GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING _____ WITH A _____ PRECAST REINFORCED CONCRETE BOX CULVERT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CULVERT CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (ORIGINAL DESIGN NO. _____).

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 PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF ____ FEET.

THE PRECAST R.C.B. BARREL AND END SECTIONS SHALL CONFORM TO IOWA D.O.T. SINGLE PRECAST R.C.B. CULVERT STANDARDS. AT THE CONTRACTOR'S OPTION, PRECAST BARREL SECTIONS MAY CONFORM TO ASTM C1577.

EXCESS CLASS 20 EXCAVATION MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED AT THE CONSTRUCTION SITE, AS DIRECTED BY THE ENGINEER.

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

THE BID ITEM "REMOVALS AS PER PLAN" SHALL INCLUDE ALL COSTS FOR REMOVALS OF PORTIONS OF THE EXISTING CULVERT, AND THE SETTING OF THE DOWEL BARS INTO EXISTING CONCRETE. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

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.

THE LENGTH IN LINEAR FEET OF PRECAST REINFORCED CONCRETE BOX CULVERT WILL BE BASED ON THE PLAN QUANTITY. FOR THE NUMBER OF LINEAR FEET GIVEN ON THE PLAN, THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER LINEAR FOOT. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, LABOR AND EQUIPMENT NECESSSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "CONCRETE BOX CULVERT STRAIGHT END SECTION", "CLASS 20 EXCAVATION", "CLASS E REVETMENT", AND "GRANULAR BACKFILL".

FOR EACH PRECAST BOX CULVERT STRAIGHT END SECTION INSTALLED THE CONTRACTOR WILL BE PAID THE CONTRACT PRICE PER EACH. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL (INCLUDING LINTEL BEAMS AND CURTAIN WALLS), LABOR AND EQUIPMENT NECESSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "PRECAST CONCRETE BOX CULVERT", "CLASS 20 EXCAVATION", "CLASS E REVETMENT", AND "GRANULAR BACKFILL".

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE I PARAPET SHALL BE PRECAST.

THE CONTRACTOR SHALL FURNISH AND INSTALL CULVERT TIES FOR ALL JOINTS. THE MAIN SECTION JOINTS WILL HAVE ONE TIE ON EACH SIDE OF THE BARREL AND THE LAST BARREL SECTION WILL BE ATTACHED TO THE END SECTIONS WITH TWO TIES PER SIDE. THE END SECTION JOINTS WILL HAVE TWO TIES PER SIDE.

CULVERT TIES SHALL BE INCLUDED IN THE COST FOR PRECAST CONCRETE BOX CULVERT. TIE RODS WILL BE 1 INCH DIAMETER STEEL AND SHALL MEET REQUIREMENTS OF ASTM A709 GRADE 36 OR EQUAL.

CULVERT TIE ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION.

THE LIMITS FOR EXCAVATION FOR THE PRECAST CONCRETE BOX CULVERT SHALL BE AS SHOWN ON THE "GRANULAR BEDDING DETAIL".

A MINIMUM OF 6 INCHES OF GRANULAR MATERIAL WITH A MAXIMUM AGGREGATE SIZE OF $\frac{3}{8}$ INCH SHALL BE USED AS BEDDING FOR THE PRECAST BOX CULVERT. THE BEDDING SHALL BE SHAPED TO A FLAT BASE USING A TEMPLATE. THE 6 INCH GRANULAR BEDDING SHALL BE BID AS GRANULAR BACKFILL.

THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED PRECAST BOX SECTIONS TO THE OFFICE OF BRIDGES AND STRUCTURES FOR ALL PROJECTS. THE DETAILS SHALL INCLUDE THE FOLLOWING INFORMATION AS FOUND ON THE "SUBMITTAL SHOP DRAWING" STANDARD SHEET:

A. A SITUATION PLAN DRAWING SHOWING THE BACK TO BACK PARAPET DIMENSION FOR THE LINE OF THE CULVERT SECTIONS.
B. DIMENSION THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTHS.
C. A DETAIL OF THE PRECAST BARREL SECTIONS SHOWING A CROSS SECTION VIEW OF THE SECTION, STEEL LOCATIONS, DIMENSIONS, ETC.
D. A DETAIL OF THE PRECAST CULVERT END SECTION SHOWING A CROSS SECTION VIEW OF THE SECTIONS, STEEL LOCATIONS, DIMENSIONS, ETC. SIMILAR TO THE END SECTION DETAILS SHOWN IN THE IDOT STANDARDS.

THE CONTRACTOR SHALL PROVIDE ALL INFORMATION SHOWN ON THE SUBMITTAL SHOP DRAWING SHEET REGARDLESS OF WHICH PRECAST BOX OPTION IS SELECTED.

APPROVAL OF DETAILS IS NOT REQUIRED FOR PROJECTS CONFORMING TO "ASTM C1577" AND "IDOT STANDARDS" PRECAST BOX OPTIONS WITH END SECTIONS CONFORMING TO "IDOT STANDARDS." HOWEVER, THE DETAILS SHALL BE RECEIVED BY THE OFFICE OF BRIDGES AND STRUCTURES PRIOR TO THE START OF FABRICATION.

APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST BOX OPTIONS AND "NONSTANDARD" END SECTION OPTIONS. BOXES AND END SECTIONS REQUIRING OPENINGS OR ATTACHMENTS SHALL BE CONSIDERED NONSTANDARD. THE CONTRACTOR SHALL ALLOW THIRTY WORKING DAYS FOR THE ENGINEER'S REVIEW PRIOR TO THE START OF FABRICATION.

DETAILS REQUIRING APPROVAL SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER CURRENTLY REGISTERED IN THE STATE OF IOWA. BOXCAR SOFTWARE VERSION 3.1 OR LATER OR OTHER EQUIVALENT SOFTWARE CAN BE USED TO DESIGN THE PRECAST BOX CULVERT BARREL SECTIONS, PROVIDING THE ANALYSIS MEETS THE MINIMUM REQUIREMENTS ESTABLISHED FOR THE IDOT STANDARDS AS FOUND IN THE IDOT BRIDGE DESIGN MANUAL. THE MINIMUM REQUIREMENTS INCLUDE REINFORCEMENT CLEARANCE REQUIREMENTS USED IN THE "IDOT STANDARDS."

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.

REMOVAL OF THE EXISTING C.I.P. CULVERT SHALL BE AS SHOWN ON THE "PART REMOVAL PLAN" ON STANDARD SHEET 1044P AND TO THE WIDTH OF THE FLOOR OF THE PROPOSED EXTENSION. THE WALLS SHALL BE CUT NORMAL TO THE BARREL WALLS. THE REMOVAL LINE SHALL BE INITIATED WITH A 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.

THE PROPOSED CULVERT SHALL BE PLACED 1'-2 AWAY FROM THE CONCRETE REMOVAL LINE SHOWN IN THE "PART ELEVATION" DETAIL ON STANDARD SHEET 1044P.

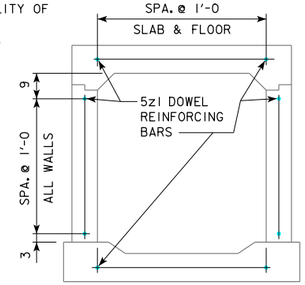
5zI x 1'-10 DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO EXISTING CONCRETE SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING CULVERT. THE 5zI x 1'-10 DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. THE 6x2 DOWEL REINFORCING BARS SHALL BE SET ALONG THE TOP SLAB AND DOWN THE SIDES WITH A 10" MINIMUM EMBEDMENT OF THE EXISTING CULVERT. ALL DOWELS SHALL BE AT 1'-0 MAXIMUM SPACING C.-C. OF DOWELS. DOWELS 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 DECIDE 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 CONTRACTOR WILL 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. ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. ALL TEMPORARY SHORING WORK SHALL BE IN ACCORDANCE WITH ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS.

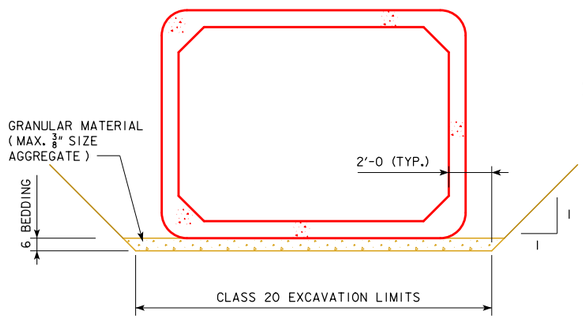
TRAFFIC WILL BE MAINTAINED AT ALL TIMES IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS SHOWN IN THESE PLANS.

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.



SECTION NEAR EXTENSION

(SHOWING SPACING OF 5zI DOWEL BARS)



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL.

DESIGN HISTORY AT THIS SITE (INCLUDES THIS DESIGN)	
DES. NO.	TYPE OF WORK
X	X
X	X
X	X
X	X
X	X

INSTALLATION NOTES:

PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE LAID WITH THE GROOVE END OF EACH SECTION UP-GRADE, AND THE SECTIONS SHALL BE TIGHTLY JOINED. CONCRETE TIES TO BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT. JOINT OPENINGS BETWEEN SECTIONS SHOULD BE AS TIGHT AS PRACTICABLE AND LIMITED TO A MAXIMUM OF $\frac{3}{4}$ INCH OPENINGS. THE JOINT ON THE BOTTOM OF THE CULVERT SHALL BE SEALED WITH A FLEXIBLE WATER TIGHT 1 INCH BUTYL ROPE GASKET AS PER MATERIALS I.M. 491.09.

BUTYL ROPE GASKET SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND SHALL EXTEND VERTICALLY 6 INCHES ABOVE THE BOTTOM FILLET. ALL JOINTS SHALL BE TRIMMED CLEAN ON THE INSIDE AFTER SEALING.

THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT DURING BACKFILLING OPERATIONS. ATTACHMENT METHODS SHALL BE APPROVED BY THE ENGINEER. ALL COSTS INCLUDING MATERIAL AND LABOR ASSOCIATED WITH PROVIDING THE ENGINEERING FABRIC AND INSTALLING IT AS REQUIRED SHALL BE INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST BOX CULVERT STRAIGHT END SECTION". THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

CLASS E REVETMENT WILL BE PLACED AROUND BOTH PRECAST BOX CULVERT END SECTIONS, AS SHOWN IN THESE PLANS.

DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADII OR CHAMFER SHALL BE ACCOMPLISHED WITH A MECHANICAL HAND COMPACTOR.

THE CONTRACTOR SHALL FURNISH AND INSTALL LIFTING HOLE PLUGS FOR EACH SECTION. LIFTING HOLES SHALL BE PLUGGED WITH A PRECAST CONCRETE PLUG OR PLASTIC PLUG APPROVED BY THE ENGINEER, SEALED AND COVERED WITH A 2'-0 x 2'-0 PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

SINCE PRECAST CONCRETE CULVERT END SECTIONS HAVE THE FORESLOPE LOCATED AT THE BOTTOM OF THE PARAPET INSTEAD OF THE TOP (AS IN THE CASE OF CAST IN PLACE RCB CULVERTS) THE MAIN BARREL SECTION HAS BEEN LENGTHENED.

SPECIFICATIONS:

DESIGN:

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010.

CONSTRUCTION:

IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT SERIES, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010:

BAR REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
WELDED WIRE REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c FOR BARREL SECTIONS AS NOTED ON CULVERT BARREL DETAIL STANDARDS, FOR END SECTION DESIGN f'c = 5 KSI.

STANDARDS:
FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:

STANDARD	ISSUED	REVISED
**		

GENERAL NOTES & QUANTITES

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
REVISED 12-15 - MODIFIED CLASS 20 EXCAVATION LIMIT FROM 1'-0 OUTSIDE FACE OF BARREL TO 2'-0 FROM INSIDE FACE OF BARREL.
ENGLISHPRECASTCULVERTS.DGN - 1043P - THIS SHEET ISSUED 01-13.

DESIGN TEAM	PRECAST CULVERT EXTENSION GENERAL NOTES	STANDARD SHEET 1043P		COUNTY	PROJECT NUMBER	SHEET NUMBER

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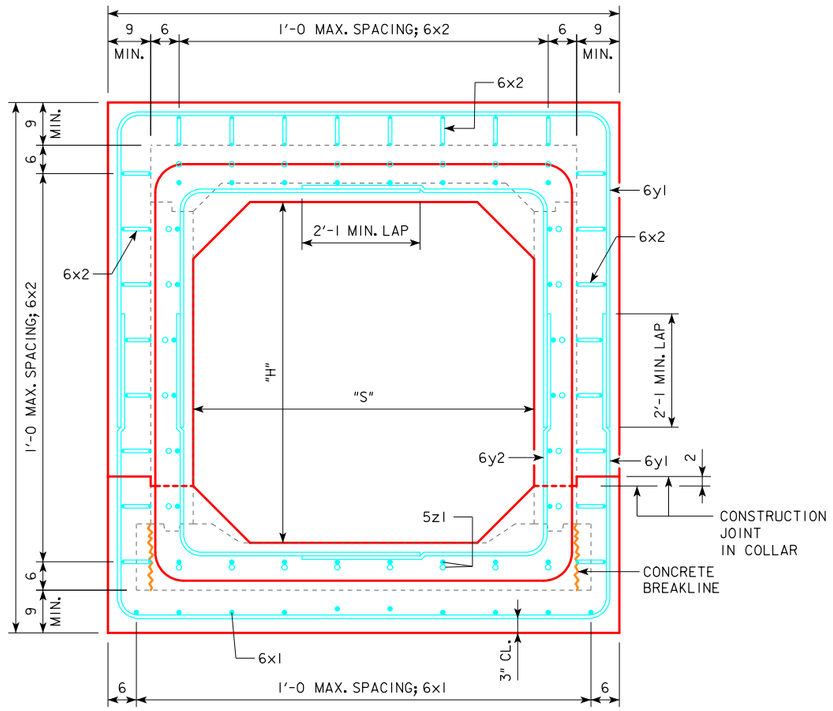
TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLANS IN THESE PLANS.

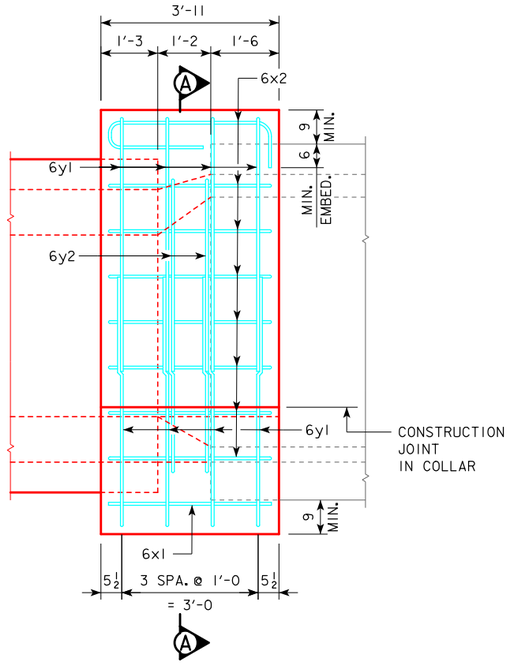
TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON DESIGN SHEET X.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLANS IN THESE PLANS.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. ROAD CLOSURE WILL BE THE RESPONSIBILITY OF THE ROAD CONTRACTOR AS SHOWN ON THE ROAD PLANS.



SECTION A-A

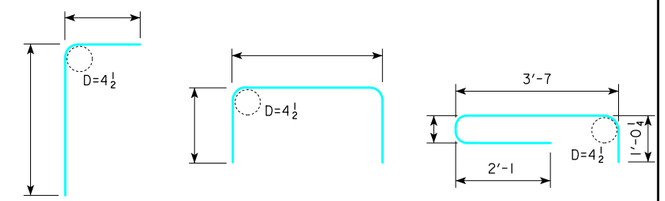


PART ELEVATION
(SHOWING COLLAR REINFORCING)

REINFORCING BAR LIST - ONE COLLAR

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6xl	LONGITUDINAL, BOTTOM			3'-7	
6x2	LONGITUDINAL, SIDES & TOP, DOWEL				
6yl	VERTICAL & HORIZONTAL, OUTSIDE FACE				
6y2	VERTICAL & HORIZONTAL, INSIDE FACE				
5zl	LONGITUDINAL, DOWEL			1'-10	
				TOTAL (LB)	

BENT BAR DETAILS



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

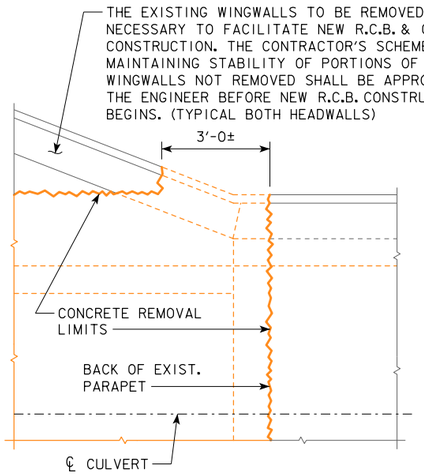
NOTE:
THE 5zl AND 6x2 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES FOR 5zl BARS ARE TO BE 10" DEEP. HOLES FOR 6x2 BARS ARE TO BE 6" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS USING A POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.

① BARREL REINFORCING EXTENDED BY THE MANUFACTURER MAY REPLACE DOWEL BARS IN PROPOSED PRECAST SECTION. THREADED INSERTS AND THREADED BARS MAY ALSO BE USED AS AN ALTERNATE IN THE PRECAST SECTION.

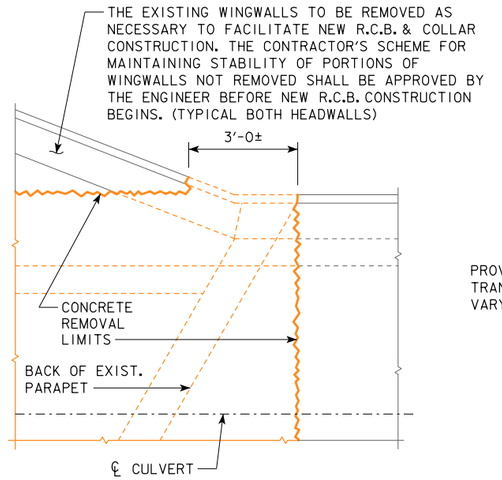
② END OF PRECAST SECTION SHALL BE FLAT BUT ROUGHENED. OMIT THE TONGUE AND GROOVE JOINT FOR THIS CONNECTION.

CONCRETE PLACEMENT SUMMARY

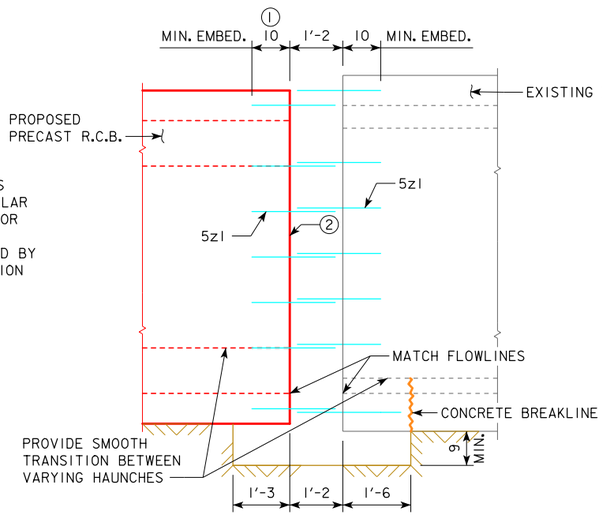
LOCATION	TOTAL
COLLAR xx @ xx.x CY	
TOTAL (CY)	



PART REMOVAL PLAN
(REQUIRED FOR 0° SKEWED CULVERTS)



PART REMOVAL PLAN
(REQUIRED FOR SKEWED CULVERTS)



PART ELEVATION
(SHOWING DOWEL OPTION)

NOTE:
THE 5zl DOWELS SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING AND PROPOSED CULVERT BARRELS. DOWELS SHALL BE CENTERED IN THE SLAB, WALLS AND FLOOR. DOWELS SHALL BE AT 1'-0 MAXIMUM SPACING C-C OF DOWELS.

CONCRETE MIX FOR JOINT FLOOR:

TO INSURE CONSOLIDATION OF CONCRETE UNDER BOX CULVERTS, THE FOLLOWING CONCRETE MIX SHALL BE USED IN THE FLOOR BETWEEN THE EXISTING CULVERT AND THE NEW PRECAST BOX CULVERT.

COARSE AGGREGATE SHALL BE PEA GRAVEL OR ⅜" LIMESTONE CHIP SHALL BE IN ACCORDANCE WITH ARTICLE 4112, OF THE STANDARD SPECIFICATIONS.

MAXIMUM FLY ASH REPLACEMENT SHALL NOT EXCEED 20% BY WEIGHT (MASS) OF THE CEMENT.

MIX DESIGN SHALL INCLUDE A MID RANGE WATER REDUCER LISTED IN MATERIALS I.M. 403, APPENDIX C, OR A HIGH RANGE WATER REDUCER LISTED IN MATERIALS I.M. 403, APPENDIX D.

MIX DESIGN SHALL INCLUDE ENOUGH WATER TO PRODUCE A READILY FLOWABLE MIXTURE WITHOUT EXCEEDING THE SPECIFIED WATER TO CEMENT RATIO FOR CLASS D CONCRETE. SLUMP SHALL NOT EXCEED 8 INCHES.

PRECAST CULV. EXTEN. DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRECAST EXTENSION OF C.I.P. CULVERT DETAILS	STANDARD SHEET 1044P	COUNTY	PROJECT NUMBER	SHEET NUMBER

ENGLISHPRECASTCULVERTS.DGN - 1044P - THIS SHEET ISSUED 01-13.

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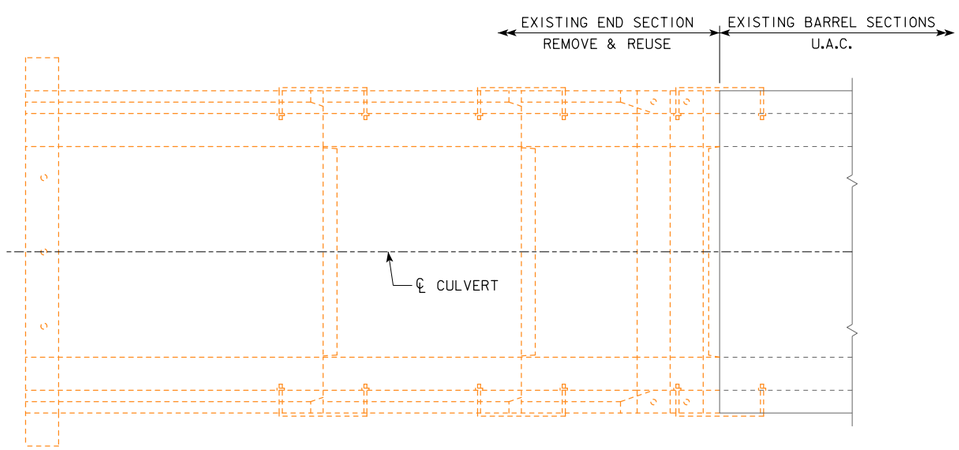
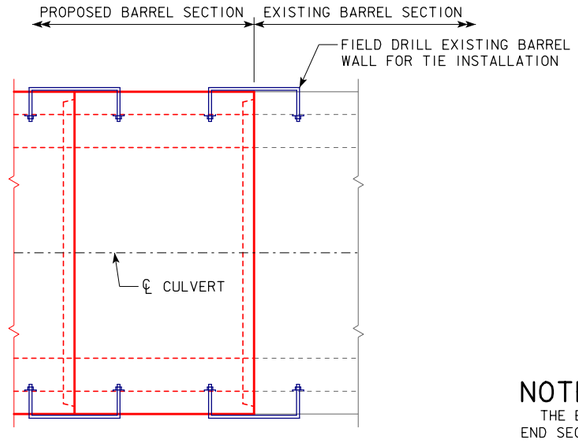
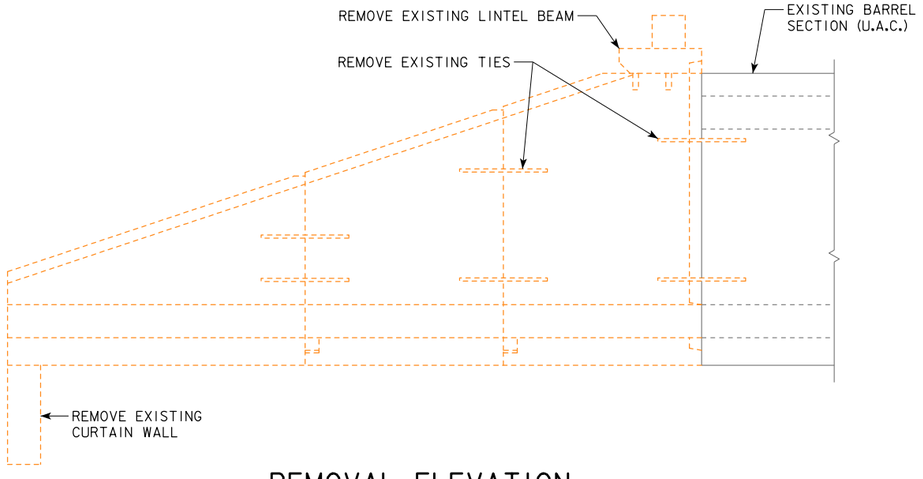


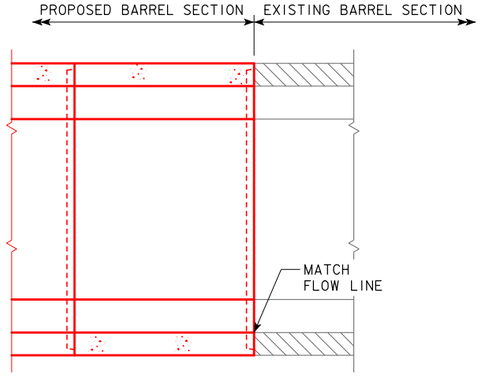
REMOVAL PLAN



PLAN



REMOVAL ELEVATION



PART LONGITUDINAL SECTION
(ALONG ℄ OF CULVERT)

NOTES:

THE EXISTING PRECAST END SECTION SHALL BE DISASSEMBLED. THE END SECTION IS TO BE SEPARATED FROM THE CURTAIN WALL. THE LINTEL BEAM MAY BE SEPARATED FROM THE END SECTION. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO THE END SECTION PIECES, CURTAIN WALL, AND LINTEL BEAM. ANY DAMAGE TO THESE PIECES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED AT NO EXTRA COST TO THE STATE. THE END SECTION PIECES, CURTAIN WALL, AND LINTEL BEAM SHALL BE STORED ON SITE FOR REUSE. SURFACE ON WHICH PIECES ARE STORED SHALL BE SMOOTH, LEVEL AND SOUND. STORAGE AREA SHALL BE APPROVED BY ENGINEER. ALL EXISTING CULVERT TIE ASSEMBLIES THAT ARE REMOVED TO PERMIT REMOVAL OF THE END SECTION PIECES SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL NOT BE REUSED.

CONTRACTOR IS RESPONSIBLE FOR THE METHOD OF LIFTING THE END SECTION PIECES AND INSTALLATION OF ANY LIFTING DEVICES. IF LIFT HOLES ARE DRILLED OR CORED THROUGH THE PIECES, THE CONTRACTOR SHALL FURNISH AND INSTALL LIFTING HOLE PLUGS FOR EACH SECTION. LIFTING HOLES SHALL BE PLUGGED WITH A PRECAST CONCRETE PLUG OR PLASTIC PLUG APPROVED BY THE ENGINEER, SEALED AND COVERED WITH A 2'-0 x 2'-0 PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

THE LAST EXISTING BARREL SECTION WILL BE ATTACHED TO THE FIRST PROPOSED BARREL SECTION WITH ONE TIE PER SIDE. IN ORDER TO ACCOMPLISH THIS, NEW HOLES FOR THE TIES WILL NEED TO BE FIELD DRILLED IN THE LAST EXISTING BARREL SECTION. THE EXISTING TIE HOLES SHALL BE FILLED WITH GROUT.

TIE HOLE LOCATIONS FOR LAST NEW BARREL SECTION SHALL BE COORDINATED WITH EXISTING TIE LOCATIONS IN FIRST END SECTION PIECE.

THE LUMP SUM BID ITEM "REMOVE AND RELAY EXISTING END SECTION" SHALL INCLUDE ALL COSTS ASSOCIATED WITH REMOVING, STORING, AND RELAYING THE EXISTING PRECAST END SECTION, PRECAST CURTAIN WALL, PRECAST LINTEL BEAM, AND NEW BOX TIES AS NOTED AND SHOWN IN THESE PLANS.

EXISTING BUTYL ROPE GASKET OR FABRIC SHALL NOT BE REUSED.

MANUFACTURER SHALL VERIFY THAT THE TONGUE AND GROOVE JOINT OF THE PROPOSED BARREL SECTION WILL ALLOW FOR PROPER CONNECTION TO THE EXISTING JOINT.

PRECAST CULV. EXTEN. DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRECAST EXTENSION OF PRECAST CULVERT DETAILS	STANDARD SHEET 1045P	COUNTY	PROJECT NUMBER	SHEET NUMBER

ENGLISHPRECASTCULVERTS.DGN - 1045P - THIS SHEET ISSUED 01-13.

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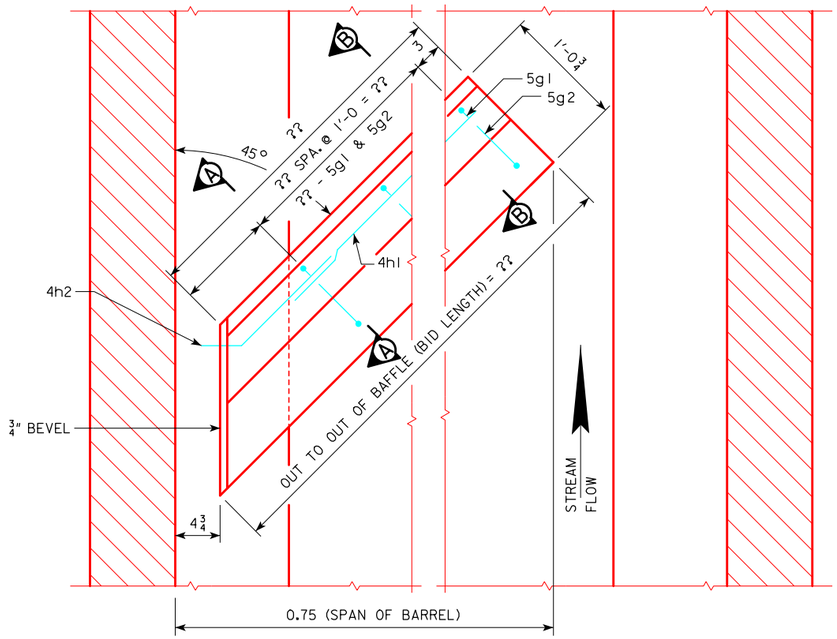
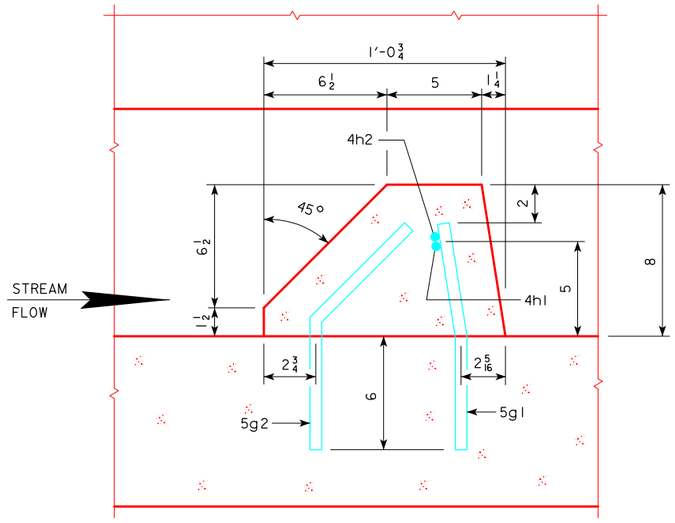
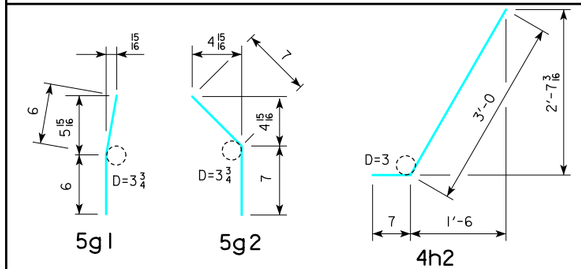


BAFFLE PLAN



SECTION A-A

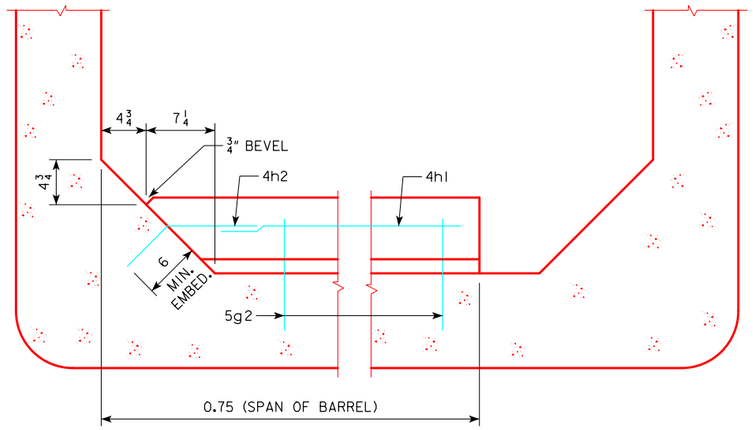
BENT BAR DETAILS



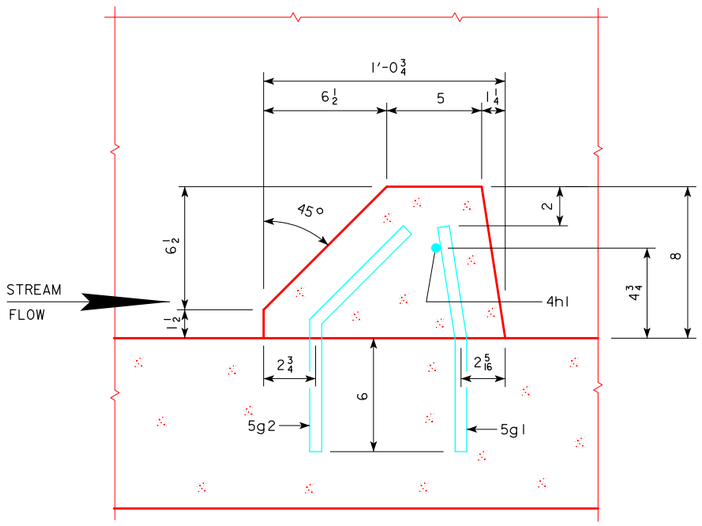
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

BAFFLE NOTES:

1. ?? BAFFLES ARE TO BE PLACED WITHIN THE PRECAST REINFORCED CONCRETE BOX CULVERT SPACED AS SHOWN ELSEWHERE IN THESE PLANS. BAFFLES SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN ON THIS SHEET.
2. CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
3. ALL CONCRETE IS TO BE CLASS C.
4. MINIMUM SPLICE LENGTH FOR THE 4h1 AND 4h2 BARS IS 13".
5. THE 5g1, 5g2 AND 4h2 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 6" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE DOWELS SHALL BE INSTALLED USING A POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.
6. A BONDING AGENT SHOULD BE USED AND THE BONDING OF THE BAFFLES TO THE BARREL FLOOR SHALL BE IN ACCORDANCE WITH ARTICLE 2403.03, I, OF THE STANDARD SPECIFICATIONS.
7. THE BAFFLES ARE TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BAFFLE INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT FOR "BAFFLE OR WEIR FOR REINFORCED CONCRETE BOX CULVERT" BASED ON PLAN QUANTITY. PRICE BID FOR "BAFFLE OR WEIR FOR REINFORCED CONCRETE BOX CULVERT" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO CONSTRUCT THE BAFFLES IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.
8. CROSS SECTIONAL AREA OF THE BAFFLE IS 0.53 SQUARE FEET.



BAFFLE ELEVATION



SECTION B-B

BAFFLE QUANTITIES

ITEM	UNIT	QUANTITY
BAFFLE FOR RCB CULVERT	L.F.	

PRECAST CULV. BAFFLE DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

ENGLISHPRECASTCULVERTS.DGN - 1060P - THIS SHEET ISSUED 01-13.

DESIGN TEAM	PRECAST CULVERT BAFFLE DETAILS	STANDARD SHEET 1060P	COUNTY	PROJECT NUMBER	SHEET NUMBER

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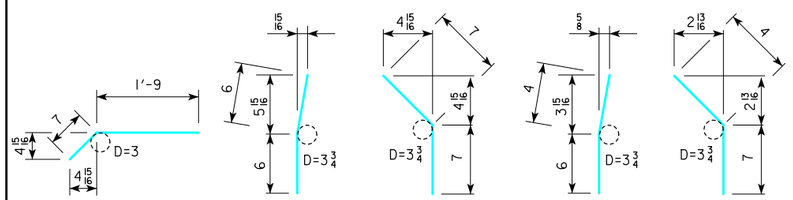
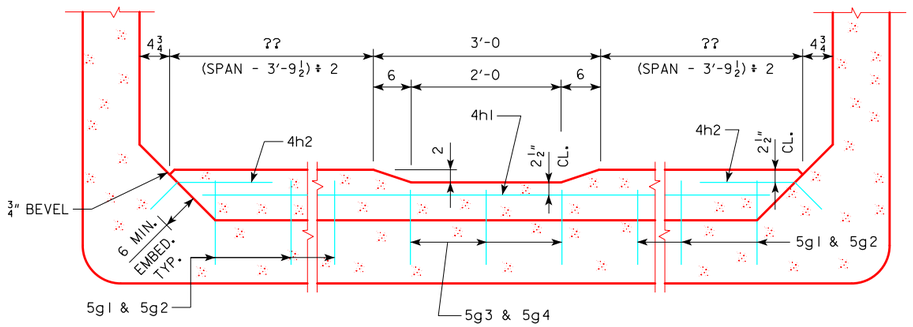
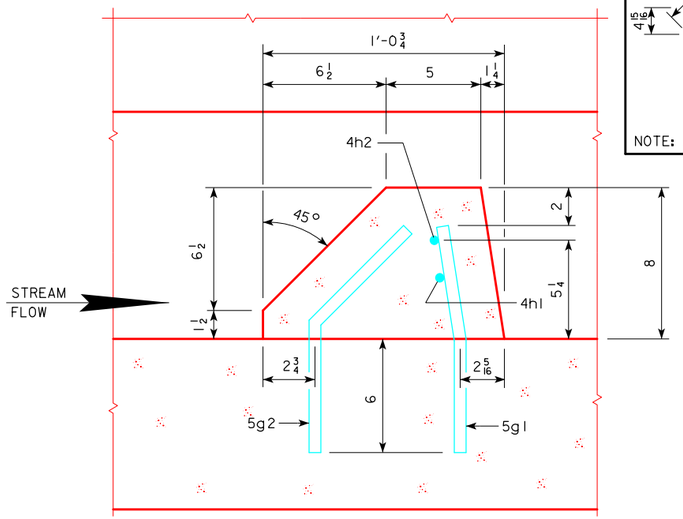
BENT BAR DETAILS



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



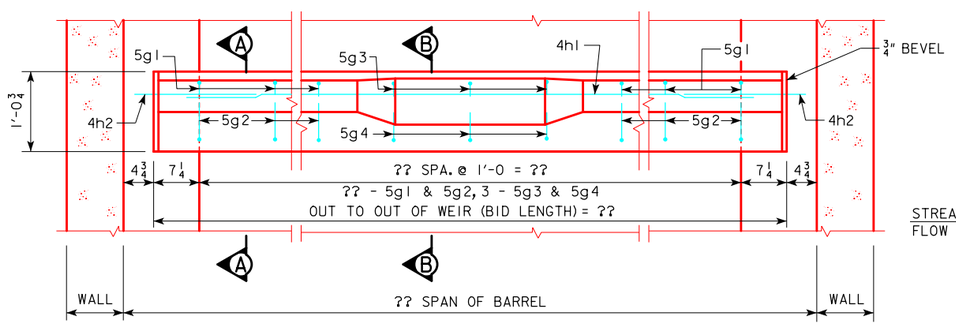
WEIR ELEVATION



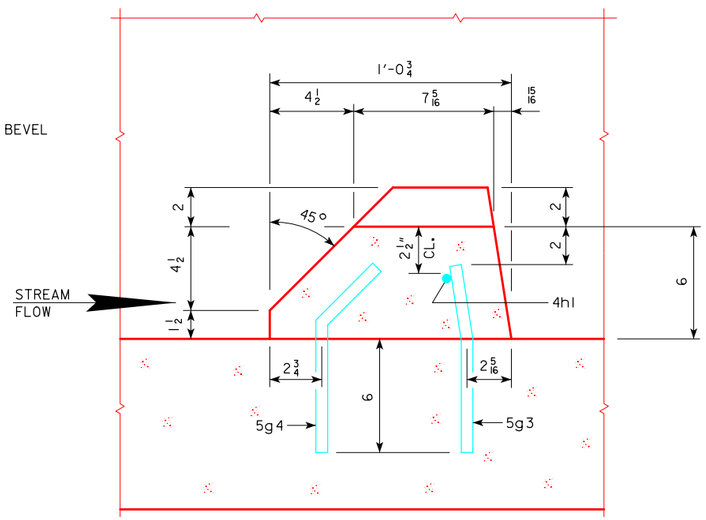
SECTION A-A

WEIR NOTES:

1. ?? WEIRS ARE TO BE PLACED WITHIN THE PRECAST REINFORCED CONCRETE BOX CULVERT SPACED AS SHOWN ELSEWHERE IN THESE PLANS. WEIRS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN ON THIS SHEET.
2. CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
3. ALL CONCRETE IS TO BE CLASS C.
4. MINIMUM SPLICE LENGTH FOR THE 4h1 AND 4h2 BARS IS 13".
5. THE 5g1, 5g2, 5g3, 5g4 AND 4h2 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 6" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE DOWELS SHALL BE INSTALLED USING A POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.
6. A BONDING AGENT SHALL BE USED AND THE BONDING OF THE WEIRS TO THE BARREL FLOOR SHALL BE IN ACCORDANCE WITH ARTICLE 2403.03, I, OF THE STANDARD SPECIFICATIONS.
7. FOR 6' BARREL SPANS THE 4h2 BARS SHALL BE FIELD BENT TO PROVIDE 2" MIN. CLEAR DISTANCE FROM THE TOP OF THE NOTCH.
8. THE WEIRS ARE TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF WEIR INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT FOR "BAFFLE OR WEIR FOR REINFORCED CONCRETE BOX CULVERT" BASED ON PLAN QUANTITY. PRICE BID FOR "BAFFLE OR WEIR FOR REINFORCED CONCRETE BOX CULVERT" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO CONSTRUCT THE WEIRS IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.
9. CROSS SECTIONAL AREA OF THE WEIR IS 0.53 SQUARE FEET.



WEIR PLAN



SECTION B-B

STREAM FLOW

WEIR QUANTITIES

ITEM	UNIT	QUANTITY
WEIR FOR RCB CULVERT	L.F.	

PRECAST CULV. WEIR DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRECAST CULVERT WEIR DETAILS	STANDARD SHEET 1061P	COUNTY	PROJECT NUMBER	SHEET NUMBER

ENGLISHPRECASTCULVERTS.DGN - 1061P - THIS SHEET ISSUED 01-13.

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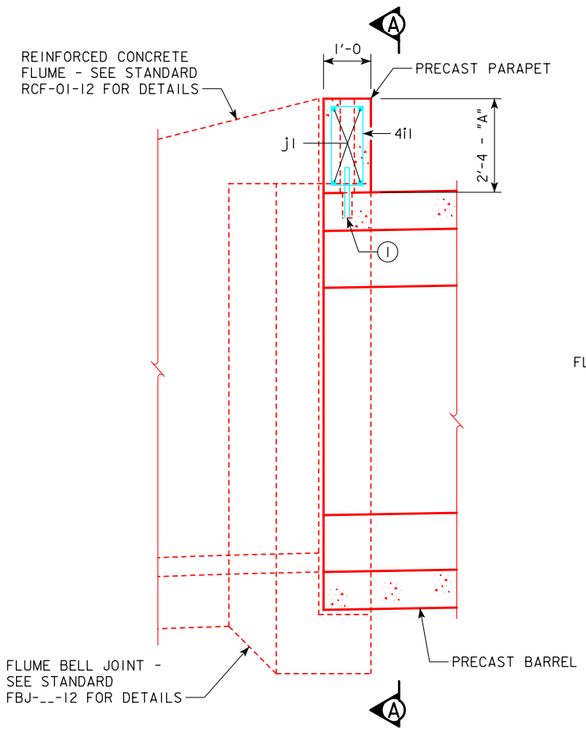
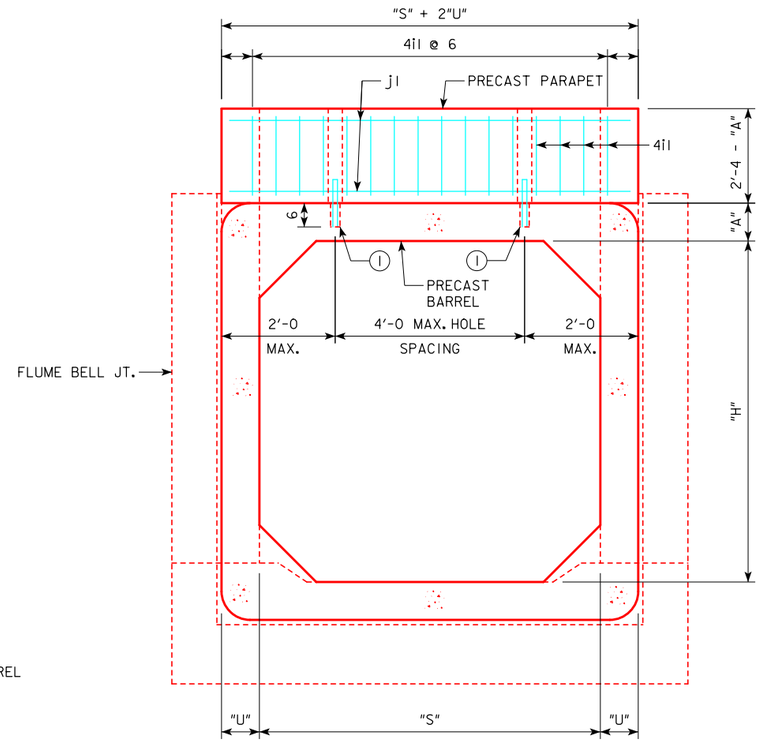


PART ELEVATION

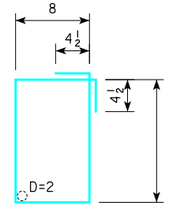


SECTION A-A

REINFORCING BAR LIST-ONE PRECAST PARAPET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4i1	STIRRUP				
j1	LONGIT.		4		
				TOTAL (LBS.)	

BENT BAR DETAILS



4i1

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

NOTES:

(1) PLACE NO. 8 DOWELS, 1'-0 LONG INTO 2 INCH DIA. HOLE IN THE TOP OF THE BARREL AND 3 INCH DIA. HOLE IN THE PRECAST PARAPET. FILL HOLES WITH GROUT.

j1 BAR

SPAN	j1 BAR SIZE
6'	#5
8'	#6
10'	#6
12'	#7

PRECAST PARAPET DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRECAST CULVERT PARAPET DETAILS	STANDARD SHEET 1073P	COUNTY	PROJECT NUMBER	SHEET NUMBER

ENGLISHPRECASTCULVERTS.DGN - 1073P - THIS SHEET ISSUED 01-13.

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING _____ WITH A _____ PRECAST REINFORCED CONCRETE BOX CULVERT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CULVERT CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (ORIGINAL DESIGN NO. _____).

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 PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF ____ FEET.

THE PRECAST R.C.B. BARREL AND END SECTIONS SHALL CONFORM TO IOWA D.O.T. SINGLE PRECAST R.C.B. CULVERT STANDARDS. AT THE CONTRACTOR'S OPTION, PRECAST BARREL SECTIONS MAY CONFORM TO ASTM C1577.

EXCESS CLASS 20 EXCAVATION MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED AT THE CONSTRUCTION SITE, AS DIRECTED BY THE ENGINEER.

THE BID ITEM "REMOVAL OF EXISTING STRUCTURES" SHALL INCLUDE ALL COSTS ASSOCIATED WITH REMOVING THE _____. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE LENGTH IN LINEAR FEET OF PRECAST REINFORCED CONCRETE BOX CULVERT WILL BE BASED ON THE PLAN QUANTITY. FOR THE NUMBER OF LINEAR FEET GIVEN ON THE PLAN, THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER LINEAR FOOT. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, LABOR AND EQUIPMENT NECESSSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "CONCRETE BOX CULVERT STRAIGHT END SECTION", "CLASS 20 EXCAVATION", "CLASS E REVETMENT", AND "GRANULAR BACKFILL".

FOR EACH PRECAST BOX CULVERT STRAIGHT END SECTION INSTALLED THE CONTRACTOR WILL BE PAID THE CONTRACT PRICE PER EACH. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL (INCLUDING LINTEL BEAMS AND CURTAIN WALLS), LABOR AND EQUIPMENT NECESSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "PRECAST CONCRETE BOX CULVERT", "CLASS 20 EXCAVATION", "CLASS E REVETMENT", AND "GRANULAR BACKFILL".

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE I PARAPET SHALL BE PRECAST.

THE CONTRACTOR SHALL FURNISH AND INSTALL CULVERT TIES FOR ALL JOINTS. THE MAIN SECTION JOINTS WILL HAVE ONE TIE ON EACH SIDE OF THE BARREL AND THE LAST BARREL SECTION WILL BE ATTACHED TO THE END SECTIONS WITH TWO TIES PER SIDE. THE END SECTION JOINTS WILL HAVE TWO TIES PER SIDE.

CULVERT TIES SHALL BE INCLUDED IN THE COST FOR PRECAST CONCRETE BOX CULVERT. TIE RODS WILL BE 1 INCH DIAMETER STEEL AND SHALL MEET REQUIREMENTS OF ASTM A709 GRADE 36 OR EQUAL.

CULVERT TIE ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION.

THE LIMITS FOR EXCAVATION FOR THE PRECAST CONCRETE BOX CULVERT SHALL BE AS SHOWN ON THE "GRANULAR BEDDING DETAIL".

A MINIMUM OF 6 INCHES OF GRANULAR MATERIAL WITH A MAXIMUM AGGREGATE SIZE OF $\frac{3}{8}$ INCH SHALL BE USED AS BEDDING FOR THE PRECAST BOX CULVERT. THE BEDDING SHALL BE SHAPED TO A FLAT BASE USING A TEMPLATE. THE 6 INCH GRANULAR BEDDING SHALL BE BID AS GRANULAR BACKFILL.

THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED PRECAST BOX SECTIONS TO THE OFFICE OF BRIDGES AND STRUCTURES FOR ALL PROJECTS. THE DETAILS SHALL INCLUDE THE FOLLOWING INFORMATION AS FOUND ON THE "SUBMITTAL SHOP DRAWING" STANDARD SHEET:

A. A SITUATION PLAN DRAWING SHOWING THE BACK TO BACK PARAPET DIMENSION FOR THE LINE OF THE CULVERT SECTIONS.
B. DIMENSION THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTHS.
C. A DETAIL OF THE PRECAST BARREL SECTIONS SHOWING A CROSS SECTION VIEW OF THE SECTION, STEEL LOCATIONS, DIMENSIONS, ETC.
D. A DETAIL OF THE PRECAST CULVERT END SECTION SHOWING A CROSS SECTION VIEW OF THE SECTIONS, STEEL LOCATIONS, DIMENSIONS, ETC. SIMILAR TO THE END SECTION DETAILS SHOWN IN THE IDOT STANDARDS.

THE CONTRACTOR SHALL PROVIDE ALL INFORMATION SHOWN ON THE SUBMITTAL SHOP DRAWING SHEET REGARDLESS OF WHICH PRECAST BOX OPTION IS SELECTED.

APPROVAL OF DETAILS IS NOT REQUIRED FOR PROJECTS CONFORMING TO "ASTM C1577" AND "IDOT STANDARDS" PRECAST BOX OPTIONS WITH END SECTIONS CONFORMING TO "IDOT STANDARDS." HOWEVER, THE DETAILS SHALL BE RECEIVED BY THE OFFICE OF BRIDGES AND STRUCTURES PRIOR TO THE START OF FABRICATION.

APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST BOX OPTIONS AND "NONSTANDARD" END SECTION OPTIONS. BOXES AND END SECTIONS REQUIRING OPENINGS OR ATTACHMENTS SHALL BE CONSIDERED NONSTANDARD. THE CONTRACTOR SHALL ALLOW THIRTY WORKING DAYS FOR THE ENGINEER'S REVIEW PRIOR TO THE START OF FABRICATION.

DETAILS REQUIRING APPROVAL SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER CURRENTLY REGISTERED IN THE STATE OF IOWA. BOXCAR SOFTWARE VERSION 3.1 OR LATER OR OTHER EQUIVALENT SOFTWARE CAN BE USED TO DESIGN THE PRECAST BOX CULVERT BARREL SECTIONS, PROVIDING THE ANALYSIS MEETS THE MINIMUM REQUIREMENTS ESTABLISHED FOR THE IDOT STANDARDS AS FOUND IN THE IDOT BRIDGE DESIGN MANUAL. THE MINIMUM REQUIREMENTS INCLUDE REINFORCEMENT CLEARANCE REQUIREMENTS USED IN THE "IDOT STANDARDS."

INSTALLATION NOTES:

PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE LAID WITH THE GROOVE END OF EACH SECTION UP-GRADE, AND THE SECTIONS SHALL BE TIGHTLY JOINED. CONCRETE TIES TO BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT. JOINT OPENINGS BETWEEN SECTIONS SHOULD BE AS TIGHT AS PRACTICABLE AND LIMITED TO A MAXIMUM OF $\frac{3}{4}$ INCH OPENINGS. THE JOINT ON THE BOTTOM OF THE CULVERT SHALL BE SEALED WITH A FLEXIBLE WATER TIGHT 1 INCH BUTYL ROPE GASKET AS PER MATERIALS I.M. 491.09.

BUTYL ROPE GASKET SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND SHALL EXTEND VERTICALLY 6 INCHES ABOVE THE BOTTOM FILLET. ALL JOINTS SHALL BE TRIMMED CLEAN ON THE INSIDE AFTER SEALING.

THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT DURING BACKFILLING OPERATIONS. ATTACHMENT METHODS SHALL BE APPROVED BY THE ENGINEER. ALL COSTS INCLUDING MATERIAL AND LABOR ASSOCIATED WITH PROVIDING THE ENGINEERING FABRIC AND INSTALLING IT AS REQUIRED SHALL BE INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST BOX CULVERT STRAIGHT END SECTION". THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

CLASS E REVETMENT WILL BE PLACED AROUND BOTH PRECAST BOX CULVERT END SECTIONS, AS SHOWN IN THESE PLANS.

DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADII OR CHAMFER SHALL BE ACCOMPLISHED WITH A MECHANICAL HAND COMPACTOR.

THE CONTRACTOR SHALL FURNISH AND INSTALL LIFTING HOLE PLUGS FOR EACH SECTION. LIFTING HOLES SHALL BE PLUGGED WITH A PRECAST CONCRETE PLUG OR PLASTIC PLUG APPROVED BY THE ENGINEER, SEALED AND COVERED WITH A 2'-0 x 2'-0 PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

SINCE PRECAST CONCRETE CULVERT END SECTIONS HAVE THE FORESLOPE LOCATED AT THE BOTTOM OF THE PARAPET INSTEAD OF THE TOP (AS IN THE CASE OF CAST IN PLACE RCB CULVERTS) THE MAIN BARREL SECTION HAS BEEN LENGTHENED.

SPECIFICATIONS:

DESIGN:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010.

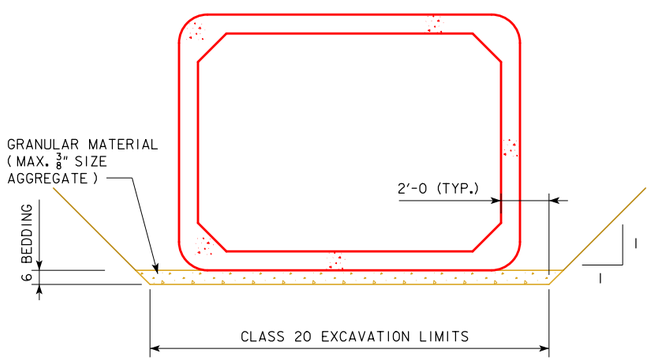
CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT SERIES, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010:
BAR REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
WELDED WIRE REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c FOR BARREL SECTIONS AS NOTED ON CULVERT BARREL DETAIL STANDARDS, FOR END SECTION DESIGN f'c = 5 KSI.

STANDARDS:
FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:

STANDARD	ISSUED	REVISED
**		



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL.

REVISED 12-15 - MODIFIED CLASS 20 EXCAVATION LIMIT FROM 1'-0 OUTSIDE FACE OF BARREL TO 2'-0 FROM INSIDE FACE OF BARREL.
ENGLISHPRECASTCULVERTS.DGN - 1081P - THIS SHEET ISSUED 01-13.

GENERAL NOTES & QUANTITES

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRECAST CULVERT GENERAL NOTES	STANDARD SHEET 1081P	COUNTY	PROJECT NUMBER	SHEET NUMBER

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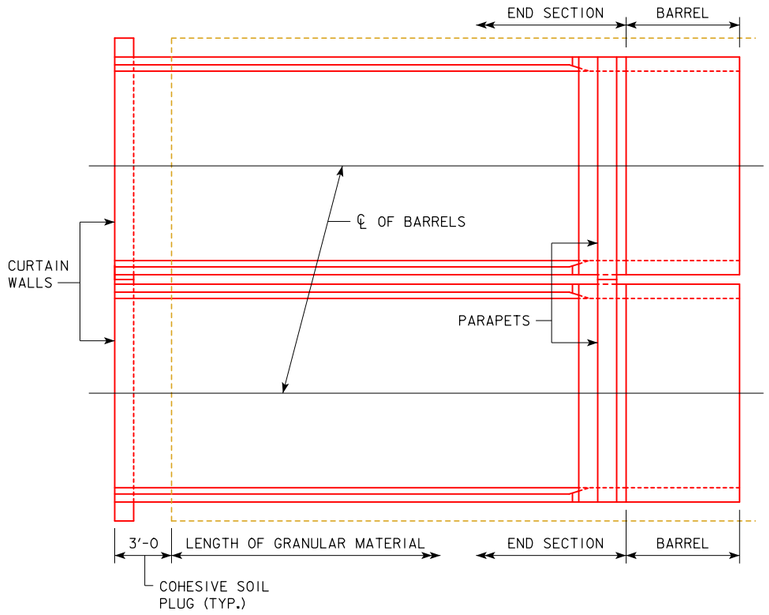
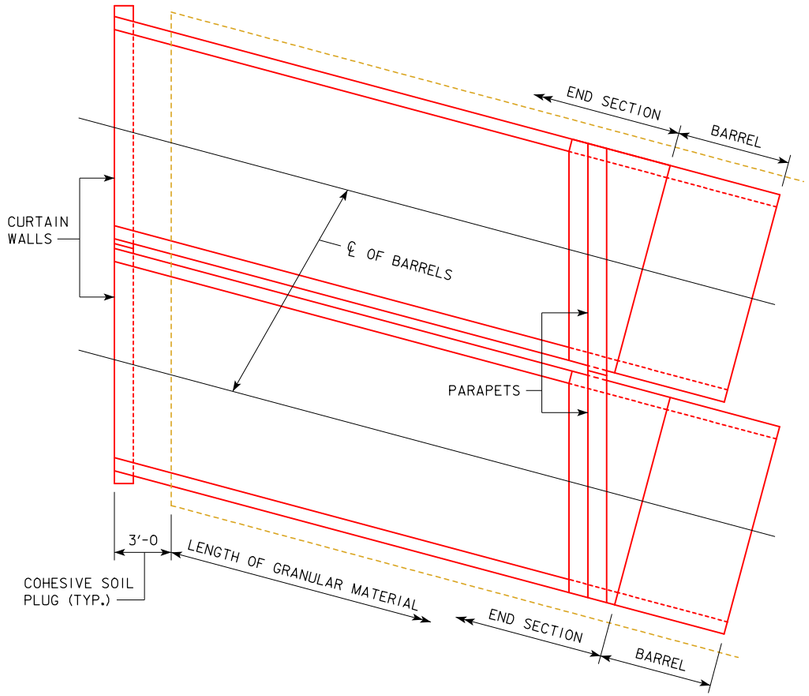
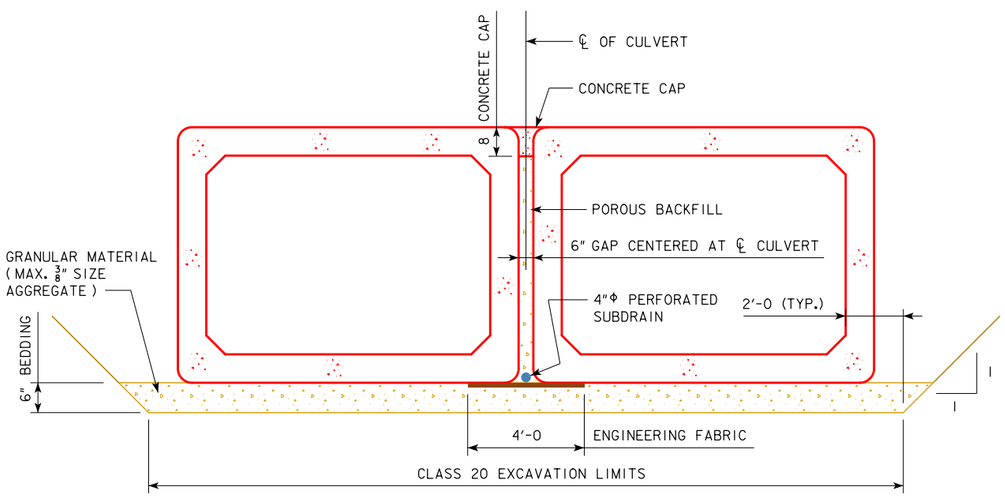


TYPICAL PLAN VIEW - 0° SKEW EXAMPLE



TYPICAL PLAN VIEW - SKEWED EXAMPLE



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL.

GRANULAR BEDDING NOTES:

ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3 OF THE STANDARD SPECIFICATIONS. A 4 FOOT WIDE STRIP OF ENGINEERING FABRIC SHALL BE PLACED ON TOP OF THE GRANULAR BEDDING MATERIAL AND THE COHESIVE SOIL. ENGINEERING FABRIC SHALL BE PLACED THE FULL LENGTH OF THE PRECAST CULVERT. THE ENGINEERING FABRIC SHALL BE CENTERED OVER THE CENTERLINE OF CULVERT BEFORE THE PRECAST CULVERTS ARE PLACED. ALL COSTS INCLUDING MATERIAL AND LABOR ASSOCIATED WITH PROVIDING THE ENGINEERING FABRIC AND INSTALLING IT AS REQUIRED SHALL BE INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST BOX CULVERT STRAIGHT END SECTION".

THE 4" DIAMETER SUBDRAIN SHALL TERMINATE AND BE CAPPED AT THE UPSTREAM END 12 INCHES SHORT OF THE END OF THE APRON OF THE END SECTION. THE SUBDRAIN SHALL OUTLET DOWNSTREAM AT THE END OF THE APRON OF THE END SECTION. THE SUBDRAIN SHALL BE SURROUNDED BY POROUS BACKFILL IN ACCORDANCE WITH SECTION 4131 OF THE STANDARD SPECIFICATIONS. NO COMPACTION OF THE POROUS BACKFILL IS REQUIRED.

POROUS BACKFILL SHALL BE PLACED BETWEEN THE PRECAST BARREL WALLS UP TO 8 INCHES FROM THE TOP OF THE BARREL SLABS. POROUS BACKFILL SHALL ALSO BE PLACED BETWEEN THE END SECTIONS UP TO 8 INCHES FROM THE TOP OF THE WALLS AND 8 INCHES SHORT OF THE END OF THE APRON OF THE END SECTION. THE POROUS BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 4131 OF THE STANDARD SPECIFICATIONS.

A CONCRETE CAP SHALL BE PLACED ON TOP OF THE POROUS BACKFILL BETWEEN THE PRECAST CULVERTS FOR A DEPTH OF 8 INCHES FROM THE TOP OF THE BARREL SLABS, THE TOP OF THE END SECTION WALLS, AND TO A 8 INCH DEPTH AT THE ENDS OF THE APRON OF THE END SECTIONS. THE CONCRETE SHALL BE CLASS C CONCRETE IN ACCORDANCE WITH SECTION 2403 OF THE STANDARD SPECIFICATIONS. THE CONCRETE CAP, APPROXIMATELY 0.03 CU. YDS. PER FOOT, INCLUDING MATERIAL AND LABOR IS INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST BOX CULVERT STRAIGHT END SECTION".

NOTES:

1. DOUBLE WELDED PIPE OR DOUBLE EYE BOLT TYPE TIES ARE REQUIRED FOR THE BARREL WALL ADJACENT TO THE FIRST PRECAST CULVERT STRUCTURE PLACED AT THE SITE TO ALLOW THE TIES TO BE TIGHTENED FROM THE INSIDE OF THE BARREL WALL.
2. THE TYPE I PARAPETS LENGTH SHALL BE INCREASED SO THE ADJOINING ENDS WILL ABUT AGAINST EACH OTHER AT THE CENTERLINE OF CULVERT FOR SIDE-BY-SIDE PRECAST CULVERT STRUCTURES.
3. THE TYPE 3 LINTEL BEAMS AND PARAPETS LENGTH SHALL BE INCREASED SO THE ADJOINING ENDS WILL ABUT AGAINST EACH OTHER AT THE CENTERLINE OF CULVERT FOR SIDE-BY-SIDE PRECAST CULVERT STRUCTURES.
4. THE CURTAIN WALLS LENGTH SHALL BE SHORTENED SO THE ADJOINING ENDS WILL ABUT AGAINST EACH OTHER AT THE CENTERLINE OF CULVERT FOR SIDE-BY-SIDE PRECAST CULVERT STRUCTURES.

GRANULAR BEDDING DETAILS

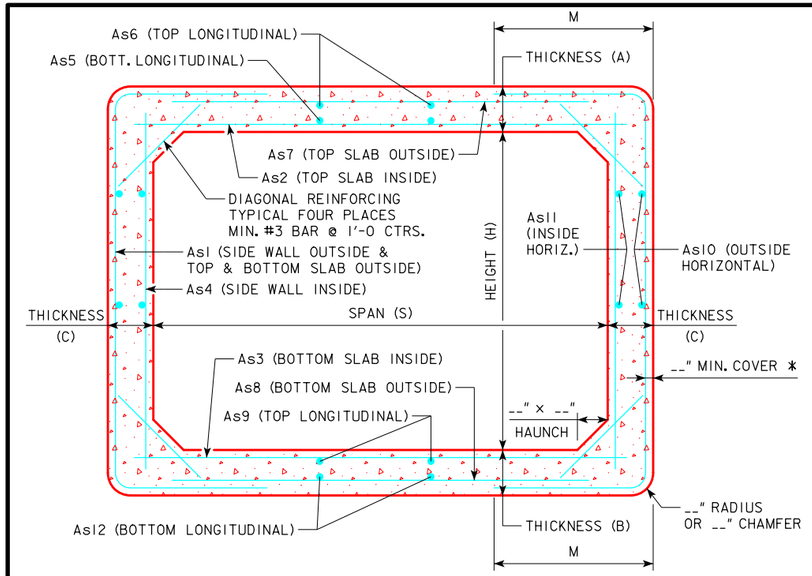
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

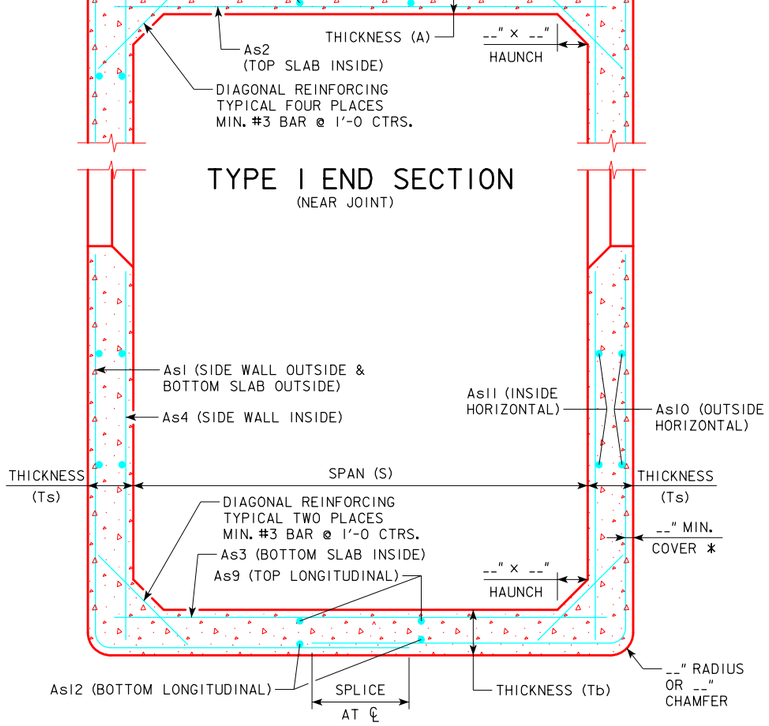
DESIGN TEAM	SIDE-BY-SIDE PRECAST CULVERT DETAILS	STANDARD SHEET 1082P	COUNTY	PROJECT NUMBER	SHEET NUMBER

REVISED 12-15 - MODIFIED CLASS 20 EXCAVATION LIMIT FROM 1'-0 OUTSIDE FACE OF BARREL TO 2'-0 FROM INSIDE FACE OF BARREL.
ENGLISHPRECASTCULVERTS.DGN - 1082P - THIS SHEET ISSUED 02-13.

11/24/2015 10:34:53 AM bkloss W:\Highway\Bridge\Standards\Culverts\LRFD\EnglishPrecastCulverts.dgn 1082P 11x17_pdf.pltcfg



BARREL SECTION



TYPE 1 END SECTION
(NEAR JOINT)

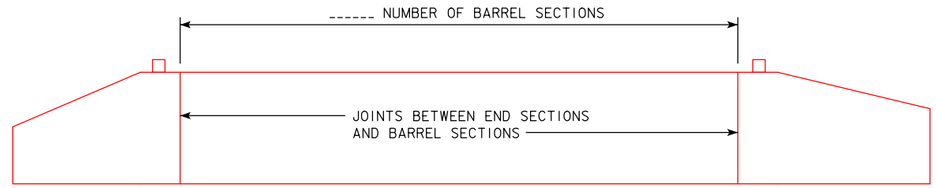
TYPE 1 AND 3 END SECTIONS

LOADING, DESIGN METHODS AND MATERIALS

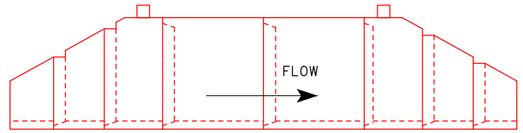
ANY PRECAST BOX CULVERT DESIGNS SUBMITTED, THAT VARY FROM THE ASTM C 1577 OR IDOT STANDARDS, SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER CURRENTLY REGISTERED IN THE STATE OF IOWA. NONSTANDARD DESIGNS SHALL BE BASED ON THE DESIGN CRITERIA USED FOR THE IDOT STANDARDS. MINIMUM LAYING LENGTH SHALL BE 4'-0. MINIMUM CONCRETE STRENGTH, f'c, SHALL BE 5 KSI.

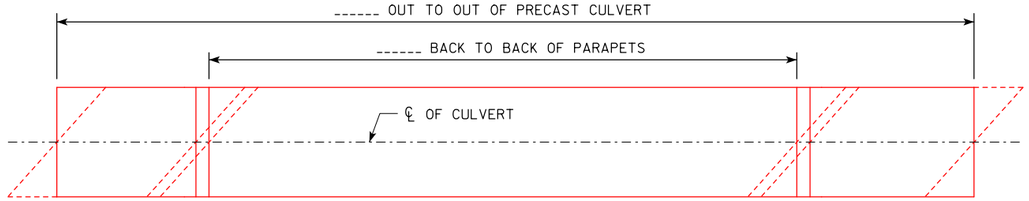
NOTE:
DIMENSION "M" BEGINS AT THE OUTSIDE EDGE OF THE WALL FOR IOWA DOT SINGLE PRECAST R.C.B. CULVERT STANDARDS AND THE BOXCAR DESIGN. THE "M" DIMENSION FOR THE ASTM STANDARDS BEGINS AT THE REINFORCING CLEAR DISTANCE FROM THE OUTSIDE EDGE OF THE WALL.

* USE 1" COVER FOR ASTM DESIGN, 1½" COVER FOR IDOT STANDARD AND NON-STANDARD BOX CAR DESIGN.



ELEVATION VIEW
(SHOW THE NUMBER OF BARREL AND END SECTIONS)





PLAN VIEW FOR BARREL SECTION
(SHOW OVERALL LENGTH AND BACK TO BACK OF PARAPETS)

____ FT. × ___ FT. × _____ FT. CULVERT

BARREL SECTION

DESIGN EARTH COVER, ft	f'c ksi	A in.	B in.	C in.	M in.		As1 L1	As1 L2	As2 L1	As2 L2	As3 L1	As3 L2	As4 L1	As4 L2	As5 L1	As5 L2	As6 L1	As6 L2	As7 L1	As7 L2	As8 L1	As8 L2	As9 L1	As9 L2	As10 L1	As10 L2	As11 L1	As11 L2	As12 L1	As12 L2
						BAR SIZE																								
						SPACING (IN.)																								
						AREA (IN.²/FT.)																								

END SECTION

f'c ksi	Ts in.	Tb in.	A in.		As1 L1	As1 L2	As2 L1	As2 L2	As3 L1	As3 L2	As4 L1	As4 L2	As5 L1	As5 L2	As6 L1	As6 L2	As7 L1	As7 L2	As9 L1	As9 L2	As10 L1	As10 L2	As11 L1	As11 L2	As12 L1	As12 L2	LENGTH OF SPLICE @ ℄
				BAR SIZE																							
				SPACING (IN.)																							
				AREA (IN.²/FT.)																							

PRECAST BOX OPTION - CHECK ONE: ASTM C1577 STANDARD ☐ IDOT STANDARD ☐ NON-STANDARD ☐
END SECTION TYPE - CHECK ONE: TYPE 1 ☐ TYPE 3 ☐
REINFORCEMENT TYPE - CHECK ONE: PLAIN WWR (65 ksi) ☐ DEFORMED WWR (70 ksi) ☐
ASTM STANDARD REINFORCING BARS (60 ksi) ☐

	PRECAST CULVERT DESIGN METHOD DETAILS	SUBMITTAL SHOP DRAWING SHEET	COUNTY	PROJECT NUMBER

ENGLISHPRECASTCULVERTS.DGN - SHOP DRAWING - THIS SHEET ISSUED 01-13.