DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	1	93
				(2)	GOURD & GRANNY CREEK STRS. & APPRS. (S)			

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

CONSTRUCTION PLANS FOR STATE HIGHWAY

GOURD & GRANNY CREEK STRS. & APPRS. (S)

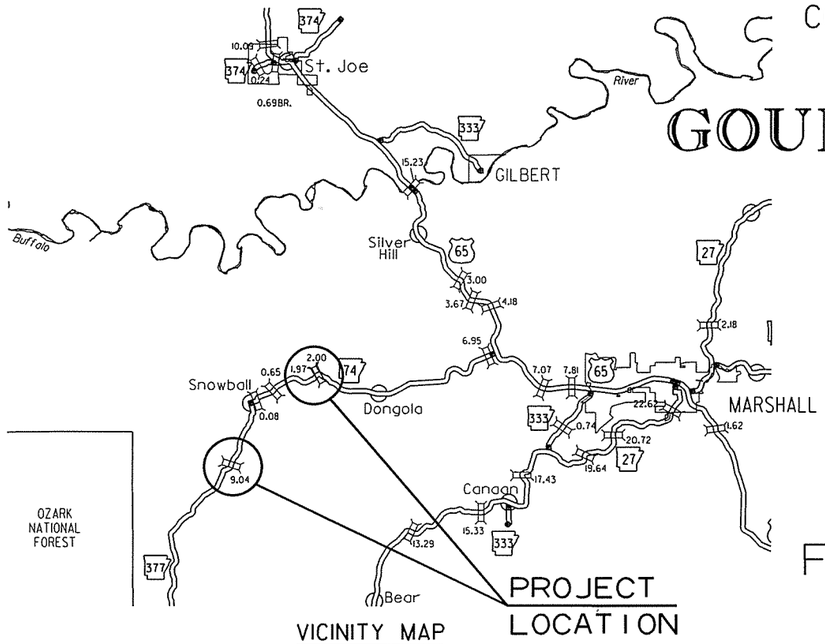
SEARCY COUNTY

ROUTES 74 & 377

SECTIONS 7 & 1

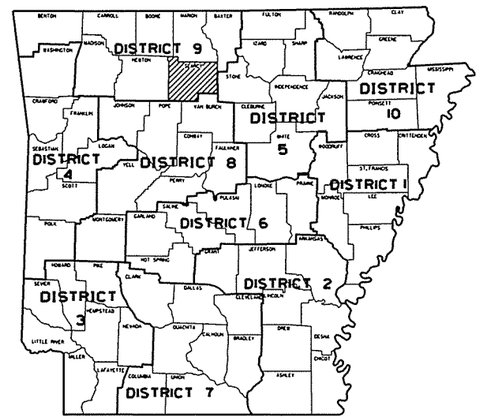
JOB 009831

FED. AID PROJ. STPR-0064(11)



VICINITY MAP

NOT TO SCALE



ARK. HWY. DIST. NO. 9

STRUCTURES OVER 20' -0" SPAN

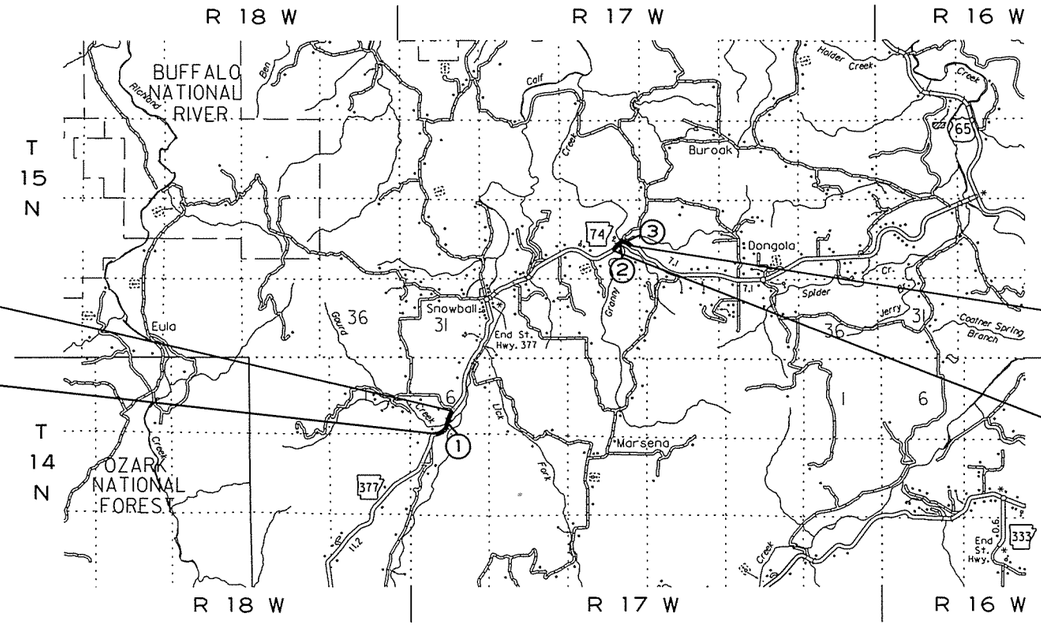
(1) STA. 108+67 CONSTRUCT
TRI. 12' X 10' X 135'
R.C. BOX CULVERT ON 45°
RT. FWD. SKEW W/ 3:1 WINGS
Q25 = 2020 CFS, DA = 3.4 SQ.MI.
ROADWAY SPAN = 56'-1⅛"

(2) STA. 212+57 CONSTRUCT
QUAD. 12' X 9' X 82'
R.C. BOX CULVERT W/ 3:1 WINGS
Q25 = 1720 CFS, DA = 4.8 SQ.MI.
ROADWAY SPAN = 52'-3"

(3) STA. 215+00 CONSTRUCT
DBL. 10' X 6' X 149'
R.C. BOX CULVERT ON 56° RT.
FWD. SKEW W/ 3:1 WINGS
Q25 = 660 CFS, DA = 384 AC.
ROADWAY SPAN = 31'-2¾"

STA. 118+16.70
END SITE 1 - (HWY. 377)

STA. 101+00.00
BEGIN JOB 009831 &
SITE 1 - (HWY. 377)
LOG MILE 8.92



STA. 222+00.00
END JOB 009831 &
SITE 2 - (HWY. 74)

STA. 202+00.00
BEGIN SITE 2 - (HWY. 74)
LOG MILE 1.77

	SITE 1 (HWY. 377)					
BEGINNING:	LAT: N 35°	52'	53"	LONG: W 92°	50'	05"
MID POINT:	LAT: N 35°	52'	59"	LONG: W 92°	49'	59"
ENDING:	LAT: N 35°	53'	07"	LONG: W 92°	49'	54"

	SITE 2 (HWY. 74)					
BEGINNING:	LAT: N 35°	54'	52"	LONG: W 92°	47'	38"
MID POINT:	LAT: N 35°	54'	58"	LONG: W 92°	47'	25"
ENDING:	LAT: N 35°	54'	54"	LONG: W 92°	47'	15"

• DESIGN TRAFFIC DATA •

	SITE 1 HWY. 377	SITE 2 HWY. 74
DESIGN YEAR	2035	2035
2015 ADT	350	950
2035 ADT	450	1200
2035 DHV	50	132
DIRECTIONAL DISTRIBUTION	60%	60%
TRUCKS	7%	7%
DESIGN SPEED	40 MPH	40 MPH

GROSS LENGTH OF PROJECT	3716.70	FEET	OR	0.704	MILES	
NET " " ROADWAY	3577.13	"	"	0.678	"	
NET " " BRIDGES	139.57	"	"	0.026	"	
NET " " PROJECT	3716.70	"	"	0.704	"	

P.E. 009831

APPROVED

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7836
M.E. BANKS

7-17-15

DEPUTY DIRECTOR AND CHIEF ENGINEER

4/23/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
9-30-2015				6	ARK.			
				JOB NO.		009831	2	93

(2) INDEX, GOVERN. SPECS., AND GENERAL NOTES

INDEX OF SHEETS

SHEET NO.	TITLE	DRWG.NO.	DATE
1	TITLE SHEET		
2	INDEX OF SHEETS, GOVERNING SPECIFICATIONS, AND GENERAL NOTES		
3 - 4	TYPICAL SECTIONS OF IMPROVEMENT		
5 - 16	SPECIAL DETAILS		
17 - 22	TEMPORARY EROSION CONTROL DETAILS		
23 - 27	MAINTENANCE OF TRAFFIC		
28	PERMANENT PAVEMENT MARKING DETAILS		
29 - 33	QUANTITIES		
34	SUMMARY OF QUANTITIES AND REVISIONS		
35 - 37	SURVEY CONTROL DETAILS		
38 - 41	PLAN AND PROFILE SHEETS		
42	CONCRETE DITCH PAVING	CDP-1	11-17-10
43	FLARED END SECTION	FES-1	10-18-96
44	FLARED END SECTION	FES-2	10-18-96
45	GUARD RAIL DETAILS	GR-8	7-14-10
46	GUARD RAIL DETAILS	GR-8A	7-14-10
47	GUARD RAIL DETAILS	GR-9	4-17-08
48	GUARD RAIL DETAILS	GR-9A	4-17-08
49	GUARD RAIL DETAILS	GRT-1	7-14-10
50	PRECAST CONCRETE BOX CULVERTS	PBC-1	1-28-15
51	CONCRETE PIPE CULVERT FILL HEIGHTS & BEDDING	PCC-1	2-27-14
52	METAL PIPE CULVERT FILL HEIGHTS & BEDDING	PCM-1	2-27-14
53	PLASTIC PIPE CULVERT (HIGH DENSITY POLYETHYLENE)	PCP-1	2-27-14
54	PLASTIC PIPE CULVERT (PVC F949)	PCP-2	2-27-14
55	PAVEMENT MARKING DETAILS	PM-1	9-12-13
56	DETAILS OF PIPE UNDERDRAIN	PU-1	4-10-03
57	REINFORCED CONCRETE BOX CULVERT DETAILS	RCB-1	7-26-12
58	EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS	RCB-2	11-20-03
59	TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC	SE-2	10-18-96
60	DETAILS OF SPECIAL ITEMS	SI-1	9-12-13
61	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	TC-1	9-02-15
62	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	TC-2	9-02-15
63	STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION	TC-3	9-02-15
64	TEMPORARY EROSION CONTROL DEVICES	TEC-1	12-15-11
65	TEMPORARY EROSION CONTROL DEVICES	TEC-2	6-02-94
66	TEMPORARY EROSION CONTROL DEVICES	TEC-3	11-03-94
67	WIRE FENCE TYPE C AND D	WF-4	8-22-02
68 - 93	CROSS SECTIONS		

NOTE: CROSS SECTIONS NOT NORMALLY INCLUDED IN PLANS SOLD TO PROSPECTIVE BIDDERS, BUT MAY BE HAD UPON REQUEST.

GOVERNING SPECIFICATIONS

ARKANSAS STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION OF 2014, AND THE FOLLOWING SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS:

NUMBER	TITLE
ERRATA	ERRATA FOR THE BOOK OF STANDARD SPECIFICATIONS
FHWA-1273	REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - NOTICE TO CONTRACTORS
FHWA-1273	SUPPLEMENT - SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (23 U.S.C. 140)
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - GOALS AND TIMETABLES
FHWA-1273	SUPPLEMENT - EQUAL EMPLOYMENT OPPORTUNITY - FEDERAL STANDARDS
FHWA-1273	SUPPLEMENT - POSTERS AND NOTICES REQUIRED FOR FEDERAL-AID PROJECTS
FHWA-1273	SUPPLEMENT - WAGE RATE DETERMINATION
108-1	LIQUIDATED DAMAGES
410-1	CONSTRUCTION REQUIREMENTS AND ACCEPTANCE OF ASPHALT CONCRETE PLANT MIX COURSES
604-1	RETROREFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVICES IN CONSTRUCTION ZONES
606-1	PIPE CULVERTS FOR SIDE DRAINS
620-1	MULCH COVER
JOB 009831	BIDDING REQUIREMENTS AND CONDITIONS
JOB 009831	BROADBAND INTERNET SERVICE FOR ASPHALT CONCRETE PLANT
JOB 009831	BROADBAND INTERNET SERVICE FOR FIELD OFFICE
JOB 009831	CULVERT CLEAN OUT
JOB 009831	DISADVANTAGED BUSINESS ENTERPRISE BIDDER'S RESPONSIBILITIES
JOB 009831	EXTENSION FOR PIPE CULVERTS
JOB 009831	GOALS FOR DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION
JOB 009831	MANDATORY ELECTRONIC CONTRACT
JOB 009831	NESTING SITES OF MIGRATORY BIRDS
JOB 009831	OFF-SITE RESTRAINING CONDITIONS FOR BATS
JOB 009831	PLASTIC PIPE
JOB 009831	REMOVAL AND DISPOSAL OF GUARDRAIL
JOB 009831	ROCK FILL
JOB 009831	SHORING FOR CULVERTS
JOB 009831	SOIL STABILIZATION
JOB 009831	SPECIAL CLEARING REQUIREMENTS
JOB 009831	STORM WATER POLLUTION PREVENTION PLAN
JOB 009831	SUBMISSION OF ASPHALT CONCRETE HOT MIX ACCEPTANCE TEST RESULTS
JOB 009831	UTILITY ADJUSTMENTS
JOB 009831	WARM MIX ASPHALT

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
10-1-15

GENERAL NOTES

1. GRADE LINE DENOTES FINISHED GRADE WHERE SHOWN ON PLANS.
2. ALL PIPE LINES, POWER, TELEPHONE, AND TELEGRAPH LINES TO BE MOVED OR LOWERED BY THE RESPECTIVE OWNERS AS PER AGREEMENT WITH SUCH OWNERS.
3. ANY EQUIPMENT OR APPURTENANCE THAT INTERFERES WITH THE PROPOSED CONSTRUCTION AND WHICH MAY BE THE PROPERTY OF UTILITY SERVICE ORGANIZATIONS SHALL BE MOVED BY THE OWNERS UNLESS OTHERWISE PROVIDED.
4. ALL LAND MONUMENTS LOCATED WITHIN THE CONSTRUCTION AREA SHALL BE PROTECTED IN ACCORDANCE WITH SECTION 107.12 OF THE STANDARD SPECIFICATIONS.
5. ALL TREES THAT DO NOT DIRECTLY INTERFERE WITH THE PROPOSED CONSTRUCTION SHALL BE SPARED AS DIRECTED BY THE ENGINEER. CARE AND DISCRETION SHALL BE USED TO INSURE THAT ALL TREES NOT TO BE REMOVED SHALL BE HARMED AS LITTLE AS POSSIBLE DURING THE CONSTRUCTION OPERATIONS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A FENCE TO CONTROL LIVESTOCK IN AREAS WHERE PASTURES ARE SEVERED. WIRE FENCE MAY BE CONSTRUCTED INITIALLY, OR IN LIEU THEREOF, THE CONTRACTOR AT HIS OWN EXPENSE, MAY ELECT TO PROVIDE TEMPORARY FENCING SUITABLE TO CONTAIN LIVESTOCK.
7. THIS PROJECT IS COVERED UNDER A SECTION 404 NATIONWIDE 14 PERMIT. REFER TO SECTION 110 OF THE STANDARD SPECIFICATIONS, EDITION OF 2014, FOR PERMIT REQUIREMENTS.
8. ALL FLEXIBLE BASE AND ASPHALTIC PAVEMENTS REMOVED SHALL BE PAID FOR UNDER THE ITEM NO. 210 - UNCLASSIFIED EXCAVATION.
9. THE EXISTING ASPHALT PAVEMENT TO BE REMOVED FROM THE REMAINING PAVEMENT SHALL BE SEPARATED BY SAWING ALONG A NEAT LINE. AFTER SAWING, THE PAVEMENT TO BE REMOVED SHALL BE CAREFULLY REMOVED IN A MANNER THAT WILL NOT DAMAGE THE PAVEMENT THAT IS TO REMAIN. ANY DAMAGE OF THE ASPHALT PAVEMENT THAT IS TO REMAIN IN PLACE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

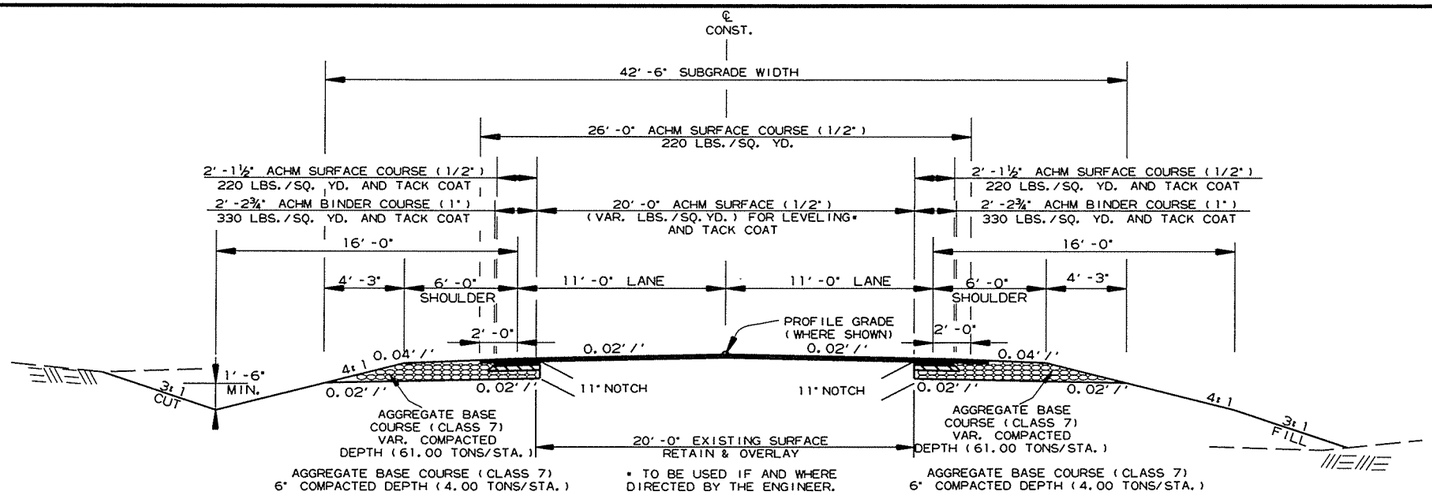
R009831.DGN 4/16/2015

INDEX OF SHEETS, GOVERNING SPECIFICATIONS, AND GENERAL NOTES

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	3	93

(2) TYPICAL SECTIONS OF IMPROVEMENT

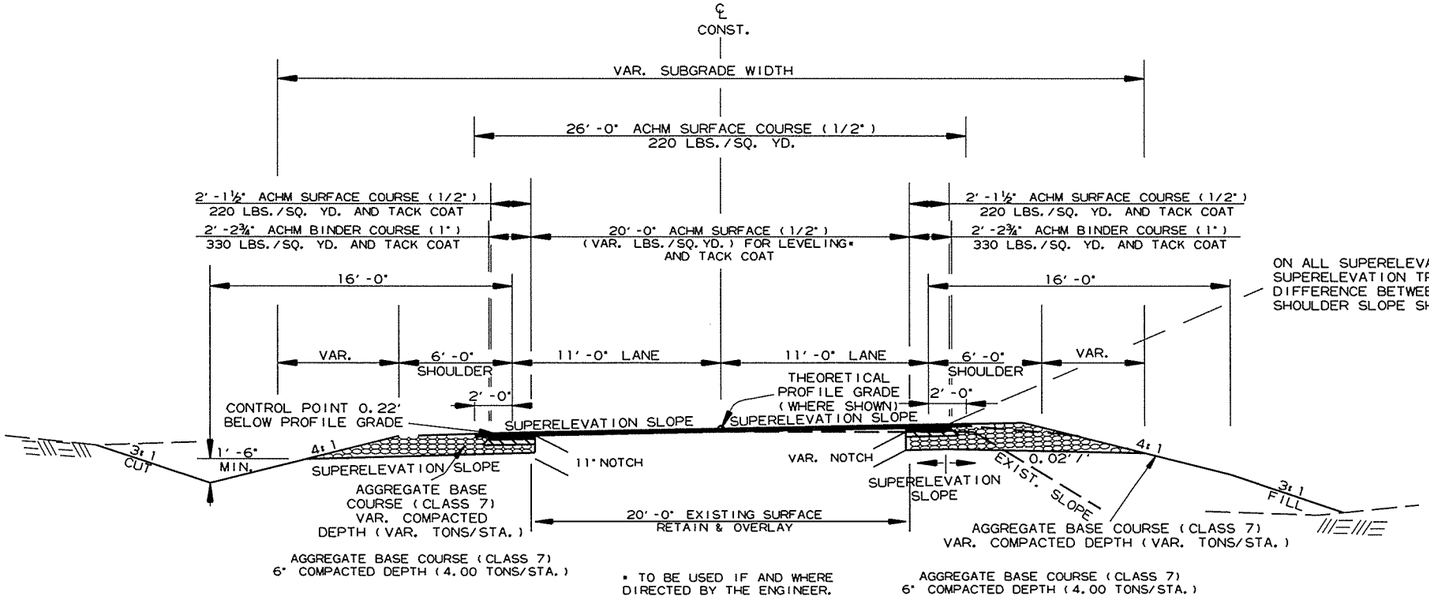
STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



**NOTE: SITE 1 TRANSITIONS FROM NOTCH AND WIDEN TO FULL DEPTH FROM STA. 101+00.00 TO STA. 103+54.18.
SITE 2 TRANSITIONS FROM NOTCH AND WIDEN TO FULL DEPTH FROM STA. 202+00.00 TO STA. 207+27.73.

**NOTE: SITE 1 TRANSITIONS FROM FULL DEPTH TO NOTCH AND WIDEN FROM STA. 112+00.00 TO STA. 118+16.70.
SITE 2 TRANSITIONS FROM FULL DEPTH TO NOTCH AND WIDEN FROM STA. 219+00.00 TO STA. 222+00.00.

TYPICAL SECTION OF IMPROVEMENT - NOTCH AND WIDEN SITE 2 - HWY. 74 STA. 202+00.00 TO STA. 202+37.72



ON ALL SUPERELEVATED CURVES AND THROUGH SUPERELEVATION TRANSITIONS, THE ALGEBRAIC DIFFERENCE BETWEEN PAVEMENT SLOPE AND SHOULDER SLOPE SHALL NOT EXCEED 0.08'/'.

TYPICAL SECTION OF IMPROVEMENT - NOTCH AND WIDEN SITE 1 - HWY. 377 STA. 101+93.95 TO STA. 103+54.18 STA. 112+00.00 TO STA. 118+16.70 SITE 2 - HWY. 74 STA. 202+37.72 TO STA. 207+27.73 STA. 219+00.00 TO STA. 222+00.00

NOTES:
REFER TO CROSS SECTIONS FOR DEVIATION FROM THE NORMAL SLOPES. NO CHANGES SHALL BE MADE FROM THE PLANNED SLOPES WITHOUT THE APPROVAL OF THE ENGINEER.

THE THICKNESS OF AGGREGATE BASE COURSE SHALL BE WITHIN PLUS OR MINUS ONE INCH OF THE PLAN THICKNESS SHOWN. THE CONTRACTOR WILL CORRECT ANY DEFICIENT THICKNESS THAT DOES NOT MEET TOLERANCE INDICATED. PAYMENT WILL NOT BE MADE FOR MATERIAL PLACED IN EXCESS OF THE TOLERANCE INDICATED.

ASPHALT FOR LEVELING OF EXISTING PAVEMENT SHALL BE PLACED ONLY IF AND WHERE DIRECTED BY THE ENGINEER. CALCULATIONS FOR THE AMOUNT OF LEVELING AND/OR LEVELING OPERATIONS SHALL BE PERFORMED BEFORE CONSTRUCTING NOTCH AND WIDENING. CALCULATIONS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE FINAL 2" OF SURFACE COURSE IS TO BE PLACED AFTER ALL OTHER COURSES HAVE BEEN LAID. LONGITUDINAL JOINTS SHALL BE AT LANE LINES.

WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, THE FIRST LIFT OF ACHM SURFACE (1/2") IN LIEU OF AGGREGATE BASE COURSE ON THE SHOULDERS.

AFTER PLACING FINAL 2" OF SURFACE COURSE, THE EXISTING SLOPE SHALL BE REDRESSED AS DIRECTED BY THE ENGINEER PRIOR TO SEEDING IN ORDER TO MAINTAIN A UNIFORM SLOPE. PAYMENT FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR VARIOUS CONTRACT ITEMS.

6/19/2015

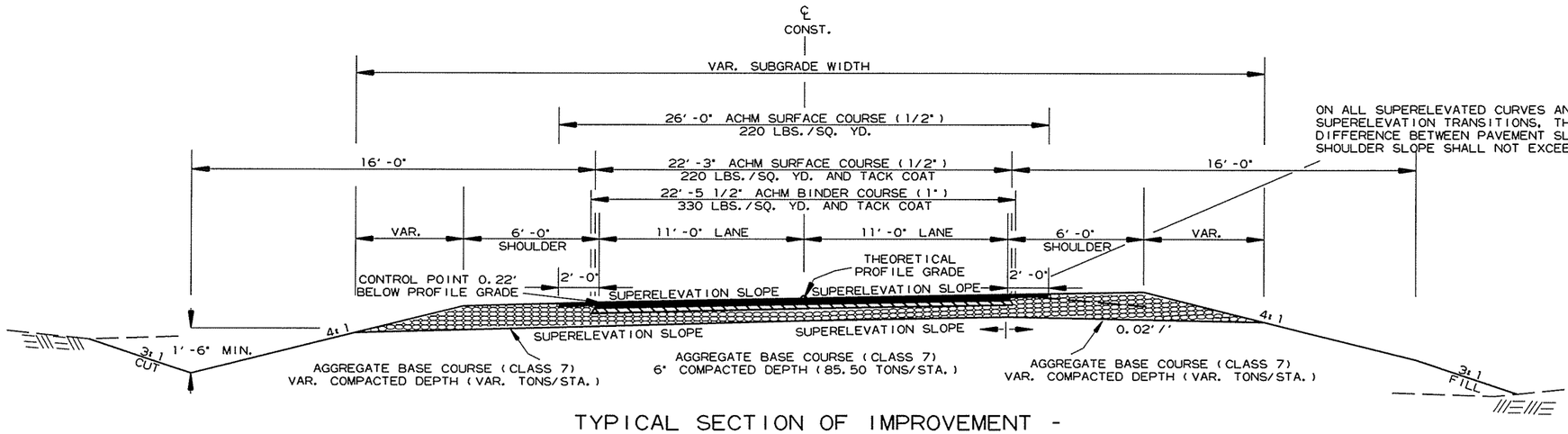
R009831.DGN

TYPICAL SECTIONS OF IMPROVEMENT

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	4	93

(2) TYPICAL SECTIONS OF IMPROVEMENT

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

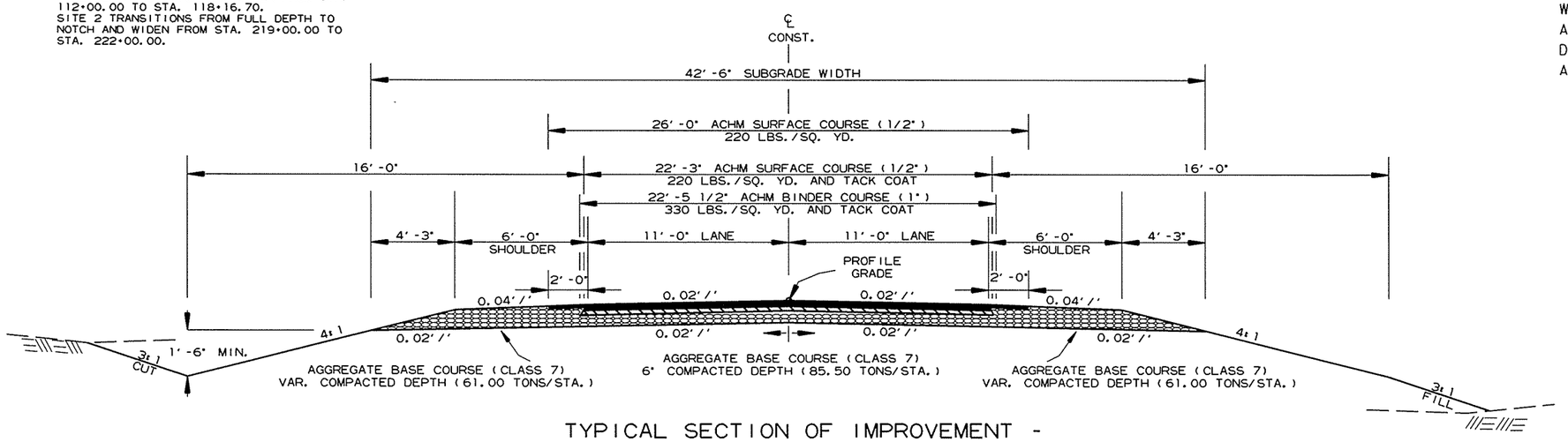


ON ALL SUPERELEVATED CURVES AND THROUGH SUPERELEVATION TRANSITIONS, THE ALGEBRAIC DIFFERENCE BETWEEN PAVEMENT SLOPE AND SHOULDER SLOPE SHALL NOT EXCEED 0.08'/'.

TYPICAL SECTION OF IMPROVEMENT -
FULL DEPTH
SITE 1 - HWY. 377
STA. 103+54.18 TO STA. 112+00.00
SITE 2 - HWY. 74
STA. 208+70.37 TO STA. 219+00.00

**NOTE: SITE 1 TRANSITIONS FROM NOTCH AND WIDEN TO FULL DEPTH FROM STA. 101+00.00 TO STA. 103+54.18.
SITE 2 TRANSITIONS FROM NOTCH AND WIDEN TO FULL DEPTH FROM STA. 202+00.00 TO STA. 207+27.73.

**NOTE: SITE 1 TRANSITIONS FROM FULL DEPTH TO NOTCH AND WIDEN FROM STA. 112+00.00 TO STA. 118+16.70.
SITE 2 TRANSITIONS FROM FULL DEPTH TO NOTCH AND WIDEN FROM STA. 219+00.00 TO STA. 222+00.00.



TYPICAL SECTION OF IMPROVEMENT -
FULL DEPTH
SITE 2 - HWY. 74
STA. 207+27.73 TO STA. 208+70.37

NOTES:
REFER TO CROSS SECTIONS FOR DEVIATION FROM THE NORMAL SLOPES. NO CHANGES SHALL BE MADE FROM THE PLANNED SLOPES WITHOUT THE APPROVAL OF THE ENGINEER.

THE THICKNESS OF AGGREGATE BASE COURSE SHALL BE WITHIN PLUS OR MINUS ONE INCH OF THE PLAN THICKNESS SHOWN. THE CONTRACTOR WILL CORRECT ANY DEFICIENT THICKNESS THAT DOES NOT MEET TOLERANCE INDICATED. PAYMENT WILL NOT BE MADE FOR MATERIAL PLACED IN EXCESS OF THE TOLERANCE INDICATED.

THE FINAL 2" OF SURFACE COURSE IS TO BE PLACED AFTER ALL OTHER COURSES HAVE BEEN LAID. LONGITUDINAL JOINTS SHALL BE AT LANE LINES.

WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, THE FIRST LIFT OF ACHM SURFACE (1/2") IN LIEU OF AGGREGATE BASE COURSE ON THE SHOULDERS.

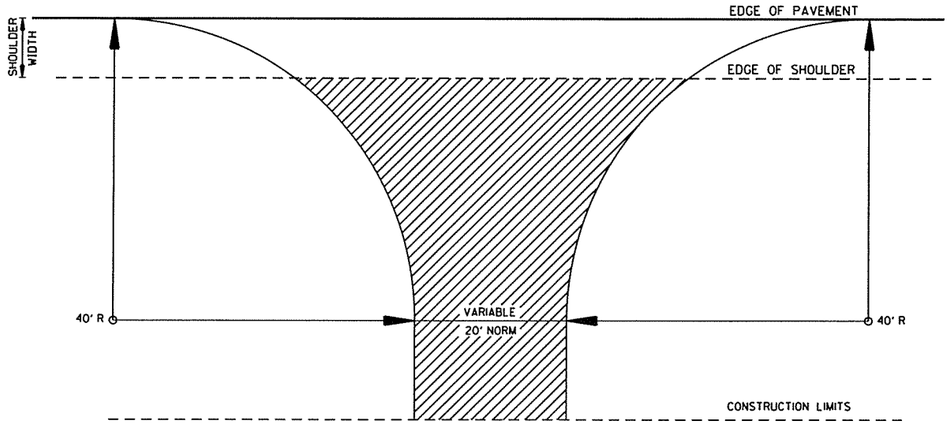
6/19/2015

R009831.DGN

TYPICAL SECTIONS OF IMPROVEMENT

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AND PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	5	93

(2) SPECIAL DETAILS

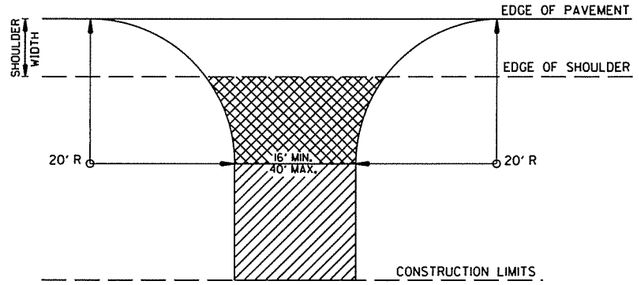


NOTE: REFER TO PLAN SHEETS FOR WIDTHS OF COUNTY ROADS.

ASPHALT CONCRETE HOT MIX SURFACE COURSE (1/2") (220 LBS. PER SQ. YD.) AND AGGREGATE BASE COURSE (CLASS 7) (7" COMPACTED DEPTH)

TURNOUTS SHALL BE MODIFIED AS NECESSARY TO MEET LOCAL CONDITIONS, AS SHOWN IN PLANS AND IF AND WHERE DIRECTED BY THE ENGINEER.

DETAIL FOR COUNTY ROAD TURNOUT



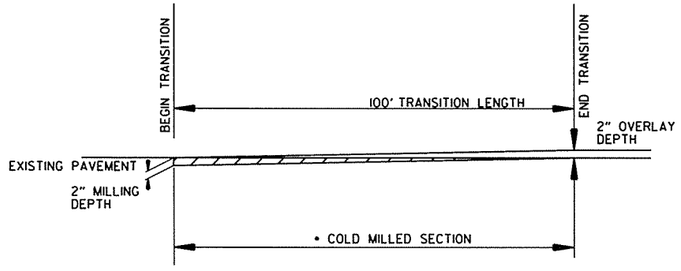
A.C.H.M. SURFACE COURSE (1/2") (220 LBS./SQ. YD.) & AGGREGATE BASE COURSE (CLASS 7) (7" COMPACTED DEPTH) IF ASPHALT DRIVE EXISTS OR 6" CONCRETE IF CONCRETE DRIVE EXISTS. OVERLAY FOR EXISTING DRIVES SHALL BE A.C.H.M. SURFACE COURSE (1/2")(220 LBS./SQ. YD.) AND TACK COAT (0.10 GAL./SQ. YD.).

AGGREGATE BASE COURSE (CLASS 7) 9" COMP. DEPTH OR CONFORM TO EXISTING DRIVEWAY.

TURNOUTS SHALL BE MODIFIED AS NECESSARY TO MEET LOCAL CONDITIONS AS DIRECTED BY THE ENGINEER.

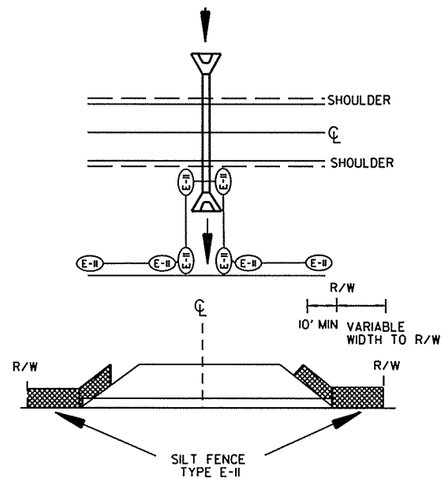
DETAIL FOR DRIVEWAY TURNOUTS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

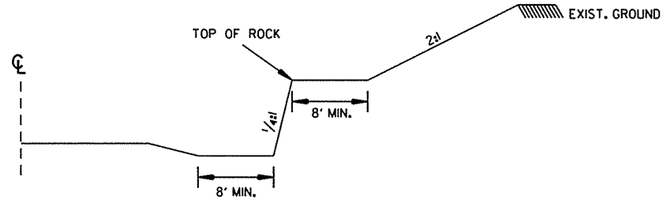


DETAIL SHOWING TAPER TO EXISTING PAVEMENT

* TO BE USED AS DIRECTED BY THE ENGINEER



DETAILS OF SILT FENCE AT CROSS DRAINS



DETAILS OF BENCHING ROCK CUT

IF AND WHERE DIRECTED BY THE ENGINEER.

THE ROCK CUT SHALL BE EXCAVATED USING A 1/4:1 SLOPE. THE ROCK CUT SLOPES SHALL HAVE AN 8 FOOT HORIZONTAL BENCH EVERY 20 VERTICAL FEET. SOIL SHALL BE EXCAVATED ON A 2:1 SLOPE FROM ITS INTERFACE WITH ROCK CONTINUING TO THE TOP OF THE BACKSLOPE. IF THE SOIL EXCAVATION IS OVER 20 VERTICAL FEET A 5 FOOT BENCH WILL PLACED EVERY 20 FEET.

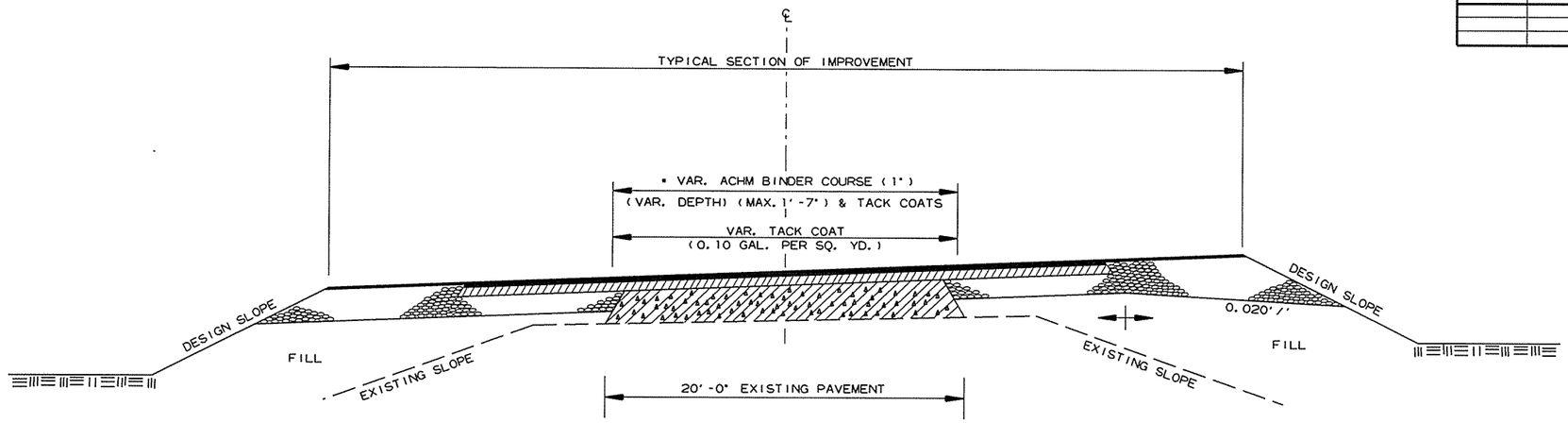
R009831.DGN 6/19/2015

SPECIAL DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	6	93

(2) SPECIAL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



* 6" AGGREGATE BASE COURSE (CLASS 7) TO BE REPLACED WITH A.C.H.M. BINDER COURSE (1")

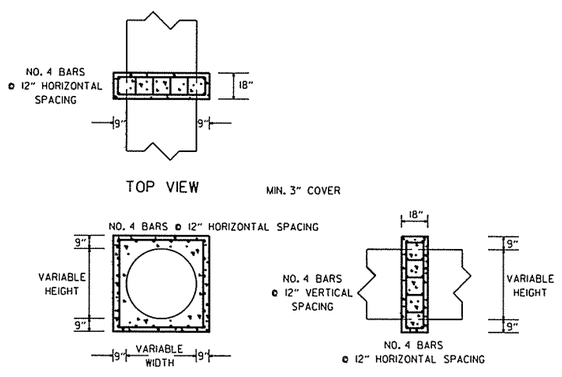
METHOD OF RAISING GRADE

NOTES:

(1) THIS DETAIL TO BE USED ONLY WHERE DIRECTED BY THE ENGINEER.

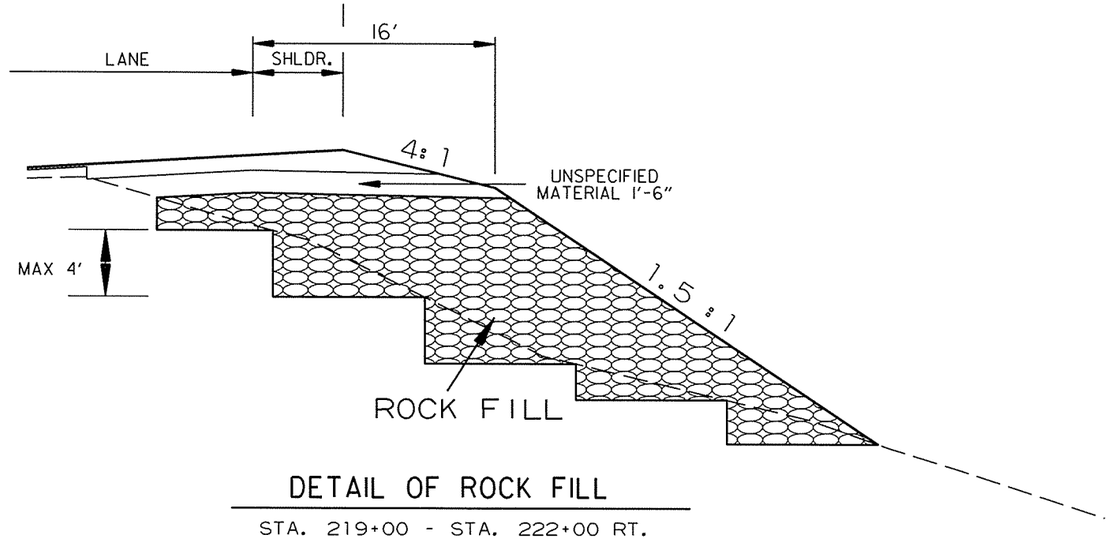
(2) QUANTITIES FOR METHOD OF GRADE RAISE USING ASPHALT WERE CALCULATED ON THIS PROJECT AT LOCATIONS WHERE THE DISTANCE BETWEEN THE EXISTING ASPHALT ROADWAY AND THE PROPOSED SUBGRADE WAS ONE FOOT OR LESS.

(3) IN LOCATIONS WHERE THE DISTANCE BETWEEN THE PROPOSED SUBGRADE AND THE EXISTING ASPHALT ROADWAY IS MORE THAN ONE FOOT, SCARIFICATION OF THE EXISTING ASPHALT ROADWAY WILL BE REQUIRED AS STATED IN SECTION 210, SUBSECTION 210.09, OF THE STANDARD SPECIFICATIONS.



NOTE: PIPE COLLAR TO BE UTILIZED AS APPROVED BY THE ENGINEER.

PIPE EXTENSION REINFORCED CONCRETE COLLAR DETAIL



DETAIL OF ROCK FILL

STA. 219+00 - STA. 222+00 RT.

SPECIAL DETAILS

R009831.DGN 6/19/2015

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	7	93

① SPECIAL DETAILS

INLET WINGWALL TABLE

OVER ALL WIDTH	CLEAR HEIGHT	FOOTING THK.	WING WALL THK.	BOX SKEW (DEG.)	SLOPE	HDWL LENGTH	HEEL	WALL HEIGHT AT HDWL	WALL HEIGHT AT WING END	WINGWALL ANGLE (DEGREE) WING A	WINGWALL ANGLE (DEGREE) WING B	FOOTING WIDTH AT WALL END	WIDTH OF WING FOOTINGS AT HDWL WING A	WIDTH OF WING FOOTINGS AT HDWL WING B	FOOTING DIMENSION PARALLEL WITH HDWL WING A	FOOTING DIMENSION PARALLEL WITH HDWL WING B	LENGTH OF WINGWALLS WING A	LENGTH OF WINGWALLS WING B	LENGTH OF FOOTING HEEL WING A	LENGTH OF FOOTING HEEL WING B
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AP1	AP2	WE	WF1	WF2	G1	G2	W1	W2	W3	W4
39'-8"	10'-0"	0'-11"	0'-10"	45	3:1	52'-3 7/8"	2'-0"	10'-10"	3'-4"	0	60	3'-4"	4'-9 1/4"	6'-0 3/8"	1'-11 1/4"	4'-7 7/8"	22'-6"	45'-0"	23'-5 3/8"	50'-5 1/8"

CLASS "S" CONCRETE (Includes apron)	REINFORCING STEEL (Includes apron and laps if required)
INLET	INLET
CU.YD	LBS.
29.90	2426

WING	F1 BAR SIZE	F1 MAX. SPACING	F1 NO. REQ'D	F1 LENGTHS VARY		F2 BAR SIZE	F2 SPACING	F2 NO. REQ'D	F2 LENGTHS	F3 BAR SIZE	F3 SPACING	F3 NO. REQ'D	F3 LENGTHS	F4 BAR SIZE	F4 SPACING	F4 NO. REQ'D	F4 LENGTHS VARY	F5 BAR SIZE	F5 SPACING	F5 NO. REQ'D	F5 LENGTHS	F6 BAR SIZE	F6 SPACING	F6 NO. REQ'D	F6 LENGTHS VARY		F7 NO. REQ'D	F7 LENGTHS	F8 BAR SIZE	F8 SPACING	F8 NO. REQ'D	F8 LENGTHS VARY	F9 BAR SIZE	F9 SPACING	F9 NO. REQ'D	F9 LENGTHS	F10 BAR SIZE	F10 NO. REQ'D	F10 LENGTHS	F11 BAR SIZE	F11 NO. REQ'D	F11 LENGTHS	F12 BAR SIZE	F12 SPACING	F12 NO. REQ'D	F12 LENGTHS		REINF. STEEL QTY. PER WING (LBS)
WING A	4	12	23	L	Min	4'-8"	5	12	3	L	7'-1"	4	12	6	L	5'-5"	4	18	10	Min	3'-4"	4	18	4	22'-2"	4	18	15	L	Min	6'-7"	4	8	24'-3"	4	18	15	Min	2'-10"	4	18	2	Min	24'-4"	4	2	23'-3"	4	2	23'-5"	6	12	10	L	3'-4"	776
					Max	13'-6"															Max									Max	13'-7"										Max	2'-6"											
				X	Min	0'-11"				X	2'-3"				X	1'-10"												X	Min	2'-6"											Max	24'-4"								X	1'-8"	
					Max	2'-5"											Max	21'-4"												Max	2'-6"																			
				Y	Min	3'-10"				Y	4'-11"				Y	3'-8"												Y	Min	4'-2"											Max	4'-3"											
					Max	11'-2"																								Max	11'-2"																			
WING B	4	12	45	L	Min	4'-8"	5	12	12	L	8'-7"	4	12	12	L	5'-8"	4	18	10	Min	6'-10"	4	18	4	44'-8"	4	18	30	L	Min	6'-5"	4	8	51'-3"	4	18	33	Min	2'-10"	4	18	4	Min	29'-8"	4	2	45'-2"	4	2	51'-9"	6	12	10	L	3'-4"	1650
					Max	14'-6"											Max	42'-10"												Max	13'-7"										Max	2'-6"											
				X	Min	0'-11"				X	2'-9"				X	2'-1"												X	Min	2'-6"											Max	56'-8"								X	1'-8"	
					Max	3'-5"																								Max	2'-6"																			
				Y	Min	3'-10"				Y	5'-11"				Y	3'-8"												Y	Min	4'-0"																						
					Max	11'-2"																								Max	11'-2"																			

③ MID-SECTION BAR LAP TABLE

# of Long. Laps Req'd.	SL = Section Length
0	< 40.0 ft
1	>40.0 ft - 78.0 ft
2	>78.0 ft - 116.0 ft
3	>116.0 ft - 154.0 ft
4	>154.0 ft - 192.0 ft
5	>192.0 ft - 230.0 ft
6	>230.0 ft - 268.0 ft
7	>268.0 ft - 306.0 ft
8	>306.0 ft -344.0 ft

Min. Bar Lap Length	
#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table	
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

STATE OF ARKANSAS
CHARLES R. ELLIS
REGISTERED PROFESSIONAL ENGINEER
No. 9255
CHARLES R. ELLIS
5-9-15

TABULAR DATA BY: TMG DATE: 4/27/2015
CHECKED BY: JAC DATE: 4/30/2015

This drawing to be used in conjunction with
SHEET 1 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'GENERAL NOTES & LONGITUDINAL SECTION LENGTH SCHEDULE',
SHEET 3 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'DETAILS OF MULTI-BARREL R.C. BOX CULVERT',
SHEET 4 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'DETAILS OF WINGWALLS', and
STANDARD DRAWING RCB-2.

For additional information and outlet sections, see Sheet 2 of 2.

INLET SKEWED END SECTION

SKEW (DEGREE)	SLOPE	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	SECTION LENGTH	TOP SLAB THK.	HDWL THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	TOP SLAB REINFORCING STEEL a SIZE	a SPACING	a LENGTHS VARY	a NO. REQ'D	TOP SLAB REINFORCING STEEL c SIZE	c SPACING	c LENGTHS VARY	c NO. REQ'D	BOTTOM SLAB REINFORCING STEEL d SIZE	d SPACING	d LENGTHS VARY	d NO. REQ'D	BOTTOM SLAB REINFORCING STEEL f SIZE	f SPACING	f LENGTHS VARY	f NO. REQ'D	SIDE WALL REINFORCING STEEL f0 SIZE	f0 SPACING	f0 NO. REQ'D	f0 LENGTH	INTERIOR WALL REINFORCING STEEL f1 SIZE	f1 SPACING	f1 NO. REQ'D	f1 LENGTH	TOP SLAB DISTRIBUTION REINFORCING STEEL g SIZE	g SPACING	g NO. REQ'D	g LENGTHS VARY	BOTTOM SLAB DISTRIBUTION REINFORCING STEEL e SIZE	e SPACING	e NO. REQ'D	e LENGTHS VARY	SIDE WALL DISTRIBUTION REINFORCING STEEL d1 SIZE	d1 SPACING	d1 NO. REQ'D	d1 LENGTH	INTERIOR WALL DISTRIBUTION REINFORCING STEEL d2 SIZE	d2 SPACING	d2 NO. REQ'D	d2 LENGTH
SK	SL	D	S	H	EL	T	HW	B	C	W	OW	OH																																													
45	3:1	10	12	10	21'-10"	12	5	13	14	8	39'-8"	12'-1"	6	7	Max 39'-4" Min 2'-9" 39'-4"	63		8	7.5	Max 39'-4" Min 2'-9" 39'-4"	59	7	5.5	Max 39'-4" Min 2'-9" 39'-4"	80	6	8	Max 39'-4" Min 2'-9" 39'-4"	55	6	8	66	11'-9"	4	12	92	11'-9"	4	9	101	Max 41'-6" Min 1'-10"	4	8.5	101	Max 41'-6" Min 1'-10"	5	12	10 LONG 40'-6" 10 SHORT 2'-10"		4	12	20 LONG 28'-0" 20 SHORT 15'-4"	

k1 SIZE	k1 LENGTH	k1 NO. REQ'D	k2 SIZE	k2 LENGTH	k2 NO. REQ'D	h SIZE	h LENGTH	h Y	h NO. REQ'D
8	55'-9"	6	8	55'-9"	6	4	2'-1"	1'-1"	58

CLASS "S" CONCRETE (Includes HDWL)	① REINFORCING STEEL (GR 60) (Includes HDWL)
CU. YDS.	LBS.
98.35	19429

① Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

INLET SLOPE SECTION(S)

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	TOP SLAB THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	SECTION LENGTH (FT.)	TOP SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	SPACING	NO. REQ'D	BOTTOM SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	SPACING	NO. REQ'D	SIDE WALL REINFORCING STEEL "f0" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINFORCING STEEL "f1" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINFORCING STEEL "g" LENGTH = SL SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINFORCING STEEL "e" LENGTH = SL SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINFORCING STEEL "d1" LENGTH = SL SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINFORCING STEEL "d2" LENGTH = SL SIZE	SPACING	NO. REQ'D
D	S	H	T	B	C	W	OW	OH	SL																																												

HDWL THK. HW	ADDITIONAL REINF. FOR HDWL LBS.	"h" BARS SIZE	Y	LENGTH	NO. REQ'D

CLASS "S" CONCRETE CU. YDS. PER LIN. FT.	REINFORCING STEEL (GR. 60) LBS. PER LIN. FT.	② ADJTL. REINF. PER LONG. LAP LOCATION LBS.	ADDITIONAL CONCRETE FOR HDWL CU. YDS.	TOTAL ADJTL. REINF. FOR HDWL LBS.

② Bar Lap - Add one long. lap for each Slope Section, and one additional long. lap for Slope Sections greater than 40'-0" in length.

Design Fill Depth	Range of Actual Fill Depth
2	0.0 ft - 2.0 ft
5	>2.0 ft - 5.0 ft
10	>5.0 ft - 10.0 ft
15	>10.0 ft - 15.0 ft
20	>15.0 ft - 20.0 ft
25	>20.0 ft - 25.0 ft
30	>25.0 ft - 30.0 ft
35	>30.0 ft - 35.0 ft
40	>35.0 ft - 40.0 ft

Data shown for Mid-Section, Slope Section(s), and Skewed End Section is based on the design fill depth shown in the table, see PLAN AND PROFILE SHEETS for actual fill depth.

MID-SECTION

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	TOP SLAB THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	SECTION LENGTH (FT.)	TOP SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	SPACING	NO. REQ'D	BOTTOM SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	SPACING	NO. REQ'D	SIDE WALL REINFORCING STEEL "f0" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINFORCING STEEL "f1" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINF. STEEL "g" LENGTH = SL SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" LENGTH = SL SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINF. STEEL "d1" LENGTH = SL SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINF. STEEL "d2" LENGTH = SL SIZE	SPACING	NO. REQ'D
D	S	H	T	B	C	W	OW	OH	SL																																											
A	10	12	10	12	13	14	8	39'-8"	12'-1"	91.33	4	39'-4"	8	40'-0"	8	39'-4"	15	73	4	39'-4"	7	40'-1"	7	39'-4"	11	99	6	8	274	11'-9"	4	12	364	11'-9"	4	9	101	4	8.5	107	5	12	20	4	12	40

CLASS "S" CONCRETE CU. YDS. PER LIN. FT.	REINFORCING STEEL (GR. 60) LBS PER LIN. FT.	③ ADTL. STEEL PER LONG. LAP LOCATION ($) LBS.
4.42	667	335

SHEET 1 OF 2
DETAILS OF R.C. BOX CULVERT
TRIPLE BARREL BOX CULVERT
Sta. 108+67

SPECIAL DETAILS

LRFD

Ver. 1.14 b009831_cl.dgn

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	8	93

① SPECIAL DETAILS

STATE OF ARKANSAS
Charles R. Ellis
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
5-4-15

TABULAR DATA BY: TMG DATE: 4/27/2015
CHECKED BY: JTC DATE: 4/27/2015

OUTLET WINGWALL TABLE

OVER ALL WIDTH	CLEAR HEIGHT	FOOTING THK.	WING WALL THK.	BOX SKEW (DEG.)	SLOPE	HDWL LENGTH	HEEL	WALL HEIGHT AT HDWL	WALL HEIGHT AT WING END	WINGWALL ANGLE (DEGREE) WING A	WINGWALL ANGLE (DEGREE) WING B	FOOTING WIDTH AT WALL END	WIDTH OF WING FOOTINGS AT HDWL WING A	WIDTH OF WING FOOTINGS AT HDWL WING B	FOOTING DIMENSION PARALLEL WITH HDWL WING A	FOOTING DIMENSION PARALLEL WITH HDWL WING B	LENGTH OF WINGWALLS WING A	LENGTH OF WINGWALLS WING B	LENGTH OF FOOTING HEEL WING A	LENGTH OF FOOTING HEEL WING B
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AF1	AF2	WE	WF1	WF2	G1	G2	W1	W2	W3	W4
39'-8"	10'-0"	0'-11"	0'-10"	45	3:1	52'-3 7/8"	2'-0"	10'-10"	3'-4"	0	60	3'-4"	4'-9 1/4"	6'-0 3/8"	1'-11 1/4"	4'-7 7/8"	22'-6"	45'-0"	23'-5 3/8"	50'-5 1/8"

CLASS "S" CONCRETE (Includes apron)	REINFORCING STEEL (Includes apron and laps if required)
OUTLET	OUTLET
CU.YD	LBS.
31.90	2426

WING	BAR SIZE	MAX. SPACING	NO. REQ'D	LENGTHS VARY	F1	F2 BAR SIZE	F2 SPACING	F2 NO. REQ'D	F2 LENGTHS	F3 BAR SIZE	F3 SPACING	F3 NO. REQ'D	F3 LENGTHS	F4 BAR SIZE	F4 SPACING	F4 NO. REQ'D	F4 LENGTHS VARY	F5 BAR SIZE	F5 SPACING	F5 NO. REQ'D	F5 LENGTHS	F6 BAR SIZE	F6 SPACING	F6 NO. REQ'D	F6 LENGTHS VARY	F7 BAR SIZE	F7 NO. REQ'D	F7 LENGTHS	F8 BAR SIZE	F8 SPACING	F8 NO. REQ'D	F8 LENGTHS VARY	F9 BAR SIZE	F9 SPACING	F9 NO. REQ'D	F9 LENGTHS	F10 BAR SIZE	F10 NO. REQ'D	F10 LENGTHS	F11 BAR SIZE	F11 NO. REQ'D	F11 LENGTHS	F12 BAR SIZE	F12 SPACING	F12 NO. REQ'D	F12 LENGTHS	REINF. STEEL QTY. PER WING (LBS)
WING A	4	12	23	L Min 4'-8" / Max 13'-6"		5	12	3	L 7'-1"	4	12	6	L 5'-5"	4	18	10	Min 3'-4" / Max 21'-4"	4	18	4	22'-2"	4	18	15	L Min 6'-7" / Max 13'-7"	4	8	24'-3"	4	18	15	Min 2'-10" / Max 4'-3"	4	18	2	Min 24'-4" / Max 24'-4"	4	2	23'-3"	4	2	23'-5"	6	12	10	L 3'-4"	776
				X Min 0'-11" / Max 2'-5"					X 2'-3"				X 1'-10"												X Min 2'-6" / Max 2'-6"																					X 1'-8"	
				Y Min 3'-10" / Max 11'-2"					Y 4'-11"				Y 3'-8"												Y Min 4'-2" / Max 11'-2"																					
WING B	4	12	45	L Min 4'-8" / Max 14'-6"		5	12	12	L 8'-7"	4	12	12	L 5'-8"	4	18	10	Min 6'-10" / Max 42'-10"	4	18	4	44'-8"	4	18	30	L Min 6'-5" / Max 13'-7"	4	8	51'-3"	4	18	33	Min 2'-10" / Max 5'-6"	4	18	4	Min 29'-8" / Max 56'-8"	4	2	45'-2"	4	2	51'-9"	6	12	10	L 3'-4"	1650
				X Min 0'-11" / Max 3'-5"					X 2'-9"				X 2'-1"												X Min 2'-6" / Max 2'-6"																					X 1'-8"	
				Y Min 3'-10" / Max 11'-2"					Y 5'-11"				Y 3'-8"												Y Min 4'-0" / Max 11'-2"																					

Min. Bar Lap Length	
#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table	
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

① Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

OUTLET SKEWED END SECTION

SKEW (DEGREE)	SLOPE	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	SECTION LENGTH	TOP SLAB THK.	HDWL THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	TOP SLAB REINFORCING STEEL a SIZE	a SPACING	a LENGTHS VARY	a NO. REQ'D	TOP SLAB REINFORCING STEEL c SIZE	c SPACING	c LENGTHS VARY	c NO. REQ'D	BOTTOM SLAB REINFORCING STEEL d SIZE	d SPACING	d LENGTHS VARY	d NO. REQ'D	BOTTOM SLAB REINFORCING STEEL f SIZE	f SPACING	f LENGTHS VARY	f NO. REQ'D	SIDE WALL REINFORCING STEEL f0 SIZE	f0 SPACING	f0 NO. REQ'D	f0 LENGTH	INTERIOR WALL REINFORCING STEEL f1 SIZE	f1 SPACING	f1 NO. REQ'D	f1 LENGTH	TOP SLAB DISTRIBUTION REINFORCING STEEL g SIZE	g SPACING	g NO. REQ'D	g LENGTHS VARY	BOTTOM SLAB DISTRIBUTION REINFORCING STEEL e SIZE	e SPACING	e NO. REQ'D	e LENGTHS VARY	SIDE WALL DISTRIBUTION REINFORCING STEEL d1 SIZE	d1 SPACING	d1 NO. REQ'D	d1 LENGTH	INTERIOR WALL DISTRIBUTION REINFORCING STEEL d2 SIZE	d2 SPACING	d2 NO. REQ'D	d2 LENGTH
SK	SL	D	S	H	LL	T	HW	B	C	W	OW	OH																																												
45	3:1	10	12	10	21'-10"	12	5	13	14	8	39'-8"	12'-1"	6	7	Max 39'-4" / Min 2'-9" / 39'-4"	63 / 4		8	7.5	Max 39'-4" / Min 2'-9" / 39'-4"	59 / 4		7	5.5	Max 39'-4" / Min 2'-9" / 39'-4"	80 / 5		6	8	Max 39'-4" / Min 2'-9" / 39'-4"	55 / 3		6	8	66	11'-9"		4	12	92	11'-9"		4	9	101	Max 41'-6" / Min 1'-10"		4	8.5	101	Max 41'-6" / Min 1'-10"		5	12	10 / 10	LONG 40'-6" / SHORT 2'-10"		4	12	20 / 20	LONG 28'-0" / SHORT 15'-4"

CLASS "S" CONCRETE (Includes HDWL)	① REINFORCING STEEL (GR 60) (Includes HDWL)
CU. YDS.	LBS.
98.35	19429

k1 SIZE	k1 LENGTH	k1 NO. REQ'D	k2 SIZE	k2 LENGTH	k2 NO. REQ'D	h SIZE	h LENGTH	h Y	h NO. REQ'D
8	55'-9"	6	8	55'-9"	6	4	2'-1"	1'-1"	58

OUTLET SLOPE SECTION(S)

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.) D	CLEAR SPAN (FT.) S	CLEAR HEIGHT (FT.) H	TOP SLAB THK. T	BOTTOM SLAB THK. B	SIDE WALL THK. C	INTERIOR WALL THK. W	OVER ALL WIDTH OW	OVER ALL HEIGHT OH	SECTION LENGTH (FT.) SL	TOP SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS a SIZE	a L	Bent b SIZE	b L	c SIZE	c L	c SPACING	c NO. REQ'D	BOTTOM SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS d SIZE	d L	Bent b1 SIZE	b1 L	f SIZE	f L	f SPACING	f NO. REQ'D	SIDE WALL REINFORCING STEEL "f0" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINFORCING STEEL "f1" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINFORCING STEEL "g" LENGTH = SL SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINFORCING STEEL "e" LENGTH = SL SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINFORCING STEEL "d1" LENGTH = SL SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINFORCING STEEL "d2" LENGTH = SL SIZE	SPACING	NO. REQ'D

HDWL THK. HW	ADDITIONAL REINF. FOR HDWL LBS.	"h" BARS SIZE	Y	LENGTH	NO. REQ'D

CLASS "S" CONCRETE PER LIN. FT. (CU. YDS.)	REINFORCING STEEL (GR. 60) PER LIN. FT. (LBS.)	② ADTL. REINF. PER LONG. LAP LOCATION (LBS.)	ADDITIONAL CONCRETE FOR HDWL (CU. YDS.)	TOTAL ADTL. REINF. FOR HDWL (LBS.)

② Bar Lap - Add one long. lap for each Slope Section, and one additional long. lap for Slope Sections greater than 40'-0" in length.

The required number of bars and lengths shown are for estimating purpose only. The actual number and length required shall be determined in field.

Unless otherwise noted, all dimensions are in inches.

SHEET 2 OF 2
DETAILS OF R.C. BOX CULVERT

TRIPLE BARREL BOX CULVERT
Sta. 108+67

SPECIAL DETAILS

Ver. 1.14 b009831_cl.dgn

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	9	93

SPECIAL DETAILS

INLET WINGWALL TABLE

OVER ALL WIDTH	CLEAR HEIGHT	FOOTING THK.	WING WALL THK.	BOX SKEW (DEG.)	SLOPE	HDWL LENGTH	HEEL	WALL HEIGHT AT HDWL	WALL HEIGHT AT WING END	WINGWALL ANGLE (DEGREE) WING A	WINGWALL ANGLE (DEGREE) WING B	FOOTING WIDTH AT WALL END	WIDTH OF WING FOOTINGS AT HDWL WING A	WIDTH OF WING FOOTINGS AT HDWL WING B	FOOTING DIMENSION PARALLEL WITH HDWL WING A	FOOTING DIMENSION PARALLEL WITH HDWL WING B	LENGTH OF WINGWALLS WING A	LENGTH OF WINGWALLS WING B	LENGTH OF FOOTING HEEL WING A	LENGTH OF FOOTING HEEL WING B
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AF1	AF2	WE	WF1	WF2	G1	G2	W1	W2	W3	W4
51'-8"	9'-0"	0'-10"	0'-9"	0	3:1	50'-0"	2'-0"	9'-10"	3'-0"	30	30	3'-3"	4'-10"	4'-10"	1'-10"	1'-10"	23'-6"	23'-6"	26'-7 1/8"	26'-7 1/8"

CLASS "S" CONCRETE (Includes apron)	REINFORCING STEEL (Includes apron and laps if required)
INLET	INLET
CU.YD	LBS.
18.58	1548

WING	F1 BAR SIZE	F1 MAX. SPACING	F1 NO. REQ'D	F1 LENGTHS VARY	F1 LENGTHS	F2 BAR SIZE	F2 SPACING	F2 NO. REQ'D	F2 LENGTHS	F3 BAR SIZE	F3 SPACING	F3 NO. REQ'D	F3 LENGTHS	F4 BAR SIZE	F4 SPACING	F4 NO. REQ'D	F4 LENGTHS VARY	F5 BAR SIZE	F5 SPACING	F5 NO. REQ'D	F5 LENGTHS	F6 BAR SIZE	F6 SPACING	F6 NO. REQ'D	F6 LENGTHS VARY	F6 LENGTHS	F7 BAR SIZE	F7 NO. REQ'D	F7 LENGTHS	F8 BAR SIZE	F8 SPACING	F8 NO. REQ'D	F8 LENGTHS VARY	F9 BAR SIZE	F9 SPACING	F9 NO. REQ'D	F9 LENGTHS	F10 BAR SIZE	F10 NO. REQ'D	F10 LENGTHS	F11 BAR SIZE	F11 NO. REQ'D	F11 LENGTHS	F12 BAR SIZE	F12 SPACING	F12 NO. REQ'D	F12 LENGTHS	REINF. STEEL QTY. PER WING (LBS)
WING A	4	12	24	L Min	4'-2"	4	12	11	L 6'-3"	-	-	-	L -	4	18	8	Min	4	18	4	23'-2"	4	18	16	L Min	5'-11"	4	8	27'-5"	4	18	16	Min	4	18	2	Min	4	2	24'-0"	4	2	25'-8"	6	12	9	L 3'-4"	774
				L Max	12'-5"												5'-7"								Max 12'-5"								2'-9"			24'-3"										X 1'-8"	
				X Min	0'-10"				X 1'-9"				X -				Max								X Min 2'-5"								Max			Max										
				X Max	2'-5"												21'-0"								Max 2'-5"								4'-3"			24'-3"										
				Y Min	3'-5"				Y 4'-7"				Y -												Y Min 3'-7"																					
				Y Max	10'-1"																				Max 10'-1"																					
WING B	4	12	24	L Min	4'-2"	4	12	11	L 6'-3"	-	-	-	L -	4	18	8	Min	4	18	4	23'-2"	4	18	16	L Min	5'-11"	4	8	27'-5"	4	18	16	Min	4	18	2	Min	4	2	24'-0"	4	2	25'-8"	6	12	9	L 3'-4"	774
				L Max	12'-5"												5'-7"								Max 12'-5"								2'-9"			24'-3"										X 1'-8"	
				X Min	0'-10"				X 1'-9"				X -				Max								X Min 2'-5"								Max			Max										
				X Max	2'-5"												21'-0"								Max 2'-5"								4'-3"			24'-3"										
				Y Min	3'-5"				Y 4'-7"				Y -												Y Min 3'-7"																					
				Y Max	10'-1"																				Max 10'-1"																					

MID-SECTION

BAR LAP TABLE

# of Long. Laps Req'd.	SL = Section Length
0	< 40.0 ft
1	>40.0 ft - 78.0 ft
2	>78.0 ft - 116.0 ft
3	>116.0 ft - 154.0 ft
4	>154.0 ft - 192.0 ft
5	>192.0 ft - 230.0 ft
6	>230.0 ft - 268.0 ft
7	>268.0 ft - 306.0 ft
8	>306.0 ft -344.0 ft

Min. Bar Lap Length	
#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table	
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

STATE OF ARKANSAS
Charles R. Ellis
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
5-4-15

TABULAR DATA BY: TMG DATE: 4/27/2015
CHECKED BY: JAC DATE: 4/27/2015

This drawing to be used in conjunction with
SHEET 1 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'GENERAL NOTES & LONGITUDINAL SECTION LENGTH SCHEDULE',
SHEET 3 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'DETAILS OF MULTI-BARREL R.C. BOX CULVERT',
SHEET 4 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'DETAILS OF WINGWALLS', and
STANDARD DRAWING RCB-2.
For additional information and outlet sections, see Sheet 2 of 2.

INLET SKEWED END SECTION

SKEW (DEGREE)	SLOPE	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	SECTION LENGTH	TOP SLAB THK.	HDWL THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	TOP SLAB REINF. STEEL a SIZE	a SPACING	a LENGTHS VARY	a NO. REQ'D	TOP SLAB REINF. STEEL c SIZE	c SPACING	c LENGTHS VARY	c NO. REQ'D	BOTTOM SLAB REINF. STEEL d SIZE	d SPACING	d LENGTHS VARY	d NO. REQ'D	BOTTOM SLAB REINF. STEEL f SIZE	f SPACING	f LENGTHS VARY	f NO. REQ'D	SIDE WALL REINF. STEEL f0 SIZE	f0 SPACING	f0 NO. REQ'D	f0 LENGTH	INTERIOR WALL REINF. STEEL f1 SIZE	f1 SPACING	f1 NO. REQ'D	f1 LENGTH	TOP SLAB DISTRIBUTION REINF. STEEL g SIZE	g SPACING	g NO. REQ'D	g LENGTHS VARY	BOTTOM SLAB DISTRIBUTION REINF. STEEL e SIZE	e SPACING	e NO. REQ'D	e LENGTHS VARY	SIDE WALL DISTRIBUTION REINF. STEEL d1 SIZE	d1 SPACING	d1 NO. REQ'D	d1 LENGTH	INTERIOR WALL DISTRIBUTION REINF. STEEL d2 SIZE	d2 SPACING	d2 NO. REQ'D	d2 LENGTH
SK	SL	D	S	H	LL	T	HW	B	C	W	OW	OH			Max				Max				Max														Max				Max						LONG			LONG
															Min				Min				Min														Min				Min						SHORT			MID
																																																	SHORT

k1 SIZE	k1 LENGTH	k1 NO. REQ'D	k2 SIZE	k2 LENGTH	k2 NO. REQ'D	h SIZE	h LENGTH	h Y	h NO. REQ'D

CLASS "S" CONCRETE (Includes HDWL) CU. YDS.	REINFORCING STEEL (GR 60) (Includes HDWL) LBS.

① Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

INLET SLOPE SECTION(S)

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.) D	CLEAR SPAN (FT.) S	CLEAR HEIGHT (FT.) H	TOP SLAB THK. T	BOTTOM SLAB THK B	SIDE WALL THK C	INTERIOR WALL THK. W	OVER ALL WIDTH OW	OVER ALL HEIGHT OH	SECTION LENGTH (FT.) SL	TOP SLAB REINF. STEEL LENGTH = OW - 4" + BENDS a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	c SPACING	c NO. REQ'D	BOTTOM SLAB REINF. STEEL LENGTH = OW - 4" + BENDS d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	f SPACING	f NO. REQ'D	SIDE WALL REINF. STEEL "f0" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINF. STEEL "f1" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINF. STEEL "g" LENGTH = SL SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" LENGTH = SL SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINF. STEEL "d1" LENGTH = SL SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINF. STEEL "d2" LENGTH = SL SIZE	SPACING	NO. REQ'D
	10	12	9																																														

HDWL THK. HW	ADDITIONAL REINF. FOR HDWL LBS.	"h" BARS SIZE	Y	LENGTH	NO. REQ'D
3"	68	4	1'-2"	2'-2"	53

CLASS "S" CONCRETE CU. YDS. PER LIN. FT.	REINFORCING STEEL (GR. 60) LBS. PER LIN. FT.	②ADTL. REINF. PER LONG. LAP LOCATION (S) LBS.	ADTL. REINF. FOR TRANS. LAP LBS. PER LIN. FT.	ADDITIONAL CONCRETE FOR HDWL CU. YDS	TOTAL ADTL. REINF. FOR HDWL LBS.
				0.48	145

② Bar Lap - Add one long. lap for each Slope Section, and one additional long. lap for Slope Sections greater than 40'-0" in length.

Design Fill Depth	Range of Actual Fill Depth
2	0.0 ft - 2.0 ft
5	>2.0 ft - 5.0 ft
10	>5.0 ft - 10.0 ft
15	>10.0 ft - 15.0 ft
20	>15.0 ft - 20.0 ft
25	>20.0 ft - 25.0 ft
30	>25.0 ft - 30.0 ft
35	>30.0 ft - 35.0 ft
40	>35.0 ft - 40.0 ft

Data shown for Mid-Section, Slope Section(s), and Skewed End Section is based on the design fill depth shown in the table, see PLAN AND PROFILE SHEETS for actual fill depth.

MID-SECTION

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.) D	CLEAR SPAN (FT.) S	CLEAR HEIGHT (FT.) H	TOP SLAB THK. T	BOTTOM SLAB THK B	SIDE WALL THK. C	INTERIOR WALL THK. W	OVER ALL WIDTH OW	OVER ALL HEIGHT OH	SECTION LENGTH (FT.) SL	TOP SLAB REINF. STEEL LENGTH = OW - 4" + BENDS a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	c SPACING	c NO. REQ'D	BOTTOM SLAB REINF. STEEL LENGTH = OW - 4" + BENDS d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	f SPACING	f NO. REQ'D	SIDE WALL REINF. STEEL "f0" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINF. STEEL "f1" LENGTH = OH - 4" SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINF. STEEL "g" LENGTH = SL SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" LENGTH = SL SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINF. STEEL "d1" LENGTH = SL SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINF. STEEL "d2" LENGTH = SL SIZE	SPACING	NO. REQ'D
A	10	12	9	15	15	10	8	51'-8"	11'-6"	82	4	51'-4"	7	52'-11"	5	51'-4"	16	61	4	51'-4"	6	52'-9"	5	51'-4"	12	82	6	5.5	356	11'-2"	4	12	492	11'-2"	5	11	119	5	11	119	4	11	20	4	12	54

CLASS "S" CONCRETE CU. YDS. PER LIN. FT.	REINFORCING STEEL (GR. 60) LBS PER LIN. FT.	③ADTL. REINF. PER LONG. LAP LOCATION (S) LBS.	ADTL. REINF. FOR TRANS. LAP LBS. PER LIN. FT.
6.01	730	624	15

SHEET 1 OF 2
DETAILS OF R.C. BOX CULVERT
QUADRUPLE BARREL BOX CULVERT
Sta. 212+57

SPECIAL DETAILS

Ver. 1.1.4 b009831_c2.dgn

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	10	93

① SPECIAL DETAILS

STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 9235 CHARLES R. ELLIS

Charles R. Ellis

5-4-15

TABULAR DATA BY: TMG DATE: 4/27/2015
CHECKED BY: JAC DATE: 4/27/2015

OUTLET WINGWALL TABLE

OVER ALL WIDTH	CLEAR HEIGHT	FOOTING THK.	WING WALL THK.	BOX SKEW (DEG.)	SLOPE	HDWL LENGTH	HEEL	WALL HEIGHT		WINGWALL ANGLE (DEGREE)		FOOTING WIDTH AT WALL END	WIDTH OF WING FOOTINGS AT HDWL		FOOTING DIMENSION PARALLEL WITH HDWL		LENGTH OF WINGWALLS		LENGTH OF FOOTING HEEL	
								AT HDWL	AT WING END	WING A	WING B		WING A	WING B	WING A	WING B	WING A	WING B	WING A	WING B
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AF1	AF2	WE	WF1	WF2	G1	G2	W1	W2	W3	W4
51'-8"	9'-0"	0'-10"	0'-9"	0	3:1	50'-0"	2'-0"	9'-10"	3'-0"	30	30	3'-3"	4'-10"	4'-10"	1'-10"	1'-10"	23'-6"	23'-6"	26'-7 1/8"	26'-7 1/8"

CLASS "S" CONCRETE (Includes apron)	REINFORCING STEEL (Includes apron and laps if required)
OUTLET	OUTLET
CU.YD	LBS.
20.31	1548

WING	F1						F2					F3					F4				F5				F6						F7			F8				F9				F10			F11			F12					REINF. STEEL QTY. PER WING (LBS)
	BAR SIZE	MAX. SPACING	NO. REQ'D	LENGTHS VARY			BAR SIZE	SPACING	NO. REQ'D	LENGTHS		BAR SIZE	SPACING	NO. REQ'D	LENGTHS		BAR SIZE	SPACING	NO. REQ'D	LENGTHS VARY	BAR SIZE	SPACING	NO. REQ'D	LENGTHS	BAR SIZE	SPACING	NO. REQ'D	LENGTHS VARY			BAR SIZE	NO. REQ'D	LENGTHS	BAR SIZE	SPACING	NO. REQ'D	LENGTHS VARY	BAR SIZE	SPACING	NO. REQ'D	LENGTHS	BAR SIZE	NO. REQ'D	LENGTHS	BAR SIZE	NO. REQ'D	LENGTHS	BAR SIZE	SPACING	NO. REQ'D	LENGTHS		
WING A	4	12	24	L	Min	4'-2"	4	12	11	L	6'-3"	-	-	-	L	-	4	18	8	Min	4	18	4	23'-2"	4	18	16	L	Min	5'-11"	4	8	27'-5"	4	18	16	Min	4	18	2	Min	4	2	24'-0"	4	2	25'-8"	6	12	9	L	3'-4"	774
					Max	12'-5"														5'-7"									Max	12'-5"							2'-9"				24'-3"												
				X	Min	0'-10"				X	1'-9"				X	-												X	Min	2'-5"																							
					Max	2'-5"														Max									Max	2'-5"							Max				Max										X	1'-8"	
				Y	Min	3'-5"				Y	4'-7"				Y	-				21'-0"								Y	Min	3'-7"							4'-3"				24'-3"												
					Max	10'-1"																							Max	10'-1"																							
WING B	4	12	24	L	Min	4'-2"	4	12	11	L	6'-3"	-	-	-	L	-	4	18	8	Min	4	18	4	23'-2"	4	18	16	L	Min	5'-11"	4	8	27'-5"	4	18	16	Min	4	18	2	Min	4	2	24'-0"	4	2	25'-8"	6	12	9	L	3'-4"	774
					Max	12'-5"														5'-7"									Max	12'-5"							2'-9"				24'-3"												
				X	Min	0'-10"				X	1'-9"				X	-												X	Min	2'-5"																							
					Max	2'-5"														Max									Max	2'-5"							Max				Max										X	1'-8"	
				Y	Min	3'-5"				Y	4'-7"				Y	-				21'-0"								Y	Min	3'-7"							4'-3"				24'-3"												
					Max	10'-1"																							Max	10'-1"																							

Min. Bar Lap Length	
#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table	
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

① Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

OUTLET SKEWED END SECTION

SKEW (DEGREE)	SLOPE	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	SECTION LENGTH	TOP SLAB THK.	HDWL THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	TOP SLAB REINFORCING STEEL								BOTTOM SLAB REINFORCING STEEL								SIDE WALL REINFORCING STEEL				INTERIOR WALL REINFORCING STEEL				TOP SLAB DISTRIBUTION REINFORCING STEEL				BOTTOM SLAB DISTRIBUTION REINFORCING STEEL				SIDE WALL DISTRIBUTION REINFORCING STEEL				INTERIOR WALL DISTRIBUTION REINFORCING STEEL			
													a				c				d				f				f0				f1				g				e				d1				d2			
SK	SL	D	S	H	LL	T	HW	B	C	W	OW	OH	SIZE	SPACING	LENGTHS VARY	NO. REQ'D	SIZE	SPACING	LENGTHS VARY	NO. REQ'D	SIZE	SPACING	LENGTHS VARY	NO. REQ'D	SIZE	SPACING	LENGTHS VARY	NO. REQ'D	SIZE	SPACING	NO. REQ'D	LENGTH	SIZE	SPACING	NO. REQ'D	LENGTH	SIZE	SPACING	NO. REQ'D	LENGTHS VARY	SIZE	SPACING	NO. REQ'D	LENGTHS VARY	SIZE	SPACING	NO. REQ'D	LENGTH	SIZE	SPACING	NO. REQ'D	LENGTH
															Max				Max				Max				Max													Max				Max				LONG				LONG
															Min				Min				Min				Min													Min				Min				SHORT				MID
																																																				SHORT

CLASS "S" CONCRETE (Includes HDWL)	① REINFORCING STEEL (GR 60) (Includes HDWL.)
CU. YDS.	LBS.

k1			k2			h			
SIZE	LENGTH	NO. REQ'D	SIZE	LENGTH	NO. REQ'D	SIZE	LENGTH	Y	NO. REQ'D

OUTLET SLOPE SECTION(S)

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	TOP SLAB THK.	BOTTOM SLAB THK	SIDE WALL THK	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	SECTION LENGTH (FT.)	TOP SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS								BOTTOM SLAB REINFORCING STEEL LENGTH = OW - 4" + BENDS								SIDE WALL REINFORCING STEEL "f0" LENGTH = OH - 4"				INTERIOR WALL REINFORCING STEEL "f1" LENGTH = OH - 4"				TOP SLAB DISTRIBUTION REINF. STEEL "g" LENGTH = SL			BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" LENGTH = SL			SIDE WALL DISTRIBUTION REINF. STEEL "d1" LENGTH = SL			INTERIOR WALL DISTRIBUTION REINF. STEEL "d2" LENGTH = SL		
											a		Bent b		c		SPACING	NO. REQ'D	d		Bent b1		f		SPACING	NO. REQ'D	SIZE	SPACING	NO. REQ'D	LENGTH	SIZE	SPACING	NO. REQ'D	LENGTH	SIZE	SPACING	NO. REQ'D	SIZE	SPACING	NO. REQ'D	SIZE	SPACING	NO. REQ'D	SIZE	SPACING	NO. REQ'D
	D	S	H	T	B	C	W	OW	OH	SL	SIZE	L	SIZE	L	SIZE	L			SIZE	L	SIZE	L	SIZE	L																						
	10	12	9																																											

HDWL THK.	ADDITIONAL REINF. FOR HDWL	"h" BARS			
HW	LBS.	SIZE	Y	LENGTH	NO. REQ'D
3"	68	4	1'-2"	2'-2"	53

CLASS "S" CONCRETE	REINFORCING STEEL (GR. 60)	② ADTL. REINF. PER LONG. LAP LOCATION (S)	ADTL. REINF. FOR TRANS. LAP	ADDITIONAL CONCRETE FOR HDWL	TOTAL ADTL. REINF. FOR HDWL
CU. YDS. PER LIN. FT.	LBS. PER LIN. FT.	LBS.	LBS. PER LIN. FT.	CU. YDS.	LBS.
				0.48	145

② Bar Lap - Add one long. lap for each Slope Section, and one additional long. lap for Slope Sections greater than 40'-0" in length.

The required number of bars and lengths shown are for estimating purpose only.
The actual number and length required shall be determined in field.

Unless otherwise noted, all dimensions are in inches.

SHEET 2 OF 2

DETAILS OF R.C. BOX CULVERT

QUADRUPLE BARREL BOX CULVERT
Sta. 212+57

SPECIAL DETAILS

LRFD

Ver. 1.14 b009831.c2.dgn

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	11	93

① SPECIAL DETAILS

INLET WINGWALL TABLE

OVER ALL WIDTH	CLEAR HEIGHT	FOOTING THK.	WING WALL THK.	BOX SKEW (DEG.)	SLOPE	HDWL LENGTH	HEEL	WALL HEIGHT AT HDWL	WALL HEIGHT AT WING END	WINGWALL ANGLE (DEGREE) WING A	WINGWALL ANGLE (DEGREE) WING B	FOOTING WIDTH AT WALL END	WIDTH OF WING FOOTINGS AT HDWL WING A	WIDTH OF WING FOOTINGS AT HDWL WING B	FOOTING DIMENSION PARALLEL WITH HDWL WING A	FOOTING DIMENSION PARALLEL WITH HDWL WING B	LENGTH OF WINGWALLS WING A	LENGTH OF WINGWALLS WING B	LENGTH OF FOOTING HEEL WING A	LENGTH OF FOOTING HEEL WING B
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AF1	AF2	WE	WF1	WF2	G1	G2	W1	W2	W3	W4
21'-10"	6'-0"	0'-9"	0'-8"	56	3:1	36'-11 1/2"	2'-0"	6'-10"	2'-0"	0	60	3'-2"	3'-2"	3'-9"	0'-6"	0'-5 1/8"	14'-6"	29'-0"	15'-7 1/8"	58'-9 1/4"

CLASS "S" CONCRETE (Includes apron) INLET	REINFORCING STEEL (Includes apron and laps if required) INLET
CU.YD	LBS.
13.11	1180

WING	F1 BAR SIZE	F1 MAX. SPACING	F1 NO. REQ'D	F1 LENGTHS VARY			F2 BAR SIZE	F2 SPACING	F2 NO. REQ'D	F2 LENGTHS		F3 BAR SIZE	F3 SPACING	F3 NO. REQ'D	F3 LENGTHS		F4 BAR SIZE	F4 SPACING	F4 NO. REQ'D	F4 LENGTHS VARY	F5 BAR SIZE	F5 SPACING	F5 NO. REQ'D	F5 LENGTHS	F6 BAR SIZE	F6 SPACING	F6 NO. REQ'D	F6 LENGTHS VARY		
WING A	4	12	15	L	Min	3'-0"	-	-	-	L	-	-	-	-	L	-	4	18	4	Min	4	18	4	14'-2"	4	18	10	L	Min	4'-9"
					Max	7'-8"														4'-10"									Max	9'-3"
				X	Min	0'-9"				X	-				X	-				Max								X	Min	2'-4"
					Max	0'-9"														9'-4"									Max	2'-4"
				Y	Min	2'-4"				Y	-				Y	-												Y	Min	2'-6"
					Max	7'-0"																							Max	7'-0"
WING B	4	12	29	L	Min	3'-0"	-	-	-	L	-	-	-	-	L	-	4	18	4	Min	4	18	4	28'-8"	4	18	20	L	Min	4'-7"
					Max	8'-3"														9'-10"									Max	9'-3"
				X	Min	0'-9"				X	-				X	-				Max								X	Min	2'-4"
					Max	1'-4"														18'-10"									Max	2'-4"
				Y	Min	2'-4"				Y	-				Y	-												Y	Min	2'-4"
					Max	7'-0"																							Max	7'-0"

WING	F7 BAR SIZE	F7 NO. REQ'D	F7 LENGTHS	F8 BAR SIZE	F8 SPACING	F8 NO. REQ'D	F8 LENGTHS VARY	F9 BAR SIZE	F9 SPACING	F9 NO. REQ'D	F9 LENGTHS	F10 BAR SIZE	F10 NO. REQ'D	F10 LENGTHS	F11 BAR SIZE	F11 NO. REQ'D	F11 LENGTHS	F12 BAR SIZE	F12 SPACING	F12 NO. REQ'D	F12 LENGTHS		REINF. STEEL QTY. PER WING (LBS)
WING A	4	8	16'-5"	4	18	10	Min	-	-	-	Min	4	2	14'-10"	4	2	15'-4"	6	12	6	L	3'-4"	359
							2'-8"				-												
							Max				Max										X	1'-8"	
							2'-8"				-												
WING B	4	8	59'-7"	4	18	20	Min	-	-	-	Min	4	2	28'-11"	4	2	31'-9"	6	12	6	L	3'-4"	821
							2'-8"				-												
							Max				Max										X	1'-8"	
							3'-3"				-												

③ MID-SECTION BAR LAP TABLE

# of Long. Laps Req'd.	SL = Section Length
0	< 40.0 ft
1	>40.0 ft - 78.0 ft
2	>78.0 ft - 116.0 ft
3	>116.0 ft - 154.0 ft
4	>154.0 ft - 192.0 ft
5	>192.0 ft - 230.0 ft
6	>230.0 ft - 268.0 ft
7	>268.0 ft - 306.0 ft
8	>306.0 ft -344.0 ft

Min. Bar Lap Length	
#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table	
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 9235 CHARLES R. ELLIS
Charles R. Ellis
6-4-15

TABULAR DATA BY: EOR DATE: 5/8/2015
CHECKED BY: JAE DATE: 5/20/15

This drawing to be used in conjunction with
SHEET 1 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'GENERAL NOTES & LONGITUDINAL SECTION LENGTH SCHEDULE',
SHEET 3 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'DETAILS OF MULTI-BARREL R.C. BOX CULVERT',
SHEET 4 OF 4, "GENERAL DETAILS OF R.C. BOX CULVERT", 'DETAILS OF WINGWALLS', and
STANDARD DRAWING RCB-2.

For additional information and outlet sections, see Sheet 2 of 2.

① Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

INLET SKEWED END SECTION

SKEW (DEGREE)	SLOPE	FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	SECTION LENGTH	TOP SLAB THK.	HDWL THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	TOP SLAB a SIZE	a SPACING	a LENGTHS VARY	a NO. REQ'D	TOP SLAB c SIZE	c SPACING	c LENGTHS VARY	c NO. REQ'D	BOTTOM SLAB d SIZE	d SPACING	d LENGTHS VARY	d NO. REQ'D	BOTTOM SLAB f SIZE	f SPACING	f LENGTHS VARY	f NO. REQ'D
SK	SL	D	S	H	LL	T	HW	B	C	W	OW	OH																
56	3:1	10	10	6	18'-1"	9.5	9.5	11	6.5	8	21'-9"	7'-8 1/2"	5	7.5	Max 21'-5"	47	7	7	Max 21'-5"	50	5	5	Max 21'-5"	70	4	5.5	Max 21'-5"	64
															Min 1'-9"				Min 1'-9"				Min 1'-9"				Min 1'-9"	
															21'-5"	4			21'-5"	4			21'-5"	5			21'-5"	5

SIDE WALL REINFORCING STEEL f0 SIZE	f0 SPACING	f0 NO. REQ'D	f0 LENGTH	INTERIOR WALL REINFORCING STEEL f1 SIZE	f1 SPACING	f1 NO. REQ'D	f1 LENGTH	TOP SLAB DISTRIBUTION REINFORCING STEEL g SIZE	g SPACING	g NO. REQ'D	g LENGTHS VARY	BOTTOM SLAB DISTRIBUTION REINFORCING STEEL e SIZE	e SPACING	e NO. REQ'D	e LENGTHS VARY	SIDE WALL DISTRIBUTION REINFORCING STEEL d1 SIZE	d1 SPACING	d1 NO. REQ'D	d1 LENGTH	INTERIOR WALL DISTRIBUTION REINFORCING STEEL d2 SIZE	d2 SPACING	d2 NO. REQ'D	d2 LENGTH	CLASS "S" CONCRETE (Includes HDWL) CU. YDS.	① REINFORCING STEEL (GR 60) (Includes HDWL) LBS.
4	4	109	7'-5"	4	12	38	7'-5"	4	11	47	Max 34'-1"	4	10	51	Max 34'-1"	4	12	6	LONG 33'-6"	4	12	12	17'-11"	34.46	7023
											Min 1'-10"				Min 1'-10"			6	SHORT 2'-5"						

k1 SIZE	k1 LENGTH	k1 NO. REQ'D	k2 SIZE	k2 LENGTH	k2 NO. REQ'D	h SIZE	h LENGTH	h Y	h NO. REQ'D
8	38'-5"	6	8	38'-5"	6	4	2'-3"	1'-3"	40

INLET SLOPE SECTION(S)

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.) D	CLEAR SPAN (FT.) S	CLEAR HEIGHT (FT.) H	TOP SLAB THK. T	BOTTOM SLAB THK. B	SIDE WALL THK. C	INTERIOR WALL THK. W	OVER ALL WIDTH OW	OVER ALL HEIGHT OH	SECTION LENGTH (FT.) SL	TOP SLAB REINFORCING STEEL (LENGTH = OW - 4" + BENDS) a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	SPACING	NO. REQ'D	BOTTOM SLAB REINFORCING STEEL (LENGTH = OW - 4" + BENDS) d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	SPACING	NO. REQ'D	SIDE WALL REINFORCING STEEL "f0" (LENGTH = OH - 4") SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINFORCING STEEL "f1" (LENGTH = OH - 4") SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINF. STEEL "g" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINF. STEEL "d1" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINF. STEEL "d2" (LENGTH = SL) SIZE	SPACING	NO. REQ'D

CLASS "S" CONCRETE CU. YDS. PER LIN. FT.	REINFORCING STEEL (GR. 60) LBS. PER LIN. FT.	② ADTL. REINF. PER LONG. LAP LOCATION LBS.	ADDITIONAL CONCRETE FOR HDWL CU. YDS.	TOTAL ADDITIONAL REINF. FOR HDWL LBS.

HDWL THK. HW	ADDITIONAL REINF. FOR HDWL LBS.	"h" BARS SIZE	"h" BARS Y	"h" BARS LENGTH	"h" BARS NO. REQ'D

② Bar Lap - Add one long. lap for each Slope Section, and one additional long. lap for Slope Sections greater than 40'-0" in length.

Design Fill Depth	Range of Actual Fill Depth
2	0.0 ft - 2.0 ft
5	>2.0 ft - 5.0 ft
10	>5.0 ft - 10.0 ft
15	>10.0 ft - 15.0 ft
20	>15.0 ft - 20.0 ft
25	>20.0 ft - 25.0 ft
30	>25.0 ft - 30.0 ft
35	>30.0 ft - 35.0 ft
40	>35.0 ft - 40.0 ft

Data shown for Mid-Section, Slope Section(s), and Skewed End Section is based on the design fill depth shown in the table, see PLAN AND PROFILE SHEETS for actual fill depth.

MID-SECTION

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.) D	CLEAR SPAN (FT.) S	CLEAR HEIGHT (FT.) H	TOP SLAB THK. T	BOTTOM SLAB THK. B	SIDEWALL THK. C	INTERIOR WALL THK. W	OVER ALL WIDTH OW	OVER ALL HEIGHT OH	SECTION LENGTH (FT.) SL	TOP SLAB REINFORCING STEEL (LENGTH = OW - 4" + BENDS) a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	SPACING	NO. REQ'D	BOTTOM SLAB REINFORCING STEEL (LENGTH = OW - 4" + BENDS) d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	SPACING	NO. REQ'D
A	10	10	6	10.5	11.5	7.0	8	21'-10"	7'-10"	112.83	4	21'-6"	8	21'-9"	6	21'-6"	13	104	4	21'-6"	6	21'-9"	5	21'-6"	8	169

SIDE WALL REINFORCING STEEL "f0" (LENGTH = OH - 4") SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINFORCING STEEL "f1" (LENGTH = OH - 4") SIZE	SPACING	NO. REQ'D	LENGTH	TOP SLAB DISTRIBUTION REINF. STEEL "g" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION STEEL "d1" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION STEEL "d2" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	CLASS "S" CONCRETE CU. YDS. PER LIN. FT.	REINFORCING STEEL (GR. 60) LBS. PER LIN. FT.	③ ADTL. REINF. PER LONG. LAP LOCATION(S) LBS.
5	6	450	7'-6"	4	12	224	7'-6"	4	10	51	4	9	51	4	12	12	4	12	12	1.89	326	147

SHEET 1 OF 2
DETAILS OF R.C. BOX CULVERT
DOUBLE BARREL BOX CULVERT
Sta. 215+00
SPECIAL DETAILS

LRFD

Ver. 1.114 b009831_c4.dgn

STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 9235 CHARLES R. ELLIS
Charles R. Ellis
6-4-15

TABULAR DATA BY: EOR DATE: 5/8/2015
CHECKED BY: JAC DATE: 5/20/15

OUTLET WINGWALL TABLE

OVER ALL WIDTH	CLEAR HEIGHT	FOOTING THK.	WING WALL THK.	BOX SKEW (DEG.)	SLOPE	HDWL LENGTH	HEEL	WALL HEIGHT AT HDWL	WALL HEIGHT AT WING END	WINGWALL ANGLE (DEGREE) WING A	WINGWALL ANGLE (DEGREE) WING B	FOOTING WIDTH AT WALL END	WIDTH OF WING FOOTINGS AT HDWL WING A	WIDTH OF WING FOOTINGS AT HDWL WING B	FOOTING DIMENSION PARALLEL WITH HDWL WING A	FOOTING DIMENSION PARALLEL WITH HDWL WING B	LENGTH OF WINGWALLS WING A	LENGTH OF WINGWALLS WING B	LENGTH OF FOOTING HEEL WING A	LENGTH OF FOOTING HEEL WING B
OW	H	WB	CW	SK	SL	K	HL	WH1	WH2	AF1	AF2	WE	WF1	WF2	G1	G2	W1	W2	W3	W4
21'-10"	6'-0"	0'-9"	0'-8"	56	3:1	36'-11 1/2"	2'-0"	6'-10"	2'-0"	0	60	3'-2"	3'-2"	3'-9"	0'-6"	0'-5 1/8"	14'-6"	29'-0"	15'-7 1/8"	58'-9 1/4"

CLASS "S" CONCRETE (Includes apron) OUTLET	REINFORCING STEEL (Includes apron and laps if required) OUTLET
CU.YD	LBS.
14.52	1180

WING	F1 BAR SIZE	F1 MAX. SPACING	F1 NO. REQ'D	F1 LENGTHS VARY	F2 BAR SIZE	F2 SPACING	F2 NO. REQ'D	F2 LENGTHS	F3 BAR SIZE	F3 SPACING	F3 NO. REQ'D	F3 LENGTHS
WING A	4	12	15	L Min 3'-0" Max 7'-8" X Min 0'-9" Max 0'-9" Y Min 2'-4" Max 7'-0"	-	-	-	L - X - Y -	-	-	-	L - X - Y -
WING B	4	12	29	L Min 3'-0" Max 8'-3" X Min 0'-9" Max 1'-4" Y Min 2'-4" Max 7'-0"	-	-	-	L - X - Y -	-	-	-	L - X - Y -

WING	F4 BAR SIZE	F4 SPACING	F4 NO. REQ'D	F4 LENGTHS VARY	F5 BAR SIZE	F5 SPACING	F5 NO. REQ'D	F5 LENGTHS	F6 BAR SIZE	F6 SPACING	F6 NO. REQ'D	F6 LENGTHS VARY
WING A	4	18	4	Min 4'-10" Max 9'-4"	4	18	4	14'-2"	4	18	10	L Min 4'-9" Max 9'-3" X Min 2'-4" Max 2'-4" Y Min 2'-6" Max 7'-0"
WING B	4	18	4	Min 9'-10" Max 18'-10"	4	18	4	28'-8"	4	18	20	L Min 4'-7" Max 9'-3" X Min 2'-4" Max 2'-4" Y Min 2'-4" Max 7'-0"

WING	F7 BAR SIZE	F7 NO. REQ'D	F7 LENGTHS	F8 BAR SIZE	F8 SPACING	F8 NO. REQ'D	F8 LENGTHS VARY	F9 BAR SIZE	F9 SPACING	F9 NO. REQ'D	F9 LENGTHS	F10 BAR SIZE	F10 NO. REQ'D	F10 LENGTHS	F11 BAR SIZE	F11 NO. REQ'D	F11 LENGTHS	F12 BAR SIZE	F12 SPACING	F12 NO. REQ'D	F12 LENGTHS	REINF. STEEL QTY. PER WING (LBS)
WING A	4	8	16'-5"	4	18	10	Min 2'-8" Max 2'-8"	-	-	-	Min - Max -	4	2	14'-10"	4	2	15'-4"	6	12	6	L 3'-4" X 1'-8"	359
WING B	4	8	59'-7"	4	18	20	Min 2'-8" Max 3'-3"	-	-	-	Min - Max -	4	2	28'-11"	4	2	31'-9"	6	12	6	L 3'-4" X 1'-8"	821

Min. Bar Lap Length	
#4	1'-9"
#5	2'-2"
#6	2'-7"
#7	3'-6"
#8	4'-7"

Bar Pin Dia. Table	
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"

① Any Bar Lap Required for the Skewed End Section shall be considered subsidiary to the item "Reinforcing Steel - Roadway (Gr. 60)."

OUTLET SKEWED END SECTION

SKEW (DEGREE)	SLOPE	FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	SECTION LENGTH	TOP SLAB THK.	HDWL THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT
SK	SL	D	S	H	LL	T	HW	B	C	W	OW	OH
56	3:1	10	10	6	18'-1"	9.5	9.5	11	6.5	8	21'-9"	7'-8 1/2"

	TOP SLAB REINFORCING STEEL a SIZE	a SPACING	a LENGTHS VARY	a NO. REQ'D	c SIZE	c SPACING	c LENGTHS VARY	c NO. REQ'D	BOTTOM SLAB REINFORCING STEEL d SIZE	d SPACING	d LENGTHS VARY	d NO. REQ'D	f SIZE	f SPACING	f LENGTHS VARY	f NO. REQ'D
	5	7.5	Max 21'-5" Min 1'-9"	47	7	7	Max 21'-5" Min 1'-9"	50	5	5	Max 21'-5" Min 1'-9"	70	4	5.5	Max 21'-5" Min 1'-9"	64
			21'-5"	4			21'-5"	4			21'-5"	5			21'-5"	5

SIDE WALL REINFORCING STEEL f0 SIZE	f0 SPACING	f0 NO. REQ'D	f0 LENGTH	INTERIOR WALL REINFORCING STEEL f1 SIZE	f1 SPACING	f1 NO. REQ'D	f1 LENGTH	TOP SLAB DISTRIBUTION REINFORCING STEEL g SIZE	g SPACING	g NO. REQ'D	g LENGTHS VARY
4	4	109	7'-5"	4	12	38	7'-5"	4	11	47	Max 34'-1" Min 1'-10"

BOTTOM SLAB DISTRIBUTION REINFORCING STEEL e SIZE	e SPACING	e NO. REQ'D	e LENGTHS VARY	SIDE WALL DISTRIBUTION REINFORCING STEEL d1 SIZE	d1 SPACING	d1 NO. REQ'D	d1 LENGTH	INTERIOR WALL DISTRIBUTION REINFORCING STEEL d2 SIZE	d2 SPACING	d2 NO. REQ'D	d2 LENGTH
4	10	51	Max 34'-1" Min 1'-10"	4	12	6 6	LONG 33'-6" SHORT 2'-5"	4	12	12	17'-11"

k1 SIZE	k1 LENGTH	k1 NO. REQ'D	k2 SIZE	k2 LENGTH	k2 NO. REQ'D	h SIZE	h LENGTH	h Y	h NO. REQ'D
8	38'-5"	6	8	38'-5"	6	4	2'-3"	1'-3"	40

CLASS "S" CONCRETE (Includes HDWL)	①REINFORCING STEEL (GR 60) (Includes HDWL)
CU. YDS.	LBS.
34.46	7023

OUTLET SLOPE SECTION(S)

R.C. BOX SECTION	DESIGN FILL DEPTH (FT.)	CLEAR SPAN (FT.)	CLEAR HEIGHT (FT.)	TOP SLAB THK.	BOTTOM SLAB THK.	SIDE WALL THK.	INTERIOR WALL THK.	OVER ALL WIDTH	OVER ALL HEIGHT	SECTION LENGTH (FT.)
	D	S	H	T	B	C	W	OW	OH	SL

TOP SLAB REINFORCING STEEL (LENGTH = OW - 4" + BENDS) a SIZE	a L	Bent b SIZE	Bent b L	c SIZE	c L	SPACING	NO. REQ'D	BOTTOM SLAB REINFORCING STEEL (LENGTH = OW - 4" + BENDS) d SIZE	d L	Bent b1 SIZE	Bent b1 L	f SIZE	f L	SPACING	NO. REQ'D

SIDE WALL REINFORCING STEEL "f0" (LENGTH = OH - 4") SIZE	SPACING	NO. REQ'D	LENGTH	INTERIOR WALL REINFORCING STEEL "f1" (LENGTH = OH - 4") SIZE	SPACING	NO. REQ'D	LENGTH

TOP SLAB DISTRIBUTION REINF. STEEL "g" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	BOTTOM SLAB DISTRIBUTION REINF. STEEL "e" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	SIDE WALL DISTRIBUTION REINF. STEEL "d1" (LENGTH = SL) SIZE	SPACING	NO. REQ'D	INTERIOR WALL DISTRIBUTION REINF. STEEL "d2" (LENGTH = SL) SIZE	SPACING	NO. REQ'D

HDWL THK.	ADDITIONAL REINF. FOR HDWL	"h" BARS SIZE	Y	LENGTH	NO. REQ'D
HW	LBS.				

CLASS "S" CONCRETE	REINFORCING STEEL (GR. 60)	②ADTL. REINF. PER LONG. LAP LOCATION	ADDITIONAL CONCRETE FOR HDWL	TOTAL ADDITIONAL REINF. FOR HDWL
CU. YDS. PER LIN. FT.	LBS. PER LIN. FT.	LBS.	CU. YDS.	LBS.

② Bar Lap - Add one long. lap for each Slope Section, and one additional long. lap for Slope Sections greater than 40'-0" in length.

The required number of bars and lengths shown are for estimating purpose only. The actual number and length required shall be determined in field.

Unless otherwise noted, all dimensions are in inches.

SHEET 2 OF 2
DETAILS OF R.C. BOX CULVERT

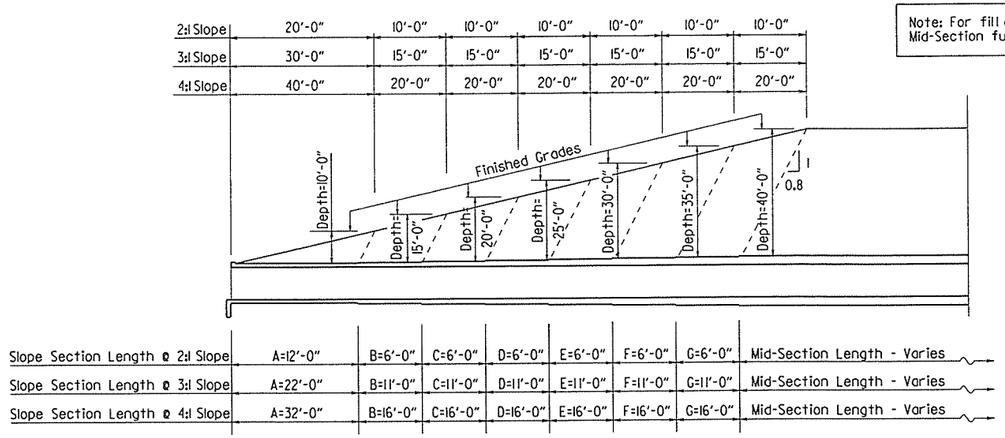
DOUBLE BARREL BOX CULVERT
Sta. 215+00

SPECIAL DETAILS

LRFD

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	13	93

(1) SPECIAL DETAILS

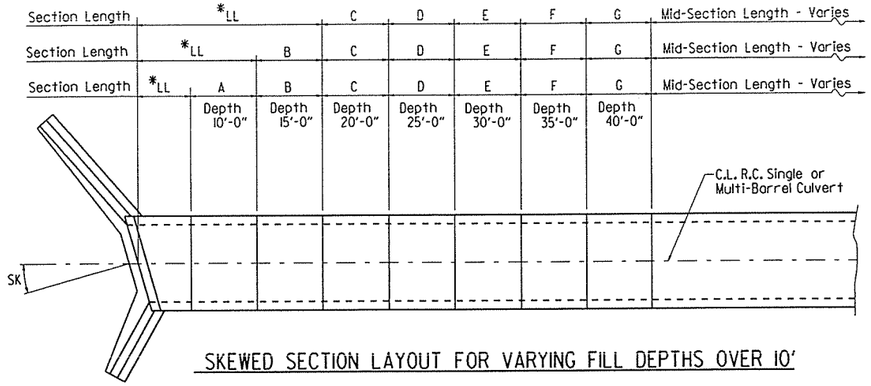


Note: For fill depths 10' and under, use Mid-Section full length of box culvert.

LONGITUDINAL SECTION LENGTH SCHEDULE FOR VARYING FILL DEPTHS OVER 10'

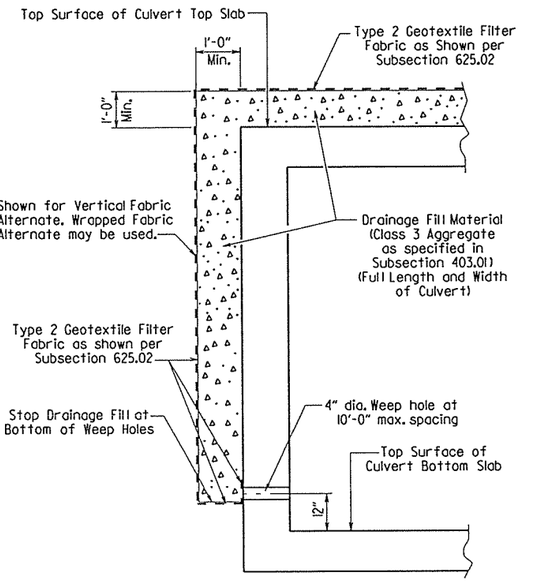
Lengths for Non-Skewed Boxes

*LL = Skewed End Section Length - See "Skewed End Section Details" Length LL varies with skew angle, overall box width and fill depth and may eliminate the need for some slope section lengths as shown.



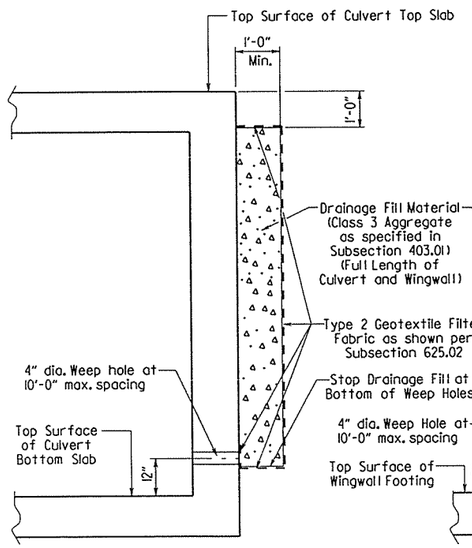
SKEWED SECTION LAYOUT FOR VARYING FILL DEPTHS OVER 10'

STATE OF ARKANSAS
Charles R. Ellis
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
6-4-15



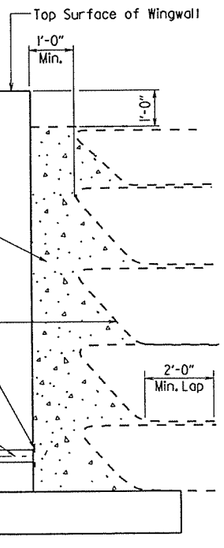
CULVERT DRAINAGE DETAIL FOR ROCK FILL

This detail shall be used when rock fill is specified for embankment construction.



VERTICAL FABRIC ALTERNATE

(Shown for Culvert, Similar for Wingwall)



WRAPPED FABRIC ALTERNATE

(Shown for Wingwall, Similar for Culvert)

For Details of Excavation and Pay Limits, see Standard Drawing RCB-2.

WINGWALL & CULVERT DRAINAGE DETAIL

GENERAL NOTES:

CONSTRUCTION SPECIFICATIONS: Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction (2014 edition) with applicable Supplemental Specifications and Special Provisions. Section and Subsection refer to the Standard Construction Specifications unless otherwise noted in the Plans.

DESIGN SPECIFICATIONS: AASHTO LRFD Bridge Design Specifications, Fifth Edition (2010) with 2010 interim revisions.

LIVE LOADING: HL-93

All concrete shall be Class S with a minimum 28-day compressive strength of 3,500 psi and shall be poured in the dry. All exposed corners to have ¾" chamfers.

Reinforcing Steel shall be Grade 60 (yield strength = 60,000 psi) conforming to AASHTO M31 or M322, Type A, with mill test reports.

Reinforcing Steel Tolerances: The tolerances for reinforcing steel shall meet those listed in 'Manual of Standard Practice' published by Concrete Reinforcing Steel Institute (CRSI) except that the tolerance for truss bars such as Figure 3 on page 7-4 of the CRSI Manual shall be minus zero to plus 1/2 inch.

Excavation and backfilling shall be in accordance with the requirements of Section 801.

Membrane Waterproofing shall conform to the requirements of Section 815. Membrane Waterproofing shall be Type C and as directed by the Engineer applied to all construction joints in the top slab and the sidewalls of R.C. Box culverts and to the construction joint between wingwalls and R.C. Box culvert walls.

Weep Holes in box culvert walls shall have a maximum horizontal spacing of 10'-0" and shall be spaced to clear all reinforcing steel. The drain opening shall be 4" diameter and shall be placed 12" above the top of the bottom slab.

Weep Holes in wingwalls shall have a maximum horizontal spacing of 10'-0" and shall be spaced to clear all reinforcing steel. There shall be a minimum of two (2) weep holes in each wingwall. The drain opening shall be 4" diameter and shall be placed 12" above the top of the wingwall footing.

The barrel components of the culvert may be constructed using continuous pours. For longer culvert construction, the Contractor may use multiple pours with transverse construction joints spaced a minimum of 50 feet apart unless superseded by stage construction or site constraints as approved by the Engineer. Construction joints between footings and walls shall be made only where shown in the Plans. Joints shall be normal to the centerline of barrel and shall be keyed. Longitudinal reinforcing shall be continuous through joints unless shown otherwise. All longitudinal construction joints shall be submitted to the Engineer for approval.

Membrane Waterproofing, Weep Holes, Geotextile Filter Fabric, and Drainage Fill Material will not be paid for directly but shall be considered subsidiary to Class S Concrete.

When the top slab of the box culvert serves as finished roadway surface, curing and finishing shall be in accordance with subsections 802.17 and 802.20 for bridge roadway surface and a tine finish shall be applied in accordance with subsection 802.19 for Class S Tined Bridge Roadway Surface Finish. Curing and finishing shall not be paid for directly, but shall be considered incidental to the item "Class S Concrete-Roadway". Class 1 Protective Surface Treatment shall be applied to the roadway surface and this work shall be paid for under the unit price bid for "Class 1 Protective Surface Treatment".

When precast reinforced concrete box culverts are substituted for cast in place box culverts, they shall be manufactured according to ASTM C 1577 and meet the requirements of Section 607. When the top slab of the box culvert serves as the finished roadway surface, a precast reinforced concrete box culvert substitution is not allowed.

SHEET 1 OF 4
GENERAL DETAILS OF R.C. BOX CULVERT
GENERAL NOTES & LONGITUDINAL SECTION LENGTH SCHEDULE

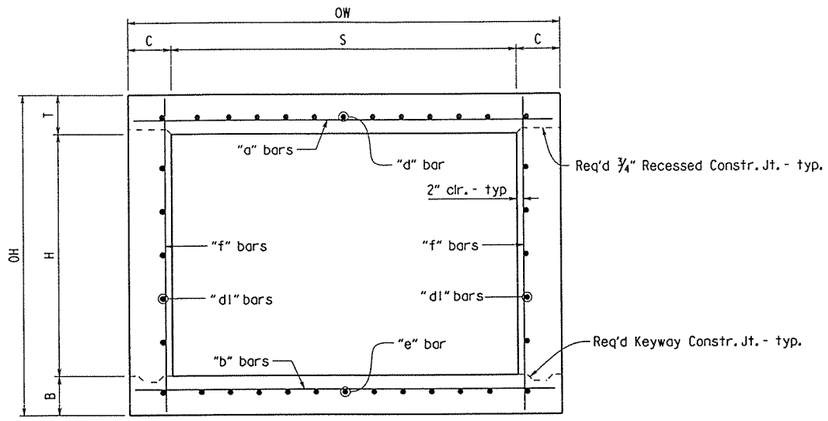
SPECIAL DETAILS

V 1.1.4 b009831_culvert.dgn

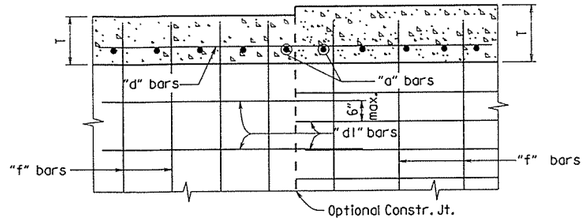
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	14	93

(1) SPECIAL DETAILS

Note: When top slab of culvert serves as finished roadway surface, see General Notes on Sheet 1 of 4.



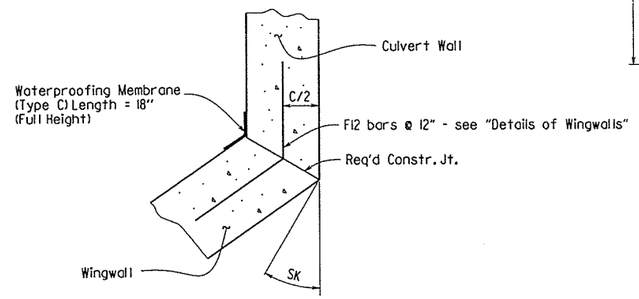
TYPICAL SECTION M-M



Longitudinal Bar Spacing at individual sections shall be maintained, which may result in noncontact bar laps.

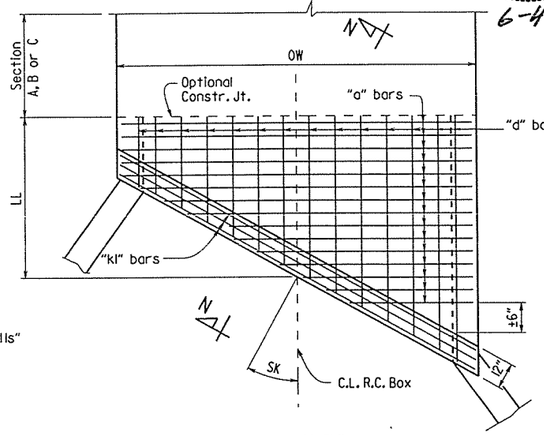
LONGITUDINAL LAP DETAIL AT CHANGE IN SECTIONS

TOP SLAB SHOWN, BOTTOM SLAB SIMILAR

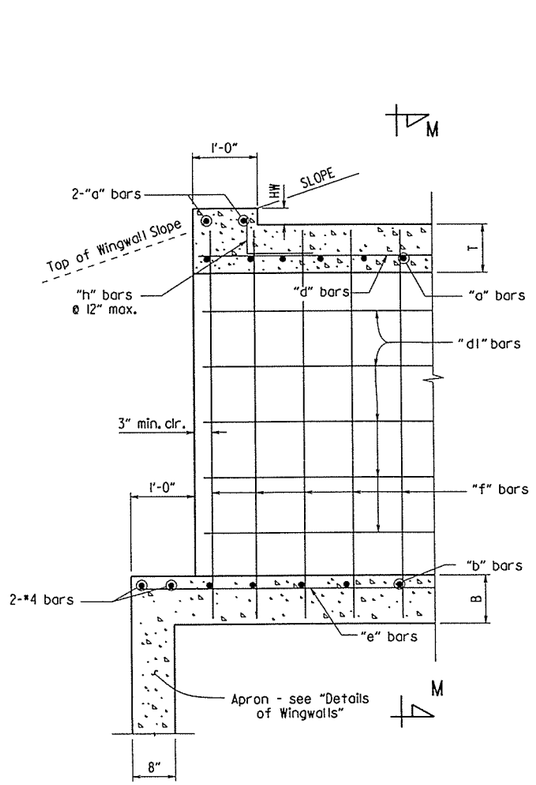


WINGWALL ATTACHMENT

See "Details of Wingwalls" for additional information and wingwall details.

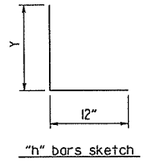


TOP SLAB REINFORCEMENT

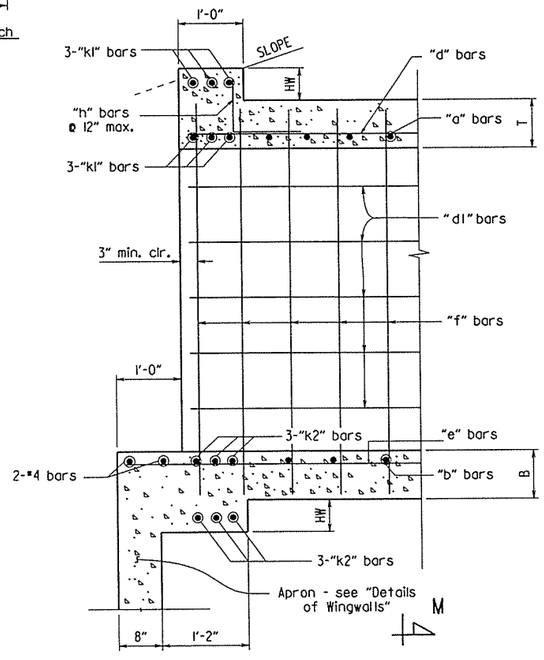


PART LONGITUDINAL SECTION

(Non-Skewed Ends)

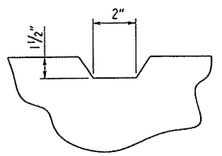


"h" bars sketch



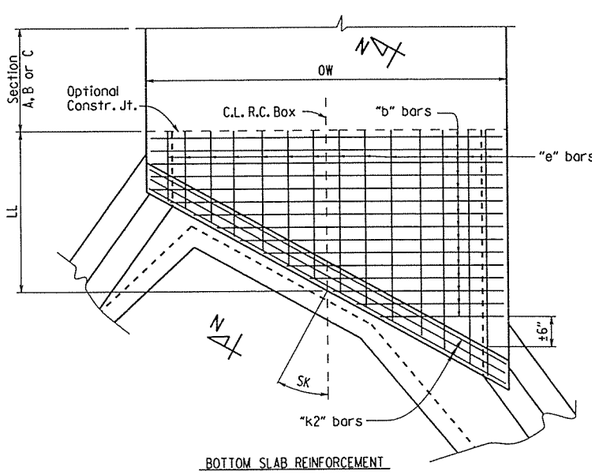
PART LONGITUDINAL SECTION N-N

(Skewed Ends)



TYPICAL KEYWAY DETAIL

(All Construction Joints)



BOTTOM SLAB REINFORCEMENT

SKEWED END SECTION DETAILS

SHEET 2 OF 4
GENERAL DETAILS OF R.C. BOX CULVERT

DETAILS OF SINGLE BARREL
R.C. BOX CULVERT

SPECIAL DETAILS

STATE OF ARKANSAS
Charles R. Ellis
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
6-4-15

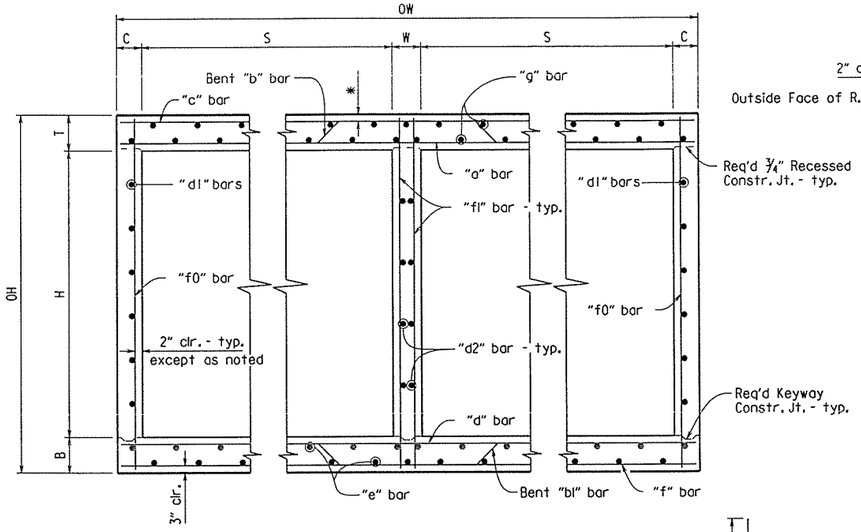
b009831.culvert.dgn

DATE REVISED	DATE FILMED	REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	15	93

SPECIAL DETAILS

*2" clr. for fill depth (D) greater than 2 ft.
2½" clr. for fill depth (D) equal to or less than 2 ft.

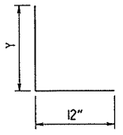
Note: When top slab of culvert serves as finished roadway surface, see General Notes on Sheet 1 of 4.



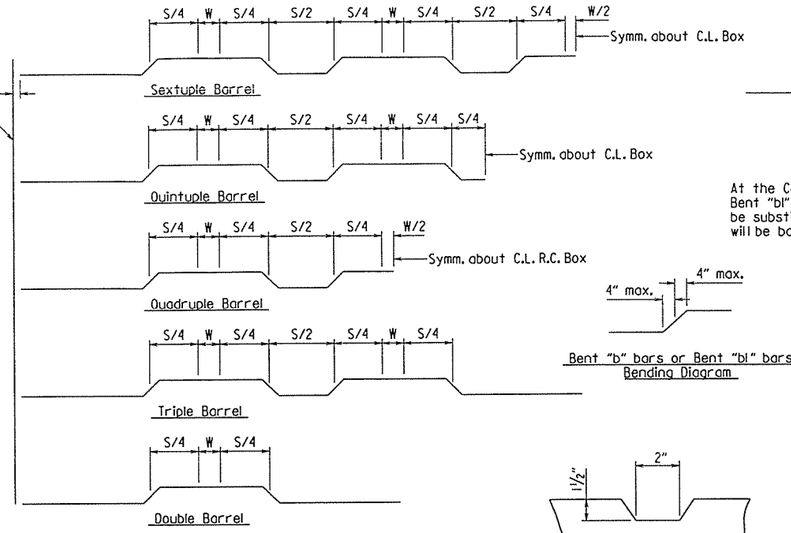
TYPICAL SECTION M-M

Top Slab
Straight "c" bars shall alternate with Bent "b" bars in top.
Straight "a" bars shall alternate with Bent "b" bars in bottom.

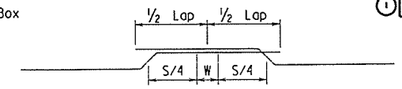
Bottom Slab
Straight "d" bars shall alternate with Bent "b1" bars in top.
Straight "f" bars shall alternate with Bent "b1" bars in bottom.



"h" bars sketch



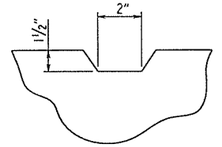
Bent "b" bars or Bent "b1" bars sketch



Lap Detail
For Bent "b" bars and Bent "b1" bars

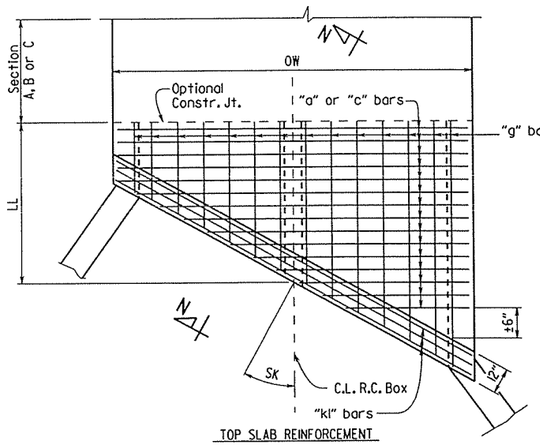
At the Contractor's option in lieu of providing Bent "b" or Bent "b1" bars, one bar top and bottom of equivalent size may be substituted for each bent bar. Payment for the reinforcing will be based on the weight of the "b" or "b1" bar.

Bent "b" bars or Bent "b1" bars Bending Diagram

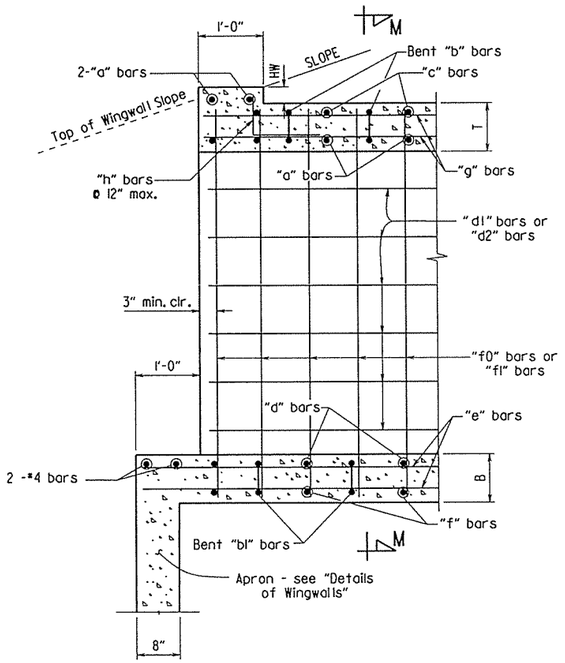


TYPICAL KEYWAY DETAIL

(All Construction Joints)

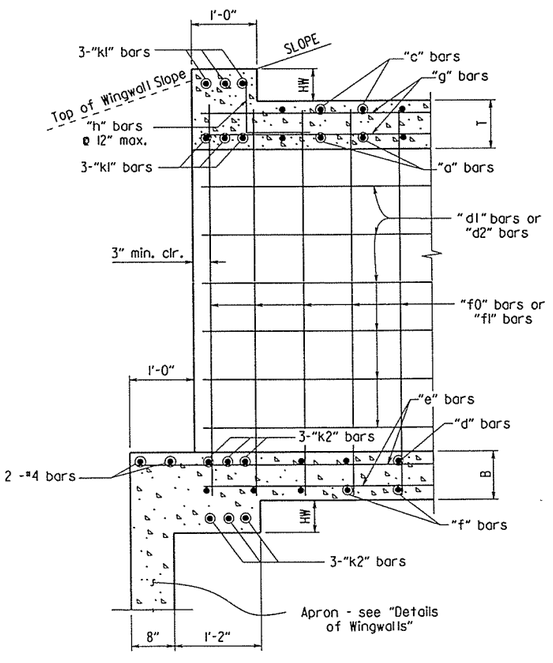


TOP SLAB REINFORCEMENT
Straight "c" bars in top.
Straight "a" bars in bottom.



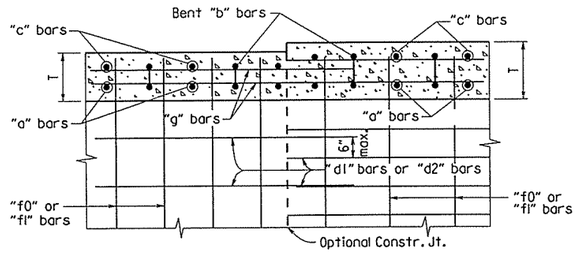
PART LONGITUDINAL SECTION

(Non-Skewed Ends)



PART LONGITUDINAL SECTION N-N

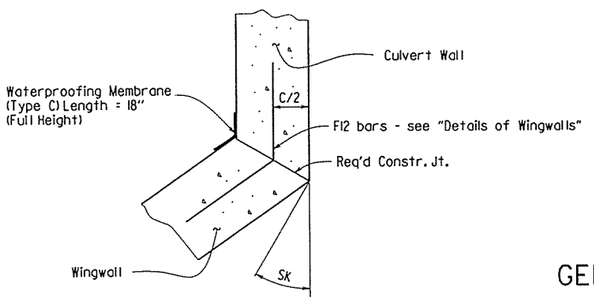
(Skewed Ends)



Longitudinal Bar Spacing at individual sections shall be maintained, which may result in noncontact bar laps.

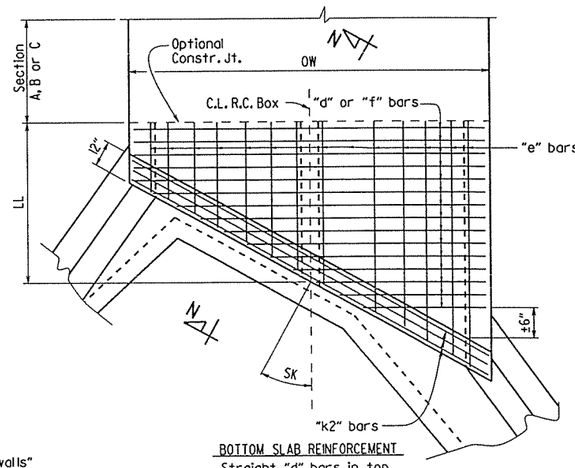
LONGITUDINAL LAP DETAIL AT CHANGE IN SECTIONS

TOP SLAB SHOWN, BOTTOM SLAB SIMILAR



WINGWALL ATTACHMENT

See "Details of Wingwalls" for additional information and wingwall details.



BOTTOM SLAB REINFORCEMENT
Straight "d" bars in top.
Straight "f" bars in bottom.

SKEWED END SECTION DETAILS

SHEET 3 OF 4
GENERAL DETAILS OF R.C. BOX CULVERT

DETAILS OF MULTI-BARREL
R.C. BOX CULVERT

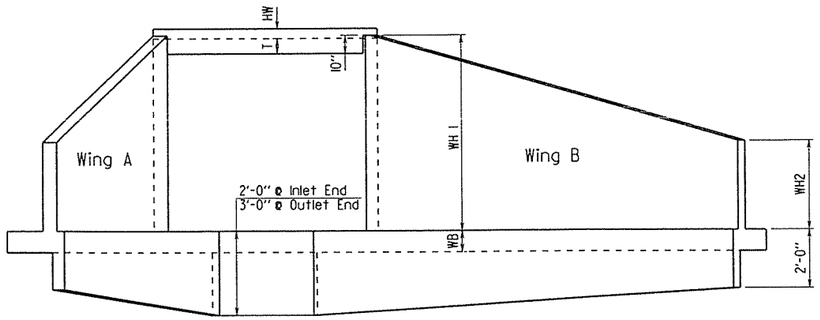
SPECIAL DETAILS

STATE OF ARKANSAS
Charles R. Ellis
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
6-4-15

b009831.culvert.dgn

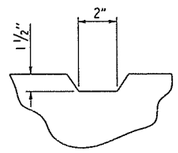
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	16	93

1 SPECIAL DETAILS



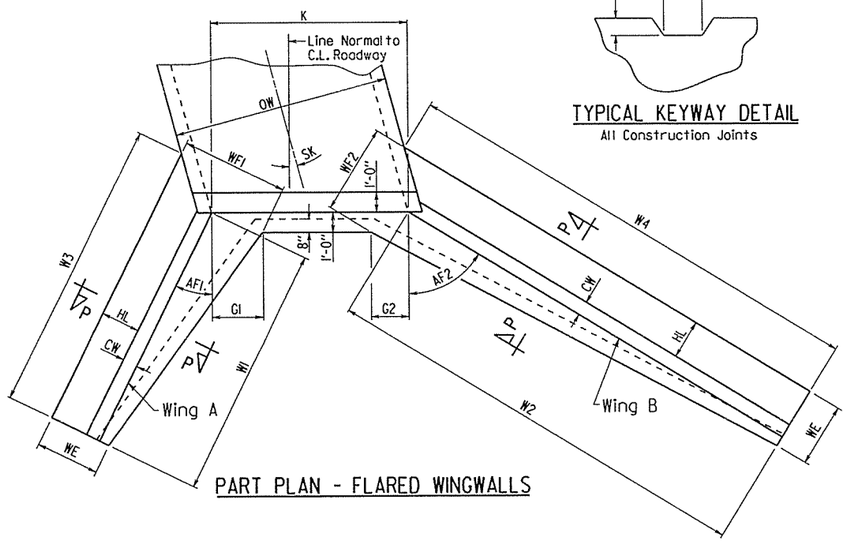
END ELEVATION

Flared Wingwalls Shown

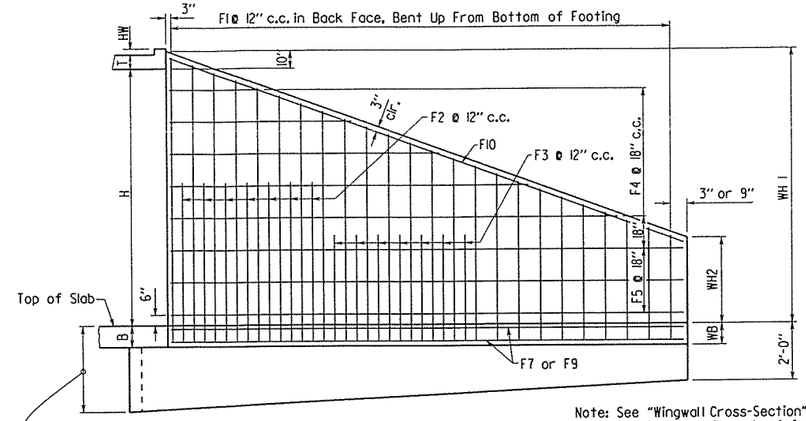


TYPICAL KEYWAY DETAIL

All Construction Joints



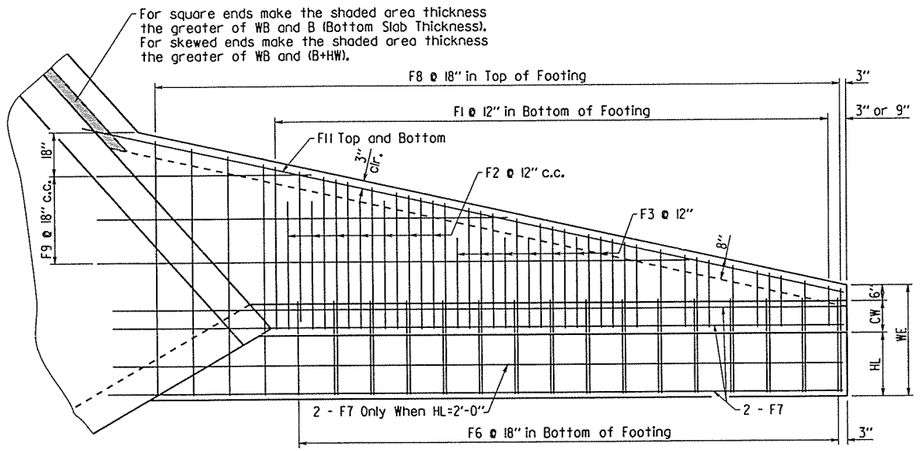
PART PLAN - FLARED WINGWALLS



WINGWALL ELEVATION

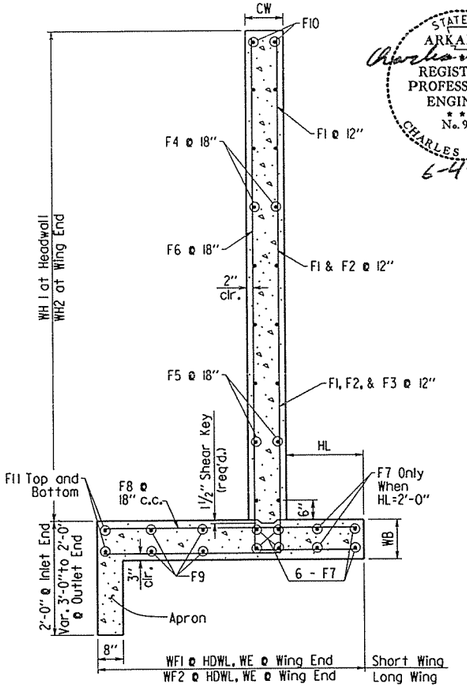
Showing Back Face Reinforcement

Note: See "Wingwall Cross-Section" for additional details and reinforcing

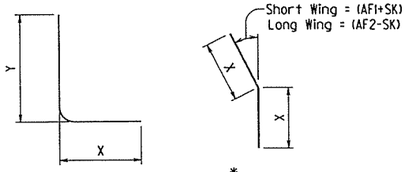


PLAN - FLARED WINGWALLS

Showing Footing Reinforcement



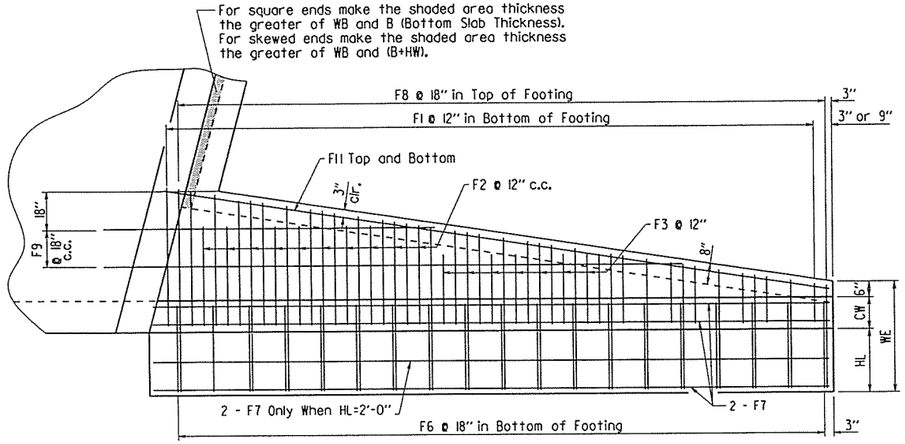
WINGWALL SECTION P-P



F1, F2, F3, & F6 BARS

*F12 BAR

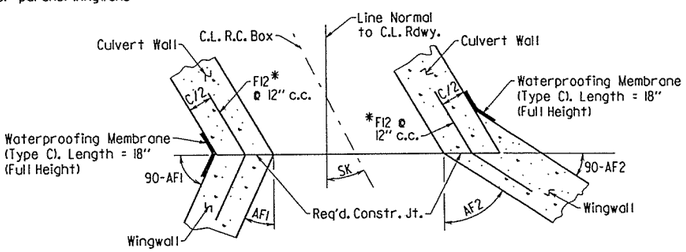
PART PLAN - PARALLEL WINGWALLS



PLAN - PARALLEL WINGWALLS

Showing Footing Reinforcement

*F12 is a straight bar for parallel wingwalls



CONSTRUCTION JOINTS

Flared Wingwalls Shown

STATE OF ARKANSAS
Charles R. Ellis
REGISTERED PROFESSIONAL ENGINEER
No. 9235
CHARLES R. ELLIS
6-4-15

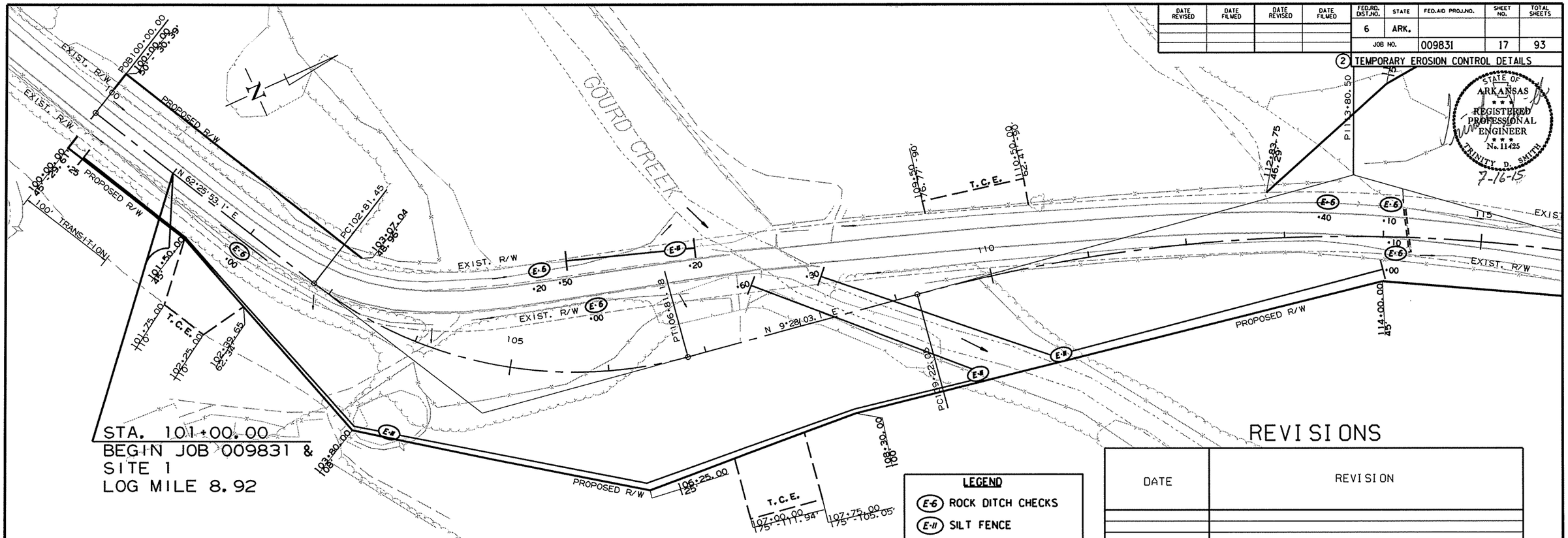
SHEET 4 OF 4
GENERAL DETAILS OF R.C. BOX CULVERT
DETAILS OF WINGWALLS
SPECIAL DETAILS

b009831_culvert.dgn

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	17	93

(2) TEMPORARY EROSION CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



LEGEND

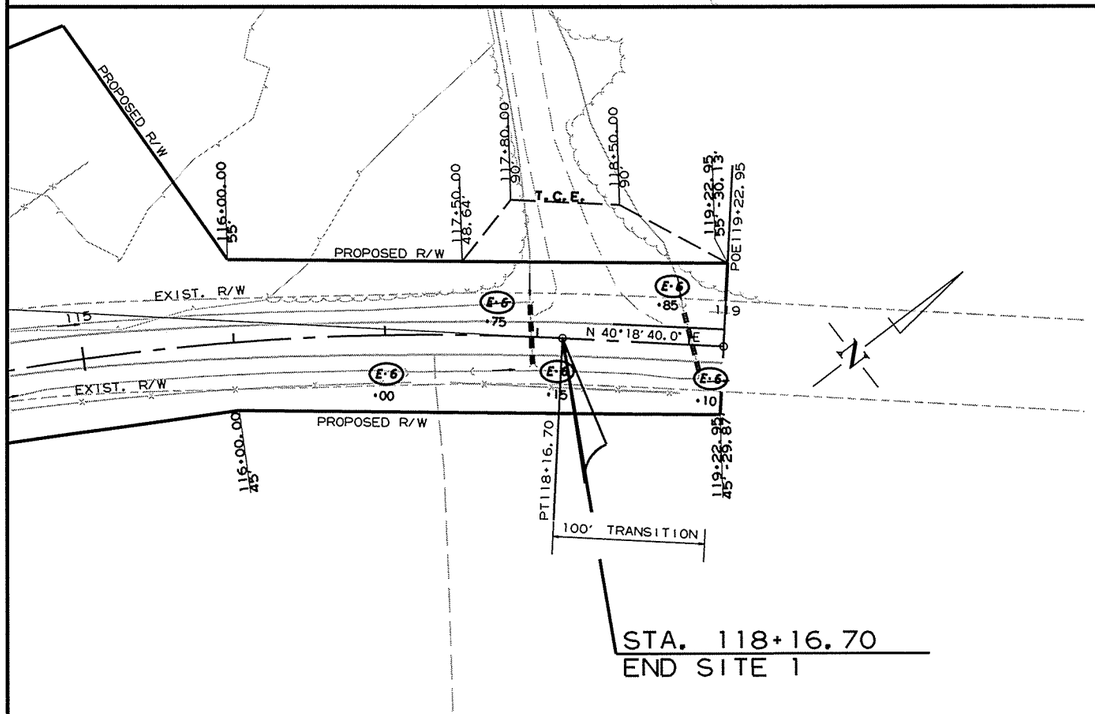
E-6 ROCK DITCH CHECKS

E-11 SILT FENCE

REVISIONS

DATE	REVISION

• MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.



SITE 1
CLEARING AND GRUBBING STAGE
TEMPORARY EROSION CONTROL DETAILS

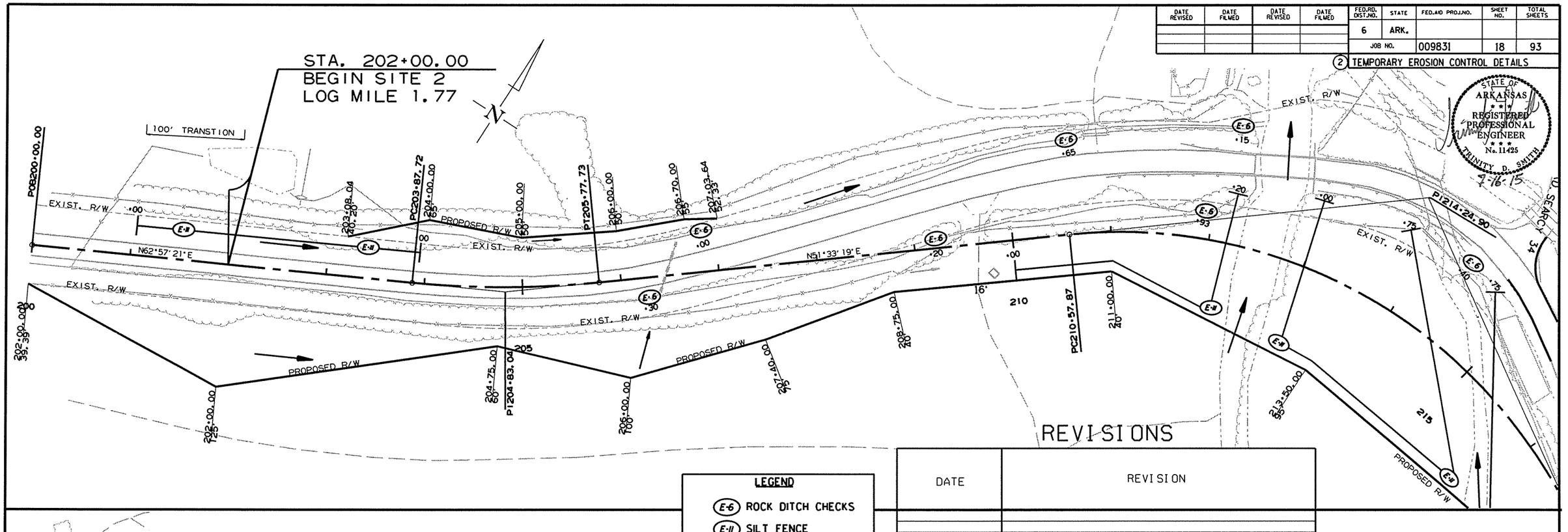
7/10/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	18	93

(2) TEMPORARY EROSION CONTROL DETAILS

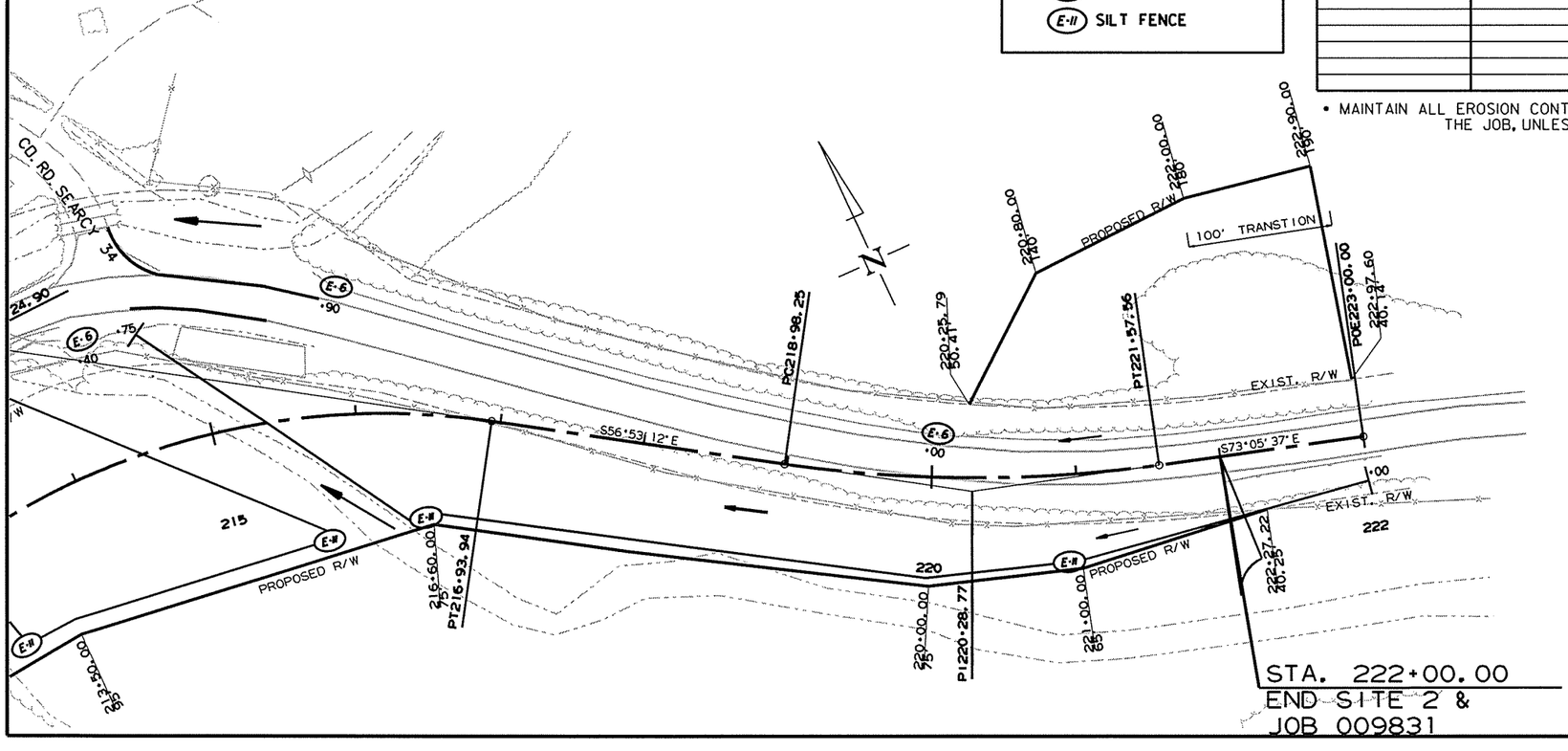
STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



LEGEND

- (E-6) ROCK DITCH CHECKS
- (E-11) SILT FENCE

- MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.



SITE 2
CLEARING AND GRUBBING STAGE
TEMPORARY EROSION CONTROL DETAILS

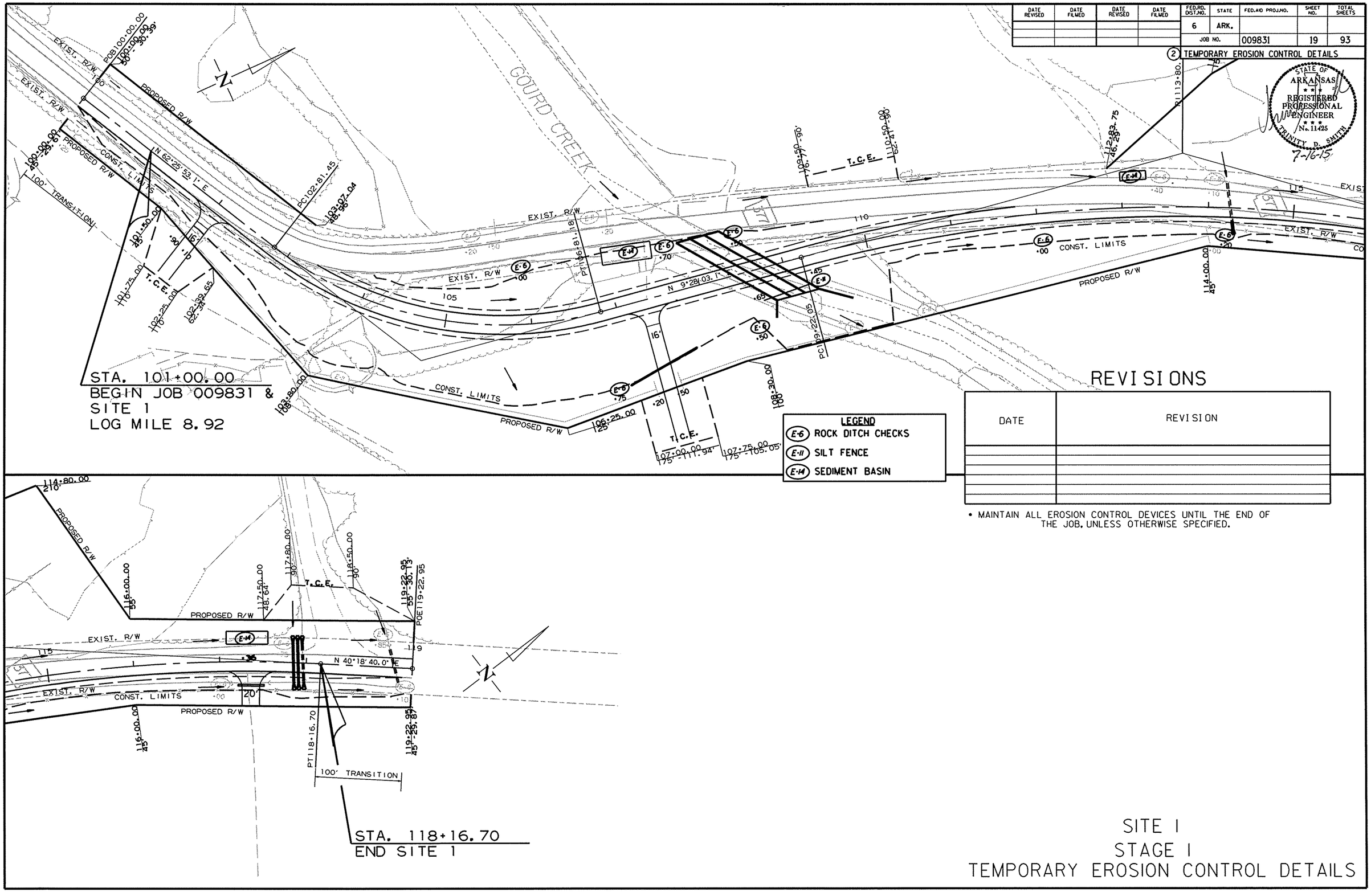
7/10/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	19	93

(2) TEMPORARY EROSION CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



LEGEND

- (E-6) ROCK DITCH CHECKS
- (E-11) SILT FENCE
- (E-14) SEDIMENT BASIN

REVISIONS

DATE	REVISION

• MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

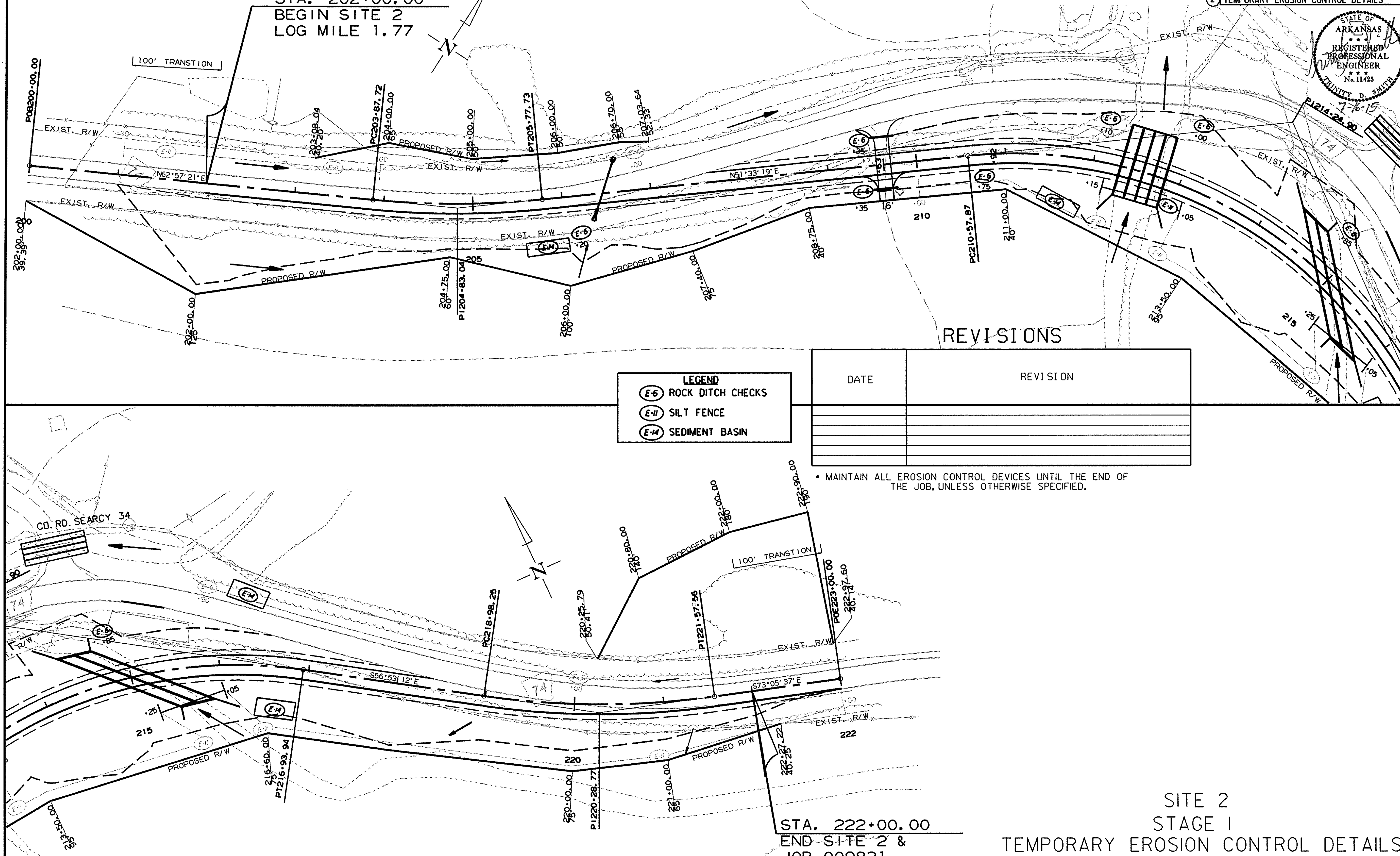
7/10/2015

R009831.DGN

SITE 1
STAGE 1
TEMPORARY EROSION CONTROL DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
					JOB NO.	009831	20	93

(2) TEMPORARY EROSION CONTROL DETAILS



LEGEND

- (E-6) ROCK DITCH CHECKS
- (E-11) SILT FENCE
- (E-14) SEDIMENT BASIN

REVISIONS

DATE	REVISION

- MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

SITE 2
STAGE I
TEMPORARY EROSION CONTROL DETAILS

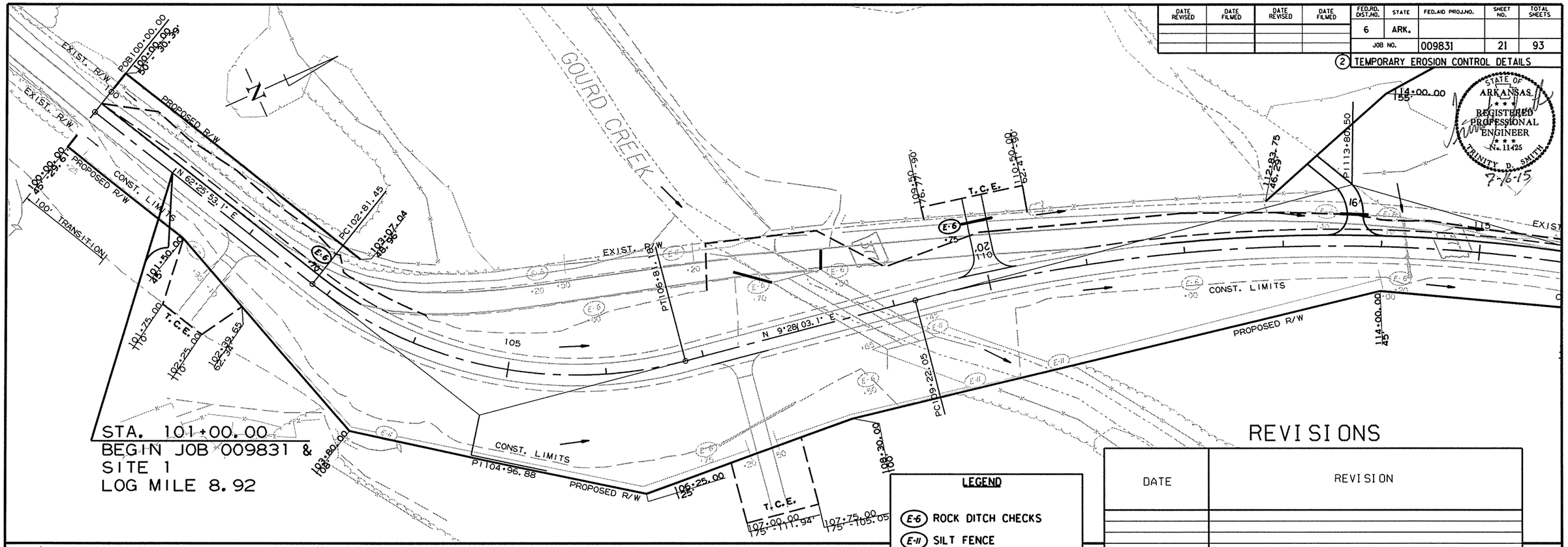
7/10/2015

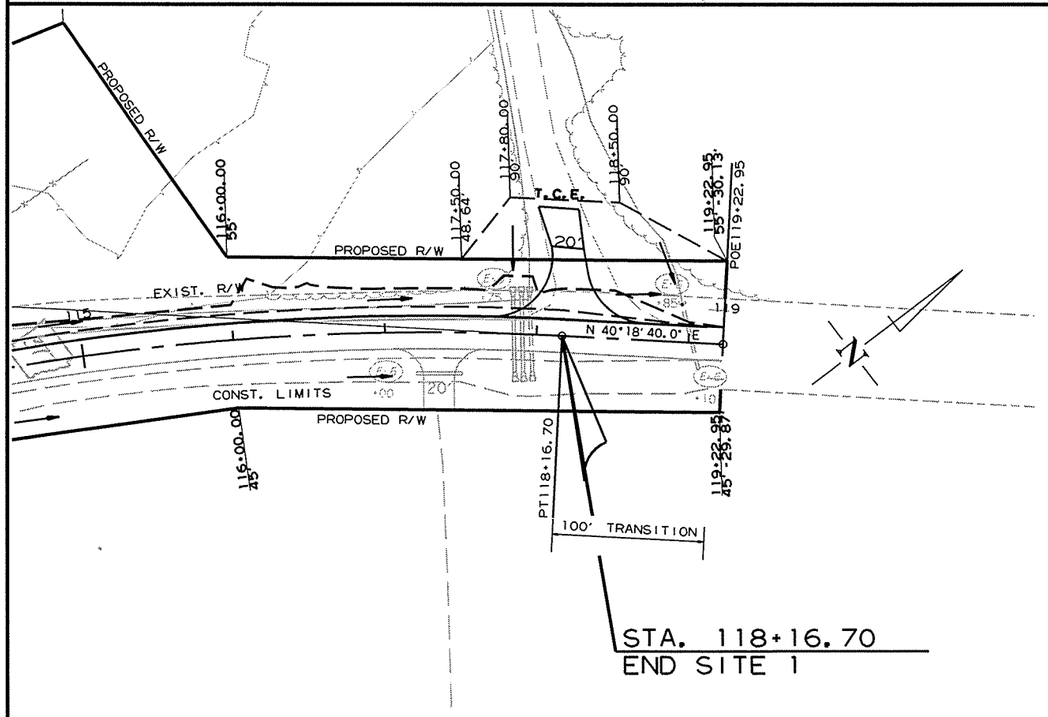
R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	21	93

(2) TEMPORARY EROSION CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-6-15





LEGEND

- (E-6) ROCK DITCH CHECKS
- (E-11) SILT FENCE

REVISIONS

DATE	REVISION

- MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

SITE 1
STAGE 2
TEMPORARY EROSION CONTROL DETAILS

7/10/2015

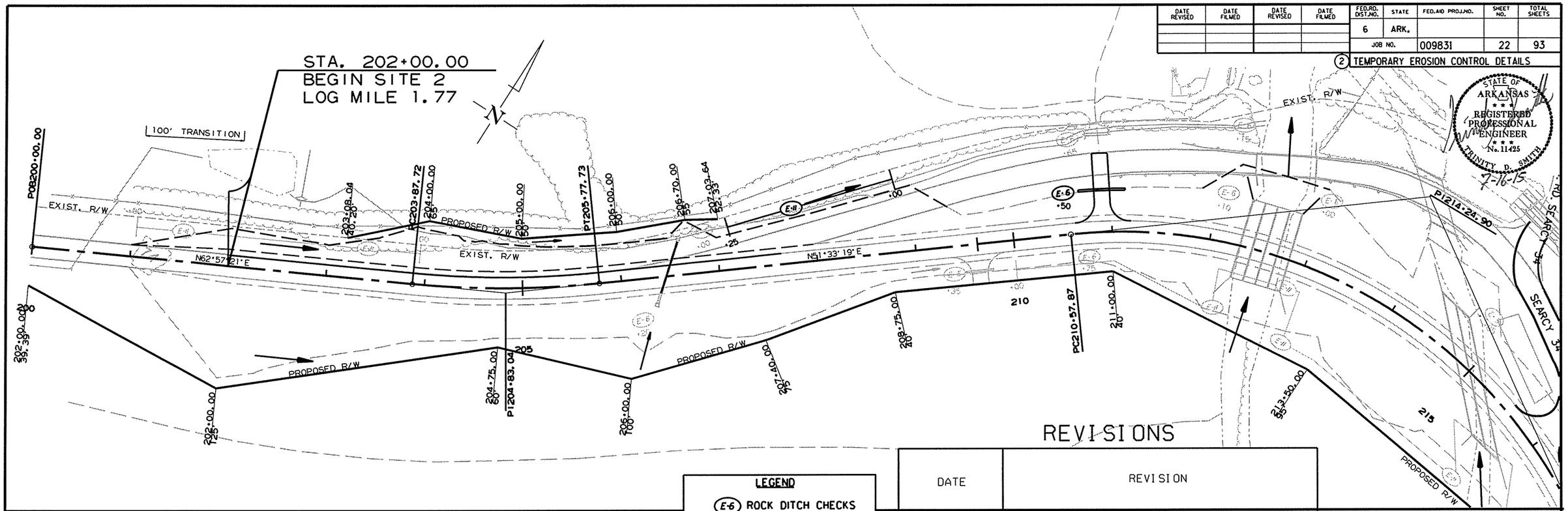
R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	22	93

(2) TEMPORARY EROSION CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

STA. 202+00.00
BEGIN SITE 2
LOG MILE 1.77



LEGEND

E-6 ROCK DITCH CHECKS

E-11 SILT FENCE

REVISIONS

DATE	REVISION

- MAINTAIN ALL EROSION CONTROL DEVICES UNTIL THE END OF THE JOB, UNLESS OTHERWISE SPECIFIED.

STA. 222+00.00
END SITE 2 &
JOB 009831

SITE 2
STAGE 2
TEMPORARY EROSION CONTROL DETAILS

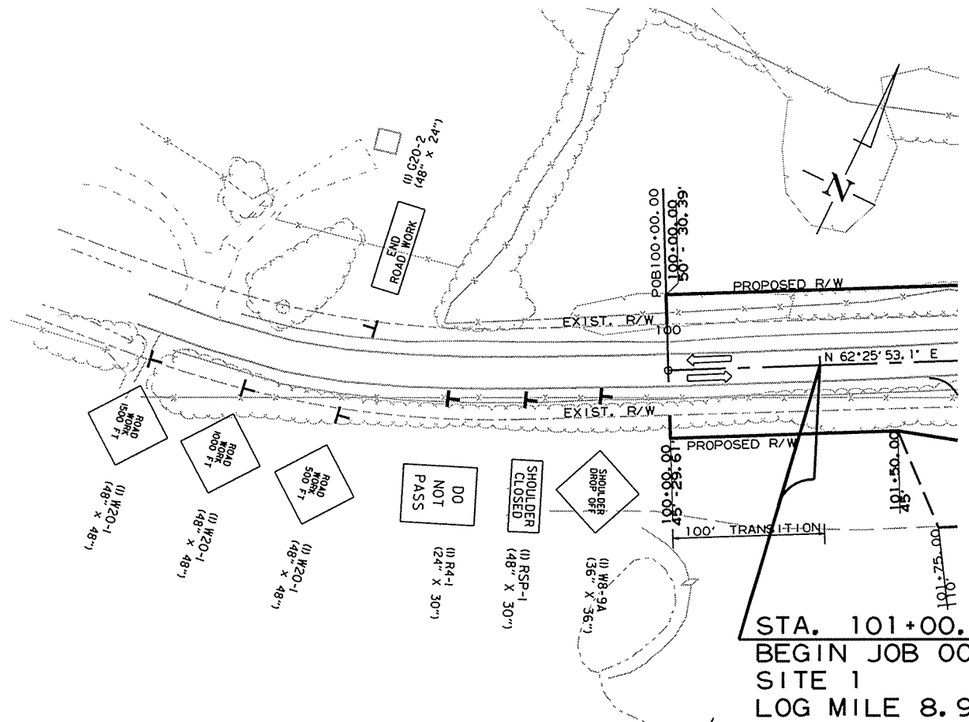
7/10/2015

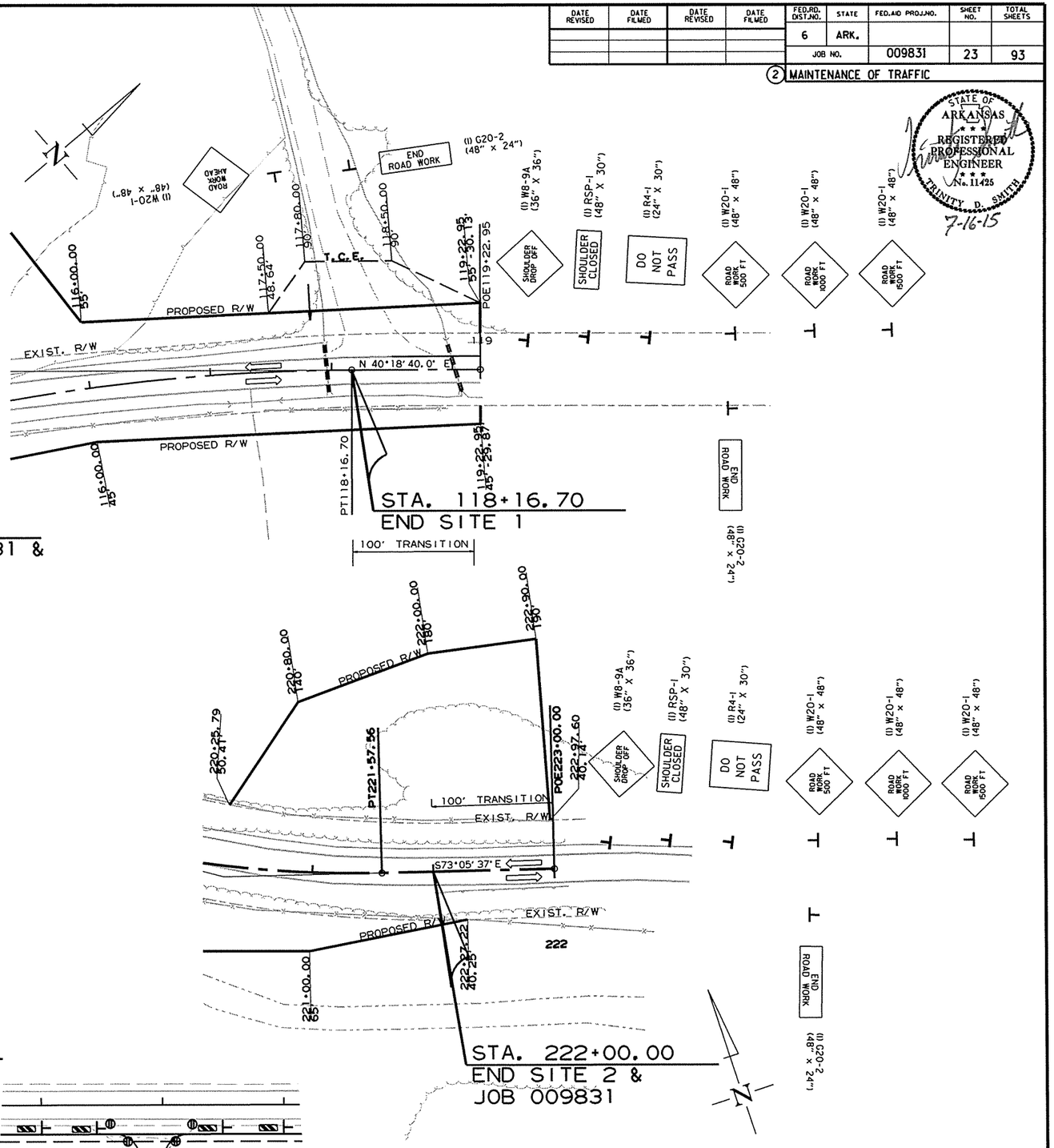
R009831.DGN

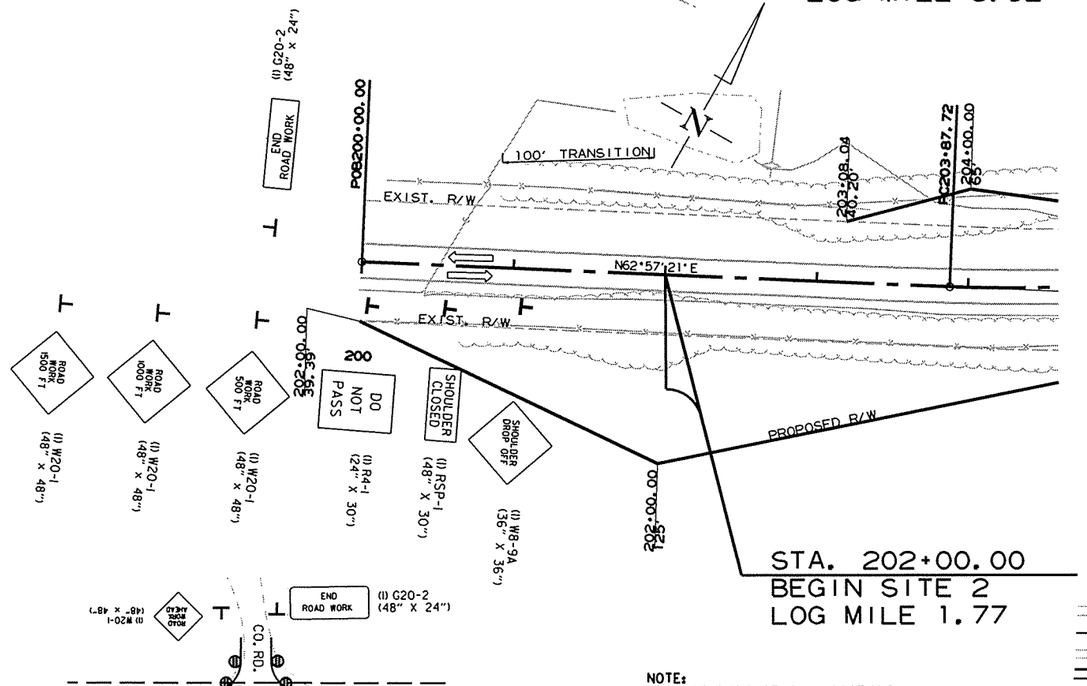
DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	23	93

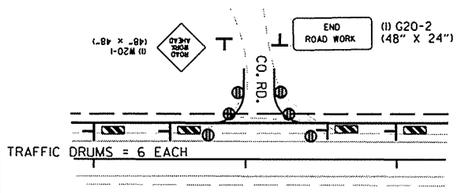
(2) MAINTENANCE OF TRAFFIC

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



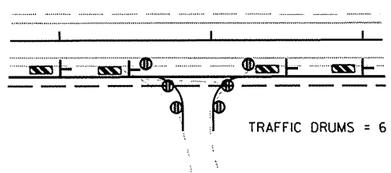






COUNTY ROAD TRAFFIC DRUM
AND ADVANCE SIGN WARNING DETAIL

NOTE:
ADVANCE SIGNS AT ALL LOCATIONS
ARE TO BE RETAINED THROUGH
ALL STAGES OF CONSTRUCTION.



DRIVEWAY TRAFFIC DRUM DETAIL

MAINTENANCE OF TRAFFIC DETAILS
ADVANCE WARNING SIGNS

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	24	93

(2) MAINTENANCE OF TRAFFIC

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
2-16-15

VERTICAL PANELS @ 40' O.C. = 11 EACH
TRAFFIC DRUMS = 16 EACH

STA. 101+00.00
BEGIN JOB 009831 &
SITE 1
LOG MILE 8.92

SEQUENCING:

STAGE 1: MAINTAIN TRAFFIC ON EXISTING ROADWAY. EXTEND EXISTING CULVERTS AND CONSTRUCT NEW CULVERTS. CONSTRUCT MAIN LANES ON NEW LOCATION. PERFORM LEVELING OPERATIONS WHERE APPLICABLE. PLACE CONSTRUCTION PAVEMENT MARKINGS. NOTCH AND WIDEN FOR LANE ON RT. UTILIZE VERTICAL PANELS AT THE NOTCH AT 40' O.C. SPACING.

STAGE 2: WIDEN SHOULDER ON LT. UTILIZE VERTICAL PANELS. UTILIZE TRAFFIC DRUMS AT 80' O.C. SPACING AT EXISTING LANE EDGE ON RT.

STAGE 3: INSTALL FINAL SURFACE COURSE AND FINAL STRIPING. OBLITERATE ROADWAY.

CONSTRUCTION PAVEMENT MARKINGS:

AS DIRECTED BY THE ENGINEER OVER LEVELING COURSE:
RT. AND LT. EDGE LINES = 1750 LIN. FT.
DBL. CENTERLINE = 1750 LIN. FT.

SEQUENCING:

STAGE 1: MAINTAIN TRAFFIC ON EXISTING ROADWAY. EXTEND EXISTING CULVERTS AND CONSTRUCT NEW CULVERTS. CONSTRUCT MAIN LANES ON NEW LOCATION. PERFORM LEVELING OPERATIONS WHERE APPLICABLE. PLACE CONSTRUCTION PAVEMENT MARKINGS. NOTCH AND WIDEN FOR LANE ON RT. UTILIZE VERTICAL PANELS AT THE NOTCH AT 40' O.C. SPACING.

STAGE 2: WIDEN SHOULDER ON LT. UTILIZE VERTICAL PANELS. UTILIZE TRAFFIC DRUMS AT 80' O.C. SPACING AT EXISTING LANE EDGE ON RT.

STAGE 3: INSTALL FINAL SURFACE COURSE AND FINAL STRIPING. OBLITERATE ROADWAY.

VERTICAL PANELS @ 40' O.C. = 22 EACH
TRAFFIC DRUMS = 6 EACH

STA. 118+16.70
END SITE 1

SITE 1
STAGE 1
MAINTENANCE OF TRAFFIC DETAILS

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	25	93

(2) MAINTENANCE OF TRAFFIC

VERTICAL PANELS @ 40' O.C. = 18 EACH

TRAFFIC DRUMS = 8 EACH

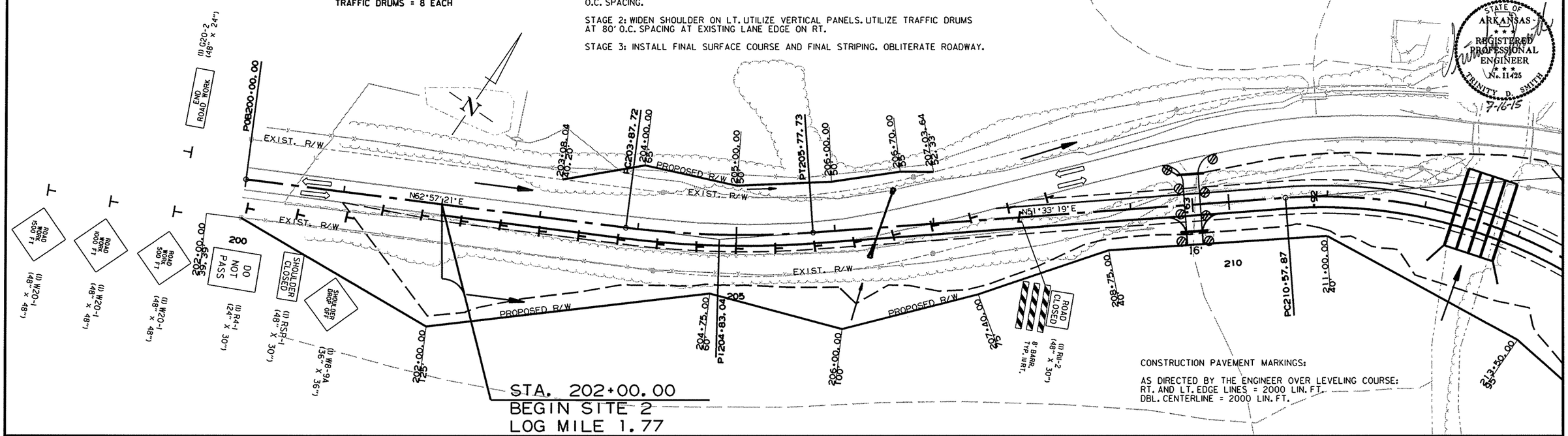
SEQUENCING:

STAGE 1: MAINTAIN TRAFFIC ON EXISTING ROADWAY. EXTEND EXISTING CULVERTS AND CONSTRUCT NEW CULVERTS. CONSTRUCT MAIN LANES ON NEW LOCATION. PERFORM LEVELING OPERATIONS WHERE APPLICABLE. PLACE CONSTRUCTION PAVEMENT MARKINGS. NOTCH AND WIDEN FOR LANE ON RT. UTILIZE VERTICAL PANELS AT THE NOTCH AT 40' O.C. SPACING.

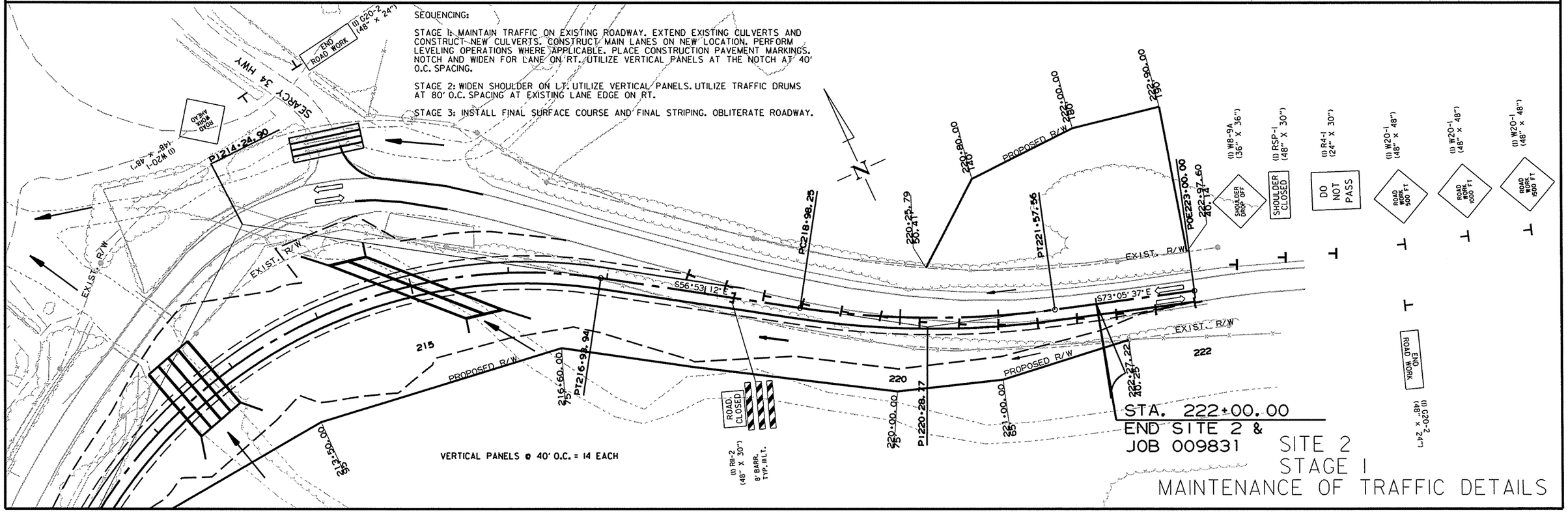
STAGE 2: WIDEN SHOULDER ON LT. UTILIZE VERTICAL PANELS. UTILIZE TRAFFIC DRUMS AT 80' O.C. SPACING AT EXISTING LANE EDGE ON RT.

STAGE 3: INSTALL FINAL SURFACE COURSE AND FINAL STRIPING. OBLITERATE ROADWAY.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



STA. 202+00.00
BEGIN SITE 2
LOG MILE 1.77



STA. 222+00.00
END SITE 2 &
JOB 009831

SITE 2
STAGE 1
MAINTENANCE OF TRAFFIC DETAILS

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	26	93

2 MAINTENANCE OF TRAFFIC

VERTICAL PANELS @ 40' O.C. = 10 EACH
TRAFFIC DRUMS = 16 EACH
TRAFFIC DRUMS @ 80' O.C. = 21EACH
OM-3R = 4 EACH

STA. 101+00.00
BEGIN JOB 009831 &
SITE 1
LOG MILE 8.92

SEQUENCING:

STAGE 1: MAINTAIN TRAFFIC ON EXISTING ROADWAY. EXTEND EXISTING CULVERTS AND CONSTRUCT NEW CULVERTS. CONSTRUCT MAIN LANES ON NEW LOCATION. PERFORM LEVELING OPERATIONS WHERE APPLICABLE. PLACE CONSTRUCTION PAVEMENT MARKINGS. NOTCH AND WIDEN FOR LANE ON RT. UTILIZE VERTICAL PANELS AT THE NOTCH AT 40' O.C. SPACING.

STAGE 2: WIDEN SHOULDER ON LT. UTILIZE VERTICAL PANELS. UTILIZE TRAFFIC DRUMS AT 80' O.C. SPACING AT EXISTING LANE EDGE ON RT.

STAGE 3: INSTALL FINAL SURFACE COURSE AND FINAL STRIPING. OBLITERATE ROADWAY.

CONSTRUCTION PAVEMENT MARKINGS:

AS DIRECTED BY THE ENGINEER:
RT. AND LT. EDGE LINES = 3433 LIN. FT.
DBL. CENTERLINE = 3433 LIN. FT.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

SEQUENCING:

STAGE 1: MAINTAIN TRAFFIC ON EXISTING ROADWAY. EXTEND EXISTING CULVERTS AND CONSTRUCT NEW CULVERTS. CONSTRUCT MAIN LANES ON NEW LOCATION. PERFORM LEVELING OPERATIONS WHERE APPLICABLE. PLACE CONSTRUCTION PAVEMENT MARKINGS. NOTCH AND WIDEN FOR LANE ON RT. UTILIZE VERTICAL PANELS AT THE NOTCH AT 40' O.C. SPACING.

STAGE 2: WIDEN SHOULDER ON LT. UTILIZE VERTICAL PANELS. UTILIZE TRAFFIC DRUMS AT 80' O.C. SPACING AT EXISTING LANE EDGE ON RT.

STAGE 3: INSTALL FINAL SURFACE COURSE AND FINAL STRIPING. OBLITERATE ROADWAY.

VERTICAL PANELS @ 40' O.C. = 20 EACH
TRAFFIC DRUMS = 30 EACH
TRAFFIC DRUMS @ 80' O.C. = 14 EACH

STA. 118+16.70
END SITE 1

SITE 1
STAGE 2
MAINTENANCE OF TRAFFIC DETAILS

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	27	93

(2) MAINTENANCE OF TRAFFIC

VERTICAL PANELS @ 40' O.C. = 18 EACH
TRAFFIC DRUMS = 14 EACH
TRAFFIC DRUMS @ 80' O.C. = 22 EACH
OM-3R = 4 EACH

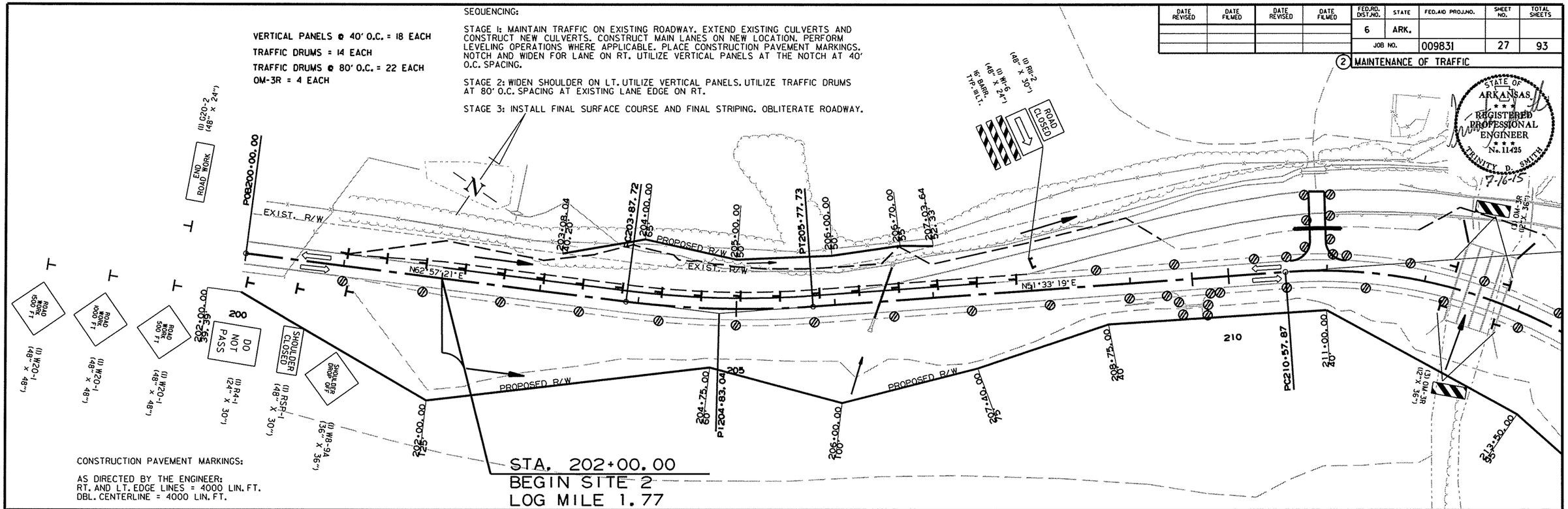
SEQUENCING:

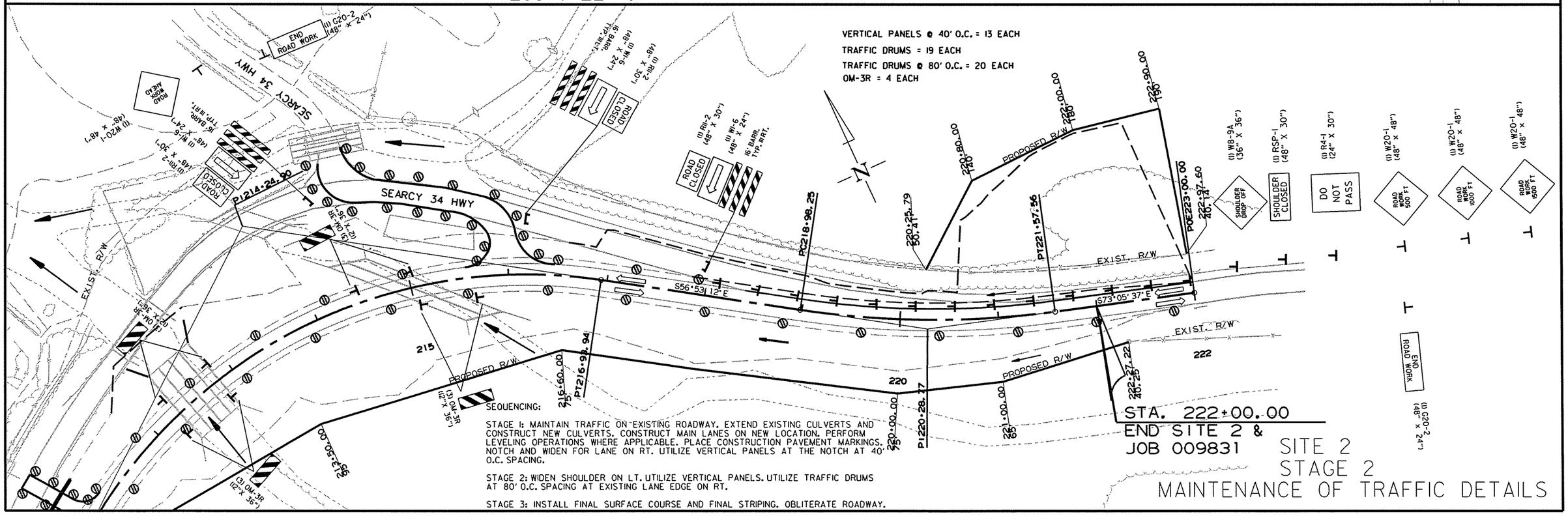
STAGE 1: MAINTAIN TRAFFIC ON EXISTING ROADWAY. EXTEND EXISTING CULVERTS AND CONSTRUCT NEW CULVERTS. CONSTRUCT MAIN LANES ON NEW LOCATION. PERFORM LEVELING OPERATIONS WHERE APPLICABLE. PLACE CONSTRUCTION PAVEMENT MARKINGS. NOTCH AND WIDEN FOR LANE ON RT. UTILIZE VERTICAL PANELS AT THE NOTCH AT 40' O.C. SPACING.

STAGE 2: WIDEN SHOULDER ON LT. UTILIZE VERTICAL PANELS. UTILIZE TRAFFIC DRUMS AT 80' O.C. SPACING AT EXISTING LANE EDGE ON RT.

STAGE 3: INSTALL FINAL SURFACE COURSE AND FINAL STRIPING. OBLITERATE ROADWAY.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15





CONSTRUCTION PAVEMENT MARKINGS:

AS DIRECTED BY THE ENGINEER:
RT. AND LT. EDGE LINES = 4000 LIN. FT.
DBL. CENTERLINE = 4000 LIN. FT.

SITE 2
STAGE 2
MAINTENANCE OF TRAFFIC DETAILS

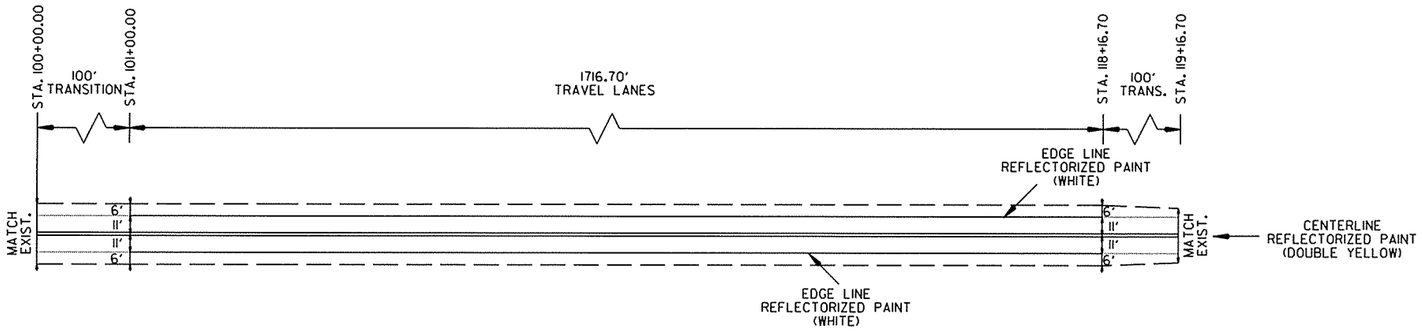
6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	28	93

(2) PERMANENT PAVEMENT MARKING DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

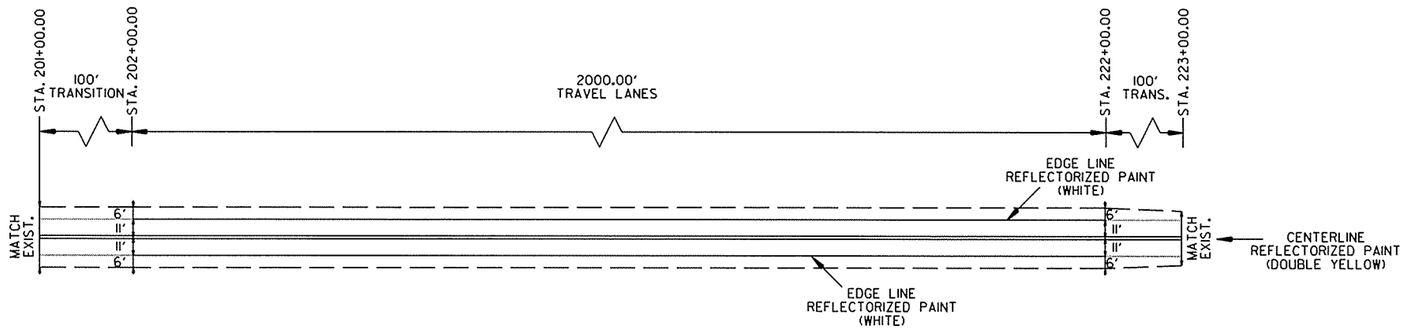


PERMANENT PAVEMENT MARKING DETAILS:

REFLECTORIZED PAINT PAVEMENT MARKINGS:
RT. AND LT. EDGE LINES = 3834 LIN. FT. WHITE
DBL. CENTERLINE = 3834 LIN. FT. YELLOW

SCHEMATIC OF FINAL STRIPING

NOT TO SCALE



PERMANENT PAVEMENT MARKING DETAILS:

REFLECTORIZED PAINT PAVEMENT MARKINGS:
RT. AND LT. EDGE LINES = 4400 LIN. FT. WHITE
DBL. CENTERLINE = 4400 LIN. FT. YELLOW

• THE 4" YELLOW STRIPING QUANTITY HAS BEEN ESTIMATED BASED ON A DOUBLE YELLOW CENTERLINE STRIPE FOR THE ENTIRE PROJECT. THE PROJECT MUST BE MARKED FOR PASSING/NO PASSING ZONES PRIOR TO THE PLACEMENT OF ANY FINAL STRIPING. CONTACT THE MAINTENANCE DIVISION AFTER THE FINAL LIFT OF SURFACE COURSE HAS BEEN PLACED TO SCHEDULE THE ZONING OF THE PROJECT.

6/22/2015

R009831.DGN

PERMANENT PAVEMENT MARKING DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	29	93

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

ADVANCE WARNING SIGNS AND DEVICES

SIGN NUMBER	DESCRIPTION	SIGN SIZE	STAGE 1	STAGE 2	END JOB	MAXIMUM NUMBER REQUIRED	TOTAL SIGNS REQUIRED		VERTICAL PANELS	TRAFFIC DRUMS	BARRICADES (TYPE III)	
											RIGHT	LEFT
			LIN. FT. - EACH				NO.	SQ. FT.	EACH		LIN. FT.	
SITE 1												
W20-1	ROAD WORK 1500 FT.	48"x48"	2	2	2	2	2	32.0				
W20-1	ROAD WORK 1000 FT.	48"x48"	2	2	2	2	2	32.0				
W20-1	ROAD WORK 500 FT.	48"x48"	2	2	2	2	2	32.0				
W20-1	ROAD WORK AHEAD	48"x48"	1	1	1	1	1	16.0				
G20-2	END ROAD WORK	48"x24"	3	3	3	3	3	24.0				
R11-2	ROAD CLOSED	48"x30"	2	2	2	2	2	20.0				
OM-3R	OBJECT MARKER	12"x36"		4	4	4	4	12.0				
W1-6	LARGE ARROW	48"x24"		2	2	2	2	16.0				
R4-1	DO NOT PASS	24"x30"	2	2	2	2	2	10.0				
RSP-1	SHOULDER CLOSED	48"x30"	2	2	2	2	2	20.0				
W8-9A	SHOULDER DROP OFF	36"X36"	2	2	2	2	2	18.0				
	VERTICAL PANELS		33	30		33			33			
	TRAFFIC DRUMS		22	81	89	89				89		
	TYPE III BARRICADE-RT. (8')		1			1					8	
	TYPE III BARRICADE-LT. (8')		1			1						8
	TYPE III BARRICADE-RT. (16')			1	1	1					16	
	TYPE III BARRICADE-LT. (16')			1	1	1						16
TOTALS SITE 1:								232.0	33	89	24	24
SITE 2												
W20-1	ROAD WORK 1500 FT.	48"x48"	2	2	2	2	2	32.0				
W20-1	ROAD WORK 1000 FT.	48"x48"	2	2	2	2	2	32.0				
W20-1	ROAD WORK 500 FT.	48"x48"	2	2	2	2	2	32.0				
W20-1	ROAD WORK AHEAD	48"x48"	1	1	1	1	1	16.0				
G20-2	END ROAD WORK	48"x24"	3	3	3	3	3	24.0				
R11-2	ROAD CLOSED	48"x30"	2	4	4	4	4	40.0				
OM-3R	OBJECT MARKER	12"x36"		8	8	8	8	24.0				
W1-6	LARGE ARROW	48"x24"		4	4	4	4	32.0				
R4-1	DO NOT PASS	24"x30"	2	2	2	2	2	10.0				
RSP-1	SHOULDER CLOSED	48"x30"	2	2	2	2	2	20.0				
W8-9A	SHOULDER DROP OFF	36"X36"	2	2	2	2	2	18.0				
	VERTICAL PANELS		32	31		32			32			
	TRAFFIC DRUMS		8	75	83	83				83		
	TYPE III BARRICADE-RT. (8')		1			1					8	
	TYPE III BARRICADE-LT. (8')		1			1						8
	TYPE III BARRICADE-RT. (16')			2	2	2					32	
	TYPE III BARRICADE-LT. (16')			2	2	2						32
TOTALS SITE 2:								280.0	32	83	40	40
TOTALS:								512.0	65	172	64	64

NOTE: THIS IS A LOW TRAFFIC VOLUME ROAD AS DEFINED IN SECTION 604.03, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

THE QUANTITY OF VERTICAL PANELS PROVIDED IN THE CONTRACT IS FOR ONE SIDE OF THE ROADWAY FOR THE FULL LENGTH OF THE JOB. THIS IS THE MAXIMUM QUANTITY REQUIRED TO ALLOW THE CONTRACTOR TO NOTCH ONE MILE, BACKFILL TO A POINT WHERE THE VERTICAL DIFFERENTIAL IS 4" OR LESS, AND THEN NOTCH ANOTHER ONE-MILE SECTION. THIS IS THE MAXIMUM NUMBER OF VERTICAL PANELS THAT WILL BE PAID FOR. REFER TO SECTION 603.02 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION REQUIREMENTS.

CONSTRUCTION PAVEMENT MARKINGS AND PERMANENT PAVEMENT MARKINGS

DESCRIPTION	STAGE 1	STAGE 2	END OF JOB	CONSTRUCTION PAVEMENT MARKINGS	REMOVAL OF CONSTRUCTION PAVEMENT MARKINGS	REFLECTORIZED PAINT PAVEMENT MARKING 4"	
						WHITE	YELLOW
	LIN. FT. - EACH			LIN. FT.	LIN. FT.	LIN. FT.	
SITE 1							
CONSTRUCTION PAVEMENT MARKINGS	3433	6866		10299			
REMOVAL OF CONSTRUCTION PAVEMENT MARKINGS		1750			1750		
REFLECTORIZED PAINT PAVEMENT MARKING WHITE (4")			3834			3834	
REFLECTORIZED PAINT PAVEMENT MARKING YELLOW (4")			3834				3834
TOTALS SITE 1:				10299	1750	3834	3834
SITE 2							
CONSTRUCTION PAVEMENT MARKINGS	4000	8000		12000			
REMOVAL OF CONSTRUCTION PAVEMENT MARKINGS		1862			1862		
REFLECTORIZED PAINT PAVEMENT MARKING WHITE (4")			4400			4400	
REFLECTORIZED PAINT PAVEMENT MARKING YELLOW (4")			4400				4400
TOTALS SITE 2:				12000	1862	4400	4400
TOTALS:				22299	3612	8234	8234

NOTE: THIS IS A LOW TRAFFIC VOLUME ROAD AS DEFINED IN SECTION 604.03, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

NOTE: THE 4" YELLOW STRIPING QUANTITY HAS BEEN ESTIMATED BASED ON A DOUBLE YELLOW CENTERLINE STRIPE FOR THE ENTIRE PROJECT.
THE PROJECT MUST BE MARKED FOR PASSING/NO PASSING ZONES PRIOR TO THE PLACEMENT OF ANY FINAL STRIPING.
CONTACT THE MAINTENANCE DIVISION AFTER THE FINAL LIFT OF SURFACE COURSE HAS BEEN PLACED TO SCHEDULE THE ZONING OF THE PROJECT.

6/22/2015

R009831.DGN

QUANTITIES

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	30	93

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

CLEARING AND GRUBBING

STATION	STATION	LOCATION	CLEARING	GRUBBING
			STATION	
SITE 1				
100+00	111+00	MAIN LANES	11	11
113+00	119+00	MAIN LANES	6	6
TOTALS SITE 1:			17	17
SITE 2				
201+00	223+00	MAIN LANES	22	22
TOTALS SITE 2:			22	22
TOTALS:			39	39

SOIL LOG

STATION	LATITUDE			LONGITUDE			LOCATION	DEPTH	LIQUID LIMIT	PLASTICITY INDEX	AASHTO CLASSIFICATION	COLOR
	DEG	MIN	SEC	DEG	MIN	SEC		FEET				
SITE 1												
101+00	35	52	57.30	92	49	54.00	5' RT.	0-5	19	4	A-4 (0)	BR/GR
101+00	35	52	57.20	92	49	53.90	18' RT.	0-5	20	5	A-4 (1)	BROWN
104+20	35	52	59.20	92	49	51.20	CL	0-5	59	40	A-7-6 (29)	BR/GR
116+00	35	53	10.20	92	49	46.00	5' LT.	0-5	42	26	A-7-6 (11)	GRAY
116+00	35	53	10.20	92	49	46.10	17' LT.	0-5	29	14	A-6 (2)	BROWN
101+00	35	52	57.20	92	49	53.90	18' RT.	0-5	17	2	A-4 (0)	BROWN
SITE 2												
203+00	35	54	52.20	92	47	36.00	5' RT.	0-3Z	67	48	A-7-6 (40)	BROWN
203+00	35	54	52.10	92	47	36.00	16' RT.	0-5	66	44	A-7-6 (36)	BR/GR
211+00	35	54	56.90	92	47	28.90	10' LT.	0-5	32	14	A-6 (2)	BR/GR
219+00	35	54	56.10	92	47	20.00	5' LT.	0-5	32	8	A-4 (3)	BR/GR
219+00	35	54	56.10	92	47	19.80	19' LT.	0-5	39	21	A-6 (10)	BR/GR
219+00	35	54	56.10	92	47	19.80	19' LT.	0-5	36	19	A-6 (8)	BR/GR

SOIL CHARACTERISTICS TABULATED ABOVE ARE REPRESENTATIVE AT THE LOCATION OF THE SAMPLE, AND FROM SURFACE INDICATIONS ARE TYPICAL FOR THE LIMITS SHOWN. THESE DATA ARE SHOWN FOR INFORMATION ONLY. THE STATE WILL NOT BE RESPONSIBLE FOR VARIATIONS IN THE SOIL CHARACTERISTICS AND/OR EXTENT OF SAME DIFFERING FROM THE ABOVE TABULATIONS.
Z- AUGER REFUSAL
NP - NON-PLASTIC
ND - NOT DETERMINABLE

BENCH MARKS

STATION	LOCATION	BENCH MARKS
		EACH
SITE 1		
108+67	LT. HEADWALL OF BOX CULVERT	1
TOTAL SITE 1:		1
SITE 2		
212+57	RT. HEADWALL OF BOX CULVERT	1
215+00	LT. HEADWALL OF BOX CULVERT	1
TOTAL SITE 2:		2
TOTAL:		3

NOTE: SHOWN FOR INFORMATION ONLY. BENCH MARKS SHALL BE FURNISHED AND PLACED BY STATE FORCES.

COLD MILLING ASPHALT PAVEMENT

STATION	STATION	LOCATION	AVG. WIDTH	COLD MILLING ASPHALT PAVEMENT
			FEET	SQ. YD.
SITE 1				
100+00.00	101+00.00	MAIN LANES	20	222.22
118+16.70	119+16.70	MAIN LANES	20	222.22
TOTAL SITE 1:				444.44
SITE 2				
201+00.00	202+00.00	MAIN LANES	20	222.22
222+00.00	223+00.00	MAIN LANES	20	222.22
TOTAL SITE 2:				444.44
TOTAL:				888.88

NOTE: AVERAGE MILLING DEPTH 1".

4" PIPE UNDERDRAIN

STATION	STATION	LOCATIONS	4" PIPE UNDERDRAINS	UNDERDRAIN OUTLET PROTECTORS
			LIN. FT.	EACH
* ENTIRE PROJECT TO BE USED IF AND			1000	8
WHERE DIRECTED BY THE ENGINEER				
TOTALS:			1000	8

* NOTE: QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STD. SPECS.

ACHM PATCHING OF EXISTING ROADWAY

DESCRIPTION	TON
ENTIRE PROJECT - TO BE USED IF AND WHERE	25
DIRECTED BY THE ENGINEER	
TOTAL:	25

NOTE: QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STD. SPECS.

ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC

LOCATION	TON	TACK COAT
		GALLON
ENTIRE PROJECT - TO BE USED IF AND WHERE	20	40
DIRECTED BY THE ENGINEER		
TOTALS:	20	40

BASIS OF ESTIMATE:
ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC...25 TON/MILE
TACK COAT FOR MAINTENANCE OF TRAFFIC.....50 GAL./MILE

PAVEMENT REPAIR OVER CULVERTS (CONCRETE)

STATION	LOCATION	WIDTH	LENGTH	CU.YD.
		FEET		
SITE 1				
117+88	MAIN LANES	14.00	20	10.4
TOTAL SITE 1:				10.4
SITE 2				
214+63	COUNTY ROAD 34	46.67	22	38.0
TOTAL SITE 2:				38.0
TOTAL:				48.4

AVG. DEPTH = 12"

REMOVAL AND DISPOSAL OF FENCE

STATION	STATION	LOCATION	FENCE
			LIN. FT.
SITE 1			
100+00	102+80	SITE 1 LT.	283
100+00	119+23	SITE 1 RT.	2301
109+50	110+50	SITE 1 LT.	105
112+92	115+49	SITE 1 LT.	278
TOTAL SITE 1:			2967
SITE 2			
200+00	212+28	SITE 2 RT.	1247
203+75	204+30	SITE 2 LT.	53
212+76	212+91	SITE 2 LT.	62
212+89	222+27	SITE 2 RT.	1005
220+26	222+98	SITE 2 LT.	265
TOTAL SITE 2:			2632
TOTAL:			5599

REMOVAL AND DISPOSAL OF ITEMS

STATION	STATION	LOCATION	BUILDINGS	WELL	GUARDRAIL
			EACH	EACH	LIN. FT.
SITE 2					
209+78		SITE 2 RT.	1	1	
210+96	212+30	SITE 2 LT.			150
211+62	212+27	SITE 2 LT.			75
212+76	214+37	SITE 2 LT.			200
212+82	214+28	SITE 2 LT.			175
TOTALS SITE 2:			1	1	600
TOTALS:			1	1	600

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	31	93

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

REMOVAL OF EXISTING BRIDGE STRUCTURE

STATION	STATION	LOCATION	LUMP SUM
SITE 1			
107+64	108+11	IN PLACE 51' X 23.5' BRIDGE (M3003) CONSISTING	1.00
		OF A CONTINUOUS STEEL GIRDER BRIDGE	
		ON MASONRY ABUTMENTS AND PIERS	
SITE 2			
212+28	212+79	IN PLACE 62' X 24' BRIDGE (M1417) CONSISTING	1.00
		OF A CONTINUOUS SLAB SPAN BRIDGE	
		ON MASONRY ABUTMENTS AND CONCRETE PIERS	

REMOVAL AND DISPOSAL OF CULVERTS

STATION	DESCRIPTION	PIPE CULVERTS	BOX CULVERTS
		EACH	EACH
SITE 1			
113+62	18"X43' C.M. PIPE CULVERT ON LT.	1	
117+25	24"X42' C.M. PIPE CULVERT ON RT.	1	
TOTALS SITE 1:		2	
SITE 2			
209+68	12"X66' ROCK PIPE CULVERT ON LT.	1	
213+85	DBL. 10'X6'X58' R.C. BOX CULVERT		1
214+63	TRI. 60"X40' C.M. PIPE CULVERT ON LT.	1	
TOTALS SITE 2:		2	1
TOTALS:		4	1

NOTE: QUANTITIES SHOWN ABOVE SHALL INCLUDE REMOVAL & DISPOSAL OF ALL HEADWALLS AND FLARED END SECTIONS IF APPLICABLE.

FENCING

STATION	STATION	LOCATION	WIRE FENCE (TYPE C)	WIRE FENCE (TYPE D)	WIRE FENCE (TYPE D-1)	* 16'-0" GATES
			LIN. FT.			EACH
SITE 1						
100+00	102+80	SITE 1 LT.		293		
100+00	108+85	SITE 1 RT.		1020		2
109+50	110+50	SITE 1 LT.			84	1
109+79	119+23	SITE 1 RT.		936		2
112+92	115+49	SITE 1 LT.	365			1
TOTALS SITE 1:			365	2249	84	6
SITE 2						
200+00	212+14	SITE 2 RT.	1260			1
203+75	204+30	SITE 2 LT.		53		
212+91		SITE 2 LT.		103		
213+00	215+38	SITE 2 RT.		292		
216+00	222+27	SITE 2 RT.		652		
220+26	222+98	SITE 2 LT.	457			
TOTALS SITE 2:			1717	1100		1
TOTALS:			2082	3349	84	7

* DENOTES ALTERNATE BID ITEM.

EARTHWORK

STATION	STATION	LOCATION / DESCRIPTION	UNCLASSIFIED EXCAVATION	COMPACTED EMBANKMENT	*ROCK FILL	*PRESPLITTING	* SOIL STABILIZATION
			CU. YD.		TON	SQ. YD.	TON
SITE 1							
ENTIRE	PROJECT	STAGE 1-MAIN LANES	1184	31035			
ENTIRE	PROJECT	STAGE 2-MAIN LANES	896	275			
ENTIRE	PROJECT	APPROACHES		2365			
ENTIRE	PROJECT	TEMPORARY APPROACHES		50			
108+67		CHANNEL CHANGE	765				
TOTALS SITE 1:			2845	33725			
SITE 2							
ENTIRE	PROJECT	STAGE 1-MAIN LANES	11001	15645	4127.76		
ENTIRE	PROJECT	STAGE 2-MAIN LANES	10954	634			
ENTIRE	PROJECT	APPROACHES		465			
ENTIRE	PROJECT	TEMPORARY APPROACHES		50			
206+35		DITCH BLOCK		4			
212+57		CHANNEL CHANGE	100				
215+00		CHANNEL CHANGE	555				
TOTALS SITE 2:			22610	16798	4127.76		
* ENTIRE	PROJECT	TO BE USED IF AND WHERE				300	100
		DIRECTED BY THE ENGINEER					
TOTALS:			25455	50523	4127.76	300	100

* QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STD. SPECS.

DRIVEWAYS & TURNOUTS

STATION	SIDE	LOCATION	WIDTH	ACHM SURFACE COURSE (1/2") 220 LBS. PER SQ. YD. (PG 64-22)		AGGREGATE BASE COURSE (CLASS 7)	SIDE DRAINS 18"	SIDE DRAINS 24"	SIDE DRAINS 72"	STANDARD DRAWINGS
			FEET	SQ. YD.	TON	TON	LIN. FT.			
SITE 1										
102+00	RT.	SITE 1 DRIVEWAY	16	30.43	3.35	86.16				
107+36	RT.	SITE 1 DRIVEWAY	16	30.43	3.35	142.16	86			PCC-1, PCM-1, PCP-1, PCP-2
110+00	LT.	SITE 1 DRIVEWAY	20	36.65	4.03	82.86	36			PCC-1, PCM-1, PCP-1, PCP-2
113+73	LT.	SITE 1 DRIVEWAY	16	30.43	3.35	87.09	30			PCC-1, PCM-1, PCP-1, PCP-2
117+36	RT.	SITE 1 DRIVEWAY	20	36.65	4.03	38.42		30		PCC-1, PCM-1, PCP-1, PCP-2
118+17	LT.	SITE 1 COUNTY ROAD 272	20	117.44	12.92	98.12				
TOTALS SITE 1:				282.03	31.03	534.81	152	30		
SITE 2										
209+63	RT.	SITE 2 DRIVEWAY	16	30.43	3.35	20.36	28			PCC-1, PCM-1, PCP-1, PCP-2
210+92	LT.	SITE 2 DRIVEWAY	16	30.43	3.35	58.16		48		PCC-1, PCM-1, PCP-1, PCP-2
214+63	LT.	SITE 2 COUNTY ROAD 34							288	PCC-1, PCM-1, PCP-1, PCP-2
216+00	LT.	SITE 2 COUNTY ROAD 34	22	247.21	27.19	100.94				
* ENTIRE PROJECT TEMPORARY DRIVES						100.00				
TOTALS SITE 2:				308.07	33.89	279.46	28	48	288	
TOTALS:				590.10	64.92	814.27	180	78	288	

BASIS OF ESTIMATE:
ACHM SURFACE COURSE (1/2").....94.7% MIN. AGGR.....5.3% ASPHALT BINDER
MAXIMUM NUMBER OF GYRATIONS = 115 FOR PG 64-22

* QUANTITY ESTIMATED
SEE SECTION 104.03 OF THE STD. SPECS.
TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.

THE CONTRACTOR, WITH THE APPROVAL OF THE ENGINEER, WILL BE ALLOWED TO SUBSTITUTE A HIGHER PERFORMANCE GRADE ASPHALT SURFACE COURSE FOR DRIVEWAYS AND MINOR SIDE STREET CONSTRUCTION AT NO ADDITIONAL COST TO THE DEPARTMENT.

NOTE: FOR R.C. PIPE CULVERT INSTALLATIONS USE TYPE 3 BEDDING UNLESS OTHERWISE SPECIFIED.
NOTE: FOR C.M. PIPE CULVERT INSTALLATIONS USE TYPE 2 BEDDING UNLESS OTHERWISE SPECIFIED.

DUMPED RIPRAP AND FILTER BLANKET

STATION	LOCATION	DUMPED RIPRAP	FILTER BLANKET
		CU. YDS.	SQ. YDS.
SITE 1			
117+88	OUTLET OF PIPE CULVERT	10	20
TOTALS SITE 1:		10	20
SITE 2			
206+49	OUTLET OF PIPE CULVERT	7	13
TOTALS SITE 2:		7	13
ENTIRE	TO BE USED IF AND WHERE	20	40
PROJECT	DIRECTED BY THE ENGINEER		
TOTALS:		37	73

*NOTE: QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STANDARD SPECIFICATIONS

NOTE: FILTER BLANKET SHALL BE GEOTEXTILE FABRIC (TYPE 5).

CONCRETE DITCH PAVING

STATION	STATION	LOCATION	LENGTH	"W"	CONC. DITCH PAVING (TYPE B)	SOLID SODDING	WATER
			LIN. FT.	FEET	SQ. YD.	SQ. YD.	M. GAL.
SITE 1							
101+00	102+50	SITE 1 LT.	150.00	7	116.67	66.67	0.84
110+00	112+50	SITE 1 RT.	250.00	7	194.44	111.11	1.40
TOTALS SITE 1:					311.11	177.78	2.24
SITE 2							
202+00	208+50	SITE 2 RT.	650.00	7	505.56	288.89	3.64
220+00	222+00	SITE 2 LT.	200.00	7	155.56	88.89	1.12
TOTALS SITE 2:					661.12	377.78	4.76
TOTALS:					972.23	555.56	7.00

BASIS OF ESTIMATE:
WATER.....12.6 GAL. / SQ. YD. OF SOLID SODDING.

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	32	93

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

EROSION CONTROL MATTING

STATION	STATION	LOCATION	LENGTH	CLASS 3
			LIN. FT.	SQ. YD.
SITE 1				
105+50	108+25	SITE 1 LT.	275.0	244.4
TOTAL SITE 1:			275.0	244.4
SITE 2				
203+50	206+45	SITE 2 LT.	295.0	262.2
208+50	212+25	SITE 2 RT.	375.0	333.3
209+50	212+25	SITE 2 LT.	275.0	244.4
213+00	214+50	SITE 2 RT.	150.0	133.3
TOTAL SITE 2:			1095.0	973.2
TOTAL:				1217.6

NOTE: AVERAGE WIDTH = 8'-0"

SELECTED PIPE BEDDING

LOCATION	SELECTED PIPE BEDDING
	CU.YD.
ENTIRE PROJECT TO BE USED IF	80
AND WHERE DIRECTED BY THE	
ENGINEER	
TOTAL:	80

NOTE: QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STD. SPECS.

CULVERT CLEAN OUT

STATION	LOCATION	EACH
SITE 1		
117+96	SITE 1 MAIN LANES	1
TOTAL:		1

GUARDRAIL

LOCATION	GUARDRAIL (TYPE A)	TERMINAL ANCHOR POST (TYPE 1)
	LIN. FT.	EACH
ENTIRE PROJECT TO BE USED IF	75	1
AND WHERE DIRECTED BY THE		
ENGINEER		
TOTALS:	75	1

NOTE: QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STD. SPECS.

STRUCTURES

STATION	DESCRIPTION	R.C. PIPE CULVERT (CLASS V)	ALUMINUM COATED CORRUGATED STEEL PIPE CULVERT (16 GAUGE)	* R.C. PIPE CULVERT ALTERNATE 1 (CLASS V)	* PIPE CULVERT ALTERNATE 2, 3, 4, 5 & 6	FLARED END SECTIONS FOR R.C. PIPE CULVERTS	FLARED END SECTIONS FOR C.M. PIPE CULVERTS	FLARED END SECTIONS ALTERNATES	TEMPORARY CULVERTS	SPAN	HEIGHT	LENGTH	CLASS S CONCRETE-ROADWAY	REINF. STEEL-ROADWAY (GRADE 60)	UNCL.EXC. FOR STR.-ROADWAY	SOLID SODDING	WATER	STD. DWG. NOS.
		24"	24"	24"	24"	24"	24"	24"	18"									
		LIN. FT.				EACH			LIN. FT.				CU.YD.	POUND	CU.YD.	SQ.YD.	M.GAL	
SITE 1																		
114+25	EXTEND C.M. PIPE CULVERT 10' RT. W/FES RT.		14				1									16	0.20	FES-1, FES-2, PCM-1
117+88	CONSTRUCT DBL. PIPE CULVERT W/FES LT. & RT.			100	112			4								18	0.23	FES-1, FES-2, PCC-1, PCM-1, PCP-1, PCP-2
117+96	EXTEND R.C. PIPE CULVERT 4' LT. & 8' RT. W/FES LT. & RT.	20				2										16	0.20	FES-1, FES-2, PCC-1
TOTALS SITE 1:		20	14	100	112	2	1	4								50	0.63	
SITE 2																		
206+49	EXTEND C.M. PIPE CULVERT ON 23^ LT. FWD. SKEW 8' RT. W/FES LT. & RT.		12				2									16	0.20	FES-1, FES-2, PCM-1
209+63	INSTALL TEMPORARY PIPE CULVERT RT. SIDE DRAIN								28									PCC-1, PCM-1, PCP-1, PCP-2
TOTALS SITE 2:			12				2		28							16	0.20	
SUBTOTALS:		20	26	100	112	2	3	4	28							66	0.83	
	STRUCTURES OVER 20' - 0" SPAN																	
SITE 1																		
108+67	CONSTRUCT TRI. R.C. BOX CULVERT ON 45^ RT. FWD. SKEW W/3:1 WINGS LT. & RT.									12	10	135	662.18	105297	239	54	0.68	RCB-1, RCB-2, SPECIAL DETAILS
TOTALS SITE 1:													662.18	105297	239	54	0.68	
SITE 2																		
212+57	CONSTRUCT QUAD. R.C. BOX CULVERT W/3:1 WINGS LT. & RT.									12	9	82	532.67	68248	200	47	0.59	RCB-1, RCB-2, SPECIAL DETAILS
215+00	CONSTRUCT DBL. R.C. BOX CULVERT ON 56^ RT. FWD.SKEW W/3:1 WINGS LT. & RT.									10	6	149	309.80	53483	138	37	0.47	RCB-1, RCB-2, SPECIAL DETAILS
TOTALS SITE 2:													842.47	121731	338	84	1.06	
SUBTOTALS:													1504.65	227028	577	138	1.74	
TOTALS:		20	26	100	112	2	3	4	28				1504.65	227028	577	204	2.57	

BASIS OF ESTIMATE:
WATER.....12.6 GAL. / SQ. YD. OF SOLID SODDING.

NOTE: FOR R.C. PIPE CULVERT INSTALLATIONS USE TYPE 3 BEDDING UNLESS OTHERWISE SPECIFIED.

NOTE: FOR C.M. PIPE CULVERT INSTALLATIONS USE TYPE 2 BEDDING UNLESS OTHERWISE SPECIFIED.
* DENOTES ALTERNATE BID ITEMS.

EROSION CONTROL

STATION	STATION	LOCATION	PERMANENT EROSION CONTROL: SEEDING	LIME	MULCH COVER	WATER	SECOND SEEDING APPLICATION	TEMPORARY EROSION CONTROL: TEMPORARY SEEDING	MULCH COVER	WATER	WATTLE 20" DITCH CHECKS (E-1)	SAND BAG DITCH CHECKS (E-5)	ROCK DITCH CHECKS (E-6)	SILT FENCE (E-11)	SEDIMENT BASIN (E-14)	OBLITERATION OF SEDIMENT BASIN	*SEDIMENT REMOVAL & DISPOSAL
			ACRE	TON	ACRE	M.GAL.	ACRE	ACRE	ACRE	M.GAL.	LIN. FT.	BAG	CU.YD.	LIN. FT.	CU.YD.	CU.YD.	CU. YD.
SITE 1																	
100+00.00	119+16.70	MAIN LANES	3.71	7.42	3.71	378.4	3.71										
100+00.00	119+16.70	CLEARING AND GRUBBING STAGE											33	2035			86
ENTIRE	PROJECT	STAGE 1						2.05	2.05	41.8			21	80	400	400	410
ENTIRE	PROJECT	STAGE 2						1.66	1.66	33.9			6				2
TOTALS SITE 1:			3.71	7.42	3.71	378.4	3.71	3.71	3.71	75.7			60	2115	400	400	498
SITE 2																	
201+00.00	223+00.00	MAIN LANES	5.38	10.76	5.38	548.8	5.38										
201+00.00	223+00.00	CLEARING AND GRUBBING STAGE											27	2234			92
ENTIRE	PROJECT	STAGE 1						3.08	3.08	62.8			21	160	586	586	599
ENTIRE	PROJECT	STAGE 2						2.30	2.30	46.9			3	495			18
TOTALS SITE 2:			5.38	10.76	5.38	548.8	5.38	5.38	5.38	109.7			51	2889	586	586	709
*ENTIRE PROJECT TO BE USED IF AND WHERE DIRECTED BY THE ENGINEER.											900	440	15	2000	500	500	694
TOTALS:			9.09	18.18	9.09	927.2	9.09	9.09	9.09	185.4	900	440	126	7004	1486	1486	1901

BASIS OF ESTIMATE:
LIME .....2 TONS / ACRE OF SEEDING
WATER.....102.0 M.G. / ACRE OF SEEDING
WATER.....20.4 M.G. / ACRE OF TEMPORARY SEEDING
WATTLE DITCH CHECKS.....9 LIN. FT. / LOCATION
SAND BAG DITCH CHECKS.....22 BAGS / LOCATION
ROCK DITCH CHECKS.....3 CU.YD./LOCATION

NOTE: THE TEMPORARY EROSION CONTROL DEVICES SHOWN ABOVE AND ON THE PLANS SHALL BE INSTALLED IN SUCH A SEQUENCE AS TO DETER EROSION AND SEDIMENTATION ON U.S. WATERWAYS AS EXPLAINED BY THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT.

*QUANTITY ESTIMATED.
SEE SECTION 104.03 OF THE STD. SPECS.

4/24/2013

R009831.DGN

QUANTITIES

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	33	93

(2) QUANTITIES

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

BASE AND SURFACING

STATION	STATION	LOCATION	LENGTH	AGGREGATE BASE COURSE (CLASS 7)		TACK COAT				ACHM BINDER COURSE (1")				ACHM SURFACE COURSE (1/2")								
				TON / STATION	TON	AVG. WID.	SQ.YD.	GALLONS / SQ.YD.	GALLON	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 64-22	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 64-22	AVG. WID.	SQ.YD.	POUND / SQ.YD.	PG 64-22	TOTAL PG 64-22
			FEET			FEET				FEET			TON	FEET			TON	FEET			TON	TON
MAIN LANES																						
SITE 1																						
100+00.00	101+00.00	TRANSITION	100.00	65.00	65.00	28.71	319.00	0.03	9.57	4.46	49.56	330.00	8.18	4.25	47.22	220.00	5.19	23.00	255.56	220.00	28.11	33.30
101+00.00	103+54.18	VARIABLE NOTCH & WIDEN	254.18	168.75	428.93	36.71	1036.77	0.03	31.10	13.46	380.14	330.00	62.72	13.25	374.21	220.00	41.16	26.00	734.30	220.00	80.77	121.93
103+54.18	112+00.00	FULL DEPTH	845.82	207.50	1755.08	44.71	4201.85	0.03	126.06	22.46	2110.79	330.00	348.28	22.25	2091.06	220.00	230.02	26.00	2443.48	220.00	268.78	498.80
112+00.00	118+16.70	VARIABLE NOTCH & WIDEN	616.70	168.75	1040.68	36.71	2515.45	0.03	75.46	13.46	922.31	330.00	152.18	13.25	907.92	220.00	99.87	26.00	1781.58	220.00	195.97	295.84
118+16.70	119+16.70	TRANSITION	100.00	65.00	65.00	28.71	319.00	0.03	9.57	4.46	49.56	330.00	8.18	4.25	47.22	220.00	5.19	23.00	255.56	220.00	28.11	33.30
TOTALS SITE 1:					**3354.69**		**8392.07**		**251.76**		**3512.36**		**579.54**		**3467.63**		**381.43**		**5470.48**		**601.74**	**983.17**
SITE 2																						
201+00.00	202+00.00	TRANSITION	100.00	65.00	65.00	28.71	319.00	0.03	9.57	4.46	49.56	330.00	8.18	4.25	47.22	220.00	5.19	23.00	255.56	220.00	28.11	33.30
202+00.00	207+27.73	VARIABLE NOTCH & WIDEN	527.73	168.75	890.54	36.71	2152.55	0.03	64.58	13.46	789.25	330.00	130.23	13.25	776.94	220.00	85.46	26.00	1524.55	220.00	167.70	253.16
207+27.73	219+00.00	FULL DEPTH	1172.27	207.50	2432.46	44.71	5823.58	0.03	174.71	22.46	2925.46	330.00	482.70	22.25	2898.11	220.00	318.79	26.00	3386.56	220.00	372.52	691.31
219+00.00	222+00.00	VARIABLE NOTCH & WIDEN	300.00	168.75	506.25	36.71	1223.67	0.03	36.71	13.46	448.67	330.00	74.03	13.25	441.67	220.00	48.58	26.00	866.67	220.00	95.33	143.91
222+00.00	223+00.00	TRANSITION	100.00	65.00	65.00	28.71	319.00	0.03	9.57	4.46	49.56	330.00	8.18	4.25	47.22	220.00	5.19	23.00	255.56	220.00	28.11	33.30
TOTALS SITE 2:					**3959.25**		**9837.80**		**295.14**		**4262.50**		**703.32**		**4211.16**		**463.21**		**6288.90**		**691.77**	**1154.98**
ADDITIONAL FOR LEVELING																						
SITE 1																						
100+00.00	103+54.18	MAIN LANES	354.18			20.00	787.07	0.10	78.71	20.00	787.07	VAR.	155.47					20.00	787.07	220.00	86.58	86.58
112+00.00	119+16.70	MAIN LANES	716.70			20.00	1592.67	0.10	159.27	20.00	1592.67	VAR.	212.37					20.00	1592.67	220.00	175.19	175.19
TOTALS SITE 1:							**2379.74**		**237.98**		**2379.74**		**367.84**						**2379.74**		**261.77**	**261.77**
SITE 2																						
201+00.00	207+27.73	MAIN LANES	627.73			20.00	1394.96	0.10	139.50	20.00	1394.96	VAR.	151.07					20.00	1394.96	220.00	153.45	153.45
219+00.00	223+00.00	MAIN LANES	400.00			20.00	888.89	0.10	88.89	20.00	888.89	VAR.	243.47					20.00	888.89	220.00	97.78	97.78
TOTALS SITE 2:							**2283.85**		**228.39**		**2283.85**		**394.54**						**2283.85**		**251.23**	**251.23**
ADDITIONAL FOR SUPERELEVATION																						
SITE 1																						
100+93.95	103+43.95	SUPERELEVATION TRANSITION	250.00	37.75	94.38																	
103+43.95	105+70.36	MAX SUPERELEVATION	226.41	75.50	170.94																	
105+70.36	108+20.36	SUPERELEVATION TRANSITION	250.00	37.75	94.38																	
108+20.37	110+20.37	SUPERELEVATION TRANSITION	200.00	21.25	42.50																	
110+20.37	117+61.14	MAX SUPERELEVATION	740.77	42.25	312.98																	
117+61.14	119+16.70	SUPERELEVATION TRANSITION	155.56	21.25	33.06																	
TOTALS SITE 1:					**748.24**																	
SITE 2																						
202+37.72	204+37.72	SUPERELEVATION TRANSITION	200.00	28.00	56.00																	
204+37.72	205+27.73	MAX SUPERELEVATION	90.01	56.00	50.41																	
205+27.73	207+27.73	SUPERELEVATION TRANSITION	200.00	28.00	56.00																	
208+70.37	211+20.37	SUPERELEVATION TRANSITION	250.00	37.50	93.75																	
211+20.37	215+46.09	MAX SUPERELEVATION	425.72	75.00	319.29																	
215+46.09	217+96.09	SUPERELEVATION TRANSITION	250.00	37.50	93.75																	
217+96.10	220+27.91	SUPERELEVATION TRANSITION	231.81	27.50	63.75																	
220+27.91	222+59.72	SUPERELEVATION TRANSITION	231.81	27.50	63.75																	
TOTALS SITE 2:					**796.70**																	
TOTALS:					8858.88		22893.46		1013.27		12438.45		2045.24		7678.79		844.64		16422.97		1806.51	2651.15

BASIS OF ESTIMATE:
ACHM SURFACE COURSE (1/2").....94.7% MIN. AGGR.....5.3% ASPHALT BINDER
ACHM BINDER COURSE (1").....95.7% MIN. AGGR.....4.3% ASPHALT BINDER
MAXIMUM NUMBER OF GYRATIONS = 115 FOR PG 64-22

6/22/2015

R009831.DGN

SUMMARY OF QUANTITIES

ITEM NUMBER	ITEM		QUANTITY	UNIT
SP & 201	CLEARING		39	STATION
201	GRUBBING		39	STATION
202	REMOVAL AND DISPOSAL OF FENCE		5599	LIN. FT.
202	REMOVAL AND DISPOSAL OF WELL		1	EACH
202	REMOVAL AND DISPOSAL OF PIPE CULVERTS		4	EACH
202	REMOVAL AND DISPOSAL OF BOX CULVERTS		1	EACH
202	REMOVAL AND DISPOSAL OF BUILDINGS		1	EACH
SP & 202	REMOVAL AND DISPOSAL OF GUARDRAIL		600	LIN. FT.
210	UNCLASSIFIED EXCAVATION		25455	CU. YD.
210	PRESPLITTING		300	SQ. YD.
210	COMPACTED EMBANKMENT		50523	CU. YD.
SP	ROCK FILL		4128	TON
SP & 210	SOIL STABILIZATION		100	TON
303	AGGREGATE BASE COURSE (CLASS 7)		9673	TON
401	TACK COAT		1053	GAL.
SP, SS, & 406	MINERAL AGGREGATE IN ACHM BINDER COURSE (1")		1957	TON
SP, SS, & 406	ASPHALT BINDER (PG 64-22) IN ACHM BINDER COURSE (1")		88	TON
SP, SS, & 407	MINERAL AGGREGATE IN ACHM SURFACE COURSE (1/2")		2572	TON
SP, SS, & 407	ASPHALT BINDER (PG 64-22) IN ACHM SURFACE COURSE (1/2")		144	TON
412	COLD MILLING ASPHALT PAVEMENT		889	SQ. YD.
SP & 414	ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC		20	TON
SP & 415	ACHM PATCHING OF EXISTING ROADWAY		25	TON
601	MOBILIZATION		1.00	LUMP SUM
SP & 602	FURNISHING FIELD OFFICE		1	EACH
603	MAINTENANCE OF TRAFFIC		1.00	LUMP SUM
603	18" TEMPORARY CULVERT		28	LIN. FT.
SS & 604	SIGNS		512	SQ. FT.
SS & 604	BARRICADES		128	LIN. FT.
SS & 604	TRAFFIC DRUMS		172	EACH
604	CONSTRUCTION PAVEMENT MARKINGS		22299	LIN. FT.
604	REMOVAL OF CONSTRUCTION PAVEMENT MARKINGS		3612	LIN. FT.
SS & 604	VERTICAL PANELS		65	EACH
605	CONCRETE DITCH PAVING (TYPE B)		972	SQ. YD.
SP	CULVERT CLEAN OUT		1	EACH
606	24" REINFORCED CONCRETE PIPE CULVERTS (CLASS V)		20	LIN. FT.
* 606	24" REINFORCED CONCRETE PIPE CULVERTS (CLASS V)	(ALTERNATE NO. 1)	100	LIN. FT.
* 606	24" ASPHALT COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)	(ALTERNATE NO. 2)	112	LIN. FT.
* 606	24" ALUMINUM COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)	(ALTERNATE NO. 3)	112	LIN. FT.
* 606	24" POLYMER PRECOATED METALLIC COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)	(ALTERNATE NO. 4)	112	LIN. FT.
* SP & 606	24" HIGH DENSITY POLYETHYLENE PIPE	(ALTERNATE NO. 5)	112	LIN. FT.
* SP & 606	24" PVC PIPE	(ALTERNATE NO. 6)	112	LIN. FT.
606	24" ALUMINUM COATED CORRUGATED STEEL PIPE CULVERTS (16 GAUGE)		26	LIN. FT.
SP, SS, & 606	18" SIDE DRAIN		180	LIN. FT.
SP, SS, & 606	24" SIDE DRAIN		78	LIN. FT.
SS & 606	72" SIDE DRAIN		288	LIN. FT.
606	24" FLARED END SECTIONS FOR REINFORCED CONCRETE PIPE CULVERTS		2	EACH
606	24" FLARED END SECTIONS FOR CORRUGATED STEEL PIPE CULVERTS		3	EACH
* 606	24" FLARED END SECTIONS FOR REINFORCED CONCRETE PIPE CULVERTS	(ALTERNATE NO. 1)	4	EACH
* 606	24" FLARED END SECTIONS FOR CORRUGATED STEEL PIPE CULVERTS	(ALTERNATE NO. 2)	4	EACH
606	SELECTED PIPE BEDDING		80	CU. YD.
611	UNDERDRAIN OUTLET PROTECTORS		8	EACH
611	4" PIPE UNDERDRAINS		1000	LIN. FT.
615	PAVEMENT REPAIR OVER CULVERTS (CONCRETE)		48.4	CU. YD.
617	GUARDRAIL (TYPE A)		75	LIN. FT.
617	TERMINAL ANCHOR POSTS (TYPE 1)		1	EACH
619	WIRE FENCE (TYPE C)		2082	LIN. FT.
619	WIRE FENCE (TYPE D)		3349	LIN. FT.
619	WIRE FENCE (TYPE D-1)		84	LIN. FT.
* 619	16' STEEL GATES	(ALTERNATE NO. 1)	7	EACH
* 619	16' ALUMINUM GATES	(ALTERNATE NO. 2)	7	EACH
620	LIME		18	TON
620	SEEDING		9.09	ACRE
SS & 620	MULCH COVER		18.18	ACRE
620	WATER		1122.2	M.GAL.
621	TEMPORARY SEEDING		9.09	ACRE
621	SILT FENCE		7004	LIN. FT.
621	SAND BAG DITCH CHECKS		440	BAG
621	SEDIMENT BASIN		1486	CU. YD.
621	OBLITERATION OF SEDIMENT BASIN		1486	CU. YD.
621	SEDIMENT REMOVAL AND DISPOSAL		1901	CU. YD.
621	ROCK DITCH CHECKS		126	CU. YD.
621	WATTLE (20")		900	LIN. FT.
623	SECOND SEEDING APPLICATION		9.09	ACRE
624	SOLID SODDING		760	SQ. YD.
626	EROSION CONTROL MATTING (CLASS 3)		1218	SQ. YD.
635	ROADWAY CONSTRUCTION CONTROL		1.00	LUMP SUM
718	REFLECTORIZED PAINT PAVEMENT MARKING WHITE (4")		8234	LIN. FT.
718	REFLECTORIZED PAINT PAVEMENT MARKING YELLOW (4")		8234	LIN. FT.
816	FILTER BLANKET		73	SQ. YD.
816	DUMPED RIPRAP		37	CU. YD.
	STRUCTURES OVER 20' SPAN			
205	REMOVAL OF EXISTING BRIDGE STRUCTURE (SITE NO. 1)		1.00	LUMP SUM
205	REMOVAL OF EXISTING BRIDGE STRUCTURE (SITE NO. 2)		1.00	LUMP SUM
801	UNCLASSIFIED EXCAVATION FOR STRUCTURES-ROADWAY		577	CU. YD.
802	CLASS S CONCRETE-ROADWAY		1504.65	CU. YD.
804	REINFORCING STEEL-ROADWAY (GRADE 60)		227028	POUND

* DENOTES ALTERNATE BID ITEMS.

REVISIONS

DATE	REVISION	SHEET NUMBER
9/30/2015	ADDED SPECIAL PROVISION "SPECIAL CLEARING REQUIREMENTS" & ADDED SP TO PAY ITEM CLEARING	2,34

STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 11435 TIMOTHY D. SMITH 10-1-15

SUMMARY OF QUANTITIES & REVISIONS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED
9-30-2015			

(2) SUMMARY OF QUANTITIES AND REVISIONS

FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
6	ARK.		34	93

JOB NO. 009831

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	35	93

(2) SURVEY CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

SURVEY CONTROL COORDINATES

Project Name: s009831
Date: 4/18/2013
Coordinate System: ARKANSAS STATE PLANE - NORTH ZONE BASED ON GPS CONTROL, PROJECTED TO GROUND.
Units: U.S. SURVEY FOOT

Point Name	Northing	Easting	Elev	Feature	Description
1	565177.0935	1066287.7020	848.77	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-1
2	565441.7889	1066437.8325	803.12	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-2
3	565544.2534	1066358.5935	804.19	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-3
4	565615.5733	1066346.7996	802.23	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-4
5	565709.3907	1066462.9324	800.08	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-5
6	576758.0542	1077802.8561	770.20	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-6
7	576960.6623	1078030.7129	751.26	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-7
8	577162.3181	1078263.6771	745.53	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-8
9	577288.9069	1078474.2604	746.07	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-9
10	577129.6652	1078558.1106	750.63	CTL	*5/8" REBAR w/ 2" ALUMINUM CAP STAMPED T-10
100	567896.7250	1067956.5430	784.89	GPS	*AHTD GPS #640014
101	565864.5473	1066470.6062	799.20	GPS	*AHTD GPS #640010A
102	575706.5735	1076326.1465	906.30	GPS	*AHTD GPS #640009
103	577935.4260	1078968.4079	852.60	GPS	*AHTD GPS #640009A
901	567777.1385	1067641.8160	801.35	TBM	*AHTD CAP
903	575121.2575	1072228.2173	792.63	TBM	*CUT SQ NE CONR HEADWALL
904	576611.8094	1075448.7918	902.37	TBM	*CPS ROOT RED OAK TREE
998	567926.1447	1068082.4890	780.76	BM	*NGS 2ND ORDER BM L 149
999	573797.3091	1069202.0387	768.66	BM	*NGS 2ND ORDER BM K 149

*Note - Rebar and Cap - Standard - 5/8" Rebar with 2" Aluminum Cap stamped *(standard markings common to all caps), or as indicated (other markings indicated in the point description of the individual point).
ALL DISTANCES ARE GROUND.
USE CAF = 1.0 FOR STAKEOUT FOR THIS PROJECT.
A PROJECT CAF OF 0.999918172 94 HAS BEEN USED TO COMPUTE THE ABOVE GROUND COORDINATES.
THIS CAF IS INTENDED FOR USE WITHIN THE PROJECT LIMITS.
GRID DISTANCE = GROUND DISTANCE X CAF.
GRID COORDINATES ARE STORED UNDER FILE NAME.XXXCTL
HORIZONTAL DATUM: NAD 83 (1997)
VERTICAL DATUM: NAVD 88 POSITIONAL ACCURACY THIRD ORDER, UNLESS SPECIFIED OTHERWISE AT A SPECIFIC POINT.

REFERENCE POINTS (1500 SERIES) ARE TO BE USED TO ESTABLISH CONTROL IF THE PRIMARY CONTROL POINTS LISTED ABOVE HAVE BEEN DESTROYED.
REFERENCE POINTS ARE NOT TO BE USED FOR VERTICAL CONTROL

BASIS OF BEARING:
ARKANSAS STATE PLANE GRID BEARINGS - 0301-NORTH ZONE
DETERMINED FROM GPS CONTROL POINTS: 640010-640010A
CONVERGENCE ANGLE: 00 28 59.52 LEFT AT LAT 35 54 56.65N LON 092 47 29.65W
GRID AZIMUTH = ASTRONOMICAL AZIMUTH - CONVERGENCE ANGLE.

CONST 1

POINT NO.	TYPE	STATION	NORTHING	EASTING
8000	POB	100+00.00	564940.9653	1065952.2013
8001	PC	102+81.45	565071.2241	1066201.6965
8003	PT	106+81.18	565383.4185	1066428.0987
8004	PC	109+22.05	565621.0081	1066467.7191
8006	PT	118+16.70	566422.8014	1066839.7174
8007	POE	119+22.95	566503.8233	1066908.4560

CONST 2

POINT NO.	TYPE	STATION	NORTHING	EASTING
8008	POB	200+00.00	576358.7887	1077198.4380
8009	PC	203+87.72	576535.0768	1077543.7641
8011	PT	205+77.73	576637.6828	1077703.3167
8012	PC	210+57.87	576936.2130	1078079.3634
8014	PT	216+93.94	576963.9104	1078674.2506
8015	PC	218+98.25	576852.2996	1078845.3738
8017	PT	221+57.56	576743.0342	1079079.5889
8018	POE	223+00.00	576701.6117	1079215.8718

6/22/2015

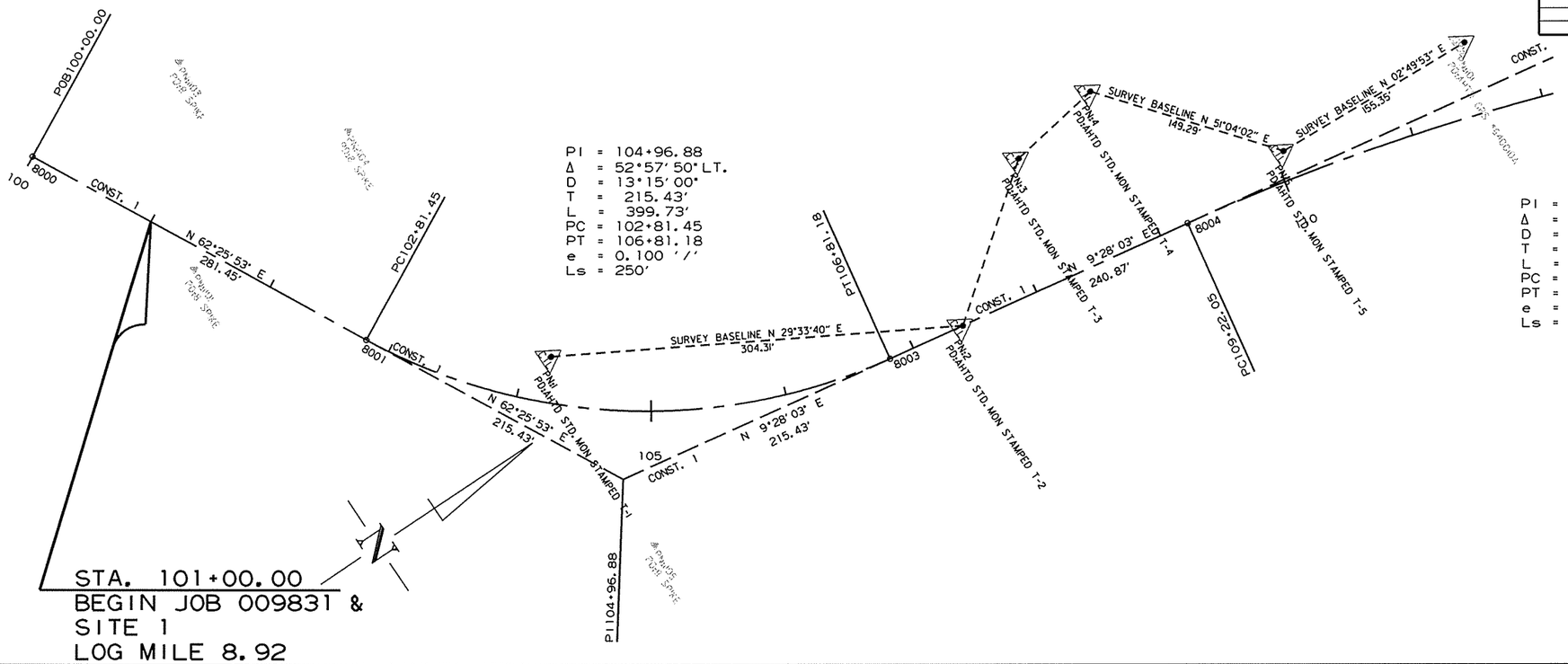
R009831.DGN

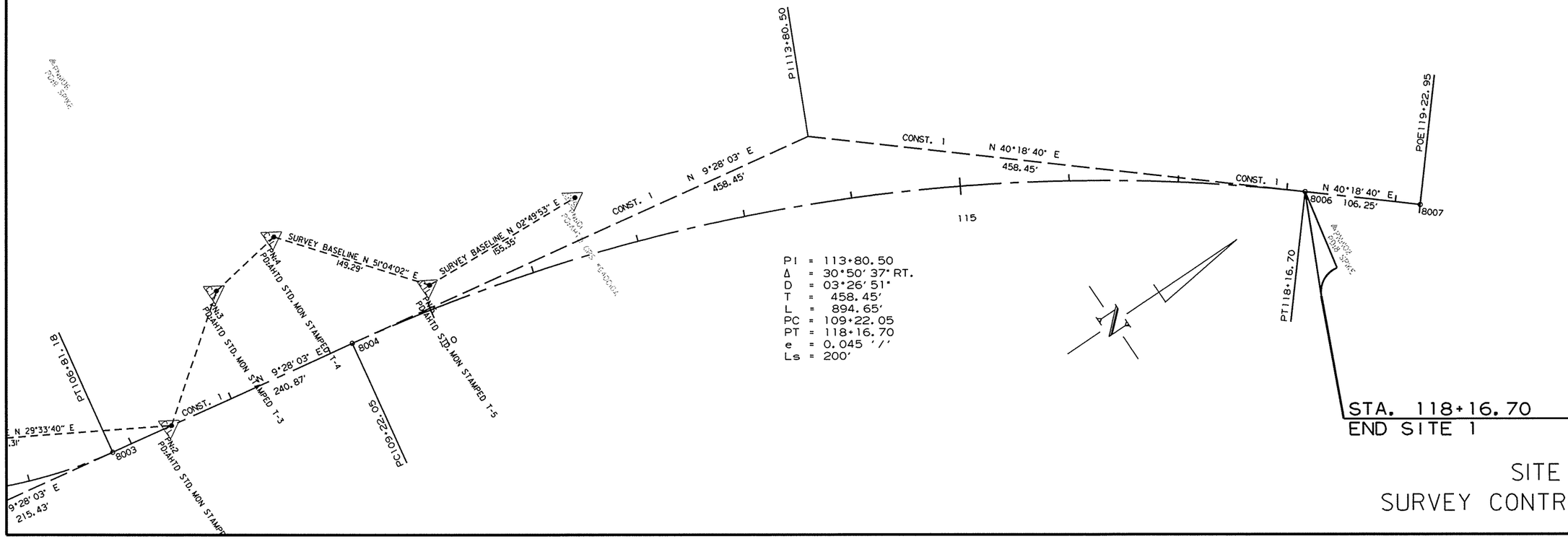
SURVEY CONTROL DETAILS

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	36	93

(2) SURVEY CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15





SITE 1
SURVEY CONTROL DETAILS

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	37	93

(2) SURVEY CONTROL DETAILS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

STA. 202+00.00
BEGIN SITE 2
LOG MILE 1.77

POB200+00.00
200
8008
CONST. 2
N 62°57'21" E
387.72'
PC203+87.72
8009
CONST. 2
N 62°57'21" E
95.32'
205
CONST. 2
N 51°33'19" E
95.32'
PT205+77.73
8011
P1204+83.04
PI = 204+83.04
Δ = 11°24'02" LT.
D = 06°00'00"
T = 95.32'
L = 190.01'
PC = 203+87.72
PT = 205+77.73
LS = 200'
e = 0.070'/'
PNI6 PDI:AHTD STD. MON STAMPED T-6
SURVEY BASELINE N 48°21'25" E
304.91'
CONST. 2
N 51°33'19" E
480.14'
210
8012
PC210+57.87
PNI7 PDI:AHTD STD. MON STAMPED T-7
SURVEY BASELINE N 49°07'13" E
308.12'
CONST. 2
N 51°33'19" E
367.03'
SURVEY BASELINE S 83°40'18" E
STAMPED T-8296.24'
CONST. 2
215
S 56°53'12" E
367.03'
PI = 214+24.90
Δ = 71°33'30" RT.
D = 11°15'00"
T = 367.03'
L = 696.07'
PC = 210+57.87
PT = 216+93.94
LS = 250'
e = 0.098'/'
P1214+24.90
PNI9 PDI:AHTD STD. MON STAMPED T-9
PNI8 PDI:AHTD STD. MON STAMPED T-8
PNI10 PDI:AHTD STD. MON STAMPED T-10
SURVEY BASELINE S 83°40'18" E
STAMPED T-8296.24'
SURVEY BASELINE N 49°07'13" E
308.12'
N 51°33'19" E
367.03'
CONST. 2
MON STAMPED T-7
PT216+93.94
8014
CONST. 2
S 56°53'12" E
204.30'
8015
CONST. 2
S 56°53'12" E
130.53'
220
CONST. 2
S 73°05'37" E
130.53'
8017
CONST. 2
S 73°05'37" E
142.44'
8018
PC218+98.25
PT221+57.56
POE223+00.00
P1220+28.77
PI = 220+28.77
Δ = 16°12'25" LT.
D = 6°15'00"
T = 130.53'
L = 259.31'
PC = 218+98.25
PT = 221+57.56
LS = 250'
e = 0.072'/'
STA. 222+00.00
END SITE 2 &
JOB 009831

SITE 2
SURVEY CONTROL DETAILS

6/22/2015
R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	38	93

(2) PLAN AND PROFILE SHEETS-SITE 1

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

REMOVAL AND DISPOSAL OF FENCE GATES

STA. 100+00 - STA. 102+80	LT.	283 LIN. FT.	3	
STA. 100+00 - STA. 119+23	RT.	2301 LIN. FT.		
STA. 109+50 - STA. 110+50	LT.	105 LIN. FT.		
STA. 112+92 - STA. 115+49	LT.	278 LIN. FT.	1	

STA. 107+64 - STA. 108+11 IN PLACE
51'X 23.5' BRIDGE NO. M3003
CONSISTING OF A CONTINUOUS STEEL GIRDER BRIDGE ON MASONRY ABUTMENTS AND PIERS
REMOVE EXISTING BRIDGE STRUCTURE (SITE 1) = 1.00 LUMP SUM

STA. 108+67 CONSTRUCT
TRI. 12'X 10'X 135' R.C. BOX CULV'T.
45° RT. FWD. SKEW W/ 3:1 WINGS
Q25 = 2020 CFS, DA = 3.4 SQ.MI.
CHANNEL CHANGE = 765 CU. YDS.

STA. 113+73 IN PLACE
18" X 43' C.M. PIPE CULV'T.
LT. SIDE DRAIN
REMOVE & INSTALL
18" X 30' PIPE CULV'T.
LT. SIDE DRAIN
CONST APPR. ON LT. = 40 CU. YDS

PI = 104+96.88
Δ = 52°57'50.0" LT.
D = 13°15'00.00"
T = 215.43'
L = 399.73'
PC = 102+81.45
PT = 106+81.18
e = 0.100 '/'
Ls = 250'

STA. 107+30 CONST.
TEMP. DRIVE ON LT. = 10 CU. YDS.

STA. 110+00 INSTALL
18" X 36' PIPE CULVERT
LT. SIDE DRAIN
CONST. APPROACH = 155 CU. YD.

OBLITERATE EXISTING ROADWAY

STA. 101+00.00
BEGIN JOB 009831 &
SITE 1
LOG MILE 8.92

STA. 102+00 CONSTRUCT
APPR. ON RT. = 230 CU. YDS.

STA. 107+36 INSTALL
18" X 86' PIPE CULVERT
RT. SIDE DRAIN CONSTRUCT
APPR. = 1875 CU. YDS.

STA. 114+25 IN PLACE
24" X 44' C.M. PIPE CULVERT
CROSS DRAIN
EXTEND C.M. PIPE 10' RT.
(TYPE LI BEDDING)
W/ F.E.S. RT.
Q25 = 21.8 CFS, DA = 6.0 AC.
24" C.M. PIPE = 14 LIN. FT.
24" F.E.S. = 1 EACH

PI = 113+80.50
Δ = 30°50'36.9" RT.
D = 03°26'51.21"
T = 458.45'
L = 894.65'
PC = 109+22.05
PT = 118+16.70
e = 0.045 '/'
Ls = 200'

SITE 1
HWY. 377

REFER TO SURVEY CONTROL DETAIL SHEETS FOR HORIZONTAL AND VERTICAL CONTROL DATA.

STA. 108+20.37 BEGIN SUPERELEVATION TRANSITION
STA. 110+20.37 MAX. SUPERELEVATION (0.045 '/')
STA. 117+61.14 MAX. SUPERELEVATION (0.045 '/')
STA. 119+16.70 MATCH EXIST. SUPERELEVATION

STA. 100+93.95 BEGIN SUPERELEVATION TRANSITION
STA. 103+43.95 MAX. SUPERELEVATION (0.100 '/')
STA. 105+70.36 MAX. SUPERELEVATION (0.100 '/')
STA. 108+20.36 END SUPERELEVATION TRANSITION

GOURD CREEK AT STA. 108+40 - 109+20 IS CLASSIFIED AS AN INTERMITTENT. THE TOP OF CHANNEL ELEVATION IS 802 FT. MSL. REFER TO SECTION 110.05(c) TEMPORARY FILL OF THE 2014 STANDARD SPECIFICATIONS.

WIRE FENCE (TYPE C) 16'-0" GATES

STA. 112+92 - STA. 115+49	RT.	365 LIN. FT.	1

WIRE FENCE (TYPE D-1) 16'-0" GATES

STA. 109+50 - STA. 110+50	LT.	84 LIN. FT.	1

WIRE FENCE (TYPE D) 16'-0" GATES

STA. 100+00 - STA. 102+80	LT.	293 LIN. FT.	
STA. 100+00 - STA. 108+85	RT.	1020 LIN. FT.	2
STA. 109+79 - STA. 119+23	RT.	936 LIN. FT.	2

P.V.I. 101+50.00 ELEV. 868.73
P.V.C. 102+81.67 ELEV. 861.81
P.V.I. 103+86.67 ELEV. 856.29
P.V.T. 104+81.67 ELEV. 845.79
P.V.C. 106+11.11 ELEV. 833.85
P.V.I. 109+75.67 ELEV. 797.39
P.V.T. 113+40.24 ELEV. 797.57
P.V.C. 113+68.07 ELEV. 797.59
P.V.I. 114+18.07 ELEV. 797.61
P.V.I. 115+00.00 ELEV. 796.28
P.V.T. 114+68.07 ELEV. 796.80

-5.26%
-10.00%
0.05%
1.63%

VC=210'
K = 44.26
e=-1.25'

VC=729'
K=72.56
e=9.16'

VC=100'
K=59.61
e=-0.21'

OUTLET FL. RT. 791.70
INLET FL. LT. 793.40
Q25=2020. DA = 3.4 SQ.MI.

OUTLET FL. RT. 793.58
INLET FL. LT. 794.10
Q25 = 21.8 CFS, DA = 6.0 AC.

880 870 860 850 840 830 820 810 800 790

100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00 109+00 110+00 111+00 112+00 113+00 114+00 115+00

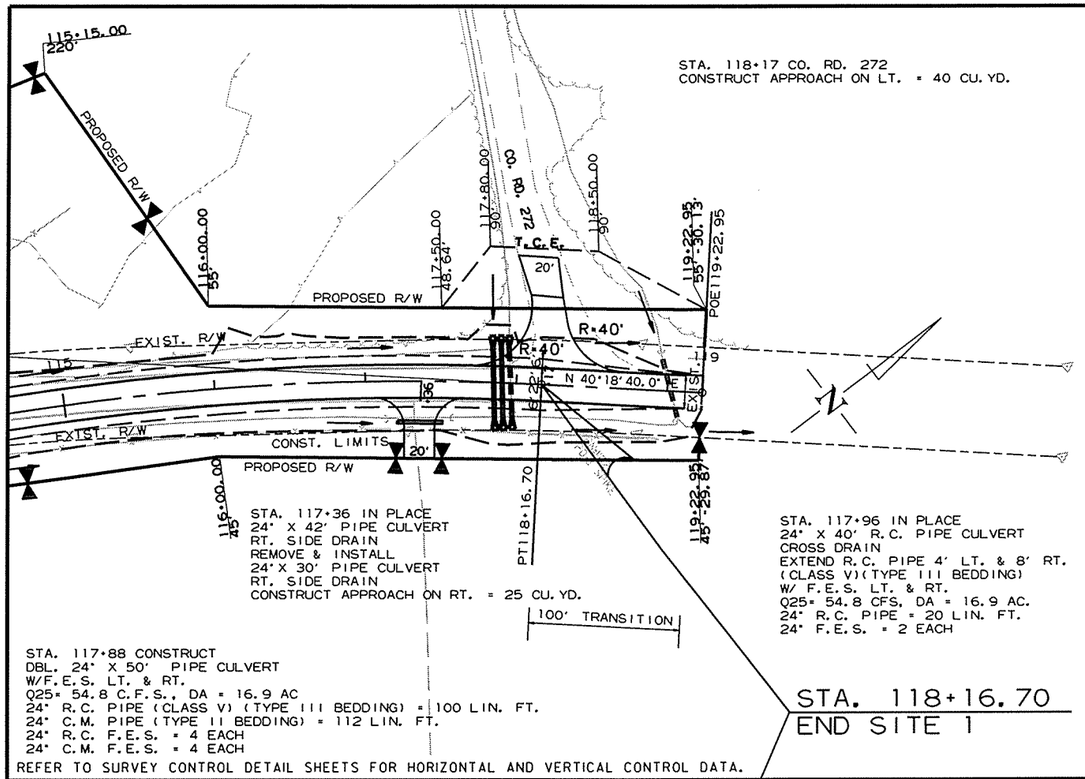
7/10/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	39	93

(2) PLAN AND PROFILE SHEETS-SITE 1

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15



STA. 118+17 CO. RD. 272
CONSTRUCT APPROACH ON LT. = 40 CU. YD.

STA. 117+36 IN PLACE
24" X 42' PIPE CULVERT
RT. SIDE DRAIN
REMOVE & INSTALL
24" X 30' PIPE CULVERT
RT. SIDE DRAIN
CONSTRUCT APPROACH ON RT. = 25 CU. YD.

STA. 117+88 CONSTRUCT
DBL. 24" X 50' PIPE CULVERT
W/F.E.S. LT. & RT.
Q25= 54.8 C.F.S., DA = 16.9 AC
24" R.C. PIPE (CLASS V) (TYPE III BEDDING) = 100 LIN. FT.
24" C.M. PIPE (TYPE II BEDDING) = 112 LIN. FT.
24" R.C. F.E.S. = 4 EACH
24" C.M. F.E.S. = 4 EACH

STA. 117+96 IN PLACE
24" X 40' R.C. PIPE CULVERT
CROSS DRAIN
EXTEND R.C. PIPE 4' LT. & 8' RT.
(CLASS V) (TYPE III BEDDING)
W/ F.E.S. LT. & RT.
Q25= 54.8 CFS, DA = 16.9 AC.
24" R.C. PIPE = 20 LIN. FT.
24" F.E.S. = 2 EACH

STA. 118+16.70
END SITE 1

REFER TO SURVEY CONTROL DETAIL SHEETS FOR HORIZONTAL AND VERTICAL CONTROL DATA.

STA. 119+02 IN PLACE
24" X 44' C.M. PIPE CULVERT
ON 15° RT. FWD. SKEW
RETAIN
Q25= 89.2 CFS, D.A. = 30.6 ACRES

PI = 113+80.50
Δ = 30°50'36.9" RT.
D = 03°26'51.21"
T = 458.45'
L = 894.65'
PC = 109+22.05
PT = 118+16.70
e = 0.045 '/'
Ls = 200'

REMOVAL AND DISPOSAL OF FENCE

			GATES
STA. 100+00 - STA. 102+80	LT.	283 LIN. FT.	
STA. 100+00 - STA. 119+23	RT.	2301 LIN. FT.	3
STA. 109+50 - STA. 110+50	LT.	105 LIN. FT.	
STA. 112+92 - STA. 115+49	LT.	278 LIN. FT.	1

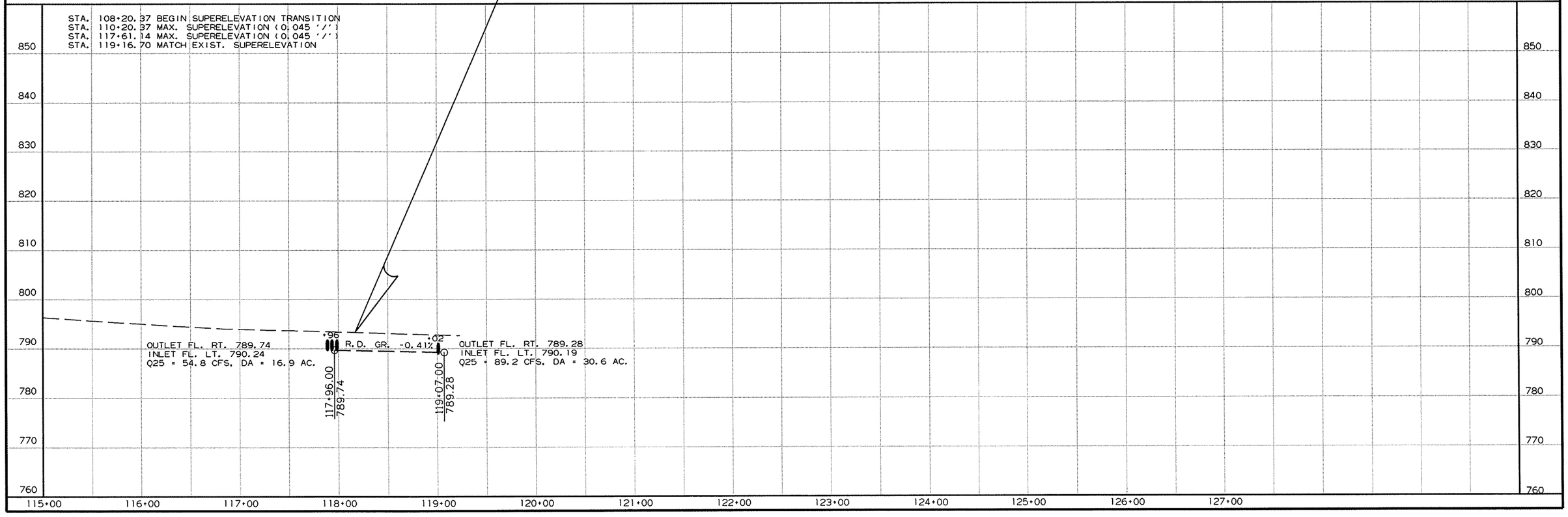
WIRE FENCE (TYPE C) — 16'-0" GATES

STA. 112+92 - STA. 115+49	RT.	365 LIN. FT.	1

WIRE FENCE (TYPE D) — 16'-0" GATES

STA. 100+00 - STA. 102+80	LT.	293 LIN. FT.	
STA. 100+00 - STA. 108+85	RT.	1020 LIN. FT.	2
STA. 109+79 - STA. 119+23	RT.	936 LIN. FT.	2

SITE 1
HWY. 377



7/10/2015
R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	40	93

(2) PLAN AND PROFILE SHEETS-SITE 2

STA. 200+55 IN PLACE
24" X 52 CM PIPE CULVERT
RETAIN

STA. 206+49 IN PLACE
24" X 54" CM PIPE CULVERT W/F.E.S.
ON 23° LT. FWD. SKEW
REMOVE FES LT. & RT. & EXTEND C.M. PIPE CULVERT
8' RT. (TYPE 2 BEDDING)
W/F.E.S. LT. & RT.
TO A COMPLETED LENGTH OF 62'
Q25= 32.9 CFS, DA = 11.3 AC
24" C.M. PIPE = 12 LIN. FT.
24" C.M. F.E.S. = 2

PI = 204+83.04
Δ = 11°24'02.3" LT.
D = 06°00'00.0"
T = 95.32'
L = 190.01'
PC = 203+87.72
PT = 205+77.73
e = 0.070'/'
LS = 200'

OBLITERATE EXISTING ROADWAY

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 11425
TRINITY D. SMITH
7-16-15

REMOVAL AND DISPOSAL OF FENCE

			16' GATES
STA. 200+00 - STA. 212+28	RT.	1247 LIN. FT.	1
STA. 203+75 - STA. 204+30	LT.	53 LIN. FT.	

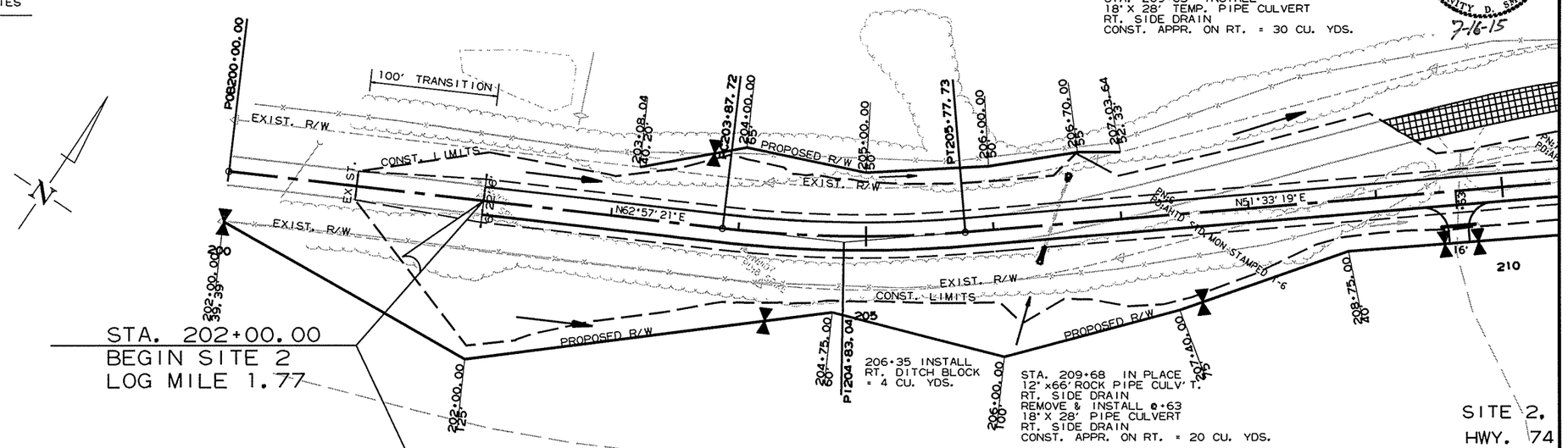
WIRE FENCE (TYPE C)

			16' GATES
STA. 200+00 - STA. 212+14	RT.	1260 LIN. FT.	1

WIRE FENCE (TYPE D)

STA. 203+75 - STA. 204+30	LT.	53 LIN. FT.

STA. 209+63 INSTALL
18' X 28' TEMP. PIPE CULVERT
RT. SIDE DRAIN
CONST. APPR. ON RT. = 30 CU. YDS.



STA. 202+00.00
BEGIN SITE 2
LOG MILE 1.77

206+35 INSTALL
RT. DITCH BLOCK
= 4 CU. YDS.

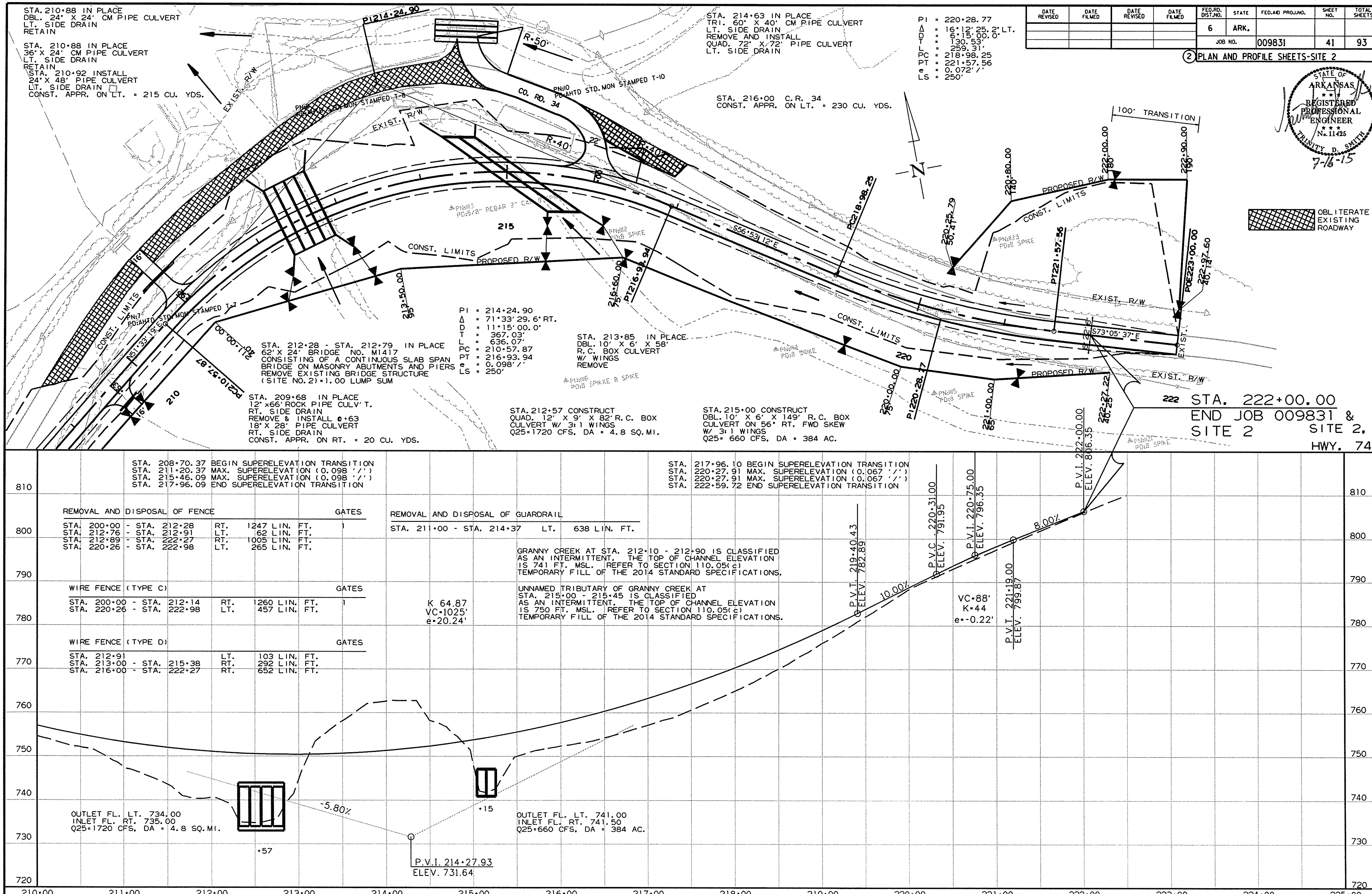
STA. 209+68 IN PLACE
12"x66' ROCK PIPE CULV'T.
RT. SIDE DRAIN
REMOVE & INSTALL @ 63
18' X 28' PIPE CULVERT
RT. SIDE DRAIN
CONST. APPR. ON RT. = 20 CU. YDS.

SITE 2.
HWY. 74

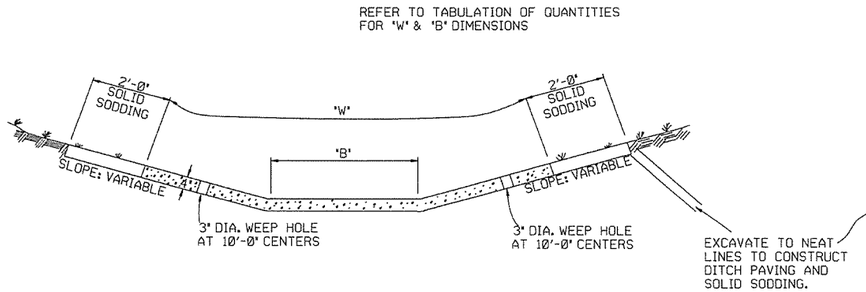
STA. 202+37.72 BEGIN SUPERELEVATION TRANSITION
STA. 204+37.72 MAX. SUPERELEVATION (0.070 '/')
STA. 205+27.73 MAX. SUPERELEVATION (0.070 '/')
STA. 207+27.73 END SUPERELEVATION TRANSITION

7/10/2015

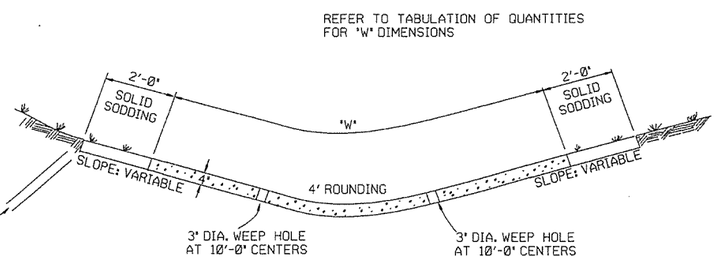
R009831.DGN



STATE OF ARKANSAS REGISTERED PROFESSIONAL ENGINEER No. 11425 TRINITY D. SMITH
7-16-15
STA. 210+88 IN PLACE
DBL. 24" X 24" CM PIPE CULVERT
LT. SIDE DRAIN
RETAIN
STA. 210+88 IN PLACE
36"X 24" CM PIPE CULVERT
LT. SIDE DRAIN
RETAIN
STA. 210+92 INSTALL
24" X 48' PIPE CULVERT
LT. SIDE DRAIN
CONST. APPR. ON LT. = 215 CU. YDS.
P.I.214+24.90
R=50'
R=40'
CO. RD. 34
EXIST. R/W
CONST. LIMITS
PROPOSED R/W
STA. 214+63 IN PLACE
TRI. 60" X 40' CM PIPE CULVERT
LT. SIDE DRAIN
REMOVE AND INSTALL
QUAD. 72" X 72' PIPE CULVERT
LT. SIDE DRAIN
PI = 220+28.77
Δ = 16°12'25.2" LT.
D = 6°15'00.0"
T = 130.53'
L = 259.31'
PC = 218+98.25
PT = 221+57.56
e = 0.072'/'
LS = 250'
STA. 216+00 C.R. 34
CONST. APPR. ON LT. = 230 CU. YDS.
100' TRANSITION
OBLITERATE EXISTING ROADWAY
S56°53'12"E
S73°05'37"E
N51°33'19"E
PC210+57.87
PT216+93.94
PC218+98.25
PT221+57.56
PI220+28.77
POE223+00.00
STA. 212+28 - STA. 212+79 IN PLACE
62' X 24' BRIDGE NO. M1417
CONSISTING OF A CONTINUOUS SLAB SPAN
BRIDGE ON MASONRY ABUTMENTS AND PIERS
REMOVE EXISTING BRIDGE STRUCTURE
(SITE NO.2) = 1.00 LUMP SUM
PI = 214+24.90
Δ = 71°33'29.6" RT.
D = 11°15'00.0"
T = 367.03'
L = 636.07'
PC = 210+57.87
PT = 216+93.94
e = 0.098'/'
LS = 250'
STA. 213+85 IN PLACE
DBL. 10' X 6' X 58'
R.C. BOX CULVERT
W/ WINGS
REMOVE
STA. 209+68 IN PLACE
12"x66' ROCK PIPE CULV'T.
RT. SIDE DRAIN
REMOVE & INSTALL @ +63
18" X 28' PIPE CULVERT
RT. SIDE DRAIN
CONST. APPR. ON RT. = 20 CU. YDS.
STA. 212+57 CONSTRUCT
QUAD. 12' X 9' X 82' R.C. BOX
CULVERT W/ 3:1 WINGS
Q25=1720 CFS, DA = 4.8 SQ.MI.
STA. 215+00 CONSTRUCT
DBL. 10' X 6' X 149' R.C. BOX
CULVERT ON 56° RT. FWD SKEW
W/ 3:1 WINGS
Q25= 660 CFS, DA = 384 AC.
STA. 222+00.00
END JOB 009831 & SITE 2
SITE 2, HWY. 74
STA. 208+70.37 BEGIN SUPERELEVATION TRANSITION
STA. 211+20.37 MAX. SUPERELEVATION (0.098 '/')
STA. 215+46.09 MAX. SUPERELEVATION (0.098 '/')
STA. 217+96.09 END SUPERELEVATION TRANSITION
STA. 217+96.10 BEGIN SUPERELEVATION TRANSITION
STA. 220+27.91 MAX. SUPERELEVATION (0.067 '/')
STA. 220+27.91 MAX. SUPERELEVATION (0.067 '/')
STA. 222+59.72 END SUPERELEVATION TRANSITION
REMOVAL AND DISPOSAL OF FENCE — GATES
STA. 200+00 - STA. 212+28 LT. 1247 LIN. FT. 1
STA. 212+76 - STA. 212+91 LT. 62 LIN. FT.
STA. 212+89 - STA. 222+27 RT. 1005 LIN. FT.
STA. 220+26 - STA. 222+98 LT. 265 LIN. FT.
REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 211+00 - STA. 214+37 LT. 638 LIN. FT.
WIRE FENCE (TYPE C) — GATES
STA. 200+00 - STA. 212+14 RT. 1260 LIN. FT. 1
STA. 220+26 - STA. 222+98 LT. 457 LIN. FT.
WIRE FENCE (TYPE D) — GATES
STA. 212+91 LT. 103 LIN. FT.
STA. 213+00 - STA. 215+38 RT. 292 LIN. FT.
STA. 216+00 - STA. 222+27 RT. 652 LIN. FT.
GRANNY CREEK AT STA. 212+10 - 212+90 IS CLASSIFIED AS AN INTERMITTENT. THE TOP OF CHANNEL ELEVATION IS 741 FT. MSL. REFER TO SECTION 110.05(c) TEMPORARY FILL OF THE 2014 STANDARD SPECIFICATIONS.
UNNAMED TRIBUTARY OF GRANNY CREEK AT STA. 215+00 - 215+45 IS CLASSIFIED AS AN INTERMITTENT. THE TOP OF CHANNEL ELEVATION IS 750 FT. MSL. REFER TO SECTION 110.05(c) TEMPORARY FILL OF THE 2014 STANDARD SPECIFICATIONS.
K 64.87
VC=1025'
e=20.24'
P.V.T. 219+40.43 ELEV. 782.89
P.V.C. 220+31.00 ELEV. 791.95
P.V.I. 220+75.00 ELEV. 796.35
P.V.T. 221+19.00 ELEV. 799.87
P.V.I. 222+00.00 ELEV. 806.35
VC=88'
K=44
e=-0.22'
10.00%
8.00%
-5.80%
P.V.I. 214+27.93
ELEV. 731.64
OUTLET FL. LT. 734.00
INLET FL. RT. 735.00
Q25=1720 CFS, DA = 4.8 SQ.MI.
OUTLET FL. LT. 741.00
INLET FL. RT. 741.50
Q25=660 CFS, DA = 384 AC.

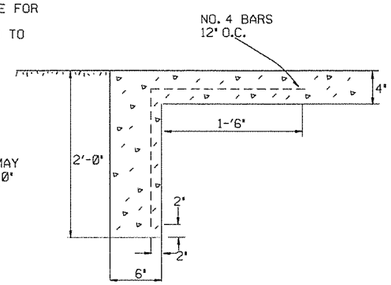


TYPE A



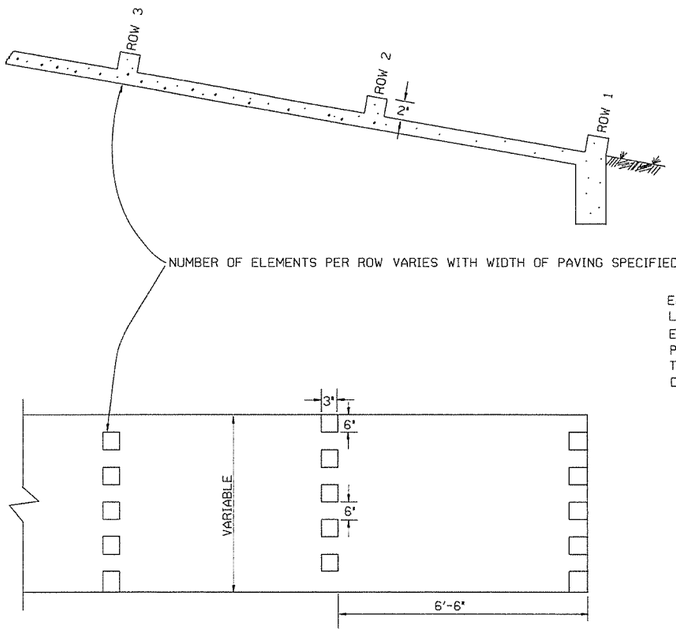
TYPE B

THE STEEL AND ADDITIONAL CONCRETE FOR THE WALLS SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR 'CONCRETE DITCH PAVING.'



TOE WALL DEPTH MAY BE ALTERED TO 1'-0" WHEN DIRECTED BY THE ENGINEER IN ROCK EXCAVATION

TOE WALL DETAIL FOR CONCRETE DITCH PAVING



ENERGY DISSIPATORS
(NO SCALE)

ENERGY DISSIPATORS TO BE USED FOR THE ENTIRE LENGTH OF DITCH WHEN SLOPE OF DITCH PAVING EXCEEDS 7%. THE DISSIPATORS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED TO BE UNCLUDED IN THE PRICE BID FOR CONCRETE DITCH PAVING.

GENERAL NOTES:

THE FULL WIDTH OF EACH SECTION SHALL BE POURED MONOLITHICALLY.

TOE WALLS TO BE CONSTRUCTED FULL WIDTH AT EACH END OF DITCH PAVING, AND POURED MONOLITHICALLY.

SOLID SOD ALONG DITCH PAVING TO BE PLACED WITHIN 14 DAYS OF DITCH PAVING CONSTRUCTION.

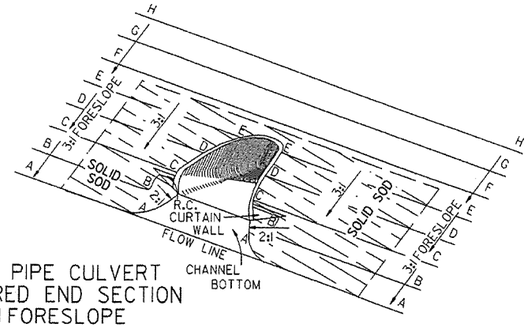
1" WIDE TRANSVERSE EXPANSION JOINTS SHALL BE PLACED IN CONCRETE DITCH PAVING AT 45' INTERVALS. THE SPACE SHALL BE FILLED WITH APPROVED JOINT FILLER COMPLYING WITH AASHTO M213.

DATE	REVISION	DATE FILM'D
11-17-10	ADDED GENERAL NOTE	
6-2-94	ADDED GENERAL NOTE ABOUT SOLID SODDING	
11-30-8	ELIMINATED MIN. ROWS OF ELEMENTS	111-30-89
7-15-88	REVISED DISSIPATOR NOTE	653-7-15-88
4-3-87	REVISED ENERGY DISSIPATOR	671-4-3-87
1-9-87	MODIFIED NOTE ON ENERGY DISS.	532-1-9-87
11-3-86	ADDED NOTE TO ENERGY DISS.	599-12-1-86
11-1-84	ENERGY DISSIPATOR DETAILS ADDED	508-11-1-84
11-1-84	EXCAVATION DETAILS ADDED TYPED A & B	
10-2-72	REVISED AND REDRAWN	508-10-2-72

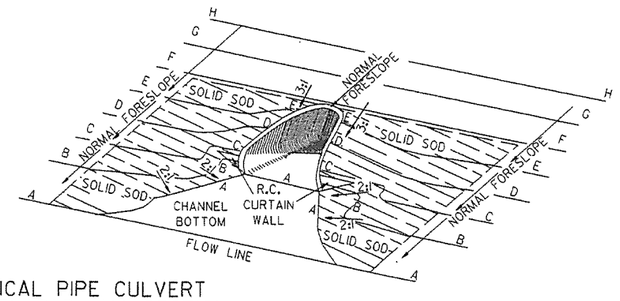
ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE DITCH PAVING

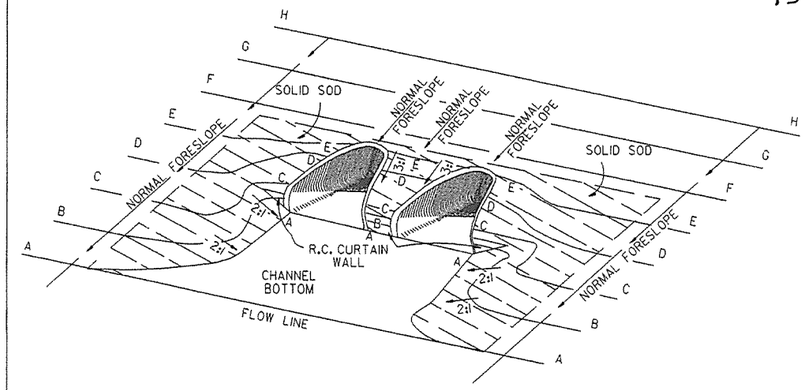
STANDARD DRAWING CDP-1



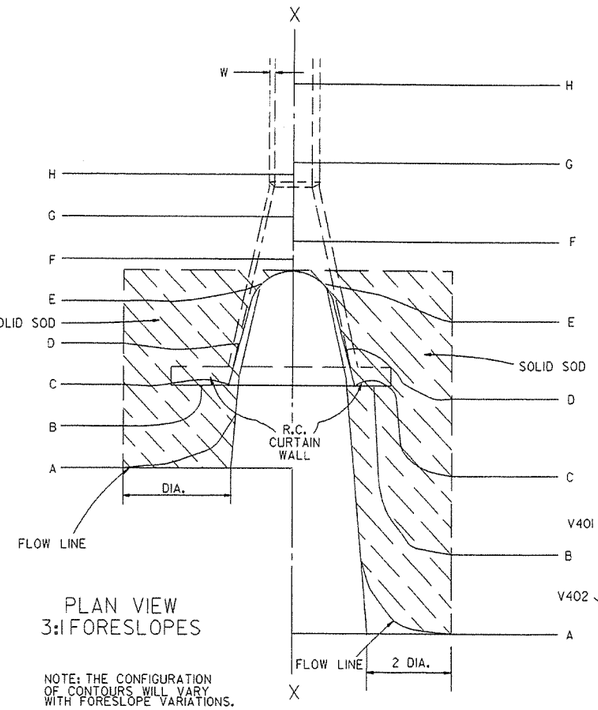
TYPICAL PIPE CULVERT
WITH FLARED END SECTION
& 3:1 FORESLOPE



TYPICAL PIPE CULVERT
WITH FLARED END SECTION
& FLATTENED ADJACENT SLOPES



TYPICAL MULTIPLE PIPE CULVERT
WITH FLARED END SECTIONS
& FLATTENED ADJACENT SLOPES



PLAN VIEW
3:1 FORESLOPES

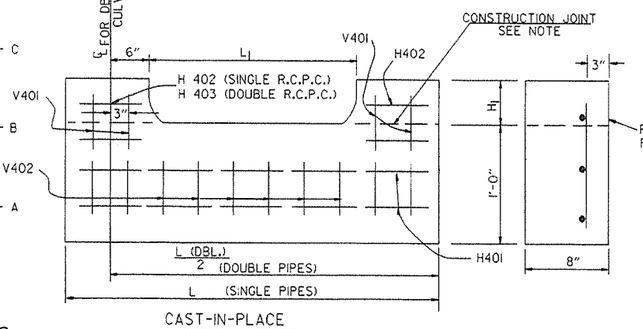
NOTE: THE CONFIGURATION OF CONTOURS WILL VARY WITH FORESLOPE VARIATIONS.

PLAN VIEW
FLATTENED FORESLOPES

R.C. CURTAIN WALL
DIMENSIONS & QUANTITIES

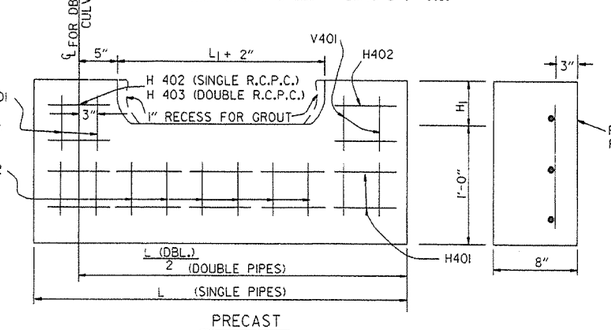
PIPE DIA.	H_1	L_1	L	L (DBL.)/2	SINGLE R.C.P.C.		DOUBLE R.C.P.C.	
					CONC.	REINF. STEEL	CONC.	REINF. STEEL
					CU. YDS.	LBS.	CU. YDS.	LBS.
18"	11½"	3'-5"	8'-0"	6'-3"	0.31	27.7	0.45	39.5
24"	1'-0½"	4'-6"	9'-6"	7'-6"	0.37	33.4	0.53	48.0
30"	1'-3½"	5'-7"	11'-0"	9'-0"	0.45	39.0	0.67	59.0
36"	1'-7"	6'-8"	13'-0"	10'-6"	0.58	52.6	0.83	73.9
42"	2'-1½"	7'-3"	15'-6"	12'-0"	0.82	77.1	1.10	100.7
48"	2'-5"	7'-10"	17'-0"	13'-0"	0.98	94.9	1.27	120.4
54"	2'-9½"	8'-5"	18'-6"	14'-0"	1.16	115.8	1.47	143.7
60"	3'-4"	9'-0"	20'-6"	15'-6"	1.47	149.7	1.84	180.3
72"	4'-5"	10'-2"	25'-6"	18'-6"	2.31	232.6	2.73	271.0

NOTE: QUANTITIES SHOWN ARE FOR ONE (1) CURTAIN WALL.



CAST-IN-PLACE

NOTE: THE PORTION OF THE R.C. CURTAIN WALL BENEATH THE FLARED END SECTION (LOWER 1'-0") SHALL BE PLACED MONOLITHICALLY. THE FLARED END SECTION SHALL THEN BE SET IN PLACE & THE REMAINING PORTIONS OF THE R.C. CURTAIN WALL PLACED.



PRECAST

NOTE: THE PRECAST CURTAIN WALL WILL BE SET AND BACKFILLED WITH COMPACTED MATERIAL. THE FLARED END SECTION SHALL THEN BE SET IN PLACE AND THE 1" RECESS FILLED WITH GROUT. WHERE "L" EXCEEDS 11' THE CURTAIN WALL MAY BE CAST IN TWO (2) OR MORE SECTIONS. THE METHOD OF JOINING THE SECTIONS FOR INSTALLATION SHALL BE APPROVED BY THE ENGINEER.

R.C. CURTAIN WALL DETAILS

REINFORCING STEEL SCHEDULE

PIPE DIA.	SINGLE R.C. PIPE CULVERT								DOUBLE R.C. PIPE CULVERT											
	H401		H402		V401		V402		H401		H402		H403		V401		V402	
	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.	L	NO.
18"	7'-8"	2	1'-11½"	4	1'-7½"	8	8"	8	12'-2"	2	1'-11½"	4	8"	2	1'-7½"	10	8"	14
24"	9'-2"	2	2'-2"	4	1'-8½"	10	8"	9	14'-8"	2	2'-2"	4	8"	2	1'-8½"	12	8"	18
30"	10'-8"	2	2'-4½"	4	1'-11½"	10	8"	12	17'-8"	2	2'-4½"	4	8"	2	1'-11½"	14	8"	22
36"	12'-8"	2	2'-10"	6	2'-3"	12	8"	14	20'-8"	2	2'-10"	6	8"	3	2'-3"	14	8"	28
42"	15'-2"	2	3'-9½"	8	2'-9½"	16	8"	15	23'-8"	2	3'-9½"	8	8"	4	2'-9½"	18	8"	30
48"	16'-8"	2	4'-3"	10	3'-1"	18	8"	16	25'-8"	2	4'-3"	10	8"	5	3'-1"	20	8"	32
54"	18'-2"	2	4'-8½"	12	3'-5½"	20	8"	17	27'-8"	2	4'-9"	12	8"	6	3'-5½"	22	8"	34
60"	20'-2"	2	5'-5"	14	4'-0"	24	8"	18	30'-8"	2	5'-5"	14	8"	7	4'-0"	26	8"	36
72"	25'-2"	2	7'-4"	18	5'-1"	30	8"	20	36'-8"	2	7'-4"	18	8"	9	5'-1"	33	8"	40

ALL REINFORCING STEEL #4 BARS @ 6" O.C.

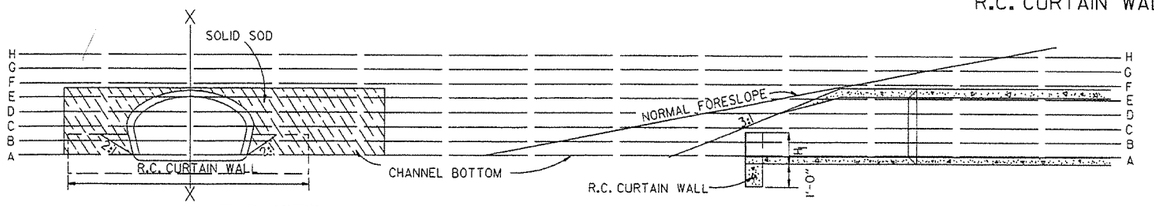
SOLID SODDING

PIPE DIA.	SINGLE R.C.P.C.			DOUBLE R.C.P.C.		
	3:1	4:1	6:1	3:1	4:1	6:1
	SQ. YDS.			SQ. YDS.		
18"	5	7	12	6	8	13
24"	8	12	19	9	13	20
30"	13	18	29	14	19	30
36"	17	26	41	18	28	43
42"	23	35	55	25	37	57
48"	29	46	68	31	48	70
54"	35	57	85	37	59	87
60"	45	62	104	48	65	107
72"	64	92	156	67	95	159

NOTE: QUANTITIES SHOWN ABOVE ARE FOR ONE (1) END OF F.E.S.

GENERAL NOTES

1. A CAST-IN-PLACE OR PRECAST CURTAIN WALL MAY BE USED. PAYMENT FOR THE CURTAIN WALL SHALL BE CONSIDERED TO BE INCLUDED IN THE UNIT PRICE BID EACH FOR FLARED END SECTIONS OF THE SEVERAL SIZES, WHICH PRICE SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIALS INCLUDING REINFORCING STEEL AND CONCRETE; FOR FORMS, MIXING AND PLACING; FOR EXCAVATION AND BACKFILL, AND FOR ALL LABOR, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
2. ALL EXPOSED EDGES SHALL BE CHAMFERED ¾".
3. CONCRETE FOR CURTAIN WALL SHALL MEET THE REQUIREMENTS FOR CLASS A OR S CONCRETE AS PROVIDED IN SECTION 802 OF THE STANDARD SPECIFICATIONS OR FOR PAVING CONCRETE AS PROVIDED IN SECTION 501 OF THE STANDARD SPECIFICATIONS.
4. WELDED WIRE MESH 3 x 3 W10 x W10 MAY BE USED IN LIEU OF REINFORCING BARS.



END VIEW

SECTIONAL VIEW "X-X"

DATE	REVISION	FILMED
10-18-93	ADDED NOTE TO SOLID SODDING	10-18-94
10-12-95	CORRECTED SPELLING	
11- 3-9	ADDED GENERAL NOTE NO. 4	
8-15-91	REV. CURTAIN WALL QUANT. STEEL SCH. & SOLID SOD QUANT.	
3-2-81	ALLOW PRECAST IN 2 OR MORE PIECES CHAMFER EDGES	
5-15-80	ADDED PRECAST WALL & GENERAL NOTES	
10-2-72	REVISED AND REDRAWN	

ARKANSAS STATE HIGHWAY COMMISSION

FLARED END SECTION

STANDARD DRAWING FES-1

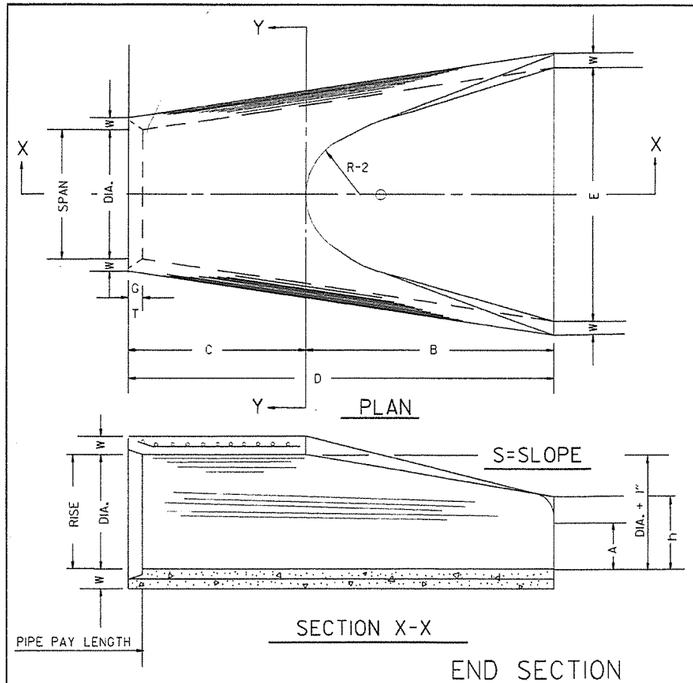
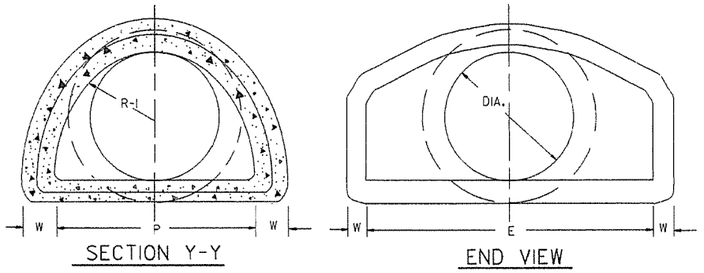


TABLE OF DIMENSIONS

DIA.	WALL	A	B	C	D	E	S	DIA. + 1"	P	R-1	R-2	G-T	WT.	h
18"	2½"	9"	2'-3"	3'-10"	6'-1"	3'-0"	3:1	19"	29"	15½"	12"	2"	1000	1'-0½"
24"	3"	9½"	3'-7½"	2'-6"	6'-11½"	4'-0"	3:1	25"	33 3/16"	16 13/16"	14"	2½"	1600	1'-1½"
30"	3½"	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3:1	31"	37"	18½"	15"	3¼"	1940	1'-4⅝"
36"	4"	1'-3"	5'-3"	2'-10¾"	8'-1¾"	6'-0"	3:1	37"	47 13/16"	24 5/16"	20"	3½"	4100	1'-8"
42"	4½"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	3:1	43"	53⅛"	27½"	22"	3½"	5380	2'-2½"
48"	5"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	3:1	49"	56½"	28½"	22"	3½"	6550	2'-6"
54"	5½"	2'-4"	6'-6"	1'-10"	8'-4"	7'-6"	3:1	55"	65½"	33⅛"	24"	4"	8750	2'-10½"
60"	6"	2'-10"	6'-6"	1'-10"	8'-4"	8'-0"	3:1	61"	72½"	36 11/16"	24"	4"	9270	3'-5"
72"	7"	3'-10"	6'-6"	1'-10"	8'-4"	9'-0"	3:1	73"	77 13/16"	38 15/16"	24"	5"	13250	4'-6"



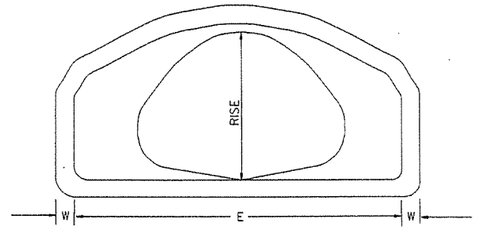
NOTE: TONGUE END ON UPSTREAM SECTION
GROOVE END ON DOWNSTREAM SECTION

END SECTION FOR REINFORCED CONCRETE PIPE CULVERTS

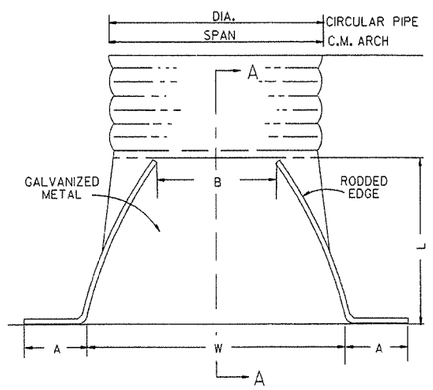
ARCH PIPE

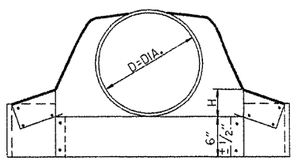
EQUIV. DIA.	• SPAN AASHTO M 206	• SPAN AHD NOMINAL	• RISE AASHTO M 206	• RISE AHD NOMINAL	W	A	B	C	D	E	P	R2	G-T	S
	INCHES													
15	18	18	11	11	2"	4"	2'-0"	4'-0"	6'-0"	3'-0"	29"	12"	1½"	2½:1
18	22	22	13½	14	2½"	5"	2'-0"	4'-1"	6'-1"	3'-6"	32⅛"	13"	2¼"	2½:1
21	26	26	15½	16	2¾"	7"	2'-3"	3'-10"	6'-1"	4'-0"	34⅛"	14"	2½"	2½:1
24	29½	29	18	18	3"	9"	2'-3"	3'-10"	6'-1"	5'-0"	36 1/16"	15"	2½"	2½:1
30	36¼	36	22½	23	3½"	10"	3'-1"	3'-0½"	6'-1½"	6'-0"	47 13/16"	20"	3"	2½:1
36	43¾	44	26⅝	27	4"	10½"	4'-0"	2'-11½"	6'-1½"	6'-6"	54 3/16"	22"	3½"	2½:1
42	51⅛	51	31 5/16	31	4½"	11½"	4'-7"	1-10¼"	6'-5¼"	7'-2"	59½"	23"	3¾"	2½:1
48	58½	59	36	36	5"	1'-3"	5'-3"	2'-10¾"	8'-1¾"	7'-10"	70 5/16"	24"	4¼"	2½:1
54	65	65	40	40	5½"	1'-7"	5'-3"	2'-11"	8'-2"	8'-6"	72 1/16"	24"	4¾"	2¼:1
60	73	73	45	45	6"	1'-10"	5'-6"	2'-8"	8'-2"	9'-0"	77 1/16"	24"	5"	2¼:1

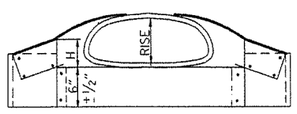
• THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PER CENT FROM THE VALUES SPECIFIED BY AASHTO M 206.



END VIEW
CONCRETE ARCH PIPE







CIRCULAR PIPE

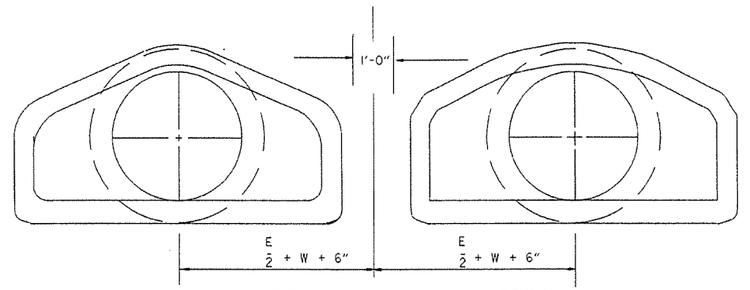
D. DIA.	GAUGE	A 1" ±	B. MAX.	H 1" ±	L 1½" ±	W 2" ±	S
		INCHES					
12	16	6	6	6	21	24	2½:1
15	16	7	8	6	26	30	2½:1
18	16	8	10	6	31	36	2½:1
21	16	9	12	6	36	42	2½:1
24	16	10	13	6	41	48	2½:1
30	14	12	16	8	51	60	2½:1
36	14	14	19	9	60	72	2½:1
42	12	16	22	11	69	84	2½:1
48	12	18	27	12	78	90	2½:1
54	12	18	30	12	84	102	2:1
60	12	18	33	12	87	114	1¾:1
66	12	18	36	12	87	120	1½:1
72	12	18	39	12	87	126	1 1/3:1

C.M. ARCH PIPE

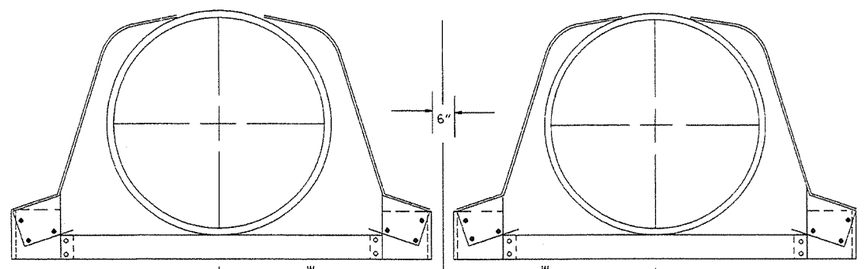
EQUIV. DIA.	SPAN	RISE	A 1" ±	B MAX.	H 1" ±	L 1½" ±	W 2" ±	S	GAUGE
	INCHES								
15"	17	13	7	9	6	19	30	2½:1	16
18"	21	15	7	10	6	23	36	2½:1	16
21"	24	18	8	12	6	28	42	2½:1	16
24"	28	20	9	14	6	32	48	2½:1	16
30"	35	24	10	16	6	39	60	2½:1	14
36"	42	29	12	18	8	46	75	2½:1	14
42"	49	33	13	21	9	53	85	2½:1	12
48"	57	38	18	26	12	63	90	2½:1	12
54"	64	43	18	30	12	70	102	2¼:1	12
60"	71	47	18	33	12	77	114	2¼:1	12

NOTE: ALTERNATE CONNECTIONS TO THE PIPE CULVERTS, IN ACCORDANCE WITH MANUFACTURER'S STANDARD PRACTICES, MAY BE MADE SUBJECT TO THE APPROVAL OF THE ENGINEER.

END SECTIONS FOR CORRUGATED METAL PIPE CULVERTS



MULTIPLE R.C. PIPE CULVERTS



MULTIPLE C.M. PIPE CULVERTS

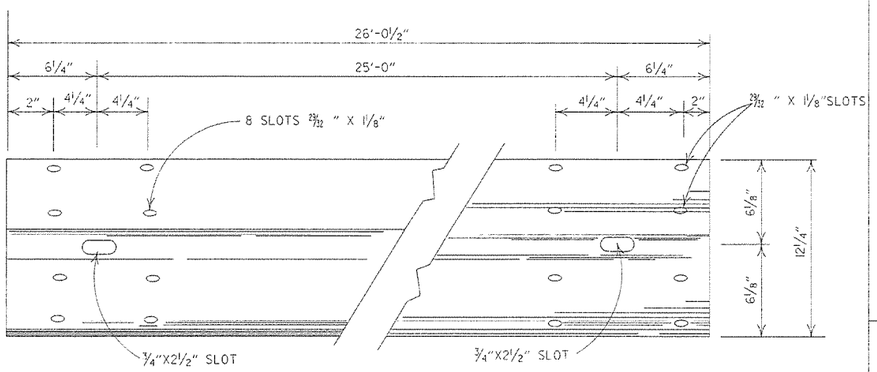
DATE	REVISION	FILMED
10-18-96	REVISED ASTM REF. TO AASHTO	10-18-96
5-15-80	REVISED DISTANCE BETWEEN MULTIPLE R.C.P. F.E.S.	664-5-15-80
7-14-78	C.M. ARCH SIZES TO CONFORM WITH AASHTO SIZES	752-7-14-78
8-22-75	ADDED MULTIPLE PIPE CULVERTS	517-8-22-75
12-5-74	REMOVED NOTE RE REINF FOR R.C. F.E.S.	500-12-5-74
5-24-73	CMP END SECTION, SHOW PIPE PAY LENGTH	627-5-24-73
10-2-72	REVISED AND REDRAWN	760-10-2-72

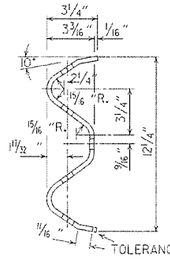
ARKANSAS STATE HIGHWAY COMMISION

FLARED END SECTION

STANDARD DRAWING FES-2

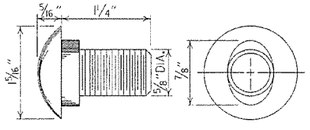
stdfes2.dgn



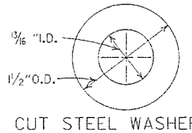


DETAILS OF W-BEAM GUARD RAIL

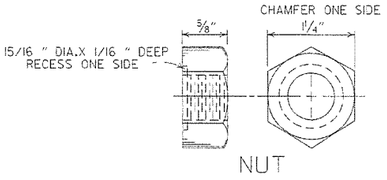
RAIL SECTION OF CLOSELY SIMILAR DIMENSIONS AND COMPARABLE STRENGTH MAY BE SUBSTITUTED IF APPROVED BY THE ENGINEER.



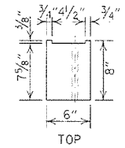
SPLICE BOLT
POST BOLT - SAME EXCEPT LENGTH



CUT STEEL WASHER

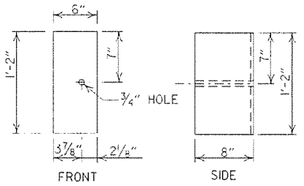


NUT

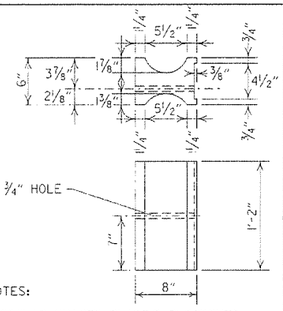


WOOD BLOCKOUT USED WITH WOOD POSTS SHALL BE 6"x8"x1'-2" WITH NO NOTCH REQUIRED.

TOP



WOOD BLOCKOUT (W-BEAM)

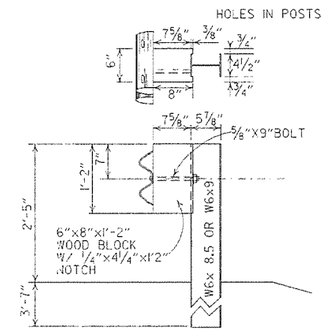


NOTES:

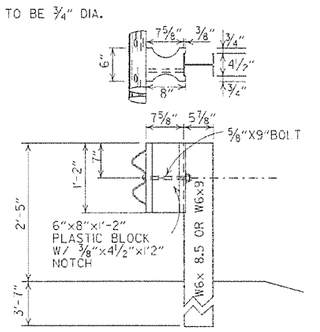
1. SIMILAR SHAPED PLASTIC BLOCKOUTS MAY BE USED AS LONG AS THEY MEET NCHRP-350 TEST LEVEL 3 SPECIFICATIONS OR REQUIREMENTS FOR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
2. DIMENSIONS ARE SUBJECT TO MANUFACTURERS TOLERANCES.

PLASTIC BLOCKOUT (W-BEAM)

HOLES IN POSTS AND BLOCKS TO BE 3/4" DIA.

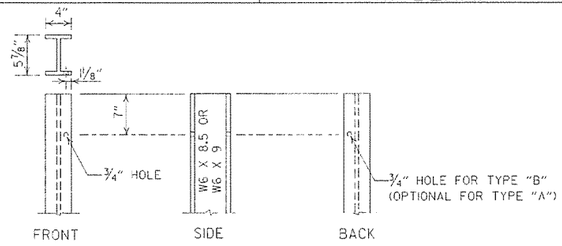


WOOD BLOCKOUT CONNECTIONS

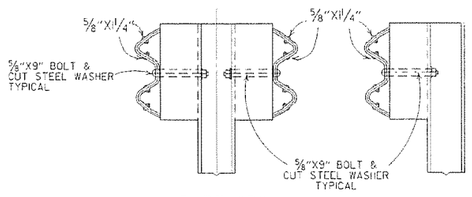


PLASTIC BLOCKOUT CONNECTIONS

DETAILS OF STEEL LINE POST CONNECTIONS (W-BEAM)



STEEL POST



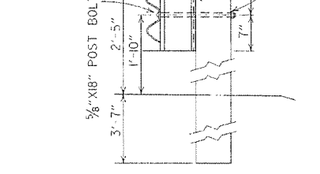
TYPE "B" TYPE "A"

DETAILS OF STEEL LINE POST CONNECTIONS (W-BEAM)

HOLES IN POSTS AND BLOCKS TO BE 3/4" DIA.

POSTS AND BLOCKS TO BE ROUGH SAWN 6"X8" WITH A TOLERANCE OF + OR - 1/4".

WOOD BLOCKOUT CONNECTIONS



PLASTIC BLOCKOUT CONNECTIONS

DETAILS OF WOOD LINE POST CONNECTIONS (W-BEAM)

-GENERAL NOTES-

ALL BOLTS SHALL BE SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3/4" BEYOND IT.

WHERE W-BEAM GUARD RAIL CONTINUES, THE INTERMEDIATE SECTIONS SHALL HAVE A POST SPACING OF 6'-3" UNLESS OTHERWISE NOTED.

W-BEAM GUARD RAIL REPRESENTING INTERMEDIATE SECTIONS WILL BE MEASURED ALONG THE ROADWAY FACE FROM CENTERLINE OF POST TO CENTERLINE OF POST.

USE W-BEAM GUARD RAIL COMPONENTS OF SAME MATERIAL FOR ENTIRE JOB. FOR EXTENSIONS OR MODIFICATION OF EXISTING GUARD RAIL, W-BEAM GUARD RAIL COMPONENTS OF THE SAME TYPE AS THOSE EXISTING SHALL BE USED.

ANY BACKFILLING UNDER OR AROUND POST SHALL BE DAMP SAND THOROUGHLY TAMPED IN PLACE.

WOOD POSTS & WOOD BLOCKS SHALL BE EITHER DENSE NO. 1 STRUCTURAL OR BETTER 8.7# (1400 f) OR NO. 1 1350 f SOUTHERN PINE.

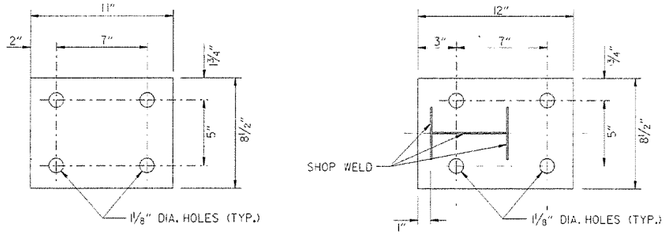
CONTRACTOR SHALL HAVE THE OPTION OF USING WOOD BLOCKOUTS FOR W-BEAM GUARD RAIL OR PLASTIC BLOCKOUTS, AS LONG AS BLOCKOUT USED MEETS NCHRP-350 TEST LEVEL 3 SPECIFICATIONS OR REQUIREMENTS FOR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) FOR W-BEAM GUARD RAIL.

DATE	REVISION	DATE FILM
7-14-10	RAISED HEIGHT OF GUARD RAIL 1"	
10-15-09	ADDED REFERENCE TO MASH	
4-10-03	REVISED GENERAL NOTES	
8-22-02	REVISED DIMENSION ON WOOD & PLASTIC BLOCKOUT CONNECTIONS & ON STEEL POST	
11-16-01	REVISED WOOD BLOCKOUT & DETAILS OF WOOD LINE POST CONNECTIONS	
3-30-00	REMOVED GUARD RAIL AT BRIDGE ENDS	
1-12-00	ADDED PLASTIC BLOCKOUT	
8-12-98	REV. BLOCKOUTS TO WOOD, DELETED CONC. POST & REV. GENERAL NOTE, DELETED DET. OF GUARD RAIL REPLACE. BEHIND CURB & DET. OF POST PLACE. IN SOLID ROCK, & ADDED DETAILS OF STEEL LINE POST CONN. REMOVED BACK-UP PLATE, REVISED HOLES IN STEEL POLES	
4-3-97	REMOVED "LAP IN DIRECTION OF TRAFFIC" NOTE & PLACED ARROWS ON WASHERS	
10-18-96	REVISED WOOD POST NOTE	
6-2-94	ADDED ALT. STEEL POST SIZE	
8-5-93	REVISED STEEL POST SIZE	8-5-93
10-1-92	REDRAWN & REVISED	10-1-92
8-15-91	REVISED WASHER NOTE	8-15-91
8-2-90	REV. GEN. NOTE & DEPHT OF ANC. POST IN ROCK	8-2-90
7-15-88	REVISED SECTION 3 & GENERAL NOTES	
3-4-88	REV. ANCHOR POST, ELEV. NOTES & POST IN ROCK	780-3-4-88
10-30-87	REVISED WOOD LINE POST DETAIL	546-10-30-87
10-9-87	REDRAWN & REVISED	802-10-9-87

ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

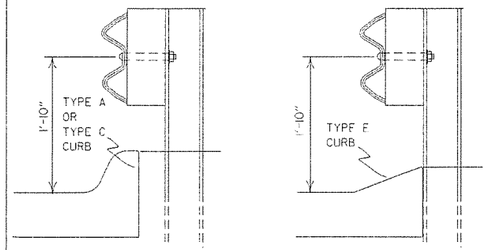
STANDARD DRAWING GR-8



WASHER PLATE

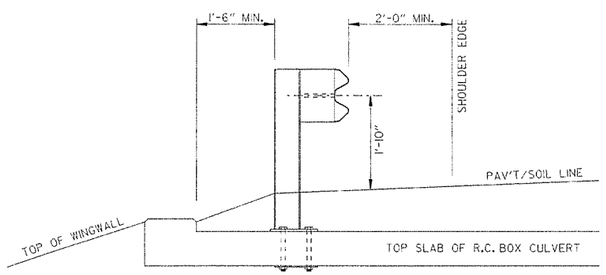
BASE PLATE

Note: Bolts, nuts, washers and plates shall be galvanized in accordance with Section 807 of the Standard Specifications.

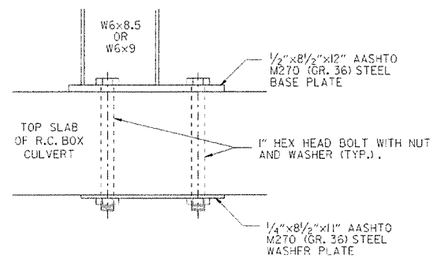


DETAIL OF GUARD RAIL PLACEMENT BEHIND CURB (W-BEAM)

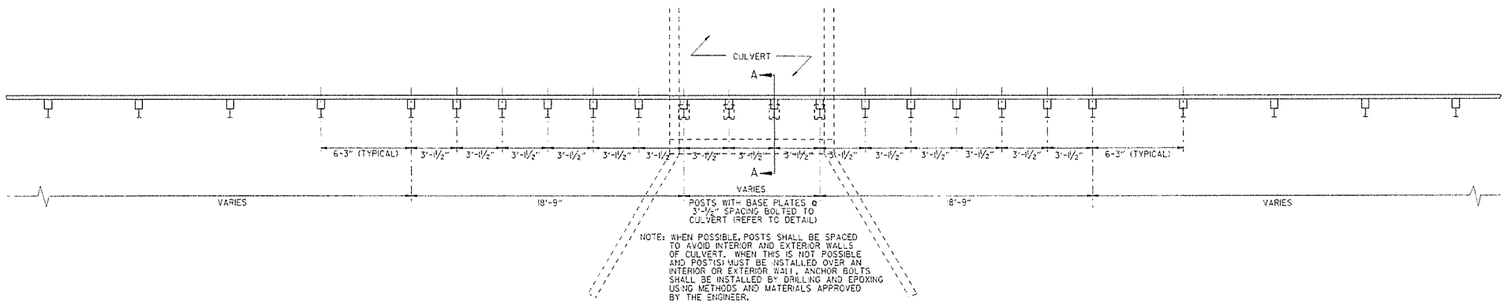
FOR DESIGN SPEEDS OF 50 MPH OR LESS ALL CURB FACES, AS SHOWN ON STD. DRWG. CC-1, MAY BE USED. FOR DESIGN SPEEDS OF 55 MPH OR MORE TYPE "E" CURB FACE SHALL BE USED.



SECTION A-A



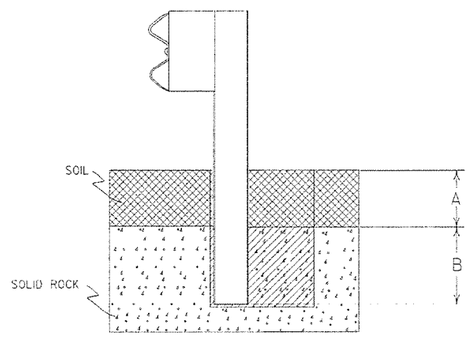
DETAIL OF CONNECTION



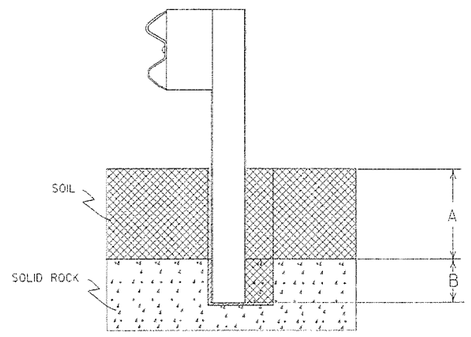
PLAN LAYOUT OF TYPE A GUARD RAIL AT LOW-FILL CULVERTS

NOTE: THIS DETAIL IS TO BE USED ONLY WHEN THE COVER OVER THE CULVERT DOES NOT PERMIT FULL EMBEDMENT OF GUARD RAIL POSTS AS SHOWN ON STD. DWG. GR-8.

Case 1

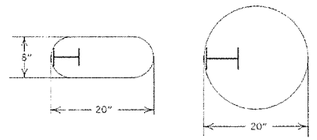


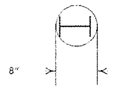
Case 2



Plan View Steel Posts

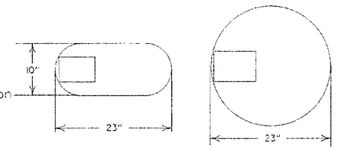
Either hole configuration acceptable

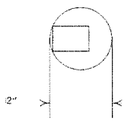




Plan View Wood Posts

Either hole configuration acceptable





Notes: For overlying soil depths (A) ranging from 0 to 18", the depth of required drilling (B) is equal to 24".

Zone A:
Backfill according to Section 617.03(a).

Zone B:
Backfill hole in 6" lifts with material meeting the requirements of Section 802.02(c) - Alternate gradation. Compact to 95% maximum dry density per ASTM D-698.

Notes: For overlying soil depths (A) ranging from 18" to 44", the depth of required drilling (B) is equal to either 12" or 44" minus the depth of soil whichever is less.

Zone A & B:
Backfill according to Section 617.03(a).

DETAIL OF POST PLACEMENT IN SOLID ROCK (W-BEAM)

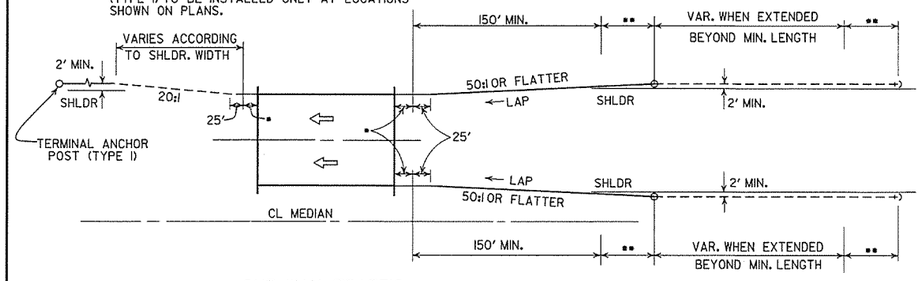
DATE	REVISION	DATE FILM
7-14-10	RAISED HEIGHT OF GUARD RAIL 1"	
4-12-07	REVISED DETAIL OF GUARD RAIL PLACEMENT BEHIND CURB	
11-10-05	ADDED GUARD RAIL PLACEMENT BEHIND CURB; REVISED DETAIL OF CONNECTION	
11-18-04	REVISED POST PLACEMENT IN ROCK & CULVERT CONNECTION DETAILS. ADDED DETAIL FOR GUARD RAIL PLACEMENT AT LOW-FILL CULVERTS	
3-30-00	REMOVED CONCRETE INSERT ANCHOR	
8-12-98	CHANGED STEEL SPACER BLOCK TO WOOD BLOCKOUT, ADD. DET. OF GUARD RAIL CONNECTION TO R.C. BOX CULVT., DELETED DET. OF STEEL LINE POST CONN.& ADDED DET. OF GUARD RAIL PLACE. BEHIND CURB & DET. OF POST PLACE. IN SOLID ROCK	
4-3-96	PLACED ARROWS AT CUT STEEL WASHERS	4-3-96
10-18-96	REV. ASTM REF. TO AASHTO	
11-22-95	ADDED OPTIONAL HOLES	
6-2-94	REVISED ALTERNATE POST SIZE	
8-5-93	REVISED STEEL POST SIZE	
10-1-92	REDRAWN & REVISED	10-1-92
8-2-90	DEL. WASHER ON ANCHOR ASSEMBLY	8-2-90
7-15-88	CONFORMED TO 1988 SPECS	
3-4-88	REVISED ANCHOR NOTE	
10-30-87	REVISED ANCHOR ASSEMBLY	712-10-30-87
10-30-87	REVISED PLACEMENT BEHIND CURB	547-10-30-87
10-9-87	REDRAWN & REVISED	803-10-9-87

ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

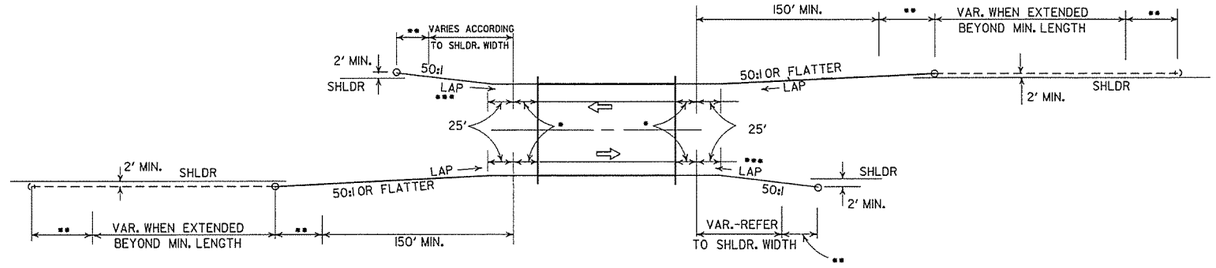
STANDARD DRAWING GR-8A

NOTE: GUARD RAIL WITH GUARD RAIL TERMINAL (TYPE I) TO BE INSTALLED ONLY AT LOCATIONS SHOWN ON PLANS.



ONE-WAY TRAFFIC

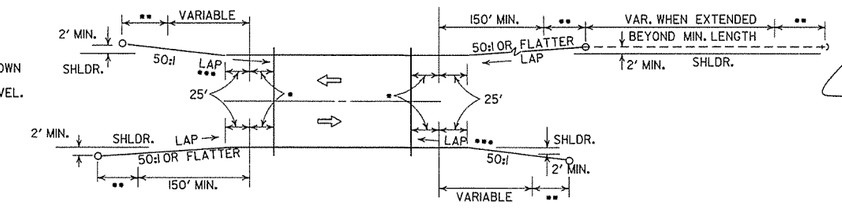
••• LAP OF GUARD RAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 200', CHANGE TO LAP IN DIRECTION OF TRAVEL.



TWO-WAY TRAFFIC

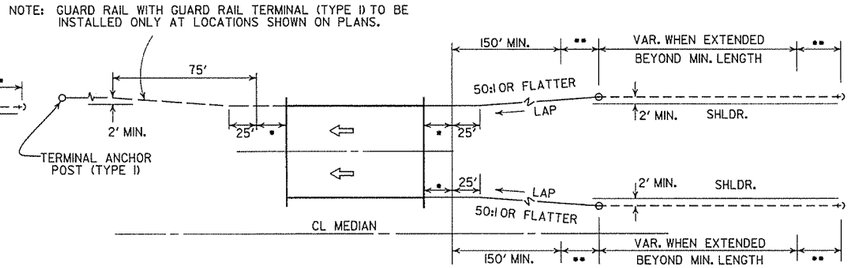
METHODS OF INSTALLATION OF GUARD RAIL AT LESS THAN FULL SHOULDER WIDTH BRIDGES USING GUARD RAIL TERMINAL (TYPE 2)

••• LAP OF GUARD RAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 200', CHANGE TO LAP IN DIRECTION OF TRAVEL.



TWO-WAY TRAFFIC

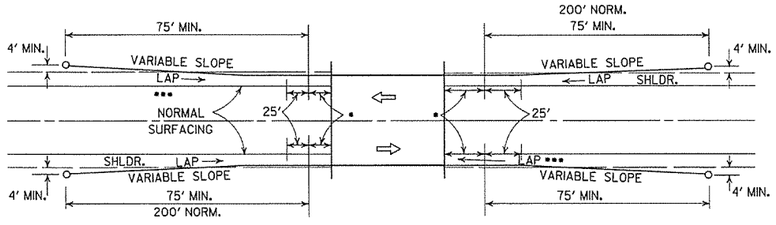
NOTE: GUARD RAIL WITH GUARD RAIL TERMINAL (TYPE I) TO BE INSTALLED ONLY AT LOCATIONS SHOWN ON PLANS.



ONE-WAY TRAFFIC

METHOD OF INSTALLATION OF GUARD RAIL AT FULL SHOULDER WIDTH BRIDGES USING GUARD RAIL TERMINAL (TYPE 2)

••• LAP OF GUARD RAIL SHALL BE AS SHOWN FOR A DISTANCE OF UP TO 200', CHANGE TO LAP IN DIRECTION OF TRAVEL.



LEGEND

- THRIE BEAM GUARD RAIL TERMINAL
- •• GUARD RAIL TERMINAL (TYPE 2)

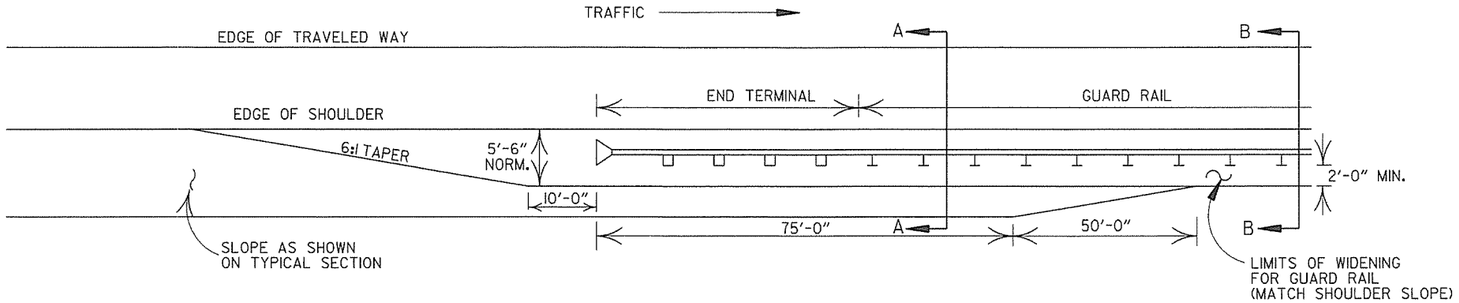
METHOD OF INSTALLATION OF GUARD RAIL USING GUARD RAIL TERMINAL (TYPE I) (FULL SHOULDER WIDTH OR LESS BRIDGES)

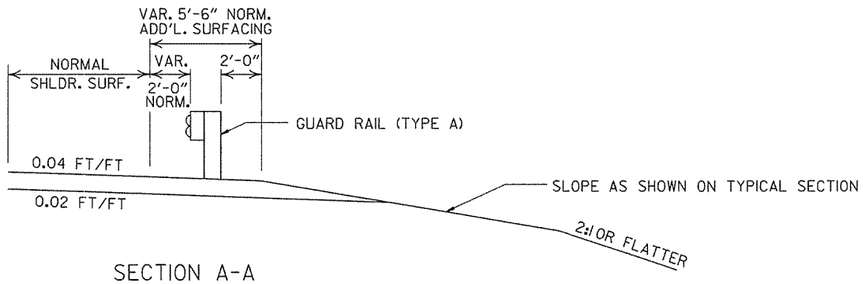
DATE	REVISION	DATE FILM
4-17-08	REVISED LAYOUTS	
11-10-05	REMOVED GUARD RAIL NOTES AND DETAILS	
11-16-01	DELETED NOTE-METHOD OF INSTALLATION OF GUARD RAIL USING GUARD RAIL TERM. (TY. I)	
1-12-00	ADDED CONSTRUCTION NOTE	1-12-00
6-26-97	REVISED LAYOUT	
10-1-92	REDRAWN & REVISED	10-1-92
	ADDED NOTE	
10-9-87	REDRAWN & REVISED	

ARKANSAS STATE HIGHWAY COMMISSION

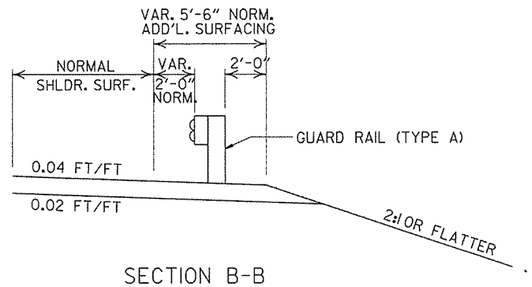
GUARD RAIL DETAILS

STANDARD DRAWING GR-9





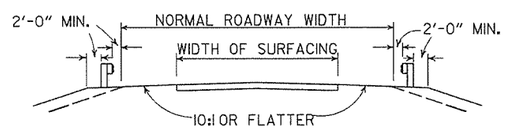
SECTION A-A



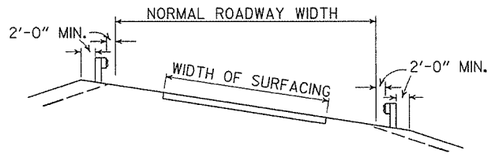
SECTION B-B

DETAILS OF WIDENING FOR GUARD RAIL

NOTE: NORMAL SECTION TO BE WIDENED APPROX. 5'-6" EACH SIDE TO SUPPORT GUARD RAIL.

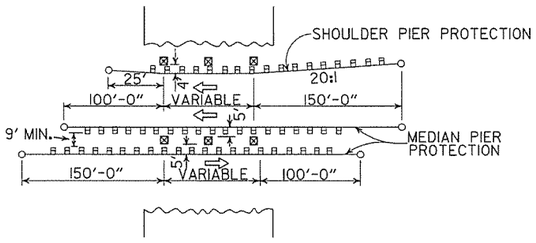


SECTION ON TANGENT



SECTION ON CURVE

DETAILS SHOWING POSITION OF GUARD RAIL ON HIGHWAY



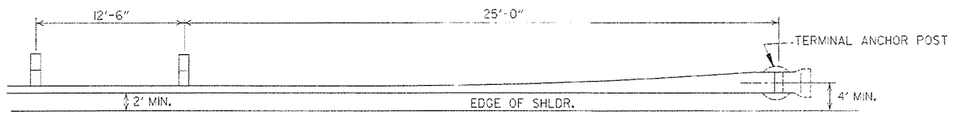
METHOD OF INSTALLATION OF GUARD RAIL AT FIXED OBSTACLE

DATE	REVISION	DATE FILM
4-17-08	MINOR REVISION	
11-10-05	DRAWN	

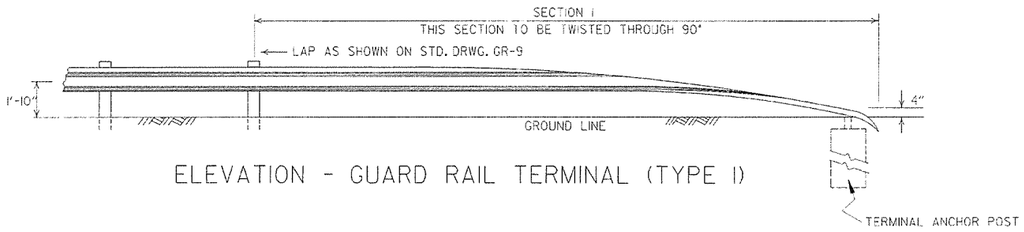
ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

STANDARD DRAWING GR-9A

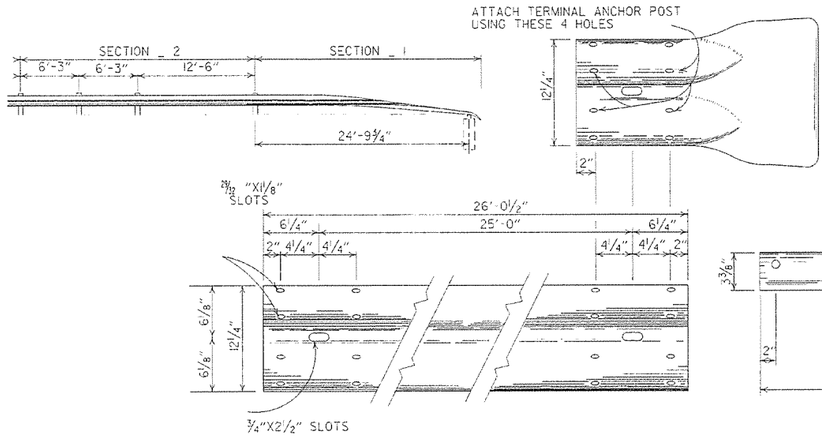


PLAN - GUARD RAIL TERMINAL (TYPE I)



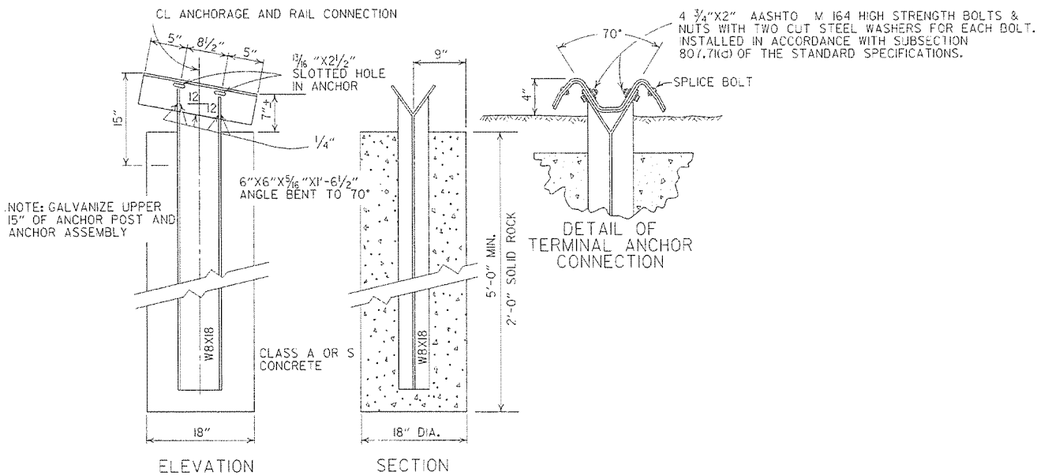
ELEVATION - GUARD RAIL TERMINAL (TYPE I)

NOTE:
SECTIONS 1 AND 2 OF GUARD RAIL TERMINAL SHALL BE PAID FOR AT THE PRICE BID PER LINEAR FOOT OF THE TYPE OF GUARD RAIL SPECIFIED.



SECTION 1

TERMINAL SECTION



ELEVATION SECTION

NOTE: RAIL MEMBERS MAY BE BOLTED TO ANGLE AT TERMINAL ANCHOR AND THE TWO ASSEMBLIES POSITIONED TO PROPER ALIGNMENT PRIOR TO PLACING CONCRETE AROUND 8 WF 17 POST IF CONTRACTOR SO DESIRES.

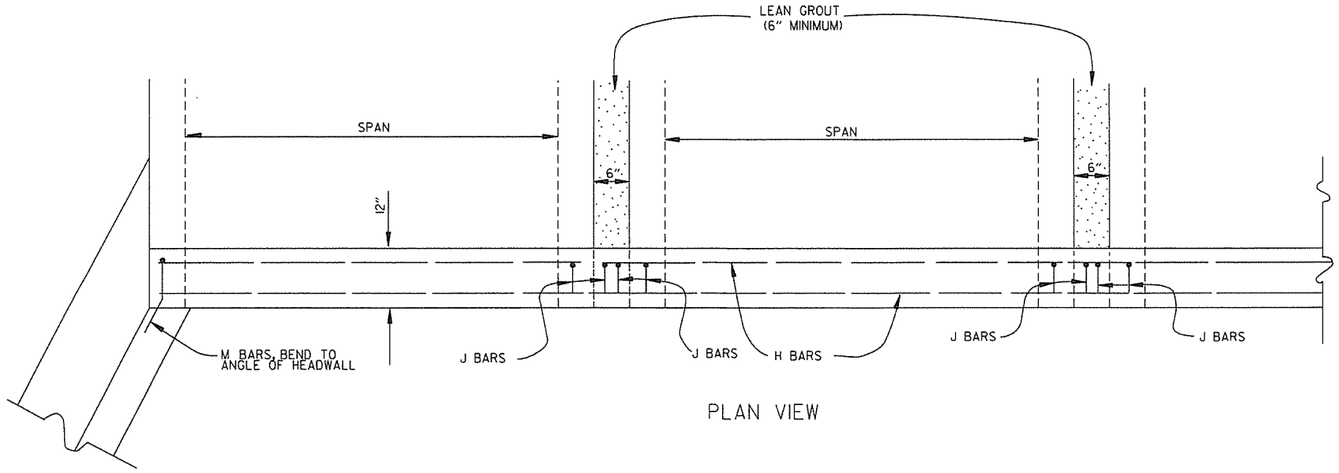
DETAIL OF TERMINAL ANCHOR POST (TYPE I)

DATE	REVISION	DATE FILM
7-14-10	RAISED HEIGHT OF GUARD RAIL 1"	
6-26-97	REVISED LAP NOTE	
10-18-96	REVISED ASTM REF. TO AASHTO	
11-3-94	DIMENSION TERMINAL DETAIL	
11-11-92	ADDED NOTE FOR PAYMENT	11-11-92
10-1-92	DRAWN & ISSUED	10-1-92

ARKANSAS STATE HIGHWAY COMMISSION

GUARD RAIL DETAILS

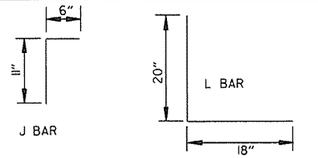
STANDARD DRAWING GRT-1



PLAN VIEW

BAR LIST

BAR	NO.	SIZE	LENGTH	BAR BENDING DIAGRAM
H	2	#4	•	
I	•	#4	•	
J	•	#4	1'-5"	
L	•	#4	3'-2"	
M	•	#4	1'-8"	



• NOTE: LENGTH AND NUMBER OF BARS VARIES WITH SIZE OF CULVERT

GENERAL NOTES

WINGS, CURTAIN WALLS AND APRONS SHALL BE TIED TO THE PRECAST CULVERT SECTION BY CASTING BARS IN CULVERT END SECTIONS AS SHOWN OR BY DOWELING AND GROUTING. J BARS AND M BARS SHALL BE EMBEDDED A MINIMUM OF 10" IN PRECAST BOX.

WINGS, FOOTINGS, APRONS AND CURTAIN WALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE WING DRAWING. STEEL AND CONCRETE QUANTITIES WILL BE ADJUSTED TO FIT THE IN-PLACE WIDTH & HEIGHT OF THE PRECAST CONCRETE BOX CULVERTS.

ALL EXPOSED CORNERS TO HAVE ¾" CHAMFERS.

WINGWALLS AND FOOTINGS MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.

ALL CONCRETE, REINFORCING STEEL, LEAN GROUT, MEMBRANE WATERPROOFING, DRAINAGE FILL MATERIAL, GEOTEXTILE FILTER FABRIC, LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR INSTALLING PRECAST BOX CULVERTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID FOR THE ITEMS AS SPECIFIED IN SECTION 607 OF THE STANDARD SPECIFICATIONS.

LEAN GROUT SHALL CONSIST OF A SAND CEMENT MIXTURE MEETING THE FOLLOWING REQUIREMENTS:
PORTLAND CEMENT SHALL BE TYPE I AND SHALL MEET THE REQUIREMENTS OF AASHTO M 85.
SAND SHALL MEET THE REQUIREMENTS OF FINE AGGREGATE AS SPECIFIED IN SECTION 802.02 OF THE STANDARD SPECIFICATIONS.
THE SAND CEMENT MIXTURE SHALL CONSIST OF NOT LESS THAN 1.5 SACKS OF PORTLAND CEMENT PER TON OF MATERIAL MIXTURE.
THE MIXTURE SHALL CONTAIN SUFFICIENT WATER TO HYDRATE THE CEMENTS. THE SAND CEMENT MIXTURE SHALL BE PLACED IN MAXIMUM 8 INCH THICK LIFTS, LOOSE MEASURE, AND THOROUGHLY RODDED AND TAMPED AROUND BOX TO THOROUGHLY FILL ALL VOIDS.

MEMBRANE WATERPROOFING CONFORMING TO THE REQUIREMENTS OF SECTION 815 OF THE STANDARD SPECIFICATIONS SHALL BE APPLIED TO ALL BOX CULVERT JOINTS.

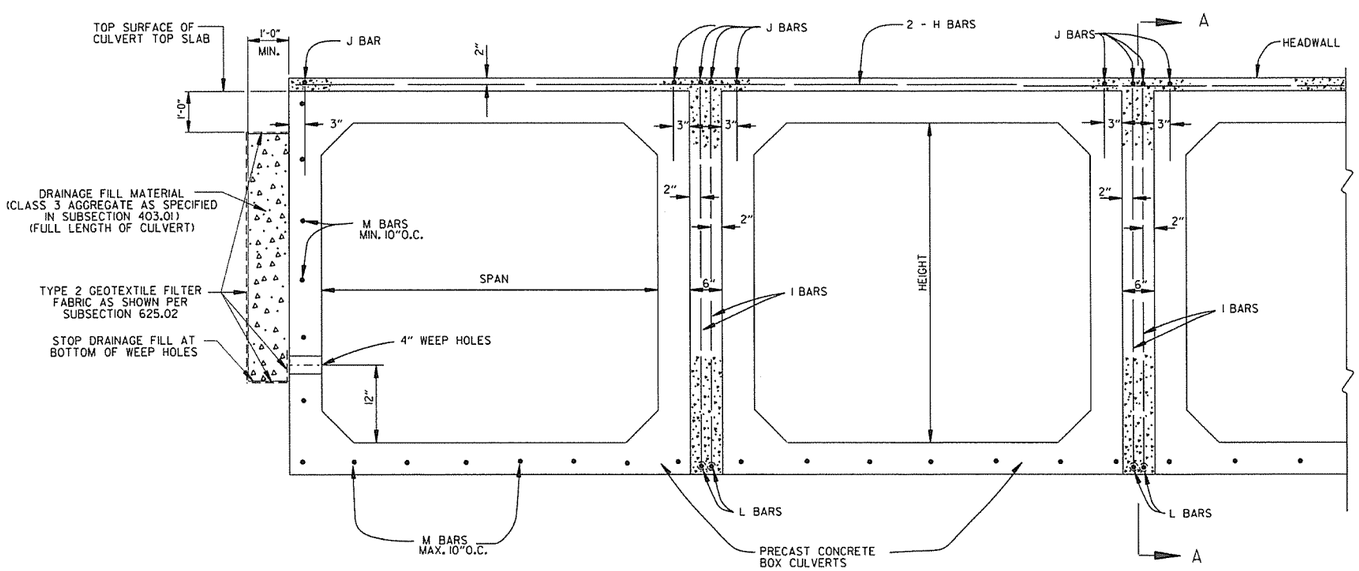
THE MEMBRANE WATERPROOFING WILL BE REQUIRED ON THE TOP EXTERNAL JOINT AND SHALL EXTEND 1 FOOT DOWN THE SIDES OF THE CULVERT.

IN OUTER BARRELS, ONE WEEP HOLE IS REQUIRED IN EXTERIOR WALLS OF EACH PRECAST CULVERT SECTION. WEEP HOLES SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 10'-0" IN THE ASSEMBLED CULVERT AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND SHALL BE PLACED 12" ABOVE THE TOP OF THE BOTTOM SLAB.

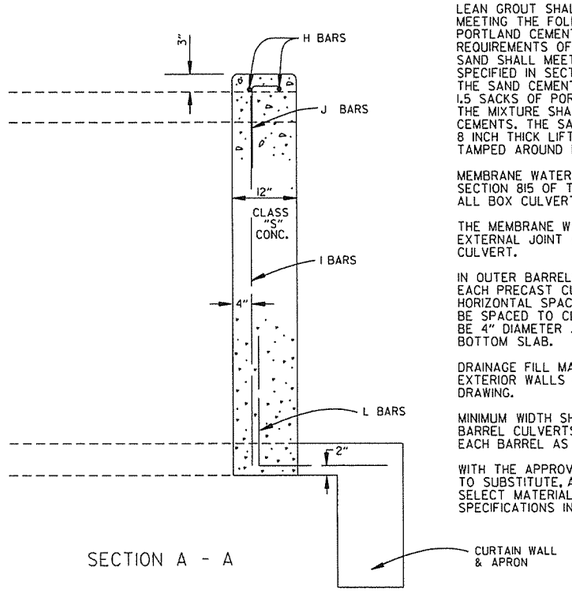
DRAINAGE FILL MATERIAL WITH GEOTEXTILE FABRIC IS REQUIRED AT THE EXTERIOR WALLS OF THE ASSEMBLED CULVERT, SEE DETAILS ON THIS DRAWING.

MINIMUM WIDTH SHALL BE 12" (6" ON EACH SIDE OF JOINT), ON MULTIPLE BARREL CULVERTS, MEMBRANE WATERPROOFING SHALL BE APPLIED TO EACH BARREL AS DESCRIBED ABOVE.

WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR WILL BE ALLOWED TO SUBSTITUTE, AT NO ADDITIONAL COST TO THE DEPARTMENT, FLOWABLE SELECT MATERIAL CONFORMING TO SECTION 206 OF THE STANDARD SPECIFICATIONS IN LIEU OF LEAN GROUT.



END VIEW



SECTION A - A

DATE	REVISION	DATE FILMED
1-28-15	REVISED GEOTEXTILE FABRIC PLACEMENT	
12-15-11	ADDED NOTE & DTLS FOR WEEP HOLE AND DRAINAGE FILL	
10-15-09	ADDED GENERAL NOTE	
11-10-05	REVISED SPACING OF "M" BARS	
4-10-03	REVISED GENERAL NOTES	
10-18-96	CORRECTED AASHTO REF.	
10-1-92	ADDED NOTE FOR MEMBRANE WATERPROOFING	
8-15-91	ADDED NOTE FOR LEAN GROUT	
11- 8-90	REVISED FOR 1991 SPECS	
11-30-89	ISSUED: JABE	

ARKANSAS STATE HIGHWAY COMMISSION

PRECAST CONCRETE BOX CULVERTS

STANDARD DRAWING PBC-1

REINFORCED CONCRETE ARCH PIPE DIMENSIONS

EQUIV. DIA.	SPAN		RISE	
	AASHTO M 206	AHTD NOMINAL	AASHTO M 206	AHTD NOMINAL
INCHES	INCHES			
15	18	18	11	11
18	22	22	13½	14
21	26	26	15½	16
24	28½	29	18	18
30	36¼	36	22½	23
36	43⅜	44	26⅝	27
42	51⅛	51	31⅞	31
48	58½	59	36	36
54	65	65	40	40
60	73	73	45	45
72	88	88	54	54
84	102	102	62	62
90	115	115	72	72
96	122	122	77½	77
108	138	138	87⅛	87
120	154	154	96⅞	97
132	168¾	169	106½	107

THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PERCENT FROM THE VALUES SPECIFIED BY AASHTO M206.

REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE DIMENSIONS

EQUIV. DIA.	AASHTO M 207	
	SPAN	RISE
INCHES	INCHES	
18	23	14
24	30	19
27	34	22
30	38	24
33	42	27
36	45	29
39	49	32
42	53	34
48	60	38
54	68	43
60	76	48
66	83	53
72	91	58
78	98	63
84	106	68

THE MEASURED SPAN AND RISE SHALL NOT VARY MORE THAN ± 2 PERCENT FROM THE VALUES SPECIFIED BY AASHTO M207.

CONSTRUCTION SEQUENCE

1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE MIDDLE OF THE PIPE.
5. COMPLETE BACKFILL ACCORDING TO SUBSECTION 606.03.(f)(1).

NOTE: HAUNCH AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF CONCRETE PIPE.

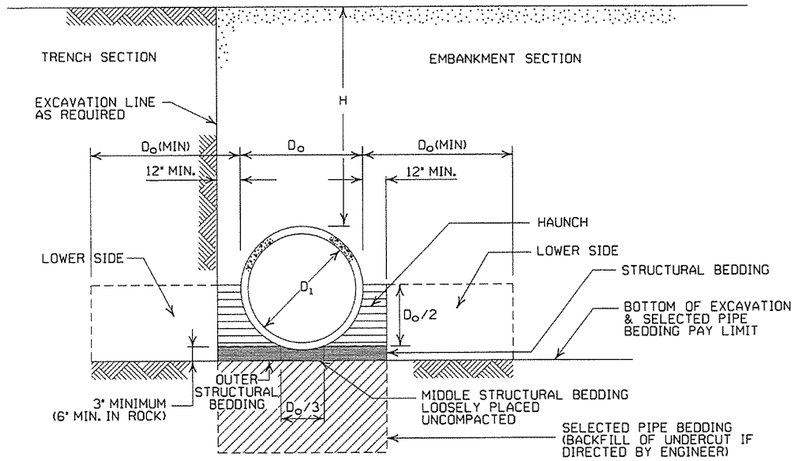
- LEGEND -

D_i = NORMAL INSIDE DIAMETER OF PIPE
D_o = OUTSIDE DIAMETER OF PIPE
H = FILL COVER HEIGHT OVER PIPE (FEET)
MIN. = MINIMUM
= UNDISTURBED SOIL

INSTALLATION TYPE	MATERIAL REQUIREMENTS FOR HAUNCH AND STRUCTURAL BEDDING
TYPE 1	AGGREGATE BASE COURSE (CLASS 5 OR CLASS 7)
TYPE 2	SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-4) OR TYPE 1 INSTALLATION MATERIAL*
TYPE 3**	AASHTO CLASSIFICATION A-1 THRU A-6 SOIL OR TYPE 1 OR 2 INSTALLATION MATERIAL

*SM-3 WILL NOT BE ALLOWED.

**MATERIALS SHALL NOT INCLUDE ORGANIC MATERIALS OR STONES LARGER THAN 3 INCHES.



EMBANKMENT AND TRENCH INSTALLATIONS

1. MATERIAL IN THE HAUNCH AND OUTER STRUCTURAL BEDDING SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.
2. FOR TRENCHES WITH WALLS OF NATURAL SOIL, THE DENSITY OF THE SOIL IN THE LOWER SIDE ZONE SHALL BE AS FIRM AS THE 95% DENSITY REQUIRED FOR THE HAUNCH. IF THE EXISTING SOIL DOES NOT MEET THIS CRITERIA, IT SHALL BE REMOVED AND RECOMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OF MATERIAL USED.
3. FOR EMBANKMENTS, THE MATERIAL IN THE LOWER SIDE ZONE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

GENERAL NOTES

1. CONCRETE PIPE CULVERT CONSTRUCTION SHALL CONFORM TO ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION), WITH APPLICABLE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS. UNLESS OTHERWISE NOTED IN THE PLANS, SECTION AND SUBSECTION REFER TO THE STANDARD CONSTRUCTION SPECIFICATIONS.
2. CONCRETE PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. ALL PIPE SHALL CONFORM TO SECTION 606. CIRCULAR R.C. PIPE CULVERTS SHALL CONFORM TO AASHTO M170, R.C. ARCH PIPE CULVERTS SHALL CONFORM TO AASHTO M206 AND HORIZONTAL ELLIPTICAL PIPE CULVERTS SHALL CONFORM TO AASHTO M207.
4. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
5. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
6. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 24 INCHES BETWEEN STRINGS OF PIPE. REFER TO STD. DWG. FES-2 FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
7. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
8. NOT MORE THAN ONE LIFTING HOLE MAY BE PROVIDED IN CONCRETE PIPE TO FACILITATE HANDLING. HOLE MAY BE CAST IN PLACE, CUT INTO THE FRESH CONCRETE AFTER FORMS ARE REMOVED, OR DRILLED. THE HOLE SHALL NOT BE MORE THAN TWO INCHES IN DIAMETER OR TWO INCHES SQUARE. CUTTING OR DISPLACEMENT OF REINFORCEMENT WILL NOT BE PERMITTED. SPALLED AREAS AROUND THE HOLE SHALL BE REPAIRED IN A WORKMANLIKE MANNER. LIFTING HOLE SHALL BE FILLED WITH MORTAR, CONCRETE, OR OTHER METHOD AS APPROVED BY THE ENGINEER.
9. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS "STRUCTURAL BEDDING" ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS "SELECTED PIPE BEDDING."
10. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS THE HAUNCH), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF "SELECTED PIPE BACKFILL."

MINIMUM HEIGHT OF FILL "H" OVER CIRCULAR R.C. PIPE CULVERTS

	CLASS OF PIPE			
	CLASS III		CLASS IV	CLASS V
INSTALLATION TYPE	TYPE 1 OR 2	TYPE 3	ALL	ALL
PIPE ID (IN.)	FEET			
12-15	2	2.5	2	1
18-24	2.5	3	2	1
27-33	3	4	2	1
36-42	3.5	5	2	1
48	4.5	5.5	2	1
54-60	5	7	2	1
66-78	6	8	2	1
84-108	7.5	8	2	1

NOTE: FOR MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM OF 12" OF PAVEMENT AND/OR BASE.

MAXIMUM HEIGHT OF FILL "H" OVER CIRCULAR R.C. PIPE CULVERTS

INSTALLATION TYPE	CLASS OF PIPE		
	CLASS III	CLASS IV	CLASS V
	FEET		
TYPE 1	21	32	50
TYPE 2	16	25	39
TYPE 3	12	20	30

NOTE: IF FILL HEIGHT EXCEEDS 50 FEET, A SPECIAL DESIGN CONCRETE PIPE WILL BE REQUIRED USING TYPE 1 INSTALLATION.

MINIMUM HEIGHT OF FILL "H" OVER R.C. ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS

INSTALLATION TYPE	CLASS OF PIPE	
	CLASS III	CLASS IV
	FEET	
TYPE 2 OR TYPE 3	2.5	1.5

NOTE: TYPE 1 INSTALLATION WILL NOT BE ALLOWED FOR ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS.

NOTE: FOR MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM OF 12" OF PAVEMENT AND/OR BASE.

MAXIMUM HEIGHT OF FILL "H" OVER R.C. ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS

INSTALLATION TYPE	CLASS OF PIPE	
	CLASS III	CLASS IV
	FEET	
TYPE 2	13	21
TYPE 3	10	16

NOTE: TYPE 1 INSTALLATION WILL NOT BE ALLOWED FOR ARCH & HORIZONTAL ELLIPTICAL PIPE CULVERTS.

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REVISED FOR LRFD DESIGN SPECIFICATIONS	
5-18-00	REVISED TYPE 3 BEDDING & ADDED NOTE	
3-30-00	REVISED INSTALLATIONS	
11-06-97	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

CONCRETE PIPE CULVERT FILL HEIGHTS & BEDDING

STANDARD DRAWING PCC-1

CORRUGATED STEEL PIPE (ROUND)

PIPE DIAMETER (INCHES)	① MINUMUM COVER TOP OF PIPE TO TOP OF GROUND "H" (FEET)	MAX. FILL HEIGHT "H" ABOVE TOP OF PIPE (FEET)				
		METAL THICKNESS (INCHES)				
		0.064	0.079	0.109	0.138	0.168
2⅔ INCH BY ½ INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM						
12	1	84	91			
15	1	67	73			
18	1	56	61			
24	1	42	46	59		
30	2	34	36	47		
36	2		30	39	41	
42	2		43	67	70	73
48	2		37	58	61	64
② 3 INCH BY 1 INCH OR 5 INCH BY 1 INCH CORRUGATION RIVETED, WELDED, BOLTED, OR HELICAL LOCK-SEAM						
36	1	48	60	88	111	118
42	1	41	51	72	90	102
48	1	36	45	64	77	85
54	2	32	40	59	71	79
60	2	29	36	53	64	71
66	2	26	33	47	58	64
72	2	24	30	44	53	59
78	2		28	41	49	54
84	2		26	38	45	51
90	2		24	35	43	45
96	2		22	33	40	44
102	2			31	38	42
108	2			30	35	39
114	2			28	34	37
120	2			27	32	35

CORRUGATED ALUMINUM PIPE (ROUND)

PIPE DIAMETER (INCHES)	① MINUMUM COVER TOP OF PIPE TO TOP OF GROUND "H" (FEET)	MAX. FILL HEIGHT "H" ABOVE TOP OF PIPE (FEET)				
		METAL THICKNESS IN INCHES				
		0.060	0.075	0.105	0.135	0.164
		2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED OR HELICAL LOCK-SEAM				
12	1	45	45			
18	2	30	30	52		
24	2	22	22	39	41	
30	2		18	31	32	34
36	2.5		15	26	27	28
42	2			43	43	44
48	2			40	41	43
54	2			35	37	38
60	2				33	34
66	2					31
72	2					29

CORRUGATED METAL PIPE ARCHES

EQUIV. DIA. (INCHES)	PIPE DIMENSION SPAN X RISE (INCHES)	MINUMUM CORNER RADIUS (INCHES)	STEEL					ALUMINUM				
			MIN. THICKNESS REQUIRED INCHES	① MIN. HEIGHT OF FILL, "H" (FT.)		MAX. HEIGHT OF FILL, "H" (FT.)		MIN. THICKNESS REQUIRED INCHES	① MIN. HEIGHT OF FILL, "H" (FT.)		MAX. HEIGHT OF FILL, "H" (FT.)	
				INSTALLATION		INSTALLATION			INSTALLATION		INSTALLATION	
				TYPE 1		TYPE 1			TYPE 1		TYPE 1	
			2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM					2 ⅔ INCH BY ½ INCH CORRUGATION RIVETED OR HELICAL LOCK-SEAM				
15	17x13	3	0.064	2		15		0.060	2		15	
18	21x15	3	0.064	2		15		0.060	2		15	
21	24x18	3	0.064	2.25		15		0.060	2.25		15	
24	28x20	3	0.064	2.5		15		0.075	2.5		15	
30	35x24	3	0.079	3		12		0.075	3		12	
36	42x29	3½	0.079	3		12		0.105	3		12	
42	49x33	4	0.079	3		12		0.105	3		12	
48	57x38	5	0.109	3		13		0.135	3		13	
54	64x43	6	0.109	3		14		0.135	3		14	
60	71x47	7	0.138	3		15		0.164	3		15	
66	77x52	8	0.168	3		15						
72	83x57	9	0.168	3		15						
			② 3 INCH BY 1 INCH OR 5 INCH BY 1 INCH CORRUGATION RIVETED, WELDED, OR HELICAL LOCK-SEAM									
				INSTALLATION		INSTALLATION						
				TYPE 2	TYPE 1	TYPE 2	TYPE 1					
36	40x31	5	0.079	3	2	12	15					
42	46x36	6	0.079	3	2	13	15					
48	53x41	7	0.079	3	2	13	15					
54	60x46	8	0.079	3	2	13	15					
60	66x51	9	0.079	3	2	13	15					
66	73x55	12	0.079	3	2	15	15					
72	81x59	14	0.079	3	2	15	15					
78	87x63	14	0.079	3	2	15	15					
84	95x67	16	0.109	3	2	15	15					
90	103x71	16	0.109	3	2	15	15					
96	112x75	18	0.109	3	2	15	15					
102	117x79	18	0.109	3	2	15	15					
108	128x83	18	0.138	3	2	15	15					

CONSTRUCTION SEQUENCE

1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. COMPLETE STRUCTURAL BACKFILL OPERATION BY WORKING FROM SIDE TO SIDE OF THE PIPE. THE SIDE TO SIDE STRUCTURAL BACKFILL DIFFERENTIAL SHALL NOT EXCEED 24 INCHES OR 1/3 THE SIZE OF THE PIPE, WHICHEVER IS LESS.

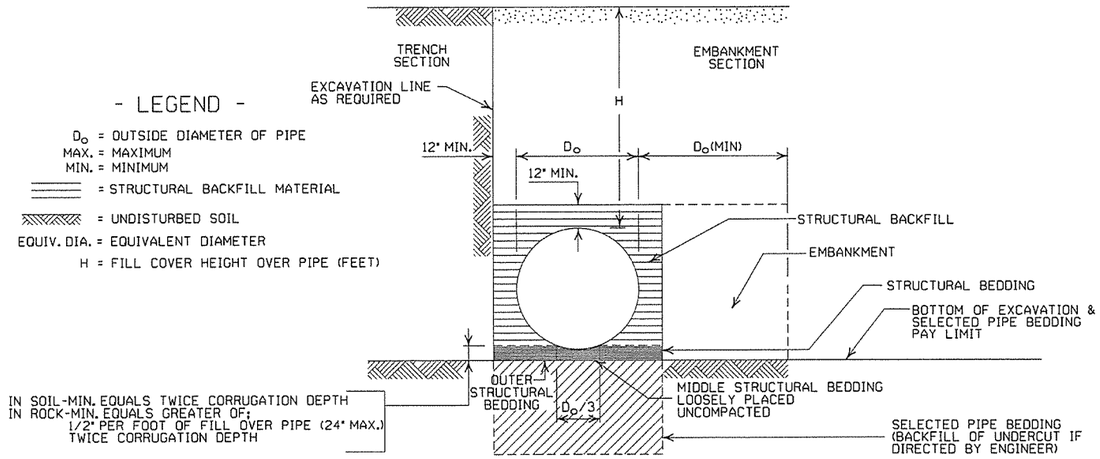
NOTE: STRUCTURAL BACKFILL AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF METAL PIPE.

INSTALLATION TYPE	MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 1	AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7)
TYPE 2	SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-4) OR TYPE 1 INSTALLATION MATERIAL ③

③ SM-3 WILL NOT BE ALLOWED.

EQUIVALENT METAL THICKNESSES AND GAUGES

METAL THICKNESS IN INCHES			GAUGE NUMBER
STEEL			
ZINC COATED	UNCOATED	ALUMINUM	
0.064	0.0598	0.060	16
0.079	0.0747	0.075	14
0.109	0.1046	0.105	12
0.138	0.1345	0.135	10
0.168	0.1644	0.164	8



EMBANKMENT AND TRENCH INSTALLATIONS

1. STRUCTURAL BACKFILL, EMBANKMENT, AND OUTER STRUCTURAL BEDDING MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.
2. INSTALLATION TYPE 1 OR 2 MAY BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE (ROUND).
3. INSTALALTION TYPE 1 SHALL BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE ARCHES WITH 2⅔" X ½" CORRUGATION.
4. INSTALLATION TYPE 1 OR 2 MAY BE USED FOR CORRUGATED STEEL OR ALUMINUM PIPE ARCHES WITH 3" X 1" OR 5" X 1" CORRUGATION.

GENERAL NOTES

1. METAL PIPE CULVERT CONSTRUCTION SHALL CONFORM TO ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION), WITH APPLICABLE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS. UNLESS OTHERWISE NOTED IN THE PLANS, SECTION AND SUBSECTION REFER TO THE STANDARD CONSTRUCTION SPECIFICATIONS.
2. METAL PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. METAL PIPE CULVERT MATERIALS AND INSTALLATIONS SHALL CONFORM TO SECTION 606 AND JOB SPECIAL PROVISION "METAL PIPE".
4. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
5. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 24 INCHES. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
6. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 24 INCHES BETWEEN STRINGS OF PIPE. REFER TO STD. DWG. FES-2 FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
7. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
8. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS "STRUCTURAL BEDDING" ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS "SELECTED PIPE BEDDING."
9. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED AS STRUCTURAL BACKFILL), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF "SELECTED PIPE BACKFILL."

① FOR MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM 12" OF PAVEMENT AND/OR BASE.

② WHERE THE STANDARD 2 2/3"x ½" CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A PIPE OF THE SAME DIAMETER WITH A 3" x 1" OR 5" x 1" CORRUGATION MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAUGE AND CORRUGATION.

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REVISED FOR LRFD DESIGN SPECS	
3-30-00	REVISED INSTALLATIONS	
11-06-97	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

METAL PIPE CULVERT FILL HEIGHTS & BEDDING

STANDARD DRAWING PCM-1

INSTALLATION TYPE	•• MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	•SELECTED MATERIALS (CLASS SM-1, SM-2 OR SM-4)

• AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL.

SM3 WILL NOT BE ALLOWED.

•• STRUCTURAL BEDDING MATERIAL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 1 INCH. STRUCTURAL BACKFILL MATERIAL SHALL BE FREE OF ORGANIC MATERIAL, STONES LARGER THAN 1.50 INCH IN GREATEST DIMENSION, OR FROZEN LUMPS.

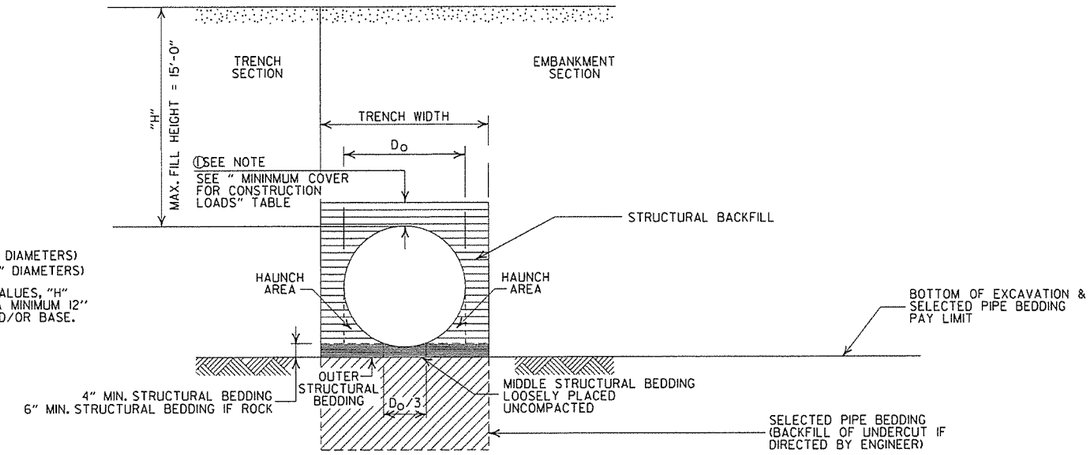
STRUCTURAL BACKFILL AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF HDPE PIPE.

MINIMUM TRENCH WIDTH BASED ON FILL HEIGHT "H"

PIPE DIAMETER	TRENCH WIDTH (FEET) "H" < 10'-0"	TRENCH WIDTH (FEET) "H" >OR= 10'-0"
18"	4'-6"	4'-6"
24"	5'-0"	6'-0"
30"	5'-6"	7'-6"
36"	6'-0"	9'-0"
42"	7'-0"	10'-6"
48"	8'-0"	12'-0"

①NOTE:
18" MIN. (18" - 30" DIAMETERS)
24" MIN. (36" - 48" DIAMETERS)

MINIMUM COVER VALUES, "H" SHALL INCLUDE A MINIMUM 12" OF PAVEMENT AND/OR BASE.



TYPE 2 EMBANKMENT AND TRENCH INSTALLATIONS

1. STRUCTURAL BACKFILL, EMBANKMENT, AND OUTER STRUCTURAL BEDDING MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

MULTIPLE INSTALLATION OF HIGH DENSITY POLYETHYLENE PIPES

PIPE DIAMETER	CLEAR DISTANCE BETWEEN PIPES
18"	1'-6"
24"	2'-0"
30"	2'-6"
36"	3'-0"
42"	3'-6"
48"	4'-0"

MINIMUM COVER FOR CONSTRUCTION LOADS

PIPE DIAMETER	② MIN. COVER (FEET) FOR INDICATED CONSTRUCTION LOADS 18.0-50.0 (KIPS)	50.0-75.0 (KIPS)	75.0-110.0 (KIPS)	110.0-175.0 (KIPS)
36" OR LESS	2'-0"	2'-6"	3'-0"	3'-0"
42" OR GREATER	3'-0"	3'-0"	3'-6"	4'-0"

②MINIMUM COVER SHALL BE MEASURED FROM TOP OF PIPE TO TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE. THE SURFACE SHALL BE MAINTAINED.

CONSTRUCTION SEQUENCE

1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. THE STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE LAYERS SHALL BE BROUGHT UP EVENLY AND SIMULTANEOUSLY TO THE ELEVATION OF THE MINIMUM COVER.
5. PIPE INSTALLATION MAY REQUIRE THE USE OF RESTRAINTS, WEIGHTING OR OTHER APPROVED METHODS IN ORDER TO HELP MAINTAIN GRADE AND ALIGNMENT.

GENERAL NOTES

1. PIPE SHALL CONFORM TO AASHTO M294, TYPE S. INSTALLATION SHALL CONFROM TO JOB SPECIAL PROVISION "PLASTIC PIPE" AND SECTION 606 OF THE STANDARD SPECIFICIATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION).
2. PLASTIC PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PLUS A SUFFICIENT WIDTH TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIAL.
4. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
5. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS "STRUCTURAL BEDDING" ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS "SELECTED PIPE BEDDING."
6. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS STRUCTURAL BACKFILL), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF "SELECTED PIPE BACKFILL."
7. FOR PIPE TYPES THAT ARE NOT SMOOTH ON THE OUTSIDE (CORRUGATED OR PROFILE WALLS), BACKFILL GRADATIONS SHOULD BE SELECTED THAT WILL PERMIT THE FILLING OF THE CORRUGATION OR PROFILE VALLEY.
8. HIGH DENSITY POLYETHYLENE PIPES OF DIAMETERS OTHER THAN SHOWN WILL NOT BE ALLOWED.
9. JOINTS FOR HDPE PIPE SHALL MEET THE REQUIREMENTS FOR SOIL TIGHTNESS AS SPECIFIED IN AASHTO SECTION 26.4.2.4 AND 30.4.2 "AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS." JOINTS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

- LEGEND -

H = FILL HEIGHT (FT.)
Ø = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM

= STRUCTURAL BACKFILL MATERIAL

= UNDISTURBED SOIL

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REVISED GENERAL NOTES & MINIMUM COVER NOTE	
11-17-10	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

PLASTIC PIPE CULVERT (HIGH DENSITY POLYETHYLENE)

STANDARD DRAWING PCP-1

INSTALLATION TYPE	•• MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	•SELECTED MATERIALS (CLASS SM-1, SM-2, OR SM-4)

• AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL.

SM3 WILL NOT BE ALLOWED.

•• STRUCTURAL BEDDING MATERIAL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 1 INCH. STRUCTURAL BACKFILL MATERIAL SHALL BE FREE OF ORGANIC MATERIAL, STONES LARGER THAN 1.50 INCH IN GREATEST DIMENSION, OR FROZEN LUMPS.

STRUCTURAL BACKFILL AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF PVC PIPE.

MINIMUM TRENCH WIDTH BASED ON FILL HEIGHT "H"

PIPE DIAMETER	TRENCH WIDTH (FEET)	
	"H" < 10'-0"	"H" >OR= 10'-0"
18"	4'-6"	4'-6"
24"	5'-0"	6'-0"
30"	5'-6"	7'-6"
36"	6'-0"	9'-0"

MULTIPLE INSTALLATION OF PVC PIPES

PIPE DIAMETER	CLEAR DISTANCE BETWEEN PIPES
18"	1'-6"
24"	2'-0"
30"	2'-6"
36"	3'-0"

MAXIMUM FILL HEIGHT BASED ON STRUCTURAL BACKFILL

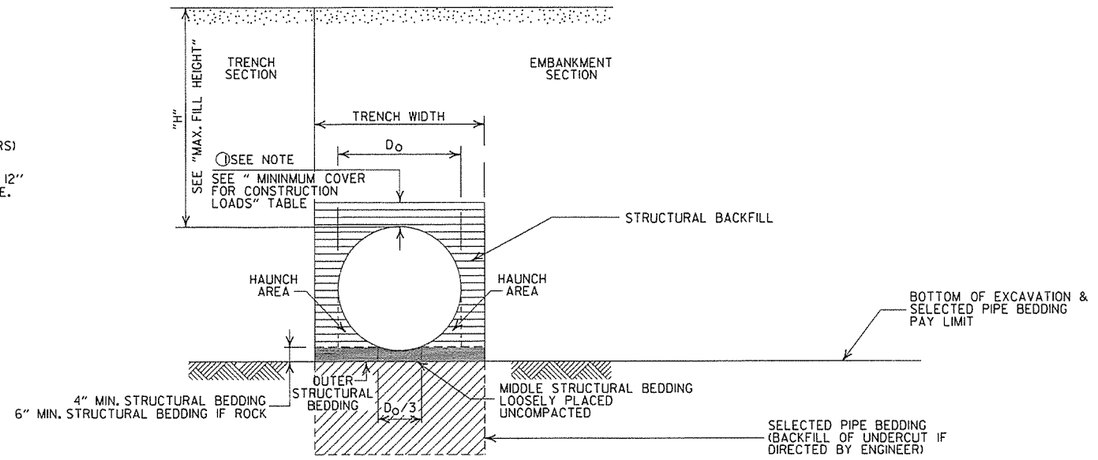
PIPE DIAMETER	"H"
18"	45'-0"
24"	45'-0"
30"	40'-0"
36"	40'-0"

① NOTE:
12" MIN. (18" - 36" DIAMETERS)
MINIMUM COVER VALUE, "H" SHALL INCLUDE A MINIMUM 12" OF PAVEMENT AND/OR BASE.

MINIMUM COVER FOR CONSTRUCTION LOADS

PIPE DIAMETER	② MIN. COVER (FEET) FOR INDICATED CONSTRUCTION LOADS			
	18.0-50.0 (KIPS)	50.0-75.0 (KIPS)	75.0-110.0 (KIPS)	110.0-175.0 (KIPS)
18" THRU 36"	2'-0"	2'-6"	3'-0"	3'-0"

②MINIMUM COVER SHALL BE MEASURED FROM TOP OF PIPE TO TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE. THE SURFACE SHALL BE MAINTAINED.



TYPE 2 EMBANKMENT AND TRENCH INSTALLATIONS

1. STRUCTURAL BACKFILL, EMBANKMENT, AND OUTER STRUCTURAL BEDDING MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

CONSTRUCTION SEQUENCE

1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. THE STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE LAYERS SHALL BE BROUGHT UP EVENLY AND SIMULTANEOUSLY TO THE ELEVATION OF THE MINIMUM COVER.
5. PIPE INSTALLATION MAY REQUIRE THE USE OF RESTRAINTS, WEIGHTING OR OTHER APPROVED METHODS IN ORDER TO HELP MAINTAIN GRADE AND ALIGNMENT.

GENERAL NOTES

1. PIPE SHALL CONFORM TO ASTM F949, CELL CLASS 12454. INSTALLATION SHALL CONFROM TO JOB SPECIAL PROVISION "PLASTIC PIPE" AND SECTION 606 OF THE STANDARD SPECIFICIATIONS FOR HIGHWAY CONSTRUCTION (CURRENT EDITION).
2. PLASTIC PIPE CULVERT DESIGN SHALL CONFORM TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION (2010) WITH 2010 INTERIMS.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PLUS A SUFFICIENT WIDTH TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIAL.
4. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
5. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS "STRUCTURAL BEDDING" ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS "SELECTED PIPE BEDDING."
6. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS STRUCTURAL BACKFILL), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF "SELECTED PIPE BACKFILL."
7. FOR PIPE TYPES THAT ARE NOT SMOOTH ON THE OUTSIDE (CORRUGATED OR PROFILE WALLS), BACKFILL GRADATIONS SHOULD BE SELECTED THAT WILL PERMIT THE FILLING OF THE CORRUGATION OR PROFILE VALLEY.
8. PVC PIPES OF DIAMETERS OTHER THAN SHOWN WILL NOT BE ALLOWED.
9. JOINTS FOR PVC PIPE SHALL MEET THE REQUIREMENTS FOR SOIL TIGHTNESS AS SPECIFIED IN AASHTO SECTION 26.4.2.4 AND 30.4.2 "AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS." JOINTS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

- LEGEND -

H = FILL HEIGHT (FT.)
D_O = OUTSIDE DIAMETER OF PIPE
MAX. = MAXIMUM
MIN. = MINIMUM

= STRUCTURAL BACKFILL MATERIAL

= UNDISTURBED SOIL

DATE	REVISION	DATE FILMED
2-27-14	REVISED GENERAL NOTE 1.	
12-15-11	REV GENERAL NOTES & MINIMUM COVER NOTE; DELETED SM3 MATERIAL	
11-17-10	ISSUED	

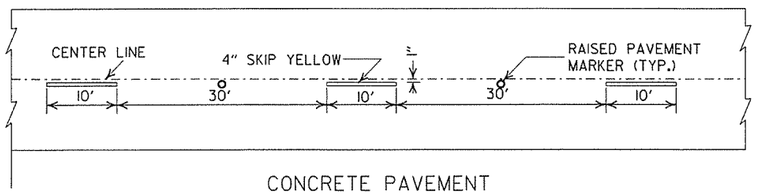
ARKANSAS STATE HIGHWAY COMMISSION

PLASTIC PIPE CULVERT (PVC F949)

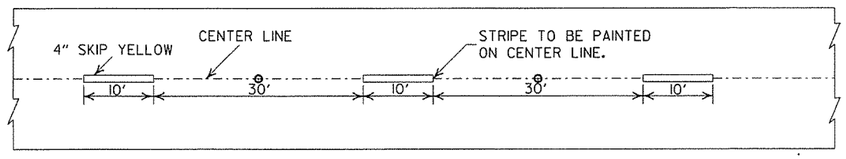
STANDARD DRAWING PCP-2

NOTES:

1. ALL LINES SHALL HAVE A WIDTH OF 4 INCHES.
2. THE THICKNESS AND RATE OF PAINT APPLICATION SHALL BE AS SPECIFIED IN SECTION 718 OF THE STANDARD SPECIFICATIONS.
3. THIS DRAWING SHALL BE USED IN CONJUNCTION WITH THE LATEST REVISED ADDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
4. RAISED PAVEMENT MARKERS SHALL BE CENTERED BETWEEN SKIP LINES ON 40 FEET SPACING UNLESS OTHERWISE SHOWN ON THE PLANS.

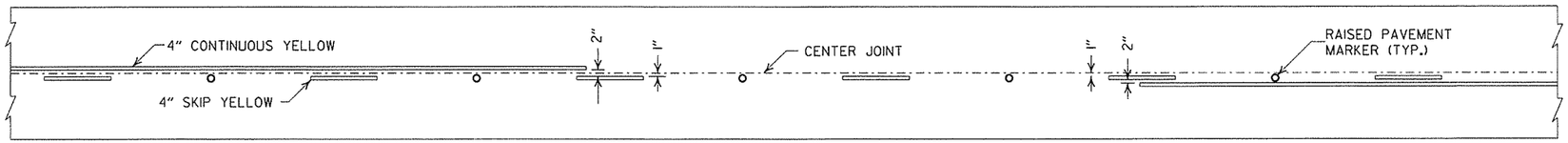


CONCRETE PAVEMENT

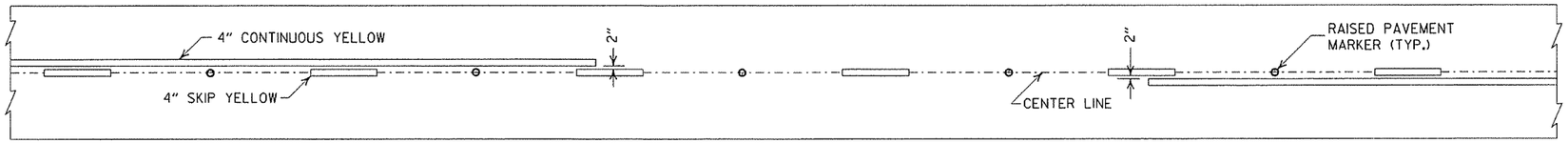


ASPHALT PAVEMENT

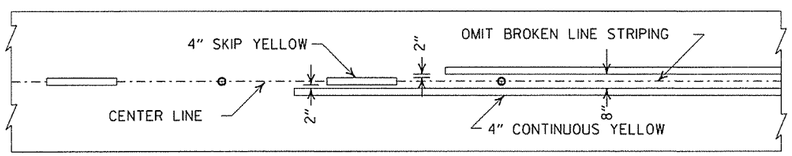
BROKEN LINE STRIPING



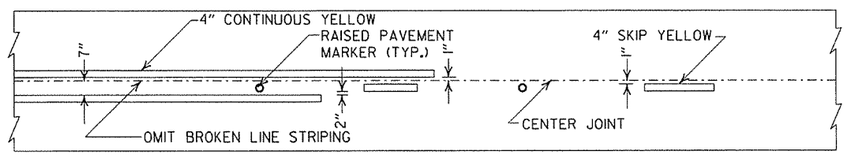
SOLID LINE STRIPING ON CONCRETE PAVEMENT



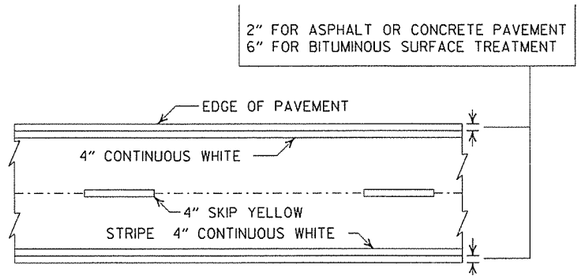
SOLID LINE STRIPING ON ASPHALT PAVEMENT



ASPHALT PAVEMENT

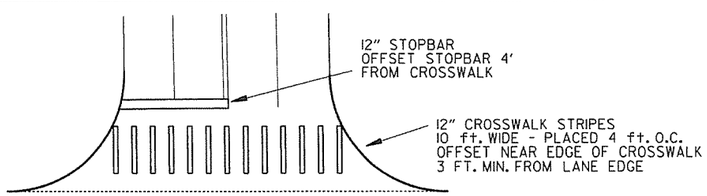


CONCRETE PAVEMENT

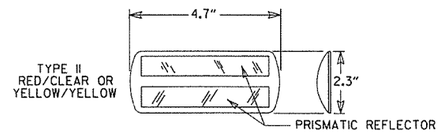


PAVEMENT EDGE LINE MARKING

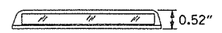
STRIPING AT ADJACENT NO PASSING LANES



CROSSWALK AND STOPBAR DETAILS



NOTE:
THE RED LENS OF THE TYPE II R.P.M. SHALL FACE THE INCORRECT TRAFFIC MOVEMENT.



DETAIL OF STANDARD RAISED PAVEMENT MARKERS

GENERAL NOTES:

THIS DRAWING SHOULD BE CONSIDERED AS TYPICAL ONLY AND THE FINAL LOCATION OF THE STRIPING AND RAISED PAVEMENT MARKERS SHALL BE DETERMINED BY THE ENGINEER.

THIS DRAWING SHOULD BE USED IN CONJUNCTION WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST REVISION.

NOTE:
DIMENSIONS SHOWN FOR RAISED PAVEMENT MARKERS ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR MARKERS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR SIMILAR MARKERS MAY BE MADE BY REFERRING TO THE AHTD QUALIFIED PRODUCTS LIST.

DATE	REVISION	FILMED
9-12-13	REVISED DETAIL OF STANDARD RAISED PAVEMENT MARKERS	
11-17-10	REVISED GENERAL NOTES & REMOVED PLOWABLE PVMT MRKRS	
11-18-04	REVISED NOTE 2 & GENERAL NOTES	
8-22-02	ADDED CROSSWALK & STOPBAR DTLS.	
7-02-98	ADDED DETAILS OF STD. RAISED PAV'T. MARKERS	
4-26-96	REV. NOTES 3&4; ADDED R.P.M.	
9-30-80	DRAWN	1-9-30-80

ARKANSAS STATE HIGHWAY COMMISSION

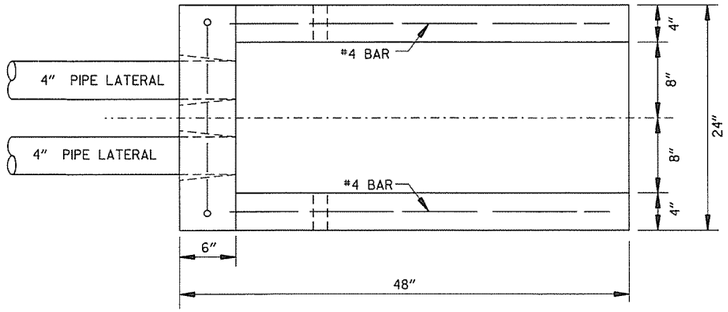
PAVEMENT MARKING DETAILS

STANDARD DRAWING PM-1

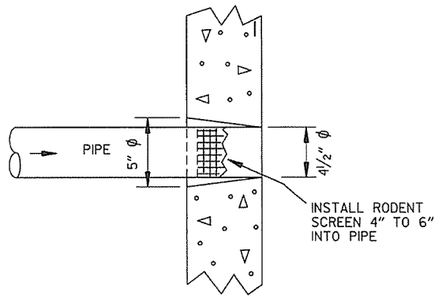
NOTE:
1. GRANULAR BACKFILL TO BE SUBSIDIARY TO PIPE UNDERDRAIN.

2. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE UNDERDRAIN COVER SHALL BE THOROUGHLY COMPACTED EARTH AND SHALL BE SUBSIDIARY TO PIPE UNDERDRAIN.

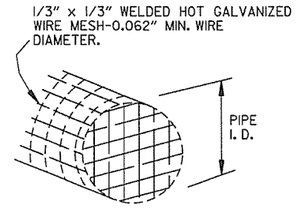
3. GRANULAR MATERIAL SHALL BE WRAPPED WITH GEOTEXTILE FABRIC. LAP FABRIC 12" OR THE WIDTH OF THE TRENCH AT THE TOP.



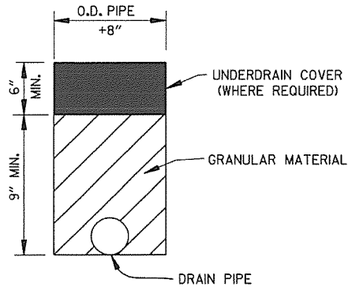
PLAN VIEW

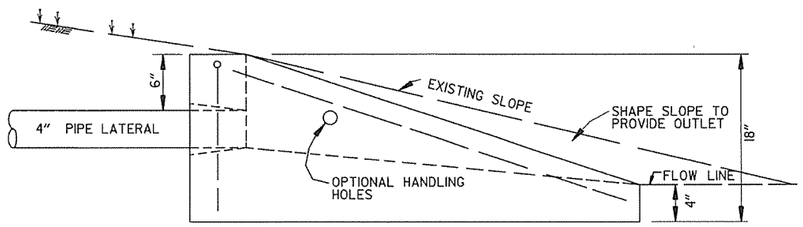


DETAIL OF HOLE FOR 4" PIPE

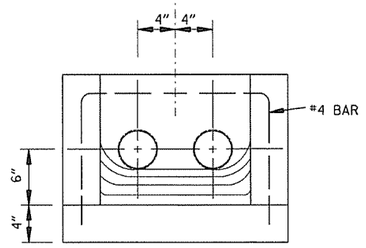


DETAIL OF RODENT SCREEN

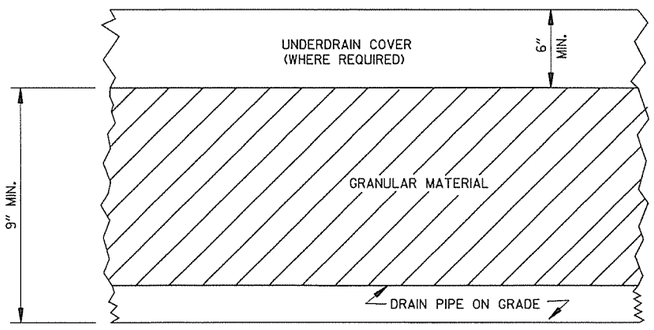




SIDE VIEW

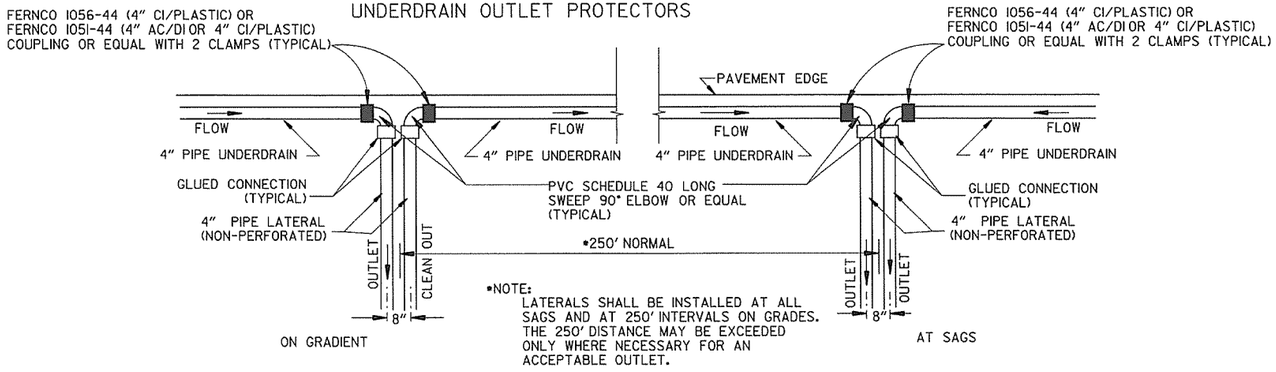


FRONT VIEW



DETAILS OF PIPE UNDERDRAIN

UNDERDRAIN OUTLET PROTECTORS



•NOTE:
LATERALS SHALL BE INSTALLED AT ALL SAGS AND AT 250' INTERVALS ON GRADES. THE 250' DISTANCE MAY BE EXCEEDED ONLY WHERE NECESSARY FOR AN ACCEPTABLE OUTLET.

DETAIL OF PIPE UNDERDRAIN LATERALS WHEN PLACED ALONG PAVEMENT EDGE

NOTE: PVC PIPE FOR LATERALS SHALL MEET THE REQUIREMENTS OF ASTM D 1785 (LATEST REVISION) FOR SCHEDULE 40 PIPE.

DATE	REVISION	DATE FILMED
4-10-03	REVISED NOTE 3	
1-12-00	REVISED DETAIL OF UNDERDRAIN LATERALS	
11-18-98	REVISED NOTE	
10-18-96	REVISED MIN. DEPTH & GEOTEXTILE FABRIC	
4-26-96	ADDED LATERAL NOTE; 5½" TO 5"	
11-22-95	REVISED LATERALS	
7-20-95	REVISED LATERALS & ADDED NOTE	
11- 3-94	REVISED FOR DUAL LATERALS	11- 3-94
10- 1-92	SUBSTITUTED GEOTEXTILE	10- 1-92
8-15-91	ADDED POLYEDTHYLENE PIPE	8-15-91
11- 8-90	DELETED ALTERNATE NOTE	11- 8-90
1-25-90	ADDED 4" SNAP ADAPTER	1-25-90
11-30-89	DEL. (SUBGRADE); ADDED (WHERE REQUIRED)	11-30-89
7-15-88	ISSUED P.L.M.	647-7-15-88

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF PIPE UNDERDRAIN

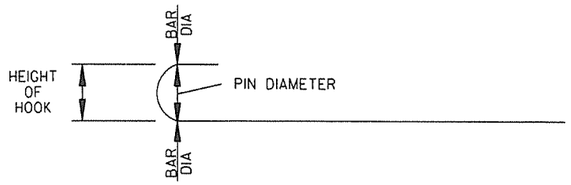
STANDARD DRAWING PU-1

7-20-95 INSTD.PUI

STEEL FABRICATION: REINFORCING STEEL FABRICATION SHALL CONFORM TO THE DIMENSIONS LISTED IN THE TABLE BELOW:

BAR SIZE	PIN DIAMETER	HOOK EXTENSION "K"
3	2¼"	4"
4	3 "	4½"
5	3¾"	5"
6	4½"	6"
7	5¼"	7"
8	6"	8"

IF THE OVERALL HEIGHT OF THE HOOK (SEE DIAGRAM BELOW) FOR A "b", "b1", "b2" or "b3" BENT BAR IS GREATER THAN THE CORRESPONDING TOP OR BOTTOM SLAB THICKNESS, LESS 2¾ INCHES, EACH BENT BAR SHALL BE REPLACED WITH ONE HOOKED BAR AND ONE STRAIGHT BAR, USING LENGTHS AS SHOWN IN THE TABLE BELOW. THE TWO BARS SHALL BE THE SAME DIAMETER AS, AND PLACED AT THE SAME SPACING AS, THE "b", "b1", "b2" OR "b3" BENT BARS THEY REPLACE.



NOTE: DIMENSIONS OF BARS ARE MEASURED OUT TO OUT OF BARS.

OVERALL HEIGHT OF HOOKED BAR DIAGRAM

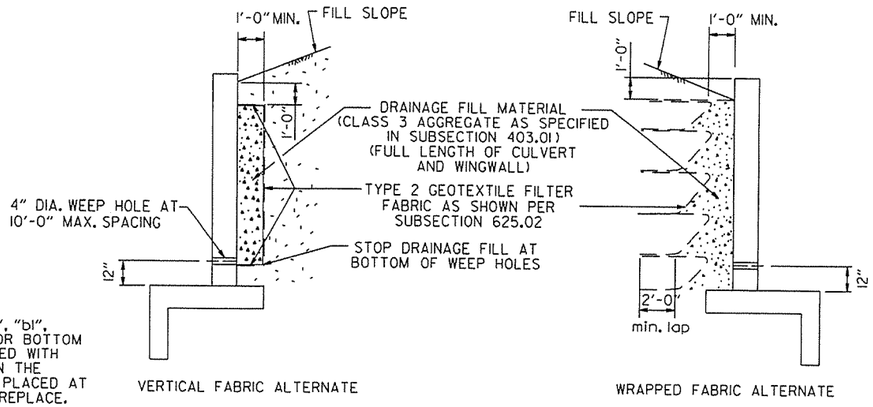
THE HOOKED BARS SHALL BE PLACED IN THE BOTTOM OF THE TOP SLAB AND THE TOP OF THE BOTTOM SLAB. THE STRAIGHT BARS SHALL BE PLACED IN THE TOP OF THE TOP SLAB AND THE BOTTOM OF THE BOTTOM SLAB. SEE TABLE BELOW FOR LENGTHS OF REPLACEMENT HOOKED AND STRAIGHT BARS.

FOR SKEWED CULVERTS, THE REPLACEMENT STRAIGHT BAR MAY HAVE TO BE CUT IN FIELD TO FIT.

REPLACEMENT BAR LENGTHS TABLE

BAR SIZE: "b", "b1", "b2" OR "b3"	LENGTH OF HOOKED BAR	LENGTH OF STRAIGHT BAR
#4	L + 1' - 0"	SEE "c" BAR LENGTH
#5	L + 1' - 2"	SEE "c" BAR LENGTH
#6	L + 1' - 4"	SEE "c" BAR LENGTH
#7	L + 1' - 8"	SEE "c" BAR LENGTH
#8	L + 1' - 10"	SEE "c" BAR LENGTH
#9	L + 2' - 6"	SEE "c" BAR LENGTH

L = "OW" - 3 INCHES



WINGWALL & CULVERT DRAINAGE DETAIL

REINFORCED CONCRETE BOX CULVERT GENERAL NOTES

CONCRETE SHALL BE CLASS S WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3500 PSI.

REINFORCING STEEL SHALL BE AASHTO M 31 OR M 53, GRADE 60.

CONSTRUCTION AND MATERIALS FOR WINGWALL & CULVERT DRAINAGE, INCLUDING WEEP HOLES AND GRANULAR MATERIAL, SHALL BE SUBSIDIARY TO THE BID ITEM, "CLASS S CONCRETE".

MEMBRANE WATERPROOFING SHALL CONFORM TO THE REQUIREMENTS OF SECTION 815 OF THE STANDARD SPECIFICATIONS.

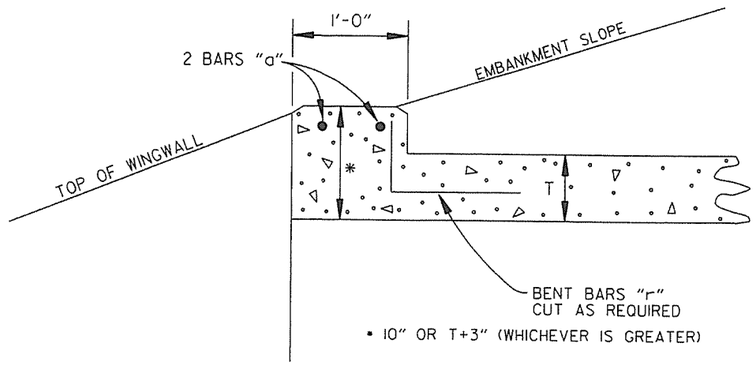
MEMBRANE WATERPROOFING SHALL BE APPLIED TO ALL CONSTRUCTION JOINTS IN THE TOP SLAB AND THE SIDEWALLS OF R.C. BOX CULVERTS AS DIRECTED BY THE ENGINEER. NO PAYMENT SHALL BE MADE FOR THIS ITEM, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS BID FOR THE R.C. BOX CULVERT.

REINFORCING STEEL TOLERANCES: THE TOLERANCES FOR REINFORCING STEEL SHALL MEET THOSE LISTED IN "MANUAL OF STANDARD PRACTICE" PUBLISHED BY CONCRETE REINFORCING STEEL INSTITUTE (CRSI) EXCEPT THAT THE TOLERANCE FOR TRUSS BARS SUCH AS FIGURE 3 ON PAGE 7-4 OF THE CRSI MANUAL SHALL BE MINUS ZERO TO PLUS ½ INCH.

WEEP HOLES IN BOX CULVERT WALLS SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 10'-0" AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND SHALL BE PLACED 12" ABOVE THE TOP OF THE BOTTOM SLAB.

WEEP HOLES IN WINGWALLS SHALL HAVE A MAXIMUM HORIZONTAL SPACING OF 10'-0" AND SHALL BE SPACED TO CLEAR ALL REINFORCING STEEL. THERE SHALL BE A MINIMUM OF TWO (2) WEEP HOLES IN EACH WINGWALL. THE DRAIN OPENING SHALL BE 4" DIAMETER AND SHALL BE PLACED 12" ABOVE THE TOP OF THE WINGWALL FOOTING.

THE REQUIREMENTS SHOWN ON THIS DRAWING SHALL SUPERCEDE THE CORRESPONDING REQUIREMENTS ON ALL REINFORCED CONCRETE BOX CULVERT STANDARD DRAWINGS.



NOTE: FOR ALL SKEWED R.C. BOX CULVERTS THE LENGTH "K" OF THE MODIFIED HEADWALL SHALL BE EQUAL TO THE ROADWAY LENGTH "RL". THE ENDS OF THE HEADWALL SHALL BE CONSTRUCTED PARALLEL TO THE SKEW ANGLE OF THE BOX CULVERT.

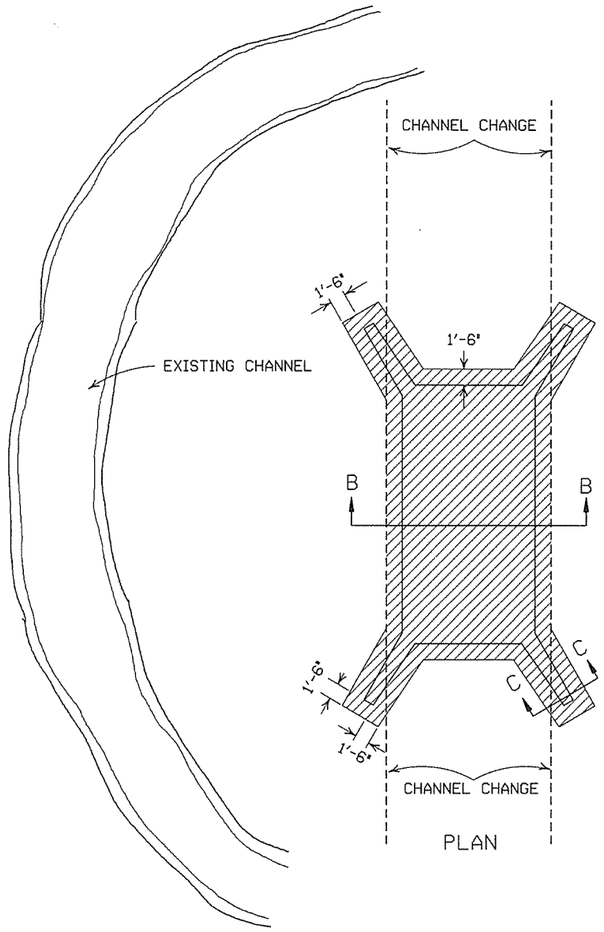
R.C. BOX CULVERT HEADWALL MODIFICATIONS

DATE	REVISION	DATE FILMED
7/26/12	REV. DRAINAGE FILL MATERIAL & DETAIL	
12/15/11	REQUIRE WEEP HOLES IN BOX CULVERT WALLS	
5-25-06	REV. GEN. NOTES AND DETAILS FOR WEEP HOLES; BAR DIAGRAM	
11-16-01	ADDED WINGWALL DRAINAGE DETAIL/EDITED GEN. NOTES	
10-18-96	REV. ASTM REF. TO AASHTO & ADDED BAR DIAGRAM	
10-12-95	MOVED SOLID SODDING DETAIL TO RCB-2	
6-2-94	ADDED SOLID SODDING PLAN DETAIL	
8-5-93	REVISED PIN DIAMETER TO SPECS.	
8-15-91	DRAWN AND ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

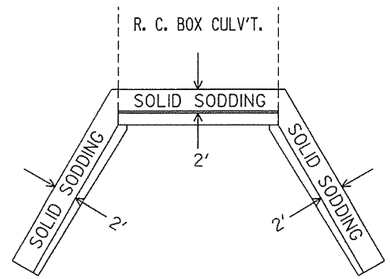
REINFORCED CONCRETE BOX CULVERT DETAILS

STANDARD DRAWING RCB-1



PLAN

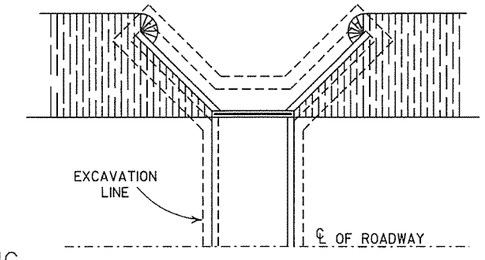
SOLID SODDING



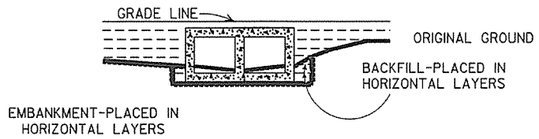
PLAN

PARTIAL SECTION SHOWING SOLID SODDING AT HEADWALLS AND WING WALLS

NOTE: LENGTH MEASURED ALONG THE CENTER OF 2' STRIP OF SOLID SODDING.

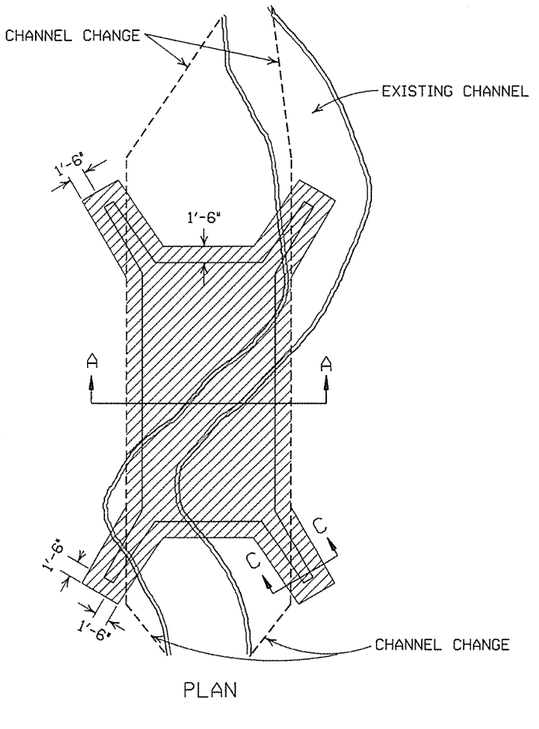


PLAN

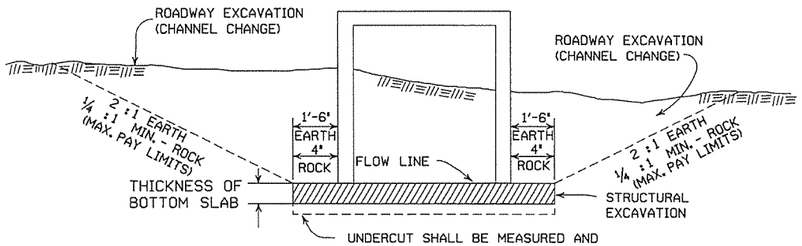


LONGITUDINAL SECTION

BACKFILL DETAILS FOR BOX CULVERT

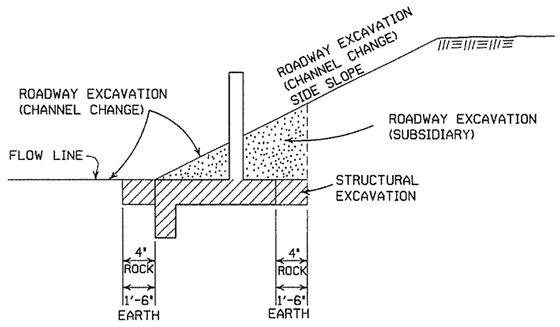


PLAN

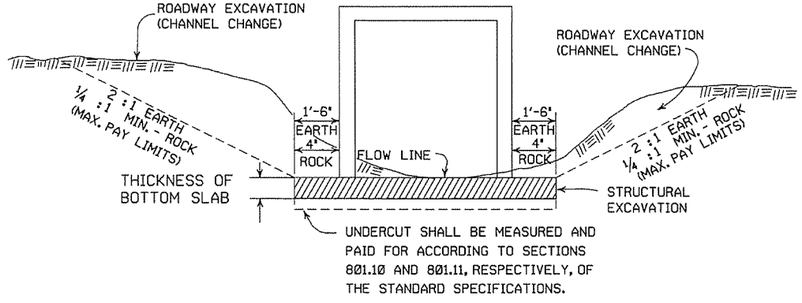


SECTION B-B

DETAILS FOR NEW CHANNELS



SECTION C-C



SECTION A-A

DETAILS THROUGH EXISTING CHANNELS

GENERAL NOTES:

ROADWAY EXCAVATION (CHANNEL CHANGE) WILL BE PAID FOR AT R.C. BOX CULVERT LOCATIONS. IT WILL BE PAID TO THE LIMITS ACTUALLY CUT AND WILL BE CONFINED TO THAT PORTION OF THE INDICATED AREA THAT IS ABOVE THE FLOW LINE. ROADWAY EXCAVATION (CHANNEL CHANGE) SHALL BE MEASURED BY CROSS SECTIONS AND VOLUMES COMPUTED BY AVERAGE END AREA METHOD. ALL CHANNEL CHANGES SHALL BE BROUGHT TO GRADE PRIOR TO MAKING ANY EXCAVATION FOR STRUCTURES.

EXCAVATION FOR STRUCTURES WILL BE PAID FOR AT ALL R.C. BOX CULVERT LOCATIONS. IT WILL BE PAID TO THE LIMITS SHOWN AND SHALL BE CONFINED TO THAT PORTION OF THE INDICATED AREA THAT IS BELOW THE CHANNEL FLOW LINE.

ROADWAY EXCAVATION SHOWN IN SECTION C-C ABOVE AS SUBSIDIARY WILL NOT BE MEASURED OR PAID FOR DIRECTLY, BUT PAYMENT WILL BE CONSIDERED TO BE INCLUDED IN THE VARIOUS ITEMS OF EXCAVATION.

DATE	REVISION	FILMED
11-20-03	REVISED SECTION A-A NOTE	
8-22-02	REVISED SECTION B-B NOTE	
10-12-95	COMBINED 1891B AND 1888A	
1-4-83	REVISED GENERAL NOTES	674-1-4-83
	AND ADDED MAXIMUM PAY	
	LIMIT NOTES.	
2-2-76	EXCAV. PAY LIMITS	917-2-2-76
10-2-72	REVISED AND REDRAWN	564-10-16-72

ARKANSAS STATE HIGHWAY COMMISSION

EXCAVATION PAY LIMITS, BACKFILL, & SOLID SODDING FOR BOX CULVERTS

STANDARD DRAWING RCB-2

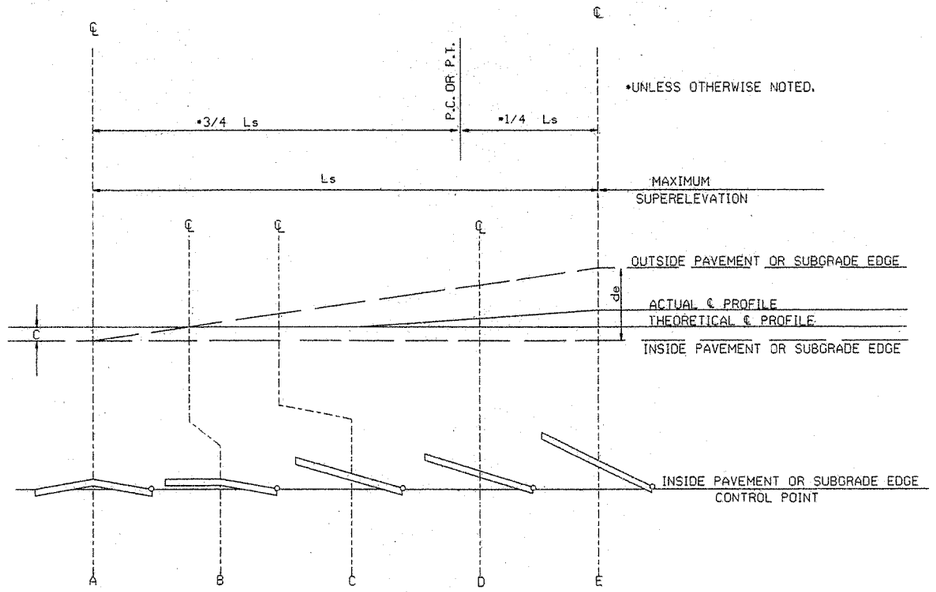
SUPERELEVATION TABLE FOR TWO - WAY TRAFFIC

DEGREE OF CURVE	30 MPH e	30 MPH Ls (FT) MINIMUM	30 MPH Ls (FT) DESIRABLE	40 MPH e	40 MPH Ls (FT) MINIMUM	40 MPH Ls (FT) DESIRABLE	50 MPH e	50 MPH Ls (FT) MINIMUM	50 MPH Ls (FT) DESIRABLE	55 MPH e	55 MPH Ls (FT) MINIMUM	55 MPH Ls (FT) DESIRABLE	60 MPH e	60 MPH Ls (FT) MINIMUM	60 MPH Ls (FT) DESIRABLE	70 MPH e	70 MPH Ls (FT) MINIMUM	70 MPH Ls (FT) DESIRABLE
0° 15'	N.C.			N.C.			N.C.			N.C.			N.C.			N.C.		
0° 30'	N.C.			N.C.			N.C.			N.C.			N.C.			N.C.		
0° 45'	N.C.			N.C.			R.C.			0.022			0.023			0.028		
1° 00'	N.C.			N.C.			0.021			0.026			0.030			0.037	275	300
1° 15'	N.C.			R.C.			0.026			0.032			0.037	250	300	0.046		
1° 30'	N.C.			0.021			0.031	200		0.037	225		0.043			0.054		
1° 45'	N.C.			0.025	175		0.036			0.043		300	0.049			0.062		
2° 00'	R.C.			0.028			0.040			0.048			0.055			0.070		
2° 15'	R.C.			0.031			0.045		250	0.053			0.061			0.078	300	350
2° 30'	0.021			0.034			0.049			0.058			0.067			0.085	315	
2° 45'	0.023			0.037		200	0.053			0.063			0.072			0.091	335	
3° 00'	0.025			0.040			0.057			0.067	230		0.077	260		0.096	350	
3° 15'	0.027	150		0.043			0.061			0.072	245		0.082	275		0.098	360	400
3° 30'	0.029			0.046			0.065	205		0.076	255		0.086	285		0.100	360	
3° 45'	0.031		200	0.049			0.069	215		0.080	265		0.090	295	350			
4° 00'	0.033			0.051			0.072	225		0.083	270		0.093	305				
4° 30'	0.037			0.056			0.078	240		0.087	280	350	0.096	315				
5° 00'	0.040			0.061			0.083	250		0.091	295		0.098	320				
5° 30'	0.043			0.066	185		0.088	260		0.094	300							
6° 00'	0.046			0.070	190		0.092	270	300	0.098	305							
6° 30'	0.050			0.074	200		0.095	280		0.100	315							
7° 00'	0.053			0.078	210		0.098	285										
7° 30'	0.056			0.081	215		0.099	290										
8° 00'	0.058			0.084	220	250	0.100	290										
8° 30'	0.061			0.087	225													
9° 00'	0.063			0.089	230													
10° 00'	0.068	160		0.094	235													
11° 00'	0.072	170		0.097	250													
12° 00'	0.076	175		0.099	250													
13° 00'	0.080	180		0.100	250													
14° 00'	0.083	190																
15° 00'	0.086	195																
16° 00'	0.089	200																
17° 00'	0.091	200																
18° 00'	0.093	205																
19° 00'	0.095	210																
20° 00'	0.097	215	250															
21° 00'	0.098	215																
22° 00'	0.099	215																
23° 00'	0.099	215																
24° 00'	0.100	220																

D MAX = 24° 45' | D MAX = 13° 15' | D MAX = 8° 15' | D MAX = 6° 30' | D MAX = 5° 15' | D MAX = 3° 30'

ABBREVIATIONS

NC - NORMAL CROWN
RC - REVERSE CROWN, SUPERELEVATION AT NORMAL CROWN SLOPE
e - RATE OF SUPERELEVATION (FT. PER FT.)
Ls - LENGTH OF SUPERELEVATION TRANSITION (FT.)
L - DISTANCE FROM BEGINNING OF SUPERELEVATION TRANSITION TO ANY POINT (FT.)
d - WIDTH OF PAVEMENT (FT.) OR WIDTH OF SUBGRADE (FT.)
C - NORMAL CROWN (FT.)



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND INNER SUBGRADE POINT OR INNER PAVEMENT EDGE

NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2C.

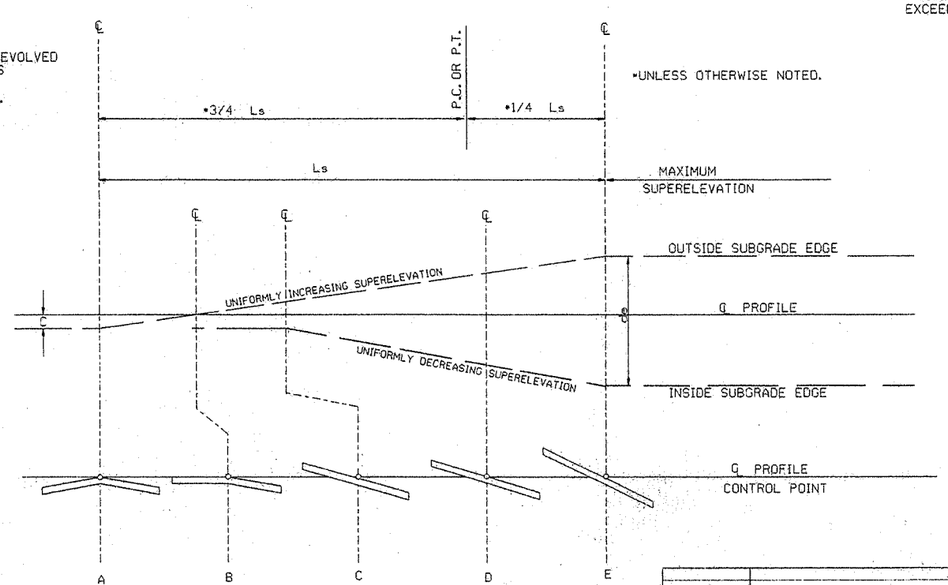
GENERAL NOTES

1. ON PAVEMENT WITH TWO-WAY TRAFFIC, THE SUPERELEVATION SHALL BE REVOLVED ON THE INSIDE PAVEMENT EDGE UNLESS OTHERWISE NOTED ON THE PLANS
2. SUPERELEVATION VALUES SHOWN ON THE CROSS SECTIONS ARE VALUES (+) OR (-) TO BE ADDED TO OR SUBTRACTED FROM THE POINT OF CONTROL.
3. LENGTHS FOR L MAY BE ROUNDED IN MULTIPLES OF 25 FT. OR 50 FT. TO PERMIT SIMPLER CALCULATIONS.
4. PAVEMENTS WIDER THAN 2 LANES SHALL HAVE ADDITIONAL TRANSITION LENGTHS AS FOLLOWS:

3 LANE UNDIVIDED - - - - - +20%
4 LANE UNDIVIDED - - - - - +50%
5 LANE UNDIVIDED - - - - - +80%
6 LANE UNDIVIDED - - - - - +100%

NOTE: MAINTAIN NORMAL CROWN ON INSIDE UNTIL SUPERELEVATION EXCEEDS 2C.

RATE OF SUPERELEVATION SHALL BE COMPUTED ON STRAIGHT LINE METHOD USING APPLICABLE Ls.



STANDARD METHOD WHEN SUPERELEVATION REVOLVES AROUND CENTER LINE

SUPERELEVATION FORMULA = $\frac{Lde}{Ls}$

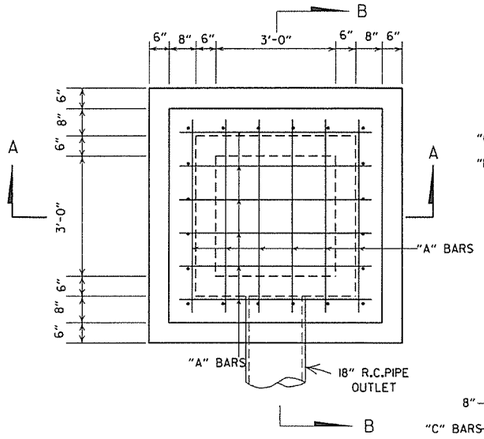
DATE	REVISION	DATE FILMED
10-18-96	ADDED FORMULA	10-18-96
01-09-87	ISSUED	534-1-9-87

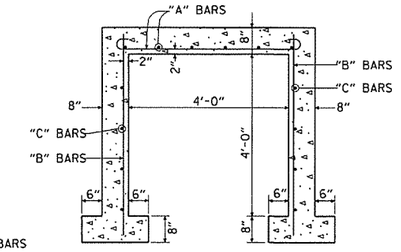
ARKANSAS STATE HIGHWAY COMMISSION

TABLES AND METHOD OF SUPERELEVATION FOR TWO-WAY TRAFFIC

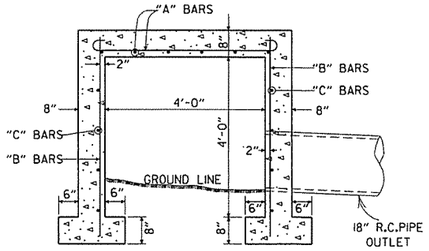
STANDARD DRAWING SE-2

FILE STDSE2.DGN





SEC A-A



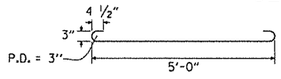
SEC B-B

NOTE: MAX FILL HEIGHT ABOVE TOP OF BOX = 13'-0".

STEEL SCHEDULE

BARS	NUMBER	LENGTH	SPACING
"A"	12	6'-0"	10"
"B"	20	5'-0"	10 ½"
"C"	16	5'-0"	12"

ALL STEEL TO BE #4 BARS



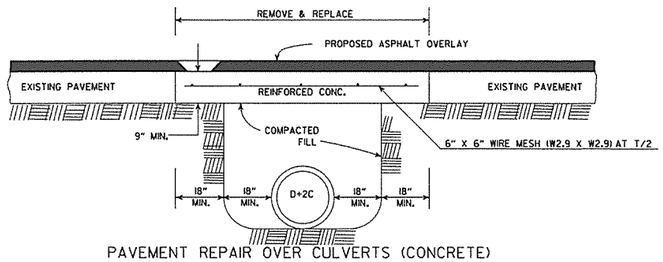
"A" BARS

QUANTITIES

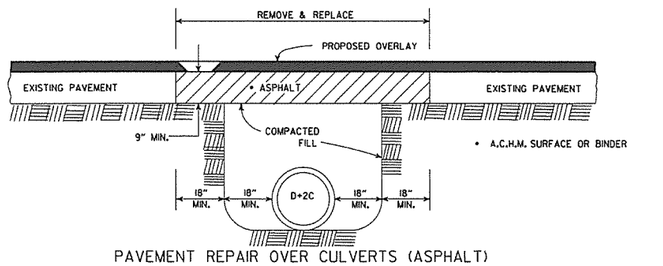
CONCRETE 3.31 CU. YDS.
REINFORCING STEEL 168 LB.

GENERAL NOTE:
THE PAY ITEMS FOR REINFORCED CONCRETE SPRING BOXES SHALL BE FOR THE QUANTITIES OF CONCRETE OF THE CLASS SPECIFIED, REINFORCING STEEL, EXCAVATION FOR STRUCTURES AND 18" R.C. PIPE CULVERT.

REINFORCED CONCRETE SPRING BOX



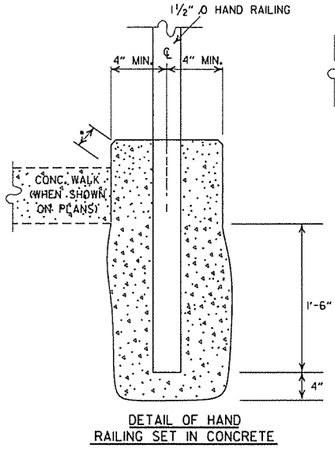
PAVEMENT REPAIR OVER CULVERTS (CONCRETE)



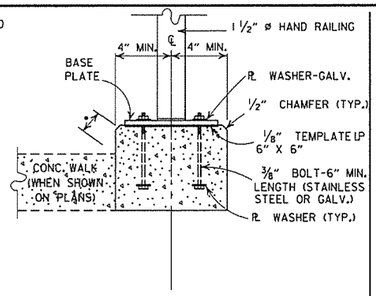
PAVEMENT REPAIR OVER CULVERTS (ASPHALT)

DETAIL SHOWING REPAIR OF EXISTING PAVEMENT AT CULVERT INSTALLATIONS

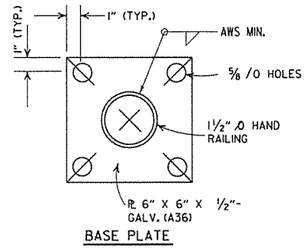
• A 2" MIN. HIGH CURB IS REQUIRED WHEN CONCRETE WALK IS ADJACENT TO THE HAND RAILING. PAYMENT FOR CURB SHALL BE CONSIDERED INCLUDED IN THE PRICE BID FOR CONCRETE WALKS.



DETAIL OF HAND RAILING SET IN CONCRETE

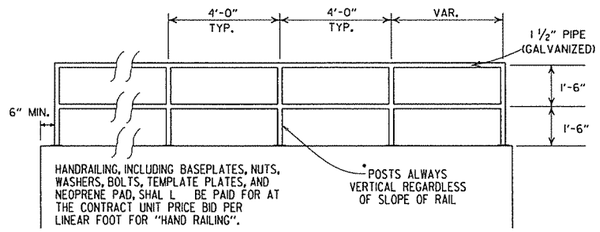


POST CONNECTION TO WALL

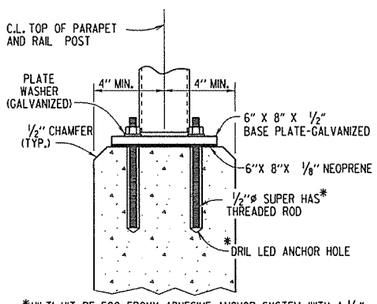


BASE PLATE

POST CONNECTION DETAILS



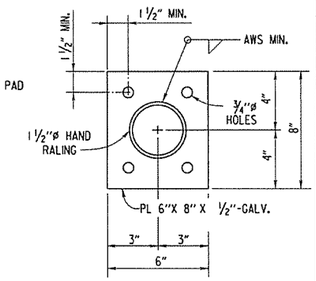
HAND RAILING SHAL L CONFORM TO SECTION 633.



*HILTI HIT RE 500 EPOXY ADHESIVE ANCHOR SYSTEM WITH 4 ½" EMBEDMENT OR APPROVED EQUAL.

THE ADHESIVE ANCHOR SYSTEM SHAL L BE INSTAL LED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

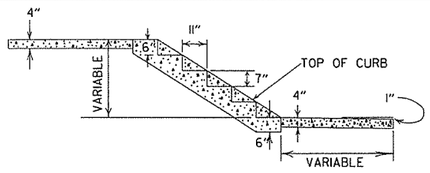
POST CONNECTION TO WALL

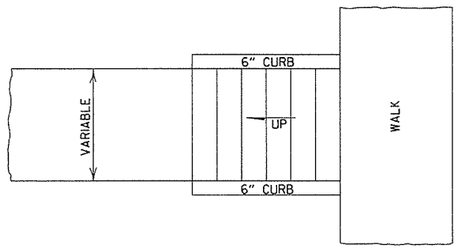


BASE PLATE

DETAILS OF ALTERNATE POST ANCHOR SYSTEM
(EPOXY ADHESIVE ANCHORS)

HAND RAILING DETAILS





GENERAL NOTES

1. RISE AND TREAD DIMENSIONS OF STEPS MAY BE VARIED AS DIRECTED BY THE ENGINEER, HOWEVER, TREAD WIDTHS SHALL BE 11" MIN. ALL STEPS IN A FLIGHT SHALL HAVE CONSISTENT TREAD & RISER DIMENSIONS.
2. 1" TRANSVERSE EXPANSION JOINTS SHALL BE PLACED IN CONCRETE WALKS AT 45' INTERVALS.

DETAILS OF CONCRETE STEPS & WALKS

DATE	REVISION	DATE FILMED
9-12-13	REVISED REINFORCED CONCRETE SPRING BOX	
7-26-12	REMOVED RETAINING WALL DETAILS & REVISED HAND RAILING DETAILS	
4-17-08	REV. JOINT & FOOTING STEP DETAILS	
11-29-07	REVISED RETAINING WALL DRAINAGE	
5-25-06	REVISED PVMT REPAIR OVER CULVERTS (CONC); REVISED REINFORCED CONC SPRING BOX	
10-9-03	REVISED PIPE RAILING DETAILS TO HAND RAILING DETAILS	
4-10-03	REVISED RETAINING WALL DRAWING	
8-22-02	ADDED HAND RAILING DETAIL	
11-16-01	REVISED PVMT REPAIR OVER CULVERTS (CONC); CORRECTED SPELLING IN GENERAL NOTES	
11-18-98	ADDED GENERAL NOTES TO CONCRETE STEPS & WALKS	
7-02-98	ENLARGED PIPE	
4-03-97	ADDED NOTE TO STEEL BAR SCHED.	
10-18-96	CORRECTED SPELLING	
4-26-96	ADD WEEP HOLE;REV. JOINT SPACING IN RET. WALL	
6-2-94	CHANGED CONST. TO CONTRACTION JOINT	
10-1-92	CHANGED MESH FABRIC TO WIRE MESH	10-1-92
8-15-91	DELETED HDWL MODIFICATION DETAIL	8-15-91
11-8-90	DELETED COLD MIX FROM CULV'T. REPAIR	11-8-90
11-30-89	REV. RETAINING WALL STEEL SCHEDULE	11-30-89
11-17-88	V, BARS BEHIND ARROW	665-11-17-88
7-15-88	REV. PAVEMENT REPAIR ADDED HDWL. MODS, DEL. PIPE UNDERDRAINS	649-7-15-88
11-1-84	REV. TRENCH FOR PIPE UNDERDRAIN	510-11-1-84
1-4-83	ELIMINATED CONC. CLASS & ADDED CHAMFER NOTE	682-1-4-83
3-2-81	SPELLING OF "UNDERDRAIN"	721-3-2-81
4-20-79	REV. UNDERDRAIN DET& PAVEMENT REPAIR	674-4-20-79
2-2-76	12"MIN. GRAN. MAT'L. OVER PIPE	919-2-2-76
4-10-75	REM. SPECS. FOR GRAN. MAT'L.	568-4-10-75-853
5-22-74	GRANULAR MAT'L. TO BE SB-3	567-5-22-74-740
10-2-72	REVISED AND REDRAWN	564-10-16-72

ARKANSAS STATE HIGHWAY COMMISSION

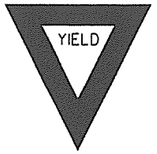
DETAILS OF SPECIAL ITEMS

STANDARD DRAWING SI-1

R1-1

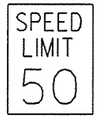
STANDARD 30"X30"
EXPRESSWAY 36"X36"
SPECIAL 48"X48"

R1-2



STD. 36"X36"X36"
EXPWY. 48"X48"X48"
FWY. 60"X60"X60"

R2-1



STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

W3-5

STD. 36"X36"
EXPWY. 48"X48"
FWY. 48"X48"

W3-5a

STD. 36"X36"
EXPWY. 48"X48"
FWY. 48"X48"

R4-1

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

R4-2

STD. 24"X30"
EXPWY. 36"X48"
FWY. 48"X60"

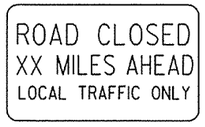
R5-1

STD. 30"X30"
EXPWY. 36"X36"
SPECIAL 48"X48"

RII-2

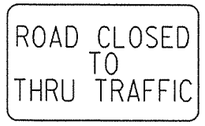
48"X30"

RII-3A



60"X30"

RII-4

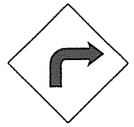


60"X30"

RSP-1

48"X30"

WI-1



STD. 36"X36"
FWY. 48"X48"

WI-2

STD. 36"X36"
FWY. 48"X48"

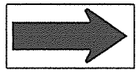
WI-3

STD. 48"X48"

WI-4

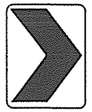
STD. 48"X48"

WI-6



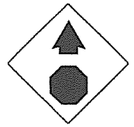
STD. 48"X24"
SPECIAL 60"X30"

WI-8



STD. 18"X24"
SPECIAL 24"X30"
EXPWY. 30"X36"
FWY. 36"X48"

W3-1

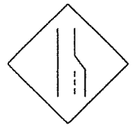


STD. 36"X36"
SPECIAL 48"X48"

W3-2

STD. 36"X36"
SPECIAL 48"X48"

W4-2



STD. 36"X36"
FWY. 48"X48"

W5-1

STD. 36"X36"
SPECIAL 48"X48"

W6-3

EXPWY. 36"X36"
SPECIAL 48"X48"

W8-7

EXPWY. 36"X36"
FWY. 48"X48"

W9-2

STD. 36"X36"
FWY. 48"X48"

WI3-1

STD. 24"X24"

W20-1

STD. 48"X48"

W20-2

STD. 48"X48"

W20-3

STD. 48"X48"

W20-4

STD. 48"X48"

W20-5

STD. 48"X48"

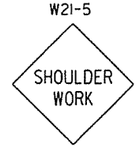
W20-7a

STD. 36"X36"
FWY. 48"X48"

W21-2

STD. 30"X30"
SPECIAL 36"X36"

W21-5



STD. 30"X30"
SPECIAL 36"X36"

W24-1

STD. 36"X36"

WI-4b

STD. 48"X48"

R56-1

STD. 18"X18"

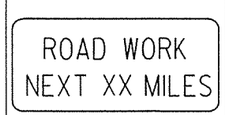
W8-11

STD. 36"X36"
FWY. 48"X48"

W8-9

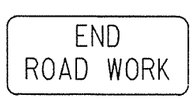
STD. 36"X36"
FWY. 48"X48"

G20-1



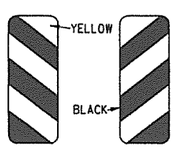
60"X24"

G20-2



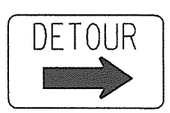
48"X24"

OM-3L OM-3R



12"X36"

M4-9

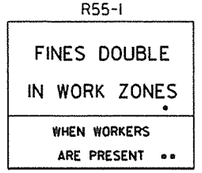


STD. 30"X24"
SPECIAL 48"X36"
SPECIAL 60"X48"

M4-10

48"X18"

R55-1



36"X60"

• USE 6" C LETTERS
•• USE 4" D LETTERS

ADVANCE DISTANCES
(XXXX)

500 FT	½ MILE
1000 FT	¾ MILE
1500 FT	1 MILE AHEAD

GENERAL NOTES:

1. ALL TRAFFIC CONTROL DEVICES USED ON ROAD CONSTRUCTION SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AND TO THE STANDARD HIGHWAY SIGNS, LATEST EDITION, OR AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION.
2. TRAFFIC CONTROL DEVICES SHALL BE SET UP JUST BEFORE THE START OF CONSTRUCTION OPERATIONS AND SHALL BE PROPERLY MAINTAINED DURING THE TIME SUCH CONDITIONS EXIST. THEY SHALL REMAIN IN PLACE ONLY AS LONG AS NEEDED AND REMOVED THEREAFTER.
3. EXISTING SIGNS AND CONSTRUCTION SIGNS SHALL BE KEPT IN PROPER POSITION, AND BE CLEAN AND LEGIBLE AT ALL TIMES. SIGNS THAT DO NOT APPLY TO EXISTING CONDITIONS SHALL BE REMOVED. SIGNS THAT ARE DAMAGED, DEFACED, OR THAT ACCUMULATE DIRT DURING CONSTRUCTION SHALL BE CLEANED, REPAIRED, OR REPLACED.
- 4. SIGNS ARE USUALLY MOUNTED ON A SINGLE POST, ALTHOUGH THOSE WIDER THAN 36" OR LARGER THAN 10 SQ. FT. SHALL BE MOUNTED ON TWO POSTS OR ABOVE A TYPE III BARRICADE.
- 5. SIGN POSTS DIRECT BURIED IN SOIL SHALL BE 2 LB. MINIMUM CHANNEL POST OR 4"x4" WOOD POSTS. CHANNEL POSTS SHALL BE PAINTED GREEN. WOOD POSTS SHALL BE PAINTED WHITE. ALL POSTS SHALL BE NEATLY CONSTRUCTED, AND SHALL BE REPLUMBED, CLEANED, OR REPAIRED AS NEEDED FOR THE DURATION OF THE JOB. THERE SHALL NOT BE MORE THAN 2 POSTS IN A 7' PATH FOR WOOD OR CHANNEL POSTS. ANY CHANNEL POST SPLICE SHALL BE IN ACCORDANCE WITH STANDARD DRAWING TC-3.
6. POST MOUNTED SIGNS IN RURAL AREAS SHALL BE CONSTRUCTED WITH THE NEAR EDGE OF THE SIGN FROM 6 TO 12 FEET FROM THE PAVEMENT EDGE. SIGNS IN URBAN AREAS AND BARRICADE MOUNTED SIGNS SHALL BE MOUNTED A MINIMUM OF 2 FEET FROM THE PAVEMENT EDGE.
7. ALL POST AND BARRICADE MOUNTED SIGNS MOUNTED IN URBAN AREAS SHALL BE MOUNTED A MINIMUM DISTANCE OF 7' FROM THE BOTTOM OF THE SIGN TO THE ROADWAY SURFACE. ALL POST AND BARRICADE MOUNTED SIGNS MOUNTED IN RURAL AREAS SHALL BE MOUNTED A MINIMUM DISTANCE OF 7' FROM THE BOTTOM OF THE SIGN TO THE ROADWAY SURFACE, EXCEPT A MINIMUM OF 6' SHALL BE USED WHEN MOUNTING AN ADVISORY SIGN BELOW A WARNING SIGN. TEMPORARY SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR INTERMEDIATE TERM STATIONARY WORK CONDITIONS. THE SIGNS MINIMUM MOUNTING HEIGHT SHALL BE 5'. RETROREFLECTIVE DEVICES SHALL BE USED. TEMPORARY SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR SHORT-TERM, SHORT DURATION, AND MOBILE CONDITIONS. THEY SHALL BE NO LESS THAN ONE (1) FOOT ABOVE THE TRAVELED WAY. LONG-TERM STATIONARY SIGNS SHALL BE DIRECT BURIED IN SOIL, UNLESS CONDITIONS NECESSITATE THE USE OF PORTABLE SIGNS, OR AS APPROVED BY THE ENGINEER. CONCRETE PADS, CONCRETE OR ROCK BALLAST, OR OTHER SOLID MATERIALS SHALL NOT BE UTILIZED WITH PORTABLE SIGN SUPPORTS.
8. FLAGGERS SHALL USE REFLECTORIZED STOP-SLOW PADDLES. FLAGS MAY BE USED ONLY FOR EMERGENCY SITUATIONS.
9. MOST OF THE SIGNS SHOWN ARE ORIENTED TO THE RIGHT. HOWEVER, THIS DOES NOT PRECLUDE THE USE OF MIRROR IMAGES OF THESE SIGNS WHERE THE REVERSE ORIENTATION MIGHT BETTER CONVEY TO MOTORISTS THE PROPER DIRECTION OF MOVEMENT.
10. R55-1 SIGNS SHALL BE PLACED AT LEAST 1500' BUT NOT MORE THAN 1 MILE IN ADVANCE OF THE WORK ZONE. IF A SPEED LIMIT REDUCTION IS IN EFFECT, THE SIGN SHALL BE PLACED A MINIMUM OF 500' IN ADVANCE OF THE "REDUCED SPEED AHEAD" SIGN.

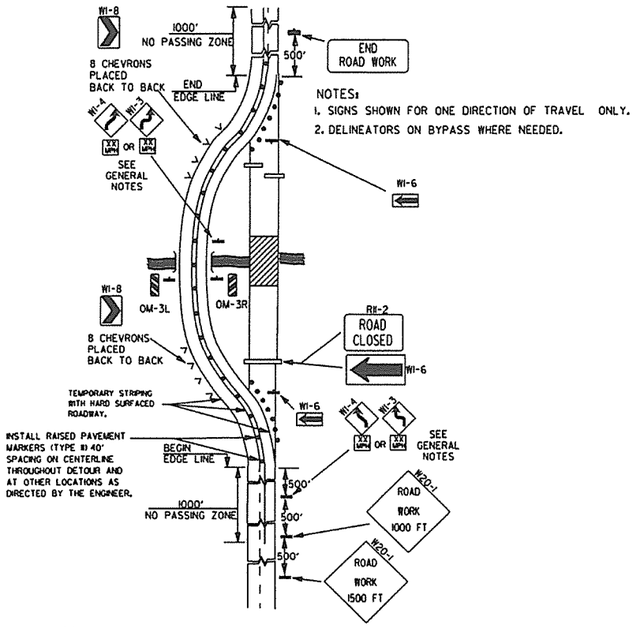
• NOTE: SUPPORTS FOR SIGNS, BARRICADES, AND VERTICAL PANELS THAT ARE DIFFERENT FROM THE REQUIREMENTS SHOWN IN NOTES 4 & 5, BUT MEET THE REQUIREMENTS OF NCHRP-350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH), WILL BE ACCEPTED. COMPLIANCE WITH THE REQUIREMENTS OF NCHRP-350 OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) IS REQUIRED FOR ALL PROJECTS.

DATE	REVISION	FILMED
9-2-15	REVISED REDUCED SPEED LIMIT AHEAD SIGNS REVISED ROAD WORK NEXT XX MILES	
12-15-11	REVISED W24-1	
8-17-10	DELETED W8-9a & ADDED W8-9	
10-15-09	ADDED REFERENCE TO MASH & ADDED SIGN W24-1	
4-17-08	REVISED SIGN DESIGNATIONS	
8-18-04	REVISED NOTES	
10-9-03	REVISED NOTE 1	
8-16-01	REVISED NOTE 7	
9-28-00	REVISED NOTE	
8-18-98	ADDED NOTE	
6-26-97	REVISED NOTE 5	
4-03-97	REVISED NOTE 5	
10-18-96	ADDED CONTROLLED ACCESS HWY. SIGN & TO NOTE 7	
10-12-95	ADDED R55-1	
6-8-95	REVISED TO CORRECT SIGN ILLUSTRATIONS	6-8-95
2-2-95	REVISED PER PART VI, MUTCD SEPT. 3, 1993	
8-15-91	DRAWN AND PLACED IN USE	

ARKANSAS STATE HIGHWAY COMMISSION

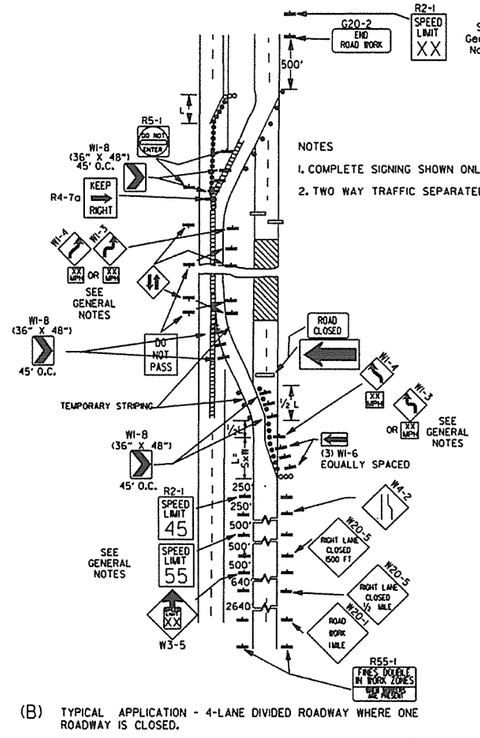
STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

STANDARD DRAWING TC-1



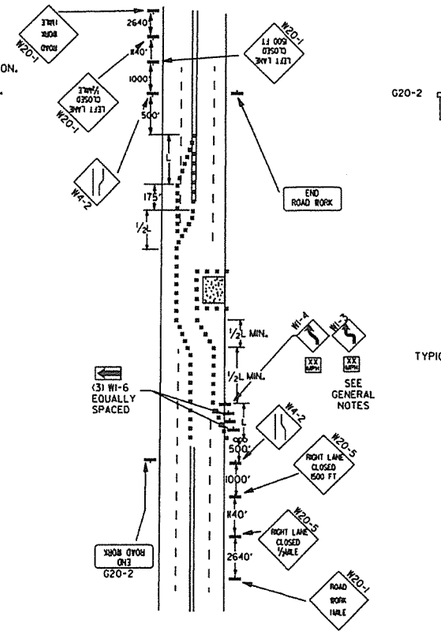
NOTES:
1. SIGNS SHOWN FOR ONE DIRECTION OF TRAVEL ONLY.
2. DELINEATORS ON BYPASS WHERE NEEDED.

(A) TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES ON A 2-LANE HIGHWAY WHERE THE ENTIRE ROADWAY IS CLOSED AND A BYPASS DETOUR IS PROVIDED.

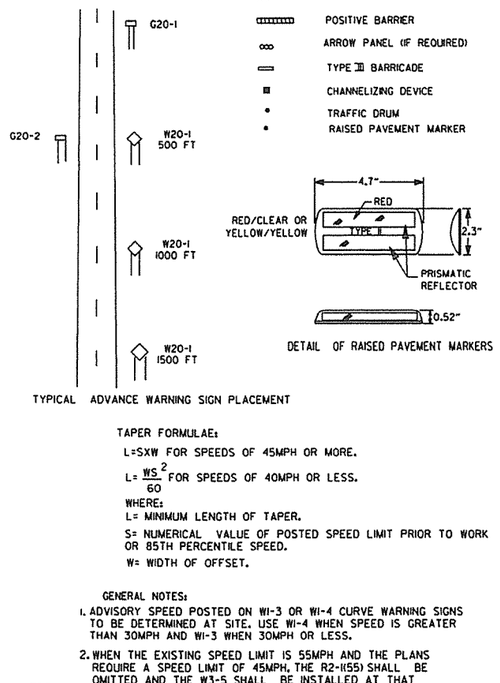


NOTES
1. COMPLETE SIGNING SHOWN ONLY IN CROSSOVER DIRECTION.
2. TWO WAY TRAFFIC SEPARATED WITH POSITIVE BARRIER.

(B) TYPICAL APPLICATION - 4-LANE DIVIDED ROADWAY WHERE ONE ROADWAY IS CLOSED.



(C) TYPICAL APPLICATION - 4-LANE UNDIVIDED ROADWAY WHERE HALF OF THE ROADWAY IS CLOSED.



DETAIL OF RAISED PAVEMENT MARKERS

TYPICAL ADVANCE WARNING SIGN PLACEMENT

TAPER FORMULAE:

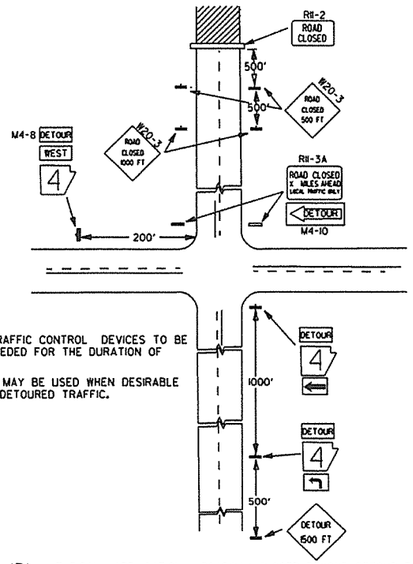
L=SXW FOR SPEEDS OF 45MPH OR MORE.

$L = \frac{WS^2}{60}$ FOR SPEEDS OF 40MPH OR LESS.

WHERE:
L= MINIMUM LENGTH OF TAPER.
S= NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK OR 85TH PERCENTILE SPEED.
W= WIDTH OF OFFSET.

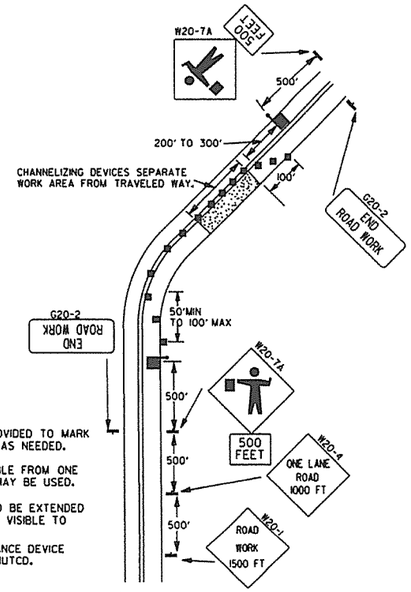
GENERAL NOTES:

1. ADVISORY SPEED POSTED ON W1-3 OR W1-4 CURVE WARNING SIGNS TO BE DETERMINED AT SITE. USE W1-4 WHEN SPEED IS GREATER THAN 30MPH AND W1-3 WHEN 30MPH OR LESS.
2. WHEN THE EXISTING SPEED LIMIT IS 55MPH AND THE PLANS REQUIRE A SPEED LIMIT OF 45MPH, THE R2-1(55) SHALL BE OMITTED AND THE W3-5 SHALL BE INSTALLED AT THAT LOCATION. ADDITIONAL R2-1 45MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-1(XX) SHALL BE INSTALLED TO MATCH ORIGINAL SPEED LIMIT.
3. WHEN THE EXISTING SPEED LIMIT IS 65MPH AND THE PLANS REQUIRE A SPEED LIMIT OF 55MPH, THE R2-1(45) SHALL BE OMITTED. ADDITIONAL R2-1 55MPH SPEED LIMIT SIGNS SHALL BE INSTALLED AT A MAXIMUM OF 1MILE INTERVALS. AT THE END OF THE WORK AREA A R2-1(XX) SHALL BE INSTALLED TO MATCH ORIGINAL SPEED LIMIT.
4. THE MAXIMUM SPACING BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD BE APPROXIMATELY EQUAL IN FEET TO THE SPEED LIMIT. BEYOND THE TAPER, MAXIMUM SPACING SHALL BE TWO TIMES THE SPEED LIMIT, OR AS DIRECTED BY THE ENGINEER.
5. WARNING LIGHTS AND/OR FLAGS MAY BE MOUNTED TO SIGNS OR CHANNELIZING DEVICES AT NIGHT AS NEEDED.
6. PAVEMENT MARKINGS NO LONGER APPLICABLE WHICH MIGHT CREATE CONFUSION IN THE MINDS OF VEHICLE OPERATORS SHALL BE REMOVED OR OBLITERATED AS SOON AS PRACTICABLE.
7. TRAILER MOUNTED DEVICES SUCH AS ARROW PANELS AND PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE DELINEATED BY AFFIXING CONSPICUITY MATERIAL IN A CONTINUOUS LINE ON THE FACE OF THE TRAILER. WHEN PLACED ON OR ADJACENT TO THE SHOULDER AND NOT BEHIND A POSITIVE BARRIER, THESE DEVICES SHALL BE DELINEATED BY PLACING FIVE (5) TRAFFIC DRUMS, EQUALLY SPACED ALONG THE TRAFFIC SIDE OF THE DEVICE.
8. DIMENSIONS SHOWN FOR RAISED PAVEMENT MARKERS ARE TYPICAL. THE CONTRACTOR MAY SUBSTITUTE SIMILAR MARKERS WITH THE APPROVAL OF THE ENGINEER. REQUESTING APPROVAL FOR SIMILAR MARKERS MAY BE MADE BY REFERRING TO THE AHTD QUALIFIED PRODUCTS LIST.



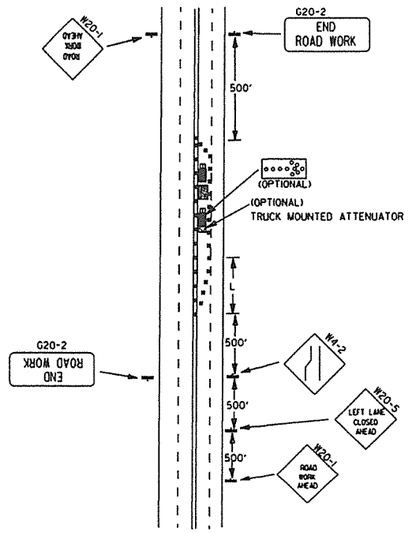
NOTES:
1. REGULATORY TRAFFIC CONTROL DEVICES TO BE MODIFIED AS NEEDED FOR THE DURATION OF THE DETOUR.
2. STREET NAMES MAY BE USED WHEN DESIRABLE FOR DIRECTING DETOURED TRAFFIC.

(D) TYPICAL APPLICATION - ROADWAY CLOSED BEYOND DETOUR POINT.



NOTES:
1. FLOOD LIGHTS SHOULD BE PROVIDED TO MARK FLAGGER STATIONS AT NIGHT AS NEEDED.
2. IF ENTIRE WORK AREA IS VISIBLE FROM ONE STATION, A SINGLE FLAGGER MAY BE USED.
3. CHANNELIZING DEVICES ARE TO BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
4. AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD) OPTIONAL. REFER TO MUTCD.

(E) TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES ON 2-LANE HIGHWAY WHERE ONE LANE IS CLOSED AND FLAGGING IS PROVIDED.



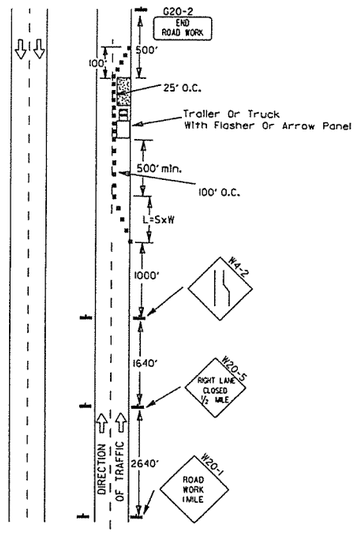
(F) TYPICAL APPLICATION - 4-LANE UNDIVIDED ROADWAY WITH INSIDE LANE CLOSED.

DATE	REVISION	FILMED
9-2-15	REVISED NOTE 2, ADDED NOTE 8, REVISED DRAWING (A) & REPLACED R2-5A WITH W3-5	
9-12-13	REVISED DETAIL OF RAISED PAVEMENT MARKERS	
3-8-10	ADDED (AFAD)	
8-20-08	REVISED SIGN DESIGNATIONS	
8-18-04	ADDED GENERAL NOTE	
10-18-96	ADDED R55-1	
4-26-96	CORRECTED (a) BEHIND G20-2	
6-8-95	CORRECTED SIGN IDENT. ON W1-4A	6-8-95
2-2-95	REVISED PER PART VI, MUTCD, SEPT. 3, 1993	
8-15-91	DRAWN AND PLACED IN USE	

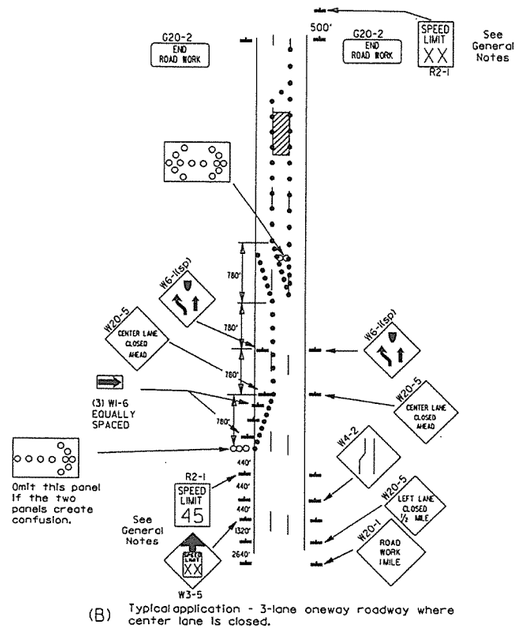
ARKANSAS STATE HIGHWAY COMMISSION

STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

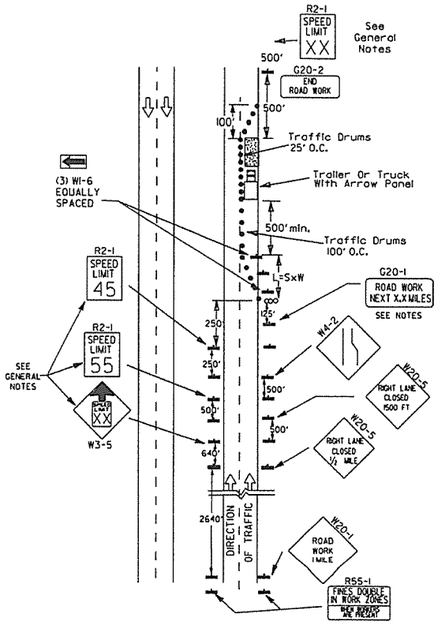
STANDARD DRAWING TC-2



(A) Typical application - daytime maintenance operations of short duration on a 4-lane divided roadway where half of the roadway is closed.



(B) Typical application - 3-lane oneway roadway where center lane is closed.



(C) Typical application - construction operations of intermediate to long term duration on a 4-lane divided roadway where half of the roadway is closed.

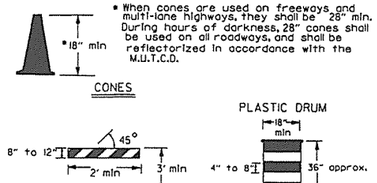
KEY:

- ○○○ Arrow Panel (if Required)
- ■ Channelizing Device
- ● Traffic drum

GENERAL NOTES:

1. A speed limit reduction may be implemented ONLY when designated in the plan or when recommended by the Roadway Design Division.
2. When the existing speed limit is 55mph and the plans require a speed limit of 45mph, the R2-1(55) shall be omitted and the W3-5 shall be installed at that location. Additional R2-1 45mph speed limit signs shall be installed at a maximum of 1 mile intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
3. When the existing speed limit is 65mph and the plans require a speed limit of 55mph, the R2-1(45) shall be omitted. Additional R2-1 55mph speed limit signs shall be installed at a maximum of 1 mile intervals. At the end of the work area a R2-1(XX) shall be installed to match original speed limit.
4. The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit. Beyond the taper, maximum spacing shall be two times the speed limit or as directed by the Engineer.
5. Warning lights and/or flags may be mounted to signs or channelizing devices at night as needed.
6. Pavement markings no longer applicable which might create confusion in the minds of vehicle operators shall be removed or obliterated as soon as practicable.
7. The G20-1 sign will be required on jobs of over two miles in length. When the lane closure is not at the beginning of the project, the G20-1 sign shall be erected 125' in advance of the job limit. Additional W20-1 (1 MILE) signs are not required in advance of lane closures that begin inside the project limits.
8. Flaggers shall use STOP/SLOW paddles for controlling traffic through work zones. Flags may be used only for emergency situations.
9. All plastic drums and cones shall meet the requirements of NCHRP-350 or Manual For Assessing Safety Hardware (MASH).
10. Trailer mounted devices such as arrow panels and portable changeable message signs shall be delineated by affixing conspicuity material in a continuous line on the face of the trailer. When placed on or adjacent to the shoulder and not behind a positive barrier, these devices shall be delineated by placing five (5) traffic drums, equally spaced along the traffic side of the device.

Channelizing devices



NOTE:
For all road closures, the Type III barricades shall be of sufficient length to extend across entire roadway.

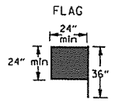
TRAFFIC CONTROL DEVICES FOR VERTICAL PAVEMENT DIFFERENTIALS

VERTICAL DIFFERENTIAL	LOCATIONS	TRAFFIC CONTROL
1" to 3"	Centerline, lane lines	W8-11
1" to 3"	Edge of shoulder	W8-9
Greater than 3"	Lane lines	Standard lane closure required
Greater than 3"	Edge of traveled lane	*RSP-1 and vertical panels, drums or concrete barrier
Greater than 3"	Edge of shoulder	*Vertical panels, drums or concrete barrier

* When shown on the plans concrete barrier will be used.

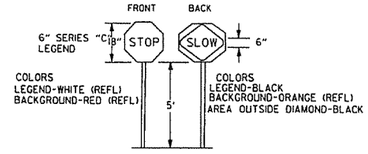
When the shoulder area is used as part of the traveled lane and there is insufficient width to place drums on the remaining shoulder width, then vertical panels shall be used.

FLAG

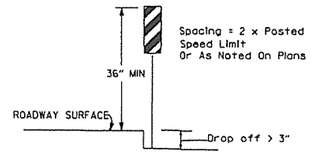


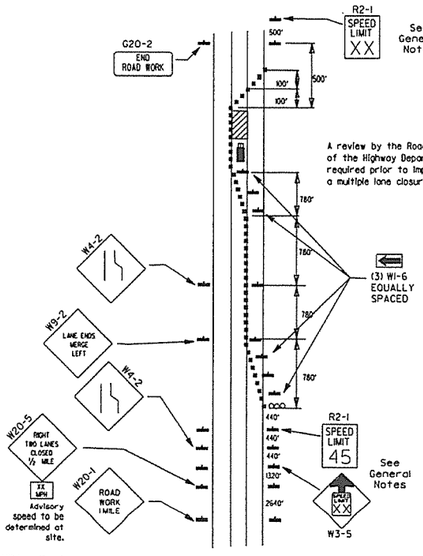
Flag shall be of good grade red material

STOP SLOW PADDLE



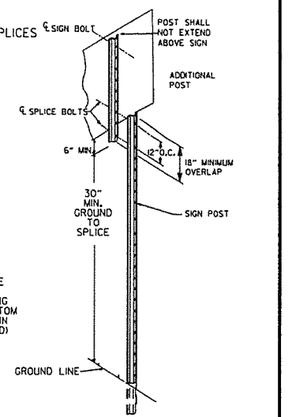
VERTICAL PANEL PLACEMENT





(D) Typical application - closing multiple lanes of a multilane highway.

DETAIL OF SPLICES



NOTES: USE SPLICES ONLY WHEN NECESSARY FOR INSTALLATION. TYPICAL INSTALLATION SHOULD HAVE NO SPLICES (SEE STD. DRAWING NO. SHS-2)

NORMAL INSTALLATIONS WILL REQUIRE 1/4" DIA. BOLTS TO MOUNT SIGNS TO POST AND 5/16" DIA. BOLTS TO ASSEMBLE THE VARIOUS POST SUPPORTS. EACH OF THESE BOLTS SHALL BE CARRIAGE BOLTS.

SIGN POSTS SHALL BE PAINTED GREEN; SIGNS SHALL NOT BE PAINTED, AND ALL SIGN POSTS SHALL BE PLUMB.

DATE	REVISION	FILMED
9-2-15	REVISED NOTE 2 & REPLACED R2-5A WITH W3-5	
10-15-09	ADDED REFERENCE TO MASH	
11-20-08	REVISED SIGN DESIGNATIONS	
11-18-04	ADDED NOTE	
10-1-98	ADDED NOTE	
4-03-97	ADDED (SP) TO W6-1& REVISED TRAFFIC CONTROL DEVICES NOTE	
10-18-96	ADDED R55-1	
10-12-95	MOVED UPPER SPLICE	
6-8-95	REVISED SPLICE DETAIL, TEXT	6-8-95
2-2-95	REVISED PER PART VI, MUTCD, SEPT. 3, 1993	
8-15-91	DRAWN AND PLACED IN USE	

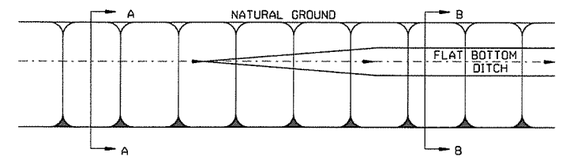
ARKANSAS STATE HIGHWAY COMMISSION

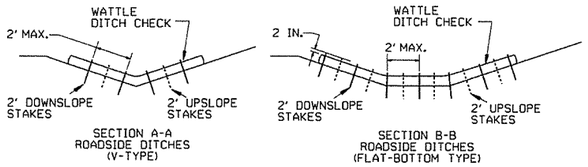
STANDARD TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION

STANDARD DRAWING TC-3

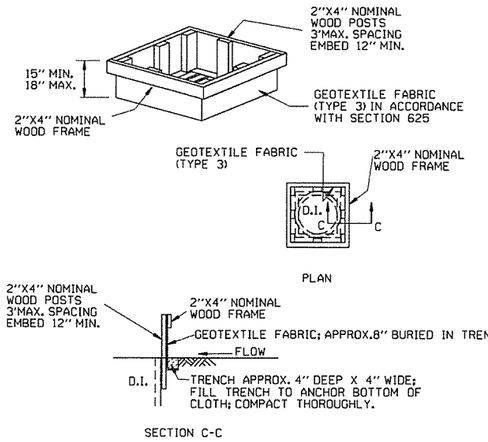
GENERAL NOTES

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

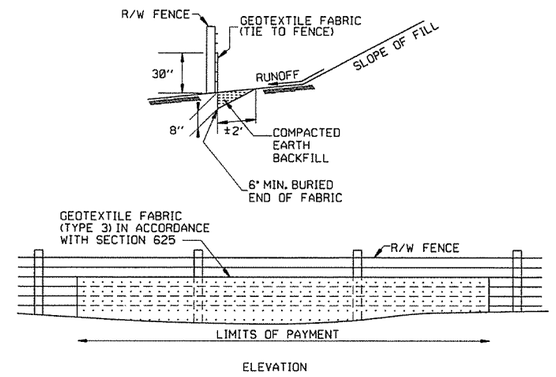




WATTLE DITCH CHECK (E-1)



DROP INLET SILT FENCE (E-7)



SILT FENCE ON R/W FENCE (E-4)

GENERAL NOTES

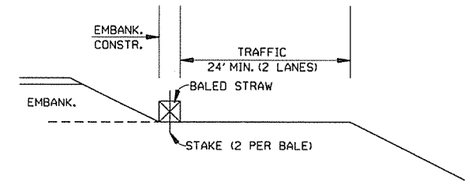
GEOTEXTILE FABRIC SHALL BE SPLICED TOGETHER WITH A SEWN SEAM ONLY AT A SUPPORT POST, OR TWO SECTIONS OF FENCE MAY BE OVERLAPPED INSTEAD. PAYMENT OF ADDITIONAL MATERIAL FOR OVERLAP WILL NOT BE MADE.

GENERAL NOTES

1. STRAW BALES SHALL BE INSTALLED SO THAT THE BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES. THE BALES SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.

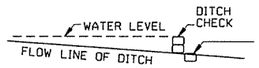
2. NO GAPS SHALL BE LEFT BETWEEN BALES.

3. BALED STRAW FILTER BARRIERS COMPLETED AND ACCEPTED WILL BE MEASURED BY THE BALE IN PLACE AS AUTHORIZED BY THE ENGINEER AND WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER BALE FOR BALED STRAW DITCH CHECKS.

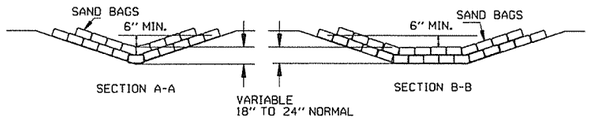


BALED STRAW FILTER BARRIER (E-2)

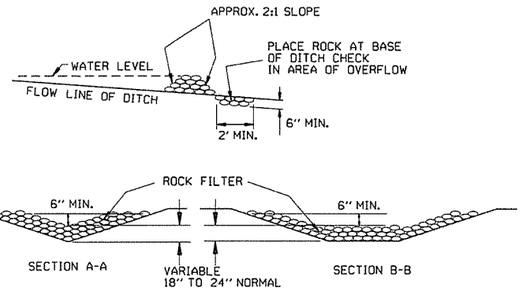
NUMBER OF SAND BAGS AND ARRANGEMENT VARIABLE WITH ON-SITE CONDITIONS.



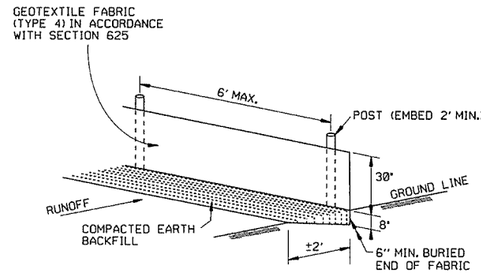
PLACE SAND BAGS AT BASE OF DITCH CHECK IN AREA OF OVERFLOW



SAND BAG DITCH CHECK (E-5)



ROCK DITCH CHECK (E-6)



SILT FENCE (E-11)

GENERAL NOTES

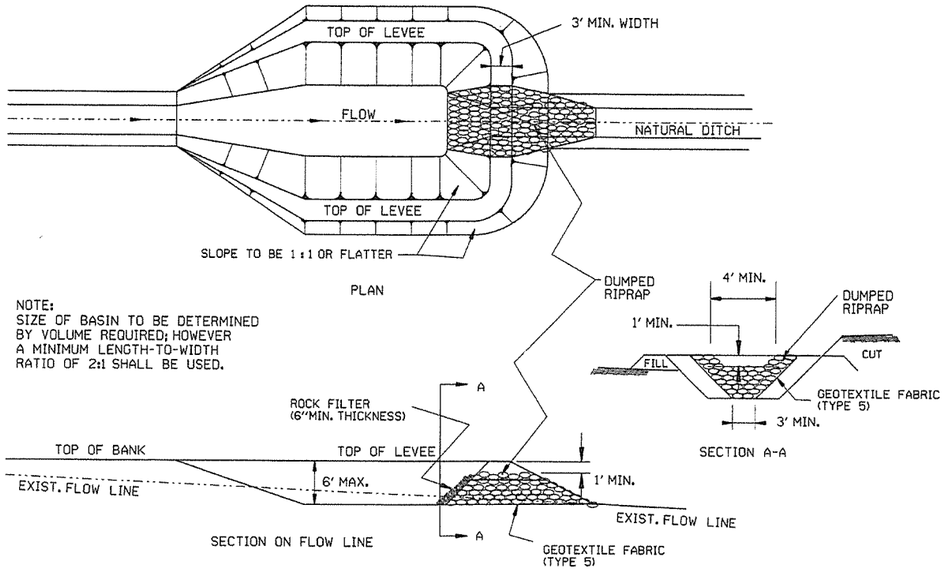
GEOTEXTILE FABRIC SHALL BE SPLICED TOGETHER WITH A SEWN SEAM ONLY AT A SUPPORT POST OR TWO SECTIONS OF FENCE MAY BE OVERLAPPED INSTEAD. PAYMENT OF ADDITIONAL MATERIAL FOR OVERLAP WILL NOT BE MADE.

DATE	REVISION	FILMED
12-15-11	DELETED BALED STRAW DITCH CHECK & ADDED WATTLE DITCH CHECK	
11-18-98	ADDED NOTES	
7-02-98	ADDED BALED STRAW FILTER BARRIER (E-2)	
7-20-95	REVISED SILT FENCE E-4 AND E-11	7-20-95
7-15-94	REV. E-4 & E-11 MIN. 13" BURIED END OF FABRIC	
6-2-94	REVISED E-1,4,7 & 11; DELETED E-2 & 3	6-2-94
4-1-93	REDRAWN	
10-1-92	REDRAWN	
8-2-76	ISSUED R.D.M.	298-7-28-76

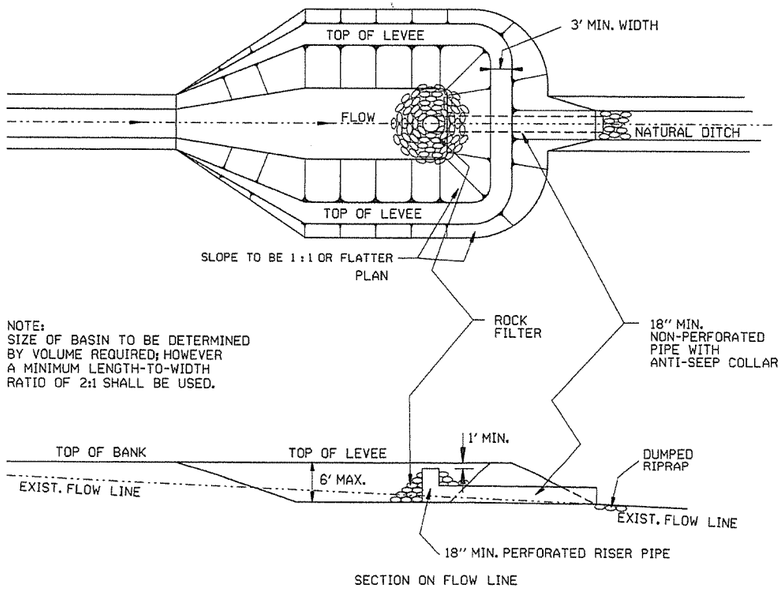
ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

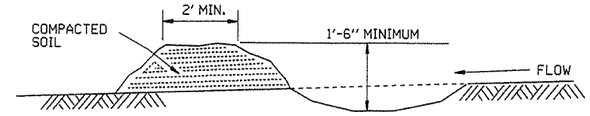
STANDARD DRAWING TEC-1



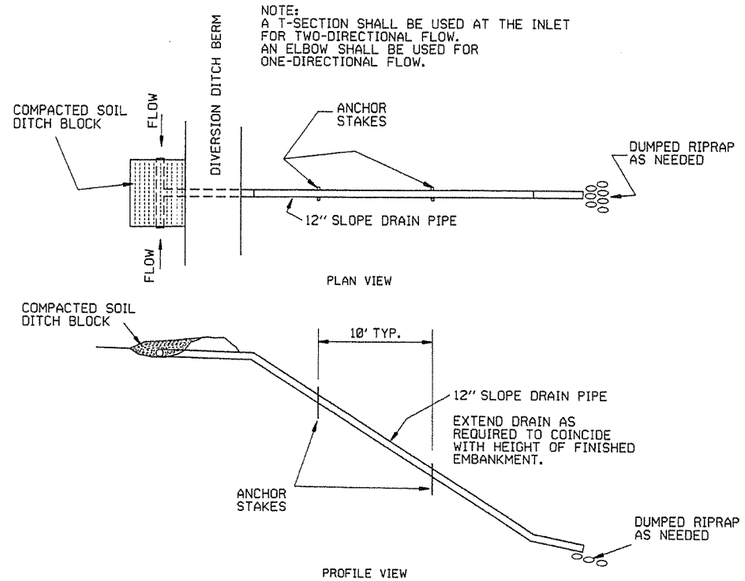
SEDIMENT BASIN WITH RIPRAP OUTLET (E-9)



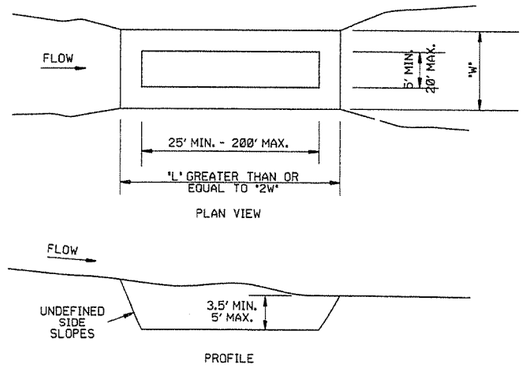
SEDIMENT BASIN WITH PIPE OUTLET (E-10)



DIVERSION DITCH (E-8)



SLOPE DRAIN (E-12)



SEDIMENT BASIN (E-14)

DATE	REVISION	FILMED
6-2-94	Revised E-8 & E-12; Added E-14 & Deleted E-13	
4-1-93	ISSUED	

ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

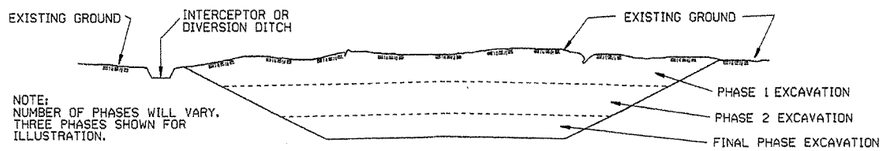
STANDARD DRAWING TEC-2

CLEARING AND GRUBBING

CONSTRUCTION SEQUENCE

1. PLACE PERIMETER CONTROLS (I.E. SILT FENCES , DIVERSION DITCHES, SEDIMENT BASINS, ETC.)
2. PERFORM CLEARING AND GRUBBING OPERATION.

EXCAVATION



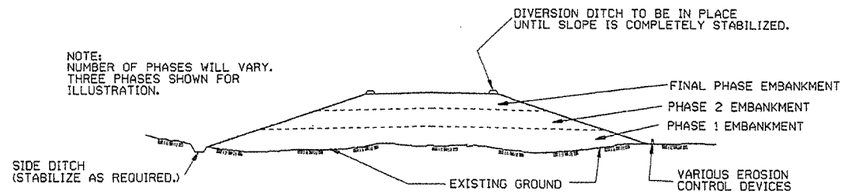
GENERAL NOTE

ALL CUT SLOPES SHALL BE DRESSED, PREPARED, SEEDED, AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE EXCAVATED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 25 FEET, MEASURED VERTICALLY.

CONSTRUCTION SEQUENCE

1. EXCAVATE AND STABILIZE INTERCEPTOR AND/OR DIVERSION DITCHES.
2. PERFORM PHASE 1 EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING.
3. PERFORM PHASE 2 EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING.
4. PERFORM FINAL PHASE OF EXCAVATION. PLACE PERMANENT OR TEMPORARY SEEDING. STABILIZE DITCHES, CONSTRUCT DITCH CHECKS, DIVERSION DITCHES, SEDIMENT BASINS, OR OTHER EROSION CONTROL DEVICES AS REQUIRED.

EMBANKMENT



GENERAL NOTE

ALL EMBANKMENT SLOPES SHALL BE DRESSED, PREPARED, SEEDED, AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE CONSTRUCTED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 25 FEET, MEASURED VERTICALLY.

CONSTRUCTION SEQUENCE

1. CONSTRUCT DIVERSION DITCHES, DITCH CHECKS, SEDIMENT BASINS, SILT FENCES, OR OTHER EROSION CONTROL DEVICES AS SPECIFIED.
2. PLACE PHASE 1 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD OF GREATER THAN 21 DAYS.
3. PLACE PHASE 2 EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PROVIDE DIVERSION DITCHES AND SLOPE DRAINS IF EMBANKMENT CONSTRUCTION IS TO BE TEMPORARILY ABANDONED FOR A PERIOD OF GREATER THAN 21 DAYS.
4. PLACE FINAL PHASE OF EMBANKMENT WITH PERMANENT OR TEMPORARY SEEDING. PLACE DIVERSION DITCHES AND SLOPE DRAINS AND MAINTAIN UNTIL ENTIRE SLOPE IS STABILIZED.

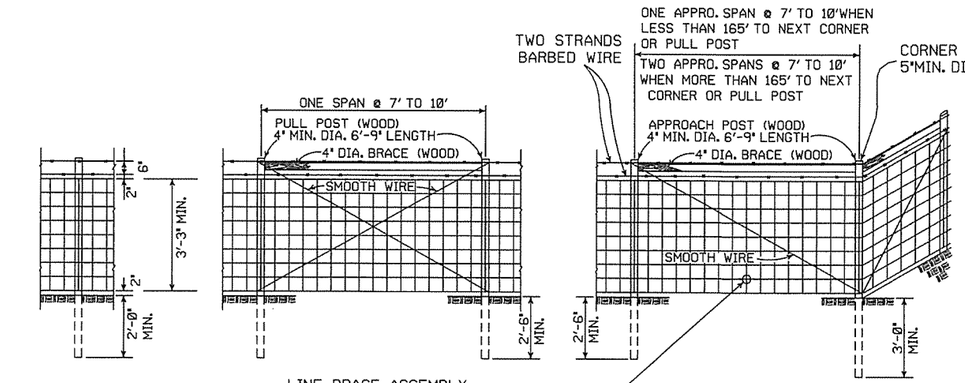
DATE	REVISION	FILMED
11-03-94	CORRECTED SPELLING	
6-2-94	Drawn & Issued	6-2-94

ARKANSAS STATE HIGHWAY COMMISSION

TEMPORARY EROSION CONTROL DEVICES

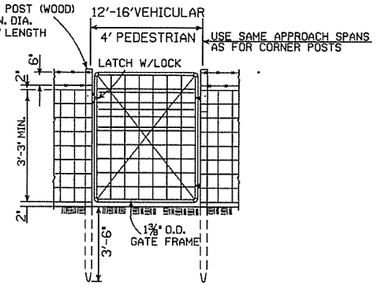
STANDARD DRAWING TEC-3

stdtec3.dgn



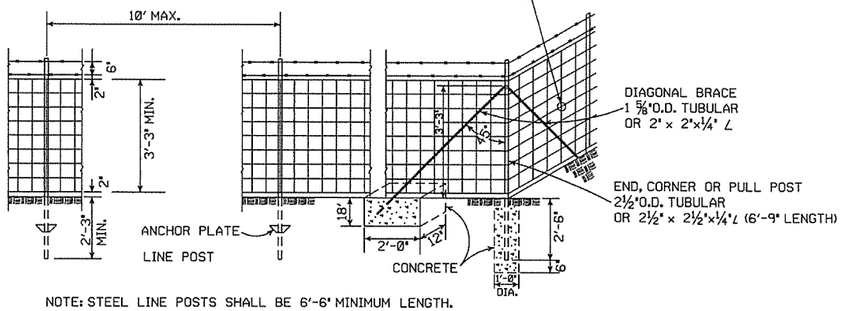
LINE POST
3" MIN. DIA. 6'-3" LENGTH
MAX. SPACING TO BE 10'-0"

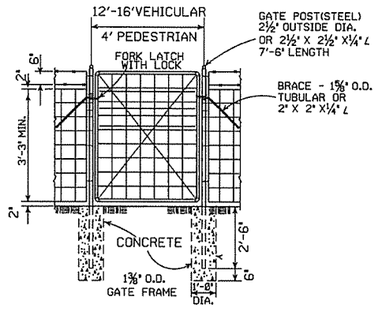
LINE BRACE ASSEMBLY
MAX. SPACING TO BE 330'



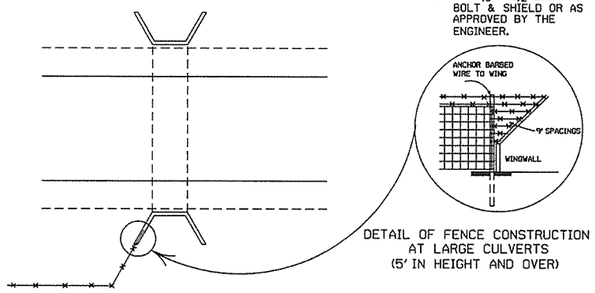
TYPE C FENCE (WOOD POSTS)

OTHER APPROVED TIES WILL BE PERMITTED





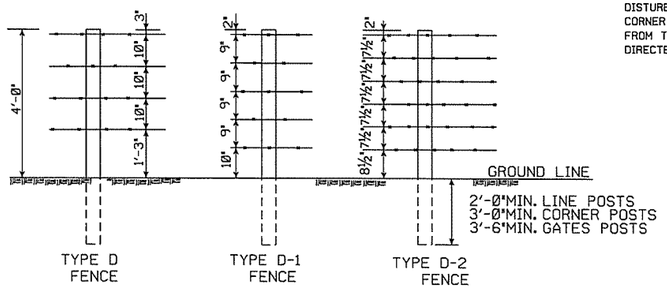
NOTE: STEEL LINE POSTS SHALL BE 6'-6" MINIMUM LENGTH.



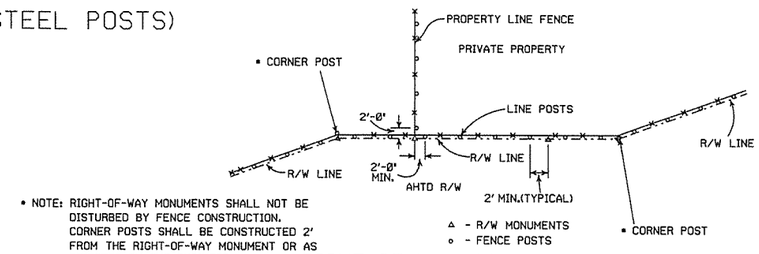
DETAIL OF FENCE CONSTRUCTION AT LARGE CULVERTS (5' IN HEIGHT AND OVER)

TYPE C FENCE (STEEL POSTS)

4 STRANDS BARBED WIRE (D)
5 STRANDS BARBED WIRE (D-1)
6 STRANDS BARBED WIRE (D-2)

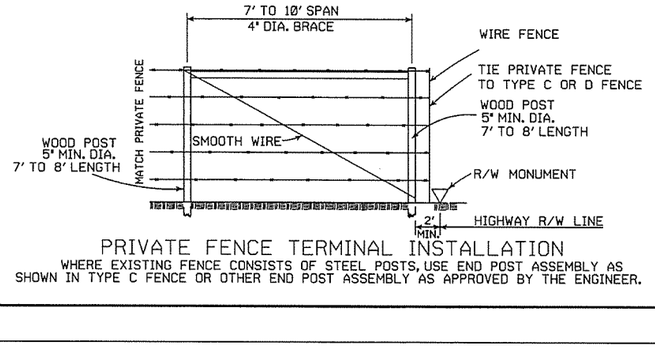


NOTE: SPACING AND SIZE (EXCEPT LENGTH) OF POSTS, APPROACH SPANS, PULL POST ASSEMBLIES, AND CORNER BRACING FOR TYPE D FENCE SHALL CONFORM TO TYPE C FENCE. USE GALVANIZED STAPLES ON WOOD POSTS AND APPROVED FASTENERS ON STEEL POSTS.



• NOTE: RIGHT-OF-WAY MONUMENTS SHALL NOT BE DISTURBED BY FENCE CONSTRUCTION. CORNER POSTS SHALL BE CONSTRUCTED 2' FROM THE RIGHT-OF-WAY MONUMENT OR AS DIRECTED BY THE ENGINEER.

RIGHT-OF-WAY FENCE LOCATION



PRIVATE FENCE TERMINAL INSTALLATION

WHERE EXISTING FENCE CONSISTS OF STEEL POSTS, USE END POST ASSEMBLY AS SHOWN IN TYPE C FENCE OR OTHER END POST ASSEMBLY AS APPROVED BY THE ENGINEER.

GENERAL NOTES:

STEEL LINE POSTS SHALL BE PAINTED OR GALVANIZED.
TUBULAR END, CORNER, PULL, OR DIAGONAL BRACES MUST CONFORM TO THE DIMENSIONS AND WEIGHTS SPECIFIED ON STANDARD DRAWING WF-3 (CHAIN LINK). APPROVED ALTERNATES ARE ACCEPTABLE.
AN ACCEPTABLE TOLERANCE IN LENGTH OF TUBULAR OR WOODEN POSTS SHALL BE - 1" TO +2".
TUBULAR POSTS MUST BE PAINTED OR GALVANIZED.

THE CONTRACTOR SHALL FURNISH AT LEAST 25% OF TIMBER LINE POSTS OF 7 FOOT LENGTHS IN ORDER TO PROVIDE SUFFICIENT SET IN SOFT GROUND OR SMALL DEPRESSIONS.

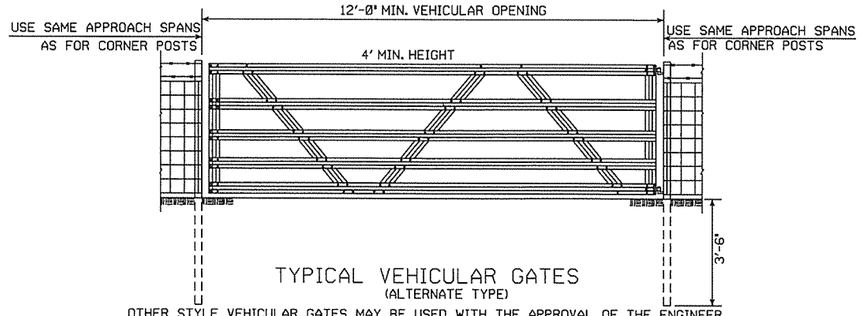
DRIVEWAY GATES, EITHER SINGLE 12' TO 16' OR DOUBLE 6' TO 8' OPENING OF THE SAME TYPE AS THE PEDESTRIAN GATE, SHALL BE INSTALLED ON THE RIGHT SIDE OF EACH THROUGH LANE ROAD AT LARGE CULVERTS OR BRIDGE CROSS FENCE, FOR USE OF MAINTENANCE EQUIPMENT. LOCATION OF GATES TO BE SHOWN ON PLANS OR AS DESIGNATED BY THE ENGINEER.

AT STREAM CROSSINGS, THE FENCE SHALL NOT BE CONSTRUCTED ACROSS LARGE STREAMS. WHERE CLEARANCE IS SUFFICIENT FROM THE TOP OF THE BANK TO THE BRIDGE STRUCTURE A CROSS CONNECTION SHALL BE CONSTRUCTED BETWEEN THE FENCE ON EACH SIDE OF THE ROAD. WHERE THE CLEARANCE IS NOT SUFFICIENT, THE FENCE SHALL BE TERMINATED WITH CROSS CONNECTIONS AND END POSTS ADJACENT TO BRIDGE ABUTMENTS OR CULVERT WINGWALLS.

SPLICE FOR BARBED WIRE BETWEEN PULL POST ASSEMBLY SHALL BE BY THE 'EYE METHOD' AS DESCRIBED AS FOLLOWS: THE ENDS OF THE BARBED WIRE SHALL BE BENT TO FORM A LOOP. THE LOOPS SHALL BE CONNECTED. AFTER THE LOOPS ARE CONNECTED THE ENDS OF THE WIRE SHALL BE WRAPPED AROUND THE PROJECTING WIRES A MINIMUM OF 4 TIMES FOR EACH WIRE LOOP.

SPLICE FOR WOVEN WIRE BETWEEN PULL POST SHALL BE BY THE 'WESTERN UNION METHOD' AS DESCRIBED AS FOLLOWS: THE VERTICAL WIRES FOR EACH END OF THE FENCE FABRIC SHALL BE PLACED SIDE BY SIDE AND THE PROJECTING HORIZONTAL WIRES SHALL BE WRAPPED A MINIMUM OF 4 TIMES AROUND THE HORIZONTAL WIRES OF THE FIRST WEB.

STAPLE AT LEAST TOP, BOTTOM AND ALTERNATE WIRES OF WOVEN FABRIC FOR WOOD LINE POSTS.



TYPICAL VEHICULAR GATES
(ALTERNATE TYPE)

OTHER STYLE VEHICULAR GATES MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
THE METHOD OF SECURING GATE (LATCH AND/OR LOCK) SHALL MEET THE APPROVAL OF THE ENGINEER.

DATE	REVISION	FILMED
8-22-02	REVISED GENERAL NOTES	
10-18-96	REVISED AASHTO	
11-22-95	REVISED R-O-W LOCATION DETAIL	
6-2-94	REVISED BARB WIRE AND ADDED CORNER POST NOTES	6-2-94
8-5-93	REVISED R/W INSTALLATION FENCE	8-5-93
10-1-92	ADDED STAPLE NOTE	10-1-92
8-15-91	ADDED TYPE D-2 FENCE	8-15-91
11-30-89	DELETED CLASS CONCRETE	11-30-89
7-15-88	ADDED SPLICE NOTE	700-7-15-88
10-30-87	GENERAL REVISIONS	549-10-30-87
11-1-84	MAX. POST SPACING MIN. WIRE GAUGE	507-11-1-84
1-4-83	MIN. DIA. LINE POST	648-1-4-83
3-2-81	TOLERANCE FOR POST LENGTH	722-3-2-81
12-1-72	ADDED D-1 & FENCE INSTALLATION	564-12-1-72
10-2-72	REVISED AND REDRAWN	540-10-2-72

ARKANSAS STATE HIGHWAY COMMISSION

WIRE FENCE TYPE C AND D

STANDARD DRAWING WF-4

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	68	93

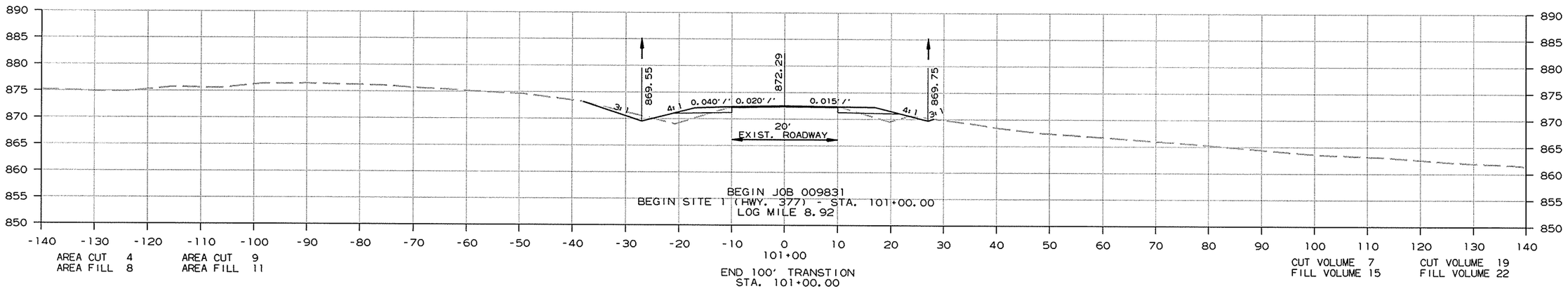
(2) CROSS SECTIONS-SITE 1

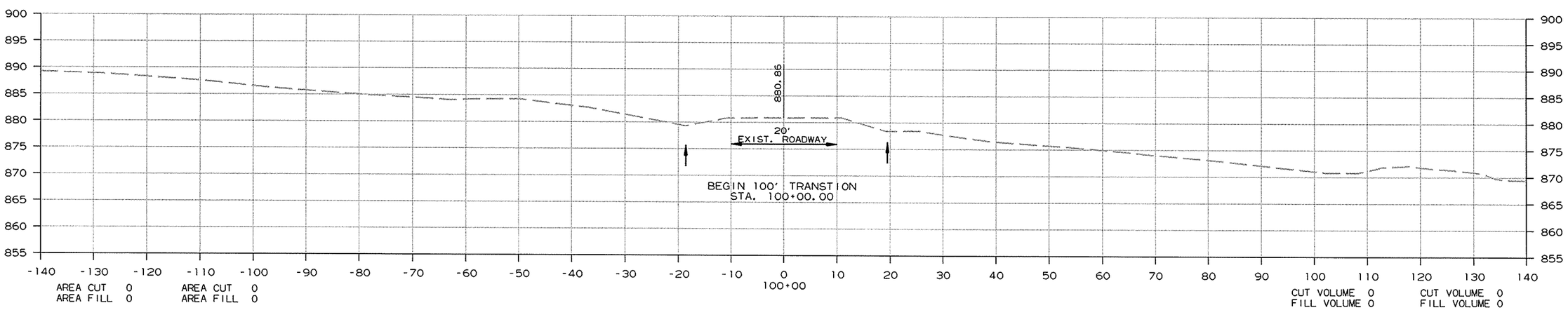
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





CROSS SECTION STA. 100+00 TO STA. 101+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	69	93

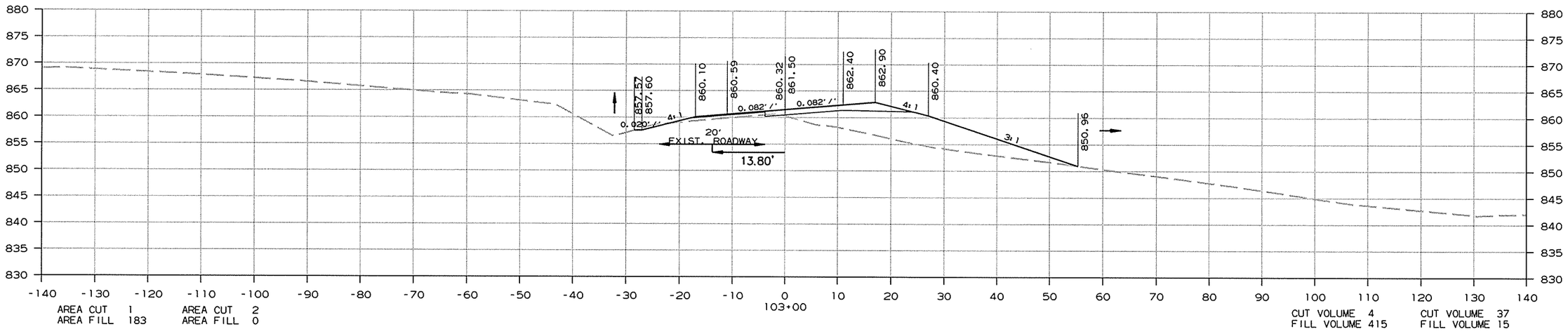
(2) CROSS SECTIONS-SITE 1

AREA

STAGE 1 STAGE 2

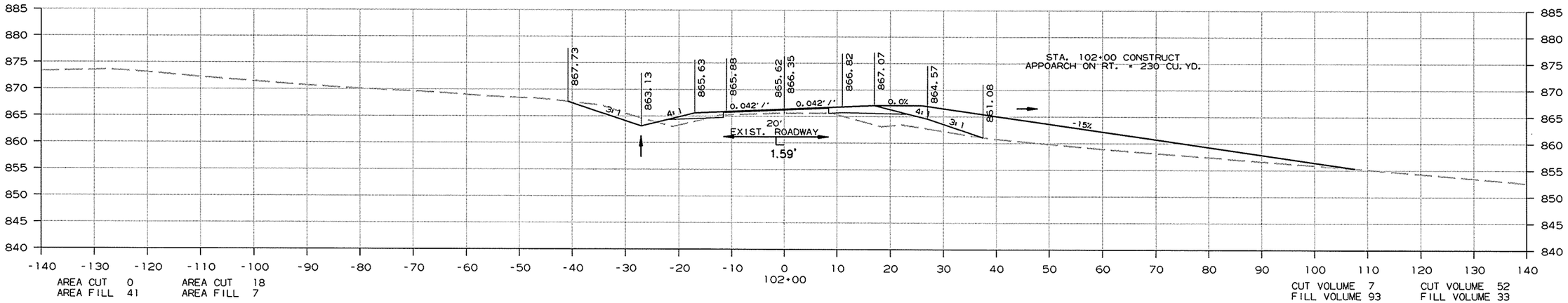
VOLUME

STAGE 1 STAGE 2



AREA CUT 1 AREA CUT 2
AREA FILL 183 AREA FILL 0

CUT VOLUME 4 CUT VOLUME 37
FILL VOLUME 415 FILL VOLUME 15



AREA CUT 0 AREA CUT 18
AREA FILL 41 AREA FILL 7

CUT VOLUME 7 CUT VOLUME 52
FILL VOLUME 93 FILL VOLUME 33

CROSS SECTION STA. 102+00 TO STA. 103+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	70	93

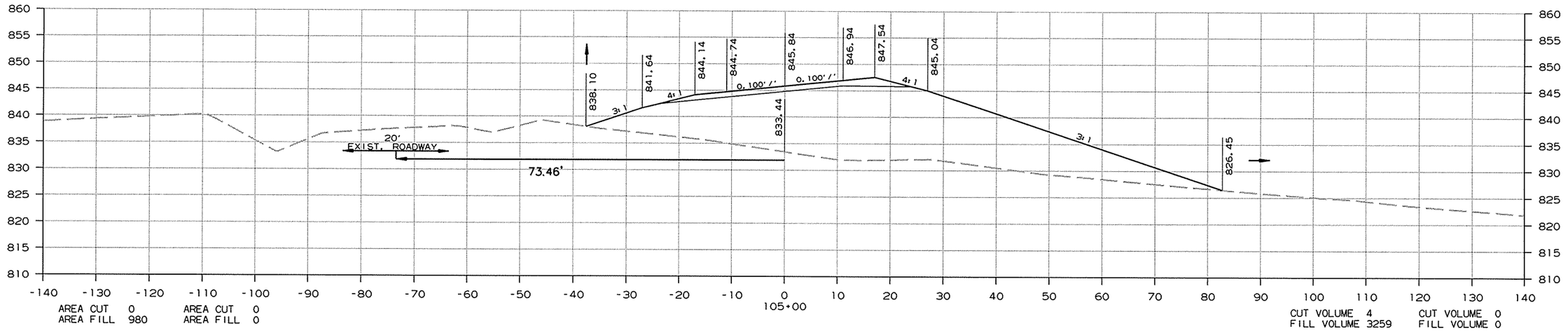
(2) CROSS SECTIONS-SITE 1

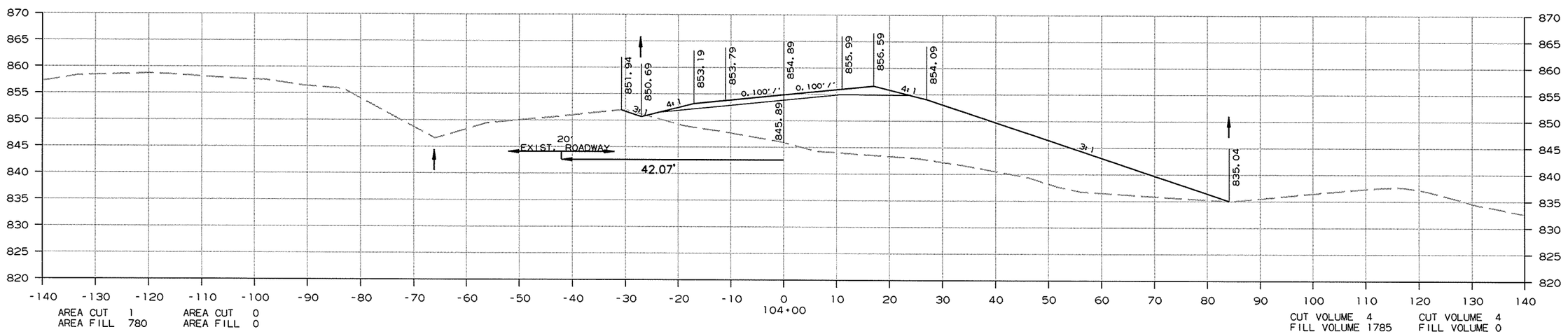
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





CROSS SECTION STA. 104+00 TO STA. 105+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	71	93

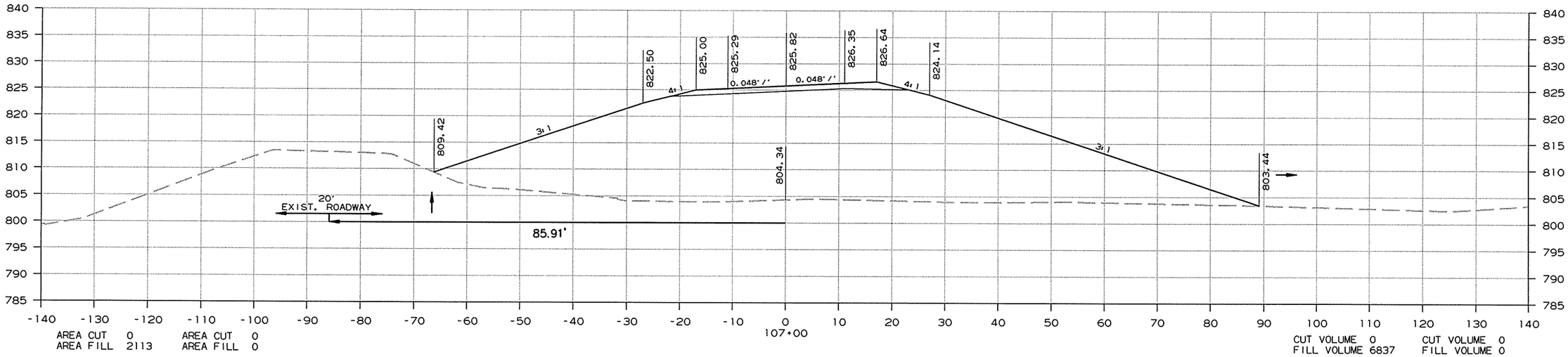
(2) CROSS SECTIONS-SITE 1

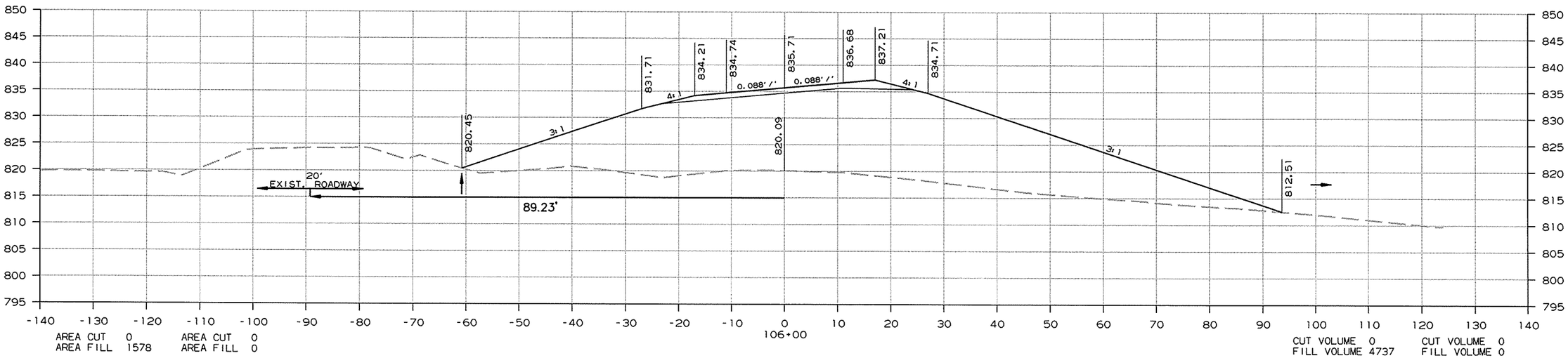
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





CROSS SECTION STA. 106+00 TO STA. 107+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	72	93

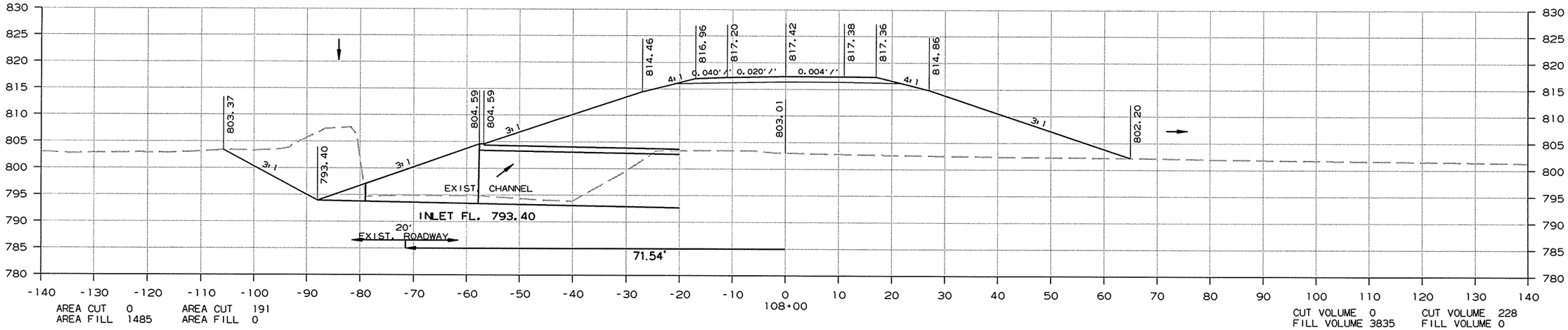
(2) CROSS SECTIONS-SITE 1

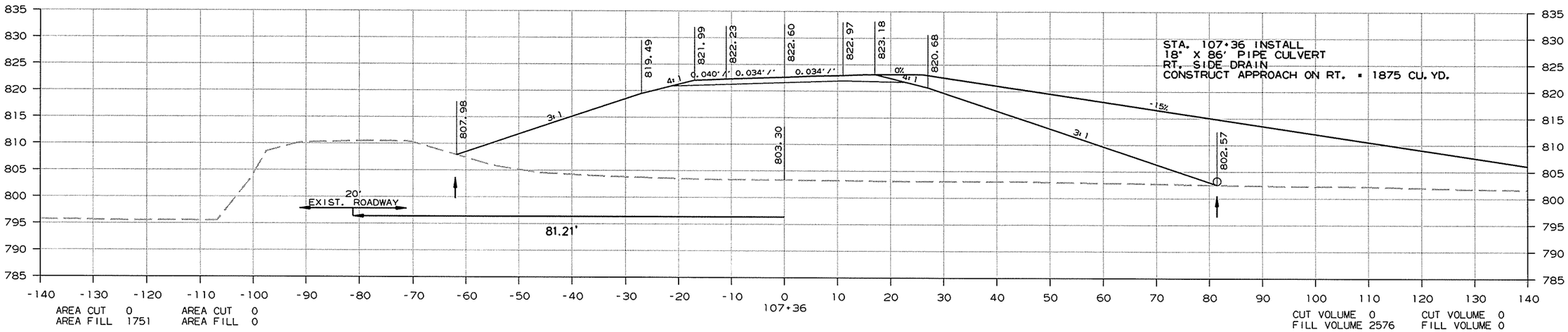
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





CROSS SECTION STA. 107+36 TO STA. 108+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	73	93

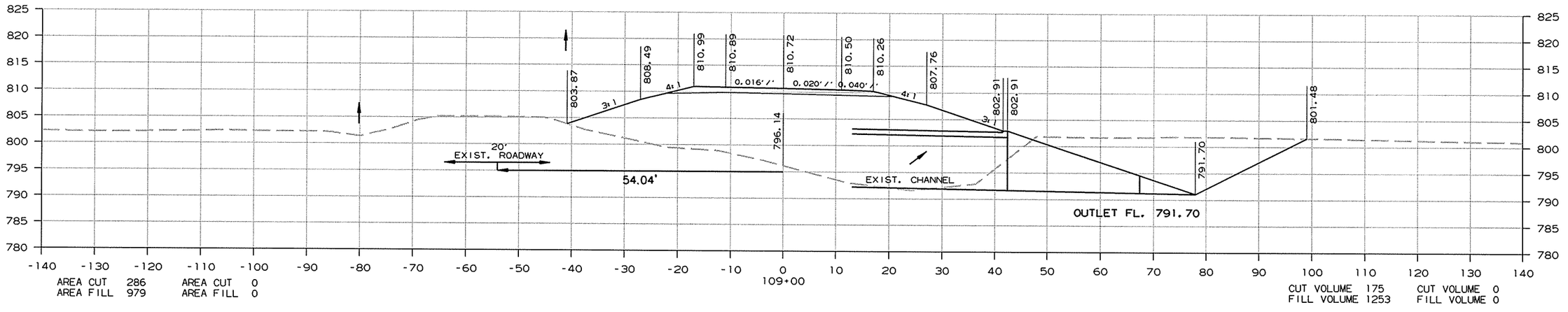
(2) CROSS SECTIONS-SITE 1

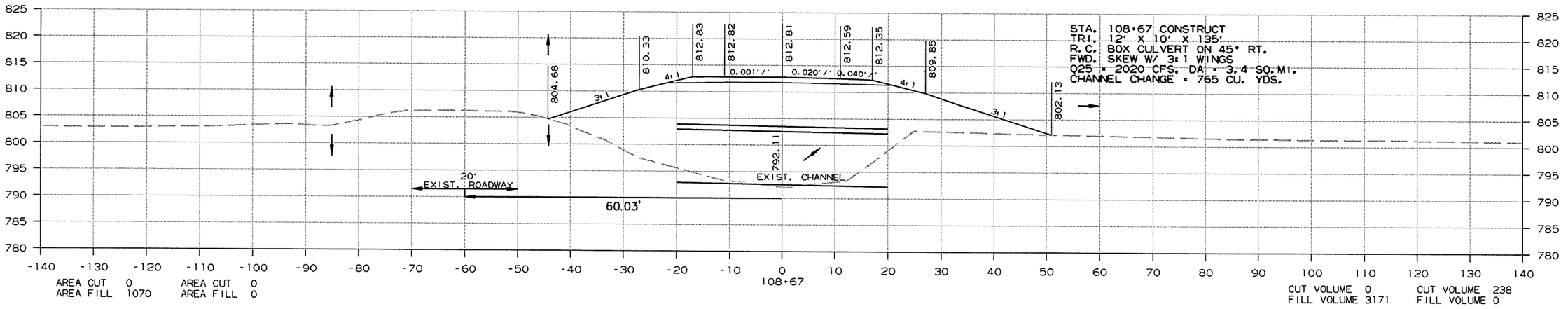
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





STA. 108+67 CONSTRUCT
TRI. 12' X 10' X 135'
R.C. BOX CULVERT ON 45° RT.
FWD. SKEW W/ 3:1 WINGS
Q25 = 2020 CFS, DA = 3.4 SQ.MI.
CHANNEL CHANGE = 765 CU. YDS.

CROSS SECTION STA. 108+67 TO STA. 109+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	74	93

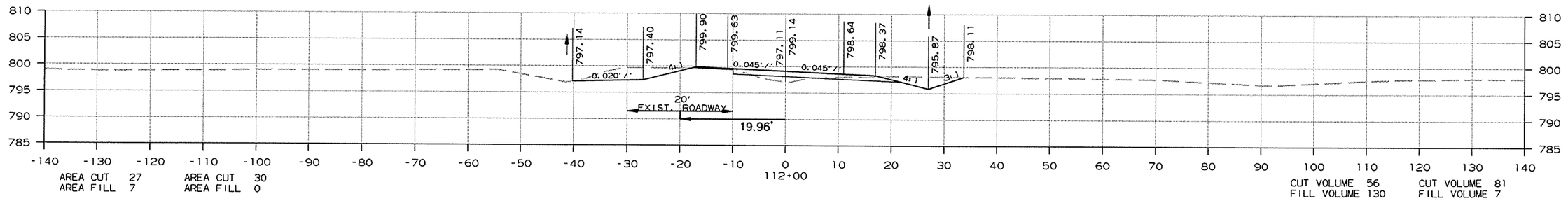
(2) CROSS SECTIONS-SITE 1

AREA

STAGE 1 STAGE 2

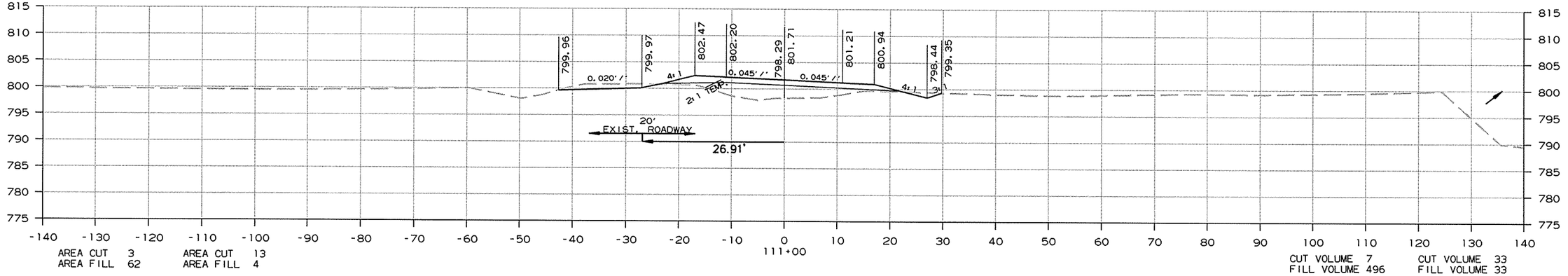
VOLUME

STAGE 1 STAGE 2



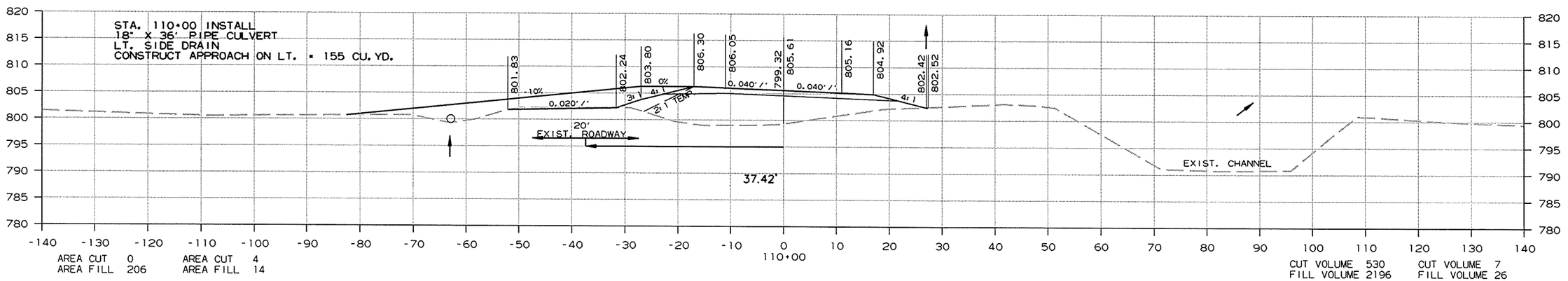
AREA CUT 27 AREA CUT 30
AREA FILL 7 AREA FILL 0

CUT VOLUME 56 CUT VOLUME 81
FILL VOLUME 130 FILL VOLUME 7



AREA CUT 3 AREA CUT 13
AREA FILL 62 AREA FILL 4

CUT VOLUME 7 CUT VOLUME 33
FILL VOLUME 496 FILL VOLUME 33



AREA CUT 0 AREA CUT 4
AREA FILL 206 AREA FILL 14

CUT VOLUME 530 CUT VOLUME 7
FILL VOLUME 2196 FILL VOLUME 26

CROSS SECTION STA. 110+00 TO STA. 112+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	75	93

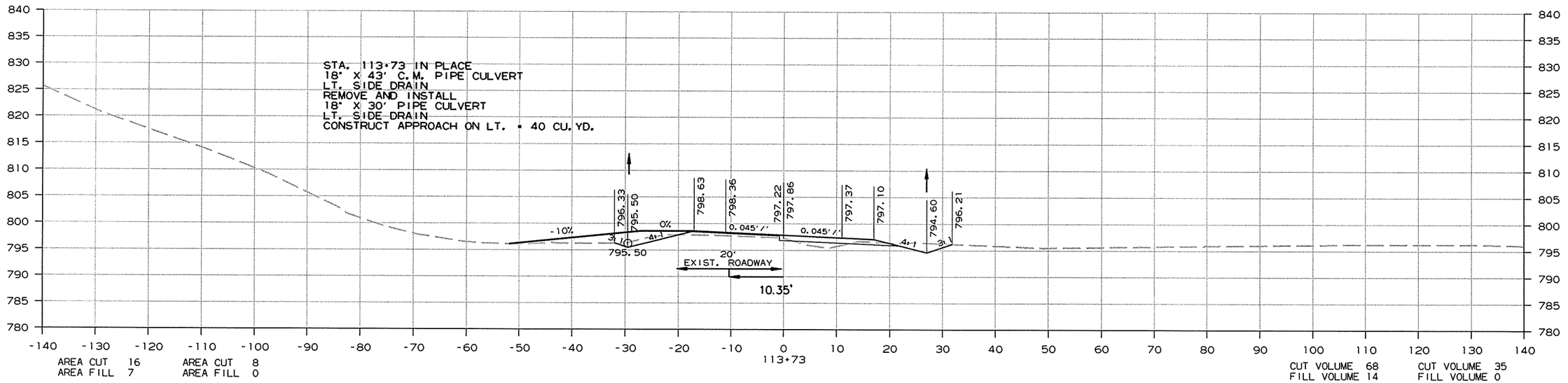
(2) CROSS SECTIONS-SITE 1

AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2



CROSS SECTION STA. 113+00 TO STA. 113+73

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	76	93

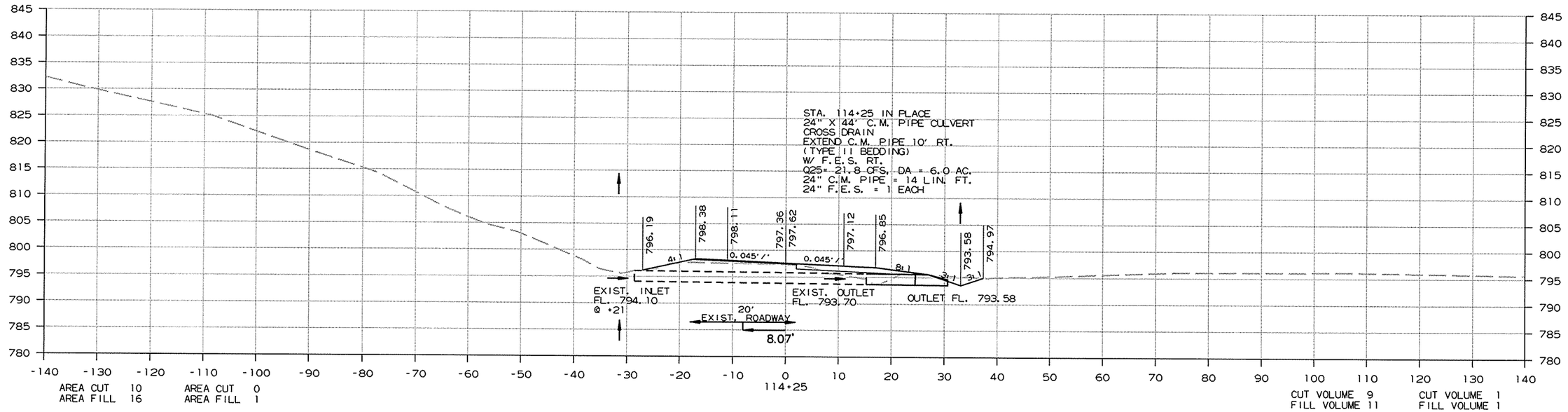
(2) CROSS SECTIONS-SITE 1

AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2



CROSS SECTION STA. 114+00 TO STA. 114+25

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	77	93

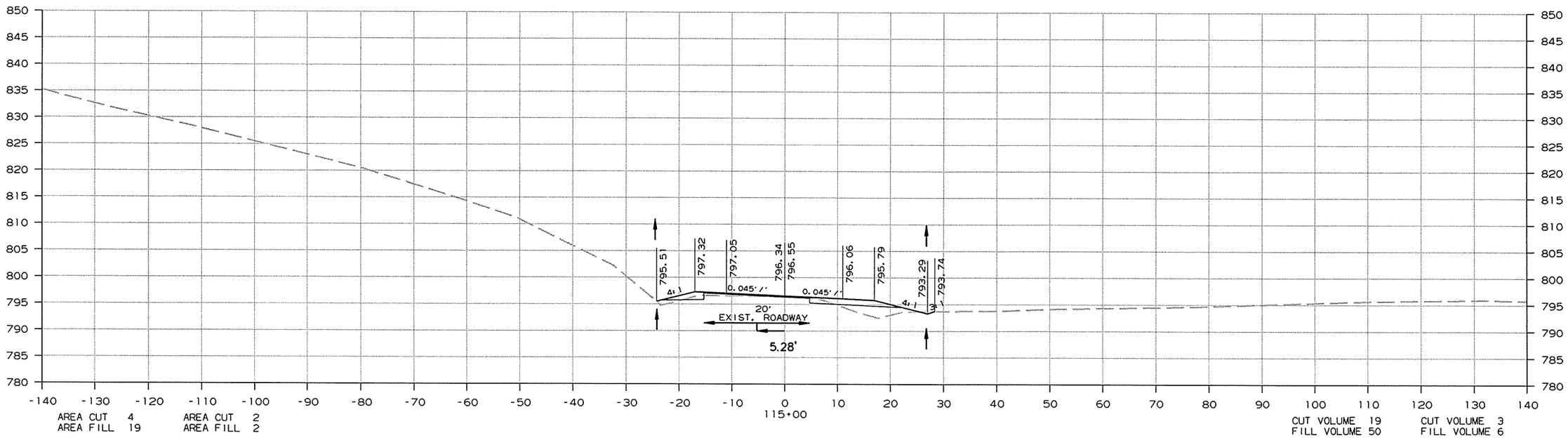
(2) CROSS SECTIONS-SITE 1

AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2



CROSS SECTION STA. 115+00 TO STA. 115+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	78	93

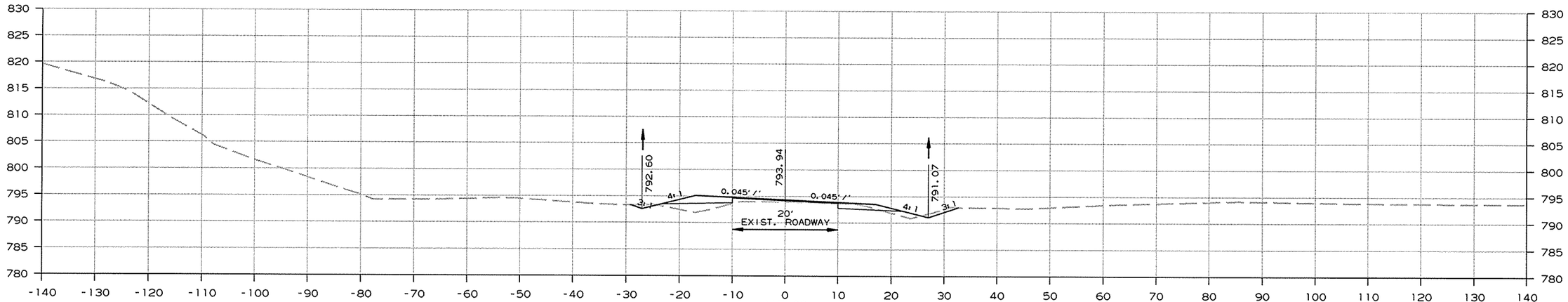
(2) CROSS SECTIONS-SITE 1

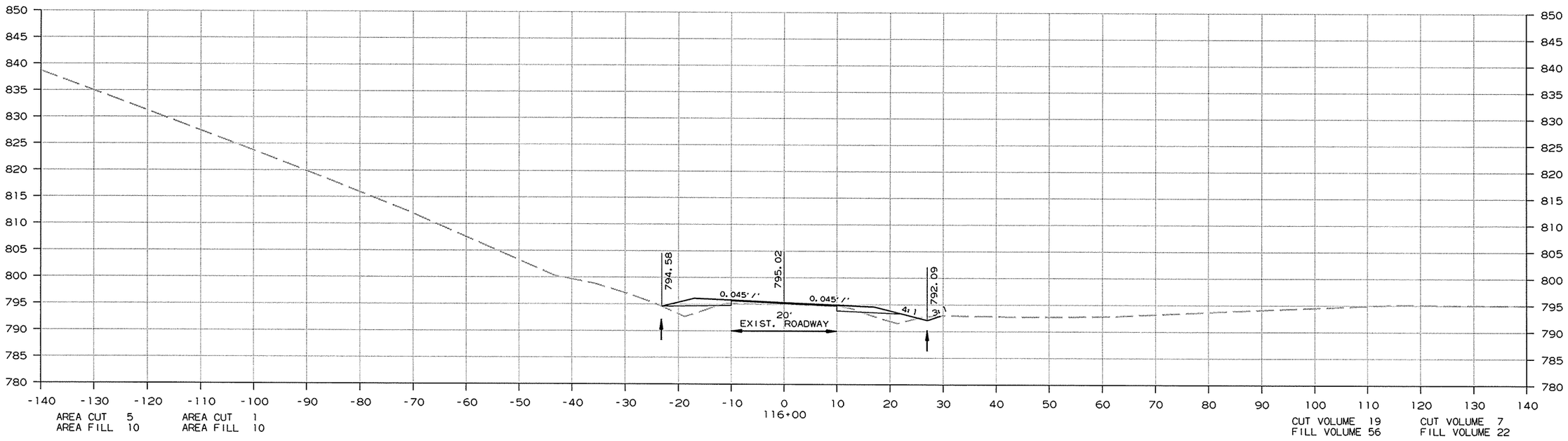
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





CROSS SECTION STA. 116+00 TO STA. 117+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	79	93

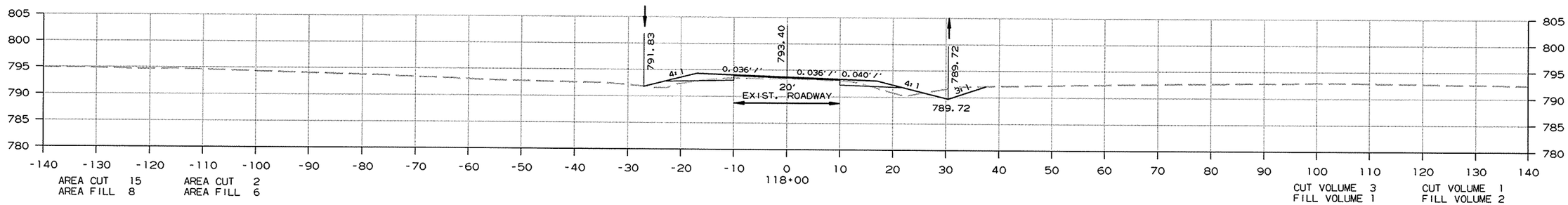
(2) CROSS SECTIONS-SITE 1

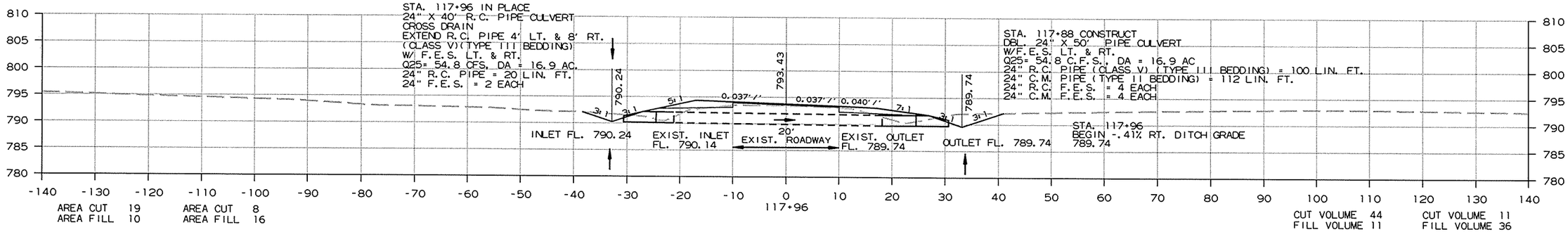
AREA

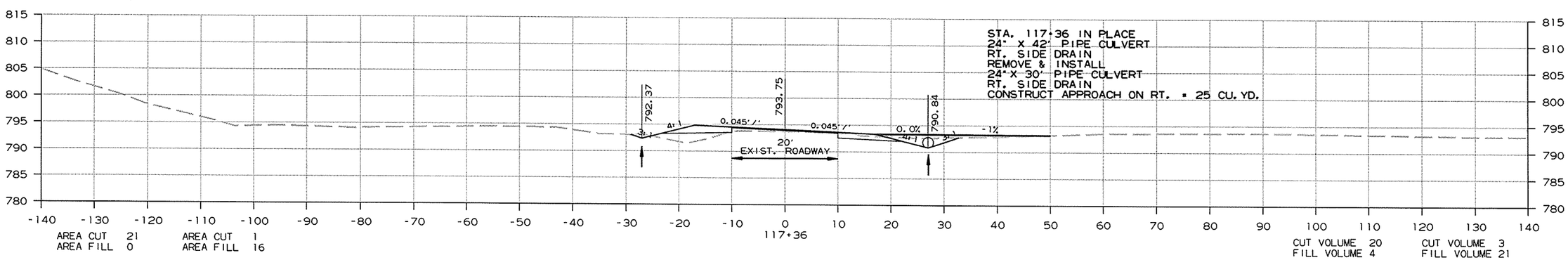
STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2







CROSS SECTION STA. 117+36 TO STA. 118+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	80	93

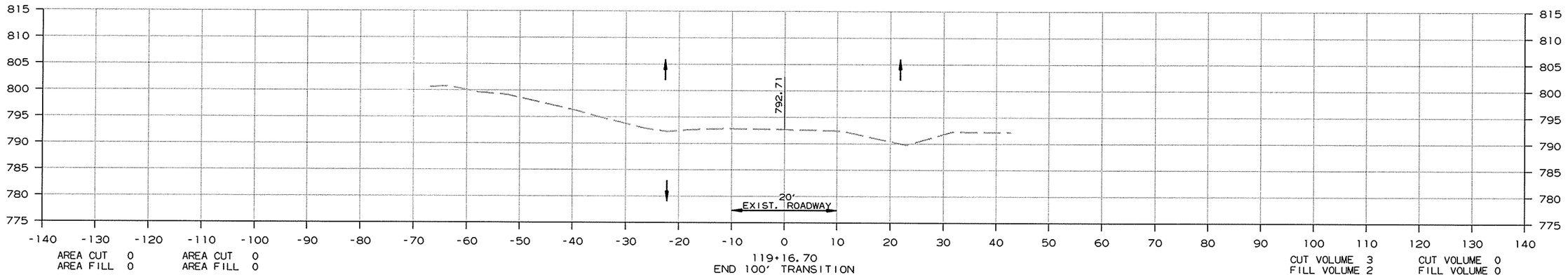
(2) CROSS SECTIONS-SITE 1

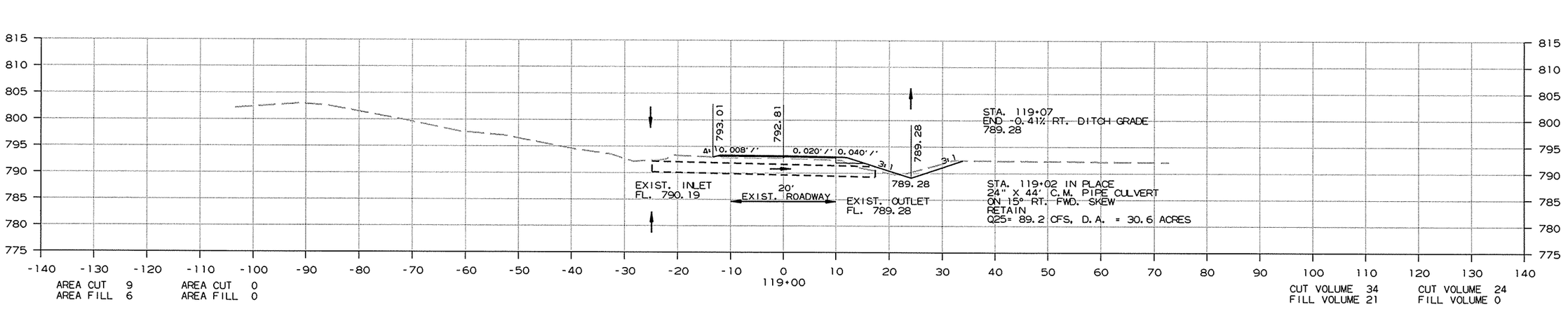
AREA

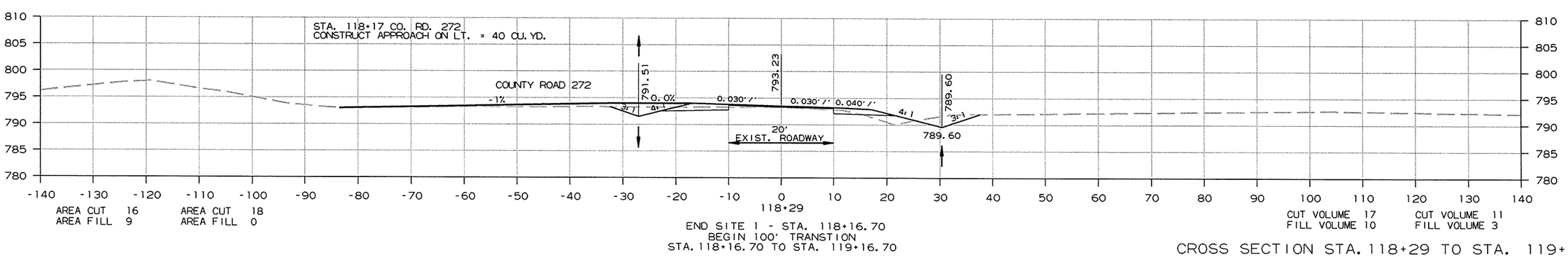
STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2







END SITE 1 - STA. 118+16.70
BEGIN 100' TRANSTION
STA. 118+16.70 TO STA. 119+16.70

CROSS SECTION STA. 118+29 TO STA. 119+17

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	81	93

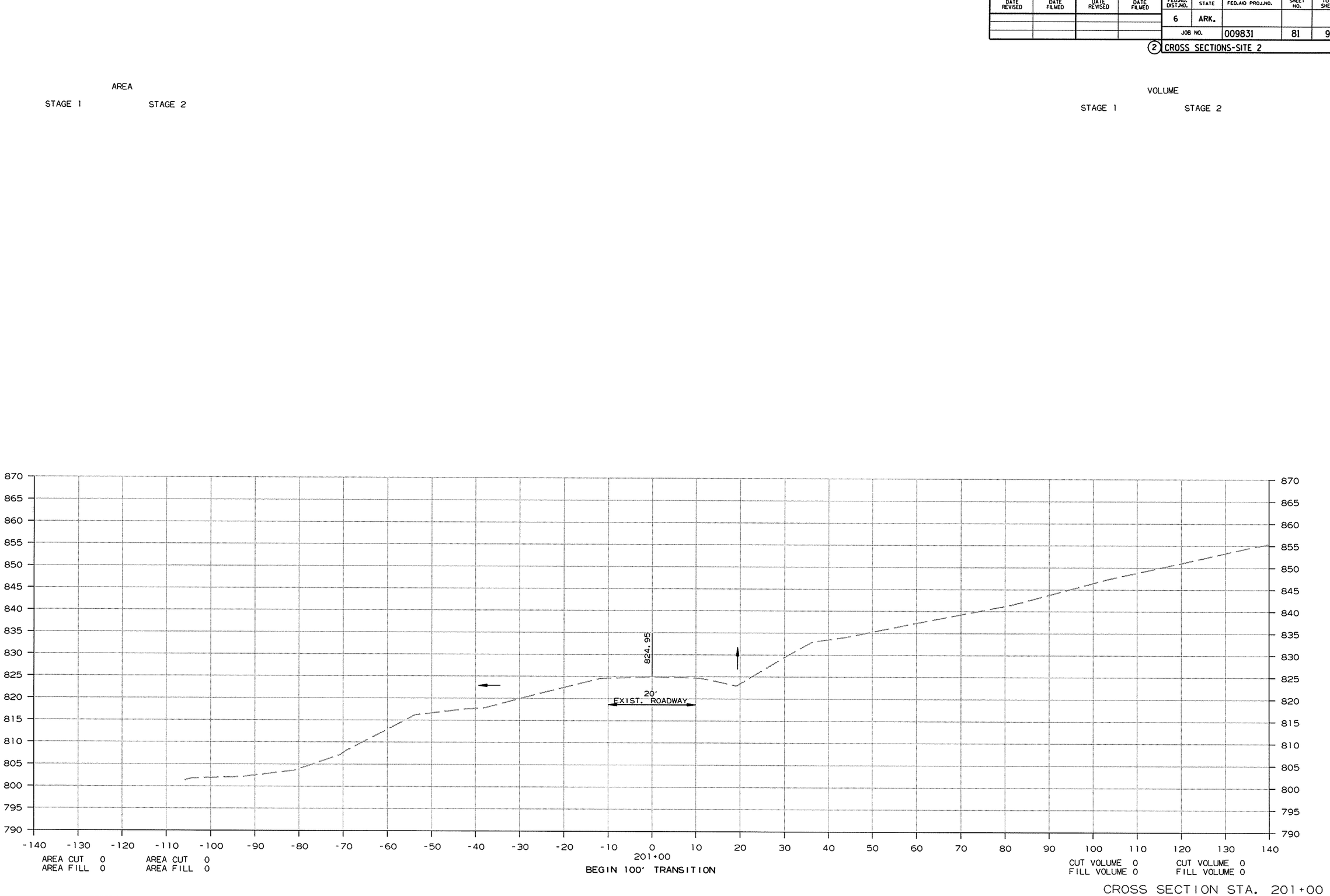
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2



CROSS SECTION STA. 201+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	82	93

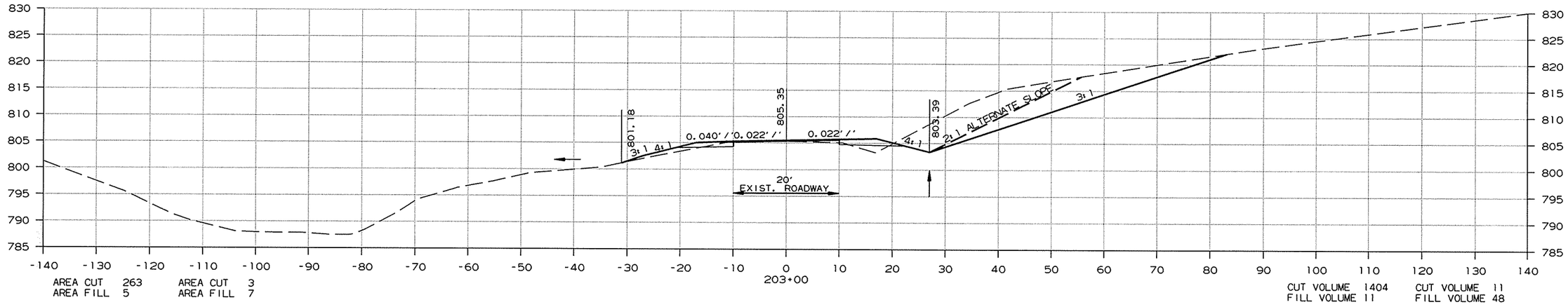
(2) CROSS SECTIONS-SITE 2

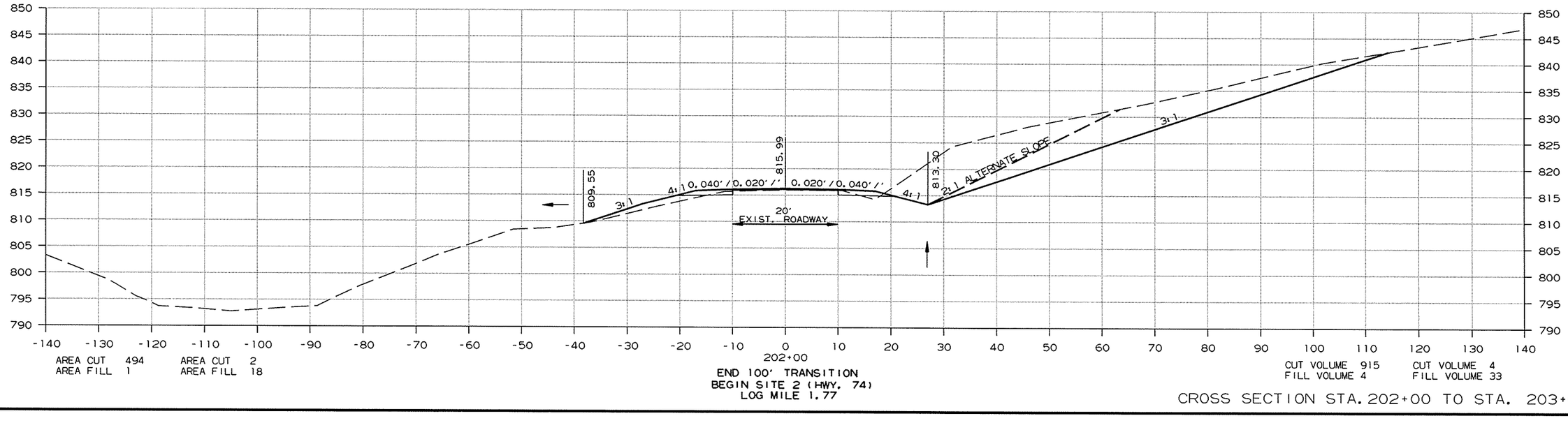
AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2





END 100' TRANSITION
BEGIN SITE 2 (HWY. 74)
LOG MILE 1.77

CROSS SECTION STA. 202+00 TO STA. 203+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	83	93

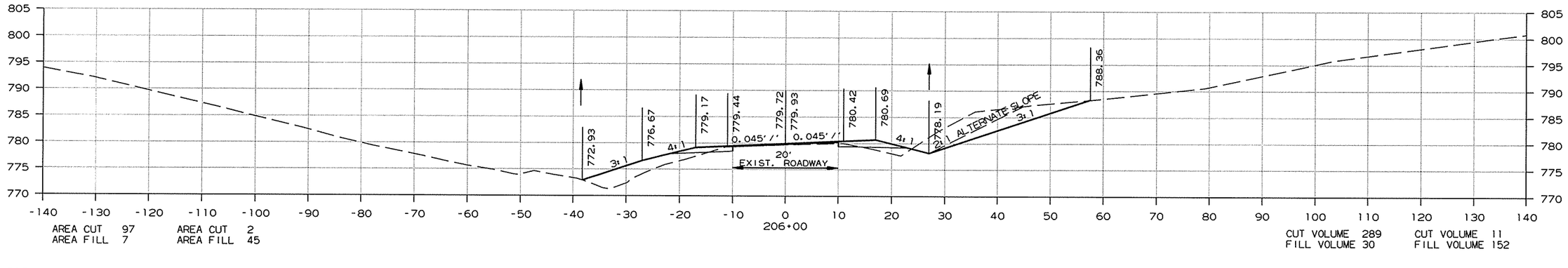
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

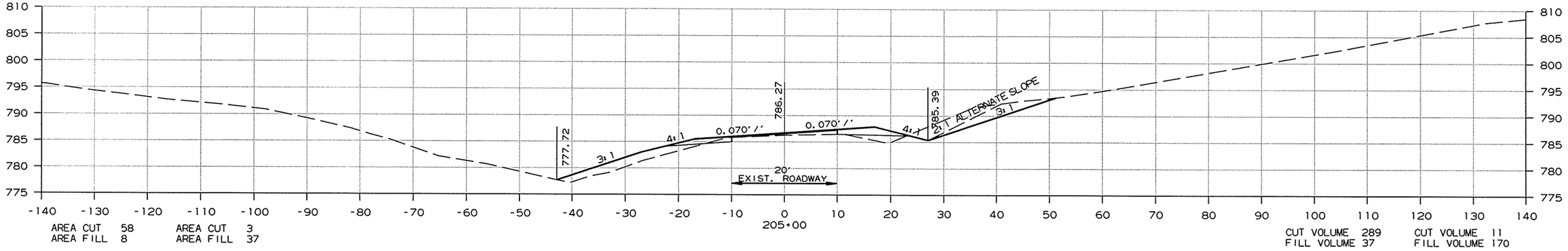
VOLUME

STAGE 1 STAGE 2



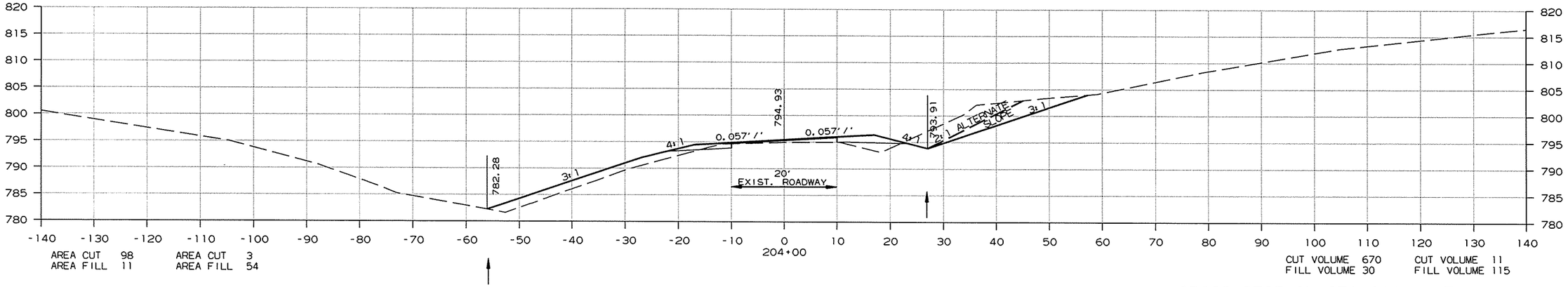
AREA CUT 97 AREA CUT 2
AREA FILL 7 AREA FILL 45

CUT VOLUME 289 CUT VOLUME 11
FILL VOLUME 30 FILL VOLUME 152



AREA CUT 58 AREA CUT 3
AREA FILL 8 AREA FILL 37

CUT VOLUME 289 CUT VOLUME 11
FILL VOLUME 37 FILL VOLUME 170



AREA CUT 98 AREA CUT 3
AREA FILL 11 AREA FILL 54

CUT VOLUME 670 CUT VOLUME 11
FILL VOLUME 30 FILL VOLUME 115

CROSS SECTION STA. 204+00 TO STA. 206+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	84	93

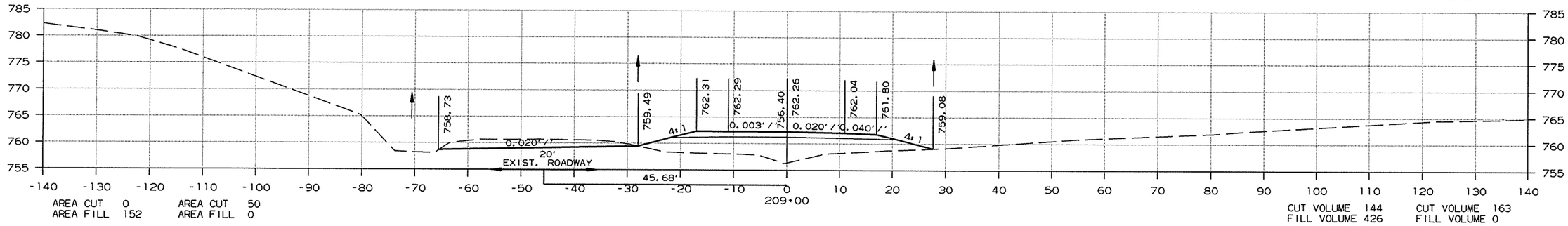
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

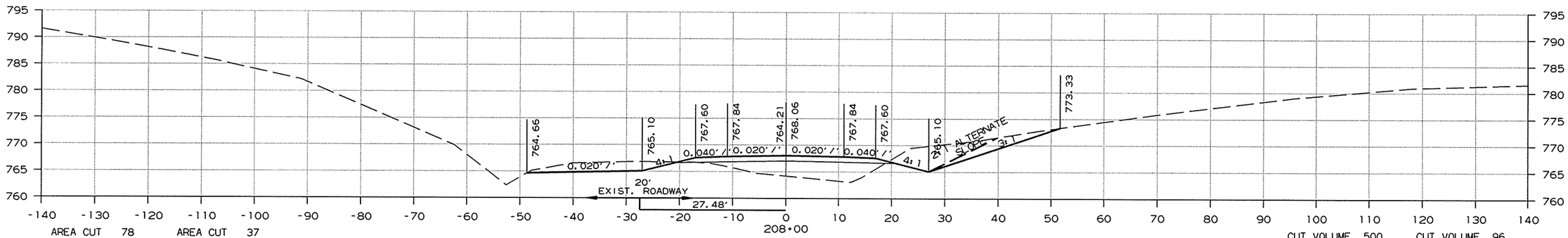
VOLUME

STAGE 1 STAGE 2



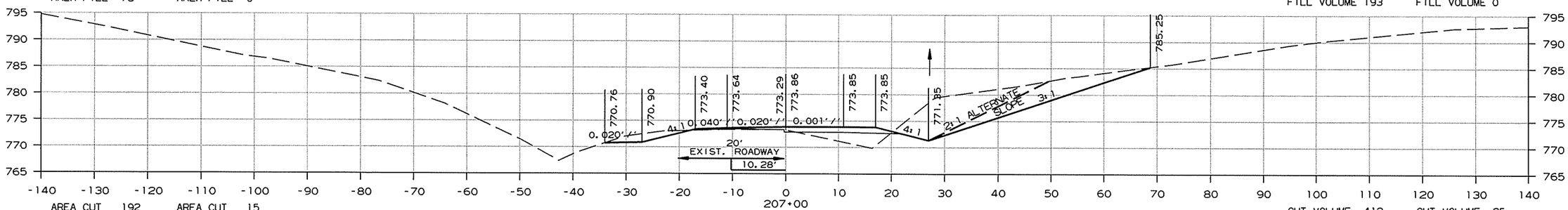
AREA CUT 0 AREA CUT 50
AREA FILL 152 AREA FILL 0

CUT VOLUME 144 CUT VOLUME 163
FILL VOLUME 426 FILL VOLUME 0



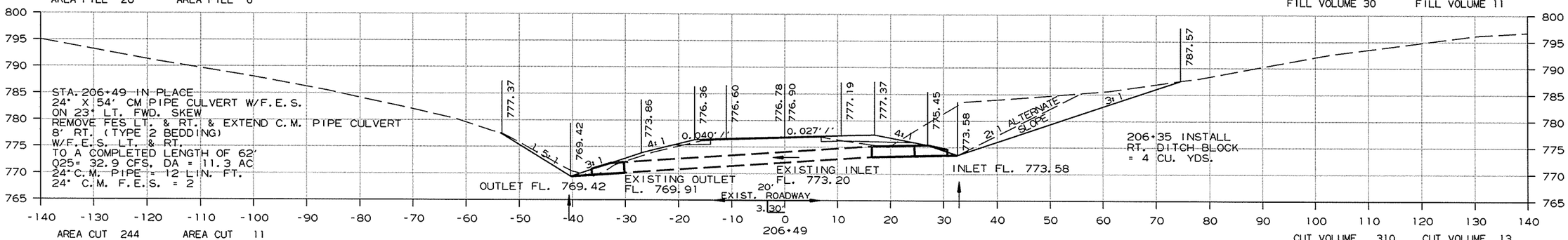
AREA CUT 78 AREA CUT 37
AREA FILL 78 AREA FILL 0

CUT VOLUME 500 CUT VOLUME 96
FILL VOLUME 193 FILL VOLUME 0



AREA CUT 192 AREA CUT 15
AREA FILL 26 AREA FILL 0

CUT VOLUME 412 CUT VOLUME 25
FILL VOLUME 30 FILL VOLUME 11



AREA CUT 244 AREA CUT 11
AREA FILL 5 AREA FILL 12

CUT VOLUME 310 CUT VOLUME 13
FILL VOLUME 11 FILL VOLUME 53

CROSS SECTION STA. 207+00 TO STA. 209+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	85	93

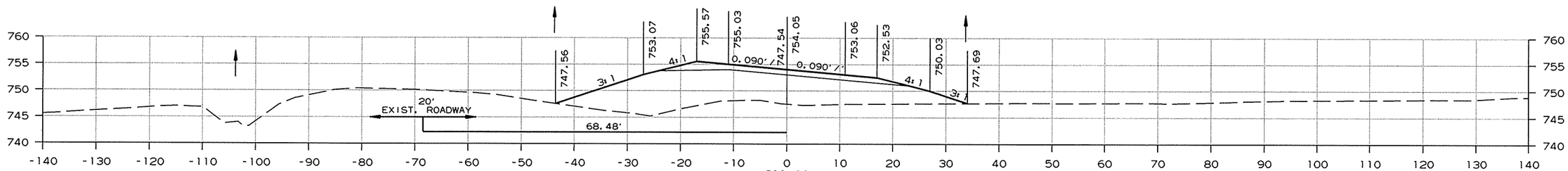
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2



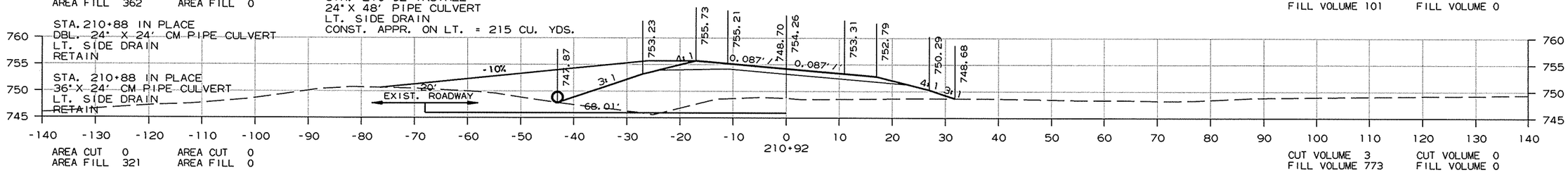
AREA CUT 0 AREA CUT 0
AREA FILL 362 AREA FILL 0

CUT VOLUME 0 CUT VOLUME 0
FILL VOLUME 101 FILL VOLUME 0

STA. 210+92 INSTALL
24" X 48' PIPE CULVERT
LT. SIDE DRAIN
CONST. APPR. ON LT. = 215 CU. YDS.

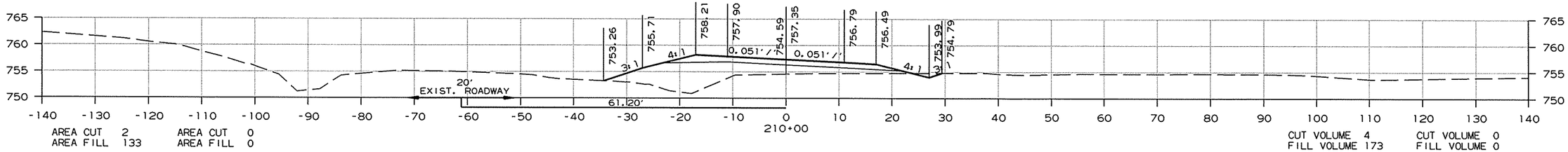
STA. 210+88 IN PLACE
DBL. 24" X 24' CM PIPE CULVERT
LT. SIDE DRAIN
RETAIN

STA. 210+88 IN PLACE
36" X 24' CM PIPE CULVERT
LT. SIDE DRAIN
RETAIN



AREA CUT 0 AREA CUT 0
AREA FILL 321 AREA FILL 0

CUT VOLUME 3 CUT VOLUME 0
FILL VOLUME 773 FILL VOLUME 0

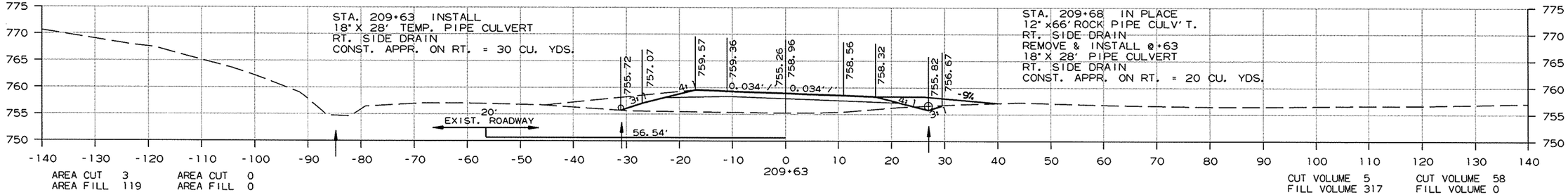


AREA CUT 2 AREA CUT 0
AREA FILL 133 AREA FILL 0

CUT VOLUME 4 CUT VOLUME 0
FILL VOLUME 173 FILL VOLUME 0

STA. 209+63 INSTALL
18" X 28' TEMP. PIPE CULVERT
RT. SIDE DRAIN
CONST. APPR. ON RT. = 30 CU. YDS.

STA. 209+68 IN PLACE
12" x66' ROCK PIPE CULV'T.
RT. SIDE DRAIN
REMOVE & INSTALL @+63
18" X 28' PIPE CULVERT
RT. SIDE DRAIN
CONST. APPR. ON RT. = 20 CU. YDS.



AREA CUT 3 AREA CUT 0
AREA FILL 119 AREA FILL 0

CUT VOLUME 5 CUT VOLUME 58
FILL VOLUME 317 FILL VOLUME 0

CROSS SECTION STA. 209+63 TO STA. 211+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	86	93

(2) CROSS SECTIONS-SITE 2

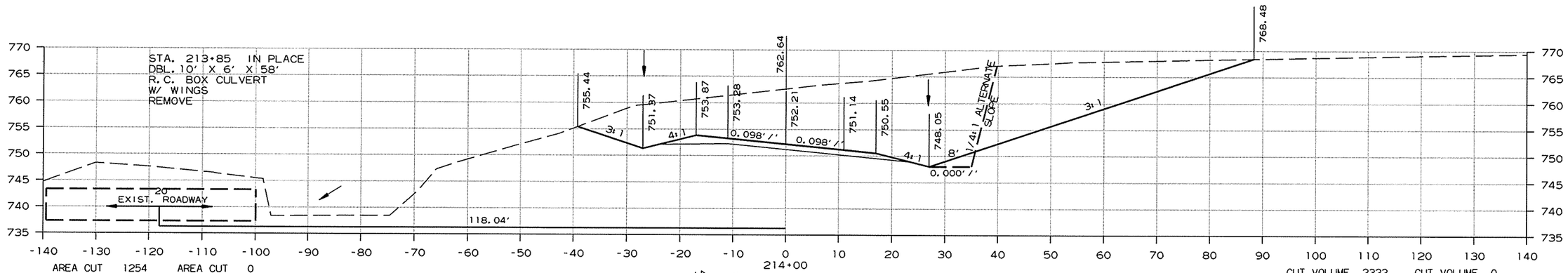
AREA

STAGE 1 STAGE 2

VOLUME

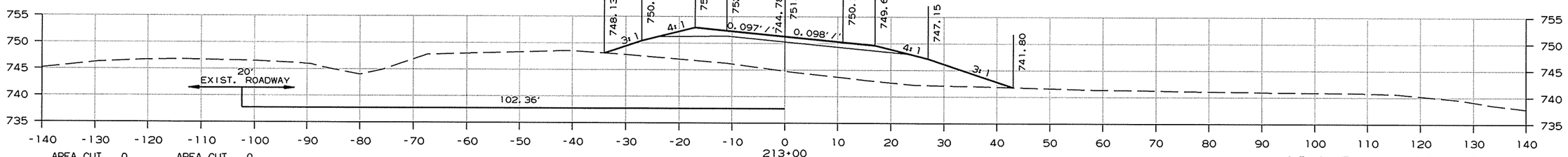
STAGE 1 STAGE 2

SLOPES MAY BE PRESPLIT
IF AND WHERE DIRECTED BY THE ENGINEER.



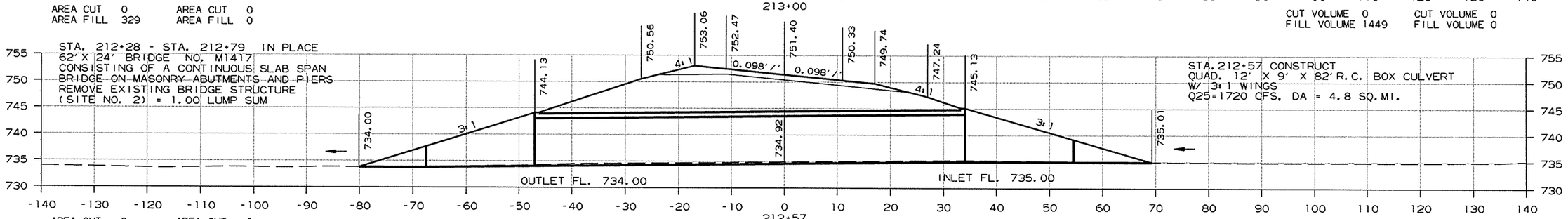
AREA CUT 1254 AREA CUT 0
AREA FILL 0 AREA FILL 0

CUT VOLUME 2322 CUT VOLUME 0
FILL VOLUME 611 FILL VOLUME 0



AREA CUT 0 AREA CUT 0
AREA FILL 329 AREA FILL 0

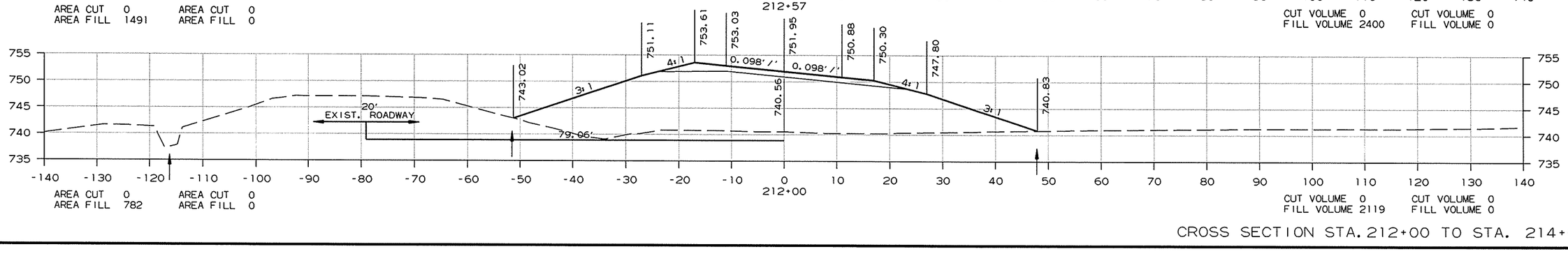
CUT VOLUME 0 CUT VOLUME 0
FILL VOLUME 1449 FILL VOLUME 0



STA. 212+57 CONSTRUCT
QUAD. 12' X 9' X 82' R.C. BOX CULVERT
W/ 3:1 WINGS
Q25=1720 CFS, DA = 4.8 SQ.MI.

AREA CUT 0 AREA CUT 0
AREA FILL 1491 AREA FILL 0

CUT VOLUME 0 CUT VOLUME 0
FILL VOLUME 2400 FILL VOLUME 0



AREA CUT 0 AREA CUT 0
AREA FILL 782 AREA FILL 0

CUT VOLUME 0 CUT VOLUME 0
FILL VOLUME 2119 FILL VOLUME 0

CROSS SECTION STA. 212+00 TO STA. 214+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	87	93

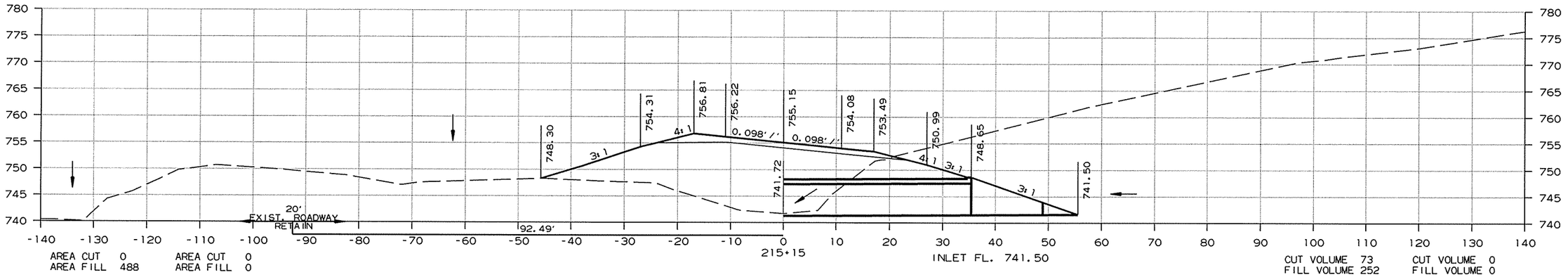
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

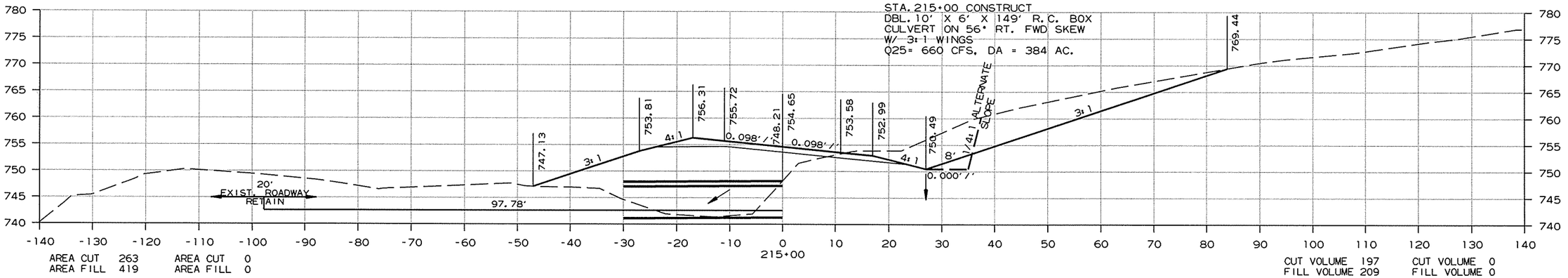
VOLUME

STAGE 1 STAGE 2



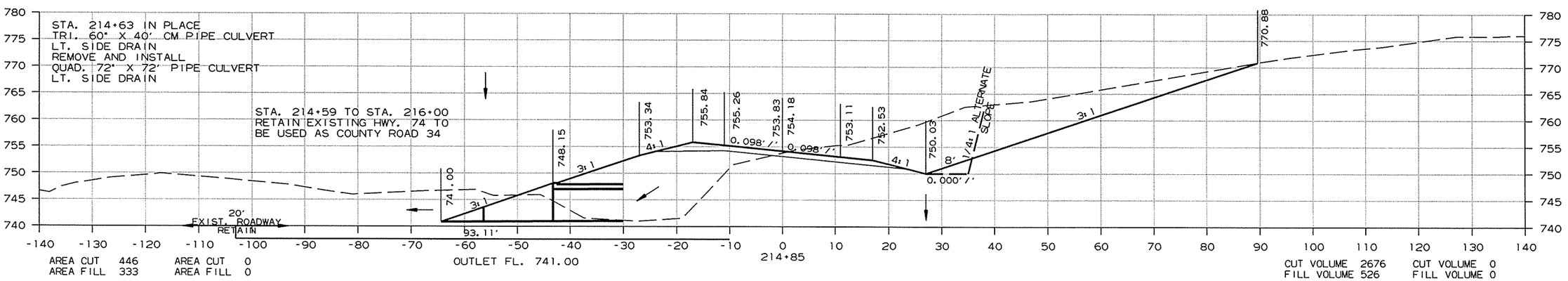
AREA CUT 0 AREA CUT 0
AREA FILL 488 AREA FILL 0

CUT VOLUME 73 CUT VOLUME 0
FILL VOLUME 252 FILL VOLUME 0



AREA CUT 263 AREA CUT 0
AREA FILL 419 AREA FILL 0

CUT VOLUME 197 CUT VOLUME 0
FILL VOLUME 209 FILL VOLUME 0



AREA CUT 446 AREA CUT 0
AREA FILL 333 AREA FILL 0

CUT VOLUME 2676 CUT VOLUME 0
FILL VOLUME 526 FILL VOLUME 0

CROSS SECTION STA. 214+85 TO STA. 215+15

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	88	93

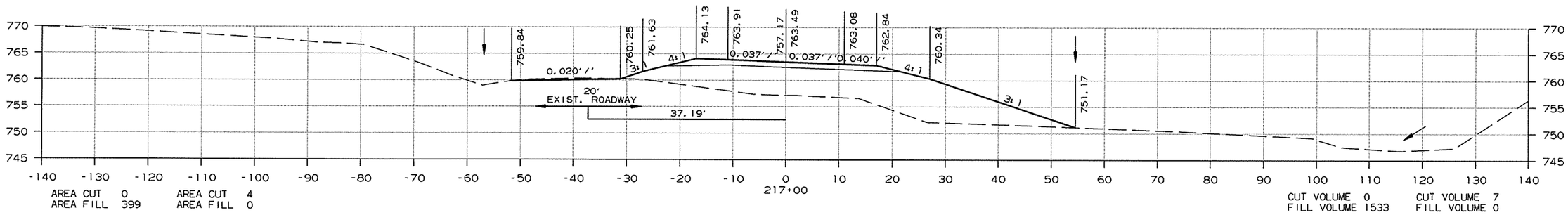
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

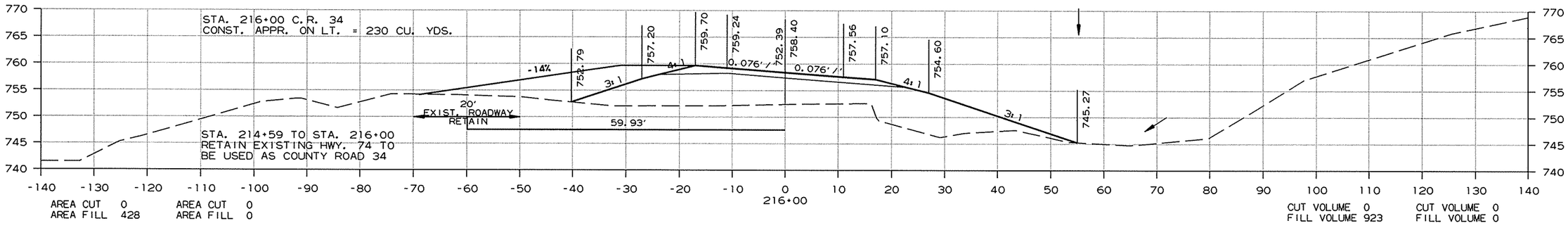
VOLUME

STAGE 1 STAGE 2



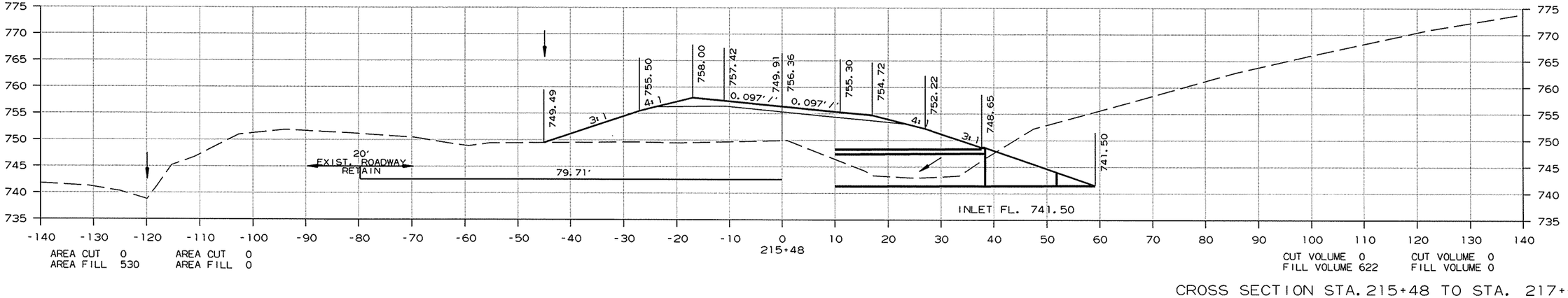
AREA CUT 0 AREA CUT 4
AREA FILL 399 AREA FILL 0

CUT VOLUME 0 CUT VOLUME 7
FILL VOLUME 1533 FILL VOLUME 0



AREA CUT 0 AREA CUT 0
AREA FILL 428 AREA FILL 0

CUT VOLUME 0 CUT VOLUME 0
FILL VOLUME 923 FILL VOLUME 0



AREA CUT 0 AREA CUT 0
AREA FILL 530 AREA FILL 0

CUT VOLUME 0 CUT VOLUME 0
FILL VOLUME 622 FILL VOLUME 0

CROSS SECTION STA. 215+48 TO STA. 217+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	89	93

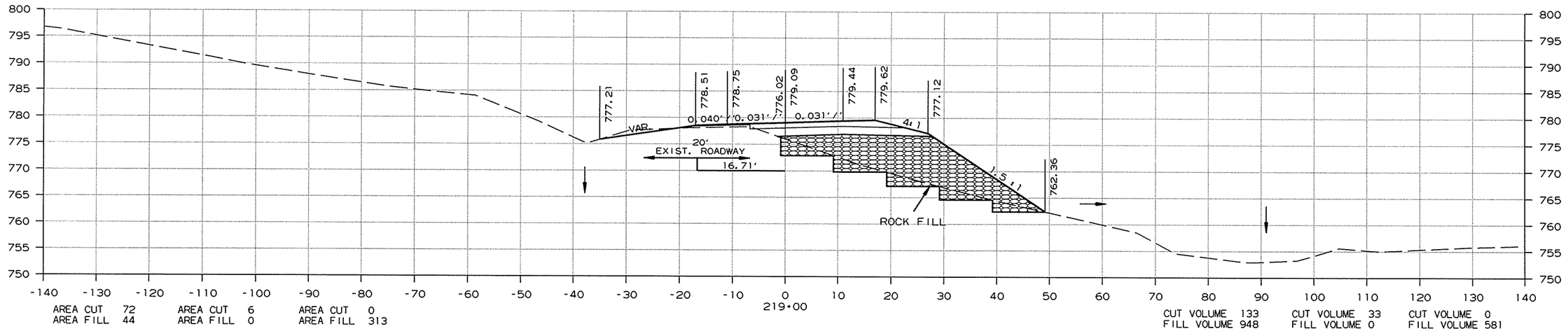
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 | STAGE 2 | ROCK FILL

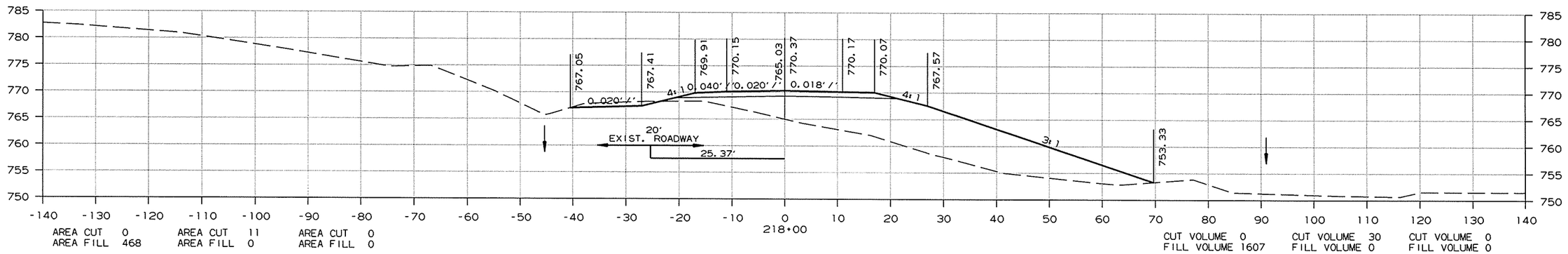
VOLUME

STAGE 1 | STAGE 2 | ROCK FILL



AREA CUT 72 | AREA CUT 6 | AREA CUT 0
AREA FILL 44 | AREA FILL 0 | AREA FILL 313

CUT VOLUME 133 | CUT VOLUME 33 | CUT VOLUME 0
FILL VOLUME 948 | FILL VOLUME 0 | FILL VOLUME 581



AREA CUT 0 | AREA CUT 11 | AREA CUT 0
AREA FILL 468 | AREA FILL 0 | AREA FILL 0

CUT VOLUME 0 | CUT VOLUME 30 | CUT VOLUME 0
FILL VOLUME 1607 | FILL VOLUME 0 | FILL VOLUME 0

CROSS SECTION STA. 218+00 TO STA. 219+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	90	93

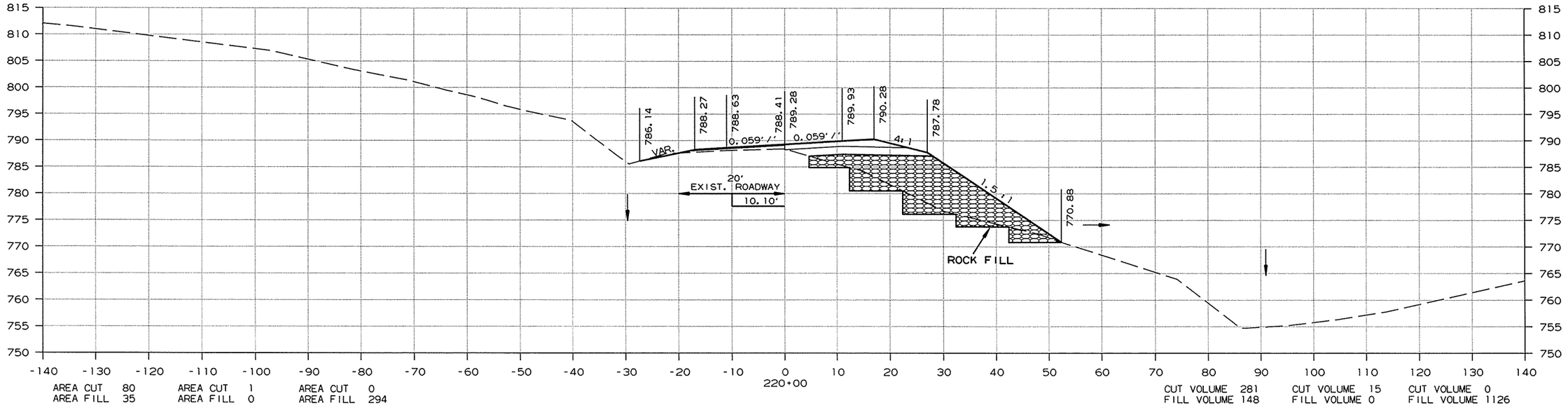
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1	STAGE 2	ROCK FILL

VOLUME

STAGE 1	STAGE 2	ROCK FILL



CROSS SECTION STA. 220+00 TO STA. 220+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	91	93

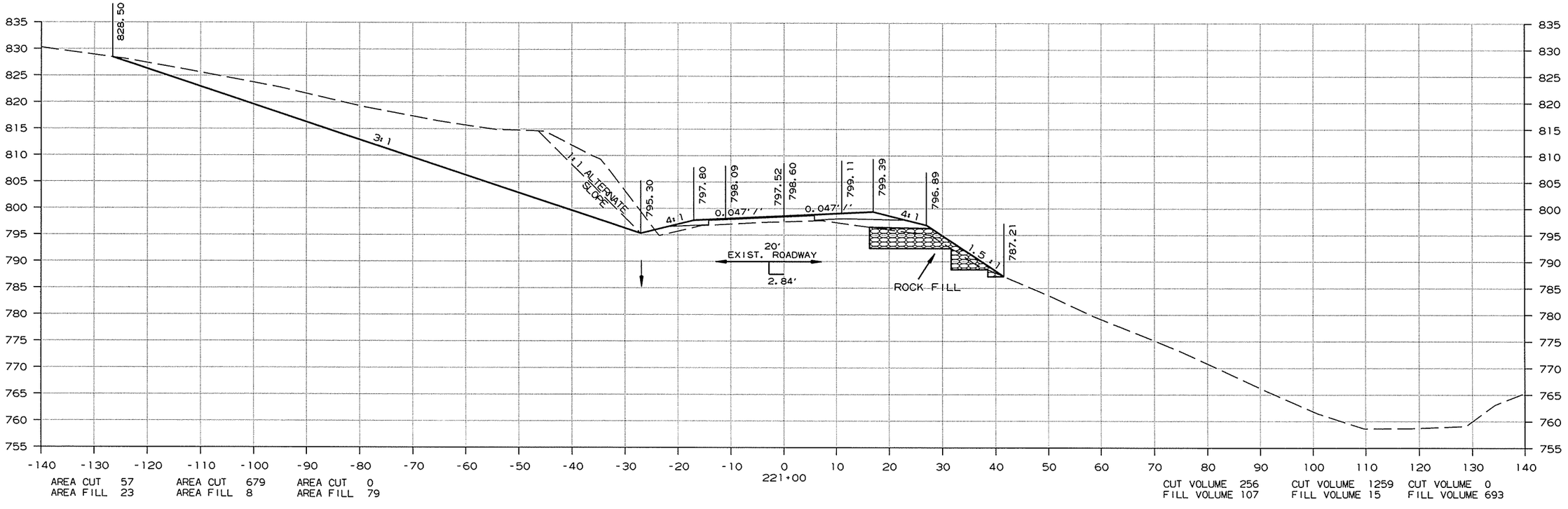
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1	STAGE 2	ROCK FILL

VOLUME

STAGE 1	STAGE 2	ROCK FILL



CROSS SECTION STA. 221+00 TO STA. 221+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	92	93

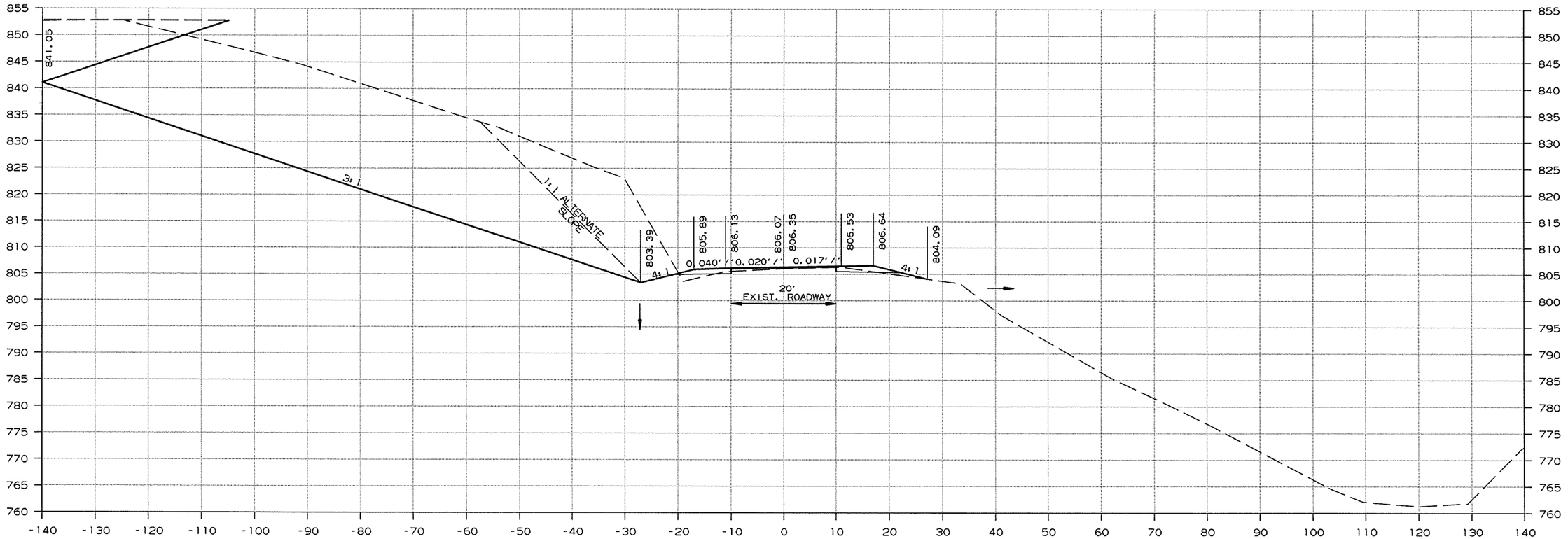
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1	STAGE 2	ROCK FILL

VOLUME

STAGE 1	STAGE 2	ROCK FILL



AREA CUT 3
AREA FILL 3

AREA CUT 2146
AREA FILL 5

AREA CUT 0
AREA FILL 0

222+00
BEGIN 100' TRANSTION
END SITE 2 &
JOB 009831

CUT VOLUME 111
FILL VOLUME 48

CUT VOLUME 5233
FILL VOLUME 26

CUT VOLUME 0
FILL VOLUME 148

CROSS SECTION STA. 222+00 TO STA. 222+00

6/22/2015

R009831.DGN

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED.RD. DIST.NO.	STATE	FED.AID PROJ.NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.			
				JOB NO.		009831	93	93

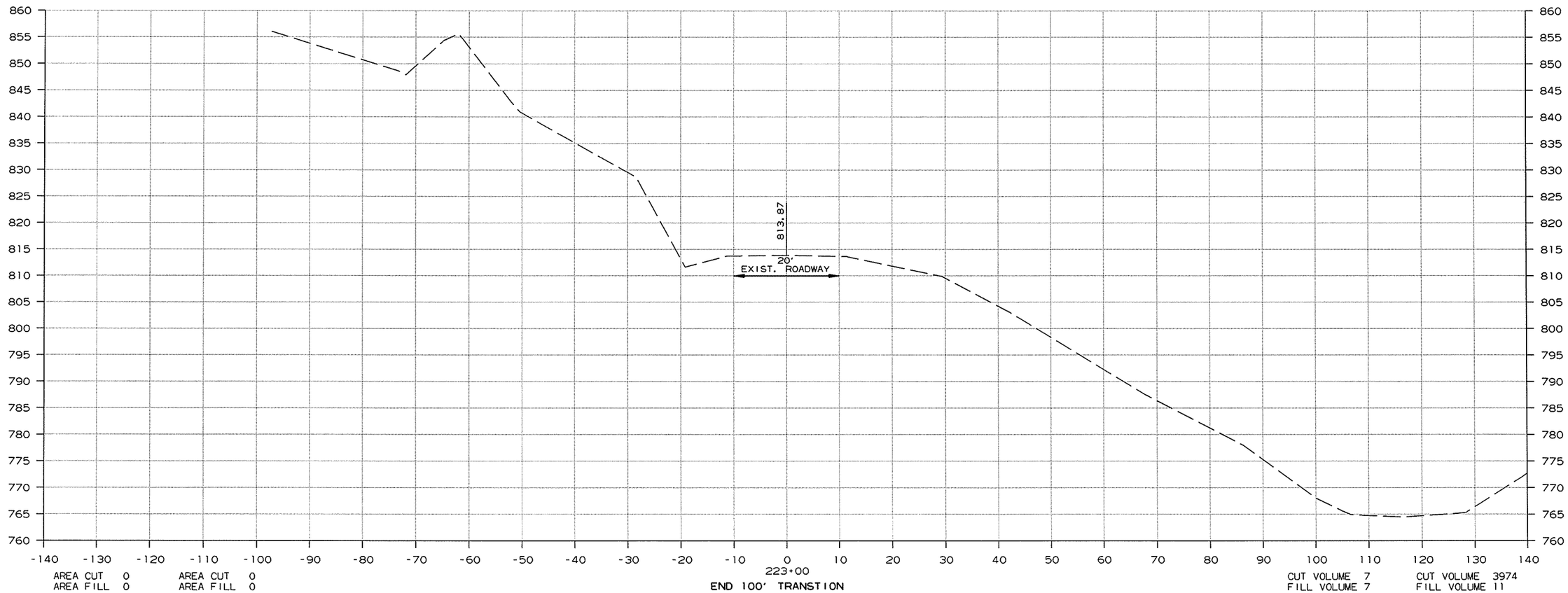
(2) CROSS SECTIONS-SITE 2

AREA

STAGE 1 STAGE 2

VOLUME

STAGE 1 STAGE 2



AREA CUT 0
AREA FILL 0

AREA CUT 0
AREA FILL 0

CUT VOLUME 7
FILL VOLUME 7

CUT VOLUME 3974
FILL VOLUME 11

CROSS SECTION STA. 223+00 TO STA. 223+00

6/22/2015

R009831.DGN