

MINNESOTA DEPARTMENT OF TRANSPORTATION LINCOLN COUNTY

CONSTRUCTION PLAN FOR REPLACING BRIDGE NO. L1978 WITH 2 LINES OF 14' X 7' R.C. BOX CULVERT

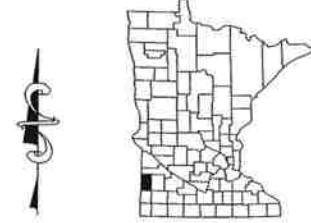
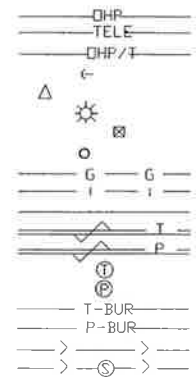
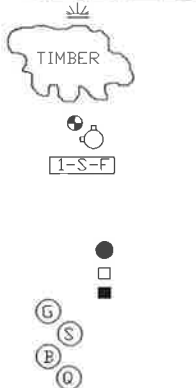
LOCATED ON C.S.A.H. 15 **BETWEEN** INTERSECTION OF CSAH 7 AND 260TH AVE. IN LAKE STAY TOWNSHIP (Geographic description)
FROM NORTHWEST CORNER OF SEC. 33-T111N-R44W **TO** NORTHEAST CORNER SEC. 33-T111N-R44W (Legal description)

PLANS SYMBOLS

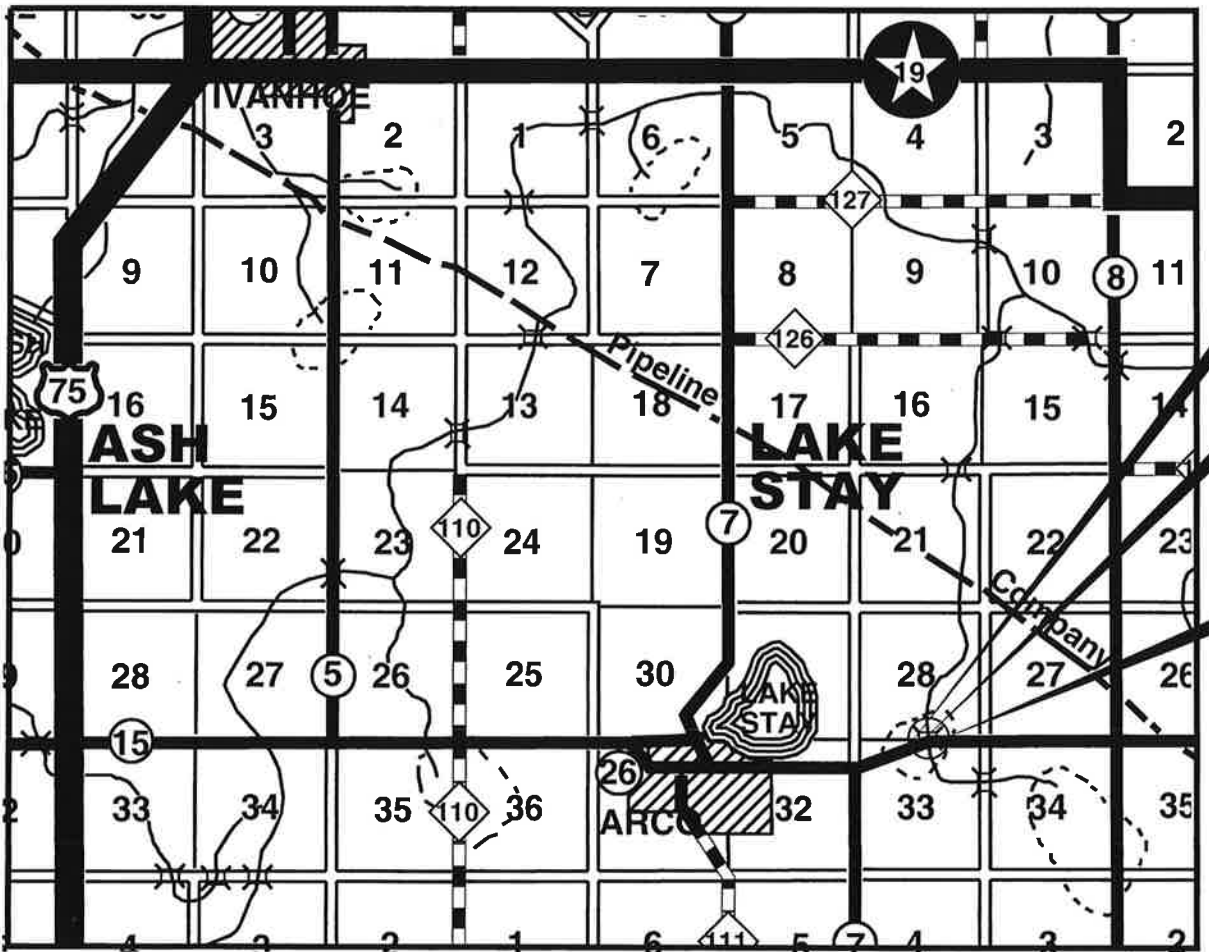
- STATE LINE
- COUNTY LINE
- TOWNSHIP OR RANGE LINE
- SECTION LINE
- QUARTER LINE
- PRESENT ROW
- NEW ROW
- TEMPORARY EASEMENT
- CONTROL OF ACCESS LINE
- PROPERTY LINES
- VACATED PLATTED PROPERTY
- CORPORATE OR CITY LIMITS
- RETAINING WALL
- RAILROAD
- RAILROAD RIGHT-OF-WAY
- DRAINAGE DITCH
- DRAIN TILE
- CULVERT
- DROP INLET
- GUARD RAIL
- BARBED WIRE FENCE
- WOVEN WIRE FENCE
- CHAIN LINK FENCE
- RAILROAD SNOW FENCE
- SWAMP
- TIMBER
- ORCHARD
- BRUSH
- NURSERY
- CATCH BASIN
- FIRE HYDRANT
- BUILDING (ONE STORY FRAME)
- F - FRAME C - CONCRETE
- S - STONE T - TILE
- B - BRICK ST - STUCCO
- IRON PIPE OR ROD
- MONUMENT (STONE, CONC. OR METAL)
- WOODEN HUB
- GRAVEL PIT
- SAND PIT
- BORROW PIT
- ROCK QUARRY

UTILITIES SYMBOLS

- POWER POLE LINE
- TELEPHONE LINE
- JOINT TELEPHONE AND POWER LINE
- ANCHOR
- STEEL TOWER
- STREET LIGHT
- PEDESTAL (TELEPHONE CABLE TERMINAL)
- OVERHEAD POWER POLE
- GAS MAIN
- WATER MAIN
- CONDUIT
- TELEPHONE CABLE IN CONDUIT
- ELECTRIC CABLE IN CONDUIT
- TELEPHONE MANHOLE
- ELECTRIC MANHOLE
- BURIED TELEPHONE CABLE
- BURIED POWER CABLE
- SEWER (SANITARY OR STORM)
- SEWER MANHOLE



S.A.P. 041-615-022 (BRIDGE)		
GROSS LENGTH	350 FT.	0.066 MI.
BRIDGES-LENGTH	0 FT.	0 MI.
EXCEPTIONS-LENGTH	0 FT.	0 MI.
NET LENGTH	350 FT.	0.066 MI.



B.O.P. STA. 348+75
SAP 041-615-022
BRIDGE STA. 350+30
OLD BR. #L1978
NEW BR. #41J73
@ 30° SKEW
E.O.P. STA. 352+25
SAP 041-615-022

SCALE: 1 MILE

FEDERAL PROJECT NO. _____

SPECIFICATIONS

THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

INDEX

- 1.) TITLE SHEET
- 2.) ESTIMATED QUANTITIES
- 3.) GENERAL PLAN AND ELEVATION
- 4.) STAKEOUT
- 5-8.) CULVERT DETAIL
- 9.) EROSION & SEDIMENT CONTROL PLAN
- 10.) EROSION & SEDIMENT CONTROL DETAILS
- 11.) PLAN & PROFILE
- 12.) BRIDGE SURVEY SHEET
- 13.) SWPPP
- 14.) TRAFFIC CONTROL

THIS PLAN CONTAINS 14 SHEETS

DESIGN DESIGNATION

R-VALUE	_____
ADT (2019)	225
Proj. ADT (2039)	225
Proj. HCADT (2039)	13
Soil Factor	100
Shoulder Width	5 FT.

OR

FUNCTIONAL CLASSIFICATION	MAJOR COLLECTOR
NO. OF TRAFFIC LANES	2
NO. OF PARKING LANES	0
DESIGN SPEED	45 MPH
BASED ON STOPPING SIGHT DISTANCE	
HEIGHT OF EYE	3.5 FT.
HEIGHT OF OBJECT	2.0 FT.
DESIGN SPEED NOT ACHIEVED AT:	N/A

LOCAL AGENCY SIGNATURES:

Signature: *Joseph M. Wilson* Typed or Printed Name: JOSEPH M. WILSON,
Design Engineer: 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.

Date: 5/02/19

License Number: 54947

Approved: *Joseph M. Wilson* Date: 5/02/19
Lincoln County Engineer

District State-Aid Engineer: *Paul H. [Signature]* Date: 5/14/19
Reviewed for Compliance with State-Aid Rules/Policy

State-Aid Engineer: _____ Date: _____
Approved for State Aid Funding

ESTIMATED QUANTITIES

NOTES	ITEM NO.	ITEM	UNITS	TOTAL PARTICIPATING	TOTAL NON-PARTICIPATING	TOTAL ESTIMATED QUANTITIES
	2021.501	MOBILIZATION	LUMP SUM	1		1
1	2104.503	REMOVE PIPE CULVERTS	LIN FT		60	60
2	2104.504	REMOVE BITUMINOUS PAVEMENT	SQ YD		320	320
3	2104.507	REMOVE AGGREGATE	CU YD		76	76
	2211.509	AGGREGATE BASE CLASS 5	TON		442	442
4	2412.502	14X7 PRECAST CONCRETE BOX CULVERT END SECTION	EACH	4		4
5,6	2412.503	14X7 PRECAST CONCRETE BOX CULVERT	LIN FT	112		112
7,8	2442.501	REMOVE EXISTING BRIDGE	LUMP SUM		1	1
9	2451.507	COARSE FILTER AGGREGATE (CV) (P)	CU YD	439		439
10	2451.609	GRANULAR BACKFILL	TON	1140		1140
11	2501.503	18" CS PIPE CULVERT	LIN FT		60	60
12,13	2511.509	RANDOM RIPRAP CLASS III	TON	190		190
	2563.601	TRAFFIC CONTROL	LUMP SUM	1		1
	2573.503	SEDIMENT CONTROL LOG TYPE WOOD FIBER	LIN. FT		45	45
	2575.504	EROSION CONTROL BLANKETS CATEGORY 3N	SQ YD		606	606
14	2575.505	SEEDING	ACRE		0.5	0.5
15	2575.505	DISK ANCHORING	ACRE		0.5	0.5
	2575.508	SEED MIXTURE 21-111	POUND		31	31
	2575.508	SEED MIXTURE 25-142	POUND		23	23
15	2575.509	MULCH MATERIAL TYPE 1	TON		1	1
16	2575.601	TURF ESTABLISHMENT (MOBILIZATION)	LUMP SUM		1	1

UTILITY CONTACTS

FRONTIER COMMUNICATIONS
2720 BROADWAY AVENUE
SLAYTON, MN 56172
(507) 836-8883

LINCOLN COUNTY ENVIRONMENTAL OFFICE
221 NORTH WALLACE AVENUE
P.O. BOX 66
IVANHOE, MN 56142 (507) 694-1344

LYON-LINCOLN ELECTRIC CO-OP INC.
BOX 639 WEST HWY 14
TYLER, MN 56178
(507) 247-5505

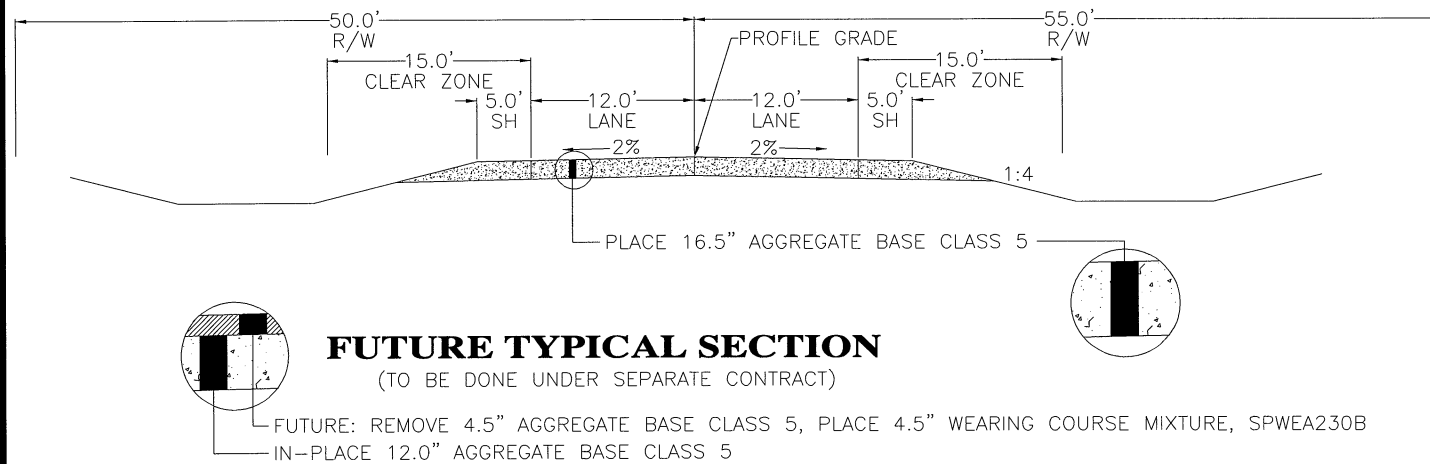
BASIS FOR PLANNED QUANTITIES

AGGREGATE BASE CLASS 5	140 LBS./CUBIC FOOT (CV)
GRANULAR BACKFILL	1.8 TONS/CUBIC YARD
QUARRY RUN RIP-RAP	1.3 TONS/CUBIC YARD
SEED MIXTURE 21-111	62 LBS./ACRE (PLS RATE)
SEED MIXTURE 25-142	45 LBS./ACRE (PLS RATE)
MULCH MATERIAL TYPE 1	2 TONS/ACRE

STANDARD PLATES

PLATE NO.	DESCRIPTION
8000 J	CHANNELIZERS - TYPE A, TYPE B, TYPE C
* THESE STANDARD PLATES ARE APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION AND SHALL APPLY ON THIS PROJECT.	

PROPOSED TYPICAL SECTION CSAH 15



FUTURE TYPICAL SECTION

(TO BE DONE UNDER SEPARATE CONTRACT)

FUTURE: REMOVE 4.5" AGGREGATE BASE CLASS 5, PLACE 4.5" WEARING COURSE MIXTURE, SPWEA230B
IN-PLACE 12.0" AGGREGATE BASE CLASS 5

GENERAL CONSTRUCTION NOTES:

- THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
- THE INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES ARE NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
- CONTRACTOR IS RESPONSIBLE FOR NOTIFYING GOPHER STATE ONE CALL PRIOR TO CONSTRUCTION (PHONE NO. 1-800-252-1166).
- CONTRACTOR SHALL COORDINATE WORK WITH OTHER UTILITY CONTRACTORS, WORK MAY BE ADJACENT AND WITHIN THE PROJECT LIMITS. NO COMPENSATION WILL BE MADE FOR THE COORDINATION WITH THE UTILITIES.
- CONTRACTOR SHALL MAINTAIN CONSTRUCTION WORK WITHIN THE LIMITS AS SHOWN ON THE PLANS. ANY DAMAGE OUTSIDE THE CONSTRUCTION LIMITS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- (P) INDICATES PLANNED QUANTITY.

NOTES:

1. THE TOTAL LENGTH OF PIPE AND REMOVAL OF APRONS SHALL BE INCLUDED IN THE BID PRICE FOR ITEM 2104.503. ALL REMOVED PIPE BECOMES PROPERTY OF THE CONTRACTOR AND MUST BE REMOVED FROM THE CONSTRUCTION SITE.
2. THE CONTRACTOR SHALL SALVAGE THE EXISTING BITUMINOUS SURFACE (APPROXIMATELY 4.5" OF BITUMINOUS) BETWEEN PROJECT STA. 349+70 AND 350+90. THE COST FOR REPLACEMENT FOR ANY BITUMINOUS REMOVED BEYOND THESE PROJECT STATIONS WILL BE AT THE CONTRACTOR'S EXPENSE. BITUMINOUS THICKNESS MAY VARY. SALVAGED BITUMINOUS PAVEMENT SHALL BE HAULED AND STOCKPILED AT SOOK PIT LOCATED IN THE NORTHWEST QUARTER OF SECTION 15 T111N, R44W IN LAKE STAY TOWNSHIP.
3. EXISTING AGGREGATE SHALL BE SALVAGED AND USED AS BACKFILL OVER 2 FEET ABOVE THE PIPE. BID PRICE SHALL INCLUDE ALL COSTS TO SALVAGE, STOCKPILE, AND PLACE THE MATERIAL.
4. PRECAST CONCRETE BOX CULV END SECT SHALL BE TYPE III, FOR A 30° SKEW.
5. MASTIC JOINT SEALER SHALL BE APPLIED TO THE ENTIRE JOINT AREA AND TO LIFT HOLE PLUGS. GEOTEXTILE MATERIAL SHALL ALSO BE INSTALLED ON THE ENTIRE JOINT AREA OF THE PIPE. MASTIC JOINT SEALER, GEOTEXTILE MATERIAL, AND PIPE TIES SHALL BE INCLUDED IN THE BID PRICE FOR PRECAST CONCRETE BOX CULVERT.
6. ALL EXCESS EXCAVATION SHALL BE DISPOSED OF BY THE CONTRACTOR. COST OF SAID DISPOSAL SHALL BE INCLUDED IN THE UNIT BID PRICE FOR PRECAST CONCRETE BOX CULVERT.
7. PRIOR TO PERFORMING EXCAVATION AND EMBANKMENT OPERATIONS WITHIN THE PROJECT LIMITS THE CONTRACTOR SHALL SALVAGE AND STOCKPILE THE TOPSOIL IN A LOCATION OF THE CONTRACTOR'S CHOICE ON THE PROJECT SITE. UPON COMPLETION OF ALL GRADING OPERATIONS, THE CONTRACTOR SHALL DEPOSIT AND SPREAD THE TOPSOIL IN A UNIFORM LAYER ON THE SUBSOIL. THIS WORK SHALL BE INCLUDED IN THE BID PRICE FOR REMOVAL OF THE EXISTING STRUCTURE.
8. EXISTING BRIDGE BECOMES THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF SITE. THE RAILING CONTAINS LEAD PAINT AND SHALL BE REMOVED AND DISPOSED. CHAIN OF CUSTODY PROTOCOL SHALL BE FOLLOWED. THE CONCRETE SHALL BE REMOVED AND DISPOSED AT AN APPROVED LANDFILL OR REUSED/RECYCLED ACCORDING TO LOCAL, STATE, AND FEDERAL REQUIREMENTS.
9. THE GRADATION FOR COARSE FILTER AGGREGATE SHALL CONFORM TO SPEC. 3149 H.
10. BACKFILLING SHALL OCCUR IN LIFTS NOT EXCEEDING 0.5 FEET IN DEPTH. THE CONTRACTOR SHALL USE HAND OPERATED COMPACTION EQUIPMENT AROUND THE PIPE CULVERT TO ATTAIN DENSITY.
11. ALL CS PIPE CULVERTS SHALL BE RIVETED.
12. GEOTEXTILE FABRIC SHALL CONFORM TO SPEC. 3733. INSTALLATION SHALL BE IN ACCORDANCE WITH SPEC. 2511. THESE ITEMS ARE INCLUDED IN THE BID PRICE FOR RIPRAP.
13. THE CONTRACTOR SHALL USE QUARRY RUN RIPRAP.
14. THE AREAS TO BE SEEDDED SHALL BE COMPRISED OF ALL DISTURBED AREAS WITHIN THE PROJECT LIMITS. PRIOR TO THE SEEDING OPERATION THE AREAS SHALL BE CLEARED OF ALL DEBRIS (INCLUDING TREE ROOTS, WEEDS, ROCKS, ETC.). ANY DEBRIS ENCOUNTERED WHILE PREPARING THE AREAS FOR SEEDING SHALL BE DISPOSED OF BY THE CONTRACTOR OFF THE PROJECT IN A SUITABLE DISPOSAL AREA PROVIDED BY THE CONTRACTOR AS APPROVED BY THE ENGINEER. THE PREPARATION FOR SEEDING AND REMOVAL AND HAULING OF DEBRIS IS INCLUDED IN THE BID PRICE FOR SEEDING.
15. MULCH MATERIAL TYPE 1 SHALL BE USED IN DISTURBED AREAS IN WHICH EROSION CONTROL BLANKET IS NOT USED AND SHALL BE DISK ANCHORED.
16. SEEDING OPERATIONS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR THE SEEDING CONTRACTOR.

ESTIMATED QUANTITIES

CERTIFIED BY *Joseph M. Miller* LIC. NO. 54947 DATE: 5/14/19
LICENSED ENGINEER

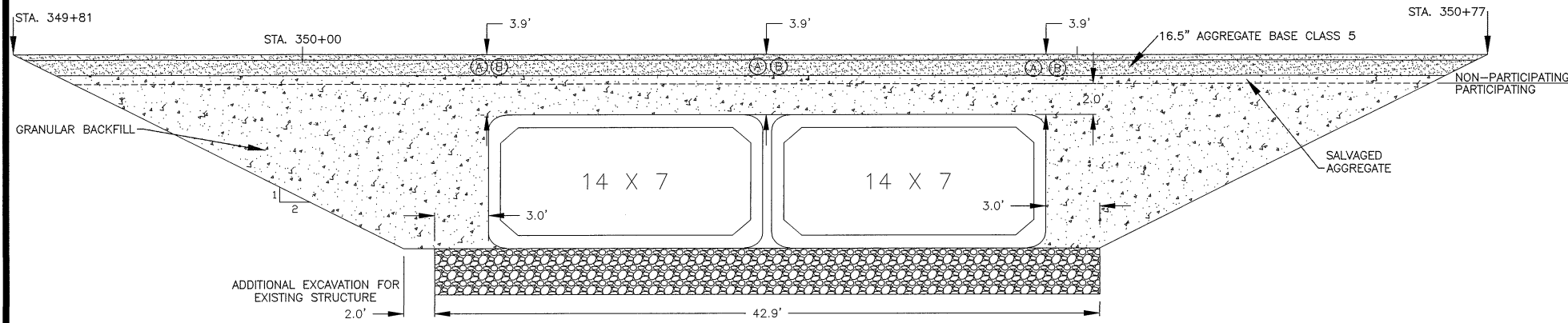
S.A.P. NO. 041-615-022 SHEET NO. 2 OF 14

NO SCALE

WEST ← → EAST

NOTES:

- BACKFILLING 2' ABOVE THE PIPE TO GRADING SHALL BE WITH SALVAGE AGGREGATE.
- BACKFILLING UP TO 2' ABOVE THE PIPE SHALL BE WITH GRANULAR BACKFILL.



DESIGN DATA

DESIGNED IN ACCORDANCE WITH 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

HL-93 LIVE LOAD
 BARREL INSIDE WIDTH = 14 FT
 BARREL INSIDE HEIGHT = 7 FT
 BARREL LENGTH = 56 FT EACH
 EST. MIN. FILL DEPTH (A) = 3.4 FT
 EST. MAX. FILL DEPTH (B) = 3.9 FT
 SKEW ANGLE = 30°

DESIGN SPEED = 45 MPH
 CURRENT ADT (2019) = 225
 PROJECTED ADT (2039) = 225

HL-93 LRFR
 BRIDGE OPERATING RATING FACTOR RF = 1.3

LIST OF SHEETS

NO.	DESCRIPTION
1.	TITLE SHEET
2.	ESTIMATED QUANTITIES
3.	GENERAL PLAN AND ELEVATION
4.	STAKEOUT
5-8.	CULVERT DETAILS
9.	EROSION & SEDIMENT CONTROL PLAN
10.	EROSION & SEDIMENT CONTROL DETAILS
11.	PLAN & PROFILE
12.	BRIDGE SURVEY SHEET
13.	SWPPP
14.	TRAFFIC CONTROL

CONSTRUCTION NOTES:

THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

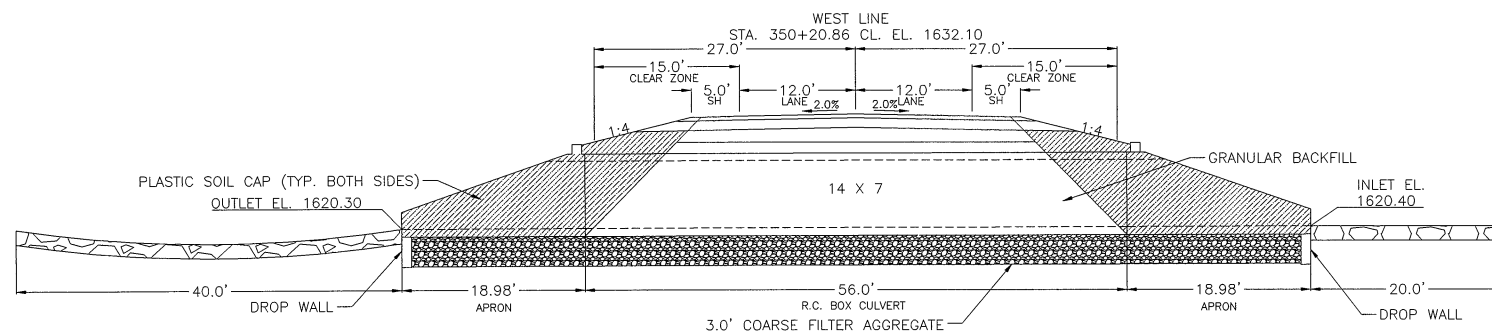
ALL EXPOSED CONCRETE EDGES SHALL BE FORMED WITH A 1/2" OR 3/4" CHAMFER UNLESS OTHERWISE NOTED.

CONSTRUCTION SHALL BE IN ACCORDANCE WITH SPEC. 2411 AND 2412, EXCEPT AS NOTED.

REFER TO REMAINDER OF GRADING PLAN FOR SUPERSTRUCTURE EXCAVATION AND BACKFILL. SPEC. 2451.

THE BAR SIZES SHOWN IN THIS PLAN ARE IN U.S. CUSTOMARY DESIGNATIONS.

REFER TO TITLE SHEET FOR THE SUBSURFACE UTILITY INFORMATION.

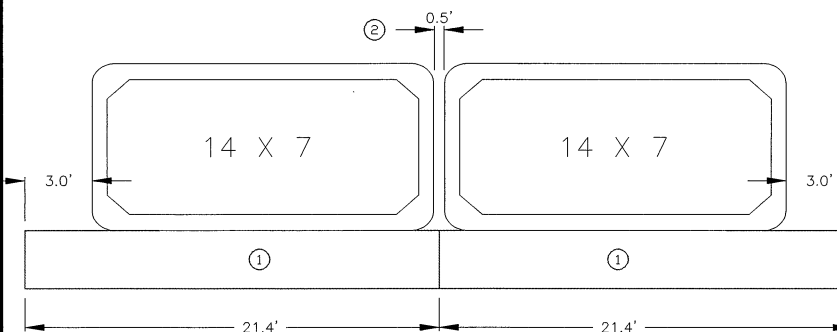


NO SCALE

WEST ← → EAST

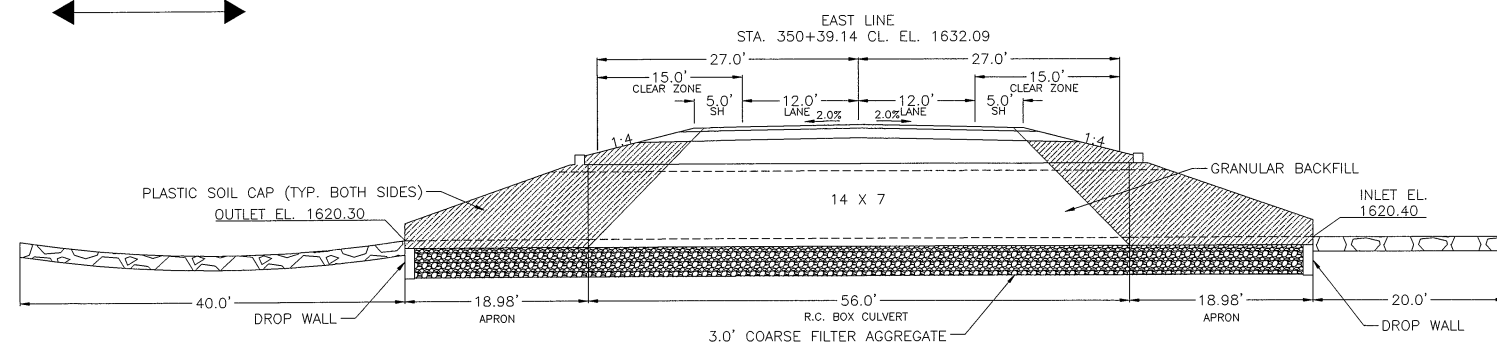
NOTES:

- DROP WALLS ON THE 14 X 7 PIPE APRONS SHALL EXTEND 3' BEYOND THE OUTER WALLS AND 0.25' BEYOND THE INNER WALL OF THE APRONS.
- CULVERTS SHALL BE PLACED WITH A SPACING OF 0.5' BETWEEN THE LINES AND SHALL BE BACKFILLED WITH CONCRETE MIX NO. 1P62.
- THE DROP WALLS AND THE CONCRETE MIX ARE INCLUDED IN THE BID PRICE FOR THE PRECAST CONCRETE BOX CULVERTS.



NO SCALE

NORTH ← → SOUTH



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.

SIGNED: *Joseph M. Wilson* DATE: 5/14/19
 LICENSED PROFESSIONAL ENGINEER
 NAME: JOSEPH M. WILSON LIC. NO. 54947

BRIDGE NO. 41J73

LOCATION: C.S.A.H. 15

MAIN 14 x 7 MNDOT STD. PRECAST CONCRETE CULVERT

IDENTIFICATION NO. 513

GENERAL PLAN AND ELEVATION

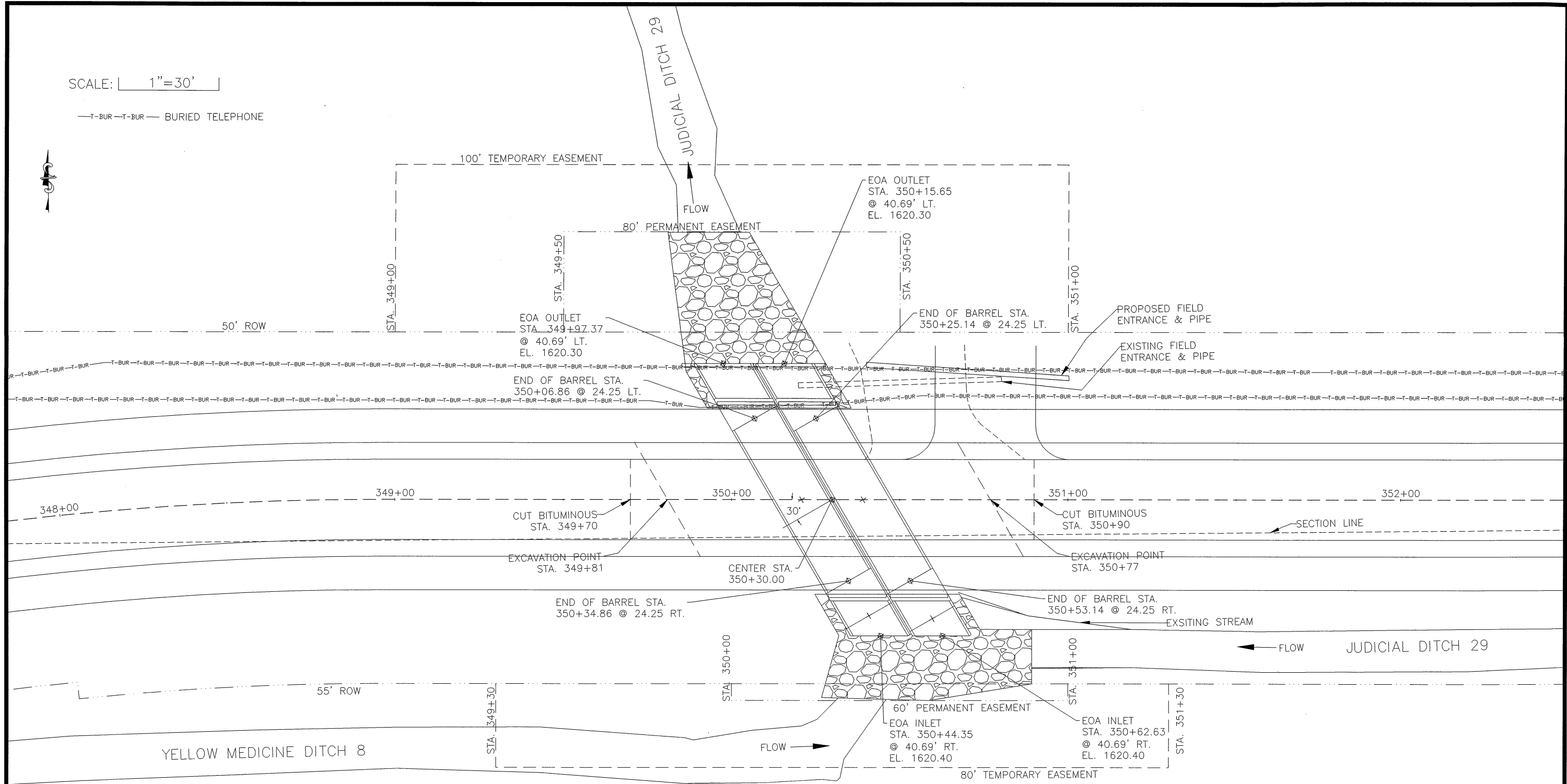
SEC. 28 & 33-T 111 N-R 44 W

TOWNSHIP: LAKE STAY, LINCOLN COUNTY

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

SCALE: 1"=30'

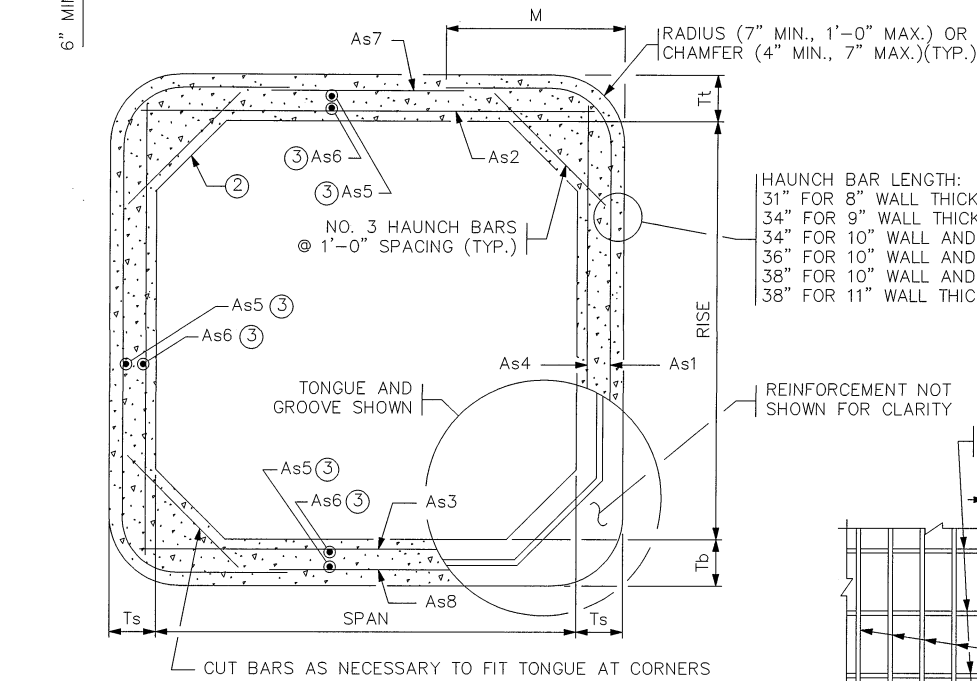
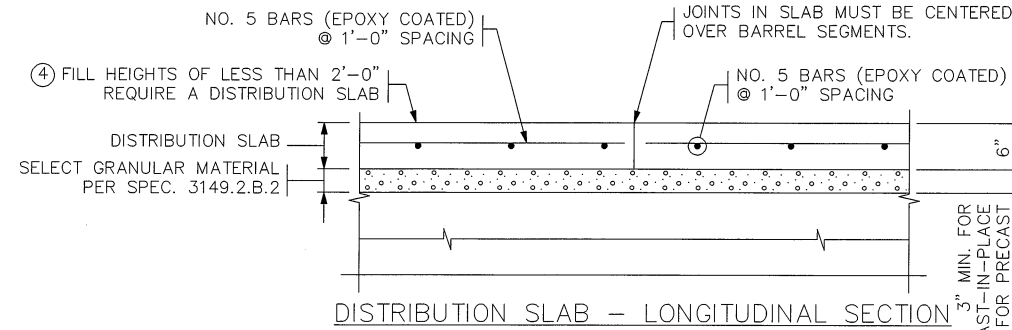
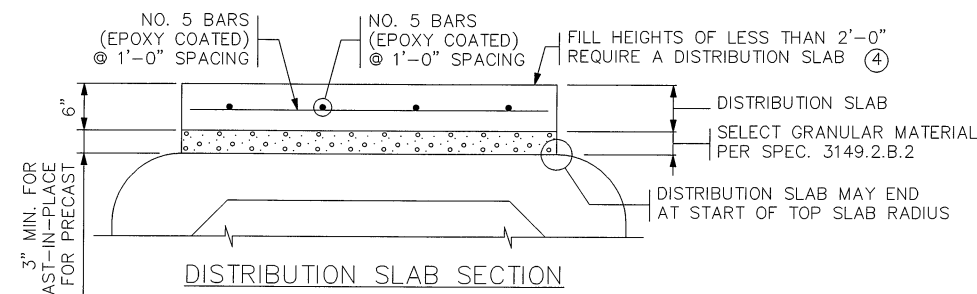
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STAKEOUT

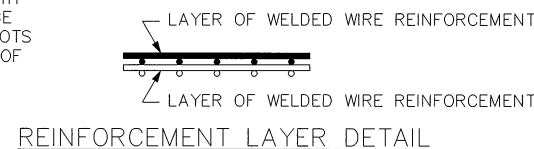
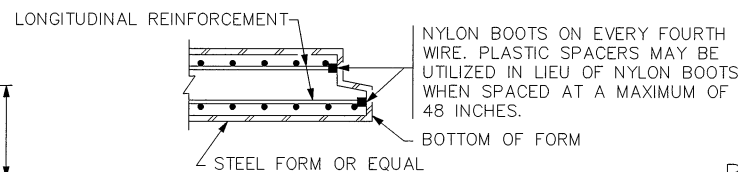
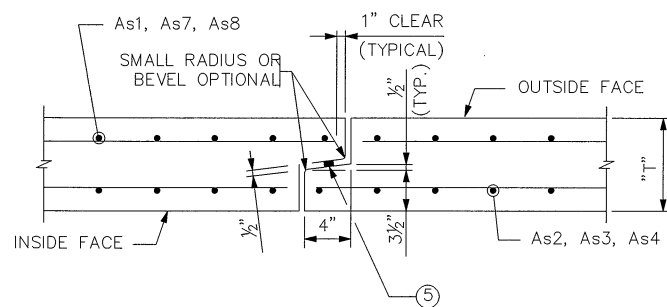
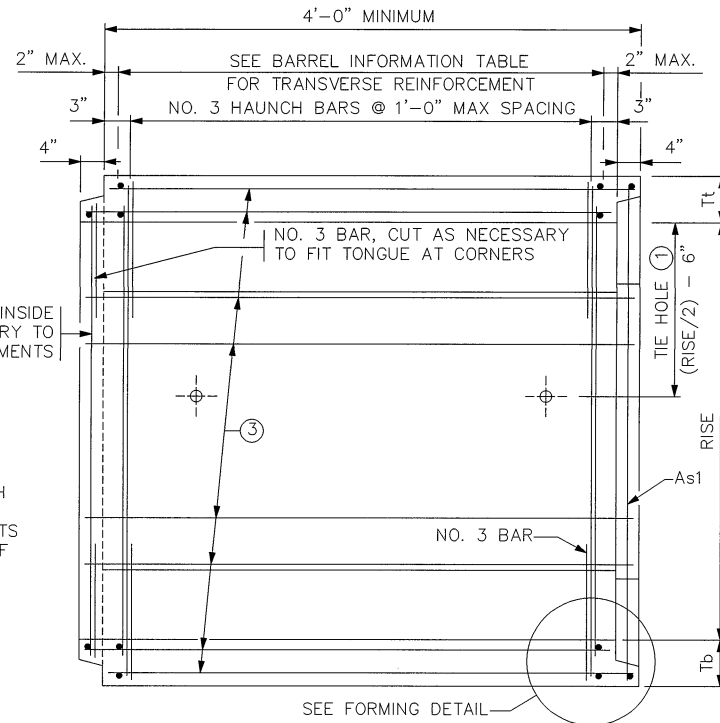
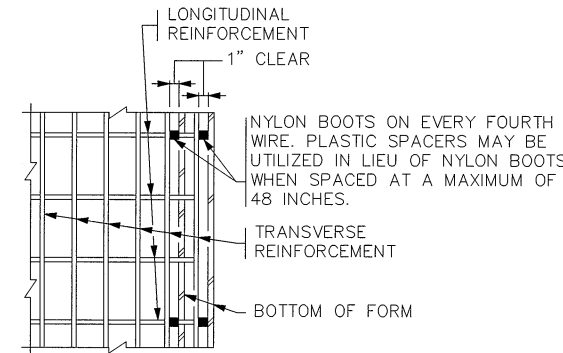
CERTIFIED BY *Joseph M. Witek* LIC. NO. 54947 DATE: 5/02/19
 LICENSED ENGINEER

S.A.P. NO. 041-615-022 SHEET NO. 4 OF 14



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

CUT OR BEND INSIDE REINFORCEMENT AS NECESSARY TO ACHIEVE COVER REQUIREMENTS



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 PER 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 PER THE APPLICABLE REQUIREMENTS OF AASHTO M259.
- 1 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 PER SPEC. 3238.2.A 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 As5 AND 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 3S52.
- PLACE CAST-IN-PLACE DISTRIBUTION SLABS WITH 3" MIN. SELECT GRANULAR MATERIAL PER SPEC. 3149.2.B.2 BETWEEN BARREL AND DISTRIBUTION SLAB.
- PRECAST DISTRIBUTION SLABS MAY BE USED FOR FILL HEIGHTS OVER 1'-0". PROVIDE 6" MINIMUM SELECT GRANULAR MATERIAL PER SPEC. 3149.2.B.2 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 CONSIDERED INCIDENTAL.
- 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 REQUIRED **	DIMENSIONS					WEIGHT (LBS./FT.)	WELDED WIRE REINFORCEMENT												
							SPAN (FT.)	RISE (FT.)	Tt (IN.)	Tb (IN.)	Ts (IN.)		As1		As2		As3		As4		As7		As8		
													AREA (IN. ² /FT.)	LENGTH (FT.)	M (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.)
STA. 350+20.86 & 350+39.14	14'X7'	2	5000	3-6	NO	NO	14'	7'	10"	10"	8"	5550	0.77	13'-9"	2'-10"	0.92	14'-6"	0.94	14'-6"	0.20	7'-6"	0.24	12'-5"	0.24	12'-5"

* 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.

REVISION: FEBRUARY 22, 2018

APPROVED: MARCH 24, 2011
Nancy S. Rubenberger
 STATE BRIDGE ENGINEER

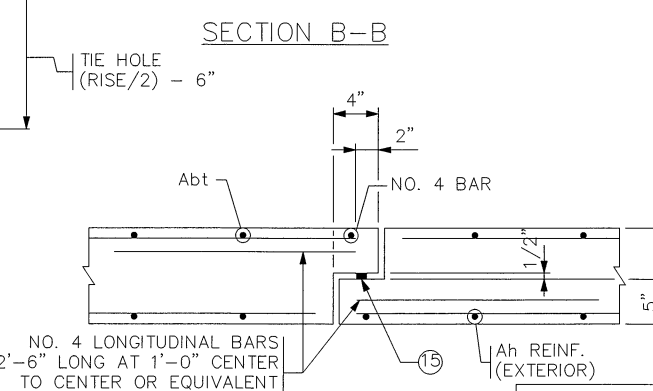
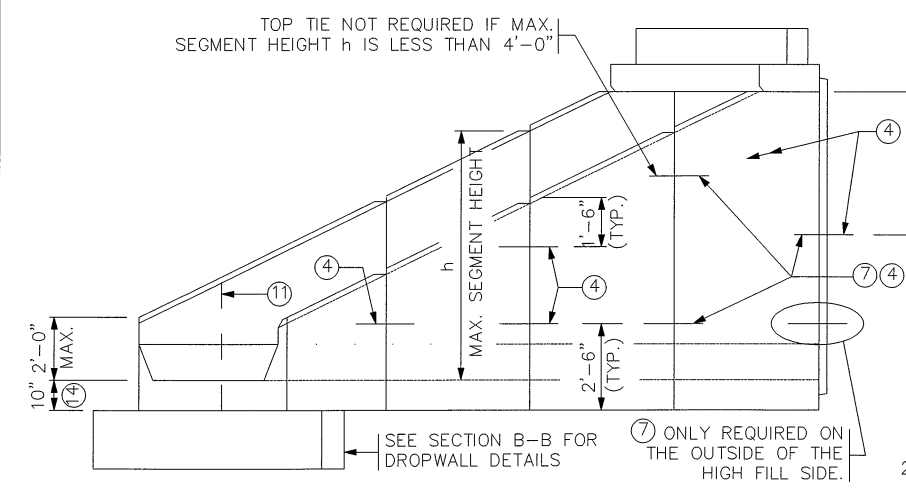
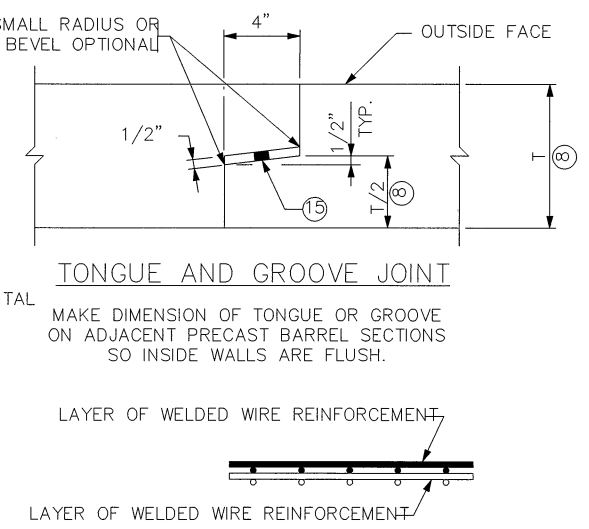
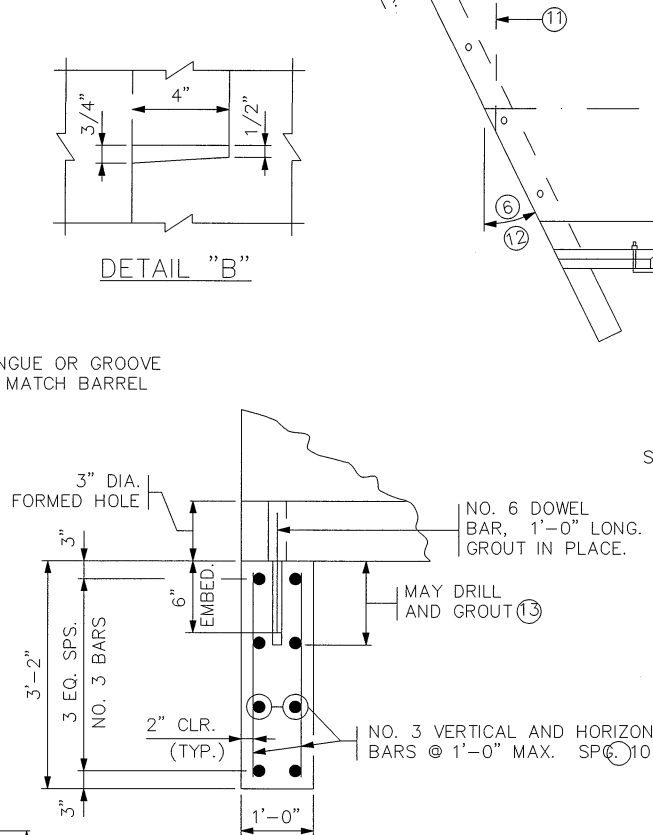
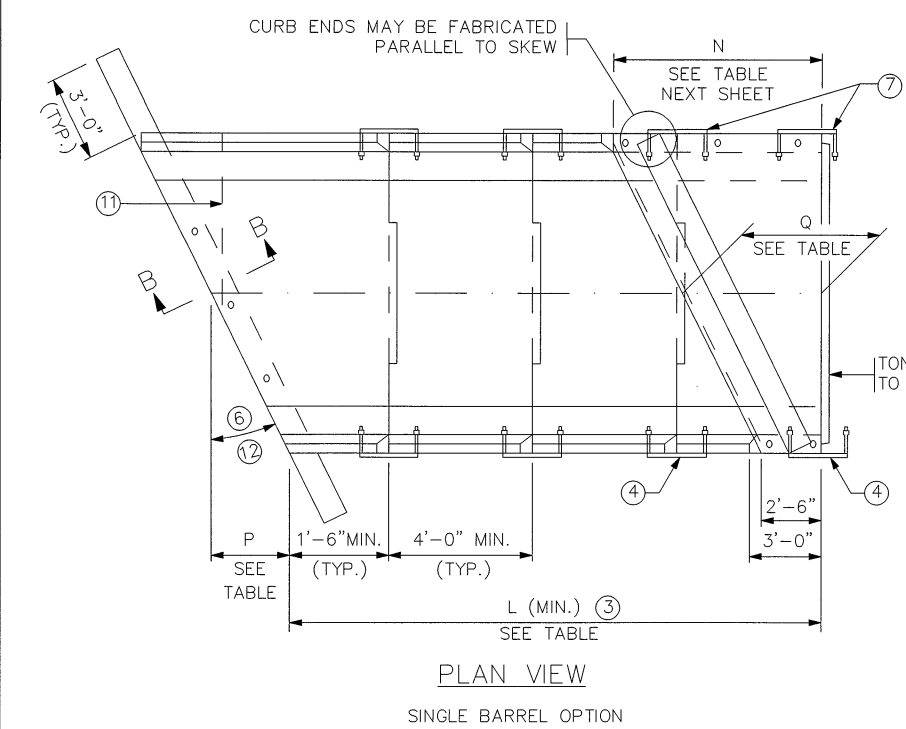
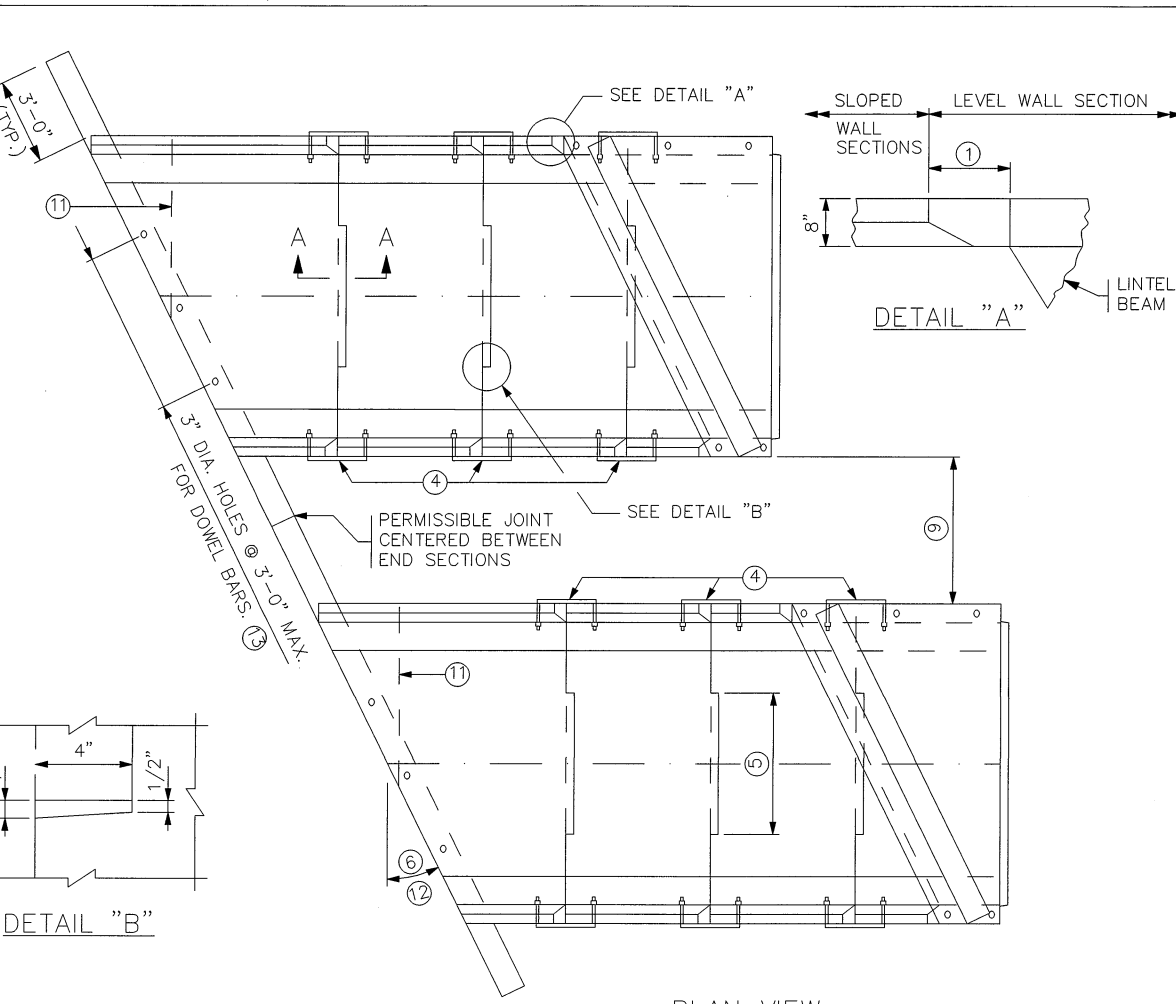
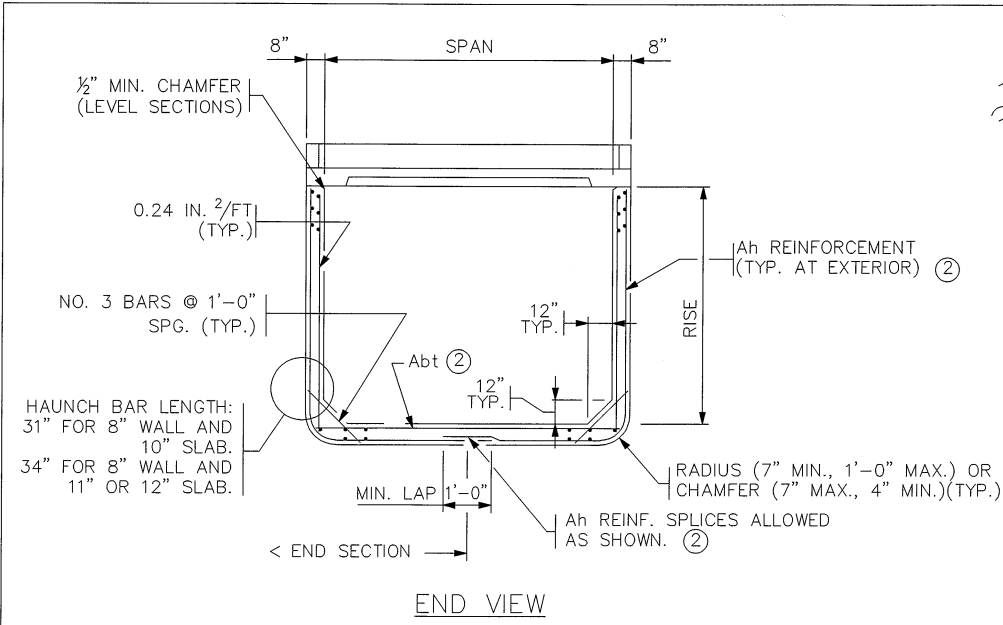
STATE AID PROJ. NO. 041-615-022 (C.S.A.H. 15) STA. 350+30.00 FIG. 5-395.101(A)

CERTIFIED BY: *Joseph M. Wilson* 5/02/19 LICENSED PROFESSIONAL ENGINEER DATE

NAME: JOSEPH M. WILSON LIC. NO. 54947 TITLE: PRECAST CONCRETE BARREL DETAILS

DES: _____ DR: _____ APPROVED: _____

CHK: _____ CHK: _____ SHEET NO. 5 OF 14 SHEETS BRIDGE NO. 41J73



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 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.

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: FEBRUARY 22, 2018
 APPROVED: MARCH 24, 2011
Nancy Saubenberg
 STATE BRIDGE ENGINEER

ELEVATION
 SECTION A-A

STATE AID PROJ. NO 041-615-022 (C.S.A.H. 15) STA. 350+30.00
 FIG. 5-395.110(A)
 CERTIFIED BY *Joseph M. Wilson* 5/02/19 DATE
 LICENSED PROFESSIONAL ENGINEER
 NAME: JOSEPH M. WILSON LIC. NO. 54947
 TITLE: PRECAST CONCRETE END SECTION TYPE III - SINGLE OR DOUBLE BARREL FOR SKEWS 7 1/2' TO 45'
 DES: DR: APPROVED:
 CHK: CHK:
 SHEET NO. 6 OF 14 SHEETS BRIDGE NO. 41J73

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

Abt REINFORCEMENT	
SPAN (FT.)	Abt (IN ² /FT.)
6-10	0.20
12	0.30
14	0.39
16	0.39

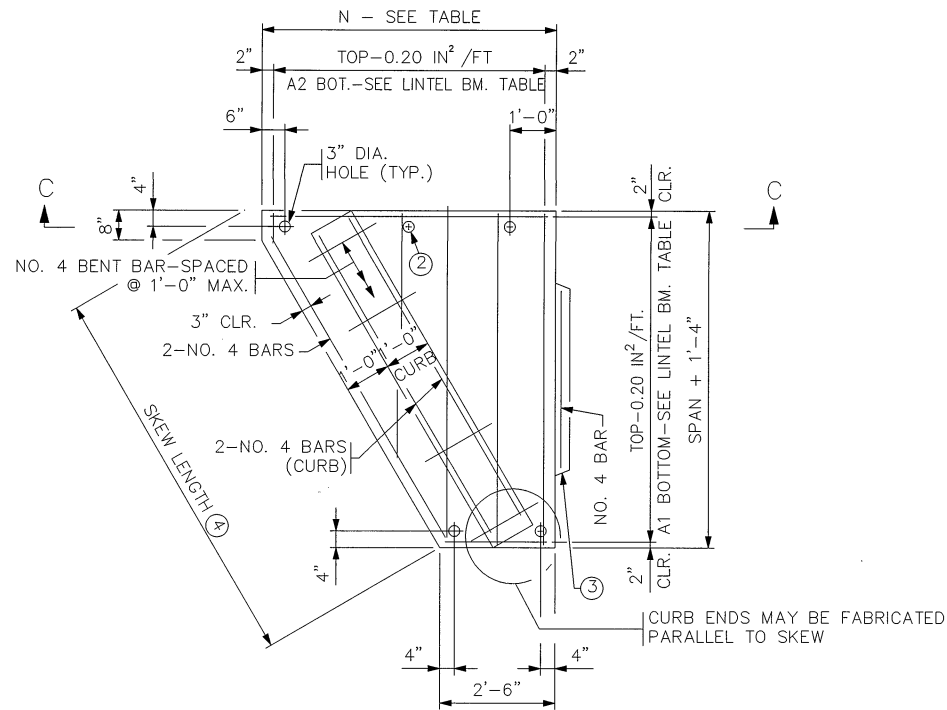
LINTEL BEAM REINFORCEMENT		
SPAN (FT.)	BOTTOM REINFORCEMENT	
	A1	A2
6	NO. 4 @ 1'-0"	NO. 4 @ 9"
8	NO. 4 @ 1'-1"	NO. 4 @ 6"
10	NO. 4 @ 9"	NO. 5 @ 6"
12	NO. 5 @ 9"	NO. 6 @ 6"
14	NO. 6 @ 9"	NO. 8 @ 6"
16	NO. 6 @ 9"	NO. 8 @ 6"

LENGTH N			
SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW
6	4'-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

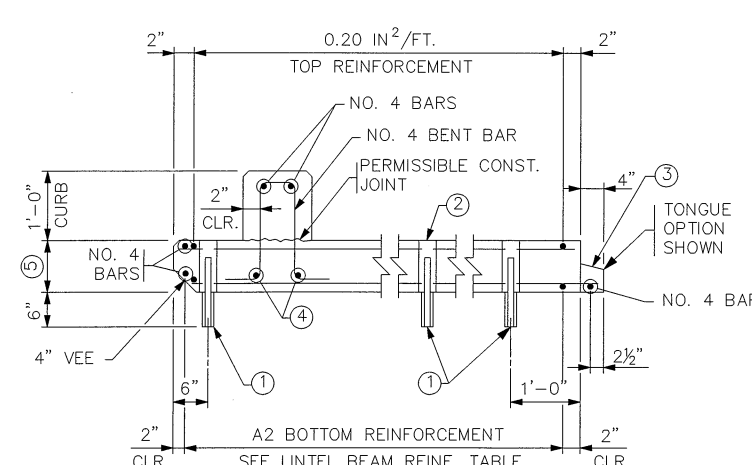
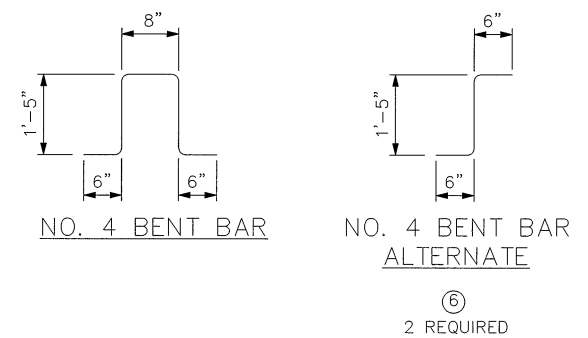
LINTEL BEAM THICKNESS			
SPAN (FT.)	15° SKEW	30° SKEW	45° SKEW
≤ 12	9"	9"	9"
14	10" ⑧	10" ⑧	10" ⑧
16	10" ⑧	10" ⑧	NA ⑦

CONSTRUCTION NOTES

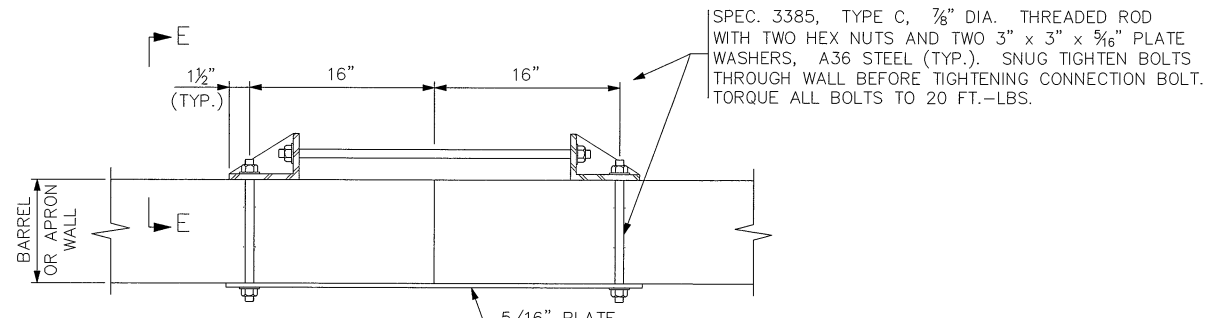
- SEE STANDARD FIG. 5-395.101(A) AND FIG. 5-395.101(B) FOR ADDITIONAL DIMENSIONS AND CONSTRUCTION NOTES.
- ALL END SECTIONS REQUIRE CURB ON LINTEL BEAM.
- GROUT CONSISTS OF 1 PART CEMENT AND 2 PARTS SAND. USE TYPE 1A AIR ENTRAINED PORTLAND CEMENT. GROUT MIX MAXIMUM SLUMP IS 4".
- STRUCTURAL STEEL PER SPEC. 3306.
- WELDING PER SPEC. 2471.
- GALVANIZE STRUCTURAL STEEL PER SPEC. 3394.
- GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.
- 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.



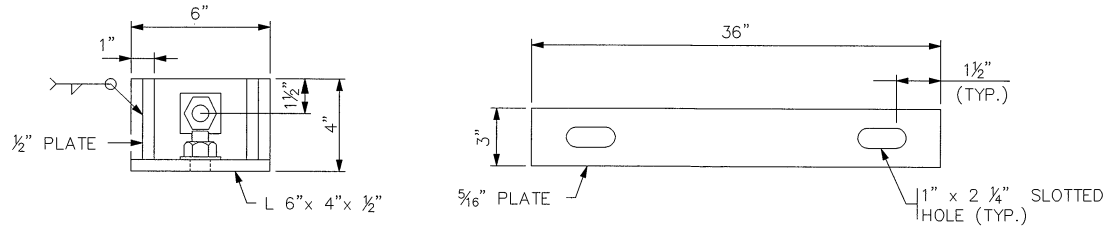
PLAN VIEW
LINTEL BEAM WITH INTEGRAL CURB



SECTION C-C
LINTEL BEAM WITH INTEGRAL CURB



PLAN VIEW



SECTION E-E
EXTRA STRONG CONNECTION DETAILS

REVISION: 10-09-2015
APPROVED: MARCH 24, 2011
Nancy S. Benbenberger
STATE BRIDGE ENGINEER

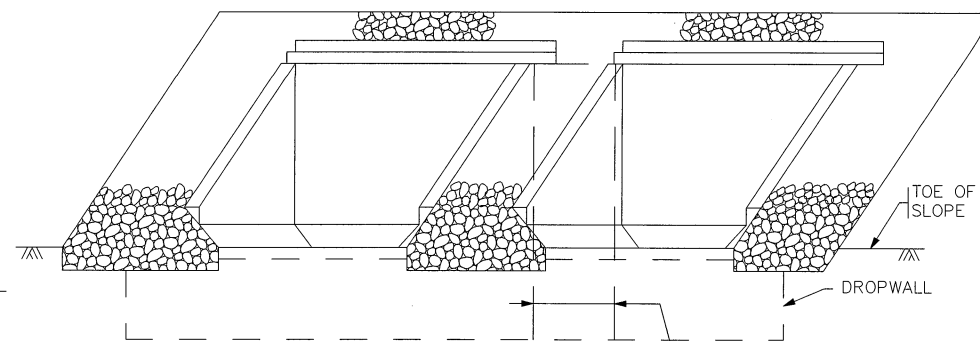
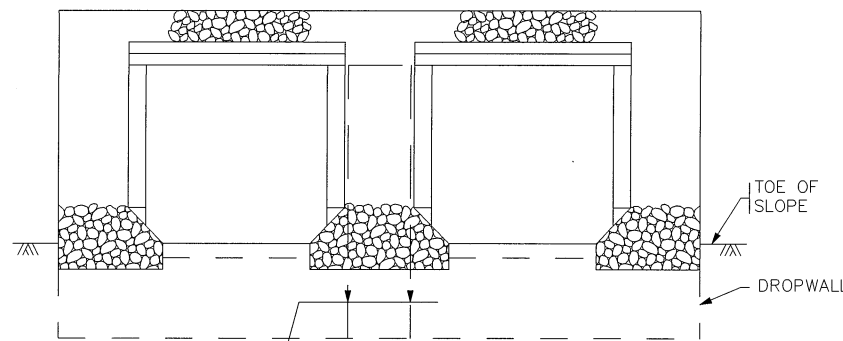
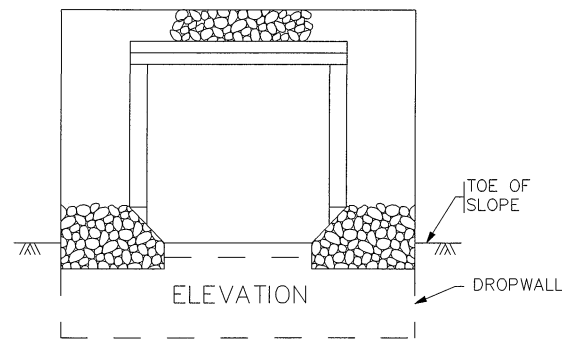
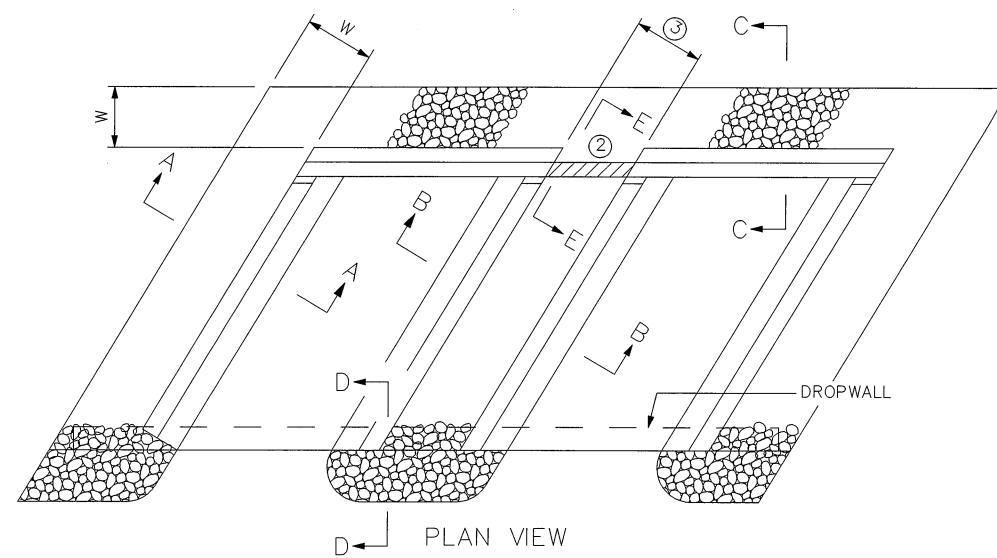
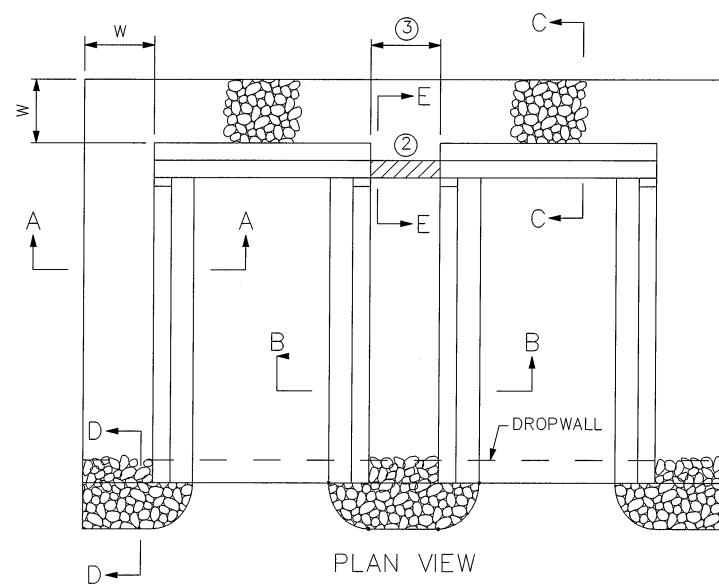
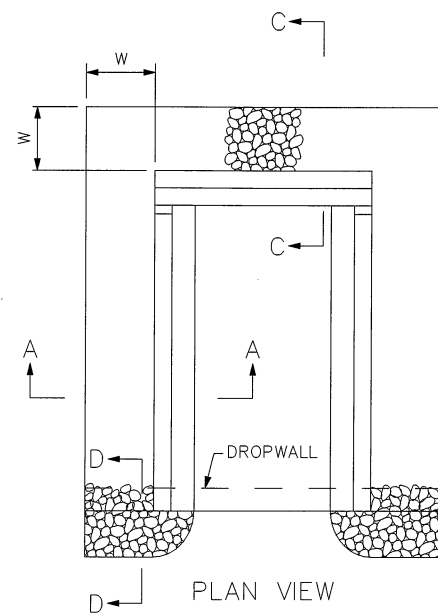
STATE AID PROJ. NO 041-615-022 (C.S.A.H. 15) STA. 350+30.00		FIG. 5-395.110(B)	
CERTIFIED BY: <i>Joseph M. Wilson</i>	DATE: 5/02/19	TITLE: PRECAST CONCRETE END SECTION TYPE III - SINGLE OR DOUBLE BARREL FOR SKEWS 7½ TO 45°	DESIGNER: _____
NAME: JOSEPH M. WILSON	LIC. NO. 54947	CHECKED BY: _____	DR. _____
APPROVED: _____		BRIDGE NO. 41J73	
SHEET NO. 7 OF 14 SHEETS			

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 PER SPECS. 2511 AND 3601.

- ① FOR TYPE OF GEOTEXTILE FILTER MATERIAL REQUIRED, SEE 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 DOUBLE 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.



SINGLE BARREL

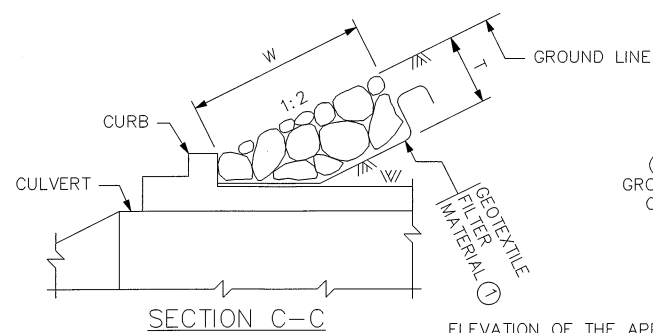
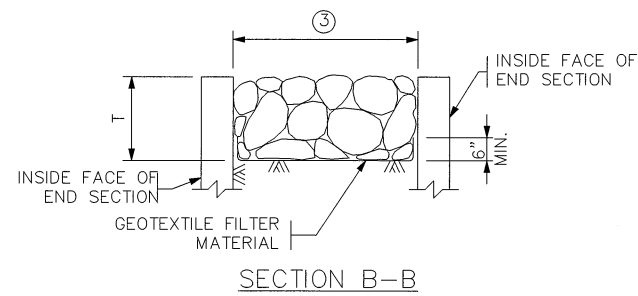
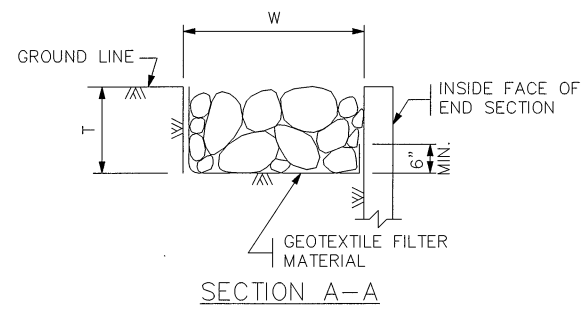
CLASS III OR IV SHOWN FOR SKEWS UP TO 7½'

MULTIPLE BARREL

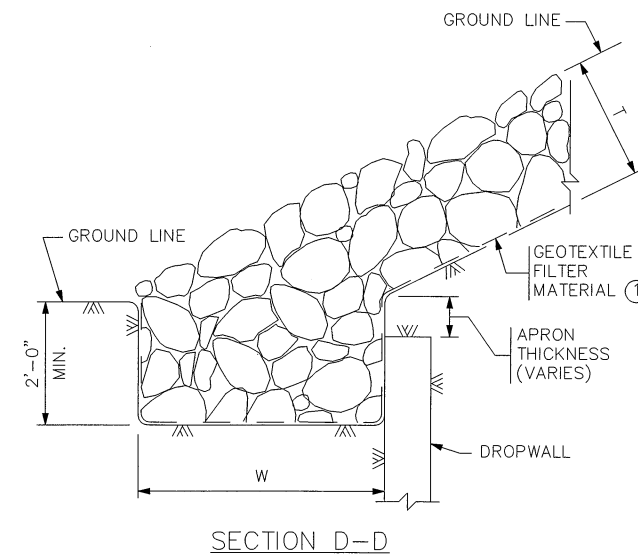
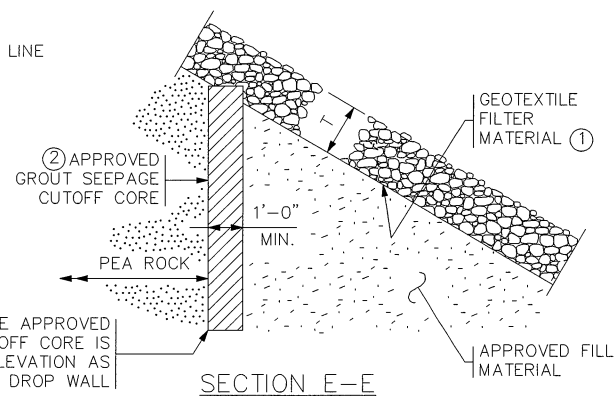
FOR SKEWS UP TO 7½' CLASS III OR IV SHOWN DOUBLE BARREL SHOWN

MULTIPLE BARREL

FOR SKEWS OVER 7½' CLASS III OR IV SHOWN DOUBLE BARREL SHOWN, OTHER BARREL CONFIGURATIONS SIMILAR.



ELEVATION OF THE APPROVED GROUT SEEPAGE CUTOFF CORE IS TO BE THE SAME ELEVATION AS THE BOTTOM OF THE DROP WALL



RIPRAP CLASS

RIPRAP CLASS	RIPRAP CLASS	T	W
☒	III	1'-6"	3'-0"
☐	IV	2'-0"	4'-0"

REVISION: 10-09-2015

APPROVED: SEPTEMBER 11, 2014

Nancy D. Wierberger
STATE BRIDGE ENGINEER

STATE AID PROJ. NO 041-615-022 (C.S.A.H. 15) STA. 350+30.00

FIG. 5-395.115

CERTIFIED BY *Joseph M. Wilson* 5/02/19
LICENSED PROFESSIONAL ENGINEER DATE
NAME: JOSEPH M. WILSON LIC. NO. 54947

TITLE: EMBANKMENT PROTECTION FOR BOX CULVERTS

DES: _____ DR: _____ APPROVED: _____
CHK: _____ CHK: _____ SHEET NO. 8 OF 14 SHEETS

BRIDGE NO. 41J73



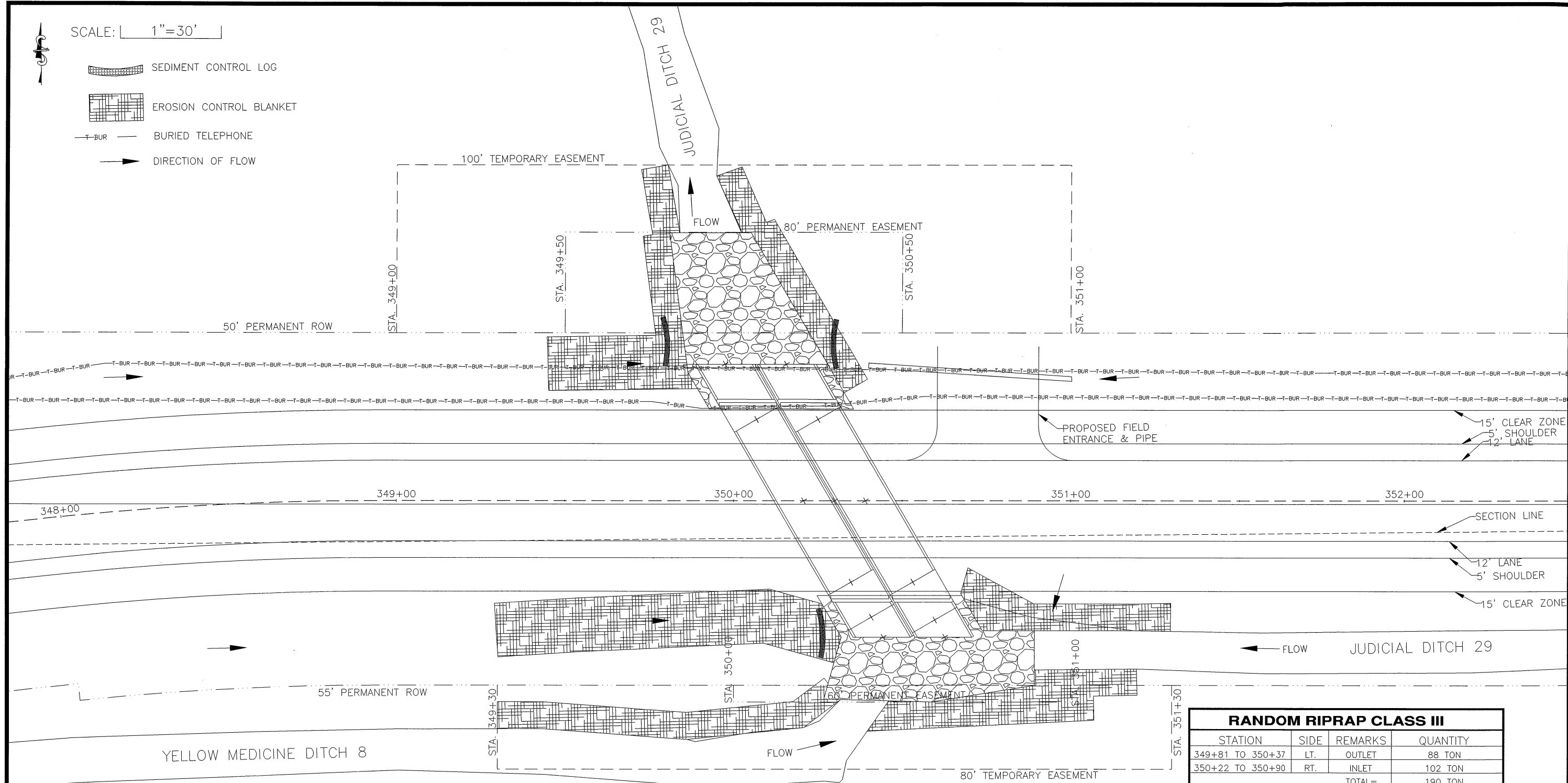
SCALE: 1"=30'

SEDIMENT CONTROL LOG

EROSION CONTROL BLANKET

BURIED TELEPHONE

DIRECTION OF FLOW



RANDOM RIPRAP CLASS III			
STATION	SIDE	REMARKS	QUANTITY
349+81 TO 350+37	LT.	OUTLET	88 TON
350+22 TO 350+90	RT.	INLET	102 TON
TOTAL=			190 TON

*1.3 TON PER CUBIC YARD

SEDIMENT CONTROL LOG TYPE WOOD FIBER		
SIDE	REMARKS	LIN. FT.
LT.	OUTLET	30'
RT.	INLET	15'
TOTAL=		45'

*QUANTITIES MAY BE ADJUSTED BY ENGINEER IN THE FIELD

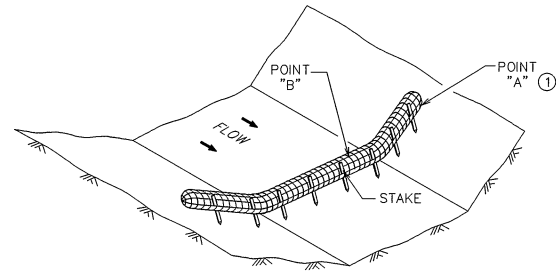
EROSION CONTROL BLANKET, CATEGORY 3N			
STATION	SIDE	REMARKS	QUANTITY
349+45 TO 350+40	LT.	OUTLET	184 SQ YD
349+30 TO 351+30	RT.	INLET	422 SQ YD
TOTAL=			606 SQ YD

*QUANTITIES MAY BE ADJUSTED BY THE ENGINEER IN THE FIELD.

EROSION & SEDIMENT CONTROL PLAN

CERTIFIED BY Joseph M. Hilton LIC. NO. 54947 DATE: 5/02/19
LICENSED ENGINEER

S.A.P. NO. 041-615-022 SHEET NO. 9 OF 14



SEDIMENT CONTROL LOG TYPE WOOD FIBER, OR TYPE COMPOST ② ③

NOTES:

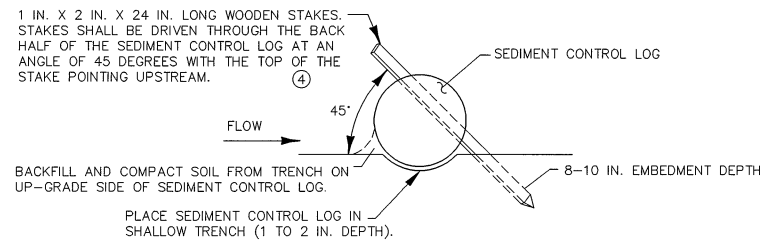
SEE SPECS. 2573, 3601, 3733, 3885, 3886 & 3889.

FOR DITCH CHECKS, PLACE SEDIMENT CONTROL LOG PERPENDICULAR TO FLOW AND IN A CRESCENT SHAPE WITH THE ENDS FACING UPSTREAM.

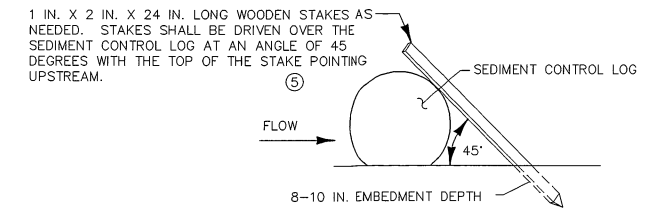
APPROXIMATE SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM THE FOLLOWING SPACING FORMULA:

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

- ① POINT "A" MUST BE A MINIMUM OF 6 INCHES HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 4.5 FT./SEC.. (SEDIMENT CONTROL LOG WITH EROSION CONTROL BLANKET)
- ③ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 1.5 FT./SEC.. (SEDIMENT CONTROL LOG WITHOUT EROSION CONTROL BLANKET)



TYPES: STRAW, WOOD FIBER, OR COIR

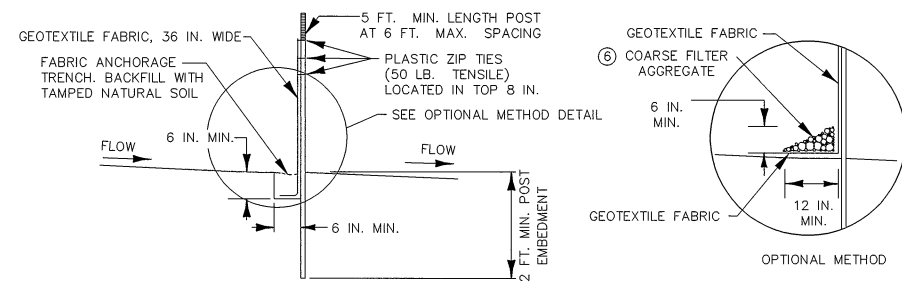


TYPES: WOOD CHIP, COMPOST, OR ROCK

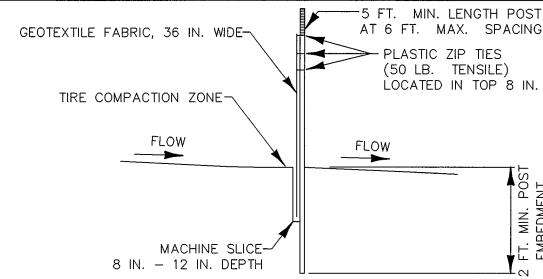
NOTES:

SEE SPECS. 2573, 3149, 3874, 3882, 3886, & 3897.

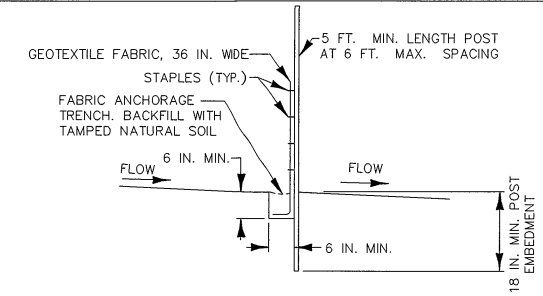
- ④ SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1 FOOT FOR DITCH CHECKS OR 2 FEET FOR OTHER APPLICATIONS.
- ⑤ PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.



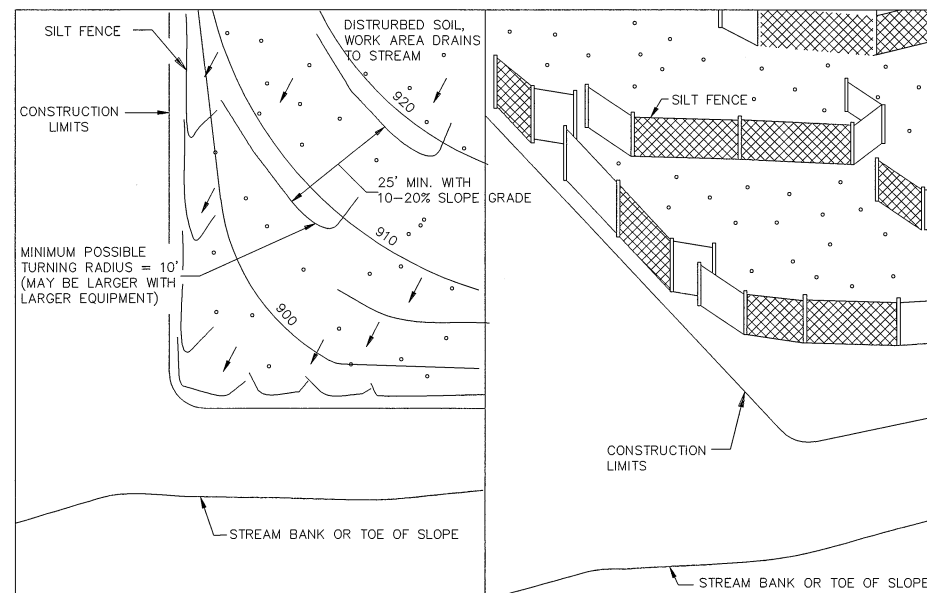
SILT FENCE TYPE HI ⑦ (HAND INSTALLED)



SILT FENCE TYPE MS ⑦ (MACHINE SLICED)



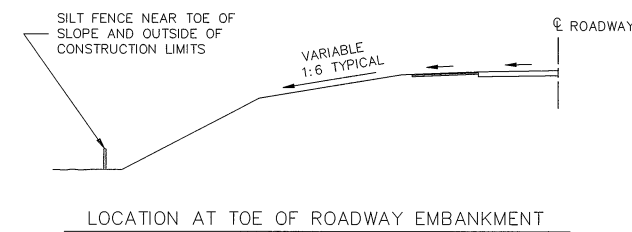
SILT FENCE TYPE PA ⑧ (PREASSEMBLED)



PLAN VIEW

PERSPECTIVE VIEW

J-HOOK INSTALLATION



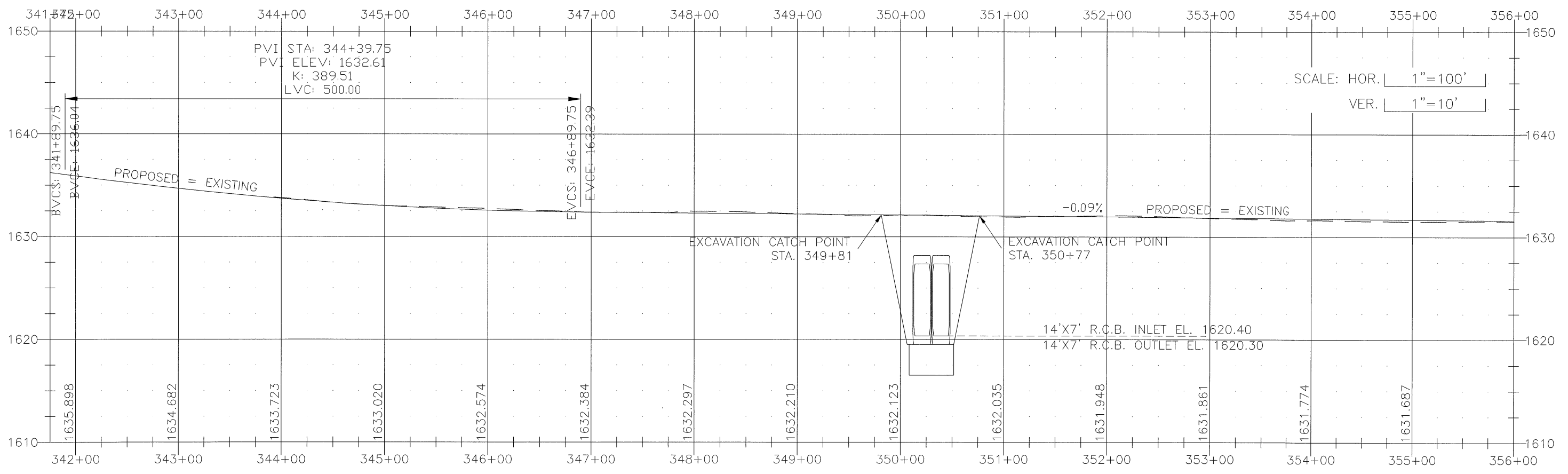
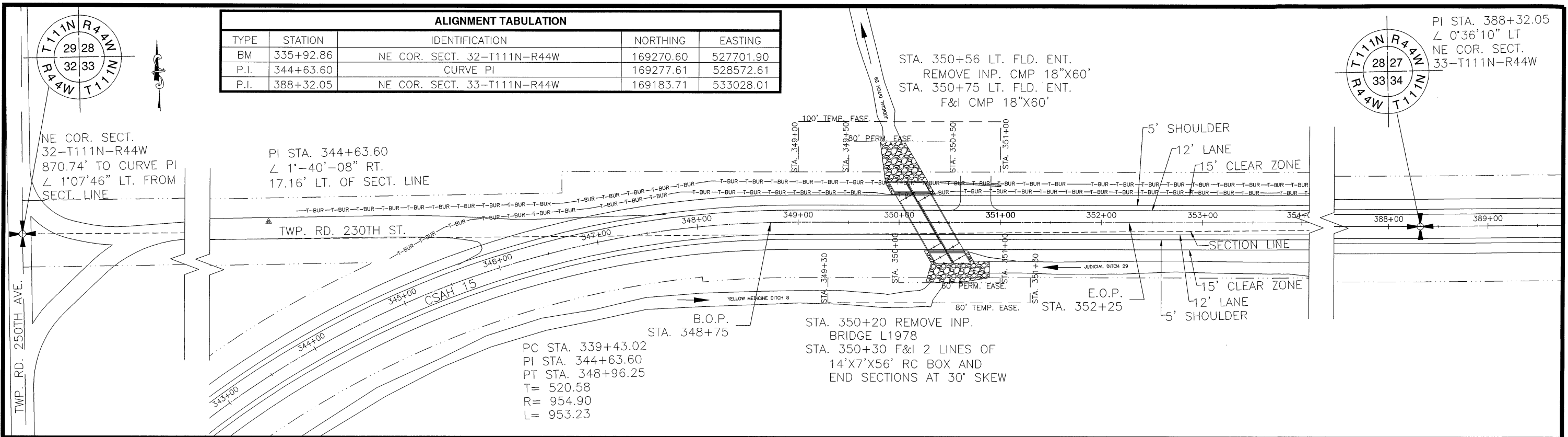
LOCATION AT TOE OF ROADWAY EMBANKMENT

NOTES:

SEE SPECS. 2573, 3149 & 3886.

- ⑥ COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.
- ⑦ TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 1 ACRE.
- ⑧ TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 0.25 ACRE.

ALIGNMENT TABULATION				
TYPE	STATION	IDENTIFICATION	NORTHING	EASTING
BM	335+92.86	NE COR. SECT. 32-T111N-R44W	169270.60	527701.90
P.I.	344+63.60	CURVE PI	169277.61	528572.61
P.I.	388+32.05	NE COR. SECT. 33-T111N-R44W	169183.71	533028.01



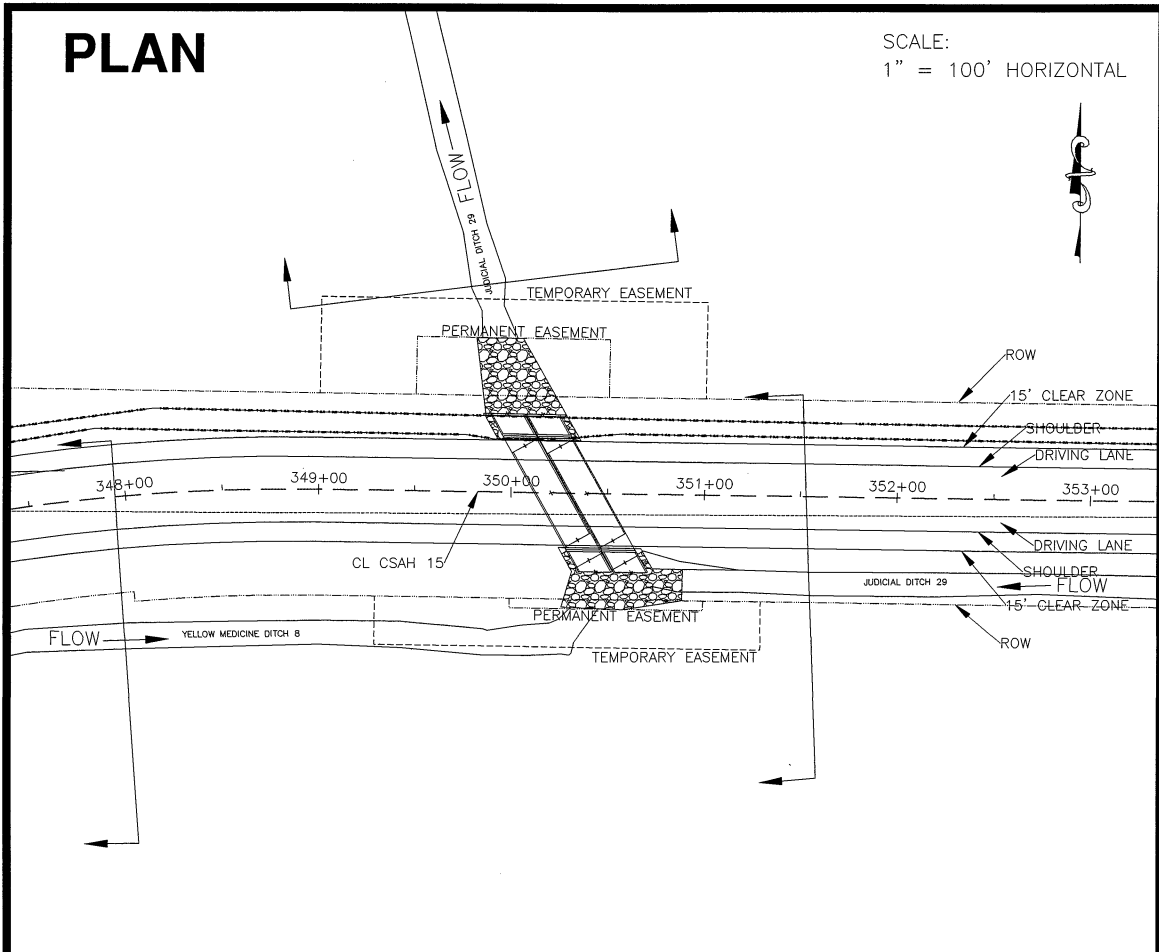
PLAN & PROFILE

CERTIFIED BY *Joseph M. Lilla* LIC. NO. 54947 DATE: 5/14/19
 LICENSED ENGINEER

S.A.P. NO. 041-615-022 SHEET NO. 11 OF 14

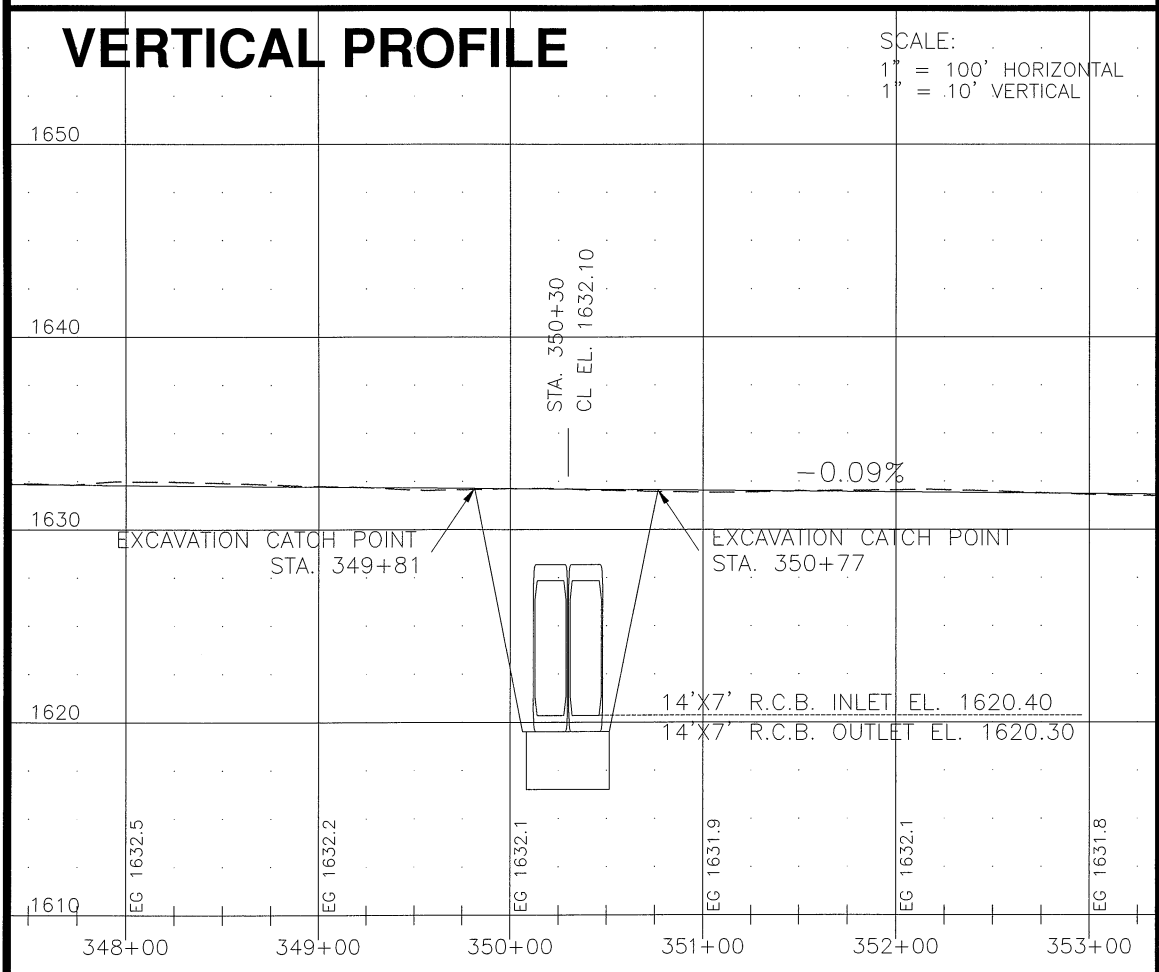
PLAN

SCALE:
1" = 100' HORIZONTAL

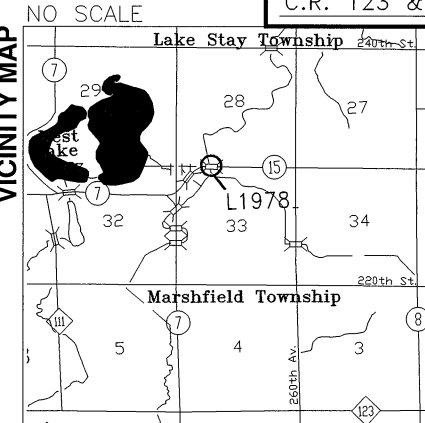
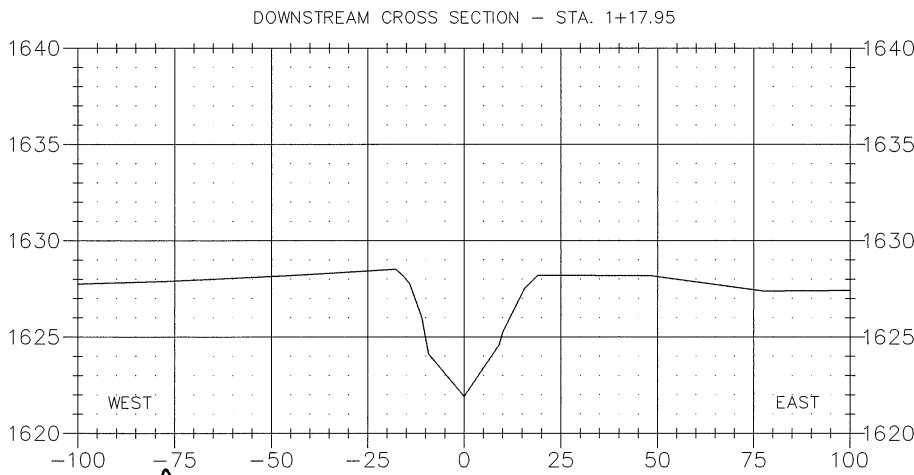
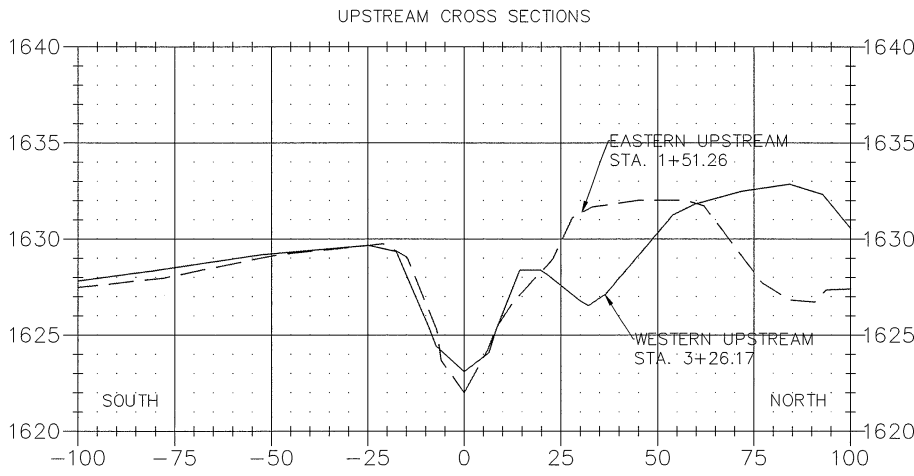
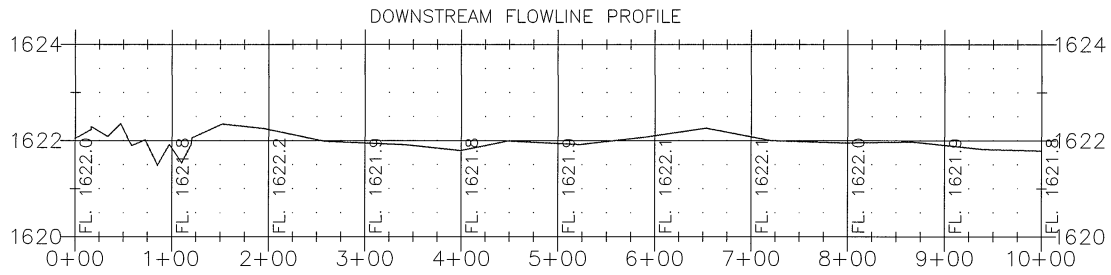
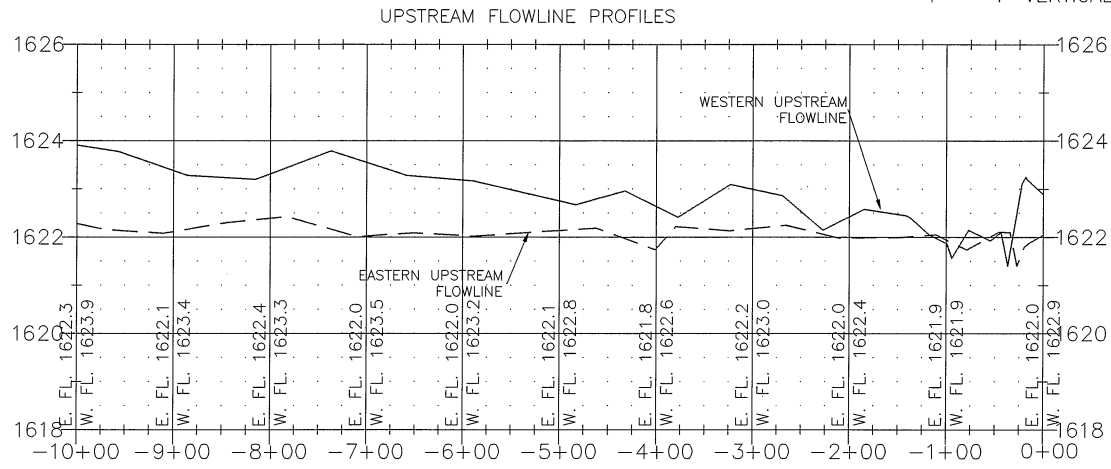


VERTICAL PROFILE

SCALE:
1" = 100' HORIZONTAL
1" = 10' VERTICAL



SCALE: 1" = 200' HORIZONTAL
1" = 4' VERTICAL



FEDERAL PROJ. NO.
LOCATION ENGINEER'S OBSERVATION AT BRIDGE SITE
1. SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE DEBRIS, ETC...
NONE
2. OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM. GIVEN LOCATION, TYPE, ETC...
3. APPARENT HIGH WATER ELEVATION _____ OBTAINED FROM _____
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY _____

HYDRAULIC ENGINEER'S RECOMMENDATION
DATE: FEB. 2, 2017
STREAM OR DITCH DESIGNATION JUDICIAL DITCH 29 & YELLOW MEDICINE DITCH 8 DRAINAGE AREA 15.52 MI.²
MAX. FLOOD ON RECORD UNK. DESIGN FLOOD (100 YR. FREQ.) 697 CFS
MAX. OBSERVED HIGHWATER ELEV. UNK. DESIGN HIGHWATER ELEV. 1631.09
DESIGN MEAN VELOCITY THROUGH STRUCTURE 3.6 FPS (AVG.)
LOW SUPERSTRUCTURE AT OR ABOVE ELEVATION 1627.30
FLOWLINE ELEVATION 1620.35 SKEW ANGLE 15°
BASIC FLOOD (100 YR. FREQ.): 697 CFS
GREATEST FLOOD (175 YR. FREQ.): 780 CFS

ENGINEER'S RECOMMENDATION
INSTALL 2 LINES OF 14X7 R.C.B. CULVERT AT A 30° SKEW.
BRIDGE SURVEY SHEETS MADE FROM LINCOLN COUNTY HIGHWAY DEPARTMENT SURVEY
BENCHMARK ELEVATION 1707.018
LOCATION ARC0 MN081, LOCATED ON C.R. 123 ON THE SOUTHEAST CORNER OF THE INTERSECTION C.R. 123 & 230TH AVE.

STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION
BRIDGE SURVEY
AT STATION 350+30 ON C.S.A.H. 15
PROPOSED BRIDGE LOCATION 0.75 MILES WEST OF INTERSECTION 260TH AVE. & C.S.A.H. 15
SEC. 28&33 TWP. 111N RNG. 44W
TOWNSHIP: LAKE STAY
COUNTY: LINCOLN EXISTING BRIDGE NO. L1978
PROPOSED BRIDGE NO. 41J73

CERTIFIED BY Joseph M. Hilton LIC. NO. 54947 DATE: 5/02/19
LICENSED ENGINEER

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

PROJECT DESCRIPTION

S.A.P. 041-615-022 CONSISTS OF REMOVING THE EXISTING STRUCTURE (EXISTING BRIDGE L1978) OVER JUDICIAL DITCH 29, LOCATED ON C.S.A.H. 15, APPROXIMATELY 1525 FT. EAST OF THE INTERSECTION OF TWP. RD. 230TH ST. & TWP. RD. 250TH AVE., AND REPLACING IT WITH 2 LINES OF 14' X 7' RC BOX CULVERT (NEW BRIDGE #41J73). CONSTRUCTION ACTIVITY INCLUDES REMOVAL OF THE EXISTING STRUCTURE, INSTALLING THE NEW BOX CULVERTS, BACKFILLING, AND GRADING. THE TOTAL NET LENGTH OF THE PROJECT IS 350 FEET. THE RECEIVING WATER FOR STORM WATER FROM THIS PROJECT IS JUDICIAL DITCH 29. JUDICIAL DITCH 29 IS NOT CLASSIFIED AS AN IMPAIRED WATER (RIVER ID 07020004-549).

PROJECT ENGINEER

THE PROJECT ENGINEER AND THE CONTRACTOR ARE RESPONSIBLE FOR THE IMPLEMENTATION OF THE SWPPP AND THE INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMP'S BEFORE AND DURING CONSTRUCTION.

TIMING AND BMP INSTALLATION

THE EROSION PREVENTION AND SEDIMENT CONTROL BMP'S SHALL BE INSTALLED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND CAPTURE SEDIMENT ON SITE, AND SHALL MEET THE NPDES PERMIT PART IV CONSTRUCTION ACTIVITY REQUIREMENTS.

CALCULATIONS FOR STA. 348+75 TO 325+25 (BRIDGE REPLACEMENT AND GRADING)

WATER QUALITY VOLUMES

NEW IMPERVIOUS AREA 0.273 - 0.273 ACRES = 0.000 ACRES = 0.000 SQ. FT.

WATER QUALITY VOLUME 0.000 SQ. FT. * 1 IN. = 0.000 CU. FT.

SWPPP DESIGNER

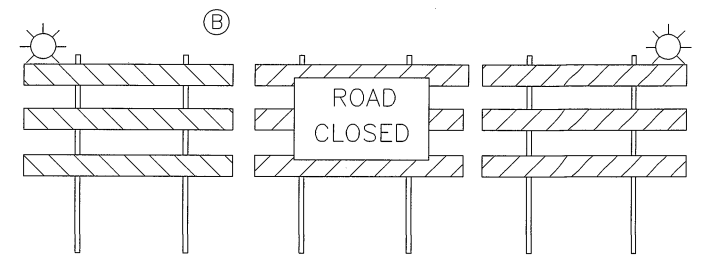
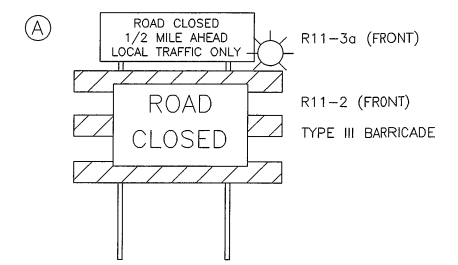
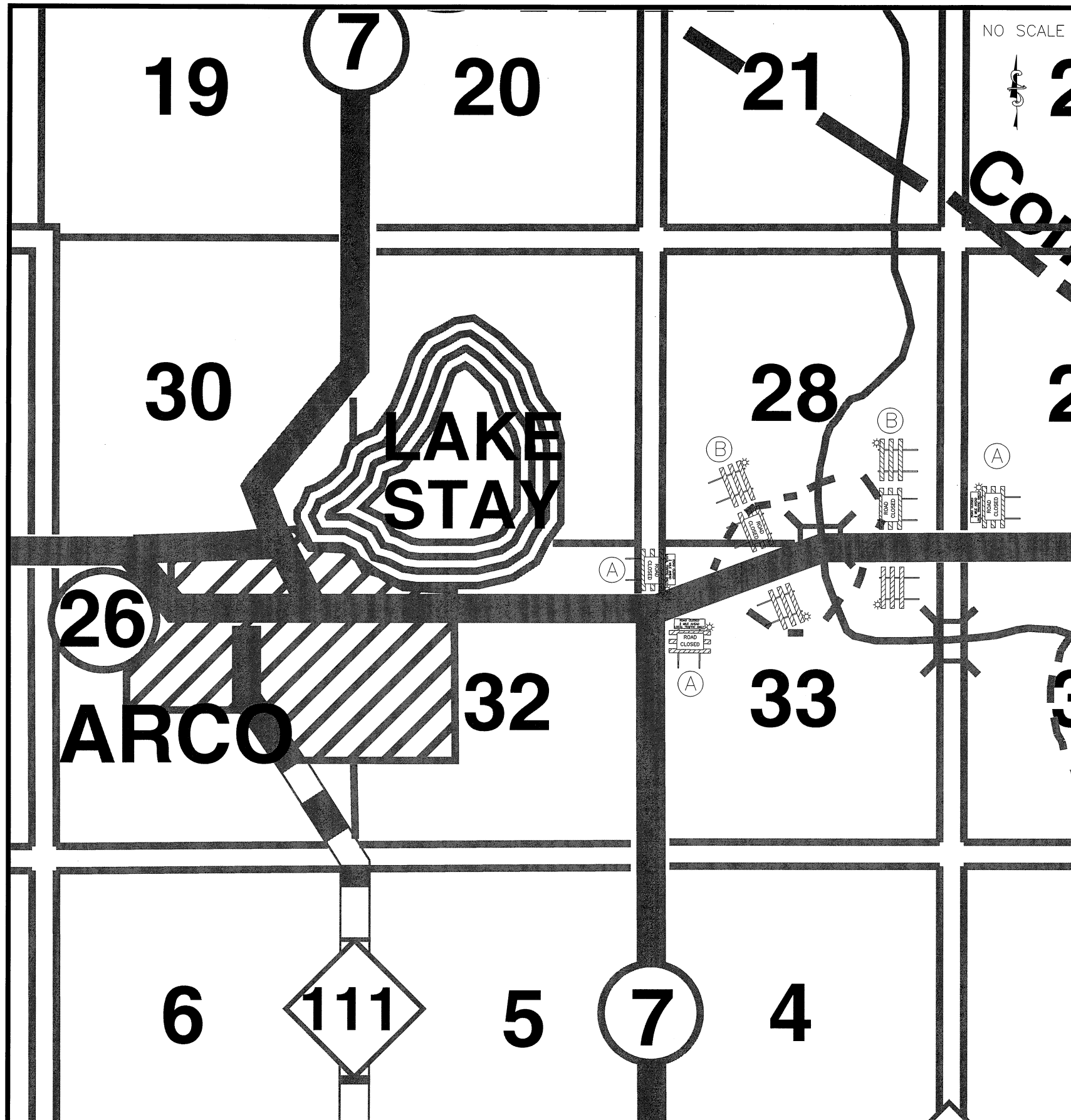
KYRA GORES-LINCOLN COUNTY TECHNICIAN

AMENDING THE SWPPP

THE SWPPP MUST BE AMENDED TO RECORD CHANGES OR MODIFICATIONS TO PERMIT BMP'S OR OTHER STORM WATER TREATMENT SYSTEMS AND REMOVALS OF TEMPORARY BMP'S. CHANGES TO TEMPORARY BMP'S MAY BE RECORDED ON THIS SHEET. INCLUDE A BRIEF DESCRIPTION OF THE PROBLEM, LOCATION, NATURE OF ALTERATION, AND COMMENTS. THIS RECORD IS TO BE RETAINED FOR THREE YEARS AFTER PROJECT COMPLETION.

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN		
DESCRIPTION	TITLE	LOCATION
SUMMARY OF PERVIOUS AND IMPERVIOUS	SWPPP	SHEET 13
DIRECTION OF FLOW	EROSION & SEDIMENT CONTROL PLAN	SHEET 9
RECEIVING SURFACE WATERS	SWPPP	SHEET 13
FINAL STABILIZATION	EROSION & SEDIMENT CONTROL PLAN	SHEET 9
DRAINAGE TABULATION	SWPPP	SHEET 13
EROSION CONTROL TABULATION	EROSION & SEDIMENT CONTROL PLAN	SHEET 9
EROSION CONTROL SHEETS	EROSION & SEDIMENT CONTROL PLAN	SHEET 9
SEDIMENT CONTROL DETAILS	SEDIMENT CONTROL DETAILS	SHEET 10

DATE REPORTED	STAFF (SHEET)	PLAN LOCATION (STATION)	PROJ. LOCATION	PROBLEM, SOLUTION, AND NOTES



NOTE:
CONTRACTOR SHALL INSTALL AND MAINTAIN ORANGE SAFETY FENCE OR OTHER MATERIAL ACCEPTED BY THE ENGINEER AS TO COMPLETELY BLOCK THE ROADWAY FROM SHOULDER PI TO SHOULDER PI AT BARRICADE (B) LOCATIONS.

SIGN	SIGN NO.	QUANTITY	SIZE	COLOR	FLASHERS
	TYPE III BARRICADE	9	60" X 48"	ORANGE ON WHITE	7
	R11-2	5	48" X 30"	BLACK ON WHITE	
	R11-3a	3	60" X 30"	BLACK ON WHITE	

ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MINNESOTA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND THE LATEST EDITION OF THE TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS FIELD MANUAL.

ALL NECESSARY TRAFFIC CONTROL DEVICES ON THIS PROJECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

TRAFFIC CONTROL

CERTIFIED BY Joseph M. Wilton LIC. NO. 54947 DATE: 5/02/19
LICENSED ENGINEER