

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: February 21, 2012
Date of Addendum: February 7, 2012

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
101	07-8155-711	PCC PAVEMENT - GRADE & REPLACE	BLACK HAWK	STP-U-8155(711)--70-07	21FEB101.A01

Notice: Only the bid proposal holders receive this addendum and responsibility for notifying any potential subcontractors or suppliers remains with the proposal holder.

Make the following changes to the plan:

Plan Sheet C.02, Tabulation 100-4A, Item Code 2510-6745850, Add the following:
The pavement is a seal coat with a general depth of 6-8”.

Plan Sheet C.03, Tabulation 100-4A, Item No. 9:
Change Item Code from:
2301-1033080
To:
2301-1032080

Change the Description from:
STANDARD OR SLIP FORM PORTLAND CEMENT CONCRETE
PAVEMENT, CLASS C, CLASS 3 DURABILITY, 8 IN.
To:
STANDARD OR SLIP FORM PORTLAND CEMENT CONCRETE
PAVEMENT, CLASS C, CLASS 2 DURABILITY, 8 IN.

Plan Sheet C.04, Tabulation 110-1, Delete the following:
Refer to Tabulation 102-5

Plan Sheets V.01-V.04:
Replace Plan Sheets V.01-V.04 with attached Plan Sheets V.01-V.04.

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A DUAL 10'x5'x155'-8" PRECAST REINFORCED CONCRETE BOX CULVERT. THESE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE IN THE CONSTRUCTION STARTING DATE. NOTIFIED BY THE CONTRACTOR ON THE CONSTRUCTION STARTING DATE. THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS $\frac{5}{8}$ 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

PRE-CONSTRUCTION NOTES:

THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED PRECAST BOX SECTIONS TO THE OFFICE OF BRIDGES & STRUCTURES FOR APPROVAL. THE DETAILS SHALL INCLUDE THE FOLLOWING:

- A SITUATION PLAN DRAWING SHOWING THE BACK TO BACK PARAPET DIMENSION FOR THE LINE OF THE CULVERT SECTIONS. INCLUDE THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTH.
- A DETAIL OF THE PRECAST CULVERT BARREL SECTIONS SHOWING A CROSS SECTION VIEW OF THE SECTION, STEEL LOCATIONS, DIMENSIONS, ETC.
- A CROSS SECTION VIEW OF THE SECTIONS, STEEL LOCATIONS, DIMENSIONS, ETC., SIMILAR TO THE END SECTION DETAILS.

EXAMPLE BARREL END SECTION SUBMITTAL SHOP DRAWING SHEETS ARE AVAILABLE AT THE IOWA DOT BRIDGE WEB SITE AT

<http://www.iowadot.gov/bridge/v8precaststd.htm>

THE CONTRACTOR SHALL ALLOW THIRTY WORKING DAYS FOR THE ENGINEER'S REVIEW. THE NEAR FEET OF PRECAST CONCRETE BOX CULVERT SHALL BE BASED ON THE PLAN QUANTITY FOR THE NUMBER OF LINEAR FEET BEING 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 NECESSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "CONCRETE BOX CULVERT STRAIGHT END SECTION", "CLASS 20 EXCAVATION", "CLASS E REVESTMENT", AND "GRANULAR BACKFILL". 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 REVESTMENT", AND "GRANULAR BACKFILL". THE LINTEL BEAM 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. THE JOINTS WILL BE BUILT TO MEET THE STEEL AND SHALL MEET REQUIREMENTS OF ASTM A 109 GRADE 36 OR EQUAL. THE ASSEMBLIES SHALL BE GALVANIZED OR PAINTED ACCORDING TO ARTICLE 2408.02 Q, OF THE STANDARD SPECIFICATIONS. THE LIMITS FOR EXCAVATION FOR THE PRECAST CONCRETE BOX CULVERT SHALL BE AS SHOWN ON THE GRANULAR BEDDING DETAIL. THE GRANULAR BEDDING DETAIL SHALL BE USED FOR ALL 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.

INSTALLATION NOTES:

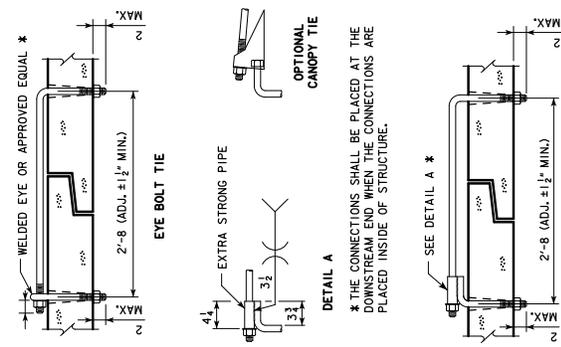
PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE LAID WITH THE GROVE END OF EACH SECTION UP-GRADE, AND THE SECTIONS SHALL BE SET ON A GRANULAR BEDDING. THE JOINTS BETWEEN SECTIONS SHOULD BE AS TIGHT AS PRACTICABLE AND LIMITED TO A MAXIMUM OF 3 INCH OPENINGS. THE JOINT ON THE BOTTOM OF THE CULVERT SHALL 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 INCH ABOVE THE BOTTOM OF ALL JOINTS. THE CONTRACTOR SHALL ALSO 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 WITH ENGINEER. ALL JOINTS INCLUDING MATERIAL SHALL BE PROTECTED WITH PROTECTIVE FABRIC AND INSTALLED 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. DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADIUS 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, SEALED AND COVERED WITH MASTIC OR MORTAR.

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 RC BOX CULVERTS) THE MAIN BARREL SECTION HAS BEEN LENGTHENED.

DESIGN REQUIREMENTS:

THE PRECAST CULVERT SECTIONS SHALL MEET THE MINIMUM REQUIREMENTS OF THE CODES AND SECTIONS THAT ARE DESIGNED FOR COMBINED EARTH DEAD LOAD AND AASHTO HS-20 LIVE LOAD CONDITIONS.

ANY PRECAST BOX CULVERT DESIGNS SUBMITTED, THAT VARY FROM THE ASTM C1433 STANDARD, SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER, CURRENTLY REGISTERED IN THE STATE OF IOWA. BOX-CULVERT SECTION 2.0 OR LATER CAN BE USED TO DESIGN STRENGTH BOX CULVERT BARREL SECTIONS PROVIDING THE ANALYSIS MEETS THE MINIMUM REQUIREMENTS OF ASTM C1433. MINIMUM LENGTH OF PRECAST SECTIONS SHALL BE 4.0 FEET. MINIMUM CULVERT WALL THICKNESS SHALL BE 8 INCHES. REINFORCING CLEAR COVER SHALL BE 1 INCH MINIMUM AND 1 1/2 INCHES MAXIMUM FOR THE BARREL SECTIONS, AND 1 INCHES MINIMUM AND 1 1/2 INCHES MAXIMUM FOR THE END SECTIONS.

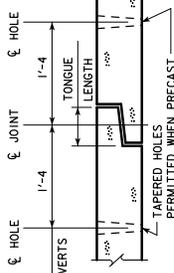


WELDED PIPE TIE

APPROVED CONCRETE BOX TIES

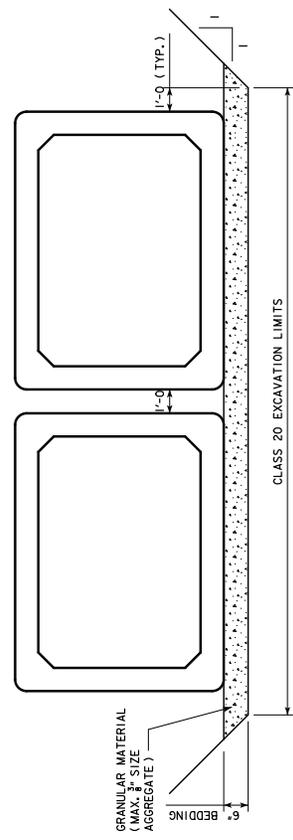
DRAWING APPROVAL:
ALL SHOP DRAWINGS AND FALSEWORK DRAWINGS THAT REQUIRE APPROVAL SHALL BE APPROVED BY KIRKHAM MICHAEL.
ADDRESS:
11021 AURORA AVENUE
URBANDALE, IA 50322
(515) 270-0848
(515) 270-1061 FAX

THESE SHOP DRAWINGS SHALL NOT BE SENT TO IOWA D.O.T. OFFICE OF BRIDGE AND STRUCTURES.



TYPICAL TIE LAYOUT

HOLES SHALL BE CAST OR DRILLED 1'-4 FROM CENTERLINE OF JOINTS FOR BOX CULVERTS, AS SHOWN ABOVE, UNLESS FORMS ARE SET UP FOR 1'-4 SPACING FROM OUTSIDE OF JOINT.



GRANULAR BEDDING DETAIL

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

DUAL 10' x 5' x 155'-8 PRECAST REINFORCED CONCRETE BOX CULVERT NOTES AND BOX TIE DETAILS
(WITH 45° SKEWED END SECTIONS)

BLACK HAWK COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 4 FILE NO. STP-19-8155(11)-70-01

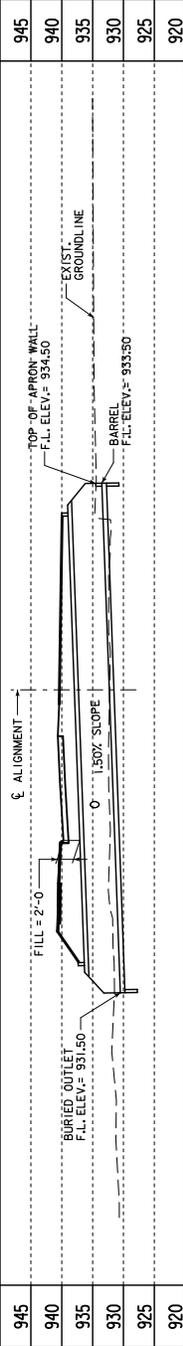
PROJECT NUMBER: BLACK HAWK COUNTY
CITY OF WATERLOO
ENGLISH
MODIFIED STANDARD SHEET 1081

DESIGN NUMBER: V.01

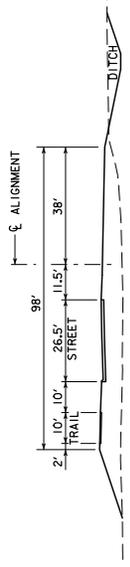
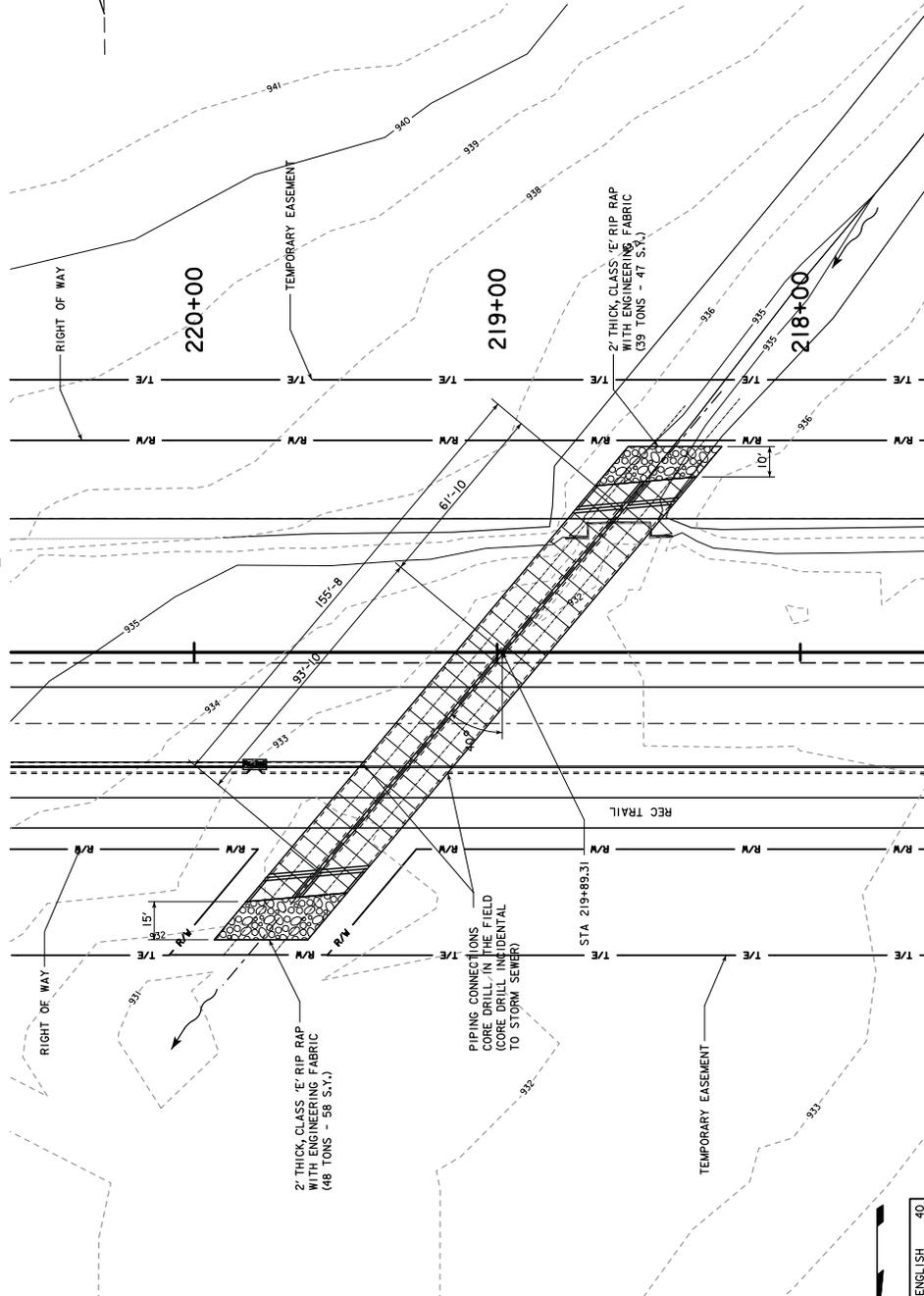
DESIGN TEAM: KIRKHAM MICHAEL
gschall@kmi.com H:\0611635 Waterloo Shulte Road\Design\Phase 2\Design\Plans\Ver081635.p02_V1.sheets.dgn

945	945
940	940
935	935
930	930
925	925
920	920

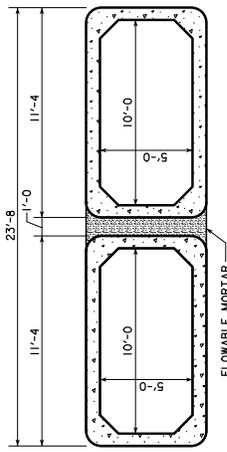
NOTES:
 STORM SEWER PIPE AND PAVEMENT SUBDRAINS SHALL BE FIELD CORE DRILLED INTO THE PROPOSED PRECAST BOX CULVERT



LONGITUDINAL SECTION ALONG CL OF CULVERT



TYPICAL APPROACH SECTION



TYPICAL DUAL 10' x 5' PRECAST CULVERT SECTION

DESIGN FOR 40° SKEW LT. AHEAD
DUAL 10' x 5' x 155'-8' PRECAST REINFORCED CONCRETE BOX CULVERT SITUATION PLAN
 (WITH 45° SKEWED END SECTIONS)
BLACK HAWK COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 4 FILE NO. _____
 PROJECT NUMBER STP-15-8155(11)-70-01 SHEET NUMBER **V.02**

DESIGN TEAM: KIRKHAM MICHAEL
 PROJECT NUMBER: STP-15-8155(11)-70-01
 CITY OF WATERLOO
 BLACK HAWK COUNTY
 ENGLISH
 SCALE IN FEET
 12/9/2011

NOTES:

- 1. PRECAST BOX CULVERT END SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH BARREL DETAILS, EXCEPT AS MODIFIED BELOW.
- 2. REINFORCING FOR PRECAST END SECTIONS: REINFORCING FOR PRECAST END SECTIONS AND CURTAIN WALLS SHALL BE WELDED WIRE FABRIC (WWF) MEETING THE REQUIREMENTS OF ASTM A497. THE MINIMUM CONCRETE COVER OVER THE REINFORCING SHALL BE 3 TIMES THE NOMINAL DIA. OF THE BAR, BUT SHALL NOT BE LESS THAN 1.25 INCHES OR GREATER THAN 1.5 INCHES.
- 3. 15°, 10 1/2°, 30°, 1 1/2°, & 45° CULVERT TIES ARE TO BE 1/2" DIA. RODS.
- 4. FOR SKEW ANGLES OVER 7°30' UP TO 22°30', USE A 15° SKEW END SECTION. FOR SKEW ANGLES OVER 22°30' UP TO 37°30', USE A 30° SKEW END SECTION. FOR SKEW ANGLES OVER 37°30' UP TO 45°, USE A 45° SKEW END SECTION.
- 5. 2" INCH DIAMETER HOLES, 6" INCH DEEP INTO TOP OF WALL. WALLS SHALL BE GROUTED WITH 1:2 PARTS PORTLAND CEMENT AND 2 PARTS SAND. USE AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES.
- 6. THICKNESS OF BOTTOM, TD, SHALL MATCH THAT OF BARREL SECTIONS.
- 7. END OF WALL MAY BE CUT SQUARE AS SHOWN OR FOLLOW THE SKEW.
- 8. JOINT DETAIL SHOULD TERMINATE AT HAUNCH.
- 9. FOR THE FIRST SECTION ADJACENT TO THE BARREL, SEE AS4 TABLE

LENGTH L

RISE R (FT.)	45° SKEW
5	16'-5"

L - BASED ON 3% FORESLOPE NORMAL TO C OF ROADWAY.

LENGTH LL

SPAN S (FT.)	45° SKEW
10	8'-6"

LENGTH N

SPAN S (FT.)	45° SKEW
10	13'-6"

LENGTH P

SPAN S (FT.)	45° SKEW
10	5'-8"

As3 REINF. TABLE

SPAN S (FT.)	SECTION HT. H (FT.)	BOT. SLAB THICKNESS (IN)	REQUIRED As3 (IN ² /FT.)
10	8	9	10
	5	9	10
		10	12
		12	12

NOTE: H IS THE LARGEST VERTICAL DIMENSION OF THE SECTION.

AH REINF. TABLE (IN²/FT.)

HEIGHT H (FT.)	AH
6 OR LESS	45° SKEW
	0.192

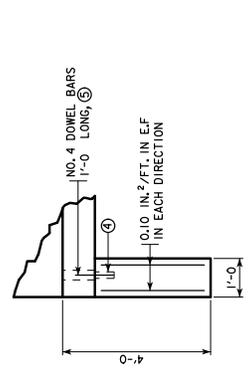
NOTE: THE ABOVE AH AREAS MAY NEED TO BE INCREASED TO MEET MINIMUM STEEL AREA REQUIREMENTS AS SHOWN BELOW:
 FOR TD = 12", AH (MIN) = 0.280
 FOR TD = 10", AH (MIN) = 0.280
 H IS THE LARGEST VERTICAL DIMENSION OF THE SECTION

As4 REINF. TABLE (IN²/FT.)

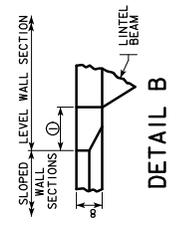
HEIGHT H (FT.)	As4
6 OR LESS	45° SKEW
	0.192

NOTE: AS4 IS INSIDE FACE WALL STEEL FOR THE 1ST SECTION ADJACENT TO THE BARREL ONLY. H IS THE LARGEST VERTICAL DIMENSION OF THE SECTION.

NOTE: DIMENSIONS SHOWN IN TABLES ARE ROUNDED TO THE NEAREST WHOLE INCH.



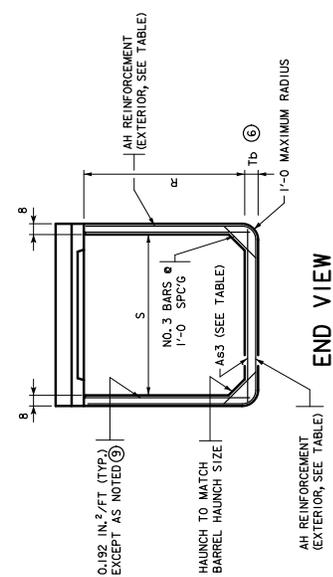
SECTION A-A



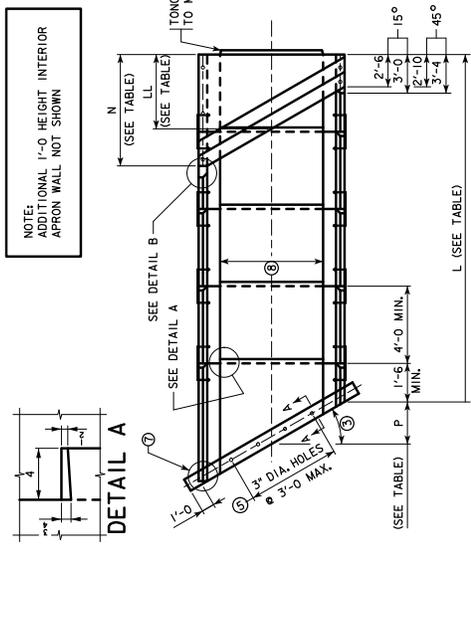
DETAIL B



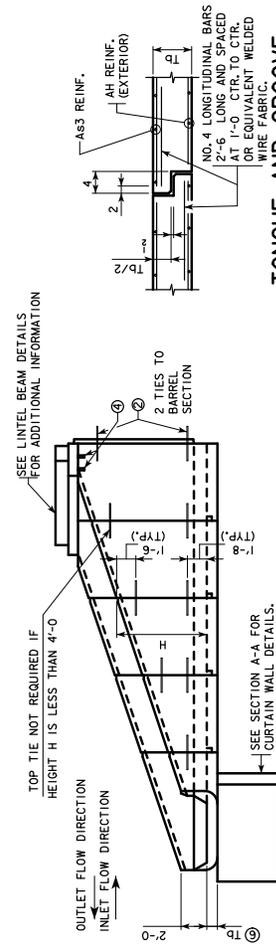
FABRIC LAYER DETAIL



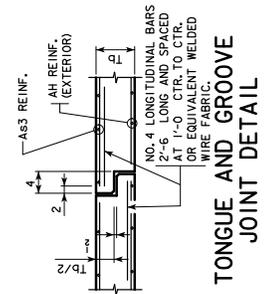
END VIEW



PLAN VIEW



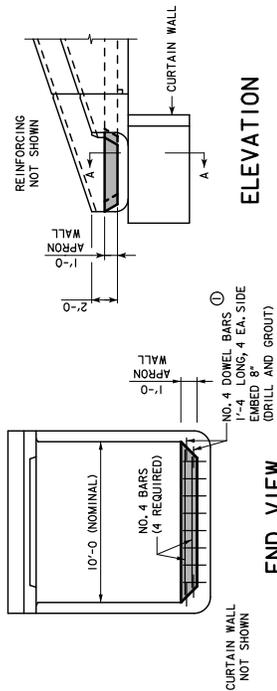
ELEVATION



TONGUE AND GROOVE JOINT DETAIL

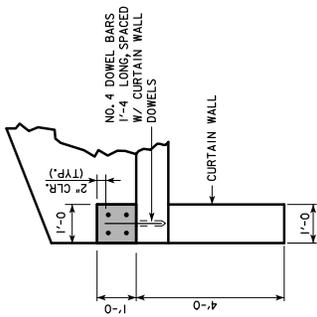
DESIGN FOR 40° SKEW LT. AHEAD
DUAL 10' x 5' x 155'-8 PRECAST REINFORCED CONCRETE BOX CULVERT END SECTION DETAILS (WITH 45° SKEWED END SECTIONS)
BLACK HAWK COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 3 OF 4 FILE NO. _____ SHEET NUMBER **V.03**

**INLET INTERIOR APRON WALL DETAILS
(CAST-IN PLACE)**



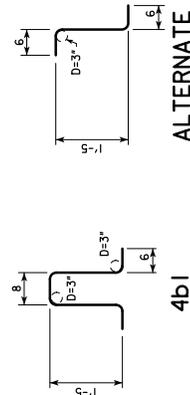
① FILL HOLES(S) WITH POLYMER GROUT.

NOTES
 BID ITEM "PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 5 FT." INCLUDES ALL COSTS FOR LABOR, EQUIPMENT, AND MATERIALS TO INSTALL INTERIOR APRON WALL AS DETAILED IN THE PLANS.
 ALL REINFORCING STEEL SHALL BE SECURELY WIRED IN PLACE BEFORE CONCRETE IS PLACED
 ALL EXPOSED CORNERS 90 DEGREES OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELLED STRIP.
 DESIGN STRESSES:
 CONCRETE SECTION 8 $f'_c = 3,500$ PSI
 REINFORCING STEEL SECTION 8
 ASTM A615 GRADE 60, $f_s = 24,000$ PSI
 POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.



SECTION A-A

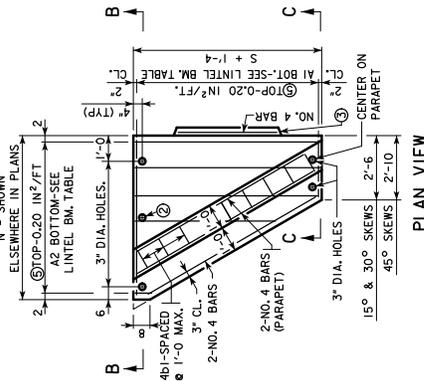
BENT BAR DETAILS



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

NOTES:

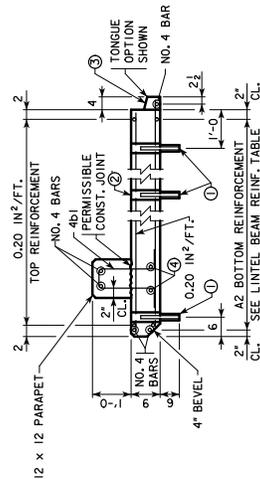
- PRECAST LINTEL BEAMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH PRECAST BARREL AND END SECTION DETAILS AND NOTES, EXCEPT AS MODIFIED BELOW.
- REINFORCING FOR PRECAST LINTELS AND PARAPETS SHALL BE EITHER WELDED WIRE FABRIC (WWF) MEETING THE REQUIREMENTS OF ASTM A185 (65 KSI) OR ASTM A497 OR REINFORCING BARS MEETING THE REQUIREMENTS OF ASTM A615 (60 KSI). WIRE SPACING FOR WWF SHALL NOT EXCEED 2 INCHES FOR PRIMARY STEEL AND 8 INCHES FOR DISTRIBUTION STEEL.
- STRUCTURAL STEEL PER ASTM A 709, GRADE 36.
- ① PLACE NO. 8 DOWEL, 1'-0 LONG INTO 2 INCH DIA. HOLE IN THE TOP OF THE WALL SECTION AND 3 INCH DIA. HOLE IN THE LINTEL BEAM. FILL HOLES WITH GROUT.
- ② CAST ADDITIONAL 3 INCH HOLES TO MAINTAIN A 4 FOOT MAXIMUM HOLE SPACING
- ③ CHECK THE LOCATION TO DETERMINE WHETHER A TONGUE OR A GROOVE IS USED. TONGUE AND GROOVE TO TERMINATE AT CULVERT RADIUS.
- ④ SEE PARAPET REINFORCEMENT TABLE BELOW.
- ⑤ AREAS SHOWN ARE FOR WELDED WIRE FABRIC. IF REBAR IS USED, #4 AT A MAX. OF 11 INCH SPACING SHOULD BE USED.



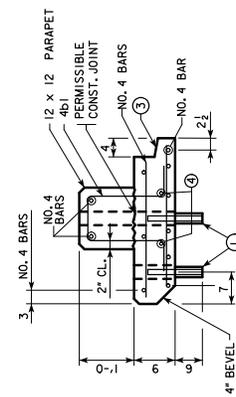
PLAN VIEW

LINTEL BEAM REINFORCEMENT TABLE		
SPAN S (FT.)	BOTTOM REINFORCEMENT	
	WWF OPTION	REBAR OPTION
10	A1 (IN²/FT.)	A2 (IN²/FT.)
	0.471	0.591
	#7 @ 12	#7 @ 6

PARAPET REINF. TABLE	
SPAN S (FT.)	45° SKEW
10	3 * #8



SECTION B-B



**SECTION C-C
(TONGUE OPTION SHOWN)**

**SKewed LINTEL BEAM
(FOR SKEWS OF 1°30' TO 45°)**

DESIGN FOR 40° SKEW LT. AHEAD
DUAL 10' x 5' x 155'-8 PRECAST REINFORCED CONCRETE BOX CULVERT LINTEL BEAM DETAILS
 (WITH 45° SKEWED END SECTIONS)
BLACK HAWK COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 4 OF 4 FILE NO. _____ SHEET NUMBER **V.04**