

LETTING DATE  
3/10/2009

## 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

SITE 7311-02 SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT 27, PERMIT NO. 2008-1450. 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.

SITE 7311-02 IS COVERED BY IOWA DNR FLOODPLAIN CONSTRUCTION PERMIT NO. 2008-207.

## 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

## FARM-TO-MARKET SYSTEM CRAWFORD COUNTY

PROJECT NO. EWP-24(08-1)

JUNE 2008 FLOOD REPAIR PROJECTS

USDA NATURAL RESOURCES CONSERVATION SERVICE  
AND CRAWFORD COUNTY, IOWA  
NRCS EMERGENCY WATERSHED PROTECTION PROGRAM  
SITES 7311-02 AND 7311-19

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

14

PROJECT NUMBER

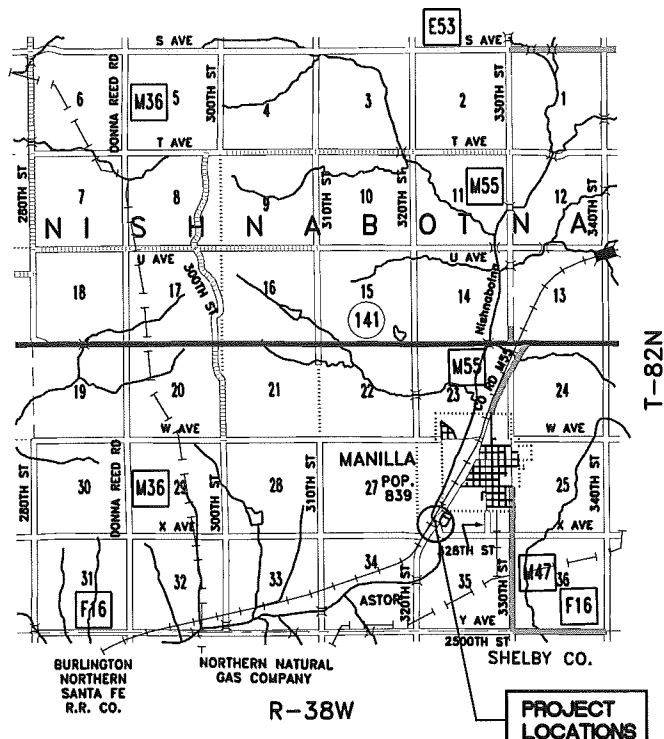
EWP-24(08-1)

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 - 7311-02
V2	SITUATION PLAN - 7311-19
Z1-4	CROSS SECTIONS - 7311-02
Z5-7	CROSS SECTIONS - 7311-19

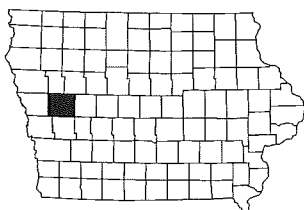


PROJECT LOCATIONS

6238-26

**SUNDQUIST**  
ENGINEERING, P.C.  
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442  
PHONE: (712)263-8118 FAX: (712)263-2181  
SUNDQUISTENGINEERING.COM

LOCATION MAP SCALE



Call Before You Dig!  
1800.292.8989  
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	200	V.P.D.
2028 AADT	300	V.P.D.
201X DHV	X	V.P.H.
TRUCKS	X	%
TOTAL		
DESIGN ESALs		

Approved

*Robert Lohmann*  
*Robert Lohmann*  
*Robert Lohmann*  
*Robert Lohmann*  
*Robert Lohmann*  
**BOARD OF SUPERVISORS**

Approved

*Robert Lohmann*  
**CRAWFORD COUNTY ENGINEER**

2/3/09  
DATE



I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

*Troy J. Groth* 2/3/09  
TROY J. GROTH, P.E. #14450 DATE

MY LICENSE RENEWAL DATE IS DECEMBER 31, 2009.  
PAGES OR SHEETS COVERED BY THIS SEAL:  
ALL SHEETS

DESIGN TEAM: TJG/SAS/TKK

ENGLISH

SE PROJECT NO. : 05708, 05808

DATE : 09/08

FHWA# 126531

CRAWFORD COUNTY

PROJECT NUMBER EWP-24(08-1)

SHEET A1

ESTIMATE REFERENCE INFORMATION

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

1. CLEARING AND GRUBBING

THIS ITEM SHALL CONSIST OF CLEARING AND GRUBBING AT SITE 7311-02 WITHIN THE CONSTRUCTION LIMITS SHOWN ON PLAN SHEET V1.

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 PROVIDED BY THE CONTRACTOR. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED. 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.

ANY CLEARING AND GRUBBING NECESSARY TO COMPLETE THE WORK AT SITE 7311-19 SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM.

PAYMENT FOR THIS ITEM SHALL BE BASED ON PLAN QUANTITY. CROSS SECTIONS WILL NOT BE TAKEN AFTER PLACEMENT OF EMBANKMENT FOR THE PURPOSE OF DETERMINING ACTUAL QUANTITIES.

3. EXCAVATION, CLASS 10, CHANNEL

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

QUANTITY INCLUDES EXCAVATION REQUIRED TO INSTALL THE REVETMENT. QUANTITY INCLUDES THE EXCAVATION REQUIRED TO TRANSITION PROPOSED CHANNEL SLOPES INTO EXISTING SLOPES WITHIN THE LIMITS SHOWN ON PLAN SHEETS V1 AND V2.

QUANTITY INCLUDES EXISTING BROKEN CONCRETE WITHIN THE LIMITS OF EXCAVATION. REMOVAL SHALL BE TO THE SUBGRADE ELEVATION UNDER PROPOSED REVETMENT AND TO THE FINISHED GRADE IN OTHER AREAS. EXCAVATED BROKEN CONCRETE SHALL BE DISPOSED OF ON SITE AS DIRECTED BY THE ENGINEER. THIS WORK 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. CROSS SECTIONS WILL NOT BE TAKEN AFTER EXCAVATION FOR THE PURPOSE OF DETERMINING ACTUAL QUANTITIES.

4. PILES, FURNISH AND INSTALL STEEL, HP 10X42

INCLUDES FURNISHING AND INSTALLING THE HP 10X42 WALER AS DETAILED ON PLAN SHEET U1. BOLTS, NUTS AND WASHERS REQUIRED TO INSTALL WALER SHALL MEET THE REQUIREMENTS OF ARTICLE 4153.07 AND SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM.

5. PILES, STEEL SHEET

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING THE SHEET PILES AS SHOWN ON THE DRAWINGS. THIS ITEM SHALL INCLUDE FIELD CUTTING THE SHEET PILES TO THE SPECIFIED 2:1 GRADE AND V-NOTCH AS SHOWN ON THE PLANS.

THE SHEET PILES AND APPURTENANT METAL WORK SHALL MEET THE REQUIREMENTS OF ASTM A328, A572 OR A690. THE SHEET PILES SHALL BE INSTALLED STARTING FROM THE CENTERLINE OF THE WEIR SECTION AND PROGRESSING AWAY FROM THE CENTERLINE.

SHEET PILES SHALL MEET THE FOLLOWING REQUIREMENTS:

- (a) MINIMUM SECTION MODULUS OF 19.25 CU. IN. PER FOOT OF LENGTH.
- (b) MINIMUM WALL THICKNESS OF 3/8 INCH.

6. ENGINEERING FABRIC

SEE PLAN SHEET U2 - DETAILS OF PLACEMENT OF ENGINEERING FABRIC FOR INSTALLATION DETAILS. MATERIAL TO 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 OVERLAPPING 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.

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, CLASS B

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

AT SITE 7311-02 CONTRACTOR SHALL BE REQUIRED TO STOCKPILE SELECTED LARGE STONES. SELECTED STONES SHALL BE PLACED IN THE LONGITUDINAL CENTER 1/3 OF THE CHANNEL BOTTOM SUCH THAT 1/3 OF THE MASS OF EACH STONE PROTRUDES FROM THE SURFACE OF THE GROUT AS DIRECTED BY THE ENGINEER. SUCH PLACEMENT SHALL OCCUR AFTER INSTALLATION OF SPECIAL REVETMENT AND PRIOR TO GROUTING OPERATION. THIS WORK SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR THIS ITEM.

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.

CLASS B REVETMENT PLACED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS WILL BE MEASURED IN TONS TO THE NEAREST 0.1 TONS. FOR THE QUANTITY OF CLASS B REVETMENT FURNISHED AND PLACED, THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER TON.

11. 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. GROUT SHALL NOT BE PLACED IN STANDING OR FLOWING WATER.

REFER TO PLAN SHEET B2 FOR ADDITIONAL REQUIREMENTS OF THIS ITEM.

ESTIMATED PROJECT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	QUANTITIES		
				DIV. 1 SITE 02	DIV. 2 SITE 19	TOTAL
1	2101-0850001	CLEARING AND GRUBBING	ACRE	0.9	-	0.9
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	24	360	384
3	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	3062	290	3352
4		PILES, FURNISH & INSTALL STEEL, HP 10x42	LF	136	-	136
5	2501-5775000	PILES, STEEL SHEET	SF	2560	-	2560
6	2507-3250005	ENGINEERING FABRIC	SY	1426	524	1950
7	2507-4011100	CONCRETE GROUT FOR REVETMENT OR GABION	CY	150	52	202
8	2507-6800021	REVTMENT, CLASS B	TON	1448	392	1840
9	2528-8445110	TRAFFIC CONTROL	LS	1	1	2
10	2533-4980005	MOBILIZATION	LS	1	1	2
11	2599-9999010	REMOVAL OF WATER	LS	1	-	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
TC-202	10-21-08	1	SHOULDER CLOSURE

ESTIMATED PROJECT QUANTITIES  
AND GENERAL INFORMATION

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.

CONTRACTOR SHALL COORDINATE WITH BNSF RAILWAY WHEN WORKING WITHIN 25 FEET OF ANY RAILROAD TIE. CONTACT DAVID MORDY, SUPERVISOR STRUCTURES FOR BNSF RAILWAY, AT 402-613-3471 (CELL).

CONSTRUCTION STAKING WILL BE PROVIDED BY THE OWNER IN ACCORDANCE WITH ARTICLE 1105.06 OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR CONDUCTING AN INDEPENDENT CHECK OF ALL CONSTRUCTION STAKES PLACED FOR THE PROJECT. THIS INDEPENDENT CHECK SHALL BE SUFFICIENT TO UNDERSTAND THE PLACEMENT AND INTENT OF THE STAKES.

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 EROSIVENESS OF LAND ADJACENT TO SURFACE WATERS AND WETLANDS, INCLUDING ESTABLISHMENT AND MAINTENANCE OF EROSION CONTROL DURING CONSTRUCTION.

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.

CLEARING AND GRUBBING OF VEGETATION, INCLUDING TREES LOCATED IN OR IMMEDIATELY ADJACENT TO WETLANDS AND STREAMS, SHALL BE LIMITED TO THAT WHICH IS ABSOLUTELY NECESSARY FOR CONSTRUCTION OF THE PROJECT. ALL VEGETATIVE MATERIAL REMOVED FROM THE RIGHT-OF-WAY SHALL BE DISPOSED OF AT AN UPLAND, NON-WETLAND LOCATION.

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.

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

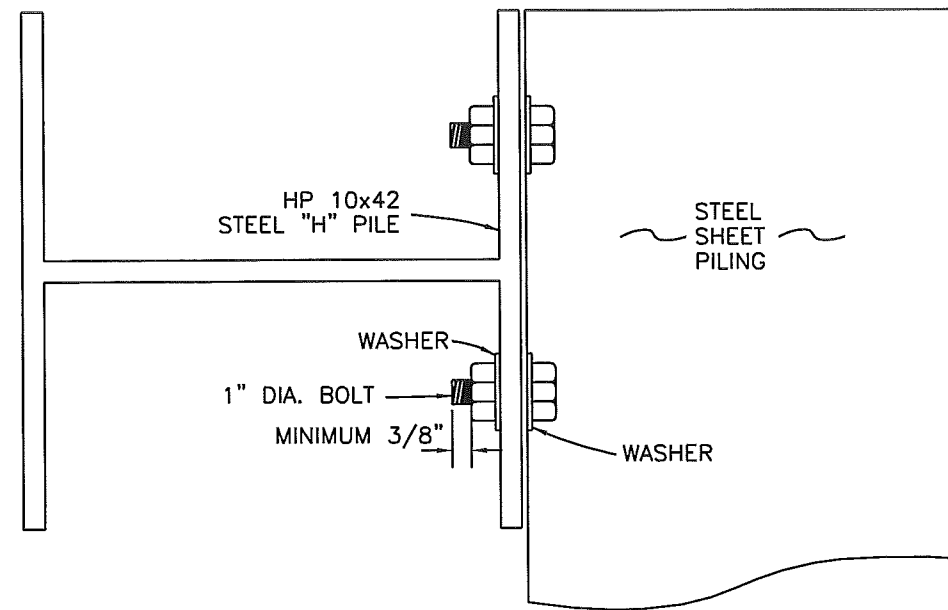
AFTER THE TEMPORARY WORKS HAVE SERVED THEIR PURPOSES, THE CONTRACTOR SHALL REMOVE THEM OR LEVEL AND GRADE THEM TO THE EXTENT REQUIRED TO PRESENT A SIGHTLY APPEARANCE AND TO PREVENT ANY OBSTRUCTION OF THE FLOW OF WATER OR ANY OTHER INTERFERENCE WITH THE OPERATION OF OR ACCESS TO THE PERMANENT WORKS.

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.

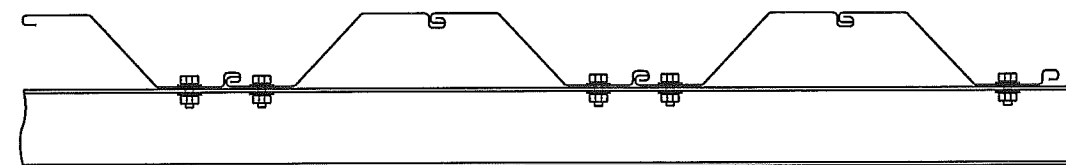
6. MEASUREMENT AND PAYMENT

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

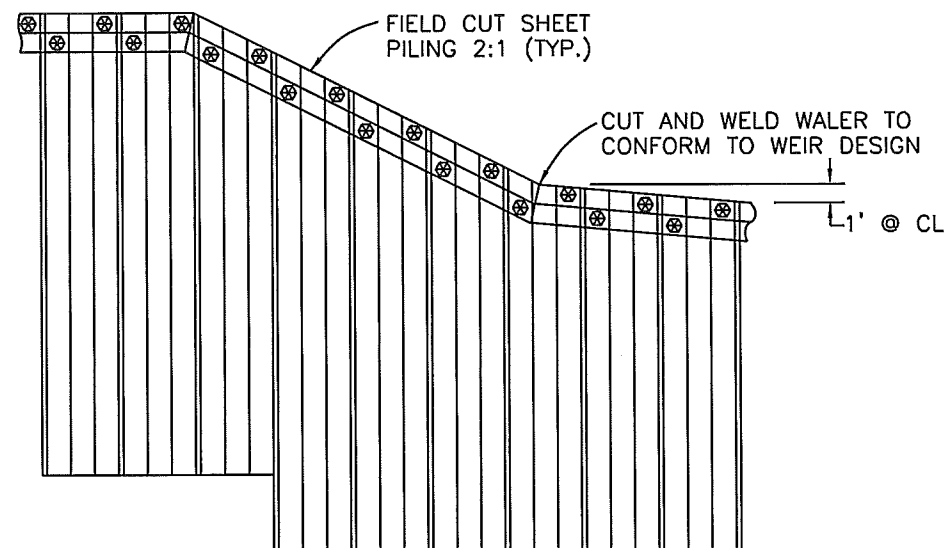
ESTIMATED PROJECT QUANTITIES  
AND GENERAL INFORMATION



**BOLT DETAIL**



**WALER BOLT PLACEMENT (HEAVY "Z" STYLE SHEETS)**

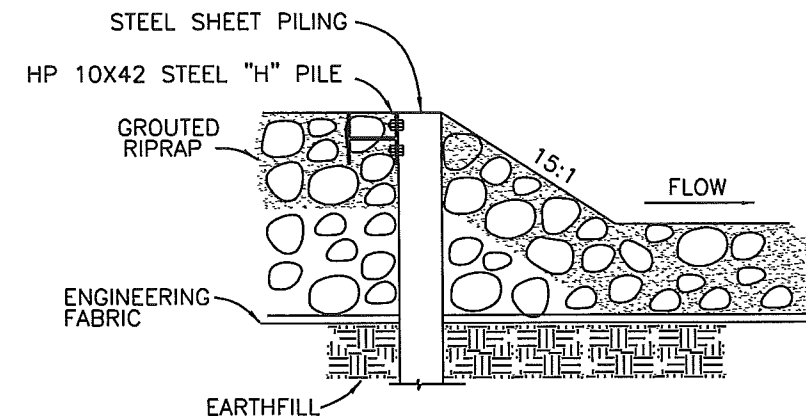


**NOTES:**

1. ALL BOLTS SHALL BE 1" DIA. W/2 WASHERS. BOLTS SHALL EXTEND AT MINIMUM 3/8" BEYOND NUT.
2. ALL HOLES SHALL BE FIELD CUT 1/16" DIA. LARGER THAN THE BOLTS.

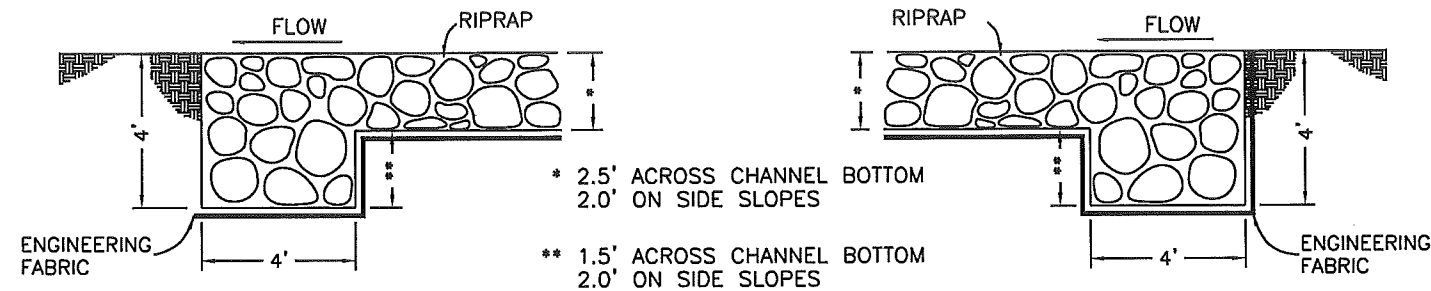
**DETAILS OF WALER**

NO SCALE



**GROUTED RIPRAP DETAIL**

NO SCALE



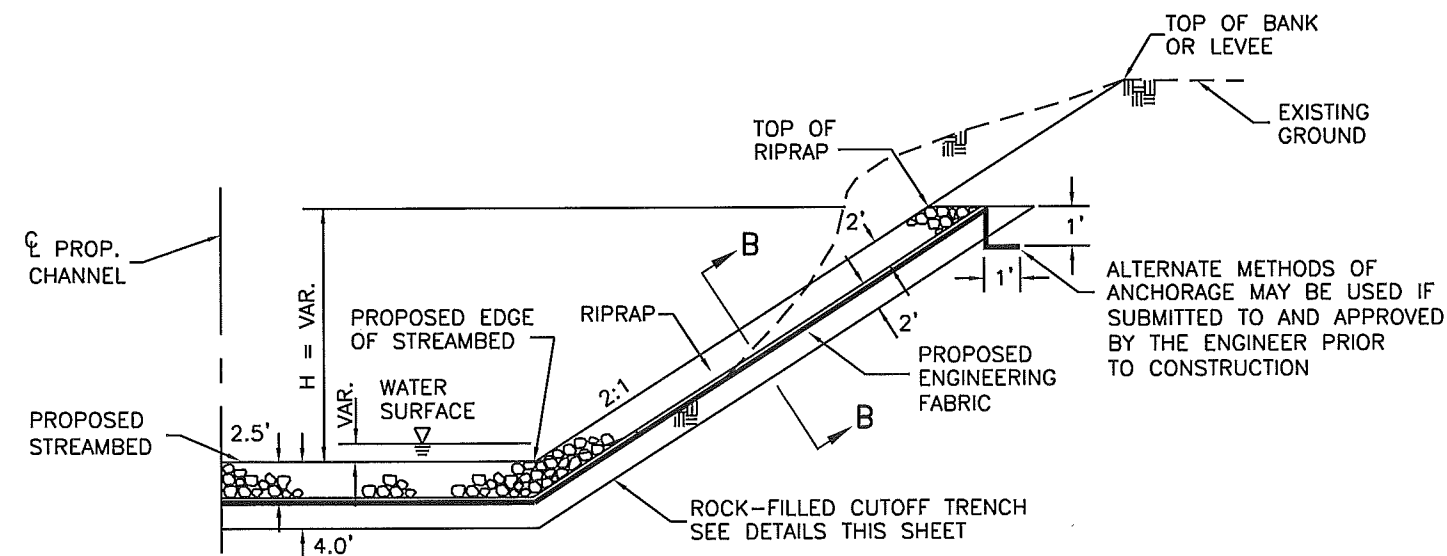
TYPICAL DOWNSTREAM

TYPICAL UPSTREAM

## SECTION B-B

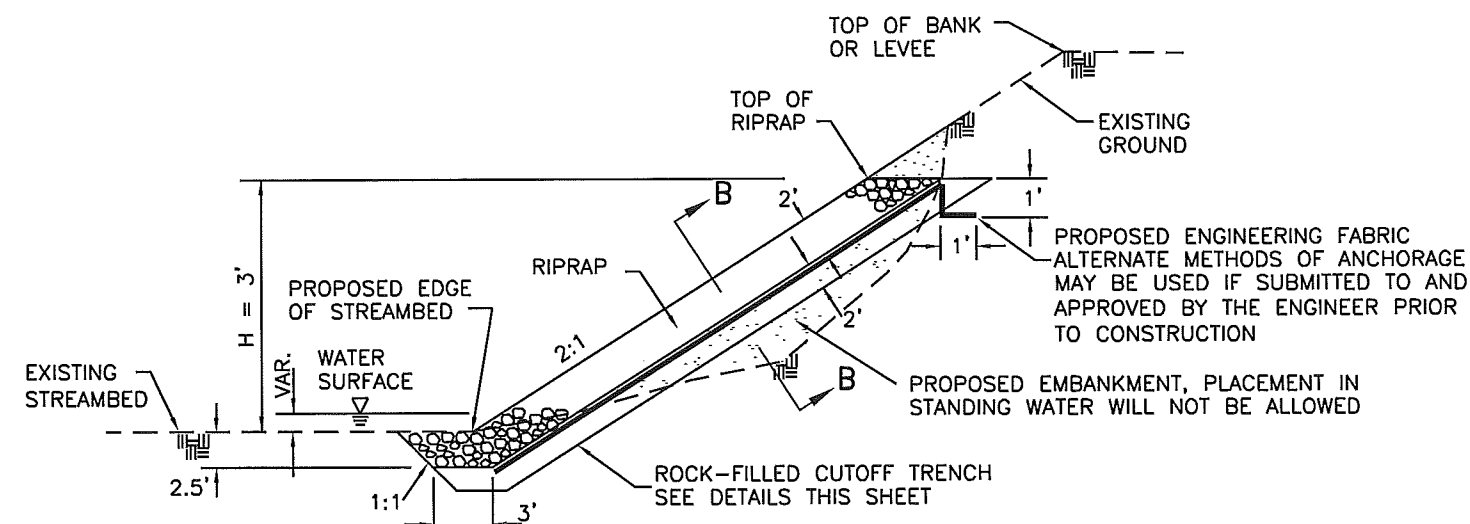
### ROCK-FILLED CUTOFF TRENCH DETAILS

CONTINUOUS ACROSS BOTTOM WIDTH AND SIDE SLOPES  
NO SCALE



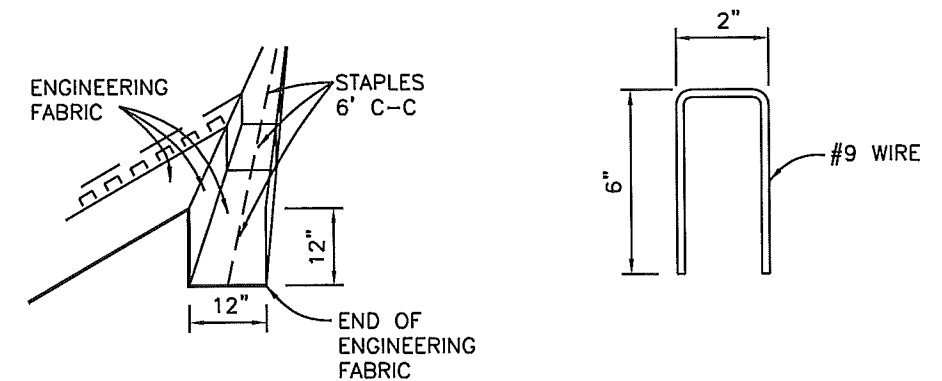
### TYPICAL FULL-CHANNEL BANK STABILIZATION SECTION

NO SCALE  
SEE CROSS SECTIONS FOR H DIMENSION



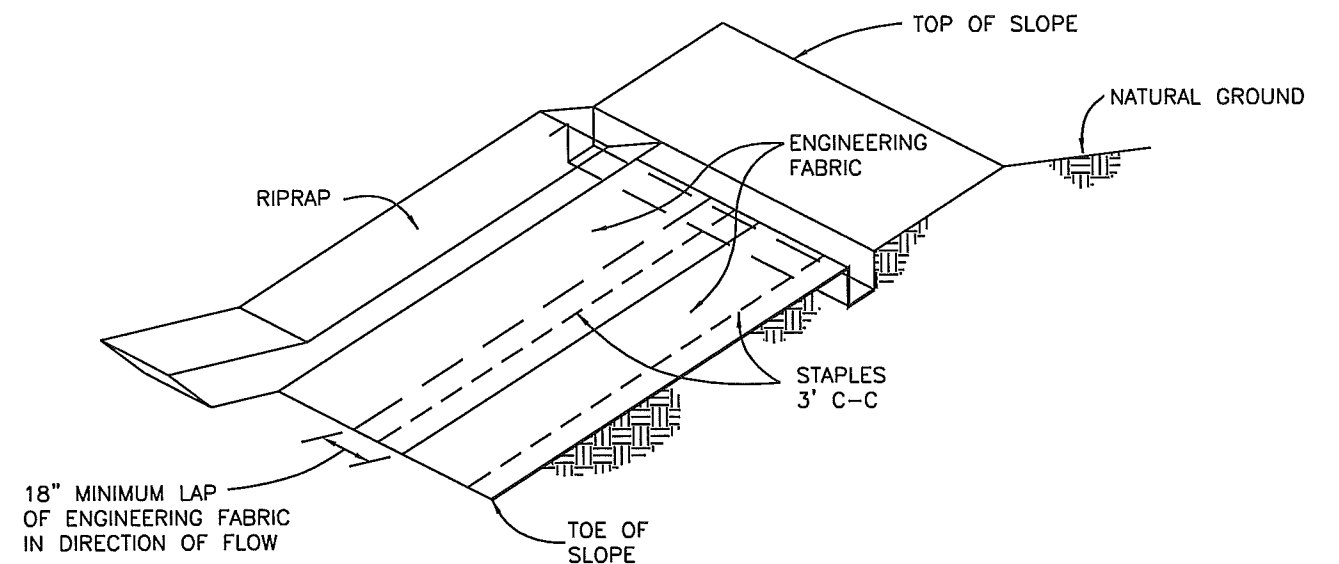
### TYPICAL HALF-CHANNEL BANK STABILIZATION SECTION

NO SCALE



DETAIL OF TRENCH

STAPLE

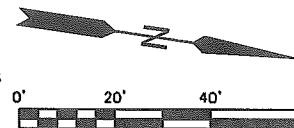


EXCAVATE 12"x12" TRENCH ALONG TOP OF RIPRAP. PLACE END OF ENGINEERING FABRIC STRIPS INTO TRENCH WITH STAPLES AS SHOWN. BACKFILL WITH THE EXCAVATED MATERIAL AND COMPACT. THE ENGINEER MAY PERMIT THE USE OF THE WHEELS OF PNEUMATIC-TIRED EQUIPMENT FOR CONSOLIDATING THE TRENCH BACKFILL MATERIAL.

### DETAILS OF PLACEMENT OF ENGINEERING FABRIC

NO SCALE

PARCEL  
NUMBER PROPERTY OWNER  
① CITY OF MANILLA  
② BNSF RAILWAY CO.



BM: BOLT IN END POST @  
NW COR BRIDGE EL = 507.48

LOOSE RIPRAP  
GROUTED RIPRAP

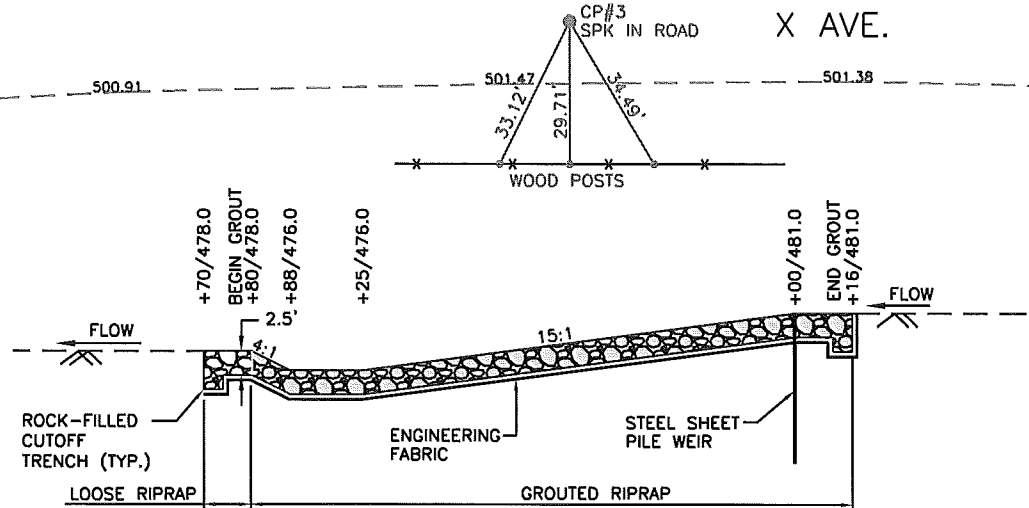
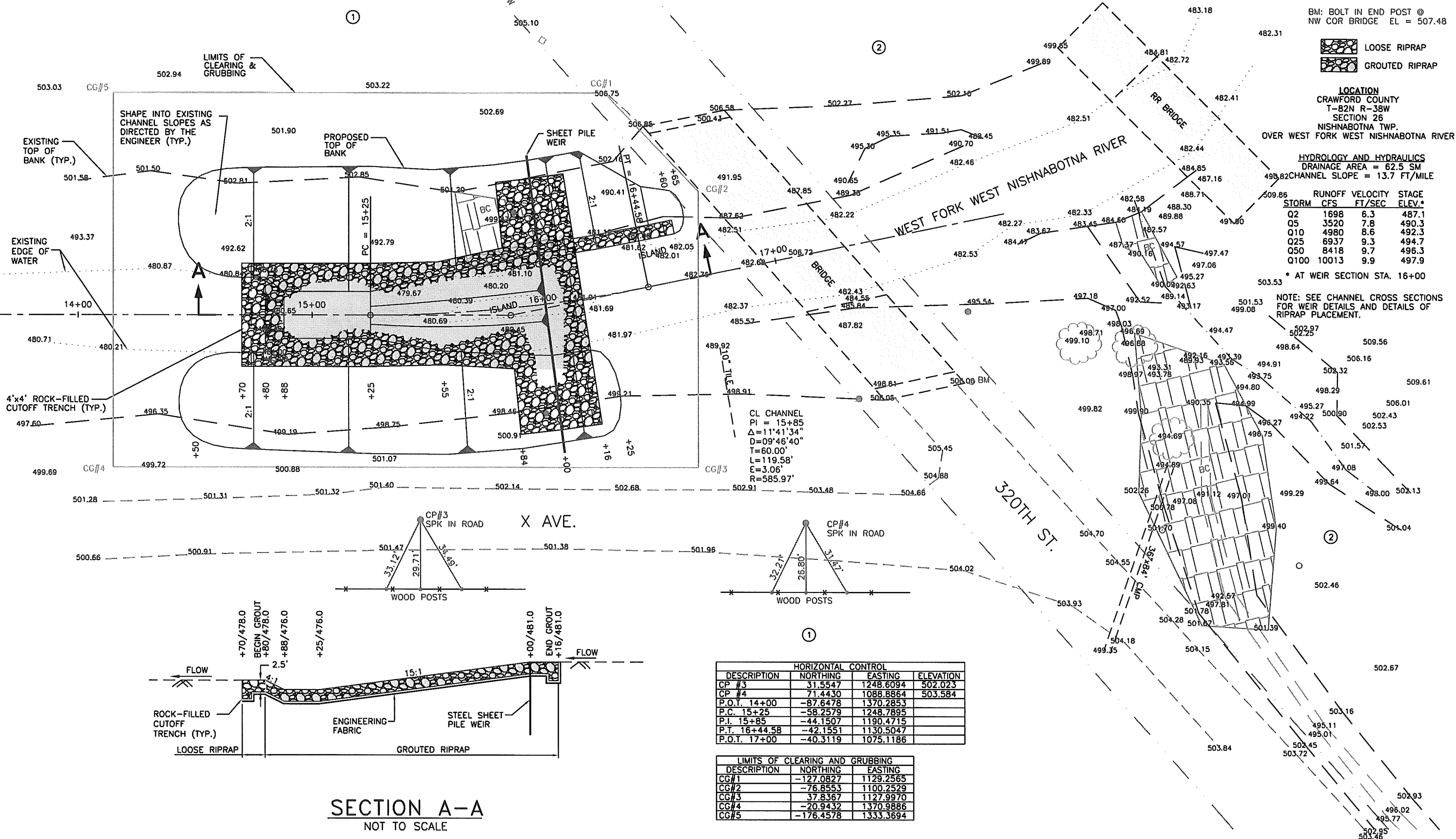
LOCATION  
CRAWFORD COUNTY  
T-82N R-38W  
SECTION 26  
NISHABOTNA TWP.  
OVER WEST FORK WEST NISHABOTNA RIVER

HYDROLOGY AND HYDRAULICS  
DRAINAGE AREA = 62.5 SM  
CHANNEL SLOPE = 13.7 FT/MILE

STORM	CFS	VELOCITY FT/SEC	STAGE ELEV.*
Q2	1698	6.3	487.1
Q5	3520	7.8	490.3
Q10	4980	8.6	492.3
Q25	6937	9.3	494.7
Q50	8418	9.7	496.3
Q100	10013	9.9	497.9

\* AT WEIR SECTION STA. 16+00

NOTE: SEE CHANNEL CROSS SECTIONS  
FOR WEIR DETAILS AND DETAILS OF  
RIPRAP PLACEMENT.



SECTION A-A  
NOT TO SCALE

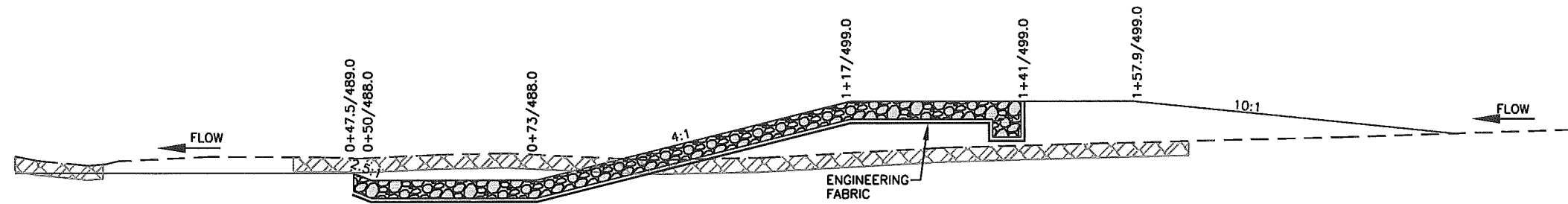
HORIZONTAL CONTROL			
DESCRIPTION	NORTHING	EASTING	ELEVATION
CP #3	31.5547	1248.6094	502.023
CP #4	71.4430	1088.8864	503.584
P.O.T. 14+00	-87.6478	1370.2853	
P.C. 15+25	-58.2579	1248.7895	
P.L. 15+85	-44.1507	1190.4715	
P.T. 16+44.58	-42.1551	1130.5047	
P.O.T. 17+00	-40.3119	1075.1186	

LIMITS OF CLEARING AND GRUBBING		
DESCRIPTION	NORTHING	EASTING
CG#1	-127.0827	1129.2565
CG#2	-76.8553	1100.2529
CG#3	37.8367	1127.9970
CG#4	-20.9432	1370.9886
CG#5	-176.4578	1333.3694

SITUATION PLAN SITE 7311-02



PARCEL  
NUMBER PROPERTY OWNER  
① CITY OF MANILLA  
② BNSF RAILWAY CO.

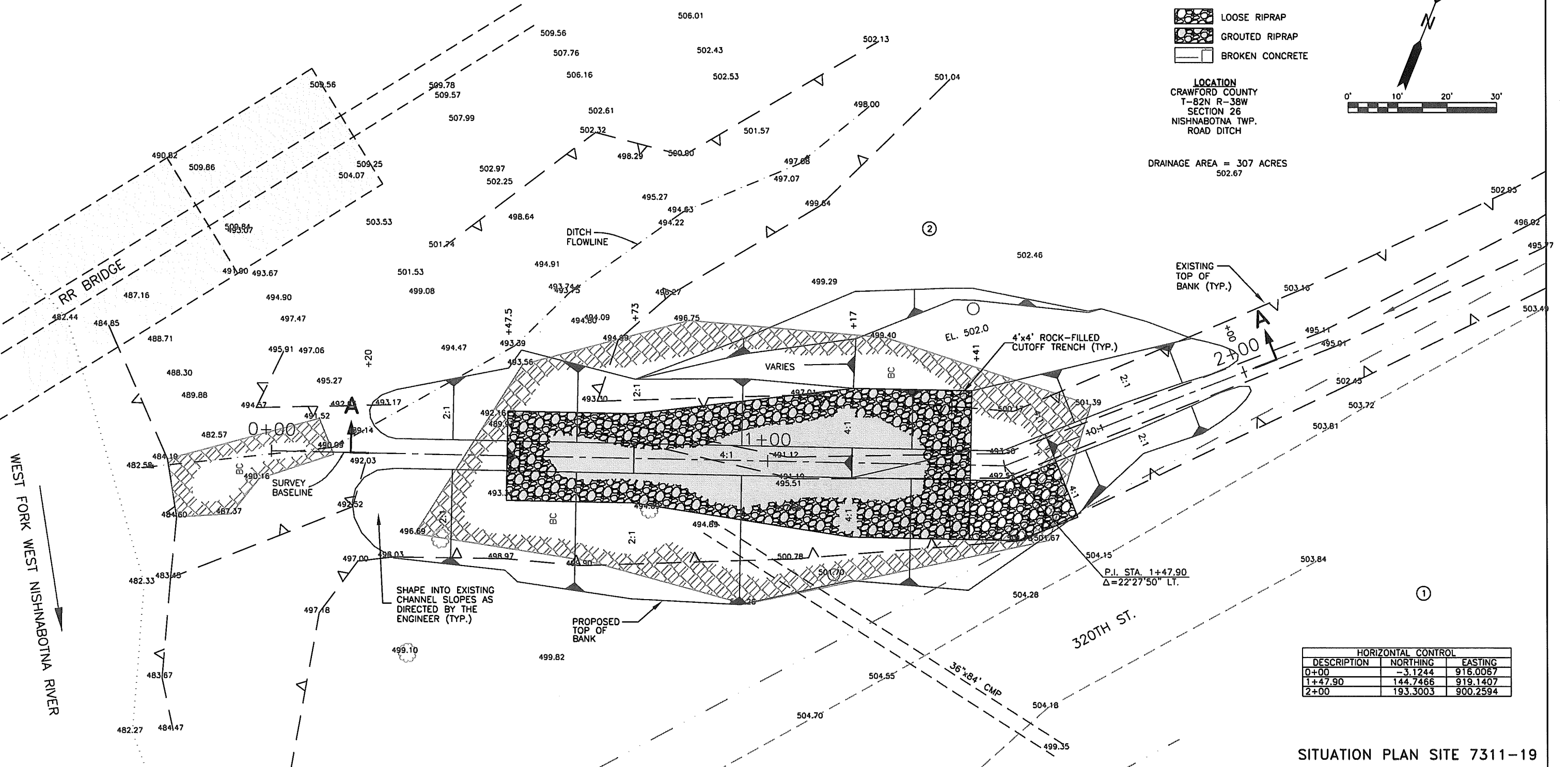
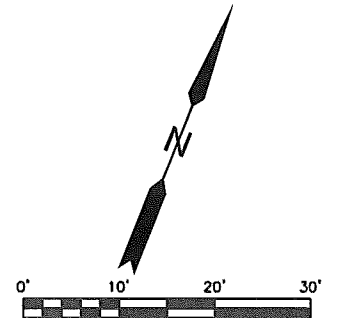


# SECTION A-A NOT TO SCALE

LOOSE RIPRAP  
GROUTED RIPRAP  
BROKEN CONCRETE

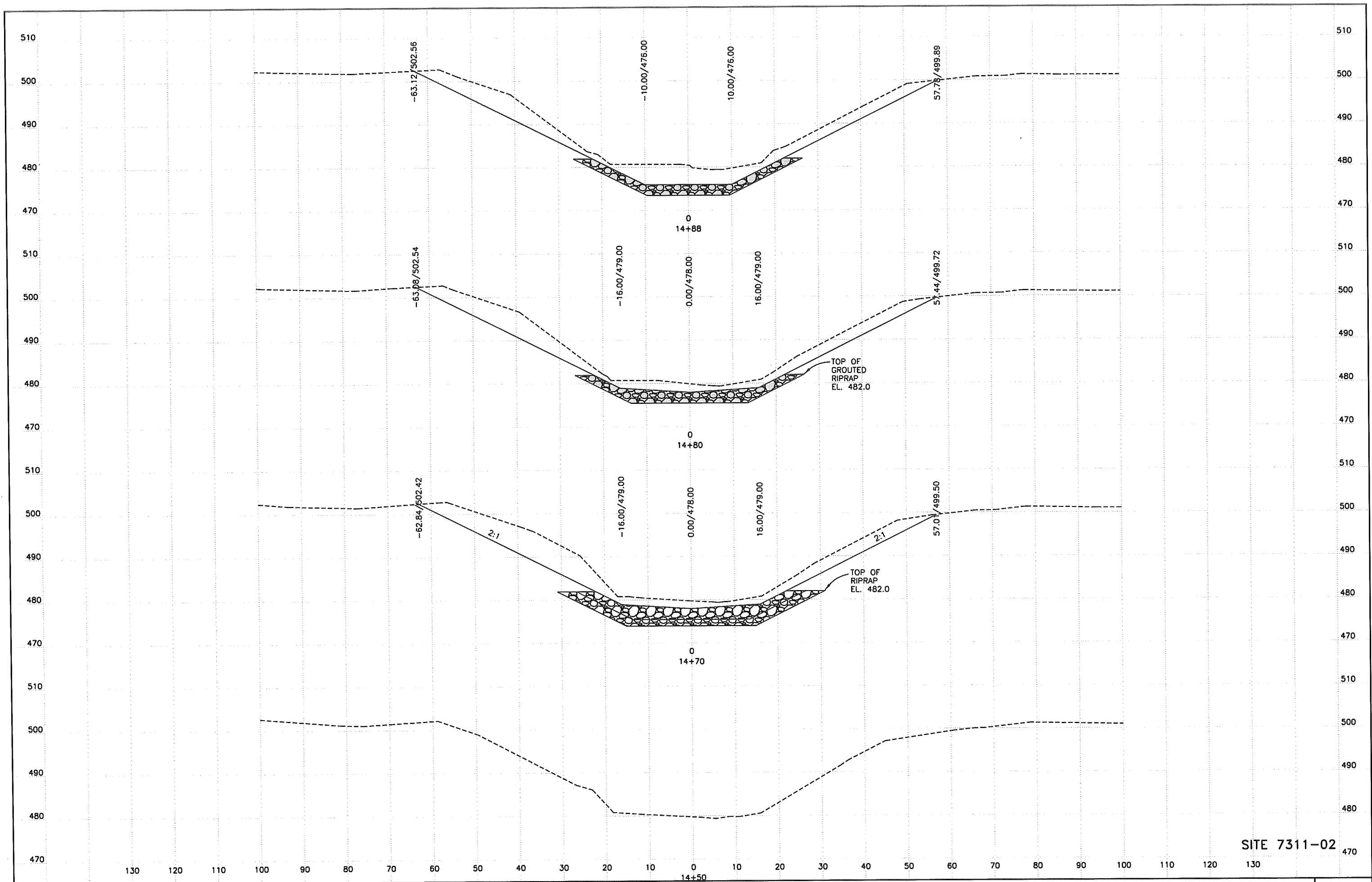
LOCATION  
CRAWFORD COUNTY  
T-82N R-38W  
SECTION 26  
NISHNABOTNA TWP.  
ROAD DITCH

DRAINAGE AREA = 307 ACRES  
502.67



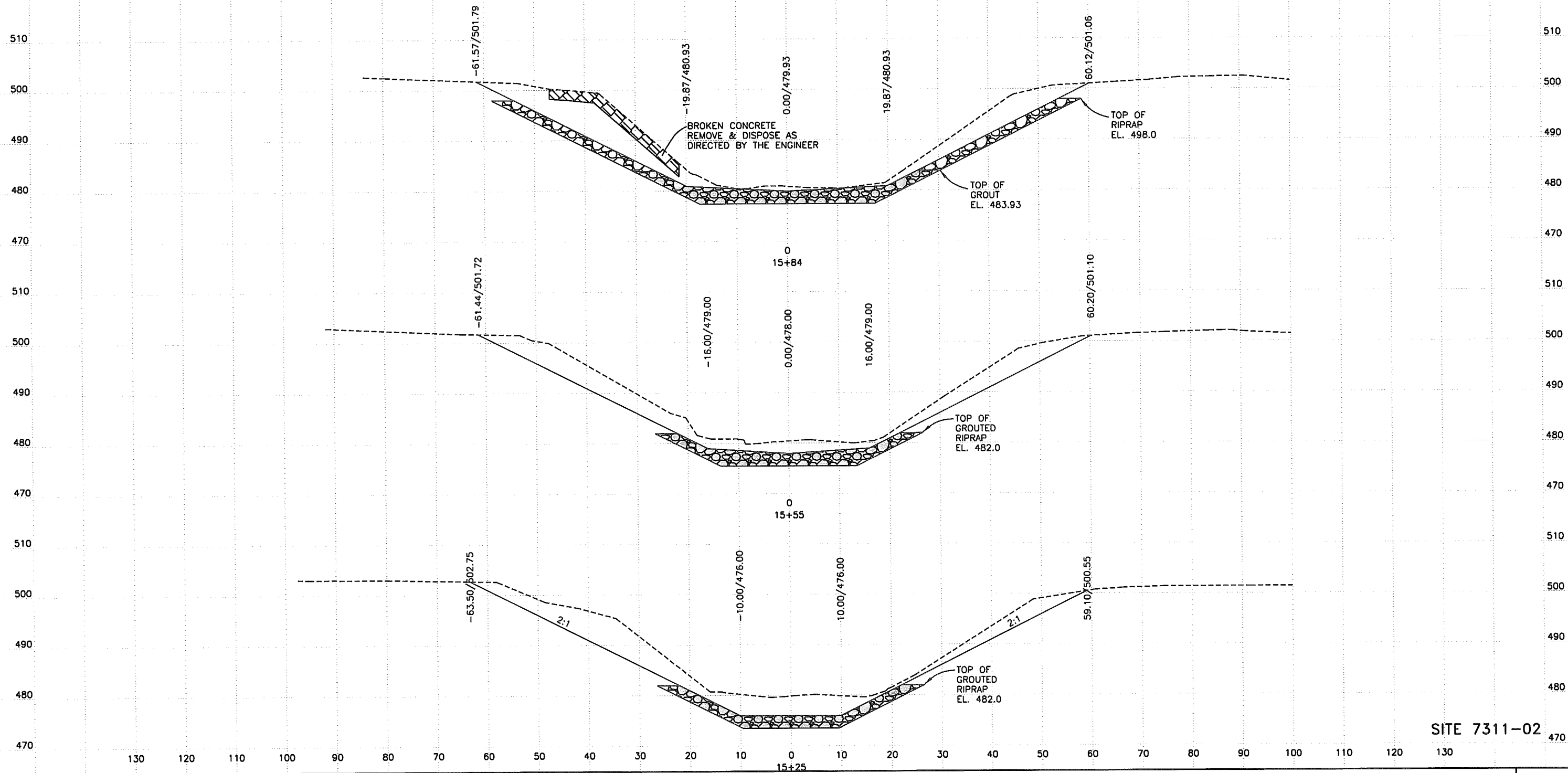
HORIZONTAL CONTROL		
DESCRIPTION	NORTHING	EASTING
0+00	-3.1244	916.0067
1+47.90	144.7466	919.1407
2+00	193.3003	900.2594

SITUATION PLAN SITE 7311-19

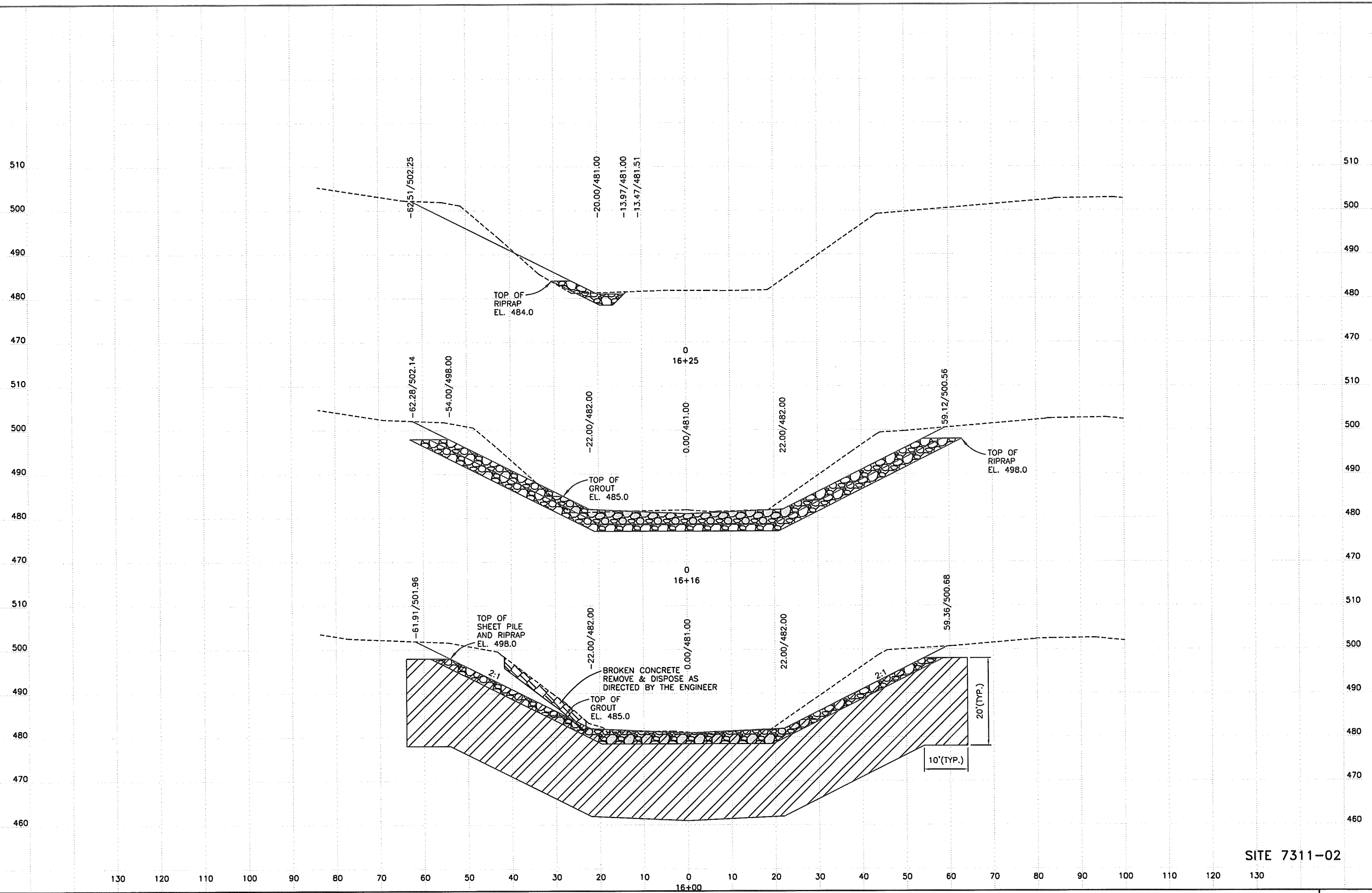


SITE 7311-02

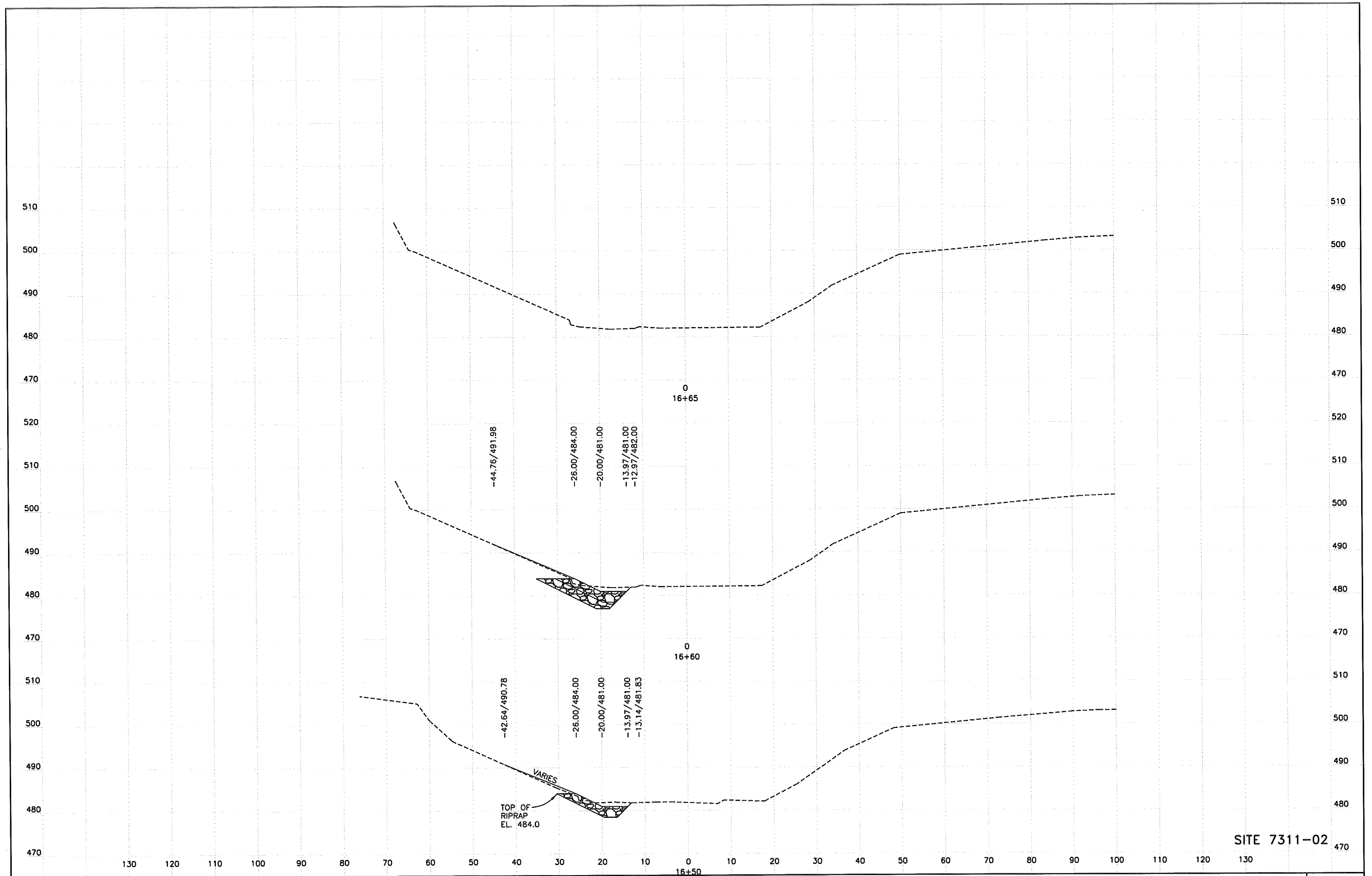




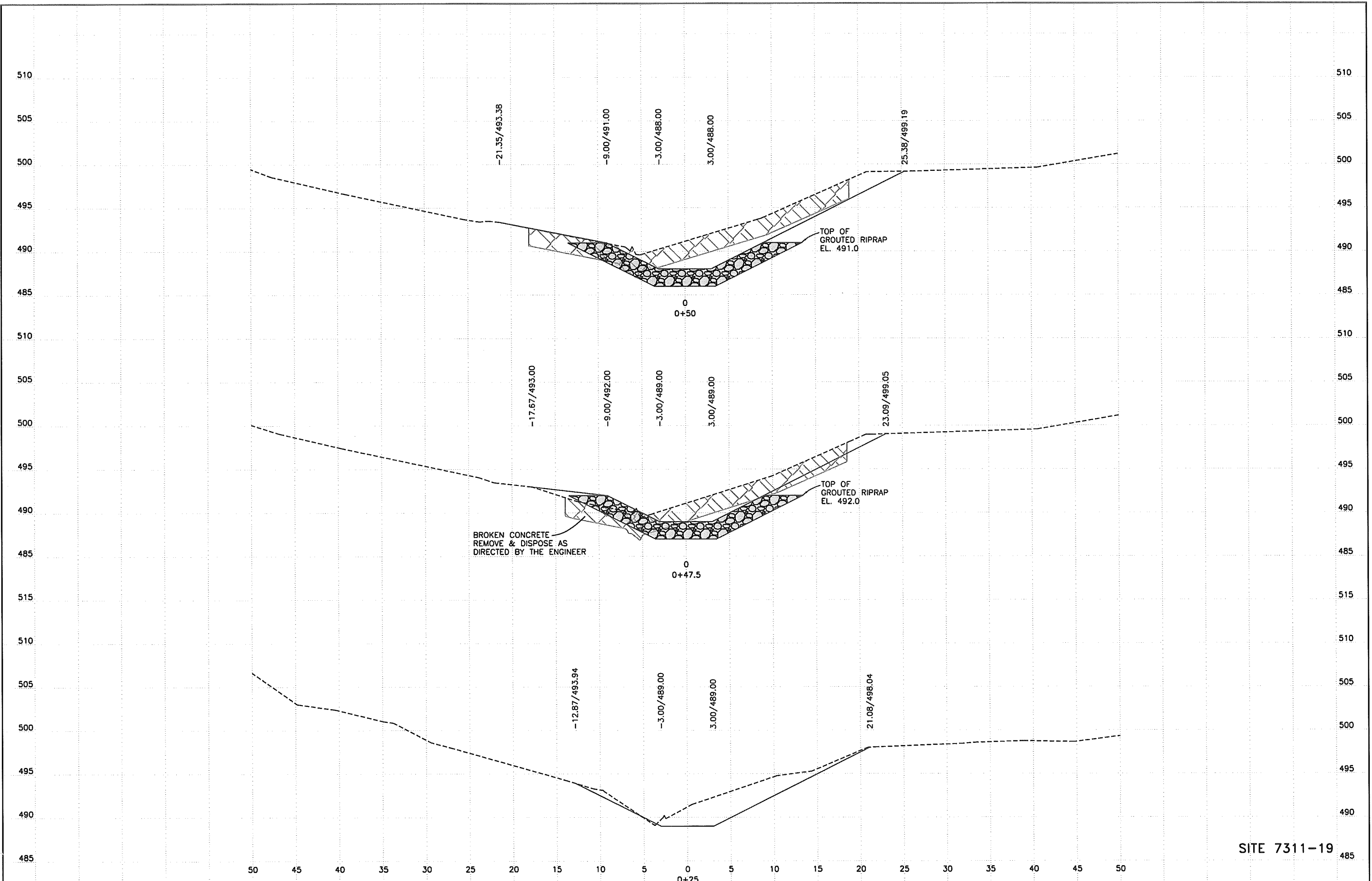
SITE 7311-02



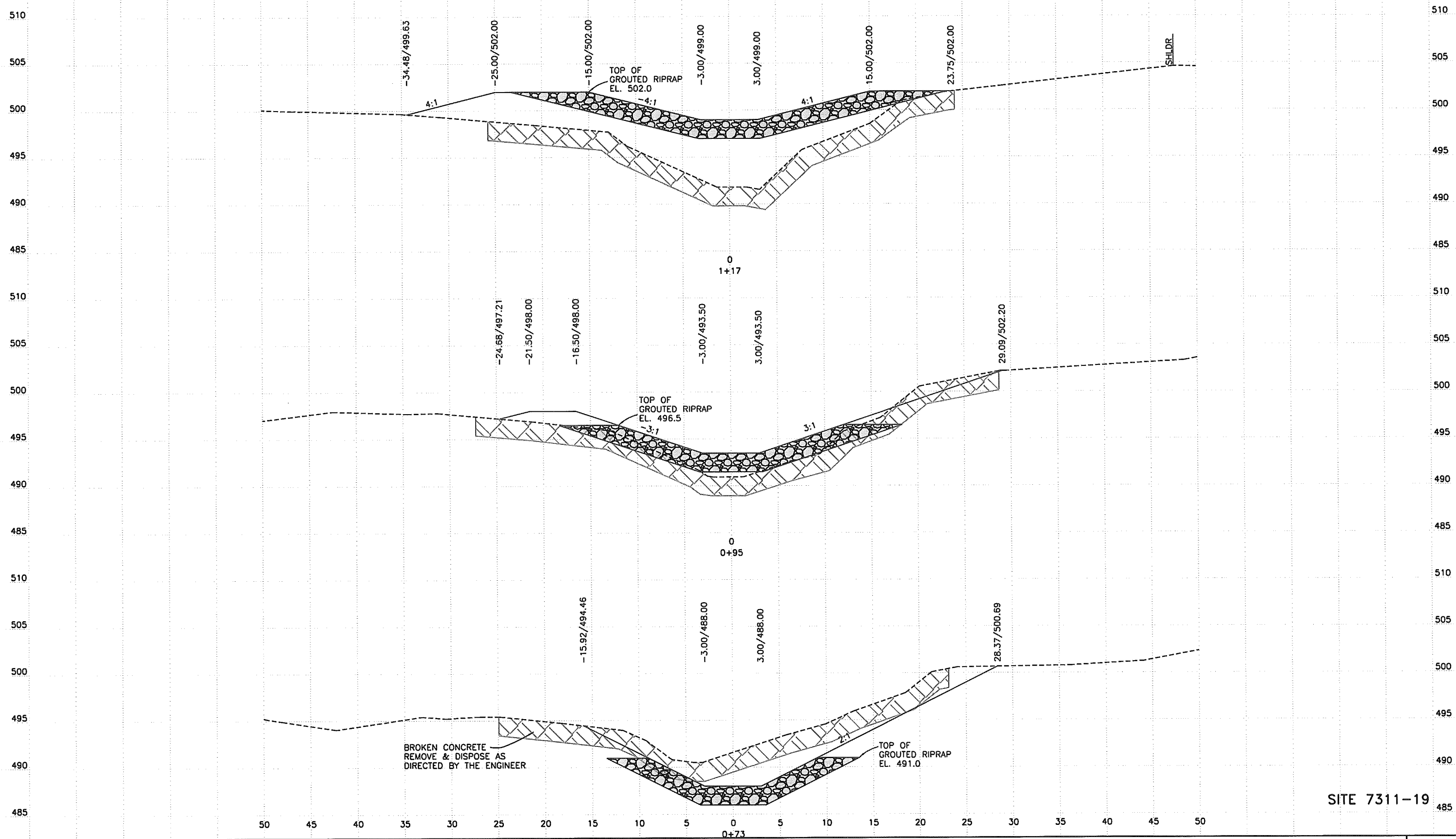
SITE 7311-02



SITE 7311-02



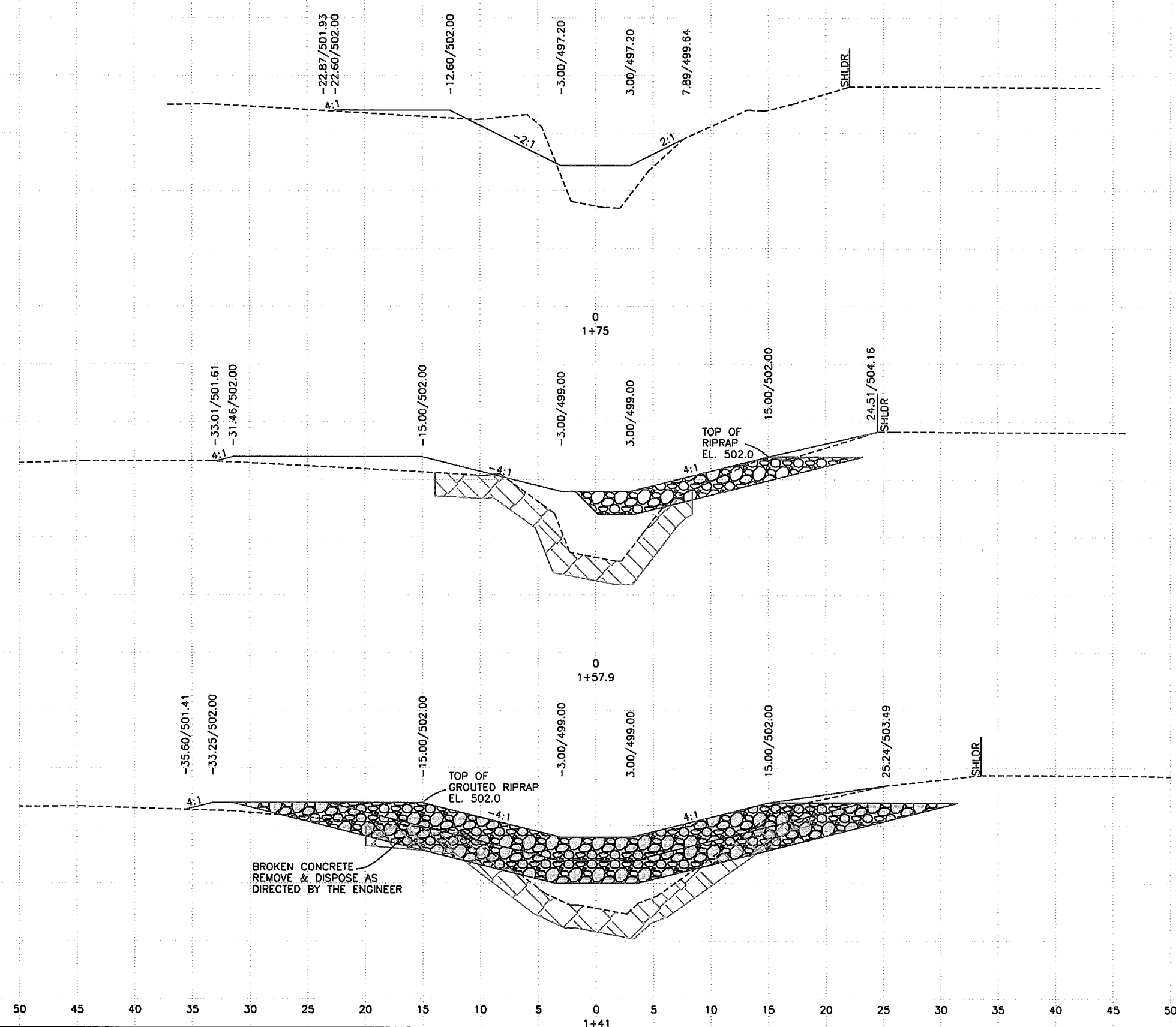
SITE 7311-19



SITE 7311-19

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SITE 7311-19