FA96 (Form 650019)
05-13

CONTRACT

Letting Date: December 15, 2015 Contract ID: 97-0201-123 Bid Order No.: 115
County: WOODBURY Project Engineer: CHEROKEE RCE
Cost Center: 611000 Object Code: 890 DBE Commitment: $0.00
Contract Work Type: PCC PAVEMENT - GRADE/NEW

This agreement made and entered by and between the IOWA DEPARTMENT OF TRANSPORTATION, CONTRACTING AUTHORITY, AND
AMES CONSTRUCTION, INC. OF BURNSVILLE, MN, (AM193), CONTRACTOR

It is agreed that the notice and instructions to bidders, the proposal filed by the Contractor, the specifications, the plan, if any, for project(s) listed below, together with Contractor's performance bond, are made a part hereof and together with this instrument constitute the contract. This contract contains all of the terms and conditions agreed upon by the parties hereto. A true copy of said plan is now on file in the office of the Contracting Authority under date of 12/10/2015.

SEE ATTACHED PROJECT LIST ON PAGE 1C.

The specifications consist of the Standard Specifications for Highway and Bridge Construction, Series 2015 of the Iowa Department of Transportation plus the following Supplemental Specifications, Special Provisions, and addendums: DS-15011, DS-15031, GS-15001, SP-150011, SS-15003,
ADDENDUMS: 15DEC115.A01, 15DEC115.A02, 15DEC115.A03, 15DEC115.A04, 15DEC115.A05, 15DEC115.A06

Contractor, for and in considerations of $62,856,676.07 payable as set forth in the specifications constituting a part of this contract, agrees to construct various items of work and/or provide various materials or supplies in accordance with the plans and specifications therefore, and in the locations designated in the Notice to Bidders.

Contractor certifies by signature on this contract, under pain of penalties for false certification, that the Contractor has complied with Iowa Code Section 452A.17(8) as amended, if applicable, and Iowa Code Section 91C.5 (Public Registration Number), if applicable.

In consideration of the foregoing, Contracting authority hereby agrees to pay the Contractor promptly and according to the requirements of the specifications the amounts set forth, subject to the conditions as set forth in the specifications.

It is further understood and agreed that the above work shall also be commenced or completed in accordance with Page 1B of this Contract and assigned Proposal Notes.

To accomplish the purpose herein expressed, the Contracting authority and Contractor have signed this and one other identical instrument.

For Federal-Aid contracts the Contractor certifies that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the contract.

By _____, _____
Contractor — Contractor (if joint venture)

By _____
Contracting Authority

JAN 06 2016
Contract Award Date

Iowa DOT Concurrence _____
For Local Agency Contracts

_____
Concurrence Date

Letting Date: December 15, 2015 Contract ID: 97-0201-123 Bid Order No. : 115

It is further understood and agreed that the above work shall be commenced or completed in accordance with the following schedule:

SITE NUMBER	CONTRACT PERIOD /SITE DESCRIPTION	LIQUIDATED DAMAGES
CONTRACT	LATE START DATE 04/04/2016 20 WORKING DAYS	$3,000.00
01	CONTRACT COMPLETION DATE: 12/01/2018 SEE SITE NUMBER 01 DESCRIPTION BELOW.	$8,000.00
02	CONTRACT COMPLETION DATE: 11/23/2016 TO COMPLETE THE OBLITERATION OF 165TH STREET.	$3,000.00
03	APPROX START DATE 05/16/2016 60 WORKING DAYS SEE SITE NUMBER 03 DESCRIPTION BELOW.	$500.00

CONTRACT NOTES

*** SITE NUMBER CONTRACT ***
THIS IS FOR ALL WORK NOT COVERED BY SITE 01. THIS IS FOR EROSION CONTROL AND SEEDING.

*** SITE NUMBER 01 ***
THIS SITE IS FOR THE COMPLETION OF STAGES 1A, 1B AND 2, COMPLETED SO THAT ALL OF US 20 MAINLINE, US 20 SHOULDERS, AND COUNTY ROADS ARE OPEN TO TRAFFIC. THIS INCLUDES THE COMPLETION OF ALL SAFETY ITEMS NEEDED TO OPEN THE ROADWAY TO TRAFFIC. THESE SAFETY ITEMS INCLUDE ITEMS SUCH AS GUARDRAIL, PAINT LINES, REGULATORY SIGNING.

SITE NUMBER 01 ALSO HAS A ROAD OPENING BONUS AS FOLLOWS:

THE CONTRACTOR WILL BE PAID THE PREDETERMINED AMOUNT SHOWN IN THE PROPOSAL SCHEDULE FOR ¢ROAD OPENING BONUS FOR COMPLETING CONSTRUCTION SO THAT NEW US 20 MAINLINE, US 20 SHOULDERS AND COUNTY ROAD CONNECTIONS ARE OPEN TO TRAFFIC. COMPLIANCE REQUIRES THAT ALL SAFETY ITEMS ARE COMPLETED. THIS INCLUDES ITEMS SUCH AS GUARDRAIL, PAINT LINES AND REGULATORY SIGNING. FAILURE TO OPEN US 20 TO TRAFFIC DUE TO WEATHER, CHANGE ORDERS, CHANGE IN QUANTITIES, UTILITY DELAYS OR ANY OTHER DELAYS WILL NOT BE CONSIDERED AS A JUSTIFICATION TO MODIFY THE DATE OR JUSTIFY PAYMENT OF THE BONUS.

SCHEDULE FOR ROAD OPENING BONUS:
OPENING DATE / BONUS
ON OR BEFORE 11/16/18 --- $1,500,000
11/17/18 --- $1,400,000
11/18/18 --- $1,300,000
11/19/18 --- $1,200,000
11/20/18 --- $1,100,000
11/21/18 --- $1,000,000
11/22/18 --- $900,000
11/23/18 --- $800,000

LETTING DATE: December 15, 2015 BID ORDER NO.: 115

PROJECT: NHSN-020-2(123)--2R-47 COUNTY: IDA
WORK TYPE: RCB CULVERT RPLC - SINGLE BOX ACCOUNTING ID: 33032
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: APPROX 3 MI E OF CORRECTIONVILLE
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $658,683.80

PROJECT: NHSN-020-2(125)--2R-47 COUNTY: IDA
WORK TYPE: RCB CULVERT RPLC - SINGLE BOX ACCOUNTING ID: 33033
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: 1 MI W OF CO RD L43
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $953,427.50

PROJECT: NHSN-020-2(127)--2R-47 COUNTY: IDA
WORK TYPE: RCB CULVERT RPLC - SINGLE BOX ACCOUNTING ID: 33034
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: 0.3 MI W OF CO RD L43
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $710,676.70

PROJECT: NHSN-020-2(129)--2R-47 COUNTY: IDA
WORK TYPE: RCB CULVERT EXT - SINGLE BOX ACCOUNTING ID: 33035
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: 1 MI E OF CO RD L43
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $2,351,811.50

PROJECT: NHSN-020-2(131)--2R-47 COUNTY: IDA
WORK TYPE: RCB CULVERT RPLC - SINGLE BOX ACCOUNTING ID: 33036
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: 0.2 MI W OF CO RD L51
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $1,646,859.00

PROJECT: NHSN-020-2(133)--2R-47 COUNTY: IDA
WORK TYPE: RCB CULVERT RPLC - SINGLE BOX ACCOUNTING ID: 33037
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: 1 MI E OF CO RD L43
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $218,050.00

PROJECT: NHSN-020-1(123)--2R-97 COUNTY: WOODBURY
WORK TYPE: PCC PAVEMENT - GRADE/NEW ACCOUNTING ID: 33038
ROUTE: U.S. 20 LENGTH (MILES): 11.25
LOCATION: E OF CORRECTIONVILLE TO W JCT US 59
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $54,893,867.17

LETTING DATE: December 15, 2015 BID ORDER NO.: 115

PROJECT: NHSN-020-1(138)--2R-97 COUNTY: WOODBURY
WORK TYPE: TRAFFIC SIGNS ACCOUNTING ID: 33039
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: E OF CORRECTIONVILLE TO W JCT US 59
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $534,394.00

PROJECT: NHSN-020-1(155)--2R-97 COUNTY: WOODBURY
WORK TYPE: RCB CULVERT NEW - SINGLE BOX ACCOUNTING ID: 33040
ROUTE: U.S. 20 LENGTH (MILES): 12.4
LOCATION: APPROX 2 MI E OF CORRECTIONVILLE
NON-FEDERAL AID - PREDETERMINED WAGES ARE NOT IN EFFECT
PROJECT AMOUNT: $888,906.40

Vendor No.: AM193 Bid Order No.: 115
Contract ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
	SECTION 0001 BID ITEMS FOR A 6' X 5' REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 54 IN RCP PIPE NHSN-020-2(123)--2R-					
0010	2402-2720000 EXCAVATION, CLASS 20	109.000 CY	20.00000		2,180.00	
0020	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	38.000 CY	950.00000		36,100.00	
0030	2404-7775000 REINFORCING STEEL	6,407.000 LB	0.80000		5,125.60	
0040	2533-4980005 MOBILIZATION	LUMP	LUMP		5,000.00	
	SECTION 0002 BID ITEMS FOR A 4' X 4' REINFORCED CONCRETE 3:1 FLUME FOR 30 IN RCP NHSN-020-2(123)--2R-47					
0050	2402-2720000 EXCAVATION, CLASS 20	218.000 CY	20.00000		4,360.00	
0060	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	35.500 CY	1,000.00000		35,500.00	
0070	2404-7775000 REINFORCING STEEL	4,913.000 LB	0.80000		3,930.40	
0080	2533-4980005 MOBILIZATION	LUMP	LUMP		5,000.00	
	SECTION 0005 BID ITEMS FOR A 8' X 5' REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR 60 IN RCP NHSN-020-2(123)--2R-47					
0230	2402-2720000 EXCAVATION, CLASS 20	142.000 CY	20.00000		2,840.00	

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0240	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	57.400 CY	850.00000		48,790.00	
0250	2404-7775000 REINFORCING STEEL	10,601.000 LB	0.80000		8,480.80	
0260	2533-4980005 MOBILIZATION	LUMP	LUMP		5,000.00	
SECTION 0006	BID ITEMS FOR A 8' X 8' REINFORCED CONCRETE DROP INLET FOR A 60 IN PIPE		NHSN-020-2(123)--2R-47			
0270	2402-2720000 EXCAVATION, CLASS 20	583.000 CY	12.00000		6,996.00	
0280	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	21.000 CY	1,000.00000		21,000.00	
0290	2404-7775000 REINFORCING STEEL	2,783.000 LB	0.80000		2,226.40	
0300	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	49.000 LF	80.00000		3,920.00	
0310	2533-4980005 MOBILIZATION	LUMP	LUMP		5,000.00	
SECTION 0007	BID ITEMS FOR A 8' X 5' REINFORCED 3:1 CONCRETE FLUME FOR 60 IN RCP		NHSN-020-2(125)--2R-47			
0320	2402-2720000 EXCAVATION, CLASS 20	483.000 CY	20.00000		9,660.00	
0330	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	52.500 CY	950.00000		49,875.00	

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0340	2404-7775000 REINFORCING STEEL	9,446.000 LB	0.80000		7,556.80	
0350	2533-4980005 MOBILIZATION	LUMP	LUMP		7,500.00	
	SECTION 0012 BID ITEMS FOR A 5' X 4' REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42 IN PIPE NHSN-020-2(125)--2R-47					
0610	2402-2720000 EXCAVATION, CLASS 20	183.000 CY	20.00000		3,660.00	
0620	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	25.000 CY	1,200.00000		30,000.00	
0630	2404-7775000 REINFORCING STEEL	3,929.000 LB	0.80000		3,143.20	
0640	2533-4980005 MOBILIZATION	LUMP	LUMP		5,000.00	
	SECTION 0014 BID ITEMS FOR A 5' X 4' REINFORCED CONCRETE FLUME WITH 42 IN RCP NHSN-020-2(127)--2R-47					
0720	2402-2720000 EXCAVATION, CLASS 20	100.000 CY	20.00000		2,000.00	
0730	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	93.000 CY	950.00000		88,350.00	
0740	2404-7775000 REINFORCING STEEL	12,671.000 LB	0.80000		10,136.80	
0750	2533-4980005 MOBILIZATION	LUMP	LUMP		10,000.00	
	SECTION 0021 DESIGN NO. 1318; ALTERNATE 'AA' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'AA' OPTION 2 IS CHOSEN (129) ALT GROUP AA2					

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1200	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	200.000 CY	15.00000		3,000.00	
1210	2402-0425030 GRANULAR BACKFILL	51.000 CY	15.00000		765.00	
1220	2402-2720000 EXCAVATION, CLASS 20	70.000 CY	15.00000		1,050.00	
1230	2415-2111010 PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	108.000 LF	750.00000		81,000.00	
1240	2415-2201010 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	2.000 EACH	22,000.00000		44,000.00	
1250	2507-3250005 ENGINEERING FABRIC	460.000 SY	3.00000		1,380.00	
1260	2507-6800061 REVETMENT, CLASS E	320.000 TON	40.00000		12,800.00	
1270	2533-4980005 MOBILIZATION	LUMP	LUMP		12,000.00	
	SECTION 0024 DESIGN NO. 1415; ALTERNATE 'CC' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'CC' OPTION 2 IS CHOSEN (131) ALT GROUP CC2					
1420	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	345.000 CY	20.00000		6,900.00	
1430	2402-2720000 EXCAVATION, CLASS 20	470.000 CY	20.00000		9,400.00	

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1440	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	45.400 CY	800.00000		36,320.00	
1450	2404-7775000 REINFORCING STEEL	8,303.000 LB	0.80000		6,642.40	
1460	2415-2111006 PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT.	172.000 LF	800.00000		137,600.00	
1470	2415-2201006 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 6 FT.	1.000 EACH	15,000.00000		15,000.00	
1480	2507-3250005 ENGINEERING FABRIC	690.000 SY	3.00000		2,070.00	
1490	2507-6800061 REVETMENT, CLASS E	560.000 TON	40.00000		22,400.00	
1500	2533-4980005 MOBILIZATION	LUMP	LUMP		24,000.00	
1505	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP		20,000.00	
	SECTION 0028 DESIGN NO. 0918; ALTERNATE 'BB' OPTION 2: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'BB' OPTION 2 IS CHOSEN (131) ALT GROUP BB2					
1720	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	55.000 CY	15.00000		825.00	
1730	2402-2720000 EXCAVATION, CLASS 20	2,800.000 CY	5.00000		14,000.00	

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1740	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	66.200 CY	600.00000		39,720.00	
1750	2404-7775000 REINFORCING STEEL	11,821.000 LB	0.80000		9,456.80	
1760	2415-2111006 PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT.	81.000 LF	650.00000		52,650.00	
1770	2507-3250005 ENGINEERING FABRIC	136.000 SY	3.00000		408.00	
1780	2507-6800061 REVETMENT, CLASS E	100.000 TON	40.00000		4,000.00	
1790	2533-4980005 MOBILIZATION	LUMP	LUMP		12,000.00	
	SECTION 0031 DESIGN NO. 1118; ALTERNATE 'DD' OPTION 2: PRECAST BID THIS SECTION IF ALTERNATE 'DD' OPTION 2 IS CHOSEN (133) ALT GROUP DD2					
1940	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	200.000 CY	15.00000		3,000.00	
1950	2402-0425030 GRANULAR BACKFILL	28.000 CY	15.00000		420.00	
1960	2402-2720000 EXCAVATION, CLASS 20	1,210.000 CY	10.00000		12,100.00	
1970	2415-2110808 PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.	88.000 LF	600.00000		52,800.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1980	2415-2200808 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 8 FT.	2.000 EACH	14,000.00000		28,000.00	
1990	2507-3250005 ENGINEERING FABRIC	430.000 SY	3.00000		1,290.00	
2000	2507-6800061 REVETMENT, CLASS E	325.000 TON	40.00000		13,000.00	
2010	2533-4980005 MOBILIZATION	LUMP	LUMP		14,000.00	
	SECTION 0033 DESIGN NO. 1218; ALTERNATE 'EE' OPTION 2: PRECAST BID THIS SECTION IF ALTERNATE 'EE' OPTION 2 IS CHOSEN (133) ALT GROUP EE2					
2090	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	155.000 CY	15.00000		2,325.00	
2100	2402-0425030 GRANULAR BACKFILL	24.000 CY	15.00000		360.00	
2110	2402-2720000 EXCAVATION, CLASS 20	907.000 CY	10.00000		9,070.00	
2120	2415-2110806 PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	75.000 LF	575.00000		43,125.00	
2130	2415-2200806 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	2.000 EACH	12,000.00000		24,000.00	
2140	2507-3250005 ENGINEERING FABRIC	320.000 SY	3.00000		960.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
2150	2507-6800061 REVETMENT, CLASS E	140.000 TON	40.00000		5,600.00	
2160	2533-4980005 MOBILIZATION	LUMP	LUMP		8,000.00	
	SECTION 0034 ROADWAY ITEMS					
			NHSN-020-1(123)--2R-97			
2170	2101-0850001 CLEARING AND GRUBBING	575.000 ACRE	200.00000		115,000.00	
2180	2102-0425071 SPECIAL BACKFILL	41,182.800 CY	30.00000		1,235,484.00	
2190	2102-2624980 CONTRACTOR FURNISHED SELECT TREATMENT	393,667.300 CY	4.50000		1,771,502.85	
2200	2102-2625000 EMBANKMENT-IN-PLACE	1,300.000 CY	18.00000		23,400.00	
2210	2102-2710070 EXCAVATION, CLASS 10, ROADWAY AND BORROW	4,576,241 CY	2.73000		12,493,137.93	
2220	2102-2710090 EXCAVATION, CLASS 10, WASTE	1,033,864 CY	0.10000		103,386.40	
2230	2102-2712015 EXCAVATION, CLASS 12, BOULDERS OR ROCK FRAGMENTS	500.000 CY	20.00000		10,000.00	
2240	2102-2713090 EXCAVATION, CLASS 13, WASTE	521.000 CY	10.00000		5,210.00	
2250	2102-4560000 LOCATING TILE LINES	1,185.000 STA	5.00000		5,925.00	

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2260	2102-5020010 OBLITERATE OLD ROADBED	116.600 STA	40.00000		4,664.00	
2270	2105-8425011 TOPSOIL, SPREAD	409,728.000 CY	1.75000		717,024.00	
2280	2105-8425020 TOPSOIL, STRIP AND STOCKPILE	628,078.000 CY	2.00000		1,256,156.00	
2290	2107-0425020 COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES	4,668.700 CY	19.00000		88,705.30	
2300	2107-0875100 COMPACTION WITH MOISTURE CONTROL	3,135,932 CY	0.20000		627,186.46	
2310	2107-3825025 GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN	2,912.000 CY	25.00000		72,800.00	
2320	2111-8174100 GRANULAR SUBBASE	458,055.000 SY	6.50000		2,977,357.50	
2330	2112-0000100 WICK DRAIN	204,276.500 LF	0.40000		81,710.60	
2340	2115-0100000 MODIFIED SUBBASE	18,999.300 CY	10.00000		189,993.00	
2350	2121-7425010 GRANULAR SHOULDERS, TYPE A	33,481.300 TON	28.00000		937,476.40	
2360	2123-7450000 SHOULDER CONSTRUCTION, EARTH	2,444.670 STA	115.00000		281,137.05	

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2370	2213-6745500 REMOVAL OF CURB	4.300 STA	1,000.00000		4,300.00	
2380	2214-5145150 PAVEMENT SCARIFICATION	578.000 SY	8.00000		4,624.00	
2390	2301-1003100 STANDARD OR SLIP-FORM PORTLAND CEMENT CONCRETE PAVEMENT, QM-C, CLASS 3 DURABILITY, 10 IN.	391,979.300 SY	29.50000		11,563,389.35	
2400	2301-9091000 RUMBLE STRIP PANEL (PCC SURFACE)	9.000 EACH	100.00000		900.00	
2410	2303-0043502 HOT MIX ASPHALT MIXTURE (3,000,000 ESAL), SURFACE COURSE, 1/2 IN. MIX, FRICTION L-2	159.300 TON	175.00000		27,877.50	
2420	2303-0246422 ASPHALT BINDER, PG 64-22	9.600 TON	500.00000		4,800.00	
2430	2304-0100000 DETOUR PAVEMENT	2,695.000 SY	62.00000		167,090.00	
2440	2304-0100000 DETOUR PAVEMENT , P.C. CONCRETE, 10 IN.	6,342.000 SY	40.00000		253,680.00	
2450	2312-8260051 GRANULAR SURFACING ON ROAD, CLASS A CRUSHED STONE	5,609.000 TON	28.00000		157,052.00	
2460	2315-8275025 SURFACING, DRIVEWAY, CLASS A CRUSHED STONE	5,350.000 TON	30.00000		160,500.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
2470	2401-6745650 REMOVAL OF EXISTING STRUCTURES	LUMP	LUMP		125,000.00	
2480	2402-0425040 FLOODED BACKFILL	22,363.400 CY	20.00000		447,268.00	
2490	2402-2720100 EXCAVATION, CLASS 20, FOR ROADWAY PIPE CULVERT	39,211.200 CY	6.00000		235,267.20	
2500	2416-0100018 APRONS, CONCRETE, 18 IN. DIA.	2.000 EACH	750.00000		1,500.00	
2510	2416-0100024 APRONS, CONCRETE, 24 IN. DIA.	128.000 EACH	1,100.00000		140,800.00	
2520	2416-0100030 APRONS, CONCRETE, 30 IN. DIA.	1.000 EACH	1,100.00000		1,100.00	
2530	2416-0100036 APRONS, CONCRETE, 36 IN. DIA.	14.000 EACH	1,350.00000		18,900.00	
2540	2416-0100042 APRONS, CONCRETE, 42 IN. DIA.	3.000 EACH	2,500.00000		7,500.00	
2550	2416-0100048 APRONS, CONCRETE, 48 IN. DIA.	7.000 EACH	2,800.00000		19,600.00	
2560	2416-0100054 APRONS, CONCRETE, 54 IN. DIA.	6.000 EACH	3,000.00000		18,000.00	
2570	2416-0100060 APRONS, CONCRETE, 60 IN. DIA.	4.000 EACH	3,200.00000		12,800.00	

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2580	2416-0101036 REMOVE AND REINSTALL CONCRETE PIPE APRONS LESS THAN OR EQUAL TO 36 IN.	18.000 EACH	800.00000		14,400.00	
2590	2416-0101136 REMOVE AND REINSTALL CONCRETE PIPE APRONS GREATER THAN 36 IN.	6.000 EACH	900.00000		5,400.00	
2600	2416-0102242 APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 42 IN.	2.000 EACH	1,600.00000		3,200.00	
2610	2416-0102308 APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 108 IN.	2.000 EACH	20,000.00000		40,000.00	
2620	2416-1180018 CULVERT, CONCRETE ROADWAY PIPE, 18 IN. DIA.	78.000 LF	50.00000		3,900.00	
2630	2416-1180024 CULVERT, CONCRETE ROADWAY PIPE, 24 IN. DIA.	8,097.000 LF	58.00000		469,626.00	
2640	2416-1180030 CULVERT, CONCRETE ROADWAY PIPE, 30 IN. DIA.	216.000 LF	76.00000		16,416.00	
2650	2416-1180036 CULVERT, CONCRETE ROADWAY PIPE, 36 IN. DIA.	1,356.000 LF	100.00000		135,600.00	
2670	2416-1180048 CULVERT, CONCRETE ROADWAY PIPE, 48 IN. DIA.	496.000 LF	175.00000		86,800.00	
2680	2416-1180054 CULVERT, CONCRETE ROADWAY PIPE, 54 IN. DIA.	1,008.000 LF	200.00000		201,600.00	

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2690	2416-1180060 CULVERT, CONCRETE ROADWAY PIPE, 60 IN. DIA.	360.000 LF	250.00000		90,000.00	
2700	2416-1200242 CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 42 IN.	60.000 LF	175.00000		10,500.00	
2710	2416-1200308 CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 108 IN.	262.000 LF	675.00000		176,850.00	
2720	2416-1240024 CULVERT, 3000D CONCRETE ROADWAY PIPE, 24 IN. DIA.	278.000 LF	65.00000		18,070.00	
2730	2416-1240042 CULVERT, 3000D CONCRETE ROADWAY PIPE, 42 IN. DIA.	472.000 LF	150.00000		70,800.00	
2740	2416-1240048 CULVERT, 3000D CONCRETE ROADWAY PIPE, 48 IN. DIA.	374.000 LF	185.00000		69,190.00	
2750	2416-1240060 CULVERT, 3000D CONCRETE ROADWAY PIPE, 60 IN. DIA.	690.000 LF	265.00000		182,850.00	
2760	2416-1245036 CULVERT, 3750D CONCRETE ROADWAY PIPE, 36 IN. DIA.	168.000 LF	136.00000		22,848.00	
2780	2416-1262024 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 24 IN. DIA.	100.000 LF	450.00000		45,000.00	
2790	2416-1262036 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 36 IN. DIA.	230.000 LF	590.00000		135,700.00	

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2800	2416-1262054 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 54 IN. DIA.	86.000 LF	1,190.00000		102,340.00	
2810	2416-1263042 CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 42 IN. DIA.	122.000 LF	735.00000		89,670.00	
2820	2416-1263048 CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 48 IN. DIA.	146.000 LF	975.00000		142,350.00	
2840	2417-0225024 APRONS, METAL, 24 IN. DIA.	50.000 EACH	400.00000		20,000.00	
2850	2417-0225030 APRONS, METAL, 30 IN. DIA.	2.000 EACH	550.00000		1,100.00	
2860	2417-1060024 CULVERT, CORRUGATED METAL ROADWAY PIPE, 24 IN. DIA.	4,228.000 LF	32.00000		135,296.00	
2870	2417-1060030 CULVERT, CORRUGATED METAL ROADWAY PIPE, 30 IN. DIA.	510.000 LF	36.00000		18,360.00	
2880	2417-2307036 DRAIN, CORRUGATED METAL SLOTTED PIPE, 36 IN., W/6 IN. GRATE	116.000 LF	175.00000		20,300.00	
2890	2417-5895018 BEVELED PIPE AND GUARD, 18 INCH	4.000 EACH	4,200.00000		16,800.00	
2900	2418-0000010 TEMPORARY STREAM DIVERSION	23.000 EACH	10,000.00000		230,000.00	

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2910	2422-0360018 APRONS, UNCLASSIFIED, 18 IN. DIA.	4.000 EACH	300.00000		1,200.00	
2920	2422-0360024 APRONS, UNCLASSIFIED, 24 IN. DIA.	136.000 EACH	325.00000		44,200.00	
2930	2422-0360030 APRONS, UNCLASSIFIED, 30 IN. DIA.	6.000 EACH	600.00000		3,600.00	
2940	2422-0360036 APRONS, UNCLASSIFIED, 36 IN. DIA.	10.000 EACH	800.00000		8,000.00	
2950	2422-0360042 APRONS, UNCLASSIFIED, 42 IN. DIA.	2.000 EACH	1,350.00000		2,700.00	
2960	2422-0360048 APRONS, UNCLASSIFIED, 48 IN. DIA.	2.000 EACH	1,500.00000		3,000.00	
2970	2422-1722018 CULVERT, UNCLASSIFIED ENTRANCE PIPE, 18 IN. DIA.	53.000 LF	30.00000		1,590.00	
2980	2422-1722024 CULVERT, UNCLASSIFIED ENTRANCE PIPE, 24 IN. DIA.	6,512.000 LF	34.00000		221,408.00	
2990	2422-1722036 CULVERT, UNCLASSIFIED ENTRANCE PIPE, 36 IN. DIA.	50.000 LF	42.00000		2,100.00	
3000	2422-1723018 CULVERT, UNCLASSIFIED ROADWAY PIPE, 18 IN. DIA.	264.000 LF	28.00000		7,392.00	
3010	2422-1723024 CULVERT, UNCLASSIFIED ROADWAY PIPE, 24 IN. DIA.	468.000 LF	50.00000		23,400.00	

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3020	2422-1723030 CULVERT, UNCLASSIFIED ROADWAY PIPE, 30 IN. DIA.	218.000 LF	40.00000		8,720.00	
3030	2422-1723036 CULVERT, UNCLASSIFIED ROADWAY PIPE, 36 IN. DIA.	274.000 LF	44.00000		12,056.00	
3040	2422-1723042 CULVERT, UNCLASSIFIED ROADWAY PIPE, 42 IN. DIA.	94.000 LF	52.00000		4,888.00	
3050	2422-1723048 CULVERT, UNCLASSIFIED ROADWAY PIPE, 48 IN. DIA.	60.000 LF	54.00000		3,240.00	
3060	2435-0254700 BARRIER INTAKE, SW-547	2.000 EACH	18,000.00000		36,000.00	
3070	2435-0256200 INTAKE, SW-562	2.000 EACH	5,500.00000		11,000.00	
3080	2502-8212024 SUBDRAIN, LONGITUDINAL, (BACKSLOPE) 4 IN. DIA.	7,525.000 LF	18.00000		135,450.00	
3090	2502-8212034 SUBDRAIN, LONGITUDINAL, (SHOULDER) 4 IN. DIA.	139,410.000 LF	4.20000		585,522.00	
3100	2502-8221304 SUBDRAIN OUTLET, DR-304	559.000 EACH	140.00000		78,260.00	
3110	2506-4984000 FLOWABLE MORTAR	1,188.900 CY	185.00000		219,946.50	
3120	2507-3250005 ENGINEERING FABRIC	25,455.300 SY	3.00000		76,365.90	

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3130	2507-6800061 REVETMENT, CLASS E	14,578.600 TON	40.00000		583,144.00	
3140	2507-8029000 EROSION STONE	434.400 TON	40.00000		17,376.00	
3150	2510-6745850 REMOVAL OF PAVEMENT	209,391.900 SY	4.52000		946,451.39	
3160	2518-6910000 SAFETY CLOSURE	258.000 EACH	45.00000		11,610.00	
3170	2519-2000010 FENCE, CHANNEL CROSSING, TYPE A	1,450.000 LF	5.00000		7,250.00	
3180	2519-3280000 FENCE, FIELD	125,117.700 LF	2.35000		294,026.60	
3190	2519-3300400 FIELD FENCE BRACE PANELS	1,929.000 EACH	125.00000		241,125.00	
3200	2520-3350010 FIELD LABORATORY	1.000 EACH	90,000.00000		90,000.00	
3210	2526-8285000 CONSTRUCTION SURVEY	LUMP	LUMP		210,000.00	
3220	2527-9263109 PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	5,259.900 STA	11.00000		57,858.90	
3230	2527-9263137 PAINTED SYMBOLS AND LEGENDS, WATERBORNE OR SOLVENT-BASED	15.000 EACH	80.00000		1,200.00	

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3240	2527-9263180 PAVEMENT MARKINGS REMOVED	2,133.730 STA	0.12000		256.05	
3250	2527-9263190 SYMBOLS AND LEGENDS REMOVED	13.000 EACH	125.00000		1,625.00	
3260	2528-8400048 TEMPORARY BARRIER RAIL, CONCRETE	9,082.000 LF	15.00000		136,230.00	
3270	2528-8400157 TEMPORARY FLOODLIGHTING LUMINAIRE	6.000 EACH	5,000.00000		30,000.00	
3280	2528-8445110 TRAFFIC CONTROL	LUMP	LUMP		100,000.00	
3290	2528-8445113 FLAGGERS	100.000 EACH	435.00000		43,500.00	
3300	2528-9109020 TEMPORARY LANE SEPARATOR SYSTEM	1,430.000 LF	8.00000		11,440.00	
3310	2529-2242304 CD JOINT ASSEMBLY	24.000 EACH	75.00000		1,800.00	
3320	2529-5070110 PATCHES, FULL-DEPTH FINISH, BY AREA	320.000 SY	130.00000		41,600.00	
3330	2529-5070120 PATCHES, FULL-DEPTH FINISH, BY COUNT	8.000 EACH	150.00000		1,200.00	
3340	2533-4980005 MOBILIZATION	LUMP	LUMP		4,370,000.00	

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3350	2538-6970010 SALVAGE, REMOVAL, AND DISPOSAL OF OBSTRUCTIONS	LUMP	LUMP		325,000.00	
3360	2548-0000200 MILLED SHOULDER RUMBLE STRIPS, PCC SURFACE	1,184.800 STA	25.00000		29,620.00	
3370	2551-0000110 TEMP CRASH CUSHION	16.000 EACH	1,500.00000		24,000.00	
3380	2599-9999009 ('LINEAR FEET' ITEM) HORIZONTAL STRIP DRAIN	45,913.000 LF	1.60000		73,460.80	
3390	2599-9999010 ('LUMP SUM' ITEM) INTERMEDIATE FOUNDATION IMPROVEMENTS	LUMP	LUMP		100,000.00	
3393	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 42 IN. DIA	196.000 LF	265.00000		51,940.00	
3394	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 48 IN. DIA.	314.000 LF	275.00000		86,350.00	
3395	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 42 IN. DIA.	118.000 LF	760.00000		89,680.00	
3396	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 48 IN. DIA.	196.000 LF	725.00000		142,100.00	
3400	2599-9999010 ('LUMP SUM' ITEM) INTERMEDIATE FOUNDATION IMPROVEMENTS VERIFICATION TESTING	LUMP	LUMP		7,500.00	

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3410	2599-9999012 ('THOUSANDS OF GALLONS' ITEM) DUST CONTROL WATERING	4,000.000 MGAL	40.00000		160,000.00	
3420	2601-2633100 MOWING	417.800 ACRE	60.00000		25,068.00	
3430	2601-2634100 MULCHING	417.800 ACRE	400.00000		167,120.00	
3440	2601-2634105 MULCHING, BONDED FIBER MATRIX	1.000 ACRE	4,000.00000		4,000.00	
3450	2601-2636043 SEEDING AND FERTILIZING (RURAL)	112.400 ACRE	475.00000		53,390.00	
3460	2601-2640350 SPECIAL DITCH CONTROL, WOOD EXCELSIOR MAT	4,799.000 SQ	11.00000		52,789.00	
3470	2601-2642100 STABILIZING CROP - SEEDING AND FERTILIZING	417.800 ACRE	395.00000		165,031.00	
3480	2601-2642120 STABILIZING CROP - SEEDING AND FERTILIZING (URBAN)	1.000 ACRE	3,500.00000		3,500.00	
3490	2601-2643110 WATERING FOR SOD, SPECIAL DITCH CONTROL, OR SLOPE PROTECTION	1,812.000 MGAL	60.00000		108,720.00	
3500	2601-2643300 MOBILIZATION FOR WATERING	3.000 EACH	350.00000		1,050.00	
3510	2601-2643412 TURF REINFORCEMENT MAT, TYPE 2	4,261.000 SQ	35.00000		149,135.00	

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3520	2602-0000020 SILT FENCE	204,001.900 LF	1.50000		306,002.85	
3530	2602-0000030 SILT FENCE FOR DITCH CHECKS	106,626.000 LF	1.75000		186,595.50	
3540	2602-0000050 SILT BASINS	312.000 EACH	175.00000		54,600.00	
3550	2602-0000071 REMOVAL OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS	155,313.900 LF	0.05000		7,765.70	
3560	2602-0000101 MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECK	31,062.800 LF	0.05000		1,553.14	
3570	2602-0000130 TEMPORARY SEDIMENT CONTROL BASIN	59.000 EACH	175.00000		10,325.00	
3580	2602-0000140 MAINTENANCE OF TEMPORARY SEDIMENT CONTROL BASIN	236.000 EACH	175.00000		41,300.00	
3590	2602-0000150 STABILIZED CONSTRUCTION ENTRANCE	15,500.000 LF	10.00000		155,000.00	
3600	2602-0000160 ROCK CHECK DAM	290.000 LF	100.00000		29,000.00	
3610	2602-0000170 MAINTENANCE OF ROCK CHECK DAM	96.000 EACH	50.00000		4,800.00	
3620	2602-0000180 REMOVAL OF ROCK CHECK DAM	12.000 EACH	300.00000		3,600.00	

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3630	2602-0000312 PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 12 IN. DIA.	4,000.000 LF	3.15000		12,600.00	
3640	2602-0000320 PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 20 IN. DIA.	34,380.000 LF	4.00000		137,520.00	
3650	2602-0000350 REMOVAL OF PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE	38,380.000 LF	0.25000		9,595.00	
3660	2602-0010010 MOBILIZATIONS, EROSION CONTROL	1.000 EACH	500.00000		500.00	
3670	2602-0010020 MOBILIZATIONS, EMERGENCY EROSION CONTROL	1.000 EACH	1,000.00000		1,000.00	
3680	2612-0000520 ROADSIDE SPRAY FOR WEED CONTROL	42.000 ACRE	250.00000		10,500.00	
	SECTION 0035 ALTERNATE 'FF' OPTION 1: PCC PAVED SHOULDERS BID THIS SECTION IF ALTERNATE 'FF' OPTION 1 IS CHOSEN (123) ALT GROUP FF1					
3690	2122-5190006 PAVED SHOULDER, P.C. CONCRETE, 6 IN.	94,838.300 SY	21.00000		1,991,604.30	
3700	2548-0000200 MILLED SHOULDER RUMBLE STRIPS, PCC SURFACE	1,146.000 STA	25.00000		28,650.00	
	SECTION 0037 PAYMENT ADJUSTMENT INCENTIVE ITEMS					

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3740	2301-7000110 PAYMENT ADJUSTMENT INCENTIVE/DISINCENTIVE FOR PCC PAVEMENT THICKNESS (BY SCHEDULE)	350,000.000 EACH	1.00000		350,000.00	
3750	2301-7000120 PAYMENT ADJUSTMENT INCENTIVE/DISINCENTIVE FOR QM-C PCC PAVEMENT COARSENESS AND WORKABILITY FACTORS	310,000.000 EACH	1.00000		310,000.00	
3760	2317-7000110 PAYMENT ADJUSTMENT INCENTIVE/DISINCENTIVE FOR PCC PAVEMENT SMOOTHNESS (BY SCHEDULE)	290,000.000 EACH	1.00000		290,000.00	
	SECTION 0038 ROAD OPENING BONUS FOR CONTRACT					
3770	2599-9999010 ('LUMP SUM' ITEM) ROAD OPENING BONUS	LUMP	LUMP		1,500,000.00	
	SECTION 0039 TRAFFIC AND SAFETY ITEMS					
			NHSN-020-1(138)--2R-97			
3780	2524-6765210 REMOVAL OF TYPE A SIGN ASSEMBLY	133.000 EACH	145.00000		19,285.00	
3790	2524-9089110 DELINEATOR, RIGID - TYPE IA	417.000 EACH	90.00000		37,530.00	
3800	2524-9210000 MILEPOST MARKERS	22.000 EACH	165.00000		3,630.00	
3810	2524-9275222 WOOD POSTS FOR TYPE A OR B SIGNS, 4 IN. X 6 IN.	600.000 LF	40.00000		24,000.00	

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3820	2524-9276010 PERFORATED SQUARE STEEL TUBE POSTS	5,010.000 LF	30.00000		150,300.00	
3830	2524-9276021 PERFORATED SQUARE STEEL TUBE POST ANCHOR, BREAK-AWAY SOIL INSTALLATION	209.000 EACH	360.00000		75,240.00	
3840	2524-9276027 PERFORATED SQUARE STEEL TUBE POST ANCHOR, TRIANGULAR SLIP BASE ASSEMBLY	139.000 EACH	360.00000		50,040.00	
3850	2524-9290009 SIGN MOUNTING BRACKETS, SPECIAL	110.000 EACH	275.00000		30,250.00	
3860	2524-9325001 TYPE A SIGNS, SHEET ALUMINUM	3,484.000 SF	23.50000		81,874.00	
3870	2524-9380001 TYPE B SIGNS, EXTRUDED ALUMINUM STRUCTURAL PANEL	69.000 SF	105.00000		7,245.00	
3880	2528-8445110 TRAFFIC CONTROL	LUMP	LUMP		5,000.00	
3890	2533-4980005 MOBILIZATION	LUMP	LUMP		50,000.00	
	SECTION 0040 BID ITEMS FOR A 6' X 4' REINFORCED CONCRETE 3:1 FLUME AND BASIN			NHSN-020-1(155)--2R-97		
3900	2402-2720000 EXCAVATION, CLASS 20	99.000 CY	10.00000		990.00	
3910	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	27.100 CY	900.00000		24,390.00	

Vendor No.: AM193 Bid Order No.: 115
Contract ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3920	2404-7775000 REINFORCING STEEL	4,623.000 LB	0.80000		3,698.40	
3930	2533-4980005 MOBILIZATION	LUMP	LUMP		4,000.00	
	SECTION 0041 DESIGN NO. 0515; ITEMS FOR A 14' X 18'-6 DISSIPATION BASIN REINFORCED CONCRETE PIPE NHSN-020-1(155)--2R-97					
3940	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	140.000 CY	20.00000		2,800.00	
3950	2402-2720000 EXCAVATION, CLASS 20	68.000 CY	20.00000		1,360.00	
3960	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	46.900 CY	950.00000		44,555.00	
3970	2404-7775000 REINFORCING STEEL	5,677.000 LB	0.80000		4,541.60	
3980	2507-3250005 ENGINEERING FABRIC	210.000 SY	3.00000		630.00	
3990	2507-6800061 REVETMENT, CLASS E	160.000 TON	40.00000		6,400.00	
4000	2533-4980005 MOBILIZATION	LUMP	LUMP		7,000.00	
	SECTION 0044 DESIGN NO. 0315; ALTERNATE 'GG' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'GG' OPTION 2 IS CHOSEN (123) ALT GROUP GG2					
4140	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	600.000 CY	20.00000		12,000.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4150	2402-0425030 GRANULAR BACKFILL	30.900 CY	20.00000		618.00	
4160	2402-2720000 EXCAVATION, CLASS 20	1,549.000 CY	20.00000		30,980.00	
4170	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	90.600 CY	850.00000		77,010.00	
4180	2404-7775000 REINFORCING STEEL	16,111.000 LB	0.80000		12,888.80	
4190	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	115.000 LF	750.00000		86,250.00	
4200	2415-2201008 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	1.000 EACH	20,000.00000		20,000.00	
4210	2507-3250005 ENGINEERING FABRIC	1,080.000 SY	3.00000		3,240.00	
4220	2507-6800061 REVETMENT, CLASS E	980.000 TON	40.00000		39,200.00	
4230	2533-4980005 MOBILIZATION	LUMP	LUMP		30,000.00	
4240	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LUMP	LUMP		7,500.00	

SECTION 0045 DESIGN NO. 0118; ALTERNATE 'HH' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'HH' OPTION 2 IS CHOSEN (123)
ALT GROUP HH2

Vendor No.: AM193 Bid Order No.: 115
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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4250	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	75.000 CY	15.00000		1,125.00	
4260	2402-0425030 GRANULAR BACKFILL	39.000 CY	15.00000		585.00	
4270	2402-2720000 EXCAVATION, CLASS 20	4,167.000 CY	5.00000		20,835.00	
4280	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	19.500 CY	800.00000		15,600.00	
4290	2404-7775000 REINFORCING STEEL	3,366.000 LB	0.80000		2,692.80	
4300	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	100.000 LF	650.00000		65,000.00	
4310	2415-2201008 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	1.000 EACH	14,000.00000		14,000.00	
4320	2507-3250005 ENGINEERING FABRIC	170.000 SY	3.00000		510.00	
4330	2507-6800061 REVETMENT, CLASS E	130.000 TON	40.00000		5,200.00	
4340	2533-4980005 MOBILIZATION	LUMP	LUMP		12,000.00	

SECTION 0046 DESIGN NO. 0615; ALTERNATE 'II' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'II' OPTION 2 IS CHOSEN (125)
ALT GROUP II2

Vendor No.: AM193 Bid Order No.: 115
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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4350	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	370.000 CY	20.00000		7,400.00	
4360	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP		15,000.00	
4370	2402-0425030 GRANULAR BACKFILL	34.700 CY	20.00000		694.00	
4380	2402-2720000 EXCAVATION, CLASS 20	1,306.000 CY	10.00000		13,060.00	
4390	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	92.200 CY	950.00000		87,590.00	
4400	2404-7775000 REINFORCING STEEL	16,495.000 LB	0.80000		13,196.00	
4410	2415-2110808 PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.	153.000 LF	800.00000		122,400.00	
4420	2507-3250005 ENGINEERING FABRIC	650.000 SY	3.00000		1,950.00	
4430	2507-6800061 REVETMENT, CLASS E	600.000 TON	40.00000		24,000.00	
4440	2533-4980005 MOBILIZATION	LUMP	LUMP		30,000.00	
4450	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LUMP	LUMP		15,000.00	

SECTION 0047 DESIGN NO. 0318; ALTERNATE 'JJ' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'JJ' OPTION 2 IS CHOSEN (125)
ALT GROUP JJ2

Vendor No.: AM193 Bid Order No.: 115
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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4460	2402-0425030 GRANULAR BACKFILL	20.100 CY	15.00000		301.50	
4470	2402-2720000 EXCAVATION, CLASS 20	1,925.000 CY	5.00000		9,625.00	
4480	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	53.900 CY	800.00000		43,120.00	
4490	2404-7775000 REINFORCING STEEL	9,661.000 LB	0.80000		7,728.80	
4500	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	58.000 LF	80.00000		4,640.00	
4510	2415-2110808 PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.	90.000 LF	600.00000		54,000.00	
4520	2533-4980005 MOBILIZATION	LUMP	LUMP		12,000.00	
	SECTION 0048 DESIGN NO. 0715; ALTERNATE 'KK' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'KK' OPTION 2 IS CHOSEN (125 ALT GROUP KK2					
4530	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	275.000 CY	20.00000		5,500.00	
4540	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP		15,000.00	
4550	2402-0425030 GRANULAR BACKFILL	32.500 CY	20.00000		650.00	

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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4560	2402-2720000 EXCAVATION, CLASS 20	230.000 CY	20.00000		4,600.00	
4570	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	65.500 CY	1,000.00000		65,500.00	
4580	2404-7775000 REINFORCING STEEL	10,973.000 LB	0.80000		8,778.40	
4590	2415-2110606 PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT.	167.000 LF	650.00000		108,550.00	
4600	2507-3250005 ENGINEERING FABRIC	500.000 SY	3.00000		1,500.00	
4610	2507-6800061 REVETMENT, CLASS E	450.000 TON	40.00000		18,000.00	
4620	2533-4980005 MOBILIZATION	LUMP	LUMP		25,000.00	
4630	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LUMP	LUMP		15,000.00	
	SECTION 0049 DESIGN NO. 0418; ALTERNATE 'LL' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'LL' OPTION 2 IS CHOSEN (125) ALT GROUP LL2					
4640	2402-0425030 GRANULAR BACKFILL	24.000 CY	15.00000		360.00	
4650	2402-2720000 EXCAVATION, CLASS 20	3,176.000 CY	5.00000		15,880.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4660	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	31.600 CY	1,000.00000		31,600.00	
4670	2404-7775000 REINFORCING STEEL	5,061.000 LB	0.80000		4,048.80	
4680	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	52.000 LF	80.00000		4,160.00	
4690	2415-2110606 PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT.	96.000 LF	450.00000		43,200.00	
4700	2533-4980005 MOBILIZATION	LUMP	LUMP		8,000.00	
	SECTION 0050 DESIGN NO. 0915; ALTERNATE 'MM' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'MM' OPTION 2 IS CHOSEN (127) ALT GROUP MM2					
4710	2102-0425071 SPECIAL BACKFILL	39.000 CY	30.00000		1,170.00	
4720	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	530.000 CY	20.00000		10,600.00	
4730	2402-2720000 EXCAVATION, CLASS 20	451.000 CY	20.00000		9,020.00	
4740	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	209.000 CY	850.00000		177,650.00	
4750	2404-7775000 REINFORCING STEEL	36,919.000 LB	0.80000		29,535.20	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4760	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	142.000 LF	800.00000		113,600.00	
4770	2507-3250005 ENGINEERING FABRIC	930.000 SY	3.00000		2,790.00	
4780	2507-6800061 REVETMENT, CLASS E	860.000 TON	40.00000		34,400.00	
4790	2533-4980005 MOBILIZATION	LUMP	LUMP		40,000.00	
4800	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP		15,000.00	
	SECTION 0051 DESIGN NO. 0518; ALTERNATE 'NN' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'NN' OPTION 2 IS CHOSEN (127) ALT GROUP NN2					
4810	2102-0425071 SPECIAL BACKFILL	35.100 CY	25.00000		877.50	
4820	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	80.000 CY	15.00000		1,200.00	
4830	2402-2720000 EXCAVATION, CLASS 20	2,830.000 CY	5.00000		14,150.00	
4840	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	46.000 CY	700.00000		32,200.00	
4850	2404-7775000 REINFORCING STEEL	8,109.000 LB	0.80000		6,487.20	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4860	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	110.000 LF	700.00000		77,000.00	
4870	2415-2201008 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	1.000 EACH	15,000.00000		15,000.00	
4880	2507-3250005 ENGINEERING FABRIC	170.000 SY	3.00000		510.00	
4890	2507-6800061 REVETMENT, CLASS E	125.000 TON	40.00000		5,000.00	
4900	2533-4980005 MOBILIZATION	LUMP	LUMP		14,000.00	
	SECTION 0052 DESIGN NO. 1115; ALTERNATE 'OO' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'OO' OPTION 2 IS CHOSEN (129) ALT GROUP OO2					
4910	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	300.000 CY	10.00000		3,000.00	
4920	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP		15,000.00	
4930	2402-0425030 GRANULAR BACKFILL	89.200 CY	20.00000		1,784.00	
4940	2402-2720000 EXCAVATION, CLASS 20	700.000 CY	10.00000		7,000.00	
4950	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	46.600 CY	800.00000		37,280.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4960	2404-7775000 REINFORCING STEEL	6,672.000 LB	0.80000		5,337.60	
4970	2415-2111208 PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 FT.	274.000 LF	1,450.00000		397,300.00	
4980	2415-2201208 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 8 FT.	1.000 EACH	25,000.00000		25,000.00	
4990	2507-3250005 ENGINEERING FABRIC	570.000 SY	3.00000		1,710.00	
5000	2507-6800061 REVETMENT, CLASS E	490.000 TON	40.00000		19,600.00	
5010	2533-4980005 MOBILIZATION	LUMP	LUMP		55,000.00	
5020	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LUMP	LUMP		15,000.00	
	SECTION 0053 DESIGN NO. 0618; ALTERNATE 'PP' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'PP' OPTION 2 IS CHOSEN (129) ALT GROUP PP2					
5030	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	80.000 CY	15.00000		1,200.00	
5040	2402-0425030 GRANULAR BACKFILL	63.900 CY	15.00000		958.50	
5050	2402-2720000 EXCAVATION, CLASS 20	9,759.000 CY	5.00000		48,795.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5060	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	38.400 CY	700.00000		26,880.00	
5070	2404-7775000 REINFORCING STEEL	5,575.000 LB	0.80000		4,460.00	
5080	2415-2111208 PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 FT.	188.000 LF	1,400.00000		263,200.00	
5090	2507-3250005 ENGINEERING FABRIC	170.000 SY	3.00000		510.00	
5100	2507-6800061 REVETMENT, CLASS E	130.000 TON	40.00000		5,200.00	
5110	2533-4980005 MOBILIZATION	LUMP	LUMP		35,000.00	
5120	2599-9999005 ('EACH' ITEM) PRECAST CONCRETE BOX CULVERT END SECTION , 12 FT. X 8	1.000 EACH	25,000.00000		25,000.00	

SECTION 0054 DESIGN NO. 1215; ALTERNATE 'QQ' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'QQ' OPTION 2 IS CHOSEN (129)
ALT GROUP QQ2

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5130	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	555.000 CY	20.00000		11,100.00	
5140	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP		15,000.00	
5150	2402-0425030 GRANULAR BACKFILL	83.800 CY	20.00000		1,676.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5160	2402-2720000 EXCAVATION, CLASS 20	2,139.000 CY	10.00000		21,390.00	
5170	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	88.600 CY	850.00000		75,310.00	
5180	2404-7775000 REINFORCING STEEL	12,677.000 LB	0.80000		10,141.60	
5190	2415-2111012 PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 FT.	282.000 LF	1,700.00000		479,400.00	
5200	2415-2201012 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT.	1.000 EACH	36,000.00000		36,000.00	
5210	2507-3250005 ENGINEERING FABRIC	1,020.000 SY	3.00000		3,060.00	
5220	2507-6800061 REVETMENT, CLASS E	925.000 TON	40.00000		37,000.00	
5230	2533-4980005 MOBILIZATION	LUMP	LUMP		60,000.00	
5240	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LUMP	LUMP		7,500.00	
	SECTION 0055 DESIGN NO. 0718; ALTERNATE 'RR' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'RR' OPTION 2 IS CHOSEN (129) ALT GROUP RR2					
5250	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	120.000 CY	15.00000		1,800.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5260	2402-0425030 GRANULAR BACKFILL	58.800 CY	15.00000		882.00	
5270	2402-2720000 EXCAVATION, CLASS 20	8,414.000 CY	5.00000		42,070.00	
5280	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	79.800 CY	625.00000		49,875.00	
5290	2404-7775000 REINFORCING STEEL	11,521.000 LB	0.80000		9,216.80	
5300	2415-2111012 PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 FT.	189.000 LF	1,400.00000		264,600.00	
5310	2415-2201012 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT.	1.000 EACH	32,000.00000		32,000.00	
5320	2507-3250005 ENGINEERING FABRIC	260.000 SY	3.00000		780.00	
5330	2507-6800061 REVETMENT, CLASS E	195.000 TON	40.00000		7,800.00	
5340	2533-4980005 MOBILIZATION	LUMP	LUMP		35,000.00	
	SECTION 0056 DESIGN NO. 1315; ALTERNATE 'SS' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'SS' OPTION 2 IS CHOSEN (131) ALT GROUP SS2					
5350	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	1,590.000 CY	10.00000		15,900.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5360	2402-2720000 EXCAVATION, CLASS 20	2,700.000 CY	10.00000		27,000.00	
5370	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	182.700 CY	700.00000		127,890.00	
5380	2404-7775000 REINFORCING STEEL	30,398.000 LB	0.80000		24,318.40	
5390	2415-2111010 PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	182.000 LF	1,300.00000		236,600.00	
5400	2415-2201010 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	1.000 EACH	25,000.00000		25,000.00	
5410	2507-3250005 ENGINEERING FABRIC	3,090.000 SY	3.00000		9,270.00	
5420	2507-6800061 REVETMENT, CLASS E	2,645.000 TON	40.00000		105,800.00	
5430	2533-4980005 MOBILIZATION	LUMP	LUMP		60,000.00	
5440	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WAL	LUMP	LUMP		15,000.00	
	SECTION 0057 DESIGN NO. 1515; ALTERNATE 'TT' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'TT' OPTION 2 IS CHOSEN (131) ALT GROUP TT2					
5450	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	95.000 CY	20.00000		1,900.00	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5460	2402-2720000 EXCAVATION, CLASS 20	1,100.000 CY	10.00000		11,000.00	
5470	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	34.400 CY	1,000.00000		34,400.00	
5480	2404-7775000 REINFORCING STEEL	5,853.000 LB	0.80000		4,682.40	
5490	2415-2110806 PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	119.000 LF	700.00000		83,300.00	
5500	2415-2200806 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	1.000 EACH	15,000.00000		15,000.00	
5510	2507-3250005 ENGINEERING FABRIC	200.000 SY	3.00000		600.00	
5520	2507-6800061 REVETMENT, CLASS E	150.000 TON	40.00000		6,000.00	
5530	2533-4980005 MOBILIZATION	LUMP	LUMP		14,000.00	
5540	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP		15,000.00	
	SECTION 0058 DESIGN NO. 0818; ALTERNATE 'UU' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'UU' OPTION 2 IS CHOSEN (131) ALT GROUP UU2					
5550	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	90.000 CY	15.00000		1,350.00	

Vendor No.: AM193 Bid Order No.: 115
Contract ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5560	2402-2720000 EXCAVATION, CLASS 20	5,000.000 CY	5.00000		25,000.00	
5570	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	85.200 CY	700.00000		59,640.00	
5580	2404-7775000 REINFORCING STEEL	13,286.000 LB	0.80000		10,628.80	
5590	2415-2111010 PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	136.000 LF	1,000.00000		136,000.00	
5600	2415-2201010 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	1.000 EACH	25,000.00000		25,000.00	
5610	2507-3250005 ENGINEERING FABRIC	185.000 SY	3.00000		555.00	
5620	2507-6800061 REVETMENT, CLASS E	135.000 TON	40.00000		5,400.00	
5630	2533-4980005 MOBILIZATION	LUMP	LUMP		25,000.00	
	SECTION 0059 DESIGN NO. 1018; ALTERNATE 'VV' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'VV' OPTION 2 IS CHOSEN (131) ALT GROUP VV2					
5640	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	150.000 CY	15.00000		2,250.00	
5650	2402-2720000 EXCAVATION, CLASS 20	1,500.000 CY	5.00000		7,500.00	

Vendor No.: AM193 Bid Order No.: 115
Contract ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5660	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	19.700 CY	1,000.00000		19,700.00	
5670	2404-7775000 REINFORCING STEEL	3,309.000 LB	0.80000		2,647.20	
5680	2415-2110806 PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	91.000 LF	525.00000		47,775.00	
5690	2415-2200806 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	1.000 EACH	10,000.00000		10,000.00	
5700	2507-3250005 ENGINEERING FABRIC	320.000 SY	3.00000		960.00	
5710	2507-6800061 REVETMENT, CLASS E	260.000 TON	40.00000		10,400.00	
5720	2533-4980005 MOBILIZATION	LUMP	LUMP		11,000.00	
	SECTION 0060 DESIGN NO. 0615; ALTERNATE 'WW' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'WW' OPTION 2 IS CHOSEN (155) ALT GROUP WW2					
5730	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	150.000 CY	20.00000		3,000.00	
5740	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP		15,000.00	
5750	2402-0425030 GRANULAR BACKFILL	45.500 CY	20.00000		910.00	

Vendor No.: AM193 Bid Order No.: 115
Contract ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5760	2402-2720000 EXCAVATION, CLASS 20	280.000 CY	20.00000		5,600.00	
5770	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	241.900 CY	750.00000		181,425.00	
5780	2404-7775000 REINFORCING STEEL	42,181.000 LB	0.80000		33,744.80	
5790	2415-2111212 PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	149.000 LF	1,600.00000		238,400.00	
5800	2507-3250005 ENGINEERING FABRIC	290.000 SY	3.00000		870.00	
5810	2507-6800061 REVETMENT, CLASS E	240.000 TON	40.00000		9,600.00	
5820	2533-4980005 MOBILIZATION	LUMP	LUMP		50,000.00	
5830	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LUMP	LUMP		7,500.00	

SECTION 0061 DESIGN NO. 0118; ALTERNATE 'XX' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'XX' OPTION 2 IS CHOSEN (155)
ALT GROUP XX2

5840	2402-0425030 GRANULAR BACKFILL	36.000 CY	15.00000		540.00	
5850	2402-2720000 EXCAVATION, CLASS 20	4,102.000 CY	5.00000		20,510.00	

Vendor No.: AM193 Bid Order No.: 115
Contract ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5860	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	71.200 CY	625.00000		44,500.00	
5870	2404-7775000 REINFORCING STEEL	11,052.000 LB	0.80000		8,841.60	
5880	2415-2111212 PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	121.000 LF	1,100.00000		133,100.00	
5890	2501-8400172 TEMPORARY SHORING	LUMP	LUMP		10,000.00	
5900	2533-4980005 MOBILIZATION	LUMP	LUMP		25,000.00	
	TOTAL BID				62,856,676.07	

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: December 15, 2015
Date of Addendum: November 18, 2015

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
115	97-0201-123	PCC PAVEMENT - GRADE AND NEW	WOODBURY	NHSN-020-2(123)--2R-47 NHSN-020-2(125)--2R-47 NHSN-020-2(127)--2R-47 NHSN-020-2(129)--2R-47 NHSN-020-2(131)--2R-47 NHSN-020-2(133)--2R-47 NHSN-020-1(123)--2R-97 NHSN-020-1(138)--2R-97 NHSN-020-1(155)--2R-97	15DEC115.A01

Make the following changes to the PROPOSAL SCHEDULE OF PRICES:

Change Proposal Line No. 2540 2416-0100042 APRONS, CONCRETE, 42 IN. DIA.;
From: 4.000 EACH
To: 3.000 EACH

Change Proposal Line No. 2560 2416-0100054 APRONS, CONCRETE, 54 IN. DIA.;
From: 7.000 EACH
To: 6.000 EACH

Delete Proposal Line No. 2660 2416-1180042 CULVERT, CONCRETE ROADWAY PIPE, 42 IN. DIA. ; 306.000 LF

Change Proposal Line No. 2680 2416-1180054 CULVERT, CONCRETE ROADWAY PIPE, 54 IN. DIA.;
From: 999.000 LF
To: 1,008.000 LF

Change Proposal Line No. 2690 2416-1180060 CULVERT, CONCRETE ROADWAY PIPE, 60 IN. DIA.;
From: 460.000 LF
To: 360.000 LF

Change Proposal Line No. 2730 2416-1240042 CULVERT, 3000D CONCRETE ROADWAY PIPE, 42 IN. DIA.;
From: 362.000 LF
To: 472.000 LF

Change Proposal Line No. 2740 2416-1240048 CULVERT, 3000D CONCRETE ROADWAY PIPE, 48 IN. DIA.;
From: 98.000 LF
To: 374.000 LF

Change Proposal Line No. 2750 2416-1240060 CULVERT, 3000D CONCRETE ROADWAY PIPE, 60 IN. DIA.;
From: 590.000 LF
To: 690.000 LF

Delete Proposal Line No. 2770 2416-1245048 CULVERT, 3750D CONCRETE ROADWAY PIPE, 48 IN. DIA.; 306.000 LF

Change Proposal Line No. 2800 2416-1262054 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 54 IN. DIA.;
From: 95.000 LF
To: 86.000 LF

Change Proposal Line No. 2810 2416-1263042 CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 42 IN. DIA.;
From: 232.000 LF
To: 122.000 LF

Change Proposal Line No. 2820 2416-1263048 CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 48 IN. DIA.;
From: 188.000 LF
To: 146.000 LF

Delete Proposal Line No. 2830 2416-1264048 CULVERT, CONCRETE PIPE, 3750D, TRENCHLESS 48 IN. DIA.; 188.000 LF

Change Proposal Line No. 2960 2422-0360048 APRONS, UNCLASSIFED, 48 IN. DIA.;
From: 4.000 LF
To: 2.000 LF

Change Proposal Line No. 3050 2422-1723048 CULVERT, UNCLASSIFED ROADWAY PIPE, 48 IN. DIA.;
From: 220.000 LF
To: 60.000 LF

Add Proposal Line No. 3393 2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 42 IN. DIA.; 196.000 LF

Add Proposal Line No. 3394 2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 48 IN. DIA.; 314.000 LF

Add Proposal Line No. 3395 2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 42 IN. DIA.; 118.000 LF

Add Proposal Line No. 3396 2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 48 IN. DIA.; 196.000 LF

If the above changes are not made, they will be made as shown here.

Make the following changes to the plan: NHSN-020-1(123)--2R-97

For updating TAB.104-3
Replace SHEET NUMBER CD.3, CD.4, CD.5, CD.6, CD.7, CD.8 CD.9 AND CD.10 with the attached

Replace the following sheets due to utility updates: NHSN-020-1(123)--2R-97
SHEET NUMBER D.1, D.2, D.4, D.6, D.8, D.10, D.12, D.14, D.16, D.18, D.20, D.22, D.24, D.26, D.28, D.30, D.32, D.34, D.36, D.38, D.40, D.42, E.1-E.26 and F.1

Add following to the reference notes on Tab. 100-4A.

2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 42 IN. DIA.
2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 48 IN. DIA.

See Tab. 104-3 in the CD sheets for locations and details.
Interlocking casing pipe connection system shall be used for all joints.

Method of Measurement:
Measurement will be length, in feet, of culvert installed, excluding aprons, to the nearest foot with no deductions for elbows, tees, and other fittings. Quantity will be determined along the axis.

Basis of Payment:
Payment will be made at the contract unit price per linear foot.
Interlocking casing pipe connection system for joints shall be included in the contract unit price per linear foot for the pipe culvert.

2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 42 IN. DIA.
2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 48 IN. DIA.

See Tab. 104-3 in the CD sheets for locations and details.
Interlocking casing pipe connection system shall be used for all joints.

Method of Measurement:
Measurement for each type and size of pipe installed by trenchless methods will be in linear feet along the centerline of the pipe.

Basis of Payment:
Payment will be made at the contract unit price per linear foot.
Payment is full compensation for:
Furnishing and installing pipe,
Trenchless installation materials and equipment,
Pit excavation, dewatering, and placing backfill material, and
Pipe connections.
Interlocking casing pipe connection system for joints shall be included in the contract unit price per linear foot for the pipe culvert.

104-3
04-21-15

DRAINAGE STRUCTURE BY ROAD CONTRACTOR

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.
* Not a bid item
① Diameter or equivalent diameter
② UNCL = Unclassified Pipe CMP = Corrugated Metal Pipe RCP = Reinforced Concrete Pipe LCP = Arch or Elliptical Low Clearance Pipe SARC = Steel Arch Pipe

Drainage Area (ACRE)	Location	Standard	Size ① (IN)	Kind Of Pipe ②	Length New Const. (LF)	Bedding Class	Design Cover (H) (FT)	Camber* (DR-102) (FT)	Apron No. IN	Apron No. OUT	Apron Guard* (DR-213) No.	Elbow* (DR-141) No.	Diaphragm* (DR-501) No.	Tee Section* (DR-142) No.	"D" Section* (DR-141) No.	Reducer* No.	Type 'C' Connections* (DR-122) Type	Type 'C' Connections* (DR-122) No.	Connected Pipe Joint* (DR-121) Type	4" Perforated Subdrain* (FT)	Flow Line Elevations Lt.	Flow Line Elevations Rt.	Flow Line Elevations Other	Flow Line Elevations Other	Dimensions Lin. Ft. Total Lt.	Dimensions Lin. Ft. Total Rt.	Dimensions Lin. Ft. Extensions Lt.	Dimensions Lin. Ft. Extensions Rt.	Skew Ahead Degrees Lt.	Skew Ahead Degrees Rt.	Dike Rt./Lt.	Dike Location Station	Dike Top Elev.	Dike Type	Class 20 (CY)	Flowable Mortar (CY)	Floodable* Backfill (A) (CY)	Porous* Backfill (B) (CY)	Flooded Backfill (A+B) (CY)	Remarks
	11073+74.53	Exist	120x96	RCB	118																																			UAC
MED	11075+50.00, 53' Rt.	DR-641	24	RCP	58		3.0		1		1						C-3	1			1273.11		1272.18		39.0										166.9	10.7	44.4	5.8	50.2	31
			24	CMP	92					1												1252.35	1270.89	1253.03		117.9														
20.0	11077+42.00	DR-601	36	RCP	164		14.0		1	1											1264.09	1256.00			16.1	163.0			3						122.2	N/A	195.7	12.3	208.1	32
	11077+43.08	Exist	42	RCP	91																																			UAC
	11085+28.31	Exist	72x72	RCB	125																																			UAC
26.0	11094+42.00	DR-601	42	RCP	202		21.0		1								C-1	1			1278.64	1268.82			29.3	178.1			19						141.3	10.7	53.1	5.8	58.9	33
	11094+86.97	Exist	48	RCP	107																																			UAC
4.0	11099+73.53	Exist	24	RCP	84																																			UAC
	11108+93.36	Exist	128x128	RCB	113																																			UAC
22.0	11118+01.00	DR-601	42	[illegible]	314		3.8														1308.80	1305.66			200.0	114.0			26		MED	11118+01.00	1313.15	G	3.3	18.5	261.4	15.3	276.7	34
MED	11118+25.00, 53' Rt.	DR-641	24	RCP	58		3.0		1		1						C-3	1			1311.24		1310.32		39.0										386.6	10.7	43.5	5.8	49.3	35
			24	CMP	234		16.0			1												1270.28	1309.10	1272.39		241.2														
	11118+92.62	Exist	36x36	RCB	154																																			P&A
MED	11123+50.00, 53' Rt.	DR-641	24	RCP	78		5.0		1		1						C-3	1			1313.12		1312.19		48.2										450.3	N/A	101.0	6.6	107.6	36
			24	CMP	76					1												1295.63	1310.60	1296.14		113.2														
MED	11130+00.00, 53' Rt.	DR-641	24	RCP	84		4.3		1		1						C-3	1			1311.34		1310.43		57.8										208.7	N/A	111.4	7.1	118.5	37
			24	CMP	132					1												1279.15	1308.90	1279.64		163.6														
	11133+51.66	Exist	144x171	Arch	167																																			UAC, 38
3.0	11144+89.00	DR-601	24	RCP	168		10.0		1	1											1334.79	1328.01			23.1	157.0									83.9	N/A	191.3	11.0	202.3	
	11144+90.22	Exist	24	RCP	98																																			UAC
MED	11148+25.00, 53' Rt.	DR-611	24	RCP	102		5.0		1	1	1										1341.19	1338.00	1340.26		48.7	65.9									260.4	N/A	109.8	6.8	116.6	39
1.6	11153+90.00	Exist	24	RCP	85																																			UAC, 40
MED	11156+00.00, 53' Rt.	DR-641	24	RCP	88		5.0		1		1						C-3	1			1340.35		1339.41		58.0										99.9	N/A	151.6	7.2	158.8	41
			24	CMP	66					1												1325.60	1337.42	1326.21		103.8														
12.1	11156+90.00	DR-601	36	RCP	170		3.0		1	1											1335.24	1342.78			17.2	168.5									24.5	N/A	253.7	12.9	266.7	
	11156+90.95	Exist	36	RCP	85																																			UAC
15.4	11163+48.00	Exist	42	RCP	145																																			42
	11169+50.12, 286'Lt	Exist	36	RCP	92																																			UAC
	11169+57.23	Exist	120x144	RCB	172																																			UAC
MED	11175+75.00, 53' Rt.	DR-641	24	RCP	80		5.0		1		1						C-3	1			1334.18		1333.23		48.5										280.3	N/A	118.1	6.7	124.8	43
			24	CMP	58					1												1321.25	1331.37	1321.83		97.5														
10.6	11177+75.00	DR-601	36	RCP	338		9.8		1	1											1329.45	1333.54			208.5	145.5	3.0			29	RT	11177+50.00	1337.40	G	1524.9	N/A	425.7	15.3	441.0	44
	11178+90.05	Exist	36	RCP	73																																			UAC
MED	11179+00.00, 53' Rt.	DR-611	24	RCP	98		5.0		1	1	1										1343.48	1335.03	1340.90		39.0	70.9					MED	11178+70.00	1345.10	G	289.8	N/A	120.3	6.5	126.8	45
MED	11185+50.00, 53' Rt.	DR-601	24	RCP	76		2.0		1	1	1										1358.43	1357.39			38.0	50.2					MED	11185+20.00	1360.00	G	88.4	8.4	23.3	5.1	28.4	
3.0	11186+39.47	Exist	36	RCP	79																																			46
MED	11192+00.00, 53' Rt.	DR-641	24	RCP	58		3.1		1		1						C-3	1			1373.17		1372.25		39.0						MED	11191+70.00	1374.90	G	289.6	10.6	43.3	5.6	48.9	47
			24	CMP	66					1												1359.33	1371.03	1359.93		92.9														
44.0	11196+74.00	DR-601	48	[illegible]	510		27.5														1363.28	1345.50			237.0	272.7			30						105.2	N/A	275.9	24.6	300.4	48
	11197+69.68	Exist	48x60	RCB	187																																			P&A
MED	11212+00.00, 53' Rt.	DR-641	24	RCP	58		3.0		1		1						C-3	1			1375.72		1374.80		39.0										385.2	10.7	43.6	5.6	49.2	49
			24	CMP	128					1												1345.60	1373.57	1346.29		152.6														
3.6	11212+76.35	Exist	30	RCP	66																																			50
	11221+95.90	Exist	120x120	RCB	115																																			UAC
MED	11224+25.00, 53' Rt.	DR-641	24	RCP	72		4.0		1		1						C-3	1			1351.56		1350.64		51.0										149.2	15.0	58.8	6.5	65.3	51
			24	CMP	78					1												1334.98	1349.06	1335.69		106.6														
3.6	11227+25.71	Exist	24	RCP	97																																			UAC, 52
9.7	11231+00.00	DR-611	36	RCP	288		13.0		1	1											1347.96	1358.76	1351.54		194.0	109.7					RT	11230+60.00	1362.50	G	1426.9	N/A	392.4	12.1	404.5	53
MED	11231+25.00, 53' Rt.	DR-611	24	RCP	82		3.0		1	1	1										1362.37	1359.36	1361.42		39.0	55.1									146.8	10.9	46.1	5.5	51.6	54
	11231+81.65	Exist	36	RCP	109																																			UAC
MED	11237+00.00, 53' Rt.	DR-611	24	RCP	76		2.6		1	1	1										1372.74	1371.70	1371.91		38.5	49.7					MED	11236+70.00	1374.70	G	102.8	9.3	30.7	5.0	35.7	55
	11255+54.15	Exist	102x120	RCB	122																																			UAC, 56
MED	11257+25.00, 53' Rt.	DR-641	24	RCP	58		3.0		1		1						C-3	1			1364.10		1363.18		39.0										138.8	10.7	43.9	5.0	49.0	57
			24	CMP	90					1												1344.00	1361.92	1344.66		116.0														
MED	11260+75.00, 53' Rt.	DR-641	24	RCP	58		3.1		1		1						C-3	1			1367.04		1366.12		39.0						MED	11260+45.00	1368.90	G	137.2	10.7	44.2	5.7	49.9	58
			24	CMP	52					1												1356.99	1364.84	1357.62		79.5														
7.6	11264+31.92	Exist	30	RCP	80																																			UAC
MED	11270+00.00, 53' Rt.	DR-611	24	RCP	76		2.6		1	1	1										1392.97	1391.93	1392.15		38.5	49.7					MED	11269+75.00	1393.60	G	103.3	10.7	44.2	5.7	49.9	59
0.5	11279+13.05	Exist	24	RCP	79																																			UAC, 60
MED	11281+00.00, 53' Rt.	DR-641	24	RCP	74		4.7		1		1						C-3	1			1412.35		1411.41		49.9										114.0	N/A	102.3	6.6	108.9	61
			24	CMP	50					1												1403.10	1409.85	1403.71		82.8														
	11281+92.71	Exist	24	RCP	98																																			UAC
4.0	11282+00.00	DR-601	24	RCP	152		13.0		1	1											1404.51	1403.50			27.2	137.0									906.6	N/A	146.4	9.6	156.0	
MED	11296+00.00, 53' Rt.	DR-641	24	RCP	58		3.2		1		1						C-3	1			1405.90		1404.98		39.0						MED	11296+30.00	1408.00	G	163.6	10.7	44.1	5.6	49.7	62
			24	CMP	76					1												1389.70	1403.72	1390.36		102.6														
MED	11298+00.00, 53' Rt.	DR-641	24	RCP	58		3.2		1		1						C-3	1			1405.11		1404.19		39.0										138.2	10.6	42.7	5.6	48.3	63
			24	CMP	90					1												1385.25	1403.03	1385.86		116.1														
150.0	11298+45.00	DR-601	138X88	LCP	200		13.0			1											1392.27	1384.60			51.0	161.6			1						49.5	N/A	556.0	35.4	591.4	64
	11298+51.68	Exist	60x60	RCB	88																																			UAC

FILE NO. | ENGLISH | DESIGN TEAM Flattery\Johnson | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-1(123)--2R-97 | SHEET NUMBER CD.3

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Includes Addenda: A02

DRAINAGE STRUCTURE BY ROAD CONTRACTOR

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.
* Not a bid item
(1) Diameter or equivalent diameter
(2) UNCL = Unclassified Pipe CMP = Corrugated Metal Pipe RCP = Reinforced Concrete Pipe LCP = Arch or Elliptical Low Clearance Pipe SARC = Steel Arch Pipe

Drainage Area	Location	Standard	Size (1)	Kind Of Pipe (2)	Length New Const.	Bedding Class	Design Cover (H)	Camber* (DR-102)	Apron No.		Apron Guard* (DR-213)	Elbow* (DR-141)	Diaphragm* (DR-501)	Tee Section* (DR-142)	"D" Section* (DR-141)	Reducer*	Type "C" Connections* (DR-122)		Connected Pipe Joint* (DR-121)	4" Perforated Subdrain*	Flow Line Elevations				Dimensions Lin. Ft.				Skew Ahead Degrees		Dike			Class 20	Flowable Mortar	Floodable* Backfill	Porous* Backfill	Flooded Backfill	Remarks
																									Total		Extensions				Rt. / Lt.	Location Station	Top Elev.	Type					
ACRE			IN		LF		FT	FT	IN	OUT	No.	No.	No.	No.	No.	No.	Type	No.	Type	FT	Lt.	Rt.	Other	Other	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.					CY	CY	(A) CY	(B) CY	(A+B) CY	
	11441+94.89	Exist	96x72	RCD	97																																	Remove
	11450+73.93	Exist	12	Clay	78																																	Remove
	11453+26.05	Exist	24	RCP	56																																	Remove
	11455+71.02	DR-621	60	RCP	22		12.0		1								C-3	1			1389.00		1388.02		123.4		22.0											148
	SIDE ROADS																																					
	Story Ave. (N)																																					
	1401+95.00	Exist	24	RCP	42																																	Remove
			24	CMP	28																																	Remove
7.0	1402+00.00	DR-651	30	UNCL	48		3.6		1	1											1238.70		1238.37		26.5		26.5								138.4	N/A	N/A	N/A	N/A	
	Timber Ave.																																					
	1602+80.00	Exist	42	RCP	79																																	Remove
	1602+81.00	DR-652	42	UNCL	94		10.0		1	1											1271.43		1267.00	1268.24	40.8		53.1				14				594.8	N/A	N/A	N/A	N/A	145
	Co. Rd. L43																																					
12.0	1701+50.00	DR-651	36	UNCL	46		2.0		1	1											1311.14		1311.43		32.0		30.0					LT	11123+00.00	1315.00	G	135.5	N/A	N/A	N/A	N/A	146
	1701+89.00	Exist	24	RCP	54																																	Remove
	1705+30.00	Exist	24	CMP	54																																	Remove
	Woodbury Ave. (N)																																					
	2106+95.77, 102' Lt	Exist	48	CMP	41																																	Remove
	Alpine Ave.																																					
	2210+48.35	Exist	96x96	RCB	83																																	Remove
	Brady Ave.																																					
3.5	2304+00.00	DR-651	24	UNCL	60		5.5		1	1											1402.60		1404.80		38.0		34.2								190.1	N/A	N/A	N/A	N/A	
	2306+95.88	Exist	18	CMP	33																																	Remove
	Eagle Ave.																																					
	3002+73.00	Exist	96x72	RCB	50																																	Remove
	TOTALS:																																		39211.2	782.3	19805.6	1139.0	20944.6	

BID ITEMS:

APRONS, CONCRETE, 24 IN. DIA.	127	EACH
APRONS, CONCRETE, 30 IN. DIA.	1	EACH
APRONS, CONCRETE, 36 IN. DIA.	12	EACH
APRONS, CONCRETE, 42 IN. DIA.	3	EACH
APRONS, CONCRETE, 48 IN. DIA.	7	EACH
APRONS, CONCRETE, 54 IN. DIA.	6	EACH
APRONS, CONCRETE, 60 IN. DIA.	4	EACH
REMOVE AND REINSTALL CONCRETE PIPE APRONS LESS THAN OR EQUAL TO 36 IN.	18	EACH
REMOVE AND REINSTALL CONCRETE PIPE APRONS GREATER THAN 36 IN.	6	EACH
APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 108 IN.	2	EACH
APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 42 IN.	2	EACH
CULVERT, CONCRETE ROADWAY PIPE, 24 IN. DIA.	7864	LF
CULVERT, CONCRETE ROADWAY PIPE, 30 IN. DIA.	216	LF
CULVERT, CONCRETE ROADWAY PIPE, 36 IN. DIA.	1356	LF
CULVERT, CONCRETE ROADWAY PIPE, 48 IN. DIA.	496	LF
CULVERT, CONCRETE ROADWAY PIPE, 54 IN. DIA.	1008	LF
CULVERT, CONCRETE ROADWAY PIPE, 60 IN. DIA.	360	LF
CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 108 IN.	262	LF
CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 42 IN.	60	LF
CULVERT, 3000D CONCRETE ROADWAY PIPE, 24 IN. DIA.	278	LF
CULVERT, 3000D CONCRETE ROADWAY PIPE, 42 IN. DIA.	472	LF
CULVERT, 3000D CONCRETE ROADWAY PIPE, 48 IN. DIA.	374	LF
CULVERT, 3000D CONCRETE ROADWAY PIPE, 60 IN. DIA.	690	LF
CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 24 IN. DIA.	100	LF
CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 36 IN. DIA.	230	LF
CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 54 IN. DIA.	86	LF
CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 42 IN. DIA.	122	LF
CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 48 IN. DIA.	146	LF
APRONS, METAL, 24 IN. DIA.	47	EACH
CULVERT, CORRUGATED METAL ROADWAY PIPE, 24 IN. DIA.	4080	LF
APRONS, UNCLASSIFIED, 24 IN. DIA.	8	EACH
APRONS, UNCLASSIFIED, 30 IN. DIA.	6	EACH
APRONS, UNCLASSIFIED, 36 IN. DIA.	8	EACH
APRONS, UNCLASSIFIED, 42 IN. DIA.	2	EACH
APRONS, UNCLASSIFIED, 48 IN. DIA.	2	EACH
CULVERT, UNCLASSIFIED ROADWAY PIPE, 24 IN. DIA.	468	LF
CULVERT, UNCLASSIFIED ROADWAY PIPE, 30 IN. DIA.	218	LF
CULVERT, UNCLASSIFIED ROADWAY PIPE, 36 IN. DIA.	274	LF
CULVERT, UNCLASSIFIED ROADWAY PIPE, 42 IN. DIA.	94	LF

DRAINAGE STRUCTURE BY ROAD CONTRACTOR

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.
* Not a bid item
① Diameter or equivalent diameter
② UNCL = Unclassified Pipe CMP = Corrugated Metal Pipe RCP = Reinforced Concrete Pipe LCP = Arch or Elliptical Low Clearance Pipe SARC = Steel Arch Pipe

Drainage Area	Location	Standard	Size ①	Kind Of Pipe ②	Length New Const.	Bedding Class	Design Cover (H)	Camber* (DR-102)	Apron No.		Apron Guard* (DR-213)	Elbow* (DR-141)	Diaphragm* (DR-501)	Tee Section* (DR-142)	"D" Section* (DR-141)	Reducer*	Type 'C' Connections* (DR-122)		Connected Pipe Joint* (DR-121)	4" Perforated Subdrain*	Flow Line Elevations				Dimensions Lin. Ft. Total		Dimensions Lin. Ft. Extensions		Skew Ahead Degrees		Dike Rt./Lt.	Dike Location Station	Dike Top Elev.	Dike Type	Class 20	Flowable Mortar	Floodable* Backfill (A)	Porous* Backfill (B)	Flooded Backfill (A+B)	Remarks
ACRE			IN		LF		FT	FT	IN	OUT	No.	No.	No.	No.	No.	No.	Type	No.	Type	FT	Lt.	Rt.	Other	Other	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.				CY	CY	CY	CY	CY	

CULVERT, UNCLASSIFIED ROADWAY PIPE, 48 IN. DIA.	60	LF	
PERMALOK, STEEL, 42 IN. DIA.	196	LF	
PERMALOK, STEEL, 48 IN. DIA.	314	LF	
PERMALOK, STEEL, TRENCHLESS, 42 IN. DIA.	118	LF	
PERMALOK, STEEL, TRENCHLESS, 48 IN. DIA.	196	LF	
REVETMENT, CLASS E	305	TON	(Shown in Remarks below.)
ENGINEERING FABRIC	365	SY	(Shown in Remarks below.)
CLASS 10	208	CY	(Shown in Remarks below.)

NOTES:
DR-651 calculated as RCP and DR-652 calculated as CMP.
Where removal of pipe is done in stage 2, make sure that length is placed correctly in the jacking.
For 6'x6' RCB and 102"x62" Low Clearance Concrete Pipes (and comparable CMP) and larger, temporary stream diversion needs to be bid.
P&A = Plug and Abandon
All RCP will be 2000D unless noted.
All pipes will be class 'B' bedding unless noted.
oted.

ARKS:
1 Ditch north side. Pipe class 3000D. Jack 146', jacked outlet 73.02' Lt. on skew Elev=1172.098, inlet 72.94' Rt. Elev=1175.57. One D section. F=232'
2 Ditch north side. Pipe class 3000D. Jack 122', jacked outlet 17.47' Lt. on skew Elev=1235.28, inlet 139.47' Lt. Elev=1237.00.
3 One D section. Two 15° CMP elbows. A=58', B=72', C=2', D=6.125', E=26', L=3.5'
4 Pipe class 3000D. One 4° elbow to raise slope. F=173.7
5 One D section. Two 15° CMP elbows. A=56', B=38', C=2', D=6.125', E=40', L=3.5'. DR-205, Top Elevation=1231.58.
6 Remove flume.
7 Pipe class 3000D. One 4° elbow. Four 6' long D sections with bevel on groove ends. At Sta. 10922+80.49, 170.49' Rt. start one 6' long normal pipe section. Then four 6' long D sections with bevel on groove ends, starting Sta. 10922+77.58, 165.33' Rt. elev= 1205.14 and ending at Sta. 10922+70.40, 144.16' Rt. elev=1205.37 Then 162' of pipe with 4° elbow 49.58' from last D section. Elbow used to raise pipe slope. F=78.34' down centerline of pipe (pipe outlet to 4° elbow).
8 Pipe class 3000D. From pipe outlet lay 238' of pipe then five (6' long) 5° D sections with bevel on groove ends. Then 30' of pipe plus apron.
9 One D section. Two 15° CMP elbows. A=58', B=46', C=2', D=6.125', E=28', L=3.5'
10 One 4° D section and one normal D section. F=78.125' at 4°. Other D section butting inlet apron. DR-205, Top Elevation=1224.36.
11 Temporary pipe, ditch outlet to drain.
12 One D section. Two 15° CMP elbows. A=58', B=74', C=2', D=6.125', E=28', L=3.5'
13 Remove flume.
14 One D section. Two 15° CMP elbows. A=68', B=80', C=2', D=6.125', E=26', L=3.5'
15 Two 15° CMP elbows. A=92', B=46', C=2', D=6.125', E=22', L=3.5'
16 Ditch outlet to staged inlet
17 One D section. Two 15° CMP elbows. A=58', B=56', C=2', D=6.125', E=26', L=3.5'
18 One D section. F=90.125'
19 One D section. Two 15° CMP elbows. A=58', B=32', C=2', D=6.125', E=26', L=3.5'
20 Two 15° CMP elbows. A=94', B=76', C=2', E=38', L=3.5'
21 One D section. Two 15° CMP elbows. A=78', B=80', C=2', D=6.125', E=24', L=3.5'. DR-205, Top Elevation=1236.46.
22 One D section. F=96.125'
23 One D section. F=116.125'
24 One D section. F=96.125'
25 One D section. F=92.125'
26 One D section. Two 15° CMP elbows. A=58', B=54', C=2', D=6.125', E=24', L=3.5'
27 Pipe class 3000D. From outlet Sta. 11039+91.53, 146.64' Rt. lay 22' of pipe to Sta. 11040+08.38, 132.5' Rt. (elev=1242.83). Then ten (8' long) 5° D sections with bevel on groove ends upstream ending at Sta. 11040+43.00, 66.00' Rt. (elev=1243.60). Then 66' of pipe.
28 One D section. Two 15° CMP elbows. A=58', B=70', C=2', D=6.125', E=26', L=3.5'
29 One D section. Two 15° CMP elbows. A=68', B=30', C=2', D=6.125', E=44', L=3.5'. DR-205, Top Elevation=1288.51.
30 One D section. Two 15° CMP elbows. A=58', B=26', C=2', D=6.125', E=26', L=3.5'
31 One D section. Two 15° CMP elbows. A=58', B=64', C=2', D=6.125', E=26', L=3.5'
32 Two double bevel D sections at outlet apron. Apron placement outlet of apron at Sta.11077+26.72 160.91' Rt. and other end of apron at Sta. 11077+31.07 154.20' Rt.
33 Pipe class 3000D. Six 8' long double bevel 4° D sections. One 8' long double bevel D section with a 5° on groove end and 4° on tongue end. At outlet lay one 6' long normal section (outlet at Sta. 11094+15.32, 167.61' Rt. and other end of 6' at Sta. 11094+11.70, 162.82' Rt. (elev=1268.88)). Then six double bevel 4° to 5° section to increase pipe slope. RF-2 at 5° if needed.
34 Jack 118' inlet 1308.80, 200' Lt. on skew outlet 1307.92, 82' Lt. on skew. 0.344" wall
35 One D section. Two 15° CMP elbows. A=58', B=132', C=2', D=6.125', E=100', L=3.5'
36 One D section. Two 15° CMP elbows. A=78', B=52', C=2', D=6.125', E=22', L=3.5'. DR-205, Top Elevation=1313.94.
37 One D section. Two 15° CMP elbows. A=84', B=106', C=2', D=6.125', E=24', L=3.5'. DR-205, Top Elevation=1312.16.
38 Remove wings as needed
39 One D section. F=108.125'. DR-205, Top Elevation=1342.01.
40 Stage 1 outlet this pipe to proposed inlet ahead.
41 One D section. Two 15° CMP elbows. A=88', B=40', C=2', D=6.125', E=24', L=3.5'. DR-205, Top Elevation=1341.17.
42 Ditch outlet in median ahead to RCB in median.
43 One D section. Two 15° CMP elbows. A=80', B=34', C=2', D=6.125', E=22', L=3.5'. DR-205, Top Elevation=1334.99.
44 Jack 112', jacked outlet 1329.54, 200.5' Lt. on skew Jacked inlet 1330.83, 88.5' Lt. on skew.
45 One D section. F=96.125'

FILE NO.	ENGLISH	DESIGN TEAM Flattery\Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER CD.8

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Includes Addenda: A02

DRAINAGE STRUCTURE BY ROAD CONTRACTOR

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.
* Not a bid item
(1) Diameter or equivalent diameter
(2) UNCL = Unclassified Pipe CMP = Corrugated Metal Pipe RCP = Reinforced Concrete Pipe LCP = Arch or Elliptical Low Clearance Pipe SARC = Steel Arch Pipe

	Drainage Area	Location	Standard	Size (1)	Kind Of Pipe (2)	Length New Const.	Bedding Class	Design Cover (H)	Camber* (DR-102)	Apron No.		Apron Guard* (DR-213)	Elbow* (DR-141)	Diaphragm* (DR-501)	Tee Section* (DR-142)	"D" Section* (DR-141)	Reducer*	Type "C" Connections* (DR-122)	Connected Pipe Joint* (DR-121)	4" Perforated Subdrain*	Flow Line Elevations				Dimensions Lin. Ft.				Skew Ahead Degrees		Dike				Class 28	Flowable Mortar	Floodable* Backfill	Porous* Backfill	Flooded Backfill	Remarks
																									Total		Extensions				Rt.	Location Station	Top Elev.	Type					
	ACRE			IN		LF		FT	FT	IN	OUT	No.	No.	No.	No.	No.	No.	Type	No.	Type	FT	Lt.	Rt.	Other	Other	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.				CY	CY	CY	CY	CY	
47		One D section. Two 15° CMP elbows. A=58', B=40', C=2', D=6.125', E=24', L=3.5'																																				
48		Jack 196', jacked outlet 1356.45, 41.1' Lt. on skew, jacked inlet 1363.28, 237' Lt. on skew. 0.344" wall. Bevel outlet end.																																				
49		One D section. Two 15° CMP elbows. A=58', B=98', C=2', D=6.125', E=28', L=3.5'																																				
50		Outlet existing pipe to inlet proposed median pipe.																																				
51		One D section. Two 15° CMP elbows. A=72', B=48', C=2', D=6.125', E=28', L=3.5'																																				
52		Use as temporary median drainage.																																				
53		North side drain temp outlet and jacking pit. Outlet temp partial silting. One 8° elbow. F=252.5' Jack 118', jacked outlet 1348.07, 186' Lt., jacked inlet 1349.78, 68.01' Lt.																																				
54		One D section. F=88.125'																																				
55		One D section. F=82.125'																																				
56		Remove old headwall as needed																																				
57		One D section. Two 15° CMP elbows. A=58', B=62', C=2', D=6.125', E=26', L=3.5'																																				
58		One D section. Two 15° CMP elbows. A=58', B=26', C=2', D=6.125', E=24', L=3.5'																																				
59		One D section. F=82.125'																																				
60		Drain into median and back.																																				
61		One D section. Two 15° CMP elbows. A=84', B=106', C=2', D=6.125', E=42', L=3.5'. DR-205, Top Elevation=1312.51.																																				
62		One D section. Two 15° CMP elbows. A=58', B=48', C=2', D=6.125', E=26', L=3.5'																																				
63		One D section. Two 15° CMP elbows. A=58', B=62', C=2', D=6.125', E=26', L=3.5'																																				
64		Ditch outlet to ROW. At outlet Rip Rap= 120 tons, Engineering Fabric= 140 Sq. Yds., Class 10= 80 cy., Ditch median, Rip Rap= 20 tons, Engineering Fabric= 30 Sq. Yds., Class 10= 13 cy.																																				
65		Two 15° CMP elbows. A=58', B=28', C=2', D=6.125', E=32', L=3.5'																																				
66		One D section. F=82.125'																																				
67		One D section. F=88.125'																																				
68		One D section. Two 15° CMP elbows. A=58', B=38', C=2', D=6.125', E=26', L=3.5'																																				
69		With 6x6x5 extension. Remove 130' from outlet.																																				
70		Temporary partial silting.																																				
71		One D section. Two 15° CMP elbows. A=72', B=36', C=2', D=6.125', E=26', L=3.5'																																				
72		One D section. F=98.125'																																				
73		Ditch median to drain.																																				
74		One D section. F=98.125'																																				
75		One D section. F=84.125'																																				
76		One D section. Two 15° CMP elbows. A=58', B=34', C=2', D=6.125', E=26', L=3.5'																																				
77		Temporary partial silting. Ditch outlet to ROW. Jack 100', jacked outlet 1457.91, 175' Lt., jacked inlet 1458.84, 75' Lt.																																				
78		One D section. F=82.125'																																				
79		One D section. F=100.125'. DR-205, Top Elevation=1448.54																																				
80		Jack 86', jacked outlet 1441.31, 169' Lt. on skew, jacked inlet 1441.64, 83' Lt. on skew.																																				
81		Two 15° CMP elbows. A=68', B=32', C=2', E=24', L=3.5'																																				
82		One D section. F=82.125'																																				
83		One D section. F=82.125'																																				
84		Ditch median to drain.																																				
85		Ditch median to drain.																																				
86		One D section. F=112.125'																																				
87		Ditch median to drain.																																				
88		One D section. F=82.125'																																				
89		One D section. Two 15° CMP elbows. A=60', B=14', C=2', D=6.125', E=22', L=3.5'. DR-205, Top Elevation=1388.71.																																				
90		One D section. Two 15° CMP elbows. A=64', B=44', C=2', D=6.125', E=24', L=3.5'. DR-205, Top Elevation=1388.24.																																				
91		Remove headwall as needed.																																				
92		One D section. Two 15° CMP elbows. A=62', B=26', C=2', D=6.125', E=22', L=3.5'. DR-205, Top Elevation=1390.39.																																				
93		One D section. Two 15° CMP elbows. A=56', B=38', C=2', D=6.125', E=24', L=3.5'. DR-205, Top Elevation=1401.76.																																				
94		UAC 60"x48" RCB. Remove outlet headwall and parapet and part of barrel to square up end to extend. DR-122																																				
95		F=26'. One 5° elbow.																																				
96		F=56'. One 3° elbow.																																				
97		Pipe class 3000D. A=98'																																				
98		One D section. F=88.125'																																				
99		Pipe class 3000D. A=88'																																				
100		One D section. F=90.125'																																				
101		Remove and relay inlet apron. Pipe class 3000D. A=108'																																				
102		One D section. Two 15° CMP elbows. A=58', B=32', C=2', D=6.125', E=26', L=3.5'																																				
103		Remove and relay inlet apron. F=98' from end of stage 1, bevel at apron.																																				
104		A=102'																																				
105		One D section. F=82.125'																																				
106		One 2° D section with bevel on tongue end to increase pipe slope. From inlet stage 1 pipe lay 12' of pipe, then 2° D section.																																				
107		Remove and relay apron. One D section at inlet apron.																																				
108		Remove and relay apron. One 4° D section with bevel on tongue end at junction of pipe after inlet apron is removed used to increase pipe slope. A=72'																																				
109		Pipe class 3000D. A=94'																																				
110		One 2° D section. 54' from extension install the 2° section to increase pipe slope. A=116'																																				
111		Remove and relay apron. A=90'																																				
112		Remove and relay apron. A=92'																																				
113		Remove and relay apron.																																				
114		One D section. F=88.125'																																				
115		Remove and relay apron. Pipe class 3000D. One D section at inlet apron. DR-205, Top Elevation=1287.77.																																				
116		One D section. Two 15° CMP elbows. A=58', B=28', C=2', D=6.125', E=24', L=3.5'																																				
117		One D section. Two 15° CMP elbows. A=58', B=80', C=2', D=6.125', E=26', L=3.5'																																				

DRAINAGE STRUCTURE BY ROAD CONTRACTOR

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.
* Not a bid item
(1) Diameter or equivalent diameter
(2) UNCL = Unclassified Pipe CMP = Corrugated Metal Pipe RCP = Reinforced Concrete Pipe LCP = Arch or Elliptical Low Clearance Pipe SARC = Steel Arch Pipe

Drainage Area	Location	Standard	Size (1)	Kind Of Pipe (2)	Length New Const.	Bedding Class	Design Cover (H)	Camber* (DR-102)	Apron No.	Apron Guard* (DR-213)	Elbow* (DR-141)	Diaphragm* (DR-501)	Tee Section* (DR-142)	"D" Section* (DR-141)	Reducer*	Type 'C' Connections* (DR-122)	Connected Pipe Joint* (DR-121)	4" Perforated Subdrain*	Flow Line Elevations				Dimensions Lin. Ft.				Skew Ahead Degrees		Dike				Class 20	Flowable Mortar	Floodable* Backfill	Porous* Backfill	Flooded Backfill	Remarks
																							Total		Extensions				Rt.	Location Station	Top Elev.	Type				
ACRE			IN		LF		FT	FT	IN OUT	No.	No.	No.	No.	No.	No.	Type No.	Type	FT	Lt.	Rt.	Other	Other	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.				CY	CY	(A) CY	(B) CY	(A+B) CY	
	118 Remove 88' of pipe. Cut bevel at pipe inlet.																																		
	119 One D section. Two 15° CMP elbows. A=82', B=86', C=2', D=6.125', E=54', L=3.5'. DR-205, Top Elevation=1313.94.																																		
	120 One D section. Two 15° CMP elbows. A=58', B=106', C=2', D=6.125', E=42', L=3.5'																																		
	121 Remove and relay inlet apron.																																		
	122 Remove and relay inlet apron. Stage 2 to dike left without pipe.																																		
	123 One D section. Two 15° CMP elbows. A=58', B=64', C=2', D=6.125', E=28', L=3.5'																																		
	124 One D section. Two 15° CMP elbows. A=58', B=86', C=2', D=6.125', E=54', L=3.5'																																		
	125 Remove and relay outlet apron. Remove 62' of outlet pipe plus apron.																																		
	126 Remove 46' of pipe. Bevel inlet end.																																		
	127 Remove as needed.																																		
	128 One D section. Two 15° CMP elbows. A=58', B=90', C=2', D=6.125', E=28', L=3.5'																																		
	129 One D section. Two 15° CMP elbows. A=82', B=60', C=2', D=6.125', E=48', L=3.5'																																		
	130 Remove 52' of pipe plus apron. Relay apron.																																		
	131 One D section. Two 15° CMP elbows. A=58', B=38', C=2', D=6.125', E=26', L=3.5'																																		
	132 Remove and relay inlet apron. A=104'																																		
	133 A=62'. At inlet Rip Rap= 165 tons, Engineering Fabric= 195 Sq. Yds., Class 10= 115 cy.																																		
	134 Remove and relay inlet apron. A=84'																																		
	135 A=116'																																		
	136 Remove and relay inlet apron. A=84'																																		
	137 Remove and relay outlet apron. Remove 70' of outlet plus apron.																																		
	138 Remove as needed.																																		
	139 Remove 58' of 54" from outlet. Add outlet apron.																																		
	140 Remove and relay outlet apron. A=124'. One D section with bevel on groove end. DR-622, left 7.5° skew.																																		
	141 Remove and relay outlet apron. Ditch outlet to ROW. A=114'																																		
	142 Remove and relay inlet apron.																																		
	143 One D section. F=84.125'																																		
	144 Remove and relay inlet apron. A=102'																																		
	145 One 3° elbow. F=56'																																		
	146 Bury flow lines 0.2'																																		
	147 Remove and relay inlet apron.																																		
	148 UAC 60"x48" RCB. Remove inlet headwall to face of parapet. DR-122																																		

FILE NO.	ENGLISH	DESIGN TEAM Flattery\Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER CD.10
11/13/2015 3:19:10 PM	pflatte	c:\pw_work\pwmain\pflatte\d0675491\(9702012)cd .xlsm		Includes Addenda: AD2	

SURVEY SYMBOLS

- GDL Guard Rail Steel
- FW Wire Fence
- TPD Telephone Pedestal
- AST Above Ground Storage Tank
- WHD Water Hydrant
- BIN Grain Bin
- TDC Tree Deciduous
- MIS Miscellaneous
- SI Sign
- OUT Tile Outlet
- TIL Tile Line
- MM Mile Marker Post
- LP L.P. Tank
- RET Retaining Walls
- TEV Evergreen Tree
- TFR Tree Fruit
- WEL Well
- PRO Profile Shot
- FCL Chain Link and Security Fence
- SNP Unpaved Shoulder
- EP Edge of Paved Roads (ML or SR)
- DU Centerline Draw or Stream (Up)
- ENU Edge Unpaved Entrance & Parking
- ENT Centerline BL of Entrance
- CON Concrete or A/C Slab
- SWK Sidewalk
- D Centerline Draw or Stream (Down)
- DIK Centerline of Dike or Dam
- EG Edge of Gravel Road
- BNK Stream Bank
- ENP Edge Paved Entrance & Park Lot
- SOP Size of Pipe or Culvert
- LUM Luminaire
- FWD Wood Fence
- MH Utility Access (Manhole)
- GP Guard Post (Less Than 4 Posts)
- FHD Fire Hydrants
- WV Water Valve
- EB Electrical Box
- IN Storm Sewer Intake
- INB Storm Sewer Beehive Intake
- SH Paved Shoulder
- GU Gutter In Front of Curb
- WM Wind Mill
- UE Utility Elevation
- BLD Building or Foundation
- SHR Shrub
- HDG Hedge Row
- SEP Septic Tank
- SLO Silo
- CIS Cistern
- WC Wild Card (Misc. Field Shot)
- TLNL Tree Line Left
- UB Utility Box
- FLG Flag Poles
- GRV Grave
- SL Speed Limit Sign
- TLNR Tree Line Right
- EW Edge of Water
- BL Topo Breakline
- EG Edge of Gravel Road
- D Centerline Draw or Stream (Down)
- BNK Stream Bank
- BLD Building or Foundation

UTILITY LEGEND

This is a POINT 25 Project and is subject to the provisions of IAC 761-115.25.

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UTILITY LEGEND

This is a POINT 25 Project and is subject to the provisions of IAC 761-115.25.

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PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(205)	Existing Utilities
SHADING	**Design Color No.**	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(205)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line
- Section Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)

FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.1

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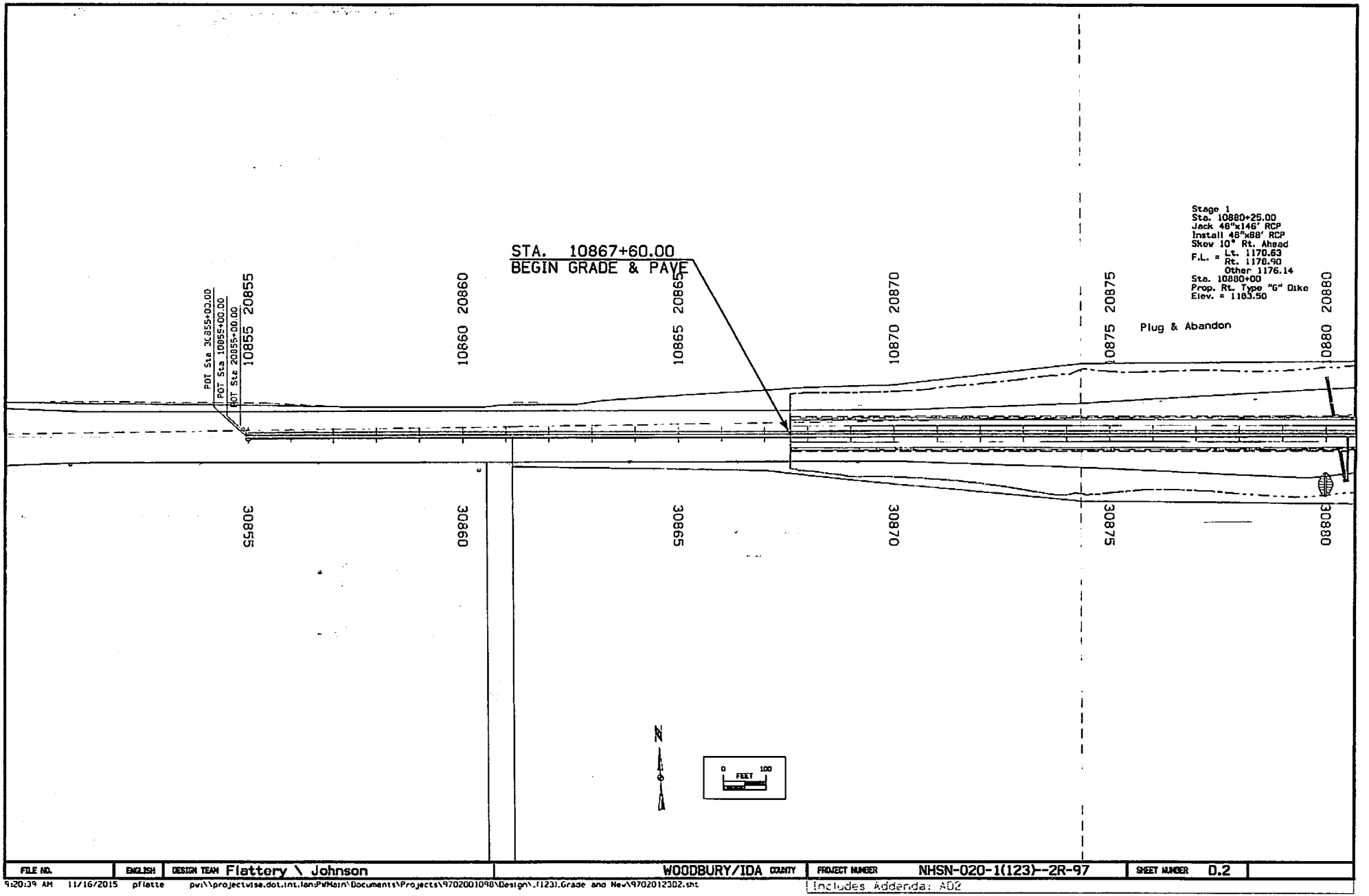
Includes Addenda: A02



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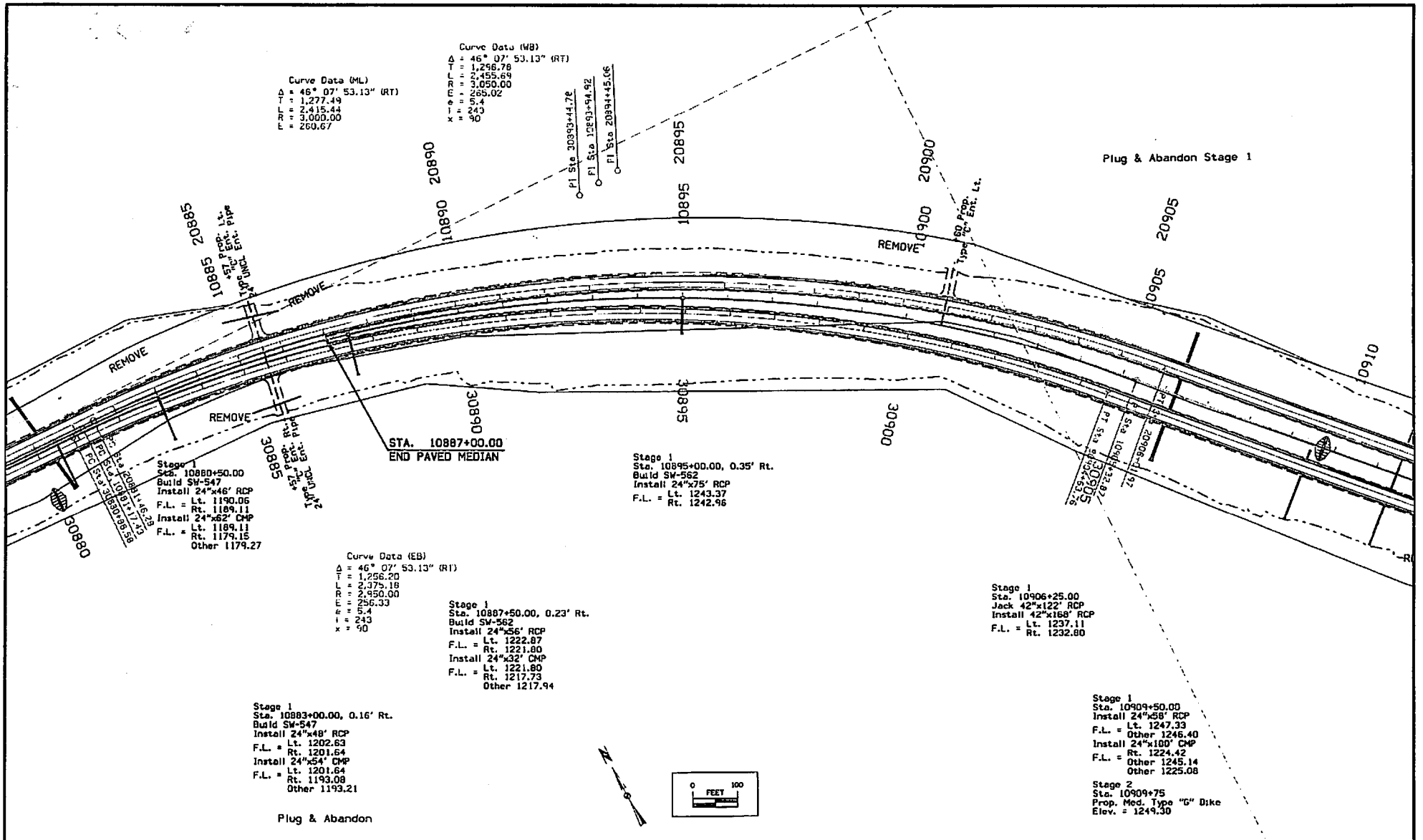
Includes Addenda: A02



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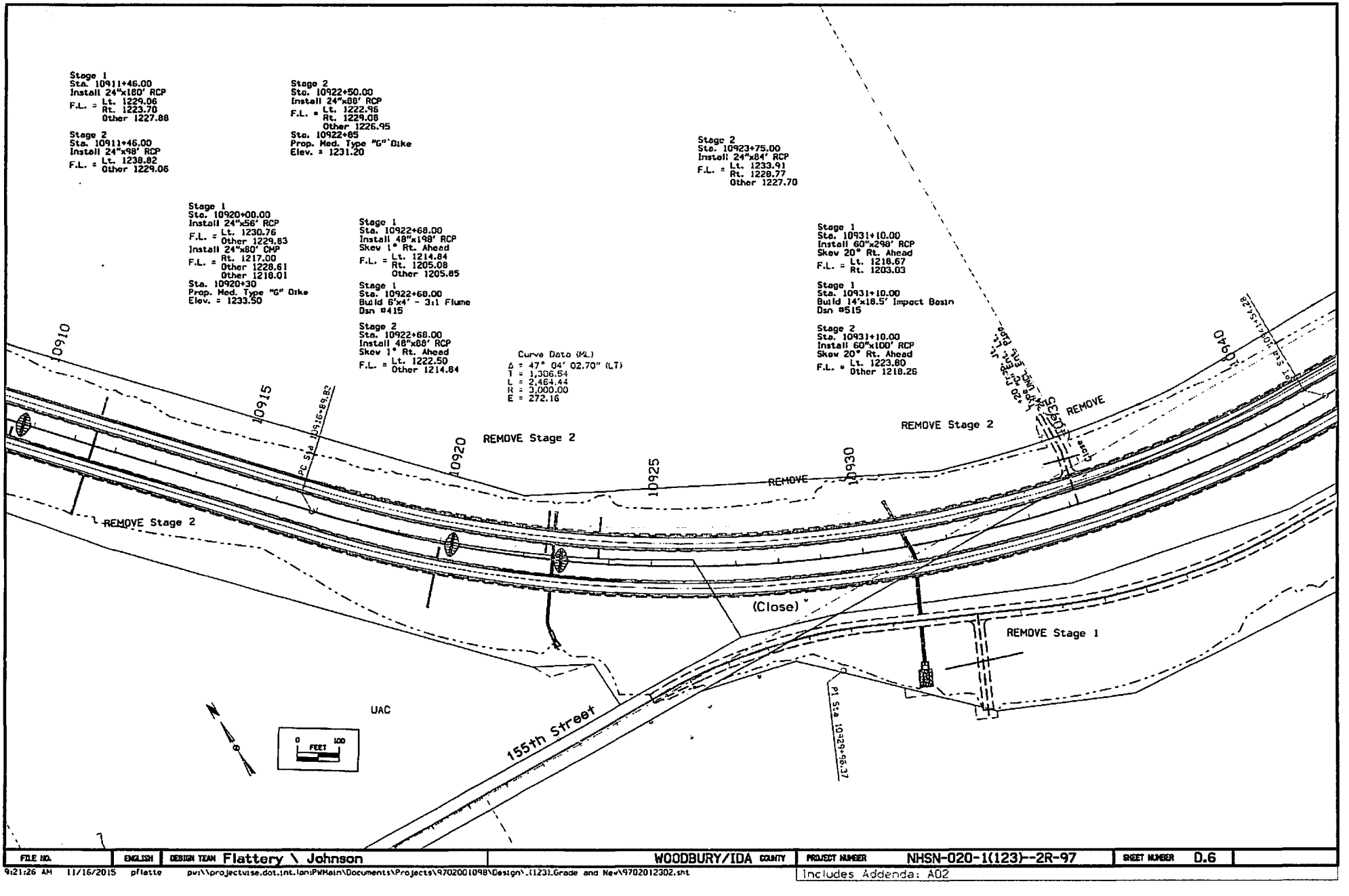

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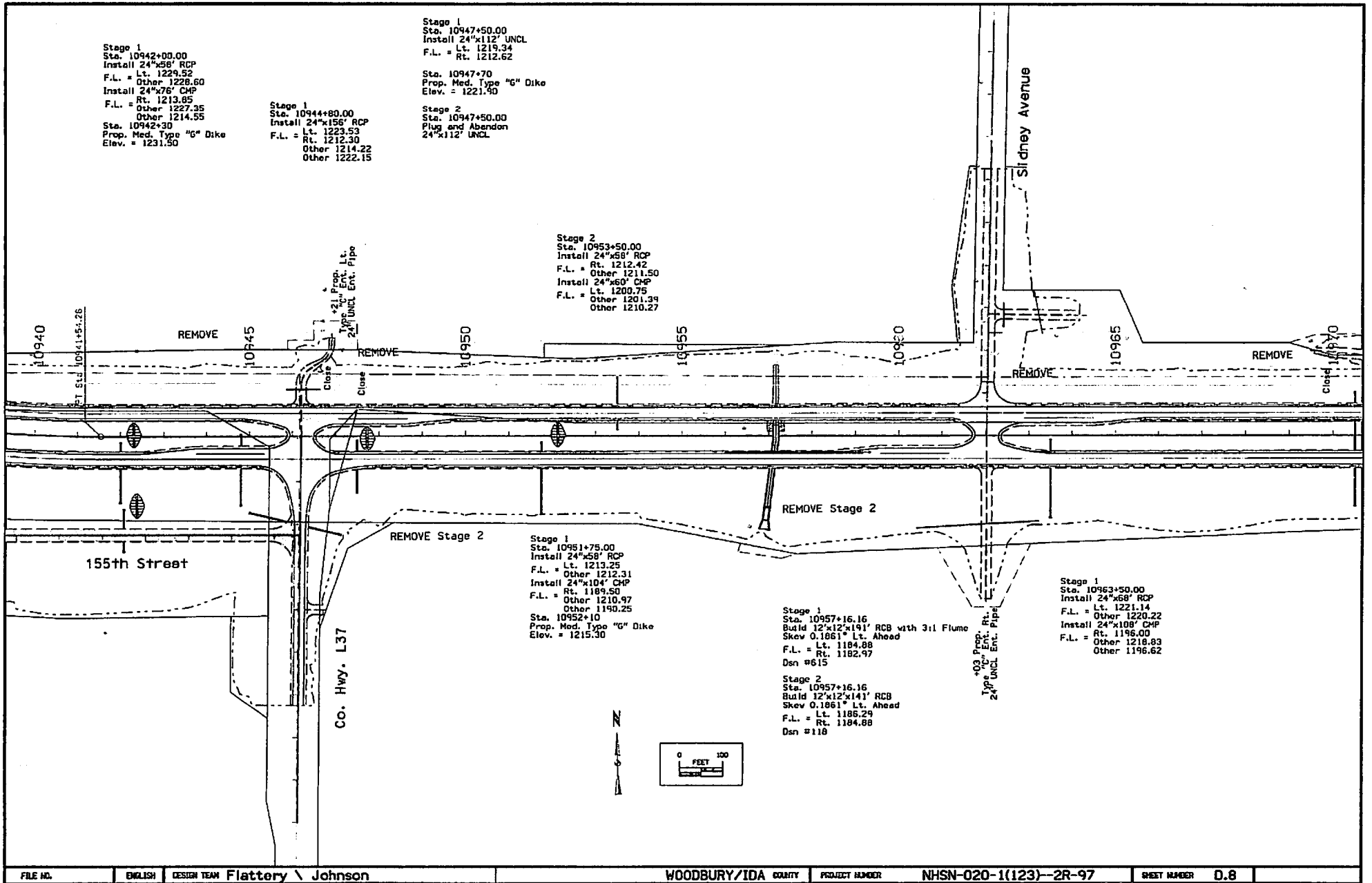
Includes Addenda: A02


Stage 1
Sta. 10942+00.00
Install 24"x58' RCP
F.L. = Lt. 1229.52
Other 1228.60
Install 24"x76' CMP
F.L. = Rt. 1213.85
Other 1227.35
Other 1214.55
Sta. 10942+30
Prop. Med. Type "G" Dike
Elev. = 1231.50
Stage 1
Sta. 10944+80.00
Install 24"x156' RCP
F.L. = Lt. 1223.53
Rt. 1212.30
Other 1214.22
Other 1222.15
Stage 1
Sta. 10947+50.00
Install 24"x112' UNCL
F.L. = Lt. 1219.34
Rt. 1212.62
Sta. 10947+70
Prop. Med. Type "G" Dike
Elev. = 1221.40
Stage 2
Sta. 10947+50.00
Plug and Abandon
24"x112' UNCL
Stage 2
Sta. 10953+50.00
Install 24"x58' RCP
F.L. = Rt. 1212.42
Other 1211.50
Install 24"x60' CMP
F.L. = Lt. 1200.75
Other 1201.39
Other 1210.27
Sidney Avenue
10940
10941+51.26
10945
10950
10955
10960
10965
10970
REMOVE
REMOVE
REMOVE
REMOVE
REMOVE Stage 2
REMOVE Stage 2
+21 Prop. Lt. 24" Type "C" UNCL Ent. Pipe
Close
Close
Close
155th Street
Co. Hwy. L37
Stage 1
Sta. 10951+75.00
Install 24"x58' RCP
F.L. = Lt. 1213.25
Other 1212.31
Install 24"x104' CMP
F.L. = Rt. 1189.50
Other 1210.97
Other 1190.25
Sta. 10952+10
Prop. Med. Type "G" Dike
Elev. = 1215.30
Stage 1
Sta. 10957+16.16
Build 12'x12'x191' RCB with 3:1 Flume
Skew 0.1861° Lt. Ahead
Lt. 1184.88
F.L. = Rt. 1182.97
Dsn #615
Stage 2
Sta. 10957+16.16
Build 12'x12'x141' RCB
Skew 0.1861° Lt. Ahead
Lt. 1186.29
F.L. = Rt. 1184.88
Dsn #118
+03 Prop. Rt. 24" Type "C" UNCL Ent. Pipe
Stage 1
Sta. 10963+50.00
Install 24"x58' RCP
Lt. 1221.14
F.L. = Other 1220.22
Install 24"x108' CMP
F.L. = Rt. 1196.00
Other 1218.83
Other 1196.62
N
0 FEET 100
FILE NO.
ENGLISH
DESIGN TEAM Flattery \ Johnson
WOODBURY/IDA COUNTY
PROJECT NUMBER NHSN-020-1(123)--2R-97
SHEET NUMBER D.8
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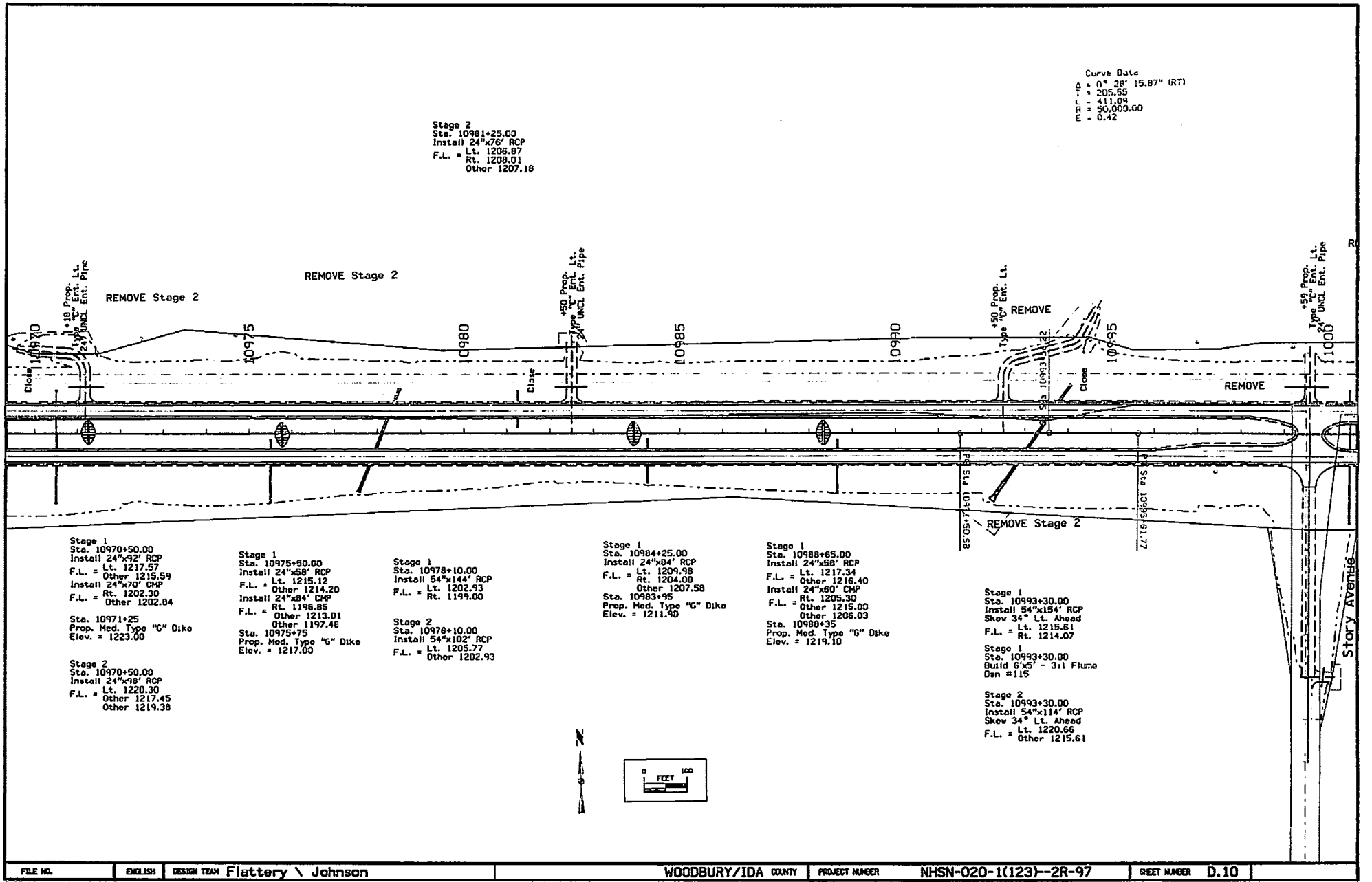

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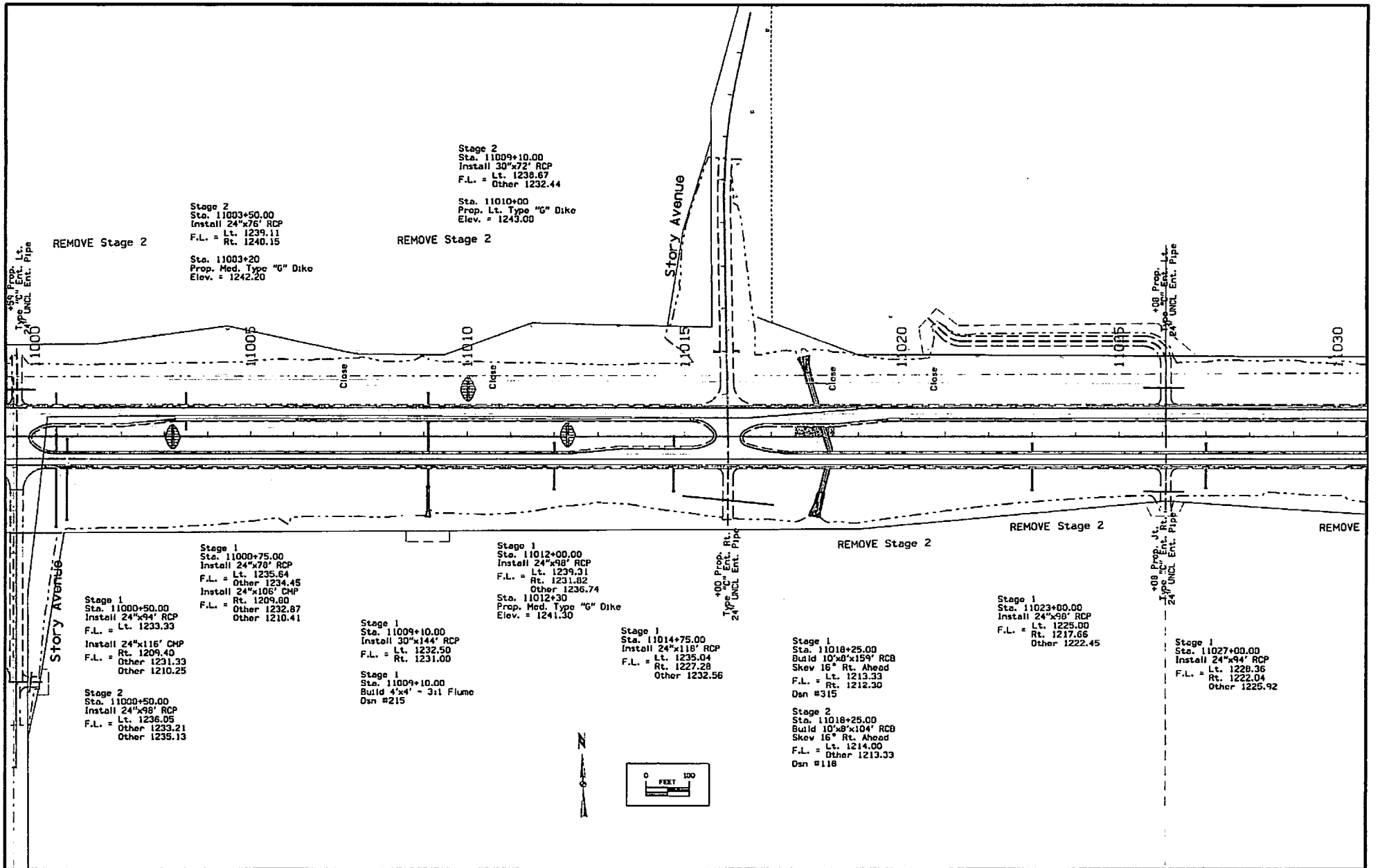
Includes Addenda: A02



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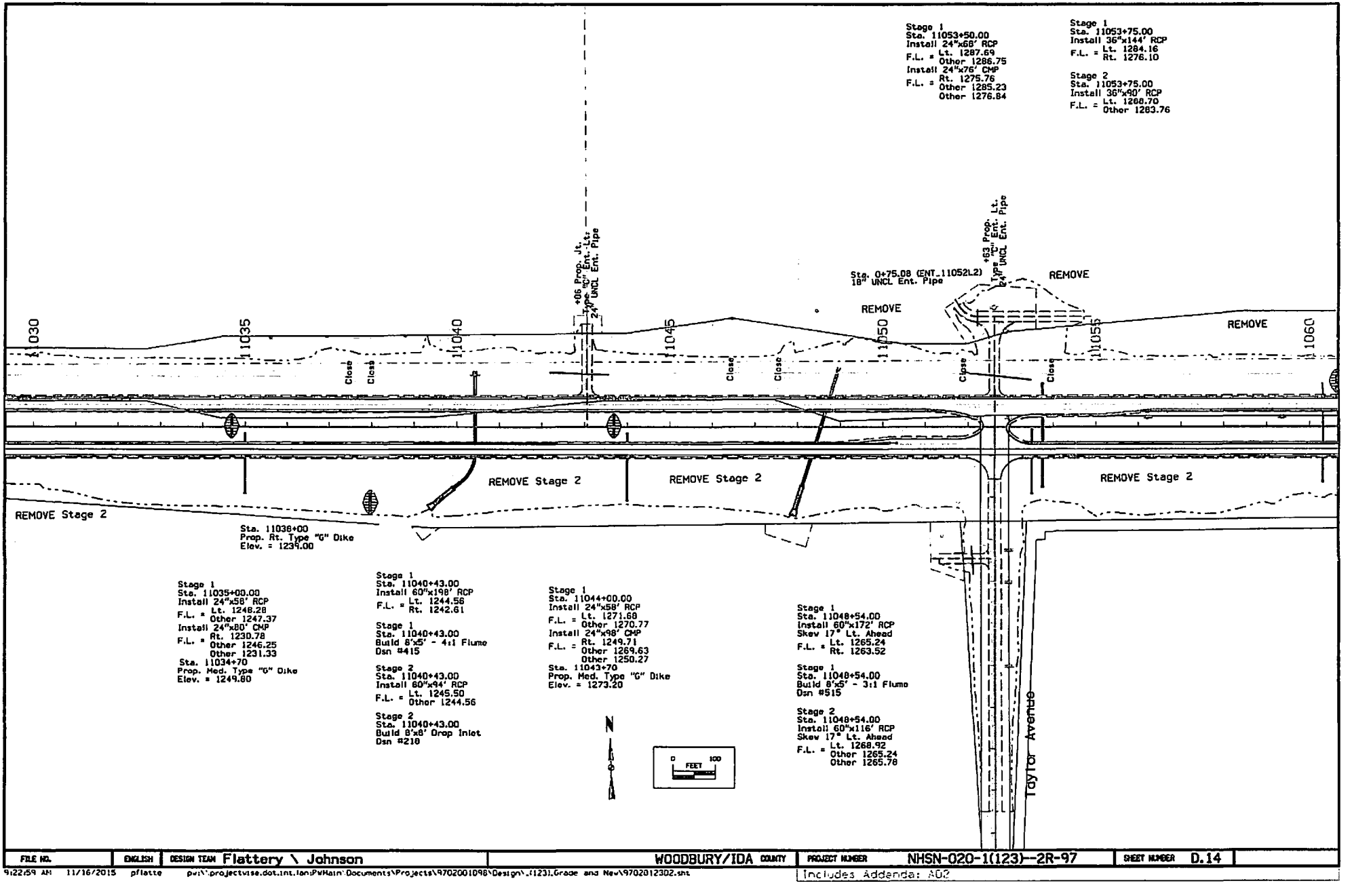

FILE NO. | ENGLISH | DESIGN TEAM Flattery \ Johnson | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-1(123)--2R-97 | SHEET NUMBER D.14

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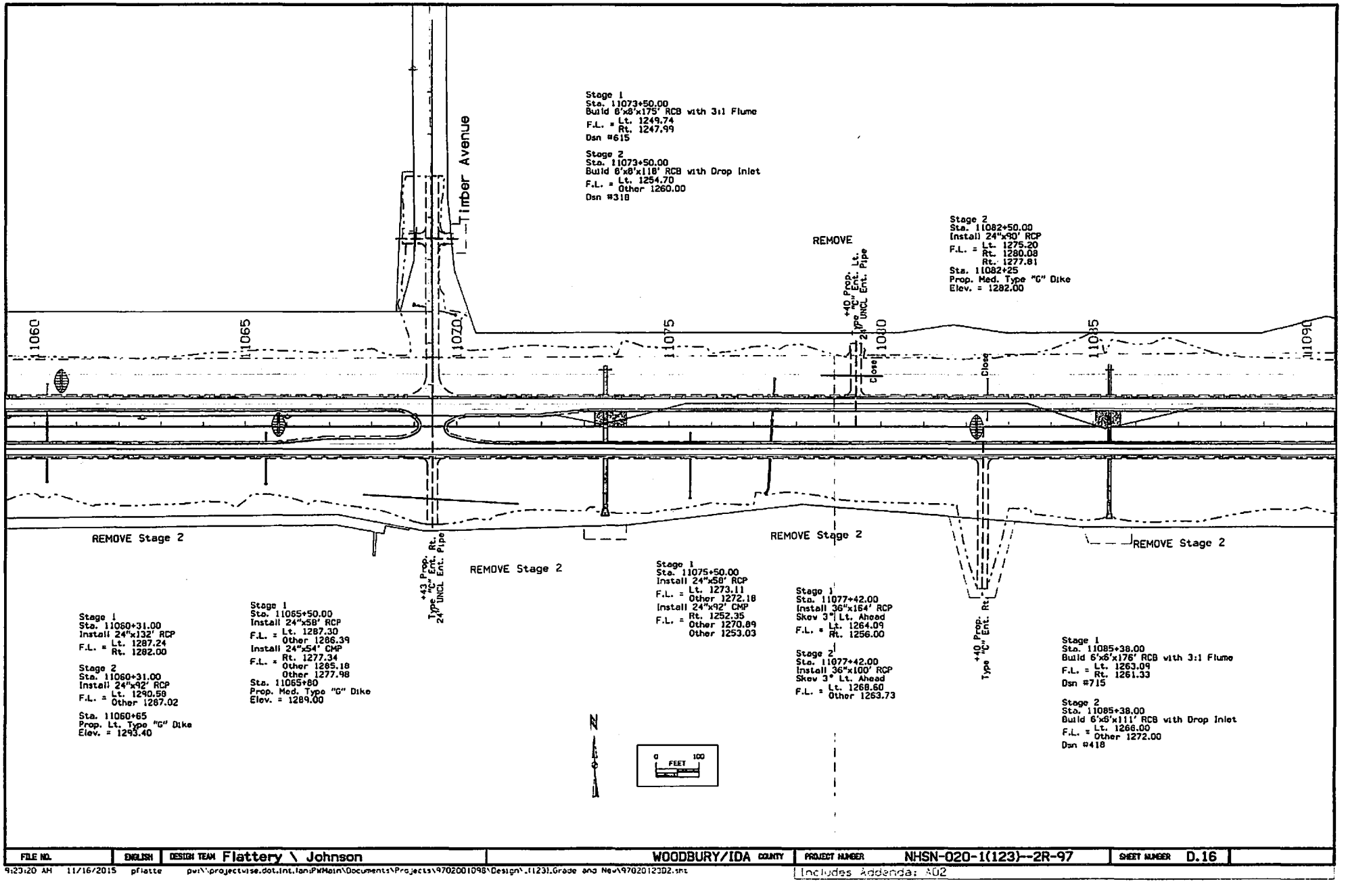

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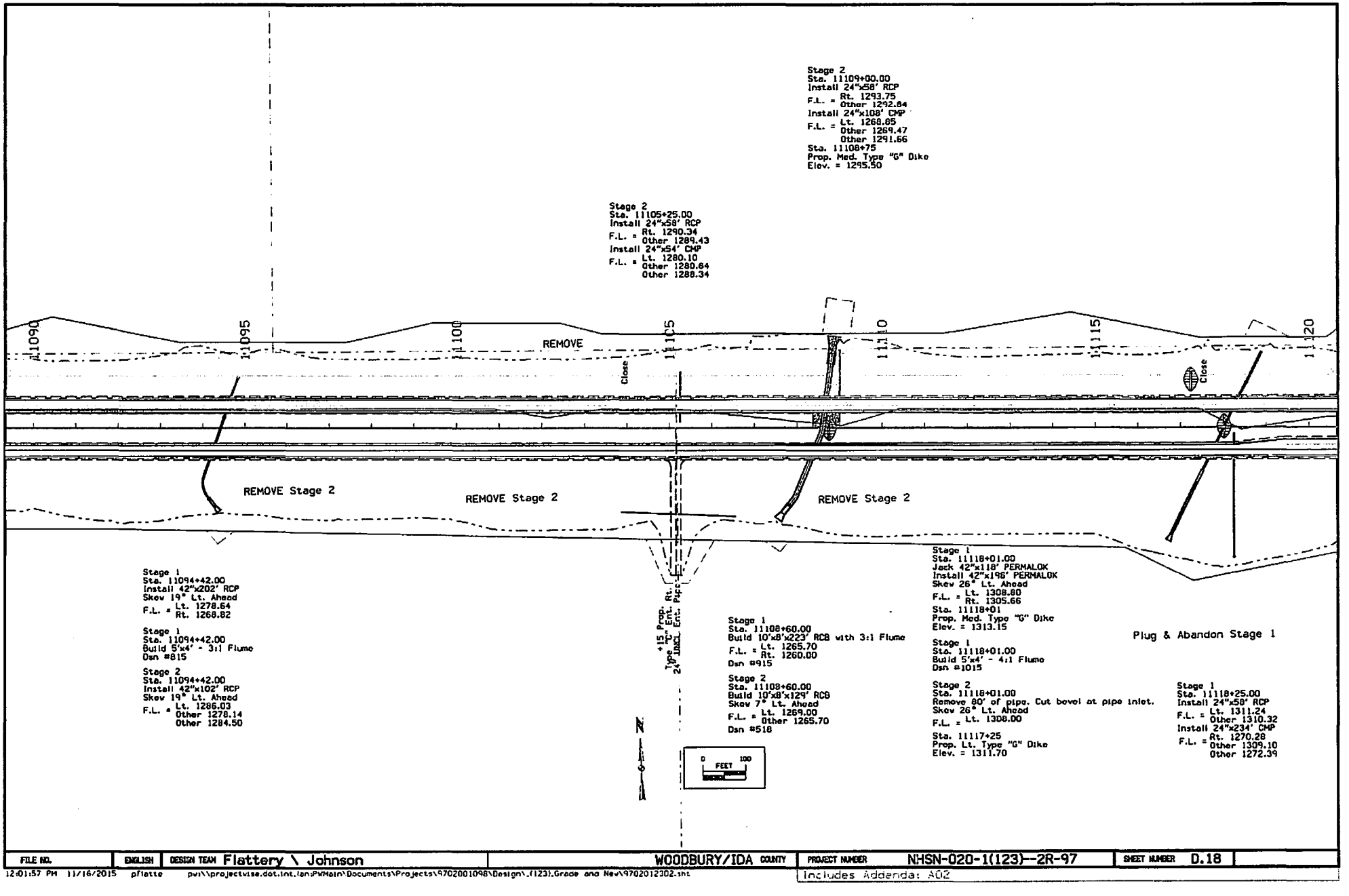

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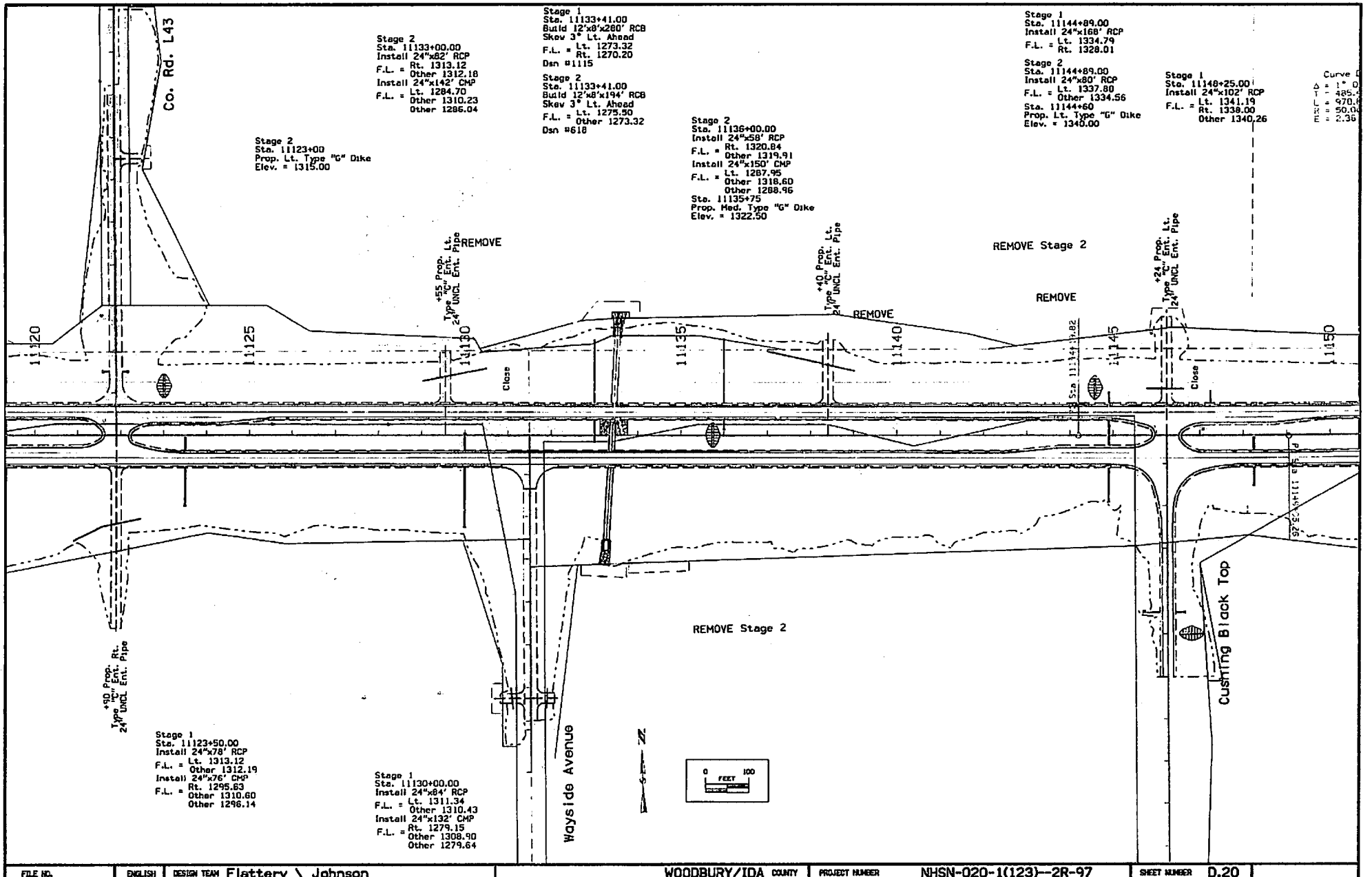

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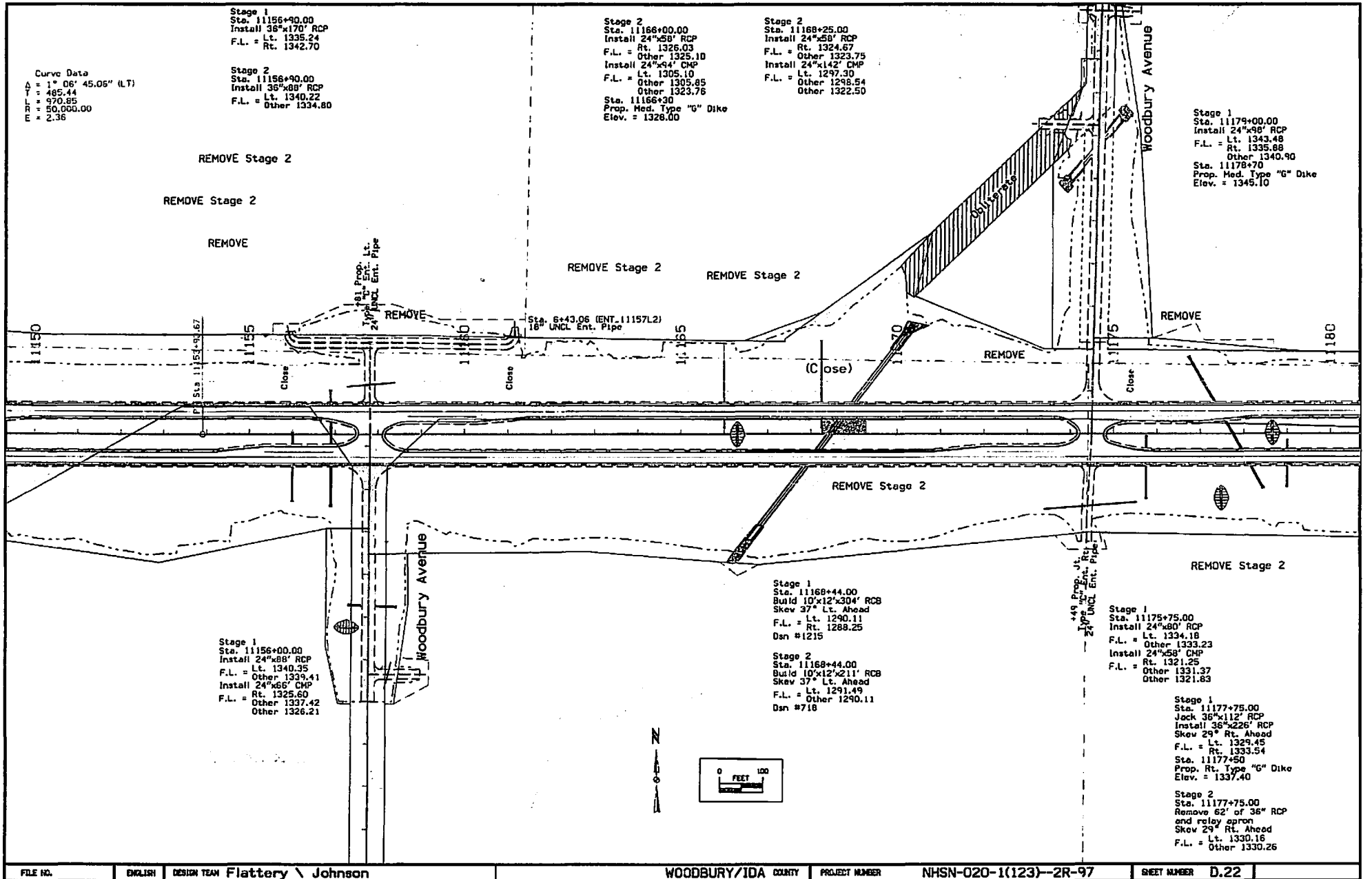
Includes Addenda: A02



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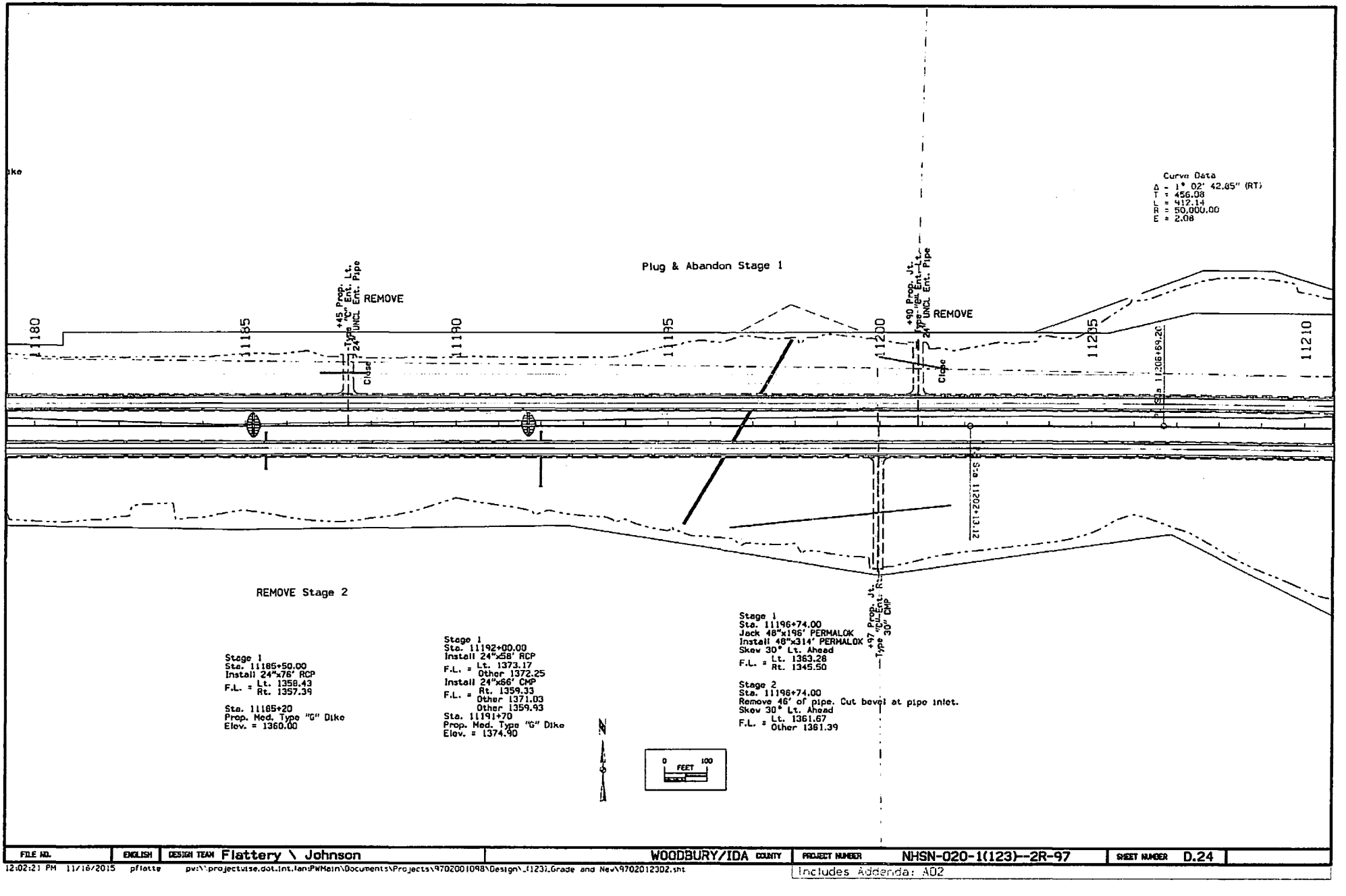

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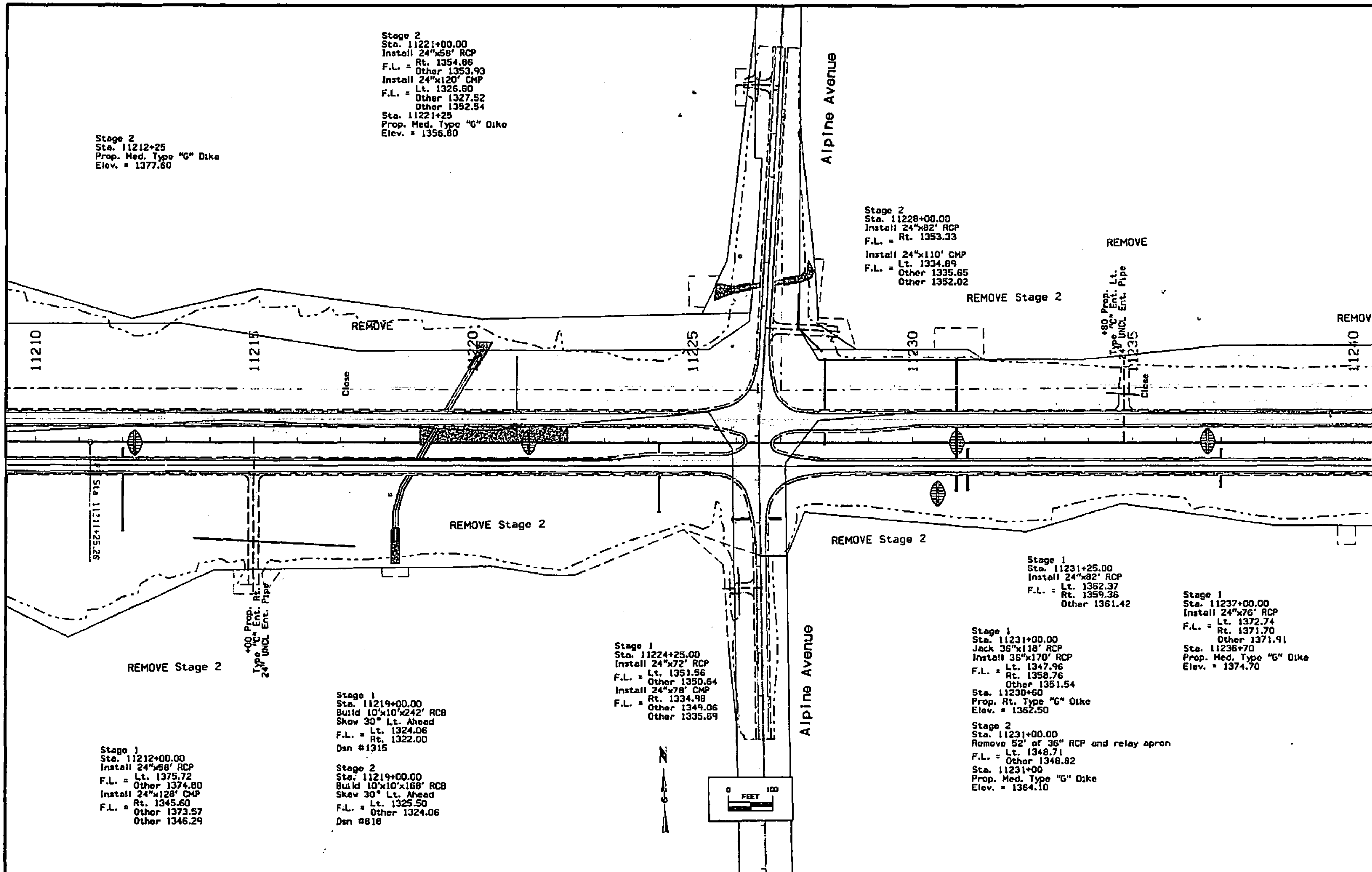

FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.26

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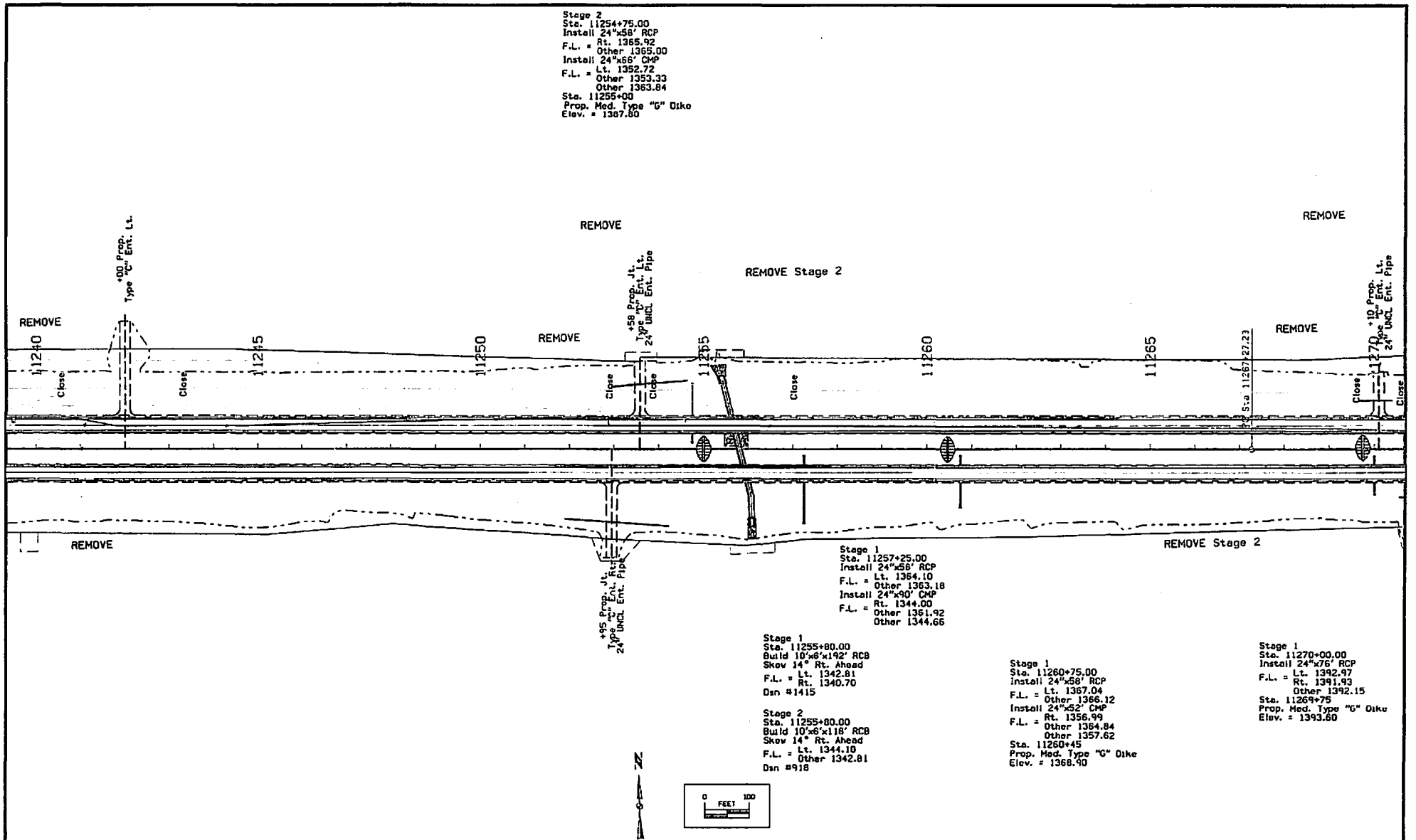
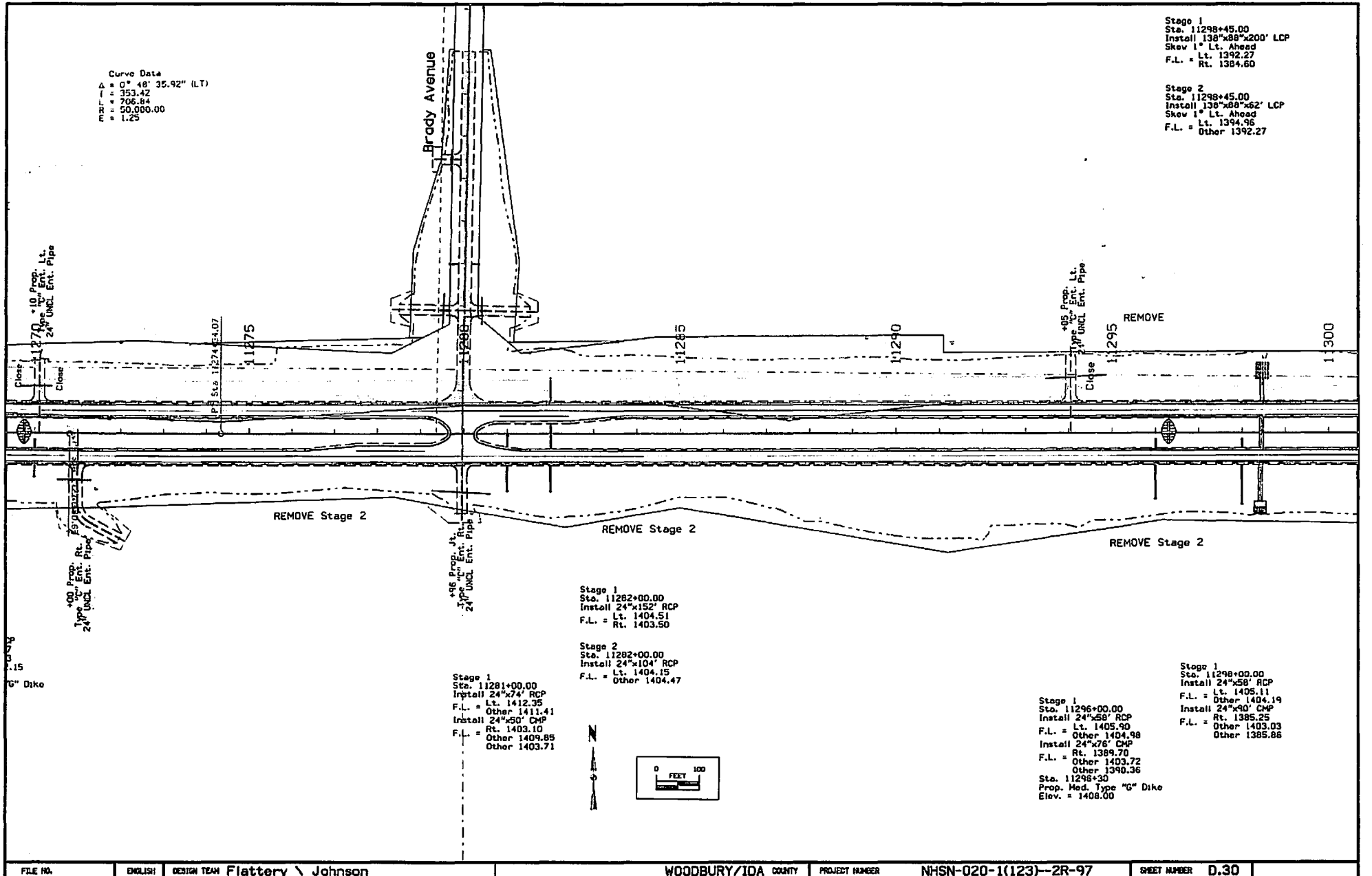
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.28

9:25:40 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and Re-\9702012302.sht

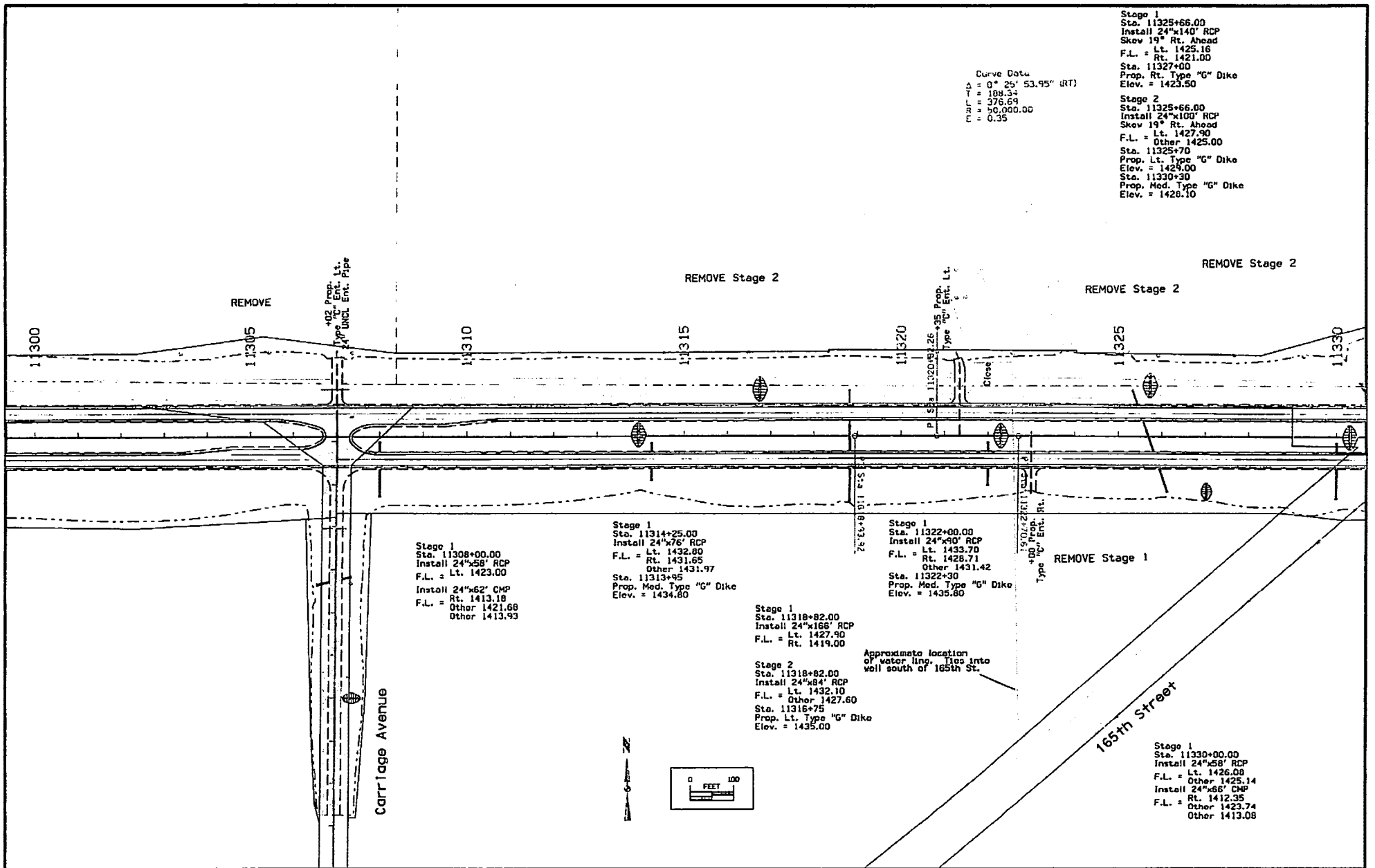
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.30

9:26:02 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain:Documents\Projects\9702001098\Design_1123).Grade and New\9702012302.sht

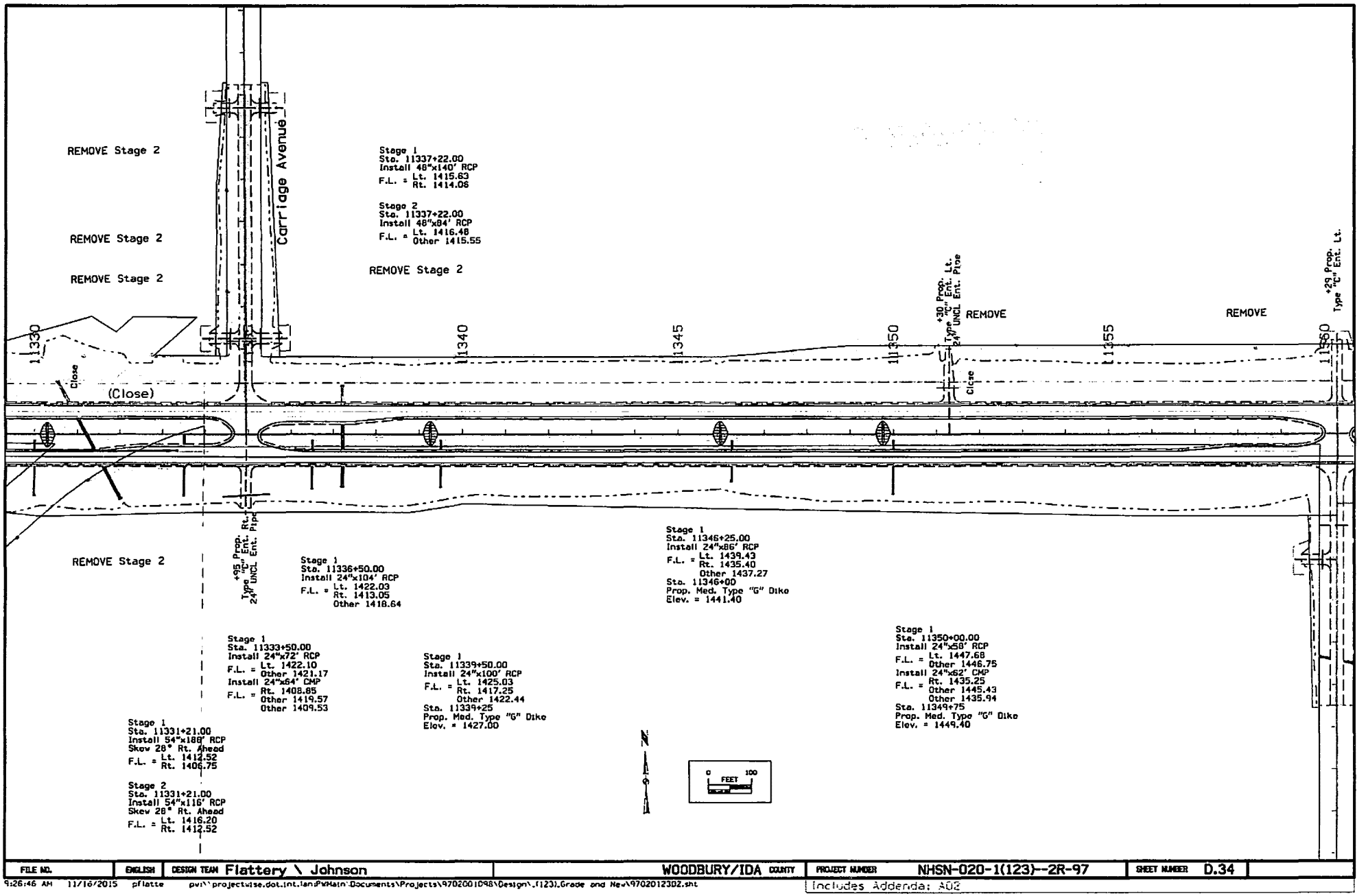
Includes Addenda: A02



FILE NO. | ENGLISH | DESIGN TEAM Flattery \ Johnson | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-1(123)--2R-97 | SHEET NUMBER D.32

9:26:24 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Pav\9702012302.sht

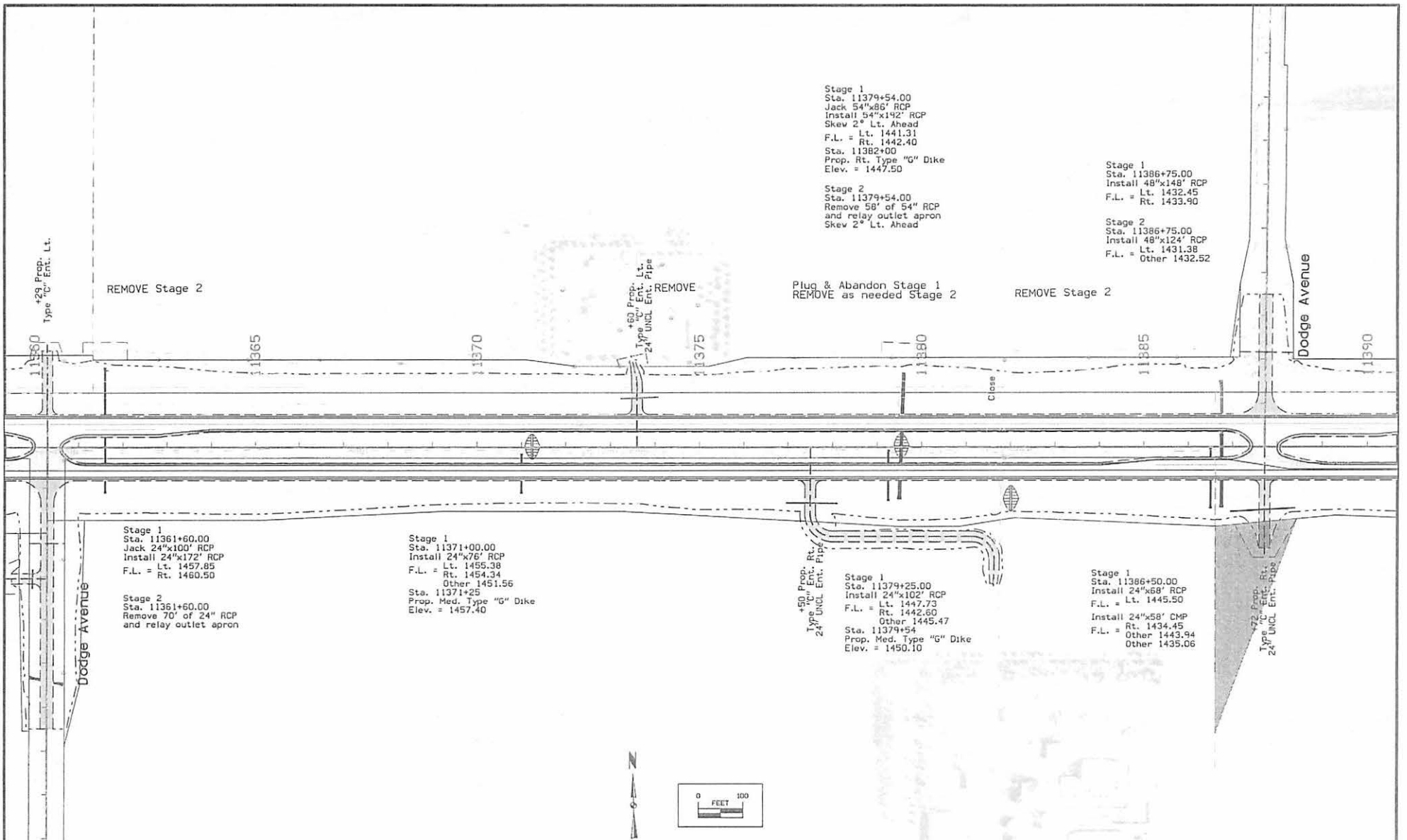
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.34

9:26:46 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Pav\9702012302.sht

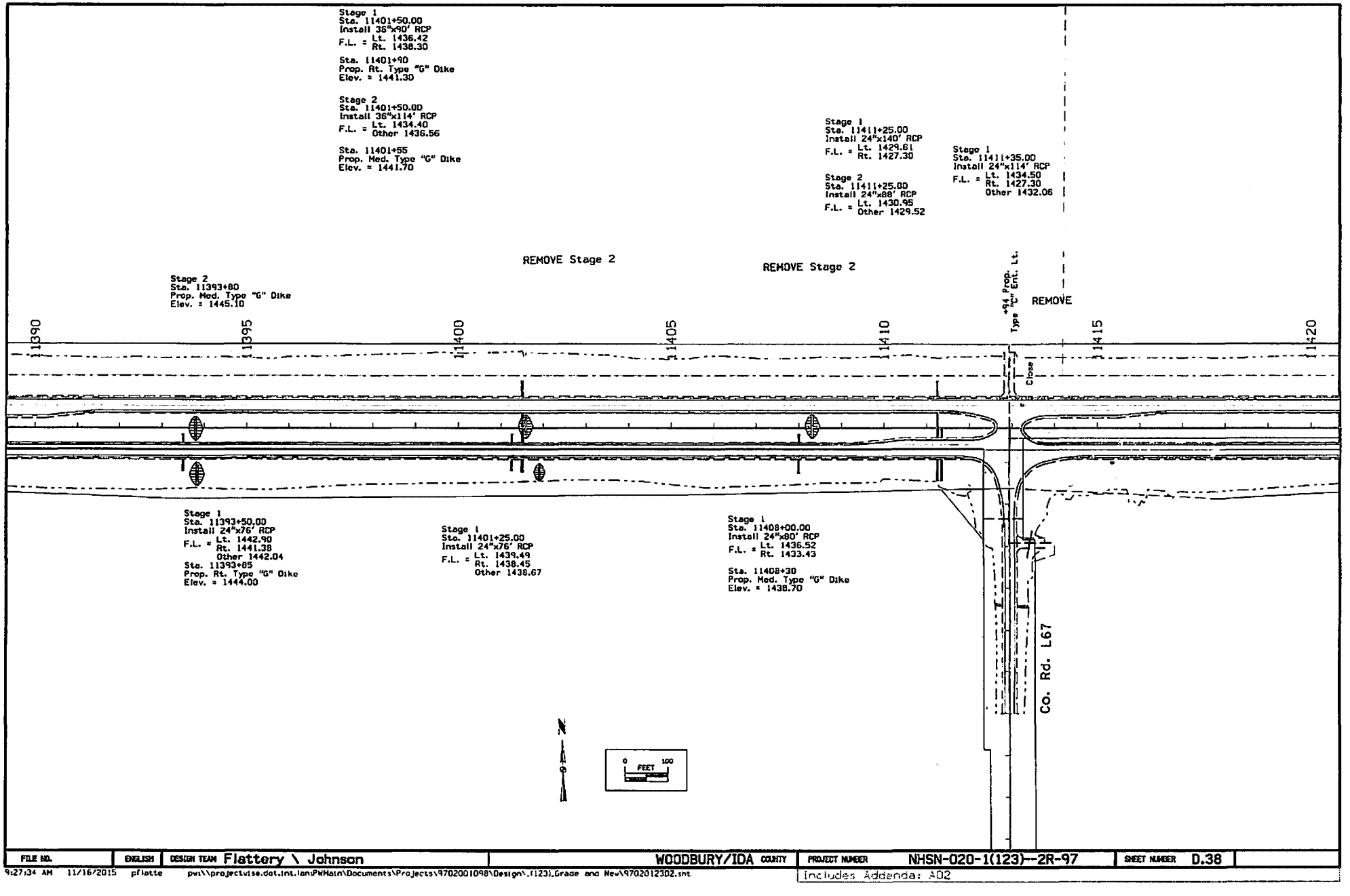
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.36

9:27:12 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and New\9702012302.sht

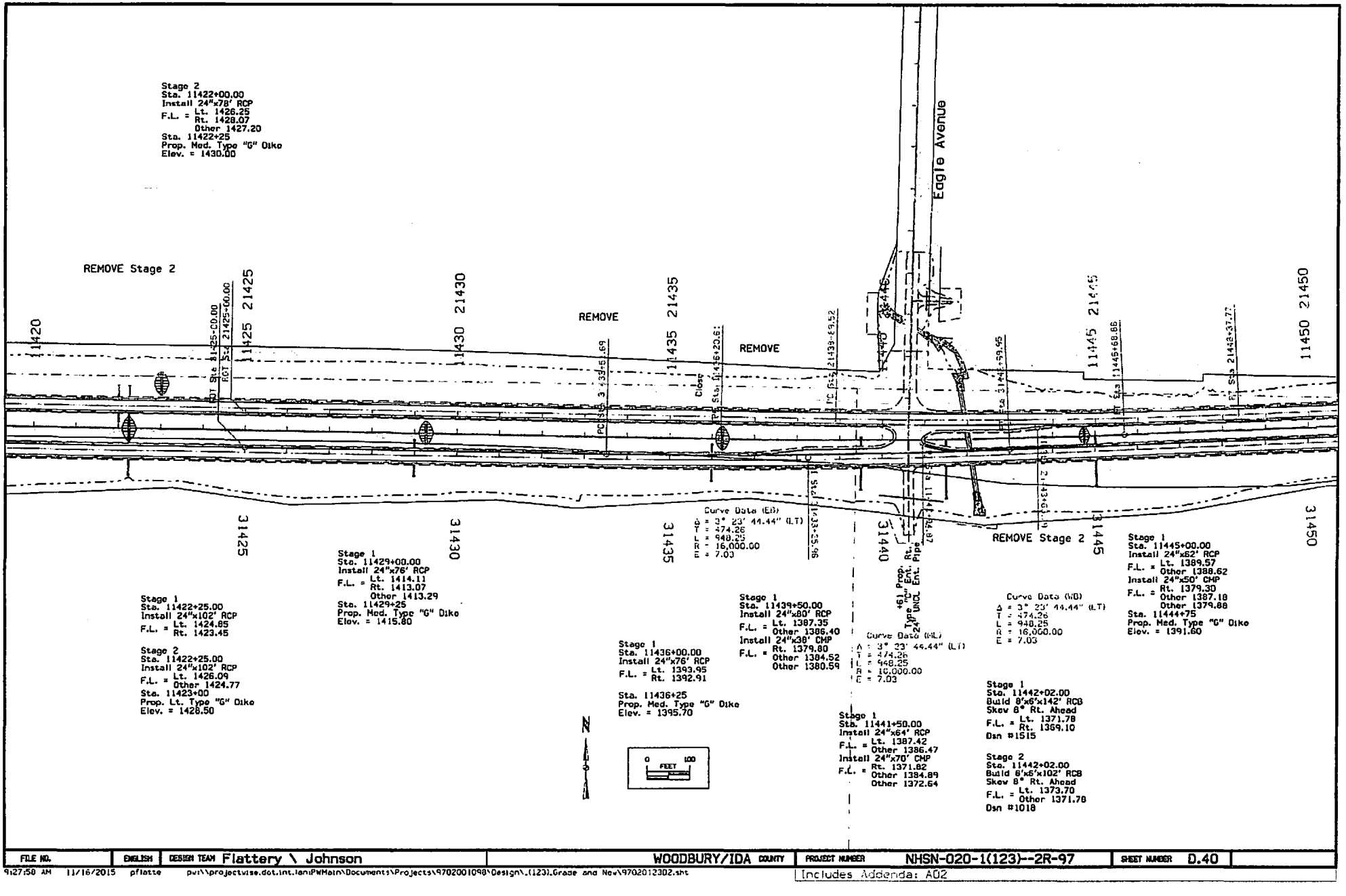
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.38

9:27:34 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Pav\9702012302.smt

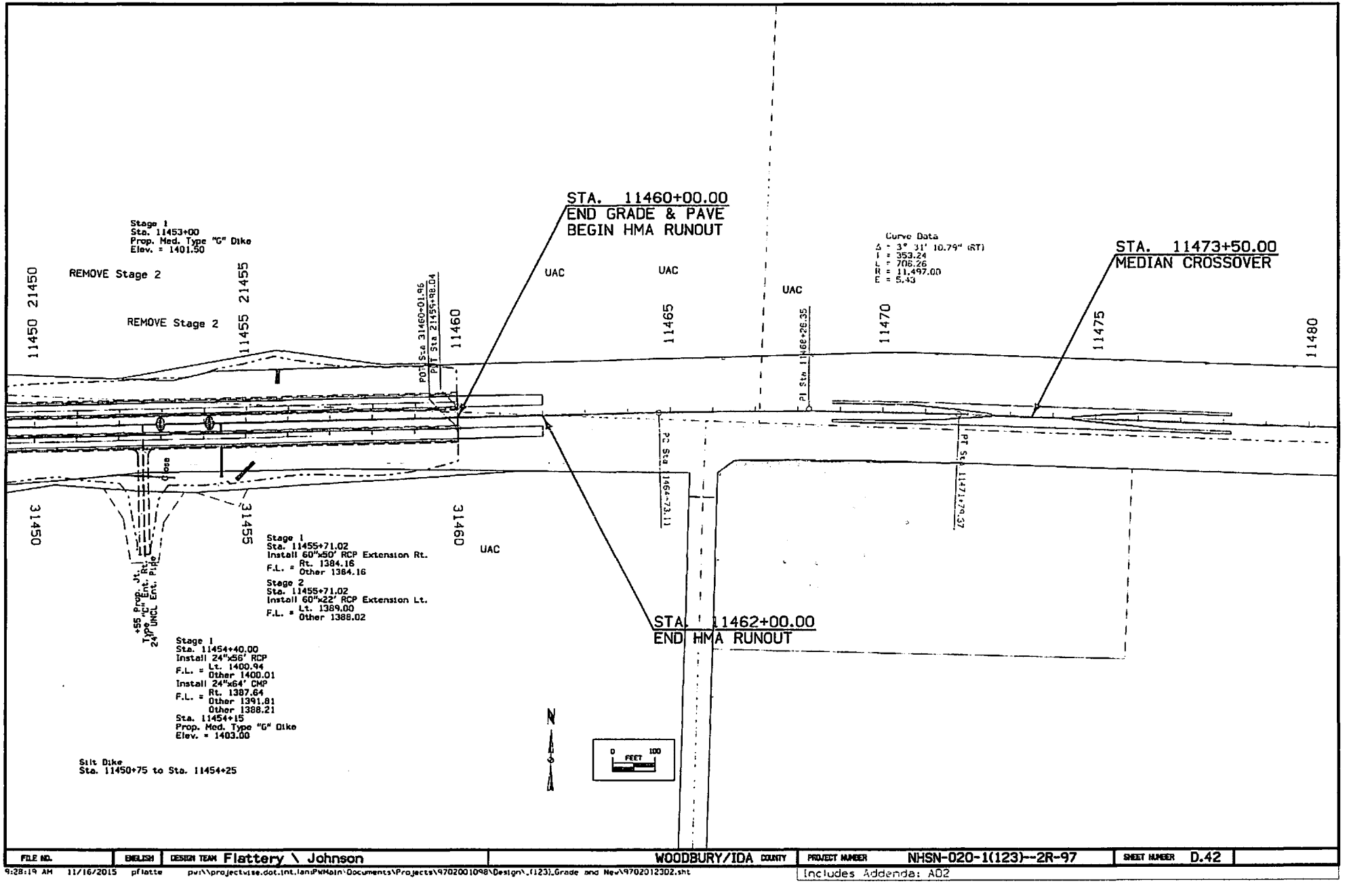
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.40

9:27:50 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and New\9702012302.sht

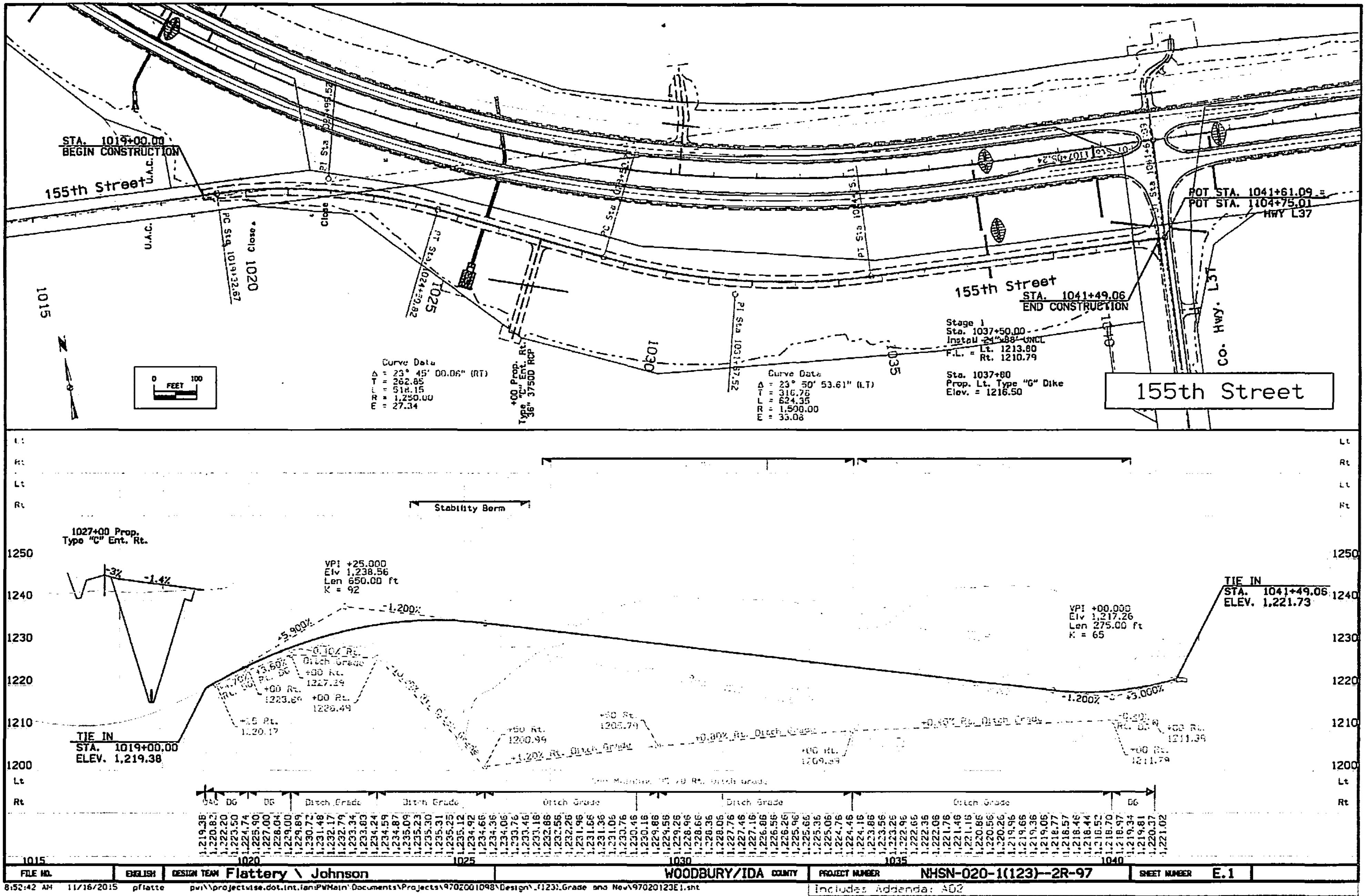
Includes Addenda: A02



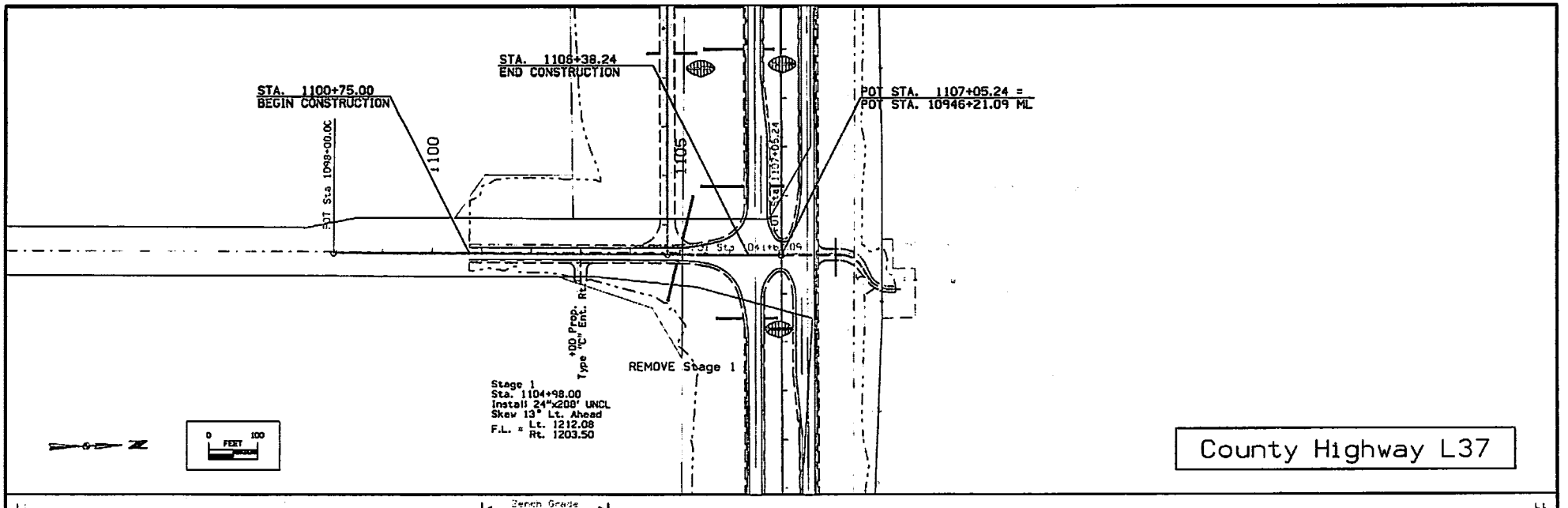
FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER D.42

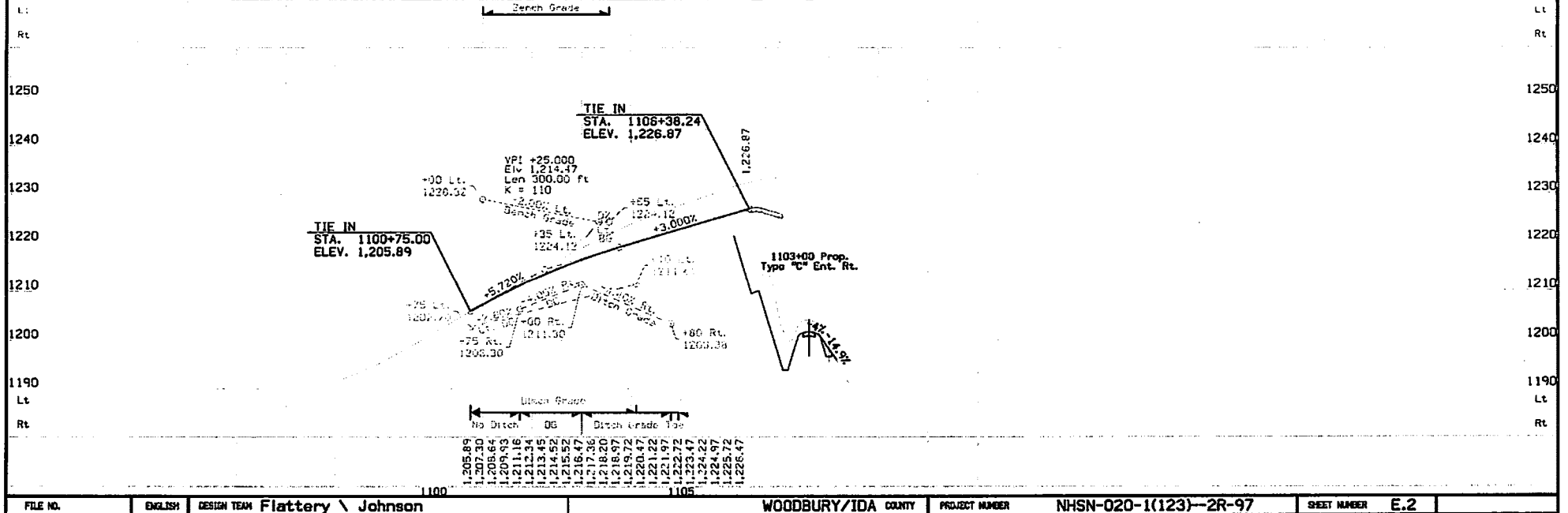
9:28:19 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Rev\9702012302.sht

Includes Addenda: A02



STA. 1019+00.00
BEGIN CONSTRUCTION
155th Street
U.A.C.
PC Sta. 1019+32.67
1020
1015
1025
1030
1035
155th Street
STA. 1041+49.06
END CONSTRUCTION
POT STA. 1041+61.09 =
POT STA. 1104+75.01
HWY L37
Co. Hwy. L37
Curve Data
Δ = 23° 45' 00.06" (RT)
T = 262.85
L = 518.15
R = 1,250.00
E = 27.34
Curve Data
Δ = 23° 50' 53.61" (LT)
T = 316.76
L = 624.35
R = 1,500.00
E = 33.08
Stage 1
Sta. 1037+50.00
F.L. = Lt. 1213.80
Rt. 1210.79
Sta. 1037+80
Prop. Lt. Type "G" Dike
Elev. = 1216.50
FEET
155th Street
Stability Berm
1027+00 Prop.
Type "C" Ent. Rt.
VPI +25.000
Elv 1,238.56
Len 650.00 ft
K = 92
+5.900%
-1.200%
VPI +00.000
Elv 1,217.26
Len 275.00 ft
K = 65
-1.200%
+3.000%
TIE IN
STA. 1019+00.00
ELEV. 1,219.38
TIE IN
STA. 1041+49.06
ELEV. 1,221.73
Ditch Grade
FILE NO.
ENGLISH
DESIGN TEAM Flattery \ Johnson
WOODBURY/IDA COUNTY
PROJECT NUMBER NHSN-020-1(123)--2R-97
SHEET NUMBER E.1
Includes Addenda: A02
8:52:42 AM 11/16/2015

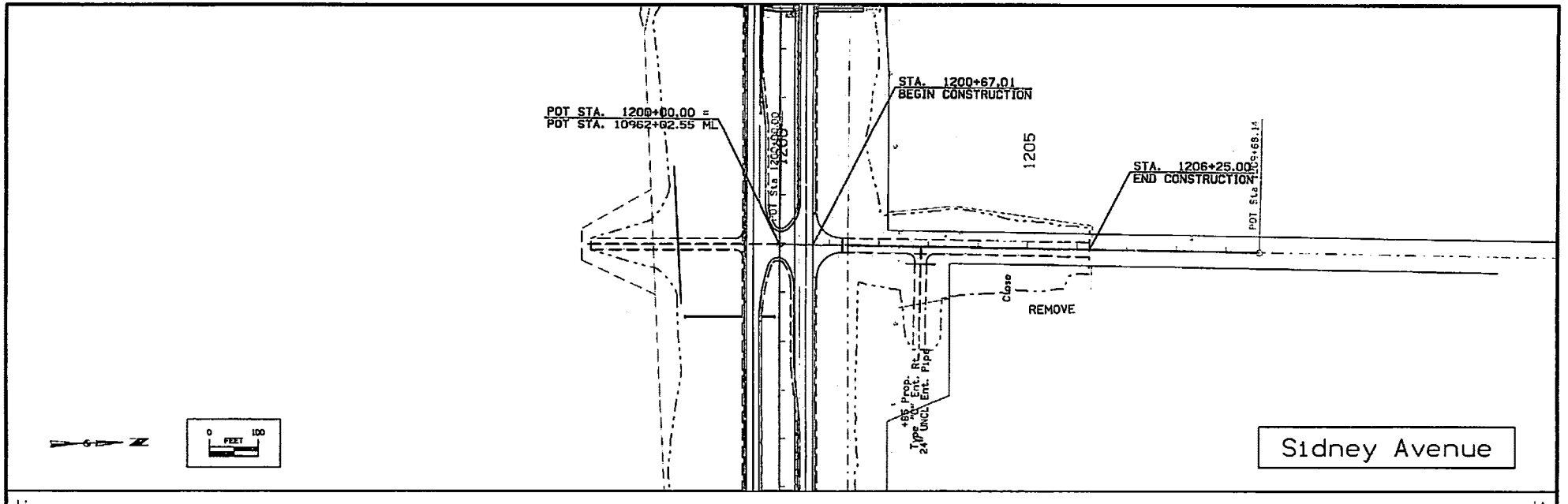


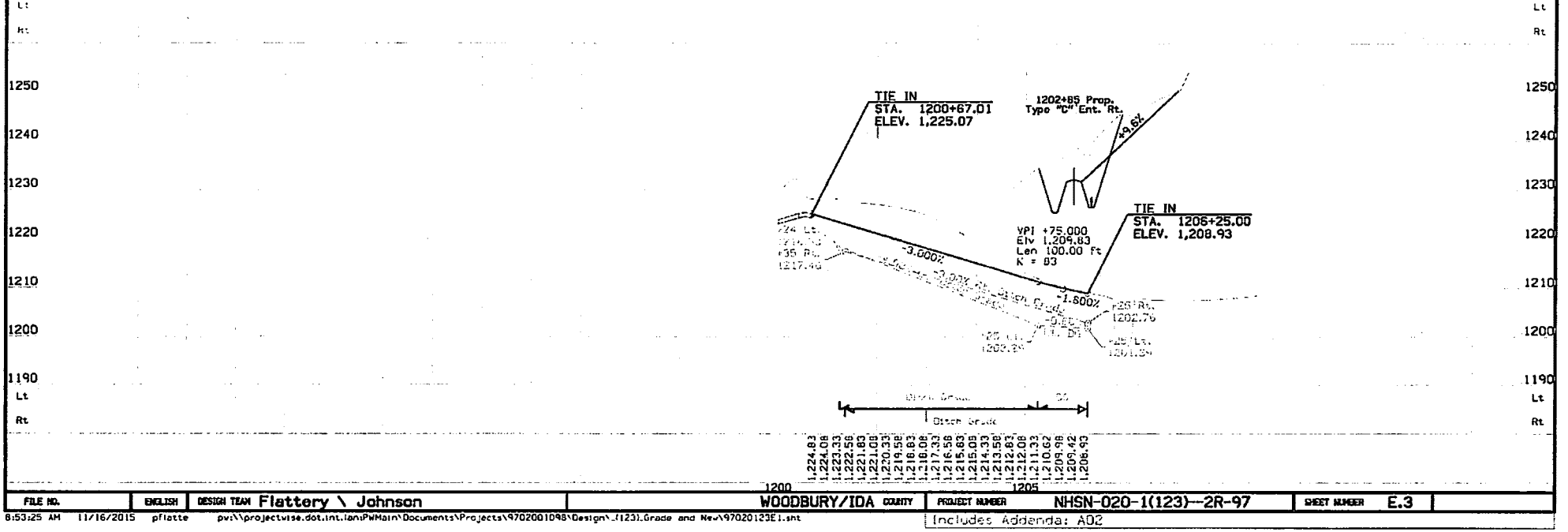


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.2

6:53:07 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain:Documents\Projects\9702001098\Design_(123).Grade and New\97020123E1.sht

Includes Addenda: A02

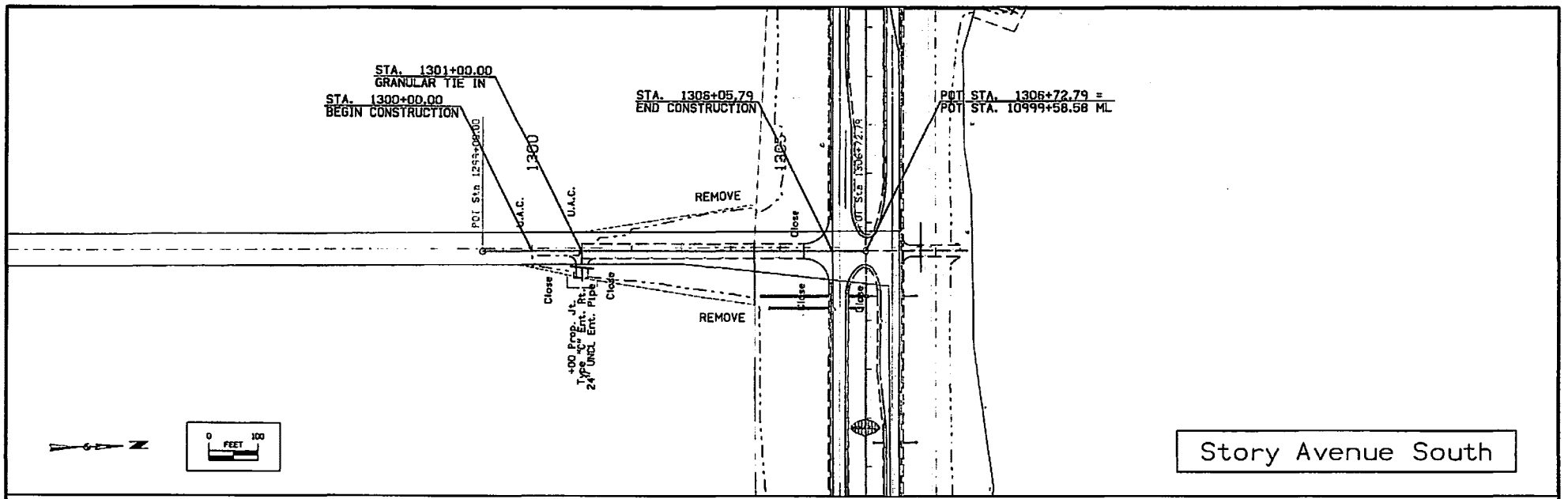


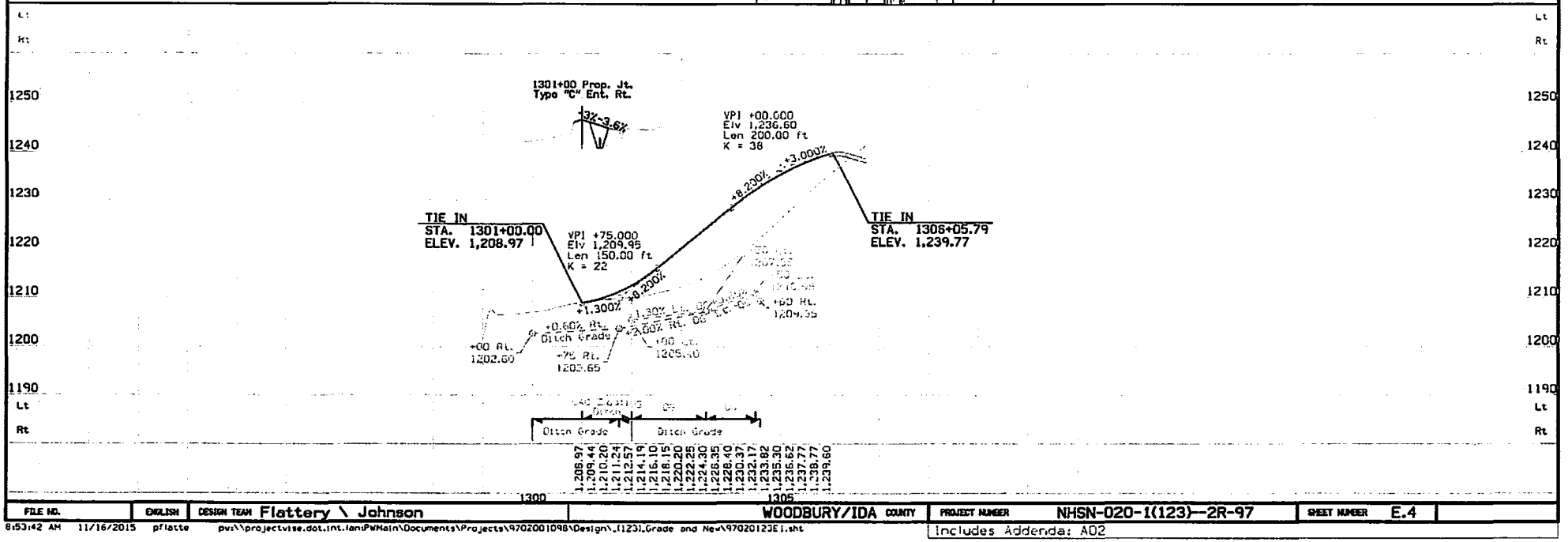


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.3

8:53:25 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Rev\97020123E1.sht

Includes Addenda: A02

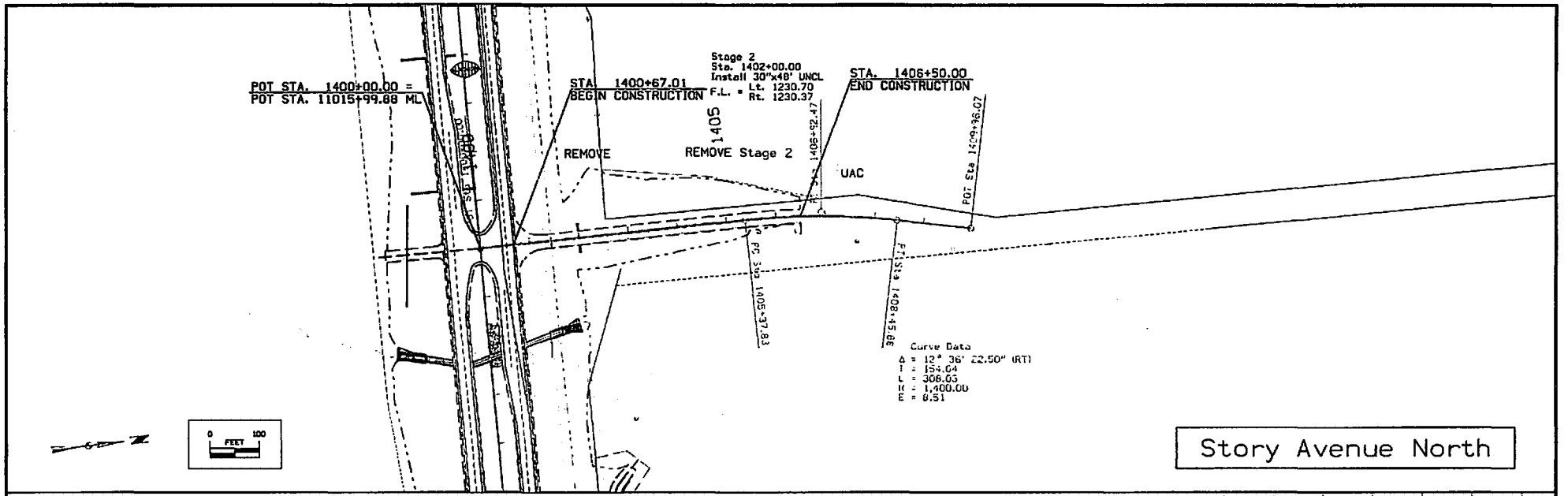


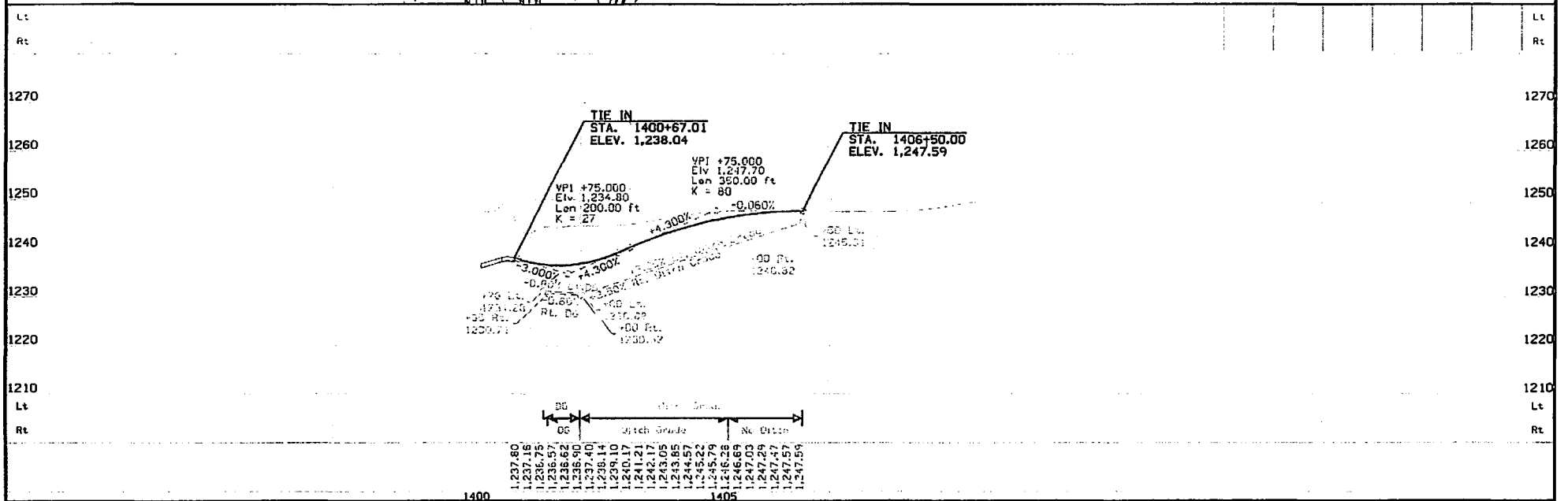


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.4

8:53:42 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and Rev\9702012361.sht

Includes Addenda: A02





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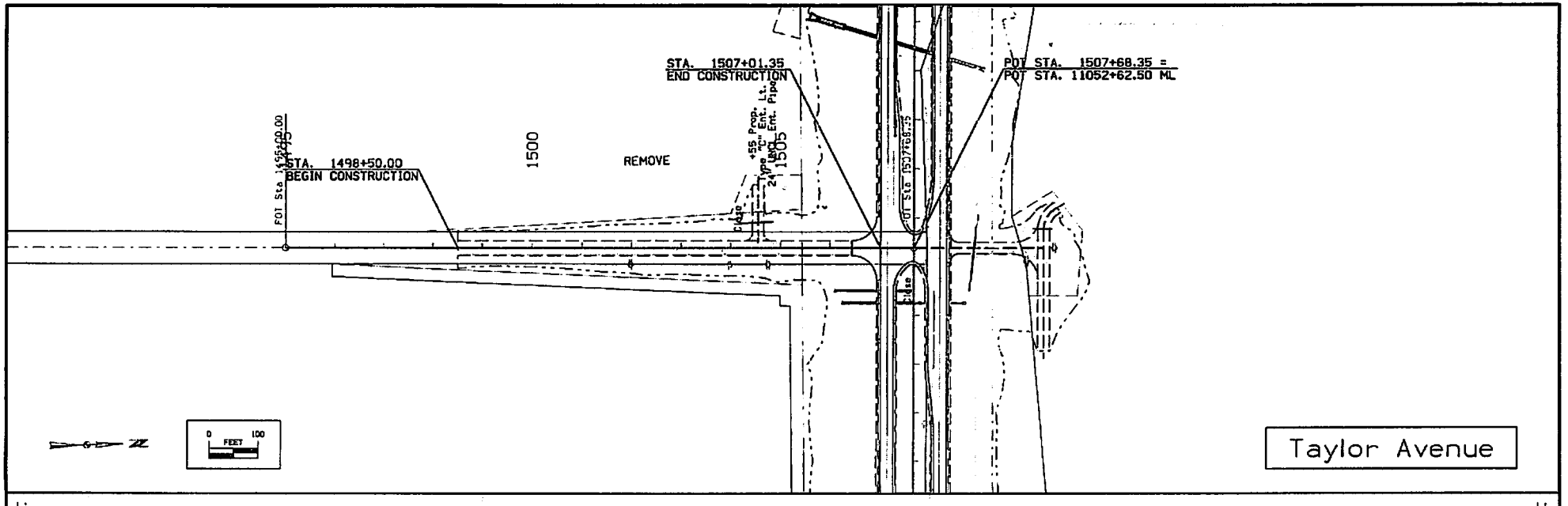
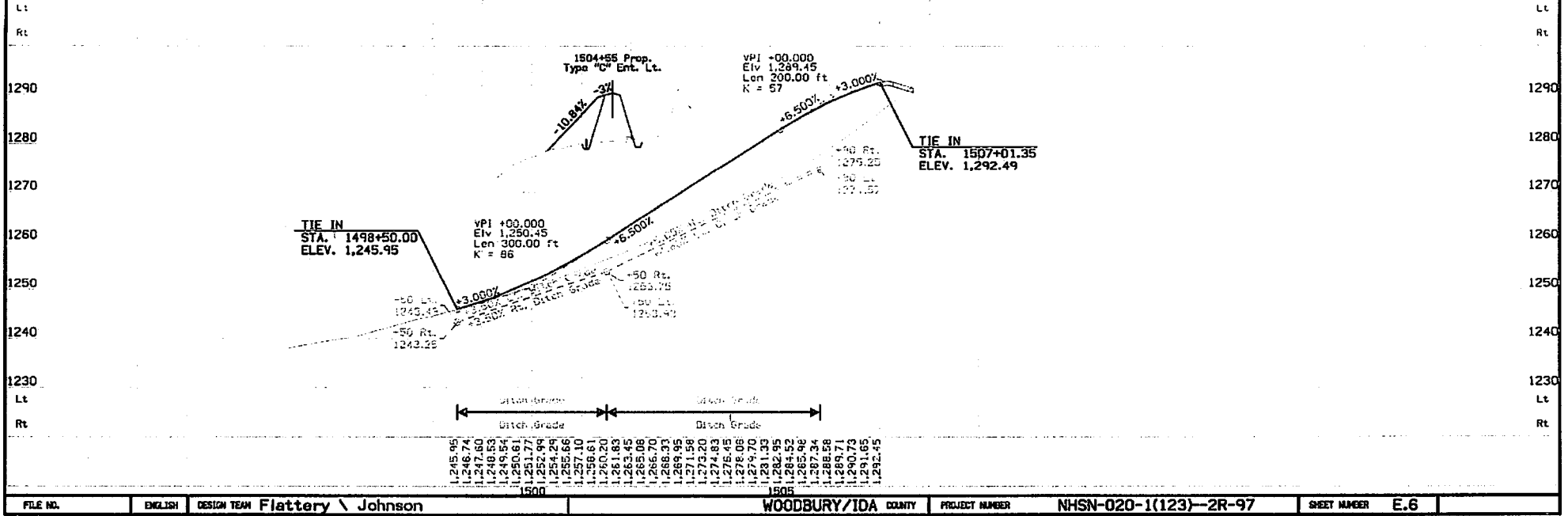
8:53:59 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001096\Design\.(123).Grade and Pav\9702012SE1.sht

Includes Addenda: A02

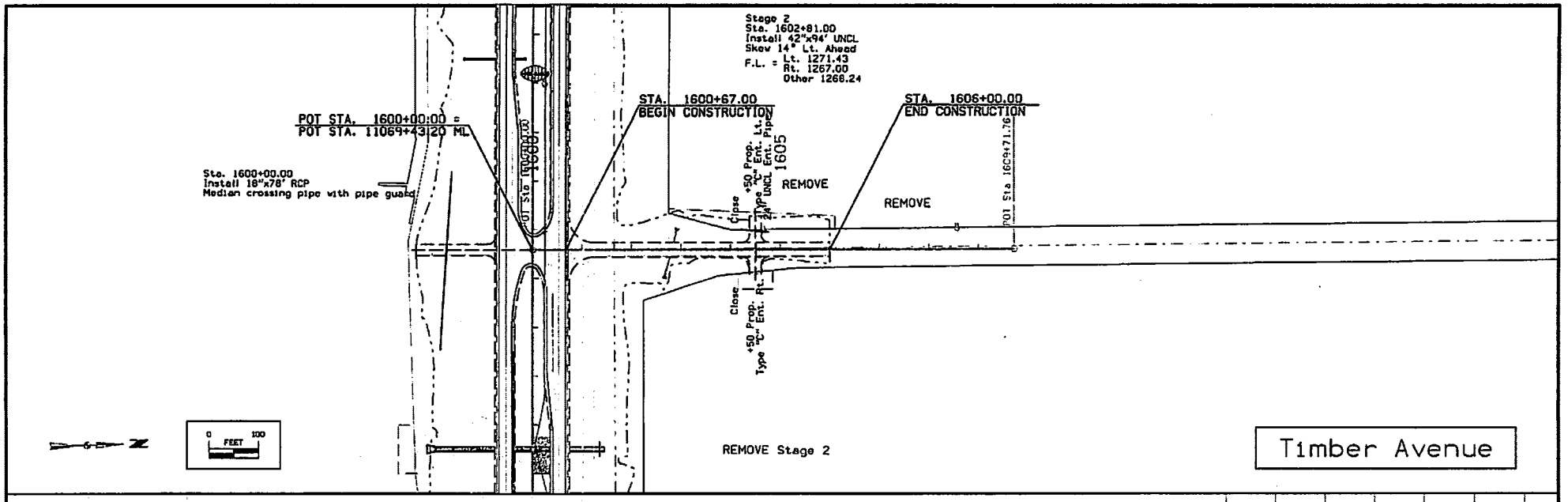


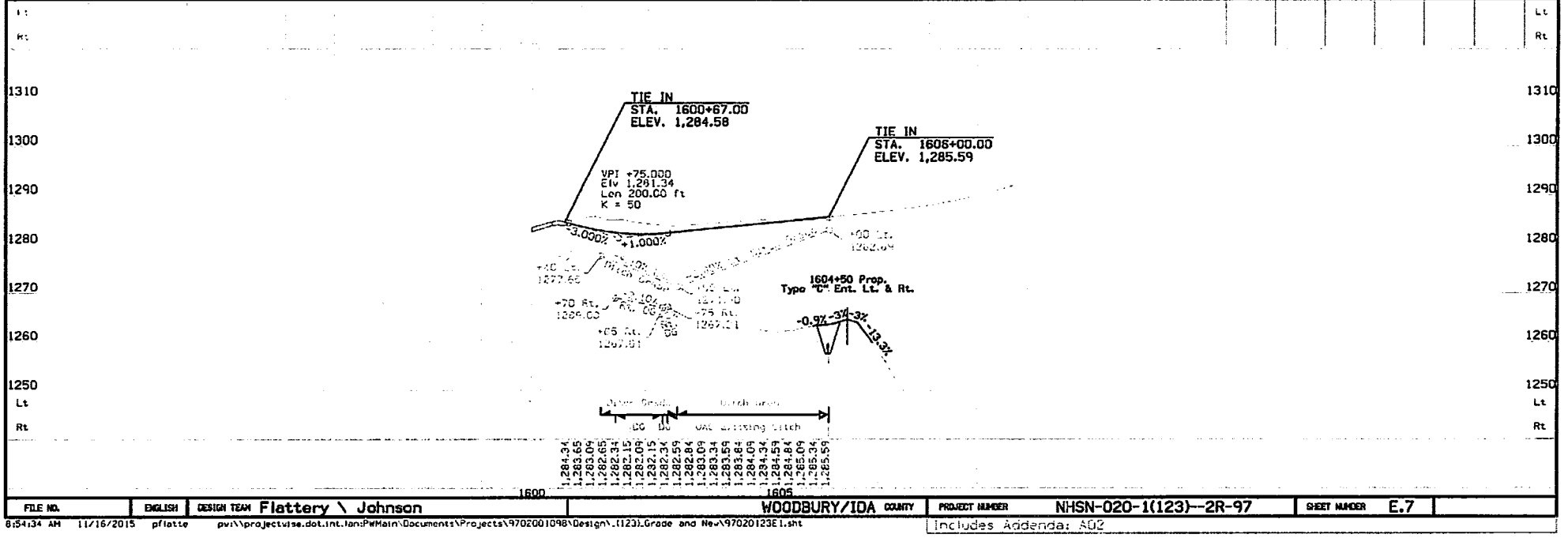


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.6

8:54:15 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain:Documents\Projects\9702001098\Design_1123].Grade and New\9702012361.sht

Includes Addenda: A02

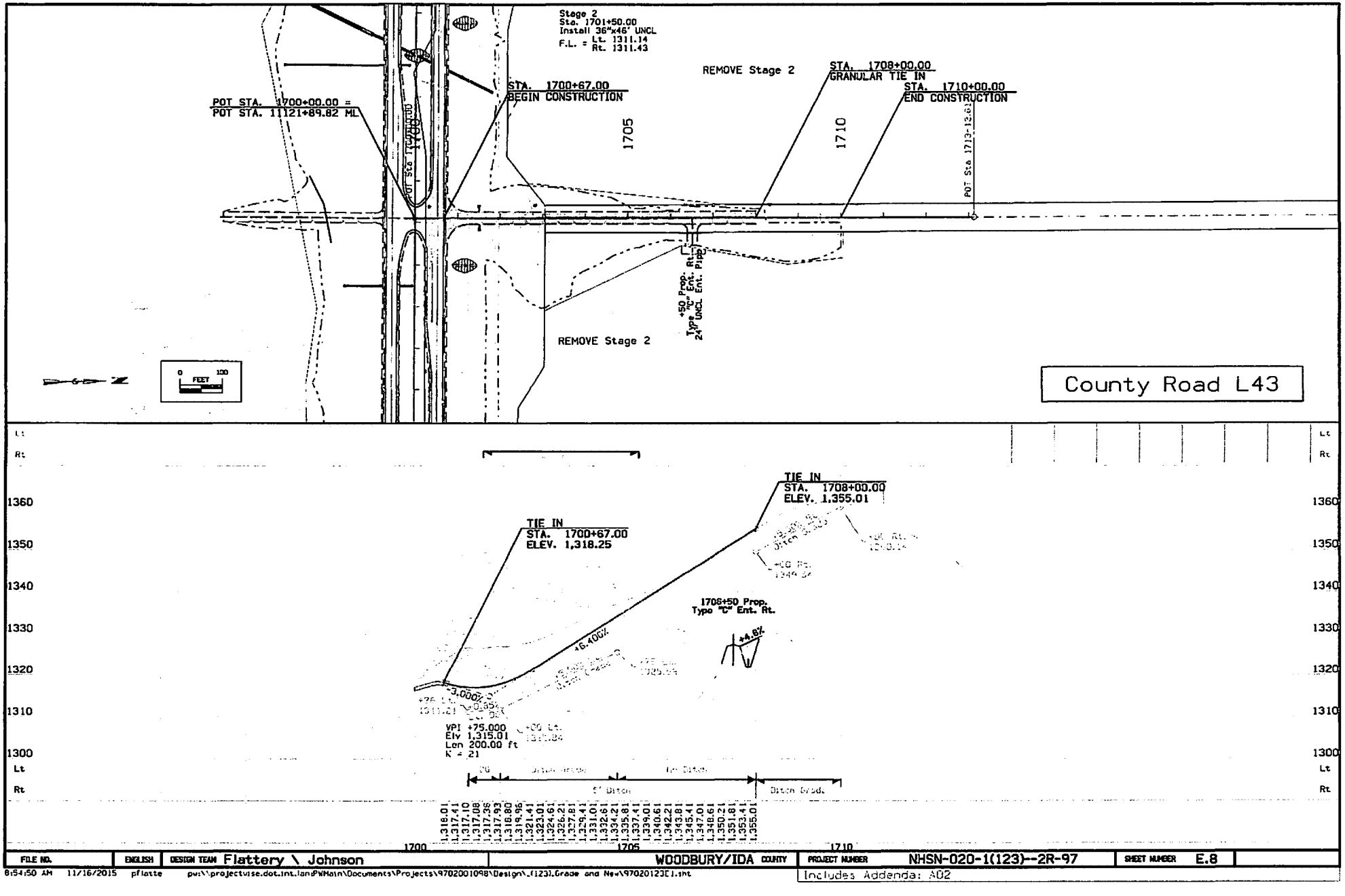




FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.7

8:54:34 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and Rev\9702012361.sht

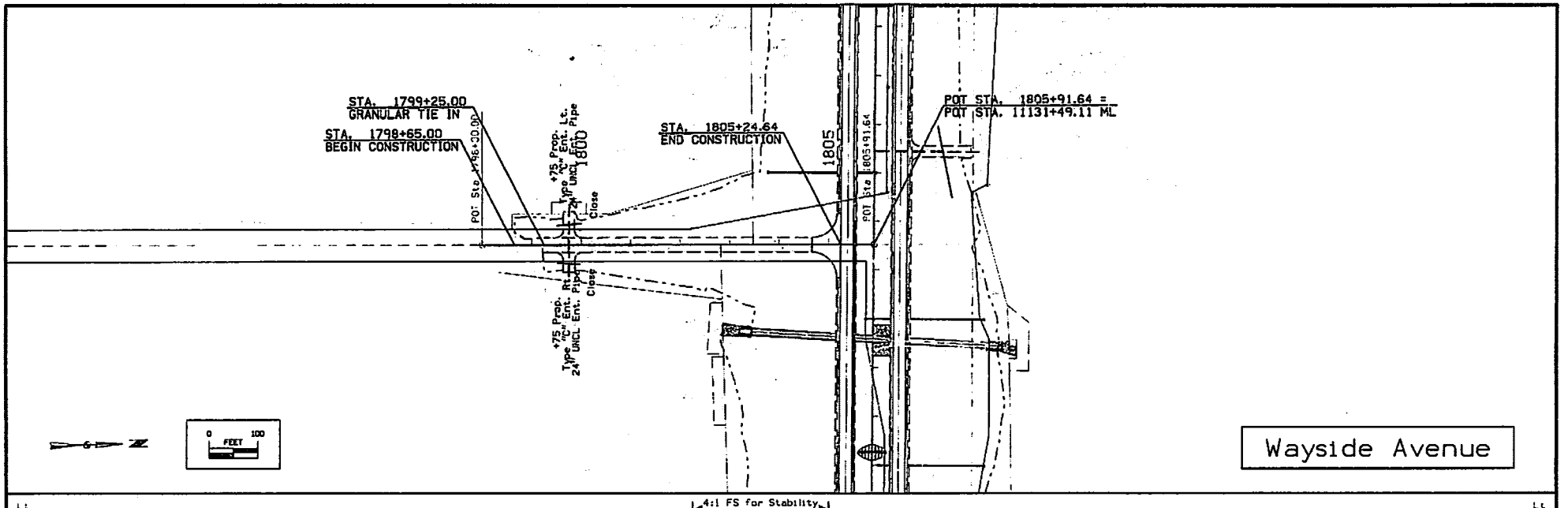
Includes Addenda: A02

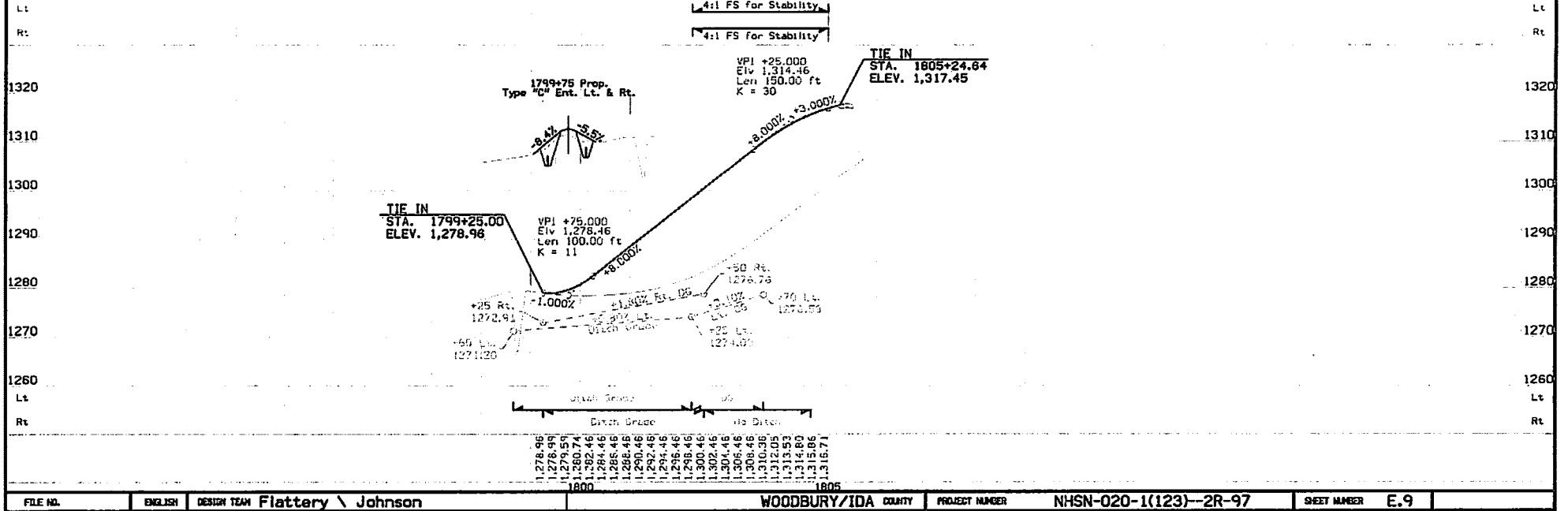


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.8

8:54:50 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and Rev\9702012JE1.sht

Includes Addenda: A02

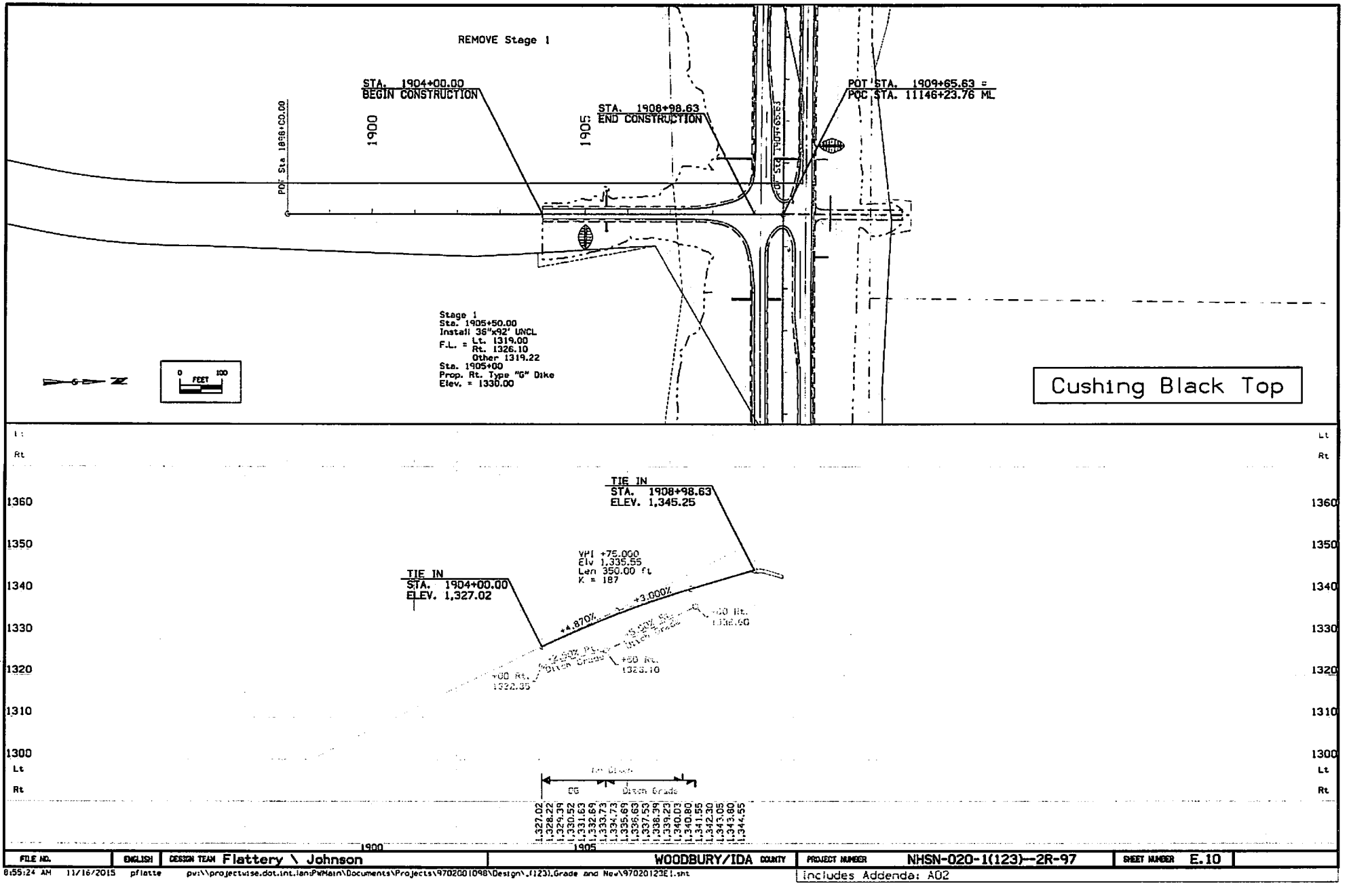




FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.9

8:55:08 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)Grade and Ne\9702012301.sht

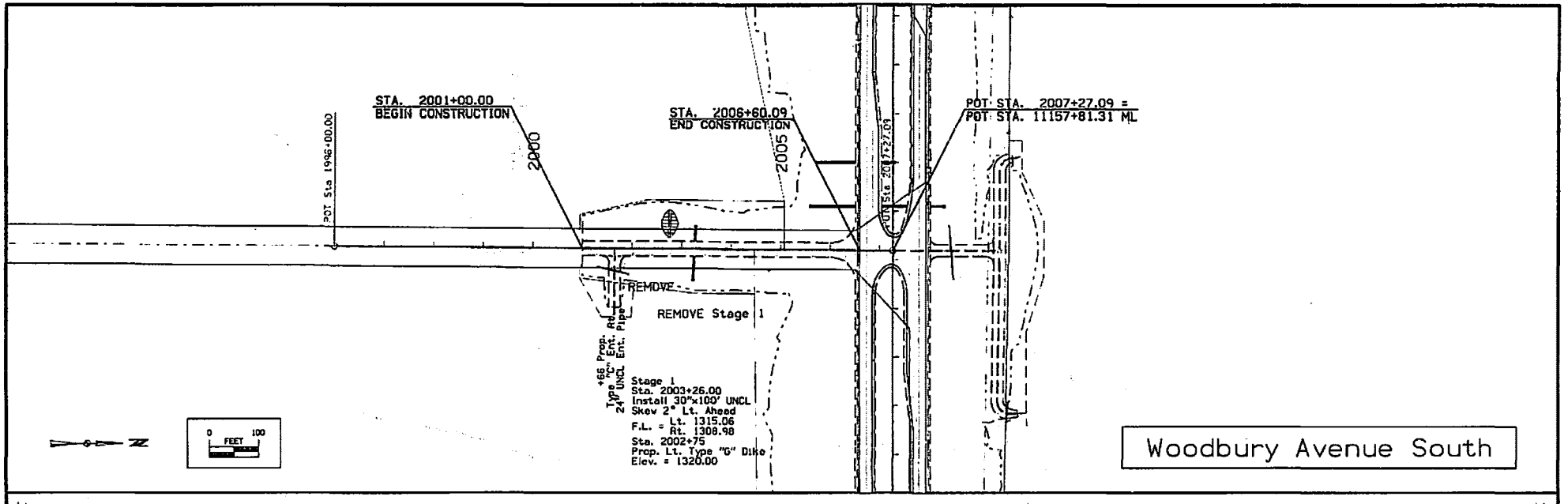
Includes Addenda: A02

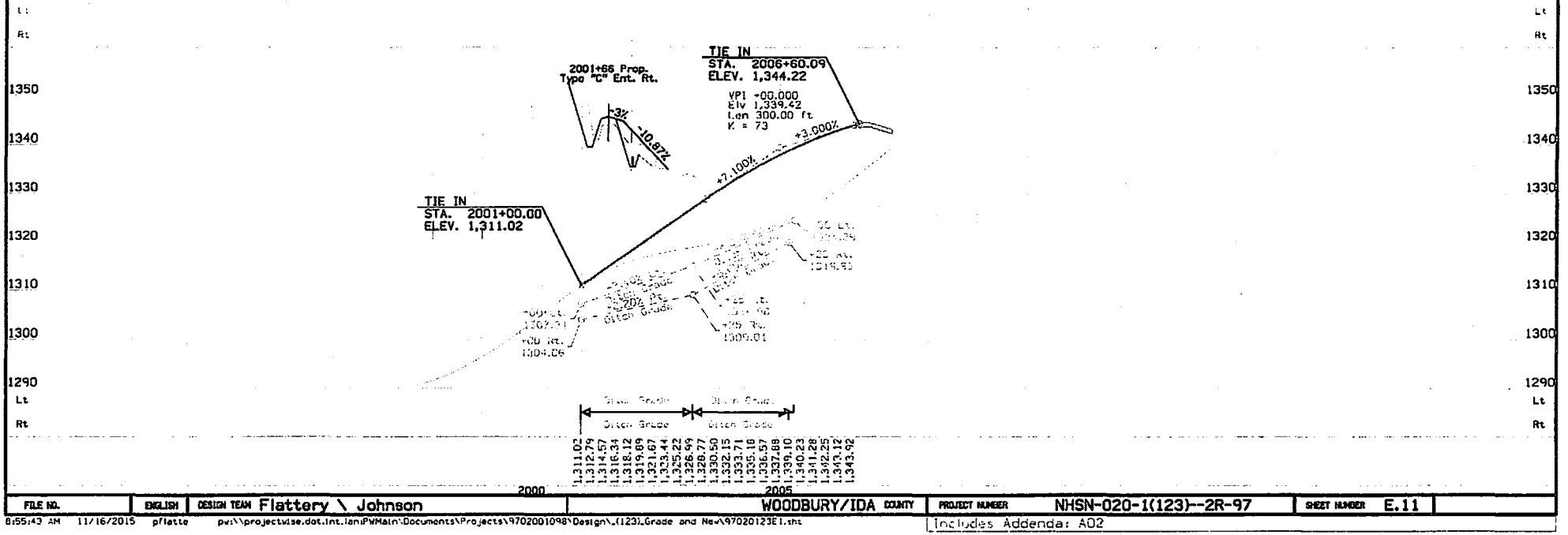


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.10

8:55:24 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\970200(098\Design\.(123).Grade and Pav\97020123E1.sht

Includes Addenda: A02

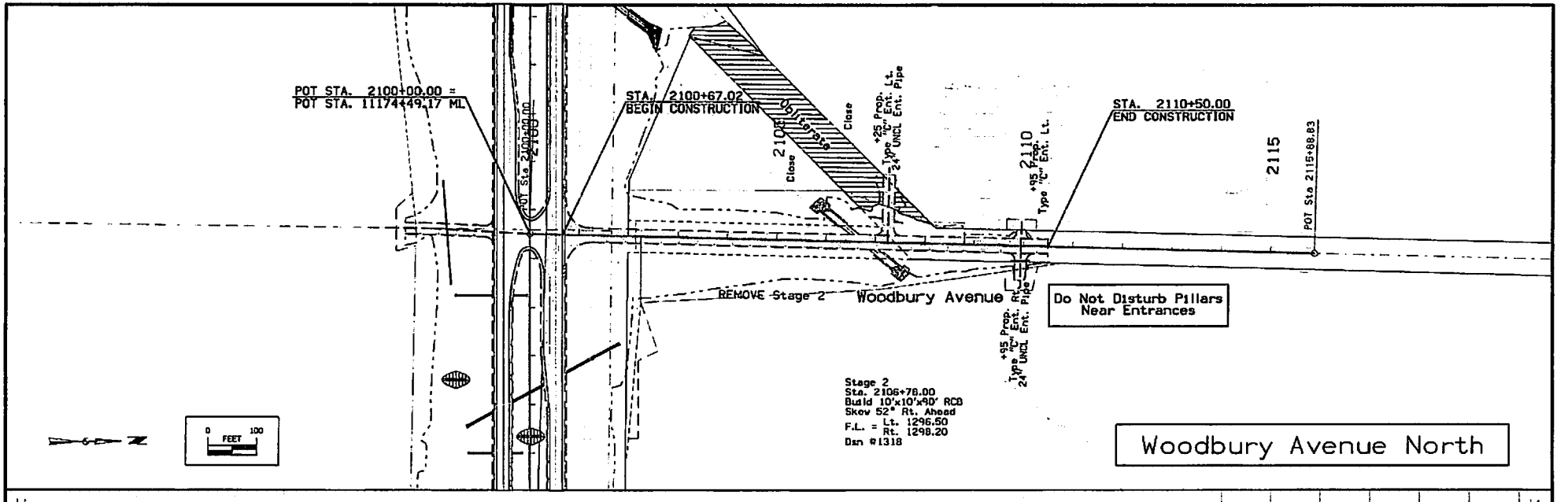


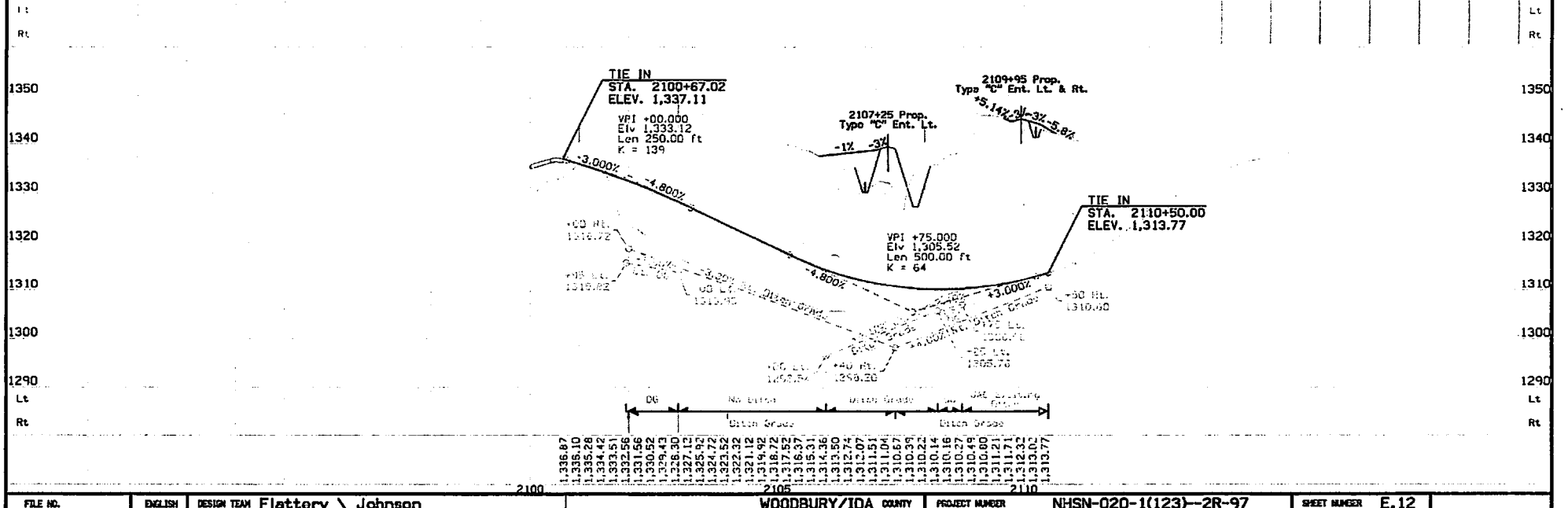


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.11

8:55:43 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan\PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Rev\97020123E1.sht

Includes Addenda: A02

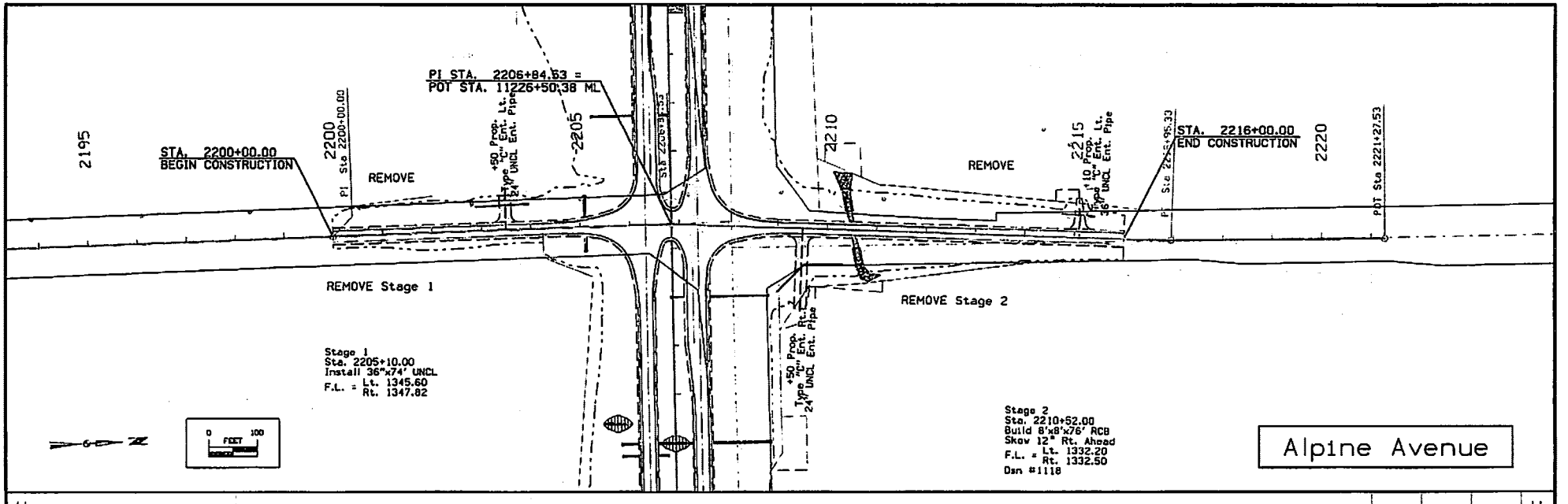


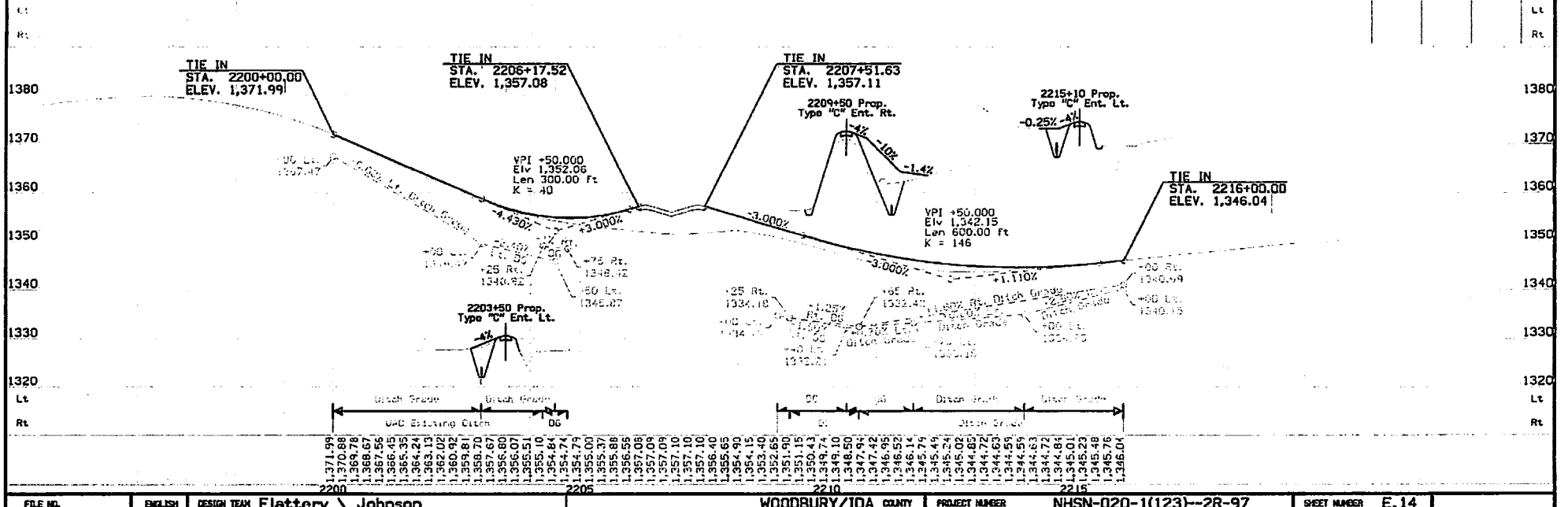


FILE NO.	ENGLISH	DESIGN TEAM			PROJECT NUMBER	SHEET NUMBER
		Flattery \ Johnson	WOODBURY/IDA COUNTY		NHSN-020-1(123)--2R-97	E.12

8:56:01 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001048\Design_(123)_Grade and New\97020123E1.sht

Includes Addenda: A02

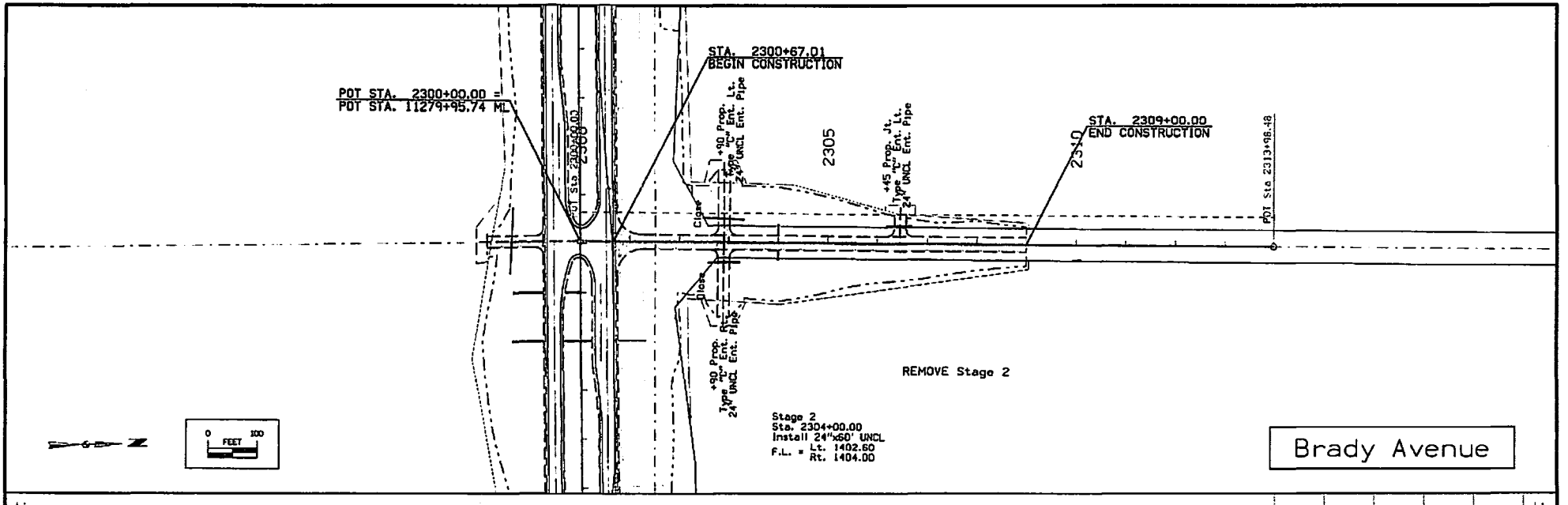


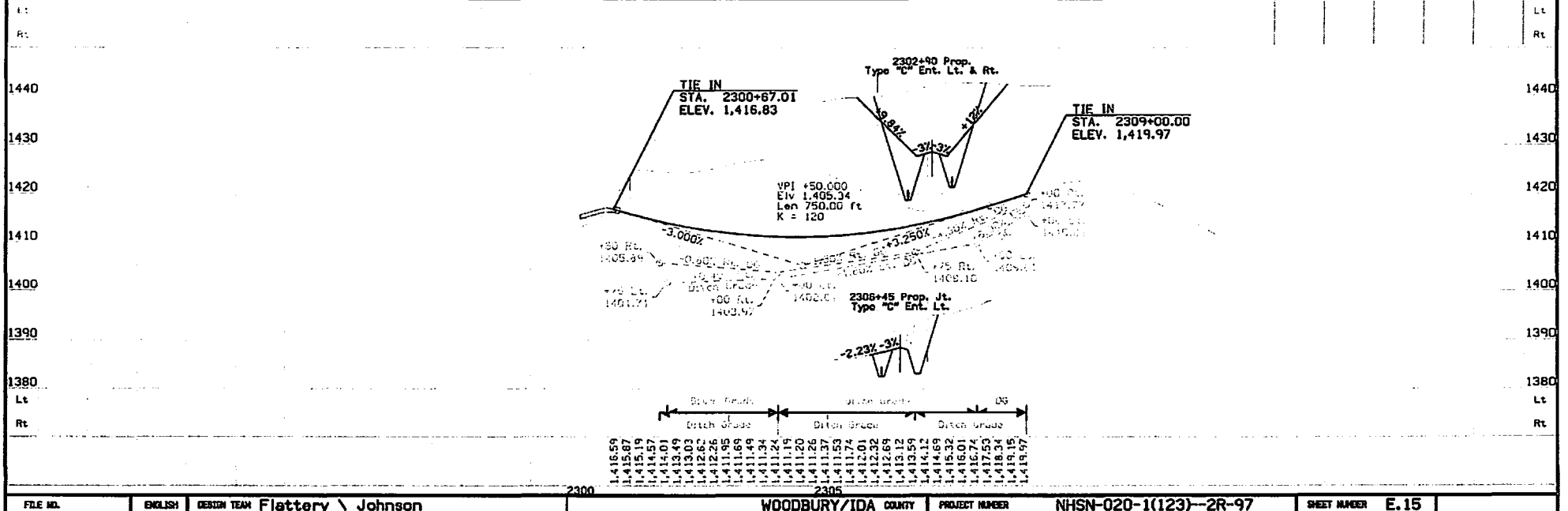


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.14

8:56:19 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Ne-\9702012361.sht

Includes Addenda: A02

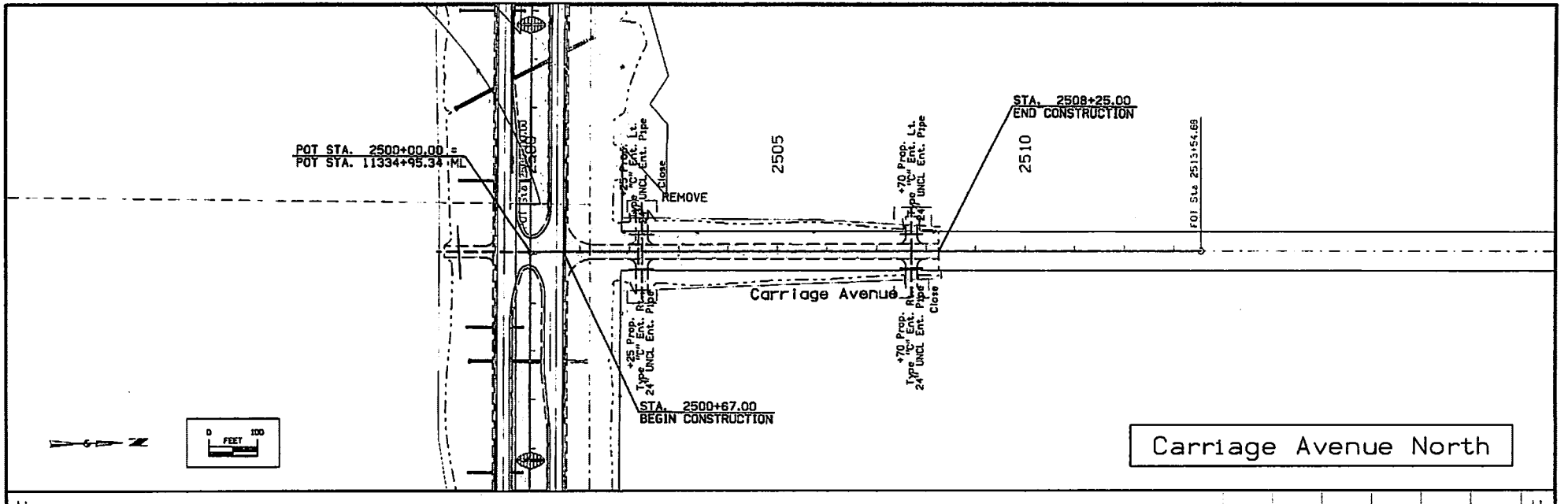




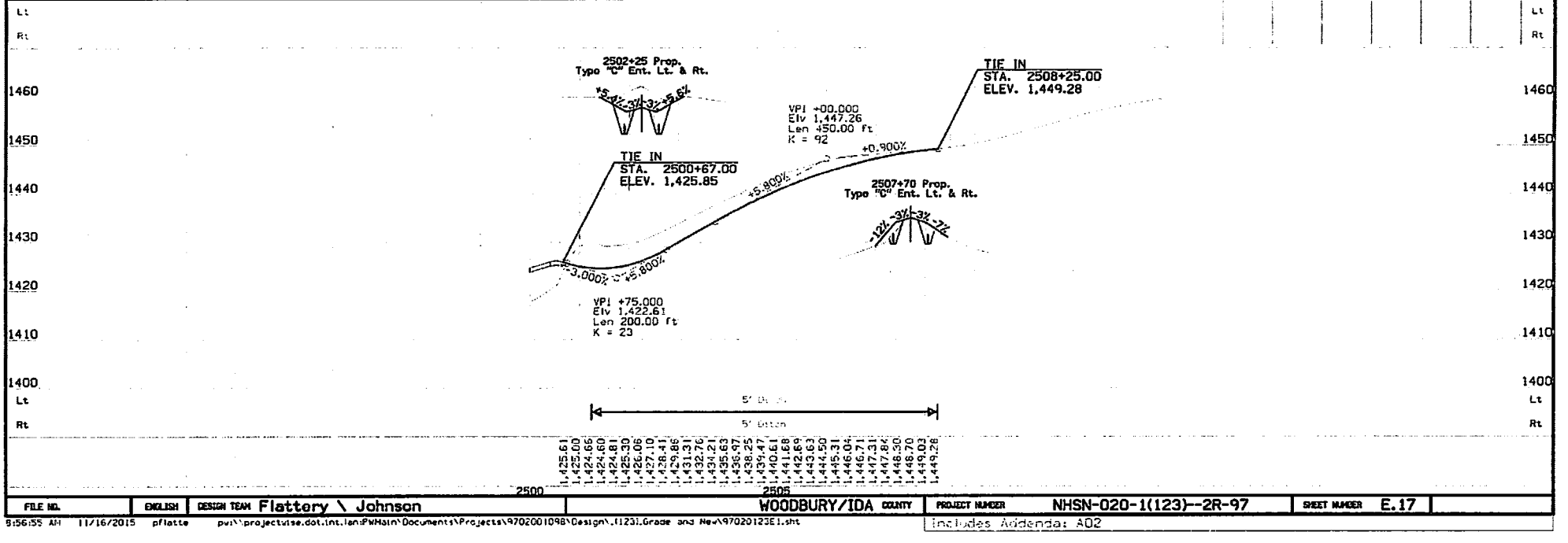
FILE NO.	ENGLISH	DESIGN TEAM			PROJECT NUMBER	SHEET NUMBER
		Flattery \ Johnson	WOODBURY/IDA COUNTY		NHSN-020-1(123)--2R-97	E.15

8:56:37 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Nav\9702012301.sht

Includes Addenda: A02



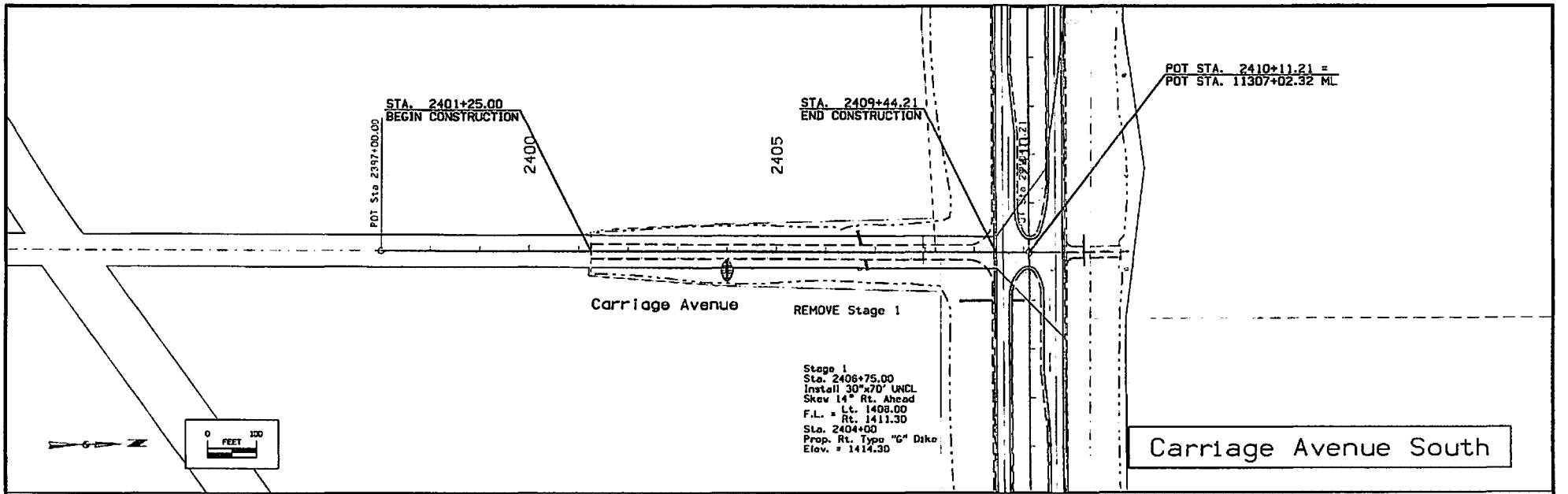
Carriage Avenue North

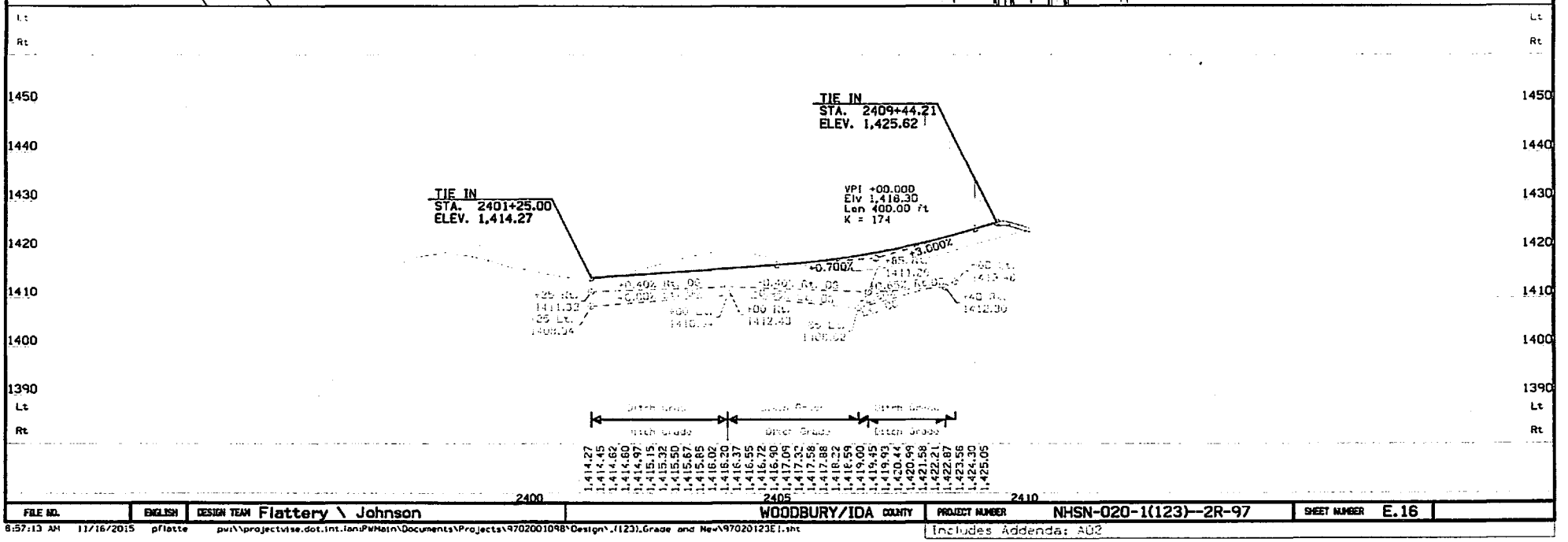


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.17

9:56:55 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Rev\9702012SE1.sht

Includes Addenda: A02

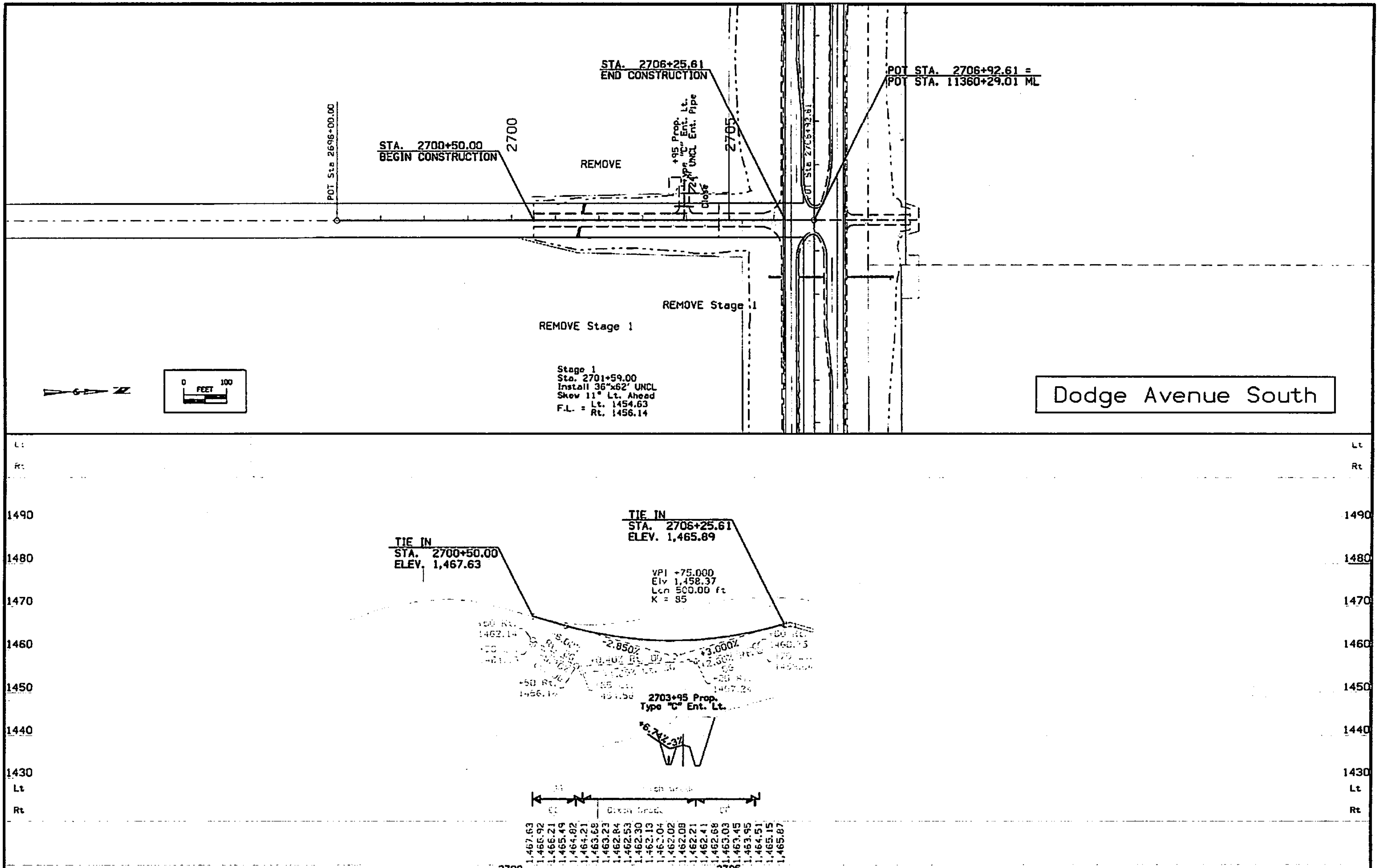




FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.16

8:57:13 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design\.(123).Grade and Rev\9702012E1.sht

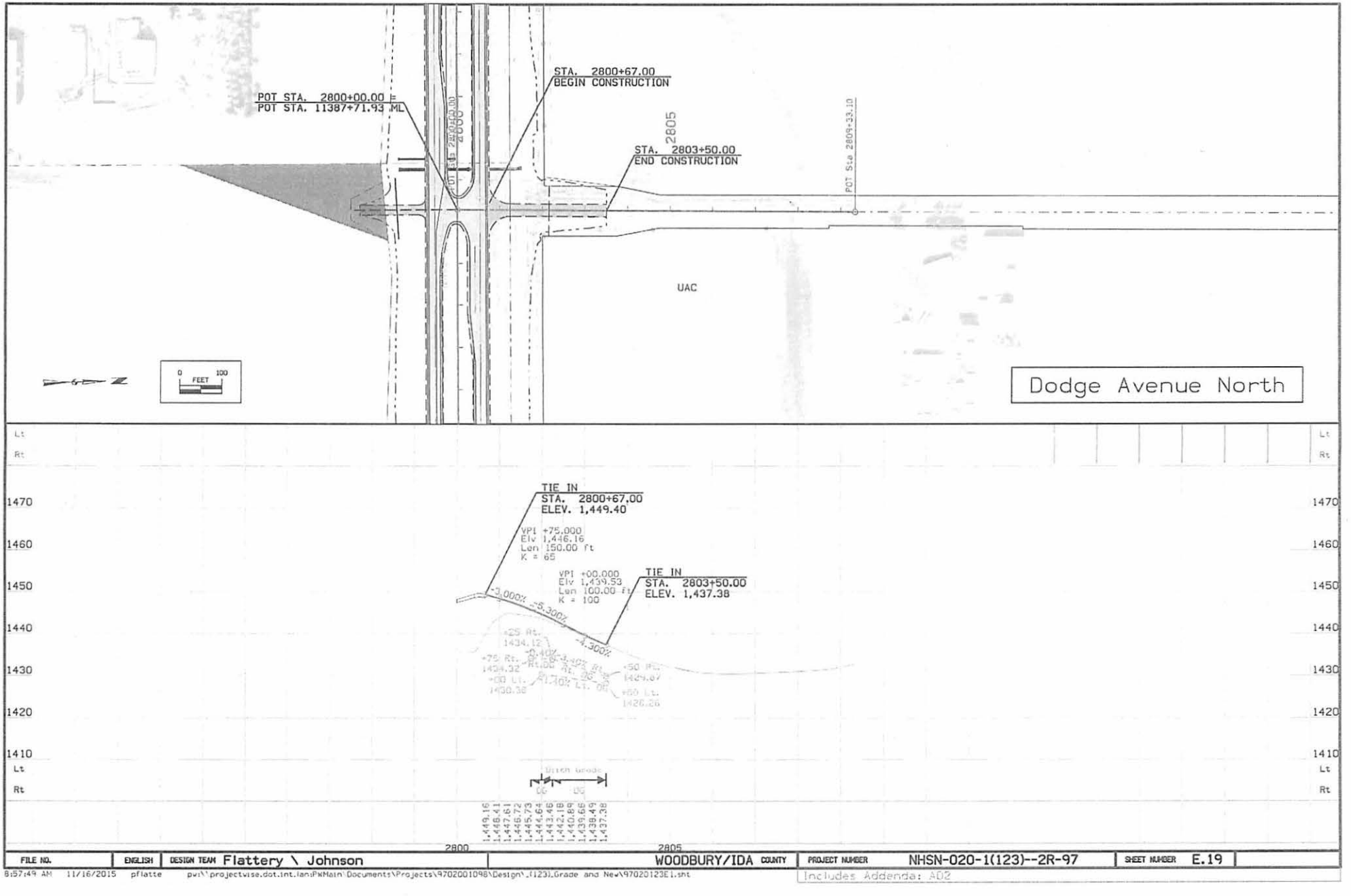
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.18

8:57:31 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_1231_Grade and New\97020123E1.sht

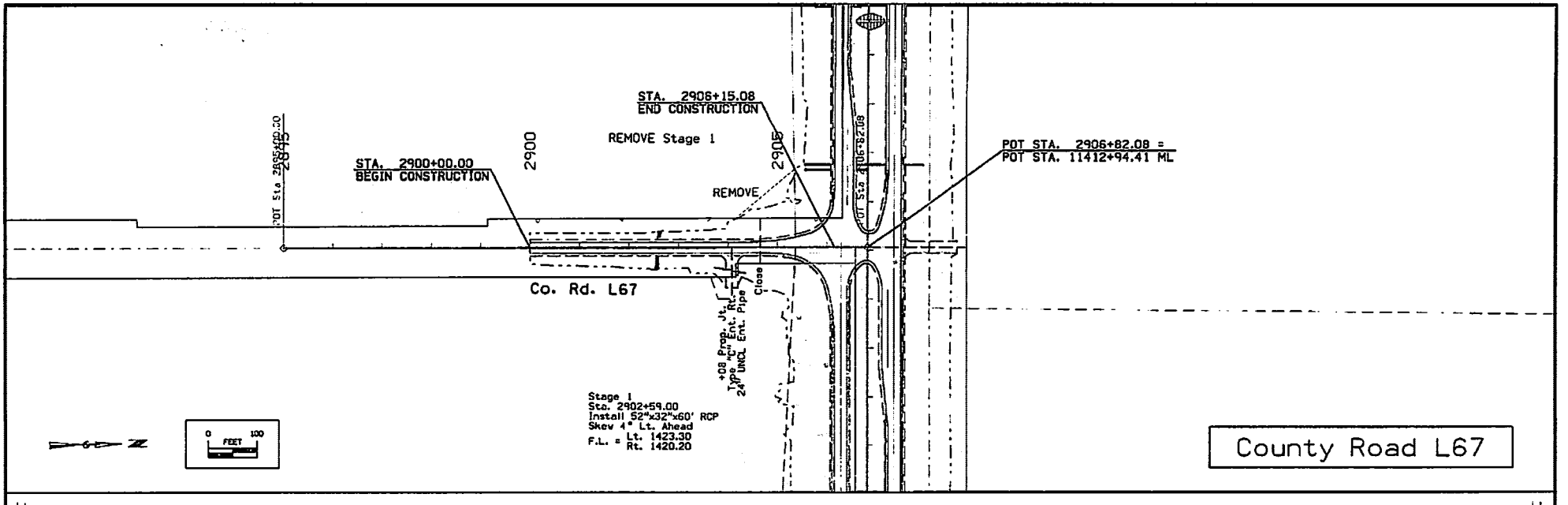
Includes Addenda: A02

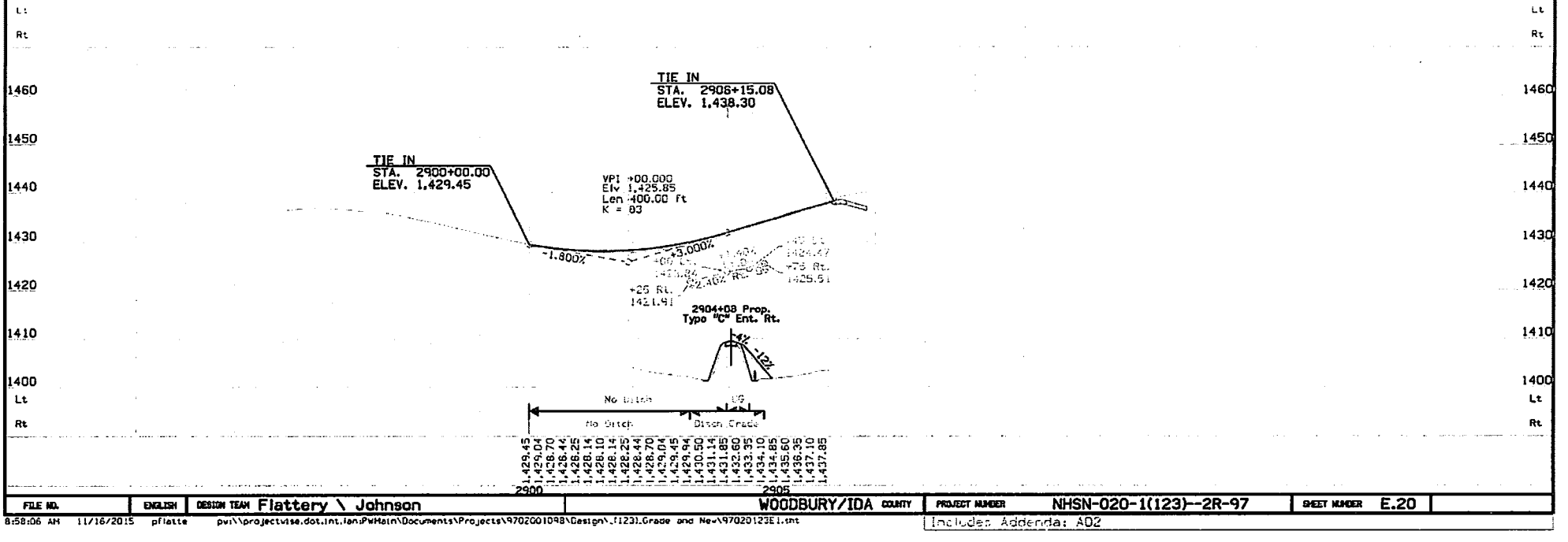


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.19

8:57:49 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and Rev\9702012JE1.sht

Includes Addenda: A02

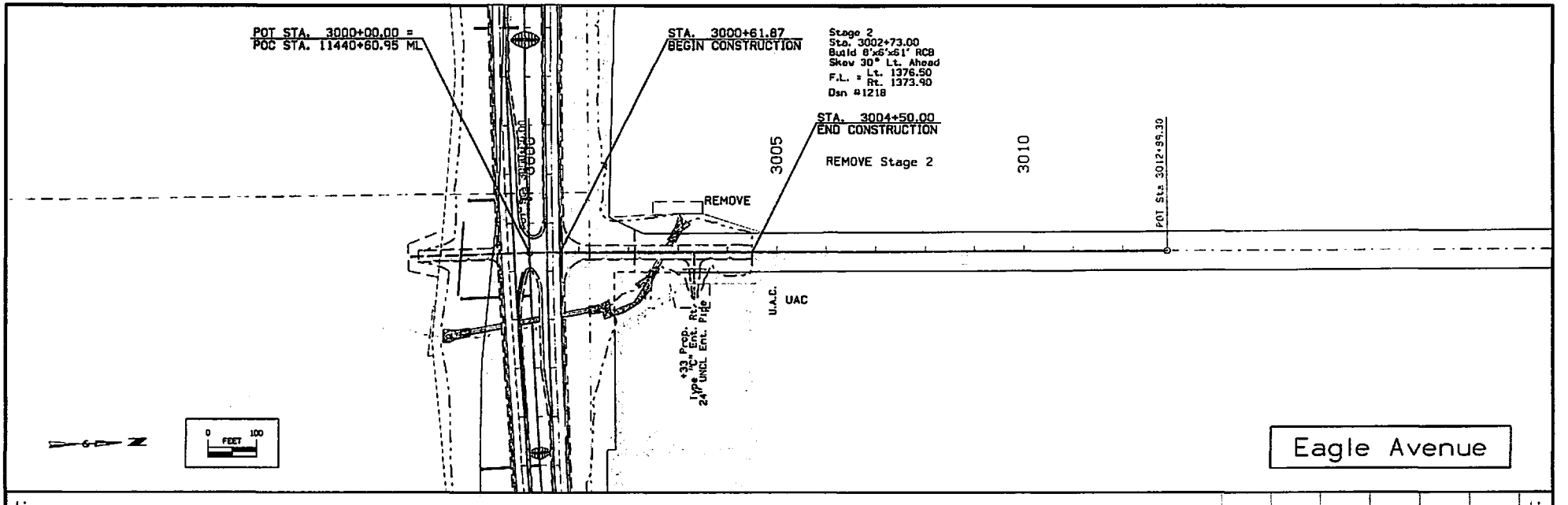


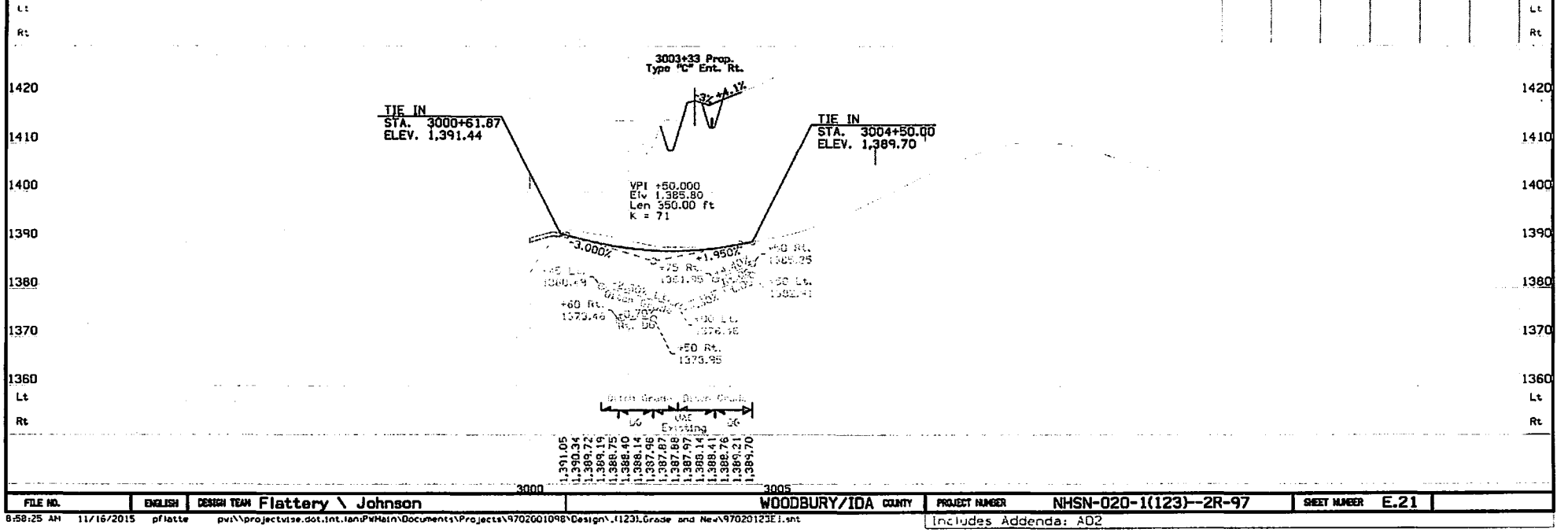


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.20

8:58:06 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.ia:PWMain\Documents\Projects\97020010981\Design_[123]_Grade and Pav\97020123E1.tnt

Includes: Addenda: A02

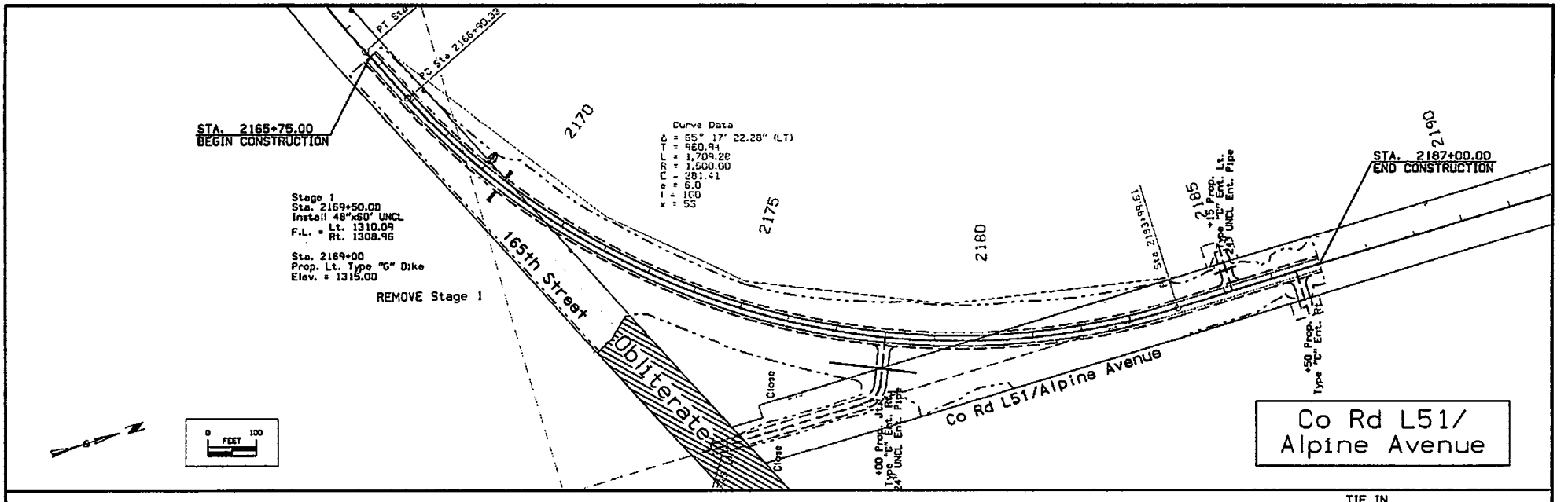


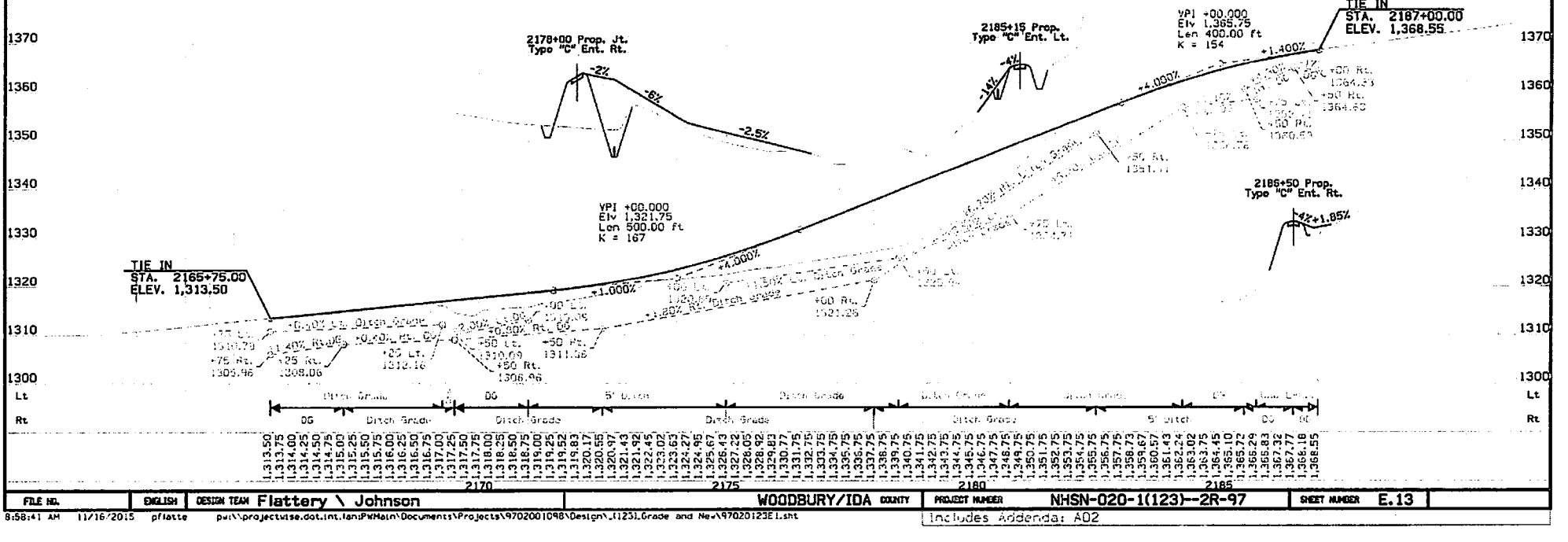


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.21

8:58:25 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\97020001098\Design\.(123)Grade and New\97020123E1.snt

Includes Addenda: AD2

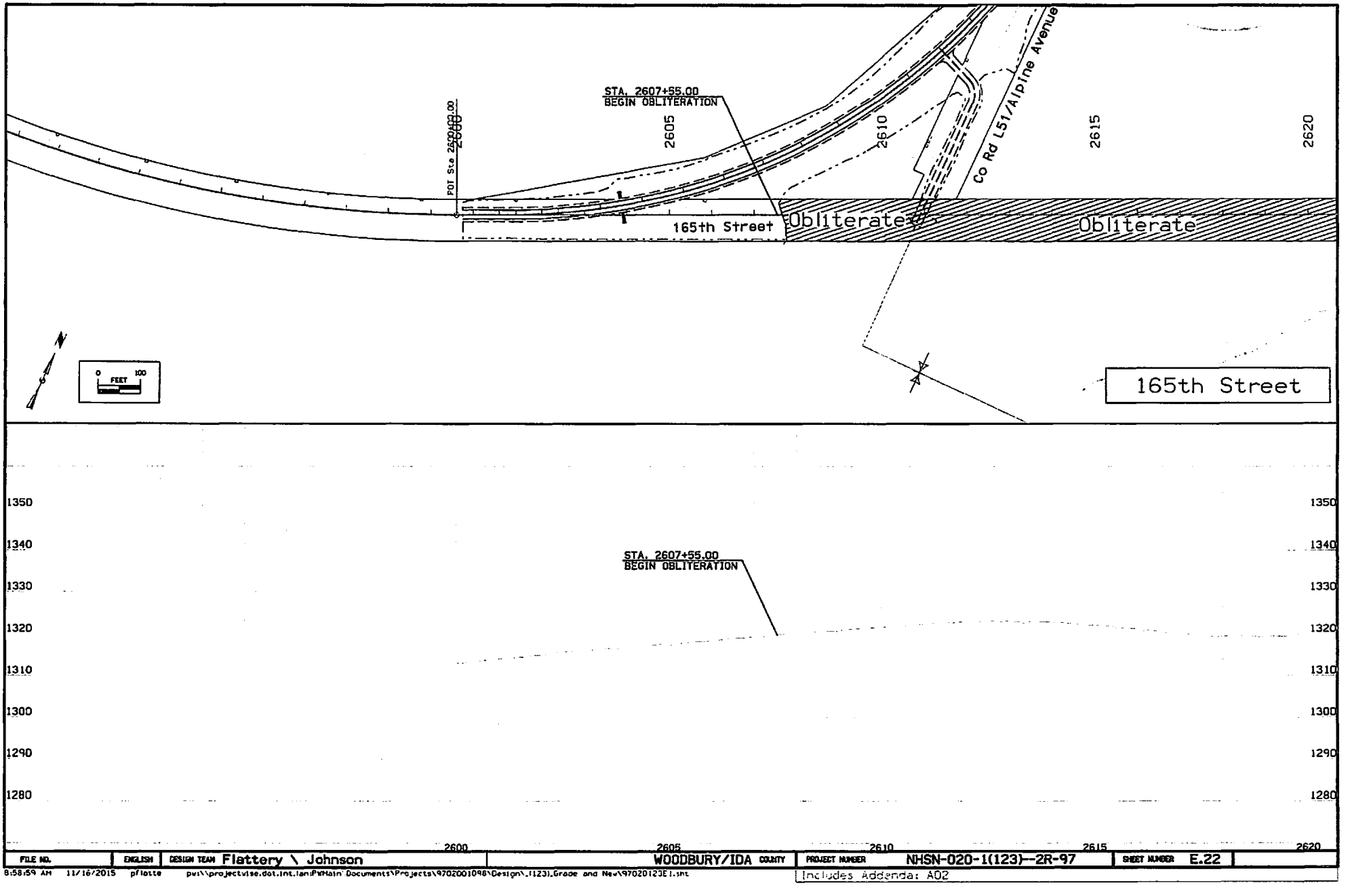


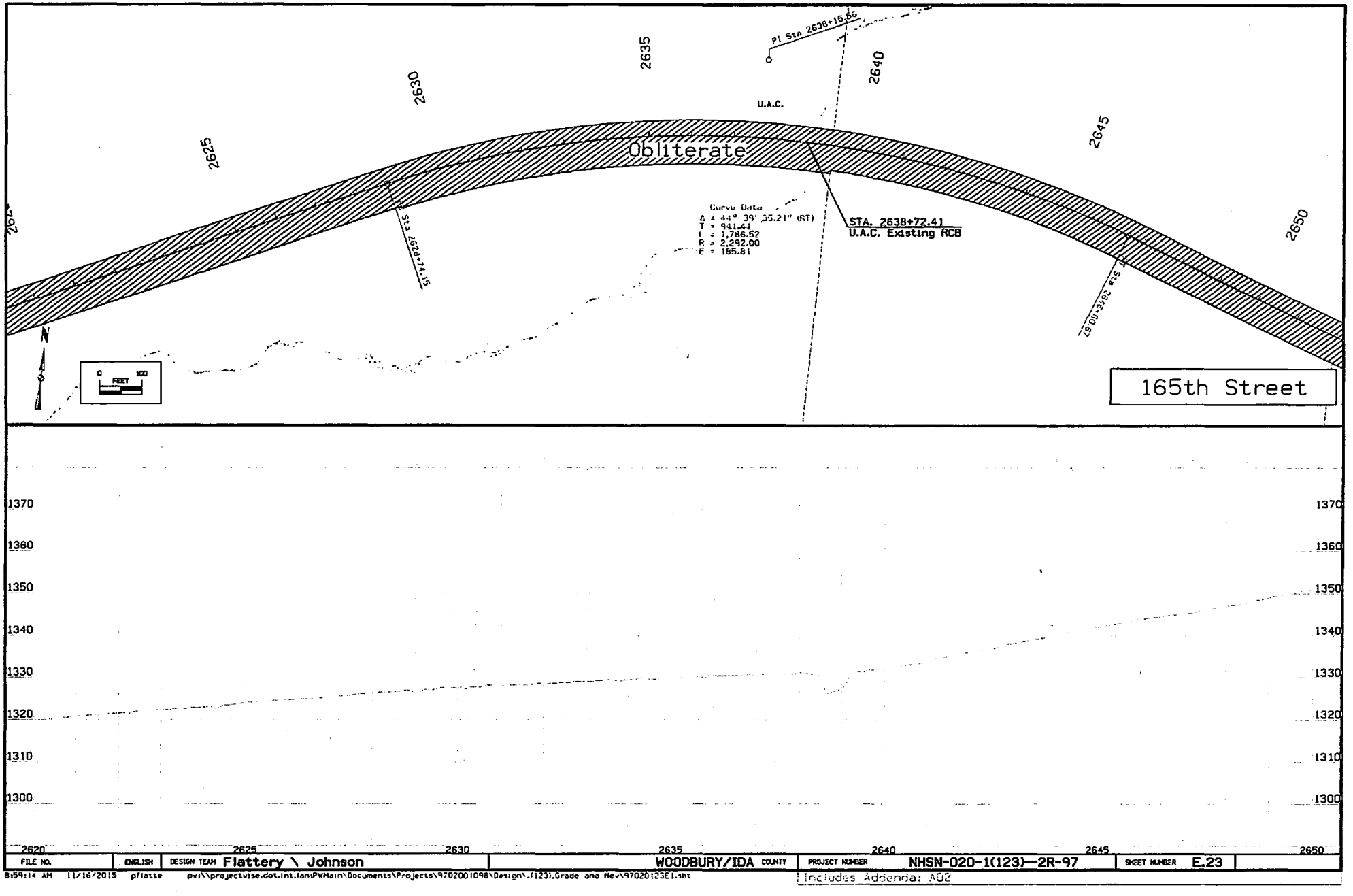


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.13

8:58:41 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design\(123)Grade and Re\97020123E1.sht

Includes Addenda: A02

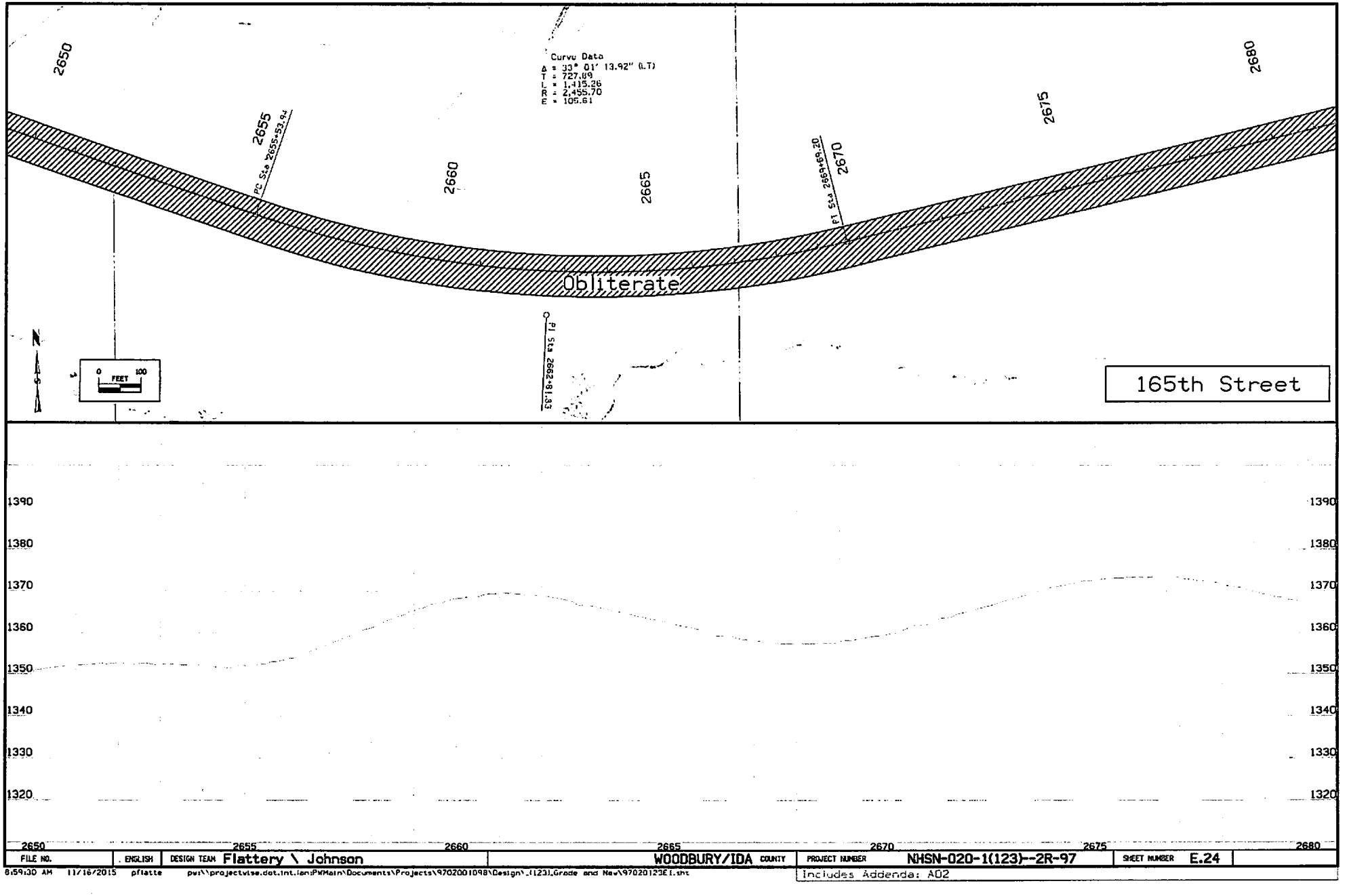

STA. 2607+55.00
BEGIN OBLITERATION
POT Sta 2600+00.00
2600
2605
2610
2615
2620
Co Rd L51/Alpine Avenue
165th Street
Obliterate
Obliterate
0
100
FEET
165th Street
1350
1340
1330
1320
1310
1300
1290
1280
STA. 2607+55.00
BEGIN OBLITERATION
2600
2605
2610
2615
2620
FILE NO.
ENGLISH
DESIGN TEAM Flattery \ Johnson
WOODBURY/IDA COUNTY
PROJECT NUMBER NHSN-020-1(123)--2R-97
SHEET NUMBER E.22
8:58:59 AM 11/16/2015 pflatte
pw:\\projectwise.dot.int.lan:PWMain Documents\Projects\9702001098\Design\.(123).Grade and Rev\97020123E1.sht
Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.23

8:59:14 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design\.(123).Grade and Rev\9702012SE1.sht

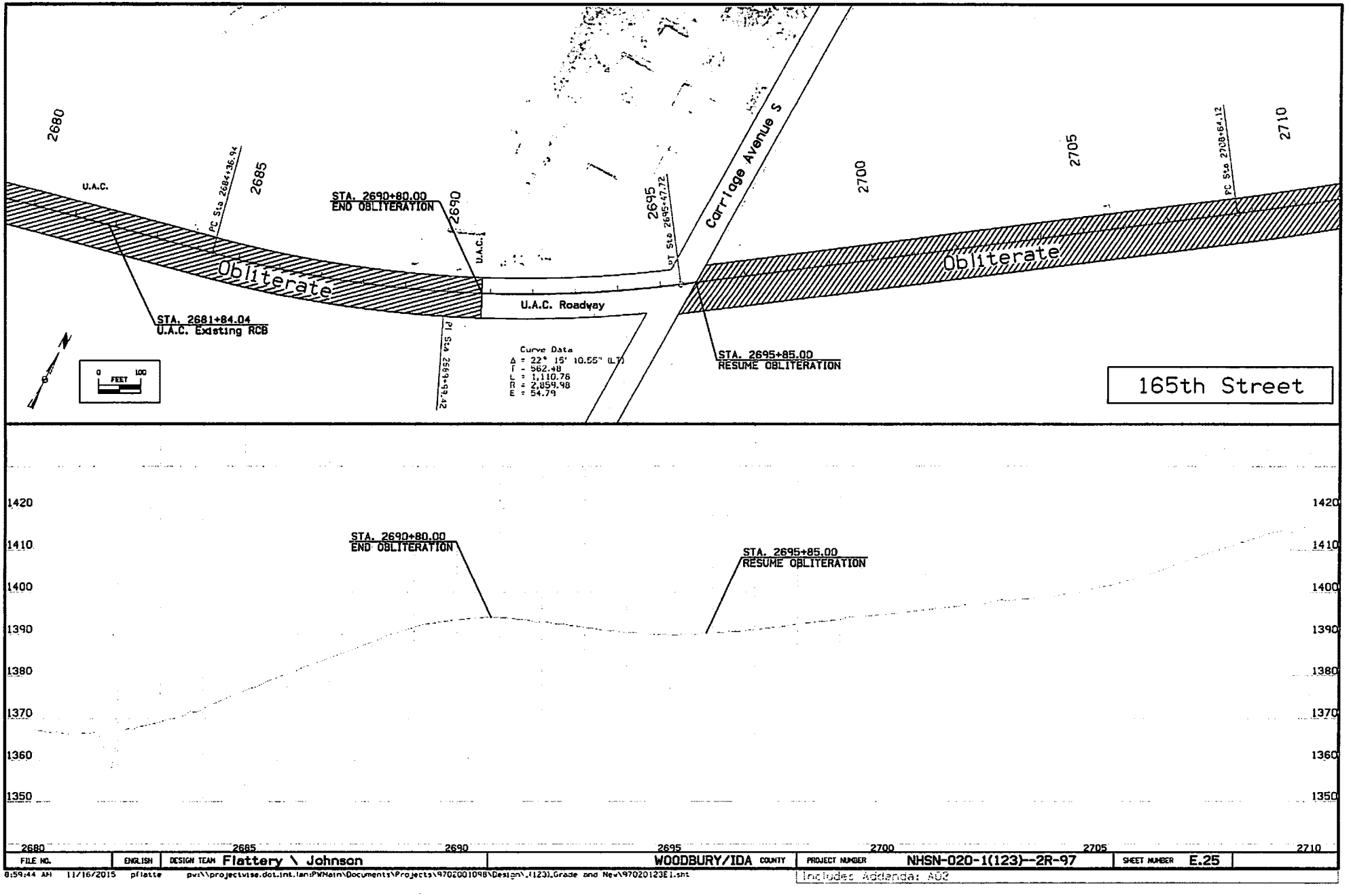
Includes Addenda: A02

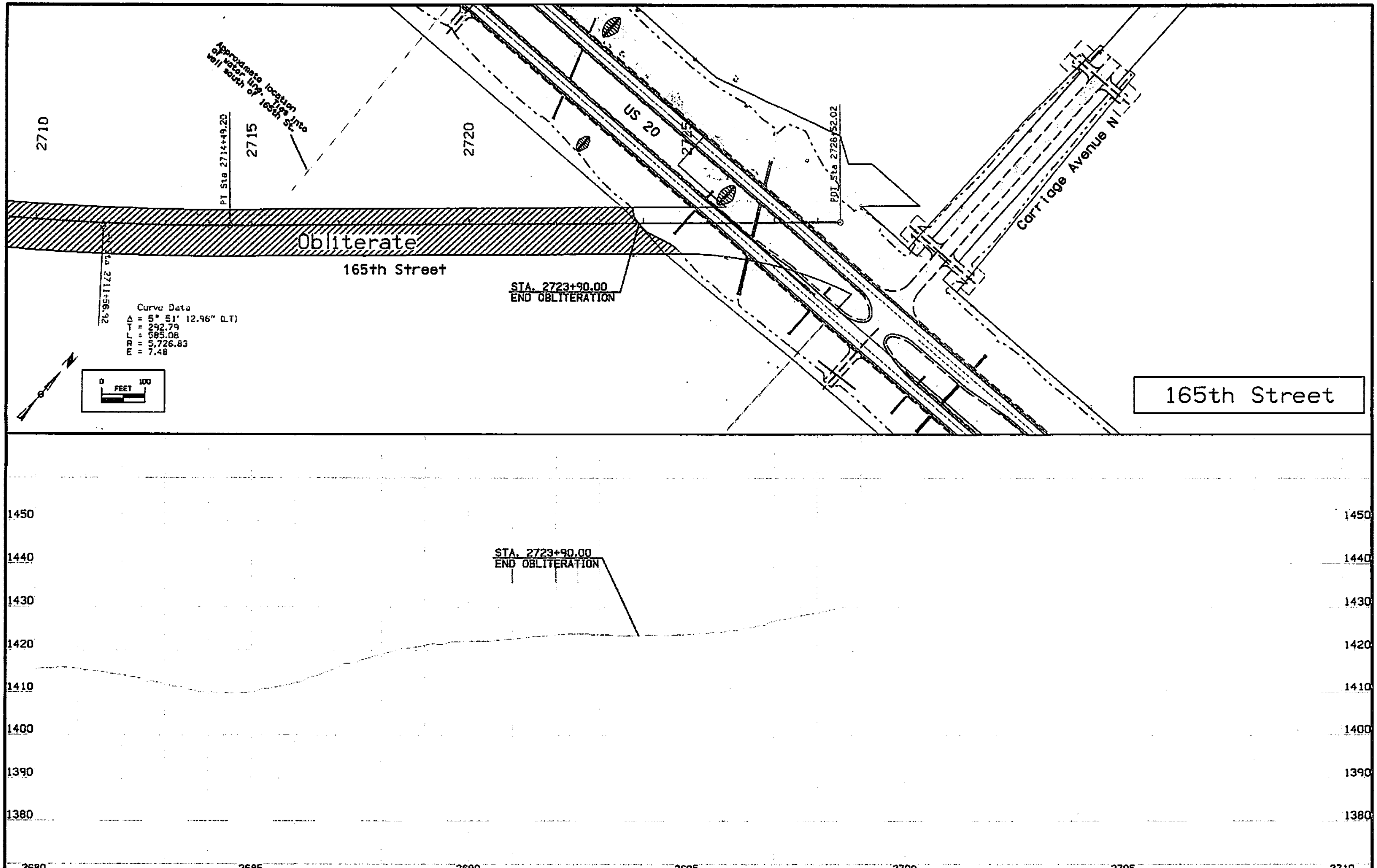


FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.24

8:59:30 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and Rev\9702012361.sht

Includes Addenda: A02

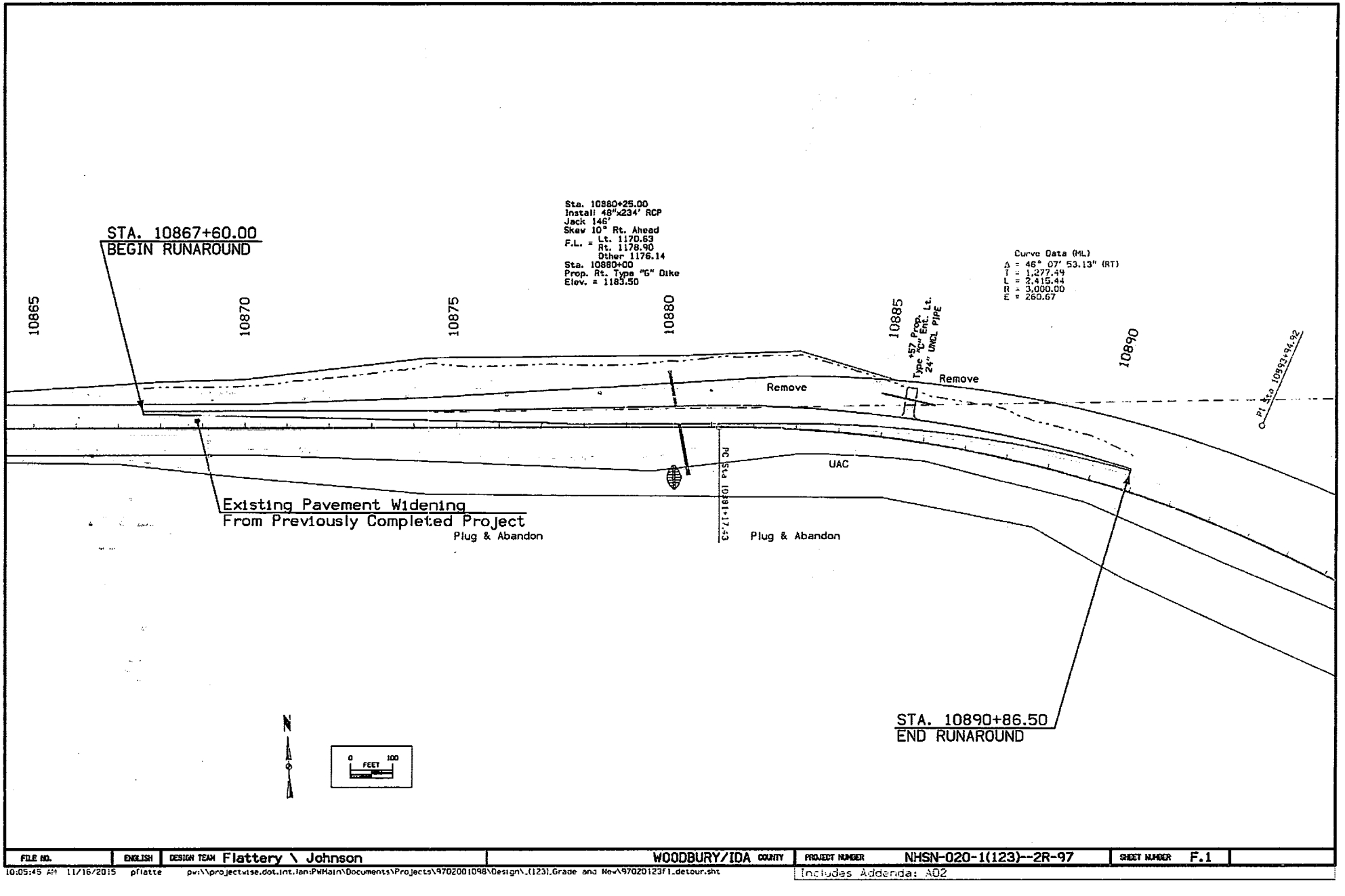

2680
2685
2690
2695
2700
2705
2710
U.A.C.
PC Sta 2684+36.94
STA. 2690+80.00
END OBLITERATION
U.A.C.
PT Sta 2695+47.72
Carriage Avenue S
PC Sta 2708+64.12
Obliterate
Obliterate
U.A.C. Roadway
STA. 2681+84.04
U.A.C. Existing RCB
PI Sta 2689+53.42
Curve Data
Δ = 22° 15' 10.55" (LT)
T = 562.48
L = 1,110.76
R = 2,859.98
E = 54.79
STA. 2695+85.00
RESUME OBLITERATION
165th Street
0 100
FEET
1420
1410
1400
1390
1380
1370
1360
1350
STA. 2690+80.00
END OBLITERATION
STA. 2695+85.00
RESUME OBLITERATION
2680
2685
2690
2695
2700
2705
2710
FILE NO.
ENGLISH
DESIGN TEAM Flattery \ Johnson
WOODBURY/IDA COUNTY
PROJECT NUMBER NHSN-020-1(123)--2R-97
SHEET NUMBER E.25
8:59:44 AM 11/16/2015 pflatte
pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\\97020001098\Design_(123)_Grade and Rec\\97020123E1.sht
Includes Addenda: A02


Approximate location of water line. Ties into well south of 165th St.
2710
2715
2720
PT Sta 2714+49.20
US 20
PDI Sta 2728+52.02
Carriage Avenue N
Obliterate
165th Street
Sta 2711+56.92
STA. 2723+90.00
END OBLITERATION
Curve Data
Δ = 5° 51' 12.98" (LT)
T = 292.79
L = 585.08
R = 5,726.83
E = 7.48
N
0 FEET 100
165th Street
1450
1440
1430
1420
1410
1400
1390
1380
STA. 2723+90.00
END OBLITERATION
2680
2685
2690
2695
2700
2705
2710

FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER E.26

9:00:03 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123)_Grade and New\97020123E1.sht

Includes Addenda: A02



FILE NO.	ENGLISH	DESIGN TEAM Flattery \ Johnson	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(123)--2R-97	SHEET NUMBER F.1

10:05:45 AM 11/16/2015 pflatte pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\Design_(123).Grade and Rev\9702012 3f1_detour.sht

Includes Addenda: A02

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: December 15, 2015
Date of Addendum: December 8, 2015

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
115	97-0201-123	PCC PAVEMENT - GRADE AND NEW	WOODBURY	NHSN-020-2(123)--2R-47 NHSN-020-2(125)--2R-47 NHSN-020-2(127)--2R-47 NHSN-020-2(129)--2R-47 NHSN-020-2(131)--2R-47 NHSN-020-2(133)--2R-47 NHSN-020-1(123)--2R-97 NHSN-020-1(138)--2R-97 NHSN-020-1(155)--2R-97	15DEC115.A02

THIS ADDENDUM IS TO ADDRESS THE ADDTION OF PRECAST CULVERT BID OPTIONS:

Make the following changes:

REPLACE THE PROPOSAL SCHEDULE OF PRICES WITH THE ATTACHED.

Make the following changes to the plan:

REPLACE THE PLANS FOR:

NHSN-020-2(123)--2R-47
NHSN-020-2(125)--2R-47
NHSN-020-2(127)--2R-47
NHSN-020-2(129)--2R-47
NHSN-020-2(131)--2R-47
NHSN-020-2(155)--2R-47

WITH THE ATTACHED PLANS:

NHSN-020-2(123)--2R-47
NHSN-020-2(125)--2R-47
NHSN-020-2(127)--2R-47
NHSN-020-2(129)--2R-47
NHSN-020-2(131)--2R-47
NHSN-020-2(155)--2R-47

For bidding information, see Preparation of Proposals in the Standard Specifications for Highway and Bridge Construction.

```
**************************************************************************
*                                        Bid Order No.: 115              *
* Proposal ID No.: 97-0201-123            Letting Date: December 15, 2015 *
*                                                       10:00 A.M.       *
*    Type of Work: PCC PAVEMENT - GRADE AND NEW                          *
*  Primary County: WOODBURY                      Design: ENGLISH         *
*       DBE Goal: None                 Std Spec Series: 2015             *
*  Pre-Qual Group: PCC PAVEMENT                                          *
*                                                                        *
* Contracting Authority: IOWA DEPARTMENT OF TRANSPORTATION               *
*     Proposal Guaranty: $ 4,250,000                                     *
**************************************************************************
```

This Proposal Includes The Following Project(s):

```
    Project: NHSN-020-2(123)--2R-47                    County: IDA
  Work Type: RCB CULVERT REPLACEMENT - SINGLE BOX       Plans: Yes
      Route: U.S. 20                                   Design: ENGLISH
   Location: APPROX 3 MI E OF CORRECTIONVILLE
Road System: PRIMARY ROAD (on NHS)
     Length:  12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    Project: NHSN-020-2(125)--2R-47                    County: IDA
  Work Type: RCB CULVERT REPLACEMENT - SINGLE BOX       Plans: Yes
      Route: U.S. 20                                   Design: ENGLISH
   Location: 1 MI W OF CO RD L43
Road System: PRIMARY ROAD (on NHS)
     Length:  12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    Project: NHSN-020-2(127)--2R-47                    County: IDA
  Work Type: RCB CULVERT REPLACEMENT - SINGLE BOX       Plans: Yes
      Route: U.S. 20                                   Design: ENGLISH
   Location: 0.3 MI W OF CO RD L43
Road System: PRIMARY ROAD (on NHS)
     Length:  12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    Project: NHSN-020-2(129)--2R-47                    County: IDA
  Work Type: RCB CULVERT EXTENSION - SINGLE BOX         Plans: Yes
      Route: U.S. 20                                   Design: ENGLISH
   Location: 1 MI E OF CO RD L43
Road System: PRIMARY ROAD (on NHS)
     Length:  12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
10:00 A.M.

Type of Work: PCC PAVEMENT - GRADE AND NEW

****

Project: NHSN-020-2(131)--2R-47 County: IDA
Work Type: RCB CULVERT REPLACEMENT - SINGLE BOX Plans: Yes
Route: U.S. 20 Design: ENGLISH
Location: 0.2 MI W OF CO RD L51
Road System: PRIMARY ROAD (on NHS)
Length: 12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect

- -

Project: NHSN-020-2(133)--2R-47 County: IDA
Work Type: RCB CULVERT REPLACEMENT - SINGLE BOX Plans: Yes
Route: U.S. 20 Design: ENGLISH
Location: 1 MI E OF CO RD L43
Road System: PRIMARY ROAD (on NHS)
Length: 12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect

- -

Project: NHSN-020-1(123)--2R-97 County: WOODBURY
Work Type: PCC PAVEMENT - GRADE AND NEW Plans: Yes & X-Sections
Route: U.S. 20 Design: ENGLISH
Location: E OF CORRECTIONVILLE TO W JCT US 59
Road System: PRIMARY ROAD (on NHS)
Length: 11.25 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect

- -

Project: NHSN-020-1(138)--2R-97 County: WOODBURY
Work Type: TRAFFIC SIGNS Plans: Yes
Route: U.S. 20 Design: ENGLISH
Location: E OF CORRECTIONVILLE TO W JCT US 59
Road System: PRIMARY ROAD (on NHS)
Length: 12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect

- -

Project: NHSN-020-1(155)--2R-97 County: WOODBURY
Work Type: RCB CULVERT NEW - SINGLE BOX Plans: Yes
Route: U.S. 20 Design: ENGLISH
Location: APPROX 2 MI E OF CORRECTIONVILLE
Road System: PRIMARY ROAD (on NHS)
Length: 12.40 Miles
Non-Federal Aid - Predetermined Wages Are Not In Effect

- -

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.

Site Number	Contract Period/ Site Description		Liquidated Damages
CONTRACT	LATE START DATE: 04/04/16	20 WORKING DAYS	$ 3,000.00
01	COMPLETION DATE: 12/01/18 SEE SITE NUMBER 01 DESCRIPTION BELOW.		$ 8,000.00
02	COMPLETION DATE: 11/23/16 TO COMPLETE THE OBLITERATION OF 165TH STREET.		$ 3,000.00
03	APPROXIMATE START DATE: 05/16/16 SEE SITE NUMBER 03 DESCRIPTION BELOW.	60 WORKING DAYS	$ 500.00

PROPOSAL NOTES

*** SITE NUMBER CONTRACT ***
THIS IS FOR ALL WORK NOT COVERED BY SITE 01. THIS IS FOR EROSION CONTROL AND SEEDING.

*** SITE NUMBER 01 ***
THIS SITE IS FOR THE COMPLETION OF STAGES 1A, 1B AND 2, COMPLETED SO THAT ALL OF US 20 MAINLINE, US 20 SHOULDERS, AND COUNTY ROADS ARE OPEN TO TRAFFIC. THIS INCLUDES THE COMPLETION OF ALL SAFETY ITEMS NEEDED TO OPEN THE ROADWAY TO TRAFFIC. THESE SAFETY ITEMS INCLUDE ITEMS SUCH AS GUARDRAIL, PAINT LINES, REGULATORY SIGNING.

SITE NUMBER 01 ALSO HAS A ROAD OPENING BONUS AS FOLLOWS:

THE CONTRACTOR WILL BE PAID THE PREDETERMINED AMOUNT SHOWN IN THE PROPOSAL SCHEDULE FOR 'ROAD OPENING BONUS' FOR COMPLETING CONSTRUCTION SO THAT NEW US 20 MAINLINE, US 20 SHOULDERS AND COUNTY ROAD CONNECTIONS ARE OPEN TO TRAFFIC. COMPLIANCE REQUIRES THAT ALL SAFETY ITEMS ARE COMPLETED. THIS INCLUDES ITEMS SUCH AS GUARDRAIL, PAINT LINES AND REGULATORY SIGNING. FAILURE TO OPEN US 20 TO TRAFFIC DUE TO WEATHER, CHANGE ORDERS, CHANGE IN QUANTITIES, UTILITY DELAYS OR ANY OTHER DELAYS WILL NOT BE CONSIDERED AS A JUSTIFICATION TO MODIFY THE DATE OR JUSTIFY PAYMENT OF THE BONUS.

SCHEDULE FOR ROAD OPENING BONUS:
OPENING DATE / BONUS
ON OR BEFORE 11/16/18 --- $1,500,000
11/17/18 --- $1,400,000
11/18/18 --- $1,300,000
11/19/18 --- $1,200,000
11/20/18 --- $1,100,000

11/21/18 --- $1,000,000
11/22/18 --- $900,000
11/23/18 --- $800,000
11/24/18 --- $700,000
11/25/18 --- $600,000
11/26/18 --- $500,000
11/27/18 --- $400,000
11/28/18 --- $300,000
11/29/18 --- $200,000
11/30/18 --- $100,000
12/01/18 --- $0

*** SITE NUMBER 03 ***
SALVAGE, REMOVAL AND DISPOSAL OF OBSTRUCTIONS. THE CONTRACTING AUTHORITY MUST INSPECT AND IF NECESSARY PROVIDE ASBESTOS ABATEMENT PRIOR TO THE CONTRACTOR BEING ABLE TO SALVAGE AND REMOVE THE BUILDINGS. REFER TO THE PROPERTIES/PARCELS ATTACHED TO THE PROPOSAL FOR LOCATION AND DESCRIPTION INFORMATION.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
Section 0001	BID ITEMS FOR A 6' X 5' REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 54 IN RCP PIPE NHSN-020-2(123)--2R-					
0010	2402-2720000 EXCAVATION, CLASS 20	109.000 CY		.		.
0020	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	38.000 CY		.		.
0030	2404-7775000 REINFORCING STEEL	6,407.000 LB		.		.
0040	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0001 TOTAL					.
Section 0002	BID ITEMS FOR A 4' X 4' REINFORCED CONCRETE 3:1 FLUME FOR 30 IN RCP NHSN-020-2(123)--2R-47					
0050	2402-2720000 EXCAVATION, CLASS 20	218.000 CY		.		.
0060	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	35.500 CY		.		.
0070	2404-7775000 REINFORCING STEEL	4,913.000 LB		.		.
0080	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0002 TOTAL					.
Section 0003	DESIGN NO. 0315; ALTERNATE 'GG' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'GG' OPTION 1 IS CHOSEN (123)					

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
	Alt Group GG1					
0090	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	600.000 CY		.		.
0100	2402-2720000 EXCAVATION, CLASS 20	1,548.000 CY		.		.
0110	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	253.000 CY		.		.
0120	2404-7775000 REINFORCING STEEL	46,280.000 LB		.		.
0130	2507-3250005 ENGINEERING FABRIC	1,080.000 SY		.		.
0140	2507-6800061 REVETMENT, CLASS E	980.000 TON		.		.
0150	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0003 TOTAL					.
	Section 0004 DESIGN NO. 0118; ALTERNATE 'HH' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'HH' OPTION 1 IS CHOSEN (123)					
	Alt Group HH1					
0160	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	75.000 CY		.		.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0170	2402-2720000 EXCAVATION, CLASS 20	4,128.000 CY		.		.
0180	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	175.800 CY		.		.
0190	2404-7775000 REINFORCING STEEL	31,831.000 LB		.		.
0200	2507-3250005 ENGINEERING FABRIC	170.000 SY		.		.
0210	2507-6800061 REVETMENT, CLASS E	130.000 TON		.		.
0220	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0004 TOTAL					.
Section 0005 BID ITEMS FOR A 8' X 5' REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR 60 IN RCP NHSN-020-2(123)--2R-47						
0230	2402-2720000 EXCAVATION, CLASS 20	142.000 CY		.		.
0240	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	57.400 CY		.		.
0250	2404-7775000 REINFORCING STEEL	10,601.000 LB		.		.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0260	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0005 TOTAL					.
Section 0006	BID ITEMS FOR A 8' X 8' REINFORCED CONCRETE DROP INLET FOR A 60 IN PIPE			NHSN-020-2(123)--2R-47		
0270	2402-2720000 EXCAVATION, CLASS 20	583.000 CY		.		.
0280	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	21.000 CY		.		.
0290	2404-7775000 REINFORCING STEEL	2,783.000 LB		.		.
0300	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	49.000 LF		.		.
0310	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0006 TOTAL					.
Section 0007	BID ITEMS FOR A 8' X 5' REINFORCED 3:1 CONCRETE FLUME FOR 60 IN RCP			NHSN-020-2(125)--2R-47		
0320	2402-2720000 EXCAVATION, CLASS 20	483.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0330	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	52.500 CY		.		.
0340	2404-7775000 REINFORCING STEEL	9,446.000 LB		.		.
0350	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0007 TOTAL					.
Section 0008 DESIGN NO. 0615; ALTERNATE 'II' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'II' OPTION 1 IS CHOSEN (125) Alt Group II1						
0360	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	370.000 CY		.		.
0370	2402-2720000 EXCAVATION, CLASS 20	1,271.000 CY		.		.
0380	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	267.000 CY		.		.
0390	2404-7775000 REINFORCING STEEL	49,444.000 LB		.		.
0400	2507-3250005 ENGINEERING FABRIC	650.000 SY		.		.
0410	2507-6800061 REVETMENT, CLASS E	600.000 TON		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0420	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0008 TOTAL					.
Section 0009	DESIGN NO. 0318; ALTERNATE 'JJ' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'JJ' OPTION 1 IS CHOSEN (125) Alt Group JJ1					
0430	2402-2720000 EXCAVATION, CLASS 20	1,905.000 CY		.		.
0440	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	159.800 CY		.		.
0450	2404-7775000 REINFORCING STEEL	29,616.000 LB		.		.
0460	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	58.000 LF		.		.
0470	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0009 TOTAL					.
Section 0010	DESIGN NO. 0715; ALTERNATE 'KK' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'KK' OPTION 1 IS CHOSEN (125) Alt Group KK1					
0480	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	275.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0490	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.
0500	2402-2720000 EXCAVATION, CLASS 20	200.000 CY		.		.
0510	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	213.800 CY		.		.
0520	2404-7775000 REINFORCING STEEL	31,039.000 LB		.		.
0530	2507-3250005 ENGINEERING FABRIC	500.000 SY		.		.
0540	2507-6800061 REVETMENT, CLASS E	450.000 TON		.		.
0550	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0010 TOTAL					.

Section 0011 DESIGN NO. 0418; ALTERNATE 'LL' OPTION 1: CAST IN PLACE
BID THIS SECTION IF ALTERNATE 'LL' OPTION 1 IS CHOSEN (125)
Alt Group LL1

0560	2402-2720000 EXCAVATION, CLASS 20	3,152.000 CY		.		.
0570	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	116.900 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0580	2404-7775000 REINFORCING STEEL	16,666.000 LB		.		.
0590	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	52.000 LF		.		.
0600	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0011 TOTAL					.
Section 0012	BID ITEMS FOR A 5' X 4' REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42 IN PIPE NHSN-020-2(125)--2R-47					
0610	2402-2720000 EXCAVATION, CLASS 20	183.000 CY		.		.
0620	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	25.000 CY		.		.
0630	2404-7775000 REINFORCING STEEL	3,929.000 LB		.		.
0640	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0012 TOTAL					.
Section 0013	DESIGN NO. 0915; ALTERNATE 'MM' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'MM' OPTION 1 IS CHOSEN (127) Alt Group MM1					

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0650	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	530.000 CY		.		.
0660	2402-2720000 EXCAVATION, CLASS 20	412.000 CY		.		.
0670	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	450.000 CY		.		.
0680	2404-7775000 REINFORCING STEEL	79,744.000 LB		.		.
0690	2507-3250005 ENGINEERING FABRIC	930.000 SY		.		.
0700	2507-6800061 REVETMENT, CLASS E	860.000 TON		.		.
0710	2533-4980005 MOBILIZATION	LUMP	LUMP			.
0715	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0013 TOTAL					.
Section 0014	BID ITEMS FOR A 5' X 4' REINFORCED CONCRETE FLUME WITH 42 IN RCP		NHSN-020-2(127)--2R-47			
0720	2402-2720000 EXCAVATION, CLASS 20	100.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0730	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	93.000 CY		.		.
0740	2404-7775000 REINFORCING STEEL	12,671.000 LB		.		.
0750	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0014 TOTAL					.
Section 0015 DESIGN NO. 0518; ALTERNATE 'NN' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'NN' OPTION 1 IS CHOSEN (127) Alt Group NN1						
0760	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	80.000 CY		.		.
0770	2402-2720000 EXCAVATION, CLASS 20	2,619.000 CY		.		.
0780	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	256.500 CY		.		.
0790	2404-7775000 REINFORCING STEEL	44,525.000 LB		.		.
0800	2507-3250005 ENGINEERING FABRIC	170.000 SY		.		.
0810	2507-6800061 REVETMENT, CLASS E	125.000 TON		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0820	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0015 TOTAL					.
Section 0016 DESIGN NO. 1115; ALTERNATE 'OO' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'OO' OPTION 1 IS CHOSEN (129) Alt Group OO1						
0830	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	300.000 CY		.		.
0840	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.
0850	2402-2720000 EXCAVATION, CLASS 20	611.000 CY		.		.
0860	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	791.400 CY		.		.
0870	2404-7775000 REINFORCING STEEL	116,530.000 LB		.		.
0880	2507-3250005 ENGINEERING FABRIC	570.000 SY		.		.
0890	2507-6800061 REVETMENT, CLASS E	490.000 TON		.		.
0900	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0016 TOTAL					.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
Section 0017	DESIGN NO. 0618; ALTERNATE 'PP' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'PP' OPTION 1 IS CHOSEN (129) Alt Group PP1					
0910	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	80.000 CY		.		.
0920	2402-2720000 EXCAVATION, CLASS 20	9,696.000 CY		.		.
0930	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	560.600 CY		.		.
0940	2404-7775000 REINFORCING STEEL	82,449.000 LB		.		.
0950	2507-3250005 ENGINEERING FABRIC	170.000 SY		.		.
0960	2507-6800061 REVETMENT, CLASS E	130.000 TON		.		.
0970	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0017 TOTAL					.
Section 0018	DESIGN NO. 1215; ALTERNATE 'QQ' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'QQ' OPTION 1 IS CHOSEN (129) Alt Group QQ1					
0980	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	555.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
0990	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.
1000	2402-2720000 EXCAVATION, CLASS 20	2,055.000 CY		.		.
1010	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	861.800 CY		.		.
1020	2404-7775000 REINFORCING STEEL	126,140.000 LB		.		.
1030	2507-3250005 ENGINEERING FABRIC	1,020.000 SY		.		.
1040	2507-6800061 REVETMENT, CLASS E	925.000 TON		.		.
1050	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0018 TOTAL					.

Section 0019 DESIGN NO. 0718; ALTERNATE 'RR' OPTION 1: CAST IN PLACE
BID THIS SECTION IF ALTERNATE 'RR' OPTION 1 IS CHOSEN (129)
Alt Group RR1

1060	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	120.000 CY		.		.
1070	2402-2720000 EXCAVATION, CLASS 20	8,355.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1080	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	613.900 CY		.		.
1090	2404-7775000 REINFORCING STEEL	90,439.000 LB		.		.
1100	2507-3250005 ENGINEERING FABRIC	260.000 SY		.		.
1110	2507-6800061 REVETMENT, CLASS E	195.000 TON		.		.
1120	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0019 TOTAL					.
Section 0020 DESIGN NO. 1318; ALTERNATE 'AA' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'AA' OPTION 1 IS CHOSEN (129) Alt Group AA1						
1130	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	200.000 CY		.		.
1140	2402-2720000 EXCAVATION, CLASS 20	22.000 CY		.		.
1150	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	216.200 CY		.		.
1160	2404-7775000 REINFORCING STEEL	39,980.000 LB		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1170	2507-3250005 ENGINEERING FABRIC	460.000 SY		.		.
1180	2507-6800061 REVETMENT, CLASS E	320.000 TON		.		.
1190	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0020 TOTAL					.
	Section 0021 DESIGN NO. 1318; ALTERNATE 'AA' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'AA' OPTION 2 IS CHOSEN (129) Alt Group AA2					
1200	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	200.000 CY		.		.
1210	2402-0425030 GRANULAR BACKFILL	51.000 CY		.		.
1220	2402-2720000 EXCAVATION, CLASS 20	70.000 CY		.		.
1230	2415-2111010 PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	108.000 LF		.		.
1240	2415-2201010 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	2.000 EACH		.		.
1250	2507-3250005 ENGINEERING FABRIC	460.000 SY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1260	2507-6800061 REVETMENT, CLASS E	320.000 TON		.		.
1270	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0021 TOTAL					.
	Section 0022 DESIGN NO. 1315; ALTERNATE 'SS' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'SS' OPTION 1 IS CHOSEN (131) Alt Group SS1					
1280	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	1,590.000 CY		.		.
1290	2402-2720000 EXCAVATION, CLASS 20	2,700.000 CY		.		.
1300	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	606.200 CY		.		.
1310	2404-7775000 REINFORCING STEEL	96,614.000 LB		.		.
1320	2507-3250005 ENGINEERING FABRIC	3,090.000 SY		.		.
1330	2507-6800061 REVETMENT, CLASS E	2,645.000 TON		.		.
1340	2533-4980005 MOBILIZATION	LUMP	LUMP			.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1345	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0022 TOTAL					.
	Section 0023 DESIGN NO. 1415; ALTERNATE 'CC' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'CC' OPTION 1 IS CHOSEN (131) Alt Group CC1					
1350	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	345.000 CY	.			.
1360	2402-2720000 EXCAVATION, CLASS 20	470.000 CY	.			.
1370	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	293.000 CY	.			.
1380	2404-7775000 REINFORCING STEEL	53,067.000 LB	.			.
1390	2507-3250005 ENGINEERING FABRIC	690.000 SY	.			.
1400	2507-6800061 REVETMENT, CLASS E	560.000 TON	.			.
1410	2533-4980005 MOBILIZATION	LUMP	LUMP			.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1415	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0023 TOTAL					.
	Section 0024 DESIGN NO. 1415; ALTERNATE 'CC' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'CC' OPTION 2 IS CHOSEN (131) Alt Group CC2					
1420	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	345.000 CY	.			.
1430	2402-2720000 EXCAVATION, CLASS 20	470.000 CY	.			.
1440	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	45.400 CY	.			.
1450	2404-7775000 REINFORCING STEEL	8,303.000 LB	.			.
1460	2415-2111006 PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT.	172.000 LF	.			.
1470	2415-2201006 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 6 FT.	1.000 EACH	.			.
1480	2507-3250005 ENGINEERING FABRIC	690.000 SY	.			.

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1490	2507-6800061 REVETMENT, CLASS E	560.000 TON		.		.
1500	2533-4980005 MOBILIZATION	LUMP	LUMP			.
1505	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0024 TOTAL					.
Section 0025 DESIGN NO. 1515; ALTERNATE 'TT' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'TT' OPTION 1 IS CHOSEN (131) Alt Group TT1						
1510	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	95.000 CY		.		.
1520	2402-2720000 EXCAVATION, CLASS 20	1,100.000 CY		.		.
1530	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	166.000 CY		.		.
1540	2404-7775000 REINFORCING STEEL	27,752.000 LB		.		.
1550	2507-3250005 ENGINEERING FABRIC	200.000 SY		.		.
1560	2507-6800061 REVETMENT, CLASS E	150.000 TON		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1570	2533-4980005 MOBILIZATION	LUMP	LUMP			.
1575	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0025 TOTAL					.
Section 0026 DESIGN NO. 0818; ALTERNATE 'UU' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'UU' OPTION 1 IS CHOSEN (131) Alt Group UU1						
1580	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	90.000 CY	.			.
1590	2402-2720000 EXCAVATION, CLASS 20	5,000.000 CY	.			.
1600	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	379.700 CY	.			.
1610	2404-7775000 REINFORCING STEEL	66,239.000 LB	.			.
1620	2507-3250005 ENGINEERING FABRIC	185.000 SY	.			.
1630	2507-6800061 REVETMENT, CLASS E	135.000 TON	.			.
1640	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0026 TOTAL					.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
Section 0027 DESIGN NO. 0918; ALTERNATE 'BB' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'BB' OPTION 1 IS CHOSEN (131) Alt Group BB1						
1650	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	55.000 CY		.		.
1660	2402-2720000 EXCAVATION, CLASS 20	2,800.000 CY		.		.
1670	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	186.100 CY		.		.
1680	2404-7775000 REINFORCING STEEL	33,742.000 LB		.		.
1690	2507-3250005 ENGINEERING FABRIC	130.000 SY		.		.
1700	2507-6800061 REVETMENT, CLASS E	100.000 TON		.		.
1710	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0027 TOTAL					.
Section 0028 DESIGN NO. 0918; ALTERNATE 'BB' OPTION 2: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'BB' OPTION 2 IS CHOSEN (131) Alt Group BB2						
1720	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	55.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
1730	2402-2720000 EXCAVATION, CLASS 20	2,800.000 CY		.		.
1740	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	66.200 CY		.		.
1750	2404-7775000 REINFORCING STEEL	11,821.000 LB		.		.
1760	2415-2111006 PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT.	81.000 LF		.		.
1770	2507-3250005 ENGINEERING FABRIC	136.000 SY		.		.
1780	2507-6800061 REVETMENT, CLASS E	100.000 TON		.		.
1790	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0028 TOTAL					.
	Section 0029 DESIGN NO. 1018; ALTERNATE 'VV' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'VV' OPTION 1 IS CHOSEN (131) Alt Group VV1					
1800	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	150.000 CY		.		.
1810	2402-2720000 EXCAVATION, CLASS 20	1,500.000 CY		.		.

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1820	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	129.300 CY		.		.
1830	2404-7775000 REINFORCING STEEL	21,628.000 LB		.		.
1840	2507-3250005 ENGINEERING FABRIC	320.000 SY		.		.
1850	2507-6800061 REVETMENT, CLASS E	260.000 TON		.		.
1860	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0029 TOTAL					.
Section 0030 DESIGN NO. 1118; ALTERNATE 'DD' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'DD' OPTION 1 IS CHOSEN (133) Alt Group DD1						
1870	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	200.000 CY		.		.
1880	2402-2720000 EXCAVATION, CLASS 20	1,182.000 CY		.		.
1890	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	124.400 CY		.		.
1900	2404-7775000 REINFORCING STEEL	18,703.000 LB		.		.

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1910	2507-3250005 ENGINEERING FABRIC	430.000 SY		.		.
1920	2507-6800061 REVETMENT, CLASS E	325.000 TON		.		.
1930	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0030 TOTAL					.
	Section 0031 DESIGN NO. 1118; ALTERNATE 'DD' OPTION 2: PRECAST BID THIS SECTION IF ALTERNATE 'DD' OPTION 2 IS CHOSEN (133) Alt Group DD2					
1940	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	200.000 CY		.		.
1950	2402-0425030 GRANULAR BACKFILL	28.000 CY		.		.
1960	2402-2720000 EXCAVATION, CLASS 20	1,210.000 CY		.		.
1970	2415-2110808 PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.	88.000 LF		.		.
1980	2415-2200808 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 8 FT.	2.000 EACH		.		.
1990	2507-3250005 ENGINEERING FABRIC	430.000 SY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
2000	2507-6800061 REVETMENT, CLASS E	325.000 TON		.		.
2010	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0031 TOTAL					.
	Section 0032 DESIGN NO. 1218;ALTERNATE 'EE' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'EE' OPTION 1 IS CHOSEN (133) Alt Group EE1					
2020	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	155.000 CY		.		.
2030	2402-2720000 EXCAVATION, CLASS 20	883.000 CY		.		.
2040	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	91.100 CY		.		.
2050	2404-7775000 REINFORCING STEEL	13,302.000 LB		.		.
2060	2507-3250005 ENGINEERING FABRIC	320.000 SY		.		.
2070	2507-6800061 REVETMENT, CLASS E	140.000 TON		.		.
2080	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0032 TOTAL					.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
Section 0033	DESIGN NO. 1218; ALTERNATE 'EE' OPTION 2: PRECAST BID THIS SECTION IF ALTERNATE 'EE' OPTION 2 IS CHOSEN (133) Alt Group EE2					
2090	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	155.000 CY		.		.
2100	2402-0425030 GRANULAR BACKFILL	24.000 CY		.		.
2110	2402-2720000 EXCAVATION, CLASS 20	907.000 CY		.		.
2120	2415-2110806 PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	75.000 LF		.		.
2130	2415-2200806 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	2.000 EACH		.		.
2140	2507-3250005 ENGINEERING FABRIC	320.000 SY		.		.
2150	2507-6800061 REVETMENT, CLASS E	140.000 TON		.		.
2160	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0033 TOTAL					.
Section 0034	ROADWAY ITEMS					

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2170	2101-0850001 CLEARING AND GRUBBING	575.000 ACRE		.		.
2180	2102-0425071 SPECIAL BACKFILL	41,182.800 CY		.		.
2190	2102-2624980 CONTRACTOR FURNISHED SELECT TREATMENT	393,667.300 CY		.		.
2200	2102-2625000 EMBANKMENT-IN-PLACE	1,300.000 CY		.		.
2210	2102-2710070 EXCAVATION, CLASS 10, ROADWAY AND BORROW	4,576,241 CY		.		.
2220	2102-2710090 EXCAVATION, CLASS 10, WASTE	795,280.000 CY		.		.
2230	2102-2712015 EXCAVATION, CLASS 12, BOULDERS OR ROCK FRAGMENTS	500.000 CY		.		.
2240	2102-2713090 EXCAVATION, CLASS 13, WASTE	521.000 CY		.		.
2250	2102-4560000 LOCATING TILE LINES	1,185.000 STA		.		.
2260	2102-5020010 OBLITERATE OLD ROADBED	116.600 STA		.		.
2270	2105-8425011 TOPSOIL, SPREAD	409,728.000 CY		.		.

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2280	2105-8425020 TOPSOIL, STRIP AND STOCKPILE	628,078.000 CY		.		.
2290	2107-0425020 COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES	4,668.700 CY		.		.
2300	2107-0875100 COMPACTION WITH MOISTURE CONTROL	3,135,932 CY		.		.
2310	2107-3825025 GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN	2,912.000 CY		.		.
2320	2111-8174100 GRANULAR SUBBASE	458,055.000 SY		.		.
2330	2112-0000100 WICK DRAIN	204,276.500 LF		.		.
2340	2115-0100000 MODIFIED SUBBASE	18,999.300 CY		.		.
2350	2121-7425010 GRANULAR SHOULDERS, TYPE A	33,481.300 TON		.		.
2360	2123-7450000 SHOULDER CONSTRUCTION, EARTH	2,444.670 STA		.		.
2370	2213-6745500 REMOVAL OF CURB	4.300 STA		.		.

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2380	2214-5145150 PAVEMENT SCARIFICATION	578.000 SY		.		.
2390	2301-1003100 STANDARD OR SLIP-FORM PORTLAND CEMENT CONCRETE PAVEMENT, QM-C, CLASS 3 DURABILITY, 10 IN.	391,979.300 SY		.		.
2400	2301-9091000 RUMBLE STRIP PANEL (PCC SURFACE)	9.000 EACH		.		.
2410	2303-0043502 HOT MIX ASPHALT MIXTURE (3,000,000 ESAL), SURFACE COURSE, 1/2 IN. MIX, FRICTION L-2	159.300 TON		.		.
2420	2303-0246422 ASPHALT BINDER, PG 64-22	9.600 TON		.		.
2430	2304-0100000 DETOUR PAVEMENT	2,695.000 SY		.		.
2440	2304-0100000 DETOUR PAVEMENT , P.C. CONCRETE, 10 IN.	6,342.000 SY		.		.
2450	2312-8260051 GRANULAR SURFACING ON ROAD, CLASS A CRUSHED STONE	5,609.000 TON		.		.
2460	2315-8275025 SURFACING, DRIVEWAY, CLASS A CRUSHED STONE	5,350.000 TON		.		.
2470	2401-6745650 REMOVAL OF EXISTING STRUCTURES	LUMP	LUMP			.

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2480	2402-0425040 FLOODED BACKFILL	22,363.400 CY		.		.
2490	2402-2720100 EXCAVATION, CLASS 20, FOR ROADWAY PIPE CULVERT	39,211.200 CY		.		.
2500	2416-0100018 APRONS, CONCRETE, 18 IN. DIA.	2.000 EACH		.		.
2510	2416-0100024 APRONS, CONCRETE, 24 IN. DIA.	128.000 EACH		.		.
2520	2416-0100030 APRONS, CONCRETE, 30 IN. DIA.	1.000 EACH		.		.
2530	2416-0100036 APRONS, CONCRETE, 36 IN. DIA.	14.000 EACH		.		.
2540	2416-0100042 APRONS, CONCRETE, 42 IN. DIA.	3.000 EACH		.		.
2550	2416-0100048 APRONS, CONCRETE, 48 IN. DIA.	7.000 EACH		.		.
2560	2416-0100054 APRONS, CONCRETE, 54 IN. DIA.	6.000 EACH		.		.
2570	2416-0100060 APRONS, CONCRETE, 60 IN. DIA.	4.000 EACH		.		.

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2580	2416-0101036 REMOVE AND REINSTALL CONCRETE PIPE APRONS LESS THAN OR EQUAL TO 36 IN.	18.000 EACH		.		.
2590	2416-0101136 REMOVE AND REINSTALL CONCRETE PIPE APRONS GREATER THAN 36 IN.	6.000 EACH		.		.
2600	2416-0102242 APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 42 IN.	2.000 EACH		.		.
2610	2416-0102308 APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 108 IN.	2.000 EACH		.		.
2620	2416-1180018 CULVERT, CONCRETE ROADWAY PIPE, 18 IN. DIA.	78.000 LF		.		.
2630	2416-1180024 CULVERT, CONCRETE ROADWAY PIPE, 24 IN. DIA.	8,097.000 LF		.		.
2640	2416-1180030 CULVERT, CONCRETE ROADWAY PIPE, 30 IN. DIA.	216.000 LF		.		.
2650	2416-1180036 CULVERT, CONCRETE ROADWAY PIPE, 36 IN. DIA.	1,356.000 LF		.		.
2670	2416-1180048 CULVERT, CONCRETE ROADWAY PIPE, 48 IN. DIA.	496.000 LF		.		.

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2680	2416-1180054 CULVERT, CONCRETE ROADWAY PIPE, 54 IN. DIA.	1,008.000 LF		.		.
2690	2416-1180060 CULVERT, CONCRETE ROADWAY PIPE, 60 IN. DIA.	360.000 LF		.		.
2700	2416-1200242 CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 42 IN.	60.000 LF		.		.
2710	2416-1200308 CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 108 IN.	262.000 LF		.		.
2720	2416-1240024 CULVERT, 3000D CONCRETE ROADWAY PIPE, 24 IN. DIA.	278.000 LF		.		.
2730	2416-1240042 CULVERT, 3000D CONCRETE ROADWAY PIPE, 42 IN. DIA.	472.000 LF		.		.
2740	2416-1240048 CULVERT, 3000D CONCRETE ROADWAY PIPE, 48 IN. DIA.	374.000 LF		.		.
2750	2416-1240060 CULVERT, 3000D CONCRETE ROADWAY PIPE, 60 IN. DIA.	690.000 LF		.		.
2760	2416-1245036 CULVERT, 3750D CONCRETE ROADWAY PIPE, 36 IN. DIA.	168.000 LF		.		.
2780	2416-1262024 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 24 IN. DIA.	100.000 LF		.		.

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2790	2416-1262036 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 36 IN. DIA.	230.000 LF		.		.
2800	2416-1262054 CULVERT, CONCRETE PIPE, 2000D, TRENCHLESS, 54 IN. DIA.	86.000 LF		.		.
2810	2416-1263042 CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 42 IN. DIA.	122.000 LF		.		.
2820	2416-1263048 CULVERT, CONCRETE PIPE, 3000D, TRENCHLESS, 48 IN. DIA.	146.000 LF		.		.
2840	2417-0225024 APRONS, METAL, 24 IN. DIA.	50.000 EACH		.		.
2850	2417-0225030 APRONS, METAL, 30 IN. DIA.	2.000 EACH		.		.
2860	2417-1060024 CULVERT, CORRUGATED METAL ROADWAY PIPE, 24 IN. DIA.	4,228.000 LF		.		.
2870	2417-1060030 CULVERT, CORRUGATED METAL ROADWAY PIPE, 30 IN. DIA.	510.000 LF		.		.
2880	2417-2307036 DRAIN, CORRUGATED METAL SLOTTED PIPE, 36 IN., W/6 IN. GRATE	116.000 LF		.		.

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2890	2417-5895018 BEVELED PIPE AND GUARD, 18 INCH	4.000 EACH		.		.
2900	2418-0000010 TEMPORARY STREAM DIVERSION	23.000 EACH		.		.
2910	2422-0360018 APRONS, UNCLASSIFIED, 18 IN. DIA.	4.000 EACH		.		.
2920	2422-0360024 APRONS, UNCLASSIFIED, 24 IN. DIA.	136.000 EACH		.		.
2930	2422-0360030 APRONS, UNCLASSIFIED, 30 IN. DIA.	6.000 EACH		.		.
2940	2422-0360036 APRONS, UNCLASSIFIED, 36 IN. DIA.	10.000 EACH		.		.
2950	2422-0360042 APRONS, UNCLASSIFIED, 42 IN. DIA.	2.000 EACH		.		.
2960	2422-0360048 APRONS, UNCLASSIFIED, 48 IN. DIA.	2.000 EACH		.		.
2970	2422-1722018 CULVERT, UNCLASSIFIED ENTRANCE PIPE, 18 IN. DIA.	53.000 LF		.		.
2980	2422-1722024 CULVERT, UNCLASSIFIED ENTRANCE PIPE, 24 IN. DIA.	6,512.000 LF		.		.

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2990	2422-1722036 CULVERT, UNCLASSIFIED ENTRANCE PIPE, 36 IN. DIA.	50.000 LF		.		.
3000	2422-1723018 CULVERT, UNCLASSIFIED ROADWAY PIPE, 18 IN. DIA.	264.000 LF		.		.
3010	2422-1723024 CULVERT, UNCLASSIFIED ROADWAY PIPE, 24 IN. DIA.	468.000 LF		.		.
3020	2422-1723030 CULVERT, UNCLASSIFIED ROADWAY PIPE, 30 IN. DIA.	218.000 LF		.		.
3030	2422-1723036 CULVERT, UNCLASSIFIED ROADWAY PIPE, 36 IN. DIA.	274.000 LF		.		.
3040	2422-1723042 CULVERT, UNCLASSIFIED ROADWAY PIPE, 42 IN. DIA.	94.000 LF		.		.
3050	2422-1723048 CULVERT, UNCLASSIFIED ROADWAY PIPE, 48 IN. DIA.	60.000 LF		.		.
3060	2435-0254700 BARRIER INTAKE, SW-547	2.000 EACH		.		.
3070	2435-0256200 INTAKE, SW-562	2.000 EACH		.		.
3080	2502-8212024 SUBDRAIN, LONGITUDINAL, (BACKSLOPE) 4 IN. DIA.	7,525.000 LF		.		.

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3090	2502-8212034 SUBDRAIN, LONGITUDINAL, (SHOULDER) 4 IN. DIA.	139,410.000 LF		.		.
3100	2502-8221304 SUBDRAIN OUTLET, DR-304	559.000 EACH		.		.
3110	2506-4984000 FLOWABLE MORTAR	1,188.900 CY		.		.
3120	2507-3250005 ENGINEERING FABRIC	25,455.300 SY		.		.
3130	2507-6800061 REVETMENT, CLASS E	14,578.600 TON		.		.
3140	2507-8029000 EROSION STONE	434.400 TON		.		.
3150	2510-6745850 REMOVAL OF PAVEMENT	209,391.900 SY		.		.
3160	2518-6910000 SAFETY CLOSURE	258.000 EACH		.		.
3170	2519-2000010 FENCE, CHANNEL CROSSING, TYPE A	1,450.000 LF		.		.
3180	2519-3280000 FENCE, FIELD	125,117.700 LF		.		.
3190	2519-3300400 FIELD FENCE BRACE PANELS	1,929.000 EACH		.		.

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3200	2520-3350010 FIELD LABORATORY	1.000 EACH		.		.
3210	2526-8285000 CONSTRUCTION SURVEY	LUMP	LUMP			.
3220	2527-9263109 PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	5,259.900 STA		.		.
3230	2527-9263137 PAINTED SYMBOLS AND LEGENDS, WATERBORNE OR SOLVENT-BASED	15.000 EACH		.		.
3240	2527-9263180 PAVEMENT MARKINGS REMOVED	2,133.730 STA		.		.
3250	2527-9263190 SYMBOLS AND LEGENDS REMOVED	13.000 EACH		.		.
3260	2528-8400048 TEMPORARY BARRIER RAIL, CONCRETE	9,082.000 LF		.		.
3270	2528-8400157 TEMPORARY FLOODLIGHTING LUMINAIRE	6.000 EACH		.		.
3280	2528-8445110 TRAFFIC CONTROL	LUMP	LUMP			.
3290	2528-8445113 FLAGGERS	100.000 EACH	435.00000		43,500.00	

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3300	2528-9109020 TEMPORARY LANE SEPARATOR SYSTEM	1,430.000 LF		.		.
3310	2529-2242304 CD JOINT ASSEMBLY	24.000 EACH		.		.
3320	2529-5070110 PATCHES, FULL-DEPTH FINISH, BY AREA	320.000 SY		.		.
3330	2529-5070120 PATCHES, FULL-DEPTH FINISH, BY COUNT	8.000 EACH		.		.
3340	2533-4980005 MOBILIZATION	LUMP	LUMP			.
3350	2538-6970010 SALVAGE, REMOVAL, AND DISPOSAL OF OBSTRUCTIONS	LUMP	LUMP			.
3360	2548-0000200 MILLED SHOULDER RUMBLE STRIPS, PCC SURFACE	1,184.800 STA		.		.
3370	2551-0000110 TEMP CRASH CUSHION	16.000 EACH		.		.
3380	2599-9999009 ('LINEAR FEET' ITEM) HORIZONTAL STRIP DRAIN	45,913.000 LF		.		.
3390	2599-9999010 ('LUMP SUM' ITEM) INTERMEDIATE FOUNDATION IMPROVEMENTS	LUMP	LUMP			.

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3393	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 42 IN. DIA	196.000 LF		.		.
3394	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, 48 IN. DIA.	314.000 LF		.		.
3395	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 42 IN. DIA.	118.000 LF		.		.
3396	2599-9999009 ('LINEAR FEET' ITEM) PERMALOK, STEEL, TRENCHLESS, 48 IN. DIA.	196.000 LF		.		.
3400	2599-9999010 ('LUMP SUM' ITEM) INTERMEDIATE FOUNDATION IMPROVEMENTS VERIFICATION TESTING	LUMP	LUMP			.
3410	2599-9999012 ('THOUSANDS OF GALLONS' ITEM) DUST CONTROL WATERING	4,000.000 MGAL		.		.
3420	2601-2633100 MOWING	417.800 ACRE		.		.
3430	2601-2634100 MULCHING	417.800 ACRE		.		.
3440	2601-2634105 MULCHING, BONDED FIBER MATRIX	1.000 ACRE		.		.
3450	2601-2636043 SEEDING AND FERTILIZING (RURAL)	112.400 ACRE		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3460	2601-2640350 SPECIAL DITCH CONTROL, WOOD EXCELSIOR MAT	4,799.000 SQ	.		.	
3470	2601-2642100 STABILIZING CROP - SEEDING AND FERTILIZING	417.800 ACRE	.		.	
3480	2601-2642120 STABILIZING CROP - SEEDING AND FERTILIZING (URBAN)	1.000 ACRE	.		.	
3490	2601-2643110 WATERING FOR SOD, SPECIAL DITCH CONTROL, OR SLOPE PROTECTION	1,812.000 MGAL	60.00000		108,720.00	
3500	2601-2643300 MOBILIZATION FOR WATERING	3.000 EACH	350.00000		1,050.00	
3510	2601-2643412 TURF REINFORCEMENT MAT, TYPE 2	4,261.000 SQ	.		.	
3520	2602-0000020 SILT FENCE	204,001.900 LF	.		.	
3530	2602-0000030 SILT FENCE FOR DITCH CHECKS	106,626.000 LF	.		.	
3540	2602-0000050 SILT BASINS	312.000 EACH	.		.	
3550	2602-0000071 REMOVAL OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS	155,313.900 LF	.		.	

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3560	2602-0000101 MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECK	31,062.800 LF		.		.
3570	2602-0000130 TEMPORARY SEDIMENT CONTROL BASIN	59.000 EACH		.		.
3580	2602-0000140 MAINTENANCE OF TEMPORARY SEDIMENT CONTROL BASIN	236.000 EACH		.		.
3590	2602-0000150 STABILIZED CONSTRUCTION ENTRANCE	15,500.000 LF		.		.
3600	2602-0000160 ROCK CHECK DAM	290.000 LF		.		.
3610	2602-0000170 MAINTENANCE OF ROCK CHECK DAM	96.000 EACH		.		.
3620	2602-0000180 REMOVAL OF ROCK CHECK DAM	12.000 EACH		.		.
3630	2602-0000312 PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 12 IN. DIA.	4,000.000 LF		.		.
3640	2602-0000320 PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 20 IN. DIA.	34,380.000 LF		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3650	2602-0000350 REMOVAL OF PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE	38,380.000 LF		.		.
3660	2602-0010010 MOBILIZATIONS, EROSION CONTROL	1.000 EACH	500.00000		500.00	
3670	2602-0010020 MOBILIZATIONS, EMERGENCY EROSION CONTROL	1.000 EACH	1,000.00000		1,000.00	
3680	2612-0000520 ROADSIDE SPRAY FOR WEED CONTROL	42.000 ACRE		.		.
	SECTION 0034 TOTAL					.
Section 0035 ALTERNATE 'FF' OPTION 1: PCC PAVED SHOULDERS BID THIS SECTION IF ALTERNATE 'FF' OPTION 1 IS CHOSEN (123) Alt Group FF1						
3690	2122-5190006 PAVED SHOULDER, P.C. CONCRETE, 6 IN.	94,838.300 SY		.		.
3700	2548-0000200 MILLED SHOULDER RUMBLE STRIPS, PCC SURFACE	1,146.000 STA		.		.
	SECTION 0035 TOTAL					.
Section 0036 ALTERNATE 'FF' OPTION 2: HMA PAVED SHOULDERS BID THIS SECTION IF ALTERNATE 'FF' OPTION 2 IS CHOSEN (123) Alt Group FF2						
3710	2122-5500060 PAVED SHOULDER, HOT MIX ASPHALT MIXTURE, 6 IN.	94,838.300 SY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3720	2548-0000100 MILLED SHOULDER RUMBLE STRIPS, HMA SURFACE	1,146.000 STA		.		.
3730	2548-0000110 ASPHALT EMULSION FOR FOG SEAL (SHOULDER RUMBLE STRIPS)	2,483.000 GAL		.		.
	SECTION 0036 TOTAL					.

Section 0037 PAYMENT ADJUSTMENT INCENTIVE ITEMS

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3740	2301-7000110 PAYMENT ADJUSTMENT INCENTIVE/DISINCENTIVE FOR PCC PAVEMENT THICKNESS (BY SCHEDULE)	350,000.000 EACH	1.00000		350,000.00	
3750	2301-7000120 PAYMENT ADJUSTMENT INCENTIVE/DISINCENTIVE FOR QM-C PCC PAVEMENT COARSENESS AND WORKABILITY FACTORS	310,000.000 EACH	1.00000		310,000.00	
3760	2317-7000110 PAYMENT ADJUSTMENT INCENTIVE/DISINCENTIVE FOR PCC PAVEMENT SMOOTHNESS (BY SCHEDULE)	290,000.000 EACH	1.00000		290,000.00	
	SECTION 0037 TOTAL					.

Section 0038 ROAD OPENING BONUS FOR CONTRACT

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3770	2599-9999010 ('LUMP SUM' ITEM) ROAD OPENING BONUS	LUMP	LUMP		1,500,000.00	
	SECTION 0038 TOTAL					.
	Section 0039 TRAFFIC AND SAFETY ITEMS					
				NHSN-020-1(138)--2R-97		
3780	2524-6765210 REMOVAL OF TYPE A SIGN ASSEMBLY	1.000 EACH	.			.
3790	2524-9089110 DELINEATOR, RIGID - TYPE IA	417.000 EACH	.			.
3800	2524-9210000 MILEPOST MARKERS	22.000 EACH	.			.
3810	2524-9275222 WOOD POSTS FOR TYPE A OR B SIGNS, 4 IN. X 6 IN.	600.000 LF	.			.
3820	2524-9276010 PERFORATED SQUARE STEEL TUBE POSTS	5,010.000 LF	.			.
3830	2524-9276021 PERFORATED SQUARE STEEL TUBE POST ANCHOR, BREAK-AWAY SOIL INSTALLATION	209.000 EACH	.			.
3840	2524-9276027 PERFORATED SQUARE STEEL TUBE POST ANCHOR, TRIANGULAR SLIP BASE ASSEMBLY	139.000 EACH	.			.
3850	2524-9290009 SIGN MOUNTING BRACKETS, SPECIAL	110.000 EACH	.			.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3860	2524-9325001 TYPE A SIGNS, SHEET ALUMINUM	3,484.000 SF		.		.
3870	2524-9380001 TYPE B SIGNS, EXTRUDED ALUMINUM STRUCTURAL PANEL	69.000 SF		.		.
3880	2528-8445110 TRAFFIC CONTROL	LUMP	LUMP			.
3890	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0039 TOTAL					.
Section 0040	BID ITEMS FOR A 6' X 4' REINFORCED CONCRETE 3:1 FLUME AND BASIN NHSN-020-1(155)--2R-97					
3900	2402-2720000 EXCAVATION, CLASS 20	99.000 CY		.		.
3910	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	27.100 CY		.		.
3920	2404-7775000 REINFORCING STEEL	4,623.000 LB		.		.
3930	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0040 TOTAL					.
Section 0041	DESIGN NO. 0515; ITEMS FOR A 14' X 18'-6 DISSIPATION BASIN REINFORCED CONCRETE PIPE NHSN-020-1(155)--2R-97					

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
3940	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	140.000 CY		.		.
3950	2402-2720000 EXCAVATION, CLASS 20	68.000 CY		.		.
3960	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	46.900 CY		.		.
3970	2404-7775000 REINFORCING STEEL	5,677.000 LB		.		.
3980	2507-3250005 ENGINEERING FABRIC	210.000 SY		.		.
3990	2507-6800061 REVETMENT, CLASS E	160.000 TON		.		.
4000	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0041 TOTAL					.
Section 0042 DESIGN NO. 0615; ALTERNATE 'WW' OPTION 1: CAST IN PLACE BID THIS SECTION IF ALTERNATE 'WW' OPTION 1 IS CHOSEN (155) Alt Group WW1						
4010	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	150.000 CY		.		.
4020	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4030	2402-2720000 EXCAVATION, CLASS 20	234.000 CY		.		.
4040	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	649.000 CY		.		.
4050	2404-7775000 REINFORCING STEEL	107,951.000 LB		.		.
4060	2507-3250005 ENGINEERING FABRIC	290.000 SY		.		.
4070	2507-6800061 REVETMENT, CLASS E	240.000 TON		.		.
4080	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0042 TOTAL					.

Section 0043 DESIGN NO. 0118; ALTERNATE 'XX' OPTION 1: CAST IN PLACE
BID THIS SECTION IF ALTERNATE 'XX' OPTION 1 IS CHOSEN (155)
Alt Group XX1

4090	2402-2720000 EXCAVATION, CLASS 20	4,066.000 CY		.		.
4100	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	403.100 CY		.		.
4110	2404-7775000 REINFORCING STEEL	64,632.000 LB		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4120	2501-8400172 TEMPORARY SHORING	LUMP	LUMP			.
4130	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0043 TOTAL					.
Section 0044 DESIGN NO. 0315; ALTERNATE 'GG' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'GG' OPTION 2 IS CHOSEN (123) Alt Group GG2						
4140	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	600.000 CY	.			.
4150	2402-0425030 GRANULAR BACKFILL	30.900 CY	.			.
4160	2402-2720000 EXCAVATION, CLASS 20	1,549.000 CY	.			.
4170	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	90.600 CY	.			.
4180	2404-7775000 REINFORCING STEEL	16,111.000 LB	.			.
4190	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	115.000 LF	.			.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4200	2415-2201008 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	1.000 EACH		.		.
4210	2507-3250005 ENGINEERING FABRIC	1,080.000 SY		.		.
4220	2507-6800061 REVETMENT, CLASS E	980.000 TON		.		.
4230	2533-4980005 MOBILIZATION	LUMP	LUMP			.
4240	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LUMP	LUMP			.
	SECTION 0044 TOTAL					.

Section 0045 DESIGN NO. 0118; ALTERNATE 'HH' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'HH' OPTION 2 IS CHOSEN (123)
Alt Group HH2

4250	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	75.000 CY		.		.
4260	2402-0425030 GRANULAR BACKFILL	39.000 CY		.		.
4270	2402-2720000 EXCAVATION, CLASS 20	4,167.000 CY		.		.

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4280	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	19.500 CY		.		.
4290	2404-7775000 REINFORCING STEEL	3,366.000 LB		.		.
4300	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	100.000 LF		.		.
4310	2415-2201008 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	1.000 EACH		.		.
4320	2507-3250005 ENGINEERING FABRIC	170.000 SY		.		.
4330	2507-6800061 REVETMENT, CLASS E	130.000 TON		.		.
4340	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0045 TOTAL					.

Section 0046 DESIGN NO. 0615; ALTERNATE 'II' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'II' OPTION 2 IS CHOSEN (125)
Alt Group II2

4350	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	370.000 CY		.		.
4360	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4370	2402-0425030 GRANULAR BACKFILL	34.700 CY		.		.
4380	2402-2720000 EXCAVATION, CLASS 20	1,306.000 CY		.		.
4390	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	92.200 CY		.		.
4400	2404-7775000 REINFORCING STEEL	16,495.000 LB		.		.
4410	2415-2111212 PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	153.000 LF		.		.
4420	2507-3250005 ENGINEERING FABRIC	650.000 SY		.		.
4430	2507-6800061 REVETMENT, CLASS E	600.000 TON		.		.
4440	2533-4980005 MOBILIZATION	LUMP	LUMP			.
4450	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LUMP	LUMP			.
	SECTION 0046 TOTAL					.

Section 0047 DESIGN NO. 0318; ALTERNATE 'JJ' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'JJ' OPTION 2 IS CHOSEN (125)
Alt Group JJ2

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4460	2402-0425030 GRANULAR BACKFILL	20.100 CY		.		.
4470	2402-2720000 EXCAVATION, CLASS 20	1,925.000 CY		.		.
4480	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	53.900 CY		.		.
4490	2404-7775000 REINFORCING STEEL	9,661.000 LB		.		.
4500	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	58.000 LF		.		.
4510	2415-2110808 PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.	90.000 LF		.		.
4520	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0047 TOTAL					.
Section 0048 DESIGN NO. 0715; ALTERNATE 'KK' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'KK' OPTION 2 IS CHOSEN (125 Alt Group KK2						
4530	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	275.000 CY		.		.
4540	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4550	2402-0425030 GRANULAR BACKFILL	32.500 CY		.		.
4560	2402-2720000 EXCAVATION, CLASS 20	230.000 CY		.		.
4570	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	65.500 CY		.		.
4580	2404-7775000 REINFORCING STEEL	10,973.000 LB		.		.
4590	2415-2110606 PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT.	167.000 LF		.		.
4600	2507-3250005 ENGINEERING FABRIC	500.000 SY		.		.
4610	2507-6800061 REVETMENT, CLASS E	450.000 TON		.		.
4620	2533-4980005 MOBILIZATION	LUMP	LUMP			.
4630	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LUMP	LUMP			.
	SECTION 0048 TOTAL					.

Section 0049 DESIGN NO. 0418; ALTERNATE 'LL' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'LL' OPTION 2 IS CHOSEN (125)
Alt Group LL2

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Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4640	2402-0425030 GRANULAR BACKFILL	24.000 CY		.		.
4650	2402-2720000 EXCAVATION, CLASS 20	3,176.000 CY		.		.
4660	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	31.600 CY		.		.
4670	2404-7775000 REINFORCING STEEL	5,061.000 LB		.		.
4680	2414-6444100 STEEL PIPE PEDESTRIAN HAND RAILING	52.000 LF		.		.
4690	2415-2110606 PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT.	96.000 LF		.		.
4700	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0049 TOTAL					.

Section 0050 DESIGN NO. 0915; ALTERNATE 'MM' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'MM' OPTION 2 IS CHOSEN (127)
Alt Group MM2

4710	2102-0425071 SPECIAL BACKFILL	39.000 CY		.		.
4720	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	530.000 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4730	2402-2720000 EXCAVATION, CLASS 20	451.000 CY		.		.
4740	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	209.000 CY		.		.
4750	2404-7775000 REINFORCING STEEL	36,919.000 LB		.		.
4760	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	142.000 LF		.		.
4770	2507-3250005 ENGINEERING FABRIC	930.000 SY		.		.
4780	2507-6800061 REVETMENT, CLASS E	860.000 TON		.		.
4790	2533-4980005 MOBILIZATION	LUMP	LUMP			.
4800	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0050 TOTAL					.
Section 0051 DESIGN NO. 0518; ALTERNATE 'NN' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'NN' OPTION 2 IS CHOSEN (127) Alt Group NN2						
4810	2102-0425071 SPECIAL BACKFILL	35.100 CY		.		.

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Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4820	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	80.000 CY		.		.
4830	2402-2720000 EXCAVATION, CLASS 20	2,830.000 CY		.		.
4840	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	46.000 CY		.		.
4850	2404-7775000 REINFORCING STEEL	8,109.000 LB		.		.
4860	2415-2111008 PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	110.000 LF		.		.
4870	2415-2201008 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	1.000 EACH		.		.
4880	2507-3250005 ENGINEERING FABRIC	170.000 SY		.		.
4890	2507-6800061 REVETMENT, CLASS E	125.000 TON		.		.
4900	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0051 TOTAL					.

Section 0052 DESIGN NO. 1115; ALTERNATE 'OO' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'OO' OPTION 2 IS CHOSEN (129)
Alt Group 002

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
4910	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	300.000 CY		.		.
4920	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.
4930	2402-0425030 GRANULAR BACKFILL	89.200 CY		.		.
4940	2402-2720000 EXCAVATION, CLASS 20	700.000 CY		.		.
4950	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	46.600 CY		.		.
4960	2404-7775000 REINFORCING STEEL	6,672.000 LB		.		.
4970	2415-2111208 PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 FT.	274.000 LF		.		.
4980	2415-2201208 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 8 FT.	1.000 EACH		.		.
4990	2507-3250005 ENGINEERING FABRIC	570.000 SY		.		.
5000	2507-6800061 REVETMENT, CLASS E	490.000 TON		.		.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5010	2533-4980005 MOBILIZATION	LUMP	LUMP			.
5020	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LUMP	LUMP			.
	SECTION 0052 TOTAL					.
Section 0053 DESIGN NO. 0618; ALTERNATE 'PP' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'PP' OPTION 2 IS CHOSEN (129) Alt Group PP2						
5030	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	80.000 CY	.			.
5040	2402-0425030 GRANULAR BACKFILL	63.900 CY	.			.
5050	2402-2720000 EXCAVATION, CLASS 20	9,759.000 CY	.			.
5060	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	38.400 CY	.			.
5070	2404-7775000 REINFORCING STEEL	5,575.000 LB	.			.
5080	2415-2111208 PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 FT.	188.000 LF	.			.
5090	2507-3250005 ENGINEERING FABRIC	170.000 SY	.			.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5100	2507-6800061 REVETMENT, CLASS E	130.000 TON		.		.
5110	2533-4980005 MOBILIZATION	LUMP	LUMP			.
5120	2599-9999005 ('EACH' ITEM) PRECAST CONCRETE BOX CULVERT END SECTION , 12 FT. X 8	1.000 EACH		.		.
	SECTION 0053 TOTAL					.
Section 0054 DESIGN NO. 1215; ALTERNATE 'QQ' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'QQ' OPTION 2 IS CHOSEN (129) Alt Group QQ2						
5130	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	555.000 CY		.		.
5140	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.
5150	2402-0425030 GRANULAR BACKFILL	83.800 CY		.		.
5160	2402-2720000 EXCAVATION, CLASS 20	2,139.000 CY		.		.
5170	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	88.600 CY		.		.
5180	2404-7775000 REINFORCING STEEL	12,677.000 LB		.		.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5190	2415-2111012 PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 FT.	282.000 LF		.		.
5200	2415-2201012 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT.	1.000 EACH		.		.
5210	2507-3250005 ENGINEERING FABRIC	1,020.000 SY		.		.
5220	2507-6800061 REVETMENT, CLASS E	925.000 TON		.		.
5230	2533-4980005 MOBILIZATION	LUMP	LUMP			.
5240	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LUMP	LUMP			.
	SECTION 0054 TOTAL					.
Section 0055 DESIGN NO. 0718; ALTERNATE 'RR' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'RR' OPTION 2 IS CHOSEN (129) Alt Group RR2						
5250	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	120.000 CY		.		.
5260	2402-0425030 GRANULAR BACKFILL	58.800 CY		.		.
5270	2402-2720000 EXCAVATION, CLASS 20	8,414.000 CY		.		.

Bid Order No.: 115
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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5280	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	79.800 CY		.		.
5290	2404-7775000 REINFORCING STEEL	11,521.000 LB		.		.
5300	2415-2111012 PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 FT.	189.000 LF		.		.
5310	2415-2201012 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT.	1.000 EACH		.		.
5320	2507-3250005 ENGINEERING FABRIC	260.000 SY		.		.
5330	2507-6800061 REVETMENT, CLASS E	195.000 TON		.		.
5340	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0055 TOTAL					.

Section 0056 DESIGN NO. 1315; ALTERNATE 'SS' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'SS' OPTION 2 IS CHOSEN (131)
Alt Group SS2

5350	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	1,590.000 CY		.		.
5360	2402-2720000 EXCAVATION, CLASS 20	2,700.000 CY		.		.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5370	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	182.700 CY		.		.
5380	2404-7775000 REINFORCING STEEL	30,398.000 LB		.		.
5390	2415-2111010 PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	182.000 LF		.		.
5400	2415-2201010 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	1.000 EACH		.		.
5410	2507-3250005 ENGINEERING FABRIC	3,090.000 SY		.		.
5420	2507-6800061 REVETMENT, CLASS E	2,645.000 TON		.		.
5430	2533-4980005 MOBILIZATION	LUMP	LUMP			.
5440	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WAL	LUMP	LUMP			.
	SECTION 0056 TOTAL					.

Section 0057 DESIGN NO. 1515; ALTERNATE 'TT' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'TT' OPTION 2 IS CHOSEN (131)
Alt Group TT2

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5450	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	95.000 CY		.		.
5460	2402-2720000 EXCAVATION, CLASS 20	1,100.000 CY		.		.
5470	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	34.400 CY		.		.
5480	2404-7775000 REINFORCING STEEL	5,853.000 LB		.		.
5490	2415-2110806 PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	119.000 LF		.		.
5500	2415-2200806 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	1.000 EACH		.		.
5510	2507-3250005 ENGINEERING FABRIC	200.000 SY		.		.
5520	2507-6800061 REVETMENT, CLASS E	150.000 TON		.		.
5530	2533-4980005 MOBILIZATION	LUMP	LUMP			.
5540	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY SHEET PILE END CUT-OFF WALL	LUMP	LUMP			.
	SECTION 0057 TOTAL					.

Section 0058 DESIGN NO. 0818; ALTERNATE 'UU' OPTION 2: PRECAST CULVERT

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
	BID THIS SECTION IF ALTERNATE 'UU' OPTION 2 IS CHOSEN (131) Alt Group UU2					
5550	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	90.000 CY		.		.
5560	2402-2720000 EXCAVATION, CLASS 20	5,000.000 CY		.		.
5570	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	85.200 CY		.		.
5580	2404-7775000 REINFORCING STEEL	13,286.000 LB		.		.
5590	2415-2111010 PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	136.000 LF		.		.
5600	2415-2201010 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	1.000 EACH		.		.
5610	2507-3250005 ENGINEERING FABRIC	185.000 SY		.		.
5620	2507-6800061 REVETMENT, CLASS E	135.000 TON		.		.
5630	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0058 TOTAL					.
	Section 0059 DESIGN NO. 1018; ALTERNATE 'VV' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'VV' OPTION 2 IS CHOSEN (131) Alt Group VV2					

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5640	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	150.000 CY		.		.
5650	2402-2720000 EXCAVATION, CLASS 20	1,500.000 CY		.		.
5660	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	19.700 CY		.		.
5670	2404-7775000 REINFORCING STEEL	3,309.000 LB		.		.
5680	2415-2110806 PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	91.000 LF		.		.
5690	2415-2200806 PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	1.000 EACH		.		.
5700	2507-3250005 ENGINEERING FABRIC	320.000 SY		.		.
5710	2507-6800061 REVETMENT, CLASS E	260.000 TON		.		.
5720	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0059 TOTAL					.

Section 0060 DESIGN NO. 0615; ALTERNATE 'WW' OPTION 2: PRECAST CULVERT
BID THIS SECTION IF ALTERNATE 'WW' OPTION 2 IS CHOSEN (155)
Alt Group WW2

Bid Order No.: 115
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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5730	2104-2710020 EXCAVATION, CLASS 10, CHANNEL	150.000 CY		.		.
5740	2401-6750001 REMOVALS, AS PER PLAN	LUMP	LUMP			.
5750	2402-0425030 GRANULAR BACKFILL	45.500 CY		.		.
5760	2402-2720000 EXCAVATION, CLASS 20	280.000 CY		.		.
5770	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	241.900 CY		.		.
5780	2404-7775000 REINFORCING STEEL	42,181.000 LB		.		.
5790	2415-2111212 PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	149.000 LF		.		.
5800	2507-3250005 ENGINEERING FABRIC	290.000 SY		.		.
5810	2507-6800061 REVETMENT, CLASS E	240.000 TON		.		.
5820	2533-4980005 MOBILIZATION	LUMP	LUMP			.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Line No	Item Number / Item Description	Item Quantity and Unit	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Cts
5830	2599-9999010 ('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LUMP	LUMP			.
	SECTION 0060 TOTAL					.
Section 0061 DESIGN NO. 0118; ALTERNATE 'XX' OPTION 2: PRECAST CULVERT BID THIS SECTION IF ALTERNATE 'XX' OPTION 2 IS CHOSEN (155) Alt Group XX2						
5840	2402-0425030 GRANULAR BACKFILL	36.000 CY		.		.
5850	2402-2720000 EXCAVATION, CLASS 20	4,102.000 CY		.		.
5860	2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)	71.200 CY		.		.
5870	2404-7775000 REINFORCING STEEL	11,052.000 LB		.		.
5880	2415-2111212 PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	121.000 LF		.		.
5890	2501-8400172 TEMPORARY SHORING	LUMP	LUMP			.
5900	2533-4980005 MOBILIZATION	LUMP	LUMP			.
	SECTION 0061 TOTAL					.
	TOTAL BID					.

****

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015

Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

When this proposal is used for bidding purposes and submitted with the proper Bidding Document, any and all items on separate documents added to this proposal by addendum must also be included.

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

Bid Order No.: 115
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Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Note	Description
001.2015	SERIES 2015 OF IDOT STANDARD SPECIFICATIONS, PLUS APPLICABLE GS, DS'S, SS'S, AND SP'S APPLY TO WORK ON THIS CONTRACT
005.15001.02	REVISIONS TO GS-15001
005.2120	A FUEL ADJUSTMENT FACTOR WILL BE APPLIED TO PAYMENTS ON THIS CONTRACT PER SECTION 2120 OF THE STANDARD SPECIFICATIONS
410.11	A STORM WATER POLLUTION PREVENTION PLAN HAS BEEN DEVELOPED FOR ONE OR MORE PROJECTS ON THIS CONTRACT
500.12	ACCELERATED WORK SCHEDULE REQUIRED
720.101	ATTACHMENT OF THE "RIGHT OF WAY CERTIFICATE"
720.122	ATTACHMENT OF "NON-POINT 25 UTILITY DATA"
720.402	ATTACHMENT OF PLAN SHEETS
DS-15011	PCC PAVEMENT NON-DESTRUCTIVE THICKNESS DETERMINATION
DS-15031	QUALITY MANAGEMENT CONCRETE (QM-C)
GS-15001	GENERAL SUPPLEMENTAL SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION
SP-150011	INTERMEDIATE FOUNDATION IMPROVEMENTS WOODBURY COUNTY NHSN-020-1(123)--2R-97
SS-15003	BACKFILLING AND COMPACTION OF PIPE AND REINFORCED BOX CULVERTS BY FLOODING

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Note Description

001.2015
*** STANDARD SPECIFICATIONS -- SERIES 2015 ***
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 contract.

005.15001.02 November 17, 2015
*** REVISIONS TO GS-15001 ***

>>> Replace Articles 1102.11, C and D with the following:

C. A Proposal Guaranty/Bid Bond (Form 131084) may be used for the proposal guaranty in lieu of that specified above, using the electronic bid bond verification feature authorized by the Department. Bid bonds will be declared invalid and bid proposals will not be considered if any of the following items are omitted or incorrect:
- Date of Letting
- Bid Order Number
- Name of Contractor
- Digital Signature of Contractor: In case of joint venture bid, all contractors must sign.
- Name of the Surety Company
- Digital Signature of Surety (if Surety's limitation is less than the amount of the bid bond, a certificate of reinsurance must be attached).

D. A Contractor's Annual Bid Bond (Form 650043) may also be used for the proposal guaranty in lieu of that specified above. The Annual Bid Bond shall contain the following items:
- Name of Contractor
- Original signature of the Contractor
- Date of signature
- Name of Surety Company
- Original signature of the Surety

>>> Add the following to Article 1105.13, C:

26. Active Nests of Migratory Birds.
To protect migratory birds, do not conduct construction activities where active nests are present between the dates of April 1 and July 15, inclusive or until the birds have fledged and left the nest. Active nests are nests containing eggs or young of migratory birds.

Beginning on the date the contract is fully executed, the contractor shall remove all non-active, existing migratory

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Note	Description
.	bird nests and monitor to prevent the establishment of active nests. Prior to that date, the Contracting Authority is responsible to remove all non-active, existing migratory bird nests and monitor to prevent the establishment of active nests.
.	
.	If evidence of migratory bird nesting is discovered after beginning work, or in the event that migratory birds nests become established, immediately stop work and notify the Engineer.
.	
	>>> Replace the first sentence of Article 2402.04, B, 4 with the following:
.	For cast-in-place culverts, the amount of excavation measured for payment will be computed from an excavation centered on the center line of the culvert, to the required depth, length, and a width 4 feet greater than the inside width of the culvert.
.	
	>>> Replace the second and third sentences of Article 2502.03, A, 8 with the following:
.	Drive the posts 3 feet into the ground. If plastic sleeves are furnished by the Contracting Authority, install over posts.

005.2120
*** FUEL ADJUSTMENT ***
A fuel adjustment factor will be applied to payments on this contract in accordance with section 2120 of the standard specifications.

410.11
*** STORM WATER POLLUTION PREVENTION PLAN ***
A Storm Water Pollution Prevention Plan has been developed by the Contracting Authority for one or more projects on this contract. See the project plans (or other contract document) for specific Storm Water Pollution Prevention Plan details.

500.12
*** ACCELERATED WORK SCHEDULE ***
The Contractor shall accelerate work on this project for two basic reasons. The contract period is much shorter than normal and/or the Contracting Authority desires that the duration of traffic interference be kept to an absolute minimum. Traffic interference means closing of a lane to normal traffic flow.

720.101
*** R-O-W CERTIFICATE ***
This Estimating Proposal has an attachment of the "RIGHT OF WAY CERTIFICATE". This attachment is a part of the proposal form.

Bid Order No.: 115
Proposal ID No.: 97-0201-123 Letting Date: December 15, 2015
Primary Work Type: PCC PAVEMENT - GRADE AND NEW 10:00 A.M.
Primary County: WOODBURY

Note	Description

720.122
*** NON-POINT 25 Utility Data ***
This Estimating Proposal has an attachment of the "NON-POINT 25 Utility Data". This attachment is for information only.

720.402
*** PLAN SHEETS ***
This Estimating Proposal has an attachment of plan sheets. The attached plan sheets are part of the plans in regards to Article 1105.04, CONFORMITY WITH AND COORDINATION OF THE CONTRACT DOCUMENTS.

DS-15011 October 20, 2015
DEVELOPMENTAL SPECIFICATIONS FOR PCC PAVEMENT NON-DESTRUCTIVE THICKNESS DETERMINATION

DS-15031 October 20, 2015
DEVELOPMENTAL SPECIFICATIONS FOR QUALITY MANAGEMENT CONCRETE (QM-C)

GS-15001 October 20, 2015
GENERAL SUPPLEMENTAL SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION

SP-150011 December 15, 2015
SPECIAL PROVISIONS FOR INTERMEDIATE FOUNDATION IMPROVEMENTS

Woodbury County NHSN-020-1(123)--2R-97

SS-15003 October 20, 2015
SUPPLEMENTAL SPECIFICATIONS FOR BACKFILLING AND COMPACTION OF PIPE AND REINFORCED BOX CULVERTS BY FLOODING

IDA COUNTY - DESIGNS 115 THRU 415, 118 & 218
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IDA COUNTY
RCB CULVERT REPLACEMENT - SINGLE BOX
NHSN-020-2(123)--2R-47
LETTING DATE 12-15-2015

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD
- INTERSTATE HIGHWAY (80)
- UNITED STATES HIGHWAY (65)
- STATE HIGHWAY (175)
- COUNTY HIGHWAY (127)
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES (ABBEY ROAD)
- UNINCORPORATED PLACE (ELWOOD)

IOWA DOT
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM
IDA COUNTY
RCB CULVERT REPLACEMENT - SINGLE BOX
AT FOUR LOCATIONS ON U.S. 20
APPROX. 3 MI EAST OF CORRECTIONVILLE

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
RCF-01-12	APRIL, 2012	05-13
RCF-02-12	APRIL, 2012	-----
RCFB-02-12	APRIL, 2012	-----
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 10-8-12	APRIL 2012	-----
PWH 15-1-12	APRIL 2012	-----
PWH 15-2-12	APRIL 2012	-----
PWH 15-3-12	APRIL 2012	-----
PWH 15-4-12	APRIL 2012	-----
PWH 15-6-12	APRIL 2012	-----
FBJ-01-12	APRIL, 2012	-----
RCFB-01-12	APRIL, 2012	-----
FBJ-03-12	APRIL, 2012	-----
RCFB-03-12	APRIL, 2012	-----
ALTERNATE PRECAST STANDARDS		
PES 2-13-T3	JANUARY 2013	5-13
PES 3-13-T3	JANUARY 2013	-----
PES 4-13	JANUARY 2013	-----
PRCB 10-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

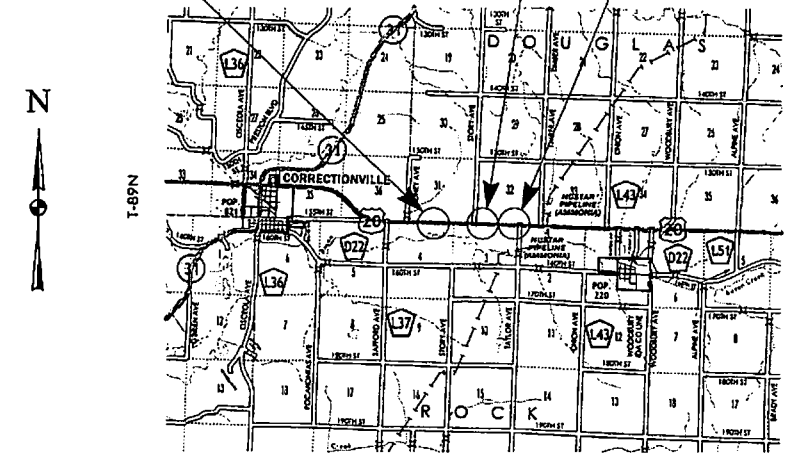
TOTAL SHEETS	53
PROJECT NUMBER	NHSN-020-2(123)--2R-47
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	98-97-020-010-04

INDEX OF SHEETS

DESIGN 115
DESIGN 215

DESIGN 315 STAGE I
DESIGN 118 STAGE II

DESIGN 415 STAGE I
DESIGN 218 STAGE II



LOCATION MAP

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL (STAGE I) AND WBL (STAGE II) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN DATA RURAL

REFER TO INDIVIDUAL SITUATION PLANS FOR TRAFFIC DATA INFORMATION

IOWA ONE CALL
1-800-292-8989 | 811
www.iowaonecall.com

REVISIONS

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	DEAN G. BIERWAGEN	STRUCTURAL DESIGN
1	DAVID R. CLAMAN	HYDRAULIC DESIGN
SPS.1	MARK A. DELL	GEOTECHNICAL DESIGN
CULVERT STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

HYDRAULIC 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.

David R. Claman 10-06-2015
Signature Date

David R. Claman
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHTS. 4, 9, 14, 21, 25, 30, 37 & 46 OF 53

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.

Dean G. Bierwagen 10-06-2015
Signature Date

Dean G. Bierwagen
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 1 THRU 47 OF 53

PROJECT DIRECTORY NAME: 9702001098

DESIGN TEAM DGB * MSF * ER	ENGLISH	IOWA DOT * OFFICE OF BRIDGES AND STRUCTURES	FILE NO. 30568	IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER 1

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INCLUDES ADDENDA: A.02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	109	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	38.0	
3	2404-7775000	REINFORCING STEEL	LB	6,407	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 - -
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
3	2404-7775000	REINFORCING STEEL - -
4	2533-4980005	MOBILIZATION - -

DESIGN FOR CONSTRUCTION OF A 34° SKEW (LA)

6'-0 X 5'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 54"Φ RC PIPE

ESTIMATED QUANTITIES

STA. 10993+30.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 115

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 2

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 6'-0 X 5'-0 REINFORCED CONCRETE FLUME COLLAR, FLUME AND BASIN FOR AN EXISTING 54" ϕ RCP ON U.S 20 AT STA. 10993+30.00 (℄ U.S. 20) 34° SKEW (L.A.)

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

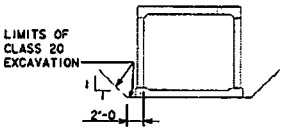
EXCESS CLASS 20 EXCAVATION MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED AT THE CONSTRUCTION SITE, AS DIRECTED BY THE ENGINEER.

THE CITY AND UTILITY COMPANIES 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.

ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

STANDARD	ISSUED	REVISED
RCF-01-12	APRIL, 2012	05-13
RCF-02-12	APRIL, 2012	------
RCFB-02-12	APRIL, 2012	------



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
6'-0 X 5'-0 FLUME	3978	3978
6'-0 X 5'-0 BASIN	2429	2429
	TOTAL (LBS.)	6407

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
115	NEW FLUME & BASIN (STAGE I)

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
6'-0 X 5'-0 FLUME	14.7	11.0	25.7
6'-0 X 5'-0 BASIN	8.7	3.6	12.3
TOTAL (CU. YDS.)	23.4	14.6	38.0

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

NOTE:
ROADWAY QUANTITIES SHOWN IN THE ROAD PLANS.

DESIGN FOR CONSTRUCTION OF A 34° SKEW (L.A.)

6'-0 X 5'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 54"ϕ RC PIPE

GENERAL NOTES

STA. 10993+30.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 115

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 3

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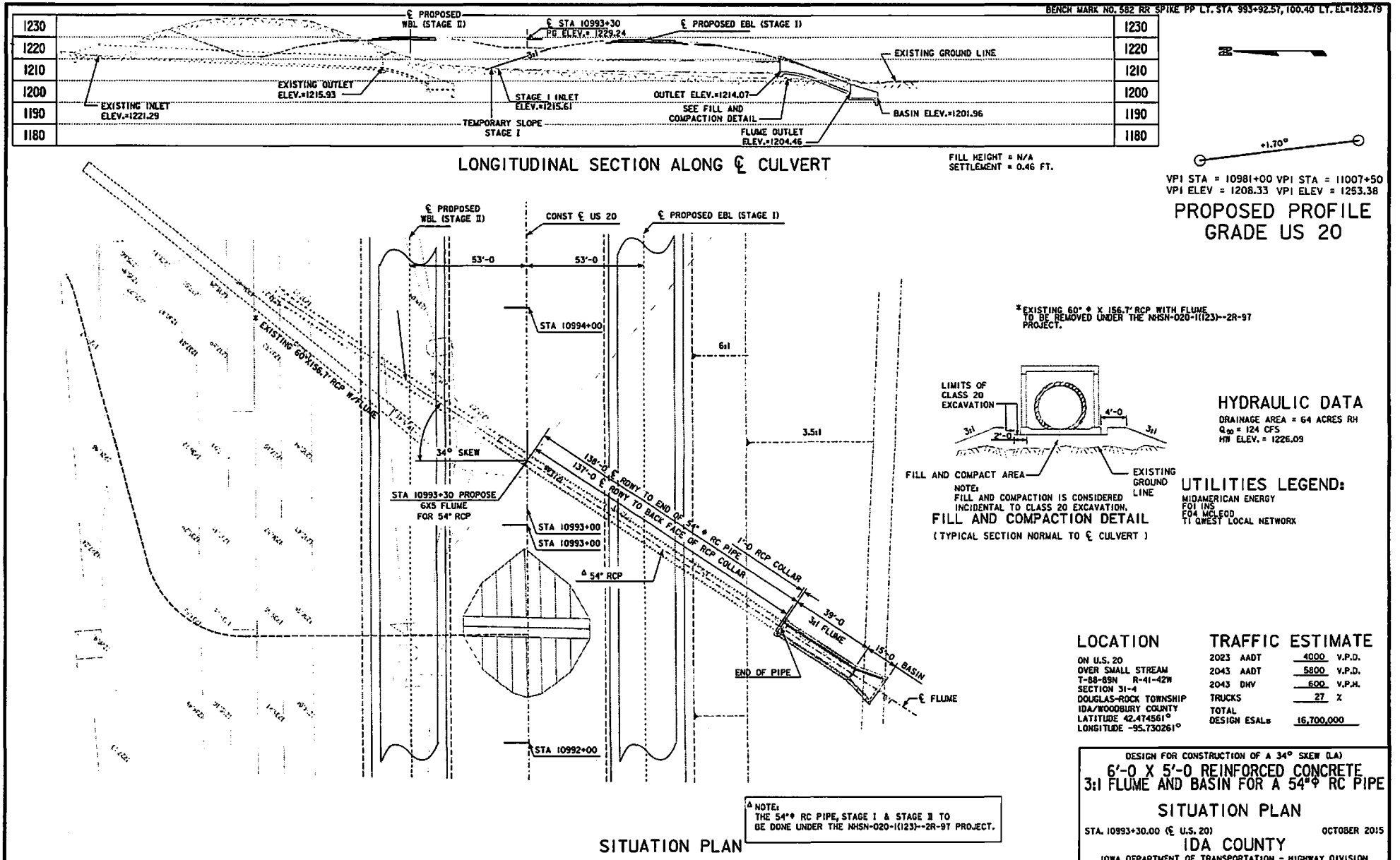
BENCH MARK NO. 582 RR SPIKE PP LT. STA 993+92.57, 100.40' LT. EL=1232.79
1230
1220
1210
1200
1190
1180
℄ PROPOSED WBL (STAGE II)
℄ STA 10993+30 PG ELEV.= 1229.24
℄ PROPOSED EBL (STAGE I)
EXISTING GROUND LINE
EXISTING OUTLET ELEV.=1215.93
STAGE I INLET ELEV.=1215.61
OUTLET ELEV.=1214.07
EXISTING INLET ELEV.=1221.29
TEMPORARY SLOPE STAGE I
SEE FILL AND COMPACTION DETAIL
BASIN ELEV.=1201.96
FLUME OUTLET ELEV.=1204.46
LONGITUDINAL SECTION ALONG ℄ CULVERT
FILL HEIGHT = N/A
SETTLEMENT = 0.46 FT.
+1.70°
VPI STA = 10981+00 VPI STA = 11007+50
VPI ELEV = 1208.33 VPI ELEV = 1253.38
PROPOSED PROFILE GRADE US 20
℄ PROPOSED WBL (STAGE II)
CONST ℄ US 20
℄ PROPOSED EBL (STAGE I)
53'-0
53'-0
STA 10994+00
6:1
3.5:1
EXISTING 60"X156.7' RCP W/FLUME
34° SKEW
STA 10993+30 PROPOSE 6X5 FLUME FOR 54" RCP
138'-0 ℄ ROWY TO END OF 54" ◆ RC PIPE
137'-0 ℄ ROWY TO BACK FACE OF RCP COLLAR
1'-0 RCP COLLAR
39'-0
3:1 FLUME
15'-0 BASIN
STA 10993+00
STA 10993+00
△ 54" RCP
END OF PIPE
℄ FLUME
STA 10992+00
SITUATION PLAN
△ NOTE: THE 54"◆ RC PIPE, STAGE I & STAGE II TO BE DONE UNDER THE NHSN-020-1(123)--2R-97 PROJECT.
*EXISTING 60" ◆ X 156.7' RCP WITH FLUME TO BE REMOVED UNDER THE NHSN-020-1(123)--2R-97 PROJECT.
LIMITS OF CLASS 20 EXCAVATION
4'-0
3:1
2'-0
3:1
FILL AND COMPACT AREA
EXISTING GROUND LINE
NOTE: FILL AND COMPACTION IS CONSIDERED INCIDENTAL TO CLASS 20 EXCAVATION.
FILL AND COMPACTION DETAIL
(TYPICAL SECTION NORMAL TO ℄ CULVERT)
HYDRAULIC DATA
DRAINAGE AREA = 64 ACRES RH
Q100 = 124 CFS
HW ELEV. = 1226.09
UTILITIES LEGEND:
MIDAMERICAN ENERGY
FOI INS
FO4 MCLEOD
TI QWEST LOCAL NETWORK
LOCATION
ON U.S. 20
OVER SMALL STREAM
T-88-89N R-41-42W
SECTION 31-4
DOUGLAS-ROCK TOWNSHIP
IDA/WOODBURY COUNTY
LATITUDE 42.474561°
LONGITUDE -95.730261°
TRAFFIC ESTIMATE
2023 AADT 4000 V.P.D.
2043 AADT 5800 V.P.D.
2043 DHV 600 V.P.H.
TRUCKS 27 %
TOTAL DESIGN ESALs 16,700,000
DESIGN FOR CONSTRUCTION OF A 34° SKEW (LA)
6'-0 X 5'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 54"◆ RC PIPE
SITUATION PLAN
STA. 10993+30.00 (℄ U.S. 20)
OCTOBER 2015
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 115
DESIGN TEAM DGB * MSF * ER
IDA COUNTY
PROJECT NUMBER NHSN-020-2(123)--2R-47
SHEET NUMBER 4
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BENCH MARK NO. 582 RR SPIKE PP LT. STA 993+92.57, 100.40 LT. EL=1232.79

REINFORCING BAR LIST - FLUME & PIPE COLLAR

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		76	LISTED	256
5b1	WALLS FFH		6	41'-9	261
4b2	WALLS BFH		6	41'-9	167
5b5	WALLS FFH		4	LISTED	32
4b6	WALLS BFH		4	LISTED	21
5c1	BOTT. FLOOR & WALLS BFV		62	LISTED	1066
5c2	BOTT. FLOOR & WALLS BFV - SPLICED		13	13'-6	183
5c3	WALLS BFV		26	LISTED	158
6f1	FLOOR LONGIT. TOP		7	41'-0	431
5f2	FLOOR LONGIT. BOTT.		7	41'-0	299
6m1	FLOOR TRANSV. TOP		41	7'-8	472
5a1	WALLS BOTH F ALONG SLOPE		4	41'-9	174
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-0	6
5d1	PIPE COLLAR, , VERTICAL, BOTH FACES		8	7'-10	65
5d2	PIPE COLLAR, , VERTICAL, BOTH FACES		12	3'-0	38
5d3	PIPE COLLAR, PIPE OPENING, BOTH FACES		8	7'-3	61
5e1	PIPE COLLAR, HORIZONTAL, BOTH FACES		6	7'-8	48
5e2	PIPE COLLAR, HORIZONTAL, BOTH FACES		20	1'-9	37
5e3	PIPE COLLAR, HORIZONTAL, BOTT. BOTH FACES		2	8'-2	17
6m2	FLOOR HORIZ. BELL JOINT		4	8'-2	49
6y2	FLOOR VERT. BELL JOINT		9	7'-4	99
6z1	FLOOR VERT. BELL JOINT		9	2'-10	38
				TOTAL (LB)	3978

LISTED BARS

BAR 5c1
62 BARS
33 AT 16'-0
29 VAR.
16'-0
16'-0
16'-0
16'-0
16'-1
16'-1
16'-2
16'-3
16'-3
16'-4
16'-5
16'-6
16'-7
16'-8
16'-9
16'-11
17'-0
17'-2
17'-3
17'-5
17'-7
17'-9
17'-11
18'-1
18'-3
18'-5
18'-8
18'-10
19'-0

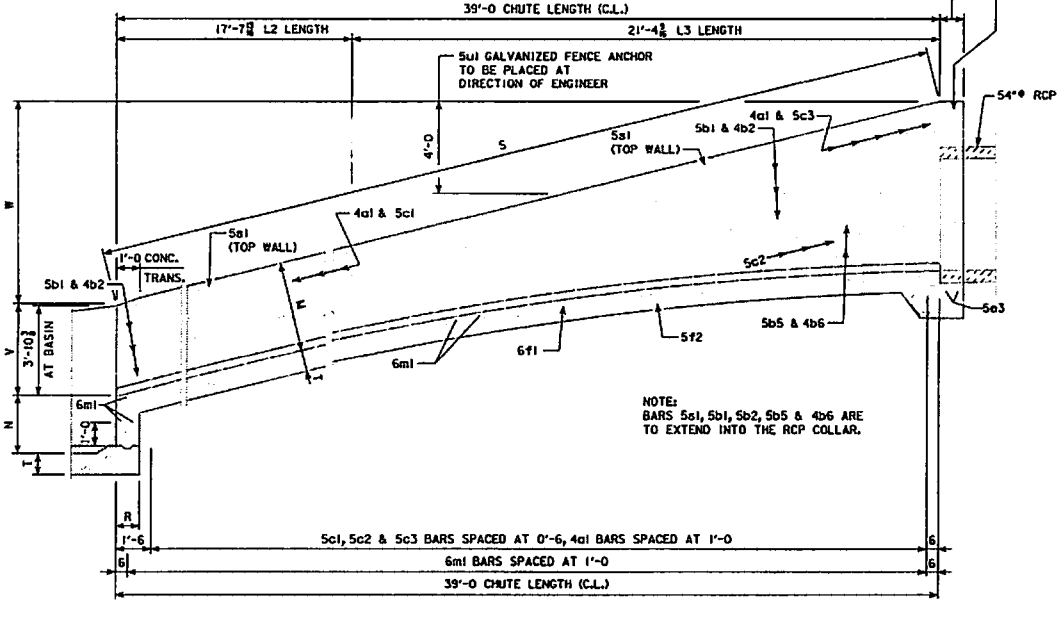
BAR 4a1
76 BARS
34 AT 4'-5
42 VAR. - 2 EA. LGTH.
4'-5
4'-5
4'-6
4'-6
4'-7
4'-8
4'-9
4'-10
5'-0
5'-2
5'-3
5'-5
5'-8
5'-10
6'-1
6'-3
6'-6
6'-9
7'-0
7'-4
7'-8

BAR 5c3
26 BARS
26 VAR. - 2 EA. LGTH.
5'-1
5'-2
5'-4
5'-5
5'-7
5'-8
5'-10
5'-11
6'-1
6'-3
6'-4
6'-6
6'-8

BAR 5b5 AND 4b6
4 BARS - 2 EA. LGTH.
5'-2
10'-2

NOTE:
FOR PIPE COLLAR DETAILS, SEE DESIGN SHEETS IN THESE PLANS.

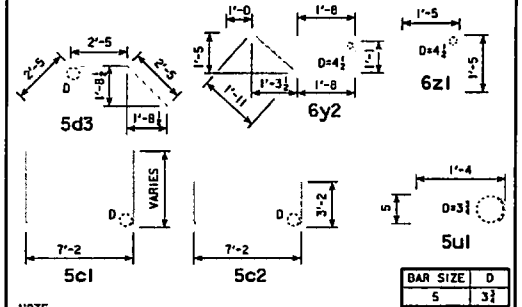
NOTE:
FIELD BEND 5a1 BARS AS SHOWN TO MAINTAIN CONCRETE CLEARANCES.



NOTE:
BARS 5a1, 5b1, 5b2, 5b5 & 4b6 ARE TO EXTEND INTO THE RCP COLLAR.

6'x5' FLUME CHUTE - LONGITUDINAL SECTION

BENT BAR DETAILS



BAR SIZE	D
5	3 1/2
6	4 1/2
7	5 1/2

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

FLUME DATA

Δ A = 18°26'
Δ C = 1°00'
B = 11'-2 3/8
S = 41'-1 1/8
V = 3'-11
W = 13-0
M = 3'-9
T = 0'-11
H = 5'-0

CURVE DATA

C. L. = 39'-0
L2 = 17'-7 5/8
L3 = 21'-4 3/8
D = 10'-8 7/8
E = 10'-7 11/16
P. C. ELEV. = 1214.07
P.I. ELEV. = 1213.68
P. P. ELEV. = 1213.70
P. T. ELEV. = 1210.34
X1 = 3'-4 5/8
X2 = 1'-10 11/16
X3 = 0'-10 5/8
X4 = 0'-2 1/4
L3/4 = 5'-4 1/16(-)

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	13.0	Δ 11.0	24.0
JUNCTION BELL, FLOOR	1.3	---	1.3
BASIN CURTAIN	0.4	---	0.4
TOTAL (CY)	14.7	11.0	25.7

Δ INCLUDES 1.9 CU.YDS. FOR PIPE COLLAR.

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-01-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-01-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.
4. SEE DESIGN SHEET 5 FOR COLLAR DETAIL.

DESIGN FOR CONSTRUCTION OF A 34° SKEW (LA)

6'-0 X 5'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 54"Φ RC PIPE

FLUME DETAILS

STA. 10993+30.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 115

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 5

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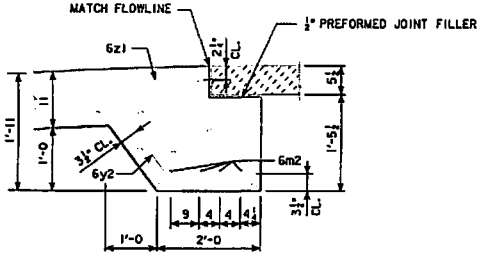
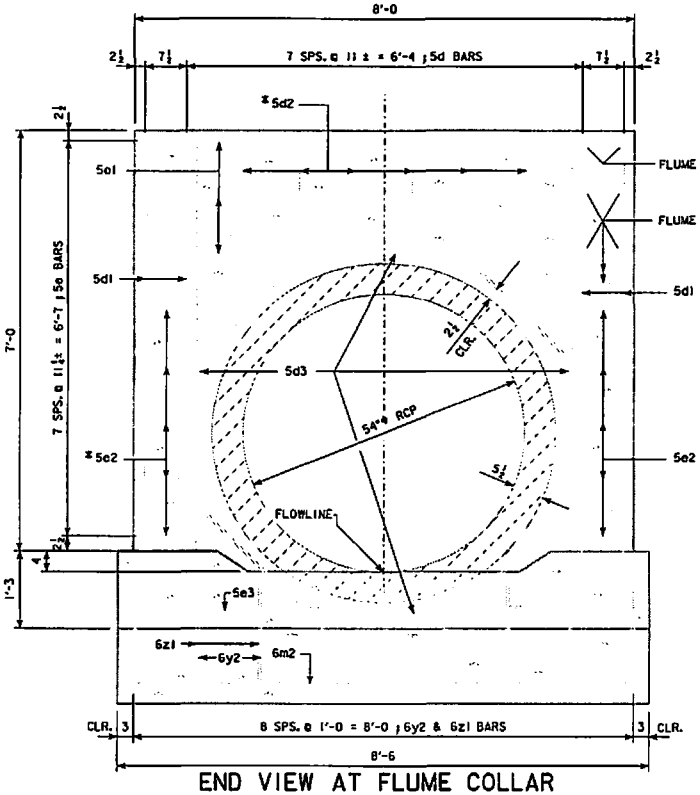
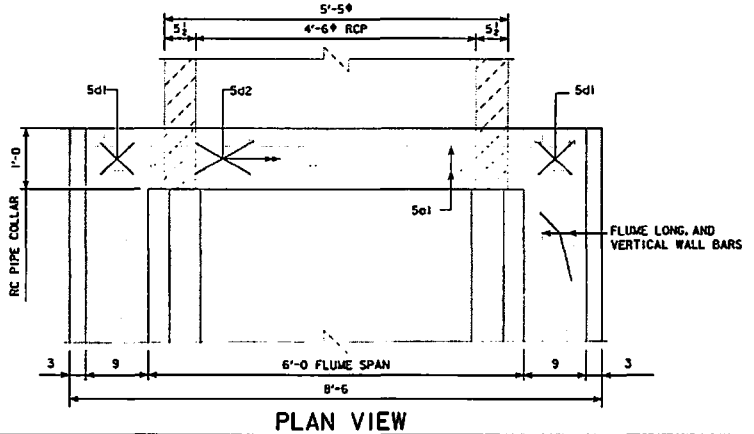


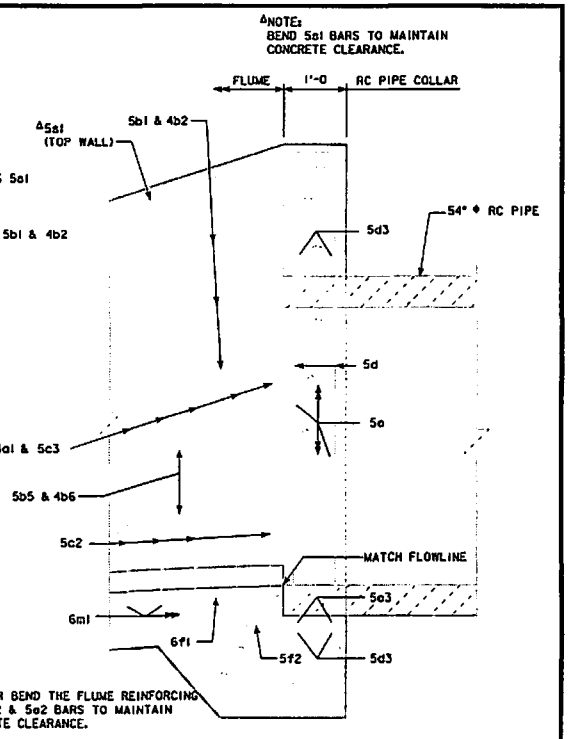
JUNCTION FOUNDATION



END VIEW AT FLUME COLLAR



PLAN VIEW



LONGITUDINAL VIEW
(JUNCTION FOOTING BARS NOT SHOWN)

DESIGN FOR CONSTRUCTION OF A 34° SKEW (L.A)

6'-0 X 5'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 54"ϕ RC PIPE

RC PIPE COLLAR DETAILS

STA. 10993+30.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 115

DESIGN TEAM DGB * MSF * ER	IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER 6

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	218	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	35.5	
3	2404-7775000	REINFORCING STEEL	LB	4,913	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 - -
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
3	2404-7775000	REINFORCING STEEL - -
4	2533-4980005	MOBILIZATION - -

DESIGN FOR CONSTRUCTION OF A 0° SKEW

4'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 30"Φ RC PIPE

ESTIMATED QUANTITIES

STA. 11009+10.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 215

DESIGN TEAM OGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 7

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 4'-0 X 4'-0 REINFORCED CONCRETE FLUME COLLAR, FLUME AND BASIN FOR A 30" ϕ RCP ON U.S 20 AT STA. 11009+10.00 (℄ U.S. 20) 0° SKEW.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

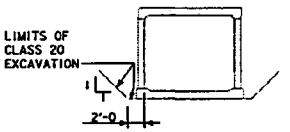
THE CITY AND UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE FLUME SECTIONS.

ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

STANDARD	ISSUED	REVISED
RCF-01-12	APRIL, 2012	05-13
RCF-02-12	APRIL, 2012	-----
FBJ-01-12	APRIL, 2012	-----
RCFB-01-12	APRIL, 2012	-----



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
215	NEW FLUME & BASIN

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
4'-0 X 4'-0 FLUME	3277	3277
4'-0 X 4'-0 BASIN	1491	1491
CHUTE BELL JOINT	253	253
	TOTAL (LBS.)	4913

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
4'-0 X 4'-0 FLUME	15.7	10.4	26.1
4'-0 X 4'-0 BASIN	6.8	2.6	9.4
TOTAL (CU. YDS.)	22.5	13.0	35.5

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR CONSTRUCTION OF A 0° SKEW
4'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 30"ϕ RC PIPE

GENERAL NOTES

STA. 11009+10.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 215

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 8

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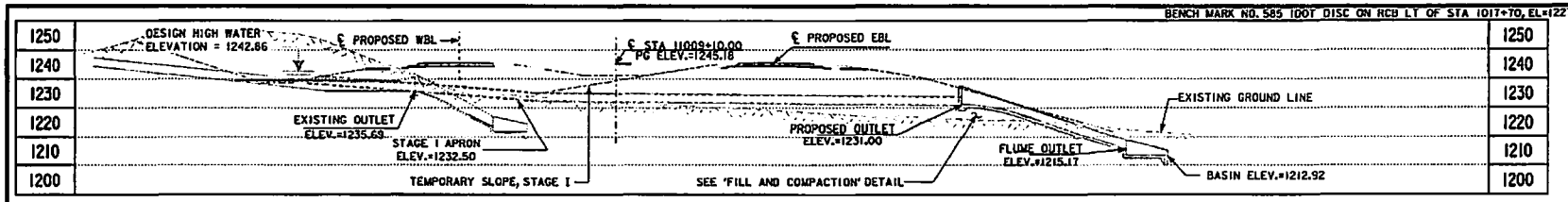
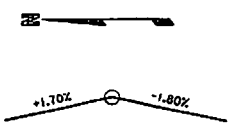


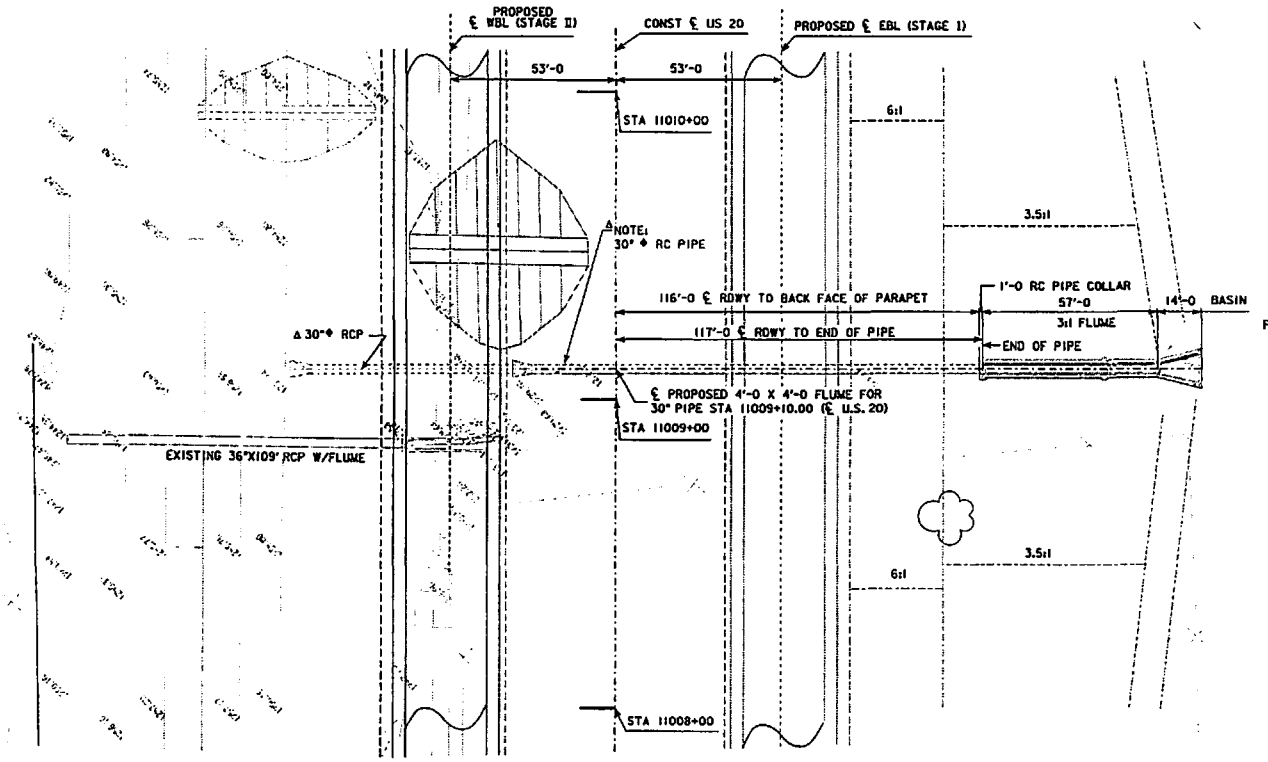


VPI STA = 11007+50 VC = 1800'
VPI ELEV = 1253.38

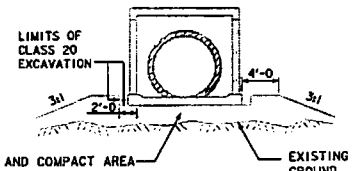
PROPOSED PROFILE GRADE US 20

LONGITUDINAL SECTION ALONG ℄ FLUME

FILL HEIGHT = N/A
SETTLEMENT = 0.15 FT.



ΔNOTE:
THE 30"Φ RC PIPE IN STAGE I & STAGE II TO BE DONE UNDER PROJECT NHSN-020-1(123)--2R-97.



NOTE:
FILL AND COMPACTION IS CONSIDERED INCIDENTAL TO CLASS 20 EXCAVATION.

FILL AND COMPACTION DETAIL

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

HYDRAULIC DATA

DRAINAGE AREA = 15 ACRES R
Q_{50} = 35 CFS
HW ELEV. = 1242.86

UTILITIES LEGEND:

MIDAMERICAN ENERGY
F02 QWEST
F04 MCLEOD

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 31-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474536°
LONGITUDE -95.724405°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR CONSTRUCTION OF A 0° SKEW

4'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 30"Φ RC PIPE

SITUATION PLAN

STA. 11009+10.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 215

SITUATION PLAN

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 9

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REINFORCING BAR LIST - FLUME & PIPE COLLAR

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		112	LISTED	299
5b1	WALLS FFH - SECTION 1		4	43'-0;43'-5	180
4b2	WALLS BFH - SECTION 1		4	43'-0;43'-5	115
5b3	WALLS FFH - SECTION 2		4	16'-11;17'-3	72
4b4	WALLS BFH - SECTION 2		4	16'-11;17'-3	46
5b5	WALLS FFH - SECTION 1		4	LISTED	30
4b6	WALLS BFH - SECTION 1		4	LISTED	19
5c1	BOTT. FLOOR & WALLS BFV		56	LISTED	769
6f1	FLOOR LONGIT. TOP - SECTION 1		5	42'-1	316
5f2	FLOOR LONGIT. BOTT. - SECTION 1		5	42'-1	219
6f3	FLOOR LONGIT. TOP - SECTION 2		5	17'-8	133
5f4	FLOOR LONGIT. BOTT. - SECTION 2		5	17'-8	92
6m1	FLOOR TRANSV. TOP		59	5'-8	502
5a1	WALLS BOTH F ALONG SLOPE - SECTION 1		4	43'-9	183
5a2	WALLS BOTH F ALONG SLOPE - SECTION 2		4	16'-7	69
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-0	6
5d1	PIPE COLLAR, , VERTICAL, BOTH FACES		12	6'-9	84
5d2	PIPE COLLAR, , VERTICAL, BOTH FACES		6	3'-5	21
5d3	PIPE COLLAR, PIPE OPENING, BOTH FACES		8	4'-3	35
5e1	PIPE COLLAR, HORIZONTAL, BOTH FACES		8	5'-8	47
5e2	PIPE COLLAR, HORIZONTAL, BOTH FACES		12	1'-5	18
5e3	PIPE COLLAR, HORIZONTAL, BOTH FACES, BOTT.		4	2'-1	9
5e4	PIPE COLLAR, HORIZONTAL, BOTH FACES, BOTT.		2	6'-2	13
				TOTAL (LB)	3277

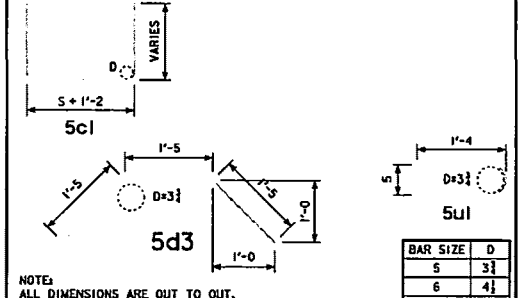
LISTED BARS

BAR 4a1
112 BARS
72 AT 3'-7
40 VAR. - 2 EA. LGTH.
3'-7
3'-8
3'-8
3'-9
3'-9
3'-10
3'-11
4'-1
4'-2
4'-4
4'-6
4'-8
4'-10
5'-1
5'-3
5'-6
5'-9
6'-1
6'-4
6'-8

BAR 5c1
56 BARS
36 AT 12'-5
20 VAR.
12'-5
12'-5
12'-6
12'-7
12'-9
12'-11
13'-1
13'-4
13'-7
13'-10
14'-2
14'-6
14'-11
15'-4
15'-9
16'-3
16'-9
17'-3
17'-10
18'-5

BAR 5b5 AND 4b6
4 BARS - 2 EA. LGTH.
4'-5
9'-9

BENT BAR DETAILS



BAR SIZE	D
5	3¾
6	4½
7	5¼

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

CONCRETE PLACEMENT QUANTITIES

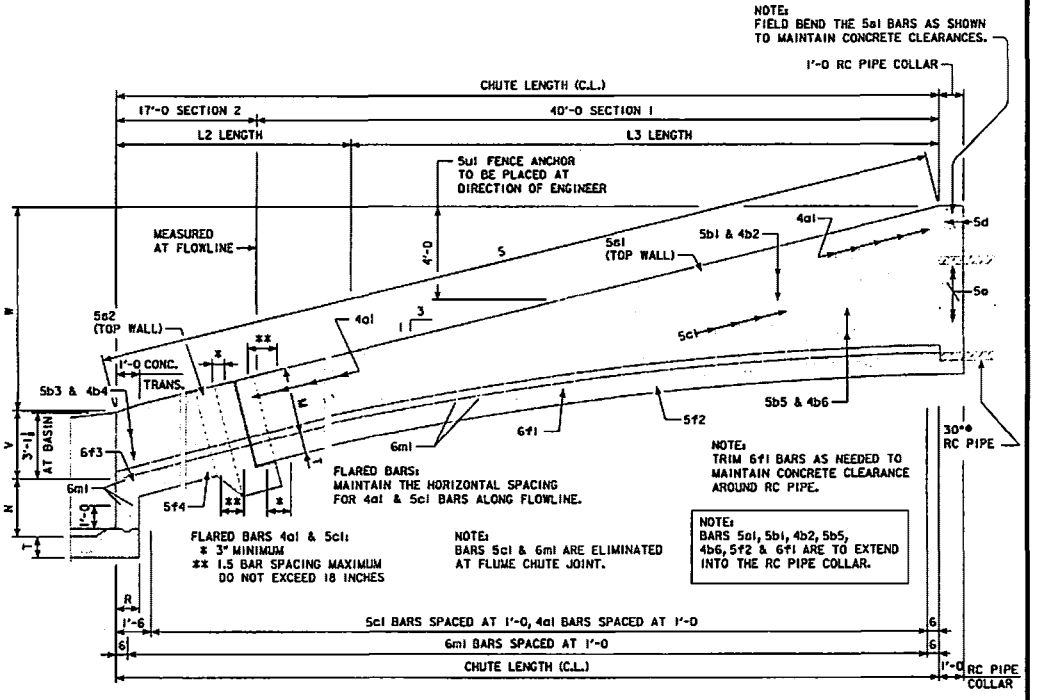
LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	10.1	7.5	17.6
FLUME - SECTION 2	4.7	2.6	7.3
BASIN CURTAIN	0.2	---	0.2
CHUTE BELL JOINT	0.7	0.3	1.0
TOTAL (CY)	15.7	10.4	26.1

FLUME DATA

Δ A = 18°26'
Δ C = 1°00'
B = 10'-6⅝
S = 60'-1
V = 3'-1½
W = 19'-0
M = 3'-0
T = 0'-11
H = 4'-0

CURVE DATA

C. L. = 57'-0
L2 = 36'-11¾
L3 = 20'-0¼
D = 10'-0⅝
E = 9'-11⅝
P. C. ELEV. = 1231.00
P. I. ELEV. = 1230.82
P. P. ELEV. = 1230.65
P. T. ELEV. = 1227.50
X1 = 3'-1⅞
X2 = 1'-9¼
X3 = 0'-9⅞
X4 = 0'-2⅜
L3/4 = 5'-0⅛



4'x4' FLUME CHUTE - LONGITUDINAL SECTION

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-01-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-01-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR CONSTRUCTION OF A 0° SKEW

4'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 30"ø RC PIPE

FLUME DETAILS

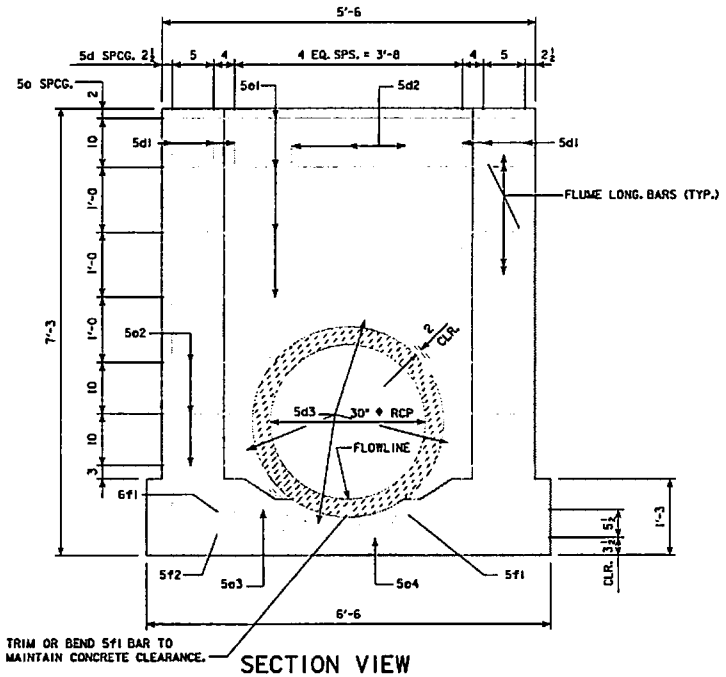
STA. 11009+10.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

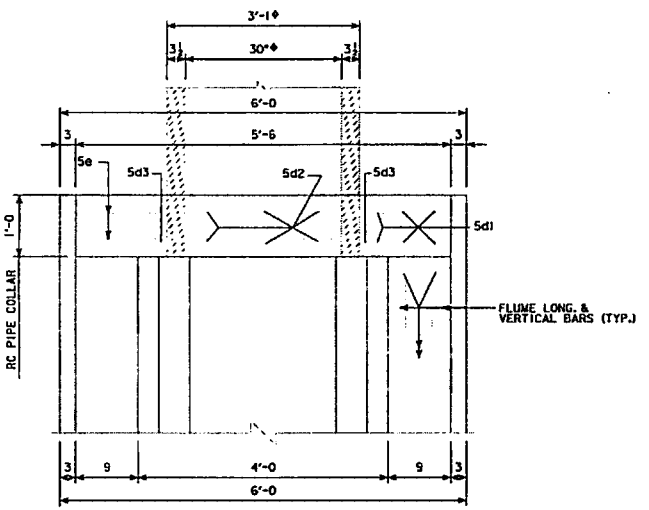
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 215

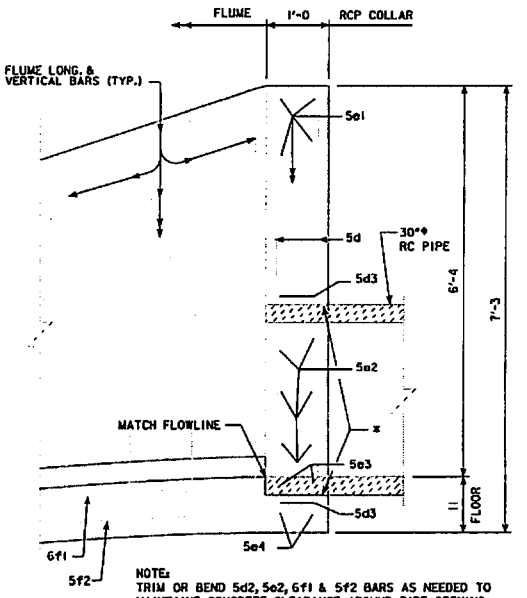
DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 10



SECTION VIEW



PLAN VIEW



NOTE:
TRIM OR BEND 5d2, 5o2, 6f1 & 5f2 BARS AS NEEDED TO MAINTAINE CONCRETE CLEARANCE AROUND PIPE OPENING.

LONGITUDINAL VIEW

*INSTALL ½" PREFORMED JOINT FILLER AROUND PIPE

NOTE:
FOR FLUME DETAILS, SEE FLUME DETAILS SHEET AND LISTED FLUME STANDARDS IN THESE PLANS.
SEE DESIGN SHEET 4 FOR REINFORCING BAR LIST.

DESIGN FOR CONSTRUCTION OF A 0° SKEW

4'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 30"ϕ RC PIPE

30"ϕ RC PIPE COLLAR DETAILS

STA. 11009+10.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 215

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 11

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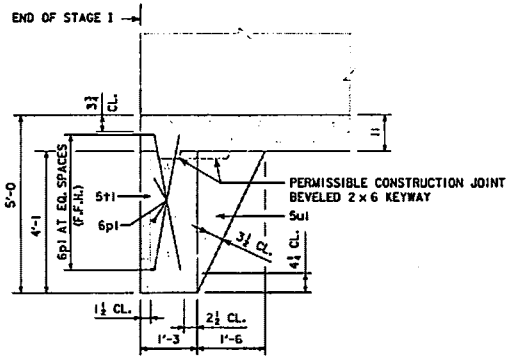
ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

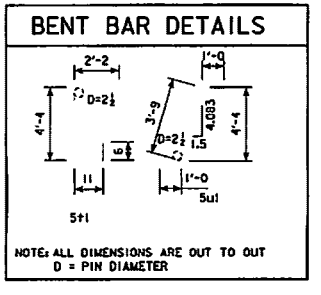
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	600.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1,548	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	253.0	
4	2404-7775000	REINFORCING STEEL	LB	46,280	
5	2507-3250005	ENGINEERING FABRIC	SY	1,080.0	
6	2507-6800061	REVETMENT, CLASS E	TON	980.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

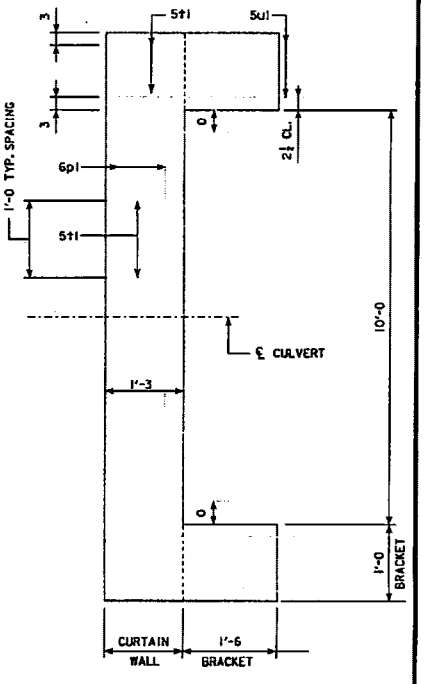
ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL
2	2402-2720000	EXCAVATION, CLASS 20
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)
4	2404-7775000	REINFORCING STEEL
5	2507-3250005	ENGINEERING FABRIC
6	2507-6800061	REVETMENT, CLASS E
7	2533-4980005	MOBILIZATION



SECTION THRU CURTAIN WALL





CURTAIN WALL DETAIL
APRON IS NOT SHOWN

CURTAIN WALL - 10'-0 END BARREL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5t1	CURTAIN, VERT.		15	7'-11	124
5u1	BRACKET, VERT.		4	5'-9	24
6p1	CURTAIN, TRANSVERSE		6	11'-8	105
				TOTAL (LBS.)	253

TOTAL CONCRETE:
CURTAIN WALL = 2.5 CU. YDS.

CURTAIN WALL DETAILS

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 12

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE I DESIGN TO CONSTRUCT A 10'-0 X 8'-0 REINFORCED CONCRETE BOX CULVERT ON U.S 20 AT STA. 11018+25.00 (℄ U.S. 20) 16° SKEW (RA). STAGE II (DES. 118) IS INCLUDED IN THIS PROJECT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6456).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 12 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

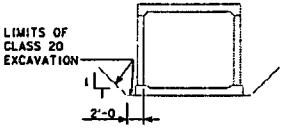
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS AS NEEDED OF THE EXISTING FLUME AND BASIN (DES. 6056).

STAGE II IS NOT PART OF THIS DESIGN. SEE DESIGN 118 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 DURING STAGE I.

SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
315	NEW RCB STAGE I

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

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

STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
* RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	------
RCB 10-8-12	APRIL 2012	------
PWH 15-1-12	APRIL 2012	------
PWH 15-2-12	APRIL 2012	------
PWH 15-3-12	APRIL 2012	------
PWH 15-4-12	APRIL 2012	------
PWH 15-6-12	APRIL 2012	------

* TOP OF SLAB DETAIL DOES NOT APPLY.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'-0 END SECTION	2366	2366
38'-0 BARRELS	2 @ 8992	17,984
33'-0 END SECTION	7809	7809
40'-0 DOUBLE BEND BENT BARREL	9745	9745
BELL JOINTS	4 @ 1000	4000
15° PARALLEL WING HDWL	4123	4123
CURTAIN WALL, END OF STAGE I BARREL	253	253
	TOTAL (LBS.)	46,280

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
10'-0 END SECTION	3.5	4.4	4.2	12.1
38'-0 BARRELS	2 @ 13.4 = 26.8	2 @ 16.9 = 33.8	2 @ 16.1 = 32.2	92.8
33'-0 END SECTION	11.6	14.7	14.0	40.3
40'-0 DOUBLE BEND BENT BARREL	14.1	17.8	17.0	48.9
BELL JOINTS	4 @ 2.372 = 9.5	4 @ 2.834 = 11.3	4 @ 2.189 = 8.8	29.6
15° PARALLEL WING HDWL	Δ 1.4	16.1	9.3	26.8
CURTAIN WALL, END OF STAGE I BARREL	———	2.5	———	2.5
TOTAL (CU. YDS.)	66.9	100.6	85.5	253.0

Δ INCLUDES PARAPET AND TOP OF WINGWALL

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 13

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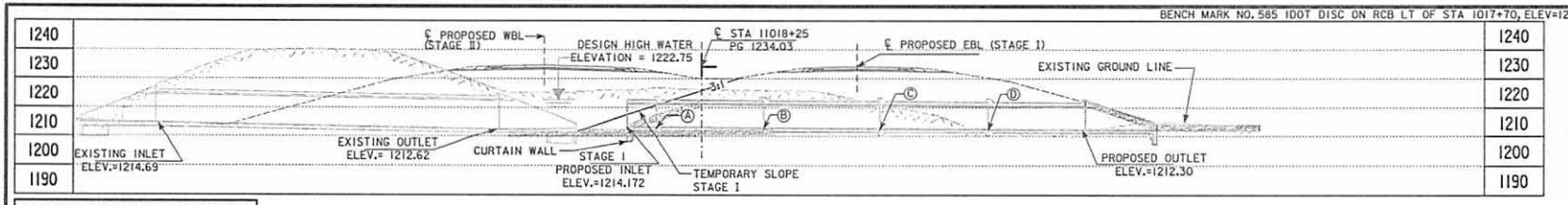
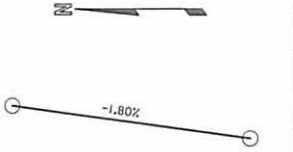
INCLUDES ADDENDA: A.02

BENCH MARK NO. 585 IDOT DISC ON RCB LT OF STA 1017+70, ELEV=1227.038





VPI STA = 11007+50 VPI STA = 11024+00
VPI ELEV = 1253.38 VPI ELEV = 1223.68

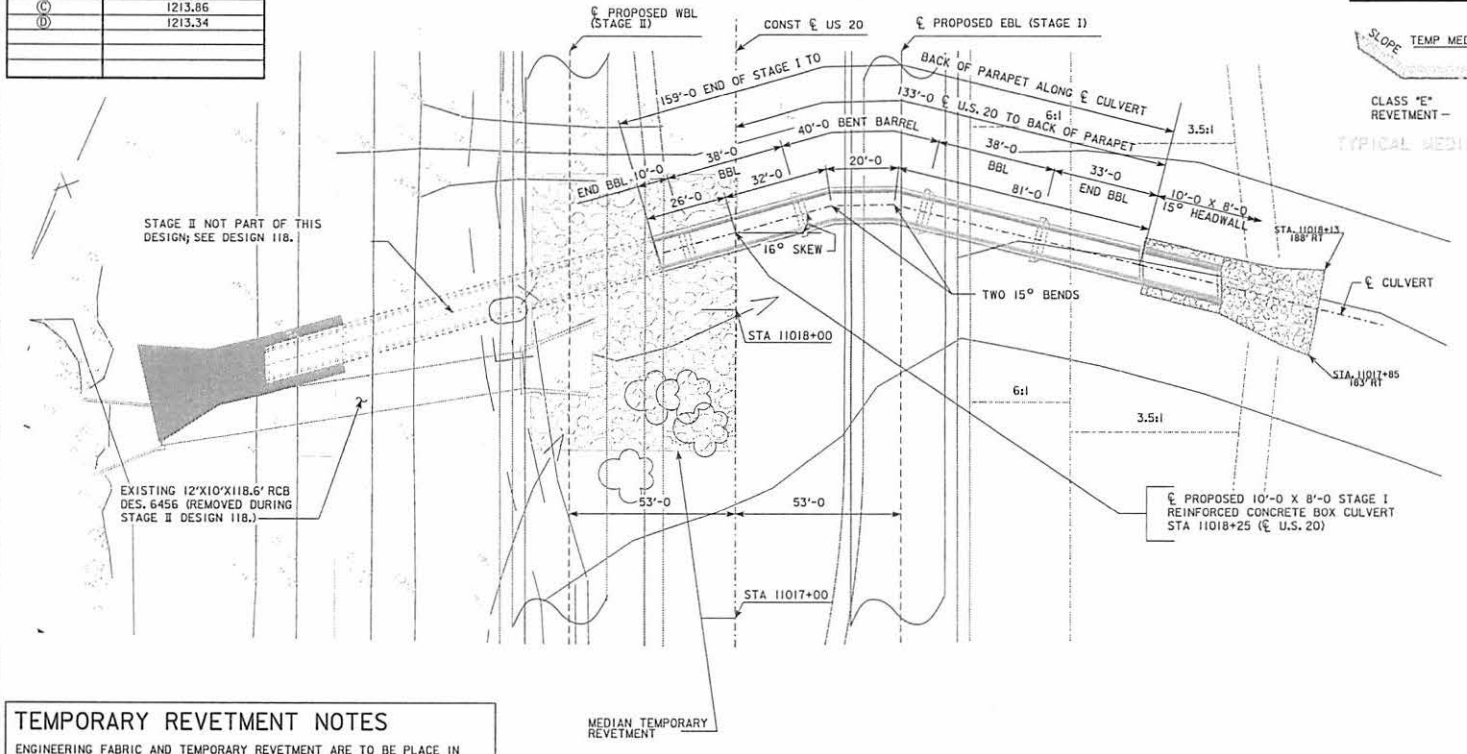
PROPOSED PROFILE GRADE US 20

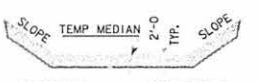
CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
Ⓐ	1213.81
Ⓑ	1213.57
Ⓒ	1213.86
Ⓓ	1213.34

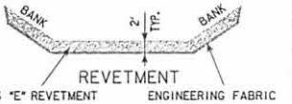
LONGITUDINAL SECTION ALONG ℄ CULVERT

FILL HEIGHT = 12.0'
SETTLEMENT = 1.10 FT.

NOTE:
BELL JOINTS ARE TO BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.







TYPICAL MEDIAN PROTECTION TYPICAL HEADWALL PROTECTION

ESTIMATED REVETMENT QUANTITIES			
LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. 10 (CY)
MEDIAN	860	930	530
RIGHT	120	150	70
TOTALS	980	1080	600

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

HYDRAULIC DATA

DRAINAGE AREA = 700 ACRES VH-H-R
Q_{50} = 764 CFS
HW ELEV. = 1222.75

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
MCLEOD
SCHALLER TELEPHONE

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474520°
LONGITUDE -95.721013°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW CULVERT TO FACILITATE DRAINAGE.

SITUATION PLAN

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 14

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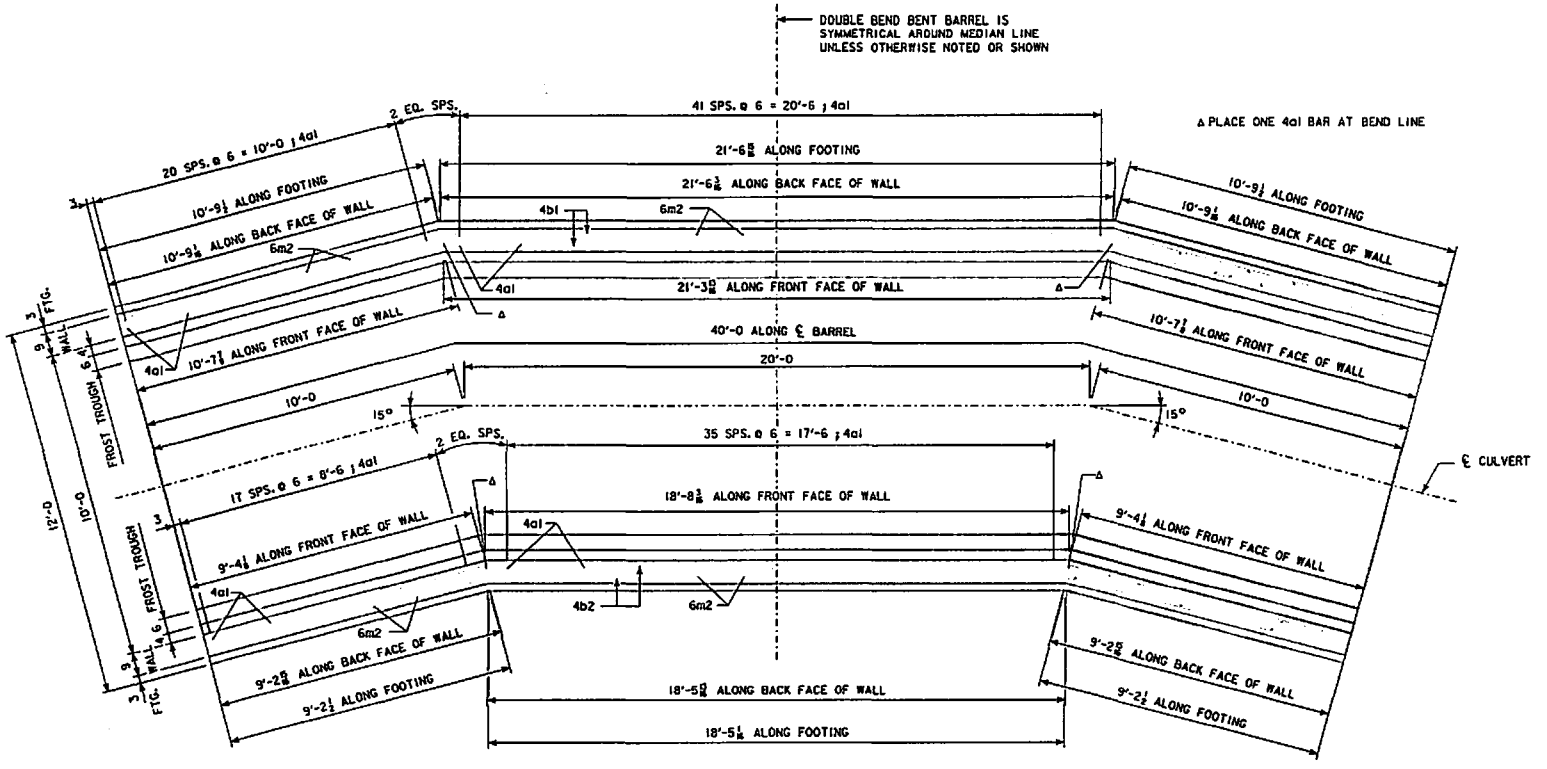

PLAN VIEW

NOTE:
BELL JOINT DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 15

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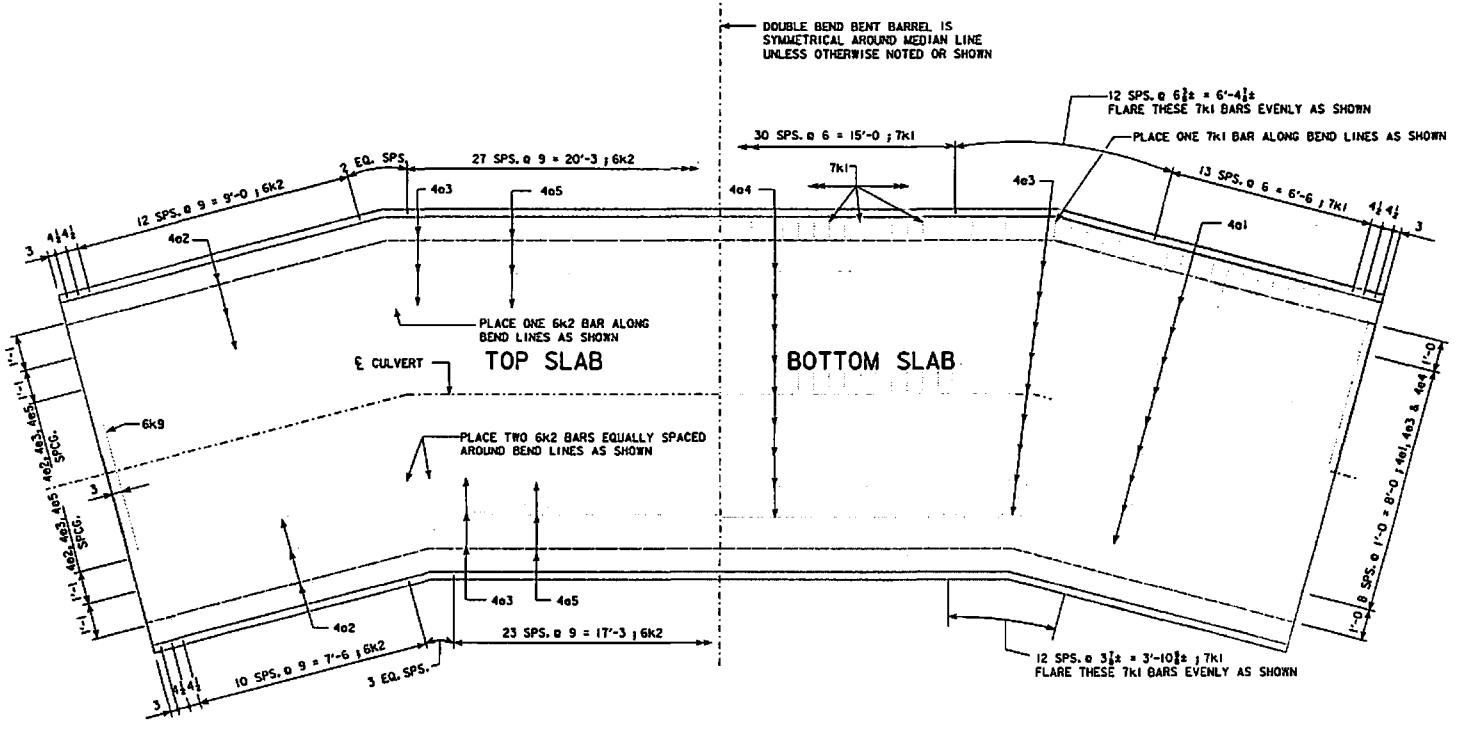

PLAN VIEW

NOTE:
BELL JOINT DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 16

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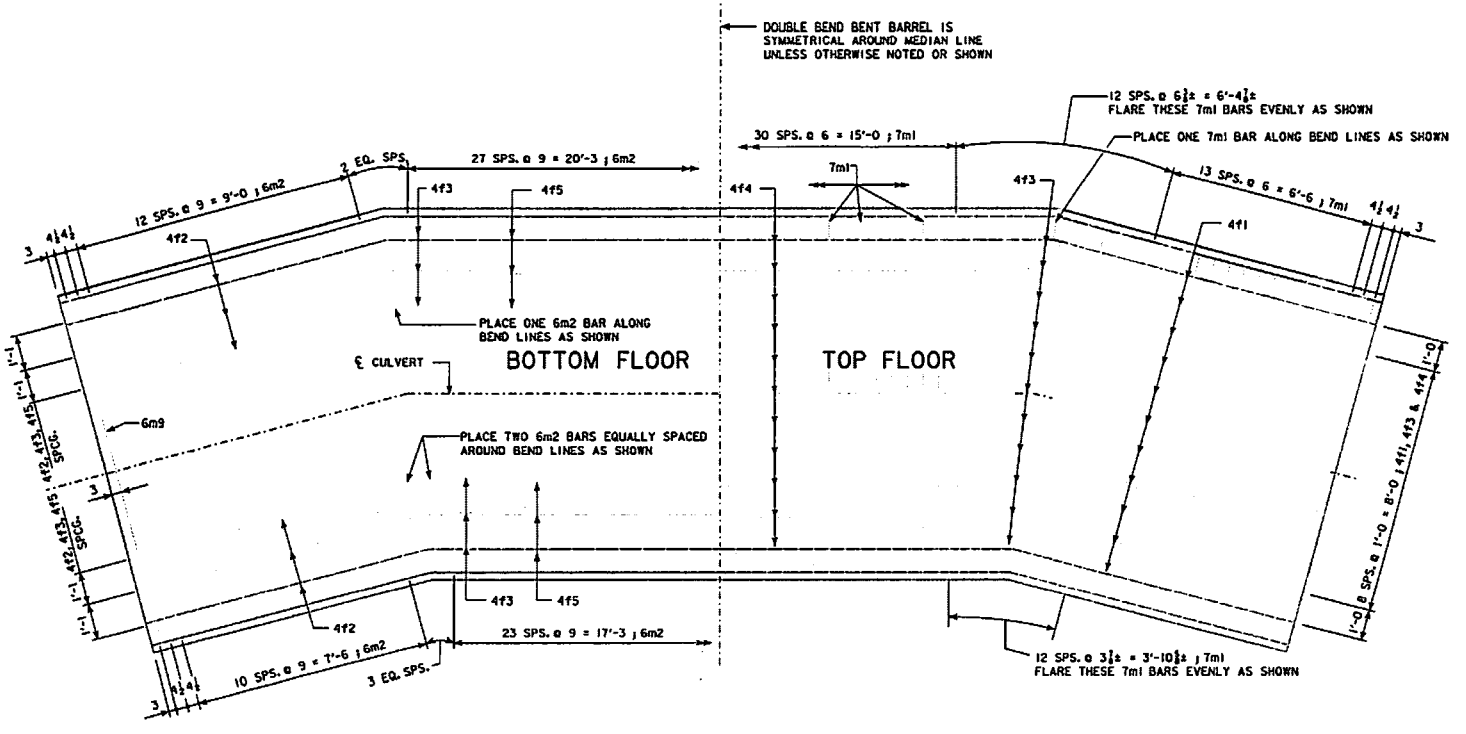

PLAN VIEW

NOTE:
BELL JOINT DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 17

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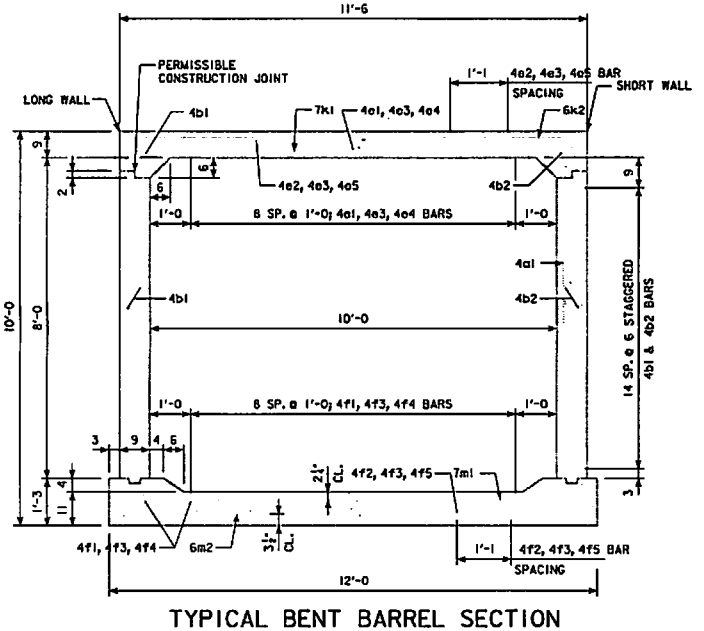
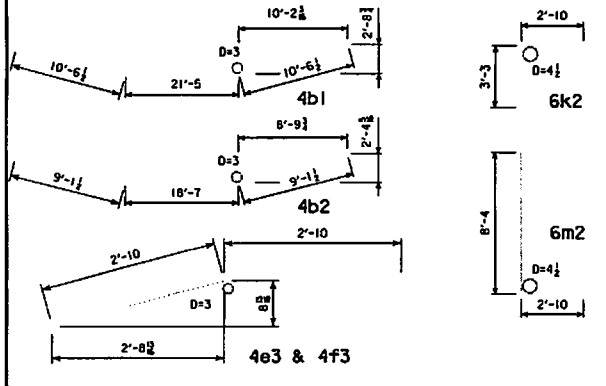


TYPICAL BENT BARREL SECTION

REINFORCING BAR LIST - ONE 40'-0 BENT BARREL SECTION

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALL, F.F., VERTICAL		160	9'-7	1024
4b1	WALL LONG, BOTH F., HORIZONTAL		16	42'-6	454
4b2	WALL SHORT, BOTH F., HORIZONTAL		16	36'-10	394
4e1	SLAB, BOTTOM, ENDS		18	9'-3	111
4e2	SLAB, TOP, ENDS		12	9'-3	74
4e3	SLAB, TOP & BOTTOM, LAP		30	5'-8	114
4e4	SLAB, BOTTOM, CENTER		9	18'-9	113
4e5	SLAB, TOP, CENTER		6	18'-9	75
4f1	FLOOR, TOP, ENDS		22	9'-3	136
4f2	FLOOR, BOTTOM, ENDS		12	9'-3	74
4f3	FLOOR, TOP & BOTTOM, LAP		34	5'-8	129
4f4	FLOOR, TOP, CENTER		11	18'-9	138
4f5	FLOOR, BOTTOM, CENTER		6	18'-9	75
7k1	SLAB, BOTTOM, TRANSV.		85	11'-2	1940
6k2	WALL, B.F., TOP		108	6'-1	987
6k9	SLAB, TOP, TRANSV.		2	11'-2	34
7m1	FLOOR, TOP, TRANSV.		85	11'-8	2027
6m2	WALL, B.F., BOTTOM		108	11'-2	1811
6m9	FLOOR, TOP, TRANSV.		2	11'-8	35
				TOTAL (LBS.)	9745

BENT BAR DETAILS



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

NOTE:
BELL JOINT DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 7 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 18

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	75.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	4,128	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	175.8	
4	2404-7775000	REINFORCING STEEL	LB	31,831	
5	2507-3250005	ENGINEERING FABRIC	SY	170.0	
6	2507-6800061	REVETMENT, CLASS E	TON	130.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-2720000	EXCAVATION, CLASS 20 - -
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC - -
6	2507-6800061	REVETMENT, CLASS E - -
7	2533-4980005	MOBILIZATION - -

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 263'-0 (STAGE II 104'-0)
REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 19

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE II DESIGN TO CONSTRUCT A 10'-0 X 8'-0 REINFORCED CONCRETE BOX CULVERT EXTENSION ON U.S 20 AT STA. 11018+25.00 (℄ U.S. 20) 16° SKEW (RA). STAGE I (DES. 315) IS INCLUDED IN THIS PROJECT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6456).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 12 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

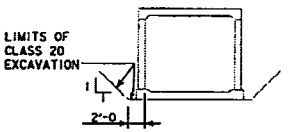
ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

STAGE I IS NOT PART OF THIS DESIGN. SEE DESIGN 315 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 DURING STAGE II . SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

THE 5z1 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE GROUT MANUFACTURER'S RECOMMENDATIONS. THE FOLLOWING SYSTEMS SHALL BE USED AS A BONDING AGENT FOR HORIZONTAL DOWELS.

A. POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E OF THE STANDARD SPECIFICATIONS.



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

DESIGN HISTORY AT THIS SITE	
DES. NO.	TYPE OF WORK
315	RCB STAGE I
118	RCB STAGE II

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

STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
* RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	------
RCB 10-8-12	APRIL 2012	------
PWH 15-1-12	APRIL 2012	------
PWH 15-2-12	APRIL 2012	------
PWH 15-3-12	APRIL 2012	------
PWH 15-4-12	APRIL 2012	------
PWH 15-6-12	APRIL 2012	------

* TOP OF SLAB DETAIL DOES NOT APPLY.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'-0 TIE-IN SECTION	2366	2366
38'-0 BARRELS	2 @ 8992	17,984
18'-0 END SECTION	4259	4259
38 EA. 5z1 DOWEL BARS - 2'-6 LENGTH	99	99
BELL JOINTS	3 @ 1000	3000
15° PARALLEL WING HDWL	4123	4123
	TOTAL (LBS.)	31,831

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
10'-0 TIE-IN SECTION	3.5	4.4	4.2	12.1
38'-0 BARRELS	2 @ 13.4 = 26.8	2 @ 16.9 = 33.8	2 @ 16.1 = 32.2	92.8
18'-0 END SECTION	6.3	8.0	7.6	21.9
BELL JOINTS	3 @ 2.372 = 7.1	3 @ 2.834 = 8.5	3 @ 2.189 = 6.6	22.2
15° PARALLEL WING HDWL	Δ 1.4	16.1	9.3	26.8
TOTAL (CU. YDS.)	45.1	70.8	59.9	175.8

Δ INCLUDES PARAPET AND TOP OF WINGWALL

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)
10'-0 X 8'-0 X 263'-0 (STAGE II 104'-0) REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 20

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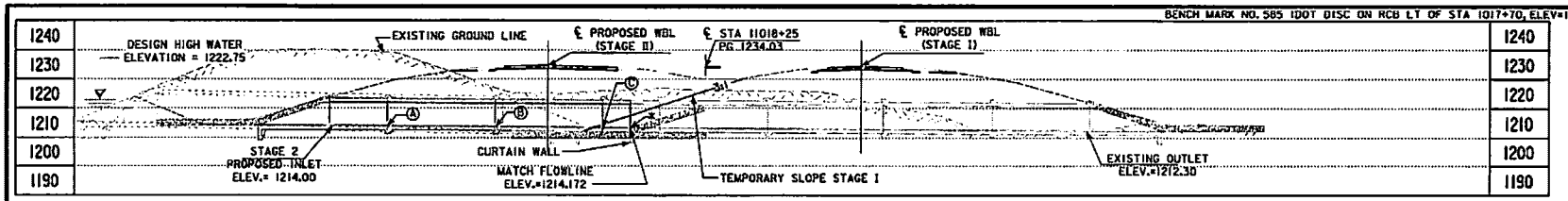
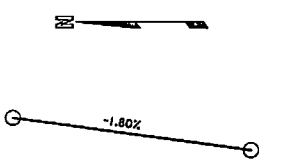
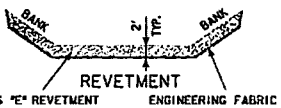




VPI STA = 11007+50 VPI STA = 11024+00
VPI ELEV = 1253.38 VPI ELEV = 1223.68

PROPOSED PROFILE GRADE US 20



CAMBER ELEVATION TABLE

NOTE:
CAMBER BELL JOINTS AS SHOWN

LOCATION	ELEVATION
Ⓐ	1214.88
Ⓑ	1214.33
Ⓒ	1214.20

LONGITUDINAL SECTION ALONG ℄ CULVERT

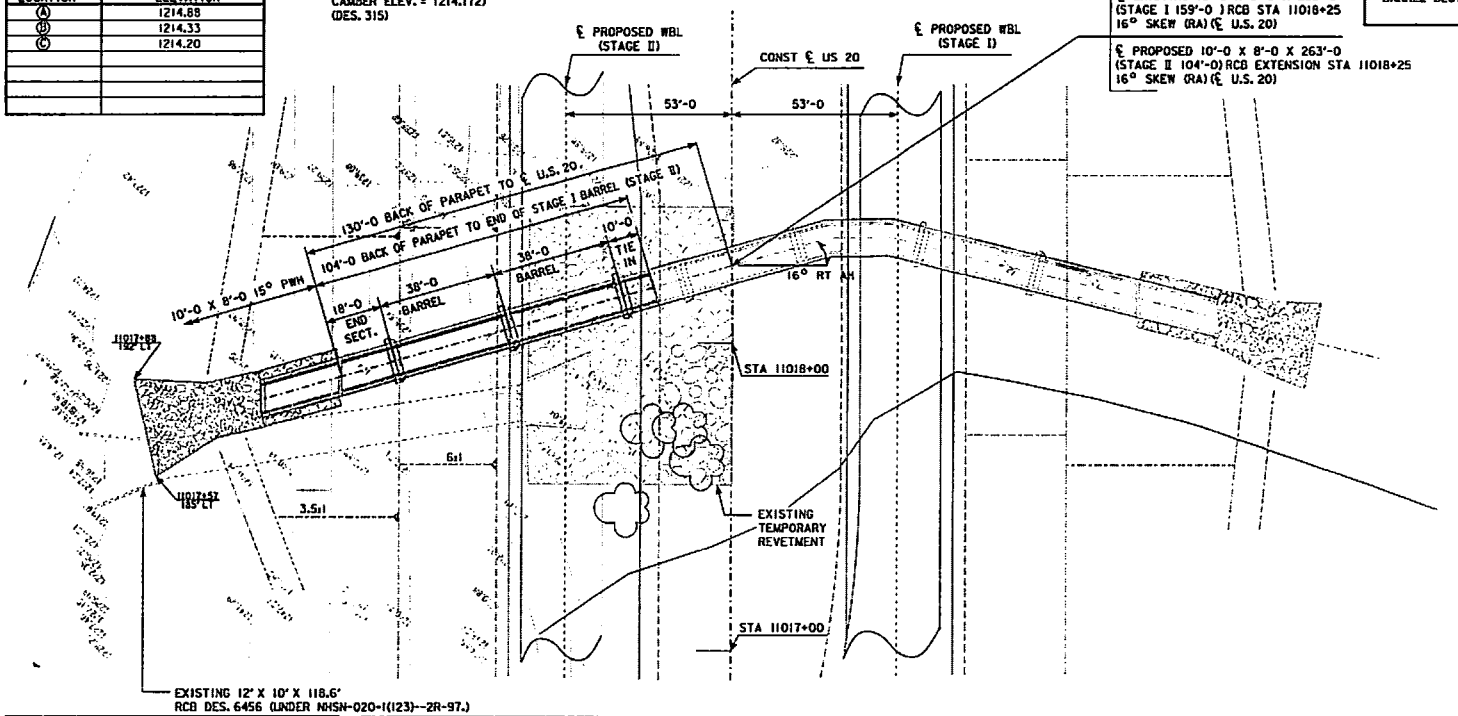
FILL HEIGHT = 12.0 FEET
SETTLEMENT = 0.70 FT.

NOTE:
BELL JOINTS ARE TO BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

*SEE CAMBER ELEVATION NOTE
(STAGE I AS DESIGNED
CAMBER ELEV. = 1214.172)
(DES. 315)

℄ EXISTING 10'-0 X 8'-0 X 263'-0 (STAGE I 159'-0) RCB STA 11018+25 16° SKEW (RA) (℄ U.S. 20)

℄ PROPOSED 10'-0 X 8'-0 X 263'-0 (STAGE II 104'-0) RCB EXTENSION STA 11018+25 16° SKEW (RA) (℄ U.S. 20)



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 10 (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	130	170	75
TOTALS	130	170	75

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

HYDRAULIC DATA

DRAINAGE AREA = 700 ACRES VH-H-R
Q_{50} = 764 CFS
HW ELEV. = 1222.75

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
MCLEOD
SCHALLER TELEPHONE

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474520°
LONGITUDE -95.721013°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AND AT NO COST TO THE STATE.

SITUATION PLAN

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)
10'-0 X 8'-0 X 263'-0 (STAGE II 104'-0) REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB ✱ MSF ✱ ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 21

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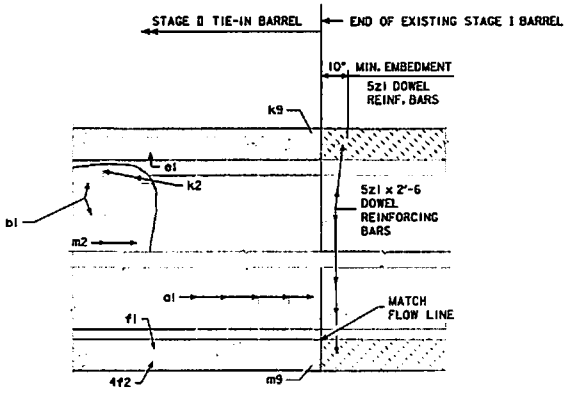
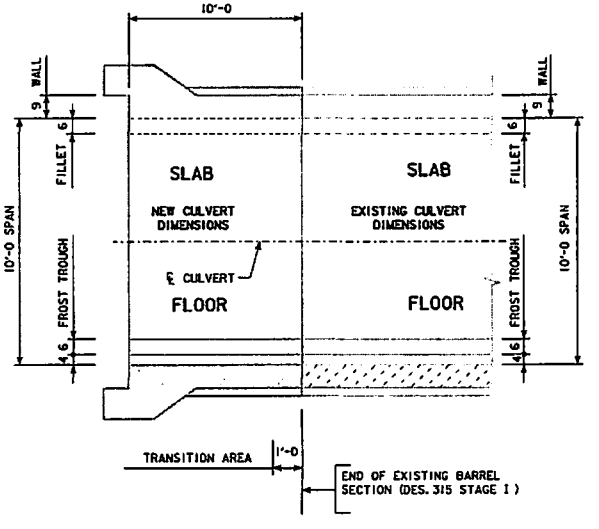
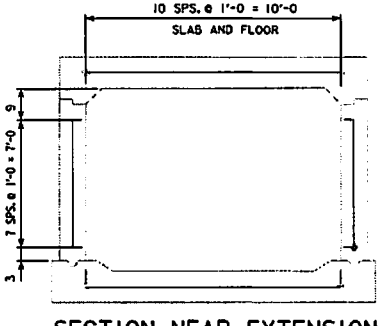


PART LONGITUDINAL SECTION
(ALONG ℄ OF CULVERT)



10'-0 BARREL TIE-IN DETAILS
(PLAN VIEW)



SECTION NEAR EXTENSION
(SHOWING SPACING OF ⅜" ♦ DOWEL BARS)

NOTE:
2'-6 - 5z1 DOWELS ARE TO BE CENTERED IN EXISTING SLAB, FLOOR AND WALLS. MINIMUM OF 10" EMBEDMENT.

NOTE:
FOR BELL JOINT AND BARREL DETAILS NOT SHOWN, REFER TO STANDARDS LISTED IN THESE PLANS.

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)
10'-0 X 8'-0 X 263'-0 (STAGE II 104'-0)
REINFORCED CONCRETE BOX CULVERT

10'-0 TIE-IN BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 22

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	142	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	57.4	
3	2404-7775000	REINFORCING STEEL	LB	10,601	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 " "
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) " "
3	2404-7775000	REINFORCING STEEL " "
4	2533-4980005	MOBILIZATION " "

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 5'-0 REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR A 60"Φ RC PIPE

ESTIMATED QUANTITIES

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 23

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT AN 8'-0 X 5'-0 REINFORCED CONCRETE FLUME COLLAR, FLUME AND BASIN FOR AN EXISTING 60" ϕ RCP ON U.S 20 AT STA. 11040+43.00 (℄ U.S. 20) 0° SKEW.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

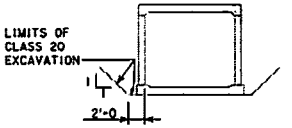
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE FLUME SECTIONS.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

STANDARD	ISSUED	REVISED
RCF-01-12	APRIL, 2012	05-13
RCF-02-12	APRIL, 2012	-----
FBJ-03-12	APRIL, 2012	-----
RCFB-03-12	APRIL, 2012	-----



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
415	NEW FLUME & BASIN (STAGE I)

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8'-0 X 5'-0 FLUME	7387	7387
8'-0 X 5'-0 BASIN	2666	2666
FLUME JUCTION BELL, FLOOR	162	162
CHUTE BELL JOINT	386	386
	TOTAL (LBS.)	10,601

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
8'-0 X 5'-0 FLUME	27.9	15.3	43.2
8'-0 X 5'-0 BASIN	10.6	3.6	14.2
TOTAL (CU. YDS.)	38.5	19.8	57.4

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW
8'-0 X 5'-0 REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR A 60"ϕ RC PIPE
GENERAL NOTES

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB x MSF x ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 24

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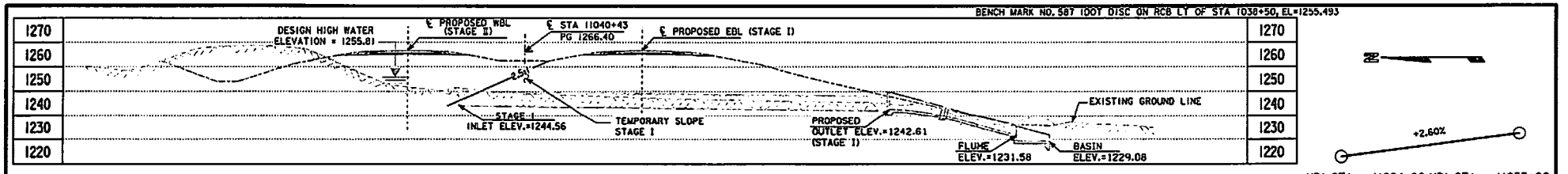
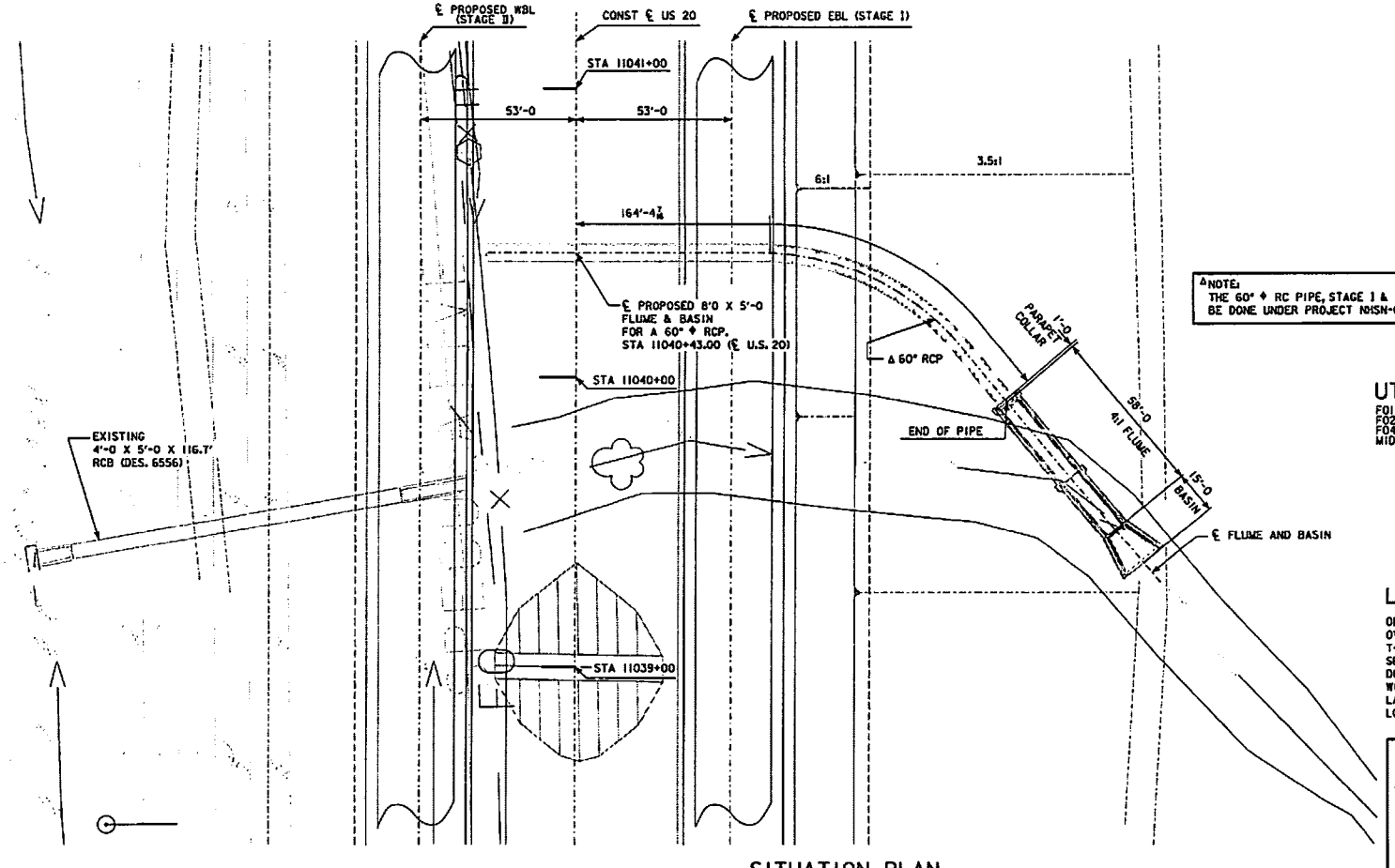


LONGITUDINAL SECTION ALONG ℄ CULVERT

FILL HEIGHT = N/A
SETTLEMENT = 0.41 FT.

VPI STA = 11024+00 VPI STA = 11057+00
VPI ELEV = 1223.68 VPI ELEV = 1309.48

PROPOSED PROFILE GRADE US 20



ΔNOTE:
THE 60" ϕ RC PIPE, STAGE I & STAGE II TO BE DONE UNDER PROJECT NHSN-020-1(123)--2R-97

HYDRAULIC DATA

DRAINAGE AREA = 88 ACRES
Q_{50} = 179 CFS
HW ELEV. = 1255.81

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD
MIDAMERICAN ENERGY

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-BBN R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474481°
LONGITUDE -95.712792°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 5'-0 REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR A 60"ϕ RC PIPE

SITUATION PLAN

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 415

SITUATION PLAN

DESIGN TEAM DGB ± MSF ± ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 25

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BENCH MARK NO. 587 IDOT DISC ON RCB LT OF STA 1038+50, EL=1255.493

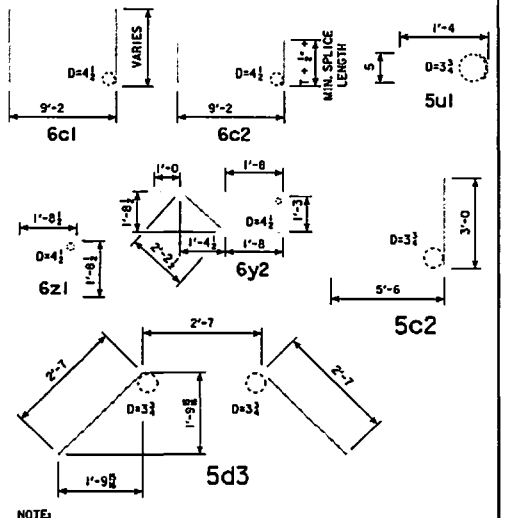
REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		114	LISTED	382
5b1	WALLS FFH - SECTION 1		6	36'-10;37'-4	226
4b2	WALLS BFH - SECTION 1	—	6	36'-10;37'-4	145
5b3	WALLS FFH - SECTION 2	—	6	22'-9;23'-2	144
4b4	WALLS BFH - SECTION 2		6	22'-9;23'-2	92
5b5	WALLS FFH - SECTION 1		4	LISTED	41
4b6	WALLS BFH - SECTION 1		4	LISTED	26
6c1	BOTT. FLOOR & WALLS BFV		93	LISTED	2574
6c2	BOTT. FLOOR & WALLS BFV - SPLICED		19	16'-5	468
5c3	WALLS BFV		38	LISTED	230
6f1	FLOOR LONGIT. TOP - SECTION 1		9	36'-1	488
5f2	FLOOR LONGIT. BOTT. - SECTION 1		9	36'-1	339
6f3	FLOOR LONGIT. TOP - SECTION 2		9	23'-5	317
5f4	FLOOR LONGIT. BOTT. - SECTION 2		9	23'-5	220
6m1	FLOOR TRANSV. TOP		60	9'-8	871
5a1	WALLS BOTH F ALONG SLOPE - SECTION 1		4	37'-7	153
5a2	WALLS BOTH F ALONG SLOPE - SECTION 2		4	22'-6	94
5u1	FENCE ANCHORS (GALVANIZED)		2	2'-10	6
5d1	PIPE COLLAR, VERT; BOTH FACES		16	9'-1	152
5d2	PIPE COLLAR, VERT; BOTH FACES		12	LISTED	24
5e1	PIPE COLLAR, HORIZ; BOTH FACES		4	9'-2	38
5e2	PIPE COLLAR, HORIZ; BOTH FACES		20	LISTED	36
5e3	PIPE COLLAR, PIPE OPENING; BOTH FACES		8	7'-9	65
6x1	PIPE COLLAR, TRANSVERSE; BELL JOINT		6	9'-8	87
6y2	PIPE COLLAR, VERT; BELL JOINT		10	7'-10	118
6z1	PIPE COLLAR, VERT; BELL JOINT		10	3'-5	51
				TOTAL (LB)	7387

LISTED BARS

BAR 6c1	BAR 4a1	BAR 5c3	BAR 5b5 AND 4b6	5d2 BARS	5e2 BARS
93 BARS	114 BARS	38 BARS	4 BARS - 2 EA. LGTH.	12 BARS	20 BARS
53 AT 17'-11	54 AT 4'-5	38 VAR. - 2 EA. LGTH.	6'-4	4 @ 2'-8	12 @ 1'-5
40 VAR.	60 VAR. - 2 EA. LGTH.	5'-0	13'-1	8 @ 1'-7	4 @ 1'-9
18'-0	4'-5	5'-1			4 @ 2'-9
18'-0	4'-5	5'-2			
18'-0	4'-5	5'-3			
18'-0	4'-5	5'-4			
18'-0	4'-6	5'-5			
18'-0	4'-6	5'-6			
18'-1	4'-7	5'-7			
18'-1	4'-7	5'-8			
18'-1	4'-8	5'-9			
18'-2	4'-9	5'-10			
18'-2	4'-10	6'-0			
18'-3	4'-11	6'-1			
18'-3	5'-0	6'-2			
18'-4	5'-1	6'-3			
18'-5	5'-2	6'-5			
18'-5	5'-4	6'-6			
18'-6	5'-5	6'-7			
18'-7	5'-7	6'-9			
18'-8	5'-9				
18'-9	5'-10				
18'-10	6'-0				
18'-11	6'-2				
19'-0	6'-4				
19'-1	6'-6				
19'-2	6'-8				
19'-3	6'-11				
19'-4	7'-1				
19'-6	7'-4				
19'-7	7'-6				
19'-8	7'-9				
19'-10					
19'-11					
20'-1					
20'-2					
20'-4					
20'-5					
20'-7					
20'-9					
20'-11					
21'-0					

BENT BAR DETAILS



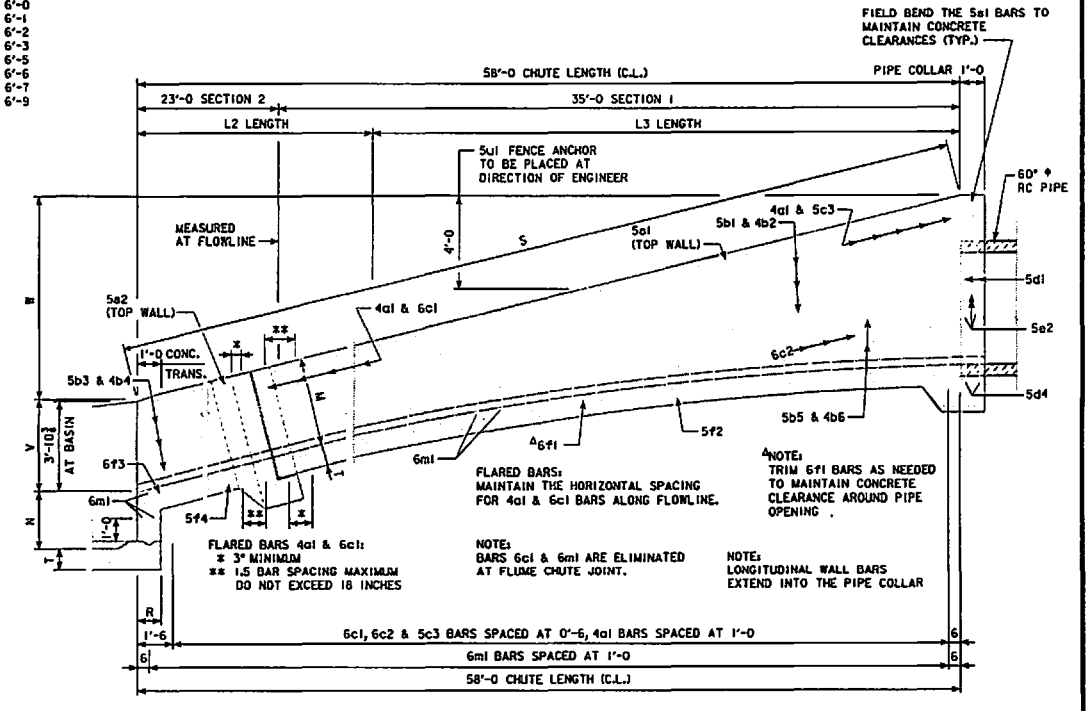
NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

FLUME DATA

- ∡A = 14°02'
- ∡C = 1°00'
- B = 15'-3½
- S = 59'-9⅝
- V = 3'-10⅝
- W = 14'-6
- M = 3'-9
- T = 1'-0
- H = 5'-0

CURVE DATA

- C. L. = 58'-0
- L2 = 28'-2¾
- L3 = 29'-9¼
- D = 14°-11
- ℄ = 14°-10¼
- P. C. ELEV. = 1242.61
- P.I. ELEV. = 1242.35
- P. P. ELEV. = 1242.09
- P. T. ELEV. = 1238.64
- X1 = 3'-5⅞
- X2 = 1'-11⅝
- X3 = 0'-10¾
- X4 = 0'-2⅝
- L3/4 = 7'-5⅝(-)



8'x5' FLUME CHUTE - LONGITUDINAL SECTION

NOTE:
FOR PIPE COLLAR DETAILS, SEE DESIGN SHEETS IN THESE PLANS.

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	14.5	8.8	23.3
FLUME - SECTION 2	10.3	4.4	14.7
JUNCTION BELL	1.6	-----	1.6
COLLAR FOR PIPE	-----	1.5	1.5
CHUTE BELL JOINT	1.5	0.6	2.1
TOTAL (CY)	27.9	15.3	43.2

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-03-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-03-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 5'-0 REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR A 60"⌖ RC PIPE

FLUME DETAILS

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 26

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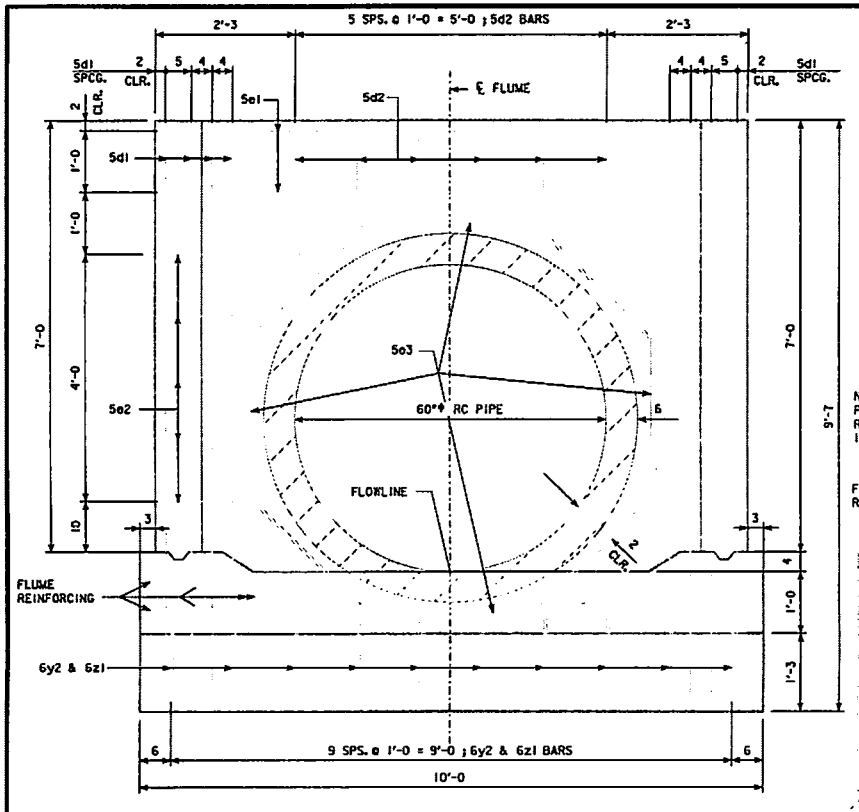
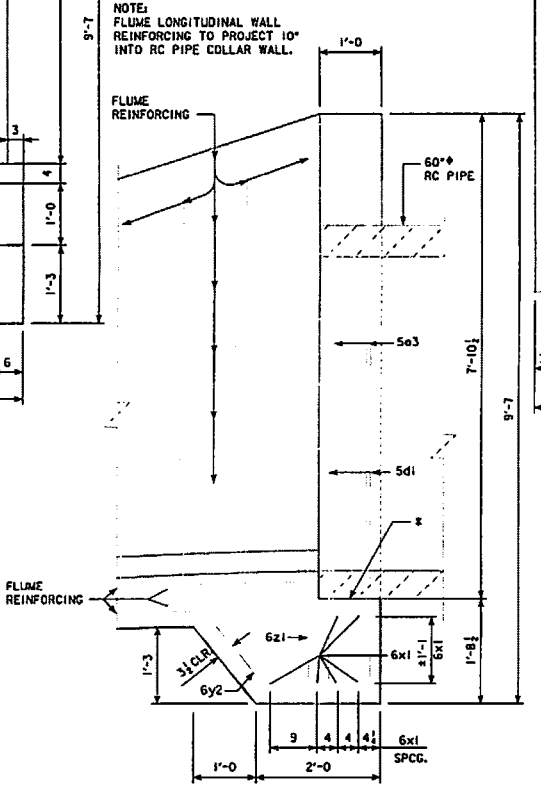
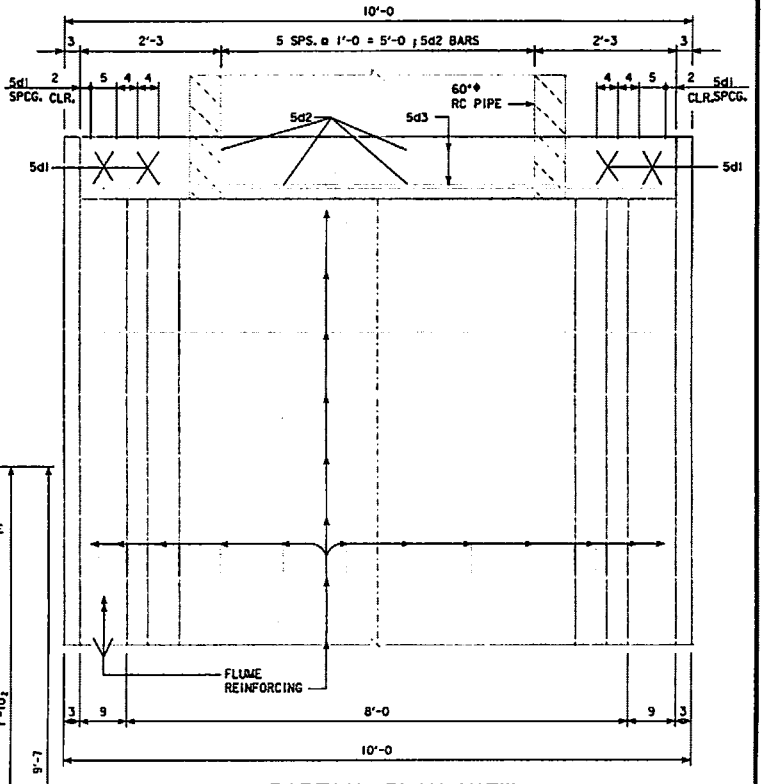


END VIEW



PARTIAL LONGITUDINAL VIEW



PARTIAL PLAN VIEW

NOTE:
FOR FLUME REINFORCING DETAILS, SEE FLUME SHEETS AND LISTED FLUME STANDARDS IN THESE PLANS.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 5'-0 REINFORCED CONCRETE 4:1 FLUME AND BASIN FOR A 60"Φ RC PIPE

FLUME PIPE COLLAR DETAILS

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB ¤ MSF ¤ ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 27

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	583	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	21.0	
3	2404-7775000	REINFORCING STEEL	LB	2,783	
4	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING	LF	49	
5	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 - -
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
3	2404-7775000	REINFORCING STEEL - -
4	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEM SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.) SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION. 1. GALVANIZED SAFETY HAND RAIL
5	2533-4980005	MOBILIZATION - -

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" Φ RC PIPE

ESTIMATED QUANTITIES

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 7 FILE NO. 30568 DESIGN NO. 218

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 28

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GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE II DESIGN TO CONSTRUCT AN 8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET ON U.S 20 AT STA. 11040+43.00 (℄ U.S. 20) 0° SKEW. STAGE I (DES. 415) IS NOT A PART OF THIS DESIGN, BUT INCLUDED IN THIS PROJECT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6456).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

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

STAGE I IS NOT PART OF THIS DESIGN, BUT INCLUDED IN THE PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 DURING STAGE II. SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS. THE CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR EDGE OR END OF REINFORCING BAR TO BE 2" UNLESS OTHERWISE NOTED.

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

THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60 REINFORCEMENT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE DESIGN STRESSES ARE BASED ON GRADE 60 REINFORCEMENT.
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	17"	21"	25"	31"	41"	51"

THIS SPLICE, IF USED, WILL BE AT THE CONTRACTOR'S EXPENSE.
REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:

EDGE CLEARANCES:	2" EXCEPT	
TOP OF FLOOR	2½" TO NEAR TRANSVERSE REINFORCING BAR	
BOTTOM OF FLOOR	3½" TO NEAR TRANSVERSE REINFORCING BAR	
END CLEARANCES:		
VERTICAL TOP	2"	
VERTICAL BOTTOM	3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH	
TRANSVERSE	2"	

ALL CONSTRUCTION JOINTS SHALL BE FORMED WITH A BEVELED KEYWAY.
ALL BEVELED KEYWAYS SHALL BE CENTERED.
KEYWAY SIZE SHALL BE 2x6.

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.

PIPE HANDRAIL ASSEMBLY WILL CONSIST OF 49 LINEAL FEET AND IS TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOPDRAWINGS.

ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED OR SHOWN.
CONCRETE FORMS ARE REQUIRED TO REMAIN IN PLACE 5 DAYS OR LONGER IN ACCORDANCE WITH ARTICLE 2403.03, M, 2, OF THE STANDARD SPECIFICATIONS, EXCEPT THE MINIMUM CONCRETE FLEXURAL STRENGTH REQUIRED BEFORE REMOVAL OF FORMS SHALL BE 575 PSI.
THESE CULVERT STANDARDS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (SoI IS ½ 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	4	5	6	7	8	9
BAR DESIGNATION	13	16	19	22	25	29

SPECIFICATIONS:

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

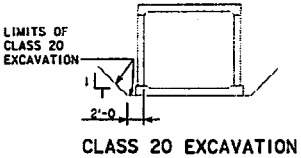
CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT SERIES, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010:
REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
415	NEW FLUME & BASIN (STAGE I)
218	DROP INLET RCB STAGE II



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	GALVANIZED SAFETY HAND RAIL

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8'-0 X 8'-0 DROP INLET	2783	2783
	TOTAL (LBS.)	2783

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FOOTING AND BELL JOINT FOOTING	Δ 5.7	——	5.7
WALLS AND WINGWALLS	——	± 15.3	15.3
TOTAL (CU. YDS.)	Δ 5.7	± 15.3	21.0

± INCLUDES REDUCTION FOR RC PIPE OPENING.
Δ INCLUDES 1.4 CU.YDS. FOR BELL JOINT FOOTING

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" ϕ RC PIPE

GENERAL NOTES

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 7 FILE NO. 30568 DESIGN NO. 218

DESIGN TEAM DGB ± MSF ± ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 29

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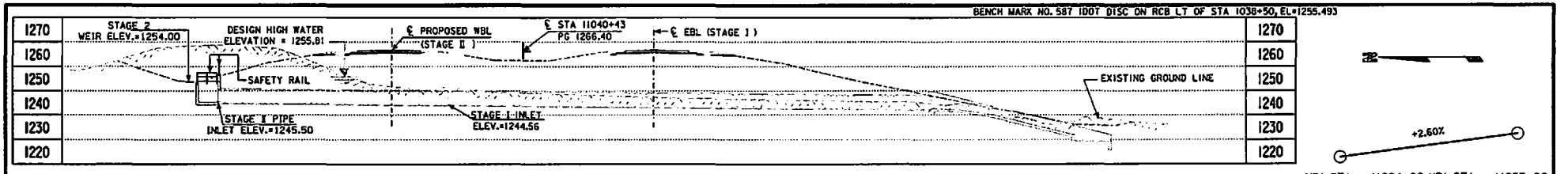
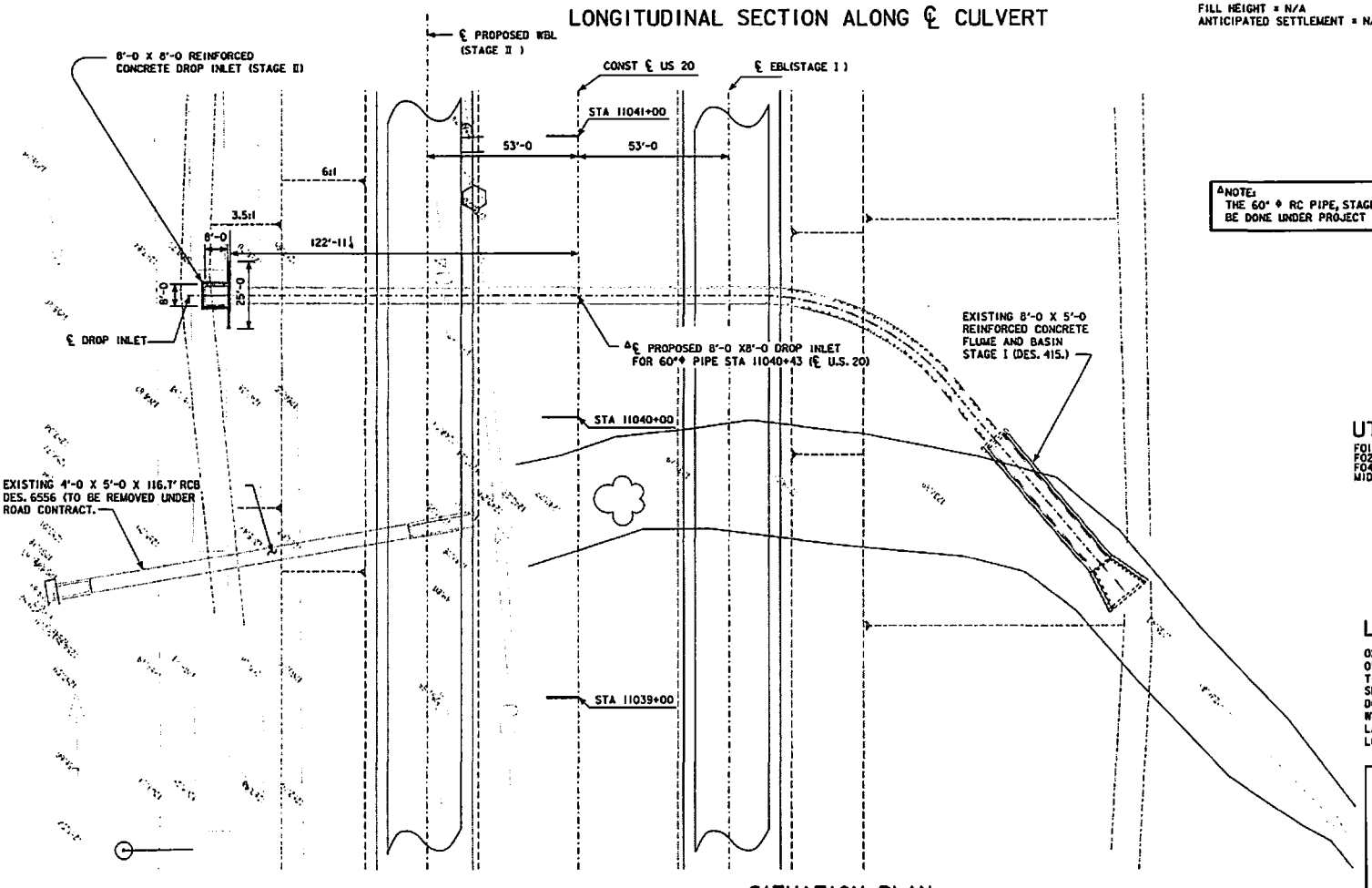


VPI STA = 11024+00 VPI STA = 11057+00
VPI ELEV = 1223.68 VPI ELEV = 1309.48

PROPOSED PROFILE GRADE US 20

FILL HEIGHT = N/A
ANTICIPATED SETTLEMENT = N/A

LONGITUDINAL SECTION ALONG ℄ CULVERT



ΔNOTE:
THE 60" Φ RC PIPE, STAGE I & STAGE II TO BE DONE UNDER PROJECT NHSN-020-1(123)--2R-97

HYDRAULIC DATA

DRAINAGE AREA = 88 ACRES
Q_{50} = 179 CFS
HW ELEV. = 1255.81

UTILITIES LEGEND:

FOI INS
FO2 QWEST
FO4 MCLEOD
MIDAMERICAN ENERGY

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474481°
LONGITUDE -95.712792°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5600	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" Φ RC PIPE

SITUATION PLAN

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 7 FILE NO. 30568 DESIGN NO. 218

DESIGN TEAM OGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 30

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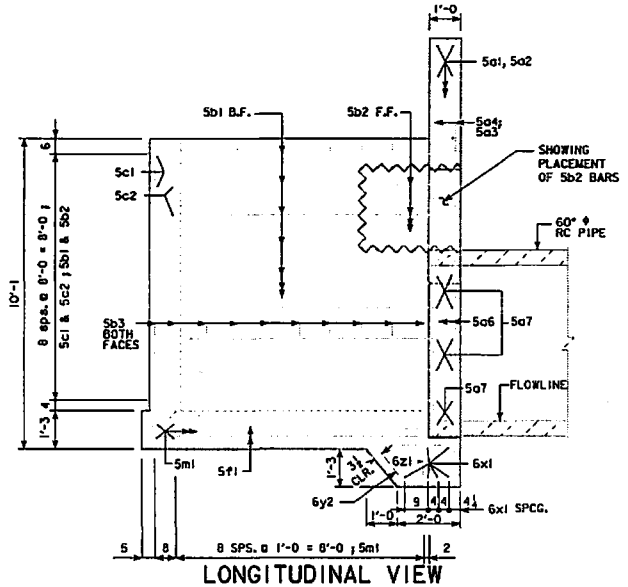
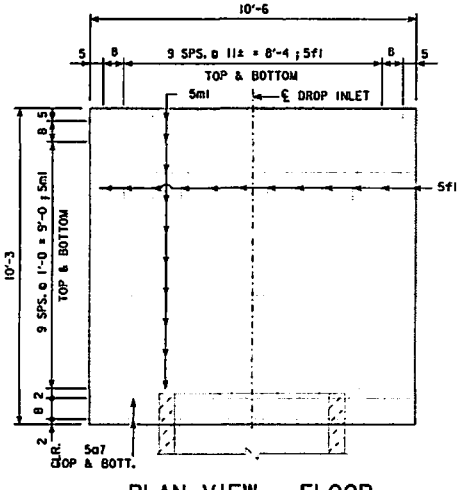
BENCH MARK NO. 587 IDOT DISC ON RCB LT OF STA 1038+50, EL=1255.493



LONGITUDINAL VIEW



PLAN VIEW - FLOOR

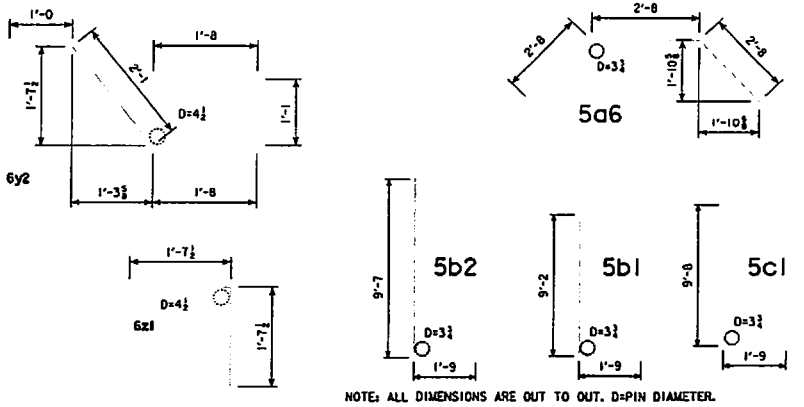
LISTED BARS

5a3	5a4	5a7
24 BARS	FOUR EACH	12 @ 1'-8
12 @ 12'-10	3'-11	4 EA. LENGTH
FOUR EA. LENGTH	4'-2	2'-1
6'-6	4'-8	2'-4
6'-8	5'-2	4'-6
7'-7	5'-8	
	6'-2	
	6'-8	
	7'-2	

REINFORCING BAR LIST - DROP INLET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	BUTTERFLY WING, HORIZ. BOTH FACES		10	24'-8	257
5a2	BUTTERFLY WING, HORIZ. BOTH FACES		4	20'-7;16'-7	77
5a3	BUTTERFLY WING, VERT., BOTH FACES		24	LISTED	247
5a4	BUTTERFLY WING, VERT., BOTH FACES		32	LISTED	156
5a5	BUTTERFLY WING, SLOPE, BOTH FACES		4	8'-9	37
5a6	PIPE OPENING, BOTH FACES		4	8'-0	33
5a7	BUTTERFLY WING, HORIZ. BOTH FACES		24	LISTED	58
5b1	WALL, LONG, BACK FACE		18	10'-11	205
5b2	WALL, LONG, FRONT FACE		18	11'-4	213
5b3	WALL, VERT. BOTH FACES		40	9'-7	400
5c1	END WALL, HORIZ. BACK FACE		9	13'-2	123
5c2	END WALL, HORIZ. FRONT FACE		9	9'-8	91
5c3	END WALL, VERT., BOTH FACES		16	9'-4	156
5f1	FLOOR, LONG. TOP & BOTTOM		24	9'-11	248
5m1	FLOOR, TRANS. TOP & BOTTOM		20	10'-2	212
6x1	BELL JOINT, TRANSVERSE	—	6	10'-2	92
6y2	BELL JOINT VERTICAL		11	7'-6	124
6z1	BELL JOINT VERTICAL		11	3'-3	54
			TOTAL (LBS.)		2783

BENT BAR DETAILS



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

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" ϕ RC PIPE

DROP INLET DETAILS

STA. 1040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 7 FILE NO. 30568 DESIGN NO. 218

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 31

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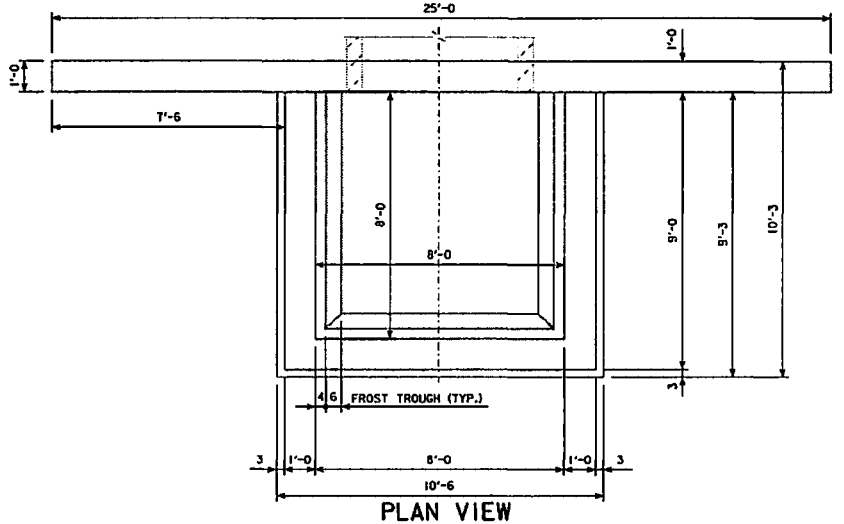
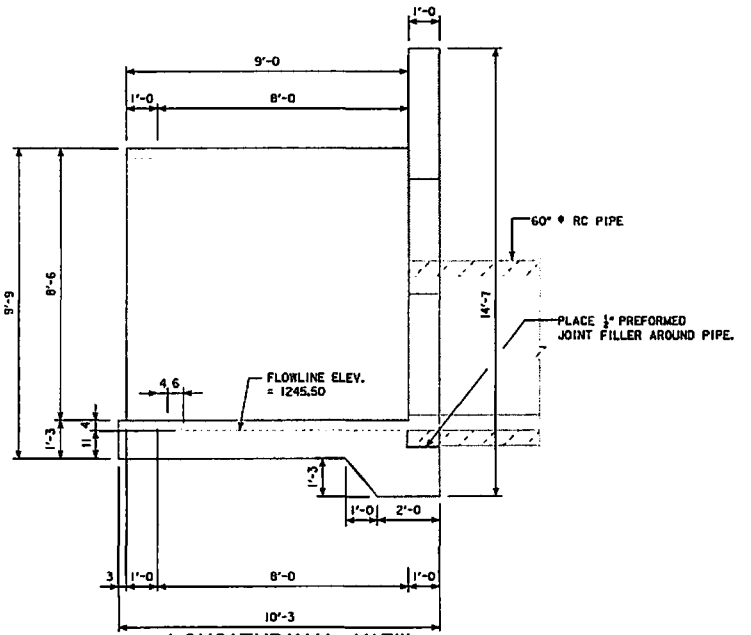
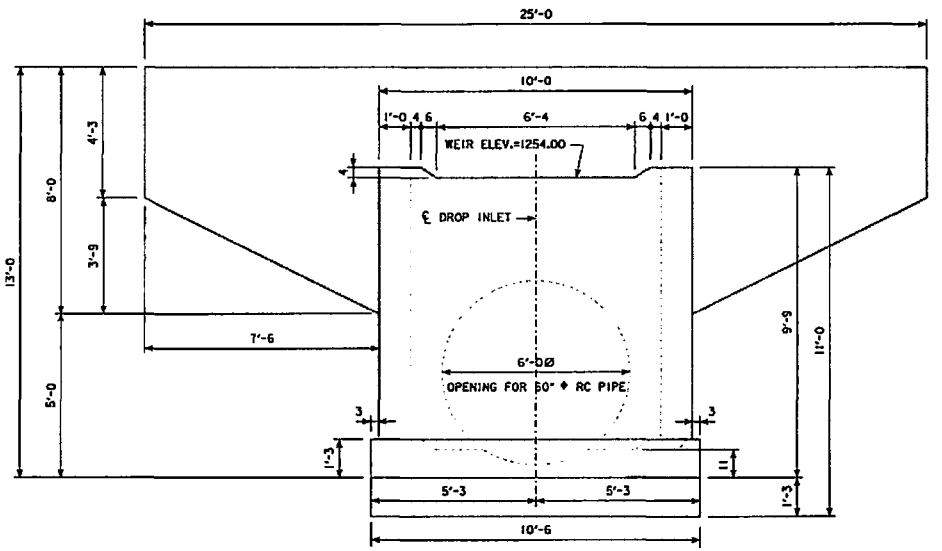


PLAN VIEW



LONGITUDINAL VIEW



END VIEW

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" ϕ RC PIPE

DROP INLET DETAILS

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 7 FILE NO. 30568 DESIGN NO. 218

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 32

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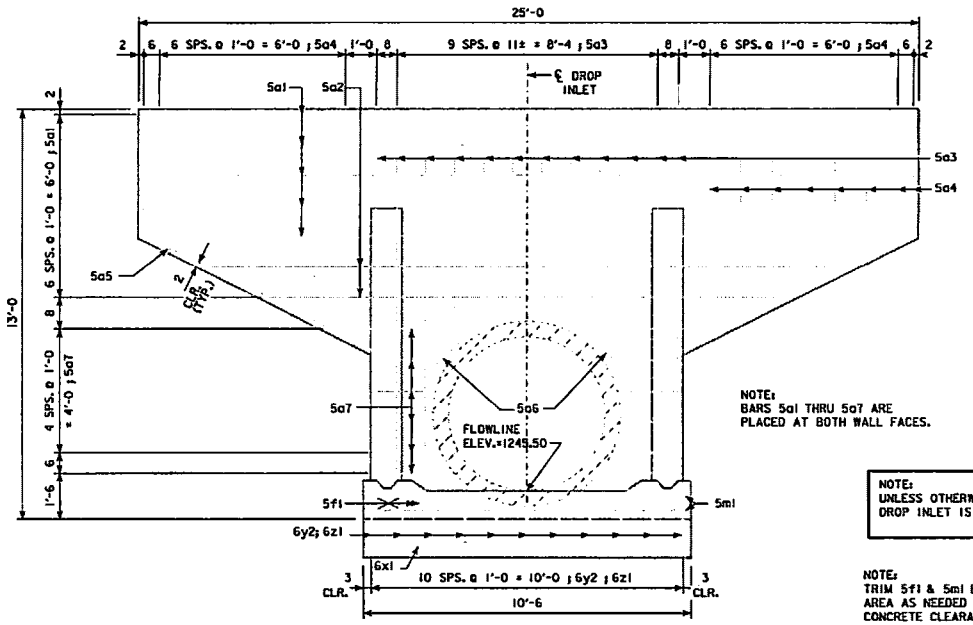
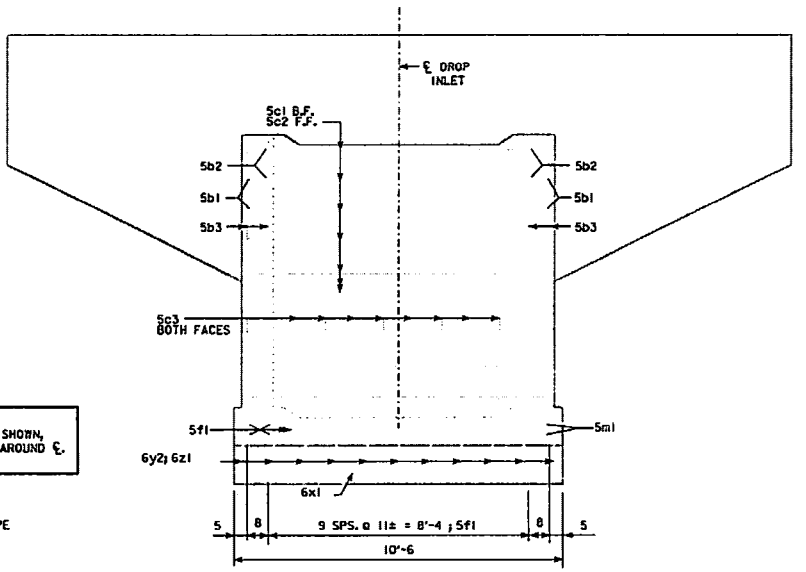


NOTE:
BARS 5a1 THRU 5a7 ARE PLACED AT BOTH WALL FACES.

NOTE:
UNLESS OTHERWISE NOTED OR SHOWN, DROP INLET IS SYMMETRICAL AROUND ℄.

NOTE:
TRIM 5f1 & 5m1 BARS IN RC PIPE AREA AS NEEDED TO MAINTAIN CONCRETE CLEARANCES.

SECTION VIEW NEAR BUTTERFLY WING WALLS



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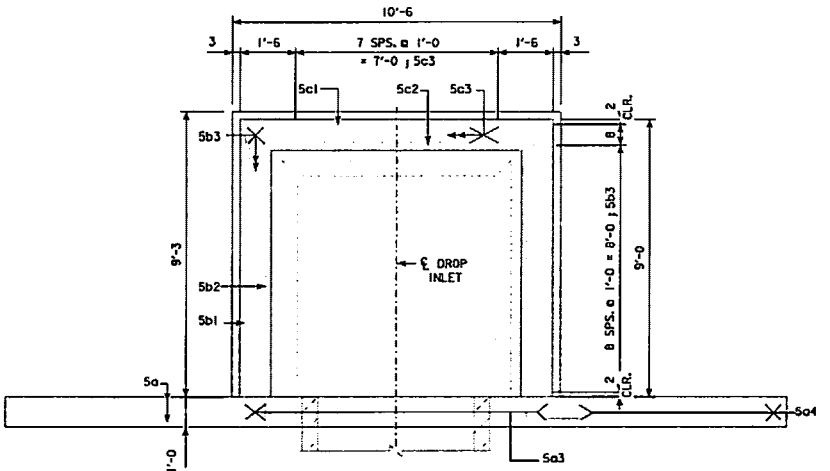

PLAN VIEW - WALLS

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" ϕ RC PIPE

DROP INLET DETAILS

STA. 11040+43.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 7 FILE NO. 30568 DESIGN NO. 210

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 33

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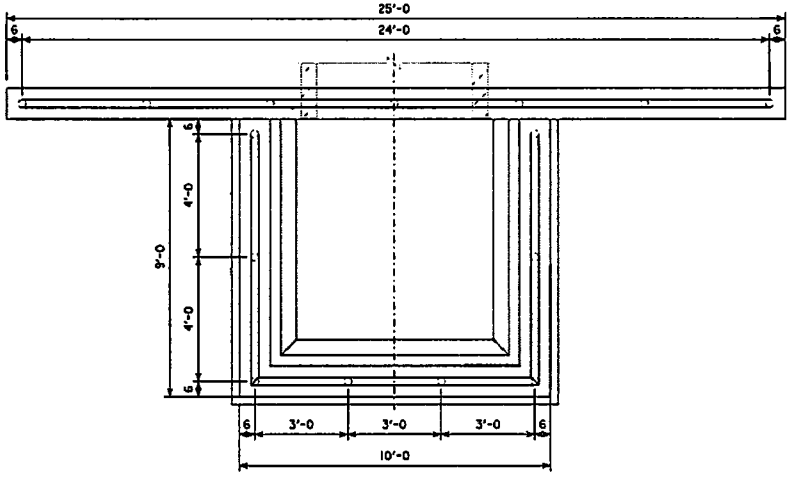
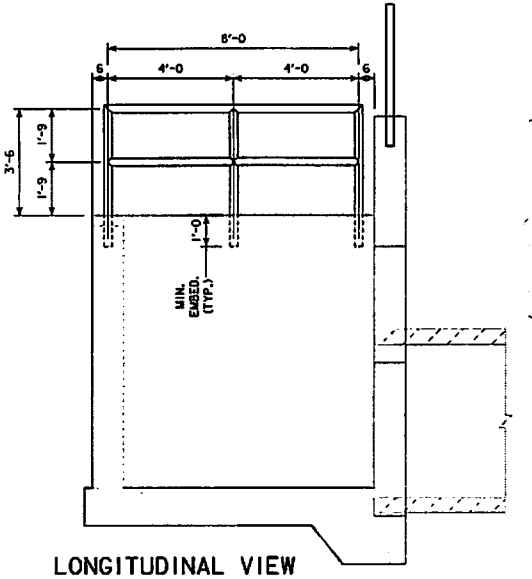
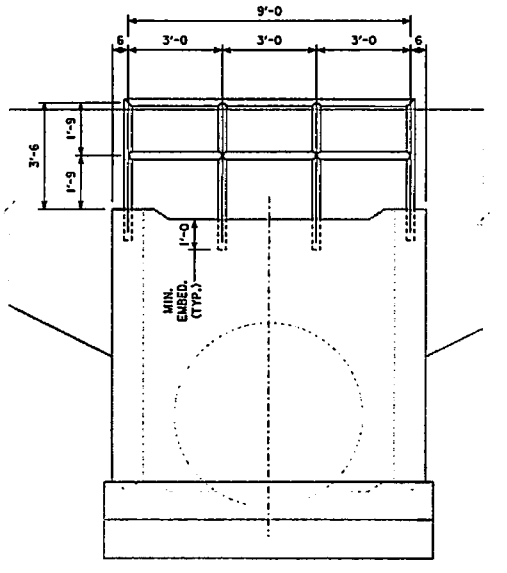


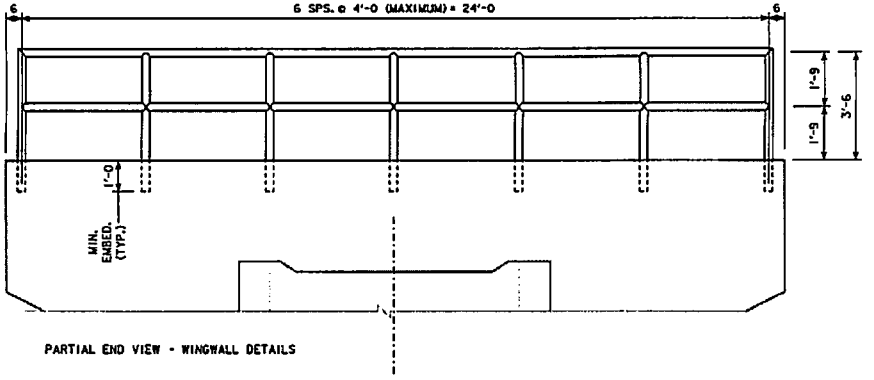
PLAN VIEW



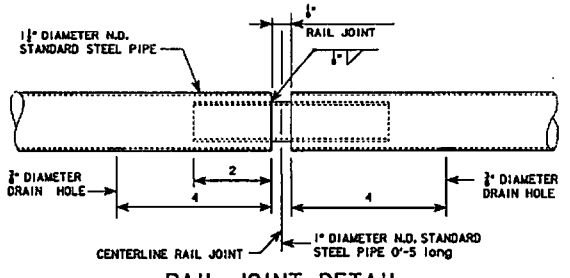
LONGITUDINAL VIEW



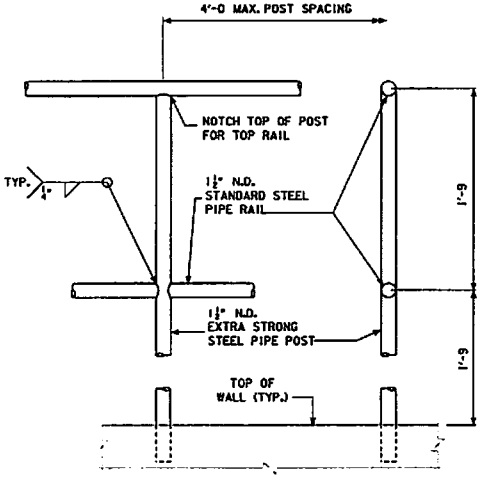
PARTIAL END WALL



PARTIAL END VIEW - WINGWALL DETAILS



RAIL JOINT DETAIL



PIPE HANDRAIL DETAILS

NOTE: PIPE HANDRAIL ASSEMBLY TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOP DRAWINGS.

PEDESTRIAN HAND RAIL NOTES:

THE STEEL PIPE PEDESTRIAN HAND RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED END TO END OF RAIL. THE PRICE BID FOR STEEL PIPE PEDESTRIAN HAND RAIL SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.

THE MATERIAL FOR TUBE RAILS, POSTS AND SPLICE TUBES SHALL BE STANDARD STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53, TYPE E OR S, GRADE B OR ASTM A500 GRADE B.

PANELS AND END SECTIONS SHALL BE GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A123.

ENDS OF RAIL SECTIONS ARE TO BE SAWED OR MILLED. ALL CUT ENDS ARE TO BE TRUE, SMOOTH, AND FREE OF BURRS OR RAGGED EDGES.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 REINFORCED CONCRETE DROP INLET FOR A 60" Φ RC PIPE

SAFETY RAIL DETAILS

STA. 11040+43.00 ℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 7 FILE NO. 30568 DESIGN NO. 218

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 34

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ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	600.0	
2	2402-0425030	GRANULAR BACKFILL	CY	30.9	
3	2402-2720000	EXCAVATION, CLASS 20	CY	1,549	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	90.6	
5	2404-7775000	REINFORCING STEEL	LB	16,111	
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	LF	115.0	
7	2415-2201008	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	EACH	1	
8	2507-3250005	ENGINEERING FABRIC	SY	1,080.0	
9	2507-6800061	REVETMENT, CLASS E	TON	980.0	
10	2533-4980005	MOBILIZATION	LS	1.00	
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-0425030	GRANULAR BACKFILL - -
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES 30.9 C.YDS. FOR CORE OUT FOR GRANULAR BLANKET.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
5	2404-7775000	REINFORCING STEEL - -
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT. - -
7	2415-2201008	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT. - -
8	2507-3250005	ENGINEERING FABRIC - -
9	2507-6800061	REVETMENT, CLASS E - -
10	2533-4980005	MOBILIZATION - -
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL INCLUDES COST OF MATERIALS AND LABOR TO INSTALL TEMPORARY STEEL CURTAIN WALL. TEMPORARY CURTAIN WALL TO REMAIN IN PLACE UNTIL STAGE 2, DESIGN 118 CONSTRUCTION BEGINS.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
40'-0 DOUBLE BEND BENT BARREL	9745	9745
10' X 8' BARREL BELL JOINTS	4 @ 1000	4000
10'-0 CIP BARREL END SECTION	2366	2366
	TOTAL (LBS.)	16,111

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
40'-0 DOUBLE BEND BENT BARREL	14.1	17.8	17.0	48.9
10' X 8' BARREL BELL JOINTS	4 @ 2.372 = 9.5	4 @ 2.834 = 11.3	4 @ 2.189 = 8.8	29.6
10'-0 CIP BARRREL END SECTION	3.5	4.4	4.2	12.1
TOTAL (CU. YDS.)	27.1	33.5	30.0	90.6

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS

DESIGN FOR STAGE 1 CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 35

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT A 10' X 8' PRECAST RCB WITH CAST IN PLACE SECTIONS ON U.S. 20 AT AT STA. 11018+25.00.

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 AND CAST IN PLACE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 12'-0 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 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 OTHER BID ITEMS LISTED IN THESE PLANS.

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 OTHER BID ITEMS LISTED IN THESE PLANS.

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 $\frac{3}{4}$ 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 AND CAST IN PLACE 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.

STAGE II IS NOT PART OF THIS DESIGN. SEE PRECAST DESIGN IIB IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING WBL U.S. 20 DURING STAGE I. SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

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."

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
315	NEW RCB STAGE I

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

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 $\frac{1}{2}$ 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 AND STANDARDS.

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' x 2' 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.

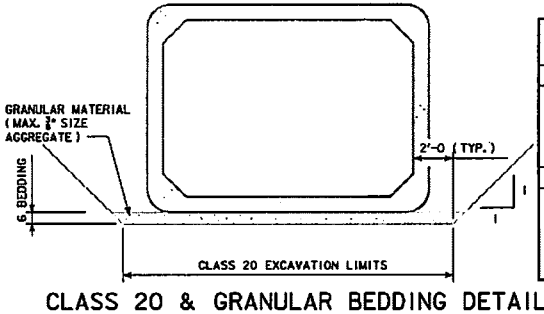
SPECIFICATIONS:

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.



CLASS 20 & GRANULAR BEDDING DETAILS

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL AND TERMINATE AT THE STAGE I CONSTRUCTION JOINT.

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

CIP STANDARD	ISSUED	REVISED
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
RCB 10-8-12	APRIL 2012	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PES 2-13-T3	JANUARY 2013	5-13
PES 3-13-T3	JANUARY 2013	-----
PES 4-13	JANUARY 2013	-----
PRCB 10-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB x MSF x ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 36

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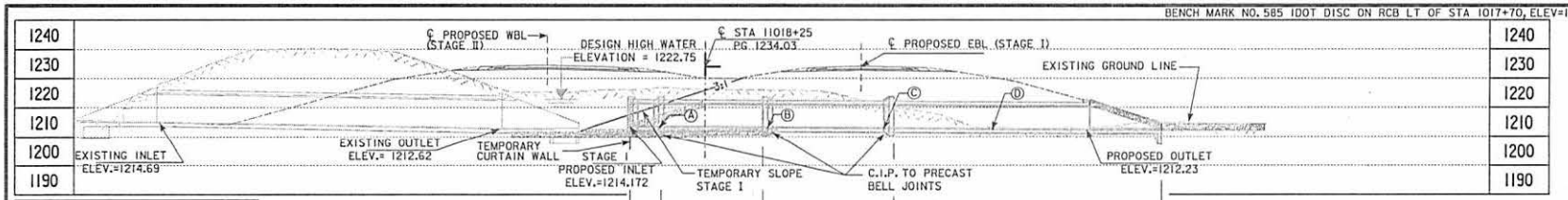
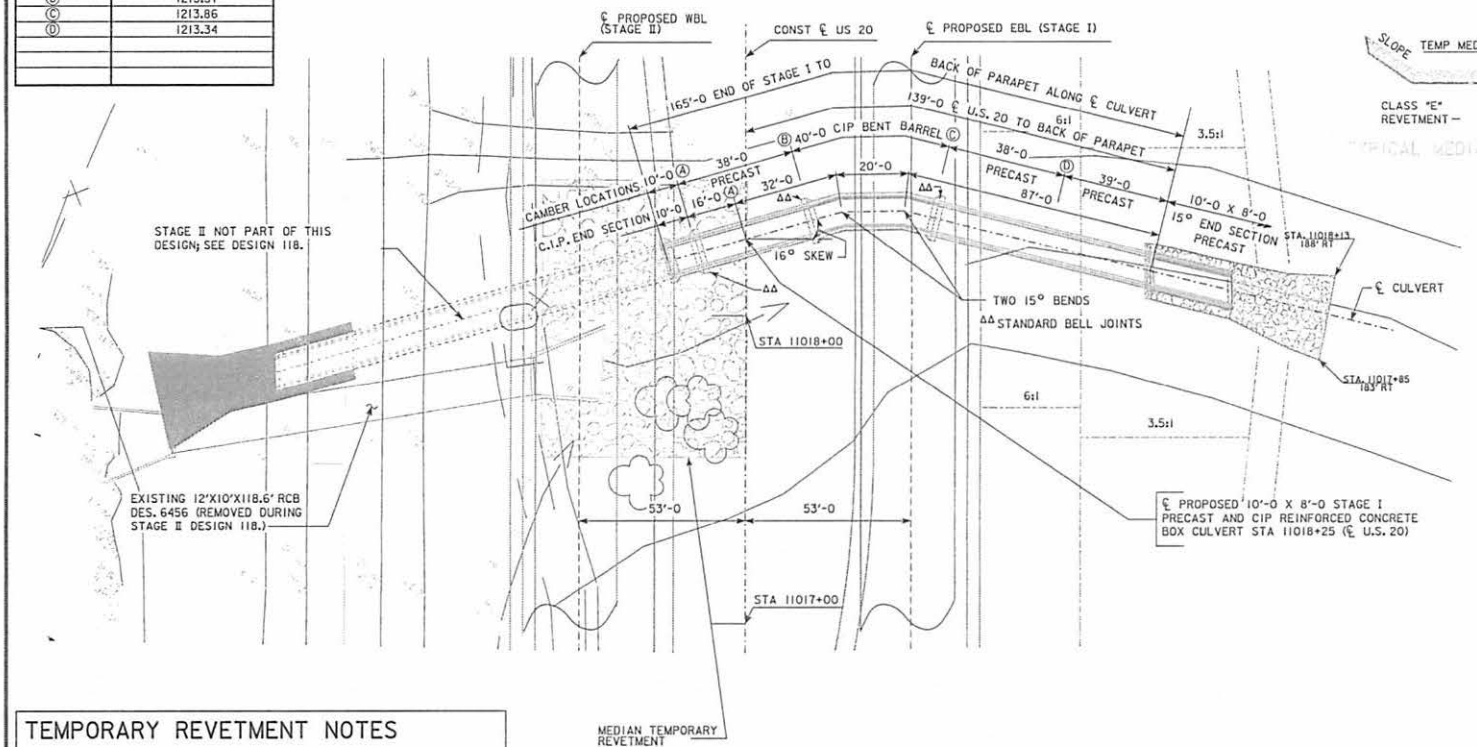
INCLUDES ADDENDA: A.02

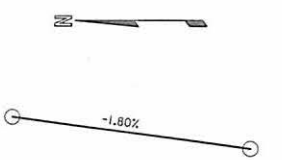


LONGITUDINAL SECTION ALONG ℄ CULVERT



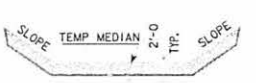
SITUATION PLAN

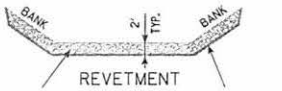
CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
Ⓐ	1213.81
Ⓑ	1213.57
Ⓒ	1213.86
Ⓓ	1213.34



VPI STA = 11007+50 VPI STA = 11024+00
VPI ELEV = 1253.38 VPI ELEV = 1223.68

PROPOSED PROFILE GRADE US 20





TYPICAL MEDIAN PROTECTION TYPICAL HEADWALL PROTECTION

ESTIMATED REVETMENT QUANTITIES			
LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. 10 (CY)
MEDIAN	860	930	530
RIGHT	120	150	70
TOTALS	980	1080	600

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

HYDRAULIC DATA

DRAINAGE AREA = 700 ACRES VH-H-R
Q_{50} = 764 CFS
HW ELEV. = 1222.75

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
MCLEOD
SCHALLER TELEPHONE

TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW CULVERT TO FACILITATE DRAINAGE.

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474520°
LONGITUDE -95.721013°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 37

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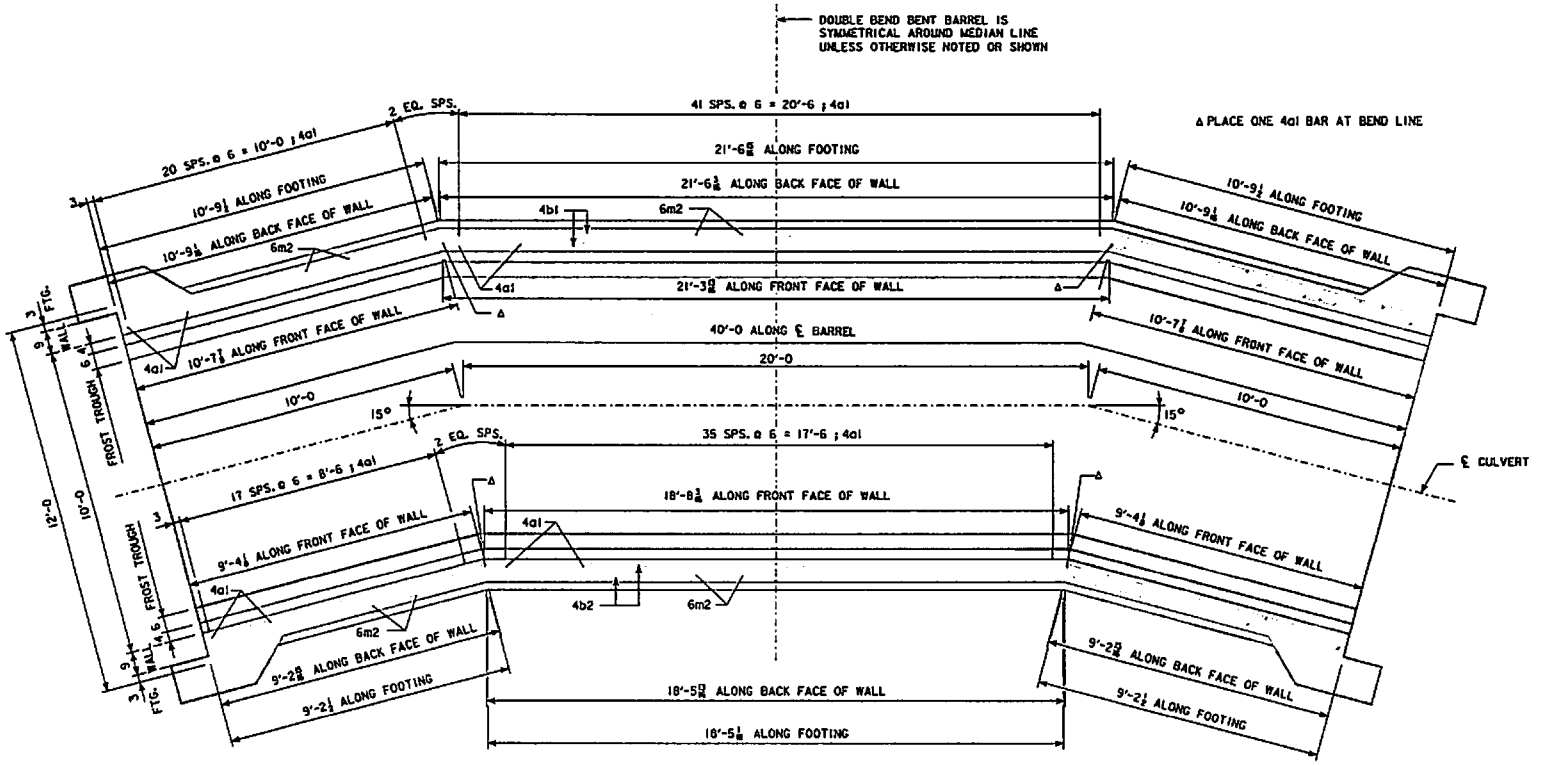
INCLUDES ADDENDA: A.02



PLAN VIEW

NOTE:
STANDARD BELL JOINT DETAILS NOT SHOWN FOR CLARITY.
SEE STANDARD SHEETS.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 38

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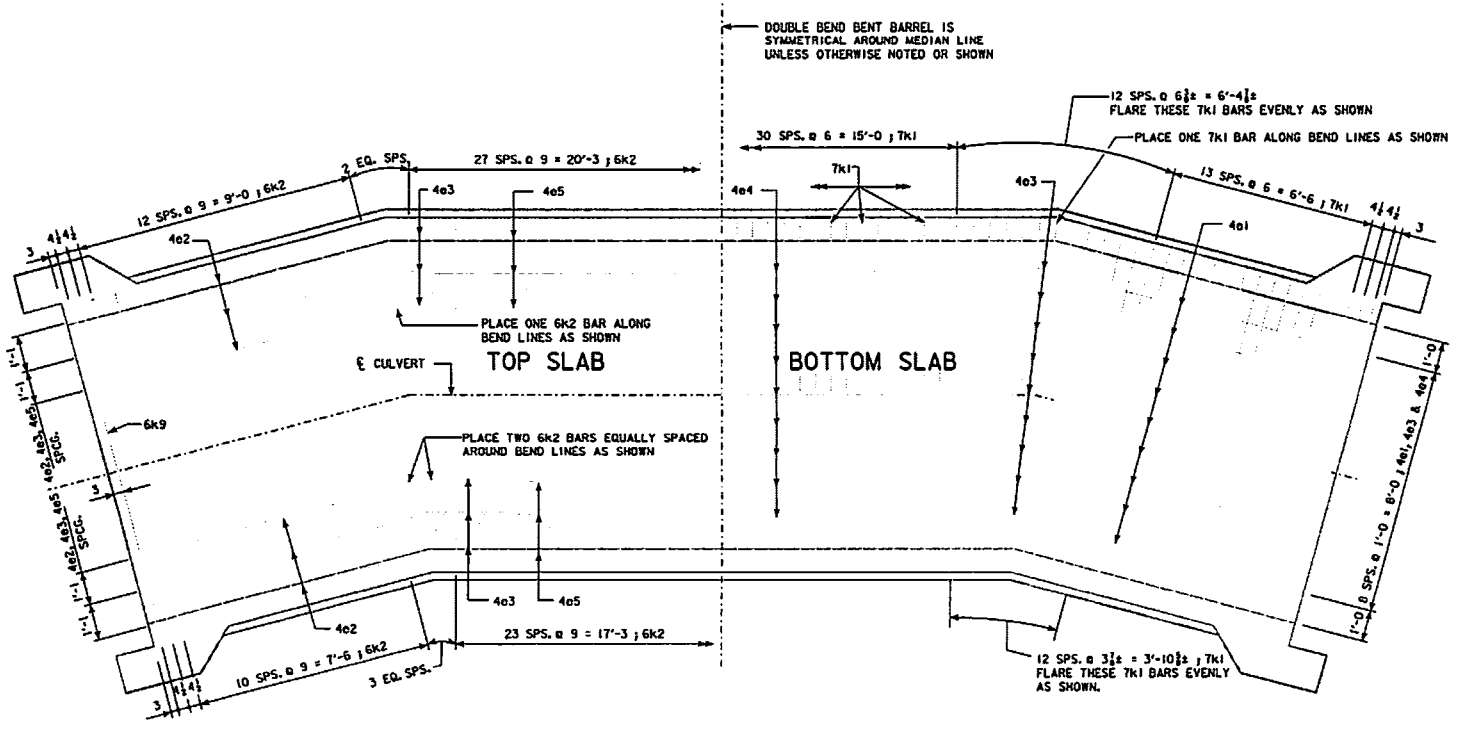
INCLUDES ADDENDA: A.02



PLAN VIEW

NOTE:
STANDARD BELL JOINT DETAILS NOT SHOWN FOR CLARITY.
SEE STANDARD SHEETS.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 39

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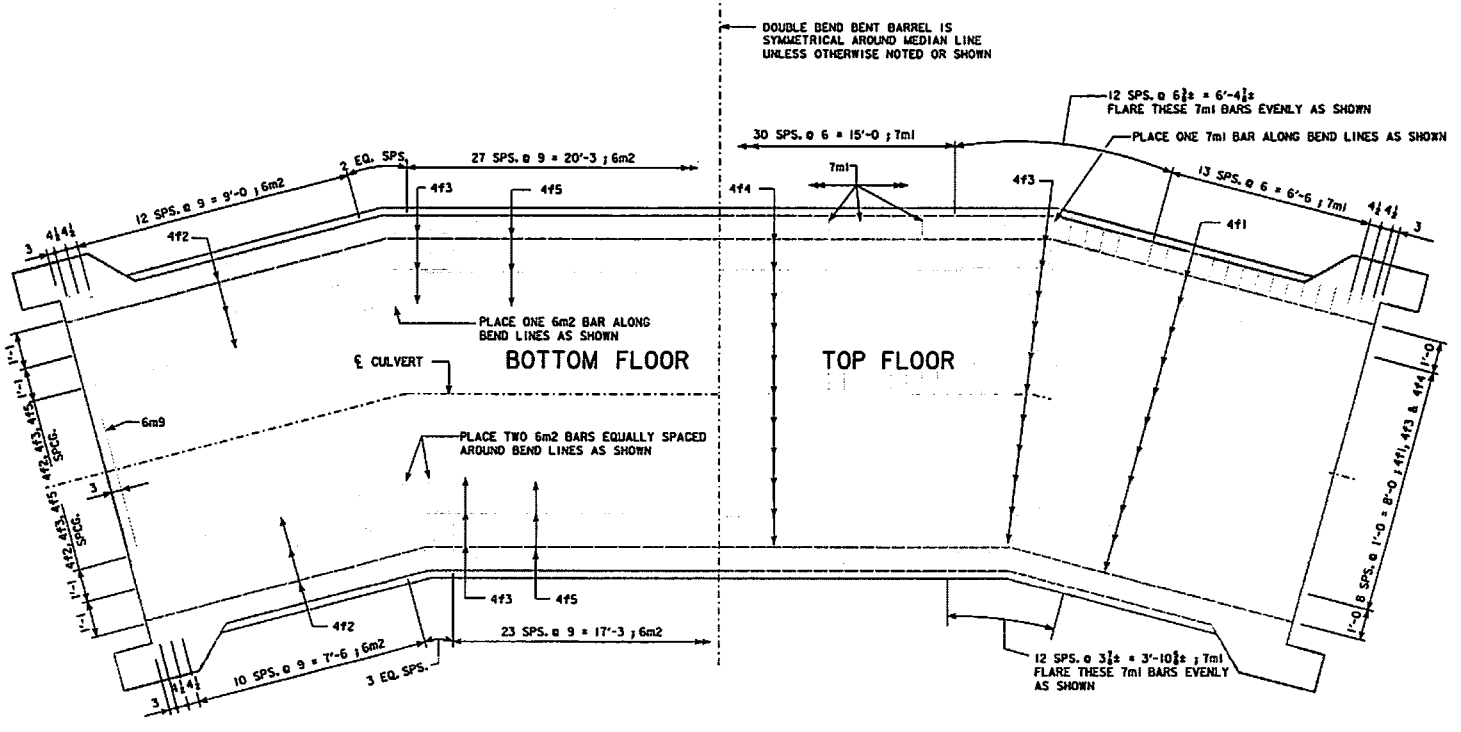
INCLUDES ADDENDA: A.02



PLAN VIEW

NOTE:
STANDARD BELL JOINT DETAILS NOT SHOWN FOR CLARITY.
SEE STANDARD SHEETS.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 40

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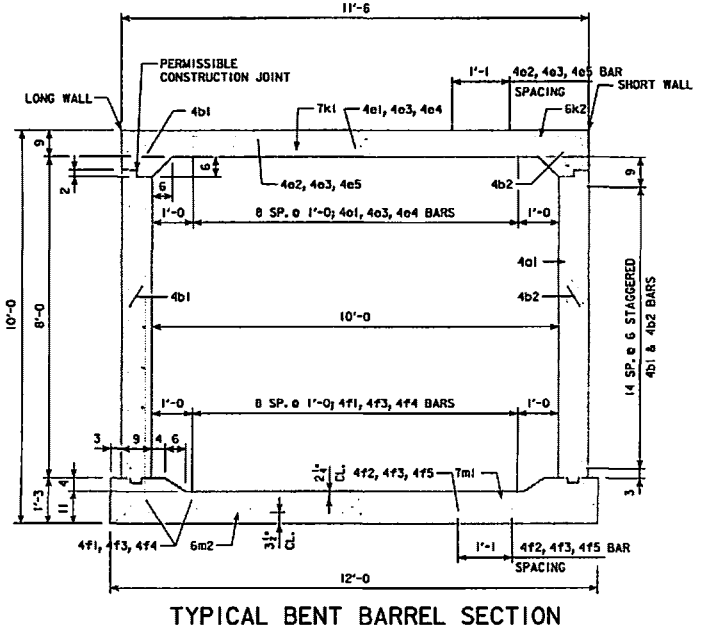
INCLUDES ADDENDA: A.02

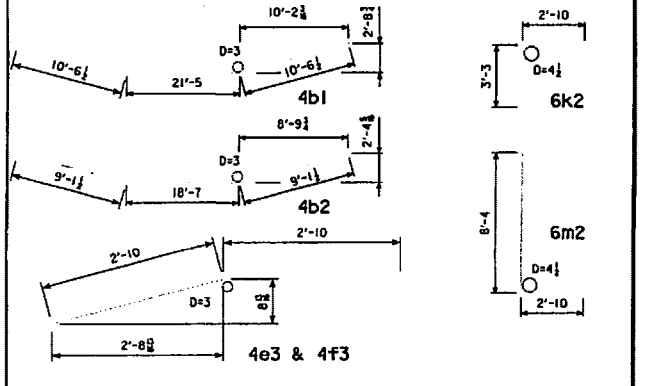


TYPICAL BENT BARREL SECTION

REINFORCING BAR LIST - ONE 40'-0 BENT BARREL SECTION

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4e1	WALL, F.F., VERTICAL		160	9'-7	1024
4b1	WALL LONG, BOTH F., HORIZONTAL		16	42'-6	454
4b2	WALL SHORT, BOTH F., HORIZONTAL		16	36'-10	394
4e1	SLAB, BOTTOM, ENDS		18	9'-3	111
4e2	SLAB, TOP, ENDS		12	9'-3	74
4e3	SLAB, TOP & BOTTOM, LAP		30	5'-8	114
4e4	SLAB, BOTTOM, CENTER		9	18'-9	113
4e5	SLAB, TOP, CENTER		6	18'-9	75
4f1	FLOOR, TOP, ENDS		22	9'-3	136
4f2	FLOOR, BOTTOM, ENDS		12	9'-3	74
4f3	FLOOR, TOP & BOTTOM, LAP		34	5'-8	129
4f4	FLOOR, TOP, CENTER		11	18'-9	138
4f5	FLOOR, BOTTOM, CENTER		6	18'-9	75
7k1	SLAB, BOTTOM, TRANSV.		85	11'-2	1940
6k2	WALL, B.F., TOP		108	6'-1	987
6k9	SLAB, TOP, TRANSV.		2	11'-2	34
7m1	FLOOR, TOP, TRANSV.		85	11'-8	2027
6m2	WALL, B.F., BOTTOM		108	11'-2	1811
6m9	FLOOR, TOP, TRANSV.		2	11'-8	35
				TOTAL (LBS.)	9745

BENT BAR DETAILS



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

NOTE:
STANDARD BELL JOINT DETAILS NOT SHOWN FOR CLARITY.
SEE STANDARD SHEETS.

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

DOUBLE BEND BENT BARREL DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM OGB x MSF x ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 41

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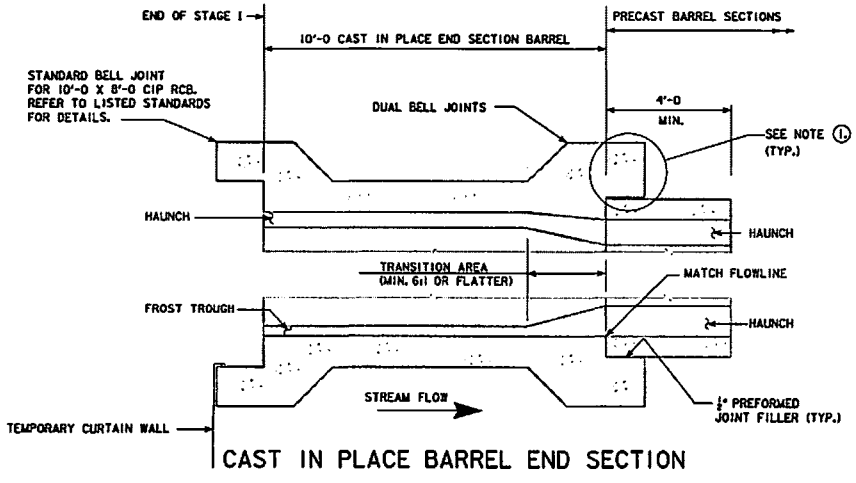
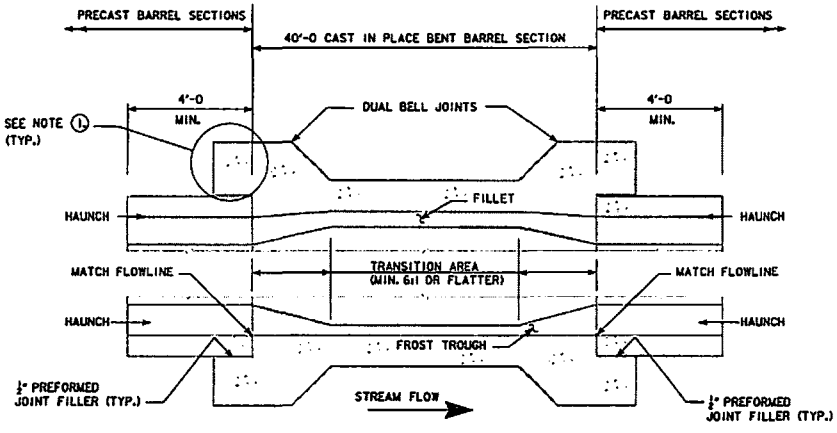
INCLUDES ADDENDA: A.02



CAST IN PLACE BARREL END SECTION



CAST IN PLACE BARREL SECTION WITH DUAL BELL JOINTS

(1) NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

PRECAST TO CAST IN PLACE TRANSITION DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB ⁂ MSF ⁂ ER	PRECAST EXTENSION OF C.I.P. CULVERT DETAILS	STANDARD SHEET 1044P	IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER 42

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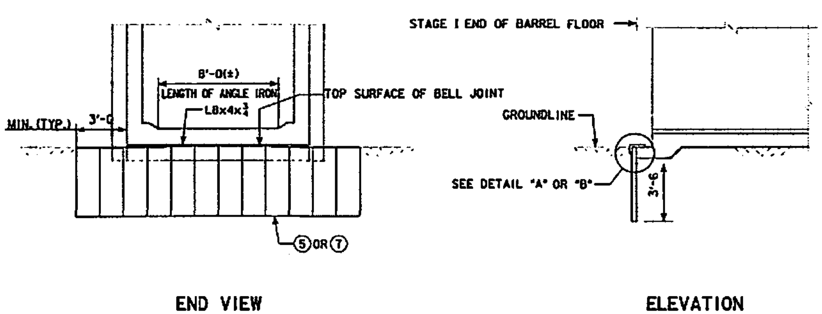
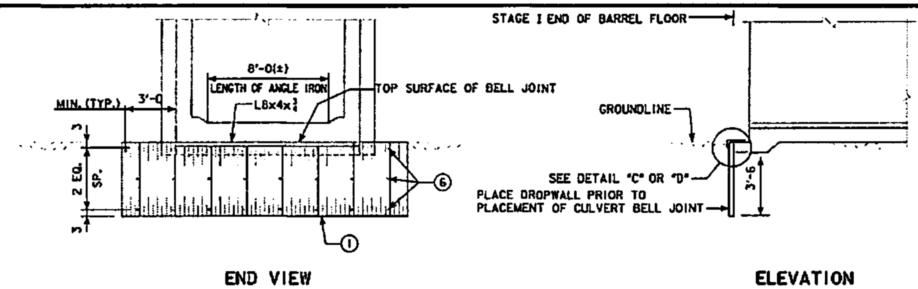
INCLUDES ADDENDA: A.02



ALTERNATES 1 & 2 (STEEL SHEET PILING)



ALTERNATES 3 & 4 (STEEL SHEETS)

NOTES:

USE OF ALTERNATE CURTAIN WALLS SHALL BE APPROVED BY THE ENGINEER.

① 2⅔"x½" OR 2"x½" CORRUGATED (12 GAGE OR HEAVIER) GALVANIZED STEEL SHEETS.

② FASTEN THE STEEL SHEETS TO THE FRONT EDGE OF THE BELL JOINT WITH ⅜"Φ x0'-4 BOLTS AND APPROVED ANCHORAGES (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

③ FASTEN THE L8x4x¾ OR L6x4x⅝ WITH ¾"Φx0'-4 BOLTS, 1" O.D. WASHER AND AN APPROVED ANCHORAGE (2'-0 SPACING).

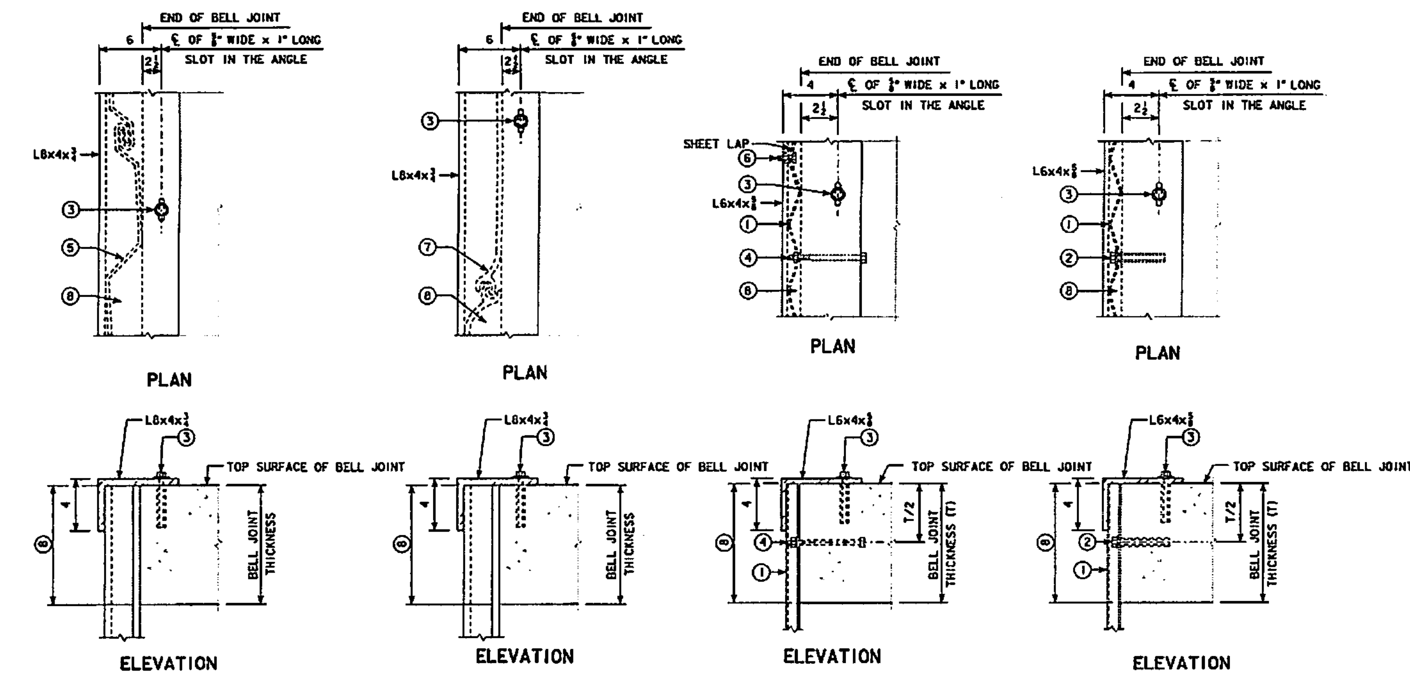
④ FASTEN THE STEEL SHEETS TO THE BELL JOINT EDGE OF THE FLOOR WITH ⅜"Φ x0'-5 BOLTS WITH NUT AND LOCK WASHER (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

⑤ CORRUGATED (12 GAUGE OR HEAVIER) STEEL SHEET PILING, INTERLOCKING TYPE A.

⑥ ⅜"Φx0'-1 BOLT WITH NUT, TO LAP STEEL SHEETS.

⑦ STEEL SHEET PILING, SECTION PS 27.5 OR EQUAL.

⑧ FILL THE VOIDS AS SHOWN, WITH CONCRETE OR CONCRETE GROUT, AS APPROVED BY THE ENGINEER.



DETAIL "A" ALTERNATE 1
STEEL SHEET PILING SHOWN

DETAIL "B" ALTERNATE 2
STEEL SHEET PILING SHOWN

DETAIL "C" ALTERNATE 3
ON NEW CONSTRUCTION ONLY

DETAIL "D" ALTERNATE 4
ON NEW OR OLD CONSTRUCTION

DESIGN FOR STAGE I CONSTRUCTION OF A 16° SKEW (RA)
10'-0 X 8'-0 X 275'-0 (STAGE I 165'-0)
PRECAST REINFORCED CONCRETE BOX CULVERT

TEMPORARY CURTAIN WALL DETAILS
STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 9 OF 9 FILE NO. 30568 DESIGN NO. 315

DESIGN TEAM DGB * MSF * ER	MODIFIED STANDARD PES 4-13	IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER 43

ENGLISH\DESIGN\PRECAST CULVERTS.DGN - PES 4-13 - THIS SHEET ISSUED 01-13.

INCLUDES ADDENDA: A.02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	75.0	
2	2402-0425030	GRANULAR BACKFILL	CY	39.0	
3	2402-2720000	EXCAVATION, CLASS 20	CY	4,167	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	19.5	
5	2404-7775000	REINFORCING STEEL	LB	3,366	
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	LF	100.0	
7	2415-2201008	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	EACH	1	
8	2507-3250005	ENGINEERING FABRIC	SY	170.0	
9	2507-6800061	REVETMENT, CLASS E	TON	130.0	
10	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-0425030	GRANULAR BACKFILL - -
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES 39 CU.YDS. CORE-OUT FOR GRANULAR MATERIAL.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) ALL COSTS FOR REMOVAL OF TEMPORARY CURTAIN WALL IS CONSIDERED INCIDENTAL.
5	2404-7775000	REINFORCING STEEL - -
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT. - -
7	2415-2201008	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT. - -
8	2507-3250005	ENGINEERING FABRIC - -
9	2507-6800061	REVETMENT, CLASS E - -
10	2533-4980005	MOBILIZATION - -

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'-0 CIP BARREL END SECTION	2366	2366
10' X 8' BARREL BELL JOINT	1000	1000
	TOTAL (LBS.)	3366

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
10'-0 CIP BARREL END SECTION	3.5	4.4	4.2	12.1
10' X 8' BARREL BELL JOINT	2.4	2.8	2.2	7.4
TOTAL (CU. YDS.)	5.9	7.2	6.4	19.5

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

I	PRECAST SECTIONS

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE II 110'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 44

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 10' X 8' PRECAST RCB WITH A 10' X 8' PRECAST REINFORCED CONCRETE BOX CULVERT AND CIP SECTIONS.

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. 6456).

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 12'-0 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 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 OTHER BID ITEMS LISTED IN THESE PLANS.

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 OTHER BID ITEMS LISTED IN THESE PLANS.

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 "GRANULAR BEDDING DETAIL".

A MINIMUM OF 6 INCHES OF GRANULAR MATERIAL WITH A MAXIMUM AGGREGATE SIZE OF ¾ 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.

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 ¾ 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 AND STANDARDS.

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' x 2' 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.

STAGE I IS NOT PART OF THIS DESIGN. SEE PRECAST DESIGN 315 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EBL U.S. 20 DURING STAGE II. SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

ALL COSTS FOR REMOVAL OF TEMPORARY CURTAIN WALL IS CONSIDERED INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

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.

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

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

CIP STANDARD	ISSUED	REVISED
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
RCB 10-8-12	APRIL 2012	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PES 2-13-T3	JANUARY 2013	5-13
PES 3-13-T3	JANUARY 2013	-----
PES 4-13	JANUARY 2013	-----
PRCB 10-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

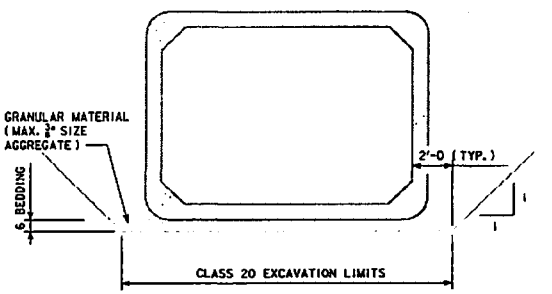
SPECIFICATIONS:

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.



CLASS 20 & GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL, AND ABUT AGAINST THE STAGE I GRANULAR BLANKET SO AS TO MAKE A SMOOTH TRANSITION TO STAGE II.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
315	RCB STAGE I
118	RCB STAGE II

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE II 110'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 45

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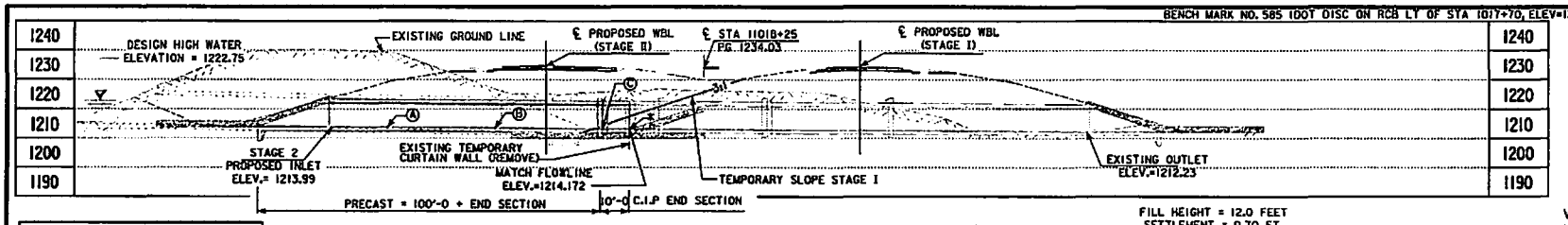
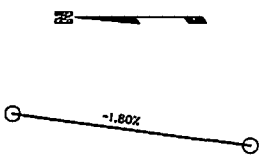
INCLUDES ADDENDA: A.02

BENCH MARK NO. 585 100T DISC ON RCB LT OF STA 11017+70, ELEV=1227.038





VPI STA = 11007+50 VPI STA = 11024+00
VPI ELEV = 1253.38 VPI ELEV = 1223.68

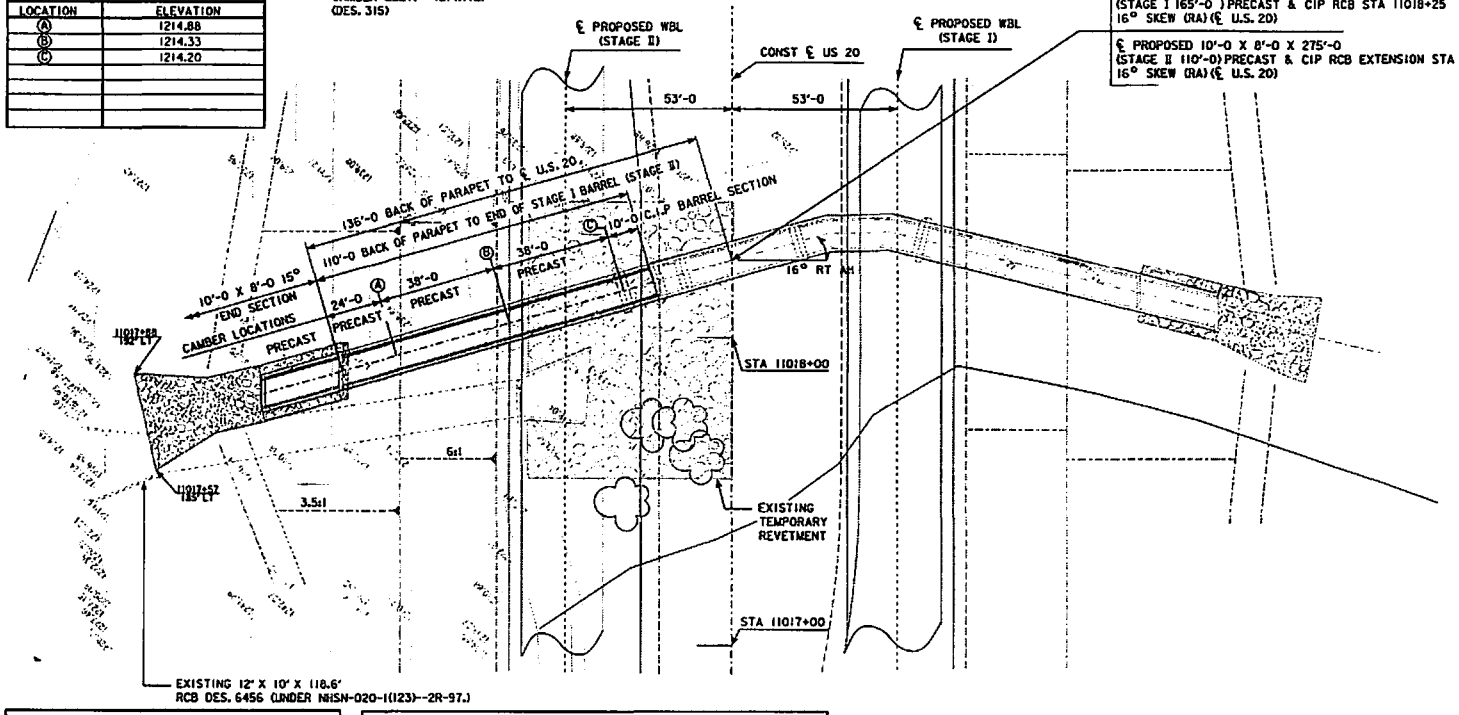
PROPOSED PROFILE GRADE US 20

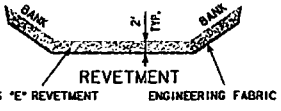
LONGITUDINAL SECTION ALONG ℄ CULVERT

FILL HEIGHT = 12.0 FEET
SETTLEMENT = 0.70 FT.

CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
Ⓐ	1214.88
Ⓑ	1214.33
Ⓒ	1214.20

*SEE CAMBER ELEVATION NOTE (STAGE I AS DESIGNED CAMBER ELEV. = 1214.172) (DES. 315)





ESTIMATED REVETMENT QUANTITIES			
LOCATION	REVETMENT CL. 10 (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	130	170	75
TOTALS	130	170	75

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

HYDRAULIC DATA

DRAINAGE AREA = 700 ACRES VH-H-R
Q_{100} = 764 CFS
HW ELEV. = 1222.75

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
MCLEOD
SCHALLER TELEPHONE

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474520°
LONGITUDE -95.721013°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AND AT NO COST TO THE STATE.

SITUATION PLAN

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)
10'-0 X 8'-0 X 275'-0 (STAGE II 110'-0)
PRECAST REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB ✱ MSF ✱ ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 46

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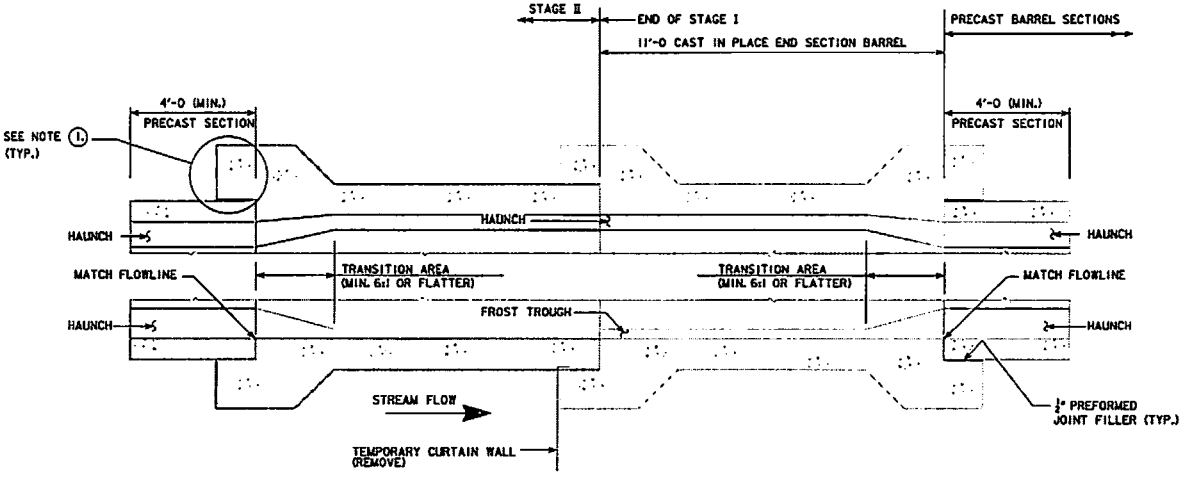
INCLUDES ADDENDA: A.02



CAST IN PLACE STAGE II BARREL SECTION

CAST IN PLACE STAGE I BARREL SECTION WITH DUAL BELL JOINTS

(1) NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

DESIGN FOR STAGE II CONSTRUCTION OF A 16° SKEW (RA)

10'-0 X 8'-0 X 275'-0 (STAGE II 110'-0) PRECAST REINFORCED CONCRETE BOX CULVERT

PRECAST TO CAST IN PLACE TRANSITION DETAILS

STA. 11018+25.00 (℄ U.S. 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * ER	PRECAST EXTENSION OF C.I.P. CULVERT DETAILS	STANDARD SHEET 1044P	IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER 47

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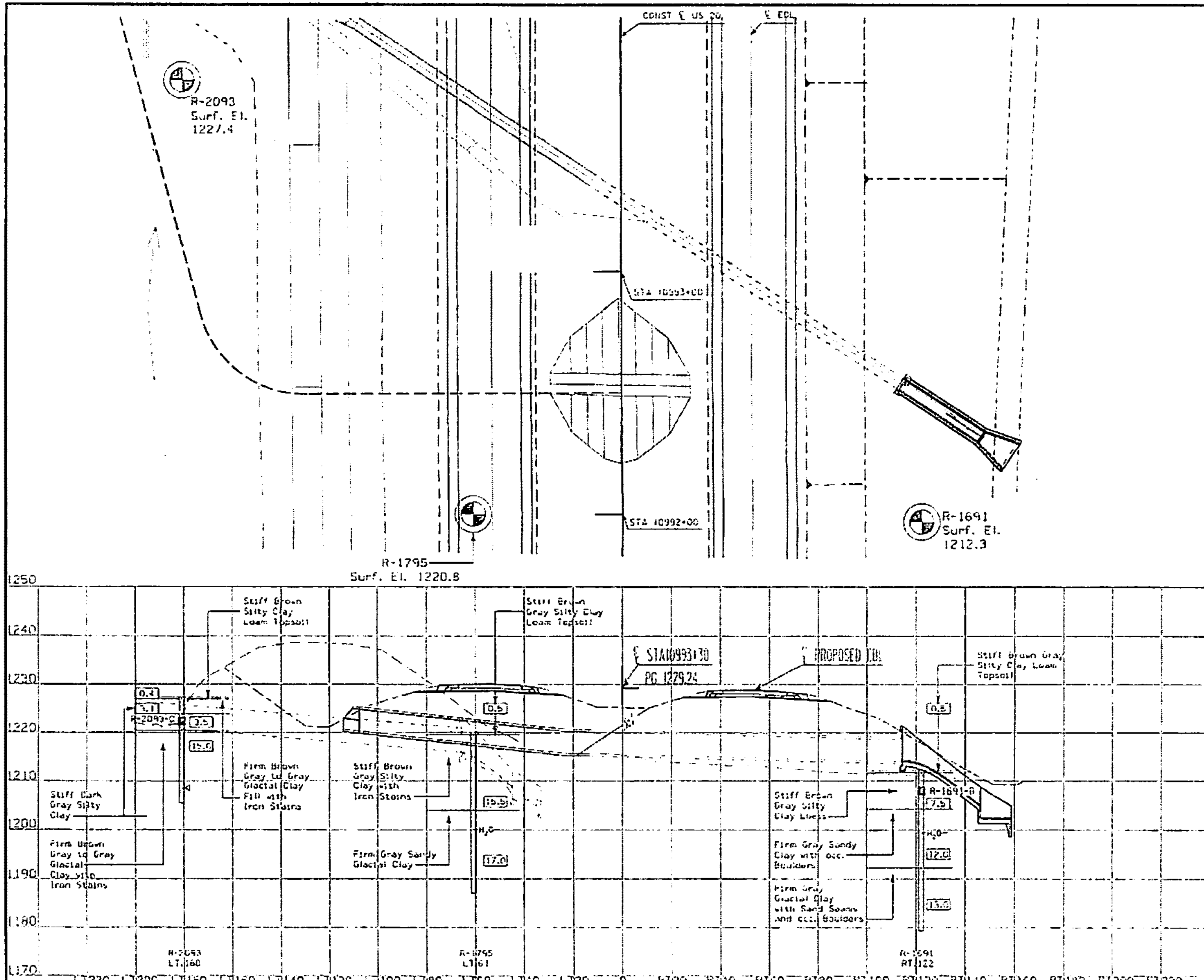
INCLUDES ADDENDA: A.02



THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

LOCATION

T-85-89N R-41-42W
SECTION 31-6
DOUGLAS-ROCK TOWNSHIP
IDA/WOODBURY COUNTY
LATITUDE 42.474561°
LONGITUDE -95.730261°

0 ENGLISH 40
SCALE IN FEET

Boring No.	Date Drilled	Groundwater Level (Ft.)
R-2093	04/07/2012	19.0 PLUGGED
R-1691	06/04/2012	12.9 AFTER 24.0 Hrs.
R-1795	09/10/2012	20.0 AFTER 24.0 Hrs.

GEOTECHNICAL 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 / Date

Printed or Typed Name

My license renewal date is December 31, 2015

Pages or sheets covered by this seal: SPS.1 - SPS.6

DESIGN FOR 34° SKEW LT AH

6' X 5' REINFORCED 3:1 CONCRETE FLUME FOR 54" RCP

SOIL PROFILE SHEET

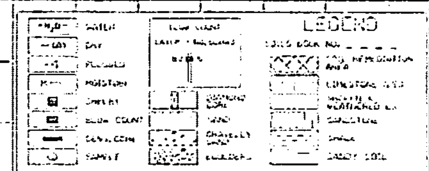
STATION 10993+30.00

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0115

LEGEND



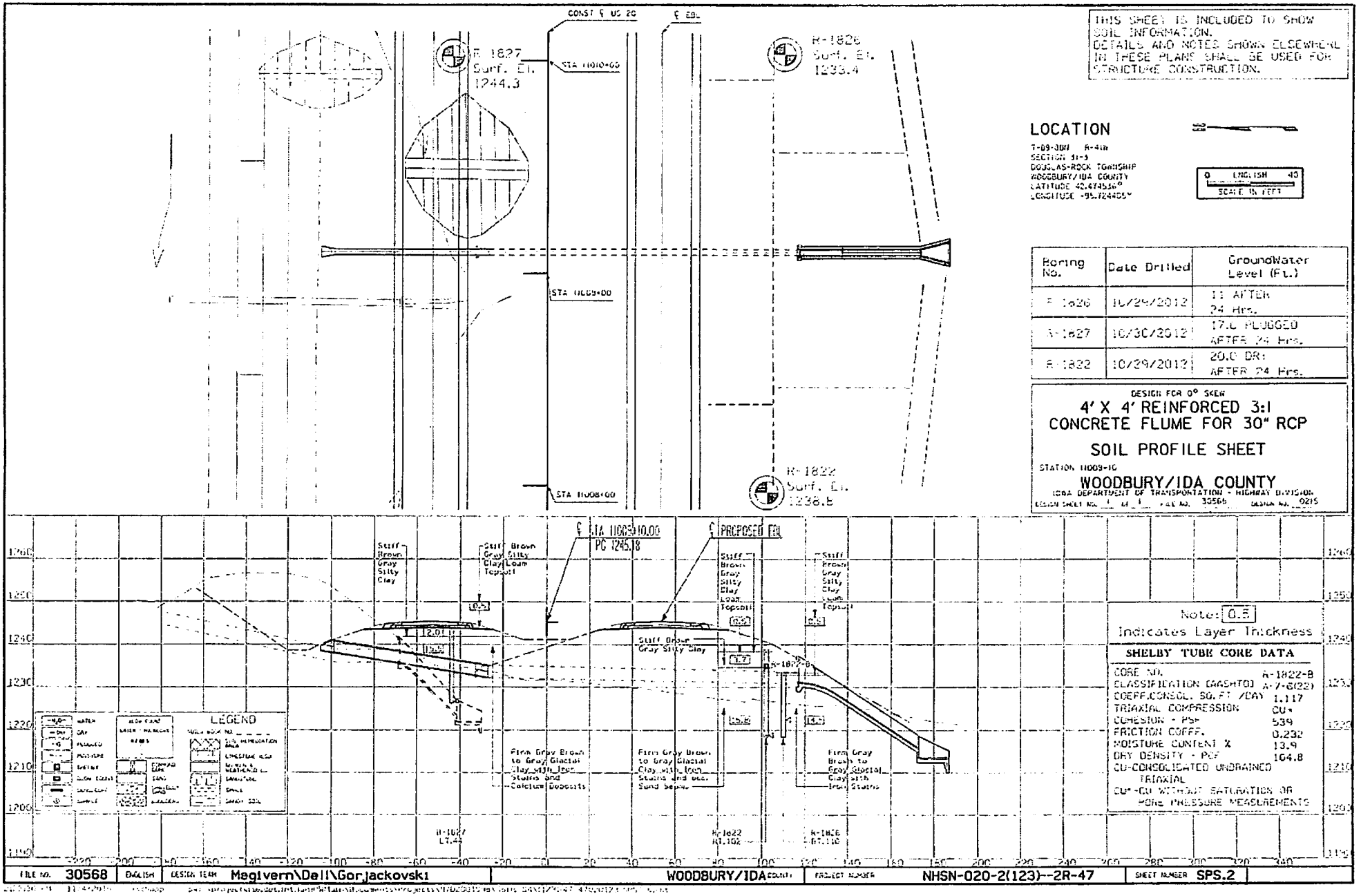
Note: 0.5 Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	R-1691-B	R-2093-C
CLASSIFICATION (AASHTO)	A-7-6(21)	A-7-6(22)
COEFF.CONSOL. SQ.FT /DAY	0.663	0.590
TRIAXIAL COMPRESSION	CU	CU
COHESION - PSF	166	478
FRICTION COEFF.	0.15	0.14
MOISTURE CONTENT %	18.7	18.7
DRY DENSITY - PCF	93.4	88.6

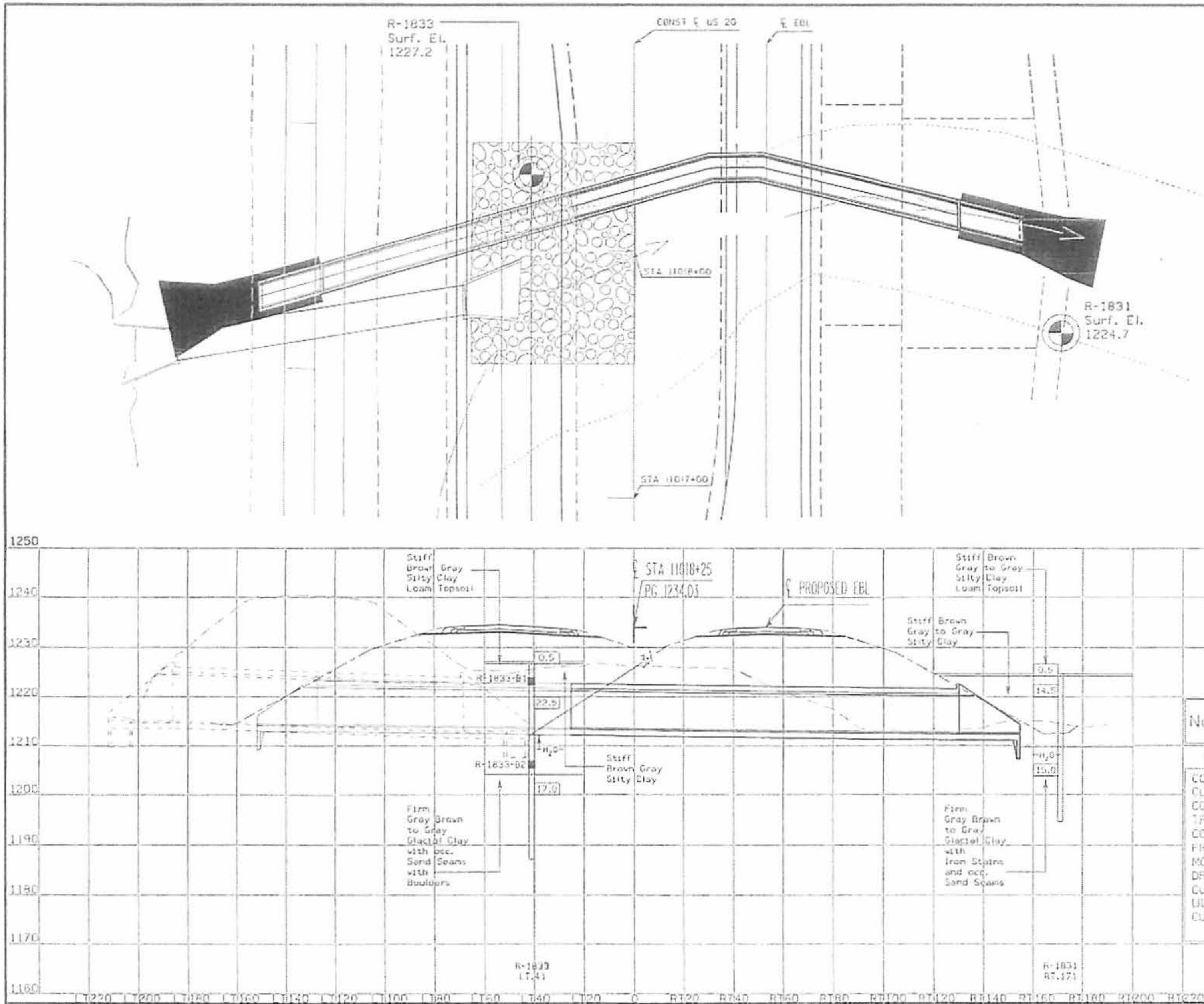
UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER SPS.1



FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER SPS.2

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



LOCATION

T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474520°
LONGITUDE -95.721013°

0 ENGLISH 40
SCALE IN FEET

Boring No.	Date Drilled	GroundWater Level (Ft.)
R-1831	10/30/2012	16.6 AFTER 24 Hrs.
R-1833	10/30/2012	15.0 AFTER 24 Hrs.

DESIGN FOR 16° SKEW RT AH

10' X 8' X 159' REINFORCED CONCRETE BOX CULVERT

SOIL PROFILE SHEET

STATION 11018+25.00

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0315

LEGEND

WATER, DRY, PLUGGED, MOISTURE, SHELBY, BLOW COUNT, DENSLCORE, SAMPLE, SOILS GROUP NO., SOIL REMEDIATION AREA, LIMESTONE, BROKEN & WEATHERED LS, SANDSTONE, SHALE, SANDY SOIL, DIAMOND CORE, SAND, GRAVELLY SAND, BOULDERS

Note: 0.5 Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	R-1833-B1	R-1833-B2
CLASSIFICATION (AASHTO)	A-7-6(22)	A-6(15)
COEFF.CONSOL. SQ.FT /DAY	0.324	0.392
TRIAXIAL COMPRESSION	UU	CU*
COHESION - PSF	n/a	251
FRICTION COEFF.	n/a	0.068
MOISTURE CONTENT %	12.2	32.0
DRY DENSITY - PCF	94.0	93.3

CU-CONSOLIDATED UNDRAINED TRIAXIAL
UU-UNCONSOLIDATED UNDRAINED
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO.	30568	ENGLISH	DESIGN TEAM	Megivern\Dell\Gor,Jackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER	NHSN-020-2(123)--2R-47	SHEET NUMBER	SPS.3

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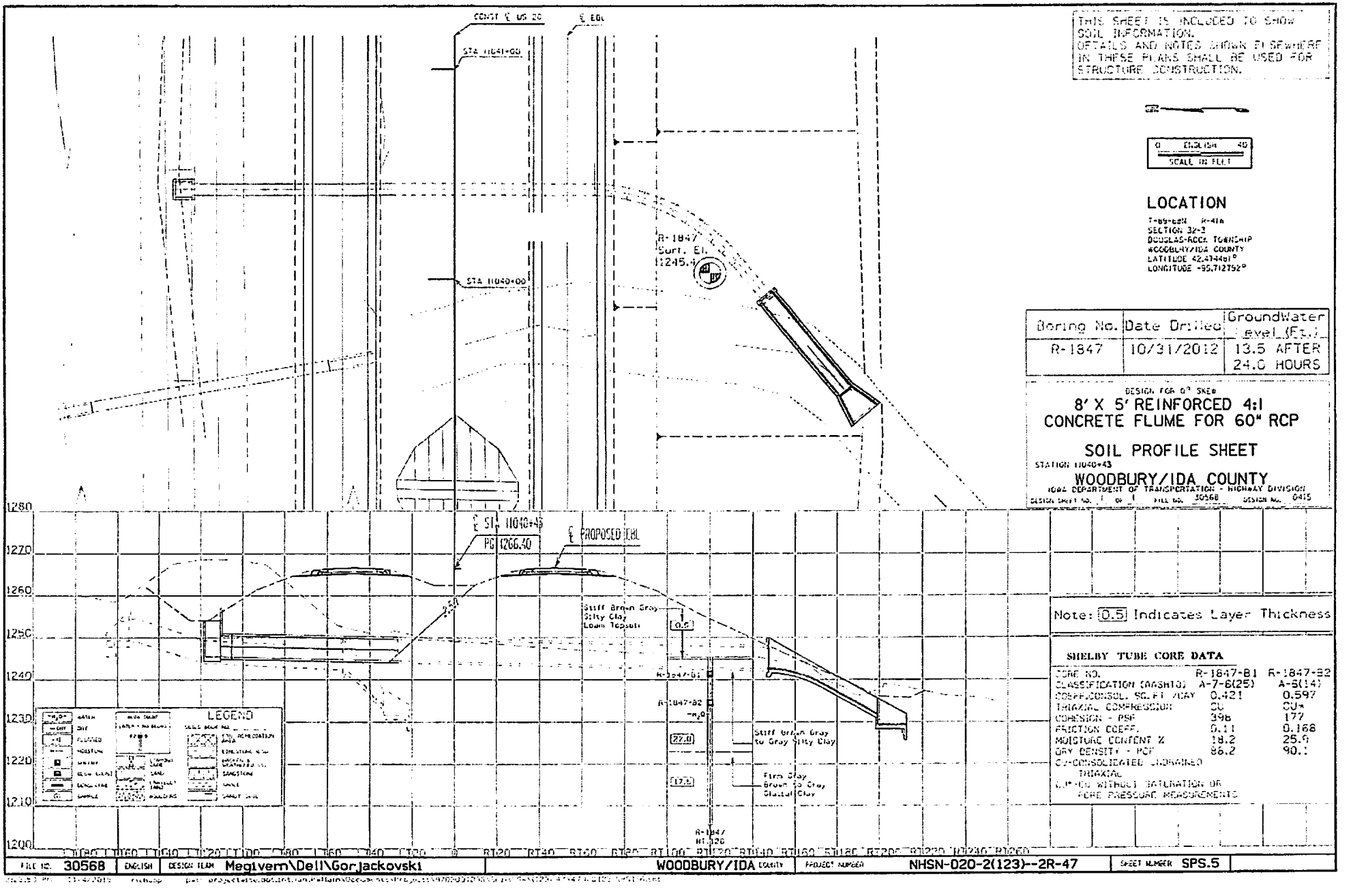


THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

0 ENGLISH 40
SCALE IN FEET

LOCATION

T-85-N R-41-W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.4744°
LONGITUDE -95.7127°

Boring No.	Date Drilled	Groundwater Level (Ft.)
R-1847	10/31/2012	13.5 AFTER 24.0 HOURS

DESIGN FOR 0° SKEW

8' X 5' REINFORCED 4:1 CONCRETE FLUME FOR 60" RCP

SOIL PROFILE SHEET

STATION 11040+43

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0415

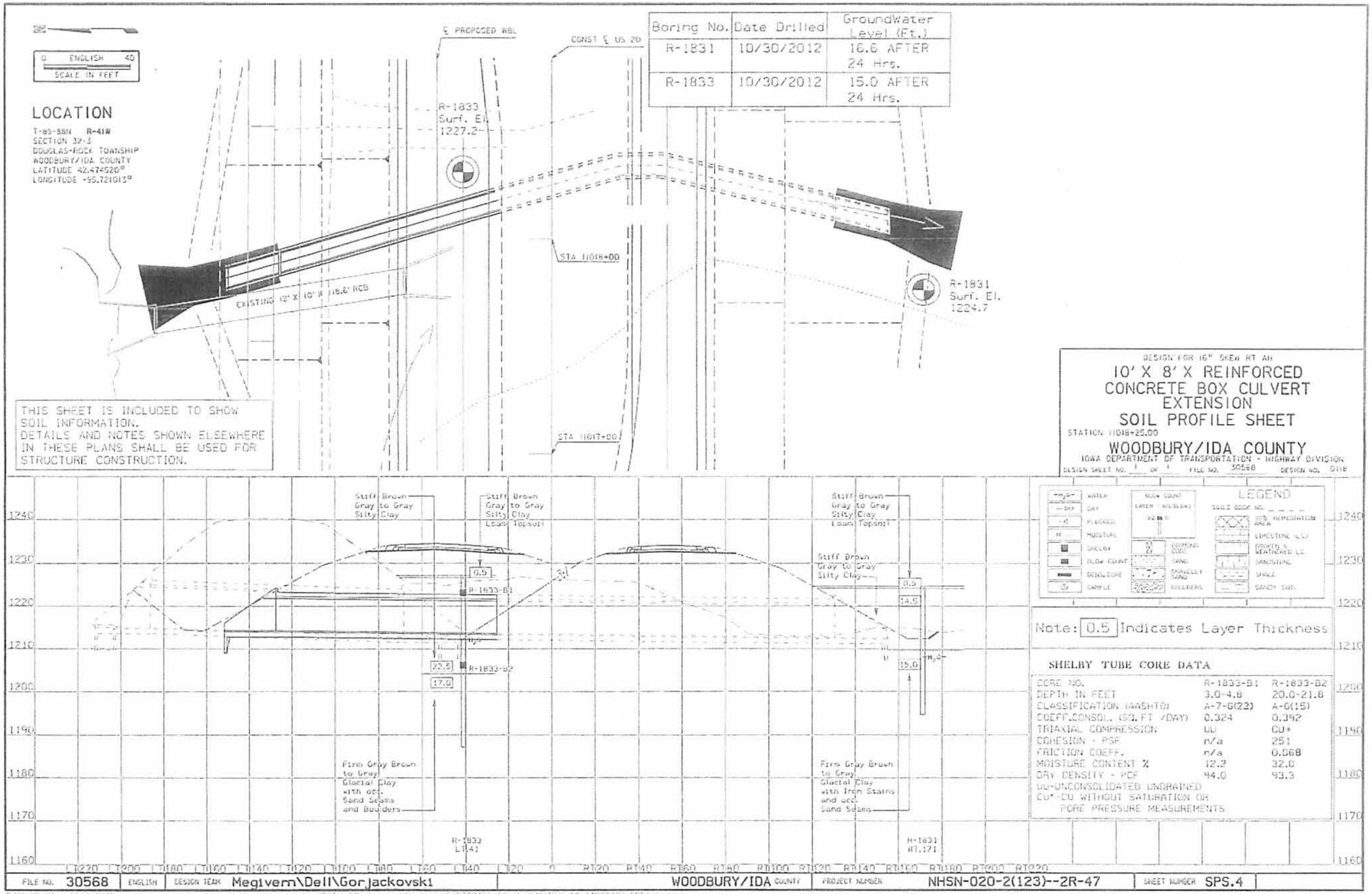
Note: 0.5 Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	R-1847-B1	R-1847-B2
CLASSIFICATION (AASHTO)	A-7-6(25)	A-6(14)
COEFF.CONSOL. SQ.FT /DAY	0.421	0.597
TRIAXIAL COMPRESSION	CU	CU*
COHESION - PSF	396	177
FRICTION COEFF.	0.11	0.168
MOISTURE CONTENT %	18.2	25.9
DRY DENSITY - PCF	86.2	90.1

CU-CONSOLIDATED UNDRAINED TRIAXIAL
*UP-ON WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER SPS.5



Boring No.	Date Drilled	GroundWater Level (Ft.)
R-1831	10/30/2012	16.6 AFTER 24 Hrs.
R-1833	10/30/2012	15.0 AFTER 24 Hrs.

DESIGN FOR 16° SKEW RT AH

10' X 8' X REINFORCED CONCRETE BOX CULVERT EXTENSION SOIL PROFILE SHEET

STATION 11018+25.00

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

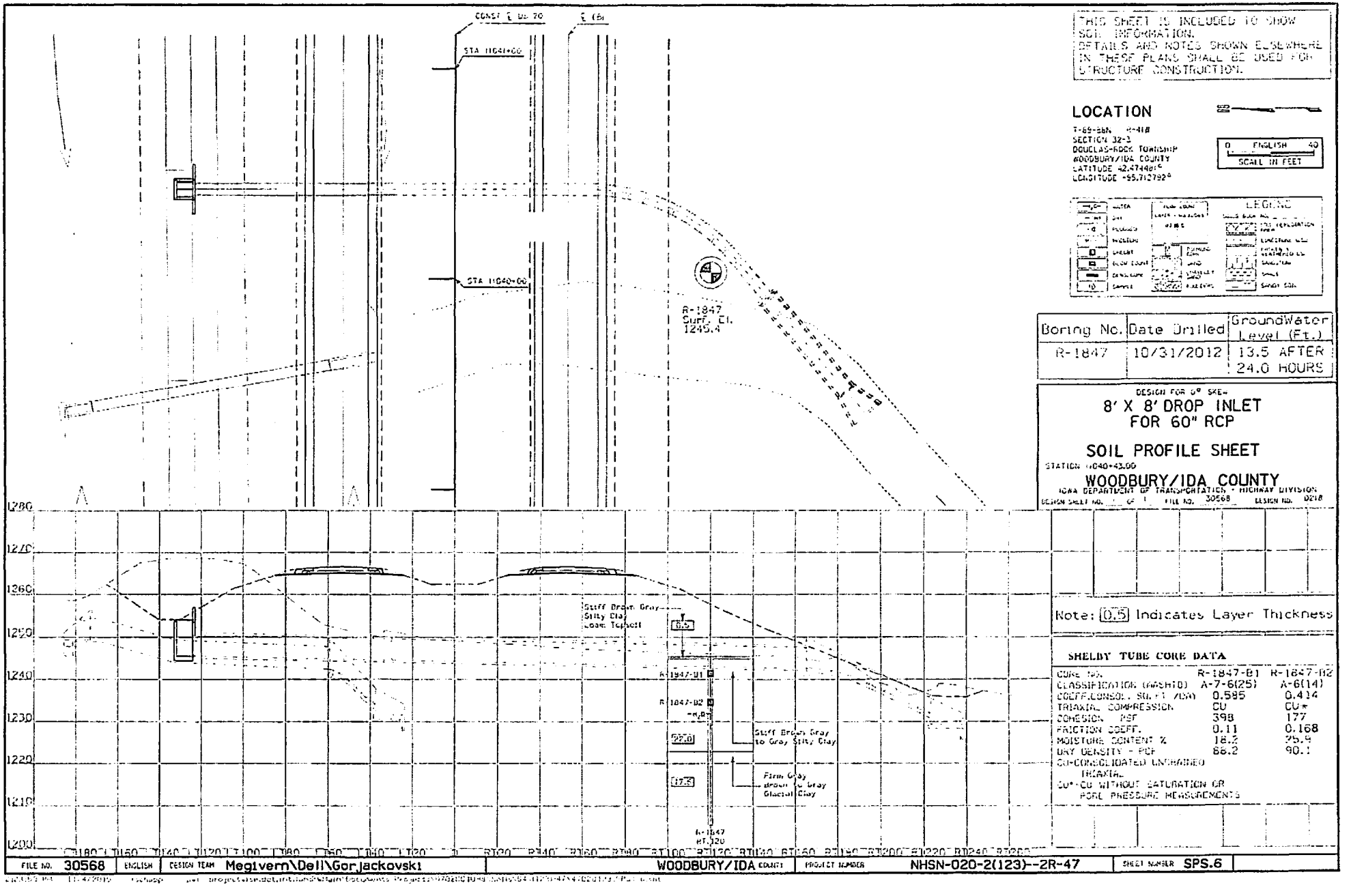
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0118

SHELBY TUBE CORE DATA

CORE NO.	R-1833-B1	R-1833-B2
DEPTH IN FEET	3.0-4.8	20.0-21.8
CLASSIFICATION (AASHTO)	A-7-6(22)	A-6(15)
COEFF.CONSOL. (SQ.FT /DAY)	0.324	0.392
TRIAXIAL COMPRESSION	UU	CU*
COHESION - PSF	n/a	251
FRICTION COEFF.	n/a	0.068
MOISTURE CONTENT %	12.2	32.0
DRY DENSITY - PCF	94.0	93.3

UU-UNCONSOLIDATED UNDRAINED
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO. 30568 | ENGLISH | DESIGN TEAM Megivern\Dell\Gorjackovski | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER SPS.4



THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

LOCATION

T-89-18A R-41B
SECTION 32-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474481°
LONGITUDE -95.712792°

0 ENGLISH 40
SCALE IN FEET

LEGEND

Boring No.	Date Drilled	GroundWater Level (Ft.)
R-1847	10/31/2012	13.5 AFTER 24.0 HOURS

DESIGN FOR 0° SKEW

8' X 8' DROP INLET FOR 60" RCP

SOIL PROFILE SHEET

STATION 11040+43.00

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0218

Note: [0.5] Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	R-1847-B1	R-1847-B2
CLASSIFICATION (AASHTO)	A-7-6(25)	A-6(14)
COEFF.CONSOL. SQ.FT. /DAY	0.585	0.414
TRIAXIAL COMPRESSION	CU	CU*
COHESION PSF	398	177
FRICTION COEFF.	0.11	0.168
MOISTURE CONTENT %	18.2	15.9
DRY DENSITY - PCF	88.2	90.1

CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO. 30568	ENGLISH	DESIGN TEAM Meglvern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(123)--2R-47	SHEET NUMBER SPS.6

LETTING DATE DEC. 15, 2015

RCB CULVERT REPLACEMENT - SINGLE BOX
NHSN-020-2(125)--2R-47

IDA COUNTY

IDA COUNTY DESIGN 515, 615, 318, 715, 418 & 815
Page 1 of 413

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD
- INTERSTATE HIGHWAY (80)
- UNITED STATES HIGHWAY (65)
- STATE HIGHWAY (175)
- COUNTY HIGHWAY (S27)
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES (ABBEY ROAD)
- UNINCORPORATED PLACE (ELWOOD)

Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

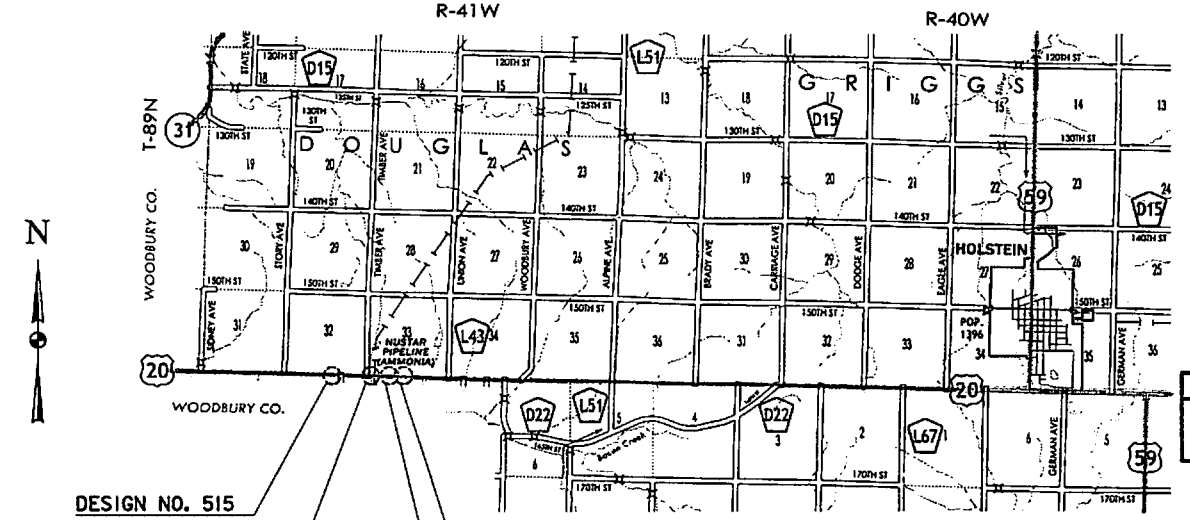
PRIMARY ROAD SYSTEM

IDA COUNTY

RCB CULVERT REPLACEMENT - SINGLE BOX

ON US 20 BETWEEN STORY AVENUE AND UNION AVENUE

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.



LOCATION MAP

ENGLISH STANDARD CULVERT PLANS

STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
RCB 6-6-12	APRIL 2012	------
RCB 8-8-12	APRIL 2012	------
CBJ 2-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	------
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	------
RCFB-01-12	APRIL 2012	------
RCFB-02-12	APRIL 2012	------
RCFB-03-12	APRIL 2012	------
FBJ-01-12	APRIL 2012	------
FBJ-02-12	APRIL 2012	------
FBJ-03-12	APRIL 2012	------
PRECAST ALTERNATE STANDARDS		
PRCB G1-13	JAN.2013	------
PRCB G2-13	JAN.2013	------
PRCB 8-13	JAN.2013	------

REVISIONS

IOWA ONE CALL
1-800-292-8989 | 811
www.iowaonecall.com

	TOTAL SHEETS
	70
PROJECT NUMBER	
NHSN-020-2(125)--2R-47	
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	
98-97-020-010-04	

INDEX OF SHEETS

DESIGN DATA RURAL

REFER TO INDIVIDUAL SITUATION PLANS FOR TRAFFIC DATA INFORMATION

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	DEAN G. BIERWAGEN	STRUCTURAL DESIGN
1	DAVID R. CLAMAN	HYDRAULIC DESIGN
SPS.1	MARK A. DELL	GEOTECHNICAL DESIGN
CULVERT STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

HYDRAULIC DESIGN

David R. Claman 11573 IOWA

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.

David R. Claman 10/5/2015
Signature Date

David R. Claman
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 4, 9, 13, 21, 25, 33, 38, 45, 53 & 59 of 70

STRUCTURAL DESIGN

Dean G. Bierwagen 11506 10/15

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.

Dean G. Bierwagen 10/5/2015
Signature Date

Dean G. Bierwagen
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 1 THRU 64 of 70

PROJECT DIRECTORY NAME: 9702001098

DESIGN TEAM DGB * TWE * MSF	ENGLISH	IOWA DOT * OFFICE OF BRIDGES AND STRUCTURES	FILE NO. 30568	IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER 1

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INCLUDES ADDENDA: A.02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	483	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	52.5	
3	2404-7775000	REINFORCING STEEL	LB	9,446	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 - -
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
3	2404-7775000	REINFORCING STEEL - -
4	2533-4980005	MOBILIZATION - -

DESIGN FOR CONSTRUCTION OF A 17° SKEW (L.A.)

8'-0 X 5'-0 REINFORCED 3:1 CONCRETE FLUME FOR 60" RCP

ESTIMATED QUANTITIES

STA. 11048+54.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 2

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 5'-0 X 5'-0 X 135.4' REINFORCED CONCRETE BOX CULVERT WITH A NEW 8'-0 X 5'-0 REINFORCED 3:1 CONCRETE FLUME & BASIN FOR A 60"Φ REINFORCED CONCRETE PIPE A 17° SKEW (L.A.) STA. 11048+54.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 6.5 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

UTILITY COMPANIES 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.

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.

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

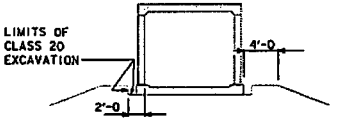
CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LOGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

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.



CLASS 20 EXCAVATION LIMITS
(TYPICAL SECTION NORMAL TO ℄ CULVERT)

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

STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
RCFB-03-12	APRIL 2012	------
FBJ-03-12	APRIL 2012	------
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	------

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8'-0 X 5'-0 BASIN	2666	2666
8'-0 X 5'-0 FLUME	6394	6394
CHUTE BELL JOINT	386	386
	TOTAL (LB)	9446

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
8'-0 X 5'-0 BASIN & CURTAIN	11.1	3.6	———	14.7
8'-0 X 5'-0 FLUME	24.2	13.6	———	37.8
TOTAL (CY)	35.3	17.2	———	52.5

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
515	NEW FLUME AND BASIN

TRAFFIC CONTROL PLAN

NOTE:
THE EBL (STAGE I) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR CONSTRUCTION OF A 17° SKEW (L.A.)

8'-0 X 5'-0 REINFORCED 3:1 CONCRETE FLUME FOR 60" RCP

GENERAL NOTES

STA. 11048+54.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 3

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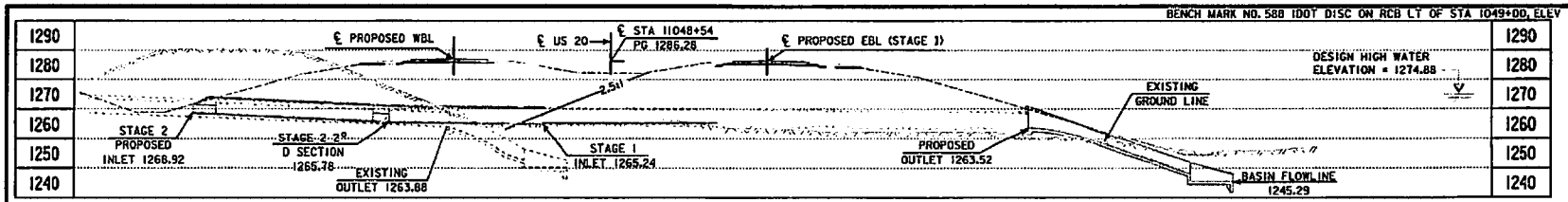
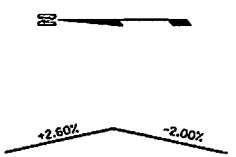
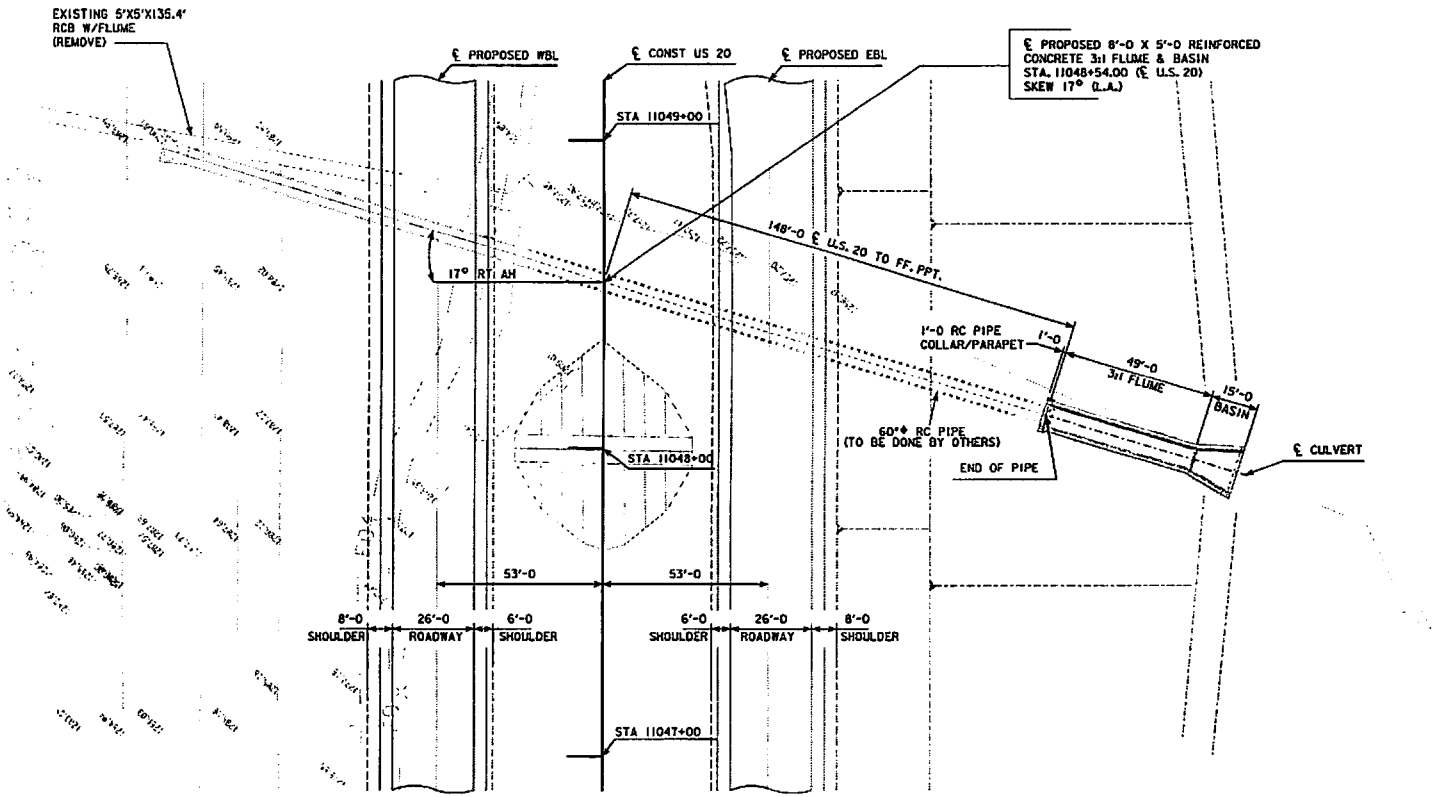


LONGITUDINAL SECTION ALONG ℄ CULVERT DESIGN FILL HEIGHT = N/A ANTICIPATED SETTLEMENT = NEGLIGIBLE



VPI STA = 11057+00 VC = 2400'
VPI ELEV = 1309.48

PROPOSED PROFILE GRADE US 20



SITUATION PLAN

HYDRAULIC DATA

DRAINAGE AREA = 74 ACRES H
Q_{50} = 159 CFS
HW ELEV. = 1274.88

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO1 INS
FO2 QWEST
FO4 MCLEOD
T4 SCHALLER TELEPHONE

LOCATION

ON US 20 OVER
SMALL STREAM
T-89-88N R-41W
SECTION 32-3
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474467°
LONGITUDE -95.709786°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR CONSTRUCTION OF A 17° SKEW (L.A.)

8'-0 X 5'-0 REINFORCED 3:1 CONCRETE FLUME FOR 60" RCP SITUATION PLAN

STA. 11048+54.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 4

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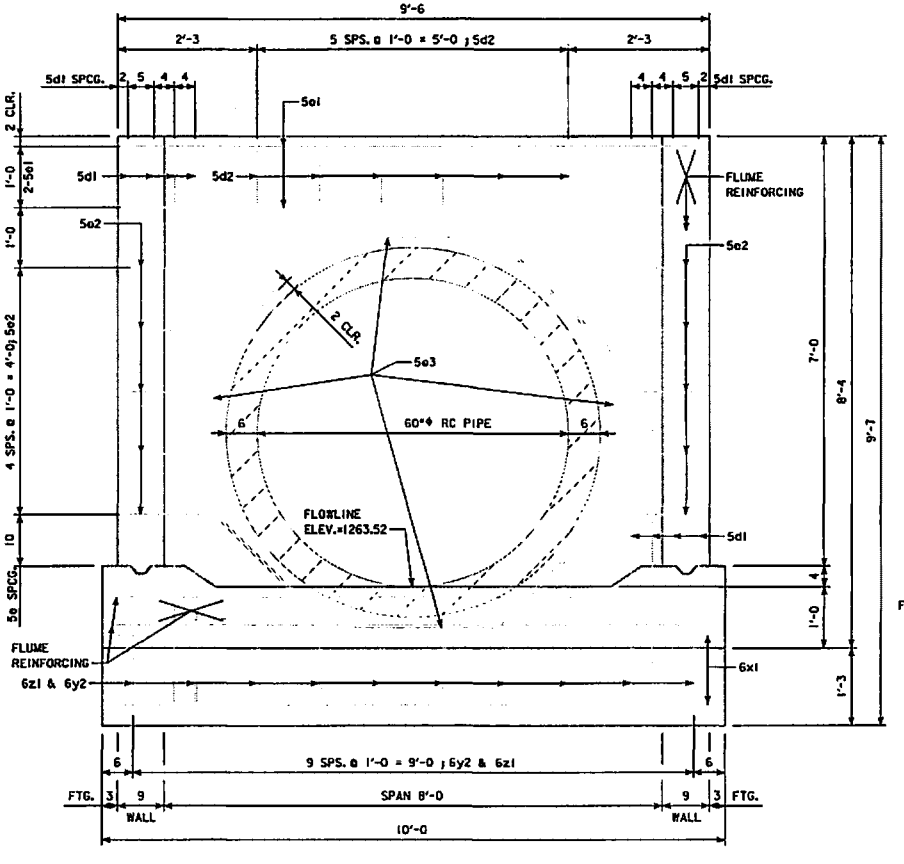
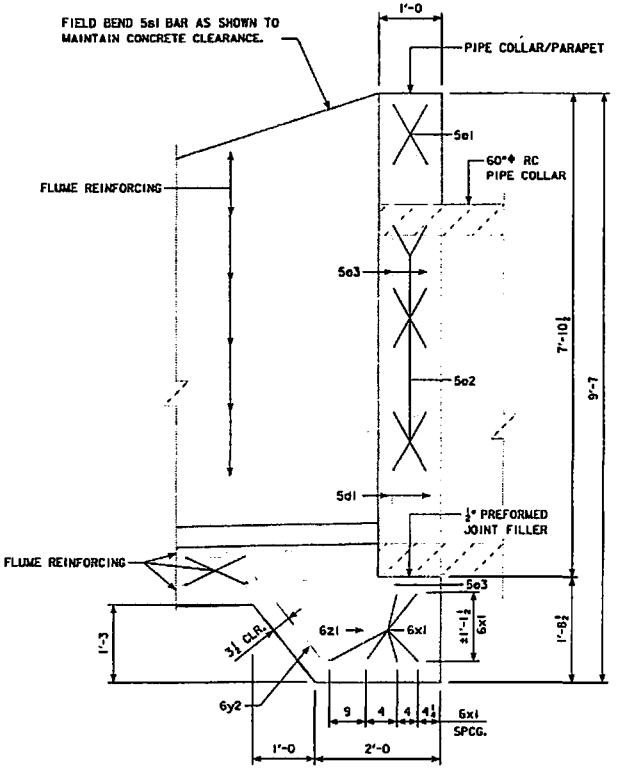
BENCH MARK NO. 588 IDOT DISC ON RCB LT OF STA 1049+00, ELEV 1275.388

NOTE:
LONGITUDINAL FLUME WALL REINFORCING TO PROJECT 10" INTO PIPE COLLAR/PARAPET AS SHOWN.



END VIEW



ELEVATION VIEW

NOTE:
FOR FLUME DETAILS NOT SHOWN, REFER TO THE LISTED STANDARDS AND DESIGN SHEETS IN THE DESIGN 515 PLANS.

DESIGN FOR CONSTRUCTION OF A 17° SKEW (L.A.)

8'-0 X 5'-0 REINFORCED 3:1 CONCRETE FLUME FOR 60" RCP

RC PIPE COLLAR/PARAPET DETAILS

STA. 1048+54.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 5

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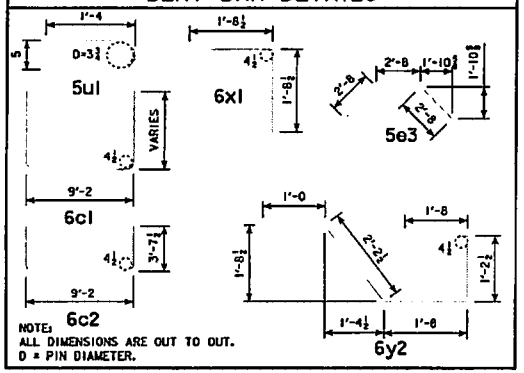
BENCH MARK NO. 588 IDOT DISC ON RCB LT OF STA 1049+00, ELEV 1275.388

REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		96	LISTED	320
5b1	WALLS FFH - SECTION 1	—	6	42'-0 / 43'-7	282
4b2	WALLS BFH - SECTION 1	–	6	42'-0 / 43'-7	181
5b3	WALLS FFH - SECTION 2		6	8'-2 / 8'-11	54
4b4	WALLS BFH - SECTION 2		6	8'-2 / 8'-11	35
5b5	WALLS FFH - SECTION 1		4	LISTED	28
4b6	WALLS BFH - SECTION 1		4	LISTED	18
6c1	BOTT. FLOOR & WALLS BFV		80	LISTED	2223
6c2	BOTT. FLOOR & WALLS BFV - SPLICED		14	16'-5	345
5c3	WALLS BFV	—	28	LISTED	169
6f1	FLOOR LONGIT. TOP - SECTION 1		9	41'-0	584
5f2	FLOOR LONGIT. BOTT. - SECTION 1		9	41'-0	406
6f3	FLOOR LONGIT. TOP - SECTION 2		9	9'-2	125
5f4	FLOOR LONGIT. BOTT. - SECTION 2		9	9'-2	87
6m1	FLOOR TRANSV. TOP		51	9'-8	740
5s1	WALLS BOTH F ALONG SLOPE - SECTION 1		4	42'-11	190
5s2	WALLS BOTH F ALONG SLOPE - SECTION 2		4	7'-11	33
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-1	6
5d1	PIPE COLLAR, VERT; BOTH FACES		16	9'-1	152
5d2	PIPE COLLAR, VERT; BOTH FACES	—	12	LISTED	24
5a1	PIPE COLLAR, HORIZ; BOTH FACES		4	9'-2	38
5a2	PIPE COLLAR, HORIZ; BOTH FACES		20	LISTED	36
5e3	PIPE COLLAR, PIPE OPENING; BOTH FACES		8	7'-8	64
6x1	PIPE COLLAR, TRANSVERSE; BELL JOINT		6	9'-8	87
6y2	PIPE COLLAR, VERT; BELL JOINT	—	10	7'-9	116
6z1	PIPE COLLAR, VERT; BELL JOINT		10	3'-5	51
				TOTAL (LB)	6394

WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE FOR A 2'-2 LAP BUT LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE THE LAP.

BENT BAR DETAILS



CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	17.0	9.4	26.4
FLUME - SECTION 2	4.5	1.7	6.2
CHUTE BELL JOINT	1.5	0.6	2.1
PIPE COLLAR/PARAPET	——	1.9	1.9
BELL JOINT	1.2	——	1.2
TOTAL (CY)	24.2	13.6	37.8

LISTED BARS

BAR 4a1
96 BARS
54 AT 4'-6
42 VAR. - 2 EA. LGTH.
4'-6
4'-6
4'-7
4'-7
4'-8
4'-9
4'-10
4'-11
5'-1
5'-3
5'-4
5'-6
5'-9
5'-11
6'-2
6'-4
6'-7
6'-10
7'-1
7'-5
7'-9

BAR 5b5 AND 4b6
4 BARS - 2 EA. LGTH.
5'-2
10'-3

BAR 5d2
12 BARS - 4 EA. LGTH.
1'-6
1'-8
2'-8

BAR 5e2
20 BARS - 4 EA. LGTH.
1'-5
1'-5
1'-5
1'-9
2'-7

BAR 6c1
80 BARS
52 AT 18'-2
28 VAR.
18'-2
18'-2
18'-2
18'-2
18'-3
18'-3
18'-3
18'-4
18'-5
18'-5
18'-6
18'-7
18'-8
18'-9
18'-10
18'-11
19'-1
19'-2
19'-4
19'-5
19'-7
19'-9
19'-11
20'-1
20'-3
20'-5
20'-7
20'-10
21'-0

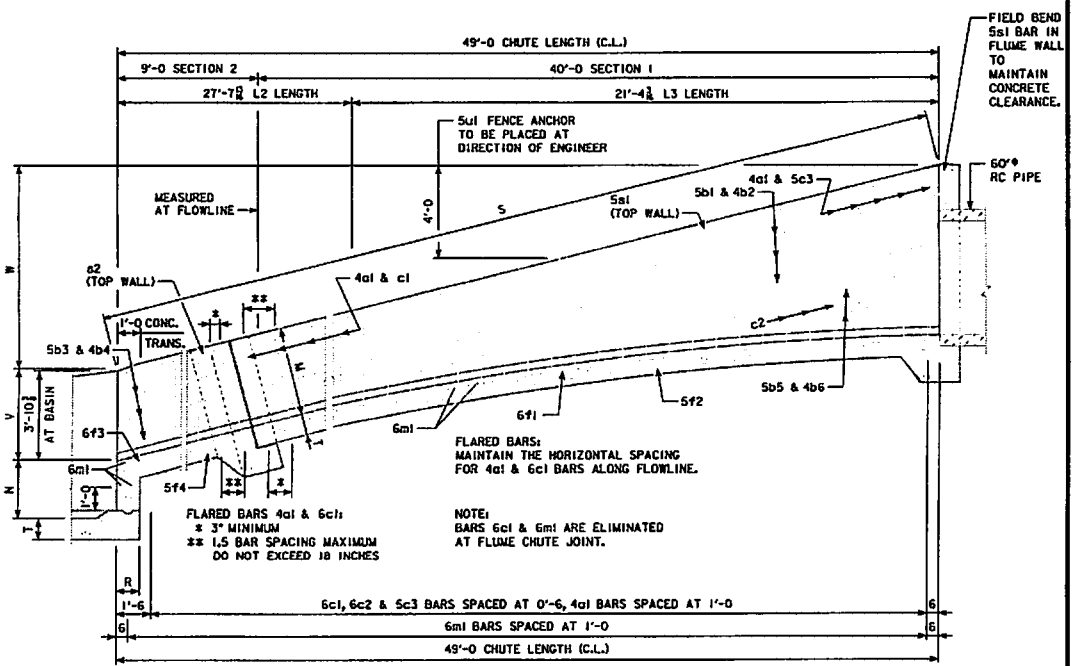
BAR 5c3
28 BARS - 2 EA. LGTH.
5'-0
5'-1
5'-2
5'-4
5'-5
5'-7
5'-8
5'-10
5'-11
6'-1
6'-3
6'-4
6'-6
6'-8

FLUME DATA

△ A = 18°26'
△ C = 1°00'
B = 11'-2 3/4
S = 51'-7 5/8
V = 3'-11 1/4
W = 16'-4
M = 3'-9
T = 1'-0
H = 5'-0

CURVE DATA

C. L. = 49'-0
L2 = 27'-7 5/8
L3 = 21'-4 3/4
D = 10'-8 1/4
E = 10'-7 3/4
P. C. ELEV. = 1263.52
P.I. ELEV. = 1263.33
P. P. ELEV. = 1263.15
P. T. ELEV. = 1259.79
X1 = 3'-4 1/8
X2 = 1'-10 11/16
X3 = 0'-10 1/16
X4 = 0'-2 1/4
L3/4 = 5'-4 1/16(-)



8'x5' FLUME CHUTE - LONGITUDINAL SECTION

NOTE: FOR 60"ø PIPE DETAILS, BELL JT. DETAILS & PIPE COLLAR DETAILS SEE DESIGN SHEET 4.

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-03-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-03-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR CONSTRUCTION OF A 17° SKEW (L.A.)

8'-0 X 5'-0 REINFORCED 3:1 CONCRETE FLUME FOR 60" RCP

FLUME DETAILS

STA. 11048+54.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 6

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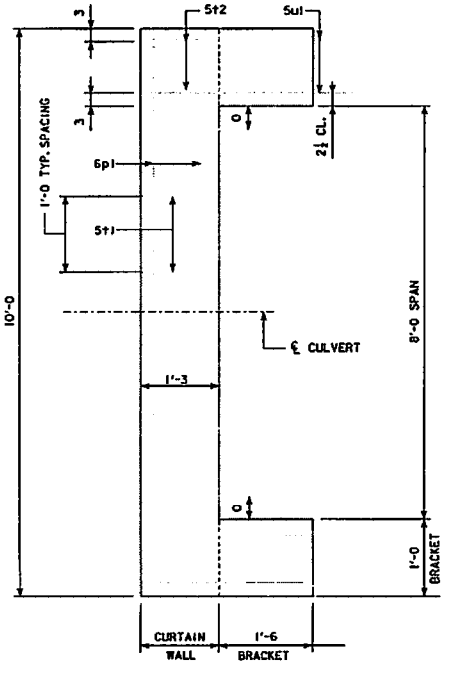
ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	370.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1,271	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	267.0	
4	2404-7775000	REINFORCING STEEL	LB	49,444	
5	2507-3250005	ENGINEERING FABRIC	SY	650.0	
6	2507-6800061	REVETMENT, CLASS E	TON	600.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
7	2533-4980005	MOBILIZATION - -

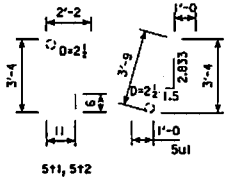


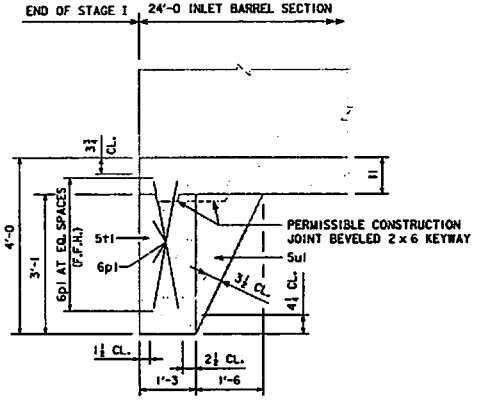
CURTAIN WALL DETAIL
BARREL IS NOT SHOWN

CURTAIN WALL QUANTITIES

CURTAIN, HORIZ.		6p1	6	9'-6	86
CURTAIN, VERT.		5t1	9	6'-11	65
CURTAIN, VERT., ENDS		5t2	4	6'-11	29
BRACKET, VERT.		5u1	4	5'-9	24
				TOTAL LBS.	204
CONCRETE TOTAL (CURTAIN WALL) = 1.5 CU. YDS.					

BENT BAR DETAILS





SECTION THRU CURTAIN WALL

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN ESTIMATED QUANTITIES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 7

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT STAGE I OF AN 8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) REINFORCED CONCRETE BOX CULVERT AND FLUME AND BASIN (DES. 615) (STA. 11073+50.00 ℄ U.S. 20.)

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. (ORIGINAL DESIGN PLANS DES. 6856.)

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 20.0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE PROPOSED WBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE IN PROJECT NHSN-020-2(133)--2R-97.

THE BID ITEM "REMOVALS, AS PER PLAN" SHALL CONSIST OF REMOVING PORTIONS OF THE EXISTING 10'-0 X 8'-0 X 118' RCB W/FLUME STA. 11073+50.00 (℄ U.S. 20) AS NECESSARY TO FACILITATE NEW CONSTRUCTION AND PLACEMENT OF REVETMENT AS SHOWN (DES. 6856)

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.

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

	STANDARD	ISSUED	REVISED
	RCB G1-12	APRIL 2012	10-12
**	RCB G2-12	APRIL 2012	07-14
	CBJ 2-12	APRIL 2012	07-13
	CBJ 4-12	APRIL 2012	-----
	RCB 8-8-12	APRIL 2012	-----
	RCF-01-12	APRIL 2012	05-13
	RCF-02-12	APRIL 2012	-----
	FBJ-03-12	APRIL 2012	-----
	RCFB-03-12	APRIL 2012	-----

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

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8'-0 X 8'-0 BASIN	3969	3969
8'-0 x 8'-0 FLUME	5630	5630
24'-0 BARREL END SECTION	4887	4887
38'-0 BARREL SECTIONS	3 @ 7738	23214
BARREL BELL JOINTS	4 @ 769	3076
FLUME JUNCTION BELL JOINT	569	569
38'-0 END SECTION w/PPT*	*7895	*7895
24'-0 INLET END SECT. CURTAIN WALL	204	204
	TOTAL (LB)	49444

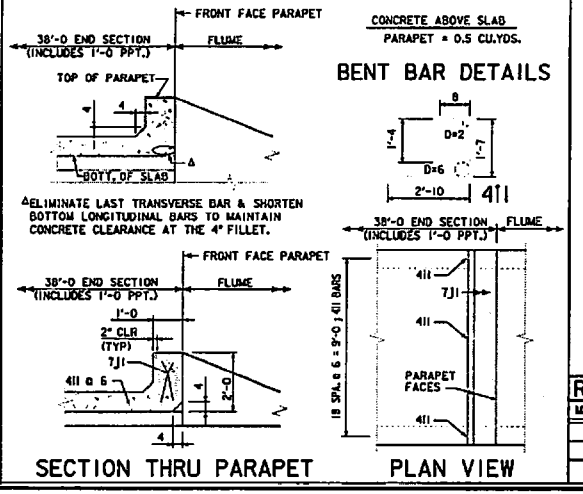
* INCLUDES 157 LBS. FOR PARAPET.

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
8'-0 x 8'-0 BASIN	14.1	7.9	———	22.0
8'-0 x 8'-0 FLUME	19.2	17.0	———	36.2
24'-0 BARREL END SECTION	8.7	10.2	7.1	26.0
38'-0 BARREL SECTIONS	3 @ 13.7 = 41.1	3 @ 16.1 = 48.3	3 @ 11.2 = 33.6	123.0
BARREL BELL JOINTS	4 @ 1.561 = 6.2	4 @ 1.396 = 5.6	4 @ 1.258 = 5.0	16.8
38'-0 END SECTION w/PPT Δ	13.7	16.1	Δ 11.7	41.5
INLET END SECTION CURTAIN WALL	1.5	———	———	1.5
OUTLET END SECTION PARAPET				
TOTAL (CY)	104.5	105.1	57.4	267.0

Δ INCLUDES 0.5 CY FOR CONCRETE CORE SLAB.

38'-0 END SECTION PARAPET DETAILS

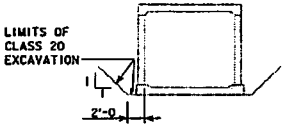


CONCRETE ABOVE SLAB
PARAPET = 0.5 CU.YDS.

BENT BAR DETAILS

PLAN VIEW

THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 615, STAGE II IS DESIGN 318, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND ABOVE.



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

REINF. BAR LIST - END SECTION PARAPET

MARK	LOCATION	SHAPE	NO.	LENGTH	WT.
4II	PARAPET, VERT.		19	6'-5	82
7J1	PARAPET, HORIZ.		4	9'-2	75
	REINFORCING STEEL ABOVE SLAB - TOTAL - LBS.				157

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL (STAGE I) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
615	STAGE I RCB CULVERT, FLUME & BASIN

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN GENERAL NOTES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 8

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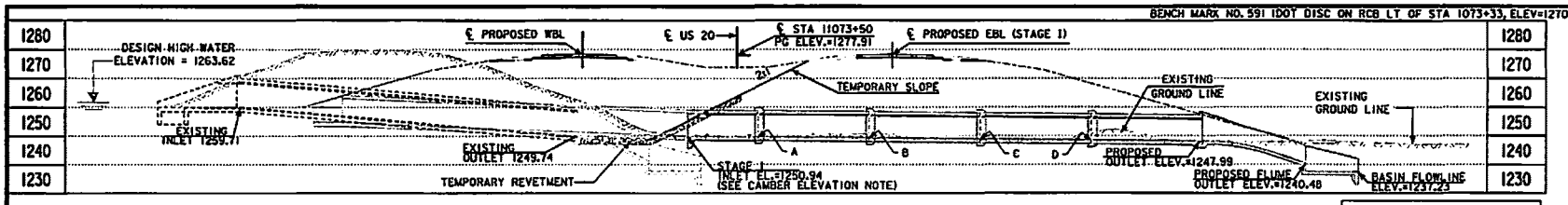
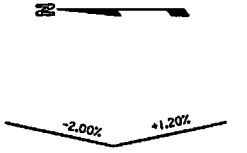
INCLUDES ADDENDA: A.02

BENCH MARK NO. 591 IDOT DISC ON RCB LT OF STA 1073+33, ELEV=1270.099





DESIGN FILL HEIGHT = 20'-0
ANTICIPATED SETTLEMENT = 1.2 FT.

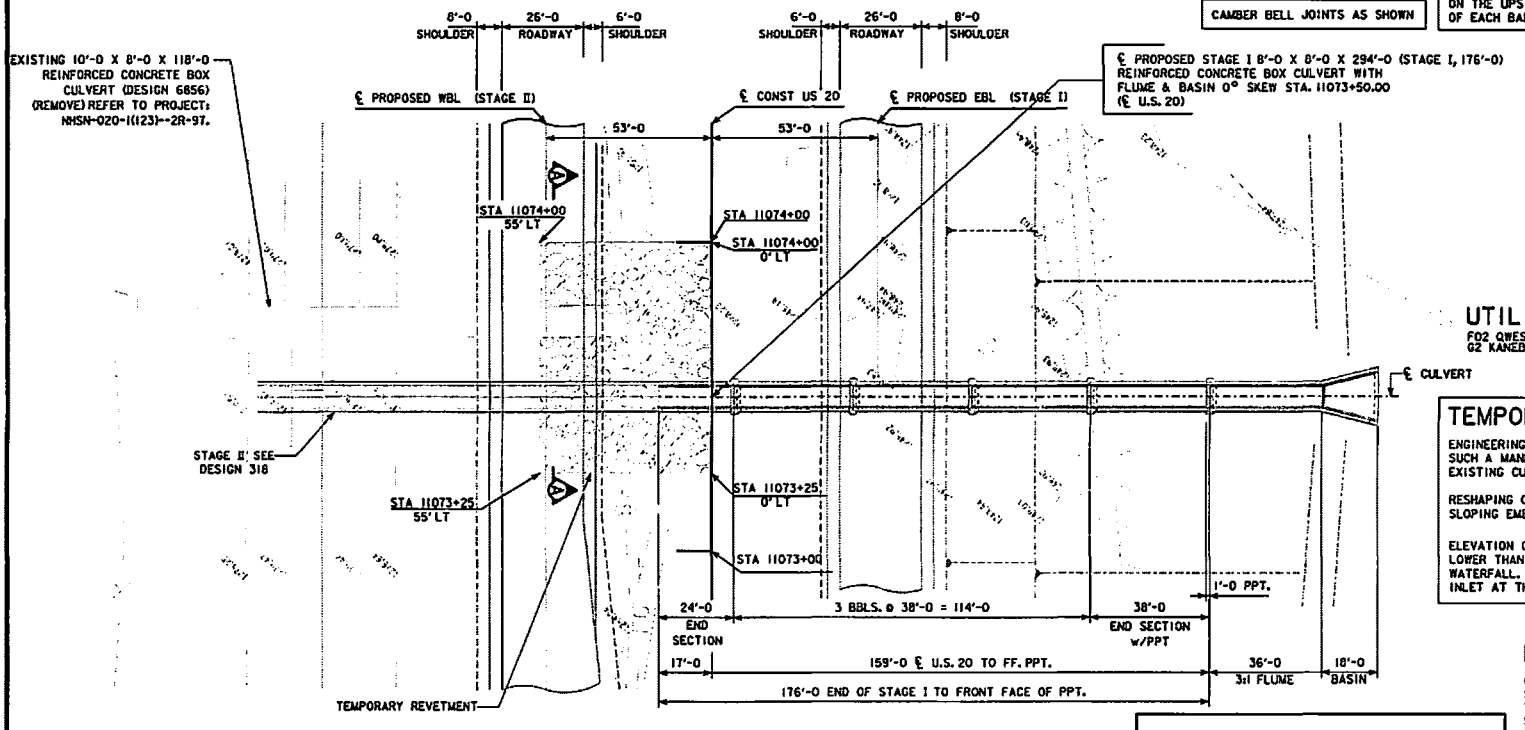
LONGITUDINAL SECTION ALONG ℄ CULVERT

CAMBER BELL JOINTS AS SHOWN

NOTE:
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.

VPI STA = 11074+50 VC = 700'
VPI ELEV = 1274.48

PROPOSED PROFILE GRADE US 20



CAMBER ELEVATION TABLE

NOTE:
CAMBER BELL JOINTS AS SHOWN

LOCATION	ELEVATION
INLET	1250.94
A	1250.71
B	1250.32
C	1249.95
D	1248.97
OUTLET	1247.99

UTILITIES LEGEND:

F02 QWEST
G2 KANEB PIPELINE CO(B)

HYDRAULIC DATA

DRAINAGE AREA = 397 ACRES VH-H
Q_{50} = 591 CFS
HW ELEV. = 1263.62

TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACED IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION.

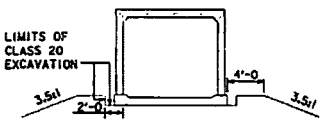
ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW CULVERT TO FACILITATE DRAINAGE.

LOCATION

ON US 20 OVER
SMALL STREAM
T-88-89N R-41W
SECTION 2-33
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474422°
LONGITUDE -95.700534°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

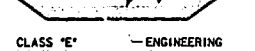


EXCAVATION DETAIL

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, SEE DES. 318 IN THIS PROJECT FOR STAGE II.

SITUATION PLAN



CLASS "E" REVETMENT — ENGINEERING FABRIC

TYPICAL SECTION A-A MEDIAN PROTECTION

EST. TEMPORARY REVETMENT QUANTITIES

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
MEDIAN	600	650	370

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN

SITUATION PLAN

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB ■ TWE ■ MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 9

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REINFORCING BAR LIST - FLUME

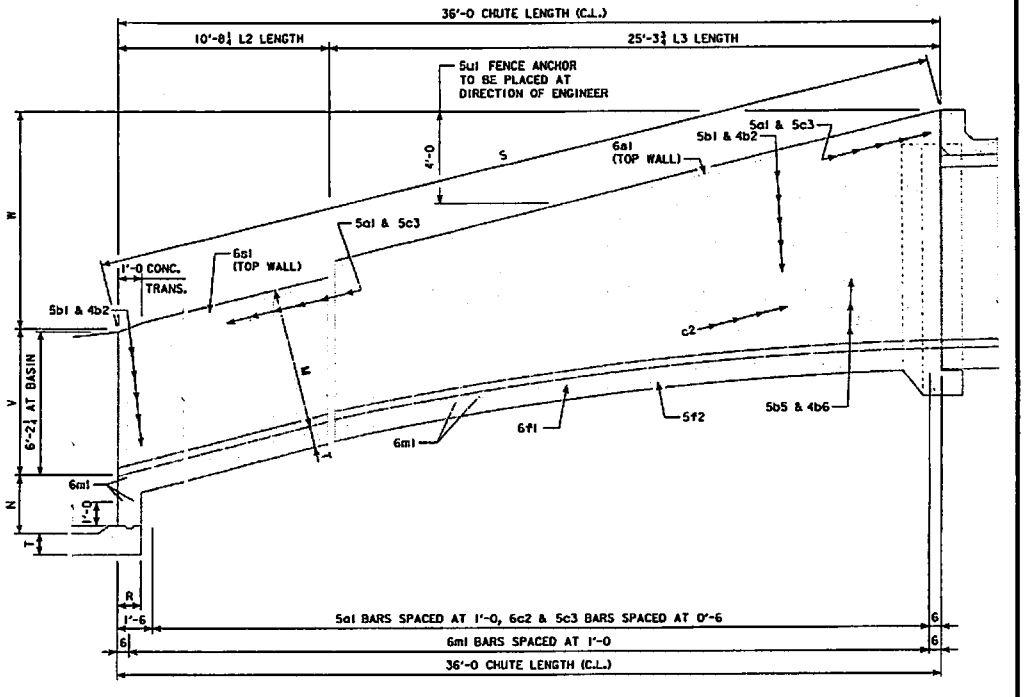
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS FFV		70	LISTED	572
5b1	WALLS FFH		10	37'-7	392
4b2	WALLS BFH		10	37'-7	251
5b5	WALLS FFH		6	LISTED	53
4b6	WALLS BFH		6	LISTED	34
6c2	BOTT. FLOOR & WALLS BFV - SPLICED		69	16'-7	1719
5c3	WALLS BFV		138	LISTED	975
6f1	FLOOR LONGIT. TOP		9	36'-8	496
5f2	FLOOR LONGIT. BOTT.		9	36'-8	345
6m1	FLOOR TRANSV. TOP		38	9'-10	561
6a1	WALLS BOTH F ALONG SLOPE		4	37'-7	226
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-1	6
				TOTAL (LB)	5630

LISTED BARS

BAR 5a1
70 BARS
20 AT 6'-10
50 VAR. - 2 EA. LGTH.
6'-10
6'-11
6'-11
6'-11
7'-0
7'-1
7'-2
7'-3
7'-4
7'-6
7'-7
7'-9
7'-11
8'-1
8'-3
8'-5
8'-8
8'-10
9'-1
9'-4
9'-7
9'-10
10'-1
10'-5
10'-9

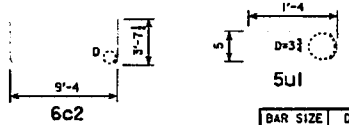
BAR 5c3
138 BARS
38 AT 5'-10
100 VAR. - 2 EA. LGTH.
5'-10
5'-10
5'-10
5'-10
5'-10
5'-10
5'-10
5'-11
5'-11
5'-11
6'-0
6'-0
6'-0
6'-1
6'-1
6'-2
6'-2
6'-3
6'-4
6'-4
6'-5
6'-6
6'-7
6'-7
6'-8
6'-9
6'-10
6'-11
7'-0
7'-1
7'-2
7'-3
7'-5
7'-6
7'-7
7'-8
7'-10
7'-11
8'-0
8'-2
8'-3
8'-5
8'-6
8'-8
8'-10
8'-11
9'-1
9'-3
9'-4
9'-6
9'-8

BAR 5b5 AND 4b6
6 BARS - 2 EA. LGTH.
3'-4
7'-11
14'-0



8'x8' FLUME CHUTE - LONGITUDINAL SECTION

BENT BAR DETAILS



BAR SIZE	D
5	3¾
6	4½
7	5¼

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

FLUME DATA

∠A = 18°26'
∠C = 1°00'
B = 13'-3⅜
S = 37'-11⅛
V = 6'-3⅞
W = 12'-0
M = 6'-0
T = 1'-0
H = 8'-0

CURVE DATA

C.L. = 36'-0
L2 = 10'-8¼
L3 = 25'-3¾
D = 12'-8⅝
E = 12'-7⅛
P.C. ELEV. = 1247.99
P.I. ELEV. = 1247.77
P.P. ELEV. = 1247.55
P.T. ELEV. = 1243.56
X1 = 3'-11⅝
X2 = 2'-2⅝
X3 = 0'-11⅝
X4 = 0'-3
L3/4 = 6'-3⅝

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	16.6	15.4	32.0
JUNCTION BELL	1.6	1.6	3.2
BASIN CURTAIN	1.0	——	1.0
TOTAL (CY)	19.2	17.0	36.2

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-03-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-03-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN
FLUME DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 10

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	1,905	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	159.8	
3	2404-7775000	REINFORCING STEEL	LB	29,616	
4	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING	LF	58	
5	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
3	2404-7775000	REINFORCING STEEL - -
4	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS* SHOWN. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE *STANDARD SPECIFICATIONS.)**SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN *ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF* THE IOWA DEPARTMENT OF TRANSPORTATION. 1 GALVANIZED SAFETY HAND RAIL
5	2533-4980005	MOBILIZATION - -

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET ESTIMATE QUANTITIES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 11

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 10'X8'X118' REINFORCED CONCRETE BOX CULVERT WITH FLUME WITH A STAGE CONSTRUCTED NEW 8' x 8' REINFORCED CONCRETE BOX CULVERT EXTENSION WITH 10' X 8' DROP INLET, AT STA. 11073+50.00 (℄ US 20)

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES.

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 20 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE PROPOSED EBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE IN PROJECT NHSN-020-1(123)--2R-97.

THE 5zI BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE GROUT MANUFACTURER'S RECOMMENDATIONS. THE FOLLOWING SYSTEM SHALL BE USED AS A BONDING AGENT FOR HORIZONTAL DOWELS:

A. POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E OF THE STANDARD SPECIFICATIONS.

THE PRICE BID FOR "STRUCTURAL CONCRETE RCB CULVERT" SHALL INCLUDE THE COSTS OF SETTING BARS AS DOWELS IN THE EXISTING END OF THE STAGE I BARREL SECTION.

PIPE HANDRAIL ASSEMBLY WILL CONSIST OF 58.25 LINEAL FEET AND IS TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOPDRAWINGS.

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

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

	STANDARD	ISSUED	REVISED
	RCB G1-12	APRIL 2012	10-12
**	RCB G2-12	APRIL 2012	07-14
	CBJ 2-12	APRIL 2012	07-13
	CBJ 4-12	APRIL 2012	-----
	RCB 8-8-12	APRIL 2012	-----

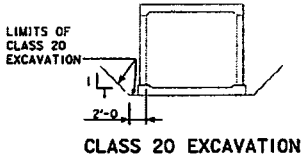
** NOTE: "TOP SLAB CONSTRUCTION JOINT DETAIL" DOES NOT APPLY.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'-0 x 8'-0 DROP INLET & 5'-0 BARREL SECT.	3440	3440
38'-0 BARREL SECTIONS	2 @ 7738	15476
16'-0 END BARREL SECTION	3259	3259
21'-0 TIE-IN BARREL SECTION	4276	4276
BELL JOINTS	4 @ 769	3076
5zI BARS, 2'-6 DOWELS @ 34 BARS	89	89
	TOTAL (LB)	29,616

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
10'-0 x 8'-0 DROP INLET & 5'-0 BARREL SECT.	6.3	13.0	1.3	20.6
38'-0 BARREL SECTIONS	2@ 13.70 = 27.4	2@ 16.1 = 32.2	2@ 11.2 = 22.4	82.0
16'-0 END BARREL SECTION	5.6	6.6	4.7	17.3
21'-0 TIE-IN BARREL SECTION	7.6	8.9	6.2	22.7
BELL JOINTS	4 @ 1.6 = 6.4	4 @ 1.4 = 5.6	4 @ 1.3 = 5.2	17.2
TOTAL (CY)	53.5	66.5	39.8	159.8



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	GALVANIZED SAFETY HAND RAIL
2	
3	
4	
5	

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
615	STAGE I RCB CULVERT, FLUME & BASIN
318	STAGE II RCB CULVERT & DROP INLET

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL (STAGE II) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ:NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT: NHSN-020-1(123)--2R-97

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT: NHSN-020-1(123)--2R-97

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET GENERAL NOTES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 12

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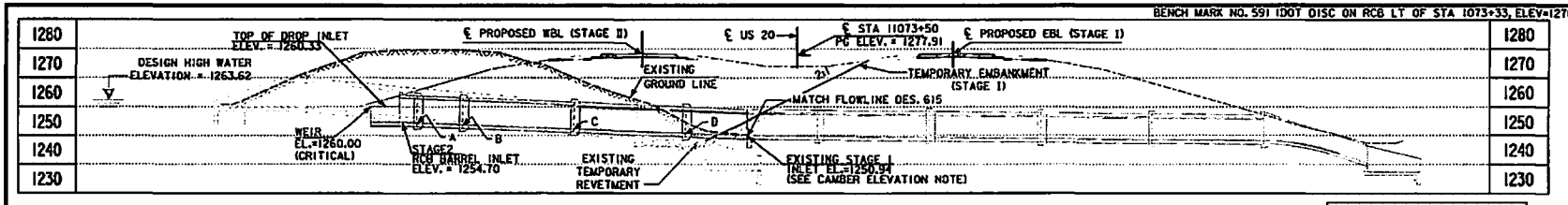
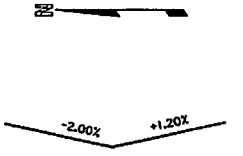
INCLUDES ADDENDA: A.02

BENCH MARK NO. 591 IDOT DISC ON RCB LT OF STA 1073+33, ELEV=1270.099





DESIGN FILL HEIGHT = 20'-0
ANTICIPATED SETTLEMENT = 0.96 FT.

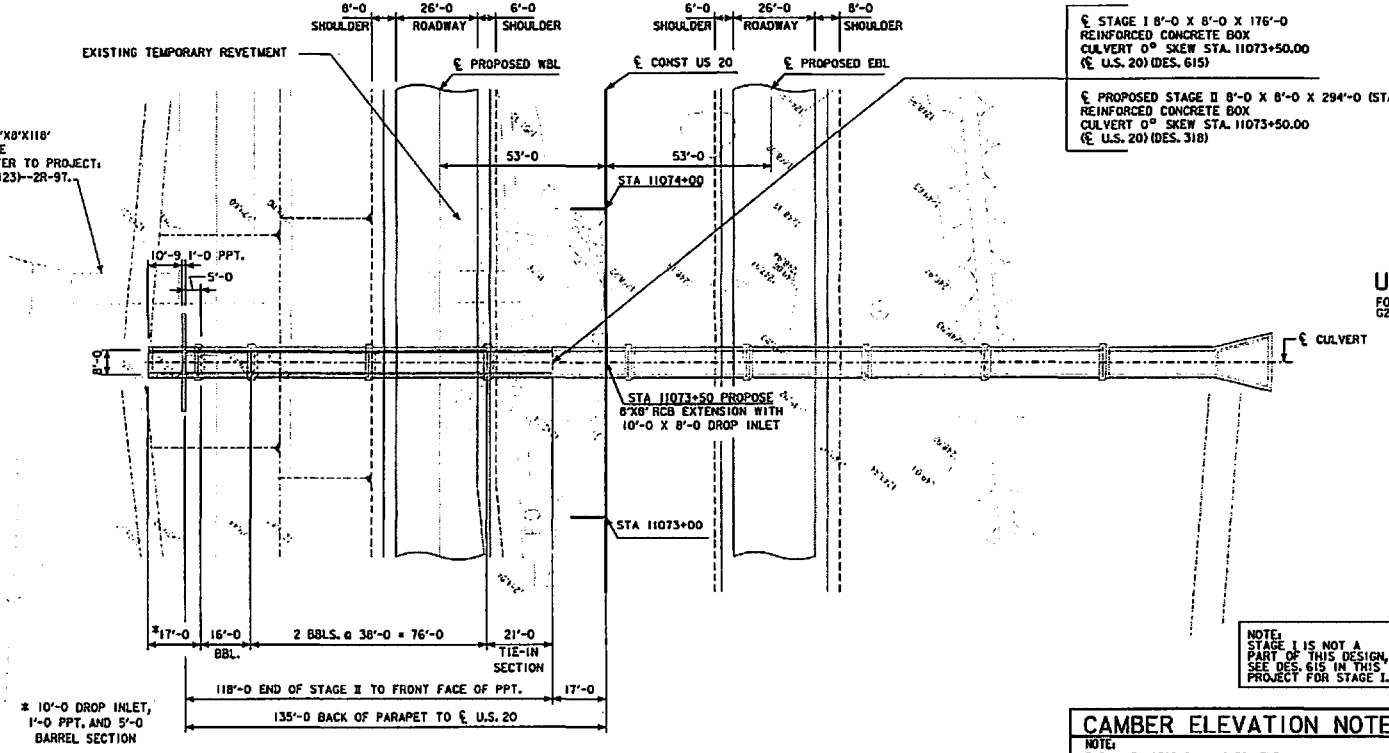
LONGITUDINAL SECTION ALONG ℄ CULVERT

CAMBER BELL JOINTS AS SHOWN

NOTE:
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.

VPI STA = 11074+50 VC = 700'
VPI ELEV = 1274.48

PROPOSED PROFILE GRADE US 20



* 10'-0 DROP INLET, 1'-0 PPT. AND 5'-0 BARREL SECTION

SITUATION PLAN

℄ STAGE I 8'-0 X 8'-0 X 176'-0 REINFORCED CONCRETE BOX CULVERT 0° SKEW STA. 11073+50.00 (℄ U.S. 20) (DES. 615)

℄ PROPOSED STAGE II 8'-0 X 8'-0 X 294'-0 (STAGE II, 118'-0) REINFORCED CONCRETE BOX CULVERT 0° SKEW STA. 11073+50.00 (℄ U.S. 20) (DES. 318)

CAMBER ELEVATION TABLE

NOTE:
CAMBER BELL JOINTS AS SHOWN

LOCATION	ELEVATION
INLET	1254.70
A	1254.47
B	1253.82
C	1252.54
D	1251.58
CONST. JT.	1250.94

UTILITIES LEGEND:

F02 QWEST
G2 KANEB PIPELINE CO(B)

HYDRAULIC DATA

DRAINAGE AREA = 397 ACRES VH-H
Q_{50} = 591 CFS
HW ELEV. = 1263.62

NOTE:
STAGE I IS NOT A PART OF THIS DESIGN, SEE DES. 615 IN THIS PROJECT FOR STAGE I.

LOCATION

ON US 20 OVER
SMALL STREAM
T-88-89N R-41W
SECTION 2-33
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474422°
LONGITUDE -95.700534°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION. THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET SITUATION PLAN

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

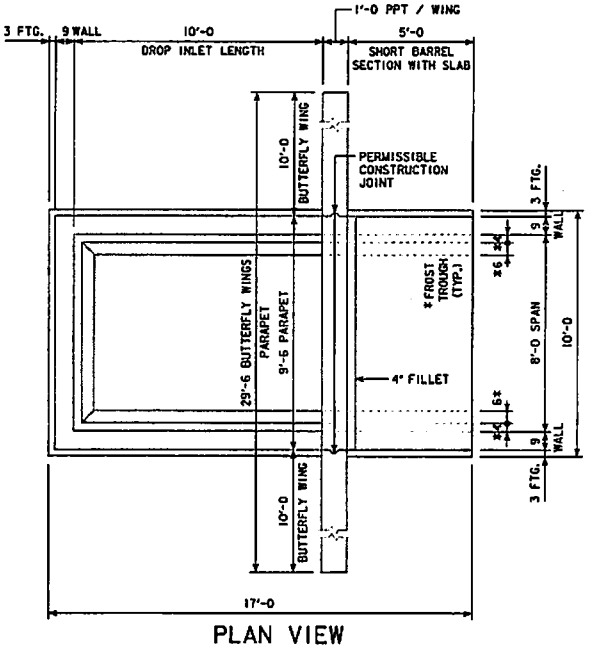
IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

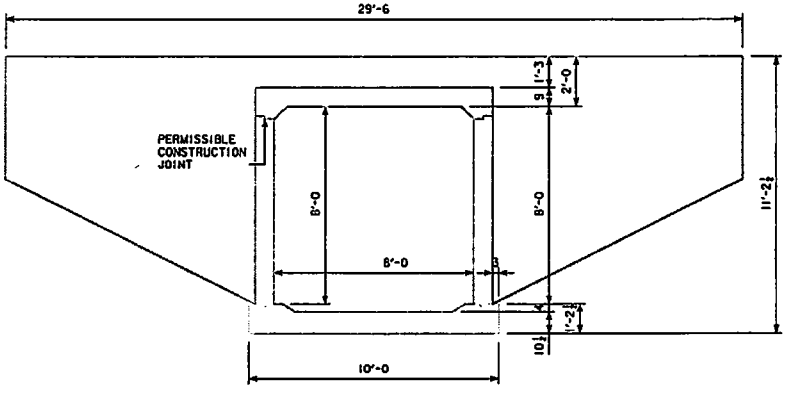
DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 13

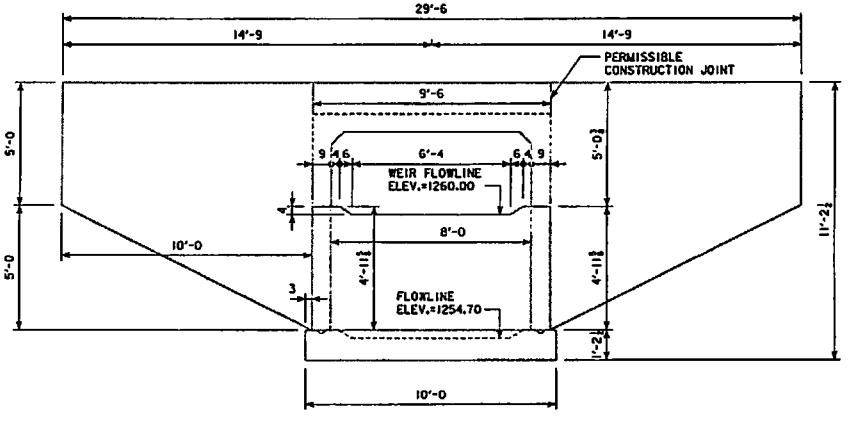
BENCH MARK NO. 591 IDOT DISC ON RCB LT OF STA 1073+33, ELEV=1270.099



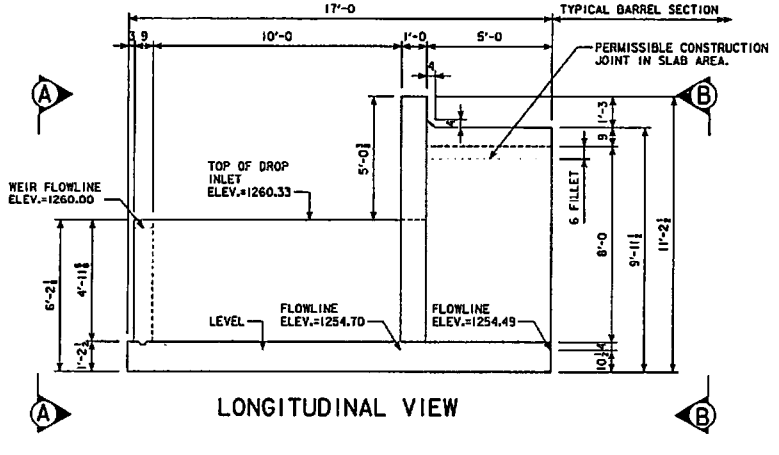
PLAN VIEW



END VIEW B-B



END VIEW A-A



LONGITUDINAL VIEW

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

DROP INLET DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 14

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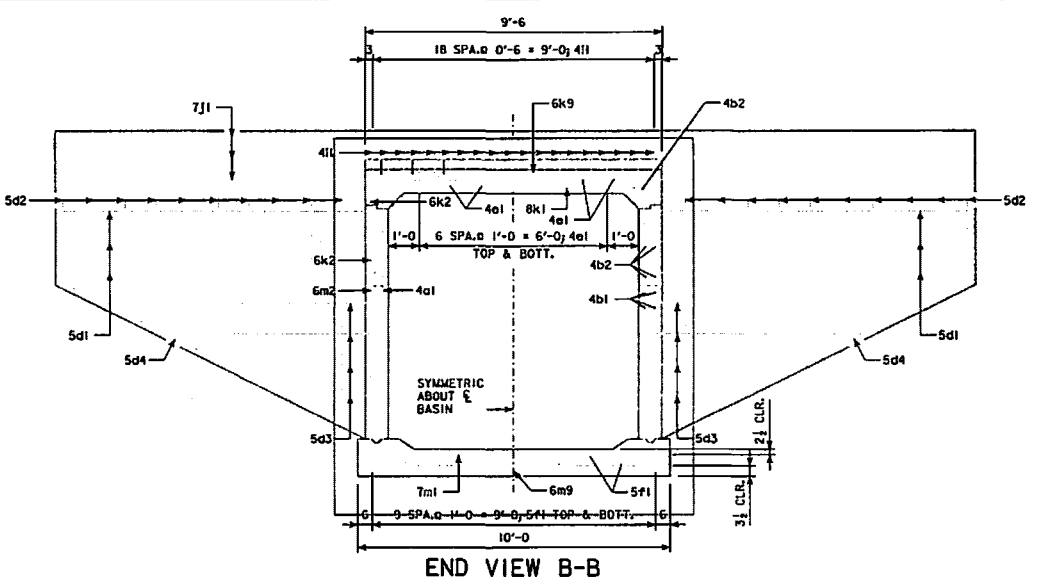
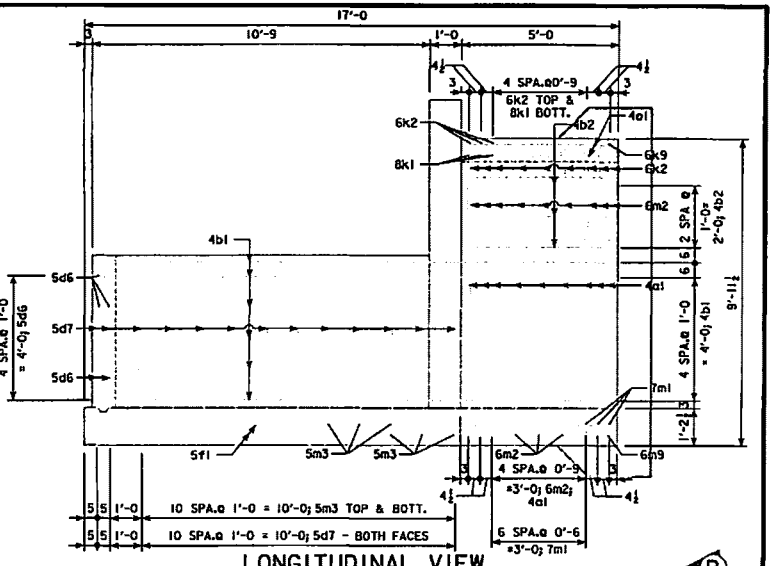
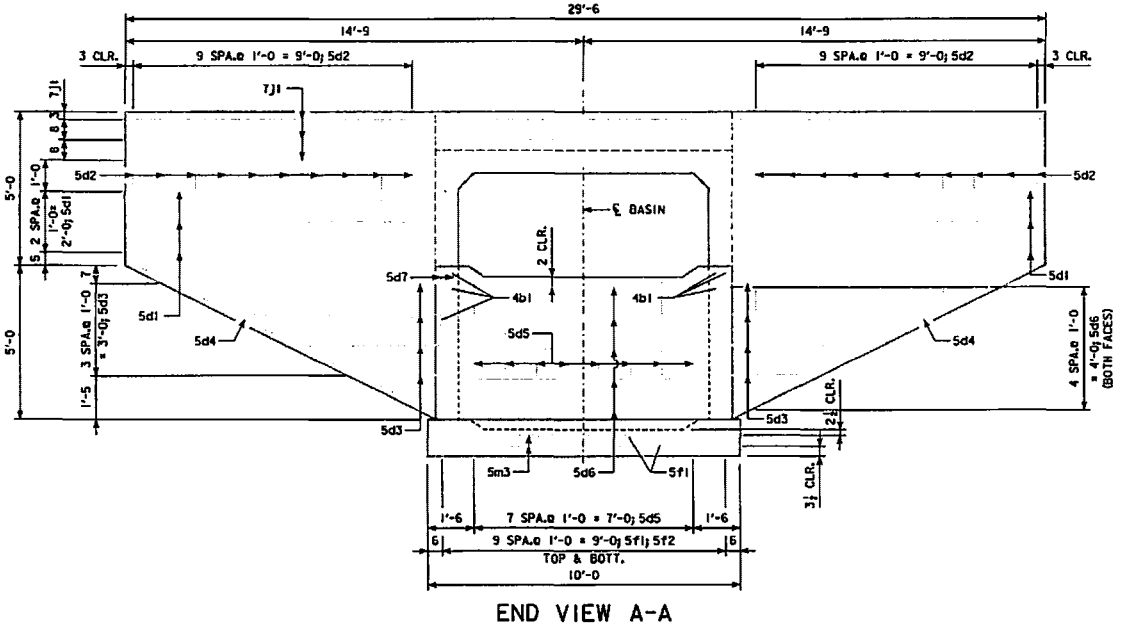


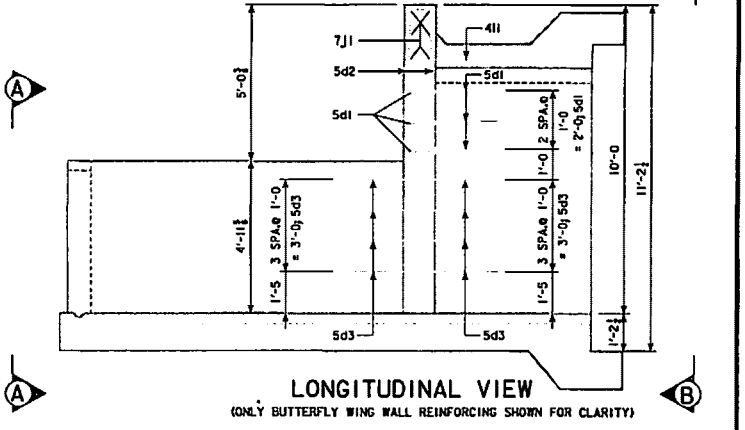
END VIEW B-B



LONGITUDINAL VIEW
(BUTTERFLY WING WALL REINFORCING NOT SHOWN FOR CLARITY)



END VIEW A-A



LONGITUDINAL VIEW
(ONLY BUTTERFLY WING WALL REINFORCING SHOWN FOR CLARITY)

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET
DROP INLET DETAILS

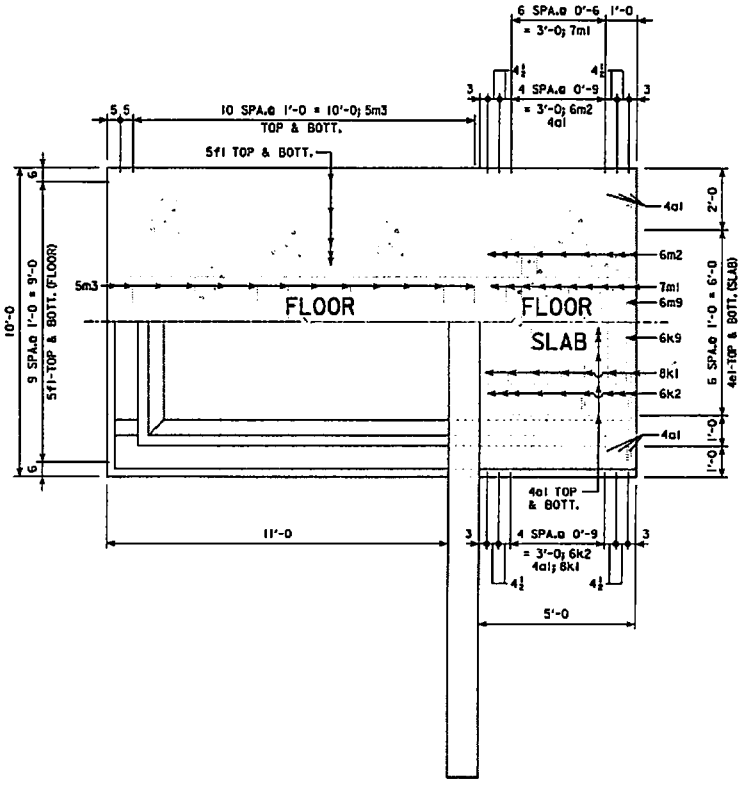
STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

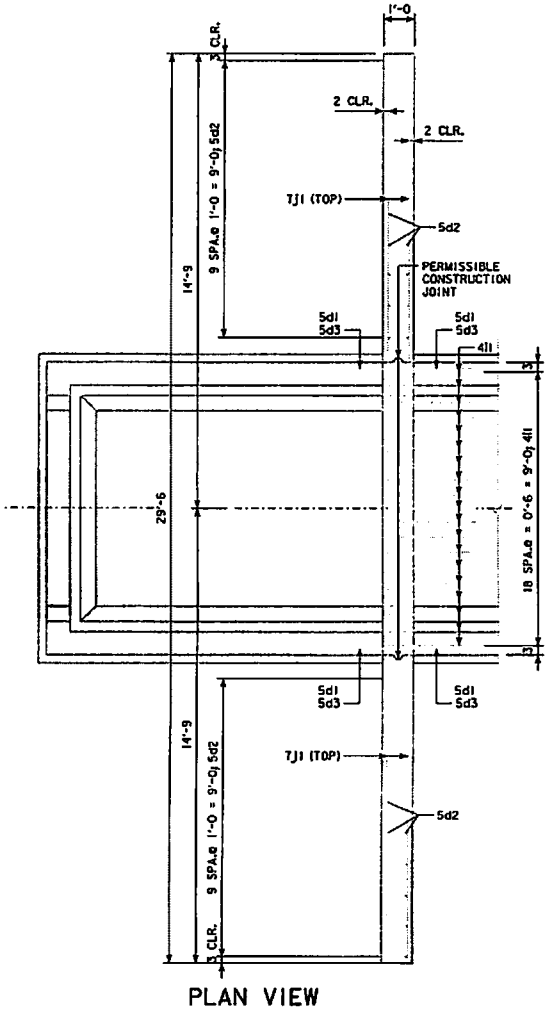
DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB x TWE x MSF	IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER 15



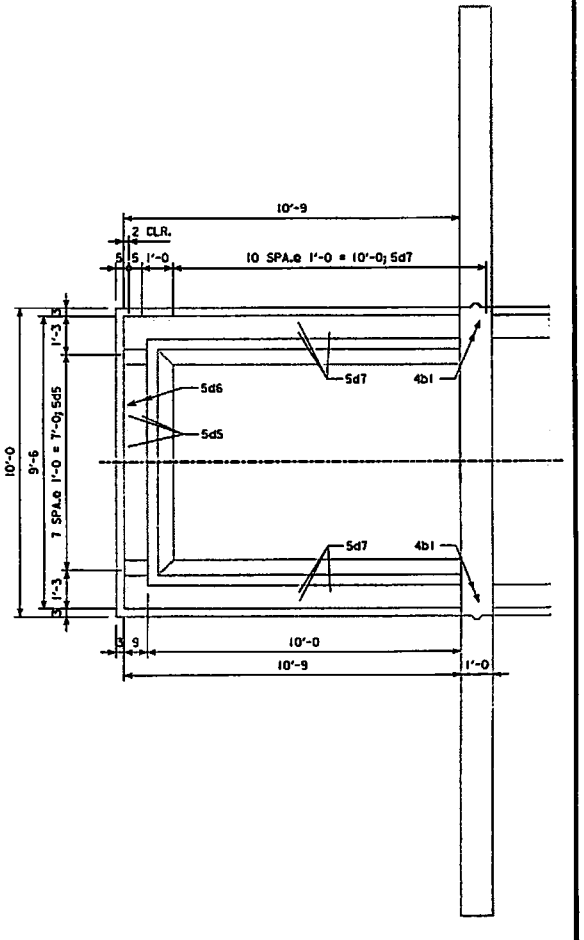
PLAN VIEW

(BUTTERFLY WING WALL REINFORCING NOT SHOWN FOR CLARITY)



PLAN VIEW

(ONLY BUTTERFLY WING WALL REINFORCING SHOWN FOR CLARITY)



PLAN VIEW

(ONLY DROP INLET WALLS REINFORCING SHOWN FOR CLARITY)

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

DROP INLET DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 16

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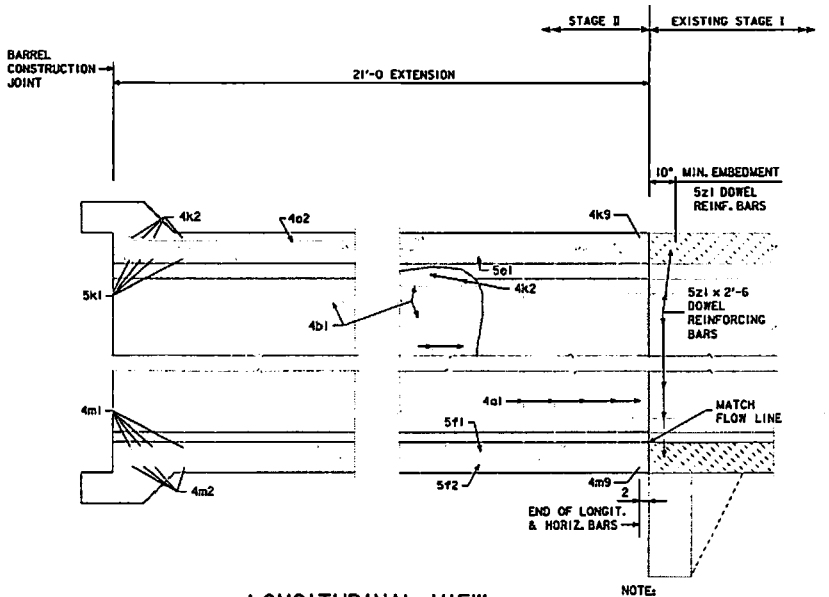
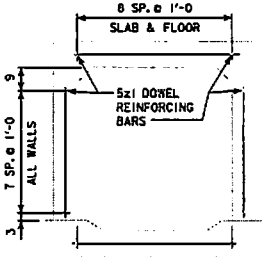
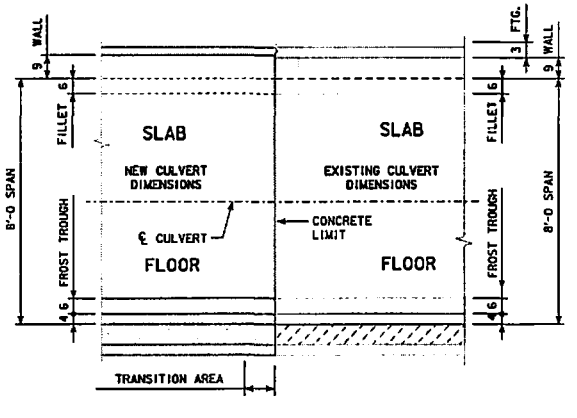


LONGITUDINAL VIEW

NOTE:
FOR BARREL DETAILS NOT SHOWN, REFER TO STANDARDS LISTED IN THESE PLANS.



SECTION NEAR EXTENSION
(SHOWING SPACING OF 34 - 5z1 DOWEL REINFORCING BARS)



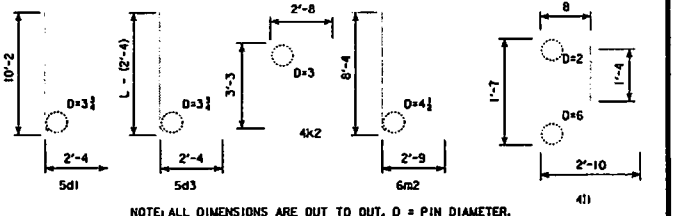
CONCRETE TRANSITION DETAILS
(PLAN VIEW)

5d2	5d3
40 BARS	16 BARS
4 EA. LENGTH	4 EA. LENGTH
9'-3	11'-2
8'-9	9'-2
8'-3	7'-2
7'-9	5'-2
7'-3	
6'-9	
6'-3	
5'-9	
5'-3	
4'-9	

REINFORCING BAR LIST - DROP INLET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	VERTICAL, FRONT FACE, BARREL SECTION		18	9'-6	114
4b1	LONGITUDINAL, BOTH FACES, WALLS		24	16'-8	267
4b2	LONGITUDINAL, BOTH FACES, WALLS		14	4'-8	44
5d1	HORIZ., BUTTERFLY WING WALL, BOTH FACES		12	12'-6	156
5d2	VERTICAL, BUTTERFLY WINGS, BOTH FACES		40	LISTED	292
5d3	HORIZ., BUTTERFLY WING WALL, BOTH FACES		16	LISTED	136
5d4	SLOPE, WINGS, BOTH FACES		4	10'-10	45
5d5	VERTICAL, BOTH FACES, END WALL		16	5'-4	89
5d6	HORIZONAL, BOTH FACES, END WALL		10	9'-2	96
5d7	VERTICAL, BOTH FACES, DROP INLET WALLS		52	5'-8	307
4a1	LONGIT., SLAB, TOP & BOTT., DROP INLET		14	4'-8	44
4f1	LONGIT., FLOOR, TOP & BOTT., DROP INLET		20	16'-8	223
4l1	VERTICAL, PARAPET		19	6'-5	81
7j1	TRANSVERSE, PARAPET/BUTTERFLY WINGS		6	29'-2	358
8k1	TRANSVERSE, BOTT. SLAB		9	9'-2	220
6k2	CORNER, TOP. SLAB		18	5'-11	160
6k9	TRANSVERSE, TOP. SLAB, END		1	9'-2	14
7m1	TRANSVERSE, TOP, FLOOR		11	9'-8	217
6m2	VERTICAL, BOTT. CORNER		18	11'-1	300
5m3	TRANSV., TOP & BOTT., FLOOR, DROP INLET		26	9'-8	262
6m9	TRANSVERSE, BOTT; FLOOR, END		1	9'-8	15
	REINFORCING STEEL - TOTAL (LBS.)				3440

BENT BAR DETAILS



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

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0") REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET EXTENSION DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 17

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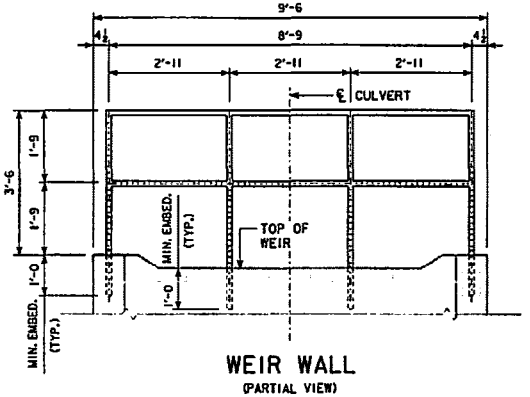
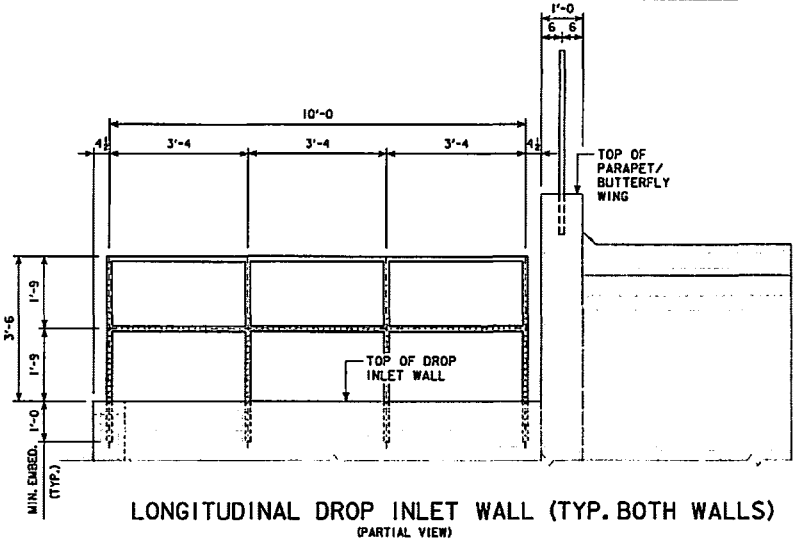
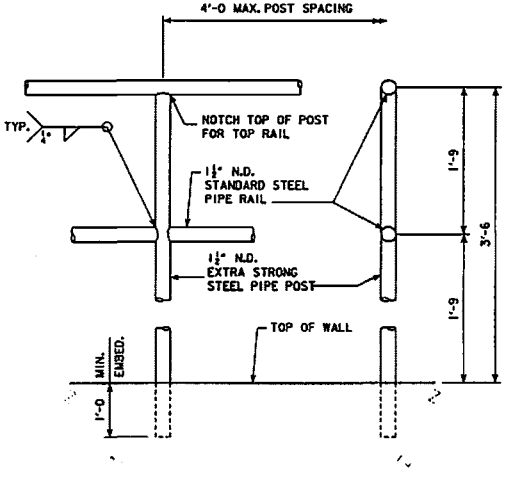


WEIR WALL
(PARTIAL VIEW)

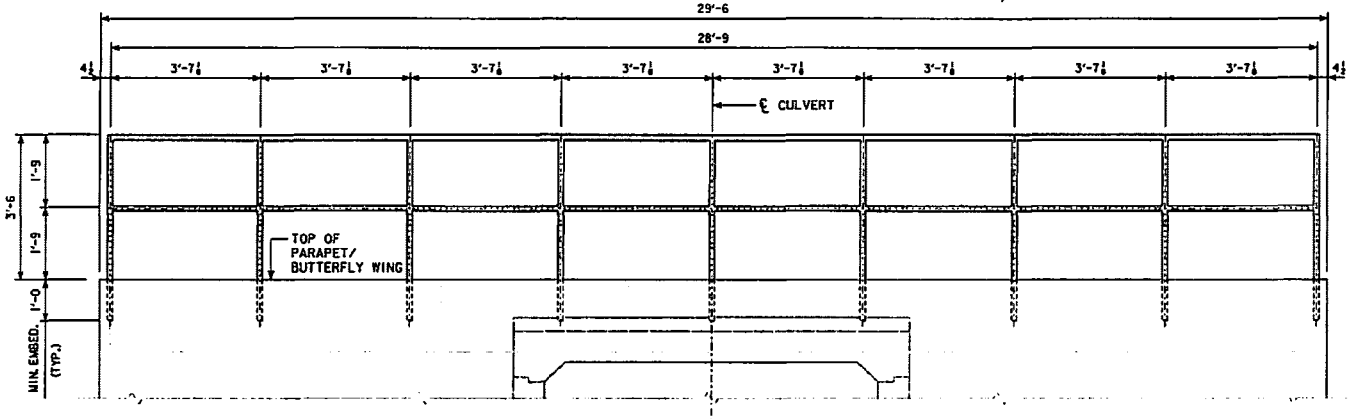


LONGITUDINAL DROP INLET WALL (TYP. BOTH WALLS)
(PARTIAL VIEW)

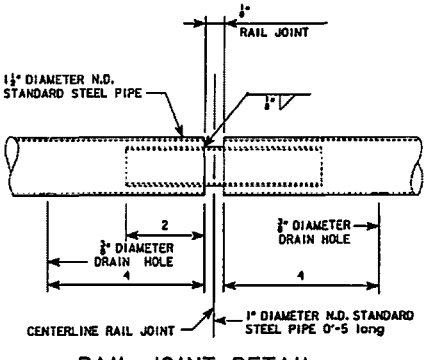


PIPE HANDRAIL DETAILS

NOTE: PIPE HANDRAIL ASSEMBLY TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOP DRAWINGS.



TOP OF
PARAPET/BUTTERFLY WING
(PARTIAL VIEW)



RAIL JOINT DETAIL

PEDESTRIAN HAND RAIL NOTES:

THE STEEL PIPE PEDESTRIAN HAND RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED END TO END OF RAIL. THE PRICE BID FOR STEEL PIPE PEDESTRIAN HAND RAIL SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.

THE MATERIAL FOR TUBE RAILS, POSTS AND SPLICE TUBES SHALL BE STANDARD STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53, TYPE E OR S, GRADE B OR ASTM A500 GRADE B.

PANELS AND END SECTIONS SHALL BE GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A123.

ENDS OF RAIL SECTIONS ARE TO BE SAWED OR MILLED. ALL CUT ENDS ARE TO BE TRUE, SMOOTH, AND FREE OF BURRS OR RAGGED EDGES.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0") REINFORCED CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET SAFETY RAIL DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 18

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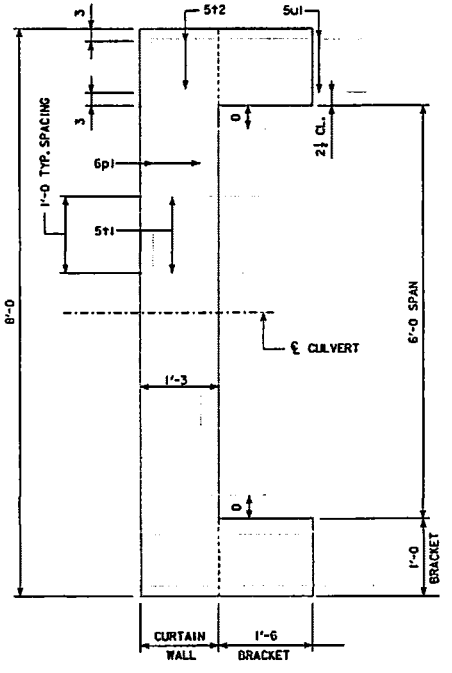
ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	275.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-2720000	EXCAVATION, CLASS 20	CY	200	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	213.8	
5	2404-7775000	REINFORCING STEEL	LB	31,039	
6	2507-3250005	ENGINEERING FABRIC	SY	500.0	
7	2507-6800061	REVETMENT, CLASS E	TON	450.0	
8	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

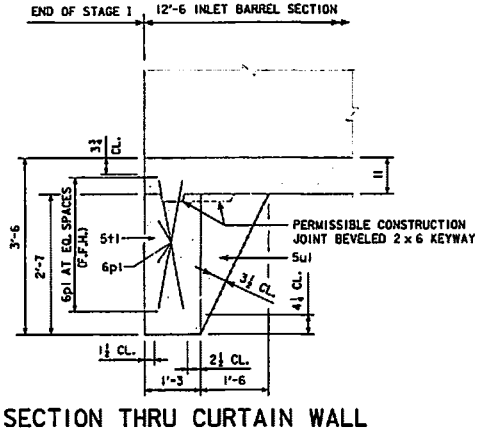
ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN CONSISTS OF REMOVING PORTIONS OF THE EXISTING 6'-0 X 6'-0 X 124.8' RCB W/FLUME STA. 11085+28.00 (℄ U.S. 20) SKEW 89°59'20.7" AS NECESSARY TO FACILITATE NEW CONSTRUCTION AND PLACEMENT OF REVETMENT AS SHOWN (DES. 7056)
3	2402-2720000	EXCAVATION, CLASS 20 - -
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
5	2404-7775000	REINFORCING STEEL - -
6	2507-3250005	ENGINEERING FABRIC - -
7	2507-6800061	REVETMENT, CLASS E - -
8	2533-4980005	MOBILIZATION - -

CURTAIN WALL DETAILS



CURTAIN WALL DETAIL

BARREL IS NOT SHOWN



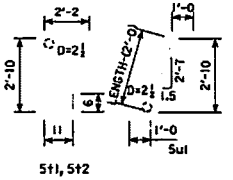
SECTION THRU CURTAIN WALL

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 715, STAGE II IS DESIGN 418, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

CURTAIN WALL QUANTITIES

CURTAIN, HORIZ.	— -	6p1	6	7'-10	71
CURTAIN, VERT.	▯	5t1	7	6'-11	50
CURTAIN, VERT., ENDS	▯	5t2	4	6'-11	29
BRACKET, VERT.	⌐	5u1	4	5'-8	24
				TOTAL LBS.	174
				CONCRETE TOTAL (CURTAIN WALL) = 1.4 CU. YDS.	

BENT BAR DETAILS



DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE I- 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN ESTIMATED QUANTITIES

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 19

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT STAGE I OF A 6'-0 X 6'-0 REINFORCED CONCRETE BOX CULVERT AND FLUME AND BASIN (DES. 715) (STA. 11085+38.00 ℄ U.S. 20.)

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. (DESIGN PLANS DES. 7056.)

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 18.0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

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.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROAD WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE.

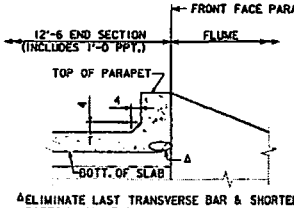
THE BID ITEM "REMOVALS, AS PER PLAN" SHALL CONSIST OF REMOVING PORTIONS OF THE EXISTING 6'-0 X 6'-0 X 124.6' RCB W/FLUME STA. 11085+28.00 (℄ U.S. 20) SKEW 89°59'20.7" AS NECESSARY TO FACILITATE NEW CONSTRUCTION AND PLACEMENT OF REVETMENT AS SHOWN (DES. 7056)

THE CONTRACTOR MAY FEEL TEMPORARY SHORING (SHEET PILE OR OTHER) IS NECESSARY TO ENSURE THAT THE EMBANKMENT WILL NOT SLOUGH IN WHILE CULVERT IS BEING CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED) NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

12'-6 OUTLET END SECTION PARAPET DETAILS

REINF. BAR LIST - END SECTION PARAPET

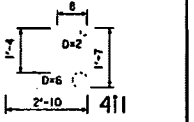
MARK	LOCATION	SHAPE	NO.	LENGTH	WT.
411	PARAPET, VERT.		15	6'-5	64
7J1	PARAPET, HORIZ.		4	7'-2	58
	REINFORCING STEEL ABOVE SLAB - TOTAL - LBS.				122

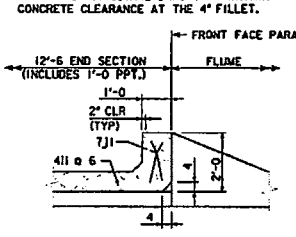


ΔELIMINATE LAST TRANSVERSE BAR & SHORTEN BOTTOM LONGITUDINAL BARS TO MAINTAIN CONCRETE CLEARANCE AT THE 4" FILLET.

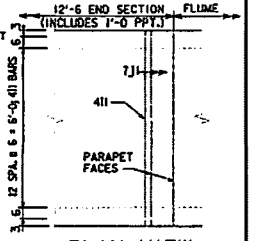
CONCRETE ABOVE SLAB
PARAPET = 0.4 CU.YDS.

BENT BAR DETAILS

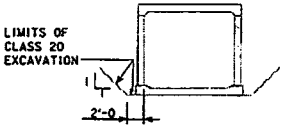




SECTION THRU PARAPET



PLAN VIEW



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

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

	STANDARD	ISSUED	REVISED
	RCB G1-12	APRIL 2012	10-12
**	RCB G2-12	APRIL 2012	07-14
	CBJ 2-12	APRIL 2012	07-13
	CBJ 4-12	APRIL 2012	-----
	RCB 6-6-12	APRIL 2012	-----
	RCF-01-12	APRIL 2012	05-13
	RCF-02-12	APRIL 2012	-----
	FBJ-02-12	APRIL 2012	-----
	RCFB-02-12	APRIL 2012	-----

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

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
6'-0 x 6'-0 FLUME	4986	4986
6'-0 X 6'-0 BASIN	2812	2812
12'-6 BARREL END SECTIONS	2 @ 1339	2678
BARREL BELL JOINTS	5 @ 629	3145
FLUME JUNCTION BELL JOINT	456	456
FLUME CHUTE BELL JOINT	390	390
38'-0 BARREL SECTIONS	4 @ 4069	16,276
12'-6 OUTLET END SECTION PARAPET	122	122
12'-6 INLET END SECTION CURTAIN WALL	174	174
	TOTAL (LB)	31,039

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
6'-0 x 6'-0 FLUME	20.4	15.9	———	36.3
6'-0 X 6'-0 BASIN	9.8	7.4	———	14.5
12'-6 BARREL END SECTIONS	2 @ 3.6 = 7.2	2 @ 3.9 = 7.8	2 @ 2.7 = 5.4	20.4
BARREL BELL JOINTS	5 @ 1.285 = 6.4	5 @ 1.032 = 5.2	5 @ 1.038 = 5.2	16.8
38'-0 BARREL SECTIONS	4 @ 10.8 = 43.2	4 @ 11.9 = 47.6	4 @ 8.3 = 33.2	124.0
OUTLET END SECTION PARAPET	———	———	0.4 *	0.4
INLET END SECTION CURTAIN WALL	1.4	———	———	1.4
TOTAL (CY)	88.4	81.2	44.2	213.8

* CONCRETE ABOVE OUTLET SLAB

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
715	STAGE I RCB CULVERT, FLUME & BASIN

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE I- 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN GENERAL NOTES

STA. 11085+38.00

OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 20

INCLUDES ADDENDA: A.02

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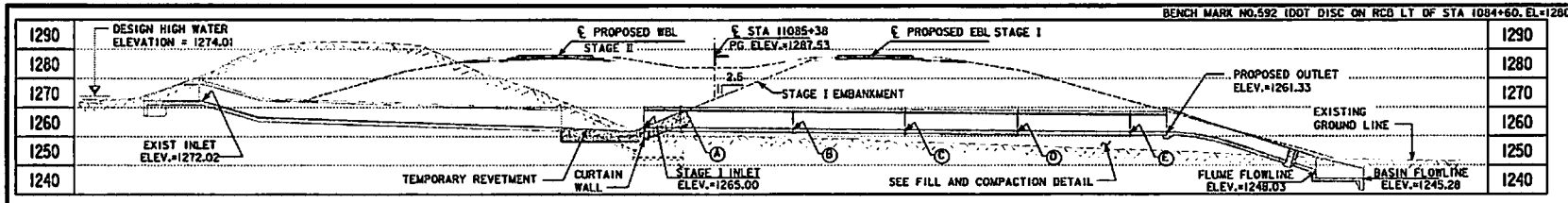
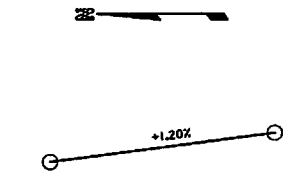


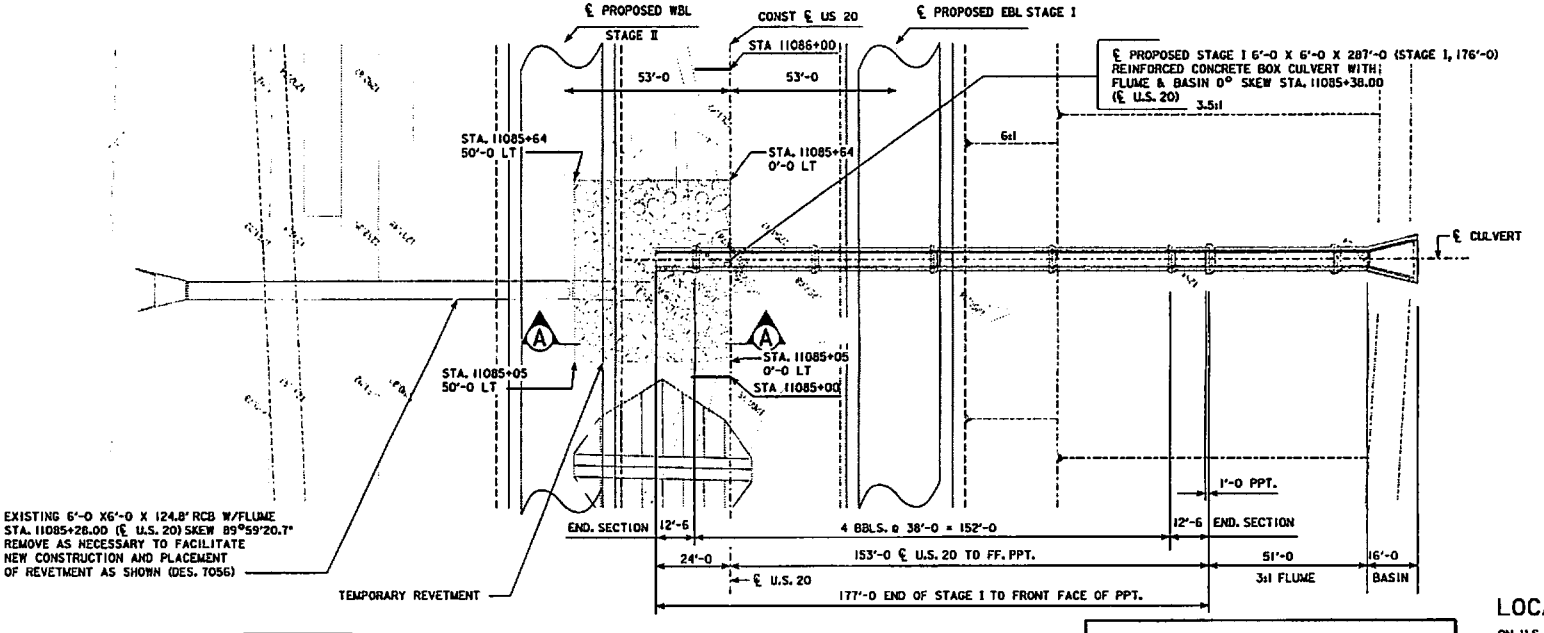
LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 18'-0
ANTICIPATED SETTLEMENT = 0.8 FT.



VPI STA = 11074+50 VPI STA = 11096+00
VPI ELEV = 1274.48 VPI ELEV = 11300.28

PROPOSED PROFILE GRADE US 20



CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
(A)	1264.80
(B)	1264.18
(C)	1263.56
(D)	1262.61
(E)	1261.65

NOTE:
BELL JOINTS ARE TO BE PLACED IN THE UPSTREAM END OF THE BARREL SECTION.

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD

HYDRAULIC DATA

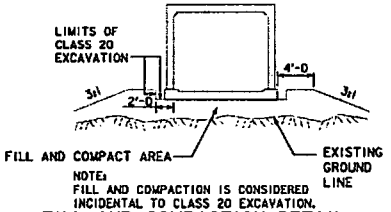
DRAINAGE AREA = 187 ACRES H
Q_{50} = 307 CFS
HW ELEV. = 1274.01

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-80N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
IDA COUNTY
LATITUDE 42.474401°
LONGITUDE -95.696130°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	



NOTE:
FILL AND COMPACTION IS CONSIDERED INCIDENTAL TO CLASS 20 EXCAVATION.

FILL AND COMPACTION DETAIL

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TEMPORARY REVETMENT NOTES

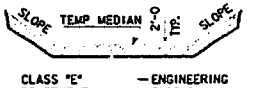
ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACED IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW CULVERT TO FACILITATE DRAINAGE.

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, BUT IT IS A PART OF THIS PROJECT.

SITUATION PLAN



CLASS "E" REVETMENT — ENGINEERING FABRIC

TYPICAL SECTION A-A MEDIAN PROTECTION

EST. TEMPORARY REVETMENT QUANTITIES

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
MEDIAN	450	500	275

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE I- 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN SITUATION PLAN

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 21

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BENCH MARK NO.592 IDOT DISC ON RCB LT OF STA 1084+60. EL=1280.618

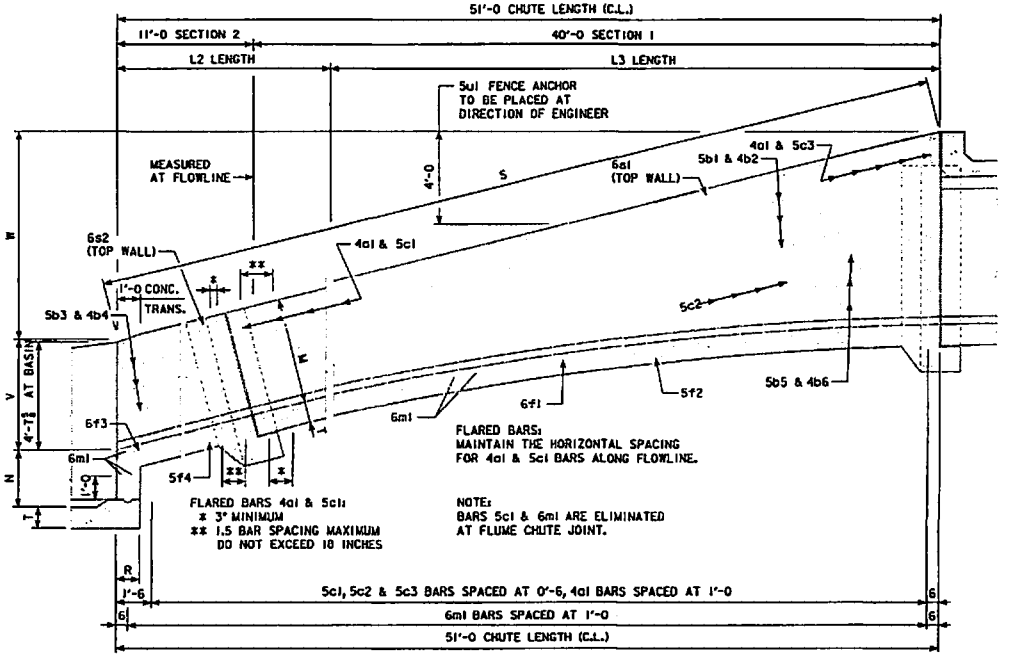
REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		100	LISTED	384
5b1	WALLS FFH - SECTION 1	——	6	42'-2±42'-10	283
4b2	WALLS BFH - SECTION 1	——	6	42'-2±42'-10	181
5b3	WALLS FFH - SECTION 2	——	6	10'-2±10'-10	66
4b4	WALLS BFH - SECTION 2	——	6	10'-2±10'-10	42
5b5	WALLS FFH - SECTION 1	——	6	LISTED	60
4b6	WALLS BFH - SECTION 1	——	6	LISTED	39
5c1	BOTT. FLOOR & WALLS BFV		75	LISTED	1387
5c2	BOTT. FLOOR & WALLS BFV - SPLICED		23	13'-5	322
5c3	WALLS BFV		46	LISTED	300
6f1	FLOOR LONGIT. TOP - SECTION 1		7	41'-0	454
5f2	FLOOR LONGIT. BOTT. - SECTION 1		7	41'-0	315
6f3	FLOOR LONGIT. TOP - SECTION 2		7	11'-4	119
5f4	FLOOR LONGIT. BOTT. - SECTION 2		7	11'-4	83
6m1	FLOOR TRANSV. TOP		53	7'-8	610
6a1	WALLS BOTH F ALONG SLOPE - SECTION 1		4	43'-2	276
6a2	WALLS BOTH F ALONG SLOPE - SECTION 2		4	9'-10	59
5u1	FENCE ANCHORS (GALVANIZED)		2	2'-10	6
				TOTAL (LB)	4986

WEIGHT OF BARS OVER 40'-0 LONG INCLUDES AN ALLOWANCE FOR LAP (2'-8 FOR 6a BARS AND 2'-2 FOR ALL OTHER BARS) BUT LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE LAPS.

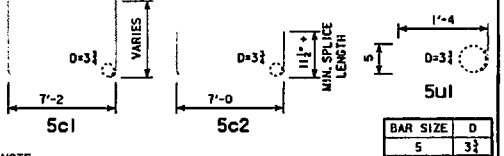
LISTED BARS

BAR 4a1	BAR 5c1	BAR 5c3	BAR 5b5 AND 4b6
100 BARS	75 BARS	46 BARS	6 BARS - 2 EA. LGTH.
54 AT 5'-2	53 AT 17'-6	46 VAR. - 2 EA. LGTH.	3'-11
46 VAR. - 2 EA. LGTH.	22 VAR.	5'-1	8'-9
5'-2	17'-7	5'-2	16'-2
5'-3	17'-7	5'-3	
5'-3	17'-7	5'-4	
5'-3	17'-7	5'-5	
5'-4	17'-8	5'-7	
5'-5	17'-8	5'-8	
5'-6	17'-9	5'-9	
5'-7	17'-9	5'-10	
5'-8	17'-10	5'-11	
5'-9	17'-10	6'-1	
5'-11	17'-11	6'-2	
6'-1	18'-0	6'-4	
6'-3	18'-1	6'-5	
6'-5	18'-2	6'-7	
6'-7	18'-3	6'-8	
6'-10	10'-5	6'-10	
7'-0	18'-6	6'-11	
7'-3	18'-7	7'-1	
7'-6	18'-9	7'-3	
7'-9	18'-10	7'-4	
8'-0	19'-0	7'-6	
8'-4	19'-2	7'-8	
8'-8			



6'x6' FLUME CHUTE - LONGITUDINAL SECTION

BENT BAR DETAILS



BAR SIZE	D
5	3½
6	4½
7	5½

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

FLUME DATA

- ∠A = 18°26'
- ∠C = 1°00'
- B = 11'-10⅜
- S = 53'-9½
- V = 4'-8⅜
- W = 17'-0
- M = 4'-6
- T = 0'-11
- H = 6'-0

CURVE DATA

- C. L. = 51'-0
- L2 = 28'-4
- L3 = 22'-8
- D = 11'-4⅜
- E = 11'-3⅜
- P. C. ELEV. = 1261.33
- P.I. ELEV. = 1261.13
- P. P. ELEV. = 1260.93
- P. T. ELEV. = 1257.36
- X1 = 3'-6⅝
- X2 = 2'-0⅜
- X3 = 0'-10⅛
- X4 = 0'-2⅛
- L3/4 = 5'-8

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	12.9	11.4	24.3
FLUME - SECTION 2	4.3	2.5	6.8
JUNCTION BELL	1.3	1.2	2.5
CHUTE BELL	1.3	0.8	2.1
BASIN CURTAIN	0.6	---	0.6
TOTAL (CY)	20.4	15.9	36.3

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-02-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-02-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE I- 176'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

FLUME DETAILS

STA. 11085+38.00 — OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 — FILE NO. 30568 — DESIGN NO. 715

DESIGN TEAM OGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 22

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	3,152	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	116.9	
3	2404-7775000	REINFORCING STEEL	LB	16,666	
4	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING	LF	52	
5	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2401-6750001	REMOVALS, AS PER PLAN THE BID ITEM "REMOVALS, AS PER PLAN" SHALL CONSIST OF REMOVING THE EXISTING 6'-0 x 6'-0 x 124.8' RCB AT STA. 11085+28.00 (℄ U.S. 20) SKEW 89°59'20.7" (ORIGINAL DESIGN 7056) AND REMOVAL OF EXISTING REVETMENT IN MEDIAN DESIGN 715).
2	2402-2720000	EXCAVATION, CLASS 20 - -
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
4	2404-7775000	REINFORCING STEEL - -
5	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS* SHOWN. (NOTE ADDITIONAL SHOP DRAWINGS *MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE *STANDARD SPECIFICATIONS.) **SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN *ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF* THE IOWA DEPARTMENT OF TRANSPORTATION. 1 GALVANIZED SAFETY HAND RAIL
6	2533-4980005	MOBILIZATION - -

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 715, STAGE II IS DESIGN 418, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0) REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET

ESTIMATED QUANTITIES

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 23

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT THE STAGE II EXTENSION WITH A 6'-0 X 6'-0 REINFORCED CONCRETE BOX CULVERT AND DROP INLET FOR THE EXISTING STAGE I 6'0 X 6'-0 RCB (DES. 715) (STA. 11085+38.00 ℄ U.S. 20.)

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON STAGE I DESIGN PLANS DES. 715

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 18.0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

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.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROAD WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE.

THE 5z1 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE GROUT MANUFACTURER'S RECOMMENDATIONS.

A. POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E OF THE STANDARD SPECIFICATIONS.

THE PRICE BID FOR "STRUCTURAL CONCRETE" SHALL INCLUDE THE COSTS OF SETTING BARS AS DOWELS IN THE EXISTING END OF THE STAGE I BARREL SECTION.

PIPE HANDRAIL ASSEMBLY WILL CONSIST OF 51.75 LINEAL FEET AND IS TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOPDRAWINGS.

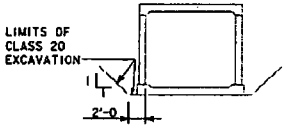
THE BID ITEM "REMOVALS, AS PER PLAN" SHALL CONSIST OF REMOVING THE EXISTING 6'-0 X 6'-0 X 124.8' RCB AT STA. 11085+28.00 (℄ U.S. 20) SKEW 89°59'20.7" (ORIGINAL DESIGN 7056) AND REMOVAL OF EXISTING REVETMENT IN MEDIAN (DESIGN 715). REVETMENT IS TO BE STOCKPILED ON SITE OR REMOVED AS DIRECTED BY THE ENGINEER.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	GALVANIZED SAFETY HAND RAIL



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

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

	STANDARD	ISSUED	REVISED
	RCB G1-12	APRIL 2012	10-12
**	RCB G2-12	APRIL 2012	07-14
	CBJ 2-12	APRIL 2012	07-13
	CBJ 4-12	APRIL 2012	------
	RCB 6-6-12	APRIL 2012	------

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

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
14'-0 x 6'-0 DROP INLET & 5'-0 BARREL	2732	2732
38'-0 BARREL SECTION	2 @ 4069	8138
15'-0 BARREL END SECTION	2 @ 1606	3212
BELL JOINTS	4 @ 629	2516
5z1 BARS, 2'-6 DOWELS @ 26 BARS	68	68
	TOTAL (LB)	16,666

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
14'-0 x 6'-0 DROP INLET & 5'-0 BBL.	6.5	7.5	1.1	15.1
38'-0 BARREL SECTION	2 @ 10.8=21.6	2 @ 11.9=23.8	2 @ 8.3=16.6	62.0
15'-0 BARREL END SECTION	2 @ 4.3=8.6	2 @ 4.7=9.4	2 @ 3.3=6.6	24.6
BELL JOINTS	4 @ 1.285=5.1	4 @ 1.032=4.1	4 @ 1.038=4.2	13.4
BUTTERFLY WINGS/PARAPET	———	1.8	———	1.8
TOTAL (CY)	41.8	46.6	28.5	116.9

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
715	STAGE I RCB CULVERT, FLUME & BASIN
418	STAGE II RCB CULVERT & DROP INLET

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0)

REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET

GENERAL NOTES

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 24

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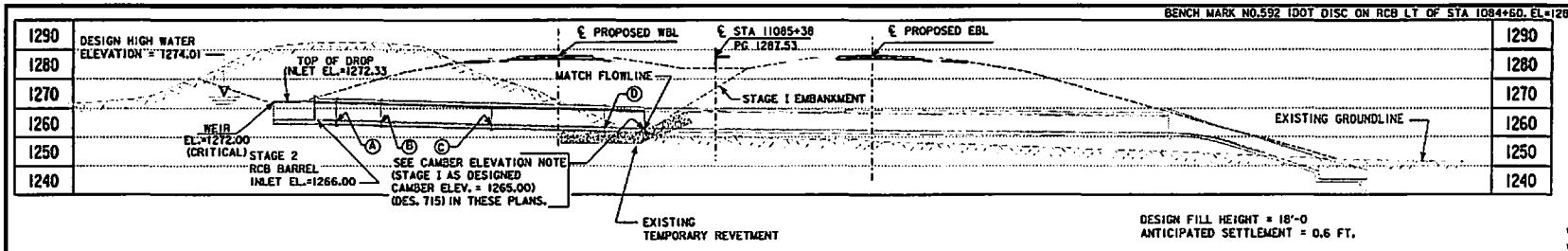
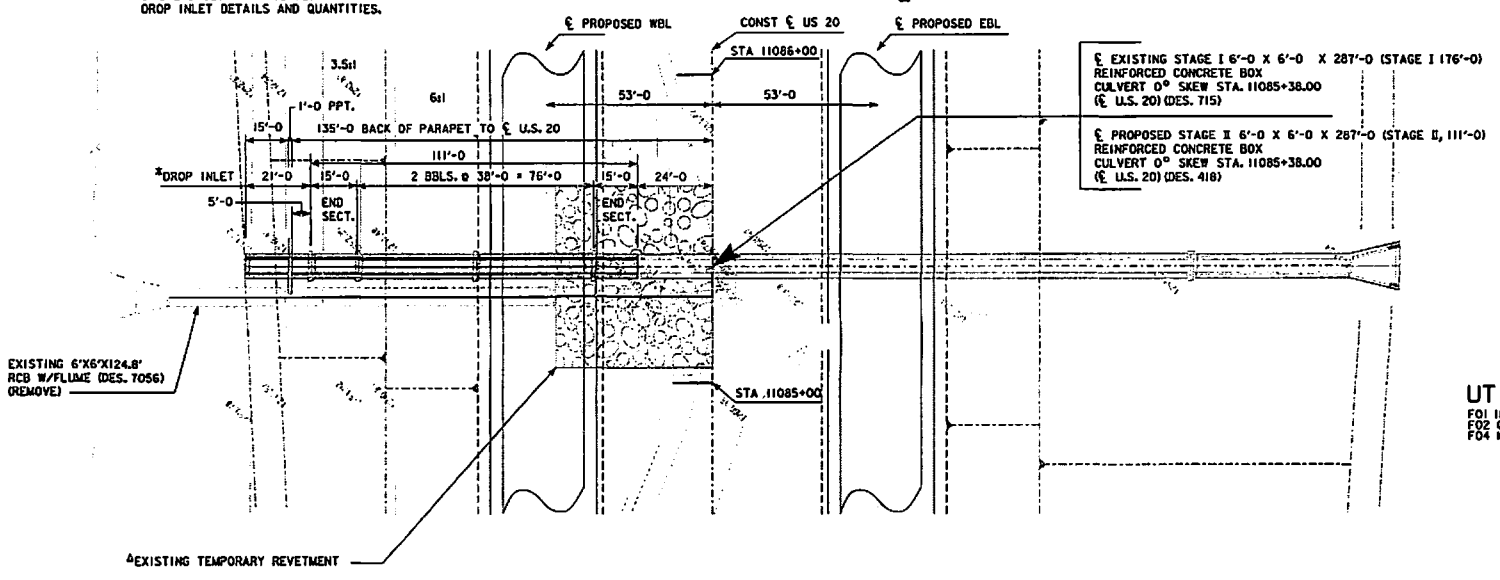
INCLUDES ADDENDA: A.02



LONGITUDINAL SECTION ALONG ℄ CULVERT



+1.20%

VPI STA = 11074+50 VPI STA = 11096+00
VPI ELEV = 1274.48 VPI ELEV = 11300.28

PROPOSED PROFILE GRADE US 20

CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
(A)	1265.92
(B)	1265.66
(C)	1265.06
(D)	1264.04

HYDRAULIC DATA

DRAINAGE AREA = 187 ACRES H
Q_{50} = 307 CFS
HW ELEV. = 1274.01

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474401°
LONGITUDE -95.696130°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I OUTLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE.

NOTE:
STAGE I IS NOT A PART OF THIS DESIGN, BUT IT IS A PART OF THIS PROJECT (DESIGN 715.)

ΔNOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER.

SITUATION PLAN

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW
6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0)
REINFORCED CONCRETE BOX CULVERT
WITH 14'-0 X 6'-0 DROP INLET
SITUATION PLAN
STA. 11085+38.00 OCTOBER 2015
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 25

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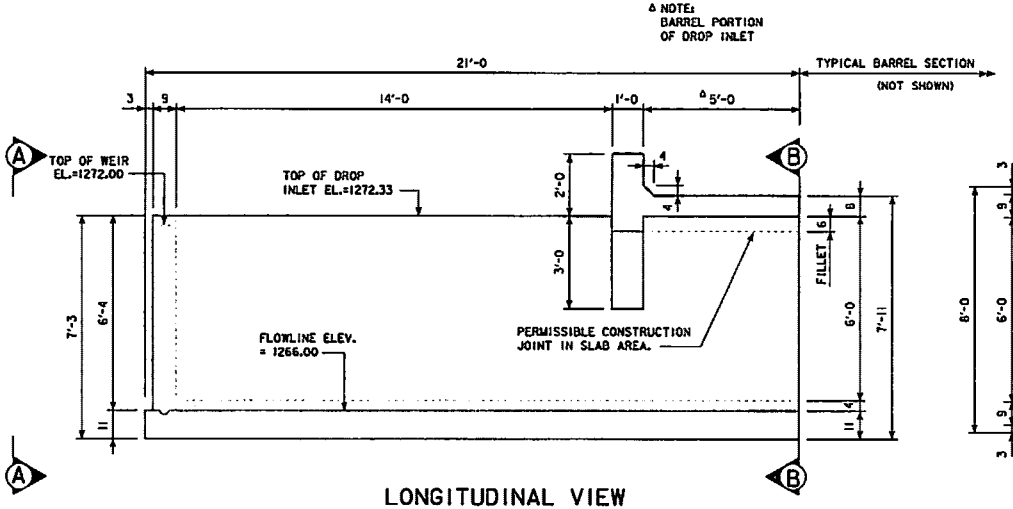
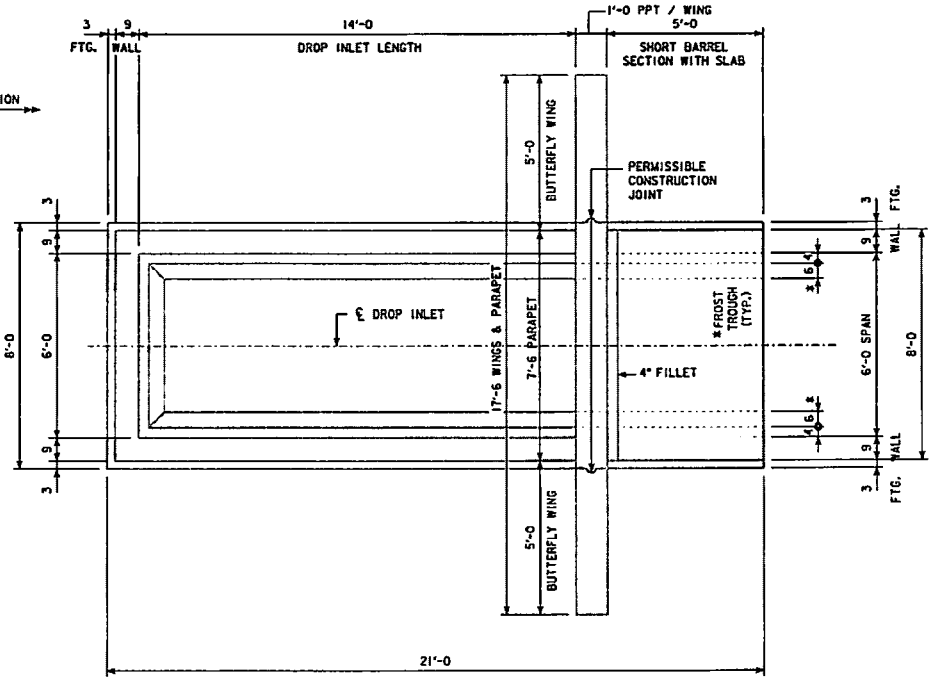
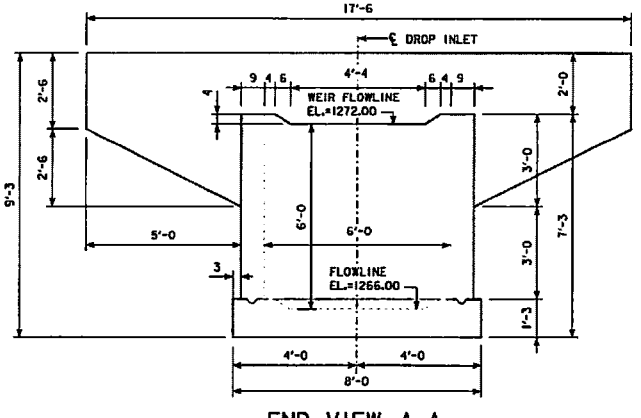
BENCH MARK NO.592 IDOT DISC ON RCB LT OF STA 1084+60. EL=1280.618



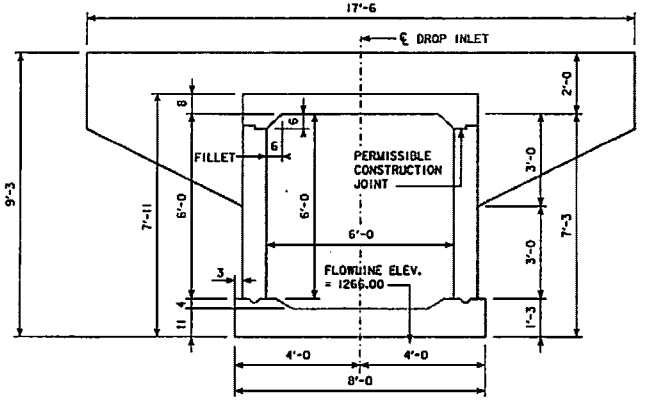
LONGITUDINAL VIEW
(TYPICAL BARREL SECTION NOT SHOWN FOR CLARITY)



PLAN VIEW



END VIEW A-A



END VIEW B-B

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0) REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET

DROP INLET DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 26

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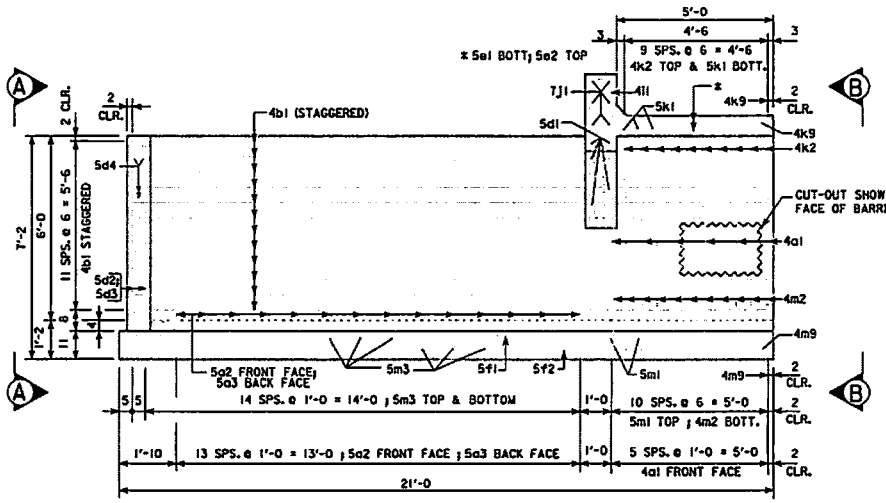
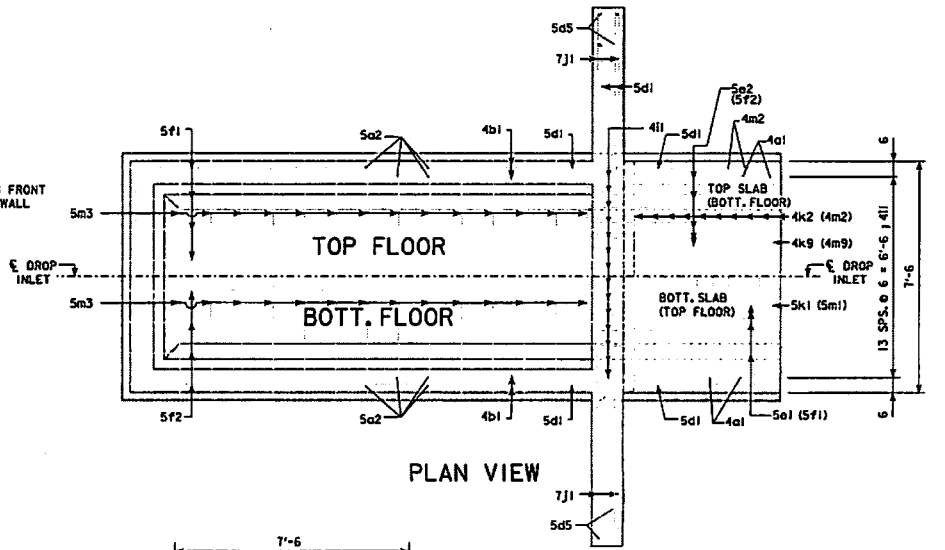
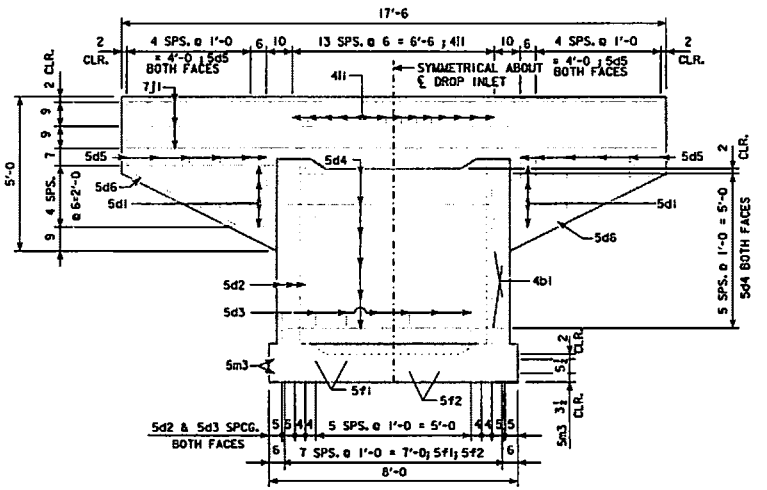


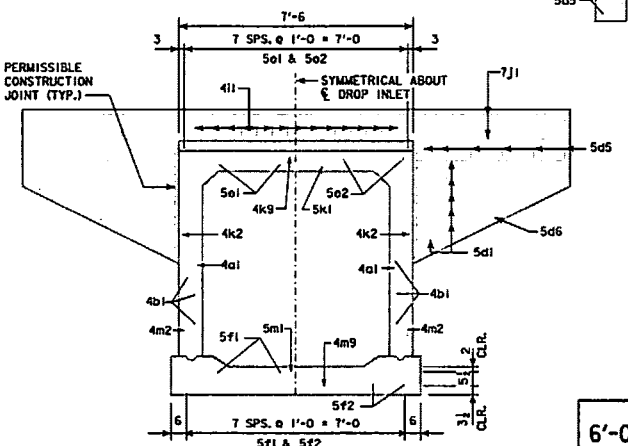
LONGITUDINAL VIEW



PLAN VIEW



END VIEW A-A



END VIEW B-B

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0) REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET

DROP INLET DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 27

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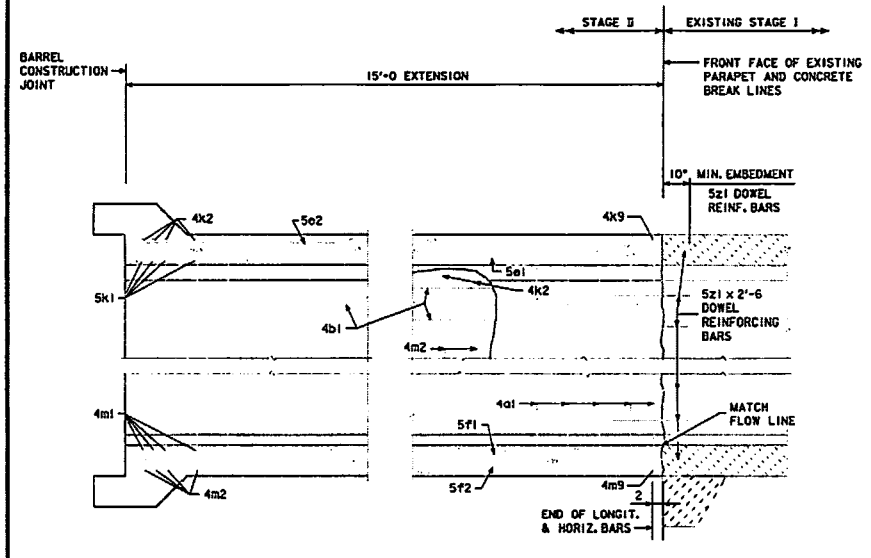
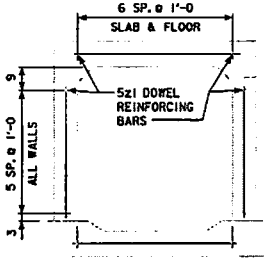
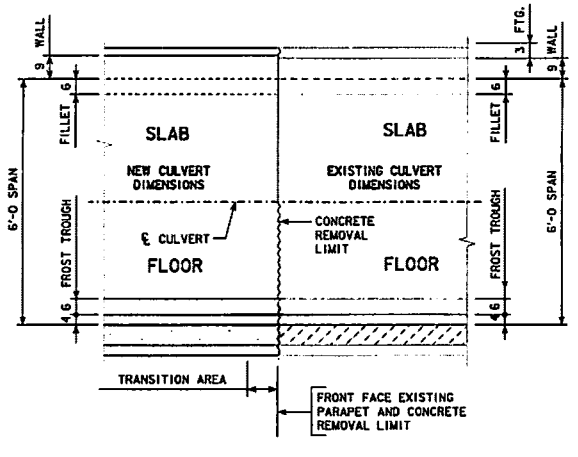


LONGITUDINAL VIEW

NOTE:
FOR BARREL DETAILS NOT SHOWN,
REFER TO STANDARDS LISTED IN THESE PLANS.



SECTION NEAR EXTENSION
(SHOWING SPACING OF 26 - 5z1 DOWEL REINFORCING BARS)



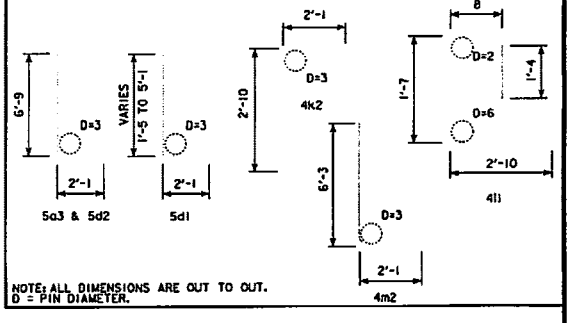
CONCRETE TRANSITION DETAILS
(PLAN VIEW)

5d5	5d1
24 BARS	20 BARS
4 EA. LENGTH	4 EA. LENGTH
2'-2	3'-6
2'-8	4'-6
3'-2	5'-6
3'-8	6'-6
4'-2	7'-2
4'-5	

REINFORCING BAR LIST - DROP INLET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	VERTICAL, FRONT FACE, BARREL SECTION		12	7'-5	59
5a2	VERTICAL, FRONT FACE, DROP INLET SECTION		28	6'-9	197
5a3	VERTICAL, BACK FACE, DROP INLET SECTION		28	8'-10	258
4b1	LONGITUDINAL, BOTH FACES, WALLS		24	20'-8	331
5d1	HORIZONTAL, WINGS, BOTH FACES		20	LISTED	113
5d2	VERTICAL, WEIR WALL, BOTH FACES		12	8'-10	111
5d3	VERTICAL, WEIR WALL, BOTH FACES		12	6'-5	80
5d4	HORIZONTAL, BOTH FACES, WEIR WALL		12	7'-2	90
5d5	VERTICAL, WINGS, BOTH FACES		24	LISTED	84
5d6	SLOPE, WINGS, BOTH FACES		4	5'-3	22
5e1	LONGITUDINAL, SLAB, BOTT.		8	5'-8	47
5e2	LONGITUDINAL, SLAB, TOP		8	5'-8	47
5f1	LONGITUDINAL, FLOOR, TOP		8	20'-8	172
5f2	LONGITUDINAL, FLOOR, BOTT.		8	20'-8	172
4i1	VERTICAL, PARAPET		14	6'-5	60
7j1	TRANSVERSE, PARAPET/WINGWALLS		6	17'-2	211
5k1	TRANSVERSE, BOTT. SLAB		10	7'-2	75
4k2	CORNER, TOP. SLAB		10	4'-11	33
4k9	TRANSVERSE, TOP. SLAB, END		1	7'-2	5
5m1	TRANSVERSE, TOP, FLOOR, BARREL SECTION		11	7'-8	88
4m2	VERTICAL, BOTT. CORNER		11	8'-4	61
5m3	TRANSVERSE, TOP, BOTT. FLOOR, DROP INLET SECTION		32	7'-8	256
4m9	TRANSVERSE, BOTT; FLOOR, END		1	7'-8	5
	REINFORCING STEEL - TOTAL (LBS.)				2577

BENT BAR DETAILS



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

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0) REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET EXTENSION DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 28

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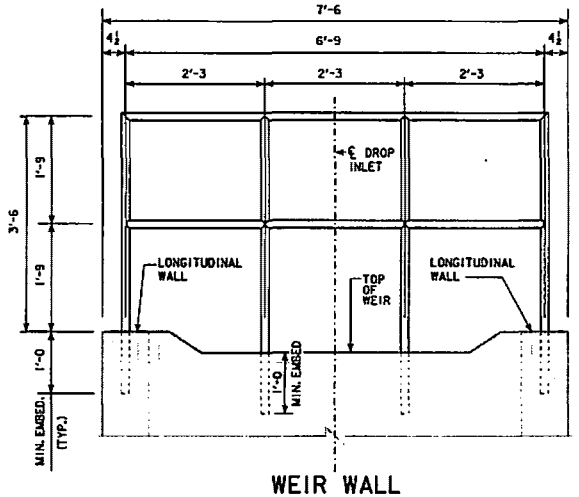
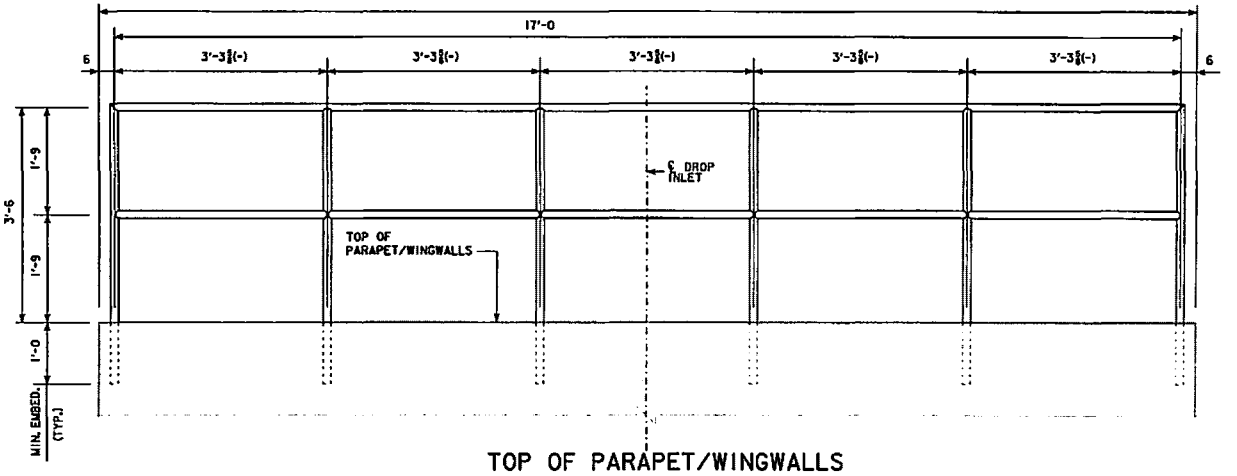
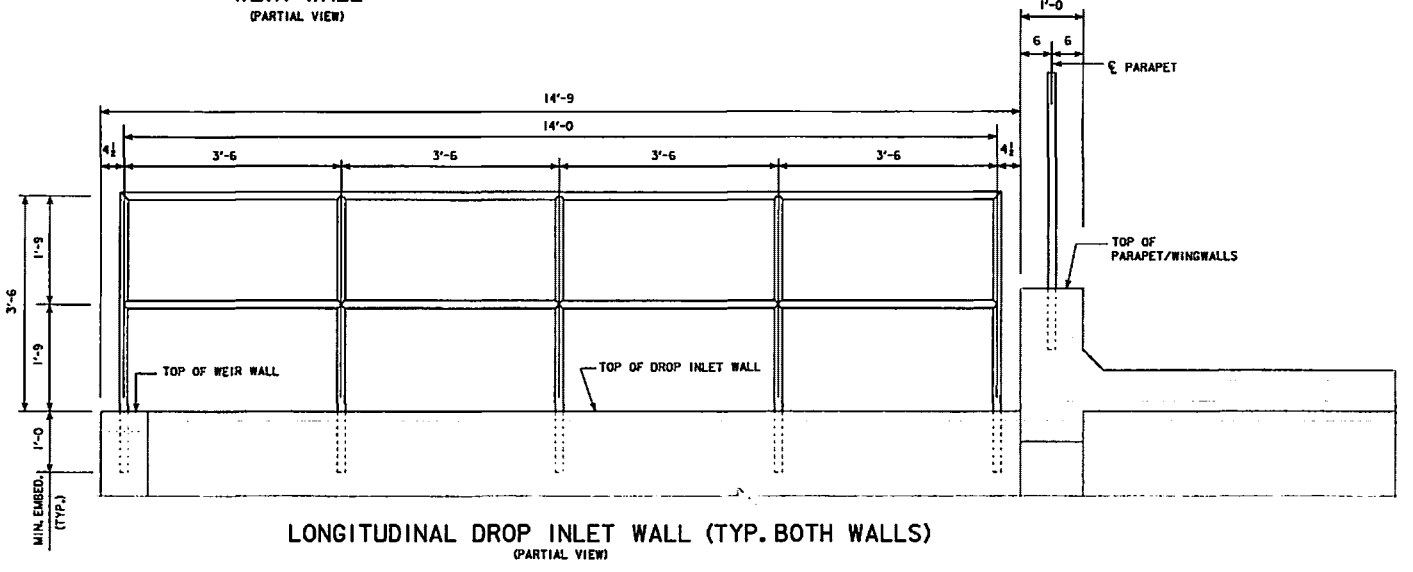


WEIR WALL
(PARTIAL VIEW)



TOP OF PARAPET/WINGWALLS
(PARTIAL VIEW)



LONGITUDINAL DROP INLET WALL (TYP. BOTH WALLS)
(PARTIAL VIEW)

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0) REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET SAFETY RAIL DETAILS

STA. 11085+38.00

OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 29

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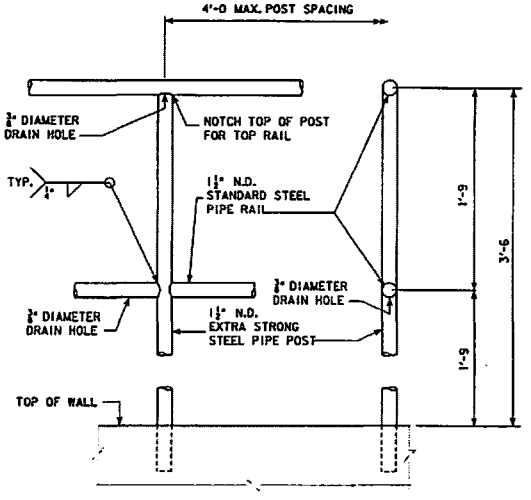
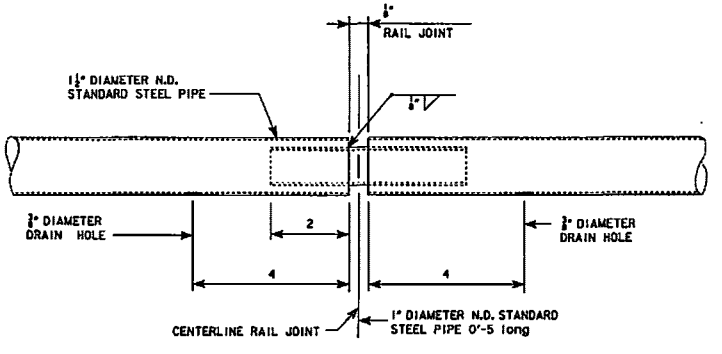


PIPE HANDRAIL DETAILS



RAIL JOINT DETAIL

NOTE: PIPE HANDRAIL ASSEMBLY TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOP DRAWINGS.

PEDESTRIAN HAND RAIL NOTES:

THE STEEL PIPE PEDESTRIAN HAND RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED END TO END OF RAIL. THE PRICE BID FOR STEEL PIPE PEDESTRIAN HAND RAIL SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.

THE MATERIAL FOR TUBE RAILS, POSTS AND SPLICE TUBES SHALL BE STANDARD STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53,-TYPE E OR S, GRADE B OR ASTM A500 GRADE B.

PANELS AND END SECTIONS SHALL BE GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A123.

ENDS OF RAIL SECTIONS ARE TO BE SAWED OR MILLED. ALL CUT ENDS ARE TO BE TRUE, SMOOTH, AND FREE OF BURRS OR RAGGED EDGES.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 287'-0 (STAGE II 111'-0) REINFORCED CONCRETE BOX CULVERT WITH 14'-0 X 6'-0 DROP INLET

SAFETY RAIL DETAILS

STA. 11085+38.00

OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)—2R-47 | SHEET NUMBER 30

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	183	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	25.0	
3	2404-7775000	REINFORCING STEEL	LB	3,929	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 --
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) --
3	2404-7775000	REINFORCING STEEL --
4	2533-4980005	MOBILIZATION --

DESIGN FOR A 19° SKEW (LA)

5'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42"Φ RC PIPE ESTIMATED QUANTITIES

STA. 11094+42.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 815

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 3

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 5'-0 X 4'-0 FLUME, FLUME COLLAR AND BASIN FOR A 42"Φ RC PIPE AT STA.11094+42.00 (℄ U.S. 20).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS 1 EXPOSURE CONDITION FOR CRACK CONTROL.

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.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

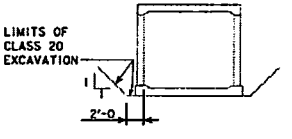
THE ROAD WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE.

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

STANDARD	ISSUED	REVISED
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	------
RCFB-01-12	APRIL 2012	------
FBJ-01-12	APRIL 2012	------

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
5'-0 X 4'-0 FLUME	2346	2346
5'-0 X 4'-0 BASIN	1583	1583
	TOTAL (LB)	3929



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
5'-0 X 4'-0 FLUME	8.8	6.2	---	15.0
5'-0 X 4'-0 BASIN	7.4	2.6		10.0
TOTAL (CY)	16.2	8.8	---	25.0

TRAFFIC CONTROL PLAN

NOTE:
THE EBL (STAGE 1) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
815	NEW FLUME AND BASIN

DESIGN FOR A 19° SKEW (LA)

5'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42"Φ RC PIPE

GENERAL NOTES

STA. 11094+42.00

OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 815

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 32

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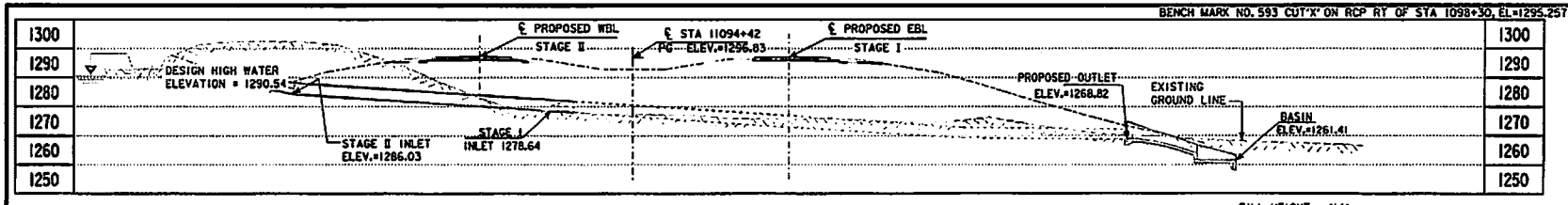
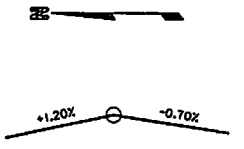


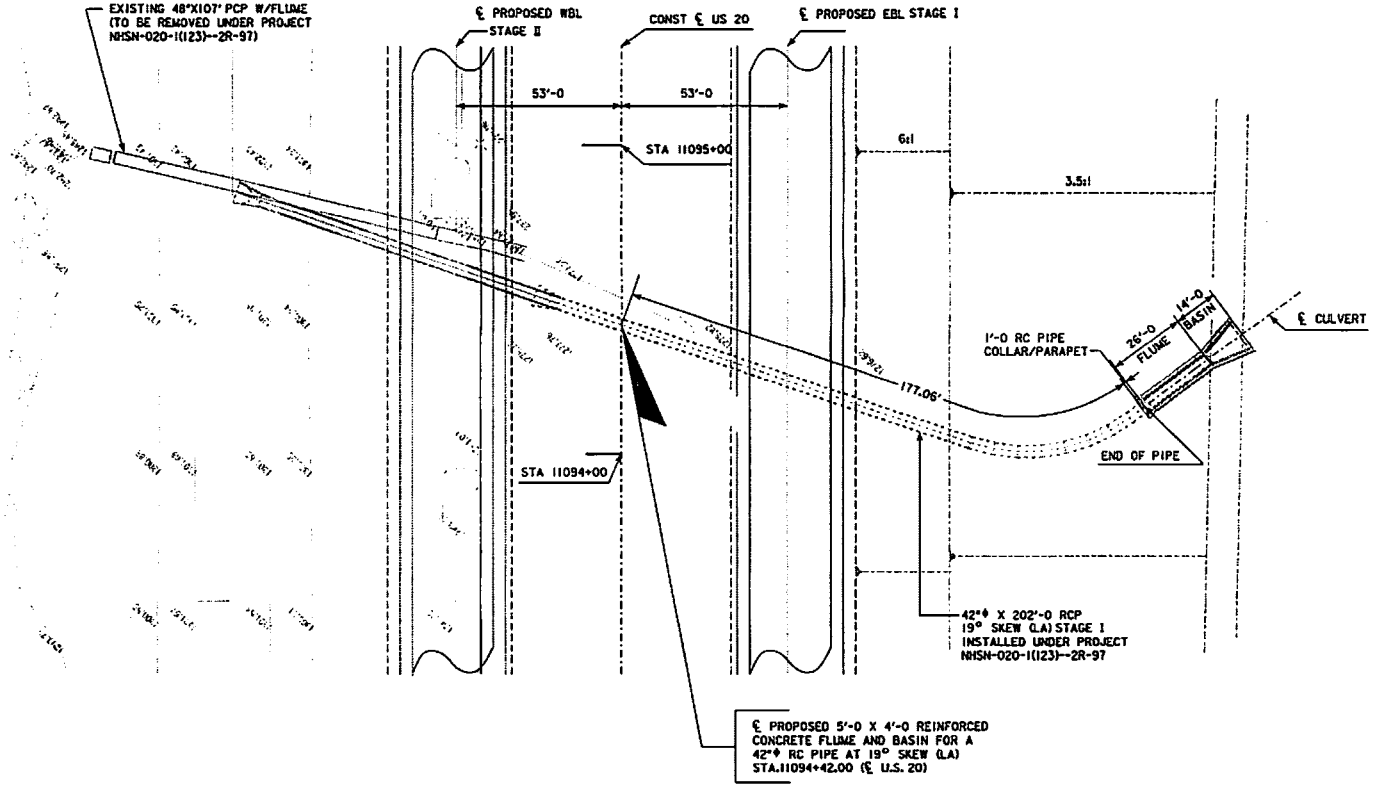
LONGITUDINAL SECTION ALONG ℄ CULVERT

FILL HEIGHT = N/A
ANTICIPATED SETTLEMENT = N/A



VPI STA = 11098+00 VC = 1200'
VPI ELEV = 1300.28

PROPOSED PROFILE
GRADE US 20



SITUATION PLAN

HYDRAULIC DATA

DRAINAGE AREA = 26 ACRES H
Q_{50} = 71 CFS
HW ELEV. = 1290.54

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD

LOCATION

ON U.S 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474384°
LONGITUDE -95.692779°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR A 19° SKEW (LA)

5'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42"Φ RC PIPE

SITUATION PLAN

STA. 11094+42.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 815

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 33

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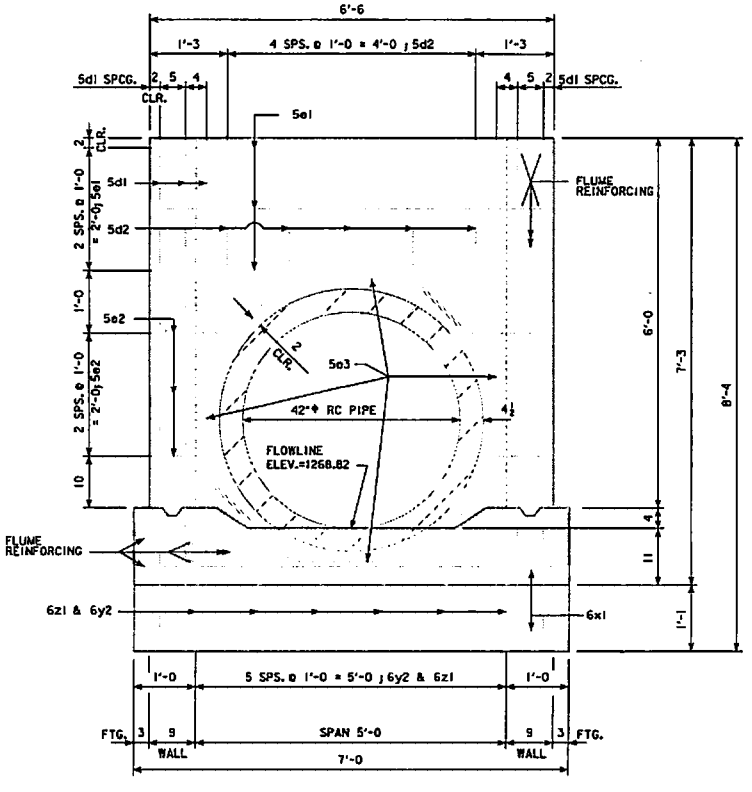
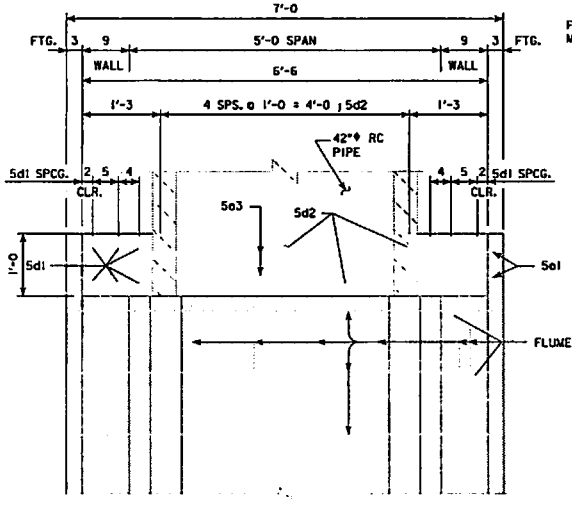
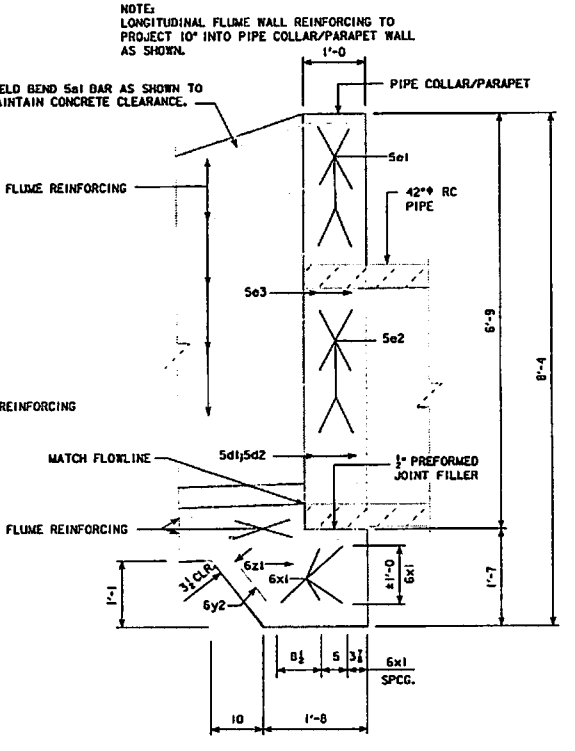
BENCH MARK NO. 593 CUT 'X' ON RCP RT OF STA 1098+30, EL.=1295.257



END VIEW



PLAN VIEW



LONGITUDINAL VIEW

NOTE:
FOR FLUME DETAILS NOT SHOWN AND REINFORCING BAR LIST, REFER TO THE LISTED STANDARDS AND DESIGN SHEETS IN THE DESIGN 815 PLANS.

DESIGN FOR A 19° SKEW (LA)

5'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42"Φ RC PIPE
RC PIPE COLLAR/PARAPET DETAILS

STA. 1109+42.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 815

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 34

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BENCH MARK NO. 593 CUT 'X' ON RCP RT OF STA 1098+30, EL.=1295.257

REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		50	LISTED	149
5b1	WALLS FFH		4	28'-0	117
4b2	WALLS BFH		4	28'-0	75
5b5	WALLS FFH		4	LISTED	34
4b6	WALLS BFH		4	LISTED	22
5c1	BOTT. FLOOR & WALLS BFV		44	LISTED	672
5c2	BOTT. FLOOR & WALLS BFV - SPLICED		5	12'-5	65
5c3	WALLS BFV		5	LISTED	56
6f1	FLOOR LONGIT. TOP		6	26'-4	237
5f2	FLOOR LONGIT. BOTT.		6	26'-4	165
6m1	FLOOR TRANSV. TOP		28	6'-8	280
5s1	WALLS BOTH F ALONG SLOPE		4	28'-0	117
5u1	FENCE ANCHORS (GALVANIZED)		2	2'-10	6
5d1	PIPE COLLAR, VERT; BOTH FACES		12	7'-10	98
5d2	PIPE COLLAR, VERT; BOTH FACES		10	LISTED	26
5e1	PIPE COLLAR, HORIZ; BOTH FACES		6	6'-2	39
5e2	PIPE COLLAR, HORIZ; BOTH FACES		12	LISTED	12
5e3	PIPE COLLAR, PIPE OPENING; BOTH FACES		8	5'-9	48
6x1	PIPE COLLAR, TRANSVERSE; BELL JOINT		5	6'-8	50
6y2	PIPE COLLAR, VERT; BELL JOINT		6	2'-8	24
6z1	PIPE COLLAR, VERT; BELL JOINT		6	6'-0	54
				TOTAL (LB)	2346

LISTED BARS

BAR 5c1
44 BARS
9 AT 13'-5
35 VAR.
13'-5
13'-5
13'-5
13'-5
13'-6
13'-6
13'-7
13'-7
13'-8
13'-9
13'-10
13'-11
14'-0
14'-1
14'-2
14'-4
14'-5
14'-7
14'-8
14'-10
15'-0
15'-2
15'-4
15'-6
15'-8
15'-11
16'-1
16'-4
16'-6
16'-9
17'-0
17'-3
17'-6
17'-9
18'-0

BAR 4a1
50 BARS
10 AT 3'-7
40 VAR. - 2 EA. LGTH.
3'-7
3'-8
3'-8
3'-9
3'-9
3'-10
3'-11
4'-1
4'-2
4'-4
4'-6
4'-8
4'-10
5'-1
5'-3
5'-6
5'-9
6'-1
6'-4
6'-8

BAR 5c3
10 BARS
10 VAR. - 2 EA. LGTH.
5'-1
5'-3
5'-4
5'-6
5'-8

BAR 5b5 AND 4b6
4 BARS - 2 EA. LGTH.
5'-5
10'-9

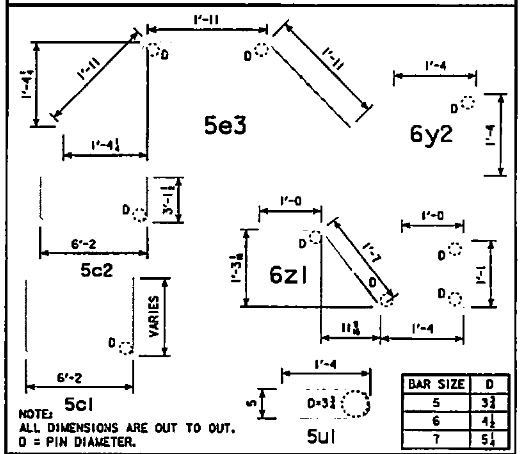
BAR 5d2
10 BARS
4 AT 3'-1
6 AT 2'-1

BAR 5e2
12 BARS
4 AT 1'-2
8 AT 0'-10

NOTE:
LONGITUDINAL BARS IN FLUME WALLS ARE TO PROJECT 10" INTO THE RC PIPE COLLAR/PARAPET AS SHOWN.

NOTE:
FOR RC PIPE COLLAR/PARAPET DETAILS, SEE DESIGN SHEET 4.

BENT BAR DETAILS



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

BAR SIZE	D
5	3 3/4
6	4 1/2
7	5 1/4

CONCRETE PLACEMENT QUANTITIES

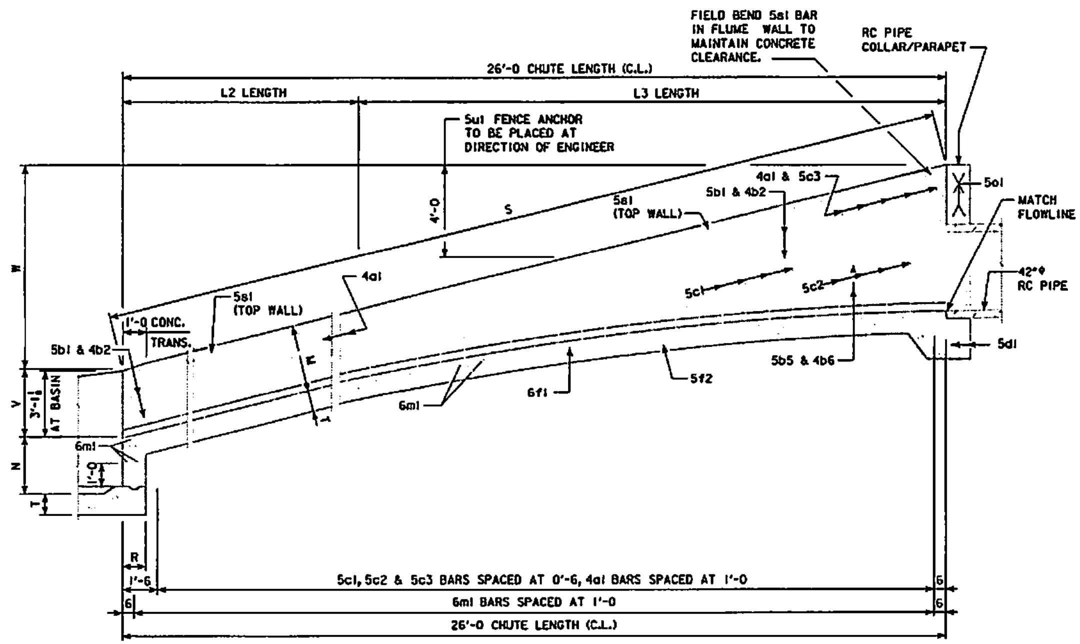
LOCATION	FOOTING	WALLS	TOTAL
FLUME	7.8	5.2	13.0
BELL JOINT FOOTING	0.7	---	0.7
BASIN CURTAIN	0.3	---	0.3
RC PIPE COLLLAR/PARAPET	---	1.0	1.0
TOTAL (CY)	8.8	6.2	15.0

FLUME DATA

∡ A = 18°26'
∡ C = 1°00'
B = 10'-6 5/16
S = 27'-4 7/8
V = 3'-2
W = 8'-8
M = 3'-0
T = 0'-11
H = 4'-0

CURVE DATA

C. L. = 26'-0
L2 = 5'-11 3/4
L3 = 20'-0 1/4
D = 10'-0 7/16
E = 9'-11 9/16
P. C. ELEV. = 1268.82
P. I. ELEV. = 1268.64
P. P. ELEV. = 1268.47
P. T. ELEV. = 1265.32
X1 = 3'-1 7/8
X2 = 1'-9 1/4
X3 = 0'-9 7/16
X4 = 0'-2 3/8
L3/4 = 5'-0 1/16



5'x4' FLUME CHUTE - LONGITUDINAL SECTION

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-01-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-01-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR A 19° SKEW (LA)

5'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR 42"Φ RC PIPE

FLUME DETAILS

STA. 11094+42.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 815

REVISION 09-13 - ADDED THE REFERENCE TO STANDARD RCF-02-12 IN THE NOTES.
HE1071.S01 - THIS SHEET ISSUED 09-03.

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	370.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-0425030	GRANULAR BACKFILL	CY	34.7	
4	2402-2720000	EXCAVATION, CLASS 20	CY	1,306	
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	92.2	
6	2404-7775000	REINFORCING STEEL	LB	16,495	
7	2415-2111212	PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	LF	153.0	
8	2507-3250005	ENGINEERING FABRIC	SY	650.0	
9	2507-6800061	REVETMENT, CLASS E	TON	600.0	
10	2533-4980005	MOBILIZATION	LS	1.00	
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES COST OF PARTIAL REMOVAL OF THE EXISTING 10'x8'x118'CULVERT, DESIGN 6856, TO ALLOW FOR CONSTRUCTION OF STAGE I AND PLACEMENT OF TEMPORARY REVETMENT.
3	2402-0425030	GRANULAR BACKFILL - -
4	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 48.4 CY EXCAVATION NECESSARY TO PLACE 6" BEDDING.
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
6	2404-7775000	REINFORCING STEEL - -
7	2415-2111212	PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT. - -
8	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
9	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
10	2533-4980005	MOBILIZATION - -
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT INCLUDES COST OF MATERIALS AND LABOR TO INSTALL TEMPORARY STEEL CURTAIN WALL. TEMPORARY CURTAIN WALL TO REMAIN IN PLACE UNTIL STAGE 2, DESIGN 318 CONSTRUCTION BEGINS.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 615, STAGE II IS DESIGN 318, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN ESTIMATED QUANTITIES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 7 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 36

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) REINFORCED CONCRETE BOX CULVERT, STATION 11073+50.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 20.0 FEET.

THE PRICE BID "REMOVALS AS PER PLAN" SHALL INCLUDE ALL COSTS ASSOCIATED WITH REMOVALS OF PORTIONS OF THE EXISTING 10'-0 x 8'-0 REINFORCED CONCRETE BOX CULVERT NEEDED TO FACILITATE NEW CONSTRUCTION.

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 OTHER BID ITEMS, LISTED IN THIS PROJECT.

PARAPET SHALL BE PRECAST.

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE II IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

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.

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 ¾ 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.

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. 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. BOXES 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."

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. (ORIGINAL DESIGN PLANS DES. 6856)

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 ½ 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". 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' x 2' PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

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.

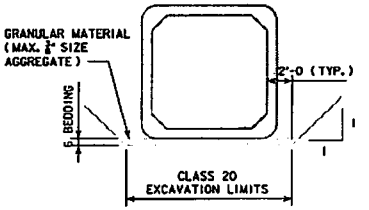
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8'-0 X 8'-0 BASIN	3969	3969
* 8'-0 x 8'-0 FLUME	5736	5736
23'-0 BARREL END SECTION	4603	4603
BARREL BELL JOINTS	2 @ 769	1538
FLUME JUNCTION BELL JOINT	569	569
	TOTAL (LB)	16,495

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
8'-0 x 8'-0 BASIN	14.1	7.9	———	22.0
** 8'-0 x 8'-0 FLUME	19.2	17.0	** 0.7	36.9
23'-0 BARREL END SECTION	8.3	9.8	6.8	24.9
BARREL BELL JOINTS	2 @ 1.561 = 3.1	2 @ 1.396 = 2.8	2 @ 1.258 = 2.5	8.4
TOTAL (CY)	44.7	37.5	10.0	92.2

* INCLUDES 106 LBS. FOR PARAPET.
** INCLUDES 0.7 CY FOR PARAPET.



GRANULAR BEDDING DETAIL

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

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

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

STANDARD	ISSUED	REVISED
RCB G1-12	4-12	10-12
**RCB G2-12	4-12	07-14
RCB 8-8-12	4-12	-----
RCF 01-12	4-12	05-13
RCF 02-12	4-12	-----
FBJ 03-12	4-12	-----
CBJ 2-12	4-12	7-13
CBJ 4-12	4-12	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PRCB G1-13	1-13	-----
PRCB G2-13	1-13	-----
PRCB 8-13	1-13	-----

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

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
615	STAGE I RCB CULVERT, FLUME & BASIN

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN GENERAL NOTES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 7 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 37

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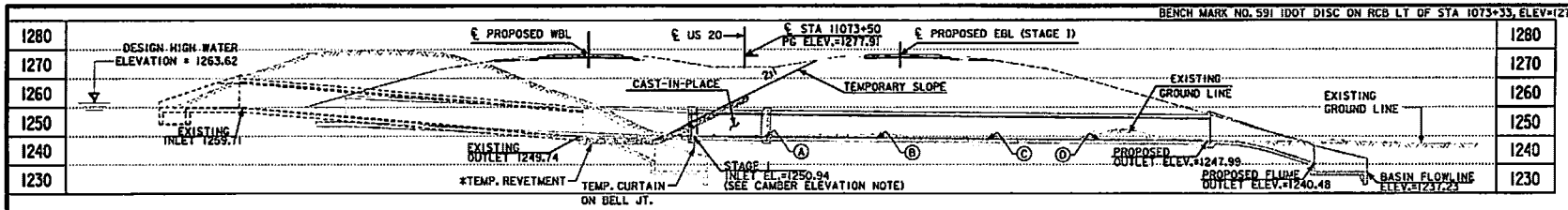
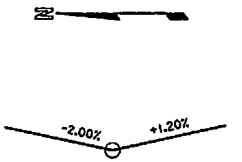
INCLUDES ADDENDA: A.02



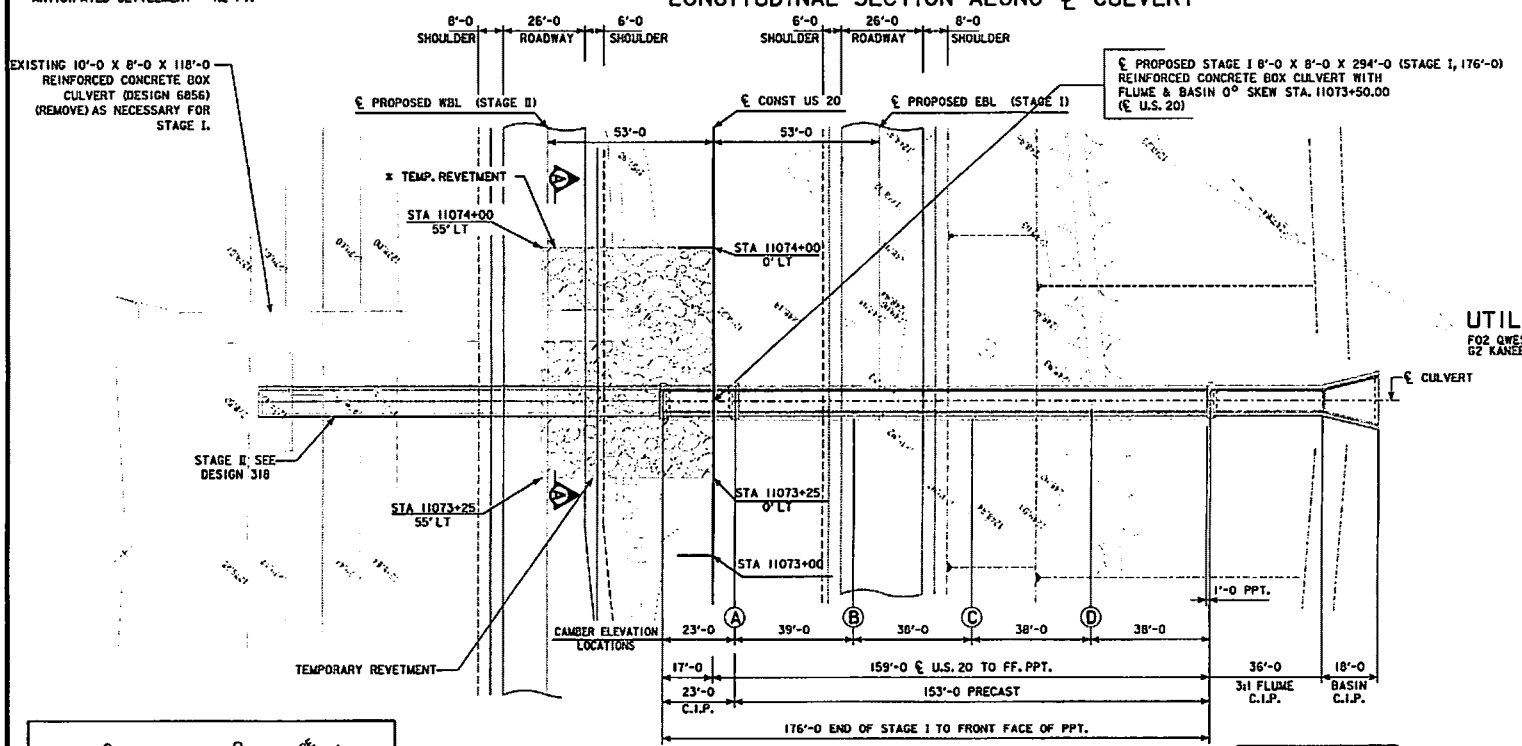


DESIGN FILL HEIGHT = 20'-0
ANTICIPATED SETTLEMENT = 1.2 FT.

LONGITUDINAL SECTION ALONG ℄ CULVERT

VPI STA = 11074+50 VC = 700'
VPI ELEV = 1274.48

PROPOSED PROFILE GRADE US 20



SITUATION PLAN

CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
INLET	1250.94
Ⓐ	1250.71
Ⓑ	1250.32
Ⓒ	1249.95
Ⓓ	1248.97
OUTLET	1247.99

UTILITIES LEGEND:

F02 QWEST
G2 KANEB PIPELINE CO(B)

HYDRAULIC DATA

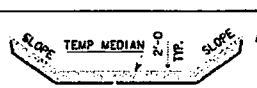
DRAINAGE AREA = 397 ACRES VH-H
Q_{50} = 591 CFS
HW ELEV. = 1263.62

LOCATION

ON US 20 OVER
SMALL STREAM
T-88-89N R-41W
SECTION 2-33
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474422°
LONGITUDE -95.700534°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	



CLASS "E" REVETMENT — ENGINEERING FABRIC

TYPICAL SECTION A-A MEDIAN PROTECTION

EST. TEMPORARY REVETMENT QUANTITIES

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
MEDIAN	600	650	370

*TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE REVETMENT, CL. E ITEM.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW STAGE I CULVERT TO FACILITATE DRAINAGE.

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, SEE DES. 318 IN THIS PROJECT FOR STAGE II.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN

SITUATION PLAN

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 7 FILE NO. 30566 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 38

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INCLUDES ADDENDA: A.02

REINFORCING BAR LIST - FLUME

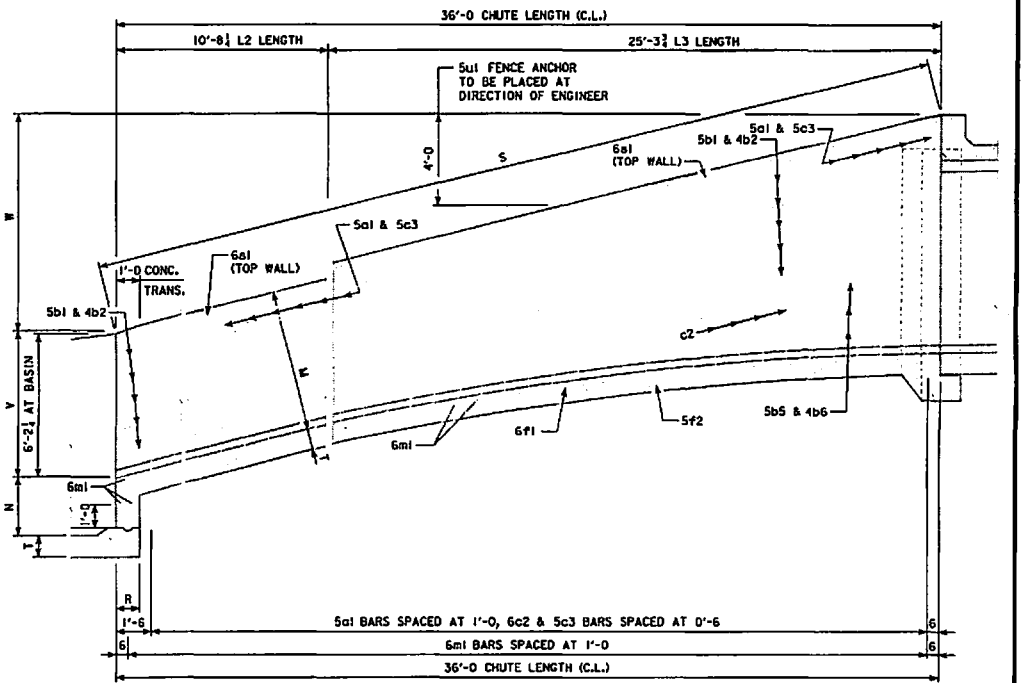
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS FFV		70	LISTED	572
5b1	WALLS FFH		10	37'-7	392
4b2	WALLS BFH		10	37'-7	251
5b5	WALLS FFH		6	LISTED	53
4b6	WALLS BFH		6	LISTED	34
6c2	BOTT. FLOOR & WALLS BFV - SPLICED		69	16'-7	1719
5c3	WALLS BFV		138	LISTED	975
6f1	FLOOR LONGIT. TOP		9	36'-8	496
5f2	FLOOR LONGIT. BOTT.		9	36'-8	345
6m1	FLOOR TRANSV. TOP		38	9'-10	561
6s1	WALLS BOTH F ALONG SLOPE	—	4	37'-7	226
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-1	6
				TOTAL (LB)	5630

LISTED BARS

BAR 5a1
70 BARS
20 AT 6'-10
50 VAR. - 2 EA. LGTH.
6'-10
6'-11
6'-11
6'-11
7'-0
7'-1
7'-2
7'-3
7'-4
7'-6
7'-7
7'-9
7'-11
8'-1
8'-3
8'-5
8'-8
8'-10
9'-1
9'-4
9'-7
9'-10
10'-1
10'-5
10'-9

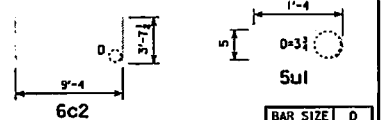
BAR 5c3
138 BARS
38 AT 5'-10
100 VAR. - 2 EA. LGTH.
5'-10
5'-10
5'-10
5'-10
5'-10
5'-10
5'-11
5'-11
5'-11
6'-0
6'-0
6'-0
6'-1
6'-1
6'-2
6'-2
6'-3
6'-4
6'-4
6'-5
6'-6
6'-7
6'-7
6'-8
6'-9
6'-10
6'-11
7'-0
7'-1
7'-2
7'-3
7'-5
7'-6
7'-7
7'-8
7'-10
7'-11
8'-0
8'-2
8'-3
8'-5
8'-6
8'-8
8'-10
8'-11
9'-1
9'-3
9'-4
9'-6
9'-8

BAR 5b5 AND 4b6
6 BARS - 2 EA. LGTH.
3'-4
7'-11
14'-0



8'x8' FLUME CHUTE - LONGITUDINAL SECTION

BENT BAR DETAILS



BAR SIZE	D
5	3¾
6	4½
7	5¼

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

FLUME DATA

∠A = 18°26'
∠C = 1°00'
B = 13'-3¾
S = 37'-11⅛
V = 6'-3¾
W = 12'-0
M = 6'-0
T = 1'-0
H = 8'-0

CURVE DATA

C.L. = 36'-0
L2 = 10'-8¼
L3 = 25'-3¾
D = 12'-8⅝
E = 12'-7⅞
P. C. ELEV. = 1247.99
P.I. ELEV. = 1247.77
P. P. ELEV. = 1247.55
P. T. ELEV. = 1243.56
X1 = 3'-11⅝
X2 = 2'-2⅝
X3 = 0'-11⅝
X4 = 0'-3
L3/4 = 6'-3⅝

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	16.6	15.4	32.0
JUNCTION BELL	1.6	1.6	3.2
BASIN CURTAIN	1.0	—	1.0
TOTAL (CY)	19.2	17.0	36.2

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-03-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-03-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN
FLUME DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 4 OF 7 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 39

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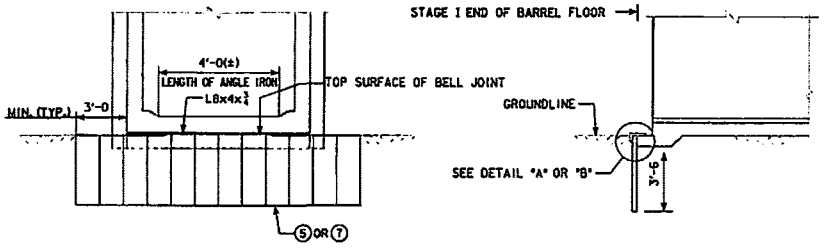
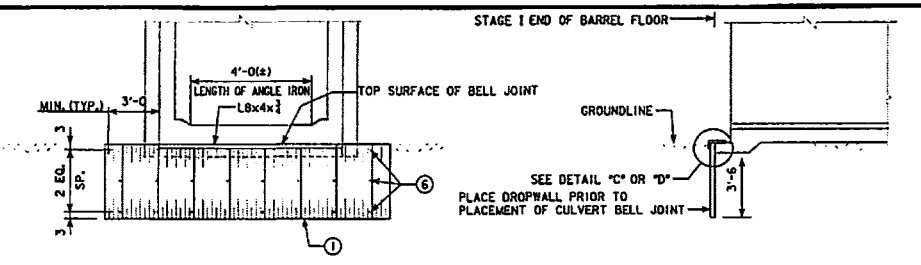
INCLUDES ADDENDA: A.02



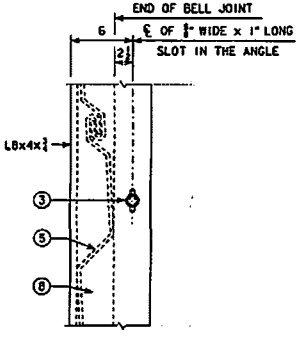
END VIEW ELEVATION

ALTERNATES 1 & 2 (STEEL SHEET PILING)

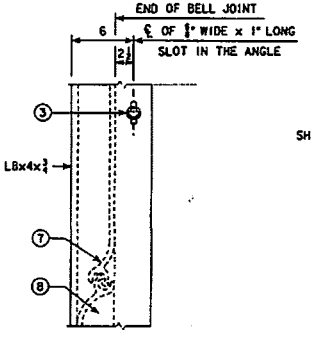


END VIEW ELEVATION

ALTERNATES 3 & 4 (STEEL SHEETS)



PLAN



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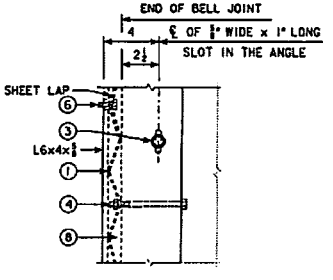
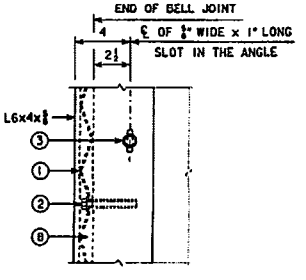
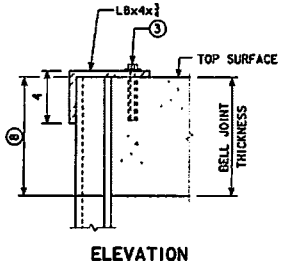


PLAN

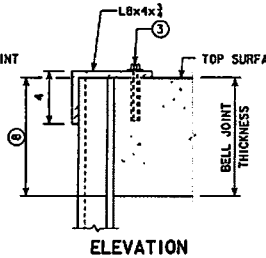


PLAN



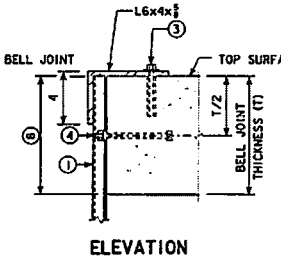
ELEVATION

DETAIL "A"
ALTERNATE 1
STEEL SHEET PILING SHOWN



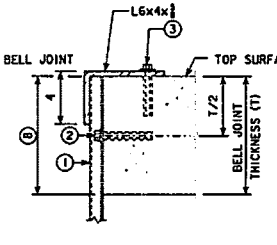
ELEVATION

DETAIL "B"
ALTERNATE 2
STEEL SHEET PILING SHOWN



ELEVATION

DETAIL "C"
ALTERNATE 3
ON NEW CONSTRUCTION ONLY



ELEVATION

DETAIL "D"
ALTERNATE 4
ON NEW OR OLD CONSTRUCTION

NOTES:

USE OF ALTERNATE CURTAIN WALLS SHALL BE APPROVED BY THE ENGINEER.

① 2½"x½" OR 2"x½" CORRUGATED (12 GAGE OR HEAVIER) STEEL SHEETS.

② FASTEN THE STEEL SHEETS TO THE FRONT EDGE OF THE BELL JOINT WITH ¾"Ø x0'-4 BOLTS AND APPROVED ANCHORAGES (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

③ FASTEN THE L8x4x½ OR L6x4x⅜ WITH ¾"Ø x0'-4 BOLTS, 1" O.D. WASHER AND AN APPROVED ANCHORAGE (2'-0 SPACING).

④ FASTEN THE STEEL SHEETS TO THE BELL JOINT EDGE OF THE FLOOR WITH ¾"Ø x0'-5 BOLTS WITH NUT AND LOCK WASHER (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

⑤ CORRUGATED (12 GAUGE OR HEAVIER) STEEL SHEET PILING, INTERLOCKING TYPE A.

⑥ ¾"Ø x0'-1 BOLT WITH NUT, TO LAP STEEL SHEETS.

⑦ STEEL SHEET PILING, SECTION PS 27.5 OR EQUAL.

⑧ FILL THE VOIDS AS SHOWN, WITH CONCRETE OR CONCRETE GROUT, AS APPROVED BY THE ENGINEER.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN

TEMPORARY CURTAIN WALL DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 7 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF	MODIFIED STANDARD PES 4-13	IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER 40

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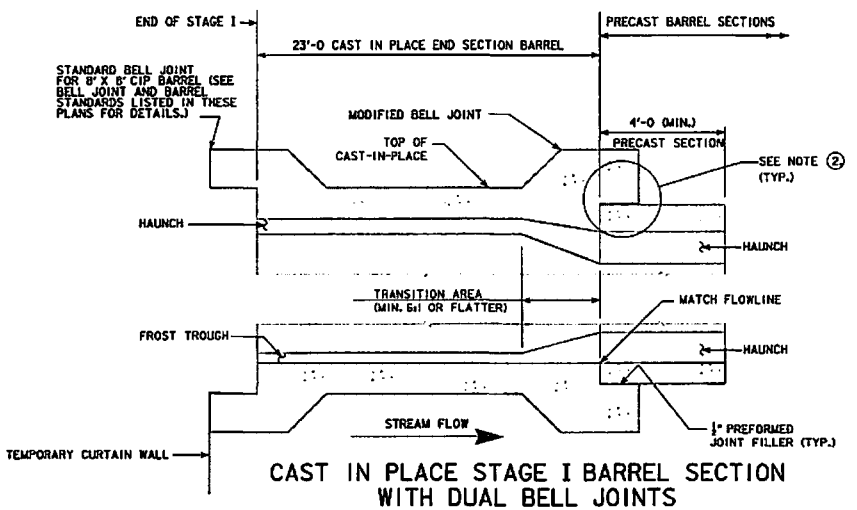
INCLUDES ADDENDA: A.02



CAST IN PLACE STAGE I BARREL SECTION
WITH DUAL BELL JOINTS
(LONGITUDINAL VIEW)

(2) NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT BELL JOINTS ARE PLACED ON THE DOWNSTREAM AND UPSTREAM END OF THE STAGE I END SECTION, AS SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0)
PRECAST REINF. CONCRETE BOX CULVERT
WITH 3:1 FLUME & BASIN

PC TO C.I.P. CONNECTION & QTY
STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 6 OF 7 FILE NO. 30560 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 41

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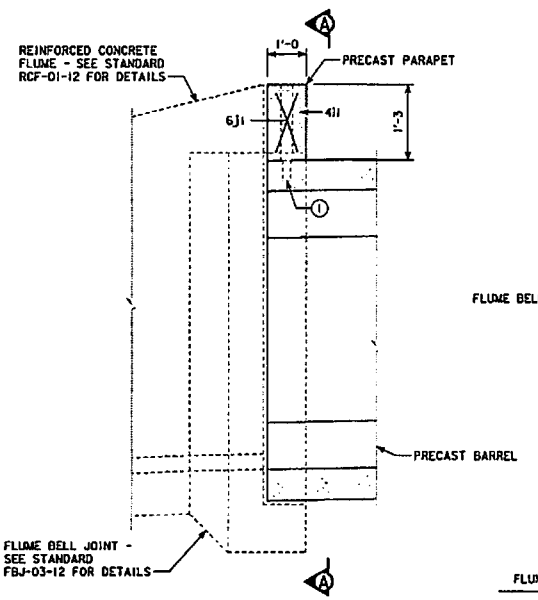
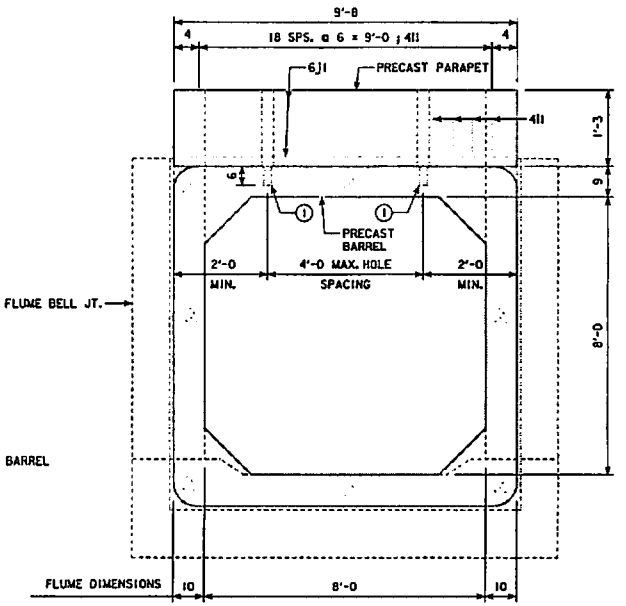
INCLUDES ADDENDA: A.02



PART ELEVATION



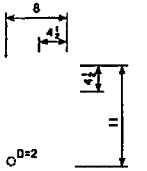
SECTION A-A

REINFORCING BAR LIST-ONE PRECAST PARAPET					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4I1	STIRRUP		19	3'-11	50
6J1	LONGIT.		4	9'-4	56
				TOTAL (LBS.)	106

CONCRETE QUANTITIES

TOTAL CONCRETE = 0.7 CU.YD.

BENT BAR DETAILS



4I1

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

NOTES:

① PLACE NO. 8 DOWELS, 1'-6 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.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE I 176'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN

PARAPET DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 7 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 42

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INCLUDES ADDENDA: A.02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-0425030	GRANULAR BACKFILL	CY	20.1	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1,925	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	53.9	
4	2404-7775000	REINFORCING STEEL	LB	9,661	
5	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING	LF	58	
6	2415-2110808	PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.	LF	90.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-0425030	GRANULAR BACKFILL - -
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 20.1 CY EXCAVATION NECESSARY TO PLACE 6" BEDDING.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF TEMPORARY CURTAIN ON STAGE I BELL JOINT NEEDED TO FACILITATE NEW CONSTRUCTION. 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.
4	2404-7775000	REINFORCING STEEL - -
5	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.) SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION. 1 GALVANIZED SAFETY HAND RAIL
6	2415-2110808	PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
7	2533-4980005	MOBILIZATION - -

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 615, STAGE II IS DESIGN 318, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0") REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET
ESTIMATE QUANTITIES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30668 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 43

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINFORCED CONCRETE BOX CULVERT, AT STATION 11073+50.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 20.0 FEET.

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, "CLASS 20 EXCAVATION", "CLASS E REVETMENT", "GRANULAR BACKFILL", "ENGINEERING FABRIC" ASSOCIATED WITH REVETMENT, "REMOVAL" AND "MOBILIZATION".

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE I IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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.

PIPE HANDRAIL ASSEMBLY WILL CONSIST OF 58.25 LINEAL FEET AND IS TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOPDRAWINGS.

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 ¾ 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.

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. 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. BOXES 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."

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. (ORIGINAL DESIGN PLANS DES. 6856)

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 ¾ 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". 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' x 2' PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

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:

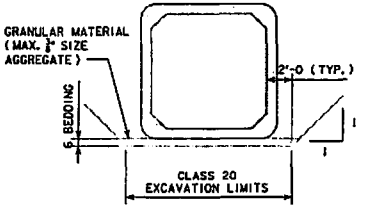
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010: BAR REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60. WELDED WIRE REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5. CONCRETE IN ACCORDANCE WITH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

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'-0 x 8'-0 DROP INLET/5'-0 BARREL SECT.	3440	3440
23'-0 BARREL END SECTION	4683	4683
BARREL BELL JOINTS	2 @ 769	1538
	TOTAL (LB)	9,661

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
10'-0 x 8'-0 DROP INLET & 5'-0 BARREL SECT.	6.3	13.0	1.3	20.6
23'-0 BARREL END SECTION	8.3	9.8	6.8	24.9
BARREL BELL JOINTS	2 @ 1.6	2 @ 1.4	2 @ 1.2	8.4
TOTAL (CY)	17.8	25.6	10.5	53.9



GRANULAR BEDDING DETAIL

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

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS
2	HANDRAIL

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ#NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

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

STANDARD	ISSUED	REVISED
RCB G1-12	4-12	10-12
** RCB G2-12	4-12	07-14
RCB B-8-12	4-12	-----
RCF 01-12	4-12	05-13
RCF 02-12	4-12	-----
FBJ 03-12	4-12	-----
CBJ 2-12	4-12	7-13
CBJ 4-12	4-12	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PRCB G1-13	1-13	-----
PRCB G2-13	1-13	-----
PRCB B-13	1-13	-----

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

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
615	STAGE I RCB CULVERT, FLUME & BASIN
318	STAGE II RCB CULVERT & DROP INLET

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET GENERAL NOTES

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 44

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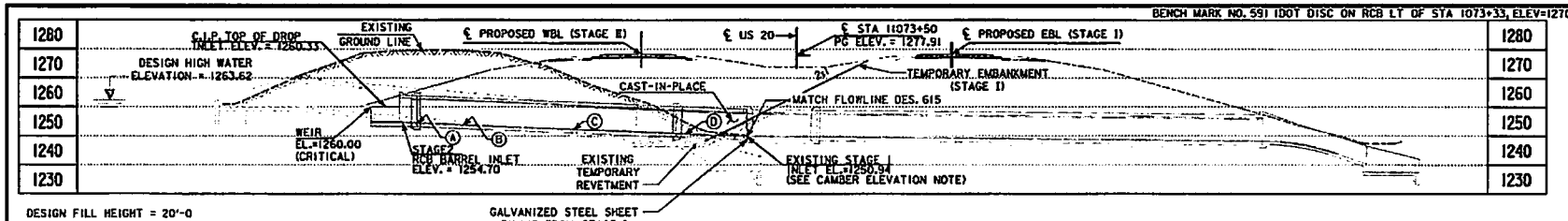
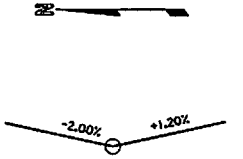
INCLUDES ADDENDA: A.02

BENCH MARK NO. 591 IDOT DISC ON RCB LT OF STA 1073+33, ELEV=1270.099



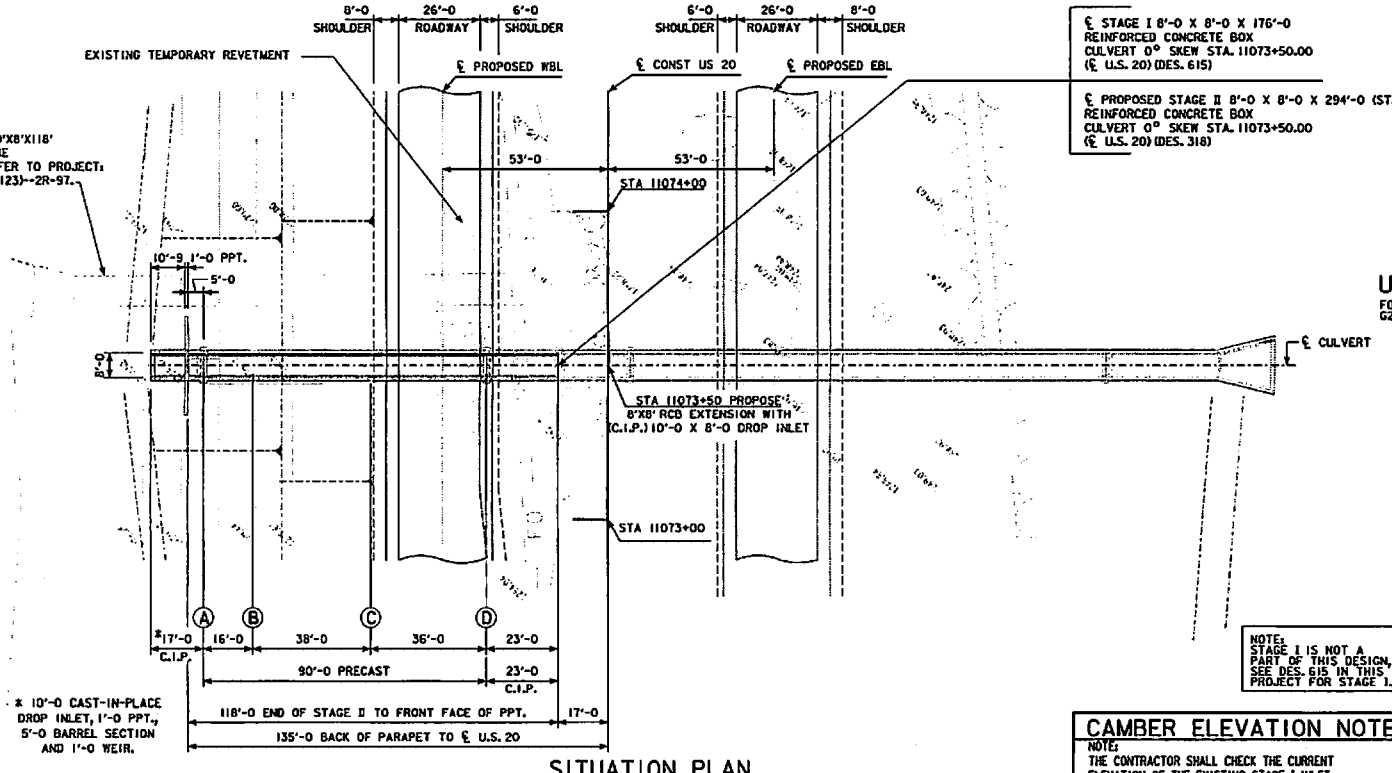
DESIGN FILL HEIGHT = 20'-0
ANTICIPATED SETTLEMENT = 0.96 FT.

LONGITUDINAL SECTION ALONG ℄ CULVERT



VPI STA = 11074+50 VC = 700'
VPI ELEV = 1274.48

PROPOSED PROFILE GRADE US 20



* 10'-0 CAST-IN-PLACE DROP INLET, 1'-0 PPT., 5'-0 BARREL SECTION AND 1'-0 WEIR.

SITUATION PLAN

℄ STAGE I 8'-0 X 8'-0 X 176'-0 REINFORCED CONCRETE BOX CULVERT 0° SKEW STA. 11073+50.00 (℄ U.S. 20) (DES. 615)

℄ PROPOSED STAGE II 8'-0 X 8'-0 X 294'-0 (STAGE II, 118'-0) REINFORCED CONCRETE BOX CULVERT 0° SKEW STA. 11073+50.00 (℄ U.S. 20) (DES. 318)

CAMBER ELEVATION TABLE

NOTE: CAMBER BELL JOINTS AS SHOWN

LOCATION	ELEVATION
INLET	1254.70
(A)	1254.47
(B)	1253.82
(C)	1252.54
(D)	1251.58
CONST. JT.	1250.94

UTILITIES LEGEND:

F02 QWEST
G2 KANEB PIPELINE CO(B)

HYDRAULIC DATA

DRAINAGE AREA = 397 ACRES VH-H
Q_{50} = 591 CFS
HW ELEV. = 1263.62

NOTE: STAGE I IS NOT A PART OF THIS DESIGN, SEE DES. 615 IN THIS PROJECT FOR STAGE I.

LOCATION

ON US 20 OVER
SMALL STREAM
T-88-89N R-41W
SECTION 2-33
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474422°
LONGITUDE -95.700534°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION. THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

NOTE:
REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

SITUATION PLAN

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DCB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 45

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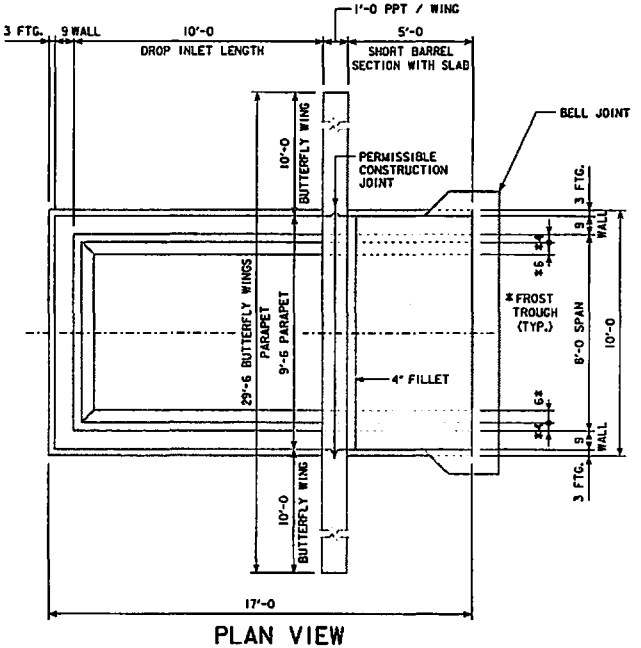
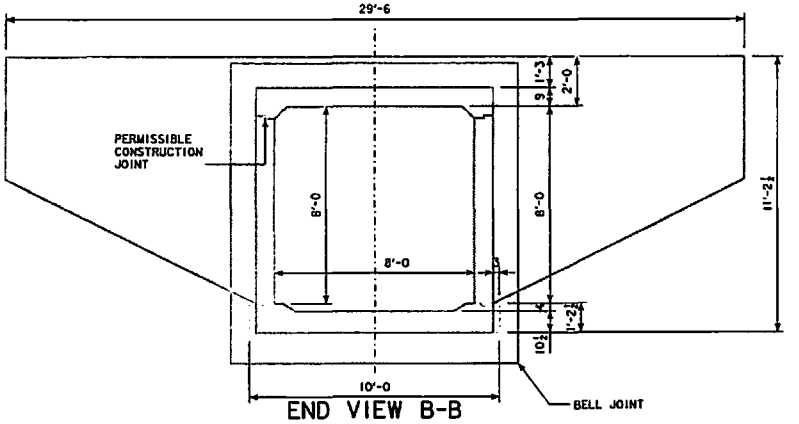
INCLUDES ADDENDA: A.02

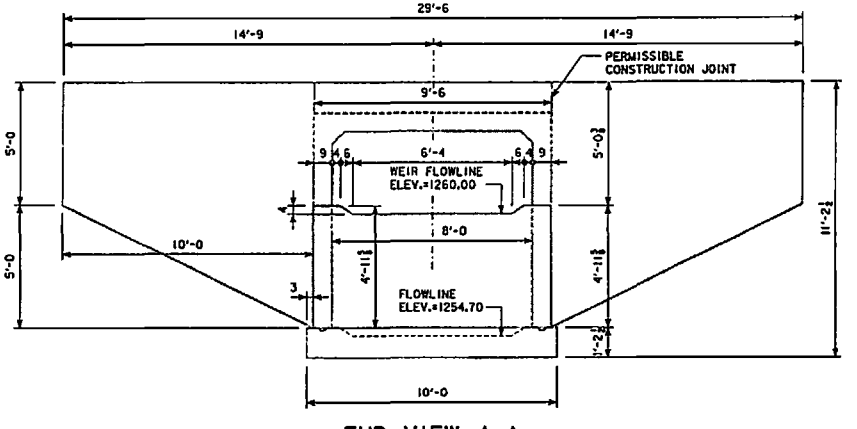
BENCH MARK NO. 591 IDOT DISC ON RCB LT OF STA 1073+33, ELEV=1270.099



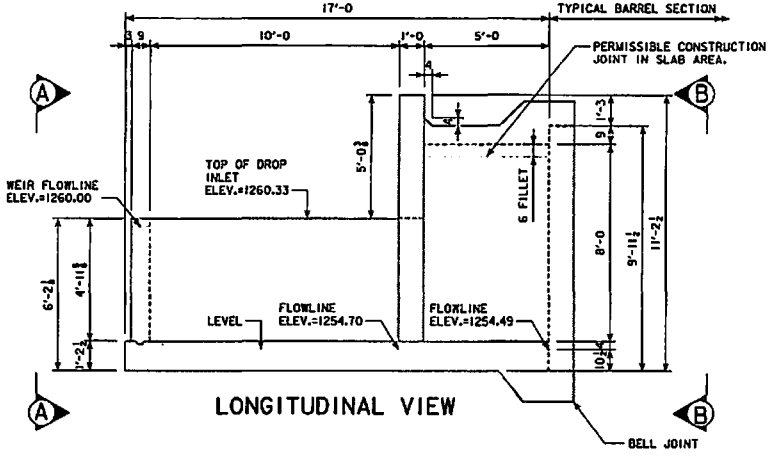
PLAN VIEW



END VIEW B-B



END VIEW A-A



LONGITUDINAL VIEW

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

DROP INLET DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 46

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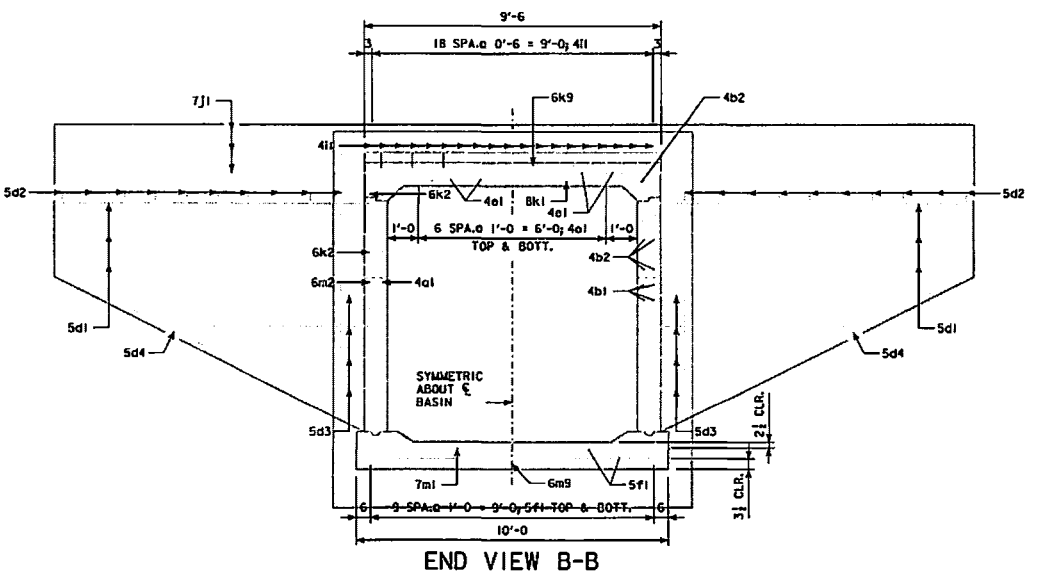
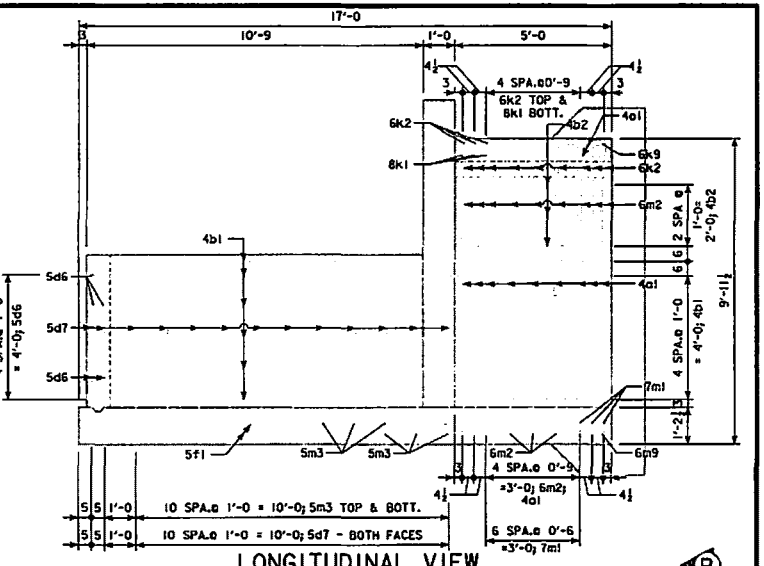
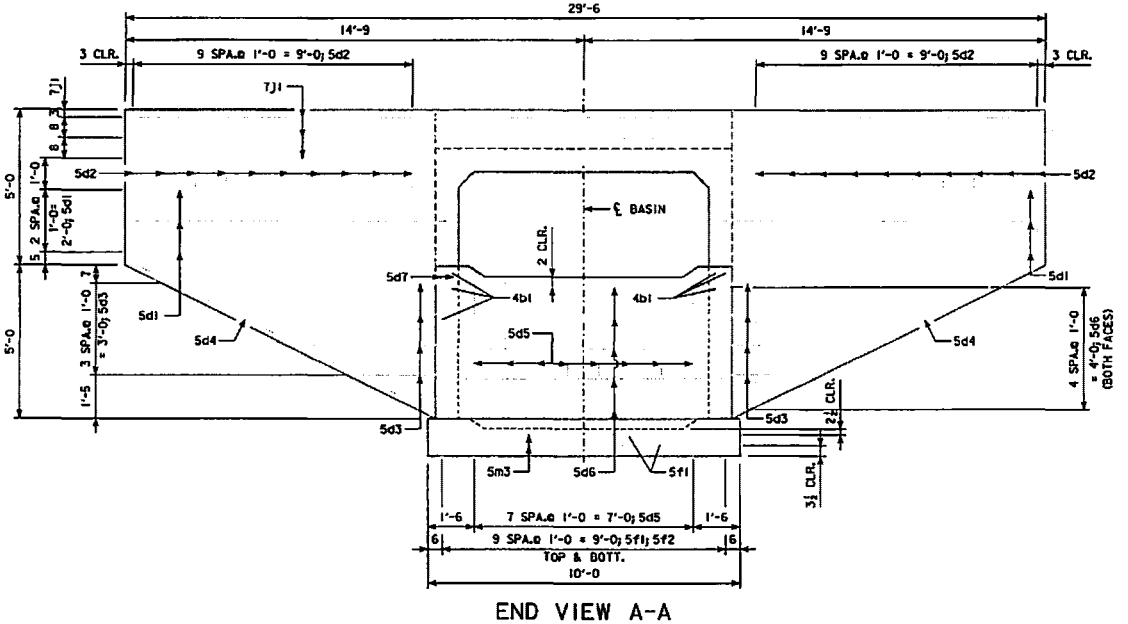


END VIEW B-B

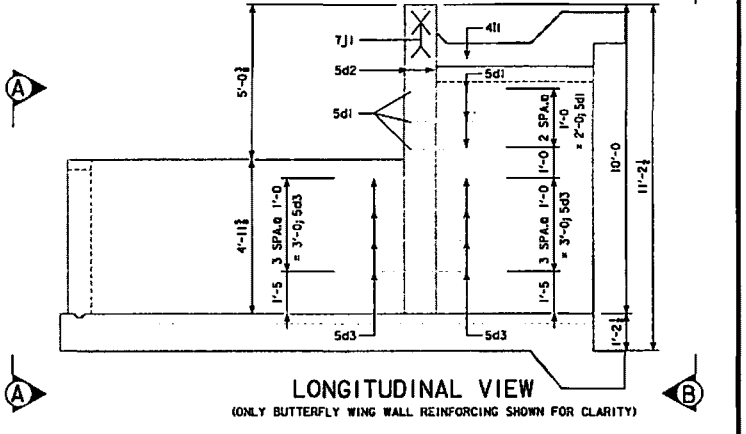


LONGITUDINAL VIEW

(BUTTERFLY WING WALL REINFORCING NOT SHOWN FOR CLARITY)



END VIEW A-A



LONGITUDINAL VIEW

(ONLY BUTTERFLY WING WALL REINFORCING SHOWN FOR CLARITY)

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0) REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

DROP INLET DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 47

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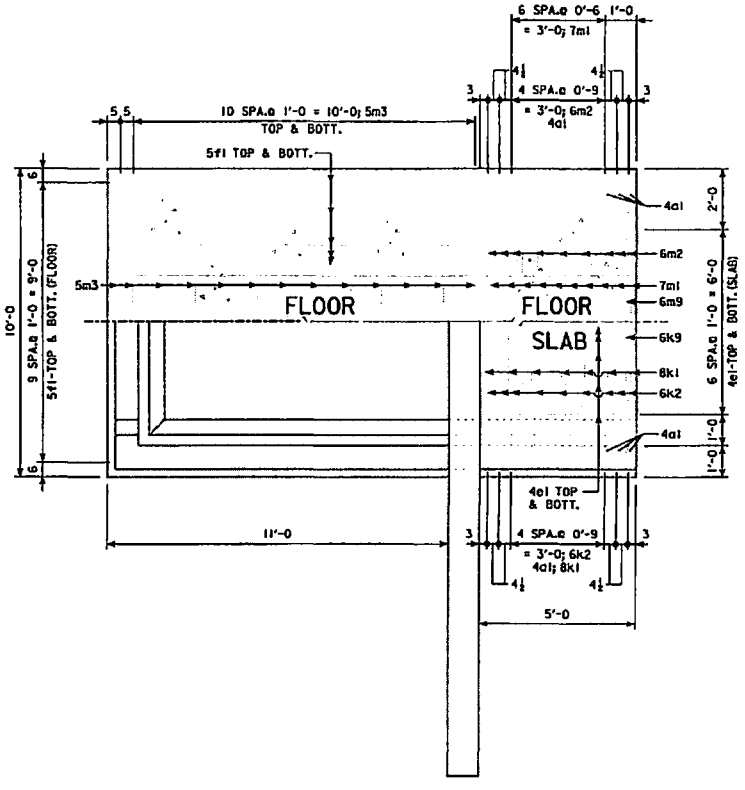
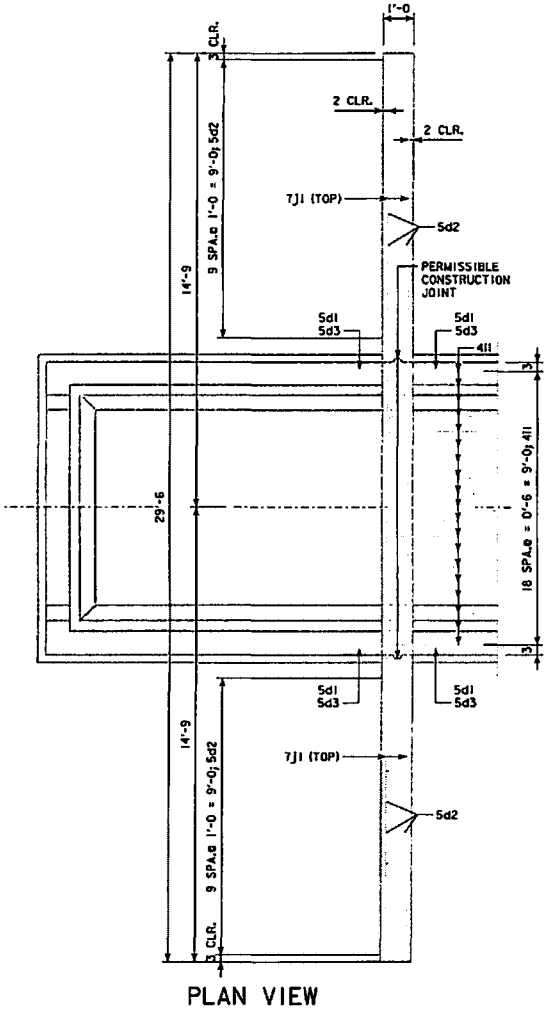


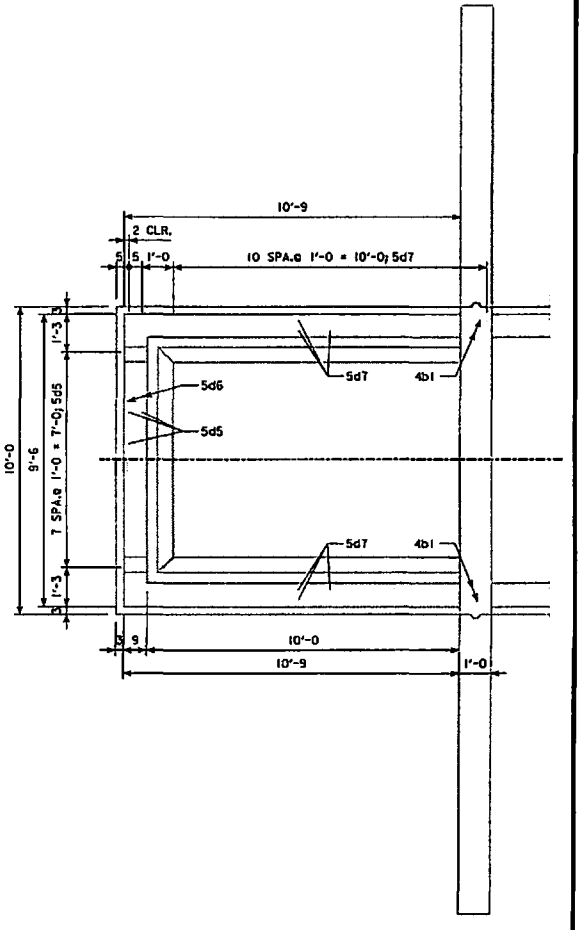
PLAN VIEW

(BUTTERFLY WING WALL REINFORCING AND BELL NOT SHOWN FOR CLARITY)



PLAN VIEW

(ONLY BUTTERFLY WING WALL REINFORCING SHOWN FOR CLARITY)



PLAN VIEW

(ONLY DROP INLET WALLS REINFORCING SHOWN FOR CLARITY)

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0") REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

DROP INLET DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 48

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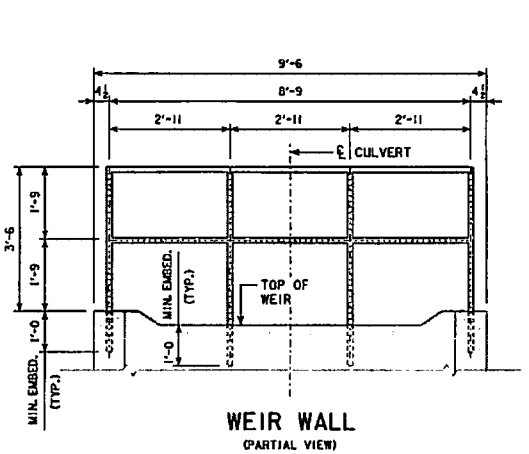
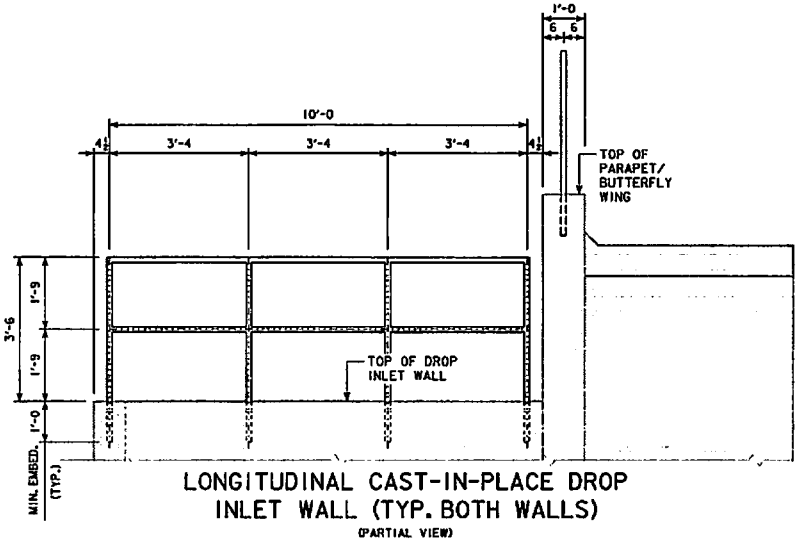
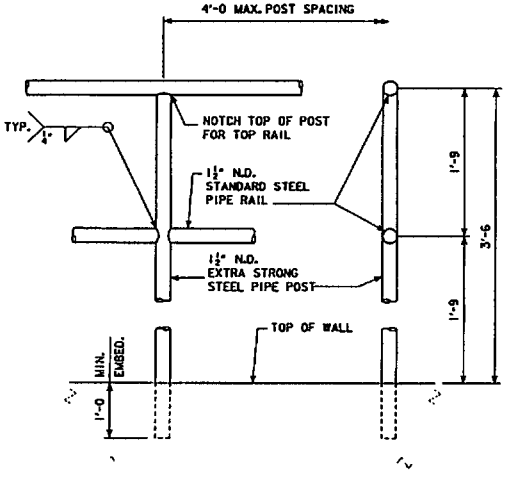


WEIR WALL
(PARTIAL VIEW)

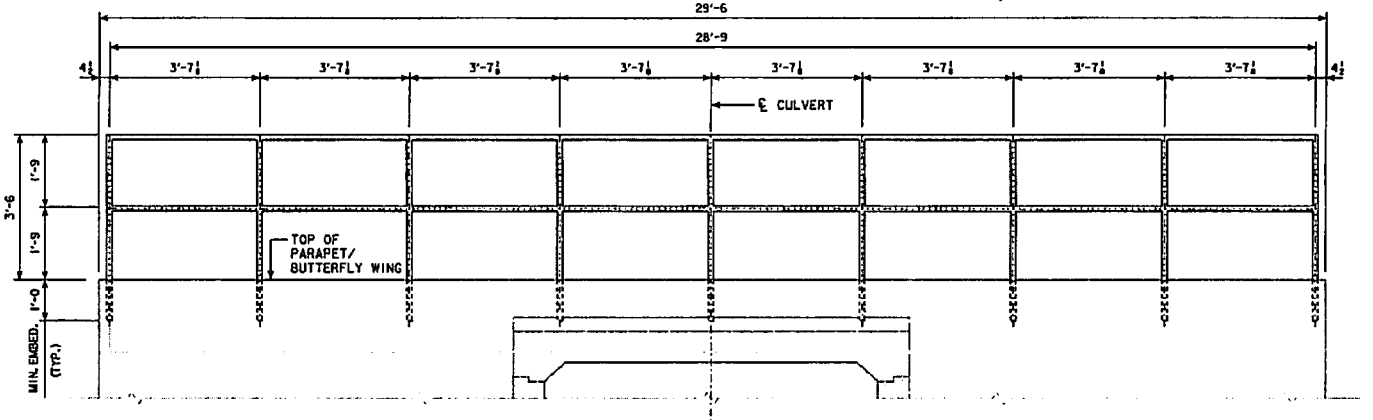


LONGITUDINAL CAST-IN-PLACE DROP INLET WALL (TYP. BOTH WALLS)
(PARTIAL VIEW)

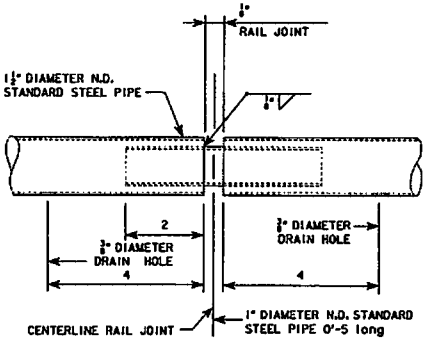


PIPE HANDRAIL DETAILS

NOTE: PIPE HANDRAIL ASSEMBLY TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOP DRAWINGS.



TOP OF CAST-IN-PLACE PARAPET/BUTTERFLY WING
(PARTIAL VIEW)



RAIL JOINT DETAIL

PEDESTRIAN HAND RAIL NOTES:

THE STEEL PIPE PEDESTRIAN HAND RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED END TO END OF RAIL. THE PRICE BID FOR STEEL PIPE PEDESTRIAN HAND RAIL SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.

THE MATERIAL FOR TUBE RAILS, POSTS AND SPLICE TUBES SHALL BE STANDARD STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53, TYPE E OR S, GRADE B OR ASTM A500 GRADE B.

PANELS AND END SECTIONS SHALL BE GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A123.

ENDS OF RAIL SECTIONS ARE TO BE SAWED OR MILLED. ALL CUT ENDS ARE TO BE TRUE, SMOOTH, AND FREE OF BURRS OR RAGGED EDGES.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0") REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET SAFETY RAIL DETAILS

STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DCB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 49

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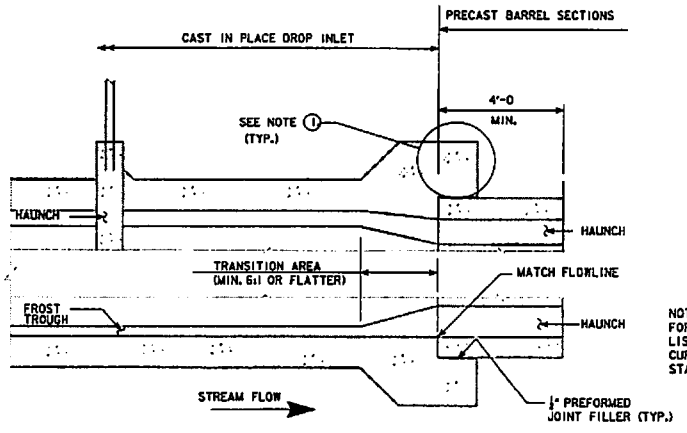
INCLUDES ADDENDA: A.02



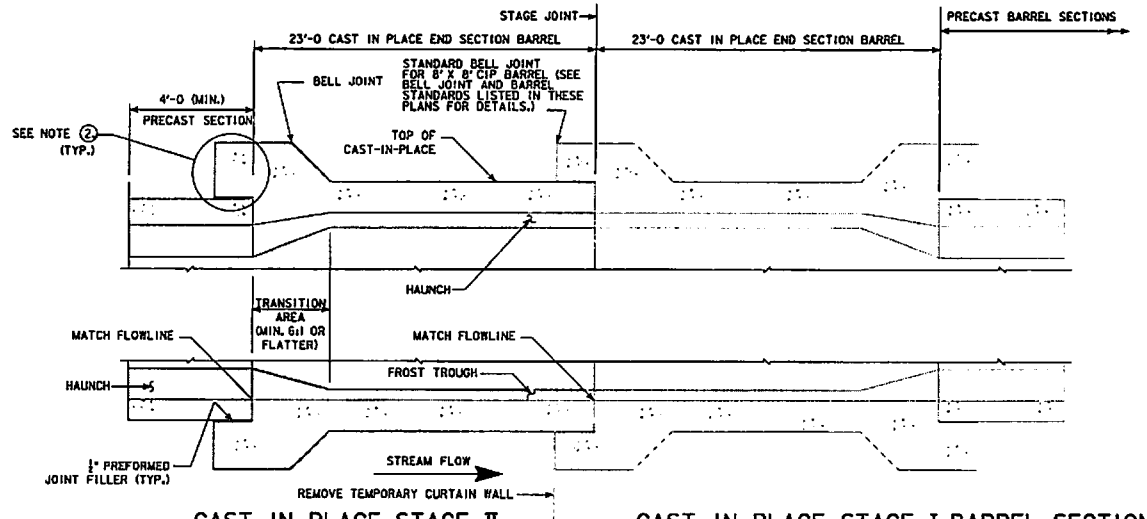
NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT TEMPORARY CURTAIN WALL SHALL BE REMOVED FROM BELL JOINT OF STAGE I, AS SHOWN.

CAST IN PLACE DROP INLET SECTION WITH BELL JOINT

(SHOWING TRANSITION DETAIL)
(LONGITUDINAL VIEW)

DROP INLET CONNECTION DETAILS

② NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½"Φ PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".



CAST IN PLACE STAGE II BARREL SECTION

CAST IN PLACE STAGE I BARREL SECTION WITH DUAL BELL JOINTS

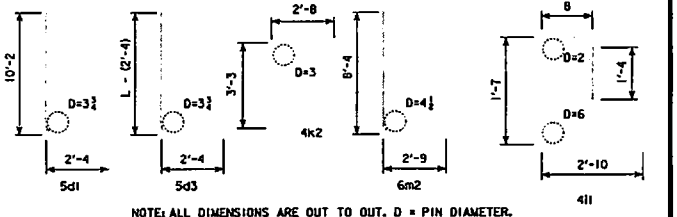
PRECAST TO CAST-IN-PLACE CONNECTION DETAILS ELEVATION

5d2	5d3
40 BARS	16 BARS
EA. LENGTH	EA. LENGTH
9'-3	11'-2
8'-9	9'-2
8'-3	7'-2
7'-9	5'-2
7'-3	
6'-9	
6'-3	
5'-9	
5'-3	
4'-9	

REINFORCING BAR LIST - DROP INLET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	VERTICAL, FRONT FACE, BARREL SECTION		18	9'-6	114
4b1	LONGITUDINAL, BOTH FACES, WALLS	—	24	16'-8	267
4b2	LONGITUDINAL, BOTH FACES, WALLS	—	14	4'-8	44
5d1	HORIZ., BUTTERFLY WING WALL, BOTH FACES		12	12'-6	156
5d2	VERTICAL, BUTTERFLY WINGS, BOTH FACES		40	LISTED	292
5d3	HORIZ., BUTTERFLY WING WALL, BOTH FACES		16	LISTED	136
5d4	SLOPE, WINGS, BOTH FACES		4	10'-10	45
5d5	VERTICAL, BOTH FACES, END WALL		16	5'-4	89
5d6	HORIZONAL, BOTH FACES, END WALL	—	10	9'-2	96
5d7	VERTICAL, BOTH FACES, DROP INLET WALLS		52	5'-8	307
4e1	LONGIT., SLAB, TOP & BOTT., DROP INLET		14	4'-8	44
4f1	LONGIT,, FLOOR, TOP & BOTT., DROP INLET		20	16'-8	223
4l1	VERTICAL, PARAPET		19	6'-5	81
7j1	TRANSVERSE, PARAPET/BUTTERFLY WINGS		6	29'-2	358
8k1	TRANSVERSE, BOTT. SLAB		9	9'-2	220
6k2	CORNER, TOP. SLAB		18	5'-11	160
6k9	TRANSVERSE, TOP. SLAB, END		1	9'-2	14
7m1	TRANSVERSE, TOP, FLOOR		11	9'-8	217
6m2	VERTICAL, BOTT. CORNER		18	11'-1	300
5m3	TRANSV., TOP & BOTT., FLOOR, DROP INLET		26	9'-8	262
6m9	TRANSVERSE, BOTT; FLOOR, END	-	1	9'-8	15
	REINFORCING STEEL - TOTAL (LBS.)				3440

BENT BAR DETAILS



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

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW
8'-0 X 8'-0 X 294'-0 (STAGE II 118'-0") REINF. PRECAST CONCRETE BOX CULVERT WITH 10'-0 X 8'-0 DROP INLET

PC TO C.I.P. CONNECTION & QTY
STA. 11073+50.00 (℄ US 20) OCTOBER 2015

IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 50

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INCLUDES ADDENDA: A.02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	275.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-0425030	GRANULAR BACKFILL	CY	32.5	
4	2402-2720000	EXCAVATION, CLASS 20	CY	230	
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	65.5	
6	2404-7775000	REINFORCING STEEL	LB	10,973	
7	2415-2110606	PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT.	LF	167.0	
8	2507-3250005	ENGINEERING FABRIC	SY	500.0	
9	2507-6800061	REVETMENT, CLASS E	TON	450.0	
10	2533-4980005	MOBILIZATION	LS	1.00	
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES COST OF PARTIAL REMOVAL OF THE EXISTING CULVERT, DESIGN 7056, TO ALLOW FOR CONSTRUCTION OF STAGE I AND PLACEMENT OF TEMPORARY REVETMENT.
3	2402-0425030	GRANULAR BACKFILL - -
4	2402-2720000	EXCAVATION, CLASS 20 INCLUDES 32.5 CU.YDS. FOR CORE-OUT FOR GRANULAR BLANKET
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
6	2404-7775000	REINFORCING STEEL - -
7	2415-2110606	PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT. INCLUDES COST OF LABOR AND MATERIALS OF PRECAST PARAPET AT FLUME LOCATION.
8	2507-3250005	ENGINEERING FABRIC - -
9	2507-6800061	REVETMENT, CLASS E - -
10	2533-4980005	MOBILIZATION - -
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL INCLUDES COST OF MATERIALS AND LABOR TO INSTALL TEMPORARY STEEL CURTAIN WALL. CURTAIN WALL TO REMAIN IN PLACE UNTIL STAGE 2, DES. 418, CONSTRUCTION BEGINS.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
6'-0 x 6'-0 FLUME	4986	4986
6'-0 X 6'-0 BASIN	2812	2812
FLUME JUNCTION BELL JOINT	456	456
FLUME CHUTE BELL JOINT	390	390
10'-0 BARREL END SECTION	1071	1071
6' x 6' BARREL BELL JOINT	2 @ 629	1258
	TOTAL (LB)	10,973

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
6'-0 x 6'-0 FLUME	20.4	15.9	———	36.3
6'-0 X 6'-0 BASIN	9.8	4.7	———	14.5
10'-0 BARREL END SECTION	2.8	3.1	2.2	8.1
6' x 6' BARREL BELL JOINT	2 @ 1.3 = 2.6	2 @ 1.0 = 2.0	2 @ 1.0 = 2.0	6.6
TOTAL (CY)	35.6	25.7	4.2	65.5

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE I- 176'-0) PRECAST REINF. CONC. BOX CULVERT WITH C.I.P 3:1 FLUME AND BASIN ESTIMATED QUANTITIES

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 6 FILE NO. 30560 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 5

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT STAGE I OF A 6'-0 X 6'-0 REINFORCED CONCRETE BOX CULVERT AND FLUME AND BASIN (DES. 715) (STA. 11085+38.00 ℄ U.S. 20.)

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. (DESIGN PLANS DES. 7056.)

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 18.0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

THE PRECAST R.C.B. BARREL 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 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 THE OTHER BID ITEMS INCLUDED IN THIS PLAN.

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 ¾ 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 AND CAST IN PLACE SECTIONS AND SECTION LENGTHS.
C. A DETAIL OF THE PRECAST BARREL SECTIONS SHOWING A CROSS SECTION VIEW OF THE SECTION, STEEL LOCATIONS, DIMENSIONS, ETC.

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.

STAGE II IS NOT PART OF THIS DESIGN. SEE PRECAST DESIGN 118 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 DURING STAGE I. SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

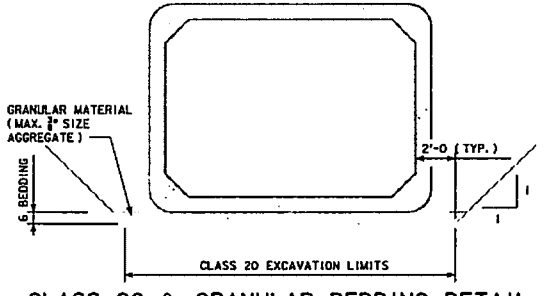
APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST BOX OPTIONS. BOX SECTIONS REQUIRING OPENINGS OR ATTACHMENTS SHALL BE CONSIDERED NONSTANDARD. THE CONTRACTOR SHALL ALLOW THIRTY WORKING DAYS FOR THE ENGINEER'S REVIEW PRIOR TO THE START OF FABRICATION.

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."

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

CIP STANDARD	ISSUED	REVISED
FBJ-02-12	APRIL 2012	-----
CBJ 2-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 6-6-12	APRIL 2012	-----
RCB GI-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	-----
RCFB-02-12	APRIL 2012	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PRCB 6-13	JANUARY 2013	-----
PRCB GI-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 715, STAGE II IS DESIGN 418, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.



CLASS 20 & GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE FLUME BELL JOINT, AND TERMINATE AT THE STAGE I CONSTRUCTION LINE.

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 ¾ 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.

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' x 2' PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

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.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 715, STAGE II IS DESIGN 418, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

TRAFFIC CONTROL PLAN

NOTE:
THE EBL (STAGE I) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONST. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
715	STAGE I RCB CULVERT, FLUME & BASIN

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE I- 176'-0) PRECAST REINF. CONC. BOX CULVERT WITH C.I.P 3:1 FLUME AND BASIN GENERAL NOTES

STA. 11085+38.00 OCTOBER 2015

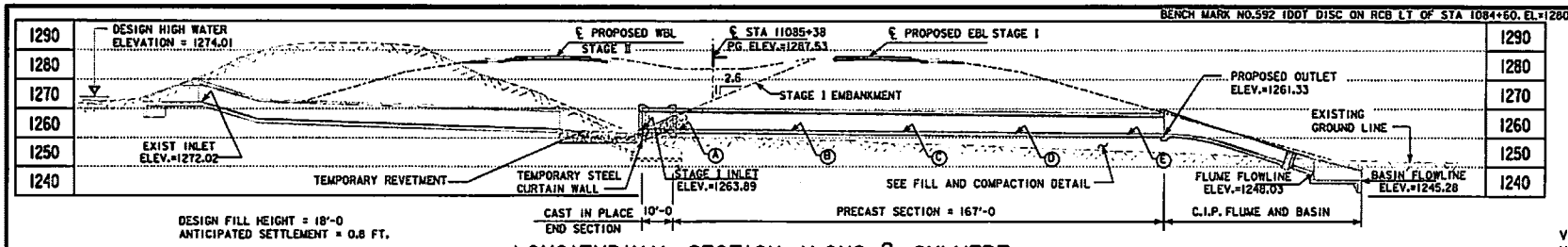
IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 6 FILE NO. 30568 DESIGN NO. 715

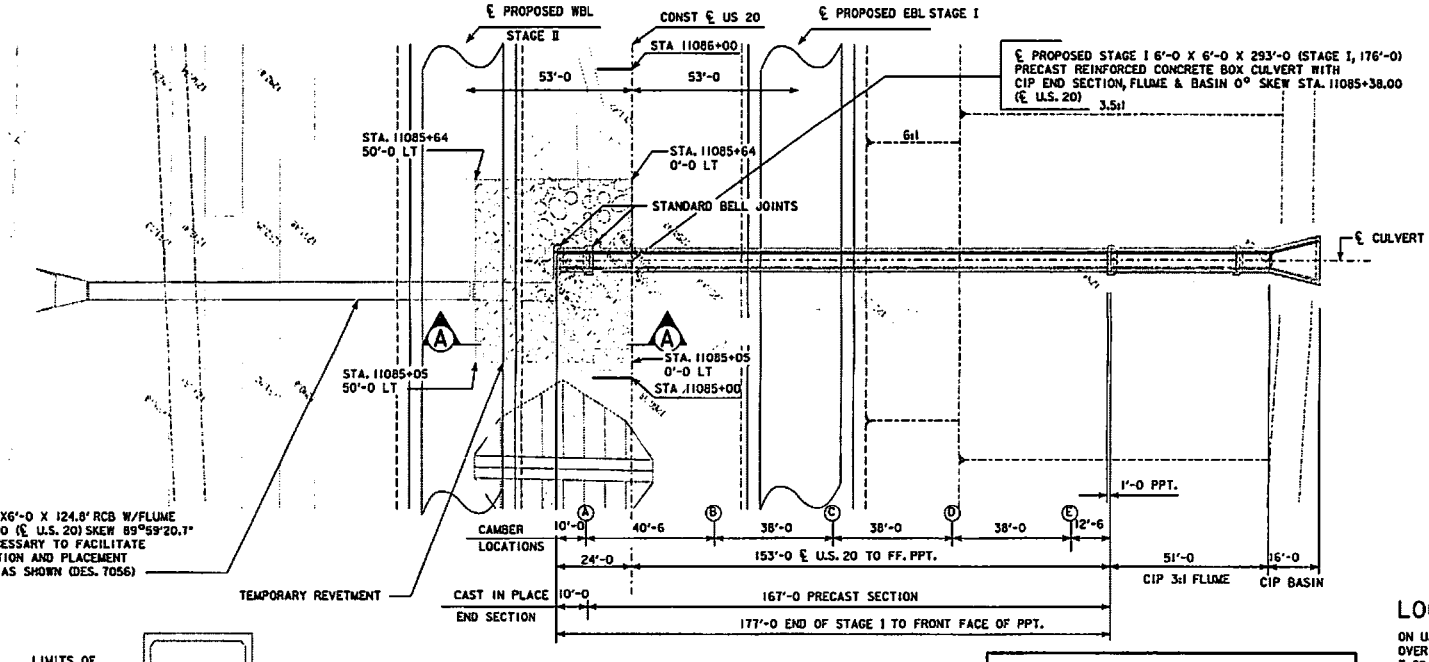
DESIGN TEAM DGB ⁑ MSF ⁑ ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 52

INCLUDES ADDENDA: A.02



LONGITUDINAL SECTION ALONG ℄ CULVERT

PROPOSED PROFILE GRADE US 20



CAMBER ELEVATION TABLE

NOTE:
CAMBER LOCATIONS AS SHOWN

LOCATION	ELEVATION
A	1263.73
B	1263.39
C	1263.01
D	1262.61
E	1261.65

NOTE:
BELL JOINTS ARE TO BE PLACED AS SHOWN IN THESE PLANS.

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD

HYDRAULIC DATA

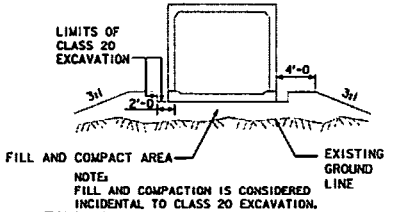
DRAINAGE AREA = 187 ACRES H
Q_{50} = 307 CFS
HW ELEV. = 1274.01

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
IDA COUNTY
LATITUDE 42.474401°
LONGITUDE -95.696130°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	



NOTE:
FILL AND COMPACTION IS CONSIDERED INCIDENTAL TO CLASS 20 EXCAVATION.

FILL AND COMPACTION DETAIL

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TEMPORARY REVETMENT NOTES

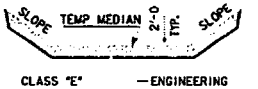
ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACED IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE REVETMENT, CL.E ITEM.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW CULVERT TO FACILITATE DRAINAGE.

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, BUT IT IS A PART OF THIS PROJECT.

SITUATION PLAN



TYPICAL SECTION A-A MEDIAN PROTECTION

EST. TEMPORARY REVETMENT QUANTITIES

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
MEDIAN	450	500	275

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE I- 176'-0) PRECAST REINF. CONC. BOX CULVERT WITH C.I.P 3:1 FLUME AND BASIN SITUATION PLAN

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 6 FILE NO. 30568 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)—2R-47 | SHEET NUMBER 53

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INCLUDES ADDENDA: A.02

BENCH MARK NO.592 100T DISC ON RCB LT OF STA 1084+60. EL=1280.618

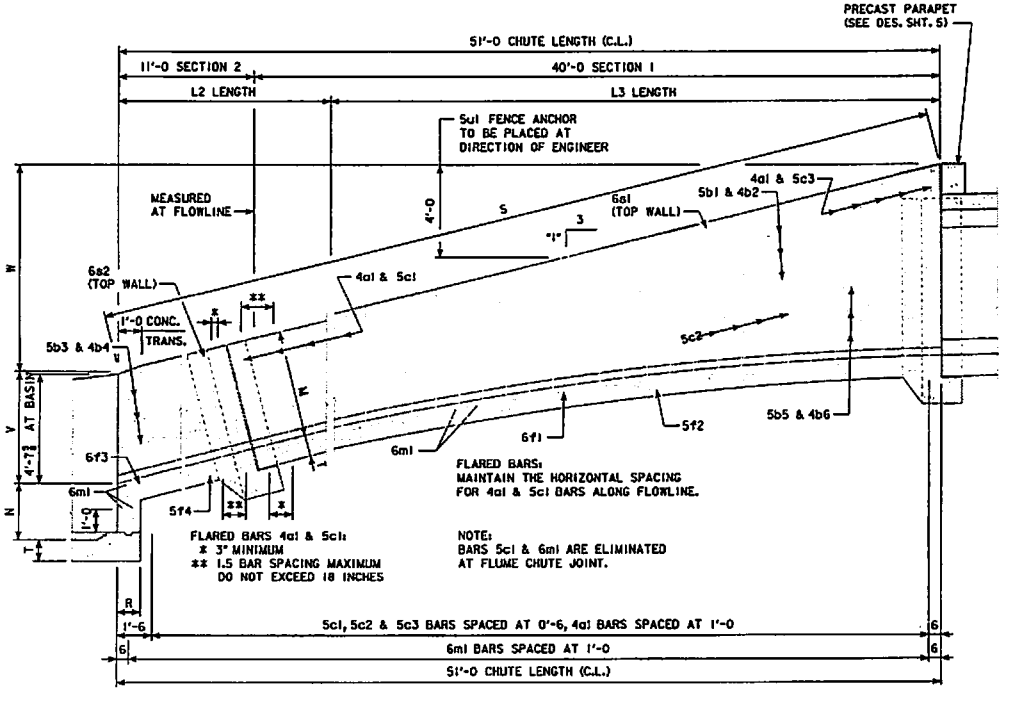
REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		100	LISTED	384
5b1	WALLS FFH - SECTION 1	---	6	42'-2;42'-10	283
4b2	WALLS BFH - SECTION 1	---	6	42'-2;42'-10	181
5b3	WALLS FFH - SECTION 2		6	10'-2;10'-10	66
4b4	WALLS BFH - SECTION 2		6	10'-2;10'-10	42
5b5	WALLS FFH - SECTION 1		6	LISTED	60
4b6	WALLS BFH - SECTION 1		6	LISTED	39
5c1	BOTT. FLOOR & WALLS BFV		75	LISTED	1387
5c2	BOTT. FLOOR & WALLS BFV - SPLICED		23	13'-5	322
5c3	WALLS BFV		46	LISTED	300
6f1	FLOOR LONGIT. TOP - SECTION 1		7	41'-0	454
5f2	FLOOR LONGIT. BOTT. - SECTION 1		7	41'-0	315
6f3	FLOOR LONGIT. TOP - SECTION 2		7	11'-4	119
5f4	FLOOR LONGIT. BOTT. - SECTION 2		7	11'-4	83
6m1	FLOOR TRANSV. TOP		53	7'-8	610
6a1	WALLS BOTH F ALONG SLOPE - SECTION 1		4	43'-2	276
6a2	WALLS BOTH F ALONG SLOPE - SECTION 2		4	9'-10	59
5u1	FENCE ANCHORS (GALVANIZED)		2	2'-10	6
				TOTAL (LB)	4986

WEIGHT OF BARS OVER 40'-0 LONG INCLUDES AN ALLOWANCE FOR LAP (2'-8 FOR 6a BARS AND 2'-2 FOR ALL OTHER BARS) BUT LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE LAPS.

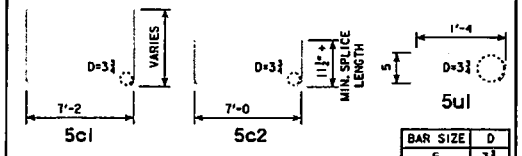
LISTED BARS

BAR 4a1	BAR 5c1	BAR 5c3	BAR 5b5 AND 6b6
100 BARS	75 BARS	46 BARS	6 BARS - 2 EA. LGTH.
54 AT 5'-2	53 AT 17'-6	46 VAR. - 2 EA. LGTH.	3'-11
46 VAR. - 2 EA. LGTH.	22 VAR.	5'-1	8'-9
5'-2	17'-7	5'-2	16'-2
5'-3	17'-7	5'-3	
5'-3	17'-7	5'-4	
5'-3	17'-7	5'-5	
5'-4	17'-8	5'-7	
5'-5	17'-8	5'-8	
5'-6	17'-9	5'-9	
5'-7	17'-9	5'-10	
5'-8	17'-10	5'-11	
5'-9	17'-10	6'-1	
5'-11	17'-11	6'-2	
6'-1	18'-0	6'-4	
6'-3	18'-1	6'-5	
6'-5	18'-2	6'-7	
6'-7	18'-3	6'-8	
6'-10	18'-5	6'-10	
7'-0	18'-6	6'-11	
7'-3	18'-7	7'-1	
7'-5	18'-9	7'-3	
7'-9	18'-10	7'-4	
8'-0	19'-0	7'-6	
8'-4	19'-2	7'-8	
8'-8			



6'x6' FLUME CHUTE - LONGITUDINAL SECTION

BENT BAR DETAILS



BAR SIZE	D
5	3½
6	4½
7	5½

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

FLUME DATA

∢A = 18°26'
∢C = 1°00'
B = 11'-10⅝
S = 53'-9½
V = 4'-8½
W = 17'-0
M = 4'-6
T = 0'-11
H = 6'-0

CURVE DATA

C.L. = 51'-0
L2 = 28'-4
L3 = 22'-8
D = 11'-4½
E = 11'-3⅝
P. C. ELEV. = 1261.33
P.I. ELEV. = 1261.13
P. P. ELEV. = 1260.93
P. T. ELEV. = 1257.36
X1 = 3'-6⅝
X2 = 2'-0⅛
X3 = 0'-10⅜
X4 = 0'-2⅜
L3/4 = 5'-8

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	12.9	11.4	24.3
FLUME - SECTION 2	4.3	2.5	6.8
JUNCTION BELL	1.3	1.2	2.5
CHUTE BELL	1.3	0.8	2.1
BASIN CURTAIN	0.6	---	0.6
TOTAL (CY)	20.4	15.9	36.3

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-02-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-02-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE I- 176'-0) PRECAST REINF. CONC. BOX CULVERT WITH C.I.P 3:1 FLUME AND BASIN FLUME DETAILS

STA. 1085+38.00

OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 6 FILE NO. 30568 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 54

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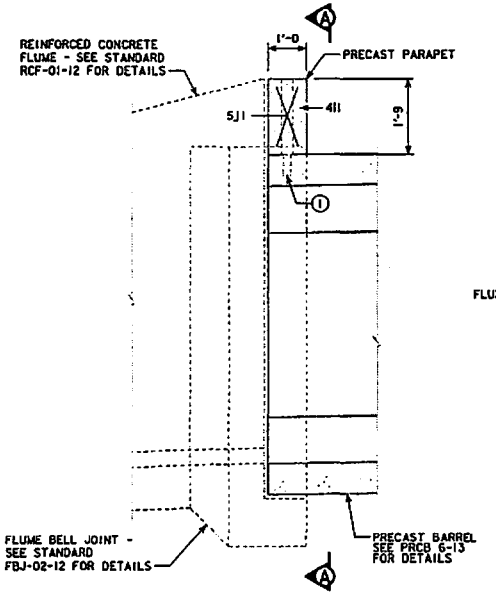
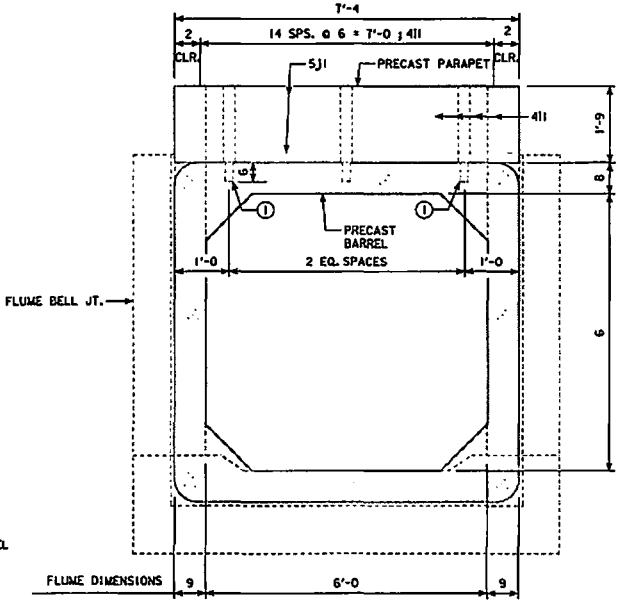
INCLUDES ADDENDA: A.02



PART ELEVATION



SECTION A-A

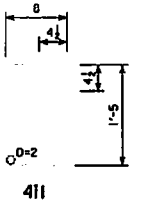
REINFORCING BAR LIST-ONE PRECAST PARAPET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4I1	STIRRUP		15	4'-11	49
5J1	LONGIT.		4	7'-0	29
			TOTAL (LBS.)		78

CONCRETE QUANTITIES

TOTAL CONCRETE = 0.5 CU.YD.

BENT BAR DETAILS

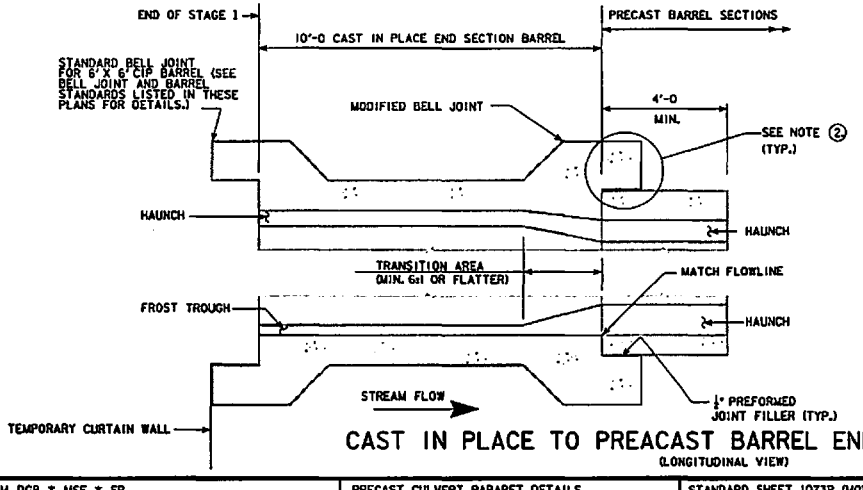


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

PRECAST PARAPET DETAILS FOR FLUME

NOTES:

① PLACE NO. 8 DOWELS, 1'-6 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.



CAST IN PLACE TO PREACAST BARREL END SECTION DETAILS

(LONGITUDINAL VIEW)

② NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT BELL JOINTS ARE PLACED ON THE DOWNSTREAM AND UPSTREAM END OF THE STAGE I END SECTION, AS SHOWN.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE I- 176'-0) PRECAST REINF. CONC. BOX CULVERT WITH C.I.P 3:1 FLUME AND BASIN

CIP END SECTION & PRECAST PARAPET DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 6 FILE NO. 30668 DESIGN NO. 715

DESIGN TEAM DGB * MSF * ER	PRECAST CULVERT PARAPET DETAILS	STANDARD SHEET 10T3P (MODIFIED)	IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER 55

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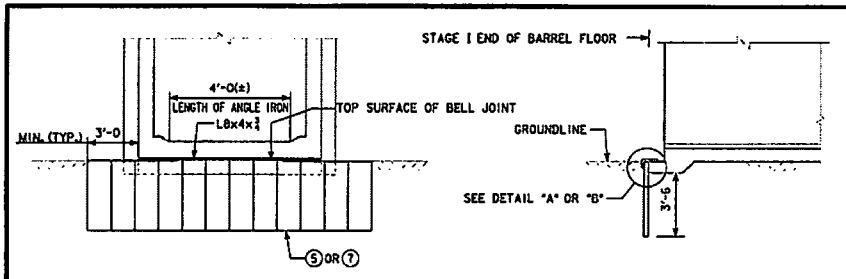
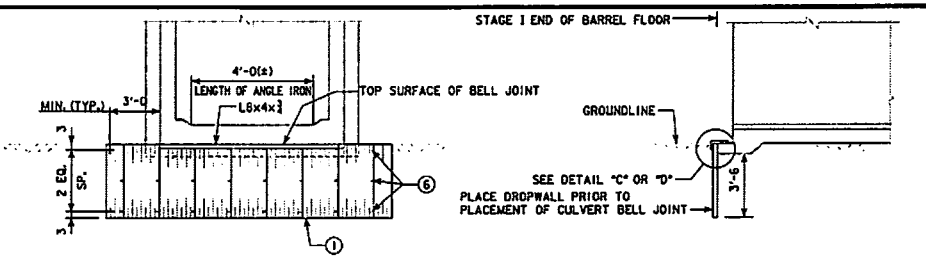
INCLUDES ADDENDA: A.02

ENGLISH\PRECASTCULVERTS.DGN - 10T3P - THIS SHEET ISSUED 01-13.



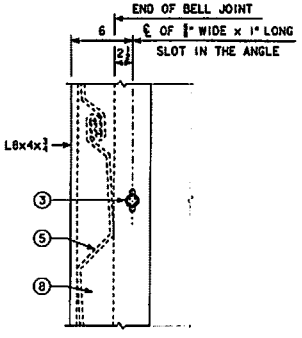
END VIEW ELEVATION

ALTERNATES 1 & 2 (STEEL SHEET PILING)

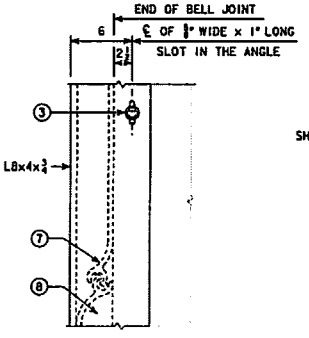


END VIEW ELEVATION

ALTERNATES 3 & 4 (STEEL SHEETS)



PLAN



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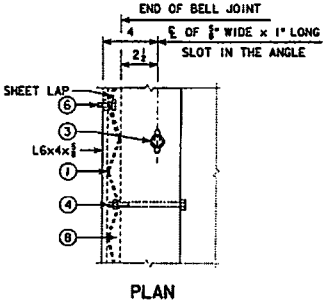

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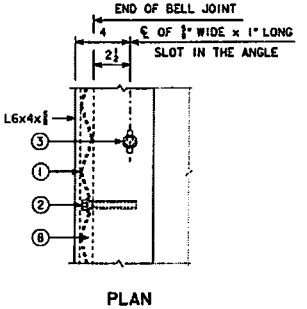
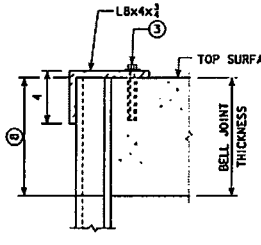
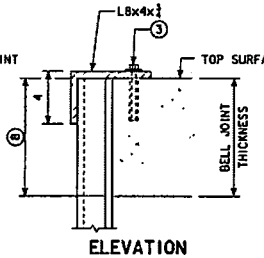


PLAN



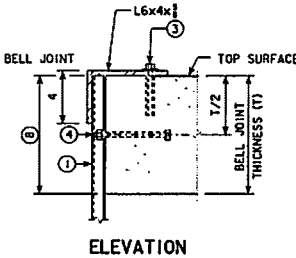
ELEVATION

DETAIL "A"
ALTERNATE 1
STEEL SHEET PILING SHOWN



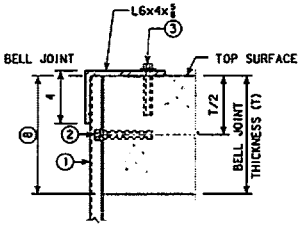
ELEVATION

DETAIL "B"
ALTERNATE 2
STEEL SHEET PILING SHOWN



ELEVATION

DETAIL "C"
ALTERNATE 3
ON NEW CONSTRUCTION ONLY



ELEVATION

DETAIL "D"
ALTERNATE 4
ON NEW OR OLD CONSTRUCTION

NOTES:

USE OF ALTERNATE CURTAIN WALLS SHALL BE APPROVED BY THE ENGINEER.

① 2½"x½" OR 2"x¼" CORRUGATED (12 GAGE OR HEAVIER) STEEL SHEETS.

② FASTEN THE STEEL SHEETS TO THE FRONT EDGE OF THE BELL JOINT WITH ¾"Ø x0'-4 BOLTS AND APPROVED ANCHORAGES (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

③ FASTEN THE L8x4x¾ OR L6x4x⅝ WITH ¾"Øx0'-4 BOLTS, 1" O.D. WASHER AND AN APPROVED ANCHORAGE (2'-0 SPACING).

④ FASTEN THE STEEL SHEETS TO THE BELL JOINT EDGE OF THE FLOOR WITH ⅝"Ø x0'-5 BOLTS WITH NUT AND LOCK WASHER (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

⑤ CORRUGATED (12 GAUGE OR HEAVIER) STEEL SHEET PILING, INTERLOCKING TYPE A.

⑥ ¾"Øx0'-1 BOLT WITH NUT, TO LAP STEEL SHEETS.

⑦ STEEL SHEET PILING, SECTION PS 27.5 OR EQUAL.

⑧ FILL THE VOIDS AS SHOWN, WITH CONCRETE OR CONCRETE GROUT, AS APPROVED BY THE ENGINEER.

DESIGN FOR STAGE I CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE I- 176'-0) PRECAST REINF. CONC. BOX CULVERT WITH C.I.P 3:1 FLUME AND BASIN TEMPORARY CURTAIN WALL DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 6 FILE NO. 30568 DESIGN NO. 715

ENG_USHSIGNEDPRECASTCULVERTS.DGN - PES 4-13 - THIS SHEET ISSUED 01-13.

DESIGN TEAM DGB * MSF * ER | MODIFIED STANDARD PES 4-13 | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 56

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INCLUDES ADDENDA: A.02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-0425030	GRANULAR BACKFILL	CY	24.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	3,176	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	31.6	
4	2404-7775000	REINFORCING STEEL	LB	5,061	
5	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING	LF	52	
6	2415-2110606	PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT.	LF	96.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-0425030	GRANULAR BACKFILL - -
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES 24 CU.YDS. CORE OUT FOR GRANULAR BLANKET.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) ALL COSTS FOR REMOVAL OF TEMPORARY CURTAIN WALL IS CONSIDERED INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".
4	2404-7775000	REINFORCING STEEL - -
5	2414-6444100	STEEL PIPE PEDESTRIAN HAND RAILING SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.) SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION. 1 GALVANIZED SAFETY HAND RAIL
6	2415-2110606	PRECAST CONCRETE BOX CULVERT, 6 FT. X 6 FT. - -
7	2533-4980005	MOBILIZATION - -

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
14'-0 x 6'-0 DROP INLET WITH 5'-0 BARREL	2577	2577
6' X 6' BARREL BELL JOINTS	2 @ 629	1258
10'-0 BARREL END SECTION	1071	1071
	TOTAL (LB)	4906

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
14'-0 x 6'-0 DROP INLET WITH 5'-0 BBL.	6.5	7.5	1.1	15.1
6' X 6' BARREL BELL JOINTS	2 @ 1.3 = 2.6	2 @ 1.0 = 2.0	2 @ 1.0 = 2.0	6.6
BUTTERFLY WINGS/PARAPET	———	1.8	———	1.8
10'-0 BARREL END SECTION	2.8	3.1	2.2	8.1
TOTAL (CY)	11.9	14.4	5.3	31.6

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS
2	DROP INLET HANDRAIL

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET

ESTIMATED QUANTITIES

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB x MSF x ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 57

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 6' X 6' PRECAST RCB WITH A 6' X 6' PRECAST REINFORCED CONCRETE BOX CULVERT AND CIP END SECTION.

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. 715).

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 18'-0 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 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 OTHER BID ITEMS SHOWN IN THESE PLANS.

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 $\frac{3}{4}$ 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.

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.

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' x 2' PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

STAGE I IS NOT PART OF THIS DESIGN. SEE PRECAST DESIGN 715 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EBL U.S. 20 DURING STAGE II. SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

ALL COSTS FOR REMOVAL OF TEMPORARY CURTAIN WALL IS CONSIDERED INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

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.

TRAFFIC CONTROL PLAN

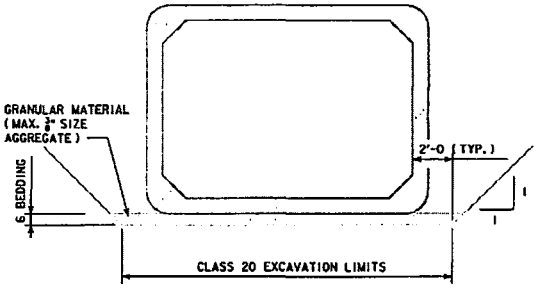
NOTE:
THE WBL (STAGE II) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONST. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

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

CIP STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 2-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 6-6-12	APRIL 2012	-----
PRECAST STANDARD		
PRCB 6-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----



CLASS 20 & GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE DROP INLET, AND ABUT AGAINST THE STAGE I GRANULAR BLANKET SO AS TO MAKE A SMOOTH TRANSITION TO STAGE II.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 715, STAGE II IS DESIGN 418, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
715	STAGE I RCB CULVERT, FLUME & BASIN
418	STAGE II RCB CULVERT & DROP INLET

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET

GENERAL NOTES

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 58

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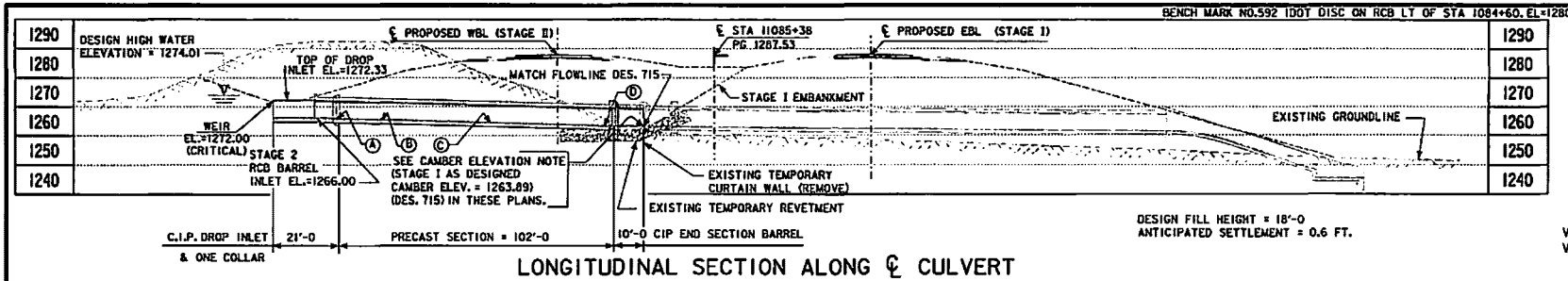
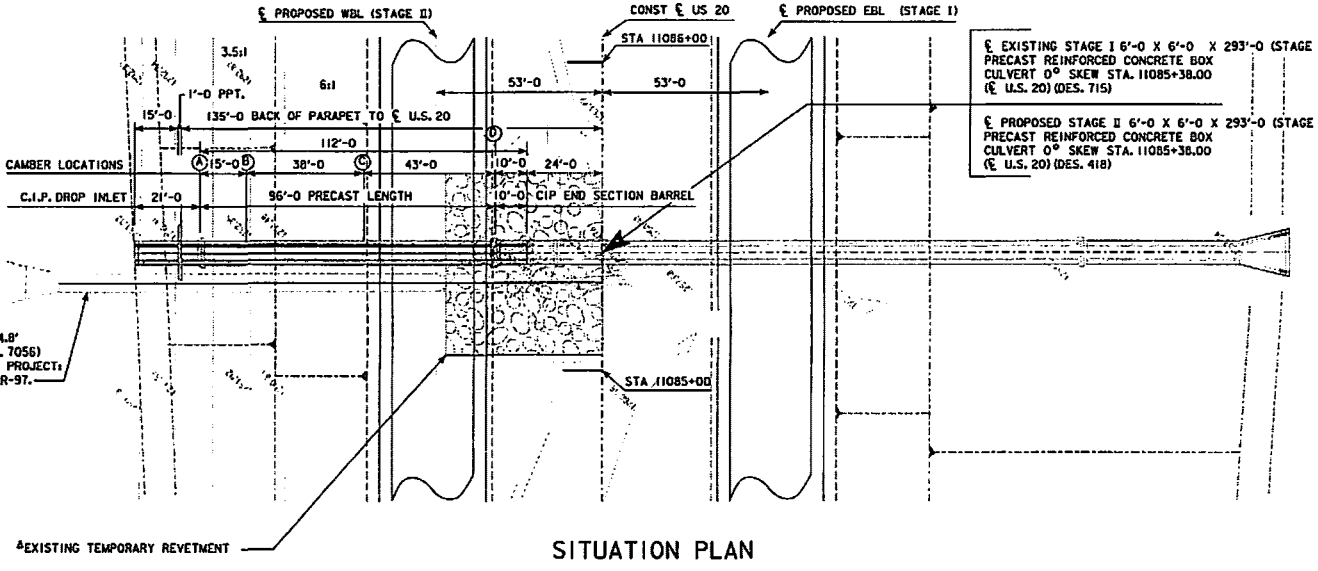
INCLUDES ADDENDA: A.02

BENCH MARK NO.592 IDOT DISC ON RCB LT OF STA 1084+60. EL=1280.618



DESIGN FILL HEIGHT = 18'-0
ANTICIPATED SETTLEMENT = 0.6 FT.

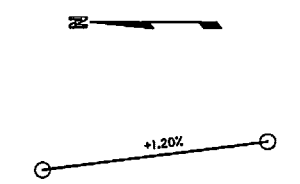
LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

℄ EXISTING STAGE I 6'-0 X 6'-0 X 293'-0 (STAGE I 176'-0) PRECAST REINFORCED CONCRETE BOX CULVERT 0° SKEW STA. 11085+38.00 (℄ U.S. 20) (DES. 715)

℄ PROPOSED STAGE II 6'-0 X 6'-0 X 293'-0 (STAGE II, 117'-0) PRECAST REINFORCED CONCRETE BOX CULVERT 0° SKEW STA. 11085+38.00 (℄ U.S. 20) (DES. 418)



VPI STA = 11074+50 VPI STA = 11096+00
VPI ELEV = 1274.48 VPI ELEV = 11300.28

PROPOSED PROFILE GRADE US 20

CAMBER ELEVATION TABLE

NOTE:
CAMBER LOCATIONS AS SHOWN

LOCATION	ELEVATION
Ⓐ	1265.87
Ⓑ	1265.48
Ⓒ	1264.68
Ⓓ	1264.04

HYDRAULIC DATA

DRAINAGE AREA = 187 ACRES H
Q_{50} = 307 CFS
HW ELEV. = 1274.01

UTILITIES LEGEND:

FO1 INS
FO2 QWEST
FO4 MCLEOD

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE.

NOTE:
STAGE I IS NOT A PART OF THIS DESIGN, BUT IT IS A PART OF THIS PROJECT (DESIGN 715.)

△NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474401°
LONGITUDE -95.696130°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET

SITUATION PLAN

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 59

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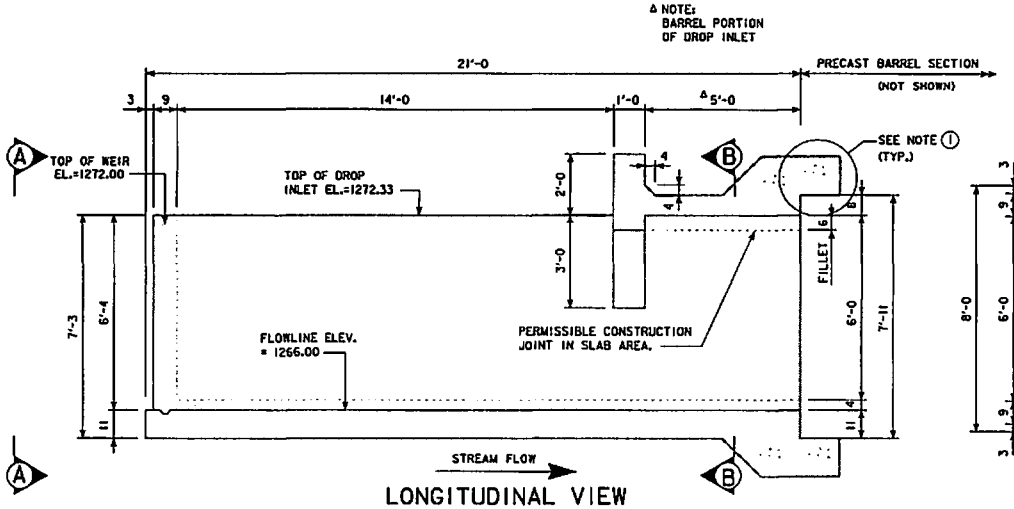
INCLUDES ADDENDA: A.02

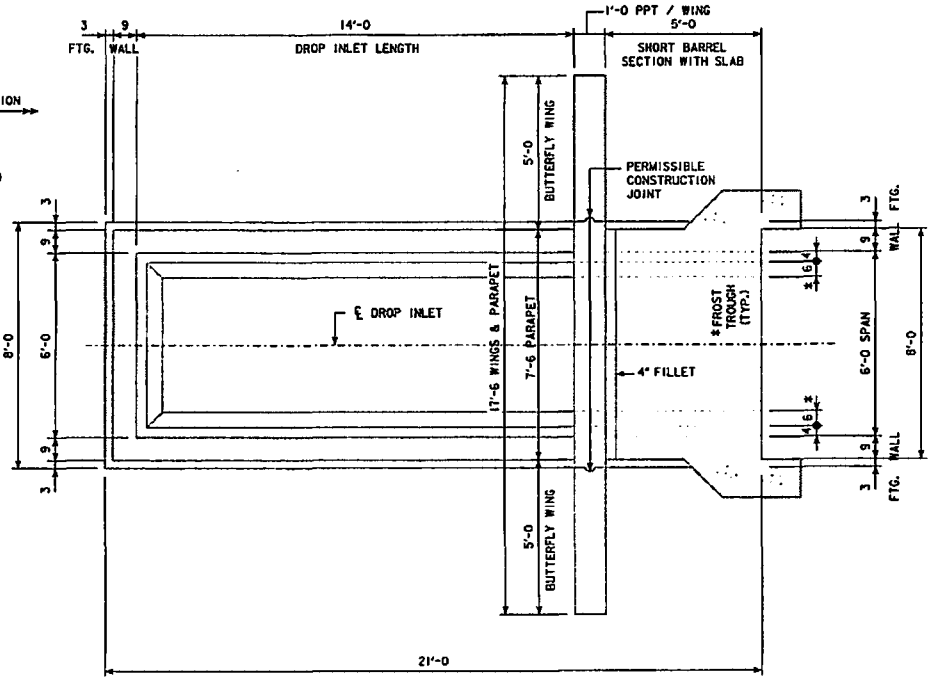
BENCH MARK NO.592 IDOT DISC ON RCB LT OF STA 1084+60. EL=1280.618



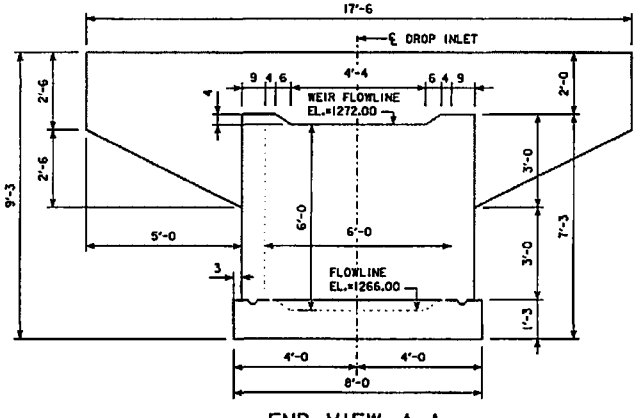
LONGITUDINAL VIEW

(TYPICAL BARREL SECTION NOT SHOWN FOR CLARITY)

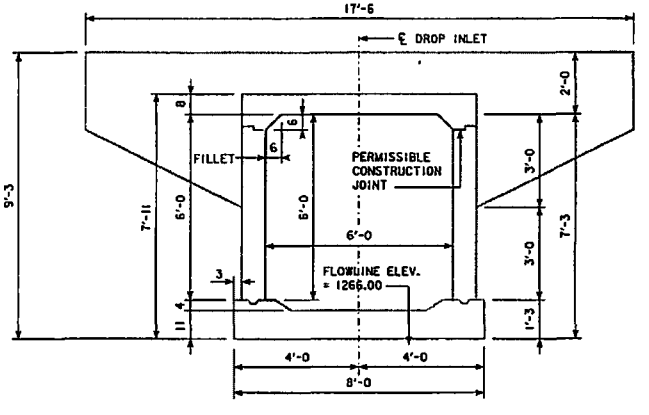
① NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, RCB CULVERT".



PLAN VIEW



END VIEW A-A



END VIEW B-B

(BELL JOINT NOT SHOWN)

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THE BELL JOINT IS PLACED ON THE DOWNSTREAM END OF THE DROP INLET, AS SHOWN.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET

DROP INLET DETAILS

STA. 11085+38.00

OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 60

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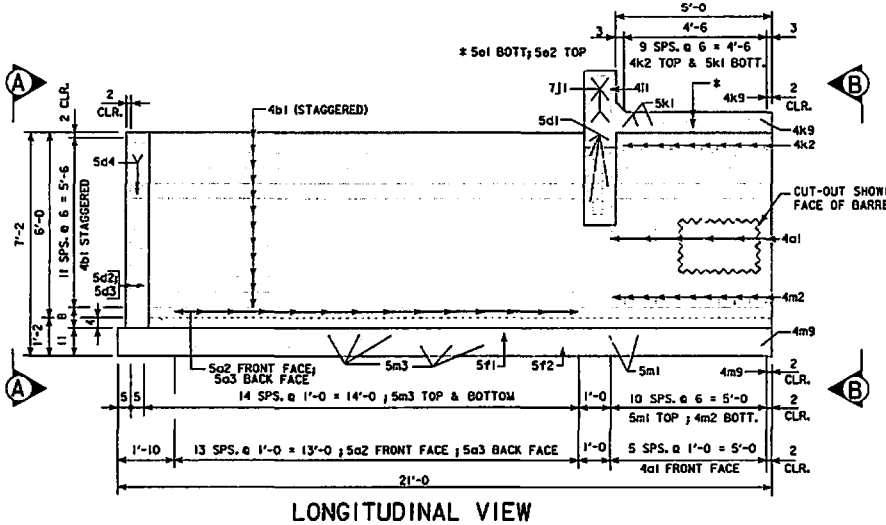
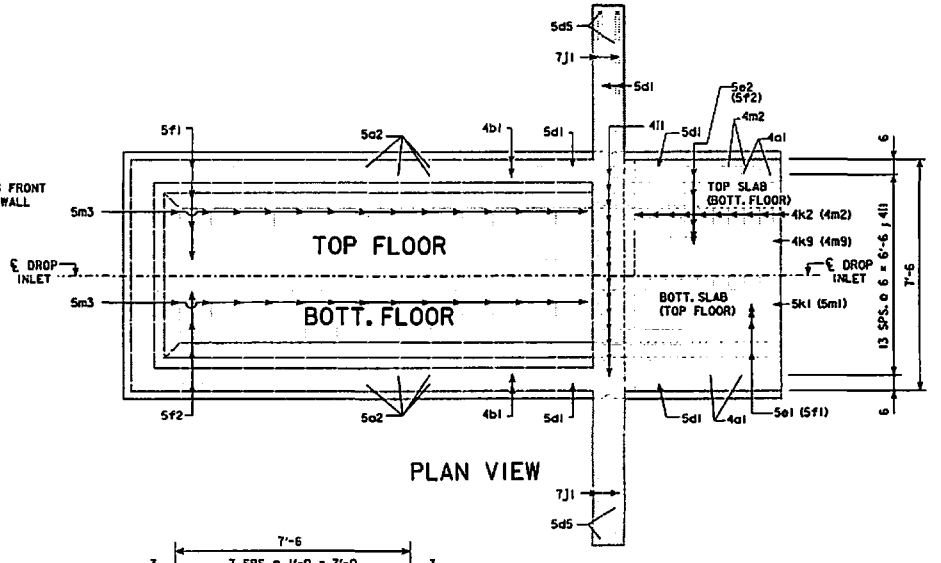
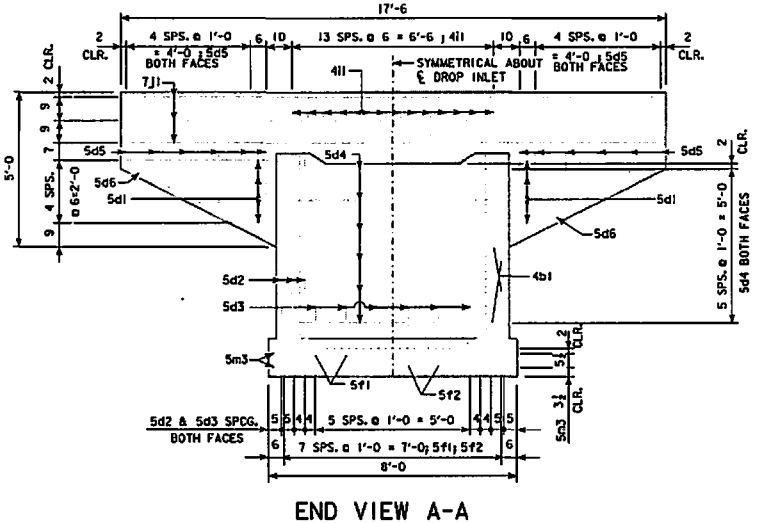
INCLUDES ADDENDA: A.02



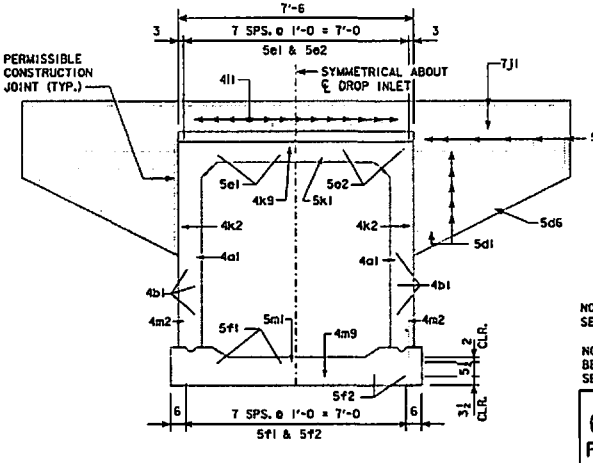
LONGITUDINAL VIEW



PLAN VIEW



END VIEW A-A



END VIEW B-B

NOTE:
SEE DESIGN SHEET 6 FOR REINFORCING BAR LIST.

NOTE:
BELL JOINT NOT SHOWN FOR CLARITY.
SEE STANDARD SHEETS.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0)
PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET
DROP INLET DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 5 OF 8 FILE NO. 30566 DESIGN NO. 418

DESIGN TEAM DGB ✱ MSF ✱ ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 61

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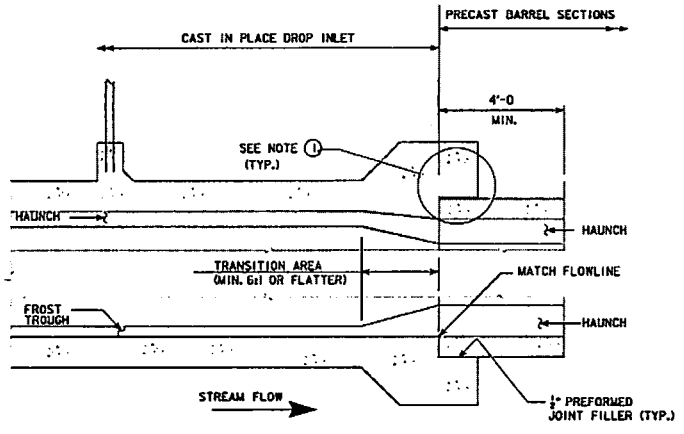
INCLUDES ADDENDA: A.02

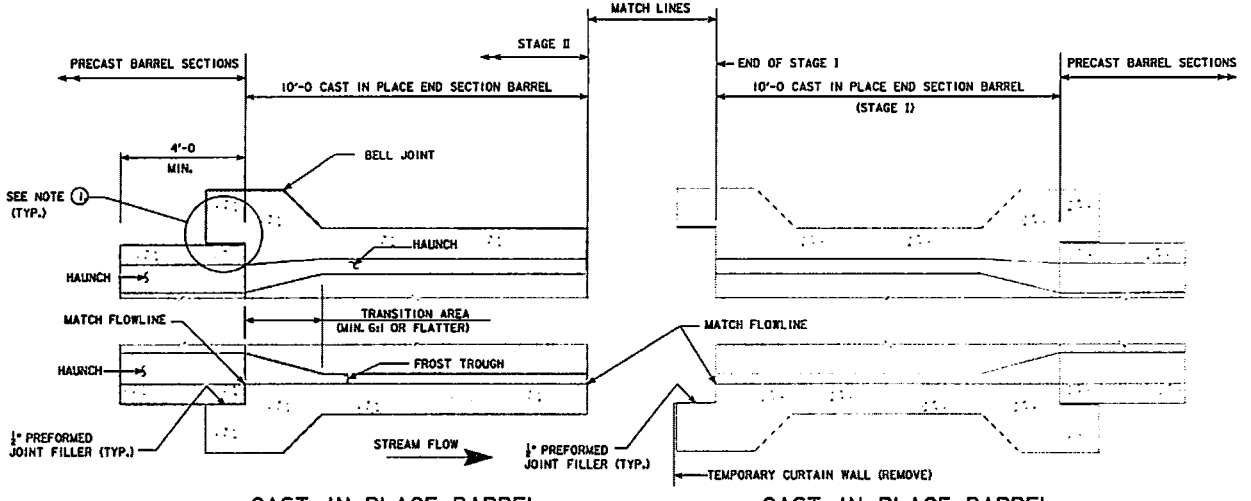


CAST IN PLACE DROP INLET SECTION WITH BELL JOINT

(SHOWING TRANSITION DETAIL)
(LONGITUDINAL VIEW)

5d5	5d1
24 BARS	20 BARS
4 EA. LENGTH	4 EA. LENGTH
2'-2	3'-6
2'-8	4'-6
3'-2	5'-6
3'-8	6'-6
4'-2	7'-2
4'-5	

1 NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".



CAST IN PLACE BARREL END SECTION STAGE II

(LONGITUDINAL VIEW)

CAST IN PLACE BARREL END SECTION (STAGE I)

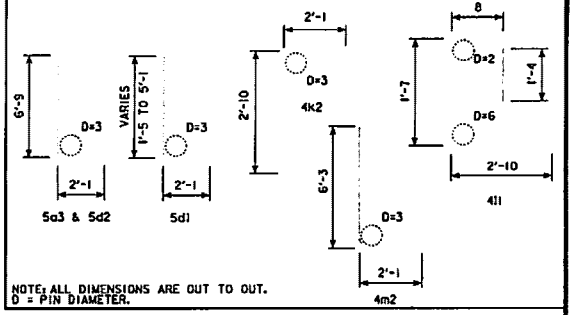
(LONGITUDINAL VIEW)

STAGE I TO STAGE II CONNECTION DETAILS

REINFORCING BAR LIST - DROP INLET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	VERTICAL, FRONT FACE, BARREL SECTION		12	7'-5	59
5a2	VERTICAL, FRONT FACE, DROP INLET SECTION		28	6'-9	197
5a3	VERTICAL, BACK FACE, DROP INLET SECTION		28	8'-10	258
4b1	LONGITUDINAL, BOTH FACES, WALLS		24	20'-8	331
5d1	HORIZONTAL, WINGS, BOTH FACES		20	LISTED	113
5d2	VERTICAL, WEIR WALL, BOTH FACES		12	8'-10	111
5d3	VERTICAL, WEIR WALL, BOTH FACES		12	6'-5	80
5d4	HORIZONTAL, BOTH FACES, WEIR WALL		12	7'-2	90
5d5	VERTICAL, WINGS, BOTH FACES		24	LISTED	84
5d6	SLOPE, WINGS, BOTH FACES		4	5'-3	22
5a1	LONGITUDINAL, SLAB, BOTT.		8	5'-8	47
5a2	LONGITUDINAL, SLAB, TOP		8	5'-8	47
5f1	LONGITUDINAL, FLOOR, TOP		8	20'-8	172
5f2	LONGITUDINAL, FLOOR, BOTT.		8	20'-8	172
4l1	VERTICAL, PARAPET		14	6'-5	60
7j1	TRANSVERSE, PARAPET/WINGWALLS		6	17'-2	211
5k1	TRANSVERSE, BOTT. SLAB		10	7'-2	75
4k2	CORNER, TOP. SLAB		10	4'-11	33
4K9	TRANSVERSE, TOP. SLAB, END		1	7'-2	5
5m1	TRANSVERSE, TOP, FLOOR, BARREL SECTION		11	7'-8	88
4m2	VERTICAL, BOTT. CORNER		11	8'-4	61
5m3	TRANSVERSE, TOP, BOTT. FLOOR, DROP INLET SECTION		32	7'-8	256
4m9	TRANSVERSE, BOTT; FLOOR, END		1	7'-8	5
				REINFORCING STEEL - TOTAL (LBS.)	2577

BENT BAR DETAILS



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

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0)
PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET
PRECAST TO CAST IN PLACE BARREL DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 62

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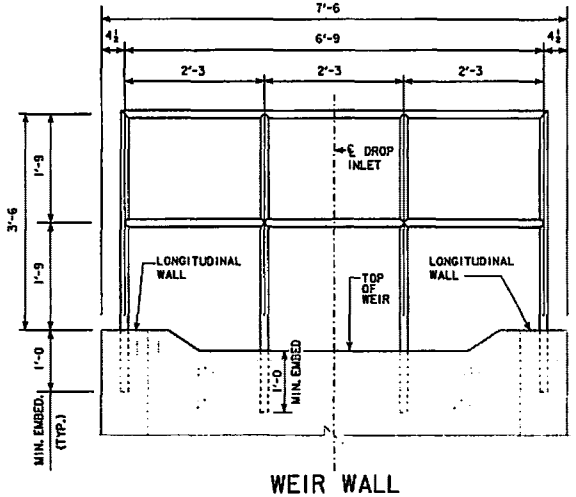
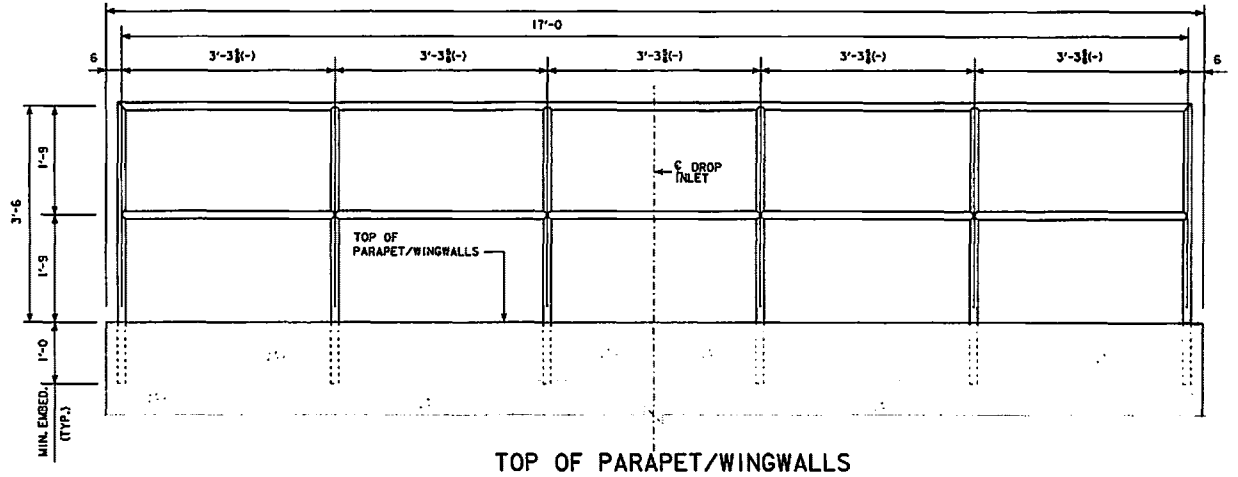
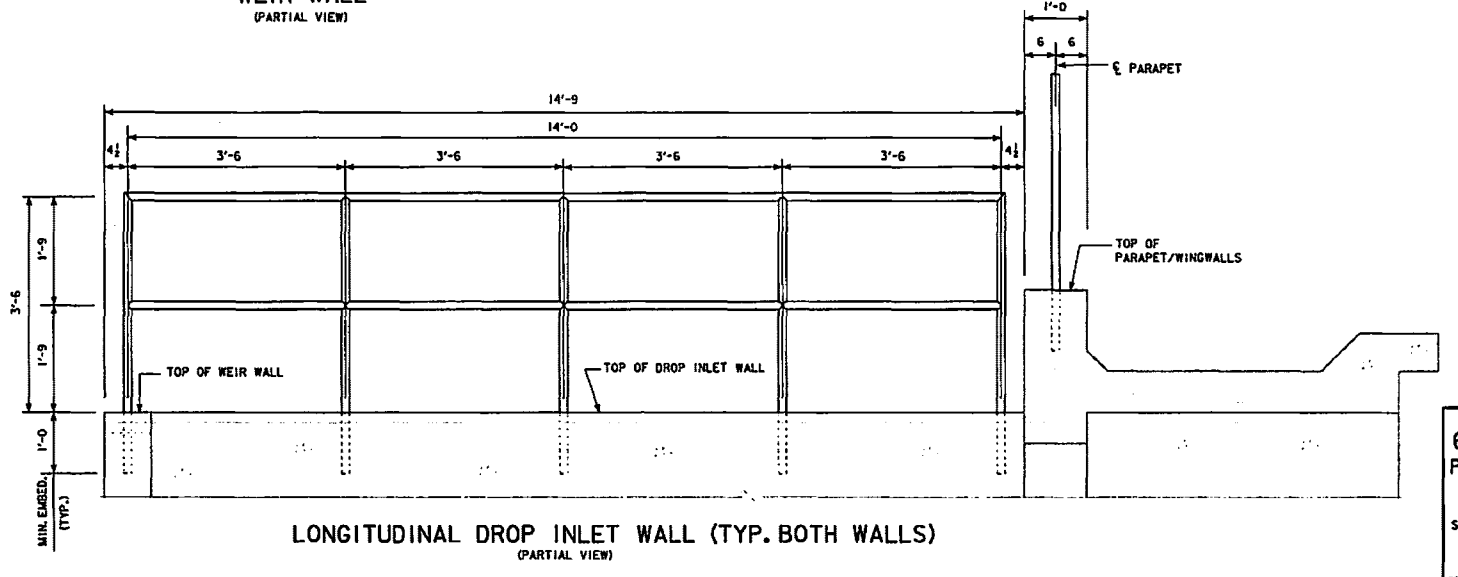
INCLUDES ADDENDA: A.02



WEIR WALL
(PARTIAL VIEW)



TOP OF PARAPET/WINGWALLS
(PARTIAL VIEW)



LONGITUDINAL DROP INLET WALL (TYP. BOTH WALLS)
(PARTIAL VIEW)

NOTE:
SEE DESIGN SHEET 7 FOR ADDITIONAL RAIL DETAILS.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0) PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET

SAFETY RAIL DETAILS

STA. 11085+38.00

OCTOBER 2015

IDA COUNTY

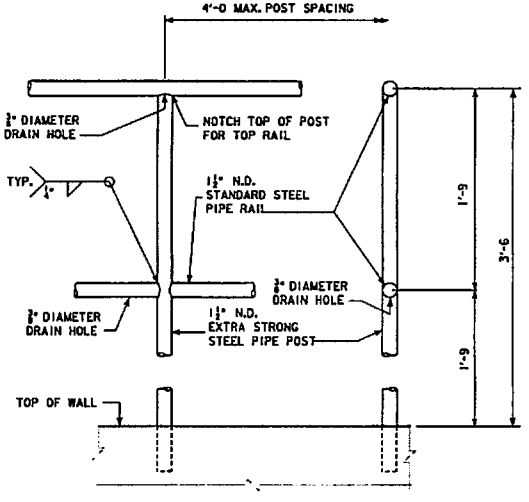
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 418

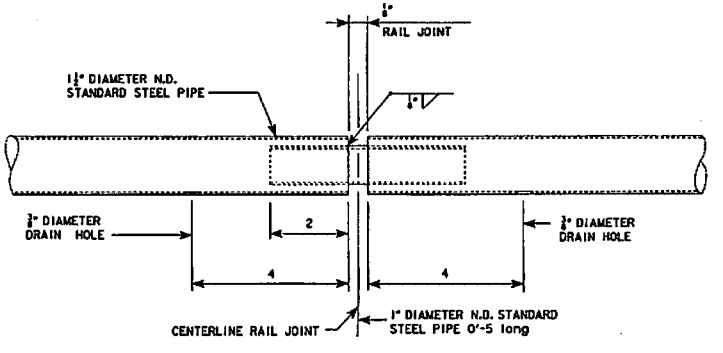
DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 63

11/30/2015 8:10:42 AM tellio2 pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020125.brg 9-4700418sp007 11x17.pdf.pltcfg

INCLUDES ADDENDA: A.02



PIPE HANDRAIL DETAILS



RAIL JOINT DETAIL

NOTE: PIPE HANDRAIL ASSEMBLY TO BE GALVANIZED AFTER FABRICATION. DRAIN HOLES, TO FACILITATE THE HOT DIP GALVANIZING PROCESS, SHALL BE INDICATED ON THE SHOP DRAWINGS.

PEDESTRIAN HAND RAIL NOTES:

THE STEEL PIPE PEDESTRIAN HAND RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED END TO END OF RAIL. THE PRICE BID FOR STEEL PIPE PEDESTRIAN HAND RAIL SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.

THE MATERIAL FOR TUBE RAILS, POSTS AND SPLICE TUBES SHALL BE STANDARD STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53, TYPE E OR S, GRADE B OR ASTM A500 GRADE B.

PANELS AND END SECTIONS SHALL BE GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A123.

ENDS OF RAIL SECTIONS ARE TO BE SAWED OR MILLED. ALL CUT ENDS ARE TO BE TRUE, SMOOTH, AND FREE OF BURRS OR RAGGED EDGES.

DESIGN FOR STAGE II CONSTRUCTION OF A 0° SKEW

6'-0 X 6'-0 X 293'-0 (STAGE II 117'-0)

PRECAST REINF. CONCRETE BOX CULVERT WITH C.I.P. 14'-0 X 6'-0 DROP INLET

SAFETY RAIL DETAILS

STA. 11085+38.00 OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 418

DESIGN TEAM DGB * MSF * ER | IDA COUNTY | PROJECT NUMBER NHSN-020-2(125)--2R-47 | SHEET NUMBER 64

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INCLUDES ADDENDA: A.02

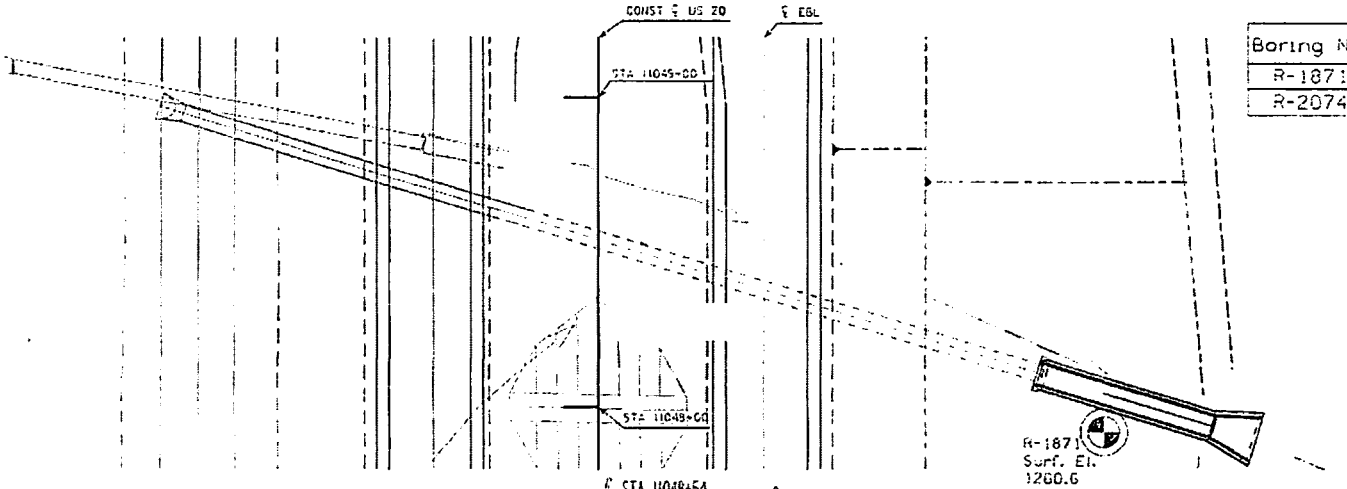
LOCATION

T-85-68N R-41W
SECTION 32-3
DOUGLAS-HOOK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.4744E F°
LONGITUDE -95.7097E6°

0 ENGLISH 40
SCALE IN FEET

R-2074
Surf. El.
1268.7

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



Boring No.	Date Drilled	Groundwater Level (Ft.)
R-1871	11/07/2012	11.7 After 0 Hrs.
R-2074	03/26/2012	23.0 DRY After 0 Hrs.

GEOTECHNICAL 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.

Mark A. Dell 21258 IOWA LICENSED PROFESSIONAL ENGINEER

Signature _____ Date _____

Mark A. Dell

Printed or typed name

My license renewal date is December 31, 2013.

Pages or sheets covered by this work: SPS.1 - SPS.6

DESIGN FOR 17° SKEW LT AB

8' X 5' REINFORCED 3:1 CONCRETE FLUME FOR 60" RCP

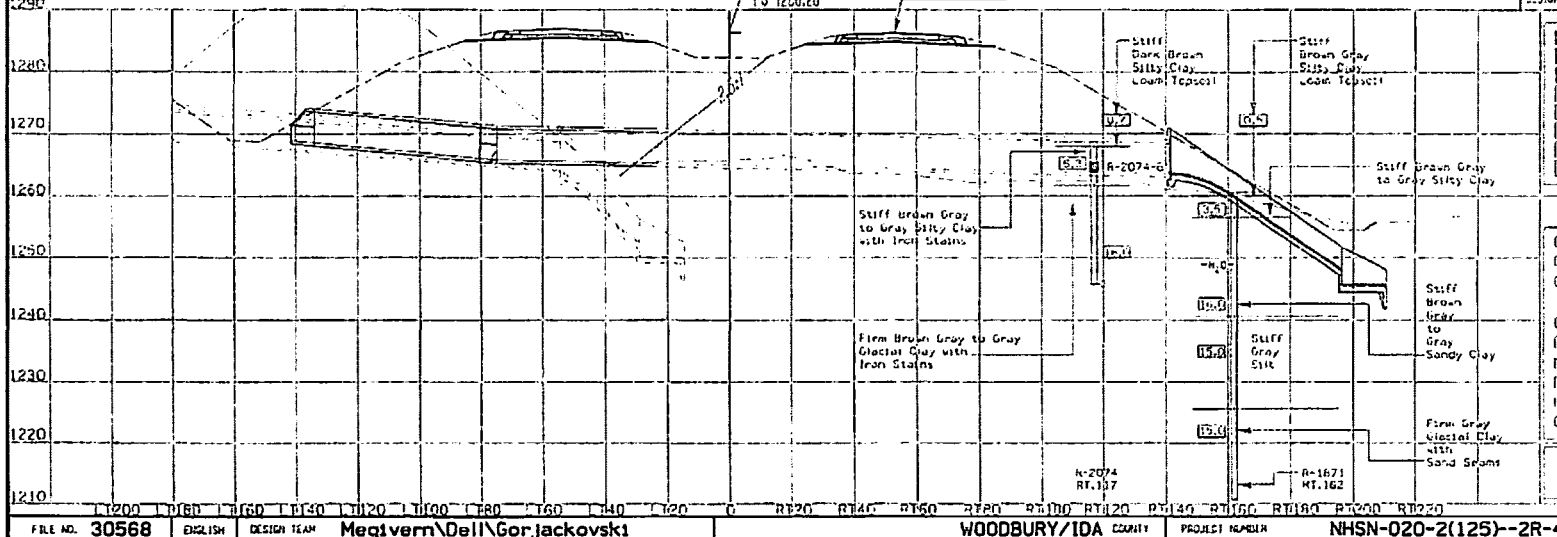
SOIL PROFILE SHEET

STATION 11048+64.00

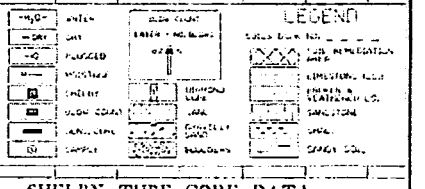
WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0515



LEGEND



SHELBY TUBE CORE DATA

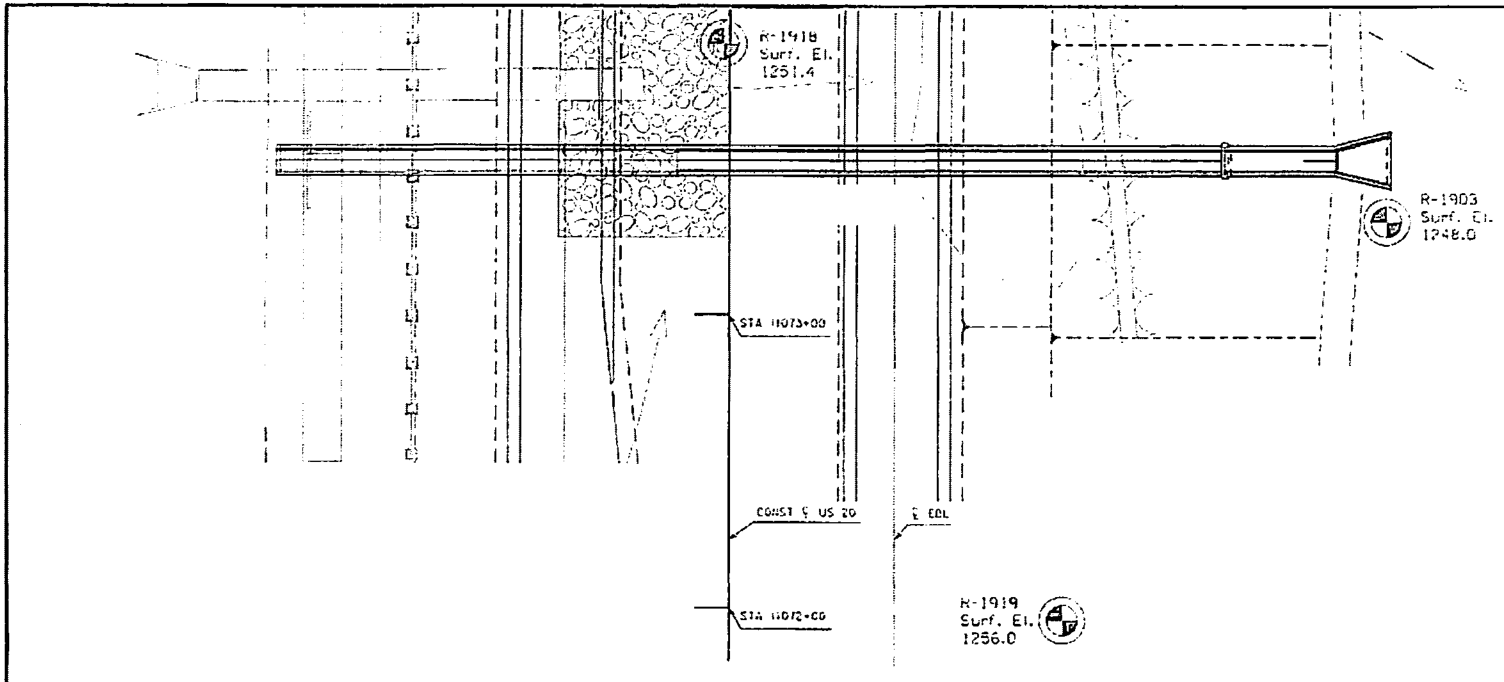
CORE NO.	R-2074-B
CLASSIFICATION (AASHTO)	A-6(15)
COEFF.CONSOL. SQ.FT /DAY	1.385
TRIAXIAL COMPRESSION	CU
COHESION - PSF	179
FRICTION COEFF.	0.21
MOISTURE CONTENT %	15.4
DRY DENSITY - PCF	95.0
UU-UNCONSOLIDATED & UNDRAINED	
CU-CONSOLIDATED & UNDRAINED	

Note:
0.5 Indicates Layer Thickness

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER SPS.1

11:57:45 AM 11/4/2013 rschapp

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



LOCATION

T-89-60N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474422°
LONGITUDE -95.700534°

0 ENGLISH 40
SCALE IN FEET

Boring No.	Date Drilled	GroundWater Level (Ft.)
R-1903	01/08/2013	7.2 AFTER 2.0 Hrs.
R-1918	01/15/2013	30.0 DRY
R-1919	01/15/2013	14.2 PLUGGED AFTER 24 Hrs.

DESIGN FOR 0° SKEW

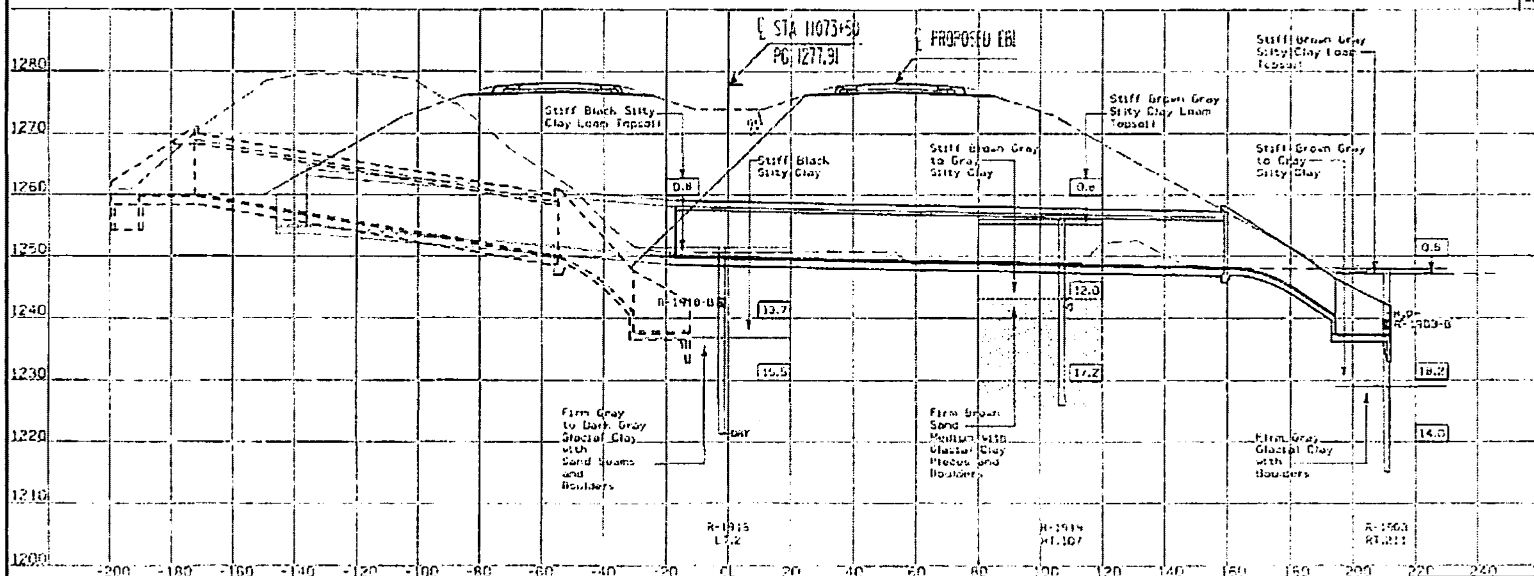
8′ X 8′ X 175′ REINFORCED CONC BOX CULVERT WITH 3:1 FLUME

SOIL PROFILE SHEET

STATION 11073+50

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0615



Note: 0.9 Indicates Layer Thickness

LEGEND

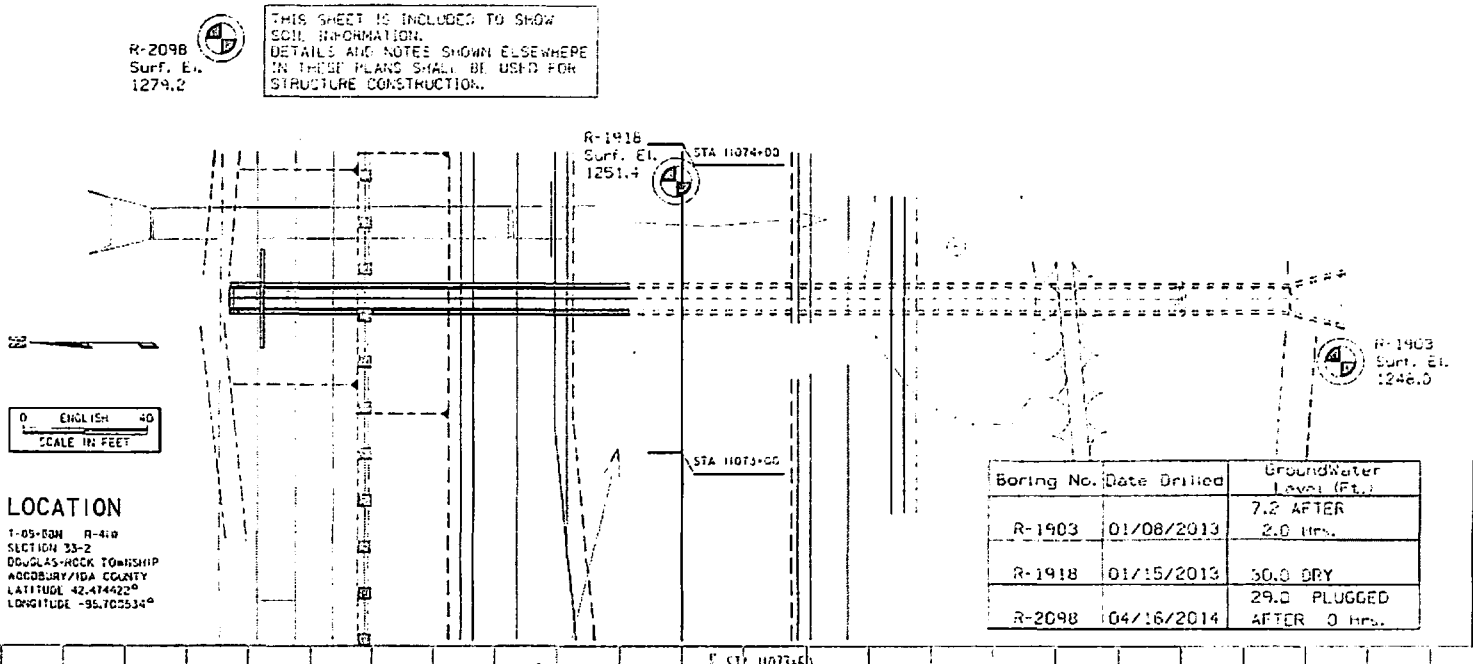
Water, Dry, Plugged, Moisture, Shelby, Flow Count, Spec. Core, Sample, Standing Water, Standing Cone, Sand, Gravelly Sand, Boulders, Soils Log No., Soil Remediation Area, Limestone, Estimated, Sandstone, Shale, Sandy Soil

SHELBY TUBE CORE DATA

CORE NO.	R-1903-B	R-1918-B
CLASSIFICATION (AASHTO)	A-7-6(23)	A-6(13)
COEFF.CONSOL. SQ.FT./DAY	0.058	0.097
TRIAXIAL COMPRESSION	CU	CU
COHESION - PSF	368	181
FRICTION COEFF.	0.16	0.19
MOISTURE CONTENT %	30.7	30.6
DRY DENSITY - PCF	90.8	89.4

UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



LOCATION

T-85-R8N R-41W
SECTION 33-2
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474422°
LONGITUDE -95.705534°

Boring No.	Date Drilled	GroundWater Level (Ft.)
R-1903	01/08/2013	7.2 AFTER 2.0 Hrs.
R-1918	01/15/2013	30.0 DRY
R-2098	04/16/2014	29.0 PLUGGED AFTER 0 Hrs.

DESIGN FOR 0° SKEW

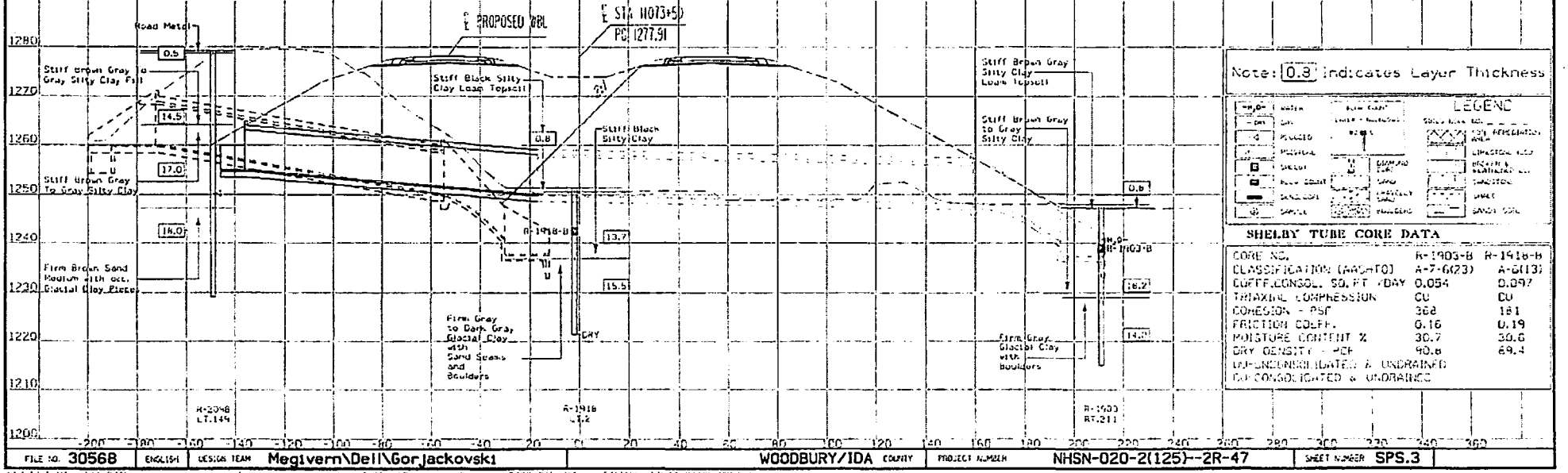
8' X 8' REINFORCED CONC BOX CULVERT EXTENSION WITH 10' X 8' DROP INLET SOIL PROFILE SHEET

STATION 11073+50

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0318



Note: 0.8 Indicates Layer Thickness

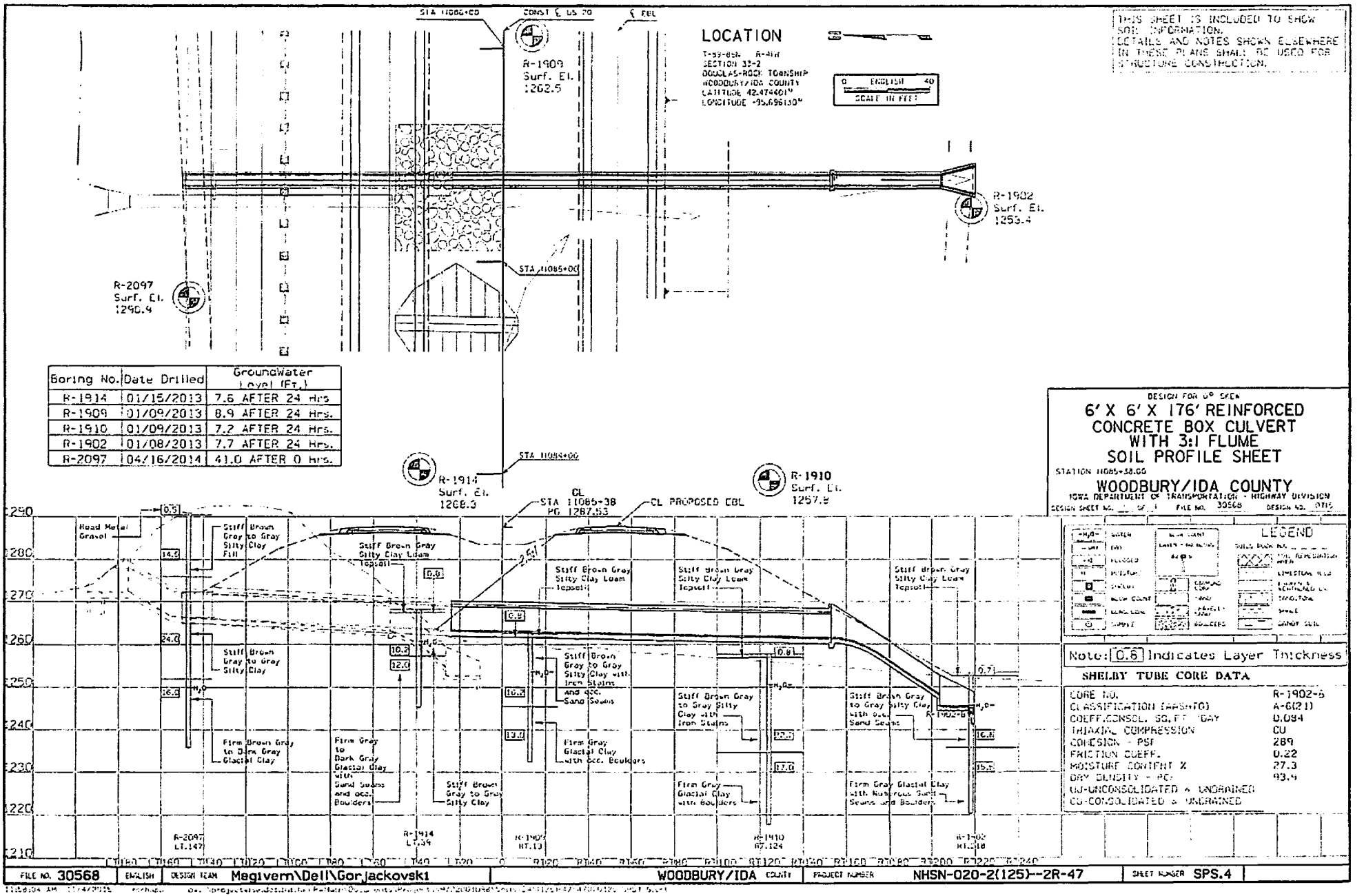
LEGEND

SHELBY TUBE CORE DATA

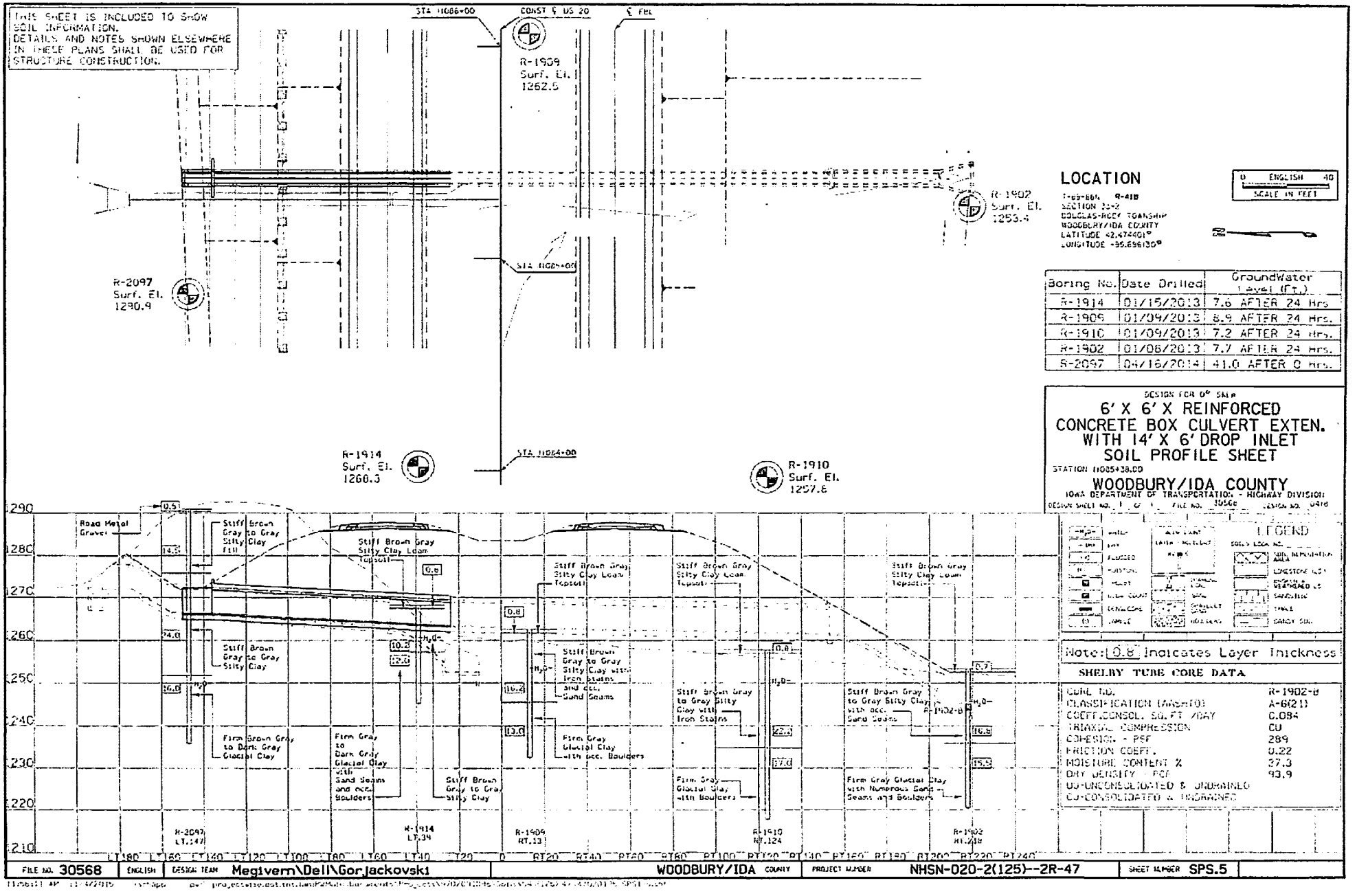
CORE NO.	R-1903-B	R-1918-B
CLASSIFICATION (AASHTO)	A-7-6(23)	A-6(13)
COEFF.CONSOL. SQ.FT /DAY	0.054	0.097
TRIAXIAL COMPRESSION	CU	CU
COHESION - PSF	368	181
FRICTION COEFF.	0.16	0.19
MOISTURE CONTENT %	30.7	30.6
DRY DENSITY - PCF	90.8	89.4

UNCONSOLIDATED & UNDRAINED
CONSOLIDATED & UNDRAINED

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER SPS.3



Boring No.	Date Drilled	Groundwater Level (Ft.)
R-1914	01/15/2013	7.6 AFTER 24 Hrs
R-1909	01/09/2013	8.9 AFTER 24 Hrs.
R-1910	01/09/2013	7.2 AFTER 24 Hrs.
R-1902	01/08/2013	7.7 AFTER 24 Hrs.
R-2097	04/16/2014	41.0 AFTER 0 Hrs.

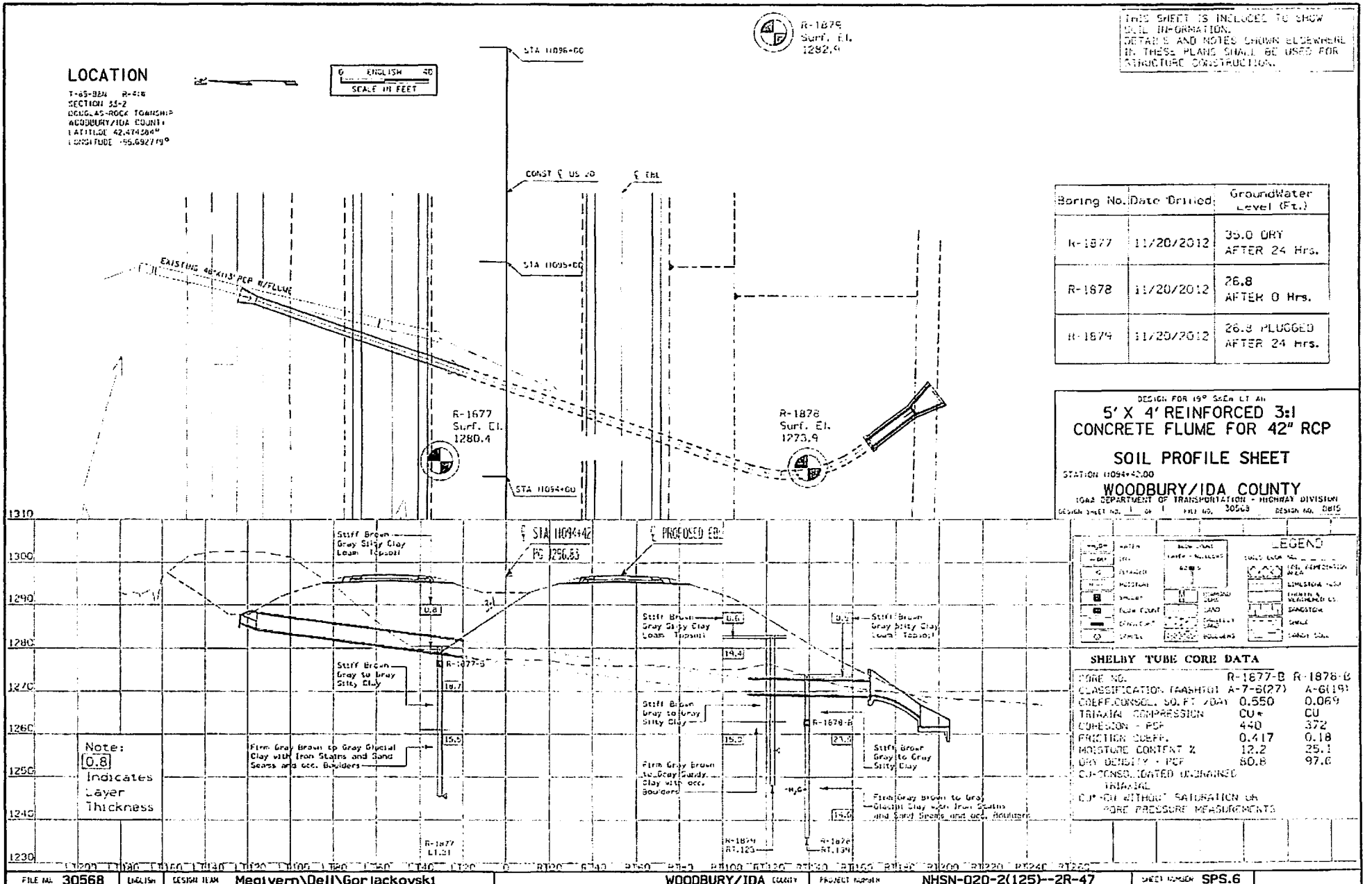

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
STA 11086+00
CONST ℄ US 20
℄ FEL
R-1909
Surf. El.
1262.6
R-1902
Surf. El.
1253.4
STA 11084+00
R-2097
Surf. El.
1290.9
R-1914
Surf. El.
1260.3
STA 11082+00
R-1910
Surf. El.
1257.6
LOCATION
SECTION 35-92
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474401°
LONGITUDE -95.896130°
0 ENGLISH 40
SCALE IN FEET
Boring No. | Date Drilled | GroundWater Level (Ft.)
R-1914 | 01/15/2013 | 7.6 AFTER 24 Hrs
R-1909 | 01/09/2013 | 8.9 AFTER 24 Hrs.
R-1910 | 01/09/2013 | 7.2 AFTER 24 Hrs.
R-1902 | 01/08/2013 | 7.7 AFTER 24 Hrs.
R-2097 | 04/16/2014 | 41.0 AFTER 0 Hrs.
DESIGN FOR 0° SKEW
6' X 6' X REINFORCED CONCRETE BOX CULVERT EXTEN. WITH 14' X 6' DROP INLET SOIL PROFILE SHEET
STATION 11085+38.00
WOODBURY/IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
LEGEND
Note: 0.8 Indicates Layer Thickness
SHELBY TUBE CORE DATA
CORE NO. R-1902-B
CLASSIFICATION (AASHTO) A-6(21)
COEFF.CONSOL. SQ.FT./DAY C.084
TRIAXIAL COMPRESSION CU
COHESION - PSF 289
FRICTION COEFF. 0.22
MOISTURE CONTENT % 27.3
DRY DENSITY - PCF 93.9
UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED
Road Metal Gravel
Stiff Brown Gray to Gray Silty Clay Fill
Stiff Brown Gray to Gray Silty Clay
Firm Brown Gray to Dark Gray Glacial Clay
Stiff Brown Gray Silty Clay Loam Topsoil
Firm Gray to Dark Gray Glacial Clay with Sand Seams and occ. Boulders
Stiff Brown Gray to Gray Silty Clay
Stiff Brown Gray to Gray Silty Clay with Iron Stains and occ. Sand Seams
Firm Gray Glacial Clay with occ. Boulders
Stiff Brown Gray to Gray Silty Clay with Iron Stains
Firm Gray Glacial Clay with Boulders
Stiff Brown Gray to Gray Silty Clay with occ. Sand Seams
Firm Gray Glacial Clay with Numerous Sand Seams and Boulders
R-2097 LT.147
R-1914 LT.39
R-1909 RT.13
R-1910 RT.124
R-1902 RT.218
FILE NO. 30568
ENGLISH
DESIGN TEAM Megivern\Dell\Gorjackovski
WOODBURY/IDA COUNTY
PROJECT NUMBER NHSN-020-2(125)--2R-47
SHEET NUMBER SPS.5

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

LOCATION

T-85-32W R-41E
SECTION 35-2
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474584°
LONGITUDE -95.692779°

0 ENGLISH 40
SCALE IN FEET



Note:
0.8 Indicates Layer Thickness

Boring No.	Date Drilled	Groundwater Level (Ft.)
R-1877	11/20/2012	35.0 DRY AFTER 24 Hrs.
R-1878	11/20/2012	26.8 AFTER 0 Hrs.
R-1879	11/20/2012	26.8 PLUGGED AFTER 24 Hrs.

DESIGN FOR 19° SKEW LT AH

5' X 4' REINFORCED 3:1 CONCRETE FLUME FOR 42" RCP

SOIL PROFILE SHEET

STATION 11094+42.00

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0815

LEGEND

SHELBY TUBE CORE DATA

CORE NO.	R-1877-B	R-1878-B
CLASSIFICATION (AASHTO)	A-7-6(27)	A-6(19)
COEFF.CONSOL. SQ.FT./DAY	0.550	0.069
TRIAXIAL COMPRESSION	CU*	CU
COHESION - PSF	440	372
FRICTION COEFF.	0.417	0.18
MOISTURE CONTENT %	12.2	25.1
DRY DENSITY - PCF	80.8	97.6

CU=CONSOLIDATED UNDRAINED TRIAXIAL
CU*=CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(125)--2R-47	SHEET NUMBER SPS.6

LETTING DATE DEC. 15, 2015

RCB CULVERT EXTENSION - SINGLE BOX
NHSN-020-2(127)--2R-47

IDA COUNTY

IDA COUNTY - DESIGN 915, 1015, & 518
Page 201 of 413

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD
- INTERSTATE HIGHWAY (80)
- UNITED STATES HIGHWAY (65)
- STATE HIGHWAY (175)
- COUNTY HIGHWAY (S27)
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES — ABBEY ROAD
- UNINCORPORATED PLACE — ELWOOD

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM

IDA COUNTY

RCB CULVERT EXTENSION - SINGLE BOX

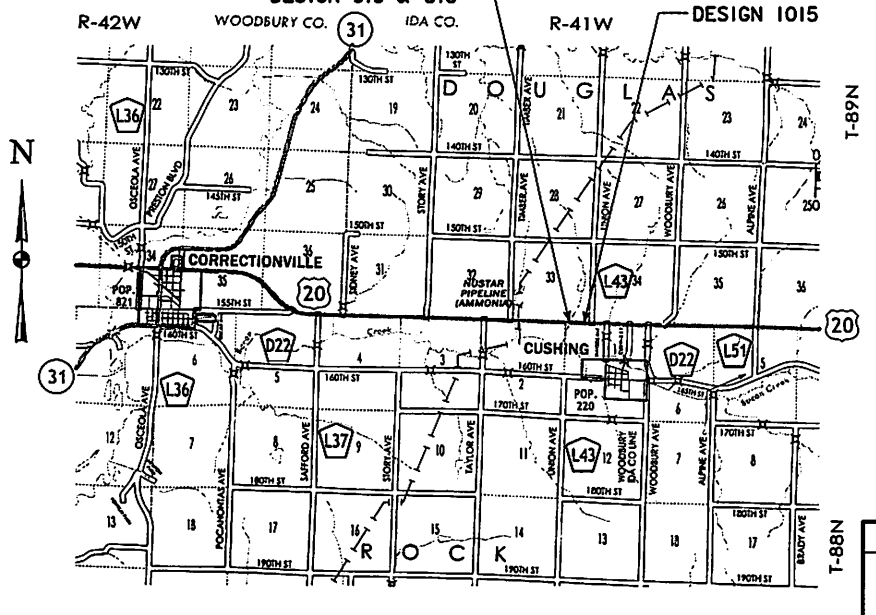
4 MI. EAST OF CORRECTIONVILLE

OVER UNNAMED STREAM

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.

DESIGN 915 & 518

DESIGN 1015



LOCATION MAP

PROJECT DIRECTORY NAME: 9702001098

ENGLISH STANDARD CULVERT PLANS

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-8-12	4-12	-
PWH 0-1-12	4-12	-
PWH 0-2-12	4-12	-
PWH 0-3-12	4-12	-
PWH 0-4-12	4-12	-
PWH 0-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-
RCF-01-12	4-12	5-13
RCF-02-12	4-12	-
RCFB-01-12	4-12	-
RCFB-04-12	4-12	-
RCFB-05-12	4-12	-
FBJ-01-12	4-12	-
FBJ-04-12	4-12	-

ENGLISH PRECAST STANDARD PLANS

STANDARD	ISSUED	REVISED
PRCB G1-13	1-13	-
PRCB G2-13	1-13	-
PRCB 10-13	1-13	-
PES 1-13-T1	1-13	5-13
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-
PES 4-13	1-13	-
PEP 1-13	1-13	10-14

	TOTAL SHEETS
	39
PROJECT NUMBER	
NHSN-020-2(127)--2R-47	
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	
98-97-020-010-04	

INDEX OF SHEETS

IOWA ONE CALL
1-800-292-8989 | 811
www.iowaonecall.com

REVISIONS

DESIGN DATA RURAL

2023 AADT	4,000	V.P.D.
2043 AADT	5,800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
Total Design ESALs	16,700,000	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	JAMES S. NELSON	STRUCTURAL DESIGN
1	DAVID R. CLAMAN	HYDRAULIC DESIGN
BRIDGE STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

HYDRAULIC DESIGN

David R. Claman 11571 IOWA

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.

David R. Claman 11-25-15
Signature Date

David R. Claman
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 4, 15, 25, 31, & 36 OF 36

STRUCTURAL DESIGN

James S. Nelson 16032 IOWA

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.

11-25-15
Signature Date

James S. Nelson
Printed or Typed Name

My license renewal date is December 31, 2015

Pages or sheets covered by this seal: SHEETS 1-36 OF 36

DESIGN TEAM SWM/JSN	ENGLISH	IOWA DOT ⌘ OFFICE OF BRIDGES AND STRUCTURES	FILE NO. 30568	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 1

12/1/2015 10:58:46 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97518s000 11x17_pdf.pltcfg

INCLUDES ADDENDA: 15DEC15.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	530.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	412	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	450.0	
4	2404-7775000	REINFORCING STEEL	LB	79,744	
5	2507-3250005	ENGINEERING FABRIC	SY	930.0	
6	2507-6800061	REVETMENT, CLASS E	TON	860.0	
7	2533-4980005	MOBILIZATION	LS	1.00	
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES 530 CY OF EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL, ARTICLE 4196.01, B, 3 OF STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
7	2533-4980005	MOBILIZATION - -
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIALS, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN. THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION. THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT IS LUMP SUM.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN QUANTITIES

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 2

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INCLUDES ADDENDA: 15DEC15.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 10'-0 x 10-0' x 110'-0 RCB CULVERT WITH A 10' x 8' x 353'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 7° L.A. AT STA. 11108+60.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE 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. 7256).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 24 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (5ai IS #5 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

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED AND IMMEDIATELY PRIOR TO STAGE 2 CONSTRUCTION. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-8-12	4-12	-
RCF-01-12	4-12	5-13
RCF-02-12	4-12	-
RCFB-04-12	4-12	-
RCFB-05-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-
FBJ 04-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
23'-0 BARREL SECTION (1 REQ'D)	6,288	6,288
26'-0 BARREL SECTION (1 REQ'D)	7,109	7,109
29'-0 BARREL SECTION (4 REQ'D)	4 @ 7,929	31,716
29'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 8,220	16,440
29'-0 BENT BARREL SECTION PARAPET	179	179
BARREL BELL JOINTS	8 @ 1,000	8,000
10' X 8' FLUME	5,159	5,159
FLUME BASIN & CURTAIN	4,247	4,247
FLUME JUNCTION BELL JOINT	606	606
TOTAL (LBS.)		79,744

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
23'-0 BARREL SECTION (1 REQ'D)	10.7	13.3	10.3	34.3
26'-0 BARREL SECTION (1 REQ'D)	12.0	15.0	11.6	38.6
29'-0 BARREL SECTION (4 REQ'D)	4 @ 13.4 = 53.6	4 @ 16.8 = 67.2	4 @ 13 = 52	172.8
29'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 13.4 = 26.8	2 @ 16.8 = 33.6	2 @ 13 = 26	86.4
29'-0 BENT BARREL SECTION PARAPET	0.5	-	-	0.5
BARREL BELL JOINTS	8 @ 2.4 = 19.2	8 @ 2.8 = 22.4	8 @ 2.2 = 17.6	59.2
10' X 8' FLUME	-	15.4	11.7	27.1
FLUME BASIN	-	16.8	7.9	24.7
FLUME CURTAIN	-	1.1	-	1.1
FLUME JUNCTION BELL JOINT	-	2.9	2.4	5.3
TOTAL (CU. YDS.)	122.8	187.7	139.5	450.0

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
7256	RCB CULVERT NEW - SINGLE
-	-
-	-

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN IN NHSN-020-1(123)--2R-97

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN IN NHSN-020-1(123)--2R-97

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN GENERAL NOTES

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 3

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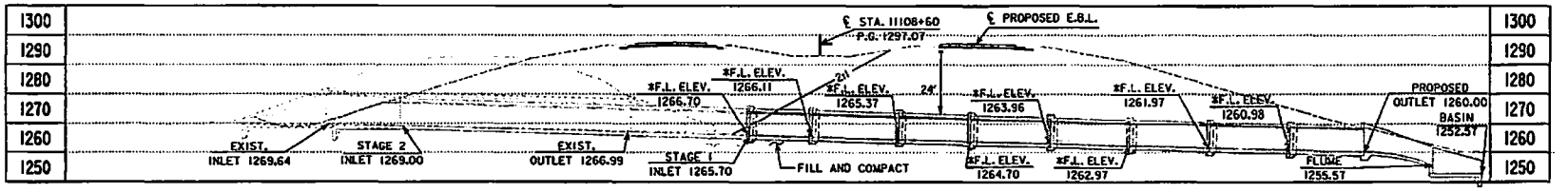


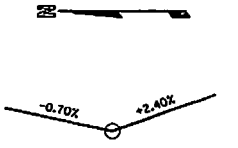
LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 24'
ANTICIPATED SETTLEMENT = 1.0'

*CAMBERED ELEVATIONS

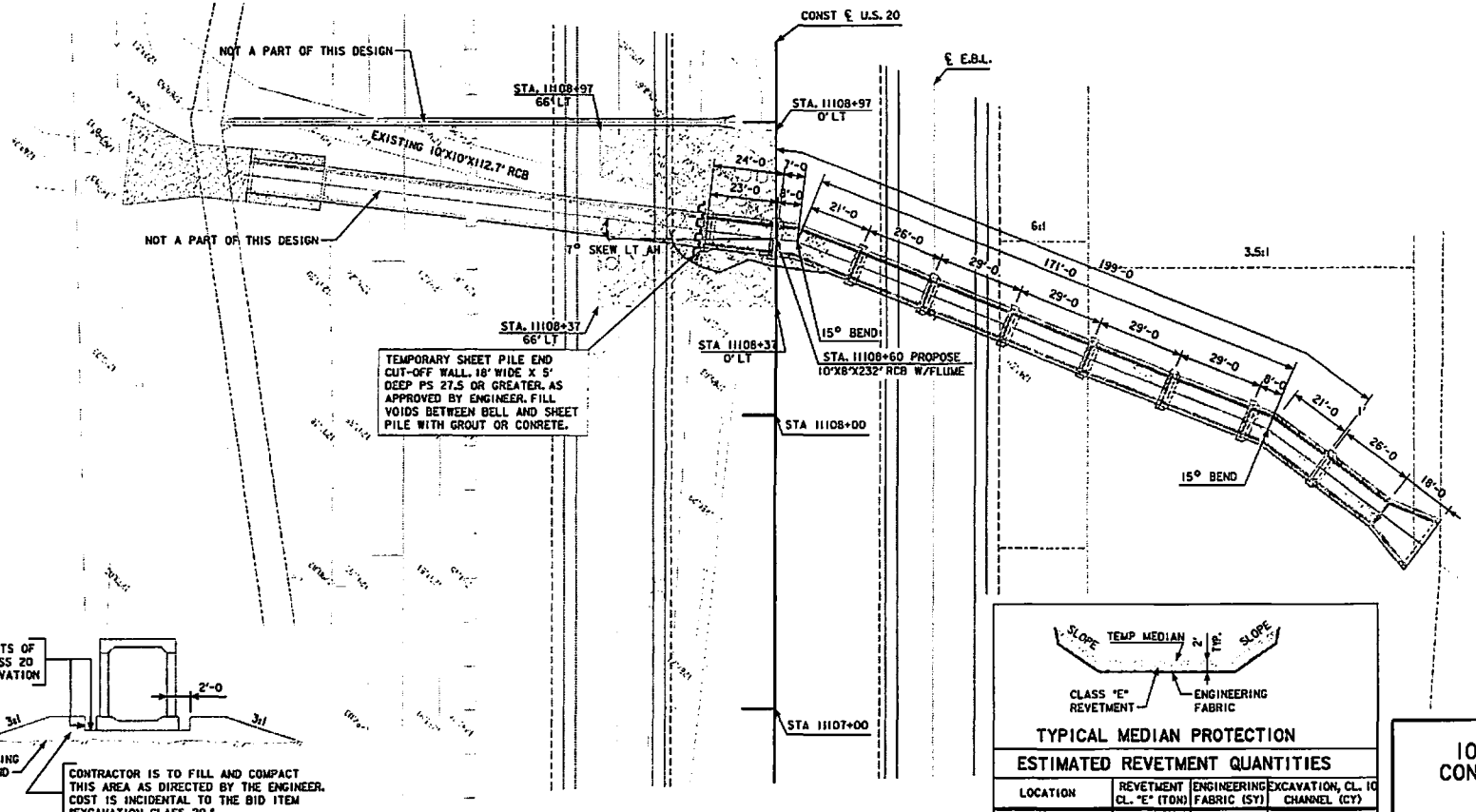
OLD DES# 7256

TWO 15° BENDS



VPI STA = 11107+00 VC = 650'
VPI ELEV = 1292.58

PROPOSED PROFILE GRADE US 20



HYDRAULIC DATA

DRAINAGE AREA = 569 ACRES VH-11
Q_{50} = 771 CFS
HW ELEV. = 1277.81

UTILITIES LEGEND:

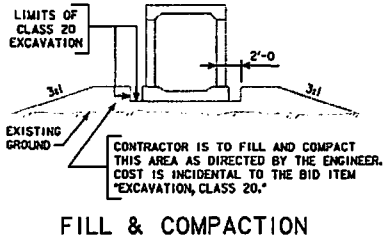
FOI INS
FO2 QWEST
FO4 MCLEOD

LOCATION

T-89-88N R-41W
SECTION 33-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474358°
LONGITUDE -95.687524°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	



FILL & COMPACTION DETAIL

SITUATION PLAN

TYPICAL MEDIAN PROTECTION

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION, CL. 10 CHANNEL (CY)
MEDIAN	860	930	530

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN SITUATION PLAN

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWW / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 4

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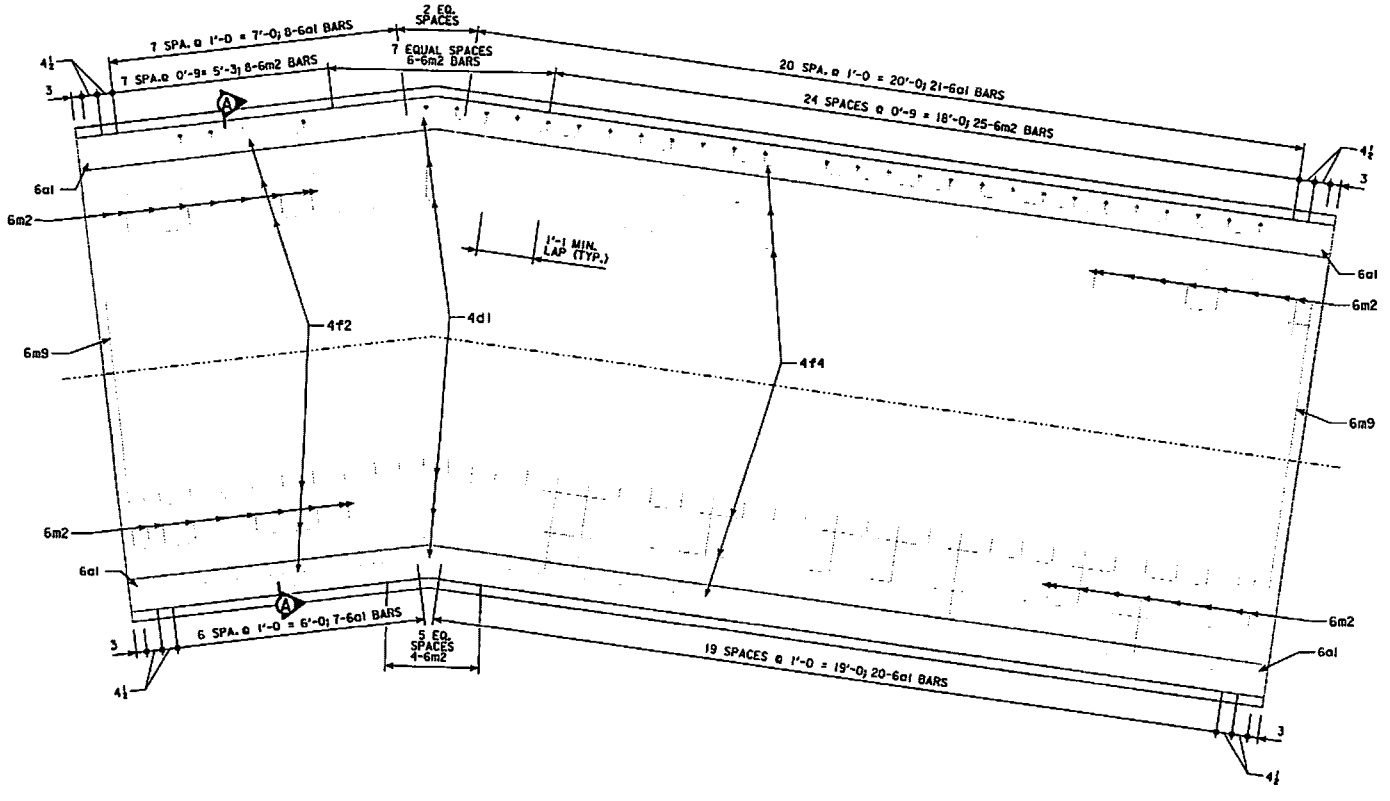
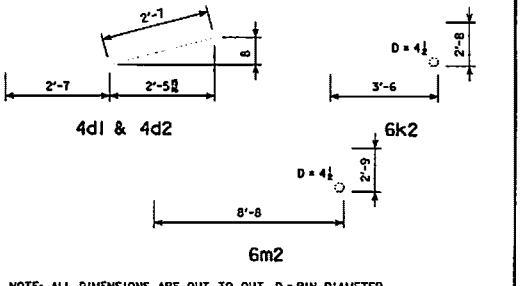


BOTTOM FLOOR REINFORCING

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	WALLS, VERTICAL, FRONT FACE		61	10'-1	924
4b1	WALLS, HORIZONTAL, BOTH F.		30	7'-1	145
4b2	WALLS, HORIZONTAL, BOTH F.		30	20'-1	403
4b3	SLAB, BOTTOM, LONGITUDINAL		2	7'-1	10
4b4	SLAB, BOTTOM, LONGITUDINAL		2	20'-1	27
4d1	FLOOR, BOTTOM, LONGITUDINAL		6	5'-2	21
4d1	SLAB, TOP, LONGITUDINAL		6	5'-2	21
4d2	FLOOR, TOP, LONGITUDINAL		11	5'-2	38
4d2	SLAB, BOTTOM, LONGITUDINAL		11	5'-2	38
4d2	WALLS, HORIZONTAL, BOTH F.		30	5'-2	104
4e1	SLAB, BOTTOM, LONGITUDINAL		9	7'-1	43
4e2	SLAB, TOP, LONGITUDINAL		6	7'-1	29
4e3	SLAB, BOTTOM, LONGITUDINAL		9	20'-1	121
4e4	SLAB, TOP, LONGITUDINAL		6	20'-1	81
4f1	FLOOR, TOP, LONGITUDINAL		11	7'-1	53
4f2	FLOOR, BOTTOM, LONGITUDINAL		6	7'-1	29
4f3	FLOOR, TOP, LONGITUDINAL		11	20'-1	148
4f4	FLOOR, BOTTOM, LONGITUDINAL		6	20'-1	81
8k1	SLAB, BOTTOM, TRANSVERSE		59	11'-3	1,773
6k2	SLAB, TOP, CORNER		78	6'-2	769
6k9	SLAB, TOP, LONGITUDINAL		2	11'-3	34
8m1	FLOOR, TOP, TRANSVERSE		58	11'-9	1,820
6m2	FLOOR, BOTTOM, CORNER		84	11'-5	1,441
8m3	FLOOR, TOP, TRANSVERSE		1	11'-10	32
6m9	FLOOR, BOTTOM, LONGITUDINAL		2	11'-9	35
				TOTAL (LBS.)	8,220

BENT BAR DETAILS



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

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 5

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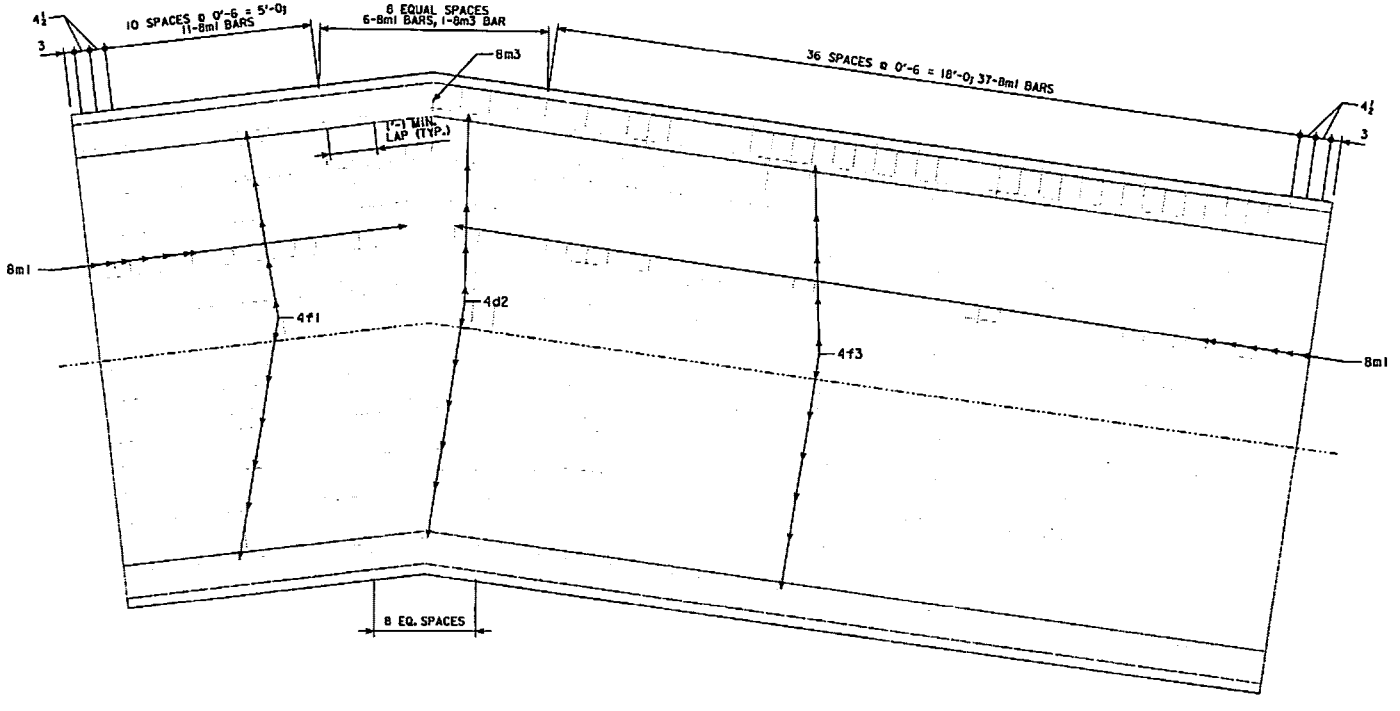

TOP FLOOR REINFORCING

NOTE: 6a1 AND 6m2 BARS NOT SHOWN FOR CLARITY.
REFER TO BOTTOM FLOOR REINFORCING FOR DETAILS.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 6

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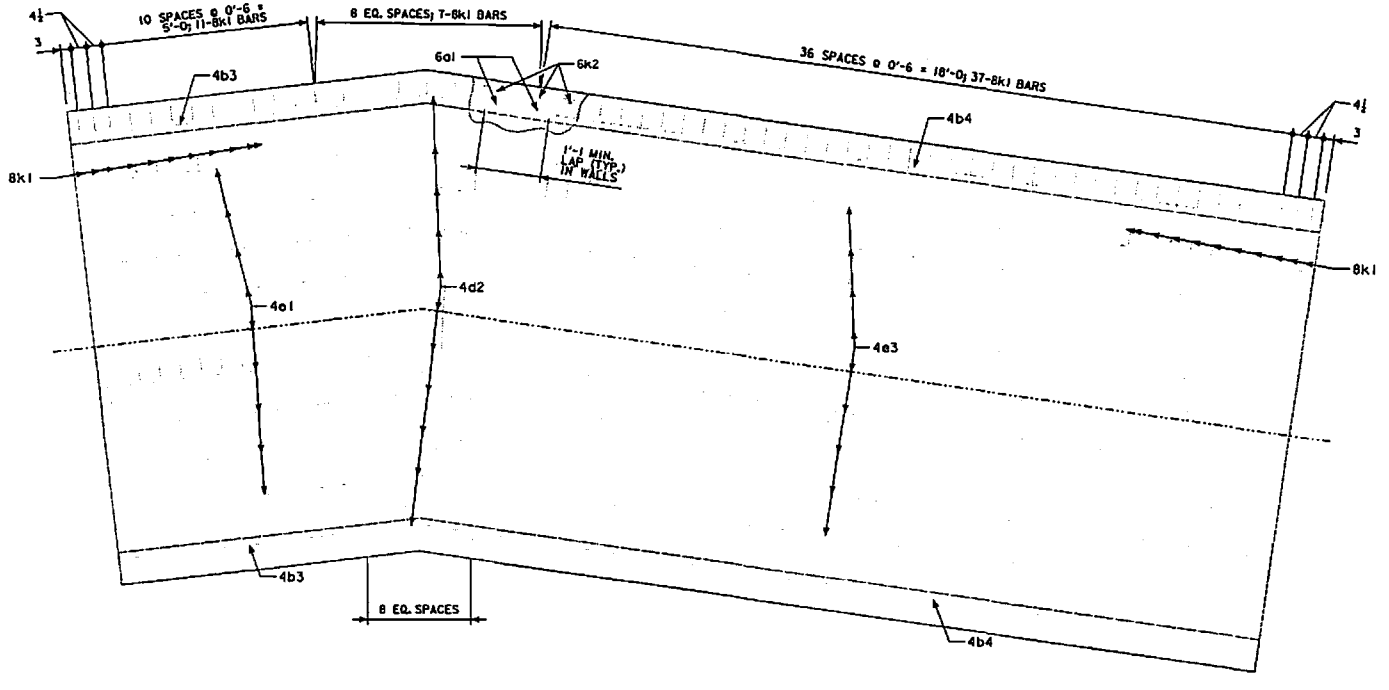

BOTTOM SLAB REINFORCING

NOTE: 6a1 AND 6k2 BARS NOT ALL SHOWN FOR CLARITY REFER TO BOTTOM FLOOR REINFORCING DETAILS AND TOP SLAB REINFORCING.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SKM / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 7

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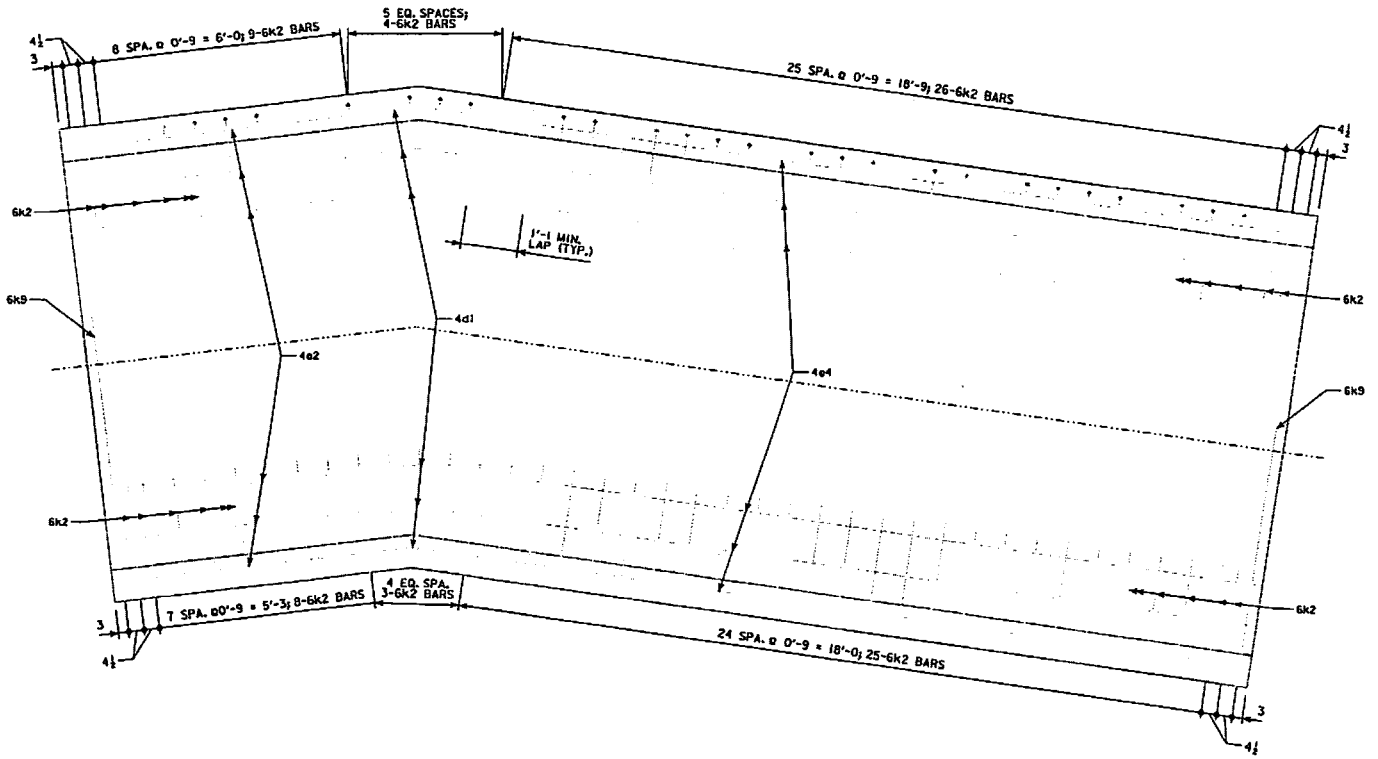
INCLUDES ADDENDA: 15DEC115.A02



TOP SLAB REINFORCING

NOTE: 6a1 BARS NOT SHOWN FOR CLARITY. REFER TO BOTTOM FLOOR REINFORCING FOR DETAILS.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 8

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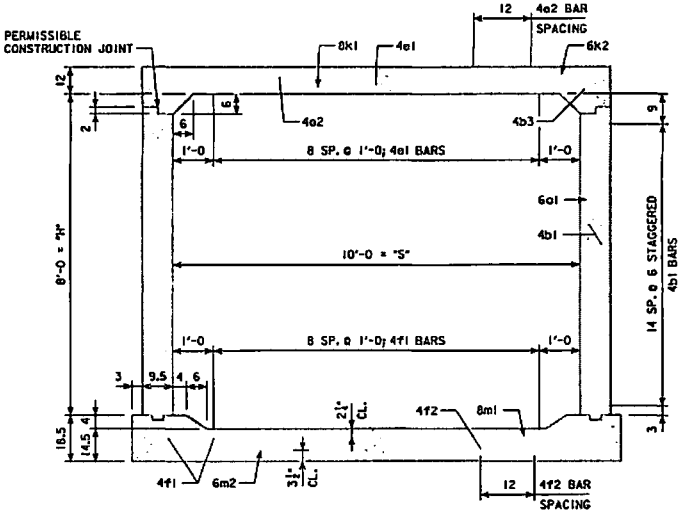
INCLUDES ADDENDA: 15DEC115.A02

VARIABLE DIMENSIONS AND QUANTITIES FOR 10 x 8 BARREL SECTIONS

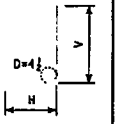
DIMENSIONS							BAR LIST																																		QUANTITIES				
							a1			b1			a1			e2			f1			f2			k1			k2				k9			m1			m2					m9		CONCRETE (CY/FT)				STEEL
FILL	S	H	A	B	C	D	SIZE	SP.	L	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	L	SIZE	SP.	L	H	V	SIZE	L	SIZE	SP.	L	SIZE	SP.	L	H	V	SIZE	L	SLAB	FLOOR	WALLS	TOTAL	LB/FT
21-25	10	8	12	14.5	9.5	9	6	12	10'-1	4	6	30	4	12	9	4	12	6	4	12	11	4	12	6	8	6	11'-3	6	9	6'-2	2'-8	3'-6	6	11'-3	8	6	11'-9	6	9	11'-5	2'-9	8'-8	6	11'-9	0.463	0.578	0.447	1.488	273.39



10 x 8 BARREL SECTION A-A

BENT BAR DETAIL

BARS	D
6	4½



k2 & m2

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

NOTES:

1. DIMENSIONS "A", "B", "C", "D", AND "SP." LISTED IN THE BAR LIST ARE IN INCHES.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN FLUME DETAILS

STA. 1108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 9

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INCLUDES ADDENDA: 15DEC115.A02

ENGLISH\LRFDSIGNEDSINGLECULVERTS.DGN - RCB 10-8-12 - THIS SHEET ISSUED 04-12.

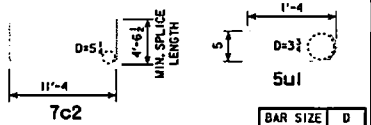
REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS FFV		50	LISTED	433
5b1	WALLS FFH		10	27'-0	282
4b2	WALLS BFH		10	27'-0	181
5b5	WALLS FFH		6	LISTED	53
4b6	WALLS BFH		6	LISTED	34
7c2	BOTT. FLOOR & WALLS BFV - SPLICED		49	20'-5	2,045
5c3	WALLS BFV		98	LISTED	732
6f1	FLOOR LONGIT. TOP		11	26'-2	432
5f2	FLOOR LONGIT. BOTT.		11	26'-2	300
6m1	FLOOR TRANSV. TOP		28	11'-10	498
6s1	WALLS BOTH F ALONG SLOPE		4	27'-0	163
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-1	6
				TOTAL (LB)	5,159

LISTED BARS

BAR 5a1	BAR 5c3		BAR 5b5 AND 4b6
6 AT 7'-0	14 AT 5'-10	4 AT 6'-1	6 BARS - 2 EA. LGTH.
4 AT 7'-2	4 AT 5'-11	4 AT 6'-3	3'-5
40 VAR. - 2 EA. LGTH.	6 AT 6'-0	4 AT 6'-5	7'-11
6'-11	62 VAR. - 2 EA. LGTH.		14'-0
7'-1	6'-2	7'-9	
7'-4	6'-4	7'-11	
7'-5	6'-6	8'-0	
7'-6	6'-7	8'-1	
7'-8	6'-8	8'-3	
7'-9	6'-9	8'-4	
7'-11	6'-10	8'-6	
8'-1	6'-11	8'-7	
8'-3	7'-0	8'-9	
8'-6	7'-1	8'-11	
8'-8	7'-2	9'-0	
8'-11	7'-3	9'-2	
9'-2	7'-4	9'-4	
9'-4	7'-5	9'-6	
9'-7	7'-7	9'-8	
9'-11	7'-8		
10'-2			
10'-5			
10'-9			

BENT BAR DETAILS

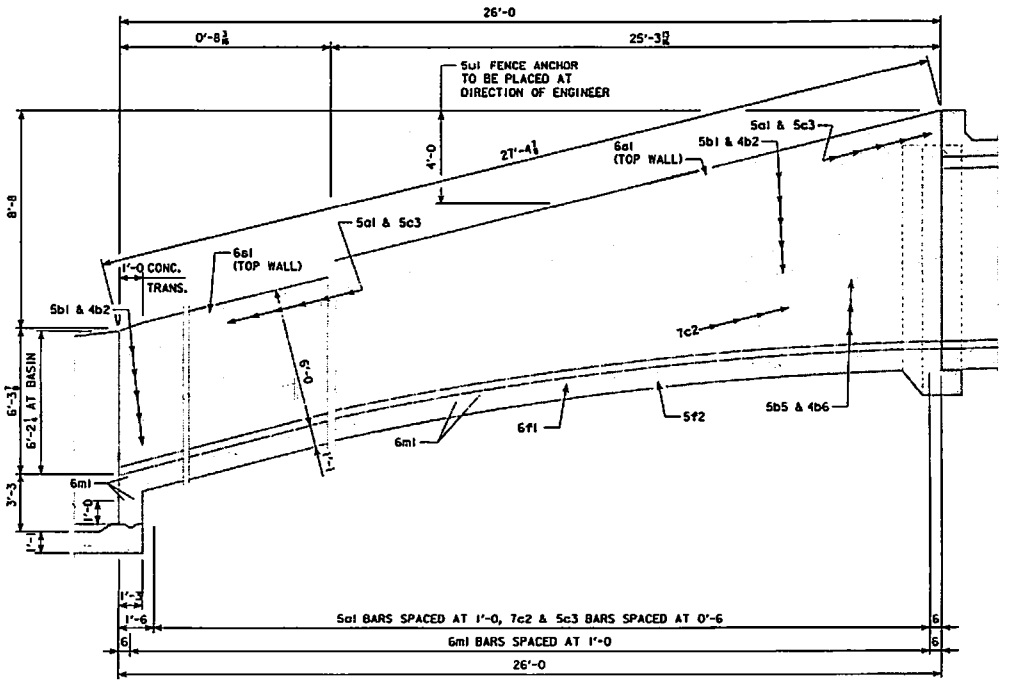


BAR SIZE	D
5	3¾
6	4½
7	5¼

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

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	15.4	11.7	27.1
JUNCTION BELL	2.9	2.4	5.3
BASIN	16.8	7.9	24.7
BASIN CURTAIN	1.1		1.1
TOTAL (CY)	36.2	22.0	58.2



10'x8' FLUME CHUTE - LONGITUDINAL SECTION

FLUME DATA

A A = 18°26'
A C = 1°00'
B = 13'-3¾
S = 10'-0
V = 6'-3¼
W = 8'-8
M = 6'-0
T = 1'-1
H = 8'-0

CURVE DATA

C. L. = 26'-0
L2 = 0'-8¼
L3 = 25'-3¾
D = 12'-8⅝
E = 12'-7⅛
P. C. ELEV. = 1260.00
P.I. ELEV. = 1259.78
P. P. ELEV. = 1259.56
P. T. ELEV. = 1255.57
X1 = 3'-11⅝
X2 = 2'-2¼
X3 = 0'-11⅝
X4 = 0'-3
L3/4 = 6'-3⅛

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-04-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-04-12 & RCFB-05-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN

FLUME DETAILS

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 10

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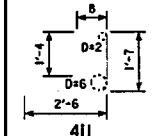
INCLUDES ADDENDA: 15DEC115.A02

29'-0 BENT BARREL END SECTION PARAPET DETAILS

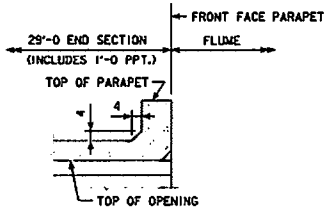
REINFORCING BAR LIST - END SECTION PARAPET					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4I1	PARAPET, VERTICAL		21	6'-1	87
7J1	PARAPET, HORIZONTAL		4	11'-3	92
				TOTAL - LBS.	179

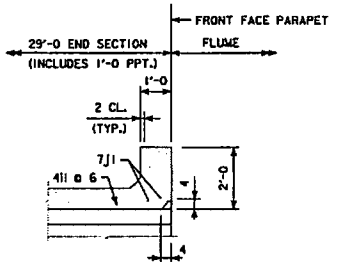
CONCRETE ABOVE SLAB
PARAPET = 0.5 CU.YDS.



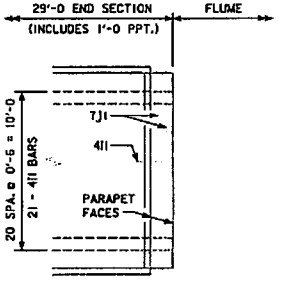
D = PIN DIAMETER
ALL DIMENSIONS ARE OUT TO OUT.

4I1
BENT BAR DETAILS

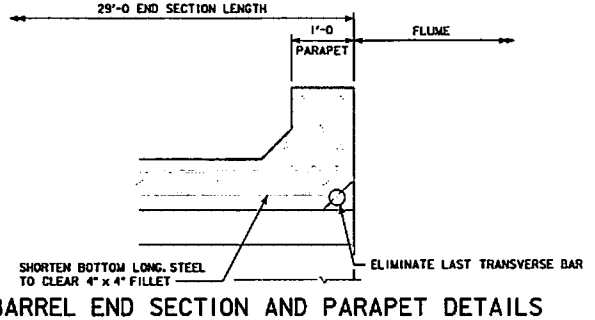




SECTION THRU PARAPET



PLAN VIEW



BARREL END SECTION AND PARAPET DETAILS
WITH FLUME OUTLET

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN OUTLET PARAPET DETAILS

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 10 OF 10 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 11

12/7/2015 10:59:11 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97915s010 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2102-0425071	SPECIAL BACKFILL	CY	39.0	
2	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	530.0	
3	2402-2720000	EXCAVATION, CLASS 20	CY	451	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	209.0	
5	2404-7775000	REINFORCING STEEL	LB	36,919	
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	LF	142.0	
7	2507-3250005	ENGINEERING FABRIC	SY	930.0	
8	2507-6800061	REVETMENT, CLASS E	TON	860.0	
9	2533-4980005	MOBILIZATION	LS	1.00	
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2102-0425071	SPECIAL BACKFILL RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR SPECIAL BACKFILL.
2	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDED 530 CY OF EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
5	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL, ARTICLE 4196.01, B, 3 OR STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
9	2533-4980005	MOBILIZATION " "
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIALS, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN. THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION. THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT IS LUMP SUM.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN QUANTITIES

STA. 1108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 12

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 10'-0 x 10-0' x 110'-0 RCB CULVERT WITH A 10' x 8' x 353'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 7° L.A. AT STA. 11108+60.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE 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. 7256).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 24 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (5oI IS⅝ 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

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED AND IMMEDIATELY PRIOR TO STAGE 2 CONSTRUCTION. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOPE@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-8-12	4-12	-
RCF-01-12	4-12	5-13
RCF-02-12	4-12	-
RCFB-04-12	4-12	-
RCFB-05-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-
FBJ 04-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
23'-0 BARREL SECTION (1 REQ'D)	6,288	6,288
29'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 8,220	16,440
29'-0 BENT BARREL SECTION PARAPET	179	179
BARREL BELL JOINTS	4 @ 1,000	4,000
10' X 8' FLUME	5,159	5,159
FLUME BASIN & CURTAIN	4,247	4,247
FLUME JUNCTION BELL JOINT	606	606
TOTAL (LBS.)		36,919

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
23'-0 BARREL SECTION (1 REQ'D)	10.7	13.3	10.3	34.3
29'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 13.4 = 26.8	2 @ 16.8 = 33.6	2 @ 13 = 26	86.4
29'-0 BENT BARREL SECTION PARAPET	0.5	-	-	0.5
BARREL BELL JOINTS	4 @ 2.4 = 9.6	4 @ 2.8 = 11.2	4 @ 2.2 = 8.8	29.6
10' X 8' FLUME	-	15.4	11.7	27.1
FLUME BASIN	-	16.8	7.9	24.7
FLUME CURTAIN	-	1.1	-	1.1
FLUME JUNCTION BELL JOINT	-	2.9	2.4	5.3
TOTAL (CU. YDS.)	47.6	94.3	67.1	209

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
7256	RCB CULVERT NEW - SINGLE
-	-
-	-

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN IN NHSN-020-1(123)--2R-97

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN IN NHSN-020-1(123)--2R-97

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN GENERAL NOTES

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 13

12/1/2015 10:59:15 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97915sp02 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 24 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 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 $\frac{3}{4}$ 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, D, 3, OF THE STANDARD SPECIFICATIONS.

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

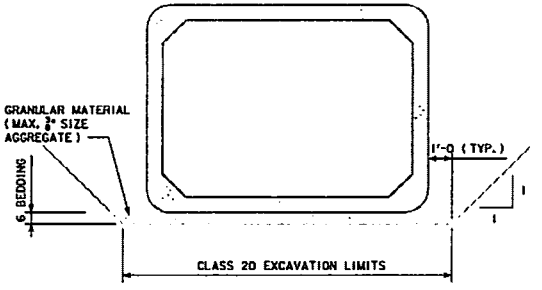
DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADII OR CHAMFER SHALL BE ACCOMPLISHED WITH A MECHANICAL HAND COMPACTOR.

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' x 2' 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.

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

STANDARD	ISSUED	REVISED
PRCB G1-13	1-13	-
PRCB G2-13	1-13	-
PRCB 10-13	1-13	-



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE AT THE BELL JOINT.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN GENERAL NOTES

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

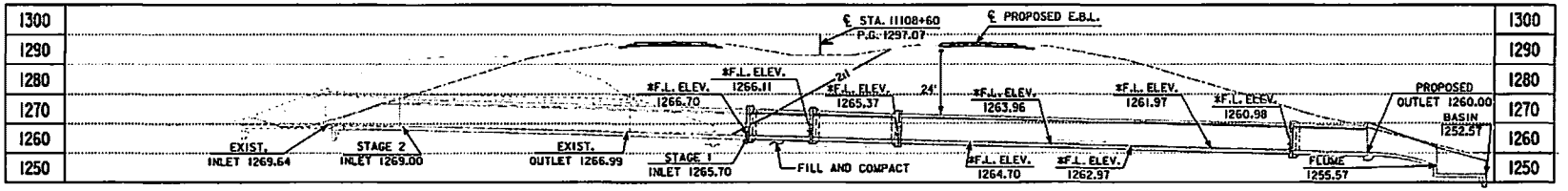
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 11 FILE NO. 39568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 14

12/1/2015 10:59:17 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97915sp03 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02



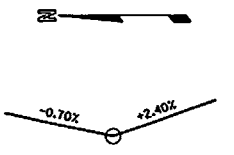
LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 24'
ANTICIPATED SETTLEMENT = 1.0'

* CAMBERED ELEVATIONS CORRESPOND TO SEGMENT DIMENSIONS SHOWN IN SITUATION PLAN

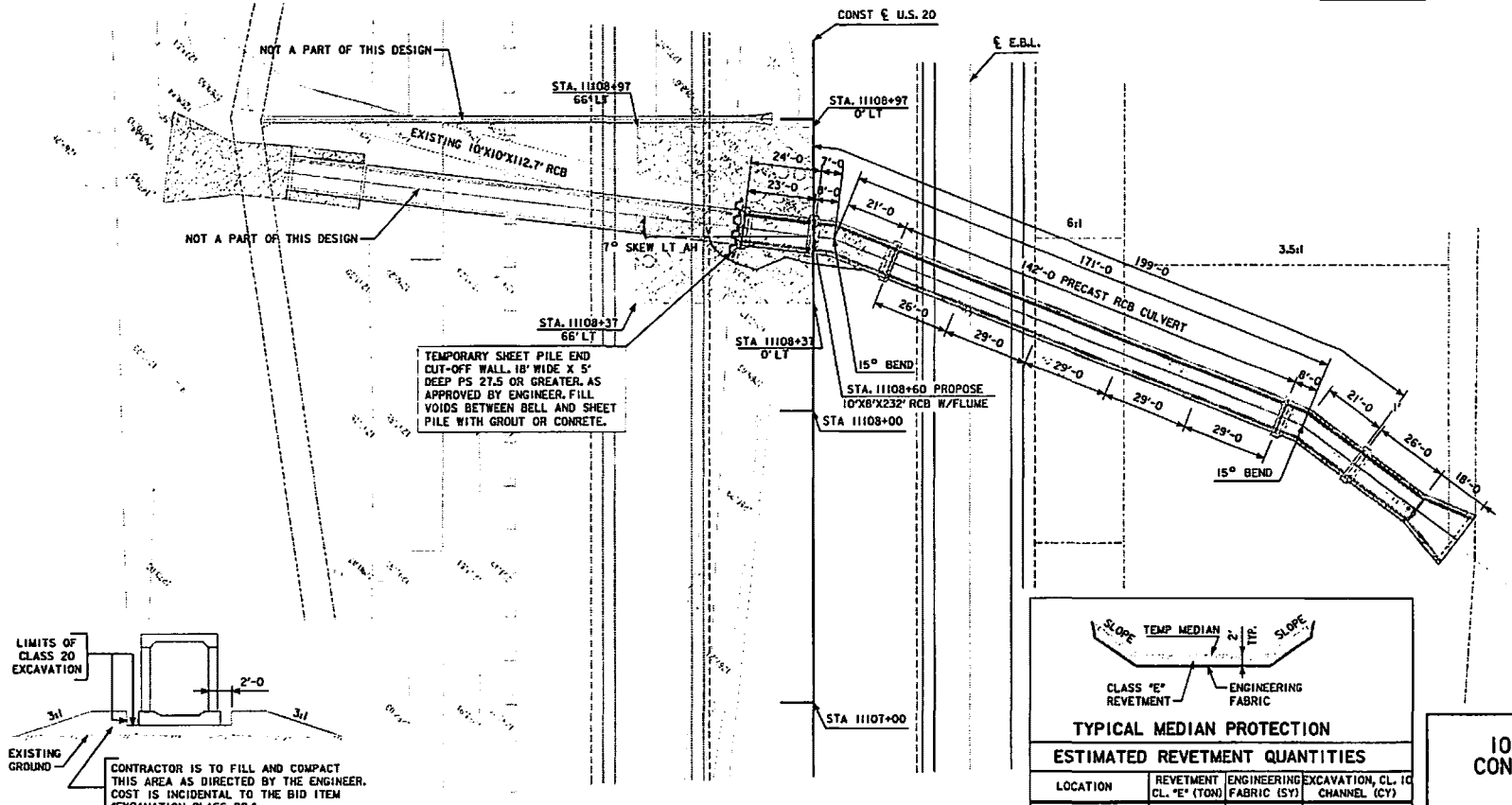
OLD DES# 7256

TWO 15° BENDS



VPI STA = 11107+00 VC = 650'
VPI ELEV = 1292.58

PROPOSED PROFILE GRADE US 20



HYDRAULIC DATA

DRAINAGE AREA = 569 ACRES VH-H
Q_{50} = 771 CFS
HW ELEV. = 1277.81

UTILITIES LEGEND:

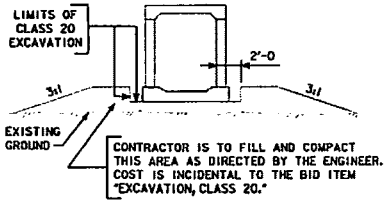
F01 INS
F02 QWEST
F04 MCLEOD

LOCATION

T-89-83N R-41W
SECTION 33-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474358°
LONGITUDE -95.687524°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	



FILL & COMPACTION DETAIL

SITUATION PLAN

TYPICAL MEDIAN PROTECTION

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION, CL. 10 CHANNEL (CY)
MEDIAN	860	930	530

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN SITUATION PLAN

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 15

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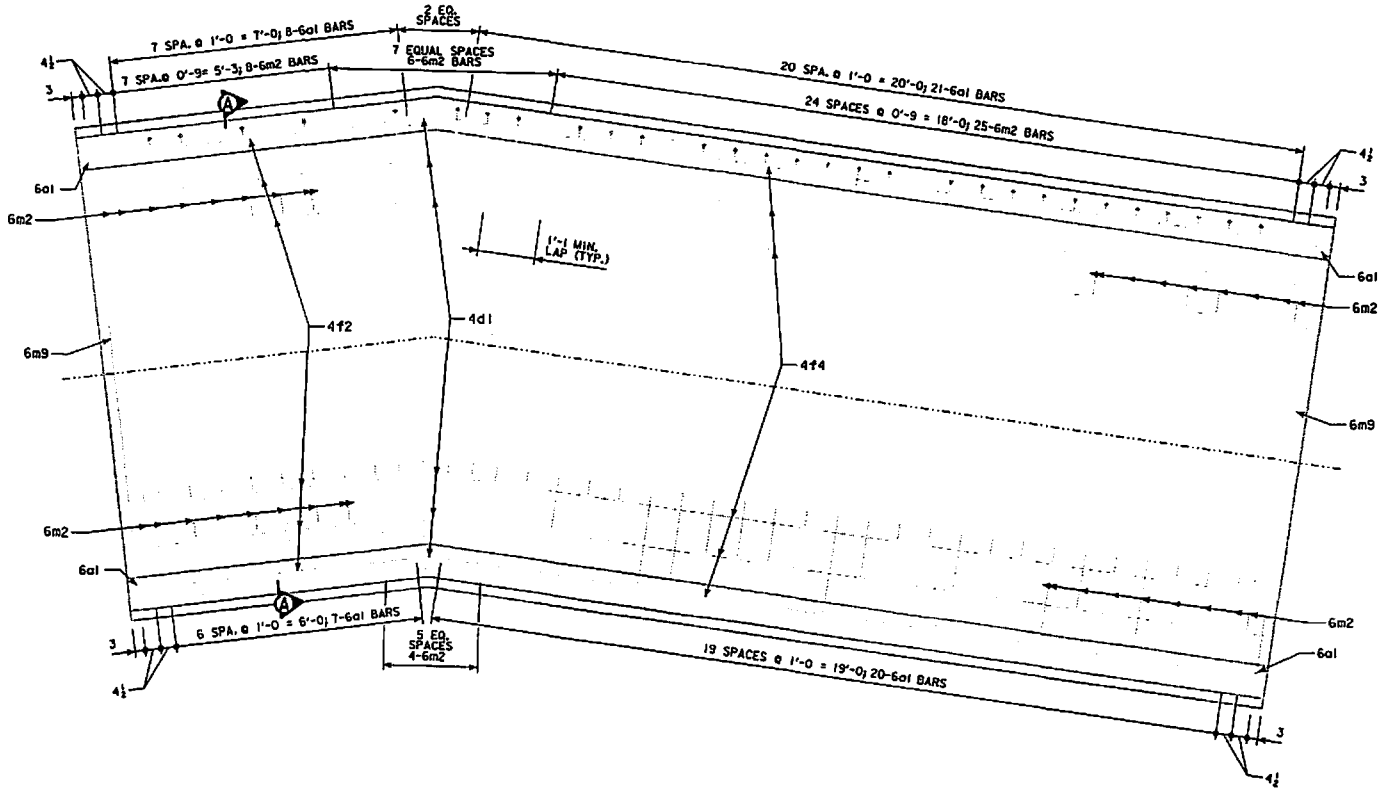
INCLUDES ADDENDA: 15DEC115.A02

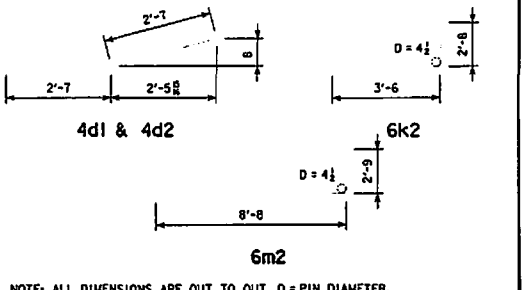


BOTTOM FLOOR REINFORCING

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	WALLS, VERTICAL, FRONT FACE		61	10'-1	924
4b1	WALLS, HORIZONTAL, BOTH F.		30	7'-1	145
4b2	WALLS, HORIZONTAL, BOTH F.		30	20'-1	403
4b3	SLAB, BOTTOM, LONGITUDINAL		2	7'-1	10
4b4	SLAB, BOTTOM, LONGITUDINAL		2	20'-1	27
4d1	FLOOR, BOTTOM, LONGITUDINAL		6	5'-2	21
4d1	SLAB, TOP, LONGITUDINAL		6	5'-2	21
4d2	FLOOR, TOP, LONGITUDINAL		11	5'-2	38
4d2	SLAB, BOTTOM, LONGITUDINAL		11	5'-2	38
4d2	WALLS, HORIZONTAL, BOTH F.		30	5'-2	104
4e1	SLAB, BOTTOM, LONGITUDINAL		9	7'-1	43
4e2	SLAB, TOP, LONGITUDINAL		6	7'-1	29
4e3	SLAB, BOTTOM, LONGITUDINAL		9	20'-1	121
4e4	SLAB, TOP, LONGITUDINAL		6	20'-1	81
4f1	FLOOR, TOP, LONGITUDINAL		11	7'-1	53
4f2	FLOOR, BOTTOM, LONGITUDINAL		6	7'-1	29
4f3	FLOOR, TOP, LONGITUDINAL		11	20'-1	148
4f4	FLOOR, BOTTOM, LONGITUDINAL		6	20'-1	81
6k1	SLAB, BOTTOM, TRANSVERSE		59	11'-3	1,773
6k2	SLAB, TOP, CORNER		78	6'-2	769
6k9	SLAB, TOP, LONGITUDINAL		2	11'-3	34
8m1	FLOOR, TOP, TRANSVERSE		58	11'-9	1,820
6m2	FLOOR, BOTTOM, CORNER		84	11'-5	1,441
8m3	FLOOR, TOP, TRANSVERSE		1	11'-10	32
6m9	FLOOR, BOTTOM, LONGITUDINAL		2	11'-9	35
				TOTAL (LBS.)	8,220

BENT BAR DETAILS



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

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

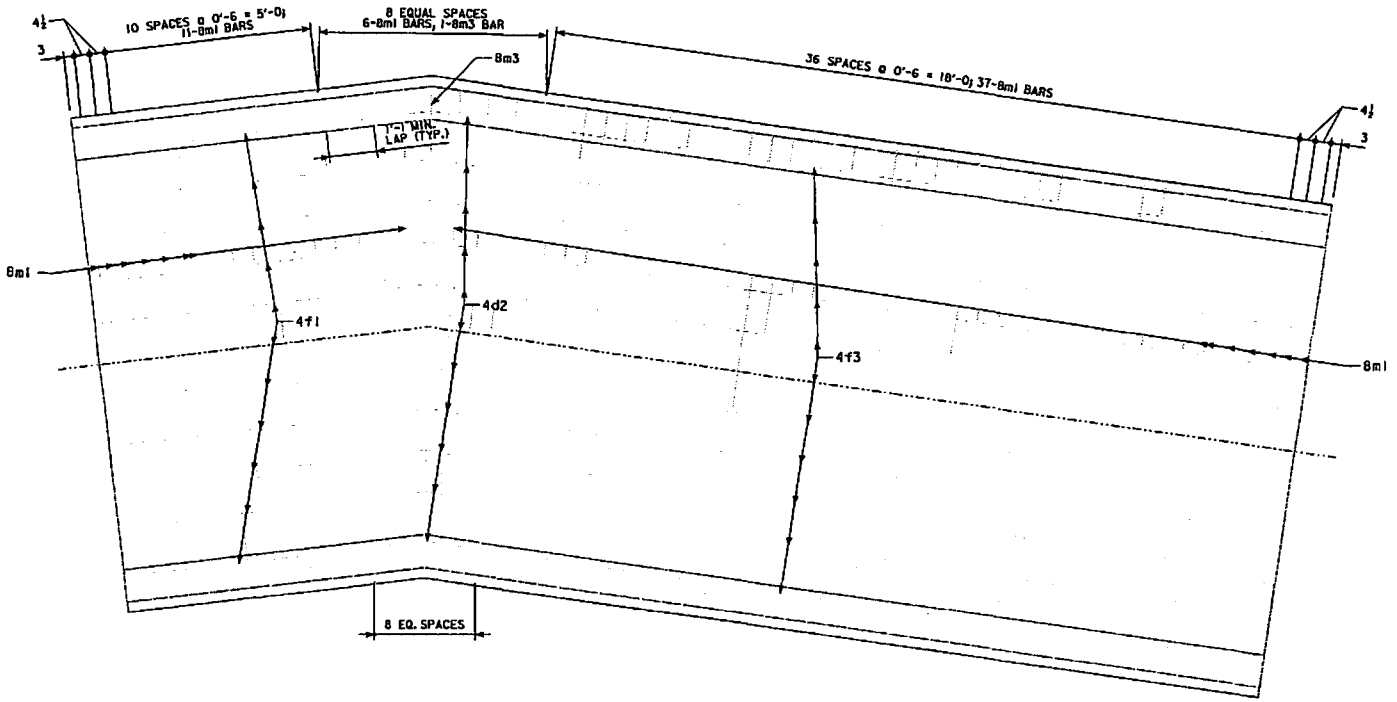
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 16

12/1/2015 10:59:21 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97915sp05 11x17_pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02



TOP FLOOR REINFORCING

NOTE: 6a1 AND 6m2 BARS NOT SHOWN FOR CLARITY.
REFER TO BOTTOM FLOOR REINFORCING FOR DETAILS.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 17

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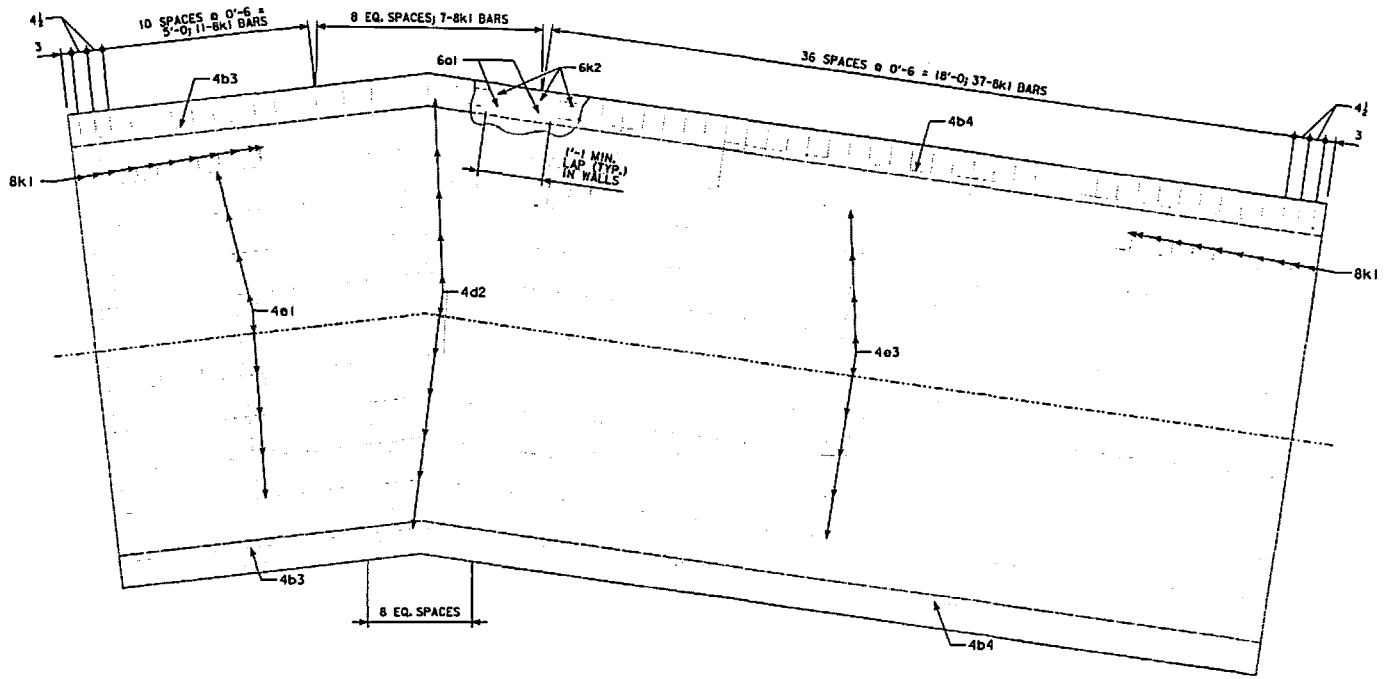
INCLUDES ADDENDA: 15DEC115.A02



BOTTOM SLAB REINFORCING

NOTE: 6a1 AND 6k2 BARS NOT ALL SHOWN FOR CLARITY REFER TO BOTTOM FLOOR REINFORCING DETAILS AND TOP SLAB REINFORCING.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 18

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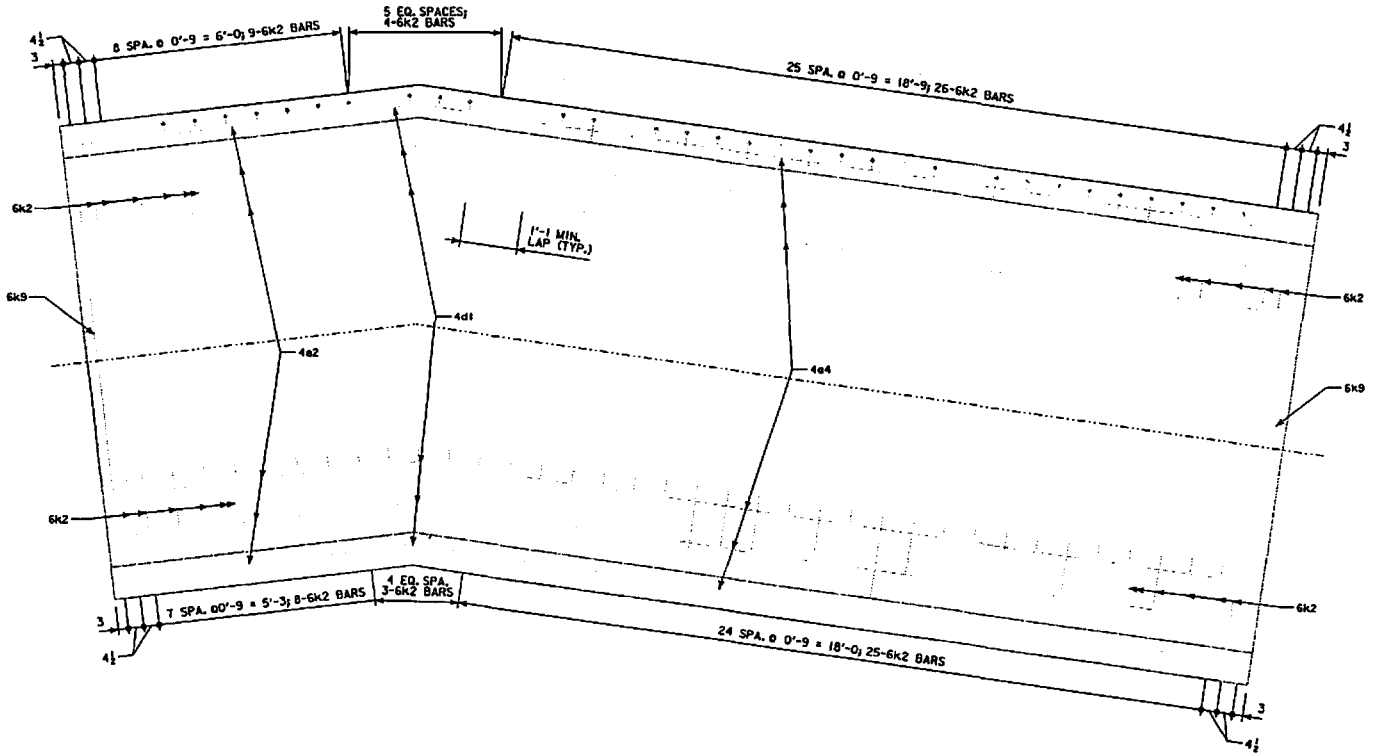
INCLUDES ADDENDA: 15DEC115.A02



TOP SLAB REINFORCING

NOTE: 6a1 BARS NOT SHOWN FOR CLARITY. REFER TO BOTTOM FLOOR REINFORCING FOR DETAILS.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN BENT BARREL DETAILS

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 19

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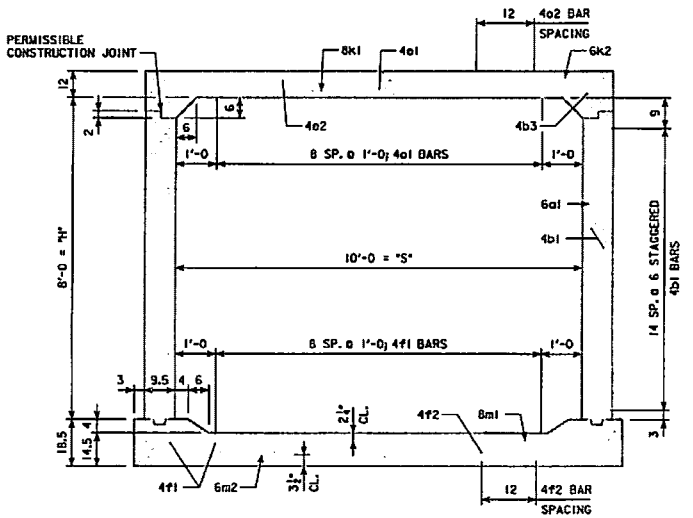
INCLUDES ADDENDA: ISDEC115.A02

VARIABLE DIMENSIONS AND QUANTITIES FOR 10 x 8 BARREL SECTIONS

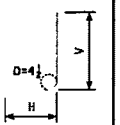
DIMENSIONS							BAR LIST																																		QUANTITIES				
							a1			b1			a1			a2			f1			f2			k1			k2					k9			m1			m2					m9		CONCRETE (CY/FT)				STEEL
FILL	S	H	A	B	C	D	SIZE	SP.	L	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	L	SIZE	SP.	L	H	V	SIZE	L	SIZE	SP.	L	SIZE	SP.	L	H	V	SIZE	L	SLAB	FLOOR	WALLS	TOTAL	(LB/FT)
21-25	10	8	12	14.5	9.5	9	6	12	10'-1	4	6	30	4	12	9	4	12	6	4	12	11	4	12	6	8	6	11'-3	6	9	6'-2	2'-8	3'-6	6	11'-3	8	6	11'-9	6	9	11'-5	2'-9	0'-8	6	11'-9	0.463	0.578	0.447	1.488	273.39



10 x 8 BARREL SECTION A-A

BENT BAR DETAIL

BARS	D
6	4½



k2 & m2

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

NOTES:

1. DIMENSIONS "A", "B", "C", "D", AND "SP." LISTED IN THE BAR LIST ARE IN INCHES.

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN FLUME DETAILS

STA. 1108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 20

12/1/2015 10:59:31 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97915sp09 11x17_pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02

ENGLISH\RFDSIGNEDSINGLECULVERTS.DGN - RCB 10-8-12 - THIS SHEET ISSUED 04-12.

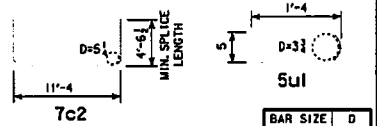
REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS FFV		50	LISTED	433
5b1	WALLS FFH		10	27'-0	282
4b2	WALLS BFH		10	27'-0	181
5b5	WALLS FFH		6	LISTED	53
4b6	WALLS BFH		6	LISTED	34
7c2	BOTT. FLOOR & WALLS BFV - SPLICED		49	20'-5	2,045
5c3	WALLS BFV		98	LISTED	732
6f1	FLOOR LONGIT. TOP		11	26'-2	432
5f2	FLOOR LONGIT. BOTT.		11	26'-2	300
6m1	FLOOR TRANSV. TOP		28	11'-10	498
6a1	WALLS BOTH F ALONG SLOPE		4	27'-0	163
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-1	6
				TOTAL (LB)	5,159

LISTED BARS

BAR 5a1	BAR 5c3		BAR 5b5 AND 4b6
6 AT 7'-0	14 AT 5'-10	4 AT 6'-1	6 BARS - 2 EA. LGTH.
4 AT 7'-2	4 AT 5'-11	4 AT 6'-3	3'-5
40 VAR. - 2 EA. LGTH.	6 AT 6'-0	4 AT 6'-5	7'-11
5'-11	62 VAR. - 2 EA. LGTH.		14'-0
7'-1	6'-2	7'-9	
7'-4	6'-4	7'-11	
7'-5	6'-6	8'-0	
7'-6	6'-7	8'-1	
7'-8	6'-8	8'-3	
7'-9	6'-9	8'-4	
7'-11	6'-10	8'-6	
8'-1	6'-11	8'-7	
8'-3	7'-0	8'-9	
8'-6	7'-1	8'-11	
8'-8	7'-2	9'-0	
8'-11	7'-3	9'-2	
9'-2	7'-4	9'-4	
9'-4	7'-5	9'-6	
9'-7	7'-7	9'-8	
9'-11	7'-8		
10'-2			
10'-5			
10'-9			

BENT BAR DETAILS

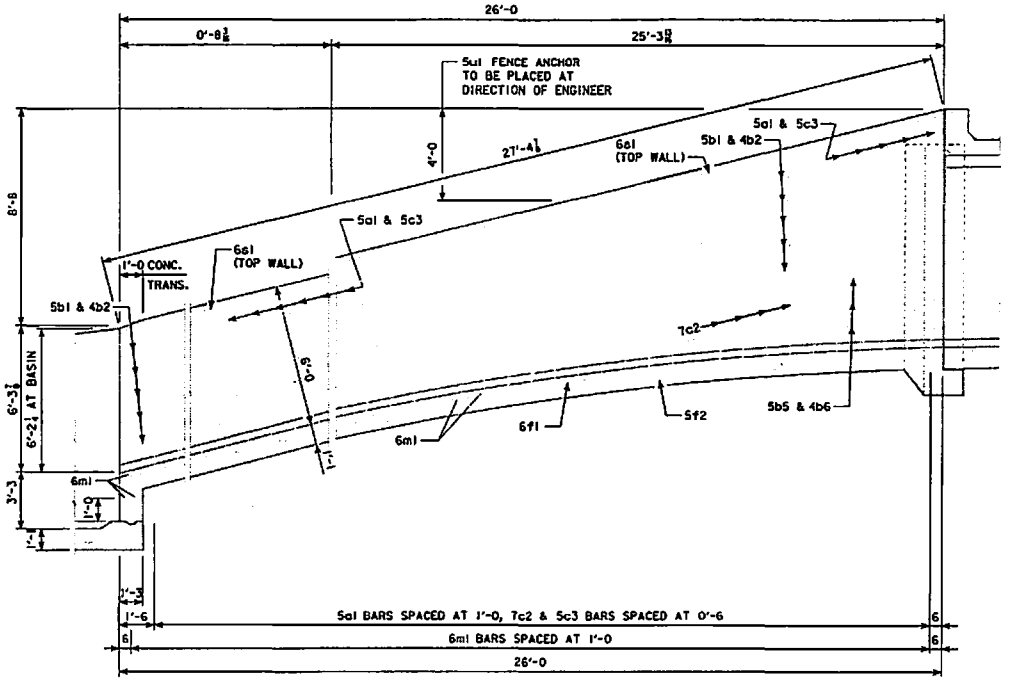


BAR SIZE	D
5	3½
6	4½
7	5¼

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

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	15.4	11.7	27.1
JUNCTION BELL	2.9	2.4	5.3
BASIN	16.8	7.9	24.7
BASIN CURTAIN	1.1		1.1
TOTAL (CY)	36.2	22.0	58.2



10'x8' FLUME CHUTE - LONGITUDINAL SECTION

FLUME DATA

Δ A = 18°26'
Δ C = 1°00'
B = 13'-3⅛
S = 10'-0
V = 6'-3½
W = 8'-8
M = 6'-0
T = 1'-1
H = 8'-0

CURVE DATA

C.L. = 26'-0
L2 = 0'-8⅛
L3 = 25'-3½
D = 12'-8⅝
E = 12'-7⅞
P.C. ELEV. = 1260.00
P.I. ELEV. = 1259.78
P.P. ELEV. = 1259.56
P.T. ELEV. = 1255.57
X1 = 3'-11⅜
X2 = 2'-2⅛
X3 = 0'-11⅝
X4 = 0'-3
L3/4 = 6'-3⅝

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-04-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-04-12 & RCFB-05-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR T° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN FLUME DETAILS

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 10 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 21

12/1/2015 10:59:33 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97915sp10 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02

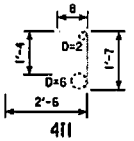
29'-0 BENT BARREL END SECTION PARAPET DETAILS

REINFORCING BAR LIST - END SECTION PARAPET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4I1	PARAPET, VERTICAL		21	6'-1	87
7J1	PARAPET, HORIZONTAL		4	11'-3	92
				TOTAL - LBS.	179

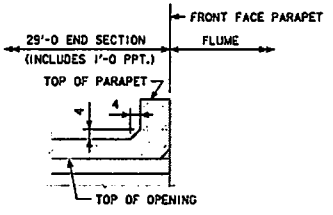
CONCRETE ABOVE SLAB

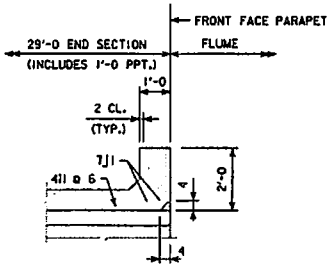
PARAPET = 0.5 CU.YDS.



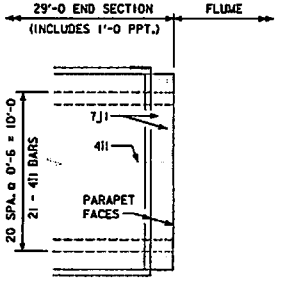
D = PIN DIAMETER
ALL DIMENSIONS ARE OUT TO OUT.

BENT BAR DETAILS

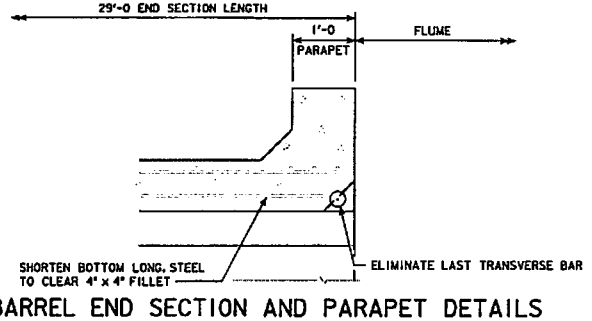




SECTION THRU PARAPET



PLAN VIEW



BARREL END SECTION AND PARAPET DETAILS
WITH FLUME OUTLET

DESIGN FOR 7° SKEW LT AH

10' x 8' x 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME & BASIN OUTLET PARAPET DETAILS

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 11 OF 11 FILE NO. 30568 DESIGN NO. 915

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 22

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INCLUDES ADDENDA: 150EC115.A02

ESTIMATED CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	100	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	93.0	
3	2404-7775000	REINFORCING STEEL	LB	12,671	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
3	2404-7775000	REINFORCING STEEL - -
4	2533-4980005	MOBILIZATION - -

DESIGN FOR 26 ° SKEW RT AH

5' x 4' REINFORCED 4:1 CONCRETE FLUME WITH 42" RCP

QUANTITIES

STA. 11118+01.00 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 6 FILE NO. 30568 DESIGN NO. 1015

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 23

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INCLUDES ADDENDA: 15DEC15.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 42" REINFORCED CONCRETE PIPE WITH A 5X4 REINFORCED 4:1 CONCRETE FLUME.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE 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. 7356).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES AND 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.

REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:

EDGE CLEARANCES:	2" EXCEPT
TOP OF FLOOR	2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR	3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:	
VERTICAL TOP	2"
VERTICAL BOTTOM	3½"
TRANSVERSE	2"

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

ALL FLOOR REINFORCING STEEL IS TO BE SUPPORTED AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS ⅝ 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.

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.

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

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUNDLINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

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:
REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED AND IMMEDIATELY PRIOR TO STAGE 2 CONSTRUCTION. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

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

STANDARD	ISSUED	REVISED
FBJ-01-12	4-12	-
RCF-01-12	4-12	5-13
RCF-02-12	4-12	-
RCFB-01-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
FLUME - SECTION 1	3,039	3,039
FLUME 40' SECTION (3 REQ'D)	3 @ 2,227	6,681
FLUME 11' SECTION	599	599
CHUTE BELL (4 REQ'D)	4 @ 157	628
BASIN	1,583	1,583
PIPE COLLAR	141	141
	TOTAL (LBS.)	12,671

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	11.6	7.9	19.5
FLUME - SECTION 2,3,&4	3 @ 11.4 = 34.2	3 @ 6.1 = 18.3	3 @ 17.5 = 52.5
FLUME - SECTION 5	3.5	1.6	5.2
CHUTE BELL (4 REQ'D)	4 @ 0.8 = 3.2	4 @ 0.3 = 1.2	4.4
BASIN	7.4	2.6	10.0
BASIN CURTAIN	0.3	-	0.3
PIPE COLLAR	-	1.2	1.2
TOTAL (CY)	60.2	32.8	93.0

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
7356	RCB CULVERT W/ FLUME
-	-
-	-

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN IN NHSN-020-1(123)--2R-97

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN IN NHSN-020-1(123)--2R-97

DESIGN FOR 26 ° SKEW RT AH

5' x 4' REINFORCED 4:1 CONCRETE FLUME WITH 42" RCP

GENERAL NOTES

STA. 1111B+01.00 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 6 FILE NO. 30560 DESIGN NO. 1015

DESIGN TEAM SWM / JSN	IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER 24

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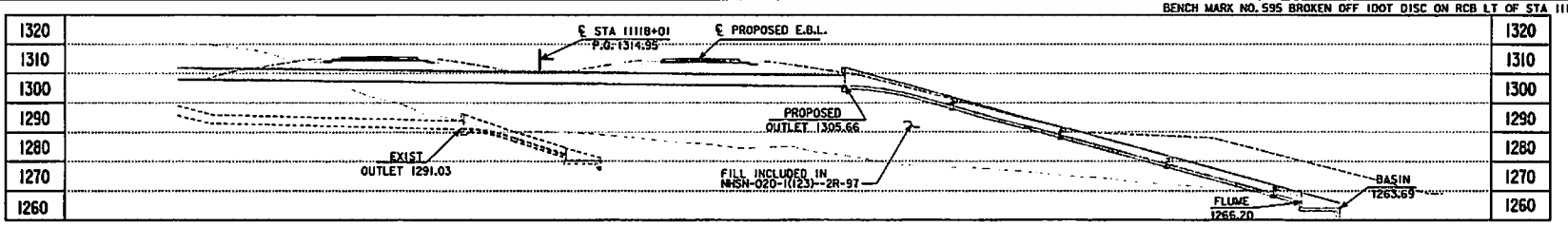
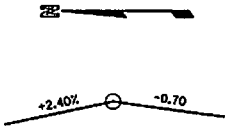
INCLUDES ADDENDA: 15DEC15.A02

BENCH MARK NO. 595 BROKEN OFF IDOT DISC ON RCB LT OF STA 11118+60 EL=1310.801



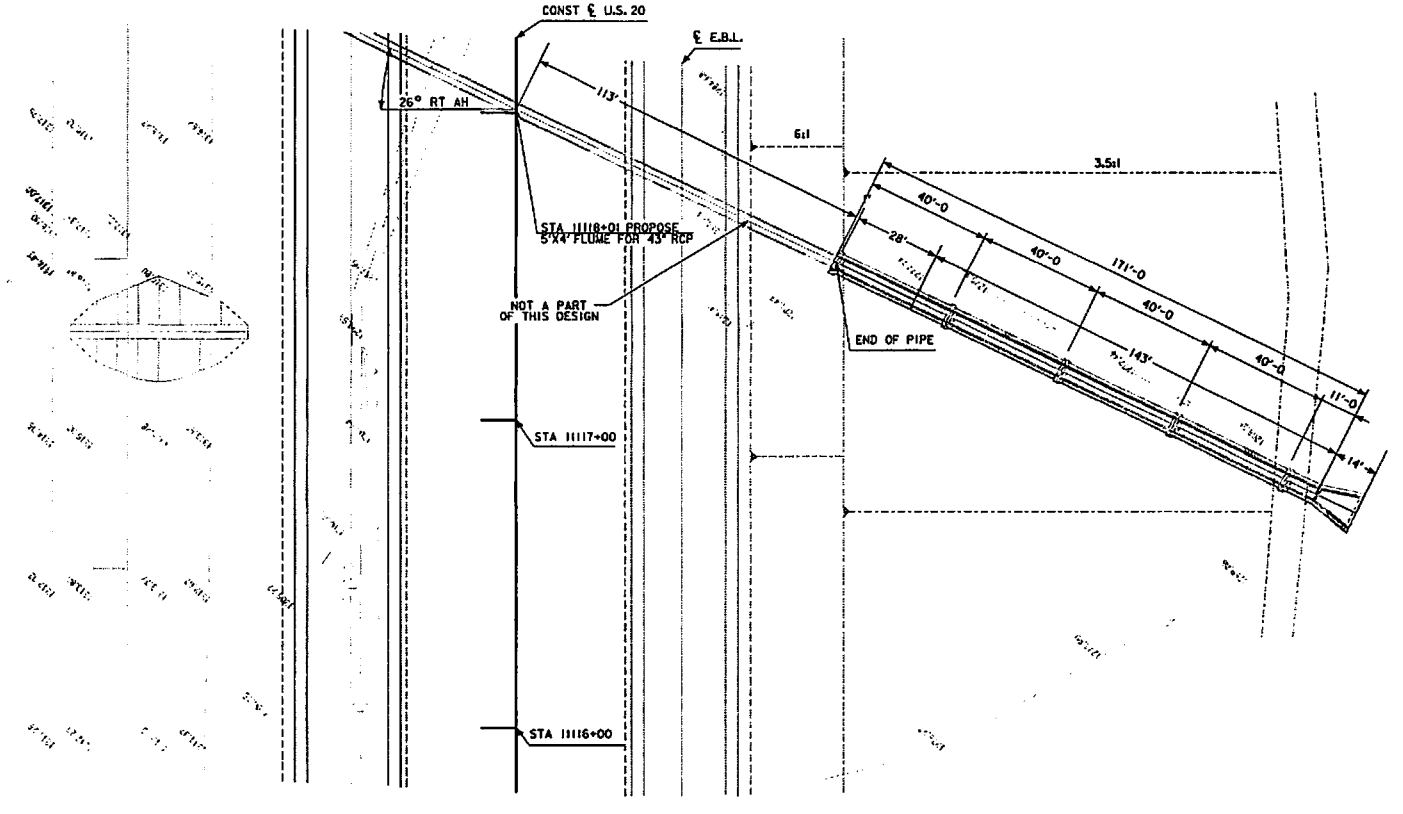


VPI STA = 11120+00 VC = 1750'
VPI ELEV = 1323.78

PROPOSED PROFILE GRADE US 20

OLD DES# 7356

LONGITUDINAL SECTION ALONG ℄ CULVERT



HYDRAULIC DATA

DRAINAGE AREA = 22 ACRES H
Q_{50} = 63 CFS
HW ELEV. = 1312.86

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD

LOCATION

T-89-88N R-41W
SECTION 33-1
DOUGLAS ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474341°
LONGITUDE -95.684035°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

DESIGN FOR 26 ° SKEW RT AH

5' x 4' REINFORCED 4:1 CONCRETE FLUME WITH 42" RCP

SITUATION PLAN

STA. 11118+01.00 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 6 FILE NO. 30568 DESIGN NO. 1015

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 25

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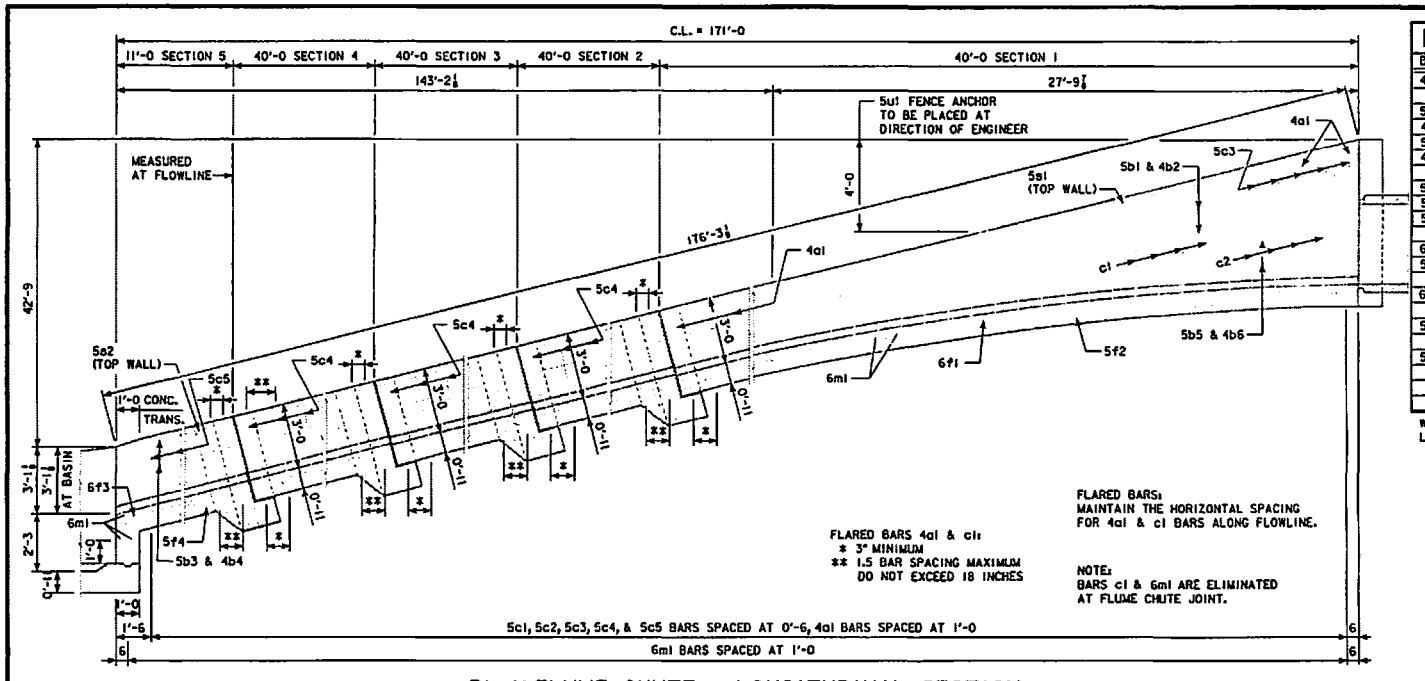
INCLUDES ADDENDA: 15DEC115.A02



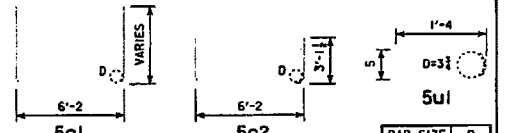
5'x4' FLUME CHUTE - LONGITUDINAL SECTION

REINFORCING BAR LIST-FLUME SECTION 1

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		80	LISTED	231
5b1	WALLS FFH		4	40'-10	180
4b2	WALLS BFH		4	40'-10	115
5b5	WALLS FFH		4	LISTED	43
4b6	WALLS BFH		4	LISTED	28
5c1	BOTT. FLOOR & WALLS BFV		73	LISTED	1,077
5c2	BOTT. FLOOR & WALLS BFV - SPLICED		7	12'-5	91
5c3	WALLS BFV		14	LISTED	79
6f1	FLOOR LONGIT. TOP		6	40'-4	363
5f2	FLOOR LONGIT. BOTT.		6	40'-4	252
6m1	FLOOR TRANSV. TOP		40	6'-8	401
5s1	WALLS BOTH F ALONG SLOPE		4	41'-6	173
5u1	FENCE ANCHORS (GALVANIZED)		2	3'-1	6
				TOTAL (LB)	3,039

WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE FOR A 2'-2 LAP BUT LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE THE LAP.

BENT BAR DETAILS



BAR SIZE	D
5	3¾
6	4½
7	5¼

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

FLUME DATA

- Δ A = 14°02'
- Δ C = 1°00'
- B = 14'-3⅛
- S = 176'-3¼
- V = 3'-1⅛
- W = 42"-9
- M = 3'-0
- T = 0'-11
- H = 4'-0

CURVE DATA

- C. L. = 171'-0
- L2 = 143'-2¼
- L3 = 27'-9¾
- D = 13'-11½
- E = 13'-10⅝
- P. C. ELEV. = 1305.66
- P.I. ELEV. = 1305.42
- P. P. ELEV. = 1305.17
- P. T. ELEV. = 1301.95
- X1 = 3'-2½
- X2 = 1'-9¾
- X3 = 0'-9⅛
- X4 = 0'-2⅝
- L3/4 = 6'-11¾(+)

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME - SECTION 1	11.6	7.9	19.5
FLUME - SECTION 2,3,&4	3 @ 11.4 = 34.2	3 @ 6.1 = 18.3	52.5
FLUME - SECTION 5	3.5	1.6	5.1
CHUTE BELL	4 @ 0.8 = 3.2	4 @ 0.3 = 1.2	4.4
BASIN	7.4	2.6	10.0
BASIN CURTAIN	0.3	-	0.3
TOTAL (CY)	60.2	31.6	91.8

LISTED BARS

BAR 4a1	BAR 5c1		BAR 5b5 AND 4b6
32 AT 3'-7	27 AT 13'-3	15'-1	2 EACH AT 6'-7
4 AT 3'-8	4 AT 13'-4	15'-3	2 EACH AT 13'-8
4 AT 3'-9	2 AT 13'-5	15'-4	
40 VAR. - 2 EA. LGTH.	2 AT 13'-6	15'-6	
3'-10	2 AT 13'-7	15'-8	BAR 5c3
3'-11	1 AT 13'-8	15'-9	14 BARS - 2 EA. LGTH.
4'-0	2 AT 13'-9	15'-11	5'-1
4'-1	13'-10	16'-1	5'-2
4'-2	13'-11	16'-3	5'-3
4'-4	14'-0	16'-5	5'-5
4'-5	14'-1	16'-7	5'-6
4'-6	14'-2	16'-9	5'-7
4'-8	14'-3	16'-11	5'-9
4'-10	14'-4	17'-1	
4'-11	14'-5	17'-3	
5'-1	14'-6	17'-5	
5'-3	14'-8	17'-7	
5'-5	14'-9	17'-10	
5'-8	14'-10	18'-0	
5'-10	15'-0		
6'-0			
6'-3			
6'-5			
6'-8			

DESIGN FOR 26 ° SKEW RT AH

5' x 4' REINFORCED 4:1 CONCRETE FLUME WITH 42" RCP

FLUME DETAILS

STA. 11118+01.00 — OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 6 — FILE NO. 30568 — DESIGN NO. 1015

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 26

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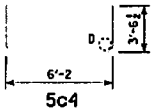
INCLUDES ADDENDA: 15DEC115.A02

REINFORCING BAR LIST-ONE 40' FLUME SECTION 2,3, OR 4

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		80	3'-7	192
5b1	WALLS FFH		4	40'-10	180
4b2	WALLS BFH		4	40'-10	115
5c4	BOTT. FLOOR & WALLS BFV		40	13'-3	553
6f1	FLOOR LONGIT. TOP		6	40'-4	363
5f2	FLOOR LONGIT. BOTT.		6	40'-4	252
6m1	FLOOR TRANSV. TOP		40	6'-8	401
5a1	WALLS BOTH F ALONG SLOPE		4	40'-10	171
				TOTAL (LB)	2,227

WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE FOR A 2'-2 LAP BUT LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE THE LAP.

BENT BAR DETAILS



5c4

BAR SIZE	D
5	3¾
6	4½
7	5¼

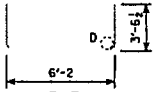
NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

REINFORCING BAR LIST-FLUME SECTION 5

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV		20	3'-7	48
5b3	WALLS FFH		4	LISTED	44
4b4	WALLS BFH		4	LISTED	28
5c5	BOTT. FLOOR & WALLS BFV		10	13'-3	138
6f3	FLOOR LONGIT. TOP		6	11'-0	99
5f4	FLOOR LONGIT. BOTTOM		6	11'-0	69
6m1	FLOOR TRANSV. TOP		13	6'-8	130
5a2	WALLS BOTH F ALONG SLOPE		4	10'-3	43
				TOTAL (LB)	599

WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE FOR A 2'-2 LAP BUT LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE THE LAP.

BENT BAR DETAILS



5c5

BAR SIZE	D
5	3¾
6	4½
7	5¼

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

LISTED BARS

BAR 5b3 AND 4b4
2 EACH AT 10'-6
2 EACH AT 10'-9

DESIGN FOR 26 ° SKEW RT AH

5' x 4' REINFORCED 4:1 CONCRETE FLUME WITH 42" RCP

FLUME DETAILS

STA. 1118+01.00 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 6 FILE NO. 30568 DESIGN NO. 1015

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 27

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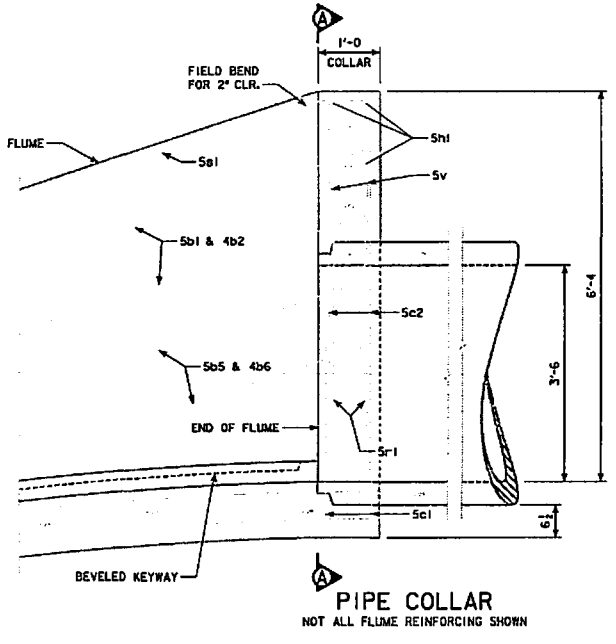
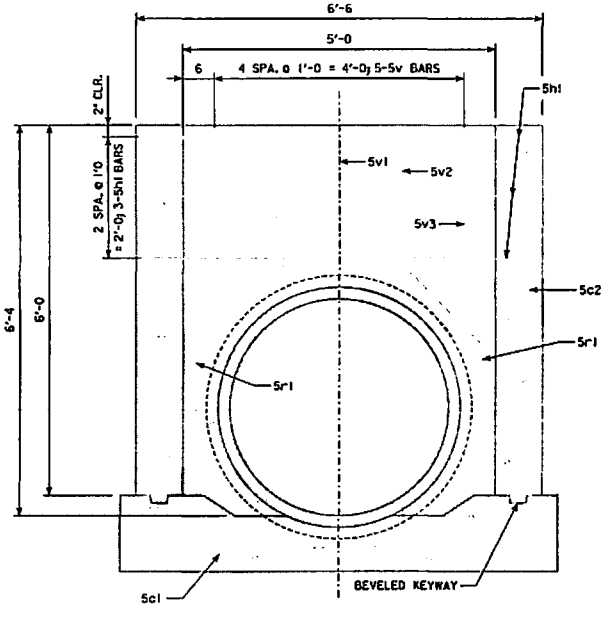
INCLUDES ADDENDA: 15DEC115.A02



PIPE COLLAR

NOT ALL FLUME REINFORCING SHOWN

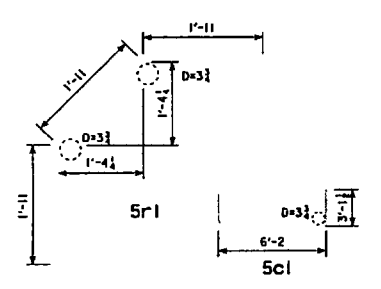


SECTION A-A

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5c1	BOTT. FLOOR & WALL, F.F., B.F.		2	12'-5	26
5c2	WALL, F.F., B.F.		4	5'-10	24
5h1	PIPE COLLAR, F.F., B.F.		6	6'-2	39
5v1	PIPE COLLAR, F.F., B.F.		2	2'-1	4
5v2	PIPE COLLAR, F.F., B.F.		4	2'-4	10
5v3	PIPE COLLAR, F.F., B.F.		4	3'-3	14
5r1	PIPE COLLAR, F.F., B.F.		4	5'-9	24
				TOTAL (LBS.)	141

BENT BAR DETAILS



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

CONCRETE PLACEMENT SUMMARY

CONCRETE	TOTAL
PIPE COLLAR	1.2 CY
TOTAL (CU. YDS.)	1.2 CY

DESIGN FOR 26 ° SKEW RT AH

5' x 4' REINFORCED 4:1 CONCRETE FLUME WITH 42" RCP

PIPE COLLAR

STA. 11118+01.00

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 6 FILE NO. 30568 DESIGN NO. 1015

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)—2R-47 | SHEET NUMBER 28

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	80.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	2,619	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	256.5	
4	2404-7775000	REINFORCING STEEL	LB	44,525	
5	2507-3250005	ENGINEERING FABRIC	SY	170.0	
6	2507-6800061	REVETMENT, CLASS E	TON	125.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES 80 CY OF EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL, ARTICLE 4196.01,B,3 OF THE STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
7	2533-4980005	MOBILIZATION - -

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 29

12/1/2015 10:59:52 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97518s001 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 10'-0 x 10-0' X 110'-0 RCB CULVERT WITH A 10' x 8' x 353'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 7° L.A. AT STA. 11108+60.00.

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. 7256).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 SECTIONS ARE DESIGNED FOR EARTH FILLS OF 24 FEET.

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.

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

THESE CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (No) IS # 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

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUNDLINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

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 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, 5TH ED., SERIES OF 2010.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-8-12	4-12	-
PWH 0-1-12	4-12	-
PWH 0-2-12	4-12	-
PWH 0-3-12	4-12	-
PWH 0-4-12	4-12	-
PWH 0-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10' x 8' HEADWALL 0 ° SKEW (1 REQ'D)	3,980	3,980
26'-0 BARREL SECTION (5 REQ'D)	5 @ 7,109	35,545
BARREL BELL JOINTS	5@ 1,000	5,000
	TOTAL (LBS.)	44,525

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
10' x 8' HEADWALL 0 ° SKEW (1 REQ'D)	1.4	15.5	9.0	25.9
26'-0 BARREL SECTION (5 REQ'D)	5 @ 12.04 = 60.2	5 @ 15.03 = 75.2	5 @ 11.63 = 58.2	193.6
BARREL BELL JOINTS	5 @ 2.4 = 12.0	5 @ 2.8 = 14.0	5 @ 2.2 = 11.0	37.0
TOTAL (CU. YDS.)	73.6	104.7	78.2	256.5

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
7256	RCB CULVERT NEW - SINGLE
-	-
-	-

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL SHOWN IN NHSN-020-1(123)--2R-97.

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 30

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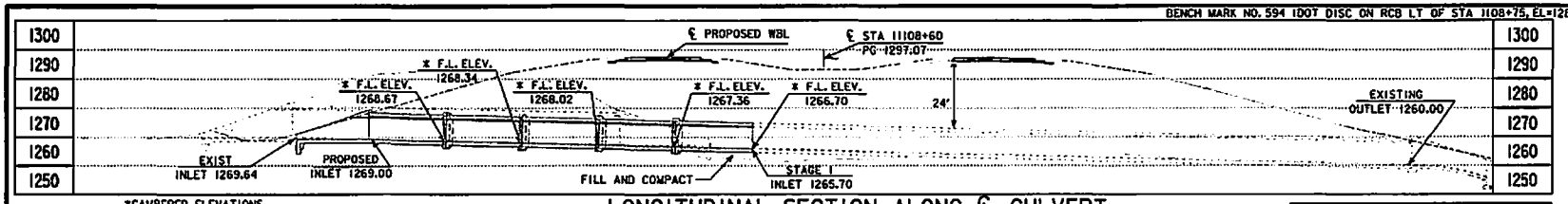
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 594 IDOT DISC ON RCB LT OF STA 11108+75, EL=1282.028



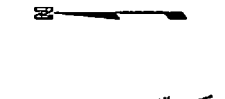
*CAMBERED ELEVATIONS

LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 24'
ANTICIPATED SETTLEMENT = 1.0'

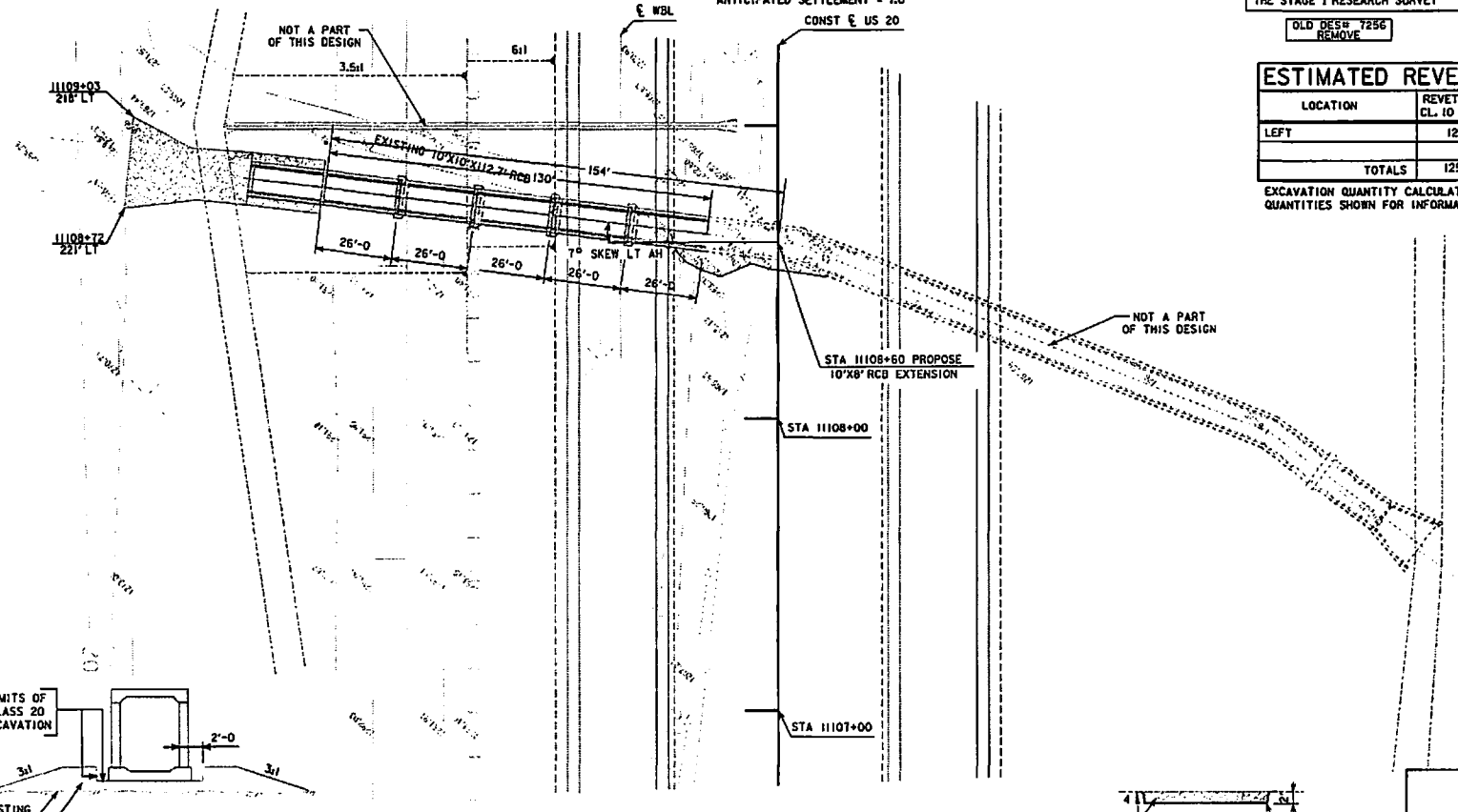
CAMBERED ELEVATIONS MAY BE ADJUSTED BY THE ENGINEER PENDING RESULTS OF THE STAGE I RESEARCH SURVEY

OLD DES# 7256 REMOVE



VPI STA = 11107+00 VC = 650'
VPI ELEV = 1292.58

PROPOSED PROFILE GRADE US 20



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 10 (TON)	ENGINEERING FABRIC (SY)	EXCAVATION, CL. 10 CHANNEL (CY)
LEFT	125	170	80
TOTALS	125	170	80

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

HYDRAULIC DATA

DRAINAGE AREA = 569 ACRES VH-H
Q_{50} = 771 CFS
HW ELEV. = 1277.81

UTILITIES LEGEND:

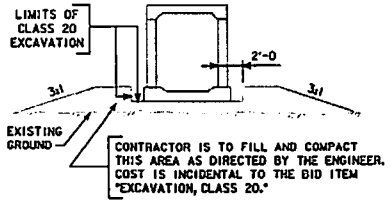
F01 INS
F02 QWEST
F04 MCLEOD

LOCATION

T-89-88N R-41W
SECTION 33-I
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474358°
LONGITUDE -95.687524°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	



FILL & COMPACTION DETAIL

SITUATION PLAN

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)—2R-47 | SHEET NUMBER 31

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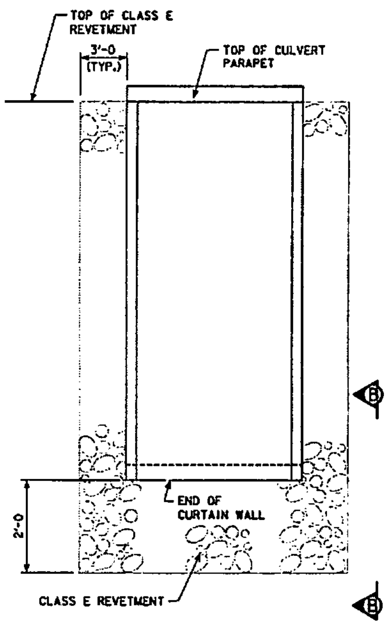
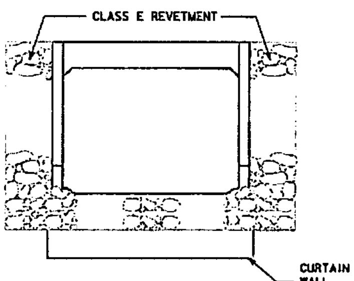
INCLUDES ADDENDA: 15DEC115.A02

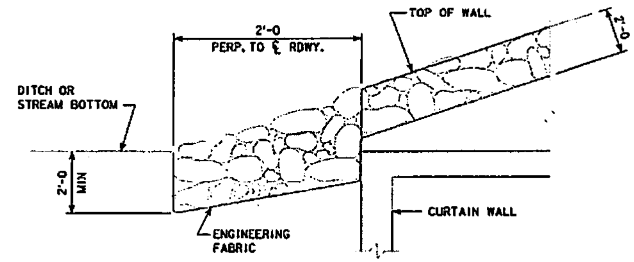


PLAN VIEW

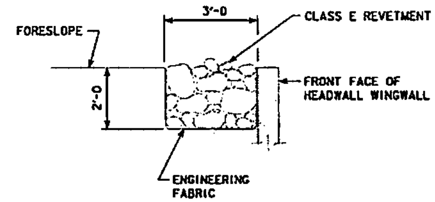


ELEVATION VIEW

0° SKEW HEADWALLS



VIEW B-B



SECTION A-A

TYPICAL DETAILS

CONSTRUCTION NOTES:

CLASS E REVETMENT SHALL BE USED AND PLACED ACCORDING TO ARTICLE 2507.03, OF THE STANDARD SPECIFICATIONS.
THE ENGINEERING FABRIC SHALL MEET THE MATERIAL REQUIREMENTS IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT

REVETMENT PROTECTION DETAILS

STA. 1108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 518

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2102-0425071	SPECIAL BACKFILL	CY	35.1	
2	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	80.0	
3	2402-2720000	EXCAVATION, CLASS 20	CY	2,830	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	46.0	
5	2404-7775000	REINFORCING STEEL	LB	8,109	
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT.	LF	110.0	
7	2415-2201008	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT.	EACH	1	
8	2507-3250005	ENGINEERING FABRIC	SY	170.0	
9	2507-6800061	REVETMENT, CLASS E	TON	125.0	
10	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2102-0425071	SPECIAL BACKFILL RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR SPECIAL BACKFILL.
2	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES 80 CY OF EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
5	2404-7775000	REINFORCING STEEL - -
6	2415-2111008	PRECAST CONCRETE BOX CULVERT, 10 FT. X 8 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
7	2415-2201008	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 8 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 0° SKEW PRECAST END SECTION, PRECAST LINTEL BEAM, AND PRECAST CURTAIN WALL.
8	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
9	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
10	2533-4980005	MOBILIZATION - -

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 1108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 33

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 10'-0 x 10-0' X 110'-0 RCB CULVERT WITH A 10' x 8' x 353'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 7° L.A. AT STA. 11108+60.00.

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. 7256).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 SECTIONS ARE DESIGNED FOR EARTH FILLS OF 24 FEET.

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.

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

THESE CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (Sci IS $\frac{1}{8}$ 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

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUNDLINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

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 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, 5TH ED., SERIES OF 2010.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-8-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
26'-0 BARREL SECTION (5 REQ'D)	7,109	7,109
BARREL BELL JOINTS	1,000	1,000
	TOTAL (LBS.)	8,109

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FOOTING	WALLS	TOTAL
26'-0 BARREL SECTION	12.0	15.0	11.6	38.6
BARREL BELL JOINTS	2.4	2.8	2.2	7.4
TOTAL (CU. YDS.)	14.4	17.8	13.8	46.0

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
7256	RCB CULVERT NEW - SINGLE
-	-
-	-

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL SHOWN IN NHSN-020-1(123)--2R-97.

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 34

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 24 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 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 ¾ 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 ¾ 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.

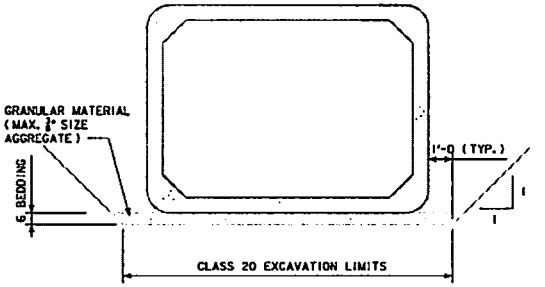
DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADII OR CHAMFER SHALL BE ACCOMPLISHED WITH A MECHANICAL HAND COMPACTOR.

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' x 2' 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.

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

STANDARD	ISSUED	REVISED
PRCB G1-13	1-13	-
PRCB G2-13	1-13	-
PRCB 10-13	1-13	-
PES 1-13-T1	1-13	5-13
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-
PES 4-13	1-13	-
PEP 1-13	1-13	10-14



GRANULAR BEDDING DETAIL

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

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11108+60

OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

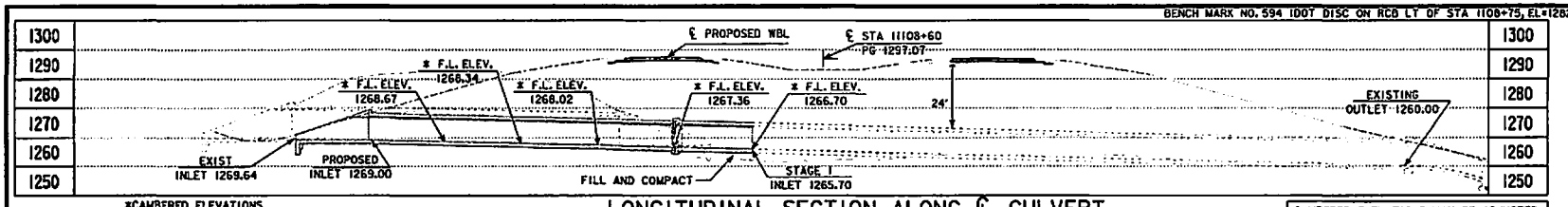
DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 35

12/1/2015 11:00:11 AM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020127.brg 97518sp03 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC15.A02

BENCH MARK NO. 594 IDOT DISC ON RCB LT OF STA 11108+75, EL=1282.028



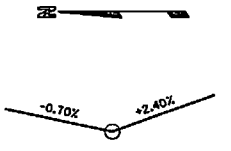
*CAMBERED ELEVATIONS

LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 24'
ANTICIPATED SETTLEMENT = 1.0'

CAMBERED ELEVATIONS MAY BE ADJUSTED BY THE ENGINEER PENDING RESULTS OF THE STAGE I RESEARCH SURVEY

OLD DES# 7256 REMOVE



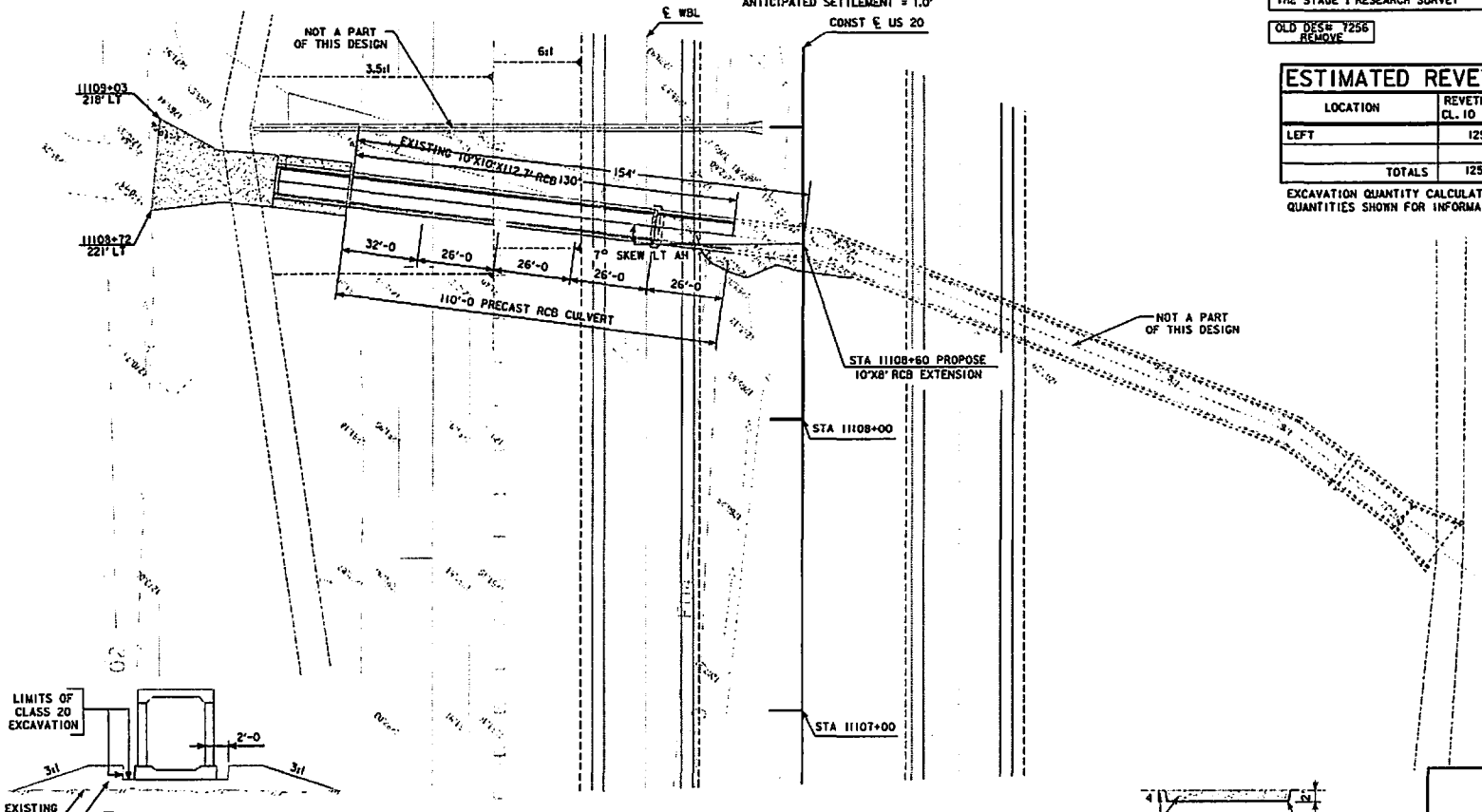
VPI STA = 11107+00 VC = 650'
VPI ELEV = 1292.58

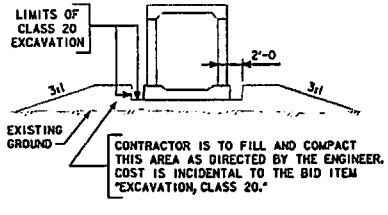
PROPOSED PROFILE GRADE US 20

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 10 (TON)	ENGINEERING FABRIC (SY)	EXCAVATION, CL. 10 CHANNEL (CY)
LEFT	125	170	80
TOTALS	125	170	80

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

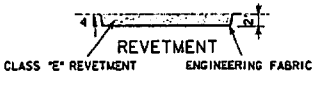




CONTRACTOR IS TO FILL AND COMPACT THIS AREA AS DIRECTED BY THE ENGINEER. COST IS INCIDENTAL TO THE BID ITEM "EXCAVATION, CLASS 20."

FILL & COMPACTION DETAIL

SITUATION PLAN



HYDRAULIC DATA

DRAINAGE AREA = 569 ACRES VH-H
Q_{50} = 771 CFS
HW ELEV. = 1277.81

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD

LOCATION

T-89-88N R-41W
SECTION 33-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474358°
LONGITUDE -95.687524°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR 7° LT AH

10' x 8' x 130' REINFORCED CONCRETE BOX CULVERT SITUATION PLAN

STA. 11108+60 OCTOBER, 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 518

DESIGN TEAM SWM / JSN | IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER 36

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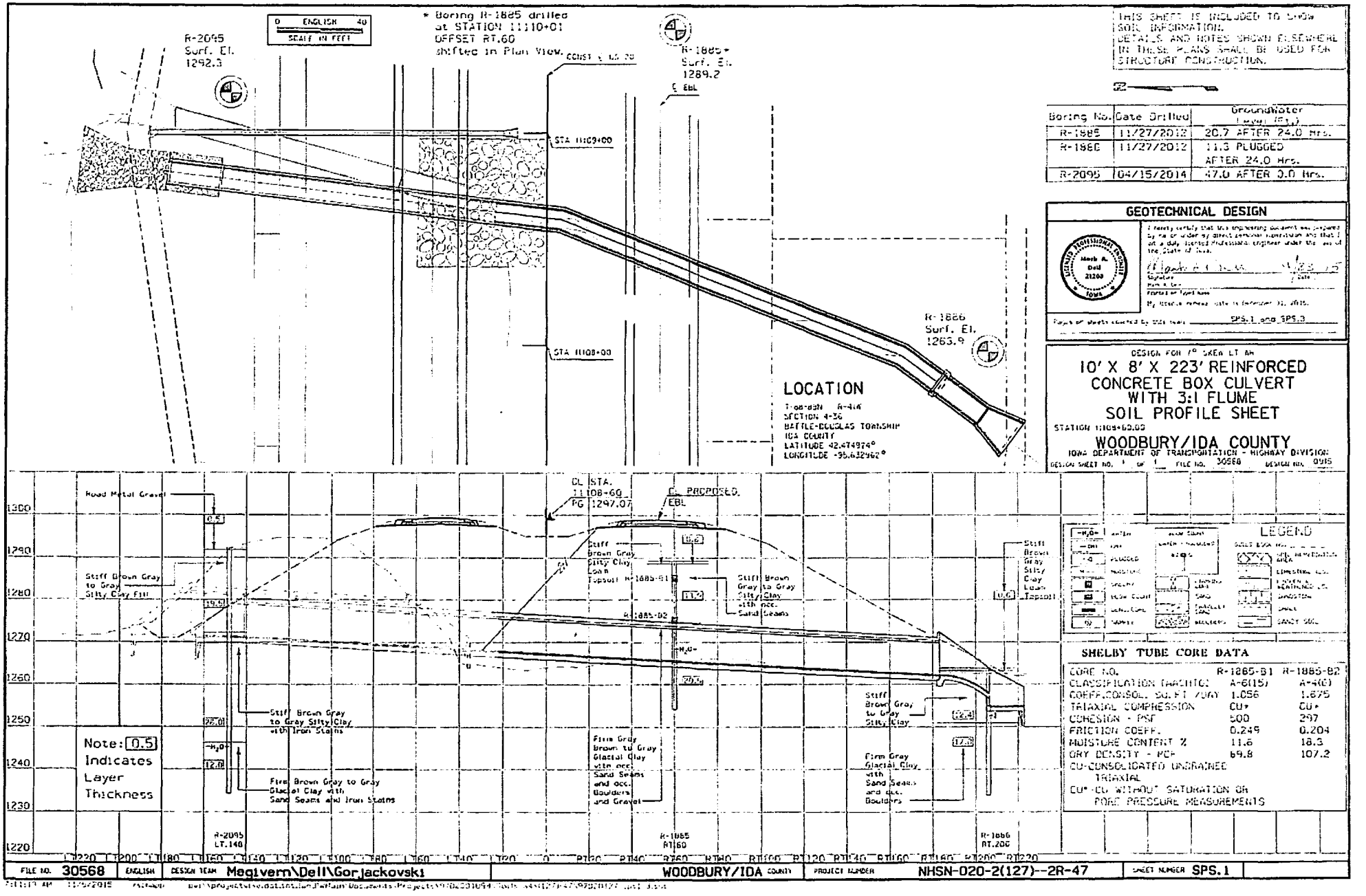
INCLUDES ADDENDA: 15DEC115.A02



THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Boring No.	Date Drilled	Groundwater Level (ft.)
R-1885	11/27/2012	20.7 AFTER 24.0 Hrs.
R-1886	11/27/2012	11.3 PLUGGED AFTER 24.0 Hrs.
R-2095	04/15/2014	47.0 AFTER 0.0 Hrs.

GEOTECHNICAL 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.

Mark A. Dell 21209 — Iowa

Signature _____ Date _____

Mark A. Dell
Printed or Typed Name

My license renewal date is December 31, 2015.

Pages or sheets covered by this seal: SPS.1 and SPS.3

DESIGN FOR 7° SKEW LT AH

10' X 8' X 223' REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME SOIL PROFILE SHEET

STATION 1109+60.00

WOODBURY/IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0915

LEGEND

SHELBY TUBE CORE DATA

CORE NO.	R-1885-B1	R-1885-B2
CLASSIFICATION (AASHTO)	A-6(15)	A-4(8)
COEFF. CONSOL. SQ. FT. /DAY	1.056	1.675
TRIAXIAL COMPRESSION	CU*	CU*
COHESION - PSF	500	297
FRICTION COEFF.	0.249	0.204
MOISTURE CONTENT %	11.6	18.3
DRY DENSITY - PCF	69.8	107.2

CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(127)--2R-47	SHEET NUMBER SPS.1

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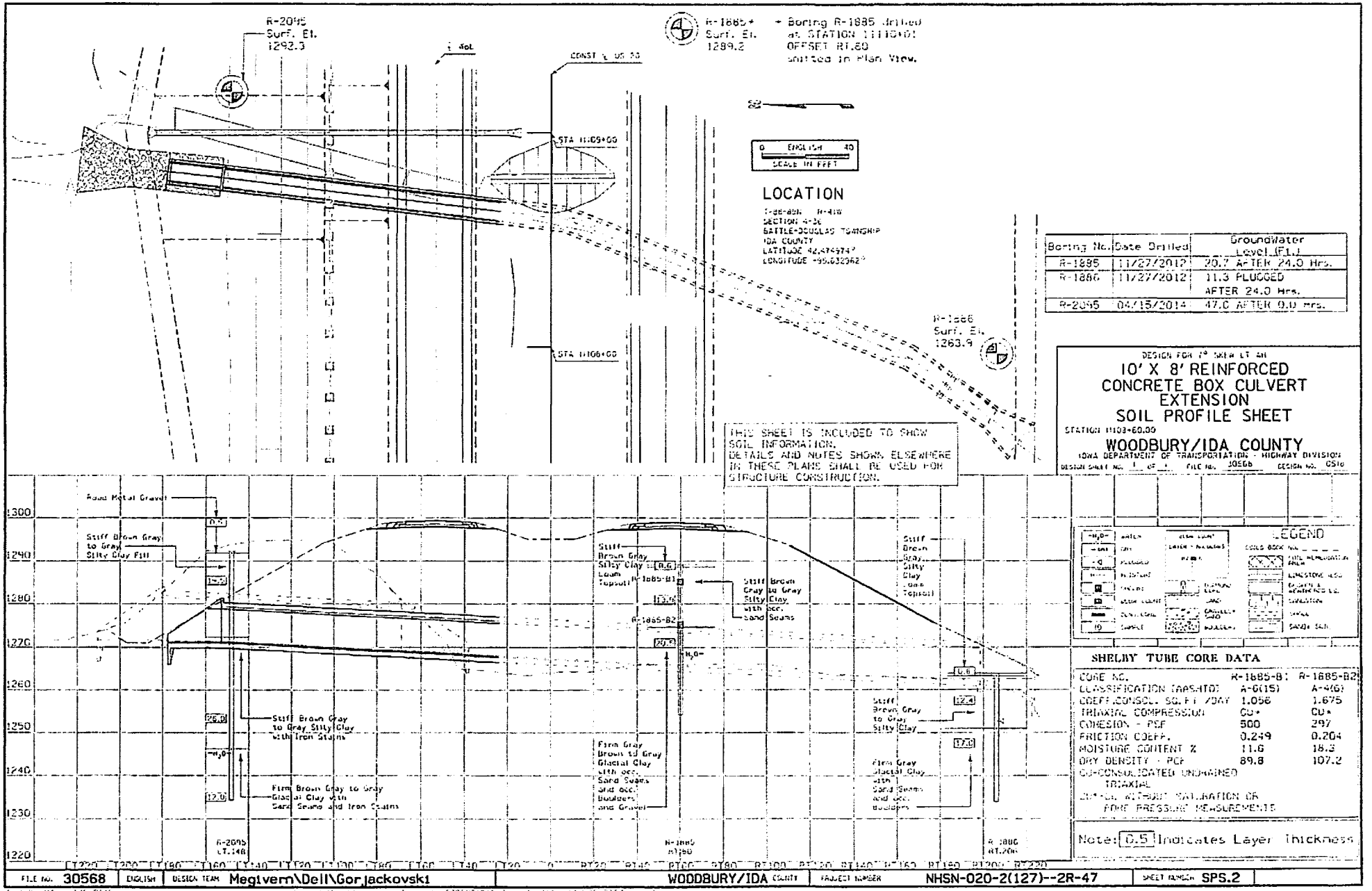
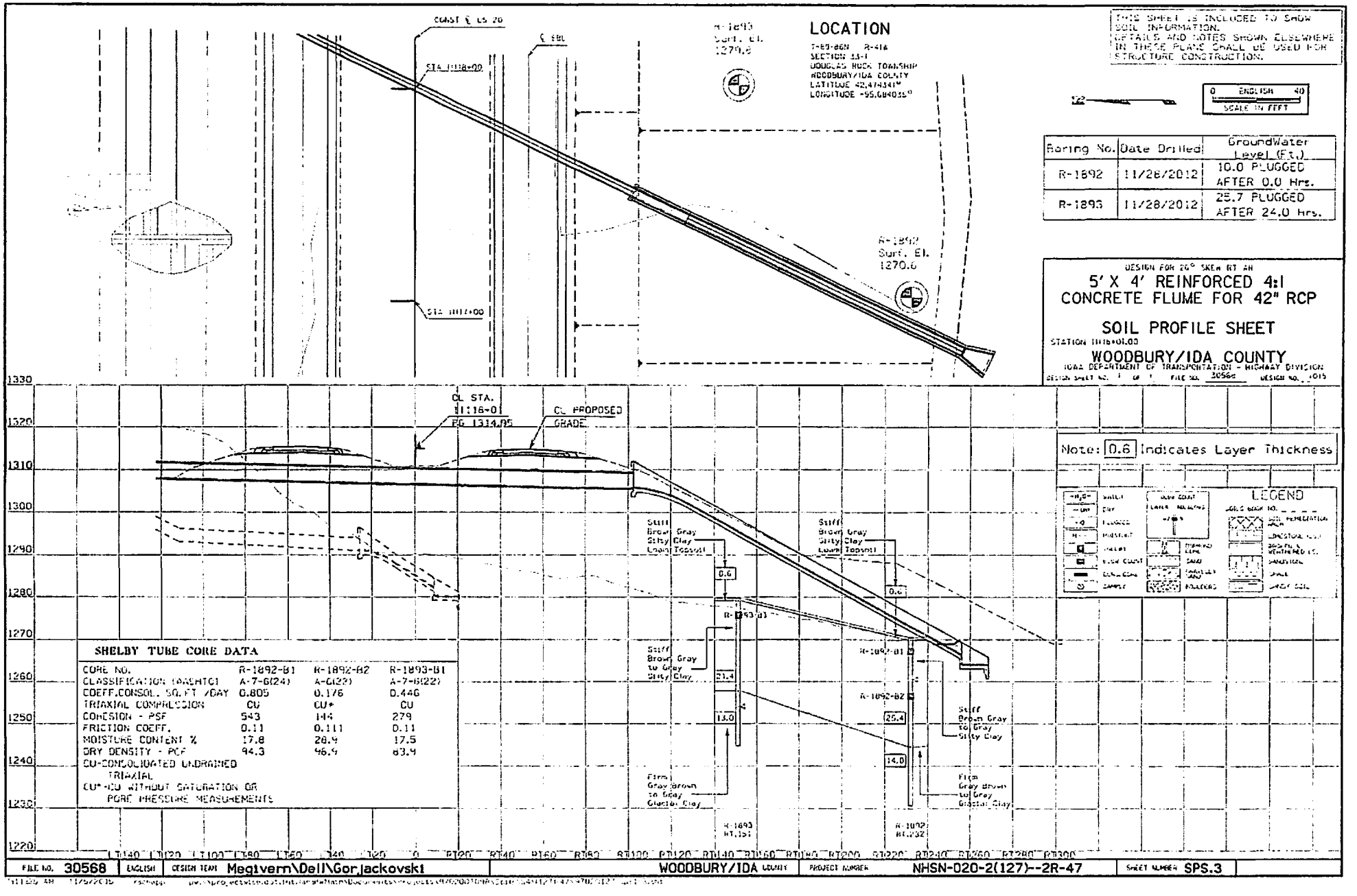

R-2045
Surf. El.
1292.3
R-1885*
Surf. El.
1289.2
* Boring R-1885 drilled at STATION 11103+60 OFFSET RT.60 omitted in Plan View.
CONST. ℄ US 20
STA 11105+00
STA 11106+00
0 ENGLISH 40
SCALE IN FEET
LOCATION
SECTION 4-86
BATTLE CREEK TOWNSHIP
IDA COUNTY
LATITUDE 42.479374°
LONGITUDE -95.632062°
R-1886
Surf. El.
1263.9
Boring No. | Date Drilled | Groundwater Level (Ft.)
R-1885 | 11/27/2012 | 20.7 AFTER 24.0 Hrs.
R-1886 | 11/27/2012 | 11.3 PLUGGED AFTER 24.0 Hrs.
R-2045 | 04/15/2014 | 47.0 AFTER 0.0 Hrs.
DESIGN FOR 7° SKEW LT AH
10' X 8' REINFORCED CONCRETE BOX CULVERT EXTENSION
SOIL PROFILE SHEET
STATION 11103+60.00
WOODBURY/IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0516
THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
Road Metal Gravel
Stiff Brown Gray to Gray Silty Clay Fill
Stiff Brown Gray Silty Clay Loam Topsoil
R-1885-B1
R-1885-B2
Stiff Brown Gray to Gray Silty Clay with occ. Sand Seams
Stiff Brown Gray to Gray Silty Clay
Stiff Brown Gray to Gray Silty Clay with Iron Stains
Firm Brown Gray to Gray Glacial Clay with Sand Seams and Iron Stains
Firm Gray Brown to Gray Glacial Clay with occ. Sand Seams and occ. Boulders and Gravel
Firm Gray Glacial Clay with Sand Seams and occ. Boulders
R-2045 LT.14ß
R-1885 RT.60
R-1886 RT.70ß
1300
1290
1280
1270
1260
1250
1240
1230
1220
T220 T200 T180 T160 T140 T120 T100 T80 T60 T40 T20 0 RT20 RT40 RT60 RT80 RT100 RT120 RT140 RT160 RT180 RT200 RT220
LEGEND
SHELBY TUBE CORE DATA
CORE NO. | R-1885-B1 | R-1885-B2
CLASSIFICATION (AASHTO) | A-6(15) | A-4(8)
COEFF.CONSOL. SQ.FT /DAY | 1.056 | 1.675
TRIAXIAL COMPRESSION | CU* | CU*
COHESION - PSF | 500 | 297
FRICTION COEFF. | 0.249 | 0.204
MOISTURE CONTENT % | 11.6 | 18.3
DRY DENSITY - PCF | 89.8 | 107.2
CU-CONSOLIDATED UNDRAINED TRIAXIAL
* WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS
Note: 0.5 Indicates Layer Thickness
FILE NO. 30568 | ENGLISH | DESIGN TEAM Megivern\Dell\Gorjackovski | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER SPS.2


COAST ℄ US 20
℄ SBL
STA 1118+00
STA 1117+00
R-1893
Surf. El.
1279.6
R-1892
Surf. El.
1270.6
LOCATION
SECTION 33-1
DOUGLAS ROCK TOWNSHIP
WOODBURY/IDA COUNTY
THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
0 ENGLISH 40
SCALE IN FEET
Boring No. | Date Drilled | Groundwater Level (Ft.)
R-1892 | 11/28/2012 | 10.0 PLUGGED AFTER 0.0 Hrs.
R-1893 | 11/28/2012 | 25.7 PLUGGED AFTER 24.0 Hrs.
DESIGN FOR 20° SKEW RT AH
5' X 4' REINFORCED 4:1 CONCRETE FLUME FOR 42" RCP
SOIL PROFILE SHEET
STATION 1118+01.00
WOODBURY/IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
FILE NO. 30568
Note: 0.6 Indicates Layer Thickness
LEGEND
CL STA. 1118+01
EG 1314.05
CL PROPOSED GRADE
1330
1320
1310
1300
1290
1280
1270
1260
1250
1240
1230
1220
Stiff Brown Gray Silty Clay Loam Topsoil
0.6
Stiff Brown Gray Silty Clay Loam Topsoil
0.6
R-1893-B1
Stiff Brown Gray to Gray Silty Clay
21.4
13.0
R-1892-B1
R-1892-B2
25.4
14.0
Stiff Brown Gray to Gray Silty Clay
Firm Gray Brown to Gray Glacial Clay
Firm Gray Brown to Gray Glacial Clay
R-1893 RT.151
R-1892 RT.232
SHELBY TUBE CORE DATA
CORE NO. | R-1892-B1 | R-1892-B2 | R-1893-B1
CLASSIFICATION (AASHTO) | A-7-6(24) | A-6(23) | A-7-6(22)
COEFF.CONSOL. SQ.FT /DAY | 0.805 | 0.176 | 0.446
TRIAXIAL COMPRESSION | CU | CU* | CU
COHESION - PSF | 543 | 144 | 279
FRICTION COEFF. | 0.11 | 0.111 | 0.11
MOISTURE CONTENT % | 17.8 | 28.9 | 17.5
DRY DENSITY - PCF | 94.3 | 96.9 | 83.9
CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS
LT140 LT120 LT100 LT80 LT60 LT40 LT20 0 RT20 RT40 RT60 RT80 RT100 RT120 RT140 RT160 RT180 RT200 RT220 RT240 RT260 RT280 RT300
FILE NO. 30568 | ENGLISH | DESIGN TEAM Megivern\Dell\Gorjackovski | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-2(127)--2R-47 | SHEET NUMBER SPS.3

IDA COUNTY - DESIGN NO. 1115, 1215, 618, 718 & 1318
Page 240 of 413

IDA COUNTY

RCB CULVERT EXTENSION - SINGLE BOX
NHSN-020-2(129)--2R-47

LETTING DATE
DEC. 15, 2015

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD
- INTERSTATE HIGHWAY (80)
- UNITED STATES HIGHWAY (65)
- STATE HIGHWAY (175)
- COUNTY HIGHWAY (S27)
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES (ABBEY ROAD)
- UNINCORPORATED PLACE (ELWOOD)

Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM

IDA COUNTY

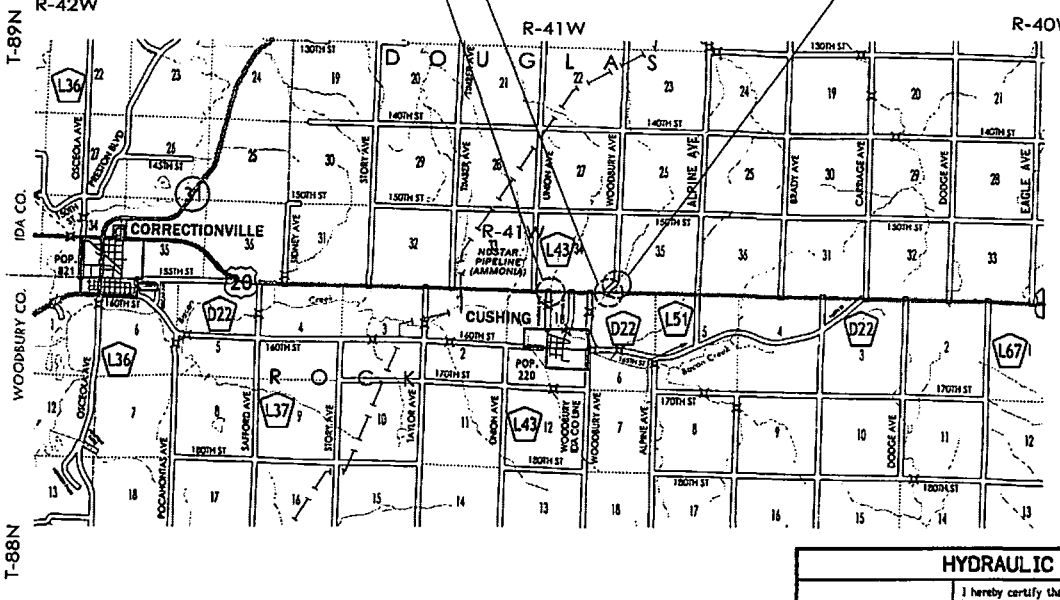
RCB CULVERT EXTENSION - SINGLE BOX

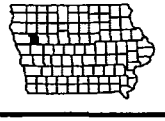
AT THREE LOCATIONS ON HWY 20

E. OF CORRECTIONVILLE TO W. OF W. JCT. US 59

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.

DESIGN NO. 1115 (STAGE I)
DESIGN NO. 618 (STAGE II)
DESIGN NO. 1215 (STAGE I)
DESIGN NO. 718 (STAGE II)
DESIGN NO. 1318





LOCATION MAP

PROJECT DIRECTORY NAME: 9702001098

ENGLISH STANDARD CULVERT PLANS

STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
RCB 12-8-12	APRIL 2012	-----
PWH 0-1-12	APRIL 2012	-----
PWH 0-2-12	APRIL 2012	-----
PWH 0-3-12	APRIL 2012	-----
PWH 0-4-12	APRIL 2012	-----
PWH 0-5-12	APRIL 2012	-----
RCB 10-10-12	APRIL 2012	-----
PWH 30-1-12	APRIL 2012	-----
PWH 30-2-12	APRIL 2012	-----
PWH 30-3-12	APRIL 2012	-----
PWH 30-4-12	APRIL 2012	-----
PWH 30-6-12	APRIL 2012	-----
RCB 10-12-12	APRIL 2012	-----
PWH 45-1-12	APRIL 2012	-----
PWH 45-2-12	APRIL 2012	-----
PWH 45-3-12	APRIL 2012	-----
PWH 45-4-12	APRIL 2012	-----
PWH 45-6-12	APRIL 2012	-----
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
PRECAST ALTERNATE STANDARDS		
PRCB G1-13	JAN. 2013	-----
PRCB G2-13	JAN. 2013	-----
PRCB 10-13	JAN. 2013	-----
PRCB 12-13	JAN. 2013	-----
PES 1-13-T3	JAN. 2013	5-13
PES 2-13-T3	JAN. 2013	5-13
PES 3-13-T3	JAN. 2013	-----
PES 4-13	JAN. 2013	-----
PEP 1-13	JAN. 2013	10-14

REVISIONS

TOTAL SHEETS	50
PROJECT NUMBER	NHSN-020-2(129)--2R-47
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	98-97-020-010-04

INDEX OF SHEETS

IOWA ONE CALL
1-800-292-8989 | 811
www.iowaonecall.com

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	DEAN G. BIERWAGEN	STRUCTURAL DESIGN
1	DAVID R. CLAMAN	HYDRAULIC DESIGN
SPS.1	MARK A. DELL	GEOTECHNICAL DESIGN
CULVERT STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

HYDRAULIC DESIGN

David R. Claman 11571 IOWA

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.

David R. Claman 10-05-15
Signature Date
David R. Claman
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 4, 7, 14, 21, 24, 27, 32, 37 & 42 OF 50

STRUCTURAL DESIGN

Dean G. Bierwagen 11406 IOWA

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.

Dean G. Bierwagen 10-05-15
Signature Date
Dean G. Bierwagen
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 1 THRU 43 OF 50

DESIGN TEAM	ENGLISH	FILE NO. 30568	IDA COUNTY	SHEET NUMBER
DGB * TWE * MSF	IOWA DOT * OFFICE OF BRIDGES AND STRUCTURES		PROJECT NUMBER: NHSN-020-2(129)--2R-47	1

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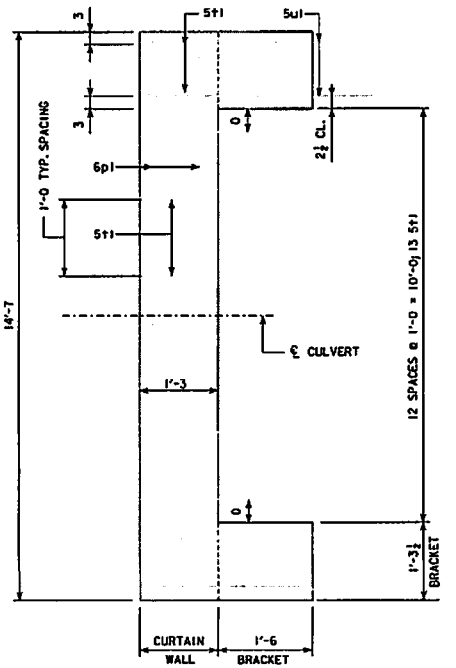
INCLUDES ADDENDA: A.02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

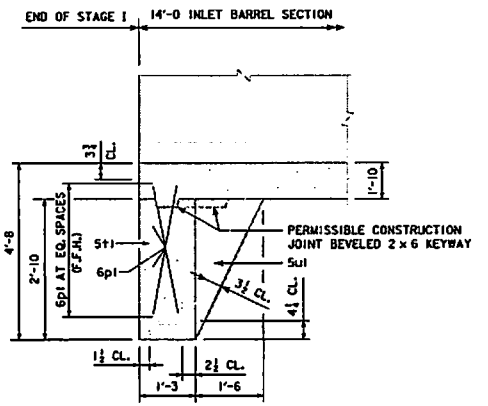
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	300.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-2720000	EXCAVATION, CLASS 20	CY	611	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	791.4	
5	2404-7775000	REINFORCING STEEL	LB	116,530	
6	2507-3250005	ENGINEERING FABRIC	SY	570.0	
7	2507-6800061	REVETMENT, CLASS E	TON	490.0	
8	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF PORTIONS OF THE EXISTING 12'-0 x 14'-3 ARCH CULVERT. 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.
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
5	2404-7775000	REINFORCING STEEL - -
6	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
7	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
8	2533-4980005	MOBILIZATION - -



CURTAIN WALL DETAIL
BARREL IS NOT SHOWN

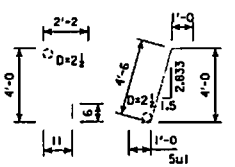


SECTION THRU CURTAIN WALL

CURTAIN WALL QUANTITIES

CURTAIN, HORIZ.		6p1	6	14'-3	128
CURTAIN, VERT.		5t1	17	7'-7	135
BRACKET, VERT.		5u1	4	6'-6	27
				TOTAL LBS.	290
CONCRETE TOTAL (CURTAIN WALL) = 2.0 CU. YDS.					

BENT BAR DETAILS



DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE I, 280'-0) REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 1115

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 2

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 12'-0 X 8'-0 X 474'-0 (STAGE I 280'-0) REINFORCED CONCRETE BOX CULVERT, 3° SKEW LT AH AT STATION 11133+41.00 (℄ US 20)

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 37 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

UTILITY COMPANIES 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.

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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LOGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

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

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE II IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE PRICE BID "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING 12'-0 x 14'-3 ARCH CULVERT NEEDED TO FACILITATE NEW CONSTRUCTION. (DESIGN #7456)

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12 *	4-12	07-14
RCB 12-8-12	4-12	
PWH 0-1-12	4-12	
PWH 0-2-12	4-12	
PWH 0-3-12	4-12	
PWH 0-4-12	4-12	
PWH 0-5-12	4-12	
CBJ 3-12	4-12	07-13
CBJ 4-12	4-12	

* TOP OF SLAB DETAIL DOES NOT APPLY.

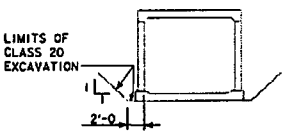
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
OUTLET HEADWALL 0° SKEW (1 REQ'D.)	4076	4076
38'-0 BARREL SECTION (7 REQ'D.)	7 AT 14180	99261
14'-0 BARREL SECTION (1 REQ'D.)	5224	5224
14'-0 INLET END SECT. CURTAIN WALL	290	290
BELL JOINTS (7 SETS REQ'D.)	7 AT 1097	7679
	TOTAL (LBS.)	116,530

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
OUTLET HEADWALL 0° SKEW (1 REQ'D.)	18.9	9.0	*1.5	29.4
38'-0 BARREL SECTION (7 REQ'D.)	7 AT 39.2 = 274.4	7 AT 22.4 = 156.8	7 AT 33.8 = 236.6	667.8
14'-0 BARREL SECTION (1 REQ'D.)	14.4	8.2	12.4	35.0
INLET END SECTION CURTAIN WALL	2.0	———	———	2.0
BELL JOINTS (7 SETS REQ'D.)	7 AT 3.25 = 22.8	7 AT 2.19 = 15.3	7 AT 2.73 = 19.1	57.2
TOTAL (CU. YDS.)	332.5	189.3	269.6	791.4

* INCLUDES PARAPET AND TOP OF WINGWALL



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ:NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1115	RCB CULVERT REPLACEMENT (STAGE I)

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE I, 280'-0) REINFORCED CONCRETE BOX CULVERT GENERAL NOTES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 1115

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 3

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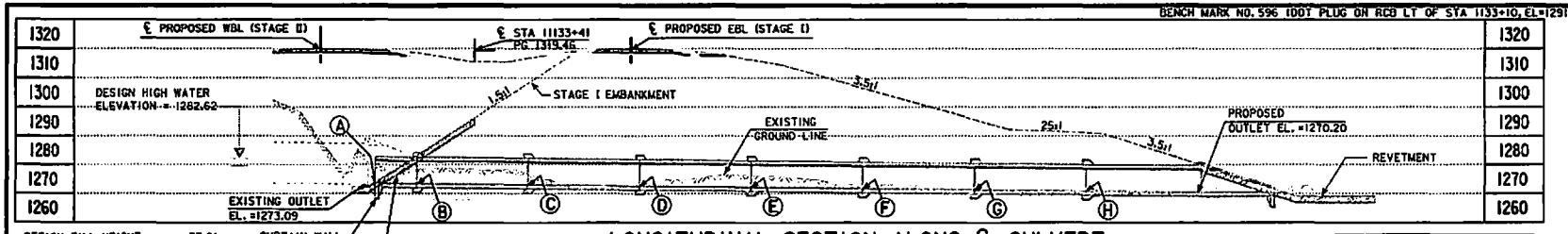
INCLUDES ADDENDA: A.02

BENCH MARK NO. 596 IDOT PLUG ON RCB LT OF STA 11133+10, EL=1291.654



DESIGN FILL HEIGHT = 37.0'
ANTICIPATED SETTLEMENT = 1.6'

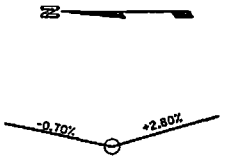
CURTAIN WALL

*TEMP. REVENTMENT

LONGITUDINAL SECTION ALONG ℄ CULVERT

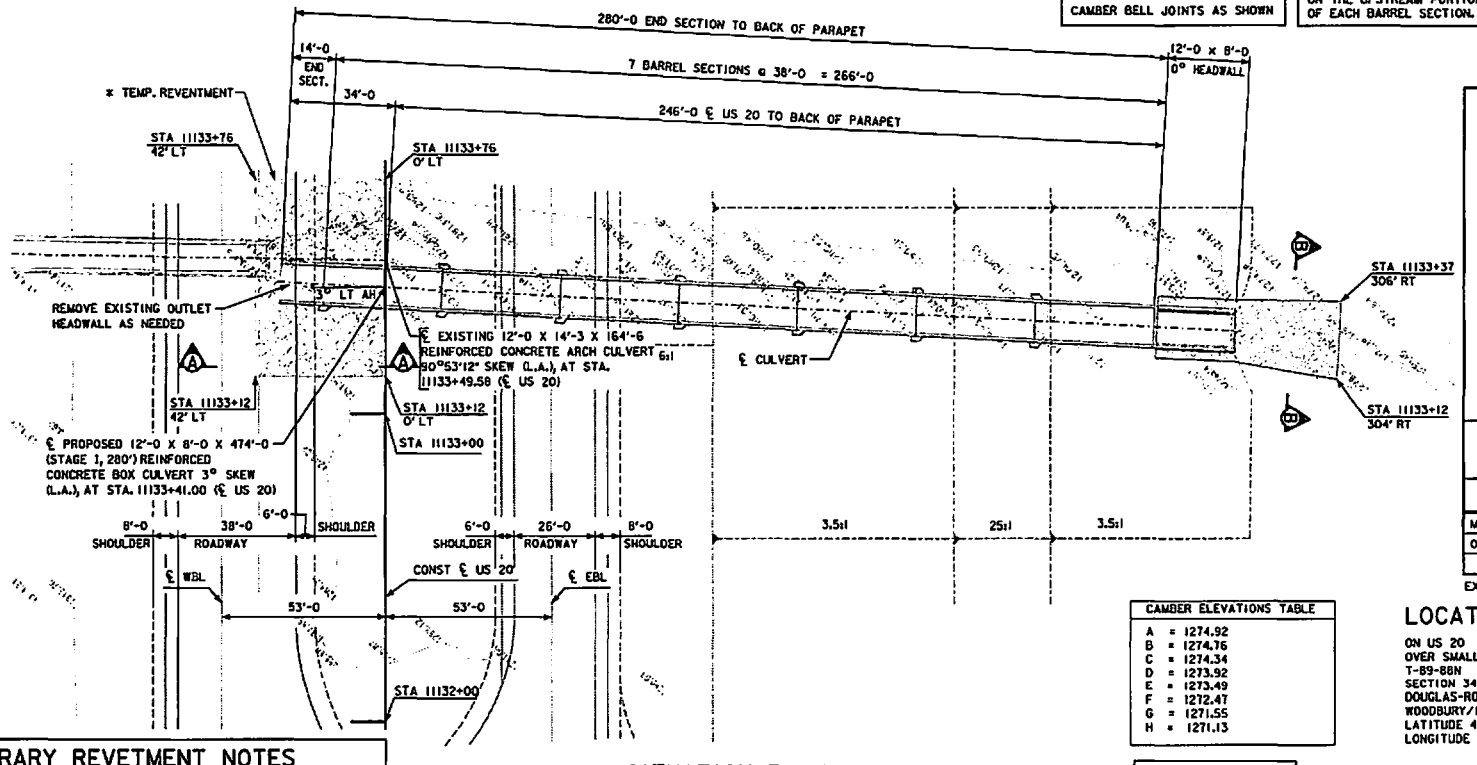
CAMBER BELL JOINTS AS SHOWN

NOTE:
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.

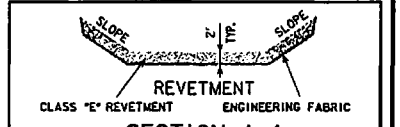


VPI STA = 11132+50 VC = 750'
VPI ELEV = 1315.03

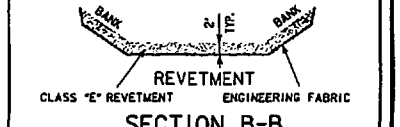
PROPOSED PROFILE GRADE US 20



SITUATION PLAN



SECTION A-A
TYPICAL TEMPERARY MEDIAN PROTECTION



SECTION B-B

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. "10" (CY)
MEDIAN	370	410	230
OUTLET	120	160	70
TOTALS	490	570	300

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE

CAMBER ELEVATIONS TABLE	
A	= 1274.92
B	= 1274.76
C	= 1274.34
D	= 1273.92
E	= 1273.49
F	= 1272.47
G	= 1271.55
H	= 1271.13

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, SEE DES. 618 IN THIS PROJECT FOR STAGE II.

LOCATION

ON US 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 34-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

*TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE REVETMENT, CL. E ITEM.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW STAGE I CULVERT TO FACILITATE DRAINAGE.

HYDRAULIC DATA

DRAINAGE AREA = 707 ACRES H-R
Q_{50} = 673 CFS
HW ELEV. = 1282.62

UTILITIES LEGEND:

FO1 INS
FO2 QWEST
FO4 MCLEOD
T4 SCHALLER TELEPHONE

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE I, 280'-0) REINFORCED CONCRETE BOX CULVERT SITUATION PLAN

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 1115

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 4

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	80.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	9,696	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	560.6	
4	2404-7775000	REINFORCING STEEL	LB	82,449	
5	2507-3250005	ENGINEERING FABRIC	SY	170.0	
6	2507-6800061	REVETMENT, CLASS E	TON	130.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
7	2533-4980005	MOBILIZATION - -

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION

ESTIMATED QUANTITIES

STATION 1133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 7 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 5

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGED DESIGN TO REPLACE THE EXISTING 12'-0 x 14'-3 x 164'-6 ARCH CULVERT WITH STAGE II OF A 12'-0 X 8'-0 X 474'-0 (STAGE II 194'-0) REINFORCED CONCRETE BOX CULVERT, 3° SKEW LT AH AT STATION 11133+41.00 (℄ US 20)

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 37 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

UTILITY COMPANIES 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.

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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LOGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE I IS NOT PART OF THIS DESIGN, BUT IS PART OF THIS PROJECT.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE 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. 7456).

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE STATE DOT.

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12 *	4-12	07-14
RCB 12-0-12	4-12	
CBJ 3-12	4-12	07-13
CBJ 4-12	4-12	

* TOP OF SLAB DETAIL DOES NOT APPLY.

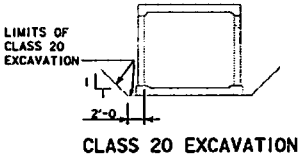
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
INLET HEADWALL 0° SKEW (1 REQ'D.)	4460	4460
38'-0 BARREL SECTION (4 REQ'D.)	4 AT 14,180	56,720
32'-0 BARREL SECTION (1 REQ'D.)	11,941	11,941
10'-0 TIE-IN SECTION (1 REQ'D.)	3,732	3,732
BELL JOINTS (5 SETS REQ'D.)	5 AT 1097	5485
DOWELS, 5x1	42 AT 2'-6	110
	TOTAL (LBS.)	82,448

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
INLET HEADWALL 0° SKEW (1 REQ'D.)	18.9	A12.4	*1.5	32.8
38'-0 BARREL SECTION (4 REQ'D.)	4 AT 39.2 = 156.8	4 AT 22.4 = 89.6	4 AT 33.8 = 135.2	381.6
32'-0 BARREL SECTION (1 REQ'D.)	33.0	18.8	28.4	80.2
10'-0 TIE-IN SECTION (1 REQ'D.)	10.3	5.9	8.9	25.1
BELL JOINTS (5 SETS REQ'D.)	5 AT 3.25 = 16.3	5 AT 2.19 = 11.0	5 AT 2.73 = 13.7	41.0
TOTAL (CU. YDS.)	235.3	137.7	187.7	560.7

* INCLUDES PARAPET AND TOP OF WINGWALL
Δ INCLUDES WEIR OF 2.4 CU.YD SEE DES. SHT. 7.



CLASS 20 EXCAVATION
(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ:NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1115	RCB CULVERT REPLACEMENT (STAGE I)
618	RCB CULVERT EXTENSION (STAGE II)

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 7 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 6

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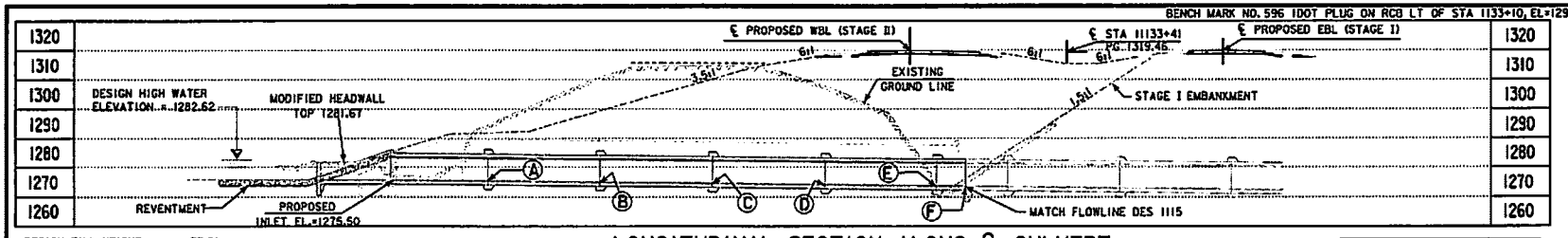
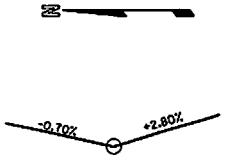
INCLUDES ADDENDA: A.02

BENCH MARK NO. 596 IDOT PLUG ON RCB LT OF STA 11133+10, EL=1297.654



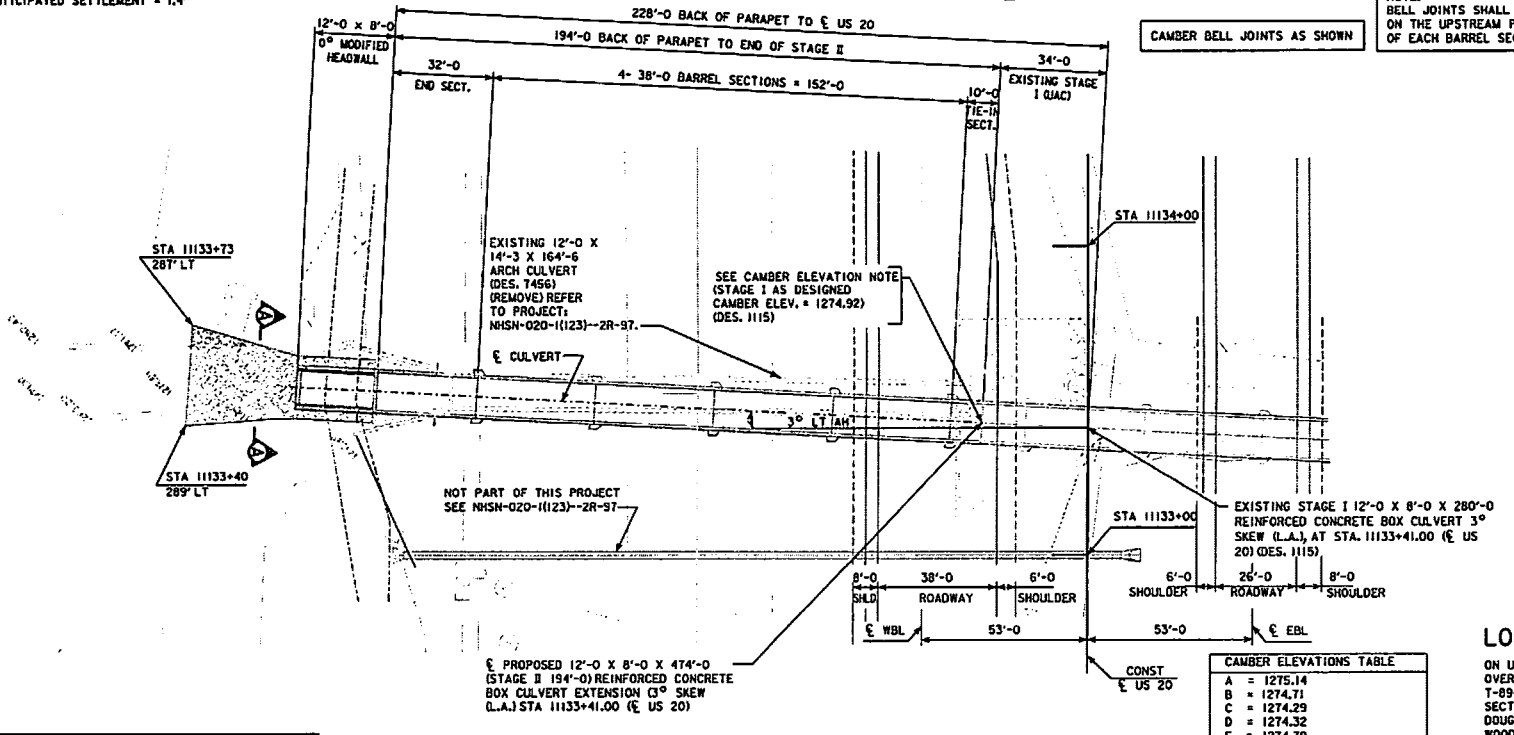


VPI STA = 11132+50 VC = 750'
VPI ELEV = 1315.03

PROPOSED PROFILE GRADE US 20

DESIGN FILL HEIGHT = 37.0'
ANTICIPATED SETTLEMENT = 1.4'

LONGITUDINAL SECTION ALONG ℄ CULVERT



CAMBER BELL JOINTS AS SHOWN

NOTE:
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.

SECTION A-A

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. '10' (CY)
INLET	130	170	80
TOTALS	130	170	80

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE

CAMBER ELEVATIONS TABLE

A	= 1275.14
B	= 1274.71
C	= 1274.29
D	= 1274.32
E	= 1274.79
F	= 1274.92 (MATCH FLOWLINE) STAGE I

NOTE:
STAGE I IS NOT A PART OF THIS DESIGN, SEE DES. 1115 IN THIS PROJECT FOR STAGE I.

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION. THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

SITUATION PLAN

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.

LOCATION

ON US 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 34-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

HYDRAULIC DATA

DRAINAGE AREA = 707 ACRES H-R
Q_{50} = 673 CFS
HW ELEV. = 1282.62

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 NCLEOD
T4 SCHALLER TELEPHONE

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION SITUATION PLAN

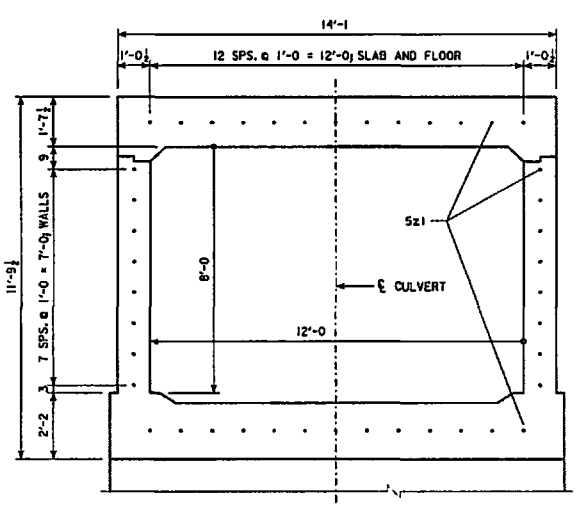
STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

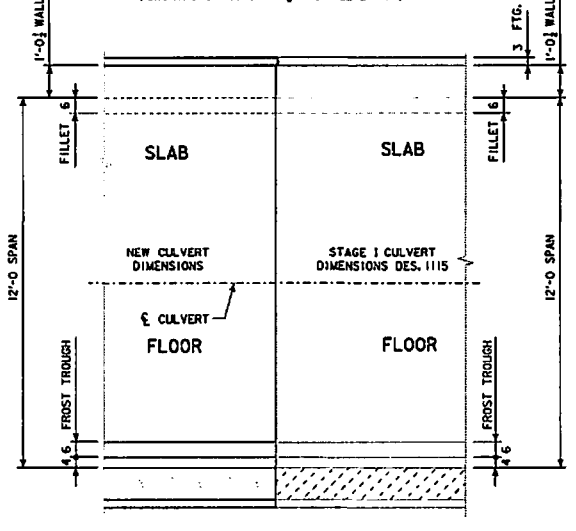
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 7 FILE NO. 30568 DESIGN NO. 618

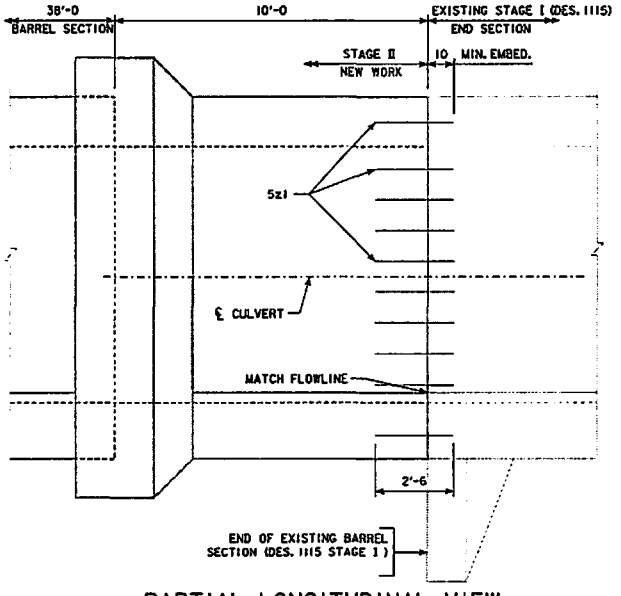
DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 7



EXISTING END VIEW
(SHOWING SPACING OF ⅝" ϕ DOWEL BARS)



CONCRETE TRANSITION DETAILS
(PLAN VIEW)



PARTIAL LONGITUDINAL VIEW
(SHOWING 5z1 DOWEL PLACEMENT)

NOTE:
5z1 BARS SHALL BE SET AS DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO THE CONCRETE. DOWEL REINFORCING BARS SHALL BE SPACED AS SHOWN. 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.

NOTE:
FOR BELL JOINT AND BARREL DETAILS NOT SHOWN, REFER TO STANDARDS LISTED IN THESE PLANS.

NOTE:
DOWELS ARE TO BE CENTERED IN EXISTING SLAB, FLOOR AND WALLS. MINIMUM OF 10" EMBEDMENT.

42 EACH 2'-6 - 5z1 DOWELS = 110 LBS.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION

10'-0 TIE-IN BARREL DETAILS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 7 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 8

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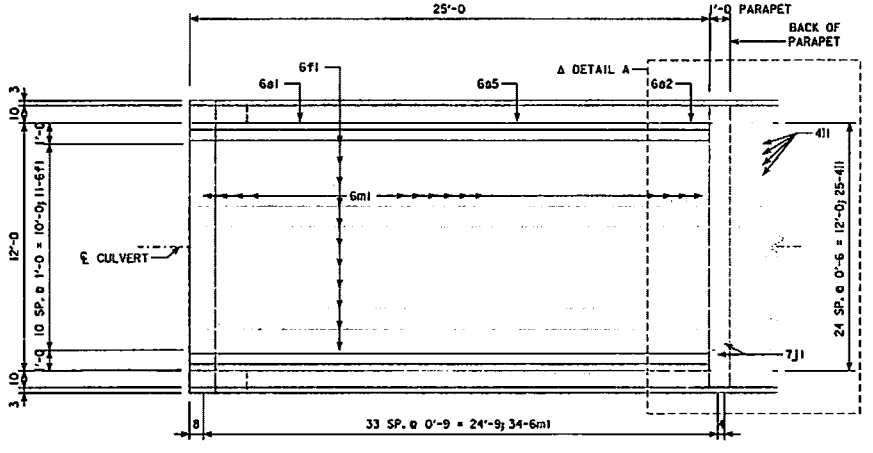
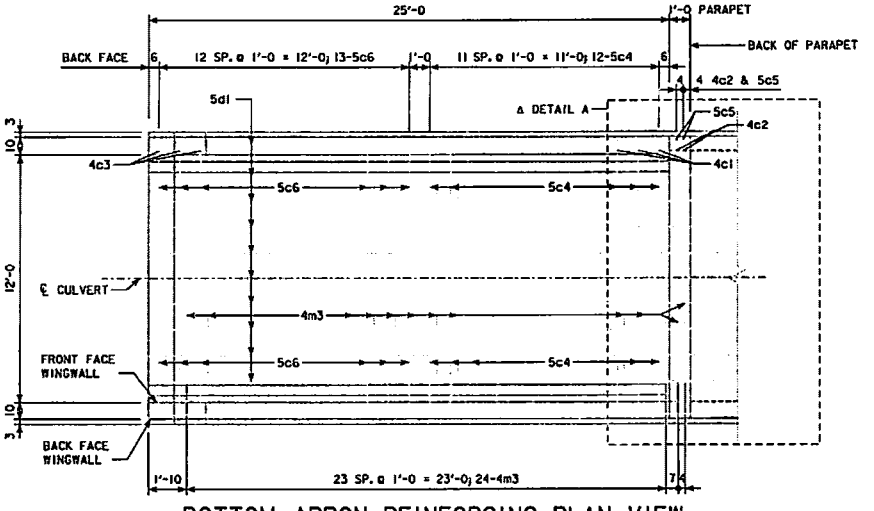
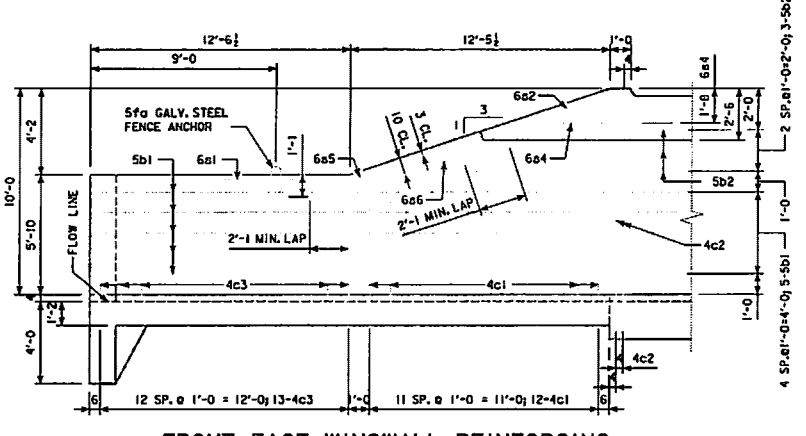


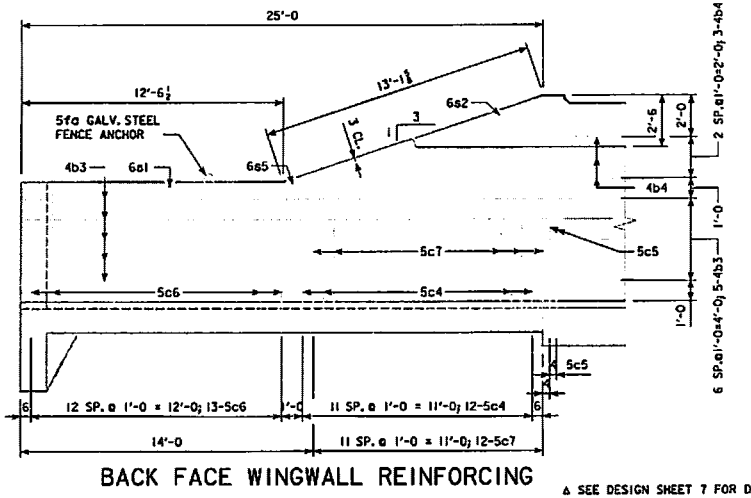
TOP APRON REINFORCING PLAN VIEW



BOTTOM APRON REINFORCING PLAN VIEW



FRONT FACE WINGWALL REINFORCING



BACK FACE WINGWALL REINFORCING

Δ SEE DESIGN SHEET 7 FOR DETAIL A.

NOTES :

WINGWALL BARS CONSISTENTLY REFERENCED FROM END OF WING FOR ALL WINGWALLS.

APRON m3 BARS ARE TO BE CENTERED ON ℄ CULVERT.

B.F.V. (5c4) AND F.F.V. (4c2) BARS ARE APPROXIMATELY 4" FROM THE BACK OF PARAPET FOR ALL HEADWALLS.

TOP TRANSVERSE APRON BARS ARE REFERENCED APPROXIMATELY 4" FROM THE BACK OF THE PARAPET FOR ALL HEADWALLS.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION

PARALLEL WING HEADWALLS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 7 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 9

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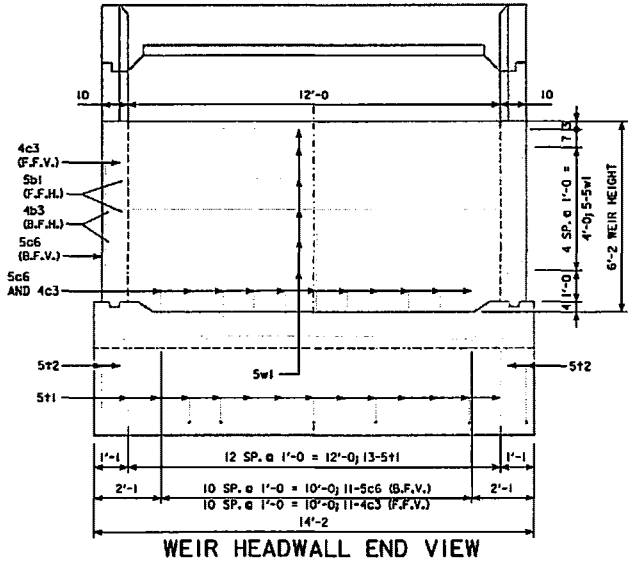
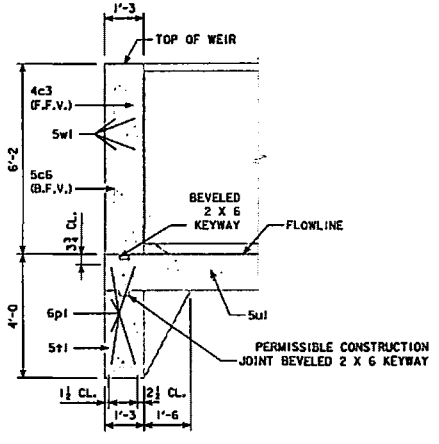
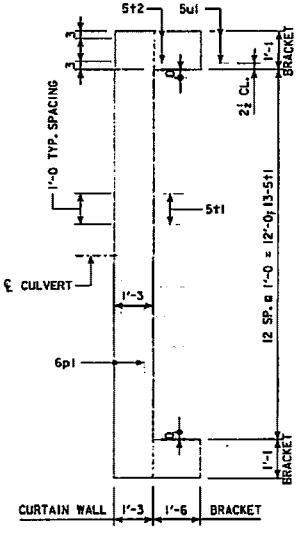


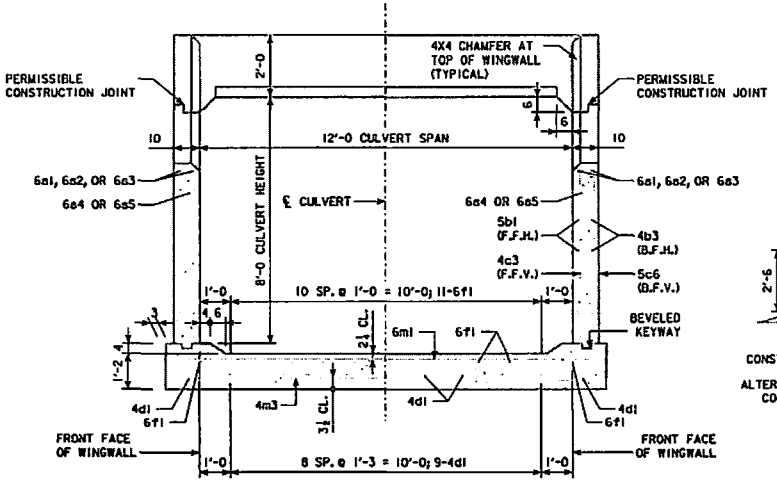
WEIR HEADWALL END VIEW



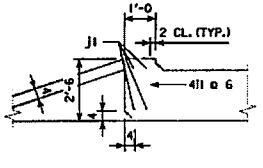
SECTION THRU WEIR AND CURTAIN WALL



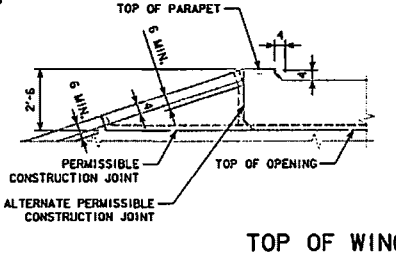
CURTAIN WALL DETAIL
(APRON IS NOT SHOWN)

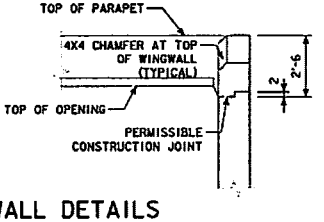


THRU HEADWALL SECTION



SECTION THRU PARAPET





TOP OF WINGWALL DETAILS

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION

HEADWALL DETAILS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

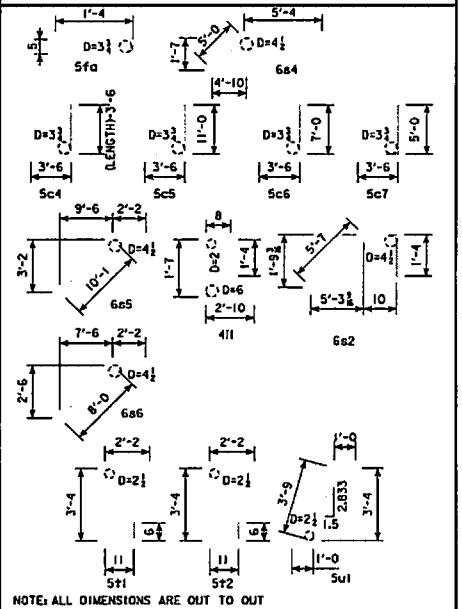
DESIGN SHEET NO. 6 OF 7 FILE NO. 30568 DESIGN NO. 618

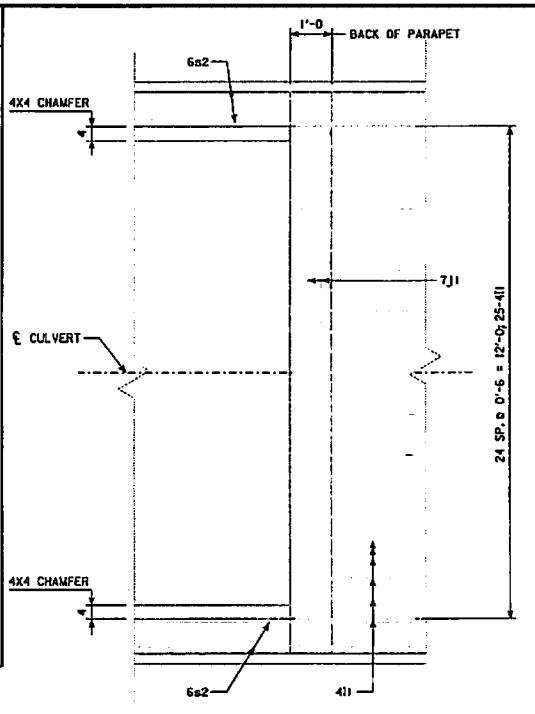
DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 10

REINFORCING BAR LIST

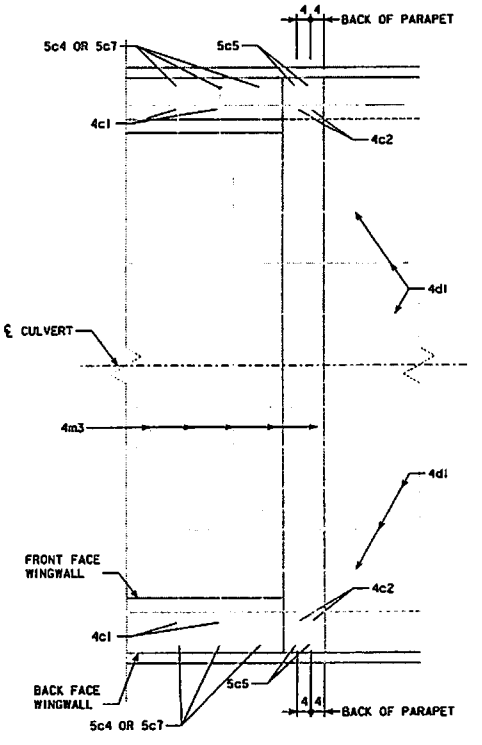
LOCATION	SHAPE	BAR	NO.	LENGTH	WT.
FENCE ANCHOR (GALV.)		5fa	2	3'-1	6
WINGWALL, F.F.H.		5b1	10	27'-10	290
WINGWALL, F.F.H.		5b2	6 VAR	LISTED	74
WINGWALL, B.F.H.		4b3	10	27'-10	186
WINGWALL, B.F.H.		4b4	4 VAR	2 EACH 8'-0;11'-10	25
WINGWALL, F.F.V.		4c1	24 VAR	2 EACH 7'-1;10'-9	143
WINGWALL, F.F.V.		4c2	4	11'-0	30
WINGWALL, F.F.V.		4c3	37	6'-10	169
WINGWALL, B.F.V.		5c4	24 VAR	LISTED	311
WINGWALL, B.F.V.		5c5	4	14'-6	60
WINGWALL, B.F.V.		5c6	37	10'-6	405
WINGWALL, B.F.V.		5c7	24	8'-6	213
APRON, LONGIT., BOTT.		4d1	11	27'-10	204
APRON, LONGIT., TOP		6f1	13	27'-10	543
PARAPET, VERTICAL		4l1	25	6'-5	107
PARAPET, HORIZ.		7j1	4	13'-4	109
APRON, TRANS., TOP		6m1	35	13'-10	727
APRON, TRANS., BOTT.		4m3	25	9'-9	163
CURTAIN, HORIZ.		6p1	6	13'-10	125
WING SLOPE, BOTH F.		6a1	4	12'-4	74
WING SLOPE, BOTH F.		6a2	4	7'-9	46
WING SLOPE, F. F.		6a4	2	10'-4	31
WING SLOPE, F. F.		6a5	4	12'-3	74
WING SLOPE, F. F.		6a6	2	10'-2	31
CURTAIN, VERT.		5t1	13	6'-11	94
CURTAIN, VERT.		5t2	4	6'-11	29
BRACKET, VERT.		5u1	4	5'-9	24
WEIR, HORIZ.		5w1	12	13'-4	167

BENT BAR DETAILS





DETAIL A
SHOWING PARAPET BARS ONLY



DETAIL A

ESTIMATED QUANTITIES ONE HEADWALL	REINF. STEEL	4460 LBS.		
	CONCRETE	PARAPET Δ	1.5	32.8 CU.YD.
		WINGWALLS	10.0	
		APRON	18.9	
		WEIR	2.4	

Δ INCLUDES TOP OF WINGWALL QUANTITIES.

BAR 5c4
2 EA. LGTH.
10'-7
10'-11
11'-3
11'-7
11'-11
12'-3
12'-7
12'-11
13'-3
13'-7
13'-11
14'-3

BAR 5b2
2 EA. LGTH.
5'-0
8'-0
11'-0

HEADWALL NOTES:

THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.

THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A ¾" DRESSED AND BEVELED STRIP.

ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.

CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.

HORIZONTAL TAILS OF BARS "b" & "8" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "4d1" AND "6f1" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET. THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

NOTE:
SEE DESIGN SHEET 5 FOR LOCATION OF DETAIL A.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 474'-0 (STAGE II, 194'-0) CONCRETE BOX CULVERT EXTENSION

INLET HEADWALL QUANTITIES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 7 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 11

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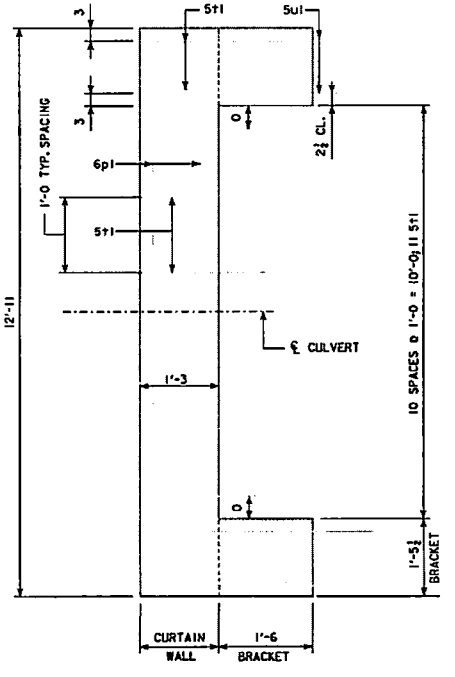
ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	555.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-2720000	EXCAVATION, CLASS 20	CY	2,055	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	861.8	
5	2404-7775000	REINFORCING STEEL	LB	126,140	
6	2507-3250005	ENGINEERING FABRIC	SY	1,020.0	
7	2507-6800061	REVETMENT, CLASS E	TON	925.0	
8	2533-4980005	MOBILIZATION	LS	1.00	

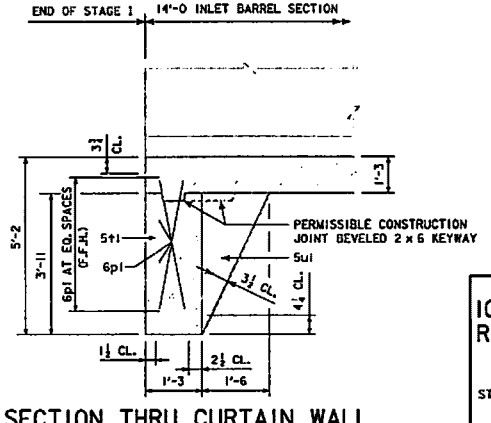
ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF PORTIONS OF THE EXISTING 12'-0 x 14'-3 ARCH CULVERT. 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.
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
5	2404-7775000	REINFORCING STEEL - -
6	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
7	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
8	2533-4980005	MOBILIZATION - -



CURTAIN WALL DETAIL

BARREL IS NOT SHOWN

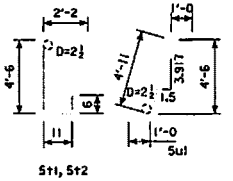


SECTION THRU CURTAIN WALL

CURTAIN WALL QUANTITIES

CURTAIN, HORIZ.		6@1	6	12'-7	113
CURTAIN, VERT.		5@1	15	8'-1	127
BRACKET, VERT.		5@1	4	6'-11	29
				TOTAL LBS.	269
				CONCRETE TOTAL (CURTAIN WALL) = 2.6 CU. YDS.	

BENT BAR DETAILS



DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 514'-0 (STAGE I, 304'-0) REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 12

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 10'-0 X 12'-0 X 515'-0 (STAGE II 280'-0) REINFORCED CONCRETE BOX CULVERT STAGE I, 37° SKEW LT AH STATION 11168+44.00 (℄ US 20)

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 26'-0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

UTILITY COMPANIES 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.

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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LOGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

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

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE 2 IS NOT PART OF THIS DESIGN, BUT IS PART OF THIS PROJECT.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE PRICE BID "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING 10'-0 X 12'-0 X 172'-0 REINFORCED CONCRETE BOX CULVERT (DESIGN #356)

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12 *	4-12	07-14
RCB 10-12-12	4-12	
PWH 30-1-12	4-12	
PWH 30-2-12	4-12	
PWH 30-3-12	4-12	
PWH 30-4-12	4-12	
PWH 30-6-12	4-12	
CBJ 3-12	4-12	07-13
CBJ 4-12	4-12	

* TOP OF SLAB DETAIL DOES NOT APPLY.

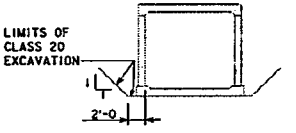
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
OUTLET HEADWALL 30° SKEW (1 REQ'D.)	9,123	9,123
38'-0 BARREL SECTION (8 REQ'D.)	8 AT 13,582	108,656
38'-0 INLET END SECT. CURTAIN WALL	269	269
BELL JOINTS (7 SETS REQ'D.)	7 AT 1,156	8,092
	TOTAL (LBS.)	126,140

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
OUTLET HEADWALL 30° SKEW (1 REQ'D.)	26.7	25.1	*1.7	53.5
38'-0 BARREL SECTION (8 REQ'D.)	8 AT 27.4=219.2	8 AT 43.6=348.8	8 AT 22.0=176.0	744.0
INLET END SECTION CURTAIN WALL	2.6	———	———	2.6
BELL JOINTS (7 SETS REQ'D.)	7 AT 2.989=20.9	7 AT 3.331=23.3	7 AT 2.502=17.5	61.7
TOTAL (CU. YDS.)	269.4	397.2	195.2	861.8

* INCLUDES PARAPET AND TOP OF WINGWALL



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1215	RCB CULVERT REPLACEMENT (STAGE I)

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 514'-0 (STAGE I, 304'-0) REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 13

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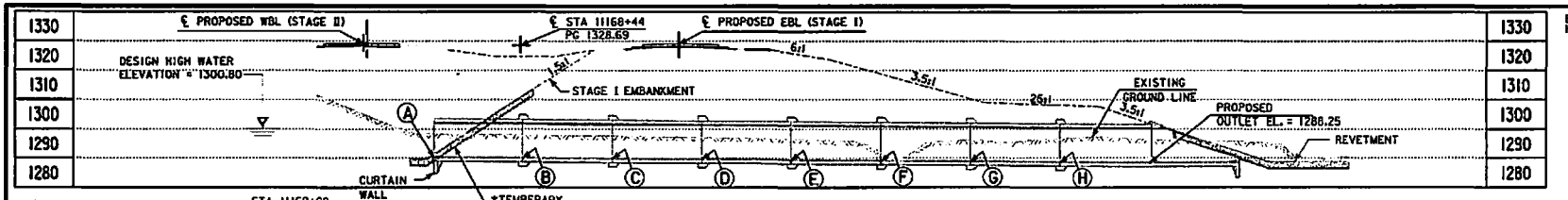
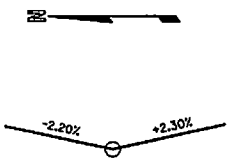
INCLUDES ADDENDA: A.02



BENCH MARK NO. 599, IDOT DISC RCB
HDWL, STA 11169+57.83, 71.89' LT, EL=1306.07



VPI STA = 11168+50 VC = 950'
VPI ELEV = 1323.33

PROPOSED PROFILE GRADE US 20

DESIGN FILL HEIGHT = 26.0'
ANTICIPATED SETTLEMENT = 2.0'

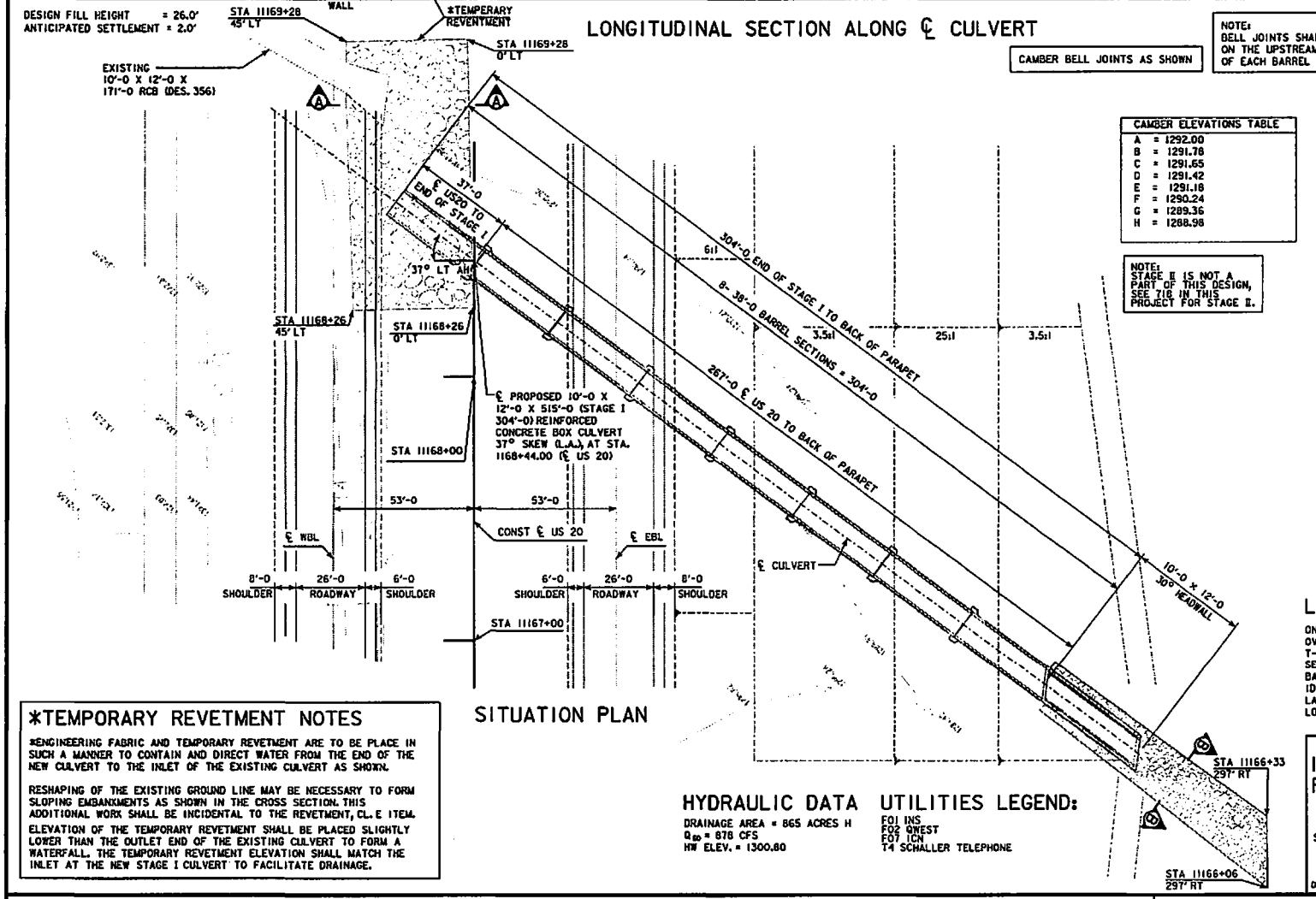
LONGITUDINAL SECTION ALONG ℄ CULVERT

CAMBER BELL JOINTS AS SHOWN

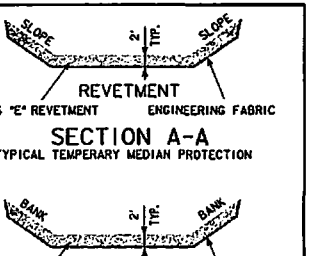
NOTE:
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.

CAMBER ELEVATIONS TABLE	
A	= 1292.00
B	= 1291.78
C	= 1291.65
D	= 1291.42
E	= 1291.18
F	= 1290.24
G	= 1289.36
H	= 1288.98

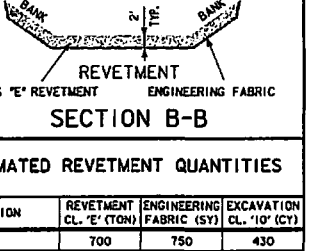
NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, SEE 718 IN THIS PROJECT FOR STAGE II.



SITUATION PLAN



SECTION A-A
TYPICAL TEMPERARY MEDIAN PROTECTION



SECTION B-B

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. '10' (CY)
MEDIAN	700	750	430
OUTLET	225	270	125
TOTALS	925	1020	555

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION

ON US 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 6-34
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474349°
LONGITUDE -95.665343°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

*TEMPORARY REVETMENT NOTES

*ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE NEW CULVERT TO THE INLET OF THE EXISTING CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE REVETMENT, CL. E ITEM.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW STAGE I CULVERT TO FACILITATE DRAINAGE.

HYDRAULIC DATA

DRAINAGE AREA = 865 ACRES H
Q_{50} = 878 CFS
HW ELEV. = 1300.80

UTILITIES LEGEND:

FOI INS
FO2 QWEST
FO7 ICN
T4 SCHALLER TELEPHONE

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 514'-0 (STAGE I, 304'-0) REINFORCED CONCRETE BOX CULVERT SITUATION PLAN

STA. 11168+44.0 (℄ US 20)
OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30560 DESIGN NO. 1215

DESIGN TEAM OGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 14

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	120.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	8,355	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	613.9	
4	2404-7775000	REINFORCING STEEL	LB	90,439	
5	2507-3250005	ENGINEERING FABRIC	SY	260.0	
6	2507-6800061	REVETMENT, CLASS E	TON	195.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-2720000	EXCAVATION, CLASS 20 - -
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
7	2533-4980005	MOBILIZATION - -

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 514'-0 (STAGE II, 211'-0) REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11168+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 718

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 15

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 10'-0 X 12'-0 X 172'-0 REINFORCED CONCRETE BOX CULVERT WITH A NEW 10'-0 X 12'-0 X 515'-0 REINFORCED CONCRETE BOX CULVERT STAGE II, 37° SKEW LT AH STATION 11168+44.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 26 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

UTILITY COMPANIES 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.

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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LOGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

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.

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE I IS NOT PART OF THIS DESIGN, BUT IS A PART OF THIS PROJECT..

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE 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. 356).

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE STATE DOT.

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12 *	4-12	07-14
RCB 10-12-12	4-12	
PWH 30-1-12	4-12	
PWH 30-2-12	4-12	
PWH 30-3-12	4-12	
PWH 30-4-12	4-12	
PWH 30-6-12	4-12	
CBJ 3-12	4-12	07-13
CBJ 4-12	4-12	

* TOP OF SLAB DETAIL DOES NOT APPLY.

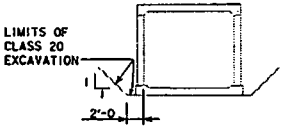
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
INLET HEADWALL 30° SKEW (1 REQ'D.)	9,123	9,123
38'-0 BARREL SECTION	5 AT 13,582	67,910
21'-0 TIE-IN SECTION (1 REQ'D.)	7,506	7,506
BELL JOINTS (5 SETS REQ'D.)	5 AT 1,156	5,780
DOWELS, Sz1	46 AT 2'-6	120
	TOTAL (LBS.)	90,439

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
INLET HEADWALL 30° SKEW (1 REQ'D.)	26.7	25.1	*1.7	53.5
38'-0 BARREL SECTION	5 AT 27.4=137.0	5 AT 43.6=218.0	5 AT 22.0=110.0	465.0
21'-0 TIE-IN SECTION (1 REQ'D.)	15.1	24.1	12.1	51.3
BELL JOINTS (5 SETS REQ'D.)	5 AT 2.98=14.9	5 AT 3.34=16.7	5 AT 2.5=12.5	44.1
TOTAL (CU. YDS.)	193.7	283.9	136.3	613.9

* INCLUDES PARAPET AND TOP OF WINGWALL



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1215	RCB CULVERT REPLACEMENT (STAGE I)
718	RCB CULVERT EXTENSION (STAGE II)

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 514'-0 (STAGE II, 211'-0) REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11168+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 718

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 16

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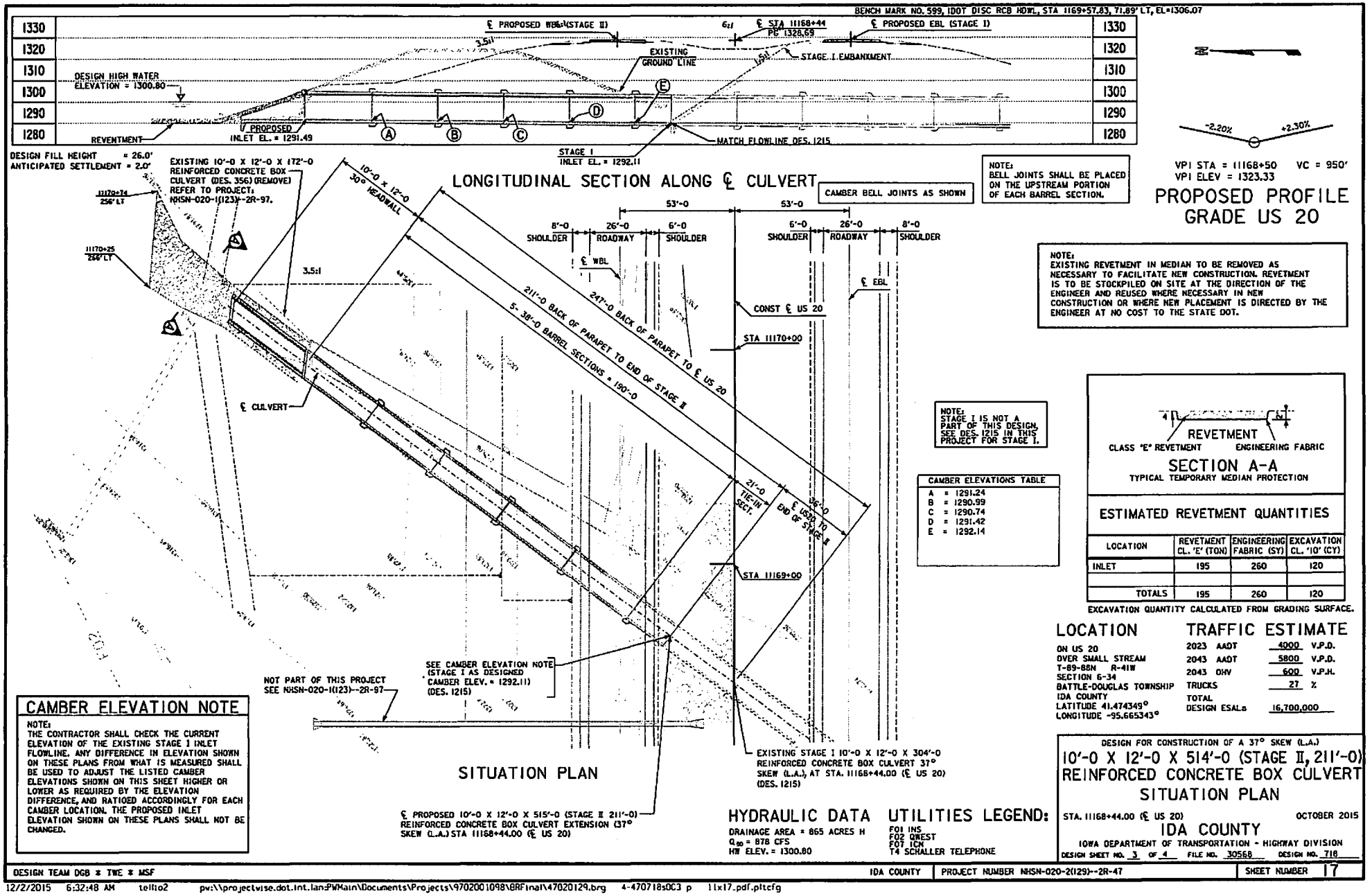
INCLUDES ADDENDA: A.02


BENCH MARK NO. 599, IDOT DISC RCB HDWL, STA 1169+57.83, 71.89' LT, EL=1306.07
1330
1320
1310
1300
1290
1280
℄ PROPOSED WBL (STAGE II)
℄ STA 11168+44
PC 1328.69
℄ PROPOSED EBL (STAGE I)
EXISTING GROUND LINE
STAGE I EMBANKMENT
DESIGN HIGH WATER ELEVATION = 1300.80
REVENTMENT
PROPOSED INLET EL. = 1291.49
STAGE I INLET EL. = 1292.11
MATCH FLOWLINE DES. 1215
DESIGN FILL HEIGHT = 26.0'
ANTICIPATED SETTLEMENT = 2.0'
EXISTING 10'-0 X 12'-0 X 172'-0 REINFORCED CONCRETE BOX CULVERT (DES. 356) (REMOVE) REFER TO PROJECT: NHSN-020-1(123)--2R-97.
10'-0 X 12'-0 30° HEADWALL
11170+74 256' LT
11170+25 256' LT
3.5:1
℄ CULVERT
LONGITUDINAL SECTION ALONG ℄ CULVERT
CAMBER BELL JOINTS AS SHOWN
53'-0
53'-0
8'-0 SHOULDER
26'-0 ROADWAY
6'-0 SHOULDER
6'-0 SHOULDER
26'-0 ROADWAY
8'-0 SHOULDER
℄ WBL
℄ EBL
CONST ℄ US 20
211'-0 BACK OF PARAPET TO END OF STAGE II
247'-0 BACK OF PARAPET TO ℄ US 20
5- 38'-0 BARREL SECTIONS = 190'-0
STA 11170+00
STA 11169+00
21'-0 TIE-IN SECT.
36'-0
℄ US 20
END OF STAGE II
SEE CAMBER ELEVATION NOTE (STAGE I AS DESIGNED CAMBER ELEV. = 1292.11) (DES. 1215)
NOT PART OF THIS PROJECT SEE NHSN-020-1(123)--2R-97
SITUATION PLAN
℄ PROPOSED 10'-0 X 12'-0 X 515'-0 (STAGE II 211'-0) REINFORCED CONCRETE BOX CULVERT EXTENSION (37° SKEW (L.A.) STA 11168+44.00 (℄ US 20)
EXISTING STAGE I 10'-0 X 12'-0 X 304'-0 REINFORCED CONCRETE BOX CULVERT 37° SKEW (L.A.), AT STA. 11168+44.00 (℄ US 20) (DES. 1215)
-2.20%
+2.30%
VPI STA = 11168+50
VC = 950'
VPI ELEV = 1323.33
PROPOSED PROFILE GRADE US 20
NOTE: BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.
NOTE: EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.
NOTE: STAGE I IS NOT A PART OF THIS DESIGN, SEE DES. 1215 IN THIS PROJECT FOR STAGE I.
CAMBER ELEVATIONS TABLE
A = 1291.24
B = 1290.99
C = 1290.74
D = 1291.42
E = 1292.14
REVETMENT
CLASS "E" REVETMENT
ENGINEERING FABRIC
SECTION A-A
TYPICAL TEMPORARY MEDIAN PROTECTION
ESTIMATED REVETMENT QUANTITIES
LOCATION | REVETMENT CL. 'E' (TON) | ENGINEERING FABRIC (SY) | EXCAVATION CL. '10' (CY)
INLET | 195 | 260 | 120
TOTALS | 195 | 260 | 120
EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.
LOCATION
ON US 20
OVER SMALL STREAM
T-89-8N R-41W
SECTION 6-34
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 41.474349°
LONGITUDE -95.665343°
TRAFFIC ESTIMATE
2023 AADT 4000 V.P.D.
2043 AADT 5800 V.P.D.
2043 DHV 600 V.P.H.
TRUCKS 27 %
TOTAL DESIGN ESALs 16,700,000
CAMBER ELEVATION NOTE
NOTE: THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION. THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.
HYDRAULIC DATA
DRAINAGE AREA = 865 ACRES H
Q50 = 878 CFS
HW ELEV. = 1300.80
UTILITIES LEGEND:
F01 INS
F02 QWEST
F07 ICN
T4 SCHALLER TELEPHONE
DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)
10'-0 X 12'-0 X 514'-0 (STAGE II, 211'-0) REINFORCED CONCRETE BOX CULVERT
SITUATION PLAN
STA. 11168+44.00 (℄ US 20)
OCTOBER 2015
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 718
DESIGN TEAM DGB * TWE * MSF
IDA COUNTY
PROJECT NUMBER NHSN-020-2(129)--2R-47
SHEET NUMBER 17
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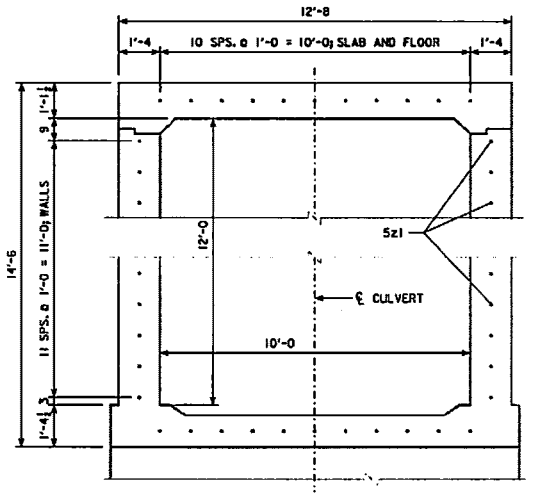
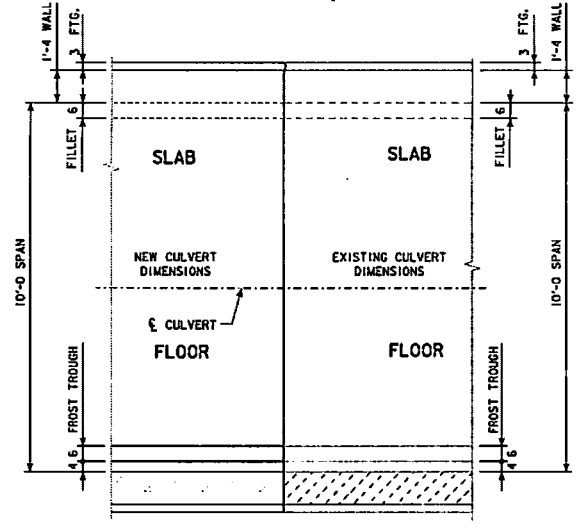
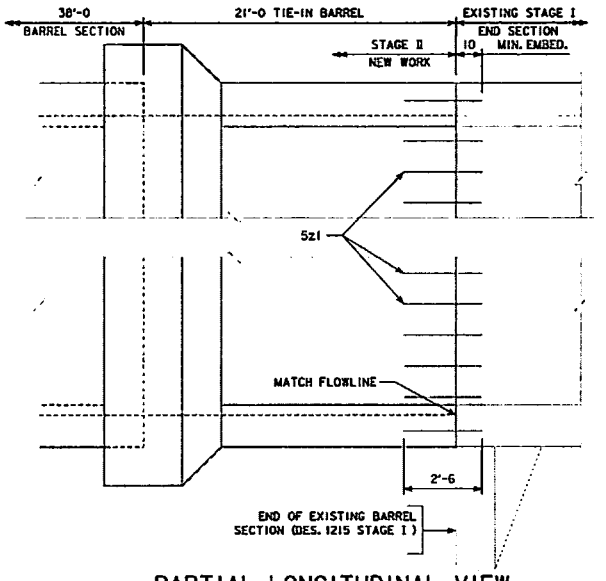


EXISTING END VIEW
(SHOWING SPACING OF 1" ϕ DOWEL BARS)



CONCRETE TRANSITION DETAILS
(PLAN VIEW)



PARTIAL LONGITUDINAL VIEW
(SHOWING 5z1 DOWEL PLACEMENT)

NOTE:
5z1 BARS SHALL BE SET AS DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO THE CONCRETE. DOWEL REINFORCING BARS SHALL BE SPACED AS SHOWN. 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.

NOTE:
FOR BELL JOINT AND BARREL DETAILS NOT SHOWN, REFER TO STANDARDS LISTED IN THESE PLANS.

NOTE:
DOWELS ARE TO BE CENTERED IN EXISTING SLAB, FLOOR AND WALLS. MINIMUM OF 10" EMBEDMENT.

46 EACH 2'-6 - 5z1 DOWELS = 120 LBS.

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 514'-0 (STAGE II, 211'-0) REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 1116+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 710

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 18

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	200.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	22	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	216.2	
4	2404-7775000	REINFORCING STEEL	LB	39,980	
5	2507-3250005	ENGINEERING FABRIC	SY	460.0	
6	2507-6800061	REVETMENT, CLASS E	TON	320.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
7	2533-4980005	MOBILIZATION - -

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)

10'-0 X 10'-0 X 90'-0 REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 2106+78.00 (℄ GRAVEL ROAD) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 1318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 19

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 10'-0 X 10'-0 X 90'-0 REINFORCED CONCRETE BOX CULVERT, 52° SKEW RT AH STATION 2106+78.00 (℄ PROPOSED WOODBURY AVE N)

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 3.0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS 1 EXPOSURE CONDITION FOR CRACK CONTROL.

UTILITY COMPANIES 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.

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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LOGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	07-14
RCB 10-10-12	4-12	
PWH 45-1-12	4-12	
PWH 45-2-12	4-12	
PWH 45-3-12	4-12	
PWH 45-4-12	4-12	
PWH 45-6-12	4-12	
CBJ 3-12	4-12	07-13
CBJ 4-12	4-12	

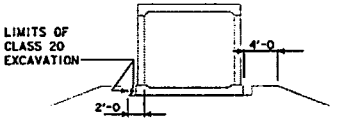
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
HEADWALL 45° SKEW (2 REQ'D.)	2 AT 9,019	18,038
38'-0 BARREL SECTION	9,230	9,230
26'-0 BARREL SECTION (2 REQ'D.)	2 AT 6,316	12,632
5rl BAR SET @ 2	2 AT 40	80
	TOTAL (LBS.)	39,980

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
HEADWALLS 45° SKEW (2 REQ'D.)	2 AT 26.8=53.6	2 AT 18.6+37.2	2 AT 1.9=3.8	94.6
38'-0 BARREL SECTION	16.5	22.6	12.3	51.4
26'-0 BARREL SECTION (2 REQ'D.)	2 AT 11.3=22.6	2 AT 15.4+30.8	2 AT 8.4=16.8	70.2
TOTAL (CU. YDS.)	92.7	90.6	32.9	216.2

* INCLUDES PARAPET AND TOP OF WINGWALL



CLASS 20 EXCAVATION LIMITS
(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN
NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT: NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT: NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT: NHSN-020-1(123)--2R-97.

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)
10'-0 X 10'-0 X 90'-0 REINFORCED CONCRETE BOX CULVERT
GENERAL NOTES
STA. 2106+78.00 (℄ GRAVEL ROAD) OCTOBER 2015
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 1318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 20

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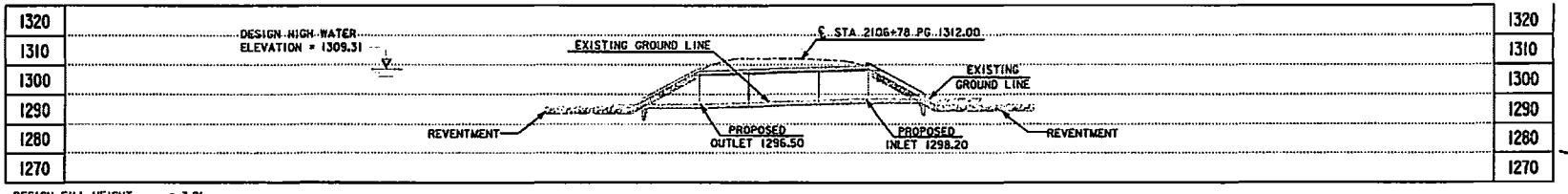
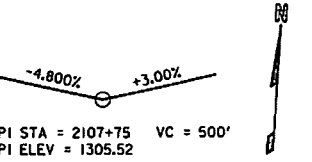


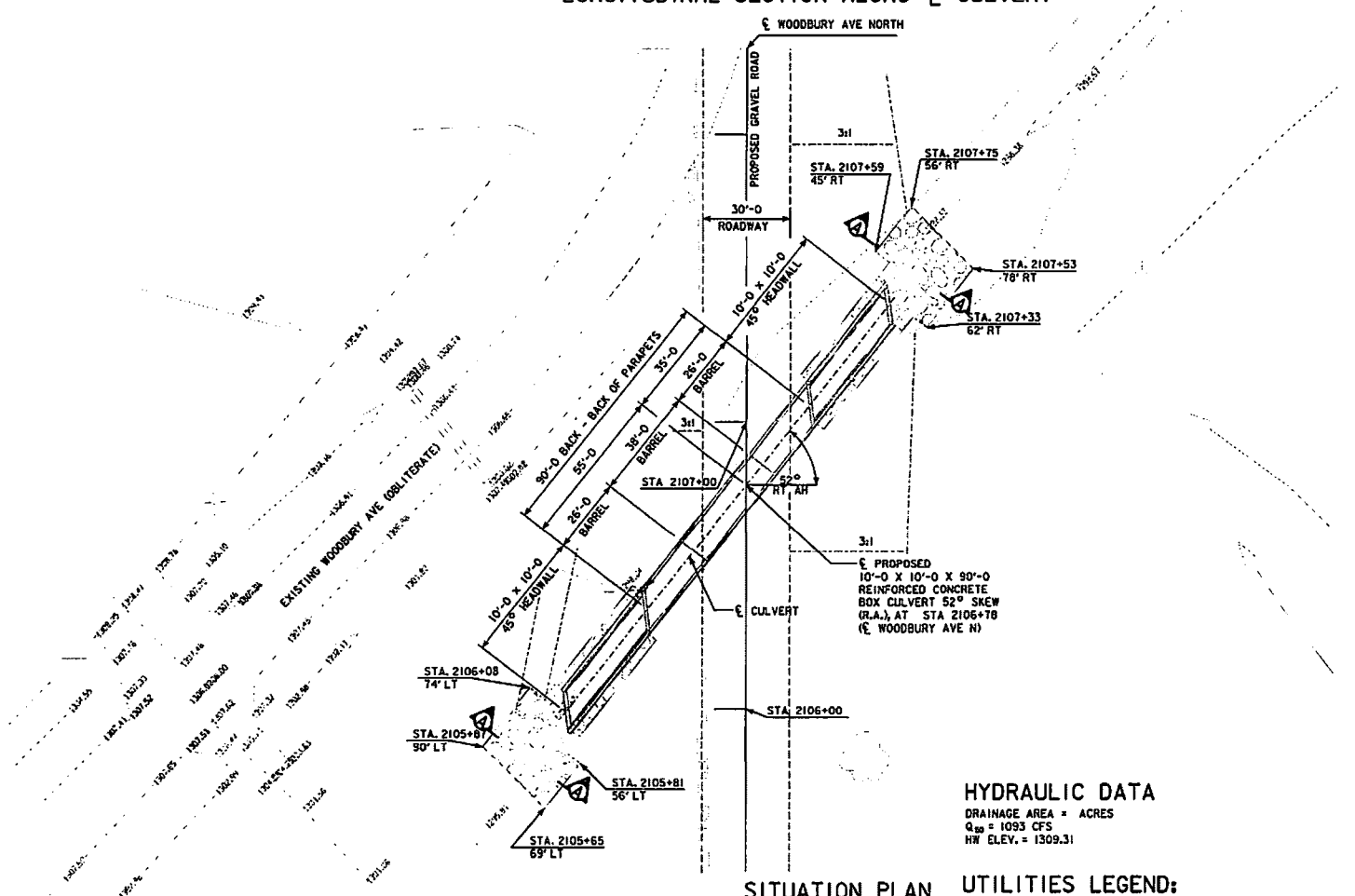
DESIGN FILL HEIGHT = 3.0'
ANTICIPATED SETTLEMENT = N/A

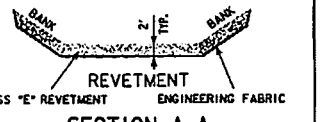
LONGITUDINAL SECTION ALONG ℄ CULVERT



VPI STA = 2107+75 VC = 500'
VPI ELEV = 1305.52

PROPOSED PROFILE GRADE WOODBURY AVE N.





SECTION A-A

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. "10" (CY)
LEFT	160	230	100
RIGHT	160	230	100
TOTALS	320	460	200

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE

LOCATION

ON WOODBURY AVE N
OVER SMALL STREAM
T-89N R-41W
SECTION 34 & 35
DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.476230°
LONGITUDE -95.663067°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

HYDRAULIC DATA

DRAINAGE AREA = ACRES
Q_{50} = 1093 CFS
HW ELEV. = 1309.31

UTILITIES LEGEND:

MIDAMERICAN ENERGY

SITUATION PLAN

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)

10'-0 X 10'-0 X 90'-0 REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 2106+78.00 (℄ GRAVEL ROAD) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 1318

DESIGN TEAM DGB ≡ TWE ≡ MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 21

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ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	200.0	
2	2402-0425030	GRANULAR BACKFILL	CY	51.0	
3	2402-2720000	EXCAVATION, CLASS 20	CY	70	
4	2415-2111010	PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	LF	108.0	
5	2415-2201010	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	EACH	2	
6	2507-3250005	ENGINEERING FABRIC	SY	460.0	
7	2507-6800061	REVETMENT, CLASS E	TON	320.0	
8	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-0425030	GRANULAR BACKFILL - -
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 51 CY EXCAVATION NECESSARY TO PLACE 6" BEDDING.
4	2415-2111010	PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
5	2415-2201010	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 52 SKEW 2 PRECAST END SECTIONS, 2 PRECAST LINTEL BEAMS, AND 2 PRECAST CURTAIN WALLS.
6	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
7	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
8	2533-4980005	MOBILIZATION - -

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)

10'-0 X 10'-0 X 108'-0 PRECAST REINFORCED CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 2106+78.00 (℄ GRAVEL ROAD) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 1318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 22

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A REINFORCED CONCRETE BOX CULVERT, 52° SKEW RT AH STATION 2106+78.00 (℄ PROPOSED WOODBURY AVE N)

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 3.0 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 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 ¾ 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 ¾ 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.

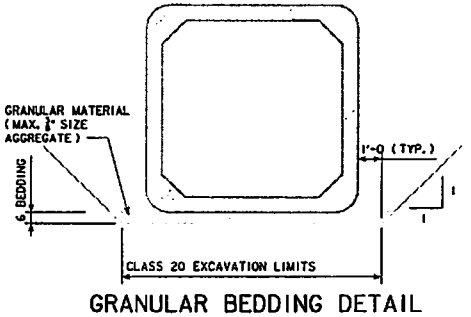
THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT 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' x 2' 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.



GRANULAR BEDDING DETAIL

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

TRAFFIC CONTROL PLAN

NOTE:
THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION.
TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT: NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT: NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT: NHSN-020-1(123)--2R-97.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1318	NEW CULVERT

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
PRCB G1-13	1-13	------
PRCB G2-13	1-13	------
PRCB 10-13	1-13	------
PES 2-13-T3	1-13	5-13
PES 3-13-T3	1-13	------
PES 4-13	1-13	------

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)

10'-0 X 10'-0 X 108'-0 PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 2106+78.00 (℄ GRAVEL ROAD) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 1318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 23

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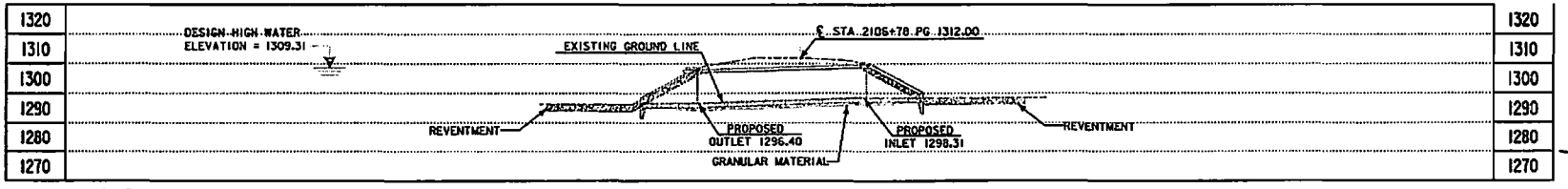
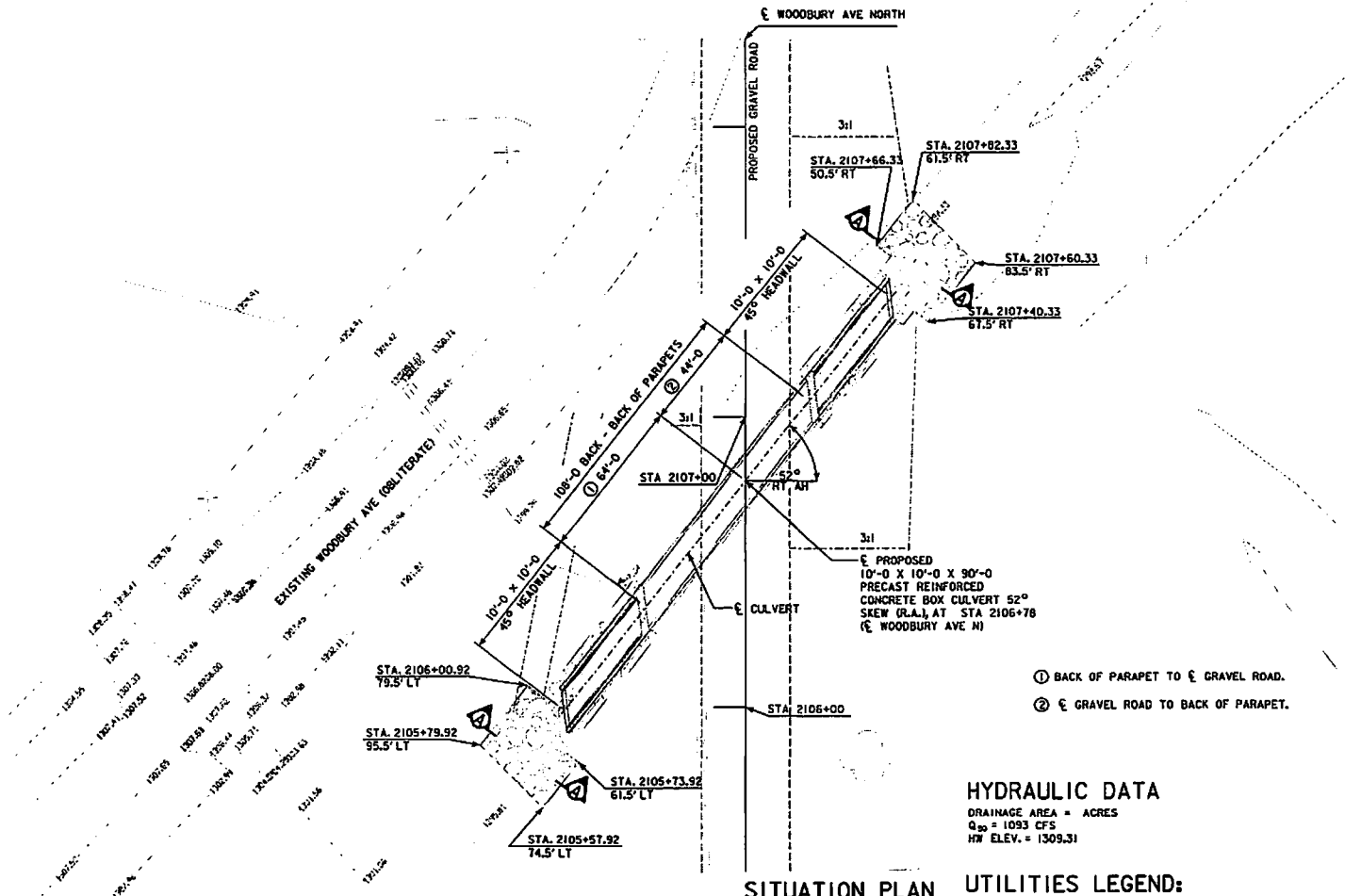


DESIGN FILL HEIGHT = 3.0'
ANTICIPATED SETTLEMENT = N/A

LONGITUDINAL SECTION ALONG ℄ CULVERT

VPI STA = 2107+75 VC = 500'
VPI ELEV = 1305.52

PROPOSED PROFILE GRADE WOODBURY AVE N.



① BACK OF PARAPET TO ℄ GRAVEL ROAD.

② ℄ GRAVEL ROAD TO BACK OF PARAPET.

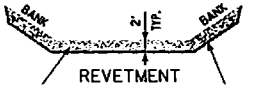
SITUATION PLAN

HYDRAULIC DATA

DRAINAGE AREA = ACRES
Q_{50} = 1093 CFS
HW ELEV. = 1309.31

UTILITIES LEGEND:

MIDAMERICAN ENERGY



SECTION A-A

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. '10' (CY)
LEFT	160	230	100
RIGHT	160	230	100
TOTALS	320	460	200

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE

LOCATION

ON WOODBURY AVE N
OVER SMALL STREAM
T-89N R-41W
SECTION 34 & 35
DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.476230°
LONGITUDE -95.663067°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)

10'-0 X 10'-0 X 108'-0 PRECAST REINFORCED CONCRETE BOX CULVERT SITUATION PLAN

STA. 2106+78.00 (℄ GRAVEL ROAD) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 1318

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 24

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ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	300.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-0425030	GRANULAR BACKFILL	CY	89.2	
4	2402-2720000	EXCAVATION, CLASS 20	CY	700	
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	46.6	
6	2404-7775000	REINFORCING STEEL	LB	6,672	
7	2415-2111208	PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 FT.	LF	274.0	
8	2415-2201208	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 8 FT.	EACH	1	
9	2507-3250005	ENGINEERING FABRIC	SY	570.0	
10	2507-6800061	REVETMENT, CLASS E	TON	490.0	
11	2533-4980005	MOBILIZATION	LS	1.00	
12	2599-9999010	('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES ALL WORK FOR PARTIAL REMOVAL AND OFF-SITE DISPOSAL OF THE EXISTING 12'-0 x 14'-3 ARCH CULVERT IN ORDER TO COMPLETE STAGE I CONSTRUCTION. 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.
3	2402-0425030	GRANULAR BACKFILL - -
4	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 89.2 CY. EXCAVATION NECESSARY TO PLACE 6" BEDDING.
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
6	2404-7775000	REINFORCING STEEL - -
7	2415-2111208	PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 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 DESIGN FILL OF 37 FT SHALL REQUIRE A NONSTANDARD DESIGN. SHOP DRAWINGS AND A DESIGN SEALED BY A PROFESSIONAL ENGINEER SHALL BE SUBMITTED FOR REVIEW & APPROVAL.
8	2415-2201208	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 8 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 1 PRECAST END SECTIONS, 1 PRECAST LINTEL BEAMS, AND 1 PRECAST CURTAIN WALLS.
9	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
10	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
11	2533-4980005	MOBILIZATION - -
12	2599-9999010	('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT INCLUDES COST OF MATERIALS AND LABOR TO INSTALL TEMPORARY STEEL CURTAIN WALL. TEMPORARY CURTAIN WALL TO REMAIN IN PLACE UNTIL STAGE 2, DESIGN 618 CONSTRUCTION BEGINS.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 1115, STAGE II IS DESIGN 618, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE I, 286'-0) PRECAST REINF. CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 1115

DESIGN TEAM DGB ± TRE ± MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 25

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 12'-0 X 8'-0 X 486'-0 (STAGE I 286'-0) REINFORCED CONCRETE BOX CULVERT, 3° SKEW LT AH AT STATION 11133+41.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 37.0 FEET.

THE PRICE BID "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING 12'-0 x 14'-3 ARCH CULVERT NEEDED TO FACILITATE NEW CONSTRUCTION. (DESIGN #7456)

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE II IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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 ¾ 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 ½ 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' x 2' 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.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

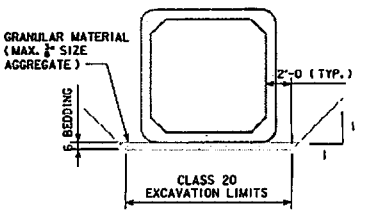
1	PRECAST SECTIONS

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
12'-0 BARREL SECTION	4,478	4,478
BELL JOINT	2 @ 1,097	2,194
	TOTAL (LBS.)	6,672

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
12'-0 BARREL SECTION	12.4	7.1	10.7	30.2
BELL JOINT	2 @ 3.3= 6.6	2 @ 2.2 = 4.4	2 @ 2.7 = 5.4	16.4
TOTAL (CU. YDS.)	19.0	11.5	16.1	46.6



GRANULAR BEDDING & CLASS 20 EXCAVATION DETAIL

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

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.

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.:NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

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

STANDARD	ISSUED	REVISED
RCB G1-12	4-12	10-12
RCB G2-12	4-12	07-14
RCB 12-8-12	4-12	-----
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-----
PES 4-13	1-13	-----
PEP 1-13	1-13	10-14
PRCB G1-13	1-13	-----
PRCB G2-13	1-13	-----
PRCB 12-13	1-13	-----

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1115	RCB CULVERT REPLACEMENT (STAGE 1)

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE I, 286'-0) PRECAST REINF. CONCRETE BOX CULVERT GENERAL NOTES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 1115

DESIGN TEAM DGB x TWE x MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(123)--2R-47 | SHEET NUMBER 26

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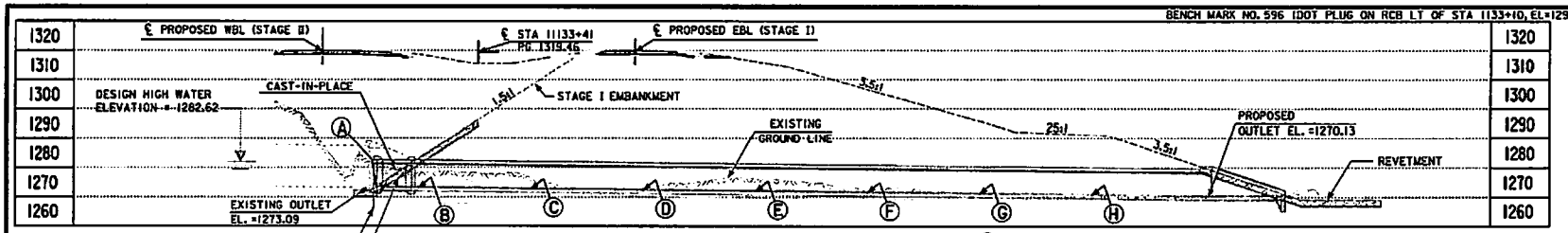
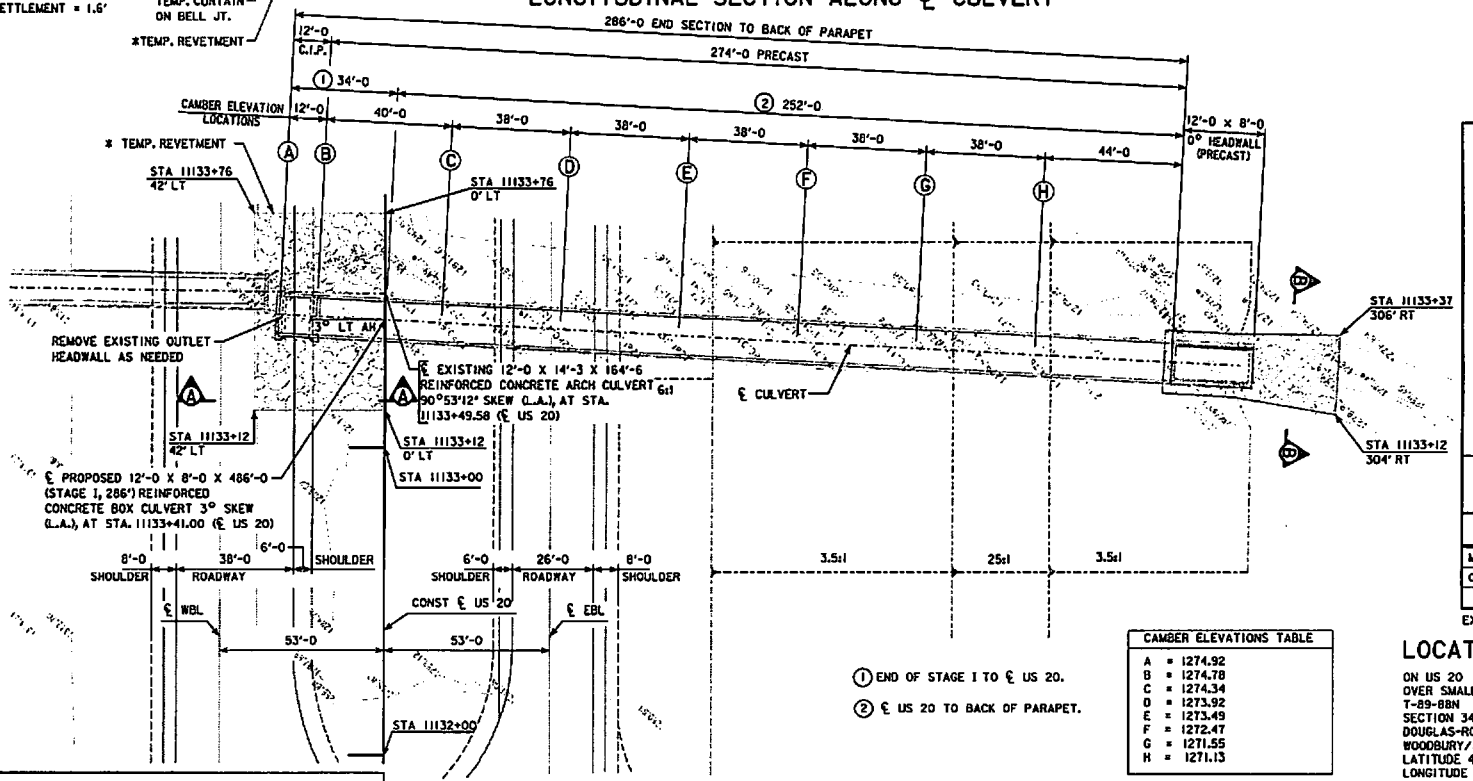
INCLUDES ADDENDA: A.02

BENCH MARK NO. 596 IDOT PLUG ON RCB LT OF STA 11133+10, EL.=1291.654



LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 37.0'
ANTICIPATED SETTLEMENT = 1.6'



SITUATION PLAN

① END OF STAGE I TO ℄ US 20.
② ℄ US 20 TO BACK OF PARAPET.

CAMBER ELEVATIONS TABLE	
A	= 1274.92
B	= 1274.78
C	= 1274.34
D	= 1273.92
E	= 1273.49
F	= 1272.47
G	= 1271.55
H	= 1271.13

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, SEE DES. 618 IN THIS PROJECT FOR STAGE II.

*TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE EXISTING CULVERT TO THE INLET OF THE NEW CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE REVETMENT, CL. E ITEM.

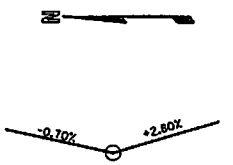
ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW STAGE I CULVERT TO FACILITATE DRAINAGE.

HYDRAULIC DATA

DRAINAGE AREA = 707 ACRES H-R
Q_{50} = 673 CFS
HW ELEV. = 1282.62

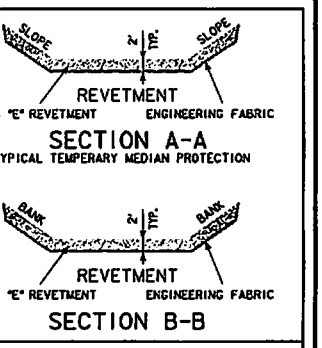
UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD
T4 SCHALLER TELEPHONE

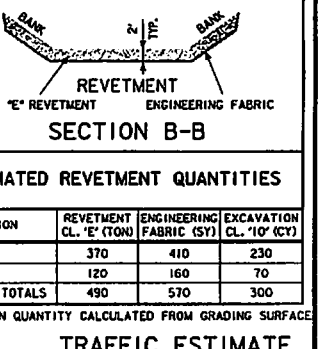


VPI STA = 11132+50 VC = 750'
VPI ELEV = 1315.03

PROPOSED PROFILE GRADE US 20



SECTION A-A
TYPICAL TEMPERARY MEDIAN PROTECTION



SECTION B-B

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. '10' (CY)
MEDIAN	370	410	230
OUTLET	120	160	70
TOTALS	490	570	300

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE

LOCATION

ON US 20
OVER SMALL STREAM
T-89-8BN R-41W
SECTION 34-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT 4000 V.P.D.
2043 AADT 5800 V.P.D.
2043 DHV 600 V.P.H.
TRUCKS 27 %
TOTAL DESIGN ESALs 16,700,000

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE I, 286'-0) PRECAST REINF. CONCRETE BOX CULVERT SITUATION PLAN

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30569 DESIGN NO. 1115

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 27

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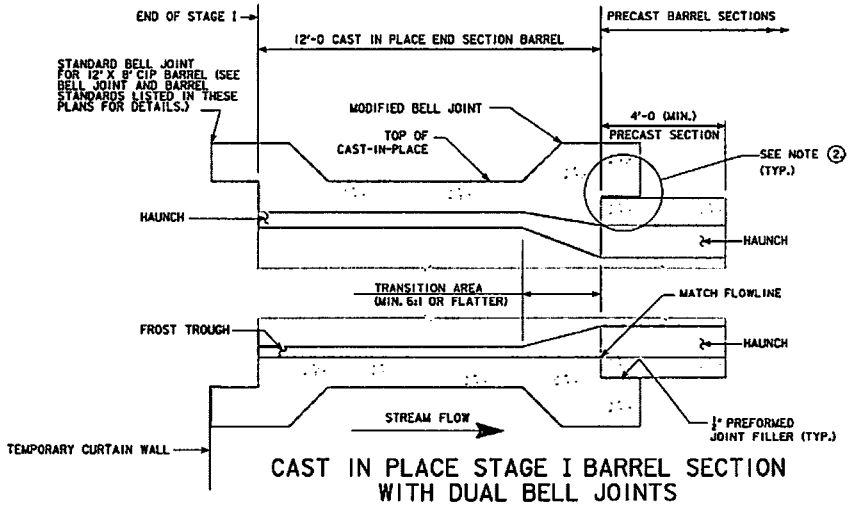
INCLUDES ADDENDA: A.02



CAST IN PLACE STAGE I BARREL SECTION
WITH DUAL BELL JOINTS
(LONGITUDINAL VIEW)

(2) NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING 1"Φ PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT BELL JOINTS ARE PLACED ON THE DOWNSTREAM AND UPSTREAM END OF THE STAGE I END SECTION, AS SHOWN.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE I, 286'-0) PRECAST REINF. CONCRETE BOX CULVERT

PC TO C.I.P. CONNECTION DETAILS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 1115

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 28

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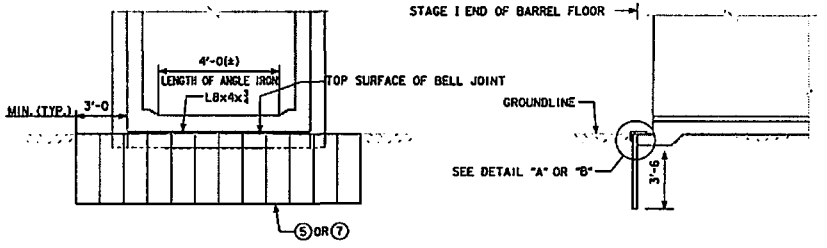
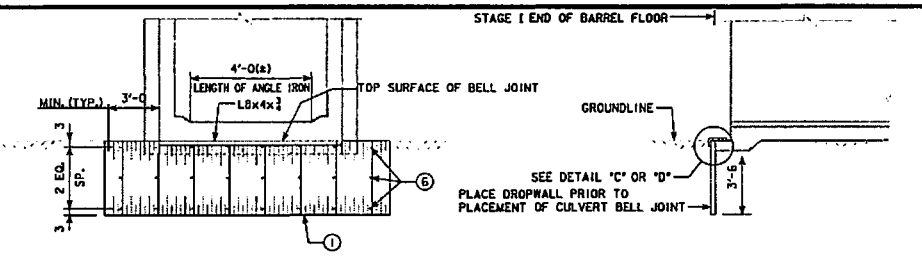
INCLUDES ADDENDA: A.02



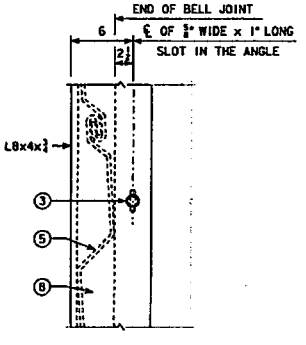
END VIEW ELEVATION

ALTERNATES 1 & 2 (STEEL SHEET PILING)

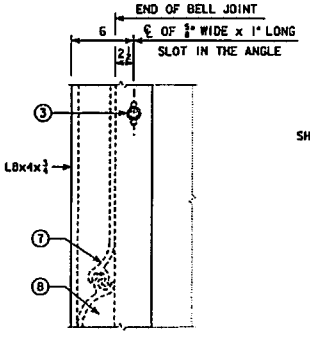


END VIEW ELEVATION

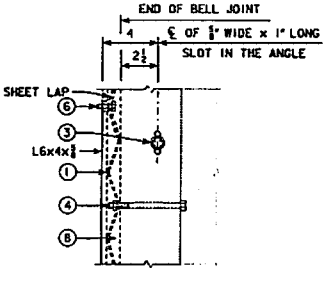
ALTERNATES 3 & 4 (STEEL SHEETS)



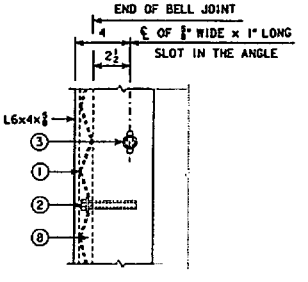
PLAN



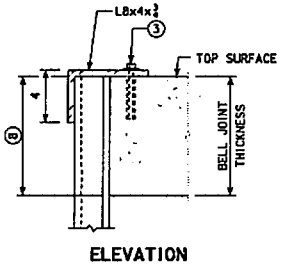
PLAN



PLAN

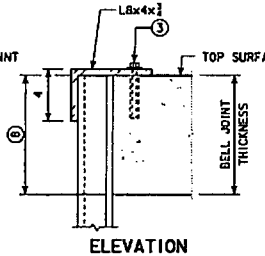


PLAN



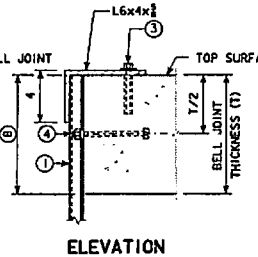
ELEVATION

DETAIL "A"
ALTERNATE 1
STEEL SHEET PILING SHOWN



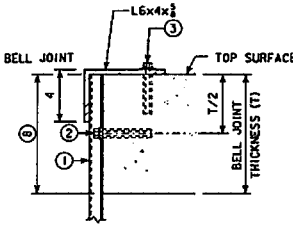
ELEVATION

DETAIL "B"
ALTERNATE 2
STEEL SHEET PILING SHOWN



ELEVATION

DETAIL "C"
ALTERNATE 3
ON NEW CONSTRUCTION ONLY



ELEVATION

DETAIL "D"
ALTERNATE 4
ON NEW OR OLD CONSTRUCTION

NOTES:

USE OF ALTERNATE CURTAIN WALLS SHALL BE APPROVED BY THE ENGINEER.

① 2 1/2"x1/2" OR 2"x1/2" CORRUGATED (12 GAGE OR HEAVIER) STEEL SHEETS.

② FASTEN THE STEEL SHEETS TO THE FRONT EDGE OF THE BELL JOINT WITH 3/4"Φ x0'-4 BOLTS AND APPROVED ANCHORAGES (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

③ FASTEN THE L8x4x3/4 OR L6x4x3/8 WITH 3/4"Φx0'-4 BOLTS, 1" O.D. WASHER AND AN APPROVED ANCHORAGE (2'-0 SPACING).

④ FASTEN THE STEEL SHEETS TO THE BELL JOINT EDGE OF THE FLOOR WITH 3/4"Φ x0'-5 BOLTS WITH NUT AND LOCK WASHER (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

⑤ CORRUGATED (12 GAUGE OR HEAVIER) STEEL SHEET PILING, INTERLOCKING TYPE A.

⑥ 3/4"Φx0'-1 BOLT WITH NUT, TO LAP STEEL SHEETS.

⑦ STEEL SHEET PILING, SECTION PS 27.5 OR EQUAL.

⑧ FILL THE VOIDS AS SHOWN, WITH CONCRETE OR CONCRETE GROUT, AS APPROVED BY THE ENGINEER.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE I, 286'-0) PRECAST REINF. CONCRETE BOX CULVERT

TEMPORARY CURTAIN WALL DETAILS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30560 DESIGN NO. 1115

DESIGN TEAM DGB * TWE * MSF | MODIFIED STANDARD PES 4-13 | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 29

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INCLUDES ADDENDA: A.02

ENG\ISSUED\BRDGECAST\CULVERTS.DGN - PES 4-13 - THIS SHEET ISSUED 01-13

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	80.0	
2	2402-0425030	GRANULAR BACKFILL	CY	63.9	
3	2402-2720000	EXCAVATION, CLASS 20	CY	9,759	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	38.4	
5	2404-7775000	REINFORCING STEEL	LB	5,575	
6	2415-2111208	PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 FT.	LF	188.0	
7	2507-3250005	ENGINEERING FABRIC	SY	170.0	
8	2507-6800061	REVETMENT, CLASS E	TON	130.0	
9	2533-4980005	MOBILIZATION	LS	1.00	
10	2599-9999005	('EACH' ITEM) PRECAST CONCRETE BOX CULVERT END SECTION , 12 FT. X 8 FT.	EACH	1	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-0425030	GRANULAR BACKFILL - -
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 63.9 CY EXCAVATION NECESSARY TO PLACE 6" BEDDING.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF TEMPORARY CURTAIN ON STAGE I BELL JOINT NEEDED TO COMPLETE STAGE 2 CONSTRUCTION. 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.
5	2404-7775000	REINFORCING STEEL - -
6	2415-2111208	PRECAST CONCRETE BOX CULVERT, 12 FT. X 8 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 DESIGN FILL OF 37 FT SHALL REQUIRE A NONSTANDARD DESIGN. SHOP DRAWINGS AND A DESIGN SEALED BY A PROFESSIONAL ENGINEER SHALL BE SUBMITTED FOR REVIEW & APPROVAL.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
9	2533-4980005	MOBILIZATION - -
10	2599-9999005	('EACH' ITEM) PRECAST CONCRETE BOX CULVERT END SECTION , 12 FT. X 8 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 1 PRECAST END SECTIONS, 1 PRECAST LINTEL BEAMS, AND 1 PRECAST CURTAIN WALLS.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 1115, STAGE II IS DESIGN 618, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE II, 200'-0) PRECAST REINF. CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30560 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 30

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 12'-0 X 8'-0 X 486'-0 (STAGE II, 200'-0) REINFORCED CONCRETE BOX CULVERT, 3° SKEW LT AH AT STATION 11133+41.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 37.0 FEET.

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE 1 PARAPET SHALL BE PRECAST.

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE 1 IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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 ¾ 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.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS

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 ½ 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' x 2' 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.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE STATE DOT.

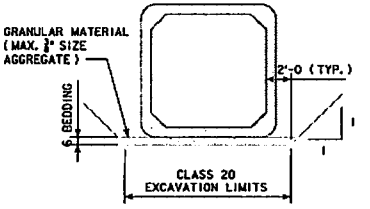
THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
12'-0 BARREL SECTION	4,478	4,478
BELL JOINT	1,097	1,097
	TOTAL (LBS.)	5,575

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
12'-0 BARREL SECTION	12.4	7.1	10.7	30.2
BELL JOINT	3.3	2.2	2.7	8.2
TOTAL (CU. YDS.)	15.7	9.3	13.4	38.4



GRANULAR BEDDING & CLASS 20 EXCAVATION DETAIL

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

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.

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

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

STANDARD	ISSUED	REVISED
RCB G1-12	4-12	10-12
RCB G2-12	4-12	07-14
RCB 12-8-12	4-12	-----
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PES 3-13-T3	1-13	-----
PES 4-13	1-13	-----
PEP 1-13	1-13	10-14
PRCB G1-13	1-13	-----
PRCB G2-13	1-13	-----
PRCB 12-13	1-13	-----

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1115	RCB CULVERT REPLACEMENT (STAGE 1)
618	RCB CULVERT REPLACEMENT (STAGE 2)

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE II, 200'-0) PRECAST REINF. CONCRETE BOX CULVERT GENERAL NOTES

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 31

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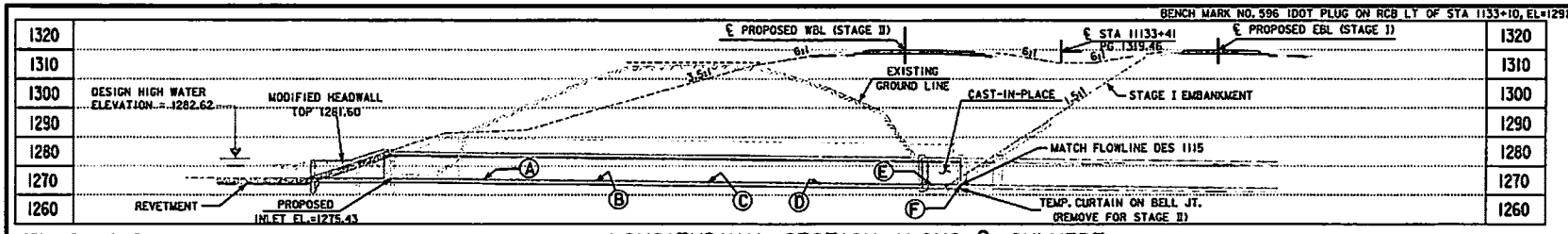
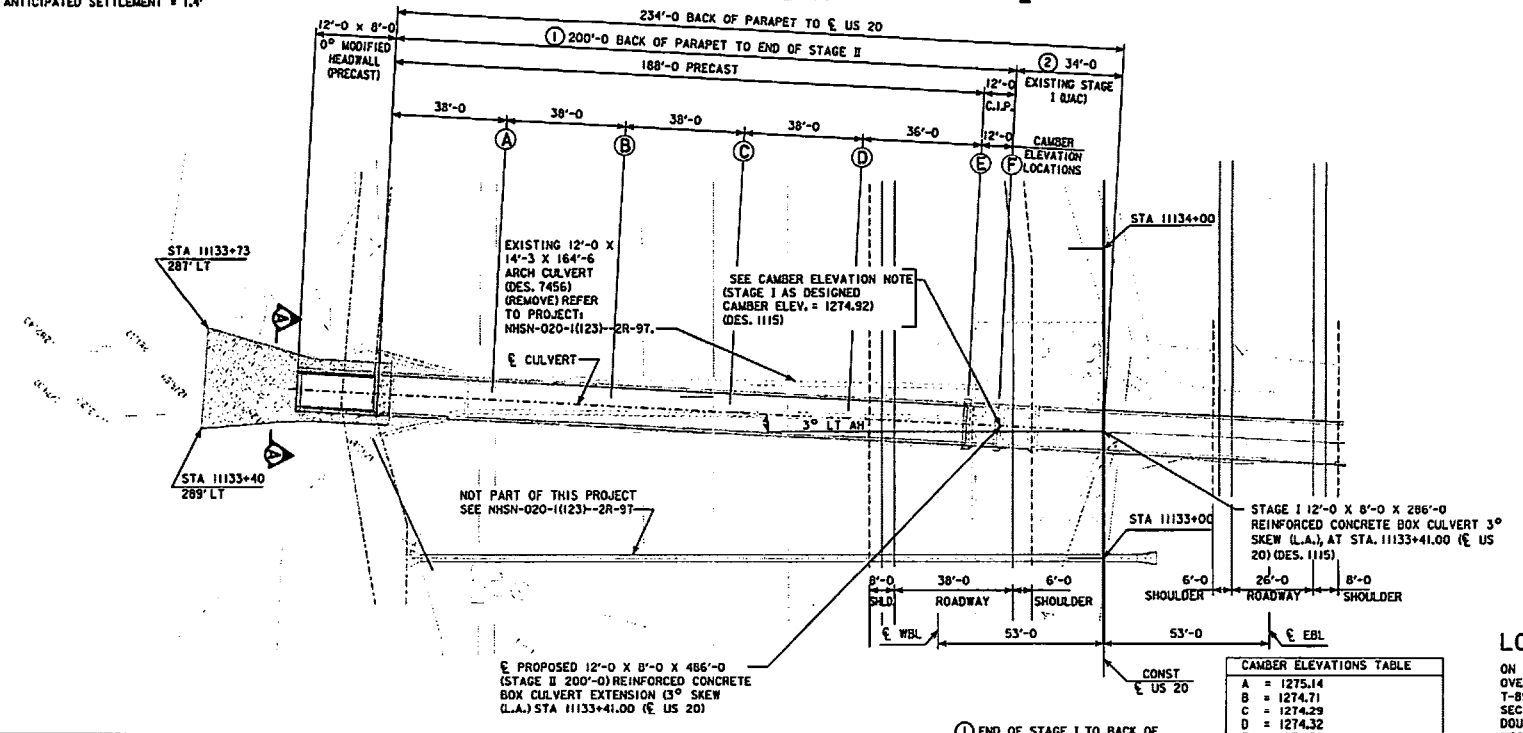
INCLUDES ADDENDA: A.02



LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 37.0'
ANTICIPATED SETTLEMENT = 1.4'



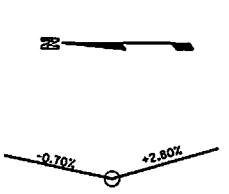
CAMBER ELEVATIONS TABLE	
A	= 1275.14
B	= 1274.71
C	= 1274.29
D	= 1274.32
E	= 1274.79
F	= 1274.92 (MATCH FLOWLINE) STAGE I

① END OF STAGE I TO BACK OF PARAPET.
② END OF STAGE I TO ℄ US 20.

SITUATION PLAN

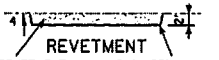
NOTE:
REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.

NOTE:
STAGE I IS NOT A PART OF THIS DESIGN, SEE DES. 1115 IN THIS PROJECT FOR STAGE I.



VPI STA = 11132+50 VC = 750'
VPI ELEV = 1315.03

PROPOSED PROFILE GRADE US 20



SECTION A-A

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. "10" (CY)
INLET	130	170	80
TOTALS	130	170	80

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION. THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

LOCATION

ON US 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 34-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

HYDRAULIC DATA

DRAINAGE AREA = 707 ACRES H-R
Q_{50} = 673 CFS
HW ELEV. = 1282.62

UTILITIES LEGEND:

FO1 INS
FO2 QWEST
FO4 MCLEOD
T4 SCHALLER TELEPHONE

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE II, 200'-0) PRECAST REINF. CONCRETE BOX CULVERT SITUATION PLAN

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 32

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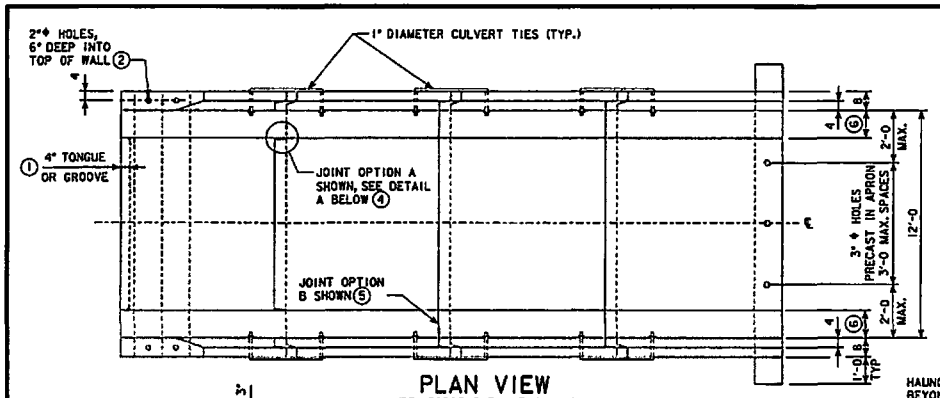
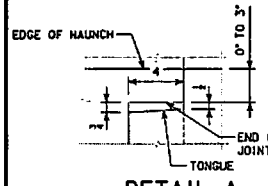
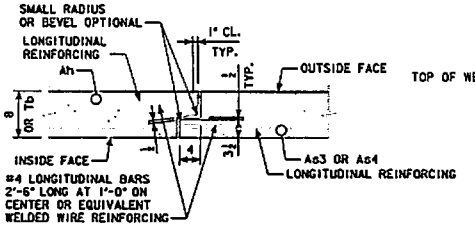
INCLUDES ADDENDA: A,02



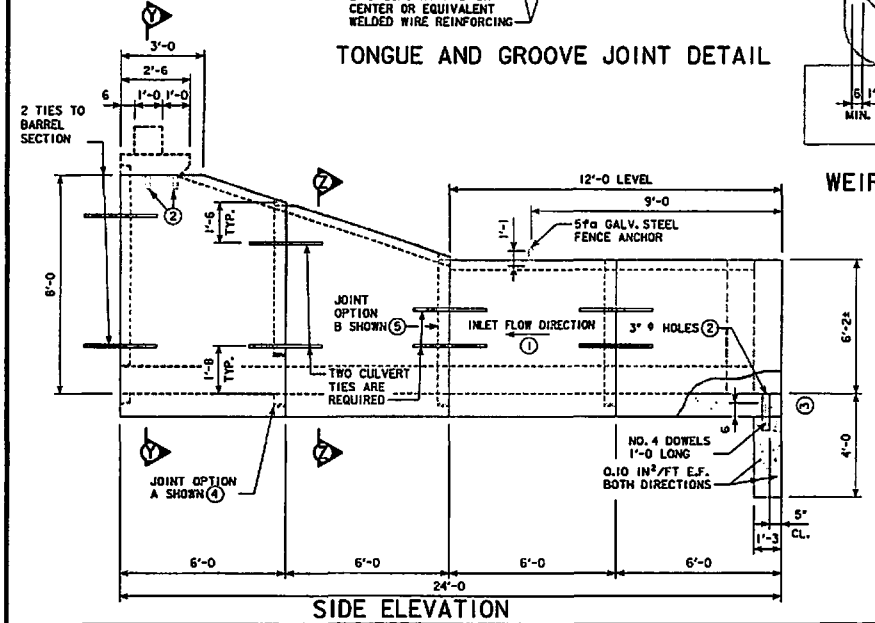
PLAN VIEW
(REINFORCEMENT NOT SHOWN)



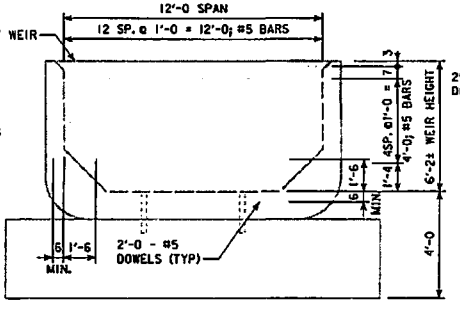
DETAIL A
(DETAIL SHOWN AT FLOOR; SIMILAR AT WALLS)



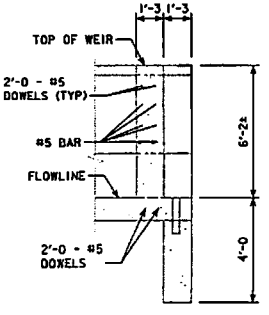
TONGUE AND GROOVE JOINT DETAIL



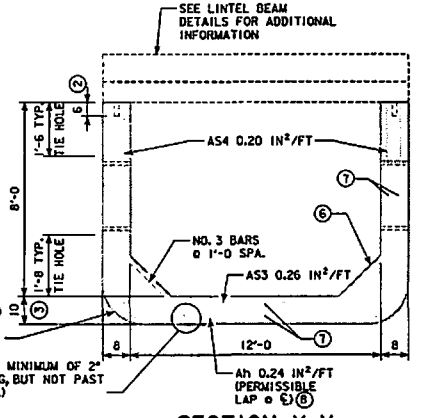
SIDE ELEVATION



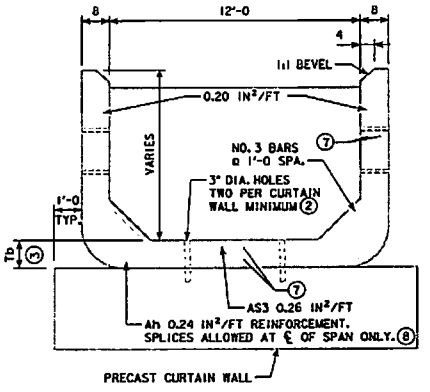
WEIR HEADWALL END VIEW



SECTION THRU WEIR AND CURTAIN WALL



SECTION Y-Y



SECTION Z-Z

CONSTRUCTION NOTES:

PRECAST BOX CULVERT END SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS AND NOTES, AS SHOWN BELOW:

REINFORCING FOR PRECAST END SECTIONS & CURTAIN WALLS SHALL BE WELDED WIRE REINFORCING (WWR) MEETING THE REQUIREMENTS OF AASHTO LRFD SECTION 5. THE CONCRETE COVER OVER THE REINFORCING STEEL SHALL NOT BE LESS THAN 1.5 INCHES OR GREATER THAN 2.0 INCHES.

REFER TO SHEET PRCB G1-13 FOR ADDITIONAL NOTES.

REFER TO FABRIC DETAIL ON SHEET PRCB G2-13 FOR MULTIPLE WWR LAYERS.

(1) USE TONGUE ON INLET END SECTION AND GROOVE ON OUTLET END SECTION.

(2) FILL HOLES WITH GROUT. GROUT SHALL CONSIST OF 1 PART CEMENT AND 2 PARTS SAND. USE AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES.

(3) THICKNESS OF FLOOR = 10 IN.

(4) JOINT OPTION A: PROVIDE JOINT IN WALLS AND FLOOR. TERMINATE JOINT AT HAUNCH. SEE DETAIL A ON THIS SHEET.

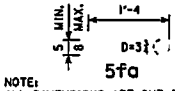
(5) JOINT OPTION B: PROVIDE JOINT IN WALLS, FLOOR AND HAUNCH.

(6) HAUNCH DIMENSION TO MATCH BARREL HAUNCH SIZE.

(7) MINIMUM LONGITUDINAL REINFORCEMENT SHALL BE 0.06 SQ. INCHES PER PERIPHERAL FOOT ON ALL FACES OF THE END SECTION, EXCEPT IN THE TONGUE AND GROOVE AREA.

(8) LAP SPLICES SHALL BE CLASS C AND SHALL BE DESIGNED ACCORDING TO THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

BENT BAR DETAILS



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

DOWEL SETTING NOTE :

THE 5fa BARS MAY BE SET AS DOWELS IN DRILLED HOLES. HOLES SHALL BE DRILLED TO THE DEPTH REQUIRED TO ACHIEVE BAR EMBEDMENT AS SHOWN IN THE "SIDE ELEVATION" DETAIL. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. EITHER OF THE FOLLOWING SYSTEMS MAY BE USED AS A BONDING AGENT:

A. POLYMER GROUT SYSTEM SHALL BE IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.

B. HYDRAULIC CEMENT GROUT SYSTEMS. DRILLED HOLES ARE TO BE 2½ TIMES THE DOWEL DIAMETER AND ARE TO BE BLOWN CLEAN WITH COMPRESSED AIR IMMEDIATELY PRIOR TO PLACING GROUT. THE HYDRAULIC CEMENT GROUT SHALL BE ONE OF THOSE APPROVED IN MATERIALS I.M. 491.13.

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE II, 200'-0) PRECAST REINF. CONCRETE BOX CULVERT

END SECTION DETAILS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM OGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 33

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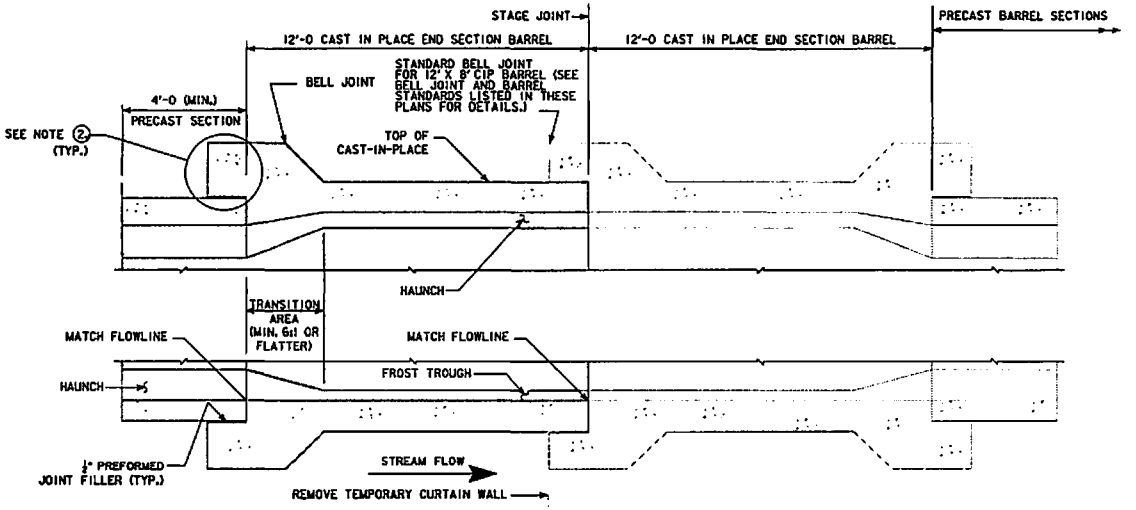
INCLUDES ADDENDA: A.02



CAST IN PLACE STAGE II BARREL SECTION

CAST IN PLACE STAGE I BARREL SECTION WITH DUAL BELL JOINTS

② NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" Φ PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT TEMPORARY CURTAIN WALL SHALL BE REMOVED FROM BELL JOINT OF STAGE I, AS SHOWN.

PRECAST TO CAST-IN-PLACE CONNECTION DETAILS ELEVATION

DESIGN FOR 3° SKEW LT AH

12'-0 X 8'-0 X 486'-0 (STAGE II, 200'-0)
PRECAST REINF. CONCRETE BOX CULVERT
PC TO C.I.P. CONNECTION DETAILS

STATION 11133+41.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 618

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 34

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INCLUDES ADDENDA: A.02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	555.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-0425030	GRANULAR BACKFILL	CY	83.8	
4	2402-2720000	EXCAVATION, CLASS 20	CY	2,139	
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	88.6	
6	2404-7775000	REINFORCING STEEL	LB	12,677	
7	2415-2111012	PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 FT.	LF	282.0	
8	2415-2201012	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT.	EACH	1	
9	2507-3250005	ENGINEERING FABRIC	SY	1,020.0	
10	2507-6800061	REVETMENT, CLASS E	TON	925.0	
11	2533-4980005	MOBILIZATION	LS	1.00	
12	2599-9999010	('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES ALL WORK FOR PARTIAL REMOVAL AND OFF-SITE DISPOSAL OF EXISTING 10'x12'x172' BOX CULVERT NEEDED TO COMPLETE STAGE I CONSTRUCTION. 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.
3	2402-0425030	GRANULAR BACKFILL - -
4	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 83.8 CY EXCAVATION NECESSARY TO PLACE 6" BEDDING.
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
6	2404-7775000	REINFORCING STEEL - -
7	2415-2111012	PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 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 DESIGN FILL OF 26 FT SHALL REQUIRE A NONSTANDARD DESIGN. SHOP DRAWINGS AND A DESIGN SEALED BY A PROFESSIONAL ENGINEER SHALL BE SUBMITTED FOR REVIEW & APPROVAL.
8	2415-2201012	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 30 SKEW 1 PRECAST END SECTIONS, 1 PRECAST LINTEL BEAMS, AND 1 PRECAST CURTAIN WALLS.
9	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
10	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
11	2533-4980005	MOBILIZATION - -
12	2599-9999010	('LUMP SUM' ITEM) TEMPORARY CURTAIN ON BELL JOINT INCLUDES COST OF MATERIALS AND LABOR TO INSTALL TEMPORARY STEEL CURTAIN WALL. TEMPORARY CURTAIN WALL TO REMAIN IN PLACE UNTIL STAGE 2, DESIGN 718 CONSTRUCTION BEGINS.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 1215, STAGE II IS DESIGN 718, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE I, 311'-0) PRECAST REINF. CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM DGB ± TWE ± MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 35

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 10'-0 X 12'-0 X 529'-0 (STAGE I 311'-0) REINFORCED CONCRETE BOX CULVERT, 37° SKEW LT AH AT STATION 11168+44.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR ML-93 LIVE LOAD AND EARTH FILLS OF 26.0 FEET.

THE PRICE BID "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING 10'-0 x 12'-0 x 172'-0 REINFORCED CONCRETE BOX CULVERT NEEDED TO FACILITATE NEW CONSTRUCTION (DESIGN #356).

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE 1 IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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 ¾ 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 ½ 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' x 2' 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.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

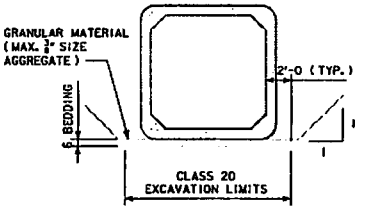
1	PRECAST SECTIONS

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
29'-0 BARREL SECTION	10,365	10,365
BELL JOINT	2 @ 1,156	2,312
	TOTAL (LBS.)	12,677

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
29'-0 BARREL SECTION	20.9	33.3	16.8	71.0
BELL JOINT	2 @ 3.0 = 6.0	2 @ 3.3 = 6.6	2 @ 2.5 = 5.0	17.6
TOTAL (CU. YDS.)	26.9	39.9	21.8	88.6



GRANULAR BEDDING & CLASS 20 EXCAVATION DETAIL

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

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ:NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT : NHSN-020-1(123)--2R-97.

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
RCB G1-12	4-12	10-12
RCB G2-12	4-12	07-14
RCB G1-12	4-12	10-12
RCB G2-12	4-12	7-14
RCB 10-12-12	4-12	-----
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-----

PRECAST STANDARD	ISSUED	REVISED
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-----
PES 4-13	1-13	-----
PEP 1-13	1-13	10-14
PRCB G1-13	1-13	-----
PRCB G2-13	1-13	-----
PRCB 10-13	1-13	-----

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1215	RCB CULVERT REPLACEMENT (STAGE I)

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE I, 311'-0) PRECAST REINF. CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 36

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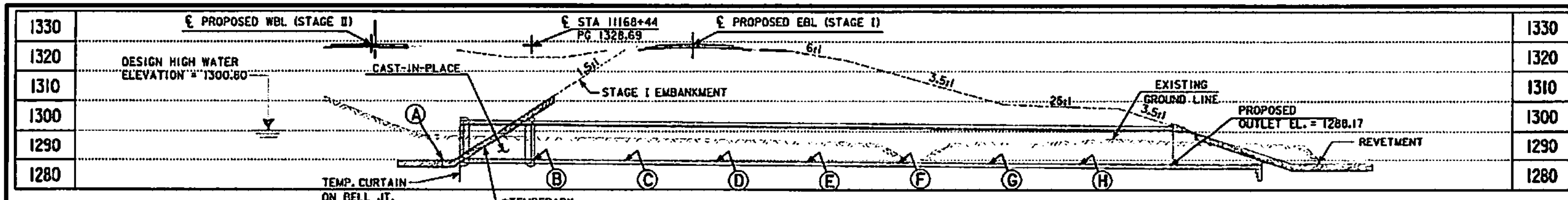
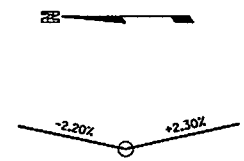
INCLUDES ADDENDA: A.02



DESIGN FILL HEIGHT = 26.0'
ANTICIPATED SETTLEMENT = 2.0'

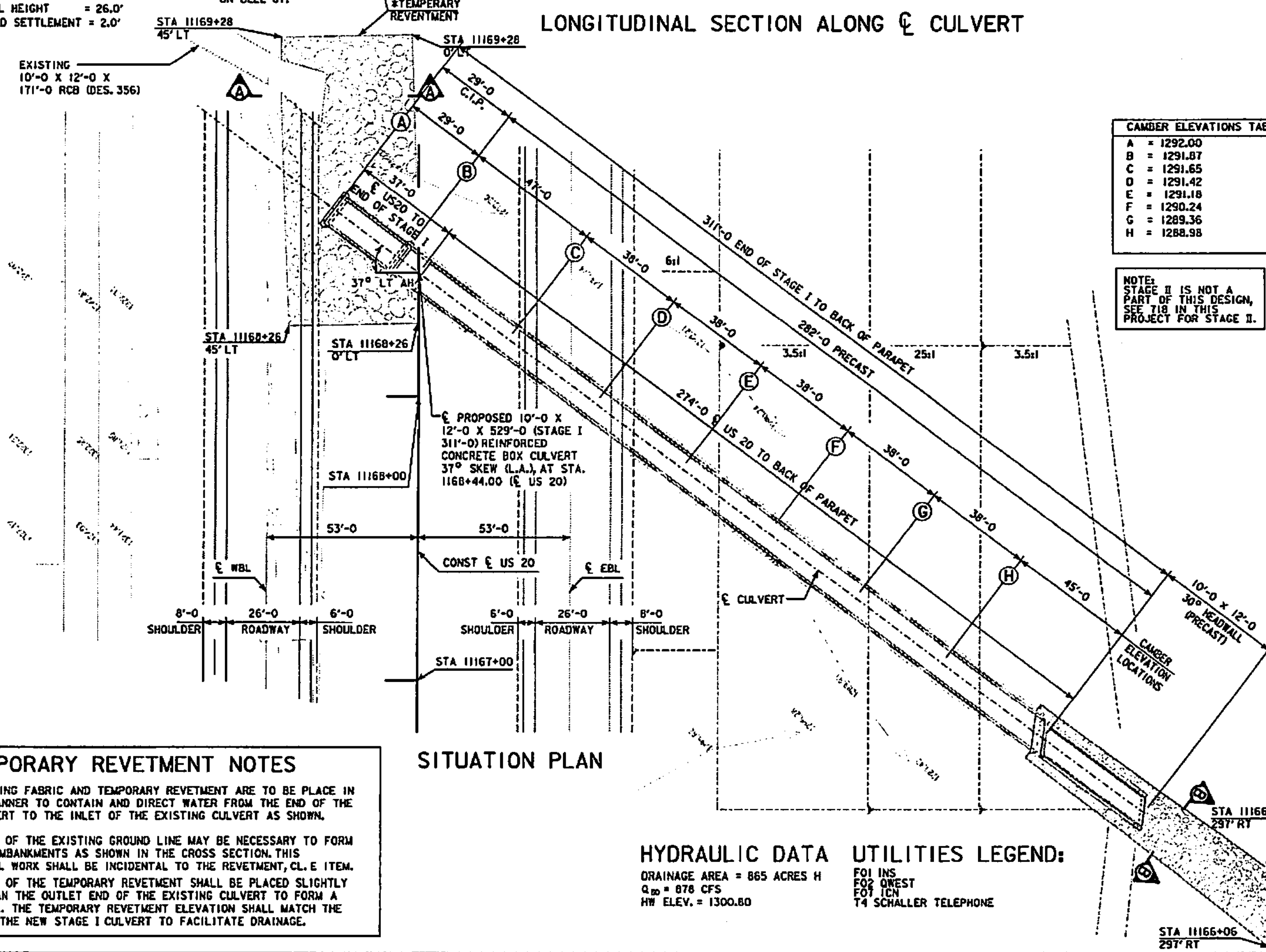
LONGITUDINAL SECTION ALONG ℄ CULVERT

BENCH MARK NO. 599, IDOT DISC RCB
HDWL, STA 1169+57.83, 71.89' LT, EL=1306.07



VPI STA = 11168+50 VC = 950'
VPI ELEV = 1323.33

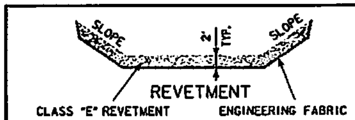
PROPOSED PROFILE GRADE US 20



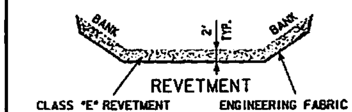
SITUATION PLAN

CAMBER ELEVATIONS TABLE
A = 1292.00
B = 1291.87
C = 1291.65
D = 1291.42
E = 1291.18
F = 1290.24
G = 1289.36
H = 1288.98

NOTE:
STAGE II IS NOT A PART OF THIS DESIGN, SEE 718 IN THIS PROJECT FOR STAGE II.



SECTION A-A
TYPICAL TEMPERARY MEDIAN PROTECTION



SECTION B-B

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. 'E' (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. '10' (CY)
MEDIAN	700	750	430
OUTLET	225	270	125
TOTALS	925	1020	555

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

*TEMPORARY REVETMENT NOTES

*ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE NEW CULVERT TO THE INLET OF THE EXISTING CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE REVETMENT, CL. E ITEM.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE EXISTING CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE NEW STAGE I CULVERT TO FACILITATE DRAINAGE.

HYDRAULIC DATA

DRAINAGE AREA = 865 ACRES H
Q_{100} = 878 CFS
HW ELEV. = 1300.80

UTILITIES LEGEND:

F01 INS
F02 QWEST
F07 ICN
T4 SCHALLER TELEPHONE

LOCATION

ON US 20
OVER SMALL STREAM
T-89-88N R-41W
SECTION 6-34
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474349°
LONGITUDE -95.665343°

TRAFFIC ESTIMATE

2023	AADT	4000	V.P.D.
2043	AADT	5800	V.P.D.
2043	DHV	600	V.P.H.
TRUCKS		27	%
TOTAL DESIGN ESALs		16,700,000	

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE I, 311'-0) PRECAST REINF. CONCRETE BOX CULVERT SITUATION PLAN

STA. 11168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 5 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 37

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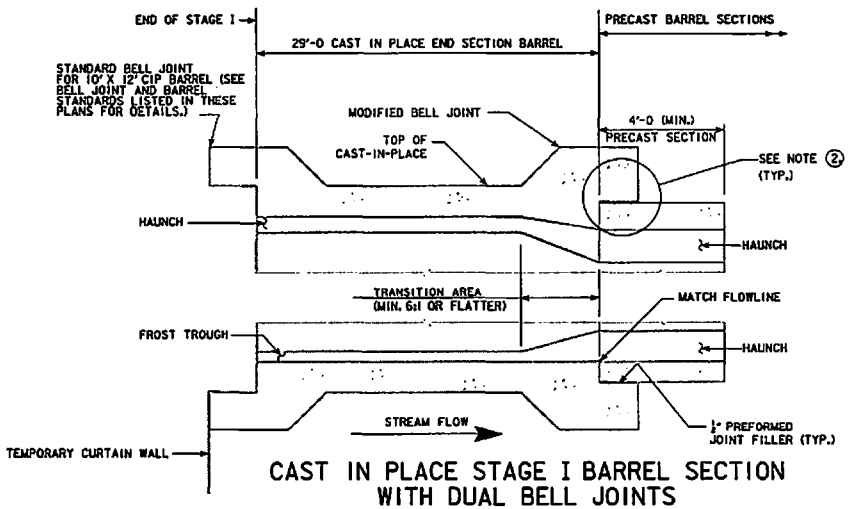
INCLUDES ADDENDA: A.02



CAST IN PLACE STAGE I BARREL SECTION
WITH DUAL BELL JOINTS
(LONGITUDINAL VIEW)

② NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½"Φ PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT BELL JOINTS ARE PLACED ON THE DOWNSTREAM AND UPSTREAM END OF THE STAGE I END SECTION, AS SHOWN.

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE I, 311'-0) PRECAST REINF. CONCRETE BOX CULVERT

PC TO C.I.P. CONNECTION DETAILS

STA. 1168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM OGB * TWE * MSF	PRECAST CULVERT PARAPET DETAILS	STANDARD SHEET 1073P (MODIFIED)	IDA COUNTY	PROJECT NUMBER NHSN-020-2(129)--2R-47	SHEET NUMBER 38

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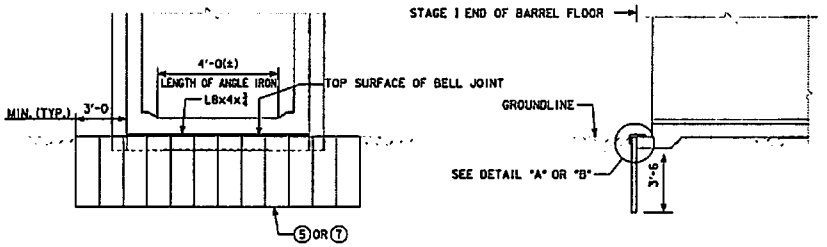
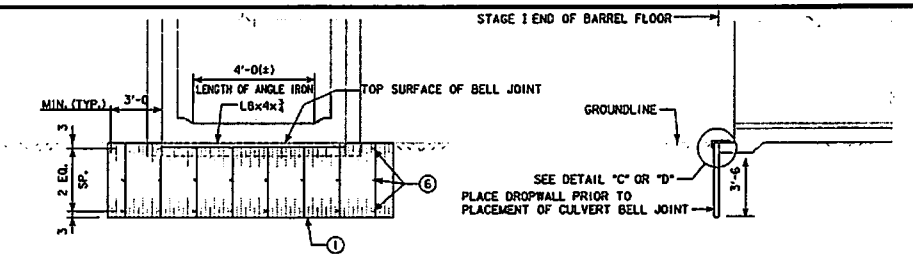
INCLUDES ADDENDA: A.02



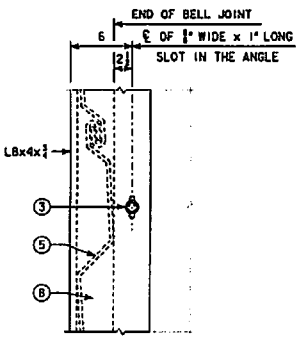
END VIEW ELEVATION

ALTERNATES 1 & 2 (STEEL SHEET PILING)

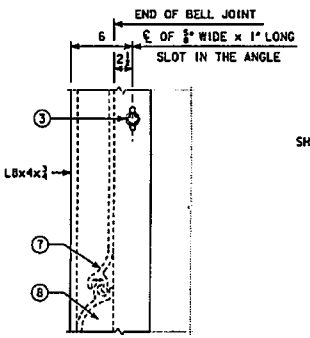


END VIEW ELEVATION

ALTERNATES 3 & 4 (STEEL SHEETS)



PLAN



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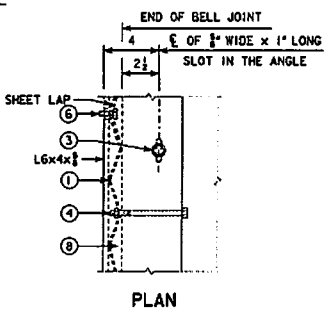
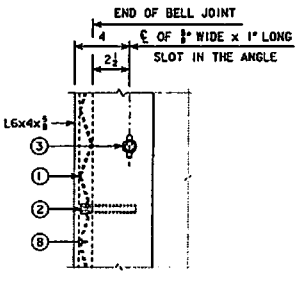
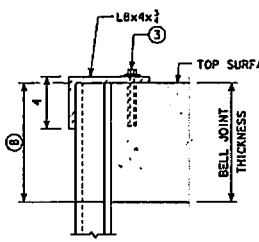


PLAN

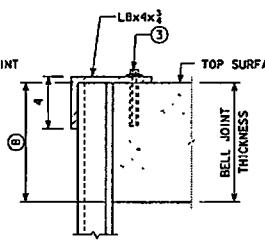


PLAN



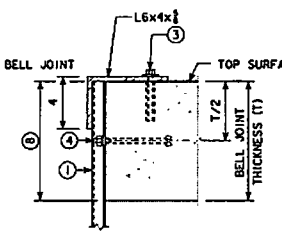
ELEVATION

DETAIL "A"
ALTERNATE 1
STEEL SHEET PILING SHOWN



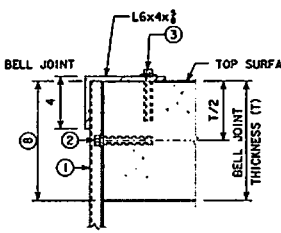
ELEVATION

DETAIL "B"
ALTERNATE 2
STEEL SHEET PILING SHOWN



ELEVATION

DETAIL "C"
ALTERNATE 3
ON NEW CONSTRUCTION ONLY



ELEVATION

DETAIL "D"
ALTERNATE 4
ON NEW OR OLD CONSTRUCTION

NOTES:

USE OF ALTERNATE CURTAIN WALLS SHALL BE APPROVED BY THE ENGINEER.

1. 2½"x½" OR 2"x¼" CORRUGATED (12 GAGE OR HEAVIER) STEEL SHEETS.
2. FASTEN THE STEEL SHEETS TO THE FRONT EDGE OF THE BELL JOINT WITH ⅝"Ø x0'-4 BOLTS AND APPROVED ANCHORAGES (10" CENTER TO CENTER, TO THE NEAREST VALLEY).
3. FASTEN THE L8x4x¾ OR L6x4x¾ WITH ¾"Ø x0'-4 BOLTS, 1" O.D. WASHER AND AN APPROVED ANCHORAGE (2'-0 SPACING).
4. FASTEN THE STEEL SHEETS TO THE BELL JOINT EDGE OF THE FLOOR WITH ⅝"Ø x0'-5 BOLTS WITH NUT AND LOCK WASHER (10" CENTER TO CENTER, TO THE NEAREST VALLEY).
5. CORRUGATED (12 GAUGE OR HEAVIER) STEEL SHEET PILING, INTERLOCKING TYPE A.
6. ¾"Ø x0'-1 BOLT WITH NUT, TO LAP STEEL SHEETS.
7. STEEL SHEET PILING, SECTION PS 27.5 OR EQUAL.
8. FILL THE VOIDS AS SHOWN, WITH CONCRETE OR CONCRETE GROUT, AS APPROVED BY THE ENGINEER.

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE I, 311'-0) PRECAST REINF. CONCRETE BOX CULVERT TEMPORARY CURTAIN WALL DETAILS

STA. 11168+44.0 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 1215

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 39

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INCLUDES ADDENDA: A.02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	120.0	
2	2402-0425030	GRANULAR BACKFILL	CY	58.8	
3	2402-2720000	EXCAVATION, CLASS 20	CY	8,414	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	79.8	
5	2404-7775000	REINFORCING STEEL	LB	11,521	
6	2415-2111012	PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 FT.	LF	189.0	
7	2415-2201012	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT.	EACH	1	
8	2507-3250005	ENGINEERING FABRIC	SY	260.0	
9	2507-6800061	REVETMENT, CLASS E	TON	195.0	
10	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL " "
2	2402-0425030	GRANULAR BACKFILL " "
3	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT. INCLUDES 58.8 CY EXCAVATION NECESSARY TO PLACE 6" BEDDING.
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL OF TEMPORARY CURTAIN ON STAGE I BELL JOINT NEEDED TO COMPLETE STAGE 2 CONSTRUCTION. 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.
5	2404-7775000	REINFORCING STEEL " "
6	2415-2111012	PRECAST CONCRETE BOX CULVERT, 10 FT. X 12 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 DESIGN FILL OF 26 FT SHALL REQUIRE A NONSTANDARD DESIGN. SHOP DRAWINGS AND A DESIGN SEALED BY A PROFESSIONAL ENGINEER SHALL BE SUBMITTED FOR REVIEW & APPROVAL.
7	2415-2201012	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 12 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 30 SKEW 1 PRECAST END SECTIONS, 1 PRECAST LINTEL BEAMS, AND 1 PRECAST CURTAIN WALLS.
8	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
9	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
10	2533-4980005	MOBILIZATION " "

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 1215, STAGE II IS DESIGN 718, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLANS.

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE II, 218'-0) PRECAST REINF. CONCRETE BOX CULVERT

ESTIMATED QUANTITIES

STA. 11168+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 718

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 40

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO STAGE CONSTRUCT 10'-0 X 12'-0 X 529'-0 (STAGE II 218'-0) REINFORCED CONCRETE BOX CULVERT, 37° SKEW LT AH AT STATION 11168+44.00 (℄ US 20).

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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.

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 CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 26.0 FEET.

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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 OTHER BID ITEMS LISTED IN THIS PROJECT.

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

NEW CULVERT CONSTRUCTION SHALL BE DONE IN STAGES AS SPECIFIED IN THESE PLANS. STAGE I IS NOT PART OF THIS DESIGN, BUT PART OF THIS PROJECT.

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, 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, SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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 ¾ 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 ½ 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' x 2' 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.

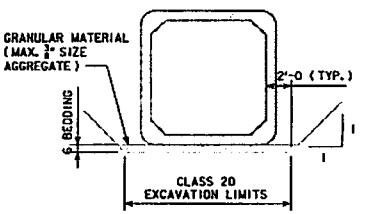
THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
29'-0 BARREL SECTION	10,365	10,365
BELL JOINT	1,156	1,156
	TOTAL (LBS.)	11,521

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
29'-0 BARREL SECTION	20.9	33.3	16.8	71.0
BELL JOINT	3.0	3.3	2.5	8.8
TOTAL (CU. YDS.)	23.9	36.6	19.3	79.8



GRANULAR BEDDING & CLASS 20 EXCAVATION DETAIL

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

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJ.#NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT #NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT #NHSN-020-1(123)--2R-97.

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
RCB G1-12	4-12	10-12
RCB G2-12	4-12	07-14
RCB G1-12	4-12	10-12
RCB G2-12	4-12	7-14
RCB 10-12-12	4-12	-----
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-----
PES 4-13	1-13	-----
PEP 1-13	1-13	10-14
PRCB G1-13	1-13	-----
PRCB G2-13	1-13	-----
PRCB 10-13	1-13	-----

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1215	RCB CULVERT REPLACEMENT (STAGE I)
718	RCB CULVERT EXTENSION (STAGE II)

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE II, 218'-0) PRECAST REINF. CONCRETE BOX CULVERT GENERAL NOTES

STA. 11168+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

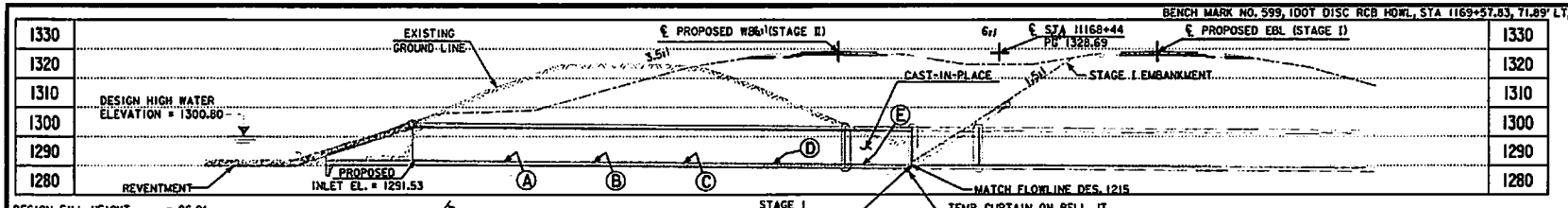
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 718

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 41

12/2/2015 6:33:59 AM telito2 pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020129.brg 9-470718sp002 11x17.pdf.pltcfg

INCLUDES ADDENDA: A.02



VPI STA = 11168+50 VC = 950'
VPI ELEV = 1323.33

PROPOSED PROFILE GRADE US 20

DESIGN FILL HEIGHT = 26.0'
ANTICIPATED SETTLEMENT = 2.0'

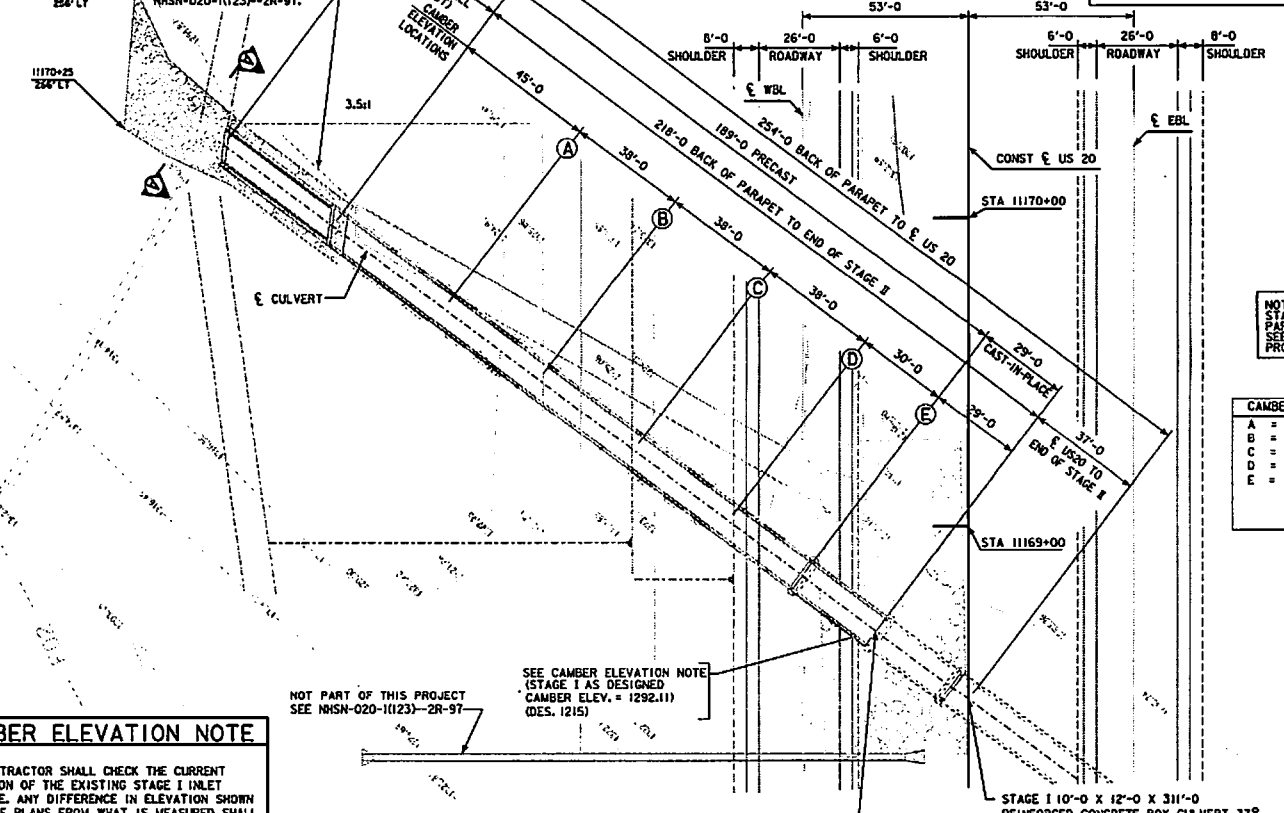
EXISTING 10'-0 X 12'-0 X 172'-0 REINFORCED CONCRETE BOX CULVERT (DES. 356) (REMOVE) REFER TO PROJECT: NHSN-020-1(123)--2R-97.

10'-0 X 12'-0 30° HEADWALL (PRECAST) CAMBER ELEVATION LOCATIONS

LONGITUDINAL SECTION ALONG ℄ CULVERT

CAMBER BELL JOINTS AS SHOWN

NOTE: BELL JOINTS SHALL BE PLACED ON THE UPSTREAM PORTION OF EACH BARREL SECTION.

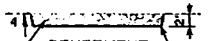


NOTE: REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AT NO COST TO THE STATE DOT.

NOTE: STAGE I IS NOT A PART OF THIS DESIGN, SEE DES. 1215 IN THIS PROJECT FOR STAGE I.

CAMBER ELEVATIONS TABLE

A	= 1291.24
B	= 1290.99
C	= 1290.74
D	= 1291.42
E	= 1291.77



SECTION A-A
TYPICAL TEMPORARY MEDIAN PROTECTION

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CL. "10" (CY)
INLET	195	260	120
TOTALS	195	260	120

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

SITUATION PLAN

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION. THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

LOCATION

ON US 20
OVER SMALL STREAM
T-89-8BN R-41W
SECTION 6-34
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 41.474349°
LONGITUDE -95.665343°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

HYDRAULIC DATA

DRAINAGE AREA = 865 ACRES H
Q_{50} = 878 CFS
HW ELEV. = 1300.80

UTILITIES LEGEND:

F01 INS
F02 QWEST
F07 ICN
T4 SCHALLER TELEPHONE

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE II, 218'-0) PRECAST REINF. CONCRETE BOX CULVERT SITUATION PLAN

STA. 11168+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 718

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 42

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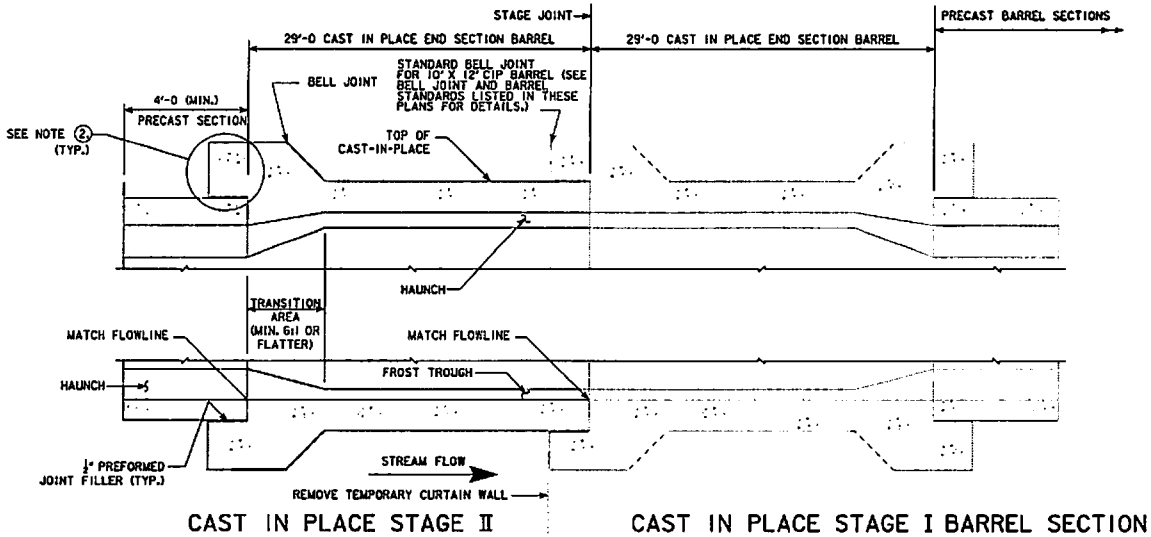
INCLUDES ADDENDA: A.02



CAST IN PLACE STAGE II BARREL SECTION

CAST IN PLACE STAGE I BARREL SECTION WITH DUAL BELL JOINTS

PRECAST TO CAST-IN-PLACE CONNECTION DETAILS ELEVATION

(2) NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING 1" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT TEMPORARY CURTAIN WALL SHALL BE REMOVED FROM BELL JOINT OF STAGE I, AS SHOWN.

DESIGN FOR CONSTRUCTION OF A 37° SKEW (L.A.)

10'-0 X 12'-0 X 529'-0 (STAGE II, 218'-0)
PRECAST REINF. CONCRETE BOX CULVERT
PC TO C.I.P. CONNECTION DETAILS

STA. 11168+44.00 (℄ US 20) OCTOBER 2015

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 718

DESIGN TEAM DGB * TWE * MSF | IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER 43

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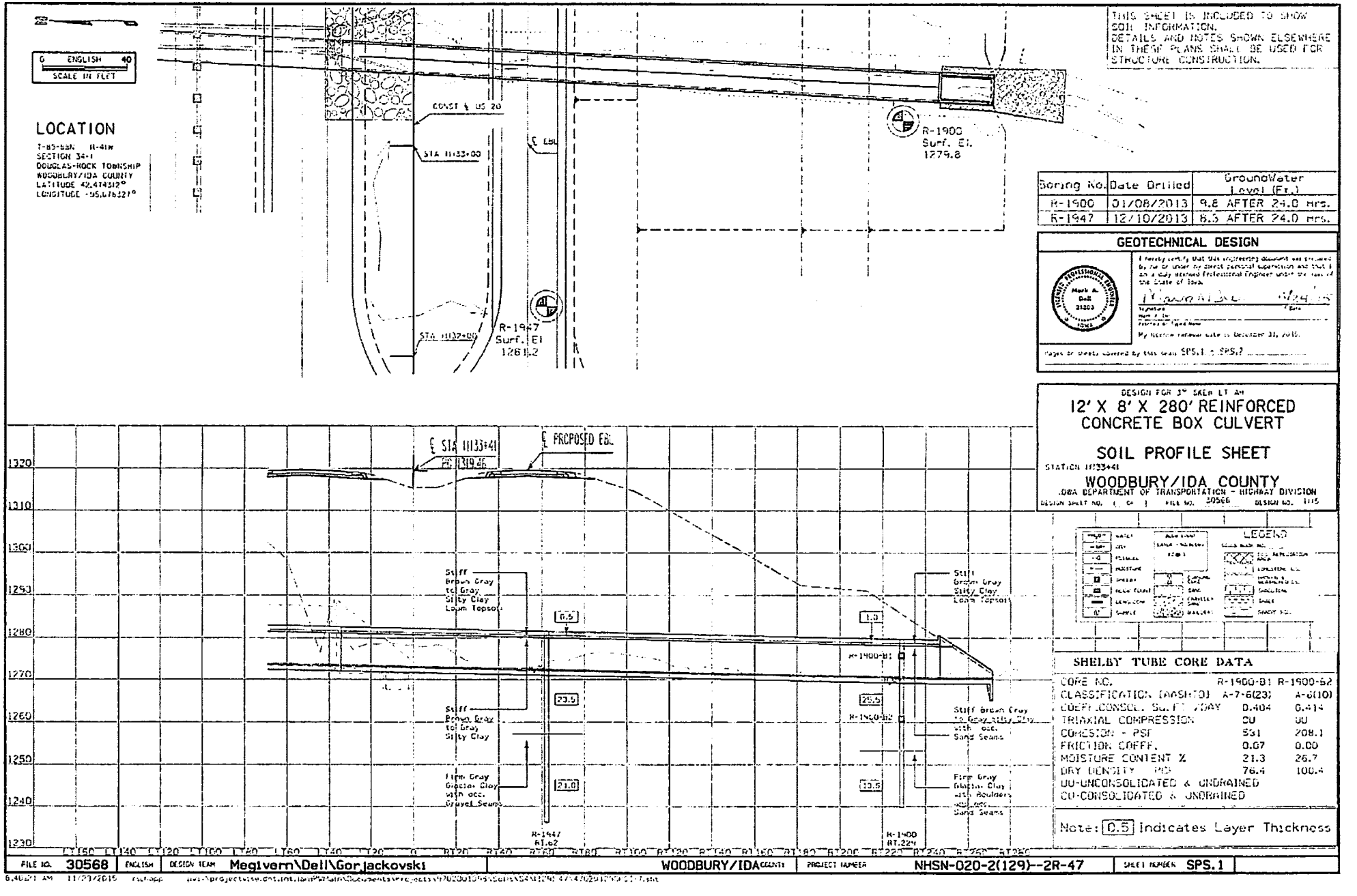
0 ENGLISH 40
SCALE IN FEET
LOCATION
T-85-N R-41W
SECTION 34-1
DOUGLAS-ROCK TOWNSHIP
WOODBURY/IDA COUNTY
LATITUDE 42.474312°
LONGITUDE -95.876227°
CONST ℄ US 20
℄ EBL
STA 11133+00
STA 11132+00
R-1947
Surf. El
1268.2
R-1900
Surf. El.
1279.8
THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
Boring No. | Date Drilled | Groundwater Level (Ft.)
R-1900 | 01/08/2013 | 9.8 AFTER 24.0 Hrs.
R-1947 | 12/10/2013 | 8.5 AFTER 24.0 Hrs.
GEOTECHNICAL DESIGN
Mark A. Dell 21363 IOWA
My license renewal date is December 31, 2015.
Pages or sheets covered by this seal: SPS.1 & SPS.2
DESIGN FOR 3" SKEW LT AH
12' X 8' X 280' REINFORCED CONCRETE BOX CULVERT
SOIL PROFILE SHEET
STATION 11133+41
WOODBURY/IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 2 | FILE NO. 30568 | DESIGN NO. 1115
℄ STA 11133+41
PT 1319.46
℄ PROPOSED EBL
1320
1310
1300
1290
1280
1270
1260
1250
1240
1230
Stiff Brown Gray to Gray Silty Clay Loam Topsoil
Stiff Brown Gray Silty Clay Loam Topsoil
8.5
1.0
R-1900-B1
23.5
25.5
R-1900-B2
Stiff Brown Gray to Gray Silty Clay
Stiff Brown Gray to Gray Silty Clay with occ. Sand Seams
Firm Gray Glacial Clay with occ. Gravel Seams
21.0
10.5
Firm Gray Glacial Clay with Boulders and occ. Sand Seams
R-1947 RT.62
R-1900 RT.224
LT160 LT140 LT120 LT100 LT80 LT60 LT40 LT20 0 RT20 RT40 RT60 RT80 RT100 RT120 RT140 RT160 RT180 RT200 RT220 RT240 RT260 RT280
LEGEND
SHELBY TUBE CORE DATA
CORE NO. R-1900-B1 R-1900-B2
CLASSIFICATION (AASHTO) A-7-6(23) A-6(10)
COEFF.CONSOL. SQ.FT./DAY 0.404 0.414
TRIAXIAL COMPRESSION CU UU
COHESION - PSF 531 208.1
FRICTION COEFF. 0.07 0.00
MOISTURE CONTENT % 21.3 26.7
DRY DENSITY PCF 76.4 100.4
UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED
Note: 0.5 Indicates Layer Thickness
FILE NO. 30568 | ENGLISH | DESIGN TEAM Meglvern\Dell\Gorjackovski | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-2(129)--2R-47 | SHEET NUMBER SPS.1
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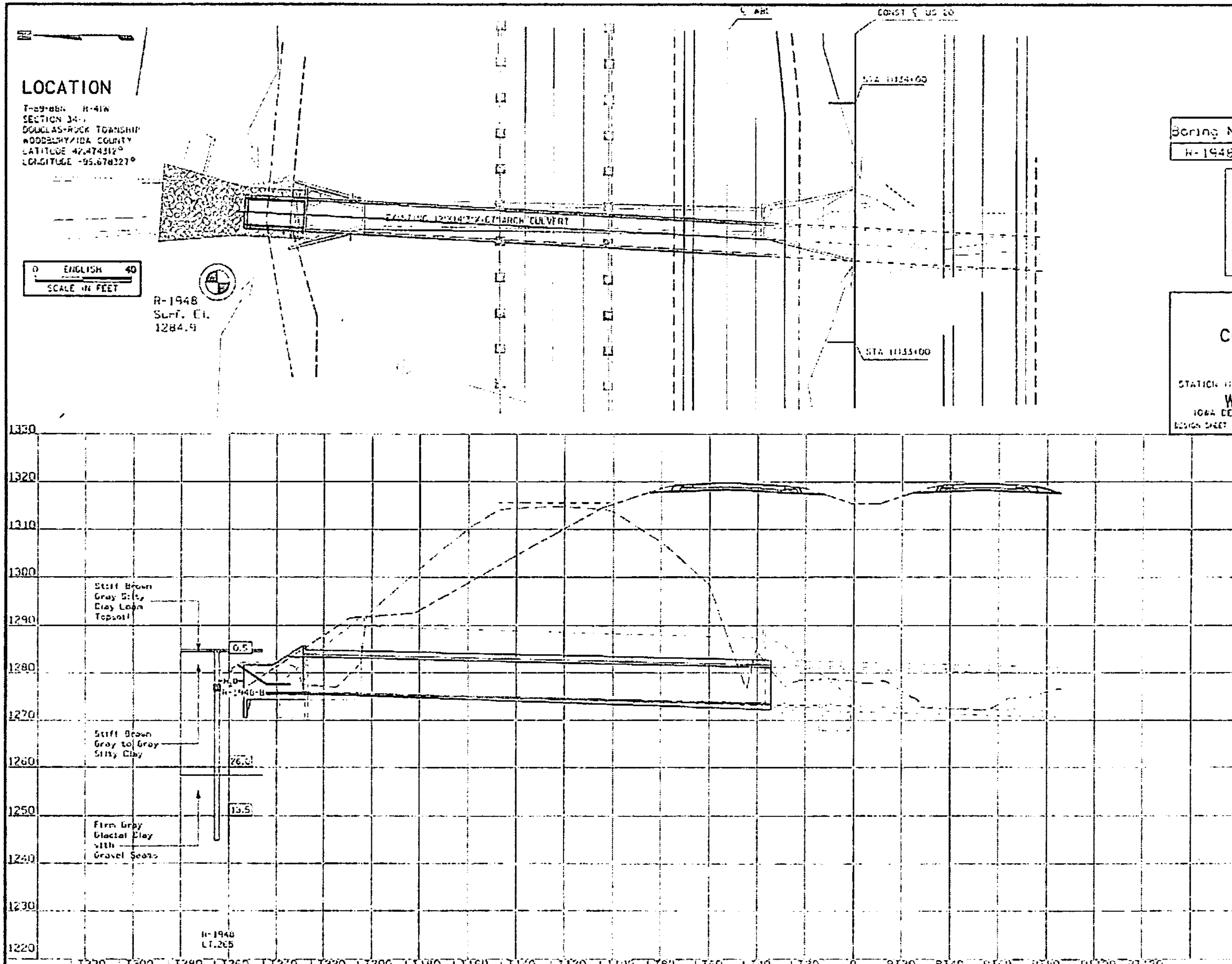


THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Boring No.	Date Drilled	GroundWater Level (Ft.)
R-1948	12/10/2013	6.6 AFTER 24 hrs.

LEGEND

DESIGN FOR 3° SKEW LT AH

12' X 8' REINFORCED CONCRETE BOX CULVERT EXTENSION SOIL PROFILE SHEET

STATION 1133+41

WOODBURY/IDA COUNTY

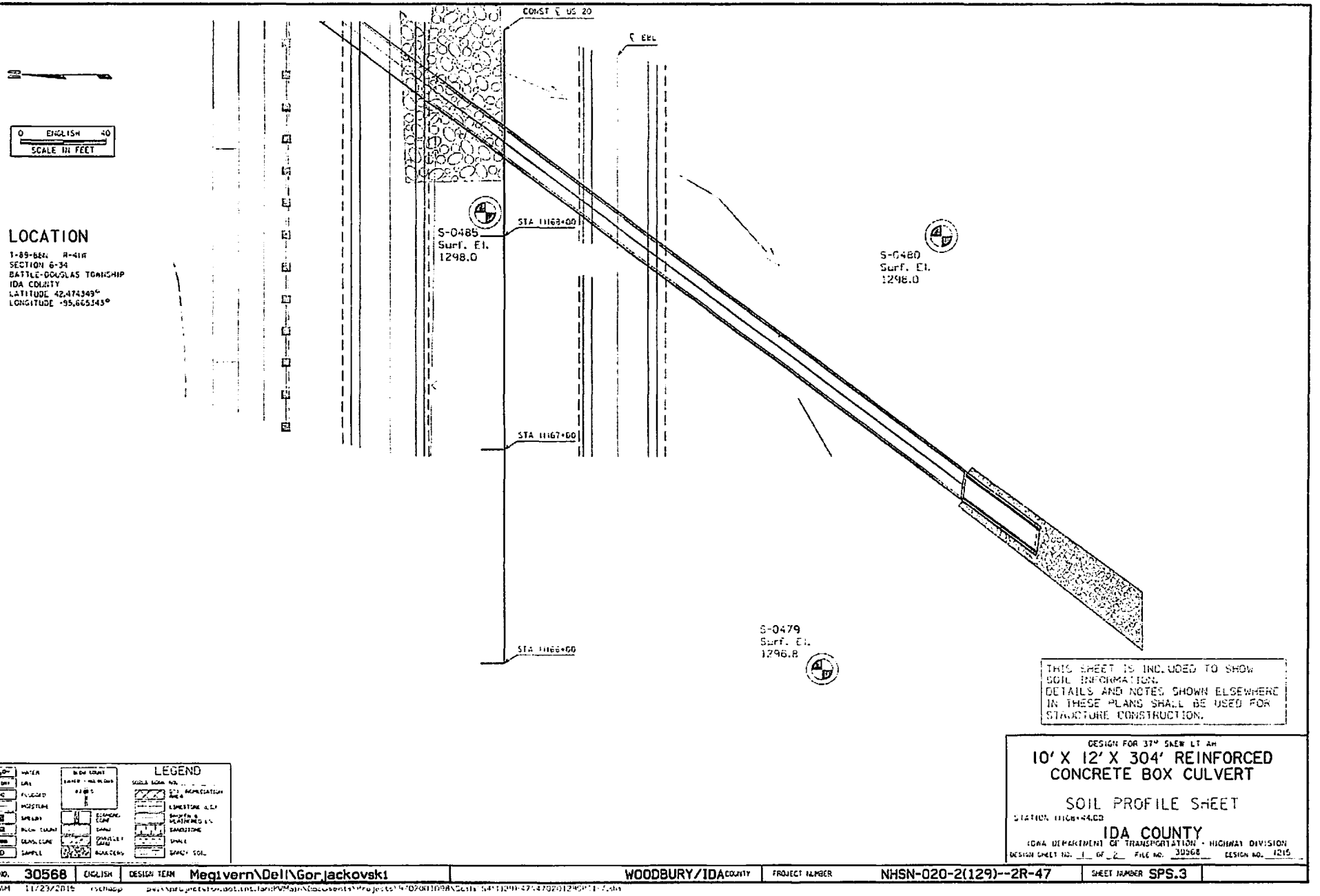
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0615

Note:
[0.5] Indicates Layer Thickness

SHELBY TUBE CORE DATA	
CORE NO.	R-1948-B
CLASSIFICATION (AASHTO)	A-7-6(28)
COEFF.CONSOL. SQ.FT./DAY	0.091
TRIAXIAL COMPRESSION	CU
COHESION - PSF	230
FRICTION COEFF.	0.17
MOISTURE CONTENT %	24.3
DRY DENSITY PCF	94.3

UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(129)--2R-47	SHEET NUMBER SPS.2



DESIGN FOR 37° SKEW LT AH

10' X 12' X 304' REINFORCED CONCRETE BOX CULVERT

SOIL PROFILE SHEET

STATION 11168+44.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 2 FILE NO. 30568 DESIGN NO. 1215

FILE NO.	30568	ENGLISH	DESIGN TEAM	Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER	NHSN-020-2(129)--2R-47	SHEET NUMBER	SPS.3

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Note: 0.5
Indicates Layer Thickness

LEGEND

SHELBY TUBE CORE DATA

CORE NO.	S-0479-B
CLASSIFICATION (AASHTO)	A-7-6(21)
COEFF.CONSOL. SQ.FT. /DAY	0.563
TRIAXIAL COMPRESSION	CU
COHESION - PSF	109
FRICTION COEFF.	0.14
MOISTURE CONTENT %	14.7
DRY DENSITY - PCF	87.5
UU-UNCONSOLIDATED & UNDRAINED	
CU-CONSOLIDATED & UNDRAINED	

LOCATION

T-89-08N R-41W
SECTION 6-84
BATTELL-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474549°
LONGITUDE -95.465343°

0 ENGLISH 40
SCALE IN FEET

Boring No.	Date Drilled	GroundWater Level (Ft.)
S-0479	12/04/2012	7.2 AFTER 24.0 Hrs.
S-0480	12/04/2012	7.0 AFTER 24.0 Hrs.
S-0485	12/04/2012	5.9 AFTER 0.0 Hrs.

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

DESIGN FOR 37° SKEW LT AH

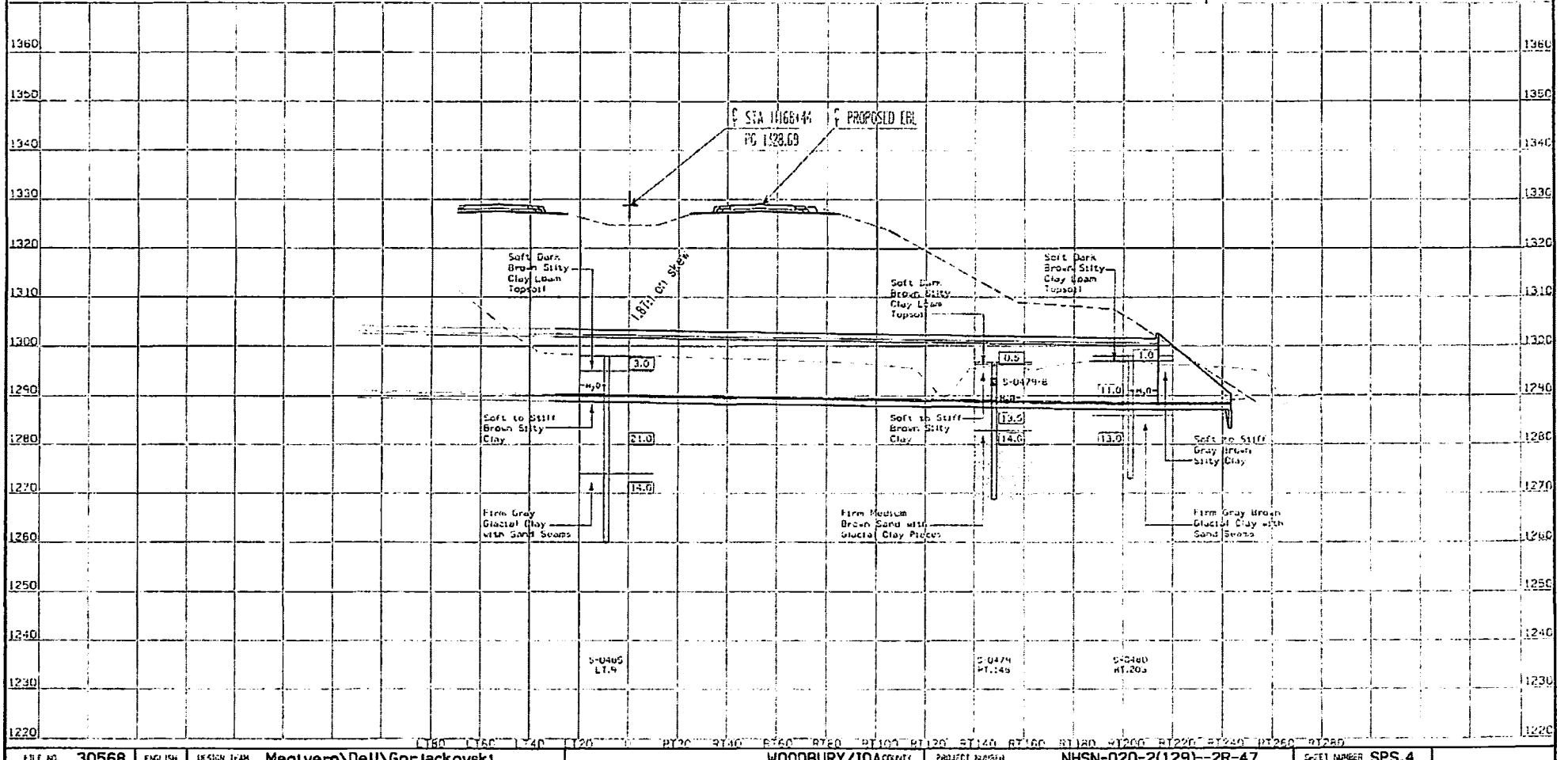
10' X 12' X 304' REINFORCED CONCRETE BOX CULVERT

SOIL PROFILE SHEET

STATION 11168+44.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 2 FILE NO. 30568 DESIGN NO. 1215



FILE NO. 30568	ENGLISH	DESIGN TEAM Meglvern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(129)--2R-47	SHEET NUMBER SPS.4

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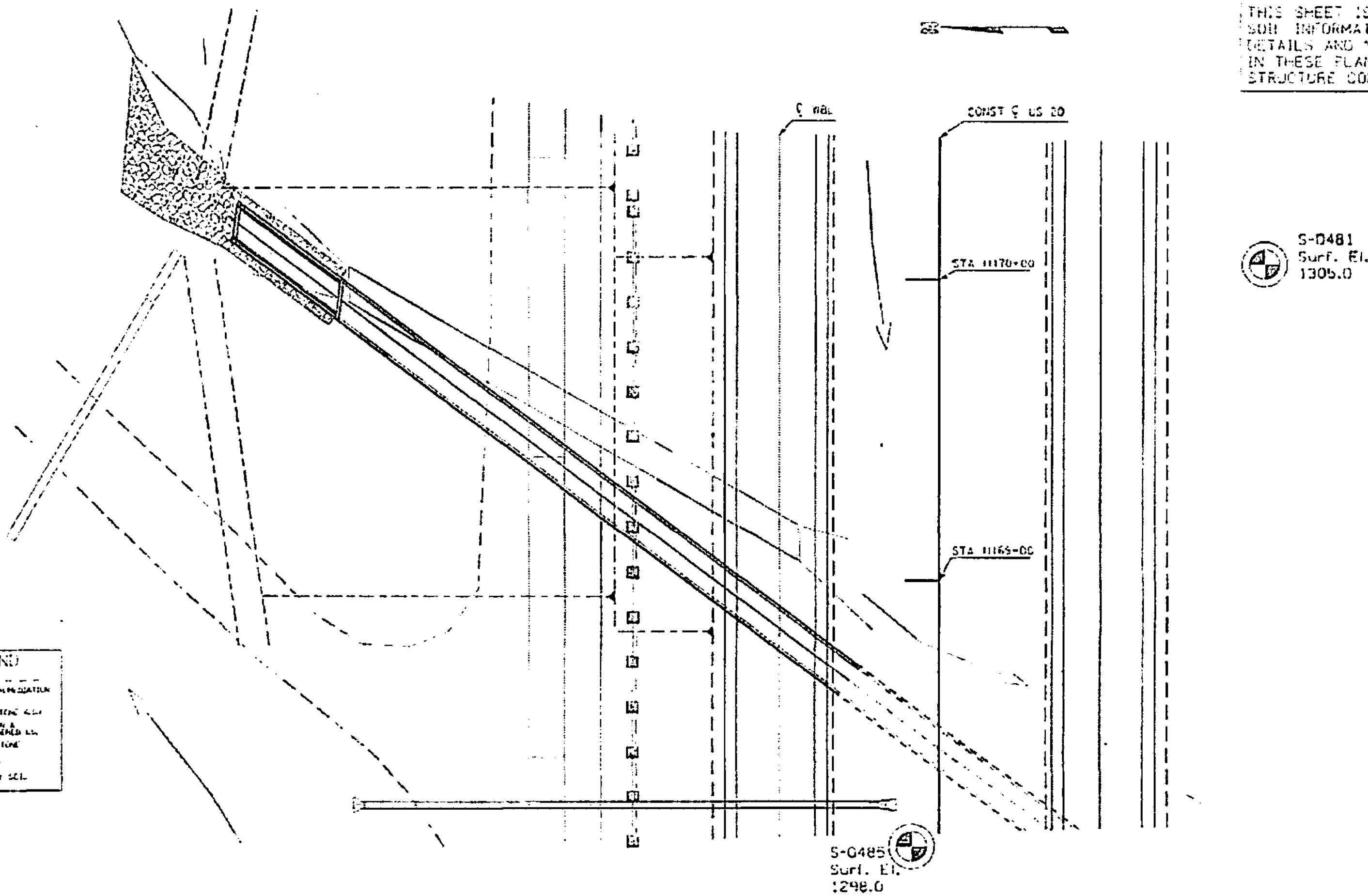
THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



LOCATION

T-69-88N R-41W
SECTION 6-34
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 41.474349°
LONGITUDE -95.665343°

0 ENGLISH 40
SCALE IN FEET

LEGEND

S-0479
Surf. El.
1296.8

Note:
Borehole
S-0479
is shifted
in Plan View.
Drilled at
1165+97
RT.148

DESIGN FOR 37° SKEW LT AH

10' X 12' REINFORCED CONCRETE BOX CULVERT EXTENSION SOIL PROFILE SHEET

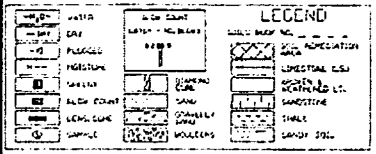
STATION 1168+44.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 2 FILE NO. 30568 DESIGN NO. 0716

Page 288 of 413

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



SHELBY TUBE CORE DATA

CORE NO.	S-0479-B
CLASSIFICATION (AASHTO)	A-7-6(21)
COEFF.CONSOL. SQ.FT /DAY	0.563
TRIAXIAL COMPRESSION	CU
COHESION - PSF	109
FRICTION COEFF.	0.14
MOISTURE CONTENT %	14.7
DRY DENSITY - PCF	87.5
UU-UNCONSOLIDATED & UNDRAINED	
CU-CONSOLIDATED & UNDRAINED	

Note:
[0.5] Indicates Layer Thickness

0 ENGLISH 40
SCALE IN FEET

Boring No.	Date Drilled	GroundWater Level (Ft.)
S-0479	12/04/2012	7.2 AFTER 24.0 Hrs.
S-0481	12/04/2012	12.0 AFTER 24.0 Hrs.
S-0485	12/04/2012	5.9 AFTER 0.0 Hrs.

LOCATION

T-83-86N R-41W
SECTION 6-34
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 41.474349°
LONGITUDE -95.665343°

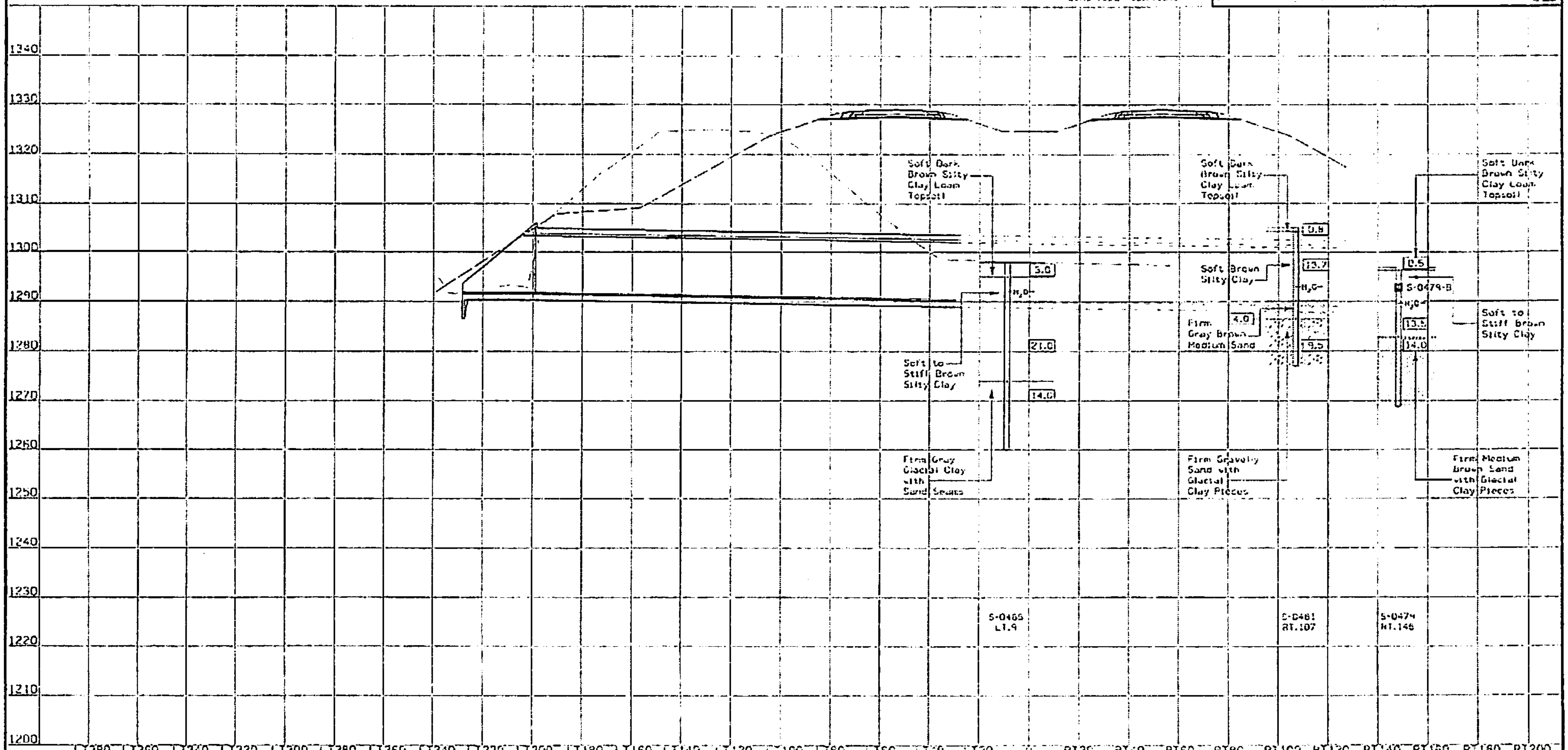
DESIGN FOR 37° SKEW LT AH

10' X 12' REINFORCED CONCRETE BOX CULVERT EXTENSION SOIL PROFILE SHEET

STATION 1166+44.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 2 FILE NO. 30566 DESIGN NO. 0712



FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-2(129)--2R-47	SHEET NUMBER SPS.6

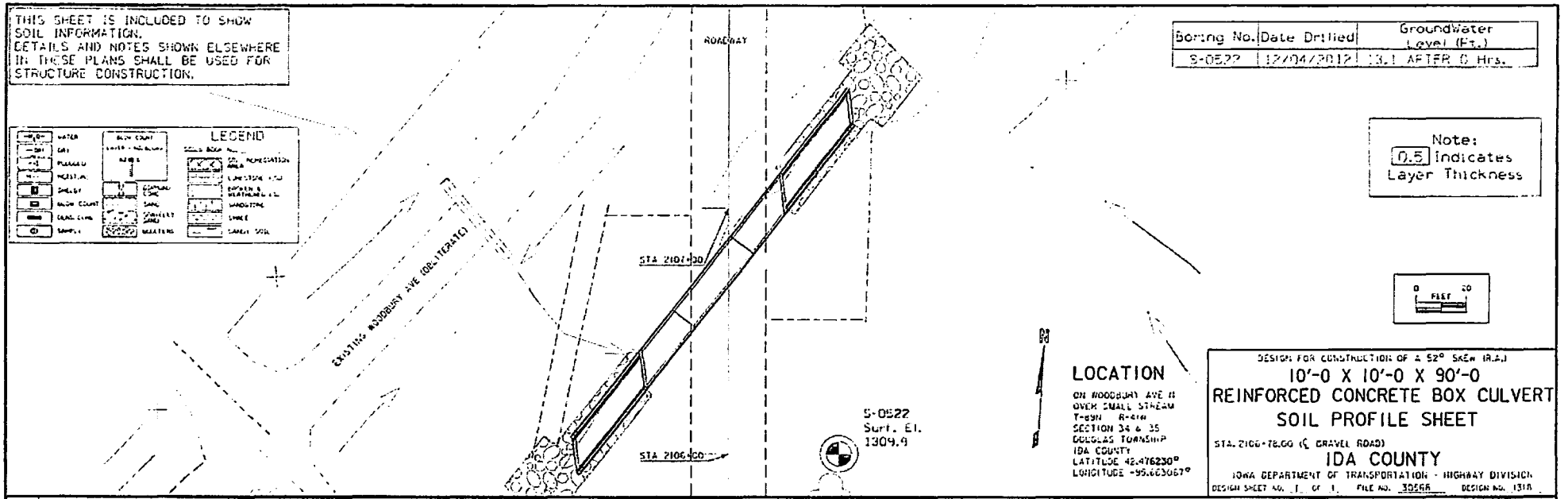
6:40:52 AM 11/23/2015

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Boring No.	Date Drilled	Groundwater Level (Ft.)
S-0522	12/04/2012	13.1 AFTER 0 Hrs.

LEGEND

Note: 0.5 Indicates Layer Thickness



LOCATION

ON WOODBURY AVE II
OVER SMALL STREAM
T-89N R-41W
SECTION 34 & 35
DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.476230°
LONGITUDE -95.603067°

DESIGN FOR CONSTRUCTION OF A 52° SKEW (R.A.)

10'-0 X 10'-0 X 90'-0 REINFORCED CONCRETE BOX CULVERT

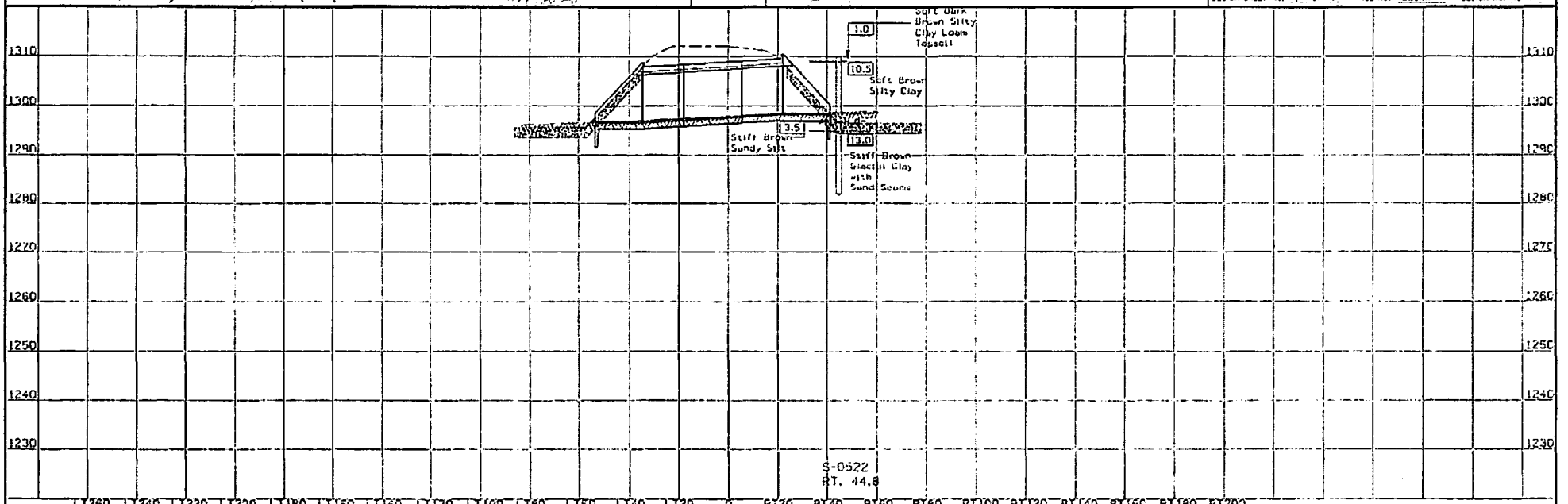
SOIL PROFILE SHEET

STA. 2106+78.00 (℄ GRAVEL ROAD)

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 1318



FILE NO.	30568	ENGLISH	DESIGN TEAM	Mogivern\Dell\Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER	NHSN-020-2(129)--2R-47	SHEET NUMBER	SPS.7

8:40:59 AM 11/23/2015 rschaap

LETTING DATE DEC. 15, 2015

RCB CULVERT REPLACEMENT - SINGLE BOX

NHSN-020-2(131)--2R-47

IDA COUNTY

IDA COUNTY - DESIGN NUMBERS STAGE I 1315, 1415, 1515

LEGEND

INTERSTATE HIGHWAY	
PRIMARY HIGHWAY-DIVIDED	
PRIMARY HIGHWAY	
PORTLAND CEMENT CONCRETE ROAD	
ASPHALT ROAD	
BITUMINOUS ROAD	
GRAVEL ROAD	
EARTHEN ROAD	
INTERSTATE HIGHWAY	80
UNITED STATES HIGHWAY	65
STATE HIGHWAY	175
COUNTY HIGHWAY	127
RAILROAD	
PIPELINE	
AIRPORT	
HYDROLOGY	
BRIDGE	
STATE BOUNDARY	
COUNTY BOUNDARY	
CORPORATE BOUNDARY	
TOWNSHIP LINE	
SECTION LINE	
ROAD NAMES	ABBEY ROAD
UNINCORPORATED PLACE	ELWOOD

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM

IDA COUNTY

RCB CULVERT REPLACEMENT - SINGLE BOX

E OF CORRECTIONVILLE TO W JCT US 59

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.

IOWA ONE CALL
1-800-292-8989 | 811
www.iowaonecall.com

ENGLISH STANDARD BRIDGE PLANS

STANDARD	ISSUED	REVISED
RCB-GI-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 8-6-12	4-12	-
RCB 10-6-12	4-12	-
RCB 10-10-12	4-12	-
PWH 0-1-12	4-12	-
PWH 0-2-12	4-12	-
PWH 0-3-12	4-12	-
PWH 0-4-12	4-12	-
PWH 0-6-12	4-12	-
PWH 15-1-12	4-12	-
PWH 15-2-12	4-12	-
PWH 15-3-12	4-12	-
PWH 15-4-12	4-12	-
PWH 15-7-12	4-12	-
PWH 30-1-12	4-12	-
PWH 30-2-12	4-12	-
PWH 30-3-12	4-12	-
PWH 30-4-12	4-12	-
PWH 30-6-12	4-12	-
CBJ 2-12	4-12	7-13
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

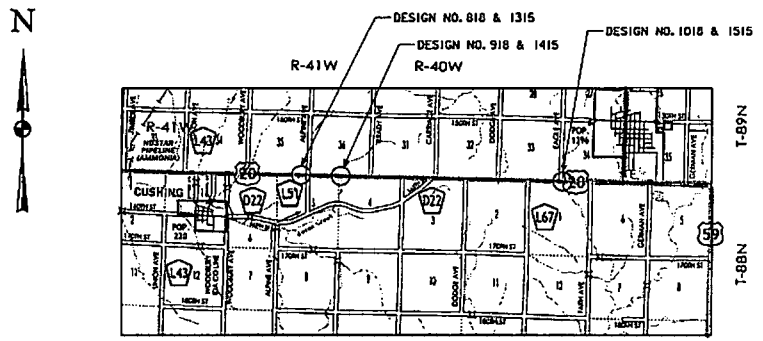
ENGLISH PRECAST STANDARD PLANS

STANDARD	ISSUED	REVISED
PRCB GI-13	1-13	-
PRCB G2-13	1-13	-
PRCB 10-13	1-13	-
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-
PES 4-13	1-13	-
PEP 1-13	1-13	10-14

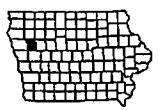
REVISIONS

TOTAL SHEETS
82
PROJECT NUMBER
NHSN-020-2(131)--2R-47
R.O.W. PROJECT NUMBER
PROJECT IDENTIFICATION NUMBER
98-97-020-010-04

INDEX OF SHEETS



LOCATION MAP



STANDARD ROAD PLANS

STANDARD ROAD PLANS ARE LISTED ON SHEET NUMBER

DESIGN DATA RURAL

2023 AADT	4,000	V.P.D.
2043 AADT	5,800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
Total Design ESALs	16,700,000	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	DAVID R. CLAMAN	HYDRAULIC DESIGN
2	AHMAD M. ABU AFIFEH	STRUCTURAL DESIGN
BRIDGE STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

HYDRAULIC 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.

David R. Claman 11-25-15
Signature Date

David R. Claman
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 4, 13, 21, 30, 38, 42, 45, 49, 52, 62, 71, & 75 OF 75

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.

Ahmad M Afifeh 11-25-15
Signature Date

Ahmad M. Abu Afifeh
Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 1-3, 5-12, 14-20, 22-29, 31-37, 39-41, 43-44, 46-48, 50-51, 53-61, 63-70, 72-74 OF 75

PROJECT DIRECTORY NAME: 9702001098

DESIGN TEAM	SWM/AMA	ENGLISH	IOWA DOT * OFFICE OF BRIDGES AND STRUCTURES	FILE NO. 30568	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 1

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INCLUDES ADDENDA: ISDEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	1,590.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	2,700	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	606.2	
4	2404-7775000	REINFORCING STEEL	LB	96,614	
5	2507-3250005	ENGINEERING FABRIC	SY	3,090.0	
6	2507-6800061	REVETMENT, CLASS E	TON	2,645.0	
7	2533-4980005	MOBILIZATION	LS	1.00	
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B,3 OF THE STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
7	2533-4980005	MOBILIZATION - -
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIAL, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 2

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 10'-0 x 10'-0 x 242'-0 RCB CULVERT, SKEWED 30° L.A. AT STA. 11219+00.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 29 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS I EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION.

THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT FOR THE SHEET PILE IS LUMP SUM.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED AND IMMEDIATELY PRIOR TO STAGE 2 CONSTRUCTION. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-10-12	4-12	-
PWH 0-1-12	4-12	-
PWH 0-2-12	4-12	-
PWH 0-3-12	4-12	-
PWH 0-4-12	4-12	-
PWH 0-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'X10' HEADWALL 0 ° SKEW (1 REQ'D)	5,361	5,361
20'-0 BARREL SECTION (1 REQ'D)	6,426	6,426
23'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 8752	17,504
23'-0 BARREL SECTION (5 REQ'D)	5 @ 7389	36,945
26'-0 BARREL SECTION (1 REQ'D)	8,353	8,353
35'-0 BARREL SECTION (1 REQ'D)	11,245	11,245
BELL JOINTS (10 REQ'D)	10 @ 1,078	10,780
TOTAL (LBS.)		96,614

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
10'X10' HEADWALL 0 ° SKEW (1 REQ'D)	1.4	19.0	13.2	33.6
20'-0 BARREL SECTION (1 REQ'D)	11.4	13.8	15.5	40.7
23'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 13.1 = 26.2	2 @ 15.8 = 31.6	2 @ 17.8 = 35.6	93.4
23'-0 BARREL SECTION (5 REQ'D)	5 @ 13.1 = 65.5	5 @ 15.8 = 79.0	5 @ 17.8 = 89.0	233.5
26'-0 BARREL SECTION (1 REQ'D)	14.8	17.9	20.1	52.8
35'-0 BARREL SECTION (1 REQ'D)	19.9	24.1	27.1	71.1
BELL JOINTS (10 REQ'D)	10 @ 2.4 = 24.4	10 @ 2.9 = 29.1	10 @ 2.8 = 27.6	81.1
			TOTAL (CU. YDS.)	606.2

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 3

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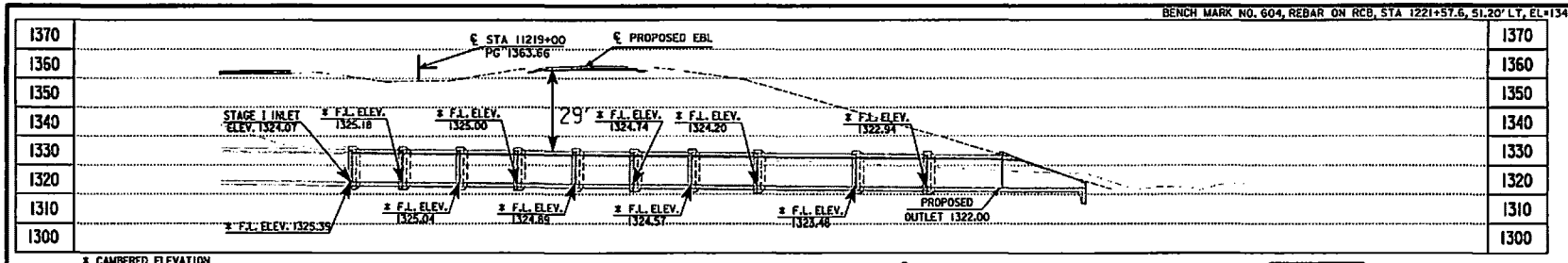
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 604, REBAR ON RCB, STA 1221+57.6, 51.20' LT, EL=1340.549

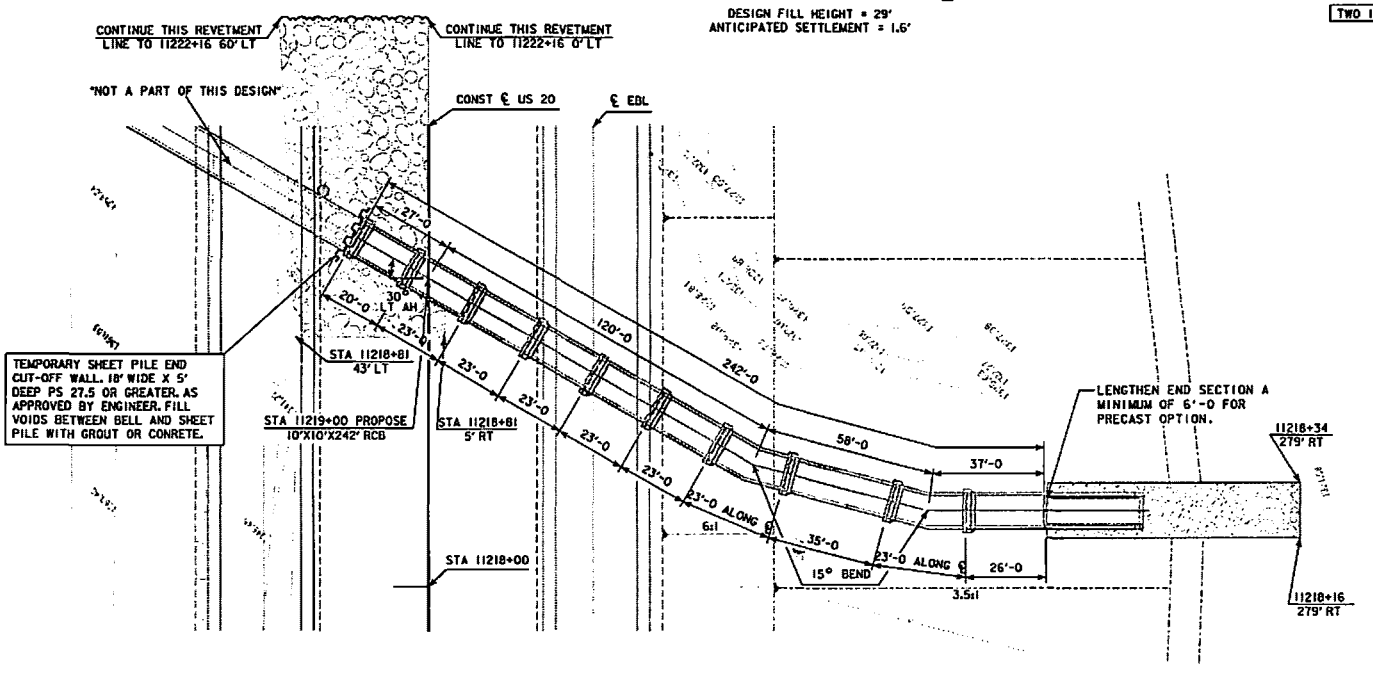


± CAMBERED ELEVATION

LONGITUDINAL SECTION ALONG ℄ CULVERT

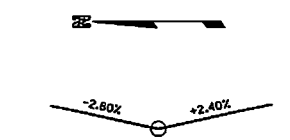
ONE 0° HDWL
TWO 15° BENDS

DESIGN FILL HEIGHT = 29'
ANTICIPATED SETTLEMENT = 1.6'



SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.



VPI STA = 11224+00 VC = 1100'
VPI ELEV = 1348.98

PROPOSED PROFILE GRADE US 20

UTILITIES LEGEND:

MIDAMERICAN ENERGY
F01 INS
F02 QWEST
F07 ICN
T4 SCHALLER TELEPHONE

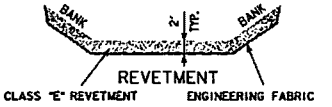
HYDRAULIC DATA

DRAINAGE AREA = 676 ACRES H-R
Q_{50} = 656 CFS
HW ELEV. = 1333.41

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
RIGHT	145	190	90
MEDIAN	2500	2900	1500
TOTAL	2645	3090	1590

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.



LOCATION

T-88-89N R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.646603°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 4

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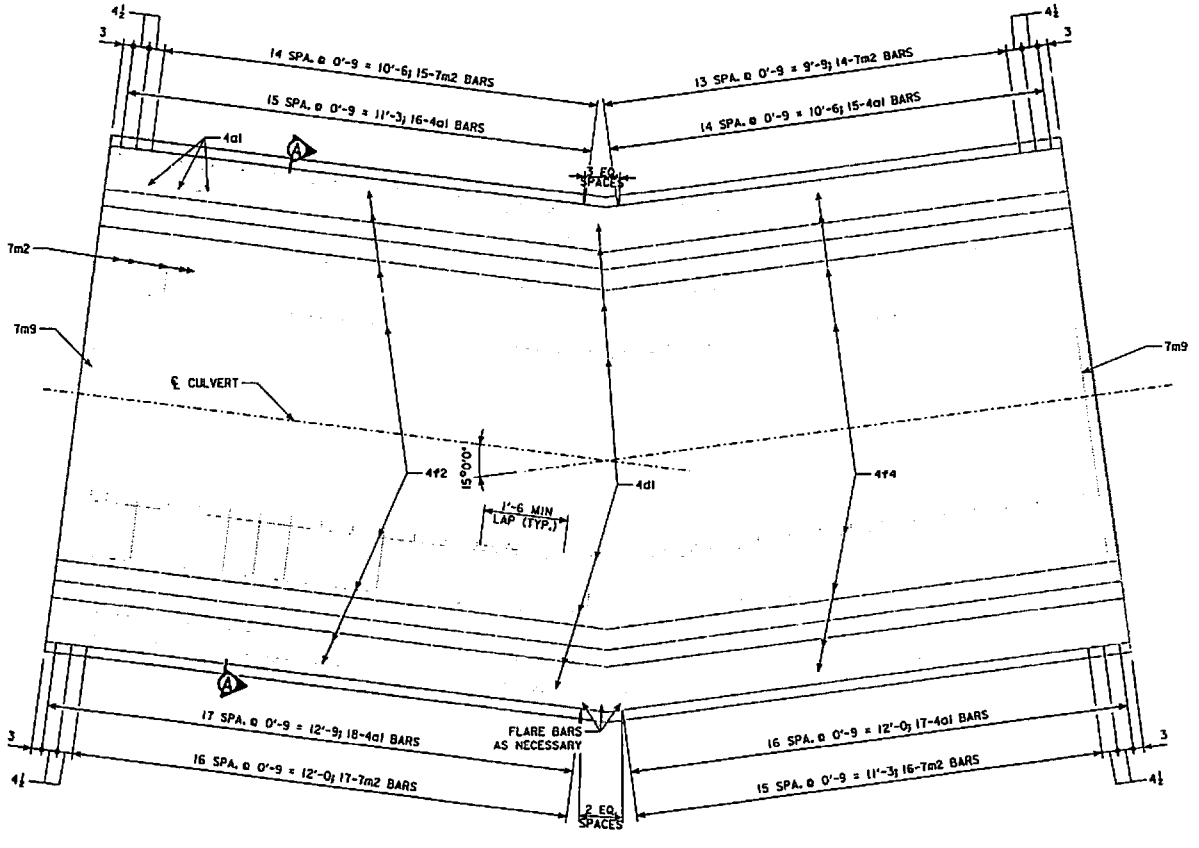
INCLUDES ADDENDA: 15DEC115.A02

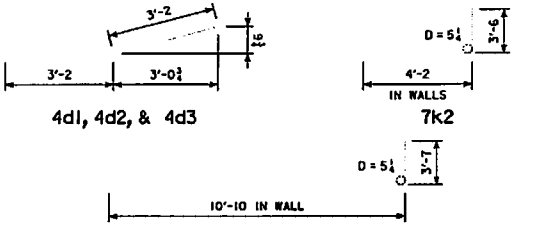


PLAN VIEW
SHOWING BOTTOM FLOOR REINFORCING

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS, FRONT FACE, VERTICAL		69	12'-5	572
4b1	WALLS, HORIZONTAL, BOTH F.	—	40	11'-11	318
4b2	WALLS, HORIZONTAL, BOTH F.		40	10'-11	292
4d1	FLOOR, TOP & BOTTOM, LONGITUDINAL		21	6'-4	89
4d2	WALLS, HORIZONTAL, BOTH F.		40	6'-4	170
4d3	SLAB, TOP & BOTTOM, LONGITUDINAL		21	6'-4	89
4e1	SLAB, BOTTOM, LONGITUDINAL		11	11'-11	88
4e2	SLAB, TOP, LONGITUDINAL		8	11'-11	64
4e3	SLAB, BOTTOM, LONGITUDINAL		11	10'-11	81
4e4	SLAB, TOP, LONGITUDINAL		8	10'-11	59
4f1	FLOOR, TOP, LONGITUDINAL		13	11'-11	104
4f2	FLOOR, BOTTOM, LONGITUDINAL		8	11'-11	64
4f3	FLOOR, TOP, LONGITUDINAL		13	10'-11	95
4f4	FLOOR, BOTTOM, LONGITUDINAL		8	10'-11	59
8k1	SLAB, BOTTOM, TRANSVERSE		50	11'-10	1,580
7k2	SLAB, TOP, CORNER		73	7'-8	1,144
7k9	SLAB, TOP, TRANSVERSE	—	2	11'-10	48
8m1	FLOOR, TOP, TRANSVERSE		50	12'-4	1,647
7m2	FLOOR, BOTTOM, CORNER		73	14'-5	2,139
7m9	FLOOR, BOTTOM, TRANSVERSE		2	12'-4	50
				TOTAL (LBS.)	6,752

BENT BAR DETAILS



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

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT

15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 5

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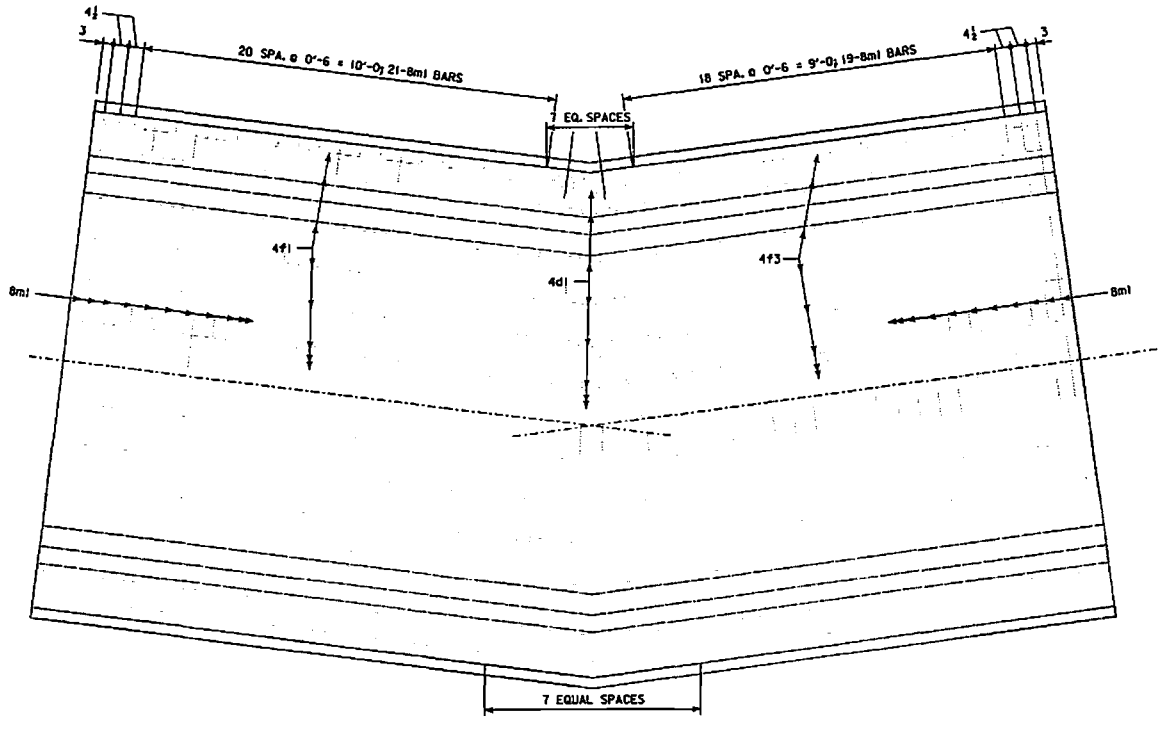

PLAN VIEW
SHOWING TOP FLOOR REINFORCING

NOTE: 4a1 AND 7m2 BARS ARE NOT SHOWN FOR CLARITY REFER TO BOTTOM FLOOR REINFORCING.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT

15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 6

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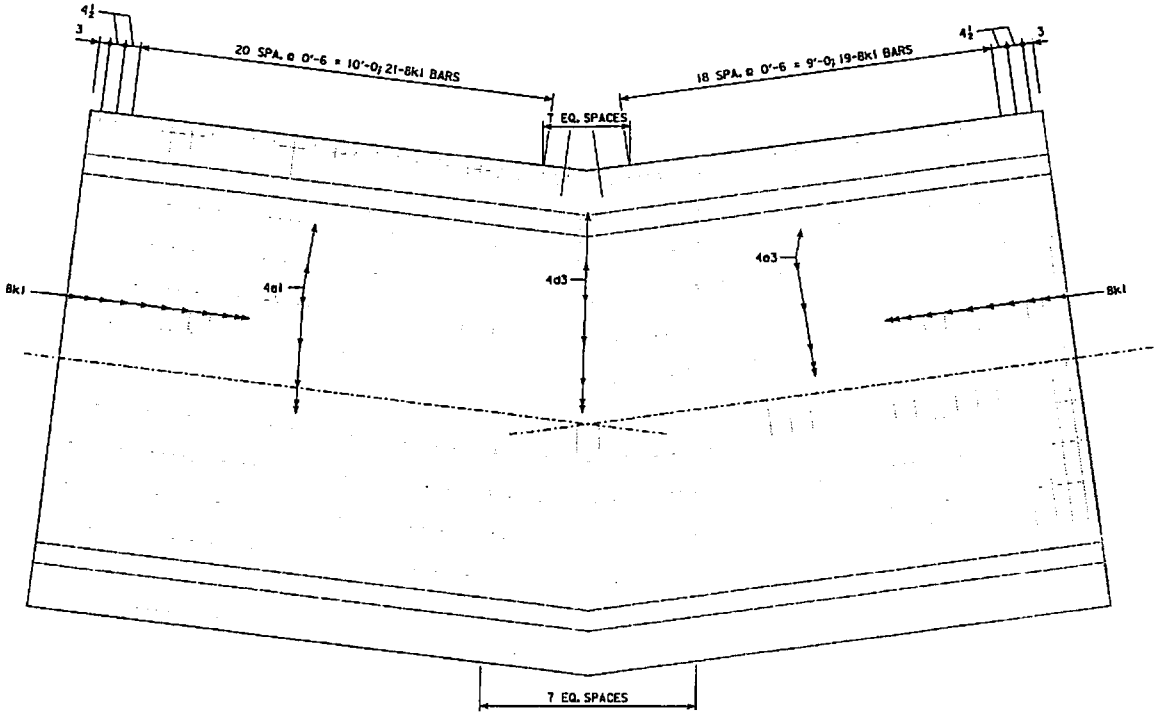
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW

SHOWING BOTTOM SLAB REINFORCING

NOTE: 4a1 AND 7k2 BARS ARE NOT SHOWN FOR CLARITY REFER TO TOP SLAB REINFORCING.

STAGE 1 DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT

15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 7

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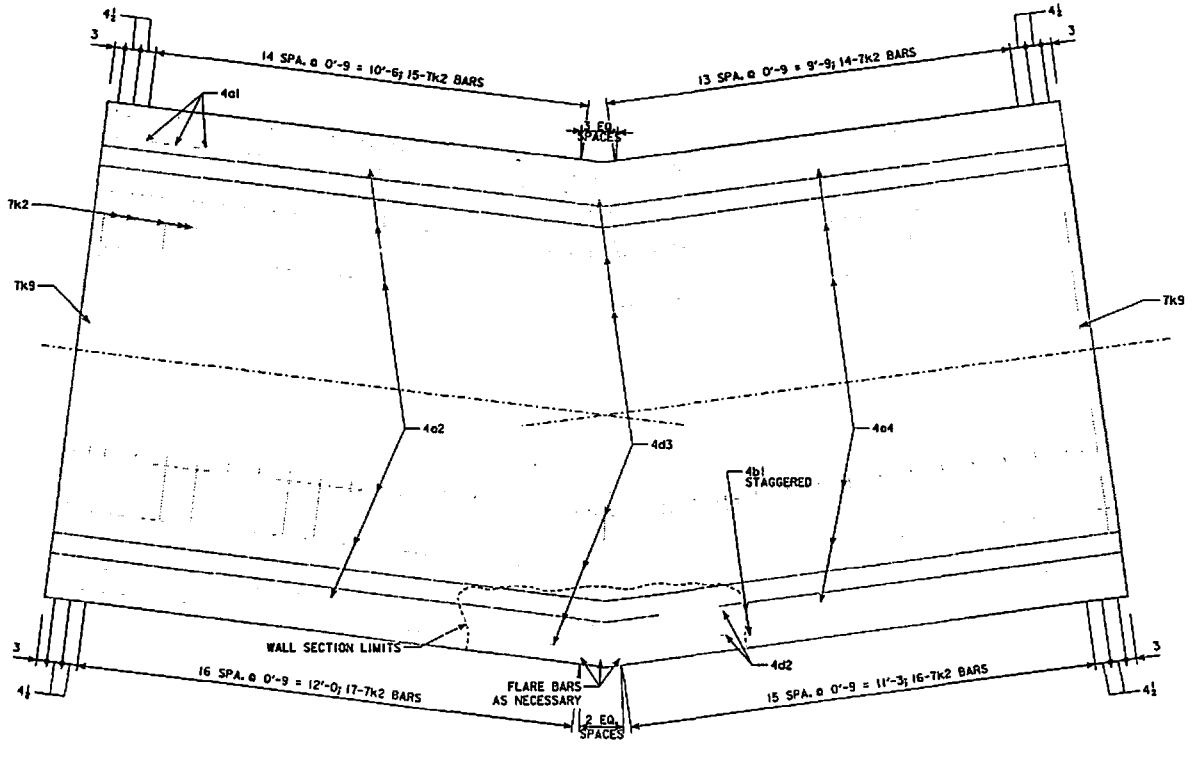
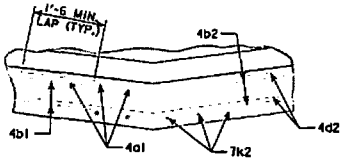
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW
SHOWING TOP SLAB REINFORCING



WALL SECTION
SHOWING TOP SLAB REINFORCING
REFER TO PLAN VIEW FOR SECTION LIMITS

NOTE: 4a1 AND 7k2 BARS ARE NOT SHOWN FOR CLARITY REFER TO TOP SLAB REINFORCING.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT
15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 8

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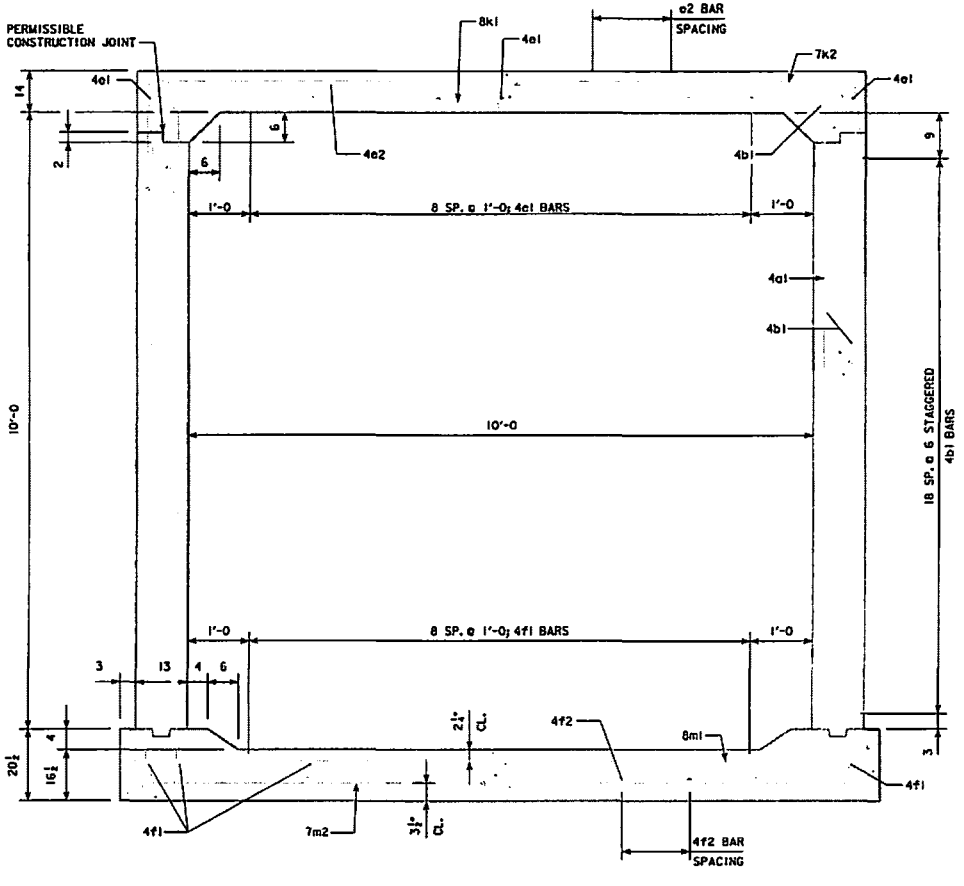
INCLUDES ADDENDA: 15DEC115.A02



10 x 10 BARREL SECTION A-A

NOTES:

1. DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET RCB G2-12.
2. DIMENSIONS ARE LISTED IN INCHES

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT

15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 9

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	1,590.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	2,700	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	182.7	
4	2404-7775000	REINFORCING STEEL	LB	30,398	
5	2415-2111010	PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	LF	182.0	
6	2415-2201010	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	EACH	1	
7	2507-3250005	ENGINEERING FABRIC	SY	3,090.0	
8	2507-6800061	REVETMENT, CLASS E	TON	2,645.0	
9	2533-4980005	MOBILIZATION	LS	1.00	
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2415-2111010	PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
6	2415-2201010	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 0 ° SKEW PRECAST END SECTION, PRECAST LINTEL BEAM, AND PRECAST CURTAIN WALL.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
9	2533-4980005	MOBILIZATION - -
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIAL, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 10

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 10'-0 x 10'-0 x 248'-0 RCB CULVERT, SKEWED 30° L.A. AT STA. 11219+00.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 29 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS I EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (Sa: IS ⅛ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION.

THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT FOR THE SHEET PILE IS LUMP SUM.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED AND IMMEDIATELY PRIOR TO STAGE 2 CONSTRUCTION. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-10-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
20'-0 BARREL SECTION	6,426	6,426
23'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 8752	17,504
BELL JOINTS (6 REQ'D)	6 @ 1,078	6,468
TOTAL (LBS.)		30,398

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
20'-0 BARREL SECTION	11.4	13.8	15.5	40.7
23'-0 BENT BARREL SECTION (2 REQ'D)	2 @ 13.1 = 26.2	2 @ 15.8 = 31.6	2 @ 17.8 = 35.6	93.4
BELL JOINTS (6 REQ'D)	6 @ 2.4 = 14.4	6 @ 2.9 = 17.4	6 @ 2.8 = 16.8	48.6
			TOTAL (CU. YDS.)	182.7

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN

NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 11

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INCLUDES ADDENDA: 15DEC11S.A02

GENERAL NOTES:

PRECAST CONCRETE BOX CULVERTS AND PRECAST CONCRETE HEADWALLS 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 LRFD BRIDGE DESIGN MANUAL. THE MINIMUM REQUIREMENTS INCLUDE REINFORCEMENT CLEARANCE REQUIREMENTS USED IN THE "IDOT STANDARDS."

THE CONTRACTOR SHALL ALLOW THIRTY CALENDAR DAYS FOR THE ENGINEER'S REVIEW OF THE PRECAST PLANS.

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 "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".

BENT BARREL SECTIONS AND THE BARREL SECTION ADJACENT TO STAGE II CONSTRUCTION SHALL BE CAST-IN-PLACE. A CAST-IN-PLACE STANDARD BELL JOINT SHALL BE USED FOR CONNECTING CAST-IN-PLACE UNITS TO PRECAST UNITS (BOTH UPSTREAM AND DOWNSTREAM). NO ADDITIONAL PAYMENT WILL BE MADE FOR THE ADDITIONAL BELL JOINTS REQUIRED.

BELL JOINTS SHALL BE INCLUDED IN THE COST FOR STRUCTURAL CONCRETE (RCB CULVERT)

GALVANIZED CULVERT TIES ARE REQUIRED BETWEEN ALL PRECAST UNITS. CULVERT TIES SHALL BE INCLUDED IN THE COST FOR PRECAST CONCRETE BOX CULVERT. TIE RODS SHALL BE A MINIMUM OF 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 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.

FOR THE PRECAST OPTION THE CULVERT SHALL BE LENGTHENED A MINIMUM AS SHOWN ON THE SITUATION PLAN TO ACCOMMODATE THE DIFFERENCES BETWEEN THE PRECAST AND CAST-IN-PLACE HEADWALLS.

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. INCLUDE CAST-IN-PLACE BENT SECTIONS, AND NON-STANDARD HEADWALLS. NOTE THE LOCATION OF CONNECTING CAST-IN-PLACE BELL JOINTS.

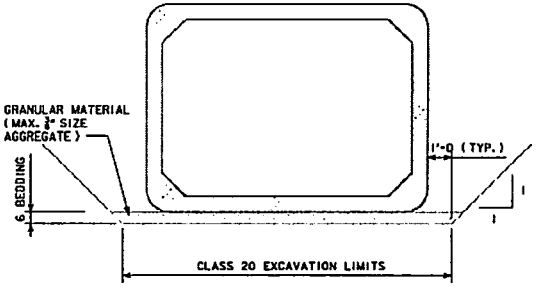
B. DIMENSION THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTHS.

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. APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST BOX OPTIONS AND "NONSTANDARD" END SECTION OPTIONS. 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.

INSTALLATION OF ALL PRECAST UNITS SHALL BE IN ACCORDANCE WITH THE FOLLOWING: 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 ARE 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 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 ITEM "STRUCTURAL CONCRETE (RCB CULVERT)." THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS. CLASS E REVETMENT WILL BE PLACED AROUND 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' X 2' 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 REQUIRES LENGTHENING AS SHOWN ON THE SITUATION PLAN.



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE BELL JOINT.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11219+00.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 12

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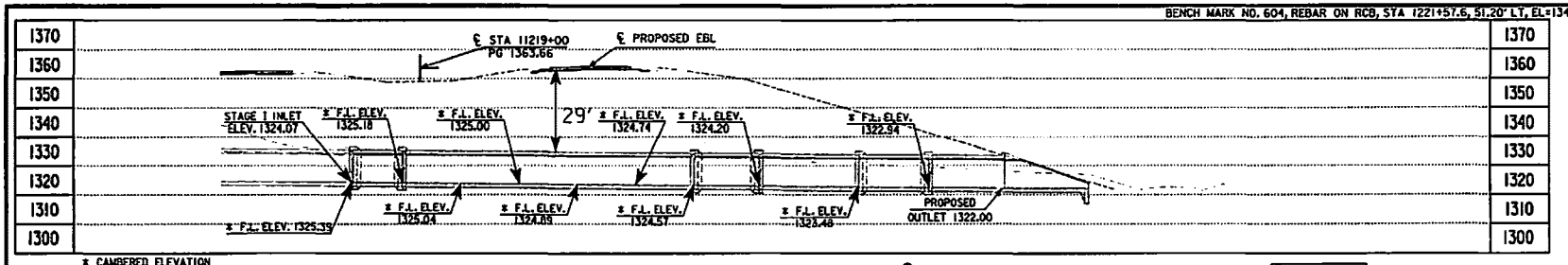
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 604, REBAR ON RCB, STA 1221+57.6, 51.20' LT, EL=1340.549

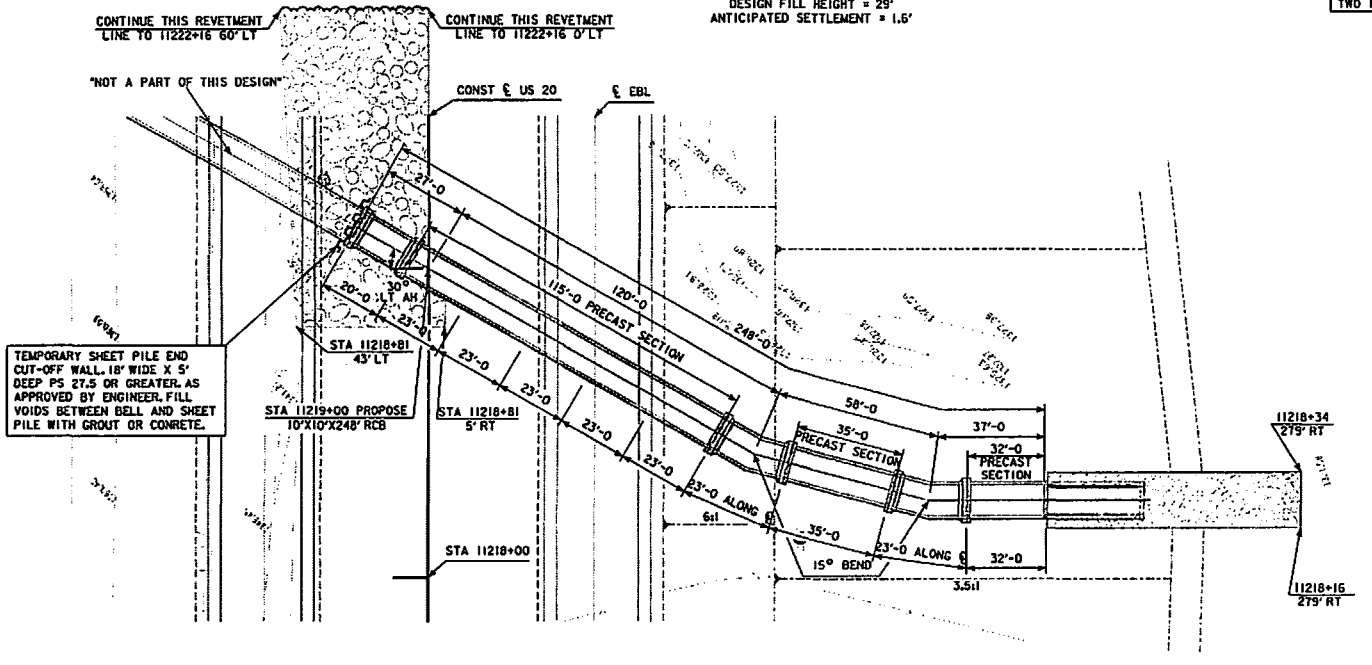


± CAMBERED ELEVATION
F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

LONGITUDINAL SECTION ALONG ℄ CULVERT

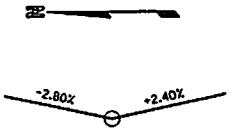
DESIGN FILL HEIGHT = 29'
ANTICIPATED SETTLEMENT = 1.6'

ONE 0° HDWL
TWO 15° BENDS



BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.

SITUATION PLAN



VPI STA = 11224+00 VC = 1100'
VPI ELEV = 1348.98

PROPOSED PROFILE GRADE US 20

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO1 INS
FO2 QWEST
FO7 ICN
T4 SCHALLER TELEPHONE

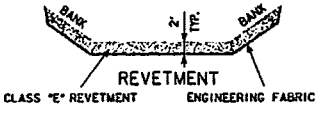
HYDRAULIC DATA

DRAINAGE AREA = 676 ACRES H-R
Q_{50} = 656 CFS
HW ELEV. = 1333.41

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
RIGHT	145	190	90
MEDIAN	2500	2900	1500
TOTAL	2645	3090	1590

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.



LOCATION

T-88-89N R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.646603°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

STAGE 1 DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT SITUATION PLAN

STA. 11219+00.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 13

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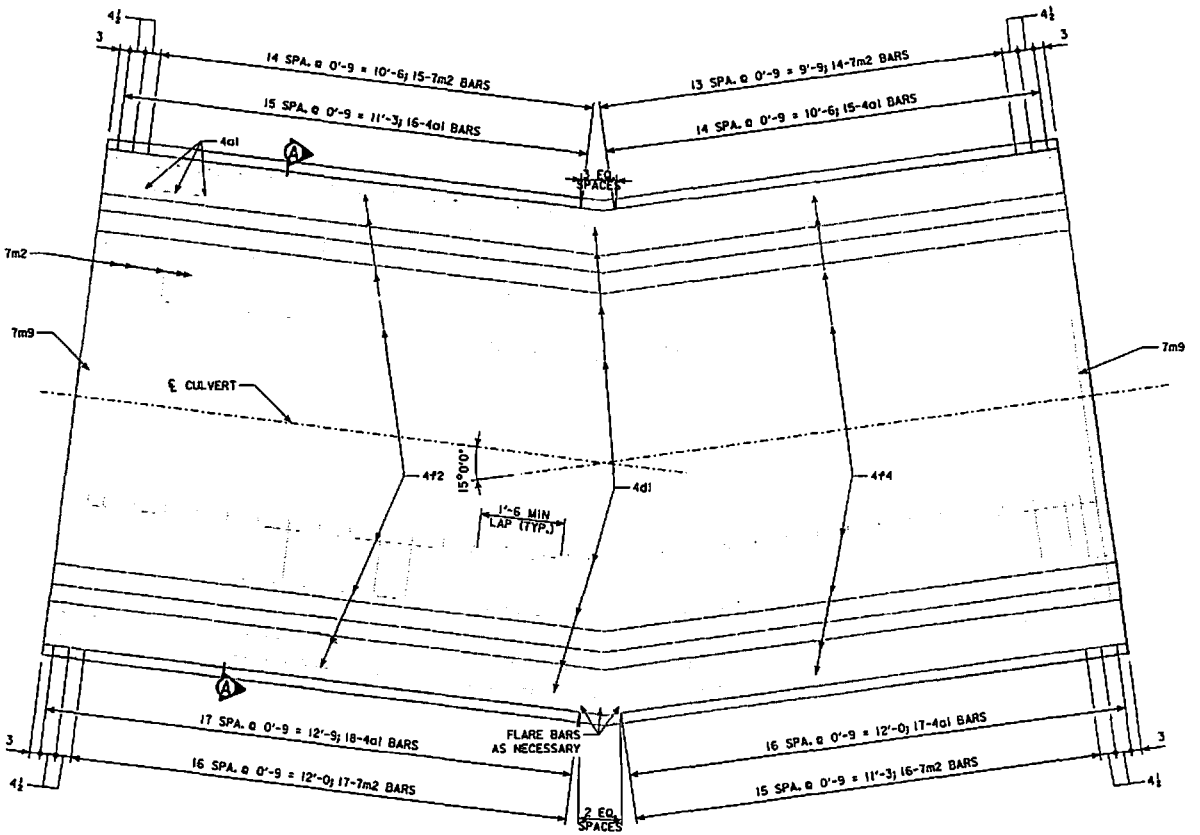
INCLUDES ADDENDA: 15DEC15.A02

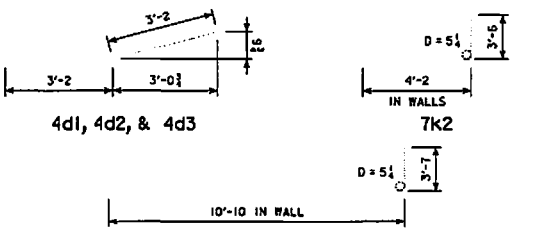


PLAN VIEW
SHOWING BOTTOM FLOOR REINFORCING

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS, FRONT FACE, VERTICAL		69	12'-5	572
4b1	WALLS, HORIZONTAL, BOTH F.		40	11'-11	318
4b2	WALLS, HORIZONTAL, BOTH F.		40	10'-11	292
4d1	FLOOR, TOP & BOTTOM, LONGITUDINAL	—	21	6'-4	89
4d2	WALLS, HORIZONTAL, BOTH F.		40	6'-4	170
4d3	SLAB, TOP & BOTTOM, LONGITUDINAL	—	21	6'-4	89
4e1	SLAB, BOTTOM, LONGITUDINAL	—	11	11'-11	88
4e2	SLAB, TOP, LONGITUDINAL		8	11'-11	64
4e3	SLAB, BOTTOM, LONGITUDINAL		11	10'-11	81
4e4	SLAB, TOP, LONGITUDINAL		8	10'-11	59
4f1	FLOOR, TOP, LONGITUDINAL		13	11'-11	104
4f2	FLOOR, BOTTOM, LONGITUDINAL		8	11'-11	64
4f3	FLOOR, TOP, LONGITUDINAL		13	10'-11	95
4f4	FLOOR, BOTTOM, LONGITUDINAL		8	10'-11	59
8k1	SLAB, BOTTOM, TRANSVERSE	—	50	11'-10	1,580
7k2	SLAB, TOP, CORNER		73	7'-8	1,144
7k9	SLAB, TOP, TRANSVERSE		2	11'-10	48
8m1	FLOOR, TOP, TRANSVERSE		50	12'-4	1,647
7m2	FLOOR, BOTTOM, CORNER		73	14'-5	2,139
7m9	FLOOR, BOTTOM, TRANSVERSE		2	12'-4	50
				TOTAL (LBS.)	8,752

BENT BAR DETAILS



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

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT 15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SNM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 14

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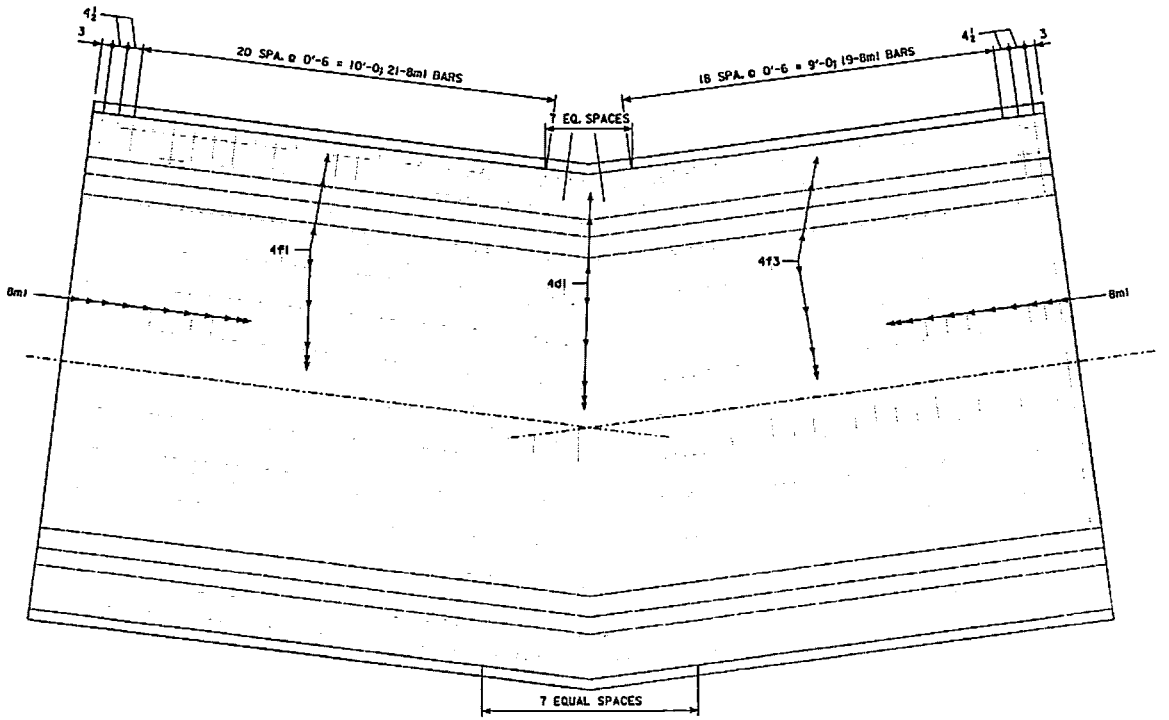
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW
SHOWING TOP FLOOR REINFORCING

NOTE: 4a1 AND 7m2 BARS ARE NOT SHOWN FOR CLARITY REFER TO BOTTOM FLOOR REINFORCING.

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT 15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 15

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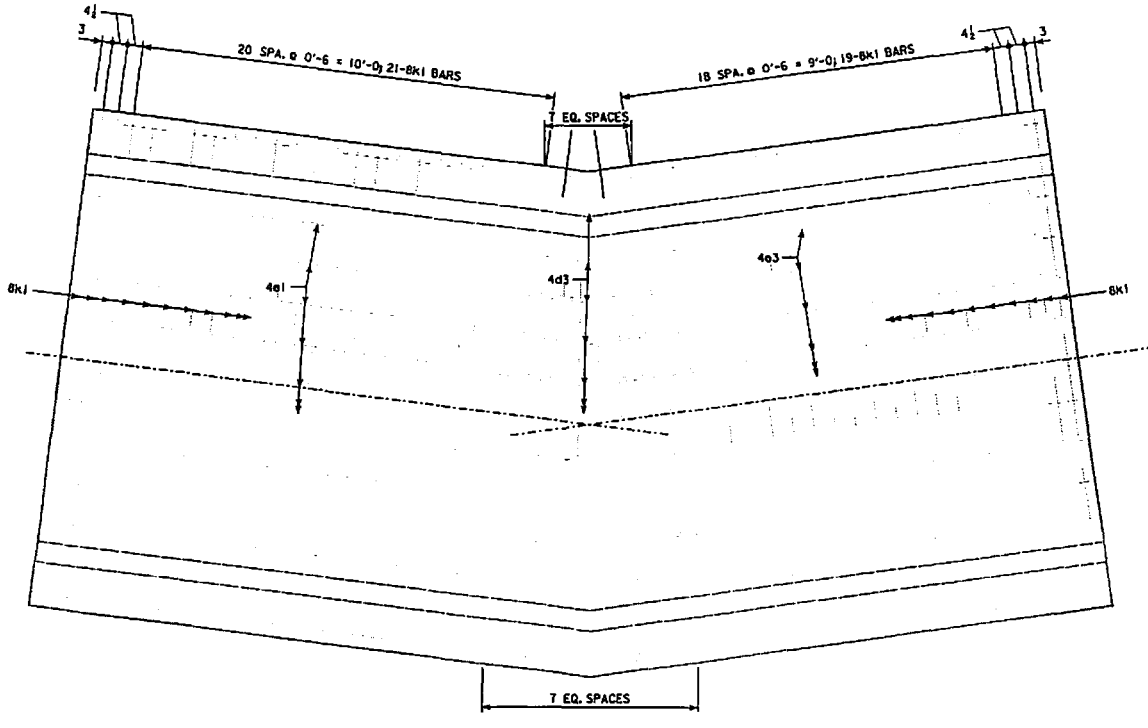
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW

SHOWING BOTTOM SLAB REINFORCING

NOTE: 4a1 AND 7k2 BARS ARE NOT SHOWN FOR CLARITY REFER TO TOP SLAB REINFORCING.

STAGE 1 DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT 15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 16

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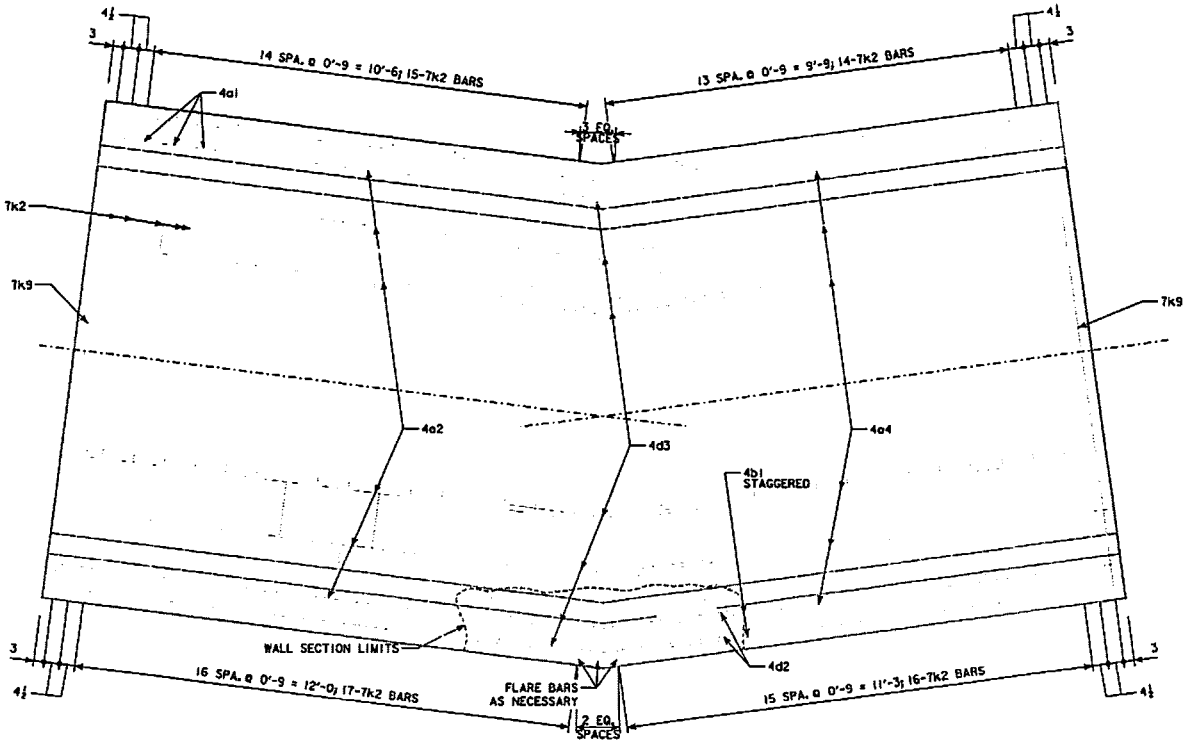
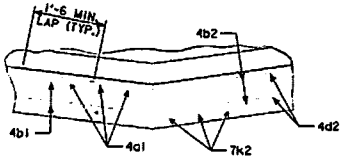
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW
SHOWING TOP SLAB REINFORCING

NOTE: 4a1 AND 7k2 BARS ARE NOT SHOWN FOR CLARITY REFER TO TOP SLAB REINFORCING.



WALL SECTION
SHOWING TOP SLAB REINFORCING
REFER TO PLAN VIEW FOR SECTION LIMITS

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT
15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 17

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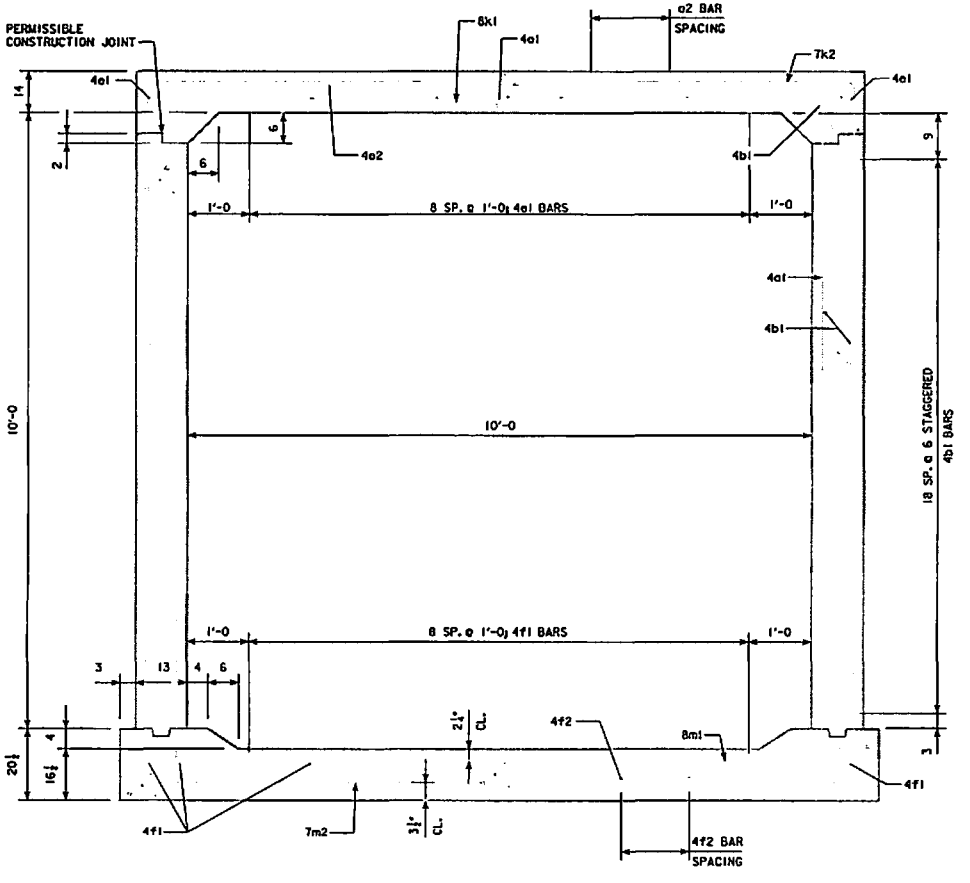
INCLUDES ADDENDA: 150EC115.A02



10 x 10 BARREL SECTION A-A

NOTES:

1. DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET RCB G2-12.
2. DIMENSIONS ARE LISTED IN INCHES

STAGE I DESIGN FOR 30° SKEW LT AH

10' X 10' X 248' PRECAST REINFORCED CONCRETE BOX CULVERT

15° BENT BARREL SECTION

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 9 FILE NO. 30568 DESIGN NO. 1315

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 18

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	345.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	470	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	293.0	
4	2404-7775000	REINFORCING STEEL	LB	53,067	
5	2507-3250005	ENGINEERING FABRIC	SY	690.0	
6	2507-6800061	REVETMENT, CLASS E	TON	560.0	
7	2533-4980005	MOBILIZATION	LS	1.00	
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B,3 OF STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
7	2533-4980005	MOBILIZATION
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIAL, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 1125+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 19

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 10' x 6' x 192' REINFORCED CONCRETE BOX CULVERT, SKEWED 14° R.A. AT STA. 11255+80.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 ML-93 LIVE LOAD AND EARTH FILLS OF 19 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS I EXPOSURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (5a) IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION.

THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT FOR THE SHEET PILE IS LUMP SUM.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-6-12	4-12	-
PMH 0-1-12	4-12	-
PMH 0-2-12	4-12	-
PMH 0-3-12	4-12	-
PMH 0-4-12	4-12	-
PMH 0-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'x6' HEADWALL 0° SKEW (1 REQ'D.)	2,768	2,768
26'-0 BENT BARREL SECTION (1 REQ'D)	6,449	6,449
32'-0 BARREL SECTION (4 REQ'D)	4 @ 7,381	29,524
38'-0 BARREL SECTION (1 REQ'D)	8,764	8,764
BELL JOINTS (6 REQ'D)	6 @ 927 = 5,562	5,562
	TOTAL (LBS.)	53,067

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
10'x6' HEADWALL 0° SKEW (1 REQ'D.)	1.3	11.8	5.0	18.1
26'-0 BENT BARREL SECTION (1 REQ'D)	10.6	13.0	8.2	31.8
32'-0 BARREL SECTION (4 REQ'D)	4 @ 13.0 = 51.8	4 @ 16.0 = 64.0	4 @ 10.0 = 40.1	155.9
38'-0 BARREL SECTION (1 REQ'D)	15.4	19.0	11.9	46.3
BELL JOINTS (6 REQ'D)	6 @ 2.4 = 14.4	6 @ 2.8 = 16.8	6 @ 1.6 = 9.7	40.9
			TOTAL (CU. YDS.)	293.0

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE 1 DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 20

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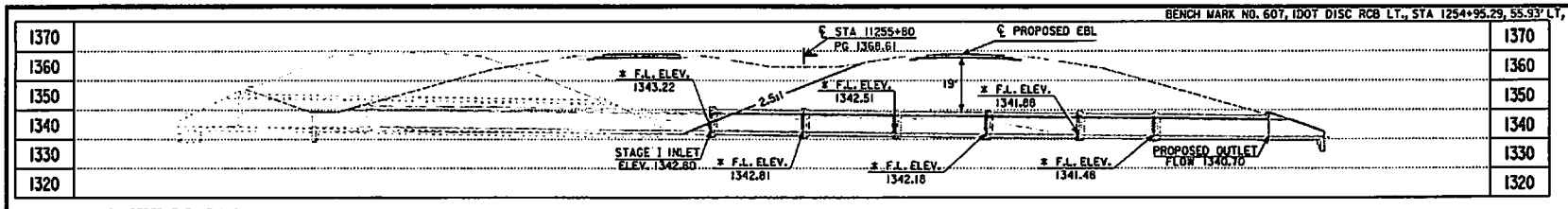
INCLUDES ADDENDA: 15DEC115.A02

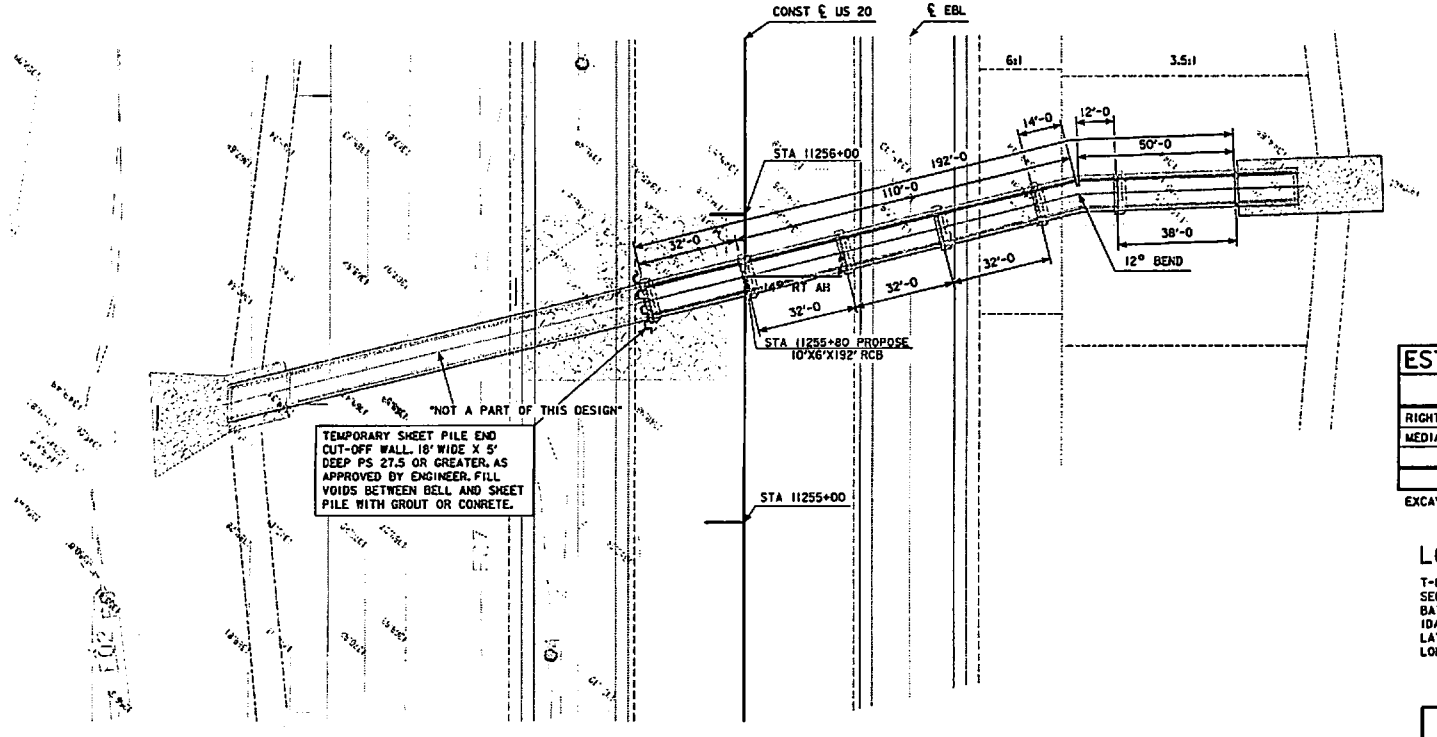
BENCH MARK NO. 607, IDOT DISC RCB LT., STA 1254+95.29, 55.93' LT, EL.=1356.44



* CAMBERED ELEVATIONS

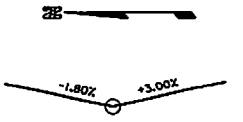
LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 19'
ANTICIPATED SETTLEMENT = 0.48'



SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.



VPI STA = 11258+50 VC = 1000'
VPI ELEV = 1362.48

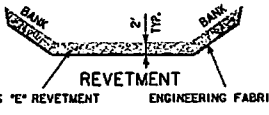
PROPOSED PROFILE GRADE US 20

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
FOT ICN
T4 SCHALLERR TELEPHONE

HYDRAULIC DATA

DRAINAGE AREA = 581 ACRES R
Q_{50} = 519 CFS
HW ELEV. = 1350.94



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
RIGHT	140	190	85
MEDIAN	420	500	260
TOTALS	560	690	345

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION

T-88-89N R-41W
SECTION 4-36
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474974°
LONGITUDE -95.632962°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 21

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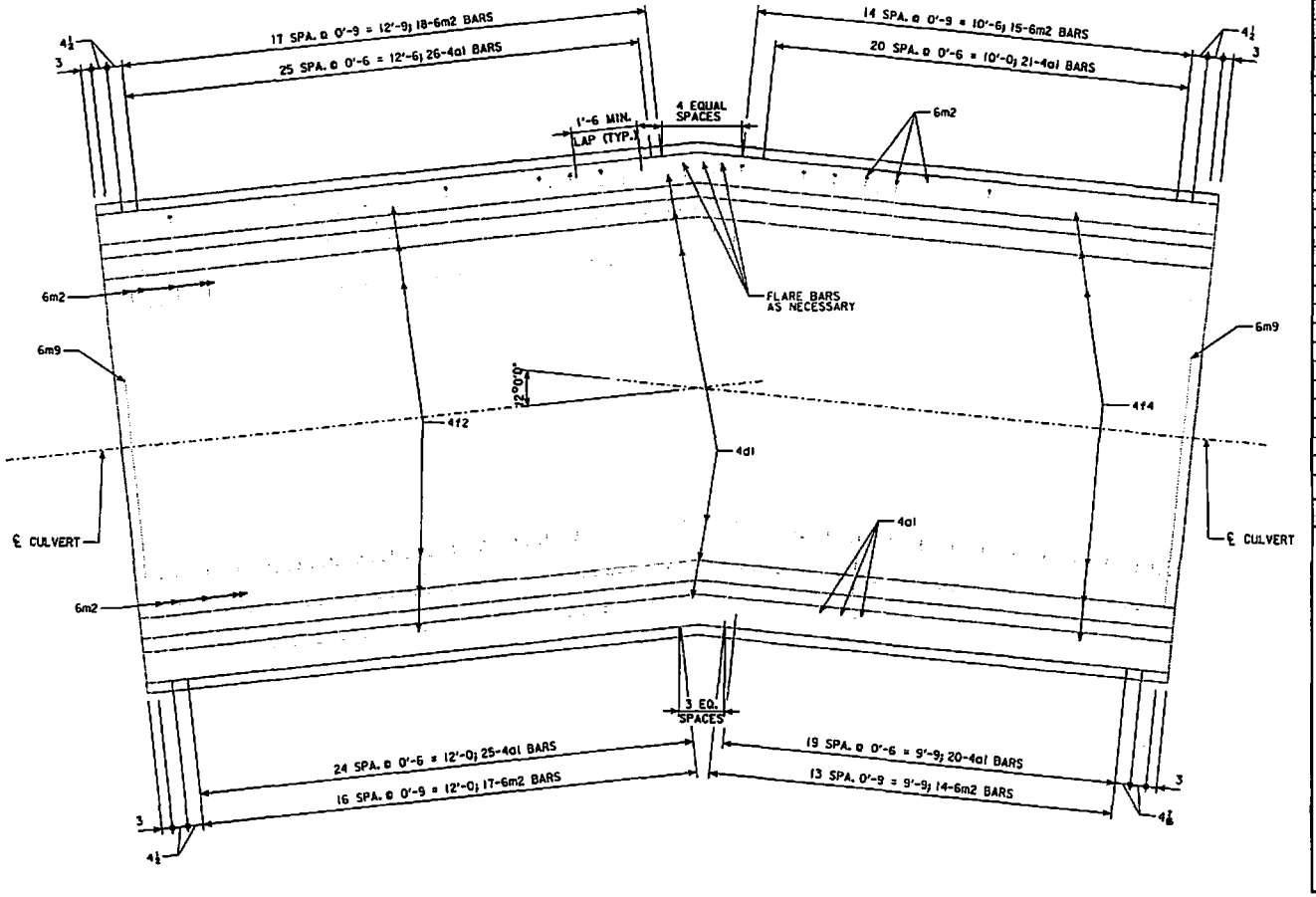
INCLUDES ADDENDA: 15DEC115.A02

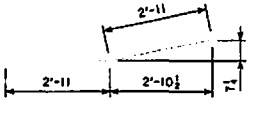


PLAN VIEW
SHOWING BOTTOM FLOOR REINFORCING

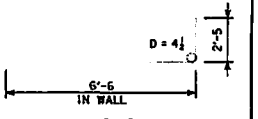
REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS, VERTICAL, F. F.		108	7'-10	565
4b1	WALLS, HORIZONTAL, BOTH F.		24	13'-1	210
4b2	WALLS, HORIZONTAL, BOTH F.		24	11'-0	175
4d1	FLOOR, TOP & BOTTOM, LONGITUDINAL		19	5'-10	75
4d2	WALLS, HORIZONTAL, BOTH F.		24	5'-10	94
4d3	SLAB, TOP& BOTTOM, LONGITUDINAL		19	5'-10	75
4e1	SLAB, BOTTOM, LONGITUDINAL		11	13'-1	97
4e2	SLAB, TOP, LONGITUDINAL		6	13'-1	53
4e3	SLAB, BOTTOM, LONGITUDINAL		11	11'-0	81
4e4	SLAB, TOP, LONGITUDINAL		6	11'-0	45
4f1	FLOOR, TOP, LONGITUDINAL		13	13'-1	114
4f2	FLOOR, BOTTOM, LONGITUDINAL		6	13'-1	53
4f3	FLOOR, TOP, LONGITUDINAL		13	11'-0	96
4f4	FLOOR, BOTTOM, LONGITUDINAL		6	11'-0	45
6k2	SLAB, TOP, CORNER		73	5'-9	631
6k9	SLAB, TOP, TRANSVERSE		2	11'-2	34
7k1	SLAB, BOTTOM, TRANSVERSE		55	11'-2	1,256
6m2	FLOOR, BOTTOM, CORNER		77	8'-11	1,031
6m9	FLOOR, BOTTOM, TRANSVERSE		2	11'-8	36
8m1	FLOOR, TOP, TRANSVERSE		54	11'-8	1,683
				TOTAL (LBS.)	6,449

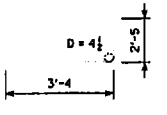
BENT BAR DETAILS



4d1, 4d2, & 4d3



6m2



6k2

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

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 22

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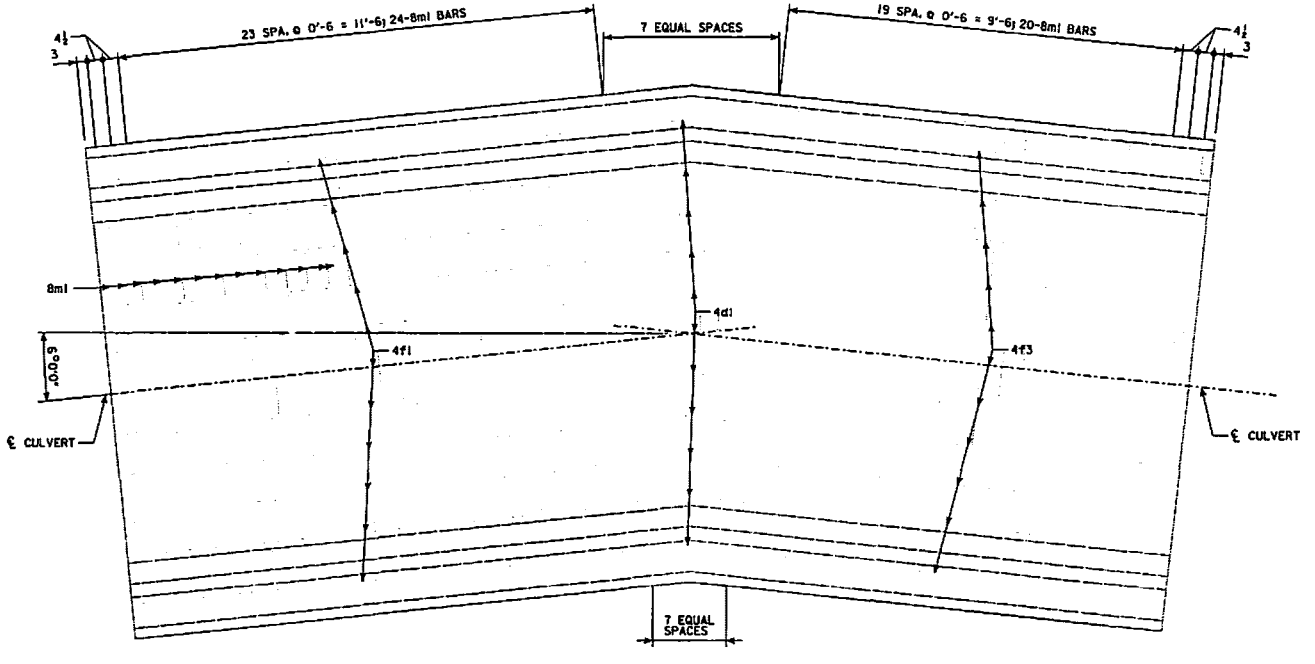
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW

SHOWING TOP FLOOR REINFORCING

NOTE: 4a1 AND 6m2 BARS ARE NOT SHOWN FOR CLARITY, REFER TO BOTTOM FLOOR REINFORCING.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 23

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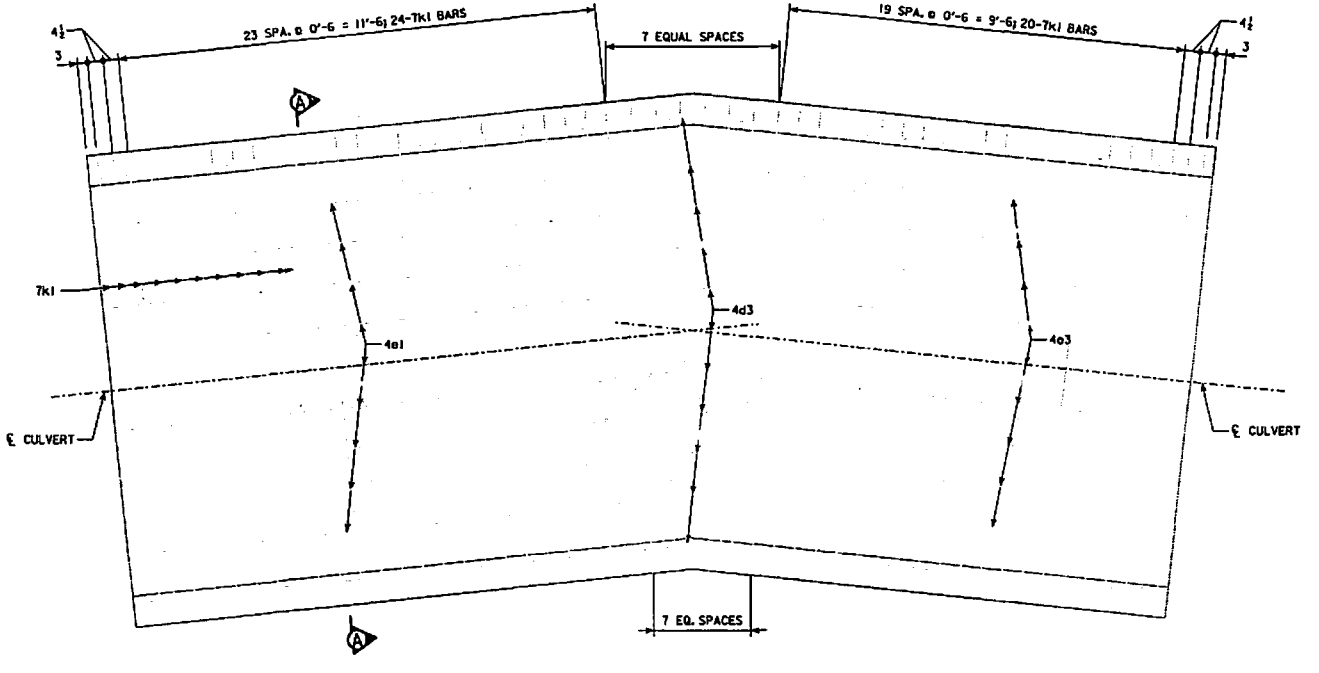
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW

SHOWING BOTTOM SLAB REINFORCING

NOTE: 4a1 AND 6k2 BARS ARE NOT SHOWN FOR CLARITY, REFER TO TOP SLAB REINFORCING.

STAGE 1 DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 11255+80.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 24

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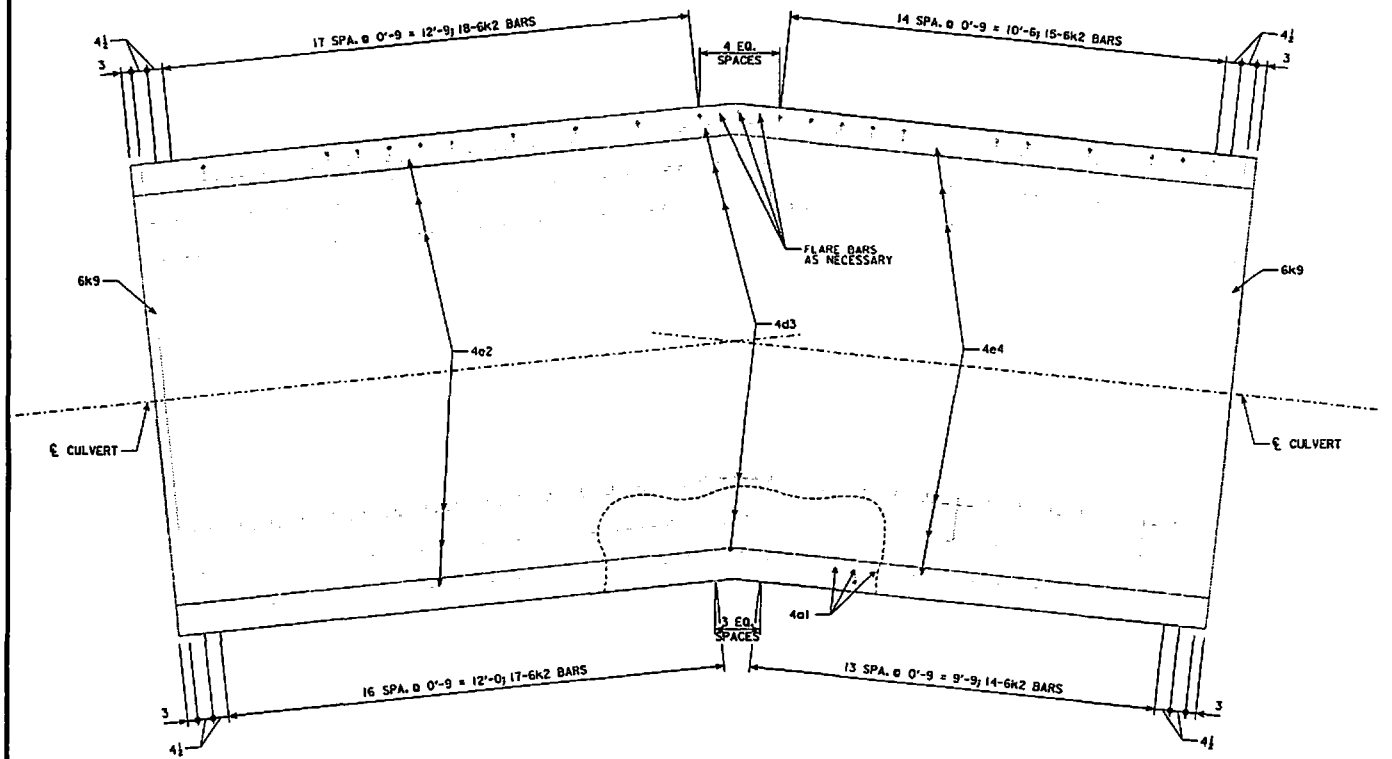
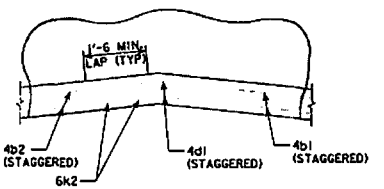
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW
SHOWING TOP SLAB REINFORCING



WALL SECTION
SHOWING TOP SLAB REINFORCING
REFER TO PLAN VIEW FOR SECTION LIMITS

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 25

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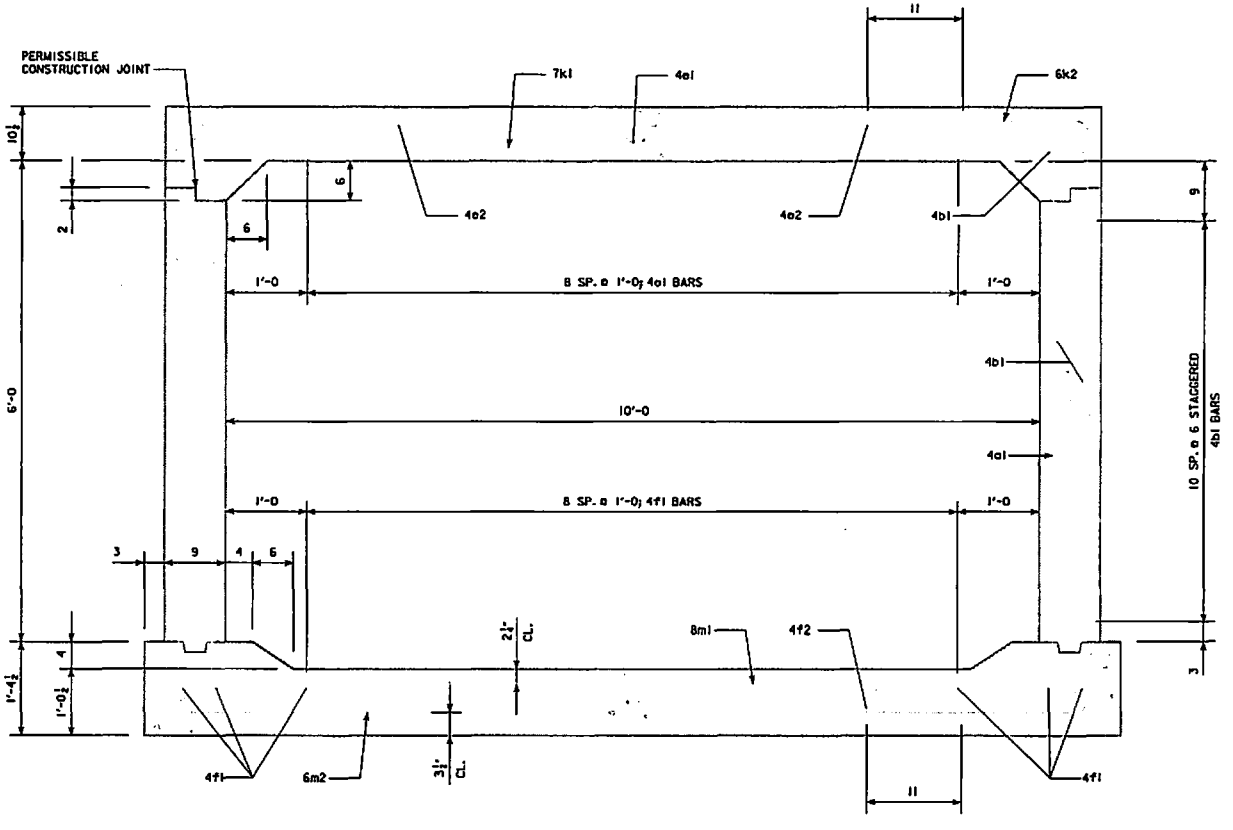
INCLUDES ADDENDA: 15DEC115.A02



10' X 6' BARREL SECTION A-A

NOTES:

1. DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET RCB G2-12.
2. THE k2 AND m2 BARS HORIZONTAL LEGS MAY LAP IN LOW FILL SITUATIONS.
3. DIMENSIONS LISTED IN THE BAR LIST ARE IN INCHES.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 26

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	345.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	470	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	45.4	
4	2404-7775000	REINFORCING STEEL	LB	8,303	
5	2415-2111006	PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT.	LF	172.0	
6	2415-2201006	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 6 FT.	EACH	1	
7	2507-3250005	ENGINEERING FABRIC	SY	690.0	
8	2507-6800061	REVETMENT, CLASS E	TON	560.0	
9	2533-4980005	MOBILIZATION	LS	1.00	
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2415-2111006	PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
6	2415-2201006	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 0 DEGREE SKEW, ONE PRECAST END SECTION, ONE PRECAST LINTEL BEAMS, AND ONE PRECAST CURTAIN WALL.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B,3 OF STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
9	2533-4980005	MOBILIZATION - -
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIAL, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

QUANTITIES

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 27

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INCLUDES ADDENDA: 15DEC15.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 10'-0 x 10'-0 x 198'-0 RCB CULVERT, SKEWED 14° R.A. AT STA. 1125S+80.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 19 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a: IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION.

THE METHOD OF MEASURE AND BASIS OF PAYMENT FOR THE SHEET PILE IS LUMP SUM.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
PRCB G1-13	1-13	-
PRCB G2-13	1-13	-
PRCB 10-13	1-13	-
PES 1-13-T3	1-13	5-13
PES 3-13-T3	1-13	-
PES 4-13	1-13	-
PEP 1-13	1-13	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
26'-0 BENT BARREL SECTION (1 REQ'D)	6,449	6,449
BELL JOINTS (2 REQ'D)	2 @ 927 = 1,854	1,854
	TOTAL (LBS.)	8,303

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
26'-0 BENT BARREL SECTION (1 REQ'D)	10.6	13.0	8.2	31.8
BELL JOINTS (2 REQ'D)	2 @ 2.4 = 4.8	2 @ 2.8 = 5.6	2 @ 1.6 = 3.2	13.6
			TOTAL (CU. YDS.)	45.4

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 28

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 19 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 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 $\frac{3}{4}$ 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.

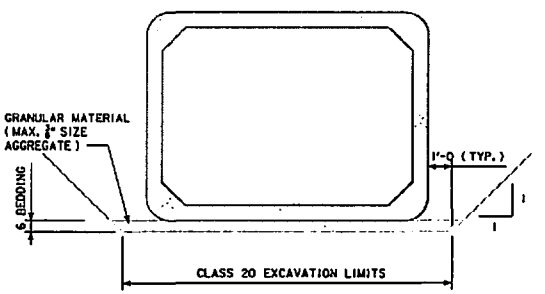
THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT 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' x 2' 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.



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE BELL JOINT.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 29

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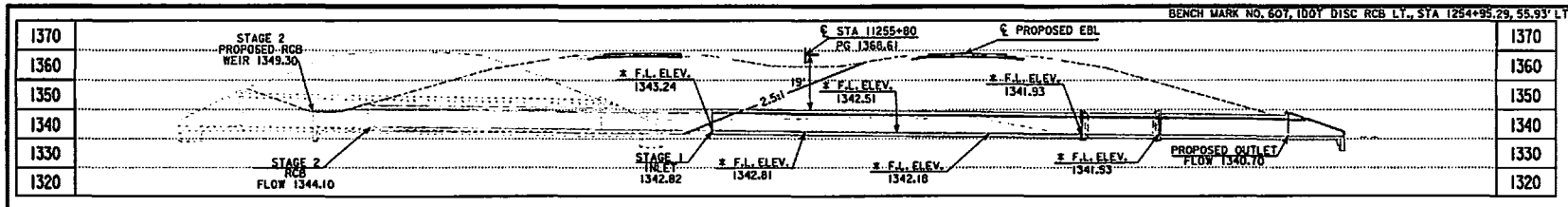
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 607, 100Y DISC RCB LT., STA 1254+95.29, 55.93' LT, EL.=1356.44



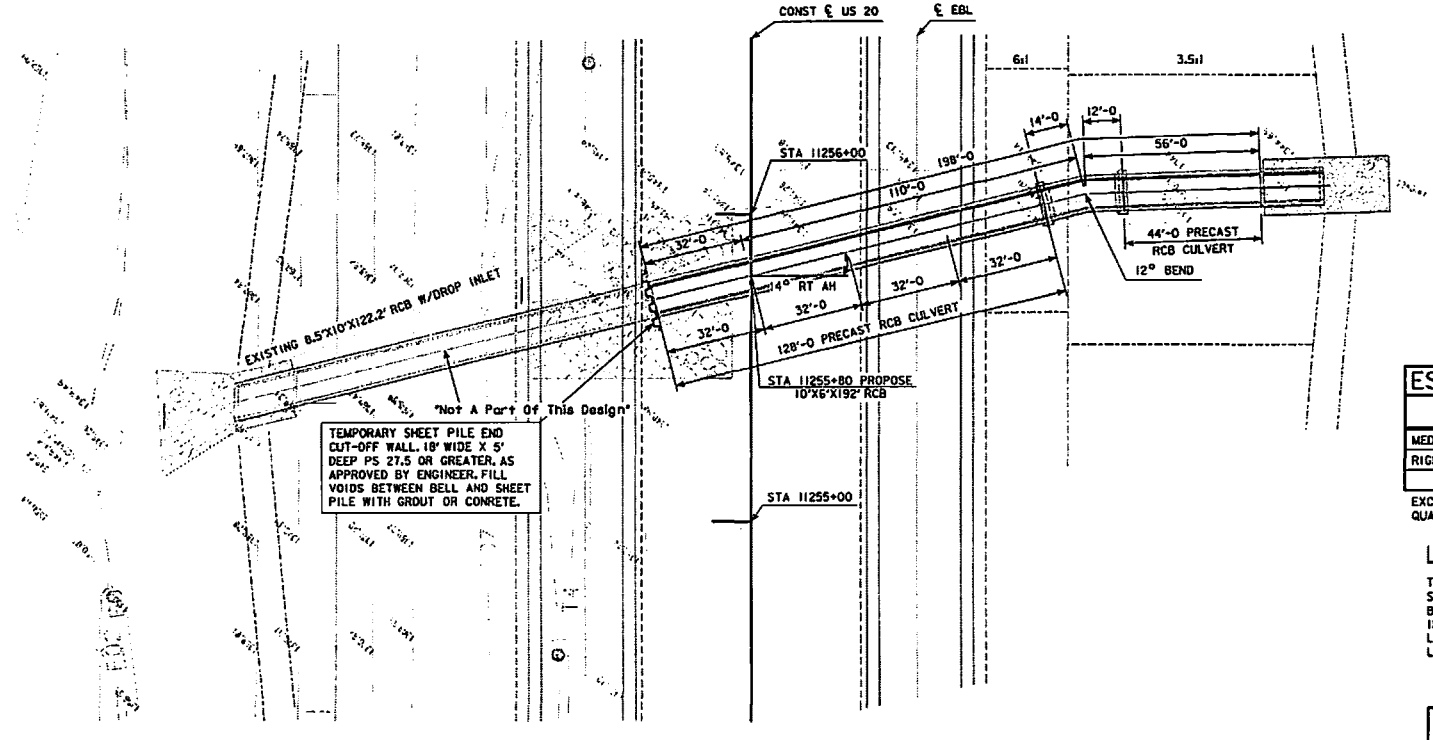
± CAMBERED ELEVATIONS

F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

LONGITUDINAL SECTION ALONG ℄ CULVERT

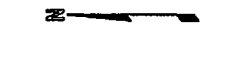
DESIGN FILL HEIGHT = 19'
ANTICIPATED SETTLEMENT = 0.48'

ONE 0° HDWL



SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.



VPI STA = 11258+50 VC = 1000'
VPI ELEV = 1362.48

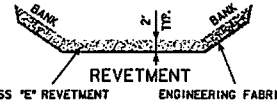
PROPOSED PROFILE GRADE US 20

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
FOT ICN
T4 SCHALLERR TELEPHONE

HYDRAULIC DATA

DRAINAGE AREA = 581 ACRES R
Q_{50} = 519 CFS
HW ELEV. = 1350.94



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
MEDIAN	420	500	260
RIGHT	140	190	85
TOTALS	560	690	345

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

LOCATION

T-88-89N R-41W
SECTION 4-36
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474974°
LONGITUDE -95.632962°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 30

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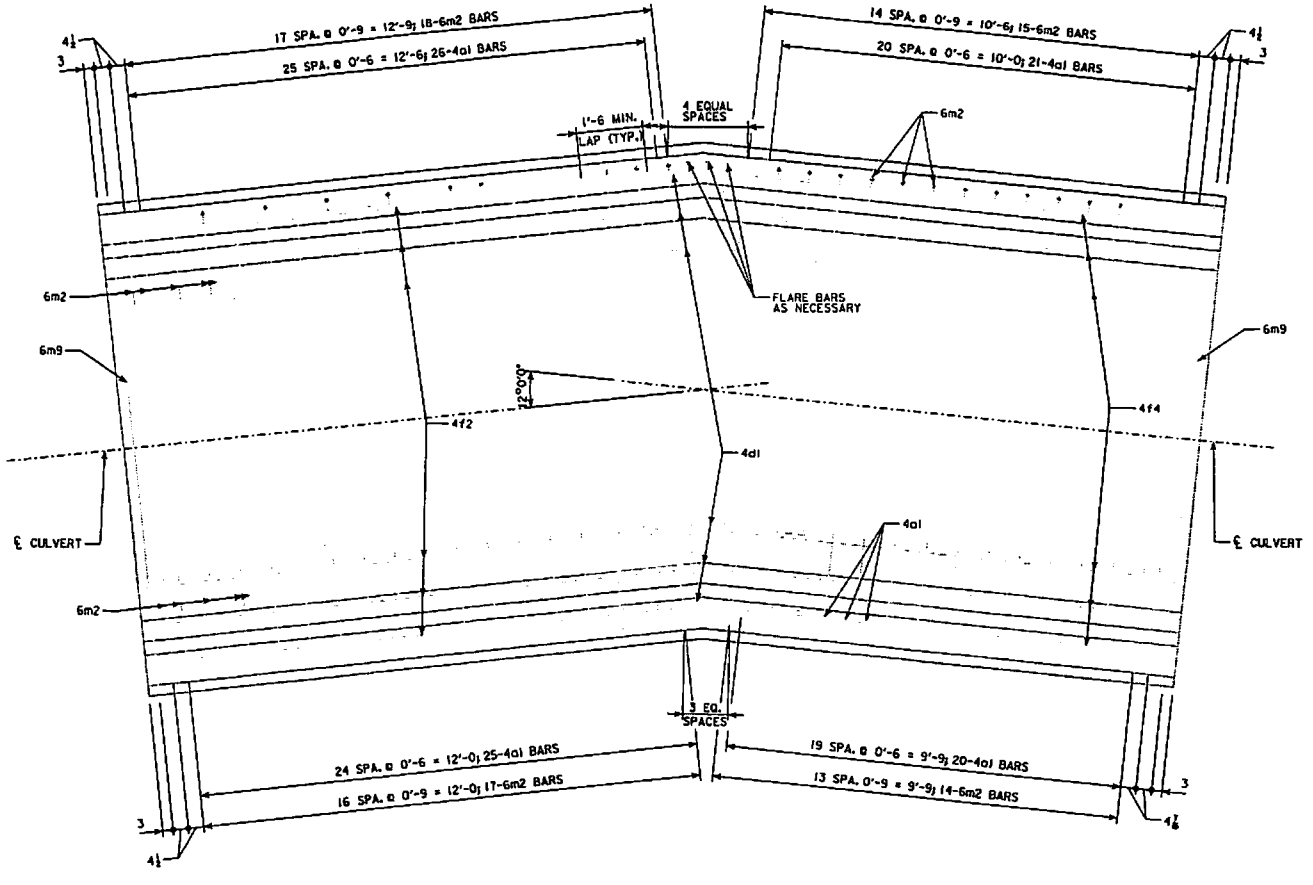
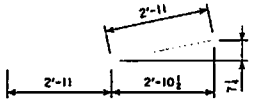


PLAN VIEW
SHOWING BOTTOM FLOOR REINFORCING

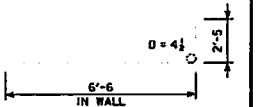
REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS, VERTICAL, F.F.		108	7'-10	565
4b1	WALLS, HORIZONTAL, BOTH F.		24	13'-1	210
4b2	WALLS, HORIZONTAL, BOTH F.		24	11'-0	175
4d1	FLOOR, TOP & BOTTOM, LONGITUDINAL		19	5'-10	75
4d2	WALLS, HORIZONTAL, BOTH F.		24	5'-10	94
4d3	SLAB, TOP& BOTTOM, LONGITUDINAL		19	5'-10	75
4e1	SLAB, BOTTOM, LONGITUDINAL		11	13'-1	97
4e2	SLAB, TOP, LONGITUDINAL		6	13'-1	53
4e3	SLAB, BOTTOM, LONGITUDINAL		11	11'-0	81
4e4	SLAB, TOP, LONGITUDINAL		6	11'-0	45
4f1	FLOOR, TOP, LONGITUDINAL		13	13'-1	114
4f2	FLOOR, BOTTOM, LONGITUDINAL		6	13'-1	53
4f3	FLOOR, TOP, LONGITUDINAL		13	11'-0	96
4f4	FLOOR, BOTTOM, LONGITUDINAL		6	11'-0	45
6k2	SLAB, TOP, CORNER		73	5'-9	631
6k9	SLAB, TOP, TRANSVERSE		2	11'-2	34
7k1	SLAB, BOTTOM, TRANSVERSE		55	11'-2	1,256
6m2	FLOOR, BOTTOM, CORNER		77	8'-11	1,031
6m9	FLOOR, BOTTOM, TRANSVERSE		2	11'-8	36
8m1	FLOOR, TOP, TRANSVERSE		54	11'-8	1,683
				TOTAL (LBS.)	6,449

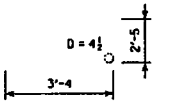
BENT BAR DETAILS



4d1, 4d2, & 4d3



6m2



6k2

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

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 31

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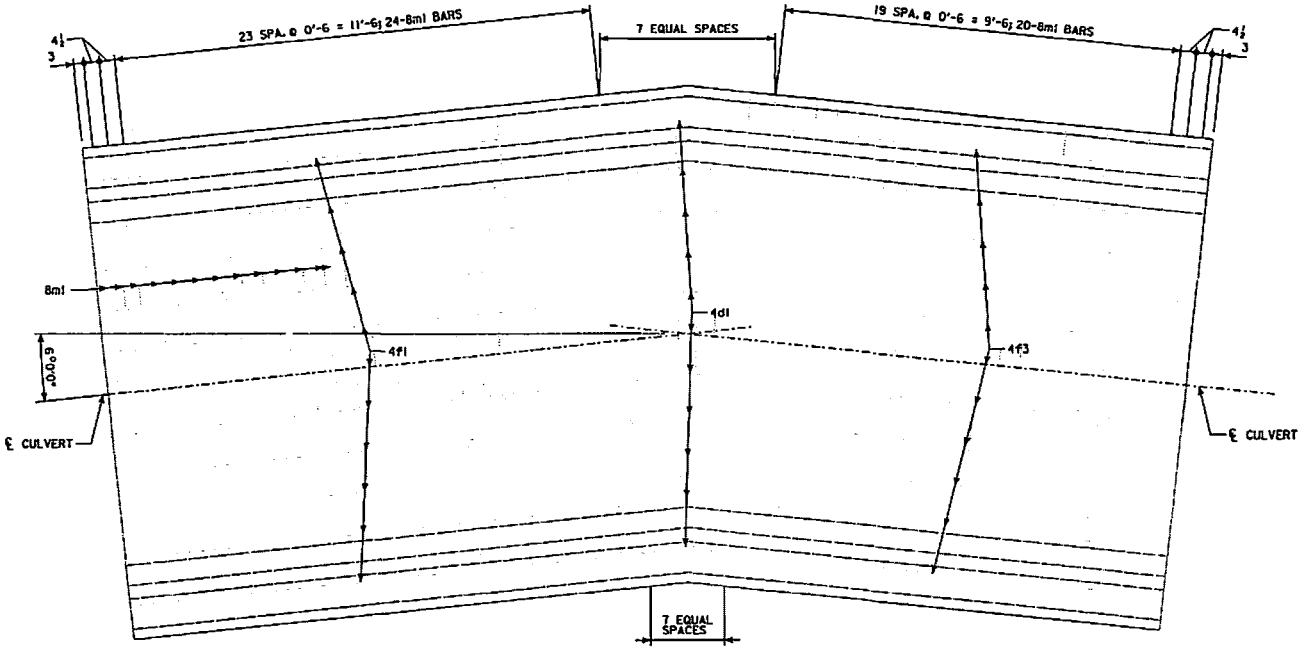

PLAN VIEW

SHOWING TOP FLOOR REINFORCING

NOTE: 4a1 AND 6m2 BARS ARE NOT SHOWN FOR CLARITY, REFER TO BOTTOM FLOOR REINFORCING.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 432+85.45

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 32

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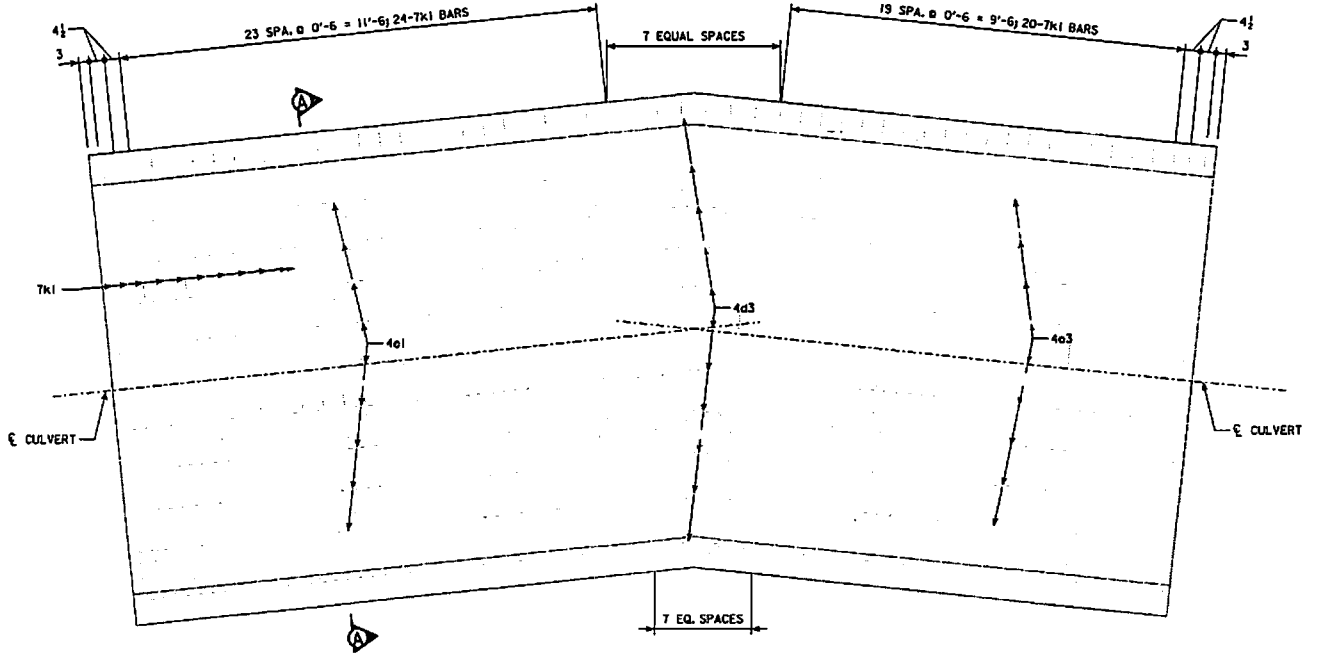

PLAN VIEW
SHOWING BOTTOM SLAB REINFORCING

NOTE: 4a1 AND 6k2 BARS ARE NOT SHOWN FOR CLARITY, REFER TO TOP SLAB REINFORCING.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 33

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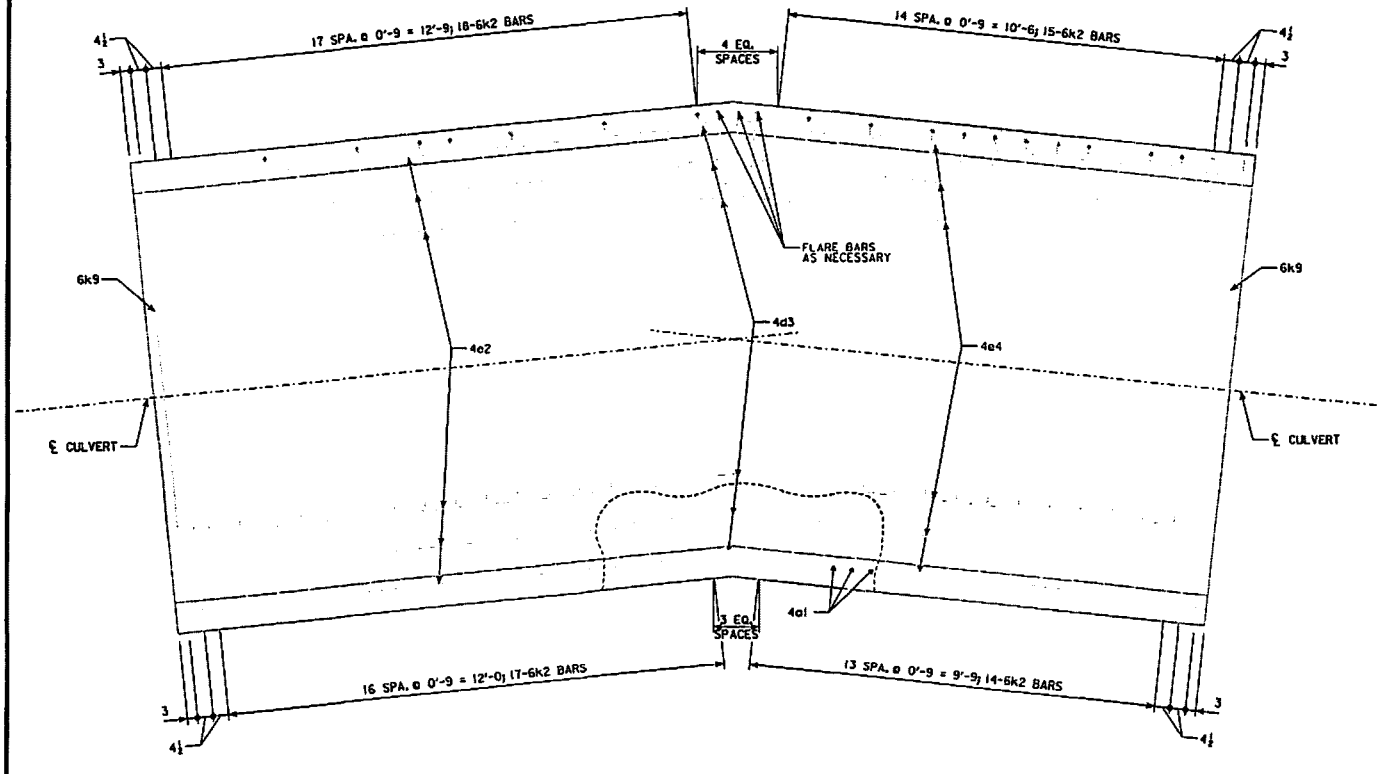
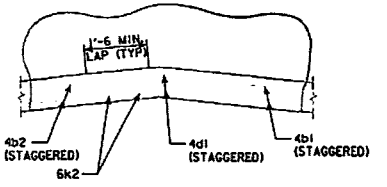


PLAN VIEW
SHOWING TOP SLAB REINFORCING



WALL SECTION
SHOWING TOP SLAB REINFORCING
REFER TO PLAN VIEW FOR SECTION LIMITS

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 34

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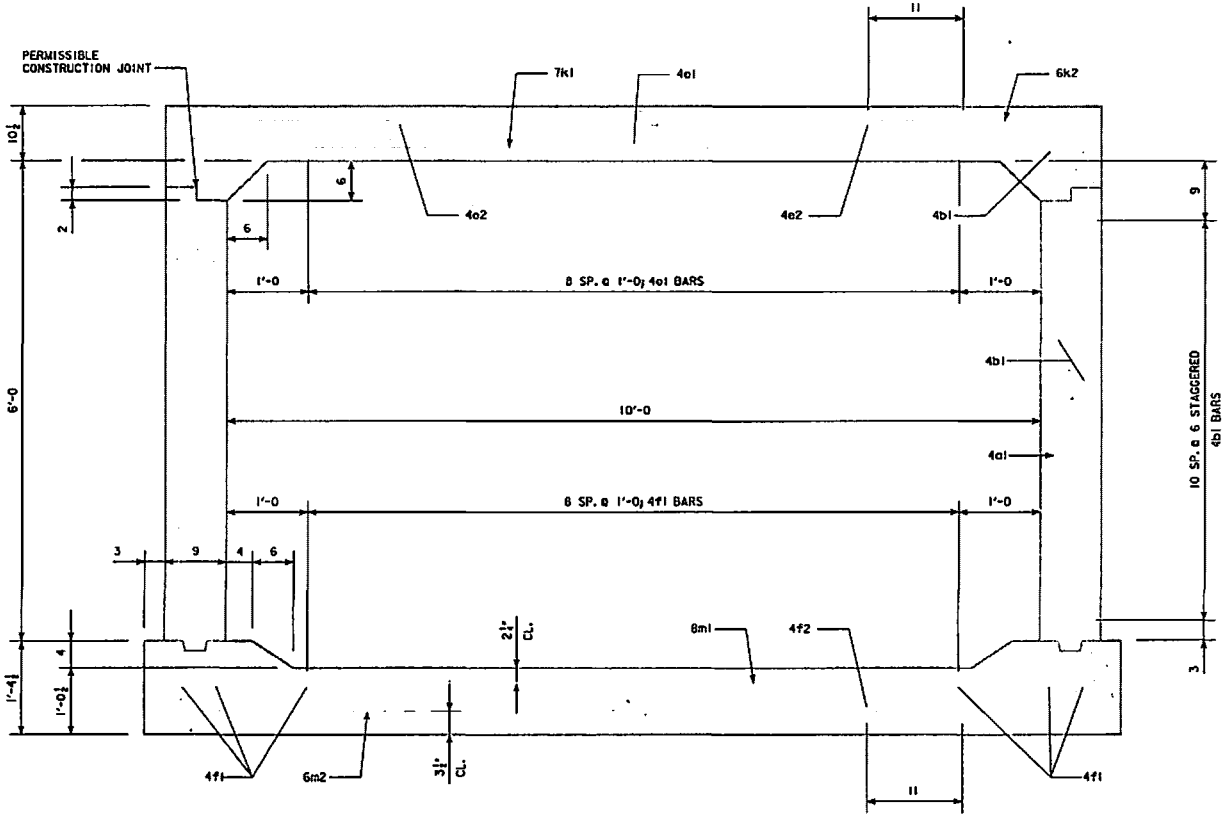
INCLUDES ADDENDA: 15DEC15.A02



10' X 6' BARREL SECTION A-A

NOTES:

1. DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET RCB G2-12.
2. THE k2 AND m2 BARS HORIZONTAL LEGS MAY LAP IN LOW FILL SITUATIONS.
3. DIMENSIONS LISTED IN THE BAR LIST ARE IN INCHES.

STAGE I DESIGN FOR 14° SKEW RT AH

10' X 6' X 198' PRECAST REINFORCED CONCRETE BOX CULVERT

12° BENT BARREL SECTION

STA. 432+85.45 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 8 FILE NO. 30568 DESIGN NO. 1415

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 35

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	95.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1,100	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	166.0	
4	2404-7775000	REINFORCING STEEL	LB	27,752	
5	2507-3250005	ENGINEERING FABRIC	SY	200.0	
6	2507-6800061	REVETMENT, CLASS E	TON	150.0	
7	2533-4980005	MOBILIZATION	LS	1.00	
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B.3 OF STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
7	2533-4980005	MOBILIZATION - -
8	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIAL, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE END CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN.

STAGE I DESIGN FOR 8° SKEW RT AH

8' X 6' X 142' REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 1442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 36

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 8'-0 x 6'-0' x 142'-0 RCB CULVERT, SKEWED 8° R.A. AT STA. 11442+02.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 14 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a) IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION.

THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT IS LUMP SUM.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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 WORX ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCD 8-6-12	4-12	-
PWH 15-1-12	4-12	-
PWH 15-2-12	4-12	-
PWH 15-3-12	4-12	-
PWH 15-4-12	4-12	-
PWH 15-7-12	4-12	-
CBJ 2-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8'X6' HEADWALL 15° SKEW (1 REQ'D)	2,481	2,481
29'-0 BARREL SECTION (4 REQ'D)	4 @ 4439	17,756
26'-0 BARREL SECTION (1 REQ'D)	3,980	3,980
BELL JOINTS (5 REQ'D)	5 @ 707	3,535
	TOTAL (LBS.)	27,752

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
8'X6' HEADWALL 15° SKEW (1 REQ'D)	1.2	9.2	5.1	15.5
29'-0 BARREL SECTION (4 REQ'D)	4 @ 7.7 = 30.8	4 @ 10.0 = 40.0	4 @ 9.1 = 36.4	107.2
26'-0 BARREL SECTION (1 REQ'D)	6.9	9.0	8.1	24.2
BELL JOINTS (5 REQ'D)	5 @ 1.3 = 6.3	5 @ 1.5 = 7.7	5 @ 1.0 = 5.2	19.1
			TOTAL (CU. YDS.)	166.0

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE I DESIGN FOR 8° SKEW RT AH

8' X 6' X 142' REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 37

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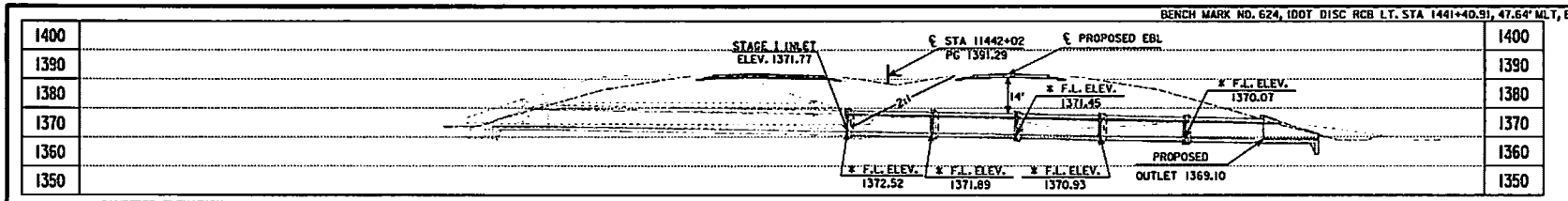
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 624, IDOT DISC RCB LT. STA 1441+40.91, 47.64' MLT, EL=1383.058

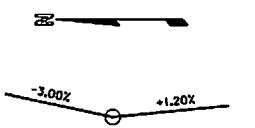


* CAMBERED ELEVATION

LONGITUDINAL SECTION ALONG ℄ CULVERT

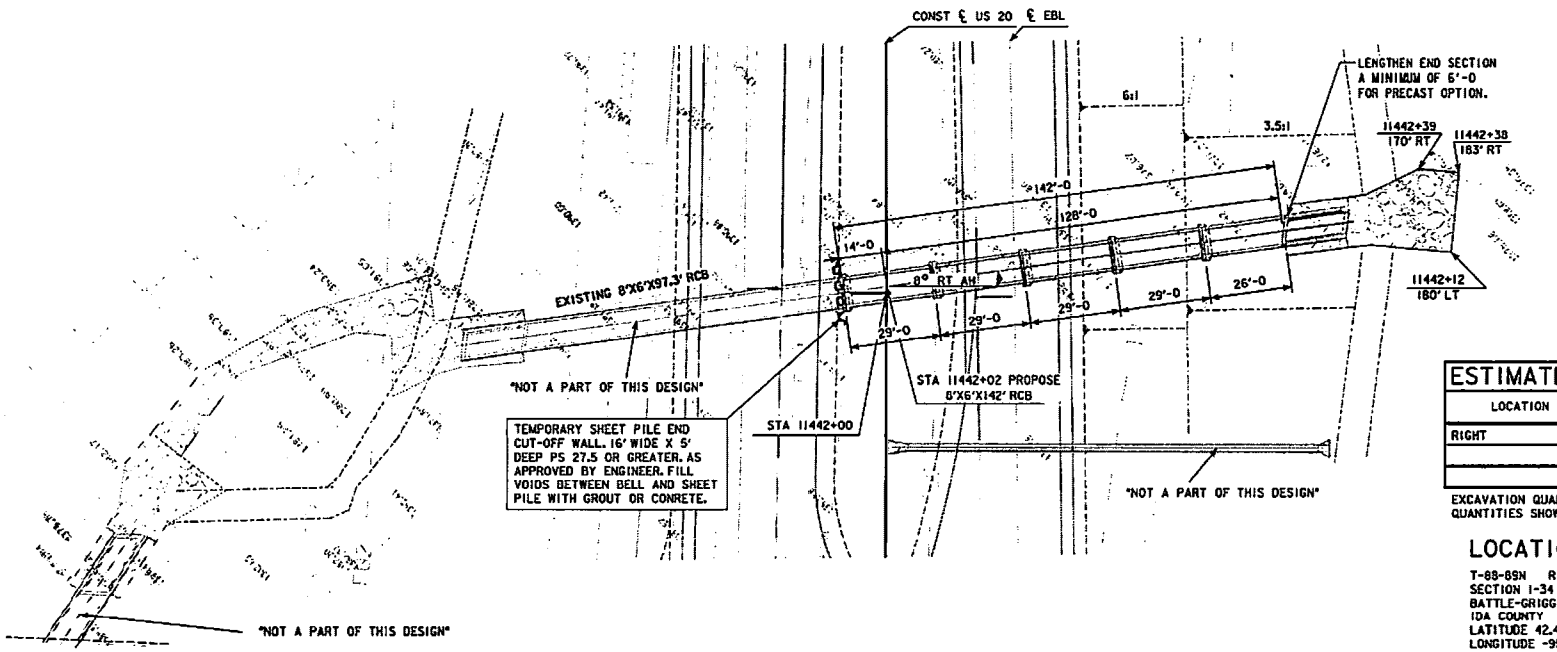
DESIGN FILL HEIGHT = 14'
ANTICIPATED SETTLEMENT = 0.85

ONE 15° HDWL



VPI STA = 11439+50 VC = 1000'
VPI ELEV = 1386.98

PROPOSED PROFILE GRADE US 20

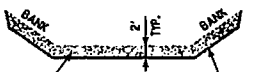


HYDRAULIC DATA

DRAINAGE AREA = 513 ACRES R
Q_{50} = 487 CFS
HW ELEV. = 1381.24

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD
F05 KNOLOGY
T4 SCHALLER TELEPHONE



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
RIGHT	150	200	95
TOTALS	150	200	95

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

LOCATION

T-88-8SN R-40W
SECTION 1-34
BATTLE-GRIGGS TOWNSHIP
IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

STAGE I DESIGN FOR 8° SKEW RT AH

8' X 6' X 142' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11442+02.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 38

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	95.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1,100	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	34.4	
4	2404-7775000	REINFORCING STEEL	LB	5,853	
5	2415-2110806	PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	LF	119.0	
6	2415-2200806	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	EACH	1	
7	2507-3250005	ENGINEERING FABRIC	SY	200.0	
8	2507-6800061	REVETMENT, CLASS E	TON	150.0	
9	2533-4980005	MOBILIZATION	LS	1.00	
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANING FENCE ANCHORS.
5	2415-2110806	PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
6	2415-2200806	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 15° SKEW PRECAST END SECTION, PRECAST LINTEL BEAM, AND PRECAST CURTAIN WALL.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
9	2533-4980005	MOBILIZATION - -
10	2599-9999010	TEMPORARY SHEET PILE END CUT-OFF WALL INCLUDES ALL COSTS FOR MATERIAL, EQUIPMENT, AND LABOR FOR INSTALLATION AND REMOVAL OF THE TEMPORARY SHEET PILE AND CUT-OFF WALL AS DETAILED ON THE SITUATION PLAN.

STAGE 1 DESIGN FOR 8° SKEW RT AH

8' X 6' X 148' PRECAST REINFORCED CONCRETE BOX CULVERT QUANTITIES

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 39

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 8'-0 x 6'-0' x 148'-0 RCB CULVERT, SKEWED 8° R.A. AT STA. 11442+02.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 14 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a) IS # 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT CONSTRUCTION.

THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT IS LUMP SUM.

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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 8-6-12	4-12	-
PRCB G1-13	1-13	-
PRCB G2-13	1-13	-
PRCB 8-13	1-13	-
PES 2-13-T3	1-13	5-13
PES 3-13-T3	1-13	-
CBJ 2-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
29'-0 BARREL SECTION	4439	4,439
BELL JOINTS (2 REQ'D)	2 @ 707	1,414
	TOTAL (LBS.)	5,853

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
29'-0 BARREL SECTION	7.7	10.0	9.1	26.8
BELL JOINTS (2 REQ'D)	2 @ 1.3 = 2.6	2 @ 1.5 = 3.0	2 @ 1.0 = 2.0	7.6
			TOTAL (CU. YDS.)	34.4

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE I DESIGN FOR 8° SKEW RT AH

8' X 6' X 148' PRECAST REINFORCED CONCRETE BOX CULVERT

GENERAL NOTES

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 40

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 14 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 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 "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 $\frac{3}{4}$ 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.

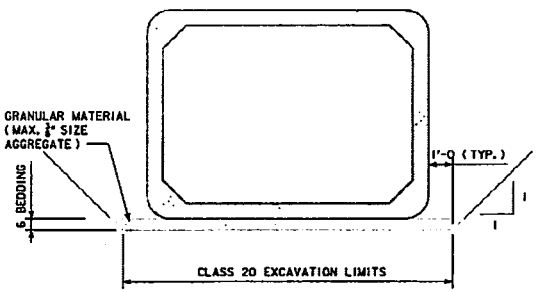
THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT 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' x 2' 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.



GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE BELL JOINT.

STAGE I DESIGN FOR 0° SKEW RT AH

8' X 6' X 148' PRECAST REINFORCED CONCRETE BOX CULVERT GENERAL NOTES

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 41

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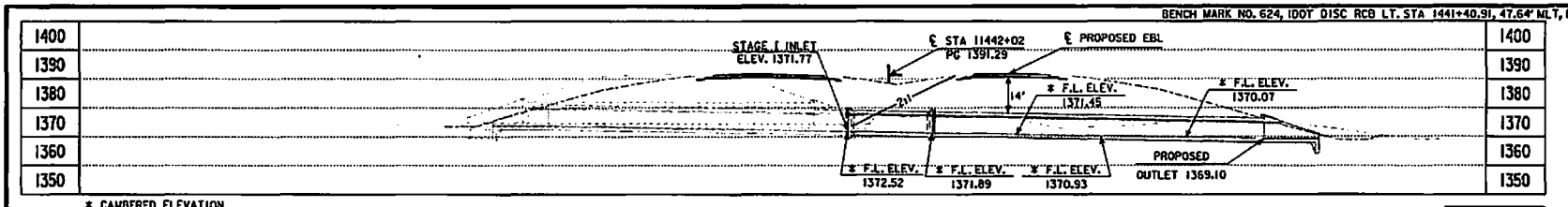


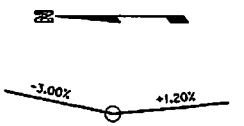
* CAMBERED ELEVATION

F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

LONGITUDINAL SECTION ALONG ℄ CULVERT

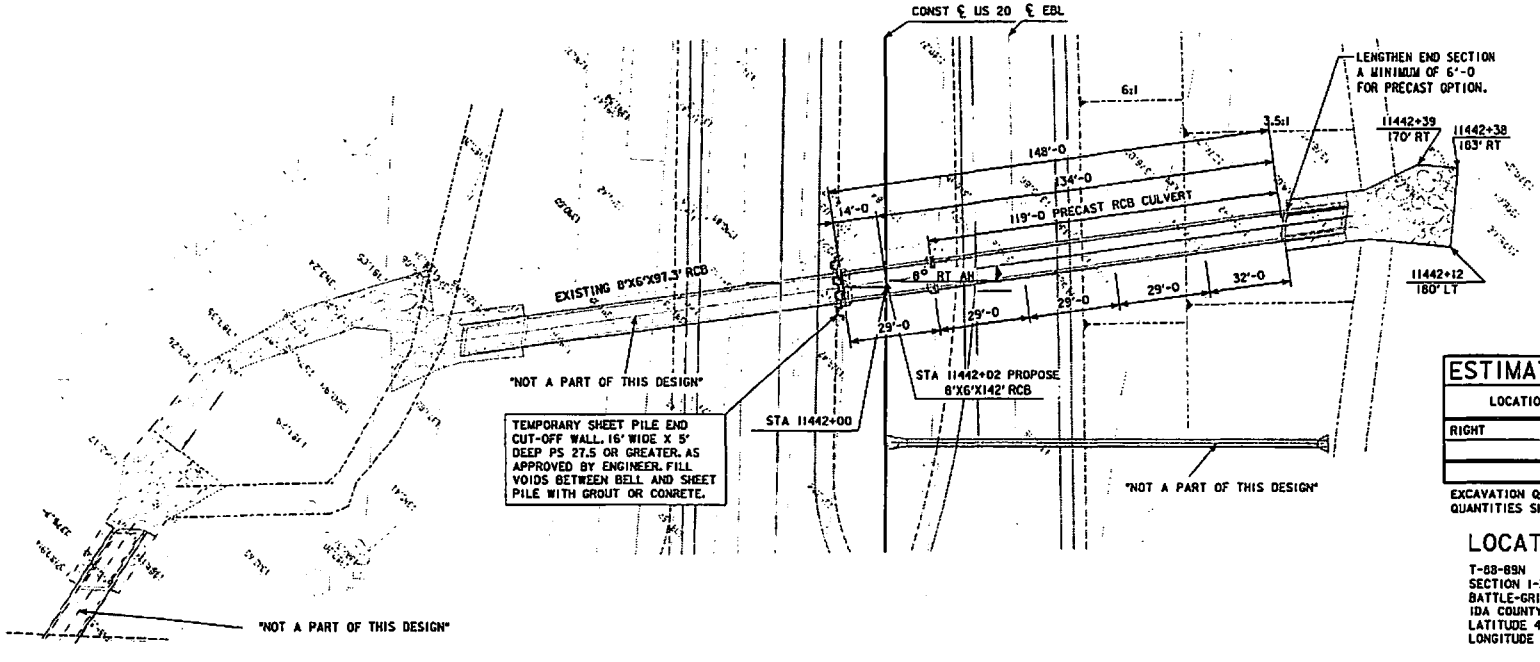
DESIGN FILL HEIGHT = 14'
ANTICIPATED SETTLEMENT = 0.85

ONE 15° HDWL



VPI STA = 11439+50 VC = 1000'
VPI ELEV = 1386.98

PROPOSED PROFILE GRADE US 20

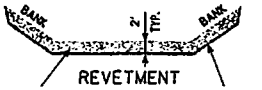


HYDRAULIC DATA

DRAINAGE AREA = 513 ACRES R
Q_{50} = 487 CFS
HW ELEV. = 1381.24

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD
F05 KNOLOGY
T4 SCHALLER TELEPHONE



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
RIGHT	150	200	95
TOTALS	150	200	95

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

LOCATION

T-88-89N R-40W
SECTION 1-34
BATTLE-GRIGGS TOWNSHIP
IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.

STAGE I DESIGN FOR 8° SKEW RT AH

8' X 6' X 148' PRECAST REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 1515

DESIGN TEAM · SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 42

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	90.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	5,000	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	379.7	
4	2404-7775000	REINFORCING STEEL	LB	66,239	
5	2507-3250005	ENGINEERING FABRIC	SY	185.0	
6	2507-6800061	REVETMENT, CLASS E	TON	135.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B.3 OF STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
7	2533-4980005	MOBILIZATION - -

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 168' REINFORCED CONCRETE BOX CULVERT EXTENSION QUANTITIES

STA. 11219+00.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 0816

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 43

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 10'-0 x 10'-0 RCB CULVERT CONSTRUCTED IN STAGE I, (DESIGN #1315) WITH A 10'-0 x 10'-0 x 168'-0 RCB CULVERT, SKEWED 30° L.A. AT STA. 11219+00.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 29 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS I EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (5a) IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT 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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCD 10-10-12	4-12	-
PWH 30-1-12	4-12	-
PWH 30-2-12	4-12	-
PWH 30-3-12	4-12	-
PWH 30-4-12	4-12	-
PWH 30-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'x10' HEADWALL 30 ° SKEW (1 REQ'D)	6,875	6,875
17'-0 BARREL SECTION (2 REQ'D)	2 @ 5,462	10,924
20'-0 BARREL SECTION (1 REQ'D)	6,426	6,426
38'-0 BARREL SECTION (3 REQ'D)	3 @ 12,208	36,624
BELL JOINTS (5 REQ'D)	5 @ 1,078	5,390
	TOTAL (LBS.)	66,239

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
10'x10' HEADWALL 30 ° SKEW (1 REQ'D)	1.6	21.9	15.2	38.7
17'-0 BARREL SECTION (2 REQ'D)	2 @ 9.7 = 19.4	2 @ 11.7 = 23.4	2 @ 13.1 = 26.2	69.0
20'-0 BARREL SECTION (1 REQ'D)	11.4	13.8	15.5	40.7
38'-0 BARREL SECTION (3 REQ'D)	3 @ 21.6 = 64.8	3 @ 26.1 = 78.3	3 @ 29.4 = 88.2	231.3
BELL JOINTS (5 REQ'D)	5 @ 2.4 = 12.0	5 @ 2.9 = 14.5	5 @ 2.8 = 14.0	40.5
			TOTAL (CU. YDS.)	379.7

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN

NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 168' REINFORCED CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 0818

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 44

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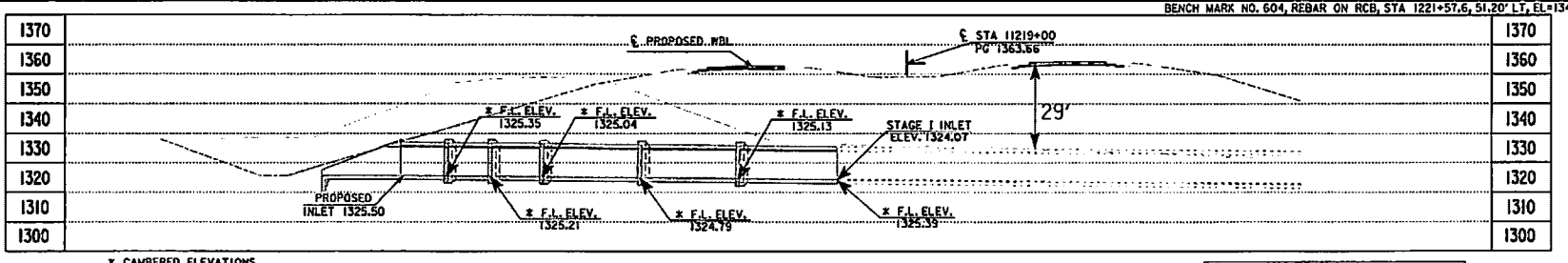
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 604, REBAR ON RCB, STA 1221+57.6, 51.20' LT, EL=1340.549



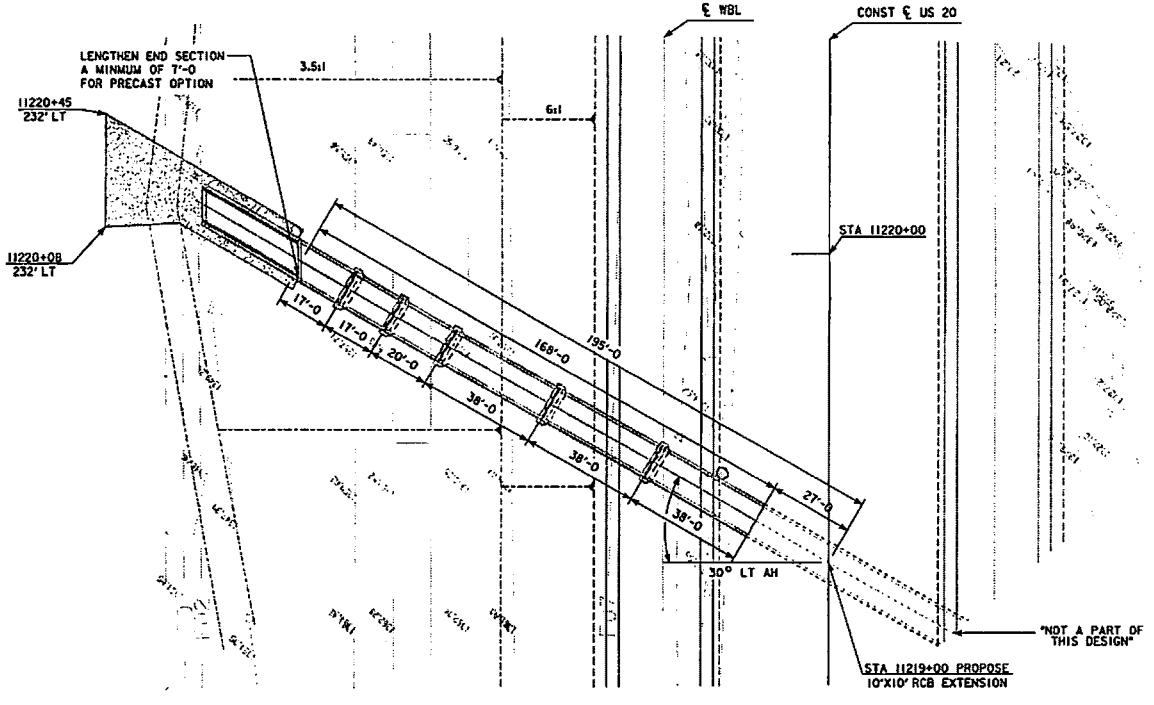
* CAMBERED ELEVATIONS
F.I. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

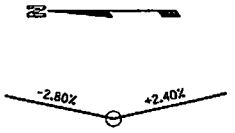
LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 29'
ANTICIPATED SETTLEMENT = 1.4'

CAMBERED ELEVATIONS MAY BE ADJUSTED BY THE ENGINEER PENDING RESULTS OF THE STAGE I RESEARCH SURVEY

ONE 30° HDWL





VPI STA = 11224+00 VC = 1100'
VPI ELEV = 1348.98

PROPOSED PROFILE GRADE US 20

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO1 INS
FO2 QWEST
FO7 ICN
T4 SCHALLER TELEPHONE

HYDRAULIC DATA

DRAINAGE AREA = 676 ACRES H-R
Q_{50} = 656 CFS
HW ELEV. = 1333.41

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	135	185	90
TOTALS	135	185	90

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION

T-88-89N R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.646603°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS, UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 168' REINFORCED CONCRETE BOX CULVERT EXTENSION

SITUATION PLAN

STA. 11219+00.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 0818

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 45

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	90.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	5,000	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	85.2	
4	2404-7775000	REINFORCING STEEL	LB	13,286	
5	2415-2111010	PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT.	LF	136.0	
6	2415-2201010	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT.	EACH	1	
7	2507-3250005	ENGINEERING FABRIC	SY	185.0	
8	2507-6800061	REVETMENT, CLASS E	TON	135.0	
9	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2415-2111010	PRECAST CONCRETE BOX CULVERT, 10 FT. X 10 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLES PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
6	2415-2201010	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 10 FT. X 10 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 30° SKEW PRECAST END SECTION, PRECAST LINTEL BEAM, AND PRECAST CURTAIN WALL.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
9	2533-4980005	MOBILIZATION - -

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 174' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION QUANTITIES

STA. 1121+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30568 DESIGN NO. 0818

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 46

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 10'-0 x 10'-0 RCB CULVERT CONSTRUCTED IN STAGE 1, (DESIGN #1315) WITH A 10'-0 x 10'-0 x 174'-0 RCB CULVERT, SKEWED 30° L.A. AT STA. 11219+00.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 29 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (5a1 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT 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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH CULVERT JOINT AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE CULVERT BOX INSTALLATION.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-10-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
38'-0 BARREL SECTION	12,208	12,208
BELL JOINTS	1,078	1,078
	TOTAL (LBS.)	13,286

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
38'-0 BARREL SECTION	21.6	26.1	29.4	77.1
BELL JOINTS	2.4	2.9	2.8	8.1
			TOTAL (CU. YDS.)	85.2

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 174' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 0818

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 47

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

PRECAST CONCRETE BOX CULVERTS AND PRECAST CONCRETE HEADWALLS 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 LRFD BRIDGE DESIGN MANUAL. THE MINIMUM REQUIREMENTS INCLUDE REINFORCEMENT CLEARANCE REQUIREMENTS USED IN THE "IDOT STANDARDS."

THE CONTRACTOR SHALL ALLOW THIRTY CALENDAR DAYS FOR THE ENGINEER'S REVIEW OF THE PRECAST PLANS.

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 "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".

BENT BARREL SECTIONS AND THE BARREL SECTION ADJACENT TO STAGE II CONSTRUCTION SHALL BE CAST-IN-PLACE. A CAST-IN-PLACE STANDARD BELL JOINT SHALL BE USED FOR CONNECTING CAST-IN-PLACE UNITS TO PRECAST UNITS (BOTH UPSTREAM AND DOWNSTREAM). NO ADDITIONAL PAYMENT WILL BE MADE FOR THE ADDITIONAL BELL JOINTS REQUIRED.

BELL JOINTS SHALL BE INCLUDED IN THE COST FOR STRUCTURAL CONCRETE (RCB CULVERT)

GALVANIZED CULVERT TIES ARE REQUIRED BETWEEN ALL PRECAST UNITS. CULVERT TIES SHALL BE INCLUDED IN THE COST FOR PRECAST CONCRETE BOX CULVERT. TIE RODS SHALL BE A MINIMUM OF 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 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.

FOR THE PRECAST OPTION THE CULVERT SHALL BE LENGTHENED A MINIMUM AS SHOWN ON THE SITUATION PLAN TO ACCOMMODATE THE DIFFERENCES BETWEEN THE PRECAST AND CAST-IN-PLACE HEADWALLS.

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. INCLUDE CAST-IN-PLACE BENT SECTIONS, AND NON-STANDARD HEADWALLS. NOTE THE LOCATION OF CONNECTING CAST-IN-PLACE BELL JOINTS.

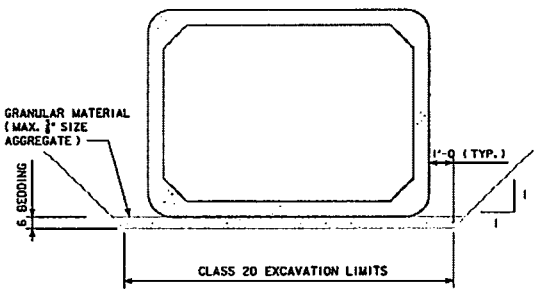
B. DIMENSION THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTHS.

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. APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST BOX OPTIONS AND "NONSTANDARD" END SECTION OPTIONS. 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.

INSTALLATION OF ALL PRECAST UNITS SHALL BE IN ACCORDANCE WITH THE FOLLOWING: 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 ARE 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 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 ITEM "STRUCTURAL CONCRETE (RCB CULVERT)." THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS. CLASS E REVETMENT WILL BE PLACED AROUND 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' X 2' 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 REQUIRES LENGTHENING AS SHOWN ON THE SITUATION PLAN.



GRANULAR BEDDING DETAIL

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

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 168' REINFORCED CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 0818

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 48

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INCLUDES ADDENDA: 15DEC115.A02

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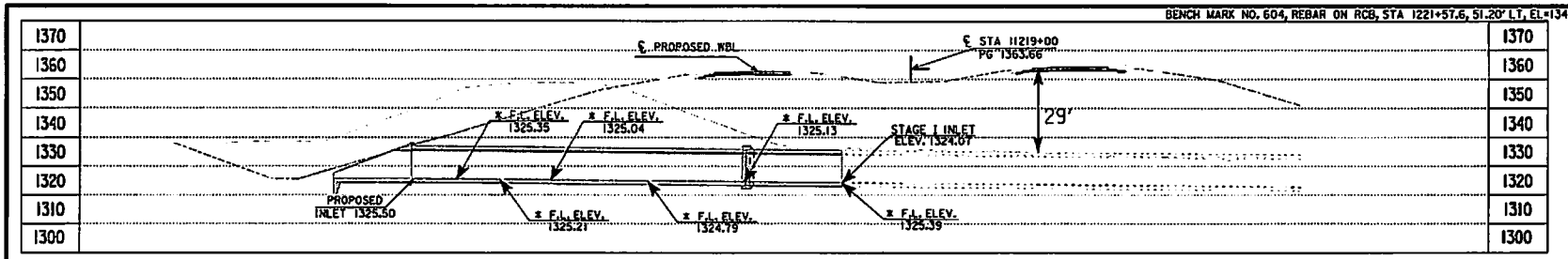
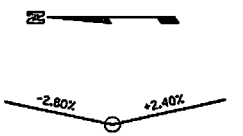




VPI STA = 11224+00 VC = 1100'
VPI ELEV = 1348.98

PROPOSED PROFILE GRADE US 20

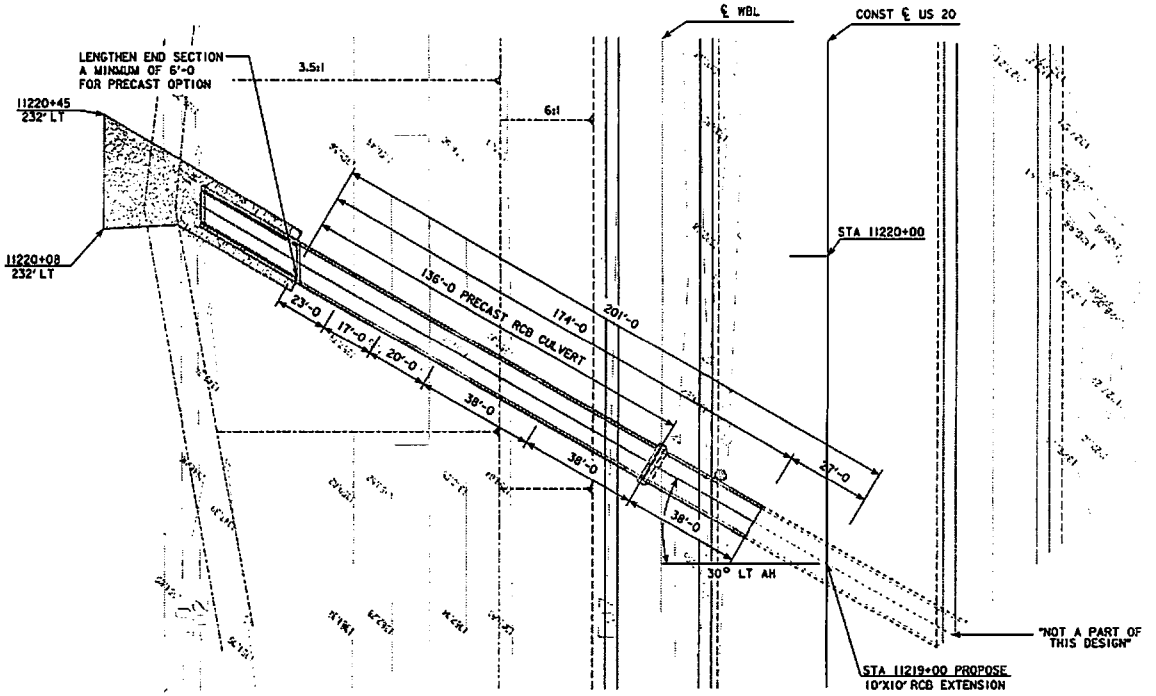
* CAMBERED ELEVATIONS
F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 29'
ANTICIPATED SETTLEMENT = 1.4'

ONE 30° HDWL

CAMBERED ELEVATIONS MAY BE ADJUSTED BY THE ENGINEER PENDING RESULTS OF THE STAGE I CONSTRUCTION SURVEY.



UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO1 INS
FO2 QWEST
FO7 ICN
T4 SCHALLER TELEPHONE

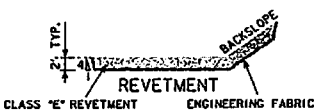
HYDRAULIC DATA

DRAINAGE AREA = 676 ACRES H-R
Q_{50} = 656 CFS
HW ELEV. = 1333.41

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	135	185	90
TOTALS	135	185	90

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.



LOCATION

T-88-8SN R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.646603°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.

STAGE II DESIGN FOR 30° SKEW LT AH

10' X 10' X 168' REINFORCED CONCRETE BOX CULVERT EXTENSION

SITUATION PLAN

STA. 11219+00.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 0818

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 49

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	55.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	2,800	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	186.1	
4	2404-7775000	REINFORCING STEEL	LB	33,742	
5	2507-3250005	ENGINEERING FABRIC	SY	130.0	
6	2507-6800061	REVETMENT, CLASS E	TON	100.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B.3 OF STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
7	2533-4980005	MOBILIZATION - -

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL QUANTITIES

STA. 11255+80.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 50

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 10' X 6' CULVERT CONSTRUCTED IN STAGE I, (DESIGN #1415) WITH A 10' x 6' x 119'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 14° R.A. AT STA. 11255+80.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 19 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS I EXPOSTURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (5a: IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT 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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, $f'c$ = 4.0 KSI.

HEADWALL NOTES:

THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.

THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A ¾" DRESSED AND BEVELED STRIP.

ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.

CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.

HORIZONTAL TAILS OF BARS "b" & "a" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "4d1" AND "6f1" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET. THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-G-12	4-12	-
PWH 0-1-12	4-12	-
PWH 0-2-12	4-12	-
PWH 0-3-12	4-12	-
PWH 0-4-12	4-12	-
PWH 0-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'x6' HEADWALL 15° SKEW (1 REQ'D)	3,513	3,513
29'-0 BARREL SECTION (3 REQ'D)	3 @ 6,689	20,067
32'-0 BARREL SECTION (1 REQ'D)	7,381	7,381
BELL JOINTS (3 REQ'D)	3 @ 927	2,781
	TOTAL (LBS.)	33,742

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
10'x6' HEADWALL 15° SKEW (1 REQ'D)	1.4	12.2	6.7	20.3
29'-0 BARREL SECTION (3 REQ'D)	3 @ 11.8 = 35.4	3 @ 14.5 = 43.5	3 @ 9.1 = 27.3	106.2
32'-0 BARREL SECTION (1 REQ'D)	13.0	16.0	10.1	39.1
BELL JOINTS (3 REQ'D)	3 @ 2.4 = 7.1	3 @ 2.8 = 8.5	3 @ 1.6 = 4.9	20.5
			TOTAL (CU. YDS.)	186.1

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL GENERAL NOTES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 51

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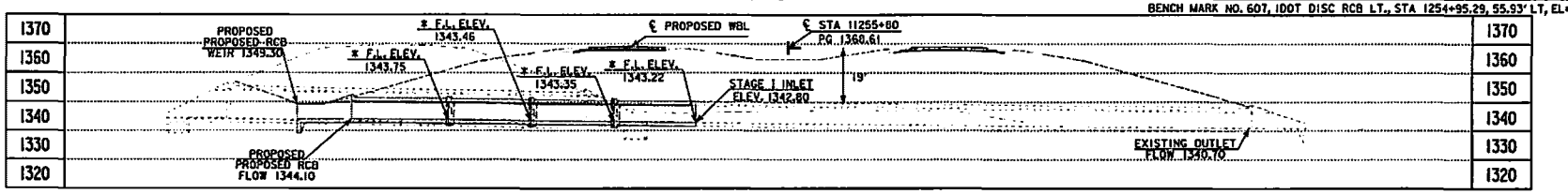
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 607, IDOT DISC RCB LT., STA 1254+95.29, 55.93' LT, EL=1356.44



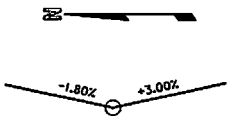
* CAMBERED ELEVATIONS

F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

LONGITUDINAL SECTION ALONG ℄ CULVERT

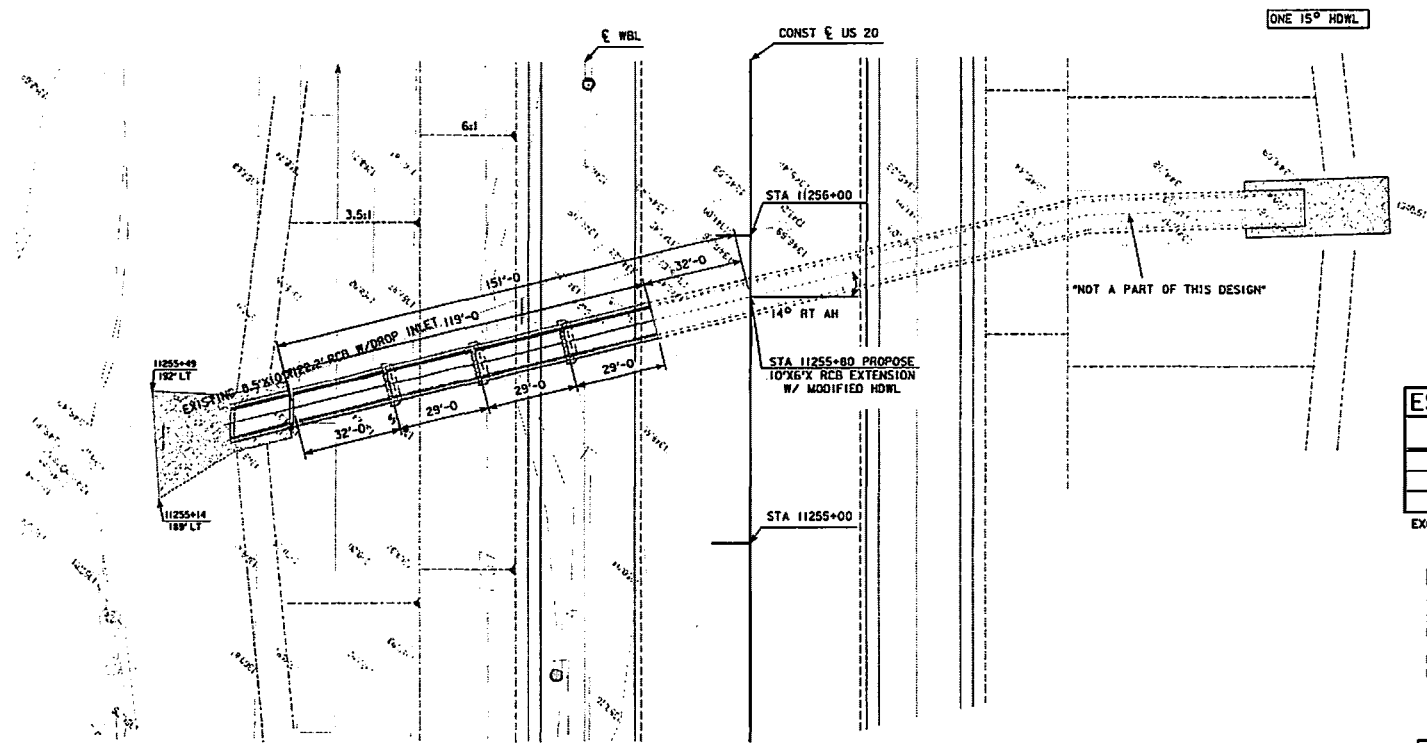
DESIGN FILL HEIGHT = 19'
ANTICIPATED SETTLEMENT = 0.44'

CAMBERED ELEVATIONS MAY BE ADJUSTED BY THE ENGINEER PENDING RESULTS OF THE STAGE I RESEARCH SURVEY



VPI STA = 11258+50 VC = 1000'
VPI ELEV = 1362.48

PROPOSED PROFILE GRADE US 20



SITUATION PLAN

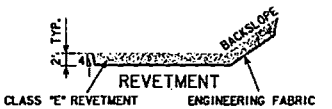
BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
FO7 ICN
T4 SCHALLERR TELEPHONE

HYDRAULIC DATA

DRAINAGE AREA = 581 ACRES R
Q_{50} = 519 CFS
HW ELEV. = 1350.94



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	100	130	55
TOTALS	100	130	55

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION

T-88-89N R-41W
SECTION 4-36
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474974°
LONGITUDE -95.632962°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL SITUATION PLAN

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 52

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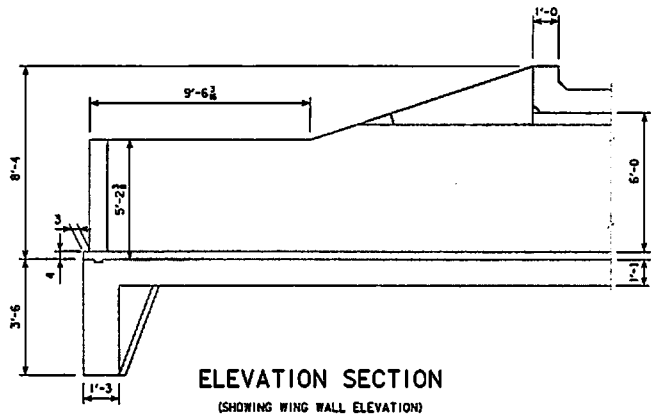
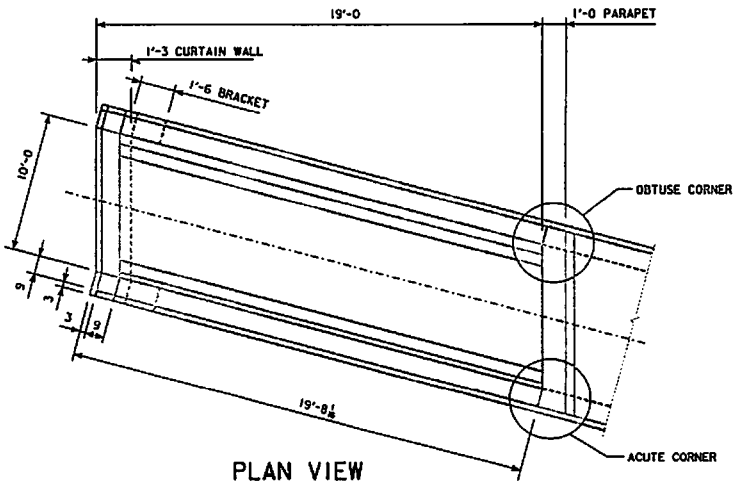
INCLUDES ADDENDA: 15DEC115.A02

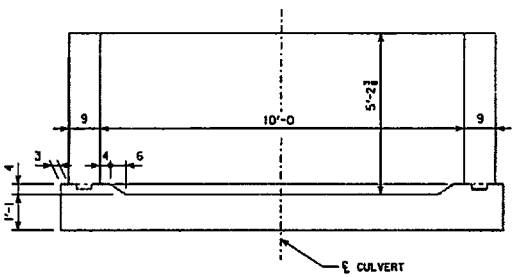


ELEVATION SECTION

(SHOWING WING WALL ELEVATION)



PLAN VIEW



ELEVATION SECTION

(SHOWING WEIR ELEVATION)

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 53

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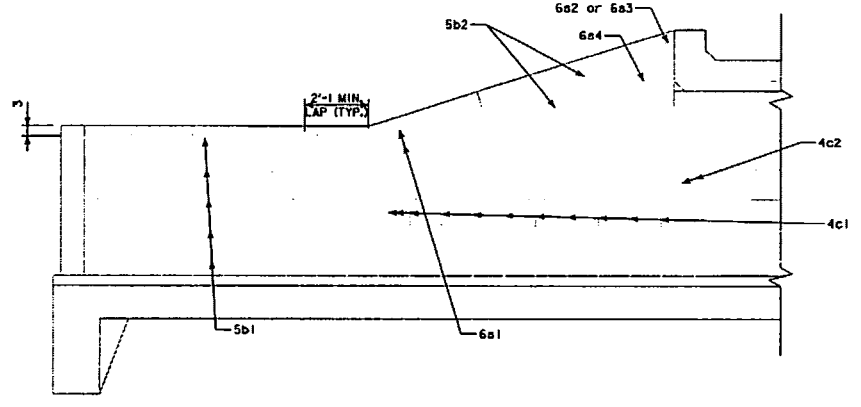
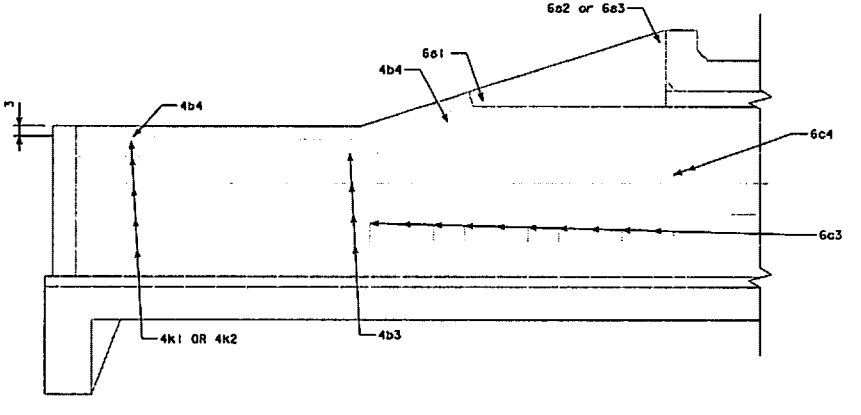
INCLUDES ADDENDA: 15DEC115.A02

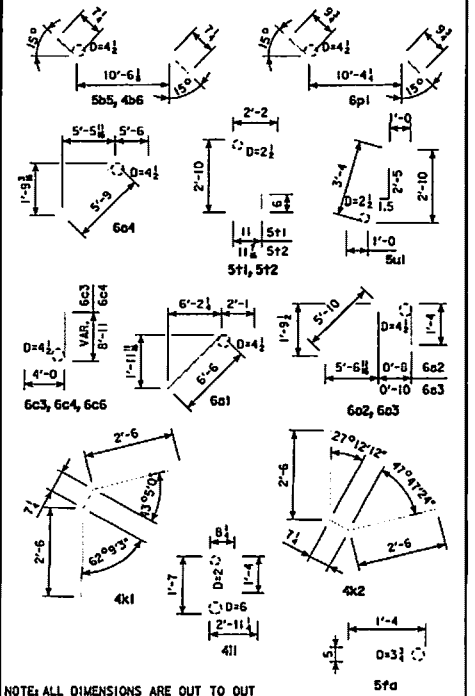


TYPICAL VIEW - FRONT FACE
WINGWALL REINFORCING



TYPICAL VIEW - BACK FACE
WINGWALL REINFORCING

BENT BAR DETAILS



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

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WT.
5f0	FENCE ANCHOR (GALV.)		2	3'-1	6
5b1	WINGWALL, F.F.H.		10	22'-7	236
5b2	WINGWALL, F.F.H.	---	4	VARIABLE 7'-2:10'-3	37
4b3	WINGWALL, B.F.H.		8	22'-8	122
4b4	WINGWALL, B.F.H.		2	11'-9	16
5b5	WEIR END WALL, F.F.H.		6	11'-6	72
4b6	WEIR END WALL, B.F.H.		6	11'-6	46
4c1	WINGWALL, F.F.V.		41	VARIABLE 5'-10:8'-9	199
4c2	WINGWALL, F.F.V.(O)		2	8'-11	12
4c2	WINGWALL, F.F.V.(A)		2	8'-11	12
6c3	WINGWALL, B.F.V.		41	VARIABLE 9'-10:12'-10	700
6c4	WINGWALL, B.F.V.(O)		2	12'-11	39
6c4	WINGWALL, B.F.V.(A)		2	12'-11	39
4c5	WEIR END WALL, F.F.V.		10	5'-10	39
6c6	WEIR END WALL, B.F.V.		10	12'-10	193
4d1	APRON, LONGIT. BOTT.		9	22'-6	135
6f1	APRON, LONGIT. TOP		11	22'-6	372
4l1	PARAPET, VERT.		21	6'-7	92
7j1	PARAPET, HORZ.		4	11'-7	95
4k1	WINGWALL, CORNER, B.F.H.		5	5'-7	19
4k2	WINGWALL, CORNER, B.F.H.		5	5'-7	19
6m1	APRON, TRANS., TOP		26	11'-8	456
6m2	APRON, TRANS., TOP		3	VARIABLE 3'-9:8'-11	28
4m3	APRON, TRANS., BOTT.		19	7'-0	89
6p1	CURTAIN, HORZ.		6	12'-0	109
6a1	WING SLOPE, BOTH F.H.		6	8'-8	79
6a2	WING SLOPE, BOTH F.(O)		2	7'-10	24
6a3	WING SLOPE, BOTH F.(A)		2	8'-0	25
6a4	WING SLOPE, F.F.		2	11'-3	34
5t1	CURTAIN, VERT.		11	6'-5	74
5t2	CURTAIN, VERT. ENDS		4	6'-5	27
5u1	BRACKET, VERT.		4	5'-4	22

ESTIMATED QUANTITIES ONE HEADWALL				
REINF. STEEL		351	LBS.	
CONCRETE	PARAPET Δ	1.4	20.3 CU.YD.	
	WINGWALLS	6.7		
	APRON	12.2		

Δ INCLUDES TOP OF WINGWALL AND WEIRWALL QUANTITIES.

(A) - INDICATES BAR LOCATED AT ACUTE CORNER.
(O) - INDICATES BAR LOCATED AT OBTUSE CORNER.
REFER TO SHEET 30 FOR ACUTE AND OBTUSE CORNER LOCATIONS.

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 54

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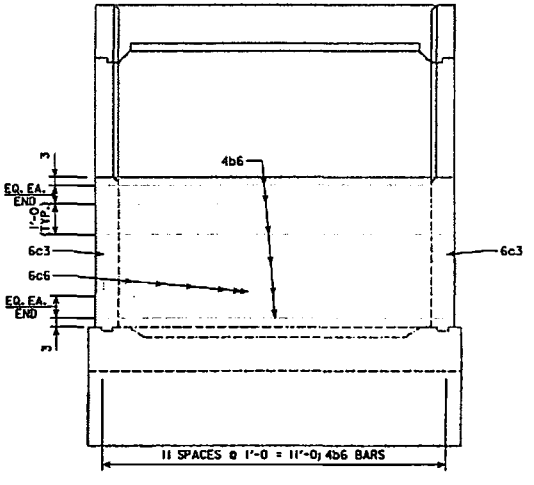
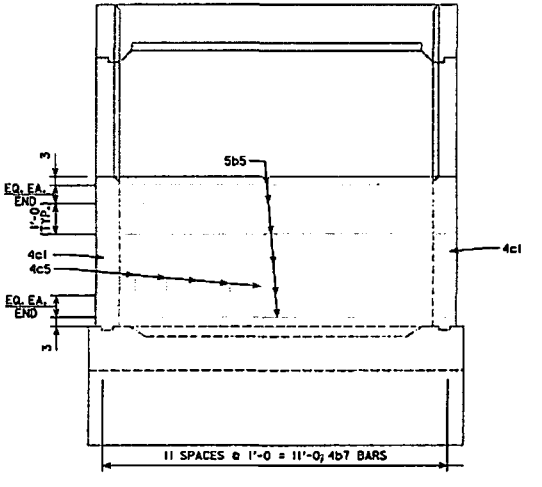
INCLUDES ADDENDA: ISDEC15.A02



CROSS SECTION THRU WEIR END
WALL BACK FACE



CROSS SECTION THRU WEIR END
WALL FRONT FACE

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL QUANTITIES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 55

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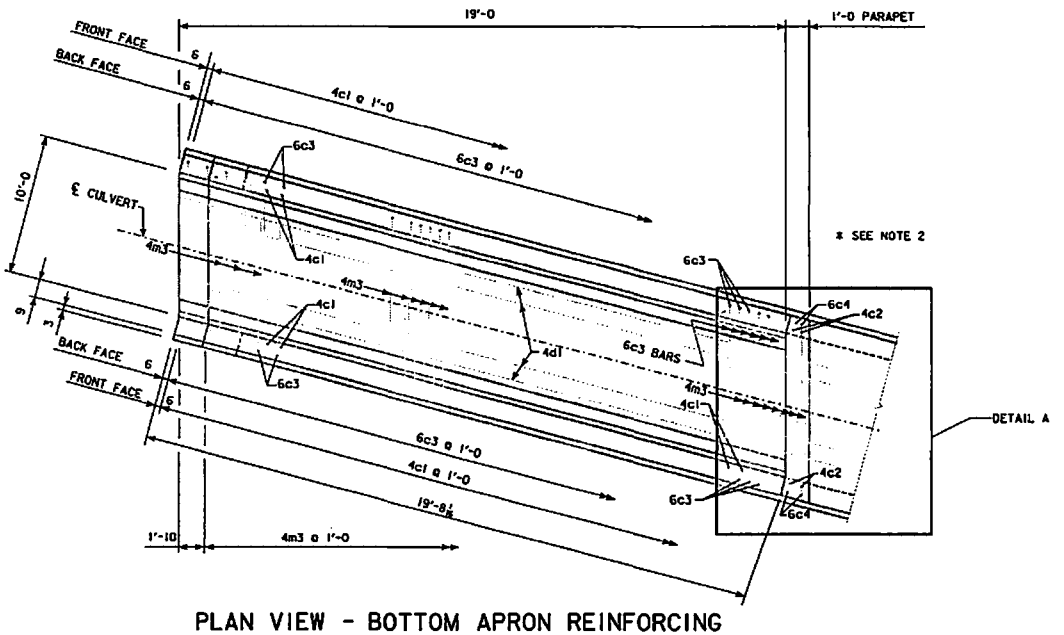
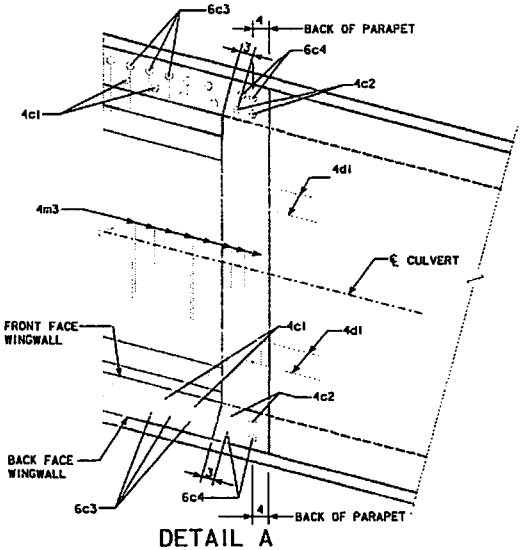
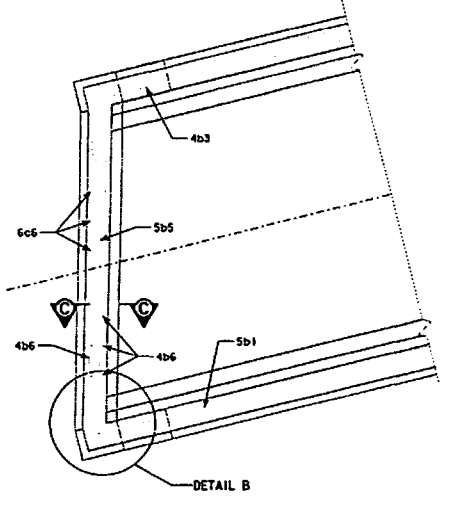
INCLUDES ADDENDA: 15DEC115.A02



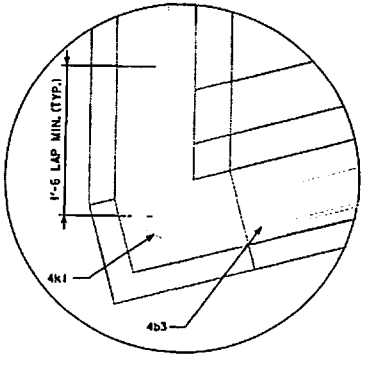
PLAN VIEW - BOTTOM APRON REINFORCING



DETAIL A



PLAN VIEW - WEIR REINFORCING



DETAIL B

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 56

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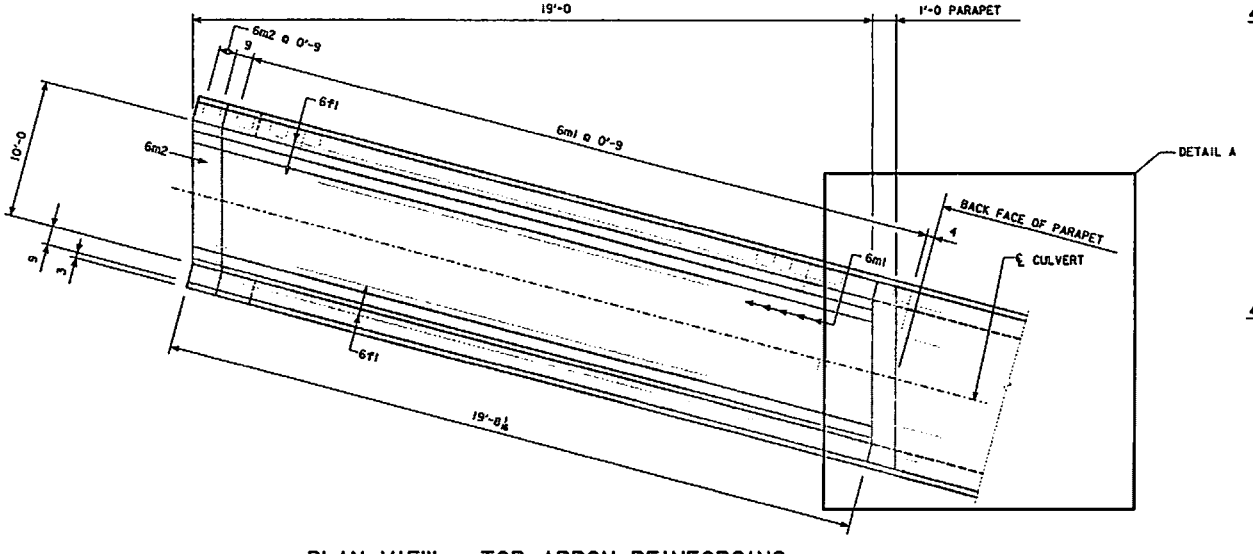
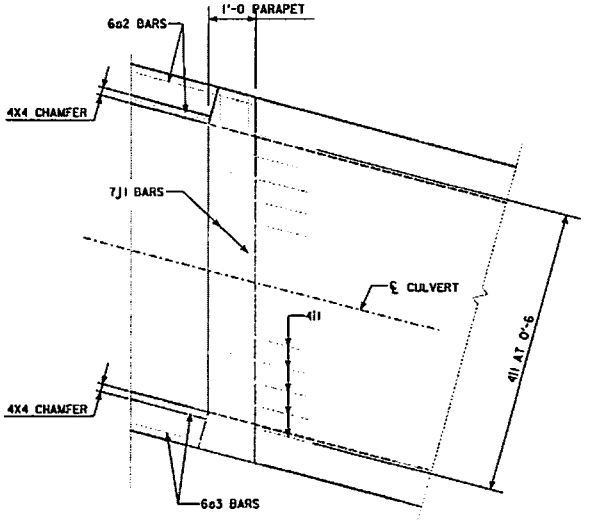


PLAN VIEW - TOP APRON REINFORCING



DETAIL A
SHOWING PARAPET BARS ONLY

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 57

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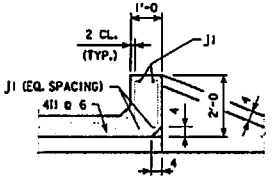
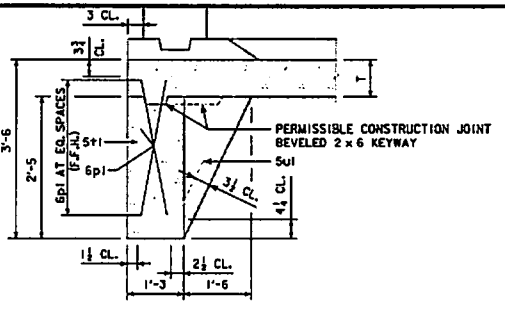
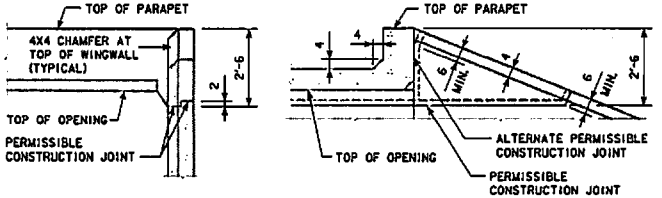
INCLUDES ADDENDA: 15DEC115.A02



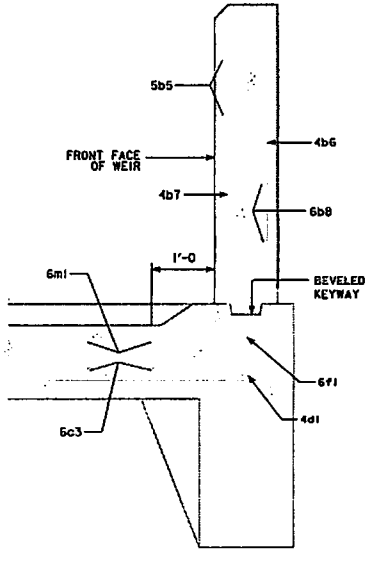
SECTION THRU PARAPET



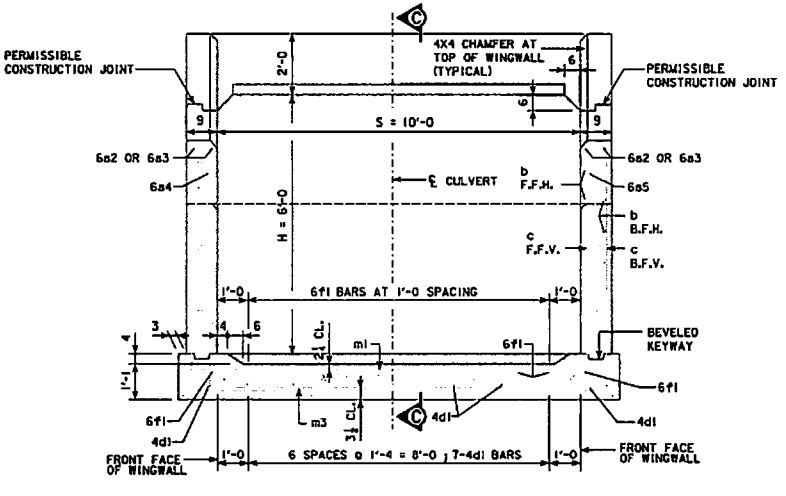
SECTION THRU CURTAIN WALL



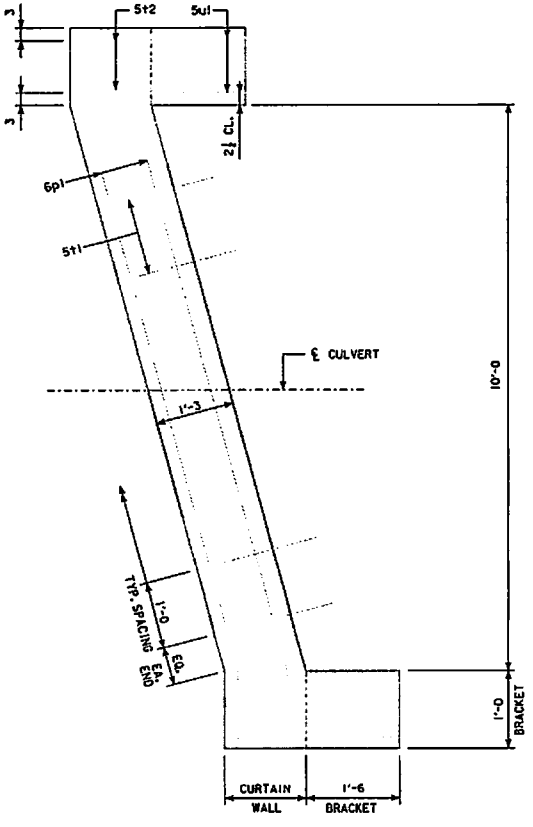
TOP OF WINGWALL DETAILS



TYPICAL CROSS SECTION C-C



TYPICAL CROSS SECTION - THRU HEADWALL



CURTAIN WALL DETAIL
APRON IS NOT SHOWN

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL WEIR DETAILS

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 58

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	55.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	2800	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	66.2	
4	2404-7775000	REINFORCING STEEL	LB	11,821	
5	2415-2111006	PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT.	LF	81.0	
6	2507-3250005	ENGINEERING FABRIC	SY	136.0	
7	2507-6800061	REVETMENT, CLASS E	TON	100.0	
8	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2415-2111006	PRECAST CONCRETE BOX CULVERT, 10 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
6	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B.3 OF STANDARD SPECIFICATIONS.
7	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
8	2533-4980005	MOBILIZATION - -

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL QUANTITIES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 59

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 10' X 6' CULVERT CONSTRUCTED IN STAGE 1, (DESIGN #1415) WITH A 10' x 6' x 119'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 14° R.A. AT STA. 11255+80.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 19 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
- TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 (Sq IS ⅛ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT 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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI.

HEADWALL NOTES:

THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY. THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A ¾" DRESSED AND BEVELED STRIP.

ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.

CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.

HORIZONTAL TAILS OF BARS "b" & "a" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "4d1" AND "6f1" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET. THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

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

STANDARD	ISSUED	REVISED
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 10-6-12	4-12	-
CBJ 3-12	4-12	7-13
CBJ 4-12	4-12	-
PRCB G1-13	1-13	-
PRCB G2-13	1-13	-
PRCB 10-13	1-13	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'x6' HEADWALL 15° SKEW (1 REQ'D)	3,513	3,513
32'-0 BARREL SECTION (1 REQ'D)	7,381	7,381
BELL JOINTS (1 REQ'D)	927	927
	TOTAL (LBS.)	11,821

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
10'x6' HEADWALL 15° SKEW (1 REQ'D)	1.4	12.2	6.7	20.3
32'-0 BARREL SECTION (1 REQ'D)	13.0	16.0	10.1	39.1
BELL JOINTS (1 REQ'D)	2.4	2.8	1.6	6.8
			TOTAL (CU. YDS.)	66.2

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN

NOTE: THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

GENERAL NOTES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 60

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 19 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 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 ¾ 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 ½ 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.

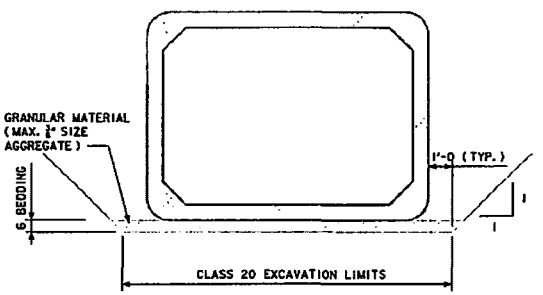
THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT 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' x 2' 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.



GRANULAR BEDDING DETAIL

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

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL GENERAL NOTES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 61

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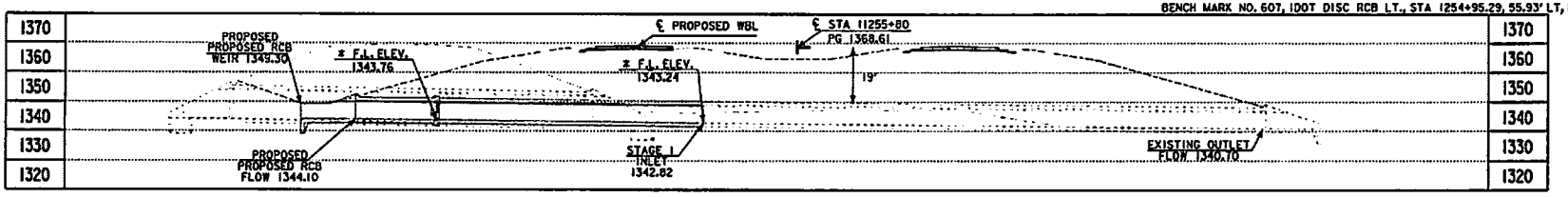
INCLUDES ADDENDA: 15DEC115.A02

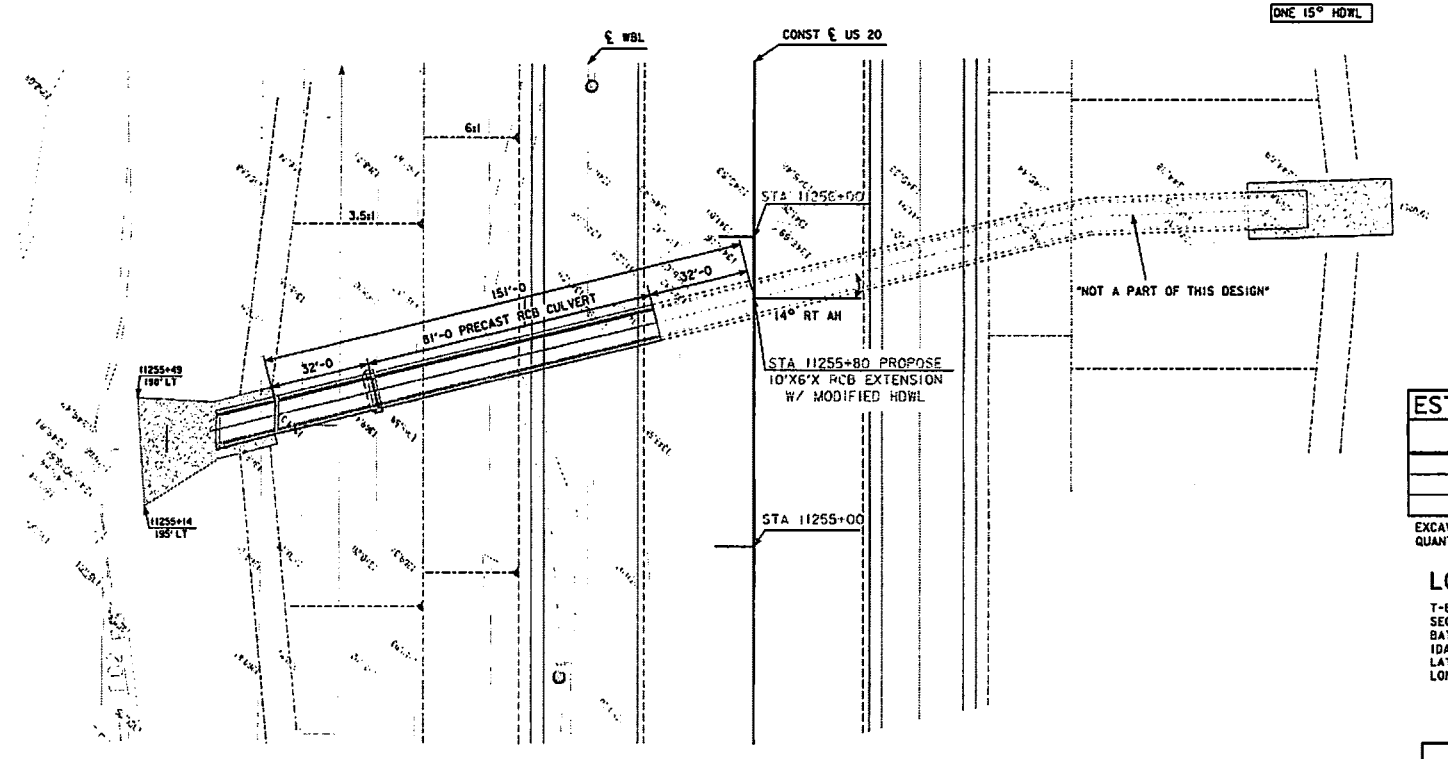
BENCH MARK NO. 607, IDOT DISC RCB LT., STA 1254+95.29, 55.93' LT, EL=1356.44



* CAMBERED ELEVATIONS
F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

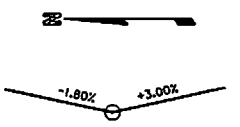
LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 19'
ANTICIPATED SETTLEMENT = 0.48'



SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.



VPI STA = 11258+50 VC = 1000'
VPI ELEV = 1362.48

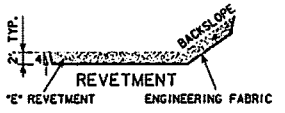
PROPOSED PROFILE GRADE US 20

UTILITIES LEGEND:

MIDAMERICAN ENERGY
FO INS
FO2 QWEST
FO7 ICN
T4 SCHALLERR TELEPHONE

HYDRAULIC DATA

DRAINAGE AREA = 581 ACRES R
Q_{50} = 519 CFS
HW ELEV. = 1350.94



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	100	130	55
TOTALS	100	130	55

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

LOCATION

T-88-89N R-41W
SECTION 4-36
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474974°
LONGITUDE -95.632962°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	15,700,000	

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL SITUATION PLAN

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 62

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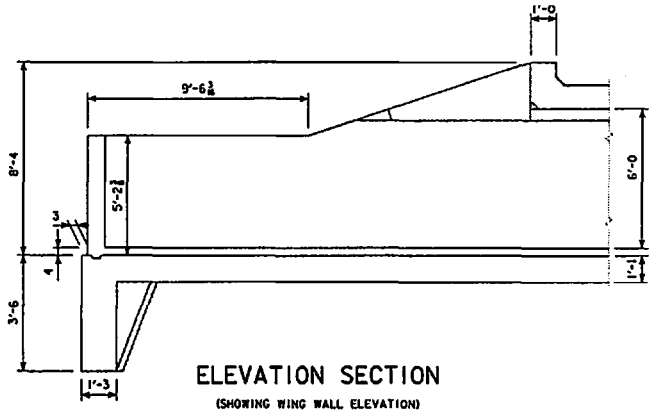
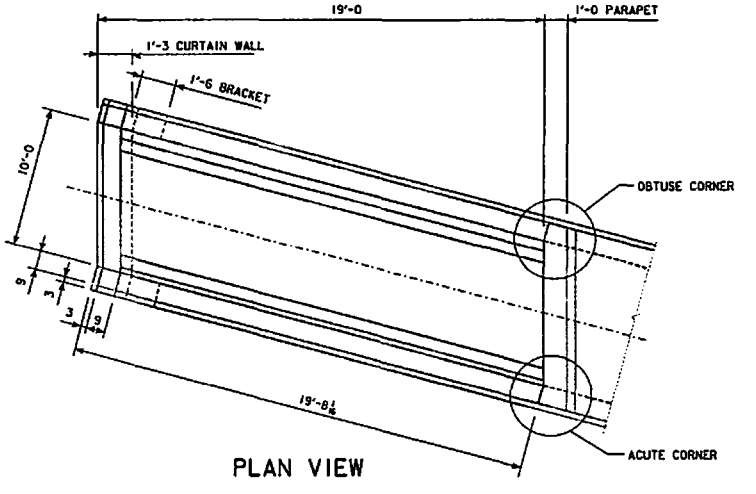
INCLUDES ADDENDA: 15DEC115.A02

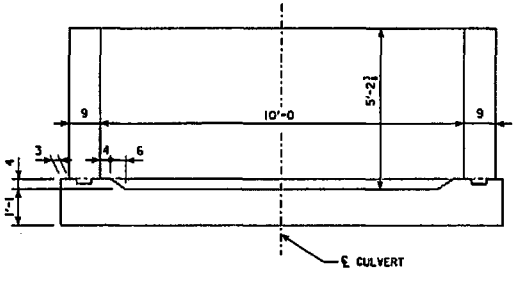


ELEVATION SECTION

(SHOWING WING WALL ELEVATION)



PLAN VIEW



ELEVATION SECTION

(SHOWING WEIR ELEVATION)

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 63

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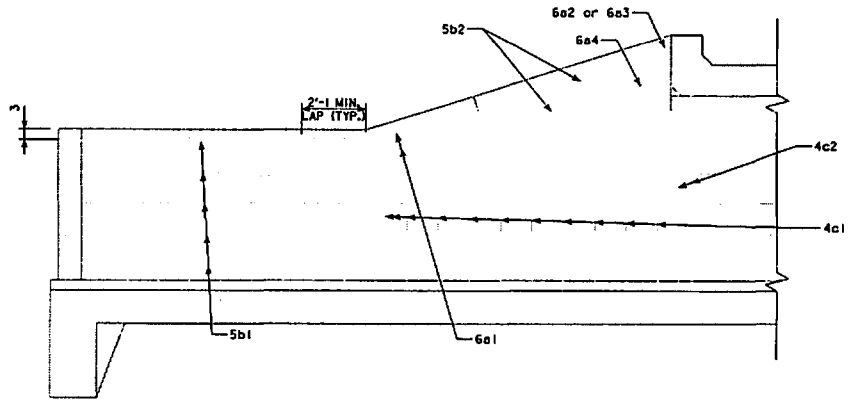
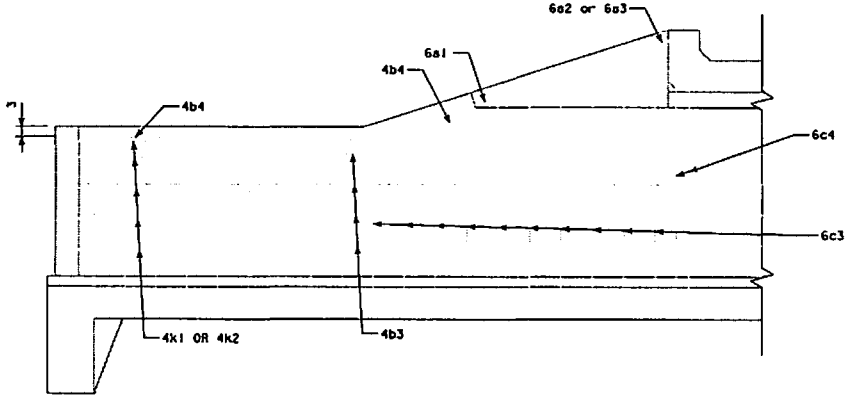
INCLUDES ADDENDA: 15DEC115.A02

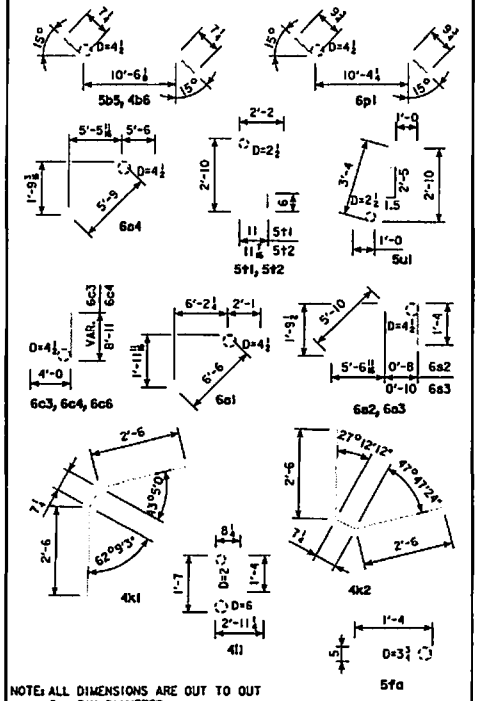


TYPICAL VIEW - FRONT FACE
WINGWALL REINFORCING



TYPICAL VIEW - BACK FACE
WINGWALL REINFORCING

BENT BAR DETAILS



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

REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WT.
5fa	FENCE ANCHOR (GALV.)		2	3'-1	6
5b1	WINGWALL, F.F.H.		10	22'-7	236
5b2	WINGWALL, F.F.H.		4	VARIABLE 7'-2:10'-3	37
4b3	WINGWALL, B.F.H.		8	22'-8	122
4b4	WINGWALL, B.F.H.		2	11'-9	16
5b5	WEIR END WALL, F.F.H.		6	11'-6	72
4b6	WEIR END WALL, B.F.H.		6	11'-6	46
4c1	WINGWALL, F.F.V.		41	VARIABLE 5'-10:8'-9	199
4c2	WINGWALL, F.F.V.(O)		2	8'-11	12
4c2	WINGWALL, F.F.V.(A)		2	8'-11	12
6c3	WINGWALL, B.F.V.		41	VARIABLE 9'-10:12'-10	700
6c4	WINGWALL, B.F.V.(O)		2	12'-11	39
6c4	WINGWALL, B.F.V.(A)		2	12'-11	39
4c5	WEIR END WALL, F.F.V.		10	5'-10	39
6c6	WEIR END WALL, B.F.V.		10	12'-10	193
4k1	WEIR CORNER, B.F.H.		12	5'-8	46
4d1	APRON, LONGIT. BOTT.		9	22'-6	135
6f1	APRON, LONGIT. TOP		11	22'-6	372
4l1	PARAPET, VERT.		21	6'-7	92
7j1	PARAPET, HORZ.		4	11'-7	95
4k1	WINGWALL, CORNER, B.F.H.		5	5'-7	19
4k2	WINGWALL, CORNER, B.F.H.		5	5'-7	19
6m1	APRON, TRANS., TOP		26	11'-8	456
6m2	APRON, TRANS., TOP		3	VARIABLE 3'-9:8'-11	28
4m3	APRON, TRANS., BOTT.		19	7'-0	89
6p1	CURTAIN, HORZ.		6	12'-0	109
6s1	WING SLOPE, BOTH F.H.		6	8'-8	79
6a2	WING SLOPE, BOTH F. (O)		2	7'-10	24
6a3	WING SLOPE, BOTH F. (A)		2	8'-0	25
6a4	WING SLOPE, F.F.		2	11'-3	34
5t1	CURTAIN, VERT.		11	6'-5	74
5t2	CURTAIN, VERT. ENDS		4	6'-5	27
5u1	BRACKET, VERT.		4	5'-4	22

ESTIMATED QUANTITIES ONE HEADWALL				
	REINF. STEEL	3,513 LBS.		
	CONCRETE	PARAPET Δ	1.4	20.3 CU.YD.
		WINGWALLS	6.7	
		APRON	12.2	

Δ INCLUDES TOP OF WINGWALL AND WEIRWALL QUANTITIES.

(A) - INDICATES BAR LOCATED AT ACUTE CORNER.
(O) - INDICATES BAR LOCATED AT OBTUSE CORNER.
REFER TO SHEET 30 FOR ACUTE AND OBTUSE CORNER LOCATIONS.

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 64

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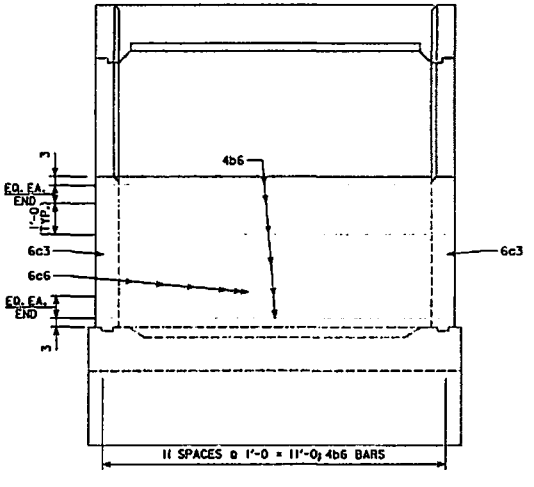
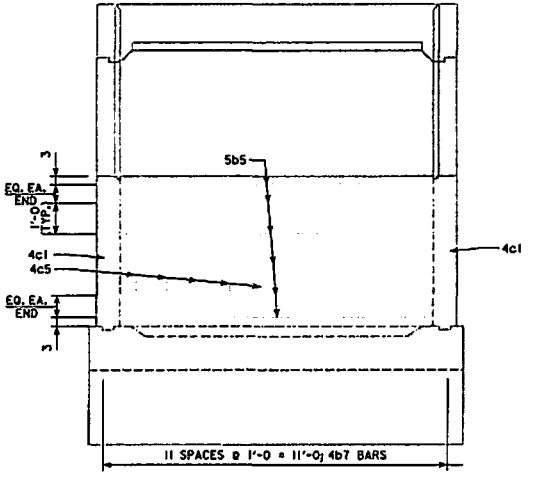
INCLUDES ADDENDA: 15DEC115.A02



CROSS SECTION THRU WEIR END
WALL BACK FACE



CROSS SECTION THRU WEIR END
WALL FRONT FACE

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL QUANTITIES

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 65

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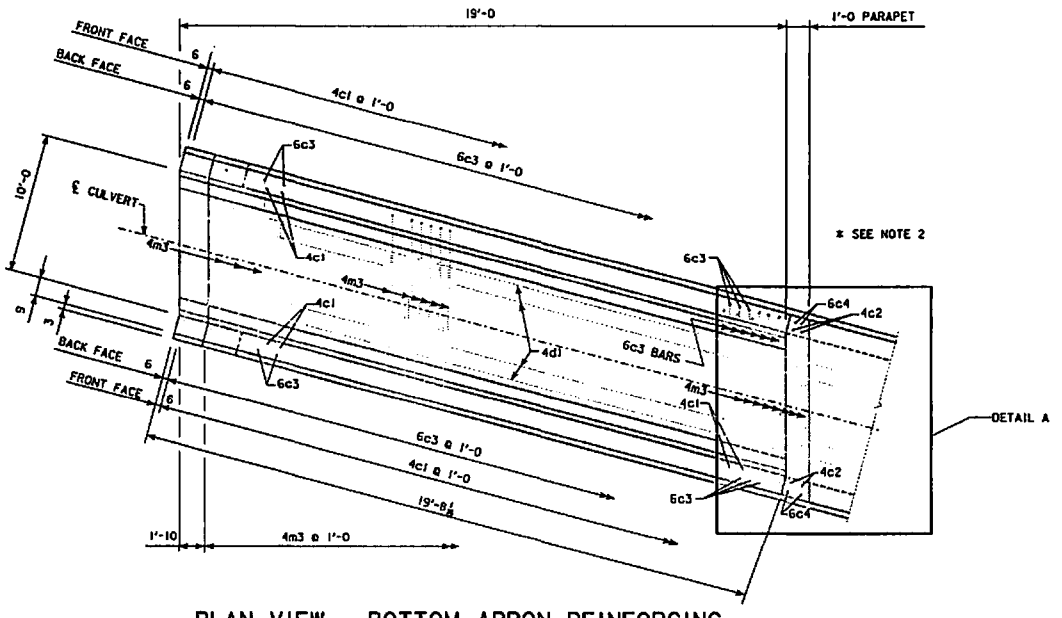
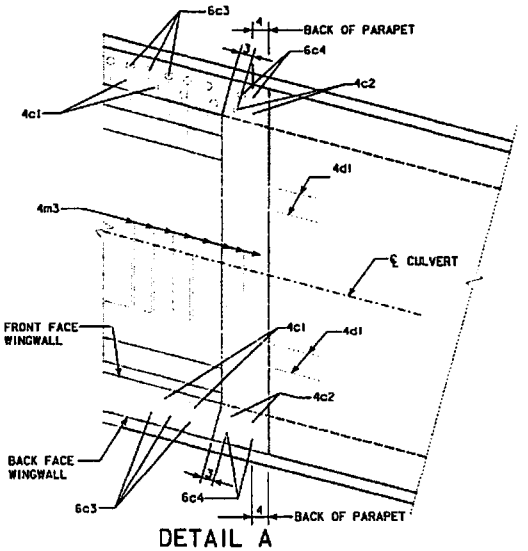
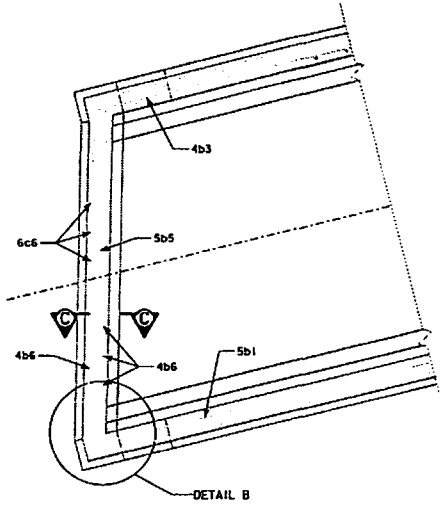


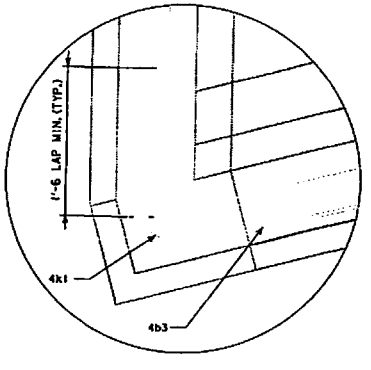
PLAN VIEW - BOTTOM APRON REINFORCING



DETAIL A



PLAN VIEW - WEIR REINFORCING



DETAIL B

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL

HEADWALL DETAILS

STA. 11255+80.00

APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/ANA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 66

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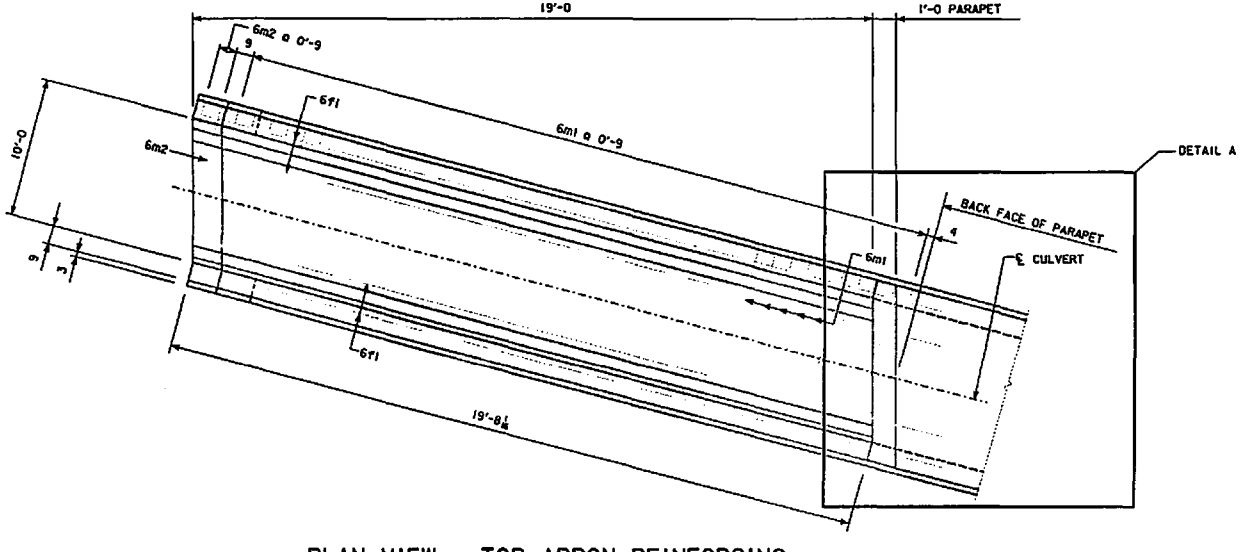
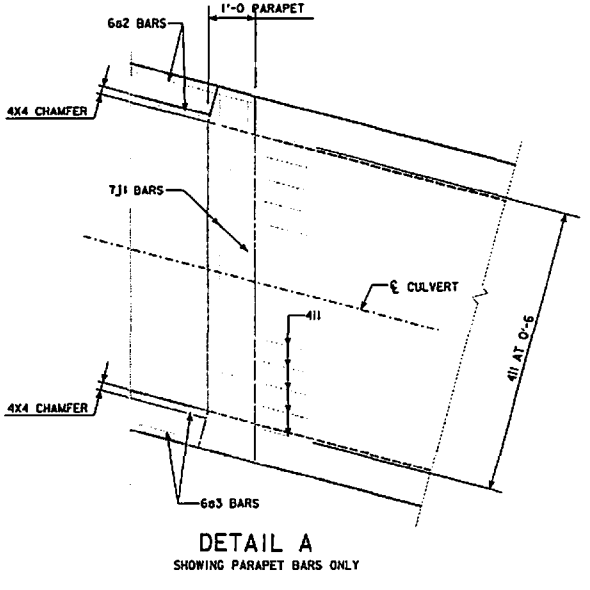
INCLUDES ADDENDA: 15DEC115.A02



PLAN VIEW - TOP APRON REINFORCING



DETAIL A
SHOWING PARAPET BARS ONLY

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL HEADWALL DETAILS

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 67

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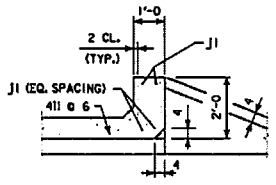
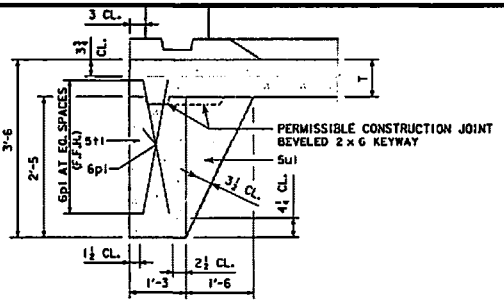
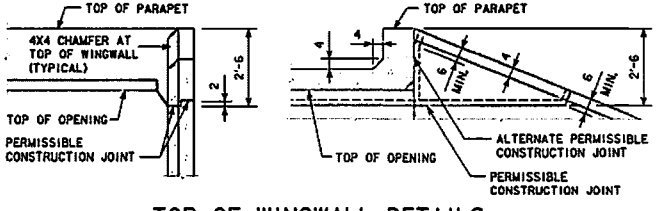
INCLUDES ADDENDA: 15DEC115.A02



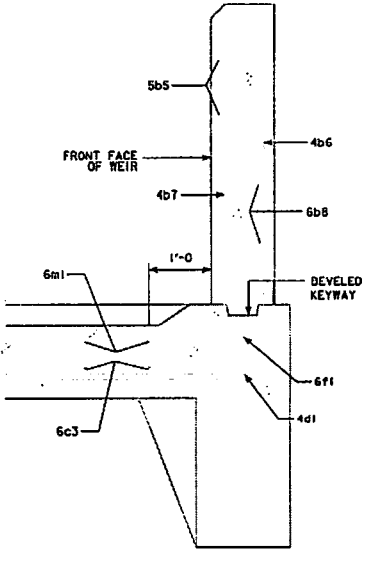
SECTION THRU PARAPET



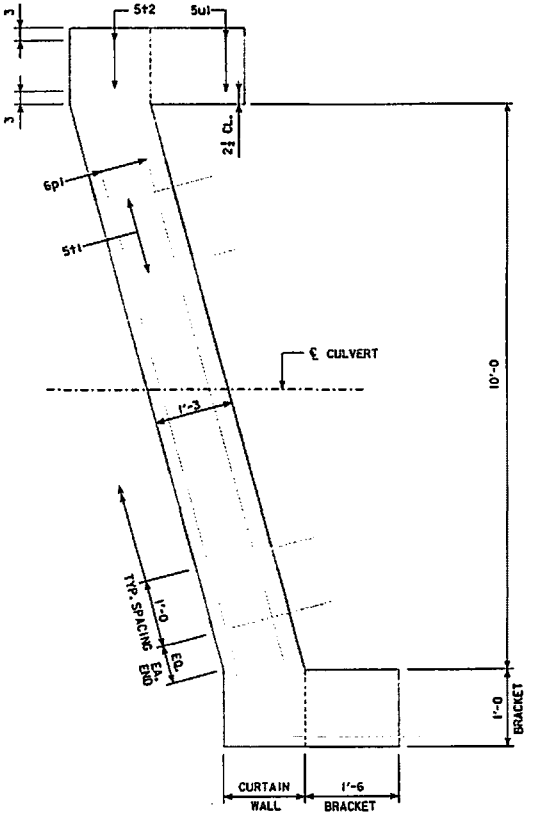
SECTION THRU CURTAIN WALL



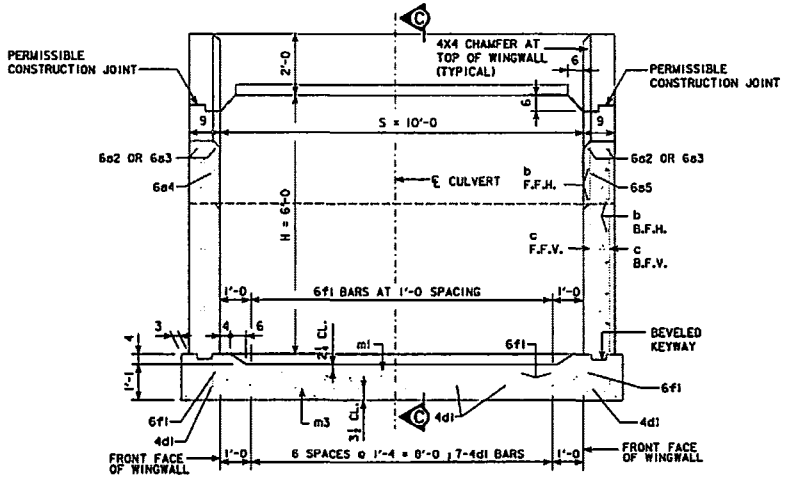
TOP OF WINGWALL DETAILS



TYPICAL CROSS SECTION C-C



CURTAIN WALL DETAIL
APRON IS NOT SHOWN



TYPICAL CROSS SECTION - THRU HEADWALL

STAGE II DESIGN FOR 14° SKEW RT AH

10' X 6' X 119' PRECAST REINFORCED CONCRETE BOX CULVERT EXTENSION W/ MODIFIED HEADWALL WEIR DETAILS

STA. 11255+80.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 9 FILE NO. 30568 DESIGN NO. 0918

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 68

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	150.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1,500	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	129.3	
4	2404-7775000	REINFORCING STEEL	LB	21,628	
5	2507-3250005	ENGINEERING FABRIC	SY	320.0	
6	2507-6800061	REVETMENT, CLASS E	TON	260.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERTS.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZING FENCE ANCHORS.
5	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B.3 OF STANDARD SPECIFICATIONS.
6	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/C.Y.
7	2533-4980005	MOBILIZATION - -

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 102' REINFORCED CONCRETE BOX CULVERT EXTENSION QUANTITIES

STA. 1142+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 30560 DESIGN NO. 1018

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 69

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 8' X 6' CULVERT CONSTRUCTED IN STAGE I, (DESIGN #1515) WITH A 8' X 6' X 102' RCB CULVERT, SKEWED 8° R.A. AT STA. 11442+02.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 14 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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	2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR	3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:	
VERTICAL TOP	2"
VERTICAL BOTTOM	3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE	2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5oI IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT 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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 8-6-12	4-12	-
PWH 15-1-12	4-12	-
PWH 15-2-12	4-12	-
PWH 15-3-12	4-12	-
PWH 15-4-12	4-12	-
PWH 15-7-12	4-12	-
CBJ 2-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
8' x 6' HEADWALL 15 ° SKEW (1 REQ'D)	2,481	2,481
17'-0 BARREL SECTION (6 REQ'D)	6 @ 2602	15,612
BELL JOINTS (5 REQ'D)	5 @ 707	3,535
	TOTAL (LBS.)	21,628

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
8' x 6' HEADWALL 15 ° SKEW (1 REQ'D)	1.2	9.2	5.1	15.5
17'-0 BARREL SECTION (6 REQ'D)	6 @ 4.54 = 27.3	6 @ 5.87 = 35.2	6 @ 5.33 = 32.0	94.5
BELL JOINTS (5 REQ'D)	5 @ 1.3 = 6.5	5 @ 1.6 = 7.8	5 @ 1.0 = 5.0	19.3
			TOTAL (CU. YDS.)	129.3

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 102' REINFORCED CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 3 FILE NO. 30568 DESIGN NO. 1018

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 70

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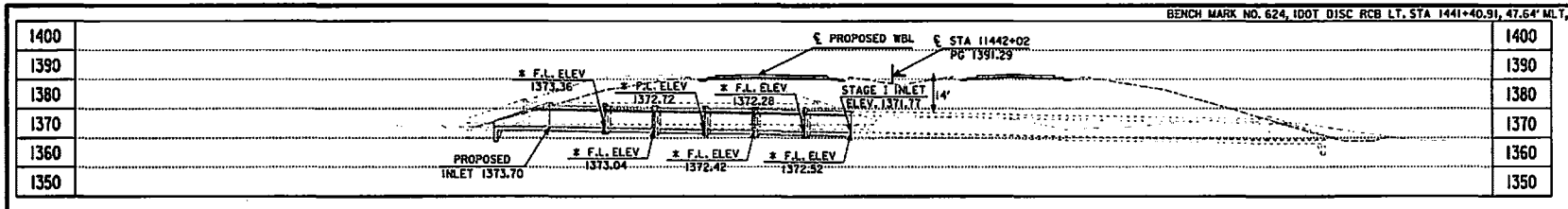
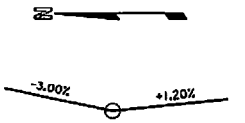
INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 624, IDOT DISC RCB LT. STA 1441+40.91, 47.64' MLT, EL=1383.058





VPI STA = 11439+50 VC = 1000'
VPI ELEV = 1386.98

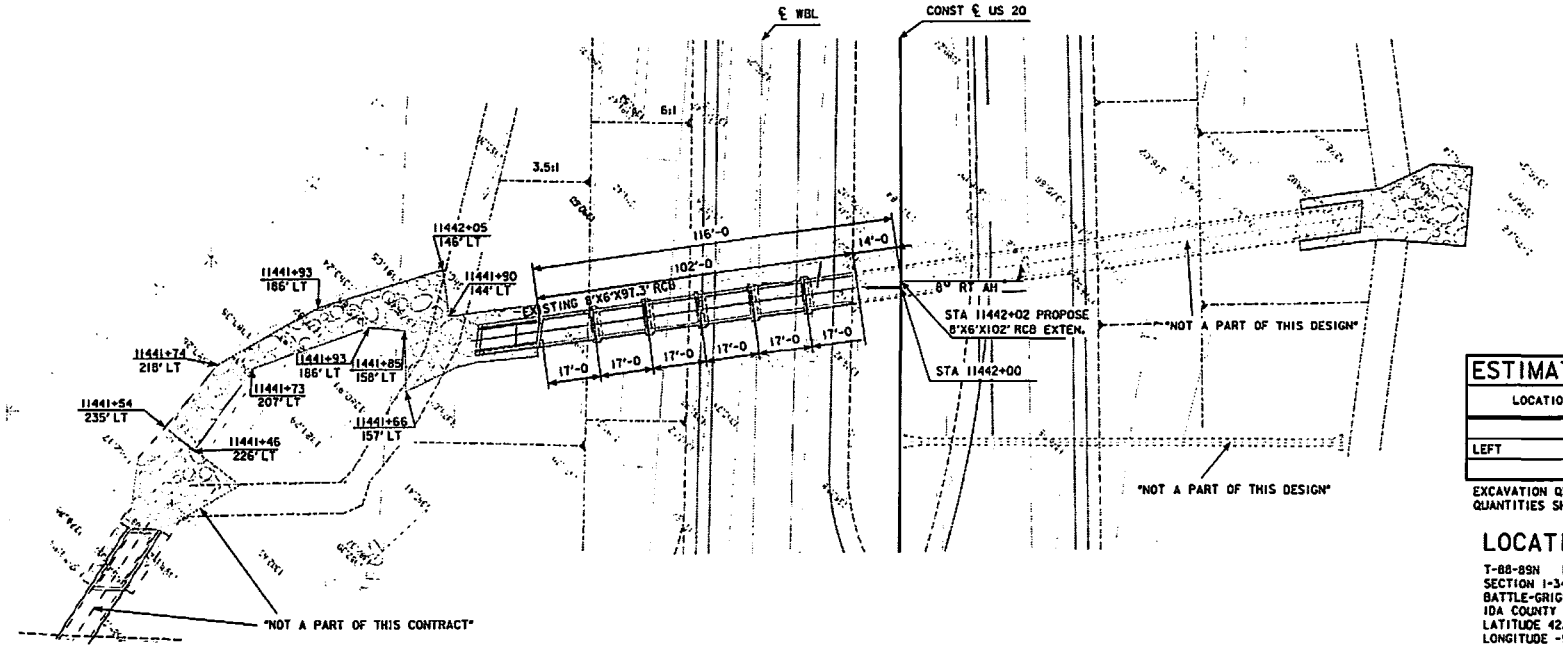
PROPOSED PROFILE GRADE US 20

LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 14'
ANTICIPATED SETTLEMENT = 0.73

OLD DGN# 1562

ONE 15° HDWL

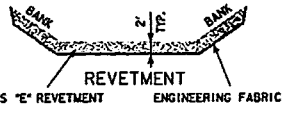


HYDRAULIC DATA

DRAINAGE AREA = 513 ACRES R
Q_{50} = 487 CFS
HW ELEV. = 1381.24

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD
F05 KNOLOGY
T4 SCHALLER TELEPHONE



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	260	320	150
TOTALS	260	320	150

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

LOCATION

T-88-89N R-40W
SECTION 1-34
BATTLE-GRIGGS TOWNSHIP
IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 102' REINFORCED CONCRETE BOX CULVERT EXTENSION

SITUATION PLAN

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 30568 DESIGN NO. 1018

DESIGN TEAM SWM/AMA	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER 71

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INCLUDES ADDENDA: 15DEC115.A02

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	150.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	1500	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	19.7	
4	2404-7775000	REINFORCING STEEL	LB	3,309	
5	2415-2110806	PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT.	LF	91.0	
6	2415-2200806	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT.	EACH	1	
7	2507-3250005	ENGINEERING FABRIC	SY	320.0	
8	2507-6800061	REVETMENT, CLASS E	TON	260.0	
9	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL INCLUDES EXCAVATION NECESSARY TO PLACE REVETMENT AND ENGINEERING FABRIC.
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) INCLUDES ALL PREFORMED EXPANSION JOINT FILLER REQUIRED.
4	2404-7775000	REINFORCING STEEL INCLUDES GALVANIZED FENCE ANCHORS.
5	2415-2110806	PRECAST CONCRETE BOX CULVERT, 8 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
6	2415-2200806	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 8 FT. X 6 FT. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED. INCLUDES 15° SKEW PRECAST END SECTION, PRECAST LINTEL BEAM, AND PRECAST CURTAIN WALL.
7	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
8	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
9	2533-4980005	MOBILIZATION - -

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 108' REINFORCED CONCRETE BOX CULVERT EXTENSION QUANTITIES

STA. 1142+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 1018

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 72

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 8' X 6' CULVERT CONSTRUCTED IN STAGE 1, (DESIGN #1515) WITH A 8' X 6' X 108' RCB CULVERT, SKEWED 8° R.A. AT STA. 11442+02.00.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES 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 14 FEET. THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS 1 EXPOSURE CONDITIONS.

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
MINIMUM SPLICE LENGTH	21"	26"	31"	41"	54"

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 2½" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3" OR 3½" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE 2"

THE PROPOSED CULVERT SHALL BE CONSTRUCTED TO THE CAMBERED ELEVATIONS UNLESS CULVERT SETTLEMENT HAS BEEN MITIGATED.

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION THE EXISTING GROUND LINE SHOWN ON THE SITUATION PLAN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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 CULVERT PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a) IS ⅝ 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

THE SHEET PILE SHALL BE REMOVED JUST PRIOR TO THE CONSTRUCTION OF THE STAGE 2 BOX CULVERT 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 CONSTRUCTED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT A 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.

SPECIFICATIONS:

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH ED., SERIES OF 2012.
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, 6TH ED., SERIES OF 2012.
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
RCB-G1-12	4-12	10-12
RCB-G2-12	4-12	7-14
RCB 8-6-12	4-12	-
PRCB G1-13	4-12	-
PRCB G2-13	4-12	-
PRCB 8-13	4-12	-
PES 2-13-T3	4-12	5-13
PES 3-13-T3	4-12	-
CBJ 2-12	4-12	7-13
CBJ 4-12	4-12	-

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
17'-0 BARREL SECTION	2,602	2,602
BELL JOINTS	707	707
	TOTAL (LBS.)	3,309

CONCRETE PLACEMENT QUANTITIES

LOCATION	SLAB	FLOOR	WALLS	TOTAL
17'-0 BARREL SECTION	4.54	5.9	5.3	15.8
BELL JOINTS	1.3	1.6	1.0	3.9
			TOTAL (CU. YDS.)	19.7

NOTE:
REFER TO POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN NHSN-020-1(123)--2R-97.

TRAFFIC CONTROL PLAN
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN ON THE ROAD PLAN NHSN-020-1(123)--2R-97.

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 108' REINFORCED CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION • HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 1018

DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 73

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INCLUDES ADDENDA: 15DEC115.A02

GENERAL NOTES:

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 14 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 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 "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 $\frac{3}{4}$ 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 $\frac{1}{2}$ 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.

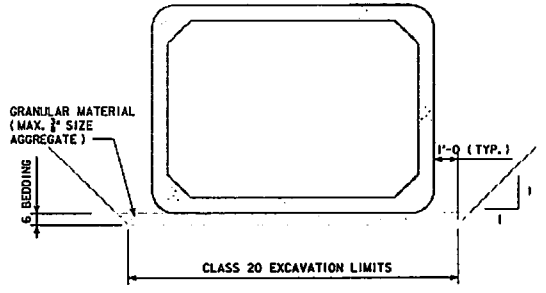
THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT 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' x 2' 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.



GRANULAR BEDDING DETAIL

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

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 108' REINFORCED CONCRETE BOX CULVERT EXTENSION

GENERAL NOTES

STA. 11442+02.00

APRIL, 2004

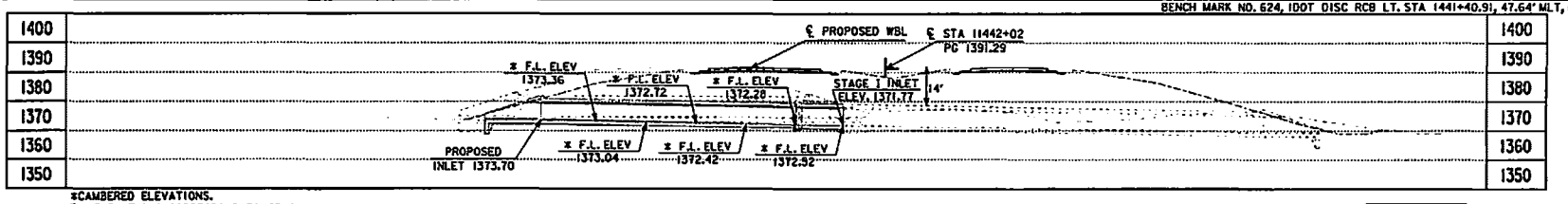
IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 1018

INCLUDES ADDENDA: 15DEC115.A02

BENCH MARK NO. 624, IDOT DISC RCB LT. STA 1441+40.91, 47.64' MLT, EL=1383.058



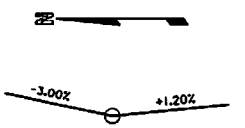
*CAMBERED ELEVATIONS.
F.L. ELEVATIONS CORRESPOND TO SPACING SHOWN ALONG THE CULVERT

LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 14'
ANTICIPATED SETTLEMENT = 0.73

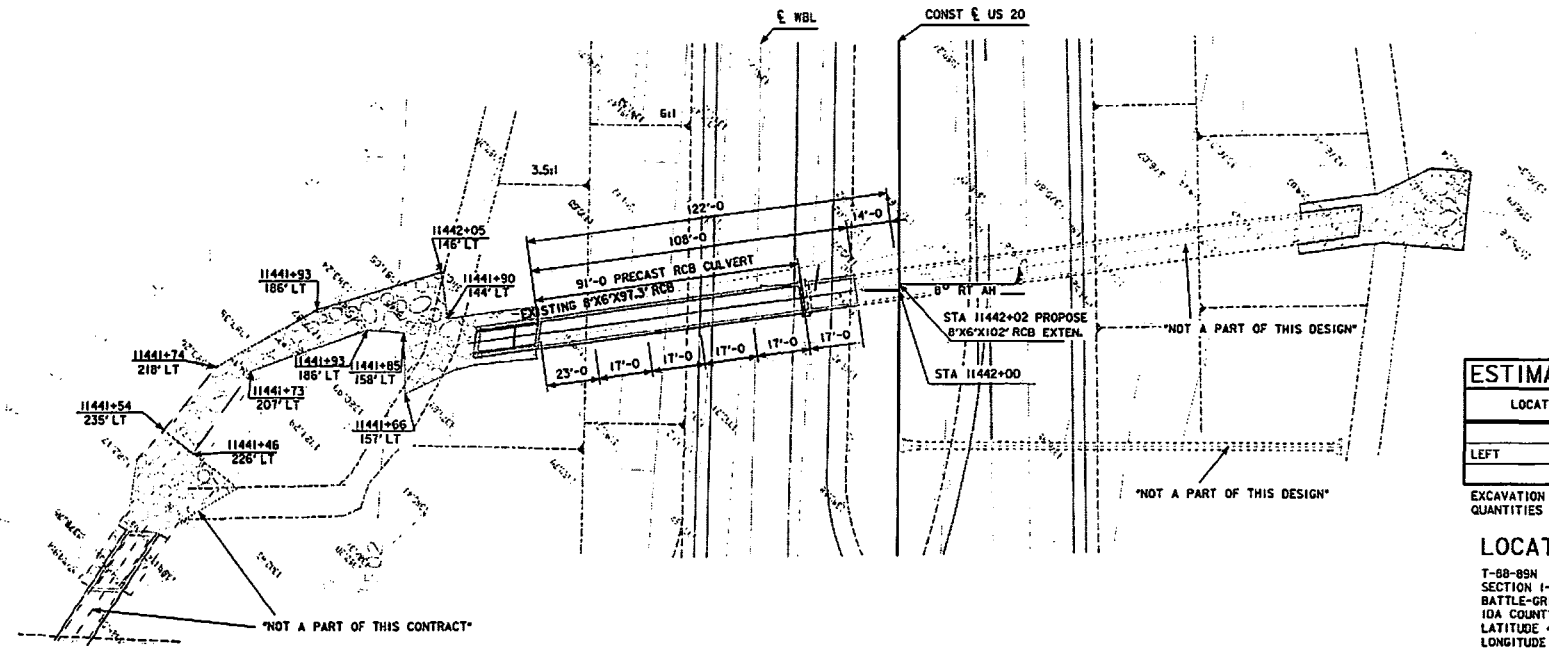
OLD DGN# 1562

ONE 15° HDWL



VPI STA = 11439+50 VC = 1000'
VPI ELEV = 1386.98

PROPOSED PROFILE GRADE US 20

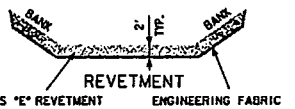


HYDRAULIC DATA

DRAINAGE AREA = 513 ACRES R
Q_{50} = 487 CFS
HW ELEV. = 1381.24

UTILITIES LEGEND:

F01 INS
F02 QWEST
F04 MCLEOD
F05 KNOLOGY
T4 SCHALLER TELEPHONE



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
LEFT	260	320	150
TOTALS	260	320	150

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

LOCATION

T-88-89N R-40W
SECTION 1-34
BATTLE-GRIGGS TOWNSHIP
IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

TRAFFIC ESTIMATE

2023 AADT 4000 V.P.D.
2043 AADT 5800 V.P.D.
2043 DHV 600 V.P.H.
TRUCKS 27 %
TOTAL DESIGN ESALs 16,700,000

SITUATION PLAN

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS. UNLESS SHOWN OTHERWISE ON THE SITUATION PLAN.

STAGE II DESIGN FOR 8° SKEW RT AH

8' X 6' X 108' REINFORCED CONCRETE BOX CULVERT EXTENSION

SITUATION PLAN

STA. 11442+02.00 APRIL, 2004

IDA COUNTY

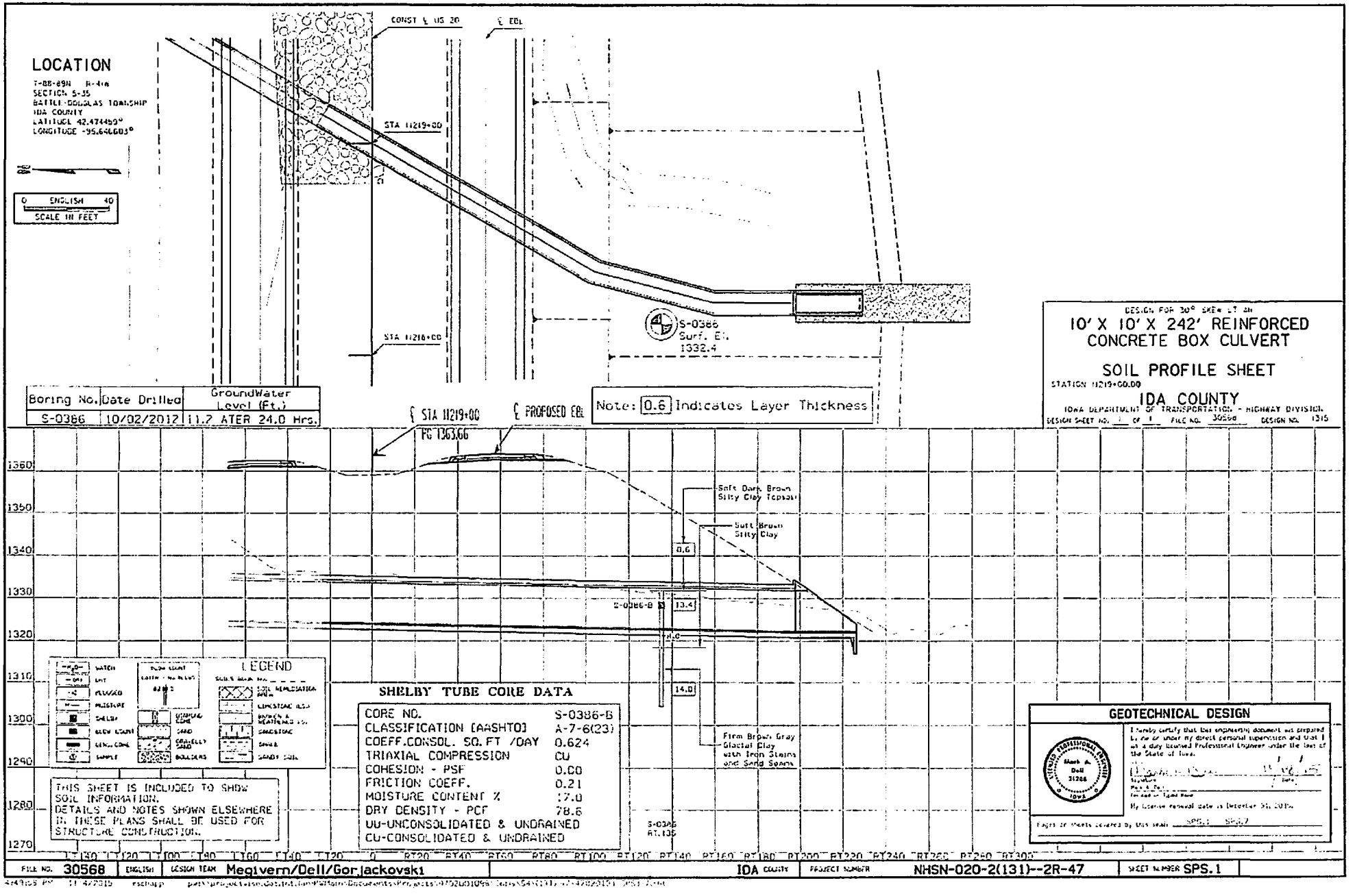
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 1018

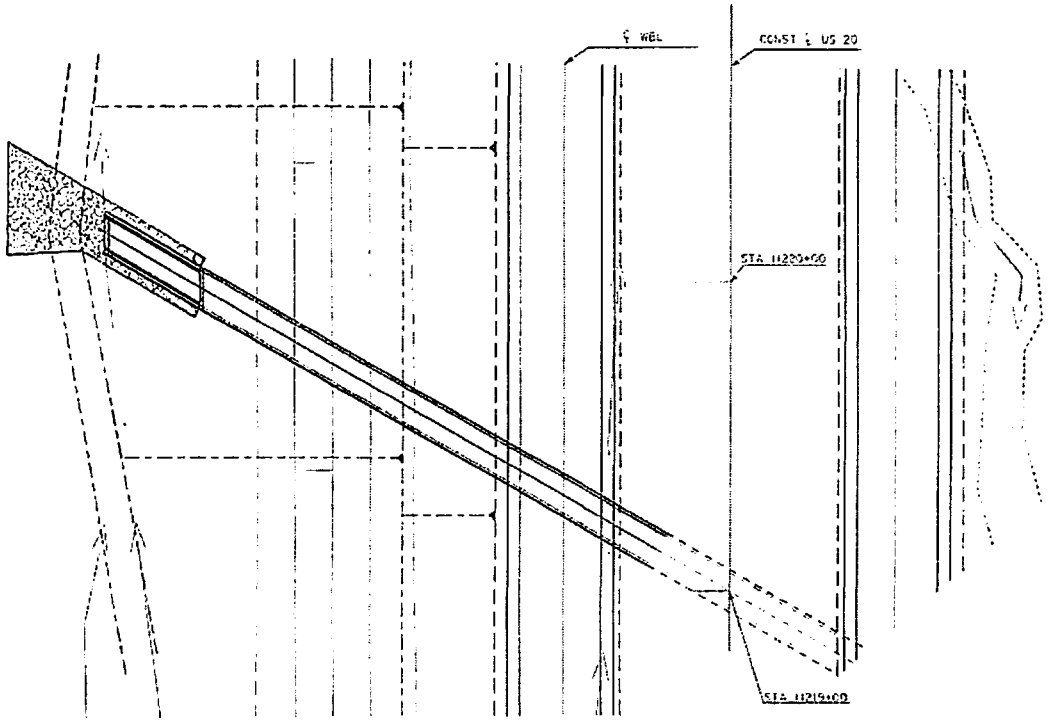
DESIGN TEAM SWM/AMA | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER 75

11/25/2015 3:15:26 PM smessle pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\47020131.brg 471018sp04P 11x17.pdf.pltcfg

INCLUDES ADDENDA: 15DEC115.A02


LOCATION
T-88-89N R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.646603°
0 ENGLISH 40
SCALE IN FEET
CONST ℄ US 20
℄ EBL
STA 11219+00
STA 11218+00
S-0386
Surf. El.
1332.4
DESIGN FOR 30° SKEW LT AH
10' X 10' X 242' REINFORCED CONCRETE BOX CULVERT
SOIL PROFILE SHEET
STATION 11219+60.00
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 1315
Boring No. | Date Drilled | GroundWater Level (Ft.)
S-0386 | 10/02/2012 | 11.7 ATER 24.0 Hrs.
Note: 0.6 Indicates Layer Thickness
℄ STA 11219+00
FG 1363.66
℄ PROPOSED EBL
1360
1350
1340
1330
1320
1310
1300
1290
1280
1270
Soft Dark Brown Silty Clay Topsoil
Soft Brown Silty Clay
0.6
S-0386-B
13.4
14.0
Firm Brown Gray Glacial Clay with Iron Stains and Sand Seams
LEGEND
THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
SHELBY TUBE CORE DATA
CORE NO. S-0386-B
CLASSIFICATION (AASHTO) A-7-6(23)
COEFF.CONSOL. SQ.FT /DAY 0.624
TRIAXIAL COMPRESSION CU
COHESION - PSF 0.00
FRICTION COEFF. 0.21
MOISTURE CONTENT % 17.0
DRY DENSITY - PCF 78.6
UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED
S-0386
RT.135
GEOTECHNICAL DESIGN
Mark A. Dell 21266 IOWA
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 Date
Mark A. Dell
Printed or Typed Name
My license renewal date is December 31, 2013
Pages or sheets covered by this seal SPS.1 SPS.2
-120 -100 -80 -60 -40 -20 0 RT20 RT40 RT60 RT80 RT100 RT120 RT140 RT160 RT180 RT200 RT220 RT240 RT260 RT280 RT300
FILE NO. 30568 ENGLISH DESIGN TEAM Megivern/Dell/Gorjackovski IDA COUNTY PROJECT NUMBER NHSN-020-2(131)--2R-47 SHEET NUMBER SPS.1

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



LOCATION

T-86-89N R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.046603°

0 ENGLISH 40
SCALE IN FEET

LEGEND

DESIGN FOR 30° SKEW LT AH

10' X 10' REINFORCED CONCRETE BOX CULVERT EXTENSION SOIL PROFILE SHEET

STATION 11219+00.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 2 TAG NO. 30568 DESIGN NO. 0918

FILE NO. 30568	ENGLISH	DESIGN TEAM Meglvern/Dell/Gorjackovski	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER SPS.2

4/5/2021 PM 12/4/2015

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Note: 0.6
Indicates Layer Thickness

LEGEND

LOCATION
T-88-69N R-41W
SECTION 5-35
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474459°
LONGITUDE -95.646603°

0 ENGLISH 40
SCALE IN FEET

DESIGN FOR 30° SKEW LT AH

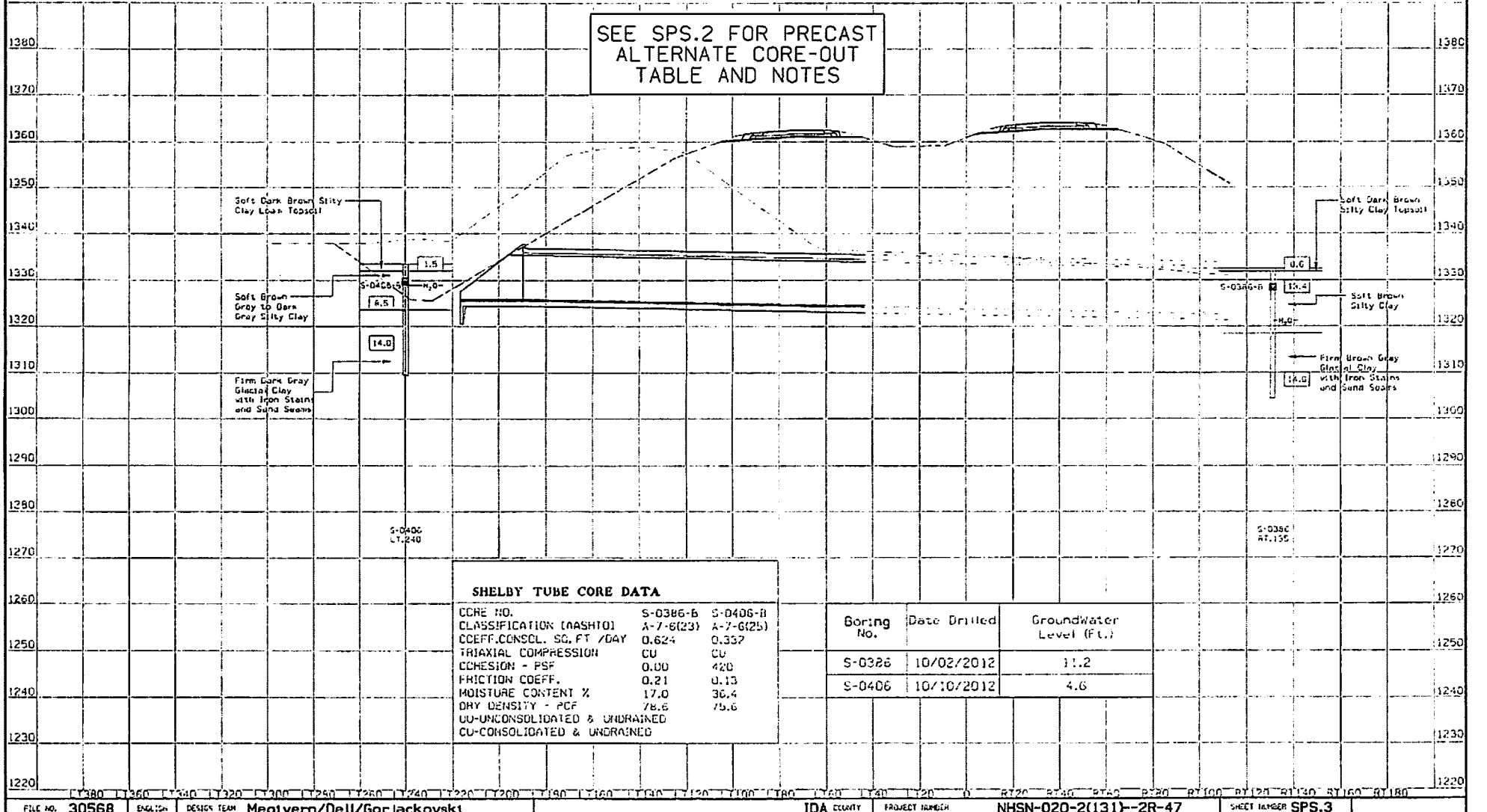
10' X 10' REINFORCED CONCRETE BOX CULVERT EXTENSION
SOIL PROFILE SHEET

STATION 11219+60.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 2 FILE NO. 30568 DESIGN NO. Gold

SEE SPS.2 FOR PRECAST ALTERNATE CORE-OUT TABLE AND NOTES



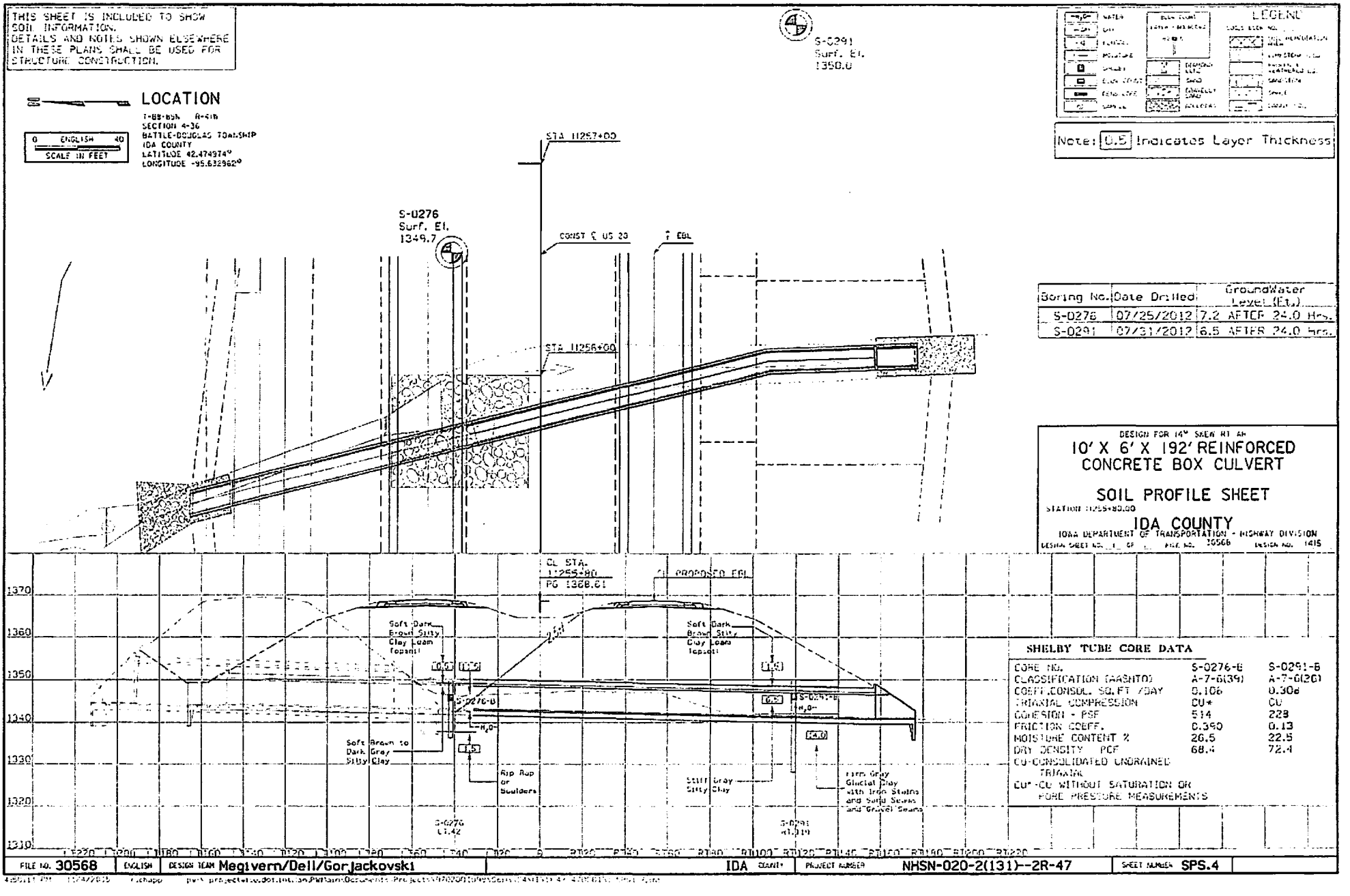
SHELBY TUBE CORE DATA

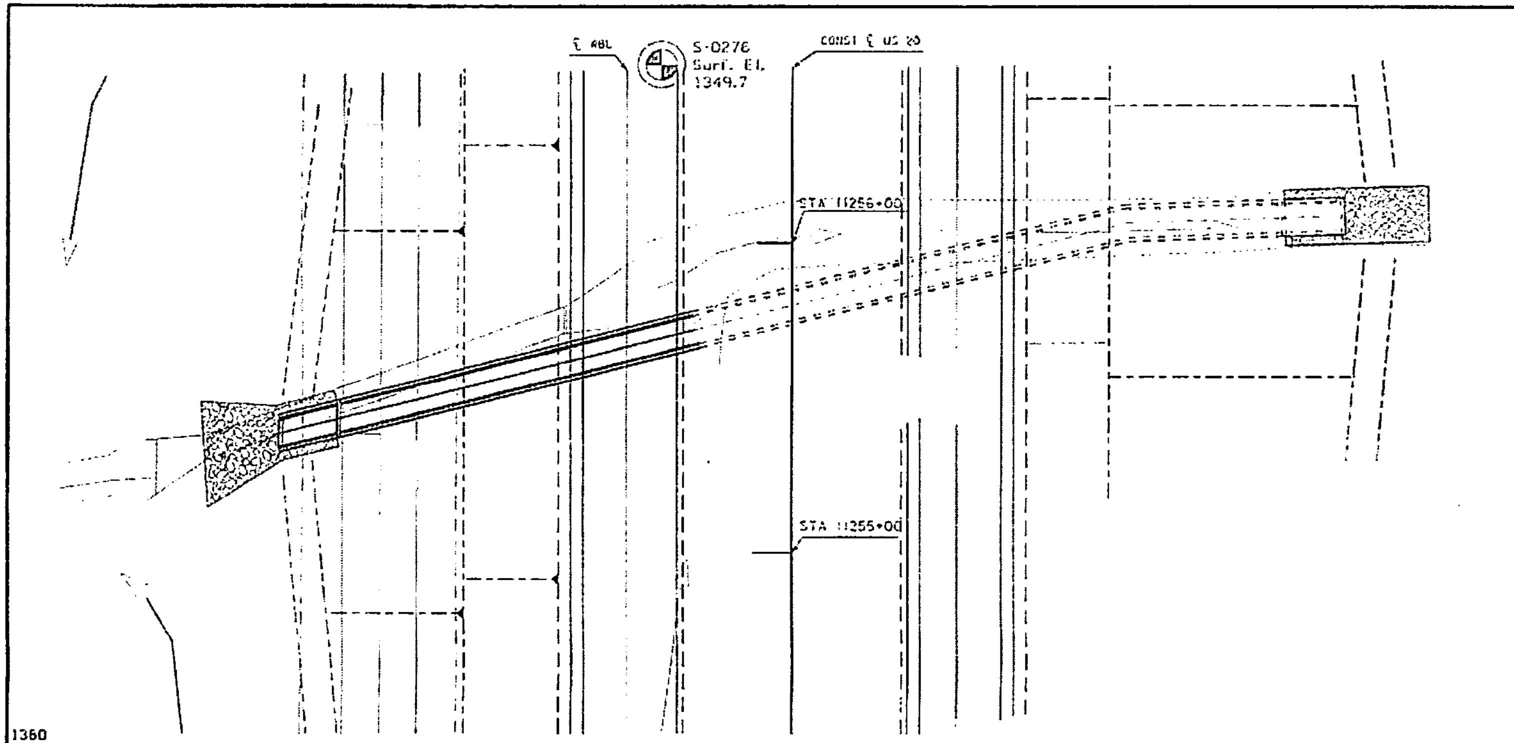
CORE NO.	S-0386-B	S-0406-B
CLASSIFICATION (AASHTO)	A-7-6(23)	A-7-6(25)
COEFF.CONSOL. SQ.FT /DAY	0.624	0.337
TRIAXIAL COMPRESSION	CU	CU
COHESION - PSF	0.00	420
FRICTION COEFF.	0.21	0.13
MOISTURE CONTENT %	17.0	36.4
DRY DENSITY - PCF	78.6	75.6

CU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED

Boring No.	Date Drilled	Groundwater Level (Ft.)
S-0386	10/02/2012	11.2
S-0406	10/10/2012	4.6

FILE NO. 30568	ENGLISH	DESIGN TEAM Meglvern/Dell/Gorjackovski	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER SPS.3


THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
LOCATION
T-88-85h R-41W
SECTION 4-36
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474974°
LONGITUDE -95.632962°
0 ENGLISH 40
SCALE IN FEET
S-0291
Surf. El.
1350.0
LEGEND
Note: 0.5 Indicates Layer Thickness
STA 11257+00
S-0276
Surf. El.
1349.7
CONST ℄ US 20
℄ EBL
STA 11256+00
Boring No. | Date Drilled | GroundWater Level (Elev.)
S-0276 | 07/25/2012 | 7.2 AFTER 24.0 Hrs.
S-0291 | 07/31/2012 | 6.5 AFTER 24.0 Hrs.
DESIGN FOR 14° SKEW RT AH
10' X 6' X 192' REINFORCED CONCRETE BOX CULVERT
SOIL PROFILE SHEET
STATION 11255+80.00
IDA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
FILE NO. 30568
DESIGN NO. 1415
CL STA. 11255+80
PG 1368.61
PROPOSED EBL
1370
1360
1350
1340
1330
1320
1310
Soft Dark Brown Silty Clay Loam Topsoil
Soft Brown to Dark Gray Silty Clay
Rip Rap or Boulders
Stiff Gray Silty Clay
Firm Gray Glacial Clay with Iron Stains and Sandy Seams and Gravel Seams
S-0276-B
S-0291-B
S-0276 El.42
S-0291 el.319
SHELBY TUBE CORE DATA
CORE NO. | S-0276-B | S-0291-B
CLASSIFICATION (AASHTO) | A-7-6(39) | A-7-6(20)
COEFF.CONSOL. SQ.FT./DAY | 0.106 | 0.30e
TRIAXIAL COMPRESSION | CU* | CU
COHESION - PSF | 514 | 228
FRICTION COEFF. | 0.390 | 0.13
MOISTURE CONTENT % | 26.5 | 22.5
DRY DENSITY PCF | 68.4 | 72.4
CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS
FILE NO. 30568
ENGLISH
DESIGN TEAM Megivern/Dell/Gorjackovski
IDA COUNTY
PROJECT NUMBER NHSN-020-2(131)--2R-47
SHEET NUMBER SPS.4



THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

0 ENGLISH 40
SCALE IN FEET

LOCATION

T-86-86N R-40W
SECTION 4-26
BATTLE-DOUGLAS TOWNSHIP
IDA COUNTY
LATITUDE 42.474974°
LONGITUDE -95.632962°

Boring No.	Date Drilled	GroundWater Level (Ft.)
S-0276	07/25/2012	7.2 AFTER 24.0 Hrs.

DESIGN FOR 14° SKEW RT AH

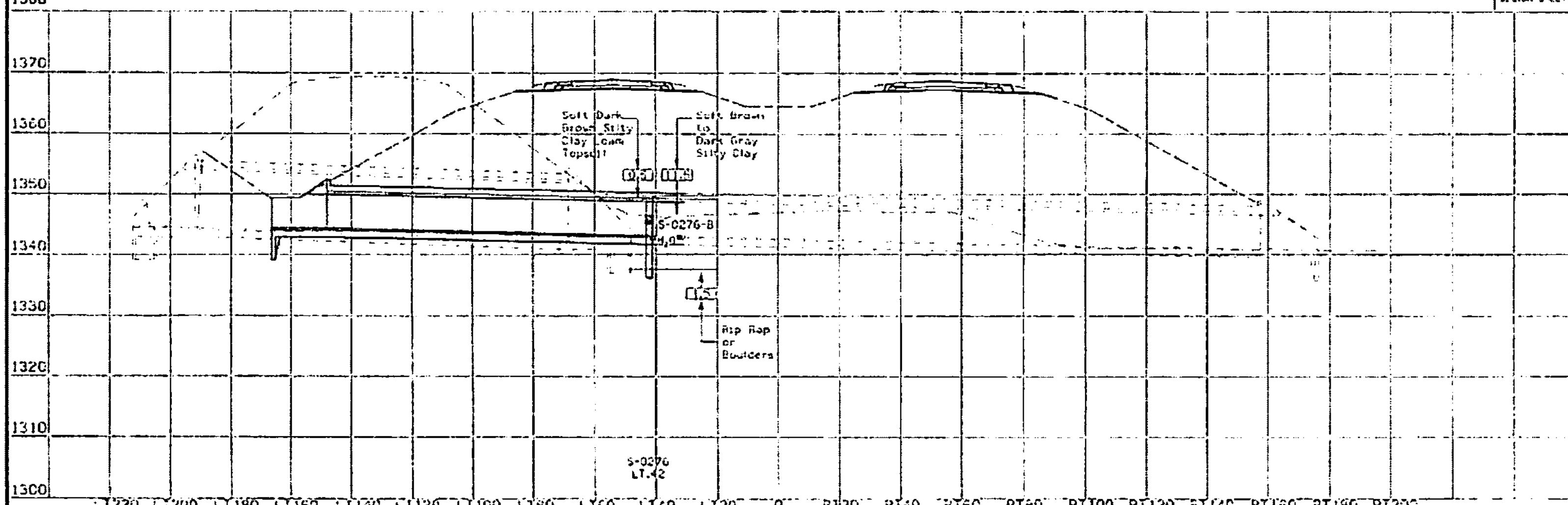
10' X 6' REINFORCED CONCRETE BOX CULVERT EXTEN W/ MODIFIED HEADWALL SOIL PROFILE SHEET

STATION 11255+80

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0516



LEGEND

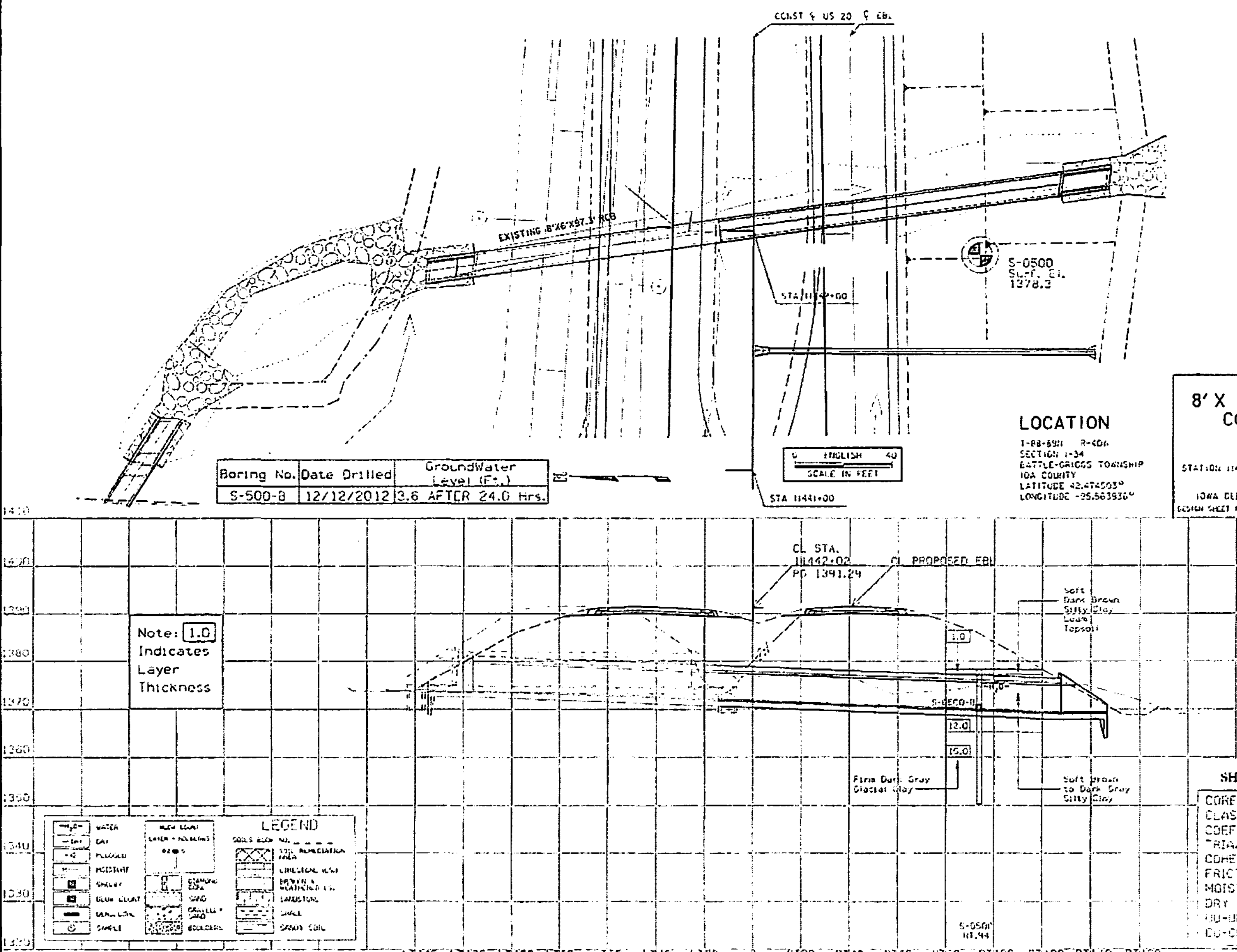
Note: 10.5 Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	S-0276-B
CLASSIFICATION (AASHTO)	A-7-6(39)
COEFF.CONSOL. SQ.FT./DAY	0.106
TRIAXIAL COMPRESSION	CU*
COHESION - PSF	514
FRICTION COEFF.	0.390
MOISTURE CONTENT %	26.5
DRY DENSITY - PCF	68.4

CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

FILE NO. 30568 | ENGLISH | DESIGN TEAM Megivern/Dell/Gorjackovski | IDA COUNTY | PROJECT NUMBER NHSN-020-2(131)--2R-47 | SHEET NUMBER SPS.5



Boring No.	Date Drilled	GroundWater Level (Ft.)
S-500-B	12/12/2012	3.6 AFTER 24.0 Hrs.

LOCATION

T-88-59N R-40W
SECTION 1-34
BATTLE-GRIGGS TOWNSHIP
IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

DESIGN FOR 8° SKEW RT AH

8' X 6' X 142' RCB REINFORCED CONCRETE BOX CULVERT

SOIL PROFILE SHEET

STATION 11442+02.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

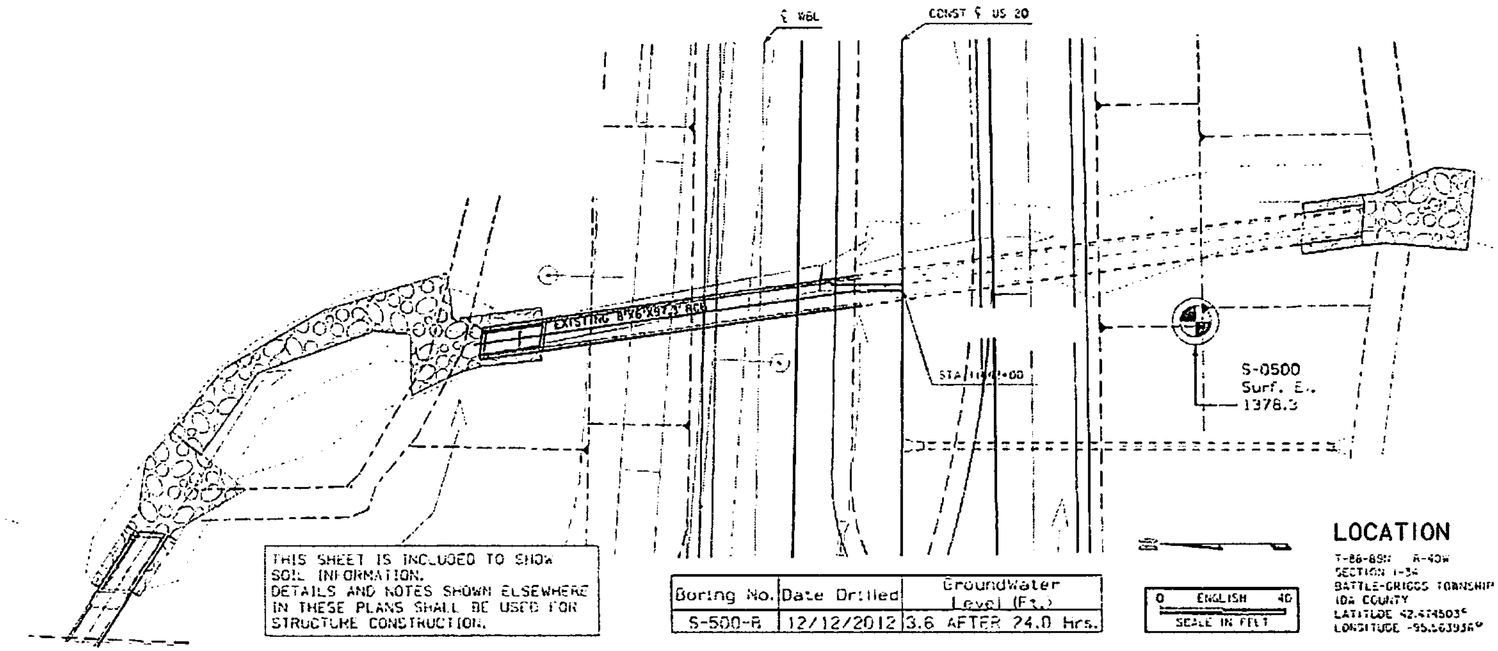
DESIGN SHEET NO. 1 OF 1 FILE NO. 30566 DESIGN NO. 1515

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

SHELBY TUBE CORE DATA

CORE NO.	S-500-B
CLASSIFICATION (AASHTO)	A-7-6(25)
COEFF.CONSOL. SQ.FT /DAY	0.083
TRIAXIAL COMPRESSION	UU
COHESION - PSF	528
FRICTION COEFF.	0.00
MOISTURE CONTENT %	30.2
DRY DENSITY - PCF	100.0

UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED



THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Boring No.	Date Drilled	GroundWater Level (Ft.)
S-500-B	12/12/2012	3.6 AFTER 24.0 Hrs.

0 ENGLISH 40
SCALE IN FEET

LOCATION

T-86-85N R-40W
SECTION 1-34
BATTLE-GRIGGS TOWNSHIP
IDA COUNTY
LATITUDE 42.474503°
LONGITUDE -95.563936°

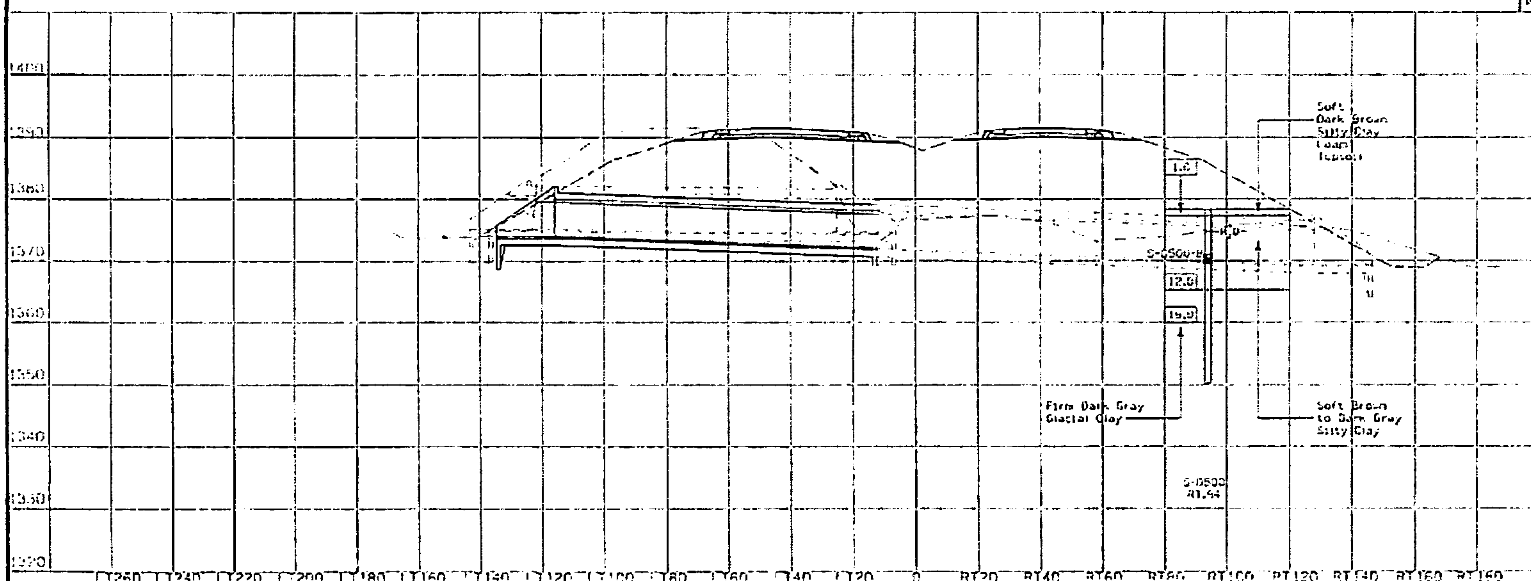
DESIGN FOR 6° SKEW

8' X 6' X RCB REINFORCED CONCRETE BOX CULVERT EXTENSION SOIL PROFILE SHEET

STATION 1144+02.00

IDA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 1016



LEGEND

Note: [1.0] Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	S-500-B
CLASSIFICATION (AASHTO)	A-7-6(25)
COEFF.CONSOL. SQ.FT./DAY	0.063
TRIAXIAL COMPRESSION	UU
COHESION PSF	528
FRICTION COEFF.	0.00
MOISTURE CONTENT %	30.2
DRY DENSITY PCF	100.0

UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern/Dell/Gorjackovski	IDA COUNTY	PROJECT NUMBER NHSN-020-2(131)--2R-47	SHEET NUMBER SPS.7

LETTING DATE 12-15-2015

NHSN-020-1(155)--2R-97

RCB CULVERT REPLACEMENT - SINGLE BOX

WOODBURY COUNTY

WOODBURY COUNTY DESIGN 415, 515, 615 & 118

Page 32 of 413

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD
- INTERSTATE HIGHWAY (80)
- UNITED STATES HIGHWAY (65)
- STATE HIGHWAY (175)
- COUNTY HIGHWAY (S27)
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES (ABBEY ROAD)
- UNINCORPORATED PLACE (ELWOOD)

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM

WOODBURY COUNTY

RCB CULVERT REPLACEMENT - SINGLE BOX

AT THREE LOCATIONS

E OF CORRECTIONVILLE TO W JCT U.S. 59

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
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 12-12-12	APRIL 2012	-----
FBJ-05-12	APRIL 2012	-----
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	-----
RCFB-06-12	APRIL 2012	-----
RCFB-07-12	APRIL 2012	-----
RCFB-02-12	APRIL 2012	-----

PRECAST STANDARD PLANS

PRCB 12-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

REVISIONS

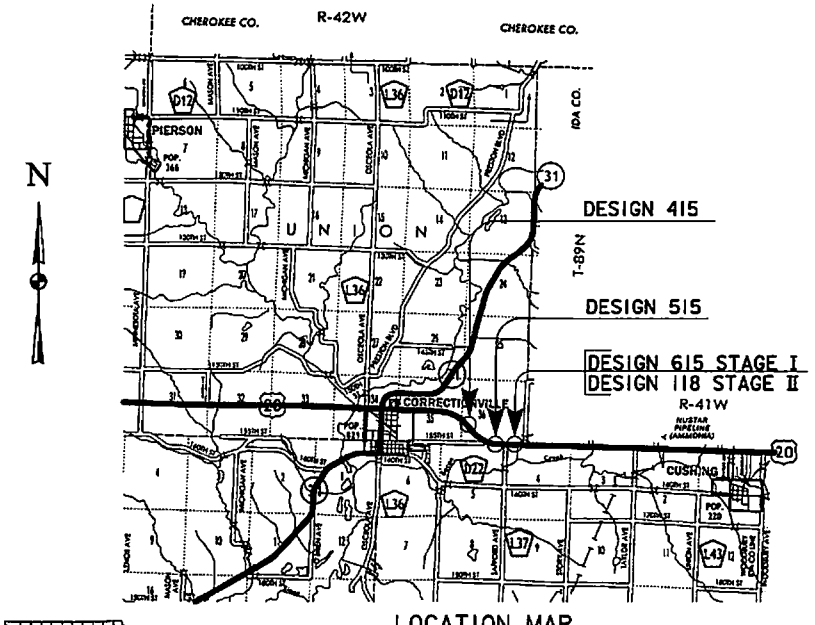
TOTAL SHEETS: 42

PROJECT NUMBER: NHSN-020-1(155)--2R-97

R.O.W. PROJECT NUMBER:

PROJECT IDENTIFICATION NUMBER: 98-97-020-010-04

INDEX OF SHEETS



LOCATION MAP

IOWA ONE CALL

1-800-292-8989 | 811

www.iowaonecall.com

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL (STAGE I) & WBL (STAGE II) WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN DATA RURAL

REFER TO INDIVIDUAL SITUATION PLANS FOR TRAFFIC DATA INFORMATION

INDEX OF SEALS

SHEET NO.	NAME	TYPE
1	DEAN G. BIERWAGEN	STRUCTURAL DESIGN
1	DAVID R. CLAMAN	HYDRAULIC DESIGN
SPS.1	MARK A. DELL	GEOTECHNICAL DESIGN
CULVERT STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

HYDRAULIC DESIGN

LICENSED PROFESSIONAL ENGINEER David R. Claman 11571 IOWA

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.

David R. Claman — 10-06-2015

Signature — Date

David R. Claman

Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 4, 9, 19, 25, 29 & 37 of 42

STRUCTURAL DESIGN

LICENSED PROFESSIONAL ENGINEER Dean G. Bierwagen 11506 IOWA

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.

Dean G. Bierwagen — 10-06-2015

Signature — Date

Dean G. Bierwagen

Printed or Typed Name

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: SHEETS 1 THRU 38 OF 42

PROJECT DIRECTORY NAME: 9702001098

DESIGN TEAM	DGB * MSF * LW	ENGLISH	IOWA DOT * OFFICE OF BRIDGES AND STRUCTURES	FILE NO. 30568	WOODBURY COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER 1

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INCLUDES ADDENDA: A.02

ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	99	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	27.1	
3	2404-7775000	REINFORCING STEEL	LB	4,623	
4	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20 - -
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
3	2404-7775000	REINFORCING STEEL - -
4	2533-4980005	MOBILIZATION - -

DESIGN FOR A 1° SKEW (RA)

6'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 48"Φ RCP

ESTIMATED QUANTITIES

STA. 10922+68.00 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM OGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 2

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 6'-0 X 4'-0 REINFORCED CONCRETE FLUME RCP COLLAR, FLUME AND BASIN FOR A PROPOSED 48" Φ RCP ON U.S 20 AT STA. 10922+68.00 (℄ U.S. 20) 1° SKEW (RA).

DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS FOR THE 48" Φ RCP AS PROPOSED IN THE ROAD PLANS (NHSN-020-1(123)--2R-97.)

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS 1 EXPOSURE CONDITION FOR CRACK CONTROL.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE BASIN CURTAIN WALL 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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

THE CITY AND UTILITY COMPANIES 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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE PROPOSED EBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE.

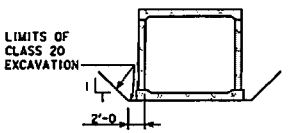
STANDARDS:
FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:

STANDARD	ISSUED	REVISED
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	-----
RCFB-02-12	APRIL 2012	-----

NOTE:
PIPE DETAILS ARE NOT A PART OF THIS DESIGN AND TO BE DONE UNDER PROJECT NHSN-020-1(123)--2R-97.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
6'-0 X 4'-0 FLUME & RCP COLLAR	2581	2581
6'-0 X 4'-0 BASIN	2042	2042
	TOTAL (LBS.)	4623



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
6'-0 X 4'-0 FLUME & RCP COLLAR	10.1	6.4	16.5
6'-0 X 4'-0 BASIN	8.1	2.6	10.7
TOTAL (CU. YDS.)	18.2	9.0	27.1

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR A 1° SKEW (RA)

6'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 48"Φ RCP

GENERAL NOTES

STA. 10922+68.00 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 3

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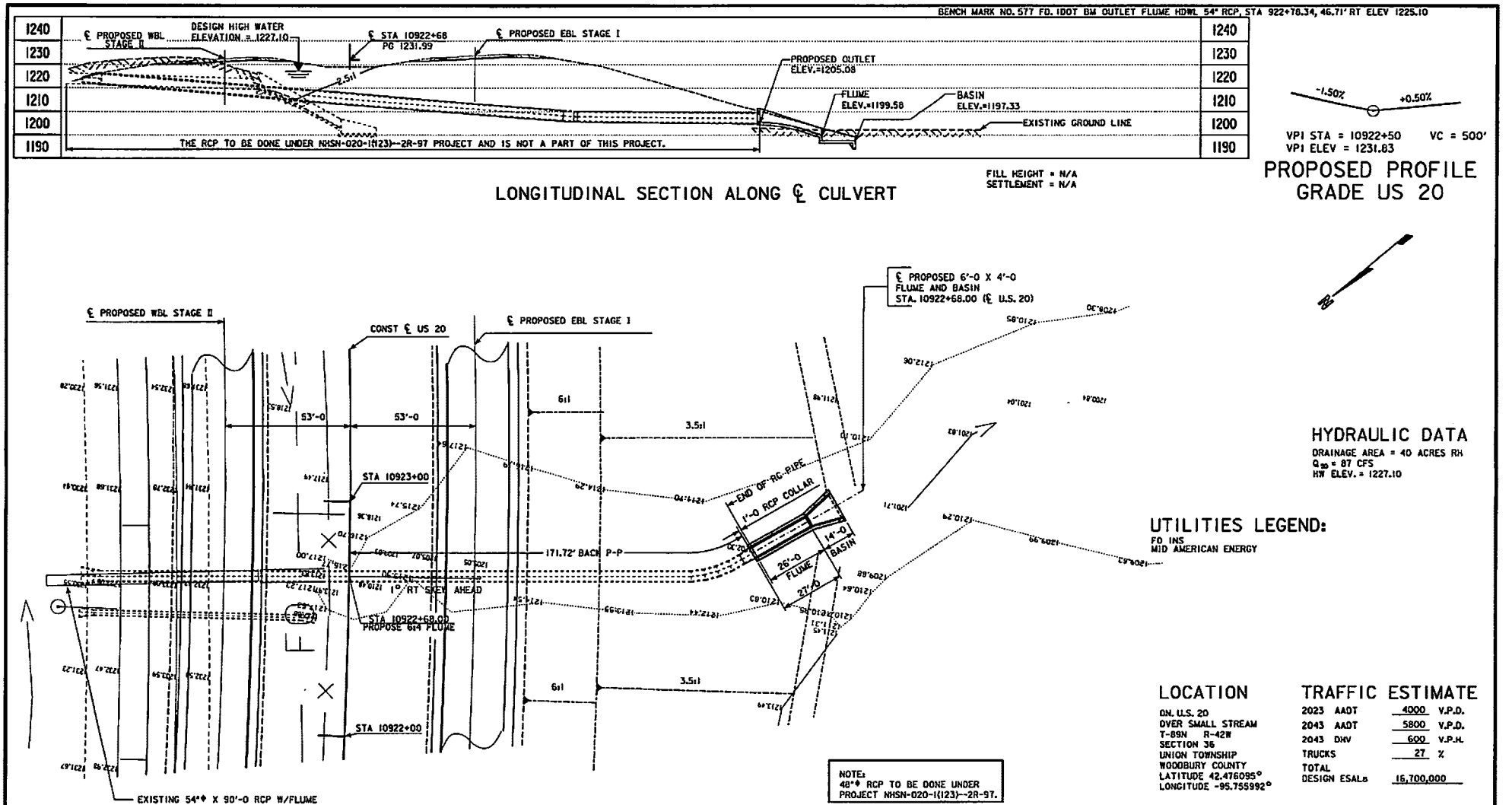
BENCH MARK NO. 577 FD. IDOT BM OUTLET FLUME HDWL 54" RCP, STA 922+78.34, 46.71' RT ELEV 1225.10
1240
1230
1220
1210
1200
1190
℄ PROPOSED WBL STAGE II
DESIGN HIGH WATER ELEVATION = 1227.10
℄ STA 10922+68 PG 1231.99
℄ PROPOSED EBL STAGE I
PROPOSED OUTLET ELEV.=1205.08
FLUME ELEV.=1199.58
BASIN ELEV.=1197.33
EXISTING GROUND LINE
2.5:1
THE RCP TO BE DONE UNDER NHSN-020-1(123)--2R-97 PROJECT AND IS NOT A PART OF THIS PROJECT.
LONGITUDINAL SECTION ALONG ℄ CULVERT
FILL HEIGHT = N/A
SETTLEMENT = N/A
-1.50%
+0.50%
VPI STA = 10922+50
VC = 500'
VPI ELEV = 1231.83
PROPOSED PROFILE GRADE US 20
℄ PROPOSED WBL STAGE II
CONST ℄ US 20
℄ PROPOSED EBL STAGE I
℄ PROPOSED 6'-0 X 4'-0 FLUME AND BASIN STA. 10922+68.00 (℄ U.S. 20)
53'-0
53'-0
6:1
3.5:1
STA 10923+00
END OF RC PIPE
1'-0 RCP COLLAR
14'-0 BASIN
26'-0 FLUME
27'-0
171.72' BACK P-P
1° RT SKEW AHEAD
STA 10922+68.00 PROPOSE 6'4 FLUME
STA 10922+00
EXISTING 54"Φ X 90'-0 RCP W/FLUME
NOTE: 48"Φ RCP TO BE DONE UNDER PROJECT NHSN-020-1(123)--2R-97.
HYDRAULIC DATA
DRAINAGE AREA = 40 ACRES RH
Q25 = 87 CFS
HW ELEV. = 1227.10
UTILITIES LEGEND:
FO INS
MID AMERICAN ENERGY
NOTE:
REMOVE EXISTING 54"Φ X 90'-0 RCP WITH FLUME UNDER NHSN-020-1(123)--2R-97 PROJECT.
SITUATION PLAN
LOCATION
ON U.S. 20
OVER SMALL STREAM
T-89N R-42W
SECTION 36
UNION TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.476095°
LONGITUDE -95.755992°
TRAFFIC ESTIMATE
2023 AADT 4000 V.P.D.
2043 AADT 5800 V.P.D.
2043 DHV 600 V.P.H.
TRUCKS 27 %
TOTAL DESIGN ESALs 16,700,000
DESIGN FOR A 1° SKEW (RA)
6'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 48"Φ RCP
SITUATION PLAN
STA. 10922+68.00 (℄ U.S. 20)
OCTOBER 2015
WOODBURY COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 5 FILE NO. 30668 DESIGN NO. 415
DESIGN TEAM DGB * MSF * LW
WOODBURY COUNTY
PROJECT NUMBER NHSN-020-1(155)--2R-97
SHEET NUMBER 4
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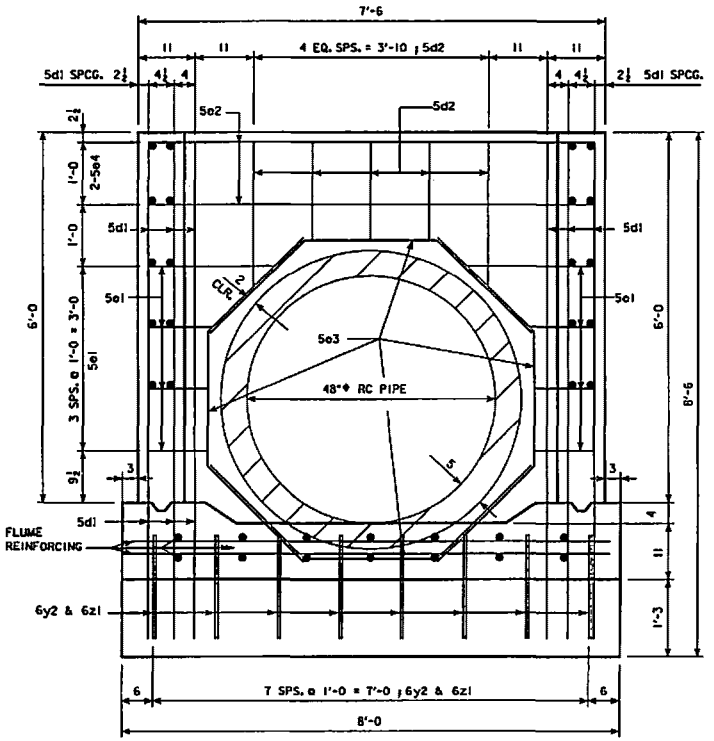
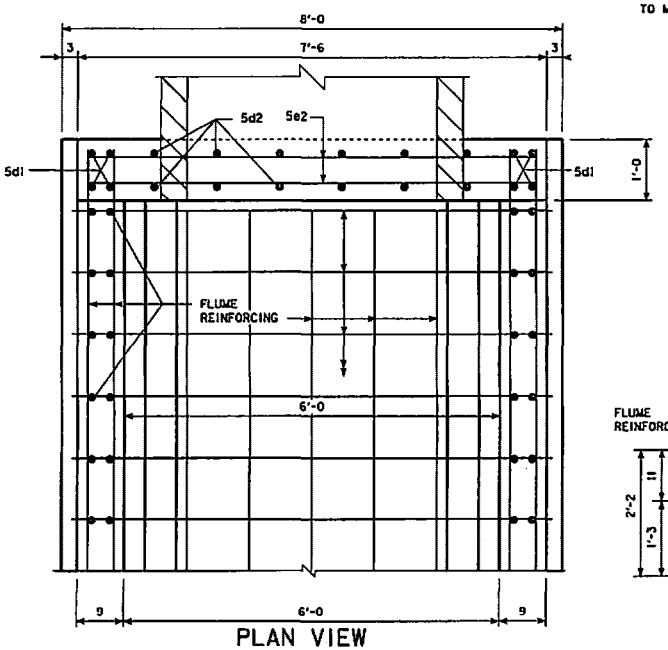
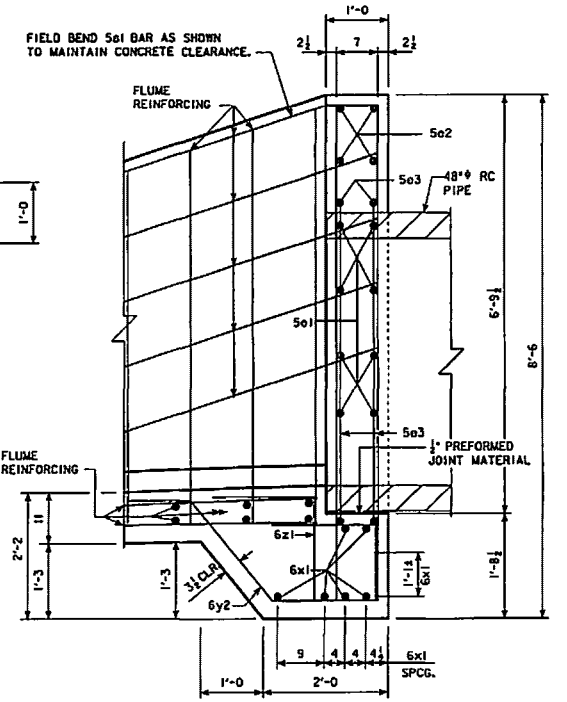
BENCH MARK NO: 577 FD. IDOT BM OUTLET FLUME HDWL 54" RCP, STA. 922+78.34, 46.71' RT ELEV 1225.10



END VIEW OF FLUME AND PIPE



PLAN VIEW



LONGITUDINAL VIEW

NOTE:
FLUME WALL LONGITUDINAL REINFORCING IS TO PROJECT 10" INTO RC PIPE COLLAR.

NOTE:
FOR FLUME DETIALS NOT SHOWN, REFER TO DESIGN SHEET 5 AND STANDARDS LISTED IN THESE PLANS.

DESIGN FOR A 1° SKEW (RA)

6'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 48"Φ RCP

48"Φ RCP COLLAR DETAILS

STA. 10922+68.00 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB ⁂ MSF ⁂ LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 5

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PIPE COLLAR =
BELL JOINT FTG =

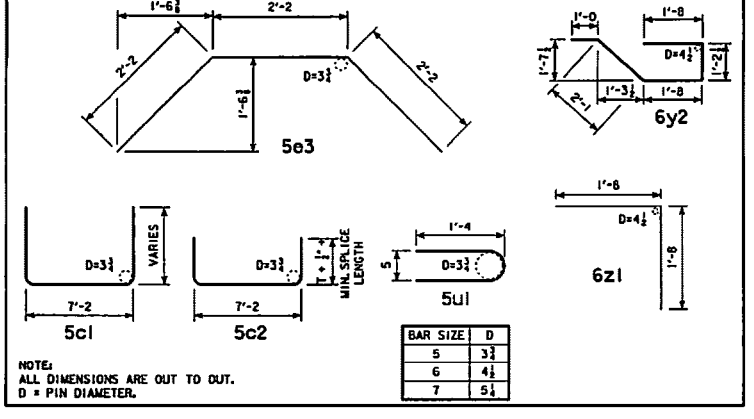
REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	WALLS FFV	—	50	LISTED	149
5b1	WALLS FFH	—	4	28'-0	117
4b2	WALLS BFH	—	4	28'-0	75
5b5	WALLS FFH	—	4	LISTED	34
4b6	WALLS BFH	—	4	LISTED	22
5a1	BOTT. FLOOR & WALLS BFV	L	44	LISTED	718
5c2	BOTT. FLOOR & WALLS BFV - SPLICED	L	5	13'-5	70
5c3	WALLS BFV	—	10	LISTED	56
6f1	FLOOR LONGIT. TOP	—	7	26'-4	217
5f2	FLOOR LONGIT. BOTT.	—	7	26'-4	192
6m1	FLOOR TRANSV. TOP	—	28	7'-8	322
5a1	WALLS BOTH F ALONG SLOPE	—	4	28'-0	117
5u1	FENCE ANCHORS (GALVANIZED)	U	2	2'-10	6
5d1	PIPE COLLAR, VERT; BOTH FACES	—	12	8'-0	100
5d2	PIPE COLLAR, VERT; BOTH FACES	—	10	LISTED	20
5e1	PIPE COLLAR, HORIZ; BOTH FACES	—	16	LISTED	21
5a2	PIPE COLLAR, HORIZ; BOTH FACES	—	4	7'-2	30
5e3	PIPE COLLAR, PIPE OPENING; BOTH FACES	V	8	6'-6	54
6x1	PIPE COLLAR, TRANSVERSE; BELL JOINT	—	6	7'-8	69
6y2	PIPE COLLAR, VERT; BELL JOINT	⊓	8	3'-4	40
6z1	PIPE COLLAR, VERT; BELL JOINT	⊓	8	7'-8	92
				TOTAL (LB)	2581

LISTED BARS

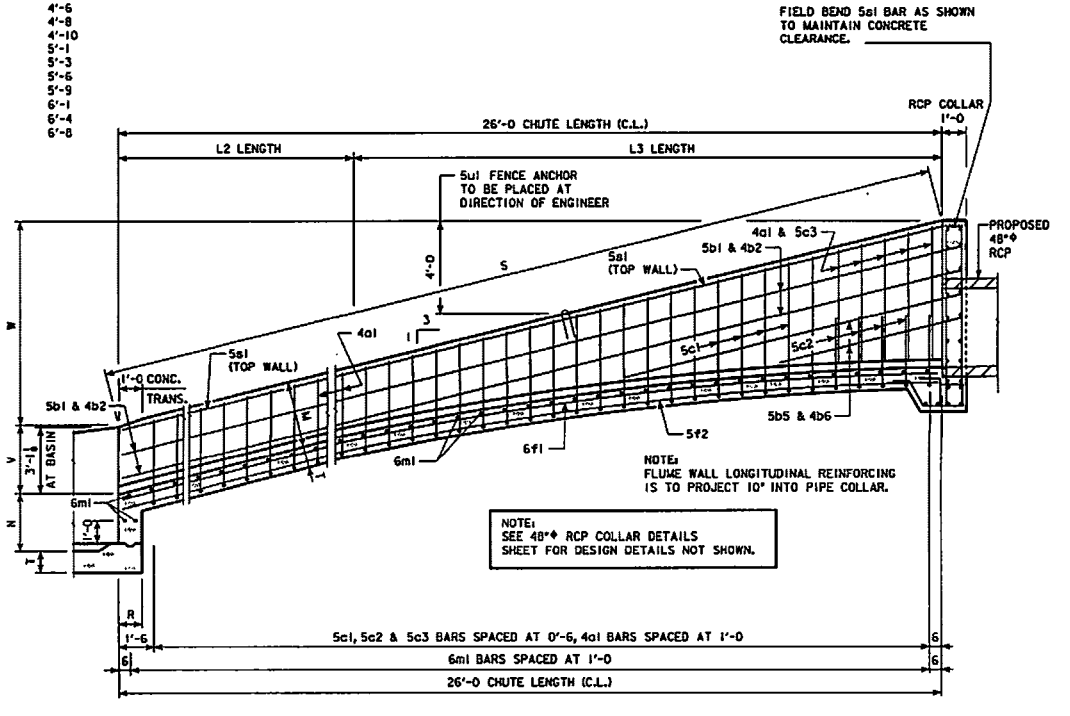
BAR 5c1	BAR 4a1	BAR 5c3	BAR 5b5 AND 4b6	5d2	5e1
44 BARS	50 BARS	10 BARS	4 BARS - 2 EA. LGTH.	10 BARS	16 BARS
9 AT 14'-5	10 AT 3'-7	10 VAR. - 2 EA. LGTH.	5'-5	6 @ 1'-7	12 @ 1'-0
35 VAR.	40 VAR. - 2 EA. LGTH.	5'-1	10'-9	4 @ 2'-4	4 @ 2'-0
14'-5	3'-7	5'-3			
14'-5	3'-8	5'-4			
14'-5	3'-8	5'-6			
14'-5	3'-9	5'-8			
14'-6	3'-9				
14'-6	3'-10				
14'-7	3'-11				
14'-7	4'-1				
14'-8	4'-2				
14'-9	4'-4				
14'-10	4'-6				
14'-11	4'-8				
15'-0	4'-10				
15'-1	5'-1				
15'-2	5'-3				
15'-4	5'-6				
15'-5	5'-9				
15'-7	6'-1				
15'-8	6'-4				
15'-10	6'-8				
16'-0					
16'-2					
16'-4					
16'-6					
16'-8					
16'-11					
17'-1					
17'-4					
17'-6					
17'-9					
18'-0					
18'-3					
18'-6					
18'-9					
19'-0					

BENT BAR DETAILS



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

BAR SIZE	D
5	3 1/2
6	4 1/2
7	5 1/2



6'x4' FLUME CHUTE - LONGITUDINAL SECTION

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	Δ 9.8	¥ 6.4	16.2
BASIN CURTAIN	0.3	---	0.3
TOTAL (CY)	10.1	6.4	16.5

ΔINCLUDES 1.1 CY FOR FOOTING BELOW COLLAR
¥INCLUDES 1.2 CY FOR RCP COLLAR

FLUME DATA

Δ A = 18°26'
Δ C = 1°00'
B = 10'-6 5/8
S = 27'-4 1/2
V = 3'-2
W = 8'-8
M = 3'-0
T = 0'-11
H = 4'-0

CURVE DATA

C. L. = 26'-0
L2 = 5'-11 3/4
L3 = 20'-0 1/4
D = 10'-0 3/8
E = 9'-11 5/8
P. C. ELEV. = 1205.08
P.I. ELEV. = 1204.90
P. P. ELEV. = 1204.73
P. T. ELEV. = 1201.58
X1 = 3'-1 7/8
X2 = 1'-9 1/4
X3 = 0'-9 7/8
X4 = 0'-2 3/8
L3/4 = 5'-0 1/8

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET RCFB-02-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.
3. SEE DESIGN SHEET 4 FOR COLLAR DETAILS

DESIGN FOR A 1° SKEW (RA)

6'-0 X 4'-0 REINFORCED CONCRETE 3:1 FLUME AND BASIN FOR A 48"Φ RCP

FLUME DETAILS

STA. 10922+68.00 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 5 OF 5 FILE NO. 30568 DESIGN NO. 415

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 6

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REVISION 09-13 - ADDED THE REFERENCE TO STANDARD RCF-02-12 IN THE NOTES.
REVISION 09-01 - THIS SHEET ISSUED 09-01.

ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	140.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	68	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	46.9	
4	2404-7775000	REINFORCING STEEL	LB	5,677	
5	2507-3250005	ENGINEERING FABRIC	SY	210.0	
6	2507-6800061	REVETMENT, CLASS E	TON	160.0	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2402-2720000	EXCAVATION, CLASS 20 - -
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)
4	2404-7775000	REINFORCING STEEL - -
5	2507-3250005	ENGINEERING FABRIC - -
6	2507-6800061	REVETMENT, CLASS E - -
7	2533-4980005	MOBILIZATION - -

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" Φ REINFORCED CONCRETE PIPE

ESTIMATED QUANTITIES

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 7

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GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A 14'-0 x 18'-6 DISSIPATION BASIN CONNECTED TO A 60"Φ REINFORCED CONCRETE PIPE STORM SEWER AT STATION 10931+10.00 (℄ U.S. 20.)

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.

REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:

EDGE CLEARANCES: 2" EXCEPT
- TOP OF FLOOR 2½" TO NEAR TRANSV. REINF. BAR
- BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR

END CLEARANCES:
- VERTICAL TOP 2"
- VERTICAL BOTTOM 3½"
- TRANSVERSE 2"

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

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS.

ALL FLOOR REINFORCING STEEL IS TO BE SUPPORTED AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60 REINFORCEMENT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE DESIGN STRESSES ARE BASED ON GRADE 60 REINFORCEMENT.

THESE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a) IS ⅝ 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	4	5	6	7	8	9
BAR DESIGNATION	13	16	19	22	25	29

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	17"	21"	25"	31"	41"	51"

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

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "SITUATION PLAN" HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

THE PROPOSED EBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

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:

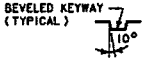
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010:
REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI.

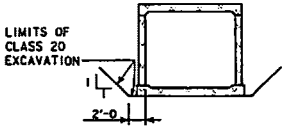
SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
DISSIPATION BASIN	5677	5677
	TOTAL (LBS.)	5677

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
DISSIPATION BASIN	16.6	30.3	46.9
TOTAL (CU. YDS.)	16.6	30.3	46.9





CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR A
14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" Φ REINFORCED CONCRETE PIPE
GENERAL NOTES

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB x MSF x LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 8

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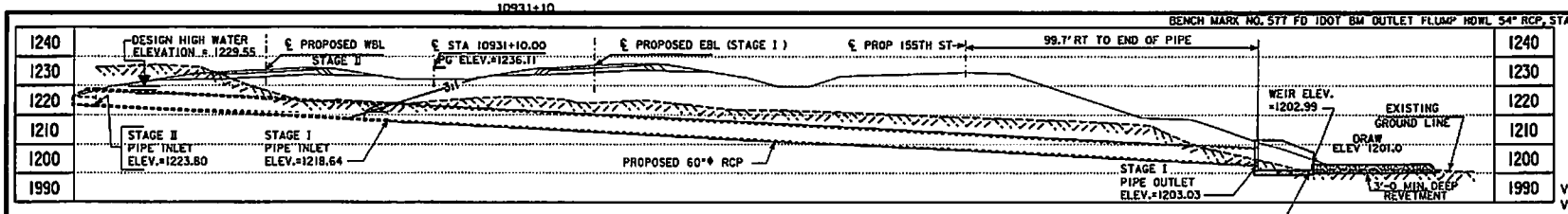
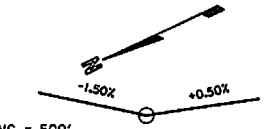


FILL HEIGHT = N/A
SETTLEMENT = N/A

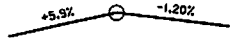
LONGITUDINAL SECTION ALONG ℄ CULVERT



VC = 500'
VPI STA = 10922+50
VPI ELEV = 1231.83

VC = 560'
VPI STA. 10939+50
VPI ELEV. = 1240.33

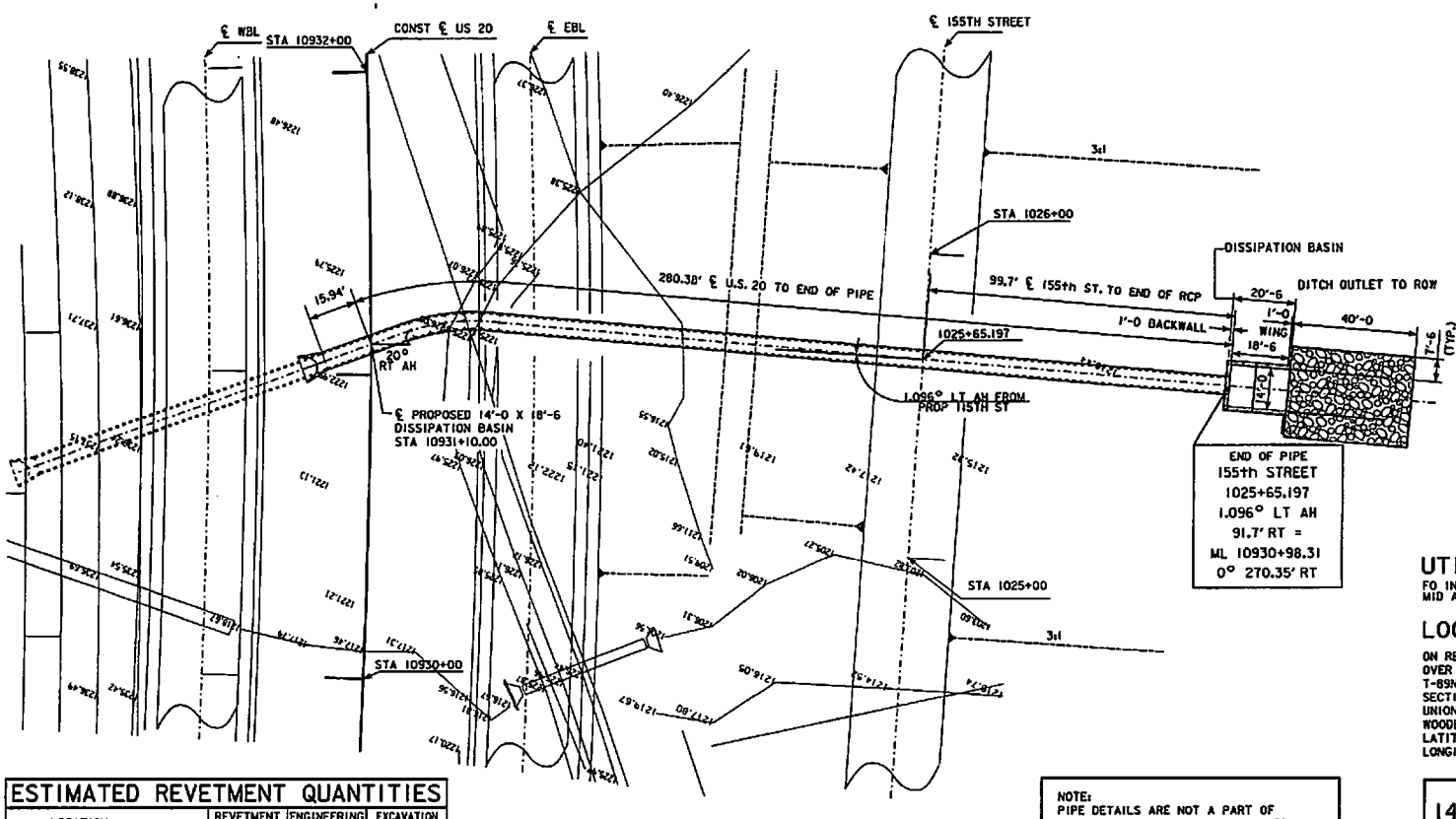
PROPOSED PROFILE GRADE US 20



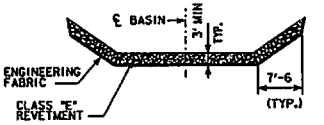
VPI STA = 1022+50
VPI ELEV = 1238.56

VC = 650'

PROPOSED PROFILE GRADE 155TH STREET



END OF PIPE
155th STREET
1025+65.197
1.096° LT AH
91.7' RT =
ML 10930+98.31
0° 270.35' RT



REVETMENT VIEW A-A

HYDRAULIC DATA

DRAINAGE AREA = 104 ACRES R
Q_{50} = 152 CFS
HW ELEV. = 1229.55

UTILITIES LEGEND:

FO INS
MID AMERICAN ENERGY

LOCATION

ON RELOCATED U.S. 20
OVER SMALL STREAM
T-89N R-42W
SECTION 36
UNION TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.475019°
LONGITUDE -95.753241°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
RIGHT	160	210	140

NOTE:
PIPE DETAILS ARE NOT A PART OF THIS DESIGN AND TO BE DONE UNDER PROJECT NHSN-020-1(123)--2R-97.

SITUATION PLAN

DESIGN FOR A
14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" Φ REINFORCED CONCRETE PIPE
SITUATION PLAN

STA. 10931+10.00
OCTOBER 2015

WOODBURY COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 3 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 9

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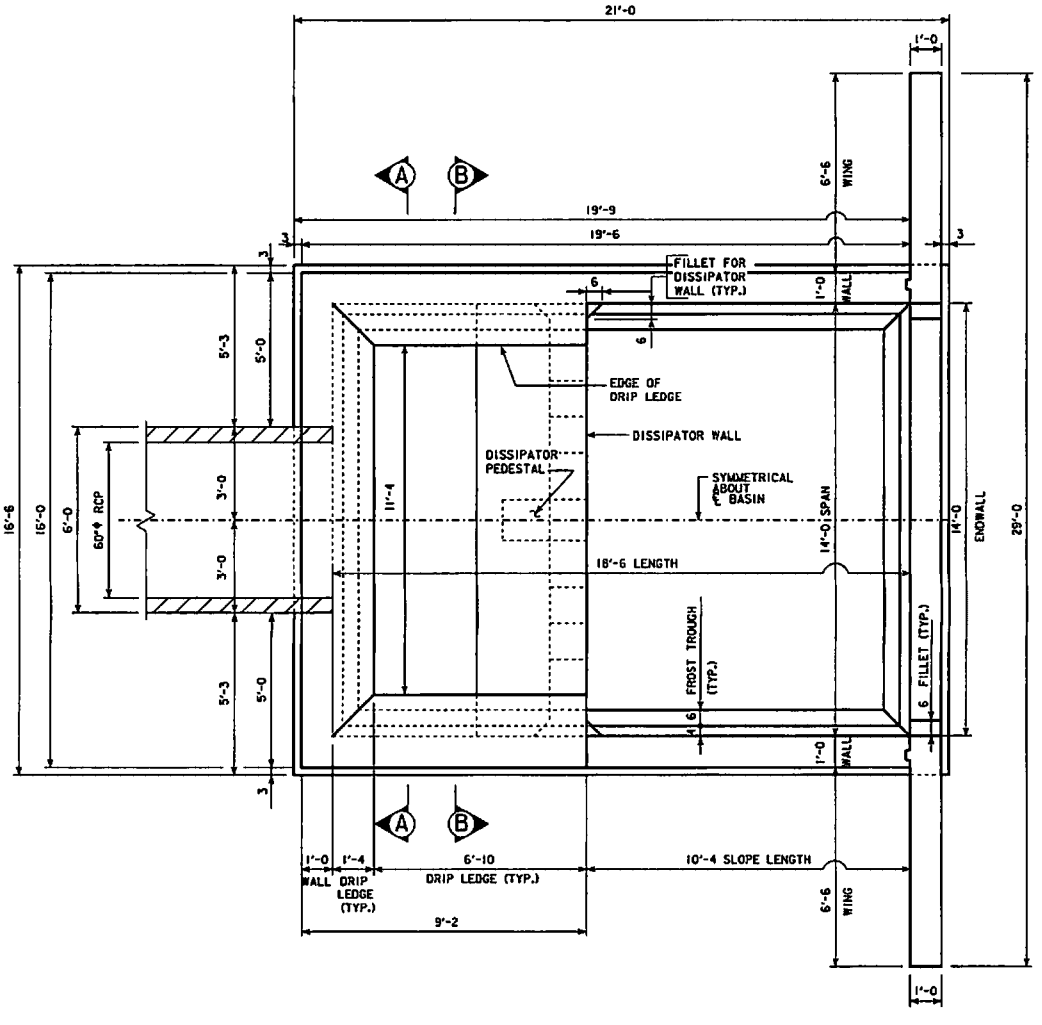
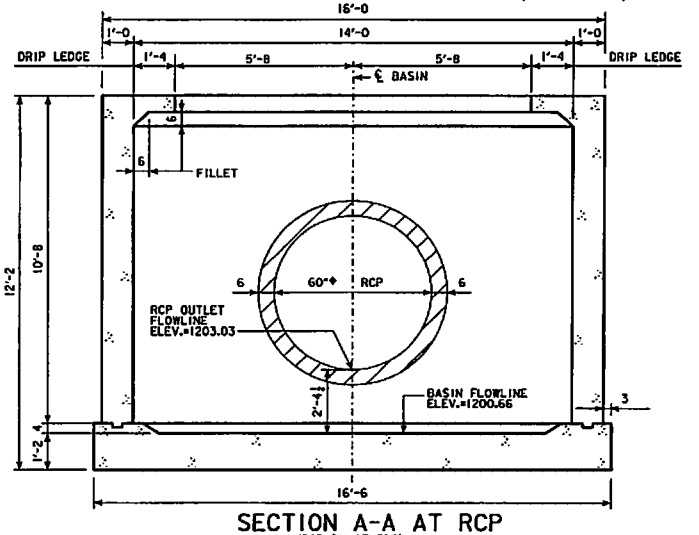
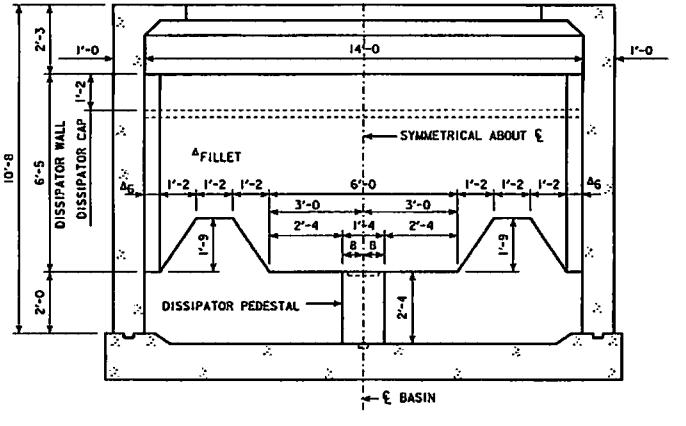
BENCH MARK NO. 577 FD IDOT BM OUTLET FLUMP HDWL 54" RCP, STA 922+78.34, 46.71' RT. ELEV 1225.10



PLAN VIEW OF DISSIPATOR BASIN



SECTION A-A AT RCP
(RCP BY OTHERS)



SECTION B-B AT DISSIPATOR WALL

NOTE:
60"Φ RCP PLACED UNDER NHSN-020-1(123)--2R-97 PROJECT.

DESIGN FOR A
14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" Φ REINFORCED CONCRETE PIPE
DISSIPATOR BASIN DETAILS

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 4 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW	WOODBURY COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER 10

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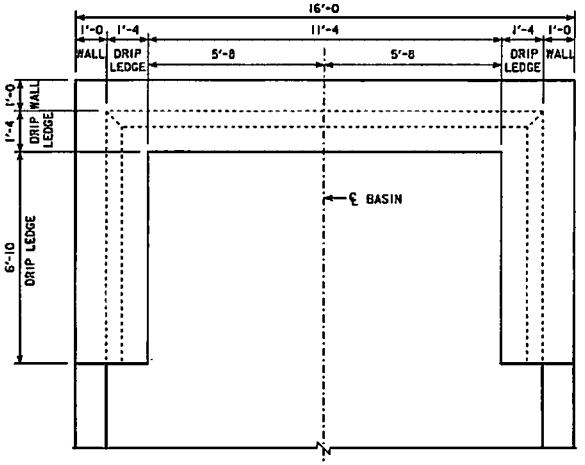
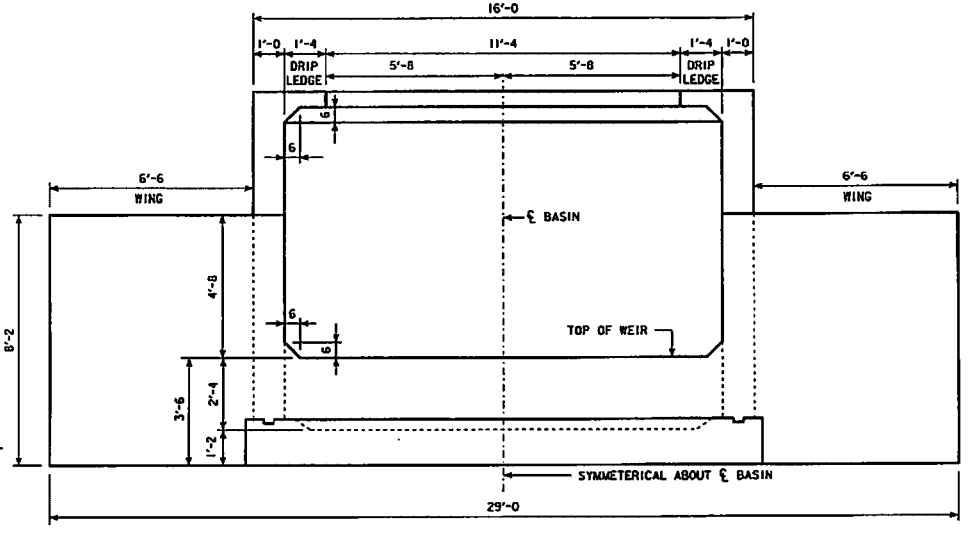
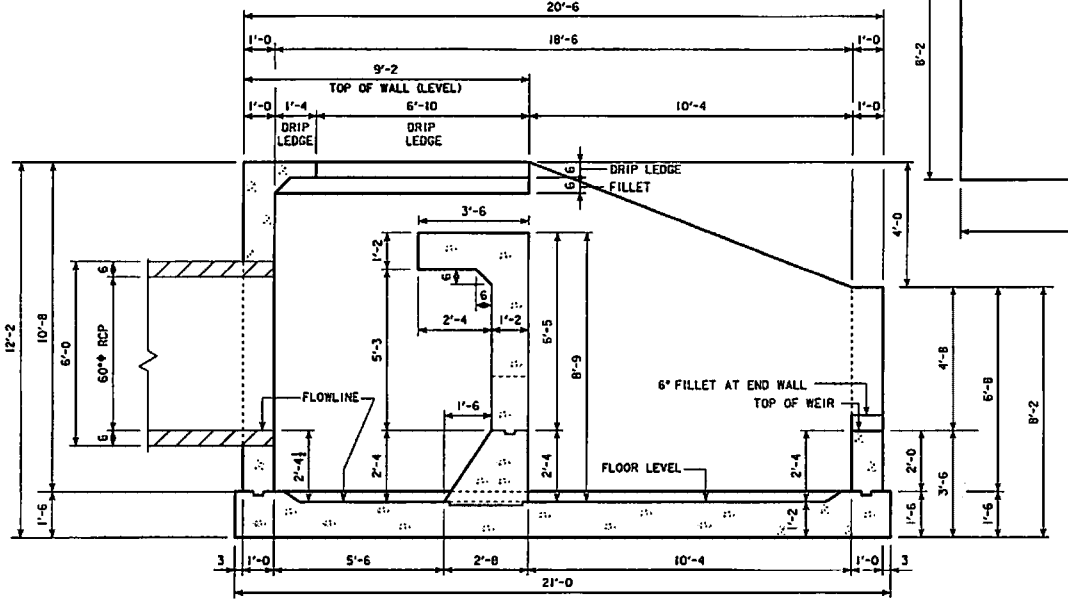


PLAN VIEW OF DRIP LEDGE AND PORTION OF TOP OF WALL



END VIEW OF WING WALLS AND WEIR



SECTION ALONG ℄ BASIN

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" ϕ REINFORCED CONCRETE PIPE

DISSIPATOR BASIN DETAILS

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 11

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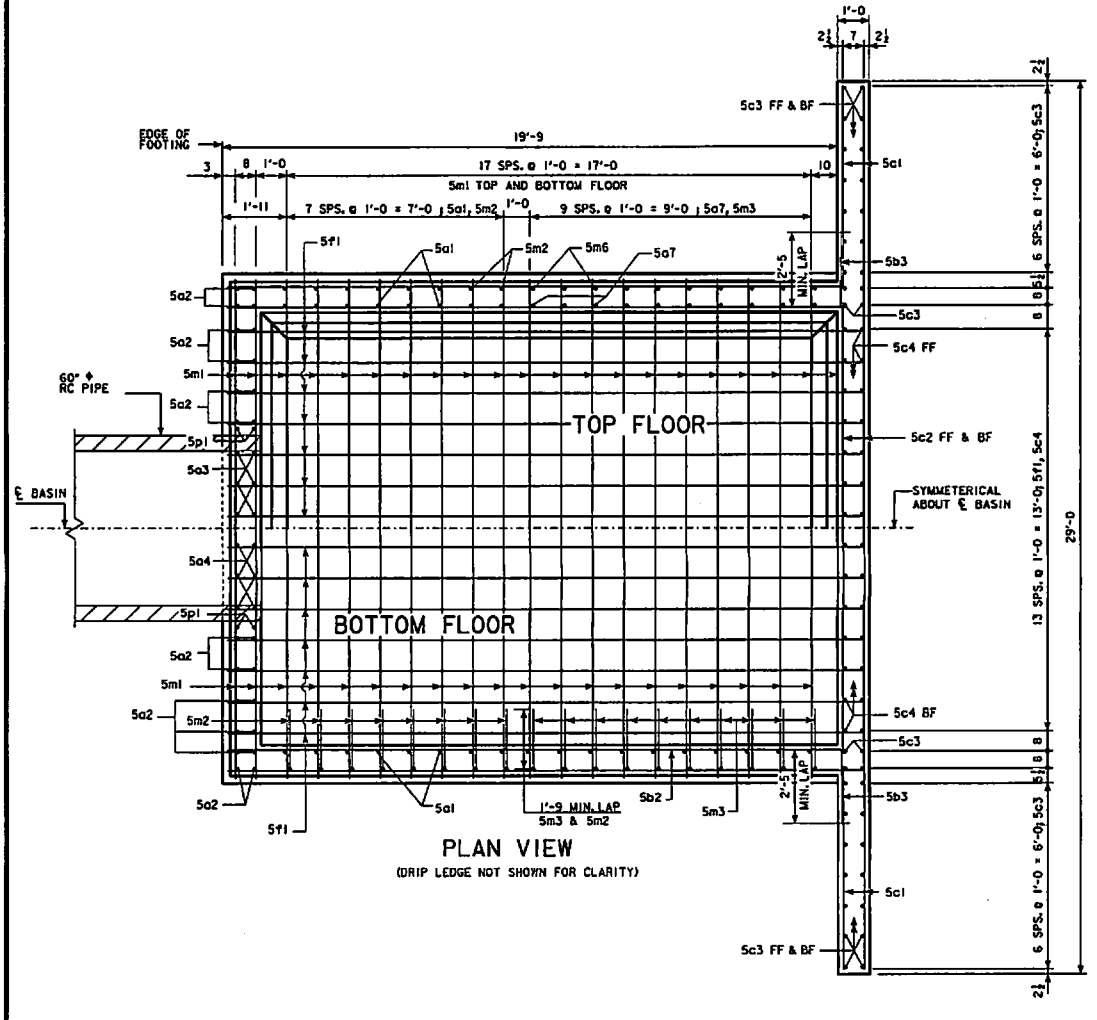
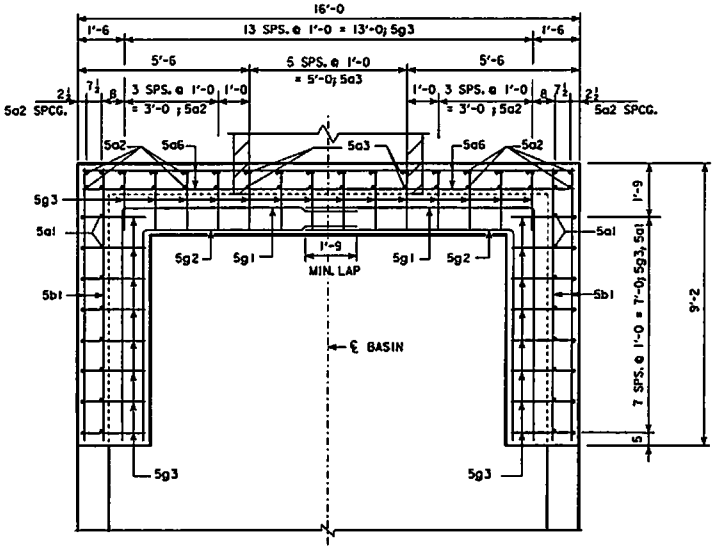
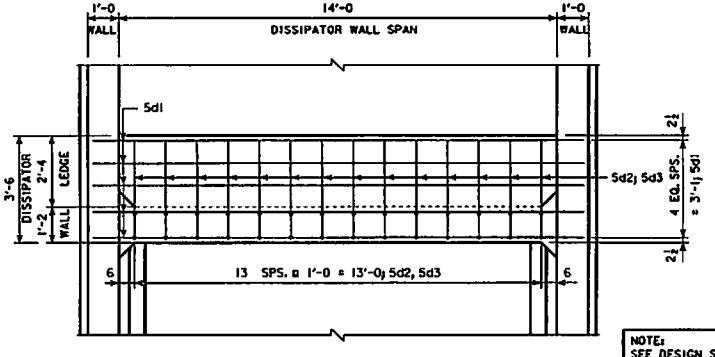


PLAN VIEW

(DRIP LEDGE NOT SHOWN FOR CLARITY)



PLAN VIEW OF DRIP LEDGE AND PORTION OF TOP OF WALL



PLAN VIEW OF DISSIPATOR WALL

NOTE:
SEE DESIGN SHEET 10
FOR REINFORCING BAR LIST.

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" ϕ REINFORCED CONCRETE PIPE

DISSIPATOR BASIN DETAILS

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 10 FILE NO. 30560 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 12

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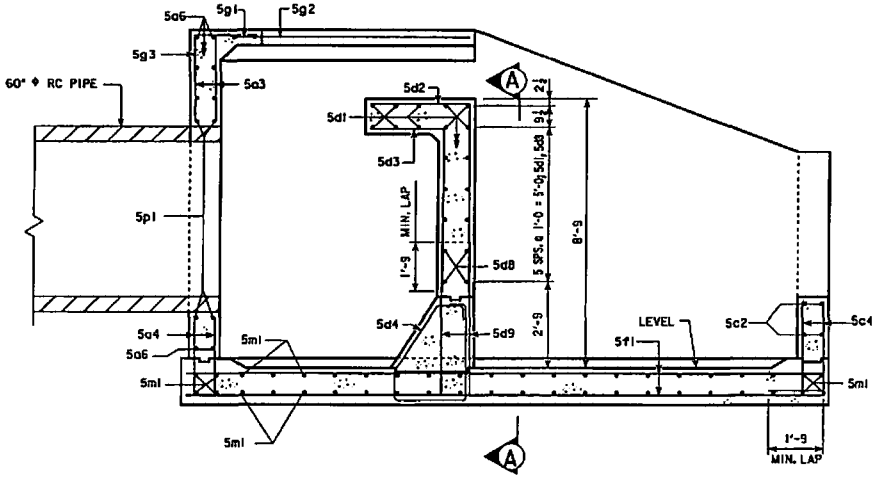
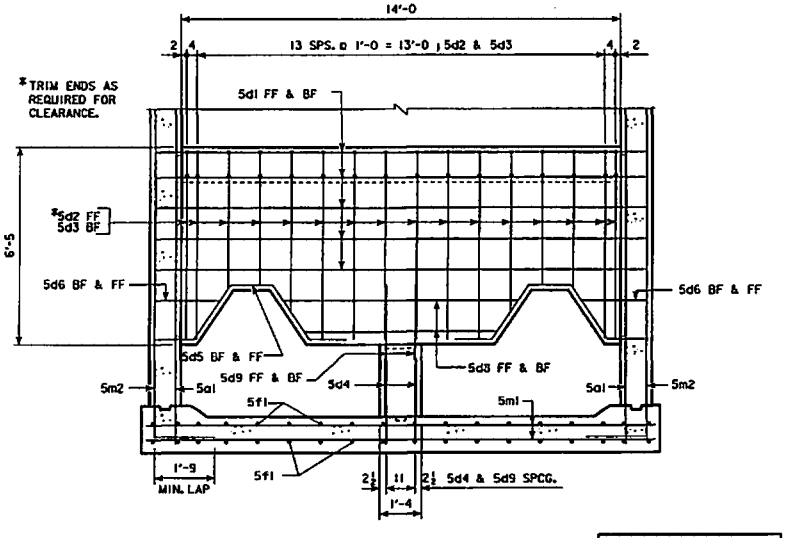


SECTION ALONG ℄ BASIN



SECTION A-A

NOTE:
SEE DESIGN SHEET 10 FOR REINFORCING BAR LIST.

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" ϕ REINFORCED CONCRETE PIPE

DISSIPATOR BASIN DETAILS

STA. 10931+10.00

OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 13

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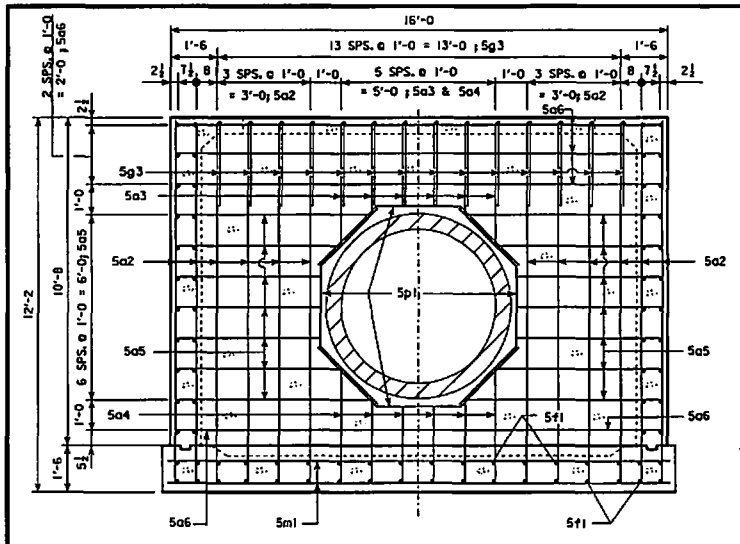
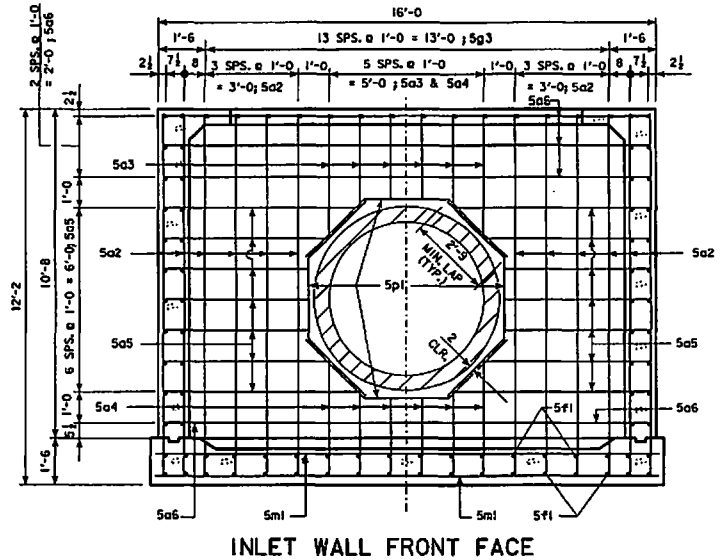
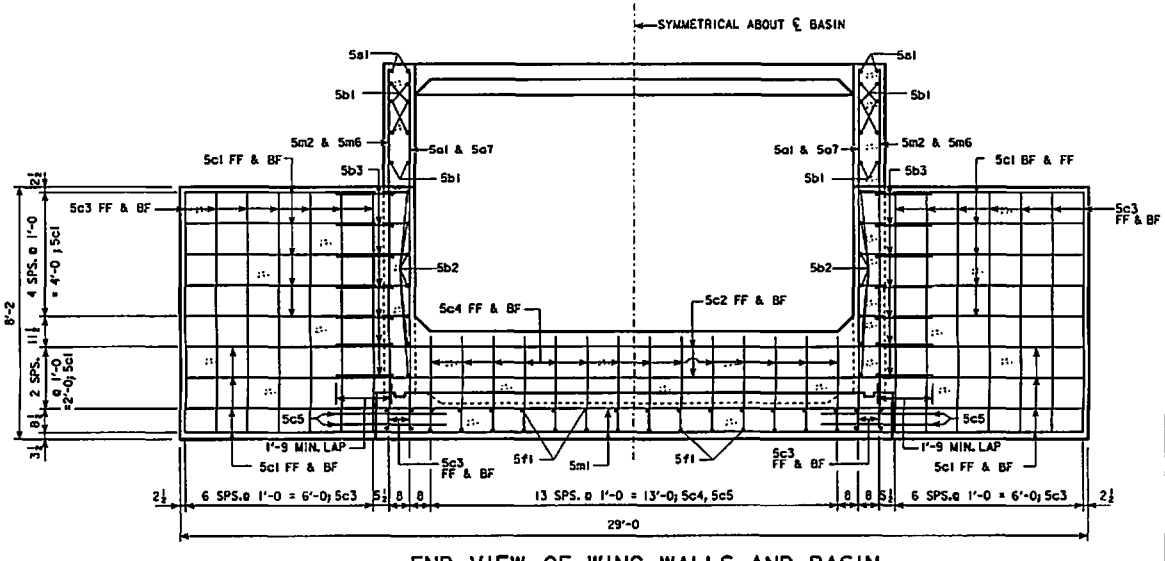


INLET WALL BACK FACE



INLET WALL FRONT FACE



END VIEW OF WING WALLS AND BASIN

NOTE:
SEE DESIGN SHEET 10 FOR REINFORCING BAR LIST.

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" ϕ REINFORCED CONCRETE PIPE

DISSIPATOR BASIN DETAILS

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB & MSF & LW	WOODBURY COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER 14

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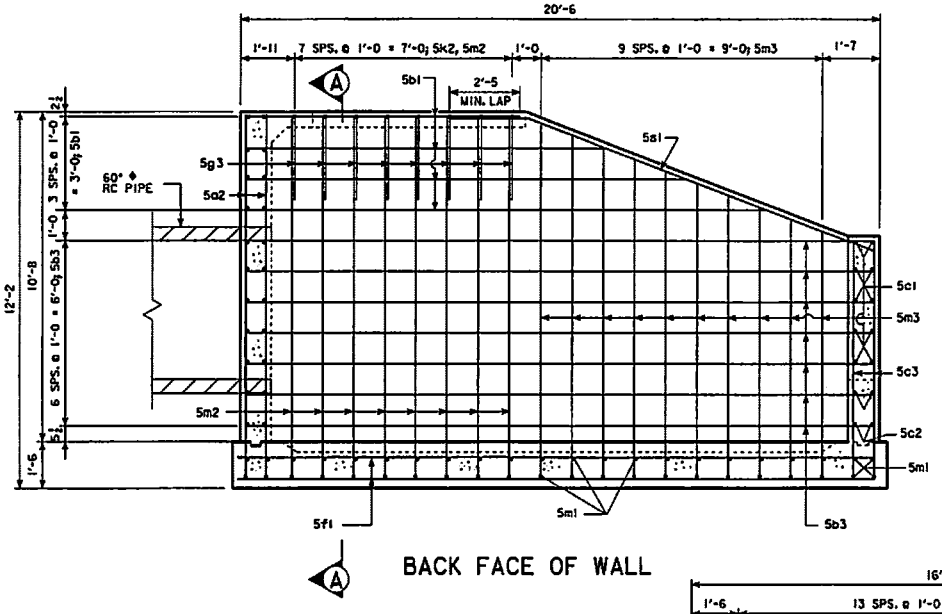

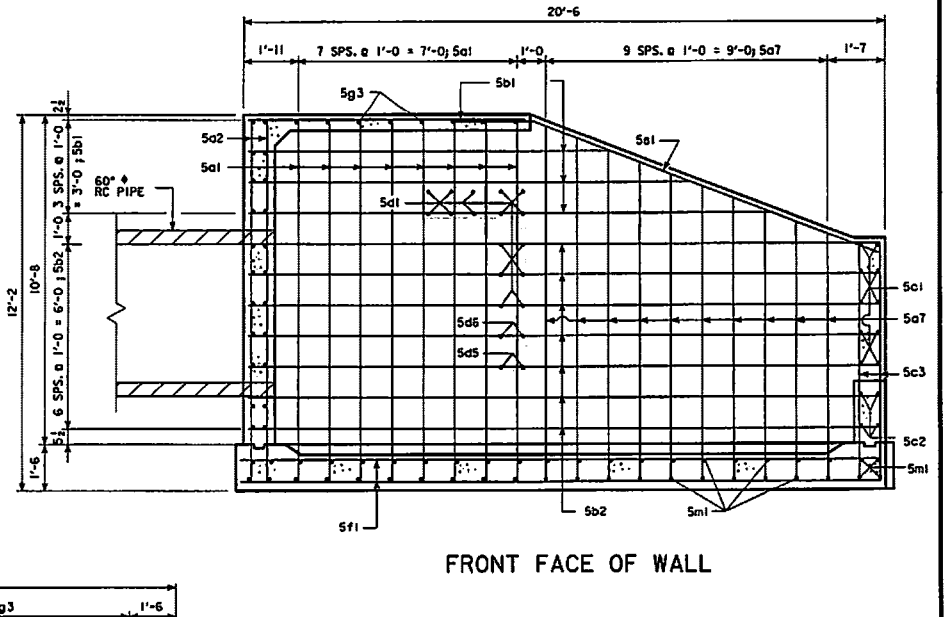

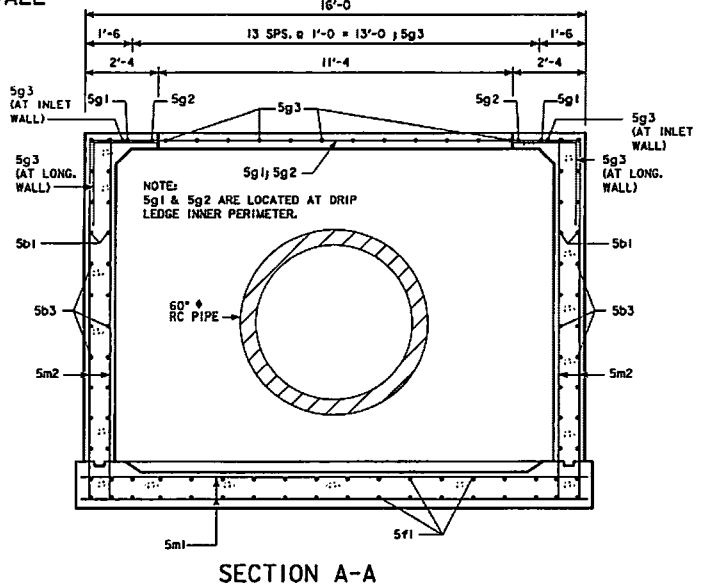

NOTE:
SEE DESIGN SHEET 10 FOR REINFORCING BAR LIST.

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" ϕ REINFORCED CONCRETE PIPE

DISSIPATOR BASIN DETAILS

STA. 10931+10.00 OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 9 OF 10 FILE NO. 30568 DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 15

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REINFORCING BAR LIST - DISSIPATION BASIN

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS, VERT. FRONT FACE		16	11'-8	195
5a2	INLET WALL, VERT. BOTH FACES		24	11'-8	292
5a3	INLET WALL, VERT. BOTH FACES, ABOVE RCP		12	LISTED	40
5a4	INLET WALL, VERT. BOTH FACES, BELOW RCP		12	LISTED	38
5a5	INLET WALL, HORIZ. BOTH FACES, AT RCP		28	LISTED	154
5a6	INLET WALL, HORIZ. BOTH FACES		8	15'-8	131
5a7	WALLS, VERT. FRONT FACE		20	LISTED	203
5b1	LONG; WALLS; BOTH FACES HORIZONTAL		16	LISTED	213
5b2	LONG; WALLS, FRONT FACE HORIZONTAL		14	20'-2	294
5b3	LONG; WALLS BACK FACE		14	22'-6	329
5c1	HORIZ. WINGS, BOTH FACES		40	6'-2	257
5c2	HORIZ. WINGS, WEIR; BOTH FACES		4	19'-10	83
5c3	VERT; WINGS, BOTH FACES		36	7'-9	291
5c4	VERT; WEIR BOTH FACES		28	4'-9	139
5c5	FOOTING WING CONNECTION		8	4'-0	33
5d1	HORIZ; DISSIPATOR DEVICE, BOTH FACES		16	15'-8	261
5d2	VERT; DISSIPATOR DEVICE, FRONT FACE WALL		16	9'-3	154
5d3	VERT; DISSIPATOR DEVICE, BACK FACE WALL		16	7'-7	127
5d4	VERT; DISSIPATOR PEDESTAL, BOTH FACES		2	11'-4	24
5d5	VERT; DISSIPATOR NOTCH, BOTH FACES		4	7'-6	31
5d6	HORIZ; DISSIPATOR NOTCH ENDS, BOTH FACES		4	2'-0	8
5d8	HORIZ; DISSIPATOR NOTCH, CENTER, BOTH FACES		4	LISTED	28
5d9	VERT; DISSIPATOR PEDESTAL, BOTH FACES		4	5'-0	21
5f1	LONG; FLOOR, TOP & BOTTOM		36	20'-8	776
5g1	HORIZ; DRIP LEDGE, BACK		2	15'-5	32
5g2	HORIZ; DRIP LEDGE, FRONT		2	13'-8	29
5g3	VERT; INLET WALL, BACK FACE, ABOVE RCP		30	4'-8	146
5m1	TRANS; FLOOR, TOP		44	16'-2	742
5m2	VERT; FLOOR, BACK FACE		16	13'-9	229
5m3	VERT; WALLS, BACK FACE		20	LISTED	245
5p1	RCB PIPE OPENING, BOTH FACES		8	8'-3	69
5s1	SLOPE; WALLS, TOP, BOTH FACES		4	15'-0	63
				TOTAL (LBS.)	5677

LISTED BARS

5a3 — 12 BARS, FOUR EACH: 2'-8, 2'-11, 3'-11

5a4 — 12 BARS, FOUR EACH: 2'-7, 2'-10, 3'-9

5a5 — 28 BARS: 4'-8 @ 12 EA., 5'-3 @ 8 EA., 6'-3 @ 8 EA.

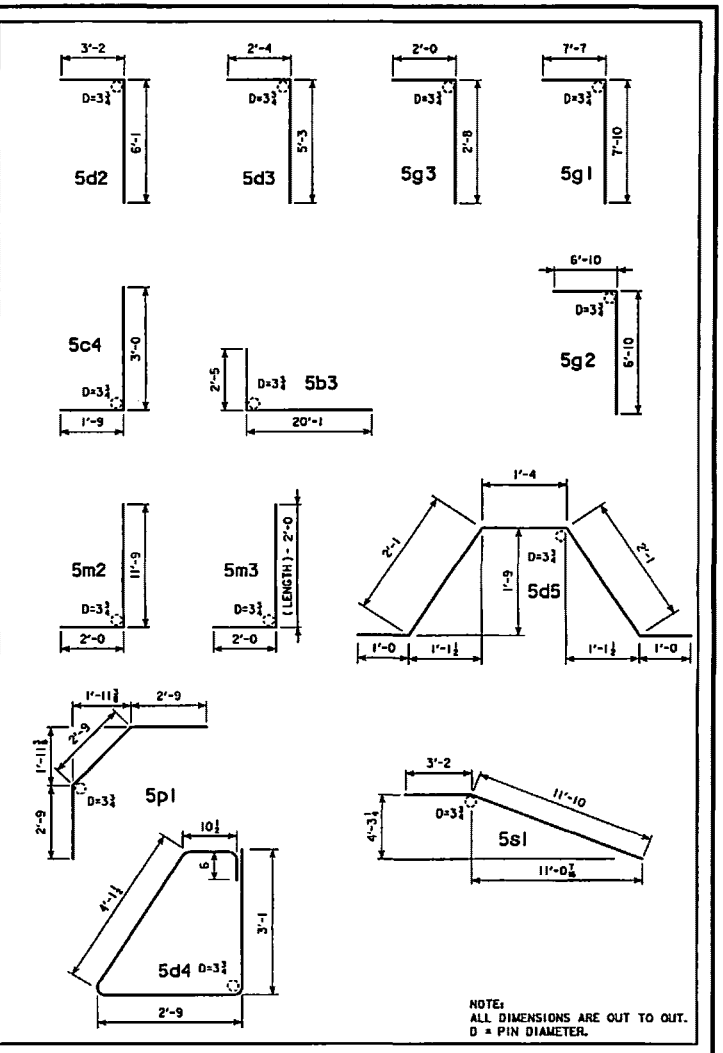
5b1 — 16 BARS, FOUR EA.: 8'-10, 11'-6, 14'-1, 16'-8

5a7 — 20 BARS, TWO EA.: 8'-1, 8'-4, 8'-9, 9'-2, 9'-6, 9'-11, 10'-4, 10'-8, 11'-1, 11'-6

5d6 — 8 BARS, FOUR EACH: 1'-4, 2'-0

5d8 — 4 BARS, TWO EACH: 6'-1, 7'-5

5m3 — 20 BARS, TWO EA.: 10'-0, 10'-4, 10'-9, 11'-2, 11'-6, 11'-11, 12'-4, 12'-8, 13'-1, 13'-6



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

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL - CU.YDS.
DISSIPATOR BASIN	16.6	30.3	46.9

DESIGN FOR A

14'-0 X 18'-6 DISSIPATION BASIN FOR A 60" Φ REINFORCED CONCRETE PIPE

REINFORCING LIST AND CONCRETE QTY.

STA. 1093I+10.00 — OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 10 OF 10 — FILE NO. 30568 — DESIGN NO. 515

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 16

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES

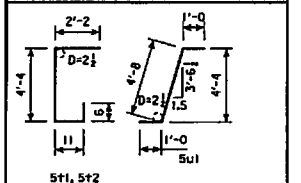
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	150.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-2720000	EXCAVATION, CLASS 20	CY	234	
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	649.0	
5	2404-7775000	REINFORCING STEEL	LB	107,951	
6	2507-3250005	ENGINEERING FABRIC	SY	290.0	
7	2507-6800061	REVETMENT, CLASS E	TON	240.0	
8	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

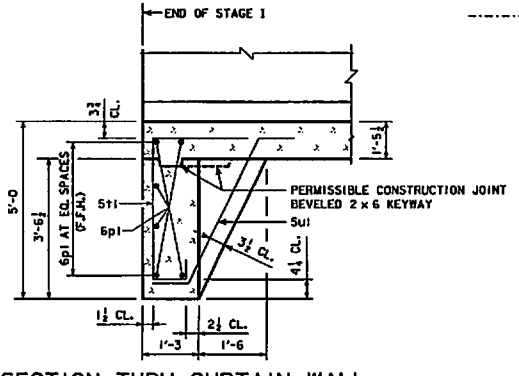
ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL " "
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDE THE COST FOR REMOVALS AS NEEDED OF THE EXISTING FLUME AND BASIN (DES. 6056).
3	2402-2720000	EXCAVATION, CLASS 20 " "
4	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) " "
5	2404-7775000	REINFORCING STEEL " "
6	2507-3250005	ENGINEERING FABRIC " "
7	2507-6800061	REVETMENT, CLASS E " "
8	2533-4980005	MOBILIZATION " "

CURTAIN WALL DETAILS FOR END OF STAGE I END BARREL

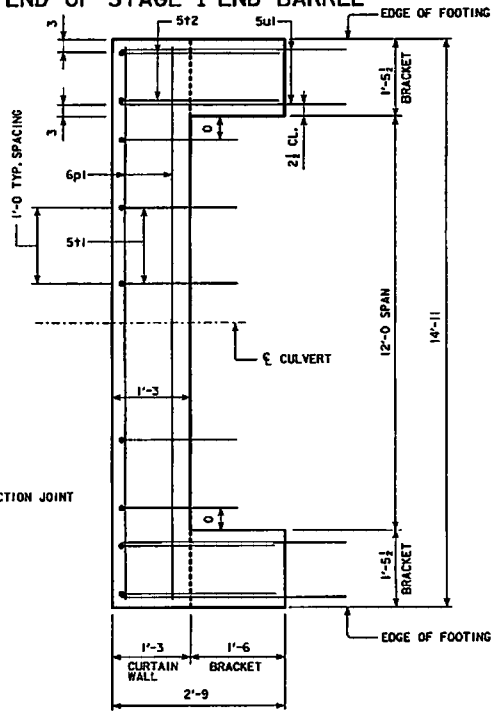
BENT BAR DETAILS



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



SECTION THRU CURTAIN WALL
(FLOOR REINFORCING NOT SHOWN FOR CLARITY)



CURTAIN WALL DETAIL
APRON IS NOT SHOWN

CURTAIN REINFORCING

LOCATION	SHAPE	BAR	NO.	LENGTH	WT.
CURTAIN, HORIZ.	——	6pl	6	14'-2	128
CURTAIN, VERT.	⊓	5t1	13	7'-11	107
CURTAIN, VERT., ENDS	⊓	5t2	4	7'-11	33
BRACKET, VERT.	⌐	5u1	4	6'-8	28
				TOTAL (LBS.)	296

CURTAIN WALL CONCRETE TOTAL = 2.6 CU. YDS.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 615, STAGE II IS DESIGN 118, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLAN NOTES.

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN ESTIMATED QUANTITIES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 6 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 17

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE I DESIGN TO CONSTRUCT A 12'-0 X 12'-0 X 192'-0 REINFORCED CONCRETE BOX CULVERT WITH A FLUME AND BASIN ON U.S 20 AT STA. 10957+16.16 (℄ U.S. 20) 0.1861° SKEW (L.A). STAGE II (DES. 118) IS NOT A PART OF THIS DESIGN, BUT INCLUDED IN THIS PROJECT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6056).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 21 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

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.

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS AS NEEDED OF THE EXISTING FLUME AND BASIN (DES. 6056).

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.

STAGE II IS NOT PART OF THIS DESIGN. SEE DESIGN NO. 118.

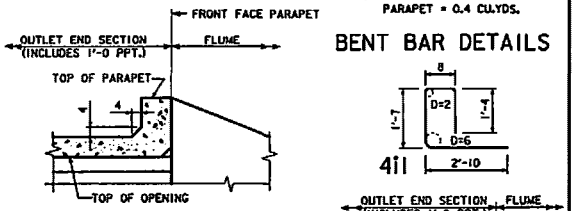
THE PROPOSED EBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE IN PROJECT NHSN-020-1(123)--2R-97.

35'-0 END SECTION PARAPET DETAILS

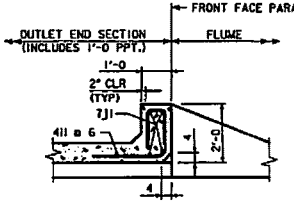
REINF. BAR LIST 35'-0 END SECTION PARAPET

MARK	LOCATION	SHAPE	NO.	LENGTH	WT.
411	PARAPET, VERT.	⊓	27	6'-5	116
7J1	PARAPET, HORIZ.	—	4	14'-1	115
	REINFORCING STEEL ABOVE SLAB - TOTAL - LBS.				231

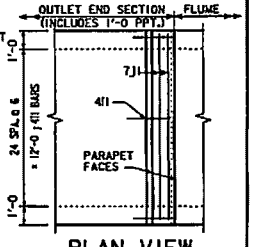
CONCRETE ABOVE SLAB PARAPET = 0.4 CU.YDS.



BENT BAR DETAILS

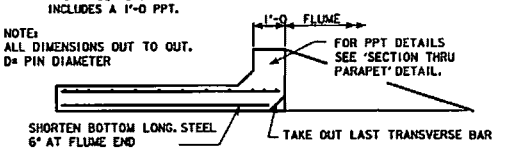


SECTION THRU PARAPET



PLAN VIEW

NOTE:
THE OUTLET END SECTION INCLUDES A 1'-0 PPT.



OUTLET END SECTION WITH PPT DETAILS WITH FLUME

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

STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 12-12-12	APRIL 2012	-----
FBJ-05-12	APRIL 2012	-----
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	-----
RCFB-06-12	APRIL 2012	-----
RCFB-07-12	APRIL 2012	-----

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
615	NEW RCB STAGE I

SUMMARY OF REINFORCING STEEL

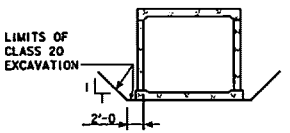
LOCATION	QUANTITY	TOTAL
12'-0 X 12'-0 FLUME	10,038	10,038
12'-0 X 12'-0 BASIN	8995	8995
38'-0 BARRELS	3 @ 16,002	48,006
35'-0 BARREL END SECTION	Δ 14,970	Δ 14,970
29'-0 BARREL WITH CURTAIN WALL	ΔΔ 12,508	ΔΔ 12,508
14'-0 BENT BARREL	6244	6244
BELL JOINTS	5 @ 1249	6245
FLUME JUNCTION BELL JOINT	945	945
	TOTAL (LBS.)	107,951

Δ INCLUDES 231 LBS. ABOVE SLAB FOR PAPAPET
ΔΔ INCLUDES 296 LBS. FOR CURTAIN WALL

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
12'-0 X 12'-0 FLUME	29.5	28.9	—	58.4
12'-0 X 12'-0 BASIN	26.0	17.6		43.6
38'-0 BARRELS	3 @ 32.4 = 97.2	3 @ 39.6 = 118.8	3 @ 26.3 = 78.9	294.9
35'-0 BARREL END SECTION	29.8	36.4	* 24.2	90.4
29'-0 BARREL WITH CURTAIN WALL	** 27.3	30.2	20.1	77.6
14'-0 BENT BARREL	11.9	14.6	9.7	36.2
BELL JOINTS	5 @ 3.392 = 17.0	5 @ 3.331 = 16.7	5 @ 2.835 = 14.2	47.9
TOTAL (CU. YDS.)	238.7	263.2	147.1	649.0

* INCLUDES 0.4 CU. YDS. CONCRETE ABOVE SLAB FOR PAPAPET
** INCLUDES 2.6 CU. YDS. CONCRETE FOR CURTAIN WALL



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR STAGE I OF A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN GENERAL NOTES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 6 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW	WOODBURY COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER 18

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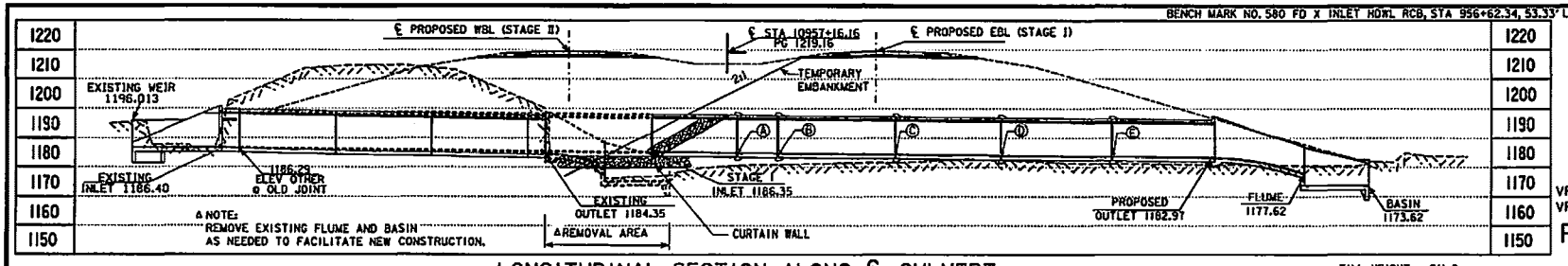
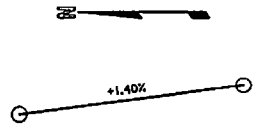
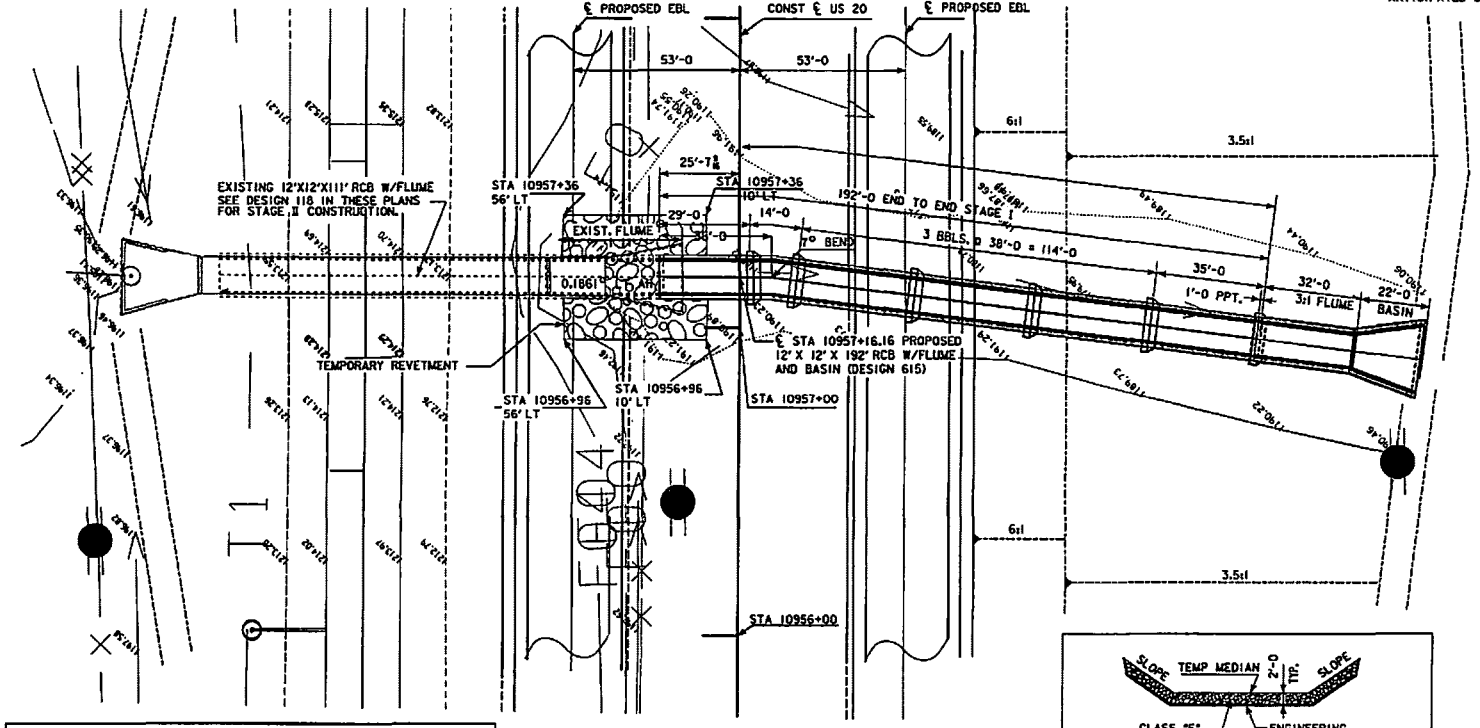




VPI STA = 10953+00 VPI STA = 10968+00
VPI ELEV = 1213.33 VPI ELEV = 1234.33

PROPOSED PROFILE GRADE US 20

LONGITUDINAL SECTION ALONG ℄ CULVERT



FILL HEIGHT = 21'-0
ANTICIPATED SETTLEMENT = 1.52 FT.

CAMBER ELEVATION TABLE

NOTE:
CAMBER BELL JOINTS AS SHOWN

LOCATION	ELEVATION
(A)	1186.11
(B)	1185.91
(C)	1185.59
(D)	1185.22
(E)	1184.08

NOTE:
BELL JOINTS ARE TO BE PLACE ON THE UPSTREAM END OF THE BARREL SECTIONS.

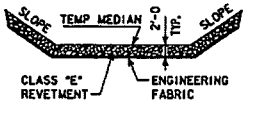
TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE NEW CULVERT TO THE INLET OF THE EXISTING CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE NEW STAGE I CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE EXISTING CULVERT TO FACILITATE DRAINAGE.

SITUATION PLAN



TYPICAL MEDIAN PROTECTION

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
MEDIAN	240	290	150

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

HYDRAULIC DATA

DRAINAGE AREA = 1106 ACRES
Q_{50} = 1268 CFS
HW ELEV. = NO CHANGE

UTILITIES LEGEND:

MID AMERICAN ENERGY
QWEST
MCLEOD
QWEST LOCAL NETWORK

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-88-89N R-42W
SECTION 36-4
UNION-ROCK TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.474541°
LONGITUDE -95.743651°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

SITUATION PLAN

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 6 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 19

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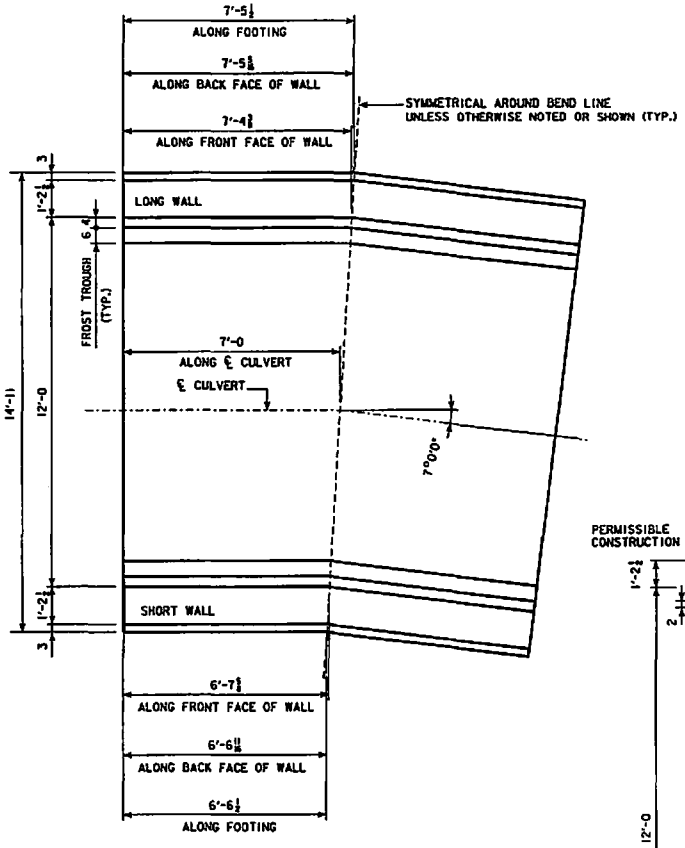
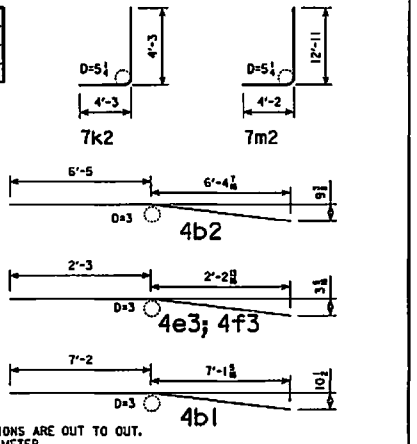


PLAN VIEW BENT BARREL

BENT BAR DETAIL

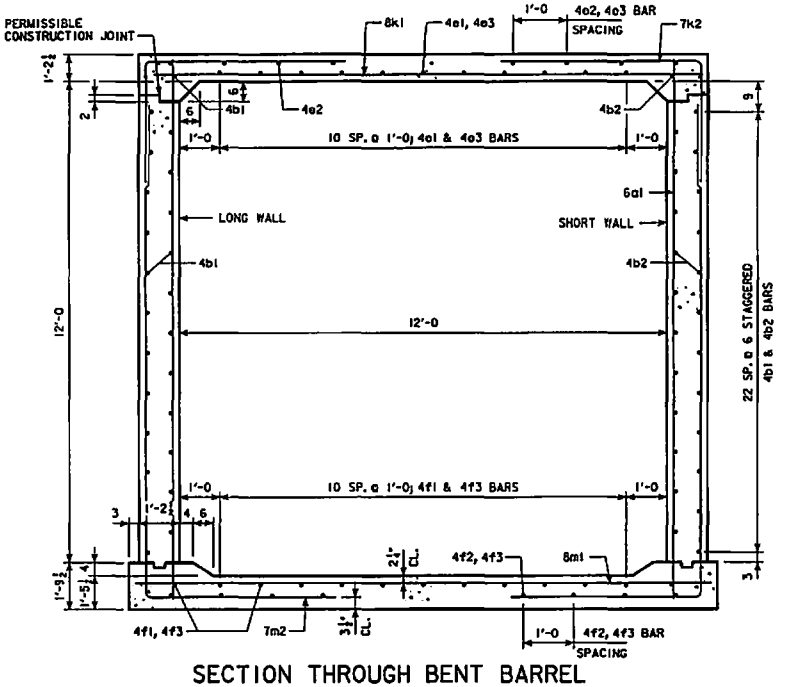
BARS	D
4	3
7	5¼



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

REINFORCING BAR LIST - 14'-0 BENT BARREL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	VERT; FRONT FACE WALLS	—	37	14'-7	810
4b1	LONG. BOTH FACES, LONG WALL	⟋	24	14'-4	230
4b2	LONG. BOTH FACES, SHORT WALL	⟋	24	12'-10	206
4e1	LONG. SLAB BOTTOM	—	22	6'-5	94
4e2	LONG. SLAB TOP	—	16	6'-5	69
4e3	LONG. SLAB TOP, BOTT; LAP	⟋	19	4'-6	57
4f1	LONG, FLOOR, TOP	—	26	6'-5	111
4f2	LONG, FLOOR, BOTTOM	—	16	6'-5	69
4f3	LONG, FLOOR, TOP, BOTTOM, LAP	⟋	21	4'-6	63
8k1	TRANSVERSE, SLAB BOTTOM	—	29	14'-1	1091
7k2	TRANSVERSE, SLAB TOP CORNER	⌜	42	8'-6	730
7k9	TRANSVERSE, SLAB TOP, LAP	—	2	14'-1	58
8m1	TRANSVERSE, FLOOR, TOP	—	29	14'-7	1129
7m2	TRANSVERSE, FLOOR, BOTT. CORNER	⌟	42	17'-1	1467
7m9	TRANSVERSE, FLOOR, BOTT., LAP	—	2	14'-7	60
				TOTAL (LBS.)	6244



SECTION THROUGH BENT BARREL

NOTE:
BELL JOINT NOT SHOWN. REFER TO LISTED STANDARDS FOR DETAILS.

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

14'-0 BENT BARREL DETAILS

STA. 1095T+16.16 (℄ U.S. 20)

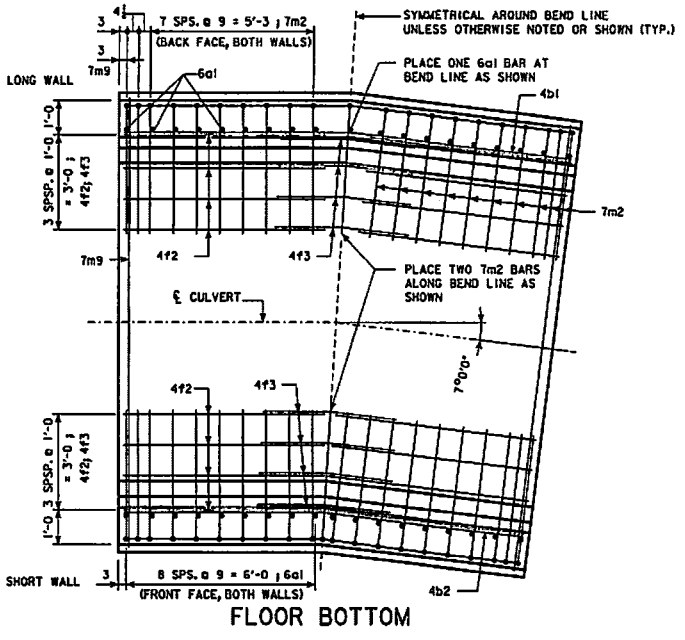
OCTOBER 2015

WOODBURY COUNTY

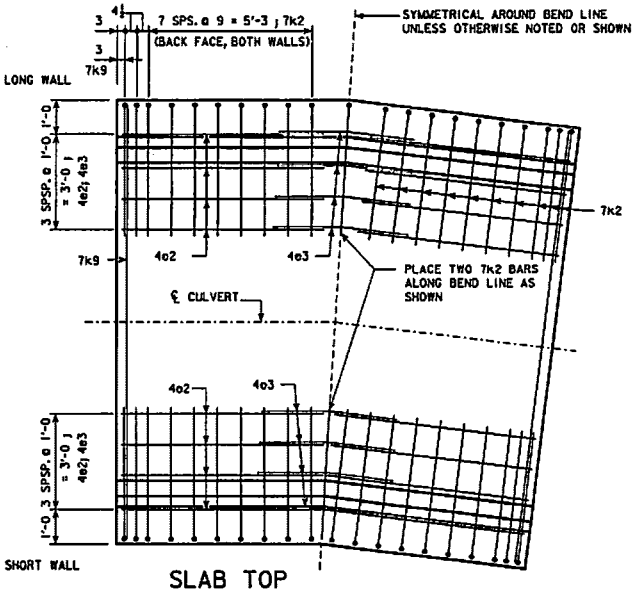
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 6 FILE NO. 30568 DESIGN NO. 615

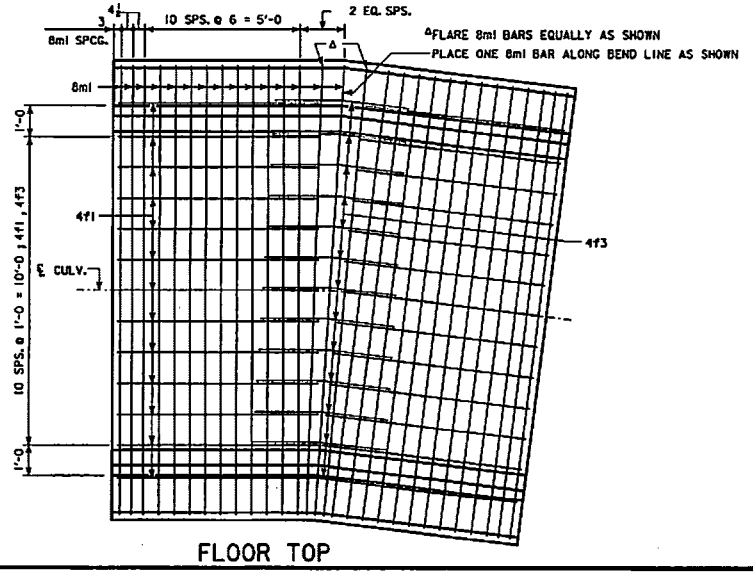
DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 20



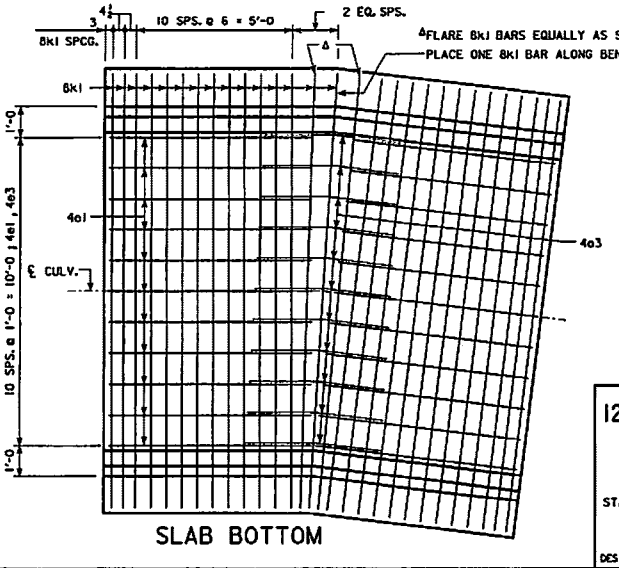
FLOOR BOTTOM



SLAB TOP



FLOOR TOP



SLAB BOTTOM

NOTE:
BELL JOINT NOT SHOWN. REFER
TO LISTED STANDARDS FOR DETAILS.

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

14'-0 BENT BARREL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 6 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB ± MSF ± LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 21

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REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS FFV	—	122	LISTED	1498
5b1	WALLS FFH	—	16	33'-4	557
4b2	WALLS BFH	—	16	33'-4	357
5b5	WALLS FFH	—	8	LISTED	82
4b6	WALLS BFH	—	8	LISTED	53
7c2	BOTT. FLOOR & WALLS BFV - SPLICED	⌊	61	22'-11	2857
7c3	WALLS BFV	—	122	LISTED	2635
6f1	FLOOR LONGIT. TOP	—	13	32'-3	631
5f2	FLOOR LONGIT. BOTT.	—	13	32'-3	438
6m1	FLOOR TRANSV. TOP	—	34	14'-2	723
6s1	WALLS BOTH F ALONG SLOPE	—	4	33'-4	201
5u1	FENCE ANCHORS (GALVANIZED)	⊃	2	2'-10	6
				TOTAL (LB)	10,038

LISTED BARS

BAR 5a1
122 BARS
122 VAR. - 2 EA. LGTH.

10'-2	11'-5
10'-2	11'-6
10'-2	11'-7
10'-3	11'-8
10'-3	11'-10
10'-3	11'-11
10'-3	12'-0
10'-3	12'-1
10'-3	12'-2
10'-4	12'-3
10'-4	12'-5
10'-4	12'-6
10'-5	12'-7
10'-5	12'-9
10'-5	12'-10
10'-6	12'-11
10'-6	13'-1
10'-7	13'-2
10'-7	13'-4
10'-8	13'-5
10'-9	13'-7
10'-9	13'-9
10'-10	13'-10
10'-11	14'-0
10'-11	14'-2
11'-0	14'-3
11'-1	14'-5
11'-2	14'-7
11'-3	14'-9
11'-4	14'-10
11'-4	

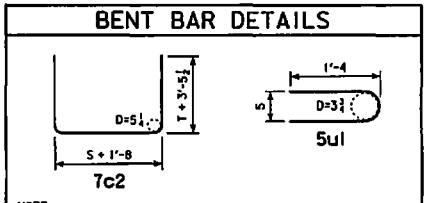
BAR 7c3
122 BARS
122 VAR. - 2 EA. LGTH.

9'-0	10'-0
9'-0	10'-1
9'-0	10'-2
9'-0	10'-3
9'-0	10'-4
9'-0	10'-5
9'-0	10'-6
9'-1	10'-7
9'-1	10'-8
9'-1	10'-9
9'-1	10'-10
9'-2	11'-0
9'-2	11'-1
9'-3	11'-2
9'-3	11'-3
9'-3	11'-5
9'-4	11'-6
9'-4	11'-8
9'-5	11'-9
9'-6	11'-10
9'-6	12'-0
9'-7	12'-1
9'-7	12'-3
9'-8	12'-4
9'-9	12'-6
9'-10	12'-8
9'-10	12'-9
9'-11	12'-11
	13'-1
	13'-3
	13'-4
	13'-6
	13'-8

BAR 5b5 AND 4b6
8 BARS - 2 EA. LGTH.

2'-7	
6'-9	
11'-8	
18'-4	

BENT BAR DETAILS



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

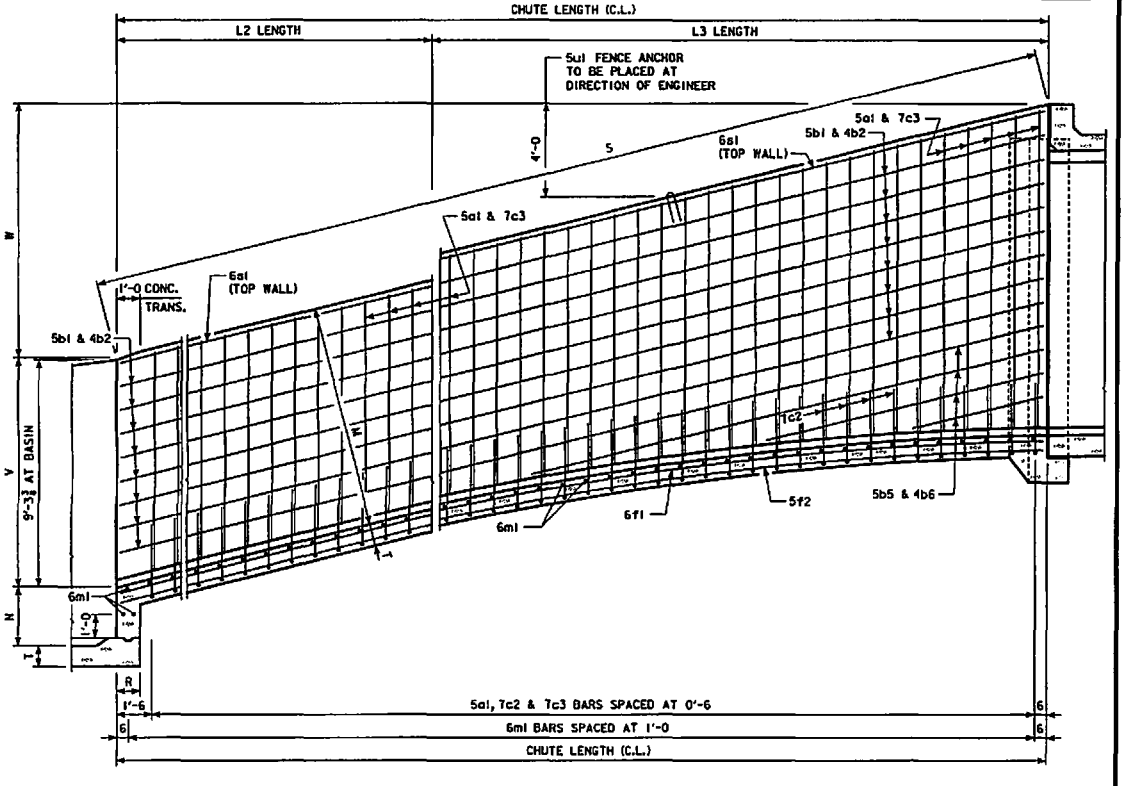
FLUME DATA

- Δ A = 18°26'
- Δ C = 1°00'
- B = 16'-1
- S = 33'-8½
- V = 9'-5½
- W = 10'-8
- M = 9'-0
- T = 1'-2
- H = 12'-0

CURVE DATA

C. L. = 32'-0
L2 = 1'-4½
L3 = 30'-7½
D = 15'-4½
E = 15'-3½
P. C. ELEV. = 1182.97
P.I. ELEV. = 1182.70
P. P. ELEV. = 1182.44
P. T. ELEV. = 1177.62
X1 = 4'-9½
X2 = 2'-8½
X3 = 1'-2½
X4 = 0'-3½
L3/4 = 7'-7½

NOTE:
FOR PARAPET DETAILS, SEE DESIGN SHEETS IN THESE PLANS.



12'x12' FLUME CHUTE - LONGITUDINAL SECTION

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	24.2	25.3	49.5
JUNCTION BELL	3.4	3.6	7.0
BASIN CURTAIN	1.9	---	1.9
TOTAL (CY)	29.5	28.9	58.4

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-05-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-06-12 & RCFB-07-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I OF A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

FLUME DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 6 FILE NO. 30568 DESIGN NO. 615

REVISION 09-13 - ADDED THE REFERENCE TO STANDARD RCF-02-12 IN THE NOTES.
REVISION 03-13 - THIS SHEET ISSUED 03-13

DESIGN TEAM DGB * MSF * LW	FLUME CHUTE DETAILS - 12' HEIGHT	STANDARD SHEET 1076	WOODBURY COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER 22

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ESTIMATED CAST IN PLACE CULVERT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	4,066	
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	403.1	
3	2404-7775000	REINFORCING STEEL	LB	64,632	
4	2501-8400172	TEMPORARY SHORING	LS	1.00	
5	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-2720000	EXCAVATION, CLASS 20
2	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)
3	2404-7775000	REINFORCING STEEL
4	2501-8400172	TEMPORARY SHORING
5	2533-4980005	MOBILIZATION

DESIGN FOR EXTENSION TO A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE II 140'-0) REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN ESTIMATED QUANTITIES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 23

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE II DESIGN TO EXTEND A 12'-0 X 12'-0 REINFORCED CONCRETE BOX CULVERT ON U.S 20 AT STA. 10957+16.16 (℄ U.S. 20) 0.1861° SKEW (LA). STAGE I (DES. 615) IS NOT A PART OF THIS DESIGN

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6056 & DESIGN 615).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 21 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS 1 EXPOSURE CONDITION FOR CRACK CONTROL.

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

THE CLASS 20 EXCAVATION QUANTITY IS BASED ON THE ASSUMPTION THAT AT THE START OF CULVERT CONSTRUCTION, THE EXISTING GROUNDLINE SHOWN ON THE "LONGITUDINAL SECTION ALONG ℄ CULVERT", ON DESIGN SHEET 3, HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

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

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

BELL JOINTS SHALL BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2 x 4 KEYWAYS, EXCEPT AT BELL JOINTS.

STAGE 1 IS NOT PART OF THIS DESIGN (SEE DESIGN NO. 615.)

THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE END FACE OF THE EXISTING STAGE I BARREL AND EXISTING DES. 6056 BARREL INLET SECTION. 5zI 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 BARREL SECTIONS. 5zI DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. 5zI DOWEL REINFORCING BARS SHALL BE AT 1'-0 MAXIMUM SPACING C.-C. OF DOWELS. 5zI 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 PROPOSED WBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE. THE EXISTING EBL ROADWAY TO REMAIN OPEN.

TEMPORARY SHORING (SHEET PILE OR OTHER) SHALL BE REQUIRED AS NECESSARY TO PREVENT THE EARTH UNDER THE TRAFFIC LANE FROM SLOUGHING IN DURING CONSTRUCTION.

THE CONTRACTOR SHALL SUBMIT A TEMPORARY SHORING PLAN TO THE ENGINEER FOR APPROVAL. THE TEMPORARY SHORING PLAN SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF IOWA. THE CONTRACTOR SHALL SUBMIT 6 COPIES OF PLANS FOR TEMPORARY SHORING. THE ENGINEER WILL BE ALLOWED 30 CALENDAR DAYS TO REVIEW THE TEMPORARY SHORING PLAN. THE CONTRACTOR SHALL NOT PROCEED WITH INSTALLATION OF THE TEMPORARY SHORING WITHOUT NOTICE TO PROCEED FROM THE ENGINEER.

THE TEMPORARY SHORING SUBMITTAL SHALL INCLUDE:
- DESIGN CALCULATIONS (INCLUDING A GLOBAL STABILITY ANALYSIS)
- SOIL PROPERTIES
- SHORING MATERIAL PROPERTIES
- SHORING PLAN LAYOUT (SHOWING LOCATION OF TRAFFIC)
- SHORING DETAILS

TEMPORARY SHORING SHALL BE PAID FOR AS A LUMP SUM INCLUDING ALL COST FOR DESIGNING, FURNISHING, INSTALLING AND REMOVAL. ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

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

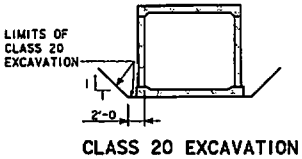
STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	------
RCB 12-12-12	APRIL 2012	------

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
5'-0 TIE-IN SECTION	2106	2106
38'-0 BARRELS	3 @ 16,002	48,006
22'-0 BARREL END SECTION	9264	9264
BELL JOINTS	4 @ 1249	4996
5zI DOWEL BARS	260	260
	TOTAL (LBS.)	64,632

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
6056	ORIGINAL DESIGN
615	NEW RCB STAGE I
118	RCB EXT. STAGE II



CLASS 20 EXCAVATION

(TYPICAL SECTION NORMAL TO ℄ CULVERT)

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
5'-0 TIE-IN SECTION	4.3	5.2	3.5	13.0
38'-0 BARRELS	3 @ 32.4 = 97.2	3 @ 39.6 = 118.8	3 @ 26.3 = 78.9	294.9
22'-0 BARREL END SECTION	18.8	23.0	15.2	57.0
BELL JOINTS	4 @ 3.392 = 13.6	4 @ 3.331 = 13.3	4 @ 2.835 = 11.3	38.2
TOTAL (CU. YDS.)	133.9	160.3	108.9	403.1

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

DESIGN FOR EXTENSION TO A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE II 140'-0) REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN GENERAL NOTES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 24

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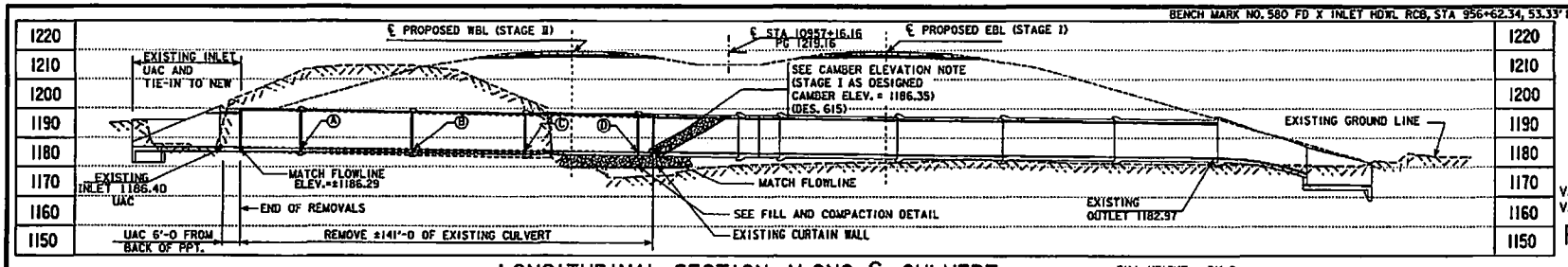
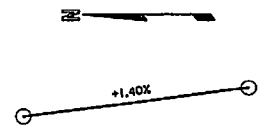
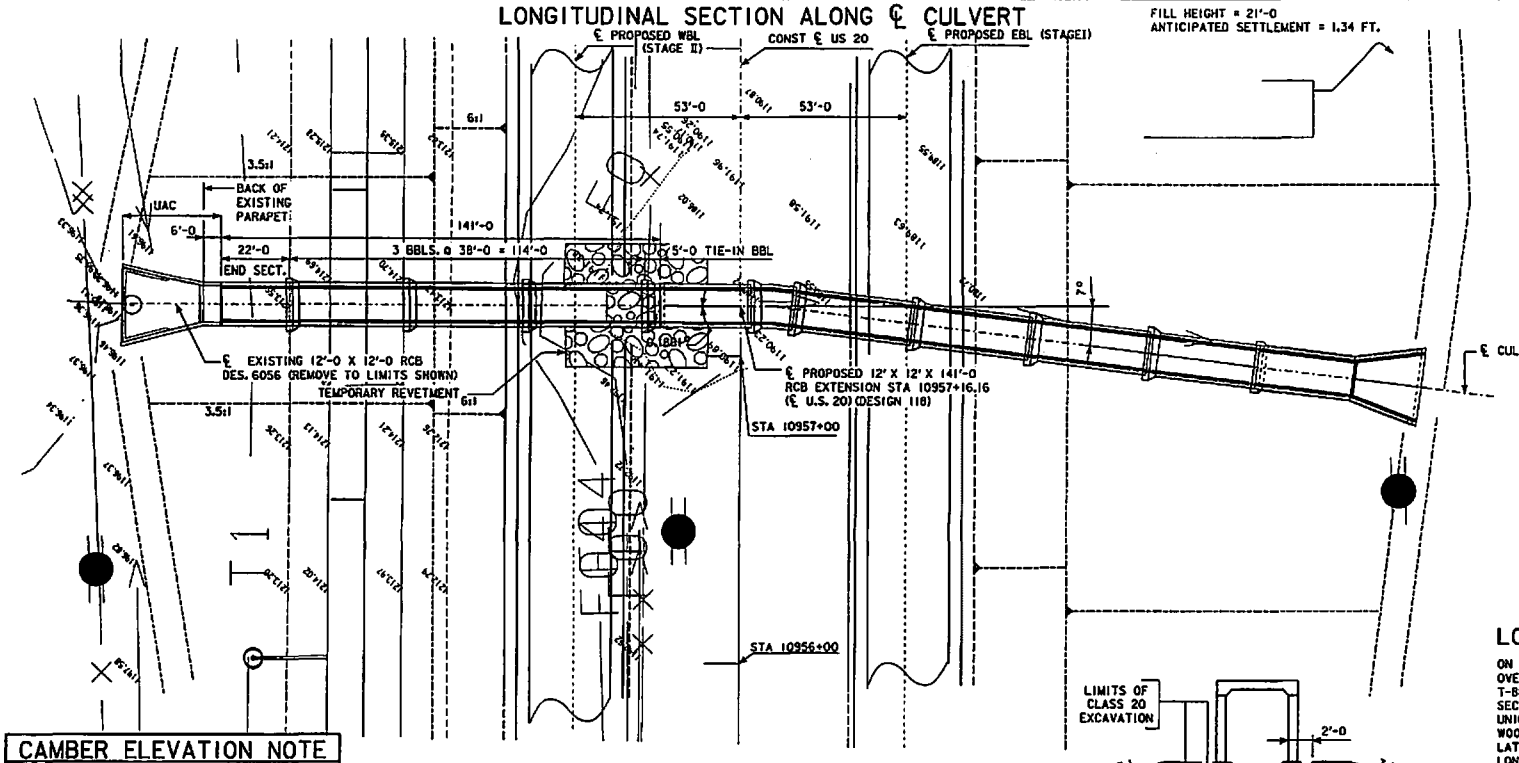




VPI STA = 10953+00 VPI STA = 10968+00
VPI ELEV = 1213.33 VPI ELEV = 1234.33

PROPOSED PROFILE GRADE US 20

LONGITUDINAL SECTION ALONG ℄ CULVERT



CAMBER ELEVATION TABLE	
NOTE: CAMBER BELL JOINTS AS SHOWN	
LOCATION	ELEVATION
Ⓐ	1186.07
Ⓑ	1185.69
Ⓒ	1186.27
Ⓓ	1186.41

NOTE:
BELL JOINTS ARE TO BE PLACED ON THE UPSTREAM END OF THE BARREL SECTIONS.

HYDRAULIC DATA

DRAINAGE AREA = 1106 ACRES
Q_{50} = 1288 CFS
HW ELEV. = NO CHANGE

UTILITIES LEGEND:

MID AMERICAN ENERGY
QWEST
MCLEOD
QWEST LOCAL NETWORK

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-88-89N R-42W
SECTION 36-4
UNION-ROCK TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.474541°
LONGITUDE -95.743657°

TRAFFIC ESTIMATE

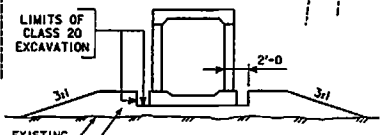
2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION.
THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AND AT NO COST TO THE STATE.

SITUATION PLAN



CONTRACTOR IS TO FILL AND COMPACT THIS AREA AND ANY OTHER AREAS AS DIRECTED BY THE ENGINEER. COST IS INCIDENTAL TO THE BID ITEM "REMOVALS AS PER PLAN".

FILL & COMPACTION DETAIL

DESIGN FOR EXTENSION TO A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE II 140'-0) REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN SITUATION PLAN

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 25

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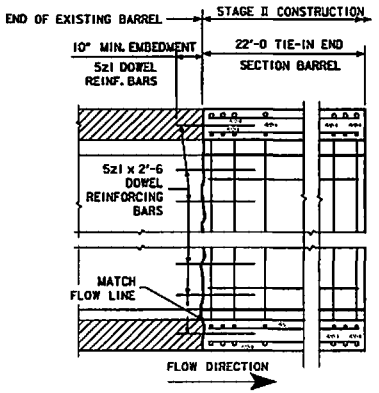
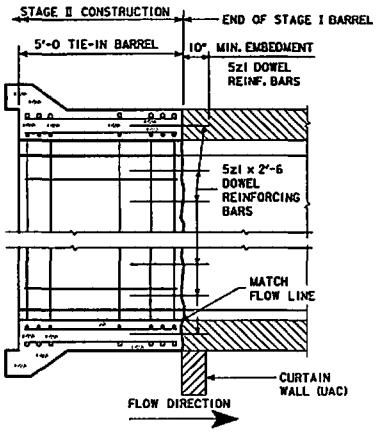
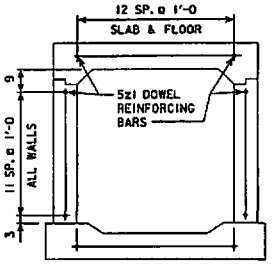


STAGE II TO EXISTING INLET SECTION TIE-IN JOINT

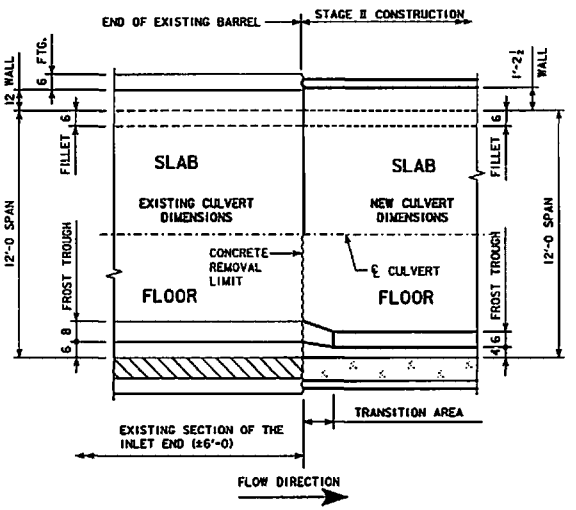


STAGE I TO II TIE-IN JOINT



JOINT TIE-IN DETAILS
(SHOWING SPACING OF 50 EA. OF 5z1 DEFORMED STEEL DOWEL REINFORCING BARS AT EACH TIE-IN JOINT)

REINFORCING - DOWEL BARS				
BAR	DESCRIPTION	NO.	LENGTH	WEIGHT
5z1	DOWEL BARS	100	2'-6	260 LBS.



CONCRETE TRANSITION DETAILS
(PLAN VIEW - STAGE II TO EXISTING INLET)

NOTE:
FOR BARREL AND BELL JOINT DETAILS NOT SHOWN, REFER TO REFERENCED STANDARDS LISTED IN THESE PLANS.

DESIGN FOR EXTENSION TO A 0.1861° SKEW (L.A.)

12'-0 X 12'-0 X 332'-0 (STAGE II 140'-0) REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN 5'-0 TIE-IN BARREL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 26

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ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	150.0	
2	2401-6750001	REMOVALS, AS PER PLAN	LS	1.00	
3	2402-0425030	GRANULAR BACKFILL	CY	45.5	
4	2402-2720000	EXCAVATION, CLASS 20	CY	280	
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	241.9	
6	2404-7775000	REINFORCING STEEL	LB	42,181	
7	2415-2111212	PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	LF	149.0	
8	2507-3250005	ENGINEERING FABRIC	SY	290.0	
9	2507-6800061	REVETMENT, CLASS E	TON	240.0	
10	2533-4980005	MOBILIZATION	LS	1.00	
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL - -
2	2401-6750001	REMOVALS, AS PER PLAN INCLUDES COST OF PARTIAL REMOVAL OF THE EXISTING FLUME, DESIGN 7056, TO ALLOW FOR CONSTRUCTION OF STAGE I AND PLACEMENT OF TEMPORARY REVETMENT.
3	2402-0425030	GRANULAR BACKFILL - -
4	2402-2720000	EXCAVATION, CLASS 20 INCLUDES 45.5 CU. YDS. CORE OUT FOR GRANULAR BLANKET
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
6	2404-7775000	REINFORCING STEEL - -
7	2415-2111212	PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT. INCLUDES COST OF PRECAST PARAPET.
8	2507-3250005	ENGINEERING FABRIC - -
9	2507-6800061	REVETMENT, CLASS E - -
10	2533-4980005	MOBILIZATION - -
11	2599-9999010	('LUMP SUM' ITEM) TEMPORARY STEEL CURTAIN WALL INCLUDES COST OF MATERIALS AND LABOR TO INSTALL TEMPORARY STEEL CURTAIN WALL. CURTAIN WALL TO REMAIN IN PLACE UNTIL STAGE 2, DES. 118, CONSTRUCTION BEGINS.

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
12'-0 X 12'-0 FLUME	10,038	10,038
12'-0 X 12'-0 BASIN	8995	8995
29'-0 CIP BARREL END SECTION	12,212	12,212
14'-0 CIP BENT BARREL	6244	6244
12' X 12" BARREL BELL JOINTS	3 @ 1249	3747
FLUME JUNCTION BELL JOINT	945	945
	TOTAL (LBS.)	42,181

CONCRETE PLACEMENT QUANTITIES

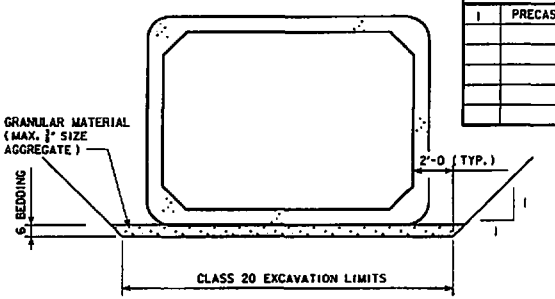
LOCATION	FOOTING	WALLS	SLAB	TOTAL
12'-0 X 12'-0 FLUME	29.5	28.9	——	58.4
12'-0 X 12'-0 BASIN	26.0	17.6	——	43.6
29'-0 CIP BARREL END SECTION	24.7	30.2	20.1	75.0
14'-0 BENT BARREL	11.9	14.6	9.7	36.2
12' X 12' BARREL BELL JOINTS	3 @ 3.392 = 10.2	3 @ 3.331 = 10.0	3 @ 2.835 = 8.5	28.7
TOTAL (CU. YDS.)	102.3	101.3	38.3	241.9

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS



CLASS 20 & GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE FLUME BELL JOINT.

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

ESTIMATED QUANTITIES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 8 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB ± MSF ± LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 27

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE I DESIGN TO CONSTRUCT A 12'-0 X 12'-0 X 332'-0 (STAGE I IS 192'-0) PRECAST & CIP REINFORCED CONCRETE BOX CULVERT WITH A CIP FLUME AND CIP BASIN ON U.S 20 AT STA. 10957+16.16 (℄ U.S. 20) 0.1861° SKEW (LA). STAGE II (DES. 118) IS NOT A PART OF THIS DESIGN, BUT INCLUDED IN THIS PROJECT.

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6056).

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 21 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS I EXPOSURE CONDITION FOR CRACK CONTROL.

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS AS NEEDED OF THE EXISTING FLUME AND BASIN (DES. 6056).

STAGE II IS NOT PART OF THIS DESIGN. SEE DESIGN NO. 118.

THE PROPOSED EBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE IN PROJECT NHSN-020-1(123)--2R-97.

THE PRECAST R.C.B. BARREL 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 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 OTHER BID ITEMS LISTED IN THESE PLANS.

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 ¾ 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 AND CAST IN PLACE 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.

STAGE II IS NOT PART OF THIS DESIGN. SEE PRECAST DESIGN 118 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EXISTING U.S. 20 DURING STAGE I. SINCE THE EXISTING 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 CONSTRUCTED. 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. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

APPROVAL OF DETAILS IS REQUIRED FOR "NONSTANDARD" PRECAST BOX OPTIONS. BOXES 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 ½ 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.

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' x 2' PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

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.

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED EBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION.
TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

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

CIP STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 12-12-12	APRIL 2012	-----
FBJ-05-12	APRIL 2012	-----
RCF-01-12	APRIL 2012	05-13
RCF-02-12	APRIL 2012	-----
RCFB-06-12	APRIL 2012	-----
RCFB-07-12	APRIL 2012	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PRCB 12-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 615, STAGE II IS DESIGN 118, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLAN NOTES.

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
615	NEW RCB STAGE I

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

GENERAL NOTES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 8 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 28

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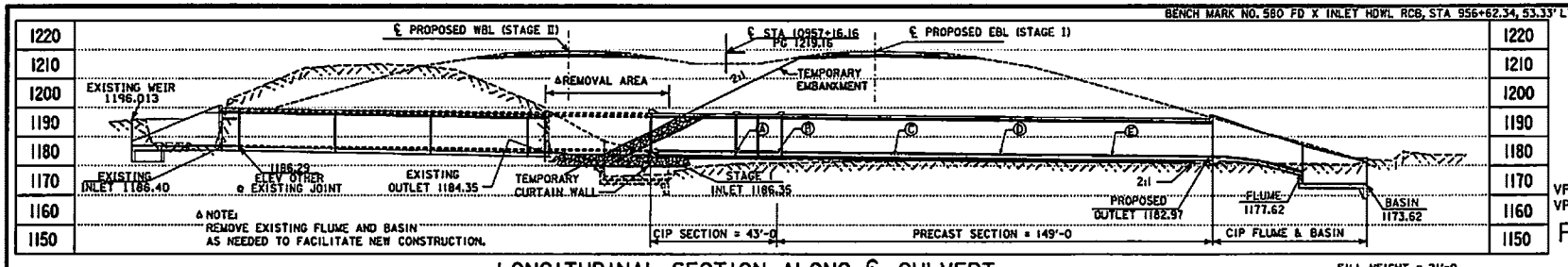
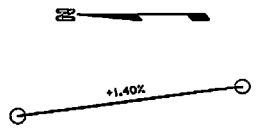
INCLUDES ADDENDA: A.02



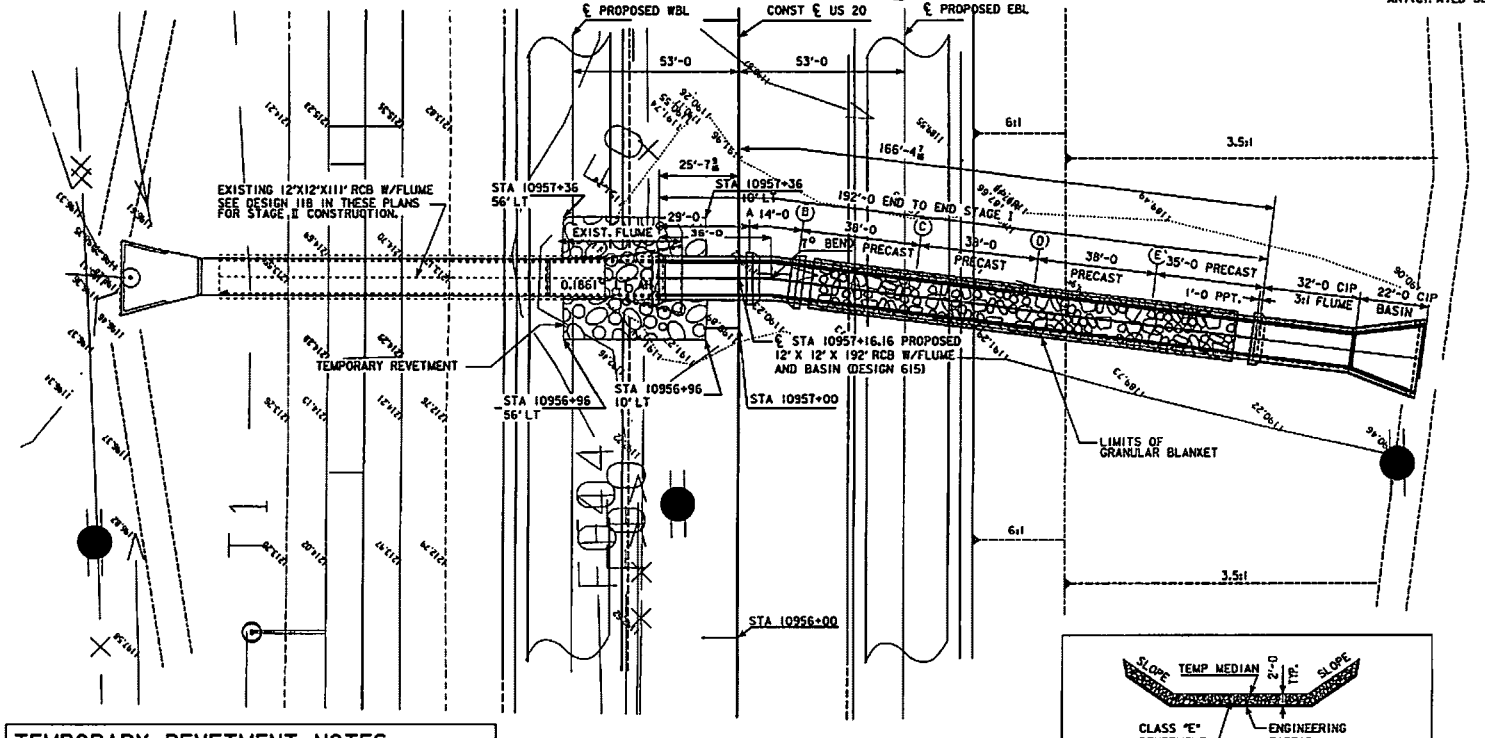


VPI STA = 10953+00 VPI STA = 10968+00
VPI ELEV = 1213.33 VPI ELEV = 1234.33

PROPOSED PROFILE GRADE US 20

LONGITUDINAL SECTION ALONG ℄ CULVERT

FILL HEIGHT = 21'-0
ANTICIPATED SETTLEMENT = 1.52 FT.



CAMBER ELEVATION TABLE	
NOTE: CAMBER LOCATIONS AS SHOWN	
LOCATION	ELEVATION
Ⓐ	1186.11
Ⓑ	1185.91
Ⓒ	1185.59
Ⓓ	1185.22
Ⓔ	1184.08

NOTE: BELL JOINTS ARE TO BE PLACED AS SHOWN IN THESE PLANS.

HYDRAULIC DATA

DRAINAGE AREA = 1106 ACRES
Q_{50} = 1288 CFS
HW ELEV. = NO CHANGE

UTILITIES LEGEND:

MID AMERICAN ENERGY
QWEST
MCLEOD
QWEST LOCAL NETWORK

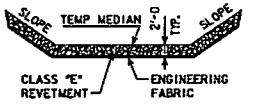
TEMPORARY REVETMENT NOTES

ENGINEERING FABRIC AND TEMPORARY REVETMENT ARE TO BE PLACE IN SUCH A MANNER TO CONTAIN AND DIRECT WATER FROM THE END OF THE NEW CULVERT TO THE INLET OF THE EXISTING CULVERT AS SHOWN.

RESHAPING OF THE EXISTING GROUND LINE MAY BE NECESSARY TO FORM SLOPING EMBANKMENTS AS SHOWN IN THE CROSS SECTION.

ELEVATION OF THE TEMPORARY REVETMENT SHALL BE PLACED SLIGHTLY LOWER THAN THE OUTLET END OF THE NEW STAGE I CULVERT TO FORM A WATERFALL. THE TEMPORARY REVETMENT ELEVATION SHALL MATCH THE INLET AT THE EXISTING CULVERT TO FACILITATE DRAINAGE.

SITUATION PLAN



TYPICAL MEDIAN PROTECTION

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION CLASS 10 (CY)
MEDIAN	240	290	150

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-88-89N R-42W
SECTION 36-4
UNION-ROCK TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.474541°
LONGITUDE -95.743657°

TRAFFIC ESTIMATE

2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

DESIGN FOR STAGE I OF A 0.186° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

SITUATION PLAN

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

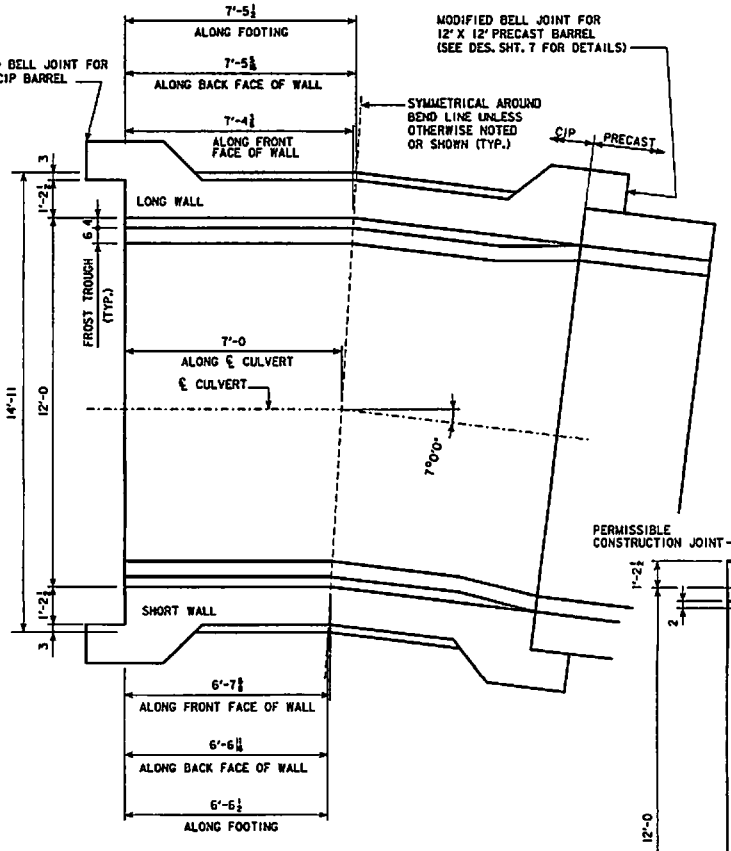
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 8 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 29

12/7/2015 2:53:33 PM dblerwa pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\97020155.brg 970615sp003p 11x17.pdf.pltcfg

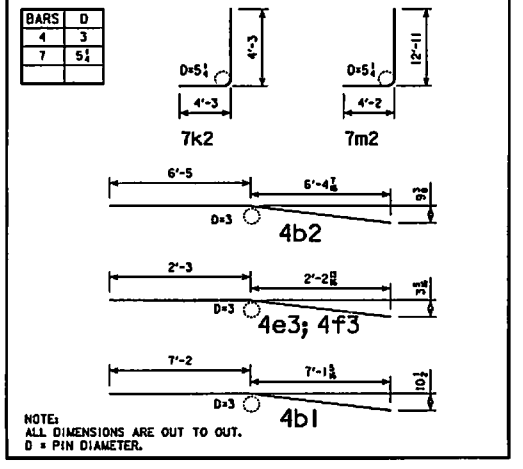
INCLUDES ADDENDA: A.02



PLAN VIEW BENT BARREL

BENT BAR DETAIL

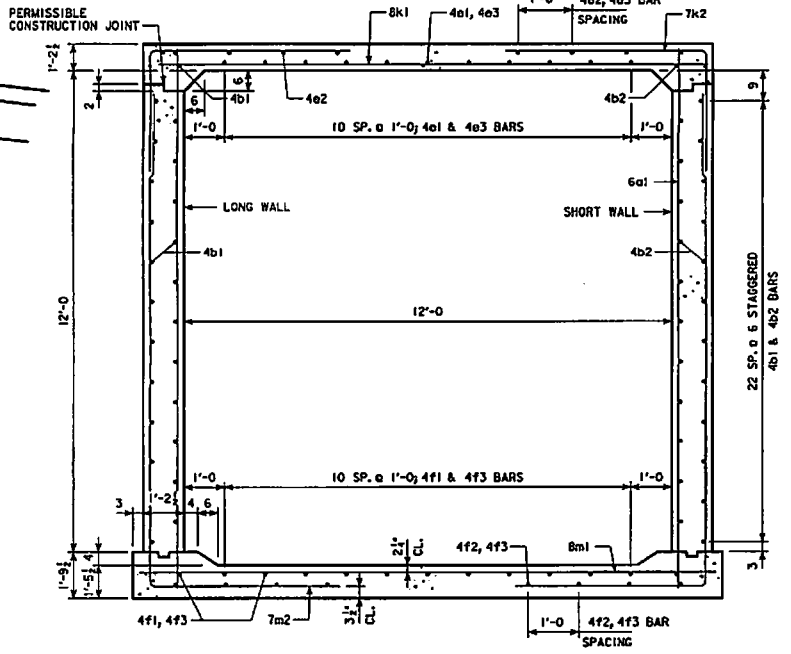
BARS	D
4	3
7	5¼



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

REINFORCING BAR LIST - 14'-0 BENT BARREL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	VERT; FRONT FACE WALLS	—	37	14'-7	810
4b1	LONG. BOTH FACES, LONG WALL	⟍	24	14'-4	230
4b2	LONG. BOTH FACES, SHORT WALL	⟍	24	12'-10	206
4e1	LONG. SLAB BOTTOM	—	22	6'-5	94
4e2	LONG. SLAB TOP	—	16	6'-5	69
4e3	LONG. SLAB TOP, BOTT; LAP	⟍	19	4'-6	57
4f1	LONG, FLOOR, TOP	—	26	6'-5	111
4f2	LONG, FLOOR, BOTTOM	—	16	6'-5	69
4f3	LONG, FLOOR, TOP, BOTTOM, LAP	⟍	21	4'-6	63
8k1	TRANSVERSE, SLAB BOTTOM	—	29	14'-1	1091
7k2	TRANSVERSE, SLAB TOP CORNER	⌐	42	8'-6	730
7k9	TRANSVERSE, SLAB TOP, LAP	—	2	14'-1	58
8m1	TRANSVERSE, FLOOR, TOP	—	29	14'-7	1129
7m2	TRANSVERSE, FLOOR, BOTT. CORNER	⌐	42	17'-1	1467
7m9	TRANSVERSE, FLOOR, BOTT., LAP	—	2	14'-7	60
				TOTAL (LBS.)	6244



SECTION THROUGH BENT BARREL

NOTE:
STANDARD BELL JOINT REINFORCING NOT SHOWN FOR CLARITY. SEE STANDARD SHEETS FOR DETAILS.

NOTE:
CONTRACTOR TO NOTE ORIENTATION OF BELL JOINTS .

DESIGN FOR STAGE 1 OF A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

14'-0 BENT BARREL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 8 FILE NO. 30560 DESIGN NO. 615

DESIGN TEAM DOB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 30

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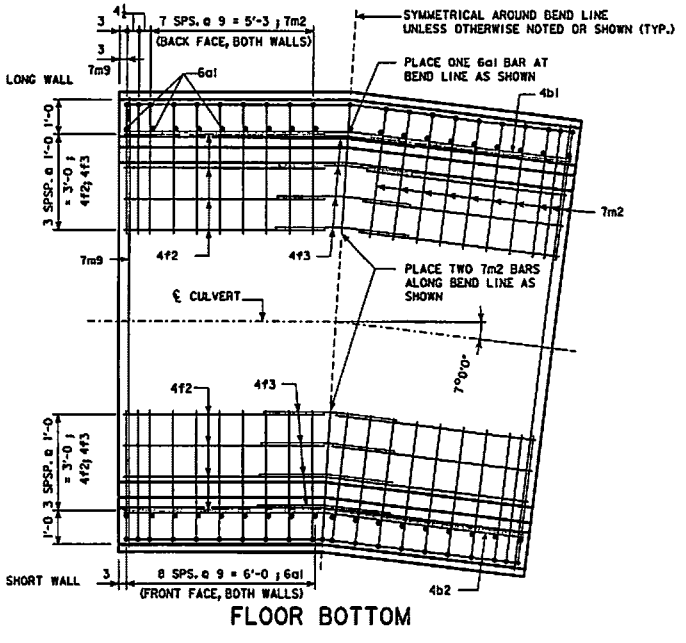
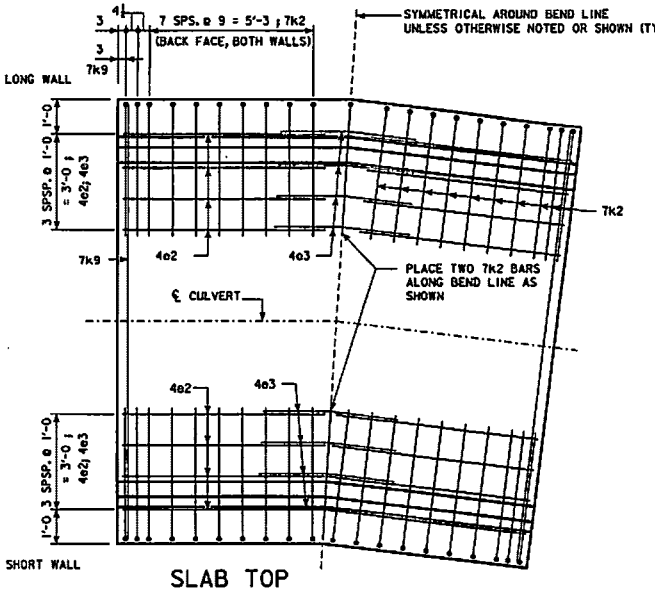
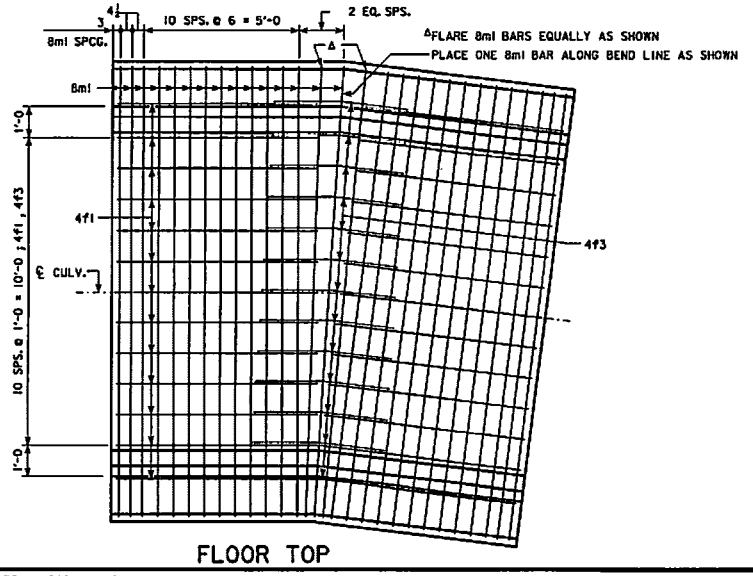
INCLUDES ADDENDA: A.02



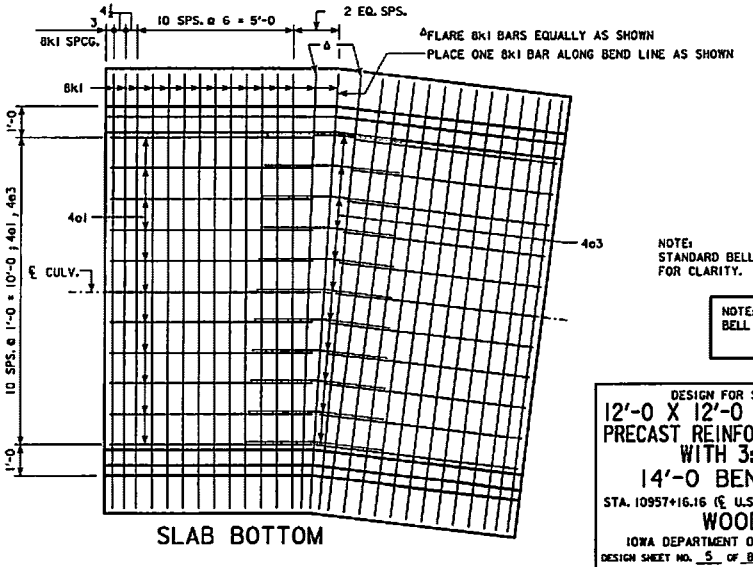
FLOOR BOTTOM



SLAB TOP



FLOOR TOP



SLAB BOTTOM

NOTE:
STANDARD BELL JOINT REINFORCING NOT SHOWN FOR CLARITY. SEE STANDARD SHEETS FOR DETAILS.

NOTE:
BELL JOINT NOT SHOWN.

DESIGN FOR STAGE I OF A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

14'-0 BENT BARREL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 8 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 31

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INCLUDES ADDENDA: A.02

REINFORCING BAR LIST - FLUME

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	WALLS FFV	—	122	LISTED	1498
5b1	WALLS FFH	—	16	33'-4	557
4b2	WALLS BFH	—	16	33'-4	357
5b5	WALLS FFH	—	8	LISTED	82
4b6	WALLS BFH	—	8	LISTED	53
7c2	BOTT. FLOOR & WALLS BFV - SPLICED	⊔	61	22'-11	2857
7c3	WALLS BFV	—	122	LISTED	2635
6f1	FLOOR LONGIT. TOP	—	13	32'-3	631
5f2	FLOOR LONGIT. BOTT.	—	13	32'-3	438
6m1	FLOOR TRANSV. TOP	—	34	14'-2	723
6a1	WALLS BOTH F ALONG SLOPE	—	4	33'-4	201
5u1	FENCE ANCHORS (GALVANIZED)	⊃	2	2'-10	6
				TOTAL (LB)	10,038

LISTED BARS

BAR 5a1
122 BARS
122 VAR. - 2 EA. LGTH.

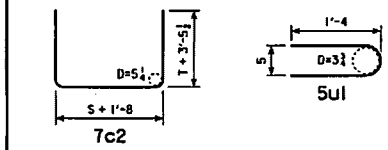
10'-2	11'-5
10'-2	11'-6
10'-2	11'-7
10'-3	11'-8
10'-3	11'-10
10'-3	11'-11
10'-3	12'-0
10'-3	12'-1
10'-3	12'-2
10'-4	12'-3
10'-4	12'-5
10'-4	12'-6
10'-5	12'-7
10'-5	12'-9
10'-5	12'-10
10'-6	12'-11
10'-6	13'-1
10'-7	13'-2
10'-7	13'-4
10'-8	13'-5
10'-9	13'-7
10'-9	13'-9
10'-10	13'-10
10'-11	14'-0
10'-11	14'-2
11'-0	14'-3
11'-1	14'-5
11'-2	14'-7
11'-3	14'-9
11'-4	14'-10
11'-4	

BAR 7c3
122 BARS
122 VAR. - 2 EA. LGTH.

9'-0	10'-0
9'-0	10'-1
9'-0	10'-2
9'-0	10'-3
9'-0	10'-4
9'-0	10'-5
9'-0	10'-6
9'-1	10'-7
9'-1	10'-8
9'-1	10'-9
9'-1	10'-10
9'-2	11'-0
9'-2	11'-1
9'-3	11'-2
9'-3	11'-3
9'-3	11'-5
9'-4	11'-6
9'-4	11'-8
9'-5	11'-9
9'-6	11'-10
9'-6	12'-0
9'-7	12'-1
9'-7	12'-3
9'-8	12'-4
9'-8	12'-6
9'-10	12'-8
9'-10	12'-9
9'-11	12'-11
	13'-1
	13'-3
	13'-4
	13'-6
	13'-8

BAR 5b5 AND 4b6
8 BARS - 2 EA. LGTH.
2'-7
6'-9
11'-8
18'-4

BENT BAR DETAILS



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

FLUME DATA

- ∠A = 18°26'
- ∠C = 1°00'
- B = 16'-1
- S = 33'-8¾
- V = 9'-5¾
- W = 10'-8
- M = 9'-0
- T = 1'-2
- H = 12'-0

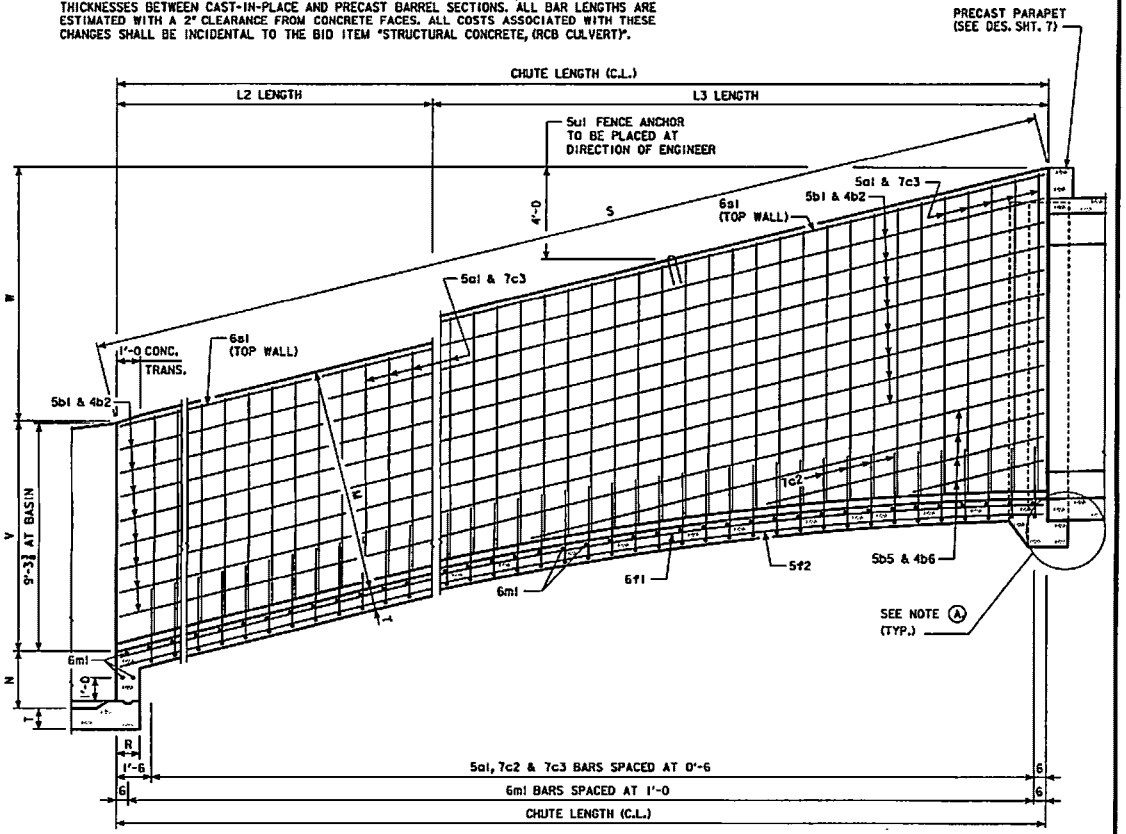
CURVE DATA

C. L. = 32'-0
L2 = 1'-4¾
L3 = 30'-7¾
D = 15'-4¼
E = 15'-3¼
P. C. ELEV. = 1182.97
P.I. ELEV. = 1182.70
P. P. ELEV. = 1182.44
P. T. ELEV. = 1177.62
X1 = 4'-9⅝
X2 = 2'-8¼
X3 = 1'-2⅞
X4 = 0'-3⅜
L3/4 = 7'-7⅝

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	TOTAL
FLUME	24.2	25.3	49.5
JUNCTION BELL	3.4	3.6	7.0
BASIN CURTAIN	1.9	---	1.9
TOTAL (CY)	29.5	28.9	58.4

Ⓐ NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".



12'x12' FLUME CHUTE - LONGITUDINAL SECTION

NOTES:

1. SEE SHEETS RCF-01-12 & RCF-02-12 FOR FLUME INFORMATION AND DETAILS NOT SHOWN.
2. SEE SHEET FBJ-05-12 FOR BELL JOINT INFORMATION AND DETAILS NOT SHOWN.
3. SEE SHEET RCFB-06-12 & RCFB-07-12 FOR FLUME BASIN INFORMATION AND DETAILS NOT SHOWN.

DESIGN FOR STAGE I OF A 0.1861° SKEW (LA)
12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN
FLUME DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015
WOODBURY COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 6 OF 0 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | FLUME CHUTE DETAILS - 12' HEIGHT | STANDARD SHEET 1076 | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 32

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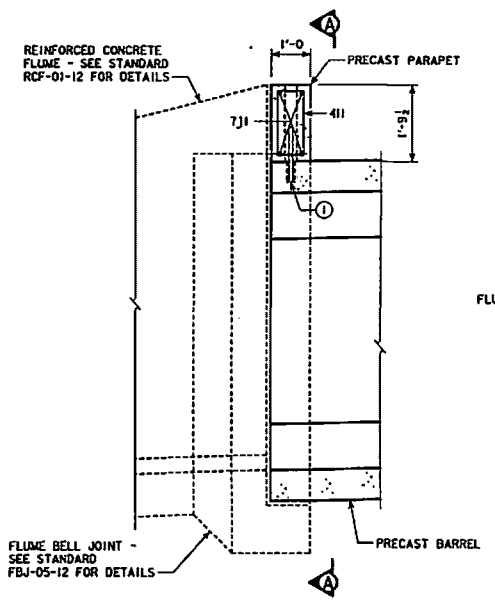
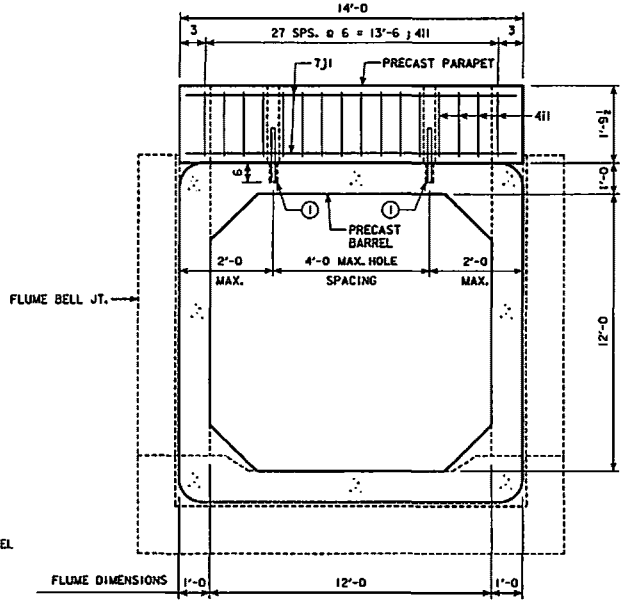
INCLUDES ADDENDA: A.02

REVISION 09-13 - ADDED THE REFERENCE TO STANDARD RCF-02-12 IN THE NOTES.
MEL076.501 - THIS SHEET ISSUED 09-03.



PART ELEVATION



SECTION A-A

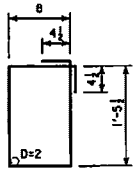
REINFORCING BAR LIST-ONE PRECAST PARAPET

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
411	STIRRUP	D	28	5'-0	94
7J1	LONGIT.	—	4	13'-8	112
				TOTAL (LBS.)	206

CONCRETE QUANTITIES

TOTAL CONCRETE = 0.9 CU.YD.

BENT BAR DETAILS



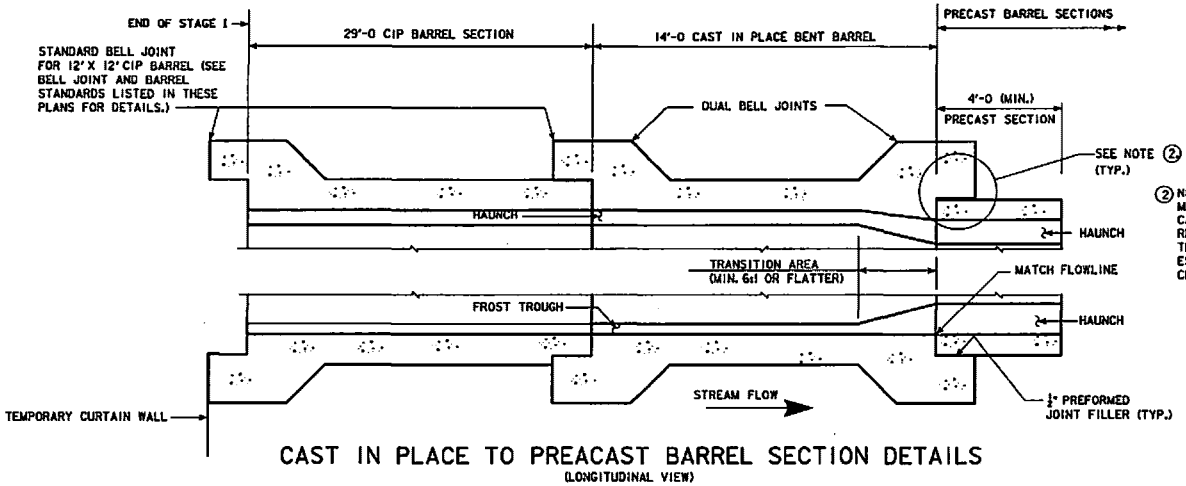
411

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

PRECAST PARAPET DETAILS FOR FLUME

NOTES:

① PLACE NO. 8 DOWELS, 1'-6 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.



CAST IN PLACE TO PRECAST BARREL SECTION DETAILS
(LONGITUDINAL VIEW)

NOTE:
FOR BELL JOINT DETAILS, REFER TO BELL JOINT STANDARDS LISTED IN THESE PLANS. CONTRACTOR TO NOTE THAT BELL JOINTS ARE PLACED ON THE DOWNSTREAM AND UPSTREAM END OF THE STAGE I BENT BARREL SECTION, AS SHOWN.

② NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

DESIGN FOR STAGE I OF A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

FLUME PARAPET & BARREL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 8 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW	PRECAST CULVERT PARAPET DETAILS	STANDARD SHEET 1073P (MODIFIED)	WOODBURY COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER 33

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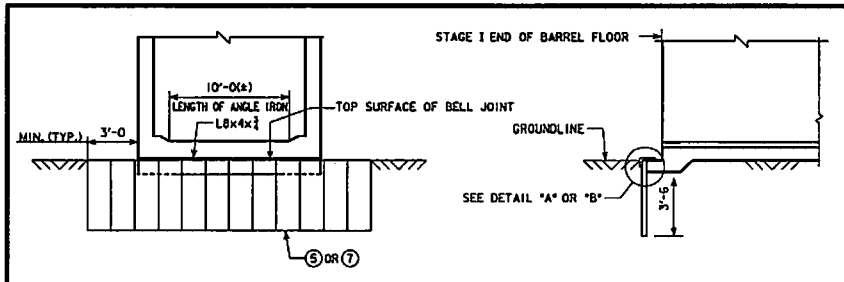
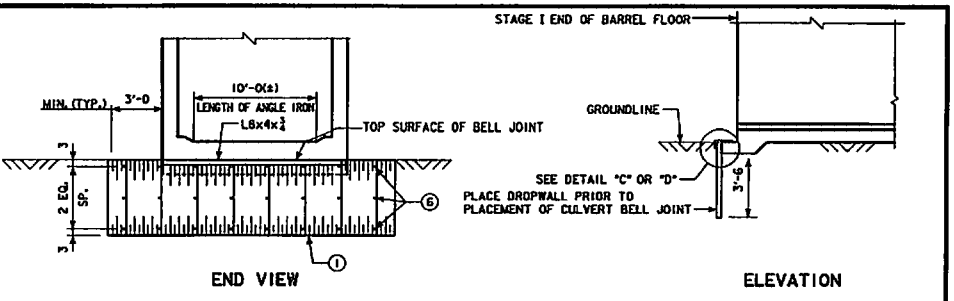
INCLUDES ADDENDA: A.02



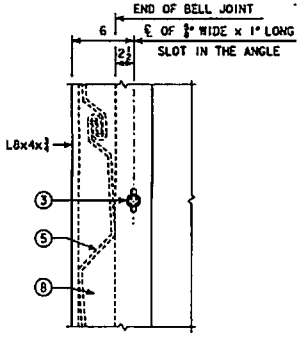
END VIEW ELEVATION

ALTERNATES 1 & 2 (STEEL SHEET PILING)

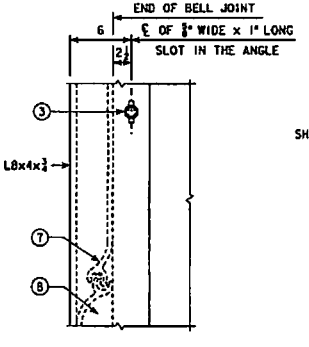


END VIEW ELEVATION

ALTERNATES 3 & 4 (STEEL SHEETS)



PLAN



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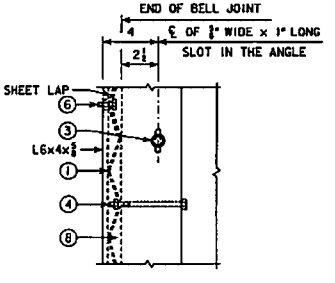

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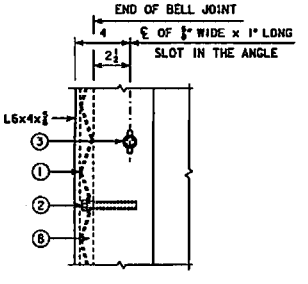

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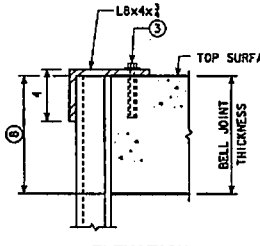
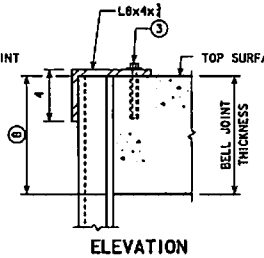


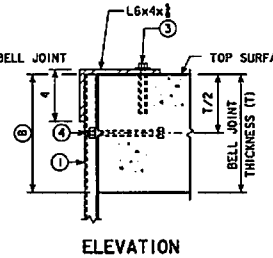
ELEVATION

DETAIL "A"
ALTERNATE 1
STEEL SHEET PILING SHOWN



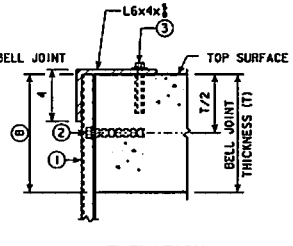
ELEVATION

DETAIL "B"
ALTERNATE 2
STEEL SHEET PILING SHOWN



ELEVATION

DETAIL "C"
ALTERNATE 3
ON NEW CONSTRUCTION ONLY



ELEVATION

DETAIL "D"
ALTERNATE 4
ON NEW OR OLD CONSTRUCTION

NOTES:

USE OF ALTERNATE CURTAIN WALLS SHALL BE APPROVED BY THE ENGINEER.

① 2½"x½" OR 2"x½" CORRUGATED (12 GAGE OR HEAVIER) GALVANIZED STEEL SHEETS.

② FASTEN THE STEEL SHEETS TO THE FRONT EDGE OF THE BELL JOINT WITH ¾"Φ x0'-4 BOLTS AND APPROVED ANCHORAGES (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

③ FASTEN THE L8x4x½ OR L6x4x½ WITH ¾"Φx0'-4 BOLTS, 1" O.D. WASHER AND AN APPROVED ANCHORAGE (2'-0 SPACING).

④ FASTEN THE STEEL SHEETS TO THE BELL JOINT EDGE OF THE FLOOR WITH ¾"Φ x0'-5 BOLTS WITH NUT AND LOCK WASHER (10" CENTER TO CENTER, TO THE NEAREST VALLEY).

⑤ CORRUGATED (12 GAUGE OR HEAVIER) STEEL SHEET PILING, INTERLOCKING TYPE A.

⑥ ¾"Φx0'-1 BOLT WITH NUT, TO LAP STEEL SHEETS.

⑦ STEEL SHEET PILING, SECTION PS 27.5 OR EQUAL.

⑧ FILL THE VOIDS AS SHOWN, WITH CONCRETE OR CONCRETE GROUT, AS APPROVED BY THE ENGINEER.

DESIGN FOR STAGE I OF A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE I 192'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME AND BASIN

TEMPORARY CURTAIN WALL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 8 FILE NO. 30568 DESIGN NO. 615

DESIGN TEAM DGB * MSF * LW | MODIFIED STANDARD PES 4-13 | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 34

INCLUDES ADDENDA: A.02

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ENGLISH\GENDRECASTCULVERTS.DGN - PES 4-13 - THIS SHEET ISSUED 10-13.

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-0425030	GRANULAR BACKFILL	CY	36.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	4,102	
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	71.2	
4	2404-7775000	REINFORCING STEEL	LB	11,052	
5	2415-2111212	PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.	LF	121.0	
6	2501-8400172	TEMPORARY SHORING	LS	1.00	
7	2533-4980005	MOBILIZATION	LS	1.00	

ESTIMATE REFERENCE INFORMATION

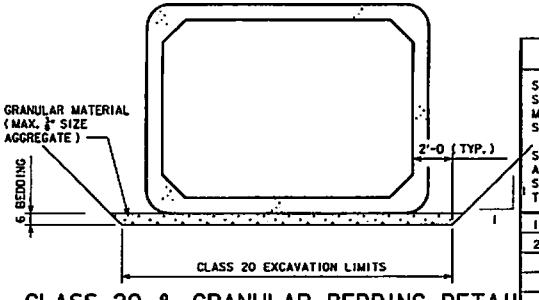
ITEM NO.	ITEM CODE	DESCRIPTION
1	2402-0425030	GRANULAR BACKFILL - -
2	2402-2720000	EXCAVATION, CLASS 20 INCLUDES 36 CU.YDS. OF CLASS 20 FOR GRANULAR BLANKET.
3	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) ALL COSTS FOR REMOVAL OF TEMPORARY CURTAIN WALL IS CONSIDERED INCIDENTAL TO THE BID ITEM.
4	2404-7775000	REINFORCING STEEL - -
5	2415-2111212	PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT. - -
6	2501-8400172	TEMPORARY SHORING - -
7	2533-4980005	MOBILIZATION - -

SUMMARY OF REINFORCING STEEL

LOCATION	QUANTITY	TOTAL
10'-0 CIP BARREL END SECTION	2 @ 4212	8424
12' X 12' BARREL BELL JOINTS	2 @ 1249	2498
5zI OO#EL BARS	130	130
	TOTAL (LBS.)	11,052

CONCRETE PLACEMENT QUANTITIES

LOCATION	FOOTING	WALLS	SLAB	TOTAL
10'-0 CIP BARREL END SECTION	2 @ 8.6 = 17.2	2 @ 10.4 = 20.8	2 @ 7.0 = 14.0	52.0
12' X 12' BARREL BELL JOINTS	2 @ 3.392 = 6.8	2 @ 3.331 = 6.7	2 @ 2.835 = 5.7	19.2
TOTAL (CU. YDS.)	24.0	27.5	19.7	71.2



CLASS 20 & GRANULAR BEDDING DETAIL

GRANULAR MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE EXISTING DROP INLET, AND ABUT AGAINST THE STAGE I GRANULAR BLANKET SO AS TO MAKE A SMOOTH TRANSITION TO STAGE II .

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRECAST SECTIONS
2	TEMPORARY SHORING

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
6056	ORIGINAL DESIGN
615	NEW RCB STAGE I
118	RCB EXT. STAGE II

DESIGN FOR EXTENSION TO A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE II 141'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN ESTIMATED QUANTITIES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 35

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INCLUDES ADDENDA: A.02

GENERAL NOTES:

IT IS THE INTENT OF THIS STAGE II DESIGN TO EXTEND A 12'-0 X 12'-0 REINFORCED CONCRETE BOX CULVERT ON U.S 20 AT STA. 10957+16.16 (℄ U.S. 20) 0.1661° SKEW (LA). STAGE I (DES. 615) IS NOT A PART OF THIS DESIGN

COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (DESIGN 6056.)

THE R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 21 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FOR VERTICAL LOADS THE WEIGHT OF EARTH IS ASSUMED AS 120 PCF. FOR LATERAL EARTH LOADS EQUIVALENT FLUID PRESSURE IS ASSUMED AS 60 PSF/FT. CLASS 1 EXPOSURE CONDITION FOR CRACK CONTROL.

THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE END FACE OF THE EXISTING STAGE I BARREL AND EXISTING DES. 6056 BARREL INLET SECTION. 5#1 x 2'-6 DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO EXISTING BARREL INLET SECTION SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING CULVERT INLET BARREL SECTION. 5#1 DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. 5#1 DOWEL REINFORCING BARS SHALL BE AT 1'-0 MAXIMUM SPACING C.-C. OF DOWELS. 5#1 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 PROPOSED WBL WILL BE CLOSED TO TRAFFIC DURING CONSTRUCTION. SEE TRAFFIC CONTROL PLAN NOTE. THE EXISTING EBL ROADWAY TO REMAIN OPEN.

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. 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 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 OTHER BID ITEMS INCLUDED IN THIS PLAN.

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 ¾ 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.

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.

THE CONTRACTOR SHALL SUBMIT A TEMPORARY SHORING PLAN TO THE ENGINEER FOR APPROVAL. THE TEMPORARY SHORING PLAN SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF IOWA. THE CONTRACTOR SHALL SUBMIT 6 COPIES OF PLANS FOR TEMPORARY SHORING. THE ENGINEER WILL BE ALLOWED 30 CALENDAR DAYS TO REVIEW THE TEMPORARY SHORING PLAN. THE CONTRACTOR SHALL NOT PROCEED WITH INSTALLATION OF THE TEMPORARY SHORING WITHOUT NOTICE TO PROCEED FROM THE ENGINEER.

THE TEMPORARY SHORING SUBMITTAL SHALL INCLUDE:

- DESIGN CALCULATIONS (INCLUDING A GLOBAL STABILITY ANALYSIS)
- SOIL PROPERTIES
- SHORING MATERIAL PROPERTIES
- SHORING PLAN LAYOUT (SHOWING LOCATION OF TRAFFIC)
- SHORING DETAILS

TEMPORARY SHORING SHALL BE PAID FOR AS A LUMP SUM INCLUDING ALL COST FOR DESIGNING, FURNISHING, INSTALLING AND REMOVAL. ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.

STAGE I IS NOT PART OF THIS DESIGN. SEE PRECAST DESIGN 615 IN THIS PROJECT. ONE LANE OF TRAFFIC IN BOTH DIRECTIONS WILL BE MAINTAINED ON EBL U.S. 20 DURING STAGE II .

ALL COSTS FOR REMOVAL OF TEMPORARY CURTAIN WALL IS CONSIDERED INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".

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.

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 ¾ 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 AND STANDARDS.

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' x 2' PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING WILL BE IMPLEMENTED AS PART OF THIS PROJECT. AN OBSERVATION AND SURVEY TEAM WILL BE ON-SITE DURING INSTALLATION OF THE PRECAST CULVERT AS PART OF A RESEARCH PROJECT. THE OBSERVATION TEAM WILL DOCUMENT THE INSTALLATION OF THE PRECAST CULVERT INCLUDING THE CONDITION OF THE CULVERT IMMEDIATELY AFTER INSTALLATION. THE SURVEY TEAM WILL TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER INSTALLATION OF THE CULVERT, BUT PRIOR TO BACKFILLING OPERATIONS. THE SURVEY TEAM WILL AGAIN TAKE ELEVATION SHOTS AND MEASUREMENTS AT EACH PRECAST CULVERT JOINT IMMEDIATELY AFTER BACKFILLING OPERATIONS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL BE REQUIRED TO ACCOMMODATE ACCESS BY THE IOWA DOT AND RESEARCH PERSONNEL. THE CONTRACTOR SHALL NOTIFY MICHAEL NOP BY EMAIL (MICHAEL.NOP@DOT.IOWA.GOV) 72 HOURS PRIOR TO STARTING INSTALLATION OF THE PRECAST CULVERT BOX SECTIONS. THE CONTRACTOR SHALL INCLUDE IN THE EMAIL THE DESIGN NUMBER, COUNTY NAME, PROJECT NUMBER AND STARTING DATE FOR THE PRECAST CULVERT BOX INSTALLATION.

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

CIP STANDARD	ISSUED	REVISED
RCB G1-12	APRIL 2012	10-12
RCB G2-12	APRIL 2012	07-14
CBJ 3-12	APRIL 2012	07-13
CBJ 4-12	APRIL 2012	-----
RCB 12-12-12	APRIL 2012	-----
PRECAST STANDARD	**ISSUED**	**REVISED**
PRCB 12-13	JANUARY 2013	-----
PRCB G1-13	JANUARY 2013	-----
PRCB G2-13	JANUARY 2013	-----

TRAFFIC CONTROL PLAN

NOTE:
THE PROPOSED WBL WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. TRAFFIC WILL BE MAINTAINED ON EXISTING LANES. REFER TO THE TRAFFIC CONTROL PLAN IN PROJECT NHSN-020-1(123)--2R-97.

POLLUTION PREVENTION PLAN IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

ROAD QUANTITY INFORMATION IS INCLUDED IN PROJECT NHSN-020-1(123)--2R-97.

NOTE:
THIS STRUCTURE IS BEING BUILT IN STAGES. STAGE I IS DESIGN 615, STAGE II IS DESIGN 118, BOTH DESIGNS ARE IN THESE PLANS. IF THE CONTRACTOR CHOOSES THE PRE-CAST OPTION, BOTH STAGES MUST BE DONE USING THE PRECAST OPTION. IF STAGE I WAS CONSTRUCTED USING CAST IN PLACE, THEN STAGE II SHALL BE CONSTRUCTED AS CAST IN PLACE. BACK TO BACK PARAPETS LENGTH AND OTHER INFORMATION PERTINENT FOR THE PRE-CAST OPTION FOR BOTH DESIGNS CAN BE FOUND IN THESE PLAN NOTES.

DESIGN FOR EXTENSION TO A 0.1661° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE II 141'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN GENERAL NOTES

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 36

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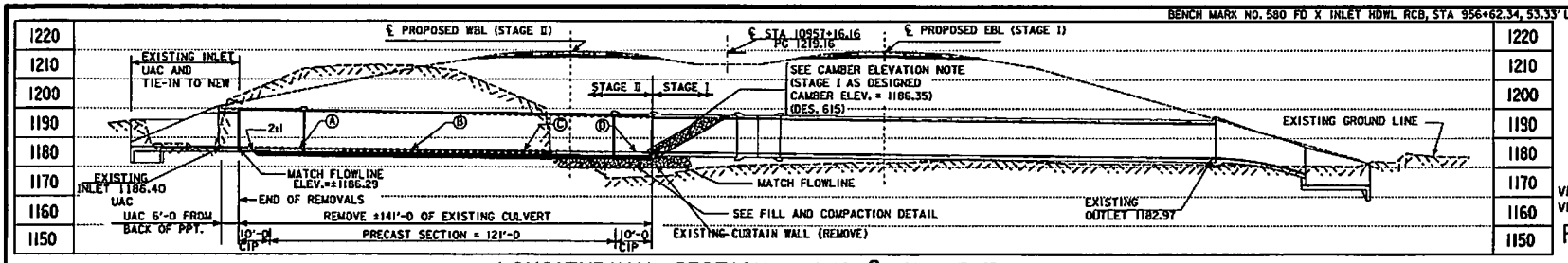
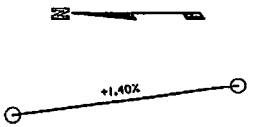
INCLUDES ADDENDA± A.02

BENCH MARK NO. 580 FD X INLET HDWL RCB, STA 956+62.34, 53.33' LT EL=1200.64



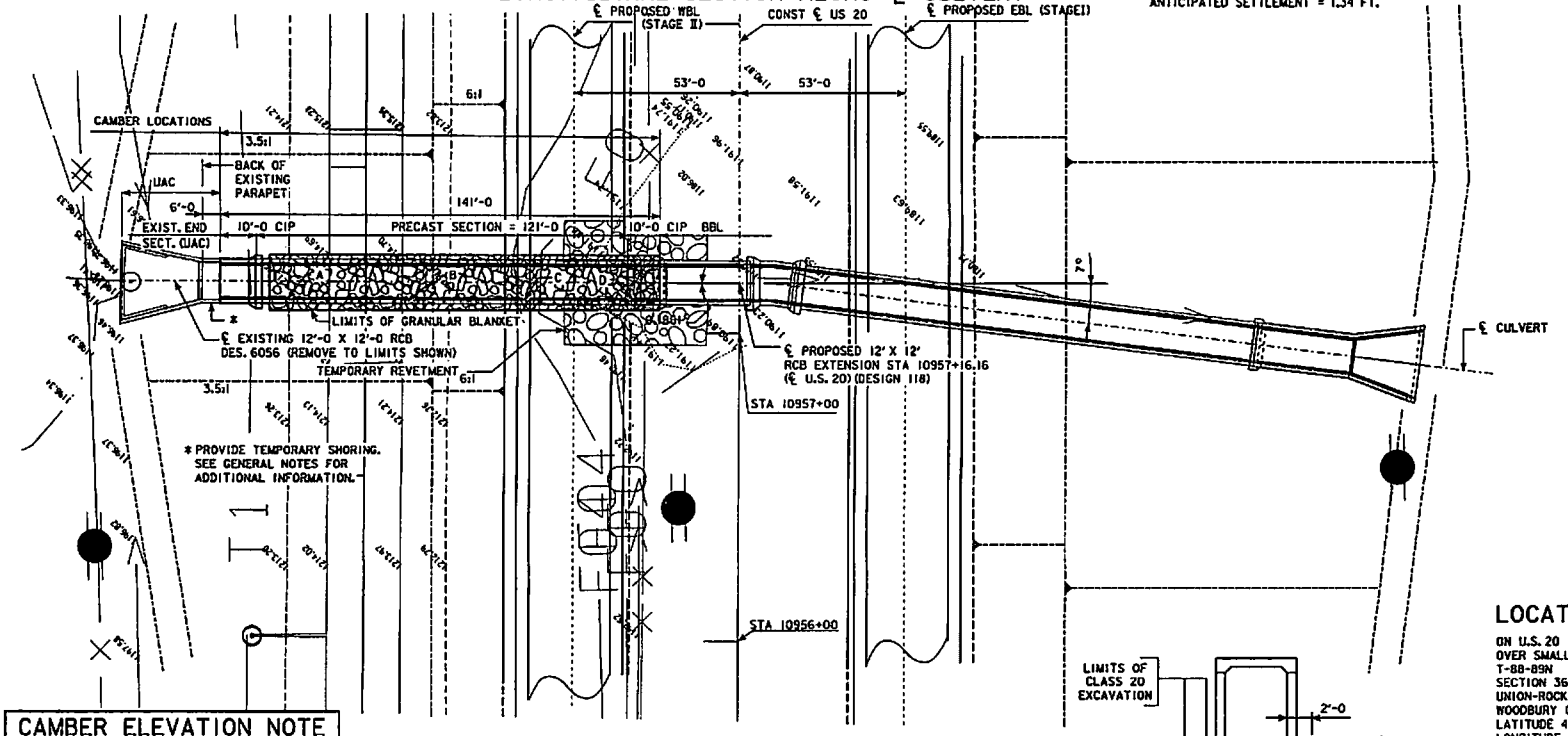


VPI STA = 10953+00 VPI STA = 10968+00
VPI ELEV = 1213.33 VPI ELEV = 1234.33

PROPOSED PROFILE GRADE US 20

LONGITUDINAL SECTION ALONG ℄ CULVERT

FILL HEIGHT = 21'-0
ANTICIPATED SETTLEMENT = 1.34 FT.



CAMBER ELEVATION TABLE

NOTE:
CAMBER LOCATIONS AS SHOWN

LOCATION	ELEVATION
Ⓐ	1186.07
Ⓑ	1185.69
Ⓒ	1186.27
Ⓓ	1186.41

NOTE:
BELL JOINTS ARE TO BE PLACED AS SHOWN IN THESE PLANS.

HYDRAULIC DATA

DRAINAGE AREA = 1106 ACRES
Q_{50} = 1288 CFS
HW ELEV. = NO CHANGE

UTILITIES LEGEND:

MID AMERICAN ENERGY
QWEST
MCLEOD
QWEST LOCAL NETWORK

LOCATION

ON U.S. 20
OVER SMALL STREAM
T-88-89N R-42W
SECTION 36-4
UNION-ROCK TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.474541°
LONGITUDE -95.743657°

TRAFFIC ESTIMATE

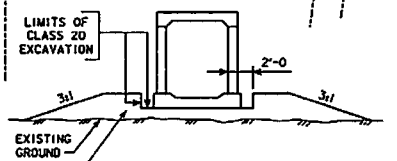
2023 AADT	4000	V.P.D.
2043 AADT	5800	V.P.D.
2043 DHV	600	V.P.H.
TRUCKS	27	%
TOTAL DESIGN ESALs	16,700,000	

CAMBER ELEVATION NOTE

NOTE:
THE CONTRACTOR SHALL CHECK THE CURRENT ELEVATION OF THE EXISTING STAGE I INLET FLOWLINE. ANY DIFFERENCE IN ELEVATION SHOWN ON THESE PLANS FROM WHAT IS MEASURED SHALL BE USED TO ADJUST THE LISTED CAMBER ELEVATIONS SHOWN ON THIS SHEET HIGHER OR LOWER AS REQUIRED BY THE ELEVATION DIFFERENCE, AND RATIOED ACCORDINGLY FOR EACH CAMBER LOCATION.
THE PROPOSED INLET ELEVATION SHOWN ON THESE PLANS SHALL NOT BE CHANGED.

NOTE:
EXISTING REVETMENT IN MEDIAN TO BE REMOVED AS NECESSARY TO FACILITATE NEW CONSTRUCTION. REVETMENT IS TO BE STOCKPILED ON SITE AT THE DIRECTION OF THE ENGINEER AND REUSED WHERE NECESSARY IN NEW CONSTRUCTION OR WHERE NEW PLACEMENT IS DIRECTED BY THE ENGINEER AND AT NO COST TO THE STATE.

SITUATION PLAN



CONTRACTOR IS TO FILL AND COMPACT THIS AREA AND ANY OTHER AREAS AS DIRECTED BY THE ENGINEER. COST IS INCIDENTAL TO THE BID ITEM "REMOVALS AS PER PLAN".

FILL & COMPACTION DETAIL

DESIGN FOR EXTENSION TO A 0.1861° SKEW (LA)

12'-0 X 12'-0 X 332'-0 (STAGE II 141'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN SITUATION PLAN

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 4 FILE NO. 30568 DESIGN NO. 118

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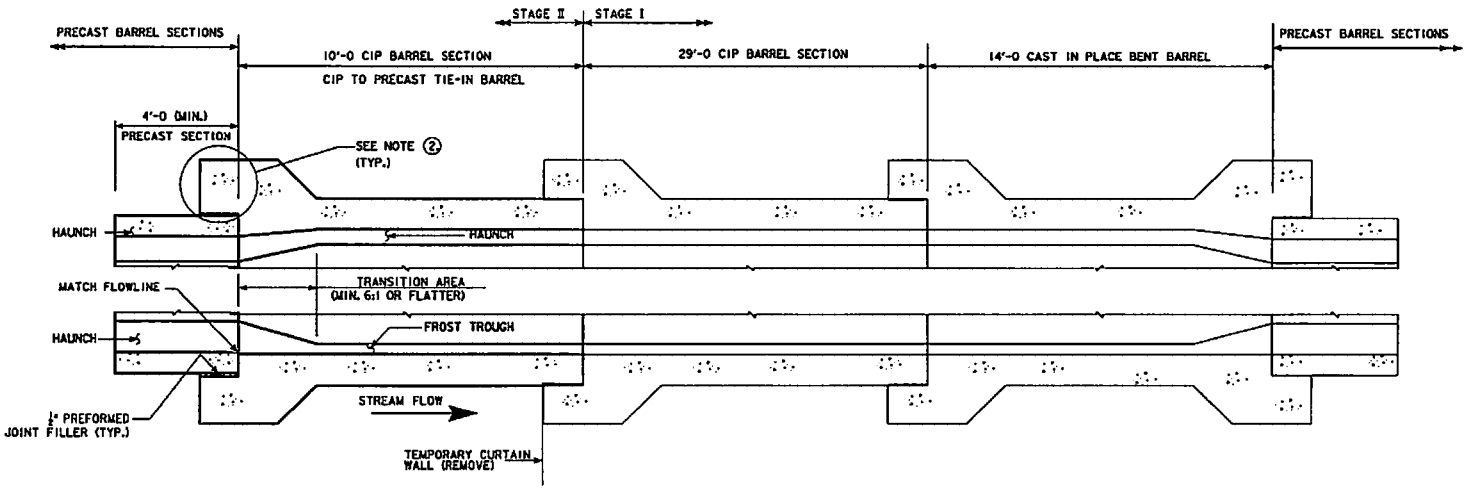
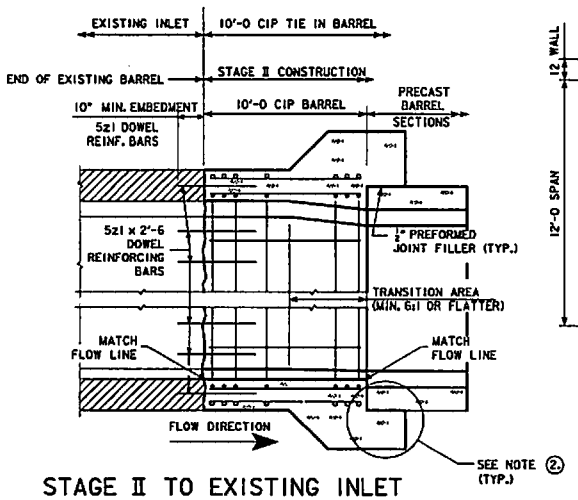
INCLUDES ADDENDA: A.02



CAST IN PLACE TO PRECAST BARREL SECTION DETAILS

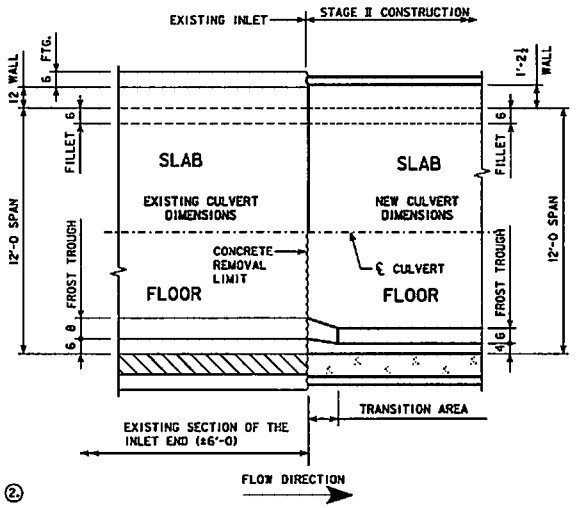
(LONGITUDINAL VIEW)

(2) NOTE: THE CONTRACTOR SHALL ADJUST THE DIMENSIONS OF THE BELL JOINT AS NECESSARY TO MAINTAIN FULL CONTACT (INCLUDING ½" PREFORMED MATERIAL) OF THE INSIDE FACE OF THE CAST-IN-PLACE BELL JOINT TO THE OUTSIDE FACE OF THE PRECAST BARREL. CONCRETE AND REINFORCING QUANTITIES MAY CHANGE DUE TO THE DIFFERENCE IN SLAB, FLOOR AND WALL THICKNESSES BETWEEN CAST-IN-PLACE AND PRECAST BARREL SECTIONS. ALL BAR LENGTHS ARE ESTIMATED WITH A 2" CLEARANCE FROM CONCRETE FACES. ALL COSTS ASSOCIATED WITH THESE CHANGES SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE, (RCB CULVERT)".



STAGE II TO EXISTING INLET SECTION TIE-IN JOINT

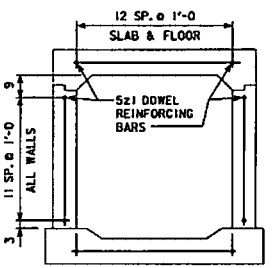
(LONGITUDINAL VIEW)



CONCRETE TRANSITION DETAILS

(PLAN VIEW - STAGE II CIP BARREL TO EXISTING INLET)

THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE FRONT FACE OF THE EXISTING INLET. 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.



JOINT TIE-IN DETAILS

(SHOWING SPACING OF 50 EA. OF 5z1 DEFORMED STEEL DOWEL REINFORCING BARS AT EXISTING INLET JOINT)

REINFORCING - DOWEL BARS

BAR	DESCRIPTION	NO.	LENGTH	WEIGHT
5z1	DOWEL BARS	50	2'-6	130 LBS.

NOTE:
FOR BARREL AND BELL JOINT DETAILS NOT SHOWN, REFER TO STANDARDS LISTED IN THESE PLANS.

DESIGN FOR EXTENSION TO A 0.1861° SKEW (L.A)

12'-0 X 12'-0 X 332'-0 (STAGE II 141'-0) PRECAST REINFORCED CONCRETE BOX CULVERT WITH FLUME AND BASIN 5'-0 TIE-IN BARREL DETAILS

STA. 10957+16.16 (℄ U.S. 20) OCTOBER 2015

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 4 FILE NO. 30568 DESIGN NO. 118

DESIGN TEAM DGB * MSF * LW | WOODBURY COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER 38

12/1/2015 2:53:44 PM dbierwa pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\9702001098\BRFinal\97020155.brg 9700118sp004 11x17.pdf.pltcfg

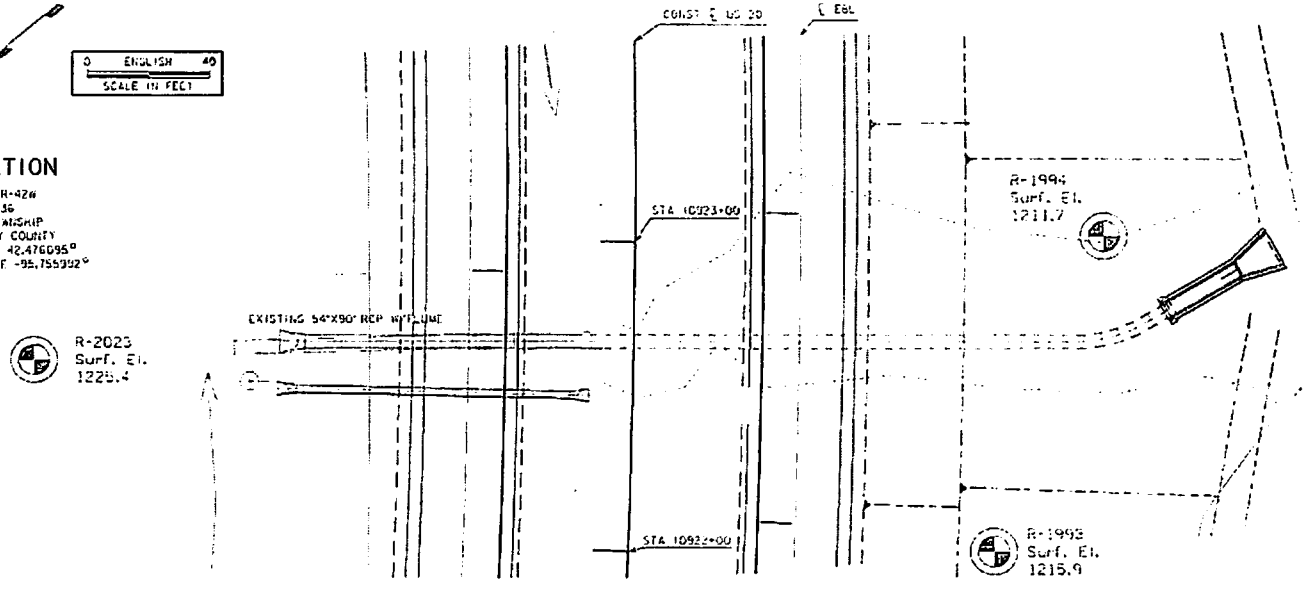
INCLUDES ADDENDA: A.02

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

0 ENGLISH 40
SCALE IN FEET

LOCATION

T-89N R-42W
SECTION 36
UNION TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.476095°
LONGITUDE -95.755992°



Boring No.	Date Drilled	GroundWater Level (Ft.)
R-2023	03/04/2014	5.8 AFTER 0.0 HOURS
R-1993	02/11/2014	3.0 AFTER 24.0 HOURS
R-1994	02/11/2014	23.0 DRY

GEOTECHNICAL 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.

Mark A. Dell 23306

Signature _____ Date _____

Printed or typed name

My license renewal date is December 31, 2015

Pages or sheets covered by this seal: SPS.1

DESIGN FOR 1° SKEW RT AH

6' X 4' REINFORCED 3:1 CONCRETE FLUME FOR 48" RCP

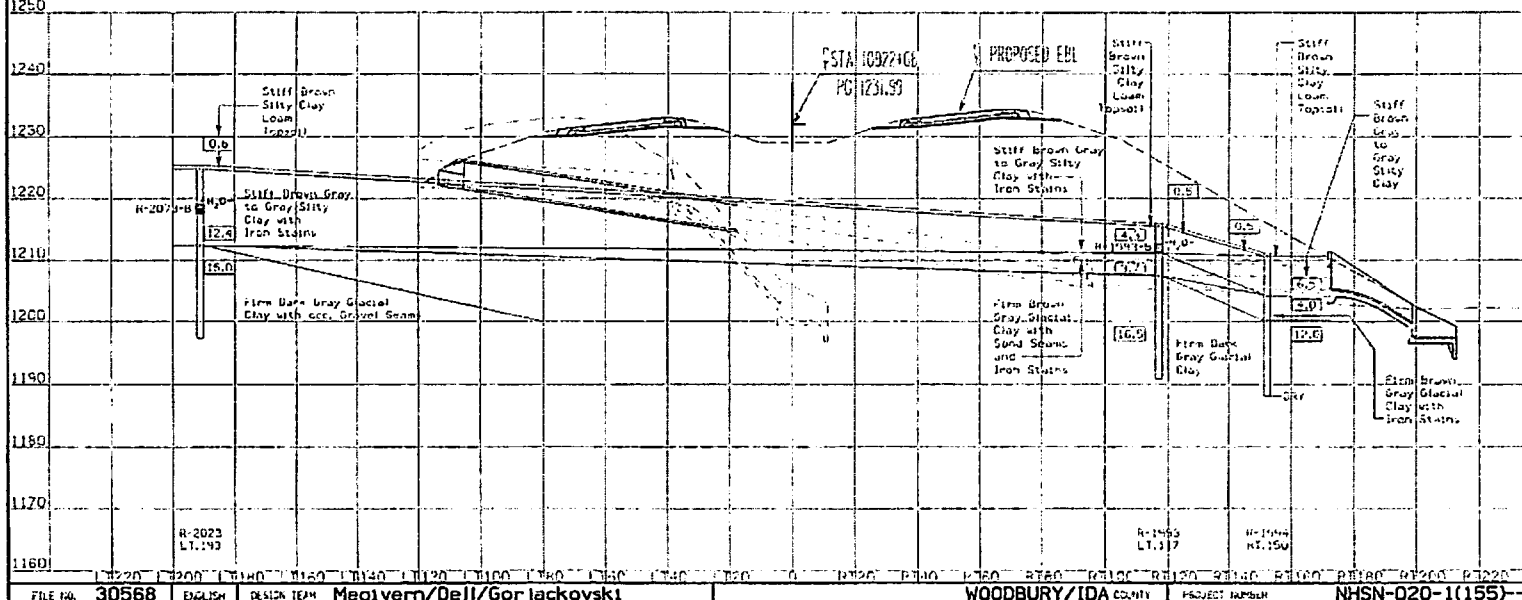
SOIL PROFILE SHEET

STATION 10922+68.00

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 5 FILE NO. 30560 DESIGN NO. 0-115



Note: C.6 Indicates Layer Thickness

SHELBY TUBE CORE DATA

CORE NO.	R-1993-B	R-2023-B
CLASSIFICATION (AASHTO)	A-6(4)	A-7-6(32)
COEFF. CONSOL. SQ. FT. /DAY	0.308	0.166
TRIAXIAL COMPRESSION	CU	CU
COHESION PSF	500	162
FRICTION COEFF.	0.00	0.19
MOISTURE CONTENT %	20.4	34.6
DRY DENSITY - PCF	106.4	82.7

UU-UNCONSOLIDATED & UNDRAINED
CU-CONSOLIDATED & UNDRAINED

LEGEND

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern/Dell/Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER SPS.1

Boring No.	Date Drilled	Groundwater Level (Ft.)
R-2022	03/04/2014	20.0 4 Hr
R-2026	03/04/2014	23.0 DRY

SHELBY TUBE CORE DATA

CORE NO.	R-2026-S
DEPTH IN FEET	3.0 - 4.8
CLASSIFICATION (AASHTO)	A-7-6(44)
COEFF.CONSOL. (SQ. FT /DAY)	0.639
TRIAXIAL COMPRESSION	CU
COHESION - PSF	355
FRICTION COEFF.	0.11
MOISTURE CONTENT %	22.6
DRY DENSITY - PCF	82.9

CU-CONSOLIDATED UNDRAINED
UU-UNCONSOLIDATED UNDRAINED
UC-UNCONFINED COMPRESSION (c=1/2 Qu)

DESIGN FOR 20° SKEW RT AH

14' X 18' 6" DESIGN IMPACT BASIN FOR 60" RCP

SOIL PROFILE SHEET

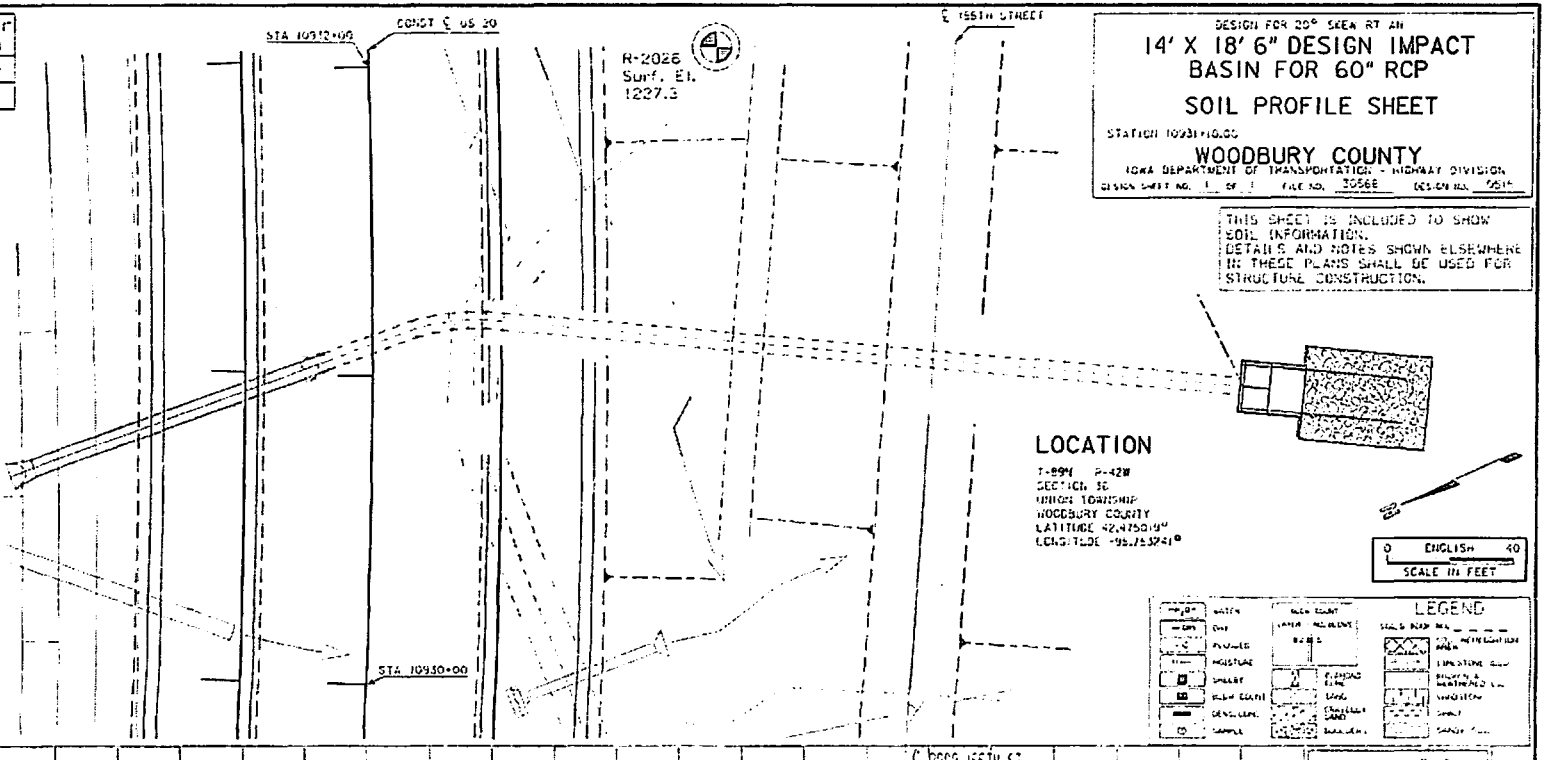
STATION 10931+10.00

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 9611

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

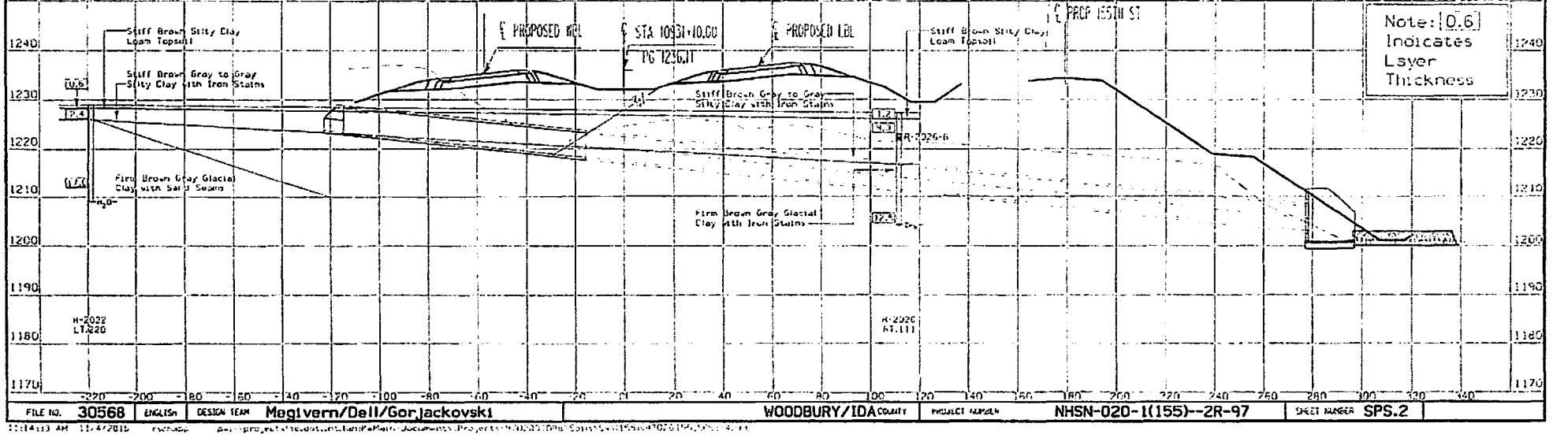


LOCATION

T-89N R-42W
SECTION 30
UNION TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.475019°
LONGITUDE -96.153741°

0 ENGLISH 40
SCALE IN FEET

LEGEND



FILE NO. 30568	ENGLISH	DESIGN TEAM Meglvern/Dell/Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER SPS.2

11:14:33 AM 11/4/2015

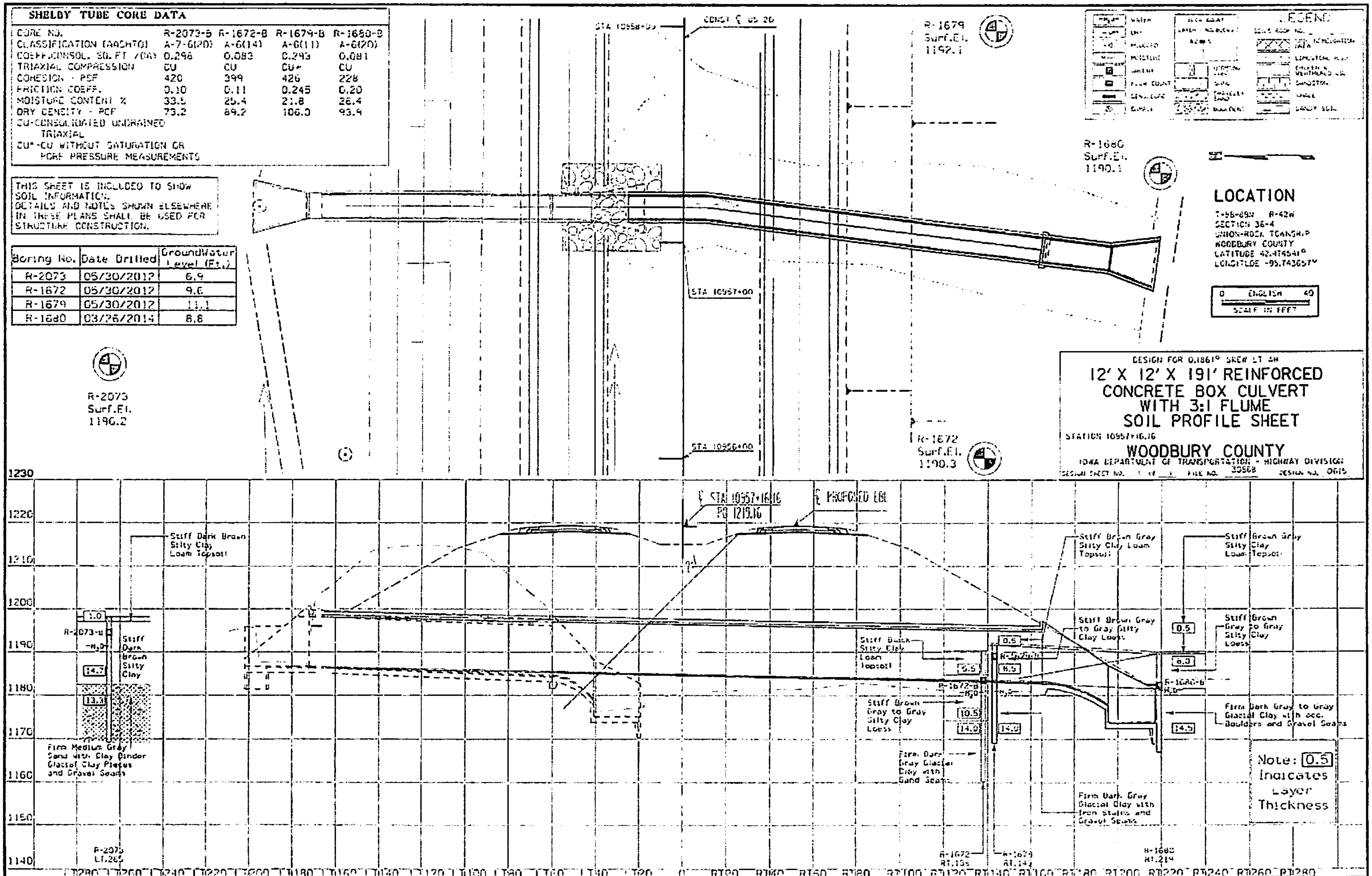
SHELBY TUBE CORE DATA

CORE NO.	R-2073-5	R-1672-B	R-1679-B	R-1680-B
CLASSIFICATION (AASHTO)	A-7-6(20)	A-6(14)	A-6(11)	A-6(20)
COEFF.CONSOL. SQ.FT /DAY	0.298	0.083	0.293	0.081
TRIAXIAL COMPRESSION	CU	CU	CU*	CU
COHESION - PSF	420	399	426	228
FRICTION COEFF.	0.10	0.11	0.245	0.20
MOISTURE CONTENT %	33.5	25.4	21.8	26.4
DRY DENSITY - PCF	73.2	89.2	106.0	93.4

CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU*-CU WITHOUT SATURATION OR PORE PRESSURE MEASUREMENTS

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Boring No.	Date Drilled	GroundWater Level (Ft.)
R-2073	05/30/2012	6.9
R-1672	05/30/2012	9.6
R-1679	05/30/2012	11.1
R-1680	03/26/2014	8.8



LOCATION

T-88-89N R-42W
SECTION 36-4
UNION-ROCK TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.474541°
LONGITUDE -95.743657°

0 ENGLISH 40
SCALE IN FEET

DESIGN FOR 0.1861° SKEW LT AH

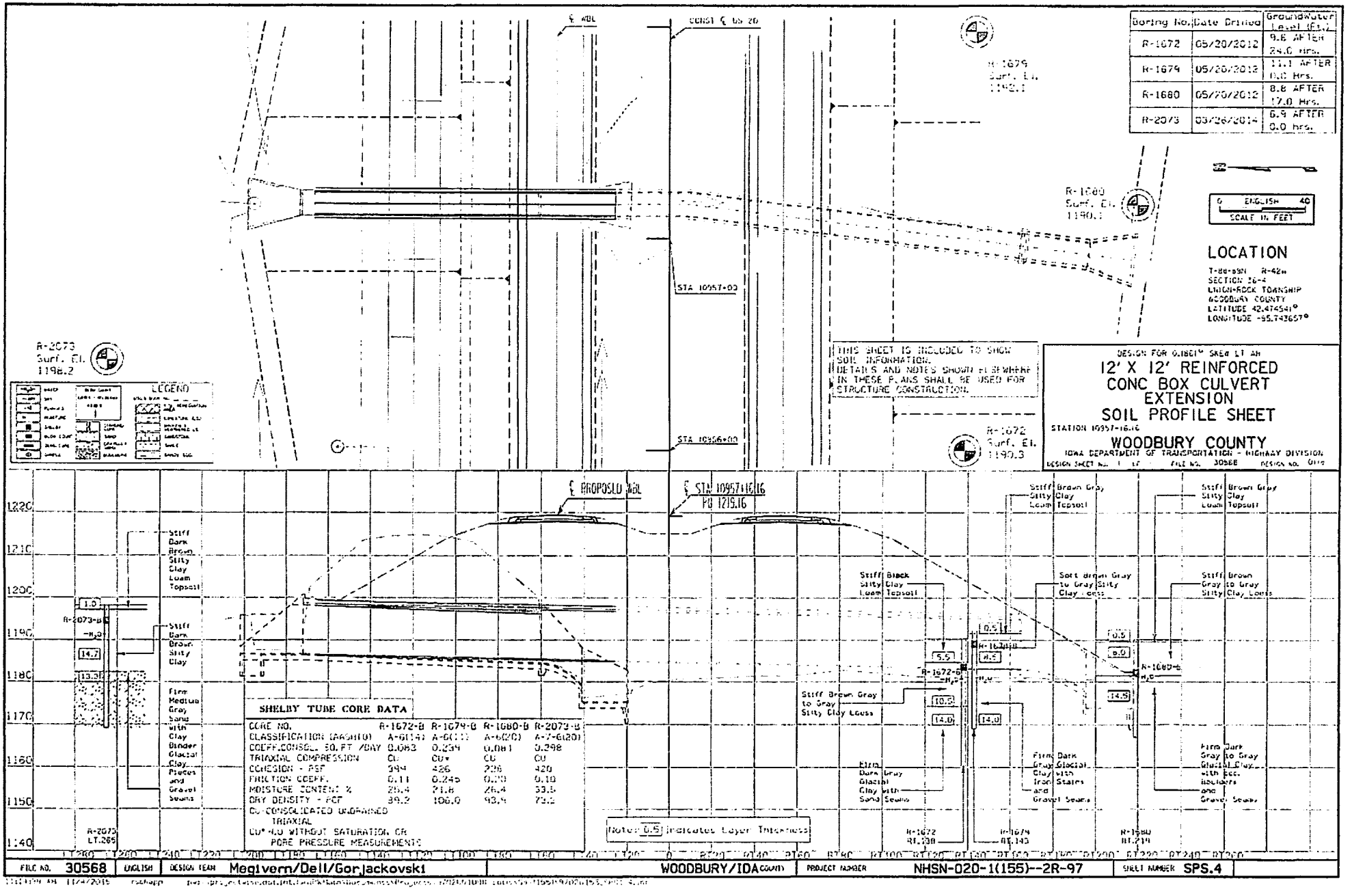
12′ X 12′ X 191′ REINFORCED CONCRETE BOX CULVERT WITH 3:1 FLUME SOIL PROFILE SHEET

STATION 10957+16.16

WOODBURY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. 30568 DESIGN NO. 0615

FILE NO. 30568	ENGLISH	DESIGN TEAM Megivern/Dell/Gorjackovski	WOODBURY/IDA COUNTY	PROJECT NUMBER NHSN-020-1(155)--2R-97	SHEET NUMBER SPS.3


Boring No. | Date Drilled | Groundwater Level (ft.)
R-1672 | 05/20/2012 | 9.8 AFTER 24.0 Hrs.
R-1679 | 05/20/2012 | 11.1 AFTER 0.0 Hrs.
R-1680 | 05/20/2012 | 8.8 AFTER 17.0 Hrs.
R-2073 | 05/26/2014 | 6.9 AFTER 0.0 hrs.
R-1679 Surf. El. 1192.1
R-1680 Surf. El. 1190.1
R-2073 Surf. El. 1198.2
R-1672 Surf. El. 1190.3
0 ENGLISH 40 SCALE IN FEET
LOCATION
T-86-89N R-42W
SECTION 26-4
UNION-ROCK TOWNSHIP
WOODBURY COUNTY
LATITUDE 42.474541°
LONGITUDE -95.743657°
LEGEND
THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.
DESIGN FOR 0.18Ø1" SKEW LT AH
12' X 12' REINFORCED CONC BOX CULVERT EXTENSION
SOIL PROFILE SHEET
STATION 10957+16.16
WOODBURY COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
PROPOSED ℄BL
STA 10957+16.16
PG 1219.16
STA 10956+00
Stiff Dark Brown Silty Clay Loam Topsoil
Stiff Dark Brown Silty Clay
Firm Medium Gray Sand with Clay Binder Glacial Clay Pockets and Gravel Seams
Stiff Black Silty Clay Loam Topsoil
Soft brown Gray to Gray Silty Clay Loess
Stiff Brown Gray to Gray Silty Clay Loess
Stiff Brown Gray to Gray Silty Clay Loess
Firm Dark Gray Glacial Clay with Sand Seams
Firm Dark Gray Glacial Clay with Iron Stains and Gravel Seams
Firm Dark Gray to Gray Glacial Clay with Occ. Boulders and Gravel Seams
R-2073-B
R-1672-B
R-1679-B
R-1680-B
SHELBY TUBE CORE DATA
CORE NO. | R-1672-B | R-1679-B | R-1680-B | R-2073-B
CLASSIFICATION (AASHTO) | A-6(14) | A-6(11) | A-6(20) | A-7-6(20)
COEFF.CONSOL. SQ.FT./DAY | 0.083 | 0.234 | 0.081 | 0.298
TRIAXIAL COMPRESSION | CU | CU* | CU | CU
COHESION - PSF | 394 | 426 | 226 | 420
FRICTION COEFF. | 0.11 | 0.245 | 0.09 | 0.10
MOISTURE CONTENT % | 25.4 | 21.8 | 26.4 | 33.6
DRY DENSITY - PCF | 89.2 | 106.0 | 93.4 | 73.2
CU-CONSOLIDATED UNDRAINED TRIAXIAL
CU* 4.0 WITHOUT SATURATION, OR PORE PRESSURE MEASUREMENTS
Note: 0.5 Indicates Layer Thickness
R-2073 LT.265
R-1672 RT.138
R-1679 RT.143
R-1680 RT.219
FILE NO. 30568 | ENGLISH | DESIGN TEAM Meglvern/Dell/Gorjackovski | WOODBURY/IDA COUNTY | PROJECT NUMBER NHSN-020-1(155)--2R-97 | SHEET NUMBER SPS.4

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: December 15, 2015
Date of Addendum: December 8, 2015

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
115	97-0201-123	PCC PAVEMENT - GRADE AND NEW	WOODBURY	NHSN-020-2(123)--2R-47 NHSN-020-2(125)--2R-47 NHSN-020-2(127)--2R-47 NHSN-020-2(129)--2R-47 NHSN-020-2(131)--2R-47 NHSN-020-2(133)--2R-47 NHSN-020-1(123)--2R-97 NHSN-020-1(138)--2R-97 NHSN-020-1(155)--2R-97	15DEC115.A03

Make the following changes to the PROPOSAL SCHEDULE OF PRICES:

Change Proposal Line No. 3780 2524-6765210 REMOVAL OF TYPE A SIGN ASSEMBLY;
From: 1.000 EACH
To: 133.000 EACH

If the above changes are not made, they will be made as shown here.

Make the following changes to the PROPOSAL SPECIAL PROVISIONS LIST & TEXT:

Add the attached:

SP- 150061

SPECIAL PROVISIONS FOR CONFORMITY WITH AND COORDINATION OF CONTRACT DOCUMENTS

Woodbury County
NHSN-020-1(123)--2R-97

Effective Date12/15/2015

IOWA DOT

SPECIAL PROVISIONS
FOR
CONFORMITY WITH AND COORDINATION OF THE CONTRACT DOCUMENTS

Woodbury County
NHSN-020-1(123)--2R-97

Effective Date
12/15/2015

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150061.01 DESCRIPTION.

A. With the exception of small or irregular areas, Automated Machine Guidance according to Article 1105.17 of the Standard Specifications will be required for the grading on this project. Automated Machine Guidance for the paving will be the Contractor's option.

B. Digital Contract Files.

1. Digital Files contained within the 97-0201-123_E_Files_(DataFiles).zip file package listed below (files are listed in descending order of precedence):
   a. LandXML Geometry file: hv_dsn_123.xml within the "Alignment_Data_Files" subfolder.
   b. LandXML surface files: All LandXML files within the "Machine_Control_Surfaces" subfolder.
   c. Three dimensional line string CADD files: All DXF files contained within the "DXF_Files" subfolder.

2. See Appendix A for names, time stamps, and sizes of official files.

3. The digital files are available for download at the following web site for the project listed above: http://www.iowadot.gov/contracts/lettings.html.

150061.02 STANDARD SPECIFICATION REVISIONS.

Make the following changes to the Standard Specifications:

1101.03, DEFINITION OF TERMS.

Add to the definition of Contract (Also Contract Documents):

- Digital contract files specified in the contract documents,

1105.04, A.

Replace the Article:

In case of a discrepancy between contents of the contract documents, the following items listed by descending order shall prevail:

1. Addendum
2. Proposal Form
3. Special Provision
4. Digital Contract Files.

~~4~~ 5. Plans

~~5~~ 6. Standard Bridge Plans, Standard Culvert Plans, and Standard Road Plans

~~6~~ 7. Developmental Specifications

~~7~~ 8. Supplemental Specifications

~~8~~ 9. General Supplemental Specifications

~~9~~ 10. Standard Specifications

~~10~~ 11. Materials I.M.

1105.04, D.

Replace the Article:

The Contractor shall not take advantage of any apparent error, omission, or discrepancy in the contract documents. The Engineer will be permitted to make such correction in interpretation as may be deemed necessary for the fulfillment of the intent of the contract documents subject to compensation as provided in Articles 1109.03, 1109.04 and 1109.16. Written notice of changes in the contract documents will be given to the Contractor by the Engineer. Field adjustment of digital contract files, if necessary, will be completed by the Engineer.

Appendix A: Listing of Digital Files

Name	File Size	File Updated
XML FILES		
Existing		
existing_surface_123.xml	52,996 KB	10/6/2015 1:22 PM
Previously Constructed Project in Correctionville (121)		
NHSX-020-1(121)--3H-97_prop_surf_Taper_EOP.xml	278 KB	10/6/2015 1:21 PM
Stage 1		
Dikes		
prop_surf_top_DK_1037L.xml	15 KB	10/21/2015 12:07 PM
prop_surf_top_DK_1905R.xml	18 KB	10/21/2015 12:08 PM
prop_surf_top_DK_2003L.xml	18 KB	10/21/2015 12:08 PM
prop_surf_top_DK_2169L.xml	9 KB	10/21/2015 12:08 PM
prop_surf_top_DK_2404R.xml	8 KB	10/21/2015 12:08 PM
prop_surf_top_DK_10880R.xml	18 KB	10/21/2015 12:07 PM
prop_surf_top_DK_10920M.xml	21 KB	10/21/2015 12:07 PM
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prop_surf_top_ENT_1103R.xml	15 KB	10/6/2015 9:43 AM
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prop_surf_top_ENT_11452R.xml	68 KB	10/6/2015 9:43 AM
Mainline		
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prop_surf_subgrade_Stage1_ML020_B.xml	6,052 KB	10/8/2015 10:49 AM

prop_surf_subgrade_Stage1_ML020_C.xml	6,587 KB	10/7/2015 1:27 PM
prop_surf_subgrade_Stage1_ML020_D.xml	6,936 KB	10/7/2015 3:05 PM
prop_surf_subgrade_Stage1_ML020_E.xml	6,477 KB	10/7/2015 4:10 PM
prop_surf_subgrade_Stage1_ML020_F.xml	5,806 KB	10/8/2015 10:01 AM
prop_surf_top_Stage1_ML020_A.xml	12,217 KB	10/8/2015 11:54 AM
prop_surf_top_Stage1_ML020_B.xml	11,976 KB	10/8/2015 10:49 AM
prop_surf_top_Stage1_ML020_C.xml	12,744 KB	10/7/2015 1:27 PM
prop_surf_top_Stage1_ML020_D.xml	13,161 KB	10/7/2015 3:05 PM
prop_surf_top_Stage1_ML020_D_Left_Ditch.xml	97 KB	10/7/2015 3:05 PM
prop_surf_top_Stage1_ML020_E.xml	12,643 KB	10/7/2015 4:10 PM
prop_surf_top_Stage1_ML020_F.xml	11,420 KB	10/8/2015 10:01 AM
Sideroads		
prop_surf_subgrade_Stage1_SR_AlpineS.xml	623 KB	10/12/2015 1:14 PM
prop_surf_subgrade_Stage1_SR_CoHwyL37.xml	709 KB	10/14/2015 8:46 AM
prop_surf_subgrade_Stage1_SR_CoRdL51.xml	1,623 KB	10/12/2015 2:08 PM
prop_surf_subgrade_Stage1_SR_CoRdL67.xml	615 KB	10/12/2015 12:49 PM
prop_surf_subgrade_Stage1_SR_CushingBT.xml	510 KB	10/12/2015 12:33 PM
prop_surf_top_Stage1_SR_155th.xml	1,941 KB	10/15/2015 1:34 PM
prop_surf_top_Stage1_SR_165thE.xml	367 KB	10/12/2015 2:08 PM
prop_surf_top_Stage1_SR_165thW.xml	1,256 KB	10/12/2015 2:08 PM
prop_surf_top_Stage1_SR_AlpineS.xml	1,160 KB	10/12/2015 1:15 PM
prop_surf_top_Stage1_SR_CarriageS.xml	604 KB	10/15/2015 1:34 PM
prop_surf_top_Stage1_SR_CoHwyL37.xml	1,292 KB	10/14/2015 8:46 AM
prop_surf_top_Stage1_SR_CoRdL51.xml	2,826 KB	10/12/2015 2:08 PM
prop_surf_top_Stage1_SR_CoRdL67.xml	1,194 KB	10/12/2015 12:49 PM
prop_surf_top_Stage1_SR_CushingBT.xml	981 KB	10/12/2015 12:33 PM
prop_surf_top_Stage1_SR_DodgeS.xml	658 KB	10/15/2015 1:34 PM
prop_surf_top_Stage1_SR_StoryS.xml	562 KB	10/15/2015 1:34 PM
prop_surf_top_Stage1_SR_Taylor.xml	749 KB	10/15/2015 1:34 PM
prop_surf_top_Stage1_SR_Wayside.xml	602 KB	10/15/2015 1:34 PM
prop_surf_top_Stage1_SR_WoodburyS.xml	513 KB	10/15/2015 1:34 PM
Stage 1A_Runaround		
Entrance		
prop_surf_top_Stage1A_ENT_10885L.xml	24 KB	10/6/2015 2:14 PM
Mainline		
prop_surf_subgrade_Stage1A_ML020_Runaround.xml	1,625 KB	10/6/2015 2:14 PM
prop_surf_top_Stage1A_ML020_Runaround.xml	2,216 KB	10/6/2015 2:14 PM
Stage 2		
Dikes		
prop_surf_top_DK_10909M.xml	23 KB	10/21/2015 1:15 PM
prop_surf_top_DK_10922M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11003M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11010L.xml	16 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11060L.xml	14 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11082M.xml	17 KB	10/21/2015 1:15 PM

prop_surf_top_DK_11108M.xml	14 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11117L.xml	27 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11123L.xml	13 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11135M.xml	17 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11144L.xml	14 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11166M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11212M.xml	17 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11221M.xml	16 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11231M.xml	17 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11254M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11316L.xml	9 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11325L.xml	9 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11330M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11393M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11401M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11422M.xml	15 KB	10/21/2015 1:15 PM
prop_surf_top_DK_11423L.xml	12 KB	10/21/2015 1:15 PM
Entrances		
prop_surf_top_ENT_1202R.xml	61 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_1604L.xml	17 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_1604R.xml	11 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_1706R.xml	16 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2107L.xml	33 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2109L.xml	10 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2109R.xml	17 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2209R.xml	42 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2215L.xml	22 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2302L.xml	40 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2302R.xml	43 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2306L.xml	14 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2502L.xml	23 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2502R.xml	23 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2507L.xml	21 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_2507R.xml	18 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_3003R.xml	26 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10885L.xml	27 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10900L.xml	22 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10935L.xml	54 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10946L.xml	70 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10971L.xml	99 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10982L.xml	45 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10992L.xml	126 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_10999L.xml	38 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11026L.xml	194 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11043L.xml	46 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11052L.xml	200 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11079L.xml	37 KB	10/6/2015 12:24 PM

prop_surf_top_ENT_11129L.xml	34 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11138L.xml	43 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11146L.xml	67 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11157L.xml	249 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11187L.xml	28 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11200L.xml	36 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11234L.xml	29 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11242L.xml	70 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11253L.xml	35 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11270L.xml	36 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11294L.xml	31 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11307L.xml	37 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11321L.xml	37 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11351L.xml	39 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11360L.xml	47 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11373L.xml	48 KB	10/6/2015 12:24 PM
prop_surf_top_ENT_11412L.xml	35 KB	10/6/2015 12:24 PM
Mainline		
prop_surf_subgrade_Stage2_ML020_A.xml	5,789 KB	10/12/2015 11:31 AM
prop_surf_subgrade_Stage2_ML020_B.xml	6,532 KB	10/8/2015 12:54 PM
prop_surf_subgrade_Stage2_ML020_C.xml	6,981 KB	10/16/2015 11:37 AM
prop_surf_subgrade_Stage2_ML020_D.xml	7,236 KB	10/9/2015 1:39 PM
prop_surf_subgrade_Stage2_ML020_E.xml	7,166 KB	10/9/2015 3:05 PM
prop_surf_subgrade_Stage2_ML020_F.xml	5,987 KB	10/9/2015 4:17 PM
prop_surf_top_Stage2_ML020_A.xml	11,730 KB	10/12/2015 11:31 AM
prop_surf_top_Stage2_ML020_B.xml	12,663 KB	10/8/2015 12:54 PM
prop_surf_top_Stage2_ML020_C.xml	13,416 KB	10/16/2015 11:37 AM
prop_surf_top_Stage2_ML020_D.xml	13,712 KB	10/9/2015 1:39 PM
prop_surf_top_Stage2_ML020_E.xml	13,868 KB	10/9/2015 3:05 PM
prop_surf_top_Stage2_ML020_F.xml	11,641 KB	10/9/2015 4:17 PM
Sideroads		
prop_surf_subgrade_Stage2_SR_AlpineN.xml	1,001 KB	10/15/2015 2:22 PM
prop_surf_top_Stage2_SR_AlpineN.xml	1,893 KB	10/15/2015 2:22 PM
prop_surf_top_Stage2_SR_Brady.xml	865 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_CarriageN.xml	920 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_CoRdL43.xml	753 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_DodgeN.xml	268 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_Eagle.xml	445 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_Sidney.xml	389 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_StoryN.xml	814 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_Timber.xml	390 KB	10/16/2015 4:26 PM
prop_surf_top_Stage2_SR_WoodburyN.xml	940 KB	10/16/2015 4:26 PM
DXF Files		
97020123_Stage1_Dikes.dxf	1,454 KB	10/21/2015 11:17 AM
97020123_Stage1_Entrances.dxf	2,498 KB	10/6/2015 10:19 AM
97020123_Stage1_ML020.dxf	183,684 KB	10/8/2015 11:54 AM

97020123_Stage1_Sideroads.dxf	24,829 KB	10/15/2015 1:28 PM
97020123_Stage1A_ENT_10885L.dxf	281 KB	10/6/2015 1:57 PM
97020123_Stage1A_ML020_Runaround.dxf	8,894 KB	10/6/2015 1:50 PM
97020123_Stage2_Dikes.dxf	782 KB	10/21/2015 12:55 PM
97020123_Stage2_Entrances.dxf	3,709 KB	10/6/2015 11:51 AM
97020123_Stage2_ML020.dxf	234,979 KB	10/21/2015 9:25 AM
97020123_Stage2_Sideroads.dxf	16,499 KB	10/21/2015 9:21 AM

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: December 15, 2015
Date of Addendum: December 9, 2015

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
115	97-0201-123	PCC PAVEMENT - GRADE AND NEW	WOODBURY	NHSN-020-2(123)--2R-47 NHSN-020-2(125)--2R-47 NHSN-020-2(127)--2R-47 NHSN-020-2(129)--2R-47 NHSN-020-2(131)--2R-47 NHSN-020-2(133)--2R-47 NHSN-020-1(123)--2R-97 NHSN-020-1(138)--2R-97 NHSN-020-1(155)--2R-97	15DEC115.A04

Make the following changes to the PROPOSAL SCHEDULE OF PRICES:

Change Proposal Line No. 2220 2102-2710090 EXCAVATION, CLASS 10, WASTE;
From: 795,280.000 CY
To: 1,033,864.000CY

If the above changes are not made, they will be made as shown here.

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: December 15, 2015
Date of Addendum: December 10, 2015

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
115	97-0201-123	PCC PAVEMENT - GRADE AND NEW	WOODBURY	NHSN-020-2(123)--2R-47 NHSN-020-2(125)--2R-47 NHSN-020-2(127)--2R-47 NHSN-020-2(129)--2R-47 NHSN-020-2(131)--2R-47 NHSN-020-2(133)--2R-47 NHSN-020-1(123)--2R-97 NHSN-020-1(138)--2R-97 NHSN-020-1(155)--2R-97	15DEC115.A05

In the PROPOSAL ATTACHEMENTS Replace the current RIGHT OF WAY CERTIFICATE with the attached RIGHT OF WAY CERTIFICATE.

This revised ROW Certificate for Woodbury Hwy 20 reflects the updated date shown for parcel 102.

RIGHT OF WAY CERTIFICATE

Letting Date: 12/15/2015
County: Woodbury
Construction Project: NHSN-020-1(123)--2R-97
Right of Way Project: NHSN-020-1(122)--2R-97/NHSN-020-2(112)--2R-47
Location Description: E of Correctionville to W Jct US 59

In connection with the above referenced project, I certify that there were no persons displaced for this project or that all individuals and families have been relocated to DSS housing or that comparable replacement housing has been made available to relocates in accordance with applicable Federal and State laws and regulations and that one of the following has application:

☐ 1. All necessary right of way has been acquired or the State has legal right of physical possession of that right of way, or

☒ 2. The acquisition or right of occupancy and use of a few remaining parcels is not complete, but all occupants of the residences on such parcels have had replacement housing made available to them in accordance with 49 CFR 24.204. I assure that, if the physical construction of the project proceeds, displaced persons who have not yet moved from the right of way will be protected against unnecessary inconvenience and disproportionate injury or any action coercive in nature. I believe that is will be in the best public interest to proceed with this project. The following information is provided regarding the excepted parcels and will be provided in the contract documents:

Parcel # not Acq'd	Station to Station	Reason not yet Available	Expected Date of Physical Occupancy
98	10999+51 to 11026+08	Pending Relocation	12-1-15
101	11092+05 to 11131+51	Pending Closing/Relocation	12-1-15
102	11131+52 to 11145+51	Pending Closing/Relocation	12-28-15
1103	Billboard/Sign	Pending Relocation	12-1-15
13	11200+00 to 11222+33	Condemnation Hearing 10-27-15 & Pending Relocation	12-28-15
15	11226+54 to 11252+95	Pending Relocation	12-1-15
28A	11412+94 to 11417+91	Pending Relocation	12-1-15

I further certify that all necessary utility and railroad work has been:

☐ 1. Completed, or

☒ 2. That all necessary arrangements have been made for it to be undertaken and completed as required for proper coordination with the physical construction schedule, and, to the extent deemed necessary, there will be appropriate notification in the contract documents identifying the utility or railroad work which is to be undertaken concurrently with the project construction.

This certification assures compliance with all applicable Federal and State laws, rules and policies.

IOWA DEPARTMENT OF TRANSPORTATION

Martin J. Sankey

Martin J. Sankey
Right of Way Director

A d d e n d u m

Iowa Department of Transportation
Office of Contracts

Date of Letting: December 15, 2015
Date of Addendum: December 11, 2015

B.O.	Proposal ID	Proposal Work Type	County	Project Number	Addendum
115	97-0201-123	PCC PAVEMENT - GRADE AND NEW	WOODBURY	NHSN-020-2(123)--2R-47 NHSN-020-2(125)--2R-47 NHSN-020-2(127)--2R-47 NHSN-020-2(129)--2R-47 NHSN-020-2(131)--2R-47 NHSN-020-2(133)--2R-47 NHSN-020-1(123)--2R-97 NHSN-020-1(138)--2R-97 NHSN-020-1(155)--2R-97	15DEC115.A06

Make the following changes to the PROPOSAL SCHEDULE OF PRICES:

Change Proposal Line No. 4410, Item Number and Item Description;
From: 2415-2111212, PRECAST CONCRETE BOX CULVERT, 12 FT. X 12 FT.
To: 2415-2110808, PRECAST CONCRETE BOX CULVERT, 8 FT. X 8 FT.

The Item Quantity and Unit remain the same.

If the above changes are not made, they will be made as shown here.