6 1/4"	(12)	

REVISION: DECEMBER 21, 2022
 APPROVED: MARCH 24, 2011
 Nancy Oberberger
 STATE BRIDGE ENGINEER

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SAP 015-599-025
 CERTIFIED BY Dan Sauve 12/29/2023
 LICENSED PROFESSIONAL ENGINEER
 NAME: DAN SAUVE LIC. NO. 24542

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

DES: DR: APPROVED: BRIDGE NO. 15J30
 CHK: CHK: SHEET NO. 7 OF 9 SHEETS

FIG. 5-395.110 (1 OF 2)

A _h REINFORCEMENT		
HEIGHT h (FT.)	A _h (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

A _b † REINFORCEMENT	
SPAN (FT.)	A _b † (IN ² /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'-3 ³ / ₈ "	6'-4 ¹ / ₄ "	9'-2"
8	4'-9 ⁷ / ₈ "	7'-6"	11'-2"
10	5'-4 ¹ / ₄ "	8'-7 ⁷ / ₈ "	13'-2"
12	5'-10 ³ / ₄ "	9'-9 ³ / ₄ "	15'-2"
14	6'-5 ¹ / ₈ "	10'-11 ⁵ / ₈ "	17'-2"
16	6'-11 ³ / ₈ "	12'-1 ¹ / 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 IN ACCORDANCE WITH SPEC. 3306.

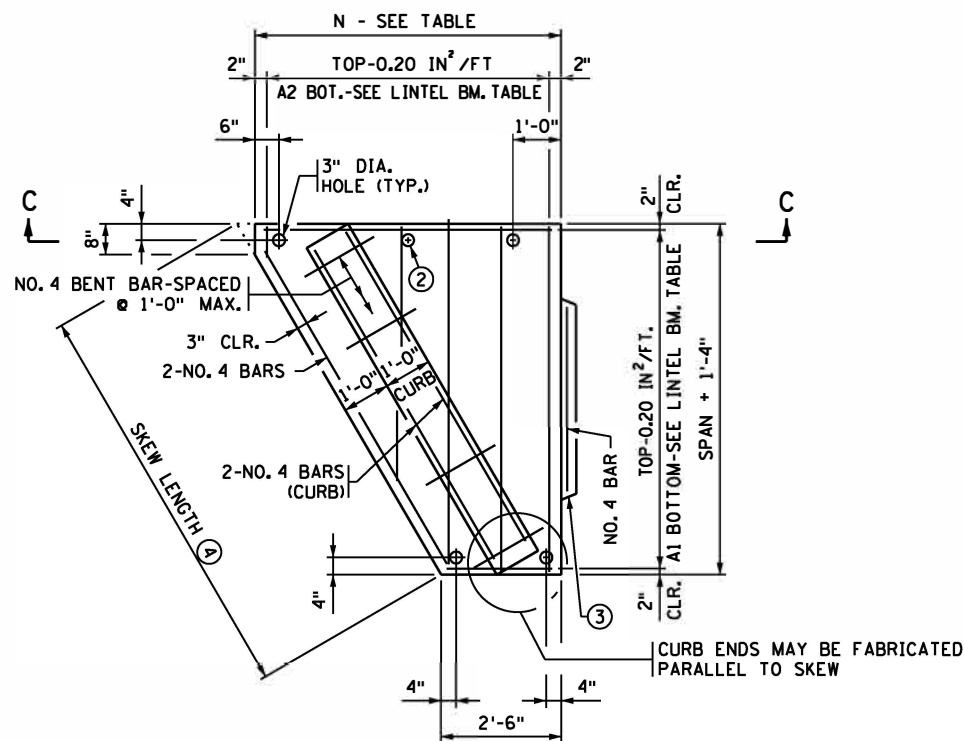
WELDING IN ACCORDANCE WITH SPEC. 2471.

GALVANIZE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3394.

GALVANIZE BOLTS, NUTS AND WASHERS IN ACCORDANCE WITH SPEC. 3392.

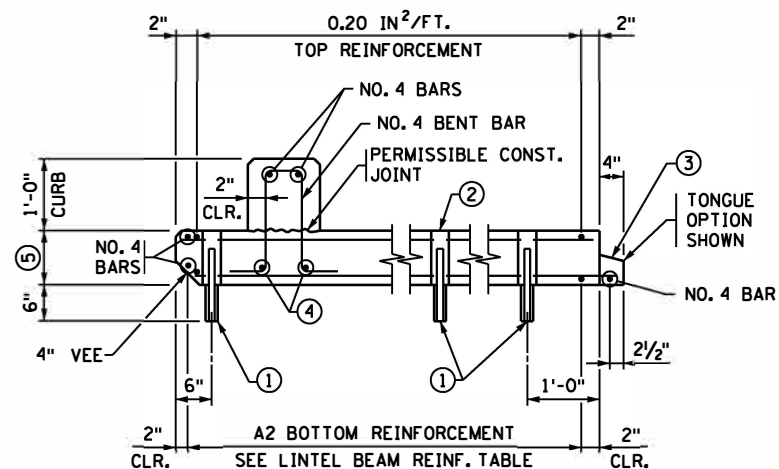
- NO. 8 DOWEL, 1'-0" LONG, 2" DIA. HOLE IN THE TOP OF THE WALL SECTION AND 3" DIA. HOLE IN THE LINTEL. FILL HOLE WITH GROUT.
- PROVIDE ADDITIONAL 3" HOLES AT 4'-0" MAXIMUM SPACING WHEN SIDE OF LINTEL BEAM IS OVER 6 FT.
- CHECK THE LOCATION TO DETERMINE WHETHER A TONGUE OR A GROOVE IS USED. TONGUE AND GROOVE TO TERMINATE AT CULVERT RADIUS.
- 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.
- SEE LINTEL BEAM THICKNESS TABLE ON THIS SHEET. USE LINTEL BEAMS WITH 5000 PSI 3W82 CONCRETE UNLESS OTHERWISE SPECIFIED.
- ALTERNATE BAR BEND MAY BE USED FOR NO. 4 BENT BARS.
- FOR CULVERTS WITH SPANS OF 16' THE MAXIMUM SKEW IS 30°.
- ALTERNATIVELY A 9" THICKNESS MAY BE USED WITH 6500 PSI 3W82 CONCRETE.

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



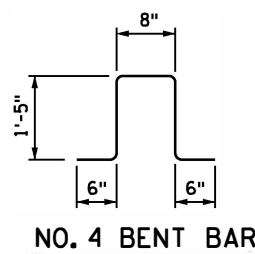
PLAN VIEW

LINTEL BEAM WITH INTEGRAL CURB

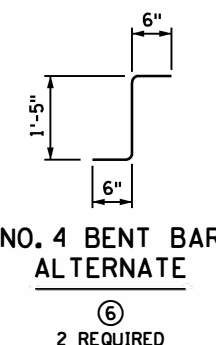


SECTION C-C

LINTEL BEAM WITH INTEGRAL CURB

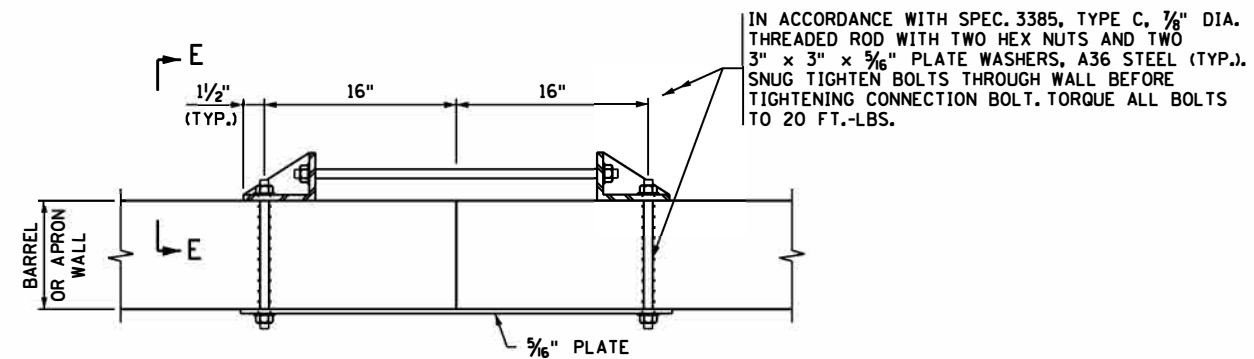


NO. 4 BENT BAR

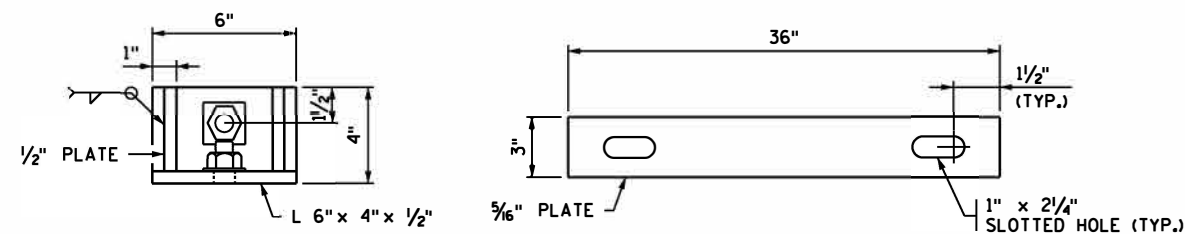


NO. 4 BENT BAR ALTERNATE

(6) 2 REQUIRED



PLAN VIEW



SECTION E-E

PLATE DETAIL

EXTRA STRONG CONNECTION DETAILS

REVISION: DECEMBER 21, 2022
 APPROVED: MARCH 24, 2011
 Nancy Sibenberger
 STATE BRIDGE ENGINEER

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SAP 015-599-025		FIG. 5-395.110 (2 OF 2)	
CERTIFIED BY: Dan Sauve	DATE: 12/29/2023	TITLE: PRECAST CONCRETE END SECTION TYPE III - SINGLE OR MULTIPLE BARREL FOR SKEWS 7 1/2° TO 45°	APPROVED:
NAME: DAN SAUVE	LIC. NO. 24542	DE 5	DR
		CHK1	CHK1
		SHEET NO. 8 OF 9 SHEETS	
		BRIDGE NO. 15J30	

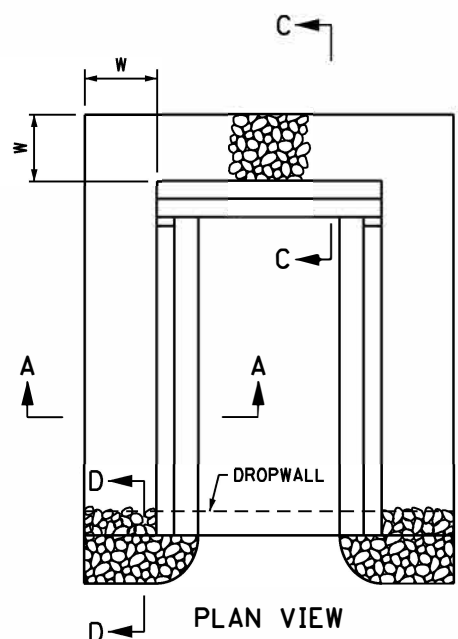
CONSTRUCTION NOTES

THIS PLAN SHEET IS FOR CULVERT EMBANKMENT PROTECTION ONLY. REFER TO THE GRADING PLANS FOR ADDITIONAL RIPRAP OR OTHER SCOUR PROTECTION MEASURES.

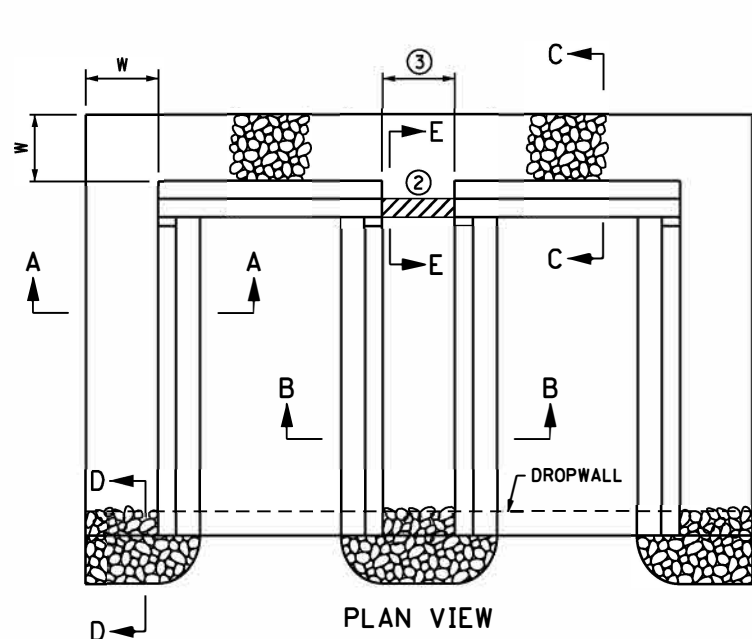
PROVIDE RIPRAP IN ACCORDANCE WITH SPECS. 2511 AND 3601.

EMBANKMENT PROTECTION, INCLUDING MATERIAL PLACED BETWEEN BARRELS THAT ARE LESS THAN 2'-0" APART, IS INCLUDED IN THE PRECAST CONCRETE BOX CULVERT PAY ITEMS.

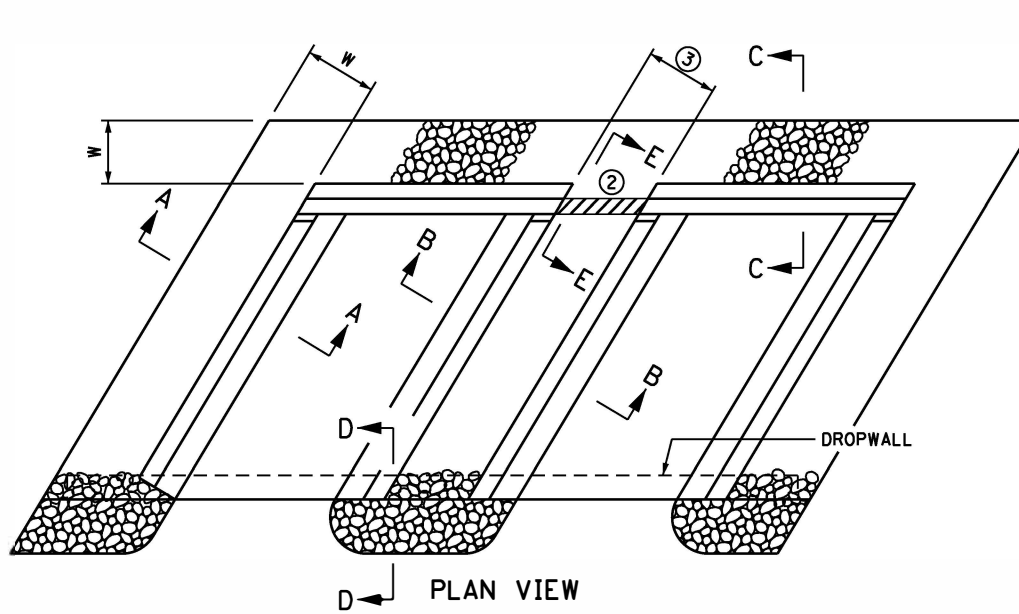
- ① PROVIDE TYPE 7 GEOTEXTILE IN ACCORDANCE WITH SPEC. 3733. PROVIDE GEOTEXTILE STRIPS CONTINUOUS WITHOUT OVERLAPS, EXCEPT FOR THE TOP STRIP, WHICH SHOULD SHINGLE VERTICAL STRIPS. BURY THE TOP EDGE TO PREVENT UNDERMINING.
- ② IF THE DISTANCE BETWEEN MULTIPLE BARRELS IS LESS THAN 2'-0" USE EITHER PEA ROCK OR LEAN MIX BACKFILL (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 AND PROVIDE CLASS I GROUTED RIPRAP IN LIEU OF CLASS III RIPRAP.
- ③ REFER TO THE GENERAL PLAN AND ELEVATION SHEET FOR THE DISTANCE BETWEEN BARRELS OF ADJACENT BOXES.



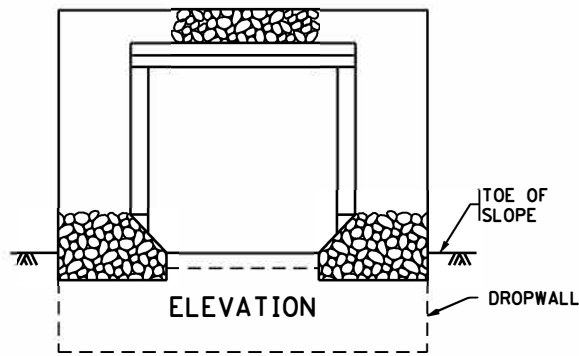
PLAN VIEW



PLAN VIEW

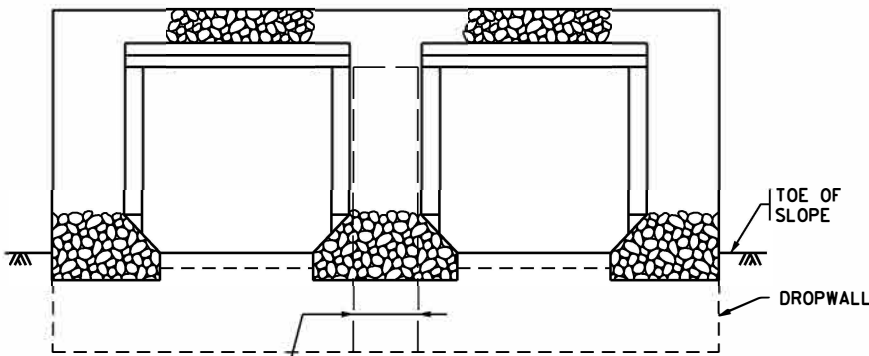


PLAN VIEW



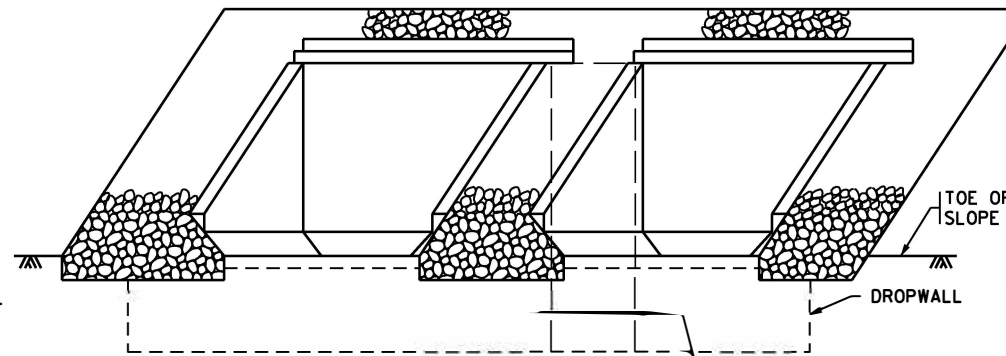
ELEVATION

SINGLE BARREL
CLASS III OR IV SHOWN FOR SKEWS UP TO 7 1/2°



ELEVATION

MULTIPLE BARREL
FOR SKEWS UP TO 7 1/2°
CLASS III OR IV SHOWN
DOUBLE BARREL SHOWN

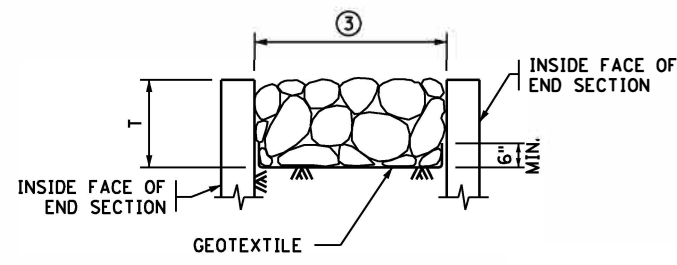


ELEVATION

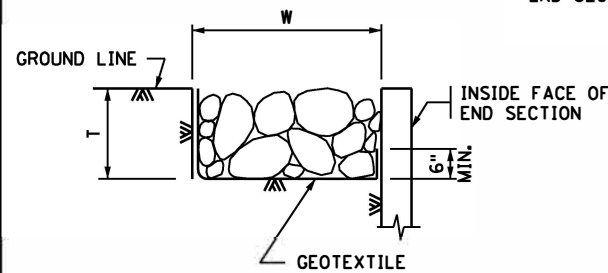
MULTIPLE BARREL
FOR SKEWS OVER 7 1/2°
CLASS III OR IV SHOWN
DOUBLE BARREL SHOWN,
OTHER BARREL CONFIGURATIONS SIMILAR.

RIPRAP CLASS

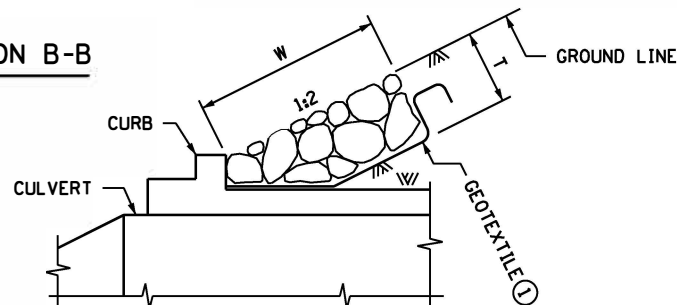
RIPRAP CLASS	RIPRAP CLASS	T	W
<input checked="" type="checkbox"/>	III	1'-6"	3'-0"
<input type="checkbox"/>	IV	2'-0"	4'-0"



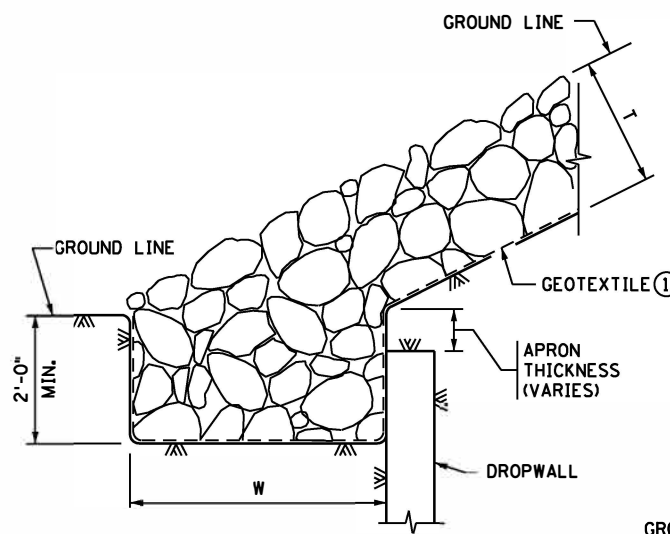
SECTION B-B



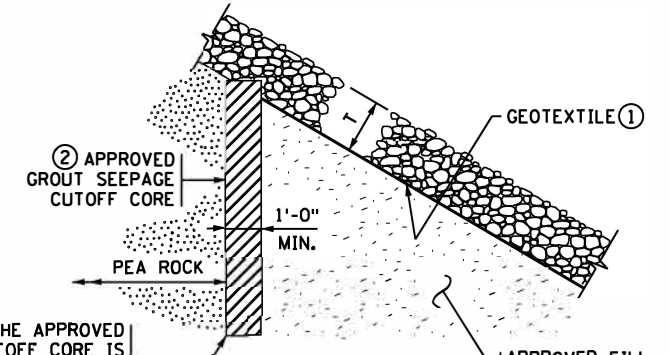
SECTION A-A



SECTION C-C



SECTION D-D



SECTION E-E

REVISION: DECEMBER 21, 2022

APPROVED: SEPTEMBER 11, 2014

Nancy S. Beninger
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY

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

SAP 015-599-025

CERTIFIED BY *Dan Sauve* 12/29/2023
LI. LICENSE D. PROFESSIONAL ENGINEER DATE
NAME: DAN SAUVE LIC. NO. 24542

EMBANKMENT PROTECTION FOR BOX CULVERTS

DES:	DR:	APPROVED:	BRIDGE NO. 15J30
CHK:	CHK:		
SHEET NO. 9 OF 9 SHEETS			FIG. 5-395.115