



PLANS OF PROPOSED IMPROVEMENTS ON THE

# PRIMARY ROAD SYSTEM

## IOWA COUNTY

### RCB CULVERT REPLACEMENT - SINGLE BOX

#### LADORA TO E. OF SOUTH AMANA (6 LOCATIONS)

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.

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

|                               |                       |
|-------------------------------|-----------------------|
| TOTAL SHEETS                  | 106                   |
| PROJECT NUMBER                | STPN-006-6(52)--2J-48 |
| R.O.W. PROJECT NUMBER         |                       |
| PROJECT IDENTIFICATION NUMBER | 13-48-006-020         |

| INDEX OF SHEETS |  |
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| NO.             | DESCRIPTION  |
| 1               | TITLE SHEET  |
| 2               | ESTIMATE SHEET - DESIGN 117<br>CAST IN PLACE CULVERT |
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| 8               | ESTIMATE SHEET - DESIGN 217<br>CAST IN PLACE CULVERT |
| 8-19            | DES 217 CAST IN PLACE CULVERT                        |
| 20              | ESTIMATE SHEET - DESIGN 317<br>CAST IN PLACE CULVERT |
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| 32              | ESTIMATE SHEET - DESIGN 417<br>CAST IN PLACE CULVERT |
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| 50-53           | DES 617 PRECAST CULVERT                              |
| SPS.1-SPS.2     | SOIL PROFILE SHEETS                                  |
| C.1             | ESTIMATE SHEET FOR ROADWAY                           |
| B.1-W.14        | ROADWAY SHEETS                                       |

REVISIONS



1-800-292-8989

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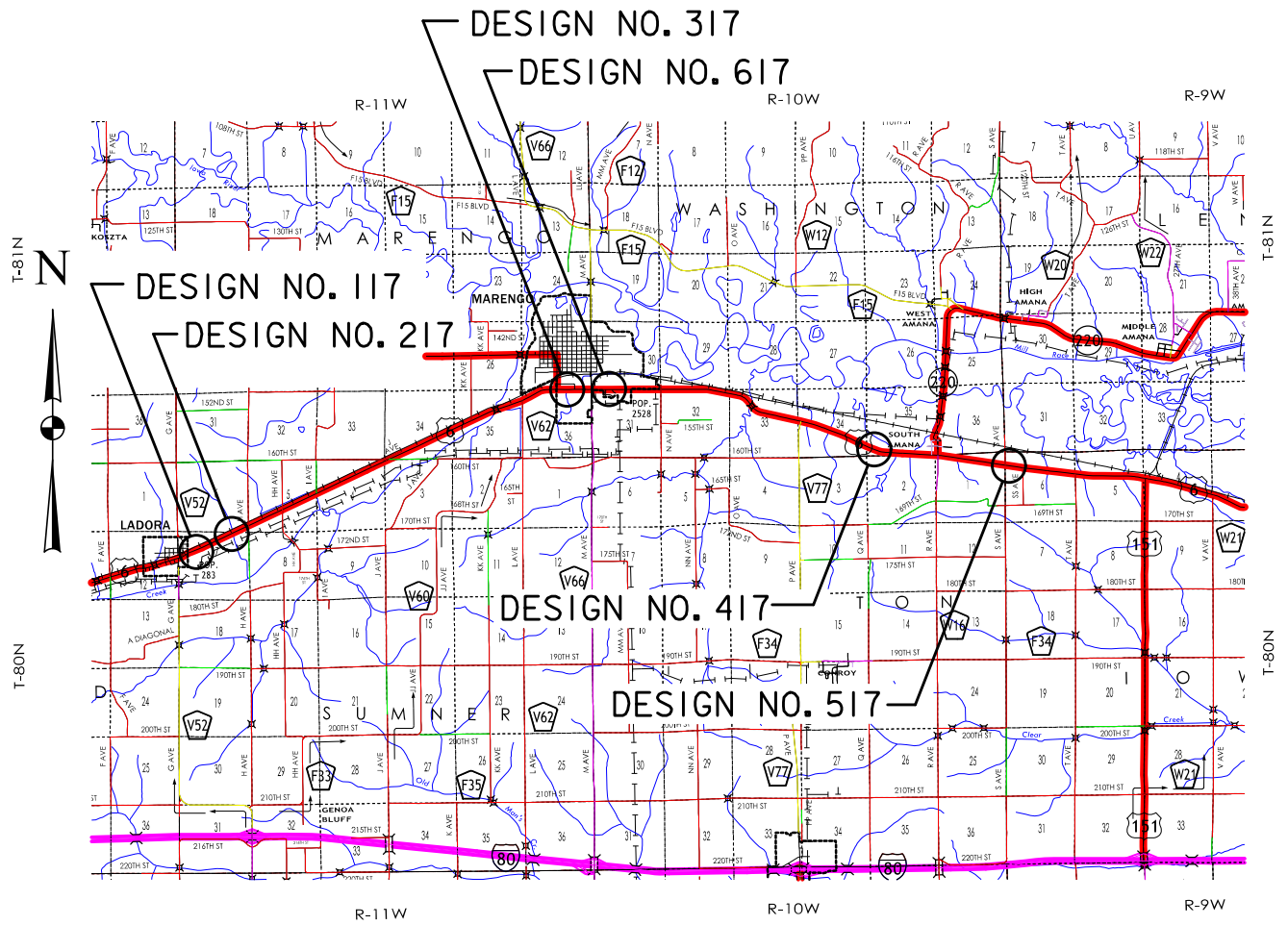
**STANDARD CULVERT PLANS**  
STANDARD CULVERT PLANS ARE LISTED ON INDIVIDUAL "ESTIMATED QUANTITIES" SHEETS.

**STANDARD ROAD PLANS**  
STANDARD ROAD PLANS ARE LISTED ON SHEET NUMBER C.2

**DESIGN DATA URBAN**  
REFER TO INDIVIDUAL SITUATION PLANS FOR TRAFFIC DATA INFORMATION

**DESIGN DATA RURAL**  
REFER TO INDIVIDUAL SITUATION PLANS FOR TRAFFIC DATA INFORMATION

| INDEX OF SEALS    |                    |                     |
|-------------------|--------------------|---------------------|
| SHEET NO.         | NAME               | TYPE                |
| 1                 | JACOB J. SHAW      | STRUCTURAL DESIGN   |
| 52                | BRIAN J. BIRKLAND  | HYDRAULIC DESIGN    |
| SPS.1             | MARK DELL          | GEOTECHNICAL DESIGN |
| B.1               | STEVEN S. SWEET    | ROADWAY DESIGN      |
| CULVERT STANDARDS | NORMAN L. McDONALD | STRUCTURAL DESIGN   |



LOCATION MAP

PROJECT DIRECTORY NAME: 4800602013

**STRUCTURAL DESIGN**

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

Signature: Jacob J. Shaw Date: 11/30/17

Printed or Typed Name: Jacob J. Shaw

My license renewal date is December 31, 2018

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



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

## ESTIMATED CULVERT QUANTITIES

| ITEM NO. | ITEM CODE    | ITEM                              | UNIT | TOTAL | AS BUILT QUANTITY |
|----------|--------------|-----------------------------------|------|-------|-------------------|
| 1        | 2102-0425071 | SPECIAL BACKFILL                  | CY   | 11.0  |                   |
| 2        | 2401-6750001 | REMOVALS, AS PER PLAN             | LS   | 1     |                   |
| 3        | 2402-2720000 | EXCAVATION, CLASS 20              | CY   | 69    |                   |
| 4        | 2403-0100020 | STRUCTURAL CONCRETE (RCB CULVERT) | CY   | 20.1  |                   |
| 5        | 2404-7775000 | REINFORCING STEEL                 | LB   | 2587  |                   |
| 6        | 2533-4980005 | MOBILIZATION                      | LS   | 1     |                   |

### SPECIFICATIONS:

DESIGN: AASHTO LRFD 5th Ed, SERIES OF 2010.

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.

SPECIAL PROVISION FOR WORK ON RAILROAD RIGHT-OF-WAY (IOWA INTERSTATE RAILROAD).

### 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.

- | ITEM NO. | ESTIMATE REFERENCE INFORMATION   |
|----------|--|
| 1        | INCLUDES COST OF 1'-0" THICK WORKING BLANKET (SPECIAL BACKFILL). THE WORKING BLANKET MAY BE DELETED IF DETERMINED TO BE UNNECESSARY AT THE TIME OF CONSTRUCTION. RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR THE SPECIAL BACKFILL.  |
| 2        | INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL AS DETAILED ON THE SITUATION PLAN. 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        | INCLUDES EXCAVATION NECESSARY TO PLACE THE 1'-0" THICK WORKING BLANKET. QUANTITY SHOULD BE REDUCED BY 11 CY IN THE EVENT THAT THE WORKING BLANKET IS DELETED. INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.   |

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

| DESIGN 117 |        |         |
|------------|--------|---------|
| STANDARD   | ISSUED | REVISED |
| RCB G2-12  | 4-12   | 12-16   |
| RCB 5-3-12 | 4-12   | -       |
| PWH 0-1-12 | 4-12   | 12-16   |
| PWH 0-2-12 | 4-12   | 12-16   |
| PWH 0-3-12 | 4-12   | 7-16    |
| PWH 0-4-12 | 4-12   | -       |
| PWH 0-9-12 | 4-12   | 7-16    |

| DESIGN 117                    |          |              |       |       |
|-------------------------------|----------|--------------|-------|-------|
| SUMMARY OF REINFORCING STEEL  |          |              |       |       |
| LOCATION                      | QUANTITY | TOTAL        |       |       |
| 23'-0" END SECTION            | 1577     | 1577         |       |       |
| HEADWALL 0° SKEW              | 963      | 963          |       |       |
| 5z1 BARS                      | 47       | 47           |       |       |
|                               |          | TOTAL (LBS.) |       |       |
|                               |          | 2587         |       |       |
| CONCRETE PLACEMENT QUANTITIES |          |              |       |       |
| LOCATION                      | FOOTING  | WALLS        | SLAB  | TOTAL |
| 23'-0" END SECTION            | 5.8      | 3.4          | 4.4   | 13.6  |
| HEADWALL 0° SKEW              | 4.0      | 1.6          | 0.9 * | 6.5   |
|                               |          |              |       |       |
|                               |          |              |       |       |
| TOTAL (C.Y.)                  |          |              |       |       |
|                               | 9.8      | 5.0          | 5.3   | 20.1  |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

NOTE:  
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

| DESIGN HISTORY<br>AT THIS SITE<br>(INCLUDES THIS DESIGN) |   |
|--|---|
| DES. NO.   | TYPE OF WORK                                    |
| 117  | 5'x3' REINFORCED CONCRETE BOX CULVERT EXTENSION |
|  |   |
|  |   |

DESIGN FOR 0°  
**5'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**ESTIMATED QUANTITIES**  
 STATION 389+13.21 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 6    FILE NO. 31463    DESIGN NO. 117



REVISED 11-2016 - ADDED THE WORD "THEREFORE" TO THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES.  
 REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRITTEN IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT.  
 ENGLISHINGLECULVERTS.DGN - 1043s2 - THIS SHEET ISSUED 10-08.

## GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 5' x 3' R.C.B. CULVERT ON BOTH ENDS, SEE ROADWAY PLANS FOR NORTH EXTENSION.  
 ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.  
 FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.  
 UTILITY COMPANIES AND MUNICIPALITIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.  
 THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 3 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 VERTICAL EARTH PRESSURE,  $E_v = 0.120$  kcf.  
 HORIZONTAL EARTH PRESSURE,  $E_{Hmax} = 0.060$  kcf MAX,  $E_{Hmin} = 0.030$  kcf.  
 THE CONTRACTOR MAY SUBMIT ALTERNATE FROST TROUGH DIMENSIONS FOR APPROVAL. ANY ADDITIONAL COSTS DUE TO CHANGE IN THE FROST TROUGH DIMENSIONS IS TO BE PAID FOR BY THE CONTRACTOR.  
 FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.  
 THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL.  
 THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

|                       |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|
| BAR SIZE NUMBER       | 4   | 5   | 6   | 7   | 8   |
| 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 2 1/4" TO NEAR TRANSV. REINF. BAR  
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR  
 END CLEARANCES:  
 VERTICAL TOP 2"  
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH  
 TRANSVERSE 2"  
 ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.  
 CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.  
 THE PRICE BID FOR "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST FOR REMOVALS OF PORTIONS OF THE EXISTING CULVERT AND THE SETTING OF THE DOWEL REINFORCING BARS INTO EXISTING CONCRETE.  
 ALL DIMENSIONS AND DETAILS SHOWN ON THESE PLANS PERTINENT TO NEW CONSTRUCTION IN RELATION TO EXISTING PORTIONS OF THE STRUCTURE SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.  
 THE REMOVAL OF THE EXISTING CULVERT SHALL BE AT THE FRONT FACE OF THE EXISTING PARAPET. REMOVALS SHALL BE ON A VERTICAL PLANE PARALLEL WITH THE FRONT FACE OF THE EXISTING PARAPET, AND TO THE WIDTH OF THE FLOOR OF THE PROPOSED EXTENSION. THE WALLS SHALL BE CUT NORMAL TO THE BARREL WALLS AND AS SHOWN ON THE "PART REMOVAL PLAN". THE REMOVAL LINE SHALL BE INITIATED WITH A 2 1/2" ± DEEP SAW CUT ON THE TOP AND BOTH SIDES OF EACH WALL, AND ACROSS THE TOP OF THE FLOOR. THIS SAW CUT SHOULD CUT THRU ANY EXISTING LONGITUDINAL REINFORCING THEREBY FACILITATING A NEAT NON-SPALLED BREAK LINE. IF EXISTING TOP OF PARAPETS WILL BE WITHIN 0'-6" OF PROPOSED SUBGRADE ELEVATION, THE PARAPETS SHALL BE REMOVED DOWN TO AN ELEVATION 1" ± ABOVE THE TOP OF THE EXISTING SLAB. ANY EXISTING PARAPET VERTICAL BARS EXPOSED DURING PARAPET REMOVAL SHALL BE CUT OFF FLUSH WITH THE PARAPET REMOVAL LINE AND PAINTED WITH TWO COATS OF ZINC RICH PAINT.  
 ALL REMOVALS SHALL BE CAREFULLY ACCOMPLISHED AND ANY CONCRETE DAMAGED BY THE CONTRACTOR THAT IS NOT TO BE REMOVED SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXTRA COST TO THE STATE. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.  
 THE PROPOSED CULVERT EXTENSION SHALL ABUT AGAINST THE FRONT FACE OF THE EXISTING PARAPET. 5z1 x 2'-6" DOWEL REINFORCING BARS WITH A 10" MINIMUM EMBEDMENT INTO EXISTING CONCRETE SHALL BE SET AROUND THE ENTIRE PERIPHERY OF THE EXISTING CULVERT. 5z1 DOWEL REINFORCING BARS SHALL BE CENTERED IN THE EXISTING SLAB, WALLS AND FLOOR. 5z1 DOWEL REINFORCING BARS SHALL BE AT 1'-0" MAXIMUM SPACING C.-C. OF DOWELS. 5z1 DOWEL REINFORCING BARS SHALL BE SET WITH POLYMER GROUT IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS, AND CURRENT SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D.O.T. HIGHWAY DIVISION.

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.  
 SINCE THE HIGHWAY WILL NOT BE CLOSED TO TRAFFIC DURING THIS CONSTRUCTION, THE CONTRACTOR MAY FEEL TEMPORARY SHORING (SHEET PILE OR OTHER) IS NECESSARY TO ENSURE THAT THE SHOULDER WILL NOT SLOUGH IN WHILE CULVERT IS BEING EXTENDED. HOWEVER, IF FOR ANY REASON SUCH SHORING IS DEEMED NECESSARY, THE CULVERT CONTRACTOR SHALL SUBMIT THE SHORING PLAN TO THE ENGINEER FOR APPROVAL. COST OF SHORING, IF REQUIRED, WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO DIRECT PAYMENT WILL BE MADE. THEREFORE, ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07, OF THE STANDARD SPECIFICATIONS, STILL APPLIES.  
 KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.  
 THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (50# IS 1/2" 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.  
 ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 3'-0" OF NEW WORK WITH A TRANSITION SLOPE OF 1:6 OR SHALLOWER.  
 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.  
 ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2x4 KEYWAYS, UNLESS NOTED OTHERWISE.  
 ALL EXPOSED CORNERS 90 DEGREES OR SHARPER TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.  
 ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED.  
 IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.  
 CONSTRUCTION SHALL BE DONE IN STAGES WITH AT LEAST ONE LANE TRAFFIC MAINTAINED AT ALL TIMES IN ACCORDANCE WITH "TRAFFIC CONTROL PLAN" NOTE.  
 CONSTRUCTION STAGES I & II AS DETAILED ON THESE PLANS MAY BE REVERSED AT THE CONTRACTOR'S OPTION SUBJECT TO THE ENGINEER'S APPROVAL.  
 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" ON DESIGN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.  
 EXCEPT FOR DOWEL BARS 5r1, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.

**TRAFFIC CONTROL PLAN**  
 NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

NOTE:  
 POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0°

**5'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 CULVERT GENERAL NOTES**

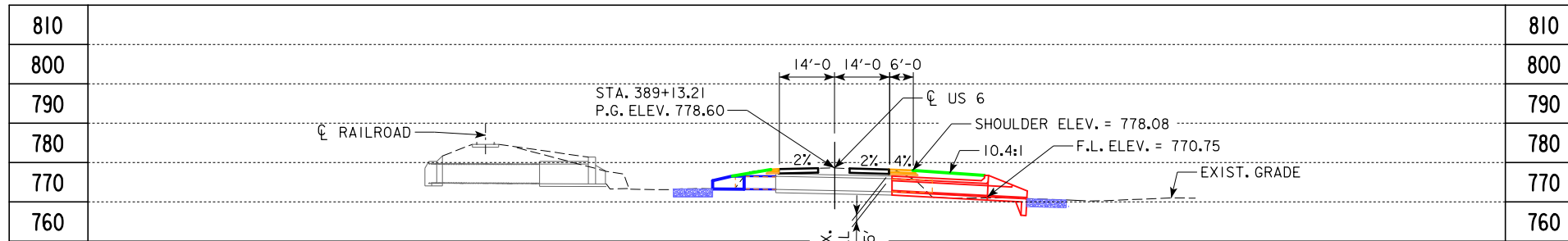
STATION 389+13.21 (US 6) DECEMBER, 2017

**IOWA COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 6 FILE NO. 31463 DESIGN NO. 117





BENCH MARK NO. 2: STA. 389+13.48, 54.55 LT., (CL US-6),  
SOUTHEAST TOP CORNER OF RR BRIDGE HEADWALL, ELEV. 781.17

0.0%  
VPI STA = 385+00.00 VPI ELEV = 778.60  
VPI STA = 394+00.00 VPI ELEV = 778.60

**PROFILE GRADE  
ON US 6 (UAC)**

**LONGITUDINAL SECTION ALONG CL CULVERT**  
DESIGN FILL HEIGHT = 3'-0"  
ANTICIPATED SETTLEMENT = NEGLIGIBLE

**NOTES:**

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 5' x 3' REINFORCED CONCRETE BOX CULVERT, BY REMOVING THE NORTH AND SOUTH CMP ENDS AND EXISTING SOUTH HEADWALL AS REQUIRED AND ADDING A 5' x 3' x 23' REINFORCED CONCRETE BOX CULVERT EXTENSION WITH HEADWALL ON THE SOUTH END AND ADDING A 65" x 40" RCAP & APRON ON THE NORTH END.

THE RCB CULVERT EXTENSION IS DESIGNED FOR EARTH FILLS OF 3 FEET.

ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.

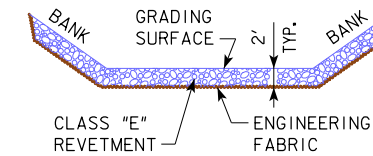
SEE ROAD SHEETS FOR ADDITIONAL INFORMATION ON PROPOSED GRADING LIMITS.

DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.

SEE H SHEETS FOR RIGHT OF WAY.

HEADWALLS SHALL BE PLACED LEVEL.

NORTH END DOES NOT SATISFY CLEAR ZONE.



| ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS |                         |                         |
|---|-------------------------|-------------------------|
| LOCATION  | REVETMENT CL. "E" (TON) | ENGINEERING FABRIC (SY) |
| INLET   | 17.1                    | 26.9                    |
| OUTLET  | 21.9                    | 39.4                    |
| TOTALS  | 39.0                    | 66.3                    |

**HYDRAULIC DATA**

DRAINAGE AREA = 48.2 ACRES  
Q<sub>50</sub> = 247 CFS  
ROLLING

**UTILITIES LEGEND:**

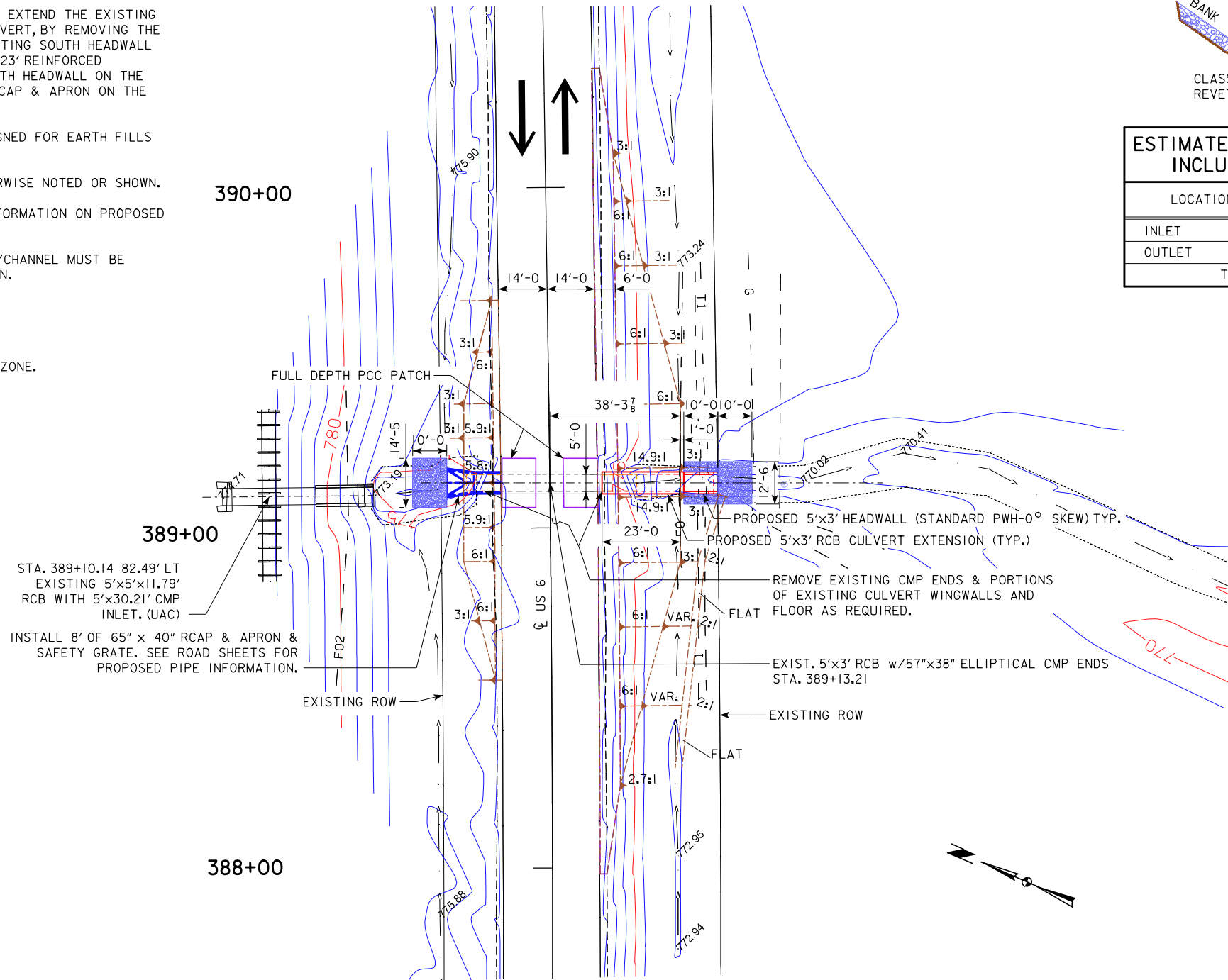
- T1 - COOPERATIVE TELEPHONE COMPANY
- F0 - IOWA NETWORK SERVICES
- G - ALLIANT ENERGY
- F02 - MCI
- F03 - MEDIACOM
- T2 - WINDSTREAM COMMUNICATIONS
- F04 - SOUTH SLOPE COOPERATIVE

**LOCATION**

ON US 6 OVER  
DRAINAGE DITCH  
T-80N R-IIW  
SECTION 7  
SUMNER TOWNSHIP  
IOWA COUNTY  
LATITUDE 41.757539  
LONGITUDE -92.174761  
FRA 607745U

**TRAFFIC ESTIMATE**

2014 AADT 1500 V.P.D.  
2034 AADT 1800 V.P.D.  
TRUCKS 11%  
DESIGN ESALs 600,000

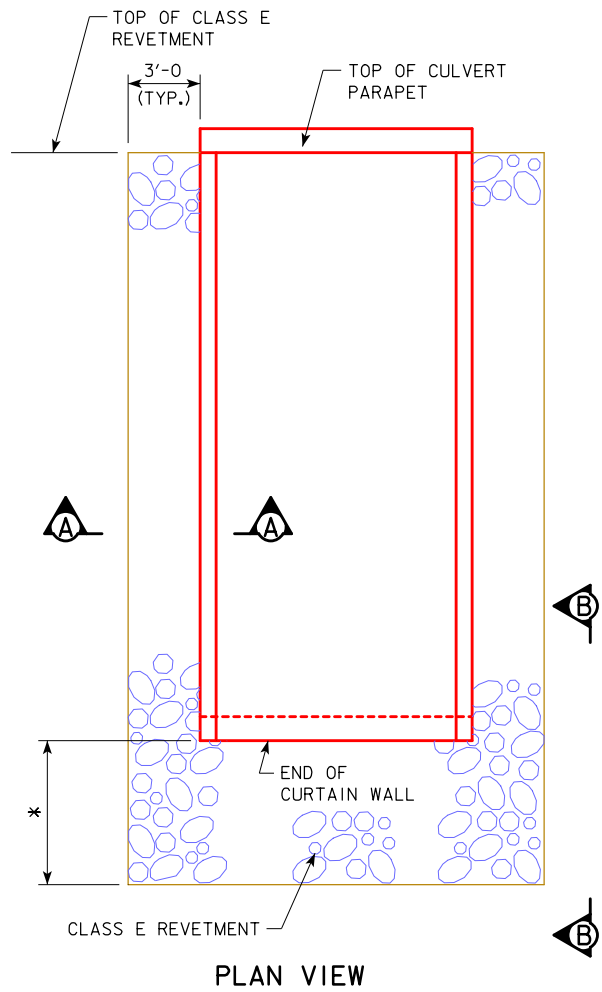


**SITUATION PLAN**

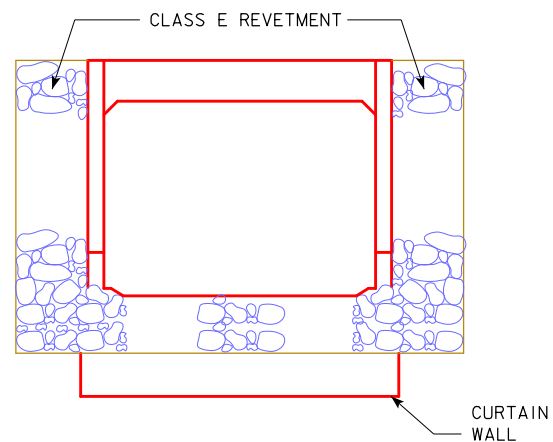
DESIGN FOR 0°  
**5'x3' REINFORCED CONCRETE  
BOX CULVERT EXTENSION  
SITUATION PLAN**  
STATION 389+13.21 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 3 OF 6 FILE NO. 31463 DESIGN NO. 117



\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.

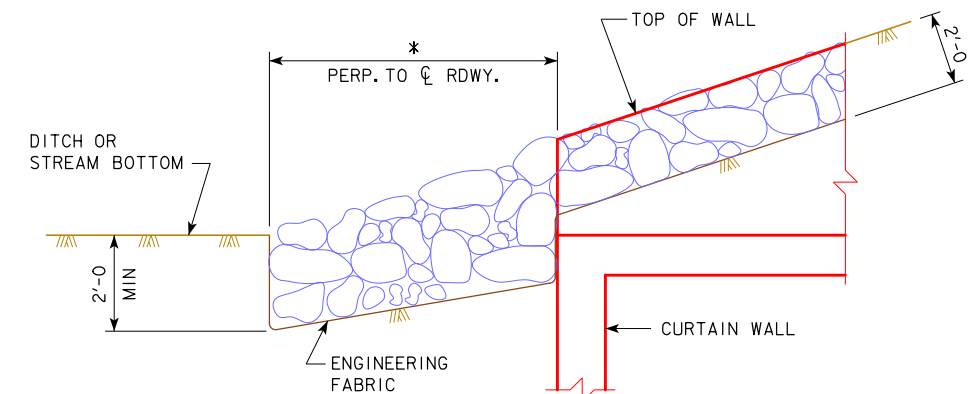


PLAN VIEW

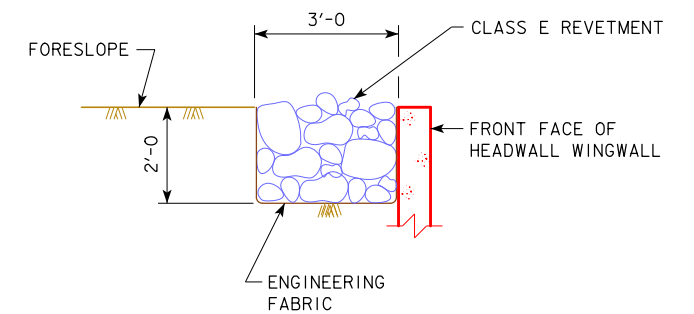


ELEVATION VIEW  
0° SKEW HEADWALLS

\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



VIEW B-B



SECTION A-A

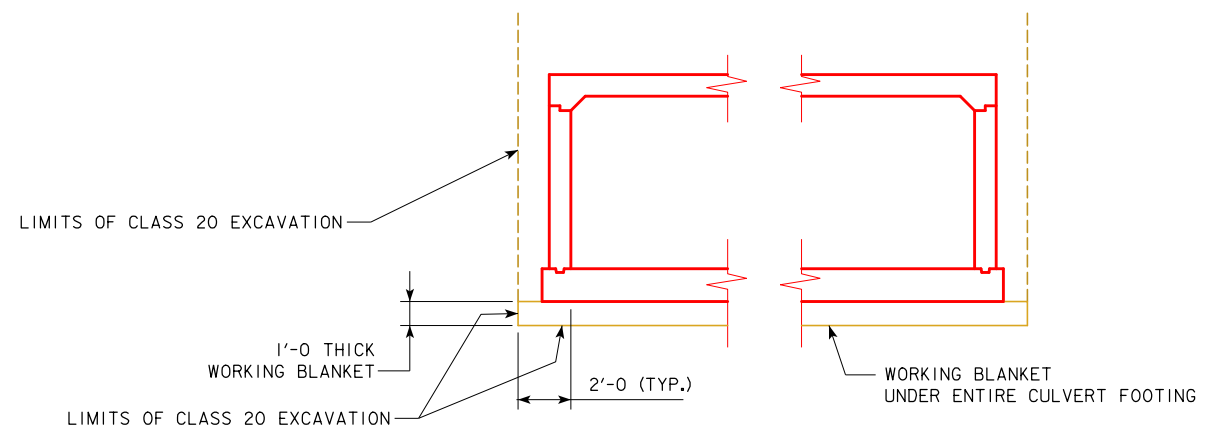
TYPICAL DETAILS

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.

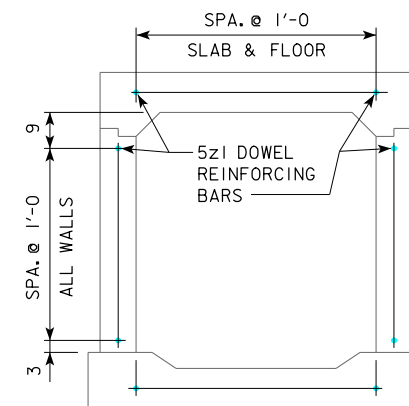
DESIGN FOR 0°  
**5'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**REVETMENT PROTECTION DETAILS**  
 STATION 389+13.21 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 6    FILE NO. 31463    DESIGN NO. 117

REVISED 1-16 - ADDED NOTE "SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC."  
 REVISED 02-2017 - ADDED SECTION DIRECTORS "A-A" TO "ZERO SKEW" PLAN VIEW DETAIL.  
 ENGLISHING\INGLCULVERTS.DGN - 1092 - THIS SHEET ISSUED 04-12.



### WORKING BLANKET/EXCAVATION DETAILS

WORKING MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE CURTAIN WALL



### SECTION NEAR EXTENSION

( SHOWING SPACING OF 5z1 DOWEL REINFORCING BARS )

| REINFORCING STEEL EXTENSION DOWELS |                        |       |         |           |        |        |
|------------------------------------|------------------------|-------|---------|-----------|--------|--------|
| BAR                                | LOCATION               | SHAPE | NO./JT. | TOTAL NO. | LENGTH | WEIGHT |
| 5z1                                | TOP SLAB. CONST. JOINT |       | 18      | 18        | 2'-6   | 47     |

DESIGN FOR 0°

**5'x3' REINFORCED CONCRETE  
BOX CULVERT EXTENSION**

**MISCELLANEOUS WALL DETAILS**

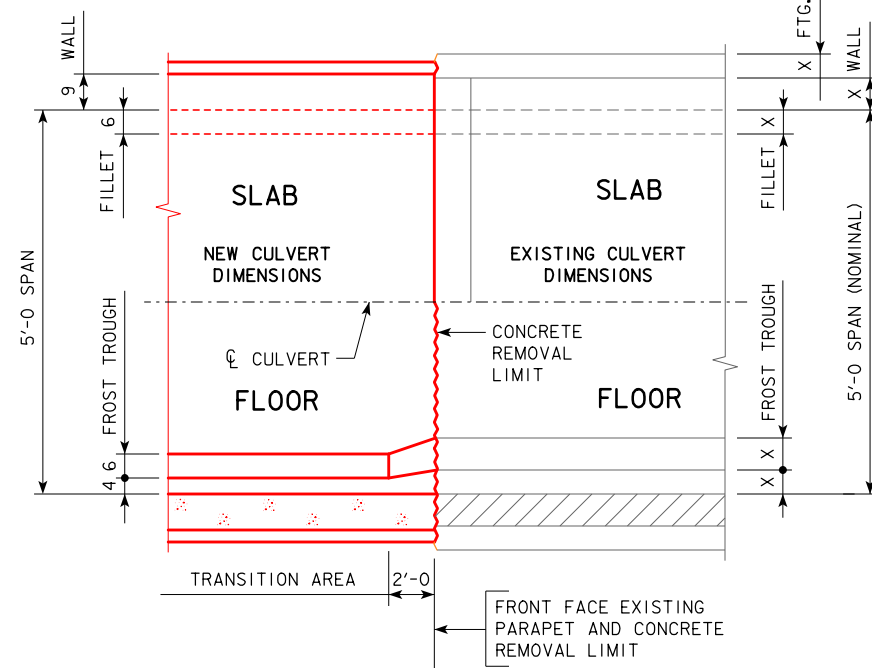
STATION 389+13.21 (US 6)      DECEMBER, 2017

**IOWA COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 6    FILE NO. 31463    DESIGN NO. 117

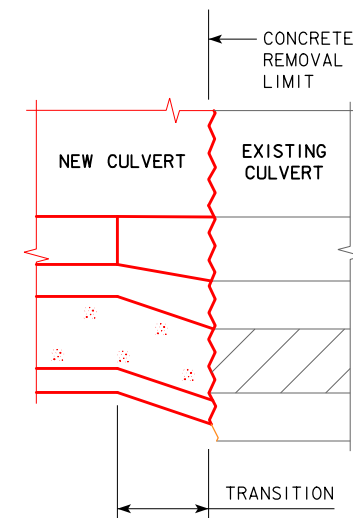
REVISED: CHANGED BRIDGE DESIGN MANUAL, SECTION 8 TO SECTION 7. (3-1-15)  
ENGLISHINGCULVERTS.DGN - 1047 - THIS SHEET ISSUED 03-12.



**CONCRETE TRANSITION DETAILS**

(PLAN VIEW)

'X' - EXISTING DIMENSION



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

**CONCRETE TRANSITION DETAILS**

(WALL TRANSITION SHOWN - TYPICAL FOR SLAB)

|  |   |
|--|---|
| DESIGN FOR 0°  |   |
| <b>5'x3' REINFORCED CONCRETE<br/>BOX CULVERT EXTENSION</b> |   |
| <b>MISCELLANEOUS CULVERT DETAILS</b>                       |   |
| STATION 389+13.21 (US 6)                                   | DECEMBER, 2017                              |
| <b>IOWA COUNTY</b>   |   |
| IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION       |   |
| DESIGN SHEET NO. <u>6</u> OF <u>6</u>                      | FILE NO. <u>31463</u> DESIGN NO. <u>117</u> |

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

## ESTIMATED CULVERT QUANTITIES

| ITEM NO. | ITEM CODE    | ITEM                              | UNIT | TOTAL | AS BUILT QUANTITY |
|----------|--------------|-----------------------------------|------|-------|-------------------|
| 1        | 2102-0425071 | SPECIAL BACKFILL                  | CY   | 23.0  |                   |
| 2        | 2401-6750001 | REMOVALS, AS PER PLAN             | LS   | 1     |                   |
| 3        | 2402-2720000 | EXCAVATION, CLASS 20              | CY   | 153   |                   |
| 4        | 2403-0100020 | STRUCTURAL CONCRETE (RCB CULVERT) | CY   | 51.3  |                   |
| 5        | 2404-7775000 | REINFORCING STEEL                 | LB   | 7569  |                   |
| 6        | 2418-0000010 | TEMPORARY STREAM DIVERSION        | EACH | 1     |                   |
| 7        | 2533-4980005 | MOBILIZATION                      | LS   | 1     |                   |

ITEM NO.                      ESTIMATE REFERENCE INFORMATION

- 1      INCLUDES COST OF 1'-0" THICK WORKING BLANKET (SPECIAL BACKFILL). THE WORKING BLANKET MAY BE DELETED IF DETERMINED TO BE UNNECESSARY AT THE TIME OF CONSTRUCTION. RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR THE SPECIAL BACKFILL.
- 2      INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL AS DETAILED ON THE SITUATION PLAN. REMOVAL OF SCHEDULED ITEMS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO MATERIAL NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE. INCLUDES ALL WORK FOR REMOVING THE EXISTING SAFETY GRATE ON THE NORTH END.
- 3      INCLUDES EXCAVATION NECESSARY TO PLACE THE 1'-0" THICK WORKING BLANKET. QUANTITY SHOULD BE REDUCED BY 23 CY IN THE EVENT THAT THE WORKING BLANKET IS DELETED. INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.

### SPECIFICATIONS:

DESIGN: AASHTO LRFD 5th Ed, SERIES OF 2010.

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.

SPECIAL PROVISION FOR WORK ON RAILROAD RIGHT-OF-WAY (IOWA INTERSTATE RAILROAD).

### 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:

| DESIGN 217 |        |         |
|------------|--------|---------|
| STANDARD   | ISSUED | REVISED |
| ---        | ---    | ---     |

### DESIGN 217

#### SUMMARY OF REINFORCING STEEL

| LOCATION                | QUANTITY | TOTAL |
|-------------------------|----------|-------|
| HEADWALL 0° SKEW        | 2607     | 2607  |
| 22'-0" BENT END SECTION | 4850     | 4850  |
| 5z1 BARS                | 112      | 112   |
| TOTAL (LBS.)            |          | 7569  |

#### CONCRETE PLACEMENT QUANTITIES

| LOCATION                | FOOTING | WALLS | SLAB  | TOTAL |
|-------------------------|---------|-------|-------|-------|
| HEADWALL 0° SKEW        | 13      | 4.5   | 1.7 * | 19.2  |
| 22'-0" BENT END SECTION | 11.3    | 8.4   | 12.4  | 32.1  |
| TOTAL (C.Y.)            |         |       |       | 51.3  |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

### DESIGN HISTORY AT THIS SITE (INCLUDES THIS DESIGN)

| DES. NO. | TYPE OF WORK   |
|----------|--|
| 2030     | TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT           |
| 217      | TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION |

NOTE:  
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

### DESIGN FOR 9° SKEW (R.A.) TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION ESTIMATED QUANTITIES

STATION 414+08.85 (US 6)                      DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO.   1   OF  12  FILE NO.  31463  DESIGN NO.  217 





REVISED 11-2016 - ADDED THE WORD "THEREFORE" TO THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES.  
 REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRITTEN IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT.  
 ENGLISH SINGLE CULVERTS.DGN - 1043s2 - THIS SHEET ISSUED 10-08.

## GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING TWIN 6' x 5' RCB CULVERT ON THE SOUTH END.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 0 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

VERTICAL EARTH PRESSURE,  $E_v = 0.120$  kcf.

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

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

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

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

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

|                       |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|
| BAR SIZE NUMBER       | 4   | 5   | 6   | 7   | 8   |
| 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 2 1/4" TO NEAR TRANSV. REINF. BAR  
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR  
 END CLEARANCES:  
 VERTICAL TOP 2"  
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH  
 TRANSVERSE 2"

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN. CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

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

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

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

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

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

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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

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

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (50# IS 1/2" 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.

ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 3'-0" OF NEW WORK WITH A TRANSITION SLOPE OF 1:6 OR SHALLOWER.

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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2x4 KEYWAYS, UNLESS NOTED OTHERWISE.

ALL EXPOSED CORNERS 90 DEGREES OR SHARPER TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

CONSTRUCTION SHALL BE DONE IN STAGES WITH AT LEAST ONE LANE TRAFFIC MAINTAINED AT ALL TIMES IN ACCORDANCE WITH "TRAFFIC CONTROL PLAN" NOTE.

CONSTRUCTION STAGES I & II AS DETAILED ON THESE PLANS MAY BE REVERSED AT THE CONTRACTOR'S OPTION SUBJECT TO THE ENGINEER'S APPROVAL.

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" ON DESIGN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

EXCEPT FOR DOWEL BARS 5r1, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.

### TRAFFIC CONTROL PLAN

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

### NOTE:

POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 9° SKEW (R.A.)

## TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION CULVERT GENERAL NOTES

STATION 414+08.85 (US 6)

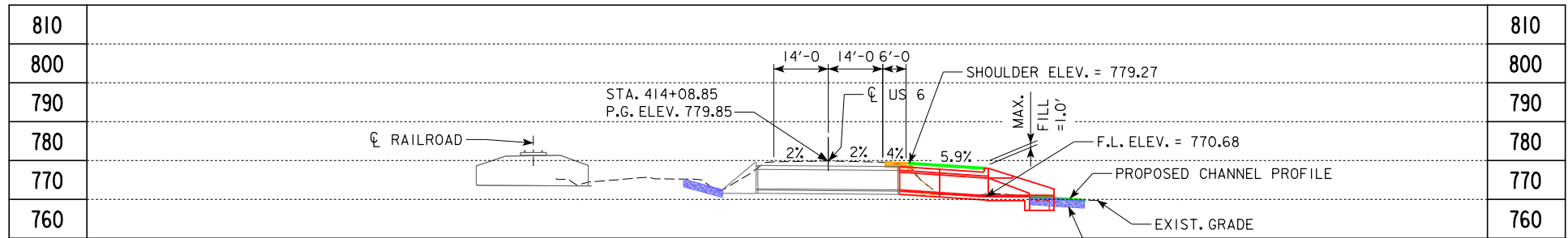
DECEMBER, 2017

### IOWA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 12 FILE NO. 31463 DESIGN NO. 217

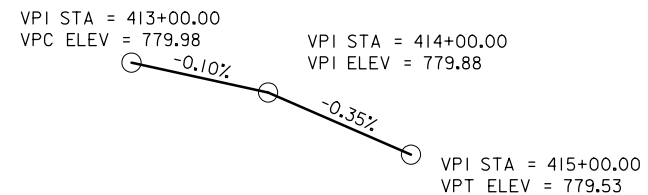




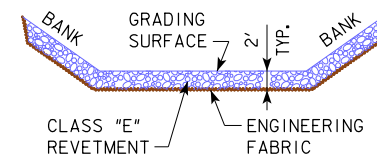
**LONGITUDINAL SECTION ALONG CL CULVERT**

DESIGN FILL HEIGHT = 0'  
ANTICIPATED SETTLEMENT = NEGLIGIBLE

BENCH MARK NO. 4: STA. 414+18.88, NORTHEAST TOP CORNER HEADWALL 17.75' RT. ELEV. 779.14



**PROFILE GRADE ON US 6 (UAC)**

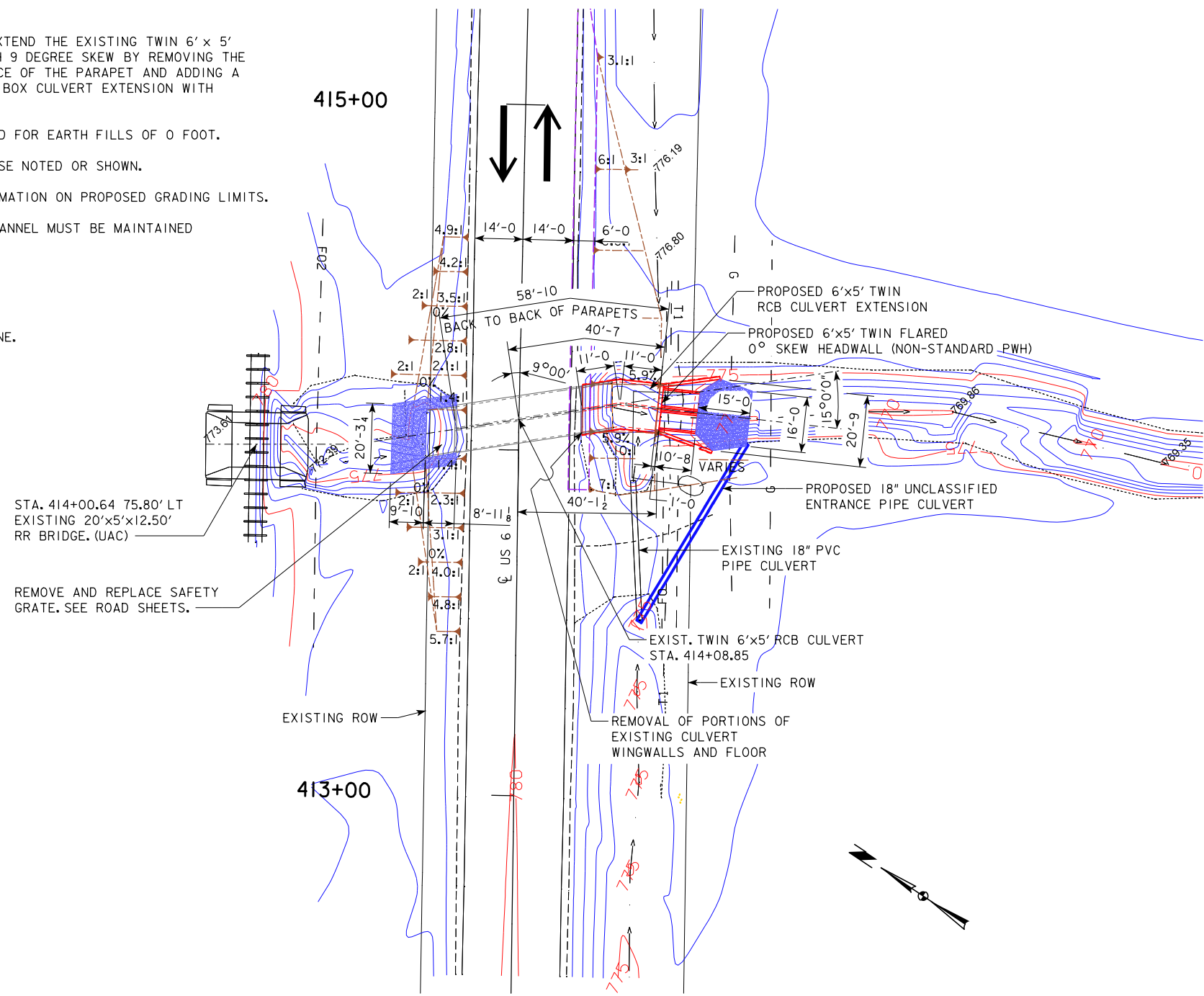


**ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS**

| LOCATION | REVETMENT CL. "E" (TON) | ENGINEERING FABRIC (SY) |
|----------|-------------------------|-------------------------|
| INLET    | 30.2                    | 49.8                    |
| OUTLET   | 31.4                    | 43.2                    |
| TOTALS   | 61.6                    | 93.0                    |

**NOTES:**

- IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING TWIN 6' x 5' REINFORCED CONCRETE BOX CULVERT WITH 9 DEGREE SKEW BY REMOVING THE HEADWALL ON THE SOUTH END TO THE FACE OF THE PARAPET AND ADDING A TWIN 6' x 5' x 22' REINFORCED CONCRETE BOX CULVERT EXTENSION WITH HEADWALL ON THE SOUTH END.
- THE RCB CULVERT EXTENSION IS DESIGNED FOR EARTH FILLS OF 0 FOOT.
- ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.
- SEE ROAD SHEETS FOR ADDITIONAL INFORMATION ON PROPOSED GRADING LIMITS.
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- SEE H SHEETS FOR RIGHT OF WAY.
- HEADWALLS SHALL BE PLACED LEVEL.
- NORTH END DOES NOT SATISFY CLEAR ZONE.



**SITUATION PLAN**

**HYDRAULIC DATA**

DRAINAGE AREA = 563.2 ACRES  
Q<sub>50</sub> = 976 CFS  
ROLLING

**UTILITIES LEGEND:**

- T1 - COOPERATIVE TELEPHONE COMPANY
- F0 - IOWA NETWORK SERVICES
- G - ALLIANT ENERGY
- F02 - MCI
- F03 - MEDIACOM
- T2 - WINDSTREAM COMMUNICATIONS
- F04 - SOUTH SLOPE COOPERATIVE

**LOCATION**

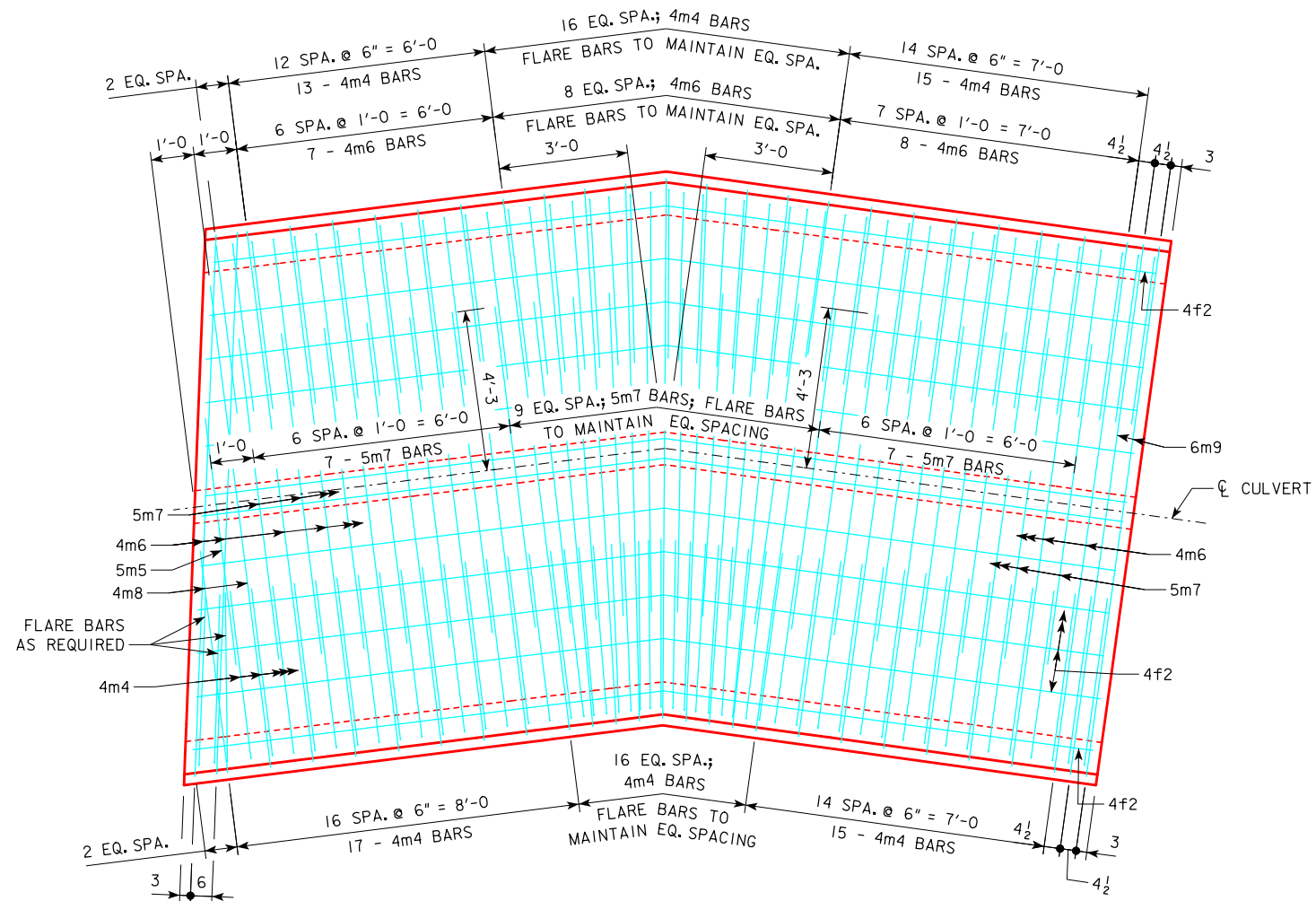
ON US 6 OVER  
DRAINAGE DITCH  
T-80N R-IIW  
SECTION 7  
SUMNER TOWNSHIP  
IOWA COUNTY  
LATITUDE 41.760364  
LONGITUDE -92.166483  
FRA 607745U

**TRAFFIC ESTIMATE**

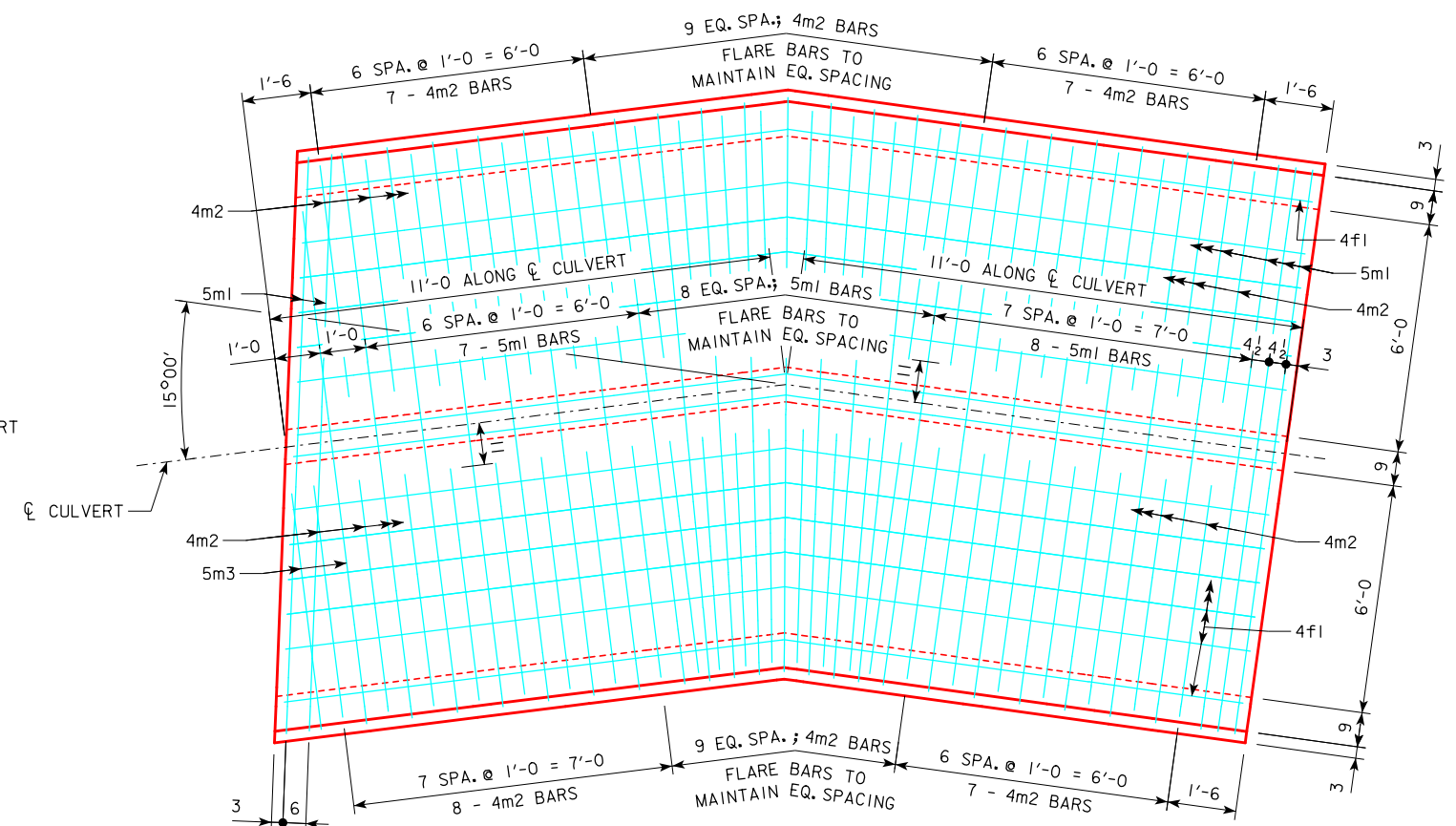
|              |         |        |
|--------------|---------|--------|
| 2014 AADT    | 1500    | V.P.D. |
| 2034 AADT    | 1800    | V.P.D. |
| TRUCKS       | 11%     |        |
| DESIGN ESALS | 600,000 |        |

DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**SITUATION PLAN**  
STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 3 OF 12 FILE NO. 31463 DESIGN NO. 217

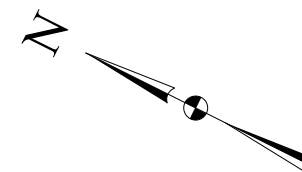




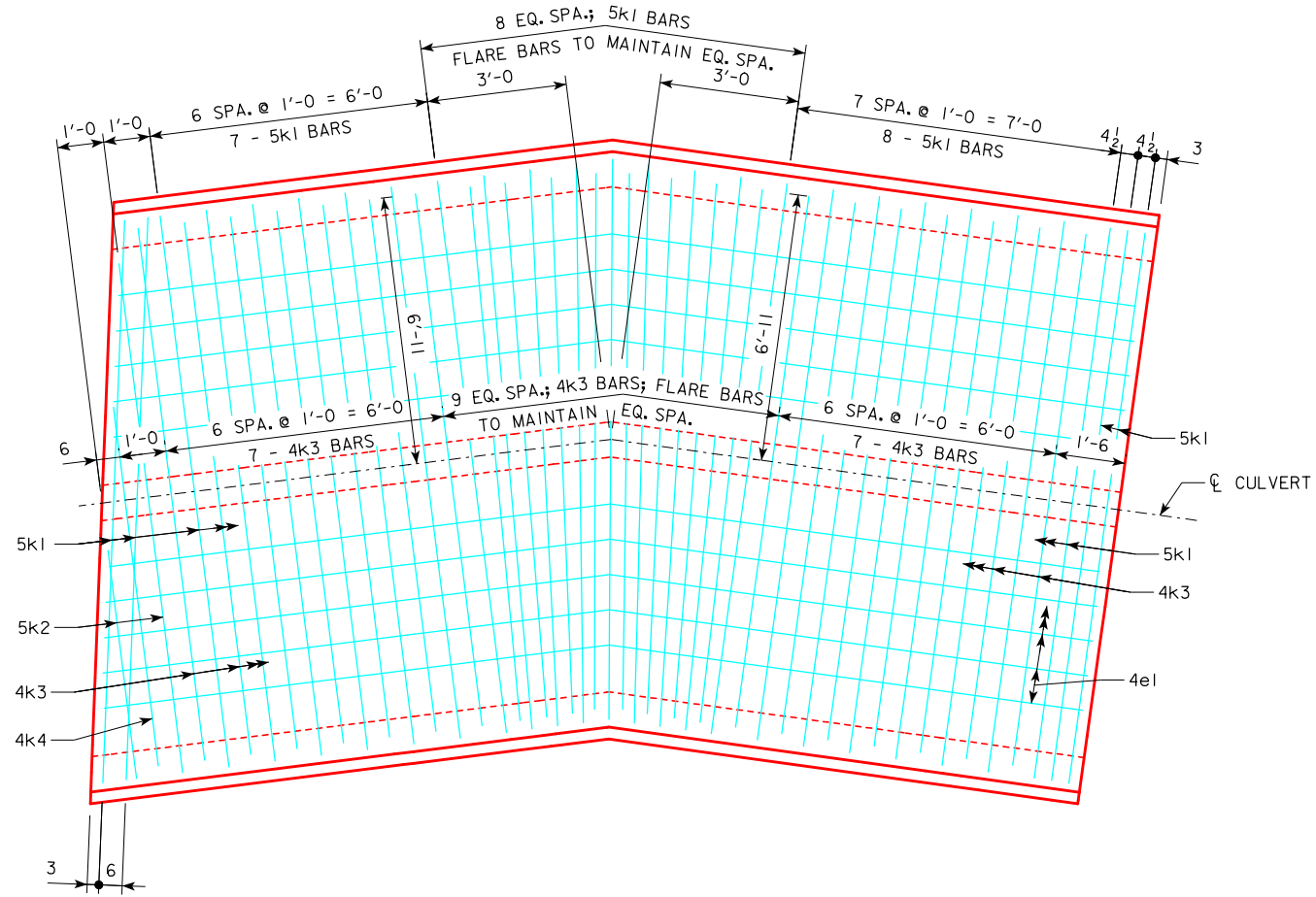
PLAN VIEW - BOTTOM FLOOR



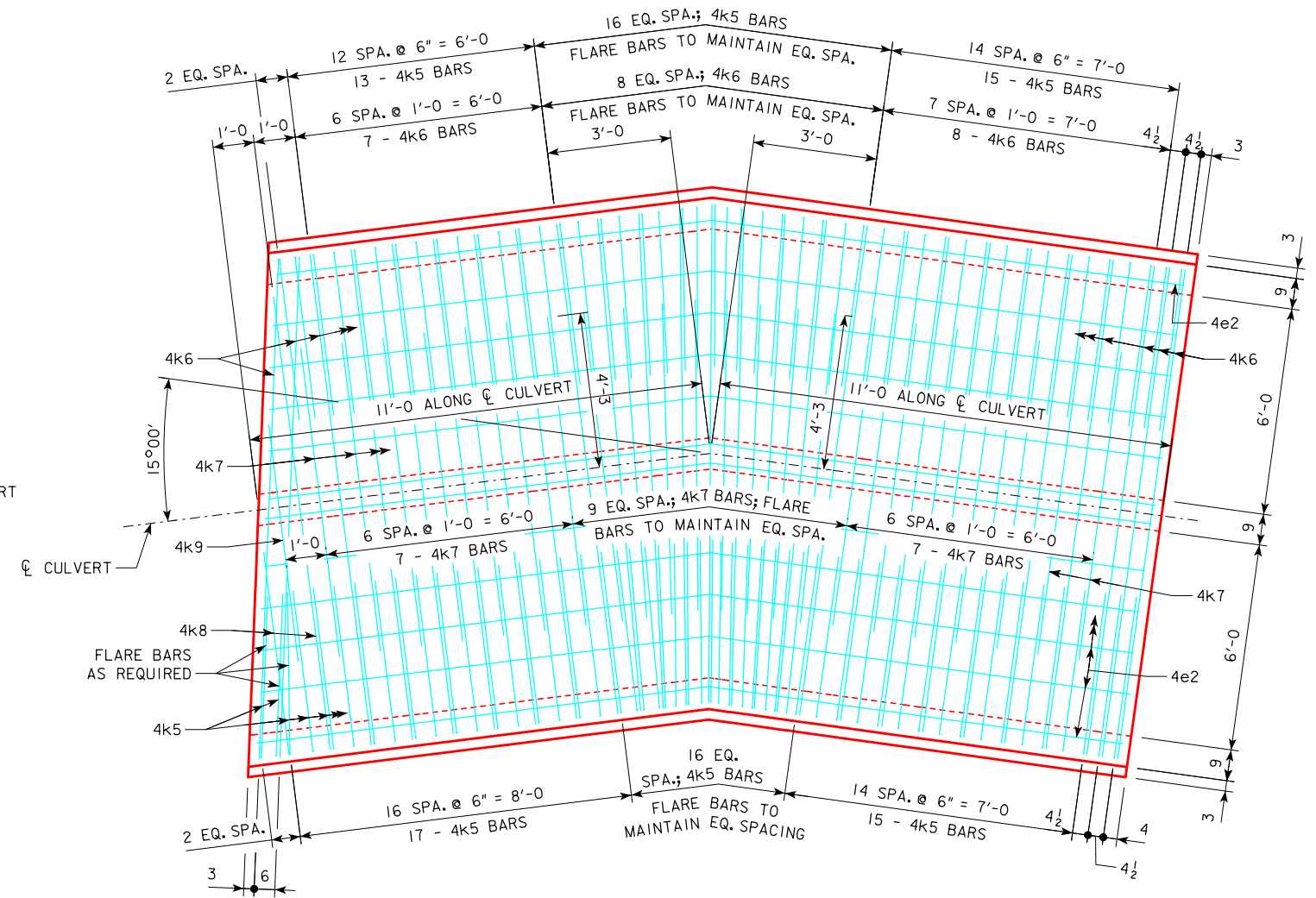
PLAN VIEW - TOP FLOOR



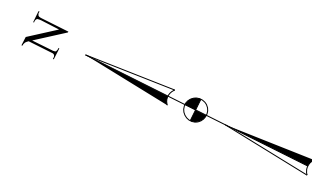
DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**22'-0" BENT BARREL PLAN**  
 STATION 414+08.85 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 12    FILE NO. 31463    DESIGN NO. 217



PLAN VIEW - BOTTOM SLAB

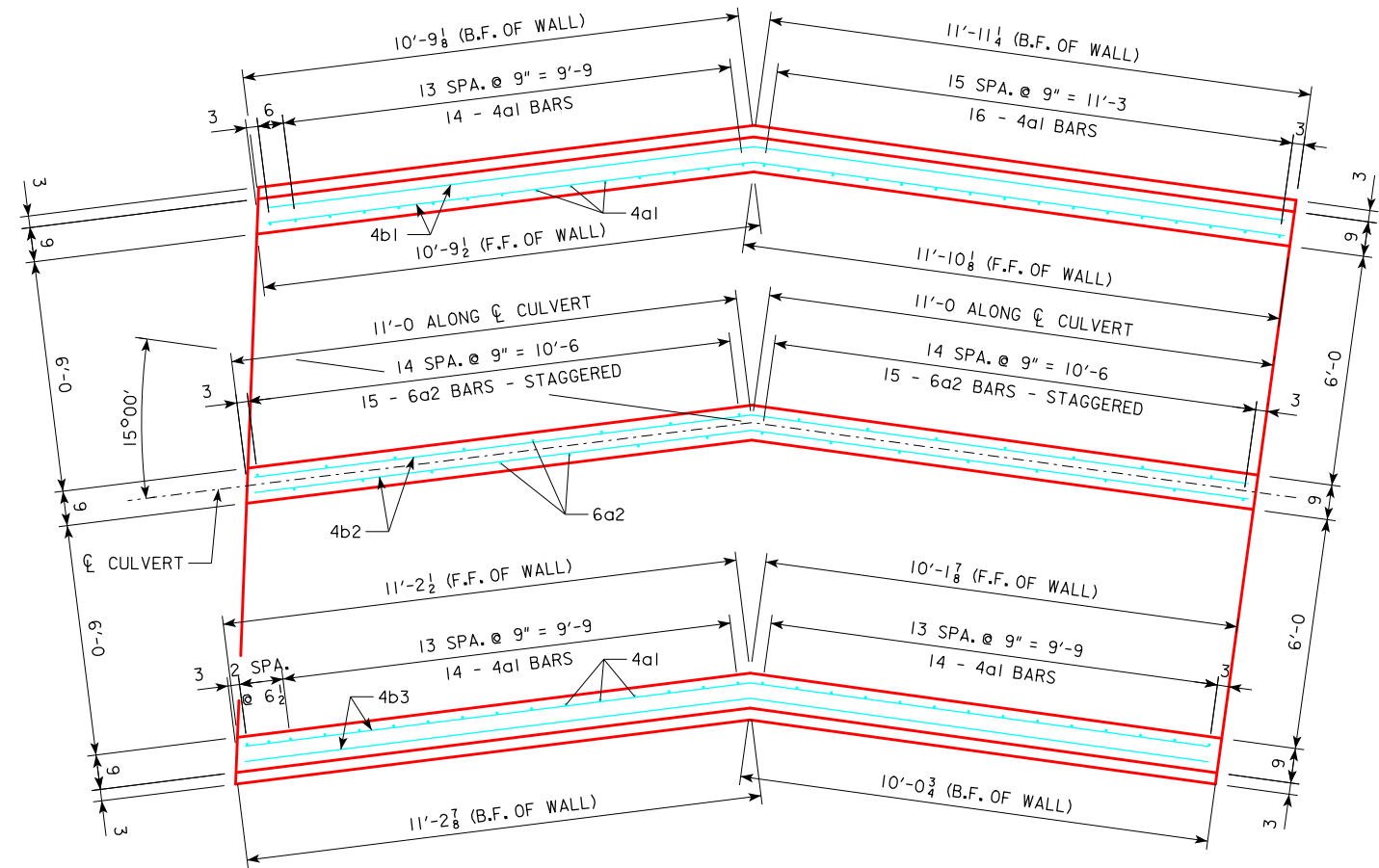


PLAN VIEW - TOP SLAB



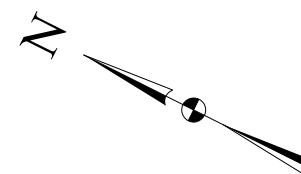
DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**22'-0" BENT BARREL PLAN**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 5 OF 12 FILE NO. 31463 DESIGN NO. 217





PLAN VIEW - WALL REINFORCING

(BAR SPACINGS ARE ALONG CL OF WALL)  
(4m AND 4k BARS NOT SHOWN)



DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**22'-0" BENT BARREL PLAN**  
 STATION 414+08.85 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 6 OF 12    FILE NO. 31463    DESIGN NO. 217



| 4e1 BAR DIMENSIONS |            |           |          |
|--------------------|------------|-----------|----------|
| DIM. 'a'           | DIM. 'b'   | DIM. 'c'  | DIM. 'd' |
| 10'-7              | 11'-1 1/4  | 2'-11 3/4 | 11'-6    |
| 10'-8              | 10'-11 3/8 | 2'-11 1/4 | 11'-4    |
| 10'-8              | 10'-10 3/8 | 2'-11     | 11'-3    |
| 10'-9              | 10'-8 1/2  | 2'-10 3/8 | 11'-1    |
| 10'-9              | 10'-7 1/2  | 2'-10 3/8 | 11'-0    |
| 10'-10             | 10'-2 5/8  | 2'-8 7/8  | 10'-7    |
| 10'-10             | 10'-1 3/4  | 2'-8 5/8  | 10'-6    |
| 10'-11             | 9'-11 3/4  | 2'-8 1/8  | 10'-4    |
| 10'-11             | 9'-10 3/4  | 2'-7 7/8  | 10'-3    |
| 11'-0              | 9'-8 7/8   | 2'-7 3/8  | 10'-1    |

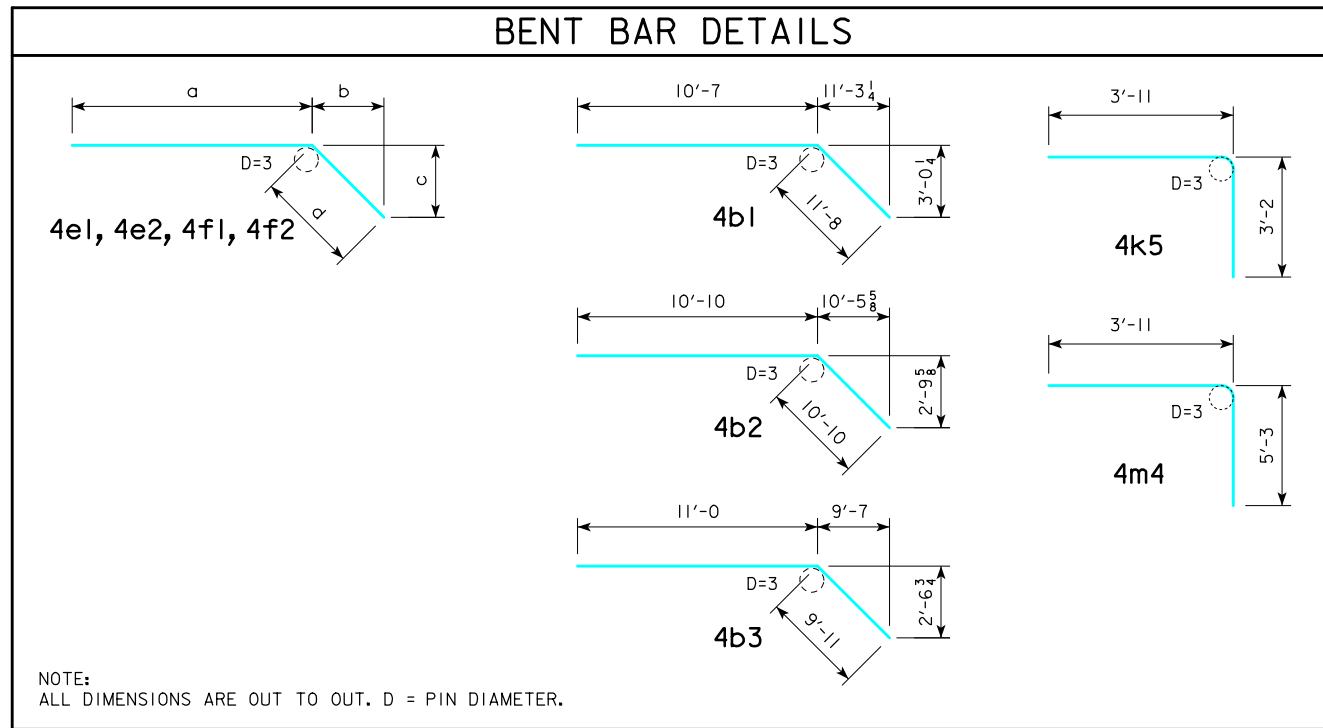
BARS ARE LISTED FROM NORTH TO SOUTH

| 4e2 & 4f2 BAR DIMENSIONS |            |           |          |
|--------------------------|------------|-----------|----------|
| DIM. 'a'                 | DIM. 'b'   | DIM. 'c'  | DIM. 'd' |
| 10'-7                    | 11'-3 1/4  | 3'-0 1/4  | 11'-8    |
| 10'-7                    | 11'-1 1/4  | 2'-11 3/4 | 11'-6    |
| 10'-8                    | 10'-11 3/8 | 2'-11 1/4 | 11'-4    |
| 10'-8                    | 10'-9 3/8  | 2'-10 5/8 | 11'-2    |
| 10'-9                    | 10'-7 1/2  | 2'-10 1/8 | 11'-0    |
| 10'-9                    | 10'-5 5/8  | 2'-9 5/8  | 10'-10   |
| 10'-10                   | 10'-4 5/8  | 2'-9 3/8  | 10'-9    |
| 10'-10                   | 10'-2 5/8  | 2'-8 7/8  | 10'-7    |
| 10'-11                   | 10'-0 3/4  | 2'-8 3/8  | 10'-5    |
| 10'-11                   | 9'-10 3/4  | 2'-7 7/8  | 10'-3    |
| 11'-0                    | 9'-8 7/8   | 2'-7 3/8  | 10'-1    |
| 11'-0                    | 9'-7       | 2'-6 3/4  | 9'-11    |

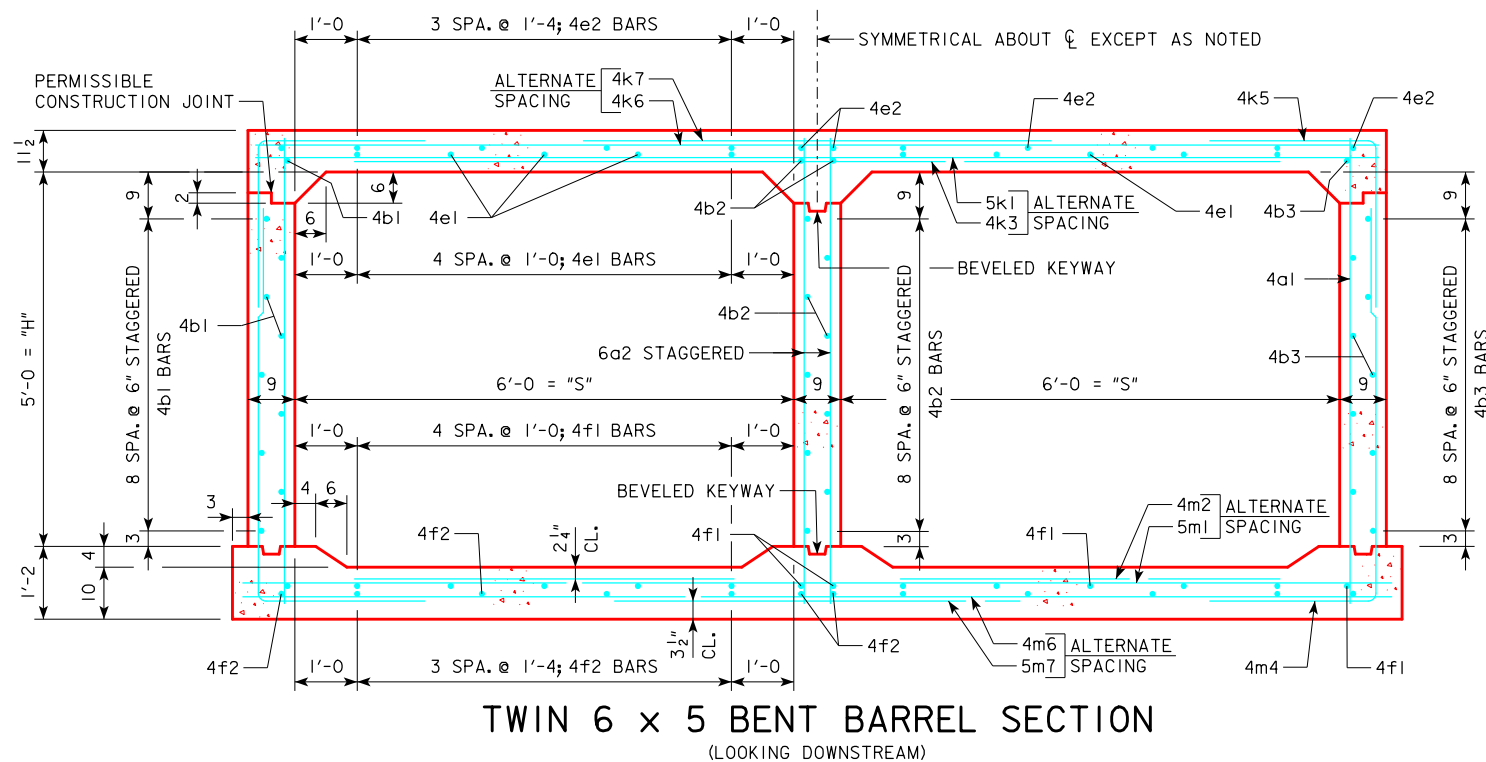
BARS ARE LISTED FROM NORTH TO SOUTH

| 4f1 BAR DIMENSIONS |            |           |          |
|--------------------|------------|-----------|----------|
| DIM. 'a'           | DIM. 'b'   | DIM. 'c'  | DIM. 'd' |
| 10'-7              | 11'-3 1/4  | 3'-0 1/4  | 11'-8    |
| 10'-7              | 11'-1 1/4  | 2'-11 3/4 | 11'-6    |
| 10'-8              | 10'-11 3/8 | 2'-11 1/4 | 11'-4    |
| 10'-8              | 10'-10 3/8 | 2'-11     | 11'-3    |
| 10'-9              | 10'-8 1/2  | 2'-10 3/8 | 11'-1    |
| 10'-9              | 10'-7 1/2  | 2'-10 1/8 | 11'-0    |
| 10'-9              | 10'-5 5/8  | 2'-9 5/8  | 10'-10   |
| 10'-10             | 10'-4 5/8  | 2'-9 3/8  | 10'-9    |
| 10'-10             | 10'-2 5/8  | 2'-8 7/8  | 10'-7    |
| 10'-11             | 9'-11 3/4  | 2'-8 1/8  | 10'-4    |
| 10'-11             | 9'-10 3/4  | 2'-7 7/8  | 10'-3    |
| 11'-0              | 9'-8 7/8   | 2'-7 3/8  | 10'-1    |
| 11'-0              | 9'-7       | 2'-6 3/4  | 9'-11    |

BARS ARE LISTED FROM NORTH TO SOUTH



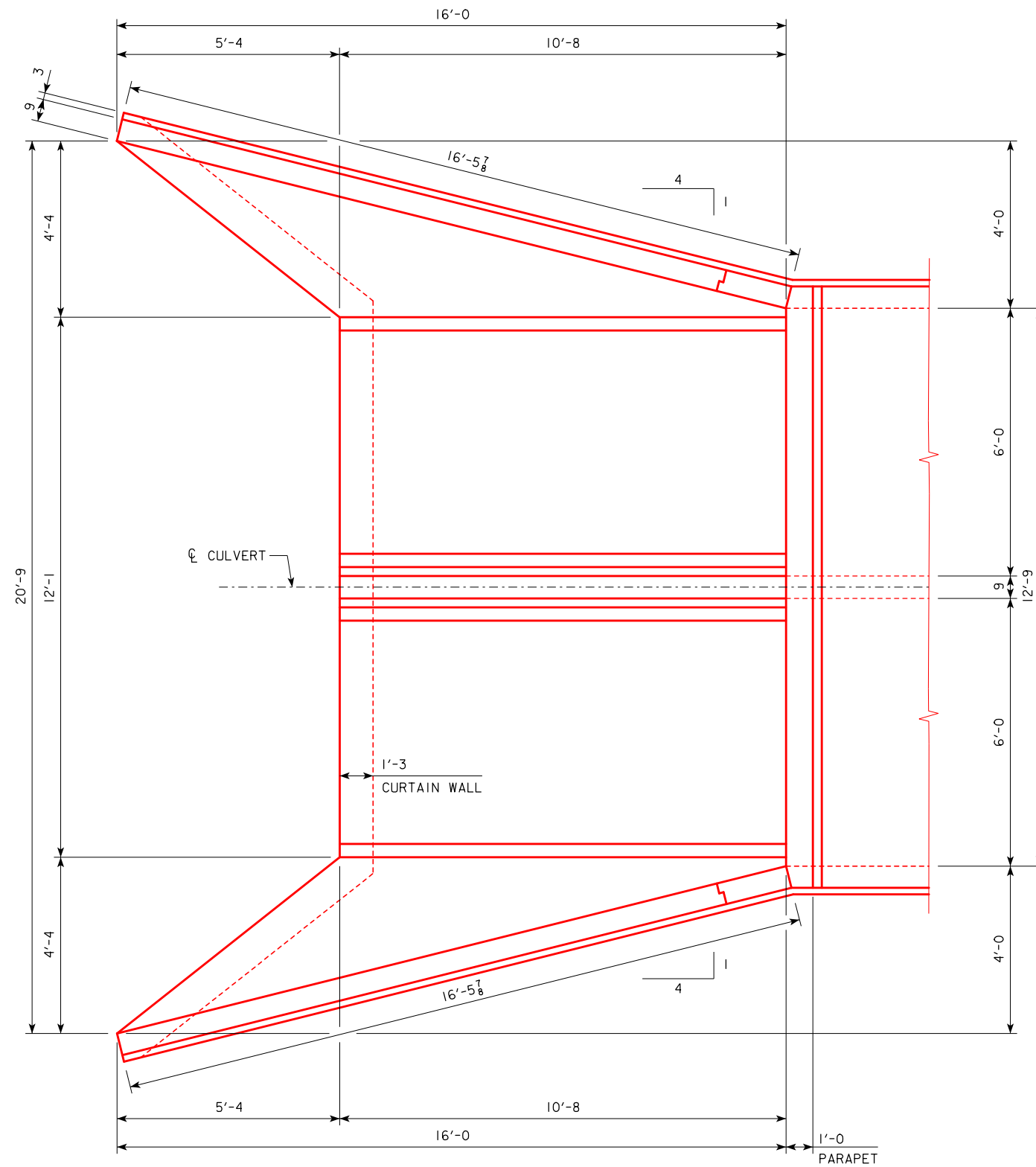
| REINFORCING BAR LIST-ONE 22'-0 BENT BARREL |                            |       |     |                       |        |
|--|----------------------------|-------|-----|-----------------------|--------|
| BAR  | LOCATION                   | SHAPE | NO. | LENGTH                | WEIGHT |
| 4a1  | EXTERIOR WALLS, F.F.V.     |       | 61  | 6'-8                  | 272    |
| 6a2  | INTERIOR WALLS, BOTH, F.V. |       | 30  | 6'-8                  | 300    |
| 4b1  | EXTERIOR WALL, HORIZONTAL  |       | 10  | 22'-3                 | 149    |
| 4b2  | INTERIOR WALL, HORIZONTAL  |       | 11  | 21'-8                 | 159    |
| 4b3  | EXTERIOR WALL, HORIZONTAL  |       | 10  | 20'-11                | 140    |
| 4e1  | SLAB, BOTT., LONGIT.       |       | 10  | VARIES                | 144    |
| 4e2  | SLAB, TOP, LONGIT.         |       | 12  | VARIES                | 173    |
| 4f1  | FLOOR, TOP, LONGIT.        |       | 14  | VARIES                | 202    |
| 4f2  | FLOOR, BOTT., LONGIT.      |       | 12  | VARIES                | 173    |
| 5k1  | SLAB, BOTT., TRANS.        |       | 26  | 13'-11                | 377    |
| 5k2  | SLAB, BOTT., TRANS.        |       | 2   | 1 EACH 12'-0 TO 5'-11 | 19     |
| 4k3  | SLAB, BOTT., TRANS.        |       | 22  | 13'-10                | 203    |
| 4k4  | SLAB, BOTT., TRANS.        |       | 1   | 8'-9                  | 6      |
| 4k5  | SLAB, TOP, CORNER          |       | 98  | 7'-1                  | 464    |
| 4k6  | SLAB, TOP, TRANS.          |       | 26  | 13'-11                | 242    |
| 4k7  | SLAB, TOP, TRANS.          |       | 22  | 8'-6                  | 125    |
| 4k8  | SLAB, TOP, TRANS.          |       | 2   | 1 EACH 12'-0 TO 5'-11 | 12     |
| 4k9  | SLAB, TOP, TRANS.          |       | 1   | 8'-9                  | 6      |
| 5m1  | FLOOR, TOP, TRANS.         |       | 26  | 14'-5                 | 391    |
| 4m2  | FLOOR, TOP, TRANS.         |       | 45  | 6'-1                  | 183    |
| 5m3  | FLOOR, TOP, TRANS.         |       | 2   | 1 EACH 12'-3 TO 6'-2  | 19     |
| 4m4  | FLOOR, BOTT., CORNER       |       | 98  | 9'-2                  | 600    |
| 5m5  | FLOOR, BOTT., TRANS.       |       | 1   | 9'-2                  | 10     |
| 4m6  | FLOOR, BOTT., TRANS.       |       | 24  | 14'-5                 | 231    |
| 5m7  | FLOOR, BOTT., TRANS.       |       | 22  | 8'-6                  | 195    |
| 4m8  | FLOOR, BOTT., TRANS.       |       | 2   | 1 EACH 12'-3 TO 6'-2  | 12     |
| 6m9  | FLOOR, BOTT., TRANS.       |       | 2   | 14'-5                 | 43     |
| REINFORCING STEEL - TOTAL (LBS.)           |                            |       |     |                       | 4850   |



| CONCRETE PLACEMENT QUANTITIES ONE 22'-0 BENT BARREL |      |
|---|------|
| LOCATION  | CY   |
| SLAB  | 12.4 |
| WALLS   | 8.4  |
| FLOOR   | 11.3 |
| TOTAL (C.Y.)  | 32.1 |

DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**22'-0 BENT BARREL DETAILS**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 7 OF 12 FILE NO. 31463 DESIGN NO. 217





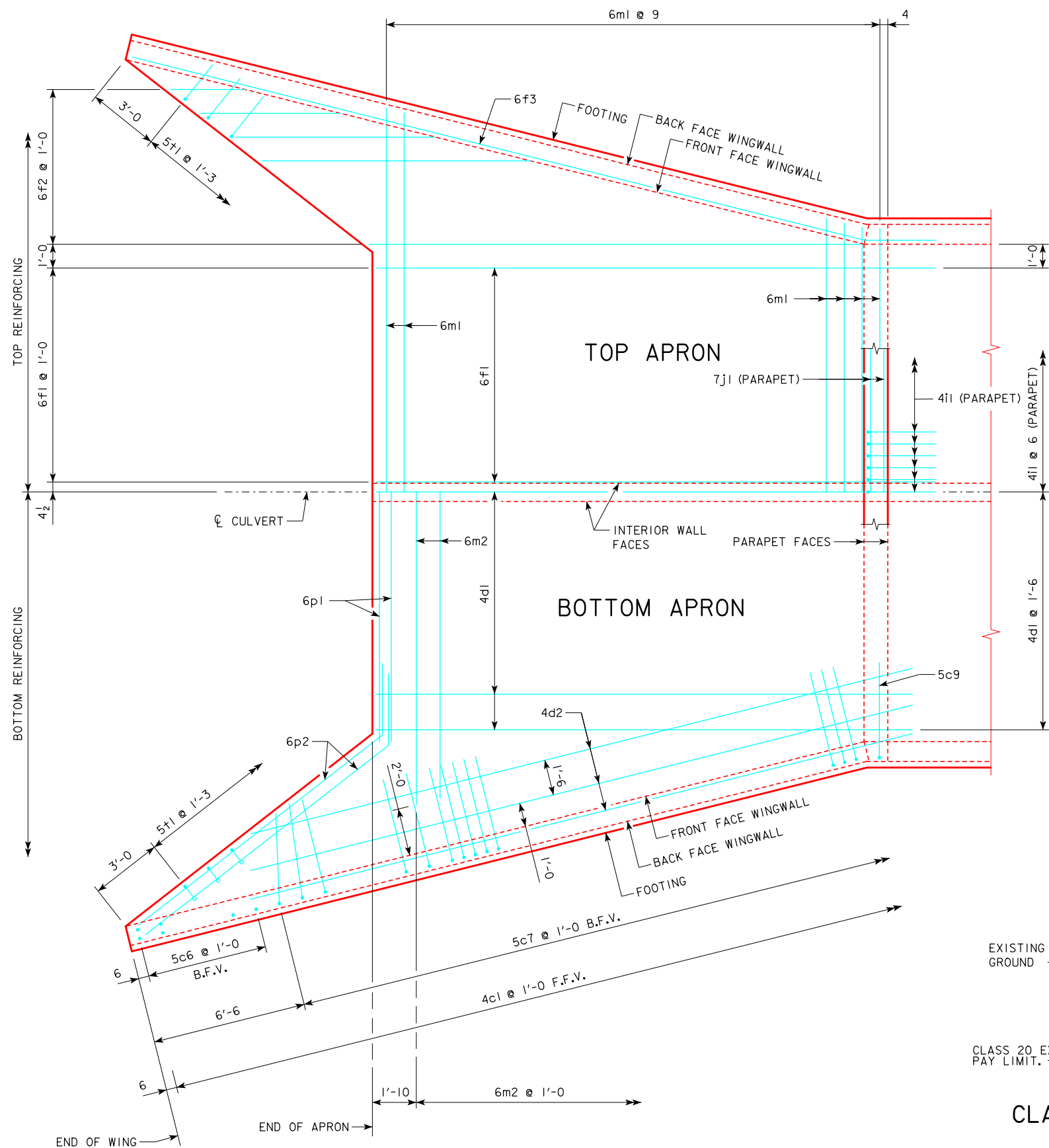
PLAN VIEW

**NOTES:**

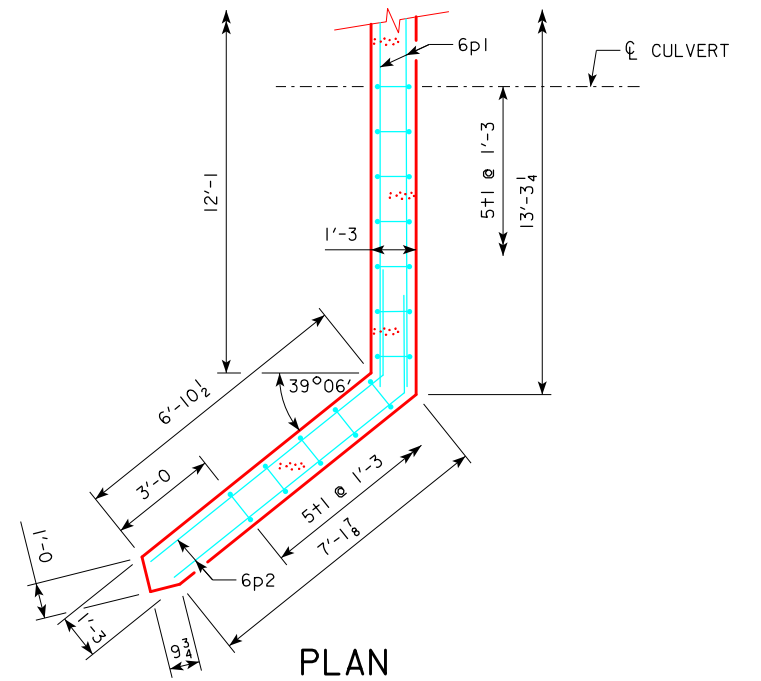
1. SEE DESIGN SHEET I FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.
2. SEE DESIGN SHEET II FOR HEADWALL NOTES.

DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 FLARED WING HEADWALL DETAILS**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 8 OF 12 FILE NO. 31463 DESIGN NO. 217

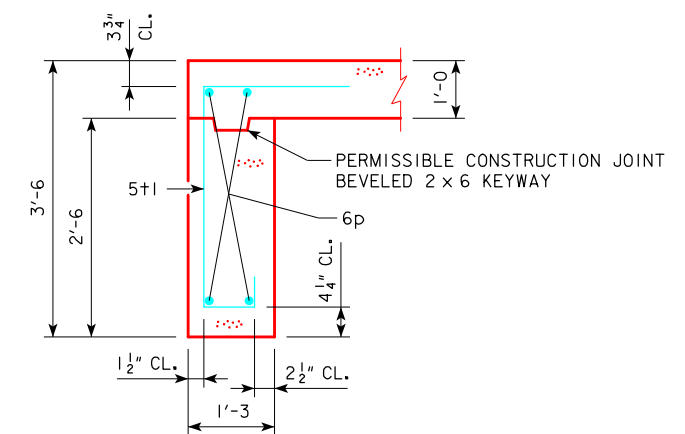




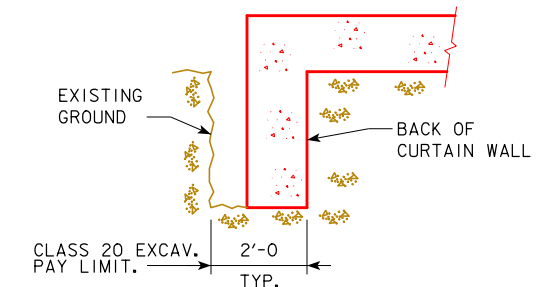
PLAN VIEW - TOP & BOTTOM OF APRON REINFORCING BARS



PLAN



SECTION CURTAIN WALL DETAILS

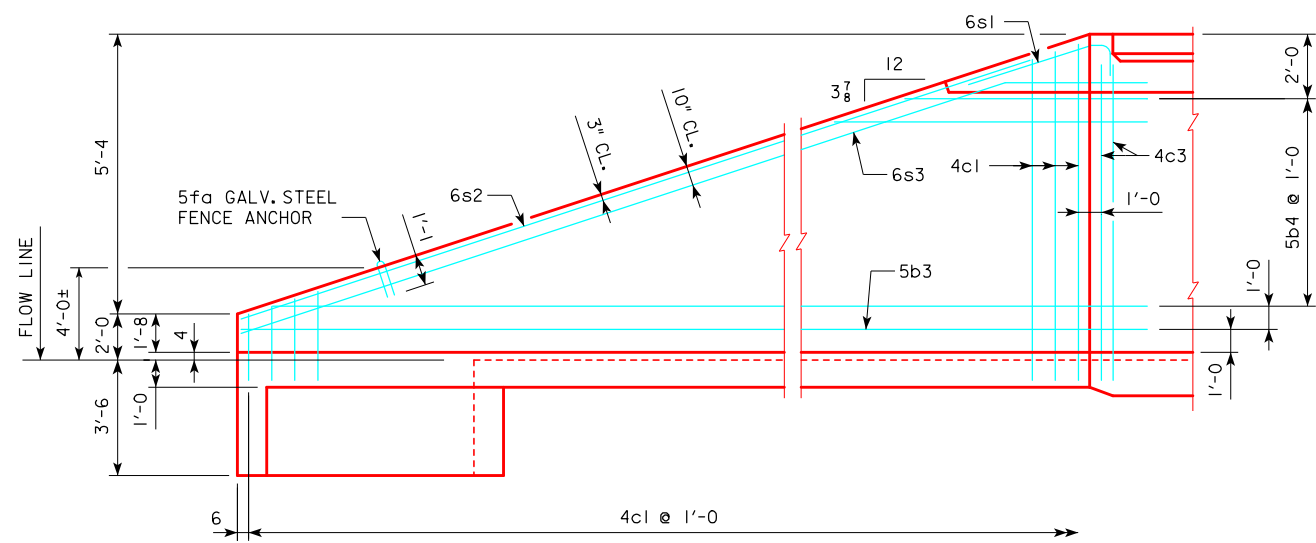


CURTAIN WALL CLASS 20 EXCAVATION

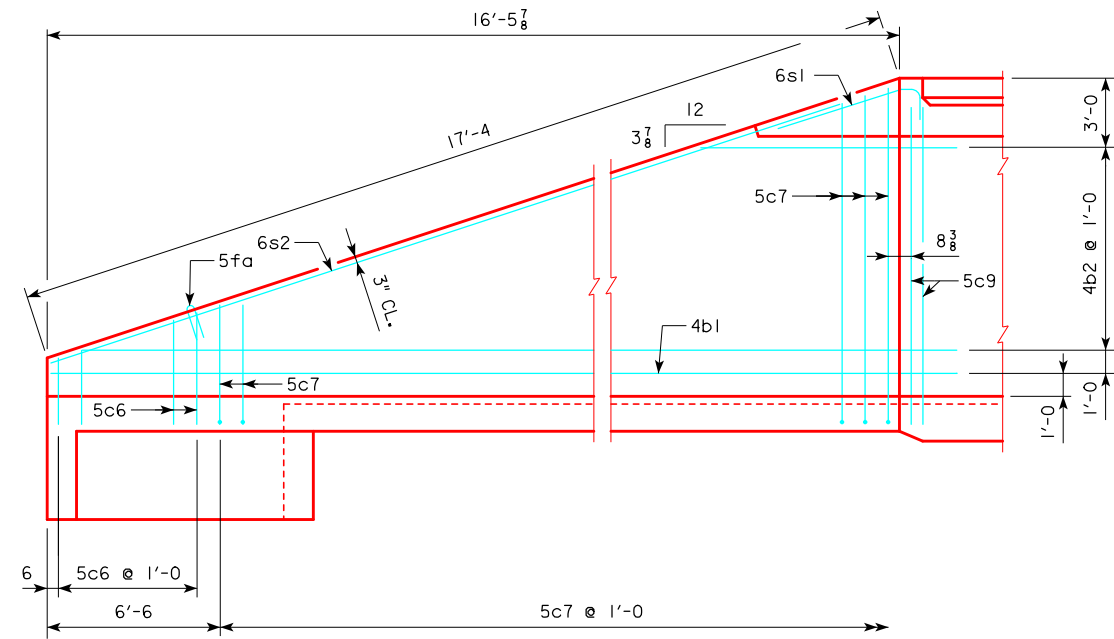
DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**FLARED WING HEADWALL DETAILS**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 9 OF 12 FILE NO. 31463 DESIGN NO. 217



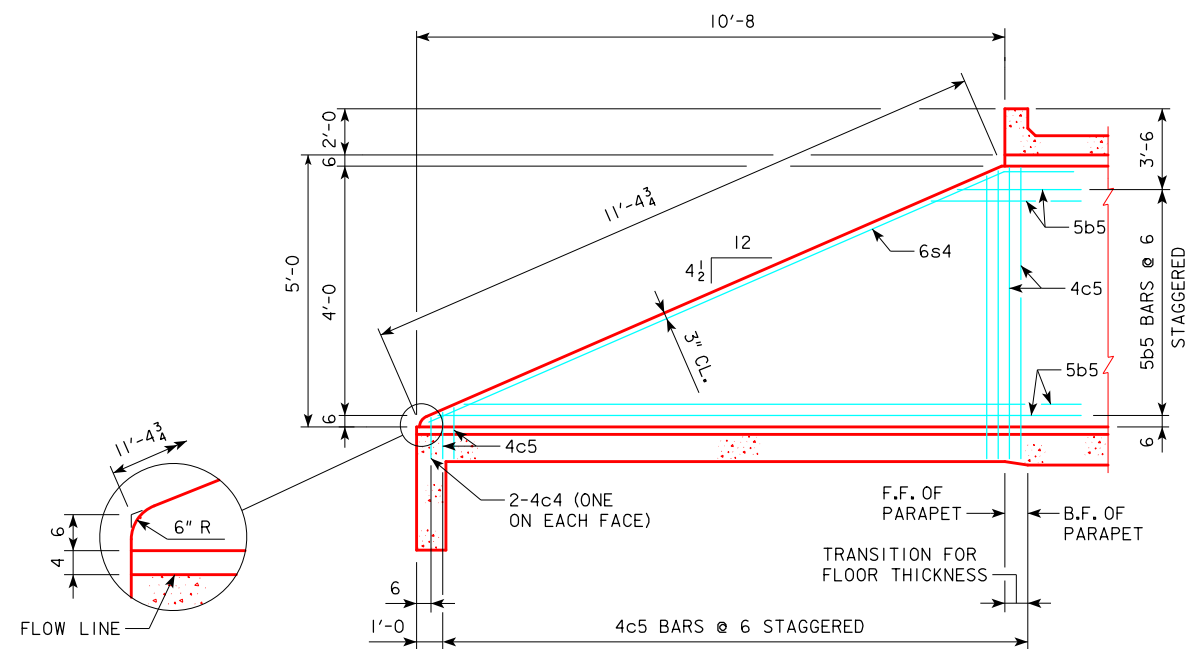




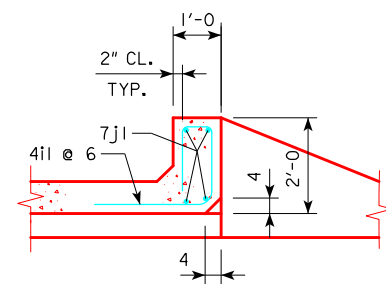
TYPICAL VIEW - FRONT FACE REINFORCING



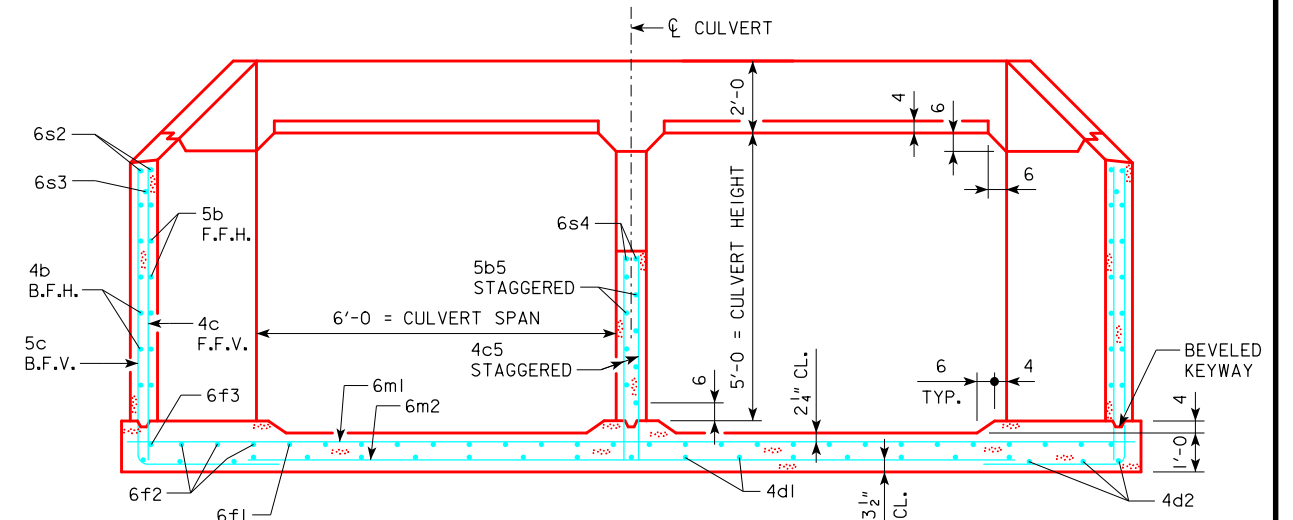
TYPICAL VIEW - BACK FACE REINFORCING



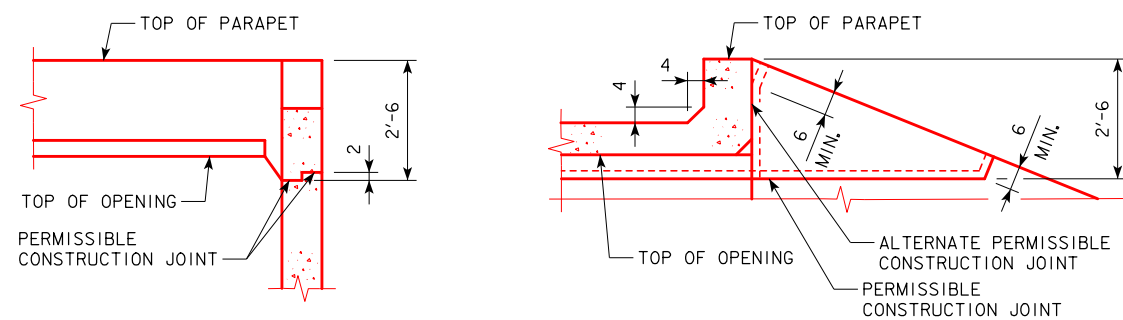
TYPICAL VIEW - INTERIOR WALL



SECTION THRU PARAPET



TYPICAL SECTION - NEAR CENTER OF APRON

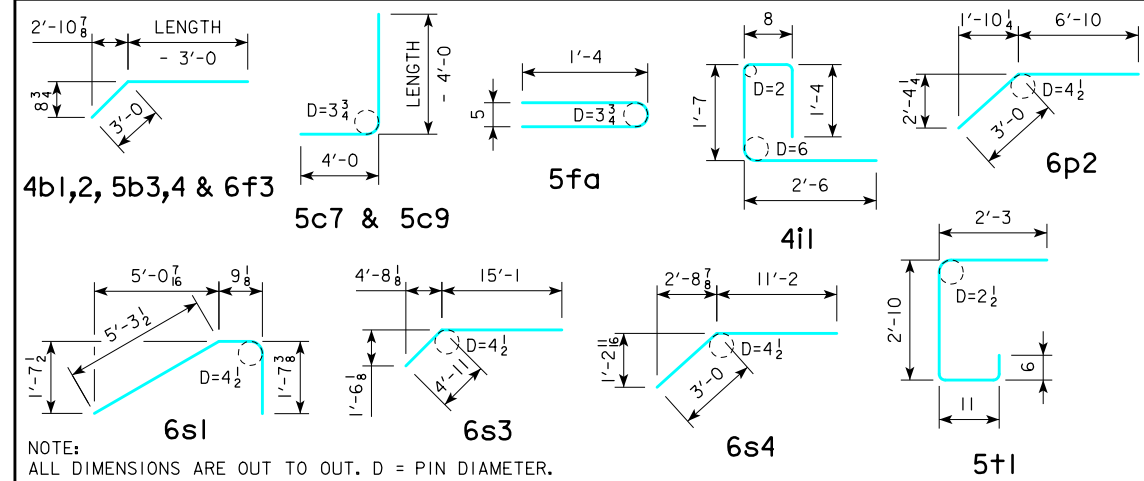


TOP OF WINGWALL DETAILS

DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 FLARED WING HEADWALL DETAILS**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 10 OF 12 FILE NO. 31463 DESIGN NO. 217



### BENT BAR DETAILS



### CONCRETE PLACEMENT QUANTITIES ONE HEADWALL-SOUTH

| LOCATION            | CY          |
|---------------------|-------------|
| PARAPET *           | 1.7         |
| WINGWALLS           | 4.5         |
| APRON               | 13.0        |
| <b>TOTAL (C.Y.)</b> | <b>19.2</b> |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

### HEADWALL NOTES:

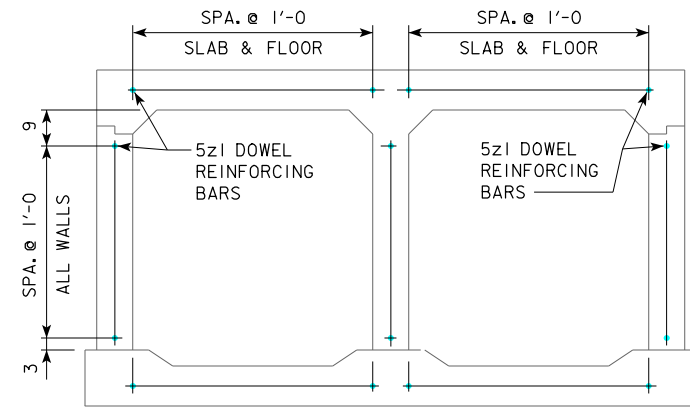
- SEE DESIGN SHEET 1 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.
- THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.
- THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.
- ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS 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" & "s" ESTIMATED TO EXTEND 2'-0" BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "d", "6f1", AND "6f3" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0" BEYOND BACK OF PARAPET.

### REINFORCING BAR LIST - SOUTH HEADWALL

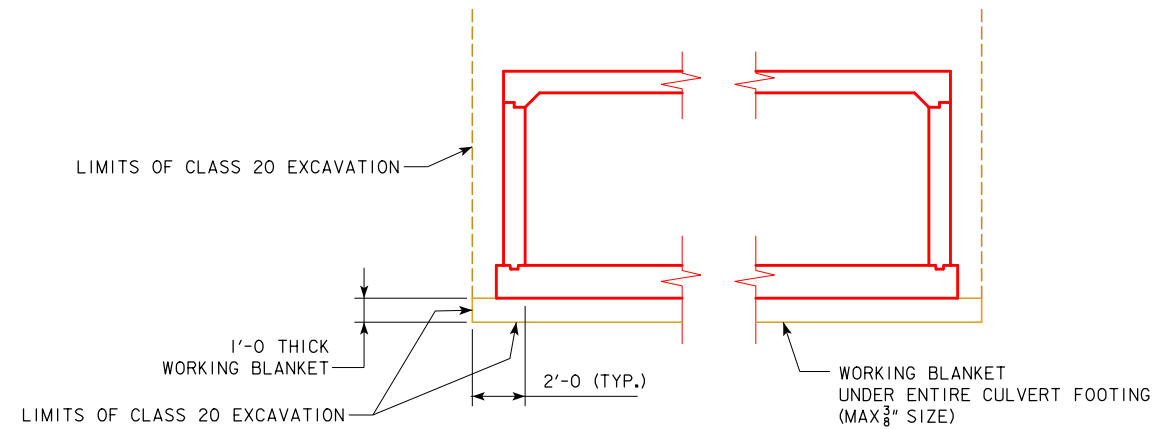
| BAR                              | LOCATION                 | SHAPE | NO. | LENGTH                 | WEIGHT |
|----------------------------------|--------------------------|-------|-----|------------------------|--------|
| 5fa                              | FENCE ANCHOR (GALV.)     |       | 2   | 2'-10                  | 6      |
| 4b1                              | WINGWALL, B.F.H.         |       | 2   | 19'-3                  | 26     |
| 4b2                              | WINGWALL, B.F.H.         |       | 6   | 2 EACH 11'-7 TO 17'-10 | 59     |
| 5b3                              | WINGWALL, F.F.H.         |       | 2   | 19'-3                  | 40     |
| 5b4                              | WINGWALL, F.F.H.         |       | 8   | 2 EACH 8'-7 TO 17'-10  | 110    |
| 5b5                              | INTERIOR WALL, BOTH F.H. |       | 7   | 1 EACH 5'-3 TO 13'-3   | 68     |
| 4c1                              | WINGWALL, F.F.V.         |       | 32  | 2 EACH 2'-8 TO 7'-7    | 110    |
| 4c3                              | WINGWALL, F.F.V.         |       | 4   | 6'-7                   | 18     |
| 4c4                              | INTERIOR WALL, BOTH F.V. |       | 2   | 1'-7                   | 2      |
| 4c5                              | INTERIOR WALL, BOTH F.V. |       | 22  | 1 EACH 1'-9 TO 5'-8    | 54     |
| 5c6                              | WINGWALL, B.F.V.         |       | 12  | 2 EACH 2'-8 TO 4'-4    | 44     |
| 5c7                              | WINGWALL, B.F.V.         |       | 20  | 2 EACH 8'-8 TO 11'-7   | 211    |
| 5c9                              | WINGWALL, B.F.V.         |       | 4   | 10'-7                  | 44     |
| 4d1                              | APRON, LONGIT., BOTT.    |       | 9   | 13'-6                  | 81     |
| 4d2                              | APRON, LONGIT., BOTT.    |       | 6   | 14'-5                  | 58     |
| 6f1                              | APRON, LONGIT., TOP      |       | 12  | 13'-6                  | 243    |
| 6f2                              | APRON, LONGIT., TOP      |       | 6   | 2 EACH 5'-4 TO 10'-10  | 73     |
| 6f3                              | APRON, LONGIT., TOP      |       | 2   | 19'-3                  | 58     |
| 4i1                              | PARAPET, VERTICAL        |       | 25  | 6'-1                   | 102    |
| 7j1                              | PARAPET, HORIZONTAL      |       | 4   | 13'-11                 | 114    |
| 6m1                              | APRON, TRANS., TOP       |       | 15  | 1 EACH 14'-1 TO 19'-4  | 376    |
| 6m2                              | APRON, TRANS., BOTT.     |       | 10  | 1 EACH 8'-6 TO 13'-0   | 161    |
| 6p1                              | CURTAIN, HORIZONTAL      |       | 4   | 13'-0                  | 78     |
| 6p2                              | CURTAIN, HORIZONTAL      |       | 8   | 9'-10                  | 118    |
| 6s1                              | WING SLOPE, BOTH F.      |       | 4   | 7'-8                   | 46     |
| 6s2                              | WING SLOPE, BOTH F.      |       | 4   | 14'-9                  | 89     |
| 6s3                              | WING SLOPE, F.F.         |       | 2   | 20'-0                  | 60     |
| 6s4                              | INTERIOR WALL, BOTH F.   |       | 2   | 14'-2                  | 43     |
| 5+1                              | CURTAIN, VERTICAL        |       | 17  | 6'-6                   | 115    |
| REINFORCING STEEL - TOTAL (LBS.) |                          |       |     |                        | 2607   |

DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**FLARED WING HEADWALL QUANTITIES**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 11 OF 12 FILE NO. 31463 DESIGN NO. 217





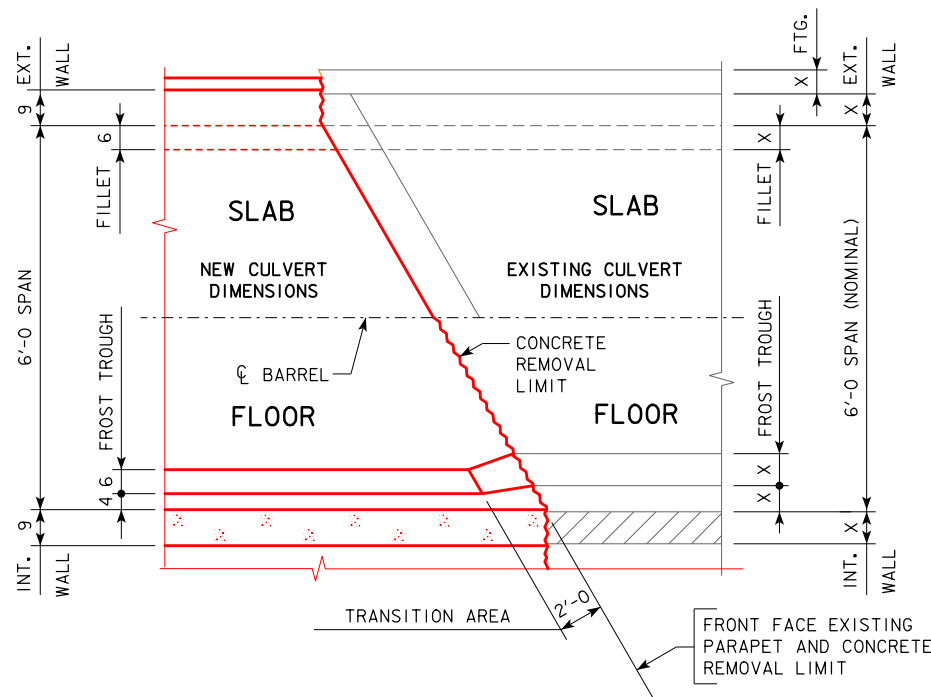
**SECTION NEAR TWIN EXTENSION**  
(SHOWING SPACING OF 5z1 DOWEL REINFORCING BARS)



**WORKING BLANKET/EXCAVATION DETAILS**

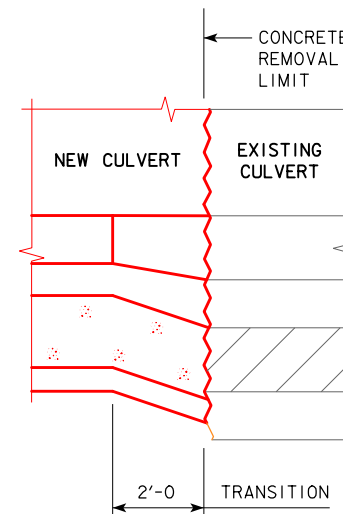
WORKING BLANKET SHALL TERMINATE 3'-0" SHORT OF CURTAIN WALL.

| REINFORCING STEEL EXTENSION DOWELS |                        |       |         |           |        |        |
|------------------------------------|------------------------|-------|---------|-----------|--------|--------|
| BAR                                | LOCATION               | SHAPE | NO./JT. | TOTAL NO. | LENGTH | WEIGHT |
| 5z1                                | TOP SLAB, CONST. JOINT |       | 43      | 43        | 2'-6   | 112    |



**CONCRETE TRANSITION DETAILS**

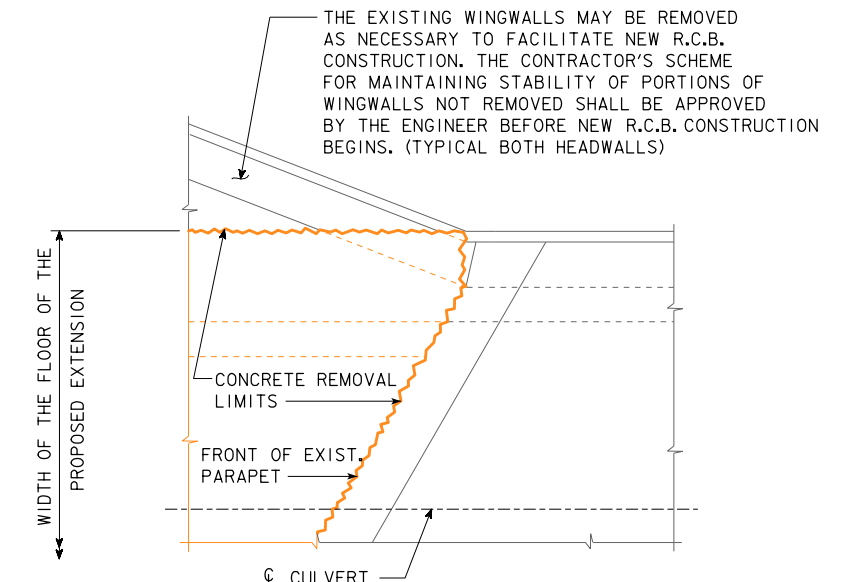
(PLAN VIEW)  
'X' - EXISTING DIMENSION



**CONCRETE TRANSITION DETAILS**

(WALL TRANSITION SHOWN - TYPICAL FOR SLAB)

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



**PART REMOVAL PLAN**

NOTE: DETAILS ON THIS SHEET SCHEMATIC ONLY, SEE PREVIOUS SHEETS FOR ACTUAL SKEWS.

DESIGN FOR 9° SKEW (R.A.)  
**TWIN 6'x5' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**CONCRETE TRANSITION DETAILS**  
 STATION 414+08.85 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 12 OF 12 FILE NO. 31463 DESIGN NO. 217



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

## ESTIMATED CULVERT QUANTITIES

| ITEM NO. | ITEM CODE    | ITEM                              | UNIT | TOTAL | AS BUILT QUANTITY |
|----------|--------------|-----------------------------------|------|-------|-------------------|
| 1        | 2102-0425071 | SPECIAL BACKFILL                  | CY   | 13    |                   |
| 2        | 2401-6750001 | REMOVALS, AS PER PLAN             | LS   | 1     |                   |
| 3        | 2402-2720000 | EXCAVATION, CLASS 20              | CY   | 61    |                   |
| 4        | 2403-0100020 | STRUCTURAL CONCRETE (RCB CULVERT) | CY   | 22.3  |                   |
| 5        | 2404-7775000 | REINFORCING STEEL                 | LB   | 3255  |                   |
| 6        | 2533-4980005 | MOBILIZATION                      | LS   | 1     |                   |

- | ITEM NO. | ESTIMATE REFERENCE INFORMATION   |
|----------|--|
| 1        | INCLUDES COST OF 1'-0" THICK WORKING BLANKET (SPECIAL BACKFILL). THE WORKING BLANKET MAY BE DELETED IF DETERMINED TO BE UNNECESSARY AT THE TIME OF CONSTRUCTION. RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR THE SPECIAL BACKFILL.  |
| 2        | INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL AS DETAILED ON THE SITUATION PLAN. 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        | INCLUDES EXCAVATION NECESSARY TO PLACE THE 1'-0" THICK WORKING BLANKET. QUANTITY SHOULD BE REDUCED BY 13 CY IN THE EVENT THAT THE WORKING BLANKET IS DELETED. INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.   |

### SPECIFICATIONS:

DESIGN: AASHTO LRFD 5th Ed, SERIES OF 2010.  
 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, 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 317 |        |         |
|------------|--------|---------|
| STANDARD   | ISSUED | REVISED |
| ---        | ---    | ---     |

| DESIGN 317                   |          |       |  |  |
|------------------------------|----------|-------|--|--|
| SUMMARY OF REINFORCING STEEL |          |       |  |  |
| LOCATION                     | QUANTITY | TOTAL |  |  |
| 17'-0" BARREL EXTENSION      | 1087     | 1087  |  |  |
| 11'-0" BARREL EXTENSION      | 735      | 735   |  |  |
| HEADWALL 0° SKEW             | 680      | 680   |  |  |
| HEADWALL 0° SKEW             | 680      | 680   |  |  |
| 5z1 BARS                     | 73       | 73    |  |  |
| TOTAL (LBS.)                 |          | 3255  |  |  |

| CONCRETE PLACEMENT QUANTITIES |         |       |      |       |
|-------------------------------|---------|-------|------|-------|
| LOCATION                      | FOOTING | WALLS | SLAB | TOTAL |
| 17'-0" BARREL EXTENSION       | 3.8     | 1.5   | 2.9  | 8.2   |
| 11'-0" BARREL EXTENSION       | 2.4     | 1.0   | 1.9  | 5.3   |
| HEADWALL 0° SKEW              | 2.8     | 0.7   | 0.9* | 4.4   |
| HEADWALL 0° SKEW              | 2.8     | 0.7   | 0.9* | 4.4   |
| TOTAL (C.Y.)                  |         | 11.8  | 3.9  | 6.6   |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

| DESIGN HISTORY<br>AT THIS SITE<br>(INCLUDES THIS DESIGN) |   |
|--|---|
| DES. NO.   | TYPE OF WORK                                    |
| 317  | 4'x2' REINFORCED CONCRETE BOX CULVERT EXTENSION |

DESIGN FOR 0°

### 4'x2' REINFORCED CONCRETE BOX CULVERT EXTENSION

#### ESTIMATED QUANTITIES

STATION 729+58.61 (US 6) DECEMBER, 2017

## IOWA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 12 FILE NO. 31463 DESIGN NO. 317

NOTE:  
 ROADWAY QUANTITIES SHOWN  
 ELSEWHERE IN THESE PLANS.



REVISED 11-2016 - ADDED THE WORD "THEREFORE" TO THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES.  
 REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRORD IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT.  
 ENGLISHINGLECULVERTS.DGN - 1043s2 - THIS SHEET ISSUED 10-08.

## GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 4' x 2' R.C.B. CULVERT.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 2 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

VERTICAL EARTH PRESSURE,  $E_v = 0.120$  kcf.

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

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

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

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

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

|                       |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|
| BAR SIZE NUMBER       | 4   | 5   | 6   | 7   | 8   |
| 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 2 1/4" TO NEAR TRANSV. REINF. BAR  
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR  
 END CLEARANCES:  
 VERTICAL TOP 2"  
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH  
 TRANSVERSE 2"

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN. CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

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

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

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

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

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

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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

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

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS 1/2 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.

ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 3'-0 OF NEW WORK WITH A TRANSITION SLOPE OF 1:6 OR SHALLOWER.

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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2x4 KEYWAYS, UNLESS NOTED OTHERWISE.

ALL EXPOSED CORNERS 90 DEGREES OR SHARPER TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

CONSTRUCTION SHALL BE DONE IN STAGES WITH AT LEAST ONE LANE TRAFFIC MAINTAINED AT ALL TIMES IN ACCORDANCE WITH "TRAFFIC CONTROL PLAN" NOTE.

CONSTRUCTION STAGES I & II AS DETAILED ON THESE PLANS MAY BE REVERSED AT THE CONTRACTOR'S OPTION SUBJECT TO THE ENGINEER'S APPROVAL.

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" ON DESIGN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

EXCEPT FOR DOWEL BARS 5r1, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.

### TRAFFIC CONTROL PLAN

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

### NOTE:

POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0°

**4'x2' REINFORCED CONCRETE  
BOX CULVERT EXTENSION  
CULVERT GENERAL NOTES**

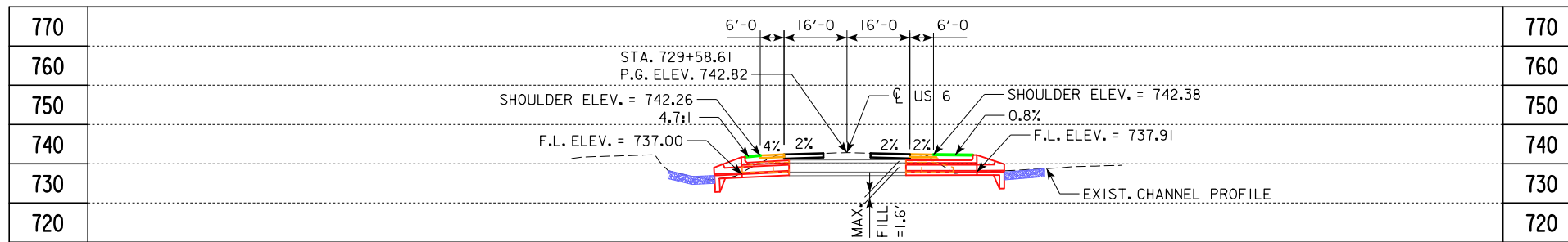
STATION 729+58.61 (US 6) DECEMBER, 2017

**IOWA COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

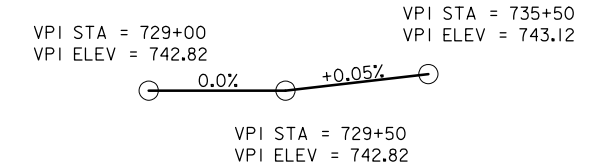
DESIGN SHEET NO. 2 OF 12 FILE NO. 31463 DESIGN NO. 317



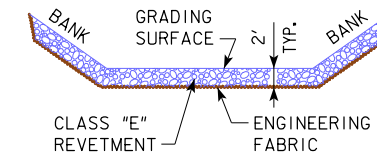


**LONGITUDINAL SECTION ALONG  $\phi$  CULVERT**  
 DESIGN FILL HEIGHT = 2'-0"  
 ANTICIPATED SETTLEMENT = NEGLIGIBLE

BENCH MARK NO. 5: STA. 729+58.46, CUT "X",  
 NORTH END REINFORCED CONCRETE PIPE 21.64' LT., ELEV. 740.85



**PROFILE GRADE ON US 6 (UAC)**



| ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS |                         |                         |
|---|-------------------------|-------------------------|
| LOCATION  | REVETMENT CL. "E" (TON) | ENGINEERING FABRIC (SY) |
| INLET   | 18.6                    | 33.2                    |
| OUTLET  | 20.5                    | 35.6                    |
| TOTALS  | 39.1                    | 68.8                    |

**NOTES:**

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 4' x 2' REINFORCED CONCRETE BOX CULVERT WITH 0 DEGREE SKEW BY REMOVING THE RCP ENDS AND EXISTING HEADWALL AS REQUIRED AND ADDING A 4' x 2' x 17' & 4' x 2' x 11' REINFORCED CONCRETE BOX CULVERT EXTENSIONS WITH HEADWALLS ON THE SOUTH AND NORTH ENDS RESPECTIVELY.

THE RCB CULVERT EXTENSION IS DESIGNED FOR EARTH FILLS OF 2 FEET.

ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.

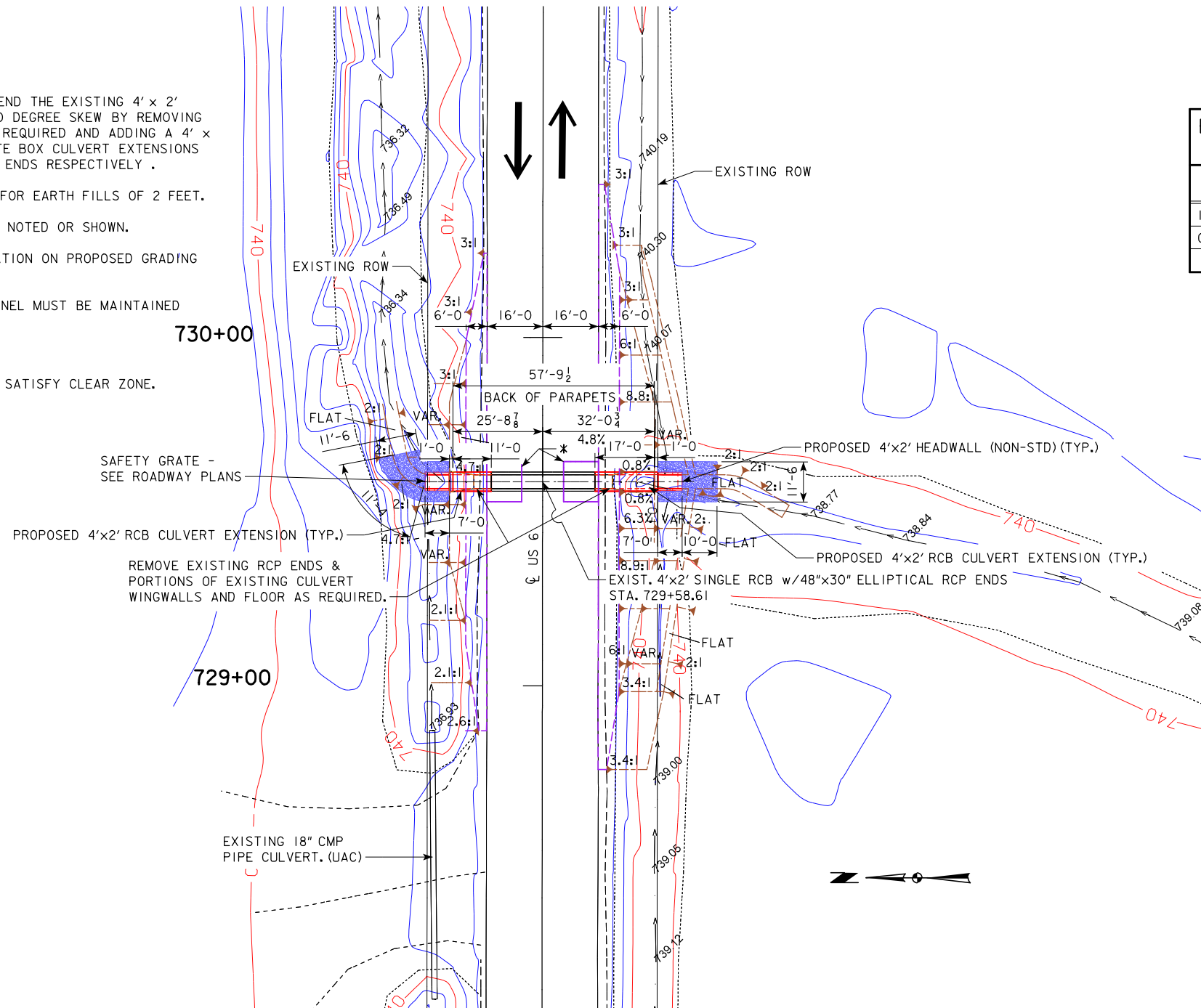
SEE ROAD SHEETS FOR ADDITIONAL INFORMATION ON PROPOSED GRADING LIMITS.

DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.

SEE H SHEETS FOR RIGHT OF WAY.

CULVERT LENGTH ON NORTH SIDE DOES NOT SATISFY CLEAR ZONE.

HEADWALLS SHALL BE PLACED LEVEL.



**HYDRAULIC DATA**

DRAINAGE AREA = 748.8 ACRES  
 $Q_{50} = 1,260$  CFS  
 ROLLING

**UTILITIES LEGEND:**

- T1 - COOPERATIVE TELEPHONE COMPANY
- F0 - IOWA NETWORK SERVICES
- G - ALLIANT ENERGY
- F02 - MCI
- F03 - MEDIACOM
- T2 - WINDSTREAM COMMUNICATIONS
- F04 - SOUTH SLOPE COOPERATIVE

**LOCATION**

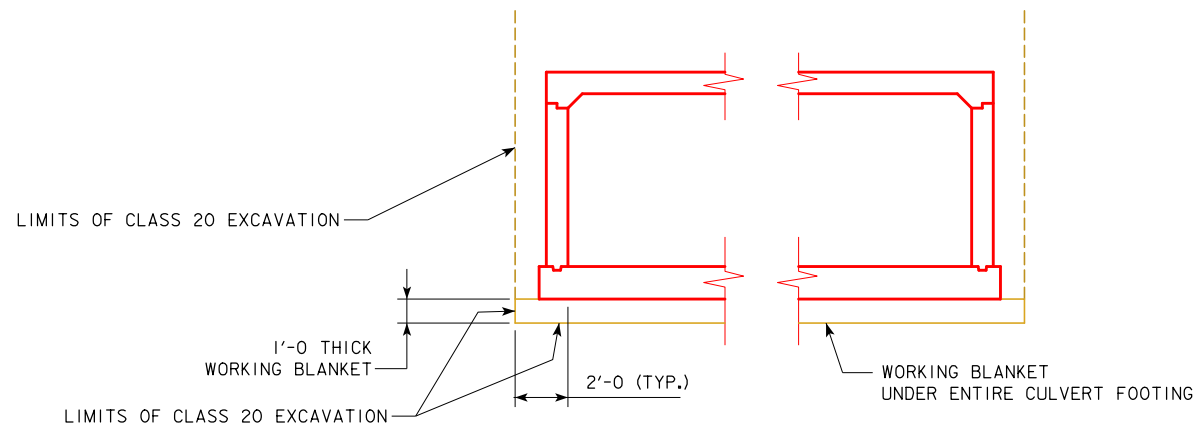
ON US 6 OVER  
 DRAINAGE DITCH  
 T-8IN R-11W  
 SECTION 25 & 36  
 MARENGO TOWNSHIP  
 IOWA COUNTY  
 LATITUDE 41.789505  
 LONGITUDE -92.071305

**TRAFFIC ESTIMATE**

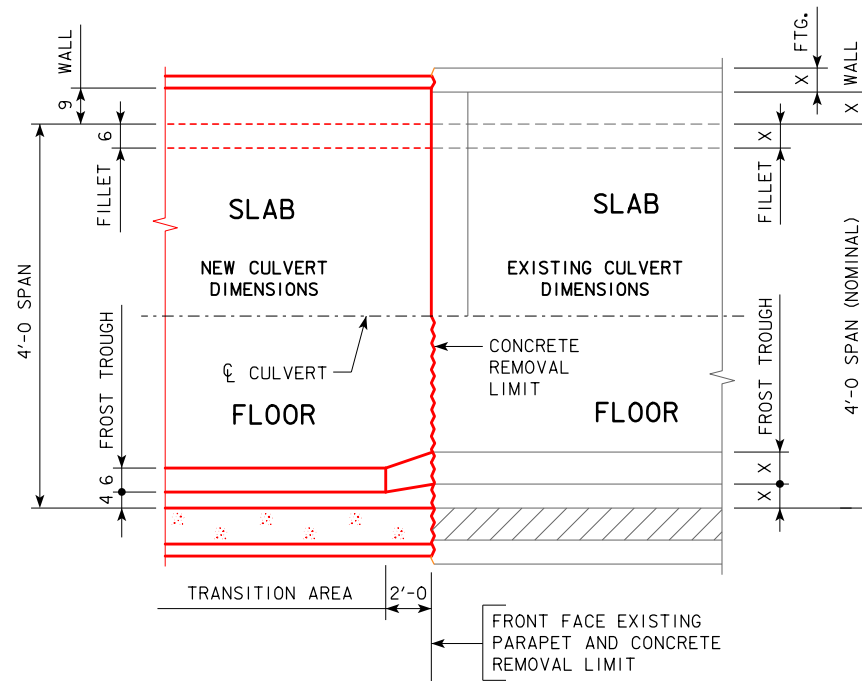
2014 AADT 3370 V.P.D.  
 2034 AADT 4100 V.P.D.  
 TRUCKS 8%  
 DESIGN ESALS 1,000,000

DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE BOX CULVERT EXTENSION SITUATION PLAN**  
 STATION 729+58.61 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 3 OF 12 FILE NO. 31463 DESIGN NO. 317

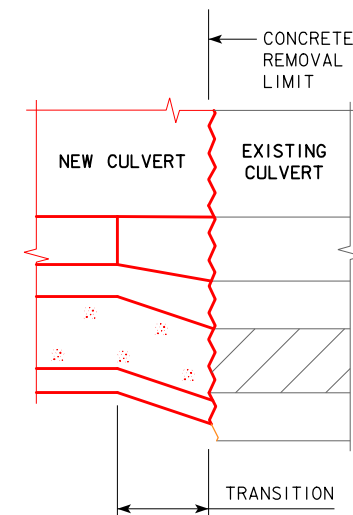




**WORKING BLANKET/EXCAVATION DETAILS**  
 WORKING MATERIAL SHALL TERMINATE 3'-0 SHORT OF THE CURTAIN WALL



**CONCRETE TRANSITION DETAILS**  
 (PLAN VIEW)  
 'X' - EXISTING DIMENSION

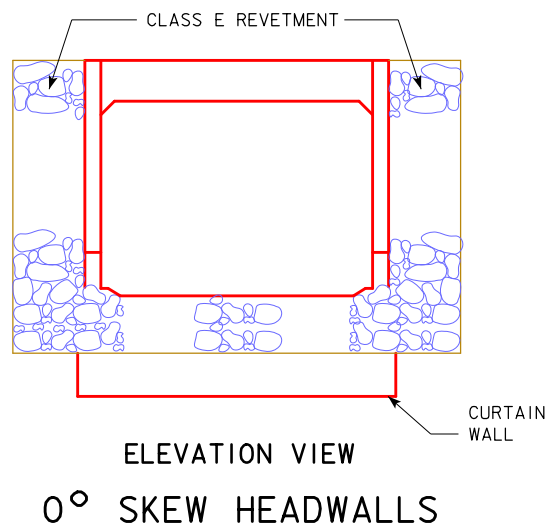
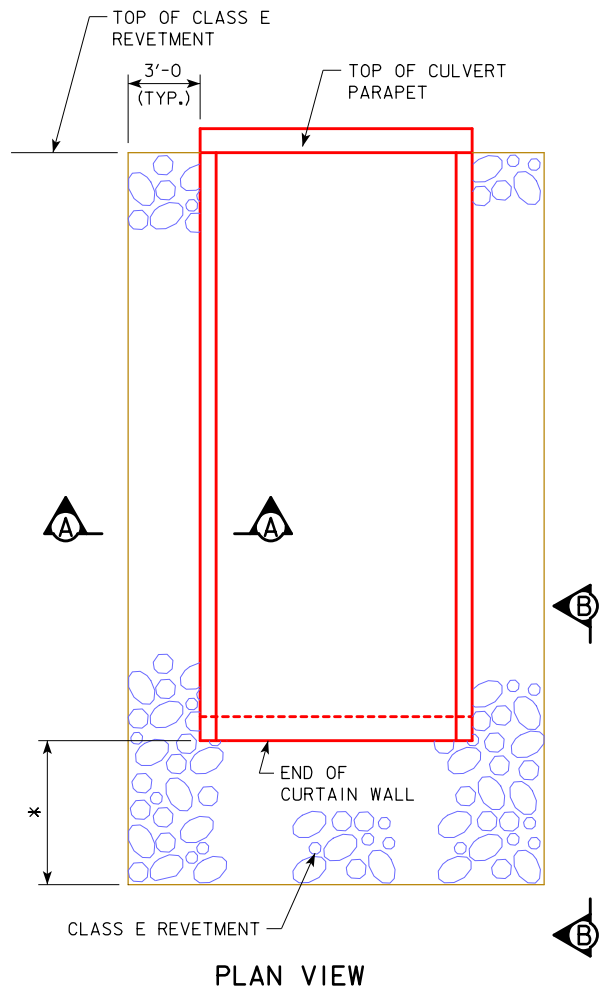


**CONCRETE TRANSITION DETAILS**  
 (WALL TRANSITION SHOWN - TYPICAL FOR SLAB)  
 NEW BARREL CONCRETE THICKNESSES SHALL BE MAINTAINED MINIMALLY WHEN TRANSITIONING TO MEET EXISTING BARREL INTERIOR SURFACES. OUTSIDE CONCRETE SURFACES DO NOT HAVE TO BE TRANSITIONED TO MATCH EXISTING SURFACES.

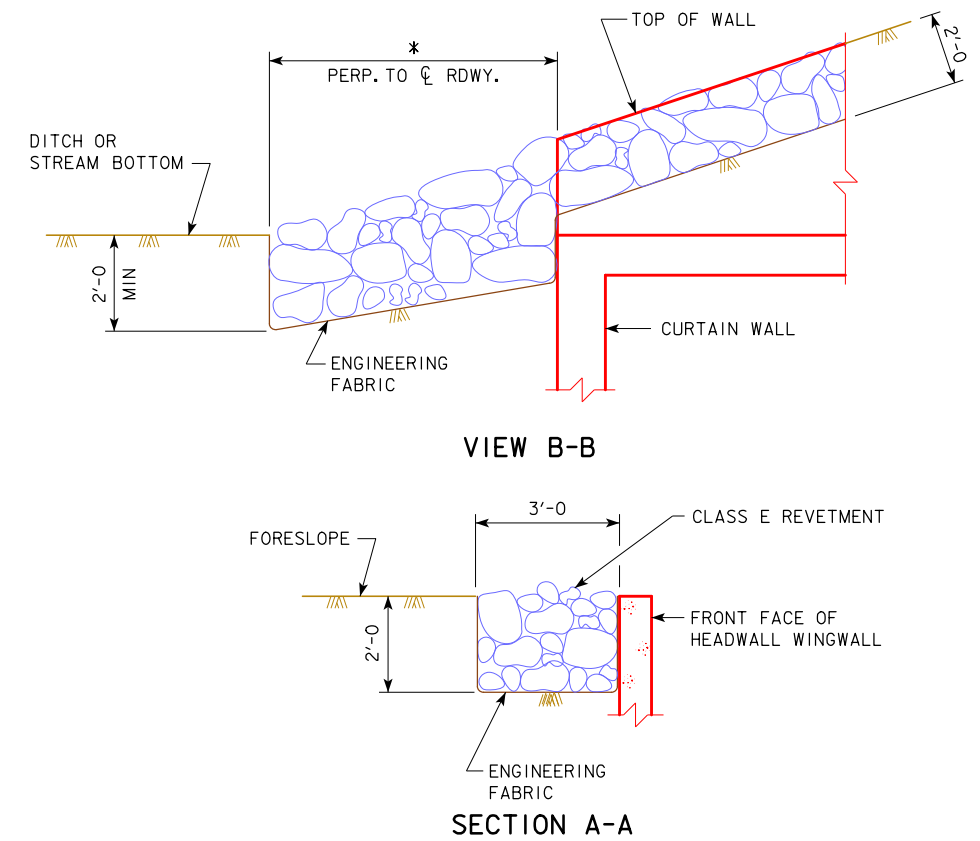
DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**MISCELLANEOUS CULVERT DETAILS**  
 STATION 729+58.61 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 12    FILE NO. 31463    DESIGN NO. 317

REVISED: CHANGED BRIDGE DESIGN MANUAL, SECTION 8 TO SECTION 7. (3-1-15)  
 ENGLISHINGCULVERTS.DGN - 1047 - THIS SHEET ISSUED 03-12.

\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



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 0°

**4'x2' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 REVETMENT PROTECTION DETAILS**

STATION 729+58.61 (US 6)      DECEMBER, 2017

**IOWA COUNTY**

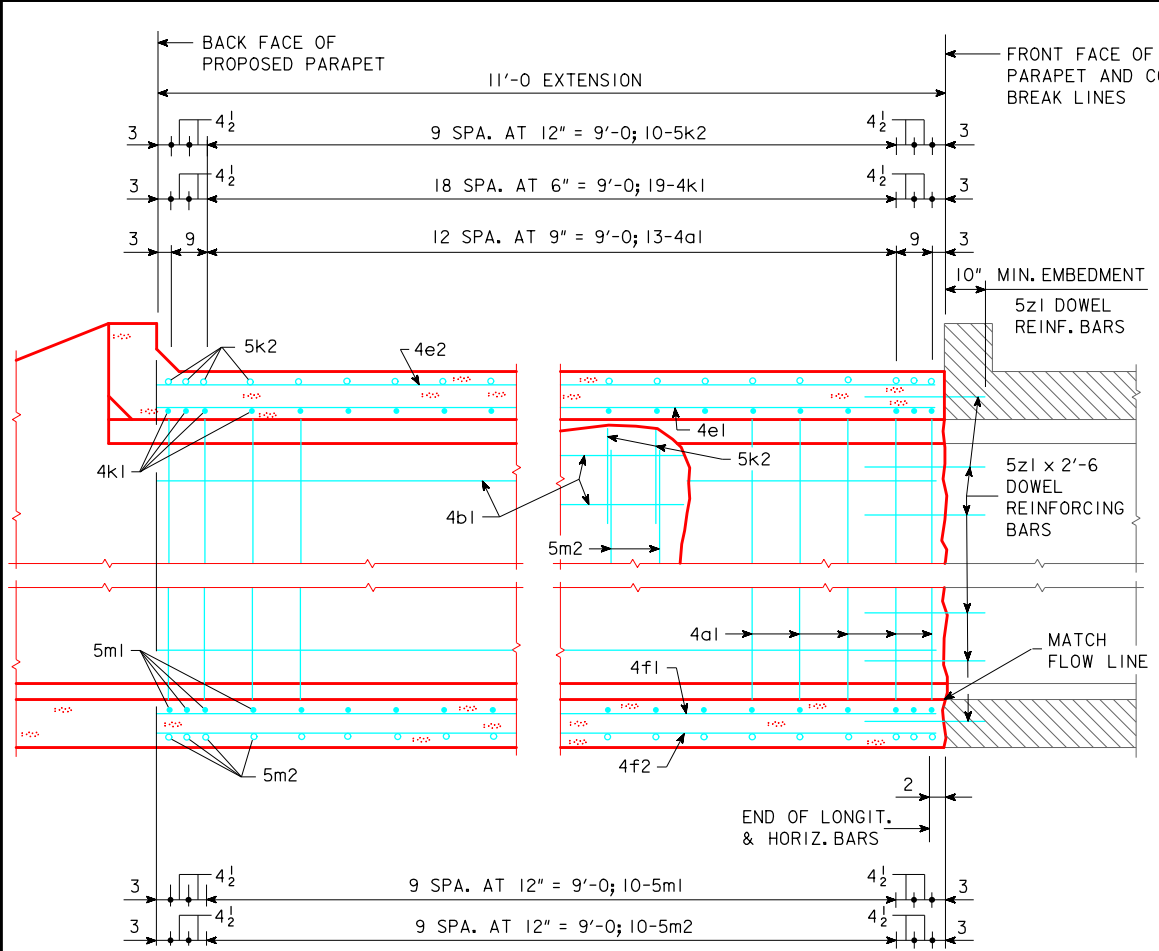
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 12    FILE NO. 31463    DESIGN NO. 317

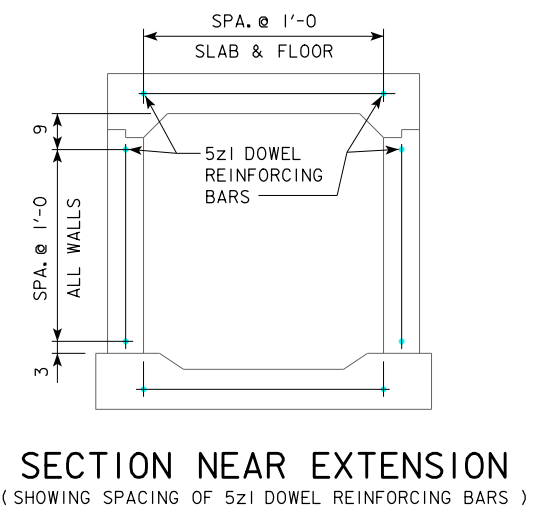
REVISED 1-16 - ADDED NOTE "SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC."  
 REVISED 02-2017 - ADDED SECTION DIRECTORS "A-A" TO "ZERO SKEW PLAN VIEW" DETAIL.  
 ENGLISHING\INGLCULVERTS.DGN - 1092 - THIS SHEET ISSUED 04-12.



CORRECTION 05-14 - ADDED THE BAR LABELS K9 & m9 TO THE PART LONGIT. SECTIONS. HEL044.S01 (ASTD01044.S01--LEP; THIS SHEET REDRAWN\_DEVICE:ZHA0R(200,004) ARCH.TAPE NO. 15 DATE 9-8-88)

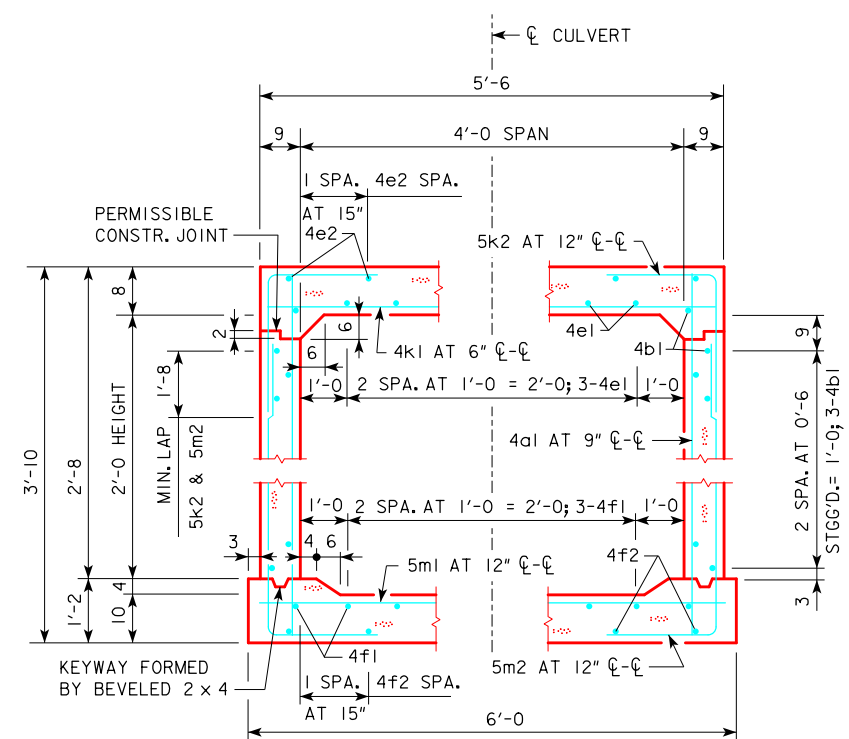


**11'-0 BARREL PART LONGITUDINAL SECTION**  
(ALONG CL OF CULVERT)



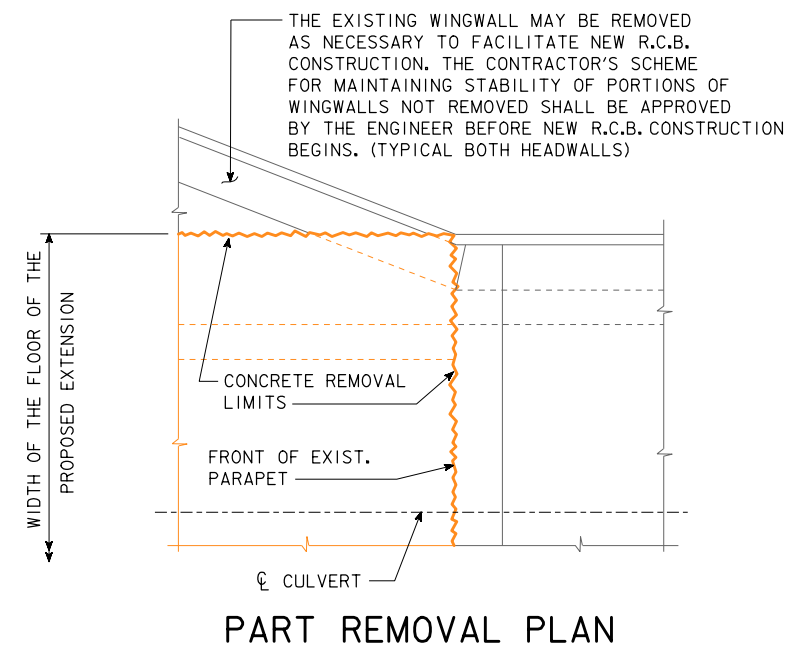
**SECTION NEAR EXTENSION**  
(SHOWING SPACING OF 5z1 DOWEL REINFORCING BARS)

| REINFORCING STEEL EXTENSION DOWELS |                        |       |         |           |        |        |
|------------------------------------|------------------------|-------|---------|-----------|--------|--------|
| BAR                                | LOCATION               | SHAPE | NO./JT. | TOTAL NO. | LENGTH | WEIGHT |
| 5z1                                | TOP SLAB, CONST. JOINT |       | 14      | 28        | 2'-6   | 73     |



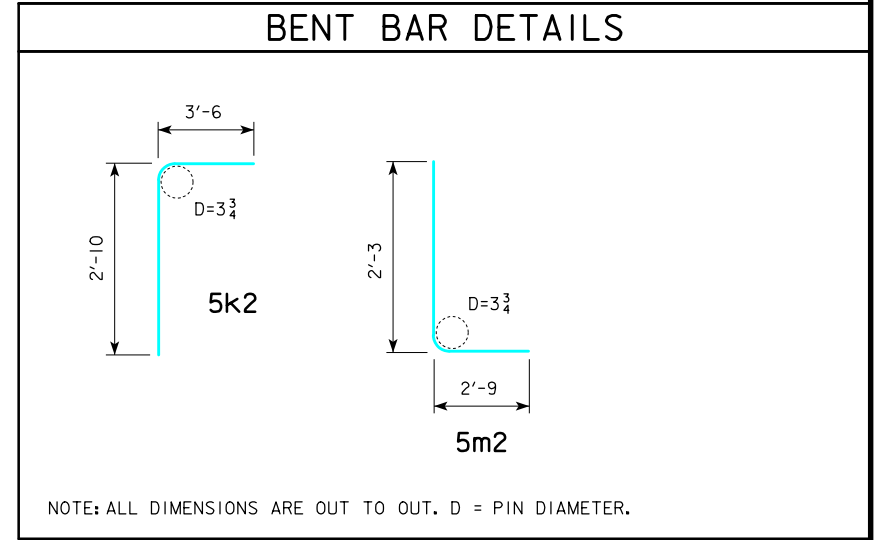
**SECTION THRU BARREL**  
(NORMAL TO CL OF CULVERT)

NOTE:  
ALL TRANSVERSE REINFORCING BARS AND HORIZONTAL LEGS OF CORNER BARS SHALL BE PLACED PARALLEL TO THE CONCRETE BREAK LINE AND NEW PARAPET EXCEPT AS SHOWN.  
DIMENSIONS SHOWN FOR CL OF TRANSVERSE BARS, VERTICAL WALL BARS, AND CORNER BARS ARE MEASURED ALONG CL OF CULVERT.  
CONCRETE PER FOOT OF BARREL:  
SLAB = 1.9 CU. YDS.  
WALLS = 1.0 CU. YDS.  
FLOOR = 2.4 CU. YDS.  
TOTAL = 5.3 CU. YDS.



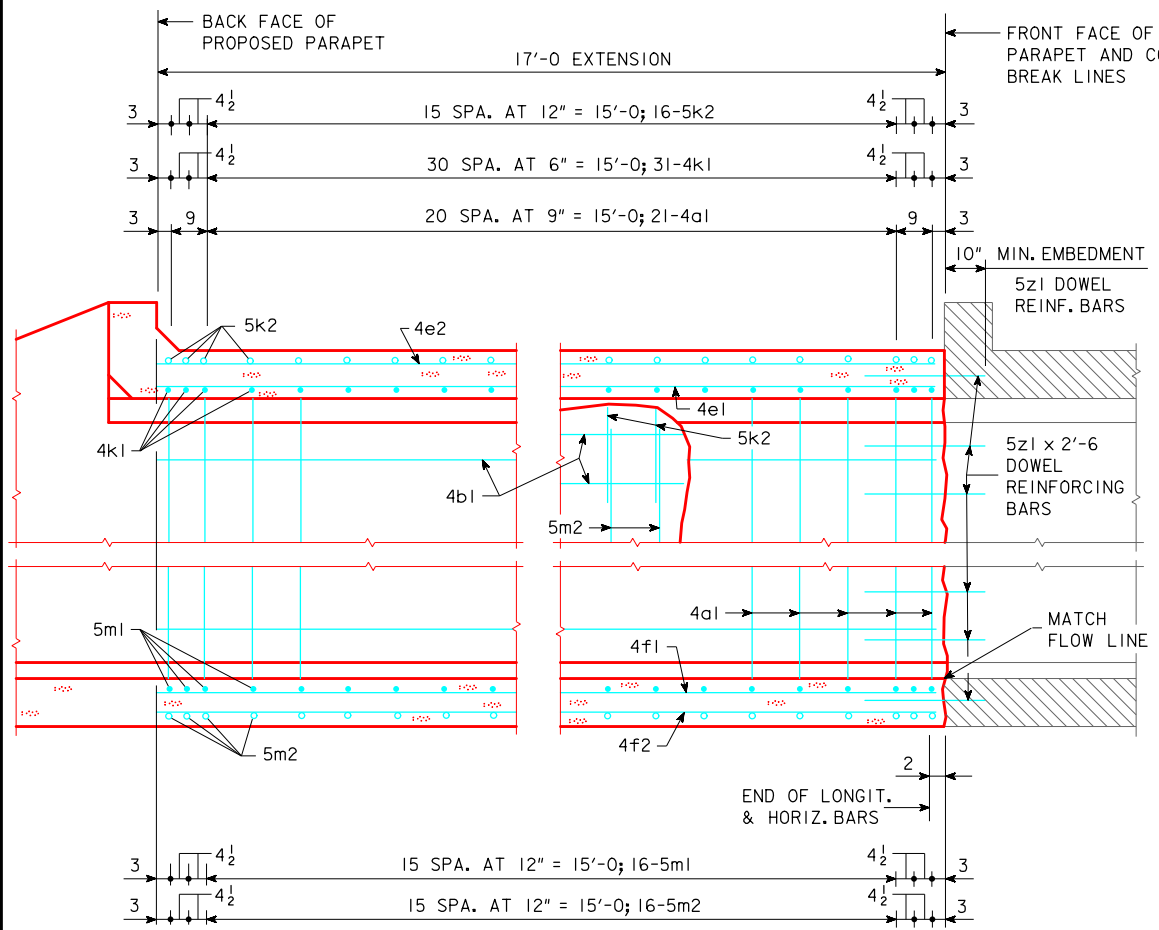
**PART REMOVAL PLAN**

| REINFORCING BAR LIST-ONE 11'-0 EXTENSION |                      |       |     |        |        |
|--|----------------------|-------|-----|--------|--------|
| BAR                                      | LOCATION             | SHAPE | NO. | LENGTH | WEIGHT |
| 4a1                                      | WALLS, F.F.V         |       | 30  | 3'-5   | 68     |
| 4b1                                      | WALLS, F.F.H & B.F.H |       | 8   | 10'-10 | 58     |
| 4e1                                      | SLAB, BOTT. LONGIT.  |       | 3   | 10'-10 | 22     |
| 4e2                                      | SLAB, TOP LONGIT.    |       | 4   | 10'-10 | 29     |
| 4f1                                      | FLOOR, TOP LONGIT.   |       | 5   | 10'-10 | 36     |
| 4f2                                      | FLOOR, BOTT LONGIT.  |       | 4   | 10'-10 | 29     |
| 4k1                                      | SLAB, BOTT. TRANSV.  |       | 23  | 5'-2   | 79     |
| 5k2                                      | SLAB, TOP CORNER     |       | 28  | 6'-4   | 185    |
| 5m1                                      | FLOOR, TOP TRANSV.   |       | 14  | 5'-8   | 83     |
| 5m2                                      | FLOOR, BOTT. CORNER  |       | 28  | 5'-0   | 146    |
| REINFORCING STEEL - TOTAL (LBS.)         |                      |       |     |        | 735    |

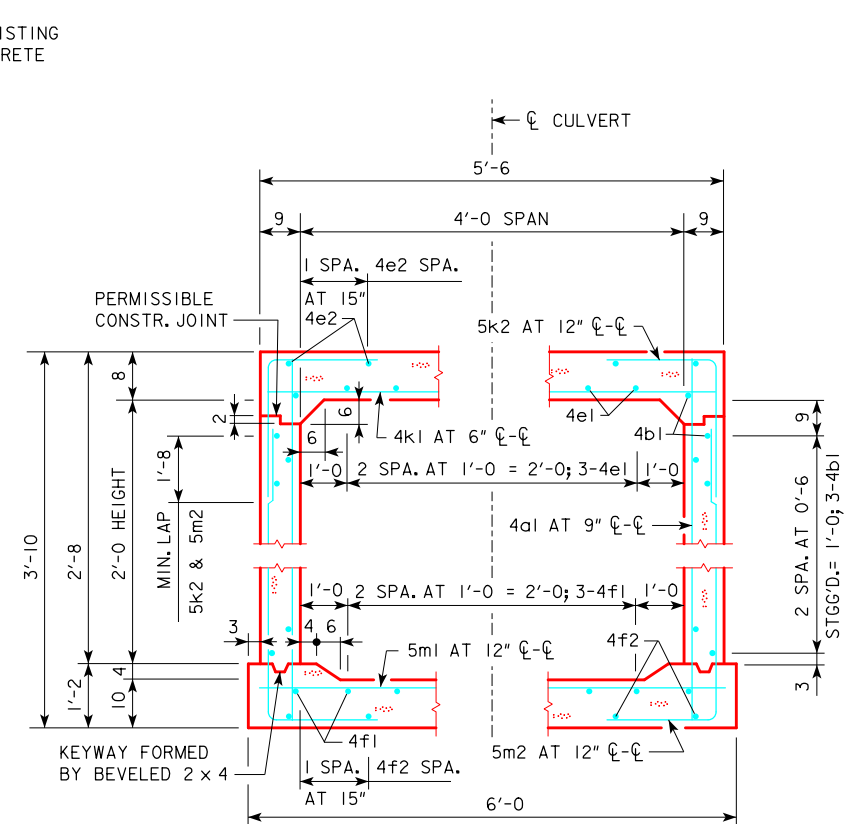


DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE  
BOX CULVERT EXTENSION**  
**11'-0 CULVERT EXTENSION DETAILS**  
STATION 729+58.61 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 6 OF 12 FILE NO. 31463 DESIGN NO. 317

CORRECTION 05-14 - ADDED THE BAR LABELS k9 & m9 TO THE PART LONGIT. SECTIONS. HEL044.S01 (ASTD01044.S01--LEP: THIS SHEET REDRAWN, DEVICE:ZHA0:200,004) ARCH.TAPE NO. 15 DATE 9-8-88)



**17'-0 BARREL PART LONGITUDINAL SECTION**  
(ALONG CL OF CULVERT)



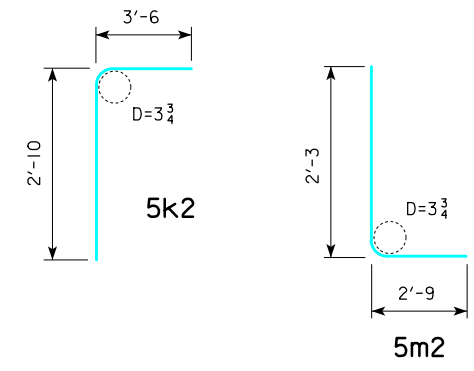
**SECTION THRU BARREL**  
(NORMAL TO CL CULVERT)

NOTE:  
ALL TRANSVERSE REINFORCING BARS AND HORIZONTAL LEGS OF CORNER BARS SHALL BE PLACED PARALLEL TO THE CONCRETE BREAK LINE AND NEW PARAPET EXCEPT AS SHOWN.  
DIMENSIONS SHOWN FOR CL-CL OF TRANSVERSE BARS, VERTICAL WALL BARS, AND CORNER BARS ARE MEASURED ALONG CL CULVERT.  
CONCRETE PER FOOT OF BARREL:  
SLAB = 2.9 CU. YDS.  
WALLS = 1.5 CU. YDS.  
FLOOR = 3.8 CU. YDS.  
TOTAL = 8.2 CU. YDS.

**REINFORCING BAR LIST-ONE 17'-0 EXTENSION**

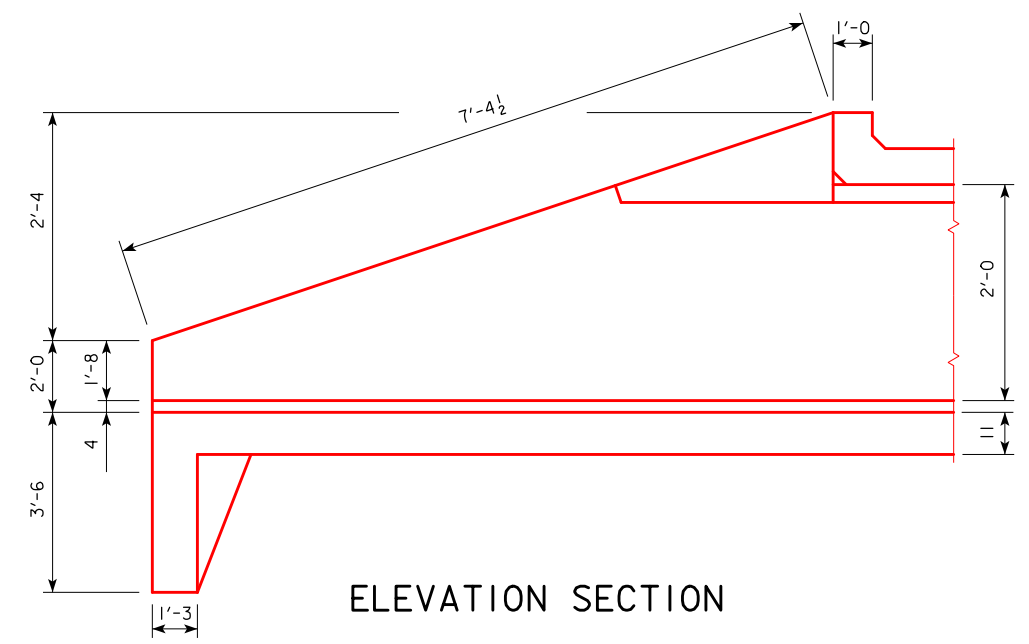
| BAR                              | LOCATION             | SHAPE | NO. | LENGTH | WEIGHT |
|----------------------------------|----------------------|-------|-----|--------|--------|
| 4a1                              | WALLS, F.F.V         | —     | 46  | 3'-5   | 105    |
| 4b1                              | WALLS, F.F.H & B.F.H | —     | 8   | 16'-10 | 90     |
| 4e1                              | SLAB, BOT. LONGIT.   | —     | 3   | 16'-10 | 34     |
| 4e2                              | SLAB, TOP LONGIT.    | —     | 4   | 16'-10 | 45     |
| 4f1                              | FLOOR, TOP LONGIT.   | —     | 5   | 16'-10 | 56     |
| 4f2                              | FLOOR, BOT. LONGIT.  | —     | 4   | 16'-10 | 45     |
| 4k1                              | SLAB, BOT. TRANSV.   | —     | 35  | 5'-2   | 121    |
| 5k2                              | SLAB, TOP CORNER     | └     | 40  | 6'-4   | 264    |
| 5m1                              | FLOOR, TOP TRANSV.   | —     | 20  | 5'-8   | 118    |
| 5m2                              | FLOOR, BOT. CORNER   | └     | 40  | 5'-0   | 209    |
| REINFORCING STEEL - TOTAL (LBS.) |                      |       |     |        | 1087   |

**BENT BAR DETAILS**

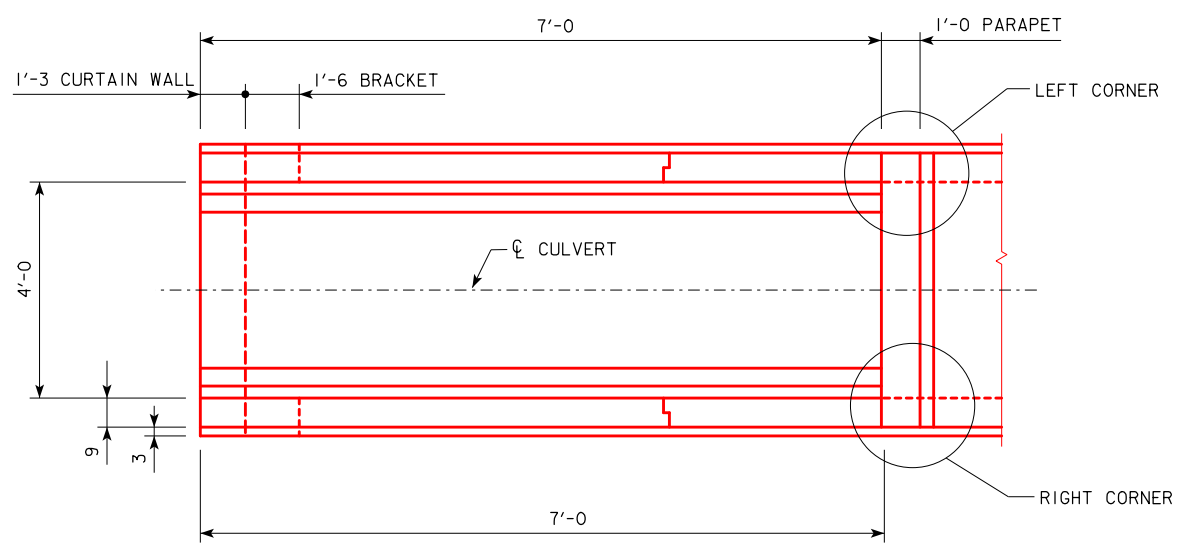


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE  
BOX CULVERT EXTENSION**  
**17'-0 CULVERT EXTENSION DETAILS**  
STATION 729+58.61 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 7 OF 12 FILE NO. 31463 DESIGN NO. 317



ELEVATION SECTION



PLAN VIEW

- NOTES:**
1. SEE DESIGN SHEET 1 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.
  2. SEE DESIGN SHEET 12 FOR HEADWALL NOTES.

DESIGN FOR 0°

**4'x2' REINFORCED CONCRETE  
BOX CULVERT EXTENSION  
PARALLEL WING DETAILS**

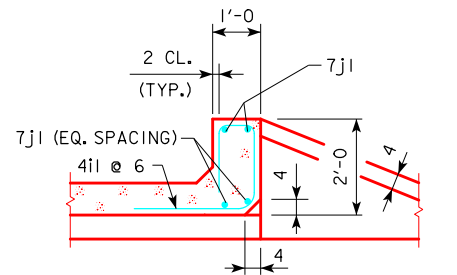
STATION 729+58.61 (US 6)      DECEMBER, 2017

**IOWA COUNTY**

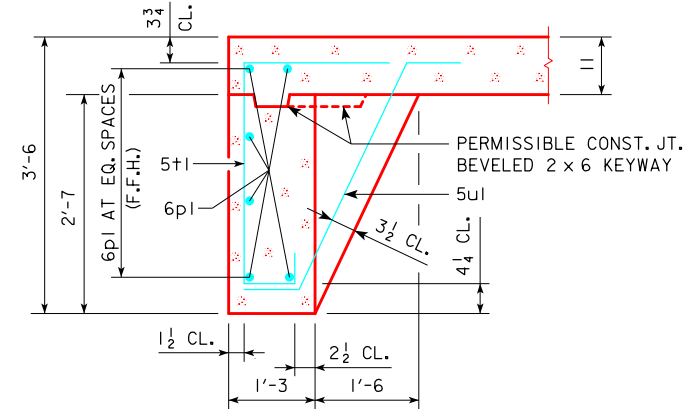
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 12    FILE NO. 31463    DESIGN NO. 317

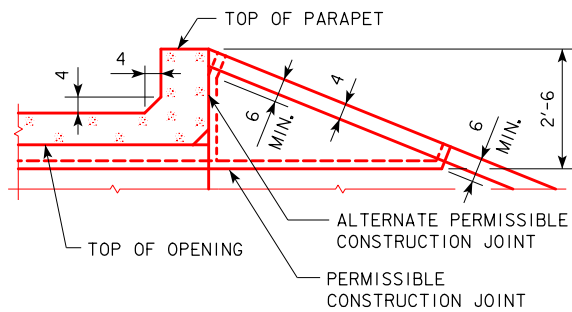
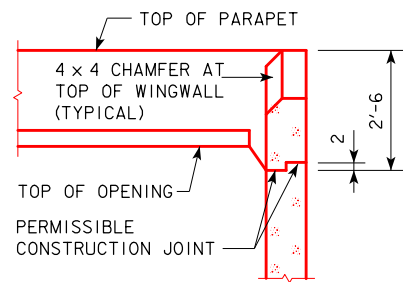




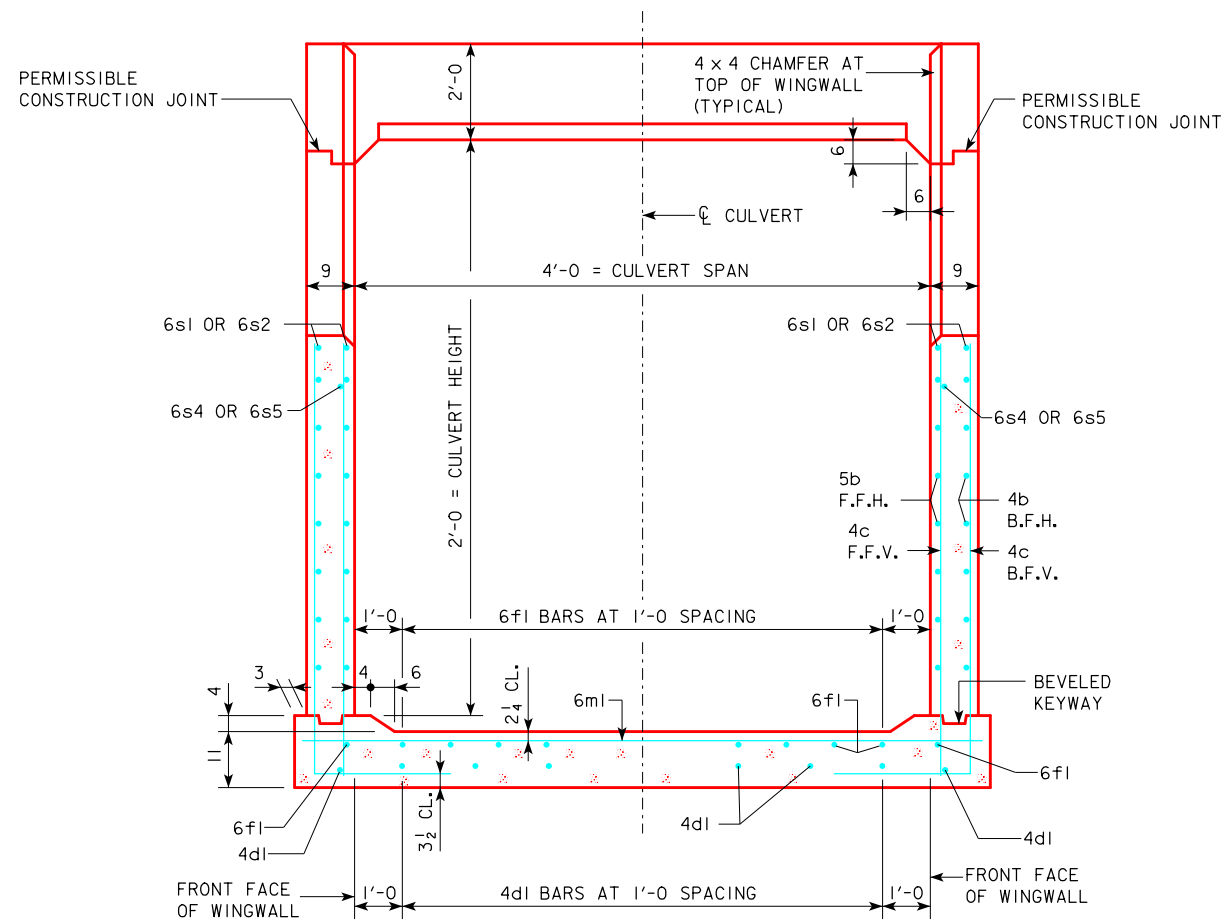
SECTION THRU PARAPET



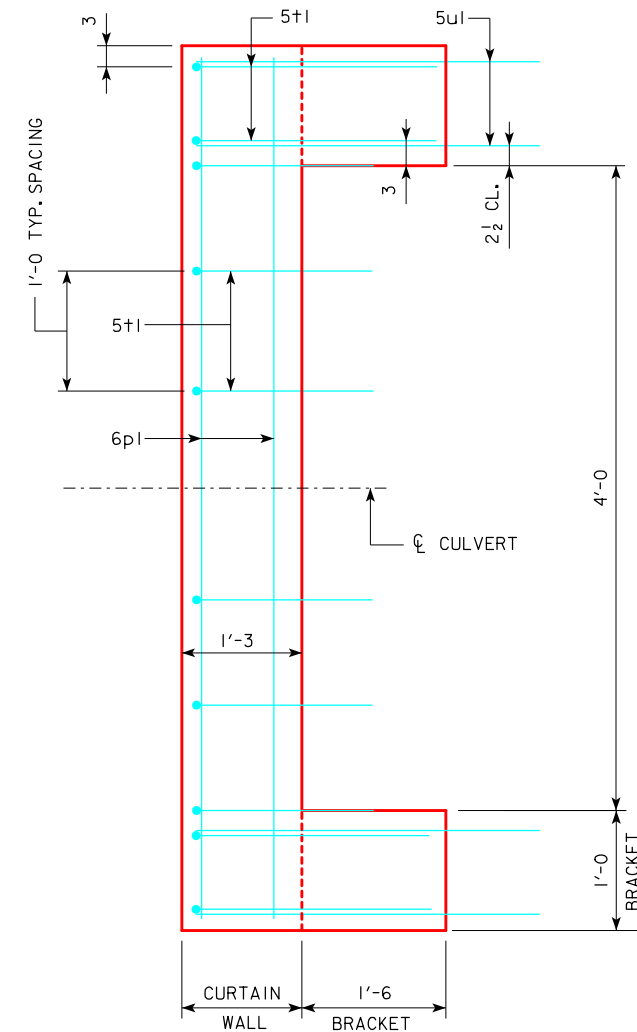
SECTION THRU CURTAIN WALL



TOP OF WINGWALL DETAILS

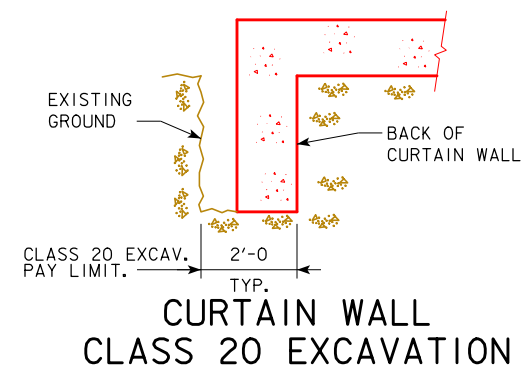


TYPICAL CROSS SECTION - THRU HEADWALL



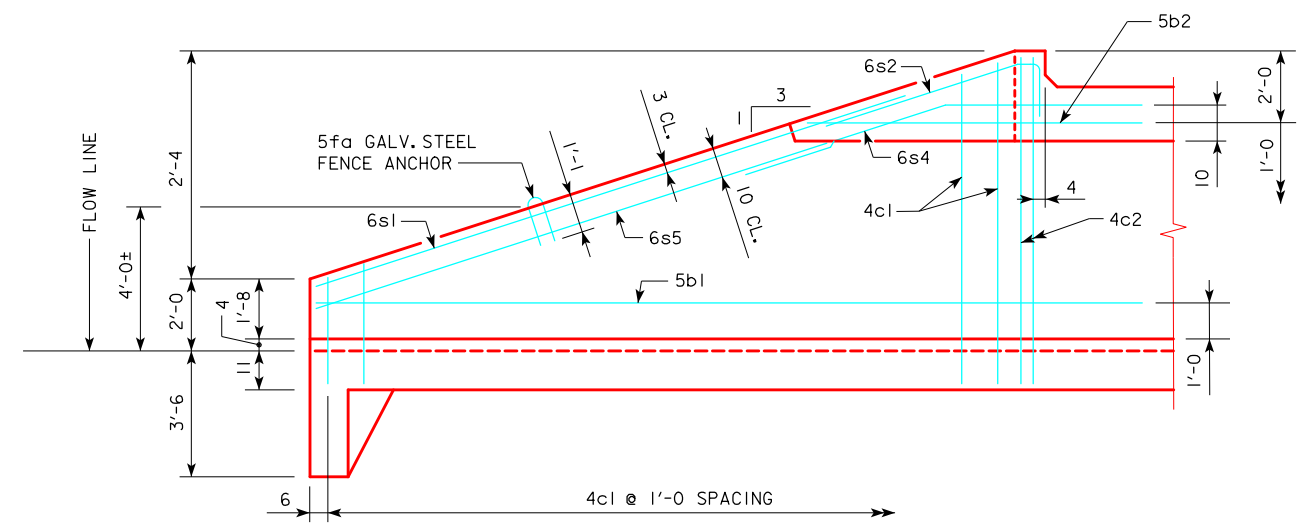
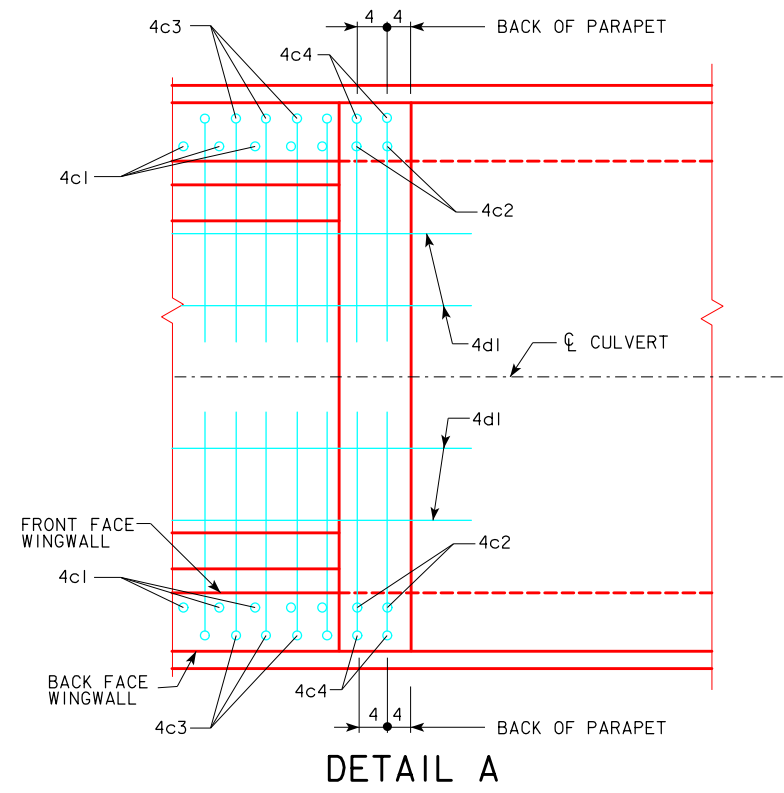
CURTAIN WALL DETAIL - PLAN VIEW

APRON IS NOT SHOWN

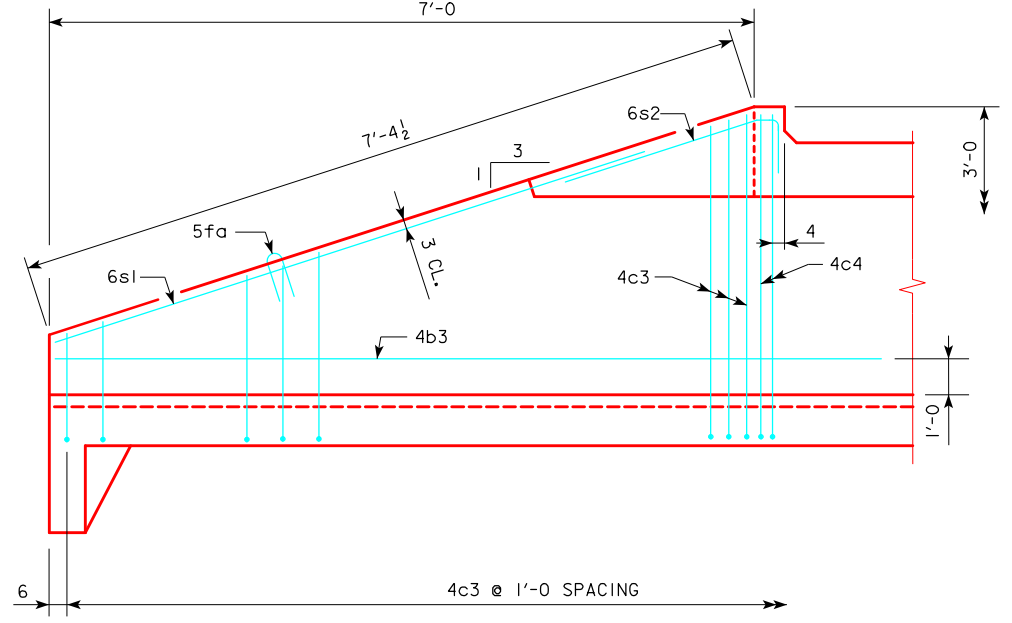


CURTAIN WALL CLASS 20 EXCAVATION

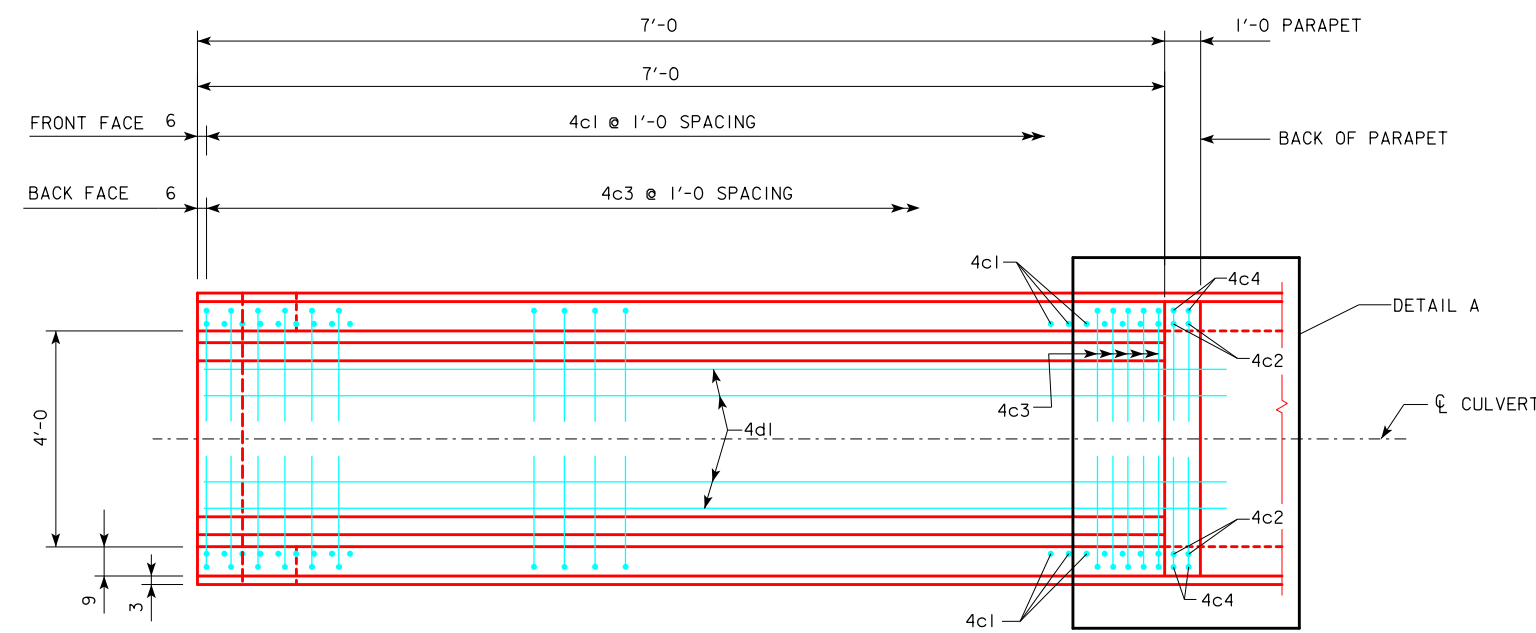
DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**PARALLEL WING HEADWALL DETAILS**  
 STATION 729+58.61 (US 6) DECEMBER, 2017  
 IOWA COUNTY  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 9 OF 12 FILE NO. 31463 DESIGN NO. 317



TYPICAL VIEW - FRONT FACE WINGWALL REINFORCING



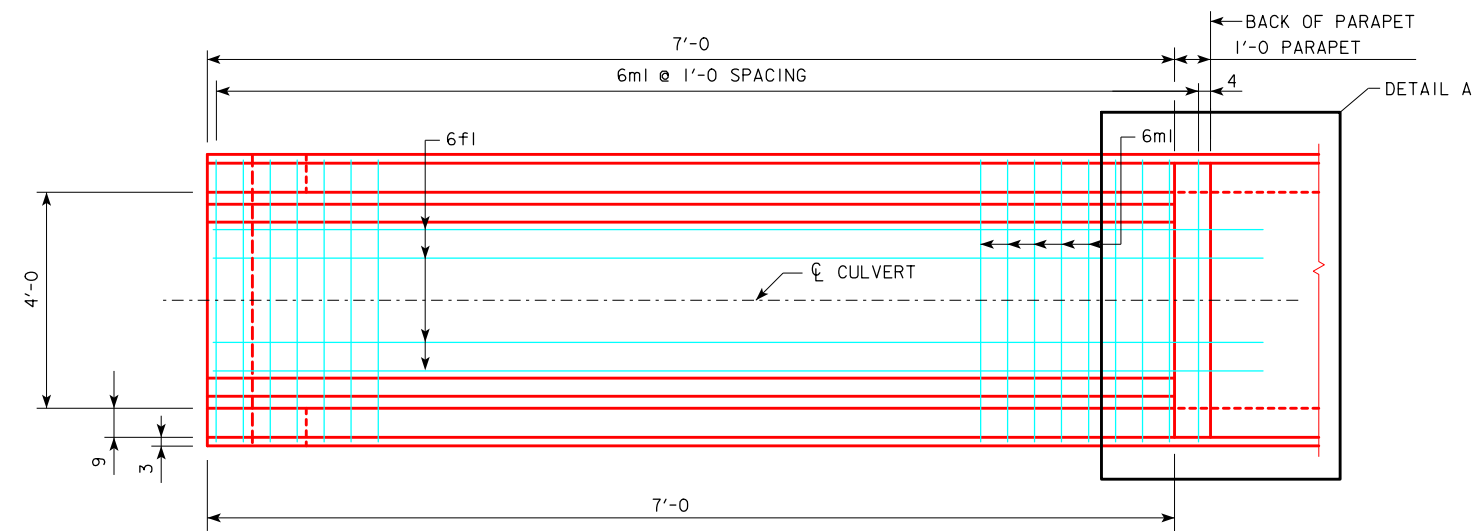
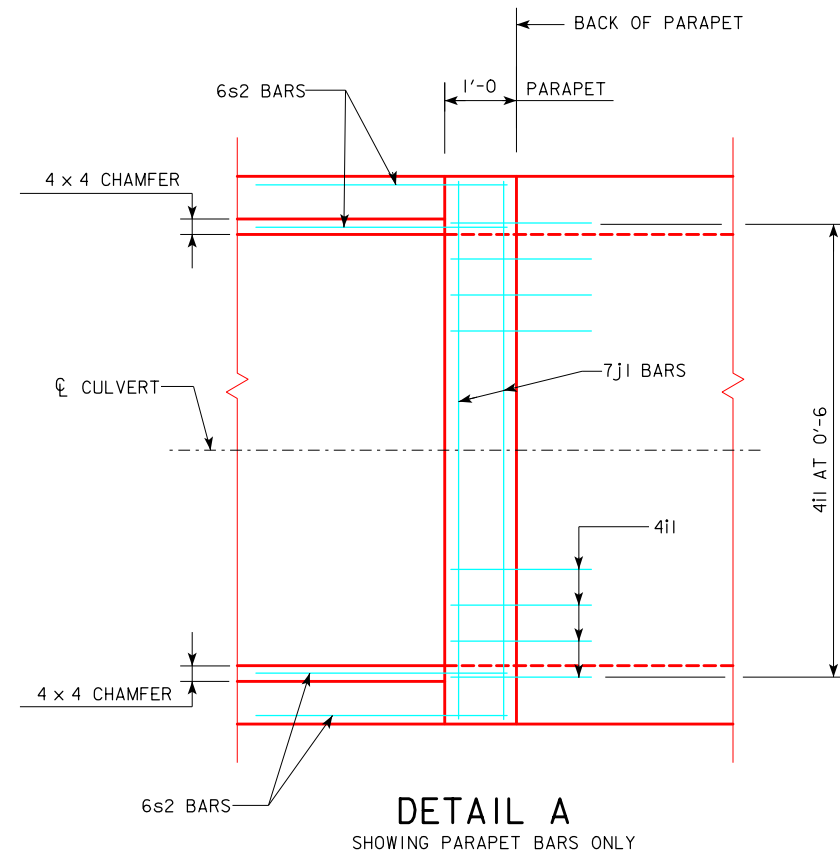
TYPICAL VIEW - BACK FACE WINGWALL REINFORCING



PLAN VIEW - BOTTOM APRON REINFORCING





















DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**PARALLEL WING HEADWALL DETAILS**  
 STATION 729+58.61 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 10 OF 12    FILE NO. 31463    DESIGN NO. 317





DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 PARAPET & APRON DETAILS**  
 STATION 729+58.61 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 11 OF 12    FILE NO. 31463    DESIGN NO. 317

## REINFORCING BAR LIST - ONE HEADWALL

| BAR                              | LOCATION             | SHAPE   | NO. | LENGTH              | WEIGHT |
|----------------------------------|----------------------|---|-----|---------------------|--------|
| 5fa                              | FENCE ANCHOR (GALV.) |    | 2   | 2'-10               | 6      |
| 5b1                              | WINGWALL, F.F.H.     |    | 2   | 9'-10               | 21     |
| 5b2                              | WINGWALL, F.F.H.     |    | 2   | 8'-10               | 18     |
| 4b3                              | WINGWALL, B.F.H.     |    | 2   | 9'-10               | 13     |
| 4c1                              | WINGWALL, F.F.V.     |    | 14  | 2 EACH 2'-6 TO 4'-6 | 33     |
| 4c2                              | WINGWALL, F.F.V.     |    | 4   | 4'-9                | 13     |
| 4c3                              | WINGWALL, B.F.V.     |    | 14  | 2 EACH 6'-1 TO 8'-1 | 66     |
| 4c4                              | WINGWALL, B.F.V.     |    | 4   | 8'-3                | 22     |
| 4d1                              | APRON, LONGIT., BOT. |    | 5   | 9'-10               | 33     |
| 6f1                              | APRON, LONGIT., TOP. |    | 5   | 9'-10               | 74     |
| 4i1                              | PARAPET, VERTICAL    |    | 9   | 6'-5                | 39     |
| 7j1                              | PARAPET, HORIZ.      |    | 4   | 5'-2                | 42     |
| 6m1                              | APRON, TRANS., TOP   |    | 8   | 5'-8                | 68     |
| 6p1                              | CURTAIN, HORIZ.      |    | 5   | 5'-8                | 43     |
| 6s1                              | WING SLOPE, BOTH F.  |    | 4   | 4'-1                | 25     |
| 6s2                              | WING SLOPE, BOTH F.  |    | 4   | 7'-9                | 47     |
| 6s4                              | WING SLOPE, F.F.     |    | 2   | 10'-0               | 30     |
| 6s5                              | WING SLOPE, F.F.     |    | 2   | 1'-9                | 5      |
| 5t1                              | CURTAIN, VERT.       |   | 9   | 6'-5                | 60     |
| 5u1                              | BRACKET, VERT.       |  | 4   | 5'-3                | 22     |
| REINFORCING STEEL - TOTAL (LBS.) |                      |   |     |                     | 680    |

### CONCRETE PLACEMENT QUANTITIES ONE HEADWALL

| LOCATION     | CY  |
|--------------|-----|
| PARAPET *    | 0.9 |
| WINGWALLS    | 0.7 |
| APRON        | 2.8 |
|              |     |
|              |     |
|              |     |
| TOTAL (C.Y.) | 4.4 |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

#### 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 3/4" DRESSED AND BEVELED STRIP.

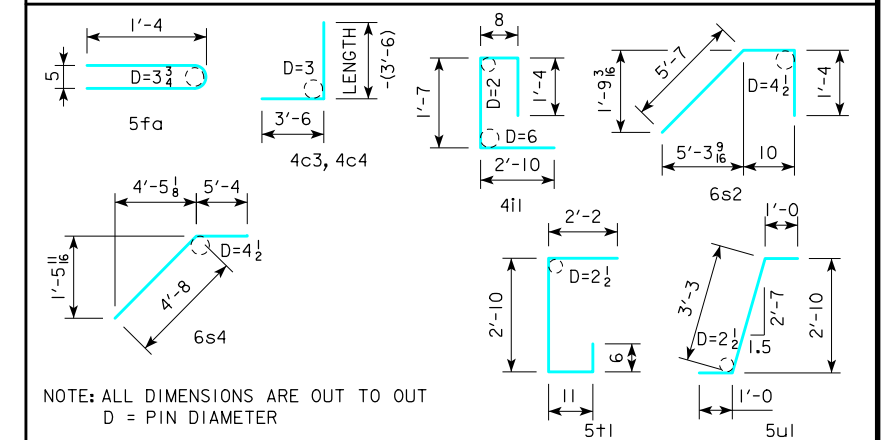
ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

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" & "s" 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.

#### BENT BAR DETAILS



DESIGN FOR 0°  
**4'x2' REINFORCED CONCRETE  
BOX CULVERT EXTENSION  
HEADWALL QUANTITIES**

STATION 729+58.61 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 12 OF 12    FILE NO. 31463    DESIGN NO. 317

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

## ESTIMATED CULVERT QUANTITIES

| ITEM NO. | ITEM CODE    | ITEM                              | UNIT | TOTAL | AS BUILT QUANTITY |
|----------|--------------|-----------------------------------|------|-------|-------------------|
| 1        | 2210-0475290 | MACADAM STONE BASE                | TON  | 85    |                   |
| 2        | 2401-6750001 | REMOVALS, AS PER PLAN             | LS   | 1     |                   |
| 3        | 2402-2720000 | EXCAVATION, CLASS 20              | CY   | 153   |                   |
| 4        | 2403-0100020 | STRUCTURAL CONCRETE (RCB CULVERT) | CY   | 59.8  |                   |
| 5        | 2404-7775000 | REINFORCING STEEL                 | LB   | 8980  |                   |
| 6        | 2533-4980005 | MOBILIZATION                      | LS   | 1     |                   |

ITEM NO.                      ESTIMATE REFERENCE INFORMATION

- 1 INCLUDES COST OF 1'-0" THICK WORKING BLANKET (MACADAM STONE BASE). SEE SPS. I FOR ADDITIONAL INFORMATION. THE WORKING BLANKET MAY BE DELETED IF DETERMINED TO BE UNNECESSARY AT THE TIME OF CONSTRUCTION. MACADAM STONE BASE MAY BE CONSTRUCTED ON NATURAL SOIL SUBGRADE AS INDICATED ON THE DRAWINGS. ESTIMATED AT 1.75 TON/CY.
- 2 INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL AS DETAILED ON THE SITUATION PLAN. 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 INCLUDES EXCAVATION NECESSARY TO PLACE THE 1'-0" THICK WORKING BLANKET. QUANTITY SHOULD BE REDUCED BY 48 CY IN THE EVENT THAT THE WORKING BLANKET IS DELETED. INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.

### SPECIFICATIONS:

DESIGN: AASHTO LRFD 5th Ed, SERIES OF 2010.

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, 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:

| DESIGN 417  |        |         |
|-------------|--------|---------|
| STANDARD    | ISSUED | REVISED |
| PWH 15-1-12 | 4-12   | 12-16   |
| PWH 15-2-12 | 4-12   | 12-16   |
| PWH 15-3-12 | 4-12   | 7-16    |
| PWH 15-4-12 | 4-12   | -       |
| PWH 15-9-12 | 4-12   | 7-16    |

### DESIGN 417

#### SUMMARY OF REINFORCING STEEL

| LOCATION           | QUANTITY | TOTAL |
|--------------------|----------|-------|
| HEADWALL 15° SKEW  | 2118     | 2118  |
| 21'-0" END SECTION | 2171     | 2171  |
| 24'-0" END SECTION | 2448     | 2448  |
| HEADWALL 15° SKEW  | 2118     | 2118  |
| 5z1 BARS           | 125      | 125   |
| TOTAL (LBS.)       |          | 8980  |

#### CONCRETE PLACEMENT QUANTITIES

| LOCATION           | FOOTING | WALLS | SLAB  | TOTAL |
|--------------------|---------|-------|-------|-------|
| HEADWALL 15° SKEW  | 6.7     | 5.1   | 1.0 * | 12.8  |
| 21'-0" END SECTION | 5.3     | 6.6   | 4.1   | 16.0  |
| 24'-0" END SECTION | 6.1     | 7.5   | 4.6   | 18.2  |
| HEADWALL 15° SKEW  | 6.7     | 5.1   | 1.0 * | 12.8  |
| TOTAL (C.Y.)       |         |       |       |       |
|                    | 24.8    | 24.3  | 10.7  | 59.8  |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

### DESIGN HISTORY AT THIS SITE

(INCLUDES THIS DESIGN)

| DES. NO. | TYPE OF WORK                                    |
|----------|---|
| 417      | 5'x6' REINFORCED CONCRETE BOX CULVERT EXTENSION |
|          |   |
|          |   |

NOTE:  
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

### DESIGN FOR 19° SKEW (R.A.) 5'x6' REINFORCED CONCRETE BOX CULVERT EXTENSION ESTIMATED QUANTITIES

STATION 973+44.77 (US 6)                      DECEMBER, 2017

### IOWA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 1 OF 7    FILE NO. 31463    DESIGN NO. 417





REVISED 11-2016 - ADDED THE WORD "THEREFORE" TO THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES.  
 REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRORD IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT.  
 ENGLISH\CULVERTS.DGN - 1043s2 - THIS SHEET ISSUED 10-08.

## GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 5' x 6' R.C.B. CULVERT.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.  
 FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 5 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

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

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

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

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

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

|                       |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|
| BAR SIZE NUMBER       | 4   | 5   | 6   | 7   | 8   |
| 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 2 1/4" TO NEAR TRANSV. REINF. BAR  
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR  
 END CLEARANCES:  
 VERTICAL TOP 2"  
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH  
 TRANSVERSE 2"

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN. CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

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

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

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

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

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

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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

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

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (50# IS 1/2 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.

ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 3'-0 OF NEW WORK WITH A TRANSITION SLOPE OF 1:6 OR SHALLOWER.

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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2x4 KEYWAYS, UNLESS NOTED OTHERWISE.

ALL EXPOSED CORNERS 90 DEGREES OR SHARPER TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

CONSTRUCTION SHALL BE DONE IN STAGES WITH AT LEAST ONE LANE TRAFFIC MAINTAINED AT ALL TIMES IN ACCORDANCE WITH "TRAFFIC CONTROL PLAN" NOTE.

CONSTRUCTION STAGES I & II AS DETAILED ON THESE PLANS MAY BE REVERSED AT THE CONTRACTOR'S OPTION SUBJECT TO THE ENGINEER'S APPROVAL.

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" ON DESIGN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

EXCEPT FOR DOWEL BARS 5r1, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.

### TRAFFIC CONTROL PLAN

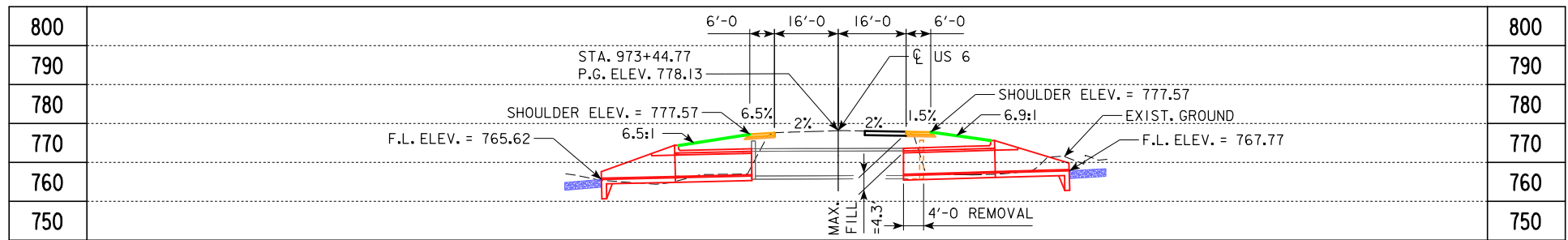
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

### NOTE:

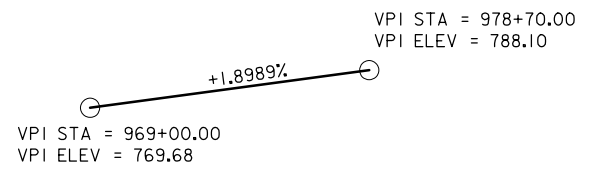
POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.



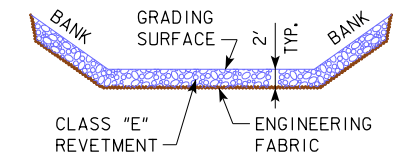
DESIGN FOR 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**CULVERT GENERAL NOTES**  
 STATION 973+44.77 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 2 OF 7    FILE NO. 31463    DESIGN NO. 417



BENCH MARK NO. 7: STA. 973+38.85, TOP OF RIGHT OF WAY RAIL, SOUTH SIDE US 6, 33.58' R., ELEV. 775.43



**PROFILE GRADE ON US 6 (UAC)**



**ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS**

| LOCATION | REVETMENT CL. "E" (TON) | ENGINEERING FABRIC (SY) |
|----------|-------------------------|-------------------------|
| INLET    | 27.3                    | 53                      |
| OUTLET   | 27.3                    | 53                      |
| TOTALS   | 54.6                    | 106                     |

**HYDRAULIC DATA**

DRAINAGE AREA = 70.4 ACRES  
 $Q_{50} = 342$  CFS  
 ROLLING

**UTILITIES LEGEND:**

- T1 - COOPERATIVE TELEPHONE COMPANY
- F0 - IOWA NETWORK SERVICES
- G - ALLIANT ENERGY
- F02 - MCI
- F03 - MEDIACOM
- T2 - WINDSTREAM COMMUNICATIONS
- F04 - SOUTH SLOPE COOPERATIVE
- x- - FENCE

**LOCATION**

ON US 6 OVER  
 DRAINAGE DITCH  
 T-80N R-IOW  
 SECTION 35  
 WASHINGTON TOWNSHIP  
 IOWA COUNTY  
 LATITUDE 41.776044  
 LONGITUDE -91.986139

**TRAFFIC ESTIMATE**

|              |           |        |
|--------------|-----------|--------|
| 2014 AADT    | 2600      | V.P.D. |
| 2034 AADT    | 3200      | V.P.D. |
| TRUCKS       | 10%       |        |
| DESIGN ESALS | 1,000,000 |        |

**LONGITUDINAL SECTION ALONG CL CULVERT**

DESIGN FILL HEIGHT = 5'-0"  
 ANTICIPATED SETTLEMENT = NEGLIGIBLE

**NOTES:**

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 5' X 6' REINFORCED CONCRETE BOX CULVERT WITH 19 DEGREE SKEW BY REMOVING 4' OF THE CULVERT AND THE CULVERT WINGWALLS ON THE SOUTH END AND REMOVING THE CULVERT WINGWALLS AS REQUIRED ON THE NORTH END AND ADDING A 5' X 6' X 24' & 5' X 6' X 21' REINFORCED CONCRETE BOX CULVERT EXTENSIONS WITH 15 DEGREE HEADWALLS ON THE SOUTH AND NORTH ENDS RESPECTIVELY.

THE RCB CULVERT EXTENSION IS DESIGNED FOR EARTH FILLS OF 5 FEET.

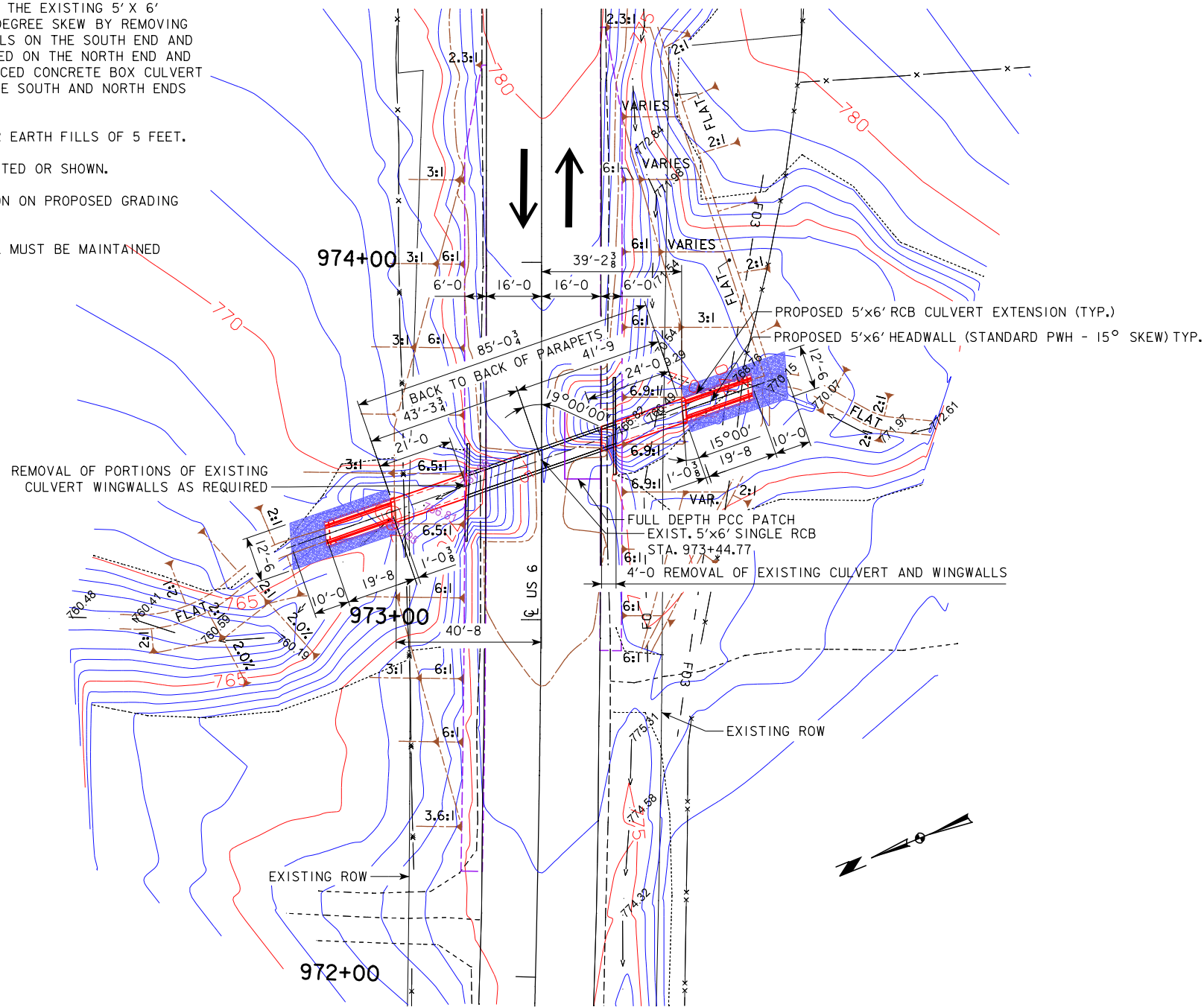
ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.

SEE ROAD SHEETS FOR ADDITIONAL INFORMATION ON PROPOSED GRADING LIMITS.

DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.

SEE H SHEETS FOR RIGHT OF WAY.

HEADWALLS SHALL BE PLACED LEVEL.

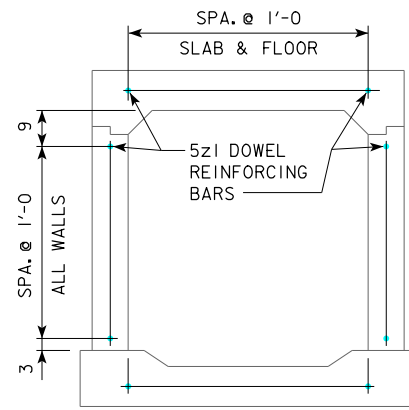


**SITUATION PLAN**

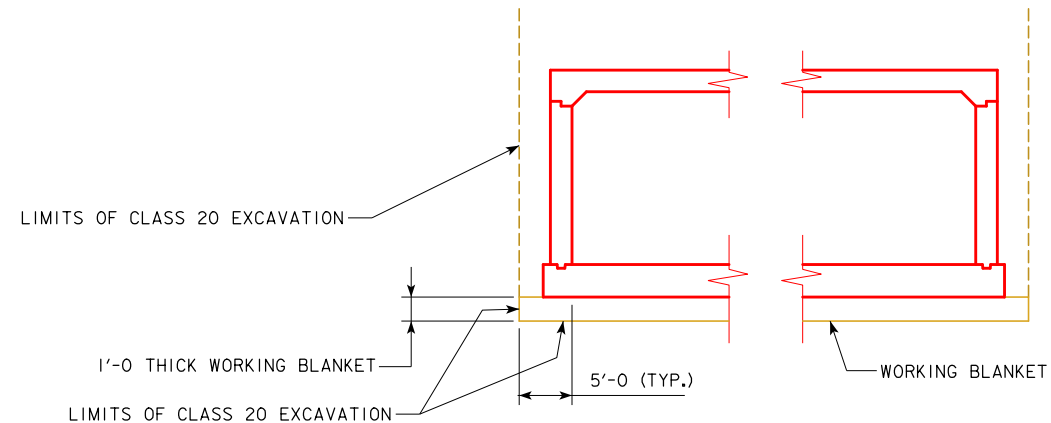
DESIGN FOR 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**SITUATION PLAN**  
 STATION 973+44.77 (US 6) DECEMBER, 2017  
 IOWA COUNTY  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 3 OF 7 FILE NO. 31463 DESIGN NO. 417



REVISED: CHANGED BRIDGE DESIGN MANUAL, SECTION 8 TO SECTION 7. (3-1-15)  
ENGLISHING\CULVERTS.DGN - 1047 - THIS SHEET ISSUED 03-12.



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

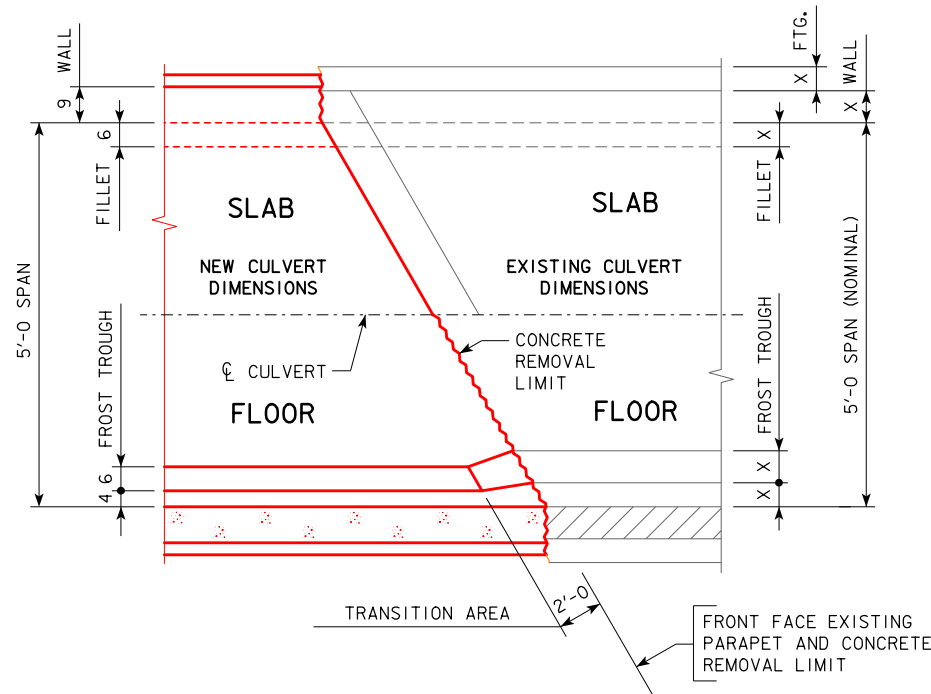


**WORKING BLANKET/EXCAVATION DETAILS**

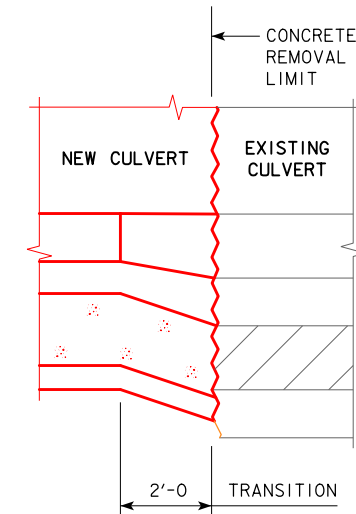
WORKING BLANKET SHALL TERMINATE 3'-0 SHORT OF CURTAIN WALL.  
WORKING BLANKET SHALL CONSIST OF MACADAM STONE (GRADATION No. 13 WITHOUT CHOKE STONE COURSE).

**REINFORCING STEEL EXTENSION DOWELS**

| BAR | LOCATION               | SHAPE | NO./JT. | TOTAL NO. | LENGTH | WEIGHT |
|-----|------------------------|-------|---------|-----------|--------|--------|
| 5z1 | TOP SLAB, CONST. JOINT |       | 24      | 48        | 2'-6   | 125    |



**CONCRETE TRANSITION DETAILS**  
(PLAN VIEW)  
'X' - EXISTING DIMENSION



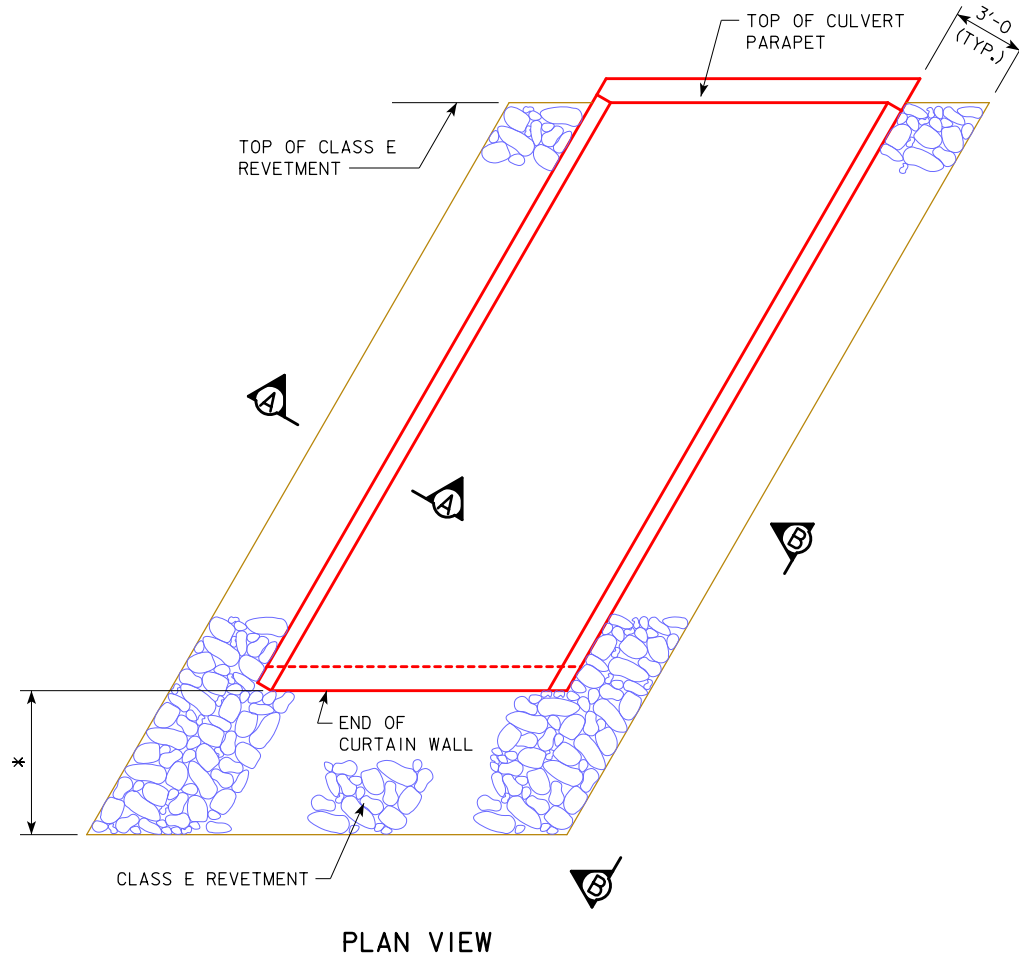
**CONCRETE TRANSITION DETAILS**  
(WALL TRANSITION SHOWN - TYPICAL FOR SLAB)

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

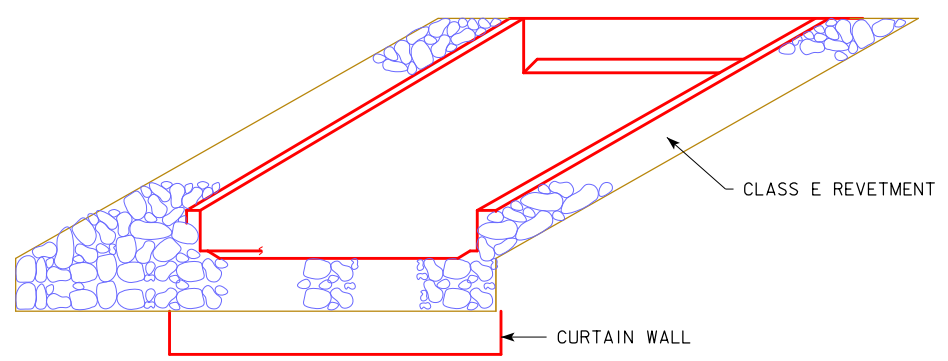
NOTE: DETAILS ON THIS SHEET SCHEMATIC ONLY, SEE PREVIOUS SHEETS FOR ACTUAL SKEWS.

DESIGN FOR 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**MISCELLANEOUS CULVERT DETAILS**  
STATION 973+44.77 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 4 OF 7    FILE NO. 31463    DESIGN NO. 417

REVISED 1-16 - ADDED NOTE "SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC."  
 REVISED 02-2017 - ADDED SECTION DIRECTORS "A-A" TO "ZERO SKEW" PLAN VIEW DETAIL.  
 ENGLISHING\INGLCULVERTS.DGN - 1092 - THIS SHEET ISSUED 04-12.

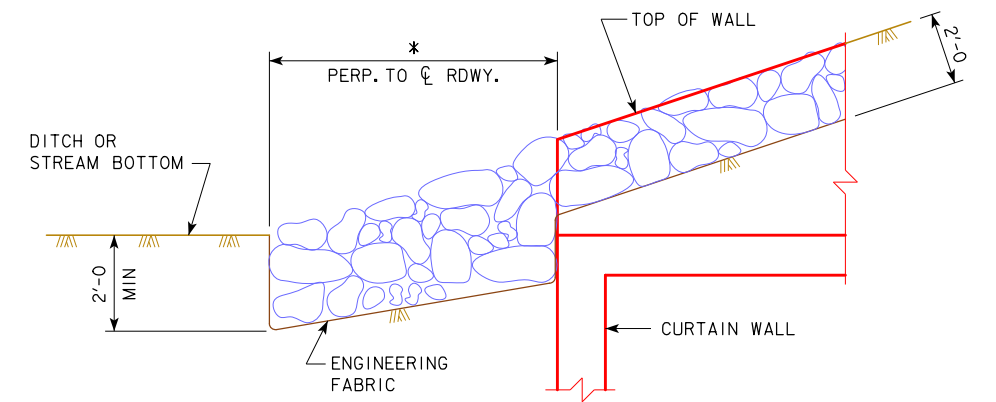


PLAN VIEW

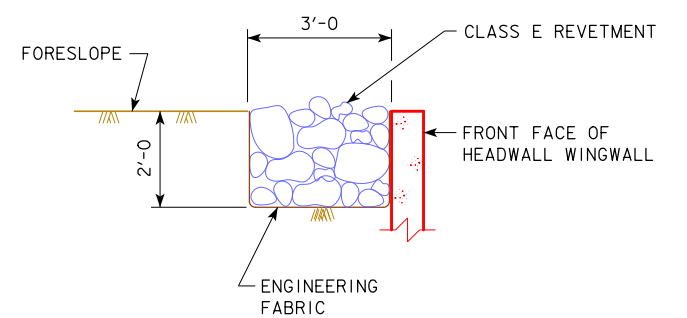


ELEVATION VIEW  
 15° SKEWED HEADWALL

\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



VIEW B-B



SECTION A-A

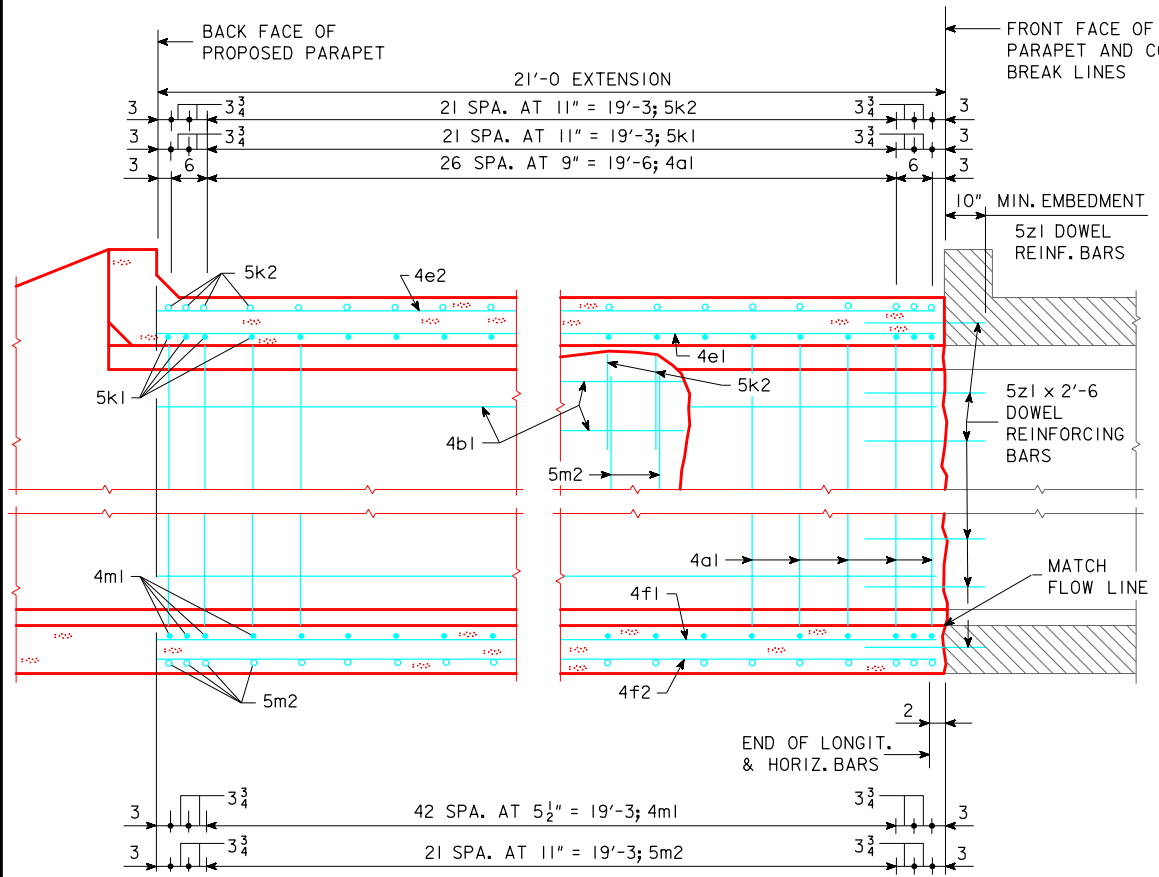
TYPICAL DETAILS

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 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**REVETMENT PROTECTION DETAILS**  
 STATION 973+44.77 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 5 OF 7 FILE NO. 31463 DESIGN NO. 417

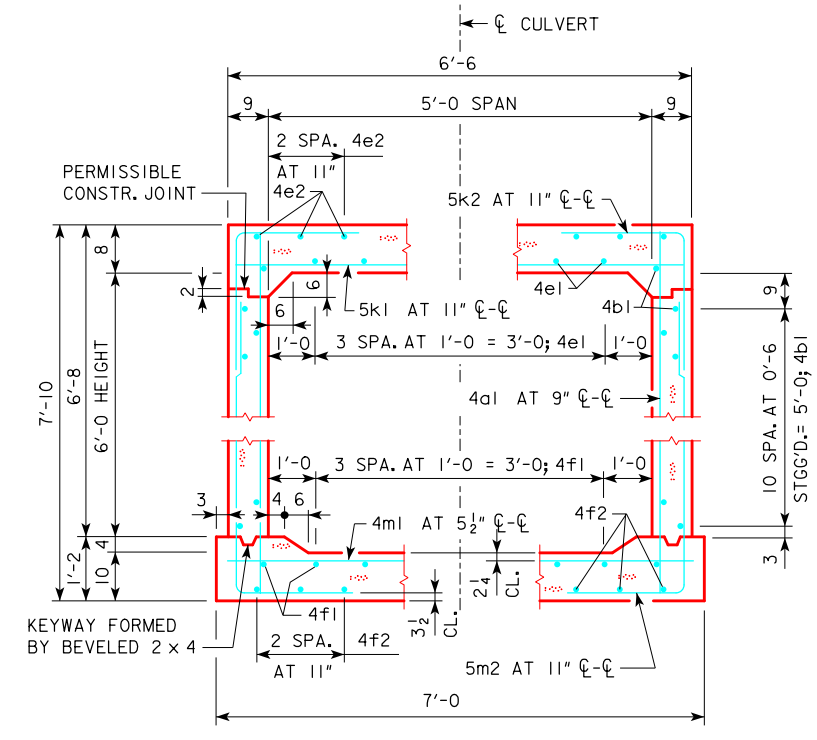
CORRECTION 05-14 - ADDED THE BAR LABELS K9 & m9 TO THE PART LONGIT. SECTIONS. HEL044.S01 (ASTD01044.S01--LEP: THIS SHEET REDRAWN. DEVICE:ZHA0R(200,004) ARCH.TAPE NO. 15 DATE 9-8-88)



**PART LONGITUDINAL SECTION**  
(ALONG CL OF CULVERT)

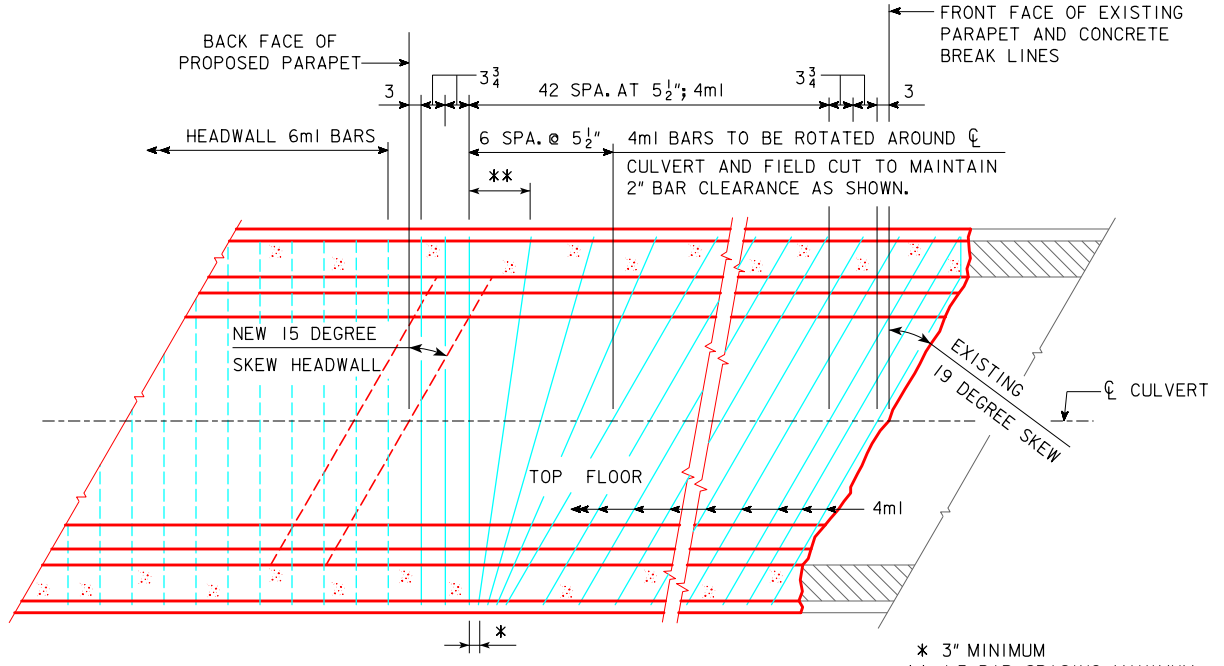
NOTE: ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.

NOTE: FIELD CUT 5k1 & 4m1 AS REQUIRED TO MAINTAIN 2" BAR CLEARANCE.



**SECTION THRU BARREL**  
(NORMAL TO CL CULVERT)

NOTE:  
ALL TRANSVERSE REINFORCING BARS AND HORIZONTAL LEGS OF CORNER BARS SHALL BE PLACED PARALLEL TO THE CONCRETE BREAK LINE AND NEW PARAPET EXCEPT AS SHOWN.  
DIMENSIONS SHOWN FOR CL-CL OF TRANSVERSE BARS, VERTICAL WALL BARS, AND CORNER BARS ARE MEASURED ALONG CL CULVERT.  
CONCRETE PER FOOT OF BARREL:  
SLAB = 4.1 CU. YDS.  
WALLS = 6.6 CU. YDS.  
FLOOR = 5.3 CU. YDS.  
TOTAL = 16.0 CU. YDS.



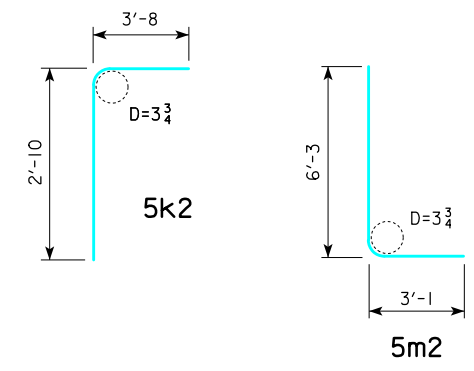
**TOP FLOOR TRANSVERSE BARS**

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

**REINFORCING BAR LIST - ONE EXTENSION**

| BAR                              | LOCATION             | SHAPE | NO. | LENGTH | WEIGHT |
|----------------------------------|----------------------|-------|-----|--------|--------|
| 4a1                              | WALLS, F.F.V         | —     | 58  | 7'-5   | 287    |
| 4b1                              | WALLS, F.F.H & B.F.H | —     | 24  | 21'-2  | 339    |
| 4e1                              | SLAB, BOT. LONGIT.   | —     | 4   | 21'-0  | 56     |
| 4e2                              | SLAB, TOP LONGIT.    | —     | 6   | 21'-0  | 84     |
| 4f1                              | FLOOR, TOP LONGIT.   | —     | 6   | 21'-0  | 84     |
| 4f2                              | FLOOR, BOT. LONGIT.  | —     | 6   | 21'-0  | 84     |
| 5k1                              | SLAB, BOT. TRANSV.   | —     | 26  | 6'-6   | 176    |
| 5k2                              | SLAB, TOP CORNER     | └     | 52  | 6'-6   | 353    |
| 4m1                              | FLOOR, TOP TRANSV.   | —     | 47  | 7'-0   | 220    |
| 5m2                              | FLOOR, BOT. CORNER   | └     | 52  | 9'-4   | 488    |
| REINFORCING STEEL - TOTAL (LBS.) |                      |       |     |        | 2171   |

**BENT BAR DETAILS**

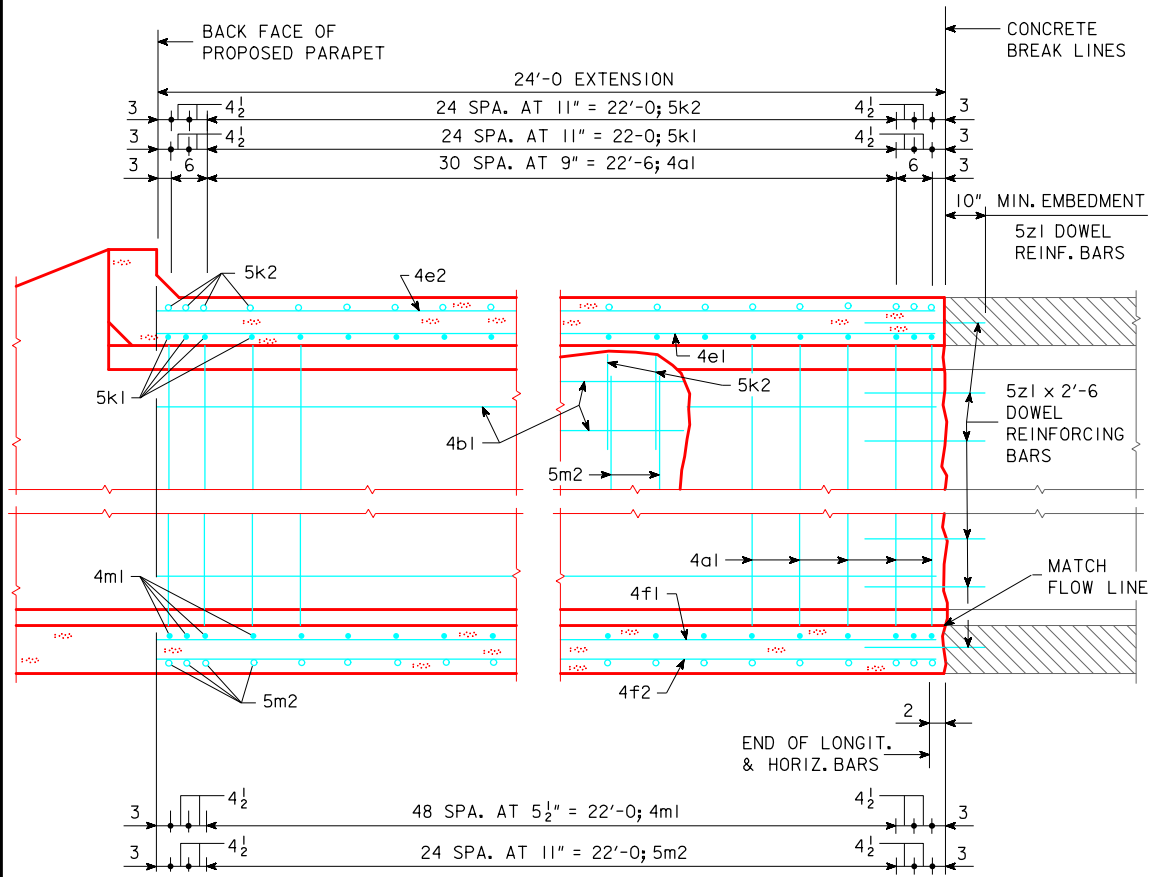


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

REMOVAL NOTE:  
CONTRACTOR SHALL REMOVE EXISTING WINGS FLUSH WITH THE EXTERIOR FACE OF THE EXISTING CULVERT WALLS AS NECESSARY TO FACILITATE CONSTRUCTION OF THE NEW CULVERT EXTENSION AND DITCH GRADES DETAILED IN THESE PLANS. THE CONTRACTOR'S SCHEME FOR MAINTAINING STABILITY OF THE PORTIONS OF THE WINGS NOT REMOVED SHALL BE APPROVED BY THE ENGINEER BEFORE CONSTRUCTION BEGINS.

DESIGN FOR 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE  
BOX CULVERT EXTENSION**  
**21'-0 CULVERT EXTENSION DETAILS**  
STATION 973+44.77 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 6 OF 7 FILE NO. 31463 DESIGN NO. 417

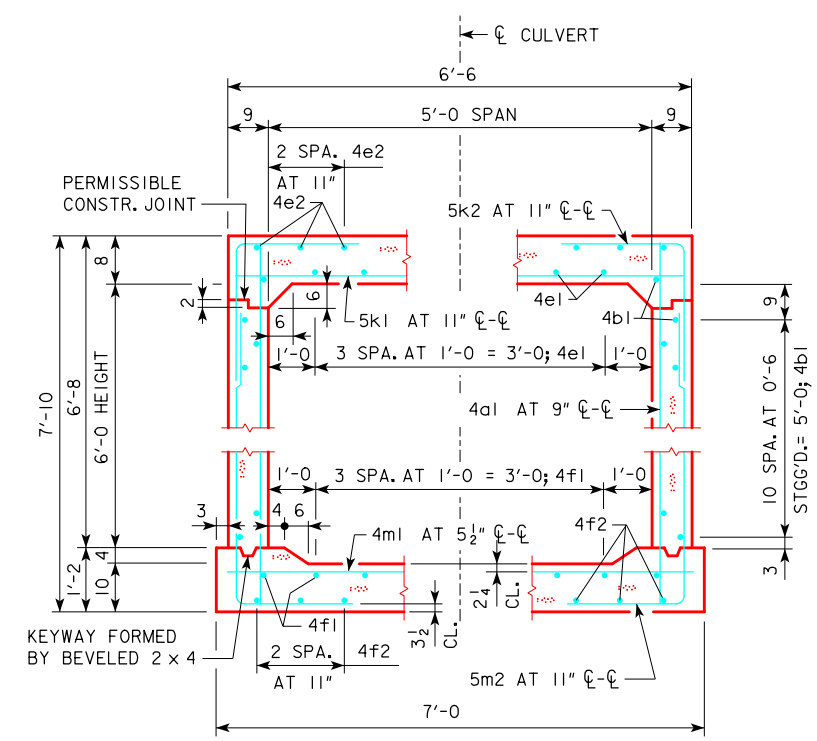
CORRECTION 05-14 - ADDED THE BAR LABELS K9 & m9 TO THE PART LONGIT. SECTIONS. HEL044.SOI (ASTD01044.SOI--LEP: THIS SHEET REDRAWN. DEVICE:ZHA0R(200,004) ARCH.TAPE NO. 15 DATE 9-8-88)



**PART LONGITUDINAL SECTION**  
(ALONG CL OF CULVERT)

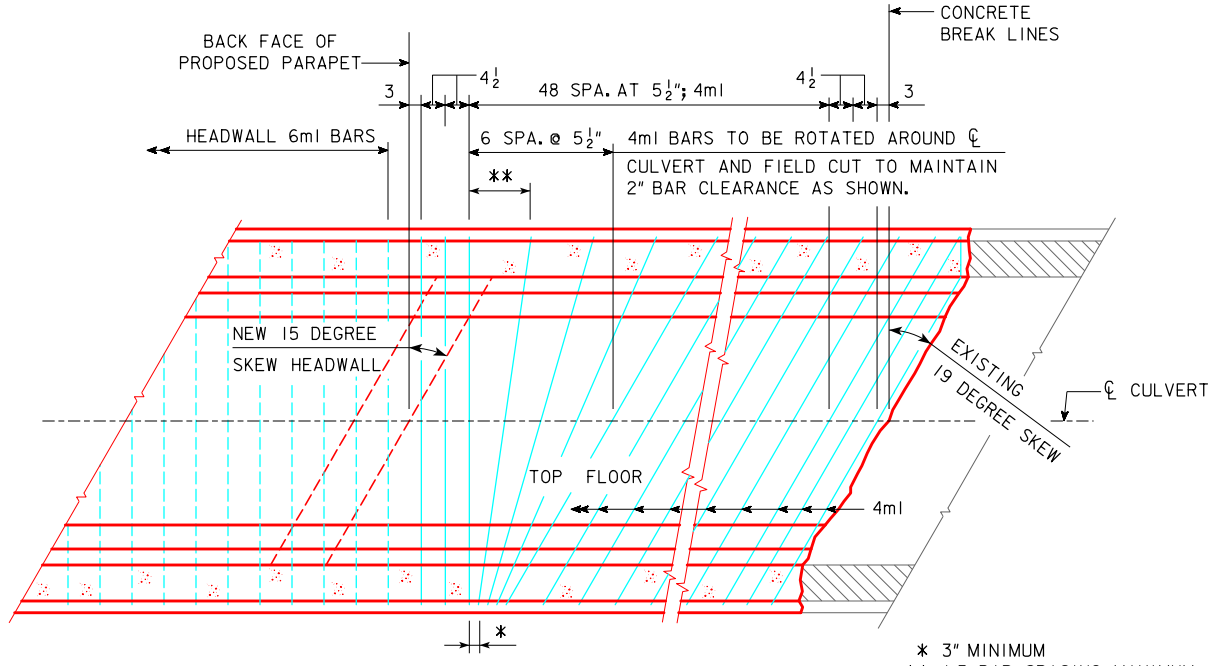
NOTE: ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.

NOTE: FIELD CUT 5k1 & 4m1 AS REQUIRED TO MAINTAIN 2\"/>



**SECTION THRU BARREL**  
(NORMAL TO CL CULVERT)

NOTE:  
ALL TRANSVERSE REINFORCING BARS AND HORIZONTAL LEGS OF CORNER BARS SHALL BE PLACED PARALLEL TO THE CONCRETE BREAK LINE AND NEW PARAPET EXCEPT AS SHOWN.  
DIMENSIONS SHOWN FOR CL-CL OF TRANSVERSE BARS, VERTICAL WALL BARS, AND CORNER BARS ARE MEASURED ALONG CL CULVERT.  
CONCRETE PER FOOT OF BARREL:  
SLAB = 4.6 CU. YDS.  
WALLS = 7.5 CU. YDS.  
FLOOR = 6.1 CU. YDS.  
TOTAL = 18.2 CU. YDS.



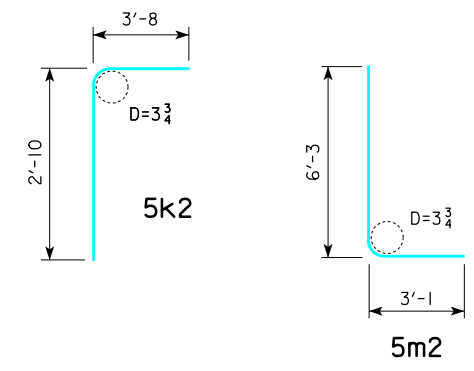
**TOP FLOOR TRANSVERSE BARS**

\* 3\"/>

**REINFORCING BAR LIST - ONE EXTENSION**

| BAR                              | LOCATION             | SHAPE | NO. | LENGTH | WEIGHT |
|----------------------------------|----------------------|-------|-----|--------|--------|
| 4a1                              | WALLS, F.F.V         | —     | 66  | 7'-5   | 327    |
| 4b1                              | WALLS, F.F.H & B.F.H | —     | 24  | 24'-2  | 387    |
| 4e1                              | SLAB, BOTT. LONGIT.  | —     | 4   | 24'-0  | 64     |
| 4e2                              | SLAB, TOP LONGIT.    | —     | 6   | 24'-0  | 96     |
| 4f1                              | FLOOR, TOP LONGIT.   | —     | 6   | 24'-0  | 96     |
| 4f2                              | FLOOR, BOTT LONGIT.  | —     | 6   | 24'-0  | 96     |
| 5k1                              | SLAB, BOTT. TRANSV.  | —     | 29  | 6'-6   | 197    |
| 5k2                              | SLAB, TOP CORNER     | —     | 58  | 6'-6   | 393    |
| 4m1                              | FLOOR, TOP TRANSV.   | —     | 53  | 7'-0   | 248    |
| 5m2                              | FLOOR, BOTT. CORNER  | —     | 58  | 9'-4   | 544    |
| REINFORCING STEEL - TOTAL (LBS.) |                      |       |     |        | 2448   |

**BENT BAR DETAILS**



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

REMOVAL NOTE:  
CONTRACTOR SHALL REMOVE 4'-0\"/>

DESIGN FOR 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**24'-0 CULVERT EXTENSION DETAILS**  
 STATION 973+44.77 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 7 OF 7 FILE NO. 31463 DESIGN NO. 417

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

## ESTIMATED CULVERT QUANTITIES

| ITEM NO. | ITEM CODE    | ITEM                              | UNIT | TOTAL | AS BUILT QUANTITY |
|----------|--------------|-----------------------------------|------|-------|-------------------|
| 1        | 2102-0425071 | SPECIAL BACKFILL                  | CY   | 8     |                   |
| 2        | 2401-6750001 | REMOVALS, AS PER PLAN             | LS   | 1     |                   |
| 3        | 2402-2720000 | EXCAVATION, CLASS 20              | CY   | 46    |                   |
| 4        | 2403-0100020 | STRUCTURAL CONCRETE (RCB CULVERT) | CY   | 15.2  |                   |
| 5        | 2404-7775000 | REINFORCING STEEL                 | LB   | 2166  |                   |
| 6        | 2533-4980005 | MOBILIZATION                      | LS   | 1     |                   |

ITEM NO.                      ESTIMATE REFERENCE INFORMATION

- 1      INCLUDES COST OF 1'-0" THICK WORKING BLANKET (SPECIAL BACKFILL). THE WORKING BLANKET MAY BE DELETED IF DETERMINED TO BE UNNECESSARY AT THE TIME OF CONSTRUCTION. RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR THE SPECIAL BACKFILL.
- 2      INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL AS DETAILED ON THE SITUATION PLAN. 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      INCLUDES EXCAVATION NECESSARY TO PLACE THE 1'-0" THICK WORKING BLANKET. QUANTITY SHOULD BE REDUCED BY 8 CY IN THE EVENT THAT THE WORKING BLANKET IS DELETED. INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.

### SPECIFICATIONS:

DESIGN: AASHTO LRFD 5th Ed, SERIES OF 2010.

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, 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 517 |        |         |
|------------|--------|---------|
| STANDARD   | ISSUED | REVISED |
| ---        | ---    | ---     |

| DESIGN 517                   |          |       |  |  |
|------------------------------|----------|-------|--|--|
| SUMMARY OF REINFORCING STEEL |          |       |  |  |
| LOCATION                     | QUANTITY | TOTAL |  |  |
| 17'-0" BARREL EXTENSION      | 1235     | 1235  |  |  |
| HEADWALL 0° SKEW             | 889      | 889   |  |  |
| 5z1 BARS                     | 42       | 42    |  |  |
|                              |          |       |  |  |
| TOTAL (LBS.)                 |          | 2166  |  |  |

| CONCRETE PLACEMENT QUANTITIES |         |       |       |       |
|-------------------------------|---------|-------|-------|-------|
| LOCATION                      | FOOTING | WALLS | SLAB  | TOTAL |
| 17'-0" BARREL EXTENSION       | 3.8     | 2.5   | 2.9   | 9.2   |
| HEADWALL 0° SKEW              | 3.5     | 1.6   | 0.9 * | 6     |
|                               |         |       |       |       |
| TOTAL (C.Y.)                  |         | 7.3   | 4.1   | 15.2  |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

| DESIGN HISTORY<br>AT THIS SITE<br>(INCLUDES THIS DESIGN) |   |
|--|---|
| DES. NO.   | TYPE OF WORK                                    |
| 517  | 4'x3' REINFORCED CONCRETE BOX CULVERT EXTENSION |
|  |   |
|  |   |

NOTE:  
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW

### 4'x3' REINFORCED CONCRETE BOX CULVERT EXTENSION

#### ESTIMATED QUANTITIES

STATION 1086+18.00 (US 6)                      DECEMBER, 2017

## IOWA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO.   1   OF  11  FILE NO.  31463  DESIGN NO.  517



REVISED 11-2016 - ADDED THE WORD "THEREFORE" TO THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES.  
 REVISED 02-2017 - UPDATED THE PARAGRAPH STATING THE HIGHWAY WILL NOT BE CLOSED, IN THE GENERAL NOTES TO MATCH WHAT IS WRDDED IN THE DESIGN MANUAL. UPDATED PARAGRAPH DISCUSSING THE REMOVAL OF EXISTING CULVERT.  
 ENGLISHINGLECULVERTS.DGN - 1043s2 - THIS SHEET ISSUED 10-08.

## GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 4' x 3' R.C.B. CULVERT.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

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

THE R.C.B. CULVERT EXTENSION SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILL OF 4 FEET. THIS DESIGN IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN, ACCORDING TO THE 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

VERTICAL EARTH PRESSURE,  $E_v = 0.120$  kcf.

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

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

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

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

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

|                       |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|
| BAR SIZE NUMBER       | 4   | 5   | 6   | 7   | 8   |
| 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 2 1/4" TO NEAR TRANSV. REINF. BAR  
 BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSV. REINF. BAR  
 END CLEARANCES:  
 VERTICAL TOP 2"  
 VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH  
 TRANSVERSE 2"

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN. CLASS 20 EXCAVATION MATERIAL UNSUITABLE FOR BACKFILLING SHALL BE DISPOSED OF IN A MANNER THAT WILL LEAVE THE SITE IN A NEAT CONDITION.

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

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

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

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

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

THE ROADWAY WILL BE OPEN TO TRAFFIC DURING CONSTRUCTION.

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

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

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS 1/2 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.

ANY DIMENSIONAL TRANSITION REQUIRED BETWEEN EXISTING STRUCTURE AND THE EXTENSION SHALL BE MADE IN THE FIRST 3'-0 OF NEW WORK WITH A TRANSITION SLOPE OF 1:6 OR SHALLOWER.

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.

ALL CONSTRUCTION JOINTS ARE TO BE FORMED WITH BEVELED 2x4 KEYWAYS, UNLESS NOTED OTHERWISE.

ALL EXPOSED CORNERS 90 DEGREES OR SHARPER TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

CONSTRUCTION SHALL BE DONE IN STAGES WITH AT LEAST ONE LANE TRAFFIC MAINTAINED AT ALL TIMES IN ACCORDANCE WITH "TRAFFIC CONTROL PLAN" NOTE.

CONSTRUCTION STAGES I & II AS DETAILED ON THESE PLANS MAY BE REVERSED AT THE CONTRACTOR'S OPTION SUBJECT TO THE ENGINEER'S APPROVAL.

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" ON DESIGN HAS REMAINED UNDISTURBED AND NO ROADWAY FILL HAS BEEN PLACED.

EXCEPT FOR DOWEL BARS 5r1, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.

### TRAFFIC CONTROL PLAN

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

### NOTE:

POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**CULVERT GENERAL NOTES**

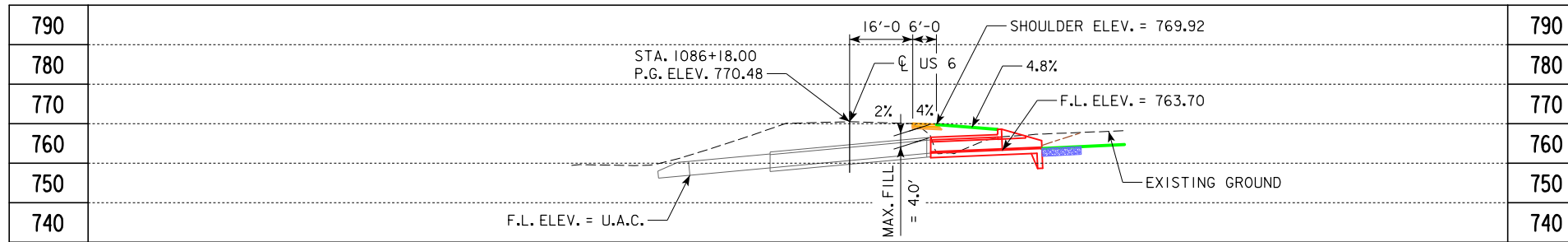
STATION 1086+18.00 (US 6) DECEMBER, 2017

**IOWA COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 2 OF 11 FILE NO. 31463 DESIGN NO. 517







BENCH MARK NO. 7: STA. 973+38.85, TOP OF RIGHT OF WAY RAIL, SOUTH SIDE US 6, 33.58' R., ELEV. 775.43

VPI STA = 1082+00.00  
VPI ELEV = 770.52  
-0.01%  
VPI STA = 1092+00.00  
VPI ELEV = 770.42

**PROFILE GRADE ON US 6 (UAC)**

**LONGITUDINAL SECTION ALONG CL CULVERT**

DESIGN FILL HEIGHT = 4'-0"  
ANTICIPATED SETTLEMENT = NEGLIGIBLE

**NOTES:**

IT IS THE INTENT OF THIS DESIGN TO EXTEND THE EXISTING 4' x 3' REINFORCED CONCRETE BOX CULVERT WITH 0 DEGREE SKEW BY REMOVING THE CULVERT WINGWALLS AS REQUIRED AT THE SOUTH END AND ADDING A 4' x 3' x 17' REINFORCED CONCRETE BOX CULVERT EXTENSION AND HEADWALL ON THE SOUTH SIDE OF THE CULVERT ONLY.

THE RCB CULVERT EXTENSION IS DESIGNED FOR EARTH FILLS OF 4 FEET.

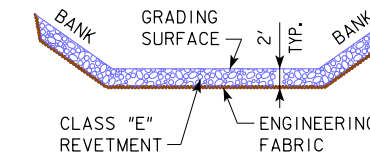
ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.

SEE ROAD SHEETS FOR ADDITIONAL INFORMATION ON PROPOSED GRADING LIMITS.

DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.

SEE H SHEETS FOR RIGHT OF WAY.

HEADWALLS SHALL BE PLACED LEVEL.



**ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS**

| LOCATION | REVETMENT CL. "E" (TON) | ENGINEERING FABRIC (SY) |
|----------|-------------------------|-------------------------|
| INLET    | 20.7                    | 37.9                    |
| OUTLET   | 0                       | 0                       |
| TOTALS   | 20.7                    | 37.9                    |

**HYDRAULIC DATA**

DRAINAGE AREA = 35.6 ACRES  
Q<sub>50</sub> = 161 CFS  
ROLLING

**UTILITIES LEGEND:**

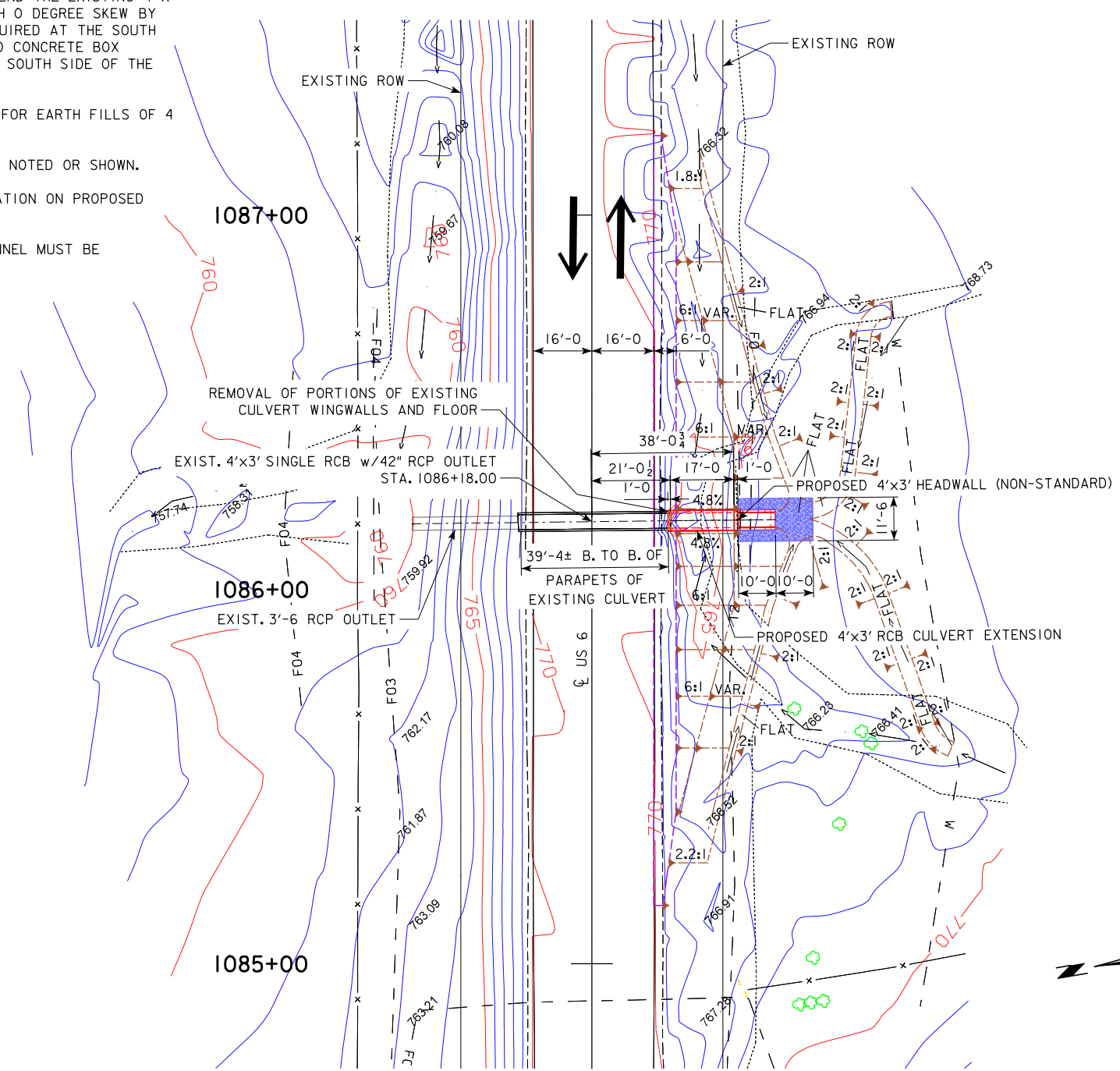
- T1 - COOPERATIVE TELEPHONE COMPANY
- F0 - IOWA NETWORK SERVICES
- G - ALLIANT ENERGY
- F02 - MCI
- F03 - MEDIACOM
- T2 - WINDSTREAM COMMUNICATIONS
- F04 - SOUTH SLOPE COOPERATIVE
- W - POWESHIK WATER ASSOCIATION
- x- - FENCE

**LOCATION**

ON US 6 OVER  
DRAINAGE DITCH  
T-80N R-9W  
SECTION 6  
IOWA TOWNSHIP  
IOWA COUNTY  
LATITUDE 41.771544  
LONGITUDE -91.945344

**TRAFFIC ESTIMATE**

|              |         |        |
|--------------|---------|--------|
| 2014 AADT    | 2350    | V.P.D. |
| 2034 AADT    | 2900    | V.P.D. |
| TRUCKS       | 9%      |        |
| DESIGN ESALS | 800,000 |        |



**SITUATION PLAN**

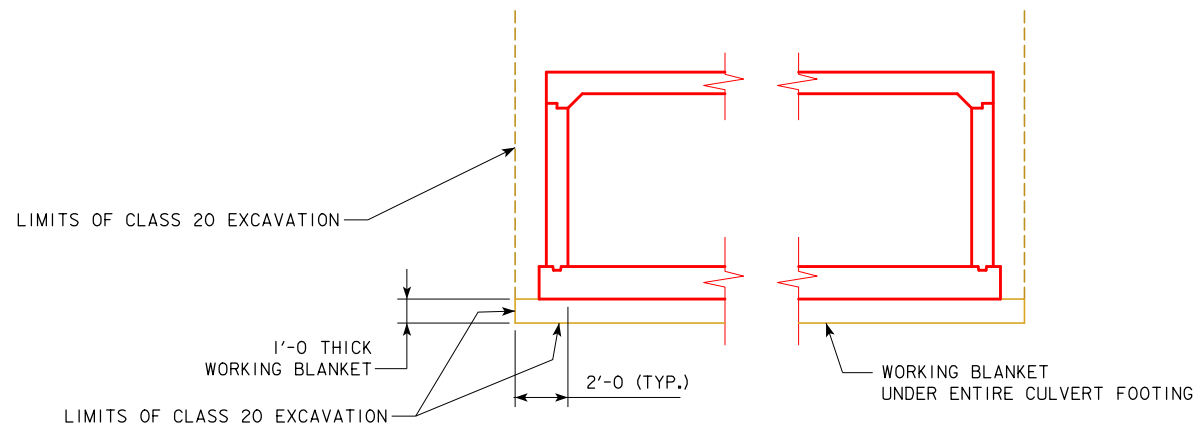
DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE BOX CULVERT EXTENSION SITUATION PLAN**

STATION 1086+18.00 (US 6) DECEMBER, 2017

**IOWA COUNTY**

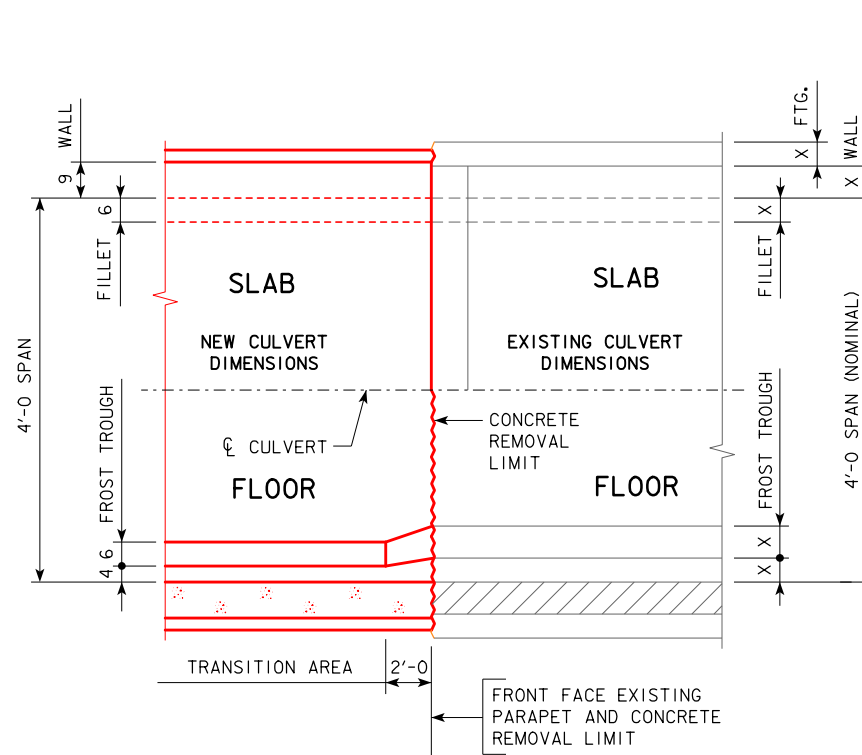
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 3 OF 11 FILE NO. 31463 DESIGN NO. 517





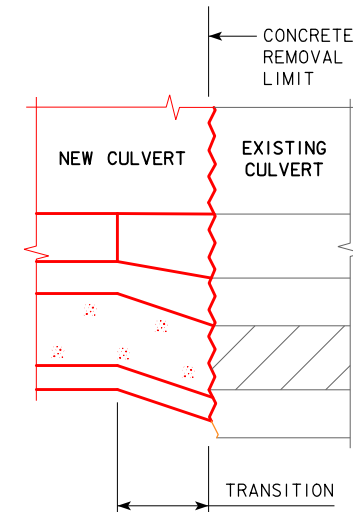
**WORKING BLANKET/EXCAVATION DETAILS**

WORKING BLANKET SHALL TERMINATE 3'-0 SHORT OF CURTAIN WALL.



**CONCRETE TRANSITION DETAILS**

(PLAN VIEW)  
 'X' - EXISTING DIMENSION



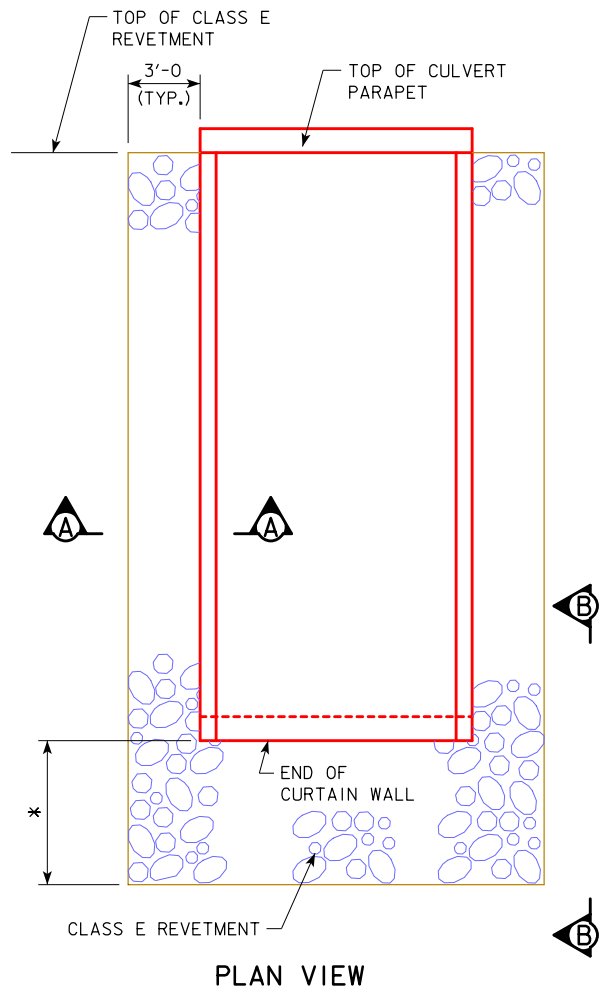
**CONCRETE TRANSITION DETAILS**

(WALL TRANSITION SHOWN - TYPICAL FOR SLAB)

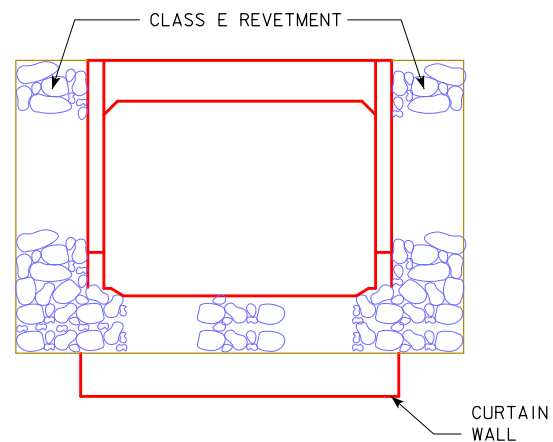
DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**MISCELLANEOUS CULVERT DETAILS**  
 STATION 1086+18.00 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 11    FILE NO. 31463    DESIGN NO. 517

REVISED: CHANGED BRIDGE DESIGN MANUAL, SECTION 8 TO SECTION 7. (3-1-15)  
 ENGLISHINGCULVERTS.DGN - 1047 - THIS SHEET ISSUED 03-12.

\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.

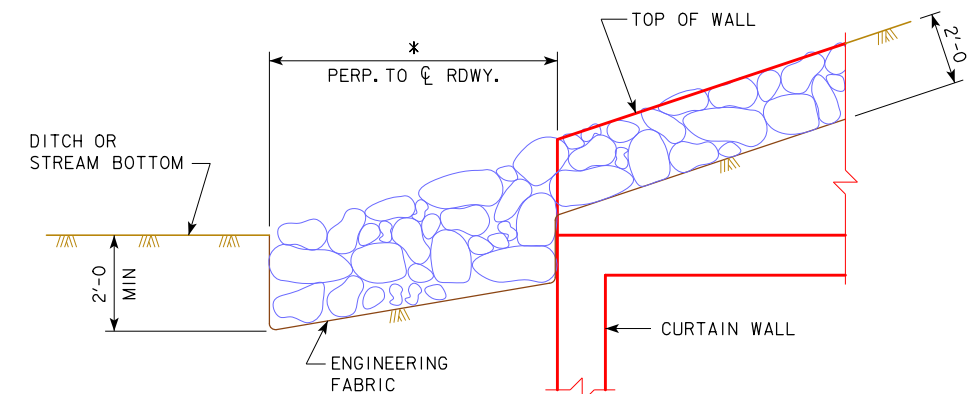


PLAN VIEW

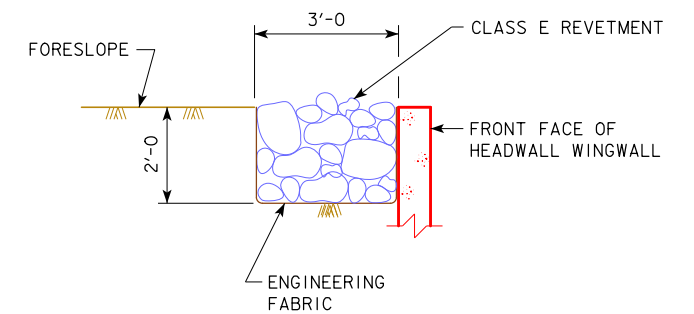


ELEVATION VIEW  
0° SKEW HEADWALLS

\* = SEE SITUATION PLAN FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



VIEW B-B



SECTION A-A

TYPICAL DETAILS

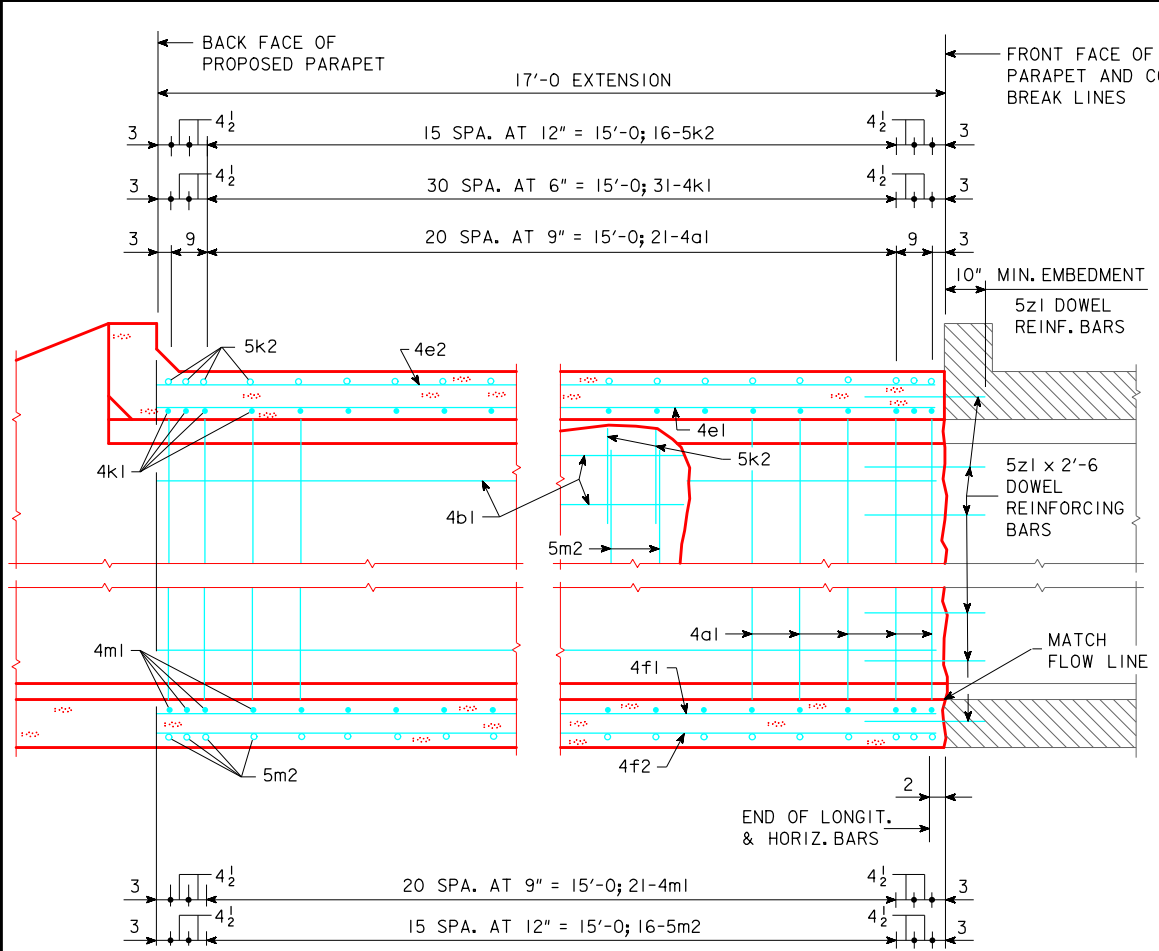
CONSTRUCTION NOTES:

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 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**REVETMENT PROTECTION DETAILS**  
 STATION 1086+18.00 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 5 OF 11 FILE NO. 31463 DESIGN NO. 517

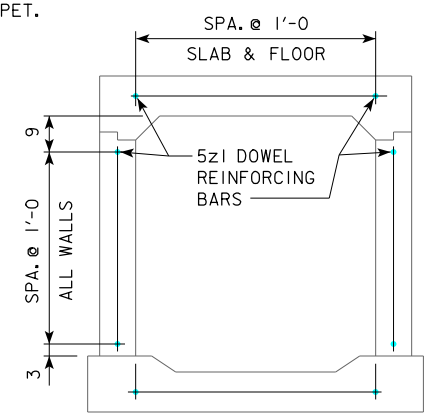
REVISED 1-16 - ADDED NOTE "SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC."  
 REVISED 02-2017 - ADDED SECTION DIRECTORS "A-A" TO "ZERO SKEW" PLAN VIEW DETAIL.  
 ENGLISHING\CULVERTS.DGN - 1092 - THIS SHEET ISSUED 04-12.

CORRECTION 05-14 - ADDED THE BAR LABELS K9 & m9 TO THE PART LONGIT. SECTIONS. HEL044.S01 (ASTD01044.S01--LEP: THIS SHEET REDRAWN, DEVICE:ZHA0R(200,004) ARCH.TAPE NO. 15 DATE 9-8-88)



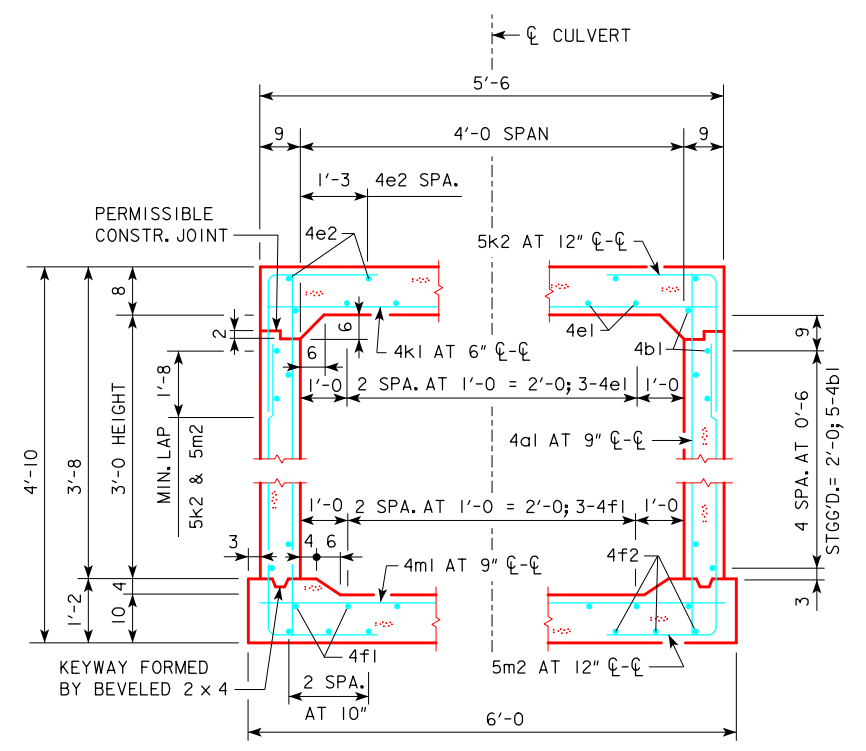
**17'-0 BARREL PART LONGITUDINAL SECTION**  
(ALONG CL OF CULVERT)

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



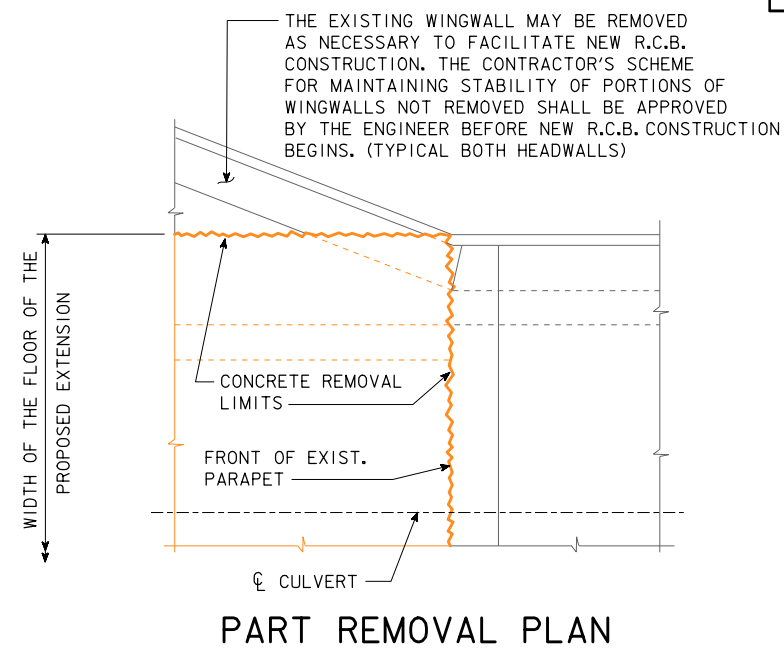
**SECTION NEAR EXTENSION**  
(SHOWING SPACING OF 5z1 DOWEL REINFORCING BARS)

| REINFORCING STEEL EXTENSION DOWELS |                        |       |         |           |        |        |
|------------------------------------|------------------------|-------|---------|-----------|--------|--------|
| BAR                                | LOCATION               | SHAPE | NO./JT. | TOTAL NO. | LENGTH | WEIGHT |
| 5z1                                | TOP SLAB, CONST. JOINT |       | 16      | 16        | 2'-6   | 42     |



**SECTION THRU BARREL**  
(NORMAL TO CL CULVERT)

NOTE:  
ALL TRANSVERSE REINFORCING BARS AND HORIZONTAL LEGS OF CORNER BARS SHALL BE PLACED PARALLEL TO THE CONCRETE BREAK LINE AND NEW PARAPET EXCEPT AS SHOWN.  
DIMENSIONS SHOWN FOR CL-CL OF TRANSVERSE BARS, VERTICAL WALL BARS, AND CORNER BARS ARE MEASURED ALONG CL CULVERT.  
CONCRETE PER FOOT OF BARREL:  
SLAB = 2.9 CU. YDS.  
WALLS = 2.5 CU. YDS.  
FLOOR = 3.8 CU. YDS.  
TOTAL = 9.2 CU. YDS.

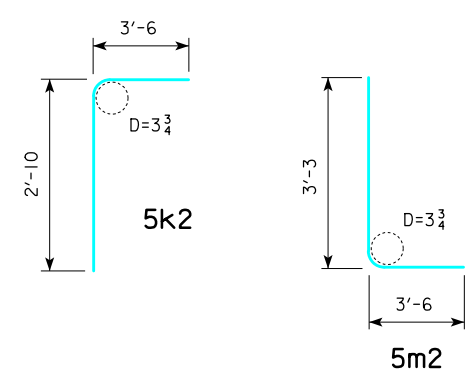


**PART REMOVAL PLAN**

**REINFORCING BAR LIST-ONE 17'-0 EXTENSION**

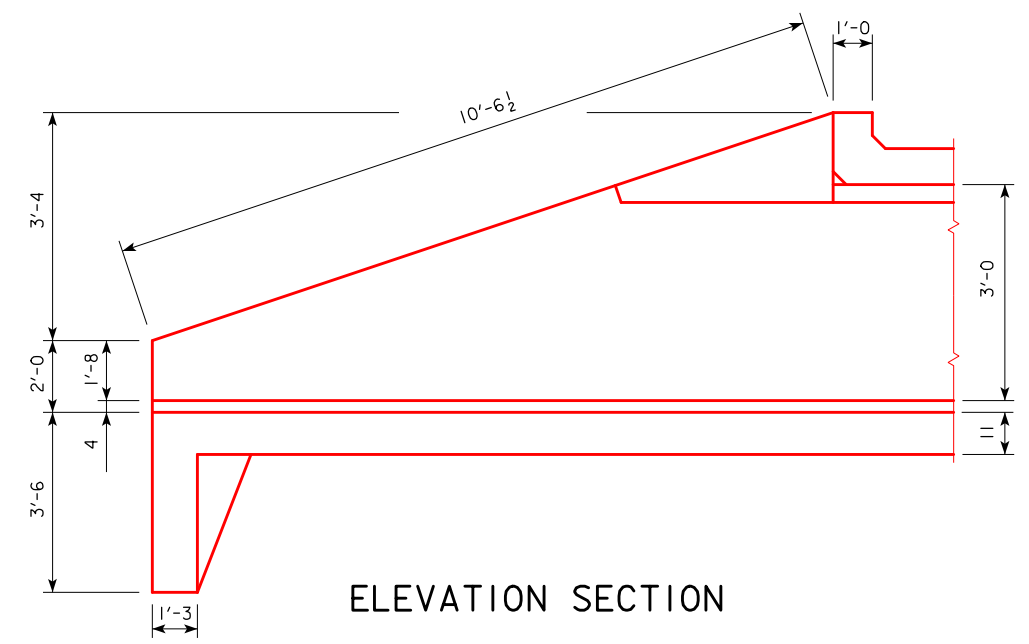
| BAR                              | LOCATION             | SHAPE | NO. | LENGTH | WEIGHT |
|----------------------------------|----------------------|-------|-----|--------|--------|
| 4a1                              | WALLS, F.F.V         |       | 46  | 4'-5   | 136    |
| 4b1                              | WALLS, F.F.H & B.F.H |       | 12  | 16'-10 | 135    |
| 4e1                              | SLAB, BOT. LONGIT.   |       | 3   | 16'-10 | 34     |
| 4e2                              | SLAB, TOP LONGIT.    |       | 4   | 16'-10 | 45     |
| 4f1                              | FLOOR, TOP LONGIT.   |       | 5   | 16'-10 | 56     |
| 4f2                              | FLOOR, BOT. LONGIT.  |       | 6   | 16'-10 | 67     |
| 4k1                              | SLAB, BOT. TRANSV.   |       | 35  | 5'-2   | 121    |
| 5k2                              | SLAB, TOP CORNER     |       | 40  | 6'-4   | 264    |
| 4m1                              | FLOOR, TOP TRANSV.   |       | 25  | 5'-8   | 95     |
| 5m2                              | FLOOR, BOT. CORNER   |       | 40  | 6'-9   | 282    |
| REINFORCING STEEL - TOTAL (LBS.) |                      |       |     |        | 1235   |

**BENT BAR DETAILS**

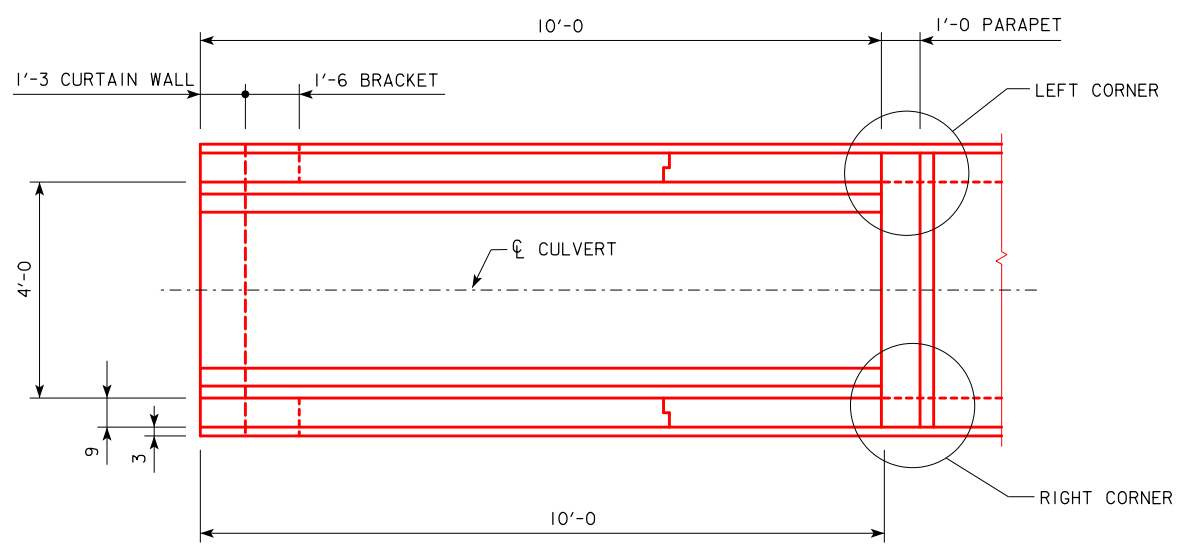


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**17'-0 CULVERT EXTENSION DETAILS**  
 STATION 1086+18.00 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 6 OF 11 FILE NO. 31463 DESIGN NO. 517



ELEVATION SECTION

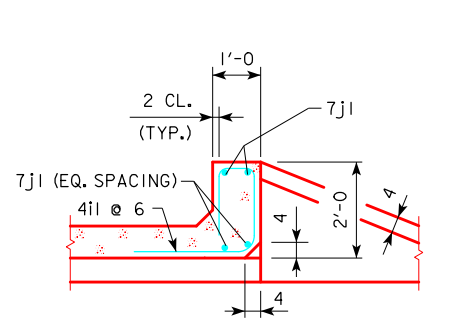


PLAN VIEW

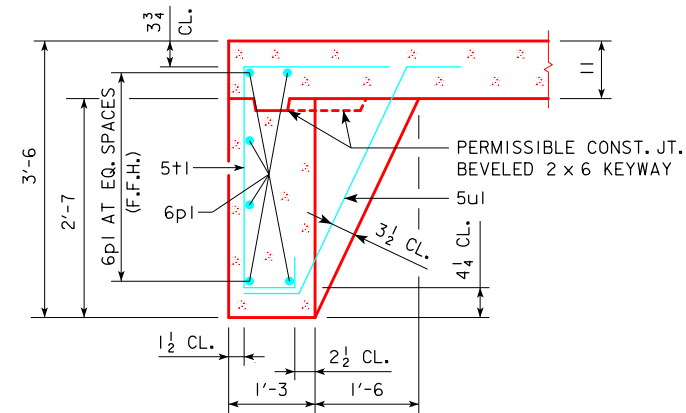
- NOTES:**
1. SEE DESIGN SHEET I FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.
  2. SEE DESIGN SHEET II FOR HEADWALL NOTES.

DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 PARALLEL WING DETAILS**  
 STATION 1086+18.00 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 7 OF 11    FILE NO. 31463    DESIGN NO. 517

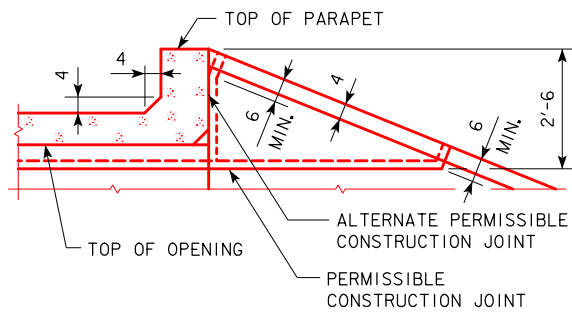
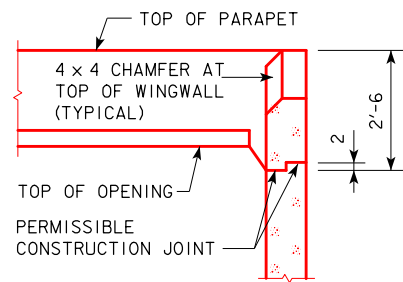




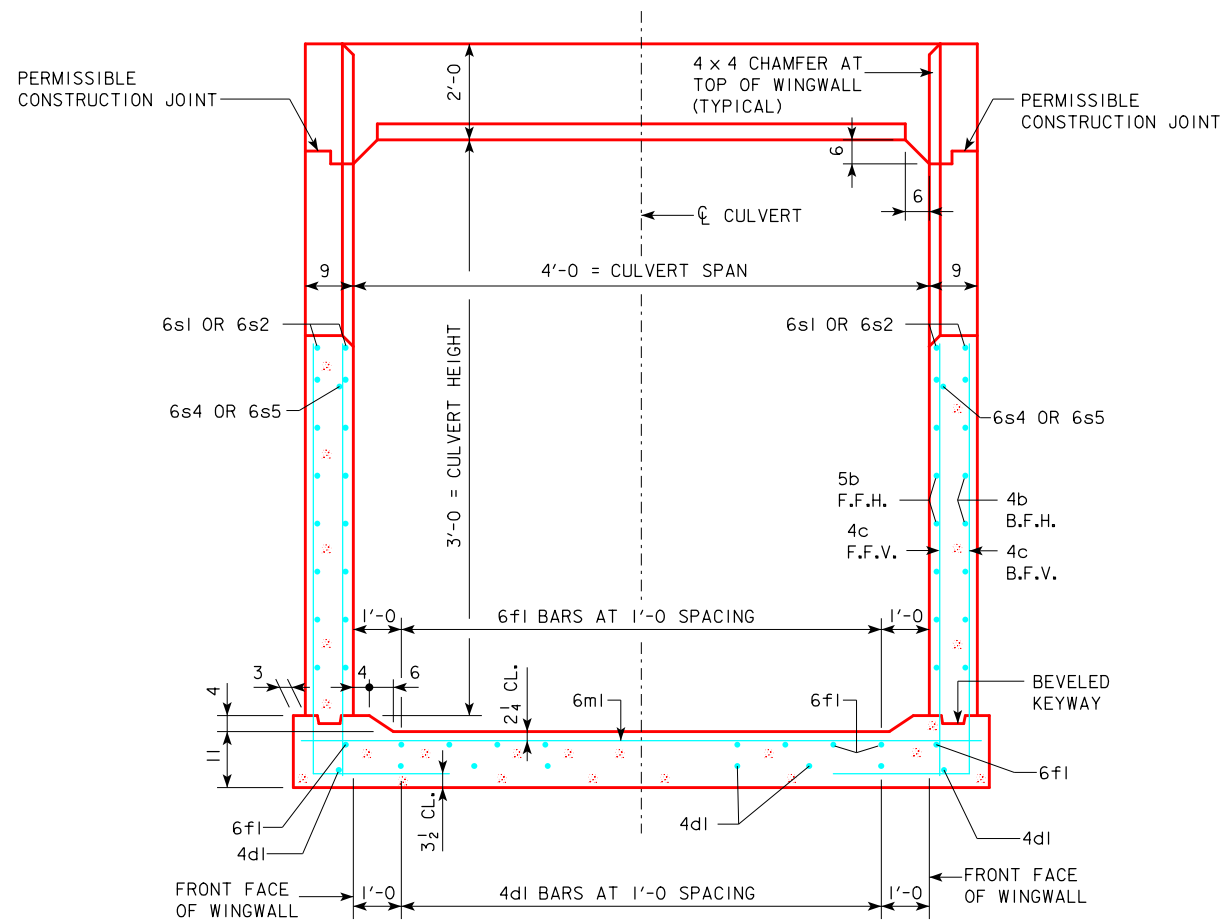
SECTION THRU PARAPET



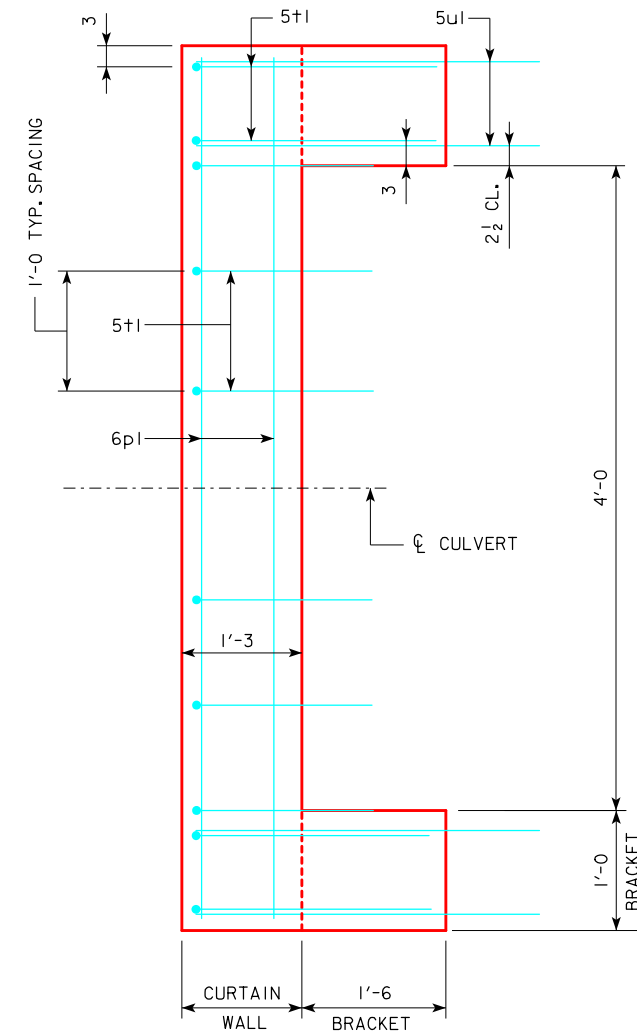
SECTION THRU CURTAIN WALL



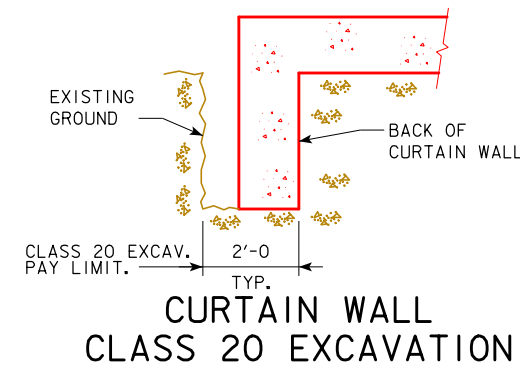
TOP OF WINGWALL DETAILS



TYPICAL CROSS SECTION - THRU HEADWALL

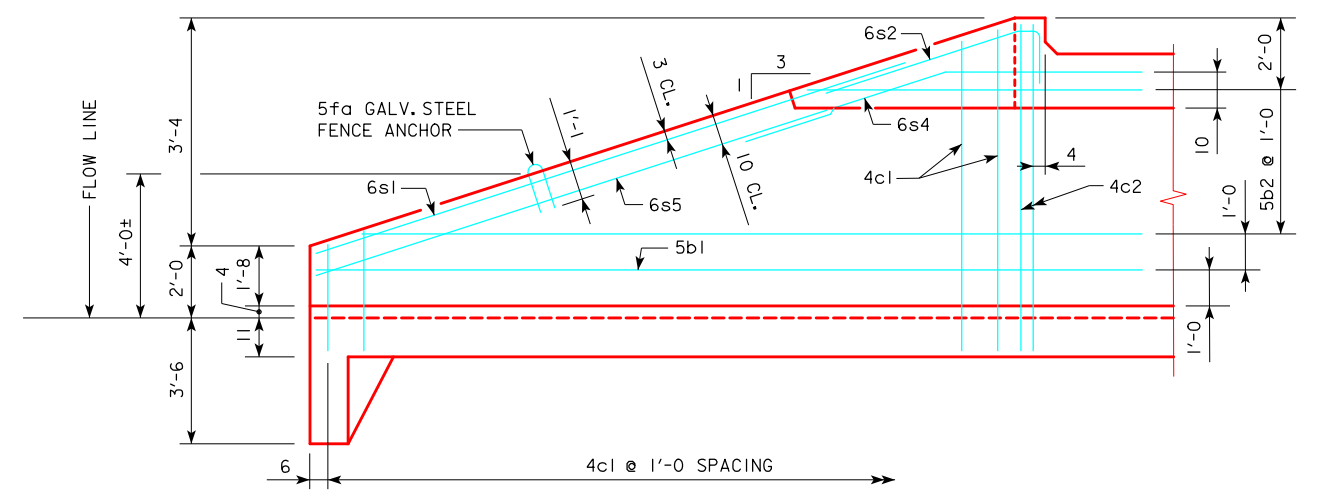
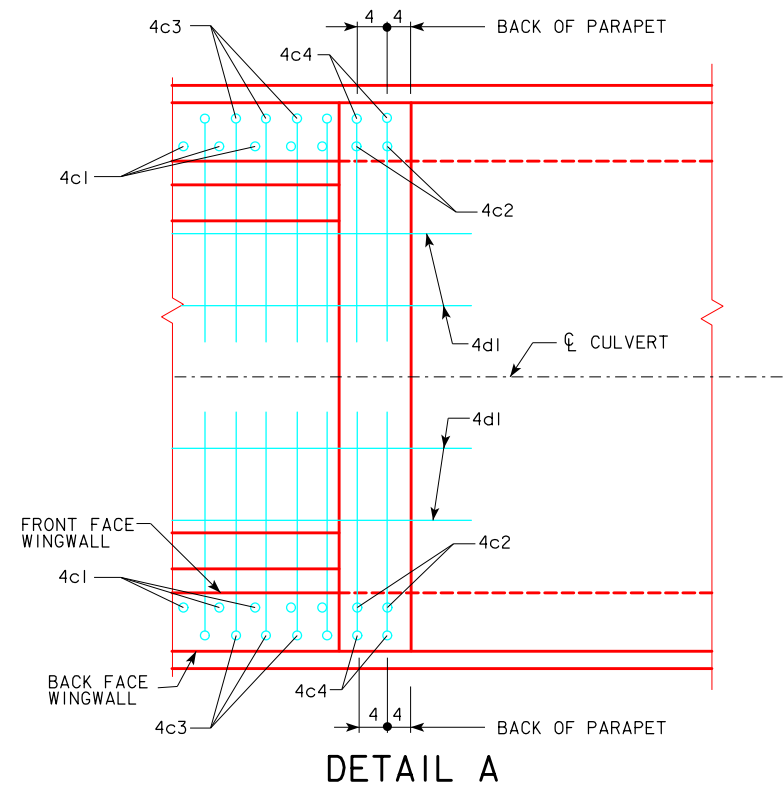


CURTAIN WALL DETAIL - PLAN VIEW  
APRON IS NOT SHOWN

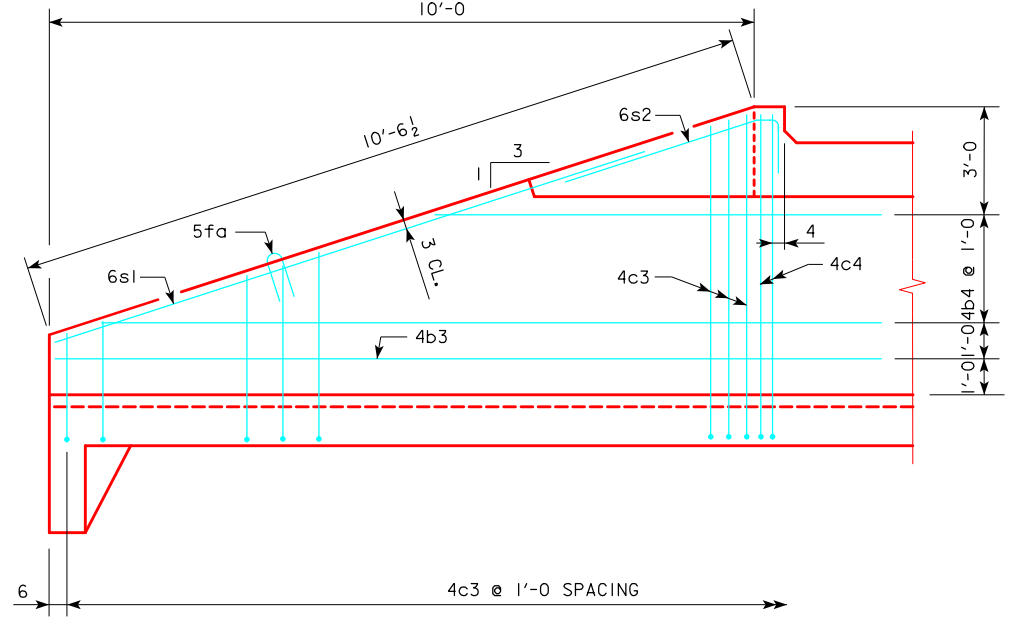


CURTAIN WALL  
CLASS 20 EXCAVATION

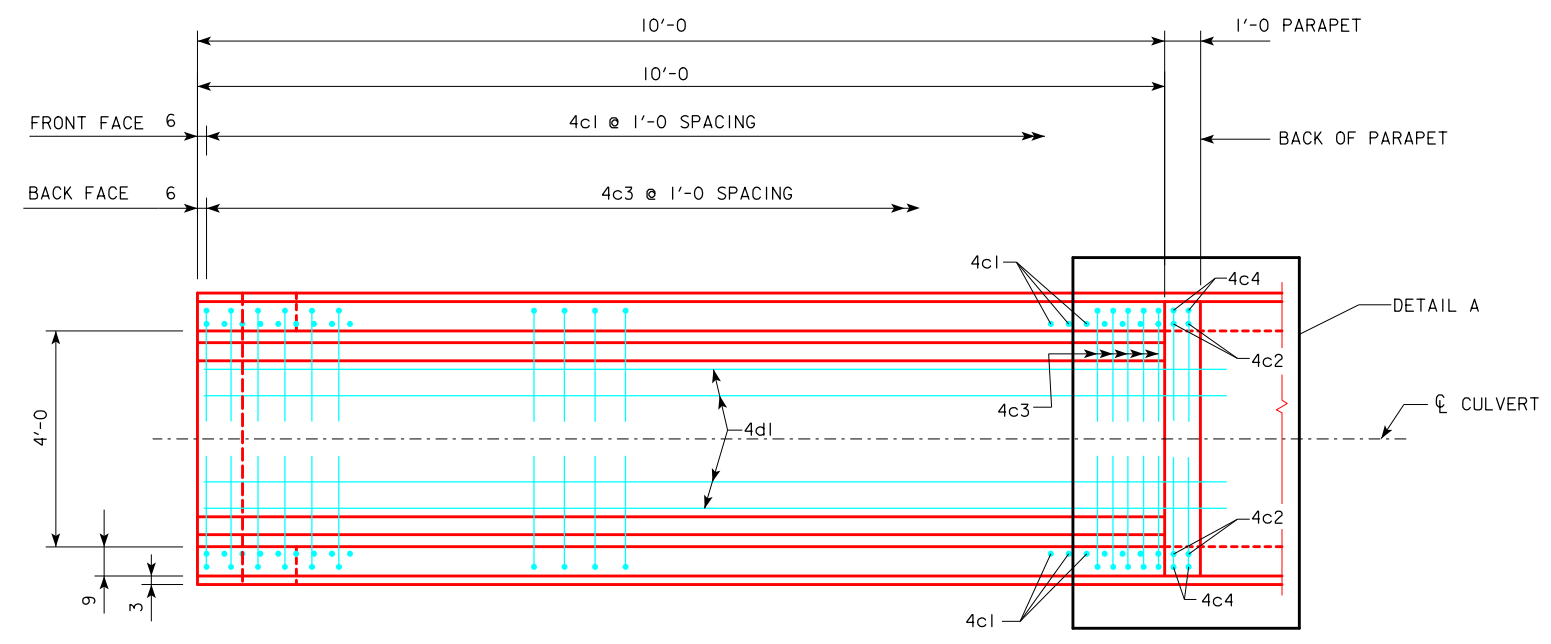
DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**PARALLEL WING HEADWALL DETAILS**  
 STATION 1086+18.00 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 8 OF 11 FILE NO. 31463 DESIGN NO. 517



TYPICAL VIEW - FRONT FACE WINGWALL REINFORCING



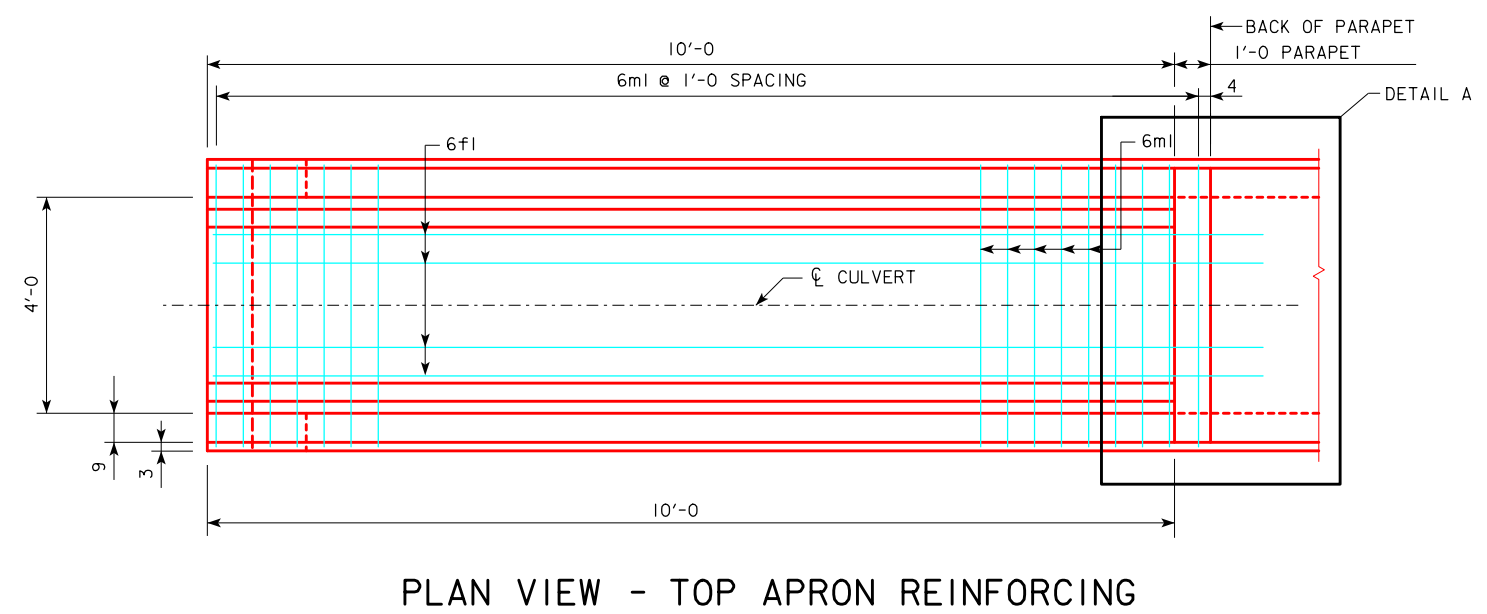
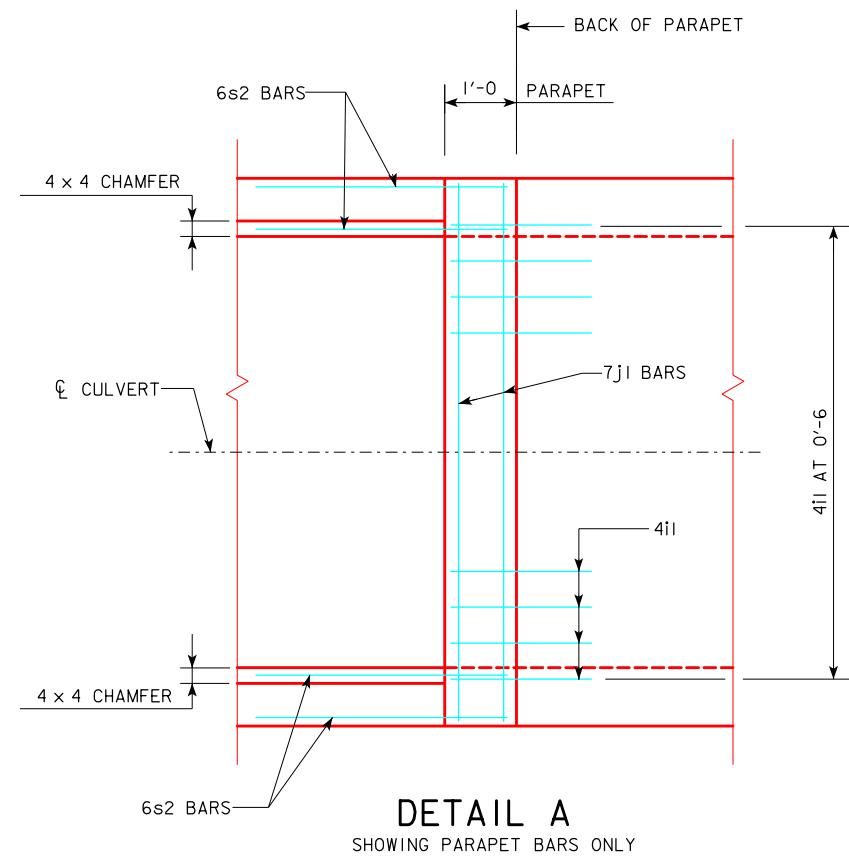
TYPICAL VIEW - BACK FACE WINGWALL REINFORCING



PLAN VIEW - BOTTOM APRON REINFORCING

DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION**  
**PARALLEL WING HEADWALL DETAILS**  
 STATION 1086+18.00 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 9 OF 11      FILE NO. 31463      DESIGN NO. 517





DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 PARAPET & APRON DETAILS**  
 STATION 1086+18.00 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 10 OF 11    FILE NO. 31463    DESIGN NO. 517





**REINFORCING BAR LIST - ONE HEADWALL**

| BAR                              | LOCATION             | SHAPE | NO. | LENGTH                 | WEIGHT |
|----------------------------------|----------------------|-------|-----|------------------------|--------|
| 5fa                              | FENCE ANCHOR (GALV.) |       | 2   | 2'-10                  | 6      |
| 5b1                              | WINGWALL, F.F.H.     |       | 2   | 12'-10                 | 27     |
| 5b2                              | WINGWALL, F.F.H.     |       | 4   | 2 EACH 8'-10 TO 11'-10 | 43     |
| 4b3                              | WINGWALL, B.F.H.     |       | 2   | 12'-10                 | 17     |
| 4b4                              | WINGWALL, B.F.H.     |       | 2   | 11'-10                 | 16     |
| 4c1                              | WINGWALL, F.F.V.     |       | 20  | 2 EACH 2'-6 TO 5'-6    | 53     |
| 4c2                              | WINGWALL, F.F.V.     |       | 4   | 5'-9                   | 15     |
| 4c3                              | WINGWALL, B.F.V.     |       | 20  | 2 EACH 6'-1 TO 9'-1    | 101    |
| 4c4                              | WINGWALL, B.F.V.     |       | 4   | 9'-3                   | 25     |
| 4d1                              | APRON, LONGIT., BOT. |       | 5   | 12'-10                 | 43     |
| 6f1                              | APRON, LONGIT., TOP. |       | 5   | 12'-10                 | 96     |
| 4i1                              | PARAPET, VERTICAL    |       | 9   | 6'-5                   | 39     |
| 7j1                              | PARAPET, HORIZ.      |       | 4   | 5'-2                   | 42     |
| 6m1                              | APRON, TRANS., TOP   |       | 11  | 5'-8                   | 94     |
| 6p1                              | CURTAIN, HORIZ.      |       | 6   | 5'-8                   | 51     |
| 6s1                              | WING SLOPE, BOTH F.  |       | 4   | 7'-3                   | 44     |
| 6s2                              | WING SLOPE, BOTH F.  |       | 4   | 7'-9                   | 47     |
| 6s4                              | WING SLOPE, F.F.     |       | 2   | 11'-0                  | 33     |
| 6s5                              | WING SLOPE, F.F.     |       | 2   | 4'-11                  | 15     |
| 5+1                              | CURTAIN, VERT.       |       | 9   | 6'-5                   | 60     |
| 5u1                              | BRACKET, VERT.       |       | 4   | 5'-3                   | 22     |
| REINFORCING STEEL - TOTAL (LBS.) |                      |       |     |                        | 889    |

**CONCRETE PLACEMENT QUANTITIES  
ONE HEADWALL**

| LOCATION     | CY  |
|--------------|-----|
| PARAPET *    | 0.9 |
| WINGWALLS    | 1.6 |
| APRON        | 3.5 |
| TOTAL (C.Y.) | 6.0 |

\* INCLUDES PARAPET AND TOP OF WINGWALL.

**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 3/4" DRESSED AND BEVELED STRIP.

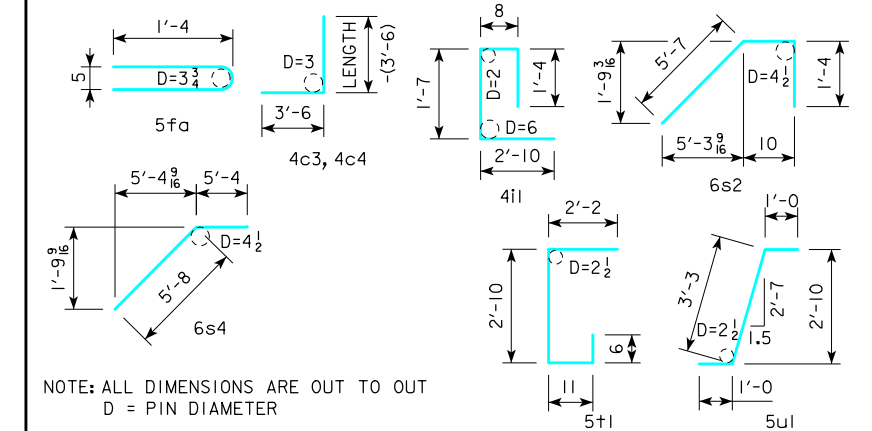
ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

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" & "s" 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.

**BENT BAR DETAILS**



DESIGN FOR 0° SKEW  
**4'x3' REINFORCED CONCRETE  
 BOX CULVERT EXTENSION  
 HEADWALL QUANTITIES**  
 STATION 1086+18.00 (US 6)      DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 11 OF 11    FILE NO. 31463    DESIGN NO. 517



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

### ESTIMATED CULVERT QUANTITIES

| ITEM NO. | ITEM CODE    | ITEM  | UNIT | TOTAL | AS BUILT QUANTITY |
|----------|--------------|---|------|-------|-------------------|
| 1        | 2102-0425071 | SPECIAL BACKFILL  | CY   | 18    |                   |
| 2        | 2401-6750001 | REMOVALS, AS PER PLAN   | LS   | 1     |                   |
| 3        | 2402-2720000 | EXCAVATION, CLASS 20  | CY   | 328   |                   |
| 4        | 2415-2111204 | PRECAST CONCRETE BOX CULVERT, 12 FT. X 4 FT.                      | LF   | 44    |                   |
| 5        | 2415-2201204 | PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 4 FT. | EACH | 2     |                   |
| 6        | 2418-0000010 | TEMPORARY STREAM DIVERSION  | EACH | 1     |                   |
| 7        | 2501-8400172 | TEMPORARY SHORING   | LS   | 1     |                   |
| 8        | 2533-4980005 | MOBILIZATION  | LS   | 1     |                   |

### 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'<sub>c</sub> FOR BARREL SECTIONS AS NOTED ON CULVERT BARREL DETAIL STANDARDS, FOR END SECTION DESIGN f'<sub>c</sub> = 5 KSI.

ITEM NO.                      ESTIMATE REFERENCE INFORMATION

- 1        RECLAIMED ASPHALT PAVEMENT (RAP) AND RECLAIMED HMA SHALL NOT BE USED FOR THE SPECIAL BACKFILL. INCLUDES COST OF 6" THICK GRANULAR BEDDING (SPECIAL BACKFILL).
- 2        INCLUDES ALL WORK FOR REMOVAL AND OFF-SITE DISPOSAL AS DETAILED ON THE SITUATION PLAN. 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        INCLUDES EXCAVATION NECESSARY TO PLACE THE 6" THICK GRANULAR BEDDING. INCLUDES FILLING AND COMPACTING LOW AREAS AROUND PROPOSED CULVERT.
- 4        INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE CULVERT TIES, LIFTING HOLE PLUGS, ENGINEERING FABRIC, JOINT MATERIAL, AND GROUT AS REQUIRED.
- 5        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 2 PRECAST END SECTIONS, 2 PRECAST LINTEL BEAMS, AND 2 PRECAST CURTAIN WALLS.
- 7        INCLUDES ALL MATERIAL AND LABOR REQUIRED FOR TEMPORARY SHORING. SEE GENERAL NOTES AND STAGING DETAILS FOR ADDITIONAL INFORMATION.

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

| DESIGN 617  |        |         |
|-------------|--------|---------|
| STANDARD    | ISSUED | REVISED |
| PRCB G2-13  | 1-13   | 7-16    |
| PRCB 12-13  | 1-13   | -       |
| PES 1-13-T1 | 1-13   | 7-16    |
| PES 1-13-T3 | 1-13   | 7-16    |
| PES 3-13-T3 | 1-13   | 7-16    |

NOTE:  
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

| DESIGN HISTORY<br>AT THIS SITE<br>(INCLUDES THIS DESIGN) |  |
|--|--|
| DES. NO.   | TYPE OF WORK                                       |
| 129  | CONSTRUCT 4'x3'x43' CONC. BOX CULVERT              |
| 617  | 12'x4'x45' PRECAST REINFORCED CONCRETE BOX CULVERT |

DESIGN FOR 0° SKEW

## 12'x4'x45' PRECAST REINFORCED CONCRETE BOX CULVERT

### ESTIMATED QUANTITIES

STATION 760+79.00 (US 6)                      DECEMBER, 2017

## IOWA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO.   1   OF   4   FILE NO.   31463   DESIGN NO.   617



**GENERAL NOTES:**

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 4' x 3' x 44.1' RCB WITH A 12' x 4' x 45' PRECAST REINFORCED CONCRETE BOX CULVERT. ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON DESIGN PLANS (ORIGINAL DESIGN NO. 129).

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 2 FEET.

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

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

THE BID ITEM "REMOVAL OF EXISTING STRUCTURES" SHALL INCLUDE ALL COSTS ASSOCIATED WITH REMOVING THE 4' x 3' x 44.1' RCB. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

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

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

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE 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 3/8 INCH SHALL BE USED AS BEDDING FOR THE PRECAST CONCRETE BOX CULVERT. THE BEDDING SHALL BE SHAPED TO A FLAT BASE USING A TEMPLATE. THE 6 INCH GRANULAR BEDDING SHALL BE BID AS SPECIAL BACKFILL.

THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED PRECAST CONCRETE BOX SECTIONS 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 CONCRETE CULVERT END SECTION SHOWING A CROSS SECTION VIEW OF THE SECTIONS, STEEL LOCATIONS, DIMENSIONS, ETC. SIMILAR TO THE END SECTION DETAILS SHOWN IN THE IDOT STANDARDS.

THE CONTRACTOR SHALL PROVIDE ALL INFORMATION SHOWN ON THE SUBMITTAL SHOP DRAWING SHEET REGARDLESS OF WHICH PRECAST CONCRETE BOX OPTION IS SELECTED. SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION:

(Paren).County.DesignNumber.SubmittalDescription.pdf  
Example: (090).BlackHawk.Design915.DeckDrains.pdf

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

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

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

**INSTALLATION NOTES:**

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

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

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

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

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

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

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

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

**TEMPORARY SHORING NOTES:**

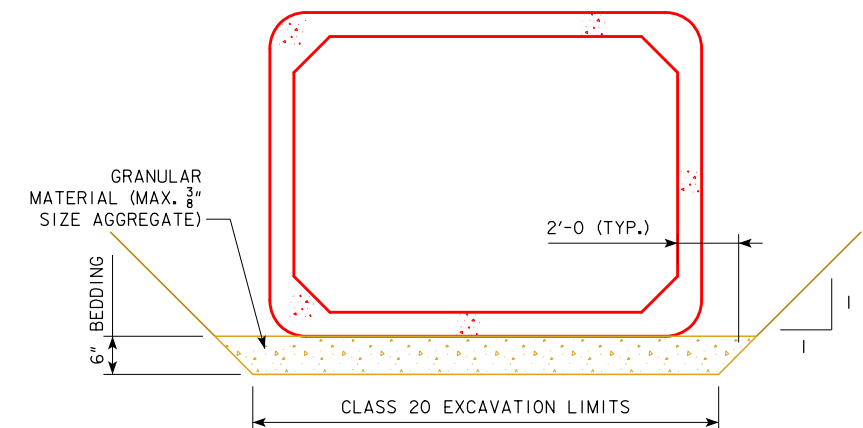
TEMPORARY SHORING (SHEET PILE OR OTHER) SHALL BE REQUIRED AS NECESSARY TO PREVENT THE EARTH UNDER THE TRAFFIC LANE FROM SLOUGHING IN DURING CONSTRUCTION.

THE CONTRACTOR SHALL SUBMIT A TEMPORARY SHORING PLAN FOR REVIEW. THE TEMPORARY SHORING PLAN SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF IOWA. 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.



**GRANULAR BEDDING DETAIL**

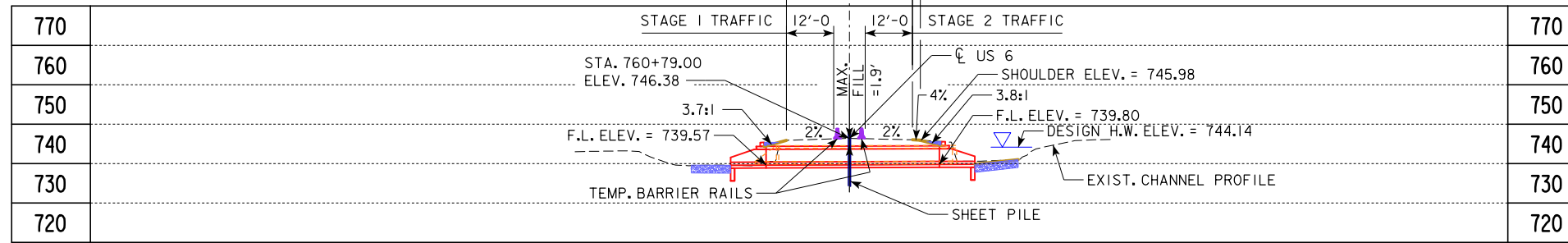
GRANULAR MATERIAL SHALL TERMINATE 3'-0" SHORT OF THE PRECAST CURTAIN WALL.

**TRAFFIC CONTROL PLAN**  
NOTE: THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

NOTE:  
POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

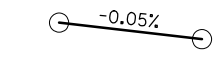
DESIGN FOR 0° SKEW  
**12'x4'x45' PRECAST REINFORCED CONCRETE BOX CULVERT**  
**CULVERT GENERAL NOTES**  
STATION 760+79.00 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 2 OF 4 FILE NO. 31463 DESIGN NO. 617

REVISED 03-2017 - CHANGED BID ITEM REFERENCES TO "SPECIAL BACKFILL" (WAS "GRANULAR BACKFILL").  
REVISED 04-2017 - REMOVED REFERENCE "TO THE OFFICE OF BRIDGES AND STRUCTURES" IN NOTE STATING TO SUBMIT DETAILS OF PROPOSED PRECAST BOX SECTIONS. ADDED NOTE STATING "SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION".  
REVISED 09-2017 - CORRECTED TYPOS.  
ENGLISHPRECASTCULVERTS.DGN - IOBIP - THIS SHEET ISSUED 01-13.



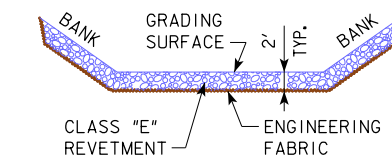
**LONGITUDINAL SECTION ALONG CL CULVERT**  
 DESIGN FILL HEIGHT = 2'-0"  
 ANTICIPATED SETTLEMENT = NEGLIGIBLE

VPI STA = 763+36  
 VPI ELEV = 746.25



VPI STA = 755+77  
 VPI ELEV = 746.63

**PROFILE GRADE ON US 6 (UAC)**

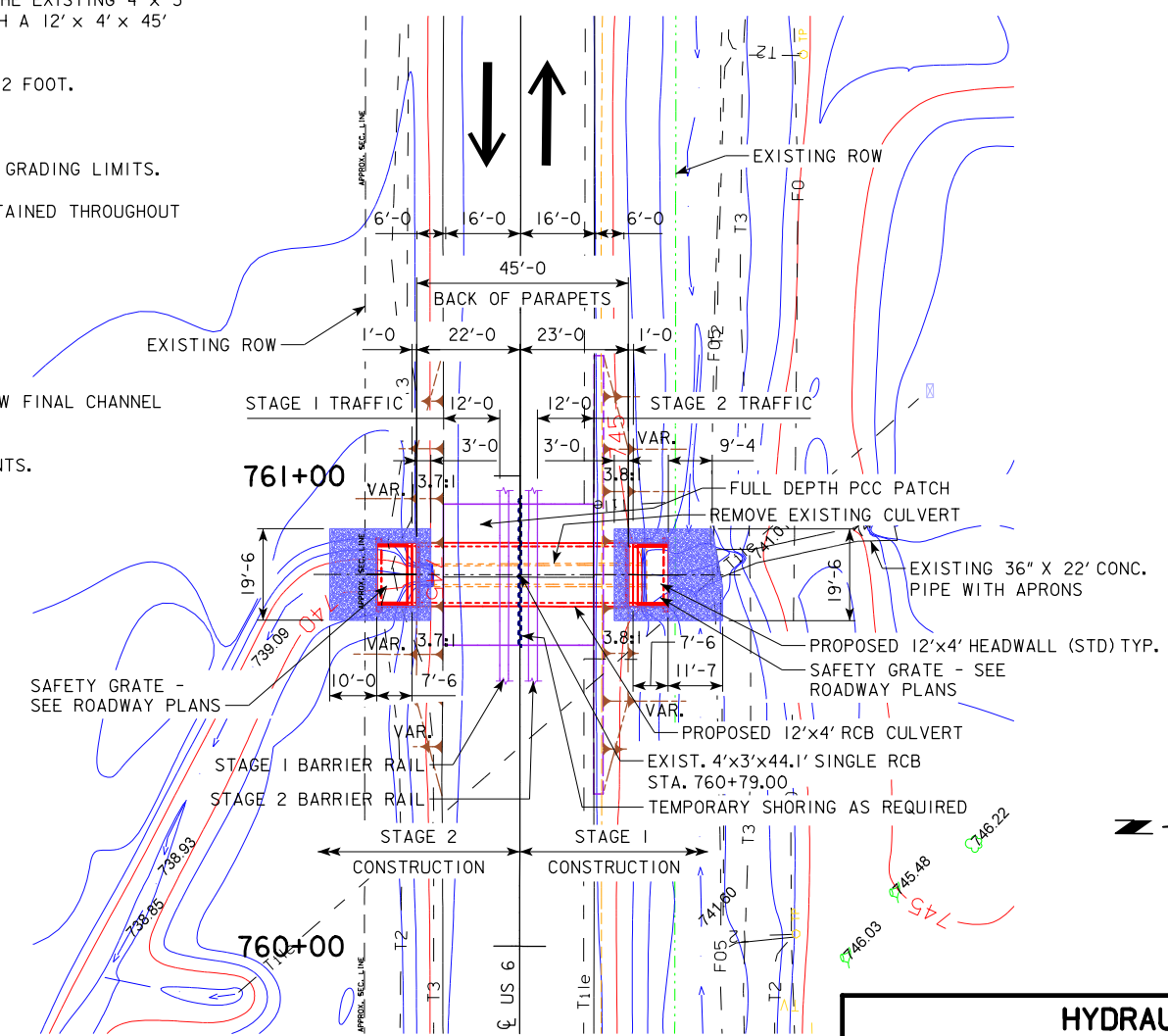


**ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS**

| LOCATION | REVETMENT CL. "E" (TON) | ENGINEERING FABRIC (SY) |
|----------|-------------------------|-------------------------|
| INLET    | 38.2                    | 64                      |
| OUTLET   | 36.1                    | 61.8                    |
| TOTALS   | 74.3                    | 125.8                   |

**NOTES:**

- IT IS THE INTENT OF THIS DESIGN TO REMOVE AND REPLACE THE EXISTING 4' x 3' REINFORCED CONCRETE BOX CULVERT WITH 0 DEGREE SKEW WITH A 12' x 4' x 45' PRECAST REINFORCED CONCRETE BOX CULVERT.
- THE PRECAST RCB CULVERT IS DESIGNED FOR EARTH FILLS OF 2 FOOT.
- ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.
- SEE ROAD SHEETS FOR ADDITIONAL INFORMATION ON PROPOSED GRADING LIMITS.
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- SEE H SHEETS FOR RIGHT OF WAY.
- NORTH AND SOUTH SIDES DO NOT SATISFY CLEAR ZONE.
- HEADWALLS SHALL BE PLACED LEVEL.
- TOP OF CULVERT FLOOR IS TO BE SET APPROXIMATELY 1' BELOW FINAL CHANNEL FLOW LINE.
- SEE STANDARD ROAD PLAN DR-1111 FOR BACKFILLING REQUIREMENTS.



**SITUATION PLAN**

**HYDRAULIC DATA**  
 DRAINAGE AREA = 247.2 ACRES  
 Q<sub>50</sub> = 281 CFS  
 HW ELEV. = 744.14  
 ROLLING

- UTILITIES LEGEND:**
- T2 - WINDSTREAM TELEPHONE - QUALITY D
  - T3 - COON CREEK TELEPHONE - QUALITY D
  - TV - MEDIACOM - QUALITY D
  - G - ALLIANT ENERGY - QUALITY D
  - E1 - ALLIANT ENERGY - QUALITY D
  - F0 - AUREON NETWORK SERVICES - QUALITY D
  - F05 - WINDSTREAM COMMUNICATIONS - QUALITY D

| LOCATION             | TRAFFIC ESTIMATE       |
|----------------------|------------------------|
| ON US 6 OVER         | 2014 AADT 3370 V.P.D.  |
| DRAINAGE DITCH       | 2034 AADT 4100 V.P.D.  |
| T-8IN R-10W          | TRUCKS 8%              |
| SECTION 30           | DESIGN ESALS 1,000,000 |
| CITY OF MERANGO      |                        |
| WASHINGTON TOWNSHIP  |                        |
| IOWA COUNTY          |                        |
| LATITUDE 41.789339   |                        |
| LONGITUDE -92.059867 |                        |

**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.

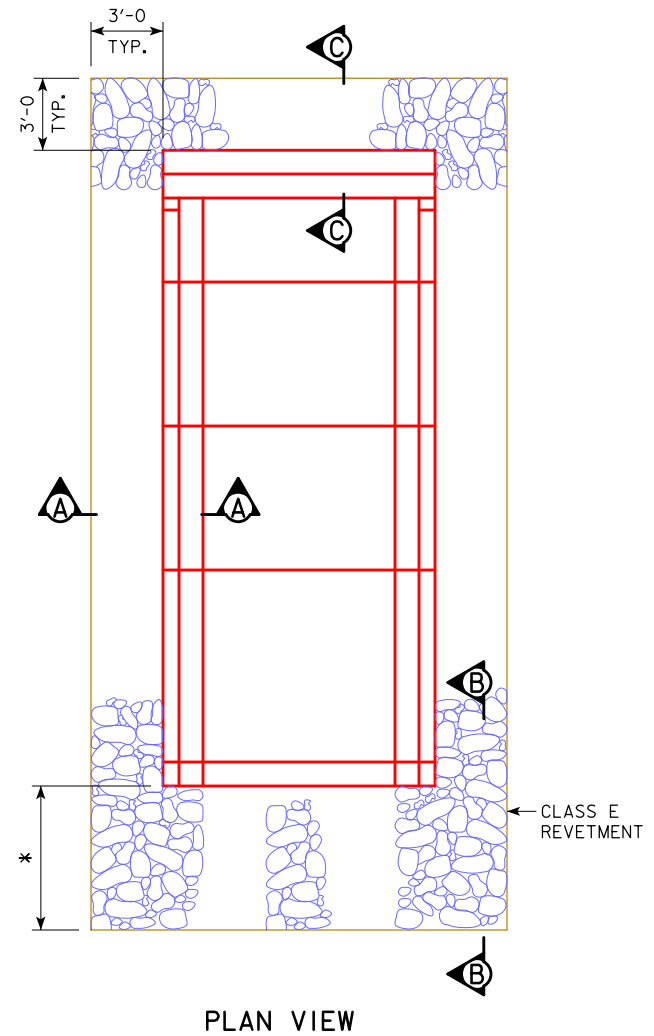
*Brian J. Birkland* 11-30-17  
 Signature Date  
 Brian J. Birkland  
 Printed or Typed Name  
 My license renewal date is December 31, 2018

Pages or sheets covered by this seal: SHEET 52

DESIGN FOR 0° SKEW  
**12'x4'x45' PRECAST REINFORCED CONCRETE BOX CULVERT**  
**SITUATION PLAN**  
 STATION 760+79.00 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 3 OF 4 FILE NO. 31463 DESIGN NO. 617

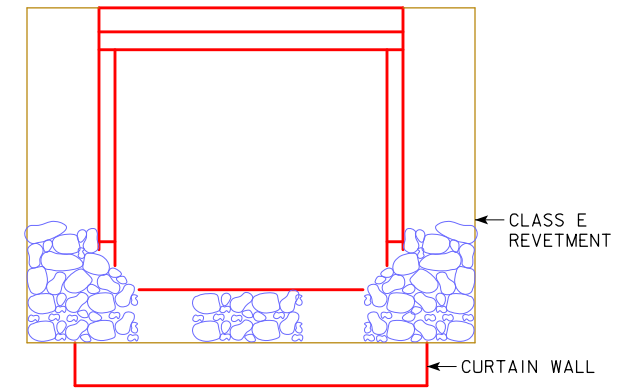


REVISED 10-14 - CHANGED THE AREA OF THE REVETMENT TO INCLUDE THE AREA IN FRONT OF THE APRON. CHANGED THE DEPTH OF REVETMENT TO 2'-0".  
 REVISED 12-15 - ADDED NOTE "SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC."  
 ENGLISH\IGNED\PRECAST\CULVERTS.DGN - PEP 1-13 - THIS SHEET ISSUED 01-13.

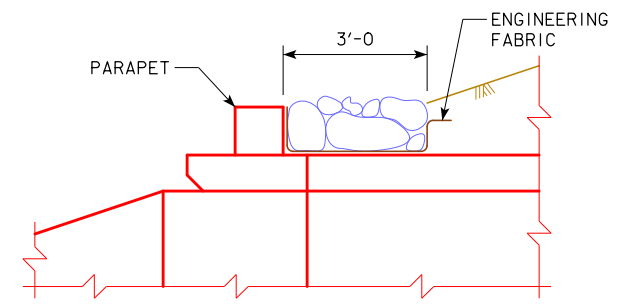


PLAN VIEW

\* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.

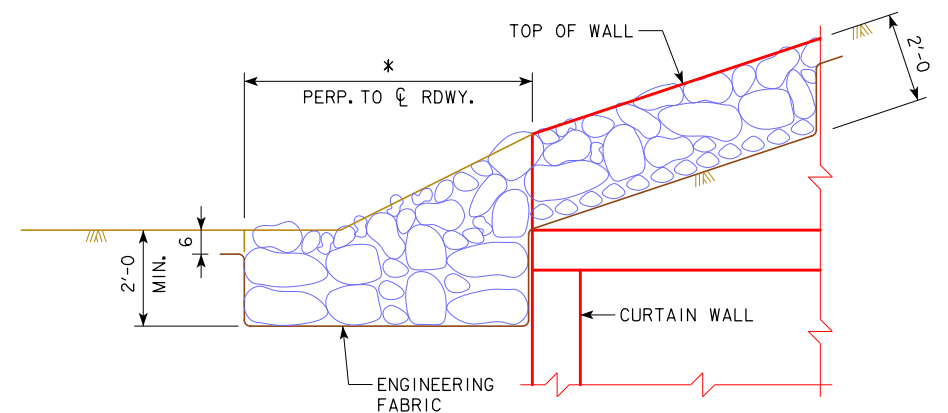


ELEVATION VIEW  
NON-SKEW END SECTIONS

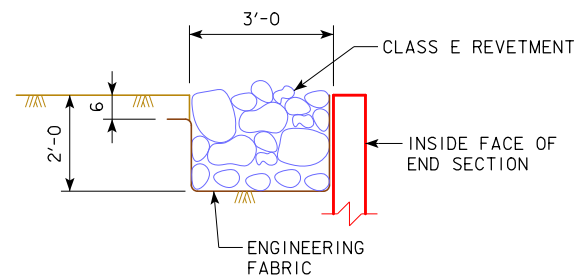


SECTION C-C

\* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



SECTION B-B



SECTION A-A  
TYPICAL DETAILS

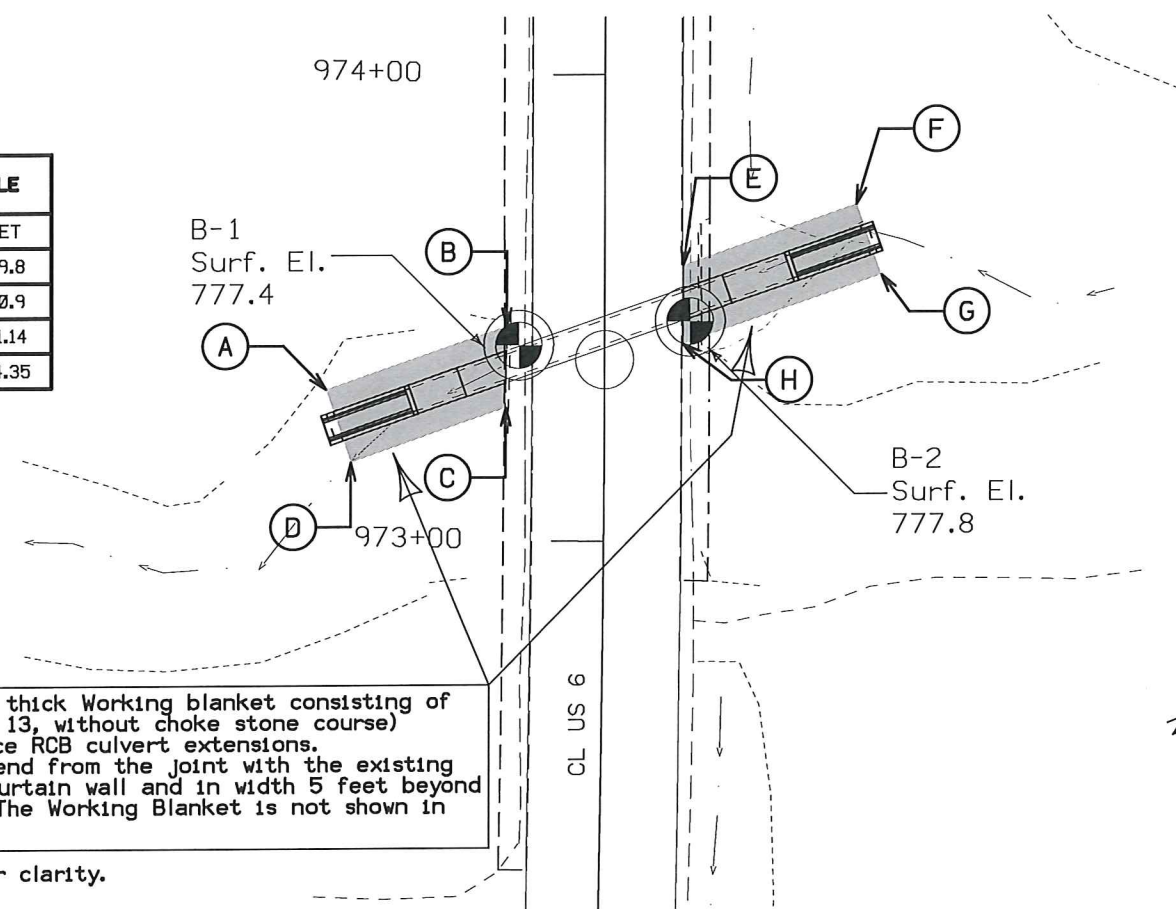
**CONSTRUCTION NOTES:**

CLASS E REVETMENT SHOULD 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 0° SKEW  
**12'x4'x45' PRECAST REINFORCED CONCRETE BOX CULVERT**  
**EMBANKMENT PROTECTION DETAILS**  
 STATION 760+79.00 (US 6) DECEMBER, 2017  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 4 OF 4 FILE NO. 31463 DESIGN NO. 617

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

| WORKING BLANKET COORDINATE TABLE |           |           |
|----------------------------------|-----------|-----------|
| CORNER                           | STATION   | OFFSET    |
| A                                | 973+32.76 | Lt. 59.8  |
| B                                | 973+46.20 | Lt. 20.9  |
| C                                | 973+28.67 | Lt. 21.14 |
| D                                | 973+17.08 | Lt. 54.35 |




| WORKING BLANKET COORDINATE TABLE |           |           |
|----------------------------------|-----------|-----------|
| CORNER                           | STATION   | OFFSET    |
| E                                | 973+59.02 | Rt. 16.74 |
| F                                | 973+72.02 | Rt. 53.89 |
| G                                | 973+56.80 | Rt. 59.18 |
| H                                | 973+42.15 | Rt. 16.78 |

| Water Level Observations (Ft.) |              |                |                        |
|--------------------------------|--------------|----------------|------------------------|
| Boring No.                     | Date Drilled | While Drilling | End of Drilling        |
| B-1                            | 11/23/2016   | 20.0           | Boring was backfilled. |
| B-2                            | 11/23/2016   | 28.0           | Boring was backfilled. |

**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: *Mark A. Dell* Date: 11/16/17  
 Mark A. Dell  
 My license renewal date is December 31, 2017.

Pages or sheets covered by this seal: SPS.1 - SPS.2

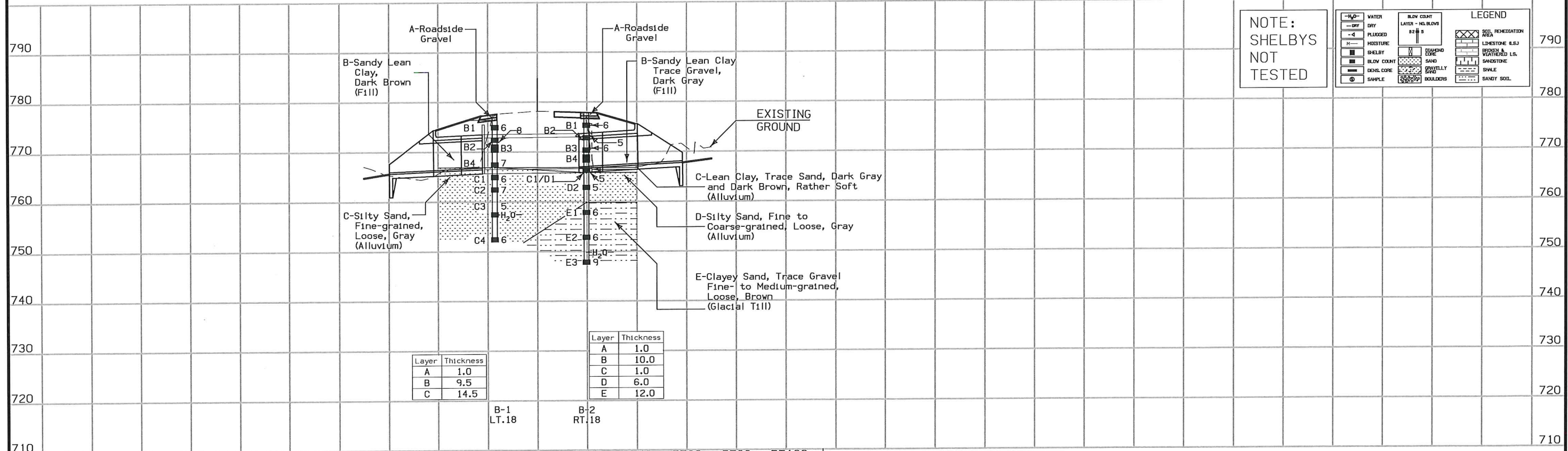
Install an approximate 1-foot thick Working blanket consisting of Macadam Stone (Gradation No. 13, without choke stone course) directly below the cast-in-place RCB culvert extensions. The Working Blanket shall extend from the joint with the existing box to 3 feet from the new curtain wall and in width 5 feet beyond the sides of each extension. The Working Blanket is not shown in the profile view.

Note: Retement not shown for clarity.

**LOCATION**  
 ON US 6 OVER  
 DRAINAGE DITCH  
 T-80N R-10W  
 SECTION 34  
 WASHINGTON TOWNSHIP  
 IOWA COUNTY  
 LATITUDE 41.776044  
 LONGITUDE -91.986139



DESIGN FOR 19° SKEW (R.A.)  
**5'x6' REINFORCED CONCRETE BOX CULVERT EXTENSION**  
**SOIL PROFILE SHEET**  
 STATION 973+44.77  
**IOWA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 2 FILE NO. 31463 DESIGN NO. 417



NOTE:  
SHELBS  
NOT  
TESTED

| LEGEND                |                       |
|-----------------------|-----------------------|
| WATER                 | NO BLOW COUNT         |
| DRY                   | NO BLOW COUNT         |
| PLUGGED               | NO BLOW COUNT         |
| MOISTURE              | NO BLOW COUNT         |
| SHELLY                | NO BLOW COUNT         |
| BLOW COUNT            | NO BLOW COUNT         |
| DENS. CORE            | NO BLOW COUNT         |
| SAMPLE                | NO BLOW COUNT         |
| SOIL REMEDIATION AREA | SOIL REMEDIATION AREA |
| LIMESTONE U.S.G.      | LIMESTONE U.S.G.      |
| WEATHERED LS.         | WEATHERED LS.         |
| SANDSTONE             | SANDSTONE             |
| SHALE                 | SHALE                 |
| SANDY SOIL            | SANDY SOIL            |

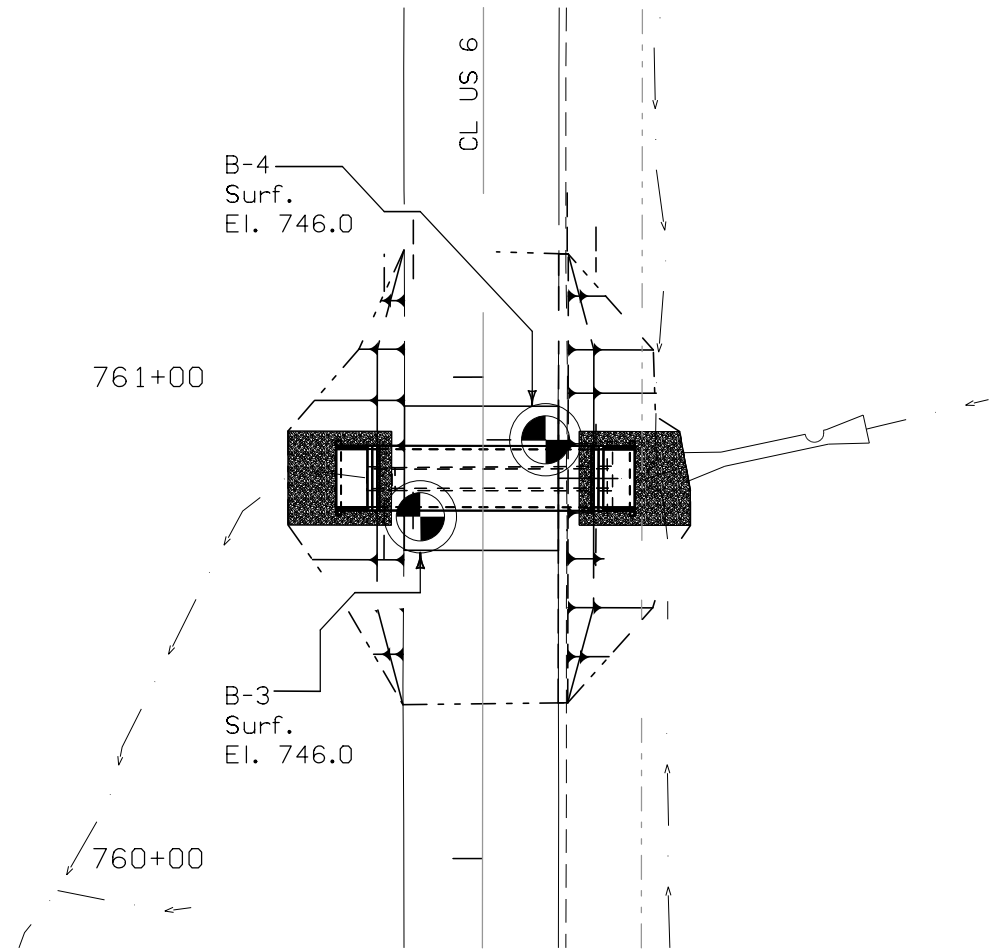
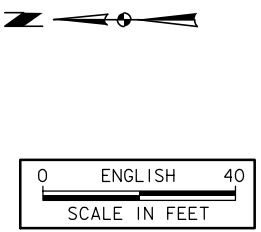
| Layer | Thickness |
|-------|-----------|
| A     | 1.0       |
| B     | 9.5       |
| C     | 14.5      |

| Layer | Thickness |
|-------|-----------|
| A     | 1.0       |
| B     | 10.0      |
| C     | 1.0       |
| D     | 6.0       |
| E     | 12.0      |

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

**LOCATION**

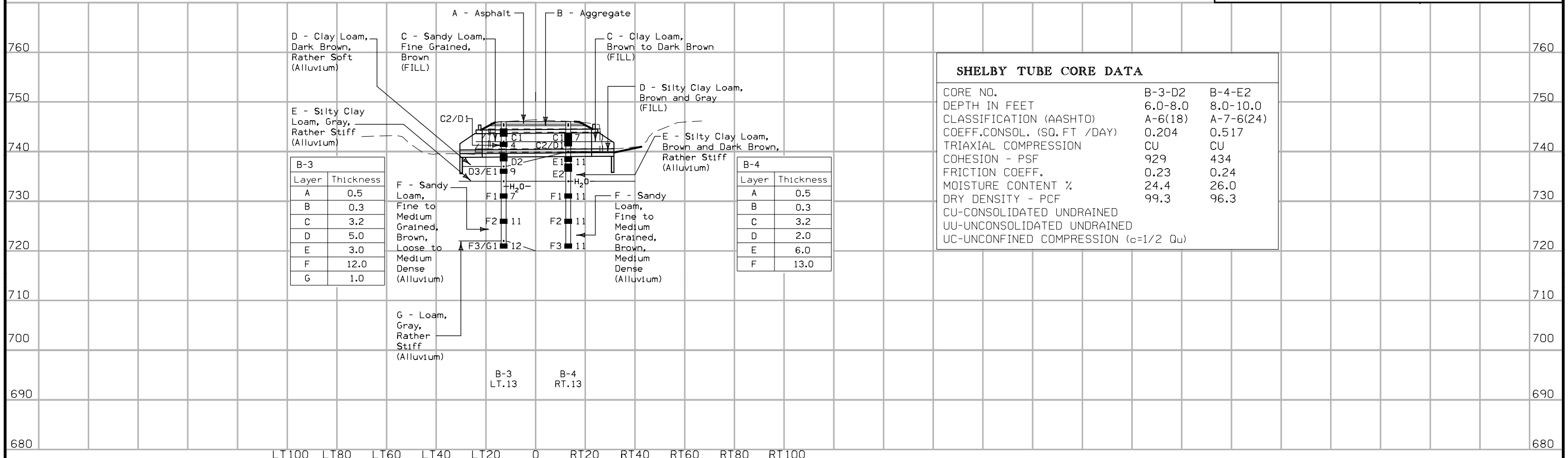
ON US 6 OVER  
DRAINAGE DITCH  
T-8IN R-10W  
SECTION 30  
CITY OF MERANGO  
WASHINGTON TOWNSHIP  
IOWA COUNTY

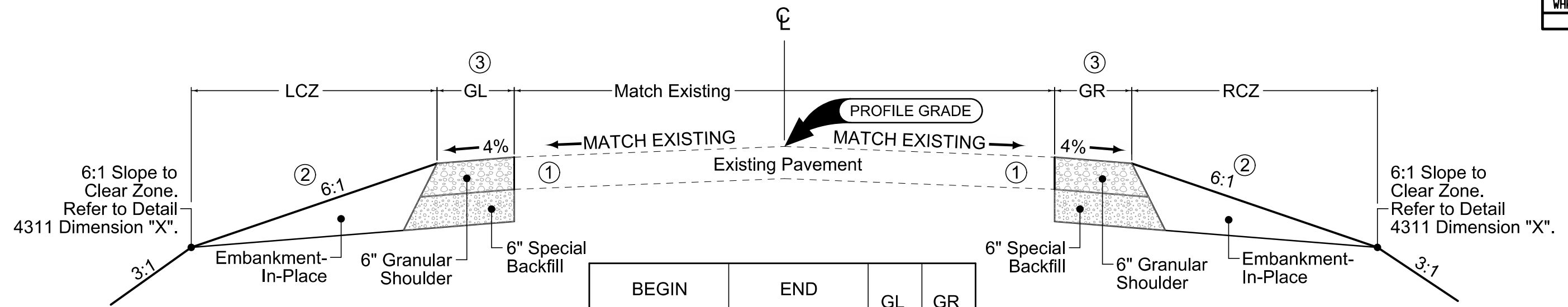


|  |            |  |                              |               |                         |
|--|------------|--|------------------------------|---------------|-------------------------|
|  | WATER      |  | BLOW COUNT LAYER - NO. BLOWS | <b>LEGEND</b> |                         |
|  | DRY        |  | PLUGGED                      |               |                         |
|  | MOISTURE   |  | SHELBY                       |               | SOIL REMEDIATION AREA   |
|  | BLOW COUNT |  | DIAMOND CORE                 |               | LIMESTONE (L.S.)        |
|  | DENS. CORE |  | SAND                         |               | BROKEN & WEATHERED L.S. |
|  | SAMPLE     |  | GRAVELLY SAND                |               | SANDSTONE               |
|  |            |  | BOULDERS                     |               | SHALE                   |
|  |            |  |                              |               | SANDY SOIL              |

| Water Level Observations (Ft.) |              |                |                    |
|--------------------------------|--------------|----------------|--------------------|
| Boring No.                     | Date Drilled | While Drilling | End of Drilling    |
| B-3                            | 06/07/2017   | 13.0           | Boring backfilled. |
| B-4                            | 06/07/2017   | 12.0           | Boring backfilled. |

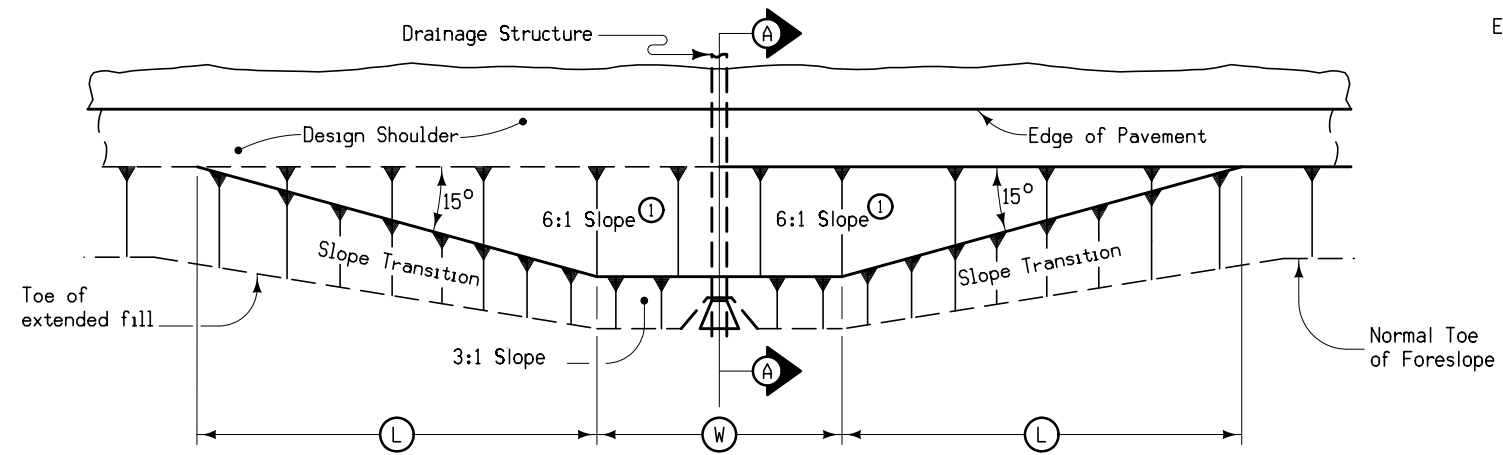
DESIGN FOR 0° SKEW  
**12'x4' PRECAST REINFORCED CONC. BOX CULVERT**  
**SOIL PROFILE SHEET**  
STATION 760+79.00  
**IOWA COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 2 OF 2 FILE NO. 31463 DESIGN NO. 617



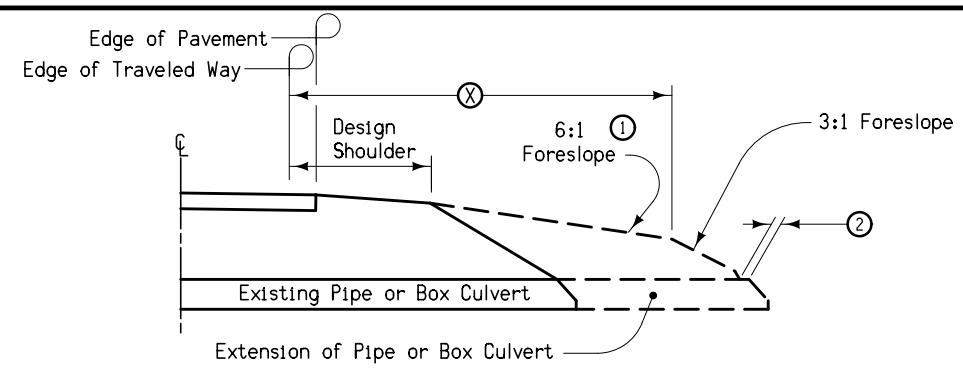


| BEGIN STATION | END STATION | GL  | GR |
|---------------|-------------|-----|----|
| 388+24        | 390+09      | 2   | 6  |
| 414+88        | 415+14      | UAC | 6  |
| 728+76        | 730+41      | 6   | 6  |
| 760+32        | 761+26      | 0   | 2  |
| 972+44        | 974+95      | 6   | 6  |
| 1085+40       | 1086+96     | 6   | 6  |

- ① Possible Full Depth PCC Patch. See D Sheets for locations.
- ② Slope may be flatter than 6:1. Refer to D Sheets and W Sheets.
- ③ Taper proposed shoulder width over 25 ft to match existing shoulder width at the beginning and end of construction limits. See D sheets and Sheet C.10 for details.



PLAN VIEW



SECTION A-A

| STRUCTURE LOCATION |      | (W)  | (L)  | (X)  |
|--------------------|------|------|------|------|
| STATION            | SIDE | Feet | Feet | Feet |
| 389+13.21          | RT   | 46.5 | 73.9 | 26.3 |
| 389+13.21          | LT   | 46.3 | 30.3 | 13.3 |
| 414+08.85          | RT   | 51.2 | 75.3 | 28.0 |
| 729+58.61          | LT   | 45.5 | 14.1 | 13.7 |
| 729+58.61          | RT   | 45.5 | 38.2 | 20.1 |
| 760+79.00          | LT   | 53.5 | 20.8 | 10.0 |
| 760+79.00          | RT   | 53.5 | 19.9 | 11.0 |
| 973+44.77          | LT   | 46.7 | 61.5 | 28.9 |
| 973+44.77          | RT   | 46.8 | 60.9 | 27.4 |
| 1086+18.00         | RT   | 45.0 | 52.3 | 26.0 |

- Notes:
- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, the foreslope shall be flattened as indicated so as to cover the structure. Minimum earth cover is 6".
  - ① 6:1 Maximum - Slope may be flatter.
  - ② 6" Minimum for pipe installations or to top of headwall on R.C.B.
  - (W) = Pipe or R.C.B. width plus 20 feet each side.

**DETAILS OF  
BARNROOF FORESLOPE  
AT DRAINAGE STRUCTURE**

PROFESSIONAL ENGINEER  
IOWA  
STEVEN S. SWEET  
12558

I hereby certify that this plan 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.

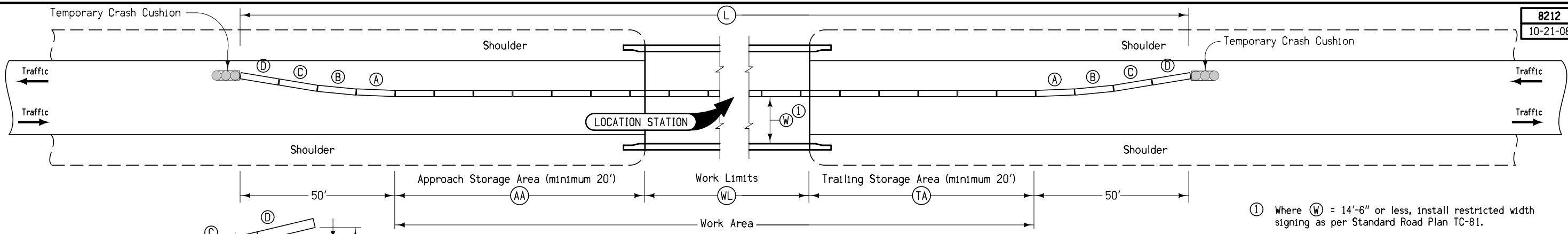
*Steven Scott Sweet* 11/30/17  
Signature Date

Steven Scott Sweet  
Printed or Typed Name

My license renewal date is December 31, 2018

Pages or sheets covered by this seal: B.1-B.2, C.1-C.10, D.1-D.7, G.1-G.4,  
J.1, T.1-T.7, W.1-W.14



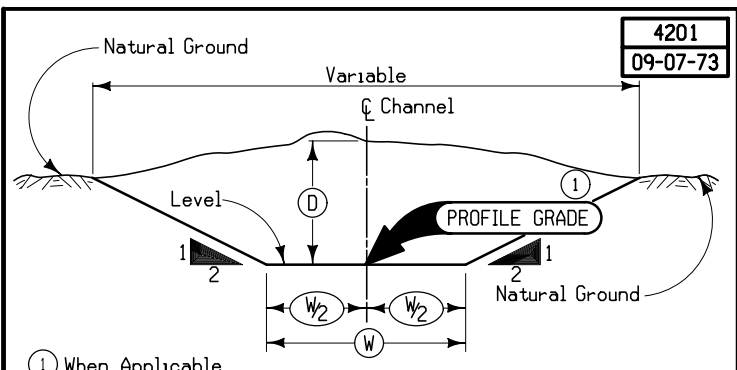


① Where (W) = 14'-6" or less, install restricted width signing as per Standard Road Plan TC-81.

**BARRIER OFFSETS FOR FLARE SECTIONS**

| Station   | Side | (AA) | (WL) | (TA) | (L)   | Anchored<br>X | (W) ①     | Remarks |
|-----------|------|------|------|------|-------|---------------|-----------|---------|
|           |      | Feet | Feet | Feet | Feet  |               | Ft-Inches |         |
| 389+13.21 | LT   | 25   | 25   | 25   | 175   |               | 13-5      |         |
| 389+13.21 | RT   | 25   | 25   | 25   | 175   |               | 13-5      |         |
| 729+58.61 | LT   | 25   | 25   | 25   | 175   |               | 16-0      |         |
| 729+58.61 | RT   | 25   | 25   | 25   | 175   |               | 16-0      |         |
| 760+79.00 | LT   | 25   | 37.5 | 25   | 187.5 |               | 13-0      |         |
| 760+79.00 | RT   | 25   | 37.5 | 25   | 187.5 |               | 13-0      |         |
| 973+44.77 | RT   | 25   | 25   | 25   | 175   |               | 15-0      |         |

**TEMPORARY CONCRETE BARRIER LAYOUT  
for Two-Way Traffic**



**TYPICAL CROSS SECTION  
TYPE 1 CHANNEL**

| LOCATION   |      | WIDTH | DEPTH (Average) |
|------------|------|-------|-----------------|
| STATION    | SIDE | (W)   | (D)             |
| 973+43.00  | LT   | 4'    | 3'              |
| 973+43.00  | RT   | 4'    | 3'              |
| 1085+57.37 | RT   | 4'    | 4'              |
| 973+43.00  | RT   | 4'    | 4'              |

**PROJECT DESCRIPTION**

This project is for various RCB culvert extensions along US 6 from 0.4 miles East of County V-52 to 1.15 miles East of IA 220. It will involve PCC patching, grading, and granular shoulder construction.

**ESTIMATED ROADWAY QUANTITIES  
(1 DIVISION PROJECT)**

| Item No. | Item Code    | Item   | Unit | Total        | As Built Qty. |
|----------|--------------|--|------|--------------|---------------|
| 1        | 2102-0425070 | SPECIAL BACKFILL   | TON  | 324.8        |               |
| 2        | 2102-2625000 | EMBANKMENT-IN-PLACE  | CY   | 1,324.0      |               |
| 3        | 2102-2710070 | EXCAVATION, CLASS 10, ROADWAY AND BORROW                                 | CY   | 936.0        |               |
| 4        | 2102-2710090 | EXCAVATION, CLASS 10, WASTE  | CY   | 8.0          |               |
| 5        | 2105-8425005 | TOPSOIL, FURNISH AND SPREAD  | CY   | 409.0        |               |
| 6        | 2105-8425015 | TOPSOIL, STRIP, SALVAGE AND SPREAD                                       | CY   | 364.0        |               |
| 7        | 2107-0875100 | COMPACTION WITH MOISTURE CONTROL   | CY   | 112.0        |               |
| 8        | 2121-7425020 | GRANULAR SHOULDERS, TYPE B   | TON  | 281.9        |               |
| 9        | 2213-2713300 | EXCAVATION, CLASS 13, FOR WIDENING                                       | CY   | 104.5        |               |
| 10       | 2402-0425040 | FLOODED BACKFILL   | CY   | 74.0         |               |
| 11       | 2414-7200010 | SAFETY GRATE, TYPE 1, CULVERT  | EACH | 3            |               |
| 12       | 2414-7200020 | SAFETY GRATE, TYPE 2, CULVERT  | EACH | 1            |               |
| 13       | 2416-0102254 | APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 54 IN.                | EACH | 1            |               |
| 14       | 2416-1200254 | CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 54 IN. | LF   | 8            |               |
| 15       | 2422-0360018 | APRONS, UNCLASSIFIED, 18 IN. DIA.  | EACH | 2            |               |
| 16       | 2422-1722018 | CULVERT, UNCLASSIFIED ENTRANCE PIPE, 18 IN. DIA.                         | LF   | 60           |               |
| 17       | 2507-3250005 | ENGINEERING FABRIC   | SY   | 497.8        |               |
| 18       | 2507-6800061 | REVTMENT, CLASS E  | TON  | 289.3        |               |
| 19       | 2519-3280000 | FENCE, FIELD   | LF   | 420.6        |               |
| 20       | 2519-4200140 | REMOVAL OF FENCE, FIELD  | LF   | 326.3        |               |
| 21       | 2527-9263109 | PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED                    | STA  | 53.80        |               |
| 22       | 2527-9263131 | WET RETROREFLECTIVE REMOVABLE TAPE MARKINGS                              | STA  | 11.55        |               |
| 23       | 2527-9263180 | PAVEMENT MARKINGS REMOVED  | STA  | 56.69        |               |
| 24       | 2528-8400048 | TEMPORARY BARRIER RAIL, CONCRETE   | LF   | 1,250.0      |               |
| 25       | 2528-8400256 | TEMPORARY TRAFFIC SIGNALS  | EACH | 4            |               |
| 26       | 2528-8445110 | TRAFFIC CONTROL  | LS   | 1.00         |               |
| 27       | 2528-8445113 | FLAGGERS   | EACH | See Proposal |               |
| 28       | 2529-2242304 | CD JOINT ASSEMBLY  | EACH | 4            |               |
| 29       | 2529-2242320 | CT JOINT   | EACH | 2            |               |
| 30       | 2529-5070110 | PATCHES, FULL-DEPTH FINISH, BY AREA                                      | SY   | 185.6        |               |
| 31       | 2529-5070120 | PATCHES, FULL-DEPTH FINISH, BY COUNT                                     | EACH | 6            |               |
| 32       | 2529-8174010 | SUBBASE (PATCHES)  | SY   | 185.6        |               |
| 33       | 2551-0000110 | TEMP CRASH CUSHION   | EACH | 14           |               |
| 34       | 2602-0000020 | SILT FENCE   | LF   | 3,425.0      |               |
| 35       | 2602-0000030 | SILT FENCE FOR DITCH CHECKS  | LF   | 94.8         |               |
| 36       | 2602-0000071 | REMOVAL OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS                     | LF   | 3,519.8      |               |
| 37       | 2602-0000101 | MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECK                  | LF   | 352.0        |               |

**ESTIMATE REFERENCE INFORMATION**

| Item No. | Item Code    | Description  |
|----------|--------------|--|
| 1        | 2102-0425070 | SPECIAL BACKFILL<br>Item is for placement under granular shoulders. See detail WHKS-1 on Sheet B.1 and Tab. 112-9 on Sheet C.10 for details. Bid item quantity is increased 5% for irregularities. |
| 2        | 2102-2625000 | EMBANKMENT-IN-PLACE<br>Item is for additional fill material required for grading. Bid item does not include shrinkage. See T Sheets for details.   |
| 3        | 2102-2710070 | EXCAVATION, CLASS 10, ROADWAY AND BORROW<br>Item is for the total cut material required for grading. See T Sheets for details.   |
| 4        | 2102-2710090 | EXCAVATION, CLASS 10, WASTE<br>Item is for excess cut material. See T Sheets for details.  |
| 5        | 2105-8425005 | TOPSOIL, FURNISH AND SPREAD<br>Item is for additional topsoil fill material required for grading. Proposed depth assumed at 12 inches. See T Sheets for details.                                   |
| 6        | 2105-8425015 | TOPSOIL, STRIP, SALVAGE AND SPREAD<br>Item is for the total topsoil cut material required for grading. Existing depth assumed at 4 inches. See T Sheets for details.                               |
| 7        | 2107-0875100 | COMPACTION WITH MOISTURE CONTROL<br>Item is for backfill of 12' x 4' RCB. See Tab. 104-4 on Sheet C.7 for details.   |

**ESTIMATE REFERENCE INFORMATION**

| Item No. | Item Code    | Description   |
|----------|--------------|---|
| 8        | 2121-7425020 | GRANULAR SHOULDERS, TYPE B<br>Item is for placement of 6" granular shoulders. See detail WHKS-1 on Sheet B.1 and Tab. 112-9 on Sheet C.10 for details. See D Sheets for locations.  |
| 9        | 2213-2713300 | EXCAVATION, CLASS 13, FOR WIDENING<br>Item is for removal of existing granular shoulders. See Tab. 112-9 on Sheet C.10 for details.   |
| 10       | 2402-0425040 | FLOODED BACKFILL<br>Item is for backfill of RCB and LCP. See Tab. 104-3 and 104-4 on Sheet C.7 for details.   |
| 11       | 2414-7200010 | SAFETY GRATE, TYPE 1, CULVERT   |
| 12       | 2414-7200020 | SAFETY GRATE, TYPE 2, CULVERT<br>See Tab. 108-24 on Sheet C.6. See Sheet 9 for Design 217 existing safety grate removal information.  |
| 13       | 2416-0102254 | APRON, LOW CLEARANCE CONCRETE, EQUIVALENT DIAMETER 54 IN.   |
| 14       | 2416-1200254 | CULVERT, LOW CLEARANCE CONCRETE ROADWAY PIPE, EQUIVALENT DIAMETER 54 IN.<br>See Tab. 104-3 on Sheet C.7.  |
| 15       | 2422-0360018 | APRONS, UNCLASSIFIED, 18 IN. DIA.   |
| 16       | 2422-1722018 | CULVERT, UNCLASSIFIED ENTRANCE PIPE, 18 IN. DIA.<br>See Tab. 102-3 on Sheet C.8.  |
| 17       | 2507-3250005 | ENGINEERING FABRIC  |
| 18       | 2507-6800061 | REVTMENT, CLASS E<br>Item is for placement at RCB outlet and inlet. See V Sheets for details and locations.   |
| 19       | 2519-3280000 | FENCE, FIELD<br>Item is for installation of fence around permanent easement limits. See Sheet D.6 for locations.  |
| 20       | 2519-4200140 | REMOVAL OF FENCE, FIELD<br>Item is for removal of existing fence. See Sheet D.6 for locations.  |
| 21       | 2527-9263109 | PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED   |
| 22       | 2527-9263131 | WET RETROREFLECTIVE REMOVABLE TAPE MARKINGS   |
| 23       | 2527-9263180 | PAVEMENT MARKINGS REMOVED<br>See Tab. 108-22 on Sheet C.9-C.10.   |
| 24       | 2528-8400048 | TEMPORARY BARRIER RAIL, CONCRETE<br>See Tab. 108-33 on Sheet C.8.   |
| 25       | 2528-8400256 | TEMPORARY TRAFFIC SIGNALS<br>See Tab. 108-28 on Sheet C.8.  |
| 26       | 2528-8445110 | TRAFFIC CONTROL<br>See Tab. 108-23A on Sheet J.1 for details.   |
| 27       | 2528-8445113 | FLAGGERS  |
| 28       | 2529-2242304 | CD JOINT ASSEMBLY   |
| 29       | 2529-2242320 | CT JOINT  |
| 30       | 2529-5070110 | PATCHES, FULL-DEPTH FINISH, BY AREA   |
| 31       | 2529-5070120 | PATCHES, FULL-DEPTH FINISH, BY COUNT  |
| 32       | 2529-8174010 | SUBBASE (PATCHES)<br>See Tab. 102-6C on Sheet C.6. See Tab. 102-5 on Sheet C.6 for existing pavement information.   |
| 33       | 2551-0000110 | TEMP CRASH CUSHION<br>See Tab. 108-30 on Sheet C.8.   |
| 34       | 2602-0000020 | SILT FENCE<br>See Tab. 100-17 on Sheet C.6 for details.<br>Verify specific locations with the Engineer prior to placement.<br>Bid item quantity is increased by 25% for field adjustments and replacement.  |
| 35       | 2602-0000030 | SILT FENCE FOR DITCH CHECKS<br>Refer to Tab. 100-18 on Sheet C.6. The tabulation includes estimated locations for placement of Silt Fence for Ditch Checks to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 50% additional quantity for field adjustments and replacements. |
| 36       | 2602-0000071 | REMOVAL OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS<br>This item is included for silt fence or silt fence for ditch check removal to allow for replacment (replacment to be paid seperately), or for areas that have achieved 70% permanent growth.<br>Item is estimated at 100% of the total Tab. 100-0A quantity for Silt Fence and Silt Fence for Ditch Checks.         |
| 37       | 2602-0000101 | MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECK<br>This item is included for clean-out of and repair of the silt fence and silt fence for ditch checks during the guardrail grading. Item is estimated at 10% of the total Tab. 100-0A quantity for Silt Fence and Silt Fence for Ditch Checks.   |

**STANDARD ROAD PLANS**105-4  
10-18-11

The following Standard Road Plans apply to construction work on this project.

| Number | Date     | Title   |
|--------|----------|---|
| BA-401 | 04-16-13 | Temporary Barrier Rail (Precast Concrete)                               |
| BA-500 | 04-19-16 | Temporary Crash Cushions Sand Barrel                                    |
| DR-101 | 04-18-17 | Pipe Culvert (Bedding and Backfill)                                     |
| DR-102 | 04-21-15 | Pipe Culvert (Cover and Camber)   |
| DR-104 | 04-19-16 | Depth of Cover Tables for Concrete and Corrugated Pipe                  |
| DR-111 | 10-17-17 | Box Culvert (Backfill)  |
| DR-121 | 10-17-17 | Connected Pipe Joints   |
| DR-122 | 10-18-16 | Construction of Type "C" Concrete Adaptors for Pipe Culvert Connections |
| DR-202 | 04-21-15 | Low Clearance Concrete Pipe Aprons                                      |
| DR-213 | 10-17-17 | Pipe Apron Guard  |
| DR-503 | 04-21-15 | Safety Grates for Box Culverts  |
| DR-651 | 04-18-17 | Unclassified Pipe Culvert   |
| EC-201 | 10-17-17 | Silt Fence  |
| EC-301 | 10-18-16 | Rock Erosion Control (REC)  |
| EW-501 | 10-20-15 | Rural Entrance  |
| PM-110 | 04-16-13 | Line Types  |
| PR-102 | 04-21-15 | Full Depth PCC Patch without Dowels                                     |
| PR-103 | 10-21-14 | Full Depth PCC Patch with Dowels  |
| PR-140 | 04-21-15 | Subbase Patches   |
| PV-101 | 10-17-17 | Joints  |
| SI-882 | 10-18-16 | Special Signs for Restricted Width Traffic Control Zones                |
| TC-1   | 04-16-13 | Work Not Affecting Traffic (Two-Lane or Multi-Lane)                     |
| TC-81  | 04-20-10 | Restricted Width Signing (Less Than 14.5 Feet)                          |
| TC-202 | 04-21-15 | Work Within 15 ft of Traveled Way                                       |
| TC-213 | 04-17-12 | Lane Closure with Flaggers  |
| TC-217 | 10-18-16 | Lane Closure with Signals and TBR                                       |

**INDEX OF TABULATIONS**111-25  
10-18-11

| Tabulation      | Tabulation Title  | Sheet No.  |
|-----------------|---|------------|
| <b>C Sheets</b> |   |            |
| 100-0A          | ESTIMATED ROADWAY QUANTITIES (1 DIVISION PROJECT)                     | C.1        |
| 100-1D          | PROJECT DESCRIPTION   | C.1        |
| 100-4A          | ESTIMATE REFERENCE INFORMATION  | C.1 - C.1  |
| 100-17          | TABULATION OF SILT FENCES   | C.6        |
| 100-18          | SILT FENCES FOR DITCH CHECKS  | C.6        |
| 100-34          | STORMWATER DRAINAGE BASIN   | C.7        |
| 100-35          | SUMMARY OF STORMWATER STORAGE   | C.7        |
| 102-3           | ACCESS POINTS AND SAFETY RAMPS  | C.8        |
| 102-5           | EXISTING PAVEMENT   | C.6        |
| 102-6C          | FULL-DEPTH PATCHES  | C.6        |
| 104-3           | DRAINAGE STRUCTURE BY ROAD CONTRACTOR                                 | C.7        |
| 104-4           | ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR | C.7        |
| 105-4           | STANDARD ROAD PLANS   | C.2        |
| 108-22          | PAVEMENT MARKING LINE TYPES   | C.9 - C.10 |
| 108-24          | SAFETY GRATE TREATMENT  | C.6        |
| 108-28          | TEMPORARY TRAFFIC SIGNALS   | C.8        |
| 108-30          | CRASH CUSHIONS  | C.8        |
| 108-33          | TEMPORARY BARRIER RAIL  | C.8        |
| 110-12A         | POLLUTION PREVENTION PLAN   | C.3 - C.4  |
| 111-25          | INDEX OF TABULATIONS  | C.2        |
| 112-9           | SHOULDERS   | C.10       |
| <b>J Sheets</b> |   |            |
| 108-23A         | TRAFFIC CONTROL PLAN  | J.1        |
| 108-25          | 511 TRAVEL RESTRICTIONS   | J.1        |
| 111-01          | COORDINATED OPERATIONS  | J.1        |
| <b>T Sheets</b> |   |            |
| 107-28          | TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS                     | T.1 - T.7  |

**POLLUTION PREVENTION PLAN**

This project is regulated by the requirements of the Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) General Permit No. 2 OR an Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) individual storm water permit. The Contractor shall carry out the terms and conditions of this permit and the Pollution Prevention Plan (PPP).

This Base PPP includes information on Roles and Responsibilities, Project Site Description, Controls, Maintenance Procedures, Inspection Requirements, Non-Storm Water Controls, Potential Sources of Off Right-of-Way Pollution, and Definitions. This plan references other documents rather than repeating the information contained in the documents. A copy of this Base Pollution Prevention Plan, amended as needed per plan revisions or by contract modification, will be readily available for review.

All contractors shall conduct their operations in a manner that controls pollutants, minimizes erosion, and prevents sediments from entering waters of the state and leaving the highway right-of-way. The prime contractor shall be responsible for compliance and implementation of the PPP for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

**I. ROLES AND RESPONSIBILITIES**

- A. Designer:
  1. Prepares Base PPP included in the project plan.
  2. Prepares Notice of Intent (NOI) submitted to Iowa DNR.
  3. Signature authority on the Base PPP and NOI.
- B. Contractor/Subcontractor:
  1. Affected contractors/subcontractors are co-permittees with the IDOT and will sign a certification statement adhering to the requirements of the NPDES permit and this PPP plan. Affected contractors/subcontractors are anyone responsible for sediment or erosion controls or involved in land disturbing activities. All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
  2. Submit an Erosion Control Implementation Plan (ECIP) according to Specifications Section 2602 and any additional plan notes.
  3. Install and maintain appropriate controls.
  4. Supervise and implement good housekeeping practices.
  5. Conduct joint required inspections of the site with inspection staff.
  6. Comply with training and certification requirements of Specifications Section 2602.
  7. Signature authority on Co-Permittee Certification Statements and storm water inspection reports.
- C. RCE/Inspector:
  1. Update PPP whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the discharge of pollutants from the project.
  2. Maintain an up-to-date record that identifies contractors and subcontractors as co-permittees.
  3. Make these plans available to the DNR upon their request.
  4. Conduct joint required inspections of the site with the contractor/subcontractor.
  5. Complete an inspection report after each inspection.
  6. Signature authority on storm water inspection reports and Notice of Discontinuation (NOD).

**II. PROJECT SITE DESCRIPTION**

- A. This Pollution Prevention Plan (PPP) is for the construction of a culvert extension.
- B. This PPP covers approximately 1.83 acres with an estimated 1.09 acres being disturbed. The portion of the PPP covered by this contract has 1.09 acres disturbed.
- C. The PPP is located in an area of 2 soil associations (Tama - Muscatine - Downs) & (Sparta - Chelsea - Dickinson). The estimated weighted average runoff coefficient number for this PPP after completion will be 0.23.
- D. Storm Water Site Map - Multiple sources of information comprise the base storm water site map including:
  1. Drainage patterns - Plan and Profile sheets and Situation plans.
  2. Proposed Slopes - Cross Sections.
  3. Areas of Soil Disturbance - construction limits shown on Plan and Profile sheets.
  4. Location of Structural Controls - Tabulations on C sheets.
  5. Locations of Non-structural Controls - Tabulations on C sheets.
  6. Locations of Stabilization Practices - generally within construction limits shown on Plan and Profile sheets.
  7. Surface Waters (including wetlands) - Project Location Map and Plan and Profile sheets.
  8. Locations where storm water is discharged - Plan and Profile sheets.
- E. The base site map is amended by contract modifications and progress payments (fieldbook entries) of completed erosion control work. Also, due to project phasing, erosion and sediment controls shown on project plans may not be installed until needed, based on site conditions. For example, silt fence ditch checks will typically not be installed until the ditch has been installed. Installed locations may also be modified from tabulation locations by field staff. Installed locations will be documented by fieldbook entries.
- F. Runoff from this work will flow into Iowa River.

**III. CONTROLS**

- A. The contractor's ECIP specified in Article 2602.03 for accomplishment of storm water controls should clearly describe the intended sequence of major activities and for each activity define the control measure and the timing during the construction process that the measure will be implemented.
- B. Preserve vegetation in areas not needed for construction.
- C. Sections 2601 and 2602 of the Standard Specifications define requirements to implement erosion and sediment control measures. Actual quantities used and installed locations may vary from the Base PPP and amendment of the plan will be documented via fieldbook entries or by contract modification. Additional erosion and sediment control items may be required as determined by the inspector and/or contractor during storm water monitoring inspections. If the work involved is not applicable to any contract items, the work will be paid for according to Article 1109.03 paragraph B.
  1. EROSION AND SEDIMENT CONTROLS
    - a. Stabilization Practices
      - 1) Site plans will ensure that existing vegetation or natural buffers are preserved where attainable and disturbed portions of the site will be stabilized.
      - 2) Initialize stabilization of disturbed areas immediately after clearing, grading, excavating, or other earth disturbing activities have:
        - a) Permanently ceased on any portion of the site, or
        - b) Temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.
      - 3) Staged permanent and/or temporary stabilizing seeding and mulching shall be completed as the disturbed areas are completed. Incomplete areas shall be stabilized according to paragraph III, C, 1, a, 2, b above.
      - 4) Permanent and Temporary Stabilization practices to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located on the C sheets of the plan.

**POLLUTION PREVENTION PLAN**

Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation.

- 5) Preservation of existing vegetation within right-of-way or easements will act as vegetative buffer strips.
- 6) Preservation of topsoil: Bid items to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located on the C sheets of the plan. Additional information may be found in Tabulations in the C or T sheets of the plans or is referenced in Standard Specifications Section 2105.

- b. Structural Practices
  - 1) Structural practices will be implemented to divert flows from exposed soils and detain or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Additionally, structural practices may include: silt basins that provide 3600 cubic feet of storage per acre drained or equivalent sediment controls, outlet structures that withdraw water from surface when discharging basins, and controls to direct storm water to vegetated areas.
  - 2) Structural practices to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located on the C sheets of the plan, as well as all other item specific Tabulations. Typical drawings detailing construction of the devices to be used on this project can be found on the B sheets of the plans or are referenced in the Standard Road Plans Tabulation.

- c. Storm Water Management
  - 1) Measures shall be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. This may include velocity dissipation devices at discharge locations and along length of outfall channel as necessary to provide a non-erosion velocity flow from structure to water course. If included with this project, these items are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located on the C sheets of the plan, as well as all other item specific Tabulations. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation. The installation of these devices may be subject to Section 404 of the Clean Water Act.

**2. OTHER CONTROLS**

- a. Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules or regulations shall apply.
  - 1) Vehicle Entrances and Exits - Construct and maintain entrances and exits to prevent tracking of sediments onto roadways.
  - 2) Material Delivery, Storage and Use - Implement practices to prevent discharge of construction materials during delivery, storage, and use.
  - 3) Stockpile Management - Install controls to reduce or eliminate pollution of storm water from stockpiles of soil and paving.
  - 4) Waste Disposal - Do not discharge any materials, including building materials, into waters of the state, except as authorized by a Section 404 permit.
  - 5) Spill Prevention and Control - Implement procedures to contain and clean-up spills and prevent material discharges to the storm drain system and waters of the state.
  - 6) Concrete Residuals and Washout Wastes - Designate temporary concrete washout facilities for rinsing out concrete trucks. Provide directions to truck drivers where designated washout facilities are located. Designated washout areas should be located at least 50 feet away from storm drains, streams or other water bodies. Care should be taken to ensure these facilities do not overflow during storm events.
  - 7) Concrete Grooving/Grinding Slurry - Do not discharge slurry to a waterbody or storm drain. Slurry may be applied on foreslopes or removed from the project.
  - 8) Vehicle and Equipment Storage and Maintenance Areas - Perform on site fueling and maintenance in accordance with all environment laws such as proper storage of onsite fuels and proper disposal of used engine oil or other fluids on site. Employ washing practices that prevent contamination of surface and ground water from wash water.
  - 9) Litter Management - Ensure employees properly dispose of litter.
  - 10) Dewatering - Properly treat water to remove suspended sediment before it re-enters a waterbody or discharges off-site. Measures are also to be taken to prevent scour erosion at dewatering discharge point.

**3. APPROVED STATE OR LOCAL PLANS**

During the course of this construction, it is possible that situations will arise where unknown materials will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

**IV. MAINTENANCE PROCEDURES**

The contractor is required to maintain all temporary erosion and sediment control measures in proper working order, including cleaning, repairing, or replacing them throughout the contract period. This shall begin when the features have lost 50% of their capacity.

**V. INSPECTION REQUIREMENTS**

- A. Inspections shall be made jointly by the contractor and the contracting authority at least once every seven calendar days. Storm water monitoring inspections will include:
  1. Date of the inspection.
  2. Summary of the scope of the inspection.
  3. Name and qualifications of the personnel making the inspection.
  5. Review erosion and sediment control measures within disturbed areas for the effectiveness in preventing impacts to receiving waters.
  6. Major observations related to the implementation of the PPP.
  7. Identify corrective actions required to maintain or modify erosion and sediment control measures.
- B. Include storm water monitoring inspection reports in the Amended PPP. Incorporate any additional erosion and sediment control measures determined as a result of the inspection. Immediately begin corrective actions on all deficiencies found within 3 calendar days of the inspection.

**VI. NON-STORM WATER DISCHARGES**

This includes subsurface drains (i.e. longitudinal and standard subdrains) and slope drains. The velocity of the discharge from these features may be controlled by the use of patio blocks, Class A stone, erosion stone or other appropriate materials. This also includes uncontaminated groundwater from dewatering operations, which will be controlled as discussed in Section III of the PPP.

**VII. POTENTIAL SOURCES OF OFF RIGHT-OF-WAY (ROW) POLLUTION**

Silts, sediment, and other forms of pollution may be transported onto highway right-of-way (ROW) as a result of a storm event. Potential sources of pollution located outside highway ROW are beyond the control of this PPP. Pollution within highway ROW will be conveyed and controlled per this PPP.

**VIII. DEFINITIONS**


- A. Base PPP - Initial Pollution Prevention Plan.

### POLLUTION PREVENTION PLAN


- B. Amended PPP - May include Plan Revisions or Contract Modifications for new items, storm water monitoring inspection reports, and fieldbook entries made by the inspector.
- C. IDR - Inspector's Daily Report - this contains the inspector's daily diary and bid item postings.
- D. Controls - Methods, practices, or measures to minimize or prevent erosion, control sedimentation, control storm water, or minimize contaminants from other types of waste or materials. Also called Best Management Practices (BMPs).
- E. Signature Authority - Representative from Designer, Contractor/Subcontractor, or RCE/Inspector authorized to sign various storm water documents.

-----  
CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

  
\_\_\_\_\_  
Signature

Steven Scott Sweet  
\_\_\_\_\_  
Printed or Typed Name

  
\_\_\_\_\_  
Signature

Roger R. Walton  
\_\_\_\_\_  
Printed or Typed Name

232-3A  
10-20-15

**EROSION CONTROL  
(RURAL SEEDING)**

Following the completion of work in a disturbed area, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows:

Use seed mix and fertilizer meeting the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications.

Use mulch meeting the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed and furnishing and applying seed, fertilizer, and mulch is incidental to mobilization and will not be paid for separately.

232-3B  
10-20-15

**EROSION CONTROL  
(URBAN SEEDING)**

Following the completion of work in a disturbed area, place seed, fertilizer, and mulch on the disturbed area as follows:

Use seed mix and fertilizer meeting the requirements of Article 2601.03,C,4 and Section 4169 of the Standard Specifications.

Use mulch meeting the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed and furnishing and applying seed, fertilizer, and mulch is incidental to mobilization and will not be paid for separately.

232-3C  
10-20-15

**EROSION CONTROL  
(NATIVE GRASS SEEDING)**

Following the completion of work in a disturbed area, place seed and mulch on the disturbed area lying 8 feet or more beyond the shoulder as follows:

SEED MIX:

|   |                             |
|---|-----------------------------|
| Big bluestem (Andropogon gerardii)        | 6 lbs. PLS/Acre (7.0 kg/ha) |
| Indiangrass (Sorghastrum nutans)          | 6 lbs. PLS/Acre (7.0 kg/ha) |
| Little bluestem (Schizachyrium scoparium) | 6 lbs. PLS/Acre (7.0 kg/ha) |
| Partridge Pea (Chamaecrista fasciculata)  | 4 lbs. PLS/Acre (4.5 kg/ha) |
| Sideoats grama (Bouteloua curtipendula)   | 4 lbs. PLS/Acre (4.5 kg/ha) |
| Canada wildrye (Elymus canadensis)        | 2 lbs. PLS/Acre (2.2 kg/ha) |
| Switchgrass (Panicum virgatum)            | 1 lbs. PLS/Acre (1.1 kg/ha) |
| Oats (Avena sativa)                       | 32 lbs./Acre (36.0 kg/ha)   |

Furnish Big bluestem, Indiangrass, Canada wildrye and Little bluestem that is debarbed or equal to facilitate the application of seed.

Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa. Oats are excluded from this requirement.

Use seed meeting requirements of Article 4169.02 of the Standard Specifications.

Use mulch meeting the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed and furnishing and applying seed and mulch is incidental to mobilization and will not be paid for separately.

281-1  
10-18-16

**SECTION 404 PERMIT AND CONDITIONS**

Construct this project according to the requirements of U.S. Army Corps of Engineers Nationwide Permit 14, Permit No. 2017-0767. A copy of this permit is available from the Iowa DOT website (<http://www.envpermits.iowadot.gov/>). The U.S. Army Corps of Engineers reserves the right to visit the site without prior notice.

262-5  
10-18-05

**UTILITIES  
(POINT 25 PROJECT)**

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

**EXISTING PAVEMENT**

| No. | Location |       |                |                      |                    | Year | Type | Project Number     | Surface |         | Base |       | Subbase |       | Removal |       | Coarse Aggregate |      |                  | Reinforcement | Remarks |                                    |                                    |
|-----|----------|-------|----------------|----------------------|--------------------|------|------|--------------------|---------|---------|------|-------|---------|-------|---------|-------|------------------|------|------------------|---------------|---------|------------------------------------|------------------------------------|
|     | County   | Route | Dir. of Travel | Begin Ref. Loc. Sign | End Ref. Loc. Sign |      |      |                    | Type    | Depth   | Type | Depth | Type    | Depth | Type    | Depth | Source           | Type | Durability Class |               |         |                                    |                                    |
|     |          |       |                |                      |                    |      |      |                    |         |         |      |       |         |       |         |       |                  |      |                  |               |         | IN                                 | IN                                 |
|     | Iowa     | US 6  | Both           | 212.06               | 221.16             | 2012 |      | STP-6-6(48)--2C-48 | HMA     | 1.5     | HMA  |       |         |       |         |       |                  |      |                  |               |         | Cold-In-Place Recycling w/ Overlay |                                    |
|     |          |       |                |                      |                    | 1984 |      | FN-6-6(22)--21-48  | HMA     | 1.5     | HMA  |       |         |       |         |       |                  |      |                  |               |         |                                    |                                    |
|     |          |       |                |                      |                    | 1956 |      | P-1067             | HMA     | 1.5     | HMA  |       |         |       |         |       |                  |      |                  |               |         |                                    |                                    |
|     |          |       |                |                      |                    | 1930 |      | FA-90AB            | PC7     | 10-7-10 |      |       |         |       |         |       |                  |      |                  |               |         |                                    | 3' PCC Widening<br>18' Wide        |
|     | Iowa     | US 6  | Both           | 221.16               | 230.01             | 2012 |      | STP-6-6(48)--2C-48 | HMA     | 1.5     | HMA  |       |         |       |         |       |                  |      |                  |               |         |                                    | Cold-In-Place Recycling w/ Overlay |
|     |          |       |                |                      |                    | 1984 |      | FN-6-6(22)--21-48  | HMA     | 1.5     | HMA  |       |         | Mil   | 1.5     |       |                  |      |                  |               |         |                                    |                                    |
|     |          |       |                |                      |                    | 1956 |      | P-1067             | HMA     | 1.5     | HMA  |       |         |       |         |       |                  |      |                  |               |         |                                    |                                    |
|     |          |       |                |                      |                    | 1930 |      | P-619A             | PC7     | 10-7-10 |      |       |         |       |         |       |                  |      |                  |               |         |                                    | 3' PCC Widening<br>18' Wide        |

**FULL-DEPTH PATCHES**

Possible Standards: PR-101, PR-102, PR-103, PR-104, PR-105 and PR-140.

| Count | Location            |            | Dimension |       |                 | PCC Patches |                |        |                  | HMA Patches | Composite HMA | Subbase Patches | Subbase Patch w/ 'EF' Joint | Patch Subdrain | 'CD' Joints | 'CT' Joints | 'EF' Joints | Anchor Lugs Removal | Remarks |       |
|-------|---------------------|------------|-----------|-------|-----------------|-------------|----------------|--------|------------------|-------------|---------------|-----------------|-----------------------------|----------------|-------------|-------------|-------------|---------------------|---------|-------|
|       | Station or Milepost | Lane       | Length    | Width | Patch Thickness | With Dowels | Without Dowels | C R C  | Ramp with Dowels |             |               |                 |                             |                |             |             |             |                     |         |       |
|       |                     |            |           |       |                 | PR-103      | PR-102         | PR-104 | PR-105           |             |               |                 |                             |                |             |             |             |                     |         |       |
|       |                     | L, R, or B | FT        | FT    | IN              | SY          | SY             | SY     | SY               | SY          | TON           | SY              | SY                          | No.            | No.         | No.         | No.         | No.                 |         |       |
| 1     | 389+13.26           | L          | 14.5      | 10.0  |                 |             | 16.1           |        |                  |             |               | 16.1            |                             |                |             |             |             |                     |         |       |
| 1     | 389+13.26           | R          | 14.5      | 10.0  |                 |             | 16.1           |        |                  |             |               | 16.1            |                             |                |             |             |             |                     |         |       |
| 1     | 729+58.60           | L          | 11.5      | 10.0  |                 |             | 12.8           |        |                  |             |               | 12.8            |                             |                |             |             |             |                     |         |       |
| 1     | 729+58.60           | R          | 11.5      | 10.0  |                 |             | 12.8           |        |                  |             |               | 12.8            |                             |                |             |             |             |                     |         |       |
| 1     | 761+79.00           | B          | 30.0      | 32.0  |                 | 106.7       |                |        |                  |             |               | 106.7           |                             | 4              | 2           |             |             |                     |         |       |
| 1     | 973+48.95           | R          | 19.0      | 10.0  |                 |             | 21.1           |        |                  |             |               | 21.1            |                             |                |             |             |             |                     |         |       |
| 6     |                     |            |           |       |                 | 106.7       | 78.9           |        |                  |             |               | 185.6           |                             |                |             |             |             |                     |         | Total |

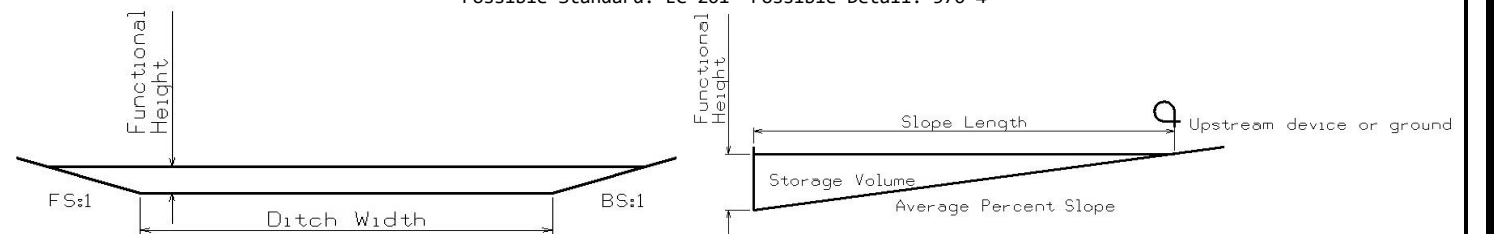
**TABULATION OF SILT FENCES**

Refer to EC-201

| Location      |             |      |        | Length              | Remarks |
|---------------|-------------|------|--------|---------------------|---------|
| Begin Station | End Station | Side | LF     |                     |         |
| 388+55.00     | 389+67.00   | LT   | 135.0  |                     |         |
| 387+98.00     | 390+35.00   | RT   | 273.0  |                     |         |
| 413+47.00     | 414+61.00   | LT   | 138.0  |                     |         |
| 413+50.00     | 415+39.00   | RT   | 181.0  |                     |         |
| 728+87.00     | 730+24.00   | LT   | 225.0  |                     |         |
| 728+76.00     | 730+44.00   | RT   | 266.0  |                     |         |
| 760+81.00     | 761+57.00   | LT   | 126.0  |                     |         |
| 760+81.00     | 761+57.00   | RT   | 126.0  |                     |         |
| 972+24.00     | 974+55.00   | LT   | 395.0  |                     |         |
| 972+90.00     | 974+66.00   | RT   | 319.0  |                     |         |
| 1085+15.00    | 1087+22.00  | RT   | 556.0  |                     |         |
|               |             |      | 2740.0 | Total               |         |
|               |             |      | 3425.0 | Total +25%          |         |
|               |             |      | 342.5  | 10% for Maintenance |         |

**SILT FENCES FOR DITCH CHECKS**

Possible Standard: EC-201 Possible Detail: 570-4



\* The functional height used in the volume equation is 85% of effective height. Effective height is 1.58 feet as shown on EC-201.  
\* Volume equation:  $[0.5 * Spacing * (0.5 * H^2 * FS + DW * H + 0.5 * H^2 * BS)]$

| Basin No. | Type | Location   |      | Bid Items       |                |            | Stormwater Storage Volume Summary |                |                |              | Remarks |            |
|-----------|------|------------|------|-----------------|----------------|------------|-----------------------------------|----------------|----------------|--------------|---------|------------|
|           |      | Station    | Side | Installation LF | Maintenance LF | Removal LF | Foreslope FS:1                    | Backslope BS:1 | Ditch Width FT | Avg. % Slope |         | Volume* CF |
| 10        |      | 728+79.23  | Rt   | 26.8            | 2.7            | 26.8       | 6.5                               | 4.6            | 4.6            | 1.5%         | 809.4   |            |
| 16        |      | 974+05.16  | Rt   | 10.9            | 1.1            | 10.9       | 1.9                               | 2.3            | 2.5            | 4.7%         | 125.0   |            |
| 16        |      | 974+40.16  | Rt   | 8.0             | 0.8            | 8.0        | 1.5                               | 2.5            | 0.0            | 4.7%         | 63.1    |            |
| 16        |      | 974+75.16  | Rt   | 24.2            | 2.4            | 24.2       | 2.3                               | 3.0            | 13.6           | 4.7%         | 403.3   |            |
| 17        |      | 1085+44.28 | Rt   | 24.9            | 2.5            | 24.9       | 2.3                               | 4.7            | 10.9           | 3.4%         | 471.4   |            |
|           |      |            |      | 94.8            | 9.5            | 94.8       |                                   |                |                |              |         | Total      |

**SAFETY GRATE TREATMENT**

Refer to DR-503.

① Lane(s) to which the installation is adjacent.

| No. | Location             |           |      |      | Culvert Skew Angle Ahead | Dimensions |         |      |      |     |     |     |     |      |  | Midspan Support Required | Wingwall Flare Angle | Remarks |
|-----|----------------------|-----------|------|------|--------------------------|------------|---------|------|------|-----|-----|-----|-----|------|--|--------------------------|----------------------|---------|
|     | Direction of Traffic | Station   | Side | Type |                          | A          | B       | C    | D    | E   | F   | G   | H   | J    |  |                          |                      |         |
|     |                      |           |      |      |                          | Degrees    | Degrees |      |      |     |     |     |     |      |  |                          |                      |         |
| 1   | WB                   | 414+08.85 | LT   | 2    | 9                        | 13         | 13.4    | 10.5 | 10.5 | 8.6 | 8.6 | 0.5 | 0.4 | 0.92 |  |                          |                      |         |
| 2   | WB                   | 729+58.60 | LT   | 1    |                          | 4          | 4       | 7.4  | 7.4  | 7   | 7   | 1   | 9"  | 2    |  |                          |                      |         |
| 3   | WB                   | 760+79.00 | LT   | 1    |                          | 12         | 12      | 6.3  | 6.3  | 7.5 | 7.5 | 1   | 9"  | 2    |  |                          |                      |         |
| 4   | EB                   | 760+79.00 | LT   | 1    |                          | 12         | 12      | 6.3  | 6.3  | 7.5 | 7.5 | 1   | 9"  | 2    |  |                          |                      |         |
|     |                      |           |      | 3    | 1                        |            |         |      |      |     |     |     |     |      |  |                          | Total                |         |

**STORMWATER DRAINAGE BASIN**

| Basin No. | Station to Station |            | Side | Disturbed Area Acres | Discharge Point |      | Required Storage Volume CF | Remarks |
|-----------|--------------------|------------|------|----------------------|-----------------|------|----------------------------|---------|
|           |                    |            |      |                      | Station         | Side |                            |         |
| 1         | 387+98.23          | 389+13.20  | Rt   | 0.0                  | 389+13.20       | Rt   | 0.0                        |         |
| 2         | 389+13.20          | 390+34.79  | Rt   | 0.0                  | 389+13.20       | Rt   | 0.0                        |         |
| 3         | 413+50.10          | 414+08.85  | Rt   | 0.0                  | 414+08.85       | Rt   | 0.0                        |         |
| 4         | 414+08.85          | 415+39.18  | Rt   | 0.0                  | 414+08.85       | Rt   | 0.0                        |         |
| 5         | 728+87.09          | 729+58.60  | Lt   | 0.0                  | 729+58.60       | Lt   | 0.0                        |         |
| 6         | 728+76.05          | 729+58.60  | Rt   | 0.0                  | 729+58.60       | Rt   | 0.0                        |         |
| 7         | 729+58.60          | 730+41.22  | Lt   | 0.0                  | 729+58.60       | Lt   | 0.0                        |         |
| 8         | 729+58.60          | 730+41.22  | Rt   | 0.0                  | 729+58.60       | Rt   | 0.0                        |         |
| 9         | 972+23.89          | 973+39.53  | Lt   | 0.0                  | 973+39.53       | Lt   | 0.0                        |         |
| 10        | 972+72.09          | 973+50.54  | Rt   | 0.0                  | 973+50.54       | Rt   | 0.0                        |         |
| 11        | 973+39.53          | 974+79.26  | Lt   | 0.0                  | 973+39.53       | Lt   | 0.0                        |         |
| 12        | 973+50.54          | 974+95.43  | Rt   | 0.0                  | 973+50.54       | Rt   | 0.0                        |         |
| 13        | 1085+40.59         | 1086+18.00 | Rt   | 0.0                  | 1086+18.00      | Rt   | 0.0                        |         |
| 14        | 1086+18.00         | 1086+96.26 | Rt   | 0.0                  | 1086+18.00      | Rt   | 0.0                        |         |

**SUMMARY OF STORMWATER STORAGE**

| Basin No. | Item                    | Total Storage Volume Provided | Total Storage Volume Required | Remarks |
|-----------|-------------------------|-------------------------------|-------------------------------|---------|
|           |                         | CF                            | CF                            |         |
| 1         | N/A                     | 0.0                           | 0.0                           |         |
| 2         | N/A                     | 0.0                           | 0.0                           |         |
| 3         | N/A                     | 0.0                           | 0.0                           |         |
| 4         | N/A                     | 0.0                           | 0.0                           |         |
| 5         | N/A                     | 0.0                           | 0.0                           |         |
| 6         | N/A                     | 0.0                           | 0.0                           |         |
| 7         | Silt Fence Ditch Checks | 809.4                         | 0.0                           |         |
| 8         | N/A                     | 0.0                           | 0.0                           |         |
| 9         | N/A                     | 0.0                           | 0.0                           |         |
| 10        | N/A                     | 0.0                           | 0.0                           |         |
| 11        | N/A                     | 0.0                           | 0.0                           |         |
| 12        | N/A                     | 0.0                           | 0.0                           |         |
| 13        | Silt Fence Ditch Checks | 591.4                         | 0.0                           |         |
| 14        | Silt Fence Ditch Checks | 471.4                         | 0.0                           |         |

**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
- ③ Backfill according to DR-101

| Drainage Area ACRE | Location  | Type | Size ① | Kind Of Pipe ② | Length New Const. LF | Bedding Class | Design Cover (H) |      | Apron No. | Apron Guard* (DR-213) |     |     |     | 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 CY | Flowable Mortar CY | Floodable* Backfill (A) CY | Porous* Backfill (B) CY | Flooded Backfill (A+B) CY ③ | Remarks |     |                  |               |      |
|--------------------|-----------|------|--------|----------------|----------------------|---------------|------------------|------|-----------|-----------------------|-----|-----|-----|----------|--------------------------------|--------|--------------------------------|-------------------------|----------------------|--------|-------|-------|---------------------|------|--------------------|-----|------|-----|-----|-------------|--------------------|----------------------------|-------------------------|-----------------------------|---------|-----|------------------|---------------|------|
|                    |           |      |        |                |                      |               | FT               | FT   |           | No.                   | No. | No. | No. |          | No.                            | No.    |                                |                         | Lt.                  | Rt.    | Other | Other | Lt.                 | Rt.  | Lt.                | Rt. | Lt.  | Rt. | Lt. |             |                    |                            |                         |                             |         | Rt. | Location Station | Top Elevation | Type |
|                    |           |      |        |                |                      |               | IN               | OUT  |           | No.                   | No. | No. | No. |          | No.                            | No.    |                                |                         | Lt.                  | Rt.    | Lt.   | Rt.   | Lt.                 | Rt.  | Lt.                | Rt. | Lt.  | Rt. | Lt. |             |                    |                            |                         |                             |         | Rt. |                  |               |      |
| 110.0              | 389+13.20 | Ext. | 54     | LCP            | 8                    | B             | 1.8              | 0.08 | 1         | 1                     |     |     |     | C-2      | 1                              | Type 3 |                                |                         | 773.25               | 771.02 |       |       | 30.3                | 38.3 | 16.0               |     |      |     | 0.0 | 0.0         | 0.0                | 2.0                        | 2.0                     |                             |         |     |                  |               |      |

**ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR**

- \* Not a Bid Item
- ① Backfill according to DR-111

| Location   | Design Number | Size         | Kind            | By Road Contractor |                  |            |       | Floodable* Backfill (A) CY | Porous* Backfill (B) CY | Flooded Backfill (A+B) CY ① | Excavation                       |                                      | Revetment |             | Engineering Fabric SY | Remarks |      |               |
|------------|---------------|--------------|-----------------|--------------------|------------------|------------|-------|----------------------------|-------------------------|-----------------------------|----------------------------------|--------------------------------------|-----------|-------------|-----------------------|---------|------|---------------|
|            |               |              |                 | Dike               |                  |            |       |                            |                         |                             | Compaction w/Moisture Control CY | Compaction w/Moisture and Density CY | Type      | Quantity CY |                       |         | Type | Quantity TONS |
|            |               |              |                 | Rt.                | Location Station | Top. Elev. | Type  |                            |                         |                             |                                  |                                      |           |             |                       |         |      |               |
| 389+13.21  | 117           | 5' x 3'      | RCB Extension   |                    |                  |            |       |                            |                         |                             |                                  | Class E                              | 39.000    | 66.3        | See Sheet 5-8         |         |      |               |
| 414+08.85  | 217           | Twin 6' x 5' | RCB Extension   |                    |                  |            |       |                            |                         |                             |                                  | Class E                              | 61.600    | 93.0        | See Sheet 9-20        |         |      |               |
| 729+58.61  | 317           | 4' x 2'      | RCB Extension   |                    |                  |            |       |                            |                         |                             |                                  | Class E                              | 39.100    | 68.8        | See Sheet 21-32       |         |      |               |
| 760+79.00  | 617           | 12' x 4'     | RCB Replacement |                    |                  |            | 112.0 |                            | 72.0                    |                             |                                  | Class E                              | 74.300    | 125.8       | See Sheet 51-54       |         |      |               |
| 973+44.77  | 417           | 5' x 6'      | RCB Extension   |                    |                  |            |       |                            |                         |                             |                                  | Class E                              | 54.600    | 106.0       | See Sheet 33-39       |         |      |               |
| 1086+18.00 | 517           | 4' x 3'      | RCB Extension   |                    |                  |            | 112.0 |                            | 72.0                    |                             |                                  | Class E                              | 20.700    | 37.9        | See Sheet 40-50       |         |      |               |
|            |               |              |                 |                    |                  |            |       |                            |                         |                             |                                  |                                      | 289.300   | 497.8       | Totals                |         |      |               |



### CRASH CUSHIONS

- \* Bid Item  
 ① Lane(s) to which the installation is adjacent.  
 ② Complete this section when using the Temporary Crash Cushion bid item and Earthwork is needed for Sand Barrel placement. Refer to BA-500

| No. | Direction of Traffic | Location Station | Side | Obstacle Width<br>FT | Crash Cushion (Select One)* |                       |                      |           |                      | Sand Barrel Details ② |              |              |              |              | Earthwork*                |                           | Spare Parts Kit (Select One)* |                              | Obstacle Description | Remarks |
|-----|----------------------|------------------|------|----------------------|-----------------------------|-----------------------|----------------------|-----------|----------------------|-----------------------|--------------|--------------|--------------|--------------|---------------------------|---------------------------|-------------------------------|------------------------------|----------------------|---------|
|     |                      |                  |      |                      | Temporary                   | Temporary Redirective | Temporary Severe Use | Permanent | Permanent Severe Use | V                     | W            | X            | Y            | Z            | Excavation Class 10<br>CY | Embankment in Place<br>CY | Permanent<br>EACH             | Permanent Severe Use<br>EACH |                      |         |
|     |                      |                  |      |                      |                             |                       |                      |           |                      | Length<br>FT          | Length<br>FT | Length<br>FT | Length<br>FT | Length<br>FT |                           |                           |                               |                              |                      |         |
| 1   | EB                   | 388+23.91        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 2   | WB                   | 390+02.69        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 3   | EB                   | 388+23.91        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | WB Closed            |         |
| 4   | WB                   | 390+02.69        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | WB Closed            |         |
| 5   | EB                   | 728+69.20        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | WB Closed            |         |
| 6   | WB                   | 730+48.00        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | WB Closed            |         |
| 7   | EB                   | 728+69.20        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 8   | WB                   | 730+48.00        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 9   | EB                   | 759+82.67        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | WB Closed            |         |
| 10  | WB                   | 761+74.28        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | WB Closed            |         |
| 11  | EB                   | 759+82.67        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 12  | WB                   | 761+74.28        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 13  | EB                   | 972+59.53        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
| 14  | WB                   | 974+38.25        |      |                      | 1                           |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               | Temporary Barrier Rail       | EB Closed            |         |
|     |                      |                  |      |                      | 14                          |                       |                      |           |                      |                       |              |              |              |              |                           |                           |                               |                              |                      | Total   |

### ACCESS POINTS AND SAFETY RAMPS

Refer to Cross-Sections

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.

- ① Refer to MI-210  
 ② Refer to EW-501.  
 ③ Refer to EW-501 or EW-502.

\*Predetermined for access point not constructed with this project.

| Location  |      | Type                                    | Length of Opening ① |                     |                 | W  | ① ② PR | ② SR | Pipe Culvert ③ |      |             |      |      | Aprons | Driveway Surface Area |     | Driveway Surfacing Material | Remarks                                   |
|-----------|------|---|---------------------|---------------------|-----------------|----|--------|------|----------------|------|-------------|------|------|--------|-----------------------|-----|-----------------------------|---|
| Station   | Side | A, B, C, Safety Ramp, or Predetermined* | Case                | 1 1/2" Dropped Curb | 3" Dropped Curb | FT | FT     | FT   | H              | Size | Pipe Length | Lt.  | Rt.  | No.    | HMA                   | PCC | TON                         |   |
|           |      |   | 1 or 2              | LF                  | LF              | FT | FT     | FT   | FT             | IN   | LF          | LF   | LF   | LF     |                       | SY  | SY                          |   |
| 413+72.00 | Rt   | C                                       |                     |                     |                 |    |        |      |                | 18.0 | 60.0        | 25.0 | 35.0 | 2      |                       |     |                             | See Sheet D.3 for additional Information. |

### TEMPORARY TRAFFIC SIGNALS

| No. | Location Station | Type             |           |              | Remarks |
|-----|------------------|------------------|-----------|--------------|---------|
|     |                  | One Lane Traffic | Haul Road | Intersection |         |
| 1   | 389+13.20        | 1                |           |              |         |
| 2   | 729+58.60        | 1                |           |              |         |
| 3   | 760+79.00        | 1                |           |              |         |
| 4   | 973+45.02        | 1                |           |              |         |
|     |                  | 4                |           |              | Total   |

### TEMPORARY BARRIER RAIL

Possible Standards: BA-400, BA-401

\* Not a bid item. Anchorage requirements are based on TBR locations shown in the plans. TBR alignments that vary from what is shown in the plans may result in additional TBR sections requiring anchorage.

| No. | Station to Station | Length<br>LF | (Select One)    |                    | Anchored*<br>(Y/N) | Modular Glare Screen System<br>(Y/N) | Remarks |
|-----|--------------------|--------------|-----------------|--------------------|--------------------|--------------------------------------|---------|
|     |                    |              | Steel<br>BA-400 | Concrete<br>BA-401 |                    |                                      |         |
| 1   | 388+23.91          | 390+02.69    | 175.0           | X                  | No                 | No                                   |         |
| 2   | 388+23.91          | 390+02.69    | 175.0           | X                  | No                 | No                                   |         |
| 3   | 728+69.20          | 730+48.00    | 175.0           | X                  | No                 | No                                   |         |
| 4   | 728+69.20          | 730+48.00    | 175.0           | X                  | No                 | No                                   |         |
| 5   | 759+82.67          | 761+74.28    | 187.5           | X                  | Yes                | No                                   |         |
| 6   | 759+82.67          | 761+74.28    | 187.5           | X                  | Yes                | No                                   |         |
| 7   | 972+59.53          | 974+38.25    | 175.0           | X                  | No                 | No                                   |         |
|     |                    | 1250.0       |                 |                    |                    |                                      | Total   |





### SURVEY SYMBOLS

- ⊙ INB Storm Sewer Beehive Intake
- PIP Pipe Culvert
- CUL Culvert
- PLG Location of General Photo
- TP TPD Telephone Pedestal
- BRG Bridge
- SIGN SI Sign
- FW Wire Fence
- ⊙ TDC Tree Deciduous
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- D Centerline Draw or Stream (Down)
- DU Centerline Draw or Stream (Up)
- BNK Stream Bank
- ENT Centerline BL of Entrance
- RR Centerline of Railroad Tracks
- CON Concrete or A/C Slab
- ENU Edge Unpaved Entrance & Parking
- T TL1D Telephone Line Co. 1 - Quality D
- F0 FO1D Fiber Optic Co. 1 - Quality D
- G GL1D Gas Line Co. 1 - Quality D
- F02 FO2D Fiber Optic Co. 2 - Quality D
- F03 FO3D Fiber Optic Co. 3 - Quality D
- T2 TL2D Telephone Line Co. 2 - Quality D
- W WL1D Water Line Co. 1 - Quality D
- F04 FO4D Fiber Optic Co. 4 - Quality D
- SOP Size of Pipe or Culvert
- PRO Profile Shot
- RRR Railroad Rail
- BD Bridge Deck
- BLS Bridge Low Steel

### SURVEYED UTILITY OWNER SYMBOLS

- SUB-SURFACE MAPPING QUALITY LEVEL  
 LEVEL (A) POTHOLE LOCATION OR ACTUAL XYZ Location  
 LEVEL (B) UTILITY FLAG LOCATION  
 LEVEL (C) PLOTTED FROM REFERENCE TO GROUND FEATURES  
 LEVEL (D) PLOTTED FROM UTILITY MAPS OR HEARSAY
- T - COOPERATIVE TELEPHONE COMPANY
  - F0 - IOWA NETWORK SERVICES
  - G - ALLIANT ENERGY
  - F02 - MCI
  - F03 - MEDIACOM
  - T2 - WINDSTREAM COMMUNICATIONS
  - W - POWESHIEK WATER ASSOCIATION
  - F04 - SOUTH SLOPE COOPERATIVE

### STA. 760+79.00 SURVEYED UTILITY OWNER SYMBOLS

- T2 - Windstream Telephone - Quality D
- T3 - Coon Creek Telephone - Quality D
- TV - Mediacom - Quality D
- G - Alliant Energy - Quality D
- E - Alliant Energy - Quality D
- F0 - Aureon Network Services - Quality D
- F05 - Windstream Communications - Quality D

### PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

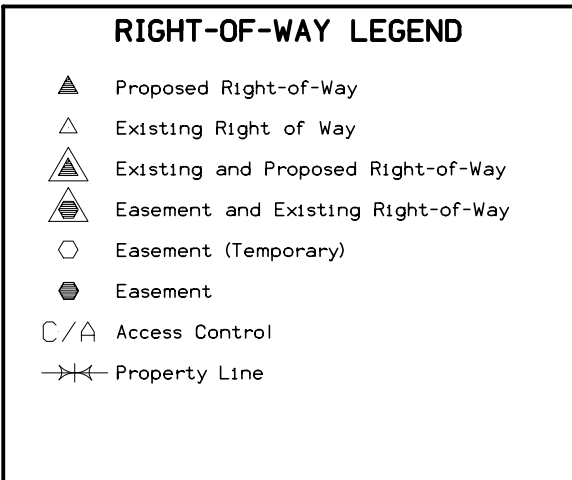
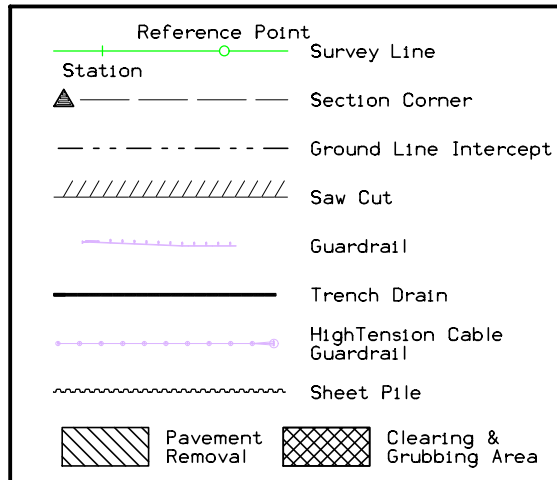
| LINEWORK     | Design Color No. |  |
|--------------|------------------|--|
| Green        | (2)              | Existing Topographic Features and Labels                             |
| Blue         | (1)              | Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation  |
| Magenta      | (5)              | Existing Utilities   |
| SHADING      |                  |  |
| 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 & PAVE SHADING *IN CONJUNCTION WITH A PAVING PROJECT* |
| Brown, Light | (236)            | Grading Shading  |
| Tan          | (8)              | Proposed Sidewalk Shading  |
| Blue, Light  | (230)            | Proposed Sidewalk Landing Shading                                    |
| Pink         | (11)             | Proposed Sidewalk Ramp 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     | (5)              | Existing Utilities              |
| Blue, Light | (230)            | Proposed Ditch Grades, Left     |
| Black       | (0)              | Proposed Ditch Grades, Median   |
| Rust        | (14)             | Proposed Ditch Grades, Right    |

### STA 760+79.00 SURVEY SYMBOLS

- PIP Pipe Culvert
- PLG Location of General Photo
- ⊙ IN Storm Sewer Intake
- TP TPD Telephone Pedestal
- OUT Tile Outlet
- MM Mile Marker Post
- PR Electric Riser Pole
- STP Stump
- ⊙ TDC Tree Deciduous
- \* TEV Evergreen Tree
- MIS Miscellaneous
- LC Lot Corner
- CUL Culvert
- TIL Tile Line
- FWD Wood Fence
- BLD Building or Foundation
- LIN Miscellaneous Line
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- D Centerline Draw or Stream (Down)
- CU Back of Curb
- GU Gutter In Front of Curb



## PLAN AND PROFILE

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

Summer TWP.  
T-80N R-11W  
SEC. 7

Sta. 389+10.17  
Skew 0°  
4.5' X 5' X 37' RCB  
60" x 22.7' CMP Inlet  
D.A. = 110 Ac - F  
U.A.C.

Construct 14.5' x 10'  
Full Depth PCC Patch

STA. 390+35  
END CONSTRUCTION

Install Safety Gate DR-213

Construct 2' Granular Shoulder

Construct 6' Granular Shoulder  
W/ 25' Shoulder Width Transitions

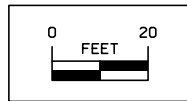
STA. 387+88  
BEGIN CONSTRUCTION

Construct 14.5' x 10'  
Full Depth PCC Patch

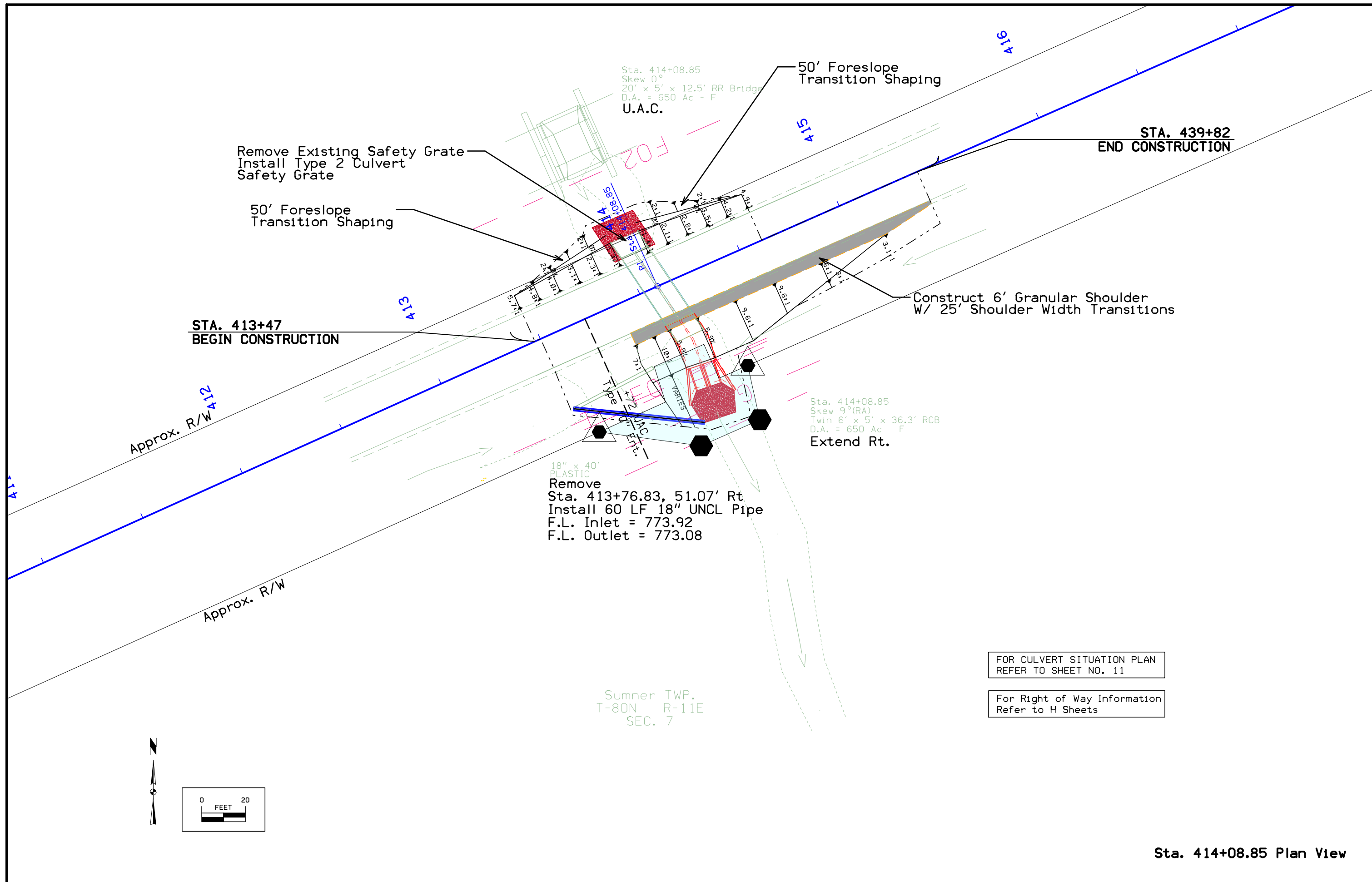
Sta. 389+13.20  
Skew 0°  
5' X 3' X 29.6' RCB  
with 62" x 38" X 10' Elliptical RCP Each End  
D.A. = 110 Ac - F  
Remove Lt. 10' elliptical RCP  
Install 8' of 65" x 40" LCP & Apron Lt.  
Remove Rt. 10' elliptical RCP  
Extend Rt.

FOR CULVERT SITUATION PLAN  
REFER TO SHEET NO. 5

For Right of Way Information  
Refer to H Sheets



Sta. 389+13.21 Plan View



Remove Existing Safety Gate  
Install Type 2 Culvert  
Safety Gate

50' Foreslope  
Transition Shaping

STA. 413+47  
BEGIN CONSTRUCTION

Approx. R/W

Approx. R/W

Sta. 414+08.85  
Skew 0°  
20' x 5' x 12.5' RR Bridge  
D.A. = 650 Ac - F  
U.A.C.

50' Foreslope  
Transition Shaping

STA. 439+82  
END CONSTRUCTION

Construct 6' Granular Shoulder  
W/ 25' Shoulder Width Transitions

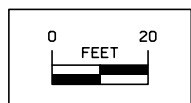
Sta. 414+08.85  
Skew 9°(RA)  
Twin 6' x 5' x 36.3' RCB  
D.A. = 650 Ac - F  
Extend Rt.

18" x 40'  
PLASTIC  
Remove  
Sta. 413+76.83, 51.07' Rt  
Install 60 LF 18" UNCL Pipe  
F.L. Inlet = 773.92  
F.L. Outlet = 773.08

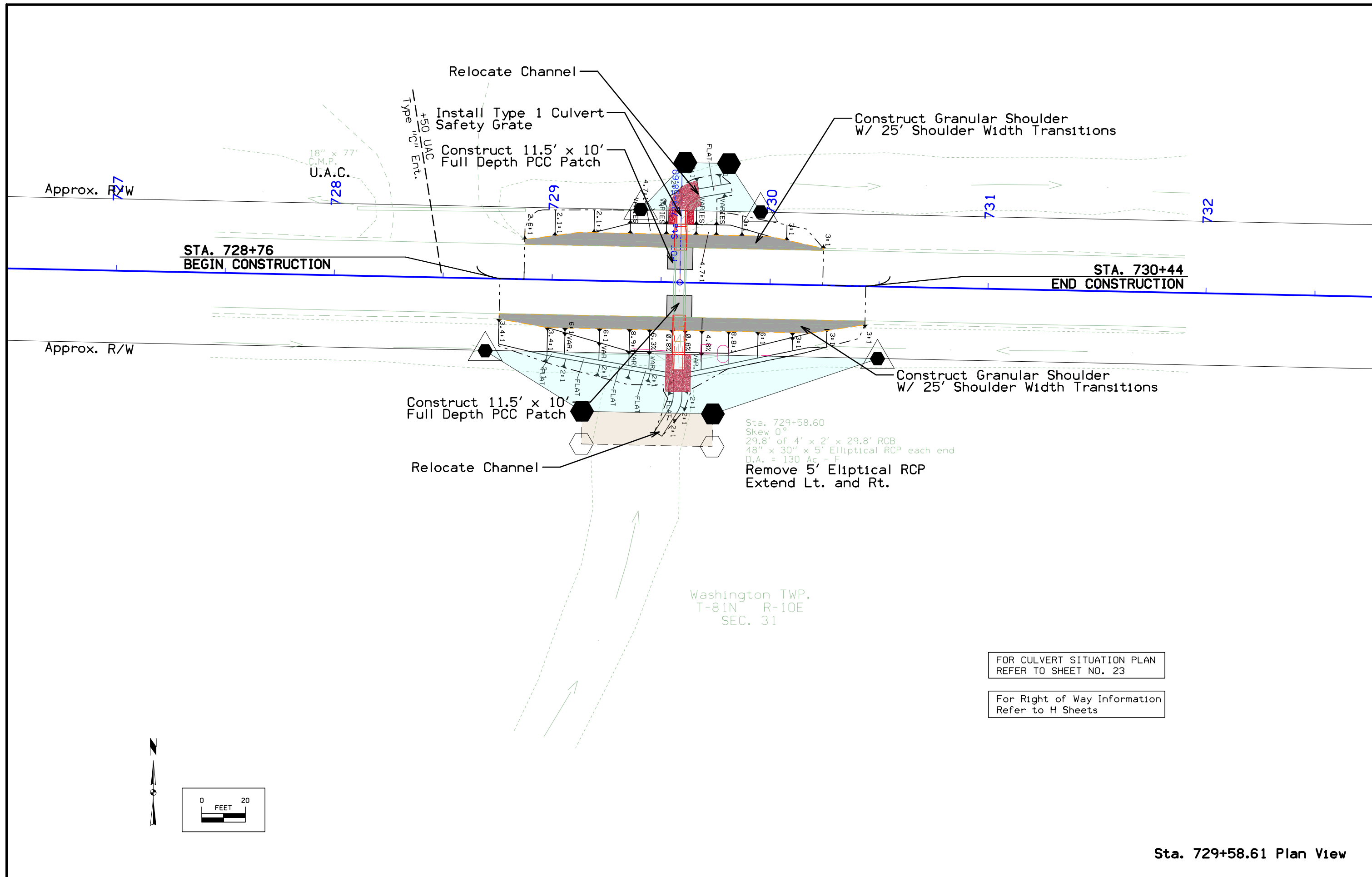
Summer TWP.  
T-80N R-11E  
SEC. 7

FOR CULVERT SITUATION PLAN  
REFER TO SHEET NO. 11

For Right of Way Information  
Refer to H Sheets

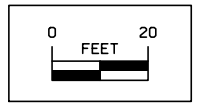


Sta. 414+08.85 Plan View



FOR CULVERT SITUATION PLAN  
REFER TO SHEET NO. 23

For Right of Way Information  
Refer to H Sheets



Sta. 729+58.61 Plan View

CITY OF MARENGO  
WASHINGTON TWP.  
T-81N R-10W  
Sec. 30

CITY OF MARENGO  
WASHINGTON TWP.  
T-81N R-10W  
Sec. 31

REMOVE  
INSTALL 12'X4' RCB  
Sta. 760+79.00  
4' x 3' x 44.1' RCB

Install Type 1 Culvert  
Safety Gate

Construct 30.0' x 32.0'  
Full Depth PCC Patch

Construct 2' Granular Shoulder

Protect Existing  
Subdrain Outlet

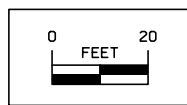
Install Type 1 Culvert  
Safety Gate

FOR CULVERT SITUATION PLAN  
REFER TO SHEET NO. 53

For Right of Way Information  
Refer to H Sheets

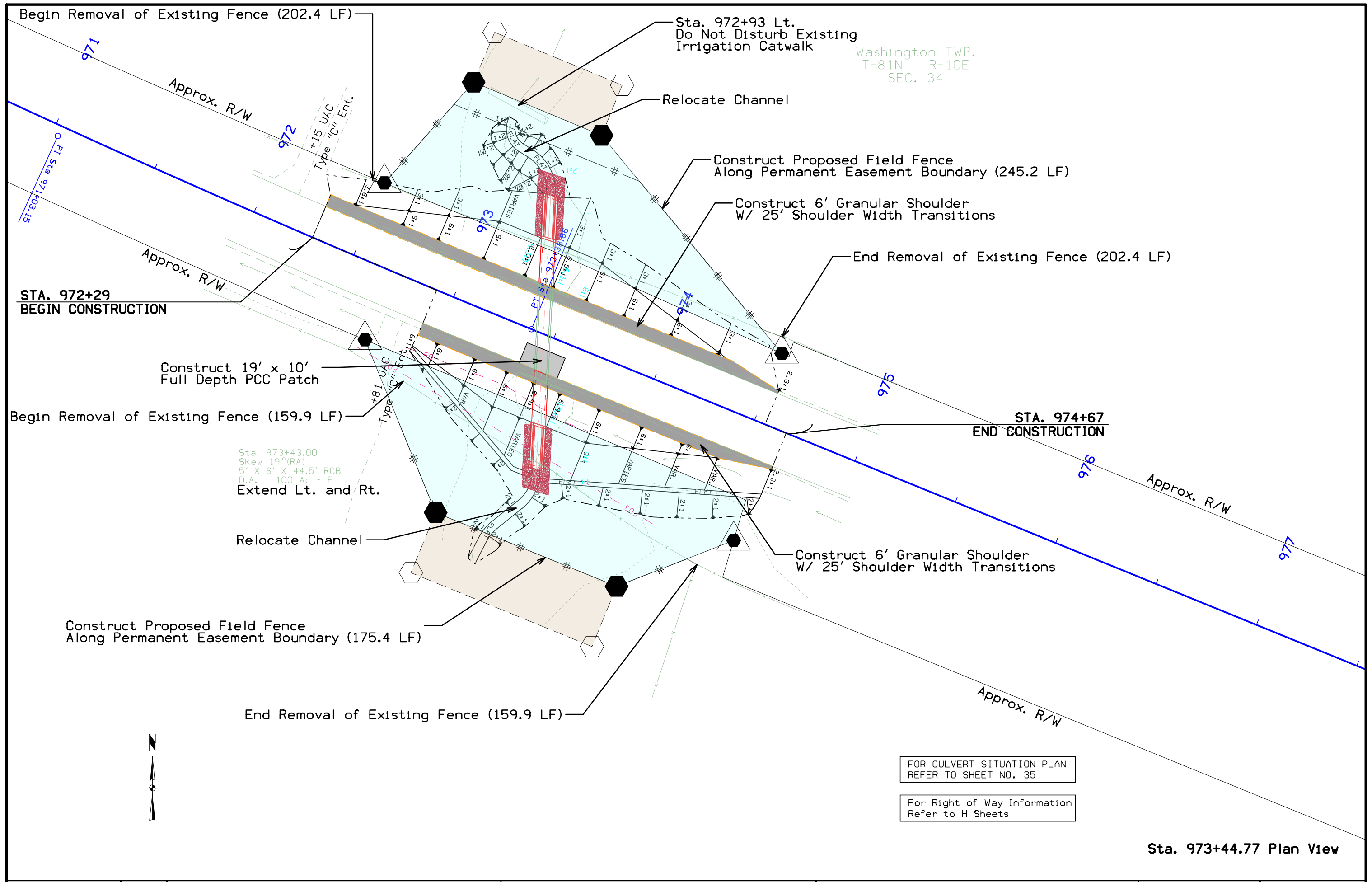
STA. 760+32  
BEGIN CONSTRUCTION

STA. 761+26  
END CONSTRUCTION



Sta. 760+79.00 Plan View

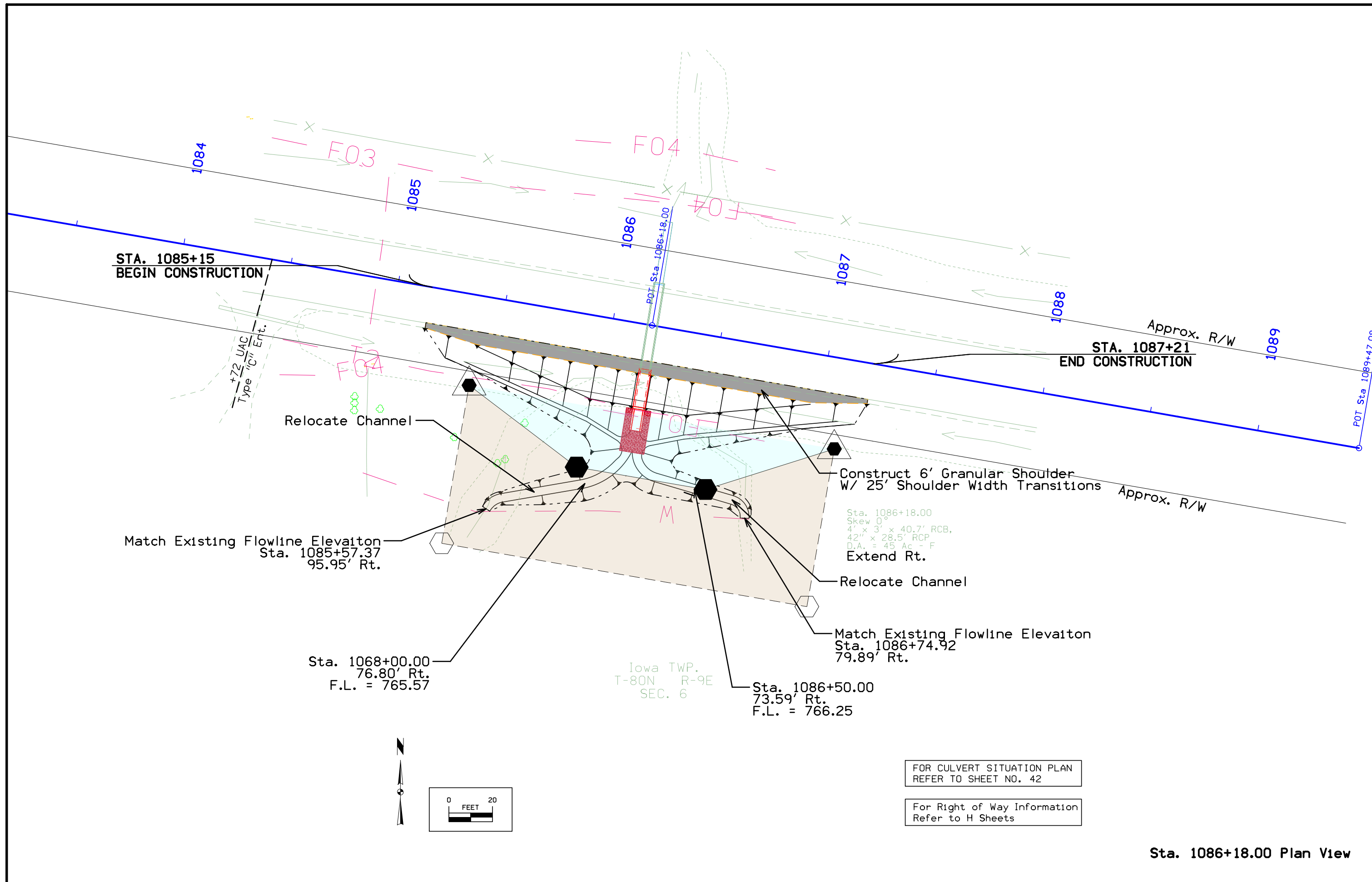




FOR CULVERT SITUATION PLAN  
REFER TO SHEET NO. 35

For Right of Way Information  
Refer to H Sheets

Sta. 973+44.77 Plan View



STA. 1085+15  
BEGIN CONSTRUCTION

Approx. R/W  
STA. 1087+21  
END CONSTRUCTION

Match Existing Flowline Elevation  
Sta. 1085+57.37  
95.95' Rt.

Sta. 1068+00.00  
76.80' Rt.  
F.L. = 765.57

Iowa TWP.  
T-80N R-9E  
SEC. 6

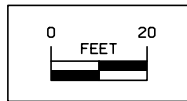
Sta. 1086+50.00  
73.59' Rt.  
F.L. = 766.25

Construct 6' Granular Shoulder  
W/ 25' Shoulder Width Transitions  
Approx. R/W

Sta. 1086+18.00  
Skew 0°  
4' x 3' x 40.7' RCB,  
42" x 28.5' RCP  
D.A. = 45' Ac - F  
Extend Rt.

Relocate Channel

Match Existing Flowline Elevation  
Sta. 1086+74.92  
79.89' Rt.



FOR CULVERT SITUATION PLAN  
REFER TO SHEET NO. 42

For Right of Way Information  
Refer to H Sheets

Sta. 1086+18.00 Plan View

## Survey Information

### General Information

Measurement units for this survey are US survey feet. This survey is for the extension of five culverts along U.S. Highway 6 from 0.42 miles east of County Road V-52 at Milepost 215.66 (Station 389+13.9) to 1.15 miles East of Iowa 220 at Milepost 228.11 (Station 1086+18.0) in Iowa County.

### Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid 12a). The Ellipsoidal Height was computed at each culvert on one benchmark by averaging multiple observations with appropriate time span between from nearby Iowa RTN reference Stations. Addition benchmark and elevations on control points were then established using differential leveling.

### Horizontal Control

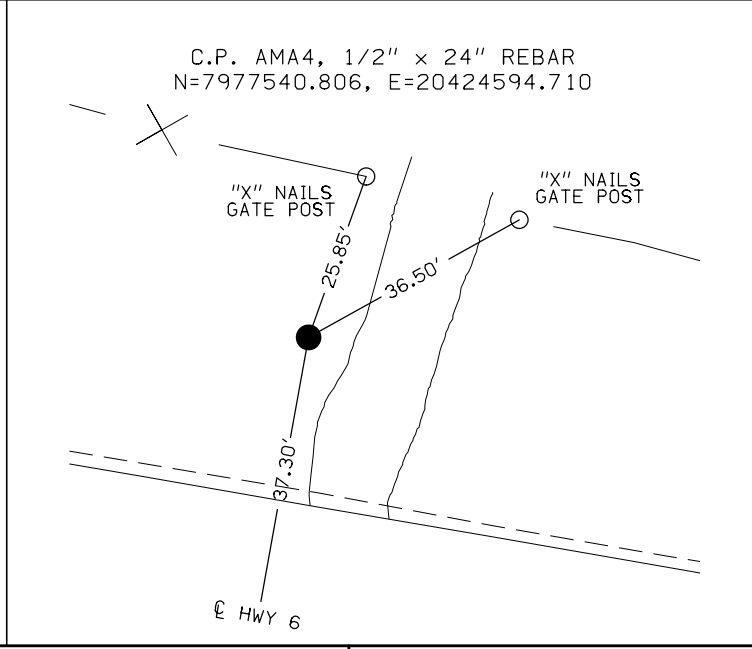
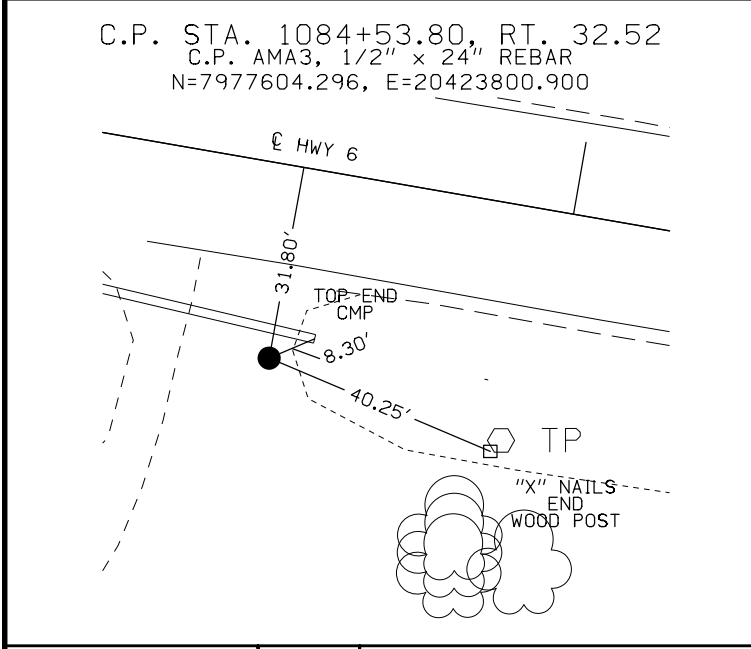
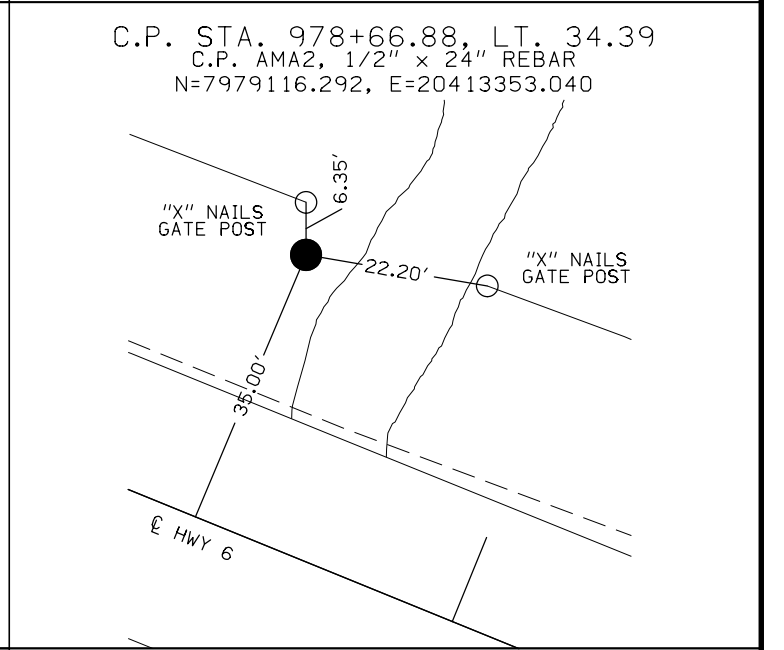
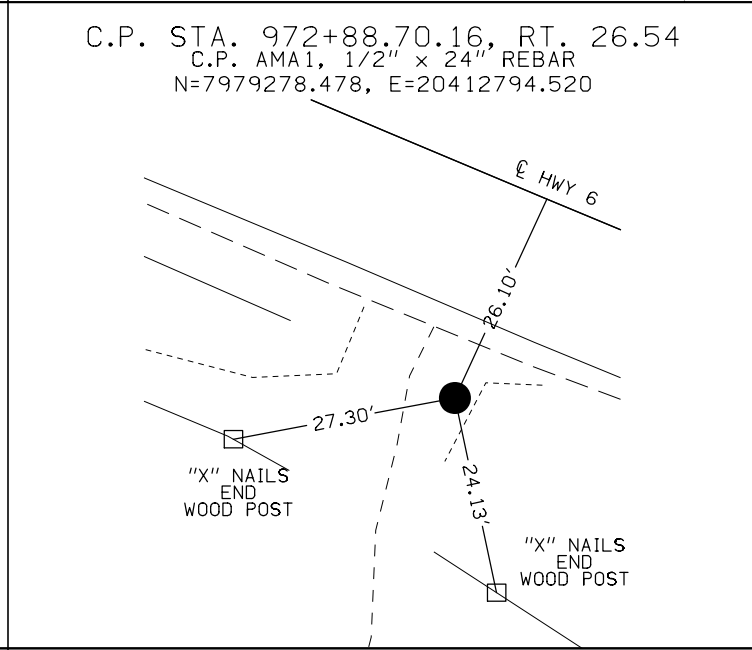
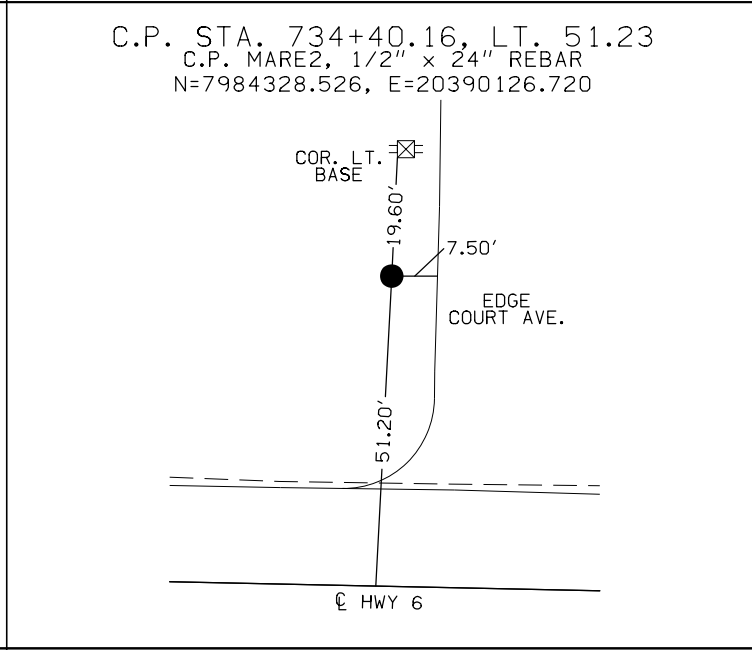
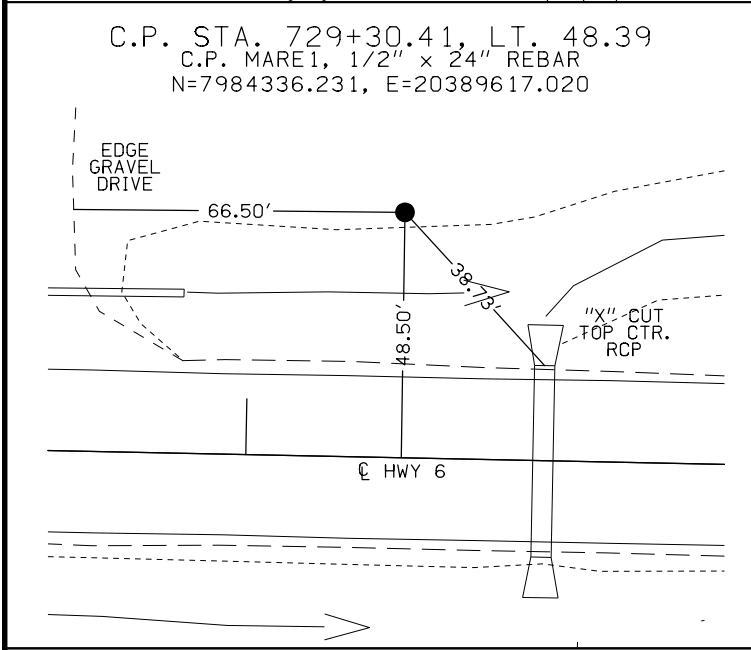
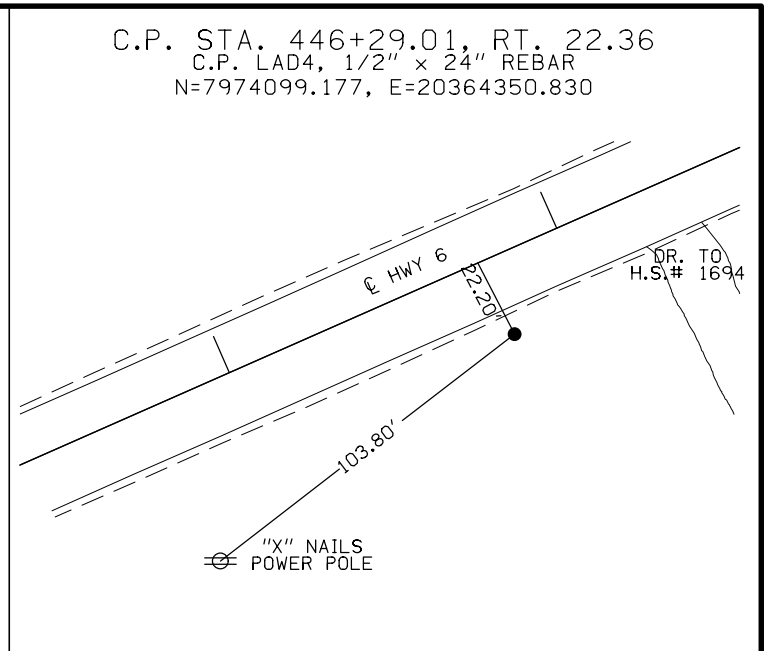
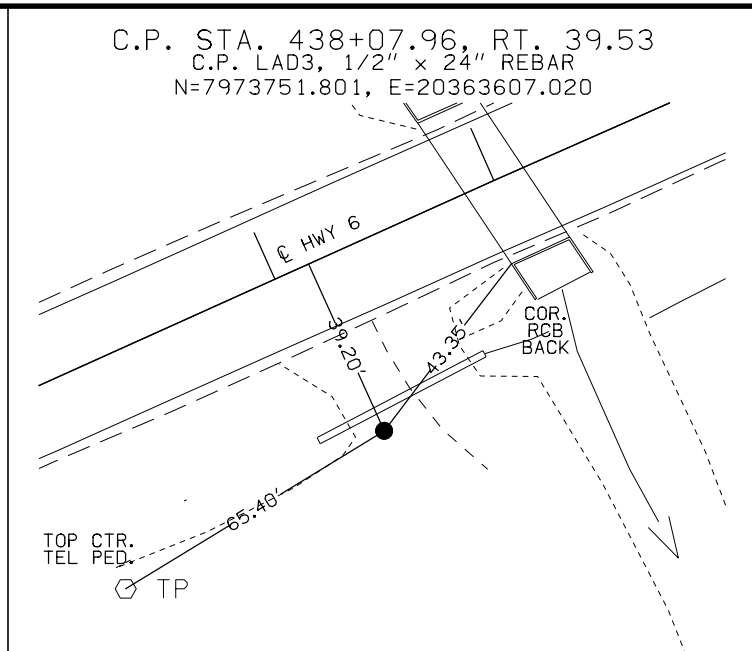
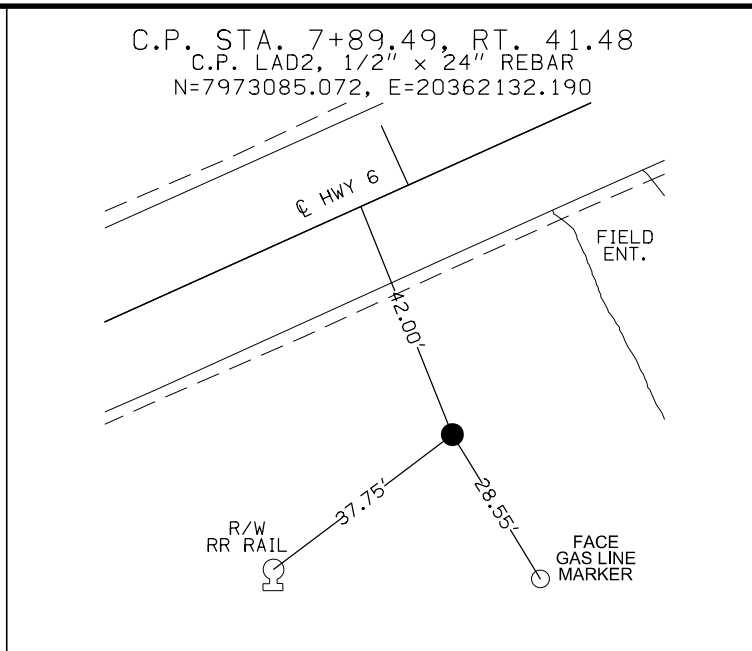
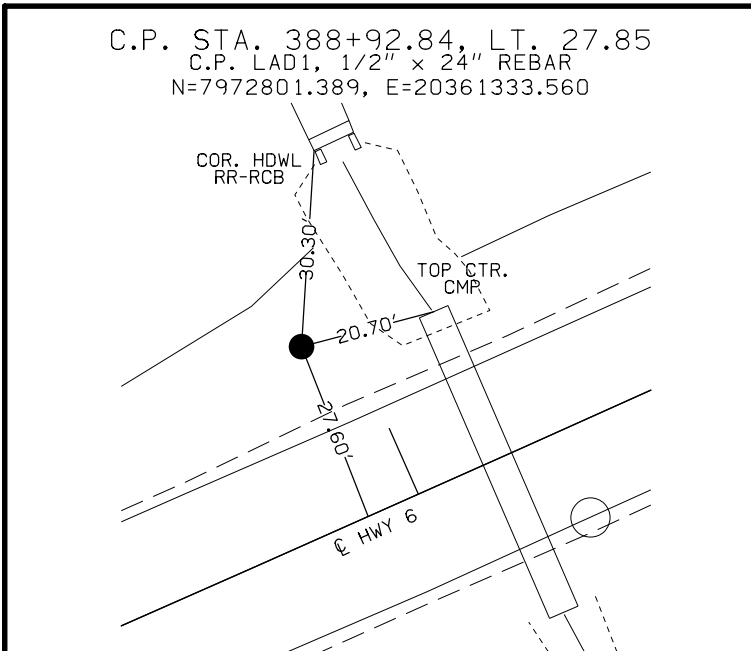
The project coordinate system for this survey is the Iowa Regional Coordinate System (IaRCS) Zone 10 (U.S. Survey Feet). The survey control is relative to IaRTN reference stations. Two control points were established at each culvert site.

### Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans Iowa County U.S. Road No. 32 From Marengo Southwest to the Poweshiek County Line (February 1932) and As-built Plans Iowa County U.S. Road 32 from Marengo East to the Johnson County Line.

## VERTICAL CONTROL

| Point | North       | East         | Elevation | Station    | Offset    | Feature | Description  |
|-------|-------------|--------------|-----------|------------|-----------|---------|--|
| BM1   | 7972753.540 | 20361415.620 | 774.940   | 389+48.13  | 49.352    | BM1     | TOP OF RIGHT-OF-WAY RAIL                                 |
| BM2   | 7972834.153 | 20361341.470 | 781.167   | 389+13.48  | -54.554   | BM2     | SOUTHEAST TOP CORNER OF HEADWALL                         |
| BM3   | 7973858.000 | 20363585.800 | 781.300   | 438+32.24  | -66.011   | BM3     | CUT X TOP OF CONCRETE HEADWALL                           |
| BM4   | 7973793.640 | 20363647.050 | 779.140   | 438+61.78  | 17.753    | BM4     | NORTHEAST TOP CORNER HEADWALL                            |
| Point | North       | East         | Elevation | Station    | Offset    | Feature | Description  |
| BM5   | 7984308.910 | 20389644.510 | 740.850   | 729+58.46  | -21.636   | BM5     | CUT X NORTH END OF REINFORCED CONCRETE PIPE              |
| BM6   | 7984243.821 | 20390178.869 | 739.624   | 734+94.05  | 32.375    | BM6     | TOP OF RIGHT-OF-WAY RAIL ON THE SOUTH SIDE OF U.S. HWY 6 |
| Point | North       | East         | Elevation | Station    | Offset    | Feature | Description  |
| BM7   | 7979252.730 | 20412838.430 | 775.430   | 973+38.85  | 33.583    | BM7     | TOP OF RIGHT-OF-WAY RAIL ON THE SOUTH SIDE OF U.S. HWY 6 |
| Point | North       | East         | Elevation | Station    | Offset    | Feature | Description  |
| BM8   | 7977587.570 | 20423966.840 | 767.020   | 1086+20.15 | 20.621    | BM8     | CUT X TOP OF CONCRETE HEADWALL                           |
| BM9   | 7977510.787 | 20424285.631 | 770.932   | Off Chain  | Off Chain | BM9     | TOP OF RIGHT-OF-WAY RAIL ON THE SOUTH SIDE OF U.S. HWY 6 |



## Survey Information

Iowa County  
 STPN-006-6(52)--2J-48  
 US6 - 0.25 mile East From the Jct of US 6 & Co Rd. V66  
 SAP 0872.1

### General Information

Measurement units for this survey are US survey feet. This survey is for modification or replacement of a culvert structure. This project is a full DTM survey. This survey is along US 6. The project is on Iowa Zone 10 IaRCS coordinates.

### Vertical Control

Vertical datum for this survey is identical to the AEOCOM survey established in 2016. This survey is relative to NAVD88 Ia RTN Datum.

### Horizontal Control

Horizontal Control for this survey is identical to the AEOCOM survey established in 2016. This survey is relative to Iowa Zone 10 IaRCS coordinates

### Alignment Information

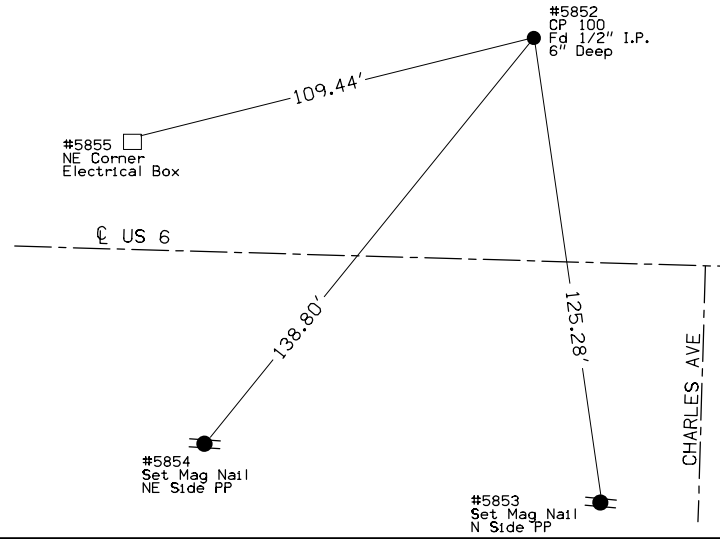
The horizontal alignment for this survey is a retrace of the existing US 6 centerline. The roadway was split both ahead and back of this structure, the stationing was established at the culvert.

P-619A 1929 Paving Plan. Survey stationing was equated to the AB plans at RCB culvert Sta 760+79.0, carried backward and forward throughout the project.

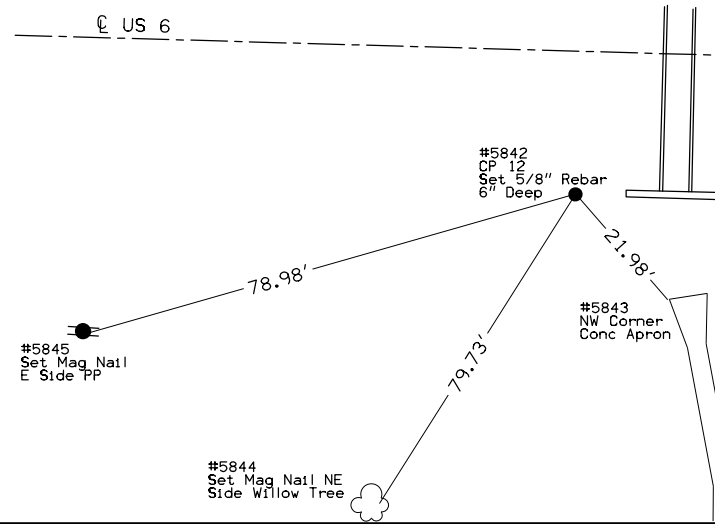
## Vertical Control

| BENCHMARKS  | ELEVATION   |
|---|---|
| No. 510 Sta. 759+87.786 50.06 Rt. Y:7984164.904 X:20392674.589 Fd RR Spk N Side PP-----               | 743.145   |
| No. 511 Sta. 760+86.342 26.292 Rt. Y:7984185.857 X:20392773.782 Fd "X" on East end of Inlet Hdwl----- | 745.076   |
| No. 512 Sta. 760+90.447 78.757 Rt. Y:7984133.296 X:20392776.392 Fd "X" on Inlet APRON of 36" RCP----- | 741.521   |
| <br>MISCELLANEOUS LOCATIONS Bench Marks on Previous surveys   |   |
| No. 501 Sta.-----Y:7972753.540 X:20361415.620   | TOP OF RIGHT-OF-WAY RAIL =AECOM BM1----- 774.940  |
| No. 502 Sta.-----Y:7972834.153 X:20361341.470   | SOUTHEAST TOP CORNER OF HEADWALL =AECOM<br>Point Name BM2----- 781.167                          |
| No. 503 Sta.-----Y:7973858.000 X:20363585.800   | CUT X TOP OF CONCRETE HEADWALL =AECOM<br>Point Name BM3----- 781.300                            |
| No. 504 Sta.-----Y:7973793.640 X:20363647.050   | NORTHEAST TOP CORNER HEADWALL =AECOM<br>Point Name BM4----- 779.140                             |
| No. 505 Sta.-----Y:7984308.910 X:20389644.510   | CUT X NORTH END OF REINFORCED CONCRETE<br>PIPE =AECOM Point Name BM5----- 740.850               |
| No. 506 Sta.-----Y:7984243.821 X:20390178.869   | TOP OF RIGHT-OF-WAY RAIL ON THE SOUTH<br>SIDE OF U.S. HWY 6 =AECOM Point Name BM6 ----- 739.624 |
| No. 507 Sta.-----Y:7979252.730 X:20412838.430   | TOP OF RIGHT-OF-WAY RAIL ON THE SOUTH<br>SIDE OF U.S. HWY 6 =AECOM Point Name BM7 ----- 775.430 |
| No. 508 Sta.-----Y:7977587.570 X:20423966.840   | CUT X TOP OF CONCRETE HEADWALL =AECOM<br>Point Name BM8----- 767.020                            |
| No. 509 Sta.-----Y:7977510.787 X:20424285.631   | TOP OF RIGHT-OF-WAY RAIL ON THE SOUTH<br>SIDE OF U.S. HWY 6 =AECOM Point Name BM9 ----- 770.932 |

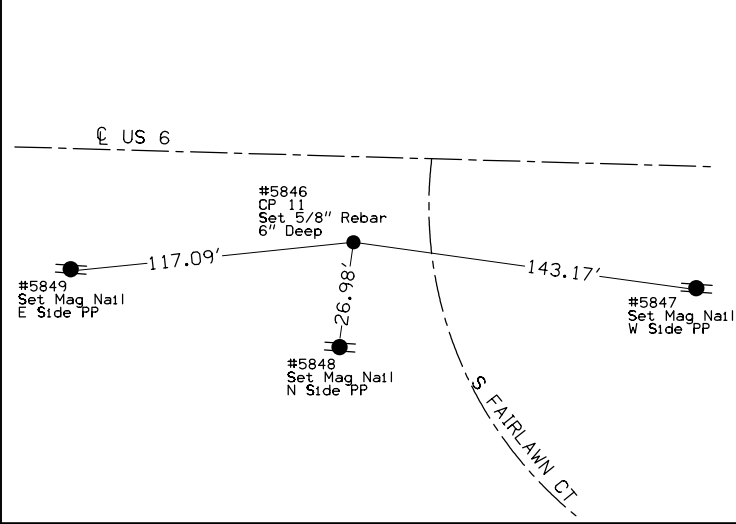
C.P. STA 758+11.38 LEFT 60.20  
 C.P. 100, FD Iron Pin 6" Deep  
 N=7984280.135 E=20392501.395



C.P. STA 760+63.39 RIGHT 26.65  
 C.P. 12, Set Rebar 6" Deep  
 N=7984186.157 E=20392750.831



C.P. STA 763+60.95 RIGHT 36.20  
 C.P. 11, Set Rebar 6" Deep  
 N=7984168.132 E=20393048.000



Sta. 389+10.17  
 Skew 0°  
 4.5' X 5' X 37' RCB  
 60" x 22.7' CMP Inlet  
 D.A. = 110 Ac - F

388+30  
 C 32±EX R/W

388+95  
 C 60'

389+30  
 C 60'

0+60  
 C 32 ±EX R/W

IOWA INTERSTATE RAILROAD, LTD.  
 (2R)

389+30  
 C 49±EX R/W



Sta. 389+13.20  
 Skew 0°  
 5' X 3' X 29.6' RCB  
 with 62" x 38" X 10'  
 Elliptical RCP Each End  
 D.A. = 110 Ac - F

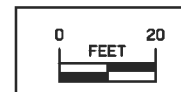
388+70  
 C 49'±EX R/W

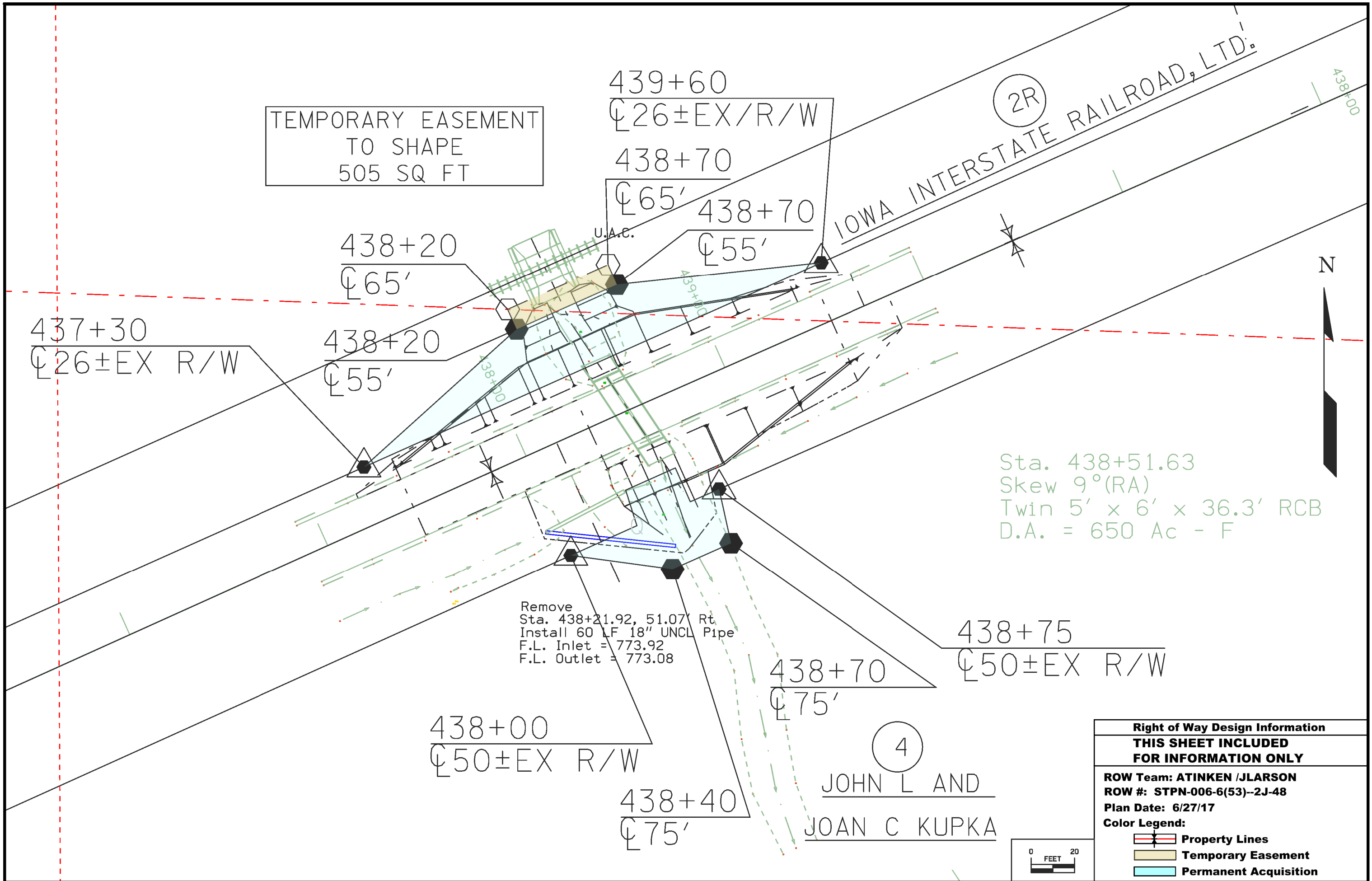
389+20  
 C 65'  
 389+05  
 C 65'

(1)  
 AARON BUTLER  
 BRIAN W. BUTLER  
 BRENT M BUTLER



|   |                       |
|---|-----------------------|
| <b>Right of Way Design Information</b>  |                       |
| <b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b>                                       |                       |
| ROW Team: ATINKEN /JLARSON  |                       |
| ROW #: STPN-006-6(53)--2J-48  |                       |
| Plan Date: 6/27/17  |                       |
| <b>Color Legend:</b>  |                       |
|  | Property Lines        |
|  | Temporary Easement    |
|  | Permanent Acquisition |





TEMPORARY EASEMENT  
TO SHAPE  
505 SQ FT

439+60  
⊥ 26±EX/R/W

438+70

⊥ 65' 438+70  
⊥ 55'

2R  
IOWA INTERSTATE RAILROAD, LTD.

438+20  
⊥ 65'

U.A.C.

437+30  
⊥ 26±EX R/W

438+20  
⊥ 55'

Sta. 438+51.63  
Skew 9°(RA)  
Twin 5' x 6' x 36.3' RCB  
D.A. = 650 Ac - F

Remove  
Sta. 438+21.92, 51.07 Rt.  
Install 60 LF 18" UNCL Pipe  
F.L. Inlet = 773.92  
F.L. Outlet = 773.08

438+75  
⊥ 50±EX R/W

438+00  
⊥ 50±EX R/W

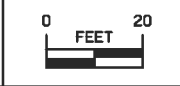
438+70  
⊥ 75'

4

JOHN L AND  
JOAN C KUPKA

438+40  
⊥ 75'

|   |                       |
|---|-----------------------|
| <b>Right of Way Design Information</b>          |                       |
| <b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b> |                       |
| ROW Team: ATINKEN /JLARSON                      |                       |
| ROW #: STPN-006-6(53)--2J-48                    |                       |
| Plan Date: 6/27/17                              |                       |
| Color Legend:                                   |                       |
|   | Property Lines        |
|   | Temporary Easement    |
|   | Permanent Acquisition |







6

729+40  
±33' EX R/W

729+60  
±55'

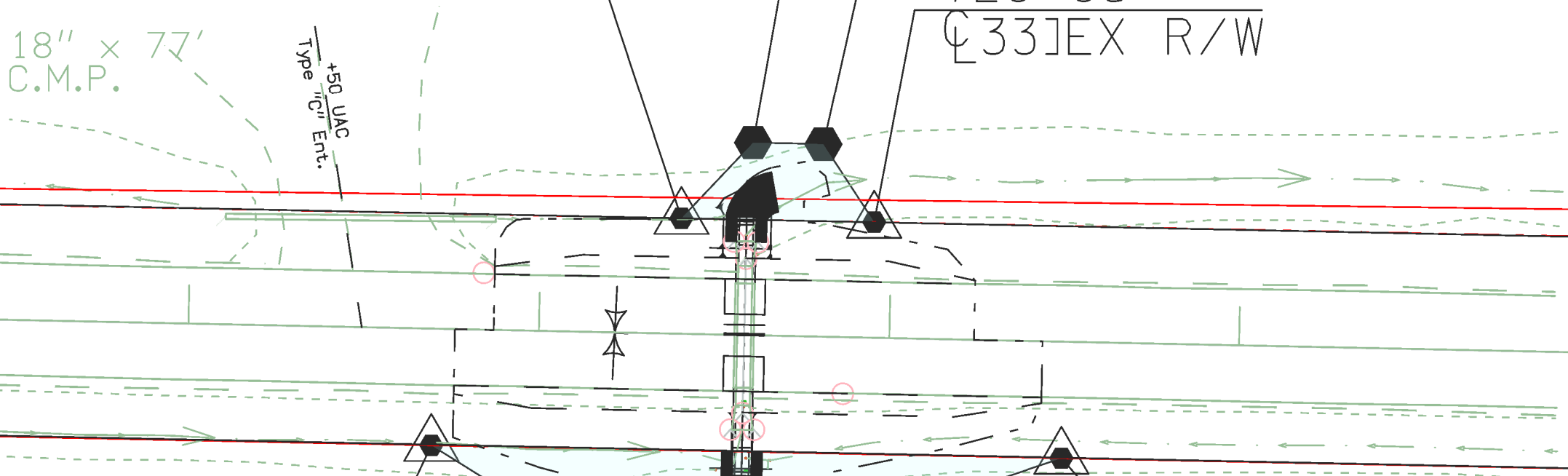
729+80  
±55'

729+95  
±33' EX R/W

2161 HIGHWAY 6 TRAIL, LLC

18" x 77'  
C.M.P.

+50 UAC  
Type 'C' Ent.



728+70  
±33' EX R/W

730+50  
±33' EX R/W

5

J.D. KINZE, LLC

729+15  
±60'

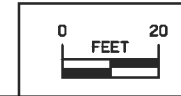
729+75  
±60'

729+15  
±75'

729+75  
±75'

Sta. 729+58.60  
Skew 0°  
29.8' of 4' x 2' x 29.8' RCB  
48" x 30" x 5' Elliptical RCP each end  
D.A. = 130 Ac - F

| Right of Way Design Information                 |                       |
|---|-----------------------|
| <b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b> |                       |
| ROW Team: ATINKEN /JLARSON                      |                       |
| ROW #: STPN-006-6(53)--2J-48                    |                       |
| Plan Date: 6/27/17                              |                       |
| Color Legend:                                   |                       |
|   | Property Lines        |
|   | Temporary Easement    |
|   | Permanent Acquisition |

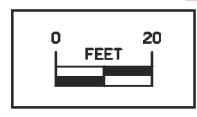
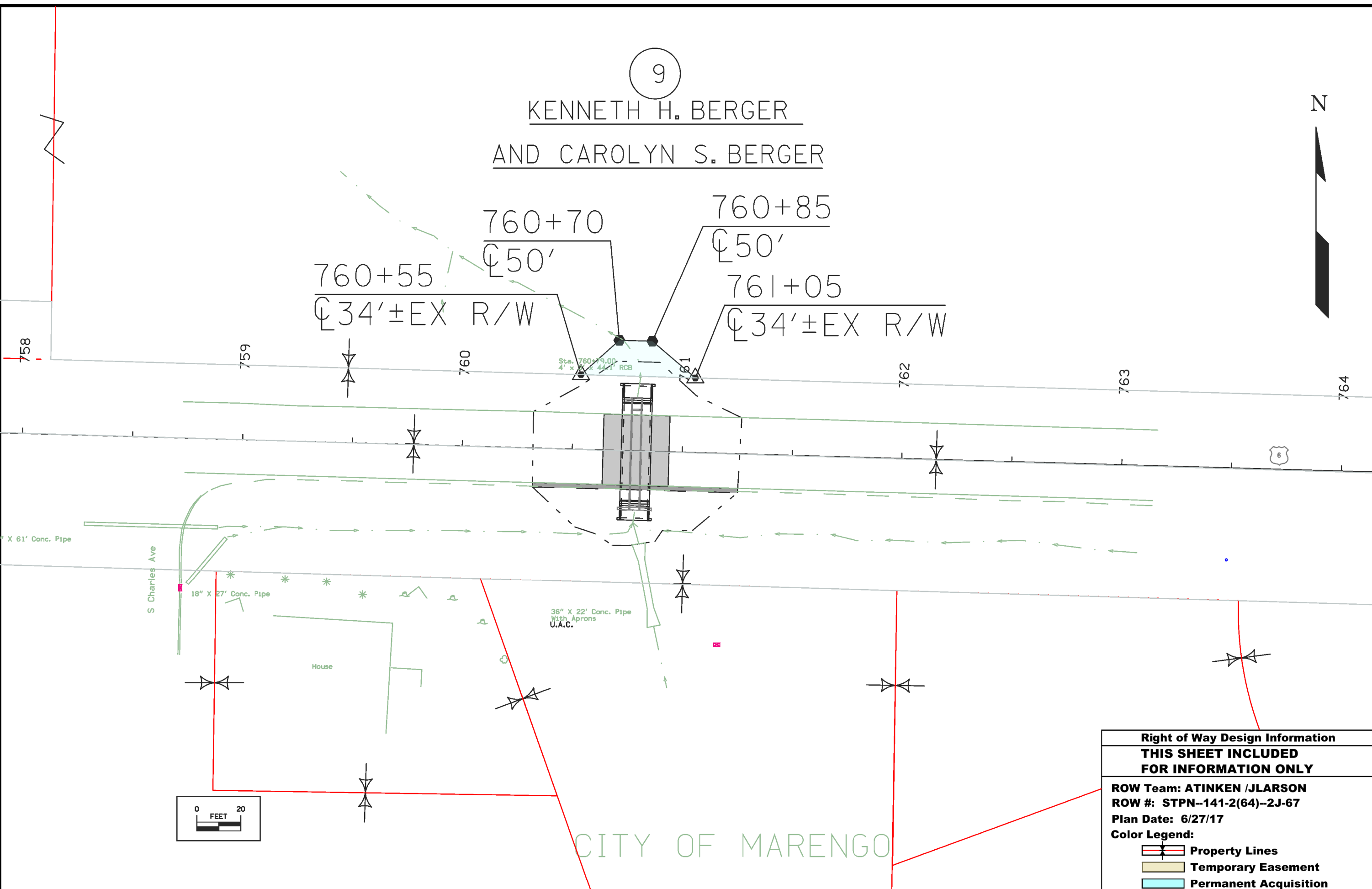


9

KENNETH H. BERGER  
AND CAROLYN S. BERGER

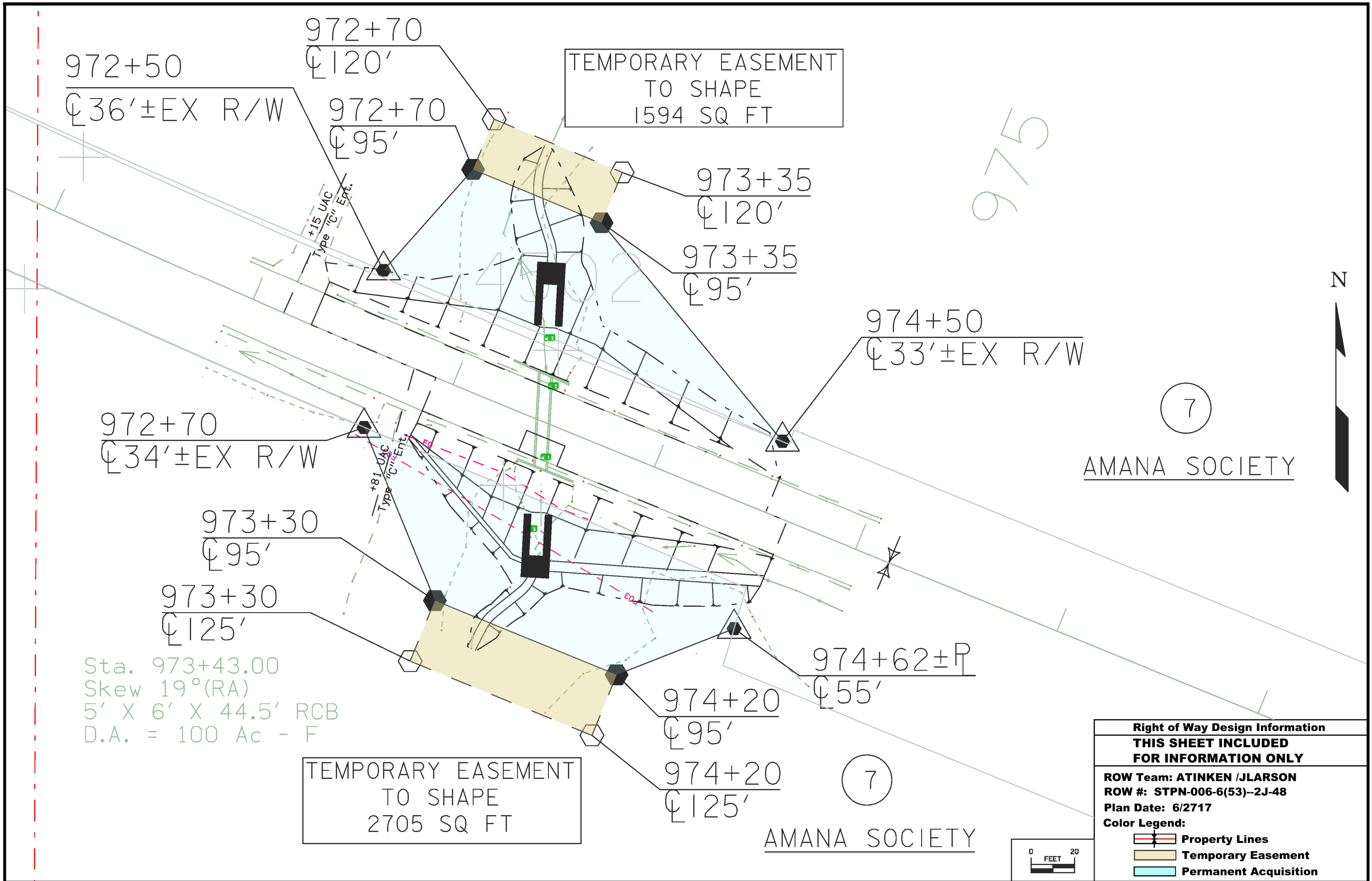


760+55  $\phi$ 34'±EX R/W  
760+70  $\phi$ 50'  
760+85  $\phi$ 50'  
761+05  $\phi$ 34'±EX R/W



CITY OF MARENGO

|   |                       |
|---|-----------------------|
| <b>Right of Way Design Information</b>          |                       |
| <b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b> |                       |
| ROW Team: ATINKEN /JLARSON                      |                       |
| ROW #: STPN--141-2(64)--2J-67                   |                       |
| Plan Date: 6/27/17                              |                       |
| <b>Color Legend:</b>                            |                       |
|   | Property Lines        |
|   | Temporary Easement    |
|   | Permanent Acquisition |

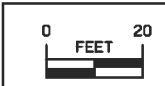


Sta. 973+43.00  
 Skew 19°(RA)  
 5' X 6' X 44.5' RCB  
 D.A. = 100 Ac - F

AMANA SOCIETY

AMANA SOCIETY

|   |                       |
|---|-----------------------|
| <b>Right of Way Design Information</b>          |                       |
| <b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b> |                       |
| ROW Team: ATINKEN /JLARSON                      |                       |
| ROW #: STPN-006-6(53)--2J-48                    |                       |
| Plan Date: 6/2717                               |                       |
| Color Legend:                                   |                       |
|   | Property Lines        |
|   | Temporary Easement    |
|   | Permanent Acquisition |





1085+40

±42'±EX R/W

1085+40

±115'

1085+95

±70'

1087+10

±42'±EX R/W

1087+10

±115'

1086+55

±70'

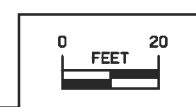
TEMPORARY EASEMENT  
TO SHAPE  
9575 SQ FT

8

DONALD D. AND  
SHARON L. HUDEPOHL

Sta. 1086+18.00  
Skew 0°  
4' x 3' x 40.7' RCB,  
42" x 28.5' RCP  
D.A. = 45 Ac - F

|   |                       |
|---|-----------------------|
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| <b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b> |                       |
| ROW Team: ATINKEN /JLARSON                      |                       |
| ROW #: STPN-006-6(53)--2J-48                    |                       |
| Plan Date: 6/27/17                              |                       |
| <b>Color Legend:</b>                            |                       |
|   | Property Lines        |
|   | Temporary Easement    |
|   | Permanent Acquisition |



**108-23A**  
08-01-08

### TRAFFIC CONTROL PLAN

Traffic Control will be in accordance with Standard Road Plans TC-1, , TC-81, TC-202, TC-213, and TC-217.

Traffic will be maintained at all times. Contractor is allowed to utilize flaggers through the construction area using Standard Road Plan TC-213 during normal working hours.

**111-01**  
04-17-12

### COORDINATED OPERATIONS

Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

| Project                  | Type of Work    |
|--------------------------|-----------------|
| HSSIPX-006-6(54)--3L-48  | HMA RESURFACING |
| STPN-006-6(75)--2J-48    | HMA RESURFACING |
| MP-212-6(705)12--76-48   | PCC PATCHING    |
| HSSIPX-000-5(897)--3L-00 | TRAFFIC SIGNS   |
|                          |                 |
|                          |                 |

**108-25**  
10-21-14

### 511 TRAVEL RESTRICTIONS

| Route | Direction | County | Location Description                                 | Feature Crossed | Object Type | Maint. Bridge No.,<br>Structure ID,<br>or FHWA No. | Type of<br>Restriction | Existing<br>Measurement | Construction<br>Measurement | Construction<br>Measurement<br>as Signed | Projected<br>As Built<br>Measurement | Remarks |
|-------|-----------|--------|--|-----------------|-------------|--|------------------------|-------------------------|-----------------------------|--|--------------------------------------|---------|
| US 6  | WB        | IOWA   | Culvert Sta. 389+13.21, East of County V52 in Ladora | Culvert         | Barrier     |  | Horizontal             | 14'-0"                  | 13'-6"                      | 13'-0"                                   |                                      |         |
| US 6  | EB        | IOWA   | Culvert Sta. 760+79.00, East of County V52 in Ladora | Culvert         | Barrier     |  | Horizontal             | 12'-0"                  | 11'-6"                      | 11'-0"                                   |                                      |         |
| US 6  | WB        | IOWA   | Culvert Sta. 760+79.00, East of County V52 in Ladora | Culvert         | Barrier     |  | Horizontal             | 12'-0"                  | 11'-6"                      | 11'-0"                                   |                                      |         |
|       |           |        |  |                 |             |  |                        |                         |                             |  |                                      |         |
|       |           |        |  |                 |             |  |                        |                         |                             |  |                                      |         |

### TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

| Station   | Cut                         |                                  |                    |   | Fill               |                              |  |   |                     |   | Checks (EW-102)                         |  | Topsoil                                |                                   |                                   |  | [18]   | [19] | [20] | [21] | [22] |  |  |
|---|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|--|------|------|------|------|--|--|
|   | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     | [17]   |      |      |      |      |  |  |
|   | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor | Topsoil Stripping Minus Topsoil Placement w/Shrink |      |      |      |      |  |  |
| CL393+13.9  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |
| 388+24.18   | 15                          | 6                                | 9                  |   | 6                  | 20                           | 9  |   | 29                  | 38  | -32                                     | 0  | 0                                      | 9                                 | 14                                | 20                                       | -11  |      |      |      |      |  |  |
| 388+55.37   | 28                          | 14                               | 14                 |   | 14                 | 36                           | 14   |   | 50                  | 65  | -51                                     | 0  | 0                                      | 14                                | 24                                | 34                                       | -20  |      |      |      |      |  |  |
| 388+90.34   | 24                          | 15                               | 9                  |   | 15                 | 71                           | 9  |   | 80                  | 104   | -89                                     | 0  | 0                                      | 9                                 | 17                                | 24                                       | -15  |      |      |      |      |  |  |
| 389+13.21   | 24                          | 15                               | 9                  |   | 15                 | 67                           | 9  |   | 76                  | 99  | -84                                     | 0  | 0                                      | 9                                 | 16                                | 22                                       | -13  |      |      |      |      |  |  |
| 389+35.92   | 23                          | 11                               | 12                 |   | 11                 | 25                           | 12   |   | 37                  | 48  | -37                                     | 0  | 0                                      | 12                                | 20                                | 28                                       | -16  |      |      |      |      |  |  |
| 389+67.09   | 18                          | 7                                | 11                 |   | 7                  | 21                           | 11   |   | 32                  | 42  | -35                                     | 0  | 0                                      | 11                                | 17                                | 24                                       | -13  |      |      |      |      |  |  |
| 390+09.79   |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |
| CL393+13.9  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |
| Totals:   | 132                         | 68                               | 64                 | 0   | 68                 | 240                          | 64   | 0   | 304                 | 396   | -328                                    | 0  | 0                                      | 64                                | 108                               | 152                                      | -88  |      |      |      |      |  |  |
| <u>Excavation, Class 10, Roadway &amp; Borrow</u> |                             |                                  |                    | 68  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |
| <u>Embankment-In-Place</u>                        |                             |                                  |                    | 253   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |
| <u>Topsoil, Strip, Salvage &amp; Spread</u>       |                             |                                  |                    | 64  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |
| <u>Topsoil, Furnish and Spread</u>                |                             |                                  |                    | 63  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |

### TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

| Station   | Cut                         |                                  |                    |   | Fill               |                              |  |   |                     |   | Checks (EW-102)                         |  | Topsoil                                |                                   |                                   |  | [18]   | [19] | [20] | [21] | [22] |  |  |  |
|---|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|--|------|------|------|------|--|--|--|
|   | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     | [17]   |      |      |      |      |  |  |  |
|   | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor | Topsoil Stripping Minus Topsoil Placement w/Shrink |      |      |      |      |  |  |  |
| CL401+00  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| 413+75.42   | 29                          | 24                               | 5                  |   | 24                 | 2                            | 5  |   | 7                   | 9   | 15                                      | 0  | 0                                      | 5                                 | 9                                 | 13                                       | -8   |      |      |      |      |  |  |  |
| 413+88.82   | 49                          | 40                               | 9                  |   | 40                 | 53                           | 9  |   | 62                  | 81  | -41                                     | 0  | 0                                      | 9                                 | 14                                | 20                                       | -11  |      |      |      |      |  |  |  |
| 414+08.84   | 41                          | 32                               | 9                  |   | 32                 | 54                           | 9  |   | 63                  | 82  | -50                                     | 0  | 0                                      | 9                                 | 14                                | 20                                       | -11  |      |      |      |      |  |  |  |
| 414+29.01   | 18                          | 13                               | 5                  |   | 13                 | 3                            | 5  |   | 8                   | 10  | 3                                       | 0  | 0                                      | 5                                 | 8                                 | 11                                       | -6   |      |      |      |      |  |  |  |
| 414+38.41   | 23                          | 15                               | 8                  |   | 15                 | 4                            | 8  |   | 12                  | 16  | -1                                      | 0  | 0                                      | 8                                 | 13                                | 18                                       | -10  |      |      |      |      |  |  |  |
| 414+61.22   | 19                          | 9                                | 10                 |   | 9                  | 7                            | 10   |   | 17                  | 22  | -13                                     | 0  | 0                                      | 10                                | 15                                | 21                                       | -11  |      |      |      |      |  |  |  |
| 415+14.18   |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| CL401+00  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Totals:</b>                                    | 179                         | 133                              | 46                 | 0   | 133                | 123                          | 46   | 0   | 169                 | 220   | -87                                     | 0  | 0                                      | 46                                | 73                                | 103                                      | -57  |      |      |      |      |  |  |  |
| <b>Excavation, Class 10, Roadway &amp; Borrow</b> |                             |                                  |                    | 133   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Embankment-In-Place</b>                        |                             |                                  |                    | 67  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Topsoil, Strip, Salvage &amp; Spread</b>       |                             |                                  |                    | 46  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Topsoil, Furnish and Spread</b>                |                             |                                  |                    | 41  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |

### TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

| Station   | Cut                         |                                  |                    |   | Fill               |                              |  |   |                     |   | Checks (EW-102)                         |  | Topsoil                                |                                   |                                   |  | [18]   | [19] | [20] | [21] | [22] |  |  |  |
|---|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|--|------|------|------|------|--|--|--|
|   | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     | [17]   |      |      |      |      |  |  |  |
|   | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor | Topsoil Stripping Minus Topsoil Placement w/Shrink |      |      |      |      |  |  |  |
| CL720+90.7  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| 728+76.05   | 0                           | 0                                | 0                  |   | 0                  | 0                            |  |   | 0                   | 0   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 728+87.09   | 8                           | 5                                | 3                  |   | 5                  | 0                            |  |   | 3                   | 4   | 1                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 728+98.38   | 13                          | 8                                | 5                  |   | 8                  | 1                            |  |   | 5                   | 6   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 729+12.09   | 29                          | 18                               | 11                 |   | 18                 | 9                            |  |   | 11                  | 20  | 8                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 729+35.90   | 35                          | 23                               | 12                 |   | 23                 | 8                            |  |   | 12                  | 20  | 26                                      | -8   | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 729+58.60   | 27                          | 17                               | 10                 |   | 17                 | 3                            |  |   | 10                  | 13  | 17                                      | -3   | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 729+81.40   | 14                          | 7                                | 7                  |   | 7                  | 3                            |  |   | 7                   | 10  | 13                                      | -6   | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 729+99.17   | 13                          | 7                                | 6                  |   | 7                  | 2                            |  |   | 6                   | 8   | 10                                      | -3   | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 730+18.94   | 3                           | 2                                | 1                  |   | 2                  | 0                            |  |   | 1                   | 1   | 1                                       | 1  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 730+24.17   | 0                           | 0                                | 0                  |   | 0                  | 0                            |  |   | 0                   | 0   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 730+43.94   |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| CL720+90.7  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| Totals:   | 142                         | 87                               | 55                 | 0   | 87                 | 26                           | 55   | 0   | 81                  | 106   | -19                                     | 0  | 0                                      | 55                                | 78                                | 110                                      | -55  |      |      |      |      |  |  |  |
| <u>Excavation, Class 10, Roadway &amp; Borrow</u> |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | 87                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <u>Embankment-In-Place</u>                        |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | 15                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <u>Topsoil, Strip, Salvage &amp; Spread</u>       |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | 55                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <u>Topsoil, Furnish and Spread</u>                |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | 40                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
|   |                             |                                  |                    |   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |



### TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

| Station   | Cut                         |                                  |                    |   | Fill               |                              |  |   |                     |   | Checks (EW-102)                         |  | Topsoil                                |                                   |                                   |  | [18]   | [19] | [20] | [21] | [22] |  |  |  |
|---|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|--|------|------|------|------|--|--|--|
|   | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     | [17]   |      |      |      |      |  |  |  |
|   | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor | Topsoil Stripping Minus Topsoil Placement w/Shrink |      |      |      |      |  |  |  |
| 721-H0872101                                      |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| 760+32.16   | 0                           | 0                                | 0                  |   | 0                  |                              |  |   | 0                   | 0   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0  |      |      |      |      |  |  |  |
| 760+50.00   | 16                          | 11                               | 5                  |   | 11                 |                              |  |   | 5                   | 7   | 5                                       | 0  | 5                                      | 10                                | 14                                | 9  |  |      |      |      |      |  |  |  |
| 760+75.00   | 17                          | 11                               | 6                  |   | 11                 |                              |  |   | 6                   | 8   | 3                                       | 0  | 6                                      | 10                                | 14                                | 8  |  |      |      |      |      |  |  |  |
| 761+00.00   | 0                           | 0                                | 0                  |   | 0                  |                              |  |   | 0                   | 0   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  |  |      |      |      |      |  |  |  |
| 761+26.14   |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| 721-H0872101                                      |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| Totals:   | 33                          | 22                               | 11                 | 0   | 22                 | 0                            | 11   | 0   | 11                  | 15  | 8                                       | 0  | 0                                      | 11                                | 20                                | 28                                       | -17  |      |      |      |      |  |  |  |
| <u>Excavation, Class 10, Roadway &amp; Borrow</u> |                             |                                  |                    | 15  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <u>Excavation, Class 10, Waste</u>                |                             |                                  |                    | 8   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <u>Topsoil, Strip, Salvage &amp; Spread</u>       |                             |                                  |                    | 11  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <u>Topsoil, Furnish and Spread</u>                |                             |                                  |                    | 13  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |

**TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS**

| Station   | Cut                         |                                  |                    |   | Fill               |                              |  |   |                     |   | Checks (EW-102)                         |  | Topsoil                                |                                   |                                   |  | [18]   | [19] | [20] | [21] | [22] |  |  |  |
|---|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|--|------|------|------|------|--|--|--|
|   | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     | [17]   |      |      |      |      |  |  |  |
|   | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor | Topsoil Stripping Minus Topsoil Placement w/Shrink |      |      |      |      |  |  |  |
| CL973+45  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| 972+29.26   | 5                           | 3                                | 2                  |   | 3                  | 0                            | 2  |   | 2                   | 3   | 0                                       | 0  | 0                                      | 2                                 | 2                                 | 3  | -1   |      |      |      |      |  |  |  |
| 972+41.71   | 51                          | 27                               | 24                 |   | 27                 | 50                           | 24   |   | 74                  | 96  | -69                                     | 0  | 0                                      | 24                                | 40                                | 56                                       | -32  |      |      |      |      |  |  |  |
| 972+91.54   | 24                          | 10                               | 14                 |   | 10                 | 70                           | 14   |   | 84                  | 109   | -99                                     | 0  | 0                                      | 14                                | 23                                | 32                                       | -18  |      |      |      |      |  |  |  |
| 973+07.22   | 72                          | 38                               | 34                 |   | 38                 | 243                          | 34   |   | 277                 | 360   | -322                                    | 0  | 0                                      | 34                                | 49                                | 69                                       | -35  |      |      |      |      |  |  |  |
| 973+35.13   | 36                          | 23                               | 13                 |   | 23                 | 141                          | 13   |   | 154                 | 200   | -177                                    | 0  | 0                                      | 13                                | 13                                | 18                                       | -5   |      |      |      |      |  |  |  |
| 973+44.77   | 33                          | 24                               | 9                  | 65  | 89                 | 127                          | 9  | 60  | 196                 | 255   | -166                                    | 0  | 0                                      | 9                                 | 13                                | 18                                       | -9   |      |      |      |      |  |  |  |
| 973+53.92   | 88                          | 63                               | 25                 |   | 63                 | 184                          | 25   |   | 209                 | 272   | -209                                    | 0  | 0                                      | 25                                | 50                                | 70                                       | -45  |      |      |      |      |  |  |  |
| 973+81.58   | 148                         | 109                              | 39                 |   | 109                | 153                          | 39   |   | 192                 | 250   | -141                                    | 0  | 0                                      | 39                                | 66                                | 92                                       | -53  |      |      |      |      |  |  |  |
| 974+27.30   | 46                          | 37                               | 9                  |   | 37                 | 25                           | 9  |   | 34                  | 44  | -7                                      | 0  | 0                                      | 9                                 | 15                                | 21                                       | -12  |      |      |      |      |  |  |  |
| 974+40.76   | 36                          | 29                               | 7                  |   | 29                 | 15                           | 7  |   | 22                  | 29  | 0                                       | 0  | 0                                      | 7                                 | 12                                | 17                                       | -10  |      |      |      |      |  |  |  |
| 974+55.21   | 11                          | 8                                | 3                  |   | 8                  | 3                            | 3  |   | 6                   | 8   | 0                                       | 0  | 0                                      | 3                                 | 4                                 | 6  | -3   |      |      |      |      |  |  |  |
| 974+65.78   |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| CL973+45  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| Totals:   | 550                         | 371                              | 179                | 65  | 436                | 1,011                        | 179  | 60  | 1,250               | 1,625   | -1,189                                  | 0  | 0                                      | 179                               | 287                               | 402                                      | -223   |      |      |      |      |  |  |  |
| <b>Excavation, Class 10, Roadway &amp; Borrow</b> |                             |                                  |                    |   | 436                | CY                           |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Embankment-In-Place</b>                        |                             |                                  |                    |   | 915                | CY                           |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Topsoil, Strip, Salvage, &amp; Spread</b>      |                             |                                  |                    |   | 179                | CY                           |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |
| <b>Topsoil, Furnish &amp; Spread</b>              |                             |                                  |                    |   | 160                | CY                           |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |  |  |  |

### TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

| Station   | Cut                         |                                  |                    |   | Fill               |                              |  |   |                     |   | Checks (EW-102)                         |  | Topsoil                                |                                   |                                   |  | [18] | [19] | [20] | [21] | [22] |  |
|---|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|------|------|------|------|------|--|
|   | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     |      |      |      |      |      | [17]   |
|   | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor |      |      |      |      |      | Topsoil Stripping Minus Topsoil Placement w/Shrink |
| CL1053+74.6                                       |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
| 1085+15.59  | 0                           | 0                                | 0                  |   | 0                  | 0                            |  |   | 0                   | 0   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0    |      |      |      |      |  |
| 1085+40.59  | 61                          | 43                               | 18                 |   | 43                 | 55                           | 18   |   | 73                  | 95  | -52                                     | 0  | 0                                      | 18                                | 29                                | 41                                       | -23  |      |      |      |      |  |
| 1085+95.77  | 26                          | 17                               | 9                  |   | 17                 | 18                           | 9  |   | 27                  | 35  | -18                                     | 0  | 0                                      | 9                                 | 13                                | 18                                       | -9   |      |      |      |      |  |
| 1086+18.11  | 23                          | 14                               | 9                  | 88  | 102                | 20                           | 9  | 13  | 42                  | 55  | 47                                      | 0  | 0                                      | 9                                 | 14                                | 20                                       | -11  |      |      |      |      |  |
| 1086+41.27  | 53                          | 35                               | 18                 |   | 35                 | 64                           | 18   |   | 82                  | 107   | -72                                     | 0  | 0                                      | 18                                | 29                                | 41                                       | -23  |      |      |      |      |  |
| 1086+96.26  | 0                           | 0                                | 0                  |   | 0                  | 0                            |  |   | 0                   | 0   | 0                                       | 0  | 0                                      | 0                                 | 0                                 | 0  | 0    |      |      |      |      |  |
| 1087+21.26  |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
| CL1053+74.6                                       |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
| Totals:   | 163                         | 109                              | 54                 | 88  | 197                | 157                          | 54   | 13  | 224                 | 292   | -95                                     | 0  | 0                                      | 54                                | 85                                | 119                                      | -65  |      |      |      |      |  |
| <b>Excavation, Class 10, Roadway &amp; Borrow</b> |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
|   |                             |                                  |                    | 197   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
| <b>Embankment-In-Place</b>                        |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
|   |                             |                                  |                    | 74  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
| <b>Topsoil, Strip, Salvage &amp; Spread</b>       |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
|   |                             |                                  |                    | 54  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
| <b>Topsoil, Furnish and Spread</b>                |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |
|   |                             |                                  |                    | 47  | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |      |      |      |      |      |  |

Includes additional Cut and Fill for Channel Shaping.

### TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

| Station                                | Cut                         |                                  |                    |   |                    | Fill                         |  |   |                     |   |   | Checks (EW-102)                                  |  | Topsoil                           |                                   |  |  | [18] | [19] | [20] | [21] | [22] |  |
|--|-----------------------------|----------------------------------|--------------------|---|--------------------|------------------------------|--|---|---------------------|---|---|--|--|-----------------------------------|-----------------------------------|--|--|------|------|------|------|------|--|
|  | [1]                         | [2]                              | [3]                | [4]   | [5]                | [6]                          | [7]  | [8]   | [9]                 | [10]  | [11]                                    | [12]   | [13]                                   | [14]                              | [15]                              | [16]                                     | [17]   |      |      |      |      |      |  |
|  | Total Cut Unadjusted Volume | Total Class 10 Unadjusted Volume | Topsoil Cut Volume | Manually Calculated Cut Adjustments (+/- Cut) | Total Cut Adjusted | Total Fill Unadjusted Volume | Existing Topsoil Stripping Undercut (+ Fill) | Manual Calculated Fill Adjustments (+/- Fill) | Total Fill Adjusted | Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor | Total Cut Adjusted Minus Fill w/ Shrink | Approx. Fill Vol. Below 5' & Above 20' w/ Shrink | Approx. Fill Volume Below 3' w/ Shrink | Topsoil Stripping Undercut Volume | Topsoil Placement Undercut Volume | Topsoil Placement With 1.4 Shrink Factor | Topsoil Stripping Minus Topsoil Placement w/Shrink |      |      |      |      |      |  |
| Summary:                               |                             |                                  |                    |   |                    |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |      |  |
| CL393+13.9                             | 132                         | 68                               | 64                 | 0   | 68                 | 240                          | 64   | 0   | 304                 | 396   | -328                                    | 0  | 0                                      | 64                                | 108                               | 152                                      | -88  |      |      |      |      |      |  |
| CL401+00                               | 179                         | 133                              | 46                 | 0   | 133                | 123                          | 46   | 0   | 169                 | 220   | -87                                     | 0  | 0                                      | 46                                | 73                                | 103                                      | -57  |      |      |      |      |      |  |
| CL720+90.7                             | 142                         | 87                               | 55                 | 0   | 87                 | 26                           | 55   | 0   | 81                  | 106   | -19                                     | 0  | 0                                      | 55                                | 78                                | 110                                      | -55  |      |      |      |      |      |  |
| 721-H0872101                           | 33                          | 22                               | 11                 | 0   | 22                 | 0                            | 11   | 0   | 11                  | 15  | 8                                       | 0  | 0                                      | 11                                | 20                                | 28                                       | -17  |      |      |      |      |      |  |
| CL973+45                               | 550                         | 371                              | 179                | 65  | 436                | 1,011                        | 179  | 60  | 1,250               | 1,625   | -1,189                                  | 0  | 0                                      | 179                               | 287                               | 402                                      | -223   |      |      |      |      |      |  |
| CL1053+74.6                            | 163                         | 109                              | 54                 | 88  | 197                | 157                          | 54   | 13  | 224                 | 292   | -95                                     | 0  | 0                                      | 54                                | 85                                | 119                                      | -65  |      |      |      |      |      |  |
| Project Totals:                        | 1,199                       | 790                              | 409                | 153   | 943                | 1,557                        | 409  | 73  | 2,039               | 2,654   | -1,710                                  | 0  | 0                                      | 409                               | 651                               | 914                                      | -505   |      |      |      |      |      |  |
| Excavation, Class 10, Roadway & Borrow |                             |                                  |                    | 936   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |      |  |
| Embankment-In-Place                    |                             |                                  |                    | 1,324   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |      |  |
| Excavation, Class 10, Waste            |                             |                                  |                    | 8   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |      |  |
| Topsoil, Strip, Salvage, & Spread      |                             |                                  |                    | 409   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |      |  |
| Topsoil, Furnish & Spread              |                             |                                  |                    | 364   | CY                 |                              |  |   |                     |   |   |  |  |                                   |                                   |  |  |      |      |      |      |      |  |

**LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)**

- Existing Ground Line
- ===== Proposed Template
- ===== Proposed Topsoil Placement
- Additional Topsoil Removal
- Subgrade Treatment
- Granular Shoulder
- ===== Pavement
- Existing Pipe\RCB
- ===== Proposed Pipe\RCB
- ===== Proposed Dike
- ===== All Elements Associated with Proposed Entrances

**LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)**

- Topsoil (Class 10)
- SLOPE DRESSING ----- Slope Dressing Only
- Class 10 Materials
- Select Loams And Clay-Loams
- Select Sand
- Unsuitable Type A Disposal
- Unsuitable Type B Disposal
- Unsuitable Type C Disposal
- Shale
- Waste
- Broken and Weathered Rock
- Solid Rock
- Boulders

Note: All layer lines and descriptions identify layers above the line.

Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

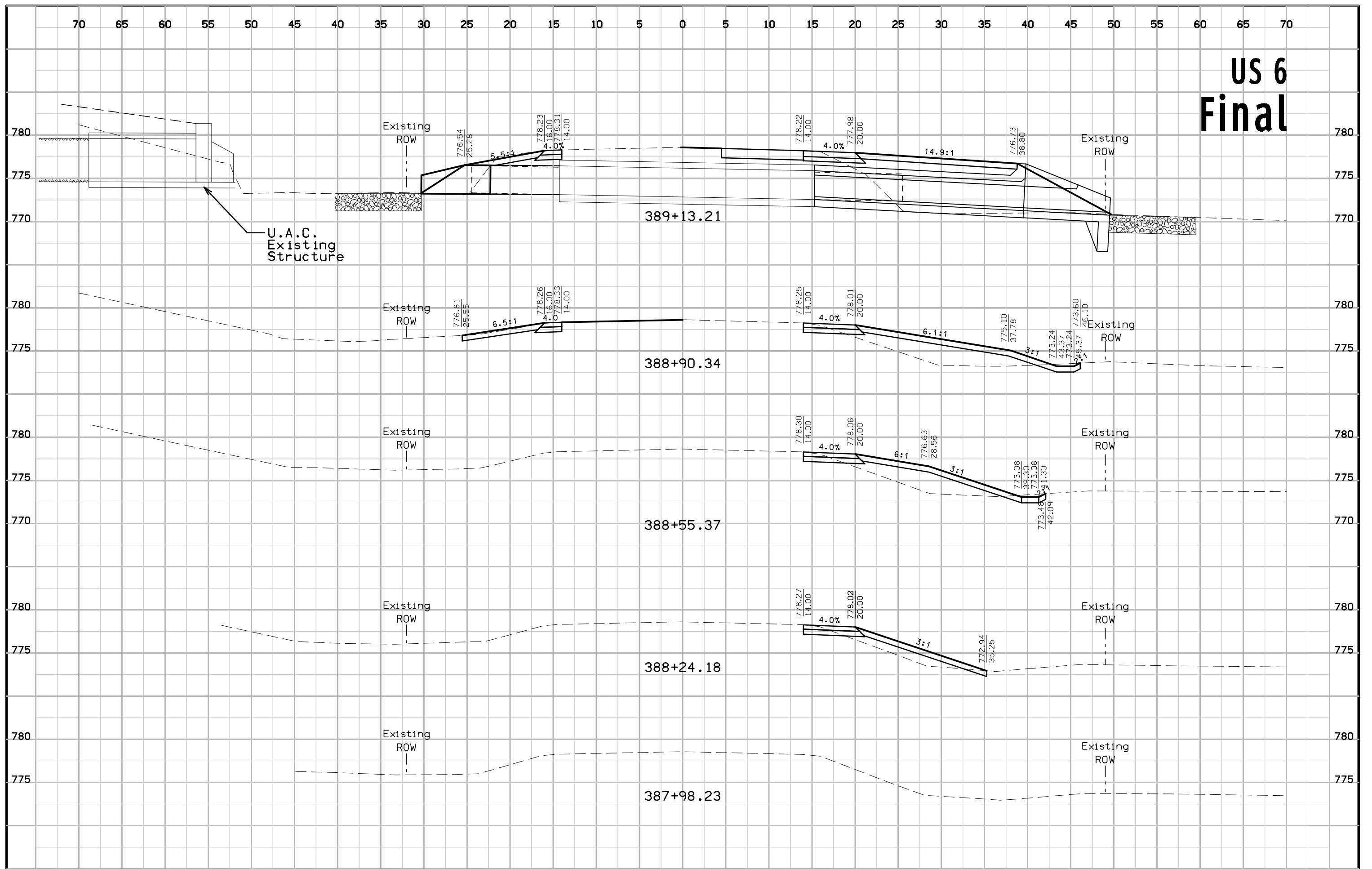
**SYMBOL LEGEND OF CROSS SECTION SHEETS**

- Existing ROW  
----- Existing Right-of-Way Limit
- Proposed ROW  
----- Proposed Right-of-Way Limit
- Temporary ROW  
----- Temporary Right-of-Way Limit

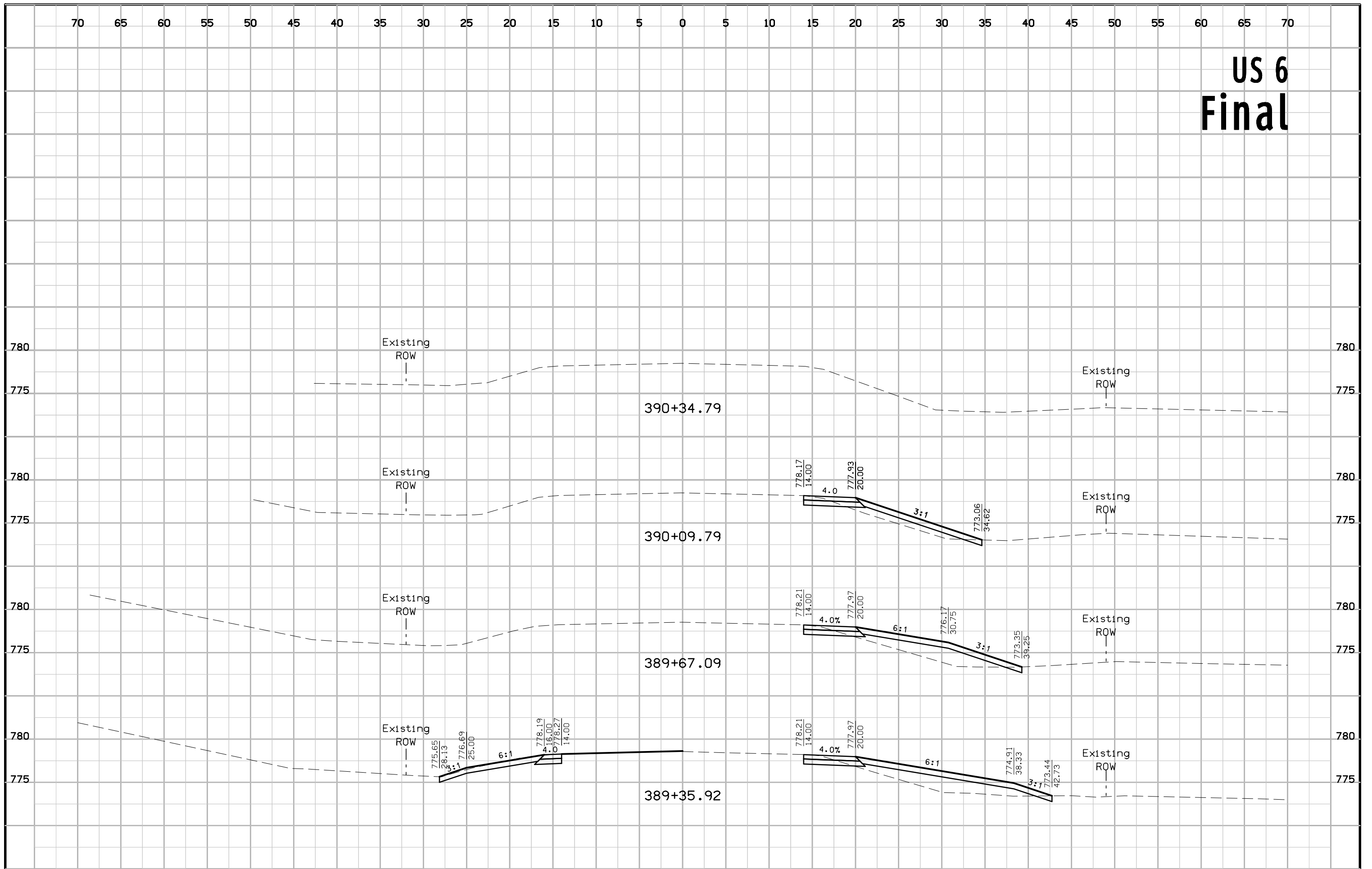
CROSS SECTION

(COVERS SHEET SERIES W, X, Y, & Z)

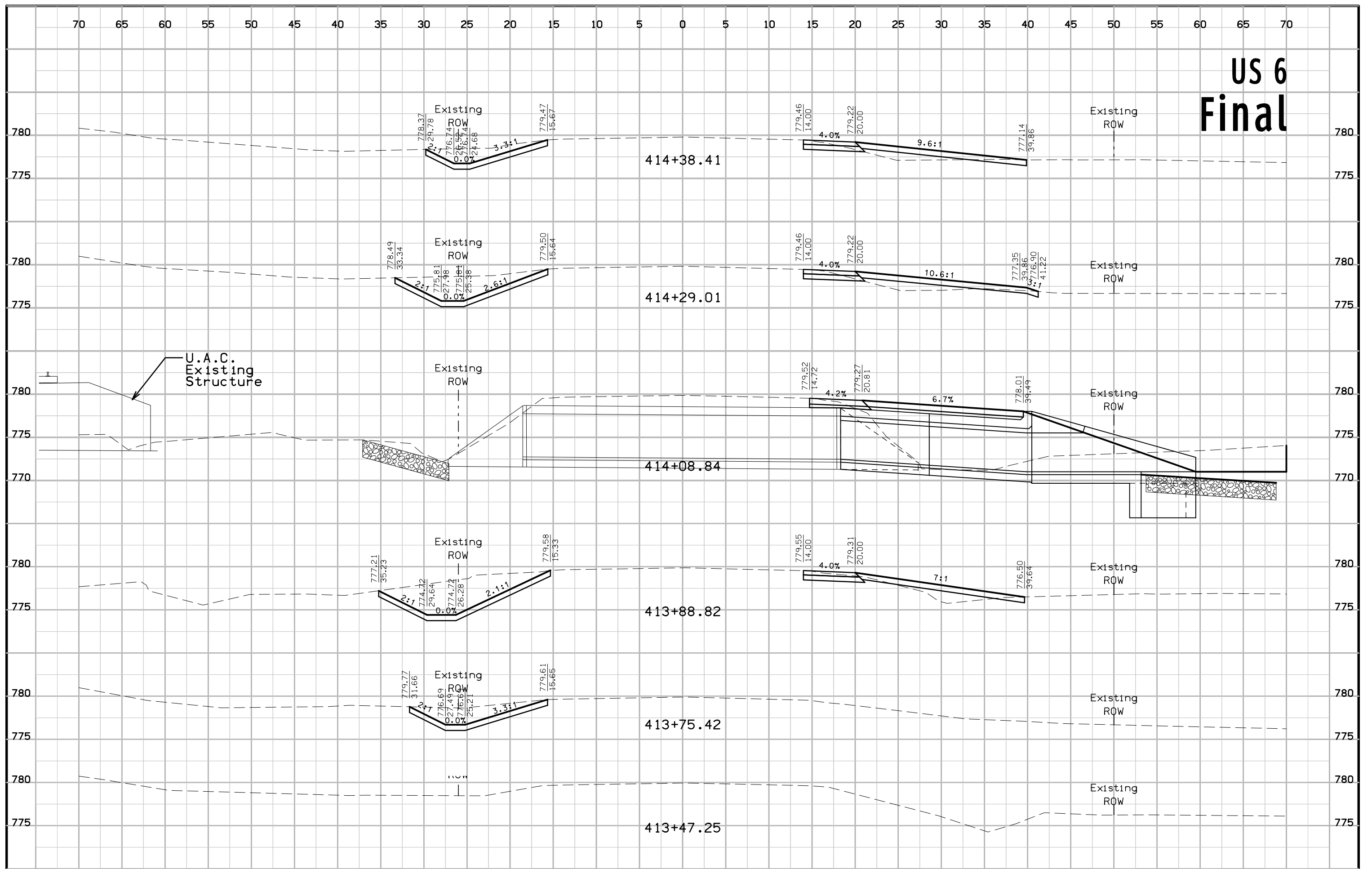
# US 6 Final



# US 6 Final

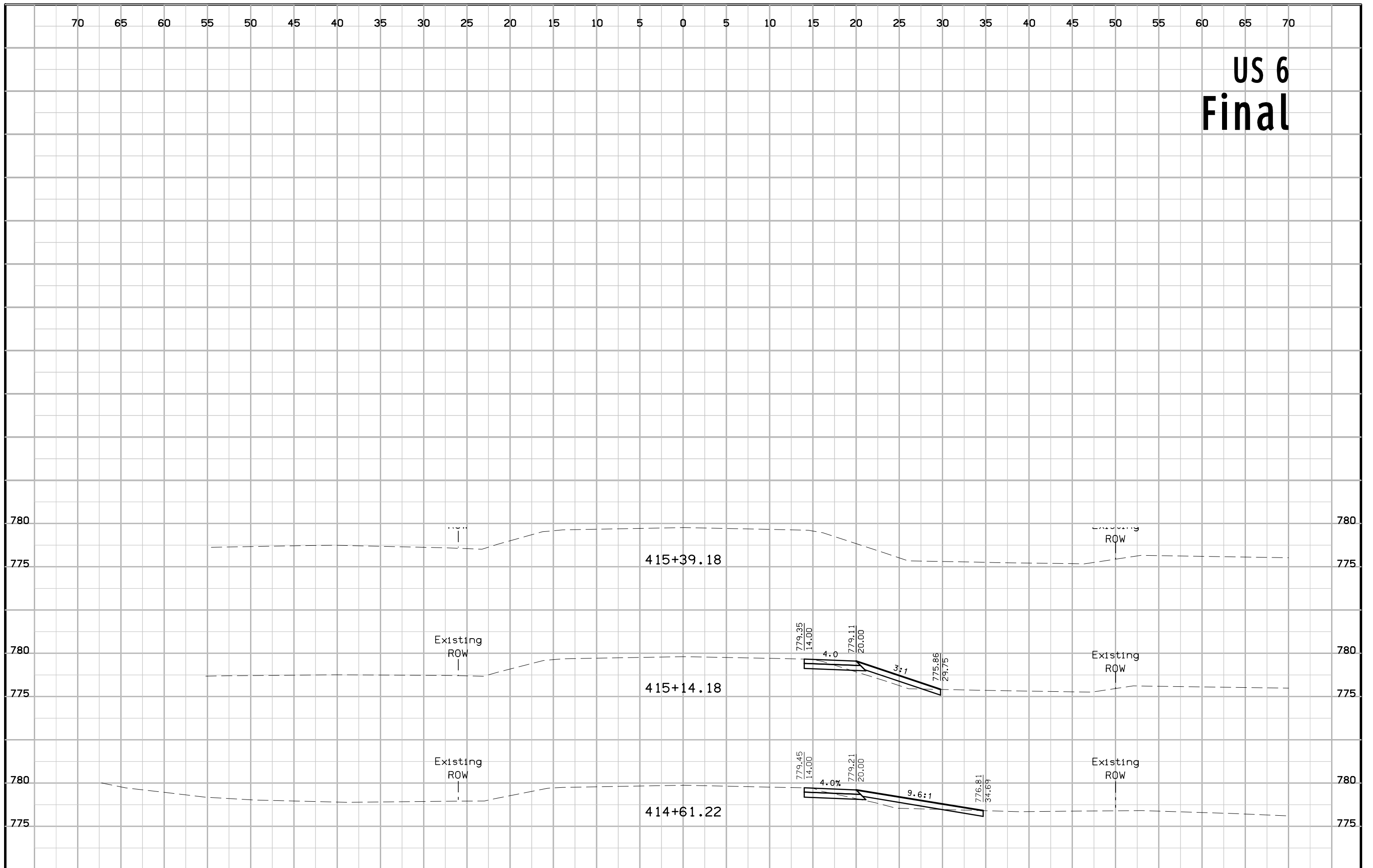


# US 6 Final

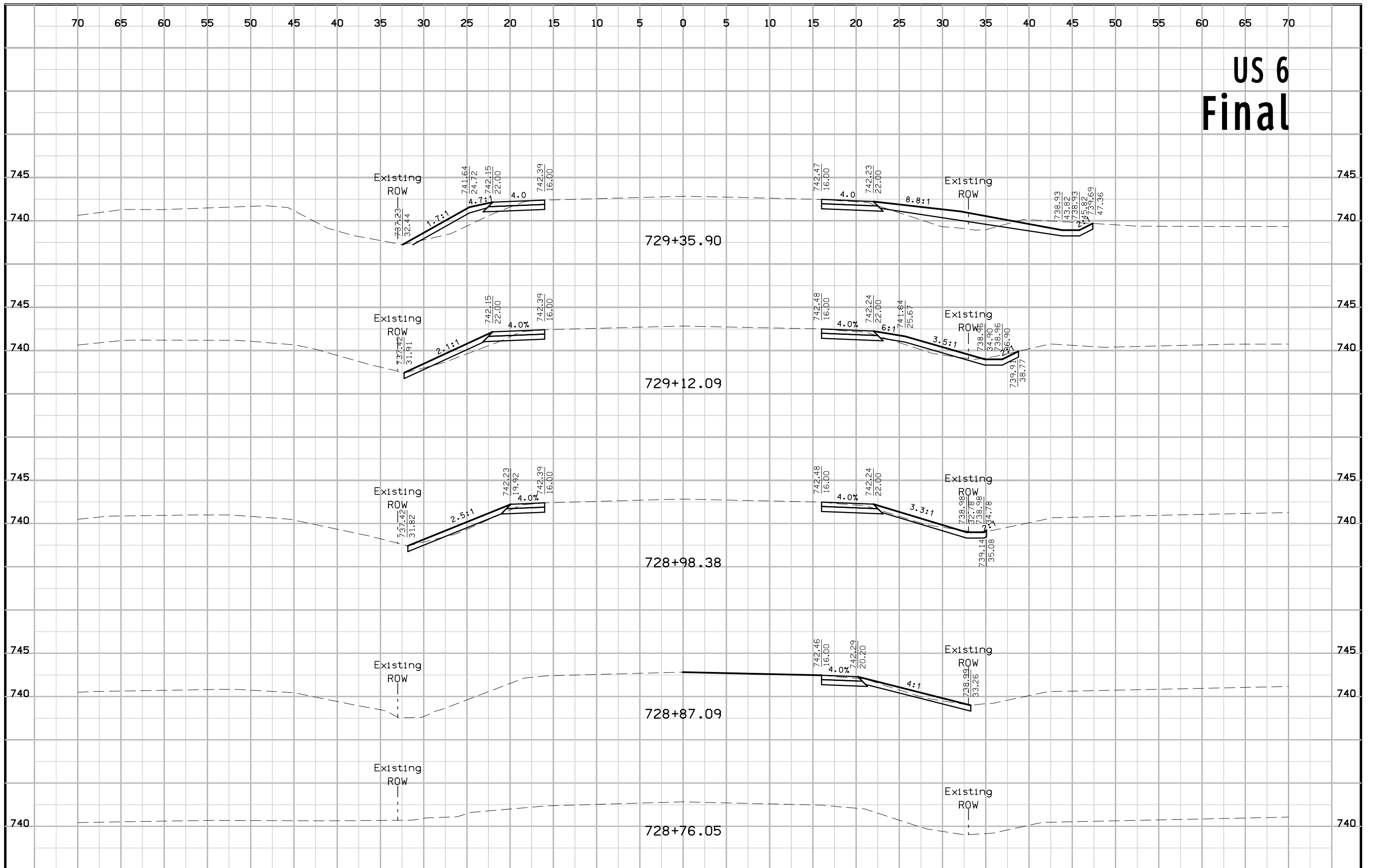




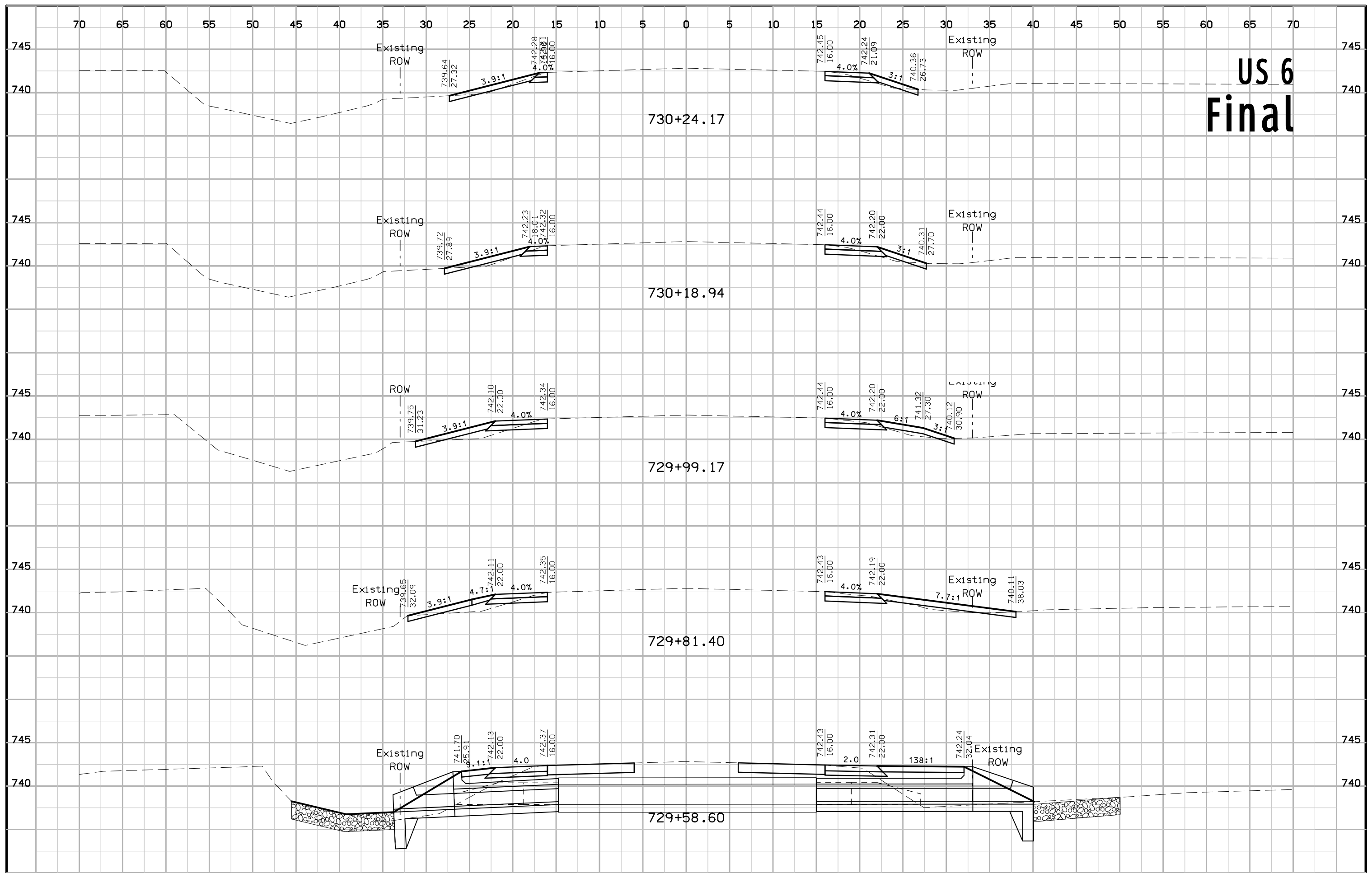
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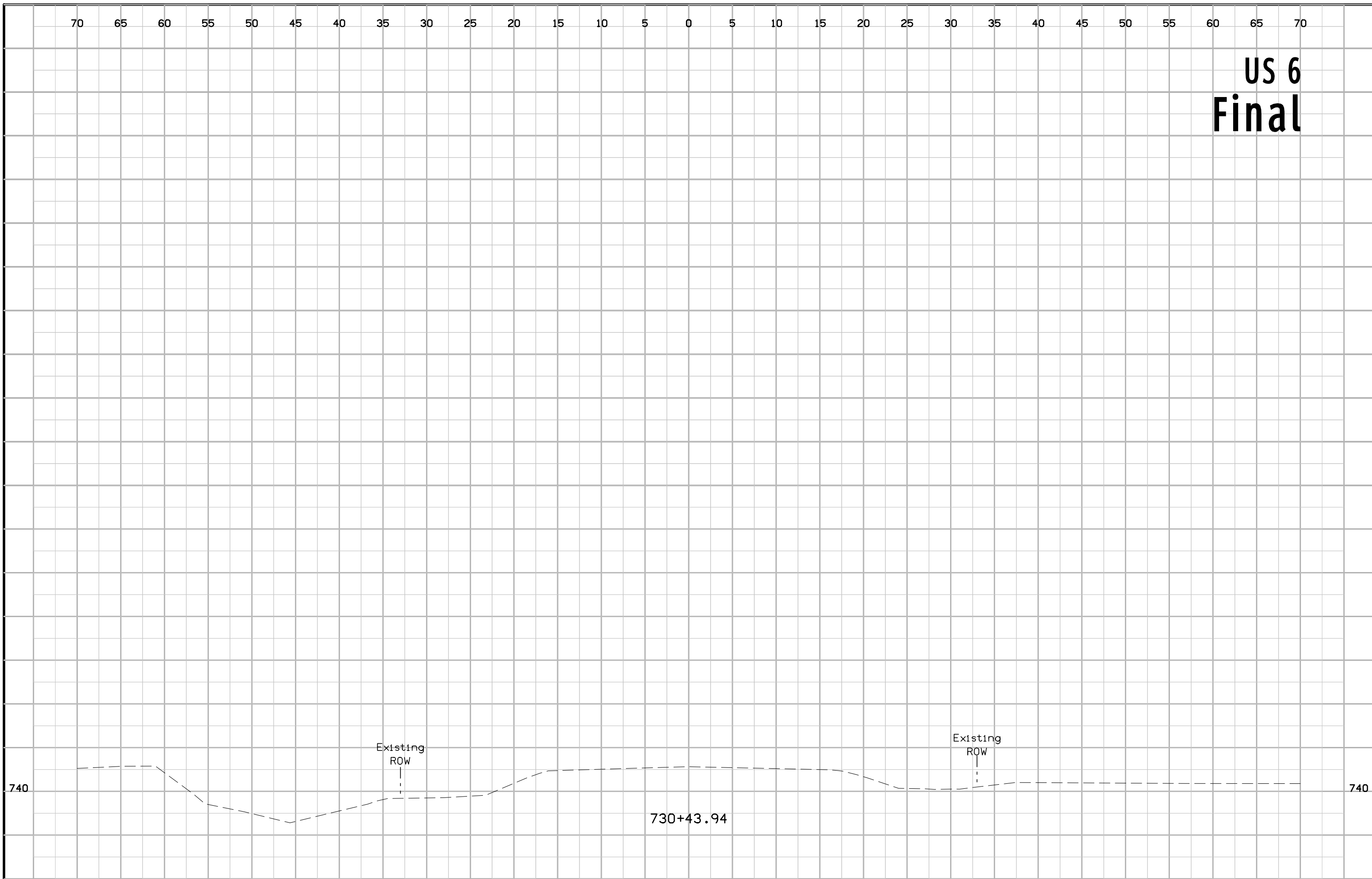
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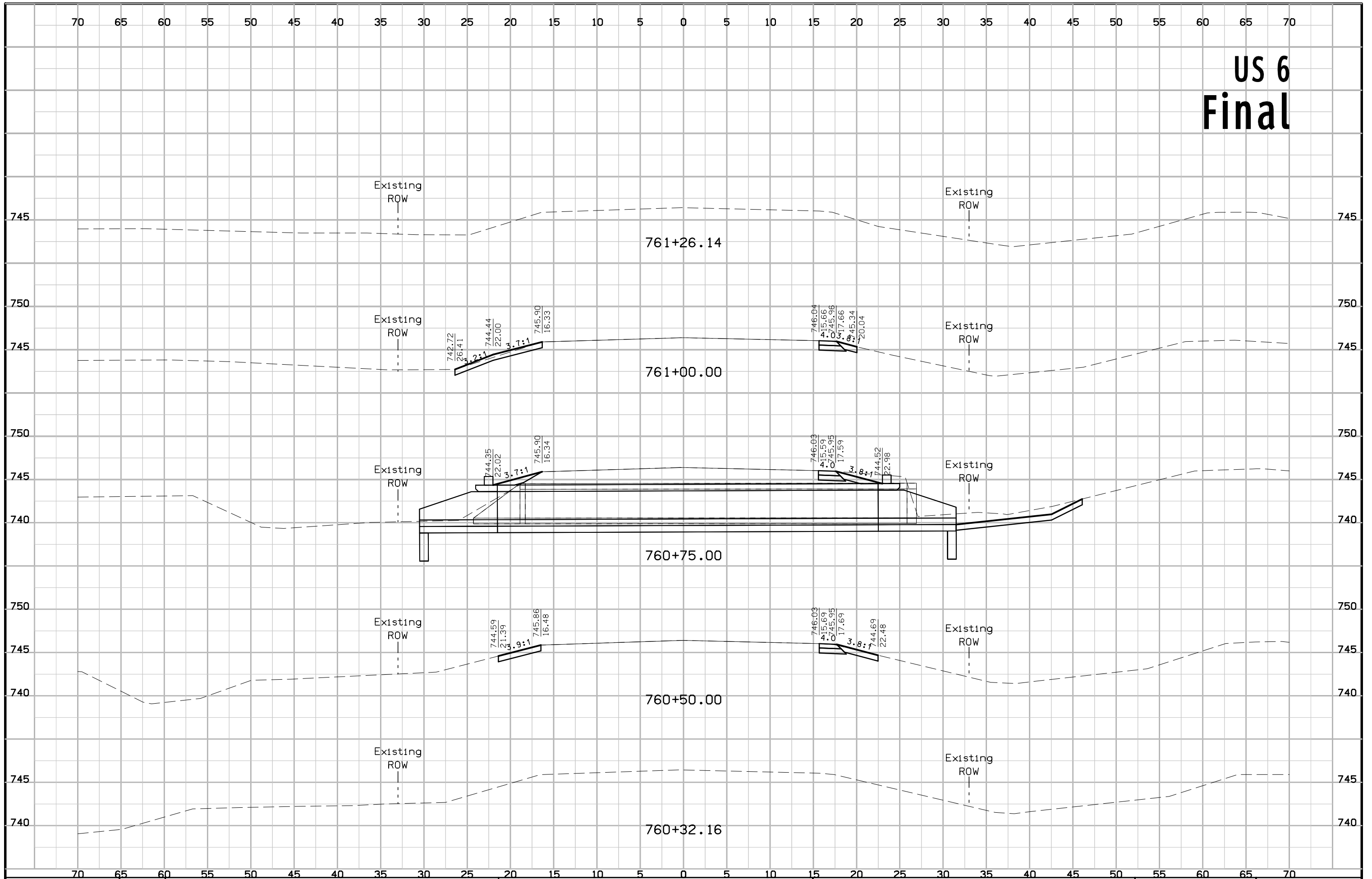
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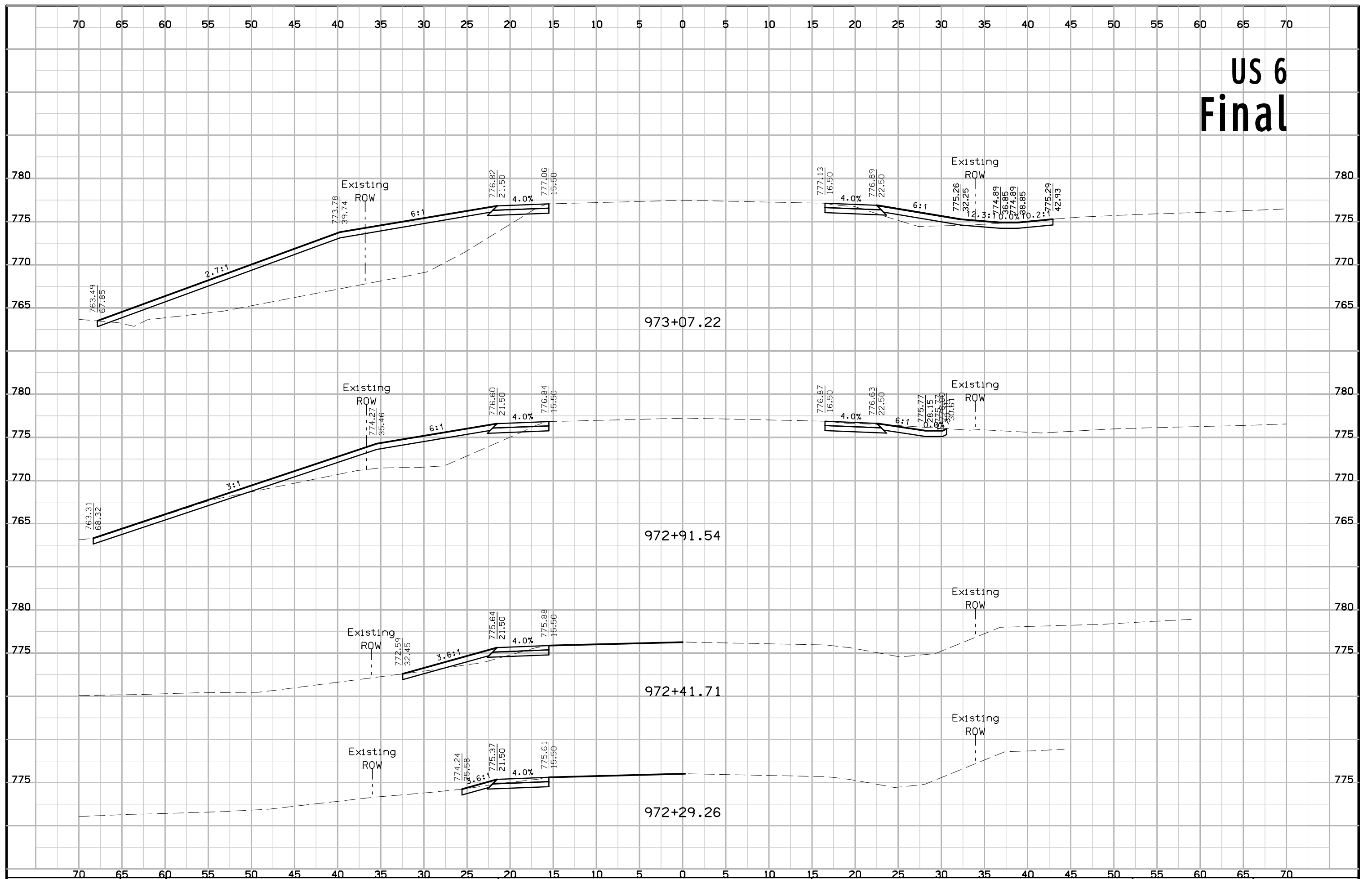
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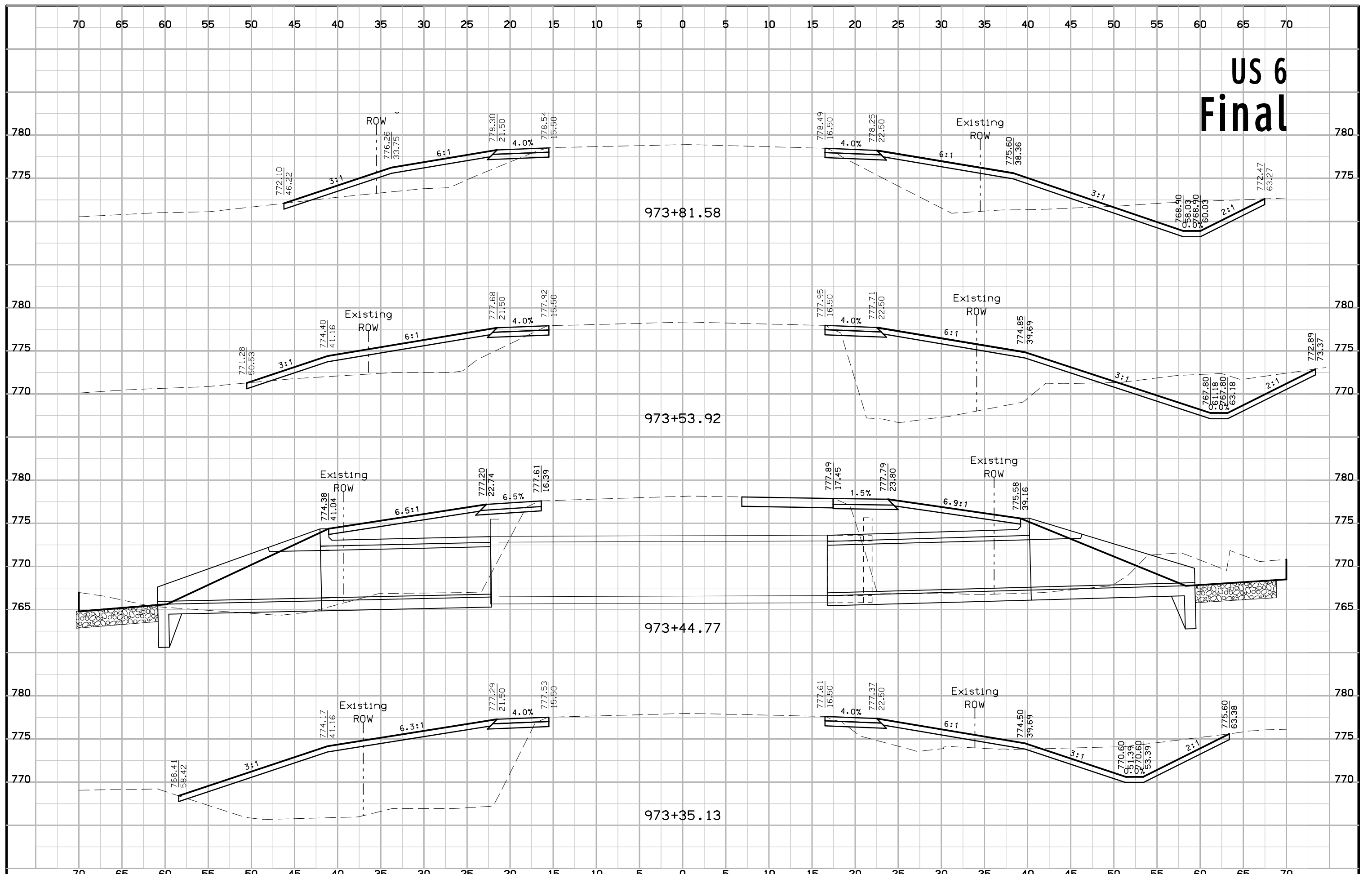
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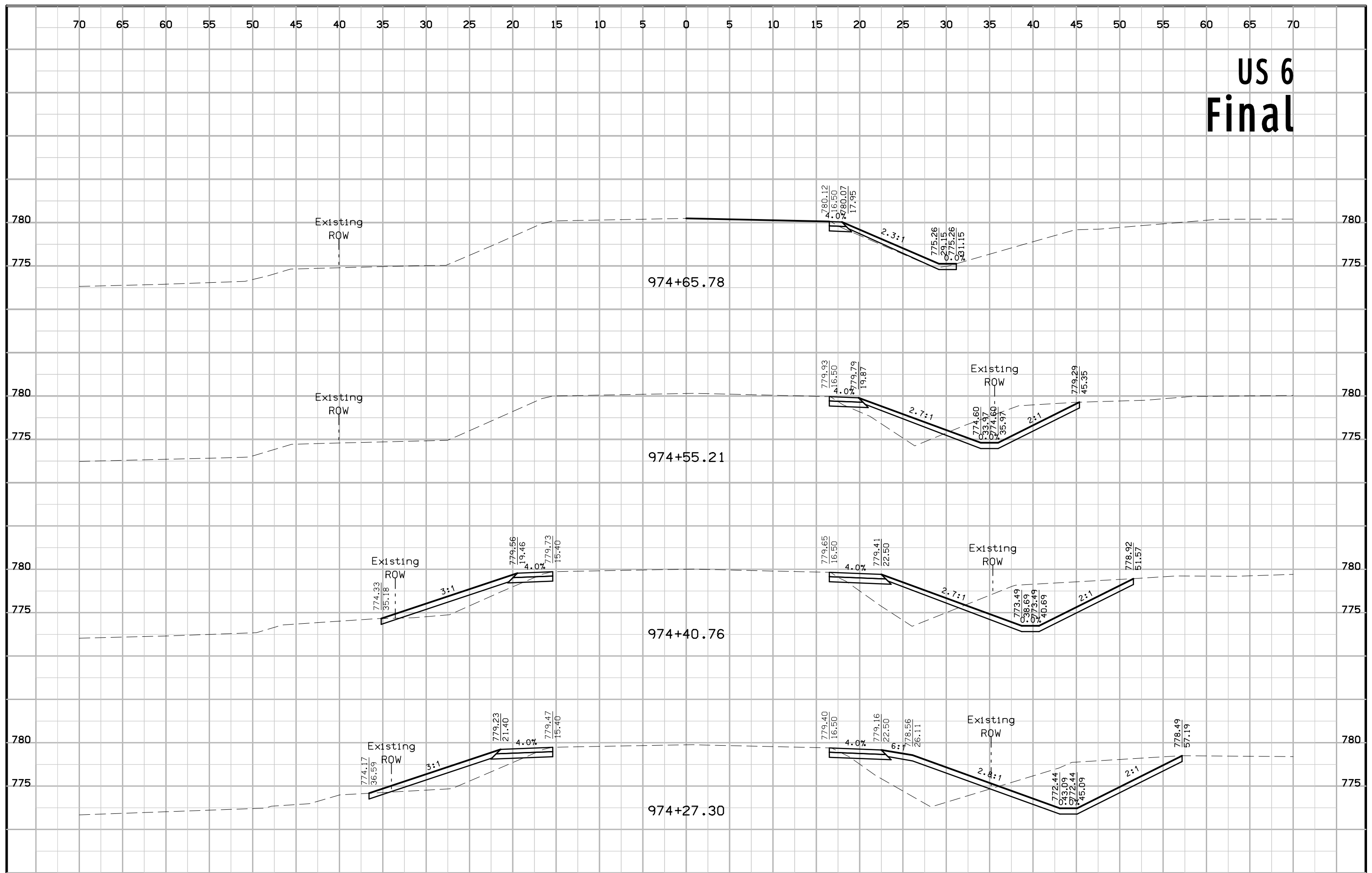
# US 6 Final



# US 6 Final

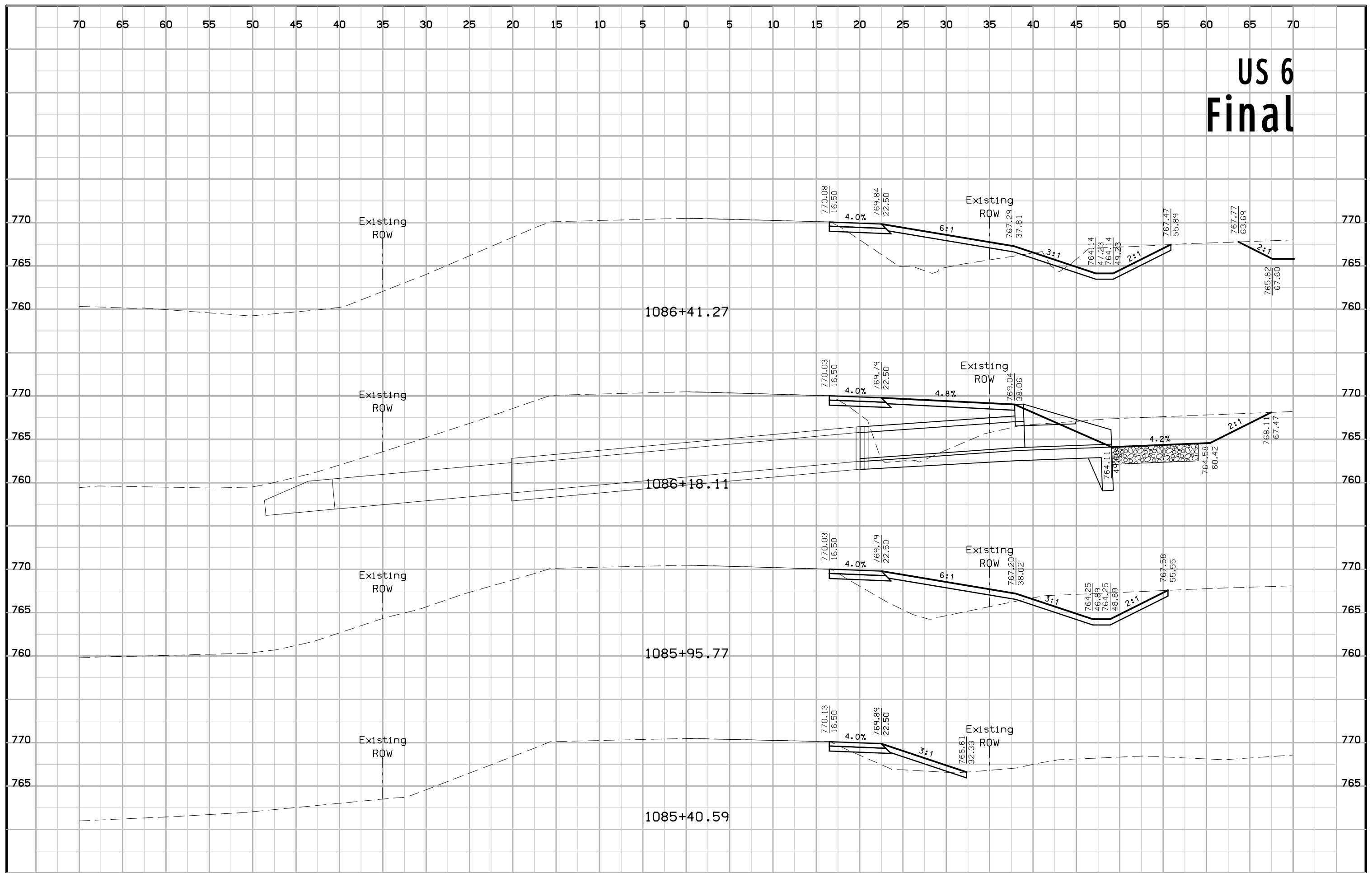


# US 6 Final





# US 6 Final



# US 6 Final

