RCB CULVERT REPLACEMENT – TWIN BOX
BRS–C024(105)––60–24
CRAWFORD COUNTY

LETTING DATE 01–21–2015

TRAFFIC CONTROL PLAN

THIS ROAD WILL BE CLOSED 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 14, PERMIT NO. CEMVR–OD–P–2014–1408. A COPY OF THIS PERMIT IS AVAILABLE FROM THE IOWA DOT OFFICE OF CONTRACTS 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 THE CRAWFORD COUNTY ENGINEER.

ADDRESS: 1202 BROADWAY, P.O. BOX 458
DENISON, IOWA 51442–0458
TELEPHONE: (712)263–2449
EMAIL: passman@crawfordcounty.org

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. BRS–C024(105)––60–24

RCB CULVERT REPLACEMENT – TWIN BOX

ON 140TH STREET OVER

WILLOW CREEK

SCALES: AS NOTED

REFER TO THE PROPOSAL FORM FOR LIST OF APPLICABLE SPECIFICATIONS.

TOTAL SHEETS
16
PROJECT NUMBER
BRS–C024(105)––60–24
R.O.W. PROJECT NUMBER
PROJECT IDENTIFICATION NUMBER
FHWA STRUCTURE NO. 128270

INDEX OF SHEETS

STANDARD ROAD PLANS

STANDARD ROAD PLANS ARE LISTED ON PLAN SHEET C1.

STANDARD BRIDGE PLANS

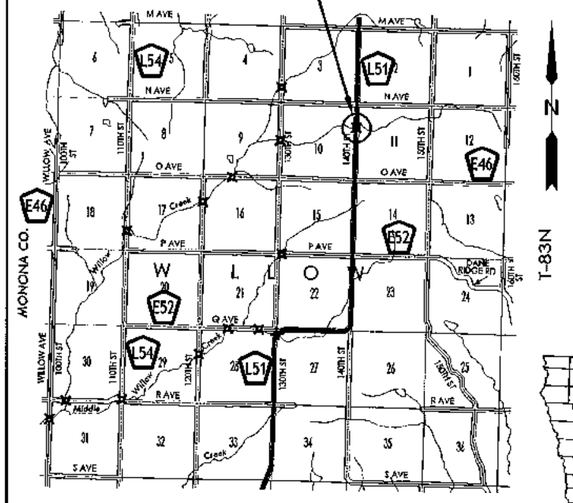
STANDARD BRIDGE PLANS ARE LISTED ON PLAN SHEET C1.

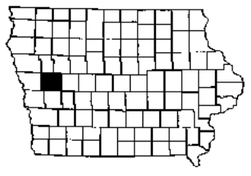
UTILITY CONTACTS

FRONTIER COMMUNICATIONS
DON PILLING
OFFICE 712–263–4840, 712–263–6086

WESTERN IOWA POWER COOPERATIVE
JIM FREML
OFFICE 712–263–2943
CELL 712–269–9003

STA. 10+52
PROPOSED TWIN 12'x12'x50' RCB
20° SKEW RT. AHEAD
B.O.P. STA. 9+77
E.O.P. STA. 11+20





IOWA ONE CALL
CALL BEFORE YOU DIG!
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

04–30–02	101–4
DESIGN DATA RURAL	
2012 AADT	310 V.P.D.
2032 AADT	370 V.P.D.
201X DHV	X V.P.H.
TRUCKS	5 %
TOTAL DESIGN ESALs	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A1	TROY J. GROTH	PRIMARY SIGNATURE BLOCK
Q1	JAMES A. BERTSCH	GEOTECHNICAL DESIGN
CULVERT STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN

Approved

BOARD OF SUPERVISORS

MILEAGE SUMMARY

LOCATION	LIN. FT.	MILES
BOP STA. 9+77 TO EOP STA. 11+20	143.00	
NET LENGTH OF ROADWAY	143.00	0.027

Approved

10/14/14
CRAWFORD COUNTY ENGINEER 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.

LICENSED PROFESSIONAL ENGINEER TROY J. GROTH 14450 IOWA

TROY J. GROTH, P.E. #14450 10/10/2014 DATE

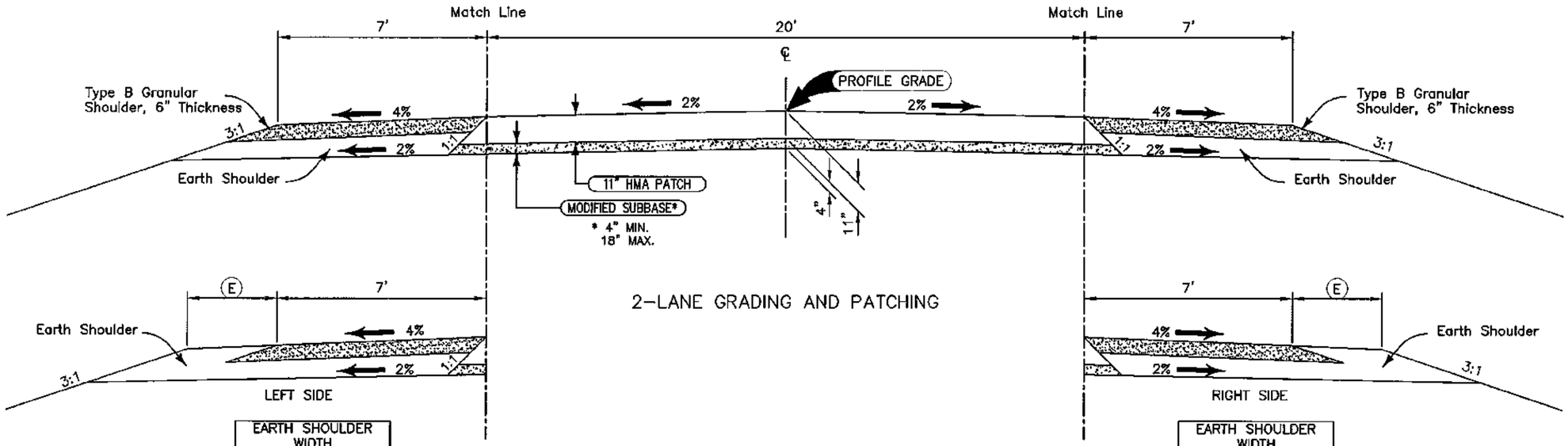
MY LICENSE RENEWAL DATE IS DECEMBER 31, 2015.

PAGES OR SHEETS COVERED BY THIS SEAL:
A1, B1, C1–4, U1–2, V1, W1–3, Z1–3

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
0 1 2 3
SCALE IN MILES

DESIGN TEAM: TJG/SAS/TKK	ENGLISH	SE PROJECT NO. : 02413	FHWA NO. 128270	CRAWFORD COUNTY	PROJECT NUMBER BRS–C024(105)––60–24	SHEET NUMBER A1

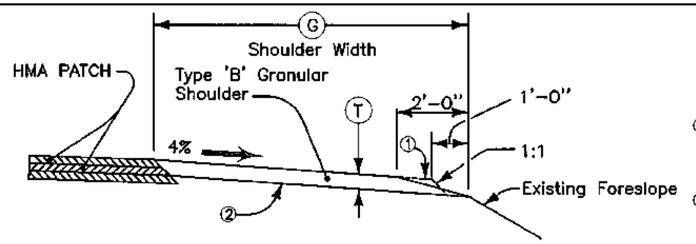


2-LANE GRADING AND PATCHING

EARTH SHOULDER WIDTH	
STATION	Ⓔ
9+97.8	0
10+09.0	3
10+76.5	3
10+87.7	0

EARTH SHOULDER WIDTH	
STATION	Ⓔ
10+15.1	0
10+26.3	3
10+93.9	3
11+05.1	0

COMBINATION SHOULDER
(BARNROOF SECTION)



GS-1

Notes:

Quantities have been determined on the basis of a design weight of 140 lbs. per cubic foot.

① Place and compact material to the dashed lines; then blade and shape to foreslope that portion above the solid line in the outer 2' and roll with loaded truck tire.

② Existing shoulder surface to be shaped to a uniform cross slope prior to placing granular shoulder material. Shape to ensure the thickness of the granular shoulder material is not less than the thickness of the resurfacing.

③ Tons per side per station.

LOCATION				TONS ③	Ⓣ	Ⓖ
ROAD IDENTIFICATION	STATION TO STATION		SIDE		Inches	Feet
L51	9+77	11+20	BOTH	26.6	6	7

TYPICAL SECTION
FOR TYPE 'B'
GRANULAR SHOULDER
ADJACENT TO HOT MIX ASPHALT PATCH

ESTIMATED PROJECT QUANTITIES

100-1A
07-15-97

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QTY.
1	2101-0850001	CLEARING AND GRUBBING	ACRE	0.2	
2	2102-0425070	SPECIAL BACKFILL	TON	250.5	
3	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	948.5	
4	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	1267.7	
5	2107-0425020	COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES	CY	88.9	
6	2107-0875000	COMPACTION WITH MOISTURE AND DENSITY	CY	3161.8	
	2113-0001100	SUBGRADE STABILIZATION MATERIAL, POLYMER GRID	SY	534.2	
8	2115-0100000	MODIFIED SUBBASE	CY	167.8	
9	2121-7425020	GRANULAR SHOULDERS, TYPE B	TON	76.1	
10	2123-7450020	SHOULDER FINISHING, EARTH	STA	2.86	
11	2210-0475290	MACADAM STONE BASE	TON	319.4	
12	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1.00	
13	2402-2720000	EXCAVATION, CLASS 20	CY	2641	
14	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	342.1	
15	2404-7775000	REINFORCING STEEL	LB	49674	
16	2501-5775000	PILES, STEEL SHEET	SF	743	
17	2502-8212204	SUBDRAIN, PERFORATED PLASTIC PIPE, 4 IN. DIA.	LF	65	
18	2502-8220196	SUBDRAIN OUTLET, RF-19E	EACH	2	
19	2505-4008120	REMOVAL OF STEEL BEAM GUARDRAIL	LF	209.0	
20	2507-3250005	ENGINEERING FABRIC	SY	1301.5	
21	2507-6800021	REVETMENT, CLASS B	TON	149.9	
22	2518-6910000	SAFETY CLOSURE	EACH	2	
23	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	4.65	
24	2528-8445110	TRAFFIC CONTROL	LS	1.00	
25	2529-5070111	PATCHES, FULL-DEPTH FINISH, BY AREA (50 FEET OR GREATER IN LENGTH)	SY	317.8	
26	2529-5070120	PATCHES, FULL-DEPTH FINISH, BY COUNT	EACH	2	
27	2533-4980005	MOBILIZATION	LS	1.00	
28	2601-2634100	MULCHING	ACRE	0.2	
29	2601-2636015	NATIVE GRASS SEEDING	ACRE	0.1	
30	2601-2636043	SEEDING AND FERTILIZING (RURAL)	ACRE	0.1	
31	2601-2643412	TURF REINFORCEMENT MAT, TYPE 2	SQ	9.6	

STANDARD ROAD PLANS

105-4
10-18-11

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

NUMBER	DATE	TITLE
EC-101	04-20-10	WOOD EXCELSIOR MAT FOR DITCH PROTECTION
EW-101	04-19-11	EMBANKMENT AND REBUILDING EMBANKMENTS
PM-110	04-16-13	LINE TYPES
RF-19A	10-16-12	SUBDRAINS FOR FILL OR FOUNDATION DRAINAGE (STANDARD)
RF-19E	10-21-14	OUTLETS FOR LONGITUDINAL, TRANSVERSE AND BACKSLOPE SUBDRAINS
TC-252	04-17-12	ROUTES CLOSED TO TRAFFIC

STANDARD BRIDGE PLANS

STANDARD	ISSUED	REVISED
TWRCB G1-12	APRIL, 2012	10-12
TWRCB G2-12	APRIL, 2012	07-14
TWRCB 12-10-12	APRIL, 2012	
TWH 15-1-12	APRIL, 2012	
TWH 15-2-12	APRIL, 2012	
TWH 15-3-12	APRIL, 2012	
TWH 15-4-12	APRIL, 2012	
TWH 15-5-12	APRIL, 2012	05-13
TWH 15-6-12	APRIL, 2012	

INDEX OF TABULATIONS

111-25
10-18-11

ESTIMATE REFERENCE INFORMATION

100-4A
10-29-02

2101-0850001 CLEARING AND GRUBBING
AREA IS LOCATED EAST OF THE ROADWAY WITHIN THE LIMITS OF THE PROPOSED RIGHT-OF-WAY AND TEMPORARY EASEMENT SHOWN ON PLAN SHEET V1.

2102-0425070 SPECIAL BACKFILL
REFER TO DETAILS ON PLAN SHEET U1. CRUSHED LIMESTONE OR CRUSHED CONCRETE SPECIAL BACKFILL MATERIAL SHALL BE USED. NO GRAVEL OR RAP WILL BE ALLOWED.

2102-2710070 EXCAVATION, CLASS 10, ROADWAY AND BORROW
INCLUDES 405.4 C.Y. CUT, 948.5 C.Y. FILL +35% SHRINK, AND 543.1 C.Y. BORROW. REFER TO TABULATION OF EARTHWORK QUANTITIES ON PLAN SHEET C3. TYPE A COMPACTION WILL BE REQUIRED. BORROW MAY BE OBTAINED FROM SUITABLE CLASS 20 AND CLASS 10 CHANNEL EXCAVATION. THE CONTRACTOR SHALL PROVIDE ADDITIONAL NECESSARY BORROW. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED.

EXISTING SLOPES THAT ARE TO RECEIVE EMBANKMENT, REGARDLESS OF THEIR HEIGHT, SHALL BE PREPARED IN ACCORDANCE WITH ARTICLE 2107.03, C, 2, OF THE STANDARD SPECIFICATIONS.

A SUFFICIENT VOLUME OF SOIL HIGH IN ORGANIC CONTENT IS AVAILABLE WITHIN THE EXCAVATION LIMITS OF THE PROJECT. THIS MATERIAL SHALL BE DEPOSITED AS THE FINAL LAYER TO A MINIMUM FINISHED DEPTH OF 4 INCHES ON THE PROPOSED ROADWAY FORESLOPES AND OTHER DISTURBED AREAS TO FACILITATE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THIS BID ITEM.

PAYMENT FOR THIS ITEM WILL BE AT PLAN QUANTITY. CROSS SECTIONS WILL NOT BE TAKEN AFTER EXCAVATION FOR THE PURPOSE OF DETERMINING ACTUAL QUANTITIES.

2104-2710020 EXCAVATION, CLASS 10, CHANNEL
INCLUDES 1267.7 C.Y. CUT, 0.0 C.Y. FILL + 35% SHRINK, AND 1267.7 C.Y. WASTE. EXCESS MATERIAL AND UNSUITABLE MATERIAL NOT DESIRABLE TO BE INCORPORATED INTO THE WORK INVOLVED ON THIS PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE HAULED FROM THE SITE. 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. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED.

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

PAYMENT FOR THIS ITEM WILL BE AT PLAN QUANTITY. CROSS SECTIONS WILL NOT BE TAKEN AFTER EXCAVATION FOR THE PURPOSE OF DETERMINING ACTUAL QUANTITIES.

2107-0425020 COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES
2107-0875000 COMPACTION WITH MOISTURE AND DENSITY CONTROL
ALL EMBANKMENT, EXCEPT MACADAM STONE AND MODIFIED SUBBASE, SHALL BE COMPACTED WITH MOISTURE AND DENSITY CONTROL, INCLUDING ANY BACKFILL MADE NECESSARY BY REMOVAL OF THE EXISTING BRIDGE AND BACKFILL PLACED WITHIN THE LIMITS OF THE CLASS 20 EXCAVATION. THIS SPECIFICATION SHALL NOT APPLY TO FILL PLACED ON THE CHANNEL BANKS.

FILL SHALL BE COMPACTED TO AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY. PRIOR TO COMPACTION, THE MOISTURE CONTENT OF THE MATERIAL SHALL BE WITHIN MINUS 3% AND PLUS 3% OF THE OPTIUM MOISTURE CONTENT AS DETERMINED IN GENERAL ACCORDANCE WITH ASTM D 698 PROCEDURES.

2113-0001100 SUBGRADE STABILIZATION MATERIAL, POLYMER GRID
REFER TO DETAILS ON PLAN SHEET U1.

2115-0100000 MODIFIED SUBBASE
AGGREGATE TYPE SHALL BE CRUSHED LIMESTONE OR CRUSHED CONCRETE. NO GRAVEL OR RAP WILL BE ALLOWED. REFER TO DETAILS ON PLAN SHEET U2.

2121-7425020 GRANULAR SHOULDERS, TYPE B
REFER TO DETAILS ON PLAN SHEET B1. GRAVEL/LIMESTONE MEETING THE REQUIREMENTS OF ARTICLE 4120.02 OF THE STANDARD SPECIFICATIONS WILL BE ALLOWED.

2123-7450020 SHOULDER FINISHING, EARTH
REFER TO DETAILS ON PLAN SHEET B1.

2210-0475290 MACADAM STONE BASE
REFER TO DETAILS ON PLAN SHEET U1. REMOVAL OF UNSUITABLE OR UNSTABLE SOIL AND PLACEMENT OF MACADAM STONE MATERIAL SHALL BE IN ACCORDANCE WITH ARTICLE 2402.03, C, 3, OF THE STANDARD SPECIFICATIONS. NO ADJUSTMENT IN UNIT PRICE WILL BE ALLOWED FOR DEVIATION BETWEEN PLAN QUANTITY AND ACTUAL QUANTITY PLACED.

2401-6745625 REMOVAL OF EXISTING BRIDGE
THE EXISTING BRIDGE IS A 31' X 30' CONCRETE SLAB BRIDGE WITH TIMBER HIGH ABUTMENTS.

2402-2720000 EXCAVATION, CLASS 20
EXCAVATION TO THE LIMITS DETAILED ON PLAN SHEET U1 IS FOR PAY QUANTITIES ONLY. EXCESS MATERIAL AND UNSUITABLE SOILS 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 20 EXCAVATION.

PRIOR TO CONSTRUCTION OF THE RCB CULVERT, BACKFILL OF THE CLASS 20 EXCAVATION WITH MACADAM STONE BASE AND SPECIAL BACKFILL SHALL BE COMPLETED THROUGHOUT THE ENTIRE CROSS SECTION TO AN ELEVATION AT OR ABOVE THE BOTTOM OF THE CULVERT FLOOR.

ITEM SHALL INCLUDE ALL WORK IN CONJUNCTION WITH THE REMOVAL OF SURFACE WATER AND GROUND WATER AS NEEDED TO PERFORM THE REQUIRED CONSTRUCTION. THIS WORK 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. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE NATURE AND EXTENT OF DEWATERING REQUIRED TO COMPLETE THE PROPOSED WORK.

ESTIMATE REFERENCE INFORMATION

100-4A
10-29-02

2403-0100020 STRUCTURAL CONCRETE (RCB CULVERT)
REFER TO TABULATION ON PLAN SHEET C3 FOR CONCRETE PLACEMENT QUANTITIES. ITEM INCLUDES CERTIFIED PLANT INSPECTION IN ACCORDANCE WITH SECTION 2521 OF THE STANDARD SPECIFICATIONS.

2404-777500 REINFORCING STEEL
REFER TO TABULATION ON PLAN SHEET C3 FOR STEEL PLACEMENT QUANTITIES.

2501-5775000 PILES, STEEL SHEET
SHALL BE 5 GAGE STEEL SHEETING WITH A MINIMUM SECTION MODULUS OF 3.3 CUBIC INCHES PER FOOT. REFER TO DETAILS ON PLAN SHEET U1.

2502-8212204 SUBDRAIN, PERFORATED PLASTIC PIPE, 4 IN. DIA.
2502-8220196 SUBDRAIN OUTLET, RF-19E
REFER TO TABULATION ON PLAN SHEET C3 AND DETAILS ON PLAN SHEET U2.

2505-4008120 REMOVAL OF STEEL BEAM GUARDRAIL
NEATLY STACK ALL DELINEATORS AND OBJECT MARKERS WITHIN THE RIGHT-OF-WAY FOR REMOVAL BY THE COUNTY. REFER TO TABULATION ON PLAN SHEET C4.

2507-3250005 ENGINEERING FABRIC
ITEM INCLUDES 1135.1 S.Y. OF ENGINEERING FABRIC PLACED ON THE BOTTOM, TOP, ENDS AND SIDES OF THE MACADAM STONE BASE. REFER TO DETAILS ON PLAN SHEET U1. ENGINEERING FABRIC FOR THIS PURPOSE SHALL BE MIRAFI 500X, GEOTEX 200ST, CONTECH C200, OR APPROVED EQUAL.

ITEM INCLUDES 166.4 S.Y. OF ENGINEERING FABRIC PLACED UNDER THE CLASS B REVETMENT. REFER TO DETAILS ON PLAN SHEET U1. ENGINEERING FABRIC FOR THIS PURPOSE SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, 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 DETAILED 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.

2507-6800021 REVETMENT, CLASS B
THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING REVETMENT STONE, COMPLETE IN PLACE AS SHOWN ON THE DRAWINGS. REFER TO DETAILS ON PLAN SHEET U1.

DEWATERING REQUIRED TO INSTALL REVETMENT 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 REVETMENT STOCKPILES FROM FARM FIELDS UTILIZED BY CONTRACTOR IN THE PROJECT AREA. THIS WORK SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR THIS ITEM.

2518-6910000 SAFETY CLOSURE
REFER TO TABULATION ON PLAN SHEET C4.

2527-9263109 PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED
REFER TO TABULATION ON PLAN SHEET C4.

2529-5070111 PATCHES, FULL-DEPTH FINISH, BY AREA (50 FEET OR GREATER IN LENGTH)
2529-5070120 PATCHES, FULL-DEPTH FINISH, BY COUNT
REFER TO TABULATION ON PLAN SHEET C3. EXISTING PCC PAVEMENT VARIES IN THICKNESS FROM 9 INCHES TO 11 INCHES.

USE DESIGN MIX SIZE OF 3/4 INCHES. COMPLETE EACH LAYER TO FULL WIDTH BEFORE PLACING SUCCEEDING LAYERS. THE MAXIMUM COMPACTED THICKNESS OF LOWER LAYERS SHALL NOT EXCEED 4 INCHES.

ITEM INCLUDES CERTIFIED HMA PLANT INSPECTION IN ACCORDANCE WITH SECTION 2521 OF THE STANDARD SPECIFICATIONS.

2601-2636015 NATIVE GRASS SEEDING
SEED ALL AREAS OF DISTURBED CHANNEL SLOPES THAT DO NOT RECEIVE REVETMENT.

2601-2636043 SEEDING AND FERTILIZING (RURAL)
SEED AND FERTILIZE ALL DISTURBED AREAS OUTSIDE OF THE CHANNEL WHICH DO NOT RECEIVE GRANULAR SURFACING.

2601-2643412 TURF REINFORCEMENT MAT, TYPE 2
APPLY TURF REINFORCEMENT MAT ACCORDING TO MANUFACTURER'S INSTRUCTIONS. REFER TO STANDARD ROAD PLAN EC-101 FOR DETAILS OF WOOD EXCELSIOR MAT INSTALLATION. REFER TO DETAILS ON PLAN SHEET C4.

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 CONTRACTOR'S EXPENSE WITHOUT COST TO THE CONTRACTING AUTHORITY. ANY TILE LINES BROKEN OR DISTURBED BY CUT LINES WILL BE REPLACED AS DIRECTED BY THE ENGINEER IN CHARGE OF CONSTRUCTION AND AT THE CONTRACTING AUTHORITY'S EXPENSE.

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 SHALL BE PROVIDED BY THE OWNER IN ACCORDANCE WITH ARTICLE 1105.06 OF THE STANDARD SPECIFICATIONS.

SOUNDING AND TEST BORING DATA SHOWN ON PLANS WERE ACCUMULATED FOR DESIGNING AND ESTIMATING PURPOSES. THEIR APPEARANCE ON THE PLAN DOES NOT CONSTITUTE A GUARANTEE THAT CONDITIONS OTHER THAN THOSE INDICATED WILL NOT BE ENCOUNTERED.

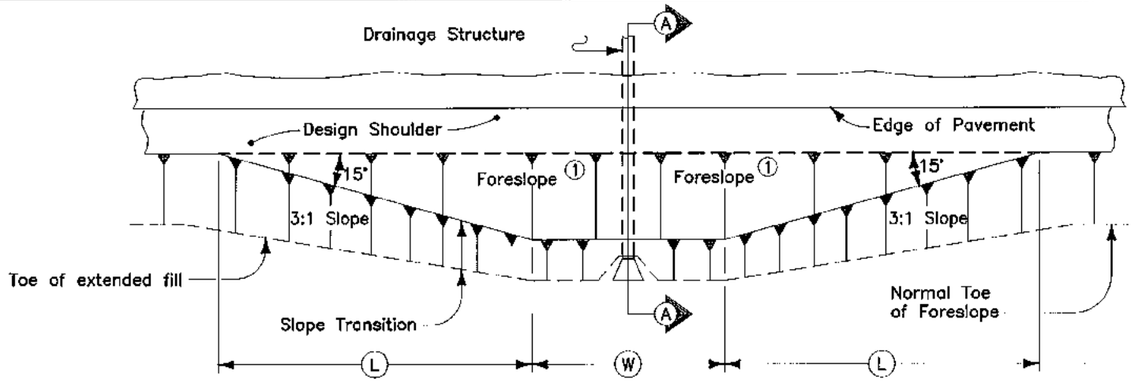
04-15-14 213-3
ALL STOCKPILE AREAS, HAUL ROADS, AND AREAS USED FOR EQUIPMENT ON THIS PROJECT REQUIRE SUBSOIL TILLAGE TO AN AVERAGE DEPTH OF 16 TO 20 INCHES PRIOR TO PLACEMENT OF TOPSOIL AND/OR STABILIZING CROP SEEDING. COMPLETE THIS TILLAGE AT 3 FOOT MAXIMUM CENTERS AND AT RIGHT ANGLES TO THE FINISHED SLOPE.

USE TILLAGE EQUIPMENT EQUIPPED WITH AN ARROWHEAD TYPE SHOE THAT WILL PROVIDE LATERAL DISPLACEMENT AND LIMIT THE MOVEMENT OF THE SUBSOIL TO THE SURFACE. OBTAIN THE ENGINEER'S APPROVAL FOR THE EQUIPMENT. THIS WORK IS INCIDENTAL TO OTHER WORK ON THE PROJECT.

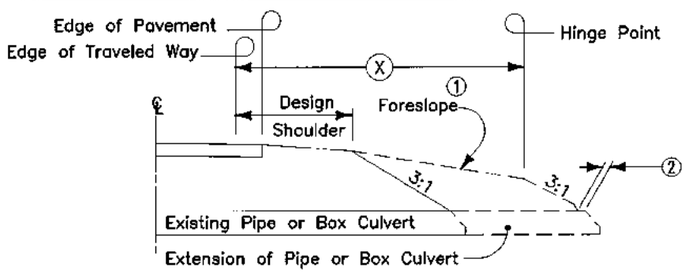
FOLLOWING THE SUBSOIL TILLAGE, THE AREA IS TO REMAIN IN A "LOOSENED" CONDITION. ADDITIONAL COMPACTION OR THE OPERATION OF HEAVY EQUIPMENT, OTHER THAN REQUIRED FOR TOPSOIL PLACEMENT AND SHAPING, WILL NOT BE ALLOWED ON AREAS WHICH HAVE BEEN RECEIVED SUBSOIL TILLAGE.

MODIFIED 232-9
CUT DOWN ALL TREES INCLUDED IN CLEARING AND GRUBBING AFTER SEPTEMBER 30 AND BEFORE APRIL 1. THESE TREES MAY BE INHABITED BY STATE AND FEDERAL LISTED THREATENED/ENDANGERED BAT SPECIES. REMOVING A TREE BETWEEN APRIL 1 AND SEPTEMBER 30 BEING USED BY A LISTED BAT CONSTITUTES A "TAKING" OF A PROTECTED SPECIES, WHICH IS PUNISHABLE BY LAW.

10-21-14 232-10
DISPOSE OF ALL WOOD MATERIAL GENERATED AS A RESULT OF CLEARING AND/OR GRUBBING ACCORDING TO THE IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP'S EMERALD ASH BORER (EAB) QUARANTINE ORDER. FOR MORE INFORMATION REFER TO http://www.iowatreepests.com/eab_regulations.html.



PLAN VIEW



SECTION A–A

STRUCTURE LOCATION		(W)	(L)	(X)
STATION	SIDE	FEET	FEET	FEET
10+52	BOTH	67.6	11.2	10

4311
MODIFIED

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 4% Design Slope
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.
(X) = Clear Zone.

DETAILS OF BARNROOF FORESLOPE AT DRAINAGE STRUCTURE

104-5C
10-19-10

LIST OF SUBDRAIN WORK
Refer to Standard Road Plans RF-3, RF-5, RF-14, RF-19A, RF-19B, RF-19C, RF-19E and RF-19F

*Not a bid item

Location			Pipe			Aprons		Outlets					Granular Material	Porous Backfill*	Class "A" Crushed Stone*	Remarks
No.	Station to Station	Type Of Installation	Concrete, C.M.P., C.M.P. Coated, or Plastic	Dia.	Length	RF-3	RF-5	RF-19E	RF-19F		Connected Pipe Joints (RF-14)*	Trench Drain	Blanket			
				IN	LF	No.	No.	No.	Type	No.	Type	LF	CY	CY	CY	
1	10+27	RF-19A TYPE 4	Plastic	4	33			1						1.67	0.21	
2	10+76	RF-19A TYPE 4	Plastic	4	32			1						1.84	0.23	
TOTALS					65			2						3.51	0.44	

TABULATION OF EARTHWORK QUANTITIES

STA.	CUT	ADD. CUT	FILL +35%	ADD. FILL	TOTAL CUT	TOTAL FILL+35%	BALANCE
9+77							
9+98	50.9		23.2		50.9	23.2	
10+09	23.4		54.0		23.4	54.0	
10+29	35.4		381.5		35.4	381.5	
10+38	14.4		263.9		14.4	263.9	
10+46	6.4		120.1		6.4	120.1	
10+57	0.0		7.5		0.0	7.5	
10+66	18.8		9.5		18.8	9.5	
10+74	33.5		11.7		33.5	11.7	
10+94	82.9		39.5		82.9	39.5	
11+05	62.4		21.6		62.4	21.6	
11+20	77.3		16.0		77.3	16.0	
TOTAL					405.4	948.5	

PLACEMENT OF QUANTITIES

TWIN 12'x12'x50' RCB CULVERT

LOCATION	CONCRETE C.Y. SLAB	FLOOR	WALLS	TOTAL	STEEL LBS.
INLET HEADWALL, 15° SKEW	2.9	60.0	29.5	92.4	10848
BARREL SECTION, 9'-0	8.1	8.6	11.6	28.3	5002
BARREL SECTION, 32'-0	28.9	30.6	41.2	100.7	17784
BARREL SECTION, 9'-0	8.1	8.6	11.6	28.3	5002
OUTLET HEADWALL, 15° SKEW	2.9	60.0	29.5	92.4	10848
5r1 DOWEL BARS (2 SETS REQ'D @ 95 LBS.)					190
TOTAL	50.9	167.8	123.4	342.1	49674

NOTE: FOR GENERAL INFORMATION, NOTES, SPECIFICATIONS & DESIGN STRESSES REFER TO IOWA D.O.T. HIGHWAY DIVISION STANDARD TWRCB-G1-12.

FOR DETAILS AND NOTES NOT SHOWN REFER TO STANDARD BRIDGE PLANS LISTED ON PLAN SHEET C1.

102-6C
10-21-14

TABULATION OF FULL-DEPTH PATCHES

Refer to Standard Road Plans PR-101, PR-102, PR-103, PR-104 and PR-140.

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
Count	Station or Milepost	Lane	Length	Width	Patch Thickness	With Dowels	Without Dowels	C R C										
						PR-103	PR-102	PR-104			PR-140	PR-101	PR-101 or PR-140			PR-101		
		L, R or B	FT	FT	IN	SY	SY	SY	SY	TON	SY	SY	No.	No.	No.	No.	No.	
2	10+48.5	B	143	10	11.0				317.8									

PAVEMENT MARKING LINE TYPES

108–22
04–16–13

See PM–110

*BCY4 – Place on the same side of the roadway to match existing markings near the project.
**NPY4 – For estimating purposes only, No Passing Zone Lines will be located in the field.
***MNY4 – Factor of 1.00 as value includes number of 4–inch passes to cover median nose area.

BCY4: Broken Centerline (Yellow) @ 0.25 DCY4: Double Centerline (Yellow) @ 2.00 NPY4: No Passing Zone Line (Yellow) @ 1.25 BLW4: Broken Lane Line (White) @ 0.25 ELW4: Edge Lane Right (White) @ 1.00
ELY4: Edge Line Left (Yellow) @ 1.00

Location								Length by Line Type (Unfactored)										Remarks
Road ID	Station to Station		Dir. of Travel	Marking Type	Side			BCY4*	DCY4	NPY4**	BLW4	ELW4	ELY4	SLW2				
					L	C	R	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	
L51	9+77	11+20	BOTH	WATERBORNE/SOLVENT PAINT			X					2.86						SURFACE
L51	9+77	11+20	SB	WATERBORNE/SOLVENT PAINT	X					1.43								
Length Subtotals										1.43		2.86						
Quantity Factors										1.25		1.00						
Totals										1.79		2.86						

SAFETY CLOSURES

108–13A
08–01–08

Refer to Section 2518 of the Standard Specifications

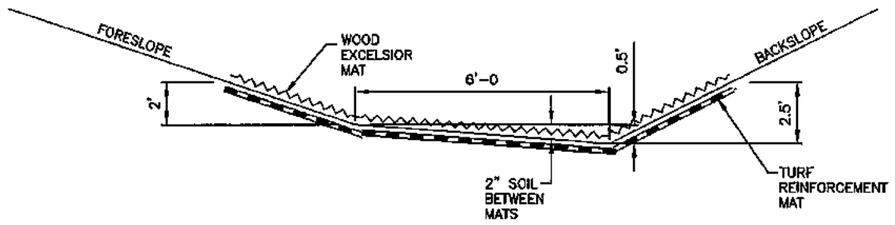
STATION	CLOSURE TYPE		REMARKS
	Road Qty.	Hazard Qty.	
9+25	–	1	SOUTH END
11+75	–	1	NORTH END
TOTAL		2	

REMOVAL OF STEEL BEAM GUARDRAIL

110–7A
04–17–12

① Lane (s) to which the installation is adjacent.
② Includes length of End Terminals and End Anchors.

No.	① Direction of Traffic	Location		Side	Removal of Guardrail ②
		Station to Station			LF
1	SB	9+59.2	10+15.8	L	57.0
2	NB	9+96.2	10+16.0	R	38.0
3	SB	10+47.4	11+03.8	L	57.0
4	NB	10+47.3	11+04.0	R	57.0
TOTAL					209.0



SWALE PROTECTION SECTION
(NOT TO SCALE)

LOG OF EXPLORATORY BORING

Sheet 1 of 1

Job Number: G4138
Project: L51 Bridge Replacement
Date Started: 9/23/14
Date Completed: 9/23/14

Boring No.: B-1
Boring Location: Crawford County, Iowa
Drill Type: HOLLOW STEM
Ground Elev.: 1264.6

Shelby Tube | Standard Split Spoon | Water Level ATD
Modified California | Grab Sample | Water Level After 24 Hours

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	USCS	Blow Counts SPT (N) Blows/Foot	Moisture Content, %	Dry Density (PCF)	% Saturation	Hand Penetrometer (TSF)	Unconfined Comp. Strength (TSF)	Liquid Limit %	Plastic Limit %	Plasticity Index %	Cone Pentrometer (Drops per 1-3/4")
			9.75 Inch Concrete Pavement											
			FILL, Lean Clay, Dark Gray and Yellow Brown, Very moist		2-5-6 N= 11	22								
5			(With Sand, Dakr Brown and Olive Gray)			17	113	96	2.00					
					1-3-3 N= 6	28								
10			(Wood Debris, Medium Gray)			29	90	94	0.50					
			LEAN CLAY, Black, Wet, Medium to Soft, Alluvium	CL	2-2-3 N= 5	43								
20			(Organics)			44	76	100	0.50	0.50				
25			(Olive Gray)		1-1-1 N= 2	43								
30			(Organics)		1-1-1 N= 2	49								
35			SANDY LEAN CLAY, Dark Gray, Wet, Soft, Alluvium	CL	1-1-2 N= 3	22								
40			SILT WITH SAND LENSES, Medium Gray, Wet, Medium, Alluvium	ML	1-1-3 N= 4	23								
			END OF BORING AT 40 FEET FREE WATER WAS ENCOUNTERED AT 14 FEET AT TIME OF DRILLING											

LOG OF BORING 041308.GPJ CERTIFIED TESTING.GDT 9/26/14

LOG OF EXPLORATORY BORING

Sheet 1 of 1

Job Number: G4138
Project: L51 Bridge Replacement
Date Started: 9/23/14
Date Completed: 9/23/14

Boring No.: B-2
Boring Location: Crawford County, Iowa
Drill Type: HOLLOW STEM
Ground Elev.: 1265.9

Shelby Tube | Standard Split Spoon | Water Level ATD
Modified California | Grab Sample | Water Level After 24 Hours

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	USCS	Blow Counts SPT (N) Blows/Foot	Moisture Content, %	Dry Density (PCF)	% Saturation	Hand Penetrometer (TSF)	Unconfined Comp. Strength (TSF)	Liquid Limit %	Plastic Limit %	Plasticity Index %	Cone Pentrometer (Drops per 1-3/4")
			11-Inch Concrete Pavement											
			FILL, Lean Clay With Sand, Medium Yellow Brown, Very Moist to Moist		2-3-3 N= 6	23								
5			(Gravel Layer)		1-1-3 N= 4	19								
			(Dark Brown and Olive Gray)			23	99	92	2.00					
10					1-1-3 N= 4	21								
			LEAN CLAY, Dark Gray Brown, Very Moist to Wet, Medium to Soft, Alluvium	CL		31	91	100	0.50	0.90				
20			(Grayish Yellow Brown)		1-1-1 N= 2	30								
25			(Medium Gray and Olive Gray)		1-1-1 N= 2	32								
30			(Gray and Yellow Brown Mottled)		1-1-1 N= 2	29								
35			SANDY LEAN CLAY, Medium Brown and Olive Gray, Wet, Medium, Alluvium	CL	1-3-3 N= 6	21								
40					1-3-3 N= 6	24								
			END OF BORING AT 40 FEET FREE WATER WAS ENCOUNTERED AT 14.1 FEET AT TIME OF DRILLING											

LOG OF BORING 041308.GPJ CERTIFIED TESTING.GDT 9/26/14

GEOTECHNICAL INFORMATION PROVIDED HEREWITH IS THE SOLE RESPONSIBILITY OF CERTIFIED TESTING SERVICES, INC., WHOSE GEOTECHNICAL REPORT DATED SEPTEMBER 29, 2014, COMPLETE WITH THE LICENSED ENGINEER'S SEAL AND CERTIFICATION, IS AVAILABLE FOR VIEWING.

SOUNDING DATA

NOTE: THESE SOUNDINGS WERE MADE FOR DESIGN PURPOSES AND ARE NOT GUARANTEED FOR CONSTRUCTION.

SOUNDINGS WERE TAKEN ON SEPTEMBER 23, 2014.

SEE SHEET V1 FOR BORING LOCATIONS.

LICENSED PROFESSIONAL ENGINEER JAMES A. BERTSCH 12121 IOWA

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

10-8-2014
JAMES A. BERTSCH, P.E. #12121 DATE

MY LICENSE RENEWAL DATE IS DECEMBER 31, 2014.

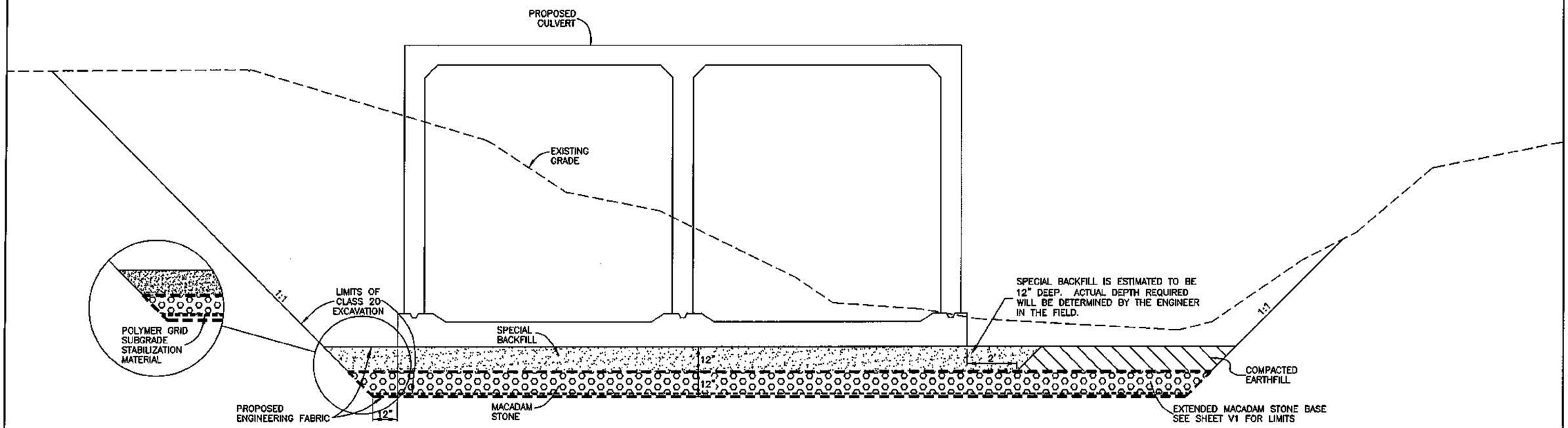
PAGES OR SHEETS COVERED BY THIS SEAL:
Q1

REV.:

SUNDQUIST ENGINEERING, P.C. | 120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442 | P712 263 8118 F712 263 2181 | SUNDQUISTENGINEERING.COM

SE PROJECT NO. 02413 DATE: 09/14 DRAWN BY: TKK REVIEWED BY: SAS APPROVED BY: TJG

CRAWFORD COUNTY PROJECT NO. BRS-C024(105)--60-24 SHEET Q1



CLASS 20 EXCAVATION & FOUNDATION TYPICAL SECTION
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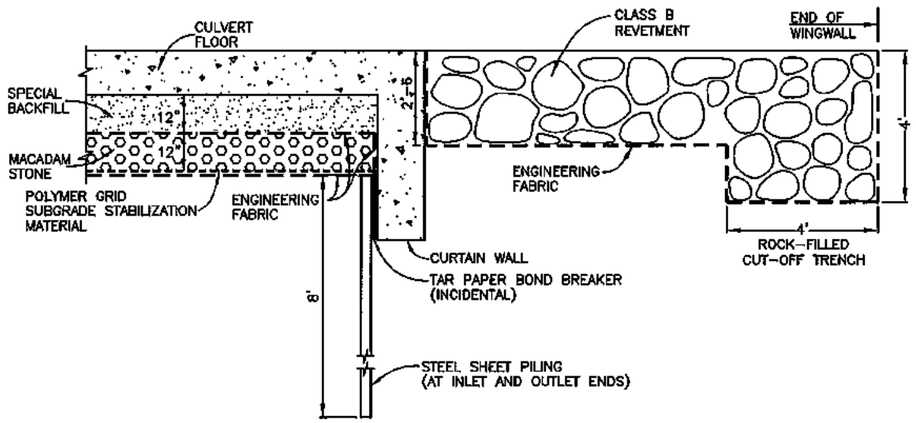

SECTION AT HEADWALL CURTAIN WALL
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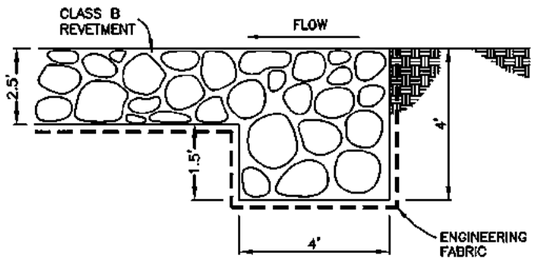
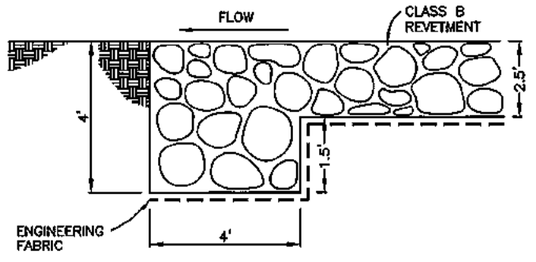


TYPICAL UPSTREAM



TYPICAL DOWNSTREAM

ROCK-FILLED CUTOFF TRENCH DETAILS
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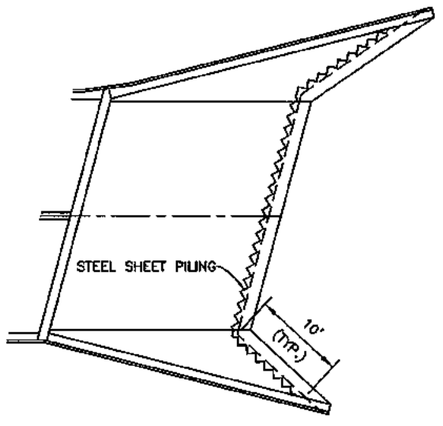
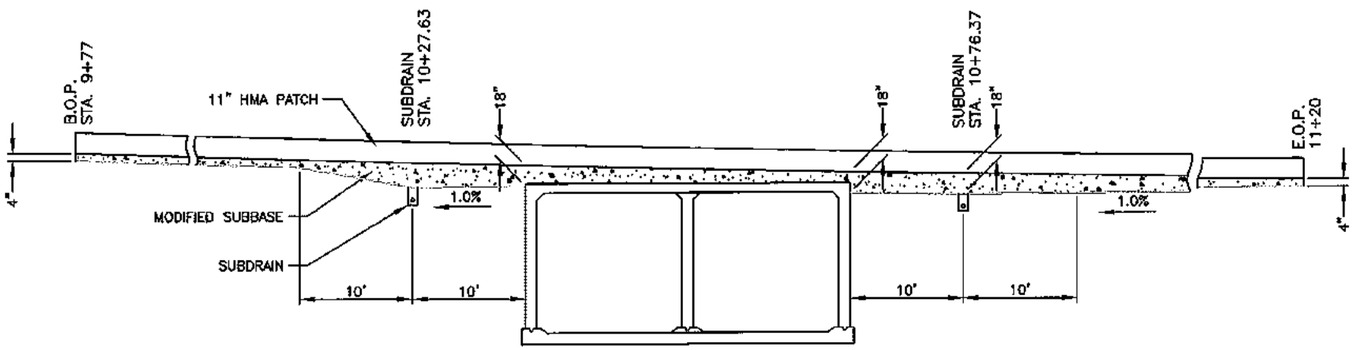
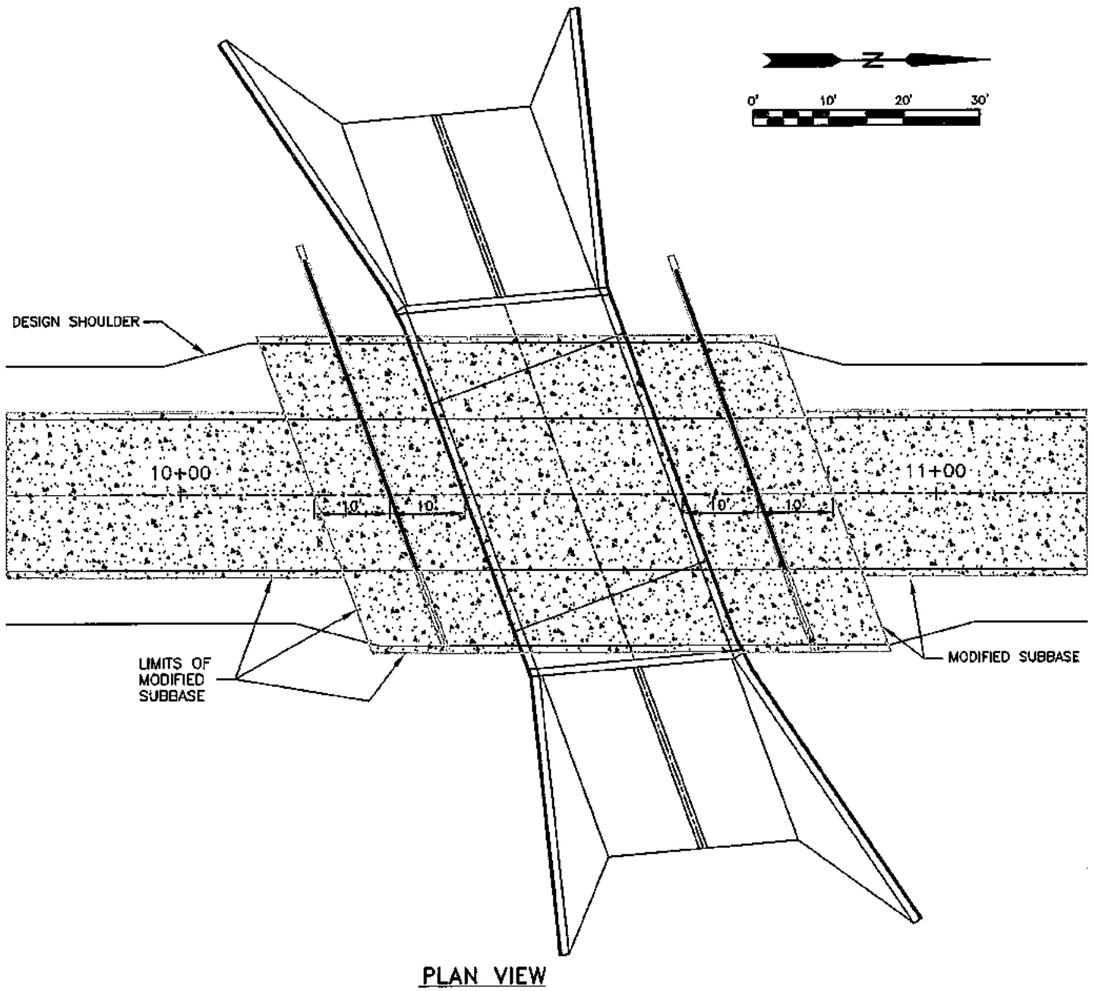


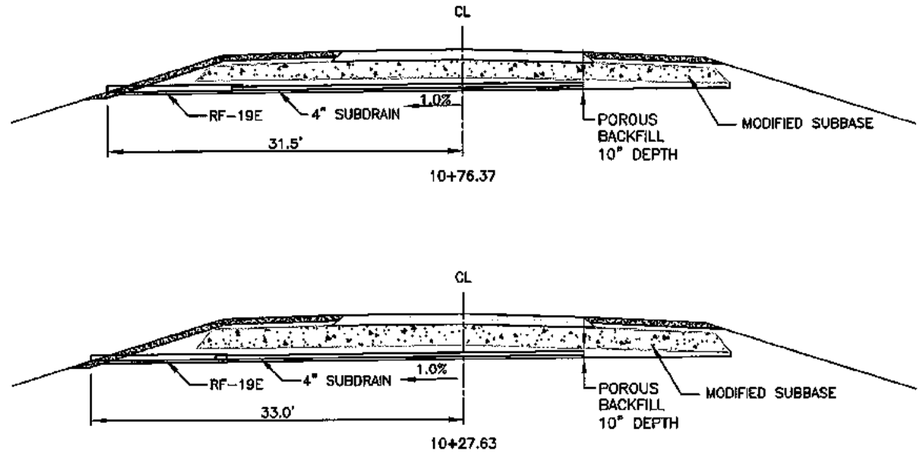
STEEL SHEET PILE AT CURTAIN WALL
NOT TO SCALE



LONGITUDINAL SECTION ALONG CENTERLINE OF ROADWAY
(NOT TO SCALE)



PLAN VIEW



SUBDRAIN SECTIONS
(NOT TO SCALE)

MODIFIED SUBBASE DETAILS

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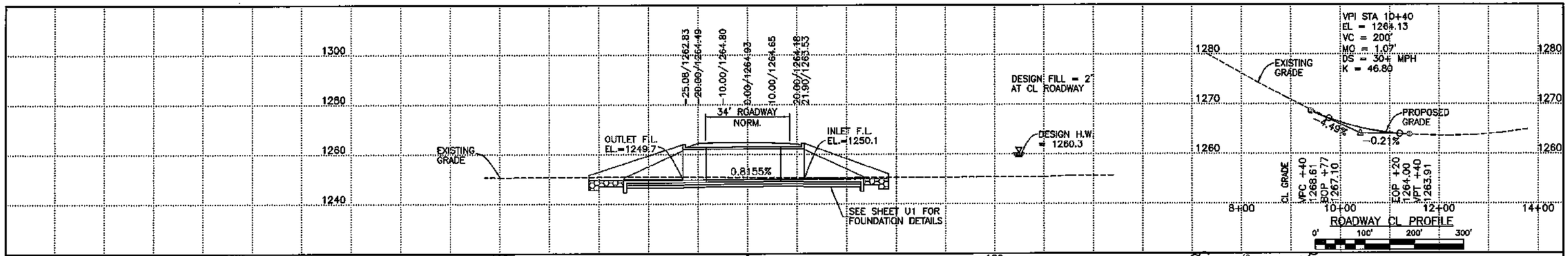
REV.:



PARCEL NUMBER — PROPERTY OWNER

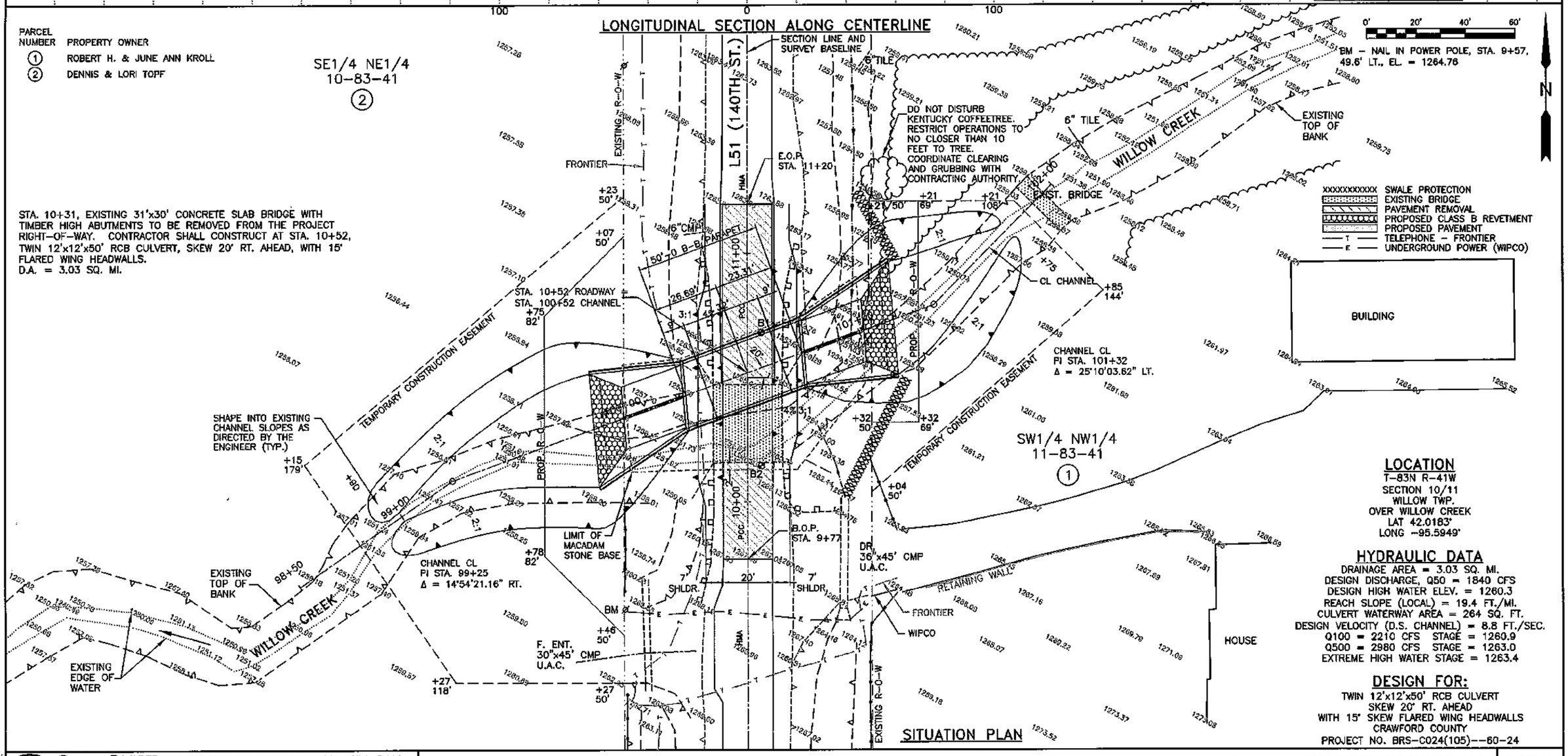
① ROBERT H. & JUNE ANN KROLL

② DENNIS & LORI TOPF

SE1/4 NE1/4
10–83–41
②

STA. 10+31, EXISTING 31'x30' CONCRETE SLAB BRIDGE WITH TIMBER HIGH ABUTMENTS TO BE REMOVED FROM THE PROJECT RIGHT–OF–WAY. CONTRACTOR SHALL CONSTRUCT AT STA. 10+52, TWIN 12'x12'x50' RCB CULVERT, SKEW 20' RT. AHEAD, WITH 15' FLARED WING HEADWALLS.
D.A. = 3.03 SQ. MI.

LONGITUDINAL SECTION ALONG CENTERLINE



SITUATION PLAN

LOCATION

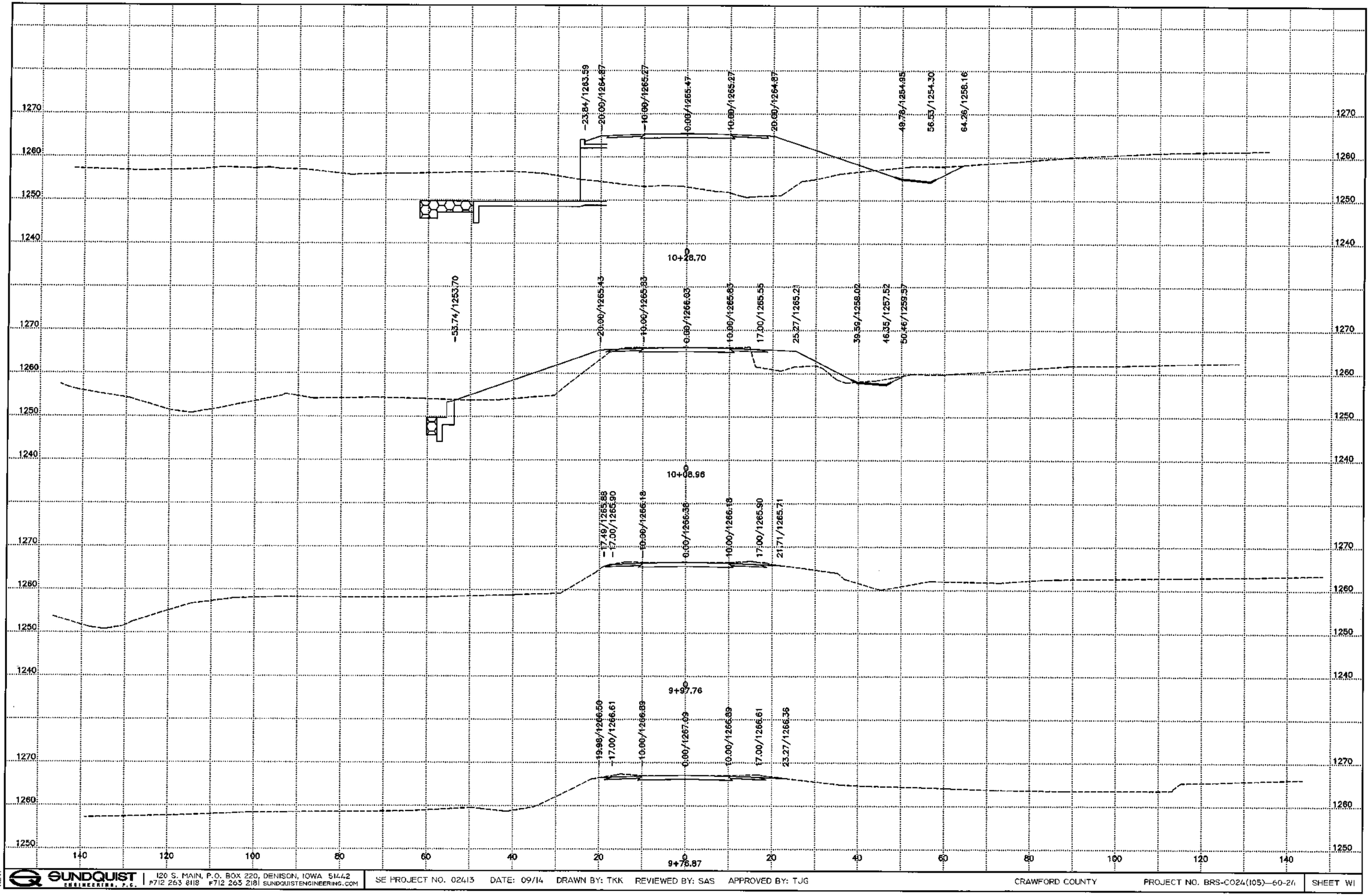
T–83N R–41W
SECTION 10/11
WILLOW TWP.
OVER WILLOW CREEK
LAT 42.0183°
LONG –95.5949°

HYDRAULIC DATA

DRAINAGE AREA = 3.03 SQ. MI.
DESIGN DISCHARGE, Q50 = 1840 CFS
DESIGN HIGH WATER ELEV. = 1260.3
REACH SLOPE (LOCAL) = 19.4 FT./MI.
CULVERT WATERWAY AREA = 264 SQ. FT.
DESIGN VELOCITY (D.S. CHANNEL) = 8.8 FT./SEC.
Q100 = 2210 CFS STAGE = 1260.9
Q500 = 2980 CFS STAGE = 1263.0
EXTREME HIGH WATER STAGE = 1263.4

DESIGN FOR:

TWIN 12'x12'x50' RCB CULVERT
SKEW 20° RT. AHEAD
WITH 15° SKEW FLARED WING HEADWALLS
CRAWFORD COUNTY
PROJECT NO. BRS–C024(105)––60–24



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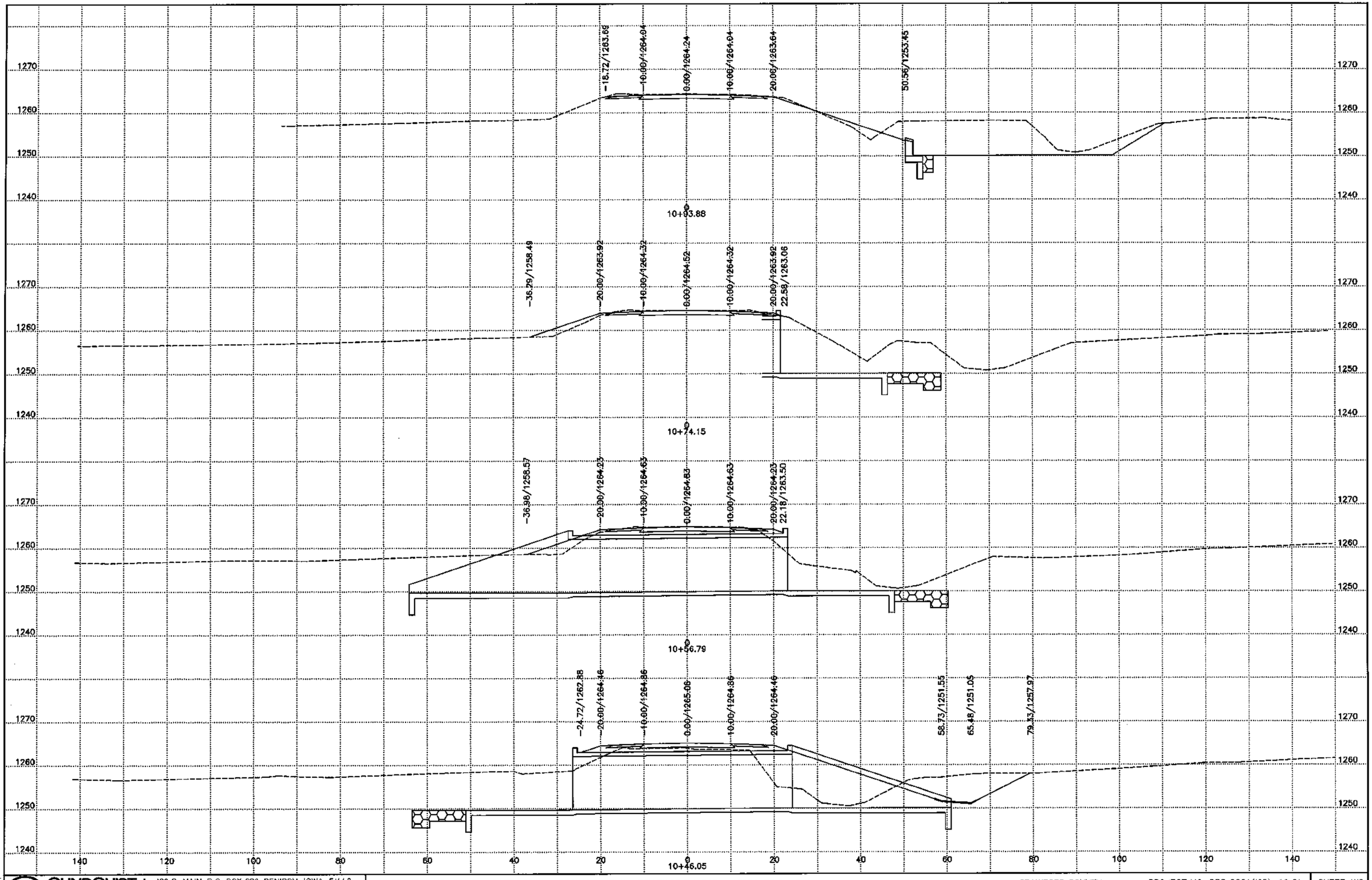
CRAWFORD COUNTY PROJECT NO. BRS-C024(105)—60-24 SHEET WI



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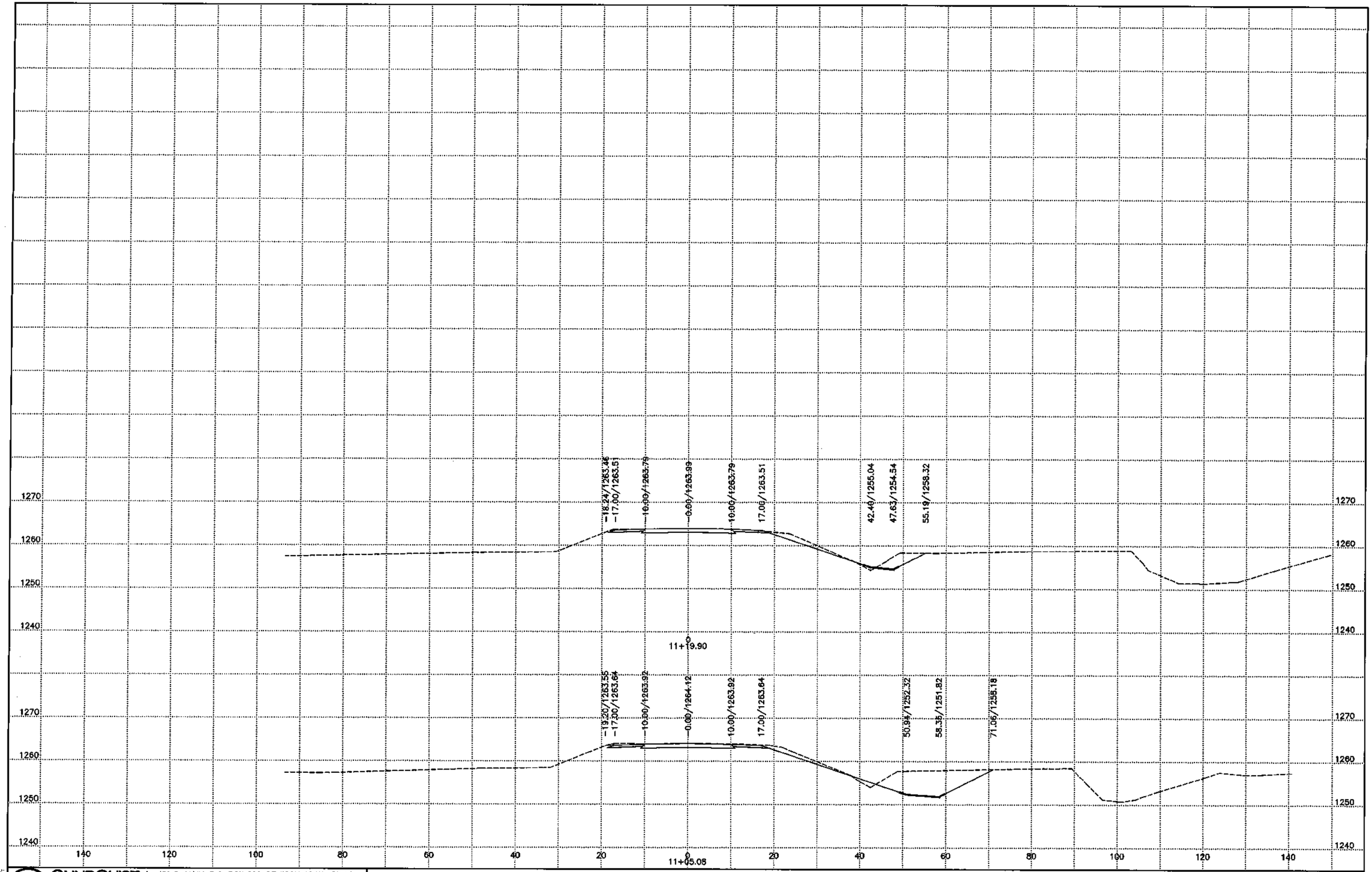
CRAWFORD COUNTY PROJECT NO. BRS-C024(105)--60-24 SHEET W2



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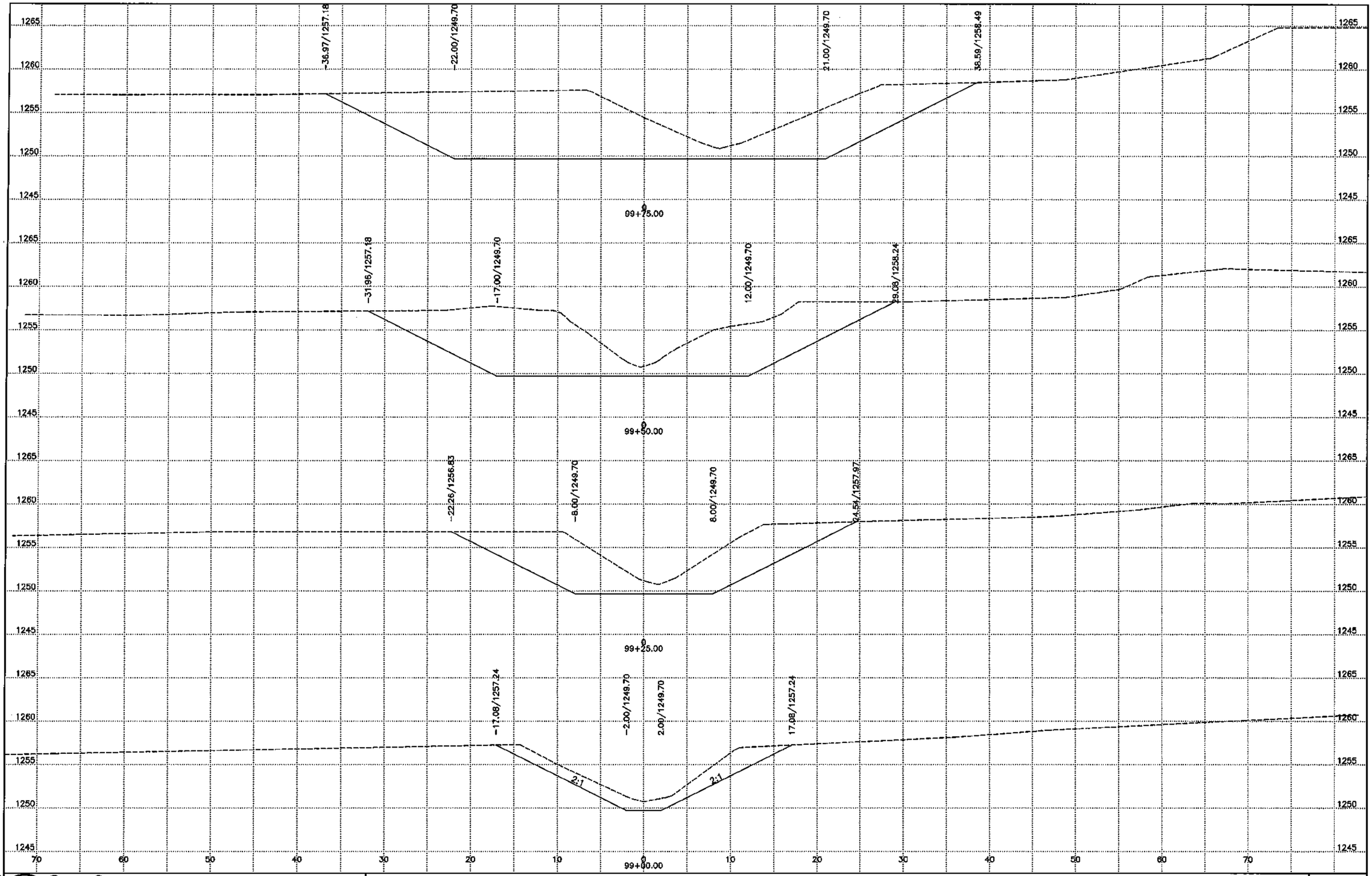
CRAWFORD COUNTY PROJECT NO. BRS-C024(105)--60-24

SHEET W3



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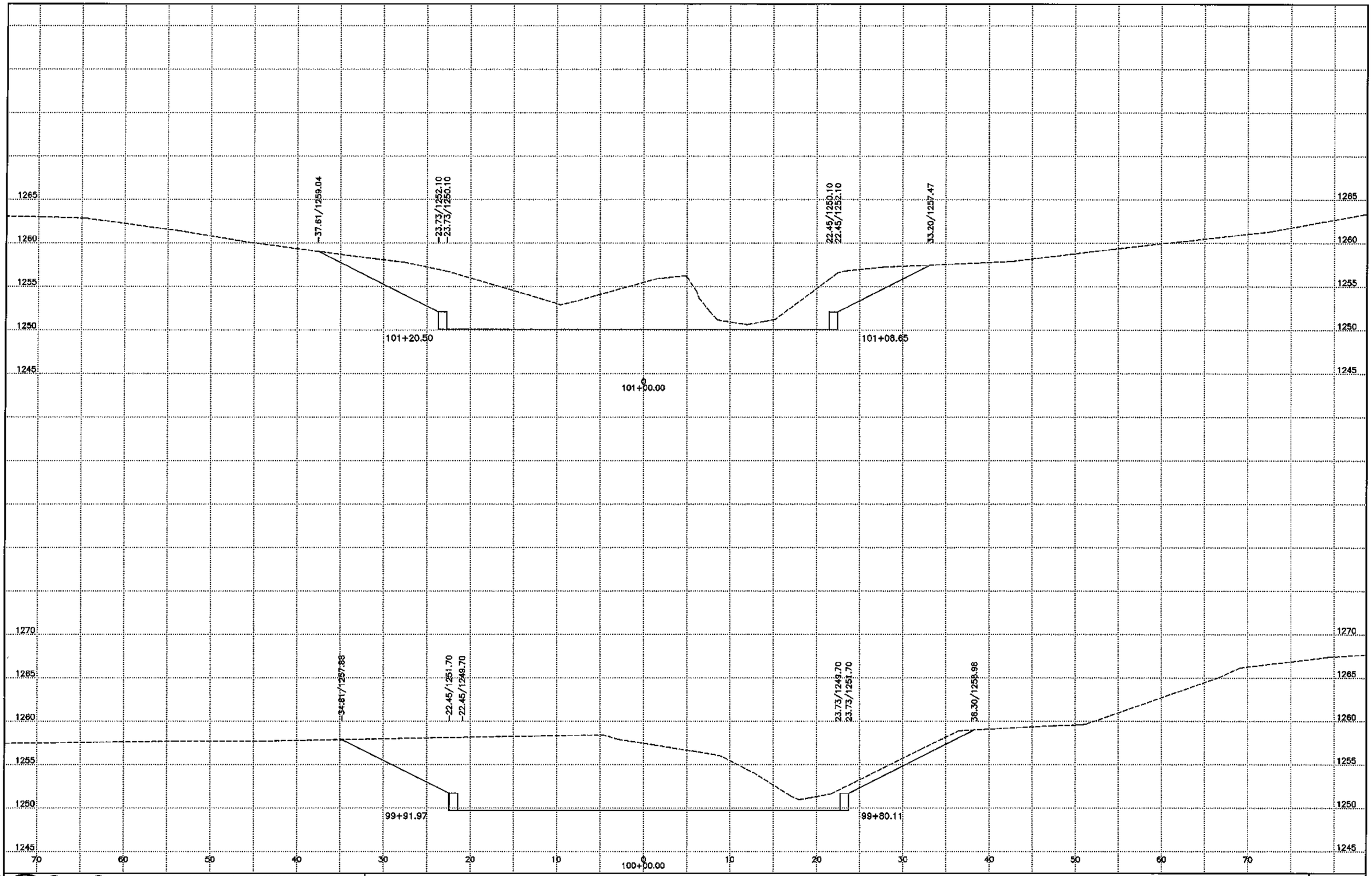
CRAWFORD COUNTY PROJECT NO. BRS-C024(105)--60-24



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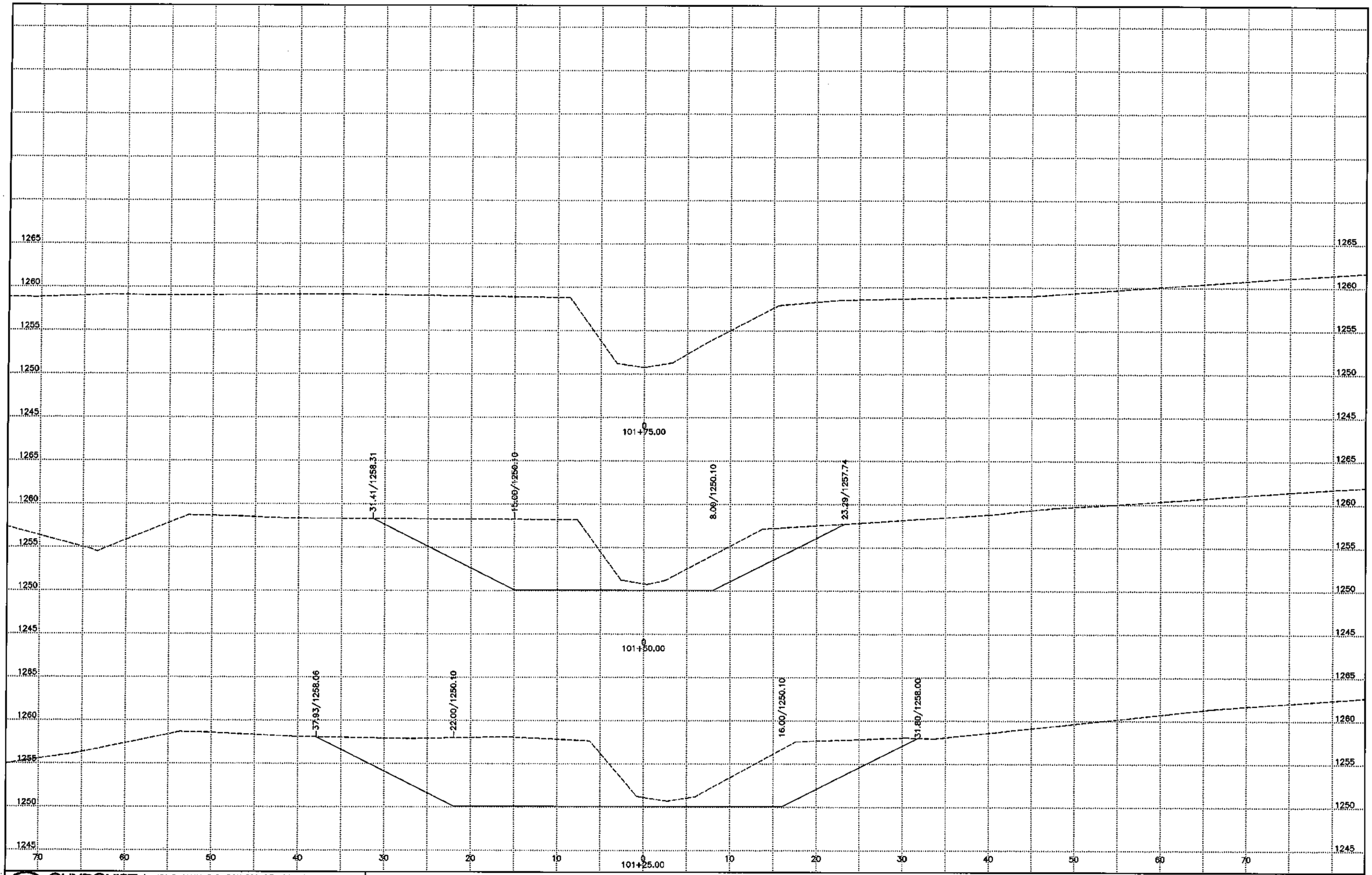
SE PROJECT NO. 02413 DATE: 09/14 DRAWN BY: TKK REVIEWED BY: SAS APPROVED BY: TJG

CRAWFORD COUNTY PROJECT NO. BRS-C024(105)--60-24 SHEET Z2



REV:

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SE PROJECT NO. 02413 DATE: 09/14 DRAWN BY: TKK REVIEWED BY: SAS APPROVED BY: TJG

CRAWFORD COUNTY

PROJECT NO. BRS-C024(105)--60-24

SHEET 73