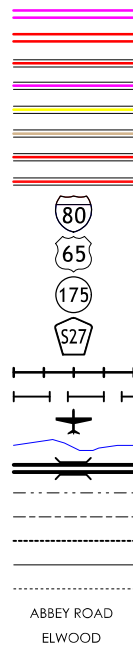


RCB CULVERT EXTENSIONS
IM-NHS-080-7(154)251--03-52

JOHNSON COUNTY - DESIGN 1820/1920/2820

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD
- INTERSTATE HIGHWAY
- UNITED STATES HIGHWAY
- STATE HIGHWAY
- COUNTY HIGHWAY
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES
- UNINCORPORATED PLACE



PLANS OF PROPOSED IMPROVEMENTS ON THE
INTERSTATE ROAD SYSTEM
JOHNSON COUNTY
RCB CULVERT EXTENSIONS
ON I-80 OVER
VARIOUS DRAINAGE DITCHES

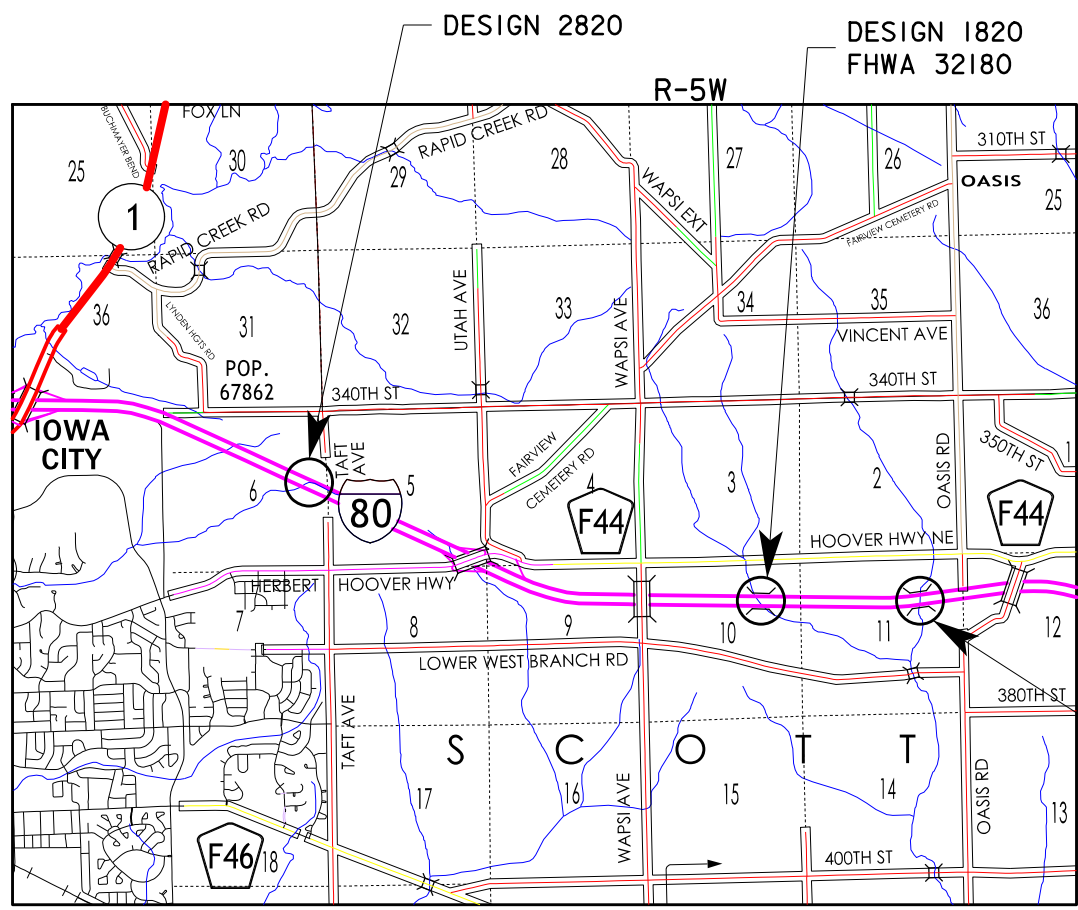
THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

ENGLISH STANDARD CULVERT PLANS		
STANDARD	ISSUED	REVISED

REVISIONS

TOTAL SHEETS	13
PROJECT NUMBER	IM-NHS-080-7(154)251--03-52
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	16-52-080-020

INDEX OF SHEETS	
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 1820
2-5	DESIGN 1820
6	ESTIMATE SHEET - DESIGN 1920
6-9	DESIGN 1920
10	ESTIMATE SHEET - DESIGN 2820
10-13	DESIGN 2820



LOCATION MAP

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

REVISIONS TO THIS DESIGN PLAN AND/OR PROJECT SPECIFICATIONS SHOULD BE SUBMITTED BY _____

STANDARD ROAD PLANS
STANDARD ROAD PLANS ARE LISTED ON SHEET NUMBER _____
DESIGN DATA RURAL
2025 AADT 45,800 V.P.D.
TRUCKS 36 %
SEE INDIVIDUAL SITUATION PLAN FOR TRAFFIC DATA

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
1	KELSEY M. BERGMAN	STRUCTURAL DESIGN
CULVERT STANDARDS	JAMES S. NELSON	STRUCTURAL DESIGN

PRELIMINARY NOT FOR CONSTRUCTION

STRUCTURAL DESIGN

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Kelsey M. Bergman Date _____
Printed or Typed Name
My license renewal date is December 31, 2021

Pages or sheets covered by this seal: SHEETS 1 THRU 13

PROJECT DIRECTORY NAME: 5208002016

ESTIMATED CULVERT QUANTITIES - DESIGN 1820

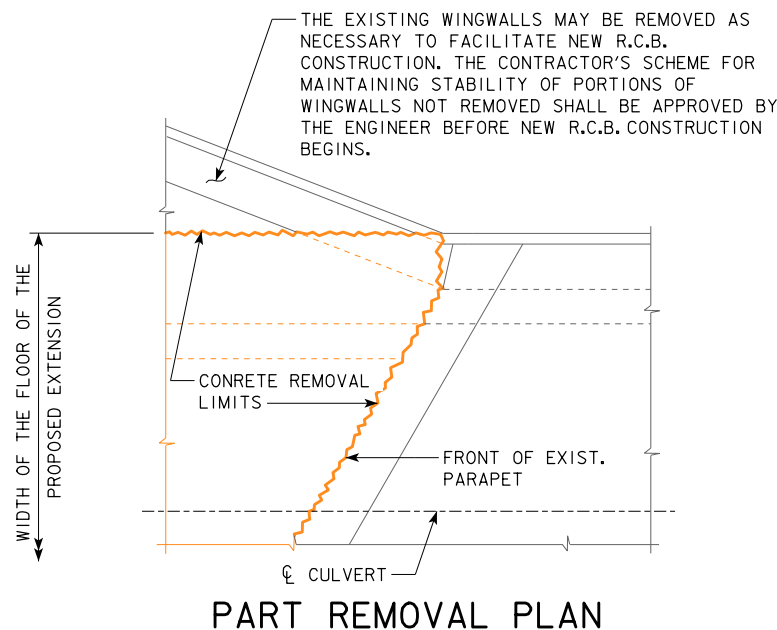
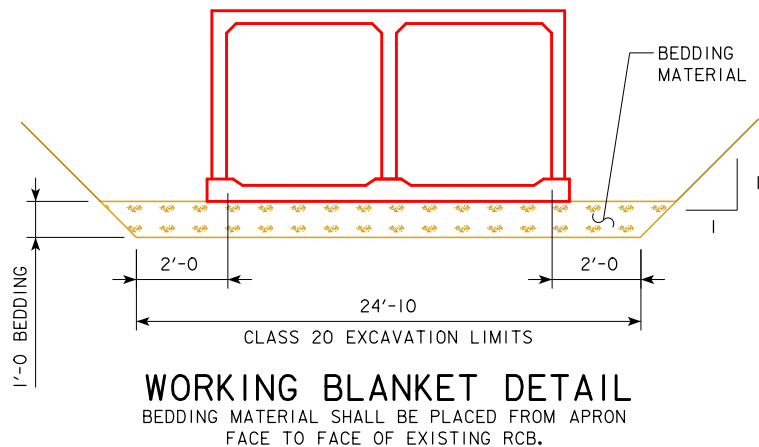
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUANTITY
1	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	344.9	
3	2404-7775000	REINFORCING STEEL	LB	58127	
4	2533-4980005	MOBILIZATION	LS	1.00	
5	2599-9999003	BEDDING MATERIAL	CY	155	

ITEM NO. ESTIMATE REFERENCE INFORMATION

1. INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF EXISTING RCB HEADWALL. REMOVAL OF SCHEDULED ITEMS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO MATERIAL NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE. INCLUDES COST OF SETTING OF THE DOWEL REINFORCING INTO THE EXISTING CULVERT CONCRETE.

5. INCLUDES COST FOR ALL LABOR, MATERIAL, AND EQUIPMENT NECESSARY TO PLACE AND COMPACT BEDDING MATERIAL AS A WORKING BLANKET, INCLUDING EXCAVATION. PLACEMENT OF MATERIAL SHALL BE IN ACCORDANCE WITH ARTICLE 2402.3, H OF THE STANDARD SPECIFICATIONS. BEDDING MATERIAL AGGREGATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION 4118, GRADATION NO. 3. RECLAIMED HMA SHALL NOT BE USED. THE WORKING BLANKET AND BID ITEM "BEDDING MATERIAL" MAY BE DELETED IF DETERMINED UNNECESSARY PER WRITTEN REQUEST TO THE ENGINEER.

WHY SPECIAL BID ITEM AND NOT SPECIAL BACKFILL OR GRANULAR?



NOTE:
ROADWAY QUANTITIES SHOWN
IN TIED GRADING PROJECT:
IM-NHS-080-7(114)248--03-52

DESIGN HISTORY AT THIS SITE (INCLUDES THIS DESIGN)	
DES. NO.	TYPE OF WORK
159	ORIGINAL DESIGN
1820	CULVERT EXTENSION - OUTLET

SPECIFICATIONS:

DESIGN: AASHTO LRFD 8th Ed, SERIES OF 2017.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8th Ed, SERIES OF 2017. REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60. CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, $f'_c = 4.0$ KSI.

STANDARDS: FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:		
STANDARD	ISSUED	REVISED
TWRCB G2-20	7-20	--
TWRCB G3-20	7-20	--
TWRCB 10-10-20	7-20	--
TWPWH 45-1-20	7-20	--
TWPWH 45-2-20	7-20	--
TWPWH 45-3-20	7-20	--
TWPWH 45-4-20	7-20	--
TWPWH 45-5-20	7-20	--
TWPWH 45-6-20	7-20	--
TWPWH 45-8-20	7-20	--

SUMMARY OF REINFORCING STEEL		
LOCATION	QUANTITY	TOTAL
HEADWALL 45° SKEW	13312	13312
29'-0 BARREL EXTENSION (3 REQ'D.)	3 @ 10956	32868
15'-0 BARREL TRANSITION SECTION	5767	5767
15'-0 BARREL END SECTION	5667	5667
5r1 x 3'-6 DOWEL BARS	4 @ 80	320
5z1 DOWEL BARS	193	193
TOTAL (LBS.)		58127

WHY DIFFERENT?

CONCRETE PLACEMENT QUANTITIES				
LOCATION	FOOTING	WALLS	SLAB	TOTAL
HEADWALL 45° SKEW	50.1	25.4	* 3.2	78.7
29'-0 BARREL EXTENSION (3 REQ'D.)	3 @ 22.4	3 @ 25.7	3 @ 17.9	198.0
15'-0 BARREL SECTION (2 REQ'D.)	2 @ 11.6	2 @ 13.3	2 @ 9.2	68.2
TOTAL (C.Y.)				
	140.5	129.1	75.3	344.9

* INCLUDES PARAPET AND TOP OF WINGWALL.

DESIGN FOR 45° R.A. SKEW
**TWIN 10' X 10' REINFORCED
CONCRETE BOX CULVERT EXTENSION
QUANTITIES**
STA. 1287+74.05 OCTOBER 2020
JOHNSON COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 4 FILE NO. 31630 DESIGN NO. 1820

REVISION 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
REVISED 11-2016 - CHANGED THE SERIES DATE "IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015", (WAS SERIES 2012).
REVISED 02-2017 - CHANGED THE DESIGN STRESSES NOTE TO STATE "AASHTO LRFD" (WAS LRFD AASHTO).
ENGLISHING/CULVERTS.DGN - 1043 - THIS SHEET REDRAWN 9-8-88

REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRORDED IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT. THE REMOVAL OF EXISTING CULVERT. REVISED 03-2019 - UPDATED NOTE REFERRING TO COPIES OF ORIGINAL DESIGN PLANS. ENGLISHINGCULVERTS.DGN - 104362 - THIS SHEET ISSUED 10-08.

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING TWIN 10' X 10' X 200' REINFORCED CONCRETE BOX CULVERT 117 FEET AT THE OUTLET END.
 ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (ORIGINAL DESIGN NO. 159).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.
 UTILITY COMPANIES AND MUNICIPALITIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 5 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

VERTICAL EARTH PRESSURE, $E_v = 0.120$ kcf.
 HORIZONTAL EARTH PRESSURE, $E_{Hmax} = 0.060$ kcf MAX, $E_{Hmin} = 0.030$ kcf.

THE CONTRACTOR MAY SUBMIT ALTERNATE FROST TROUGH DIMENSIONS FOR APPROVAL. ANY ADDITIONAL COSTS DUE TO CHANGE IN THE FROST TROUGH DIMENSIONS IS TO BE PAID FOR BY THE CONTRACTOR.

FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL.

THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

BAR SIZE NUMBER	4	5	6	7	8	9
MINIMUM SPLICE LENGTH	20"	24"	29"	34"	38"	47"

THIS SPLICE, IF USED WILL BE AT THE CONTRACTOR'S EXPENSE.

METAL BAR CHAIRS SPACED AT NOT OVER 3'-0" C.-C. IN EITHER DIRECTION ARE TO BE USED TO SUPPORT ALL SLAB AND FLOOR STEEL AS OUTLINED IN THE STANDARD SPECIFICATIONS.

THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60. REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:

EDGE CLEARANCES: 2" EXCEPT
 TOP OF FLOOR 2 1/4" TO NEAR TRANSV. REINF. BAR
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR
 END CLEARANCES:
 VERTICAL TOP 2"
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH

TRANSVERSE 2"
 ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING CULVERT, AND THE SETTING OF THE DOWEL REINFORCING BARS INTO EXISTING CONCRETE.

ALL DIMENSIONS AND DETAILS SHOWN ON THESE PLANS PERTINENT TO NEW CONSTRUCTION IN RELATION TO EXISTING PORTIONS OF THE STRUCTURE SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.

THE REMOVAL OF THE EXISTING CULVERT SHALL BE AT THE FRONT FACE OF THE EXISTING PARAPET. REMOVALS SHALL BE ON A VERTICAL PLANE PARALLEL WITH THE FRONT FACE OF THE EXISTING PARAPET, AND TO THE WIDTH OF THE FLOOR OF THE PROPOSED EXTENSION. THE WALLS SHALL BE CUT NORMAL TO THE BARREL WALLS AND AS SHOWN ON THE "PART REMOVAL PLAN". THE REMOVAL LINE SHALL BE INITIATED WITH A 2 1/2"± DEEP SAW CUT ON THE TOP AND BOTH SIDES OF EACH WALL, AND ACROSS THE TOP OF THE FLOOR. THIS SAW CUT SHOULD CUT THRU ANY EXISTING LONGITUDINAL REINFORCING THEREBY FACILITATING A NEAT NON-SPALLED BREAK LINE. IF EXISTING TOP OF PARAPETS WILL BE WITHIN 0'-6" OF PROPOSED SUBGRADE ELEVATION, THE PARAPETS SHALL BE REMOVED DOWN TO AN ELEVATION 1"± ABOVE THE TOP OF THE EXISTING SLAB. ANY EXISTING PARAPET VERTICAL BARS EXPOSED DURING PARAPET REMOVAL SHALL BE CUT OFF FLUSH WITH THE PARAPET REMOVAL LINE AND PAINTED WITH TWO COATS OF ZINC RICH PAINT.

ALL REMOVALS SHALL BE CAREFULLY ACCOMPLISHED AND ANY CONCRETE DAMAGED BY THE CONTRACTOR THAT IS NOT TO BE REMOVED SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXTRA COST TO THE STATE. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE FRONT FACE OF THE EXISTING PARAPET. 5z1 x 2'-6" DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO EXISTING CONCRETE SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING CULVERT. 5z1 DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. 5z1 DOWEL REINFORCING BARS SHALL BE AT 1'-0" MAXIMUM SPACING C.-C. OF DOWELS. 5z1 DOWEL REINFORCING BARS SHALL BE SET WITH POLYMER GROUT IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS, AND CURRENT SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D.O.T. HIGHWAY DIVISION.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.
 SINCE THE HIGHWAY WILL NOT BE CLOSED TO TRAFFIC DURING THIS CONSTRUCTION, THE CONTRACTOR MAY FEEL TEMPORARY SHORING (SHEET PILE OR OTHER) IS NECESSARY TO ENSURE THAT THE SHOULDER WILL NOT SLOUGH IN WHILE CULVERT IS BEING EXTENDED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT THE SHORING PLAN TO THE ENGINEER FOR APPROVAL. COST OF SHORING, IF REQUIRED, WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO DIRECT PAYMENT WILL BE MADE. THEREFORE, ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5z1 IS 5/8 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

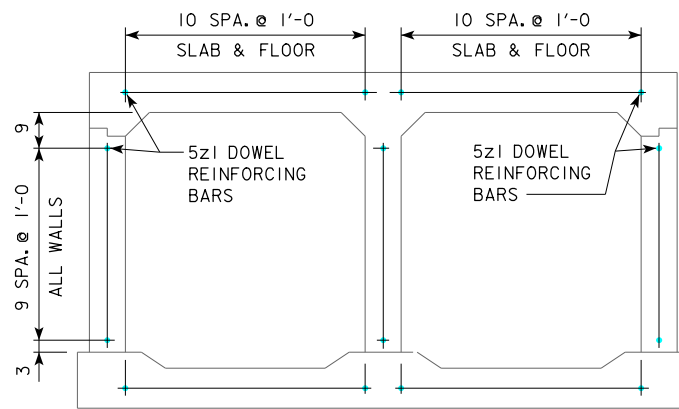
ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

TRAFFIC WILL BE MAINTAINED AT ALL TIMES IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS SHOWN IN THE TIED ROADWAY PROJECT.

TRAFFIC CONTROL ADJACENT TO THE CULVERT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR CONSTRUCTING THE CULVERT AND IS TO COORDINATE CONSTRUCTION OF THE CULVERT WITH THE CONTRACTOR DOING THE GRADING.

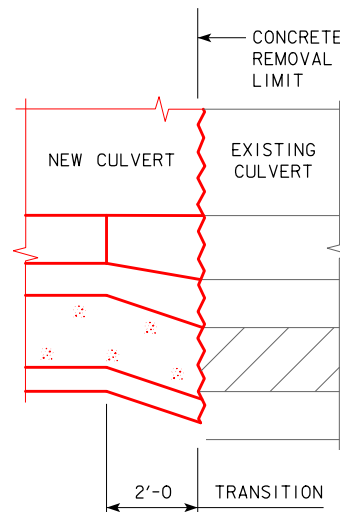
ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 2 FEET OF NEW WORK.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE CURTAIN WALLS AS DETAILED, ALTERNATE METHODS SUCH AS STEEL SHEET PILE AND PRECAST CONCRETE WALLS MAY BE APPROVED BUT AT NO ADDITIONAL COST. THE CONTRACTOR IS TO SUBMIT TO THE ENGINEER FOR APPROVAL COMPLETE DRAWINGS OF THE PROPOSED CURTAIN WALL ALTERNATE BEFORE BEGINNING CONSTRUCTION.



SECTION NEAR TWIN EXTENSION
 (SHOWING SPACING OF 5z1 DOWEL REINFORCING BARS)

REINFORCING STEEL EXTENSION DOWELS					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5z1	DOWEL REINFORCING BARS		74	2'-6"	193

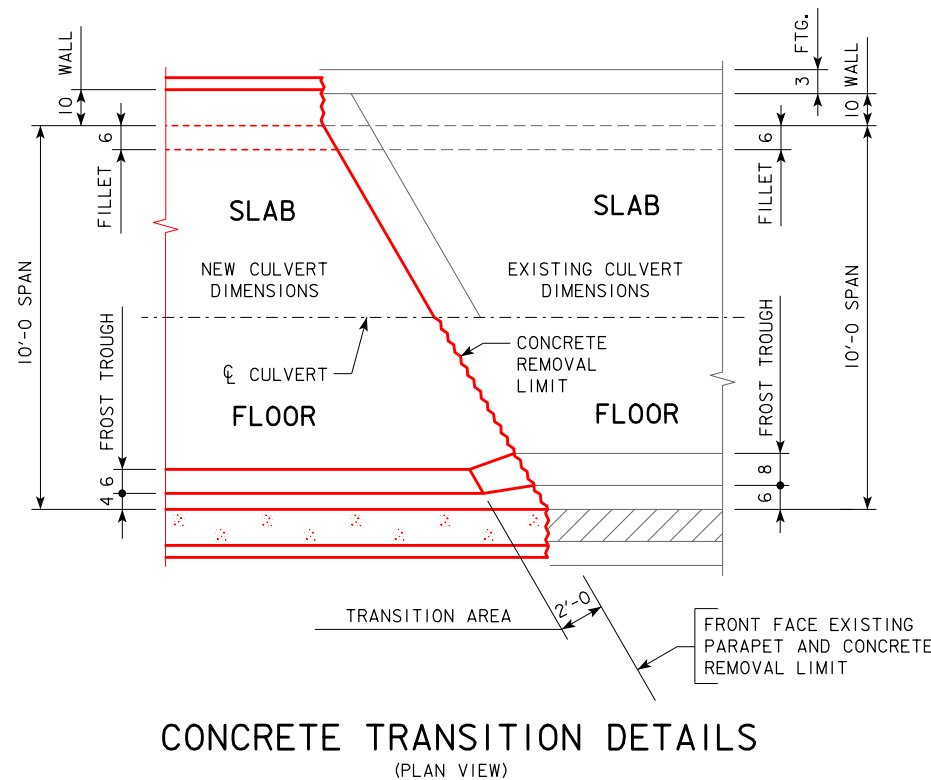


NEW BARREL CONCRETE THICKNESSES SHALL BE MAINTAINED MINIMALLY WHEN TRANSITIONING TO MEET EXISTING BARREL INTERIOR SURFACES. OUTSIDE CONCRETE SURFACES DO NOT HAVE TO BE TRANSITIONED TO MATCH EXISTING SURFACES.

CONCRETE TRANSITION DETAILS

(WALL TRANSITION SHOWN - TYPICAL FOR SLAB)

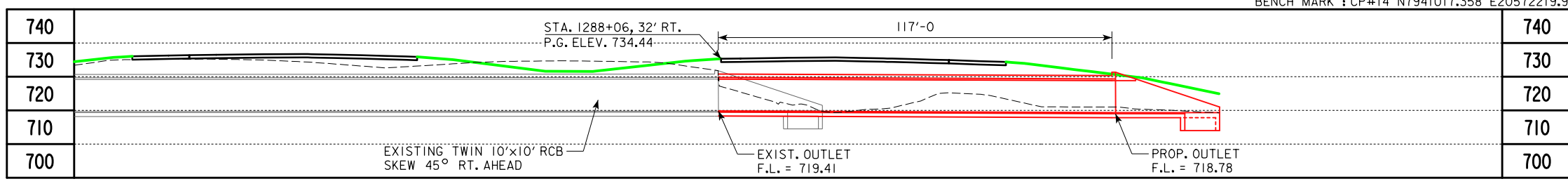
NOTE: REFER TO THE BRIDGE DESIGN MANUAL, SECTION 7 FOR CULVERT EXTENSION DETAILS FOR TRANSITION INFORMATION.



CONCRETE TRANSITION DETAILS
 (PLAN VIEW)

TRAFFIC CONTROL PLAN
 NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN IN THE TIED ROADWAY PROJECT.

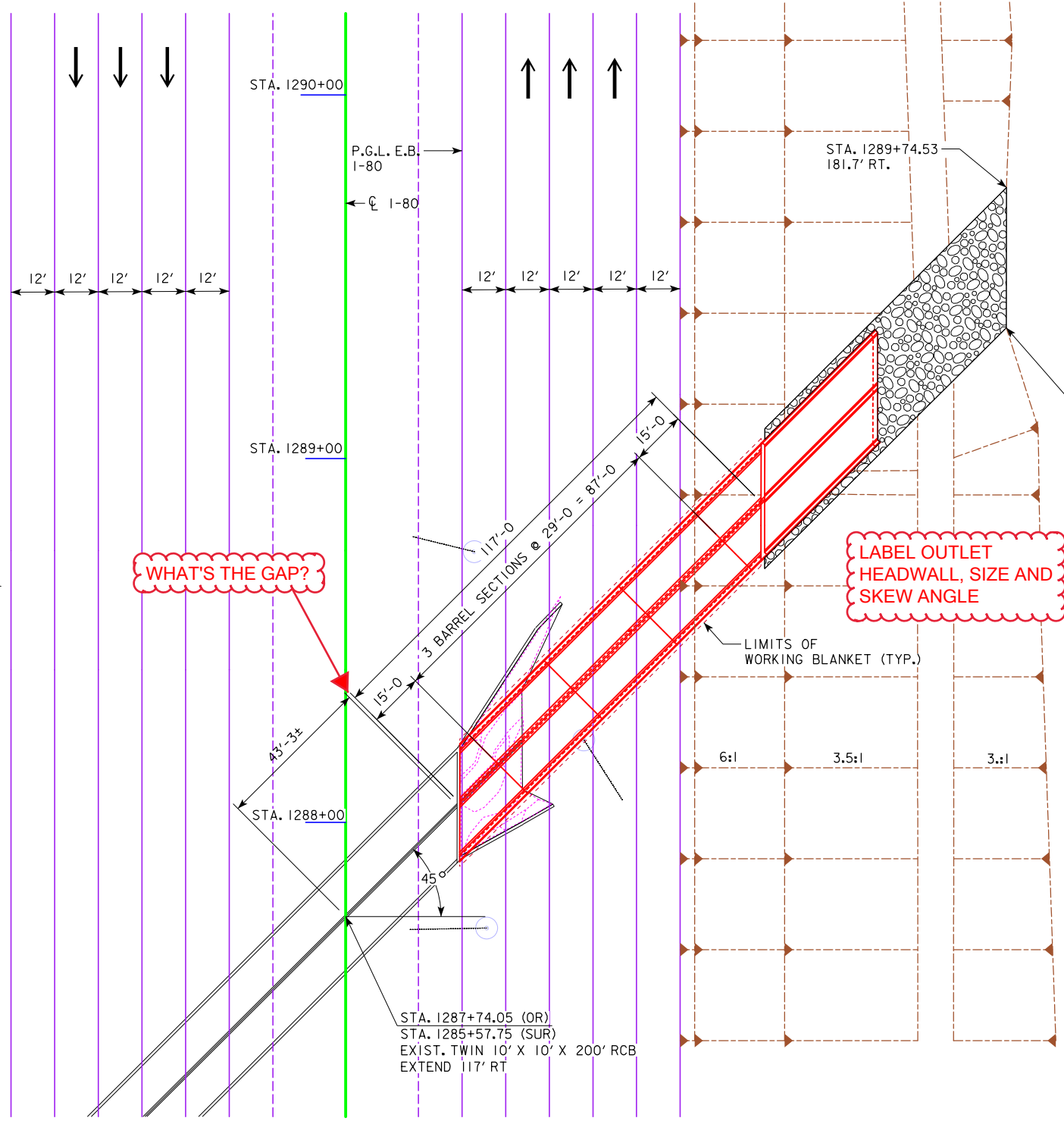
DESIGN FOR 45° R.A. SKEW
TWIN 10' X 10' REINFORCED CONCRETE BOX CULVERT EXTENSION
 GENERAL NOTES
 STA. 1287+74.05 OCTOBER 2020
JOHNSON COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 4 FILE NO. 31630 DESIGN NO. 1820



LONGITUDINAL SECTION ALONG ϕ CULVERT

FILL HEIGHT = 5 FT
SETTLEMENT = 5.5 INCHES

**PROPOSED PROFILE
GRADE I-80**



NOTE:
REMOVE HEADWALL TO FACE OF
PARAPET AND EXTEND RIGHT (LEFT
TO BE EXTENDED IN FUTURE).
USE 1-45° HEADWALL

TRAFFIC ESTIMATE

TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

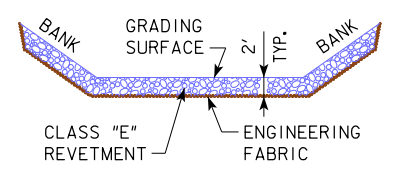
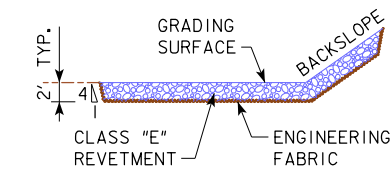
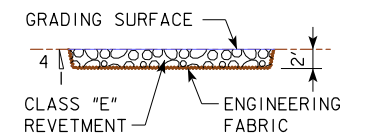
LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
OUTLET	186	255	115
TOTALS	186	255	115

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.



HYDRAULIC DATA

DRAINAGE AREA = 2.5 SQ. MILES
 $Q_{50} = 1890$ CFS
HW ELEV. = 729.6



UTILITIES LEGEND:

SYMBOL - TYPE
-or-
NO KNOWN UTILITIES
-or-
UTILITY SURVEY NOT CONDUCTED

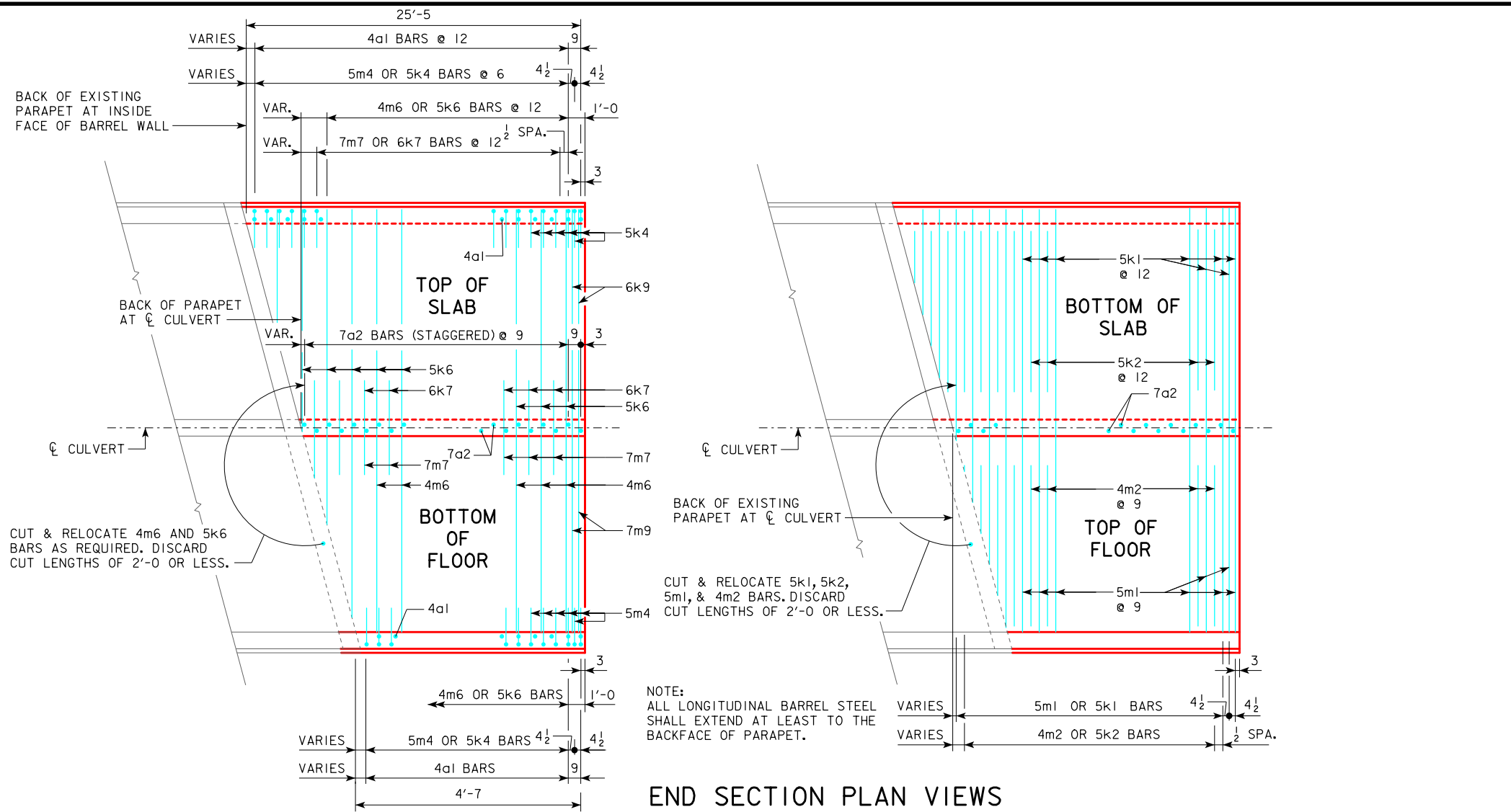
UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

I-80 OVER DRAINAGE DITCH
T-79N R-5W
SECTION 10
SCOTT TOWNSHIP
JOHNSON COUNTY
FHWA NO. 032180
BRIDGE MAINT. NO. 5251.45080
LATITUDE 41.66712° **14**
LONGITUDE -91.410405° **248**

SITUATION PLAN

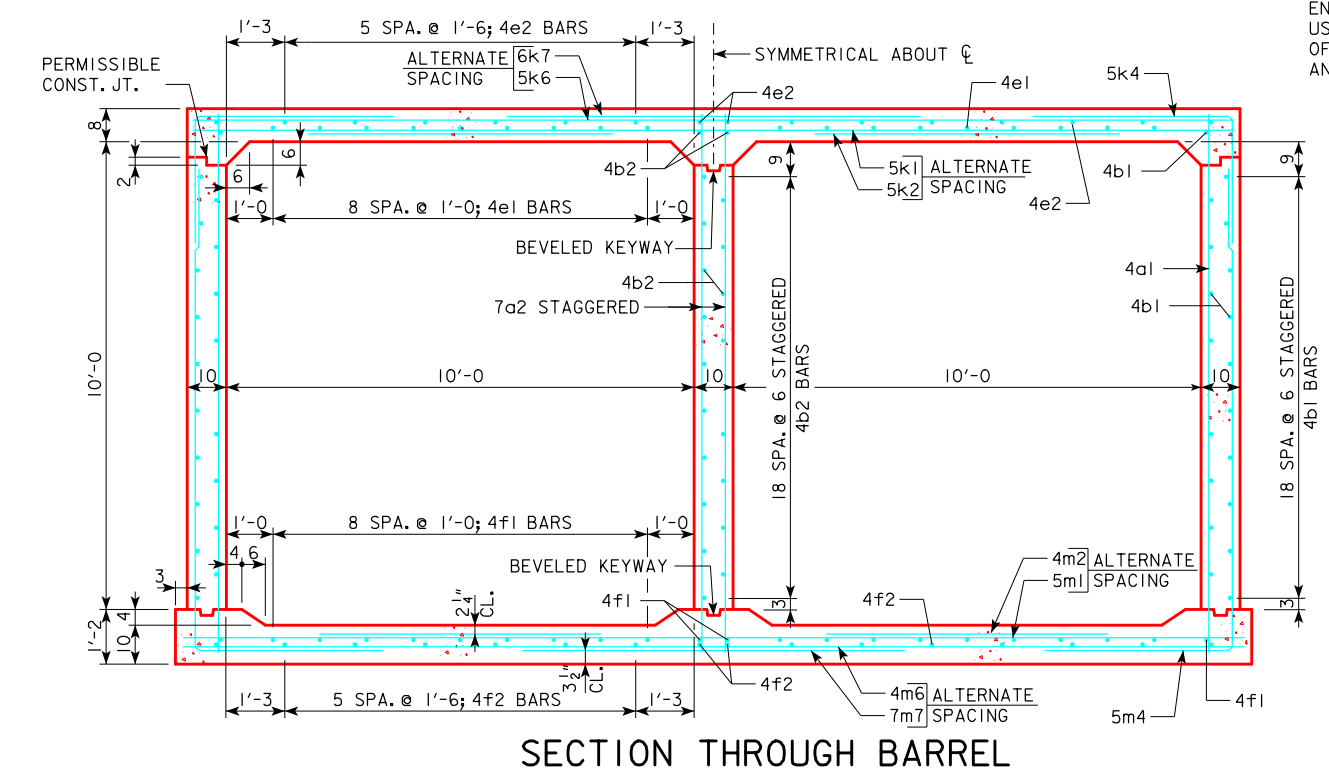
DESIGN FOR 45° R.A. SKEW
**TWIN 10' X 10' REINFORCED
CONCRETE BOX CULVERT EXTENSION**
SITUATION PLAN
STA. 1287+74.05 OCTOBER 2020
JOHNSON COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 4 FILE NO. 31630 DESIGN NO. 1820



END SECTION PLAN VIEWS
(KEYWAYS NOT SHOWN)

NOTE:
ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.

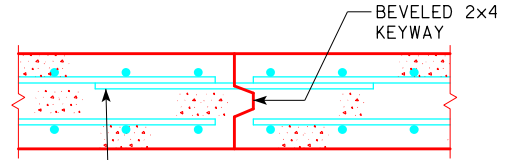
NOTE:
END SECTION DETAILS SHOWN ARE FOR A 15° SKEW BARREL. USE FOR SKEWS OF 30° & 45° BY INCREASING THE NUMBER OF TRANSVERSE REINFORCING BARS REQUIRED TO BE CUT AND RELOCATED.



SECTION THROUGH BARREL

5r1 BARS - ONE CONST. JT.

SPAN	NO.	WEIGHT (LB)
10'-0	22	80



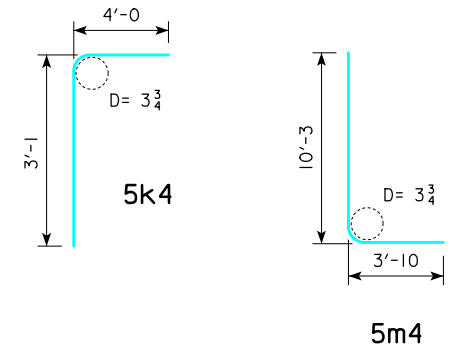
ONE SET OF 5r1 x 3'-6 DOWEL BARS @ 1'-0 SPACING REQUIRED IN SLAB AT ALL CULVERT BARREL JOINTS, EXCEPT JOINTS WITH EXISTING BARRELS. SEE TABLE FOR NUMBER REQUIRED AND TOTAL WEIGHT.

**TOP SLAB CONSTRUCTION
NEW JOINT DETAIL**

REINFORCING BAR LIST - ONE END SECTION

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	EXT. WALLS, F.F.V.	—	30	11'-5	229
7a2	INT. WALL, F.F.V. & B.F.V.	—	20	11'-5	467
4b1	EXT. WALLS, F.F.H. & B.F.H.	—	40	20@4'-4, 20@25'-0	392
4b2	INT. WALLS, F.F.H. & B.F.H.	—	21	14'-8	208
4e1	SLAB, BOTT. LONGIT.	—	18	23'-3 TO 6'-9	180
4e2	SLAB, TOP LONGIT.	—	16	23'-8 TO 6'-4	160
4f1	FLOOR, TOP LONGIT.	—	22	23'-3 TO 6'-9	220
4f2	FLOOR, BOTT. LONGIT.	—	16	23'-8 TO 6'-4	160
5k1	SLAB, BOTT. TRANSV.	—	17	22'-2	393
5k2	SLAB, BOTT. TRANSV.	—	28	7'-4	214
5k4	SLAB, TOP CORNER	└	63	7'-1	465
5k6	SLAB, TOP TRANSV.	—	15	22'-2	347
6k7	SLAB, TOP TRANSV.	—	14	7'-10	165
6k9	SLAB, TOP TRANSV.	—	2	22'-2	67
5m1	FLOOR, TOP TRANSV.	—	21	22'-8	496
4m2	FLOOR, TOP TRANSV.	—	38	5'-8	144
5m4	FLOOR, BOTT. CORNER	└	63	14'-1	925
4m6	FLOOR, BOTT. TRANSV.	—	15	22'-8	227
7m7	FLOOR, BOTT. TRANSV.	—	14	7'-6	215
7m9	FLOOR, BOTT. TRANSV.	—	2	22'-8	93
REINFORCING STEEL - TOTAL (LBS.)					5767

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE -- TO OUT. D = PIN DIAMETER.

DESIGN FOR 45° R.A. SKEW
TWIN 10' X 10' REINFORCED CONCRETE BOX CULVERT EXTENSION
 TRANSITION BARREL DETAILS
 STA. 1287+74.05
 JOHNSON COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 4 OF 4 FILE NO. 31630 DESIGN NO. 1820

ESTIMATED CULVERT QUANTITIES - DESIGN 1920

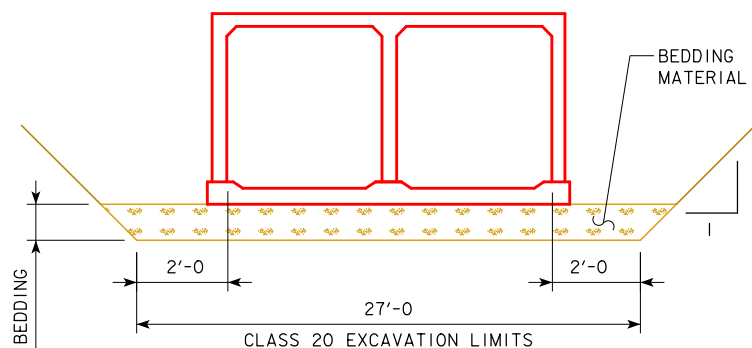
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUANTITY
1	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	423.7	
3	2404-7775000	REINFORCING STEEL	LB	63559	
4	2533-4980005	MOBILIZATION	LS	1.00	
5	2599-9999003	BEDDING MATERIAL	CY	139	

ITEM NO. ESTIMATE REFERENCE INFORMATION

1. INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF EXISTING RCB HEADWALL. REMOVAL OF SCHEDULED ITEMS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO MATERIAL NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE. INCLUDES COST OF SETTING OF THE DOWEL REINFORCING INTO THE EXISTING CULVERT CONCRETE.

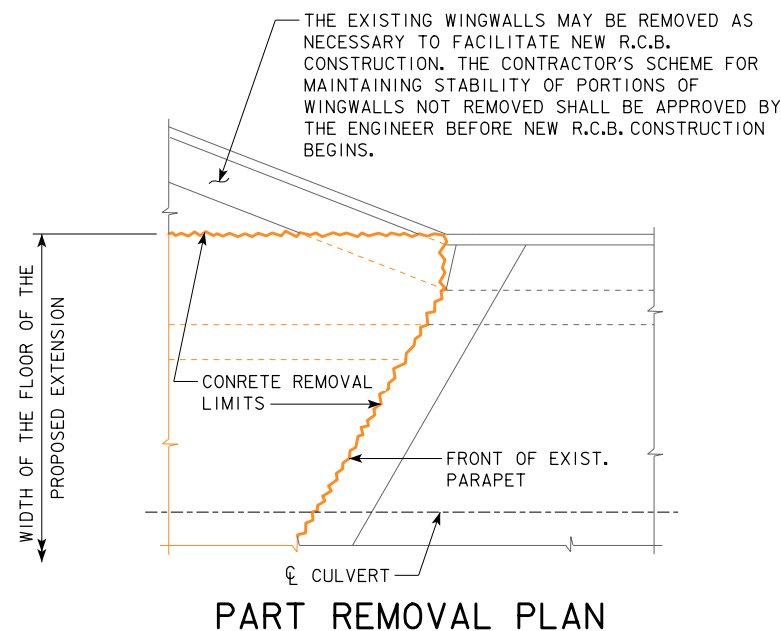
5. INCLUDES COST FOR ALL LABOR, MATERIAL, AND EQUIPMENT NECESSARY TO PLACE AND COMPACT BEDDING MATERIAL AS A WORKING BLANKET, INCLUDING EXCAVATION. PLACEMENT OF MATERIAL SHALL BE IN ACCORDANCE WITH ARTICLE 2402.3, H OF THE STANDARD SPECIFICATIONS. BEDDING MATERIAL AGGREGATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION 4118, GRADATION NO. 3. RECLAIMED HMA SHALL NOT BE USED. THE WORKING BLANKET AND BID ITEM "BEDDING MATERIAL" MAY BE DELETED IF DETERMINED UNNECESSARY PER WRITTEN REQUEST TO THE ENGINEER.

WHY SPECIAL BID ITEM AND NOT SPECIAL BACKFILL OR GRANULAR?



WORKING BLANKET DETAIL
BEDDING MATERIAL SHALL BE PLACED FROM APRON FACE TO FACE OF EXISTING RCB.

NOTE:
ROADWAY QUANTITIES SHOWN
IN TIED GRADING PROJECT:
IM-NHS-080-7(114)248--03-52



PART REMOVAL PLAN

SPECIFICATIONS:

DESIGN: AASHTO LRFD 8th Ed, SERIES OF 2017.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8th Ed, SERIES OF 2017. REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60. CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, $f'_c = 4.0$ KSI.

STANDARDS: FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:		
STANDARD	ISSUED	REVISED
TWRCB G2-20	7-20	--
TWRCB G3-20	7-20	--
TWRCB I2-12-20	7-20	--
TWPWH 15-1-20	7-20	--
TWPWH 15-2-20	7-20	--
TWPWH 15-3-20	7-20	--
TWPWH 15-4-20	7-20	--
TWPWH 15-5-20	7-20	--
TWPWH 15-6-20	7-20	--

SUMMARY OF REINFORCING STEEL		
LOCATION	QUANTITY	TOTAL
HEADWALL 15° SKEW	12652	12652
38'-0" BARREL EXTENSION (2 REQ'D.)	2 @ 19874	39748
10'-0" BARREL TRANSITION SECTION	5415	5415
10'-0" BARREL END SECTION	5230	5230
5r1 x 3'-6" DOWEL BARS	3 @ 95	285
5z1 DOWEL BARS	229	229
TOTAL (LBS.)		63559

WHY DIFFERENT?

CONCRETE PLACEMENT QUANTITIES				
LOCATION	FOOTING	WALLS	SLAB	TOTAL
HEADWALLS 15° SKEW	54.9	31.0	* 2.8	88.7
38'-0" BARREL EXTENSION (2 REQ'D.)	2 @ 46.1	2 @ 49.0	2 @ 37.5	265.2
10'-0" BARREL SECTION (2 REQ'D.)	2 @ 12.1	2 @ 12.9	2 @ 9.9	69.8
TOTAL (C.Y.)	171.3	154.8	97.6	423.7

* INCLUDES PARAPET AND TOP OF WINGWALL.

DESIGN HISTORY AT THIS SITE (INCLUDES THIS DESIGN)

DES. NO.	TYPE OF WORK
259	ORIGINAL DESIGN
1920	CULVERT EXTENSION - OUTLET

DESIGN FOR 15° L.A. SKEW TWIN 12' X 12' REINFORCED CONCRETE BOX CULVERT EXTENSION QUANTITIES

STA. 1340+17.27 OCTOBER 2020
JOHNSON COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 4 FILE NO. 31630 DESIGN NO. 1920

REVISION 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
REVISED 11-2016 - CHANGED THE SERIES DATE "IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015", (WAS SERIES 2012).
REVISED 02-2017 - CHANGED THE DESIGN STRESSES NOTE TO STATE "AASHTO LRFD" (WAS LRFD AASHTO).
ENGLISHINGCULVERTS.DGN - 1043 - THIS SHEET REDRAWN 9-8-88

REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRORDEN IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT. REVISED 03-2019 - UPDATED NOTE REFERRING TO COPIES OF ORIGINAL DESIGN PLANS. ENGLISHINTELCULVERTS.DGN - 104362 - THIS SHEET ISSUED 10-08.

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING TWIN 12' X 12' X 162' REINFORCED CONCRETE BOX CULVERT 96 FEET AT THE OUTLET END.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (ORIGINAL DESIGN NO. 259).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES AND MUNICIPALITIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 10 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

VERTICAL EARTH PRESSURE, $E_v = 0.120$ kcf.

HORIZONTAL EARTH PRESSURE, $E_{hmax} = 0.060$ kcf MAX, $E_{hmin} = 0.030$ kcf.

THE CONTRACTOR MAY SUBMIT ALTERNATE FROST TROUGH DIMENSIONS FOR APPROVAL. ANY ADDITIONAL COSTS DUE TO CHANGE IN THE FROST TROUGH DIMENSIONS IS TO BE PAID FOR BY THE CONTRACTOR.

FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL.

THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

BAR SIZE NUMBER	4	5	6	7	8	9
MINIMUM SPLICE LENGTH	20"	24"	29"	34"	38"	47"

THIS SPLICE, IF USED WILL BE AT THE CONTRACTOR'S EXPENSE.

METAL BAR CHAIRS SPACED AT NOT OVER 3'-0" C.-C. IN EITHER DIRECTION ARE TO BE USED TO SUPPORT ALL SLAB AND FLOOR STEEL AS OUTLINED IN THE STANDARD SPECIFICATIONS.

THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60. REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:

EDGE CLEARANCES: 2" EXCEPT

TOP OF FLOOR 2 1/4" TO NEAR TRANSV. REINF. BAR

BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:

VERTICAL TOP 2"

VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH

TRANSVERSE 2"

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING CULVERT, AND THE SETTING OF THE DOWEL REINFORCING BARS INTO EXISTING CONCRETE.

ALL DIMENSIONS AND DETAILS SHOWN ON THESE PLANS PERTINENT TO NEW CONSTRUCTION IN RELATION TO EXISTING PORTIONS OF THE STRUCTURE SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.

THE REMOVAL OF THE EXISTING CULVERT SHALL BE AT THE FRONT FACE OF THE EXISTING PARAPET. REMOVALS SHALL BE ON A VERTICAL PLANE PARALLEL WITH THE FRONT FACE OF THE EXISTING PARAPET, AND TO THE WIDTH OF THE FLOOR OF THE PROPOSED EXTENSION. THE WALLS SHALL BE CUT NORMAL TO THE BARREL WALLS AND AS SHOWN ON THE "PART REMOVAL PLAN". THE REMOVAL LINE SHALL BE INITIATED WITH A 2 1/2"± DEEP SAW CUT ON THE TOP AND BOTH SIDES OF EACH WALL, AND ACROSS THE TOP OF THE FLOOR. THIS SAW CUT SHOULD CUT THRU ANY EXISTING LONGITUDINAL REINFORCING THEREBY FACILITATING A NEAT NON-SPALLED BREAK LINE. IF EXISTING TOP OF PARAPETS WILL BE WITHIN 0'-6" OF PROPOSED SUBGRADE ELEVATION, THE PARAPETS SHALL BE REMOVED DOWN TO AN ELEVATION 1"± ABOVE THE TOP OF THE EXISTING SLAB. ANY EXISTING PARAPET VERTICAL BARS EXPOSED DURING PARAPET REMOVAL SHALL BE CUT OFF FLUSH WITH THE PARAPET REMOVAL LINE AND PAINTED WITH TWO COATS OF ZINC RICH PAINT.

ALL REMOVALS SHALL BE CAREFULLY ACCOMPLISHED AND ANY CONCRETE DAMAGED BY THE CONTRACTOR THAT IS NOT TO BE REMOVED SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXTRA COST TO THE STATE. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE FRONT FACE OF THE EXISTING PARAPET. 5z1 x 2'-6" DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO EXISTING CONCRETE SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING CULVERT. 5z1 DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. 5z1 DOWEL REINFORCING BARS SHALL BE AT 1'-0" MAXIMUM SPACING C.-C. OF DOWELS. 5z1 DOWEL REINFORCING BARS SHALL BE SET WITH POLYMER GROUT IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS, AND CURRENT SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D.O.T. HIGHWAY DIVISION.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

SINCE THE HIGHWAY WILL NOT BE CLOSED TO TRAFFIC DURING THIS CONSTRUCTION, THE CONTRACTOR MAY FEEL TEMPORARY SHORING (SHEET PILE OR OTHER) IS NECESSARY TO ENSURE THAT THE SHOULDER WILL NOT SLOUGH IN WHILE CULVERT IS BEING EXTENDED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT THE SHORING PLAN TO THE ENGINEER FOR APPROVAL. COST OF SHORING, IF REQUIRED, WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO DIRECT PAYMENT WILL BE MADE. THEREFORE, ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5z1 IS 5/8 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

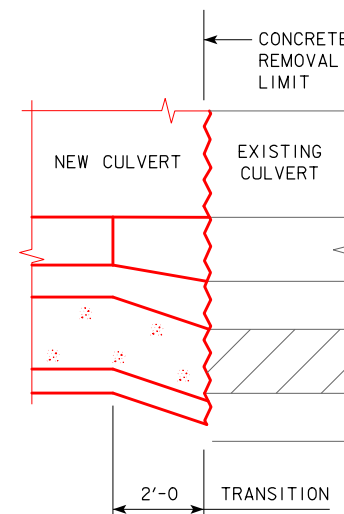
TRAFFIC WILL BE MAINTAINED AT ALL TIMES IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS SHOWN IN THE TIED ROADWAY PROJECT.

TRAFFIC CONTROL ADJACENT TO THE CULVERT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR CONSTRUCTING THE CULVERT AND IS TO COORDINATE CONSTRUCTION OF THE CULVERT WITH THE CONTRACTOR DOING THE GRADING.

ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 2' OF NEW WORK.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE CURTAIN WALLS AS DETAILED, ALTERNATE METHODS SUCH AS STEEL SHEET PILE AND PRECAST CONCRETE WALLS MAY BE APPROVED BUT AT NO ADDITIONAL COST. THE CONTRACTOR IS TO SUBMIT TO THE ENGINEER FOR APPROVAL COMPLETE DRAWINGS OF THE PROPOSED CURTAIN WALL ALTERNATE BEFORE BEGINNING CONSTRUCTION.

PPP?



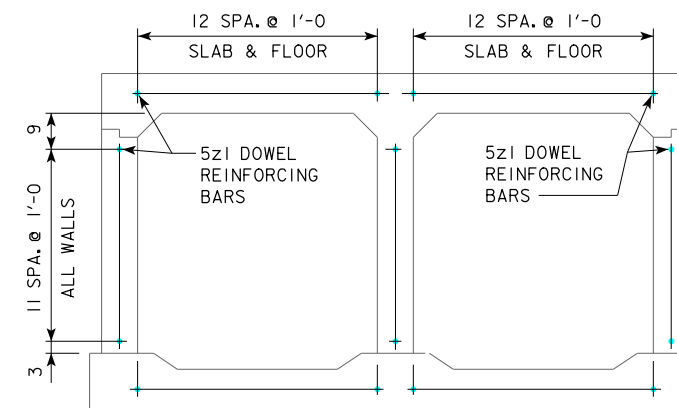
CONCRETE TRANSITION DETAILS

(WALL TRANSITION SHOWN - TYPICAL FOR SLAB)

NOTE: REFER TO THE BRIDGE DESIGN MANUAL, SECTION 7 FOR CULVERT EXTENSION DETAILS FOR TRANSITION INFORMATION.

TRAFFIC CONTROL PLAN

NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN IN THE TIED ROADWAY PROJECT.

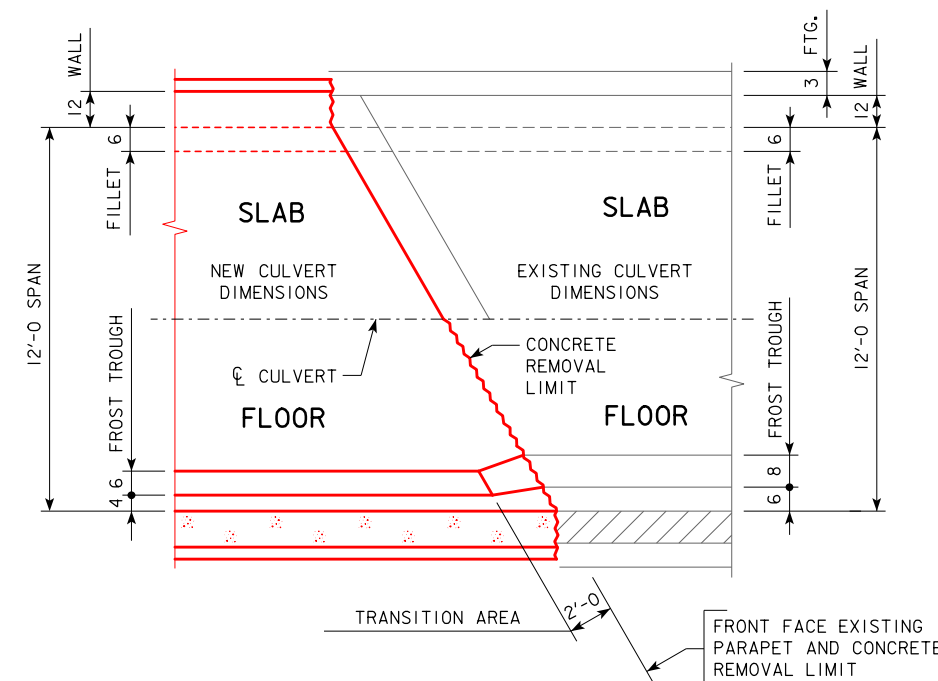


SECTION NEAR TWIN EXTENSION

(SHOWING SPACING OF 5z1 DOWEL REINFORCING BARS)

REINFORCING STEEL EXTENSION DOWELS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5z1	DOWEL REINFORCING BARS		88	2'-6"	229



CONCRETE TRANSITION DETAILS

(PLAN VIEW)

DESIGN FOR 15° L.A. SKEW
TWIN 12' X 12' REINFORCED CONCRETE BOX CULVERT EXTENSION

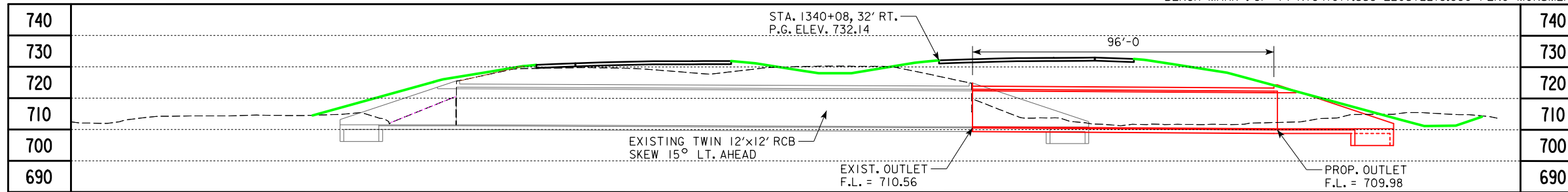
GENERAL NOTES

STA. 1340+17.27

OCTOBER 2020

JOHNSON COUNTY

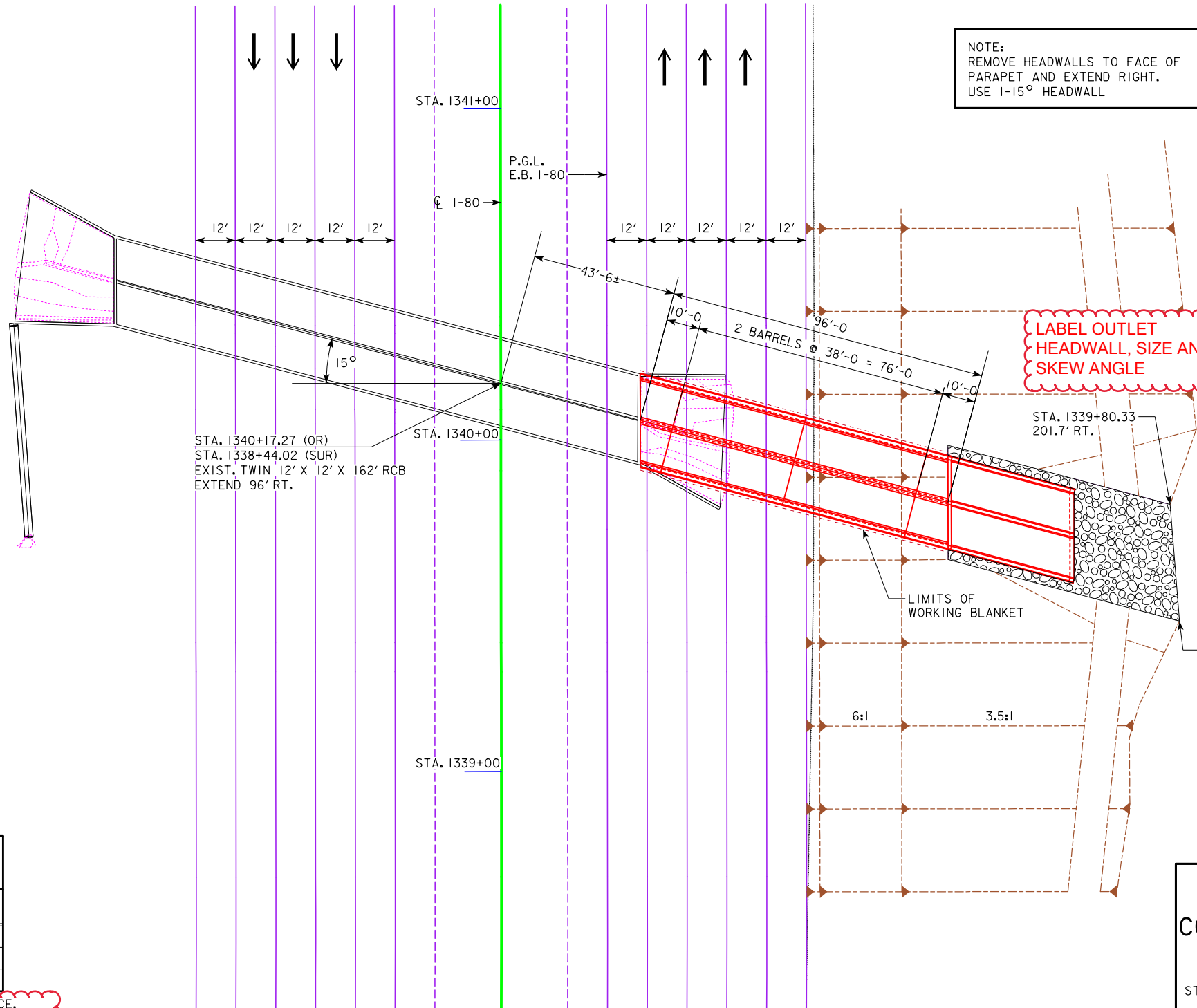
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 4 FILE NO. 31630 DESIGN NO. 1920



PROPOSED PROFILE GRADE I-80
 VPI STA = 1342+42.84 VC = 1000'
 VPI ELEV = 724.00
 -2.750% +2.013%

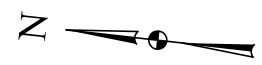
LONGITUDINAL SECTION ALONG ϕ CULVERT

FILL HEIGHT = 10 FT.
 SETTLEMENT = 5.5 INCHES



NOTE:
 REMOVE HEADWALLS TO FACE OF PARAPET AND EXTEND RIGHT.
 USE 1-15° HEADWALL

TRAFFIC ESTIMATE



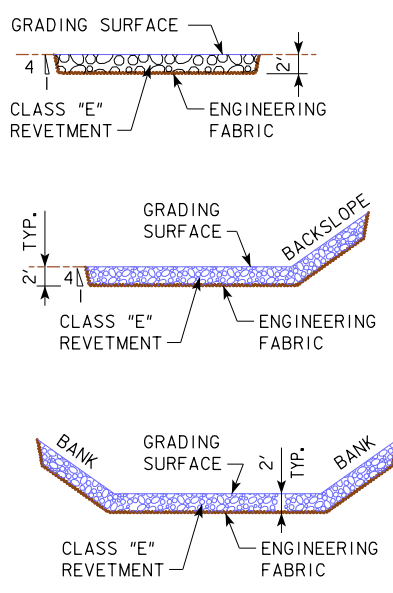
LABEL OUTLET HEADWALL, SIZE AND SKEW ANGLE

HYDRAULIC DATA
 DRAINAGE AREA = 2.9 SQ. MILES
 $Q_{50} = 2160$ CF
 HW ELEV. = 721.3

UTILITIES LEGEND:
 SYMBOL - TYPE
 -or- NO KNOWN UTILITIES
 -or- UTILITY SURVEY NOT CONDUCTED

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION
 I-80 OVER DRAINAGE DITCH
 T-79N R-5W
 SECTION 11
 SCOTT TOWNSHIP
 JOHNSON COUNTY
 FHWA NO. 032190
 BRIDGE MAINT. NO. 5252.4S080
 LATITUDE 41.666° 899
 LONGITUDE -91.391074°



TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
OUTLET	153	208	95
TOTALS	153	208	95

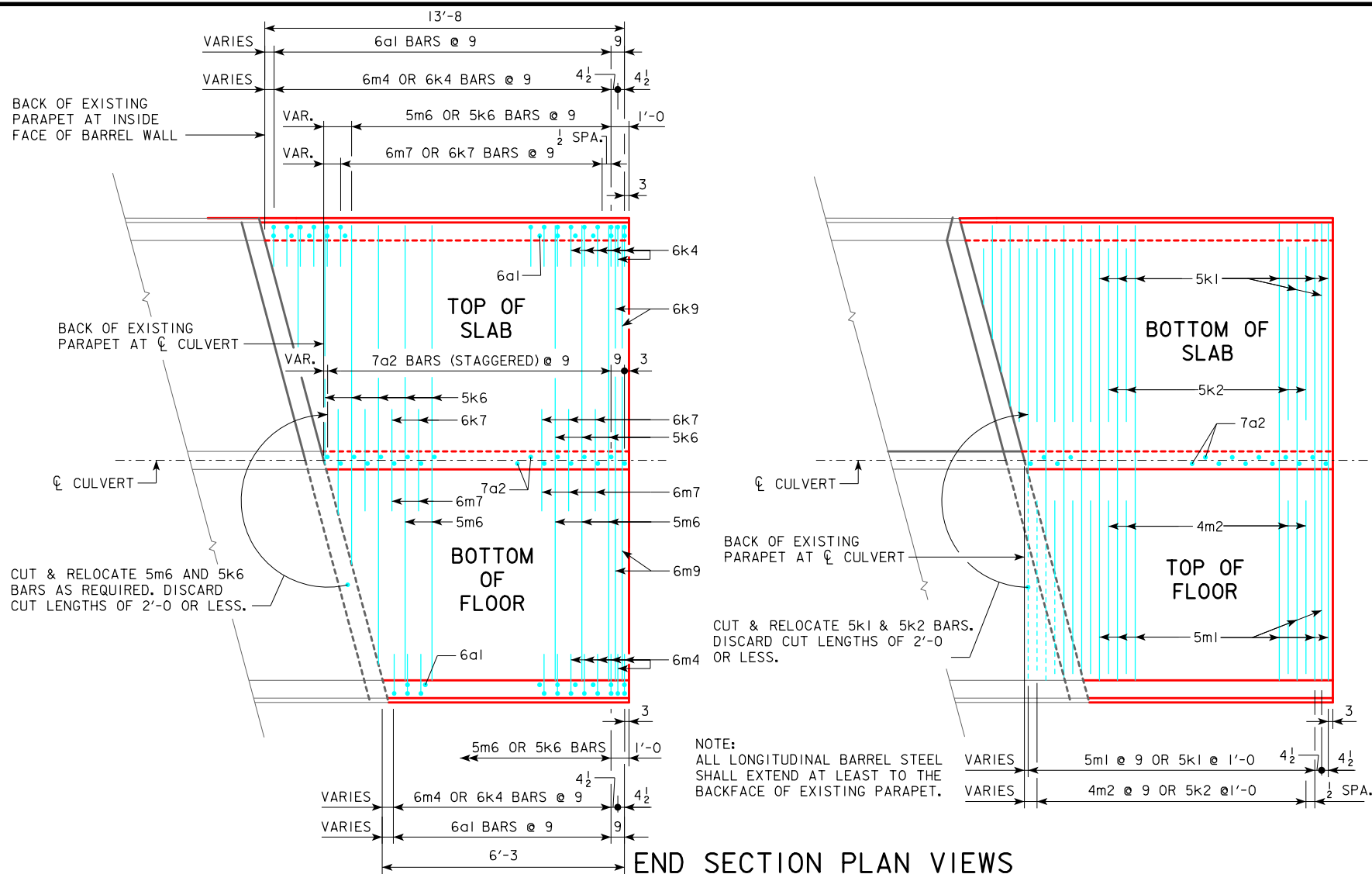
EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

SITUATION PLAN

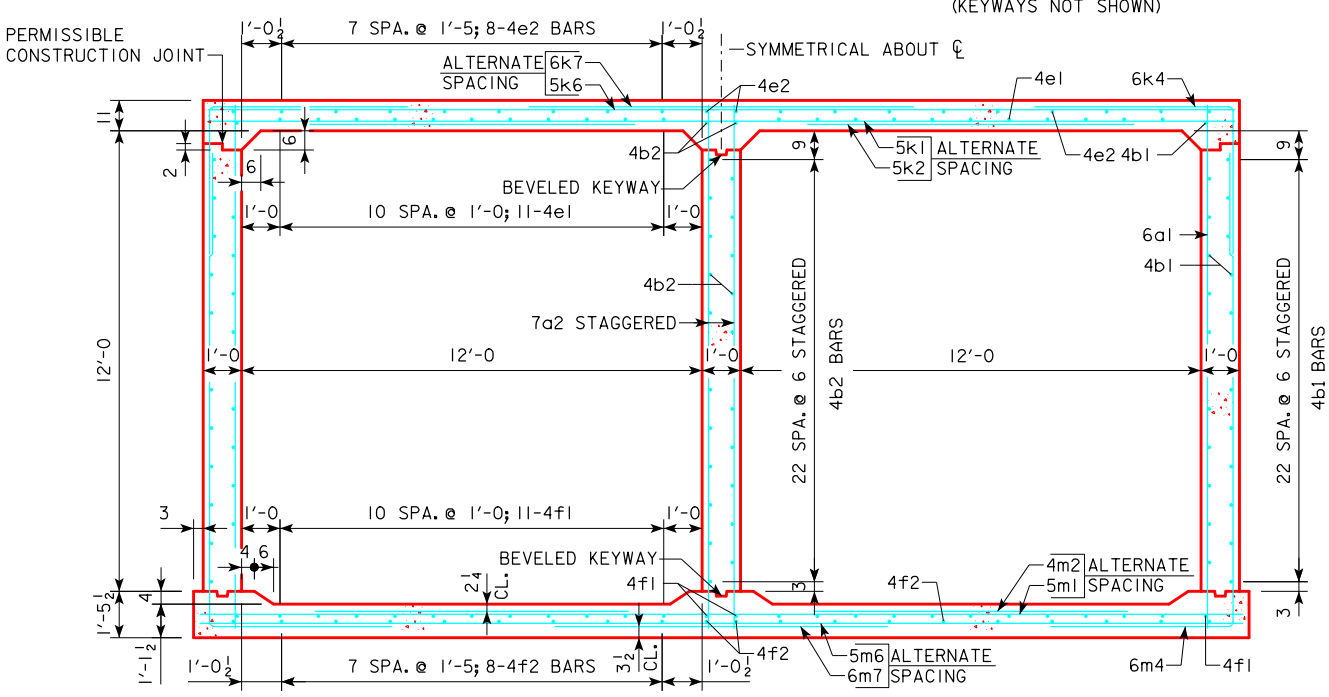
DESIGN FOR 15° L.A. SKEW
TWIN 12' X 12' REINFORCED CONCRETE BOX CULVERT EXTENSION

SITUATION PLAN
 STA. 1340+17.27 JOHNSON COUNTY OCTOBER 2020

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 3 OF 4 FILE NO. 31630 DESIGN NO. 1920



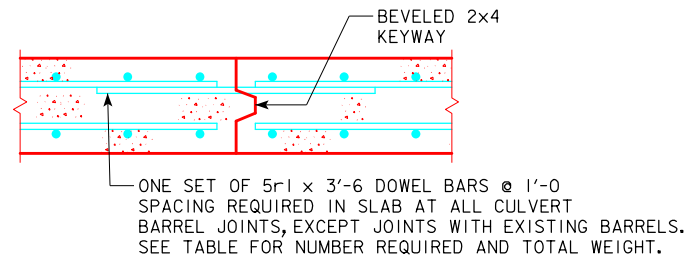
END SECTION PLAN VIEWS
(KEYWAYS NOT SHOWN)



BARREL SECTION

5r1 BARS - ONE CONST. JT.

SPAN	NO.	WEIGHT (LB)
12'-0"	26	95

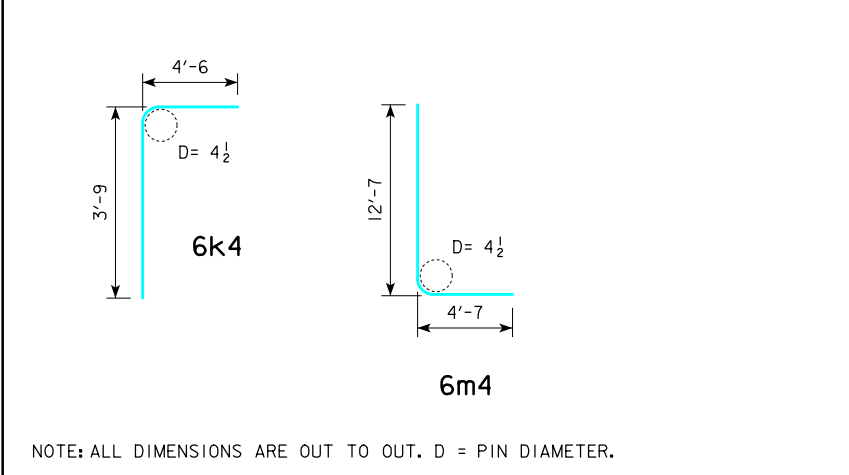


TOP SLAB CONSTRUCTION NEW JOINT DETAIL

REINFORCING BAR LIST - ONE END SECTION

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	EXT. WALLS, F.F.V.	—	22	13'-11"	460
7a2	INT. WALL, F.F.V. & B.F.V.	—	14	13'-11"	398
4b1	EXT. WALLS, F.F.H. & B.F.H.	—	48	24 @ 6'-0"; 24 @ 13'-6"	312
4b2	INT. WALLS, F.F.H. & B.F.H.	—	25	14'-10"	248
4e1	SLAB, BOT. LONGIT.	—	22	13'-6" TO 6'-1"	145
4e2	SLAB, TOP LONGIT.	—	20	13'-6" TO 6'-1"	132
4f1	FLOOR, TOP LONGIT.	—	26	13'-6" TO 6'-1"	172
4f2	FLOOR, BOT. LONGIT.	—	20	13'-6" TO 6'-1"	132
5k1	SLAB, BOT. TRANSV.	—	12	26'-8"	334
5k2	SLAB, BOT. TRANSV.	—	18	9'-8"	181
6k4	SLAB, TOP CORNER	└	30	8'-3"	372
5k6	SLAB, TOP TRANSV.	—	13	26'-8"	362
6k7	SLAB, TOP TRANSV.	—	12	8'-4"	150
6k9	SLAB, TOP TRANSV.	—	2	26'-8"	80
5m1	FLOOR, TOP TRANSV.	—	15	27'-2"	425
4m2	FLOOR, TOP TRANSV.	—	24	8'-7"	138
6m4	FLOOR, BOT. CORNER	└	30	17'-2"	774
5m6	FLOOR, BOT. TRANSV.	—	13	27'-2"	368
6m7	FLOOR, BOT. TRANSV.	—	12	8'-4"	150
6m9	FLOOR, BOT. TRANSV.	—	2	27'-2"	82
REINFORCING STEEL - TOTAL (LBS.)					5415

BENT BAR DETAILS



DESIGN FOR 15° L.A. SKEW

TWIN 12' X 12' REINFORCED CONCRETE BOX CULVERT EXTENSION

TRANSITION BARREL DETAILS

STA. 1340+17.27 OCTOBER 2020

JOHNSON COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 31630 DESIGN NO. 1920

REVISION 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
 REVISED 11-2016 - CHANGED THE SERIES DATE "IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015", (WAS SERIES 2012).
 REVISED 02-2017 - CHANGED THE DESIGN STRESSES NOTE TO STATE "AASHTO LRFD" (WAS LRFD AASHTO).
 ENGLISHINGCULVERTS.DGN - 1043 - THIS SHEET REDRAWN 9-8-88

SPECIFICATIONS:

DESIGN: AASHTO LRFD 8th Ed, SERIES OF 2017.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8th Ed, SERIES OF 2017. REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60. CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, $f'c = 4.0$ KSI.

ESTIMATED CULVERT QUANTITIES - DESIGN 2820					
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUANTITY
1	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
2	2402-2720000	EXCAVATION, CLASS 20	CY	12	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	19.1	
4	2404-7775000	REINFORCING STEEL	LB	3085	
5	2533-4980005	MOBILIZATION	LS	1.00	
6	2599-9999003	BEDDING MATERIAL	CY	11	

NOT SHOWN IN BID ITEM APP?

ITEM NO. ESTIMATE REFERENCE INFORMATION

- INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF EXISTING RCB HEADWALL. REMOVAL OF SCHEDULED ITEMS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO MATERIAL NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE. INCLUDES COST OF SETTING OF THE DOWEL REINFORCING INTO THE EXISTING CULVERT CONCRETE.
-
-
-
- INCLUDES COST FOR ALL LABOR, MATERIAL, AND EQUIPMENT NECESSARY TO PLACE AND COMPACT BEDDING MATERIAL AS A WORKING BLANKET, INCLUDING EXCAVATION. PLACEMENT OF MATERIAL SHALL BE IN ACCORDANCE WITH ARTICLE 2402.3, H OF THE STANDARD SPECIFICATIONS. BEDDING MATERIAL AGGREGATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATION 411B, GRADATION NO. 3. RECLAIMED HMA SHALL NOT BE USED. THE WORKING BLANKET AND BID ITEM "BEDDING MATERIAL" MAY BE DELETED IF DETERMINED UNNECESSARY PER WRITTEN REQUEST TO THE ENGINEER.

WHY SPECIAL BID ITEM AND NOT SPECIAL BACKFILL OR GRANULAR?

NOTE:
ROADWAY QUANTITIES SHOWN
IN TIED GRADING PROJECT:
IM-NHS-080-7(114)248--03-52

STANDARDS: FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:		
STANDARD	ISSUED	REVISED
RCB G2-20	7-20	--
RCB 10-4-20	7-20	--
PWH 30-1-20	7-20	--
PWH 30-2-20	7-20	--
PWH 30-3-20	7-20	--
PWH 30-4-20	7-20	--
PWH 30-8-20	7-20	--

** NOTE: "TOP SLAB CONSTRUCTION JOINT DETAIL" DOES NOT APPLY.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
HEADWALL 30° SKEW	1997	1997
5'-0 BARREL END SECTION	1010	1010
5z1 DOWEL BARS	78	78
TOTAL (LBS.)		3085

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
HEADWALL 30° SKEW	10.1	*2.8	1.6	14.5
5'-0 BARREL END SECTION	2.0	1.0	1.6	4.6
TOTAL (C.Y.)	12.1	3.8	3.2	19.1

* INCLUDES PARAPET AND TOP OF WINGWALL.

DESIGN HISTORY AT THIS SITE
(INCLUDES THIS DESIGN)

DES. NO.	TYPE OF WORK
1961	ORIGINAL DESIGN
2820	CULVERT EXTENSION - OUTLET

DESIGN FOR 30° L.A. SKEW
**10' X 4' REINFORCED CONCRETE
BOX CULVERT EXTENSION**

QUANTITIES

STA. 1127+22.26 OCTOBER 2020

JOHNSON COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 4 FILE NO. 31630 DESIGN NO. 2820

REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRORDED IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT. REVISED 03-2019 - UPDATED NOTE REFERRING TO COPIES OF ORIGINAL DESIGN PLANS. ENGLISHINGCULVERTS.DGN - 104362 - THIS SHEET ISSUED 10-08.

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 10' X 4' X 15' REINFORCED CONCRETE BOX CULVERT 5 FEET AT THE OUTLET END. ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN NO. 1961). FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE. UTILITY COMPANIES AND MUNICIPALITIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE. THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 2 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. VERTICAL EARTH PRESSURE, $E_v = 0.120$ kcf. HORIZONTAL EARTH PRESSURE, $E_{Hmax} = 0.060$ kcf MAX, $E_{Hmin} = 0.030$ kcf. THE CONTRACTOR MAY SUBMIT ALTERNATE FROST TROUGH DIMENSIONS FOR APPROVAL. ANY ADDITIONAL COSTS DUE TO CHANGE IN THE FROST TROUGH DIMENSIONS IS TO BE PAID FOR BY THE CONTRACTOR. FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE. THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL. THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

BAR SIZE NUMBER	4	5	6	7	8	9
MINIMUM SPLICE LENGTH	20"	24"	29"	34"	38"	47"

THIS SPLICE, IF USED WILL BE AT THE CONTRACTOR'S EXPENSE. METAL BAR CHAIRS SPACED AT NOT OVER 3'-0" C.-C. IN EITHER DIRECTION ARE TO BE USED TO SUPPORT ALL SLAB AND FLOOR STEEL AS OUTLINED IN THE STANDARD SPECIFICATIONS. THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60. REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:
 EDGE CLEARANCES: 2" EXCEPT
 TOP OF FLOOR 2 1/4" TO NEAR TRANSV. REINF. BAR
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR
 END CLEARANCES:
 VERTICAL TOP 2"
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
 TRANSVERSE 2"
 ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN. CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION. THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING CULVERT, AND THE SETTING OF THE DOWEL REINFORCING BARS INTO EXISTING CONCRETE.

ALL DIMENSIONS AND DETAILS SHOWN ON THESE PLANS PERTINENT TO NEW CONSTRUCTION IN RELATION TO EXISTING PORTIONS OF THE STRUCTURE SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION. THE REMOVAL OF THE EXISTING CULVERT SHALL BE AT THE FRONT FACE OF THE EXISTING PARAPET. REMOVALS SHALL BE ON A VERTICAL PLANE PARALLEL WITH THE FRONT FACE OF THE EXISTING PARAPET, AND TO THE WIDTH OF THE FLOOR OF THE PROPOSED EXTENSION. THE WALLS SHALL BE CUT NORMAL TO THE BARREL WALLS AND AS SHOWN ON THE "PART REMOVAL PLAN". THE REMOVAL LINE SHALL BE INITIATED WITH A 2 1/2"± DEEP SAW CUT ON THE TOP AND BOTH SIDES OF EACH WALL, AND ACROSS THE TOP OF THE FLOOR. THIS SAW CUT SHOULD CUT THRU ANY EXISTING LONGITUDINAL REINFORCING THEREBY FACILITATING A NEAT NON-SPALLED BREAK LINE. IF EXISTING TOP OF PARAPETS WILL BE WITHIN 0'-6" OF PROPOSED SUBGRADE ELEVATION, THE PARAPETS SHALL BE REMOVED DOWN TO AN ELEVATION 1"± ABOVE THE TOP OF THE EXISTING SLAB. ANY EXISTING PARAPET VERTICAL BARS EXPOSED DURING PARAPET REMOVAL SHALL BE CUT OFF FLUSH WITH THE PARAPET REMOVAL LINE AND PAINTED WITH TWO COATS OF ZINC RICH PAINT.

ALL REMOVALS SHALL BE CAREFULLY ACCOMPLISHED AND ANY CONCRETE DAMAGED BY THE CONTRACTOR THAT IS NOT TO BE REMOVED SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXTRA COST TO THE STATE. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE FRONT FACE OF THE EXISTING PARAPET. 5z1 x 2'-6" DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO EXISTING CONCRETE SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING CULVERT. 5z1 DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. 5z1 DOWEL REINFORCING BARS SHALL BE AT 1'-0" MAXIMUM SPACING C.-C. OF DOWELS. 5z1 DOWEL REINFORCING BARS SHALL BE SET WITH POLYMER GROUT IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS, AND CURRENT SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D.O.T. HIGHWAY DIVISION.

PPP?

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION. SINCE THE HIGHWAY WILL NOT BE CLOSED TO TRAFFIC DURING THIS CONSTRUCTION, THE CONTRACTOR MAY FEEL TEMPORARY SHORING (SHEET PILE OR OTHER) IS NECESSARY TO ENSURE THAT THE SHOULDER WILL NOT SLOUGH IN WHILE CULVERT IS BEING EXTENDED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT THE SHORING PLAN TO THE ENGINEER FOR APPROVAL. COST OF SHORING, IF REQUIRED, WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO DIRECT PAYMENT WILL BE MADE. THEREFORE, ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5z1 IS 5/8 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

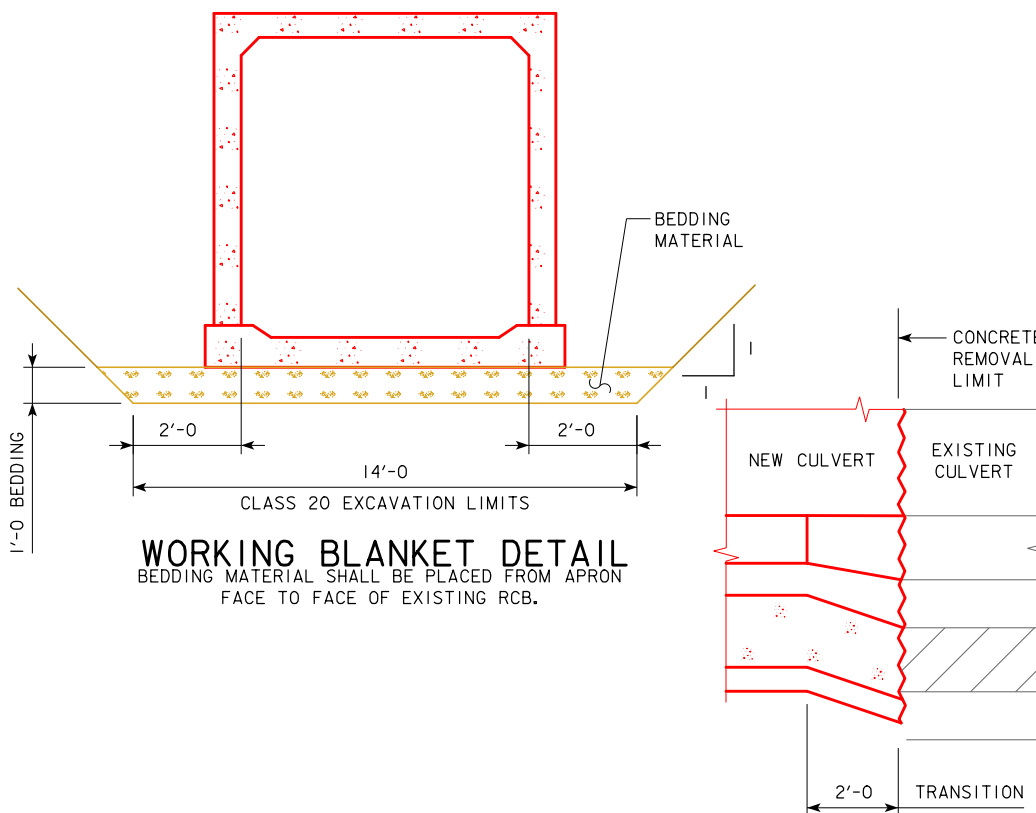
ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

TRAFFIC WILL BE MAINTAINED AT ALL TIMES IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS SHOWN IN THESE PLANS.

TRAFFIC CONTROL ADJACENT TO THE CULVERT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR CONSTRUCTING THE CULVERT AND IS TO COORDINATE CONSTRUCTION OF THE CULVERT WITH THE CONTRACTOR DOING THE GRADING.

ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 2 FEET OF NEW WORK.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE CURTAIN WALLS AS DETAILED, ALTERNATE METHODS SUCH AS STEEL SHEET PILE AND PRECAST CONCRETE WALLS MAY BE APPROVED BUT AT NO ADDITIONAL COST. THE CONTRACTOR IS TO SUBMIT TO THE ENGINEER FOR APPROVAL COMPLETE DRAWINGS OF THE PROPOSED CURTAIN WALL ALTERNATE BEFORE BEGINNING CONSTRUCTION.

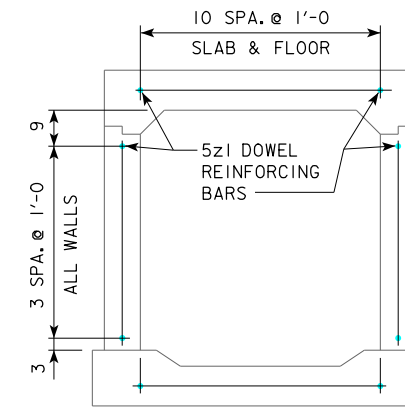


TRAFFIC CONTROL PLAN
 NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN IN THE TIED ROADWAY PROJECT.

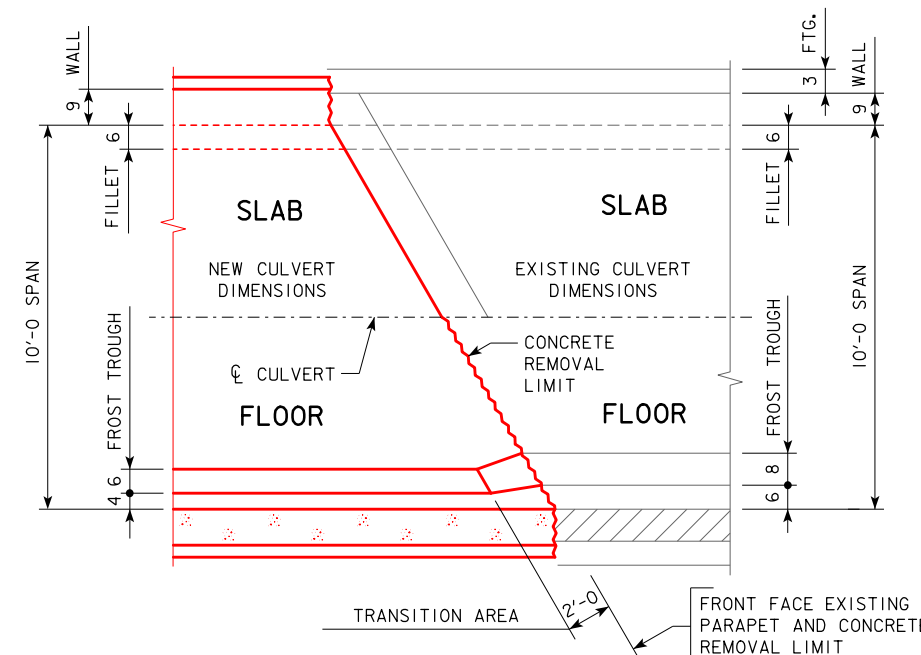
CONCRETE TRANSITION DETAILS

NOTE: REFER TO THE BRIDGE DESIGN MANUAL, SECTION 7 FOR CULVERT EXTENSION DETAILS FOR TRANSITION INFORMATION.

BENCH MARK : #461 N20552410.405 E7945151.243 FD 1HC BM ON 5x4 RCB, ELEV. 763.58

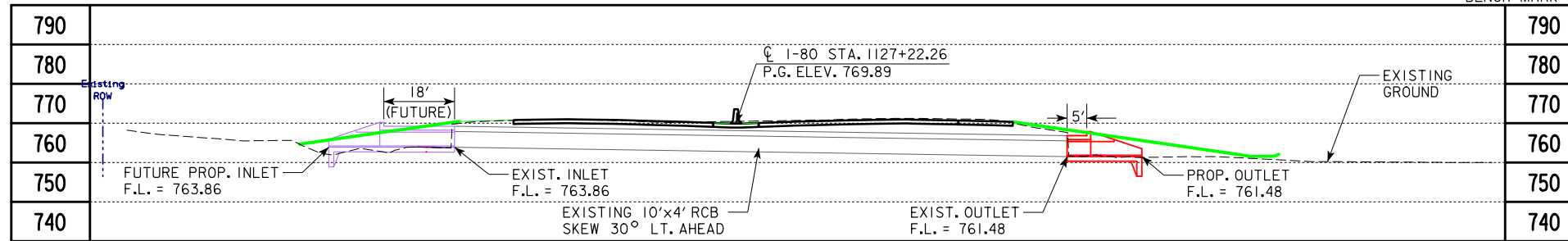


REINFORCING STEEL EXTENSION DOWELS					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5z1	DOWEL REINFORCING BARS		30	2'-6"	78



CONCRETE TRANSITION DETAILS (PLAN VIEW)

DESIGN FOR 30° L.A. SKEW
10' X 4' REINFORCED CONCRETE BOX CULVERT EXTENSION
 GENERAL NOTES
 STA. 1127+22.26 OCTOBER 2020
JOHNSON COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 4 FILE NO. 31630 DESIGN NO. 2820

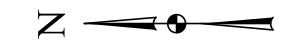


LONGITUDINAL SECTION ALONG ϕ CULVERT

PROPOSED PROFILE GRADE I-80
 VPI STA = 1129+00
 VPI ELEV = 768.82
 VC = 800'

NOTE:
 REMOVE HEADWALLS TO FACE OF PARAPET AND EXTEND RIGHT (LEFT TO BE EXTENDED IN FUTURE).
 USE 1-30° HEADWALL

ANTICIPATED SETTLEMENT = NEGLIBLE
 FILL HEIGHT = 2'



TRAFFIC ESTIMATE

HYDRAULIC DATA
 DRAINAGE AREA = 127 ACRES-R
 $Q_{50} = 175$ CFS

UTILITIES LEGEND:
 SYMBOL - TYPE
 -or-
 NO KNOWN UTILITIES
 -or-
 UTILITY SURVEY NOT CONDUCTED

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

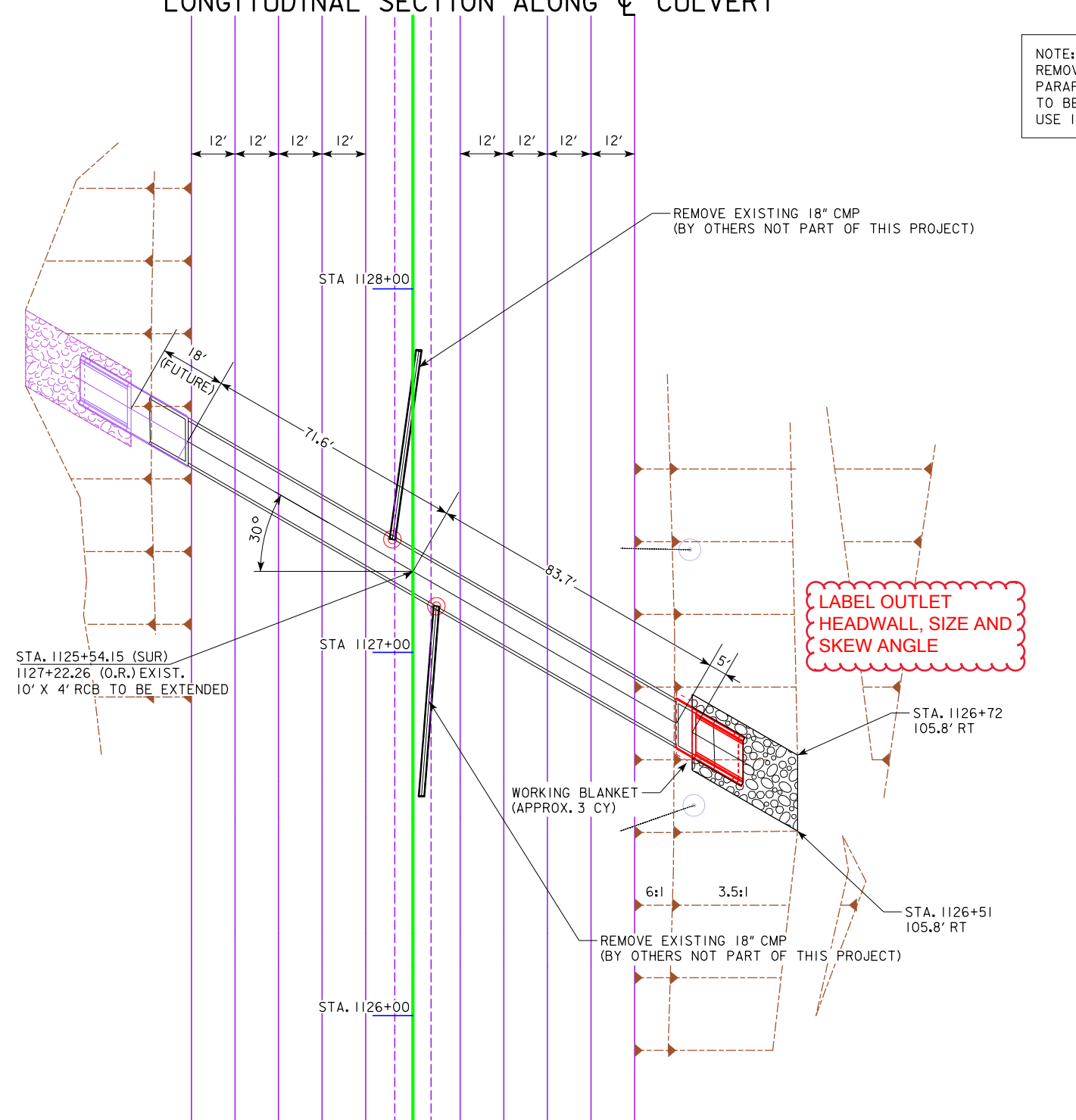
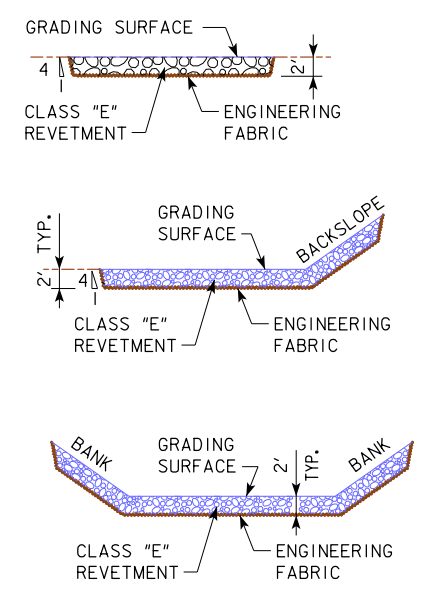
LOCATION
 I-80 OVER DRAINAGE DITCH
 T-79N R-5W
 SECTION 6
 SCOTT TOWNSHIP
 JOHNSON COUNTY
 LATITUDE 41.67917°
 LONGITUDE -91.46556°

TYPICAL CHANNEL PROTECTION

ESTIMATED REVELTMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVELTMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
OUTLET	50	79	31
TOTALS	50	79	31

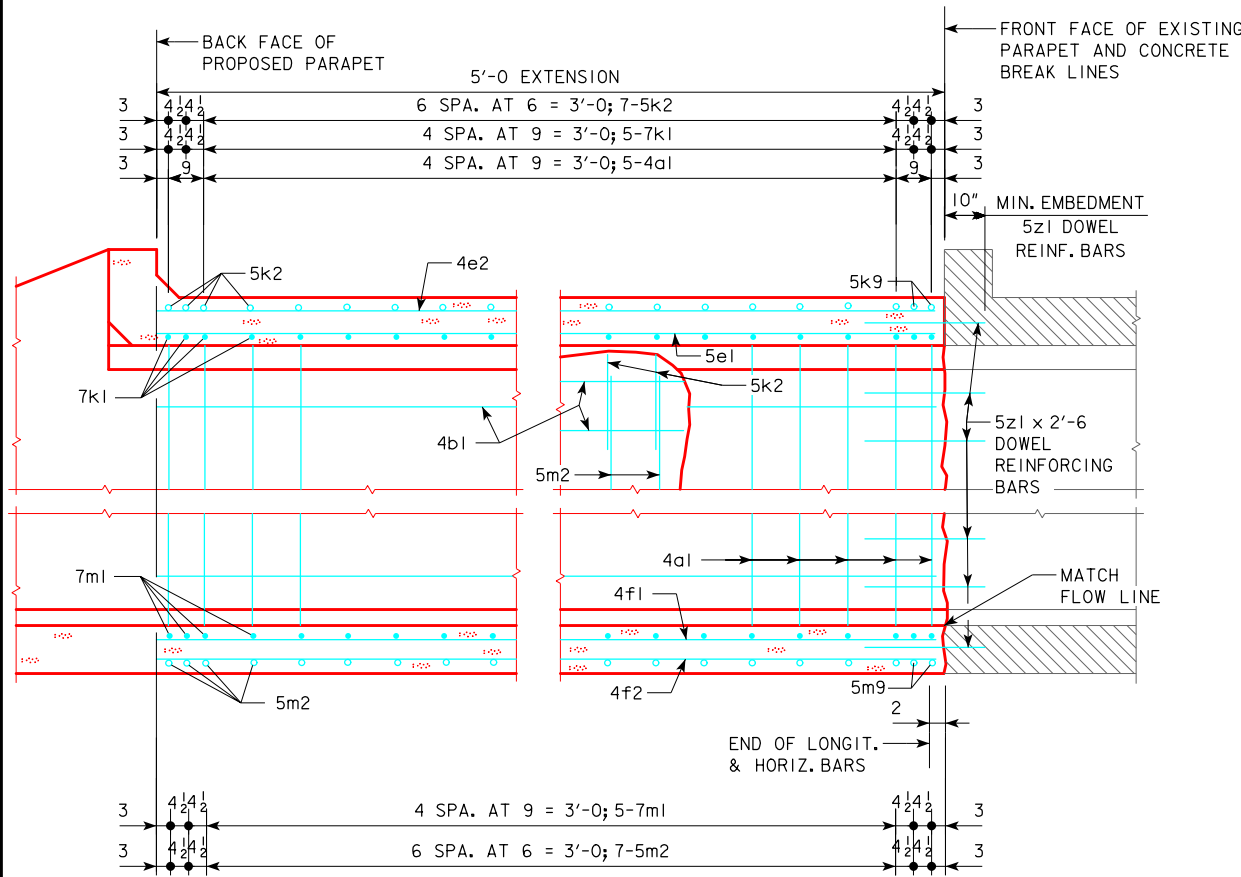
EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.



SITUATION PLAN

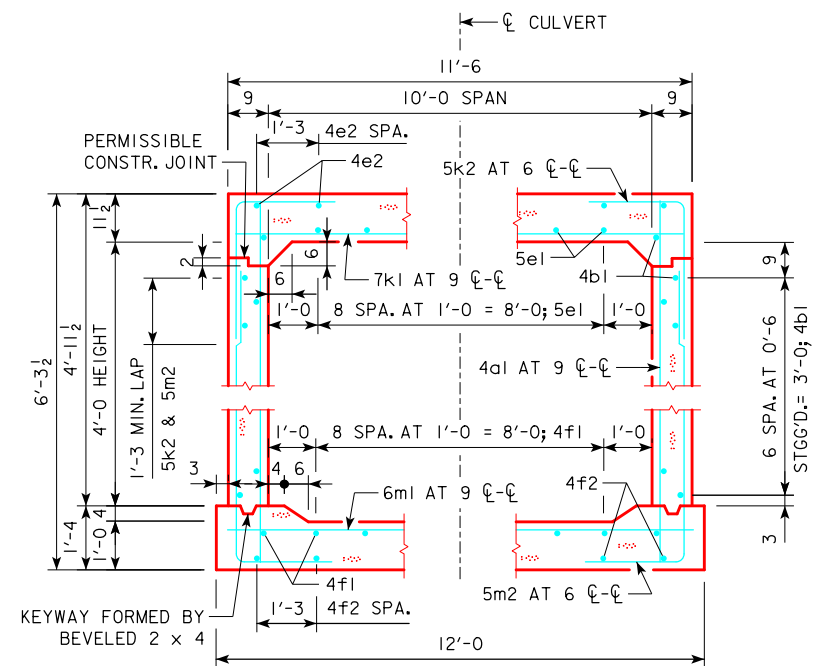
DESIGN FOR 30° L.A. SKEW
10' X 4' REINFORCED CONCRETE BOX CULVERT EXTENSION
 SITUATION PLAN
 STA. 1127+22.26
 JOHNSON COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 3 OF 4 FILE NO. 31630 DESIGN NO. 2820

CORRECTION 05-14 - ADDED THE BAR LABELS k9 & m9 TO THE PART LONGIT. SECTIONS. HEL044.SOI (HSTD01044.SOI--LEP: THIS SHEET REDRAWN, DEVICE:ZHAO(200,004) ARCH.TAPE NO. 15 DATE 9-8-88)



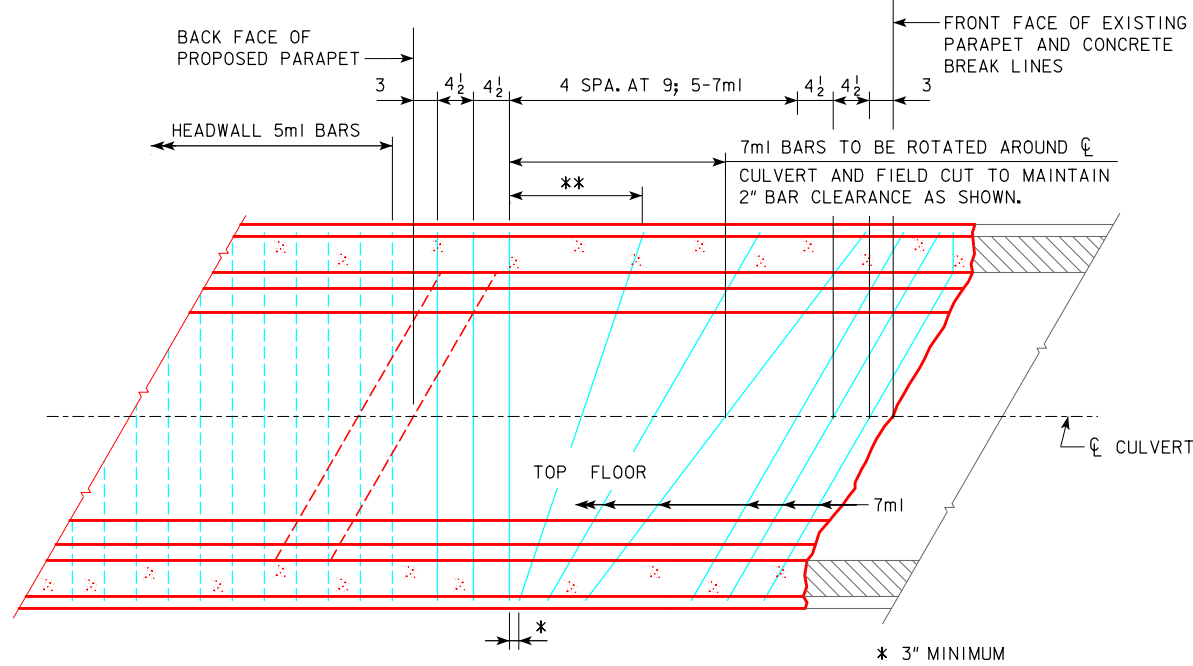
PART LONGITUDINAL SECTION
(ALONG CL OF CULVERT)

NOTE: ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.



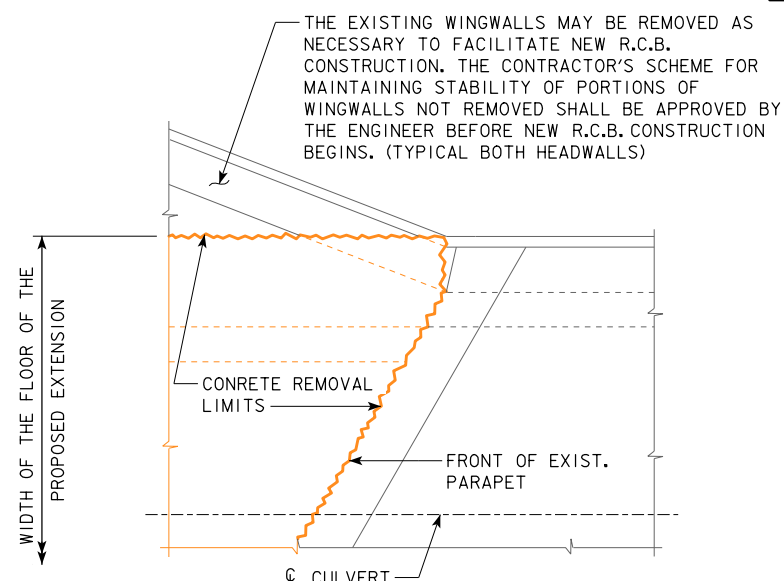
SECTION THRU BARREL
(NORMAL TO CL CULVERT)

NOTE:
ALL TRANSVERSE REINFORCING BARS AND HORIZONTAL LEGS OF CORNER BARS SHALL BE PLACED PARALLEL TO THE CONCRETE BREAK LINE AND NEW PARAPET EXCEPT AS SHOWN.
DIMENSIONS SHOWN FOR CL-CL OF TRANSVERSE BARS, VERTICAL WALL BARS, AND CORNER BARS ARE MEASURED ALONG CL CULVERT.
CONCRETE PER FOOT OF BARREL:
SLAB = 0.316 CU. YDS.
WALLS = 0.202 CU. YDS.
FLOOR = 0.407 CU. YDS.
TOTAL = 0.925 CU. YDS.



TOP FLOOR TRANSVERSE BARS

* 3" MINIMUM
** 1.5 BAR SPACING MAXIMUM
DO NOT EXCEED 18 INCHES

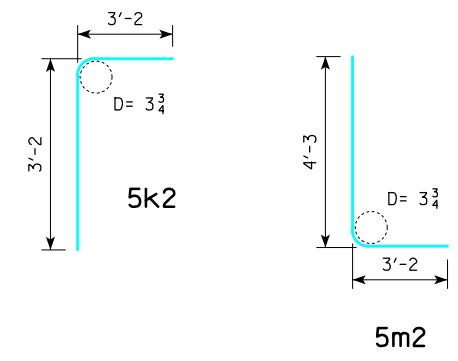


PART REMOVAL PLAN

REINFORCING BAR LIST - ONE EXTENSION

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS, F.F.V.	—	14	5'-5"	51
4b1	WALLS, F.F.H. & B.F.H.	—	16	4'-10"	52
5e1	SLAB, BOT. LONGIT.	—	9	4'-10"	45
4e2	SLAB, TOP LONGIT.	—	6	4'-10"	19
4f1	FLOOR, TOP LONGIT.	—	11	4'-10"	36
4f2	FLOOR, BOT. LONGIT.	—	6	4'-10"	19
7k1	SLAB, BOT. TRANSV.	—	9	12'-11"	238
5k2	SLAB, TOP CORNER	└	18	6'-4"	119
5k9	SLAB, TOP TRANSV.	—	2	12'-11"	27
7m1	FLOOR, TOP TRANSV.	—	9	12'-11"	238
5m2	FLOOR, BOT. CORNER	└	18	7'-5"	139
5m9	FLOOR, BOT. TRANSV.	—	2	12'-11"	27
REINFORCING STEEL - TOTAL (LBS.)					1010

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

DESIGN FOR 30° L.A. SKEW
**10' X 4' REINFORCED CONCRETE
 BOX CULVERT EXTENSION**
TRANSITION BARREL DETAILS
 STA. 1127+22.26 OCTOBER 2020
JOHNSON COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 4 OF 4 FILE NO. 31630 DESIGN NO. 2820