

STATE DEPARTMENT OF HIGHWAYS

DIVISION OF HIGHWAYS—STATE OF COLORADO

PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT NO. BRF 050-5(27) STATE HIGHWAY NO. 50 PROWERS COUNTY

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
XIII	COLORADO	BRF 050-5(27)	1

AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID

REVISIONS		

INDEX OF SHEETS

SHEET NO.

1. TITLE SHEET
2. STANDARD PLANS LIST
3. TYPICAL SECTIONS AND TYPICAL SECTION NOTES
4. SUMMARY OF APPROXIMATELY QUANTITIES
5. GENERAL NOTES, SUMMARY OF EARTHWORK QUANTITIES, END POST SPECIAL DETAIL AND TABULATION OF FENCING
6. TABULATION OF SURFACING QUANTITIES, CONSTRUCTION TRAFFIC CONTROL DEVICES TABULATION OF GUARD RAIL
7. STRUCTURE QUANTITIES
- 8-9. PLAN AND PROFILE SHEETS
10. DETAILS FOR SINGLE CONCRETE BOX CULVERT
11. DETAILS FOR BRIDGE RAIL TYPE 3R

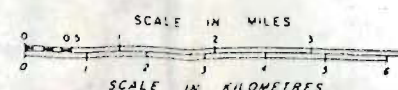
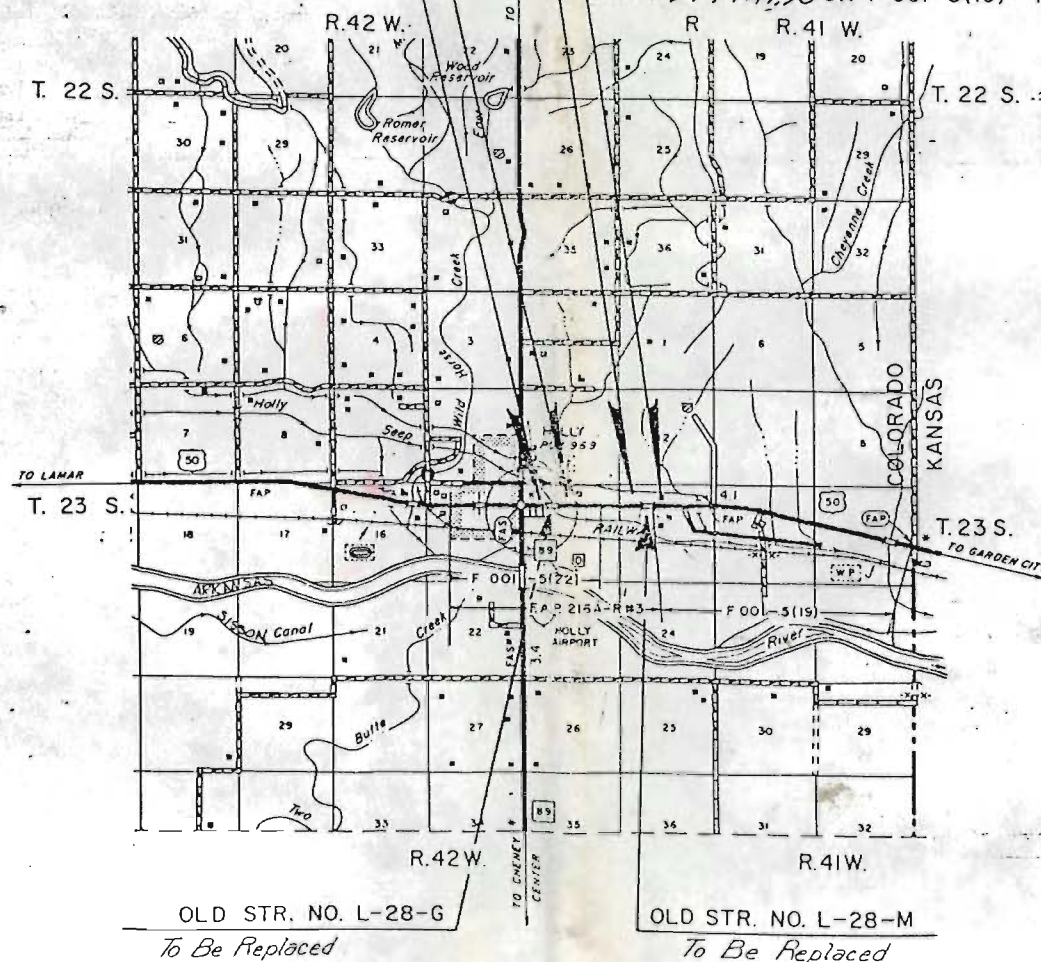
SCALES OF ORIGINAL DRAWINGS
ON PLAN, 1" = 100 FT.
ON PROFILE { 1" = 100 FT. HORIZONTAL
1" = 10 FT. VERTICAL
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

STA. 918+46 BEGIN NO WORK SECTION
BRF 050-5(27)

STA. 917+75 BEGIN BRF 050-5(27)=
STA. 917+75 ON F 001-5(22)= M.P. 463.75

STA. 966+47.11 END NO WORK SECTION
BRF 050-5(27)

STA. 977+41.95 END BRF 050-5(27)
STA. 977+41.95 ON F 001-5(19)= M.P.



TABULATION OF LENGTH AND DESIGN DATA

STATION	ROADWAY LIN. FT.	NO WORK SECTION LIN. FT.
917+75 BEGIN BRF 050-5(27)= 917+75 ON F 001-5(22)= M.P. 463.75		
918+46 BEGIN NO WORK SECTION	71.0	4801.11
966+47.11 END NO WORK SECTION	1094.84	
977+41.95 END BRF 050-5(27)= 977+41.95 ON F 001-5(19)= M.P. 464.88		
PROJECT TOTALS	1165.84	4801.11
SUMMARY	FEET	MILES
NET LENGTH	5866.95	1.13
GROSS LENGTH	1165.84	0.22
DESIGN DATA		
MAXIMUM DEGREE OF CURVE	0.09%	
MAXIMUM GRADE	450	
MINIMUM S.S.D. (VERTICAL)		
MINIMUM S.S.D. (HORIZONTAL)		
MAXIMUM DESIGN SPEED	55 MPH	
TRAFFIC DATA:		
1985 ADT = 1700		
2007 ADT = 2050		
2007 DHV = 310		
% TRUCKS = 18%		

FILE COPY
DO NOT REMOVE

Note: There are No
R.O.W. Plans for this Proj.
SEE File Box
46 For TE-1

DIVISION OF HIGHWAYS	
APPROVED:	
CHIEF ENGINEER	DATE

AS CONSTRUCTED INFORMATION	
CONTRACTOR	
ENGINEER	
(Project or Resident)	
PROJECT STARTED	
PROJECT COMPLETED	
AS CONSTRUCTED PLANS	
APPROVED	
TITLE	DATE

AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	BRF 050-5(27)	2	

Plan No.	Title	Page
☒ M-100-1	STANDARD SYMBOLS.....	1
☒ M-107-1	TEMPORARY EROSION CONTROL.....	2
☒ M-203-1	APPROACH ROADS, FLARING, CUT SLOPE TREATMENT, BRIDGE & CREST WIDENING.....	3
☒ M-203-2	DITCH TYPES.....	4
☐ M-203-10	SUPERELEVATION OF CURVES - CROWNED HIGHWAYS.....	5
☐ M-203-11	SUPERELEVATION OF CURVES - DIVIDED HIGHWAYS- SHOULDER PIVOT.....	6
☐ M-203-12	SUPERELEVATION OF CURVES - STREETS.....	7
☐ M-203-13	SUPERELEVATION OF CURVES - DIVIDED HIGHWAYS- CENTER PIVOT.....	8
☒ M-206-1	EXCAVATION AND BACKFILL FOR STRUCTURES....(2 SHEETS)	9
☐ M-206-2	EXCAVATION AND BACKFILL FOR BRIDGES.....	11
☐ M-214-1	PLANTING DETAILS.....	12
☐ M-412-1	CONCRETE PAVEMENT JOINTS.....	13
☐ M-504-1	STEEL CRIBBING.....	14
☐ M-506-1	GABIONS AND SLOPE MATTRESS.....	15
☐ M-510-1	STRUCTURAL PLATE CULVERT PIPE - H-20 LOADING.....(2 SHEETS)	16
☒ M-601-1	SINGLE CONCRETE BOX CULVERT.....	18
☐ M-601-2	DOUBLE CONCRETE BOX CULVERT.....	19
☐ M-601-3	TRIPLE CONCRETE BOX CULVERT.....	20
☐ M-601-10	HEADWALL FOR PIPE CULVERTS.....	21
☐ M-601-11	TYPE "S" SADDLE HEADWALL FOR PIPE CULVERTS.....	22
☐ M-601-12	HEADWALL, INTERCEPTING HEADWALL AND CULVERT OUTLET PAVING.....	23
☒ M-601-20	WINGWALLS FOR PIPE OR BOX CULVERTS.....	24
☐ M-603-1	METAL CULVERT PIPE - H-20 LOADING.....(2 SHEETS)	25
☐ M-603-2	REINFORCED CONCRETE PIPE.....	27
☐ M-603-3	PRECAST CONCRETE BOX CULVERT.....	28
☐ M-603-10	CONCRETE AND METAL END SECTIONS.....	29
☐ M-604-1	PIPE SEWER IN TRENCH.....	30
☐ M-604-10	INLET, TYPE C.....	31
☐ M-604-11	INLET, TYPE D.....	32
☐ M-604-12	CURB INLET, TYPE R.....(2 SHEETS)	33
☐ M-604-13	CONCRETE INLET, TYPE 13.....	35
☐ M-604-20	MANHOLES.....	36
☐ M-604-21	STEPS FOR MANHOLES & INLETS.....	37
☒ M-606-1	GUARD RAIL, TYPE 3, W-BEAM.....(8 SHEETS)	38
☒ M-606-2	GUARD RAIL, TYPE 3, W-BEAM FOR LOCAL ROADS & STREETS.....(4 SHEETS)	46
☐ M-606-10	GUARD RAIL, TYPE 4, CONCRETE BARRIER, CAST-IN-PLACE.....	50
☒ M-606-11	GUARD RAIL, TYPE 4, CONCRETE BARRIER, PRECAST-PORTABLE.....	51

Plan No.	Title	Page
☒ M-607-1	WIRE FENCES AND GATES.....(2 SHEETS)	52
☐ M-607-2	CHAIN LINK FENCE.....(3 SHEETS)	54
☐ M-607-3	BARRIER FENCE.....	57
☐ M-607-4	DEER FENCE AND GATE.....(2 SHEETS)	58
☐ M-607-10	PICKET SNOW FENCE.....	60
☐ M-608-1	CURB RAMPS.....	61
☐ M-609-1	CURBS AND GUTTERS.....	62
☐ M-611-1	CATTLE GUARD - WELDED GRILL UNITS - 10' THRU 42' ROADWAYS.....(2 SHEETS)	63
☐ M-613-1	HIGHWAY LIGHTING.....(2 SHEETS)	65
☐ M-615-1	EMBANKMENT PROTECTOR, TYPES 3 & 4.....	67
☐ M-615-2	EMBANKMENT PROTECTOR, TYPE 5.....	68
☐ M-616-1	INVERTED SIPHON.....(2 SHEETS)	69
	(ALSO USE M-603 OR M-604 AS REQUIRED)	
☐ M-620-1	FIELD LABORATORY - CLASS 1.....	70
☐ M-620-2	FIELD LABORATORY - CLASS 2.....	71
☐ M-620-11	FIELD OFFICE - CLASS 1.....	72
☐ M-620-12	FIELD OFFICE - CLASS 2.....	73

Plan No.	Title	Page
☐ S-612-1	TYPICAL DELINEATOR INSTALLATIONS.....(4 SHEETS)	75
☐ S-614-1	TYPICAL GROUND SIGN PLACEMENT.....	79
☐ S-614-2	CLASS I GROUND SIGN INSTALLATIONS.....	80
☐ S-614-3	CLASS II GROUND SIGN INSTALLATIONS.....	81
☐ S-614-4	CLASS III SIGNS, LAMINATED ALUMINUM PANELS AND POST SPACING TABLE.....(2 SHEETS)	82
☐ S-614-5	BREAK-AWAY SIGN SUPPORT DETAILS FOR GROUND SIGNS.....(2 SHEETS)	84
☐ S-614-6	CONCRETE FOOTINGS AND SIGN ISLANDS FOR CLASS III SIGNS.....(2 SHEETS)	86
☐ S-614-10	TYPICAL MARKER ASSEMBLY INSTALLATIONS.....	88
☐ S-614-11	MILEPOST SIGN AND INSTALLATION.....	89
☐ S-614-12	STRUCTURE NUMBER INSTALLATION (BRIDGE INFORMATION SHEET).....	90
☐ S-614-13	STANDARD RAILROAD CROSSING SIGNS AND MARKINGS....	91
☐ S-614-20	TYPICAL POLE MOUNT SIGN INSTALLATION.....	92
☐ S-614-21	CONCRETE BARRIER SIGN POST INSTALLATIONS.....	93
☐ S-614-22	TYPICAL MULTI-SIGN INSTALLATIONS.....	94
☐ S-614-30	INTERSTATE ROUTE MARKERS.....	95
☐ S-614-31	U. S. & COLORADO ROUTE MARKERS.....	96
☐ S-614-32	AUXILIARY MARKERS.....	97
☐ S-614-40	TRAFFIC SIGNAL INSTALLATION DETAILS...(3 SHEETS)	98
☒ S-614-50	TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION.....(4 SHEETS)	101
☒ S-614-51	BARRICADES, DRUMS, CONCRETE BARRIER (TEMP) & VERTICAL PANELS.....	105
☒ S-627-1	TYPICAL PAVEMENT MARKINGS.....(3 SHEETS)	106

THE STANDARD PLAN SHEETS INDICATED HEREON BY A
MARKED BOX ARE TO BE USED TO CONSTRUCT THIS
PROJECT.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
DIVISION OF HIGHWAYS

STANDARD PLANS LIST

M & S STANDARDS

JANUARY, 1982

TYPSEC #86119C

SUMMARY OF APPROXIMATE QUANTITIES

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
NO REVISIONS	REVISED	VOID	VIII	COLO.	BRF 050-5(27)	4

INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY										PROJECT TOTALS		DIFF. +/-	PLAN
BOOK	PAGE	SHEET				PLAN	AS CONST.									PLAN	AS CONST.		
			202	REMOVAL OF PAVEMENT MARKING	SQ FT	1000										1000			
			202	REMOVAL OF BRIDGE	EACH	2										2			
			202	REMOVAL OF FENCE	LIN FT	600										600			
			202	REMOVAL OF END ANCHORAGE	EACH	2										2			
			202	REMOVAL OF DETOUR	L S	1										1			
			203	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	CU YD	4536										4536			
			206	STRUCTURE EXCAVATION	CU YD	291										291			
			206	STRUCTURE BACKFILL (CLASS 2)	CU YD	299										299			
			210	RESET GUARD RAIL TYPE 3	LIN FT	1000	425									1000	425		
			212	SEEDING (NATIVE)	ACRE	1										1			
			213	MULCHING	ACRE TON	2										2			
			403	HOT BITUMINOUS PAVEMENT (GRADING EX) (HAUL AND ASPHALT)	TON	1213										1213			
			411	EMULSIFIED ASPHALT (SLOW-SETTING)	GAL	556										556			
			601	CONCRETE CLASS A (BOX CULVERT)	CU YD	210										210			
			602	REINFORCING STEEL	LB	17631										17631			
			606	END ANCHORAGE TYPE 3E	EACH	6										6			
			607	END POST	EACH	4										4			
			607	END POST SPECIAL	EACH	2										2			
			607	FENCE BARBED WIRE WITH TREATED WOODEN POSTS	LIN FT	584										584			
			607	16 FOOT GATE	EACH	2										2			
			612	DELINEATOR (TYPE I)	EACH	108										108			
			612	DELINEATOR (TYPE III)	EACH	104										104			
			614	FLAGGING	HOUR	500										500			
			614	TRAFFIC CONTROL SUPERVISOR	DAY	10										10			
			614	BARRICADE (TYPE 3 M-B) (TEMPORARY)	EACH	2										2			
			614	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE A)	EACH	3										3			
			614	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE B)	EACH	32										32			
			614	DRUM CHANNELIZING DEVICE (WITH LIGHT) (FLASHING)	EACH	12										12			
			614	DRUM CHANNELIZING DEVICE (WITH LIGHT) (STEADYBURN)	EACH	30										30			
			614	CONCRETE BARRIER (TEMPORARY)	LIN FT	2062										2062			
			617	DETOUR CULVERT PIPE	L S	2										2			
			620	FIELD LABORATORY (CLASS 3)	EACH	1										1			
			620	SANITARY FACILITY	EACH	1										1			
			626	MOBILIZATION	L S	1										1			
				FORCE ACCOUNT ITEMS															
			F/A01	MINOR CONTRACT REVISIONS	L.S.	1										1			
			F/A02	ON-THE-JOB TRAINEE	EACH	1										1			
			606	BRIDGE RAIL TYPE 3R	LIN FT	28										28			
			202	REMOVAL OF GUARD RAIL TYPE 3	LIN FT	627										627			
			210	RESET END ANCHORAGE	EACH	4										4			

GENERAL NOTES

THIS WILL REQUIRE 12 YELLOW REFLECTORS
8 CRYSTAL REFLECTORS

- Includes the Removal of 1 gate.

(B) THE BRACE IS TO BE MADE FROM A REGULAR LINE POST AND SECURELY FASTENED TO THE END POSTS WITH NO. 11 GAUGE GALVANIZED WIRE.

CONSTRUCTION TRAFFIC CONTROL DEVICES

SIGN CODE	LEGEND	DIMENSIONS	PANEL SIZE-QUANTITY			
			EACH			
			A	B	C	OTHER
48W20-1	POST/CONST/ (DIST)	48" x 48"		6		
48W20-2	DETOUR/ (DIST)	48" x 48"		4		
48W20-7a	FLAGGER SYMBOL	48" x 48"		4		
48W20-50	BE/PREPARED/ TO STOP	48" x 48"		4		
48W20-4	ONE LANE/ ROAD/ (DIST)	48" x 48"		2		
48E11-2	ROAD/ CLOSED	48" x 30"		2		
48M4-10(R)	DETOUR ARROW - RT	48" x 18"	7			
48M4-10(L)	DETOUR ARROW - LT	48" x 18"	1			
36E2-1(40)	SPEED/ LIMIT 40	36" x 48"		4		
24E2-1(55)	SPEED/ LIMIT 55	24" x 30"	1			
DRUM CHANNELIZING DEVICE (L) (F)						12
DRUM CHANNELIZING DEVICE (L) (SB)						30
BARRICADE (3M-B) (TEMP)						2
60G20-2	END/ CONSTRUCTION	60" x 24"		2		
CONCRETE BARRIER (TEMP)						2062
48W1-4(R)	REVERSE CURVE - RT	48" x 48"		2		
48W1-4(L)	REVERSE CURVE - LT	48" x 48"		2		
Project Totals			3	32		

NOTE: ALL CONSTRUCTION WARNING SIGNS PROVIDED ON THIS PROJECT SHALL BE PROVIDED WITH HIGH BRIGHTNESS ENCAPSULATED TYPE REFLECTIVE SHEETING. SEE SECTION 713.10 OF THE STANDARD SPECIFICATIONS.

NOTE: PAY UNIT IS LINEAL FT, NOT EACH.

TABULATION OF SURFACING QUANTITIES

STATION TO STATION	HOT BITUMINOUS PAVEMENT (HAUL & ASPHALT) - TONS						EMULSIFIED ASPHALT (SLOW-SETTING)	
	(GRADING EX)						GALS.	FINAL
	TOP LAYER	FINAL	MIDDLE LAYER	FINAL	BOTTOM LAYER	FINAL		
MAINLINE:								
WEST STRUCTURE:								
917+75 TO 918+46	Δ29		Δ29		□38		54	
EAST STRUCTURE:								
966+47 TO 971+65	Δ209						127	
971+65 TO 972+36	Δ29		Δ29		□38		54	
972+36 TO 977+42	Δ204						123	
From Structure Quantities	1							
DETOUR (EAST STRUCTURE):								
10+00 TO 21+10.95	*544						198	
10% for Irregularities	55				8			
TOTALS	1071		58		84 75		556	

Δ THICKNESS: 1 1/2"

* THICKNESS: 2 1/2"

□ THICKNESS: 2

CONTRACTOR'S SOURCE

Serviceability Index 2.5

Regional Factor 0.50

18K ESAL

Str. Coefficient (HBP) .44

Minimum R-Value (Top 2') 55

WSN = 2.08

1,218,600

TABULATION OF GUARD RAIL

STATION TO STATION	SIDE	REMOVAL OF GUARD RAIL TYPE 3	RESET GUARD RAIL TYPE 3	RESET END ANCHORAGE TYPE	CONCRETE BARRIER TEMPORARY	REMOVAL OF END ANCHORAGE
		LIN. FT.	LIN. FT.	EACH	LIN. FT.	EACH
MAINLINE:						
WEST STRUCTURE:						
916+ TO 917+	LT.	Δ100				Δ1
918+ TO 920+	LT.	Δ250 330				Δ1
918+ TO 919+	RT.	Δ100		1▲		
EAST STRUCTURE:						
969+ TO 972+	RT.	Δ135	200239	1		
970+ TO 971+	LT.	Δ25	75	1		
972+ TO 975+	LT.	Δ100	150	1		
971+93 TO 972+07					28	
DETOUR-EAST STRUCTURE:						
10+00 TO 21+10.95	RT.				2114	
10+00 TO 21+10.95	LT.				2114	
TOTALS		237 668	425 484	4	4228	2

■ INCLUDES RESET GUARD RAIL ON EAST STRUCTURE LT AND RT.

▲ RESET AND ANCHOR TO EAST STRUCTURE.

MATERIAL SHALL BE SALVAGED AND LOADED ON STATE VEHICLES AT NO EXTRA COST

STRUCTURE QUANTITIES

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
NO REVISIONS		REVISED	VOID	VIII	000.	BAF 050-5(27)	7

INDEX			LOCATION	REMOVING STRUCTURE	UNCLASSIFIED EXCAVATION CUBIC YARD		REMOVAL OF BRIDGE EACH	STRUCTURE EXCAVATION	STRUCTURE BACKFILL	AGGREGATE BASE COURSE (CLASS) GRADING (TON)		HOT BITUMINOUS PAVEMENT (TON)	CONCRETE CLASS A CUBIC YARD	REINFORCING STEEL LB.	CULVERT PIPE LINEAR FEET	"H" OVER CULV. FT.	END SECTION EACH	MISCELLANEOUS
BOOK	PAGE	SHEET		EACH	DITCH	EMB		CUBIC YARD	CUBIC YARD CL 2		(TON)	(TON)						
			917+75 to 918+46				1											
			918+00															Req'd ~ Detour Culvert Pipe Lump Sum.
			918+10			710		165	173				89	8,132				
			971+65 to 972+36				1											
			972+00			20 420		126	126				121	9,499				
			972+00 Rt.															Req'd ~ Detour Culvert Pipe Lump Sum
			972+ Rt.								1							
			Project Totals			20 ^A 1130 ^D	2	291	299				210	17,631				

Note: The FIR letter stated this. But the contractor has the option what size pipe he wants so he may use a 36" instead of a 42". Is so then not want this.

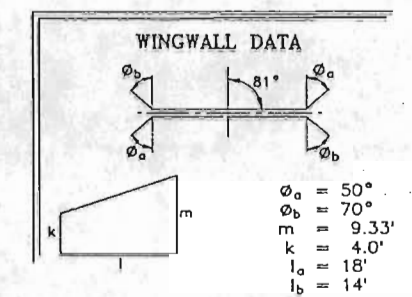
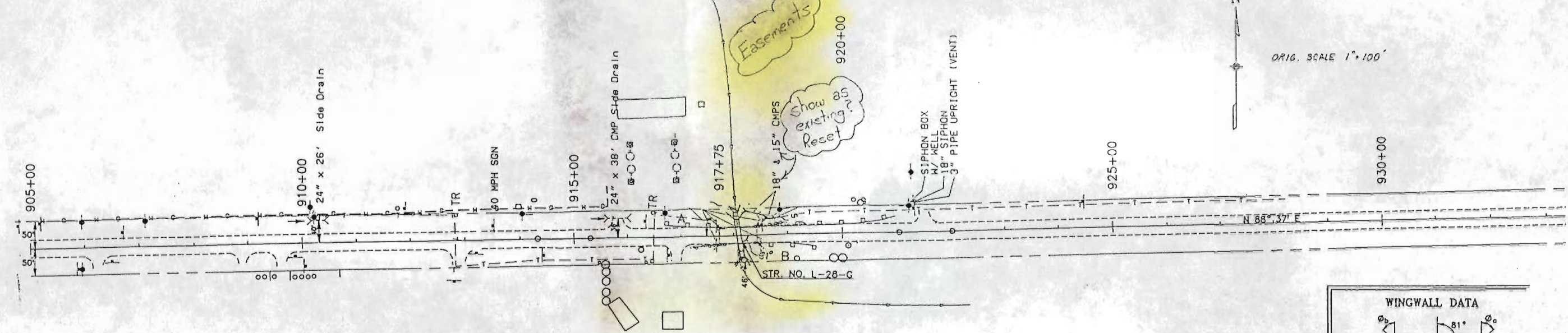
^Δ Carried to the Summary of Earthwork.
[▲] For Information Only.

- Detour Pipe when removed shall become the property of the State and shall be loaded on State Vehicles for removal by State Forces

Note: The FIR letter stated this. But the contractor has the option of what size pipe he wants so he may use a size other than 36". We may not want this restriction.

WEST STRUCTURE

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
NO REVISIONS	REVISED	VOID	VIII	COLO.	BRF 050-5(27)	8



917+75 to 918+46 ~ Remove Bridge

918+10 ~ SKEW 81° RT. REQ'D. 6' x 8' x 85' CBC (SPECIAL)
WITH HEADWALLS AND WINGWALLS LT. AND RT.
BURY FLOWLINE TWO FEET.

DA = 290 ACRES
DHW = 3382.0'
AHW = 3385.0'
Q₂₅ = Q DESIGN 255 CFS*
Q₁₀₀ = 415 CFS*
HW = 3385.0'
*INCLUDES WATER RIGHT FOR HOLLY DITCH OF 2.3 CFS

918+00 ~ REQ'D DETOUR CULVERT PIPE
(DESIGN BASED ON 36" PIPE)

NO. 1A	NO. 1B	NO. 1C	NO. 2A	NO. 2B
A1 = 6(0)	A2 = 4(0)	A3 = 6(3)	SIMILAR TO 1A	SIMILAR TO 1B
LL = 20	LL = 23	LL = 26		
PI = 5	PI = 9	PI = 13		
x200 = 9	x200 = 19	x200 = 48		
"R" = 74	"R" = 55	"R" = 23		
MR = 28,900 PSI	MR = 15,500 PSI	MR = 5,400 PSI		

REPRESENTS MATERIAL FOR 1500 FEET
WEST OF WEST ABUTMENT

NO. 1A
(175' WEST OF
L-28-M EBL)

NO. 1B
NO. 1C

R_L = 75.50

NO. 2A
NO. 2B
(175' EAST OF L-28-M WBL)

REPRESENTS MATERIAL FOR 1500 FEET
EAST OF EAST ABUTMENT

PLAN	SURVEYED	DATE
BY	0. LOZLIN	7-86
NOTE BOOK	PLOTTED	7-86
RT. OF WAY CHECKED	RT. OF WAY CHECKED	5-87

PROF. ILE	SURVEYED	DATE
BY	0. LOZLIN	7-86
NOTE BOOK	PLOTTED	7-86
RT. OF WAY CHECKED	RT. OF WAY CHECKED	5-87

EAST STRUCTURE

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
NO REVISIONS	REVISED	VOID	III	COLO.	BRF 050-5(27)	9

ORIGINAL SCALE: 1" = 100'

PLAN	DATE	BY	DATE
10/24/02	10/24/02	10/24/02	10/24/02

DETOUR CURVE DATA

DELTA = 9° 36' 56.8"
D = 3° 30'
T = 137.692'
L = 274.736'
R = 1637.022'
MDS = 55 MPH
e = -0.020 FT./FT.

NOTE: CURVE DATA IS IDENTICAL FOR ALL 4 CURVES.

971+65 to 972+36
~ Remove Bridge

972+00 ~ REQ'D. DETOUR CULVERT PIPE
(SEE SPECIAL PROVISIONS FOR SIZE)

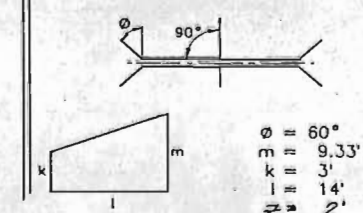
972+00 ~ REQ'D. 12' x 8' x 56' CBC (SPECIAL)
WITH HEADWALLS AND WINGWALLS LT. AND RT.
BURY FLOWLINE TWO FEET.

*DA = 585 acres
*Q₂₅ = 682 CFS
DHW = 3377.0'
AHW = 3378.45'
*Q₁₀₀ = 1180 CFS
HW = OVERTOPPING

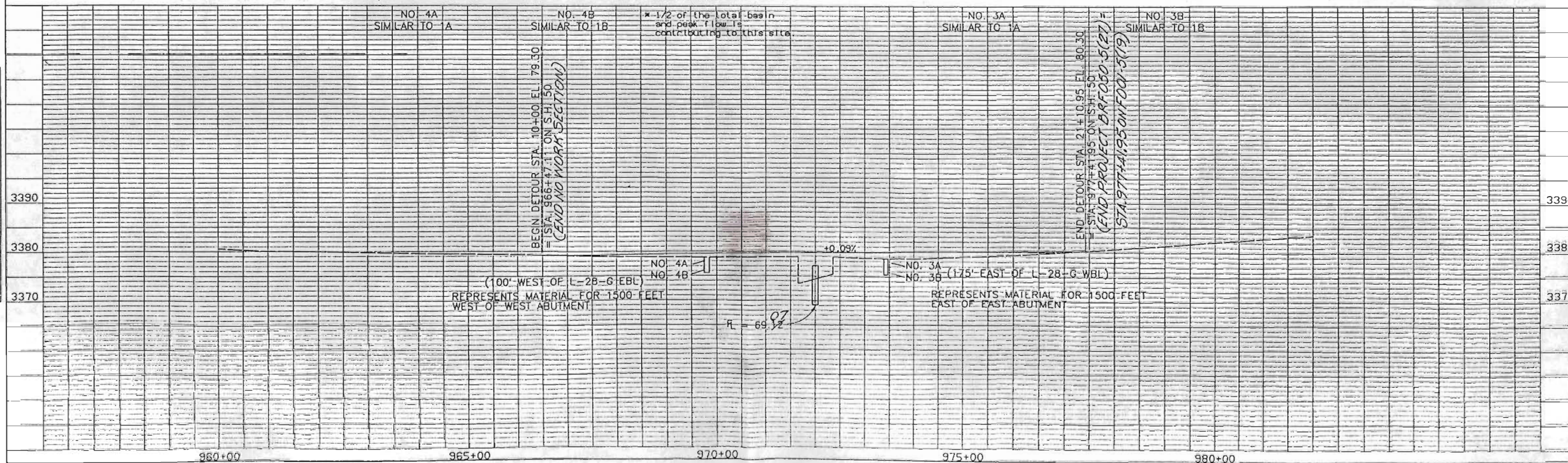
* 1/2 of the total basin
and peak flow is
contributing to this str.

972+RT
Req'd Field Entrance Rt.
W=16' R=20'

WINGWALL DATA



PROFILE	DATE	BY	DATE
10/24/02	10/24/02	10/24/02	10/24/02



HEADWALL & TOEWALL
QUANTITIES

Z-bars	APPROX. QUANTS. FOR ONE HEADWALL & TOEWALL
#	LBS. PER LINEAR FT.
4	13
Concrete = 0.085 cu.yds./lin.ft.	

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the project.

For construction details of Structure Excavation and Backfill see Standard M-206-1.

All construction joints shall be thoroughly cleaned before fresh concrete is poured and approved by the Engineer.

Splice quantities for longitudinal bars are not included in the table.

All exposed corners on concrete shall be chamfered 3/4".

All concrete shall be Class A (Box Culvert). (28 days strength 3000 psi)

DESIGN DATA: AASHTO, 1983 (LOAD FACTOR)
Unit Stresses: $f_y = 60,000$; $f_c = 3000$; $n = 10$

DESIGN CRITERIA: Culvert in trench on unyielding subgrade, or culvert untrenched on yielding foundation.

LOADING DATA:
Live Load = HS 20-44 or Interstate Alternate
Dead Load = Earth Load = 84 lbs./cu.ft.
Equivalent Fluid Pressure = 36 lbs./cu.ft.

The minimum splice length for common bar sizes shall be:
Bar #4 #5 #6 #7 #8 #9
Length 1'-0" 1'-3" 1'-8" 2'-3" 3'-0" 3'-10"

REINFORCING DETAILS

Bar Size	Spacing	Length
#	(inches)	(ft.-in.)
F1	4	8.5 IN. 7- 0.0
W1	5	18.0 IN. 8-11.0
W2	4	10.0 IN. 7- 5.0
W3	4	10.0 IN. 7- 6.0
S1	4	10.0 IN. 7- 0.0

LONGITUDINAL BARS

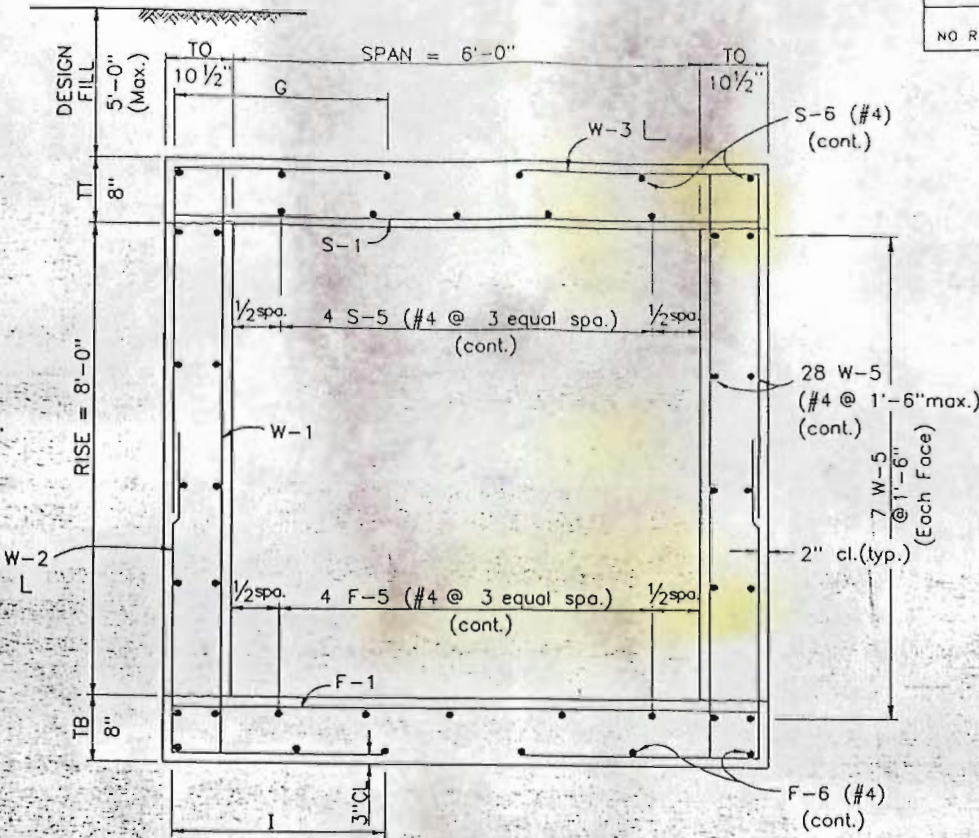
Bar	Number
F5	4
F6	6
W5	28
S5	4
S6	6

BAR DIMENSIONS

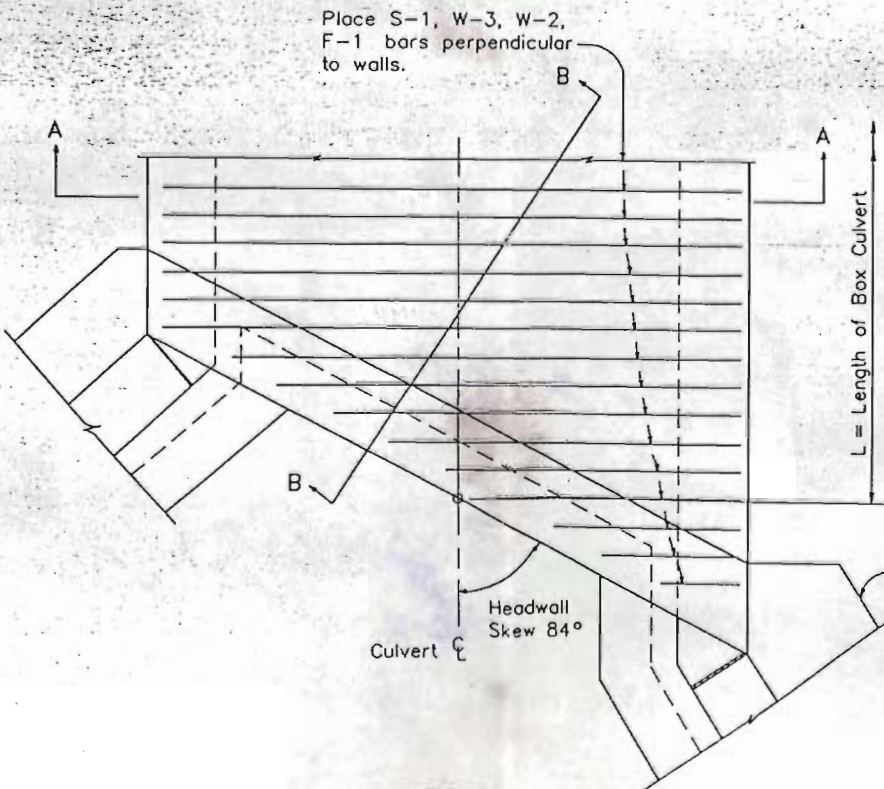
Dimension	Length	For Bar
	(ft.-in.)	
I	2- 6.0	W2
F	1- 2.0	S2
G	2- 6.0	W3

AS CONSTRUCTED
NO REVISIONS ☐ REVISED ☐ VOID ☐

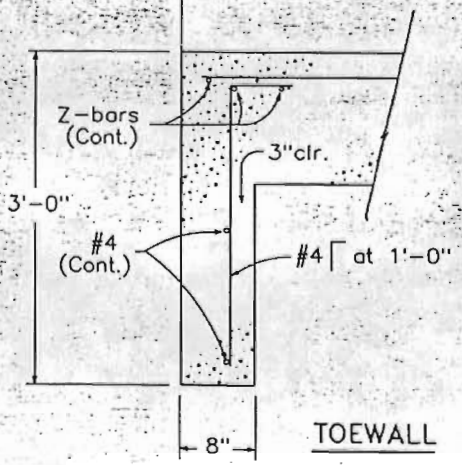
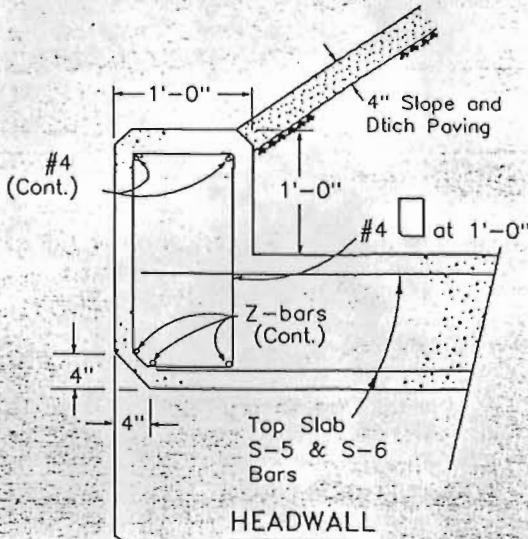
FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
VIII	COLO.	BRF 050-5(27)	10
REVISIONS			



SECTION A-A



PLAN



SECTION B-B

QUANTITIES (Per foot of Barrel)
Concrete .76 cu. yds.
Reinforcement 80 lbs.

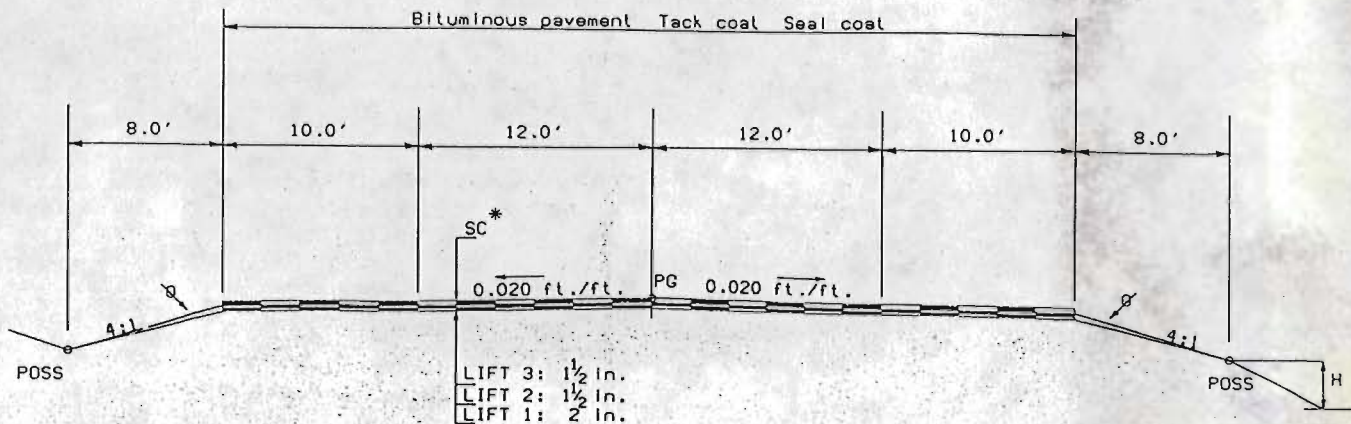
DIVISION OF HIGHWAYS

SINGLE
CONCRETE BOX CULVERT
EAST OF HOLLY

DESIGNER Singh	STRUCTURE	Minor
DETAILER Boomer	NUMBERS	
DRAWING NUMBER B 1	OF 1	DRAWINGS

REVISION DATES (PRELIMINARY STAGE ONLY)

TYPICAL SECTION A
STATION 917+75 TO STATION 918+46, STATION 971+65 TO STATION 972+36



The depth and width of the ditch shall be varied where necessary in order to provide proper drainage.

Material shall be placed in courses at the following approximate rates per 100 lin. ft. of roadway:

LIFT 3	4 1/2 tons
LIFT 2	4 1/2 tons
LIFT 1	4 1/2 tons

The contractor will be required to place suitable material to this line after completion of paving operation.

Break points on slopes and in bottoms of ditches shall be rounded during construction for a pleasing appearance. See Standards for Details of Cut Slope Treatment, Flaring, and Widening.

The top 2 feet of embankment material shall have a minimum "R" value of 55.

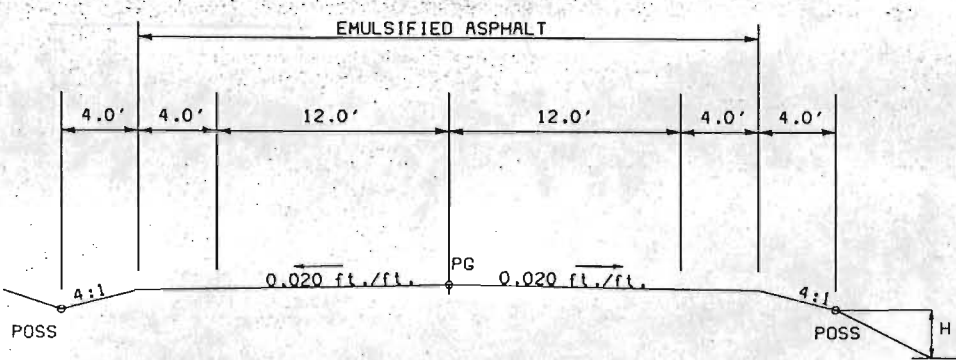
FILL SLOPES:
Slope 4:1 where 'H' is less than 10'
Slope 3:1 where 'H' is 10' to 15'
Slope 2:1 where 'H' is over 15'
In special cases, slope may be steepened.

The rates shown have been determined from information available at time of design. Rates should be adjusted during construction to obtain the required approximate thickness.

* Approximate thickness.

TYPSEC #86119A

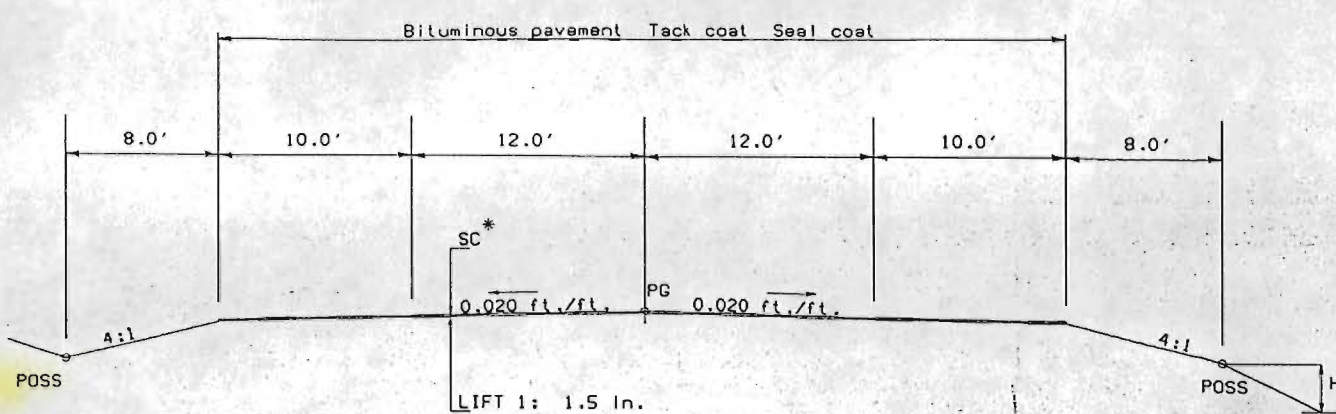
TYPICAL SECTION D
WEST DETOUR
STATION 0+00 TO STATION 7+77.99



TYPSEC #86119B

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
NO REVISIONS	REVISED	VOID	VIII	COL.	BRF 050-5(27)	West Detour

TYPICAL SECTION B
STATION 966+47.11 TO STATION 971+65
STATION 972+36 TO STATION 977+41.95



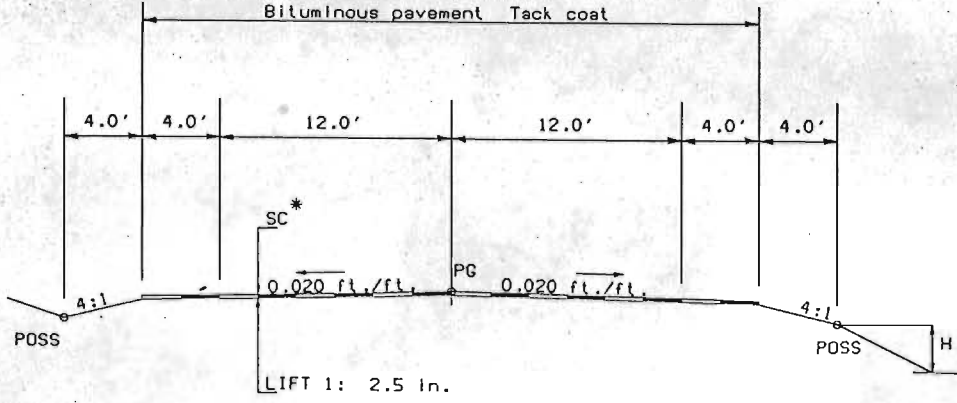
Break points on slopes and in bottoms of ditches shall be rounded during construction for a pleasing appearance. See Standards for Details of Cut Slope Treatment, Flaring, and Widening.

Material shall be placed in courses at the following approximate rates per 100 lin. ft. of roadway:

Bituminous pavement	4 1/2 tons
---------------------	------------

* Approximate thickness.

TYPICAL SECTION C
EAST DETOUR
STATION 10+00 TO STATION 21+10.95



Material shall be placed in courses at the following approximate rates per 100 lin. ft. of roadway:

Bituminous pavement	4 1/2 tons
---------------------	------------

* Approximate thickness.

TYPSEC #86119C

PLAN	SURVEYED	DATE
NO. 34102	BY O. LOOKIN	7-86
NOTE: ROK PLANNED CHECKED	105	5-87
NOTE: ROK PLANNED CHECKED	105	5-87

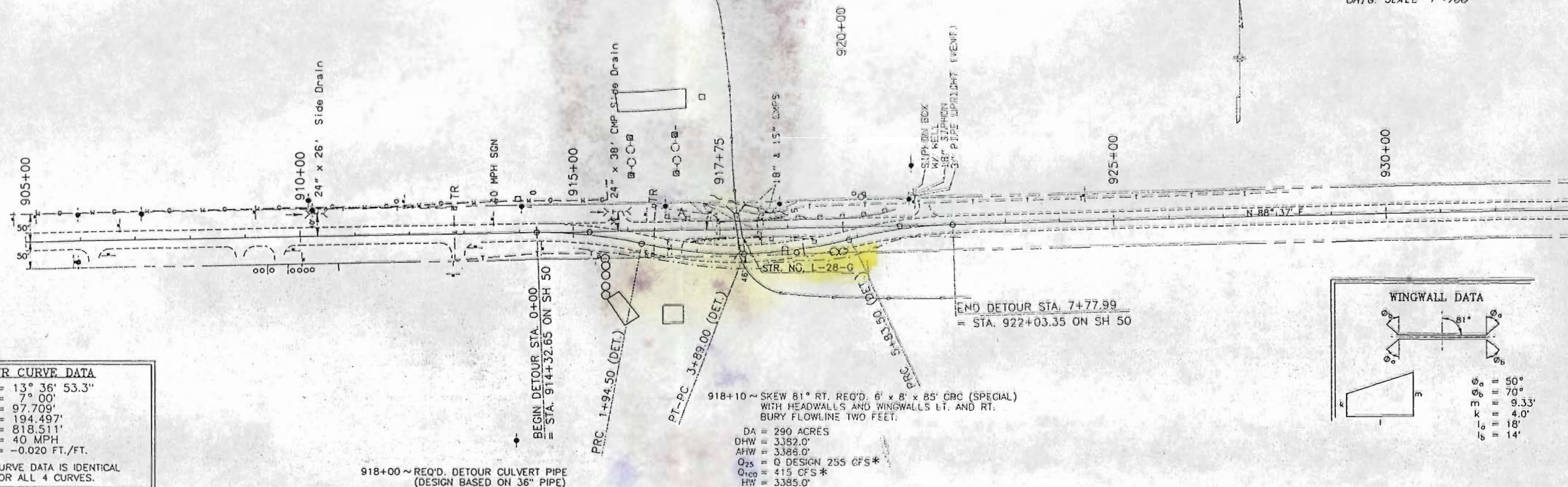
PROFILE	SURVEYED	DATE
NO. 34102	BY O. LOOKIN	7-86
NOTE: ROK PLANNED CHECKED	105	5-87
NOTE: ROK PLANNED CHECKED	105	5-87

NO number 07/16/97 01:30:13 DUAL: (DRAW.PJ.86119.RMKY.H104.PPS) CTRX1

AS CONSTRUCTED	FED. ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.
NO REVISIONS ☐ REVISER ☐ VOID ☐	VIII	COLO.	BRF 050-5(27)	West 5 Detour

ORIG. SCALE 1"=100'

WEST STRUCTURE



DETOUR CURVE DATA

DELTA = 13° 36' 53.3"
D = 7° 00'
T = 97.709'
L = 194.497'
R = 818.511'
MDS = 40 MPH
e = -0.020 FT./FT.

NOTE: CURVE DATA IS IDENTICAL FOR ALL 4 CURVES.

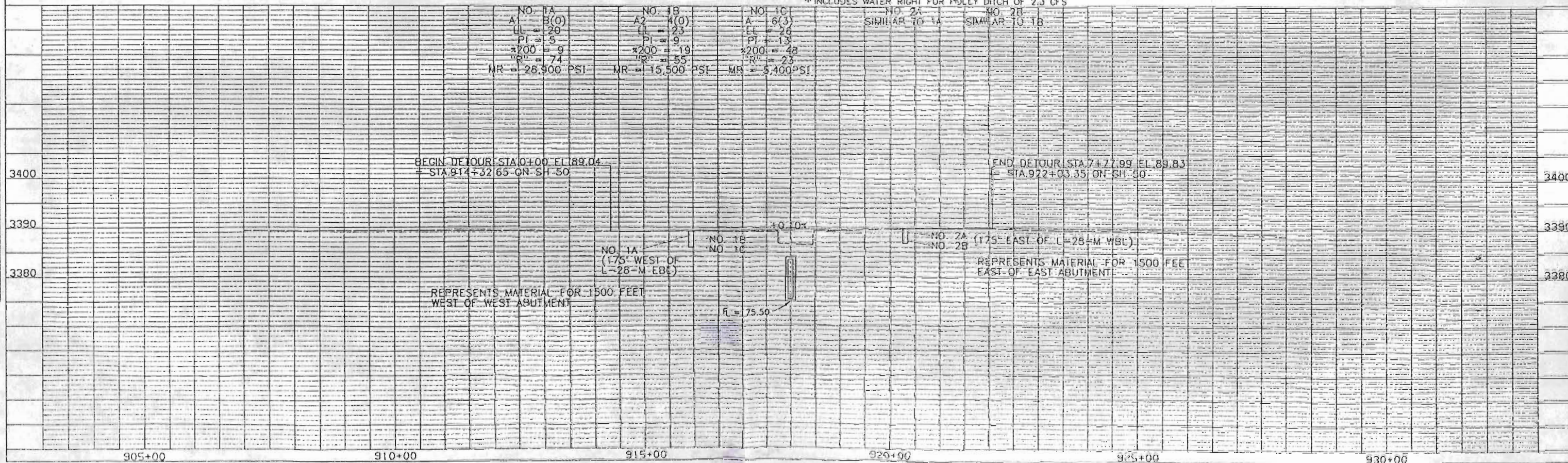
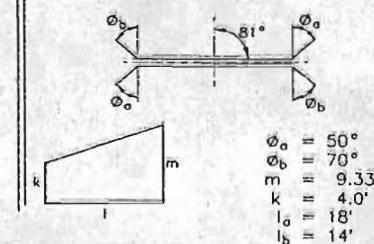
918+00 ~ REQ'D. DETOUR CULVERT PIPE
(DESIGN BASED ON 36" PIPE)

918+10 ~ SKEW 81° RT. REQ'D. 6' x 8' x 85' CBC (SPECIAL)
WITH HEADWALLS AND WINGWALLS LT. AND RT.
BURY FLOWLINE TWO FEET.

DA = 290 ACRES
DHW = 3382.0'
AHW = 3386.0'
Q₂₅ = Q DESIGN 255 CFS*
Q₁₀₀ = 415 CFS*
HW = 3385.0'

*INCLUDES WATER RIGHT FOR HOLLY DITCH OF 2.3 CFS

WINGWALL DATA



EXCAVATION AREA EMBANKMENT
CU. YDS. AREA CU. YDS. CU. YDS. EXCAVATION AREA EMBANKMENT
CU. YDS. AREA CU. YDS.

FED. ROAD REGION DIVISION PROJ. NO. SHEET NO.
VIII COLO. 9AF 050-5(27) 101

AS CONSTRUCTED
NO REVISIONS REVISED VOID

SCALE 1" = 10' H. & V.

FINAL SURVEY
NOTE BOOK NO. 1
DATE
BY
SURVEYED
PLANNED
CHECKED
AREAS CHECKED

ORIGINAL SURVEY
NOTE BOOK NO. 1
DATE
BY
SURVEYED
PLANNED
CHECKED
AREAS CHECKED

EMB. (NET) TO REPLACE BRIDGE (STR. L-28-6)

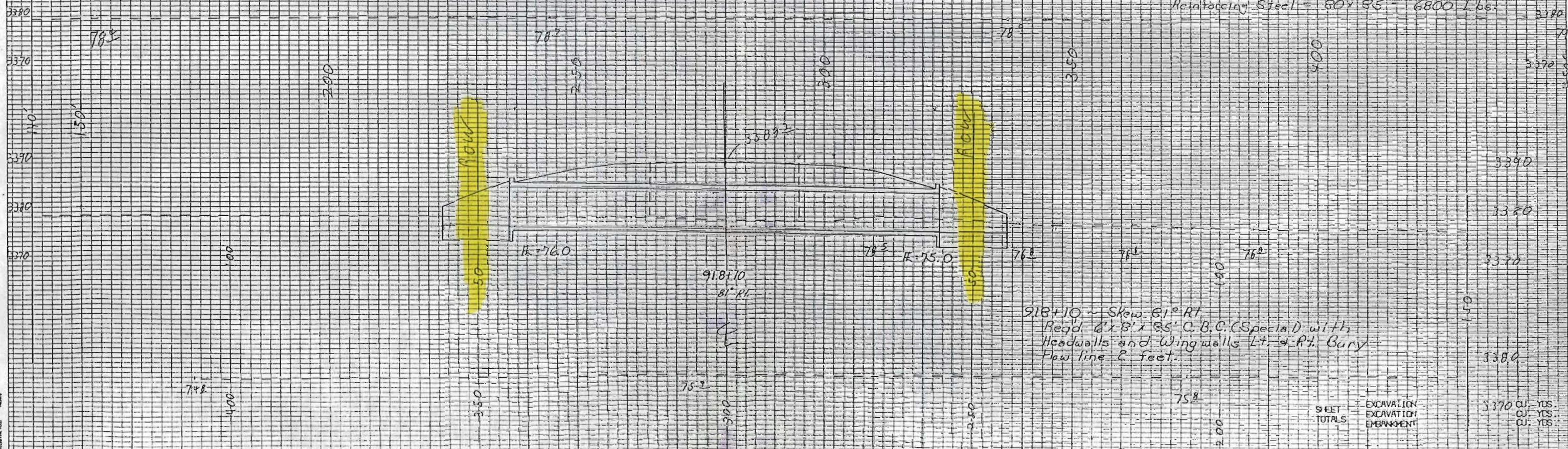
STA.	EMB. AREA	EMB. VOLUME
917+75	0	
917+75.1	304 ft ²	215 cu. yd.
918+03	304 ft ²	
918+18	304 ft ²	315 cu. yd.
918+46	304 ft ²	
918+46.1	0	
TOTAL		630 cu. yd.

WING WALL QUANTITIES

Concrete $4 \times (3.1 + 0.8) = 23.6$ Cu Yds
Reinforcing Steel $4 \times (277 + 56) = 1332$ Lbs
Site Backfill $4 \times (13.3 + 2.9) = 63$ Cu Yds

CBC Quantities

Site Area: $(85 \times 3) + 2(15 \times 3) = 270$ sq. ft.
Site Area: $1.5 \times 85 \times 2 = 255$ sq. ft.
Embl. Material: $11' \times 85' - 6' \times 8.5' = 80$ Cu Yd
Concrete: $1.6 \times 85 = 62.6$ Cu Yds
Reinforcing Steel: $80 \times 85 = 6800$ Lbs



SHEET TOTALS
EXCAVATION
EXCAVATION
EMBANKMENT
CU. YDS.
CU. YDS.
CU. YDS.

CU. YDS. EXCAVATION AREA AREA EMBANKMENT CU. YDS. CU. YDS. EXCAVATION AREA AREA EMBANKMENT CU. YDS.

FED. ROAD REGION DIVISION PROJ. NO. SHEET NO.
VIII COLO. BAF 050-5(27) 102

AS CONSTRUCTED
NO REVISIONS ☐ REVISED ☐ VOID ☐

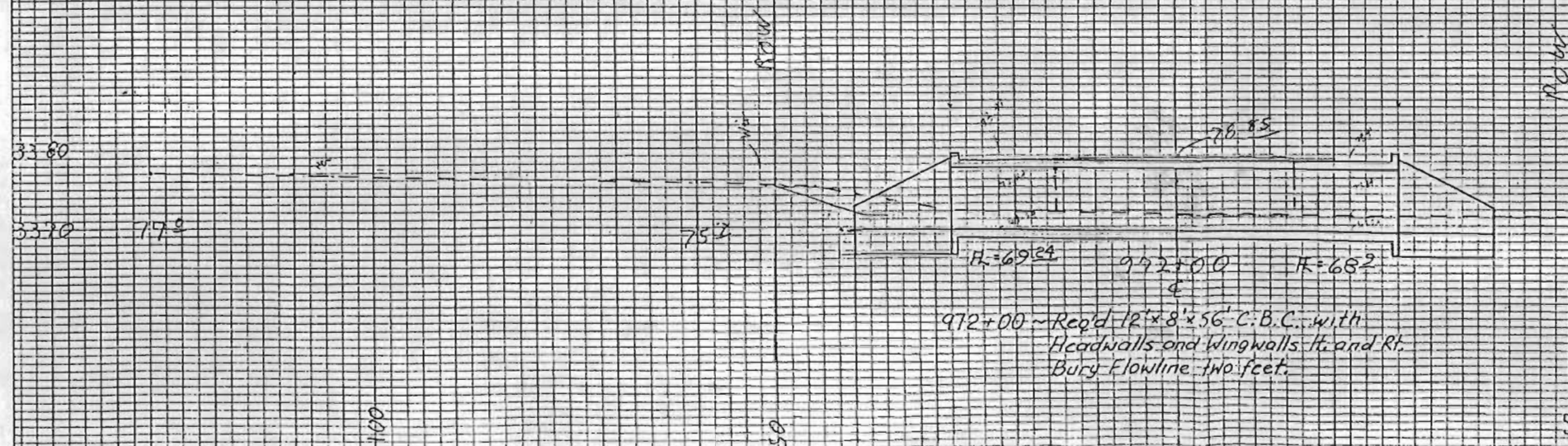
SCALE 1" = 10' H & V

FINAL SURVEY
SURVEYED
TECH. NO.
NOTE BOOK
AREAS CHECKED
NO.

ORIGINAL SURVEY
SURVEYED
TECH. NO.
NOTE BOOK
AREAS CHECKED
NO.

EMB. (NET) TO REPLACE BRIDGE (STR. L 28-M)

STA.	EMB. AREA	EMB. VOLUME
971+65	0	
971+65.1	214 ft ²	
971+91.5	214 ft ²	210 cu. yd.
972+07.5	214 ft ²	
972+36.0	214 ft ²	210 cu. yd.
972+36.1	0	
TOTAL		420 cu. yd.



Box
Str. Ex. (Walls) = $[(12+2+3)(3)(56)]/27 + 20 \text{ cu. yd.} = 126 \text{ cu. yd.}$
Str. Bkfl. (Box) = $(3)(10)(56)/27 = 62.2 \text{ use } 63 \text{ cu. yd.}$
Steel (Box) = $(56)(144.7) = 8,103 \text{ lb.}$
Conc. (Box) = $(56)(1.673) = 94 \text{ cu. yd.}$
Steel (Headwalls) = $(48)(14) = 32 \text{ cu. yd.} = 64 \text{ cu. yd.}$
Conc. (Headwalls) = $(1.085)(14)(2) = 2.38 \text{ cu. yd.} = 3 \text{ cu. yd.}$
Str. Bkfl. (Walls) = $(4)(13.3) = 53.2 + 9.2 \text{ (T.W.)} = 62.4 \text{ use } 63 \text{ cu. yd.}$
Conc. (Walls) = $(4)(5.1) = 20.4 \text{ cu. yd.} + 2.2 \text{ (T.W.)} = 22.6 \text{ use } 24 \text{ cu. yd.}$
Steel (Walls) = $4(27.1) = 1,084 \text{ cu. yd.} + 4(56) = 1,392 \text{ lb.}$

18.0
Ditch Ex. = 20 cu. yd.
Total
Str. Ex = 126 cu. yd.
Str. Bkfl. = 126 cu. yd.
Conc. = 121 cu. yd.
Steel = 9,199 lb.
Ditch Ex. = 20 cu. yd.
Emb Mater = 420 cu. yd.

SHEET TOTALS EXCAVATION EMBANKMENT CU. YDS. CU. YDS. CU. YDS.