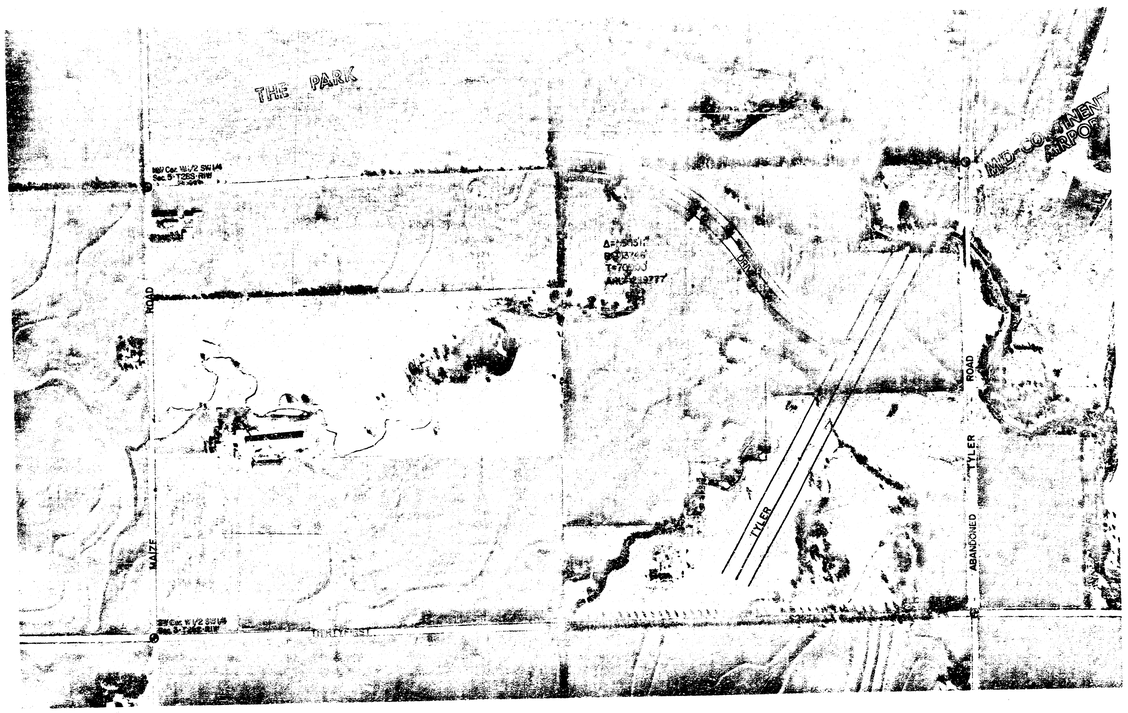
YOSEMITE DRIVE,

FROM THE EAST LINE OF THE PARK TO THE WEST LINE OF TYLER ROAD

PROJECT NO.
472-76-245-80908-000-000-001



INDEX TO DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	PAVING DETAILS
3-4	YOSEMITE DRIVE
5-8	CROSS SECTIONS
9	BOX CULVERT LAYOUT
10-11	BOX CULVERT DETAIL
12	WASH CHECH DETAIL

CITY OF WICHITA, KANSAS
DEAN SELLERS, ACTING CITY ENGINEER

Van Doren - Hazard - Stallings
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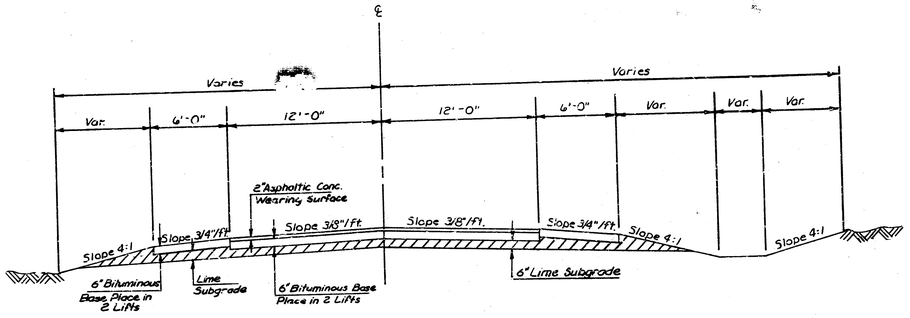
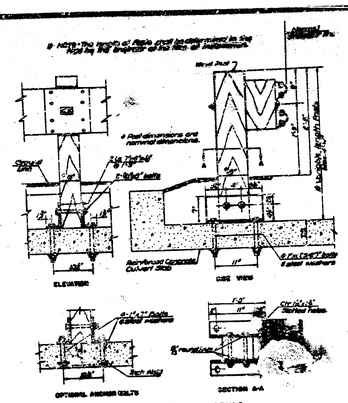
Sheet 1 of 12

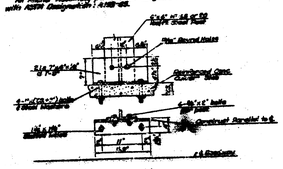


TYPICAL STREET SECTION

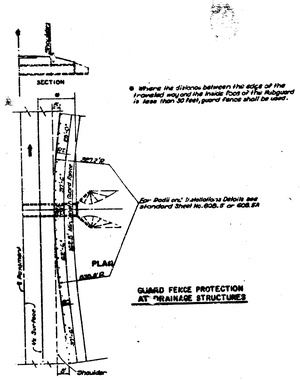


ANCHOR ASSEMBLY DETAILS
FOR GUARD FENCE POST ATTACHED
TO REINFORCED CONCRETE BOX CULVERTS

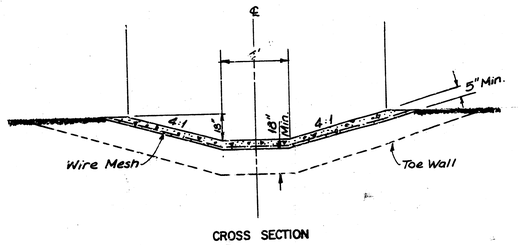
NOTE: The contractor installing the guard fence shall furnish and install the anchor assembly at the culvert. The anchor assembly and the installation shall be subsidiary to bid item "Steel Posts Guard Fence (Strip)".
All anchor assembly parts shall be galvanized in accordance with ASTM Designation A 153-68.



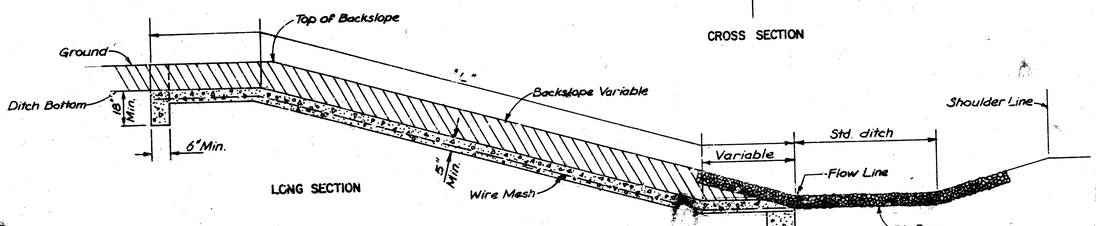
POST FASTENING DETAIL



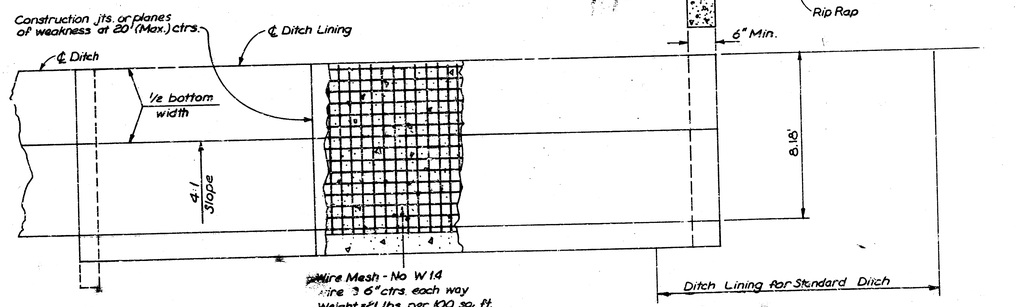
GUARD FENCE DETAILS



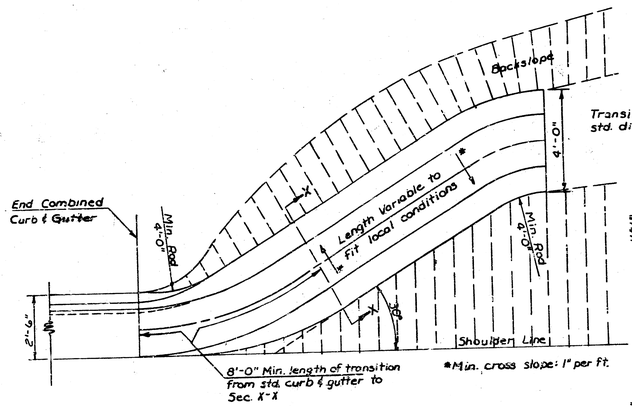
CROSS SECTION



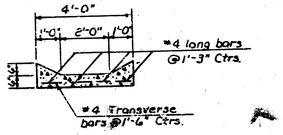
LONG SECTION



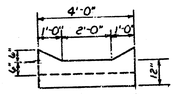
HALF PLAN



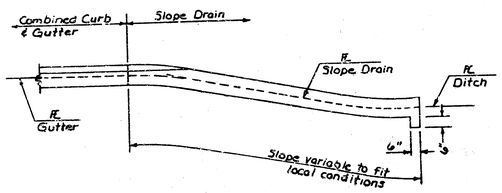
TYPICAL PLAN



SECTION X-X



END ELEVATION
(Downstream End)



TYPICAL ELEVATION

SLOPE DRAIN

NOTE: Use Class "A" - AE throughout the entire area of the Slope Drain below the curbs, to be poured and struck off with a uniform thickness of 6". The curbs are to be applied in the same manner and using the same methods as for edge curb. Reinforcing steel to be deformed #4 bars.

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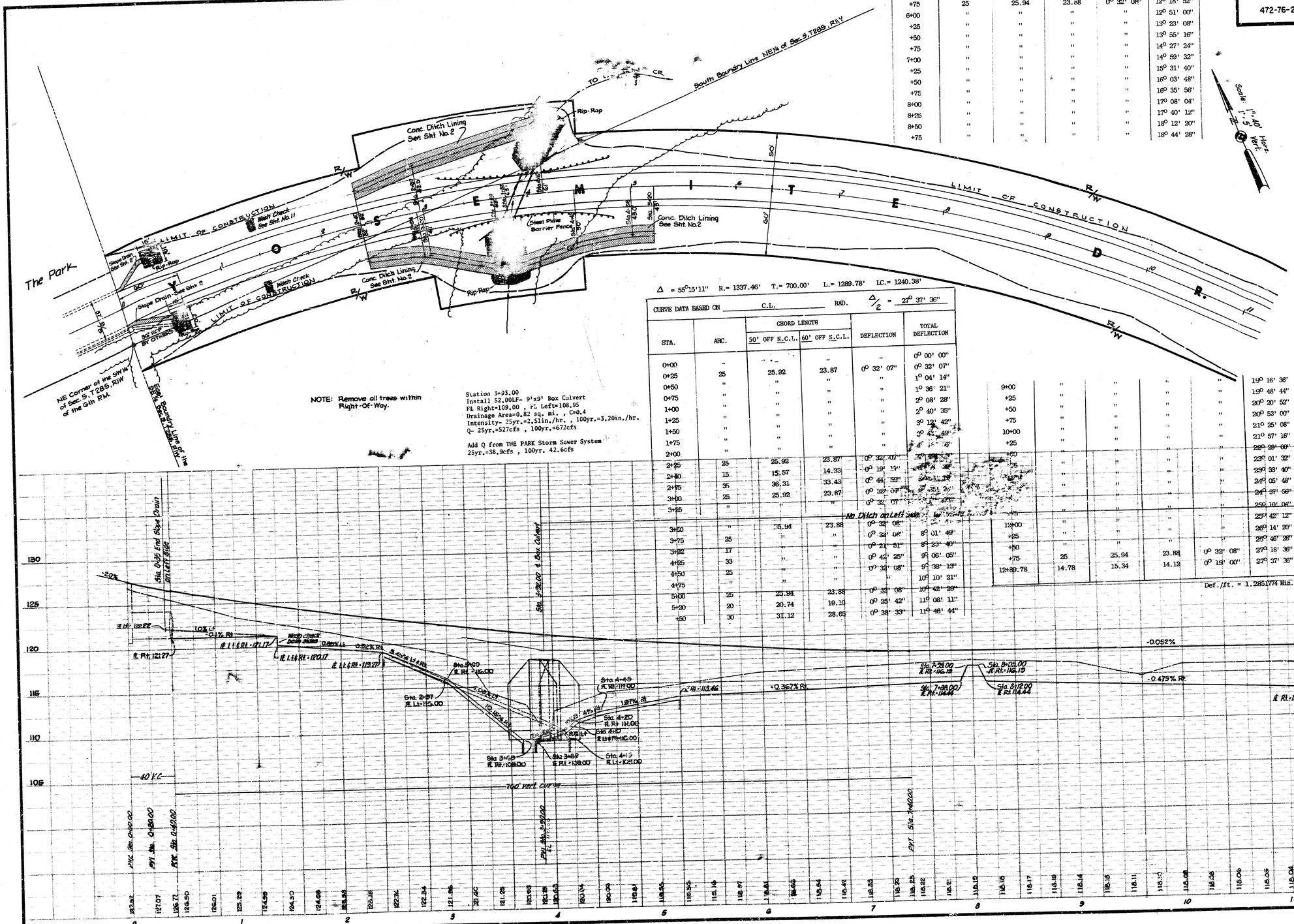
22x36

YOSEMITE DRIVE

472-76-245-80908-000-000-001



NOTE: Remove all trees within Right-Of-Way.

Station 3+25.00
Install 52.00LF- 9'x9' Box Culvert
FL Right=109.00 , FL Left=108.95
Drainage Area=0.82 sq. mi. , C=0.4
Intensity- 25yr.=2.51in./hr. , 100yr.=3.20in./hr.
Q- 25yr.=527cfs , 100yr.=672cfs

Add Q from THE PARK Storm Sewer System
25yr.=38.9cfs , 100yr. 42.6cfs

$\Delta = 55^{\circ}15'11''$ R.= 1337.46' T.= 700.00' L.= 1289.78' LC.= 1240.38'

CURVE DATA BASED ON C.L. RAD. $\frac{\Delta}{2} = 27^{\circ}\ 37'\ 36''$

STA.	ARC.	CHORD LENGTH 50' OFF N.C.L.	CHORD LENGTH 50' OFF S.C.L.	DEFLECTION	TOTAL DEFLECTION
0+00	-	-	-	-	0° 00' 00"
0+25	25	25.92	23.87	0° 32' 07"	0° 32' 07"
0+50	"	"	"	"	1° 04' 14"
0+75	"	"	"	"	1° 36' 21"
1+00	"	"	"	"	2° 08' 28"
1+25	"	"	"	"	2° 40' 35"
1+50	"	"	"	"	3° 12' 42"
1+75	"	"	"	"	3° 44' 49"
2+00	"	"	"	"	4° - 6"
2+25	25	25.92	23.87	0° 32' 07"	4° 32' 13"
2+40	15	15.57	14.33	0° 19' 19"	4° 51' 32"
2+75	35	36.31	33.43	0° 44' 59"	5° 36' 31"
3+00	25	25.92	23.87	0° 32' 07"	6° 08' 38"
3+25	"	"	"	0° 32' 07"	6° 40' 45"
3+50	"	25.91	23.88	0° 32' 08"	7° 12' 53"
3+75	25	"	"	0° 34' 08"	7° 47' 01"
3+92	17	"	"	0° 21' 51"	8° 08' 52"
4+25	33	"	"	0° 42' 25"	8° 51' 17"
4+50	25	"	"	0° 32' 08"	9° 23' 25"
4+75	"	"	"	"	9° 55' 33"
5+00	25	25.91	23.88	0° 32' 08"	10° 27' 41"
5+20	20	20.74	19.10	0° 25' 42"	10° 53' 23"
5+50	30	31.12	28.65	0° 38' 33"	11° 31' 56"
5+75	25	25.94	23.88	0° 32' 08"	12° 04' 04"
6+00	"	"	"	"	12° 36' 12"
6+25	"	"	"	"	13° 08' 20"
6+50	"	"	"	"	13° 40' 28"
6+75	"	"	"	"	14° 12' 36"
7+00	"	"	"	"	14° 44' 44"
7+25	"	"	"	"	15° 16' 52"
7+50	"	"	"	"	15° 49' 00"
7+75	"	"	"	"	16° 21' 08"
8+00	"	"	"	"	16° 53' 16"
8+25	"	"	"	"	17° 25' 24"
8+50	"	"	"	"	17° 57' 32"
8+75	"	"	"	"	18° 29' 40"
9+00	"	"	"	"	19° 01' 48"
9+25	"	"	"	"	19° 33' 56"
9+50	"	"	"	"	20° 06' 04"
9+75	"	"	"	"	20° 38' 12"
10+00	"	"	"	"	21° 10' 20"
10+25	"	"	"	"	21° 42' 28"
10+50	"	"	"	"	22° 14' 36"
10+75	"	"	"	"	22° 46' 44"
11+00	"	"	"	"	23° 18' 52"
11+25	"	"	"	"	23° 51' 00"
11+50	"	"	"	"	24° 23' 08"
11+75	"	"	"	"	24° 55' 16"
12+00	"	"	"	"	25° 27' 24"
12+25	"	"	"	"	25° 59' 32"
12+50	"	"	"	"	26° 31' 40"
12+75	"	"	"	"	27° 03' 48"
12+89.78	14.78	15.34	14.12	0° 19' 00"	27° 37' 36"

No Ditch on Left side

YOSEMITE DRIVE

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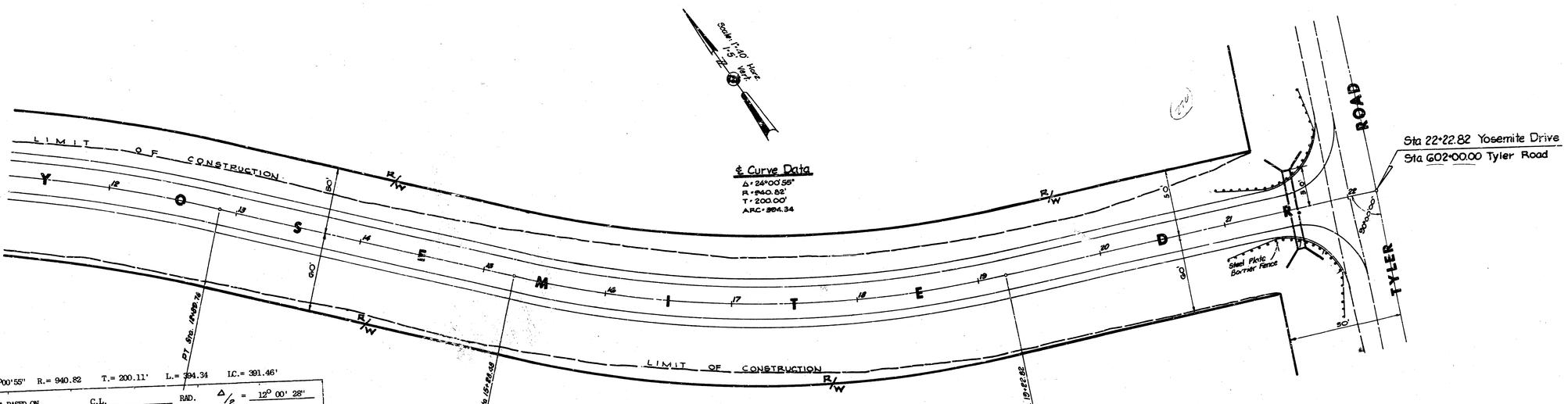
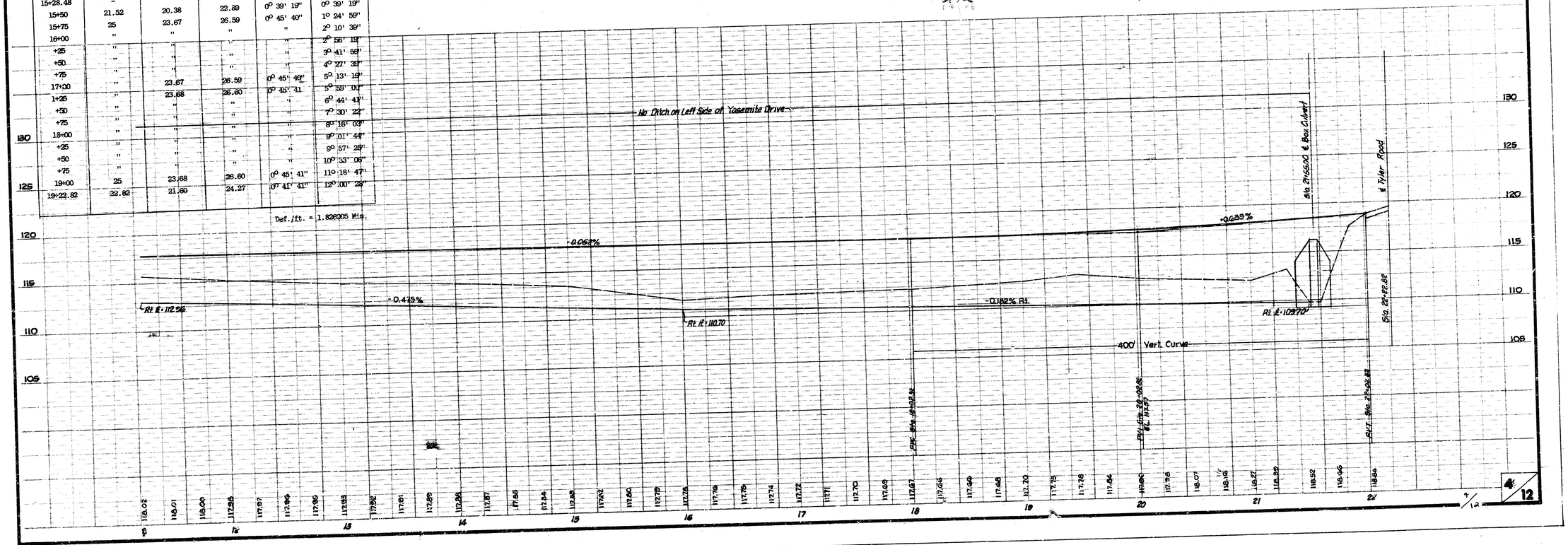
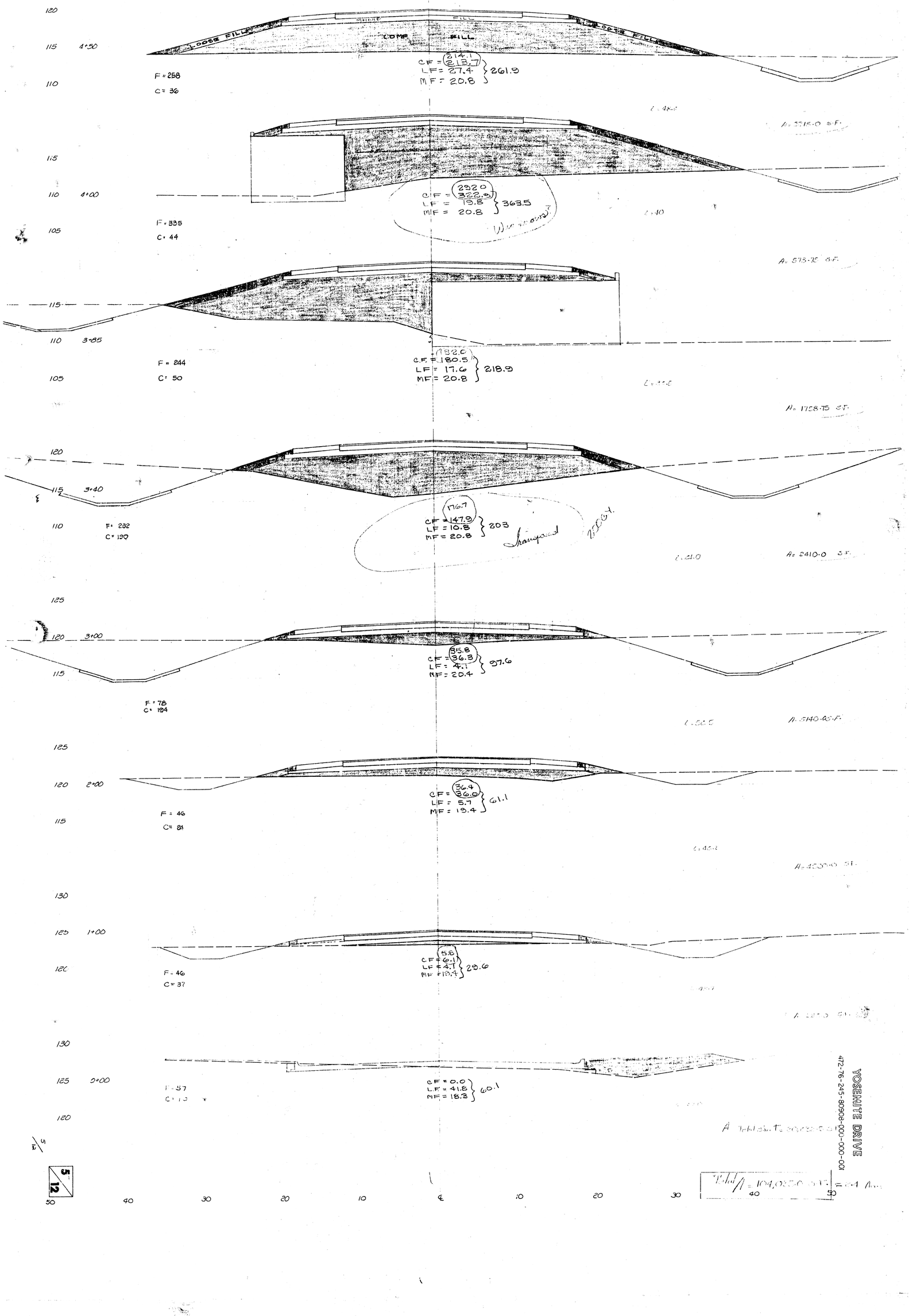


CURVE DATA BASED ON C.L. RAD.

STA.	ARC.	CHORD LENGTH 50' OFF N.C.L.	CHORD LENGTH 60' OFF S.C.L.	DEFLECTION	TOTAL DEFLECTION
15+28.48	–	–	–	–	0° 00' 00"
15+50	21.52	20.38	22.89	0° 39' 19"	0° 39' 19"
15+75	25	23.67	26.59	0° 45' 40"	1° 24' 59"
16+00	"	"	"	"	2° 10' 39"
+25	"	"	"	"	2° 56' 19"
+50	"	"	"	"	3° 41' 58"
+75	"	"	"	"	4° 27' 38"
17+00	"	23.67	26.59	0° 45' 40"	5° 13' 19"
1+25	"	23.68	26.60	0° 45' 41"	5° 59' 00"
+50	"	"	"	"	6° 44' 41"
+75	"	"	"	"	7° 30' 22"
18+00	"	"	"	"	8° 16' 03"
+25	"	"	"	"	9° 01' 44"
+50	"	"	"	"	9° 57' 25"
+75	"	"	"	"	10° 33' 06"
19+00	25	23.68	26.60	0° 45' 41"	11° 18' 47"
19+22.82	22.82	21.60	24.27	0° 41' 41"	12° 00' 28"



Station 21+55.00
Install 60LF- 7'x7' Box Culvert
FL Right=109.20, FL left 109.14
Drainage Area= 0.31 sq. mi. , C=0.4
Intensity- 25yr.=3.34in./hr. , 100yr.=4.25in./hr.
Q- 25yr.=264cfs , 100yr.=337cfs


LOOSE FILL
COMP FILL
LOOSE FILL
4+50
F = 258
C = 36
C.F. = 213.7
L.F. = 27.4
M.F. = 20.8
261.9
A = 3715.0 S.F.
4+00
F = 335
C = 44
C.F. = 322.5
L.F. = 19.8
M.F. = 20.8
363.5
A = 5735.25 S.F.
3+85
F = 244
C = 50
C.F. = 180.5
L.F. = 17.6
M.F. = 20.8
218.9
A = 1758.75 S.F.
3+40
F = 232
C = 190
C.F. = 147.9
L.F. = 10.8
M.F. = 20.8
303
A = 2410.0 S.F.
3+00
F = 78
C = 194
C.F. = 35.8
L.F. = 41.1
M.F. = 20.4
97.6
A = 5140.25 S.F.
2+00
F = 46
C = 84
C.F. = 36.4
L.F. = 5.7
M.F. = 19.4
61.1
A = 4250.0 S.F.
1+00
F = 46
C = 37
C.F. = 6.1
L.F. = 4.1
M.F. = 19.4
29.6
0+00
F = 57
C = 13
C.F. = 0.0
L.F. = 41.8
M.F. = 18.3
60.1
YOSEMITE DRIVE
472-76-245-80908-000-000-001
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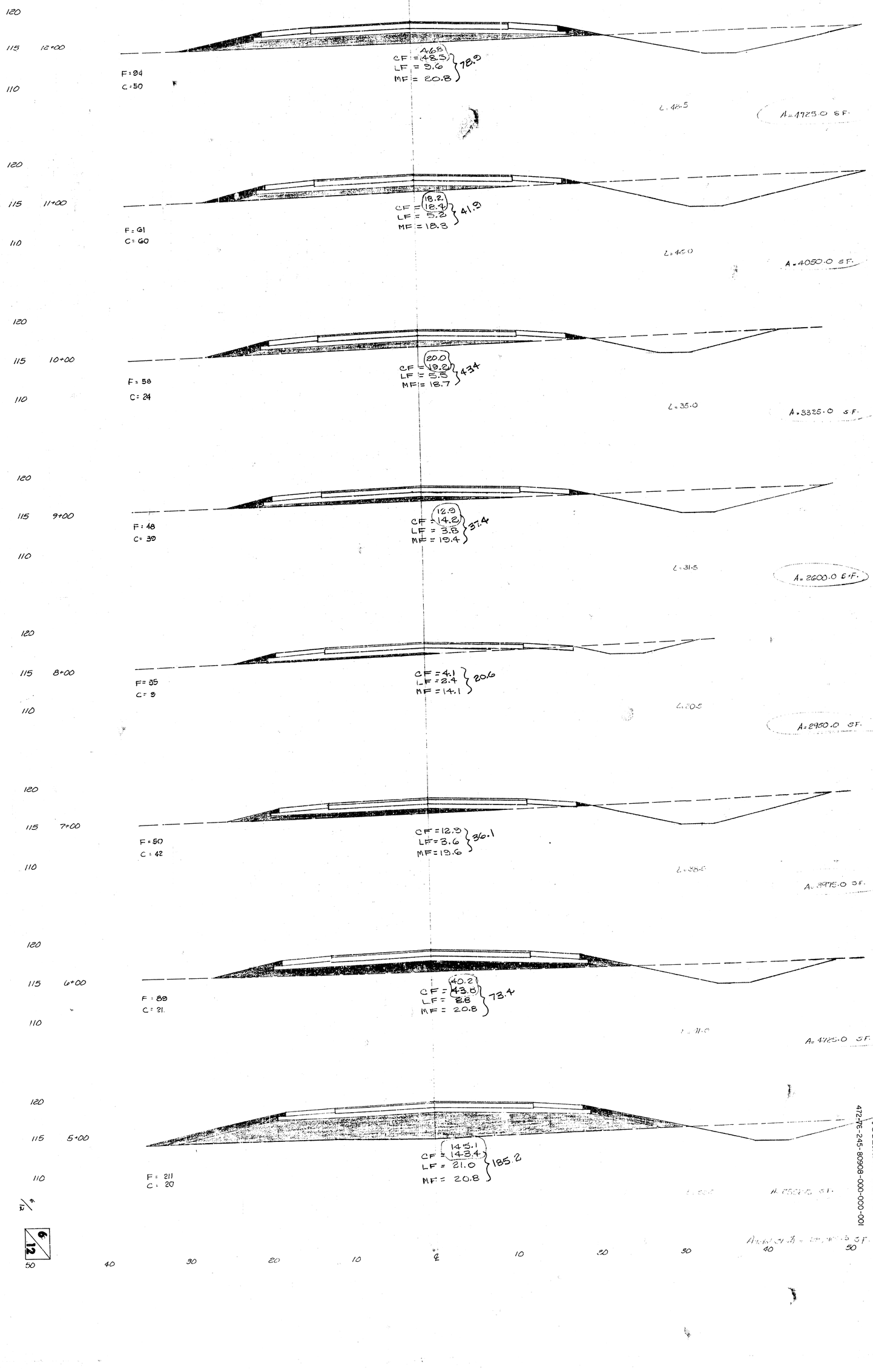
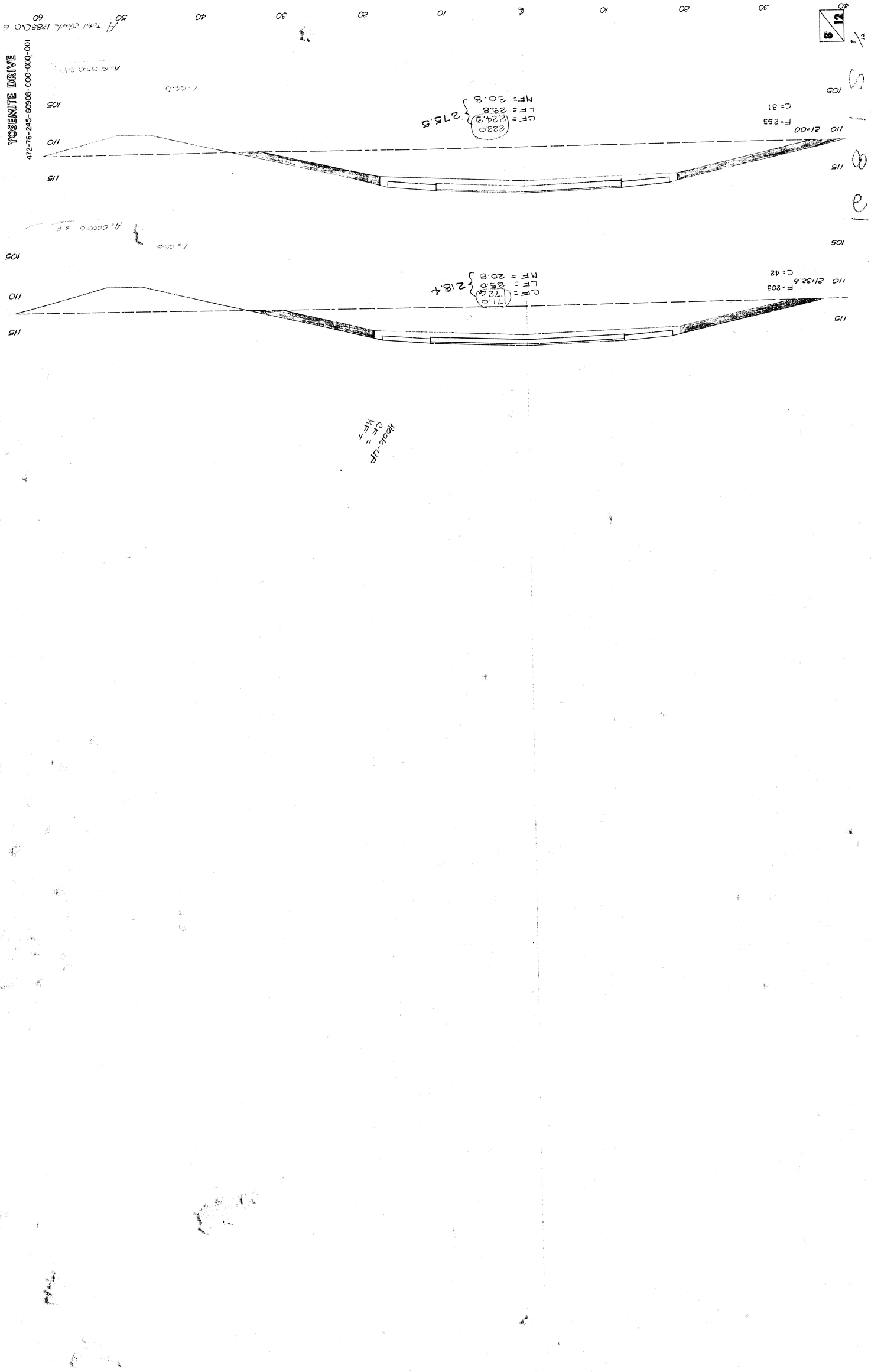
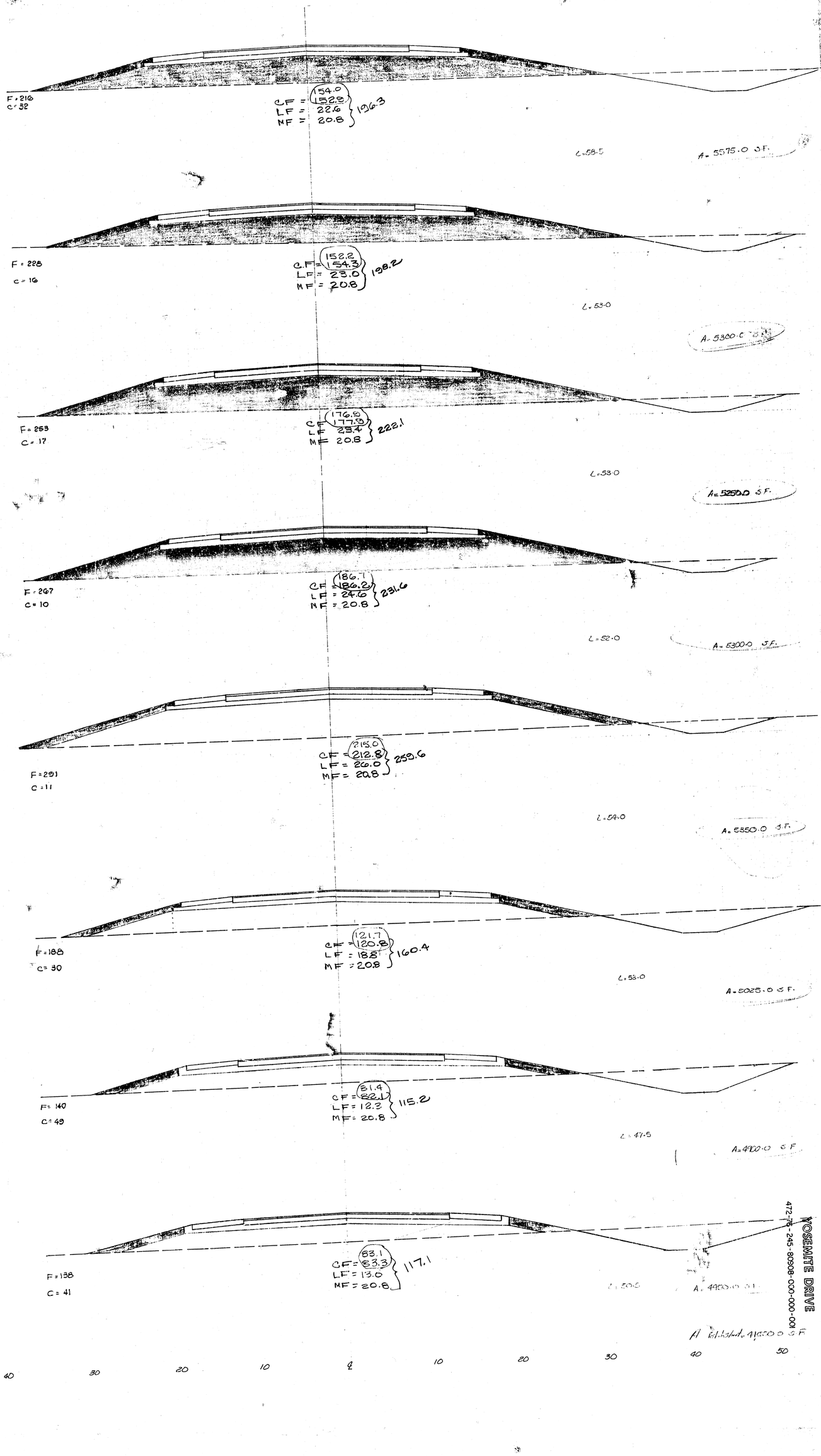


YOSEMITE DRIVE

472-76-245-80908-000-000-001


YOSEMITE DRIVE
472-76-245-80908-000-000-001
8 12
21+00
F = 253
C = 31
21+32.6
F = 203
C = 42
105
110
115
60
50
40
30
20
10
0



YOSEMITE DRIVE
472-78-245-80308-000-000-001

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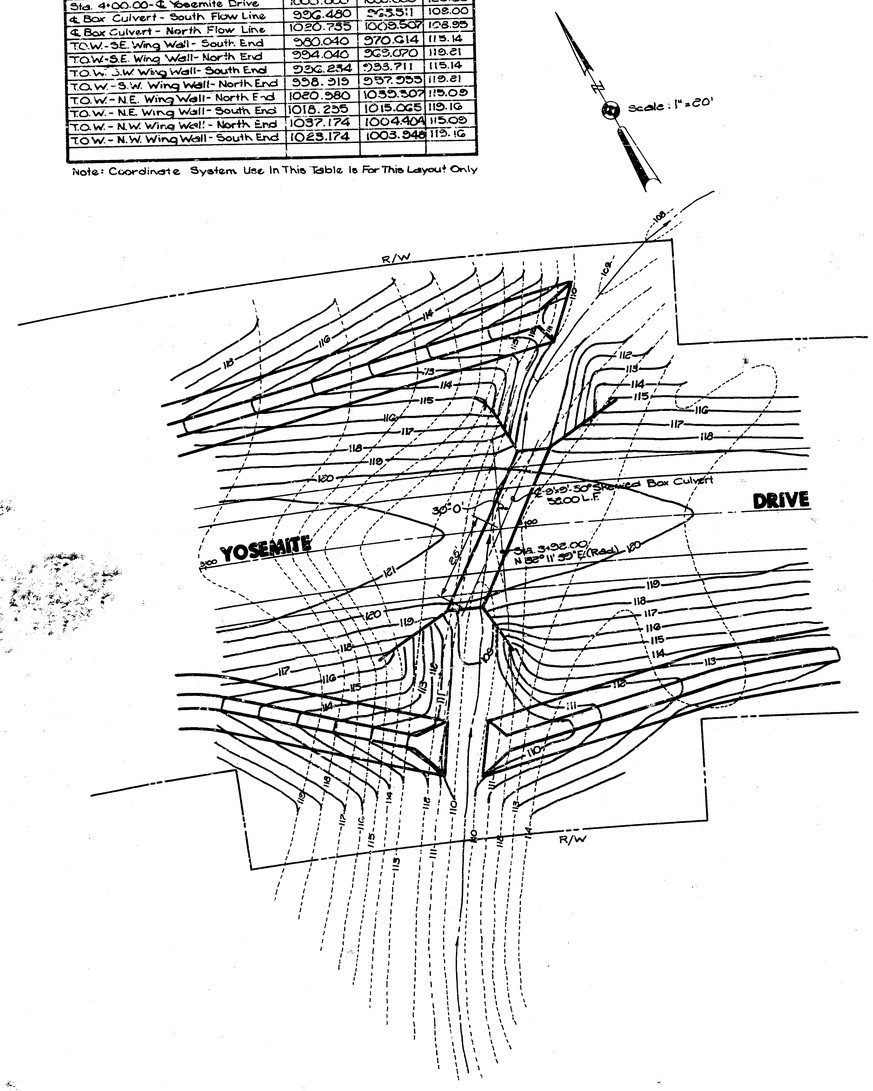
9'x9'- 30° Skewed Box Culvert			
Description	North Coordinate	East Coordinate	Elev.
Sta. 4+00.00- ℄ Yosemite Drive	1000.000	1000.000	120.93
℄ Box Culvert - South Flow Line	956.480	965.511	108.00
℄ Box Culvert - North Flow Line	1030.755	1008.507	108.95
T.O.W.-S.E. Wing Wall - South End	980.040	970.614	115.14
T.O.W.-S.E. Wing Wall- North End	984.040	965.070	118.81
T.O.W. S.W. Wing Wall- South End	956.234	953.711	115.14
T.O.W - S.W. Wing Wall- North End	958. 315	957.555	118.81
T.O.W - N.E. Wing Wall- North End	1020.580	1035.307	115.09
T.O.W. - N.E. Wing Wall- South End	1018.235	1015.065	115.16
T.O.W. - N.W. Wing Wall - North End	1037.174	1004.404	115.09
T.O.W. - N.W. Wing Wall - South End	1023.174	1003.848	115.16

Note: Coordinate System Use In This Table Is For This Layout Only

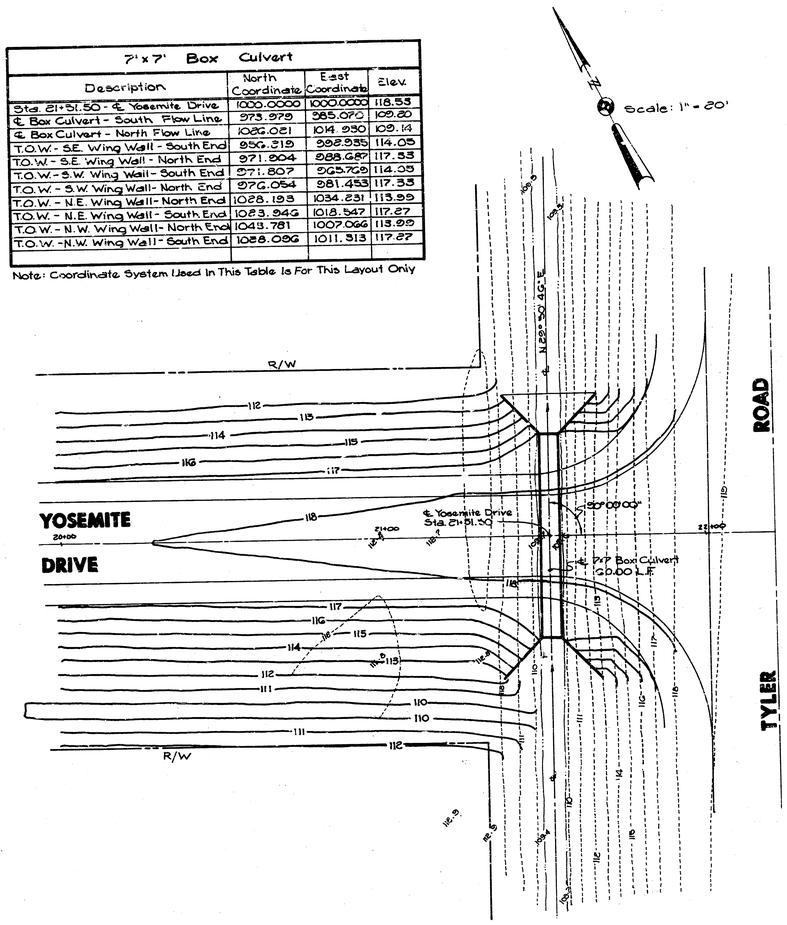


SITE LAYOUT

9'x9' - 30° SKEWED BOX CULVERT

7'x7' Box Culvert			
Description	North Coordinate	East Coordinate	Elev.
Sta. 21+51.50 - ℄ Yosemite Drive	1000.0000	1000.0000	118.53
℄ Box Culvert - South Flow Line	973.979	985.070	109.20
℄ Box Culvert - North Flow Line	1026.021	1014.930	109.14
T.O.W.- S.E. Wing Wall - South End	956.319	982.935	114.05
T.O.W.- S.E. Wing Wall - North End	971.804	988.687	117.53
T.O.W.- S.W. Wing Wall - South End	971.807	963.769	114.05
T.O.W. - S.W. Wing Wall- North End	976.054	981.453	117.33
T.O.W. - N.E. Wing Wall- North End	1028.193	1034.231	113.99
T.O.W. - N.E. Wing Wall - South End	1023.946	1018.547	117.27
T.O.W. - N.W. Wing Wall- North End	1043.781	1007.066	113.99
T.O.W. -N.W. Wing Wall- South End	1038.086	1011.313	117.27

Note: Coordinate System Used In This Table Is For This Layout Only



SITE LAYOUT

7' x 7' BOX CULVERT

Note: For location of coordinate points and elev. for Box Culverts see Box Culvert Details Sheets.

BOX CULVERT LAYOUTS

Design	
Drawn by	
Checked by	
Date	
Job no.	

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Topeka Wichita Minneapolis

Sheet 9 of 12

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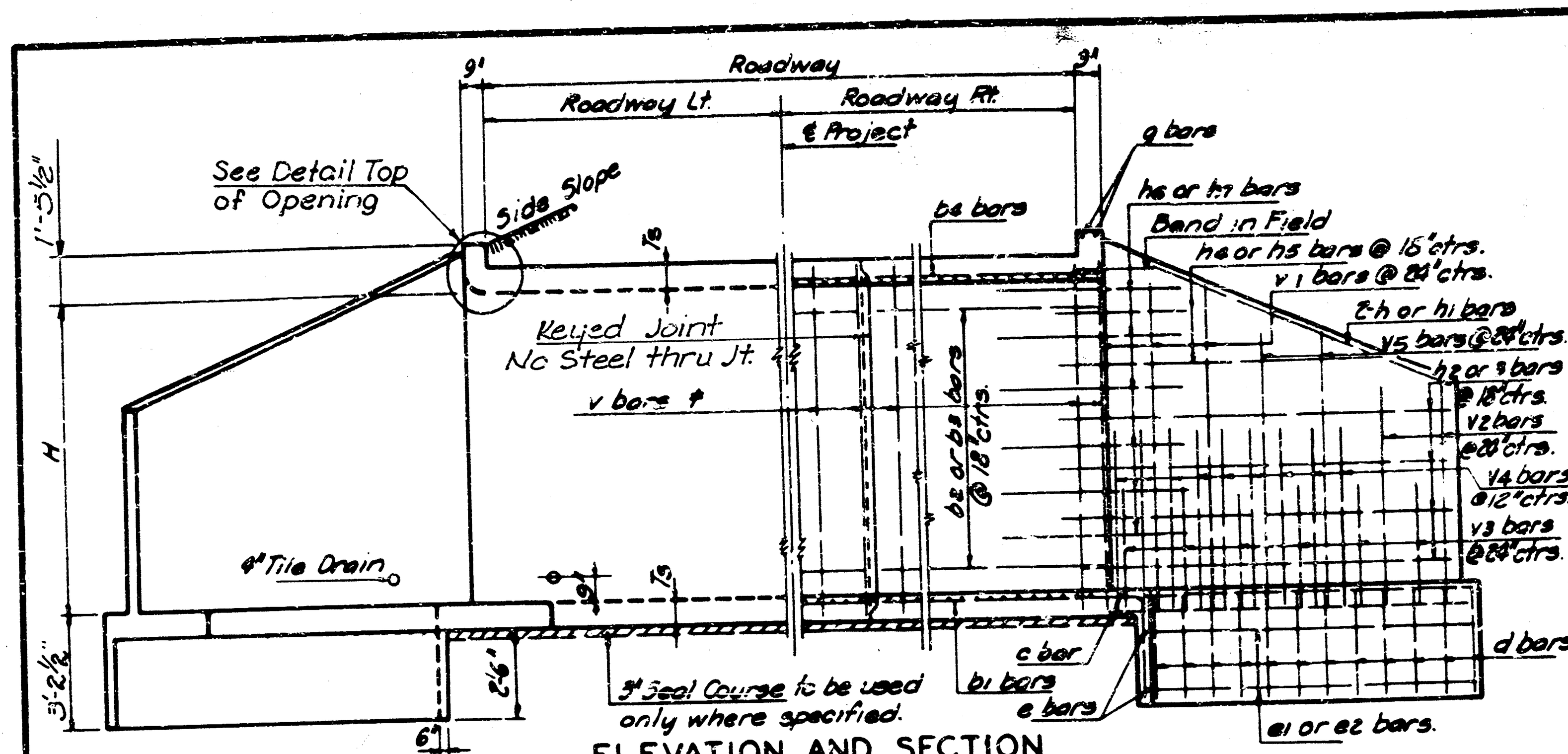
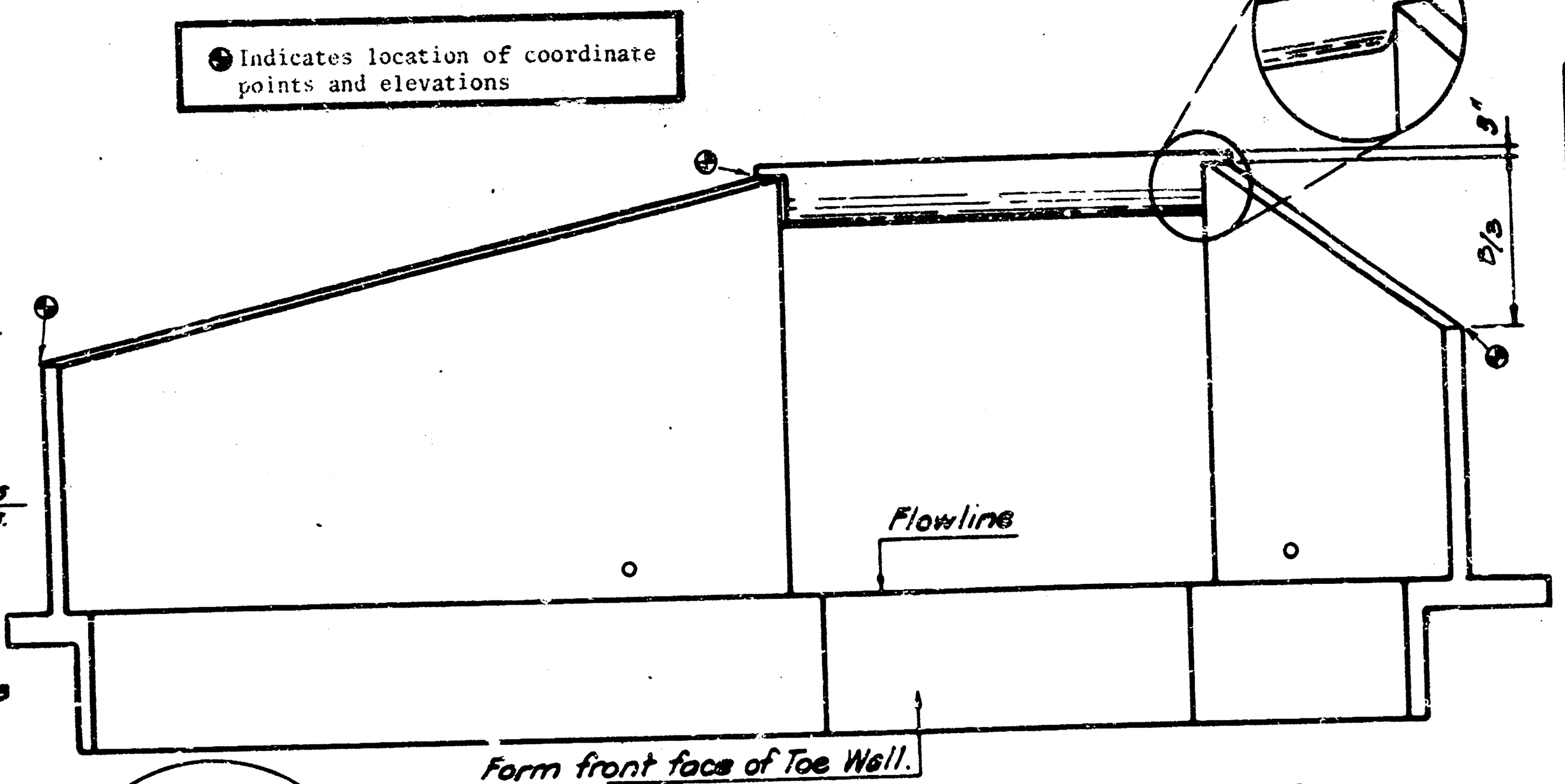
22x36

FHWA REG. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KANSAS				

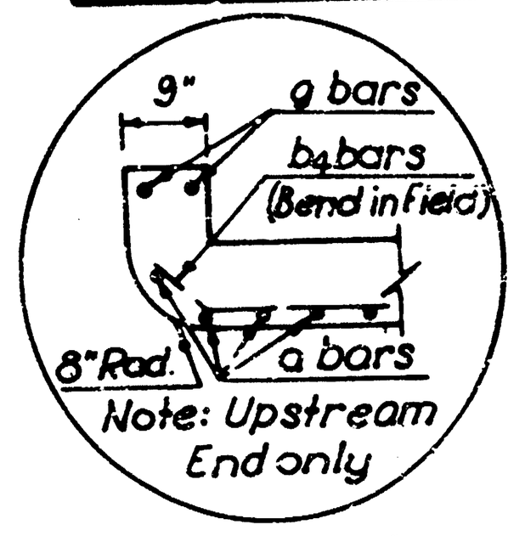


ELEVATION AND SECTION

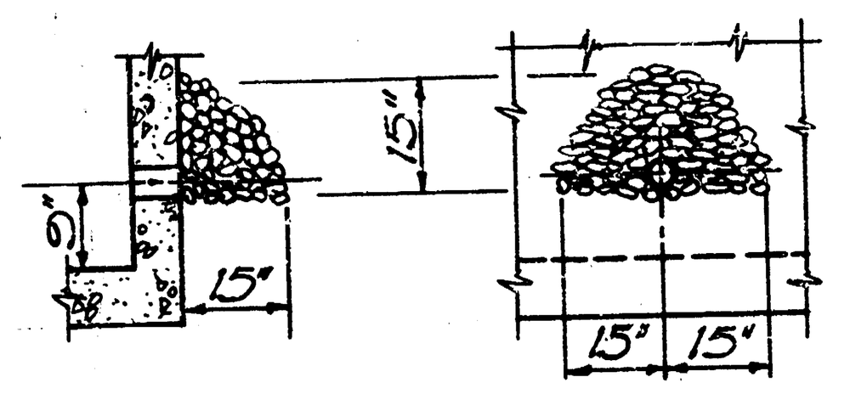


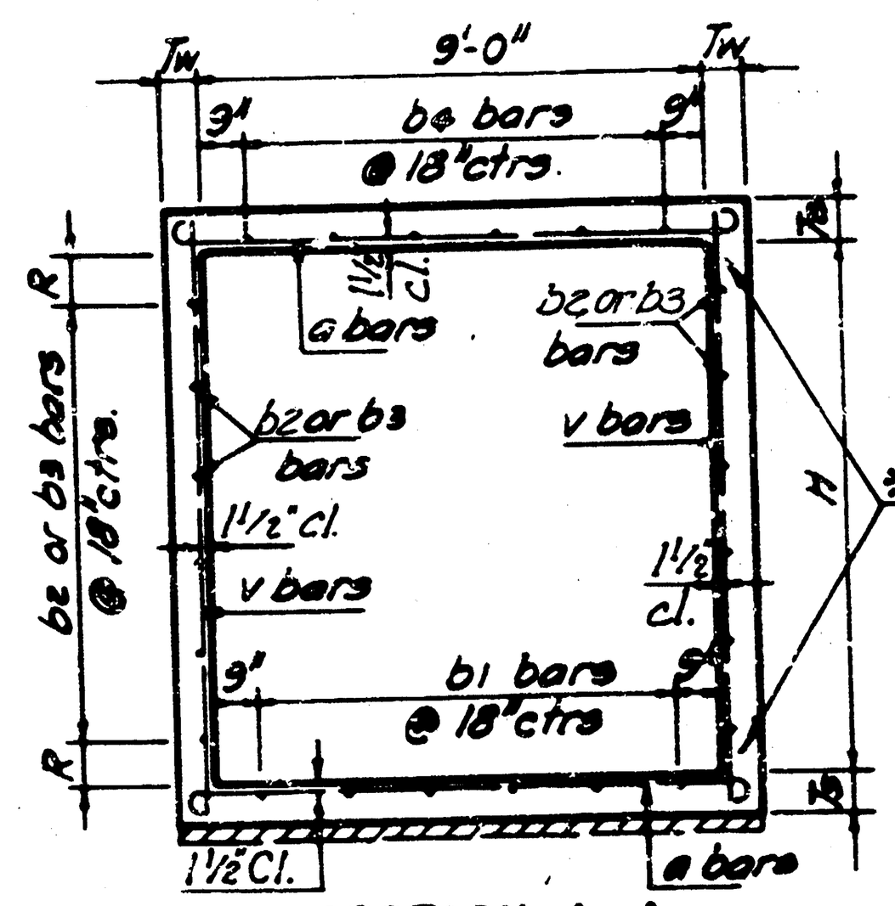
END ELEVATION

✝ See Bar List for size and spacing

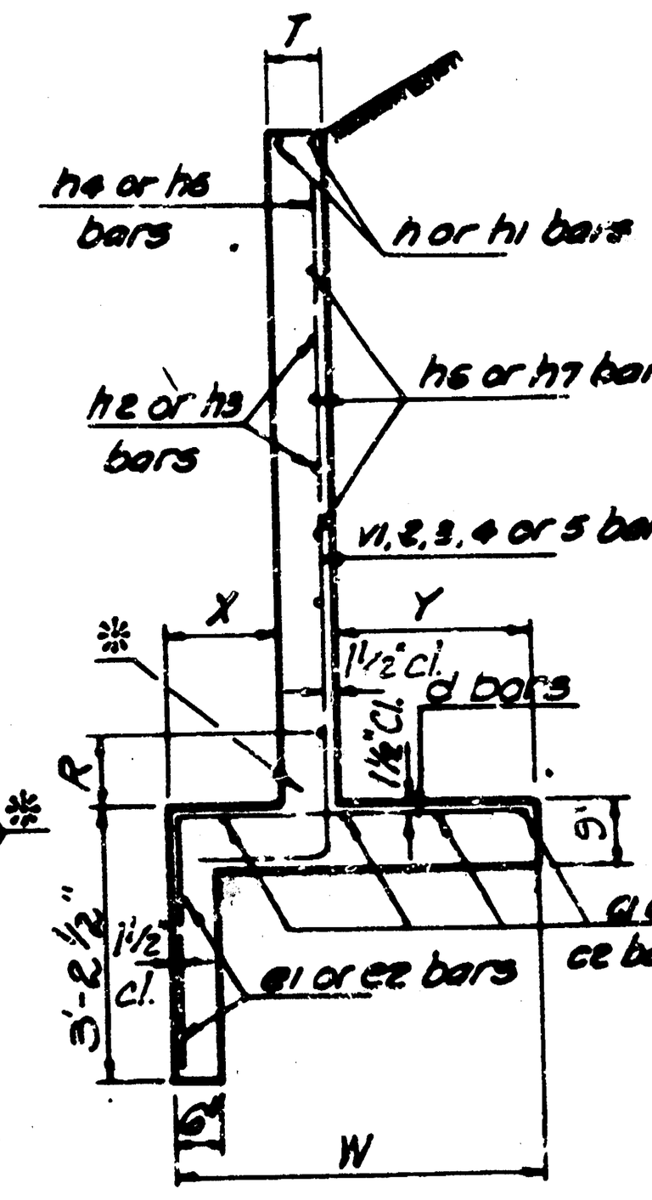


DETAIL OF TOP OF OPENING


DETAIL OF COARSE AGGREGATE AROUND TILE DRAINS

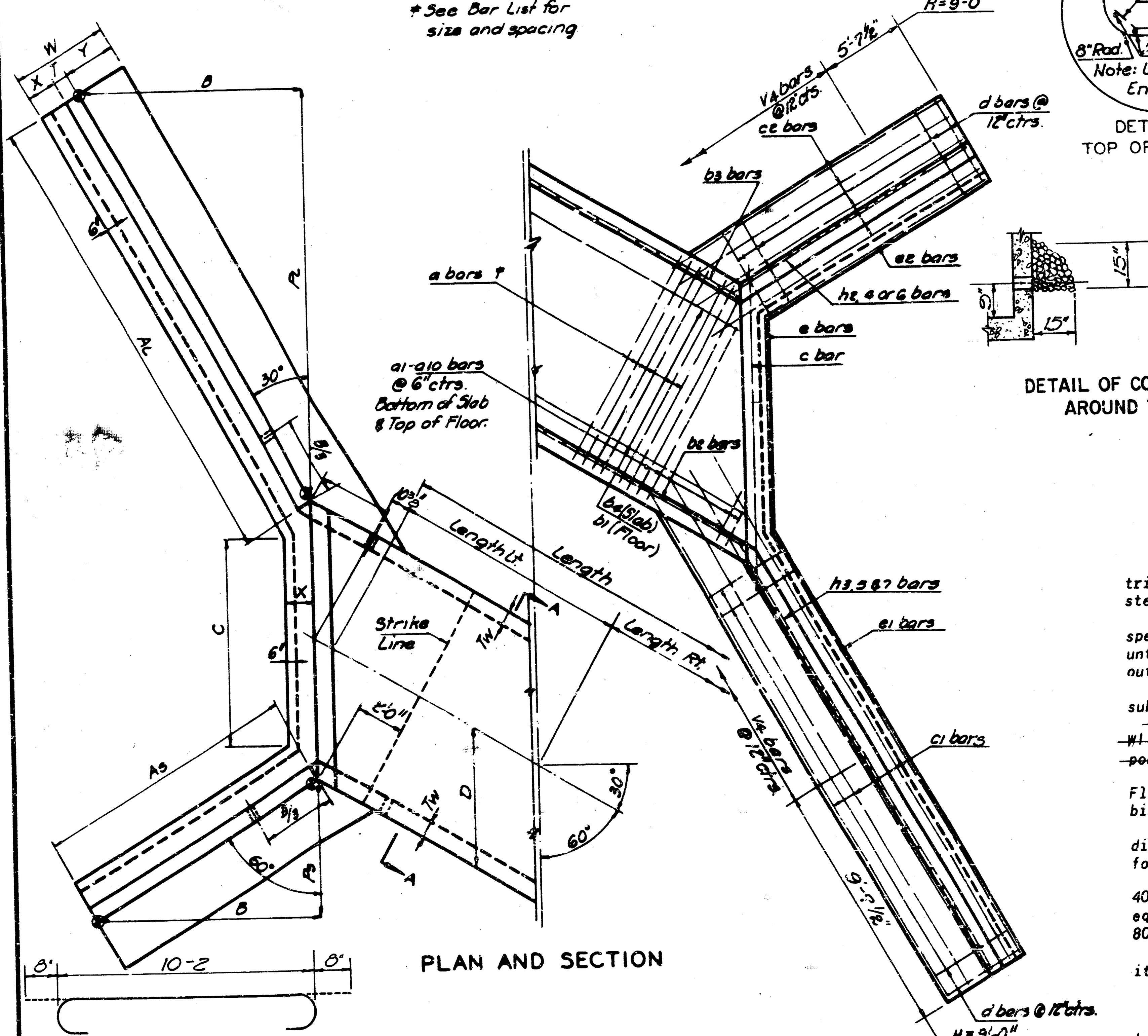


SECTION A-A

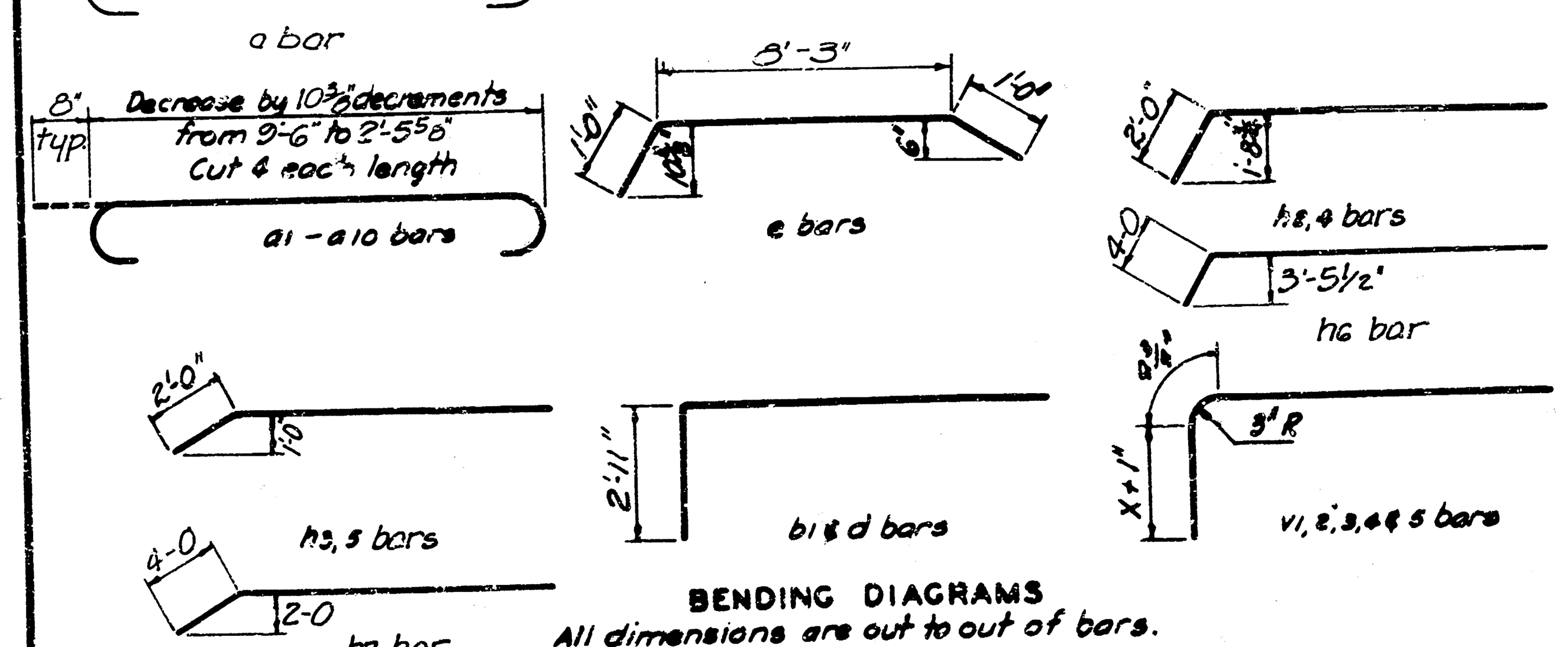


SECTION THRU WING

※ Optional Construction Joints (May be Constructed at the Contractor's option)



PLAN AND SECTION



BENDING DIAGRAMS
All dimensions are out to out of bars.

GENERAL NOTE

LOADING: H20-44AASHO Specifications, Edition of 1969

UNIT STRESSES: f'c=3,000p.s.i.; fc=1,200p.s.i.; fs=20,000p.s.i.

Class A-AE Conc. shall be used throughout. Bevel all exposed edges with a 3/4" triangular moulding, unless otherwise noted. All dimensions relative to reinforcing steel are to center-line of bars unless otherwise noted.

Seal Course consisting of 3" of Class A Concrete shall be constructed only where specified on the plans or by the Engineer. No reinforcing steel shall be placed until the Seal Course has gained sufficient strength to permit working upon it without injury.

Floating Apron shall be constructed only between downstream wings in locations subject to scour where specified on the plans or by the Engineer. ~~Wire Reinforcing Mesh shall be electrically welded and shall be composed of No. W1.4 wire at 6" centers each way. Weight of reinforcing mesh shall be classified as pounds of reinforcing steel.~~

Payment for additional quantities resulting from including Seal Course and or Floating Apron as a change in the original plans, shall be made at the Unit Price bid for the various items involved.

Coarse Aggregate shall be deposited behind each weephole to occupy a space extending 15" in all directions above the weephole flowline. This work shall not be paid for directly, but shall be considered as part of the excavation work.

Keyed Joints shall be provided as shown on all culverts where the box length is 40' or more. These joints shall be spaced so as to divide the box into sections of equal length. The number of joints to be used shall be as follows; 40' to 80'-1 joint; 80' to 120'-2 joints; 120' to 160'-3 joints, etc.

The quantities shown in the Culvert Summary include Apron and or Soil Saver quantities, if they are to be constructed.

The Contractor may, at his option, substitute No. 4 steel reinforcing bars for the keyed construction joints. Rebars are to be a minimum of thirty (30) inches in length, set so the joint divides the bar equally and these extra rebars will be required in each plane of steel in the culvert. The extra steel required will not be paid for directly but will be considered subsidiary to other items in the contract.

LIST OF BARS AND DIMENSIONS

~~9x — Design Fill Ft; Apron Steel (One) Lbs; Seal Course C.Y; Hdwl. Concrete (Two) C.Y.; Apron Concrete (One) C.Y; Apron Seal Course C.Y; Concrete per Ft. of Box C.Y.~~

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension																Space		

Bar	a	a1-a10	b	b1	b2	b3	b4	c	c1	c2	d	e	e1	e2	g	h	h1	h2	h3	h4	h5	v	v1	v2
Number		40		12				2			4	4	4	4	4	4								
Size		#6	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#5	#5	#5	#4	#4	#4	#4		#4	#4
Length		##		*			**	14'-0"																

~~9x5x — Design Fill Ft; Apron Steel (One) 40 Lbs; Seal Course C.Y; Hdwl. Concrete (Two) 11.756 C.Y.; Apron Concrete (One) 3.150 C.Y; Apron Seal Course C.Y; Concrete per Ft. of Box C.Y.~~

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension	14'-6"	8'-4½	7'-3"	7'-11⅝		5'-0"	12'-6⅛	4'-2½	6"				2'-9"	1'-0"	1'-3"	Space		

~~9x6x — Design Fill Ft; Apron Steel (One) 49 Lbs; Seal Course C.Y; Hdwl. Concrete (Two) 15.10 C.Y.; Apron Concrete (One) 3.819 C.Y; Apron Seal Course C.Y; Concrete per Ft. of Box C.Y.~~

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension	16'-11⅞	9'-9⅞	8'-5⅜	7'-8"		6'-0"	14'-6⅞	4'-11	6¼"				3'-0"	1'-0"	1'-5⅜	Space		

~~9x7x — Design Fill Ft; Apron Steel (One) 58 Lbs; Seal Course C.Y; Hdwl. Concrete (Two) 19.39 C.Y.; Apron Concrete (One) 4.54 C.Y; Apron Seal Course C.Y; Concrete per Ft. of Box C.Y.~~

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension	19'-5⅜	11'-2⅝	9'-6⅞	7'-8"		7'-0"	16'-10	5'-7	7"				3'-5"	1'-0"	1'-10"	Space		

~~9x8x — Design Fill Ft; Apron Steel (One) 67 Lbs; Seal Course C.Y; Hdwl. Concrete (Two) 24.462 C.Y.; Apron Concrete (One) 5.240 C.Y; Apron Seal Course C.Y; Concrete per Ft. of Box C.Y.~~

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension	21'-11"	12'-7⅝	10'-11½	7'-3¾" +2.3' Tw		8'-0"	18'-11¾	6'-3½	8"	7½"			3'-10"	1'-2"	2'-0½"	Space		

Bar	a	a1-a10	b	b1	b2	b3	b4	c	c1	c2	d	e	e1	e2	g	h	h1	h2	h3	h4	h5	h6	h7	v	v1	v2	v3	v4	v5
Number		40		12	12	12	12	2	6	6	72	4	4	4	4	4	4	8	8	2	3	8	8		12	10	34	20	14
Size		#6	#4	#4	#4	#4	#6	#4	#4	#4	#4	#4	#4	#4	#5	#5	#5	#4	#4	#4	#4	#4	#4		#4	#4	#4	#4	#4
Length		##		*			**	14'-0"	26'-3	14'-6	6'-7	11'-5	22'-6	12'-3	11'-7	15'-3	24'-11	15'-0	24'-6	12'-3	19'-8	6'-0	8'-0		9'-9	7'-5	4'-0	5'-11	8'-7

9x9x52' — Design Fill 2.0 Ft

Apron Steel (None) Lbs	Seal Course 5.06 C.Y	Hdwl. Concrete (Two) 32.773 C.Y.	
Apron Concrete (None) C.Y.	Apron Seal Course (None) C.Y.	Concrete per Ft. of Box 1.083 C.Y.	

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension	24'-4¾	14'-1"	12'-2⅜	8'-0 3/16	6'-0¾	9'-0"	21'-1½	7'-0½	9"	9"	9"	9"	5'-3"	2'-0"	2'-6"	Space	6"	12"

Bar	a	a1-a10	b	b1	b2	b3	b4	c	c1	c2	d	e	e1	e2	g	h	h1	h2	h3	h4	h5	h6	h7	v	v1	v2	v3	v4	v5
Number	192	40		12	12	12	12	2	8	8	78	4	4	4	4	4	4	8	8	2	2	12	12	100	12	12	38	48	16
Size	#6	#6		#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#5	#5	#5	#4	#4	#4	#4	#4	#4	#6	#5	#4	#4	#6	#6
Length	11'-6"	##		*	23'-4	23'-10	**	14'-0"	29'-3	16'-4	7'-11"	10'-3"	25'-2	13'-4	11'-8	16'-10	27'-6	16'-6	27'-3	14'-0	22'-11	8'-5	10'-9	10'-0	10'-11	8'-1	5'-9	6'-9	9'-2

~~9x — Design Fill Ft; Apron Steel (One) Lbs; Seal Course C.Y; Hdwl. Concrete (Two) C.Y.; Apron Concrete (One) C.Y; Apron Seal Course C.Y; Concrete per Ft. of Box C.Y.~~

Letter	AL	As	B	C	D	H	PL	Ps	R	T	Ts	Tw	W	X	Y	Bar	a	v
Dimension																Space		

Bar	a	a1-a10	b	b1	b2	b3	b4	c	c1	c2	d	e	e1	e2	g	h	h1	h2	h3	h4	h5	h6	h7	v	v1	v2	v3	v4	v5
Number		40		12			12	2				4	4	4	4	4	4												
Size		#6	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#4	#5	#5	#5	#4	#4	#4	#4	#4	#4		#4	#4	#4	#4	#4
Length		##		*			**	14'-0"																					

See Bending Diagrams

* b1 bars increase by 10" increments from 29'-7". Cut 2 each length.

** b4 bars increase by 10" increments from 24'-6". Cut 2 each length.

NO. OF "d" BARS EACH WING FTG.

H	WING	d
5	Long	
	Short	
6	Long	
	Short	
7	Long	
	Short	
8	Long	
	Short	
9	Long	25
	Short	14

NO. OF "V" BARS EACH WING

H	WING	v1	v2	v3	v4	v5
5	Long					
	Short					
6	Long					
	Short					
7	Long					
	Short					
8	Long					
	Short					
9	Long	4	4	12	13	5
	Short	2	2	7	5	3

CULVERT SUMMARY

Station	Size	Crown or Elev.	Flowline Elev. Lt	Flowline Elev. Rt	Rdwy Horizon Lt	Rdwy Horizon Rt	Lgth. along Box Lt	Lgth. along Box Rt	Sections No.	Sections Length	Apron	Soil Saver		Cl. A-AE Concrete C.Y.	Reinf. Steel Lbs.
3+93.00	9x9x52	120.75	108.95	109.00	24-2⅜	24-2⅜	26-0	26-0	2	26-0	—	—		93.4	8660

NO	DATE	REVISIONS	BY	APP'D
2	4-5-79	Steel & Conc. Quant., Fence Bolt	W.L.H.	L.R.P.
1	9-26-77	Keyed Joint Option	W.L.H.	L.R.P.

KANSAS DEPARTMENT OF TRANSPORTATION

STD. 9' SPAN CONCRETE BOX 30° SKEW

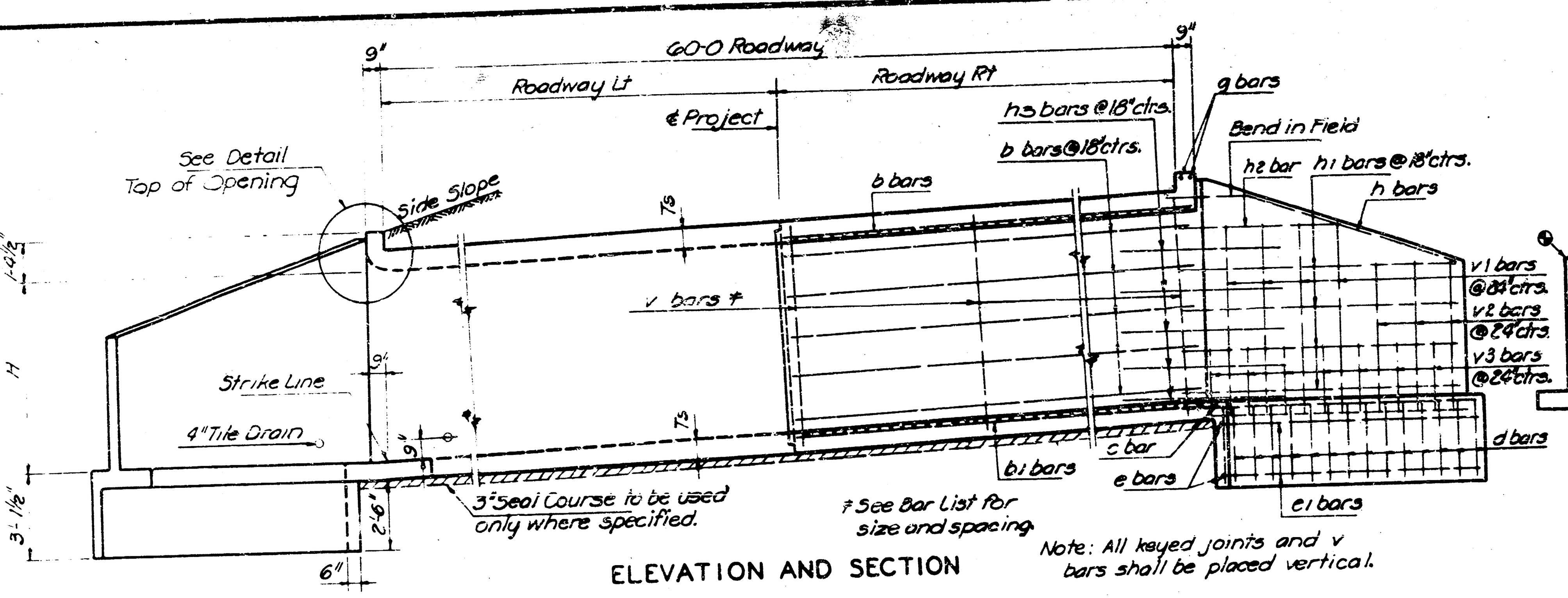
10/12

~~STD. NO. 328.3~~ DATE: March 13, 1973

SHEET NO. OF — SCALE — APP'D K. H. Lancaster
DESIGNED McCollom — DETAILED Sloop — QUANTITIES Sloop — TRACED
DESIGN CK Armstrong — DETAIL CK Challacombe — QUAN. CK Challacombe — TRACE CK

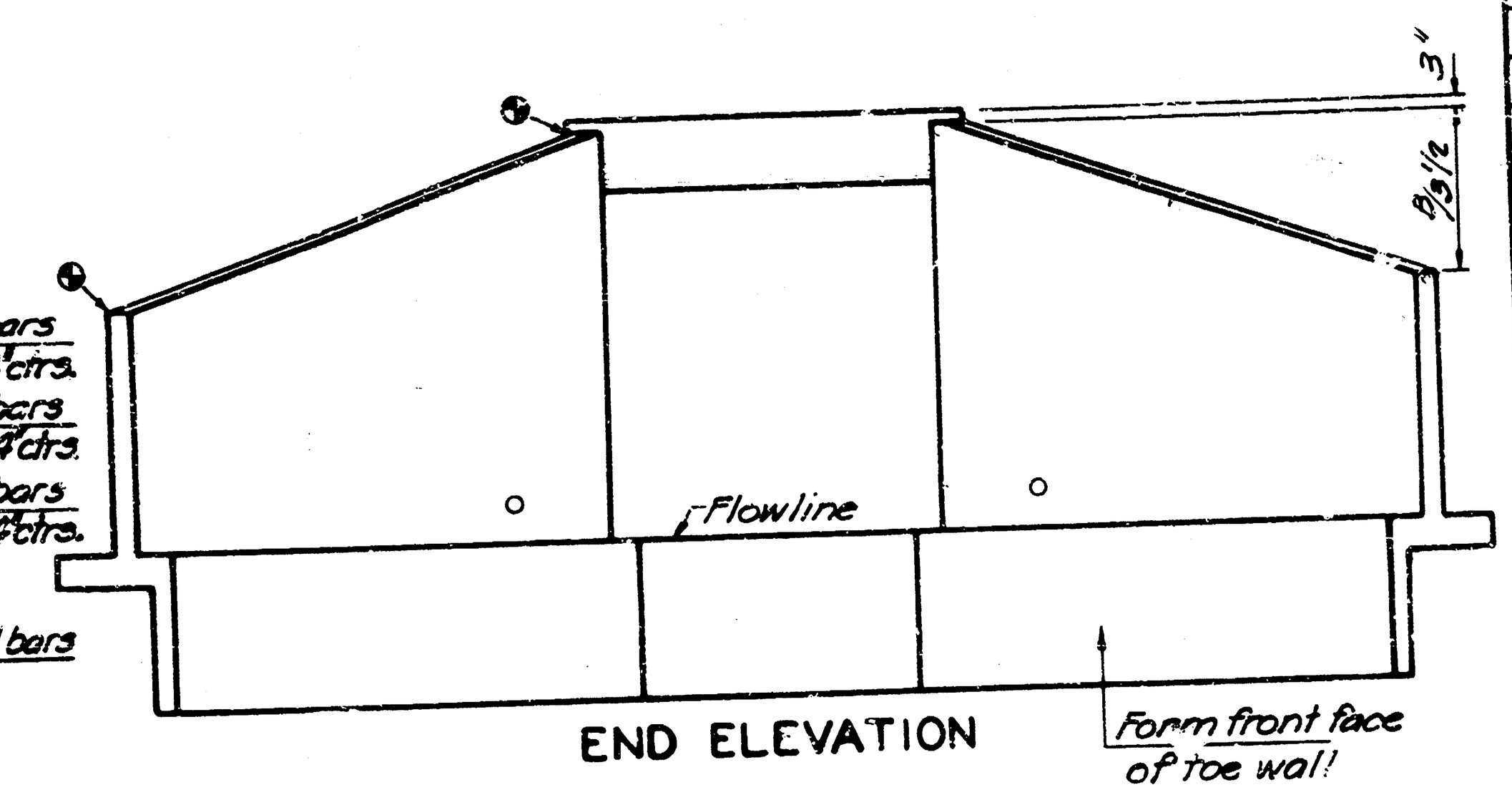
CALCULATED BY ________ DATE ________
CHECKED BY ________ DATE ________

CALCULATED BY ________ DATE ________
CHECKED BY ________ DATE ________

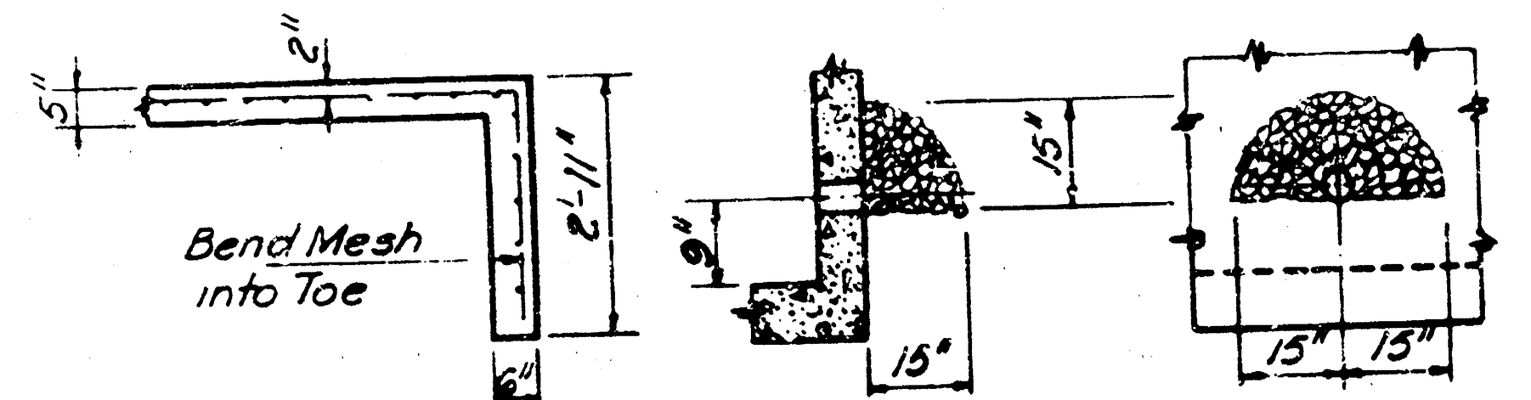


ELEVATION AND SECTION

● Indicates location of coordinate points and elevations

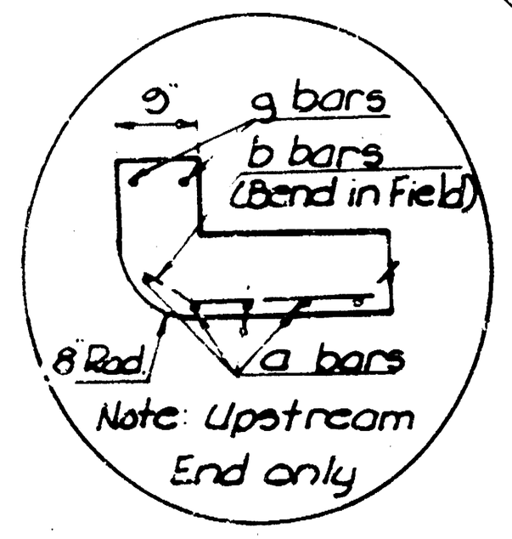


END ELEVATION

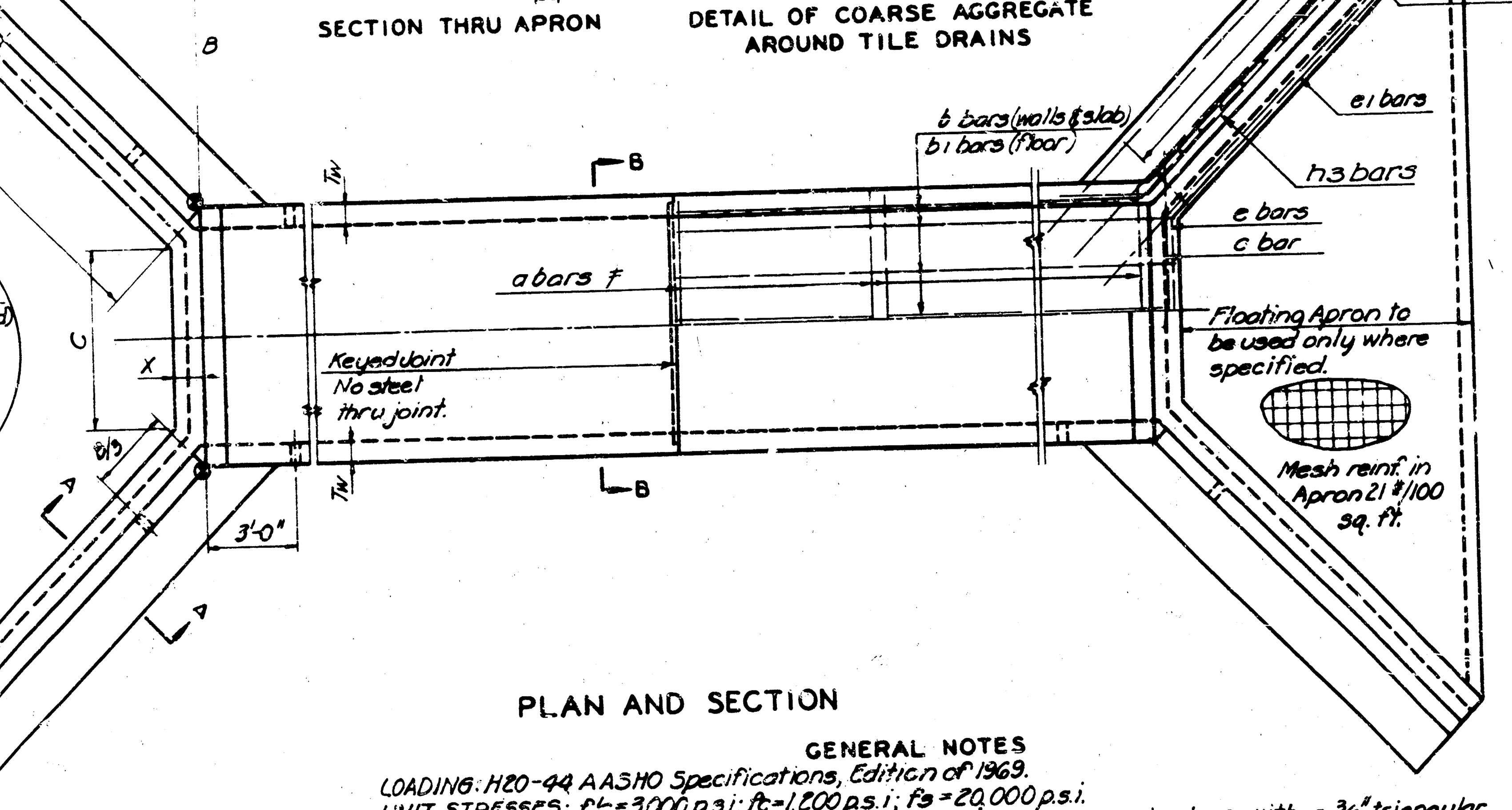


SECTION THRU APRON

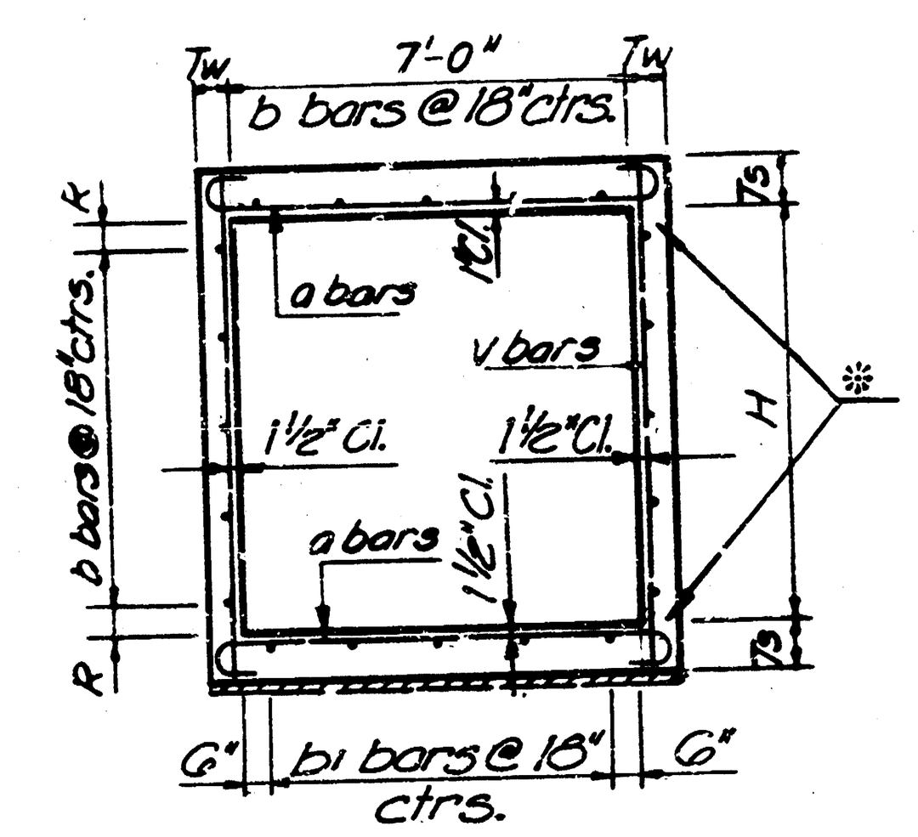
DETAIL OF COARSE AGGREGATE AROUND TILE DRAINS



DETAIL OF TOP OF OPENING

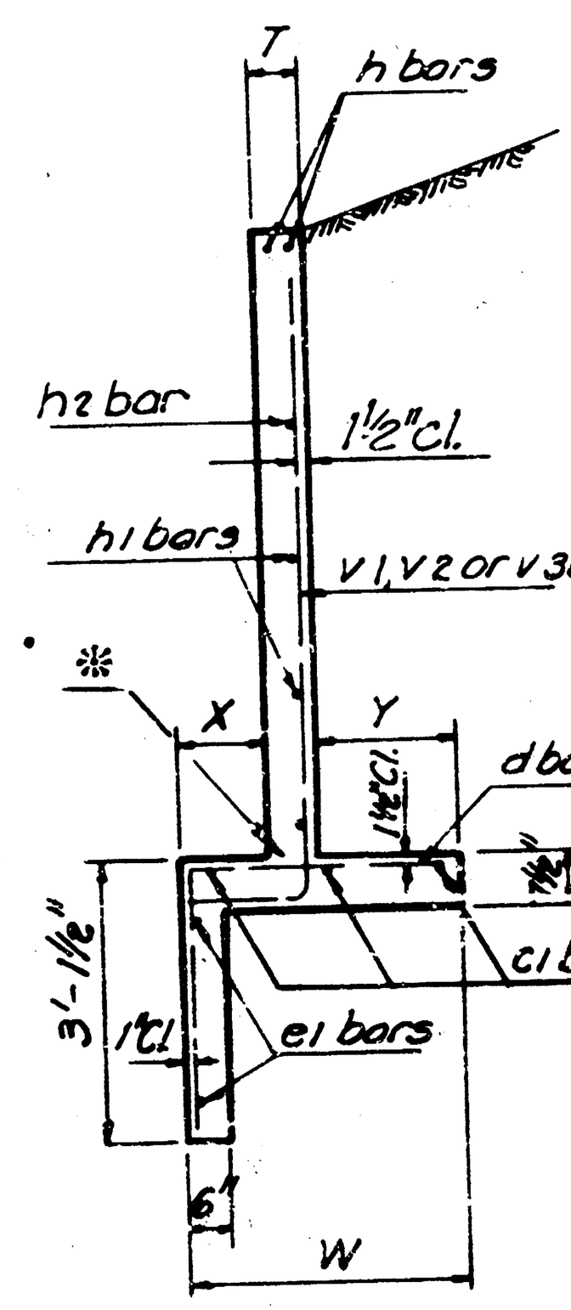


PLAN AND SECTION



SECTION B-B

※ Optional Construction Joints
(May be constructed at the Contractor's option.)



SECTION A-A

GENERAL NOTES

LOADING: H20-44 AASHO Specifications, Edition of 1969.
UNIT STRESSES: f'c=3,000 p.s.i.; fc=1,200 p.s.i.; fs=20,000 p.s.i.

Class A-AE Conc. shall be used throughout. Bevel all exposed edges with a ¾" triangular molding unless otherwise noted.

All dimensions relative to reinforcing steel are to center line of bar unless otherwise noted.

Seal Course, consisting of 3" of Class A Concrete, shall be constructed only where specified on the Plans or by the Engineer. No reinforcing shall be placed until the Seal Course has gained sufficient strength to permit working upon it without injury.

Floating Apron shall be constructed only between downstream wings in locations subject to scour where specified on the Plans or by the Engineer.

Wire reinforcing mesh shall be electrically welded and shall be composed of No. 10 Gage wire at 6" centers each way. Weight of reinforcing mesh shall be classified as pounds of reinforcing steel.

Payment for additional quantities resulting from including Seal Course and or Floating Apron as a change in the original plans, shall be made at the Unit Price bid for the various items involved.

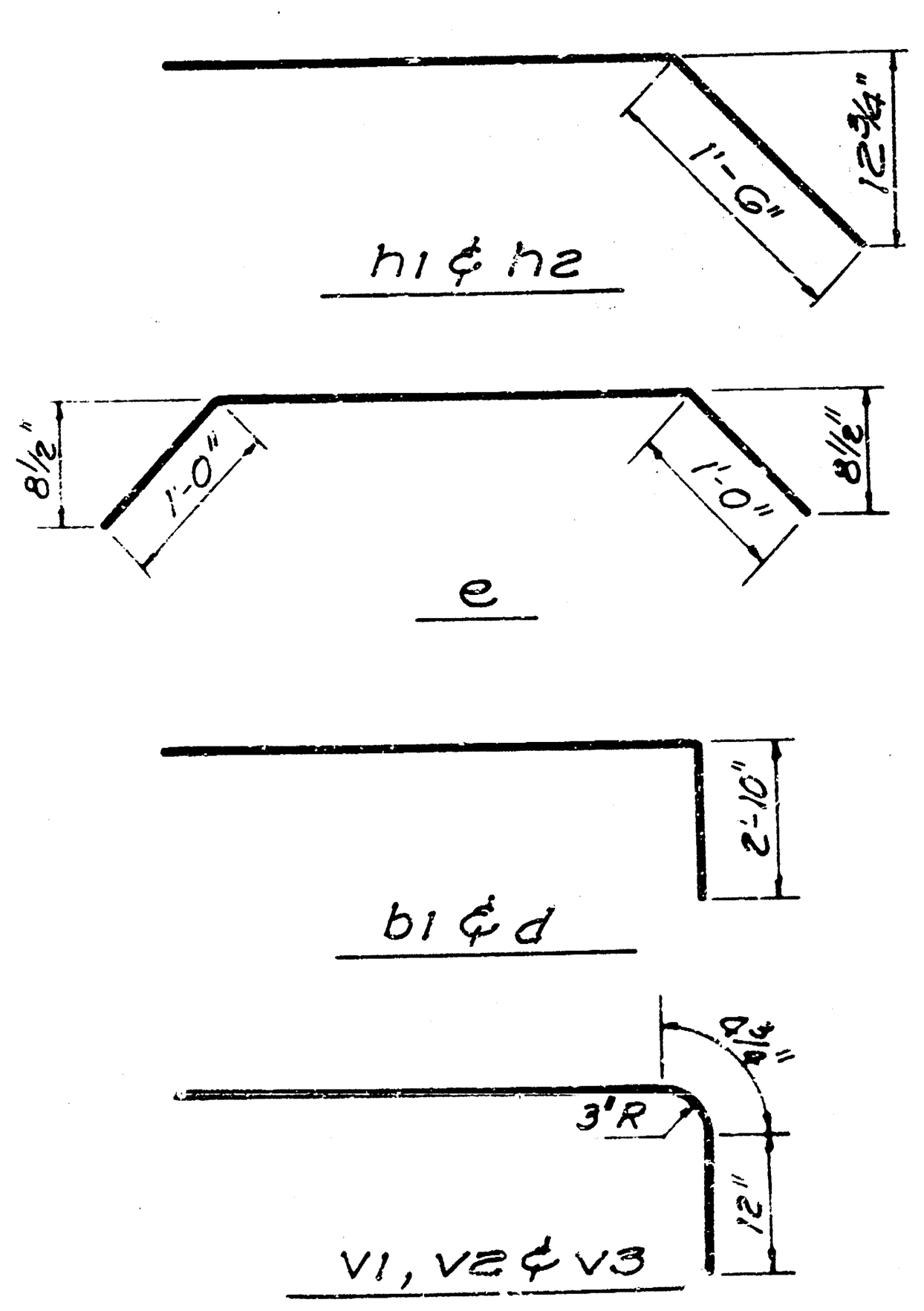
Coarse aggregate shall be deposited behind each weep hole to occupy a space extending 15" in all directions above the weep hole flowline. This work shall not be paid for directly, but shall be considered a part of the excavation work.

Keyed Joints shall be provided as shown on all culverts where the box length is 40' or more. These joints shall be spaced so as to divide the box into sections of equal length. The number of joints to be used shall be as follows; 40' to 80' - 1 joint; 80' to 120' - 2 joints; 120' to 160' - 3 joints, etc.

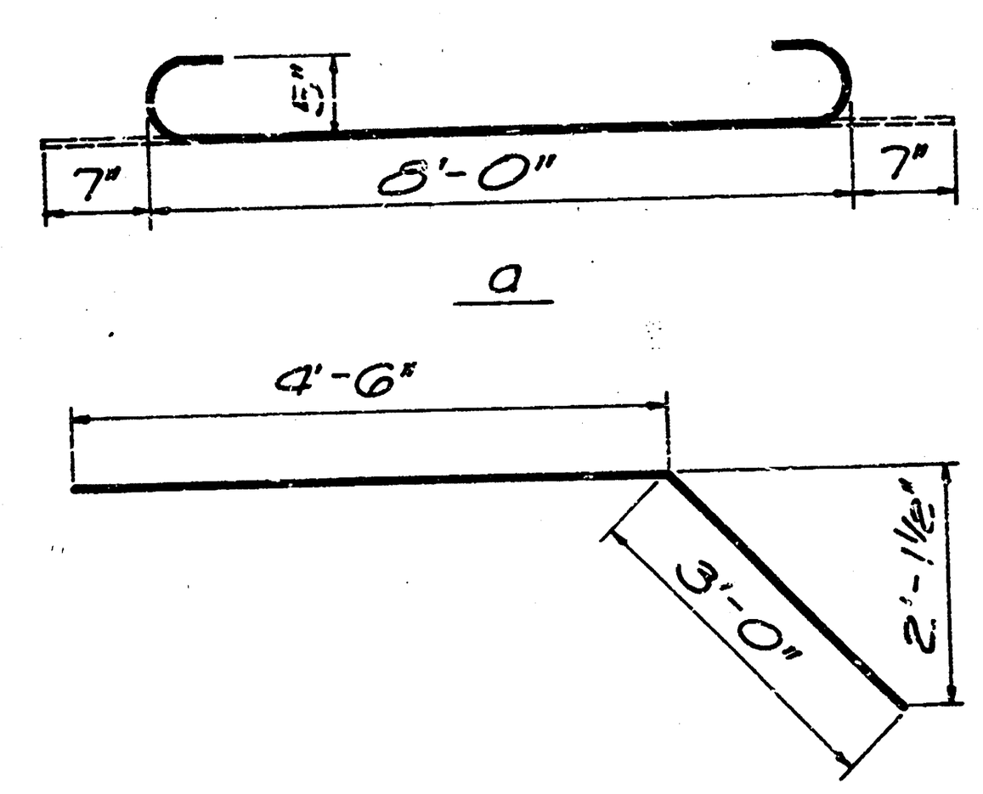
The quantities shown in Culvert Summary include Apron and or Soil Saver quantities if they are to be constructed.

~~See Standard No. 671.1 (Woven Wire) or Standard No. 672.1 (Barbed Wire) for details of attachment to culvert wings.~~

The Contractor may, at his option, substitute No. 4 steel reinforcing bars for the keyed construction joints. Rebars are to be a minimum of thirty (30) inches in length, set so the joint divides the bar equally and these extra rebars will be required in each plane of steel in the culvert. The extra steel required will not be paid for directly but will be considered subsidiary to other items in the contract.



BENDING DIAGRAMS
All dimensions are out to out of bars.
Design Note: Length b1 = b + X + 2 - 9"



LIST OF BARS AND DIMENSIONS

7'x (crossed out)

Apron Steel (One)	Lbs.	Hdwl. Concrete (Two)	C.Y.
Apron Concrete (One)	C.Y.	Concrete Per Ft of Box	C.Y.
Seal Course	C.Y.	Apron Seal Course	

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v
Dimension														

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	v	v1	v2	v3
Number			10	2	12		4	8	4	8					
Size		#4	#4	#4	#4	#4	#4	#4	#5	#5	#4		#4	#4	#4
Length				10'-0"											

7'x3'x (crossed out)

Apron Steel (One)	23 Lbs	Hdwl. Concrete (Two)	6.778 C.Y.
Apron Concrete (One)	1.849 C.Y.	Concrete Per Ft of Box	C.Y.
Seal Course	C.Y.	Apron Seal Course	C.Y.

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v
Dimension	8'-3"	5'-10"	4'-9⅛"+2Tw	3'-0"	9"	6"		6"	2'-0"	1'-0"	1'-0"			

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	v	v1	v2
Number			10	2	12	36	4	8	4	8	8		8	12
Size		#4	#4	#4	#4	#4	#4	#4	#5	#5	#4		#4	#4
Length				10'-0"	10'-0"	5'-1"	8'-0"	8'-3"	7'-9"	9'-9"	9'-6"		5'-2"	4'-0"

7'x4'x (crossed out)

Apron Steel (One)	30 Lbs	Hdwl Concrete (Two)	8.720 C.Y.
Apron Concrete (One)	2.395 C.Y.	Concrete Per Ft of Box	C.Y.
Seal Course	C.Y.	Apron Seal Course	C.Y.

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v
Dimension	10'-3"	7'-3"	4'-9⅛"+2Tw	4'-0"	6"	6"		6"	2'-6"	1'-0"	1'-0"			

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	h2	v	v1	v2
Number			10	2	12	44	4	8	4	8	8	4		12	12
Size		#4	#4	#4	#4	#4	#4	#4	#5	#5	#4	#4		#4	#4
Length				10'-0"	12'-3"	5'-1"	8'-0"	10'-3"	7'-9"	11'-9"	11'-6"	8'-8"		5'-10"	4'-7"

7'x5'x (crossed out)

Apron Steel (One)	38 Lbs	Hdwl Concrete (Two)	11.208 C.Y.
Apron Concrete (One)	3.000 C.Y.	Concrete Per Ft of Box	C.Y.
Seal Course	C.Y.	Apron Seal Course	C.Y.

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v
Dimension	12'-3"	8'-8"	4'-9⅛"+2Tw	5'-0"	3"	6"			2'-9"	1'-0"	1'-3"			

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	h2	v	v1	v2
Number			10	2	12	52	4	8	4	8	12	4		16	12
Size		#4	#4	#4	#4	#4	#4	#4	#5	#5	#4	#4		#4	4
Length				10'-0"	14'-9"	5'-4"	8'-0"	12'-3"	7'-9"	13'-9"	13'-6"	7'-6"		6'-5"	5'-2"

7'x6'x (crossed out)

Apron Steel (One)	47 Lbs	Hdwl Concrete (Two)	14.558 C.Y.
Apron Concrete (One)	3.675 C.Y.	Concrete Per Ft of Box	C.Y.
Seal Course	C.Y.	Apron Seal Course	

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v
Dimension	14'-3"	10'-0⅞"	4'-7⅝"+2Tw	6'-0"	9"	6½"			3'-0"	1'-0"	1'-5½"			

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	h2	v	v1	v2	v3
Number			10	2	12	60	4	8	4	8	12	4		20	[illegible]	[illegible]
Size		#4	#4	#4	#4	#4	#4	#4	#5	#5	#4	#4		#4	#4	#4
Length				10'-0"	17'-0"	5'-7"	8'-0"	14'-3"	7'-10"	15'-9"	15'-6"	10'-0"		7'-0"	[illegible]	3'-6"

7'x7'x60'

Apron Steel (One)	57 Lbs	Hdwl Concrete (Two)	19.97 C.Y.
Apron Concrete (One)	4.414 C.Y.	Concrete Per Ft of Box	.757 C.Y.
Seal Course for Box	4.82 C.Y.	Apron Seal Course	~~[illegible]~~ C.Y.

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v
Dimension	16'-3"	11'-5⅞"	5'-7 7/16"	7'-0"	6"	8"	8"	8"	3'-6"	1'-0"	1'-10"		5½"	12"

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	h2	h3	v	v1	v2	v3
Number	268	30	10	2	12	68	4	8	4	8	16	4	20	124	20	16	32
Size	#5	#4	#4	#4	#4	#4	#4	#4	#5	#5	#4	#4	#4	#4	#4	#4	#5
Length	9'-2"	30'-6"	34'-4"	10'-0"	19'-6"	6'-0"	8'-0"	16'-3"	7'-11"	17'-9"	17'-7"	8'-10"	7'-6"	8'-0"	8'-0"	16'-4"	4'-9"

7'x (crossed out)

Apron Steel (One)	Lbs.	Hdwl Concrete (Two)	C.Y.
Apron Concrete (One)	C.Y.	Concrete Per Ft of Box	C.Y.
Seal Course for Box	C.Y.	Apron Seal Course	

Letter	A	B	C	H	R	T	Ts	Tw	W	X	Y	Bar Space	a	v	v1
Dimension															

Bar	a	b	b1	c	c1	d	e	e1	g	h	h1	h2	v	v1	v2	v3
Number			10	2	12		4	8	4	8						
Size		#4	#4	#4	#4	#4	#4	#4	#5	#5	#4	#4		#4	#4	
Length				10'-0"												

CULVERT SUMMARY

Station	Size	Crown or Elev.	Flowline Elev. Lt.	Flowline Elev. Rt.	Rdwy Horiz. Lt.	Rdwy Horiz. Rt.	Lgth. along Box Lt.	Lgth. along Box Rt.	Sections No.	Sections Length	Apron	Cl. A Seal Course C.Y.	Design Fill Ft.	Cl. A-AE Conc. Cu. Yds.	Reinf. Steel Lbs.
21+55	7x7x60	118.57	109.14	109.20	30-0	30-0	30-0	30-0	2	30-0	Lt.	4.82	1-9	71.4	5498

No	Date	Revisions	By	App'd
5	4-5-79	Rebar Quan., Rev. Conc & Elim. Fence Bolt	W.L.H.	L.R.P.
4	9-26-77	Keyed Joint Option	W.L.H.	L.R.P.
3	9-10-73	Wire Reinf. Mesh Changed to W1.4	W.L.H.	K.G.L.
2	10-27-72	Wire Size AASHO Des. M32-72I	W.L.H.	K.G.L.
1	5-19-72	Removed 12' Uniform Bbl. Sections	W.L.H.	K.G.L.

FHWA Region No.	State	Project No.	Fiscal Year	Sheet No.	Total Sheets
7	Kansas				

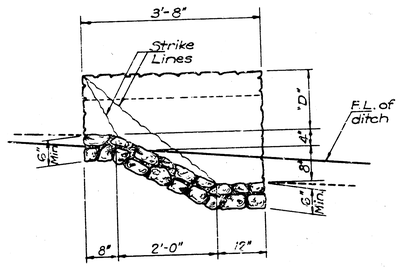
KANSAS DEPARTMENT OF TRANSPORTATION

R.C. BOX CULVERT
7 FT. SPAN

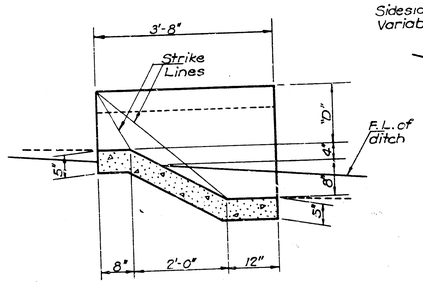
11/12

~~STD. NO. 314.2~~ 4-6-71

SHEET NO ___ OF ___ SCALE
DESIGNED Boynton — DETAILED Richards — APP'D K. G. Lancaster — QUANTITIES Richards — TRACED Booth
DESIGN CK Latham — DETAIL CK Schwartz — QUAN CK Clennon — TRACE CK Hecht

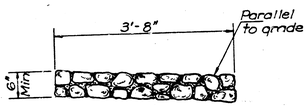


GROUTED STONE
TYPE I



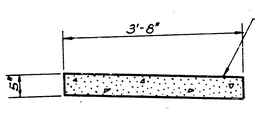
CONCRETE
TYPE 5

SECTION A-A
Without Toe Wall.



GROUTED STONE
TYPE I

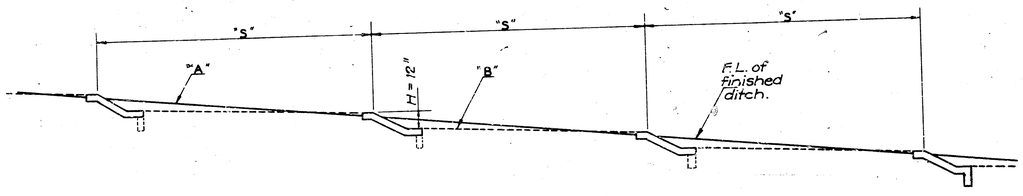
SECTION B-B
Same section at each end of unit.
Without Toe Wall.



CONCRETE
TYPE 5

Note: Use Class "A" concrete thruout for Type 5 & 5-T Wash Checks.

Note: The stone in all stone wash checks shall be laid in a 3" mortar bed and the spaces between stones shall be filled with mortar.



SPACING DIAGRAM
Same for each type.

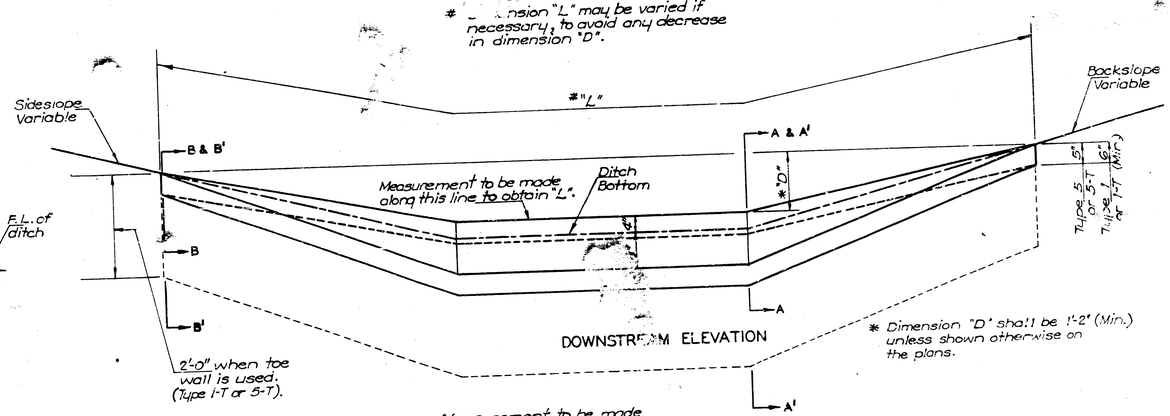
S = Spacing of units in feet (10' min.).
A = Per cent grade of ditch.
B = Per cent at which washing is expected to stop. This will vary with the type of soil, etc.
H = Height of drop at each unit.

$$S = \frac{100\,H}{(A-B)}, (10'\text{min.})$$

FORMULA

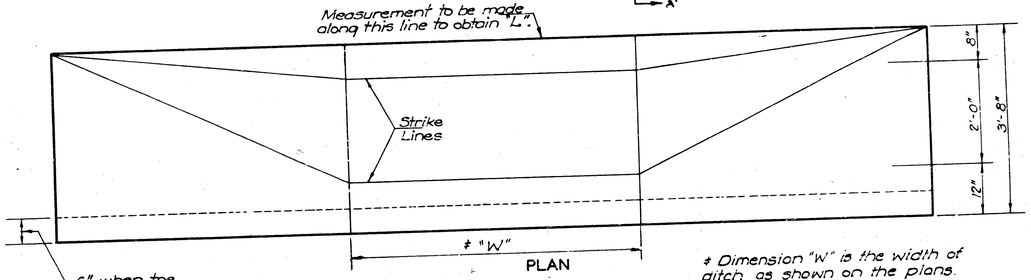
TABLE OF SPACING Same for each type			
(A-B)	Spacing	(A-B)	Spacing
1	100'	6	17'
1.5	67'	6.5	15.5'
2	50'	7	14'
2.5	40'	7.5	13'
3	33'	8	12.5'
3.5	29'	8.5	12'
4	25'	9	11'
4.5	22'	9.5	10.5'
5	20'	10	10'
5.5	18'		

\# Dimension "L" may be varied if necessary, to avoid any decrease in dimension "D".



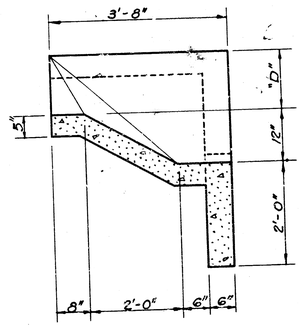
DOWNSTREAM ELEVATION

* Dimension "D" shall be 1'-2" (Min.) unless shown otherwise on the plans.



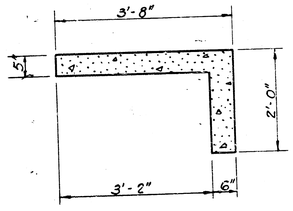
PLAN

Dimension "W" is the width of ditch as shown on the plans.

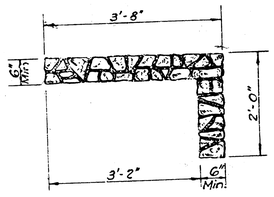


SECTION A'-A'
With Toe Wall
TYPE 5-T

Note: Type 1-T or 5-T wash checks shall be used on the lowest unit in each row. Additional locations where these units are to be constructed shall be designated by the Engineer.



SECTION B'-B'
With Toe Wall
TYPE 5-T



SECTION B'-B'
With Toe Wall
TYPE 1-T

Note: Unless otherwise noted, either of these types may be used.

Van Doren - Hazard - Stallings
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