

8241-28

STREAM CHANNEL STABILIZATION STRUCTURE

LHC21-28

CRAWFORD COUNTY

CRAWFORD COUNTY

LETTING DATE
7/1/2008

TRAFFIC CONTROL PLAN

THIS ROAD WILL BE OPEN TO THROUGH TRAFFIC DURING CONSTRUCTION. LOCAL TRAFFIC TO ADJACENT PROPERTIES WILL BE MAINTAINED AS PROVIDED FOR IN ARTICLE 1107.08 OF THE CURRENT STANDARD SPECIFICATIONS. TRAFFIC CONTROL DEVICES, PROCEDURES, LAYOUTS, SIGNING, AND PAVEMENT MARKINGS INSTALLED WITHIN THE LIMITS OF THIS PROJECT SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, AS ADOPTED BY THE DEPARTMENT PER 761 OF THE IOWA ADMINISTRATIVE CODE (IAC), CHAPTER 130."

PERMITS

THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF U.S. ARMY CORPS OF ENGINEERS' NATIONWIDE PERMIT _____. PERMIT NO. _____ A COPY OF THIS PERMIT IS AVAILABLE FROM THE CRAWFORD COUNTY ENGINEER'S OFFICE UPON REQUEST. THE U.S. ARMY CORPS OF ENGINEERS RESERVES THE RIGHT TO VISIT THE SITE WITHOUT PRIOR NOTICE.

DRAWING APPROVAL

ALL SHOP DRAWINGS THAT REQUIRE APPROVAL SHALL BE APPROVED BY SUNDQUIST ENGINEERING, P.C.

ADDRESS: 120 SOUTH MAIN, P.O. BOX 220
DENISON, IOWA 51442-0220
TELEPHONE: (712)263-8118

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



Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

SECONDARY ROAD SYSTEM CRAWFORD COUNTY

PROJECT NO. LHC21-28

STREAM CHANNEL STABILIZATION STRUCTURE

OFF COUNTY ROAD E5L (O'Banion Rd)

UNNAMED TRIBUTARY TO BOYER RIVER

IN COOPERATION WITH LOESS HILLS DEVELOPMENT AND
CONSERVATION AUTHORITY - HUNGRY CANYONS ALLIANCE
AND THE U.S.D.A. NATURAL RESOURCES CONSERVATION SERVICE

SCALES: As Noted

The Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, plus General Supplemental Specifications; and applicable Supplemental Specifications, Developmental Specifications, and Special Provisions, shall apply to construction on this project.

TOTAL SHEETS
13

PROJECT NUMBER

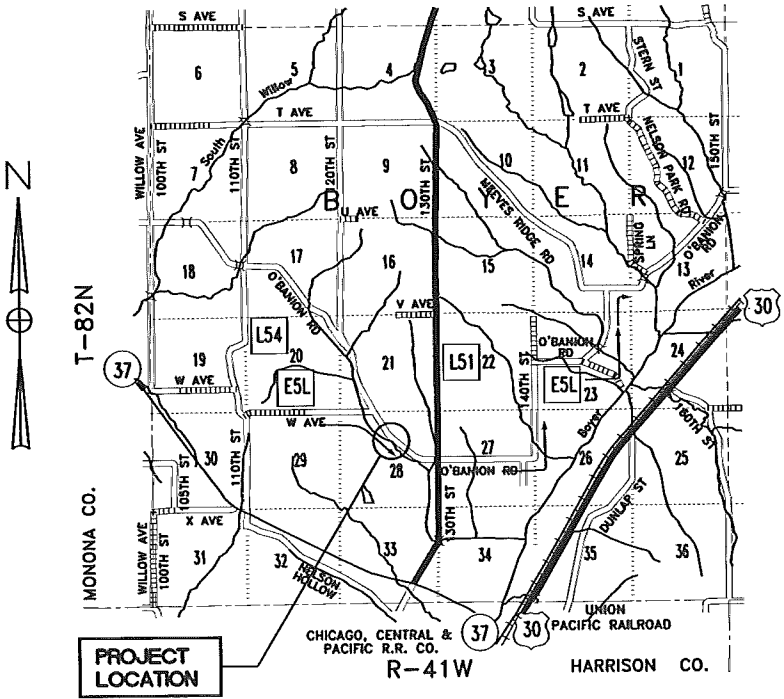
LHC21-28

R.O.W. PROJECT NUMBER

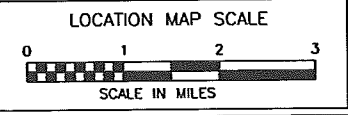
PROJECT IDENTIFICATION NUMBER

INDEX OF SHEETS

NO.	DESCRIPTION
A1	TITLE SHEET
B1-2	ESTIMATED PROJECT QUANTITIES AND GENERAL INFORMATION
U1-2	DETAIL SHEETS
V1	SITUATION PLAN
W1-2	CROSS SECTIONS - ENTRANCE
Z1-5	CROSS SECTIONS - CHANNEL



SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS
HIGHWAYS • MUNICIPAL • MAPPING • SURVEYING
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442-0220
PHONE: (712)263-8118 FAX: (712)263-2181



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Call the toll-free number at least
48 hours
prior to ALL excavations in Iowa.

04-30-02	101-4
DESIGN DATA RURAL	
2004 AADT	70 V.P.D.
2028 AADT	120 V.P.D.
201X DHV	X V.P.H.
TRUCKS	X %
TOTAL	
DESIGN ESALs	

Approved
John P. Loefer
Mark J. Loefer
Steve Elmer
Robert Lohmann
David W. Mader
BOARD OF SUPERVISORS

Approved
Robert J. Loefer
CRAWFORD COUNTY ENGINEER
DATE 6/3/08

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.
Troy J. Groth 6/2/08
TROY J. GROTH, P.E. #14450 DATE
MY LICENSE RENEWAL DATE IS DECEMBER 31, 2009.
PAGES OR SHEETS COVERED BY THIS SEAL:
ALL SHEETS



ESTIMATE REFERENCE INFORMATION

DATA LISTED BELOW ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT CONSTITUTE A BASIS FOR ANY EXTRA WORK ORDERS.

1. SPECIAL BACKFILL

CRUSHED LESTONE OR CRUSHED CONCRETE SPECIAL BACKFILL MATERIAL SHALL MEET THE GRADATION REQUIREMENTS OF GRADATION NO. 3 OF THE AGGREGATE GRADATION TABLE REFERENCED IN SECTION 4109.

REMOVAL OF UNSUITABLE OR UNSTABLE SOIL AND PLACEMENT OF SPECIAL BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH ARTICLE 2402.04 OF THE STANDARD SPECIFICATIONS. NO ADJUSTMENT IN UNIT PRICE WILL BE ALLOWED FOR DEVIATION BETWEEN PLAN QUANTITY AND ACTUAL QUANTITY PLACED. A CONVERSION FACTOR OF 130 PCF WAS USED TO DETERMINE THE TOTAL WEIGHT OF SPECIAL BACKFILL MATERIAL REQUIRED.

2. EMBANKMENT-IN-PLACE

PLAN QUANTITY FOR EMBANKMENT-IN-PLACE INCLUDES FILL + 35% SHRINK.

TYPE "A" COMPACTION WILL BE REQUIRED. BORROW FROM SUITABLE CLASS 10 CHANNEL EXCAVATION ALLOWED. ADDITIONAL NECESSARY BORROW SHALL BE FURNISHED AND STOCKPILED AT THE PROJECT SITE BY THE OWNER. A PORTION OF THIS BORROW IS CURRENTLY STOCKPILED AT THE SITE. REMAINDER OF BORROW WILL BE STOCKPILED BY OWNER IN A TIMELY MANNER AS CONSTRUCTION PROGRESSES. CONTRACTOR IS ADVISED TO EXAMINE THE SITE OF THE PROPOSED IMPROVEMENTS TO FAMILIARIZE THEMSELVES WITH THE BORROW STOCKPILE AND ALL OTHER FACTORS AND CONDITIONS AFFECTING CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.

ALL AREAS TO RECEIVE NEW EMBANKMENT SHALL BE THOROUGHLY CLEANED OF ALL VEGETATION AND OTHER DEBRIS. EXISTING SURFACES SHALL BE PLOWED, STEPPED OR BENCHED PRIOR TO PLACEMENT OF NEW EMBANKMENT FILLS. SUCH WORK SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM.

FILL MATERIALS SHALL CONTAIN NO SOD, BRUSH, ROOTS OR OTHER PERISHABLE MATERIALS. FILL SHALL NOT BE PLACED UPON A FROZEN SURFACE, NOR SHALL SNOW, ICE OR FROZEN MATERIAL BE INCORPORATED IN THE FILL.

PAYMENT FOR THIS ITEM SHALL BE BASED ON PLAN QUANTITY.

3. EXCAVATION, CLASS 10, CHANNEL

QUANTITY INCLUDES EXCAVATION REQUIRED TO INSTALL THE SPECIAL REVETMENT AND SPECIAL BACKFILL. QUANTITY INCLUDES THE EXCAVATION REQUIRED TO TRANSITION PROPOSED CHANNEL SLOPES INTO EXISTING SLOPES WITHIN THE LIMITS SHOWN ON PLAN SHEET V1.

SUITABLE CLASS 10 CHANNEL EXCAVATION MAY BE USED FOR EMBANKMENT-IN-PLACE. EXCESS MATERIALS AND UNSUITABLE MATERIAL SHALL BE DISPOSED OF ON SITE AS DIRECTED BY THE ENGINEER. THE COST OF DISPOSING OF THIS MATERIAL SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR CLASS 10 CHANNEL EXCAVATION.

PAYMENT FOR THIS ITEM SHALL BE BASED ON PLAN QUANTITY.

4. GRANULAR MATERIAL FOR BLANKETS AND SUBDRAINS

INCLUDES 235 C.Y. OF POROUS BACKFILL MATERIAL FOR THE FOUNDATION DRAINAGE SYSTEM. MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 4131 OF THE STANDARD SPECIFICATIONS.

INCLUDES 4 C.Y. OF GRANULAR BEDDING MATERIAL BENEATH THE RIPRAP AT THE OUTLETS OF THE FOUNDATION DRAINAGE SYSTEM. MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 4122 AND THE GRADATION REQUIREMENTS OF GRADATION NO. 13 OF THE AGGREGATE GRADATION TABLE REFERENCED IN SECTION 4109.

EXCAVATION REQUIRED TO INSTALL POROUS BACKFILL AND GRANULAR BEDDING MATERIAL SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR THIS ITEM. ANY DAMAGE TO THE FOUNDATION SURFACE OR THE TRENCH SIDES OR BOTTOM OCCURRING DURING PLACEMENT OF DRAINFILL SHALL BE REPAIRED BEFORE DRAINFILL PLACEMENT IS CONTINUED.

THE UPPER SURFACE OF DRAINFILL CONSTRUCTED CONCURRENTLY WITH ADJACENT ZONES OF EARTHFILL SHALL BE MAINTAINED AT A MINIMUM ELEVATION OF 1 FOOT ABOVE THE UPPER SURFACE OF ADJACENT EARTHFILL.

AT THE CONTRACTOR'S OPTION, LONGITUDINAL SECTIONS OF THE FOUNDATION DRAIN MAY BE INSTALLED IN ACCORDANCE WITH THE OPTIONAL LONGITUDINAL FOUNDATION DRAIN DETAILED ON PLAN SHEET U2. ENGINEERING FABRIC REQUIRED FOR THIS METHOD OF FOUNDATION DRAIN INSTALLATION SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR THIS ITEM. ENGINEERING FABRIC FOR THIS PURPOSE SHALL CONFORM TO IOWA DOT MATERIALS IM 496.01 APPENDIX A, SUBSURFACE DRAINAGE (ARTICLE 4196.01, B).

5. REMOVAL OF EXISTING STRUCTURES

INCLUDES 72" X 40' BOILER PLATE PIPE AT STA 24+29.

6. ENGINEERING FABRIC

ITEM INCLUDES 249 S.Y. OF ENGINEERING FABRIC PLACED ON THE BOTTOM, SIDES AND ENDS OF THE SPECIAL BACKFILL. ENGINEERING FABRIC FOR THIS PURPOSE SHALL BE MIRAFI 500X, SI GEOSOLUTIONS GEOTEX 200 ST, CONTECH C-200, OR APPROVED EQUAL. REFER TO DETAILS ON PLAN SHEET U2.

ITEM INCLUDES 1548 S.Y. OF ENGINEERING FABRIC PLACED UNDER THE SPECIAL REVETMENT. SEE PLAN SHEET U1 - DETAILS OF PLACEMENT OF ENGINEERING FABRIC FOR INSTALLATION DETAILS. MATERIAL SHALL CONFORM TO IOWA DOT MATERIALS IM 496.01 APPENDIX A, EMBANKMENT EROSION CONTROL (ARTICLE 4196.01, C OF THE STANDARD SPECIFICATIONS).

MATERIAL SHALL BE JOINED BY OVER LAPPING A MINIMUM OF 18 INCHES. THE QUANTITY OF ENGINEERING FABRIC FOR WHICH PAYMENT WILL BE MADE, WHEN PLACED AS SHOWN IN THE CONTRACT DOCUMENTS, WILL BE THE QUANTITY SHOWN IN THE CONTRACT DOCUMENTS IN SQUARE YARDS. MATERIAL FOR LAPS IS NOT INCLUDED IN THE PLAN QUANTITY.

ESTIMATED PROJECT QUANTITIES

100-1A
07-15-97

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2102-0425070	SPECIAL BACKFILL	TON	102	
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	11881	
3	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	7347	
4	2107-3825025	GRANULAR MATERIAL FOR BLANKET AND SUBRAIN	CY	225	
5	2401-6745650	REMOVAL OF EXISTING STRUCTURES	LS	1	
6	2507-3250005	ENGINEERING FABRIC	SY	1797	
7	2507-4011100	CONCRETE GROUT FOR REVETMENT OR GABION	CY	198	
8	2507-6850053	REVETMENT, SPECIAL	TON	1301	
9	2507-6875002	REVETMENT, REMOVE AND REPLACE	CY	85	
10	2528-8445110	TRAFFIC CONTROL	LS	1	
11	2533-4980005	MOBILIZATION	LS	1	
12	2599-9999010	REMOVAL OF WATER	LS	1	

STANDARD ROAD PLANS

105-4
10-16-07

The following Standard Road Plans shall be considered applicable to construction work on this project.			
NUMBER	DATE	SHEETS	TITLE
TC-1	10-17-06	1	WORK NOT AFFECTING TRAFFIC

7. CONCRETE GROUT FOR REVETMENT OR GABION

GROUTING OPERATION SHALL NOT BE PERFORMED EXCEPT IN THE PRESENCE OF THE ENGINEER.

THE AVERAGE RATE OF GROUT APPLICATION SHALL BE 5.4 CUBIC FEET OF GROUT PER SQUARE YARD OF SURFACE AREA.

THE GROUT SHALL BE CONSOLIDATED INTO THE VOIDS WITH THE USE OF A CONCRETE VIBRATOR.

METHOD OF MEASUREMENT: THE ENGINEER WILL COMPUTE TO THE NEAREST 0.1 CUBIC YARD THE VOLUME OF CONCRETE GROUT FOR REVETMENT OR GABION FURNISHED AND ACCEPTABLY PLACED WITHIN THE SPECIFIED LIMITS, FROM THE NOMINAL VOLUME OF EACH BATCH AND A COUNT OF BATCHES. GROUT UNUSED OR WASTED, INCLUDING ANY PARTIAL BATCH REMAINING AT THE COMPLETION OF THE OPERATION, WILL BE ESTIMATED AND DEDUCTED BY THE ENGINEER. METHOD OF MEASUREMENT IN THE CURRENT STANDARD SPECIFICATIONS SHALL NOT APPLY.

8. REVETMENT, SPECIAL

SPECIAL REVETMENT SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATIONS SECTION 2507.03, CLASS B REVETMENT.

MATERIAL SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATIONS SECTION 4130 FOR CLASS B REVETMENT ON PRIMARY PROJECTS. PRIOR TO MATERIAL DELIVERY, CONTRACTOR SHALL PROVIDE CERTIFICATION THAT MATERIAL MEETS SAID SPECIFICATIONS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVAL OF ALL REMNANTS OF RIPRAP STOCKPILES FROM FARM FIELDS UTILIZED BY CONTRACTOR IN THE PROJECT AREA. THIS WORK WILL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR THIS ITEM.

MATERIAL FOR SPECIAL REVETMENT SHALL BE MEASURED IN TONS TO THE NEAREST 0.1 TONS. ONLY MATERIAL PLACED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS WILL BE MEASURED.

FOR THE QUANTITY OF REVETMENT FURNISHED AND PLACED, THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER TON.

9. REVETMENT, REMOVE AND REPLACE

ITEM INCLUDES REMOVING EXISTING REVETMENT TO THE EXTENT NECESSARY TO COMPLETE INSTALLATION OF THE PROPOSED IMPROVEMENTS AND IN ACCORDANCE WITH DETAILS SHOWN IN THE PLANS. REVETMENT SHALL BE REMOVED TO A DEPTH OF 1 FOOT BELOW THE PROPOSED SUBGRADE, STOCKPILED AND REPLACED ON THE PROPOSED CHANNEL SLOPES. REMOVAL AND DISPOSAL OF EXISTING ENGINEERING FABRIC SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM.

THE QUANTITY OF REVETMENT, REMOVE AND REPLACE FOR WHICH PAYMENT WILL BE MADE, WHEN PLACED AS SHOWN IN THE CONTRACT DOCUMENTS, WILL BE THE QUANTITY SHOWN IN THE CONTRACT DOCUMENTS IN CUBIC YARDS.

FOR REVETMENT, REMOVE AND REPLACE THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER CUBIC YARD. THIS PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR AND FOR PERFORMANCE OF ALL WORK NECESSARY FOR REMOVING AND STOCKPIILING THE EXISTING RIPRAP REVETMENT AND REPLACEMENT OF THE REVETMENT.

12. REMOVAL OF WATER

THIS ITEM CONSISTS OF DIVERTING SURFACE WATER AND DEWATERING THE SITE AS NEEDED FOR CONSTRUCTION. POLLUTION CONTROL SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM. DEWATERING OF SITE SHALL INCLUDE REMOVAL OF WATER FROM THE PROPOSED STILLING BASIN TO FACILITATE PLACEMENT OF ENGINEERING FABRIC, RIPRAP AND GROUT. PLACEMENT OF GROUT IN STANDING WATER SHALL NOT BE ALLOWED.

REFER TO PLAN SHEET U2 FOR ADDITIONAL REQUIREMENTS OF THIS ITEM.

ESTIMATED PROJECT QUANTITIES
AND GENERAL INFORMATION

REV: 1

SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS

HIGHWAYS • MUNICIPAL • MAPPING • SURVEYING
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442
PHONE: (712)263-8118 FAX: (712)263-2181

SE PROJECT NO. 08007

DATE: 03/08

DRAWN BY: DRD

REVIEWED BY: SAS

APPROVED BY: T.JG

CRAWFORD COUNTY PROJECT NO. LHC21-28

SHEET B1

GENERAL NOTES

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL NECESSARY ARRANGEMENTS WITH ADJACENT PROPERTY OCCUPANTS FOR RESTRAINING LIVESTOCK FROM ENTERING THE RIGHT-OF-WAY DURING CONSTRUCTION.

CONTRACTOR IS TO USE DUE CAUTION IN WORKING OVER AND AROUND ALL TILE LINES. BREAKS IN THE TILE LINE DUE TO THE CONTRACTOR'S CARELESSNESS ARE TO BE REPLACED AT HIS EXPENSE WITHOUT COST TO THE COUNTY. ANY TILE LINES BROKEN OR DISTURBED BY CUT LINES WILL BE REPLACED AS DIRECTED BY THE ENGINEER IN CHARGE OF CONSTRUCTION AND AT THE COUNTY'S EXPENSE.

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.

WHERE PUBLIC UTILITY FIXTURES ARE SHOWN AS EXISTING ON THE PLANS OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNERS OF THOSE UTILITIES PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. THE CONTRACTOR SHALL AFFORD ACCESS TO THESE FACILITIES FOR NECESSARY MODIFICATION OF SERVICES. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS, AND THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION AND TO AVOID DAMAGE THERETO. NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR ANY INTERFERENCE OR DELAY CAUSED BY SUCH WORK.

CONTRACTOR SHALL NOTIFY ONE-CALL (1-800-292-8989) FOR UTILITY LOCATES PRIOR TO COMMENCING WORK.

CONSTRUCTION STAKING WILL BE PROVIDED BY THE OWNER IN ACCORDANCE WITH ARTICLE 1105.06.

EQUIPMENT FOR HANDLING AND CONVEYING MATERIALS DURING CONSTRUCTION SHALL BE OPERATED TO PREVENT DUMPING OR SPILLING THE MATERIAL INTO WATERBODIES, STREAMS OR WETLANDS EXCEPT AS APPROVED HEREIN AND IN THE 404 PERMIT.

CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED DURING LOW TO NORMAL FLOWS. LOW TO NORMAL FLOWS SHALL BE DETERMINED IN CONSULTATION WITH THE PROJECT ENGINEER AND ARE DEFINED AS FLOWS AT OR BELOW THE ORDINARY HIGH WATER MARK. THE ORDINARY HIGH WATER MARK IS THAT LINE ON THE SHORE OF A STREAM OR WATERBODY ESTABLISHED BY THE FLUCTUATIONS OF WATER AND BEST INDICATED BY THE LINE IMPRESSED ON THE BANK CONTAINING VEGETATION ABOVE AND BARE SOIL BELOW.

THE PRIME CONTRACTOR SHALL EMPLOY CONTROLS TO REDUCE THE EROSION OF LAND ADJACENT TO SURFACE WATERS AND WETLANDS, INCLUDING ESTABLISHMENT AND MAINTENANCE OF EROSION CONTROL DURING AND AFTER CONSTRUCTION AND REVEGETATION OF ALL DISTURBED AREAS UPON PROJECT COMPLETION. THE PRIME CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF ALL EROSION CONTROL MEASURES.

CARE SHALL BE TAKEN TO PREVENT ANY PETROLEUM PRODUCTS, CHEMICALS, OR OTHER DELETERIOUS MATERIALS FROM ENTERING WATERBODIES, STREAMS OR WETLANDS.

ALL CONSTRUCTION DEBRIS SHALL BE DISPOSED OF AT AN UPLAND, NON-WETLAND LOCATION, IN SUCH A MANNER THAT IT CANNOT ENTER A WATERWAY OR WETLAND.

CONSTRUCTION EQUIPMENT, ACTIVITIES, AND MATERIALS SHALL BE KEPT OUT OF STREAMS AND WETLANDS TO THE MAXIMUM EXTENT POSSIBLE.

SEEDING WILL BE ACCOMPLISHED BY OTHERS.

04-15-08 213-1
IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE WASTE AREAS OR DISPOSAL SITES FOR EXCESS MATERIAL (EXCAVATED MATERIAL OR BROKEN CONCRETE) WHICH IS NOT DESIRABLE TO BE INCORPORATED INTO THE WORK INVOLVED ON THIS PROJECT.

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT AREAS (INCLUDING HAUL ROADS) SELECTED FOR WASTE OR DISPOSAL NOT IMPACT 1) CULTURALLY SENSITIVE SITES OR GRAVES OR 2) WETLANDS OR "WATERS OF THE U.S.", INCLUDING STREAMS OR STREAM BANKS BELOW THE "ORDINARY HIGH WATER MARK", WITHOUT AN APPROVED U.S. ARMY CORPS OF ENGINEERS SECTION 404 PERMIT.

NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES. NO MATERIAL SHALL BE PLACED WITHIN THE RIGHT-OF-WAY, UNLESS SPECIFICALLY STATED IN THE PLANS.

01-19-88 251-1
THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN ACCESS TO INDIVIDUAL PROPERTIES DURING CONSTRUCTION.

RELOCATED ACCESS SHALL BE COMPLETED TO INDIVIDUAL PROPERTIES PRIOR TO REMOVAL OF EXISTING ACCESS.

IF THE PERMANENT ACCESS CANNOT BE COMPLETED PRIOR TO REMOVAL OF THE EXISTING ACCESS, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN AN ALTERNATE ACCESS. TEMPORARY GRANULAR SURFACING WILL BE PAID FOR AS A CONTRACT ITEM OR BY EXTRA WORK.

ESTIMATED PROJECT QUANTITIES
AND GENERAL INFORMATION

REV.:



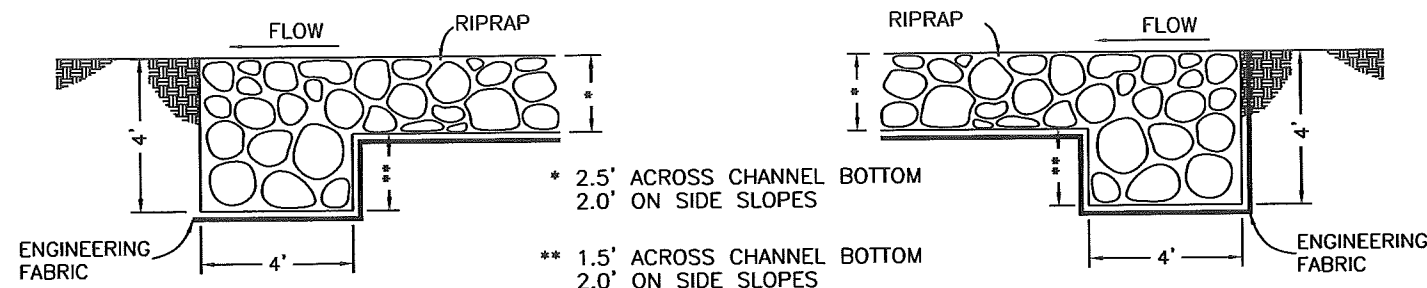
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SE PROJECT NO. 08007 DATE: 03/08 DRAWN BY: DRD REVIEWED BY: SAS APPROVED BY: TJG

CRAWFORD COUNTY PROJECT NO. LHC21-28

SHEET B2



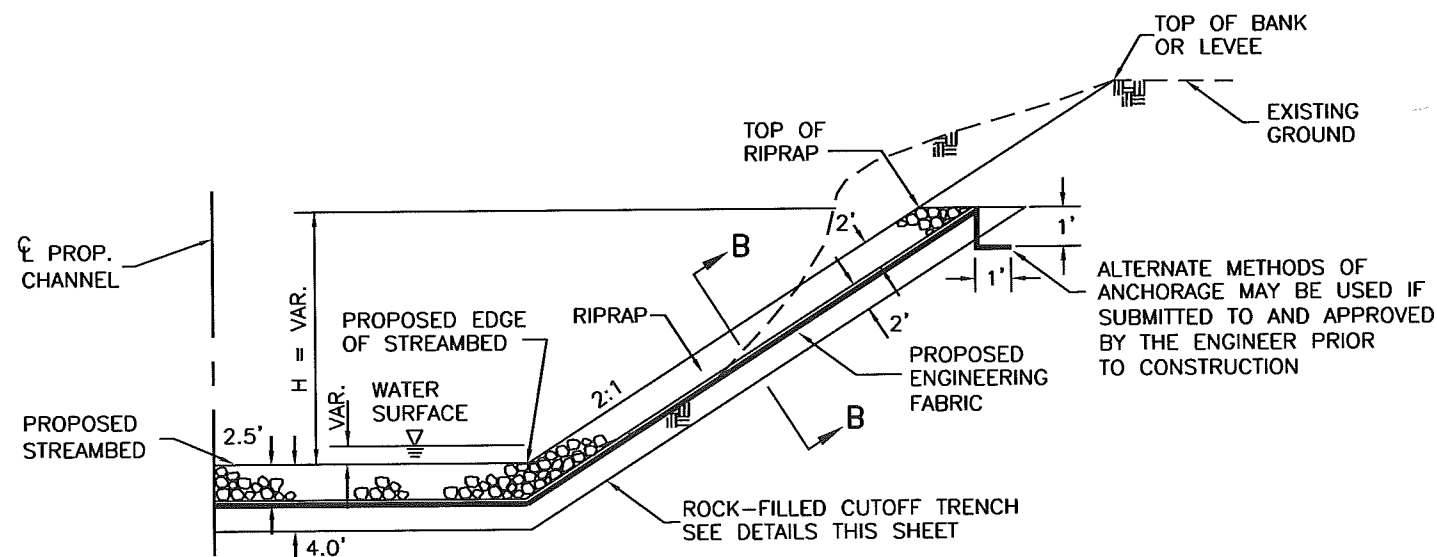
TYPICAL DOWNSTREAM

TYPICAL UPSTREAM

SECTION B-B

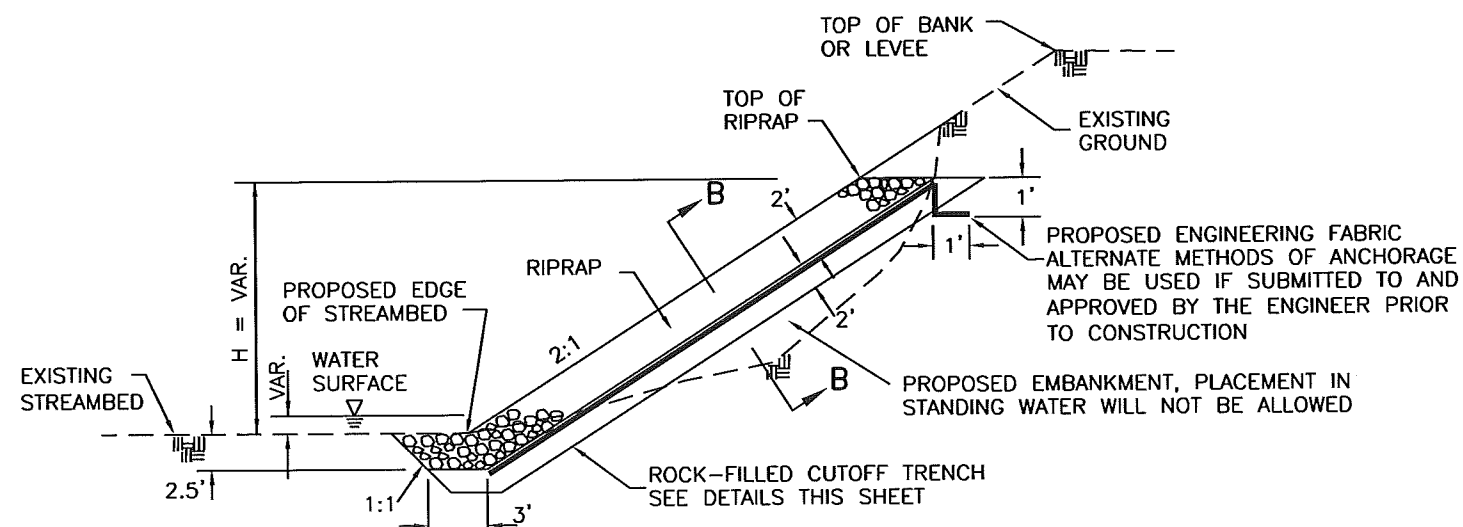
ROCK-FILLED CUTOFF TRENCH DETAILS

CONTINUOUS ACROSS BOTTOM WIDTH AND SIDE SLOPES
NO SCALE



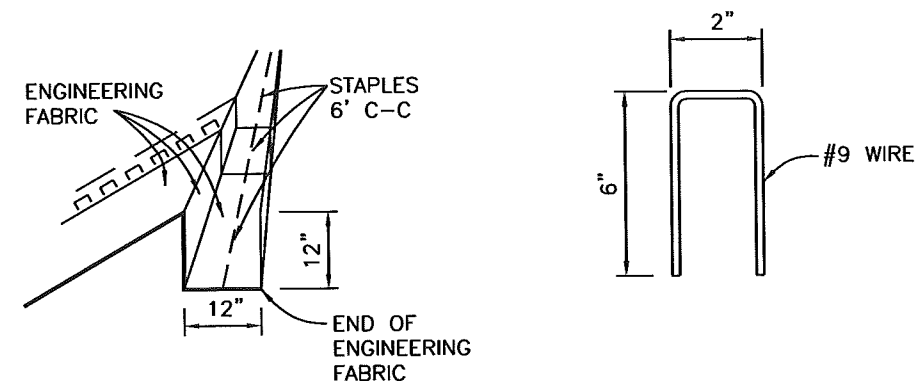
TYPICAL FULL-CHANNEL BANK STABILIZATION SECTION

NO SCALE
SEE CROSS SECTIONS FOR H DIMENSION



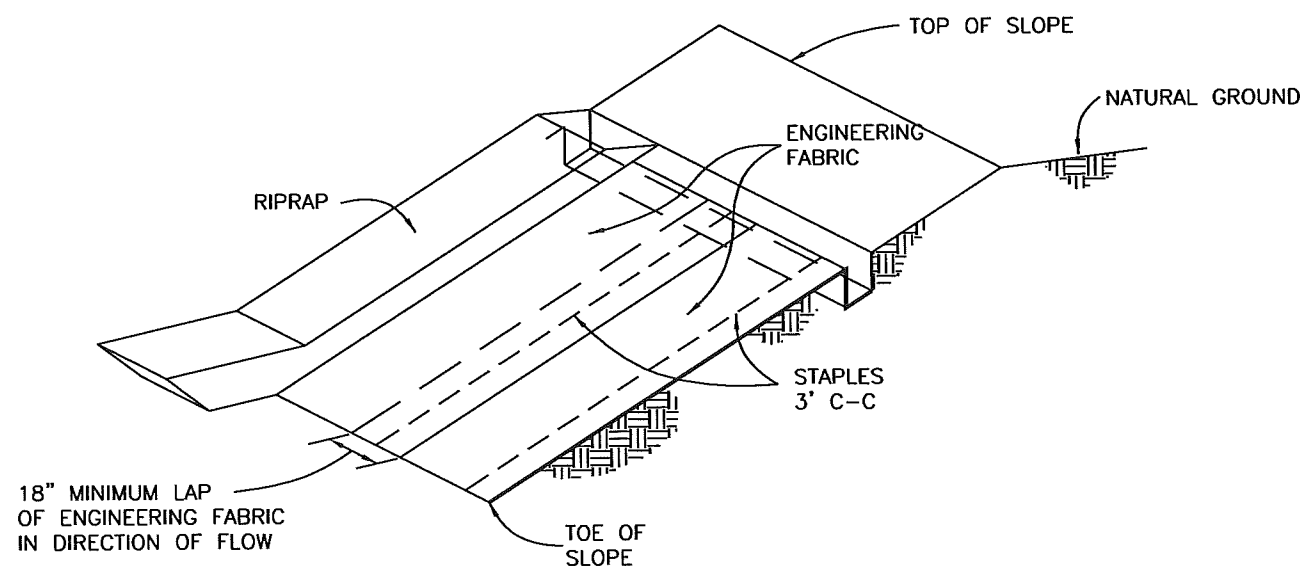
TYPICAL HALF-CHANNEL BANK STABILIZATION SECTION

NO SCALE
SEE CROSS SECTIONS FOR H DIMENSION



DETAIL OF TRENCH

STAPLE



EXCAVATE 12"x12" TRENCH ALONG TOP OF RIPRAP. PLACE END OF ENGINEERING FABRIC STRIPS INTO TRENCH WITH STAPLES AS SHOWN. BACKFILL WITH THE EXCAVATED MATERIAL AND COMPACT. THE ENGINEER MAY PERMIT THE USE OF THE WHEELS OF PNEUMATIC-TIRED EQUIPMENT FOR CONSOLIDATING THE TRENCH BACKFILL MATERIAL.

DETAILS OF PLACEMENT OF ENGINEERING FABRIC

NO SCALE

CONSTRUCTION SPECIFICATIONS

REMOVAL OF WATER

1. SCOPE

THE WORK SHALL CONSIST OF REMOVAL OF SURFACE WATER AND GROUND WATER AS NEEDED TO PERFORM THE REQUIRED CONSTRUCTION IN ACCORDANCE WITH THE SPECIFICATIONS. IT SHALL INCLUDE (1) BUILDING AND MAINTAINING ALL NECESSARY TEMPORARY IMPOUNDING WORKS, CHANNELS, AND DIVERSIONS, (2) FURNISHING, INSTALLING AND OPERATING ALL NECESSARY PUMPS, PIPING AND OTHER FACILITIES AND EQUIPMENT, AND (3) REMOVING ALL SUCH TEMPORARY WORKS AND EQUIPMENT AFTER THEY HAVE SERVED THEIR PURPOSES.

2. DIVERTING SURFACE WATER

THE CONTRACTOR SHALL BUILD, MAINTAIN AND OPERATE ALL COFFERDAMS, CHANNELS, FLUMES, SUMPS, AND OTHER TEMPORARY DIVERSION AND PROTECTIVE WORKS NEEDED TO DIVERT STREAMFLOW AND OTHER SURFACE WATER THROUGH OR AROUND THE CONSTRUCTION SITE AND AWAY FROM THE CONSTRUCTION WORK WHILE CONSTRUCTION IS IN PROGRESS. UNLESS OTHERWISE SPECIFIED, A DIVERSION MUST DISCHARGE INTO THE SAME NATURAL DRAINAGEWAY IN WHICH ITS HEADWORKS ARE LOCATED.

UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL FURNISH TO THE ENGINEER, IN WRITING, HIS PLAN FOR DIVERTING SURFACE WATER BEFORE BEGINNING THE CONSTRUCTION WORK FOR WHICH THE DIVERSION IS REQUIRED. ACCEPTANCE OF THIS PLAN WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR COMPLETING THE WORK AS SPECIFIED.

3. DEWATERING THE CONSTRUCTION SITE

FOUNDATIONS, CUTOFF TRENCHES AND OTHER PARTS OF THE CONSTRUCTION SITE SHALL BE DEWATERED AND KEPT FREE OF STANDING WATER OR EXCESSIVELY MUDDY CONDITIONS AS NEEDED FOR PROPER EXECUTION OF THE CONSTRUCTION WORK. THE CONTRACTOR SHALL FURNISH, INSTALL, OPERATE AND MAINTAIN ALL DRAINS, SUMPS, PUMPS, CASING, WELLPOINTS, AND OTHER EQUIPMENT NEEDED TO PERFORM THE DEWATERING AS SPECIFIED. DEWATERING METHODS THAT CAUSE A LOSS OF FINES FROM FOUNDATION AREAS WILL NOT BE PERMITTED.

UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL FURNISH TO THE ENGINEER, IN WRITING, HIS PLAN FOR DEWATERING BEFORE BEGINNING THE CONSTRUCTION WORK FOR WHICH THE DEWATERING IS REQUIRED. ACCEPTANCE OF THIS PLAN WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR COMPLETING THE WORK AS SPECIFIED.

4. EROSION AND POLLUTION CONTROL

REMOVAL OF WATER FROM THE CONSTRUCTION SITE SHALL BE ACCOMPLISHED IN SUCH A MANNER THAT EROSION AND THE TRANSMISSION OF SEDIMENT AND OTHER POLLUTANTS ARE MINIMIZED.

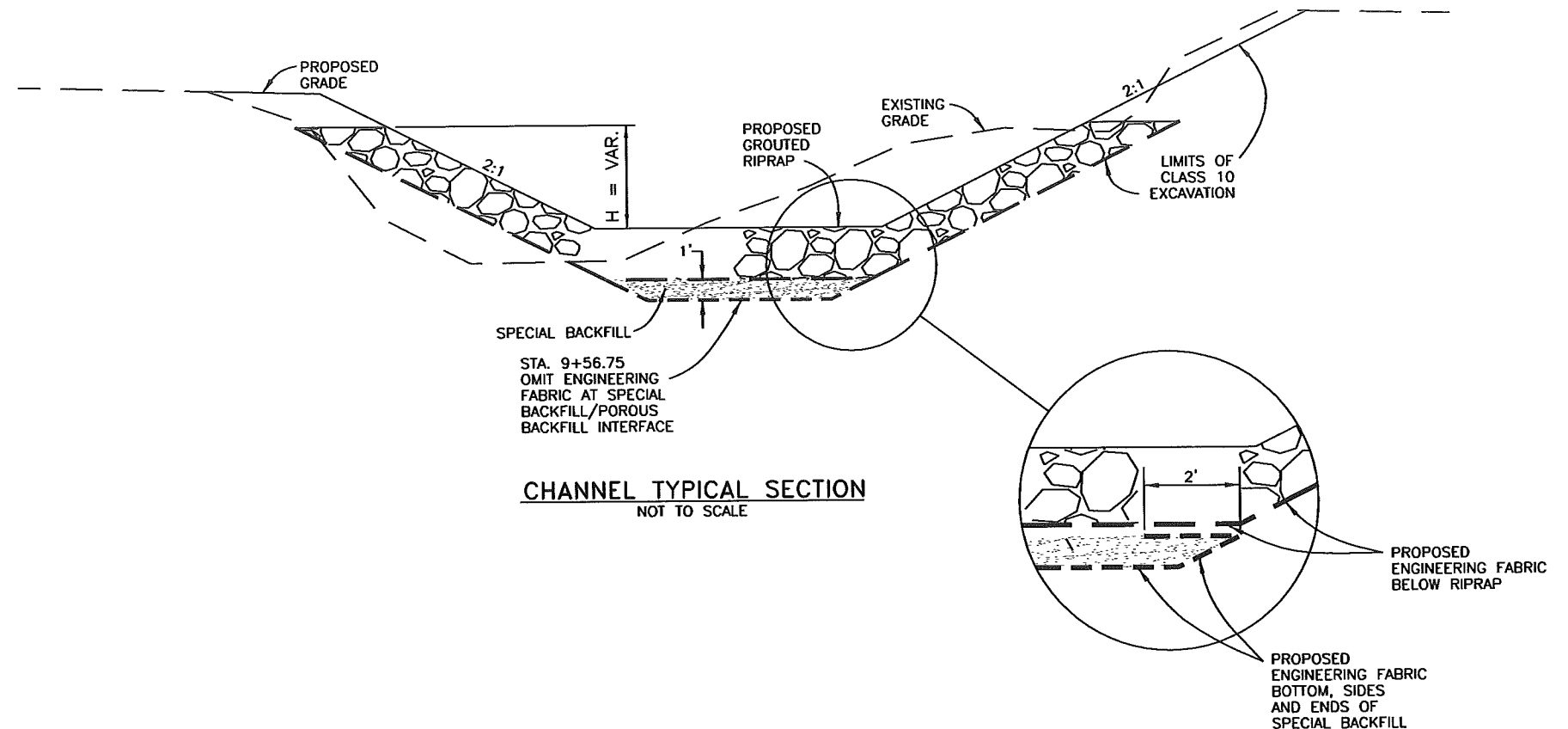
5. REMOVAL OF TEMPORARY WORKS

AFTER THE TEMPORARY WORKS HAVE SERVED THEIR PURPOSES, THE CONTRACTOR SHALL REMOVE THEM OR LEVEL AND GRADE THEM TO THE EXTENT REQUIRED TO PRESENT A SLIGHTLY APPEARANCE AND TO PREVENT ANY OBSTRUCTION OF THE FLOW OF WATER OR ANY OTHER INTERFERENCE WITH THE OPERATION OF OR ACCESS TO THE PERMANENT WORKS.

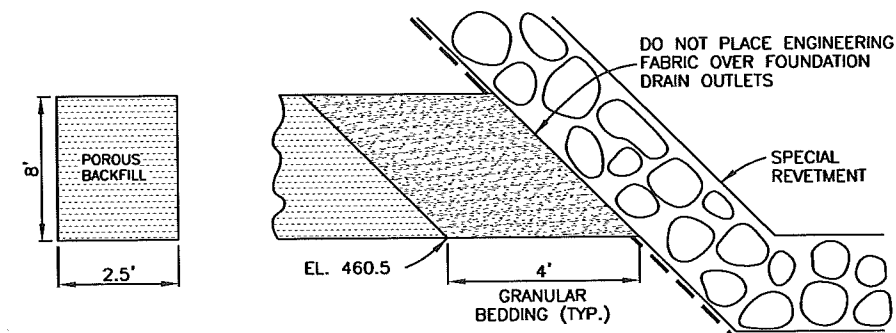
EXCEPT AS OTHERWISE SPECIFIED, PIPES AND CASINGS SHALL BE REMOVED FROM TEMPORARY WELLS AND THE WELLS SHALL BE FILLED TO GROUND LEVEL WITH GRAVEL OR OTHER MATERIAL APPROVED BY THE CONTRACTING OFFICER.

6. MEASUREMENT AND PAYMENT

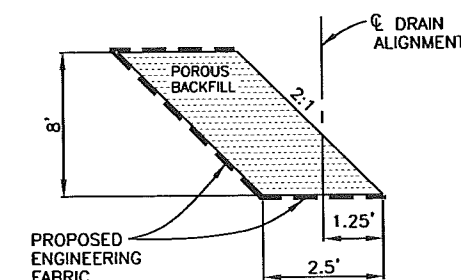
PAYMENT FOR THIS ITEM WILL BE MADE AT THE CONTRACT LUMP SUM PRICE AND WILL CONSTITUTE FULL COMPENSATION FOR COMPLETION OF THE WORK.



CHANNEL TYPICAL SECTION
NOT TO SCALE



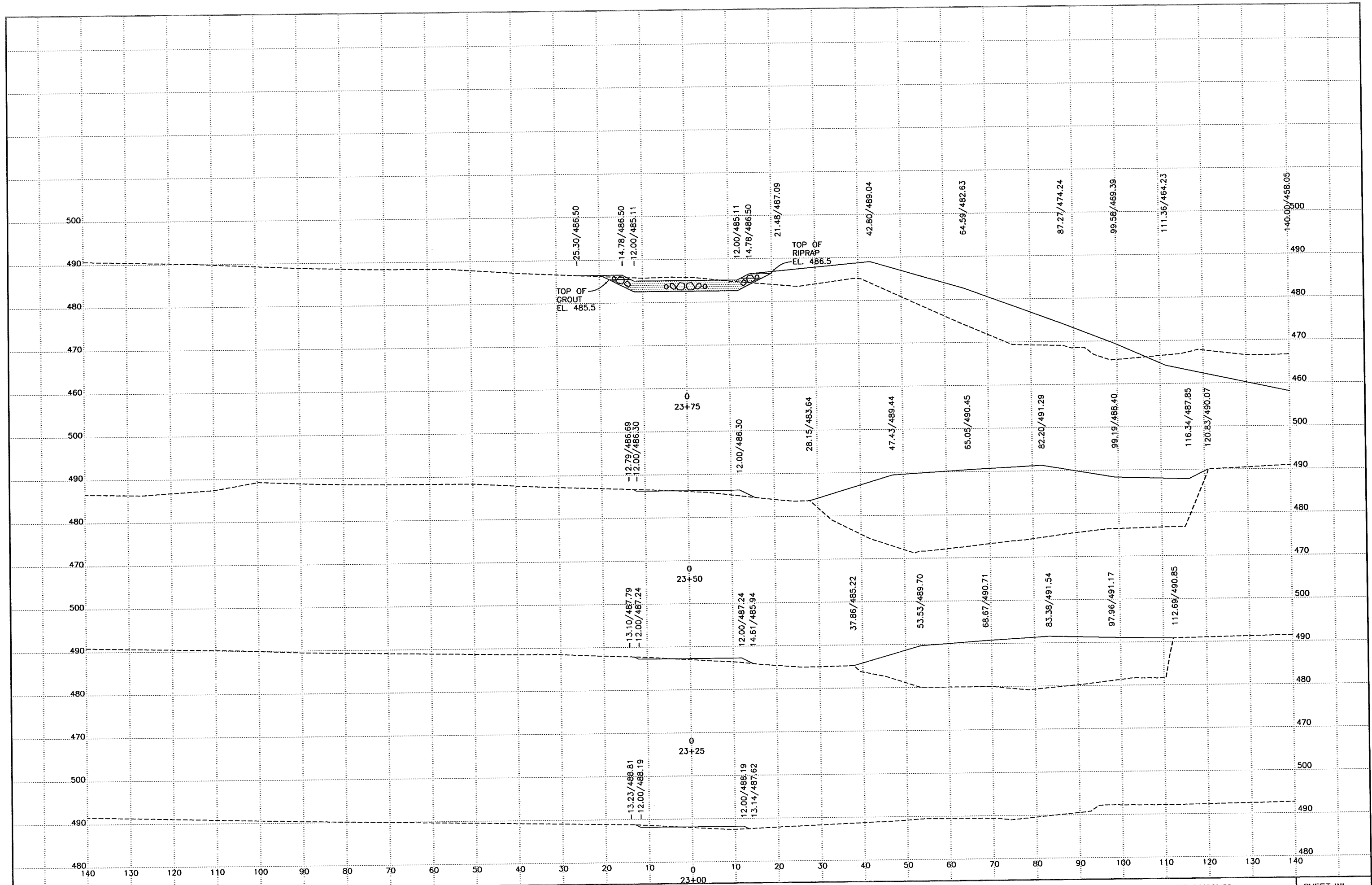
FOUNDATION DRAIN
NOT TO SCALE

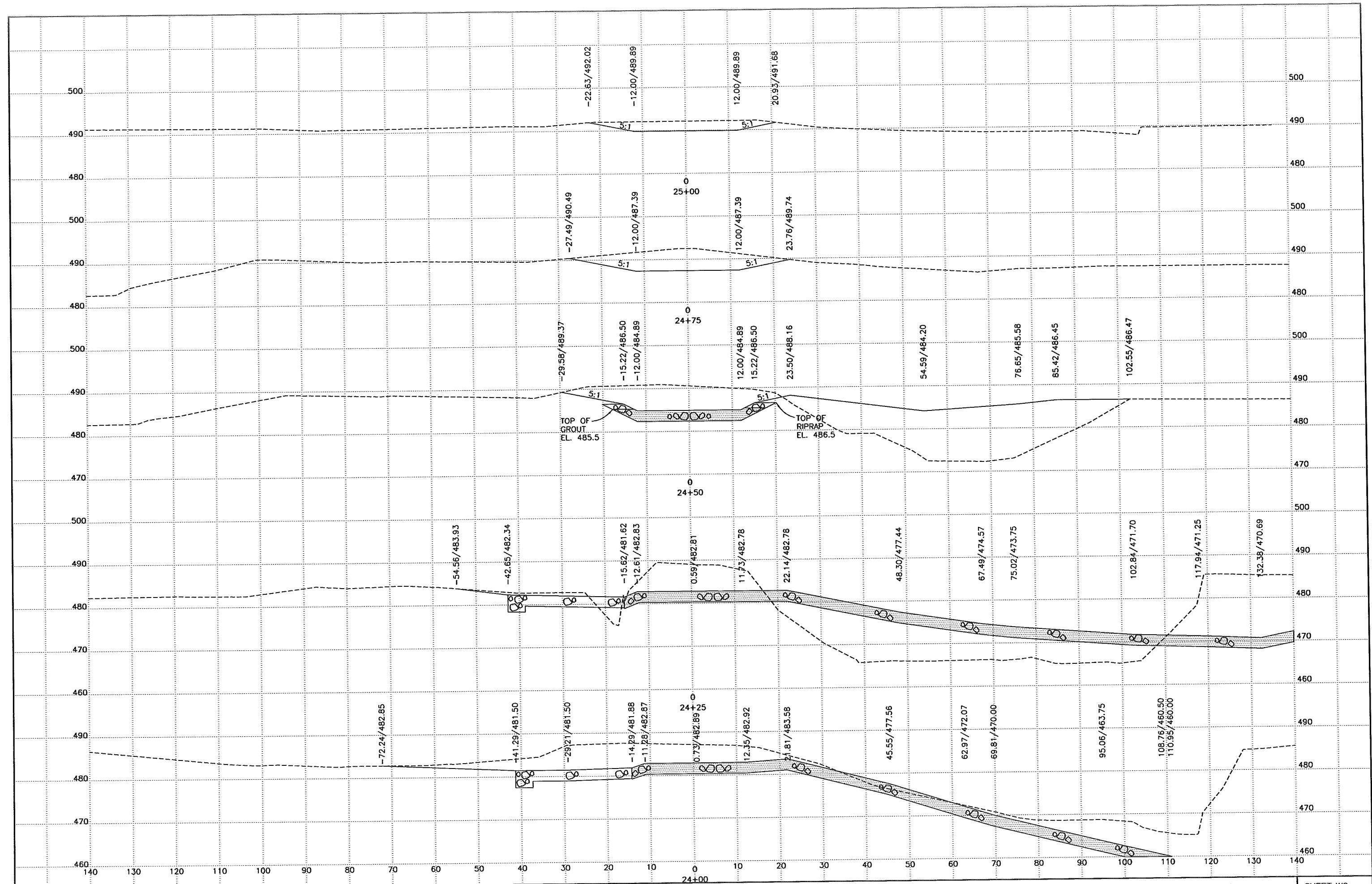


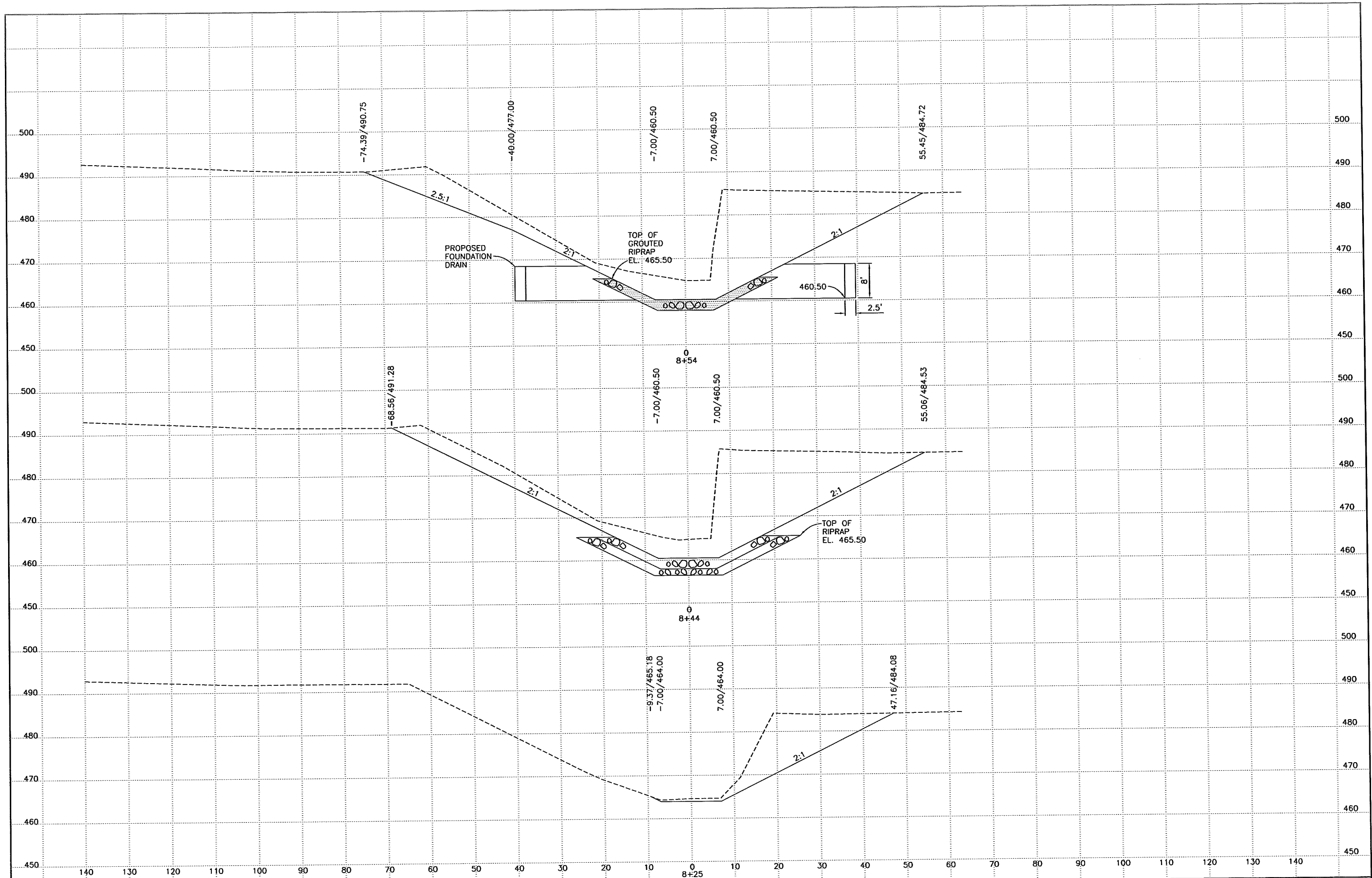
OPTIONAL LONGITUDINAL FOUNDATION DRAIN
NOT TO SCALE

SPECIAL DETAILS

SHEET VI







REV:

SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS

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120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442
PHONE: (712)263-8118 FAX: (712)263-2181

SE PROJECT NO. 08007

DATE: 03/08

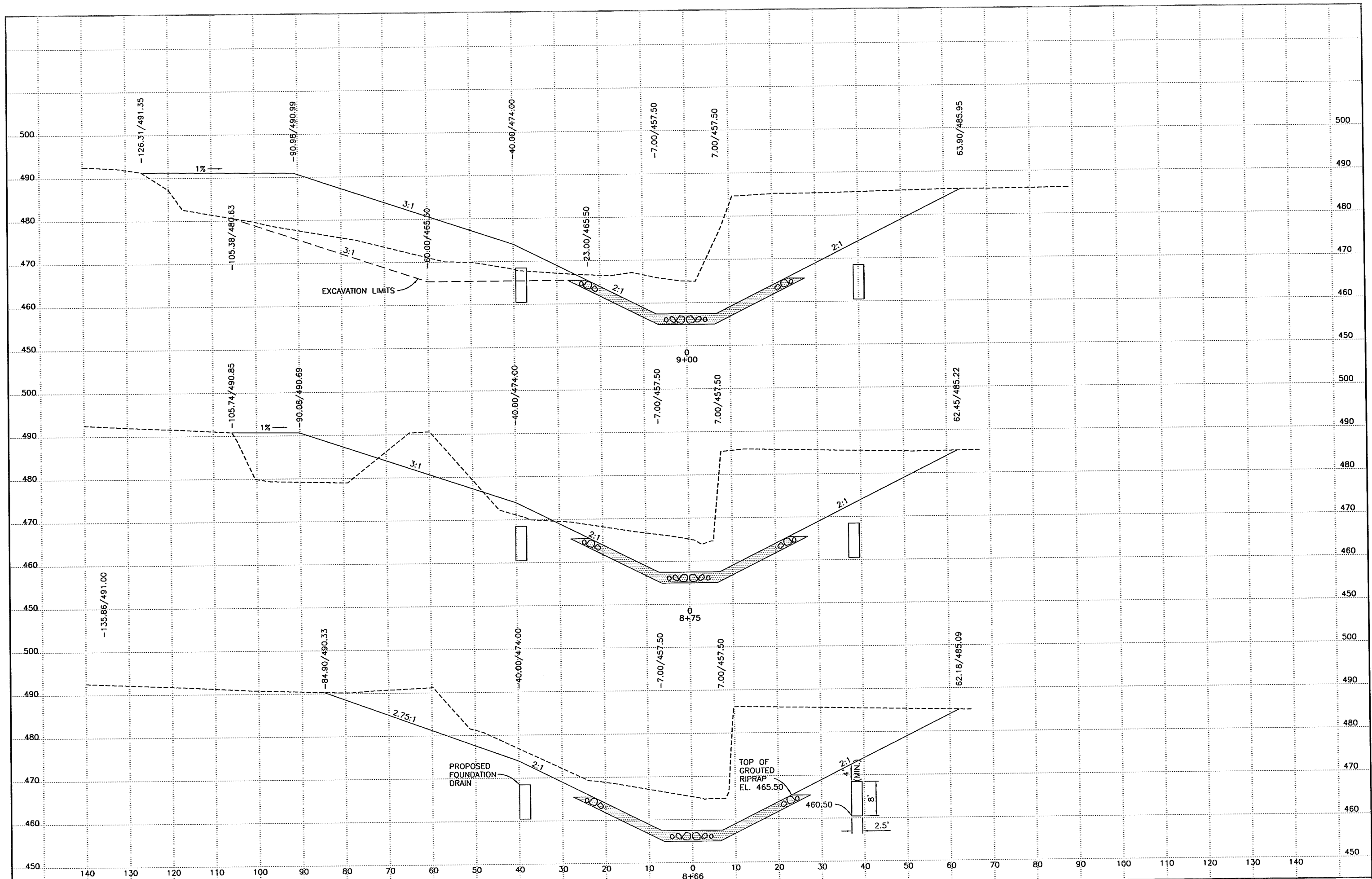
DRAWN BY: DRD

REVIEWED BY: SAS

APPROVED BY: TJG

CRAWFORD COUNTY PROJECT NO. LHC21-28

SHEET ZI



REV:

SUNDQUIST ENGINEERING, P.C.
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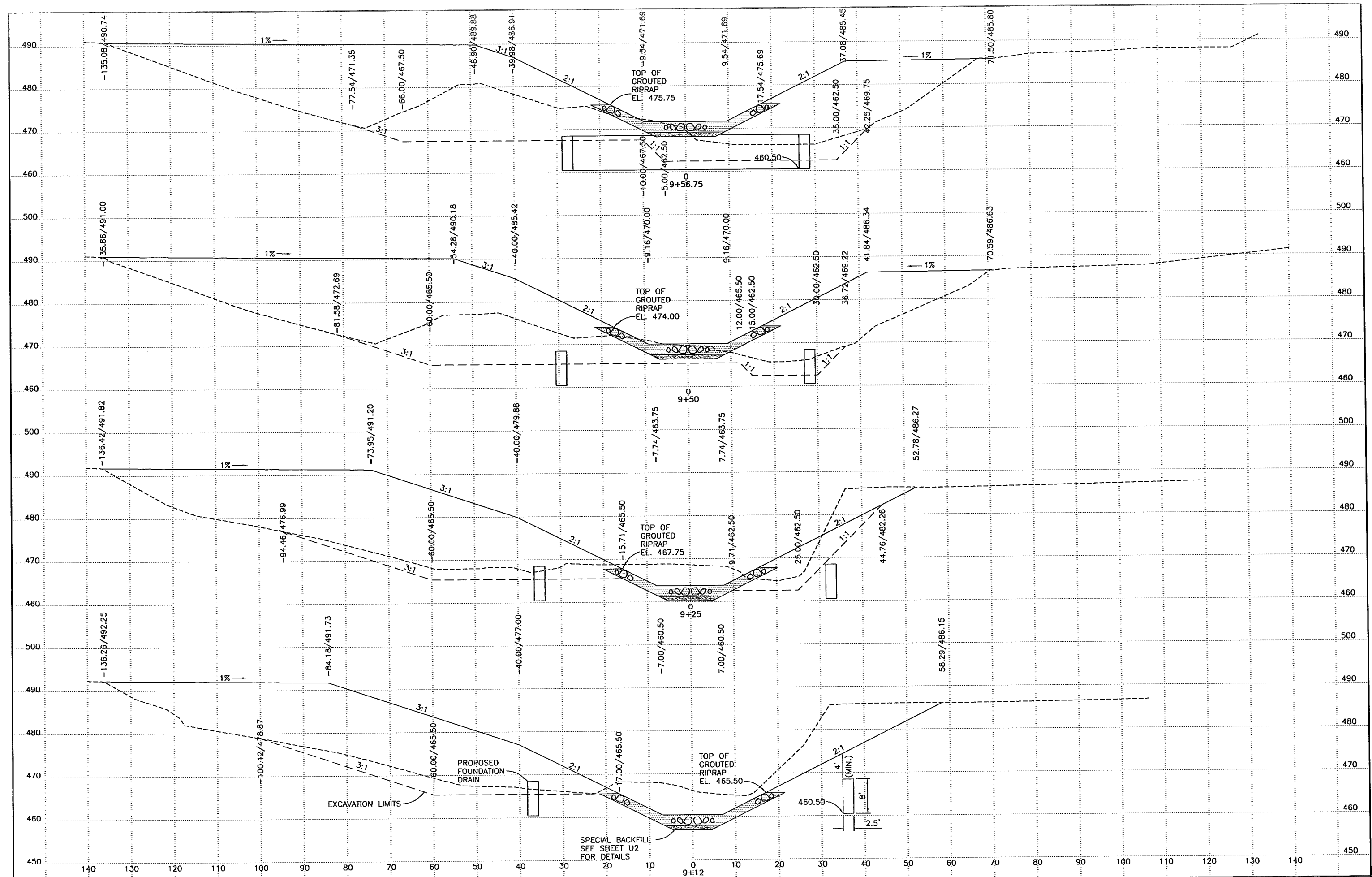
DRAWN BY: DRD

REVIEWED BY: SAS

APPROVED BY: TJG

CRAWFORD COUNTY PROJECT NO. LHC21-28

SHEET Z2



REV:

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SE PROJECT NO. 08007 DATE: 03/08 DRAWN BY: DRD REVIEWED BY: SAS APPROVED BY: TJG

CRAWFORD COUNTY PROJECT NO. LHC21-28

SHEET Z3

