

PROJECT MARKER

To be erected at each end of all Federal Aid Projects by the Resident Engineer.

Project Markers are to be placed on R.W. line, but not more than 50' from E. of road, if R.W. is greater than 100'.

GENERAL REQUIREMENTS

Round posts shall be 6" min. & 9" max. diameter at a point 6" below top of post and 1 1/2" max. & 10 1/2" max. diameter at the butt, and shall be graded for size so that in any one continuous row of guide posts the top diameters shall not vary more than 1". Measurement for size shall be made after shrinkage.

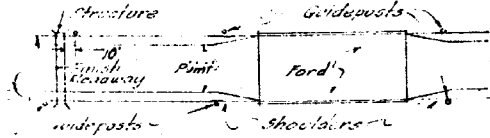
The minimum height in any post shall equal to the diameter + 1/2 inch.

All guide posts shall conform to Std. Specs. Guide post locations shown on plans are approximate and changes may be necessary to meet field conditions.

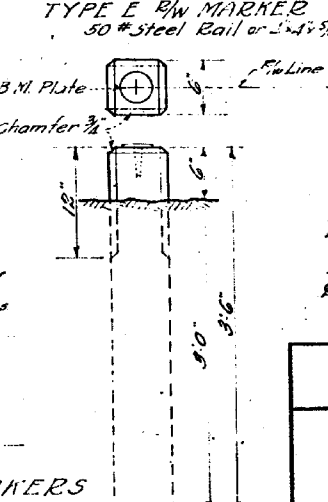
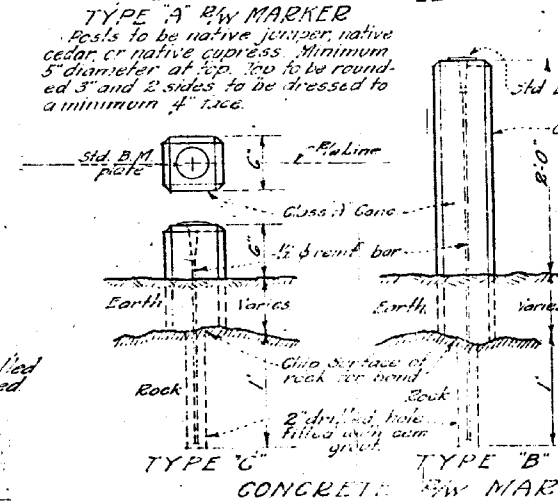
When placed in rows guide posts shall be spaced 50' center to center.

Type of guide posts & road guard posts shall conform through out project.

Reflector button as shown above is to be installed facing traffic after post is erected & painted.

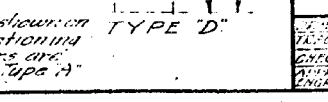


TYPICAL GUIDE POST INSTALLATION



TYPE B CONCRETE R.W. MARKERS

Note: R.W. Markers to be erected where shown on the plans or as determined by the Engineer. Stationing to be furnished by Engineer. When R.W. Markers are in solid rock Type B may be substituted for Type A and Type C may be substituted for Type D.



ARIZONA HIGHWAY DEPARTMENT PLANS DIVISION				REV.
GUIDE POSTS RIGHT OF WAY AND PROJECT MARKERS.				24
DESIGNED BY	A.S.	6/11/34	DRAWING NO. A-1	
CHECKED BY	K.S.	6/11/34		
APPROVED BY	H.W.	7/20/38		
ENGINEER	G.P.	6/11/34		

CONSTRUCTION STANDARDS - INDEX

C-01.10	Plans Symbols	C-10.18	Flared Breakaway Cable Terminal Assembly (Steel Post)
C-01.11	Plans Symbols	C-10.19	Flared Breakaway Cable Terminal Assembly (Timber Post, Special)
C-01.12	Plans Symbols	C-10.20	Flared Breakaway Cable Terminal Assembly (Timber Post, Special)
C-01.30	General Abbreviations	C-10.21	Guard Rail Anchor Assembly (Timber Post)
C-01.31	General Abbreviations	C-10.22	Guard Rail Anchor Assembly (Steel Post)
C-01.32	General Abbreviations	C-10.23	Buried & Bolted Anchor Timber Post
		C-10.24	Buried & Bolted Anchor Steel Post
C-02.10	Slopes, Interstate & Class A-A Roadways	C-10.25	Transition W Beam (Timber Post) to Concrete Half Barrier
C-02.20	Slopes, Class A & B Roadways	C-10.26	Transition W Beam (Timber Post) to Concrete Half Barrier
C-02.30	Slopes, Class C & D Roadways	C-10.27	Transition W Beam (Timber Post) to Concrete Half Barrier
C-02.40	Pavement Crown, Parabolic	C-10.28	Transition W Beam (Timber Post) to Concrete Half Barrier
		C-10.29	Transition W Beam (Timber Post) to Concrete Half Barrier
C-03.10	Ditches & Dykes	C-10.31	Transition W Beam (Steel Post) to Concrete Half Barrier
C-03.20	Channels & Dykes Typical Parallel Installations	C-10.32	Transition W Beam (Steel Post) to Concrete Half Barrier
		C-10.33	Transition W Beam (Steel Post) to Concrete Half Barrier
C-04.10	Spillway, Embankment	C-10.34	Transition W Beam (Steel Post) to Concrete Half Barrier
C-04.20	Downdrain, Embankment	C-10.35	Transition W Beam (Steel Post) to Concrete Half Barrier
C-04.30	Spillway, Embankment Length Table	C-10.37	Transition W Beam (Steel Post) to Concrete Half Barrier
C-04.40	Downdrain, Embankment, Length Table	C-10.38	Transition W Beam (Steel Post) to Concrete Half Barrier, Curb Installation
		C-10.39	Transition W Beam (Steel Post) to Concrete Half Barrier, Curb Installation
C-05.10	Single Curb, Curb & Gutter, Embankment Curb	C-10.40	Transition W Beam (Steel Post) to Concrete Half Barrier, Curb Installation
C-05.20	Concrete Sidewalk & Driveway	C-10.41	Transition W Beam (Steel Post) to Concrete Half Barrier, Curb Installation
		C-10.43	Transition W Beam to Concrete Median Barrier
C-06.10	Turnout & Driveway Layout	C-10.44	Transition W Beam to Concrete Median Barrier
C-06.20	Geometrics, Detour	C-10.45	Transition W Beam to Concrete Median Barrier
		C-10.46	Transition W Beam to Concrete Median Barrier
C-07.10	Pavement, Concrete, Transverse Joints	C-10.48	W Beam BCT Attenuator Assembly
C-07.20	Pavement, Concrete, Longitudinal Joints	C-10.49	W Beam BCT Attenuator Assembly
C-07.30	Pavement, Out & Replacement	C-10.50	W Beam BCT Attenuator Assembly
		C-10.51	W Beam BCT Attenuator Assembly
C-08.10	Geometrics, Exit Ramp	C-10.52	W Beam BCT Attenuator Assembly
C-08.20	Geometrics, Entrance Ramp	C-10.54	W Beam BCT Attenuator Assembly, Curb Installation
		C-10.55	W Beam BCT Attenuator Assembly, Curb Installation
C-09.10	Grooving for Bituminous Shoulders	C-10.56	W Beam BCT Attenuator Assembly, Curb Installation
C-09.20	Grooving for Concrete Shoulders	C-10.57	W Beam BCT Attenuator Assembly, Curb Installation
		C-10.58	W Beam BCT Attenuator Assembly, Curb Installation
C-10.01	Type A Guard Rail Installation, Reflector Tab	C-10.60	Median W Beam BCT Attenuator Assembly
C-10.02	Type B Guard Rail Installation, Reflector Tab	C-10.61	Median W Beam BCT Attenuator Assembly
C-10.03	Measurement Limits for W Beam & Thrie Beam System	C-10.62	Median W Beam BCT Attenuator Assembly
C-10.04	G4(1W) & G4(2W) Blocked Out W Beam (Timber Post)	C-10.63	Median W Beam BCT Attenuator Assembly
C-10.05	G4(1S) & G4(2S) Blocked Out W Beam (Steel Post)	C-10.96	Glare Screen, Type "P", Concrete Median Barrier
C-10.06	G4(1S-Modified) Blocked Out W Beam (Steel Post) with Special Curb & Gutter	C-10.97	Glare Screen, Type "O", Concrete Median Barrier
C-10.07	G9(A) & G9(B) Blocked Out Thrie Beam (Steel Post)		
C-10.08	G9(C) Blocked Out Thrie Beam (Steel Post)		
C-10.09	Half Barrier, Cast In Place, Slip Form	C-11.10	Roadway Cattle Guard-Footing Type
C-10.10	Half Barrier, Cast In Place, Fixed Form	C-11.11	Roadway Cattle Guard-Grill & Grill Clamp Detail
C-10.11	Half Barrier, Precast	C-11.12	Roadway Cattle Guard-Footing Type, Misc. Details
C-10.12	Median Barrier, Cast In Place, Slip Form	C-11.20	Cattle Guard, Drainage
C-10.13	Median Barrier, Cast In Place, Fixed Form	C-11.30	Cattle Guard, Railroad
C-10.14	Median Barrier, Precast		
C-10.15	Flared Breakaway Cable Terminal Assembly (Timber Post)	C-12.10	Fence, Woven Wire
C-10.16	Flared Breakaway Cable Terminal Assembly (Timber Post)	C-12.20	Fence, Barbed Wire
C-10.17	Flared Breakaway Cable Terminal Assembly (Steel Post)	C-12.30	Fence, Gate, Type 1 & 2

CONSTRUCTION STANDARDS - INDEX

C-12.40 Fence, Flood Gate
 C-12.50 Fence, Misc. Details
 C-12.60 Fence Chain Link Type 1
 C-12.70 Fence Chain Link Type 2
 ▲C-13.10 Pipe Culvert Installation
 C-13.15 Pipe Culvert Placement
 C-13.20 Pipe, Reinforced Concrete, End Section
 C-13.25 Pipe, Corrugated Metal, End Section
 C-13.30 Pipe & Pipe Arch, Corrugated Metal Concrete Invert Paving
 C-13.35 Structural Excavation, Payment Limits
 C-13.40 Structural Excavation, Payment Limits, Special Backfill Placement
 C-13.45▲Structure Backfill Placement
 C-13.50▲Structure Backfill Measurement
 C-13.55 Pipe, Cattle-Vehicle Pass, Mitered End Treatment

 C-14.10 Headwall, Pipe, Straight & "L" Types
 C-14.20 Headwall, Normal to Pipe, 42" - 84" Pipe
 C-14.21 Headwalls, 42" - 84" Pipe Skewed
 C-14.30 Headwall, Drop Inlet

 C-15.10 Catch Basin, Type 1
 C-15.20 Catch Basin, Type 3
 C-15.30 Catch Basin, Type 4
 C-15.40 Catch Basin, Type 5
 C-15.50 Catch Basin, Grates, Longitudinal Bars
 C-15.60 Catch Basin, Grates, Transverse Bars
 C-15.70 Catch Basin, Misc. Details
 C-15.80 Catch Basin, Median Flush
 C-15.90 Catch Basin, Median Dyke, Precast

 C-16.10 Irrigation Headwalls 18" to 60" Diameter Pipes
 C-16.20 Irrigation Standpipes
 C-16.30 Irrigation Valve & Gate

 C-17.10 Bank Protection, Rail Types 1, 2 & 3
 C-17.20 Bank Protection, Rail Types 4, 5 & 6

 C-18.10 Manhole Details
 C-18.20 Manhole Frame & Cover

 C-19.10 Ford - Concrete Walls
 C-19.20 Ford - Types 1 & 2

 C-21.10 Survey Monument, Frame & Cover, Right Of Way Marker
 C-21.20 Standard Marker




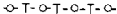














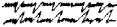
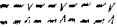












 C-22.10 Utility Line, Protective Concrete Slab



	Pen Size	NEW	Pen Size	EXISTING		Pen Size	NEW	Pen Size	EXISTING
City Limits (Zip-a-Tone No.113, Shade inside) - - - - -			1		Curb, Single with Depressed Area - - - - -	1		00	
County Line - - - - -			2	- - - - -	Pavement & Sidewalk Edge - - - - -	1	- - - - -	00	- - - - -
Forest or Reservation Boundry (Line-Shading, Shade inside) - - - - -			2		Turnout (Indicate width & surface material) - - - - -	1		00	
Property Line - - - - -	1	- P/L - - - - - P/L -	00	- P/L - - - - - P/L -	Cut - - - - -	0	- C - - - - - C -		
Quarter Section Line - - - - -			1	- - - -	Fill - - - - -	0	- F - - - - - F -		
Right-Of-Way Line - - - - -	1	New - R/W -	00	Existing R/W -	Transition ; Cut to Fill - - - - -	0	- C - O - F -		
Section Line - - - - -			1	- - - -	Railroad Track (1" = 20') - - - - -			00	
Sixteenth Section Line - - - - -			1	- - - -	Railroad Track (1" = 100') - - - - -			00	
State or National Boundry - - - - -			4	- - - - -	Bank Protection - - - - -	1		00	
Township or Range Line - - - - -			2	- - - - -	Bridge - - - - -	1		00	
Mile Post - - - - -	1		00		Building - - - - -	1		00	
Right-Of-Way Marker - - - - -	1		00		Catch Basin, Curb & Gutter - - - - -	1		00	
Survey Monument - - - - -	1		00		Catch Basin, Median Dike - - - - -			00	
Angle Point - - - - -	1		00		Catch Basin, Off Roadway, Flush - - - - -	1		00	
Construction \angle , Station Marks - - - - -	3-0		00		Catch Basin, Single Curb - - - - -	1		00	
Quarter Corners - - - - -			00		Cattle Guard - - - - -	1		00	
Section Corners - - - - -			00		Concrete Box Culvert - - - - -	1		00	
Survey Control Point - - - - -	1		00		Dike - - - - -	1		00	
Access Control (Chart Pak 256 TAA $\frac{1}{8}$ " wide, Shade outside) - - - - -	1	New	00	Existing	Downdrain, one way - - - - -	0		00	
Curb & Gutter with Depressed Curb (1" = 20') - - - - -	1		00						
Curb & Gutter with Depressed Curb (1" = 100') - - - - -	1		00						

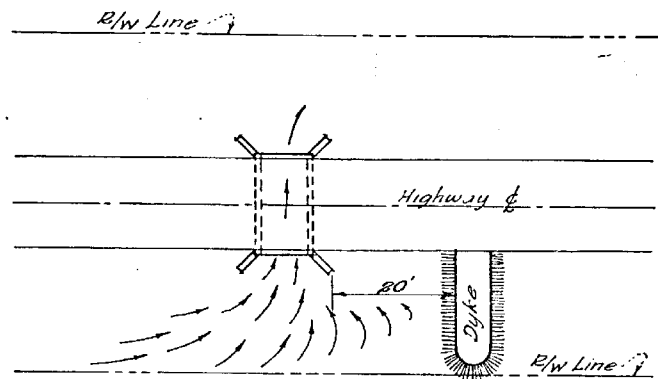
DESIGN APPROVED 	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION - STANDARD DRAWINGS	REV. DATE
APPROVED FOR DISTRIBUTION 	PLANS SYMBOLS	PLAN NO. C-01.10

	Pen Size	NEW	Pen Size	EXISTING		Pen Size	NEW	Pen Size	EXISTING
Downdrain, two way—	0		00		Aggregate Base—	1		00	
Manhole—	1		00		Select Material—	1		00	
Manhole Frame & Cover, Reset—	1				Subgrade Seal—	1		00	
Retaining Wall—	1		00		Ground Line Profile—			0	
Rock Riprap—	1		00		Ground Line Section—	0		00	
Spillway, one way—	0		00		Barbed Wire Fence & Gate—	0		00	
Spillway, two way—	0		00		Chain Link Fence & Gate—	0		00	
Straight Headwall with End Section (1"=20')—	1		00		Guard Rail & Breakaway Cable Terminal—	1		00	
Straight Headwall with End Section (1"=100')—	1		00		Gas Line—	0		00	
"U" Headwall with End Section (1"=20')—	1		00		Irrigation Ditch, Concrete—	0		00	
"U" Headwall with End Section (1"=100')—	1		00		Irrigation Ditch, Earth—	0		00	
Wing Headwall with End Section (1"=20')—	1		00		Irrigation Line (1"=20')—	0		00	
Wing Headwall with End Section (1"=100')—	1		00		Irrigation Line (1"=100')—	0		00	
Plan, Aggregate Surface (Zip-a-Tone No. 275-20)—	1		00		Power or Joint Use Line—	1		00	
Bituminous Pavement (Zip-a-Tone No. 309)—	1		00		Sanitary Sewer (1"=20')—	0		00	
Concrete Pavement (Zip-a-Tone No. 340)—	1		00		Sanitary Sewer (1"=100')—	0		00	
Graded Surface—	1		00		Storm Drain (1"=20')—	0		00	
Obliterate Pavement (Zip-a-Tone No. 438)—	1				Storm Drain (1"=100')—	0		00	
Section, Asphaltic Concrete Friction Course—	1		00		Street Light with Mast Arm—	1		00	
Bituminous Pavement—	1		00						
Concrete Pavement—	1		00						

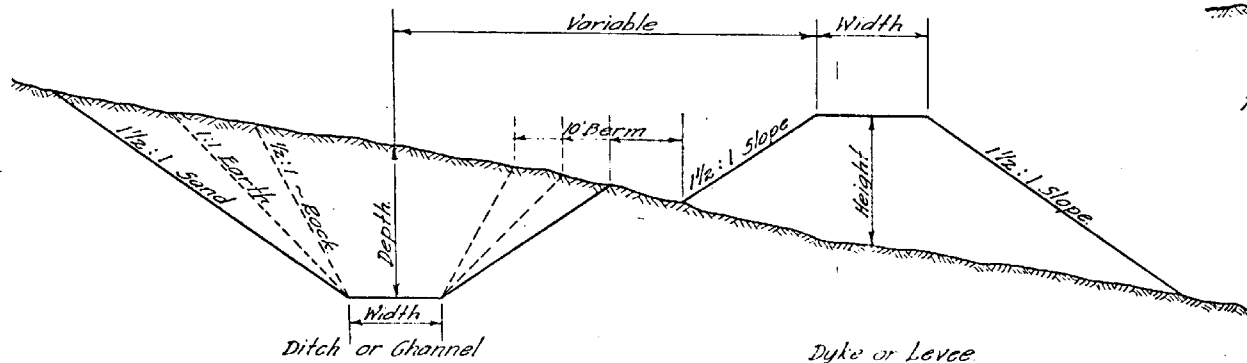
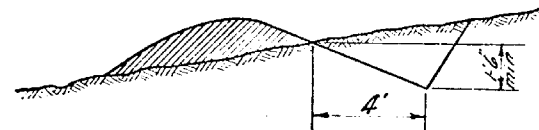
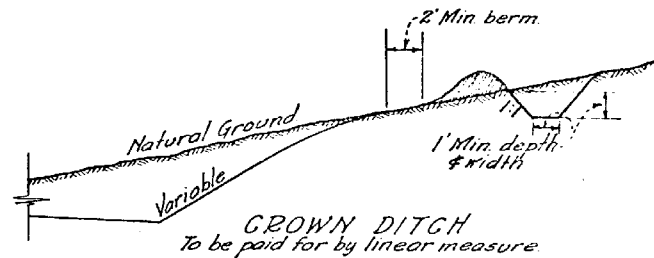
DESIGN APPROVED 	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION - STANDARD DRAWINGS	REV. DATE
APPROVED FOR DISTRIBUTION 	PLANS SYMBOLS	PLAN NO. C-01.11

	Pen Size	NEW	Pen Size	EXISTING		Pen Size	NEW	Pen Size	EXISTING
Telephone Booth— — — — —	I	 T	00	 T	Ugnd Tel/ Telegraph— — — — —	I	— T — T —	00	— T — T —
Telephone Line— — — — —	I	 T	00	 T	Ugnd Power/Joint Use— — — — —	I	— P — P —	00	— P — P —
Utility Pole with Down Guy & Anchor— — — — —	I	 	00	 	<p>NOTE</p> <p>ALL LINES AND SYMBOLS NOT SHOWN WILL CONFORM TO; American National Standard Lines for Engineering Drawings (ANSI Y14.2-1973) American National Standard Symbols for Section Lining (ANSI Y14.2-1973)</p>				
Water or Gas Meter Box— — — — —	0	 W or G	00	 W or G					
Water or Gas Valve— — — — —	0	 W or G	00	 W or G					
Water Line— — — — —	0	— W — 6"	00	— W — 6"					
Drainage Channel— — — — —	I		00						
Drainage Ditch— — — — —	I		00						
Major Wash— — — — —			00						
Minor Wash— — — — —			00						
Hedge— — — — —	0		00						
Palm Tree— — — — —	0		00						
Shrubbery— — — — —	0		00						
Unclassified Tree— — — — —	0		00						
Advertising Sign, Large— — — — —			00						
Advertising Sign, Small— — — — —			00						
Traffic Sign, Single Post— — — — —	I		00						
Traffic Sign, Two or More Posts— — — — —	I		00						
℄ Grade, Profile— — — — —	2	—	00	—					
Dimensions— — — — —	00	—		—					
Visible Outlines, Sections, etc.— — — — —	I	—		—					

DESIGN APPROVED 	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION - STANDARD DRAWINGS	REV DATE
APPROVED FOR DISTRIBUTION 	PLANS SYMBOLS	PLAN NO. C-01.12



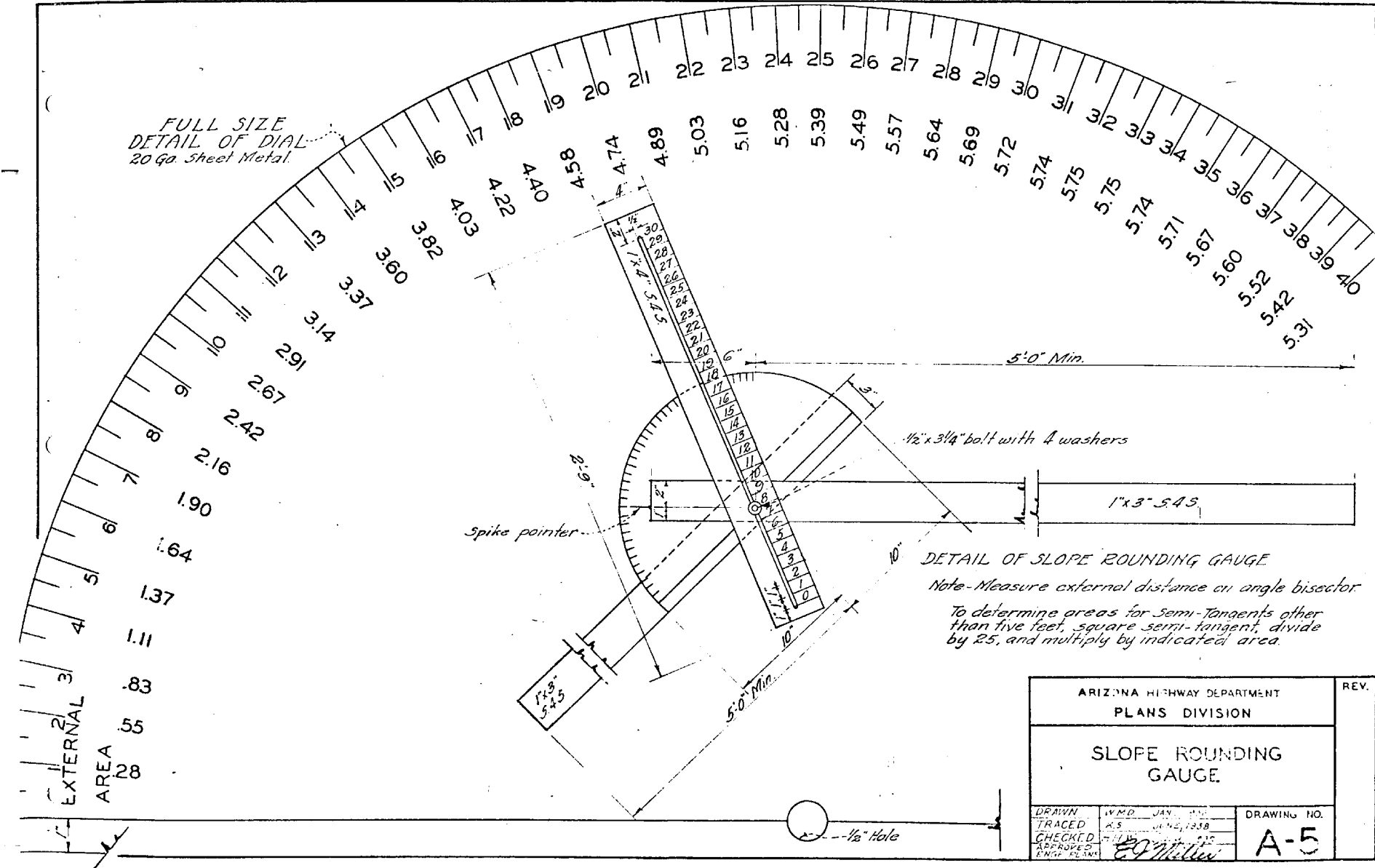
TYPICAL DYKE INSTALLATION AT STRUCTURE.
Dykes at structures to be so placed that they create a water cushion, generally 20' back from end of wings.



SECTION OF DITCH, CHANNEL, DYKE OR LEVEE.
Dimensions shown on plans are respectively width, (depth or height) and length.
Standard slope rounding as shown on Standard Drawing "A-2" shall be used where revegetation, erosion control or beautification in metropolitan areas is necessary.

ARIZONA HIGHWAY DEPARTMENT PLANS DIVISION			REV
STANDARD DITCHES , DYKES AND CHANNELS.			
DRAWN	W.M.D.	11/75	DRAWING NO. A-4
TRACED	H.S.	6/1/38	
CHECKED	H.M.W.	7/20/38	
APPROVED CHGR PLANS	<i>C. Phillips</i>		

FULL SIZE
DETAIL OF DIAL
20 Ga. Sheet Metal.



ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

SLOPE ROUNDING
GAUGE

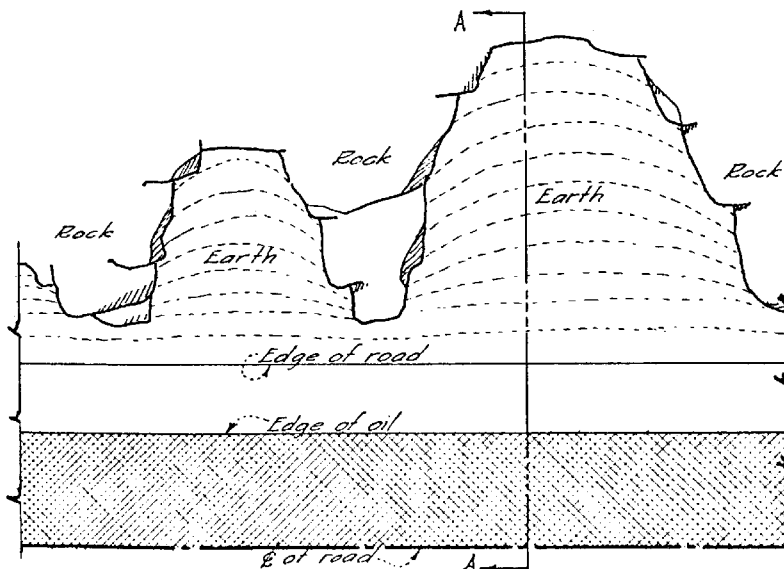
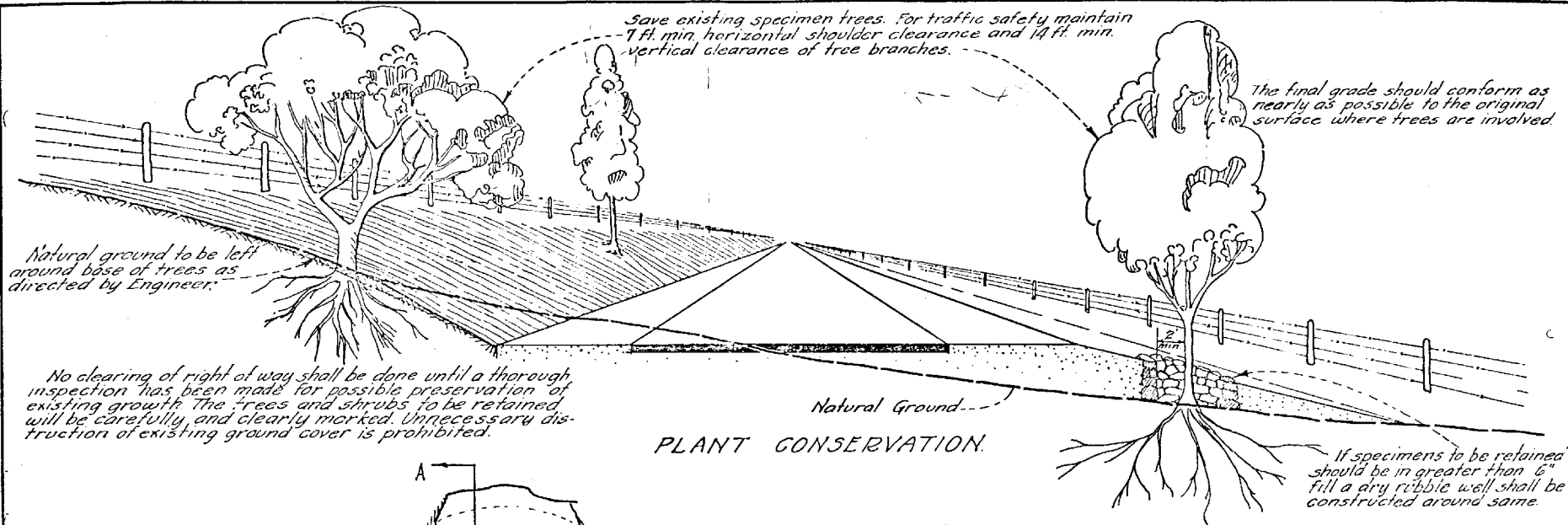
DRAWN
TRACED
CHECKED
APPROVED
ENGR. PLANN

IVMD JAN 1938
A.S. JUN 1938
H.L. JUN 1938
E.G. Miller

DRAWING NO.

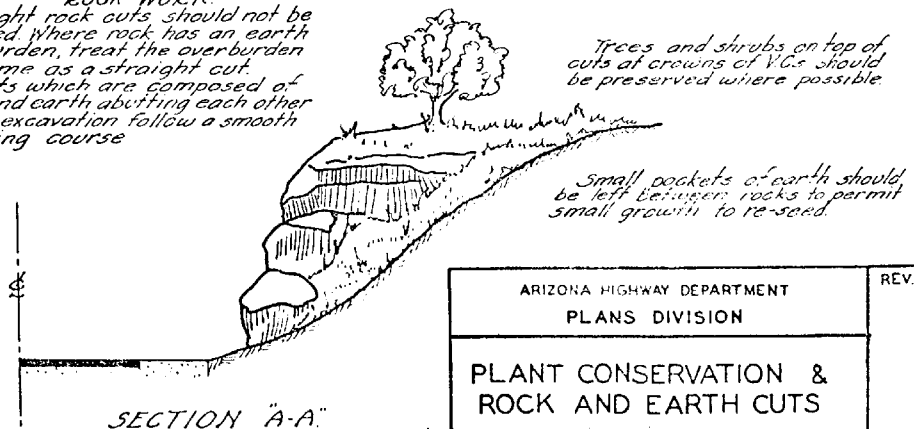
A-5

REV.



PLAN ~ ROCK & EARTH CUT.

ROCK WORK.
 Straight rock cuts should not be rounded. Where rock has an earth overburden, treat the overburden the same as a straight cut.
 In cuts which are composed of rock and earth abutting each other let the excavation follow a smooth rounding course



ARIZONA HIGHWAY DEPARTMENT			REV.
PLANS DIVISION			
PLANT CONSERVATION & ROCK AND EARTH CUTS			
DRAWN	W.M.D.	JAN., 1936	DRAWING NO.
TRACED	H.S.	JUNE, 1938	
CHECKED	E.P.		
APPROVED	E.P.		
ENGR. PLANS	E.P. Miller		A-6

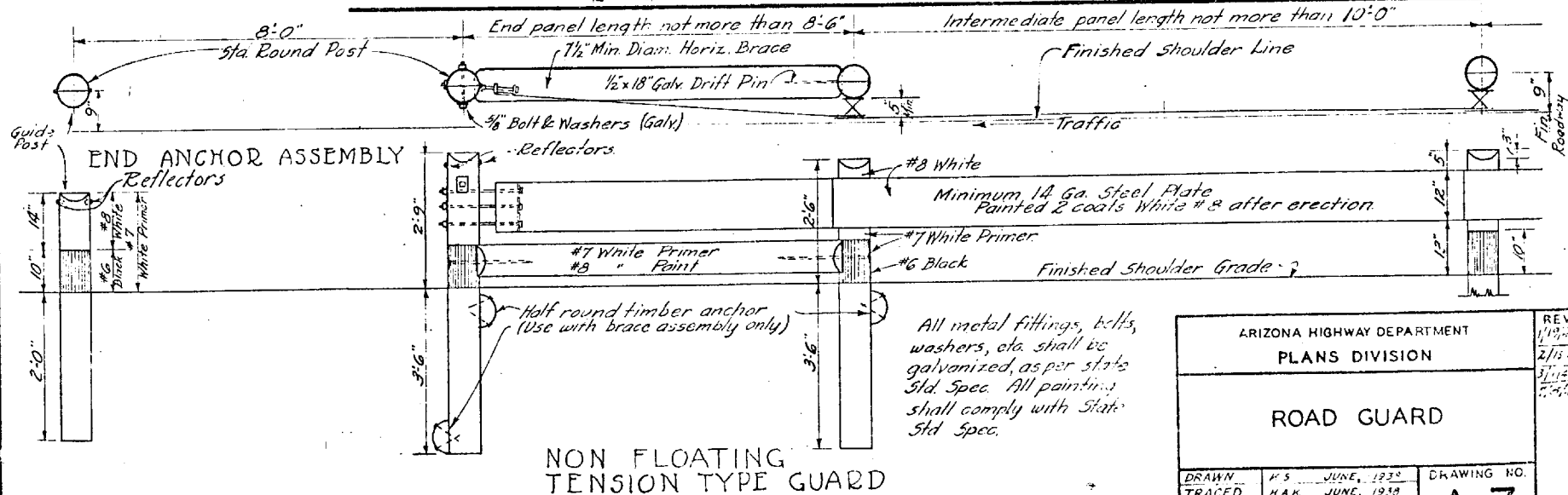
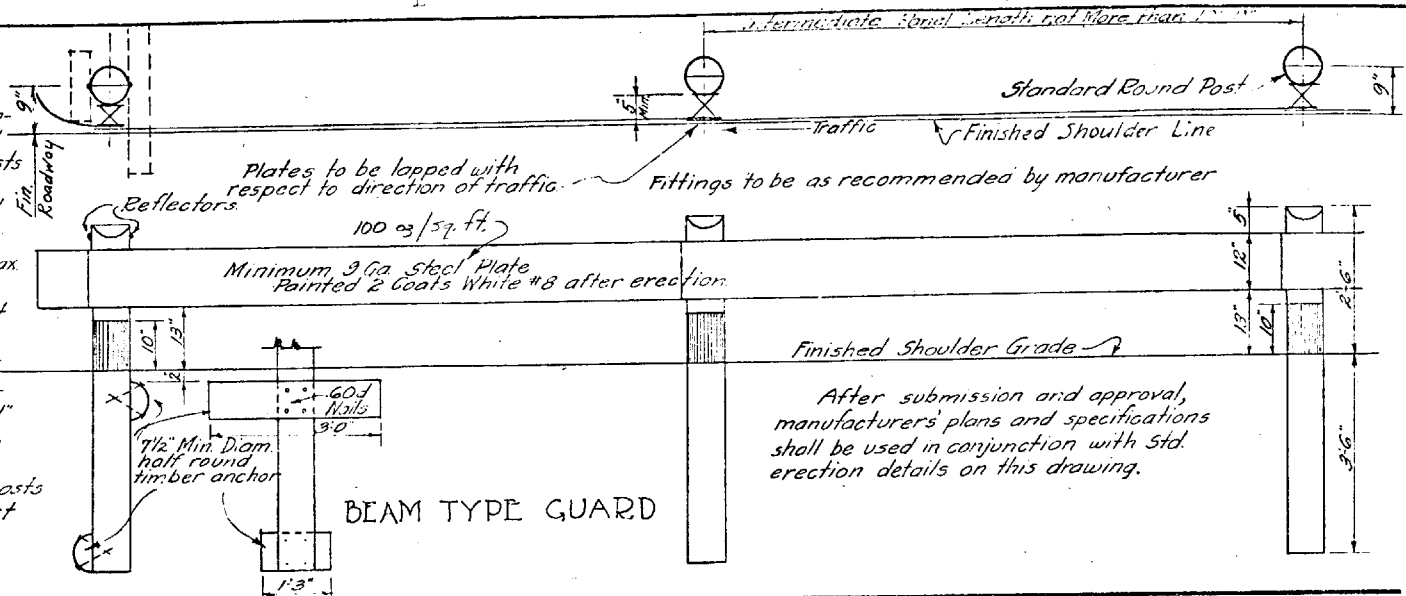
In order to secure proper alignment, all bolt holes shall be bored — and top of posts trimmed after posts are set.

Length of bolts shall be governed by size of posts.

Round posts shall be 6" min. and 9" max. diameter at a point 6" below top of post, and 7½" min. and 10½" max. diameter at the butt; and shall be graded for size so that in any one continuous section of road guard the top diameters shall not vary more than 1"

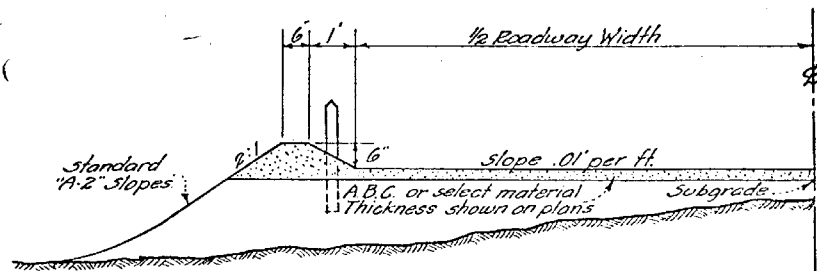
Measurement for size shall be made after shrinkage.

No. 1 Crystal Reflectors in end posts
and every third intermediate post
facing traffic both ways.

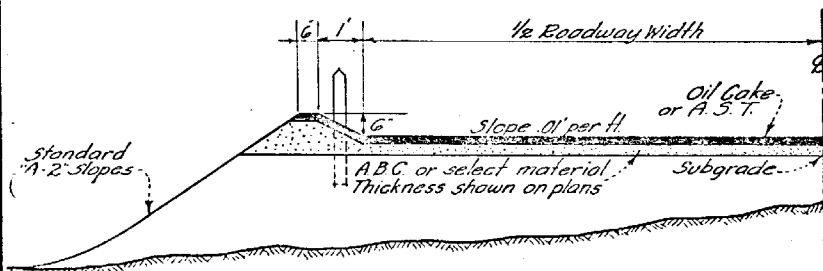


All metal fittings, bolts, washers, etc. shall be galvanized, as per State Std. Spec. All painting shall comply with State Std. Spec.

ARIZONA HIGHWAY DEPARTMENT		REV 1/19/58
PLANS DIVISION		2/18/58
ROAD GUARD		3/11/58 4/11/58
DRAWN TRACED CHECKED APPROVED ENGR. PLANS	K.S. JUNE, 1958 HAK JUNE, 1958 H.W. JULY, 1958 8277-165	DRAWING NO. A-7



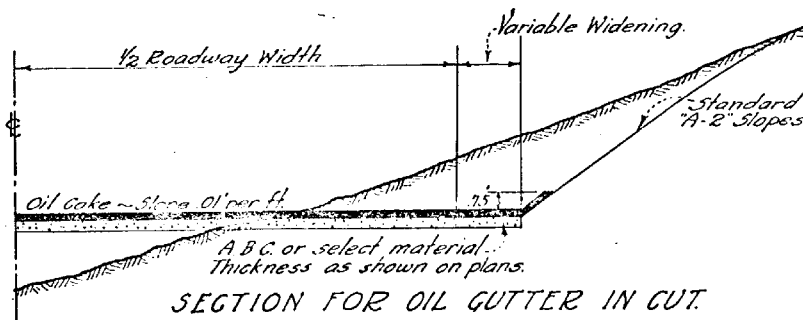
EMBANKMENT GUTTER FOR GRAVEL ROADWAY



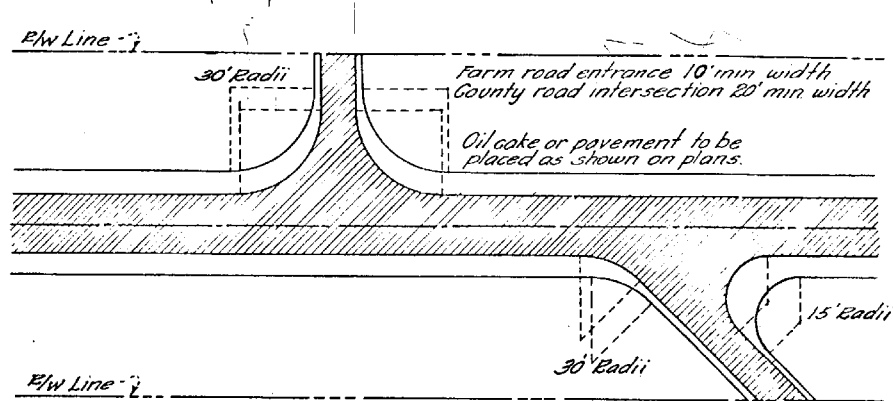
SECTION FOR OIL GUTTER ON FILL

OIL FLARES

1. All small structures within one foot of finish grade shall have 3' oil flares.
2. All structures over 20' clear span shall have 50' oil flares.
3. All roads shall have 100' oil flares.



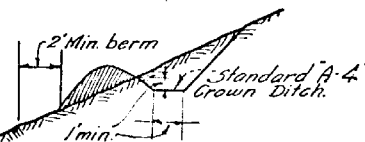
SECTION FOR OIL GUTTER IN CUT



SIDE ROAD ENTRANCES

GENERAL NOTES

Typical sections and slopes shown on this sheet may be superseded by special cross sections and slopes as shown on plans.



ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

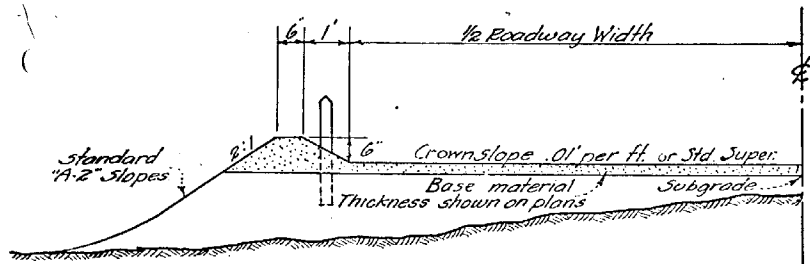
ROADWAY GUTTERS AND SIDE ROAD ENTRANCES

DRAWN WMD JAN. 1936
TRACED K.S. JUNE, 1938
CHECKED N. H. J. 1938
APPROVED ENGR. PLANS E. Miller

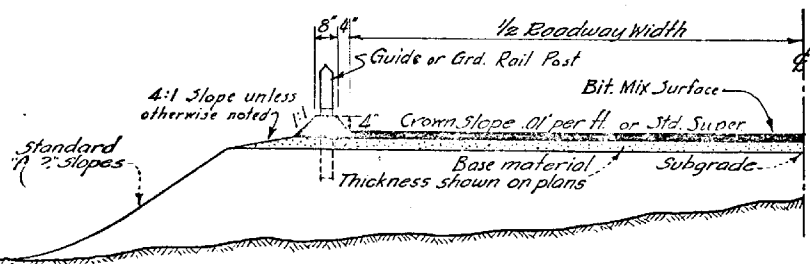
DRAWING NO.

A-8

REV.



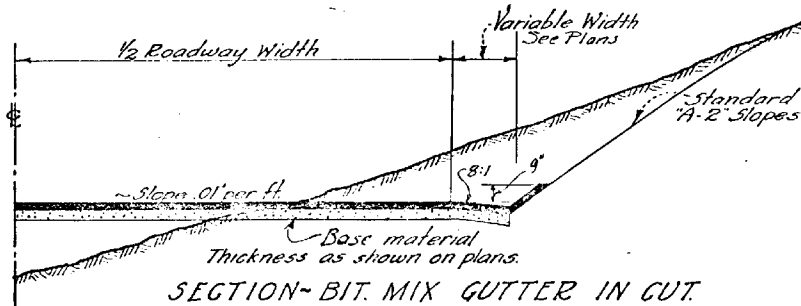
EMBANKMENT CURB FOR GRAVEL ROADWAY



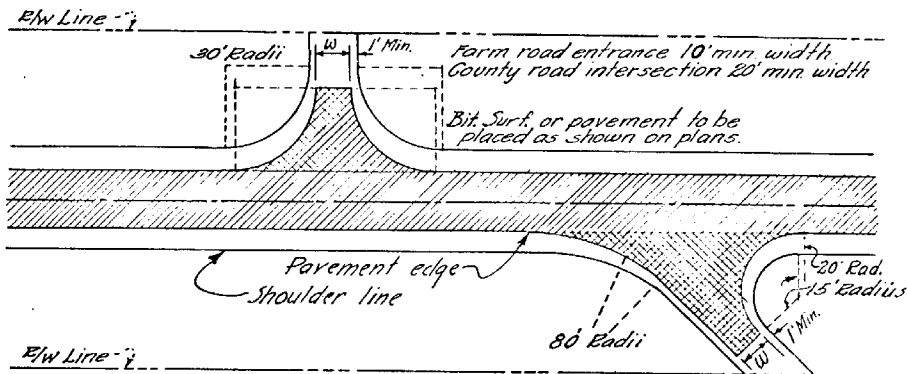
SECTION FOR BIT. MIX CURB ON FILL

BIT. SURF FLARES

1. All small structures within one foot of finish grade shall have 3:1 Bit. flares.
2. All structures over 20' clear span shall have 50' Bit. flares.
3. All roads shall have 100' Bit. flares.



SECTION-BIT. MIX GUTTER IN CUT

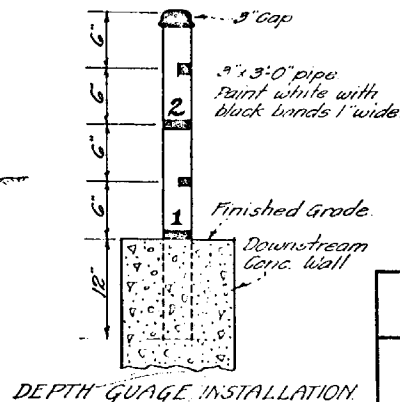
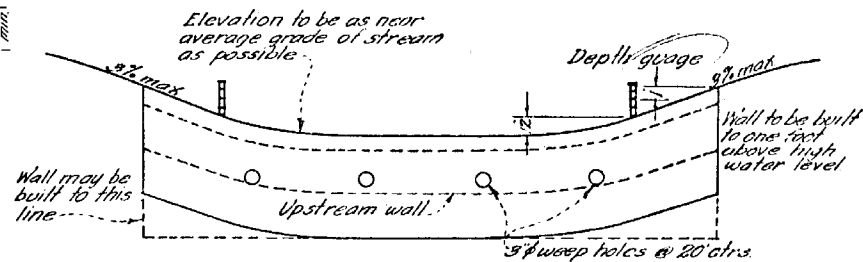
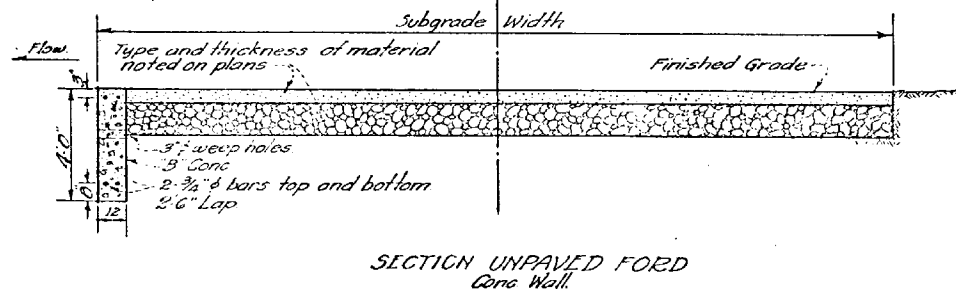
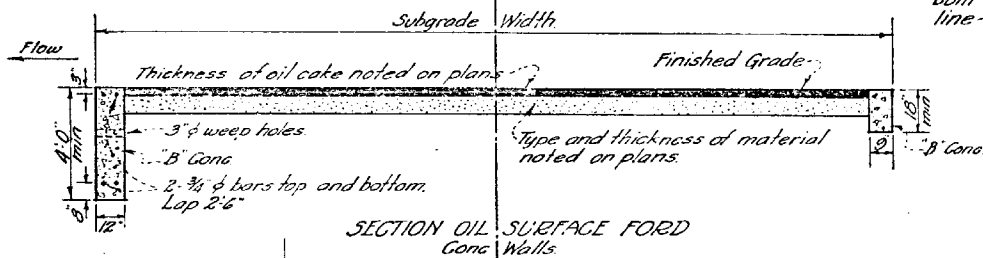
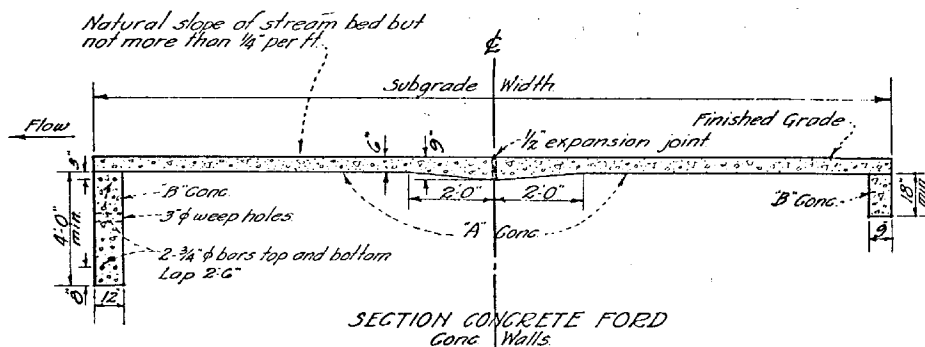


SIDE ROAD ENTRANCES

GENERAL NOTES

Typical sections and slopes shown on this sheet may be superseded by special cross sections and slopes as shown on plans.
All structures within 1 ft. of finished grade shall have bituminous surface full width.

ARIZONA HIGHWAY DEPARTMENT PLANS DIVISION			REV. 3-1-41
FLARES, CURBS, GUTTERS AND SIDE ROAD ENTRANCES			
DRAWN	W.M.D.	JAN. 1938	DRAWING NO. A-8
TRACED	K.S.	JUNE, 1938	
CHECKED	H.M.D.	JULY 1938	
APPROVED	<i>E. Miller</i>		
ENGR. PLANS			



ARIZONA HIGHWAY DEPARTMENT			REV.
PLANS DIVISION			
STANDARD FORD NO. 1 CONCRETE WALLS			
DRAWN BY	W.M.D.	MAY 1934	DRAWING NO. A-9
TRACED BY	K.S.	JULY 1934	
CHECKED BY	F.H.W.	JULY 1934	
APPROVED BY E.C. Miller			
DESIGNED BY			

PLAN

ELEVATION.

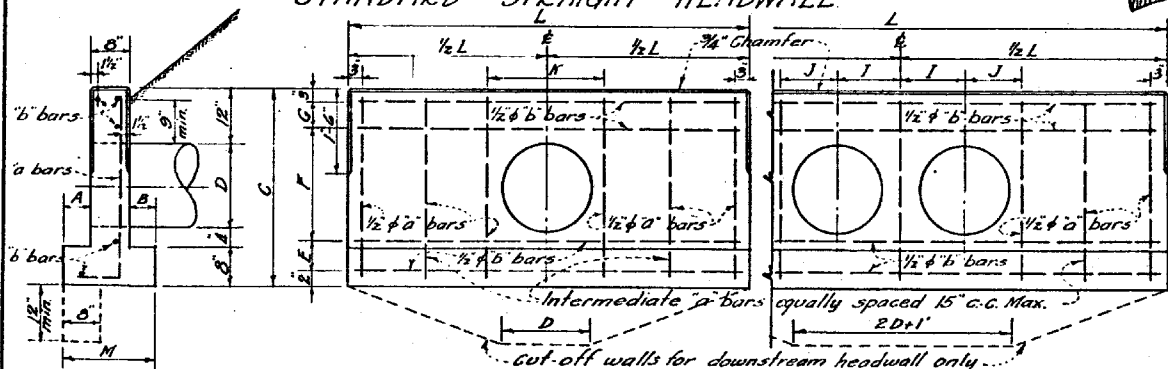
PLAN

ELEVATION

"L" TYPE REINFORCED HEADWALLS ~ SINGLE PIPES												
Diam. Pipe	DIMENSIONS								% Conc OneWall	STEEL		
	A	B	C	D	E	F	G	H		"a" bars	"b" Lirs	height
18"	2'-4"	2'-0"	8"	5'-0"	4'-6"	1'-8"	6"	8"	.95CY	5'-8"x4'-0"	5'-2"x5'-3"	51 lbs.
24"	2'-10"	2'-6"	8"	6'-2"	5'-6"	2'-0"	8"	8"	1.36CY	5'-8"x4'-9"	5'-2"x6'-3"	64 "
30"	3'-4"	3'-9"	8"	7'-2"	6'-6"	2'-0"	8"	8"	1.94CY	7'-4"x5'-3"	5'-2"x8'-9"	88 "
36"	3'-10"	5'-0"	8"	8'-2"	7'-6"	2'-4"	10"	8"	2.75CY	9'-4"x6'-0"	5'-4"x11'-3"	117 "

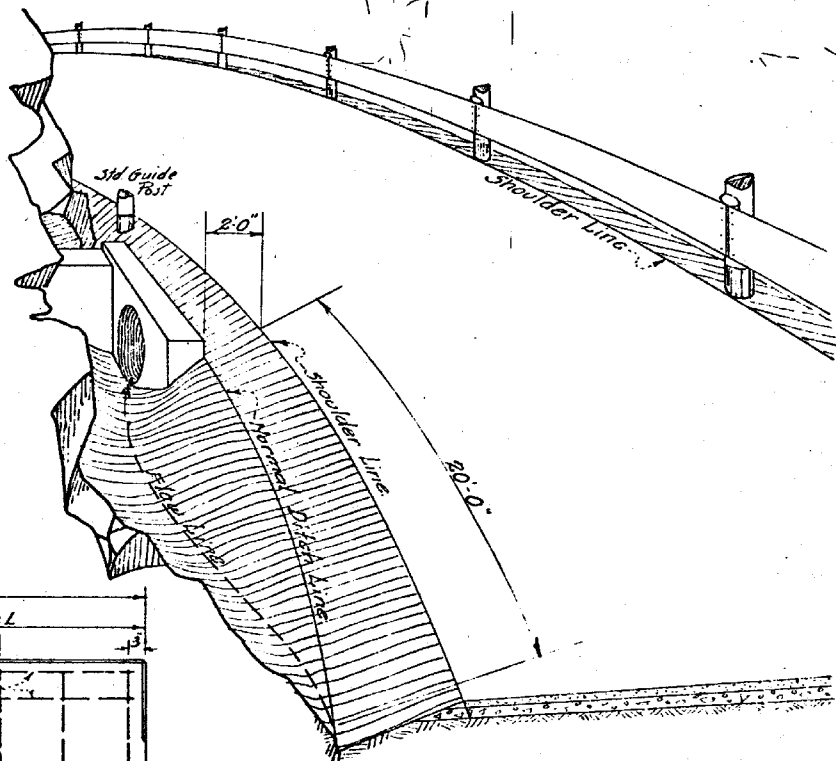
Note:- All un-noted dimensions and size and spacing of reinforcing bars, same as shown on details of straight type headwalls.

STANDARD STRAIGHT HEADWALL



STRAIGHT TYPE REINFORCED CONCRETE HEADWALLS FOR 18" TO 36" PIPES.

Drawings Notes		SINGLE TYPE HEADWALLS														DOUBLE PIPE HEADWALLS													
		DIMENSIONS										STEEL				DIMENSIONS										STEEL			
		A	B	C	E	F	G	H	I	J	a' bars	b' bars	Weight	A	B	C	E	F	G	H	I	J	a' bars	b' bars	Weight				
18"	6"	6"	3'6"	7'	2'0"	6"	2'	7'0"	18"	38	5/8"x4'0"	5/8"x6'6"	37 lbs	6"	6"	3'6"	7'	2'0"	6"	2'	7'0"	18"	38	5/8"x4'0"	5/8"x6'6"	40 lbs			
24"	8"	8"	4'0"	8'	2'4"	7'	2'6"	8'0"	20"	98	5/8"x4'8"	5/8"x7'8"	48 "	8"	8"	4'0"	8'	2'4"	7'	2'6"	8'0"	20"	98	5/8"x4'8"	5/8"x7'8"	57 "			
30"	8"	8"	4'6"	8'	2'0"	7'	3'0"	10'6"	20"	139	5/8"x5'2"	5/8"x10'2"	62 "	8"	8"	4'6"	8'	2'0"	7'	3'0"	10'6"	20"	139	5/8"x5'2"	5/8"x10'2"	76 "			
36"	12"	8"	5'0"	8'	3'4"	7'	3'6"	13'0"	24"	197	1/2"x6'0"	5/8"x12'8"	82 "	12"	8"	5'0"	8'	3'4"	7'	3'6"	13'0"	24"	197	1/2"x6'0"	5/8"x12'8"	99 "			



TYPICAL INSTALLATION OF
"L" TYPE HEADWALL.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

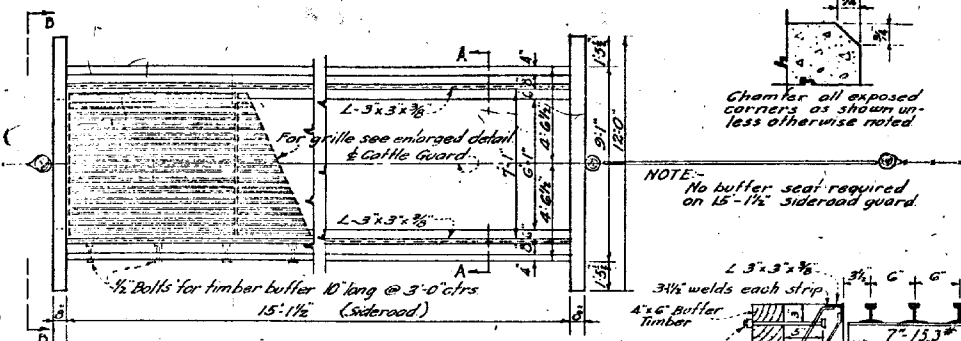
REV.

STD. STRAIGHT HEADWALLS
" L TYPE HEADWALLS

DRAWN	WMD	MAY, 1936
TRACED	H.S.	JUNE, 1938
CHECKED	HHW	JULY 25
APPROVED ENGR PLANS	C. O. H. [Signature]	

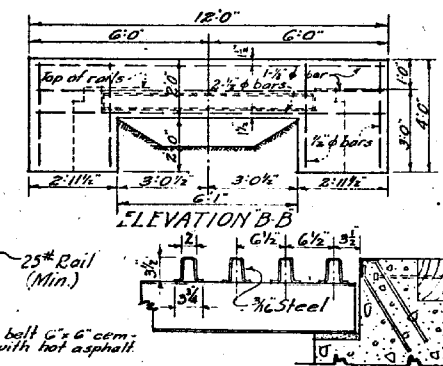
DRAWING NO. 1

A-13



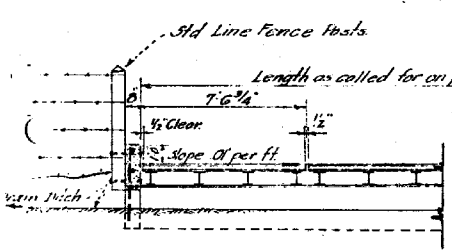
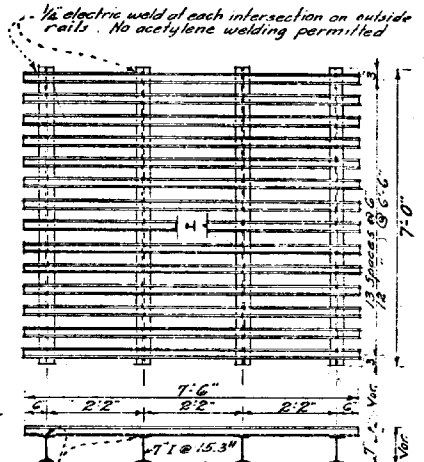
GENERAL PLAN

Paint Note: Shop Coat - All rails and structural steel to be painted 1 coat paint No. 1 spec 4-7. All cedar posts 1 coat paint No. 7 and 1 coat paint No. 8.

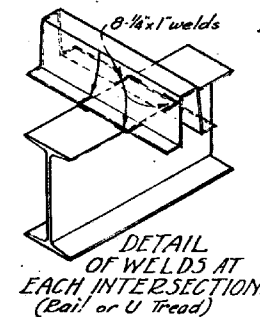
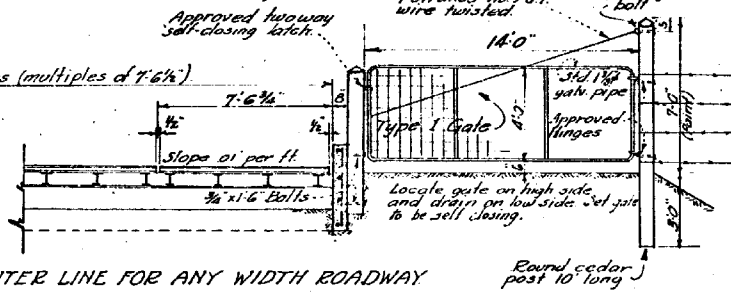


PART SECTION A-A
Rail Treads

PART SECTION A-A
U Type Treads

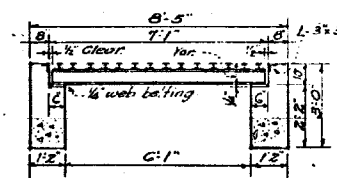
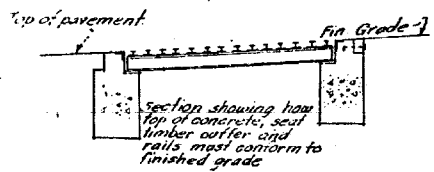


SECTION ON CENTER LINE FOR ANY WIDTH ROADWAY

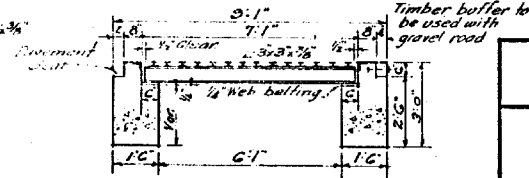


MATERIAL LIST				
Item	Qty	Size	Length	Steel & Cement
Common to all guard lengths				
Post/Roundhead	2	2"	5'-6 min.	
Bolts	4	3/4"	1'-6"	
Reinf. Bars	8	1/2"	11'-6"	60.70
Gate	3	3"	3'-6"	18.88
2 Unit - Sideroad				
Concrete	2	1'-3"	2'-11 1/2"	252
Fabricated L	2	3/4"	2'-11 1/2"	252
Web Belling	10	6"	6" x 1/4"	
3 Unit - Rd Roadway				
Concrete	2	1'-3"	2'-11 1/2"	377
Fabricated L	2	3/4"	2'-11 1/2"	377
Web Belling	24	6"	6" x 1/4"	
4 Unit - 20' L 20' Roadway				
Concrete	2	1'-3"	2'-11 1/2"	508
Fabricated L	2	3/4"	2'-11 1/2"	508
Web Belling	32	6"	6" x 1/4"	
5 Unit - 32' L 32' Roadway				
Concrete	2	1'-3"	2'-11 1/2"	12.71
Fabricated L	2	3/4"	2'-11 1/2"	12.71
Web Belling	40	6"	6" x 1/4"	

NOTE: Second hand rails may be used providing they are clean, free from rust scales, of uniform cross section, and weighing at least 95% of original nominal weight, 25 lbs. Min.



FOR SIDEROAD ONLY
No buffer seat required.



FOR ROADWAYS OF 21' OR MORE
SECTION A-A

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

STD. CATTLE GUARDS

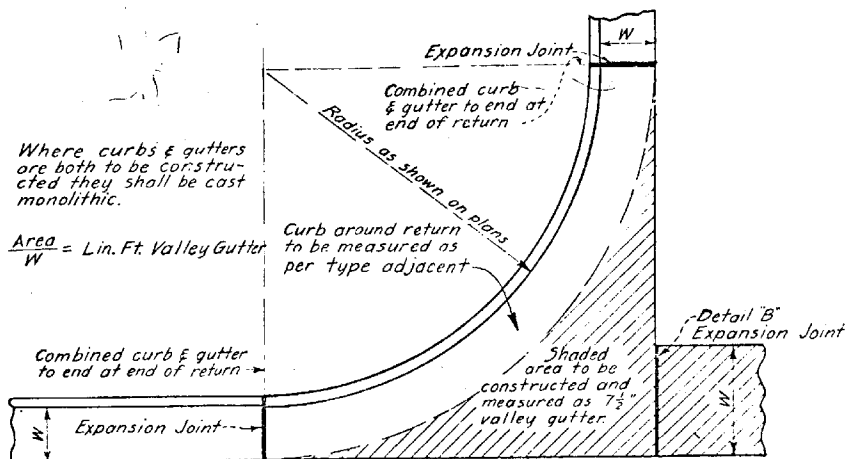
DRAWN WMD MAY 1936
TRACED K.S. JUNE 1938
CHECKED HHW JULY 1938
APPROVED E.C. MILLER

DRAWING NO.
A-14

REV
Weld
3/15/41

Where curbs & gutters are both to be constructed they shall be cast monolithic.

$$\frac{\text{Area}}{W} = \text{Lin. Ft. Valley Gutter}$$



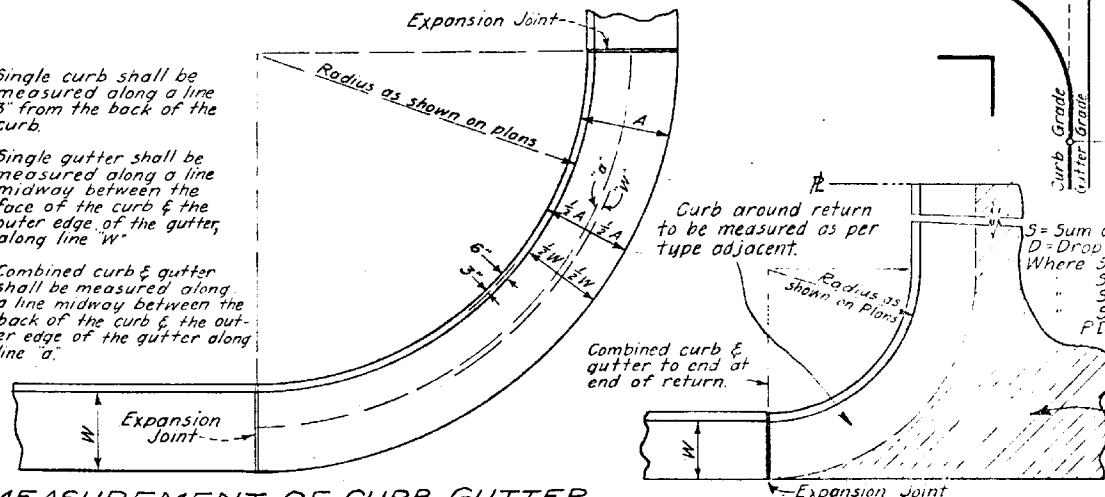
TYPICAL CONSTRUCTION OF VALLEY GUTTER AT STREET INTERSECTION OR ALLEY

W = width as shown on plans.

Single curb shall be measured along a line 3" from the back of the curb.

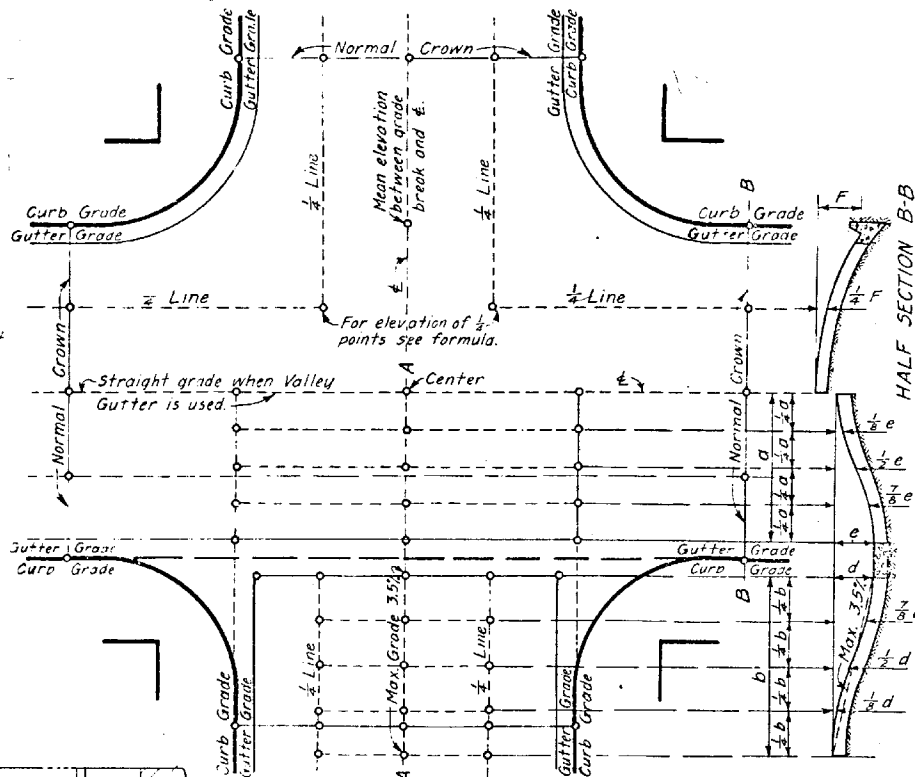
Single gutter shall be measured along a line midway between the face of the curb & the outer edge of the gutter, along line "W".

Combined curb & gutter shall be measured along a line midway between the back of the curb & the outer edge of the gutter along line "a".



MEASUREMENT OF CURB, GUTTER OR COMBINED CURB & GUTTER ON CURVES.

TYPICAL CONSTRUCTION OF CEMENT CONCRETE ALLEYS OR DRIVEWAYS



FORMULA FOR QUARTER POINTS

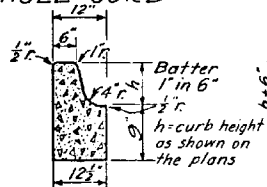
S = Sum of intersecting pavement widths.
D = Drop from center of intersection to center of return.
Where S = 0 to 90, P = 0.17
S = 91 " 100, P = 0.18
S = 101 " 110, P = 0.19
S = 111 " 136, P = 0.20
FD = drop from center of intersection to the quarter point

ARIZONA HIGHWAY DEPARTMENT		REV.
PLANS DIVISION		
CURB & GUTTER MEASUREMENT AND STREET INTERSECTION GRADES		
DESIGNED BY	CH & WFO 1935-36	DRAWING NO. A-17
TRACED BY	HAK JUNE, 1938	
CHECKED BY	AHW JULY 1938	
APPROVED	<i>EQ Miller</i>	
CONTR. PLANS		

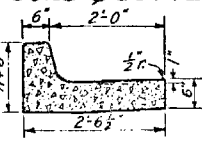
A-20

NOTE: Radii shown for single curbs are typical throughout for respective type.

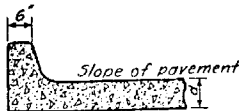
SINGLE CURB



COMBINED CURB & GUTTER

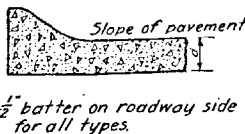
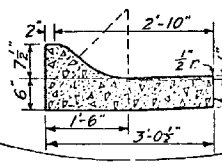
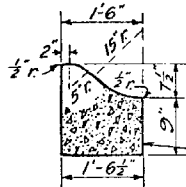


INTEGRAL CURB

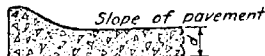
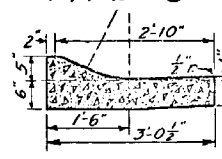
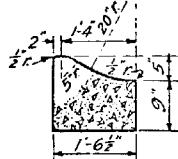


TYPE "A" (For 6" curb height or over)

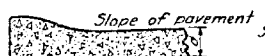
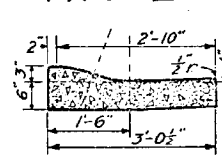
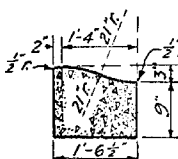
d = pavement thickness as shown on the plans.



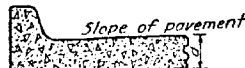
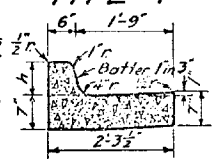
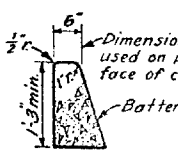
TYPE "C"



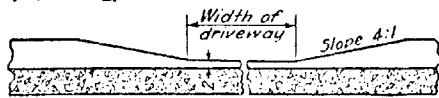
TYPE "E"



TYPE "F"

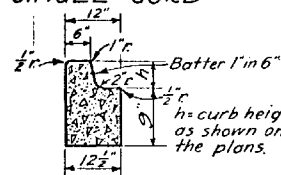


TYPE "G"

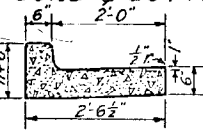


DEPRESSED CURB FOR DRIVEWAY ENTRANCE

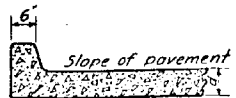
SINGLE CURB



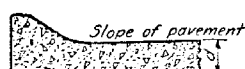
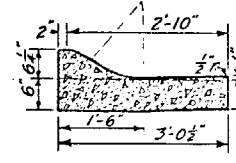
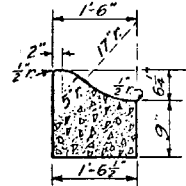
COMBINED CURB & GUTTER



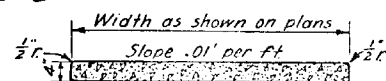
INTEGRAL CURB



TYPE "B" (For curb height of less than 6")



TYPE "D"



Transverse expansion joints in valley gutter to be constructed not more than 30' apart.

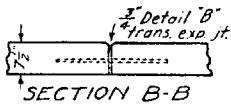
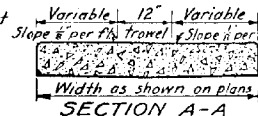
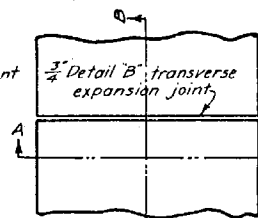
Sidewalk shall be single course Class A concrete, float finished and shall be marked in squares. A 1/4" open expansion joint shall be placed every 15 ft and a 1/4" pre-moulded filler joint between sidewalk & curb, as shown in detail below. Sidewalk across driveways shall be 6" thick.

CONCRETE SIDEWALK



Joint filler shall be included & measured as sidewalk.

EXPANSION JOINT BETWEEN CURB & SIDEWALK

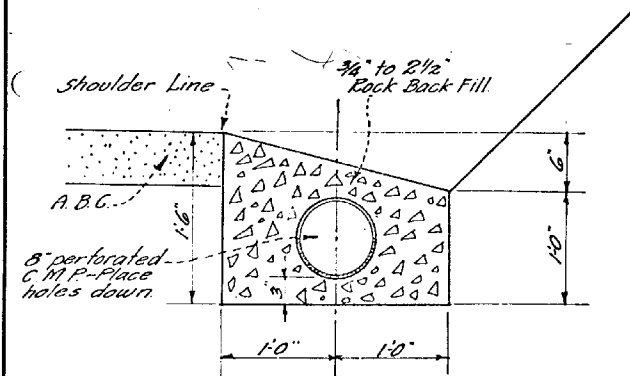


VALLEY GUTTER

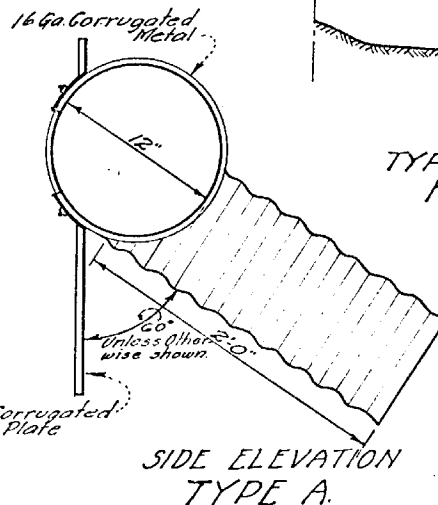
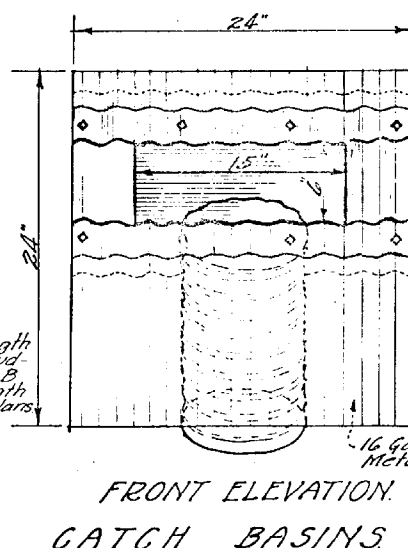
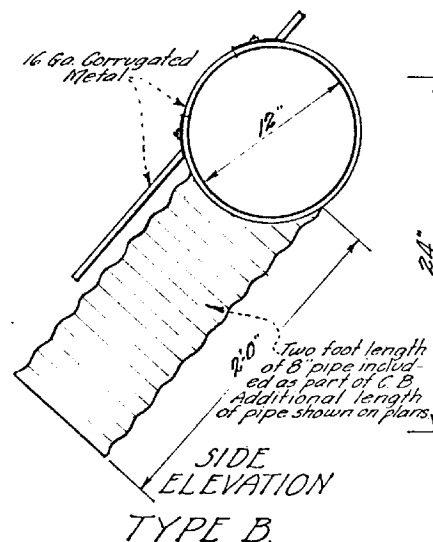
GENERAL NOTES

All curbs & gutters to be single course Class A concrete unless otherwise specified on the plans. Where plaster coat is called for it shall consist of 1/2" of 1:2 cement mortar on exposed surfaces of curb & gutter. All curbs shall be trowel finished. All flow lines of gutters shall be troweled to an accurate grade for a width of 9". Curbs or curb & gutter shall have a 1/4" open expansion joint, extending all the way through the concrete, every 20 feet. In integral curb all expansion & contraction joints shall extend through the curb. Expansion joints to be placed at all radius points.

ARIZONA HIGHWAY DEPARTMENT				REV.
PLANS DIVISION				
CONCRETE CURBS, GUTTERS & SIDEWALKS				
DRAWN	O.K.	MAR. 1935	DRAWING NO.	
TRACED	H.A.K.	JUNE 1935		
CHECKED	H.H.N.	JULY 1935		
APPROVED				
ENGR. J.W.S.				
A-20				

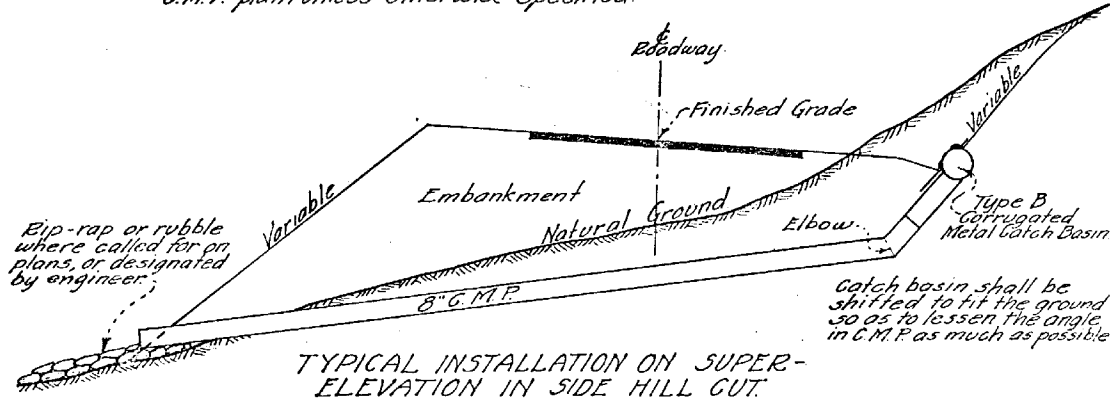


TYPICAL INSTALLATION
OF PERFORATED C. M. P.

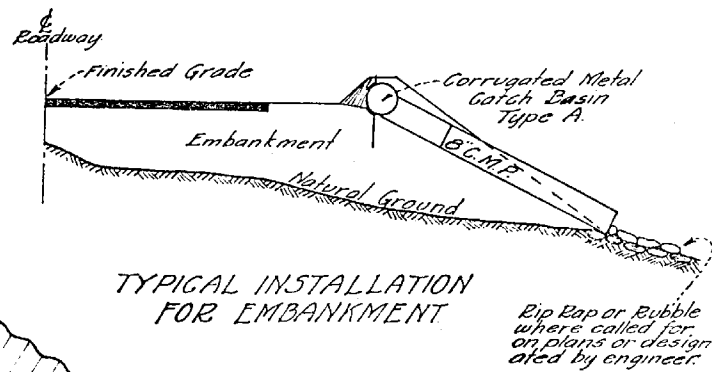


Rip-rap or rubble
where called for on
plans, or designated
by engineer.

NOTE: Include elbow as part of total length.
Call for hinged band coupling for pipe joints. Use
12\"/>



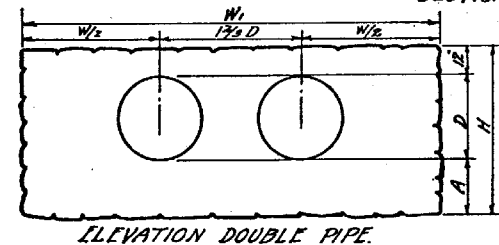
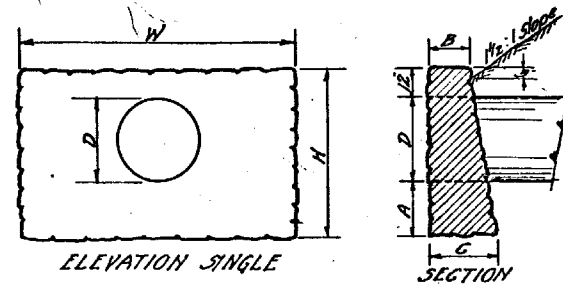
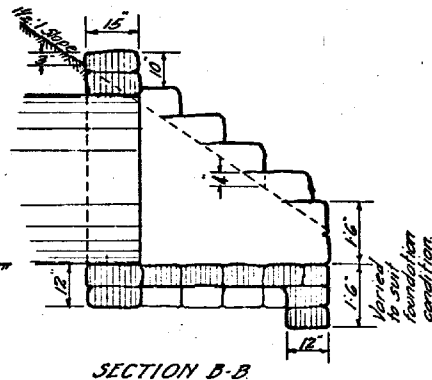
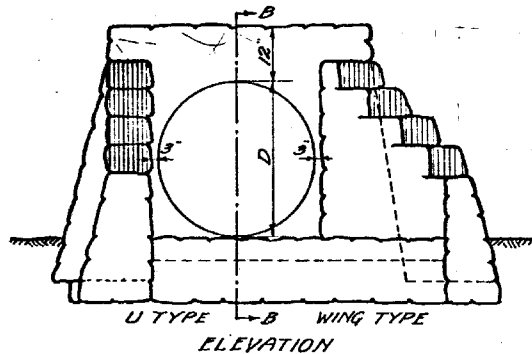
TYPICAL INSTALLATION ON SUPER-
ELEVATION IN SIDE HILL CUT.



TYPICAL INSTALLATION
FOR EMBANKMENT

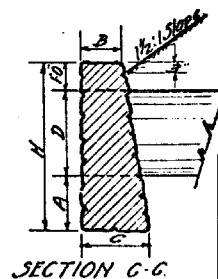
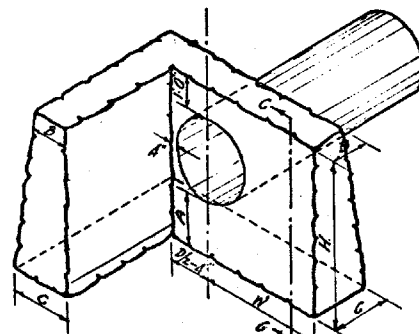
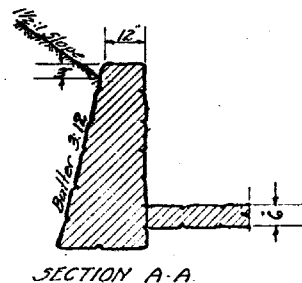
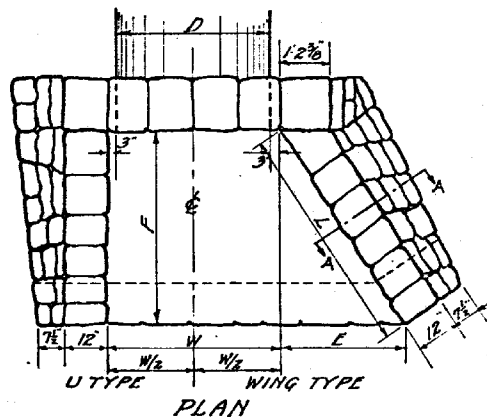
Rip Rap or Rubble
where called for
on plans or design-
ated by engineer.

ARIZONA HIGHWAY DEPARTMENT		REV.
PLANS DIVISION		
PERFORATED C.M.P. & CORRUGATED METAL CATCH BASINS		
DRAWN BY	W.M.D. 1234	DRAWING NO. A-23
TRACED BY	K.S. JUNE, 1934	
CHECKED BY	M.H.W. JULY, 1933	
APPROVED	<i>[Signature]</i>	
END OF PLANS		



STRAIGHT TYPE HEADWALLS

Diag.	Dimensions				Single Pipe		Double Pipe	
D	A	B	C	H	W	CEMENT	W	CEMENT
18"	1'-0"	1'-6"	1'-6"	3'-6"	4'-6"	0.78	1'-0"	1.16
24"	1'-4"	1'-6"	1'-10"	4'-4"	6'-4"	1.50	1'-8"	2.20
30"	1'-8"	1'-6"	2'-2"	5'-2"	8'-2"	2.49	2'-2"	3.41
36"	2'-0"	1'-6"	2'-6"	6'-0"	10'-0"	3.94	2'-6"	5.66



L TYPE HEADWALLS

Diag.	Dimensions				Single Pipe		Double Pipe	
D	A	B	C	H	W	CEMENT	W	CEMENT
18"	1'-0"	1'-6"	1'-6"	3'-6"	4'-6"	0.78	1'-0"	1.16
24"	1'-4"	1'-6"	1'-10"	4'-4"	6'-4"	1.50	1'-8"	2.20
30"	1'-8"	1'-6"	2'-2"	5'-2"	8'-2"	2.49	2'-2"	3.41
36"	2'-0"	1'-6"	2'-6"	6'-0"	10'-0"	3.94	2'-6"	5.66

WING AND U TYPE HEADWALL ~ 30" TO 60" PIPES									
Dimensions		Single Pipe				Double Pipe			
Diag.	Wing Type	U Type	Wing Type	U Type	Wing Type	U Type	Wing Type	U Type	Wing Type
D	L	T	F	Area	CEMENT	Area	CEMENT	Area	CEMENT
30"	2'-8 1/2"	1'-6"	2'-3"	4.91	2.03	2.43	9.82	3.00	4.01
36"	3'-7 1/4"	2'-0"	3'-0"	7.07	2.63	3.15	14.14	4.25	5.40
42"	4'-6"	2'-6"	3'-9"	9.62	3.35	4.08	19.24	5.05	6.76
48"	5'-5 1/2"	3'-0"	4'-6"	12.34	4.16	5.08	25.12	6.25	8.17
54"	6'-3 3/4"	3'-6"	5'-3"	15.20	5.04	6.18	31.20	7.29	9.73
60"	7'-2 1/2"	4'-0"	6'-0"	18.23	6.02	7.40	39.26	8.60	10.84

NOTE: W for single pipes equals D+6"
W for double pipes equals 2D+7 1/2"+6"

ARIZONA HIGHWAY DEPARTMENT

REV.

PLANS DIVISION

CEMENT RUBBLE
MASONRY HEADWALLS

DRAWN BY B.P.R. DRAWING 1936

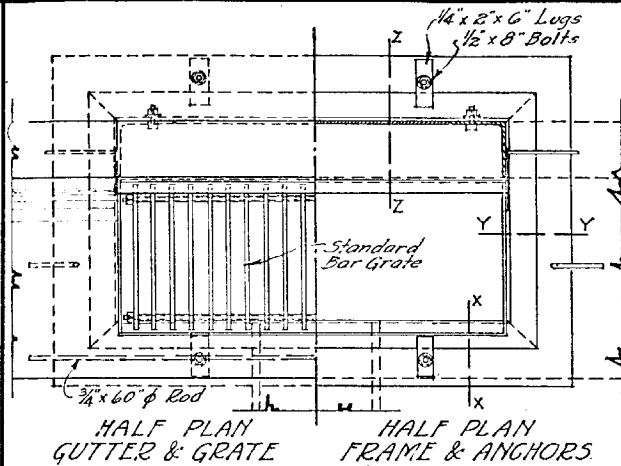
DRAWING NO.

TRACED BY K.S. JUNE, 1938

CHECKED BY H.W. JULY, 1938

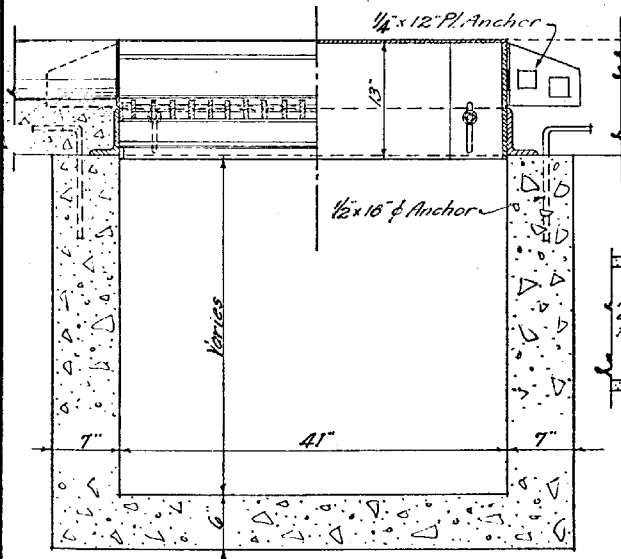
APPROVED

A-24



HALF PLAN
GUTTER & GRATE

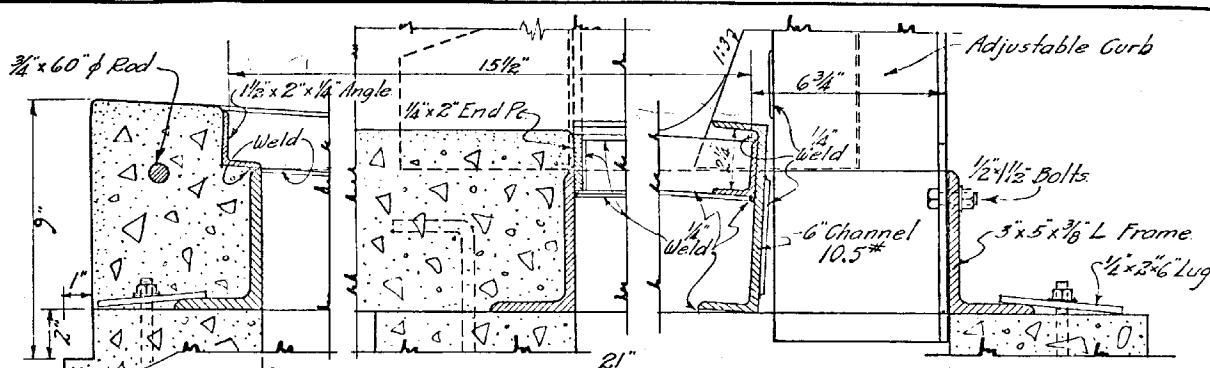
HALF PLAN
FRAME & ANCHORS



LONGITUDINAL SECTION

DETAILS OF NO. 3 CATCH BASIN

Scale ~ 1" = 1'-0"

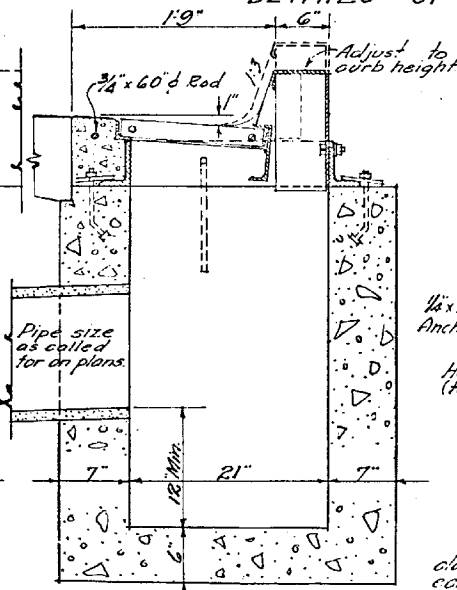


SECTION XX

SECTION YY

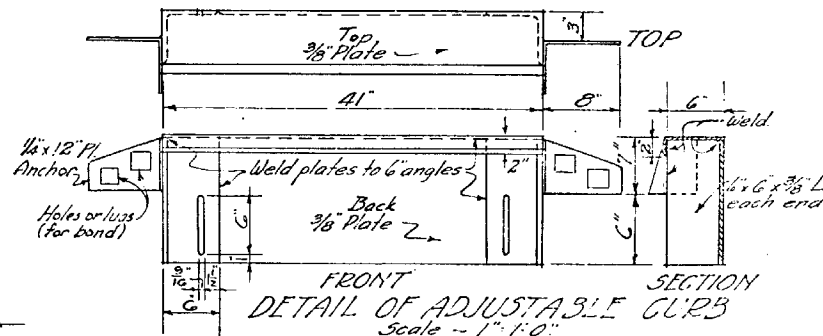
SECTION ZZ

DETAILS OF STEEL FRAME ~ Scale ~ 3" = 1'-0"



CROSS SECTION

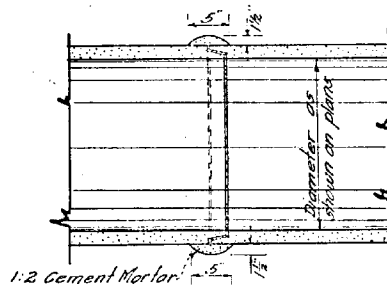
Warp face of Standard curb and gutter into catch basin in lengths of 2 feet on each side if necessary.
All structural iron to be given a shop coat of No. 1 paint and a second coat of No. 3 paint.
Detail is for type G curb and gutter. If other types are used the concrete shall be warped to fit catch basin.



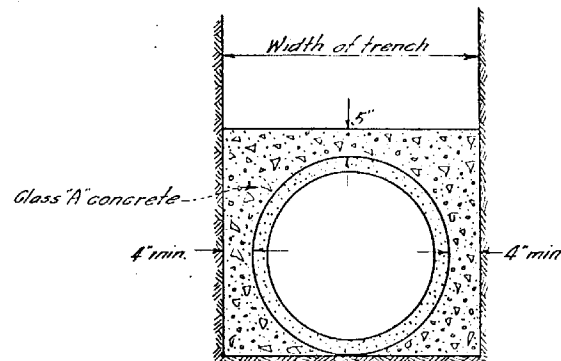
FRONT
DETAIL OF ADJUSTABLE CURB
Scale ~ 1" = 1'-0"

All concrete to be class 11, and all exposed edges are to be finished with a suitable edger.

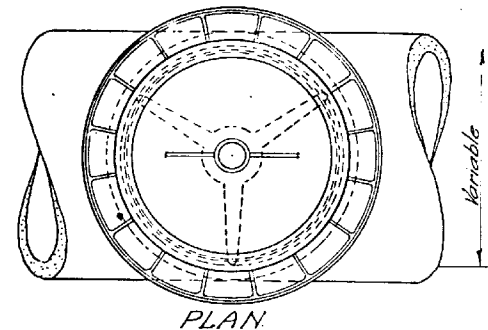
ARIZONA HIGHWAY DEPARTMENT		REV. 8-41
PLANS DIVISION		
CATCH BASIN NO. 3		
DRAWN	H.H.W.	DRAWING NO.
TRACED	K.S.	
CHECKED	M.H.W.	
APPROVED	Signature	A-27



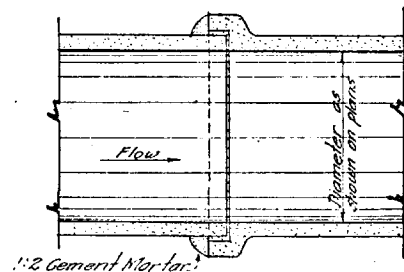
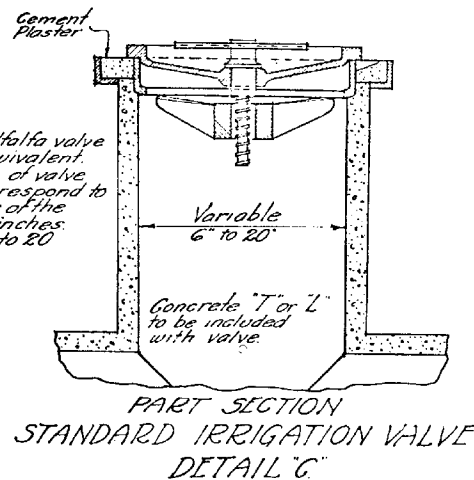
BEVELED END
CONCRETE PIPE



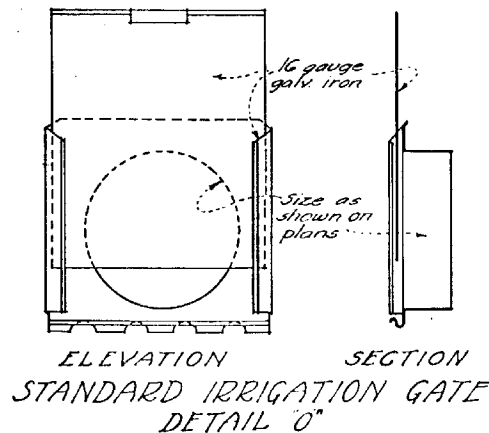
DETAIL "X"
CONCRETE ENGAGEMENT



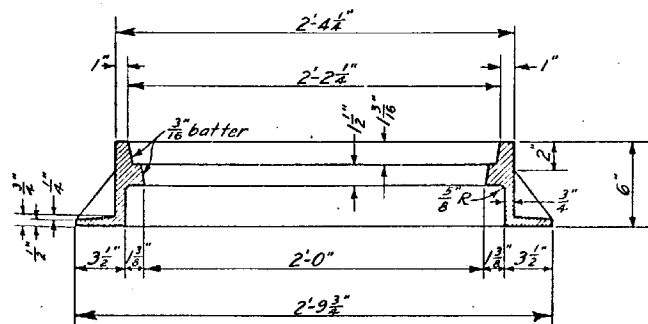
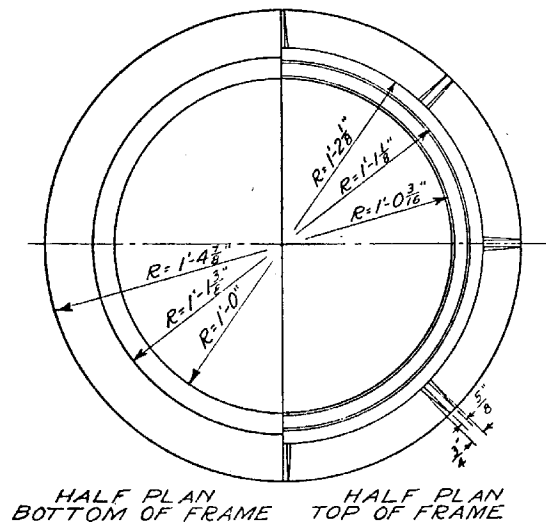
Snow alfalfa valve
or its equivalent.
Number of valve
shall correspond to
the size of the
pipe in inches.
No 6 to 20



BELL & SPIGOT
CONCRETE PIPE, OR
VITRIFIED CLAY PIPE.



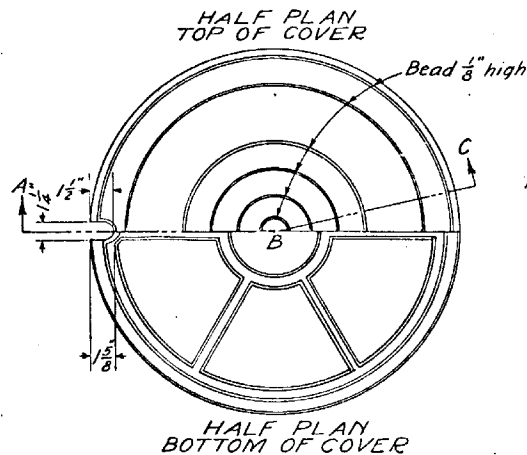
ARIZONA HIGHWAY DEPARTMENT		REV.
PLANS DIVISION		
CONCRETE & VIT. CLAY PIPE		
IRRIGATION		DRAWING NO.
IRRIGATION VALVE		
GATE		A-28
Drawn	C.M. Dec. 33	
Traced	H.S. July 33	
Checked	H.M.W. July 1938	
Approved Eng. of Plans.	E. Miller	



SECTION OF FRAME

Approx. weight 205 lbs.

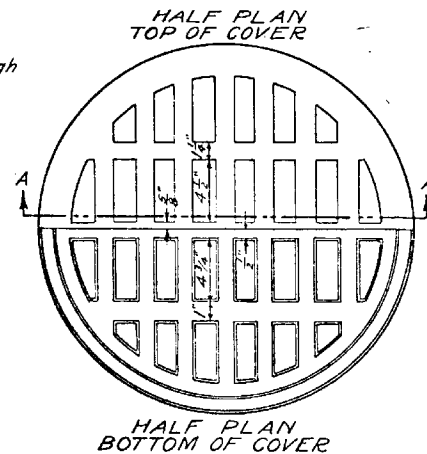
Scale $1\frac{1}{2}'' = 1'-0''$



SECTION A-B-C OF COVER

TYPE "A" COVER

Approx. weight 190 lbs.



SECTION A-A OF COVER

TYPE "B" COVER

Approx. weight 280 lbs.

TYPE "A-1" COVER: shall be the same as Type "A" except that the cover shall be vented with at least six one inch holes equally spaced in a circle $8\frac{1}{2}''$ from the center of the cover.

Type "A" cover shall be used unless otherwise specified.

Notations as shown on the plans shall be as follows: Std. M.H. Frame & Cover No. 1-B, the letter denoting the type of cover.

The bearing faces shall be machined so that the cover will have a uniform bearing in any position in the frame.

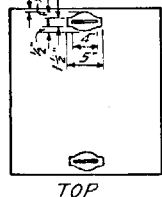
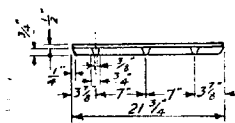
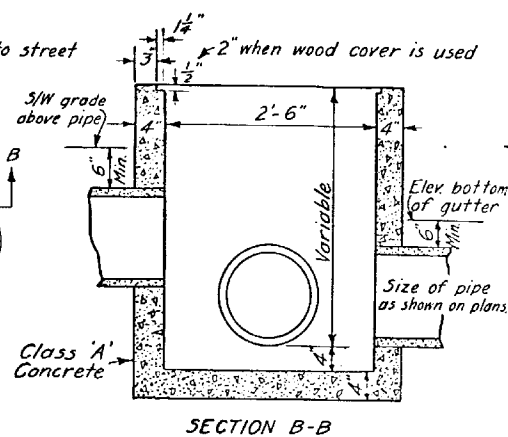
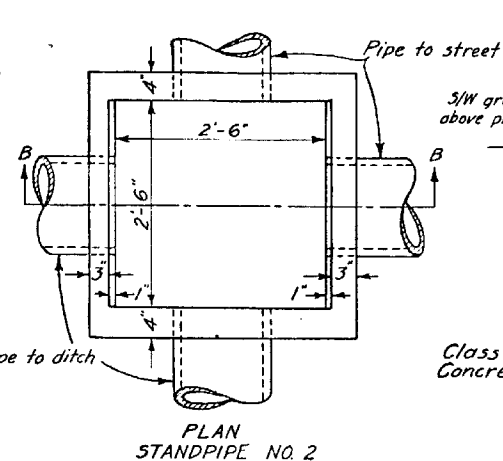
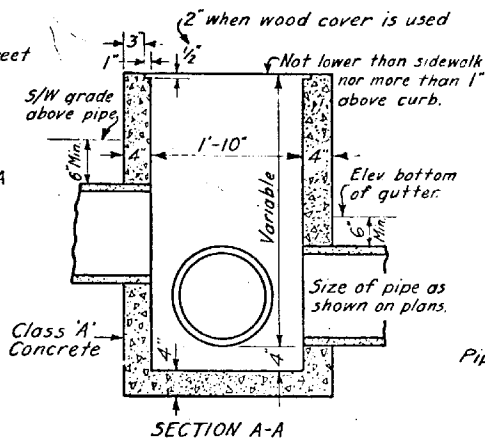
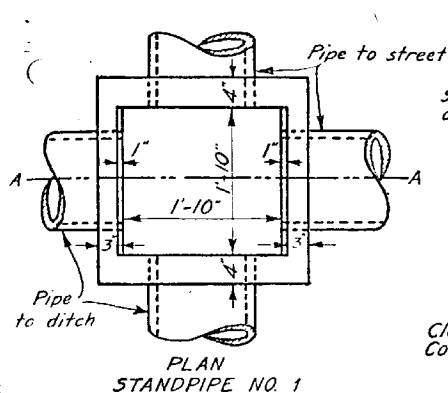
ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

STANDARD MANHOLE
FRAME & COVER NO. 1

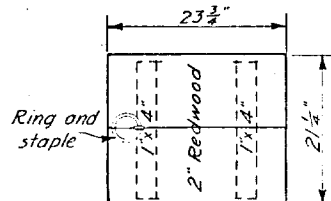
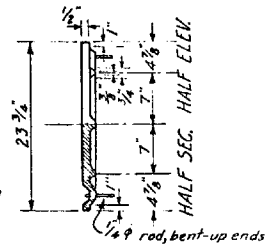
DRAWN BY: D.W. OCT. 1935
TRACED BY: H.A.K. JUNE 1938
CHECKED BY: H.W.V. JULY 1938
APPROVED: [Signature] AUG. 1938

DRAWING NO.
A-29

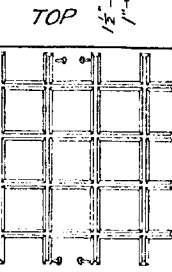
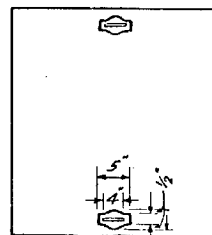
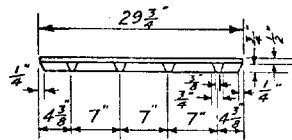
REV.



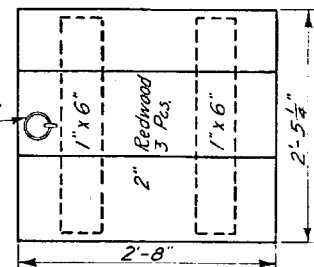
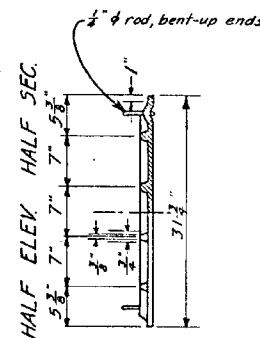
CAST IRON
COVER FOR
STANDPIPE
NO. 1.



PLAN OF REDWOOD COVER
FOR STANDPIPE NO. 1
Redwood cover to be used
when top of standpipe is
above sidewalk.



CAST IRON COVER
FOR STANDPIPE NO. 2



PLAN OF REDWOOD COVER
FOR STANDPIPE NO. 2
Redwood cover to be used
when top of standpipe is
above sidewalk.

STANDARD IRRIGATION STANDPIPE NO. 1

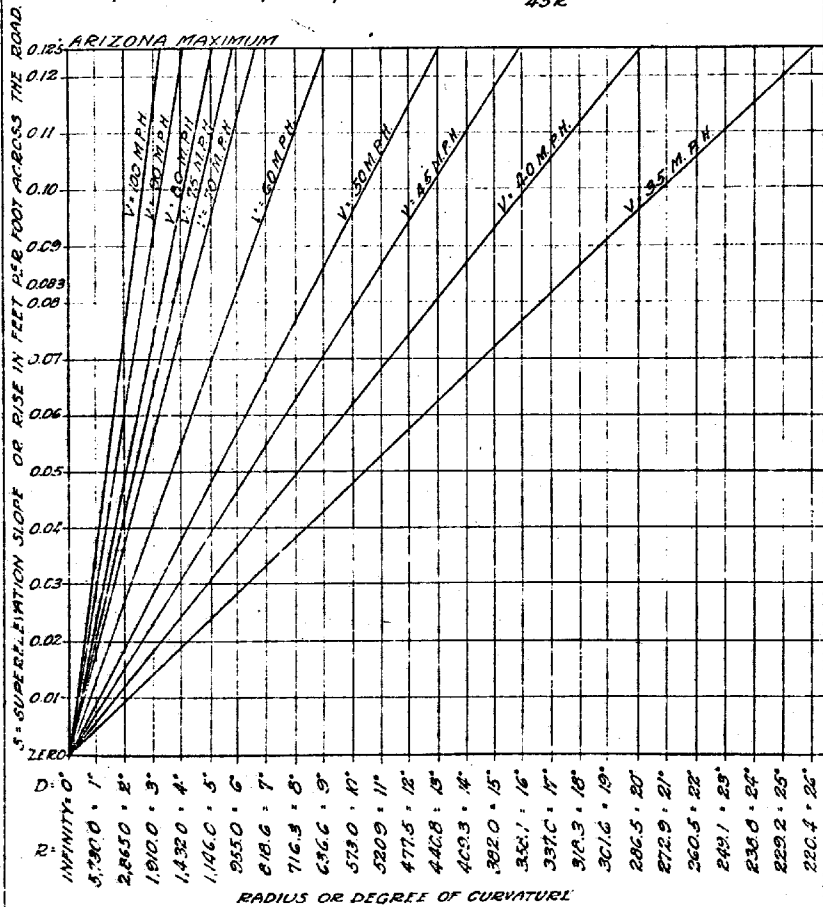
STANDARD IRRIGATION STANDPIPE NO. 2

ARIZONA HIGHWAY DEPARTMENT		REV.
PLANS DIVISION		
STANDARD IRRIGATION		
STANDPIPE NO. 1 & NO. 2		
DRAWN BY	PHOENIX STANDARD	DRAWING NO. A-32
TRACED BY	H.A. - JUNE, 1934	
CHECKED BY	H.W. - JULY, 1938	
APPROVED	<i>E. J. [Signature]</i>	
DATE OF PLANS		

SUPERELEVATION CHART BASED ON SPEED.

V. Designed or critical velocity in miles per hr. = $\sqrt{45SR}$
 R. Radius of curve in feet.
 D. Degree of curvature.
 S. Superelevation slope in ft. per ft. across road = $\frac{V^2}{45R} = 0.0000388 V^2/D$

Note:
 0.6175V = Safe Speed
 0.5773V = Full Compensation



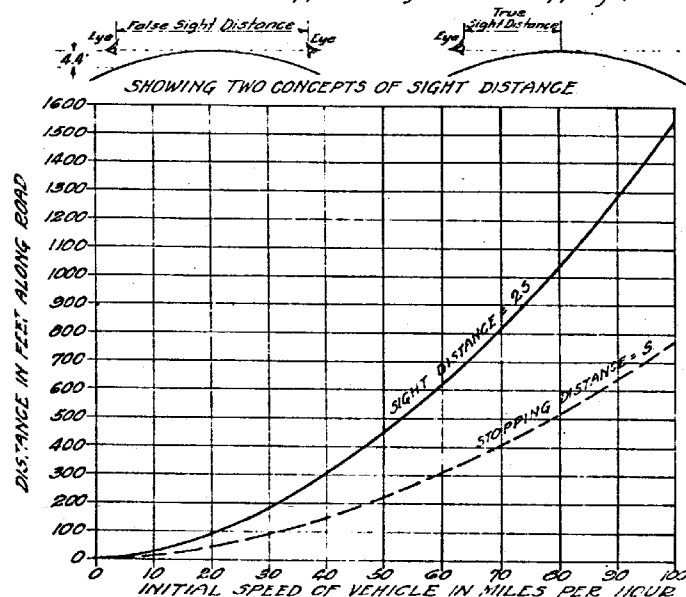
STOPPING DISTANCE & SIGHT DISTANCE

STOPPING DISTANCE:-

The total average stopping distance for one vehicle, considering average brakes and average reaction time, may be computed by the formula $S = \frac{V^2}{25} + 1.1V$
 In which; S. The distance in feet along the road to stop
 V. Initial velocity of vehicle in miles per hour

SIGHT DISTANCE:-

Sight distance should be double the stopping distance for the sake of two vehicles approaching, or as a stopping factor

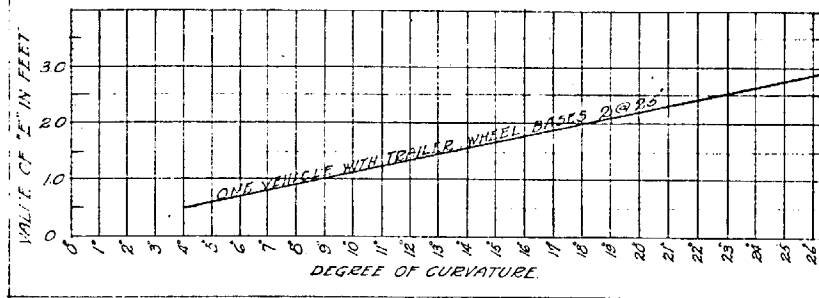


NOTE:-
 Sight distance should be considered when selecting the designed or critical speed for horizontal and vertical curve limitations

ARIZONA HIGHWAY DEPARTMENT		REV.
PLANS DIVISION		
SUPERELEVATION AND SIGHT DISTANCE CHARTS		
COMPILED BY JESSIE MCDOUGALL 12"	DRAWING NO.	
DESIGNED BY A.S.		
CHECKED BY H.W.		
APPROVED		
A-37		

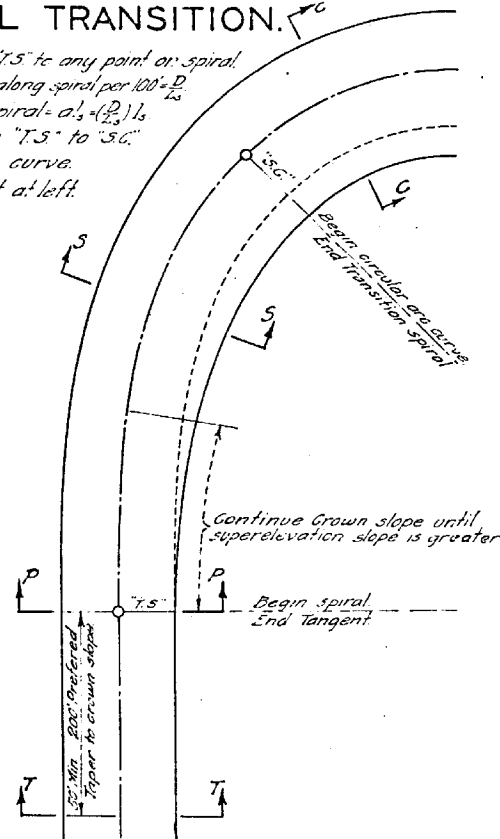
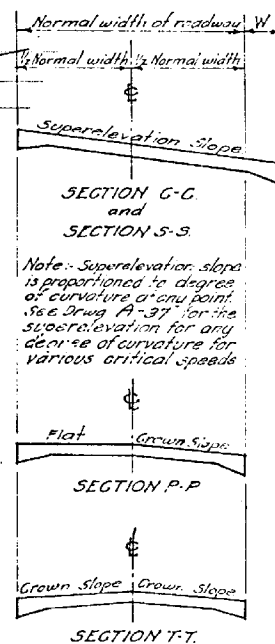
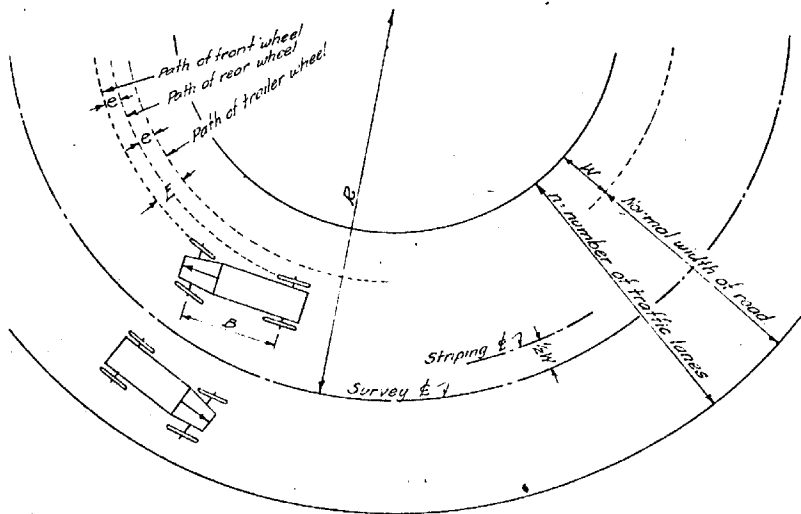
ENCROACHMENT CHART & CURVE WIDENING

R = Radius of curve survey ϕ in ft. = $5729.58 \div \text{Degree of curvature}$
 B = Wheel base in feet. For example 24'
 e = Rear wheel encroachment in feet = $R - \sqrt{R^2 - B^2}$
 E = Total encroachment assuming trailer with added "B" wheel base = $2e$
 n = Number of traffic lanes across roadway
 W = En = Required curve widening in ft to be added to normal road width
 Always on inside of curve.



SUPERELEVATION & CURVE WIDENING WITH SPIRAL TRANSITION.

L_s = Length on spiral in 100' stations from "T.S." to any point on spiral.
 a = Rate of change in degree of curvature along spiral per 100' = $\frac{D}{L_s}$
 d = Degree of curvature at any point on spiral = $a \cdot L_s$
 L_c = Length of spiral in 100' stations from "T.S." to "S.C."
 D = Degree of curvature of circular arc curve.
 W = Curve widening. See detail and chart at left.



ARIZONA HIGHWAY DEPARTMENT		REV
PLANS DIVISION		
SURERELEVATION AND CURVE WIDENING WITH SPIRAL TRANSITION		
COMPILED BY	ISSUED BY	DRAWING NO
DESIGNED BY	APPROVED BY	A-38
CHECKED BY	DATE	
APPROVED BY	DATE	
DATE OF PLAN		

MISCELLANEOUS INFORMATION Beginning of Spiral or Initial Tangent	LENGTH OF SPIRAL IN FEET 100 L _s	D DEGREE OF CURVATURE a L _s	R RADIUS IN FEET 5729.58-D	o OFFSET IN FEET 0.727aL _s	t IN FEET 50 L _s - 0.00127dL _s	Δ _s SPIRAL DEVIATION 1/2 a L _s	θ DEFLECTION 1/3 Δ _s	φ DEFLECTION 2/3 Δ _s	r IN FEET C sin θ sin Δ _s	u IN FEET C sin φ sin Δ _s	C IN FEET 100 L _s 0.0034a ² L _s	SUPER- ELEVATION SLOPE FT. PER FT.
Time: 60 M.P.H.	0	0°00'	INFINITY		0.00	0°00'00"	0°00'00"	0°00'00"	0.00	0.00	0.00	0.0000
1 Second	10	0°10'	34.377.48		5.00	0°00'30"	0°00'10"	0°00'20"	3.33	6.67	10.00	.0063
	20	0°20'	17.188.74		10.00	0°01'00"	0°00'40"	0°01'20"	6.67	13.33	20.00	.0046
	30	0°30'	11.459.16		15.00	0°01'30"	0°01'10"	0°02'30"	10.00	20.00	30.00	.0039
	40	0°40'	8.594.37	.01	20.00	0°02'00"	0°01'40"	0°03'20"	13.33	26.67	40.00	.0033
	50	0°50'	6.875.50	.02	25.00	0°02'30"	0°02'10"	0°03'40"	16.67	33.33	50.00	.0116
	60	1°00'	5.729.58	.03	30.00	0°03'00"	0°02'40"	0°04'20"	20.00	40.00	60.00	.0139
2 Seconds	70	1°10'	4.911.07	.04	35.00	0°03'30"	0°03'10"	0°04'40"	23.33	46.67	70.00	.0163
	80	1°20'	4.297.19	.06	40.00	0°04'00"	0°03'40"	0°05'20"	26.67	53.33	80.00	.0186
	90	1°30'	3.819.72	.09	45.00	0°04'30"	0°04'10"	0°05'40"	30.00	60.00	90.00	.0209
	100	1°40'	3.437.75	.12	50.00	0°05'00"	0°04'40"	0°06'20"	33.33	66.67	100.00	.0232
	110	1°50'	3.125.23	.16	55.00	0°05'30"	0°05'10"	0°06'40"	36.67	73.33	110.00	.0256
	120	2°00'	2.864.79	.21	60.00	0°06'00"	0°05'40"	0°07'20"	40.00	80.00	120.00	.0279
3 Seconds	130	2°10'	2.644.42	.26	65.00	0°06'30"	0°06'10"	0°07'40"	43.33	86.67	130.00	.0302
	140	2°20'	2.455.53	.33	70.00	0°07'00"	0°06'40"	0°08'20"	46.67	93.33	140.00	.0326
	150	2°30'	2.291.83	.41	75.00	0°07'30"	0°07'10"	0°08'40"	50.00	100.00	150.00	.0349
	160	2°40'	2.148.59	.50	80.00	0°08'00"	0°07'40"	0°09'20"	53.33	106.67	160.00	.0372
	170	2°50'	2.022.26	.59	85.00	0°08'30"	0°08'10"	0°09'40"	56.67	113.33	170.00	.0395
	180	3°00'	1.909.86	.70	90.00	0°09'00"	0°08'40"	0°10'20"	60.00	120.00	180.00	.0419
4 Seconds	190	3°10'	1.809.34	.83	94.99	0°09'30"	0°09'10"	0°10'40"	63.33	126.67	190.00	.0442
	200	3°20'	1.718.87	.97	99.99	0°10'00"	0°09'40"	0°11'20"	66.67	133.33	200.00	.0465
	210	3°30'	1.637.02	1.12	104.99	0°10'30"	0°10'10"	0°11'40"	70.00	140.00	210.00	.0488
	220	3°40'	1.562.61	1.29	109.98	0°11'00"	0°10'40"	0°12'20"	73.33	146.67	220.00	.0512
	230	3°50'	1.494.67	1.47	114.98	0°11'30"	0°11'10"	0°12'40"	76.67	153.33	230.00	.0535
	240	4°00'	1.432.40	1.67	119.97	0°12'00"	0°11'40"	0°13'20"	80.00	160.00	240.00	.0558
5 Seconds	250	4°10'	1.375.10	1.89	124.97	0°12'30"	0°12'10"	0°13'40"	83.33	166.67	250.00	.0582
	260	4°20'	1.322.21	2.13	129.96	0°13'00"	0°12'40"	0°14'20"	86.67	173.33	260.00	.0605
	270	4°30'	1.273.24	2.38	134.95	0°13'30"	0°13'10"	0°14'40"	90.00	180.00	270.00	.0628
	280	4°40'	1.227.77	2.66	139.94	0°14'00"	0°13'40"	0°15'20"	93.33	186.67	280.00	.0652
	290	4°50'	1.185.43	2.96	144.93	0°14'30"	0°14'10"	0°15'40"	96.67	193.33	290.00	.0675
	300	5°00'	1.145.92	3.27	149.91	0°15'00"	0°14'40"	0°16'20"	100.00	200.00	300.00	.0698
6 Seconds	310	5°10'	1.108.95	3.61	154.90	0°15'30"	0°15'10"	0°16'40"	103.33	206.67	310.00	.0722
	320	5°20'	1.074.30	3.97	159.88	0°16'00"	0°15'40"	0°17'20"	106.67	213.33	320.00	.0746
	330	5°30'	1.041.74	4.35	164.86	0°16'30"	0°16'10"	0°18'00"	110.00	220.00	330.00	.0768
	340	5°40'	1.011.10	4.76	169.84	0°17'00"	0°16'40"	0°18'40"	113.33	226.67	340.00	.0792
	350	5°50'	982.21	5.20	174.81	0°17'30"	0°17'10"	0°19'20"	116.67	233.33	350.00	.0814
	360	6°00'	954.93	5.65	179.79	0°18'00"	0°17'40"	0°20'00"	120.00	240.00	360.00	.0838
7 Seconds	370	6°10'	929.12	6.14	184.76	0°18'30"	0°18'10"	0°20'40"	123.33	246.67	370.00	.0861
	380	6°20'	904.67	6.65	189.72	0°19'00"	0°18'40"	0°21'20"	126.67	253.33	380.00	.0884
	390	6°30'	881.47	7.19	194.68	0°19'30"	0°19'10"	0°22'00"	130.00	260.00	390.00	.0908
	400	6°40'	859.44	7.75	199.64	0°20'00"	0°19'40"	0°22'40"	133.33	266.67	400.00	.0931
	410	6°50'	838.48	8.35	204.59	0°20'30"	0°20'10"	0°23'20"	136.67	273.33	410.00	.0954
	420	7°00'	818.51	8.98	209.54	0°21'00"	0°20'40"	0°24'00"	140.00	280.00	420.00	.0978
8 Seconds	430	7°10'	799.48	9.63	214.48	0°21'30"	0°21'10"	0°24'40"	143.33	286.67	430.00	.1001
	440	7°20'	781.31	10.32	219.42	0°22'00"	0°21'40"	0°25'20"	146.67	293.33	440.00	.1024
	450	7°30'	763.94	11.04	224.35	0°22'30"	0°22'10"	0°26'00"	150.00	300.00	450.00	.1046
	460	7°40'	747.34	11.79	229.27	0°23'00"	0°22'40"	0°26'40"	153.33	306.67	460.00	.1071
	470	7°50'	731.42	12.58	234.19	0°23'30"	0°23'10"	0°27'20"	156.67	313.33	470.00	.1094
	480	8°00'	716.20	13.40	239.10	0°24'00"	0°23'40"	0°28'00"	160.00	320.00	480.00	.1117
9 Seconds	490	8°10'	701.38	14.26	244.00	0°24'30"	0°24'10"	0°28'40"	163.33	326.67	490.00	.1141
	500	8°20'	687.55	15.15	248.90	0°25'00"	0°24'40"	0°29'20"	166.67	333.33	500.00	.1164
	510	8°30'	674.07	16.07	253.78	0°25'30"	0°25'10"	0°30'00"	170.00	340.00	510.00	.1187
	520	8°40'	661.11	17.04	258.66	0°26'00"	0°25'40"	0°30'40"	173.33	346.67	520.00	.1211
	530	8°50'	648.63	18.04	263.52	0°26'30"	0°26'10"	0°31'20"	176.67	353.33	530.00	.1234
	540	9°00'	636.62	19.08	268.38	0°27'00"	0°26'40"	0°32'00"	180.00	360.00	540.00	.1257

TABLE - E

TRANSITION SPIRAL TABLE FOR HIGHWAY CURVES

60 MILES PER HOUR CRITICAL
SPEED = 87.96 FEET PER SEC.
49 MILES PER HOUR SAFE
SPEED.

35 MILES PER HOUR FULL
COMPENSATION SPEED.
AVERAGE STOPPING DIS-
TANCE INCLUDING REACTION
306 FEET EXCEPT ON ICE OR
SLICK SURFACE.

a = 1 2/3, RATE INCREASE IN
DEGREES OF CURVATURE PER
100 FEET ALONG SPIRAL.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

TRANSITION SPIRAL TABLE 49 M.P.H. SAFE SPEED

DESIGNED BY: LESLIE H. BOWMAN
CHECKED BY: A.S. 3-21-39
APPROVED BY: G.E. 3-21-39
SUPERVISOR: E.O. Miller

DRAWING NO.

A-45

REV.

MISCELLANEOUS INFORMATION Beginning at Main or Initial Tangent		LENGTH OF SPIRAL IN FEET 100 L _s	D DEGREE OF CURVATURE a L _s	R RADIUS IN FEET 5729.58 ÷ D	o OFFSET IN FEET 0.727 a L _s ²	t IN FEET 50 L _s - 0.00127 a L _s ³	Δ _s SPIRAL DEVIATION ½ a L _s ²	θ DEFLECTION ½ Δ _s	φ DEFLECTION ¾ Δ _s	Y IN FEET G Sin θ Sin Δ _s	U IN FEET G Sin φ Sin Δ _s	C IN FEET 100 L _s 0.0034 a L _s ³	SUPER ELEVATION SLOPE FT. PER FT.
Time @ M.P.H.	Trans. Spiral Unnecessary	0	0°00'	INFINITY		0.00	0°00'00"	0°00'00"	0°00'00"	0.00	0.00	0.00	0.0000
		10	0°15'	22,918.32		5.00	0°00'45"	0°00'15"	0°00'30"	3.33	6.67	10.00	.0024
		20	0°30'	11,459.16		10.00	0°01'30"	0°01'00"	0°02'00"	6.67	13.33	20.00	.0048
		30	0°45'	7,639.44		15.00	0°02'45"	0°02'15"	0°04'30"	10.00	20.00	30.00	.0073
		40	1°00'	5,729.58	.01	20.00	0°04'12"	0°04'00"	0°08'30"	13.33	26.67	40.00	.0097
		50	1°15'	4,583.66	.02	25.00	0°06'18"	0°06'15"	0°12'30"	16.67	33.33	50.00	.0121
15second	Trans. Spiral Unnecessary	60	1°30'	3,812.72	.04	30.00	0°09'27"	0°09'30"	0°18'30"	20.00	40.00	60.00	.0145
		70	1°45'	3,274.05	.06	35.00	0°12'36"	0°12'15"	0°24'30"	23.33	46.67	70.00	.0169
		80	2°00'	2,864.79	.09	40.00	0°16'48"	0°16'00"	0°32'30"	26.67	53.33	80.00	.0194
		90	2°15'	2,526.68	.13	45.00	0°21'00"	0°20'15"	0°40'30"	30.00	60.00	90.00	.0218
		100	2°30'	2,291.83	.18	50.00	0°25'15"	0°25'00"	0°50'30"	33.33	66.67	100.00	.0243
		110	2°45'	2,083.40	.24	55.00	0°30'45"	0°30'15"	1°00'30"	36.67	73.33	110.00	.0267
2Seconds	Trans. Spiral Unnecessary	120	3°00'	1,902.86	.31	60.00	0°36'00"	0°36'00"	1°12'30"	40.00	80.00	120.00	.0291
		130	3°15'	1,762.25	.40	65.00	0°42'15"	0°42'15"	1°24'30"	43.33	86.67	130.00	.0315
		140	3°30'	1,637.02	.50	70.00	0°48'27"	0°48'30"	1°38'30"	46.67	93.33	140.00	.0340
		150	3°45'	1,527.89	.61	74.99	0°54'45"	0°54'15"	1°52'30"	50.01	100.00	150.00	.0364
		160	4°00'	1,432.40	.74	79.99	0°1°12'	1°04'00"	2°08'30"	53.36	106.70	160.00	.0388
		170	4°15'	1,348.14	.89	84.98	0°1°36'45"	1°12'15"	2°24'30"	56.68	113.37	170.00	.0412
3Seconds	Trans. Spiral Unnecessary	180	4°30'	1,273.24	1.06	89.98	0°4°03'	1°21'00"	2°42'30"	60.03	120.03	180.00	.0436
		190	4°45'	1,206.23	1.25	94.96	0°4°30'45"	1°30'15"	3°00'30"	63.38	126.71	190.00	.0461
		200	5°00'	1,145.92	1.45	99.97	0°5°00'	1°40'00"	3°20'30"	66.70	133.36	200.00	.0485
		210	5°15'	1,091.35	1.68	104.97	0°5°30'45"	1°50'15"	3°40'30"	70.06	140.05	210.00	.0509
		220	5°30'	1,041.74	1.93	109.96	0°6°03'	2°01'00"	4°02'30"	73.41	146.75	220.00	.0533
		230	5°45'	.996.45	2.20	114.95	0°6°36'45"	2°12'15"	4°24'30"	76.77	153.43	230.00	.0557
4Seconds	Trans. Spiral Unnecessary	240	6°00'	.954.93	2.51	119.94	0°7°12'	2°28'00"	4°48'30"	80.14	160.13	240.00	.0581
		250	6°15'	.916.73	2.84	124.92	0°7°46'45"	2°36'15"	5°12'30"	83.49	166.81	250.00	.0606
		260	6°30'	.881.47	3.19	129.91	0°8°21'	2°49'00"	5°38'30"	86.86	173.51	260.00	.0630
		270	6°45'	.848.83	3.57	134.89	0°8°56'45"	3°02'15"	6°04'30"	90.24	180.22	270.00	.0655
		280	7°00'	.818.51	3.99	139.86	0°9°48'	3°16'00"	6°32'30"	93.61	186.92	280.00	.0679
		290	7°15'	.790.29	4.43	144.84	0°10°30'45"	3°30'15"	7°00'30"	97.01	193.65	290.00	.0703
5Seconds	Trans. Spiral Unnecessary	300	7°30'	.763.24	4.91	149.81	0°11°15'	3°45'00"	7°30'30"	100.39	200.37	300.00	.0727
		310	7°45'	.739.30	5.41	154.77	0°12°00'45"	4°00'15"	8°00'30"	103.81	207.10	310.00	.0752
		320	8°00'	.716.20	5.96	159.73	0°12°36'	4°16'00"	8°32'30"	107.22	213.84	320.00	.0776
		330	8°15'	.694.37	6.53	164.69	0°13°36'45"	4°32'15"	9°04'30"	110.65	220.60	330.00	.0800
		340	8°30'	.674.07	7.14	169.64	0°14°27'	4°49'00"	9°38'30"	114.08	227.35	340.00	.0824
		350	8°45'	.654.18	7.79	174.58	0°15°16'45"	5°06'15"	10°12'30"	117.53	234.13	350.00	.0848
6Seconds	Trans. Spiral Unnecessary	360	9°00'	.636.62	8.48	179.52	0°16°12'	5°28'00"	10°46'30"	121.00	240.93	360.00	.0873
		370	9°15'	.619.41	9.21	184.45	0°17°06'45"	5°42'15"	11°24'30"	124.48	247.76	370.00	.0897
		380	9°30'	.603.11	9.97	189.37	0°18°03'	6°01'00"	12°02'30"	127.98	254.55	380.00	.0921
		390	9°45'	.587.65	10.78	194.28	0°19°00'45"	6°20'15"	12°40'30"	131.49	261.37	390.00	.0945
		400	10°00'	.572.96	11.63	199.19	0°20°00'	6°40'00"	13°20'30"	135.04	268.22	400.00	.0970
		410	10°15'	.558.98	12.53	204.08	0°21°00'45"	7°00'15"	14°00'30"	138.60	275.12	410.00	.0994
7Seconds	Trans. Spiral Unnecessary	420	10°30'	.545.67	13.47	208.96	0°22°03'	7°21'00"	14°42'30"	142.17	282.01	420.00	.1018
		430	10°45'	.532.98	14.45	213.83	0°23°06'45"	7°42'15"	15°24'30"	145.79	288.95	430.00	.1042
		440	11°00'	.520.87	15.48	218.69	0°24°12'	8°04'00"	16°08'30"	149.43	295.89	440.00	.1066
		450	11°15'	.509.29	16.56	223.54	0°25°18'45"	8°26'15"	16°52'30"	153.00	302.83	450.00	.1091
		460	11°30'	.498.22	17.69	228.37	0°26°27'	8°49'00"	17°38'30"	156.70	309.86	460.00	.1115
		470	11°45'	.487.62	18.87	233.18	0°27°36'45"	9°12'15"	18°26'30"	160.52	316.91	470.00	.1139
8Seconds	Trans. Spiral Unnecessary	480	12°00'	.477.47	20.10	237.98	0°28°48'	9°36'00"	19°12'30"	164.39	323.99	480.00	.1163
		490	12°15'	.467.72	21.38	242.75	0°30°00'45"	10°00'15"	20°00'30"	168.10	331.08	490.00	.1187
		500	12°30'	.458.37	22.72	247.52	0°31°15'	10°25'00"	20°50'30"	171.95	338.29	500.00	.1212
		510	12°45'	.449.39	24.11	252.26	0°32°36'45"	10°50'15"	21°40'30"	175.85	345.52	510.00	.1236
		520	13°00'	.440.74	25.56	256.98	0°33°48'	11°16'00"	22°32'30"	179.79	352.85	520.00	.1261

TABLE - F

TRANSITION SPIRAL TABLE FOR HIGHWAY CURVES

50 MILES PER HOUR CRITICAL
SPEED = 73.30 FEET PER SEC.
41 MILES PER HOUR SAFE
SPEED.

29 MILES PER HOUR FULL
COMPENSATION SPEED.
AVERAGE STOPPING DIS-
TANCE INCLUDING REACTION
221 FEET EXCEPT ON ICE OR
SLICK SURFACE.

a = 2½ RATE INCREASE IN
DEGREES OF CURVATURE PER
100 FEET ALONG SPIRAL.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

REV.

TRANSITION SPIRAL TABLE 41 M. P. H. SAFE SPEED

DESIGNED BY: E. L. M. R. GILL 37
CHECKED BY: H. S. 2-27-38
APPROVED BY: E. L. M. R. GILL
DATE: 2-27-38

DRAWING NO.

A-46

MISCELLANEOUS INFORMATION Beginning at Main or Initial Tangent	LENGTH ON SPIRAL IN FEET 100 L _s	D DEGREE OF CURVATURE a L _s	R RADIUS IN FEET 5729.58-D	o OFFSET IN FEET 0.027 a L _s ²	t IN FEET SOL _s 0.00127 a L _s ³	Δ _s SPIRAL DEVIATION 1/2 a L _s ²	θ DEFLECTION 1/3 Δ _s	φ DEFLECTION 2/3 Δ _s	Y IN FEET C sin θ sin Δ _s	U IN FEET C sin φ sin Δ _s	C IN FEET 100 L _s ² 0.0034 a L _s ²	SUPER- ELEVATION SLOPE FT. PER FT.
Time @ 45 M.P.H.	0	0°00'	INFINITY		0.00	0°00'	0°00'20"	0°00'00"	0.00	0.00	0.00	0.0000
1 Second	10	0°20'	17,188.74		5.00	0°01'	0°00'20"	0°00'40"	3.33	6.67	10.00	.0026
	20	0°40'	8,594.37		10.00	0°04'	0°01'20"	0°02'40"	6.67	13.33	20.00	.0052
	30	1°00'	5,729.58	.01	15.00	0°09'	0°03'	0°06'	10.00	20.00	30.00	.0078
	40	1°20'	4,297.19	.02	20.00	0°16'	0°05'20"	0°10'40"	13.33	26.67	40.00	.0104
	50	1°40'	3,437.75	.03	25.00	0°25'	0°08'20"	0°16'40"	16.67	33.33	50.00	.0131
	60	2°00'	2,864.79	.05	30.00	0°36'	0°12'	0°24'	20.00	40.00	60.00	.0157
	70	2°20'	2,453.53	.06	35.00	0°49'	0°16'20"	0°32'40"	23.33	46.67	70.00	.0183
	80	2°40'	2,148.59	.12	40.00	1°04'	0°21'20"	0°42'40"	26.67	53.33	80.00	.0209
	90	3°00'	1,909.86	.18	45.00	1°21'	0°27'	0°54'	30.00	60.00	90.00	.0235
	100	3°20'	1,718.87	.24	50.00	1°40'	0°33'20"	1°06'40"	33.33	66.67	100.00	.0262
2 Seconds	110	3°40'	1,562.61	.32	55.00	2°01'	0°40'20"	1°20'40"	36.67	73.33	109.99	.0288
	120	4°00'	1,432.40	.42	60.00	2°24'	0°48'	1°36'	40.00	80.00	119.99	.0314
	130	4°20'	1,322.21	.53	64.99	2°49'	0°56'20"	1°52'40"	43.35	86.67	129.99	.0340
	140	4°40'	1,227.77	.67	69.99	3°16'	1°05'20"	2°10'40"	46.69	93.36	139.98	.0366
	150	5°00'	1,145.92	.82	74.99	3°45'	1°15'	2°30'	50.01	100.03	149.97	.0393
3 Seconds	160	5°20'	1,074.30	.99	79.99	4°16'	1°25'20"	2°40'40"	53.36	106.69	159.96	.0419
	170	5°40'	1,011.10	1.19	84.98	4°49'	1°36'20"	3°12'40"	56.70	113.37	169.95	.0445
	180	6°00'	954.23	1.41	89.98	5°24'	1°48'	3°36'	60.05	120.05	179.93	.0471
	190	6°20'	904.67	1.66	94.96	6°01'	2°00'20"	4°00'40"	63.41	126.74	189.91	.0497
	200	6°40'	859.44	1.94	99.95	6°40'	2°13'20"	4°26'40"	66.76	133.43	199.88	.0523
4 Seconds	210	7°00'	818.51	2.24	104.94	7°21'	2°27'	4°54'	70.12	140.12	209.85	.0549
	220	7°20'	781.31	2.58	109.93	8°04'	2°41'20"	5°22'40"	73.49	146.81	219.81	.0576
	230	7°40'	747.34	2.95	114.91	8°53'	2°56'20"	5°58'40"	76.85	153.51	229.76	.0602
	240	8°00'	716.20	3.35	119.89	9°36'	3°12'	6°24'	80.23	160.22	239.70	.0628
	250	8°20'	687.55	3.78	124.86	10°25'	3°28'20"	6°56'40"	83.62	166.91	249.63	.0654
5 Seconds	260	8°40'	661.11	4.25	129.83	11°16'	3°45'20"	7°30'40"	87.01	173.65	259.55	.0680
	270	9°00'	636.62	4.76	134.80	12°09'	4°03'	8°06'	90.43	180.39	269.46	.0707
	280	9°20'	613.88	5.31	139.76	13°04'	4°21'20"	8°42'40"	93.84	187.14	279.35	.0733
	290	9°40'	592.72	5.91	144.71	14°01'	4°40'20"	9°20'40"	97.27	193.89	289.23	.0759
	300	10°00'	572.96	6.54	149.66	15°00'	5°00'	10°00'	100.71	200.66	299.09	.0785
5.5 Seconds	310	10°20'	554.48	7.21	154.60	16°01'	5°20'20"	10°40'40"	104.17	207.44	308.92	.0811
	320	10°40'	537.15	7.94	159.53	17°04'	5°41'20"	11°22'40"	107.66	214.25	318.73	.0838
	330	11°00'	520.87	8.70	164.45	18°09'	6°03'	12°06'	111.16	221.07	328.52	.0864
	340	11°20'	505.55	9.52	169.36	19°16'	6°25'20"	12°50'20"	114.67	227.91	338.28	.0890
	350	11°40'	491.11	10.39	174.26	20°25'	6°48'20"	13°36'40"	118.22	234.77	348.02	.0916
6 Seconds	360	12°00'	477.47	11.31	179.15	21°36'	7°12'	14°24'	121.78	241.66	357.72	.0942
	370	12°20'	464.56	12.27	184.02	22°49'	7°36'20"	15°12'40"	125.39	248.57	367.38	.0968
	380	12°40'	452.34	13.30	188.89	24°04'	8°01'20"	16°02'40"	129.02	255.52	377.01	.0995
	390	13°00'	440.74	14.37	193.73	25°21'	8°27'	16°54'	132.69	262.48	386.59	.1021
	400	13°20'	429.72	15.51	198.57	26°50'	8°53'20"	17°46'40"	136.39	269.51	396.16	.1047
7 Seconds	410	13°40'	419.24	16.70	203.37	28°01'	9°20'20"	18°40'40"	140.13	276.54	405.62	.1073
	420	14°00'	409.20	17.95	208.16	29°24'	9°45'	19°36'	143.91	283.63	415.06	.1100
	430	14°20'	399.74	19.27	212.93	30°53'	10°16'20"	20°32'40"	147.50	290.76	424.45	.1126
	440	14°40'	390.65	20.64	217.68	32°25'	10°45'20"	21°30'40"	151.53	297.93	433.77	.1152
	450	15°00'	381.97	22.09	222.40	33°55'	11°15'	22°30'	155.57	305.16	443.03	.1178
7.5 Seconds	460	15°20'	373.67	23.59	227.09	35°16'	11°45'20"	23°30'40"	159.57	312.45	452.22	.1204
	470	15°40'	365.72	25.16	231.76	36°43'	12°16'20"	24°32'40"	163.64	319.80	461.34	.1231
	480	16°00'	358.10	26.80	236.40	38°24'	12°48'	25°36'	167.77	327.20	470.37	.1257

TABLE - G

TRANSITION SPIRAL TABLE FOR HIGHWAY CURVES

45 MILES PER HOUR CRITICAL
SPEED = 65.97 FEET PER SEC.
37 MILES PER HOUR SAFE
SPEED.

26 MILES PER HOUR FULL
COMPENSATION SPEED.
AVERAGE STOPPING DIS-
TANCE INCLUDING REACTION
185 FEET EXCEPT ON ICE OR
SLICK SURFACE.

a = 3 1/3 RATE INCREASE IN
DEGREES OF CURVATURE PER
100 FEET ALONG SPIRAL.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

REV.

TRANSITION SPIRAL TABLE 37 M.P.H. SAFE SPEED

DESIGNED BY: J. S. McDOUGALL '37
CHECKED BY: A. S. 3-1939
DESIGNED BY: G. F. 3-1939
APPROVED: J. S. McDOUGALL

DRAWING NO.

A-47

MISCELLANEOUS INFORMATION Beginning at Main or Initial Tangent	LENGTH ON SPIRAL IN FEET 100 L _s	D DEGREE OF CURVATURE aL _s	R RADIUS IN FEET 5729.58=D	o" OFFSET IN FEET 0.727aL _s ²	t IN FEET 50 L _s	Δ _s SPIRAL DEVIATION 1/2 oL _s	θ DEFLECTION 1/2 Δ _s	Δ DEFLECTION 1/2 Δ _s	Y IN FEET C sin θ sin Δ _s	U IN FEET C sin Δ _s	C IN FEET 100 L _s 0.0034aL _s ³	SUPER- ELEVATION SLOPE FT. PER FT.
Time @ 40 M.P.H.	0	0°00'	INFINITY		0.00	0°00'00"	0°00'00"	0°00'00"	0.00	0.00	0.00	0.0000
15 Second	10	0°30'	11,459.16		5.00	0°01'30"	0°00'30"	0°01'30"	3.33	6.67	10.00	.0031
	20	1°00'	5,729.58		10.00	0°06'00"	0°02'00"	0°04'00"	6.67	13.33	20.00	.0062
	30	1°30'	3,819.72	.01	15.00	0°13'30"	0°04'30"	0°09'00"	10.00	20.00	30.00	.0093
	40	2°00'	2,864.79	.02	20.00	0°24'00"	0°08'00"	0°16'00"	13.33	26.67	40.00	.0124
	50	2°30'	2,291.83	.05	25.00	0°37'30"	0°12'30"	0°25'00"	16.67	33.33	50.00	.0155
2 Seconds	60	3°00'	1,909.86	.08	30.00	0°54'00"	0°18'00"	0°36'00"	20.00	40.00	60.00	.0186
	70	3°30'	1,637.02	.12	35.00	1°13'30"	0°24'30"	0°49'00"	23.33	46.67	70.00	.0217
	80	4°00'	1,432.40	.19	40.00	1°36'00"	0°32'00"	1°04'00"	26.67	53.33	80.00	.0248
	90	4°30'	1,273.24	.26	45.00	2°01'30"	0°40'30"	1°21'00"	30.00	60.00	90.00	.0279
	100	5°00'	1,145.92	.36	50.00	2°30'00"	0°50'00"	1°40'00"	33.33	66.67	99.99	.0310
3 Seconds	110	5°30'	1,041.74	.48	54.99	3°01'30"	1°00'30"	2°01'00"	36.67	73.33	109.99	.0341
	120	6°00'	954.93	.63	59.99	3°36'00"	1°12'00"	2°24'00"	40.01	80.02	119.98	.0372
	130	6°30'	881.47	.80	64.99	4°13'30"	1°24'30"	2°49'00"	43.35	86.69	129.97	.0403
	140	7°00'	818.51	1.00	69.98	4°54'00"	1°36'00"	3°16'00"	46.70	93.36	139.96	.0434
	150	7°30'	763.94	1.23	74.98	5°37'30"	1°52'30"	3°45'00"	50.05	100.05	149.94	.0465
4 Seconds	160	8°00'	716.20	1.49	79.97	6°24'00"	2°08'00"	4°16'00"	53.41	106.73	159.91	.0496
	170	8°30'	674.07	1.79	84.95	7°13'30"	2°24'30"	4°49'00"	56.77	113.42	169.88	.0527
	180	9°00'	636.62	2.12	89.94	8°06'00"	2°42'00"	5°24'00"	60.13	120.12	179.84	.0558
	190	9°30'	603.11	2.49	94.92	9°01'30"	3°00'30"	6°01'00"	63.50	126.82	189.79	.0589
	200	10°00'	572.96	2.91	99.90	10°00'00"	3°20'00"	6°40'00"	66.87	133.52	199.73	.0620
5 Seconds	210	10°30'	545.67	3.37	104.87	11°01'30"	3°40'30"	7°21'00"	70.27	140.25	209.65	.0651
	220	11°00'	520.87	3.87	109.84	12°06'00"	4°02'00"	8°04'00"	73.68	146.98	219.56	.0682
	230	11°30'	498.22	4.42	114.80	13°13'30"	4°24'30"	8°49'00"	77.09	153.72	229.45	.0713
	240	12°00'	477.47	5.02	119.75	14°24'00"	4°48'00"	9°36'00"	80.53	160.49	239.32	.0744
	250	12°30'	458.37	5.68	124.69	15°37'30"	5°12'30"	10°25'00"	83.98	167.27	249.17	.0776
6 Seconds	260	13°00'	440.71	6.39	129.62	16°54'00"	5°38'00"	11°16'00"	87.45	174.07	258.99	.0807
	270	13°30'	424.41	7.15	134.54	18°13'30"	6°04'30"	12°09'00"	90.95	180.88	268.78	.0838
	280	14°00'	409.26	7.98	139.45	19°36'00"	6°32'00"	13°04'00"	94.48	187.72	278.54	.0869
	290	14°30'	395.14	8.87	144.35	21°01'30"	7°00'30"	14°01'00"	98.03	194.60	288.26	.0900
	300	15°00'	381.97	9.81	149.23	22°30'00"	7°30'00"	15°00'00"	101.62	201.50	297.93	.0931
7 Seconds	310	15°30'	369.65	10.83	154.09	24°01'30"	8°00'30"	16°01'00"	105.25	208.44	307.57	.0962
	320	16°00'	358.10	11.91	158.93	25°36'00"	8°30'00"	17°04'00"	108.91	215.41	317.15	.0993
	330	16°30'	347.25	13.06	163.76	27°13'30"	9°04'30"	18°09'00"	112.62	222.43	326.67	.1024
	340	17°00'	337.03	14.29	168.56	28°54'00"	9°38'00"	19°16'00"	116.39	229.51	336.12	.1055
	350	17°30'	327.40	15.59	173.33	30°37'30"	10°12'30"	20°25'00"	120.21	236.62	345.54	.1086
8 Seconds	360	18°00'	318.31	16.96	178.08	32°24'00"	10°48'00"	21°36'00"	124.09	243.79	354.86	.1117
	370	18°30'	309.71	18.41	182.80	34°13'30"	11°24'30"	22°49'00"	128.05	251.04	364.11	.1148
	380	19°00'	301.56	19.95	187.48	36°06'00"	12°02'00"	23°04'00"	132.08	258.35	373.27	.1179
	390	19°30'	293.82	21.56	193.14	38°01'30"	12°40'30"	24°21'00"	136.19	265.74	382.33	.1210
	400	20°00'	286.48	23.26	196.77	40°00'00"	13°20'00"	26°40'00"	140.42	273.26	391.37	.1241

TABLE - H

TRANSITION SPIRAL TABLE FOR HIGHWAY CURVES

40 MILES PER HOUR CRITICAL
SPEED = 58.64 FEET PER SEC.
33 MILES PER HOUR SAFE
SPEED.

23 MILES PER HOUR FULL
COMPENSATION SPEED.

AVERAGE STOPPING DIS-
TANCE INCLUDING REACTION
151 FEET EXCEPT ON ICE OR
SLICK SURFACE.

a = 5 RATE INCREASE IN
DEGREES OF CURVATURE PER
100 FEET ALONG SPIRAL.

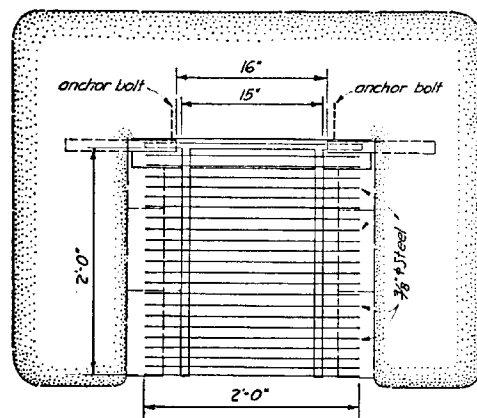
ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

TRANSITION SPIRAL TABLE 33 M.P.H. SAFE SPEED

COMPILED BY L. L. LIEBOWITZ
CHECKED BY K. S. LIEBOWITZ
APPROVED BY J. L. LIEBOWITZ

DRAWING NO.

A-48



GENERAL NOTES
Fireplaces to be set on leeward sides of tables in picnic areas.

Forms to be removed before concrete has cured, to permit stoning of rounded corners and removal of form marks.

Mortar for fire brick to be mixture of fire clay and 25% Portland Cement "buttered" on surface lightly with trowel to make a joint about 1/16 thick. After setting, the fireplace is to be fired strongly for several hours to further set the mortar.

Angle iron with 2 anchor bolts attached, to be tilted sufficiently to allow grill to remain upright when raised.

Pipe lengths to be set so that grill will lie flat when lowered. Grill to be welded.

QUANTITIES

FIREPLACE

0.47 C.Y. 4" Concrete

48 Firebrick

0.6 C.Y. Str. Exc.

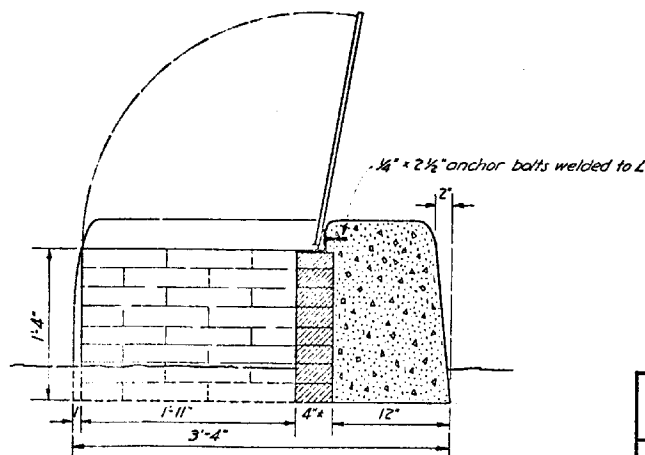
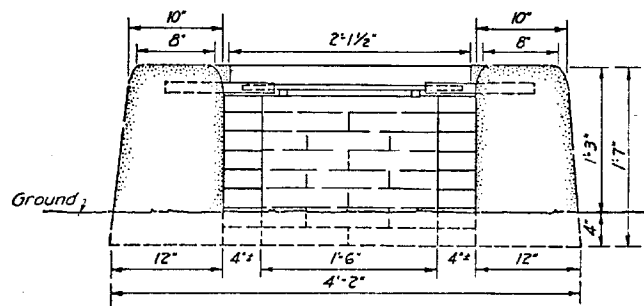
GRILL

1-3" x 3" x 1/4" x 2'-1 1/2" L with anchor bolts

3-3/4" x 24" Bars

23-3/8" x 24" Bars

2-1" Pipes 12" long.



Scale 1" = 1'-0"

TYPE A

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

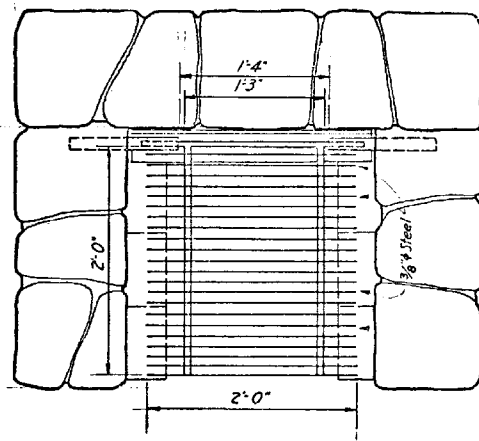
TYPE A FIREPLACE

DRAWN	F.M.G.	Nov 39
TRACED	F.M.G.	Nov 39
CHECKED		
APPROVED		
CHIEF PLANS		

DRAWING NO.

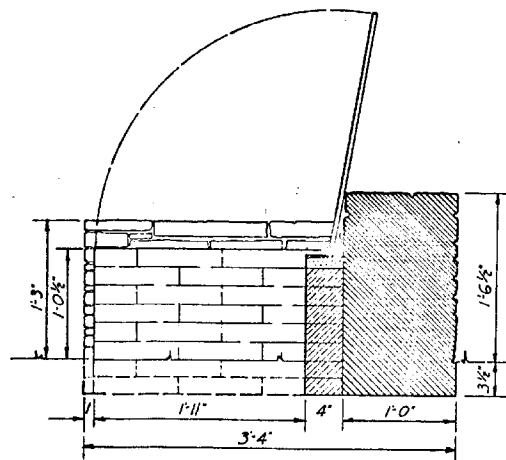
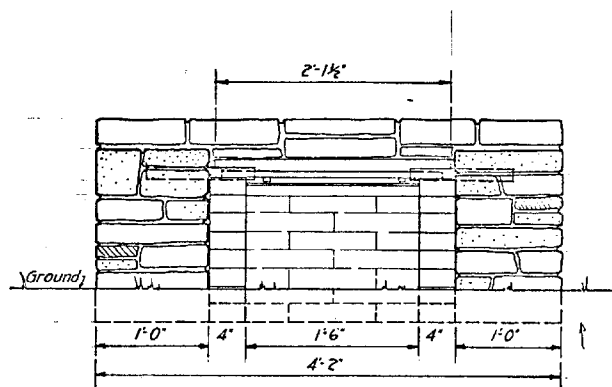
A-53

REV.



GENERAL NOTES
 Fireplaces shall be set on leeward sides of tables in picnic areas.
 Mortar for fire brick to be mixture of fire clay and 25% Portland Cement "buttered" on surface lightly with trowel to make a joint about 1/8" thick. After setting, the fireplace is to be fired strongly for several hours to further set the mortar.
 All joints in stonework to be raked to 1/2" minimum depth.
 Use weathered stone where possible for exposed surfaces.
 After pointing, remove all excess mortar from faces of stonework.
 Angle iron with 2 anchor bolts attached to be tilted sufficiently to allow grill to remain upright when raised.
 Pipe lengths to be set so that grill will lie flat when lowered.
 Grill to be welded.

QUANTITIES
FIREPLACE
 0.54 C.Y. Cement Rubble Masonry
 48 Firebrick
 0.6 C.Y. Str. Exc.
GRILL
 1'-3" x 3" x 1/4" x 2'-1 1/2" L with anchor bolts.
 3'-3/4" x 2'-0" Bars
 23'-3/8" x 2'-0" Bars
 2'-1" Pipes 1'-0" long.



ARIZONA HIGHWAY DEPARTMENT
 PLANS DIVISION

TYPE B FIREPLACE

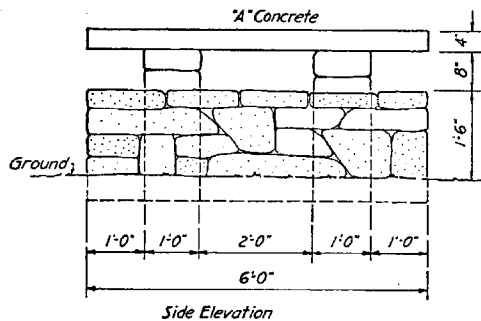
DRAWN F.M.G. Nov '39
 TRACED F.M.G. Nov '39
 CHECKED
 APPROVED
 CHIEF PLANS

DRAWING NO.

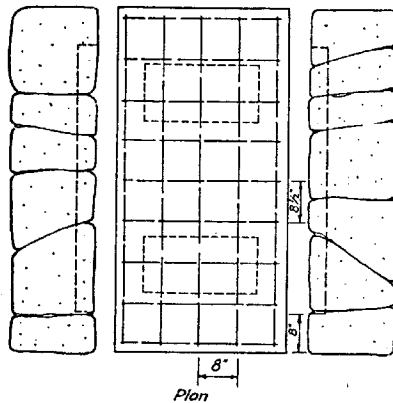
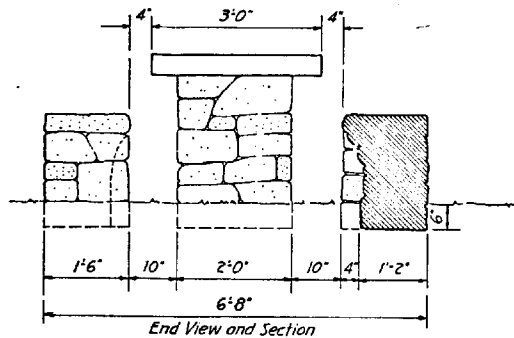
A-54

REV.

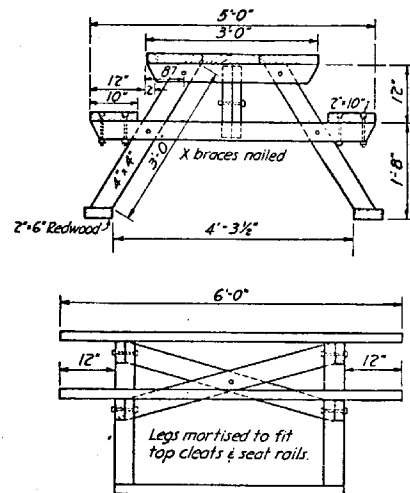
TYPE "A"



Scale $\frac{1}{2}" = 1'-0"$



TYPE "B"



GENERAL NOTES

All exposed edges of concrete must be smooth and rounded with a $\frac{1}{2}$ " radius.

Top slab to be precast and bedded on stone piers with 3:1 mix.

All joints in stonework to be raked to $\frac{1}{2}$ " minimum depth

Use weathered stone for all possible exposed masonry surfaces.

Fresh cut stone surfaces to be stained, old crankcase oil diluted with gasoline, and, when necessary, dusted to absorb excess oil.

After pointing, remove all excess mortar from faces of stonework.

QUANTITIES

.22 C.Y. "A" Concrete.

1.57C.Y Cement Rubble Masonry.

5 Pcs. $\frac{3}{8}$ " ϕ Steel 5'-9 $\frac{1}{2}$ " long.

9 Pcs. $\frac{3}{8}$ " ϕ Steel 2'-9 $\frac{1}{2}$ " long.

GENERAL NOTES

All exposed edges of top and seats to be smooth and rounded.

Table to be well oiled with 2 coats of raw linseed, the first coat of which is to be applied hot (1* burnt umber per gal)

Boltheads on table top and seats to be countersunk flush with surface.

Woodwork to be stained after framing, prior to erection.

QUANTITIES

2 Pcs. 2" x 6" x 4'-0" Rough Redwood

1 - 4" x 4" x 12'-4" S4S Pine or Douglas Fir. #2 Clear

$$2 \cdot 2^* \cdot 4^* \cdot 4' \cdot 0^* \cdot \cdot \cdot \cdot \cdot \cdot$$

2 - 2° - 4° - 3' - 0"

2 = 2' + 4' + 5' + 0' =

$$2 = 2' + 10' + 6' - 0' = \dots$$

3' - 2' - 12' - 6' - 0' - . . .

9- $\frac{3}{8}$ " \times 4 $\frac{1}{2}$ " Carriage Bolts with nuts & washers

20. $7\frac{1}{8} \cdot 6\frac{1}{2}$ " " " " " "

PICNIC TABLES

DRAWN	F.M.G.	Nov. '39	DRAWING NO. A-55
TRACED	F.M.G.	Nov. '39	
CHECKED			
APPROVED CHIEF PLANT			

Technical drawing of a wooden fence section showing an intermediate panel and an end panel. The drawing includes dimensions for height (2'11", 2'2", 1'11", 1'5"), width (9", 10'0"±), and spacing (5'8", 2'4", 9'1", 2'9"). It labels "Pine Rails", "Juniper Posts", and "3/4" x 1/6" Bolts with Washers". A note specifies staining the wood with gasoline-cresote mix and linseed oil. The scale is 1/2" = 1'-0".

NOTE
 Stain exposed wood with gasoline-cresote mix, followed by 2 coats of raw linseed oil.
 Cresote all wood in contact with ground.
 Woodwork to be stained after framing and prior to erection.

TYPE B CRASH RAIL

1'-6"

2'-0"

6"

1'-6"

2'-0"

10'-0"

10'-0"

2'-0"

1'-6"

3"

3"

Countersink nuts & bolt ends, plug holes

~ 1/2" x 18" Bolts set in masonry

9" min. dia. Pine Log

Ground

1'-0"

2'-0"

5'-0"

3"

Scale 1/2" = 1'-0"

Intermediate Panel

End Panel - Rt. or Lt.

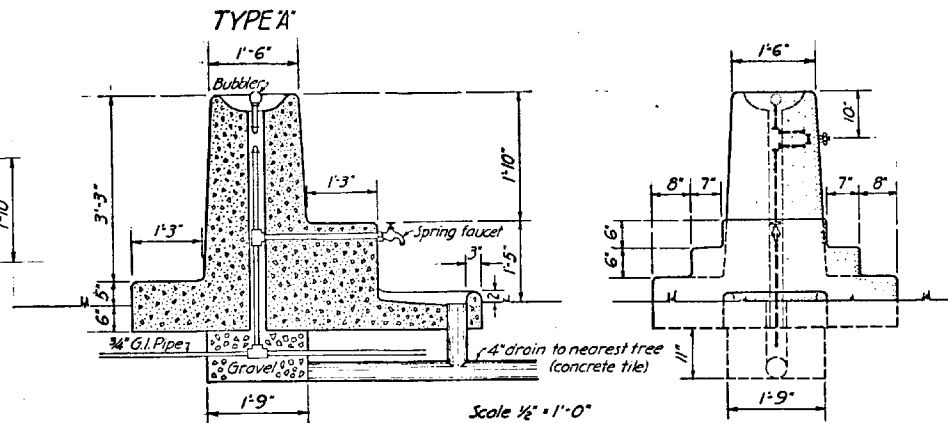
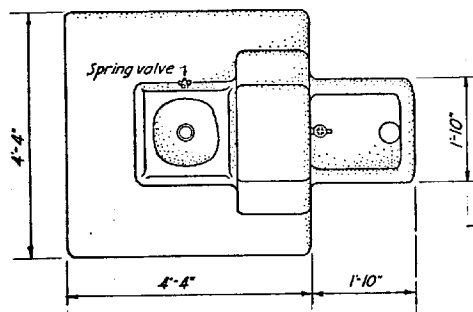
GENERAL NOTES

GENERAL NOTES

Stain exposed wood with gasoline - creosote mix, followed by 2 coats of raw linseed oil.
All joints in stonework to be raked to $\frac{1}{2}$ " minimum depth.
Use weathered stone where possible for exposed surfaces.
Fresh cut stone surfaces to be stained with old crankcase oil, diluted with gasoline,
and, when necessary, dusted to absorb excess oil.
After pointing, remove all excess mortar from faces of stonework.
Woodwork to be stained after framing and prior to erection.

NOTE
10" diameter
Creosote butt

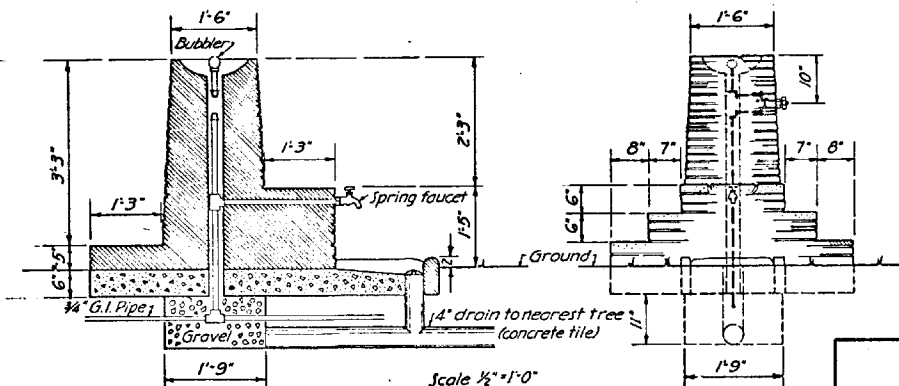
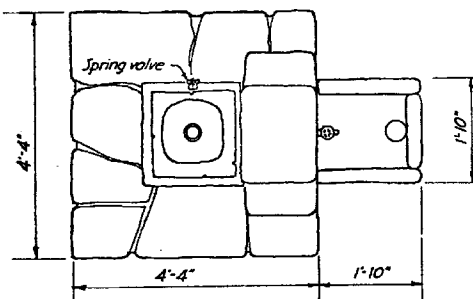
ARIZONA HIGHWAY DEPARTMENT PLANS DIVISION		REV.
CRASH RAILS, STONE CURB GUARD POST		DRAWING NO. A-56
DRAWN	F.M.G. Nov. 39	
TRACED	F.M.G. Nov. 39	
CHECKED		
APPROVED CHIEF PLANS		



QUANTITIES
 1.145 CY. 'A' Concrete
 1 Bubbler head
 1 Spring faucet
 1 Spring valve
 7 lin. ft. 3/4" G.I. Pipe

GENERAL NOTES
 Concrete to be adobe colored through the use of burnt umber for pigment.
 Forms to be removed before concrete has cured to allow staining of rounded
 corners and removal of form marks.
 All exposed edges of concrete must be smooth, and rounded with a 1" radius.

TYPE 'B'



QUANTITIES
 0.41 CY. 'A' Concrete
 0.73 CY. Cement Rubble Masonry
 1 Bubbler head
 1 Spring faucet
 1 Spring valve
 7 lin. ft. G.I. Pipe

GENERAL NOTES
 All joints in stonework to be raked to 1/2" minimum depth.
 Use weathered stone where possible for exposed surfaces.
 Fresh cut stone surfaces to be stained with old crankcase oil diluted with gasoline.
 After pointing, remove all excess mortar from faces of stonework.
 Plaster inside of drinking bowl with 3-1 Portland Cement mix.

ARIZONA HIGHWAY DEPARTMENT
 PLANS DIVISION

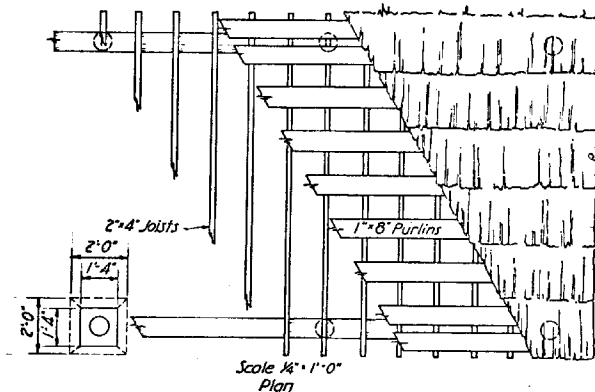
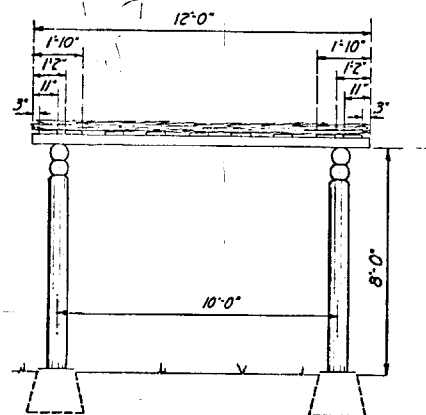
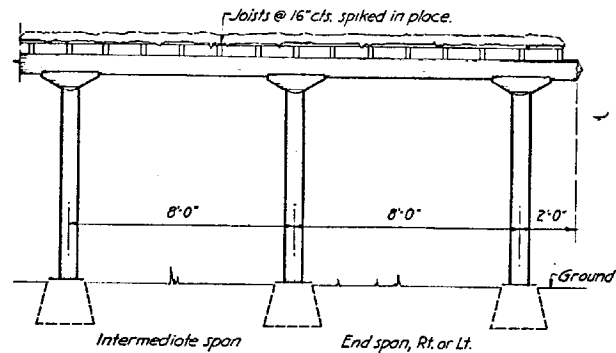
DRINKING FOUNTAINS

DRAWN FMG. NOV. '39
 TRACED FMG. NOV. '39
 CHECKED
 APPROVED CHIEF PLANT

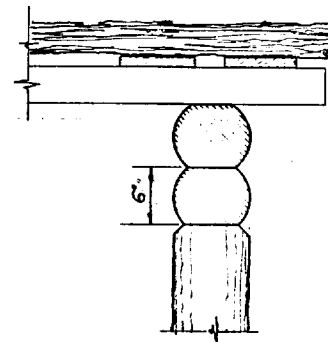
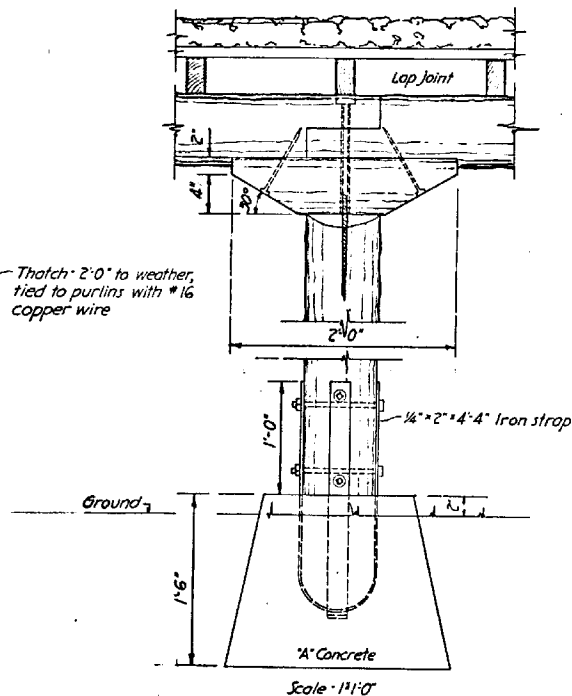
DRAWING NO.

A-57

REV.



GENERAL NOTES
 Thatch and lumber to be natural, rough finish.
 Logs to have minimum diameter of 8" peeled
 Logs to be given two coats raw linseed oil after framing
 and prior to erection.
 Lintel & girder to be counterbored to pass log screw freely.
 Log butts to be creosoted for 1'-0" at base.



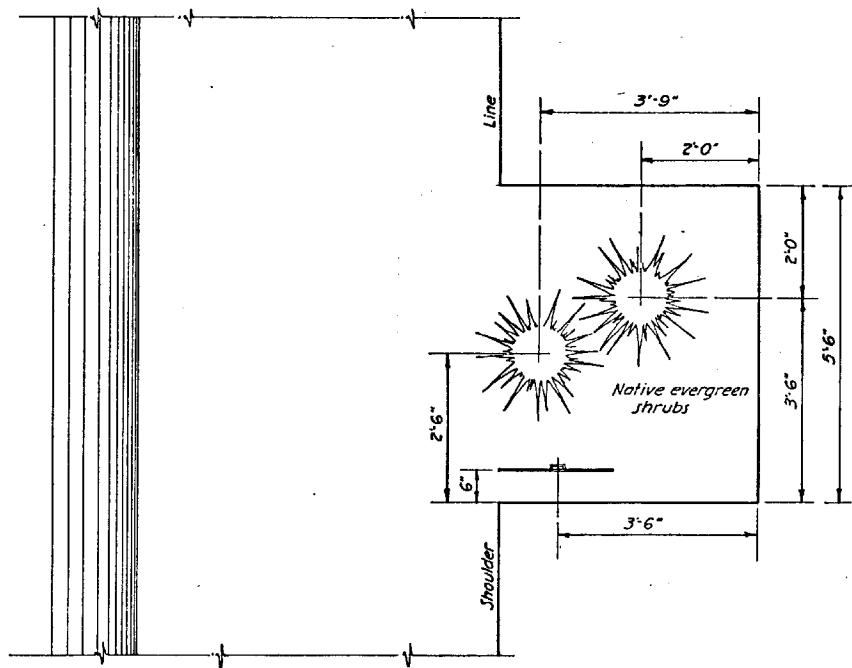
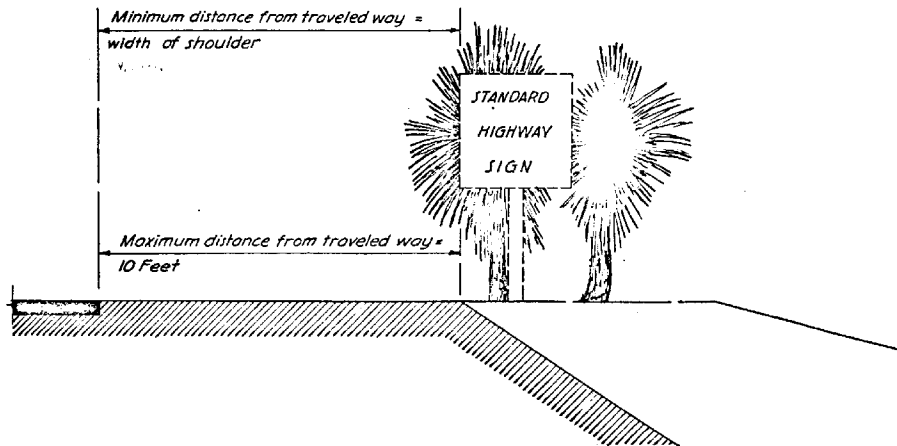
ARIZONA HIGHWAY DEPARTMENT
 PLANS DIVISION

RAMADA

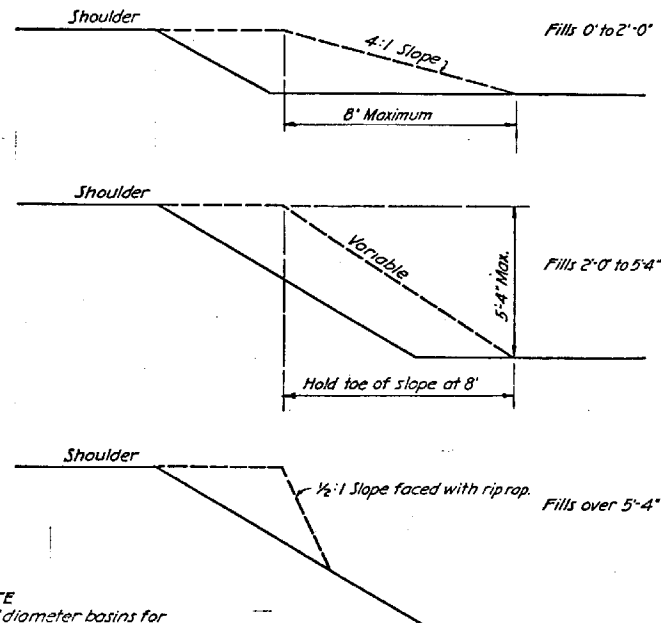
DRAWN F.M.G. NOV '39
 TRACED F.M.G. NOV '39
 CHECKED
 APPROVED CHIEF PLANS

DRAWING NO.
A-58

REV.



NOTE
Provide 2' diameter basins for temporary shrub watering.
Plant signs in cuts only where practicable. Where space is limited, shrub on right may be omitted.



ARIZONA HIGHWAY DEPARTMENT
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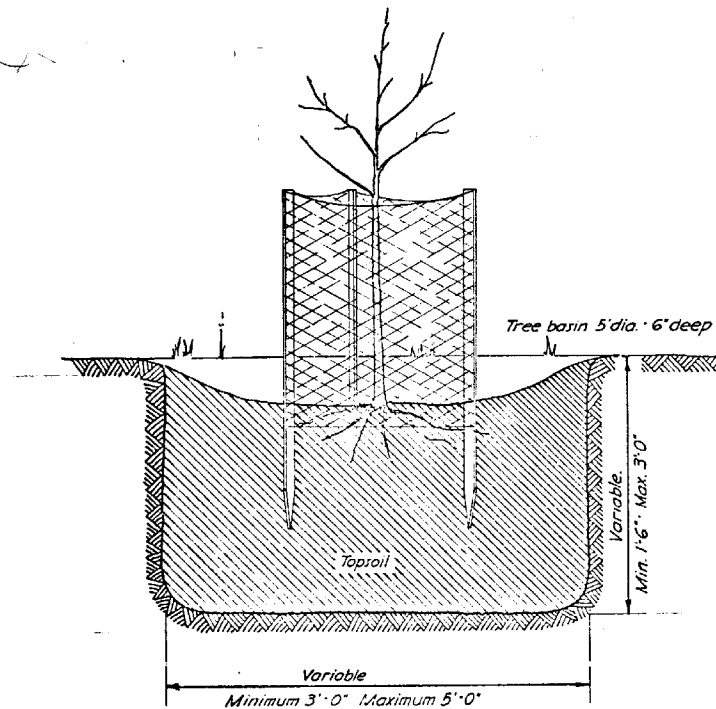
SIGN PLANTING

DRAWN F.M.G. NOV. '39
TRACED F.M.G. NOV. '39
CHECKED
APPROVED
CHIEF PLANS

DRAWING NO.

A-59

REV.



QUANTITIES
 3'-1" x 2" x 4'-0" Stakes
 6 Lin. ft. 36" Chicken wire (2" mesh)

RABBIT GUARD

ARIZONA HIGHWAY DEPARTMENT
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RABBIT AND TREE GUARDS

DRAWN	F.M.G. NOV. '39
TRACED	F.M.G. NOV. '39
CHECKED	
APPROVED	
CHIEF PLANS	

DRAWING NO.

A-60

REV.