

Proj. No.: BROS-C040(119)--8J-40
Letting Date: June 16th, 2026

HAMILTON COUNTY
RCB CULVERT REPLACEMENT -
TWIN BOX

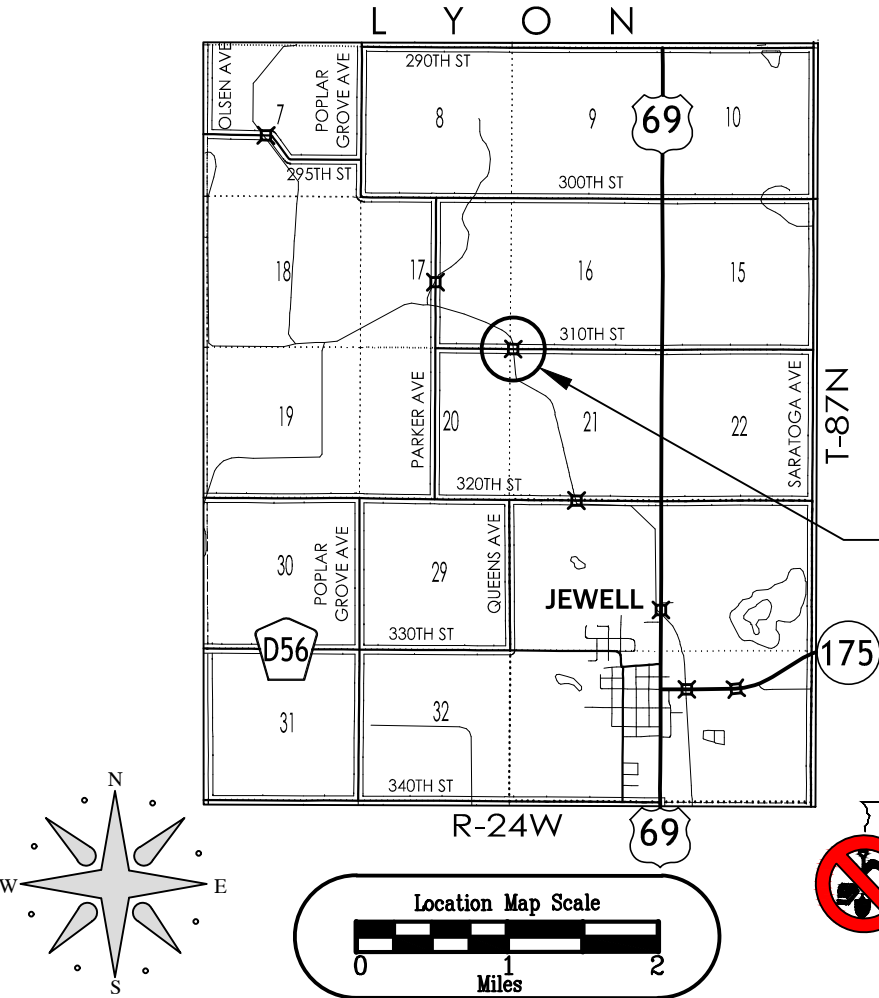
PROJECT LENGTH SUMMARY		
Location	Lin. Ft.	Miles
1+00 - 5+50	450	0.09
Total:	450	0.09

STANDARD ROAD PLANS					
(The following Standard Plans shall be considered applicable to construction work on this project)					
Identification	Date	Identification	Date	Identification	Date
EW-402	04/18/17				
TC-252	10/21/25				
DR-305	04/19/22				

STANDARD PRECAST BOX CULVERT PLANS					
(The following plans shall be considered applicable to construction work on this project)					
Standard	Issued	Revised	Standard	Issued	Revised
PRCB G1-20	12/2020				
PRCB G2-20	01/2023				

SHOP DRAWINGS

Any Shop Drawing required shall be submitted to the Hamilton County Engineer's Office:
2300 Superior Street, Suite 4
Webster City, IA 50595
Office: (515) 832-9520
Fax: (515) 832-9525
Email: rweidemann@hamiltoncounty.org



STA: 3+22.56
Construct Twin
14' x 16' x 52' RCB
County No: L23.1
FHWA No: 171340



IOWA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
PLANS OF PROPOSED IMPROVEMENT ON THE
SECONDARY ROAD SYSTEM
HAMILTON COUNTY
RCB CULVERT REPLACEMENT - TWIN BOX
PROJECT NO.:
BROS-C040(119)--8J-40
On 310th Street, Over Main Branch of Mud Lake DD #71, NW S21-T87-R24
Refer to the Proposal Form for list of applicable specifications.

PROJECT TRAFFIC CONTROL PLAN

This road will be closed to through vehicular and pedestrian traffic during construction. Local traffic to adjacent properties will be maintained as provided for in article 1107.08 of the current standard specifications plus current supplemental specifications. Traffic control devices, procedures, and layouts shall conform to the "Manual of Uniform Traffic Control Devices" as adopted by the department per 761 of the Iowa Administrative Code (IAC) Chapter 130.

Section 404 Permit and Conditions

Construct this project according to the requirements of U.S. Army Corps of Engineers Nationwide Permit No 14. A copy of this permit is available from the Iowa DOT website (<http://www.envpermits.iowadot.gov/>). The Army Corps of Engineers reserves the right to visit the site without prior notice.

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INDEX OF SHEETS	
SHEET	CONTENT
A.1	Title Sheet
B.1	Estimated Quantities & Reference Information
C.1,2	Typical Cross Sections, Details, & Tabulations
D.1,2	Situation Plan, Plan & Profile
U.1	Precast Culvert Standard 1081P Modified

APPROVED

RICK YOUNG, CHAIRMAN

APRIL ELY

MARY CLAUSEN
BOARD OF SUPERVISORS

2/24/26

COUNTY ENGINEER DATE

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.

Ryan J. Weidemann
Date: 2/24/26 License #: 21150
My licence renewal date is December 31, 2027
Pages or sheets covered by this seal: A.1 - U.1

ESTIMATED PROJECT QUANTITIES				
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL
1	2102-2625000	EMBANKMENT-IN-PLACE	CY	733.0
2	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1.00
3	2402-0425031	GRANULAR BACKFILL	TON	227.07
4	2402-2720000	EXCAVATION, CLASS 20	CY	1452.0
5	2403-0100000	STRUCTURAL CONCRETE (MISCELLANEOUS)	CY	45.0
6	2415-2100000	PRECAST CONCRETE BOX CULVERT, 14 FT. X 16 FT.	LF	104.0
7	2415-2200000	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 14 FT. X 16 FT.	EACH	4
8	2417-1040018	CULVERT, CORRUGATED METAL ENTRANCE PIPE, 18 IN. DIA	LF	340.0
9	2418-0000010	TEMPORARY STREAM DIVERSION	EACH	1.00
10	2502-8215112	SUBDRAIN, CORRUGATED METAL PIPE, 12 IN. DIA	LF	95.00
11	2507-3250005	ENGINEERING FABRIC	SY	82.40
12	2507-6800061	REVETMENT, CLASS E	TON	176.40
13	2528-2518000	SAFETY CLOSURE	EACH	2
14	2528-8445110	TRAFFIC CONTROL	LS	1.00
15	2533-4980005	MOBILIZATION	LS	1.00
16	2602-0000312	PERIMETER AND SEDIMENT CONTROL DEVICE, 12 IN. DIA	LF	450.0

ESTIMATE REFERENCE INFORMATION					
ITEM NO.	ITEM CODE	DESCRIPTION	ITEM NO.	ITEM CODE	DESCRIPTION
1	2102-2625000	EMBANKMENT-IN-PLACE EXCAVATION, CLASS 20 The Contractor is to construct culvert approaches from 2+80.19 to 3+64.69. The Contractor shall shape the culvert approaches and culvert berm to the elevations and dimensions shown on the plans. Raw volumes within the project corridor are estimated at 1452 cubic yards of cut, and 1677 cubic yards of fill. Design compaction factor used for mass quantities is 35%. The Contractor shall be responsible for providing the estimated 733 cubic yards of borrow material. Any unsuitable material, as designated by the Engineer, shall be wasted. The Contractor shall be responsible for providing disposal sites outside of the right of way for wasted material. The contractor is responsible for all costs associated with alternate borrow locations. Pay quantity for Class 20 Excavation will be plan quantity adjusted for obvious errors, plan revisions, or change orders.	6	2415-2200000	PRECAST CONCRETE BOX CULVERT, STRAIGHT END SECTIONS, 14 FT. X 16 FT. Includes 4 precast end sections, 4 precast lintel beams, and 4 precast curtain walls. End sections shall be 2:1 sloped end sections.
4	2402-2720000		8	2417-1040018	CULVERT, CORRIGATED METAL ENTRANCE PIPE, 18 IN. DIA Location of CMP entrance culverts shown in the Situation Plan on Sheet D.1 is to be considered approximate. Exact location is to be varified with Engineer in the field prior to placement. Existing culvert material that is removed shall become property of the Contractor.
2	2401-6745625	REMOVAL OF EXISTING BRIDGE The Contractor shall remove the existing 50' x 18' clear span steel beam bridge with a concrete deck and concrete abutments from STA 2+98.04 to STA 3+46.31. The entire existing bridge shall become property of the Contractor and shall be removed from the project site. No part of the existing structure shall be buried within the road right of way. Scrape samples of existing bridge were taken to get an indication of the existence of and level of total chromium and total lead. The analysis of total chromium in the sample was 42.1 ppm. The analysis of total lead in the sample was 1,400 ppm. The analysis shows the existence of these two toxic substances. The levels indicated by these tests could create conditions above regulatory limits for health and safety requirements. No other substances were analyzed. The bidder should not rely on the contracting authority's testing and analysis for any purpose other than an indication of the existence of these two substances.	9	2418-0000010	TEMPORARY STREAM DIVERSION This bid item shall be for the construction of a temporary stream diversion in accordance with Standard Road Plan EW-402
3	2402-0425031	GRANULAR BACKFILL The Contractor shall place a 9" layer of granular bedding material below the concrete box culvert. Method of Measurement shall be plan quantity. The Basis of Payment will be at the contract unit price per ton.	10	2502-8215112	SUBDRAIN, CORRUGATED METAL PIPE, 12 IN. DIA. Location of CMP subdrain culverts shown in the Situation Plan on Sheet D.1 is to be considered approximate. Exact location is to be varified with Engineer in the field prior to placement. Existing culvert material that is removed shall become property of the Contractor.
5	2403-0100000	STRUCTURAL CONCRETE (MISCELLANEOUS) This bid letm shall be used to fill the 9" gap between the two box culvert barrels and end sections. Max slump for the concrete shall be 4". Method of Measurement and Basis of Payment shall be plan quantity. Certified Plant Inspection shall be provided by the Contractor. Type of concrete to be Class C.	11	2507-3250005	ENGINEERING FABRIC REVETMENT, CLASS E The Contractor shall place Engineering Fabric under all Class E Revetment. Class E Revetment shall be placed by the Contractor in a layer 2'-0" thick. Location and extent of Engineering Fabric and Class E Revetment are shown on Situation Plan on Sheet D.1. The Contractor shall furnish and install Engineering Fabric and Class E Revetment.
6	2415-2100000	PRECAST CONCRETE BOX CULVERT, 14 FT. X 16 FT.	12	2507-6800061	
7	2415-2200000	PRECAST CONCRETE BOX CULVERT, STRAIGHT END SECTIONS, 14 FT. X 16 FT. Includes material and labor associated with providing and installing the culvert ties, lifting hole plugs, engineering fabric, joint material, and grout as required. The precast concrete box barrel and end sections shall meet the requirements of Materials I.M. 445.02.	13	2528-2518000	SAFETY CLOSURE
			14	2528-8445110	TRAFFIC CONTROL See Traffic Control Plan on Sheet A.1 and tabulation on Sheet C.1 for Safety Closures. The Contractor shall be resposible for furnishing, erecting, and maintaining all signs relating to the road closure.
			16	2602-0000312	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 12 IN. DIA. The Contractor shall place Perimeter and Slope Sediment Control Devices on any exposed soil along the top of bank, and around inlets of entrance pipes. See Situation Plan on Sheet D.1 for details

CL 310th Street
3+22.59
Existing Elev. 1056.44
Proposed Elev. 1056.44
Design Fill = 5.6'

UPSTREAM DOWNSTREAM

1070
1060
1050
1040
1030

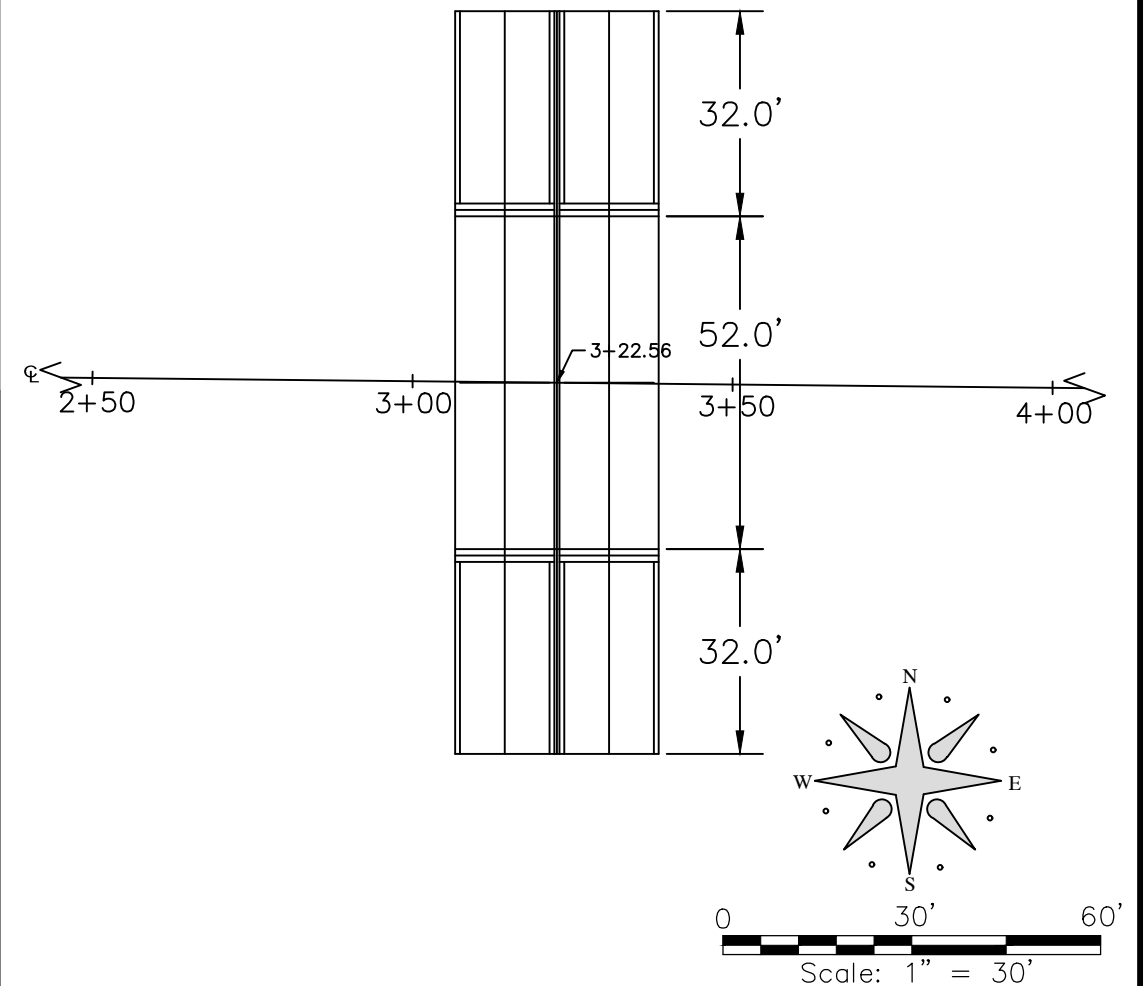
7.5' 7' 12' 12'
3:1 4:1 4% 4%
CL Elev. 1056.44

FL Inlet Elev. 1036.07 FL Outlet Elev. 1036.07
Box Inlet Elev. 1034.13 Box Outlet Elev. 1034.07

Twin 14' x 16' RCB
16.0'
14.0'

9" STRUCTURAL CONCRETE
(MISCELLANEOUS)

0 30' 60'
Scale: 1" = 30'



HYDRAULIC DATA			
Drainage Area	60.9 Sq. Mi	Q Design HW	2915 CFS
Stream Slope	-5.28 ft/mi	Design HW Elev.	1046.57
Bridge WW Area	-	Design Velocity	11.53 ft/s
Q10	2094 CFS	Scour Design Flood	Q50
Nat Stage Elev.	1045.38	Scour Design Elev.	1047.51
Q25	2915 CFS	Scour Check Flood	Q100
Nat Stage Elev.	1046.57	Scour Check Elev.	1048.26
Q50	3530 CFS		
Nat Stage Elev.	1047.51		
Q100	4192 CFS		
Nat Stage Elev.	1048.26		

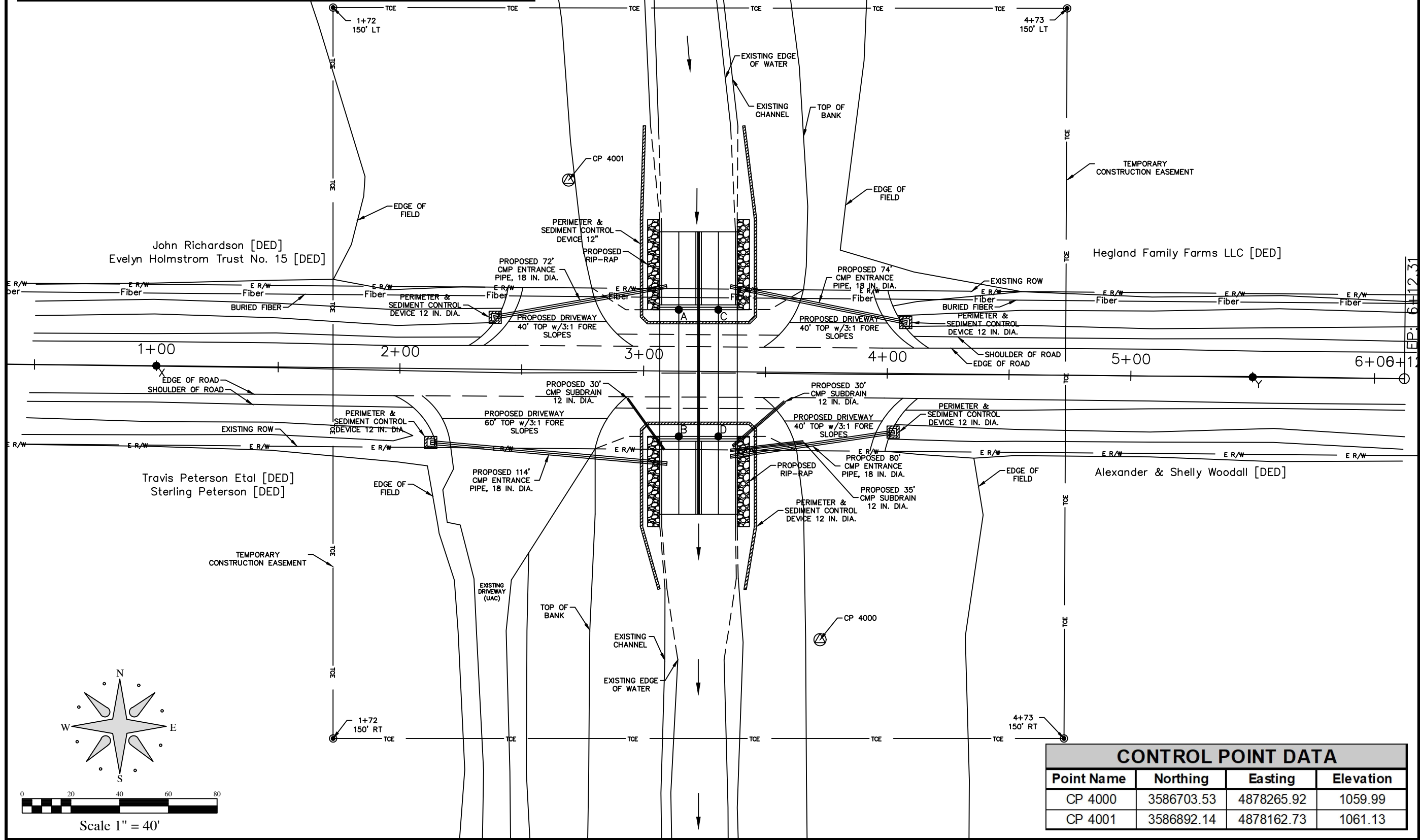
SAFETY CLOSURES			
Refer to Section 2518 of the Standard Specifications			
Location or Station	Closure Type		Remarks
	Road Qty.	Hazard Qty.	
1+00	1	0	On 310th St. near BOP
5+50	1	0	On 310th St. near EOP
Total	2	0	

UTILITY CONTACT INFO	
AUREON NETWORK SERVICES Contact Name : Jeff Klocko Contact Phone: (515) 830-0445 Contact Email: jeff.klocko@areon.com	MIDLAND POWER COOPERATIVE Contact Name : ENG DEPT. Contact Phone: (515) 386-4111 Contact Email: ENG@MIDLANDPOWER.COOP
CENTURYLINK Contact Name : Sadie Hull Contact Phone: (918) 470-0147 Contact Email: sadie.hull@umen.com	XEINIA RURAL WATER DISTRICT Contact Name: Laird VanDee Contact Phone: (515) 676-2117 Contact Email: lvandee@xeiniawater.org

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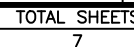
POINTS FOR BOX CULVERT ALIGNMENT			
Point Name	Northing	Easting	Remarks
A	3586838.98	4878207.93	North End of Barrel Section West Box
B	3586786.98	4878207.93	South End of Barrel Section West Box
C	3586838.98	4878224.18	North End of Barrel Section East Box
D	3586786.98	4878224.18	South End of Barrel Section East Box

ROAD CENTERLINE ALIGNMENT			
Point Name	Northing	Easting	Remarks
X	3586815.96	4877993.51	West CL - STA 1+00
Y	3586811.28	4878443.49	East CL - STA 5+50
Road Alignment Follows Section Line			



CONTROL POINT DATA			
Point Name	Northing	Easting	Elevation
CP 4000	3586703.53	4878265.92	1059.99
CP 4001	3586892.14	4878162.73	1061.13

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GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF SHOWN ELSEWHERE ON THE PLANS.

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 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 NECESSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION", "CLASS 20 EXCAVATION", "CLASS E REVETMENT", AND "SPECIAL BACKFILL".

FOR EACH PRECAST CONCRETE 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 "SPECIAL BACKFILL".

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE 1 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 "SPECIAL BACKFILL BEDDING DETAIL".

A MINIMUM OF 9 INCHES OF SPECIAL BACKFILL WITH A MAXIMUM AGGREGATE SIZE OF 1.5 INCH SHALL BE USED AS BEDDING FOR THE PRECAST BOX CULVERT. THE BEDDING SHALL BE SHAPED TO A FLAT BASE USING A TEMPLATE.

THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED PRECAST CONCRETE BOX SECTIONS FOR THIS PROJECT. 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 CONCRETE 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 CONCRETE BOX OPTION IS SELECTED.

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

APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST CONCRETE 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 CONCRETE 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 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.

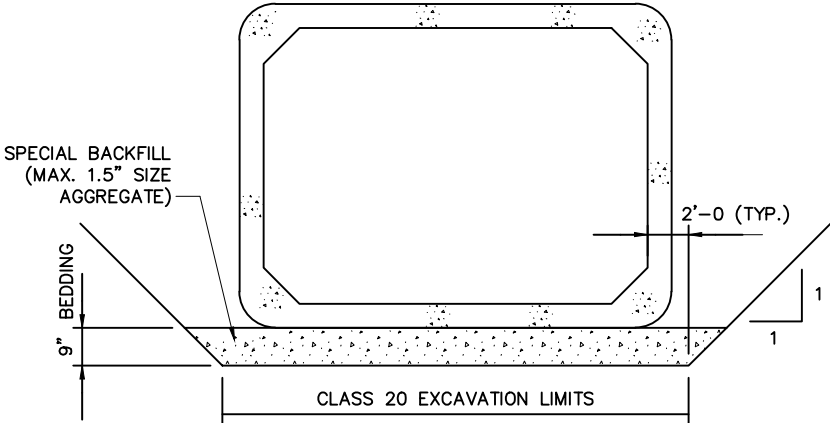
CLASS E REVETMENT WILL BE PLACED AROUND BOTH PRECAST CONCRETE BOX CULVERT END SECTIONS, AS SHOWN IN THESE PLANS.

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 BOX 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.

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



SPECIAL BACKFILL BEDDING DETAIL

SPECIAL BACKFILL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL.

DESIGN FOR
PRECAST REINFORCED
CONCRETE BOX CULVERT

GENERAL NOTES & QUANTITIES

HAMILTON COUNTY
IOWA DEPARTMENT OF TRANSPORTATION – HIGHWAY DIVISION