

## STANDARD ROAD PLANS

THE FOLLOWING STANDARD ROAD PLANS SHALL BE CONSIDERED  
APPLICABLE TO CONSTRUCTION WORK ON THIS PROJECT.

IDENT.	DATE	IDENT.	DATE	IDENT.	DATE
RL-1	4-23-82				

IOWA  
DEPARTMENT OF TRANSPORTATION  
*Highway Division*  
PLANS OF PROPOSED IMPROVEMENT ON THE  
FARM TO MARKET SYSTEM  
**CRAWFORD COUNTY**  
STREAM STABILIZATION STRUCTURES

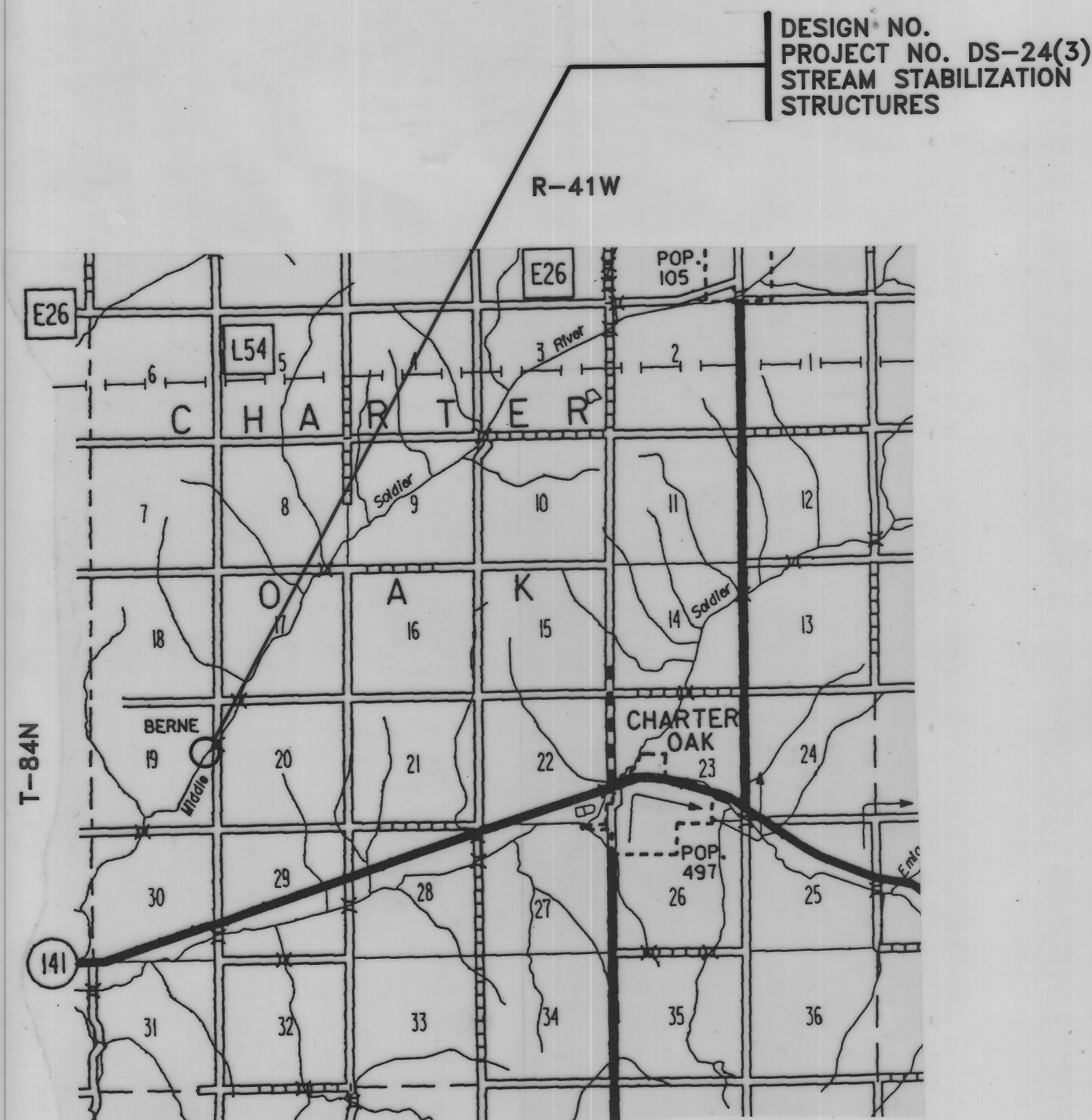
THE STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION,  
SERIES OF 1992, PLUS CURRENT SPECIAL PROVISIONS AND SUPPLEMENTAL  
SPECIFICATIONS, SHALL APPLY TO WORK ON THIS PROJECT.

## TOTAL ESTIMATED QUANTITIES

NO.	ITEM	UNIT	WEIR#1	WEIR#2	TOTAL
1	PILING, STEEL SHEET, FURNISH AND DRIVE	S.F.	1633	1707	3340
2	STRUCTURAL STEEL	LBS.	3105	3855	6960
3	MOBILIZATION	L.S.	—	—	LUMP SUM
4	EXCAVATION, CLASS 10, CHANNEL	C.Y.	923	1237	2160
5	REVTMENT, SPECIAL RIPRAP	TONS	604	446	1050
6	FABRIC, ENGINEERING	S.Y.	686	469	1155
7	TEMPORARY BARRIER RAIL, FURNISH ONLY	L.F.	60	60	120
8	TEMPORARY BARRIER RAIL, PLACE ONLY	L.F.	60	60	120

## ITEM NO. ESTIMATE REFERENCE INFORMATION

1. SHEET PILE MAY BE NEW OR USED MATERIAL. SEE WEIR NOTES FOR ADDITIONAL INFORMATION.
2. INCLUDES WEIGHT OF HP10X42 WALE AND ALL WELDS.
4. SEE SITUATION PLAN FOR LIMITS.
5. SEE RIP-RAP NOTES.
6. SEE SITUATION PLAN AND WEIR DETAILS FOR LIMITS. TO CONFORM TO I.D.O.T. MATERIALS I.M. 496.01 APPENDIX A.
7. SEE NOTES, SHEET 5. MAY BE NEW OR USED.
8. INCLUDES COST FOR EXCAVATION, TIE BARS AND ALL LABOR FOR PLACEMENT OF THE RAIL SECTIONS AS SHOWN SHEETS 2, 3, 4 AND 5.

PROJECT LOCATION  
SCALE 1" = 1 MILE

PROJECT NO. DS-24(3)

## INDEX OF SHEETS

1. TITLE SHEET
2. SITUATION PLAN
3. WEIR #1 DETAILS
4. WEIR #2 DETAILS
5. TEMPORARY BARRIER RAIL DETAILS

THIS PROJECT (COE # 274700) IS COVERED BY THE  
CORPS OF ENGINEERS NATIONWIDE 404 PERMIT #26.

## DRAWING APPROVAL

ALL SHOP DRAWINGS AND FALSEWORK DRAWINGS THAT REQUIRE APPROVAL  
SHALL BE APPROVED BY CALHOUN-BURNS AND ASSOCIATES, INC.ADDRESS : 1801 FULLER ROAD, P.O. BOX 65859  
WEST DES MOINES, IOWA 50265  
TELEPHONE : (515) 224-4344THESE SHOP DRAWINGS SHALL NOT BE SENT TO IOWA D.O.T. OFFICE OF  
BRIDGE DESIGN.U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

APPROVED BY:

DATE

*Lee C. White* 2-1-94  
Acting STATE CONSERVATION ENGINEER

*Michael C. Schendel* 2/17/94  
HEAD ENGINEERING STAFF, MNTC  
LINCOLN, NEBRASKA

IA. DEPT. OF NATURAL RESOURCES PERMIT NO. FP93-184; DATED 10-8-93

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR

DATE

APPROVED

*H. Dale Wright* 1-28-94  
CRAWFORD COUNTY ENGINEER DATE

*John P. Lawler*  
*Le Roy A. Hanson*  
*Edwin Hendon* 1-28-94  
BOARD OF SUPERVISORS DATE

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT  
WAS PREPARED UNDER MY SUPERVISION AND THAT I  
AM A DULY REGISTERED PROFESSIONAL ENGINEER  
UNDER THE LAWS OF THE STATE OF IOWA  
SIGNATURE: *Steven B. Reneker*  
NAME: STEVEN B. RENEKER, P.E.  
DATE 10-18-93 REG. NO. 11455

MY REGISTRATION EXPIRES DECEMBER 31, 1994



AUTHORIZED FOR LETTING

DEPUTY CHIEF ENGINEER

DATE

IOWA DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION

ACCEPTED FOR LETTING

DISTRICT LOCAL SYSTEMS ENGR. DATE

SHEET 1 OF 5

CALHOUN-BURNS & ASSOCIATES, INC. CONSULTING ENGINEERS  
WEST DES MOINES, IOWA 50265 (515)224-4344

JOB NO. 92143

DESIGNED BY : RJV  
DRAWN BY : EAL  
CHECKED BY : SBR

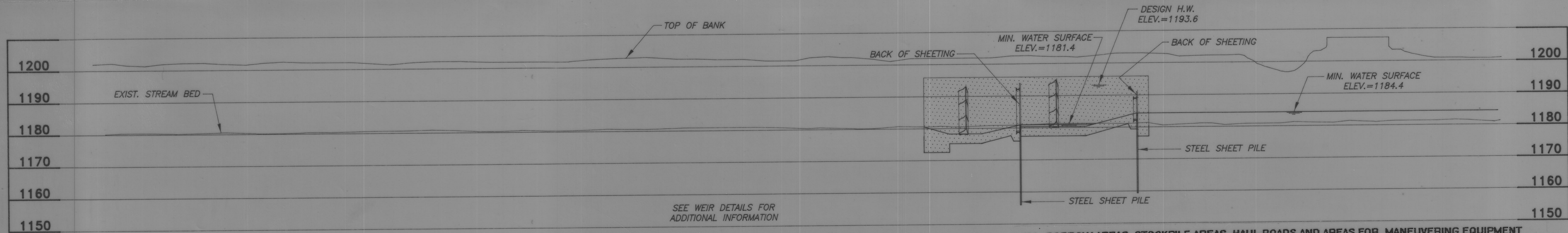
DESIGN NO.

CRAWFORD COUNTY

PROJECT NO. DS-24(3)

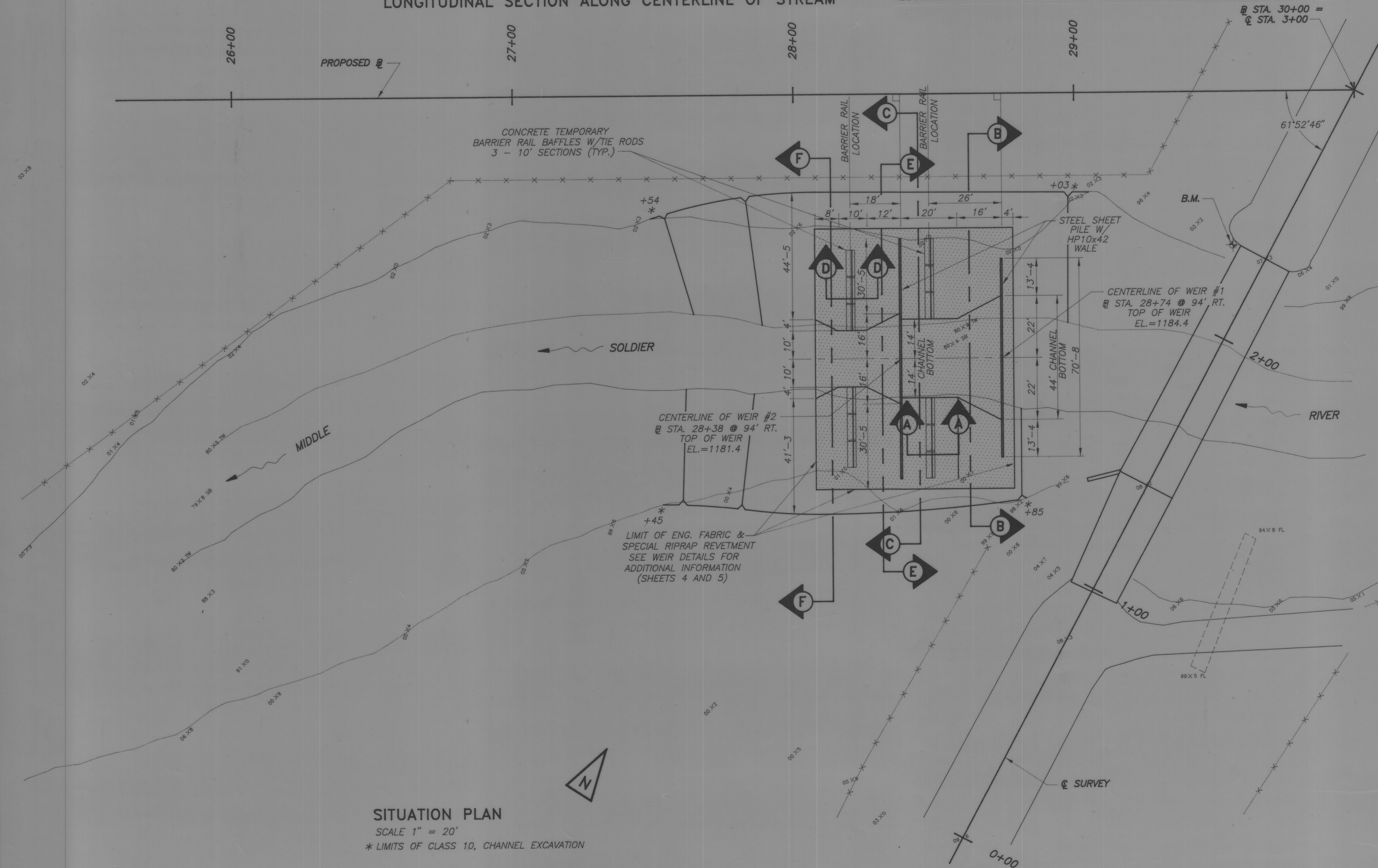
FILE NO.





LONGITUDINAL SECTION ALONG CENTERLINE OF STREAM

ALL BORROW AREAS, STOCKPILE AREAS, HAUL ROADS AND AREAS FOR MANEUVERING EQUIPMENT ON THIS PROJECT WILL REQUIRE SUBSOIL TILLAGE TO AN AVERAGE DEPTH OF 18 TO 24 INCHES. SUCH TILLAGE SHALL BE ACCOMPLISHED ON MAXIMUM OF THREE FOOT CENTERS. SUCH AREAS SHALL BE DESIGNATED BY THE COUNTY ENGINEER.



SITUATION PLAN

SCALE 1" = 20'

\* LIMITS OF CLASS 10, CHANNEL EXCAVATION

BENCH MARK: "X" IN CENTER ABUTMENT @ N.W. CORNER. ELEV.= 1207.22

## SPECIFICATIONS

DESIGN: AASHTO, SERIES OF 1992, PLUS INTERIM SPECIFICATIONS.  
CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION, SERIES OF 1992, PLUS CURRENT SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.

## DESIGN STRESSES

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 1992, PLUS INTERIM NOT EXCEEDING SPECIFICATIONS.  
STRUCTURAL STEEL ASSUMING SALVAGED MATERIAL WITH STRESSES NOT EXCEEDING 0.55 FY.  
STEEL SHEET PILE ASSUMING SALVAGED MATERIAL WITH STRESSES NOT EXCEEDING 0.65 FY.

## GENERAL NOTES

QUANTITY SHOWN FOR STRUCTURAL STEEL IS FOR FURNISHING AND PLACING STEEL I-BEAM WALER AND ALL WELDING.  
THE CONTRACTOR SHALL CLEAR THE CHANNEL AS SHOWN ON THE WEIR DETAIL SHEET AND "SITUATION PLAN". EXCESS MATERIAL SHALL BE DISPOSED AT A SITE FURNISHED BY THE CONTRACTOR.  
IF ARCHAEOLOGICAL MATERIALS ARE ENCOUNTERED DURING THE CONSTRUCTION PHASE OF THIS PROJECT, THE OFFICE OF PLANNING AND/OR THE OFFICE OF LOCAL SYSTEMS (IOWA DOT) MUST BE CONTACTED IMMEDIATELY SO THE PROPER AUTHORITIES CAN BE NOTIFIED ACCORDING TO THE EXISTING FEDERAL REGULATIONS AND STATE PROCEDURES. ADDITIONALLY, IT SHOULD BE NOTED THAT FINDINGS AND RECOMMENDATIONS FOR CLEARANCE OR FURTHER TESTING CANNOT BE CONSIDERED FINAL UNTIL CONCURRENCE IS RECEIVED FROM THE STATE HISTORICAL PRESERVATION OFFICER PHONE: OFFICE OF PROJECT PLANNING - (515)239-1225; OFFICE OF LOCAL SYSTEMS - (515)239-1528.  
THE CONTRACTOR IS TO CONTACT ALL UTILITY COMPANIES WHO HAVE LINES, CONDUITS OR OTHER FACILITIES WITHIN THE WORK AREA, BEFORE STARTING CONSTRUCTION.  
SEEDING, FERTILIZING, AND MULCHING OF ALL DISTURBED AREAS SHALL BE DONE FOLLOWING THE COMPLETION OF WORK ON THIS PROJECT AS PER ARTICLE 2601.04 FOR RURAL AREAS.  
THE PREPARATION OF THE SEEDBED, FURNISHING AND APPLICATION OF SEED AND FERTILIZER TO ALL DISTURBED AREAS ON THIS PROJECT SHALL BE CONSIDERED INCIDENTAL TO WORK ON THIS PROJECT, AND NO EXTRA COMPENSATION WILL BE ALLOWED.  
THE CONTRACTOR IS TO VISIT THE SITE TO ENSURE THAT HE IS FAMILIAR WITH THE EXISTING SITE CONDITIONS. UTILITIES ARE INDICATED ON THE DRAWINGS TO PROVIDE GENERAL LOCATION INFORMATION ONLY. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. SHOULD ANY UNDERGROUND UTILITIES BE FOUND DIFFERENT THAN SHOWN ON DRAWINGS, THEY SHALL BE PROTECTED IN PLACE AND THE ENGINEER SHALL BE IMMEDIATELY NOTIFIED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

## LOCATION

CRAWFORD COUNTY  
T-84N, R-41W  
SECTION 19  
CHARTER OAK TOWNSHIP  
ON MIDDLE SOLDIER RIVER

## HYDRAULIC DATA

DRAINAGE AREA = 21.3 SQ. MI.  
DESIGN DISCHARGE = 5200 C.F.S.  
DESIGN HIGH WATER EL. = 1193.6  
MANNINGS SLOPE = 0.00222 FT./FT.  
WATERWAY AREA = 574 SQ. FT.  
DESIGN VELOCITY = 9.1 F.P.S.  
Q25 = 4300 C.F.S. STAGE EL. = 1192.6  
Q50 = 5200 C.F.S. STAGE EL. = 1193.6 (DESIGN)  
Q100 = 6250 C.F.S. STAGE EL. = 1194.6  
Q500 = 8400 C.F.S. STAGE EL. = 1196.5  
EXT. H.W. EL. = UNKNOWN

## STREAM STABILIZATION STRUCTURES

## SITUATION PLAN

CRAWFORD COUNTY

IOWA  
SHEET 2 OF 5



CALHOUN-BURNS & ASSOCIATES, INC. CONSULTING ENGINEERS  
WEST DES MOINES, IOWA 50265

JOB NO. 92143

DESIGNED BY: R.V.  
DRAWN BY: E.A.L.  
CHECKED BY: J.S.R.

DESIGN NO.

CRAWFORD COUNTY

FILE NO.



WEIR NOTES

ENGINEERING FABRIC INSTALLATION SEQUENCE DOWNSTREAM FROM WEIR SHALL BE AS FOLLOWS:

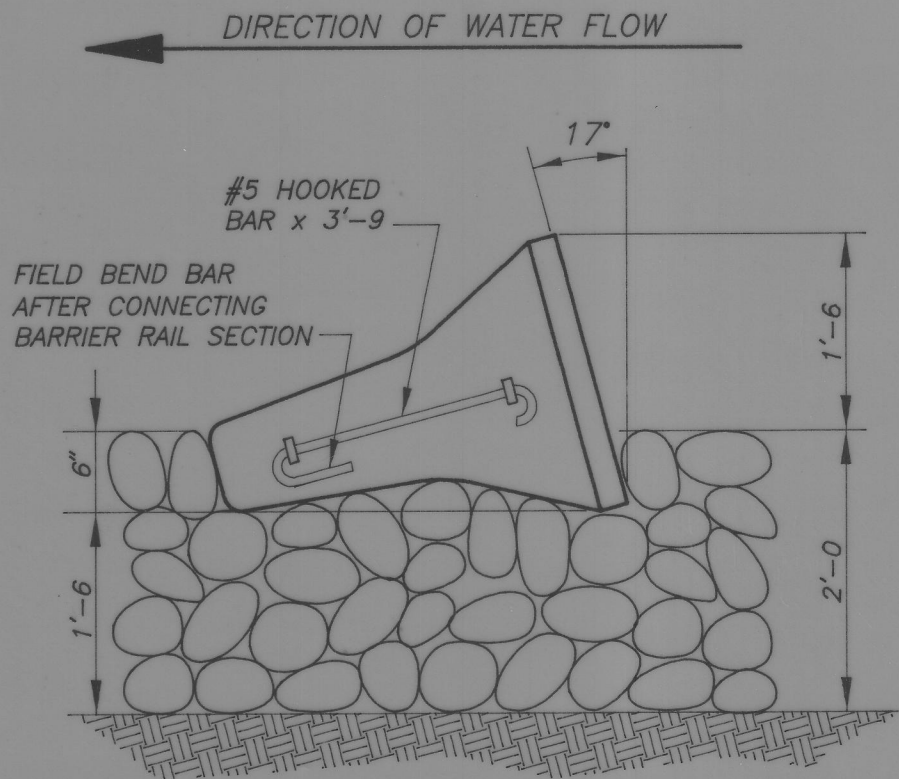
- EXCAVATE TRENCH BELOW HP10x42 WALE.
  - PLACE ENGINEERING FABRIC, BEGINNING AT DOWNSTREAM END OF TRENCH, ROLLING FABRIC UP THE FACE OF THE SHEET PILE WALL. ROLL A SUFFICIENT AMOUNT OF FABRIC FREE TO FACILITATE RIP-RAP PLACEMENT WITHIN TRENCH. PLACE RIP-RAP IN THE TRENCH TO LEVELS SHOWN AND COVER WITH FABRIC. ENGINEERING FABRIC SHALL CONFORM TO I.D.O.T. MATERIALS I.M. 496.01.
  - PLACE REMAINDER OF FABRIC AND COVER WITH RIP-RAP.
- ENGINEERING FABRIC SHALL BE LAPPED 3'-0" MINIMUM IN DIRECTION SHOWN.

STEEL SHEET PILE SECTION SHOWN IS A MINIMUM SIZE AND MAY BE SALVAGED MATERIAL; OTHER SHEET PILE SIZES MAY BE SUBSTITUTED WITH COUNTY ENGINEER'S APPROVAL. ALL SALVAGED MATERIAL SHALL BE APPROVED BY THE ENGINEER PRIOR TO INCORPORATION INTO THE PROJECT. THE WEIR SHEET PILE WALL SHALL CARRY A MOMENT OF 200,000 IN.-LBS./FT. AT A STRESS NOT EXCEEDING .65 FY. MINIMUM SHEET PILE THICKNESS IS 3/8 INCH, MINIMUM SECTION MODULUS WILL BE 8.0 CUBIC INCHES PER FOOT OF WALL USING FY = 38,500 PSI (REGULAR CARBON GRADE STEEL). THE HP10x42 WALE IS A MINIMUM SIZE, ASSUMING SALVAGED MATERIAL, FY = 33,000 PSI. SHEET PILE SHALL BE DRIVEN TO FULL PENETRATION WHERE PRACTICABLE.

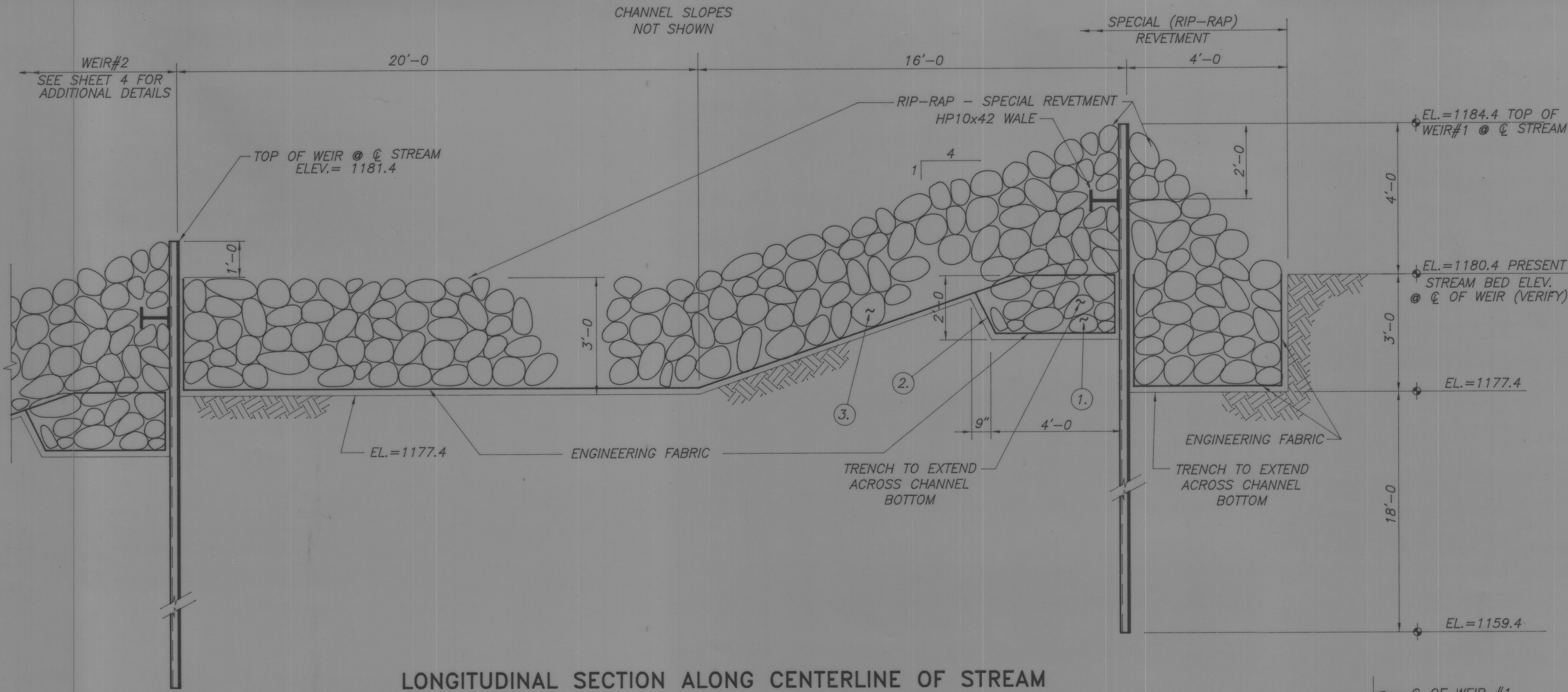
ALL EXCAVATION FOR RIP-RAP WEIR INSTALLATION SHALL BE PAID FOR AS CLASS 10, CHANNEL, EXCAVATION.

THE STEEL SHEET PILE WEIR AND RIP-RAP STILLING BASIN ARE DESIGNED AND CONSTRUCTED AS A RESEARCH PROJECT IN CONNECTION WITH EFFORTS TO DEVELOP ECONOMICAL STREAM STABILIZATION FACILITY WHICH PROVIDES A DEGREE OF PROTECTION AND EXTENSION OF EXPECTED LIFE OF BRIDGE STRUCTURES LOCATED IN CLOSE PROXIMITY OF THE FACILITY.

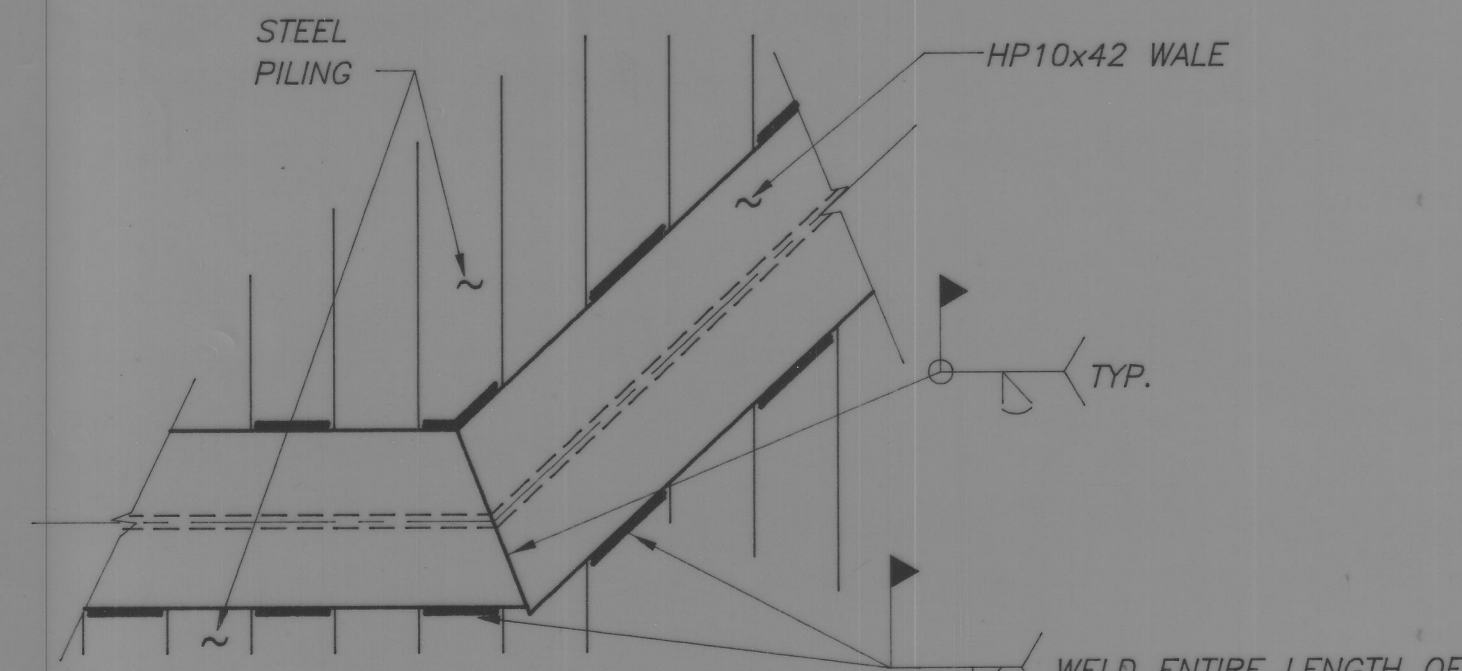
DESIGN TECHNIQUES AND PRINCIPLES USED TO DESIGN THIS PROJECT ARE THOSE GENERALLY ACCEPTED IN THE ENGINEERING PROFESSION, OR REPRESENT THE GENERALLY ACCEPTED EFFORTS OF A COMPETENT ENGINEER. THESE TECHNIQUES AND PRINCIPLES, AND THEIR ASSOCIATED DESIGN CODES, INCLUDE ACCEPTABLE AMOUNTS OF MOVEMENT, DEFLECTION, SETTLEMENT, DEVIATION, CRACKING, BENDING, AND DETERIORATION OVER TIME, AS THE INTENDED LEVEL OF PERFORMANCE OF THE FACILITY.



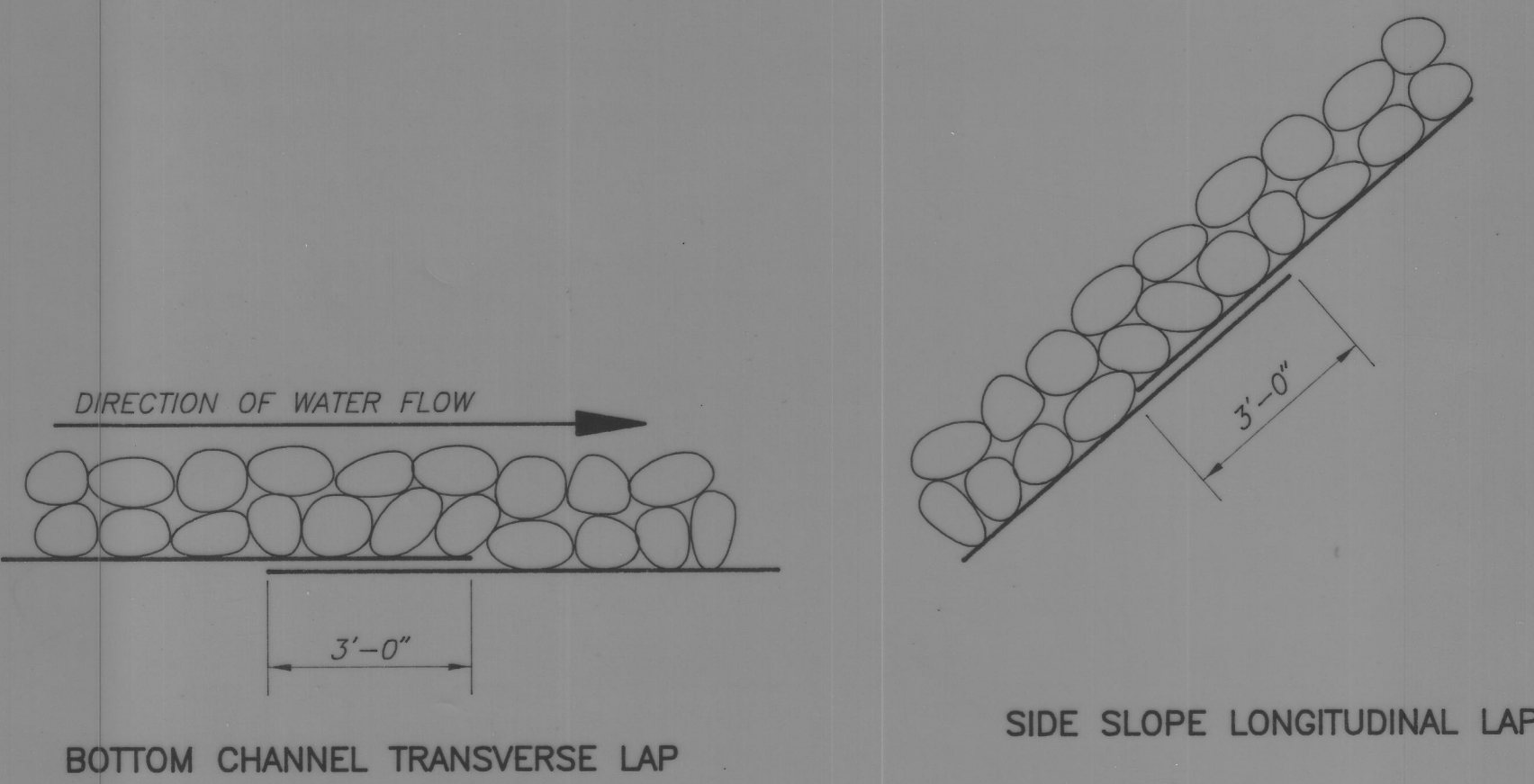
SECTION A-A  
CONCRETE BARRIER RAIL BAFFLES



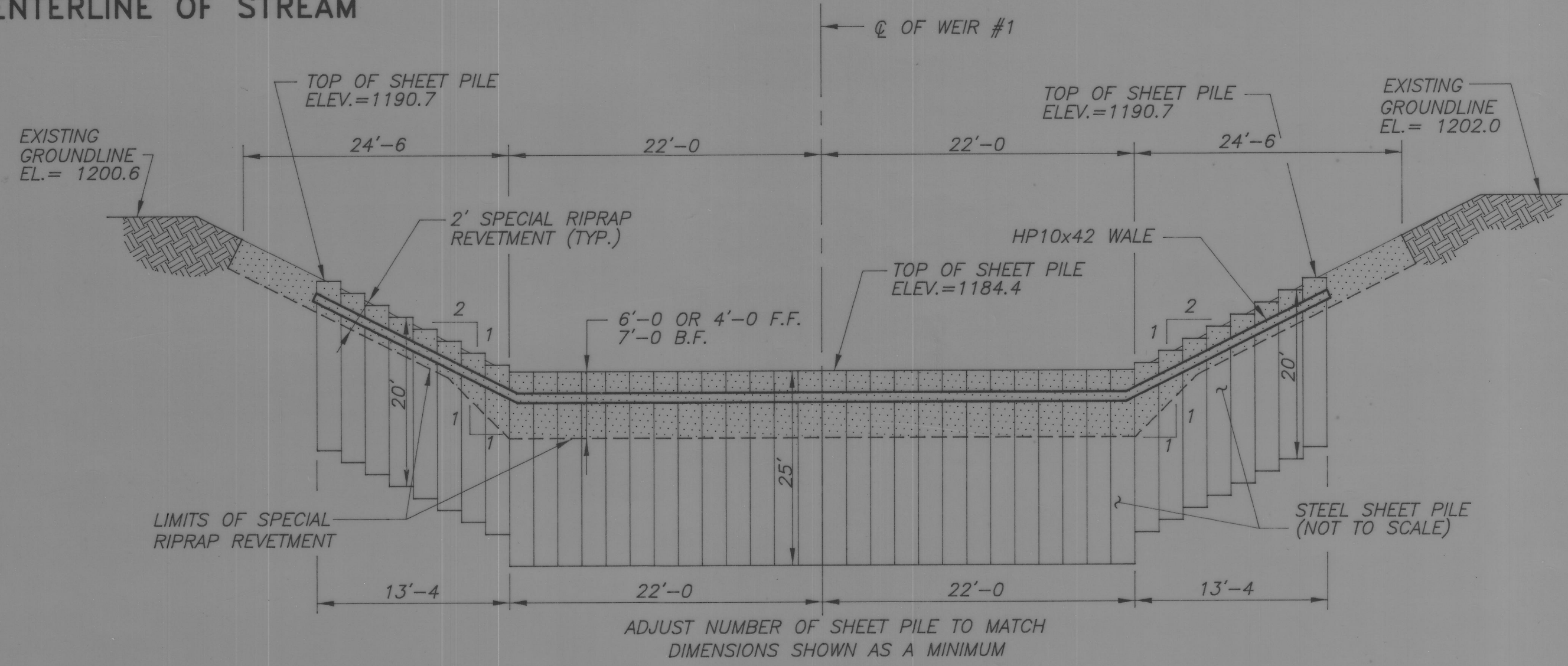
LONGITUDINAL SECTION ALONG CENTERLINE OF STREAM



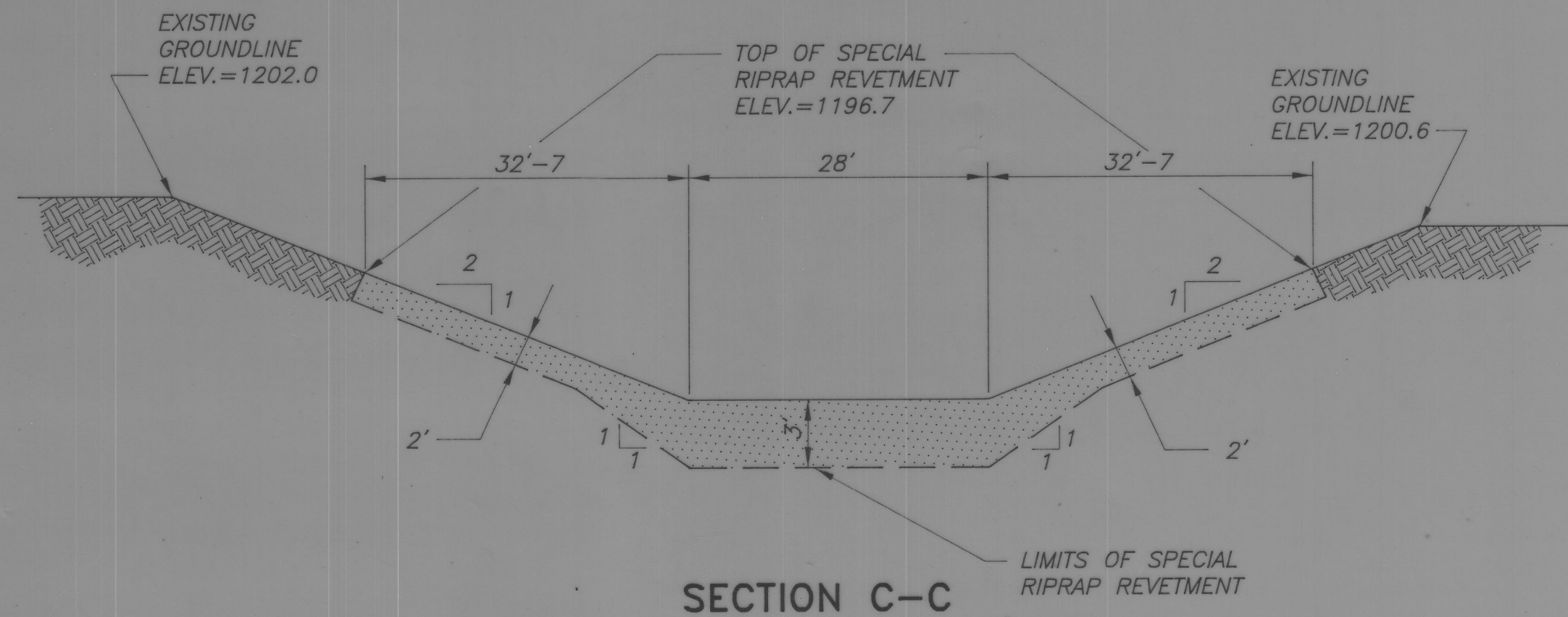
TYPICAL SPLICE DETAIL



TYPICAL ENGINEERING FABRIC LAP DETAILS



SECTION B-B



SECTION C-C

RIPRAP NOTES

SPECIAL (RIP-RAP) REVETMENT AROUND WEIR AS SHOWN ON THE PLANS SHALL COMPLY WITH SECTION 2507 OF STANDARD SPECIFICATIONS, 1992 AND THE FOLLOWING:

STONE WT., POUNDS	MINIMUM % LARGER THAN
1500	0
700	20
400	50
70	80

NO MORE THAN 5% PASSING THE 1/2" SIEVE.

SPECIAL (RIP-RAP) REVETMENT SHALL COMPLY WITH DURABILITY AND FREEZE AND THAW REQUIREMENTS AS PER SECTION 4130.01 FOR CLASS "E" REVETMENT, METHOD A, WITH UP TO 25% VARIANCE.

THE CONTRACTOR WILL ENCOUNTER LOESS SOILS ON THIS PROJECT. LOESS IS A FINE GRAINED, SILTY SOIL HAVING CHARACTERISTICS OF LOW DENSITY AND HIGH PERMEABILITY. IF SATURATED, THE SOIL WILL LOSE ITS STRENGTH (COHESIVENESS) DRAMATICALLY. SATURATED OR NEAR SATURATED LOESS IS VERY WEAK AND WILL CAUSE FOUNDATION STABILITY PROBLEMS FOR STREAM BANKS AND EQUIPMENT. WHEN THIS CONDITION EXISTS THE CONTRACTOR SHALL NOT WORK. IT IS THE INTENT OF THESE PLANS FOR CONSTRUCTION TO BE PERFORMED DURING RELATIVELY DRY WEATHER CONDITIONS. THE ENGINEER SHALL, IN CONSULTATION WITH THE CONTRACTOR, MAKE A DETERMINATION REGARDING AN EXTENSION OF THE CONTRACT PERIOD, SHOULD SATURATED SOIL CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION OF THE PROJECT.

STREAM STABILIZATION STRUCTURE

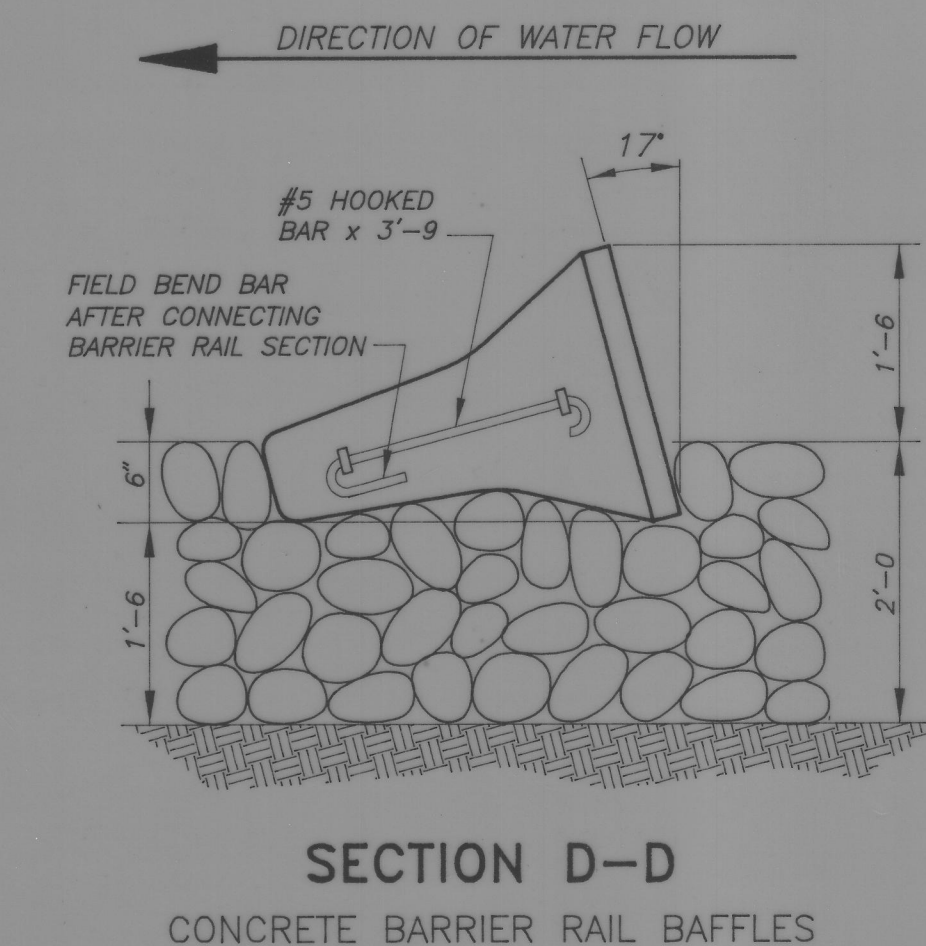
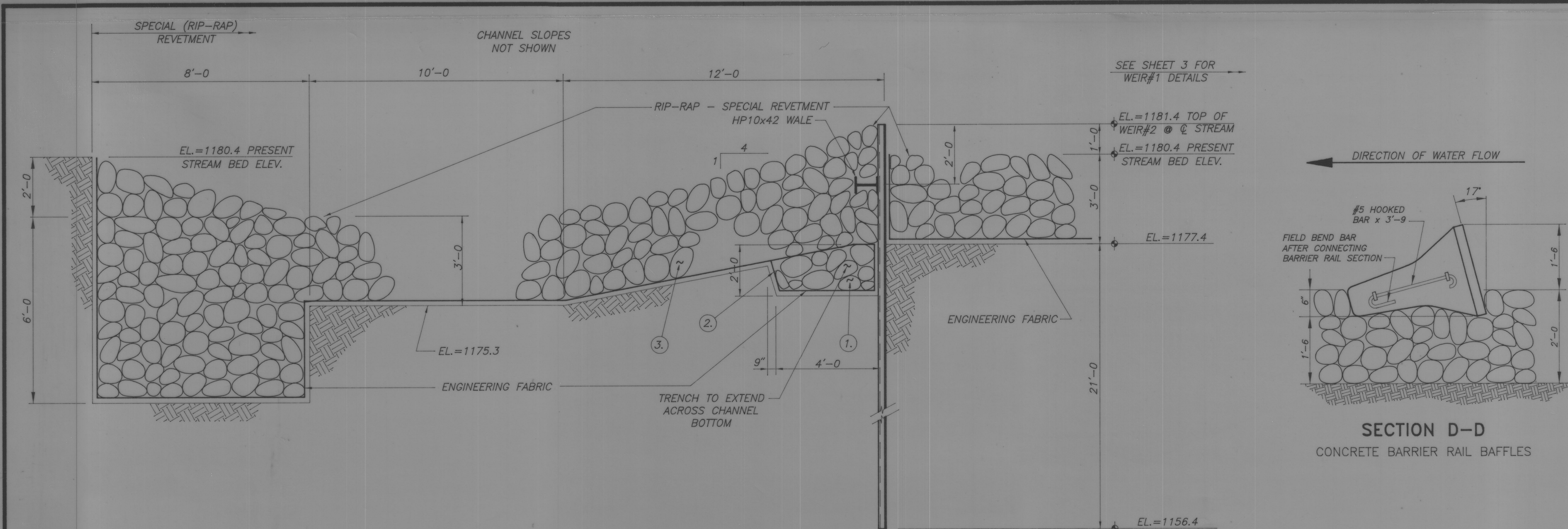
WEIR #1 DETAILS

CRAWFORD COUNTY

IOWA

SHEET 3 OF 5





BENCH MARK: "X" IN CENTER ABUTMENT @ N.W. CORNER. ELEV.= 1207.22

## WEIR NOTES

ENGINEERING FABRIC INSTALLATION SEQUENCE DOWNSTREAM FROM WEIR SHALL BE AS FOLLOWS:

- EXCAVATE TRENCH BELOW HP10x42 WALE.
- PLACE ENGINEERING FABRIC, BEGINNING AT DOWNSTREAM END OF TRENCH, ROLL A SUFFICIENT AMOUNT OF FABRIC FREE TO FACILITATE RIP-RAP PLACEMENT WITHIN TRENCH. PLACE RIP-RAP IN THE TRENCH TO LEVELS SHOWN AND COVER WITH FABRIC. ENGINEERING FABRIC SHALL CONFORM TO I.D.O.T. MATERIALS I.M. 496.01.
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ALL EXCAVATION FOR RIP-RAP WEIR INSTALLATION SHALL BE PAID FOR AS CLASS 10, CHANNEL, EXCAVATION.

THE STEEL SHEET PILE WEIR AND RIP-RAP STILLING BASIN ARE DESIGNED AND CONSTRUCTED AS A RESEARCH PROJECT IN CONNECTION WITH EFFORTS TO DEVELOP ECONOMICAL STREAM STABILIZATION FACILITY WHICH PROVIDES A DEGREE OF PROTECTION AND EXTENSION OF EXPECTED LIFE OF BRIDGE STRUCTURES LOCATED IN CLOSE PROXIMITY OF THE FACILITY.

DESIGN TECHNIQUES AND PRINCIPLES USED TO DESIGN THIS PROJECT ARE THOSE GENERALLY ACCEPTED IN THE ENGINEERING PROFESSION, OR REPRESENT THE GENERALLY ACCEPTED EFFORTS OF A COMPETENT ENGINEER. THESE TECHNIQUES AND PRINCIPLES, AND THEIR ASSOCIATED DESIGN CODES, INCLUDE ACCEPTABLE AMOUNTS OF MOVEMENT, DEFLECTION, SETTLEMENT, DEVIATION, CRACKING, BENDING, AND DETERIORATION OVER TIME, AS THE INTENDED LEVEL OF PERFORMANCE OF THE FACILITY.

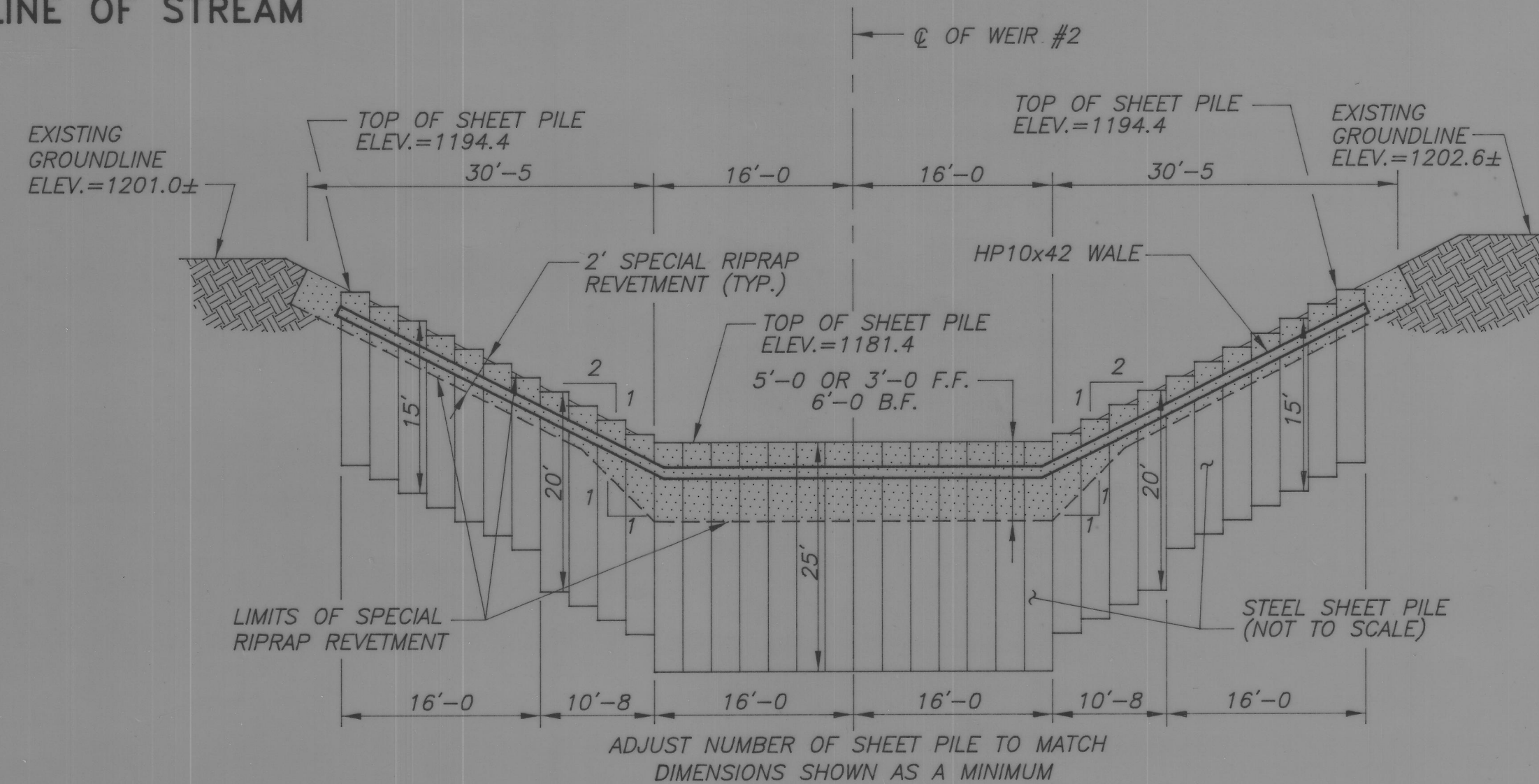
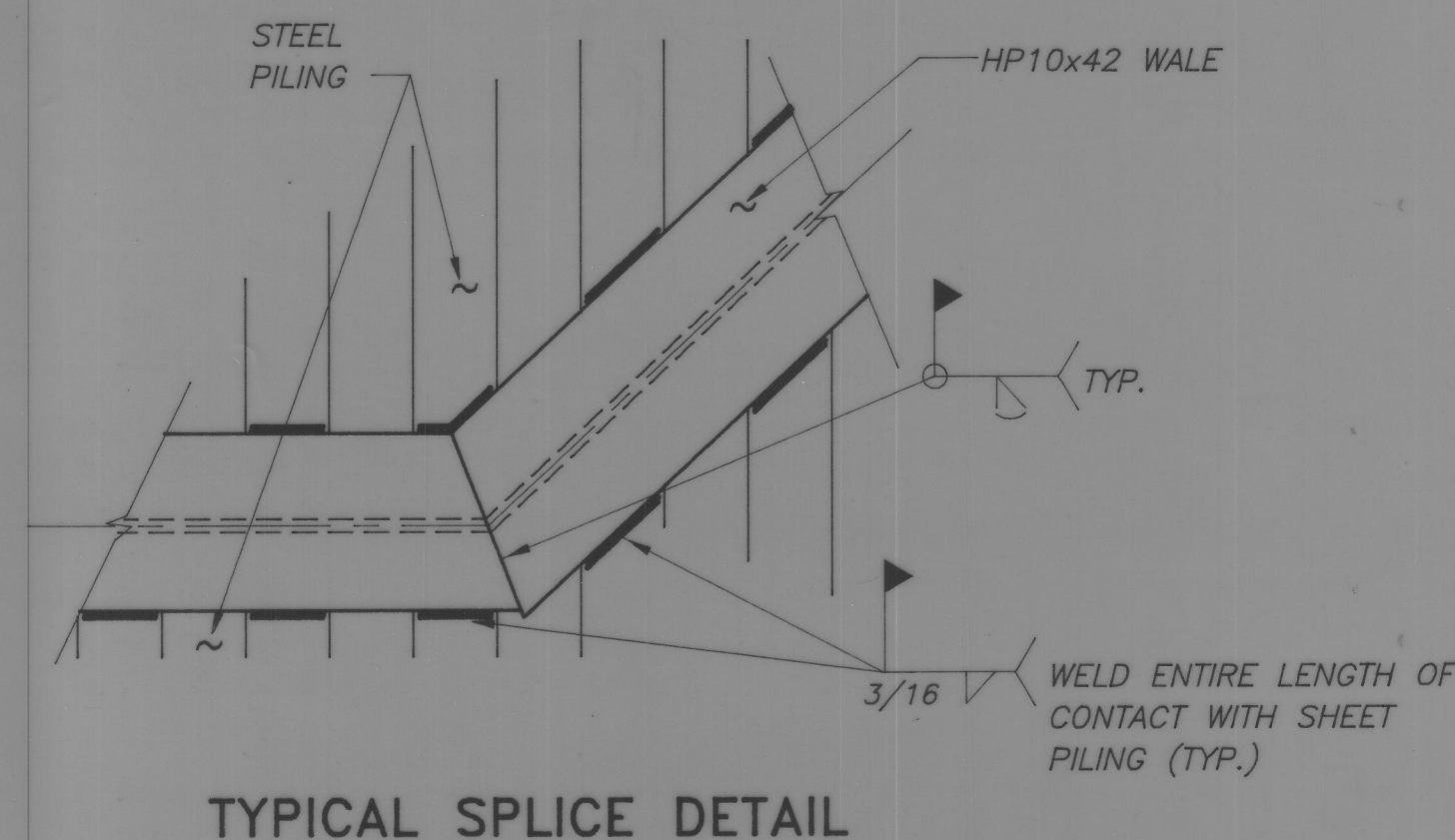
## RIPRAP NOTES

SPECIAL (RIP-RAP) REVETMENT AROUND WEIR AS SHOWN ON THE PLANS SHALL COMPLY WITH SECTION 2507 OF STANDARD SPECIFICATIONS, 1992 AND THE FOLLOWING:

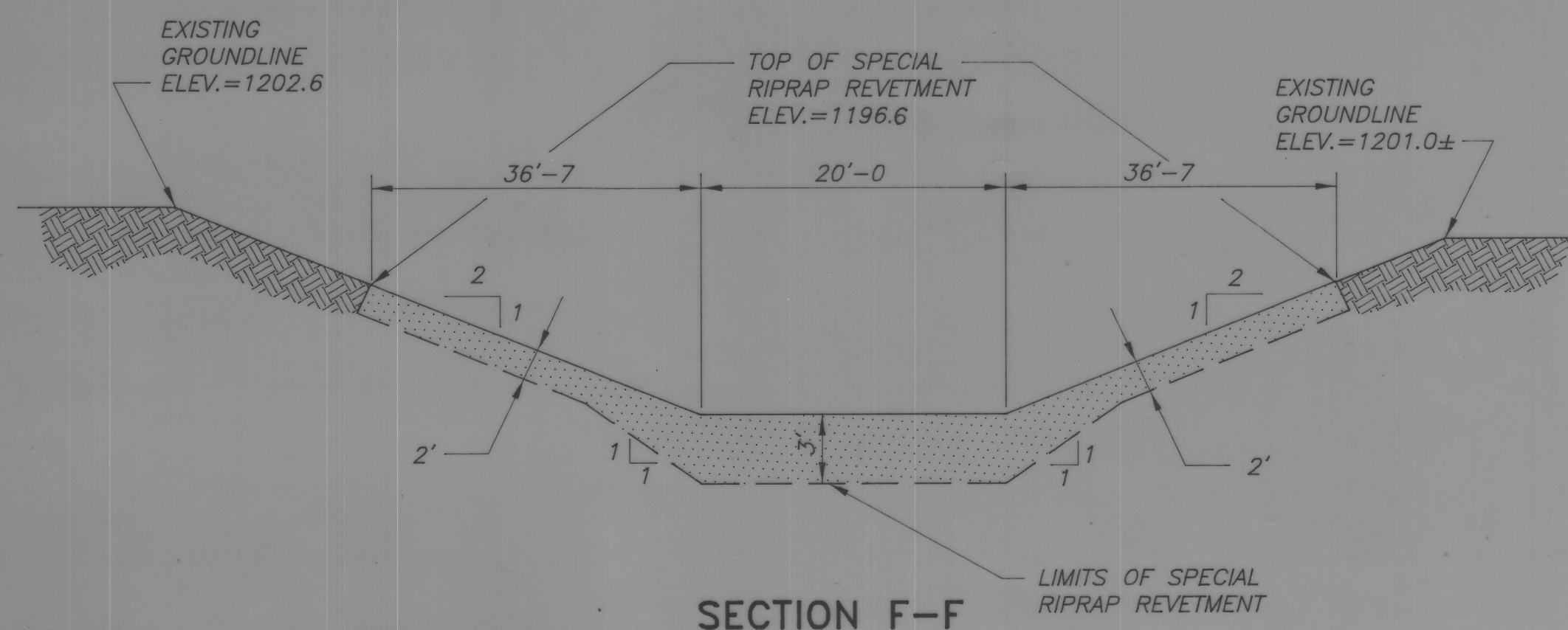
STONE WT., POUNDS	MINIMUM % LARGER THAN
1500	0
700	20
400	50
70	80

NO MORE THAN 5% PASSING THE 1/2" SIEVE.

SPECIAL (RIP-RAP) REVETMENT SHALL COMPLY WITH DURABILITY AND FREEZE AND THAW REQUIREMENTS AS PER SECTION 4130.01 FOR CLASS "E" REVETMENT, METHOD A, WITH UP TO 25% VARIANCE.



## SECTION E-E



## SECTION F-F

## STREAM STABILIZATION STRUCTURE

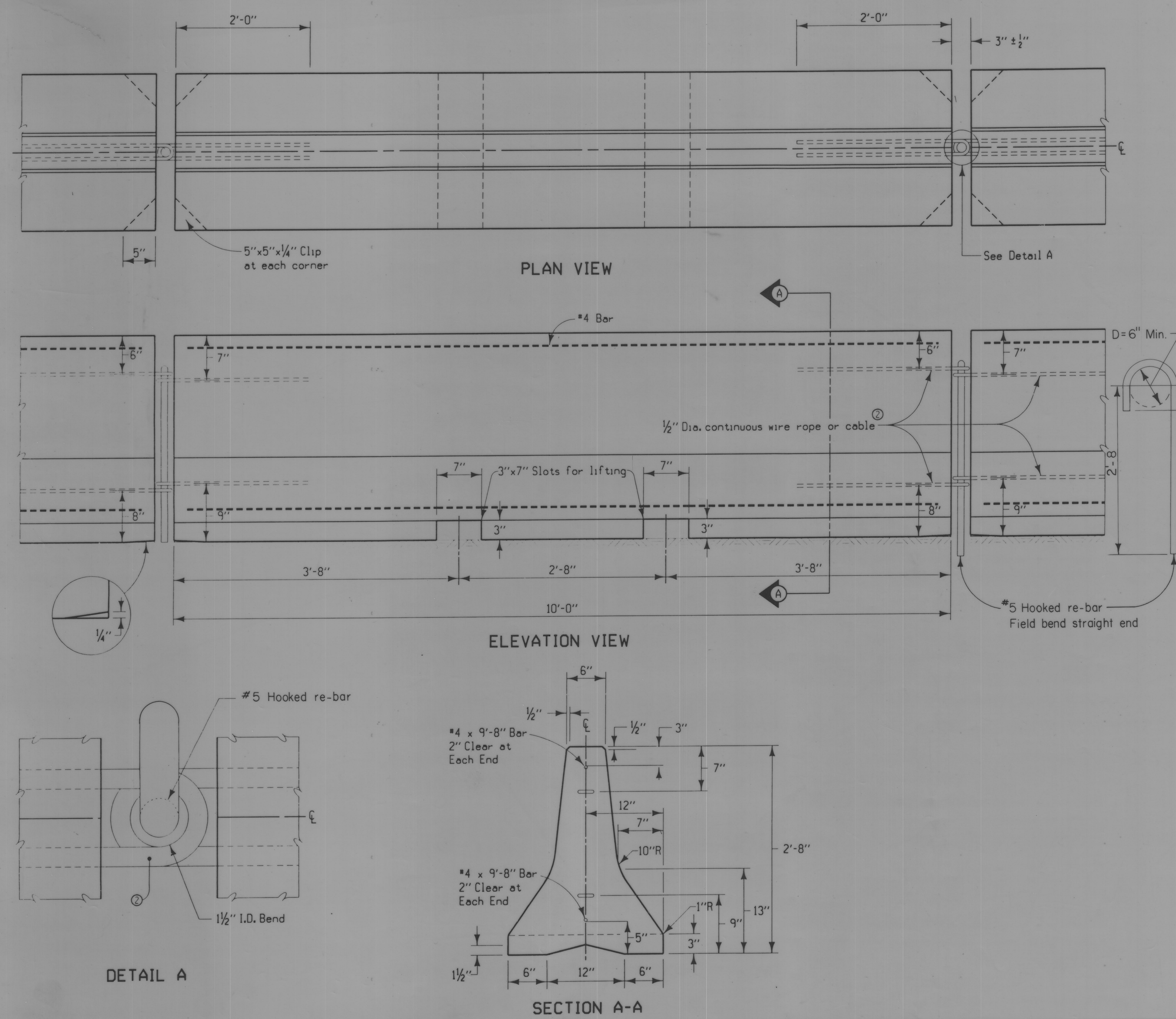
## WEIR#2 DETAILS

CRAWFORD COUNTY

IOWA  
SHEET 4 OF 5



WSS-1478 (Rev. 1/10/02) POTTAWATTAMIE COUNTY, IOWA (3) PS-20



**GENERAL NOTES:**

The details hereon are for the fabrication and installation of temporary concrete barrier rail. The barrier shall be Class "D" structural concrete and finished in conformance with current specifications.

Details shown are typical. Alternate design details may be submitted to the engineer for approval.

\* The contractor shall provide for an approved monitoring schedule with a person on call and available 24 hours a day, each day of the week, to realign barrier rail which has been struck. Initiation of service shall be within one hour of notification of need.

\* Markers shall be furnished and installed by the contractor. Markers shall be placed on the barrier as recommended by the manufacturer, and as shown in the Marker Placement Detail or as directed by the engineer. The markers shall be installed at 10 ft. spacing and face oncoming traffic. Refer to Details of Barrier Placement. The contractor shall maintain the markers and promptly repair or replace any damaged or missing units. All costs for furnishing, installing and maintaining markers shall be included in the price bid for the temporary barrier rail.

\* Unless stated otherwise in the plans, the barrier rail sections shall remain the property of the contractor and at the completion of the work shall be removed from the site by him.

When Temporary Barrier Rail is installed within 2 feet of a drop-off, tie downs as described and shown on Detail Sheet 540-10 shall be required.

The price bid for "Temporary Barrier Rails Furnish Only" in linear feet shall be full compensation for furnishing temporary barrier rail as detailed and measured on this sheet.

Δ The price bid for "Temporary Barrier Rails, Place Only" in linear feet of Barrier Rail shall be full compensation for placing temporary barrier rail as detailed on this sheet and elsewhere in the plan.

Contractor may add extra reinforcing bars to increase the service life of the rail sections.

① Color same as adjacent edgeline.

② Wire rope or cable to be 1/2" diameter, with a minimum breaking strength of 20,000 pounds.

\* NOTES INDICATED SHALL NOT APPLY TO THIS PROJECT, BARRIER RAIL SECTIONS SHALL BE INCORPORATED INTO THE PROJECT AND SHALL BECOME THE PROPERTY OF POTTAWATTAMIE COUNTY. TEMPORARY BARRIER RAILS MAY BE NEW OR USED BUT UNDEGRADED SECTIONS.

Δ PRICE BID FOR "TEMPORARY BARRIER RAILS, PLACE ONLY" SHALL BE FULL COMPENSATION FOR EXCAVATION, TIE BARS AND ALL LABOR FOR PLACEMENT OF THE RAIL SECTIONS SHOWN ON SHEET 2.

**TEMPORARY BARRIER RAIL DETAILS**

CRAWFORD COUNTY

IOWA