ROAD DESIGN STANDARDS

JANUARY 1980

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A	AREA
AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
ABC	ASPHALT BASE COURSE
ABD	ABANDONED
AC	ACRE
ACT	ACTUATED
ADJ	ADJUST
ADT	ANNUAL AVERAGE DAILY TRAFFIC
AGG	AGGREGATE
AH	AHEAD
ALT	ALTERNATE
ALUM	ALUMINUM
APPRH	APPROACH
APPROX	APPROXIMATE
ARTF	ARTIFICIAL
ASPH	ASPHALT
ASPH CONC	ASPHALTIC CONCRETE
OR AC	ASPHALTIC CONCRETE
ASSEM	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
ATTNUATR	ATTENUATOR
AVE	AVENUE

B TO B	BACK TO BACK
BASC	BASCULE
BBL	BARREL
BC	BOTTLE CAP
BCCMP	BITUMINOUS COATED CORRUGATED METAL PIPE CULVERT
BCPA	BITUMINOUS COATED PIPE ARCH CULVERT
BCPCMP	BITUMINOUS COATED AND PAVED CORRUGATED METAL PIPE CULVERT
BCPPA	BITUMINOUS COATED AND PAVED PIPE ARCH CULVERT
BEG	BEGIN
BIT	BITUMINOUS
BK	BACK
BL	BASE LINE
BLDG	BUILDING
BLKHD	BULKHEAD
BLVD	BOULEVARD
BM	BENCH MARK
BOT	BOTTOM
BP	BORROW PIT
BRG	BEARING
BRKWY	BREAKAWAY
BTFLY	BUTTERFLY
BW	BARBED WIRE

C	CANTILEVER LENGTH
C & G	CURB AND GUTTER
CAP	CORRUGATED ALUMINUM PIPE
CB	CATCH BASIN
CBC	CONCRETE BOX CULVERT
CBS	CONCRETE BOX STRUCTURE
CC	CENTER TO CENTER
CD	CROSS DRAIN
CEM	CEMENT
CEM'D	CEMENTED
CH	CHANNEL
CH CH	CHANNEL CHANGE
CHGABLE	CHANGABLE
CI	CAST IRON
CIP	CAST IRON PIPE
CIPL	CAST IN PLACE
CL	CLEARANCE OR CENTER LINE
CM	CONCRETE MONUMENT
CMP	CORRUGATED METAL PIPE
CO	COUNTY
COM	COMMERCIAL
COMP	COMPOSITE
CONC	CONCRETE
CONST	CONSTRUCT
CONTRL	CONTROLLER
CONT	CONTINUATION
CONTR	CONTRACTOR
COORD	COORDINATE
COR	CORNER
CORR	CORRUGATED
CP	CONCRETE PIPE
CRS	COURSE
CS	CURVE TO SPIRAL
CSE	COURSE
CTLVR	CANTILEVER
CTR	CENTER
CULV	CULVERT
CY	CUBIC YARD
CYL	CYLINDRICAL

D	DEGREE OF CURVATURE
DA	DRAINAGE AREA
DBL	DOUBLE
D-CSE	DOUBLE COURSE
D=POST	DOUBLE POST
DCS	DEGREE OF CURVATURE (SPIRAL)
DELIN	DELINEATORS
DEMOB	DEMOBILIZATION
DEPT	DEPARTMENT
DET	DETOUR
DHV	DESIGN HOURLY VOLUME
DT	DITCH
DI	DROP INLET
DIA	DIAMETER
DIM	DIMENSION
DISP	DISPOSAL
DOT	DEPARTMENT OF TRANSPORTATION
DPI	DITCH POINT INTERSECTION
DR	DRAIN
DRIV	DRIVEN
DRWY	DRIVEWAY
DS	DESIGN SPEED
DWG	DRAWING

E	EAST
E	RATE OF SUPERELEVATION
E TO E	END TO END
E=	EXTERNAL DISTANCE
EA	EACH
EB	EASTBOUND
EL OR ELEV	ELEVATION
ELAST	ELASTOMERIC
ELEC	ELECTRIC
ELLIP	ELLIPTICAL
EMBK	EMBANKMENT
EMUL	EMULSIFIED
ENCL	ENCLOSURE
ENGR	ENGINEER
EOS	END OF SURVEY
EQ	EQUATION OR EQUAL
EQUIP	EQUIPMENT
ESMT	EASEMENT
EST	ESTIMATE
ESTBLMNT	ESTABLISHMENT
EW	ENDWALL
EXCAV	EXCAVATION
OR EXC	EXCAVATION
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTENSION

F	FILL
F & I	FURNISH & INSTALL
F TO F	FACE TO FACE
FA	FEDERAL AID
FAP	FEDERAL AID PROJECT
FE	FLOOR ELEVATION
FED	FEDERAL
FERT	FERTILIZER
FETS	FLARED END TERMINAL SECTION
FH	FIRE HYDRANT
FHWA	FEDERAL HIGHWAY ADMINISTRATION
FIN	FINISH
FL	FLOW LINE
FLEX	FLEXIBLE
FOUND	FOUNDATION
FR	FRAME
FRANG	FRANGIBLE
FT	FEET
FURN	FURNISH
FUT	FUTURE

GA	GAUGE, GAGE
GAL	GALLON
GALV	GALVANIZED
GAR	GARAGE
GD	GUTTER DRAIN
GIP	GALVANIZED IRON PIPE
GR	GRADE OR GUARDRAIL
GRD	GROUND
GTTR	GUTTER

HDWL	HEADWALL
HNDRL	HANDRAIL
HORIZ	HORIZONTAL
HR	HOUR
HSE	HOUSE
HW	HIGH WATER
HWY	HIGHWAY
HYD	HYDRANT

I	EXTERNAL ANGLE(DELTA)
ID	INSIDE DIAMETER
IN	INCH
INC	INCORPORATED
INCL	INCLUDED
IP	IRON PIPE
INSTL	INSTALL
INTCH	INTERCHANGE

JB	JUNCTION BOX
JCT	JUNCTION

L	LENGTH OF CURVE
LA	LIMITED ACCESS
LB	POUND
LBR	LIMEROCK BEARING RATIO
LC	LONG CHORD
LF	LINEAR FEET
LGTH	LENGTH
LIN	LINEAR
LMRK	LIMEROCK
LS	LENGTH OF SPIRAL
LT	LEFT
LT'D	LIGHTED
L/W	LIGHTWEIGHT

M	MIDDLE ORDINATE DISTANCE
MAINT	MAINTENANCE
MATL	MATERIAL
MAX	MAXIMUM
MED	MEDIAN
MESS	MESSAGE
MH	MANHOLE
MHW	MEAN HIGH WATER
MI	MILE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLW	MEAN LOW WATER
MOBL	MOBILIZATION
MOD	MODIFY
MON	MONUMENT
MP	MILE POST
MPH	MILES PER HOUR
MSL	MEAN SEA LEVEL
MT'D	MOUNTED
MB	MEDIAN BARRIER

N	NORTH
N & C	NAIL & (BOTTLE) CAP
NB	NORTHBOUND
NE	NORTHEAST
NIC	NOT IN CONTRACT
NO	NUMBER
NW	NORTHWEST

O PASS	OVERPASS
O TO O	OUTSIDE TO OUTSIDE
OD	OUTSIDE DIAMETER
OPT	OPTICALLY
OVHD	OVERHEAD

PAVT	PAVEMENT
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE OR PLAIN CEMENT CONCRETE
PEDES	PEDESTRIAN
PEN	PENETRATION
PG	PROFILE GRADE
PH	PHASE
PI	POINT OF INTERSECITON
PK	PER CAP
PL	PROPERTY LINE
POC	POINT ON CURVE
POST	POINT ON SEMI TANGENT
POT	POINT ON TANGENT
PP	POWER POLE
PRC	POINT OF REVERSE CURVATURE
PRCST	PRECAST
PREST	PRESTRESSED
PROG	PROGRAMMED
PROJ	PROJECT
PRM	PERMANENT REFERENCE MONUMENT
PROV	PROVISIONS
PRSE	PRESSURE
PS&E	PLANS, SPECIFICATIONS AND ESTIMATES
PT	POINT OF TANGENCY
P-TIME	PRE-TIMED
Q	PEAK DISCHARGE

R	RADIUS
R-	RANGE
RBAC	ROCK BASE ASPHALTIC CONCRETE
RBST	ROCK BASE SURFACE TREATMENT
RCP	REINFORCED CONCRETE PIPE
RCPA	REINFORCED CONCRETE PIPE ARCH
RD	ROAD
RD-SD	ROADSIDE
RDWY	ROADWAY
REF	REFERENCE
REFL	REFLECTIVE
REINF	REINFORCED
REJUV	REJUVENATION
RELOC	RELOCATED
REM	REMOVAL
REPL	REPLACE
RES	RESIDENCE
RM	REFERENCE MONUMENT
RP	REFERENCE POINT
RR	RAILROAD
RSF	RESURFACE
RT	RIGHT
R/W	RIGHT OF WAY

S	SOUTH
SAHM	SAND-ASPHALT HOT MIX
SAN	SANITARY
SB	SOUTHBOUND"
SBAC	SHELL BASE ASPHALTIC CONCRETE
SBRM	SAND BITUMINOUS ROAD MIX
SBST	SHELL BASE SURFACE TREATMENT
SC	SEAL COAT
SCST	SAND-CLAY SURFACE TREATMENT
SD	SIDE DRAIN
SE	SOUTHEAST
SECT	SECTION
SED	SEDIMENT
SEP	SEPARATOR
SEQ	SEQUENTIAL
SF	SHRINKAGE FACTOR
SG	SUBGRADE
SHLDR	SHOULDER
SPEC	SPECIFICATION
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SQ YD OR SY	SQUARE YARD
SR	STATE ROAD
SS	STORM SEWER
SSMD	SOLID STATE MODULAR DESIGN
ST	SURFACE TREATMENT OR STREET
STA	STATION
STAB	STABILITY
STD	STANDARD
STL	STEEL
STR	STRUCTURE
SUBGR	SUBGRADE
SUPPTS	SUPPORTS
SURF	SURFACE
SW	SOUTHWEST OR SIDEWALK
SYST	SYSTEM
S-POST	SINGLE POST

T	TANGENT LENGTH OF CURVE
TBM	TEMPORARY BENCH MARK
TC	TANGENT TO CURVE
TCP	TERRA COTTA PIPE
TEL	TELEPHONE
TEMP	TEMPERATURE
THRMPLSTC	THERMPLASTIC
TN	TON
TRAF	TRAFFIC
TREAT	TREATMENT
TS	TANGENT TO SPIRAL
TSC	LENGTH OF TANGENT (SPIRAL CURVE)
TWP	TOWNSHIP
TYP	TYPICAL
T-CSE	TRIPLE COURSE

U PASS	UNDERPASS
UNDGRD	UNDERGROUND
UNDDR	UNDERDRAINS
UNDRDWY	UNDERROADWAY
UNL	UNLOADED
UNTR	UNTREATED
USC&GS	US COAST AND GEODETIC SURVEY (NOW NATIONAL GEODETIC SURVEY)
USGS	US GEOLOGICAL SURVEY

VAR	VARIABLE
VC	VERICAL CURVE
VF	VERTICAL FOOT
VCP	VIRTIFIED CLAY PIPE
VEH	VEHICLE
VERT	VERTICAL
VOL	VOLUME
VW	VARIABLE WIDTH

W	WEST
WB	WESTBOUND
WM	WATER MAIN
WT	WATER TABLE OR WEIGHT

X	COORDINATE DISTANCE (EAST-WEST)
X RD	CROSS ROAD
XING	CROSSING
X-SEC	CROSS SECTION
Y	COORDINATE DISTANCE(NORTH-SOUTH)
2L	TWO LANE

UNITS OF MEASURE

AC	ACRE
AS	ASSEMBLY
BA	BARREL
BU	BUSHEL
CF	CUBIC FT.
CO	PER CLEANOUT
CY	CUBIC YARD
CW	CWT
DA	DAYS
EA	EACH
FB	MFBM
FT	FOOT
GA	GALLON
GM	GROSS MILE
LB	POUND
LF	LIN. FT.
LS	LUMP SUM
ED	PER EACH PER DAY
LU	PER LUMINAIRE
MG	THOUSAND GALLONS
NM	NET MILE
PB	PER BUILDING
PC	PER CLUSTER
PE	PILE
PI	PER INTERSECTION
PJ	PER JOINT
PL	PLANT
PO	POST
PP	PER POLE
PW	PER WELL
RM	ROAD MILE
SF	SQUARE FOOT
SP	SPAN
SY	SQUARE YARD
TN	TON
VF	VERTICAL FOOT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STANDARD ABBREVIATIONS

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By
E C Bartel
Deputy Design Engineer, Roadways

F.H.W.A. Approved: 12/13/74

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STANDARD SYMBOLS FOR KEY MAPS

- HIGHWAY WITH FULL CONTROL OF ACCESS
- CONTROLLED ACCESS HIGHWAY WITH FRONTAGE ROADS
- INTERCHANGE
- PROPOSED CONTROLLED ACCESS HIGHWAY
- DIVIDED HIGHWAY
- PAVED ROAD—HIGH TYPE
- BITUMINOUS ROAD— MEDIUM AND LOW TYPE
- GRAVEL OR STONE ROAD
- SOIL SURFACED ROAD
- GRADED AND DRAINED ROAD
- UNIMPROVED ROAD
- PRIMITIVE ROAD
- IMPASSABLE ROAD
- PRIVATE ROAD
- DISTANCE BETWEEN POINTS
- STREETS IN INSET AREAS OR DELIMITED URBAN COMPACT AREAS
- EXTENSION OF LOCAL ROADS WITHIN CITY LIMITS
- FAI — FEDERAL AID INTERSTATE HIGHWAY
- FAP — FEDERAL AID PRIMARY HIGHWAY
- FAS — FEDERAL AID SECONDARY HIGHWAY
- NF — NATIONAL FOREST ROAD
- INTERSTATE HIGHWAY
- U. S. NUMBERED HIGHWAY
- STATE HIGHWAY
- RAILROAD
- ABANDONED RAILROAD OR LOGGING TRAM
- RAILROAD STATION OR PREPAY STATION
- GRADE CROSSING
- RAILROAD ABOVE
- RAILROAD BELOW
- AIRPORT, COMPLETE FACILITIES
- AIRFIELD, LIMITED FACILITIES
- LANDING AREA OR STRIP
- RUNWAYS
- CANAL OR DRAINAGE DITCH
- NARROW STREAM

- WIDE STREAM
- WIDE STREAM WITH DAM
- DAM WITH ROAD
- LAKE, RESERVOIR OR POND
- LAKE, RESERVOIR OR POND WITH DAM
- INTERMITTENT POND
- MARSH
- SWAMP
- HIGHWAY BRIDGE
- HIGHWAY GRADE SEPARATION
- PEDESTRIAN UNDERPASS OR OVERPASS
- Ped.U.P.
- STATE BOUNDARY LINE
- COUNTY BOUNDARY LINE
- CIVIL TOWNSHIP BOUNDARY
- FORBES PURCHASE LINE
- LAND SECTION LINE
- SURVEY BY OTHERS
- NATIONAL OR STATE PARK BOUNDARY
- NATIONAL OR STATE FOREST BOUNDARY
- SCHOOL
- COMMUNITY HALL
- POST OFFICE
- POLICE SCHOOL
- D — GARBAGE DUMP
- A — AUTO JUNKYARD
- F — SANITARY FILL
- S — SEWAGE DISPOSAL PLANT
- POWER PLANT
- POWER SUBSTATION
- RADIO OR TV CONTROL TOWER
- RADAR STATION
- AS — ANIMAL SHELTER
- LOCKED GATE OR FENCE
- DIRECTIONAL ARROW
- △ PHIPPS — TRIANGULATION STATION WITH NAME
- LOCATION OF SYMBOL

- LOCATION OF INSET BOUNDARY WITHIN MAP
- STATE CAPITAL
- OTHER CITY OR VILLAGE
- CORPORATE LIMITS
- DELIMITED URBAN COMPACT AREA BOUNDARY
- PICNIC GROUND
- BATHING BEACH SWIMMING POOL
- CAMP SITE, TRAILER PARK
- TOURIST COURT OR MOTEL
- CAMP OR LODGE
- SP — SMALL STATE PARK
- NFP — NATIONAL FOREST PARK
- CP — COUNTY PARK
- WP — WAYSIDE PARK
- B — BOAT RAMP
- FIRE CONTROL HEADQUARTERS
- LOOKOUT TOWER
- F — FISH HATCHERY (POND)
- GAME CHECKING STATION
- PR — PISTOL RANGE
- GC — GOLF COURSE
- CC — COUNTRY CLUB
- FS — FIRE STATION
- RACE COURSE, SPEEDWAY
- DOG TRACK, RODEO ARENA
- RECREATION AREA, HISTORIC SITE
- DWELLING
- 5 — GROUP OF DWELLINGS
- SEASONAL DWELLING
- 3 — SEASONAL DWELLINGS CLOSELY SPACED
- CHURCH
- CEMETERY
- CHURCH AND CEMETERY
- BUSINESS
- GAUGING OR SMALL PUMPING STATION
- DAIRY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STANDARD SYMBOLS

	Names	Dates
Designed by		
Drawn by	CDP	8/72
Checked by	COR	8/72
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Deputy Design Engineer, Roadways

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STANDARD SYMBOLS FOR PLAN SHEETS

SYMBOLS	
	STATE LINE
	COUNTY LINE
	TOWNSHIP LINE
	SECTION LINE
	CITY LINE
	BASE OR SURVEY LINE
	RIGHT-OF-WAY LINE
	LIMITED ACCESS LINE
	FENCE LINE
	NATIONAL OR STATE PARK OR FOREST
	GRANT LINE
	RAILROAD (DRAINAGE MAPS)
	RAILROAD (DETAIL PLANS)
	FENCE (LIMITED ACCESS)
	BOX CULVERT
	BRIDGE
	SIDE DRAIN PIPE
18"	STORM SEWER
	INLET
	MANHOLE
	TIED LONGITUDINAL JOINT
	KEYED LONGITUDINAL JOINT
	DOWELED TRANSVERSE EXPANSION JOINT
	DOWELED TRANSVERSE CONTRACTION JOINT
	TRANSVERSE CONTRACTION JOINT WITHOUT DOWELS
ALACHUA	TRIANGULATION STATION
BM NO 1:2	BENCH MARK
	POINT OF INTERSECTION
	NORTH POINT
TYPE / WALK	EDGES OF EXISTING PAVEMENT AND SIDEWALK
	BASE LINE
	CENTERLINE
	PROPERTY LINE
	DELTA ANGLE
	APPROXIMATE
	ROUND
	CURB
	CURB AND GUTTER
	WATER WELL, SPRING
	LEVEE
MP 327	RAILROAD MILE POST
	GATE
	PUMP ISLAND
	STORAGE TANK (SURFACE)
	STORAGE TANK (UNDERGROUND)

SYMBOLS	
	MINE OR QUARRY
B P	BORROW PIT
	CHURCH
S	STORE
RES	RESIDENCE
B	BARN
	SCHOOL
	STREAM
	SHORE LINE
	MARSH
	HEDGE
	TREES
	EDGE OF WOODED AREA
	SHRUBBERY
	GROVE OR ORCHARD
L.T. SKEW RT. ℄ RT. SKEW L.T.	DEFINITION OF SKEW
	CONCRETE
	WOOD
e	RATE OF SUPERELEVATION

UTILITY ADJUSTMENT SYMBOLS	EXISTING	PROPOSED
POWER POLE		
OVERHEAD POWER CABLE	OE(7.5KV)	OE(7.5KV)
TELEPHONE POLE		
OVERHEAD TELEPHONE CABLE	OT(100PR)	OT(100PR)
COMBINATION POLE		
GUY WIRE AND ANCHOR PIN		
BURIED POWER CABLE	BE(7.5KV)	BE(7.5KV)
ELECTRIC DUCT	BE4MTD(7.5KV)	BE4MTD(7.5KV)
BURIED TELEPHONE CABLE	BT(200PR)	BT(200PR)
TELEPHONE DUCT	BT6MTD	BT6MTD
TOWER		
LIGHT POLE		
GAS MAIN	6"GM	6"GM
WATER MAIN	6"WM	6"WM
SANITARY SEWER	8"SAN	8"SAN
MANHOLE		
WATER METER		
VALVE		
FIRE HYDRANT		
UNDERGROUND CABLE TELEVISION	UG(CATV)	UG(CATV)
OVERHEAD CABLE TELEVISION	OH(CATV)	OH(CATV)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STANDARD SYMBOLS

	Names	Dates
Designed by		
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STANDARD SYMBOLS FOR PLAN SHEETS

TRAFFIC SIGNALS SYMBOLS

	EXISTING	PROPOSED
TRAFFIC SIGNAL HEAD (SPAN WIRE MOUNTED)		
TRAFFIC SIGNAL HEAD (PEDESTAL MOUNTED)		
TRAFFIC SIGNAL HEAD (MAST ARM MOUNTED)		
TRAFFIC SIGNAL POLE (CONCRETE, WOOD, METAL)		
VEHICLE DETECTOR (LOOP)		
SIGNAL CABLE (ON MESSENGER WIRE)		
CONDUIT		
VEHICLE DETECTOR (OTHERS)		
PEDESTRIAN DETECTOR (PUSHBUTTON)		
PEDESTRIAN SIGNAL HEAD (POLE OR PEDESTAL MOUNTED)		
CONTROLLER CABINET (BASE MOUNTED)		
CONTROLLER CABINET (POLE MOUNTED)		
WALK - DON'T WALK	W-DW	
FLASH	FL.	
SIGNAL FACE NUMBER	5	
ITEM NUMBER	630-113	
SIGNAL LENS		
PROGRAMED SIGNAL HEAD	P	
MESSENGER WIRE		
POLE TABULATION CROSS REFERENCE	3	
POLE TABULATION CROSS REFERENCE (JOINT USE POLE)	* 3	
SIGNAL PHASE	∅	

LIGHTING SYMBOLS

- NEW POLE & LUMINAIRE
- EXISTING POLE & LUMINAIRE
- EXISTING POLE & LUMINAIRE TO BE REMOVED
- FINAL POSITION OF RELOCATED OR ADJUSTED POLE & LUMINAIRE
- NEW HIGH MAST LIGHTING TOWER
- CITY OR UTILITY OWNED LUMINAIRE & POLE
- PVC (POLYVINYL CHLORIDE) LIGHTING CONDUIT AND CONDUCTORS
- RIGID GALVANIZED LIGHTING CONDUIT AND CONDUCTORS
- CONCRETE LIGHTING PULL-BOX
- WATERPROOF LIGHTING PULL-BOX
- LIGHTING DISTRIBUTION POINT
- NEW JOINT USE POLE
- EXISTING USE POLE
- UNDER DECK LIGHTING FIXTURE

SIGNING AND PAVEMENT MARKING SYMBOLS

- PAVEMENT ARROW
- SINGLE SOLID LINE
- DOUBLE SOLID LINE
- SKIP LINE
- STOP BAR
- TRAFFIC SIGN (POST MOUNTED)
- TRAFFIC SIGN (OVERHEAD)
- SIGN NUMBER (13)
- SIGN ITEM NUMBER 700-83
- TRAFFIC FLOW ARROW

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STANDARD SYMBOLS

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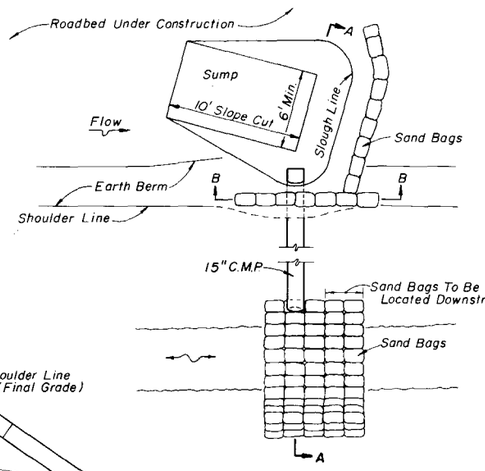
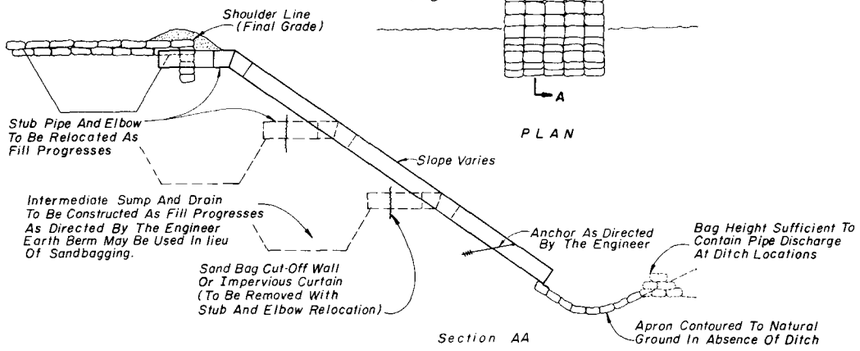
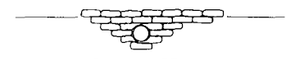


PLAN

Note:
Slope drain pipe to be paid for as Slope Drains (Temporary) LF, based on linear feet of pipe installed. Payment to be made for one installation per site, including one stub and elbow. Sump construction and maintenance and curtains to be included in cost for Slope Drains (Temporary). Sand bags to be paid for as Sandbagging CY.

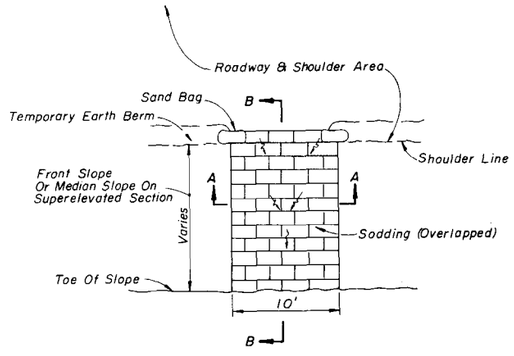


Section AA

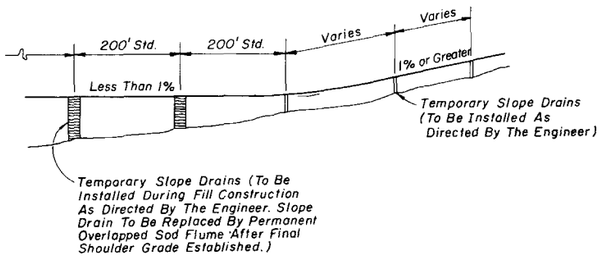


Section BB

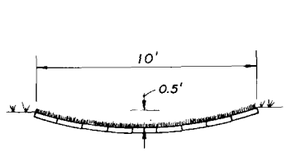
TEMPORARY SLOPE DRAIN



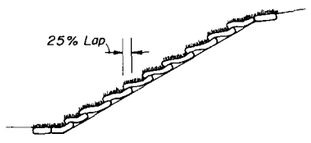
PLAN



SLOPE DRAIN APPLICATION



Section AA



Section BB

SOD FLUME - SODDING (OVERLAPPED)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TEMPORARY SLOPE DRAIN AND SOD FLUME

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved:

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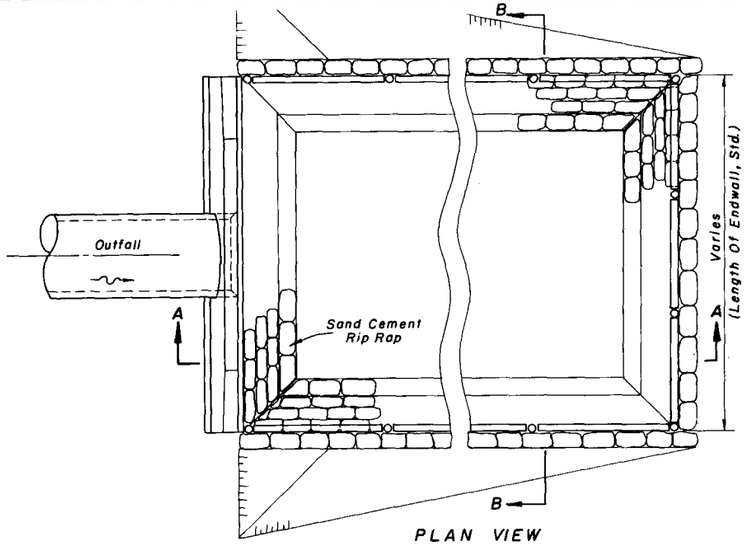
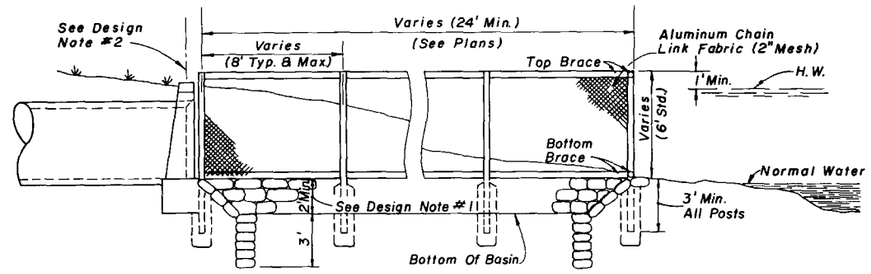
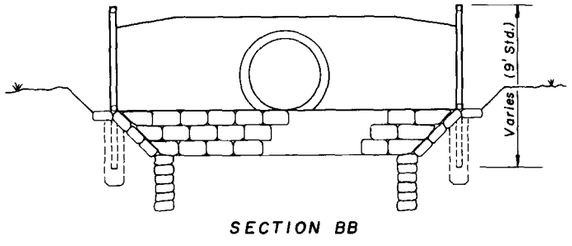


PLAN VIEW



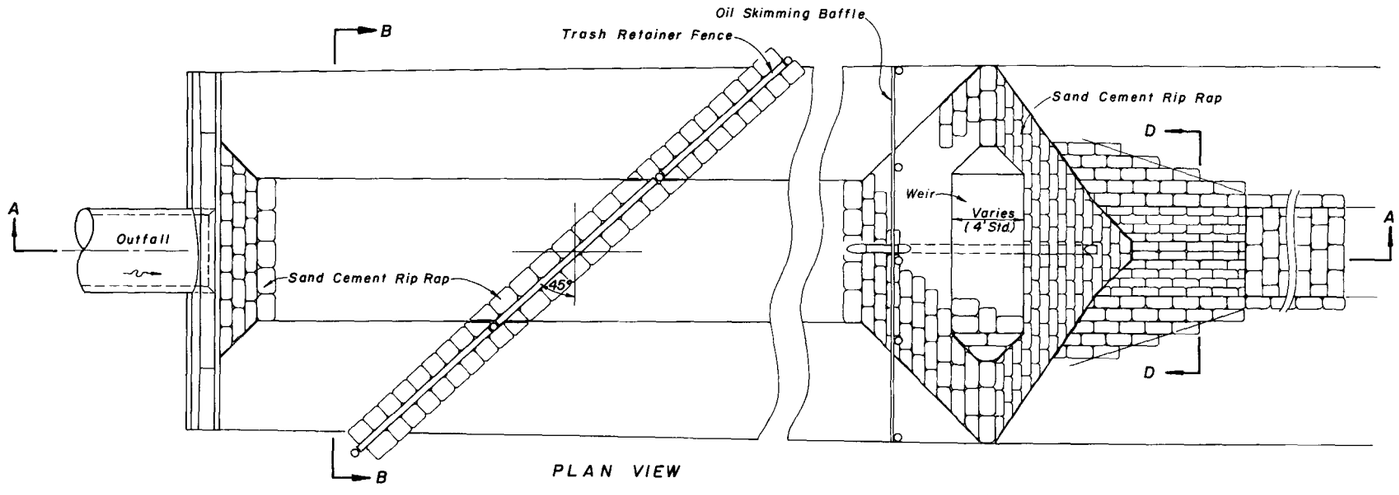
SECTION AA



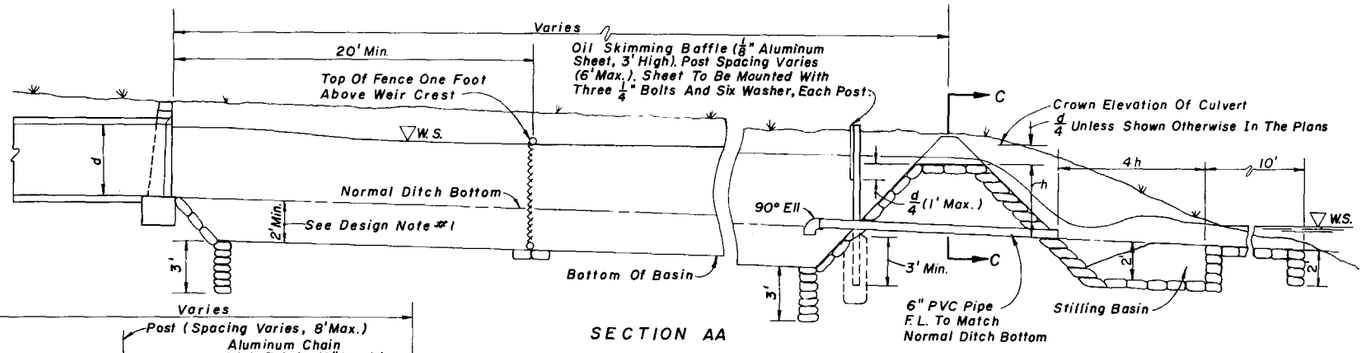
SECTION BB

TYPE A

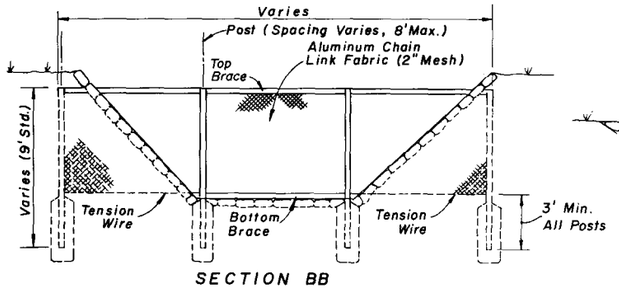
INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS ADJACENT TO A SHORE LINE



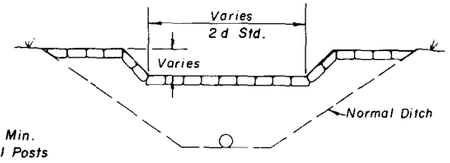
PLAN VIEW



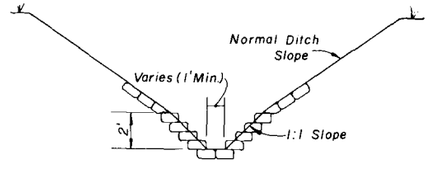
SECTION AA



SECTION BB



SECTION CC



SECTION DD

TYPE B

INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS IN AN OPEN DITCH

GENERAL DESIGN NOTES

1. Basins should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of endwall is below high water, fence will be required along the top of the endwall.
3. In Type B, the weir shall be located as far from the endwall as practical. On steep ditch grades two or more weirs may be required. Intermediate weirs shall be constructed without stilling basins.
4. In Type B, the 6" PVC pipe shall be constructed unless shown otherwise in the plans.

GENERAL CONSTRUCTION NOTES

1. Fence materials shall be aluminum or concrete only.
2. Aluminum posts shall be 3" diameter minimum. Aluminum rail braces shall be in accordance with Index 452. Concrete posts and rail braces shall be in accordance with 451. All posts to be set in concrete.
3. Fabric shall be installed to inside of posts and rail braces, and tied to posts and braces at 6" centers.
4. For additional details on fencing, see Index Nos. 451 and 452.
5. All basin slopes to be 1:1 unless detailed otherwise in the plans.
6. Sediment basins to be constructed prior to commencement of upland construction. Maintenance and clean out to be by the Contractor until acceptance of project by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TRASH RETAINER AND SEDIMENT BASIN

	Name	Date
Designed by	WJR	5/74
Drawn by		
Checked by	HLB	6/74
F. H. W. A. Approved:		

Approved By
Deputy Design Engineer, Roadways

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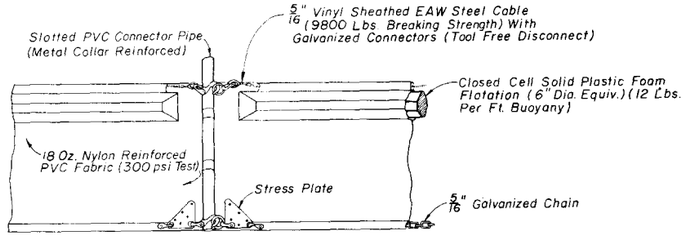
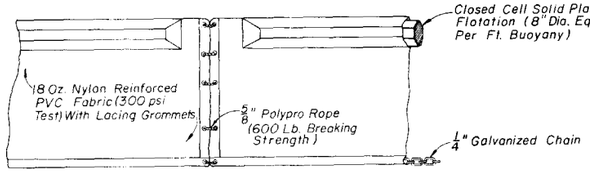
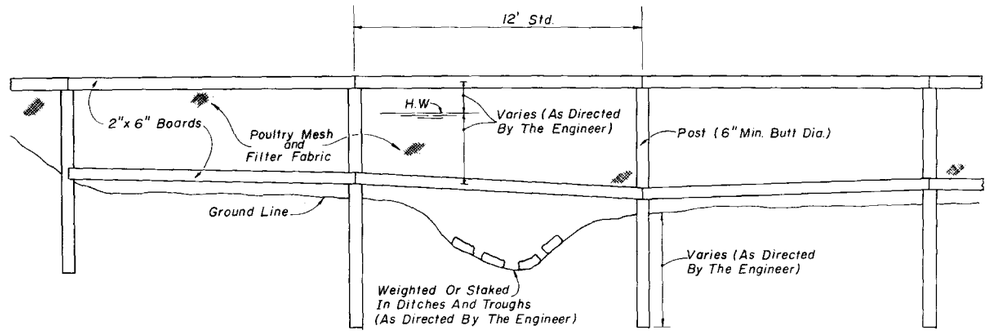


TYPE I

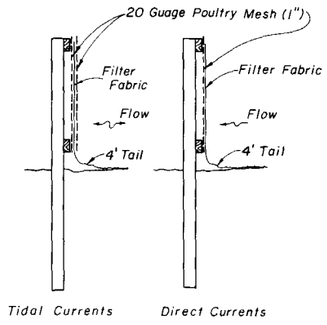


TYPE II

FLOATING SILT BARRIERS

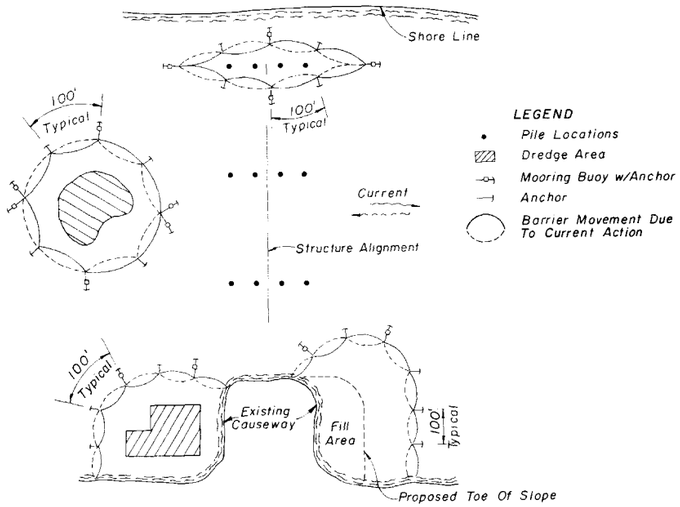


ELEVATION



SECTIONS

STAKED SILT BARRIER



NOTES:

1. Number and spacing of anchors dependent on current velocities.
2. Deployment of barrier around pile locations may vary to accomodate construction operations.
3. Navigation may require segmenting barrier during construction operations.
4. The above applications indicate Type I Floating Silt Barrier since anchors are shown, however, if conditions warrent, Type II Floating Silt Barrier may be used. For additional information see Standard Specifications.

FLOATING SILT BARRIER APPLICATIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FLOATING AND STAKED SILT BARRIERS

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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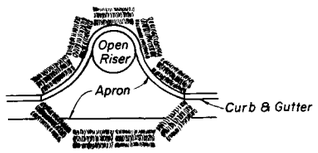
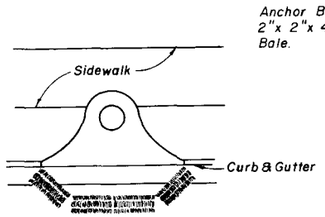
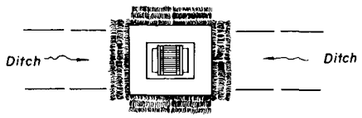


PARTIAL INLET

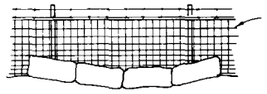


COMPLETED INLET

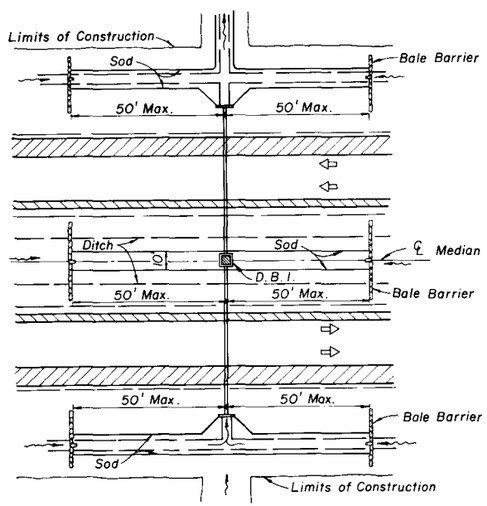


DITCH BOTTOM INLET

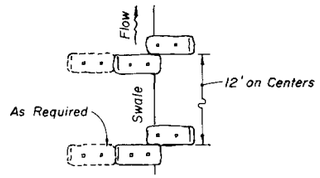
PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



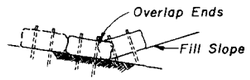
BALES BACKED BY FENCE



DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

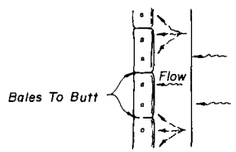


PLAN



ELEVATION

TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF FILL

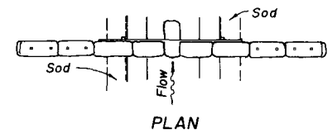


PLAN

ELEVATION

TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES AWAY FROM THE TOE OF THE FILL

BARRIERS FOR FILL SLOPES



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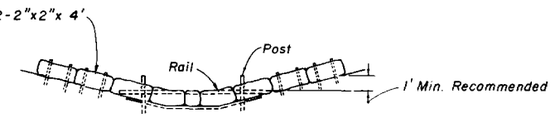
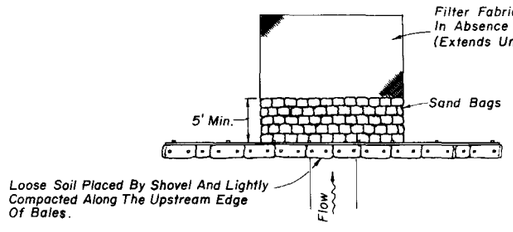


ELEVATION

BARRIER FOR PAVED DITCH



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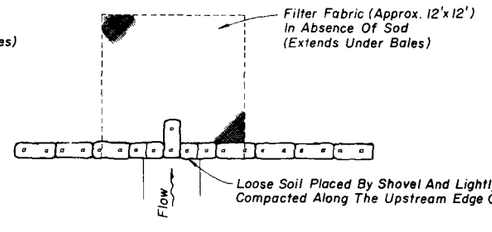

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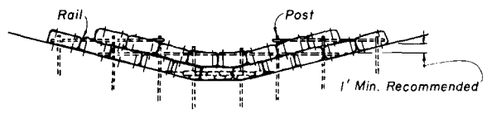
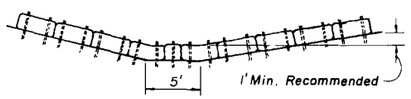


Anchor Lower Bales With 2-2"x 2"x 4' Stakes Per Bale.
Anchor Top Bales To Lower Bales With 2-2"x 2"x 4' Stakes Per Bale.

ELEVATION



Anchor Bales With 2-2"x 2"x 4' Stakes Per Bale

ELEVATION

BARRIERS FOR UNPAVED DITCHES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

BALED HAY OR STRAW BARRIERS

	Names	Dates
Designed by	WJR	5/74
Drawn by		
Checked by	HLB	6/74
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

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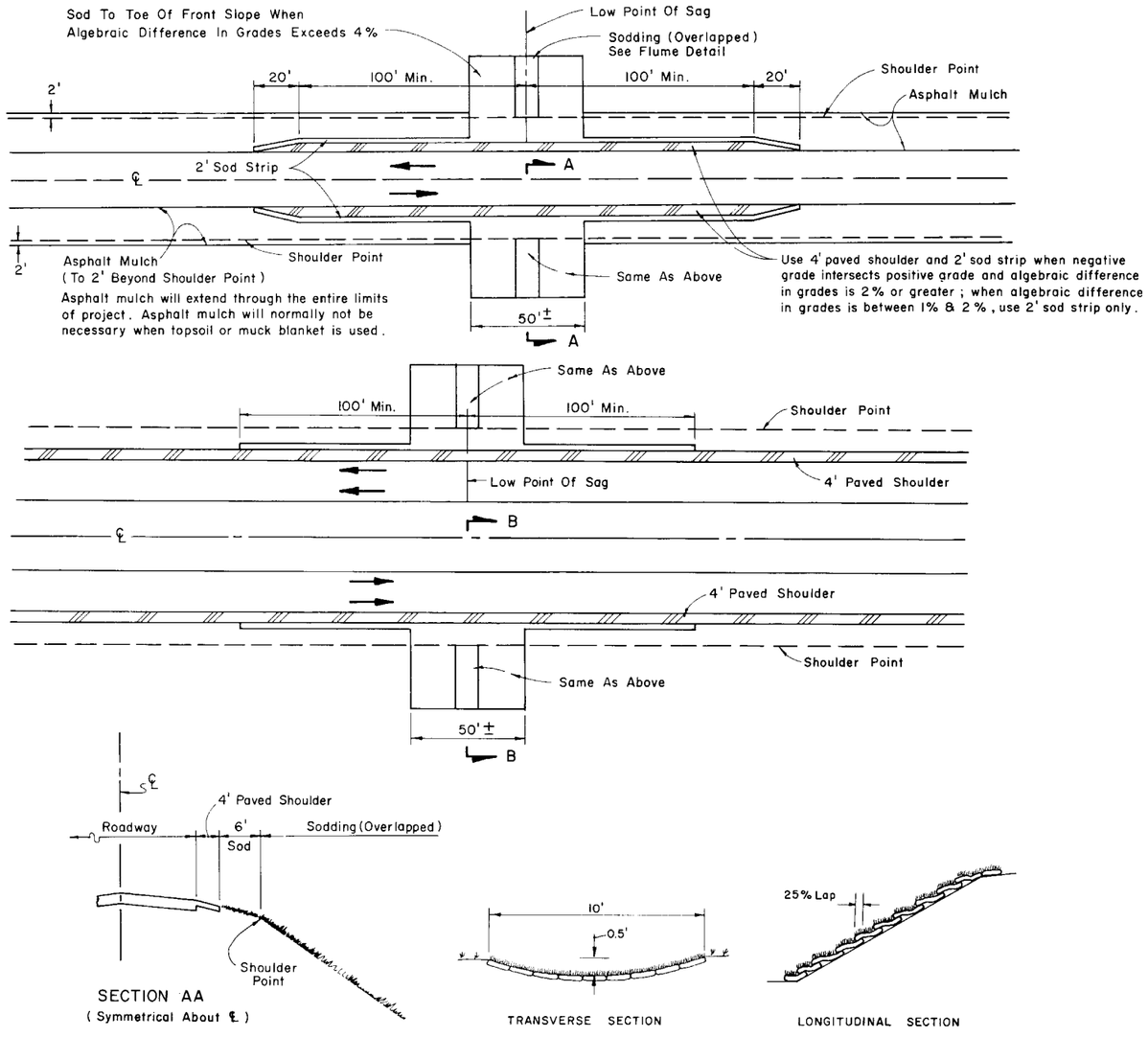
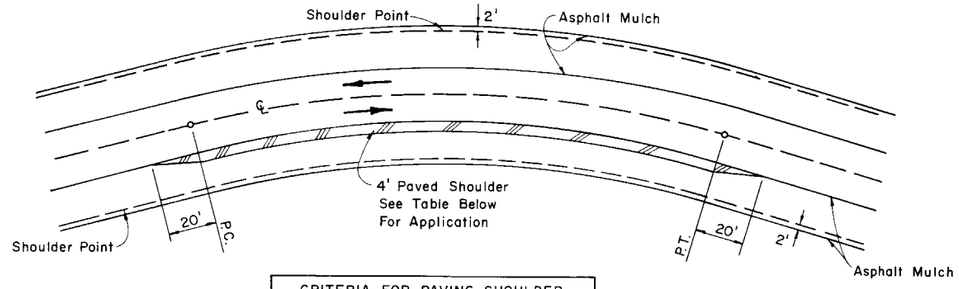
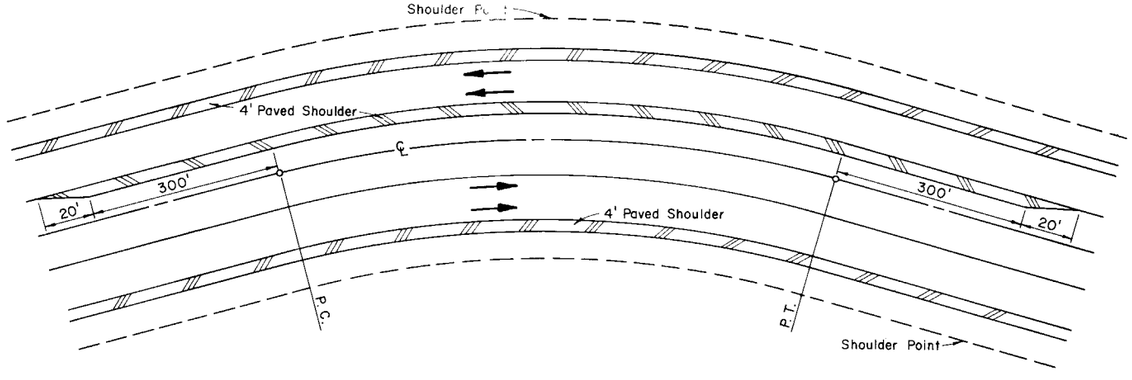


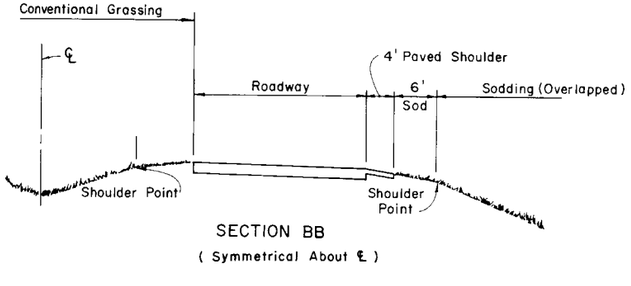
OVERLAPPED SOD FLUME



CRITERIA FOR PAVING SHOULDER	
Design Speed	Degree Of Curve
30	7° or greater
40	5° or greater
50	4° or greater
60	3° or greater
65	3° or greater
70	2° or greater



SHOULDER AND SLOPE TREATMENT FOR SUPERELEVATED ROADWAYS



SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES

GENERAL NOTES

1. For sodding adjacent to ditches and at headwalls, see Index No. 281.
2. All front slopes steeper than 4:1 are to be sodded.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

EROSION CONTROL DETAILS FOR PERMANENT CONSTRUCTION

	Names	Dates
Designed by	H.L.G.	4/75
Drawn by		
Checked by	D.C.B.	4/75
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

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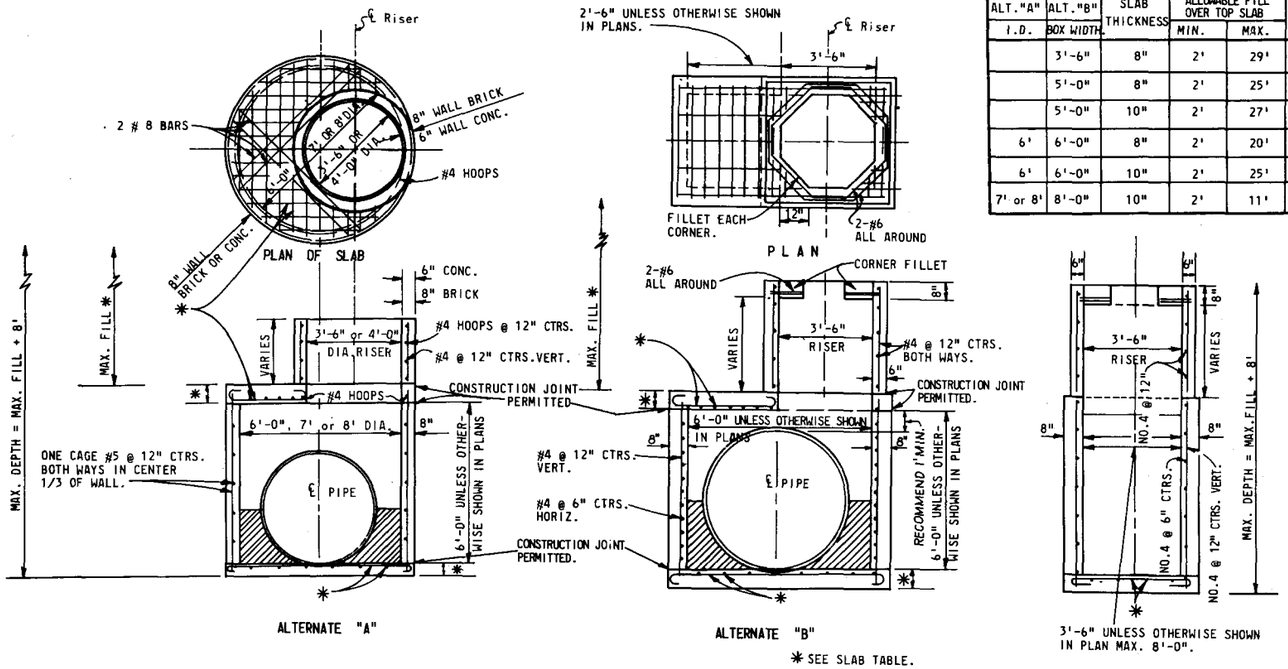
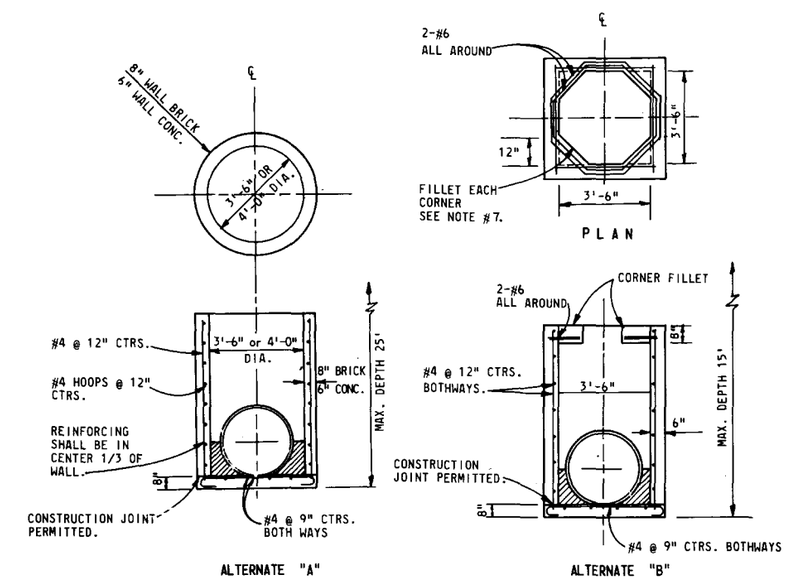
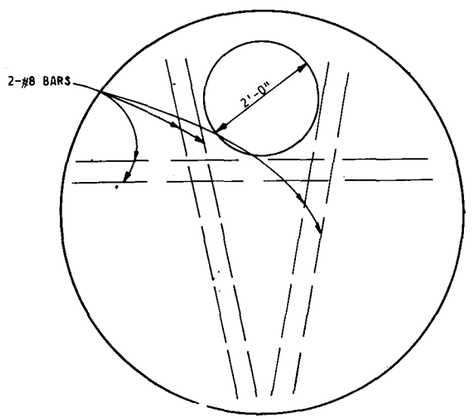


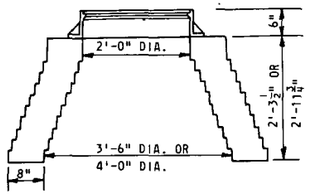
INLET, MANHOLE, JUNCTION BOX TYPE J

TOP AND FLOOR SLAB TABLE TYPE "J"					
ALT."A" I.D.	ALT."B" BOX WIDTH	SLAB THICKNESS	ALLOWABLE FILL OVER TOP SLAB MIN.	ALLOWABLE FILL OVER TOP SLAB MAX.	REINFORCING TOP & FLOOR SLABS
	3'-6"	8"	2'	29'	#6 @ 6" CTRS. B.W.
	5'-0"	8"	2'	25'	#6 @ 6" CTRS. B.W.
	5'-0"	10"	2'	27'	#7 @ 6" CTRS. B.W.
6'	6'-0"	8"	2'	20'	#6 @ 6" CTRS. B.W.
6'	6'-0"	10"	2'	25'	#7 @ 6" CTRS. B.W.
7' or 8'	8'-0"	10"	2'	11'	#7 @ 6" CTRS. B.W.



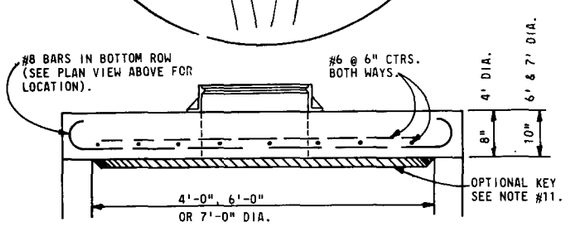
INLET, MANHOLE, JUNCTION BOX TYPE P





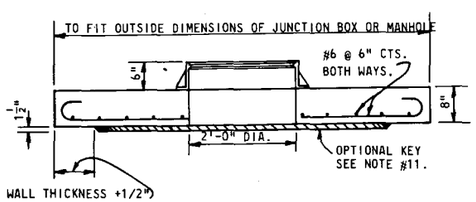
MANHOLE TOP TYPE 8

NOTE: DETAIL SHOWN IS FOR BRICK CONSTRUCTION.



JUNCTION BOX OR MANHOLE TOP TYPE 7-T

FOR USE WHEN TOP SLAB IS SUBJECTED TO WHEEL LOADS (H-20) (TRAFFIC)



JUNCTION BOX OR MANHOLE TOP TYPE 7-NT

FOR USE WHEN TOP SLAB IS NOT SUBJECTED TO WHEEL LOADS (NON-TRAFFIC)

GENERAL NOTES

1. WALLS OF CIRCULAR STRUCTURES (ALTERNATE "A") MAY BE CONSTRUCTED OF CONCRETE OR BRICK, BUT RECTANGULAR STRUCTURES (ALTERNATE "B") SHALL BE CONSTRUCTED OF CONCRETE ONLY. THE CONCRETE MAY BE CAST-IN-PLACE OR PRECAST.
2. WALL REINFORCEMENT AND THICKNESS ARE FOR EITHER CAST-IN-PLACE OR PRECAST CONCRETE UNITS EXCEPT THAT THE MANUFACTURER MAY FURNISH PRECAST CIRCULAR UNITS IN ACCORDANCE WITH A.S.T.M. SPECIFICATION C-478 UP TO 96" IN DIA. OR PRECAST CIRCULAR UNITS A.S.T.M. SPECIFICATION C-76, TABLE III, FOR "B" WALL CONCRETE PIPE. TOP AND FLOOR SLAB THICKNESS AND REINFORCEMENT ARE FOR ALL TYPES OF CONSTRUCTION.
3. ELLIPTICAL STEEL, ASTM SPECIFICATION C-76, TABLE III, "B" WALL, IS MODIFIED TO USE A CIRCULAR CAGE OF STEEL AREA EQUAL TO THAT OF THE ELLIPTICAL CAGE AND PLACED IN THE CENTER ONE-THIRD OF THE WALL. THIS MODIFICATION IS FOR PRECAST CIRCULAR UNITS PRODUCED IN ACCORDANCE WITH ASTM C-76.
4. TOP AND FLOOR SLABS FOR TYPE J UNITS AND TYPE 7 MANHOLE TOPS SHALL BE OF CLASS II CONCRETE. CONCRETE AS SPECIFIED IN ASTM C-478 MAY BE USED FOR PRECAST UNITS.
5. ANY INLET, MANHOLE OR JUNCTION BOX MAY BE USED IN CONJUNCTION WITH ANY INLET THROAT OR MANHOLE TOP. FOR EXAMPLE, AN INLET WITH A TYPE J BOX AND A TYPE 2 THROAT WOULD BE CALLED AN INLET TYPE J-2 IN THE PLANS. THE CONTRACTOR MAY AT HIS OPTION USE EITHER ALTERNATE A OR B STRUCTURES, UNLESS OTHERWISE SHOWN IN THE PLANS.
6. RECTANGULAR STRUCTURES MAY BE ROTATED AS DIRECTED BY THE ENGINEER IN ORDER TO FACILITATE CONNECTIONS BETWEEN THE STRUCTURE WALLS AND STORM SEWER PIPES.
7. THE CORNER FILLETS SHOWN FOR RECTANGULAR STRUCTURES ARE NECESSARY ONLY WHEN STRUCTURES ARE USED IN CONJUNCTION WITH CIRCULAR INLET THROATS (TYPES 1, 2, 3 & 4) OR WHEN USED ON SKEW WITH RECTANGULAR INLET THROATS (TYPES 5 & 6).
8. INLET THROATS, RISERS OR MANHOLE TOPS SHALL BE SECURED TO STRUCTURES WITH A MINIMUM OF 6 - NO. 4 BARS 12" LONG OR AS SHOWN ON INDEX NO 201
9. STRUCTURES WITH DEPTHS OVER 14' ARE TO BE CHECKED FOR FLOTATION BY DESIGNER OF PROJECT DRAINAGE.
10. ALL STEEL BARS SHALL HAVE 1½" MINIMUM COVER UNLESS OTHERWISE SHOWN AND SHALL BE HOOKED WHERE INDICATED. HORIZONTAL STEEL IN RECTANGULAR STRUCTURES SHALL BE LAPPED A MINIMUM OF 24 BAR DIAMETERS AT CORNERS. ON PRECAST UNITS, FLOOR SLABS MAY BE SECURED TO STRUCTURE WALLS BY NO. 4 DOWEL BARS (A MINIMUM OF 6 DOWELS) PUSHED INTO THE WET CONCRETE AFTER THE FLOOR SLAB IS PLACED.
11. TYPE 7 TOP SLABS MAY BE OF CAST-IN-PLACE OR PRECAST CONSTRUCTION. THE OPTIONAL KEY IS FOR PRECAST TOPS AND IS IN LIEU OF DOWELS. FRAME AND SLAB OPENINGS ARE TO BE OMITTED WHEN TOP IS USED OVER A JUNCTION BOX. FRAME CAN BE ADJUSTED WITH FROM ONE TO SIX COURSES OF BRICK.
12. MANHOLE TOP TYPE 8 MAY BE OF CAST-IN-PLACE OR PRECAST CONCRETE CONSTRUCTION OR BRICK CONSTRUCTION. FOR CONCRETE CONSTRUCTION, THE CONCRETE AND STEEL REINFORCEMENT SHALL BE THE SAME AS THE SUPPORTING WALL UNIT. AN ECCENTRIC CONE MAY BE USED.
13. LARGER THAN SPECIFIED STANDARD UNITS MAY BE SUBSTITUTED AT THE CONTRACTOR'S OPTION WHEN THESE UNITS WILL NOT CAUSE OR INCREASE THE SEVERITY OF UTILITY CONFLICTS. SUCH LARGER UNITS SHALL BE FURNISHED AT NO ADDITIONAL COST TO THE DEPARTMENT. LARGER ALTERNATE "A" UNITS CANNOT REPLACE ALTERNATE "B" UNITS WITHOUT APPROVAL OF THE ENGINEER. THIS NOTE APPLIES TO THIS INDEX ONLY.
14. FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 201

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRUCTURE BOTTOMS TYPES J AND P

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 5/1/75

Revision No.	Sheet No.	Index No.
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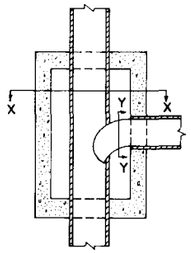
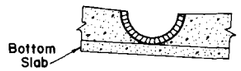


PLAN ON PIPE ℄



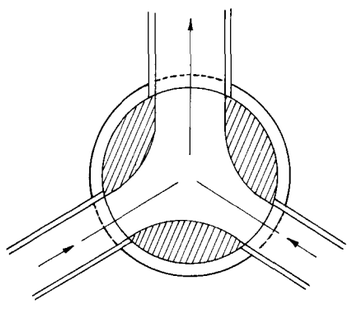
SECTION X-X

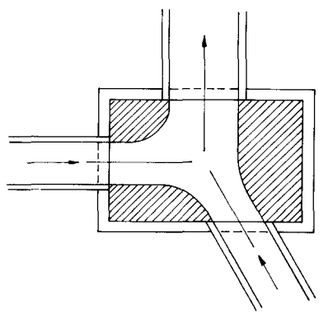
Channel to be formed with either half-pipe and mortar or brick and mortar.

SECTION Y-Y

DETAIL OF BOTTOM CONSTRUCTION WHEN INLET SERVES AS MANHOLE

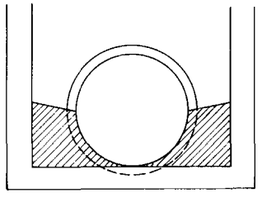
GENERAL NOTE:
Mortar used to seal the pipe into the walls of precast units will be of such a mix that shrinkage will not cause leakage into or out of the units. Maximum opening for pipe shall be the O.D. of the pipe required plus 6".



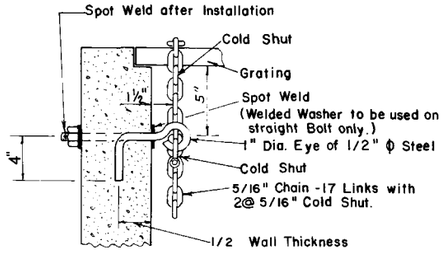


DETAIL OF CHANNELIZATION

Note: Channelization required at all drainage structures with two or more pipes.

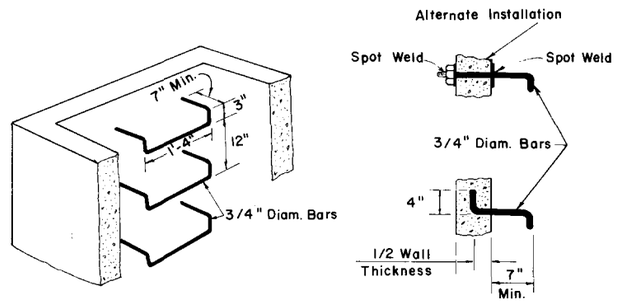


Smooth flow channels composed of concrete, or brick and mortar shall be constructed in the bottoms of all structures to a depth equal to half the diameter of the largest pipe.



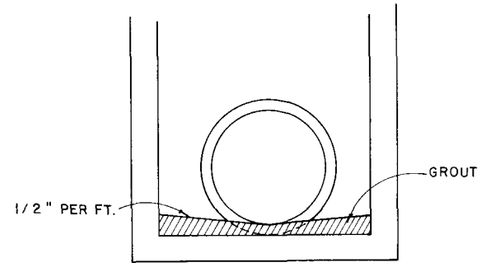
DETAIL OF EYE BOLT AND CHAIN FOR LOCKING GRATES TO INLETS

Note: One required per inlet grate.



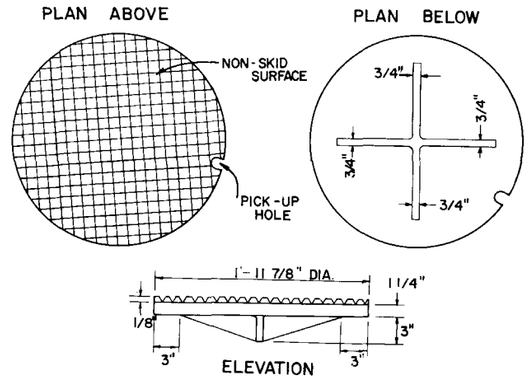
DETAIL OF LADDER BARS

Use for box heights over 10'-0"

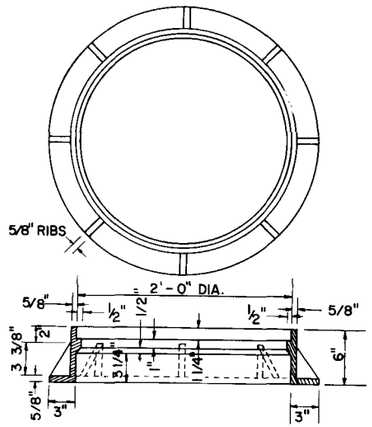


ALTERNATE LOCATION OF PIPE IN STRUCTURE WHEN PREFABRICATED FLOOR SLAB IS USED

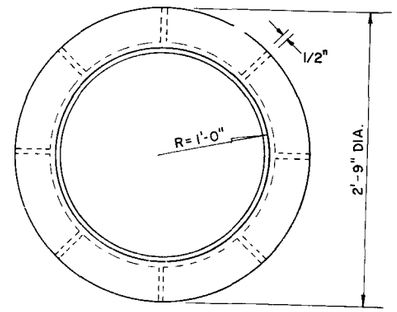
COMPLETE FLOW CHANNEL IS REQUIRED WHEN THERE IS FLOW THROUGH THE STRUCTURE

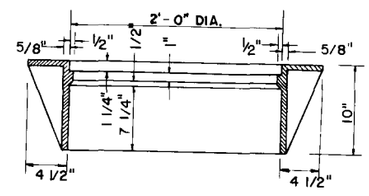


COVER FOR ALL FRAMES
(WHEEL LOADS H-20)



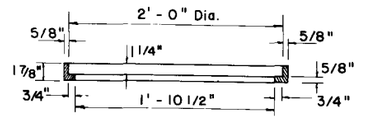
TYPE I FRAME FOR MANHOLES
AS SHOWN ON INDEX 200





TYPE II FRAME
For Type 1,2,3 & 4 Inlets

CAST IRON



TYPE III FRAME
For Type 7 & 8 Inlets

FRAME AND COVER DETAILS

Note: Tack Weld all Covers to Frames (3 places) as directed by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS

	Names	Dates
Designed by	HLB	4/75
Drawn by		
Checked by	LMF	4/75
F.H.W.A. Approved		11/16/78

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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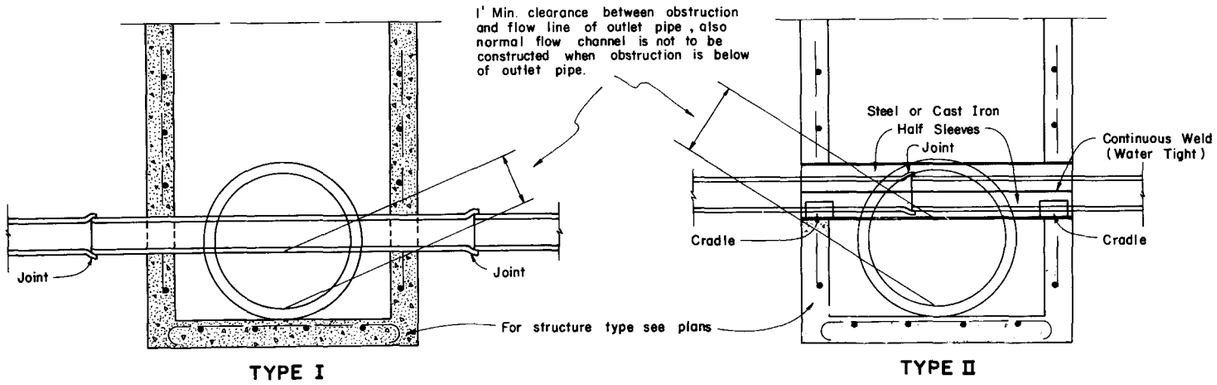


TYPE I

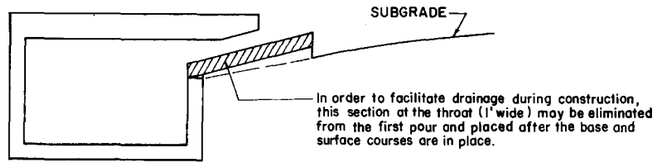
TYPE II

NOTE:
1. No joints allowed in Type I structure opening.
2. Only cast iron or steel water mains will be allowed to pass directly through structure.
3. Only cast iron sanitary sewer will be allowed to pass directly through structure.

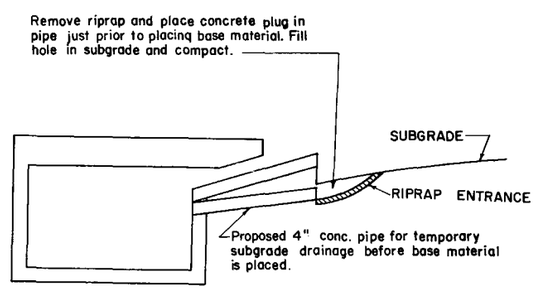
NOTE:
1. Only water mains will be allowed to pass through a Type II structure.

DESIGNERS NOTE: "Sumped" conflict manholes shall not be used unless the system is hydraulically designed to take in account the headloss generated if the sump is completely blocked. "Sumped" conflict manholes must be larger than those normally provided.

DETAIL SHOWING PIPE CONSTRUCTION THRU STORM SEWER STRUCTURES



ALTERNATE A

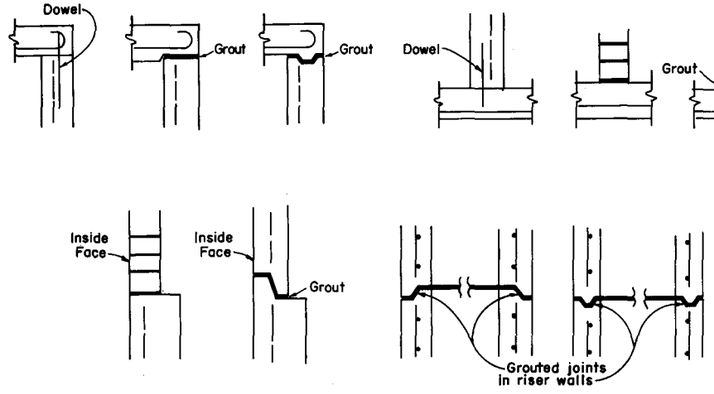


ALTERNATE B

(Cost to be included in the unit price bid for inlets.)

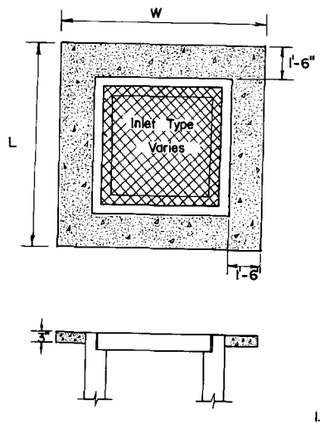
DETAIL OF TEMPORARY SUBGRADE DRAINS

(Optional with Contractor)



1. Any type joint may be used in conjunction with any other type joint. Brick wall and joint construction is permitted on circular units only.
2. All grouted joints are to have a maximum thickness of 1".
3. Keyways are to be a minimum of 1 1/2" deep.
4. Joint dowels are to be #4 bars, 12" long with a minimum of 6 bars per joint evenly spaced.
5. Minimum cover on reinforcing bars is 1 1/4".

OPTIONAL CONSTRUCTION JOINTS



Inlet	"L"	"W"	C.Y.*
C	7'-5"	6'-4"	0.30
D	8'-5"	7'-5"	0.36
E	8'-10"	7'-4"	0.37
F	8'-4"	6'-11"	0.34
G	9'-4"	9'-2"	0.43
H	12'-0"	7'-4"	0.45

* for estimating purposes only

1. Cost of ditch pavement pad to be included in cost of inlet.
2. Ditch pavement pad to be used only where shown on the plans.

DITCH PAVEMENT PAD FOR STANDARD DITCH BOTTOM INLETS

NOTE:
For all manhole, inlet and junction box structures the mortar used to seal the pipe into the walls of the precast units will be of such a mix that shrinkage will not cause leakage into or out of the units. Maximum opening for pipe shall be max. req'd O D + 6".

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS

	Names	Dates
Designed by	HLB	4/75
Drawn by		
Checked by	LMF	4/75

F.H.W.A. Approved: 11/16/78

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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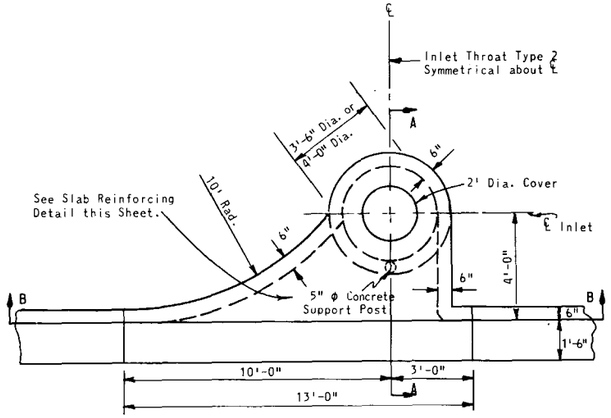
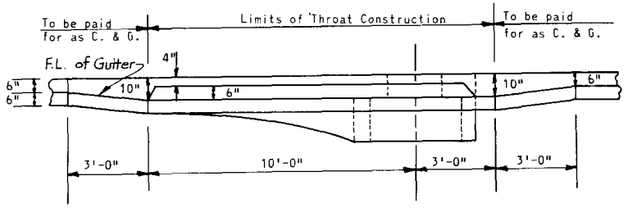
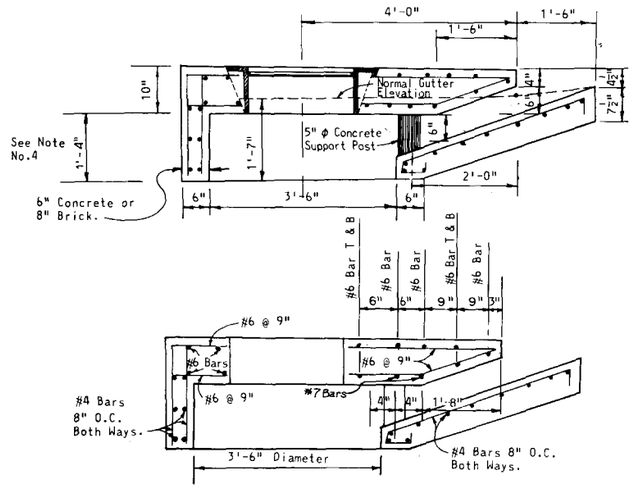


INLET THROAT TYPE 1

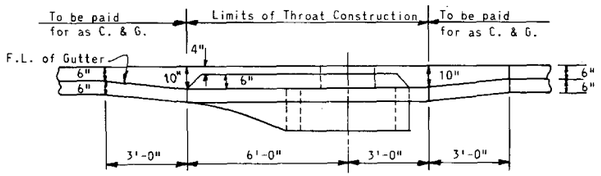
Inlet Throat Type 2
Symmetrical about ℄



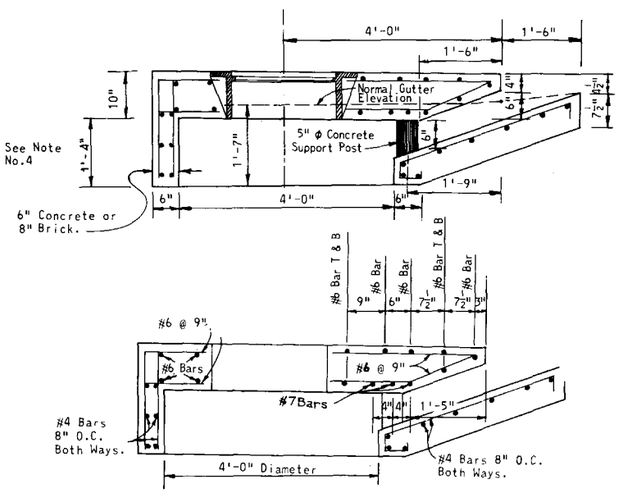
SECTION B-B



3'-6" DIAMETER



SECTION B-B

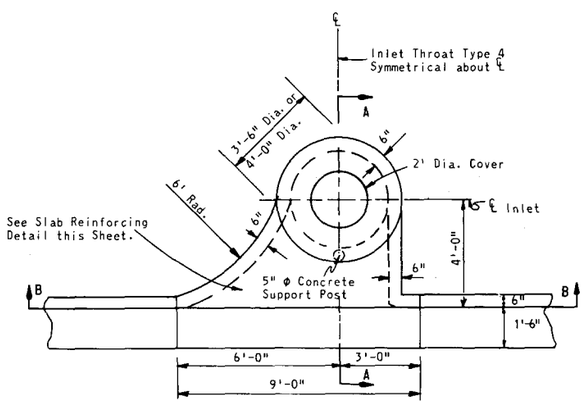


4'-0" DIAMETER

SECTION A-A FOR INLETS TYPE 1, 2, 3 & 4

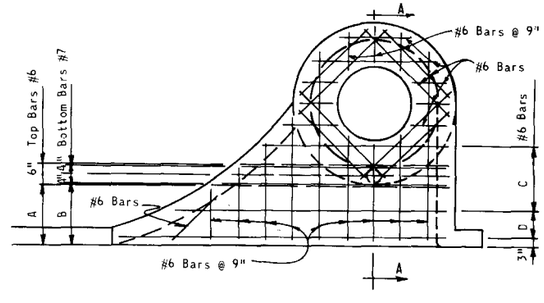
INLET THROAT TYPE 3

Inlet Throat Type 4
Symmetrical about ℄



GENERAL NOTES

1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or parkway.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All steel in throats shall have 1½" minimum cover unless otherwise shown. Inlet throats shall be either cast-in-place or precast concrete.
4. The rear wall portion of throat Types 1, 2, 3 & 4 may be constructed with brick. Dowels to top slab required.
5. Only round concrete support post will be acceptable.
6. For supplemental details see index no. 201.
7. These inlet throats were designed for use with std. curb & gutter and Type E curb. Locate outside of pedestrian cross traffic if possible.
8. For inlet bottoms see index no. 200.



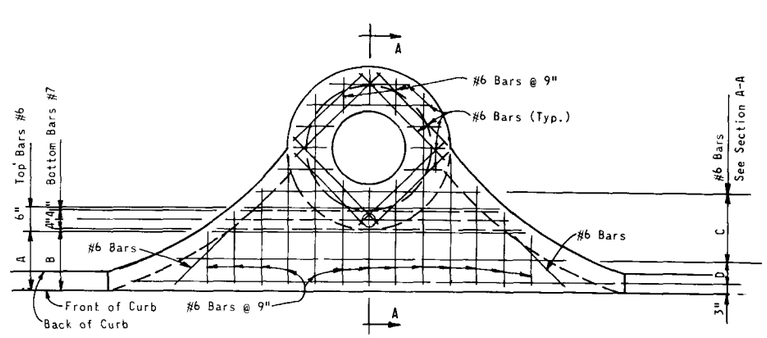
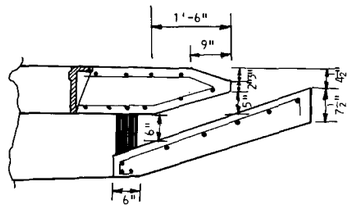


TABLE OF VARIABLE DIMENSIONS		
DIMENSION	3'-6"	4'-0"
A	1'-9"	1'-6"
B	1'-8"	1'-5"
C	1'-9"	1'-10½"
D	9"	7½"

SLAB REINFORCING DETAILS
INLETS 1, 2, 3 & 4



INLET TOP MODIFICATION
FOR TYPE "E" CURB

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB INLET TOPS TYPES 1,2,3,&4

	Names	Dates
Designed by		
Drawn by		
Checked by		

F.H.W.A. Approved: 5/1/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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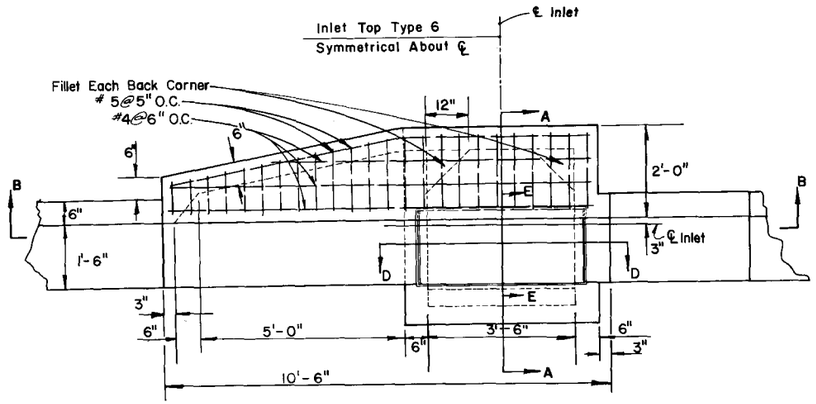
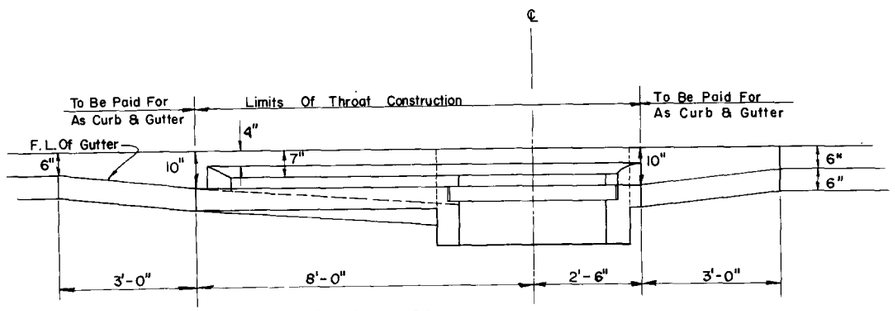


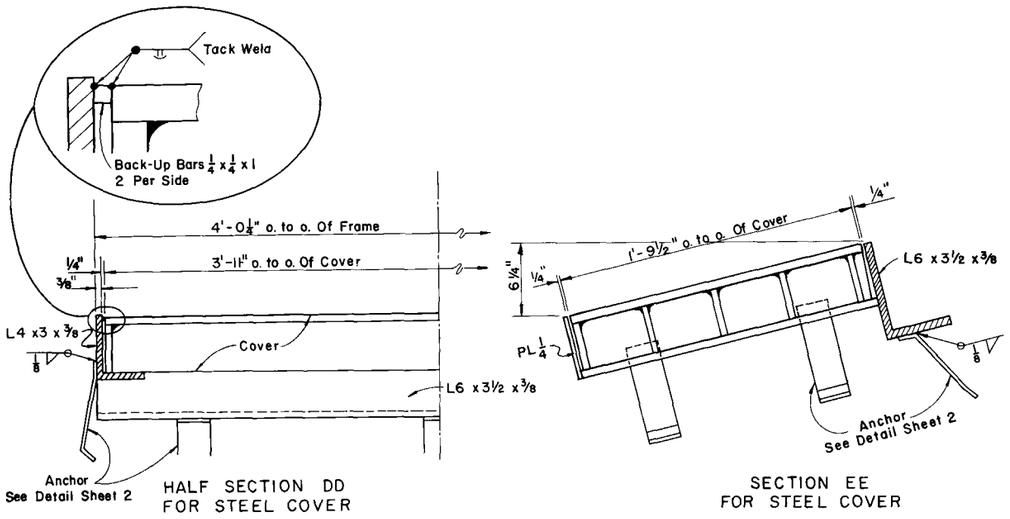
TOP VIEW

CURB INLET TOP TYPE 5

(Curb Inlet Top Type 6 Symmetrical With Left Half)

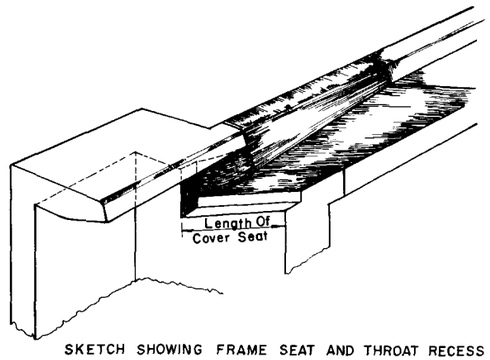


SECTION BB

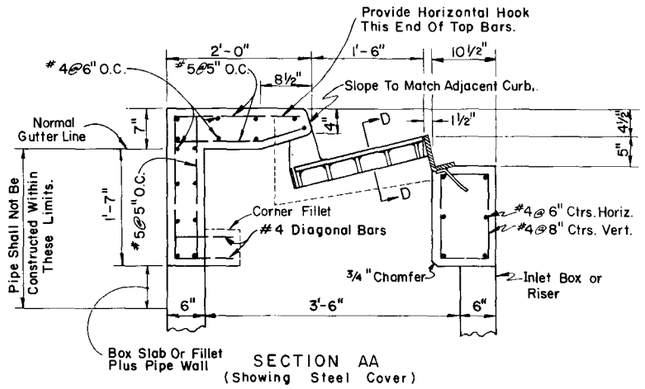


HALF SECTION DD
FOR STEEL COVER

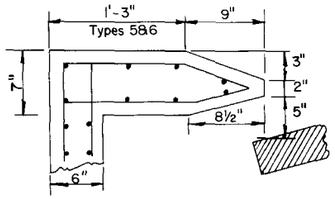
SECTION EE
FOR STEEL COVER



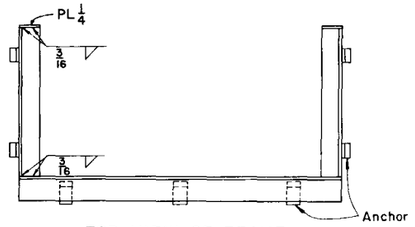
SKETCH SHOWING FRAME SEAT AND THROAT RECESS
(All Covers Are Removable)



SECTION AA
(Showing Steel Cover)



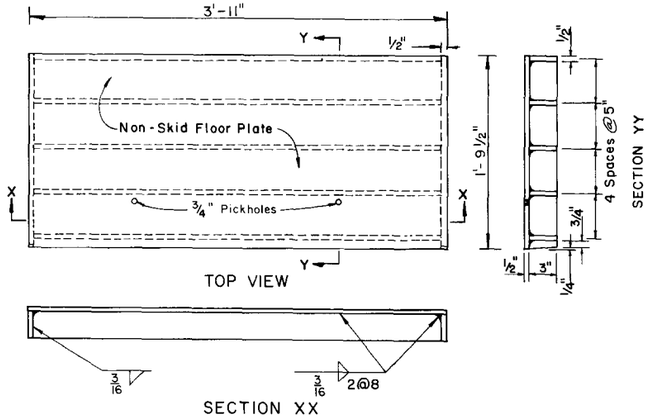
INLET TOP MODIFICATION
FOR TYPE E CURB



TOP VIEW OF FRAME
FOR STEEL COVER

GENERAL NOTES:

1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and / or parkway.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All reinforcing steel shall have 1 1/4" minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.
4. The corner fillets shown for rectangular throats are necessary only when throats are to be used in conjunction with circular inlet bottoms or when used on skew with rectangular inlet boxes.
5. For inlet bottoms see Index No. 200.
6. These inlet tops are designed for use with standard curb and gutter Type E and Type F. Locate outside of pedestrian cross traffic if possible.
7. See Index 201 for supplemental details.
8. Tack weld cover to frame with back-up bars or clips.
9. All steel used for frame and cover shall meet the requirements of ASTM A-36.
10. Either cast iron covers or steel covers may be used.
11. When Alternate "G" Cover is specified in plans either the cast iron cover and galvanized steel frame or the galvanized steel cover and frame must be used. Covers are to be grouted in accordance with the grouting detail shown on sheet 2 of 2 , in lieu of tack welding.



TOP VIEW

SECTION XX

STEEL COVER

(See Sheet 2 of 2 For Cast Iron Cover And Frame)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB INLET TOPS TYPES 5&6

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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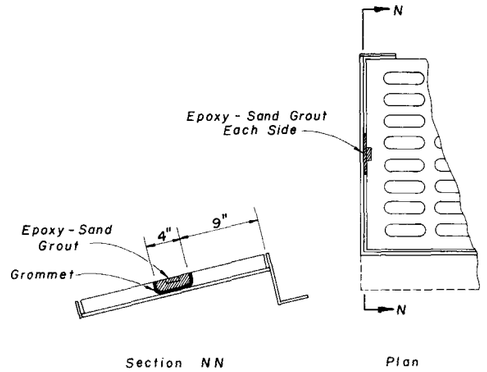
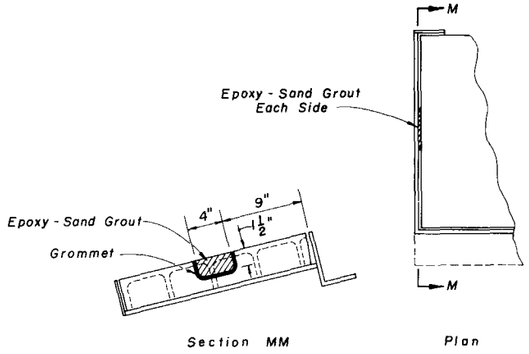
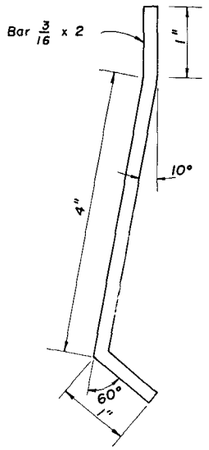




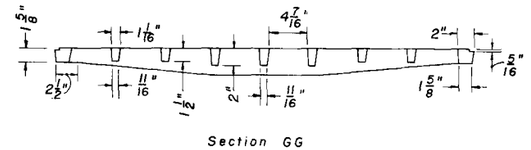
CAST IRON COVER AND GALVANIZED STEEL FRAME

GALVANIZED STEEL COVER AND FRAME

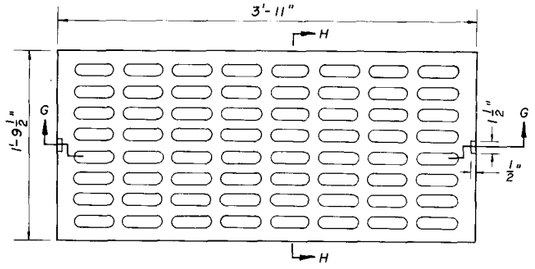
ALTERNATE G DETAIL



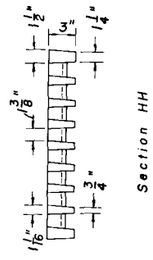
ANCHOR DETAIL



Section GG

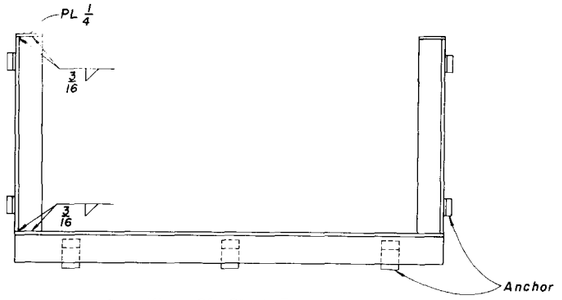


Top View

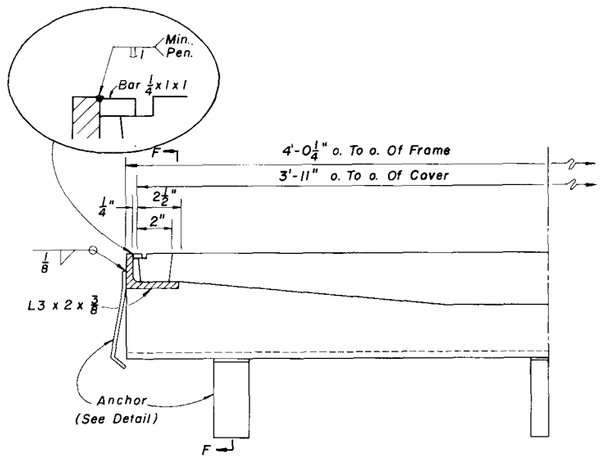


Section HH

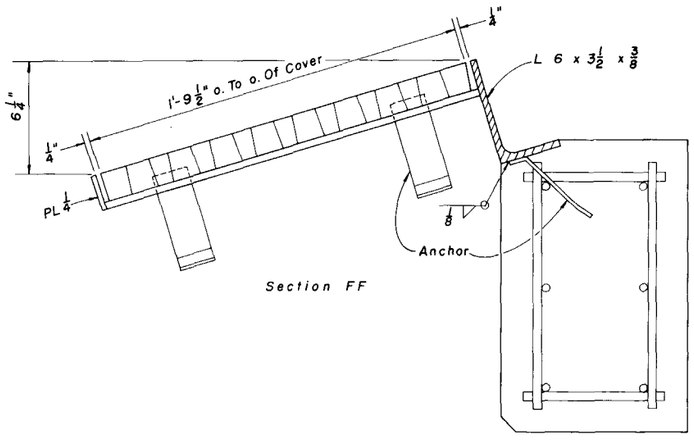
CAST IRON COVER



Top View Of Steel Frame
For Cast Iron Cover



Half Section DD
For Cast Iron Cover



Section FF

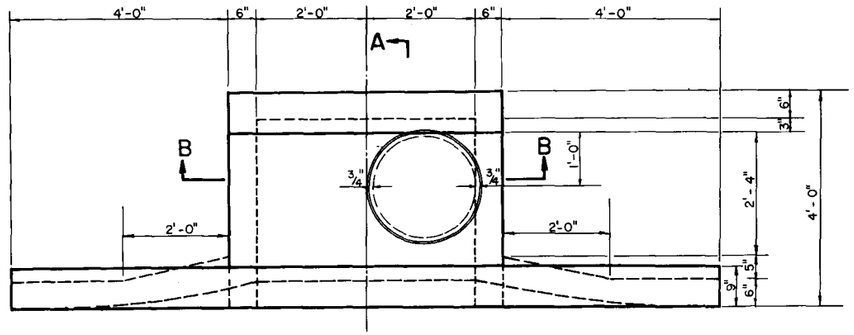
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB INLET TOPS TYPES 5 & 6

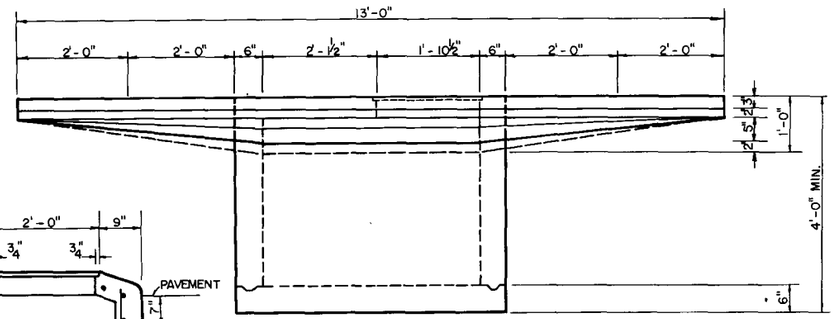
	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved:		

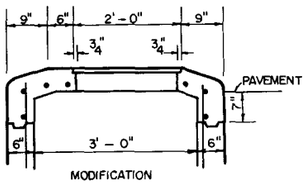
Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	2 of 2	211



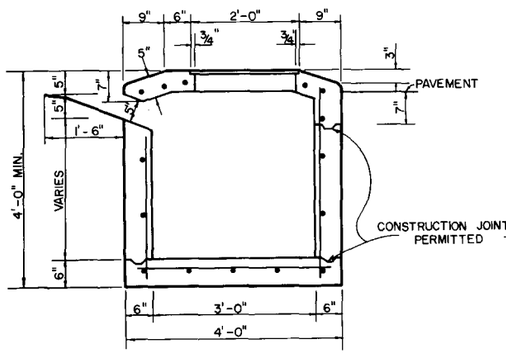
A
PLAN



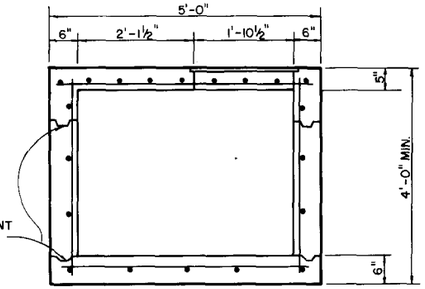


MODIFICATION
WHEN USED AS A
MANHOLE

ELEVATION

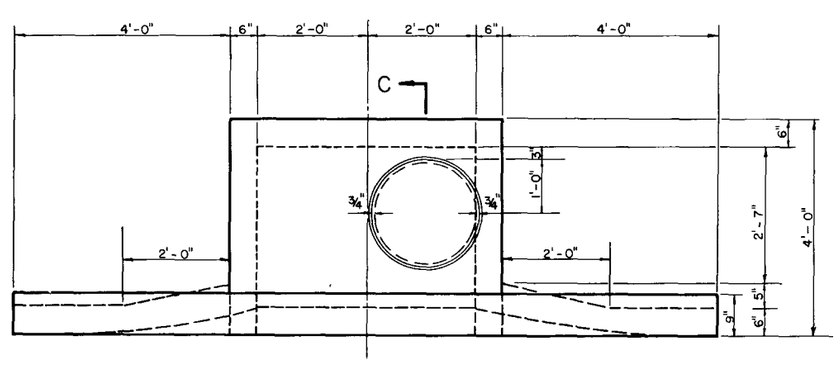


SECTION A-A

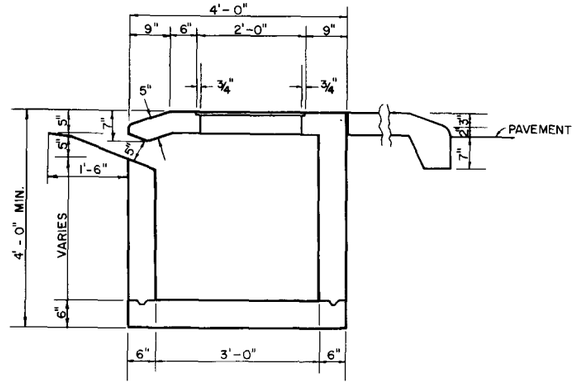


SECTION B-B

DETAILS OF TYPE "7" INLET FOR FOUR FEET WIDE MEDIAN

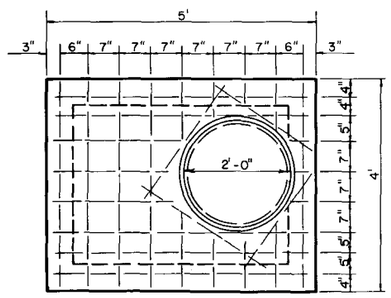


C
PLAN



SECTION C-C

DETAILS OF TYPE "7" INLETS FOR MEDIAN WIDER THAN FOUR FEET



DETAIL
REINFORCING STEEL DIAGRAM
TOP SLAB OF INLET

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O.-1973

CHAMFER: All EXPOSED EDGES TO BE CHAMFERED 3/4" UNLESS OTHERWISE SHOWN.

CONCRETE CURB: FOR SHAPE OF CONCRETE CURB SEE INDEX NO. 300.

STEEL: NO. 4 REINFORCING BARS 12" CENTERS UNLESS OTHERWISE NOTED. 1½" CLEARANCE TO INSIDE FACE.

FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 201.

THIS INLET WAS DESIGNED FOR USE WITH TYPE A & B MEDIAN CURB OR TYPE I & II TRAFFIC SEPARATOR. LOCATE OUTSIDE OF PEDESTRIAN CROSS TRAFFIC.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB INLET TYPE 7

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved: 5/1/75

Revision No.	Sheet No.	Index No.
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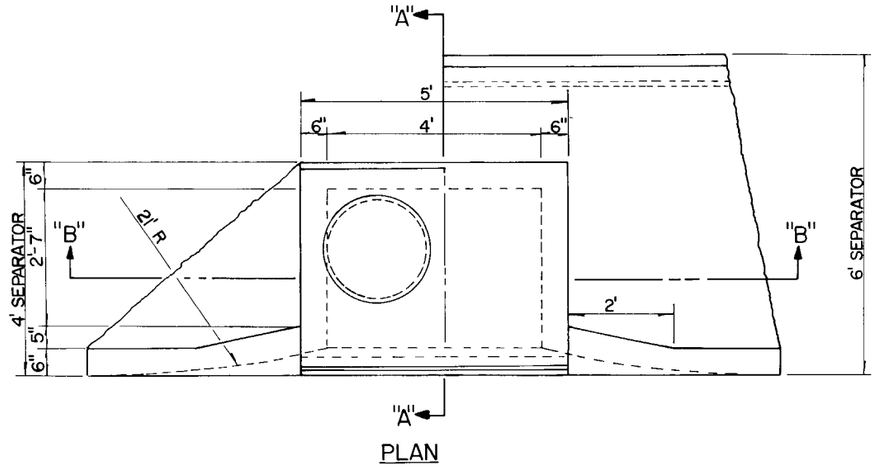
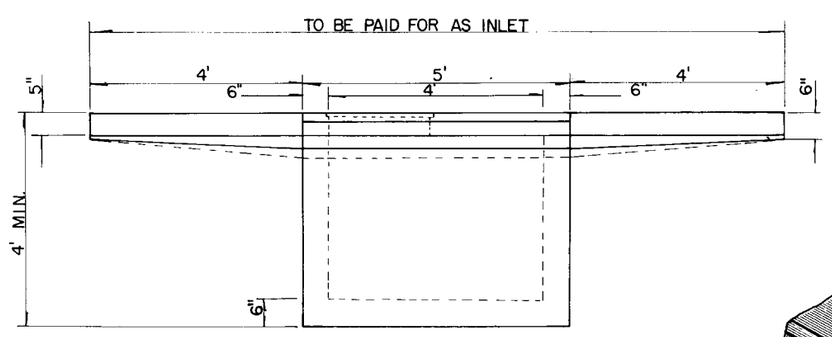
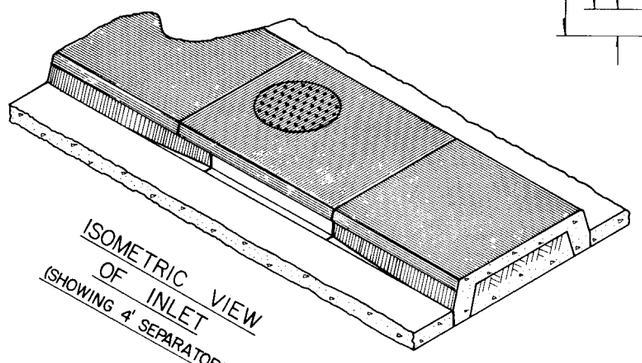


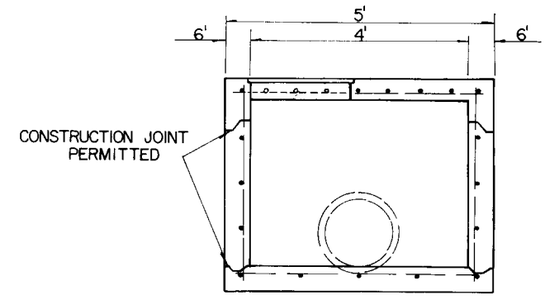
PLAN



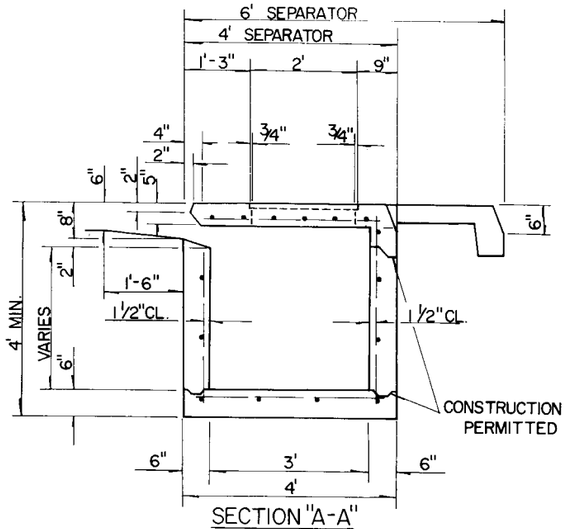
ELEVATION



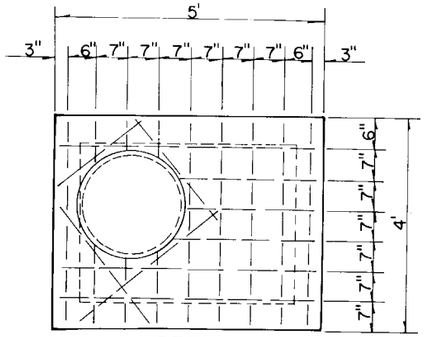
ISOMETRIC VIEW OF INLET (SHOWING 4' SEPARATOR)



SECTION "B-B"



SECTION "A-A"



DETAIL
REINFORCING STEEL DIAGRAM
TOP SLAB OF INLET

NOTES:

1. NO. 4 REINFORCING BARS 12" CENTERS UNLESS OTHERWISE NOTED.
2. CUT AND BEND BARS OUT OF WAY OF PIPE WHEN NECESSARY. BARS TO CLEAR PIPE BY 1½".
3. FOR SUPPLEMENTAL DETAILS SEE INDEX NO. 201.
4. THIS INLET WAS DESIGNED FOR USE WITH TYPE D MEDIAN CURB OR TYPE IV & V TRAFFIC SEPARATOR. LOCATE OUTSIDE OF PEDESTRIAN CROSS TRAFFIC.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB INLET TYPE 8

	Names	Dates
Designed by	HW	11/68
Drawn by	HW	11/68
Checked by	HW	11/68
F.H.W.A. Approved: 5/11/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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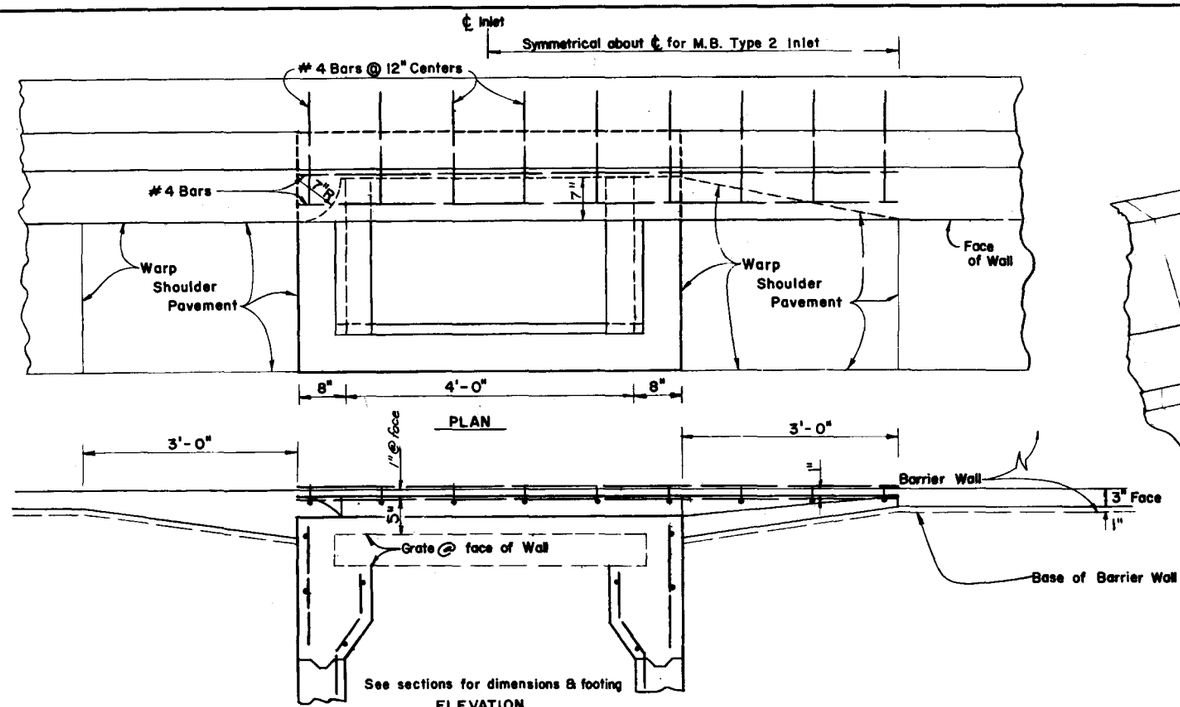
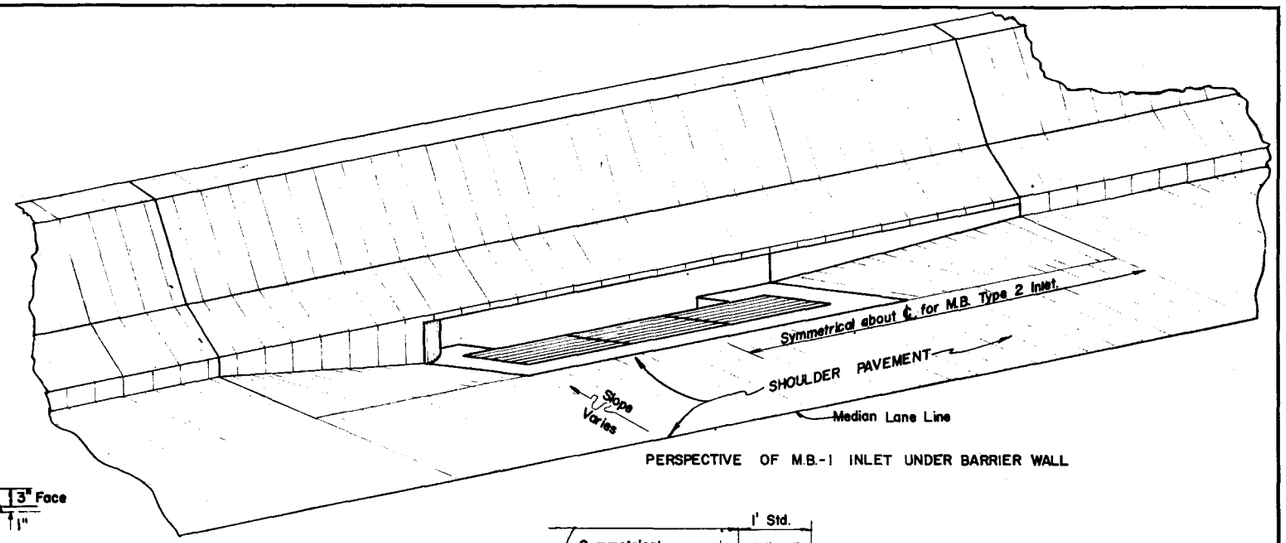
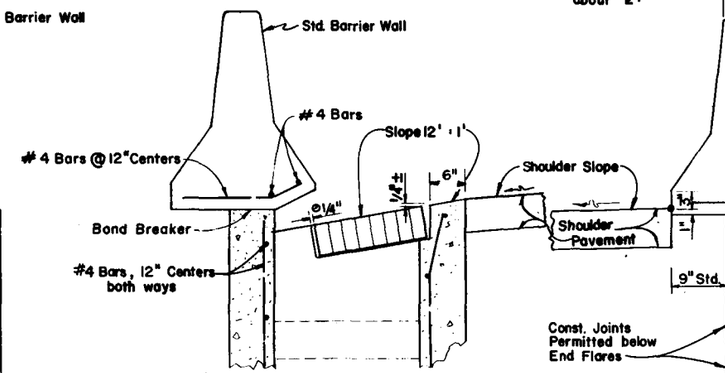


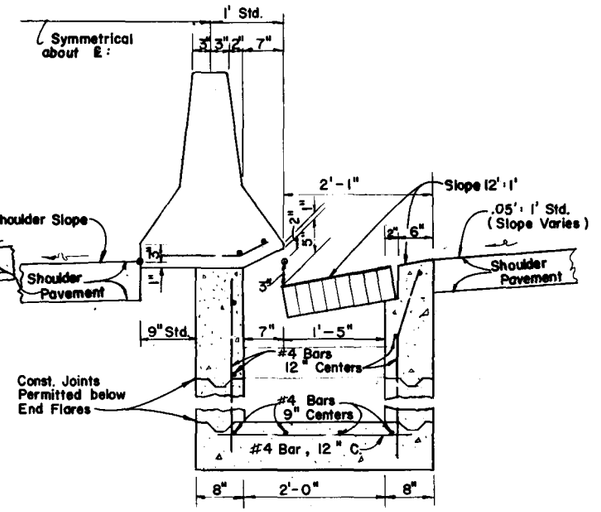
MEDIAN BARRIER INLET TYPE 1 AND 2



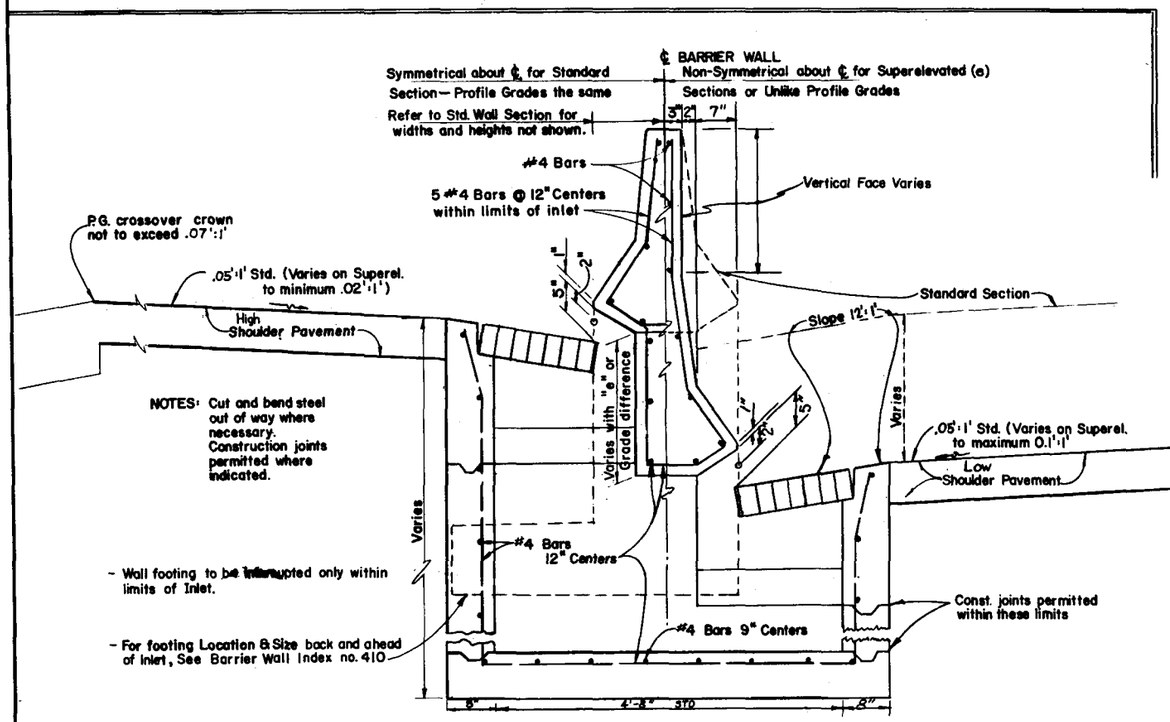
PERSPECTIVE OF M.B.-1 INLET UNDER BARRIER WALL



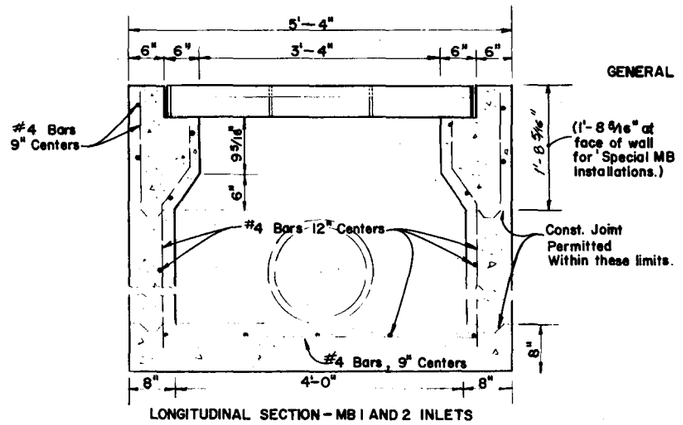
END SECTION M.B.-1 AND 2 INLETS



CENTER SECTION MB-1 AND 2 INLETS



MB (SPECIAL) INLET FOR DEPRESSED MEDIANS (SHOWING GRATE SUPPORT)



LONGITUDINAL SECTION - MB 1 AND 2 INLETS

GENERAL NOTES:

1. For standard barrier wall dimensions, see Index No. 410.
2. For flow channel details see Index No. 201.
3. For grate details see Index No. 220. In those rare situations where bicycle traffic is anticipated, the grate type should be changed to Index No. 221.
4. ℄ Theoretical grade point at junction of 3" barrier wall face and pavement.
5. For barrier wall dimensions, incorporating Light Standards within wall, refer to Index No. 410.
6. Minimum cover for reinforcing steel shall be 2".

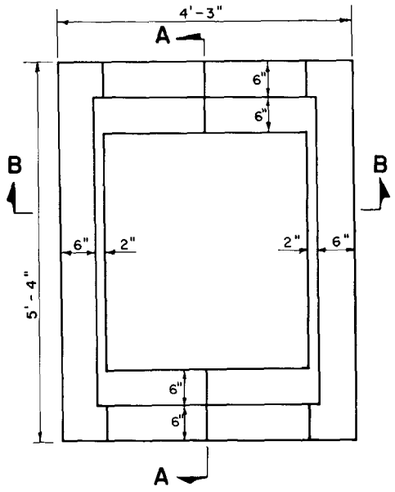
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MEDIAN BARRIER INLETS TYPES 1 AND 2

	Names	Dates
Designed by	AF	9/73
Drawn by		
Checked by	EGR	9/73
F.H.W.A. Approved: 10/8/76		

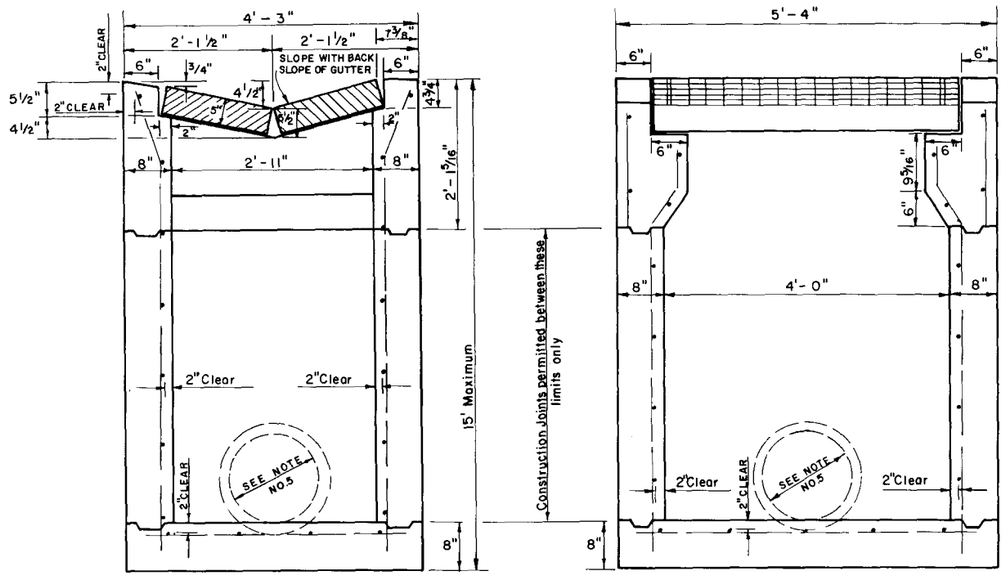
Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	1 of 1	217



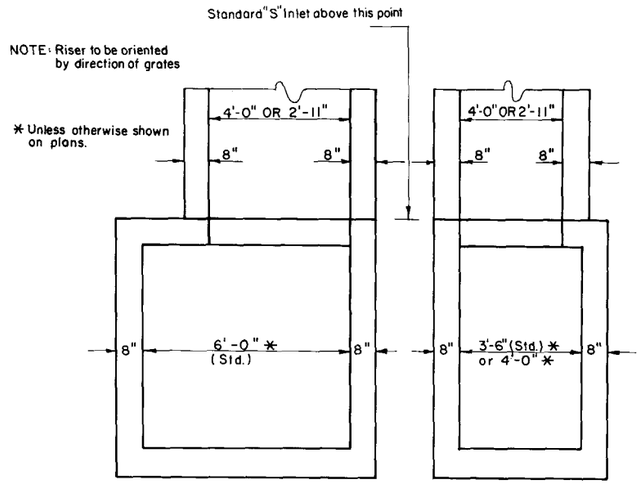
PLAN

(WITHOUT GRATE)



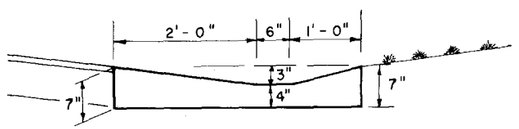
SECTION B-B

SECTION A-A

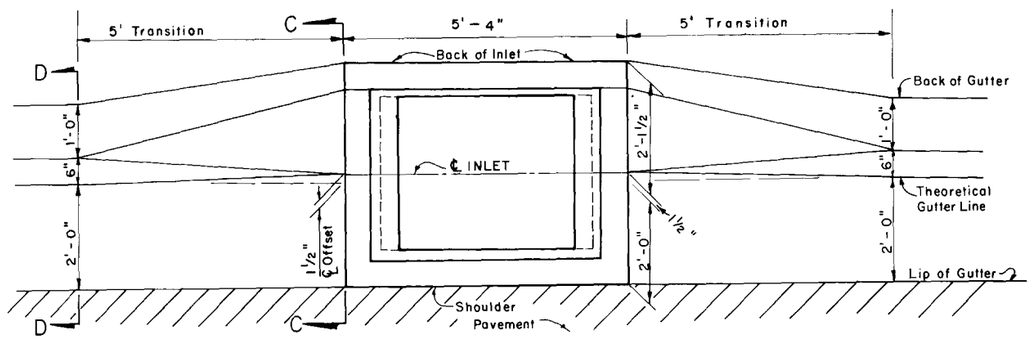


"S" INLET WITH "J" TYPE BOTTOM

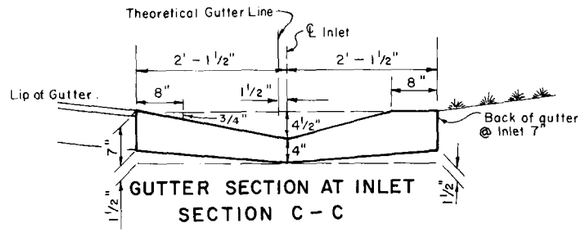
NOTE: FOR DETAILS OF "J" BOX SEE INDEX NUMBER 200.



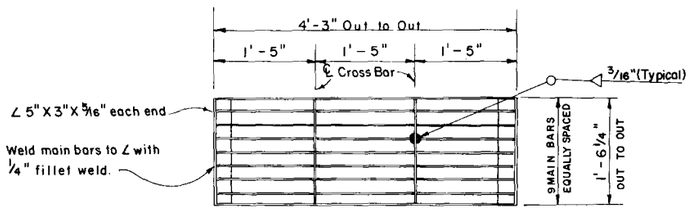
DETAIL OF SHOULDER GUTTER SECTION D-D



SHOULDER GUTTER TRANSITION AT INLET TYPE "S"



GUTTER SECTION AT INLET SECTION C-C



STEEL GRATING DETAIL

NOTE: TWO REQUIRED PER INLET

Main Bars 5" X ¼" (notched for cross bars)
Cross Bars 1¾" X ¼" (continuosly welded at main bar notches)
Main Bars and Cross Bars flush on top.

GENERAL NOTES

1. This inlet was designed for shoulder gutters subject to heavy wheel loads on sections where bicycle traffic is not anticipated (ie: limited access, rural sections). Also may be used in locations where the wide openings in the "A" and "B" inlets are unacceptable. Where a bicycle safe grate is necessary use the steel grating shown on Index no. 221.
2. All reinforcing steel bars are ½" ø @ 12" centers.
3. Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by 1½".
4. All exposed edges and corners shall be tooled to ¾" radius.
5. Recommended maximum pipe sizes based on concrete pipe: Section A-A, 36" pipe; Section B-B, 24" pipe. Larger pipe sizes may be used but should be checked for fit "J-S" detail is recommended for larger pipe sizes.
6. For supplementary details see index numbers 201 and 200.
7. Grate and top of structure shall be true to grade shown on plans.
8. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

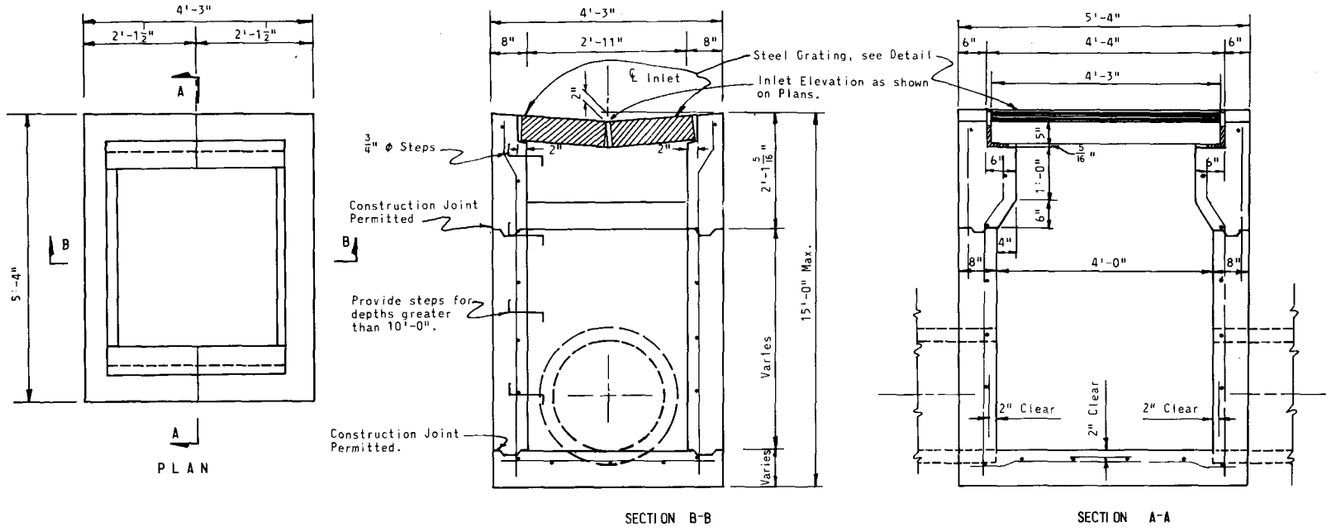
GUTTER INLET TYPE S

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved: 5/1/75

Revision No.	Sheet No.	Index No.
80	1 of 1	220

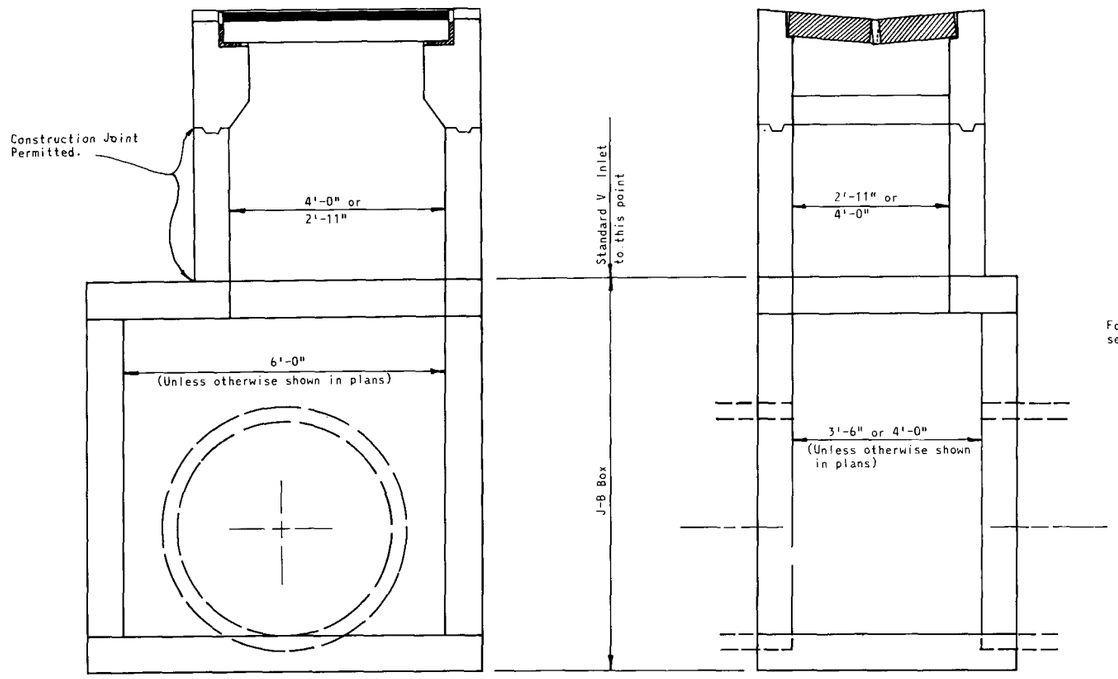


NOTE: Cut and bend Bars out of way of Pipe when necessary. Bars to clear Pipe 1½".

NOTE: All Reinforcing Steel Bars are ½" ϕ @ 12" Ctrs.

GUTTER INLET TYPE V

FOR PIPES 24" DIAM. AND UNDER

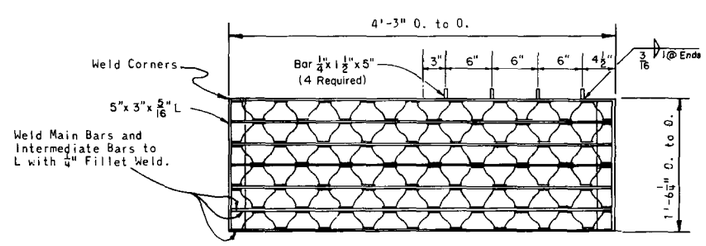


FOR PIPES 30" DIAM. AND LARGER

For details of J-B Box see Index No. 200.

GENERAL NOTES

1. All exposed edges and corners shall be tooled to ¼" radius.
2. For supplementary details see index no. 201.
3. This inlet was designed for village swales, ditches, or other areas subject to heavy wheel loads where debris is minimum and it is subject to pedestrian and/or bicycle traffic.
4. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
5. Grate and top of structure shall be true to grade shown on plans.



STEEL GRATING DETAIL

TWO REQUIRED PER INLET

5" Steel Decking Main Bars 5"X¼"
Intermediate Bars 1½"X¼" Reticuline Bars 1"X3/16"

STEEL DECKING: MANUFACTURED BY BORDEN, FLORIDA STEEL, U.S. FOUNDRY IRVING, RELIANCE, GREULICH (OR EQUAL).

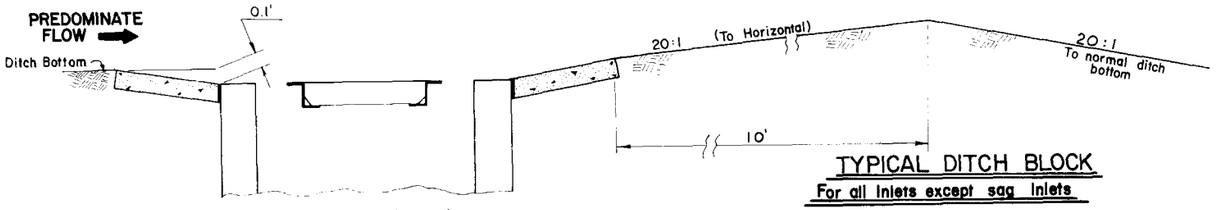
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUTTER INLET TYPE V

	Names	Dates
Designed by		
Drawn by	WHW	4/57
Checked by	RMM	4/57
F.H.W.A. Approved: 5/1/75		

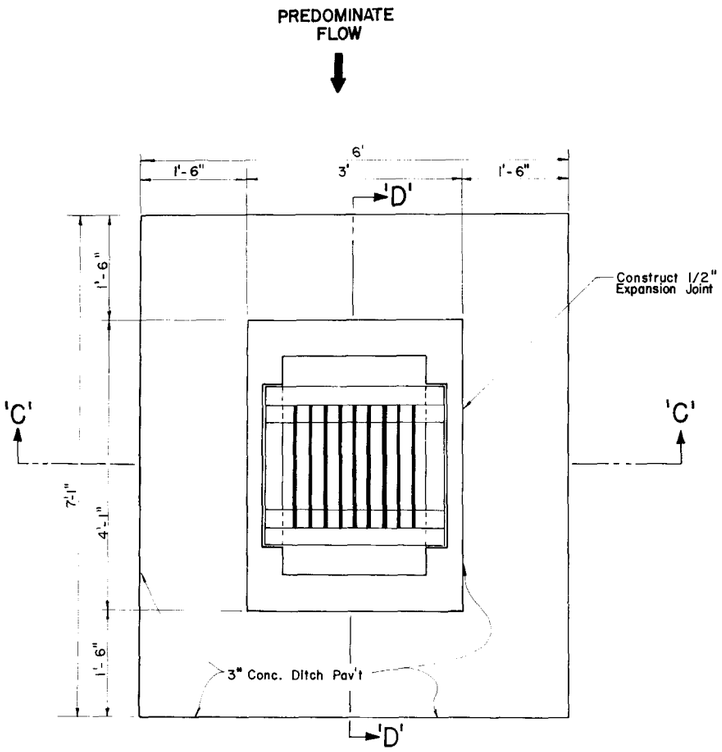
Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	1 of 1	221

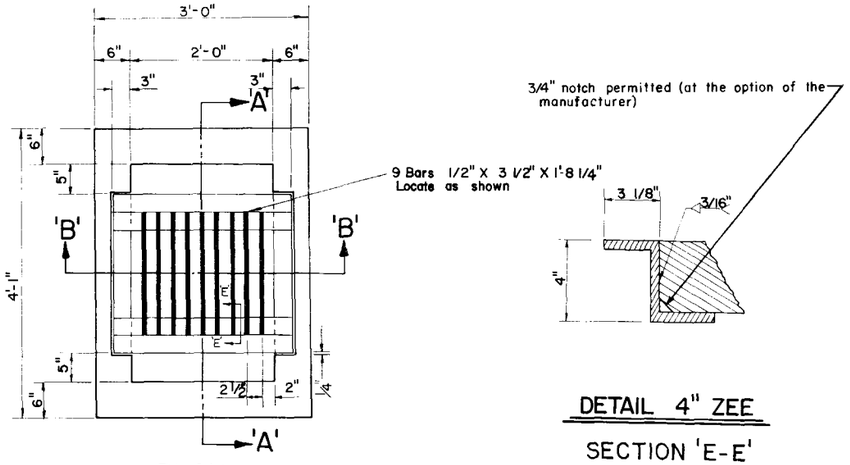


SECTION 'D-D'

TYPICAL DITCH BLOCK
For all inlets except sag inlets



PAVEMENT DETAIL FOR ALL "A" INLETS



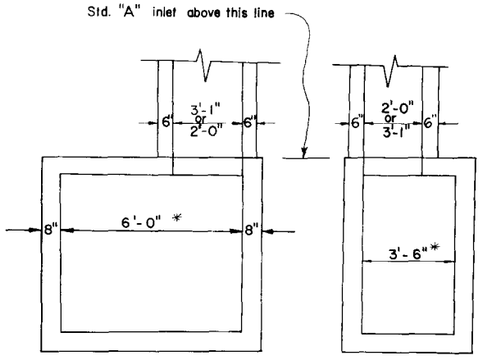
PLAN

Recommended Maximum Pipe Sizes *
2'-0" Side – 18" Pipe
3'-1" Side – 24" Pipe

*See note * 9

DETAIL 4" ZEE

SECTION 'E-E'



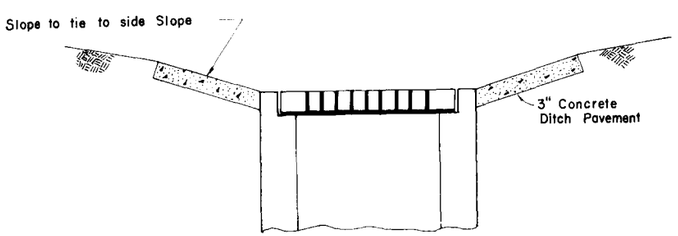
* unless otherwise shown in plans

"J-A" DETAIL

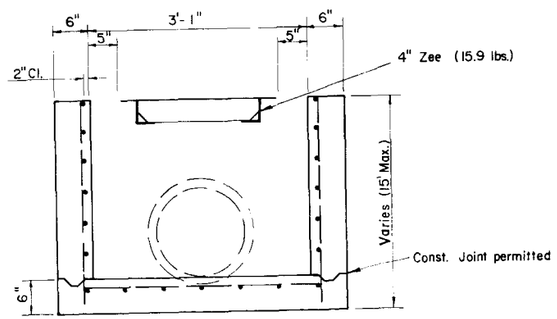
NOTES:
For details of "J" bottom, see Index 200 (Alt. "B" only).
"A" top to be oriented as required by Note * 5.

GENERAL NOTES

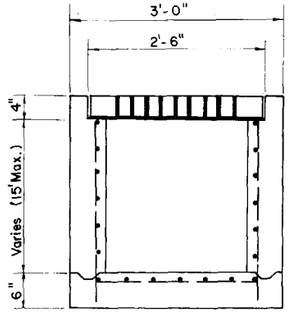
1. Cost of ditch paving to be included in cost of inlet.
2. Reinforcing - No. 4 bars at each 12" center both ways, 2" clearance to inside face.
3. Inlet to be used only where flow thru grate is less than 7 c.f.s.
4. Where material unsatisfactory for foundation is encountered at F.L. Elev. omit floor and carry walls down to satisfactory foundation. Backfill to F.L. with clear sand.
5. Direction of 1/2" x 3 1/2" bars to be in same direction as predominant flow.
6. Chamfer exposed edges. (3/4" chamfer.)
7. Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by 1 1/2".
8. For supplemental detail, see Index 201.
9. Recommended maximum pipe sizes are for concrete pipe. Check larger sizes for fit. For larger pipe, Type "B" inlet or "J-A" inlet (see detail above) should be considered.
10. This inlet was designed for ditches, medians, or other areas subject to heavy wheel loads where debris may be a problem. It is not for use in areas subject to pedestrian and/or bicycle traffic.
11. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.



SECTION 'C-C'



SECTION 'A-A'



SECTION 'B-B'

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

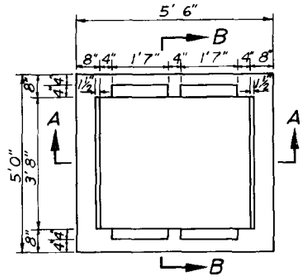
DITCH BOTTOM INLET TYPE A

	Names	Dates
Designed By		
Drawn By		
Checked By		

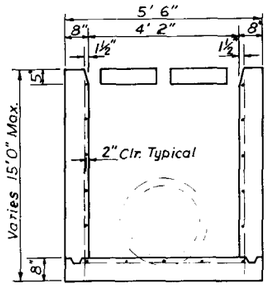
Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 7/18/75

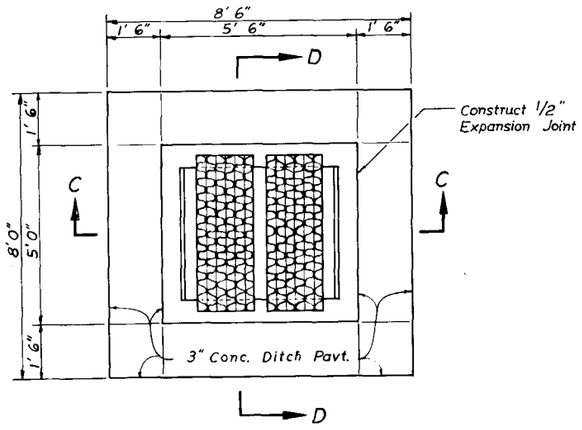
Revision No.	Sheet No.	Index No.
80	1 of 1	230

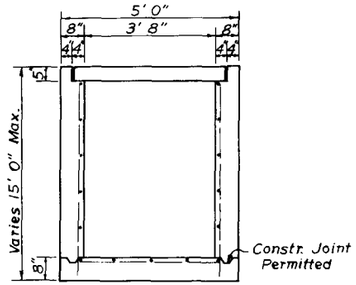


PLAN



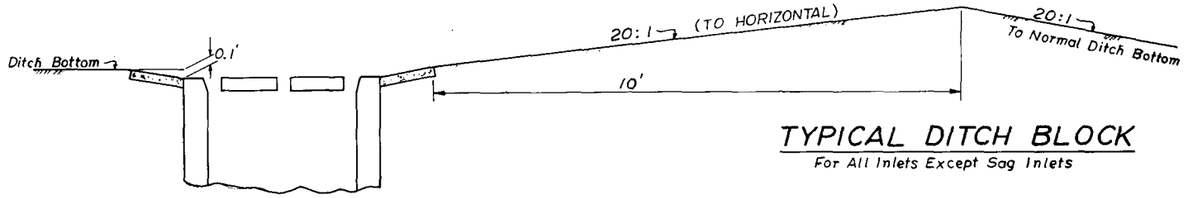
SECTION A-A





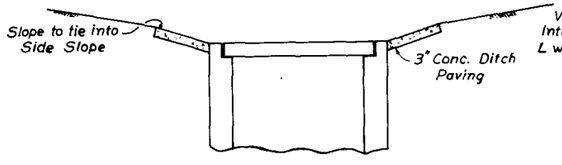
SECTION B-B

PAVING DETAIL FOR ALL INLETS



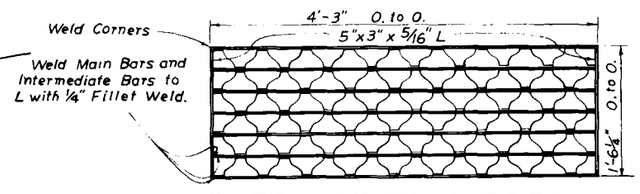
TYPICAL DITCH BLOCK

For All Inlets Except Sag Inlets



SECTION C-C

SECTION D-D



STEEL GRATING DETAIL

TWO REQUIRED PER INLET

5" Borden, Florida Steel, Irving, Reliance, Greulich, U.S. Foundry, (or equal)
Main Bars 5"x ¼" Intermediate Bars 1½"x ¼" Reticuline Bars
1¼" x 3/16" (or equal).

~GENERAL NOTES:~

1. COST OF DITCH PAVING TO BE INCLUDED IN COST OF INLET.
2. REINFORCING~Nº 4 BARS AT 12" CENTERS BOTH WAYS 2" CLEARANCE TO INSIDE FACE.
3. FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 201.
4. CUT AND BEND BARS OUT OF WAY OF PIPE WHEN NECESSARY; BARS TO CLEAR PIPE BY 1½".
5. WHERE MATERIAL UNSATISFACTORY FOR FOUNDATION IS ENCOUNTERED AT FL. EL. OMIT FLOOR AND CARRY WALLS DOWN TO SATISFACTORY FOUNDATION. BACKFILL TO FL. WITH CLEAR SAND.
6. THIS INLET WAS DESIGNED FOR DITCHES, MEDIANS, OR OTHER AREAS SUBJECT TO HEAVY WHEEL LOADS WHERE DEBRIS MAY BE A PROBLEM (FOR MORE THAN 7 CFS THRU GRATE). IT IS NOT FOR USE IN AREAS SUBJECT TO PEDESTRIAN AND/OR BICYCLE TRAFFIC.
7. RECOMMEND 36" PIPE AS MAXIMUM SIZE FOR CONCRETE PIPE. FOR LARGER PIPE, "J-B" INLET SHOULD BE CONSIDERED.
8. WHEN ALTERNATE "G" GRATE IS SPECIFIED IN PLANS, THE GRATE IS TO BE HOT DIPPED GALVANIZED AFTER FABRICATION.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLET TYPE B

	Names	Dates
Designed by	HAB	4/67
Drawn by	GCB	4/67
Checked by		

F.H.W.A. Approved: 7/18/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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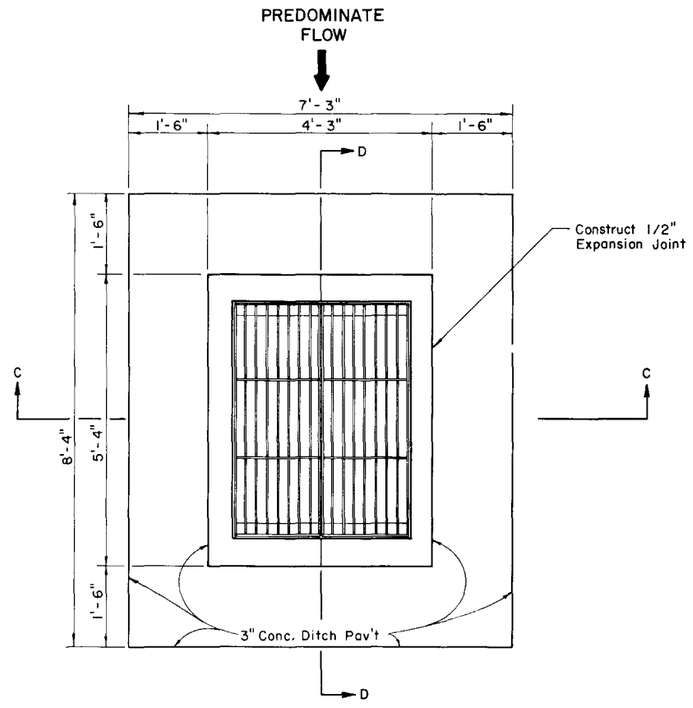
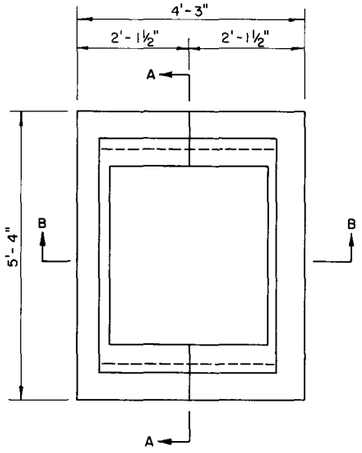
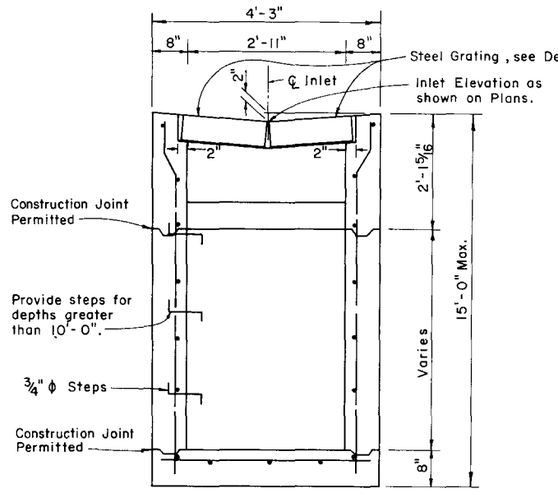


PAVEMENT DETAIL FOR ALL "J" INLETS

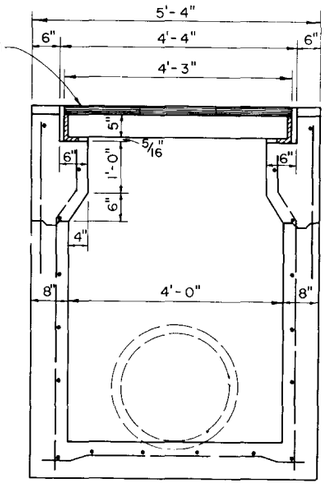


PLAN

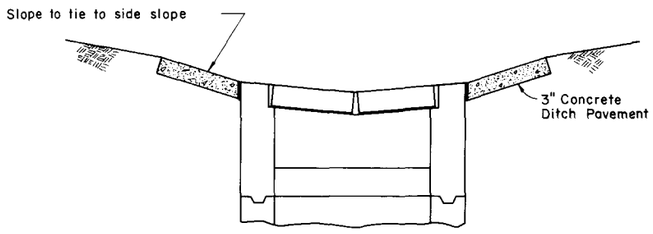
Recommended Maximum Pipe Sizes (See Notes 4 & 8)
2'-11" Wall - 24"
4'-0" Wall - 36"



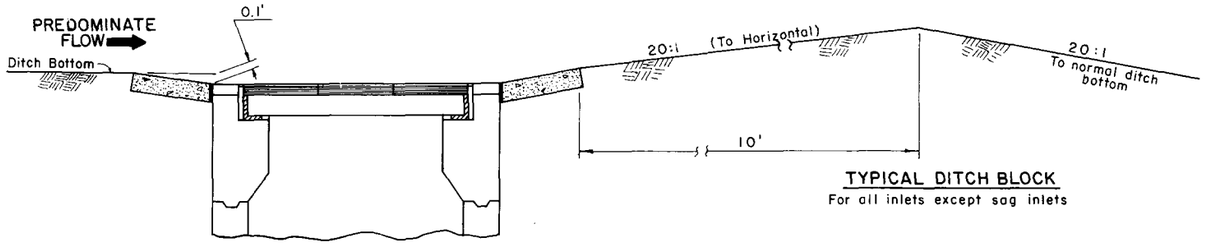
SECTION B-B



SECTION A-A

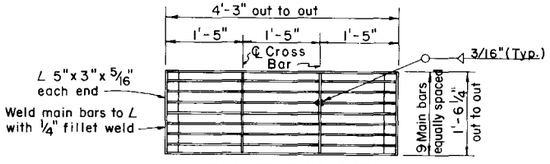


SECTION C-C



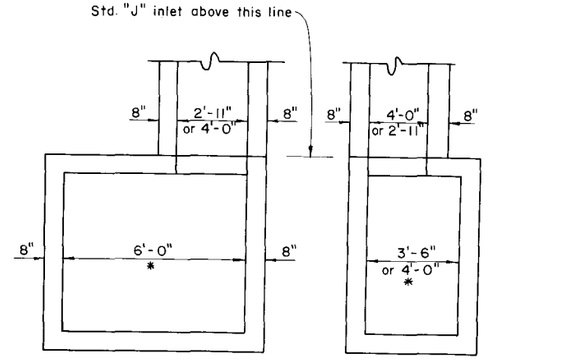
SECTION D-D

TYPICAL DITCH BLOCK
For all inlets except sag inlets



STEEL GRATING DETAIL
Note: Two required per inlet

Main Bars 5"x ¼" (Notched for cross bars).
Cross Bars 1¾" x ¼" (Continuously welded at main bar notches).
Main Bars and Cross Bars flush on top.



* unless otherwise shown in plans.

"J-J" DETAIL

NOTES:
For details of "J" bottom, see Index 200 (Alt. B only).
"J" top to be oriented as required by Note 4.

GENERAL NOTES

1. Cost of Ditch Paving to be included in cost of inlet.
2. Reinforcing - Nº 4 bars at 12" centers both ways with 2" clearance to inside face.
3. Where material unsatisfactory for foundation is encountered at F.L. elevation omit floor and carry walls down to satisfactory foundation. Backfill to F.L. with clean sand.
4. Direction of ¼"x 5" Main bars to be in same direction as predominant flow.
5. Chamfer exposed edges. (¾" Chamfer)
6. Cut and bend bars out of way of pipe when necessary; Bars to clear pipe by 1½".
7. For supplemental details, see Index 201.
8. Recommended maximum pipe sizes are for concrete pipe. Check larger sizes for fit. For larger pipe, a "J-J" inlet should be considered (see detail above).
9. This inlet is designed for ditches, medians or other areas subject to heavy wheel loads, where only light debris is expected and pedestrian traffic is anticipated. It is not for use in areas subject to bicycle traffic.
10. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLET TYPE J

	Names	Dates
Designed by	L.M.F.	8/76
Drawn by		
Checked by	S.R.L.	8/76
F.H.W.A. Approved: 9/3/76		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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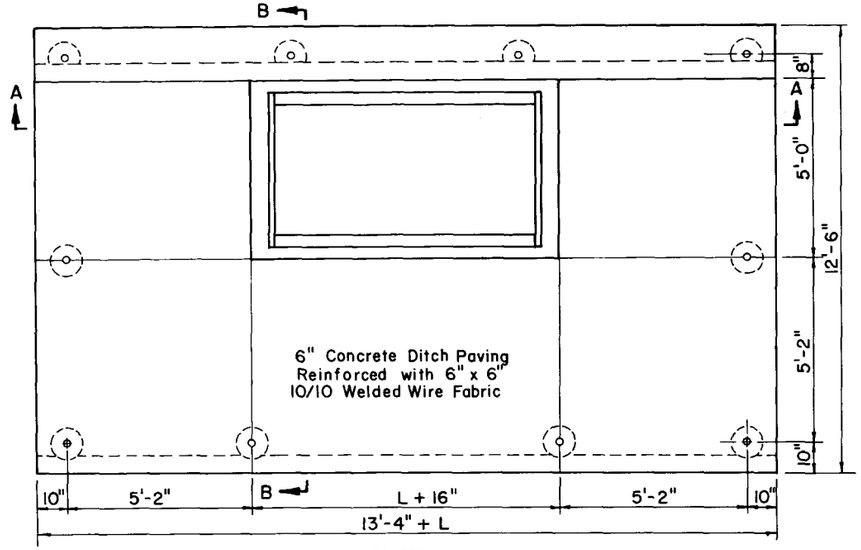
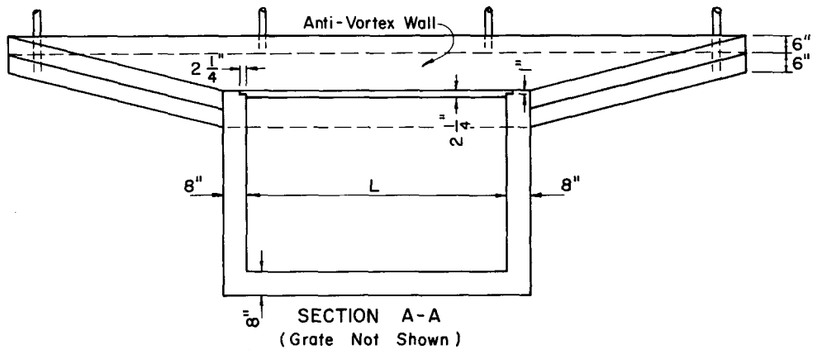
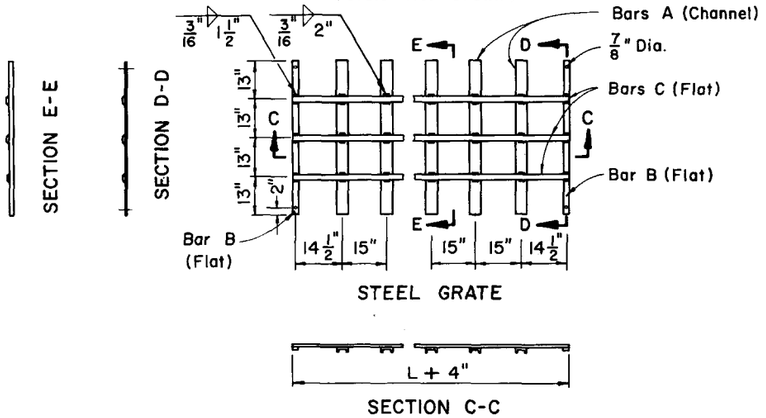


PLAN
(Grate Not Shown)

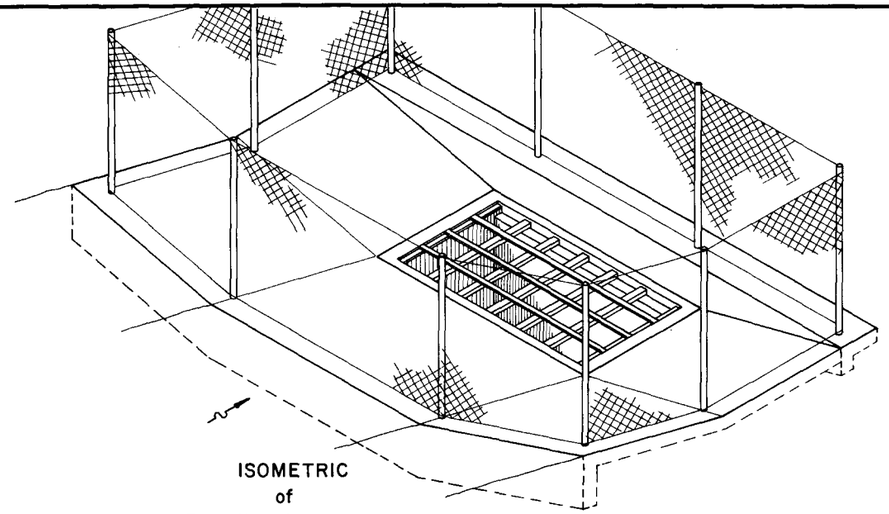


SECTION A-A
(Grate Not Shown)

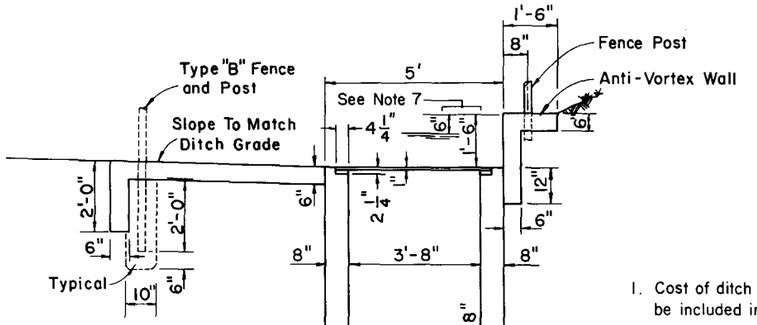


STEEL GRATE

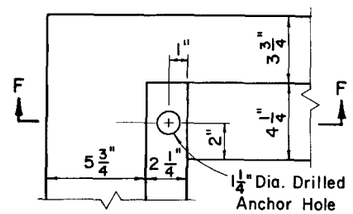
SECTION C-C



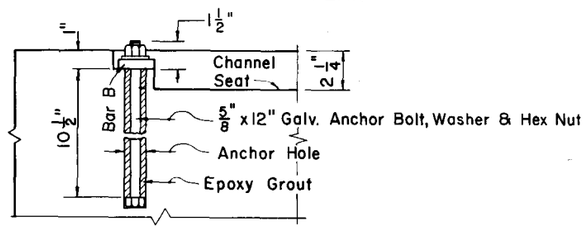
ISOMETRIC
of
INLET FENCE ENCLOSURE



SECTION B-B
(Grate Not Shown)



GRATE SEAT AND ANCHOR HOLE PLAN



SECTION F-F
(With Bar B and Anchor Bolt)

PIPE SIZE	L	BILL OF STEEL			STEEL WEIGHT	
		BAR	No. REQ'D.	LENGTH	CHANNEL 4"x5.4#	FLAT 2" x 1/2" (3.4#)
30" & 36"	4'-9"	A	3	4'-4"	70	
		B	2	4'-4"		30
		C	3	5'-1"		52
42" & 48"	6'-0"	A	4	4'-4"	94	
		B	2	4'-4"		30
		C	3	6'-4"		65
54" & 60"	7'-3"	A	5	4'-4"	117	
		B	2	4'-4"		30
		C	3	7'-7"		77
66" & 72"	8'-6"	A	6	4'-4"	140	
		B	2	4'-4"		30
		C	3	8'-10"		90
SPECIAL	9'-9"	A	7	4'-4"	164	
		B	2	4'-4"		30
		C	3	10'-1"		103
SPECIAL	11'-0"	A	8	4'-4"	187	
		B	2	4'-4"		30
		C	3	11'-4"		116
SPECIAL	12'-3"	A	9	4'-4"	211	
		B	2	4'-4"		30
		C	3	12'-7"		128
SPECIAL	13'-6"	A	10	4'-4"	234	
		B	2	4'-4"		30
		C	3	13'-10"		141
SPECIAL	14'-9"	A	11	4'-4"	257	
		B	2	4'-4"		30
		C	3	15'-1"		154
SPECIAL	16'-0"	A	12	4'-4"	281	
		B	2	4'-4"		30
		C	3	16'-4"		167
SPECIAL	17'-3"	A	13	4'-4"	304	
		B	2	4'-4"		30
		C	3	17'-7"		179
SPECIAL	18'-6"	A	14	4'-4"	328	
		B	2	4'-4"		30
		C	3	18'-10"		192

GENERAL NOTES

1. Cost of ditch paving, anti-vortex wall, grate, concrete, reinforcing steel and fence enclosure to be included in the cost of inlet.
2. Inlet and anti-vortex wall to be Class I Concrete.
3. Reinforcing - No. 4 bars at 12" centers both ways, 1 1/2" clearance to inside face and bottom of inlet. Bend top and corner bars to clear anchor holes.
4. Channel section C 3 x 6 may be used as an alternate for the C 4 x 5.4 channel.
5. Channel and bar steel to be ASTM A588 weathering steel. Grating exposed to salt water shall be ASTM A 572, Grade 50, and galvanized in accordance with Section 962-7 of the Standard Specifications, and shall be designated in the plans as Alternate G.
6. Fence enclosure shall be Type "B" Fence (Index No. 452). Chain link fabric, posts, wire ties, hardware, and miscellaneous fittings shall be aluminum alloy. All posts to be set in concrete. A minimum of 10 posts required. Corner and approach side posts to be 3" nominal.
7. Inlet length (L) shall be set by the designer for the greater of either culvert requirement or inlet pool not to exceed 12" depth.
8. This inlet is to be used at locations having high flow rates, usually where an endwall could not be utilized without hazardous intake.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLET TYPE K

	Names	Dates
Designed by	FHWA	
Drawn by	SM	6/79
Checked by	JG	6/79
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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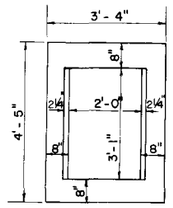
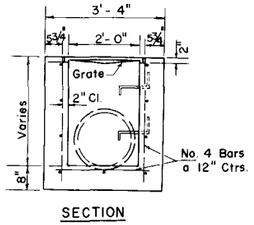


PLAN

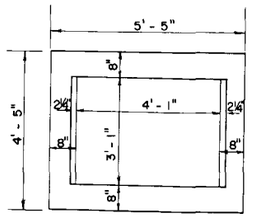


SECTION

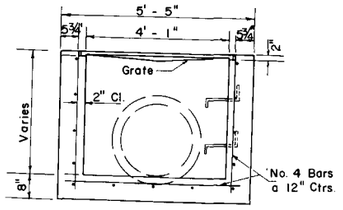
TYPE C

Recommended Maximum Pipe Size :

2'-0" Wall - 18" Pipe
3'-1" Wall - 24" Pipe



PLAN

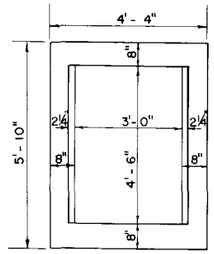


SECTION

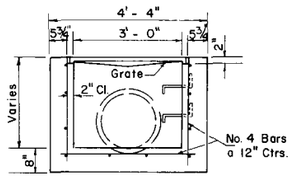
TYPE D

Recommended Maximum Pipe Size :

3'-1" Wall - 24" Pipe
4'-1" Wall - 36" Pipe



PLAN

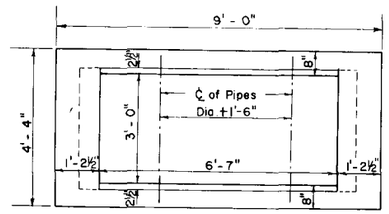


SECTION

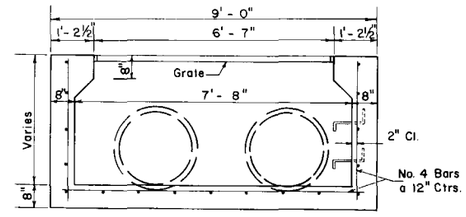
TYPE E

Recommended Maximum Pipe Size :

3'-0" Wall - 24" Pipe
4'-6" Wall - 42" Pipe



PLAN

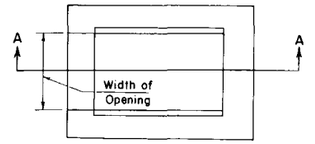


SECTION

TYPE H

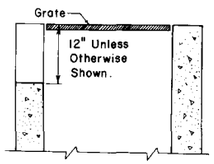
Recommended Maximum Pipe Size :

3'-0" Wall - 30" Pipe
7'-8" Wall - 1 - 66" Pipe
2 - 30" Pipe

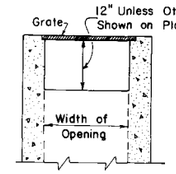


PLAN

NOTE :
Opening may be constructed at either end or at both ends as shown on plans.



SECTION A-A

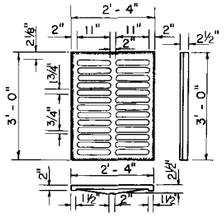


END VIEW

DETAIL OF OPENINGS IN DITCH BOTTOM INLETS

GENERAL NOTES :

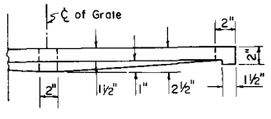
1. BEVELED EDGES: All exposed corners and edges to be chamfered 3/4".
2. FOUNDATION MATERIAL: Where material unsatisfactory for foundation is encountered at FL. EL. omit floor and carry walls down to satisfactory foundation. Backfill to FL. with clear sand.
3. CAST IRON: In accordance with Florida Department of Transportation Specifications.
4. STEEL GRATING: Manufactured by Borden, Florida Steel, Irving, Reliance, U.S. Foundry, Greulich (or equal).
5. STRUCTURES: These structures are not to be placed in areas subject to heavy wheel loads.
6. DETAILS: For supplementary details see Standard Index 201.
7. PIPE SIZES: Recommended maximum pipe sizes given are for concrete pipe. Larger than recommended sizes must be checked for fit.
8. USES: When used without slots – For ditches, medians & other areas subject to infrequent traffic loads where debris is minimum. Where debris is a problem slots should be used unless controlled by safety criteria.
9. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.



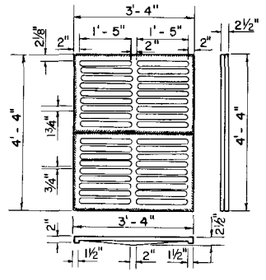
TYPE C

Approx. Weight 235 Lbs.

Note:
Type D Inlet to be used only when openings are required in wide side of Inlet. Cast Iron Grate not permitted.

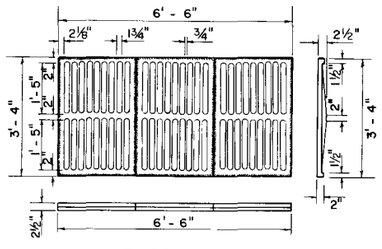


HALF SECTION DETAIL OF CAST IRON GRATES



TYPE E

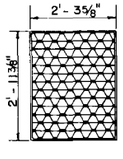
Approx. Weight 465 Lbs.



TYPE H

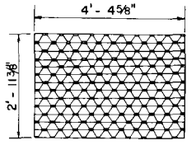
Approx. Weight 725 Lbs.

DETAILS OF CAST IRON GRATING



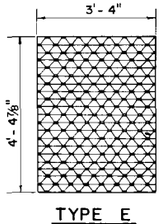
TYPE C

Straight Bars 2" X 3/16"
Reticuline Bars 1¼" X 3/16"
Approx. Weight 100 Lbs.



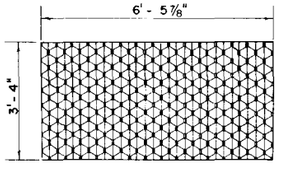
TYPE D

Straight Bars 2" X 3/16"
Reticuline Bars 1¼" X 3/16"
Approx. Weight 180 Lbs.



TYPE E

Straight Bars 2" X 3/16"
Reticuline Bars 1 ¼" X 3/16"
Approx. Weight 215 Lbs.



TYPE H

Straight Bars 2" X 3/16"
Reticuline Bars 1¼" X 3/16"
Approx. Weight 315 Lbs.

DETAILS OF STEEL GRATING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLETS TYPES C,D,E & H

	Names	Dates
Designed by		
Drawn by		
Checked by	LMF	10/74
F.H.W.A. Approved: 5/1/75		

Approved By
Deputy Design Engineer, Roadways

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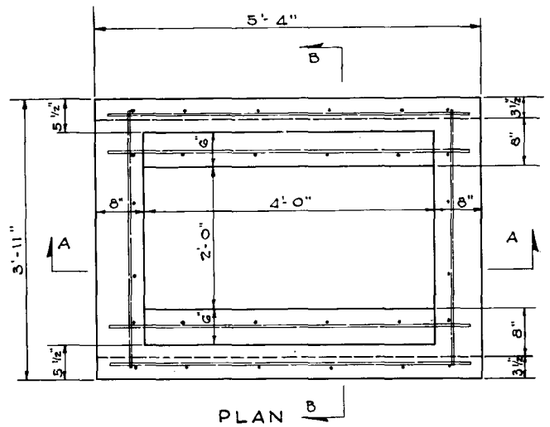
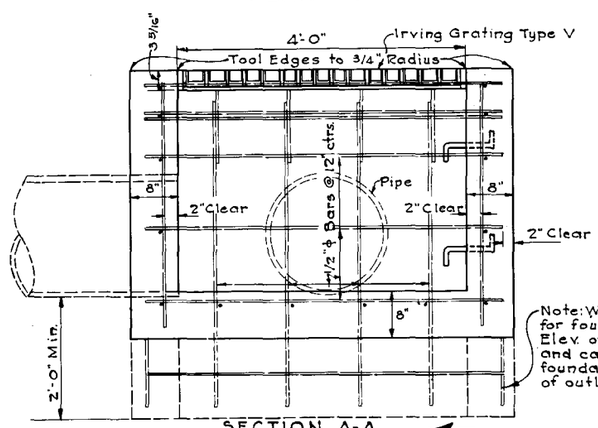
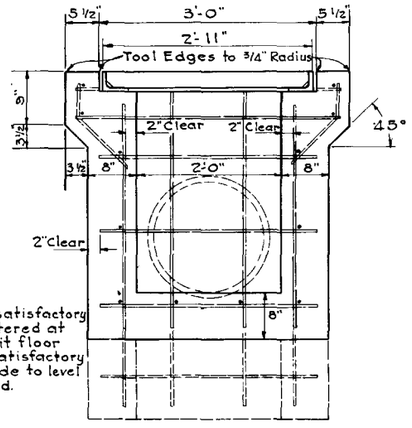
ESTIMATED QUANTITIES		
HEIGHT OF WALLS	CONCRETE CU. YD.	REINFORCING STEEL, LBS.
2'-0"	0.07	81
3'-0"	1.15	102
4'-0"	1.51	124
5'-0"	1.87	145
6'-0"	2.23	166
Floor only (Inside of Walls)	0.20	25

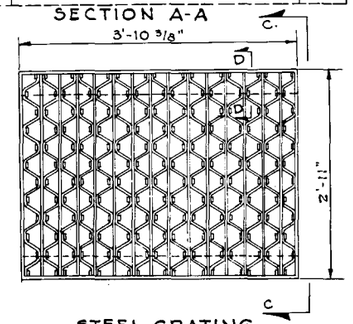




SECTION A-A



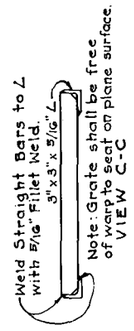
SECTION B-B

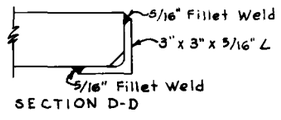


STEEL GRATING

STEEL GRATING, STRAIGHT BARS 3"x 1/4"
RETICULINE BARS 2"x 3/16".

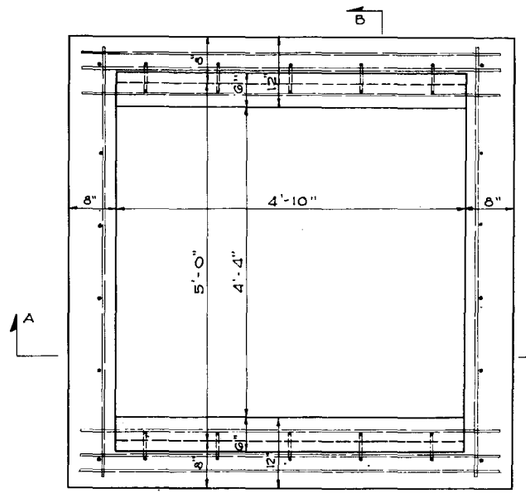
STEEL DECKING: Manufactured by Borden, Florida Steel, Irving, U.S. Foundry, Reliance, Greulich (or equal).

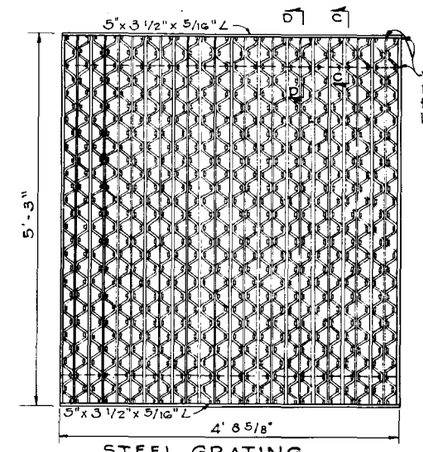


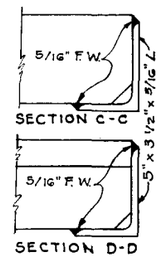


SECTION D-D

2' x 4' DROP INLET - TYPE "F"

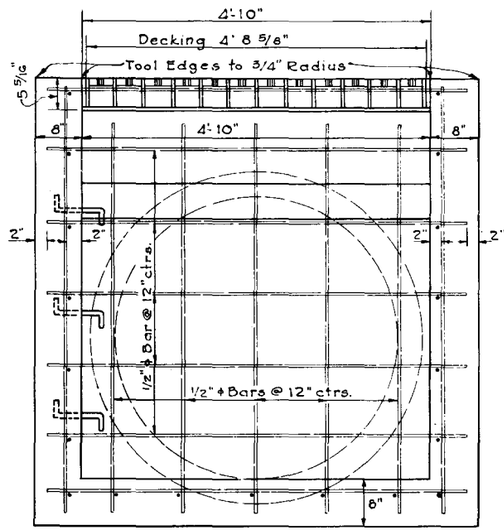




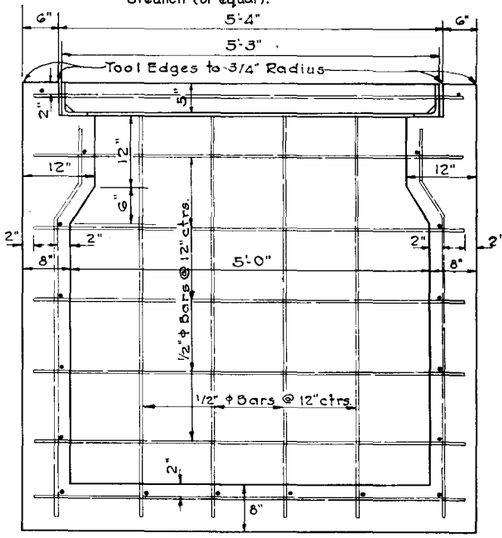


STEEL GRATING

5" STEEL DECKING, WEIGHT 630 LBS. MAIN BARS 5" x 1/4"
INTERMEDIATE BARS 1½" x 1/4", RETICULINE BARS 1½" x 3/16".
STEEL DECKING: Manufactured by Borden, Florida Steel, Irving, Reliance, U.S. Foundry, Greulich (or equal).



SECTION A-A



SECTION B-B

5' x 5' DITCH BOTTOM INLET - TYPE "G"

Note: These inlets were designed for use in ditches, medians, pavement areas, or other areas subject to heavy wheel loads where debris is minimum and it is subject to pedestrian and/or bicycle traffic.

When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.

Note: For construction of bottom where unsatisfactory foundation is encountered (see Note Section A-A, Type "F")

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLETS TYPES F & G

	Names	Dates
Designed by	TWJ	1/50
Drawn by	MEF	1/50
Checked by	WHM	1/50
F.H.W.A. Approved:		5/1/75

Approved By
Deputy Design Engineer, Roadways

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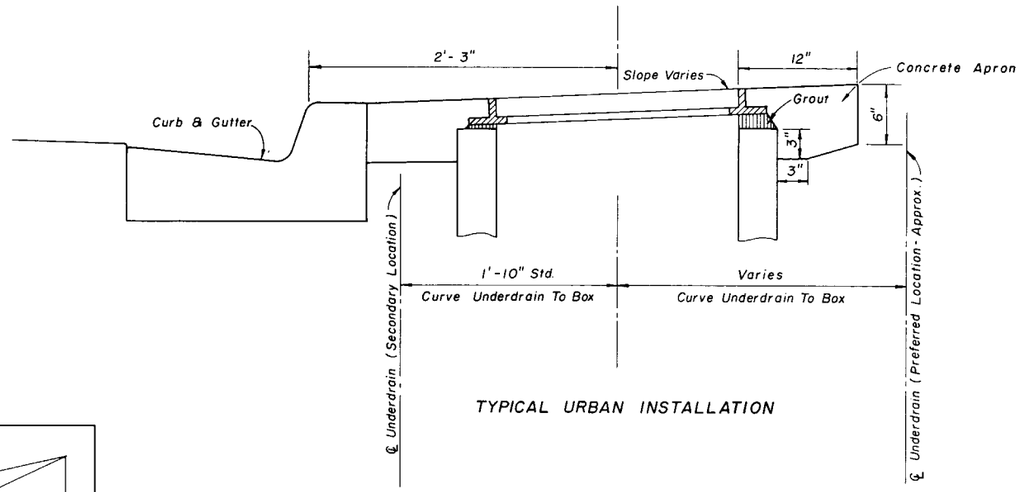
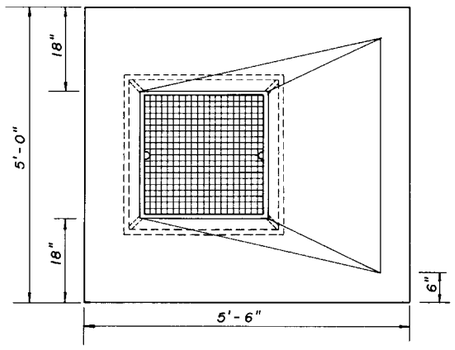
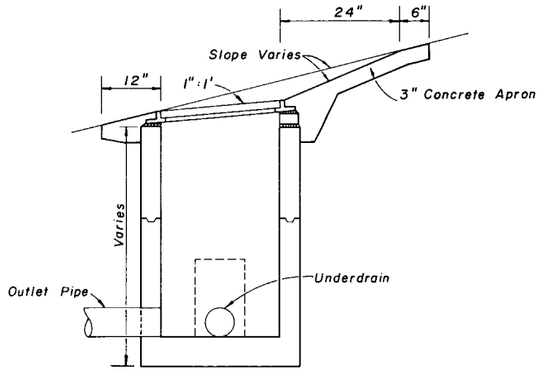


TYPICAL URBAN INSTALLATION



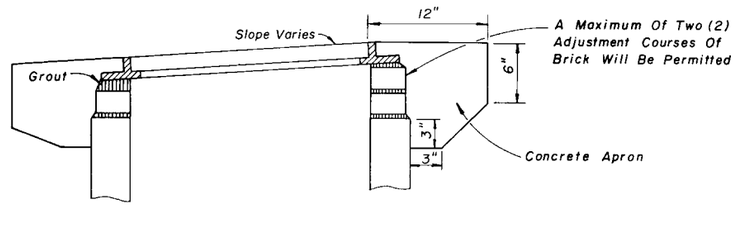
TOP VIEW



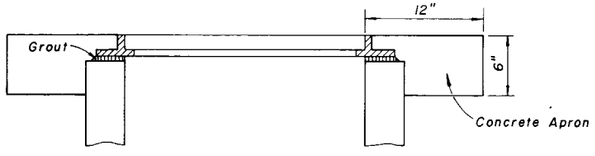
SECTION

TYPICAL INSTALLATION ON SLOPES

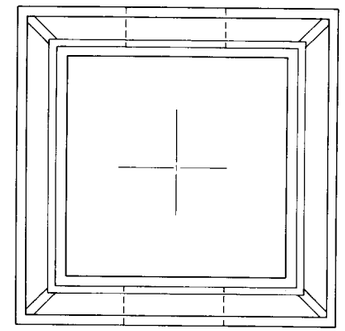
(Half Scale)



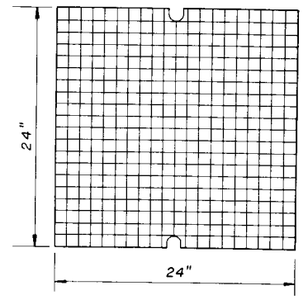
PERMISSIBLE TOP ADJUSTMENT



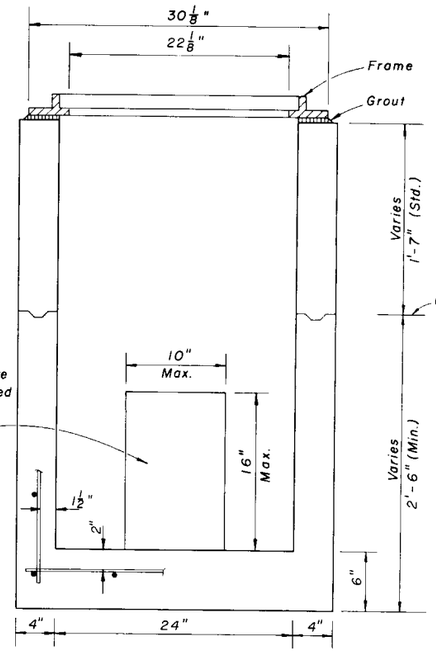
TYPICAL TOP AND APRON



TOP VIEW

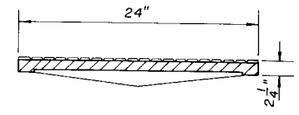


TOP VIEW



SECTION

BOX AND FRAME



SECTION

CAST IRON COVER

GENERAL NOTES

1. Cast iron cover and frame to be U.S. Foundry and Manufacturing Corporation No. 1610, Neenah Foundry Company R-6683-2 or equal. US. Foundry No. 1610 detailed this index.
2. Box to be Class I Concrete, reinforced with No. 3 bars on 8" centers both ways sides and bottom.
3. Concrete apron to be included in cost of inspection box.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

UNDERDRAIN INSPECTION BOX

	Names	Dates
Designed by	EGR	8/79
Drawn by	HSD	8/79
Checked by	JVG	8/79
F.H.W.A. Approved:		

Approved By _____ Deputy Design Engineer, Roadways

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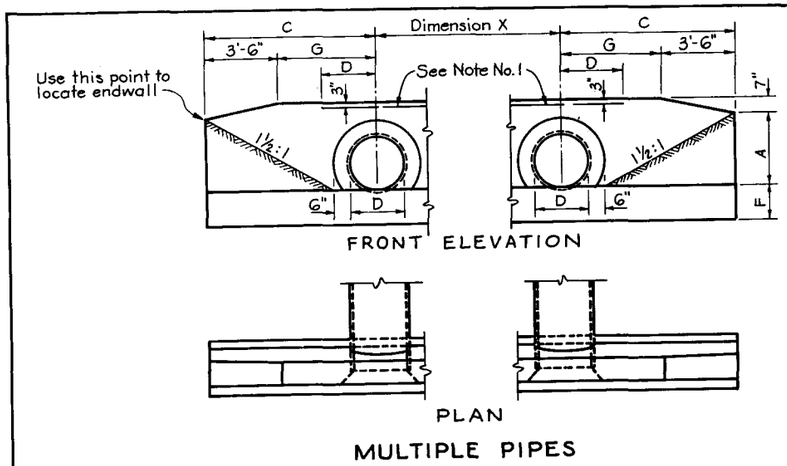
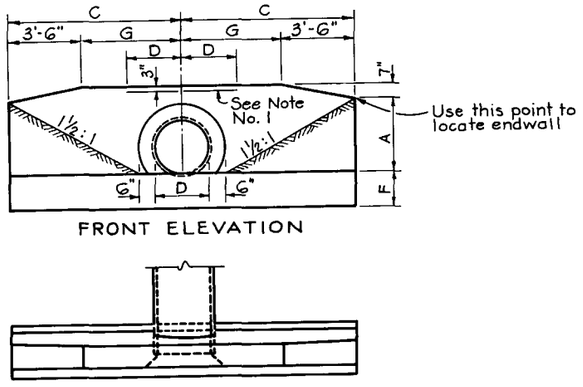




CONCRETE ENDWALLS FOR ROUND PIPE CULVERTS

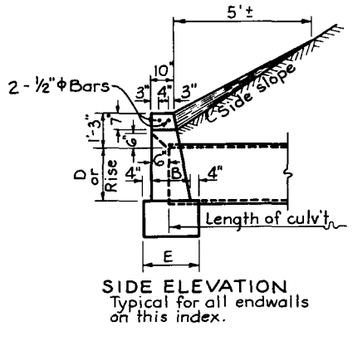


TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR ROUND PIPE CULVERT ENDWALLS

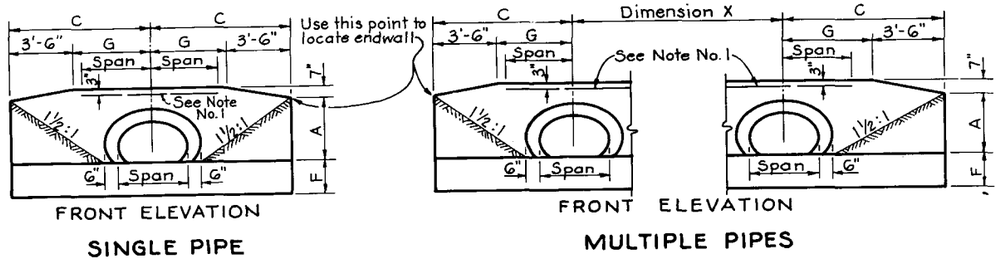
D	AREA OF OPENING SQUARE FEET				DIMENSIONS							QUANTITIES IN ONE ENDWALL CU. YDS. OF CLASS I CONCRETE												D
												ONE PIPE CULVERT			TWO PIPE CULVERT			THREE PIPE CULVERT			FOUR PIPE CULVERT			
	1 PIPE	2 PIPES	3 PIPES	4 PIPES	A	B	C	E	F	G	X	CONC.	C.M.	C.I.	CONC.	C.M.	C.I.	CONC.	C.M.	C.I.	CONC.	C.M.	C.I.	
15"	1.23	2.46	3.69	4.92	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"	2'-7"	1.23	1.24	1.24	1.59	1.62	1.61	1.94	1.99	1.98	2.30	2.37	2.36	15"
18"	1.77	3.54	5.31	7.08	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"	2'-10"	1.56	1.59	1.58	1.99	2.04	2.03	2.43	2.51	2.49	2.86	2.96	2.94	18"
21"	2.41	4.82	7.23	9.64	2'-5"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"	3'-2"	1.97												21"
24"	3.14	6.28	9.42	12.56	2'-8"	1'-4"	5'-6"	2'-0"	1'-4"	2'-0"	3'-5"	2.24	2.29	2.28	2.82	2.91	2.89	3.39	3.52	3.48	3.97	4.14	4.09	24"
27"	3.98	7.96	11.94	15.92	2'-11"	1'-5"	6'-0"	2'-1"	1'-5"	2'-6"	3'-10"	2.73												27"
30"	4.91	9.82	14.73	19.64	3'-2"	1'-6"	6'-6"	2'-2"	1'-6"	3'-0"	4'-3"	3.26	3.34	3.32	4.13	4.28	4.24	4.98	5.20	5.14	5.84	6.13	6.05	30"
36"	7.07	14.14	21.21	28.28	3'-8"	1'-8"	7'-6"	2'-4"	1'-8"	4'-0"	5'-1"	4.53	4.64	4.61	5.73	5.95	5.89	6.92	7.25	7.17	8.13	8.57	8.46	36"
42"	9.62	19.24	28.86	38.48	4'-2"	1'-10"	8'-6"	2'-6"	2'-0"	5'-0"	6'-0"	6.33	6.49	6.45	8.11	8.43	8.35	9.90	10.38	10.26	11.68	12.32	12.16	42"
48"	12.57	25.14	37.71	50.28	4'-8"	2'-1"	9'-6"	2'-9"	2'-0"	6'-0"	6'-9"	8.15	8.38	8.32	10.40	10.85	10.74	12.64	13.34	13.17	14.89	15.82	15.59	48"
54"	15.90	31.80	47.70	63.60	5'-2"	2'-6"	10'-6"	3'-2"	2'-3"	7'-0"	7'-8"	11.71			15.23			18.77			22.29			54"

TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR METAL PIPE ARCH CULVERT ENDWALLS

SPAN	RISE	AREA OF OPENING SQUARE FEET				DIMENSIONS							QUANTITIES IN ONE ENDWALL CU. YDS. OF CLASS I CONCRETE				SPAN	RISE	EQUIV. ROUND PIPE
		1 PIPE	2 PIPES	3 PIPES	4 PIPES	A	B	C	E	F	G	X	1 PIPE	2 PIPES	3 PIPES	4 PIPES			
28"	20"	2.8	5.6	8.4	11.2	2'-4"	1'-3"	5'-2"	1'-11"	1'-3"	1'-8"	3'-5"	1.78	2.31	2.83	3.36	28"	20"	24"
35"	24"	4.3	8.6	12.9	17.2	2'-8"	1'-4"	5'-11½"	2'-0"	1'-4"	2'-5½"	4'-0"	2.34	3.03	3.72	4.40	35"	24"	30"
42"	29"	5.9	11.8	17.7	23.6	3'-1"	1'-5"	6'-10½"	2'-1"	1'-5"	3'-4½"	4'-9"	3.13	4.06	4.99	5.93	42"	29"	36"
49"	33"	8.4	16.8	25.2	33.6	3'-5"	1'-6"	7'-8"	2'-2"	1'-6"	4'-2"	5'-6"	3.83	5.00	6.16	7.32	49"	33"	42"
57"	38"	10.6	21.2	31.8	42.4	3'-10"	1'-7"	8'-7½"	2'-3"	1'-7"	5'-1½"	6'-4"	4.87	6.31	7.74	9.18	57"	38"	48"
64"	43"	13.2	26.4	39.6	52.8	4'-3"	1'-8"	9'-6½"	2'-4"	1'-8"	6'-0½"	7'-1"	5.88	7.64	9.40	11.15	64"	43"	54"
71"	47"	16.9	33.8	50.7	67.6	4'-7"	1'-10"	10'-4"	2'-6"	2'-0"	6'-10"	7'-10"	7.80	10.15	12.49	14.85	71"	47"	60"

TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR CONCRETE ELLIPTICAL PIPE CULVERT ENDWALLS

SPAN	RISE	AREA OF OPENING SQUARE FEET				DIMENSIONS							QUANTITIES IN ONE ENDWALL CU. YDS. OF CLASS I CONCRETE				SPAN	RISE	EQUIV. ROUND PIPE
		1 PIPE	2 PIPES	3 PIPES	4 PIPES	A	B	C	E	F	G	X	1 PIPE	2 PIPES	3 PIPES	4 PIPES			
30"	19"	3.10	6.20	9.30	12.40	2'-3"	1'-4"	5'-1½"	2'-0"	1'-4"	1'-7½"	4'-2"	1.89	2.55	3.22	3.88	30"	19"	24"
38"	24"	4.98	9.96	14.94	19.92	2'-8"	1'-5"	6'-3"	2'-1"	1'-5"	2'-9"	5'-2"	2.64	3.55	4.48	5.39	38"	24"	30"
45"	29"	7.13	14.26	21.39	28.52	3'-1"	1'-6"	7'-0"	2'-2"	1'-6"	3'-6"	6'-0"	3.32	4.48	5.64	6.80	45"	29"	36"
53"	34"	9.82	19.64	29.46	39.28	3'-6"	1'-7"	7'-11½"	2'-3"	1'-7"	4'-5½"	7'-1"	4.24	5.76	7.29	8.81	53"	34"	42"
60"	38"	12.45	24.90	37.35	49.80	3'-10"	1'-8"	8'-9"	2'-4"	1'-8"	5'-3"	7'-11"	5.22	7.16	9.10	11.05	60"	38"	48"
68"	43"	15.94	31.88	47.82	63.76	4'-3"	1'-10"	9'-8½"	2'-6"	1'-10"	6'-3½"	8'-10"	6.63	9.01	11.39	13.77	68"	43"	54"
76"	48"	19.89	39.78	59.67	79.56	4'-8"	2'-1"	10'-8"	2'-9"	2'-0"	7'-2"	9'-9"	8.66	11.74	14.82	17.91	76"	48"	60"
83"	53"	24.02	48.04	72.06	96.08	5'-1"	2'-6"	11'-7"	3'-2"	2'-6"	8'-1"	10'-7"	12.50	16.98	21.47	25.97	83"	53"	66"
91"	58"	28.76	57.52	86.28	115.04	5'-6"	2'-10"	12'-6½"	3'-6"	2'-10"	9'-0½"	11'-4"	16.46	22.26	28.05	33.85	91"	58"	72"



CONCRETE ENDWALLS FOR METAL PIPE ARCH CULVERTS AND CONCRETE ELLIPTICAL PIPE CULVERTS

GENERAL NOTES

1. Reinforcing Steel grade 40 or 60. Cost of bars shall be included in the contract unit price for concrete.
2. For sodding around endwall see detail on Index Nº 281.
3. Provide 20' transition from endwall to ditch slopes where sideslopes on outfall ditches are flatter than 1½:1.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS SINGLE AND MULTIPLE PIPE

	Names	Dates
Designed by	HAB	5/73
Drawn by		
Checked by	LMF	5/73
F.H.W.A. Approved		8/30/77

Approved By: Jc Bullard
Deputy Design Engineer, Roadways

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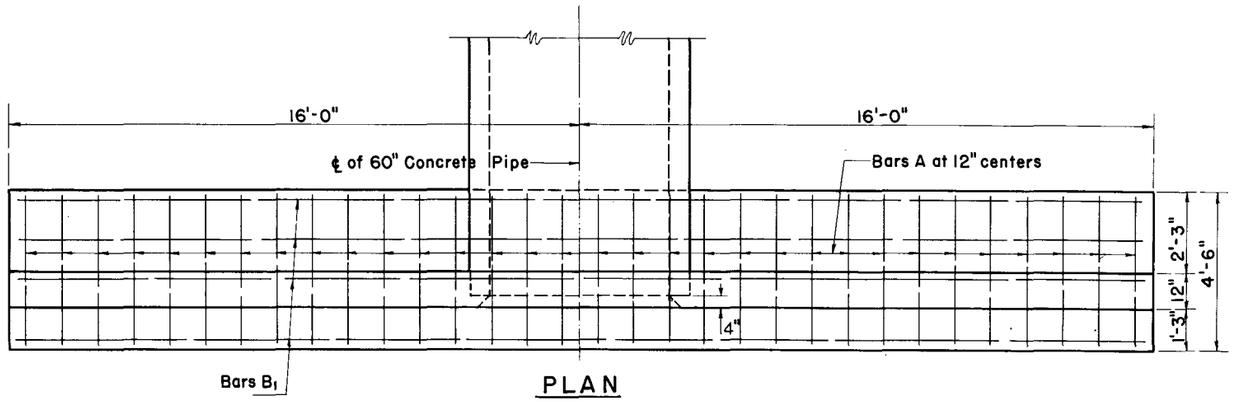
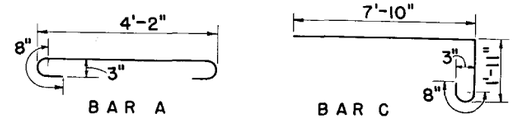


PLAN
SHOWING BARS IN FOOTING

BILL OF REINFORCING STEEL					
MARK	SIZE	Nº REQ'D.	LENGTH	LOCATION	BENDING
A	Nº 4	32	5'-3"	Footing	Bend
B_1	Nº 4	14	31'-6"	Footing and Wall	Straight
B_2	Nº 4	4	12'-4"	Wall	Straight
B_3	Nº 4	4	13'-9"	Wall	Straight
C	Nº 4	26	10'-3"	Wall	Bend
D	Nº 4	18	7'-10"	Wall	Straight
E	Nº 4	8	1'-8"	Footing and Wall	Straight

BENDING DIAGRAMS

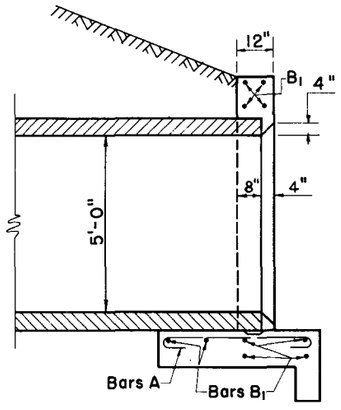


NOTE: All bar dimensions are out to out

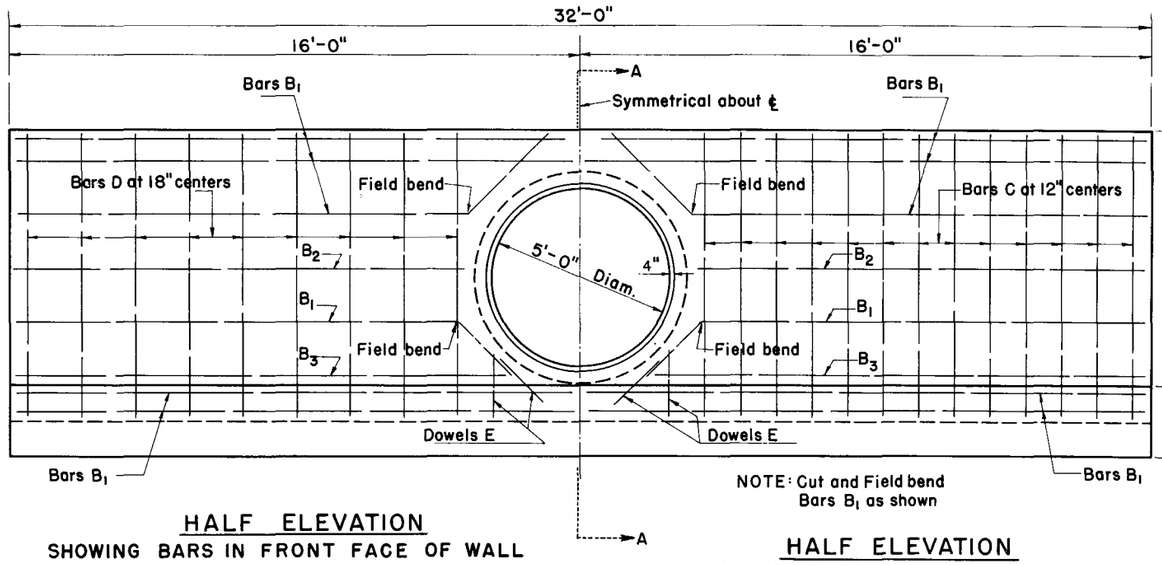
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete Class II	Cu. Yd.	13.56
Reinforcing Steel	Pound	758

Note: For sodding around endwall see detail on Index no. 281.



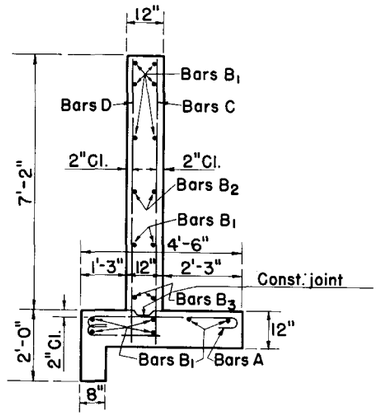
SECTION A-A



HALF ELEVATION
SHOWING BARS IN FRONT FACE OF WALL

NOTE: Cut and Field bend Bars B_1 as shown

HALF ELEVATION
SHOWING BARS IN BACK FACE OF WALL



TYPICAL SECTION
THRU ENDWALL

-GENERAL NOTES-

DESIGN SPECIFICATIONS: A.A.S.H.O., 1973
CHAMFER: All exposed edges and corners to be chamfered 3/4" unless otherwise shown
REINFORCING STEEL: Grade 40 or 60

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

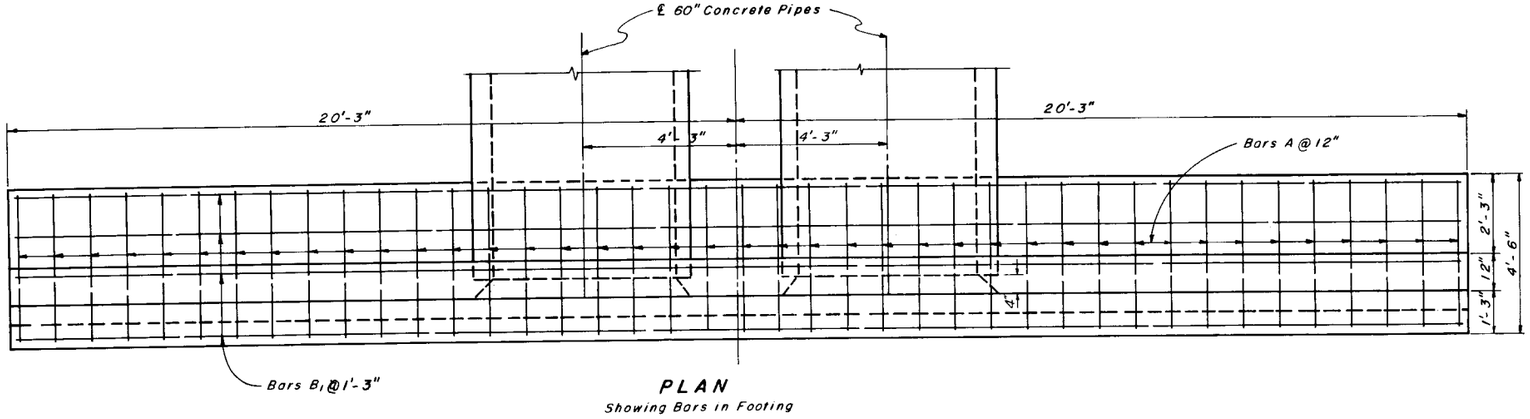
STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 60" CONCRETE PIPE

	Names	Dates
Designed By		
Drawn By	TWJ	11/49
Checked By	WHM	11/49

F.H.W.A. Approved: 3/20/75

Approved By: Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	1 of 2	251



PLAN
Showing Bars in Footing

BILL OF REINFORCING STEEL

MARK	SIZE	No. REQ'D.	LENGTH	LOCATION	BENDING
A	4	41	5'-3"	Footing	Bend
B_1	4	10	40-2"	Footing&Wall	Straight
B_2	4	4	12'-6"	Wall	Straight
B_3	4	4	13'-9"	Wall	Straight
B_4	4	4	6'-0"	Wall	Field Bend
B_5	4	2	2'-2"	Wall	Straight
B_6	4	8	15'-0"	Wall	Field Bend
C	4	29	10'-3"	Footing&Wall	Bend
D	4	20	7'-10"	Footing&Wall	Straight
E	4	16	1'-8"	Footing&Wall	Straight

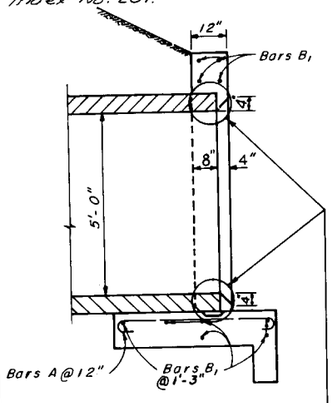
BENDING DIAGRAMS

NOTE: All Bar dimensions are out to out.

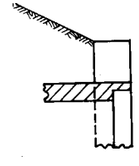
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class II Concrete	Cu. Yd.	16.39
Reinforcing Steel	Lb.	901

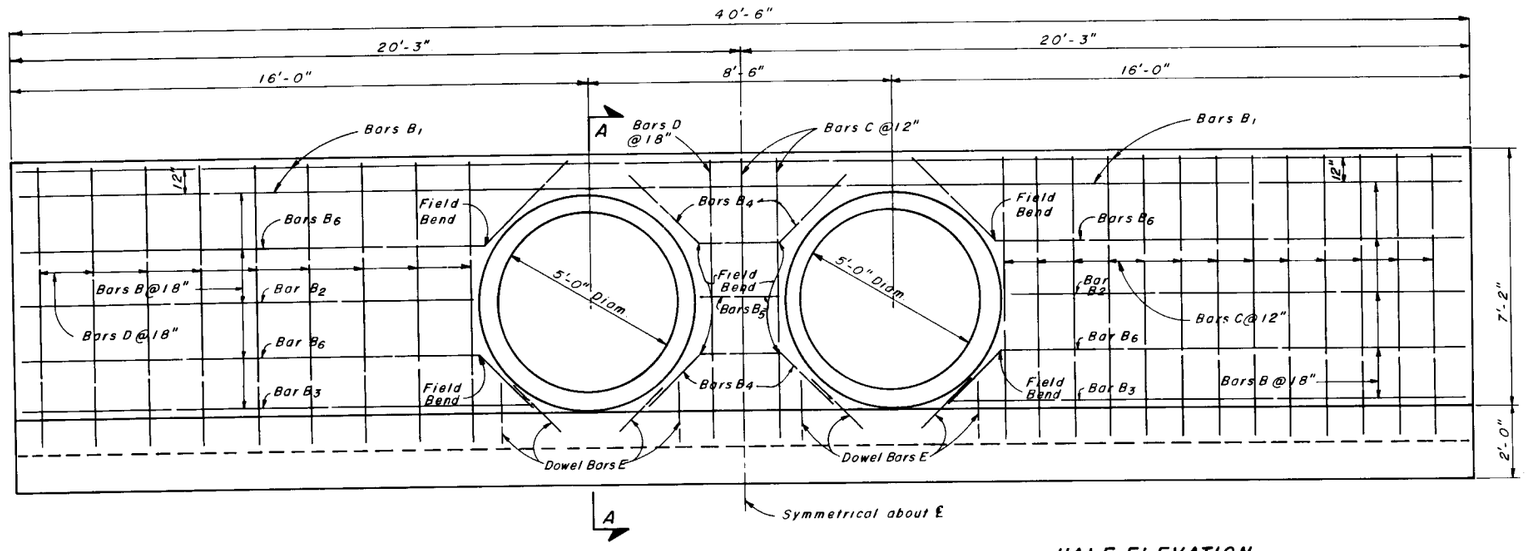
Note: For sodding around endwall see detail on Index No. 281.



SECTION A-A

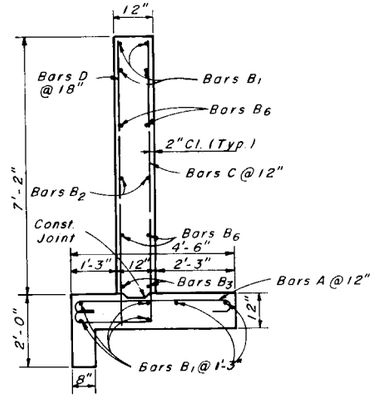


ALTERNATE ENTRANCE



HALF ELEVATION
Showing Bars in Front Face of Wall

HALF ELEVATION
Showing Bars in Back Face of Wall



TYPICAL SECTION
THRU ENDWALL

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O. 1973
CHAMFER: All Exposed Edges and Corners to be Chamfered 3/4" unless otherwise shown.
MAXIMUM WORKING STRESSES:
Class II Concrete 1,360 PSI
Reinforcing Steel 20,000 PSI
REINFORCING STEEL: Grade 40 or 60

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 60" CONCRETE PIPE

	Names	Dates
Designed by		
Drawn by	TWJ	11/48
Checked by	WHM	11/49
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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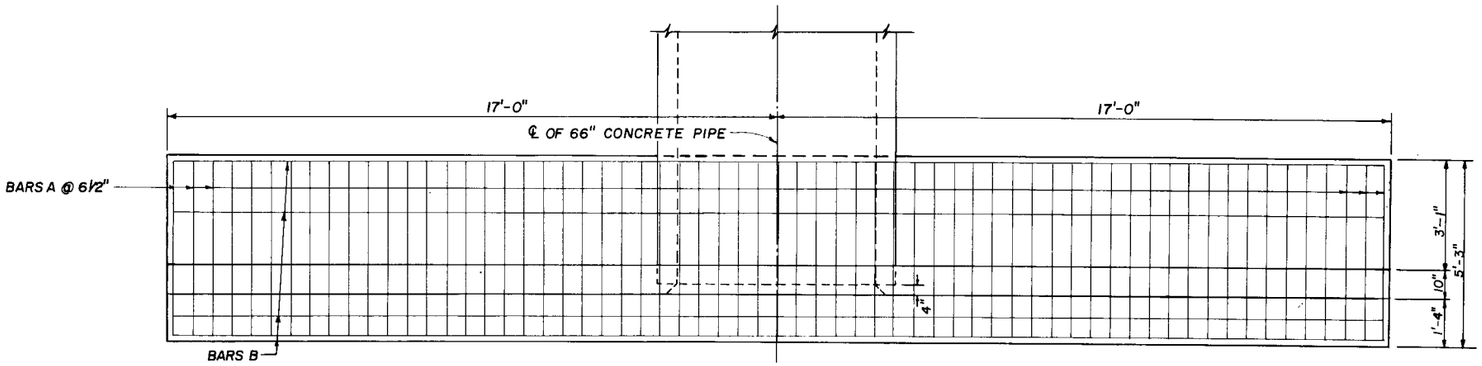
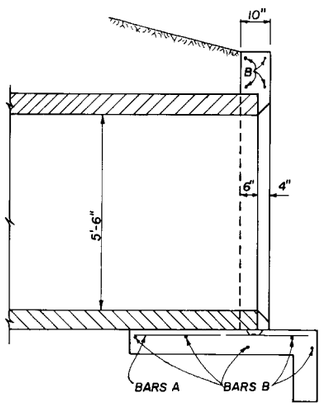
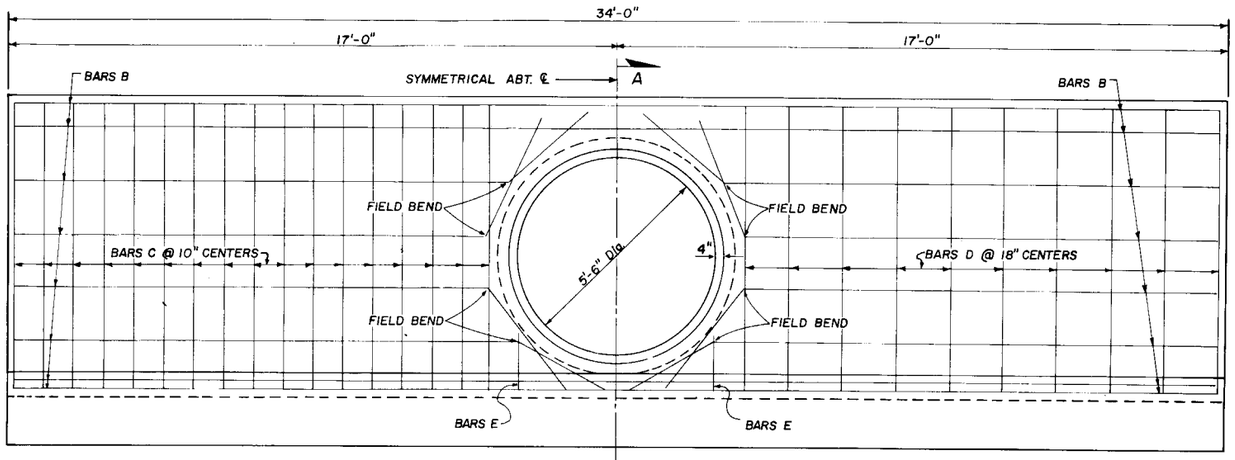


PLAN
(SHOWING BARS IN FOOTING)

NOTE: For sodding around endwall see Index No. 281.



SECTION A-A

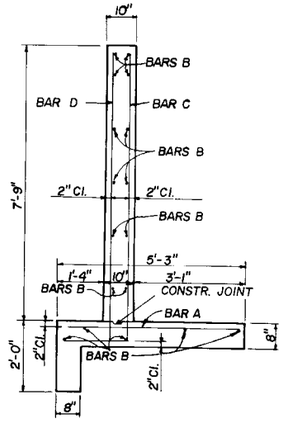


NOTE: CUT AND FIELD BEND BARS B AS SHOWN.

A

HALF ELEVATION
(SHOWING BARS IN BACK FACE OF WALL)

HALF ELEVATION
(SHOWING BARS IN FRONT FACE OF WALL)

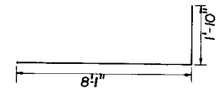


TYPICAL SECTION
THRU ENDWALL

BILL OF REINFORCING STEEL

MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	63	4'-11"	FOOTING	STRAIGHT
B	4	17	33'-8"	FOOTING & WALL	"
C	5	34	9'-10"	WALL	BEND
D	4	20	8'-1"	"	STRAIGHT
E	4	4	1'-8"	"	"

BENDING DIAGRAMS



BAR C

NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE, CLASS II	CU. YD.	12.60
REINFORCING STEEL	LB.	1167

GENERAL NOTES

DESIGN SPECIFICATION: A.A.S.H.O., 1973
CHAMFER: ALL EXPOSED EDGES AND CORNERS TO BE CHAMFERED 3/4" UNLESS OTHERWISE NOTED
REINFORCING STEEL: GRADE 40 OR 60

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALL SINGLE 66" CONCRETE PIPE

	Names	Dates
Designed by	JLW	3/54
Drawn by		
Checked by	RCB	3/54
F.H.W.A. Approved:		3/20/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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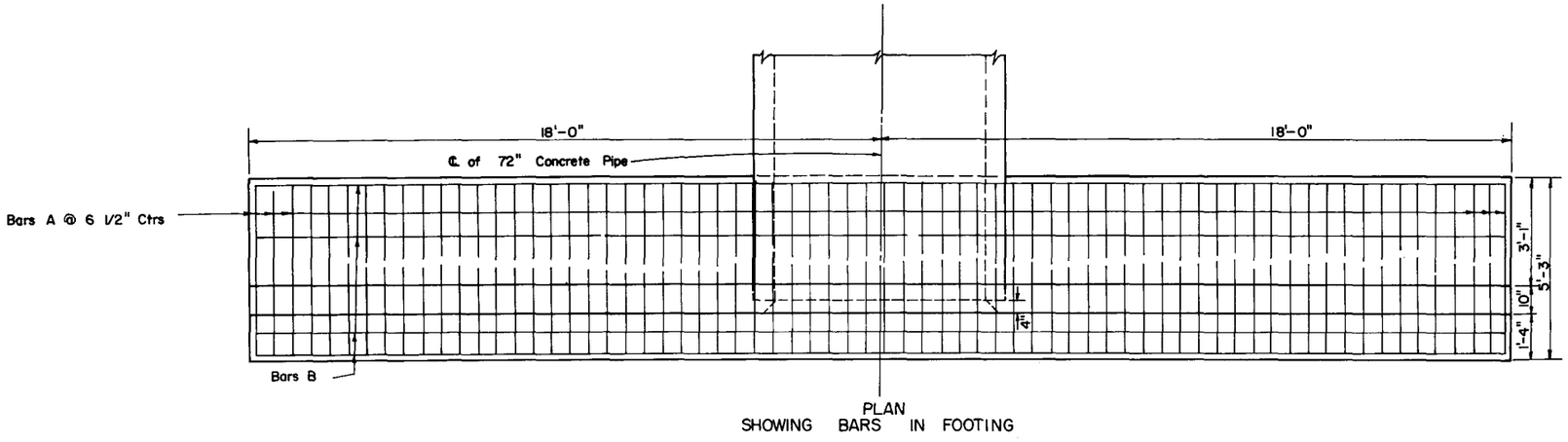
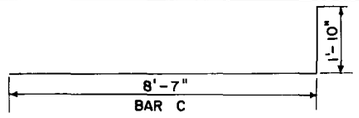


PLAN
SHOWING BARS IN FOOTING

BILL OF REINFORCING STEEL					
MARK	SIZE	No. Req'd	LENGTH	LOCATION	BENDING
A	5	68	4' – 11"	FOOTING	STRAIGHT
B	4	17	35' – 8"	FOOTING & Wall	"
C	5	34	10' – 5"	WALL	BEND
D	4	20	8' – 7"	WALL	STRAIGHT
E	4	4	2' – 6"	WALL	"
F	4	4	1' – 6"	WALL	"

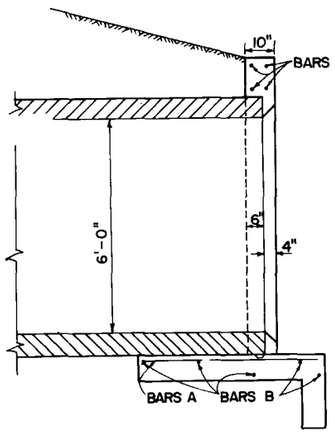
BENDING DIAGRAMS



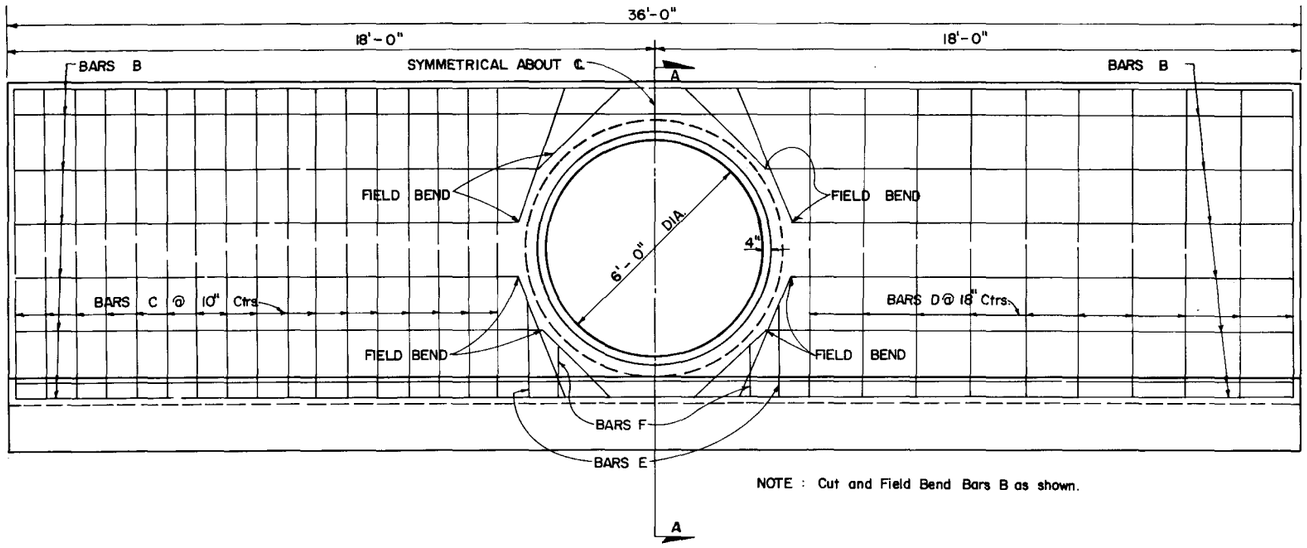
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES		
ITEMS	UNIT	QUANTITY
CONCRETE CLASS II	CU. YD.	13.76
REINFORCING STEEL	LB.	1249

NOTE: For sodding around endwall see Index No. 281.



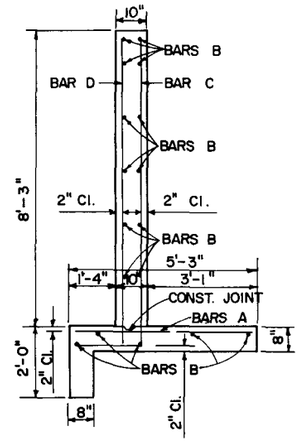
SECTION A-A



NOTE : Cut and Field Bend Bars B as shown.

HALF ELEVATION
SHOWING BARS IN BACK FACE OF WALL

HALF ELEVATION
SHOWING BARS IN FRONT FACE OF WALL



TYPICAL SECTION
THRU ENDWALL

GENERAL NOTES

DESIGN SPECIFICATIONS : A.A.S.H.O., 1973

CHAMFER: All exposed edges and corners to be chamfered 3/4" unless otherwise noted.

REINFORCING STEEL: GRADE 40 or 60

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 72" CONCRETE PIPE

	Names	Dates
Designed by	EVC	10/55
Drawn by		
Checked by	WHW	10/55
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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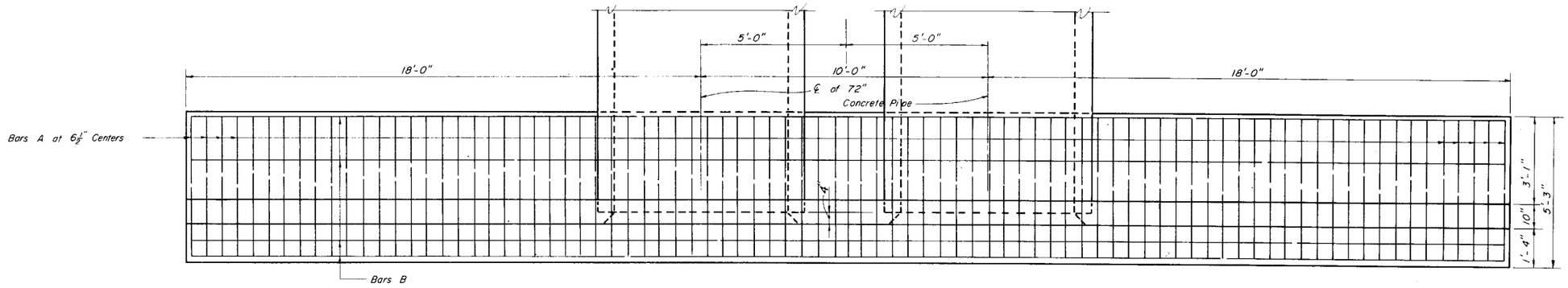
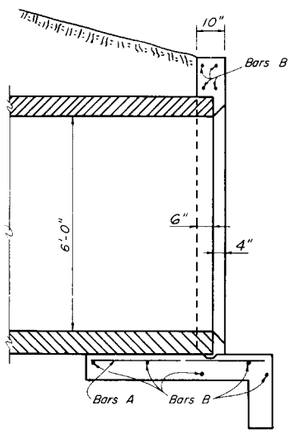
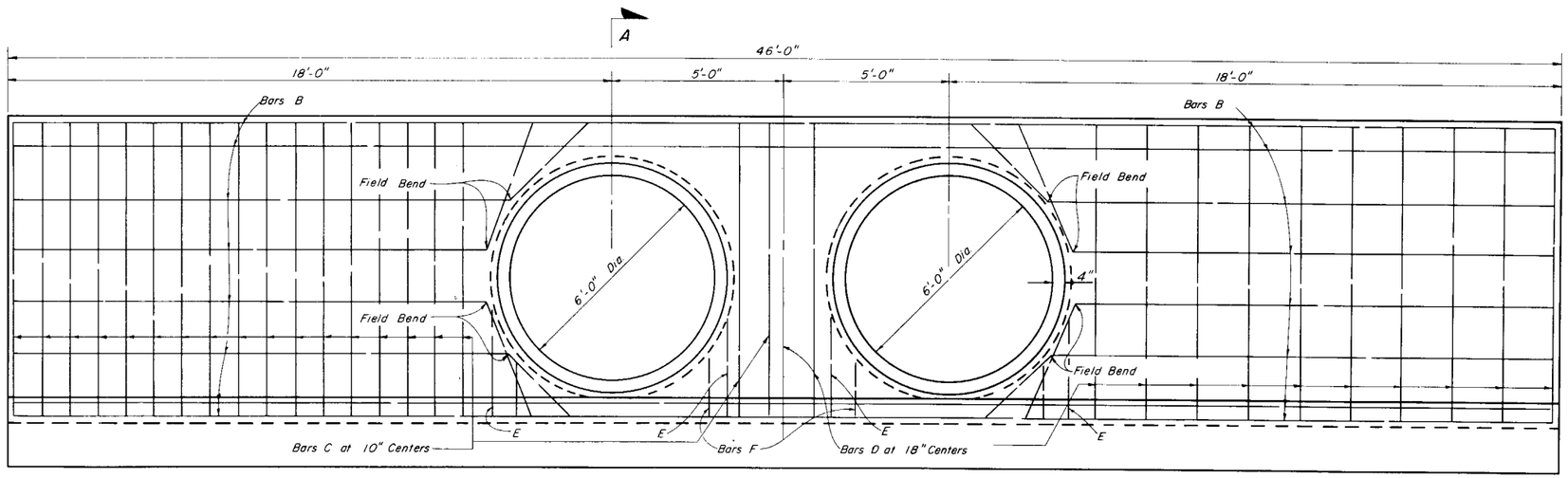


PLAN
(SHOWING BARS IN FOOTING)

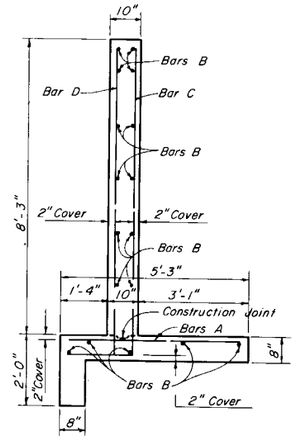
NOTE: For sodding around endwall see Index No. 281.



SECTION A-A



NOTE: Cut and Field Bend Bars B as shown.



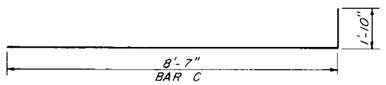
TYPICAL SECTION
THRU ENDWALL

HALF ELEVATION
(SHOWING BARS IN BACK FACE OF WALL)

HALF ELEVATION
(SHOWING BARS IN FRONT FACE OF WALL)

BILL OF REINFORCING STEEL					
Mark	Size	No Req'd	Length	Location	Bending
A	5	85	4'-11"	Footing	Straight
B	4	17	45'-8"	Footing & Wall	"
C	5	38	10'-5"	Wall	Bend
D	4	23	8'-7"	Wall	Straight
E	4	8	2'-6"	Wall	"
F	4	8	1'-6"	Wall	"

BENDING DIAGRAM



NOTE: All Bar dimensions are out-to-out.

ESTIMATED QUANTITIES		
Item	Unit	Quantity
Class II Concrete	Cu. Yd.	16.74
Reinforcing Steel	Lb.	1519

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O. 1973
CHAMFER: All exposed edges and corners to be chamfered ¾" unless otherwise noted.
REINFORCING STEEL: Grade 40 or 60

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 72" CONCRETE PIPE

	Names	Dates
Designed by	E.V.C	10/55
Drawn by		
Checked by	W.H.W	10/55
F.H.W.A. Approved:		7/7/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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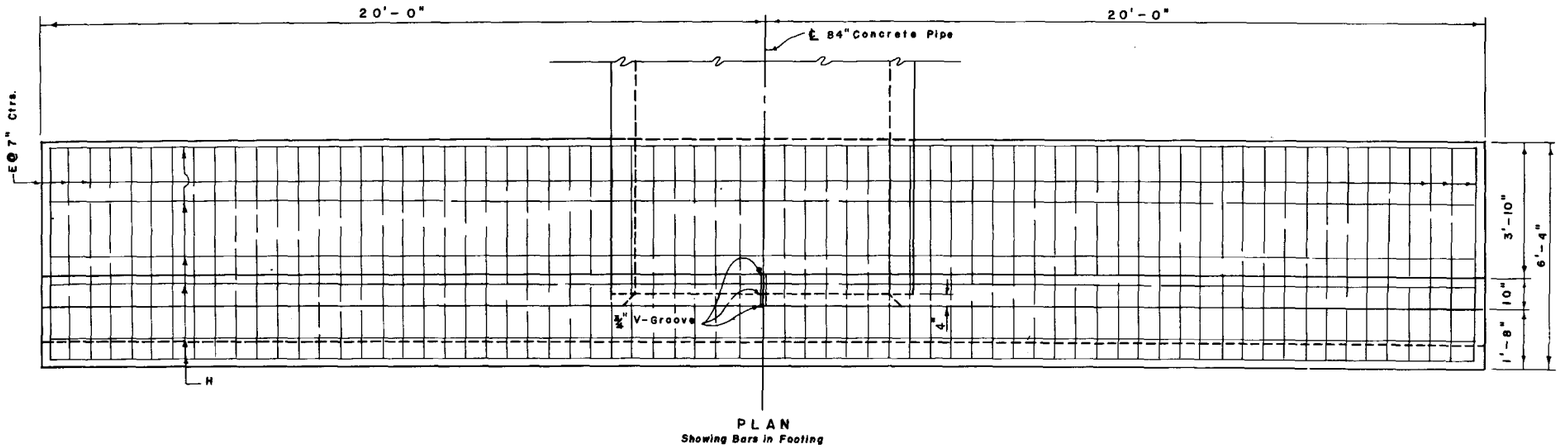
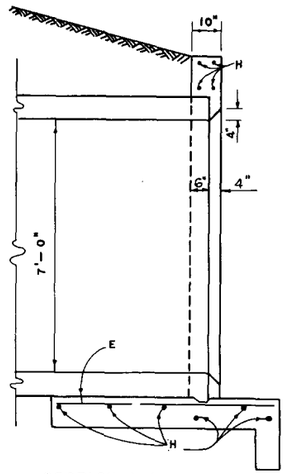


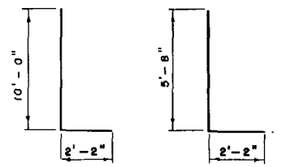
PLAN
Showing Bars in Footing



SECTION A-A
NOTE: For sodding around endwall see Index No. 281.

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D.	LENGTH
E	6	69	6'-0"
H	4	20	39'-8"
V_1	6	26	12'-2"
V_2	6	26	7'-10"
V_3	4	22	10'-0"
V_4	4	4	2'-0"

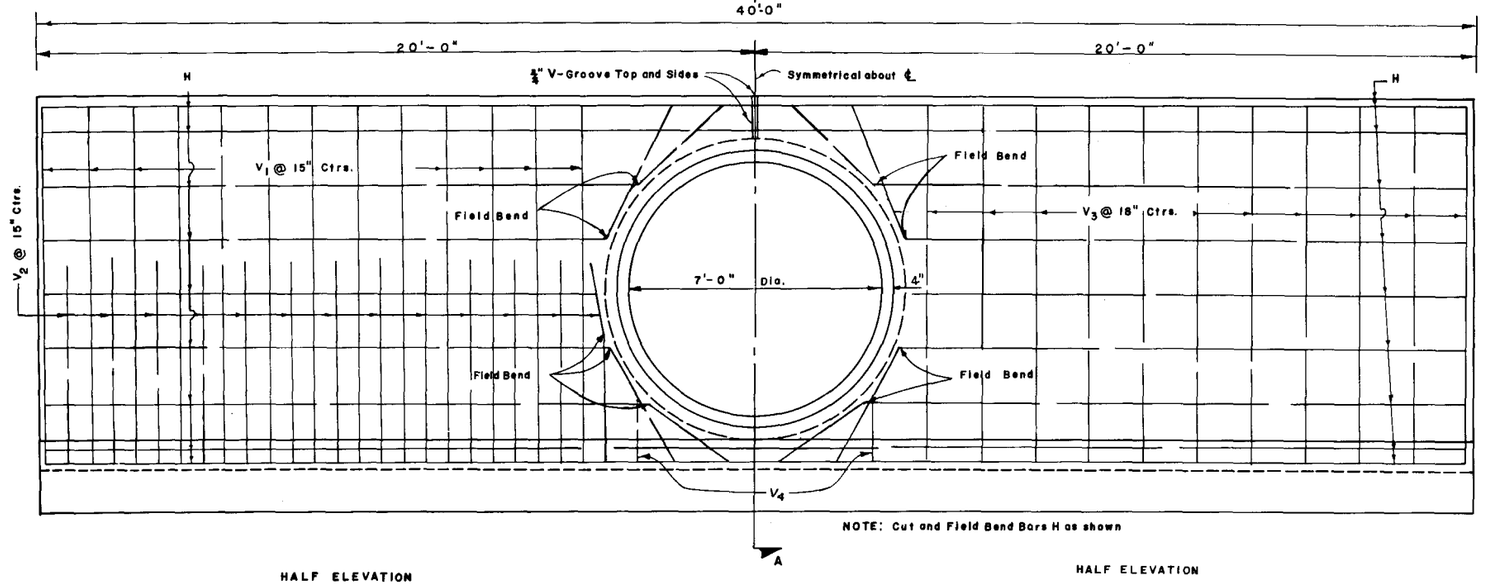
BENDING DIAGRAM



BAR V1 BAR V2

NOTE: All Bar Dimensions are out-to-out.

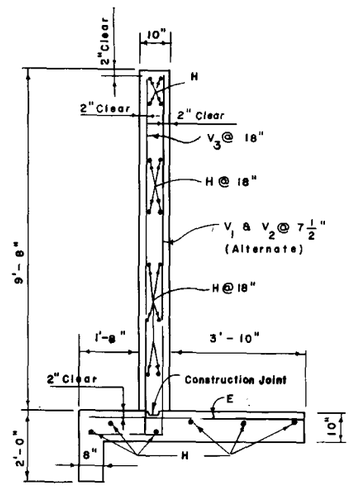
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete, Class II	Cu. Yd.	19.3
Reinforcing Steel	Lb.	2,085



NOTE: Cut and Field Bend Bars H as shown

HALF ELEVATION
Showing Bars in Back Face of Wall

HALF ELEVATION
Showing Bars in Front Face of Wall



TYPICAL SECTION THRU ENDWALL

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O. 1973
CHAMFER: All exposed edges and corners to be chamfered 3/4" unless otherwise noted.
REINF. STEEL; Grade 40 to 60.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALL SINGLE 84" CONCRETE PIPE

	Names	Dates
Designed by		
Drawn by	WHW	7/58
Checked by	HCG	7/58
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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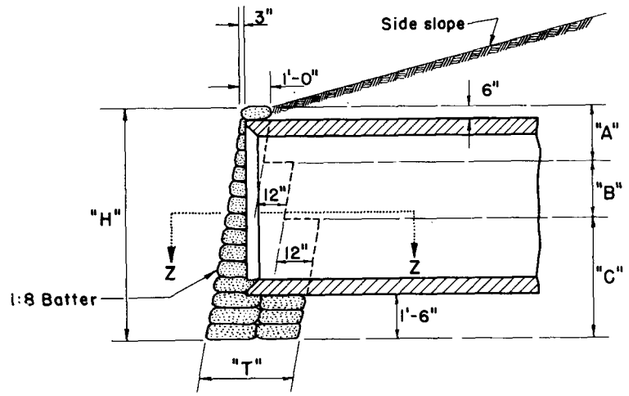
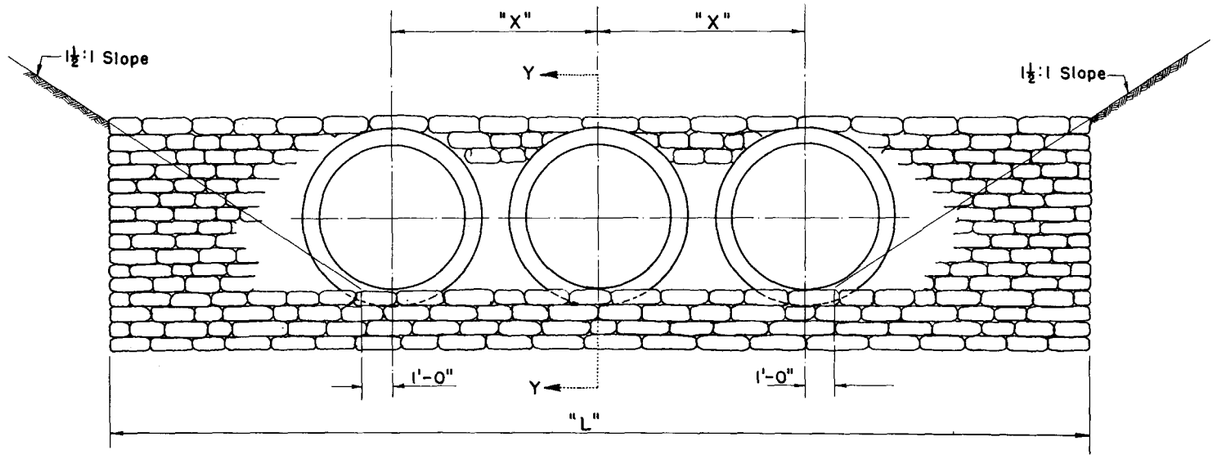
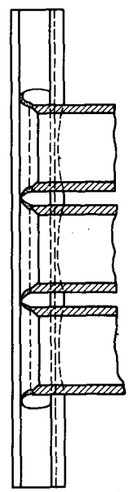


SECTION Y-Y



FRONT ELEVATION



SECTION Z-Z

TABLE OF DIMENSIONS							QUANTITIES FOR ONE ENDWALL							
SIZE OF PIPE	H	T	A	B	C	X	ONE PIPE CULVERTS		TWO PIPE CULVERTS		THREE PIPE CULVERTS		FOUR PIPE CULVERTS	
							L	RIPRAP CU. YDS.	L	RIPRAP CU. YDS.	L	RIPRAP CU. YDS.	L	RIPRAP CU. YDS.
18"	3'-10"	1'-0"	3'-10"	0'-0"	0'-0"	2'-10"	8'-0"	1.04	10'-10"	1.34	13'-8"	1.65	16'-6"	1.95
24"	4'-5"	2'-0"	2'-0"	2'-5"	0'-0"	3'-5"	9'-8"	2.22	13'-1"	2.85	16'-6"	3.49	19'-11"	4.13
30"	5'-0"	2'-0"	2'-0"	3'-0"	0'-0"	4'-3"	11'-3"	2.94	15'-6"	3.81	19'-9"	4.67	24'-0"	5.54
36"	5'-7"	2'-0"	2'-0"	3'-7"	0'-0"	5'-1"	12'-11"	3.79	18'-0"	4.91	23'-1"	6.04	28'-2"	7.17
42"	6'-3"	3'-0"	2'-0"	2'-0"	2'-3"	6'-0"	14'-7"	5.94	20'-7"	7.83	26'-7"	9.71	32'-7"	11.60
48"	6'-10"	3'-0"	2'-0"	2'-0"	2'-10"	6'-9"	16'-3"	7.45	23'-0"	9.81	29'-9"	12.16	36'-6"	14.51
54"	7'-6"	3'-0"	2'-0"	2'-0"	3'-6"	7'-8"	18'-0"	9.22	25'-8"	12.12	33'-4"	15.02	41'-0"	17.92
60"	8'-2"	3'-0"	2'-0"	2'-0"	4'-2"	8'-6"	19'-9"	11.23	28'-3"	14.75	36'-9"	18.27	45'-3"	21.79
66"	8'-7"	3'-0"	2'-0"	2'-0"	4'-7"	9'-2"	21'-7½"	12.92	30'-9½"	15.18				
72"	9'-2"	3'-0"	2'-0"	2'-0"	5'-2"		23'-3"	15.07						
84"	10'-4"	3'-0"	2'-0"	2'-0"	6'-4"		26'-6"	18.72						

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT SAND-CEMENT ENDWALLS

	Names	Dates
Designed by		
Drawn by	EH	5/48
Checked by	HB	5/48
F.H.W.A. Approved: 12/6/76		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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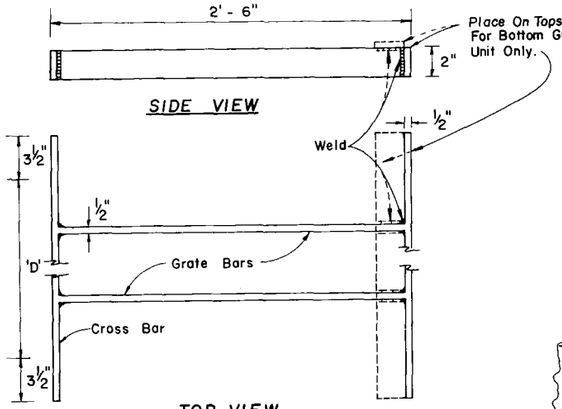
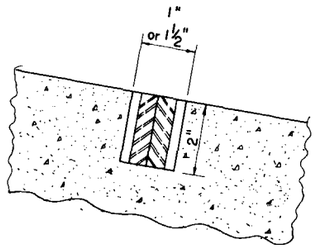


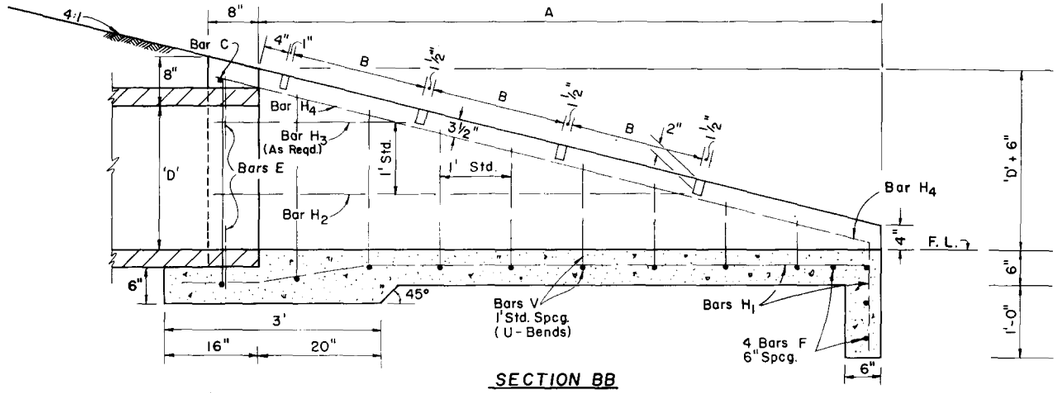
GRATE TYPE NO. 1

Pipe Size	Grate Bars Reqd.	Grate Wt.
15"	2	28.93

Bars to be evenly spaced across dimension 'D'.
All bars ½" x 2".



SECTION AA



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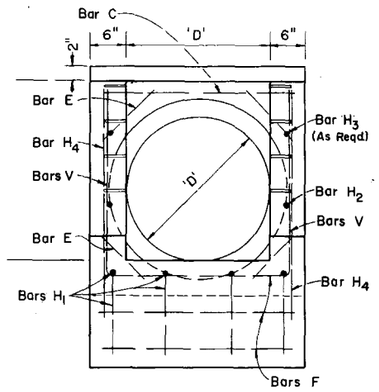
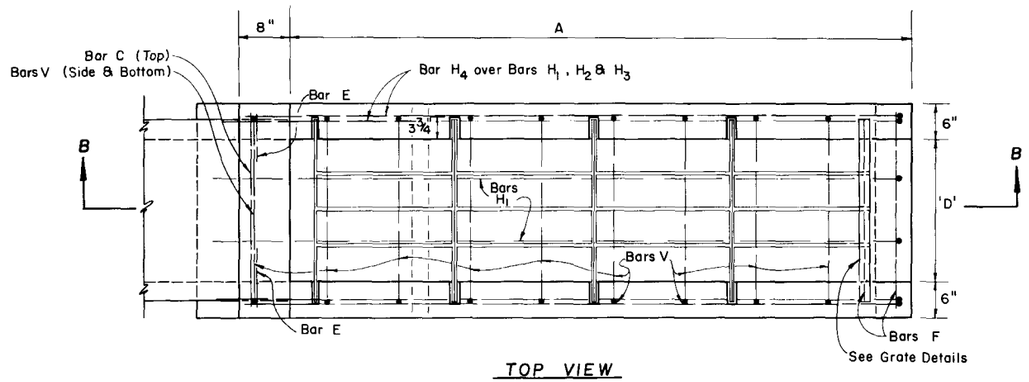
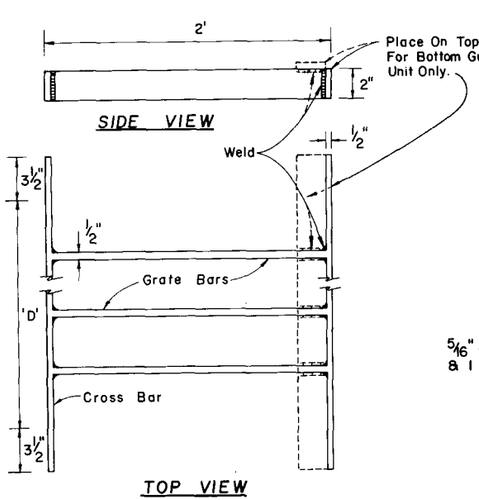


END VIEW



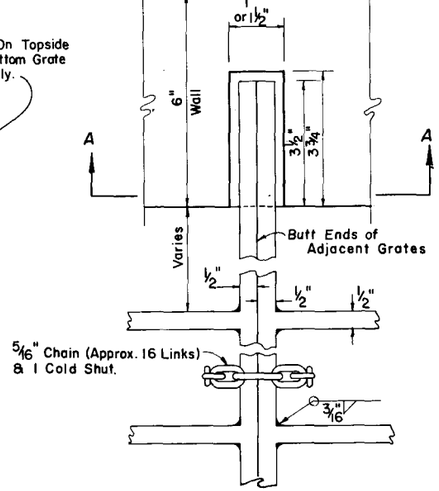
TOP VIEW



GRATE TYPE NO. 2

Pipe Size	Grate Bars Reqd.	Grate Wt.
18"	3	33.69
24"	4	43.63
30"	5	53.55

Bars to be evenly spaced across dimension 'D'.
All bars ½" x 2".



GRATE, SEAT, WELD & CHAIN DETAIL

TABLE OF DIMENSIONS AND QUANTITIES

RATE OF SLOPE	PIPE SIZE 'D'	A	B		CONC. CLASS I (Cu.Yds)	REINF. STEEL (lbs.)	NUMBER OF GRATES REQ'D. GRATE TYPE NO. 1	NUMBER OF GRATES REQ'D. GRATE TYPE NO. 2	TOTAL GRATE WT(lbs.)	SODDING (Sq. Yds.)
4:1	15"	5.67'	2.38'		0.85	56	2	0	57.86	14.5
	18"	6.67'	1.875'		1.01	73	0	3	101.08	15.8
	24"	8.67'	1.875'		1.65	97	0	4	174.52	18.4
	30"	10.67'	1.875'		2.33	129	0	5	267.75	21.0

GENERAL NOTES

1. This endwall is to be used only in the clear recovery area for the drainage of medians and other areas having low design velocities and negligible debris.
2. Reinforcing Steel: All bars are size # 4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted.
   Square welded wire fabric (two cages max.) having an equivalent cross sectional area (0.20 sq. in.) may be substituted for bar reinforcement.
3. Grates to be ASTM A 588 weathering steel. If exposed to salt water, (Specific locations will be designated in plans.) grate to be fabricated from ASTM A 572, Grade 50, then galvanized.
4. Endwall to be paid for per each. Payment shall include cost of concrete, reinforcing steel, grate, and accessories. Quantities shown are for estimating purposes only.
5. Sod slopes 5' each side and above endwall. Sodding to be paid for under contract unit price for Sodding.
6. Precasting of this endwall will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the D.O.T. Engineer of Drainage.
7. Concrete meeting the requirements of A.S.T.M. C 478 (4,000 P.S.I.) may be used in lieu of Class I concrete for precast units.

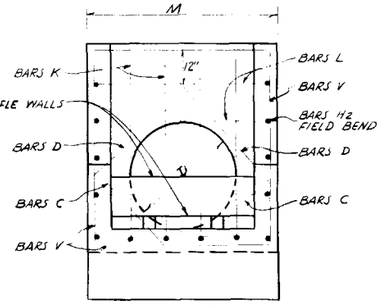
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE CONCRETE ENDWALLS WITH GRATES 15" TO 30" PIPE

	Names	Dates
Designed by	EGR	6/77
Drawn by	HKH	6/77
Checked by	JVG	6/77
F.H.W.A. Approved:		7/15/77

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	1 of 1	260



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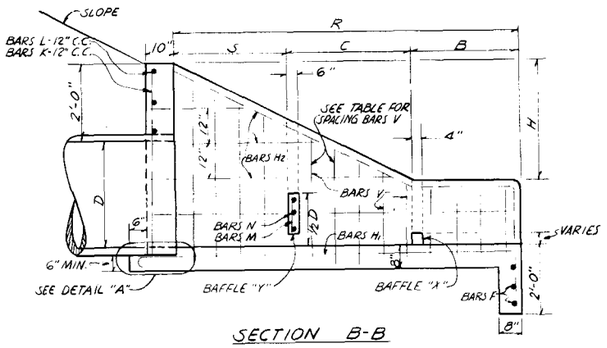
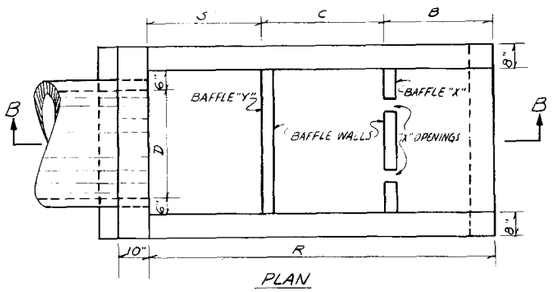


SECTION B-B



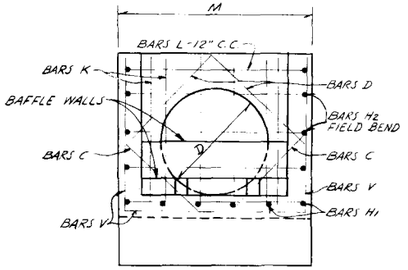
DETAILS OF U-ENDWALL WITH BAFFLES FOR 2:1 SLOPE

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL (SECTION A-A)

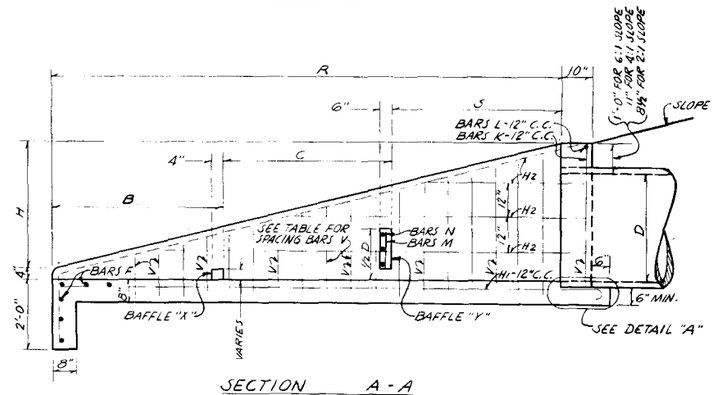
RATE OF SLOPE	PIPE SIZE "D"	AREA OF OPENING SQ. FT.	R	H	M	BAFFLE LOCATIONS (WHEN REQUIRED) S	B	C	CONCRETE CLASS I CU. YD.	REINFORCING STEEL LBS.
2:1	15"	1.23	3'-3"	1'-7½"	3'-7"				0.88	49
	18"	1.77	3'-9"	1'-10½"	3'-10"				1.05	60
	24"	3.14	4'-3"	2'-4½"	4'-4"				1.40	82
	30"	4.91	5'-9"	2'-10½"	4'-10"				1.88	106
4:1	15"	1.23	7'-4"	1'-10"	3'-7"	2'-6"	2'-6"	2'-4"	1.54	95
	18"	1.77	8'-4"	2'-1"	3'-10"	2'-10"	2'-10"	2'-8"	1.84	109
	24"	3.14	10'-4"	2'-7"	4'-4"	3'-6"	3'-6"	3'-4"	2.53	139
	30"	4.91	12'-4"	3'-1"	4'-10"	4'-2"	4'-2"	4'-0"	3.34	236
6:1	15"	1.23	11'-6"	1'-11"	3'-7"	3'-10"	3'-10"	3'-10"	2.19	138
	18"	1.77	13'-0"	2'-2"	3'-10"	4'-4"	4'-4"	4'-4"	2.63	145
	24"	3.14	16'-0"	2'-8"	4'-4"	5'-4"	5'-4"	5'-4"	3.59	227
	30"	4.91	19'-0"	3'-2"	4'-10"	6'-4"	6'-4"	6'-4"	4.81	333

TABLE OF DIMENSIONS AND QUANTITIES FOR BAFFLES (SECTION A-A)

PIPE SIZE "D"	X BAFFLE OPENINGS WIDTH	HEIGHT	LENGTH	Y BAFFLE OPENING VERTICAL CLEARANCE	Y BAFFLE - REINFORCING STEEL BARS M	BARS N	CONCRETE CLASS I CU. YD.	REINFORCING STEEL LBS.
15"	4"	4"	4"	4"	3 - #4	1 - #4	0.03	4
18"	4"	4"	4"	4"	4 - #4	2 - #4	0.04	8
24"	5"	5"	4"	4"	5 - #4	3 - #4	0.05	12
30"	5"	5"	4"	4"	6 - #4	4 - #4	0.07	18



END VIEW

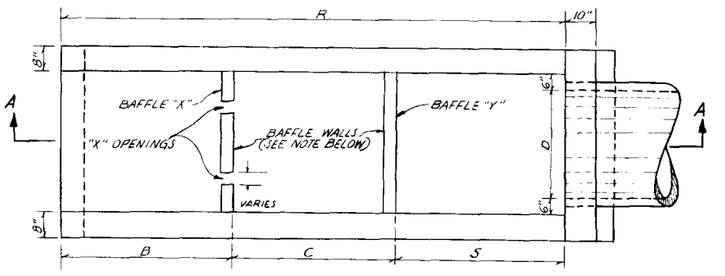


SECTION A-A

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL WITH BAFFLES FOR 2:1 SLOPE (SECTION B-B)

PIPE SIZE "D"	AREA OF OPENING SQ. FT.	R	H	M	S	B	C	X BAFFLE OPENINGS WIDTH	HEIGHT	LENGTH	Y BAFFLE OPENING VERTICAL CLEAR.	Y BAFFLE REINFORCING STEEL BARS M	BARS N	*CONCRETE CLASS I CU. YD.	*REINFORCING STEEL LBS.
15"	1.23	5'-9"	2'-3½"	3'-7"	2'-3"	1'-3"	2'-3"	4"	4"	4"	4"	3 - #4	1 - #4	1.61	99
18"	1.77	6'-6"	2'-5"	3'-10"	2'-6"	1'-6"	2'-6"	4"	4"	4"	4"	4 - #4	2 - #4	1.89	142
24"	3.14	8'-0"	2'-8"	4'-4"	3'-0"	2'-0"	3'-0"	5"	5"	4"	4"	5 - #4	3 - #4	2.52	193
30"	4.91	9'-6"	2'-11"	4'-10"	3'-6"	2'-6"	3'-6"	5"	5"	4"	4"	6 - #4	4 - #4	3.34	241

*NOTE: CONCRETE AND REINFORCING STEEL QUANTITIES IN THIS TABLE INCLUDE BAFFLE QUANTITIES.

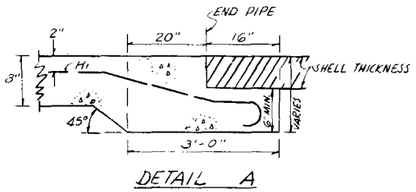


-PLAN-

DETAILS OF U-ENDWALL WITH OR WITHOUT BAFFLES FOR 4:1 AND 6:1 SLOPES AND WITHOUT BAFFLES FOR 2:1 SLOPE

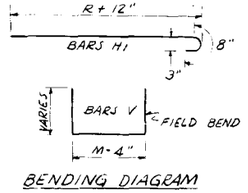
GENERAL NOTES

1. BAFFLES TO BE CONSTRUCTED ONLY AT LOCATIONS SPECIFIED IN THE PLANS.
2. WHEN STEEL GRATING IS REQUIRED ON ENDWALL SEE SHEET NO. 2 FOR MOUNTING DETAILS.
3. FOR SODDING AROUND ENDWALL SEE INDEX NO. 281.
4. REINFORCING - NO. 4 BARS 2" CLEARANCE EXCEPT AS NOTED.



DETAIL A

V.E.F. BAR SPACING	
PIPE DIAMETER	C. C.
15"	12"
18"	12"
24"	10"
30"	10"



BENDING DIAGRAM

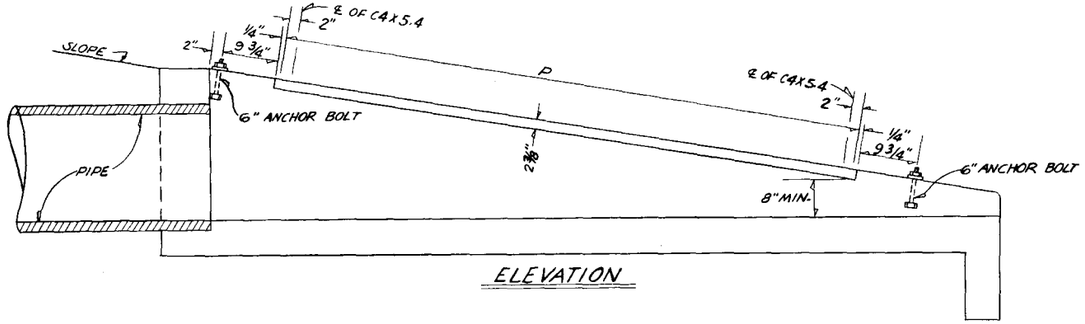
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE CONCRETE ENDWALLS BAFFLES AND GRATE OPTIONAL 15" TO 30" PIPE

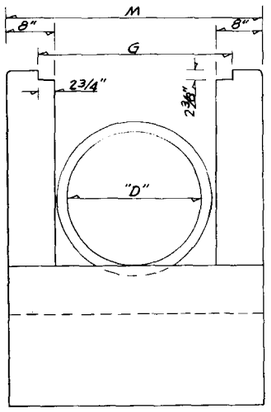
	Names	Dates
Designed by		
Drawn by	CDP	7/71
Checked by		
F.H.W.A. Approved		3/20/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	1 of 2	261



ELEVATION



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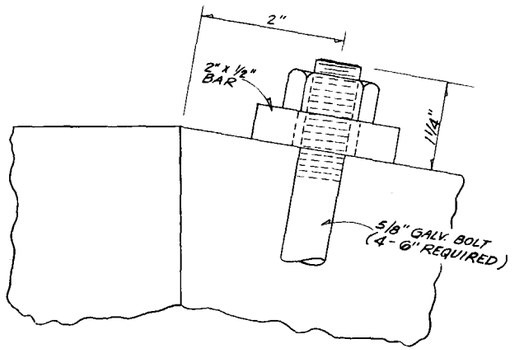
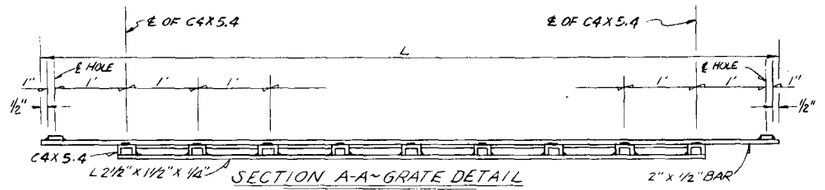


ANCHOR BOLT DETAIL

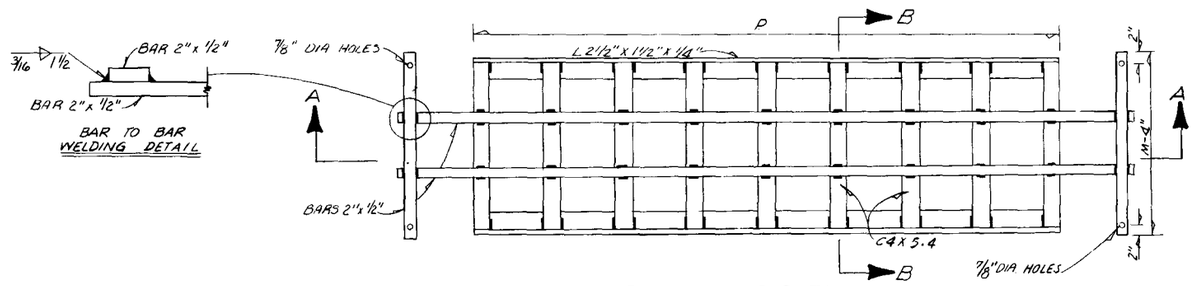
MOUNTING DETAILS FOR STEEL GRATING

STEEL GRATING USE CRITERIA

1. GRATED HEADWALL AND/OR ENDWALL TO BE USED ON PIPE CULVERTS WHEN IN THE DESIGNATED CLEAR RECOVERY AREA AND WHEN ANY OF THE FOLLOWING CONDITIONS EXIST:
   - A. DRAINAGE AREA TO CULVERT CONSISTS OF MEDIAN OR INFIELD AREAS OR AREAS WHERE DEBRIS AND/OR DRIFT IS NEGLIGIBLE.
   - B. RUNOFF TO CULVERT IS BY SHEET FLOW OR IN SUCH ILL DEFINED CHANNELS THAT DEBRIS TRANSPORT IS NOT CONSIDERED A MAJOR PROBLEM.
   - C. RUNOFF TO CULVERT IS MINOR EXCEPT ON AN INFREQUENT BASIS (10 TO 15 YEAR FREQUENCY); FOR EXAMPLE A DRAINAGE BASIN IN FLAT SANDY TERRAIN WITH NORMALLY LOW GROUND WATER TABLE.
   - D. AREAS WHERE CULVERT BLOCKAGE WITH RESULTANT BACKWATER WOULD NOT SERIOUSLY AFFECT ROADWAY EMBANKMENT, TRAFFIC OPERATION OR UPLAND PROPERTY.
2. STEEL GRATING TO BE USED ONLY WHERE CALLED FOR IN PLANS AND ONLY ON HEADWALLS AND/OR ENDWALLS HAVING EITHER 4:1 OR 6:1 RATES OF SLOPE.

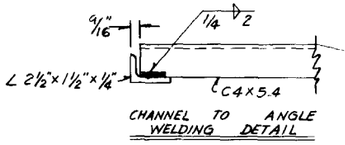


SECTION A-A~GRATE DETAIL

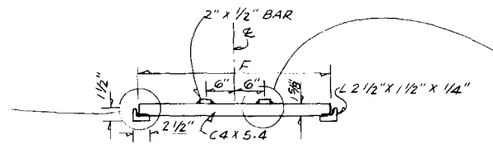


BAR TO BAR WELDING DETAIL

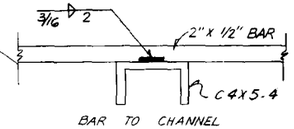
PLAN~GRATE DETAIL



CHANNEL TO ANGLE WELDING DETAIL



SECTION B-B~GRATE DETAIL



BAR TO CHANNEL WELDING DETAIL

DETAILS OF STEEL GRATING FOR U-ENDWALL

GENERAL NOTES:

1. COST OF GRATING TO BE PAID FOR AS ENDWALL GRATE PER POUND, TABULATED QUANTITY.
2. COST OF GALVANIZED BOLTS AND NUTS TO BE INCLUDED IN BID PRICE FOR ENDWALL GRATE.
3. ALL ANGLE, CHANNEL AND BAR STEEL TO BE A.S.T.M. A-588 WEATHERING STEEL EXCEPT AS NOTED IN GENERAL NOTE NO. 4.
4. WHEN GRATING WILL BE EXPOSED TO SALT WATER ALL ANGLE, CHANNEL AND BAR STEEL TO BE A.S.T.M. A-572 GRADE 50, GALVANIZED. SPECIFIC LOCATIONS WILL BE DESIGNATED IN PLANS.
5. CHANNEL SECTION C3X6.0 MAY BE SUBSTITUTED FOR C4 x 5.4 CHANNEL.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

RATE OF SLOPE	SIZE PIPE "D"	G	2 EACH BARS @ 3.4 LBS/L.F.			(X) CHANNELS @ 5.4 LBS/L.F.			2 ANGLES @ 3.2 LBS/L.F.		TOTAL WEIGHT LBS.
			L	M-4"	LBS.	(X)	F	LBS.	P	LBS.	
6:1	15"	2'-8 1/2"	9'-3"	3'-3"	85	8	2'-6 1/8"	111	7'-4"	47	243
	18"	2'-11 1/2"	10'-3"	3'-6"	94	9	2'-9 1/8"	137	8'-4"	54	285
	24"	3'-5 1/2"	13'-3"	4'-0"	117	12	3'-3 1/2"	215	11'-4"	73	405
	30"	3'-11 1/2"	16'-3"	4'-6"	141	15	3'-9 7/8"	310	14'-4"	92	543
4:1	15"	2'-8 1/2"	6'-3"	3'-3"	65	5	2'-6 7/8"	70	4'-4"	28	163
	18"	2'-11 1/2"	7'-3"	3'-6"	73	6	2'-9 3/8"	92	5'-4"	35	200
	24"	3'-5 1/2"	9'-3"	4'-0"	90	8	3'-3 3/8"	144	7'-4"	47	281
	30"	3'-11 1/2"	11'-3"	4'-6"	107	10	3'-9 7/8"	206	9'-4"	60	373

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

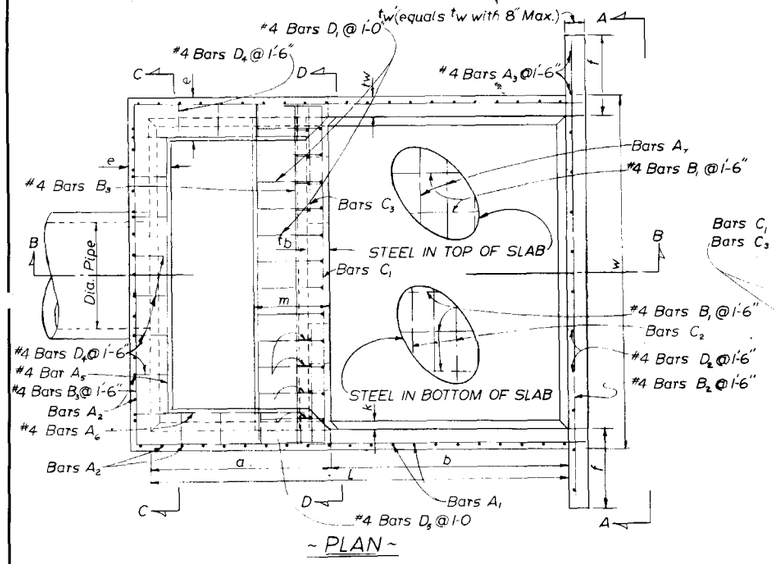
U-TYPE CONCRETE ENDWALLS BAFFLES AND GRATE OPTIONAL 15" TO 30" PIPE

	Names	Dates
Designed by		
Drawn by	CDP	7/71
Checked by		

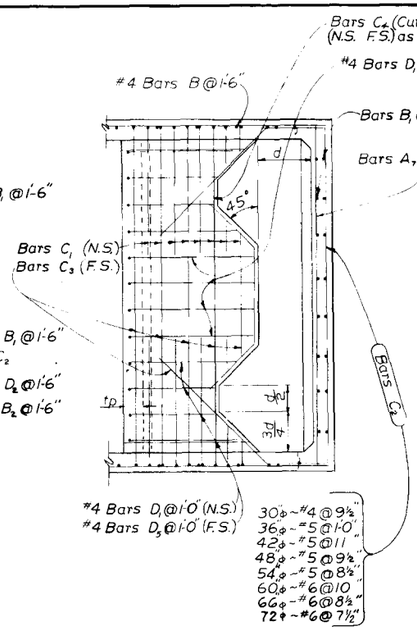
Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved:

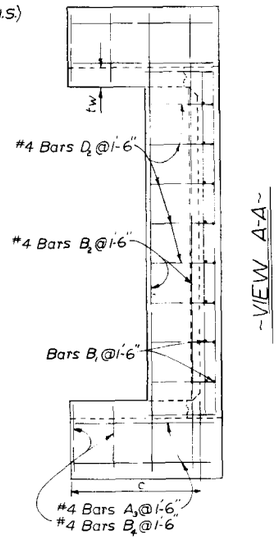
Revision No.	Sheet No.	Index No.
80	2 of 2	261



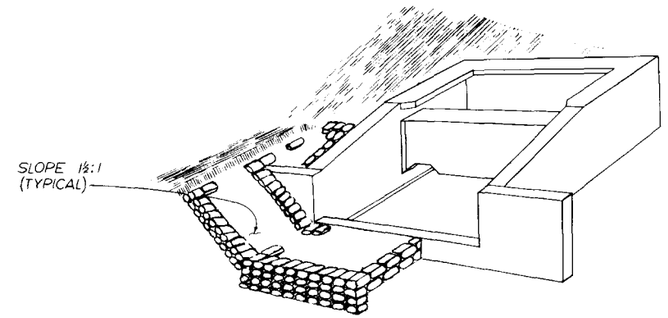
~ PLAN ~



~ SECTION D-D ~

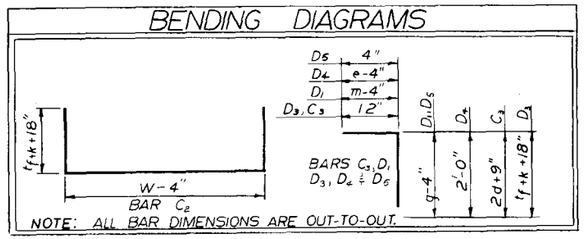


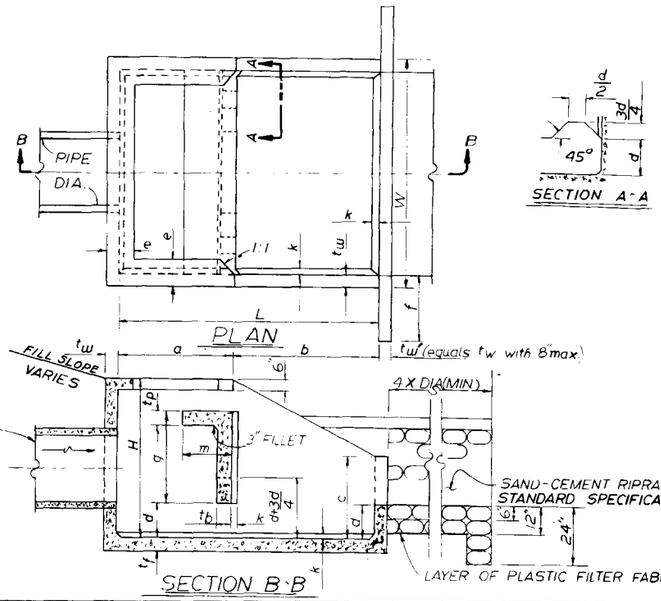
~ VIEW A-A ~



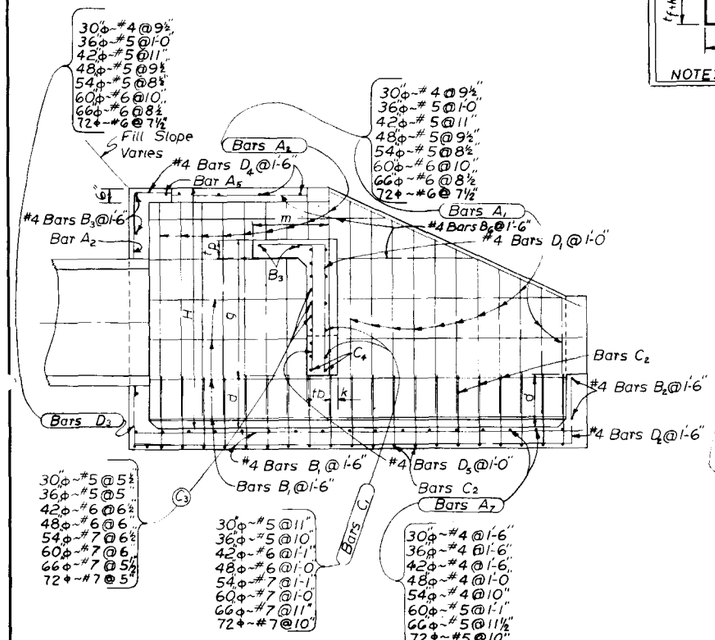
PERSPECTIVE
ENERGY DISSIPATOR

BENDING DIAGRAMS





SECTION B-B



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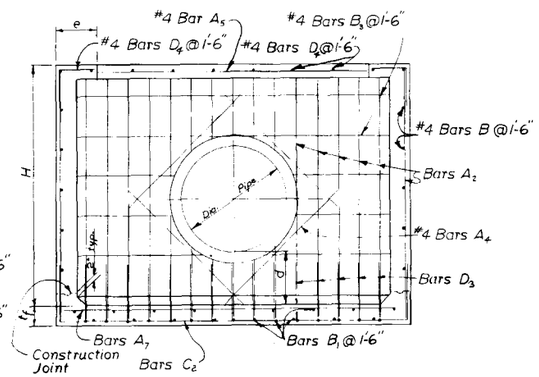

Note: Cut bars as required.

~ SECTION C-C ~

SIZE	PIPE	MAX. DISCHARGE	FEET AND INCHES											INCHES					CONCRETE CLASS I	REINF. STEEL
DIA. INCHES	AREA SQ. FT.	Q	W	H	L	a	b	c	d	e	f	g	m	tw	tf	tb	tp	k	CU. YD.	LBS.
30	4.91	59	9'-0	6'-3	10'-8	4'-7	6'-1	3'-4	1'-4	1'-2	2'-6	3'-0	1'-11	6	6-1/2	7	7	3	6.72	736
36	7.07	85	10'-5	7'-3	12'-4	5'-3	7'-1	3'-10	1'-7	1'-3	3'-0	3'-6	2'-3	7	7-1/2	8	8	3	10.34	1,072
42	9.62	115	11'-10	8'-0	14'-0	6'-0	8'-0	4'-5	1'-9	1'-6	3'-0	3'-11	2'-6	8	8-1/2	9	8	4	14.82	1429
48	12.57	151	13'-3	9'-0	15'-8	6'-9	8'-11	4'-11	2'-0	1'-7	3'-0	4'-5	2'-10	9	9-1/2	10	8	4	20.32	2,000
54	15.90	191	14'-8	9'-9	17'-4	7'-4	10'-0	5'-5	2'-2	1'-10	3'-0	4'-11	3'-0	10	10-1/2	10	8	4	27.19	2659
60	19.63	236	16'-1	10'-9	19'-0	8'-0	11'-0	5'-11	2'-5	1'-11	3'-0	5'-4	3'-4	11	11-1/2	11	8	6	36.52	3,552
66	23.76	285	17'-3	11'-6	20'-6	8'-8	11'-10	6'-5	2'-7	2'-1	3'-0	5'-9	3'-7	12	12-1/2	12	8	6	42.82	4,472
72	28.27	339	18'-6	12'-3	22'-0	9'-3	12'-9	6'-11	2'-9	2'-3	3'-0	6'-2	3'-9	12	12-1/2	12	8	6	50.68	5,426

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE CONCRETE ENDWALL ENERGY DISSIPATOR 30" To 72" PIPE

	Names	Dates
Designed by	HAB	10/69
Drawn by	HW	10/69
Checked by	DEK	11/69

Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved: 3/20/75

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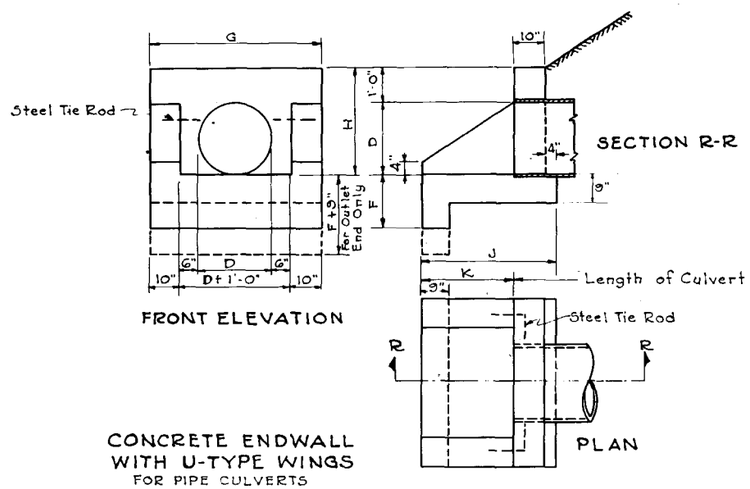
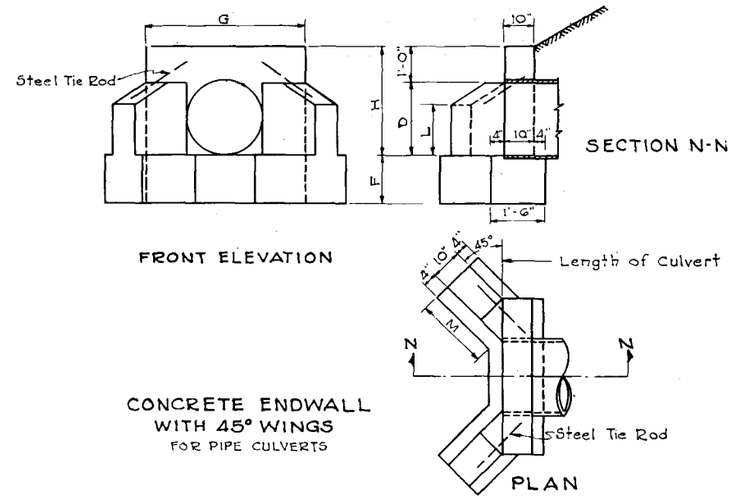


CONCRETE ENDWALL
WITH U-TYPE WINGS
FOR PIPE CULVERTS



CONCRETE ENDWALL
WITH 45° WINGS
FOR PIPE CULVERTS

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH U-TYPE WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL						
Opening		Wall			Footing		Total Cu. Yds. Concrete, Class I						Steel Tie Rods
							Conc Pipe		C.M. Pipe		C.I. Pipe		
D	Area Sq. Ft.	G	H	K	F	J	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	
12"	0.8	3'-8"	2'-0"	1'-0"	1'-3"	2'-2"	0.50	0.57	0.51	0.59	0.51	0.59	none
15"	1.2	3'-11"	2'-3"	1'-5"	1'-3"	2'-7"	0.61	0.69	0.64	0.72	0.63	0.72	none
18"	1.8	4'-2"	2'-6"	1'-9"	1'-3"	2'-11"	0.72	0.81	0.76	0.84	0.76	0.84	none
24"	3.1	4'-8"	3'-0"	2'-6"	1'-6"	3'-8"	1.03	1.13	1.08	1.18	1.08	1.18	2-3/4"ϕx2'-0"
30"	4.9	5'-2"	3'-6"	3'-3"	1'-6"	4'-5"	1.35	1.46	1.43	1.53	1.42	1.53	2-3/4"ϕx2'-0"
36"	7.1	5'-8"	4'-0"	4'-0"	1'-9"	5'-2"	1.75	1.87	1.86	1.98	1.84	1.96	2-3/4"ϕx2'-6"
42"	9.6	6'-2"	4'-6"	4'-9"	2'-0"	5'-11"	2.21	2.34	2.34	2.47			2-3/4"ϕx2'-6"
48"	12.6	6'-8"	5'-0"	5'-6"	2'-0"	6'-8"	2.66	2.80	2.83	2.97			2-3/4"ϕx3'-0"

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH 45° WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL			
Opening		Wall				Footing	Concrete, Class I			Steel Tie Rods
							Total Cu Yds.			
D	Area Sq. Ft.	H	G	L	M	F	Conc. Pipe	C.M. Pipe	C.I. Pipe	
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	0.76	0.79	0.79	none
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	1.03	1.08	1.08	2-3/4"ϕx2'-0"
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	1.34	1.42	1.41	2-3/4"ϕx2'-0"
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	1.74	1.85	1.84	2-3/4"ϕx3'-0"
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	2'-0"	2.36	2.49		2-3/4"ϕx3'-0"
48"	12.6	5'-0"	6'-4"	2'-6"	4'-0"	2'-0"	2.76	2.92		2-3/4"ϕx3'-0"
15"	1.2	2'-3"	3'-7"	1'-0"	1'-8"	1'-3"	0.58	0.61	0.61	none

Note:
Chamfer all exposed edges 3/4".
Provide good foundation under pipes using concrete, if natural conditions are very bad.
Where tie rods are required the cost of same shall be included in the unit price bid for Concrete. } Rev 6-14-46
For sodding around endwalls see Index No. 281.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

WINGED CONCRETE ENDWALLS SINGLE ROUND PIPE

	Names	Dates
Designed by		
Drawn by	TJK	12/31
Checked by	GEF	3/32
F.H.W.A. Approved:		3/20/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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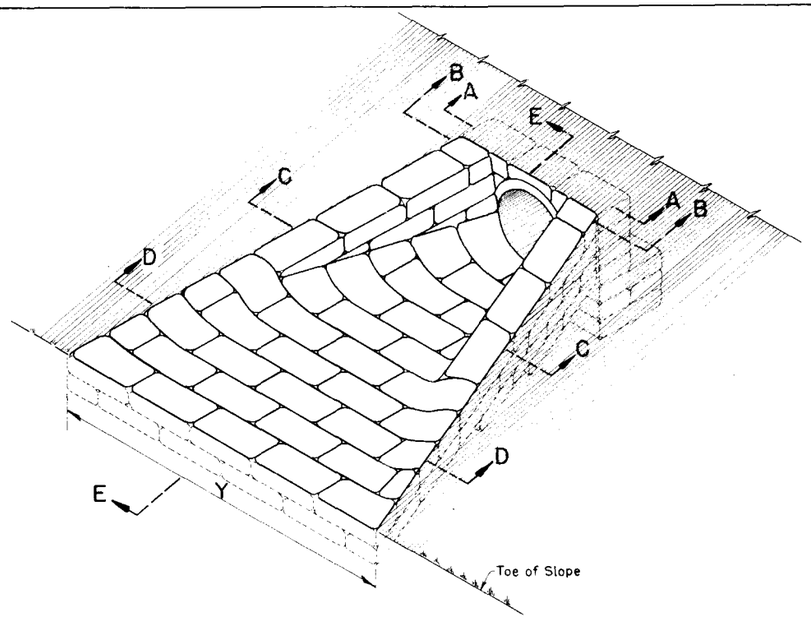

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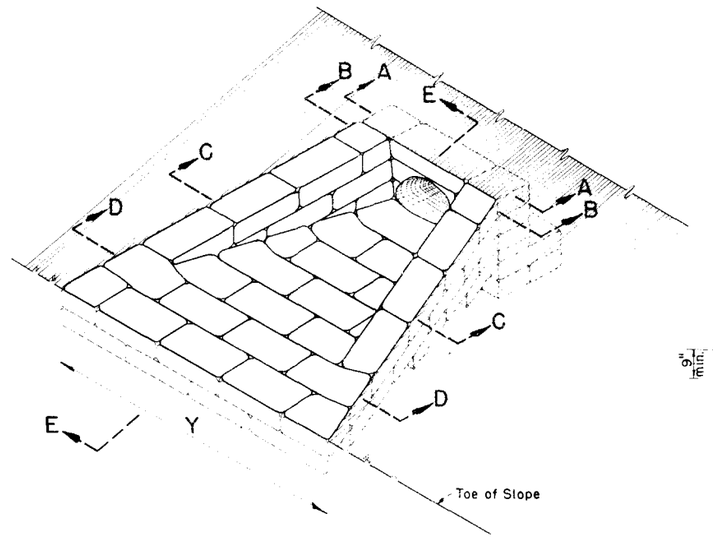

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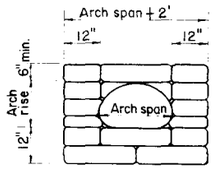
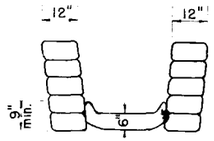
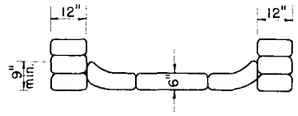


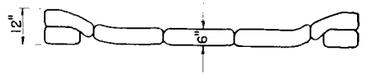
SECTION A-A



SECTION B-B



SECTION C-C



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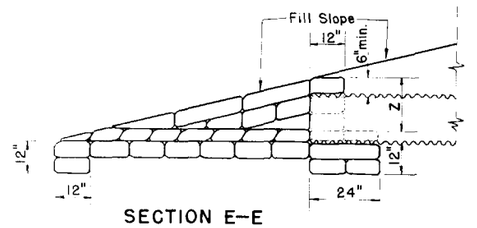


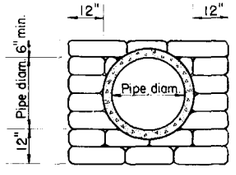
SECTION E-E

DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS

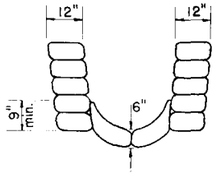
NOTE: For Multiple Metal Pipe Arch Culvert spacing between Arch centers = X

DIMENSIONS and QUANTITIES for METAL PIPE ARCH CULVERTS

Span	Rise	Dimensions						Quantity of Sand-Cement Riprap in Cu. Yds. for One Endwall											
		X	Y				Z	For 2:1 Slopes				For 4:1 Slopes				For 6:1 Slopes			
			1-Arch	2-Arch	3-Arch	4-Arch		1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch
17"	13"	2'-6"	6'-6"	9'-0"	11'-6"	14'-0"	1'-7"	1.0	1.5	2.0	2.5	1.5	2.2	2.9	3.6				
21"	15"	2'-10"	7'-6"	10'-4"	13'-2"	16'-0"	1'-9"	1.2	1.8	2.4	3.0	1.9	2.7	3.5	4.3				
28"	20"	3'-5"	9'-3"	12'-8"	16'-1"	19'-6"	2'-0"	1.7	2.5	3.3	4.1	2.6	3.7	4.8	5.9				
35"	24"	4'-0"	11'-0"	15'-0"	19'-0"	23'-0"	2'-0"	2.2	3.1	4.0	4.9	3.4	4.7	6.0	7.3				
42"	29"	4'-9"	12'-9"	17'-6"	22'-3"	27'-0"	2'-0"	2.9	4.1	5.3	6.5	4.5	6.1	7.7	9.3				
49"	33"	5'-6"	14'-6"	20'-0"	25'-6"	31'-0"	2'-0"	3.5	4.9	6.3	7.7	5.5	7.4	9.3	11.2				
57"	38"	6'-4"	16'-6"	22'-10"	29'-2"	35'-6"	2'-0"	4.4	6.1	7.8	9.5	6.9	9.2	11.5	13.8				
64"	43"	7'-1"	18'-3"	25'-4"	32'-5"	39'-6"	2'-0"	5.1	7.0	8.9	10.8	8.1	10.7	13.3	15.9				
71"	47"	7'-10"	20'-0"	27'-10"	35'-8"	43'-6"	2'-0"	5.9	8.1	10.3	12.5	9.5	12.4	15.3	18.2				



SECTION A-A



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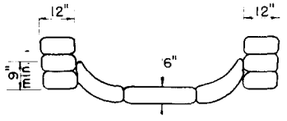
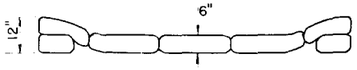


SECTION C-C



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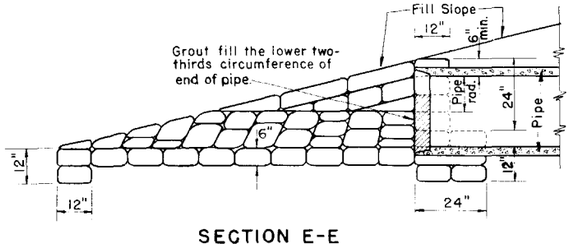

SECTION E-E

DETAIL FOR SINGLE PIPE CULVERT

NOTE: For Multiple Pipe Culvert spacing between pipe centers = X

DIMENSIONS and QUANTITIES for ROUND PIPE CULVERTS

Pipe Diam.	Dimensions					Quantity of Sand-Cement Riprap in Cu. Yds. for One Endwall												
	X	Y				For 2:1 Slopes				For 4:1 Slopes				For 6:1 Slopes				
		1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	
15"	2'-7"	7'-0"	9'-7"	12'-2"	14'-9"	1.2	1.6	2.1	2.6	1.7	2.4	3.0	3.6					
18"	2'-10"	8'-0"	10'-10"	13'-8"	16'-6"	1.4	2.0	2.6	3.1	2.1	2.9	3.7	4.4					
24"	3'-5"	10'-0"	13'-5"	16'-10"	20'-3"	1.9	2.7	3.5	4.3	2.9	4.0	5.1	6.3					
30"	4'-3"	12'-0"	16'-3"	20'-6"	24'-9"	2.5	3.6	4.8	5.9	3.8	5.4	7.0	8.6					
36"	5'-1"	14'-0"	19'-1"	24'-2"	29'-3"	3.1	4.6	6.2	7.7	4.8	7.0	9.2	11.4					
42"	6'-0"	16'-0"	22'-0"	28'-0"	34'-0"	3.8	5.8	7.7	9.7	6.0	8.8	11.7	14.5					
48"	6'-9"	18'-0"	24'-9"	31'-6"	38'-3"	4.5	7.0	9.4	11.8	7.2	10.8	14.3	17.9					
54"	7'-8"	20'-0"	27'-8"	35'-4"	43'-0"	5.3	8.3	11.3	14.2	8.5	12.9	17.3	21.7					
60"	8'-6"	22'-0"	30'-6"	39'-0"	47'-6"	6.2	9.7	13.3	16.9	10.0	15.3	20.6	25.9					

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE SAND-CEMENT ENDWALLS

	Names	Dates
Designed by	JEP	12/48
Drawn by	HW	3/54
Checked by	CDD	3/54

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 8/30/77

Revision No.	Sheet No.	Index No.
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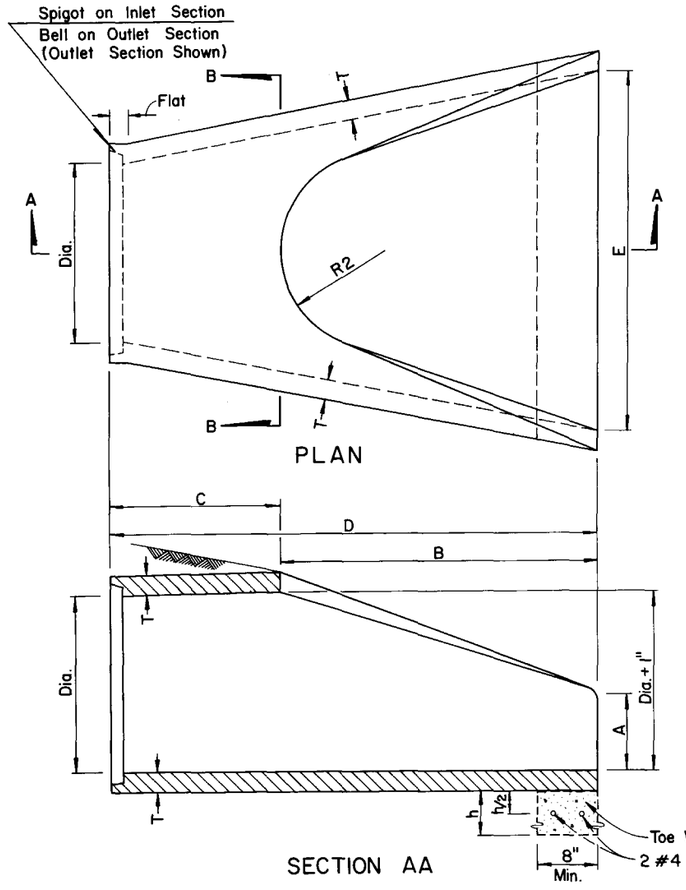
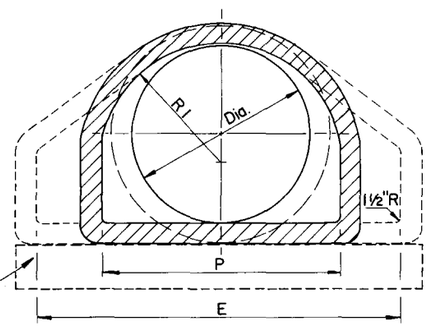




FLARED END SECTION

DIA.	T	REINF. Sq. In./Lin. Ft.	BELL or SPIGOT	A	B	C	D	E	P	R1	R2	FLAT	WEIGHT (LBS.)	TOE WALL h
12"	2"	0.07	1 1/2"	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	19 15/16"	10 1/8"	9"	3 1/2"	530	12"
15"	2 1/4"	0.07	2"	6"	2'-3"	3'-10"	6'-1"	2'-6"	24 5/16"	12 1/2"	11"	3 1/2"	740	12"
18"	2 1/2"	0.07	2 1/2"	9"	2'-3"	3'-10"	6'-1"	3'-0"	29"	15 1/2"	12"	4"	990	15"
21"	2 3/4"	0.07	2 1/4"	9"	2'-11"	3'-2"	6'-1"	3'-6"	31 5/8"	16 1/8"	13"	4"	1280	15"
24"	3"	0.07	2 1/2"	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	33 3/16"	16 13/16"	14"	4 1/2"	1520	18"
27"	3 1/4"	0.148	2 1/2"	10 1/2"	4'-0"	2'-1 1/2"	6'-1 1/2"	4'-6"	36"	18 9/16"	14 1/2"	4 1/2"	1930	18"
30"	3 1/2"	0.148	3"	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	37"	18 1/2"	15"	5"	2190	21"
36"	4"	0.148	3 1/2"	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	47 13/16"	24 5/16"	20"	5 1/2"	4100	21"
42"	4 1/2"	0.148	3 3/4"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	53 7/8"	27 1/2"	22"	5 1/2"	5380	24"
48"	5"	0.148	4 1/4"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	56 1/2"	28 1/2"	22"	5 3/4"	6550	24"
54"	5 1/2"	0.174	4 3/4"	2'-3"	5'-5"	2'-11"	8'-4"	7'-6"	65 1/2"	33 1/8"	24"	6 1/4"	8040	24"
60"	6"	0.174	5"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"	72 1/2"	36 11/16"	24"	6 3/4"	8750	24"
66"	6 1/2"	0.174	5 1/2"	2'-0"	6'-6"	1'-9"	8'-3"	8'-6"	72"	36 1/8"	24"	7 1/4"	10630	24"
72"	7"	0.174	6"	2'-0"	6'-6"	1'-9"	8'-3"	9'-0"	77 13/16"	38 15/16"	24"	7 3/4"	12520	24"

GENERAL NOTES

1. Flared end sections shall conform to the requirements of ASTM 76 with the exception that dimensions and reinforcement shall be as prescribed in the table above. Circumferential reinforcement may consist of either one cage or two cages of steel. Compressive strength of concrete shall be 4000 psi. Shop drawings for flared end sections having dimensions other than above must be submitted for approval to the Engineer of Drainage.

2. Connections between the flared end section and the pipe culvert may be any of the following types unless otherwise shown on the plans.

   a. Joints meeting the requirements of Section 941-1.5 of the Standard Specifications.

      The manufacturer of the flared end section shall identify the manufacturer of the pipe culvert and certify that the flared end section is suited to joining the pipe culvert.

   b. Joints sealed with preformed plastic gaskets.

      The gaskets shall meet the requirements of Section 942-2 of the Standard Specifications and the minimum sizes for gaskets shall be as that specified for equivalent sizes of elliptical pipe.

   c. Reinforced concrete jackets, as detailed on this drawing.

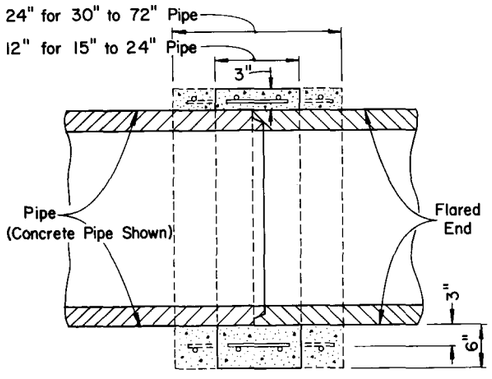
      Cost of the reinforced concrete jacket to be included in the contract unit price for the flared end section.

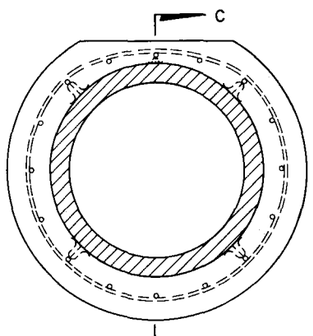
      When non-coated corrugated metal pipe is called for in the plans, the pipe shall be bituminous coated in the jacketed area as specified on Index 280. Bituminous coating to be included in the contract unit price for the pipe culvert.

3. Toe walls shall be constructed when shown on the plans or at locations designated by the Engineer. Toe walls are to be cast in-place with Class I Concrete and paid for under the contract unit price for Class I Concrete (Miscellaneous). Reinforcing steel to be included in cost of toe wall.

4. Sodding shall be placed about the flared end section in accordance with Index 281, and paid for under the contract unit price for Sodding.

5. On skewed pipe culverts the flared end sections shall be placed in line with the pipe culvert. Side slopes shall be warped as required to fit the flared end sections.





REINFORCED CONCRETE JACKET DETAIL

DESIGN NOTES

1. Flared end sections are intended for use outside the clear recovery area on median drain and cross drain installations.

   Flared end sections are not intended for side drain installations.

2. Reinforced concrete jackets shall be used at all locations where high velocities and/or highly erosive soils may cause disjointing. These locations will be shown on the plans.

3. Toe walls shall be used whenever the anticipated velocity of discharge and soil type are such that erosive action would occur. Toe walls are not required where ditch pavement is provided, except when disjointing would occur if the ditch pavement should fail.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FLARED END SECTION

	Names	Dates
Designed by	EGR	9/77
Drawn by	HKH	9/77
Checked by	JVG	9/77
F.H.W.A. Approved: 9/23/77		

Approved By
Deputy Design Engineer, Roadways

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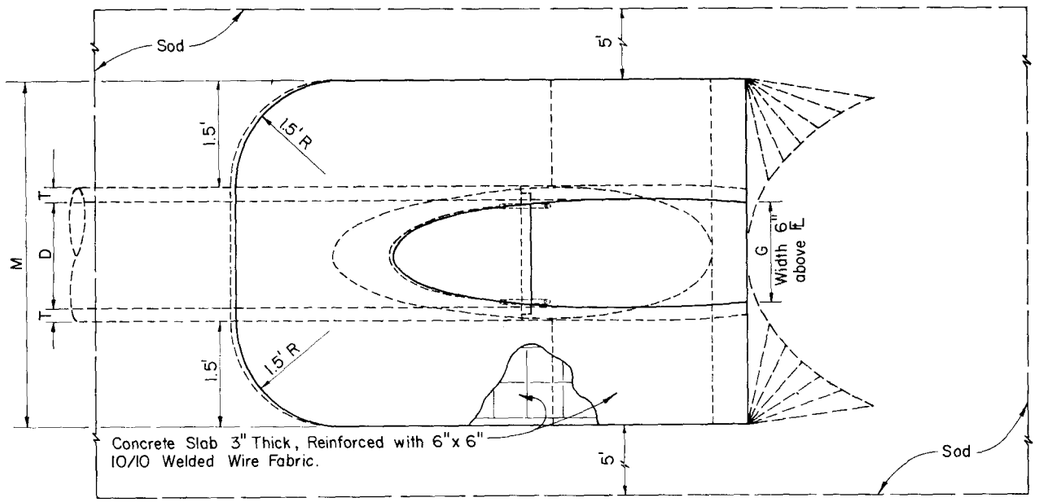
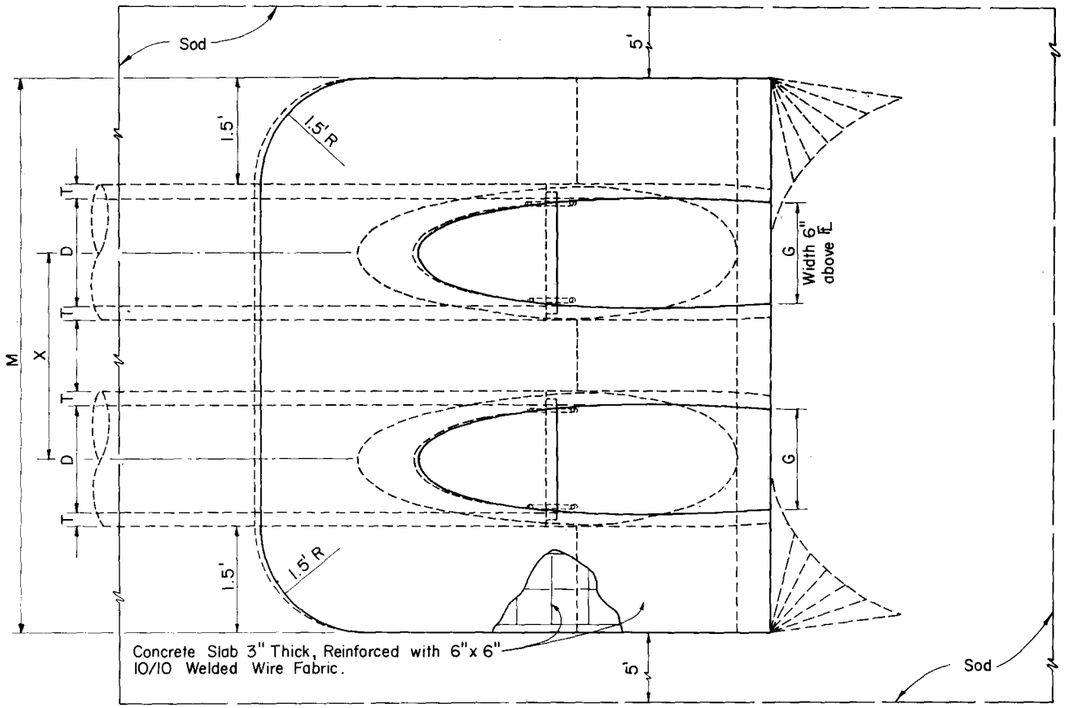
DIMENSIONS AND QUANTITIES

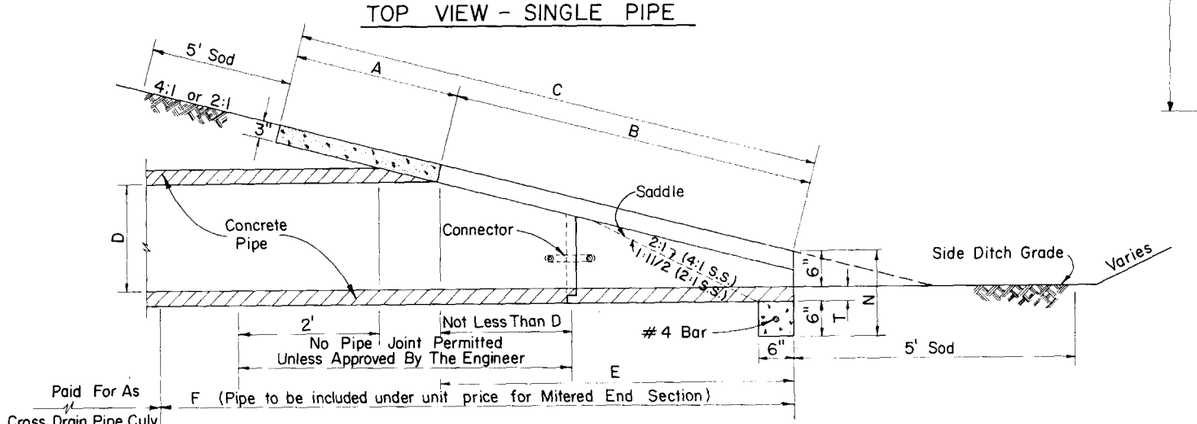
	D	X	A	B	C	E	F	G	M Single Pipe	M Double Pipe	M Triple Pipe	M Quad Pipe	N	CONCRETE (CU.YDS.) Single Pipe	CONCRETE (CU.YDS.) Double Pipe	CONCRETE (CU.YDS.) Triple Pipe	CONCRETE (CU.YDS.) Quad. Pipe	SODDING (SQ.YDS.) Single Pipe	SODDING (SQ.YDS.) Double Pipe	SODDING (SQ.YDS.) Triple Pipe	SODDING (SQ.YDS.) Quad. Pipe
2:1 Slope	15"	2'-7"	1.92'	2.18'	4.10'	2.06'	5'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'	0.27	0.41	0.54	0.67	20.83	23.70	26.57	29.43
	18"	2'-10"	1.97'	2.74'	4.71'	2.56'	6'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'	0.31	0.45	0.60	0.75	21.82	24.97	28.10	31.27
	24"	3'-5"	2.06'	3.85'	5.91'	3.56'	7'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'	0.39	0.59	0.79	1.00	23.82	27.62	31.78	35.21
	30"	4'-3"	2.15'	4.95'	7.10'	4.56'	8'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	0.46	0.76	1.04	1.32	25.81	30.53	35.26	39.98
	36"	5'-1"	2.25'	6.08'	8.33'	5.56'	9'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	0.55	0.94	1.33	1.71	27.76	33.46	39.10	44.76
	42"	6'-0"	2.34'	7.21'	9.55'	6.56'	10'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	0.66	1.15	1.66	2.15	29.80	36.47	43.13	49.80
	48"	6'-9"	2.43'	8.33'	10.76'	7.56'	11'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	0.76	1.37	1.96	2.57	31.79	39.29	46.79	54.29
	54"	7'-8"	2.52'	9.44'	11.96'	8.56'	12'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	0.87	1.62	2.38	3.14	33.79	42.30	50.82	59.34
	60"	8'-6"	2.62'	10.56'	13.18'	9.56'	14'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	0.99	1.90	2.81	3.73	35.78	45.22	54.67	64.11
	66"	9'-2"	2.71'	11.68'	14.39'	10.56'	15'	3.18'	9.58'	18.75'	27.92'	37.08'	1.54'	1.11	2.15	3.21	4.27	37.78	48.00	58.13	68.31
	72"	10'-0"	2.80'	12.80'	15.60'	11.56'	16'	3.30'	10.16'	20.16'	30.16'	40.16'	1.58'	1.24	2.46	3.68	4.90	39.77	50.88	61.99	73.10
4:1 Slope	15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'	0.40	0.61	0.80	1.00	23.33	26.20	29.07	31.93
	18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'	0.47	0.69	0.91	1.14	24.90	28.04	31.19	34.34
	24"	3'-5"	2.53'	7.18'	9.71'	7.03'	11'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'	0.60	0.90	1.21	1.52	28.02	31.82	35.61	39.41
	30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	0.76	1.19	1.63	2.07	31.16	35.88	40.60	45.32
	36"	5'-1"	2.87'	11.31'	14.18'	11.03'	15'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	0.89	1.48	2.05	2.63	34.23	39.93	45.58	51.23
	42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	1.05	1.82	2.57	3.34	37.42	44.09	50.76	57.42
	48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	1.21	2.15	3.07	4.00	40.54	48.04	55.54	63.04
	54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	1.39	2.55	3.72	4.88	43.68	52.19	60.71	69.23
	60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	1.59	3.02	4.44	5.86	46.80	56.24	65.69	75.13
	66"	9'-2"	3.73'	21.62'	24.35'	21.03'	25'	3.18'	9.58'	18.75'	27.92'	37.08'	1.54'	1.91	3.66	5.40	7.15	48.82	59.01	69.18	79.36
	72"	10'-0"	3.91'	22.68'	26.59'	23.03'	27'	3.30'	10.16'	20.16'	30.16'	40.16'	1.58'	2.12	4.18	6.24	8.30	51.94	63.06	74.17	85.28



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

NOTE: See Sheet 4 for Details and Notes

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CROSS DRAIN MITERED END SECTION

SINGLE AND MULTIPLE ROUND CONCRETE PIPE

	Names	Dates
Designed by	DCB	6/78
Drawn by		
Checked by	KNM	6/78
F.H.W.A. Approved: 7/21/78		

Approved By: Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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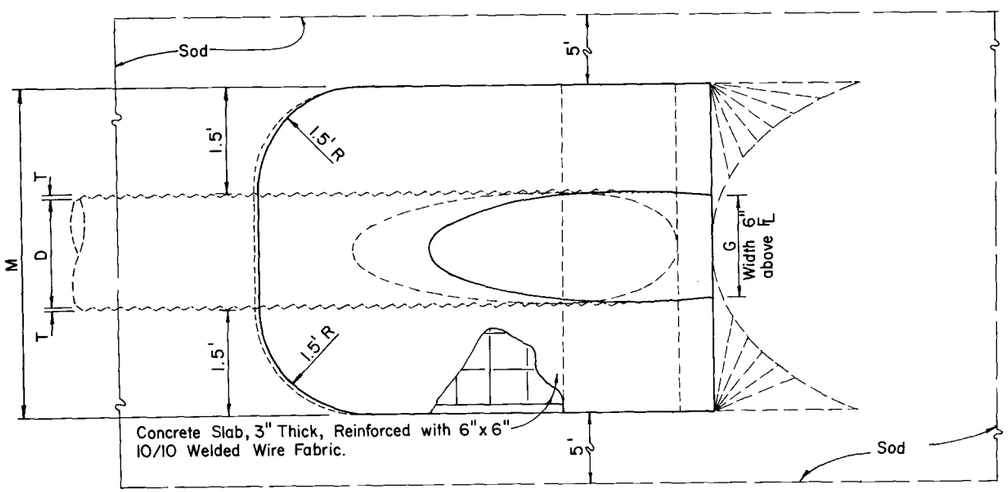
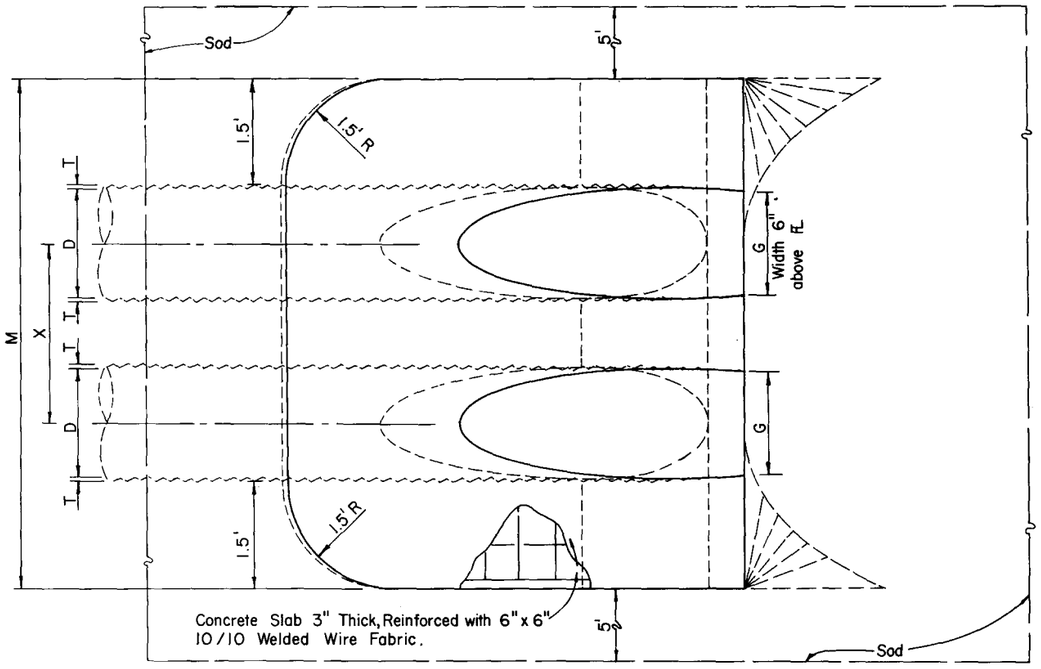
DIMENSIONS AND QUANTITIES

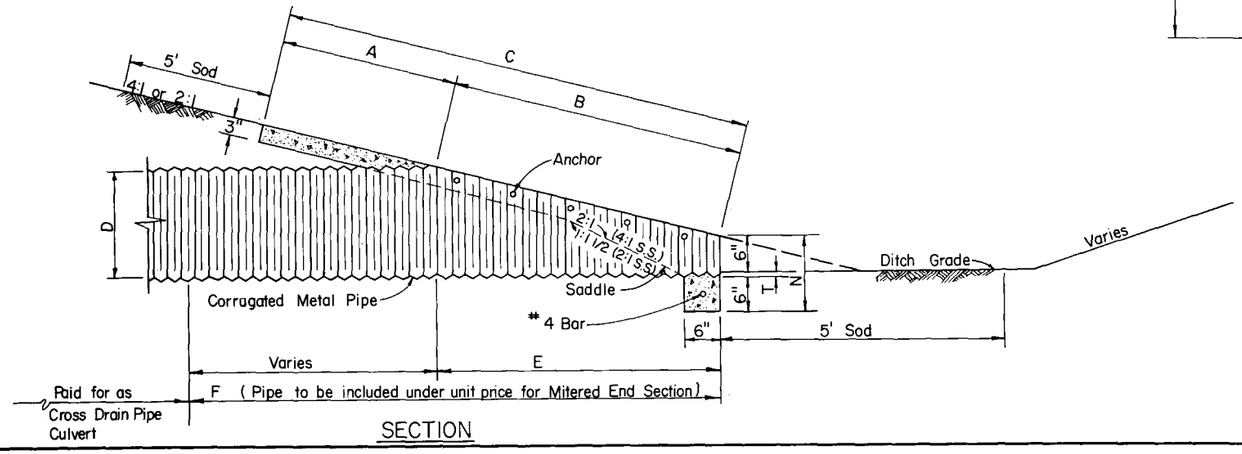
	D	X	A	B	C	E	F	G	M Single Pipe	M Double Pipe	M Triple Pipe	M Quad. Pipe	N	CONCRETE (CU.YDS.) Single Pipe	CONCRETE Double Pipe	CONCRETE Triple Pipe	CONCRETE Quad. Pipe	SODDING (SQ.YDS.) Single Pipe	SODDING Double Pipe	SODDING Triple Pipe	SODDING Quad. Pipe
2:1 Slope	15"	2'-7"	2.5'	1.68'	4.18'	1.50'	5'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'	0.24	0.37	0.51	0.64	20.58	23.46	26.32	29.19
	18"	2'-10"	2.5'	2.24'	4.74'	2.00'	6'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'	0.26	0.43	0.61	0.78	21.43	24.65	27.78	30.92
	24"	3'-5"	2.5'	3.35'	5.85'	3.00'	7'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'	0.32	0.52	0.72	0.91	23.28	27.07	30.87	34.66
	30"	4'-3"	2.5'	4.47'	6.97'	4.00'	8'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	0.38	0.64	0.91	1.18	25.07	29.79	34.51	39.23
	36"	5'-1"	2.5'	5.59'	8.09'	5.00'	9'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	0.44	0.78	1.13	1.48	26.87	32.52	38.17	43.81
	42"	6'-0"	2.5'	6.71'	9.21'	6.00'	10'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	0.51	0.96	1.41	1.87	28.67	35.33	42.00	48.67
	48"	6'-9"	2.5'	7.83'	10.33'	7.00'	11'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	0.57	1.09	1.63	2.15	30.47	37.97	45.47	52.97
	54"	7'-8"	2.5'	8.94'	11.44'	8.00'	12'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	0.65	1.32	1.99	2.66	32.26	40.78	49.30	57.81
	60"	8'-6"	2.5'	10.06'	12.56'	9.00'	13'	3.00'	8.08'	16.58'	25.08	33.58'	1.04'	0.71	1.49	2.28	3.07	34.06	43.50	52.94	62.39
4:1 Slope	15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'	0.31	0.47	0.63	0.79	22.14	25.02	27.89	30.76
	18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'	0.34	0.53	0.71	0.90	23.57	26.72	29.87	33.01
	24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'	0.44	0.69	0.92	1.18	26.41	30.21	34.01	37.80
	30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	0.53	0.88	1.25	1.60	29.27	33.99	38.71	43.43
	36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	0.62	1.07	1.53	2.00	32.11	37.77	43.41	49.06
	42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	0.71	1.30	1.92	2.52	34.96	41.62	48.29	54.96
	48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	0.80	1.54	2.29	3.02	37.80	45.30	52.80	60.30
	54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	7.58'	15.25	22.92'	30.58'	1.04'	0.91	1.83	2.74	3.67	40.64	49.17	57.69	66.20
	60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	8.08'	16.58'	25.08'	33.58'	1.04'	1.02	2.15	3.27	4.39	43.49	52.93	62.38	71.82



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

NOTE: See Sheet 4 for Details and Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CROSS DRAIN MITERED END SECTION

SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE

	Names	Dates
Designed by	DCB	6/78
Drawn by		
Checked by	KNM	6/78
F.H.W.A. Approved:		7/21/78

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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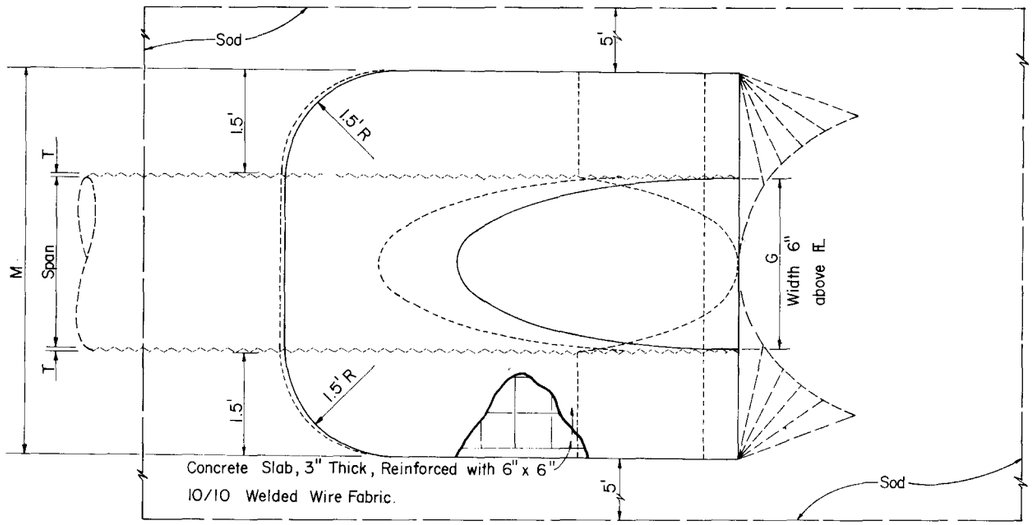
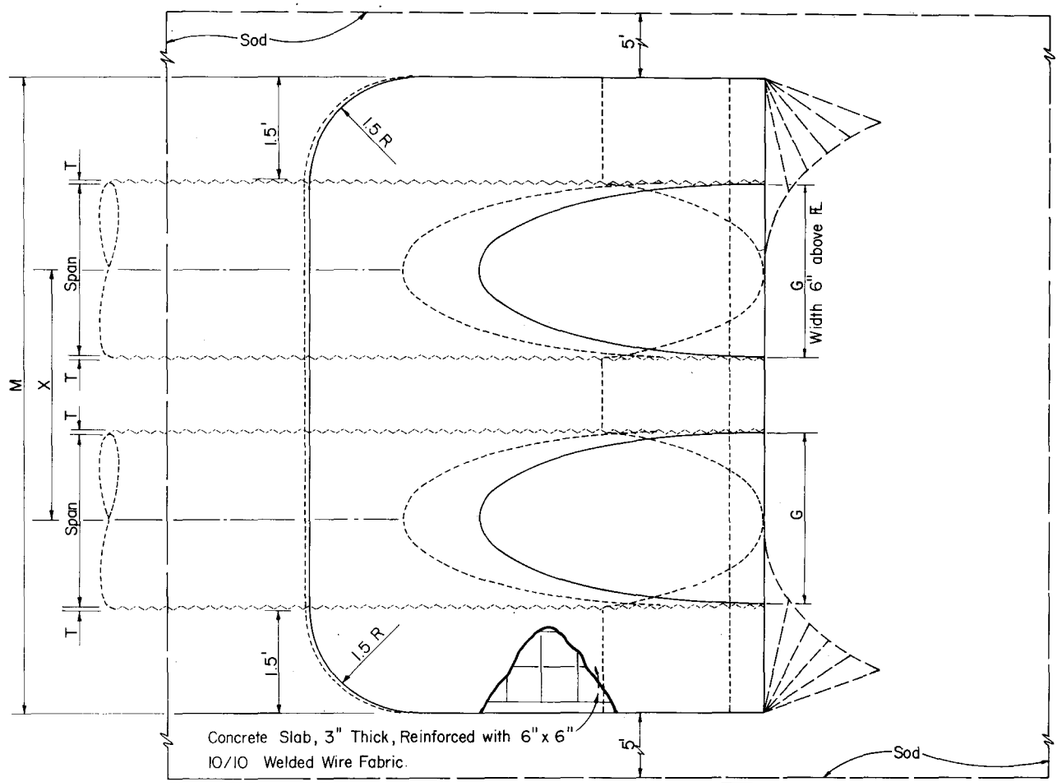
DIMENSIONS AND QUANTITIES

1974 AASHTO

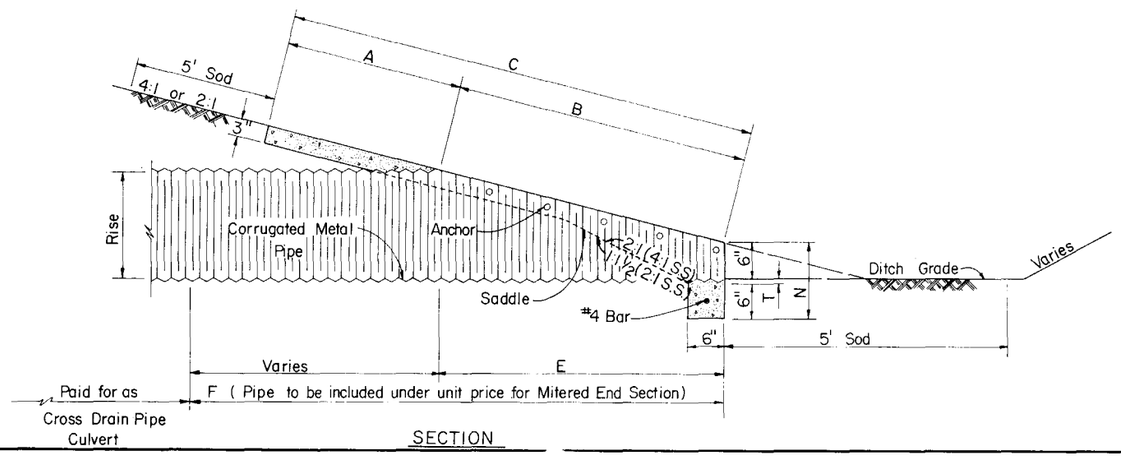
	SPAN	RISE	X	A	B	C	E	F	G	M Single Pipe	M Double Pipe	M Triple Pipe	M Quad. Pipe	N	CONCRETE (CU.YDS.) Single Pipe	CONCRETE (CU.YDS.) Double Pipe	CONCRETE (CU.YDS.) Triple Pipe	CONCRETE (CU.YDS.) Quad. Pipe	SODDING (SQ.YDS) Single Pipe	SODDING (SQ.YDS) Double Pipe	SODDING (SQ.YDS) Triple Pipe	SODDING (SQ.YDS) Quad. Pipe
2:1 Slope	17"	13"	2'-6"	2.5'	1.30'	3.80'	1.17'	4'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'	0.25	0.37	0.49	0.61	20.34	23.12	25.90	28.68
	21"	15"	2'-10"	2.5'	1.68'	4.17'	1.50'	5'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'	0.26	0.39	0.53	0.66	21.13	24.29	27.43	30.58
	28"	20"	3'-5"	2.5'	2.61'	5.11'	2.33'	6'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'	0.32	0.49	0.66	0.83	22.83	26.62	30.42	34.22
	35"	24"	4'-0"	2.5'	3.35'	5.85'	3.00'	7'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	0.37	0.58	0.79	1.00	24.29	28.73	33.18	37.62
	42"	29"	4'-9"	2.5'	4.29'	6.79'	3.83'	8'	2.97'	6.58'	11.33'	16.08'	20.83'	1.04'	0.42	0.69	0.96	1.22	25.98	31.26	36.53	41.81
	49"	33"	5'-6"	2.5'	5.03'	7.53'	4.50'	9'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	0.49	0.82	1.15	1.48	27.46	33.57	39.68	45.78
	57"	38"	6'-4"	2.5'	5.96'	8.46'	5.33'	10'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	0.55	0.95	1.35	1.75	29.23	36.28	43.31	50.34
	64"	43"	7'-1"	2.5'	6.89'	9.39'	6.17'	11'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	0.62	1.10	1.57	2.05	30.91	38.78	46.64	54.52
	71"	47"	7'-10"	2.5'	7.64'	10.14'	6.83'	12'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	0.69	1.24	1.80	2.35	32.40	41.10	49.81	58.51
4:1 Slope	17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'	0.28	0.42	0.56	0.70	21.58	24.36	27.13	29.91
	21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'	0.32	0.49	0.66	0.78	22.70	25.85	29.00	32.14
	28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'	0.40	0.60	0.82	1.03	25.27	29.06	32.86	36.66
	35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	0.49	0.77	1.05	1.33	27.43	31.88	36.32	40.77
	42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	6.58'	11.33'	16.08'	20.83'	1.04'	0.57	0.92	1.27	1.62	29.99	35.27	40.52	45.82
	49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	0.65	1.08	1.50	1.93	32.18	38.29	44.40	50.51
	57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	0.76	1.30	1.83	2.37	34.82	41.87	48.90	55.93
	64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	0.87	1.55	2.18	2.83	37.38	45.24	53.11	60.99
	71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	0.95	1.68	2.43	3.17	39.56	48.26	56.97	65.67



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

NOTE: See Sheet 4 for Details and Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CROSS DRAIN MITERED END SECTION

SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH

	Names	Dates
Designed by	D.C.B	6/78
Drawn by		
Checked by	K.N.M	6/78
F.H.W.A. Approved:	7/21/78	

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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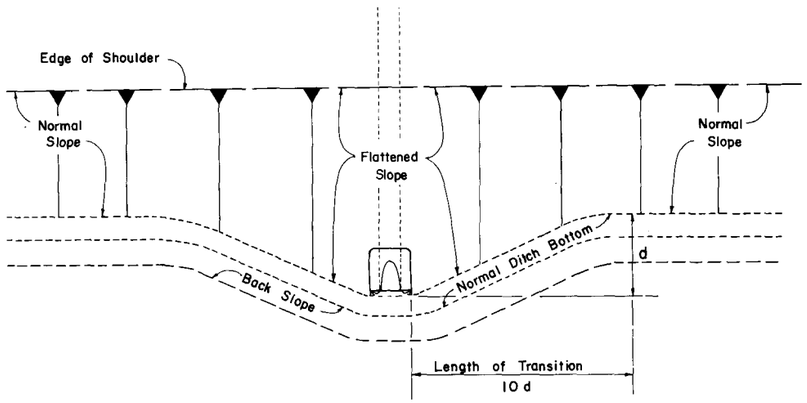
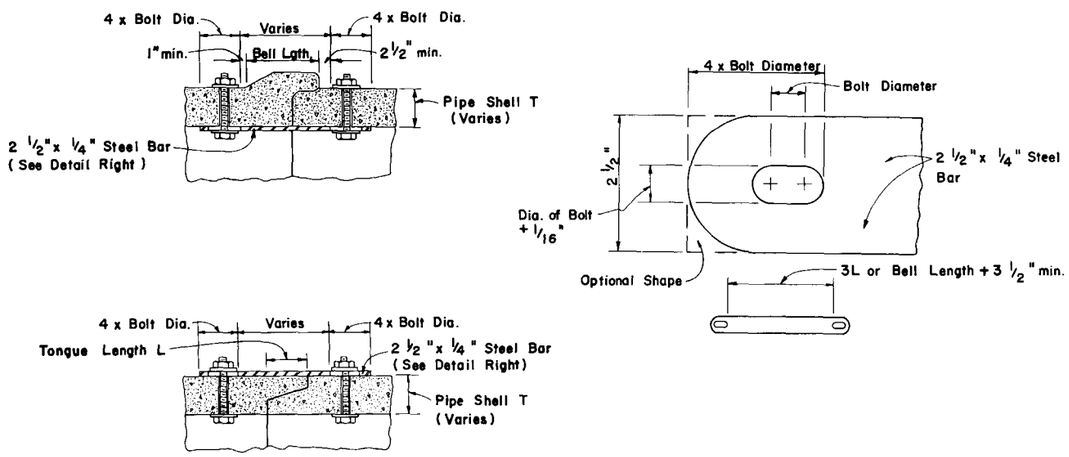


SLOPE AND DITCH TRANSITIONS (Plan View)

GENERAL NOTES

1. The cost of all pipe(s), reinforcing, connectors, anchors and concrete shall be included in the contract unit price for mitered end section, each. Sodding not included.
2. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cast in place with Class I concrete.
3. Concrete pipe used in the assembly of mitered end sections shall be selective lengths to avoid excessive connections.
4. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
5. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
6. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of cross drain pipe, corrugated steel pipe mitered end sections may be used with any type of cross drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of cross drain pipe except steel pipe. When bituminous coated metal pipe is specified for cross drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe.

   When the mitered end section pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 280.
7. When existing multiple cross drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each, based on each independent pipe end.
8. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place end section outside clear recovery area. See detail left.
9. Cross Drain – Mitered End Sections only to be used outside of clear recovery area.



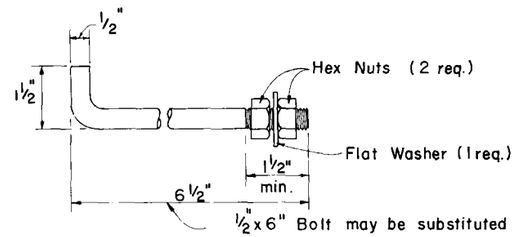
All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be $\frac{3}{8}$" for 15" to 36" pipe and $\frac{5}{8}$" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shell are to be drilled.

CONCRETE PIPE CONNECTOR DETAIL



Anchors required for CMP only.

Anchor, washer and nuts to be galvanized steel.

Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending. Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.

Flat washers to be placed on inside wall of pipe.

ANCHOR DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CROSS DRAIN MITERED END SECTION

SPECIAL DETAILS AND NOTES

	Names	Dates
Designed by	DCB	6/78
Drawn by		
Checked by	KNM	6/78
F.H.W.A. Approved:		7/21/78

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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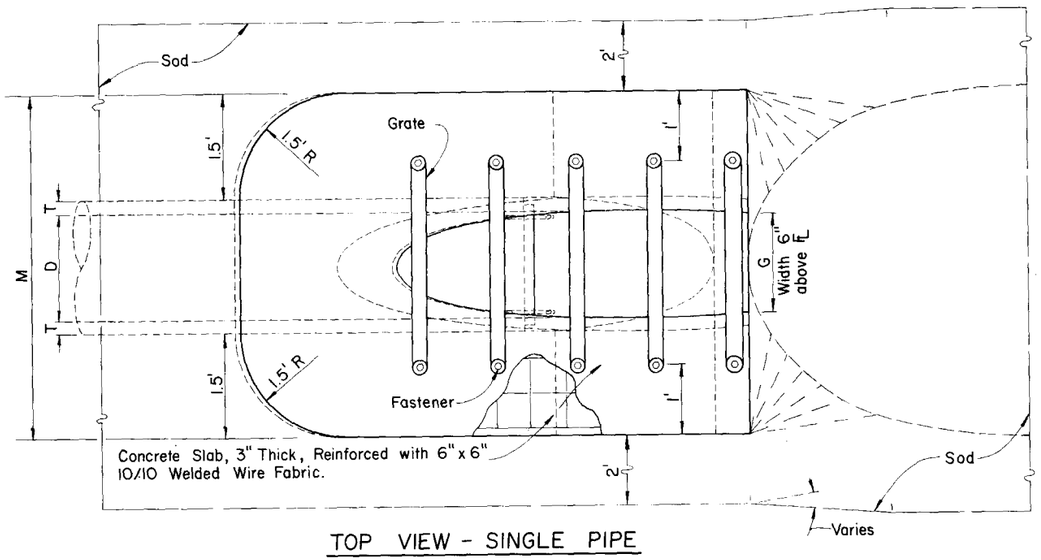
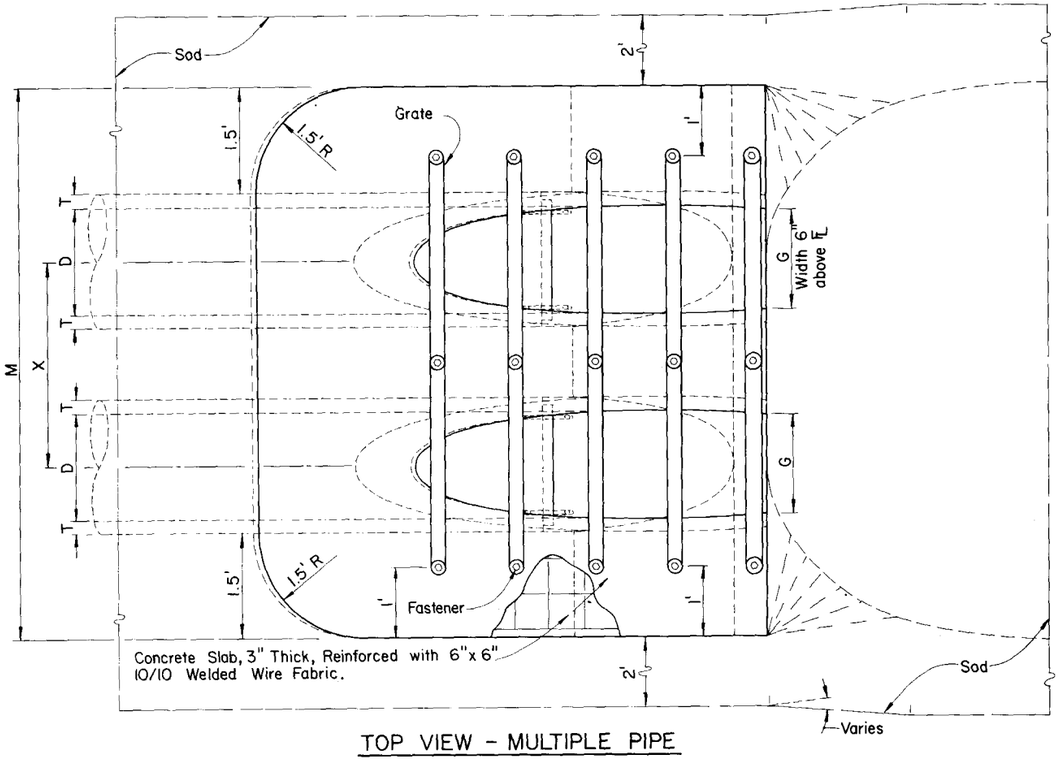
DIMENSIONS & QUANTITIES

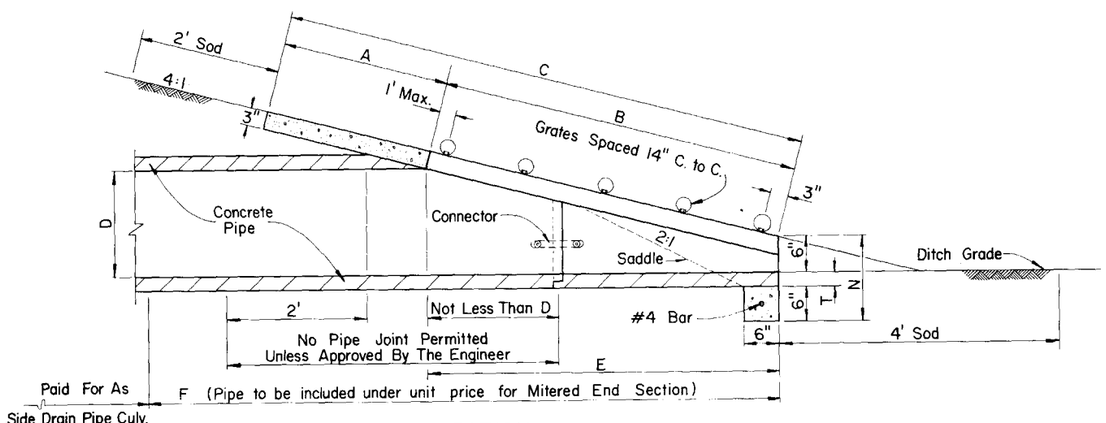
D	X	A	B	C	E	F	G	M Single Pipe	M Double Pipe	M Triple Pipe	M Quad. Pipe	N	GRATE SIZES Standard Weight Pipe	GRATE SIZES Extra Strong Pipe	CONCRETE (Cu. Yds.) Single Pipe	CONCRETE (Cu. Yds.) Double Pipe	CONCRETE (Cu. Yds.) Triple Pipe	CONCRETE (Cu. Yds.) Quad. Pipe	SODDING (Sq. Yds.) Single Pipe	SODDING (Sq. Yds.) Double Pipe	SODDING (Sq. Yds.) Triple Pipe	SODDING (Sq. Yds.) Quad. Pipe
15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'			0.40	0.61	0.80	1.00	8.69	10.41	12.13	13.86
18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'			0.47	0.69	0.91	1.14	9.39	11.25	13.14	15.02
24"	3'-5"	2.53'	7.18'	9.71'	7.03'	11'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'			0.60	0.90	1.21	1.52	10.76	13.03	15.31	17.59
30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	2 1/2"	3"	0.76	1.19	1.63	2.07	12.14	14.97	17.81	20.64
36"	5'-1"	2.87'	11.31'	14.18'	11.03'	15'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	2 1/2"	3"	0.89	1.48	2.05	2.63	13.52	16.92	20.30	23.69
42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	2 1/2"	3 1/2"	1.05	1.82	2.57	3.34	14.90	18.90	22.90	26.90
48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	2 1/2"	3 1/2"	1.21	2.15	3.07	4.00	16.28	20.78	26.50	29.78
54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	3"	4"	1.39	2.55	3.72	4.88	17.67	22.78	27.89	33.00
60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	3"	4"	1.59	3.02	4.44	5.86	19.04	24.71	30.38	36.04



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

Note:

See Sheet 4 for Details and Sheet 5 for Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SIDE DRAIN MITERED END SECTION

SINGLE AND MULTIPLE ROUND CONCRETE PIPE

	Names	Dates
Designed by	EGR	6/78
Drawn by	HKH	6/78
Checked by	JVG	6/78
F.H.W.A. Approved:		10/21/77

Approved By: Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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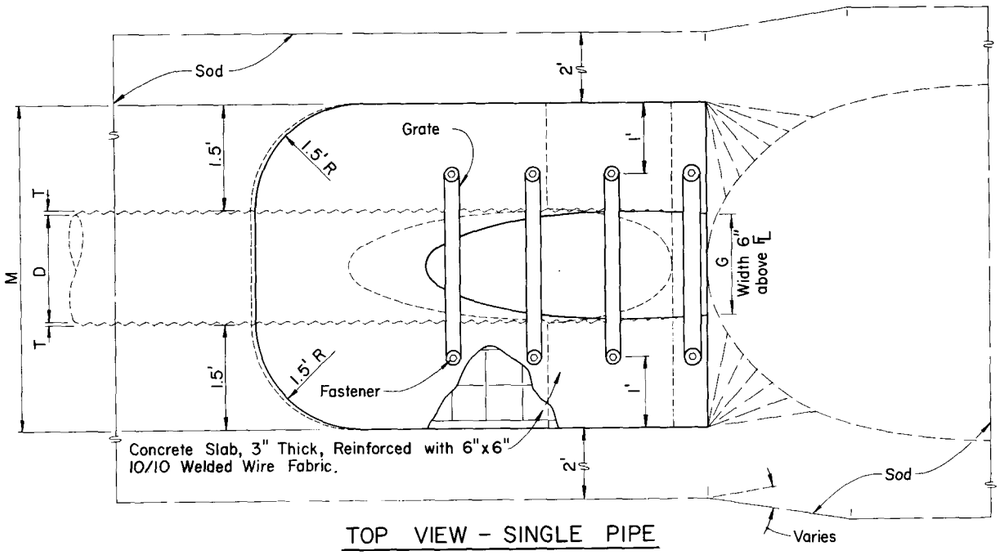
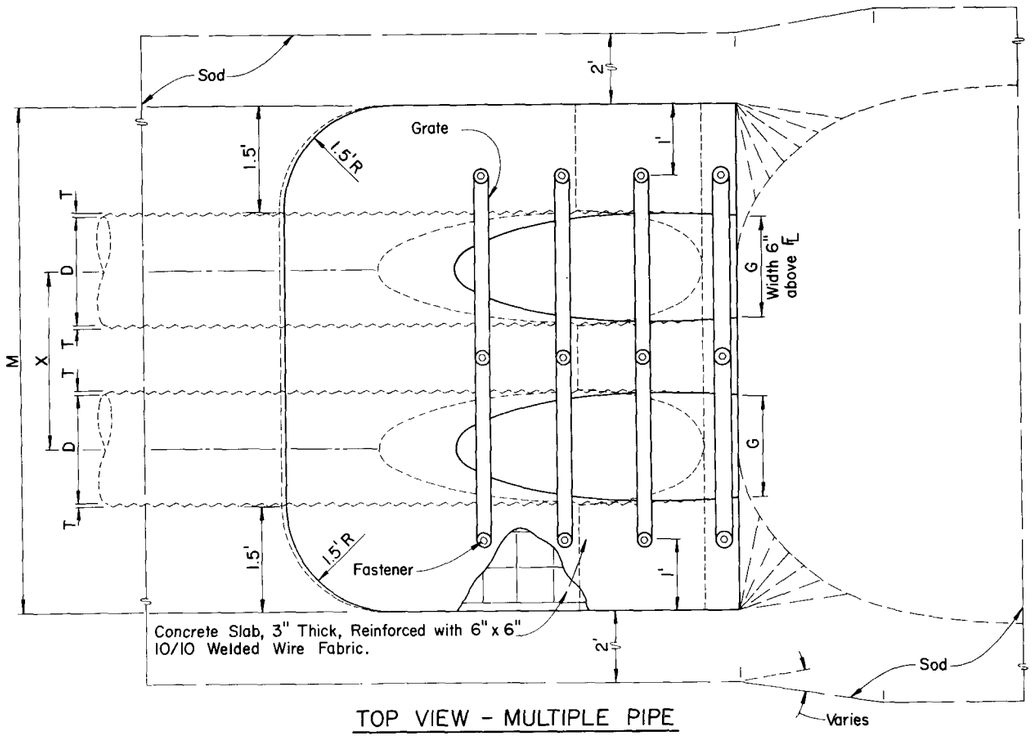
DIMENSIONS & QUANTITIES

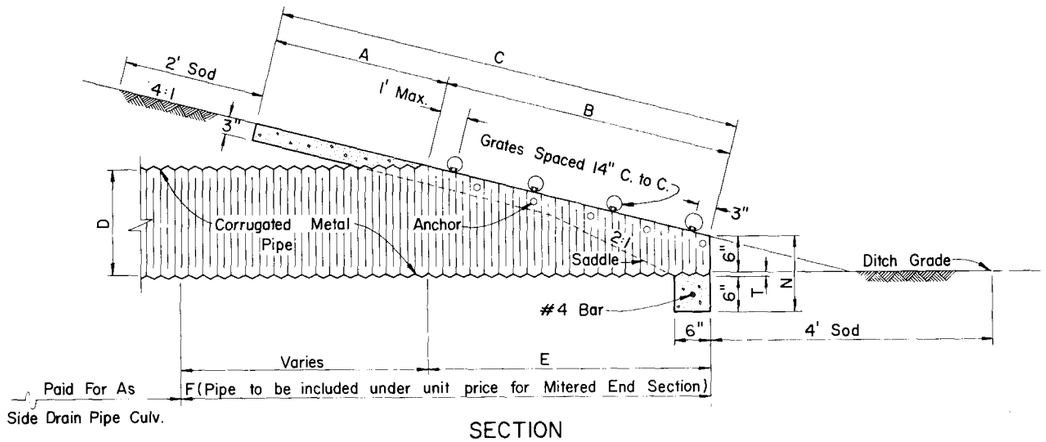
D	X	A	B	C	E	F	G	M Single Pipe	M Double Pipe	M Triple Pipe	M Quad. Pipe	N	GRATE SIZES Standard Weight Pipe	GRATE SIZES Extra Strong Pipe	CONCRETE (Cu. Yds.) Single Pipe	CONCRETE (Cu. Yds.) Double Pipe	CONCRETE (Cu. Yds.) Triple Pipe	CONCRETE (Cu. Yds.) Quad. Pipe	SODDING (Sq. Yds.) Single Pipe	SODDING (Sq. Yds.) Double Pipe	SODDING (Sq. Yds.) Triple Pipe	SODDING (Sq. Yds.) Quad. Pipe
15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'			0.31	0.47	0.63	0.79	8.15	9.88	11.59	13.31
18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'			0.34	0.53	0.71	0.90	8.77	10.67	12.55	14.44
24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'			0.44	0.69	0.92	1.18	10.02	12.30	14.59	16.86
30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	2½"	3"	0.53	0.88	1.25	1.60	11.28	14.12	16.95	19.77
36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	2½"	3"	0.62	1.07	1.53	2.00	12.52	15.92	19.30	22.69
42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	2½"	3½"	0.70	1.30	1.92	2.52	13.77	17.78	21.77	25.77
48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	2½"	3½"	0.80	1.54	2.29	3.02	15.02	19.53	24.02	28.52
54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	3"	4"	0.90	1.83	2.74	3.67	16.27	21.39	26.49	31.61
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	8.08'	16.58'	25.08'	33.58'	1.04'	3"	4"	1.02	2.15	3.27	4.39	17.52	23.19	28.85	34.52



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

Note:

See Sheet 4 for Details and Sheet 5 for Notes.

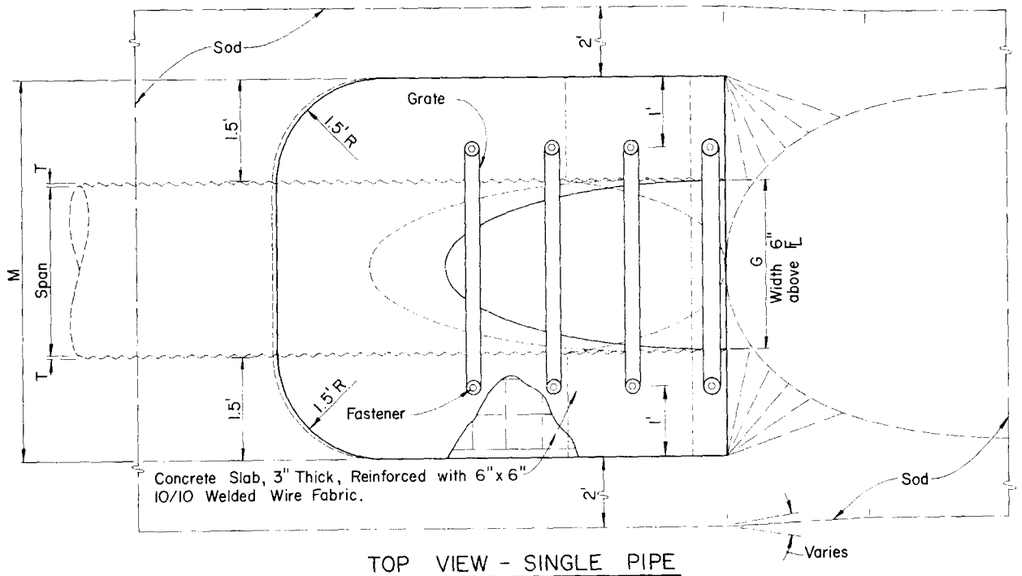
STATE OF [illegible] DEPARTMENT OF TRANSPORTATION
[illegible] DESIGN

SIDE DRAIN
MITERED END SECTION
SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE

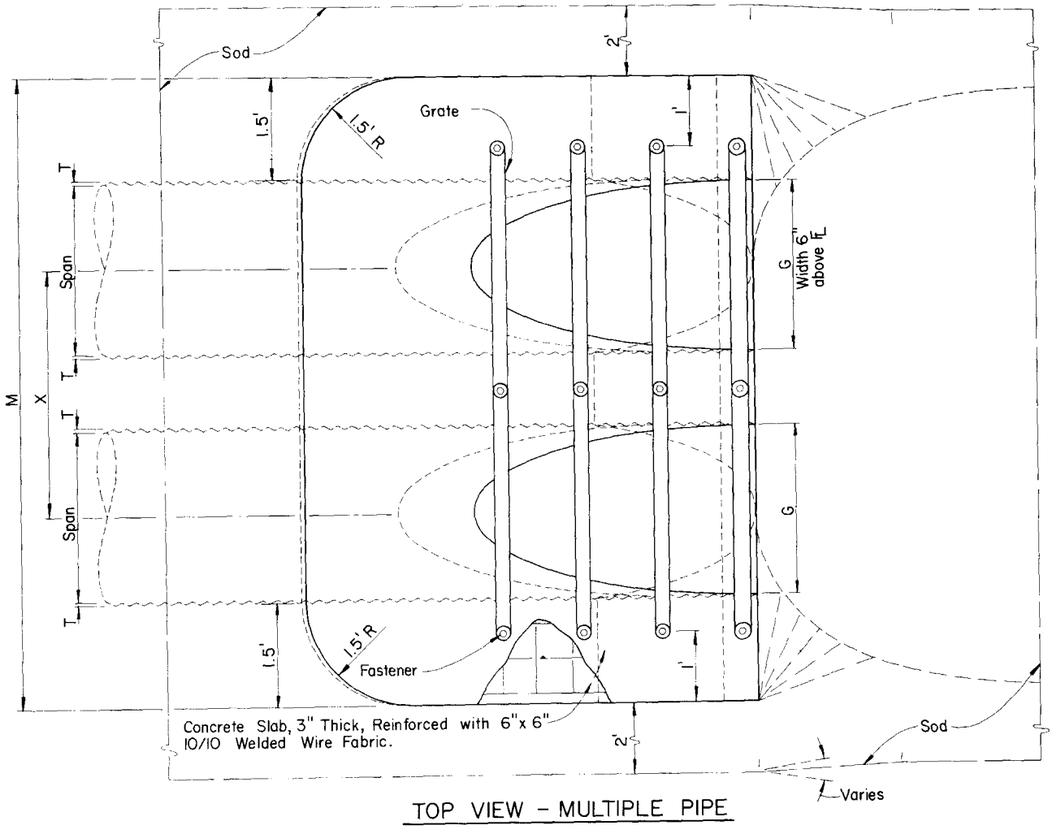
Designed by EGR	8/77	Recommended By: [signature] Deputy Chief Engineer, Roadways
Drawn by HKH	8/77	
Checked by JVG	8/77	
F.H.W.A. Approved: 10/21/77	Revision No. 80	Sheet No. 2 of 5
		Index No. 273

DIMENSIONS & QUANTITIES

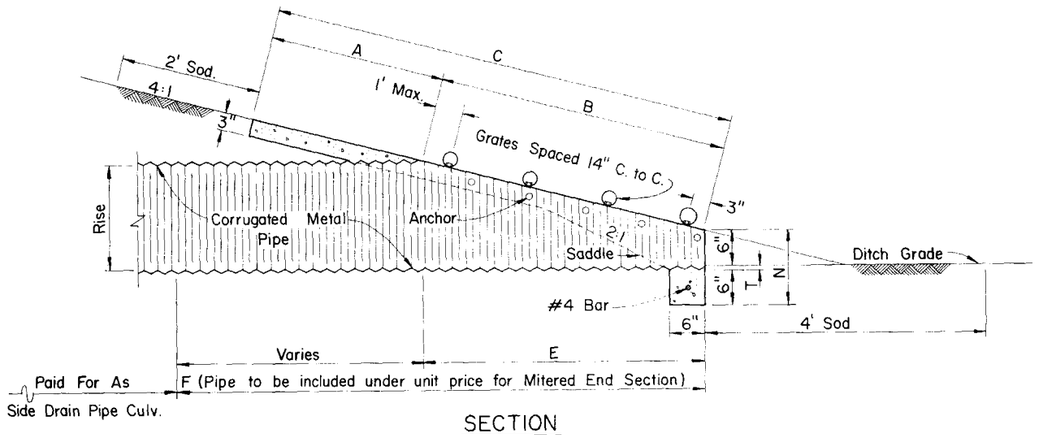
1974 AASHTO									M					GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
Span	Rise	X	A	B	C	E	F	G	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	N	Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'			.28	.42	.56	.70	7.96	9.62	11.29	12.96
21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'			.32	.49	.66	.78	8.48	10.37	12.26	14.15
28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'			.40	.60	.82	1.03	9.64	11.91	14.19	16.47
35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	2 ½"	3"	.49	.77	1.05	1.33	10.63	13.30	15.97	18.63
42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	6.58'	11.33'	16.08'	20.83'	1.04'	2 ½"	3 ½"	.57	.92	1.27	1.62	11.78	14.95	18.12	21.28
49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	2 ½"	3 ½"	.65	1.08	1.50	1.93	12.79	16.45	20.12	23.79
57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	3"	4"	.76	1.30	1.83	2.37	13.99	18.22	22.44	26.66
64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	3"	4"	.87	1.55	2.18	2.83	15.15	19.86	24.59	29.31
71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	3"	4"	.95	1.68	2.43	3.17	16.15	21.37	26.59	31.82



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

Note:

See Sheet 4 for Details and Sheet 5 for Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SIDE DRAIN MITERED END SECTION

SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH

	Name	Date
Designed by	EGR	8/77
Drawn by	HKH	8/77
Checked by	JVG	8/77
F.H.W.A. Approved		10/21/77

Approved By: Deputy Design Engineer, Roadways

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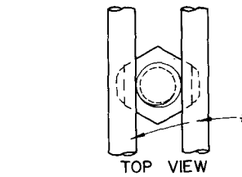
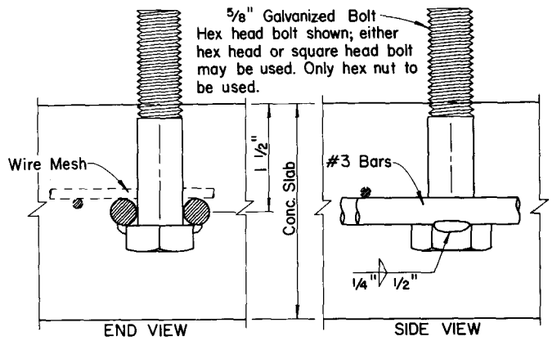
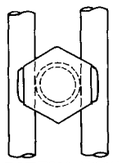
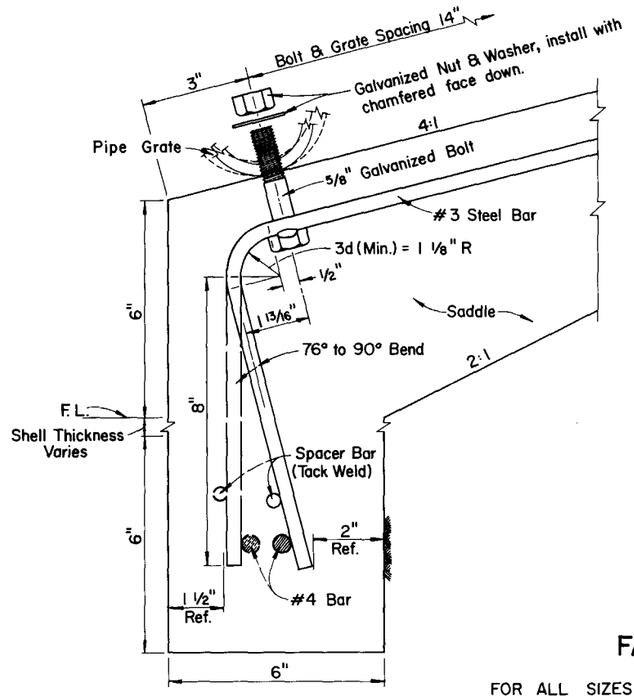
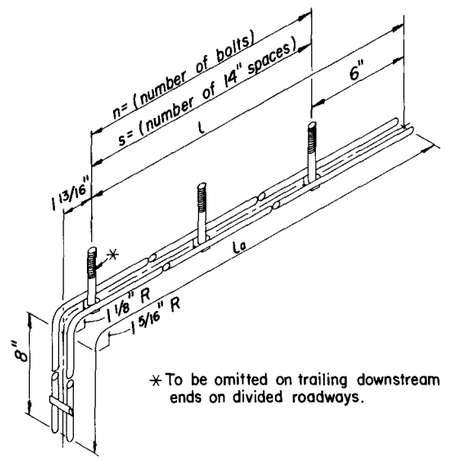






The specified weld shall be made when the fabricated unit is subject to hazardous hauls and repeated handling. Tack welds are permitted for local or job site fabrication. Galvanizing over welded surface not required.





* To be omitted on trailing downstream ends on divided roadways.

FASTENER UNIT

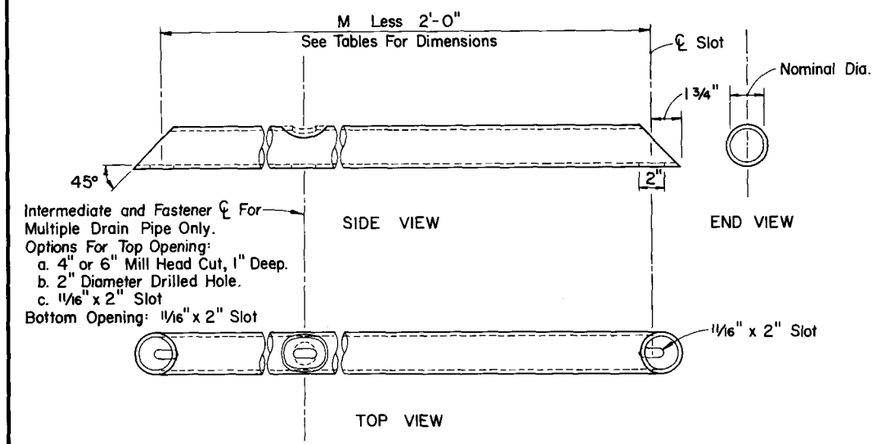
FOR ALL SIZES OF SINGLE AND MULTIPLE DRAIN PIPE

Drain Size	s	n	L	La	
CONCRETE PIPE (ROUND)					
15"	3	4	4'-0"	4'-11"	**
18"	4	5	5'-2"	6'-1"	
24"	6	7	7'-6"	8'-5"	
30"	7	8	8'-8"	9'-7"	
36"	9	10	11'-0"	11'-11"	
42"	11	12	13'-4"	14'-3"	
48"	13	14	15'-8"	16'-7"	
54"	14	15	16'-10"	17'-9"	
60"	16	17	19'-2"	20'-1"	
CORRUGATED METAL PIPE (ROUND)					
15"	2	3	2'-10"	3'-9"	**
18"	3	4	4'-0"	4'-11"	
24"	5	6	6'-4"	7'-3"	
30"	7	8	8'-8"	9'-7"	
36"	8	9	9'-10"	10'-9"	
42"	10	11	12'-2"	13'-1"	
48"	12	13	14'-6"	15'-5"	
54"	14	15	16'-10"	17'-9"	
60"	15	16	18'-0"	18'-11"	
CORRUGATED METAL PIPE (ARCH)***					
17"x13"	1	2	1'-8"	2'-7"	**
21"x15"	2	3	2'-10"	3'-9"	
28"x20"	4	5	5'-2"	6'-1"	
35"x24"	5	6	6'-4"	7'-3"	
42"x29"	6	7	7'-6"	8'-5"	
49"x33"	7	8	8'-8"	9'-7"	
57"x38"	9	10	11'-0"	11'-11"	
64"x43"	10	11	12'-2"	13'-1"	
71"x47"	12	13	14'-6"	15'-5"	

** To be used only when grates are called for in the plans.
*** 1974 AASHTO Pipe Arch Sizes.

Note:
5/8" x 3" bolts are standard for all grate fasteners, except when the contractor elects to use the slotted upper holes for the intermediate fasteners on multiple drain pipe, which will require the following bolt lengths:

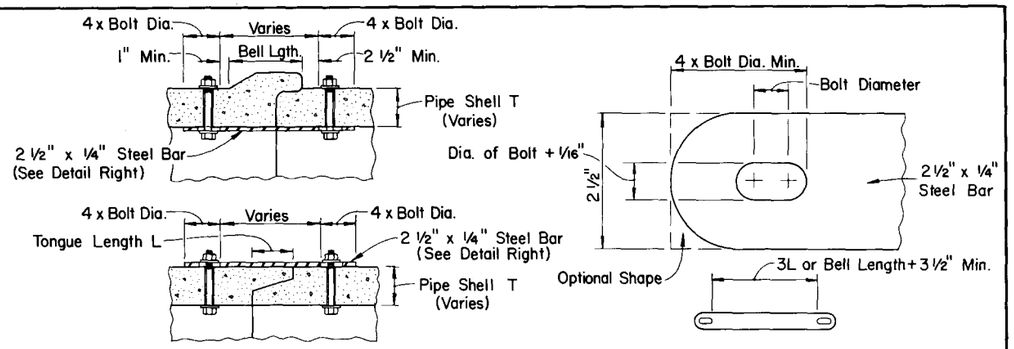
Grate Size (Std. & X-Stg.)	Bolt Length
2 1/2"	5 1/2"
3"	6"
3 1/2"	6 1/2"
4"	7"



See General Notes, Sheet 5.

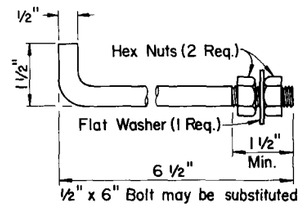
GRATE DETAIL

FOR SINGLE & MULTIPLE DRAIN PIPE



All bars, bolts, nuts and washers are to be galvanized steel.
Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 60" pipe.
Two connectors required per joint, located 60° right and left of bottom center of pipe.
Bolt holes in pipe shell are to be drilled.

CONCRETE PIPE CONNECTOR DETAIL



Anchors required for CMP only.
Anchor, washer and nuts to be galvanized steel.
Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending.
Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.
Flat washer to be placed on inside wall of pipe.

ANCHOR DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SIDE DRAIN MITERED END SECTION

DETAILS FOR CONCRETE & CORRUGATED METAL PIPE

	Names	Dates
Designed by	EGR	8/77
Drawn by	HKH	8/77
Checked by	JVG	8/77
F.H.W.A. Approved: 10/21/77		

Approved By: Deputy Design Engineer, Roadways

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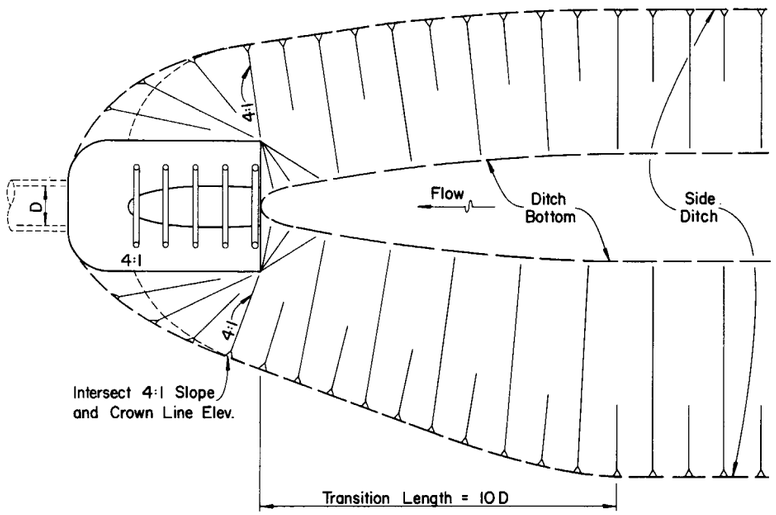

PLAN

DITCH TRANSITION

GENERAL NOTES

1. Mitered end sections shall be paid for as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe(s), grates, fasteners, reinforcing, connectors, anchors and concrete shall be included in the contract unit price for mitered end section, each. Sodding not included.
3. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class I concrete.
4. Round pipe size 30" or greater and pipe-arch size 35" x 24" or greater shall be grated unless excepted in the plans. Smaller sizes of pipe shall be grated only when called for in the plans.

   The lower grate on trailing downstream ends on divided highways shall be omitted.
5. Grates are to be fabricated from galvanized steel ASTM A 53, Grade B, pipe. The lower grate on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40.

   Base metal exposed during fabrication shall be repaired as specified in Section 562, Standard Specifications. Grates subject to salt water or highly corrosive environment shall be hot dipped galvanized after fabrication in accordance with ASTM A 123.
6. Concrete pipe used in the assembly of mitered end sections shall be of selective lengths to avoid excessive connections.
7. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
8. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
9. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of side drain pipe; corrugated steel pipe mitered end sections may be used with any type of side drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of side drain pipe except steel pipe. When bituminous coated metal pipe is specified for side drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe. Bituminized-Fiber pipe mitered end sections constructed in accordance with the details shown for corrugated metal pipe (including anchor bolts, apron, etc.) may be used with any type of 15", 18", or 24" side drain pipe.
   When the mitered end section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 280.
10. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each, based on each independent pipe end.
11. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.
12. Elliptical concrete pipe mitered end sections shall be constructed using appropiate mitered end section details for round concrete pipe and corrugated metal pipe arch, sheets 1, 3, 4 and 5.

DESIGN NOTES

1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 3% or pipe with less than 1.5' of cover and grades in excess of 1% will require such an evaluation (General Note 4).
2. The design engineer shall determine highly corrosive locations and specify in the plans when the grates shall be hot-dipped galvanized after fabrication (General Note 5).
3. The design engineer shall determine and designate in the plans which alternate types of mitered end section will not be permitted. The restriction shall be based on corrosive or structural requirements.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SIDE DRAIN MITERED END SECTION
NOTES & INFORMATION

	Names	Dates
Designed by	EGR	8/77
Drawn by	HKH	8/77
Checked by	JVG	8/77
F.H.W.A.	Approved: 10/21/77	

Approved By
Deputy Design Engineer, Roadways

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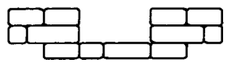
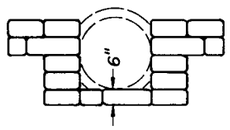


SECTION DD



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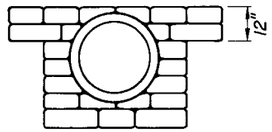

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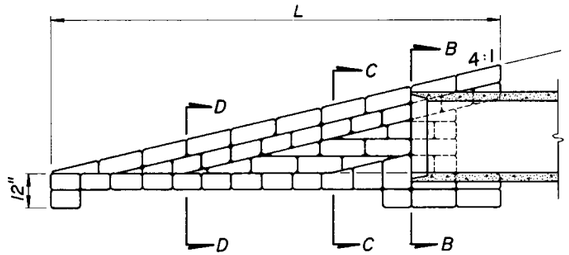

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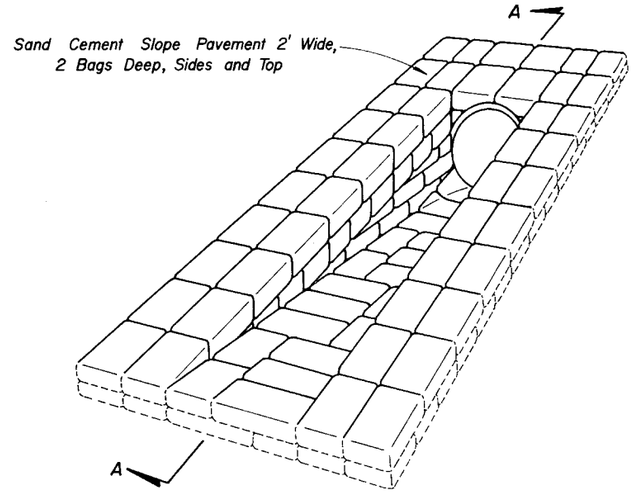
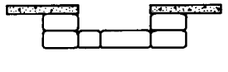


ISOMETRIC

ESTIMATED QUANTITIES & DIMENSIONS					
PIPE SIZE	L CMP	L Conc. Pipe	SAND-CEMENT RIPRAP (Cu. Yd.)	Bags (Jute)	SOD (Sq. Yd.)
15"	8'-2"	8'-9"	2.2	90	8.40
18"	9'-2"	9'-10"	2.5	100	9.10
24"	11'-2"	12'-0"	3.5	140	10.40



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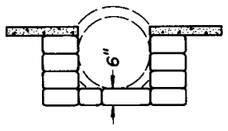

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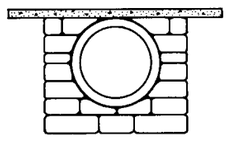

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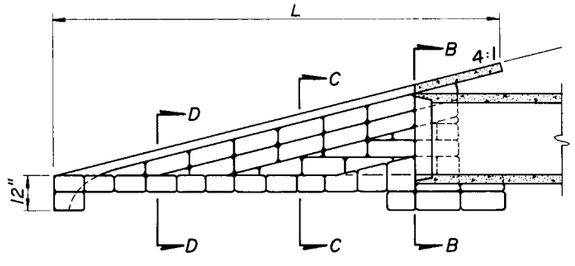

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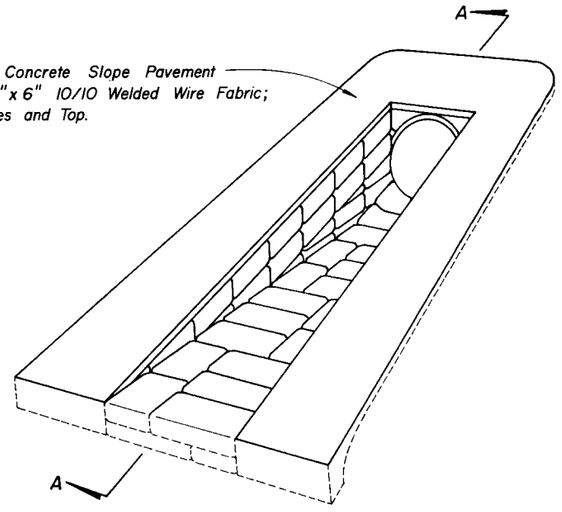

ISOMETRIC

ESTIMATED QUANTITIES & DIMENSIONS						
PIPE SIZE	L CMP	L Conc. Pipe	SAND-CEMENT RIPRAP (Cu. Yd.)	Bags (Jute)	CONCRETE (Cu. Yd.)	SOD (Sq. Yd.)
15"	8'-2"	8'-9"	1.0	40	0.45	8.40
18"	9'-2"	9'-10"	1.4	60	0.50	9.10
24"	11'-2"	12'-0"	2.0	80	0.60	10.40

GENERAL NOTE

1. Details for concrete and round corrugated metal pipe, concrete pipe shown.
2. Sod slopes 2' each side and top and ditch 4' beyond toe.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SIDE DRAIN
MITERED END SECTION
SINGLE ROUND CONCRETE & CORRUGATED METAL PIPE

	Names	Dates
Designed by	EGR	10/77
Drawn by	HKH	10/77
Checked by	JVG	10/77
F.H.W.A.	Approved: 10/23/78	

Approved By
Deputy Design Engineer, Roadways

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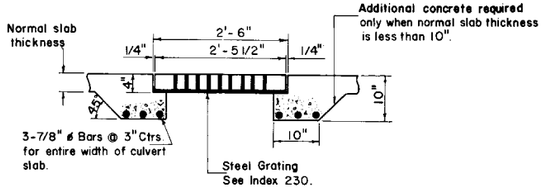
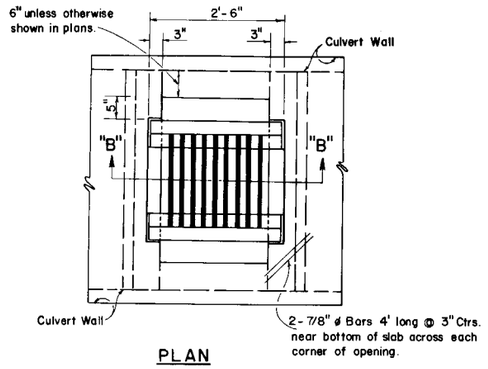
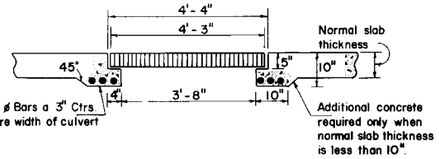


SECTION "B-B"

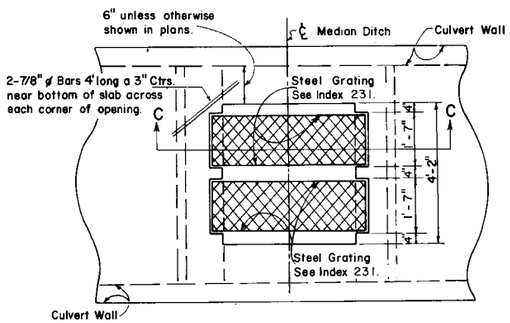


PLAN

MODIFIED TOP (TYPE "A" INLET)



SECTION C-C

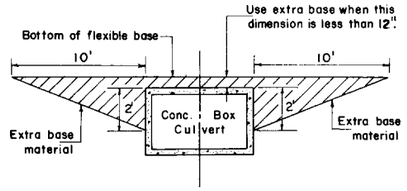


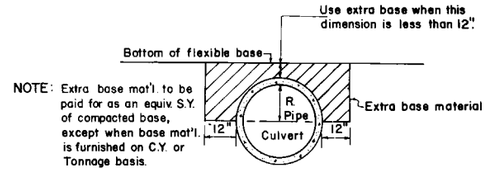
PLAN

MODIFIED TOP (TYPE "B" INLET)

DETAIL SHOWING OPENING IN TOP OF BOX CULVERT FOR DRAINING MEDIAN DITCH

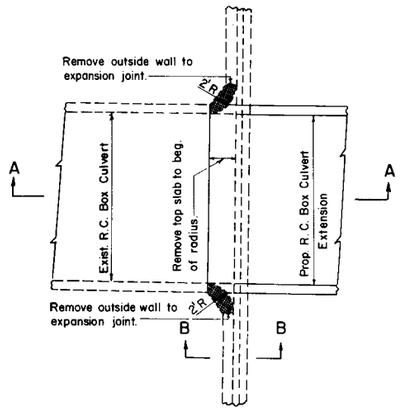
NOTE:
1. Cost of Steel Grating to be included in cost of Box Culvert.
2. All steel shall be 1 1/4" clear.



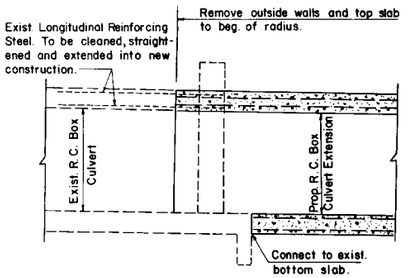


NOTE: Extra base mat'l. to be paid for as an equiv. S.Y. of compacted base, except when base mat'l. is furnished on C.Y. or Tonnage basis.

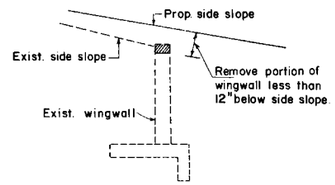
DETAIL OF EXTRA BASE CONSTRUCTION FOR THE PROTECTION OF CULVERTS WITH LESS THAN MINIMUM COVER



PLAN

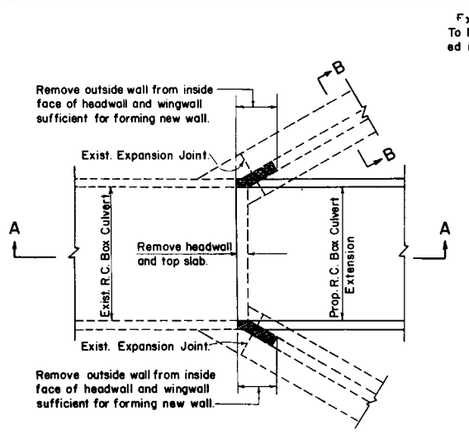


SECTION A-A

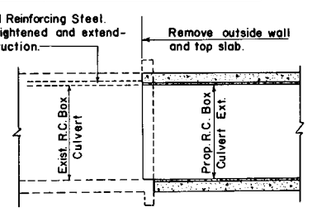


SECTION B-B

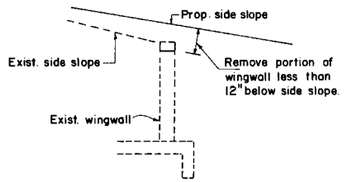
ENDWALLS PARALLEL TO ℄ ROADWAY



PLAN



SECTION A-A



SECTION B-B

FLARED ENDWALL

CONNECTION DETAILS R.C. BOX CULVERT EXTENSIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MISCELLANEOUS DRAINAGE DETAILS

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 11/16/78

Revision No.	Sheet No.	Index No.
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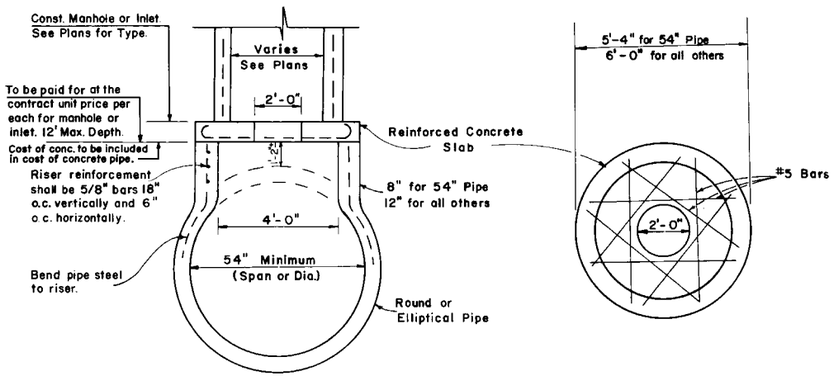
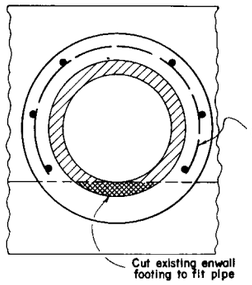


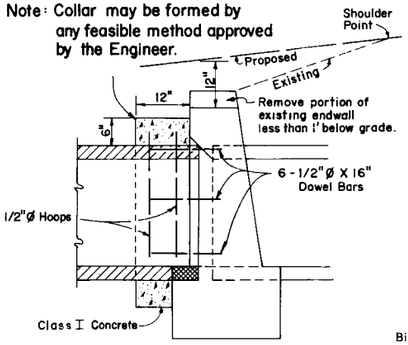
Reinforced slabs are required when inlet or manhole riser is less than 4' in diameter or when Type P, Alt. B manhole or inlet riser is used.
For optional construction joints see Index NO. 201.

DETAILS OF CONSTRUCTION OF INLETS OR MANHOLES ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE

Note: Cost of Concrete and Reinforcing Steel to be included in Contract Unit Price for Pipe Culvert.



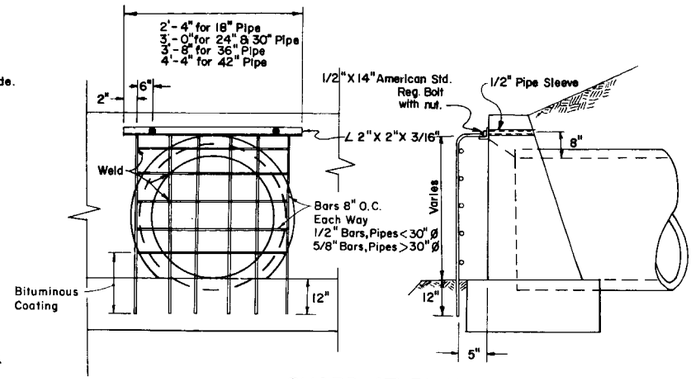
Note: Collar may be formed by any feasible method approved by the Engineer.



Note: Spigot end to be placed in existing Endwall regardless of direction of flow.

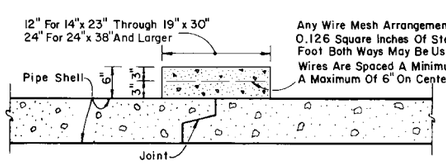
DETAIL OF CONCRETE COLLAR

FOR EXTENTION OF EXISTING PIPE CULVERTS

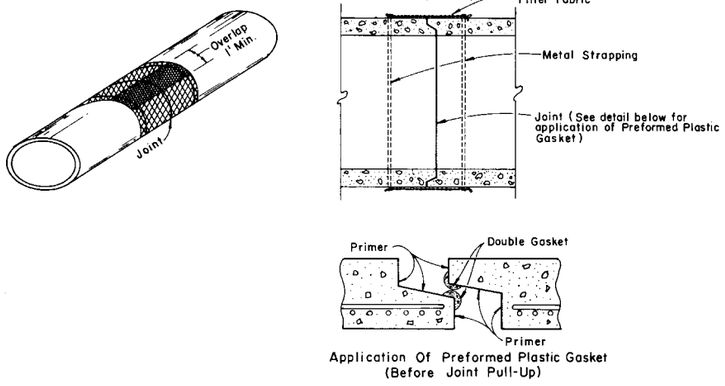


GUARD AT PIPE ENDS

Notes: Guards to be constructed only at locations specified in detail plans.
Cost of guard bolts, nuts and sleeves to be included in the contract unit price for concrete.



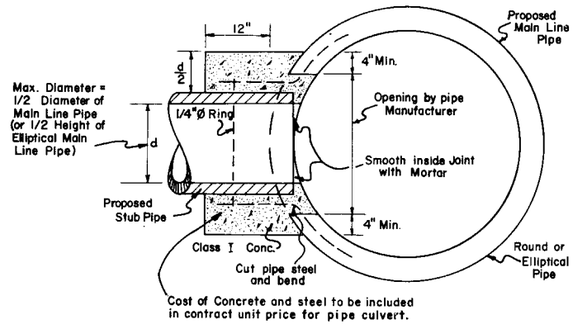
CONCRETE JACKET



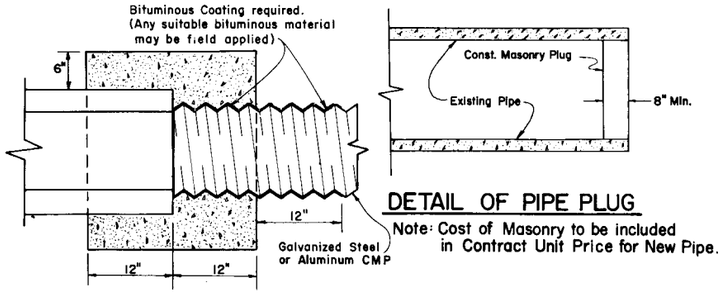
FILTER FABRIC JACKET

ELLIPTICAL CONCRETE PIPE JOINTS

Cost of concrete jacket and filter fabric jacket to be included in cost of Elliptical Concrete Pipe Culverts.



DETAILS OF CONSTRUCTION AT JUNCTIONS OF MAINLINE PIPE AND STUB PIPE



DETAIL OF CONCRETE JACKET

REQUIRED AT JUNCTION OF DISSIMILAR TYPES OF PIPE

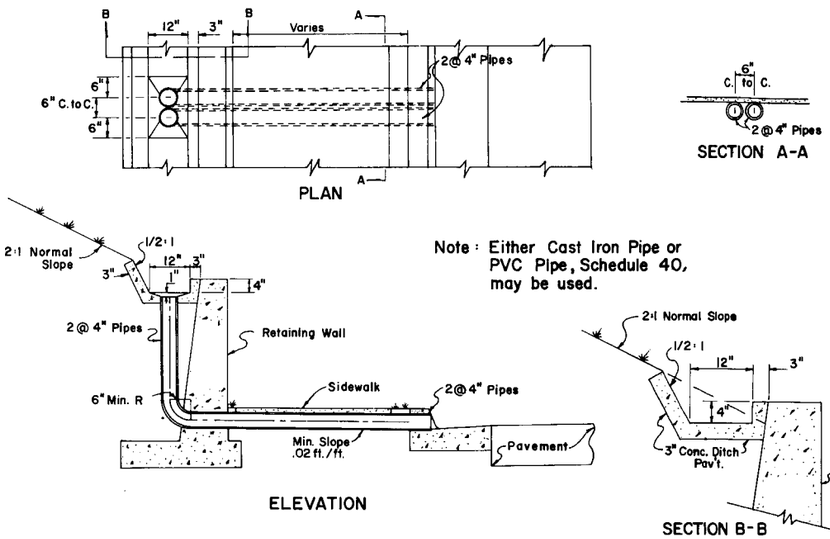
Note: COST OF CONCRETE AND BITUMINOUS COATING TO BE INCLUDED IN CONTRACT UNIT PRICE FOR NEW PIPE.

DETAIL OF PIPE PLUG

Note: Cost of Masonry to be included in Contract Unit Price for New Pipe.

GENERAL NOTE

ALL CROSS DRAIN AND SIDE DRAIN PIPE STRUCTURES TO BE CONSTRUCTED TO A LENGTH THAT WILL BE A MULTIPLE OF 4' JOINT LENGTHS FURNISHED TO THE NEAREST MULTIPLE LENGTH EQUAL TO, OR ABOVE THAT SHOWN IN PLANS.



DETAILS OF CONCRETE GUTTER AND DRAINS AT RETAINING WALLS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MISCELLANEOUS DRAINAGE DETAILS

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved:		

Approved By: Deputy Design Engineer, Roadways

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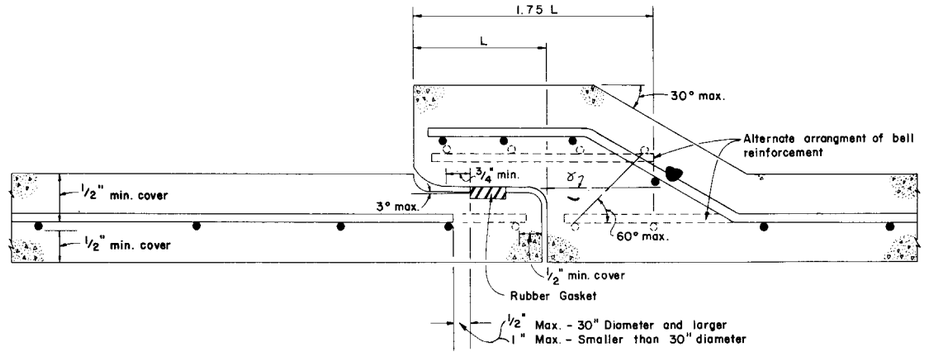
SCHEDULE OF BELL REINFORCEMENT

Classes - III, IV, V; Wall - A,B,C

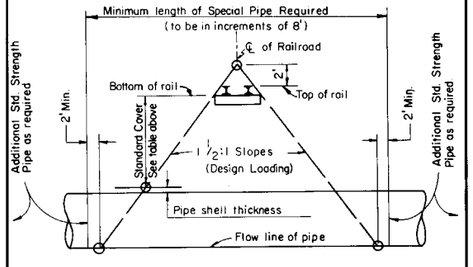
Nominal Pipe Diameter	Design Bell Reinforcement	Maximum Reinforcement Under Tolerance
	SQUARE INCHES	SQUARE INCHES
15"	0.12	0.010
18"	0.16	0.010
24"	0.20	0.010
30"	0.24	0.010
36"	0.28	0.010
42"	0.32	0.010
48"	0.36	0.011
54"	0.40	0.012
60"	0.45	0.0135
66"	0.50	0.015
72"	0.55	0.0165
78"	0.60	0.018
84"	0.65	0.0195
90"	0.70	0.021
96"	0.75	0.0225
102"	0.80	0.024
108"	0.85	0.0255



γ All circumferential steel located above this line within 1.75 L is defined as bell reinforcement.

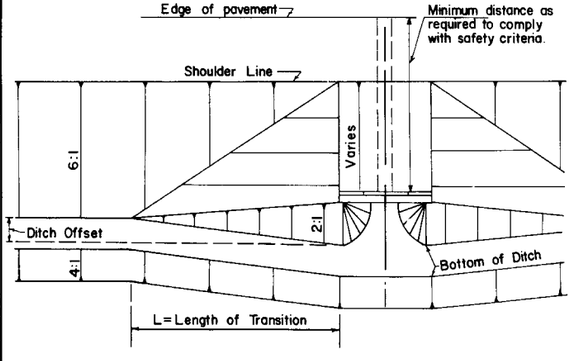
DETAIL OF BELL & SPIGOT CONCRETE PIPE JOINT USING ROUND RUBBER GASKET

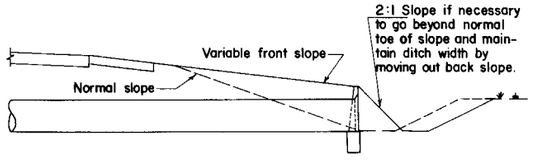
RAILROAD COMPANY	CLEARANCE BELOW BOTTOM OF RAIL (FEET)	STRENGTH (A.S.T.M.) TABLE NO.
APALACHICOLA NORTHERN	4.0	IV
ATLANTA AND ST ANDREWS BAY	3.0	IV
FLORIDA EAST COAST	5.5 *	IV
LOUISVILLE AND NASHVILLE	4.6	IV
ST LOUIS - SAN FRANCISCO	4.5	IV WALL B
SEABOARD COASTLINE	5.5	IV
SOUTHERN RAILWAY SYSTEM		
GEORGIA SOUTHERN AND FLORIDA	5.5	V
LIVE OAK, PERRY AND SOUTH GEORGIA	5.5	V
ST JOHNS RIVER TERMINAL	5.5	V

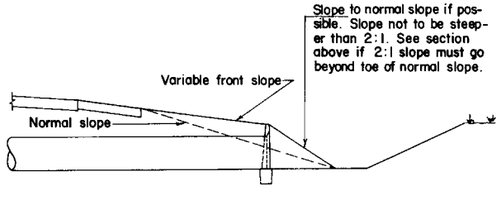


METHOD FOR DETERMINING THE LENGTH OF SPECIAL PIPE REQUIRED UNDER RAILROADS

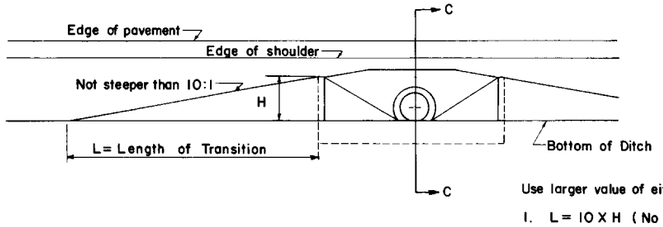
* Clearance is for casing pipe. All subgrade carrier pipelines and wirelines will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.







NOTE: Filling or excavation of variable slopes to be done during normal grading operations.

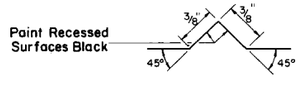


SECTION C-C

Use larger value of either:

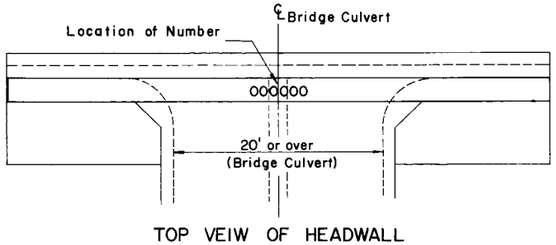
1. L = 10 X H (No maximum)
2. L = 10 X Ditch Offset (Maximum L = 100')

DETAIL FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES WHERE FRONT SLOPES ARE FLATTER THAN NORMAL SLOPES.



SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED FIGURES

The number is to be placed in the center of the top surface of all BRIDGE CULVERT headwalls.
Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of Figures formed by 3/8" "V" Grooves.
"V" Grooves shall be formed by preformed Figures.



TOP VEIW OF HEADWALL SHOWING BRIDGE CULVERT NUMBER LOCATION

For Bridge Number see Key Map

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

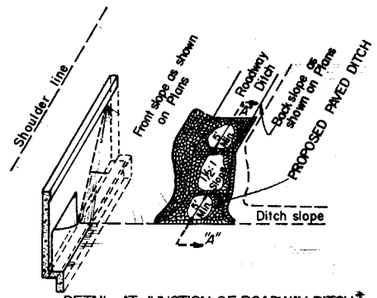
MISCELLANEOUS DRAINAGE DETAILS

	Names	Dates
Designed by		
Drawn by		
Checked by		

F.H.W.A. Approved: 11/16/78

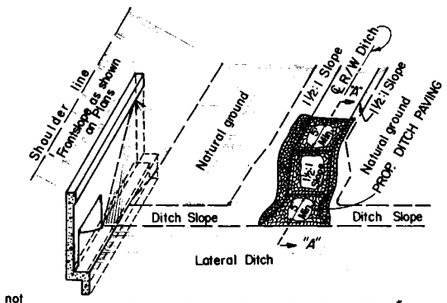
Approved By: Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	3 of 3	280

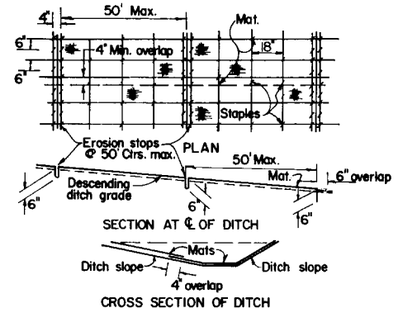


DETAIL AT JUNCTION OF ROADWAY DITCH* AND LATERAL DITCH

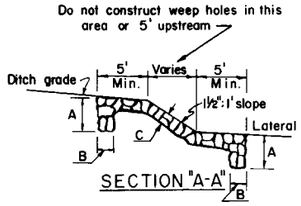
*Soil cement or SBRM will not be permitted for this type of construction.



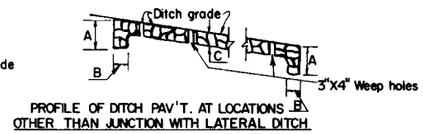
DETAIL AT JUNCTION OF R/W DITCH* AND LATERAL DITCH



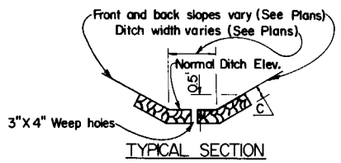
DETAILS OF INSTALLATION OF MATTING FOR EROSION CONTROL



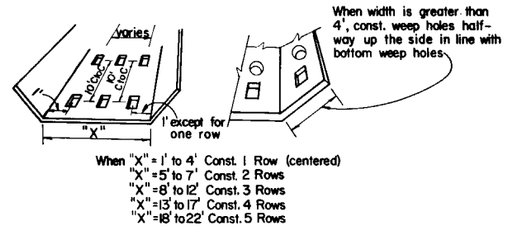
SECTION "A-A"



PROFILE OF DITCH PAV'T. AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



TYPICAL SECTION

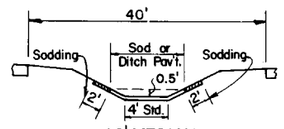


When "X" = 1' to 4' Const. 1 Row (centered)
"X" = 5' to 7' Const. 2 Rows
"X" = 8' to 12' Const. 3 Rows
"X" = 13' to 17' Const. 4 Rows
"X" = 18' to 22' Const. 5 Rows

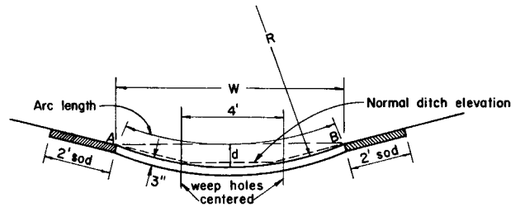
Notes: All weep holes to be 3"X4" rectangle or 4" or 5" Dia. circular hole. 1/2 Cu. ft. (12"x12"x6") of No. 6 aggregate to be placed under each hole. 1 Sq. ft. of galvanized wire mesh (1/4" openings) shall be placed between the aggregate and the concrete. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

WEEP HOLE ARRANGEMENT

SCHEDULE OF MIN. DIMENSIONS			
TYPE OF PAVEMENT	A	B	C
Concrete	24"	6"	3"
Rubble	24"	12"	9"
Sand-Cement	24"	12"	4"
Soil- Cement	24"	12"	4"
S.B.R.M.	24"	12"	4"
Salvaged Concrete	24"	12"	3½"



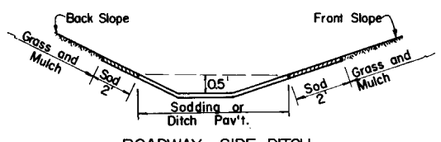
40' MEDIAN



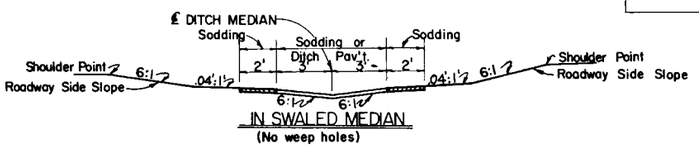
TO REPLACE:	W	d	R	No. of rows of weep holes	Arc Length
6' Median Swale	6'	.24'	19'	0	6.0
6:1 Front Slopes; 4:1 Back Slope					
5' B.W. Ditch	10'	.67'	19'	2	10.1
4' B.W. Ditch	9'	.54'	19'	2	9.1
4:1 Front slope & Back slope					
5' B.W. Ditch	9'	.74'	14'	2	9.2
4' B.W. Ditch	8'	.58'	14'	1 in center	8.1

ALTERNATE DITCH PAVEMENT

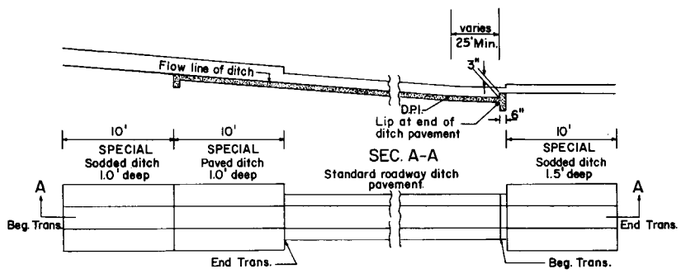
For use only where side slopes are 4:1 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.



ROADWAY SIDE DITCH



IN SWALED MEDIAN
(No weep holes)



TYPICAL PAVED DITCH SECTION FOR TRANSITIONS FROM PAVED TO UNPAVED SECTIONS

DITCH PAVEMENT & SODDING

GENERAL NOTES

1. Type of ditch pavement shall be as shown on plans.
2. In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints will be permitted.

   ½" expansion joints with preformed joint filler shall be constructed at all inlets, endwalls, and at intervals of not more than 200'.
3. Salvaged concrete ditch pavement shall consist of concrete pav't., sidewalk, curb and gutter with a 3 sq. ft. minimum surface area.
4. All joints shall be grouted when rubble, sand cement or salvaged concrete paving is used for ditch paving.
5. Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
6. When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
7. For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
8. Lip at end of ditch pavement shall normally be located downstream of D.P.I. or on flatter grades where there is a decrease in ditch velocity.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH PAVEMENT & SODDING

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 5/1/75

Revision No.	Sheet No.	Index No.
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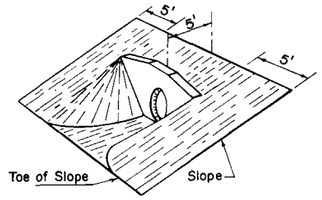
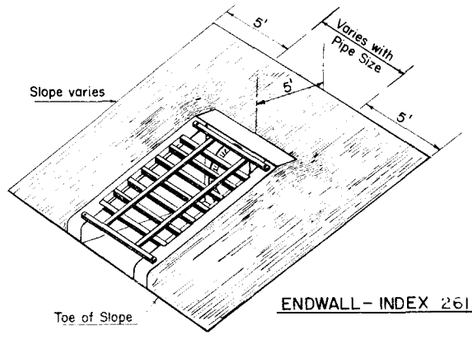
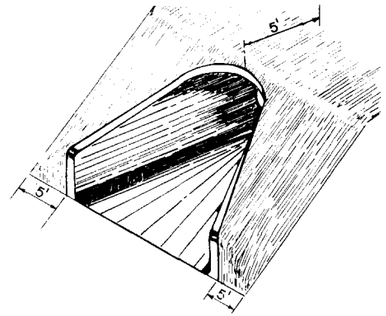


ENDWALL - INDEX 250



ENDWALL - INDEX 261



ENDWALL - INDEX 270

SODDING QUANTITIES

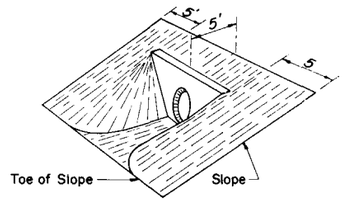
PIPE SIZE	INDEX 250										INDEX 266		
	2:1 SLOPE			4:1 SLOPE			6:1 SLOPE				2:1 SLOPE	4:1 SLOPE	6:1 SLOPE
	1-PIPE	2-PIPE	3-PIPE	1-PIPE	2-PIPE	3-PIPE	1-PIPE	2-PIPE	3-PIPE				
12"											14.73 S.Y.	20.61 S.Y.	26.71 S.Y.
15"											16.72 S.Y.	23.80 S.Y.	31.12 S.Y.
18"	25 S.Y.	28 S.Y.	3: S.Y.	35 S.Y.	40 S.Y.	45 S.Y.	45 S.Y.	51 S.Y.	57 S.Y.		18.83 S.Y.	27.22 S.Y.	35.93 S.Y.
21"													
24"	30	34	39	43	50	57	57	65	74		23.42 S.Y.	34.74 S.Y.	46.50 S.Y.
27"													
30"	35	42	48	53	62	72	70	86	95		28.51 S.Y.	43.18 S.Y.	58.42 S.Y.
36"	4 :	50	58	63	76	88	85	102	118		30.08 S.Y.	52.53 S.Y.	71.70 S.Y.
42"	49	59	70	75	91	107	101	123	144		40.16 S.Y.	63.80 S.Y.	86.32 S.Y.
48"	56	69	86	87	107	126	119	145	172		46.74 S.Y.	74.01 S.Y.	102.30 S.Y.
54"	64	79	94	100	124	140	137	170	203				
60"	S.Y.		S.Y.	S.Y.		S.Y.	S.Y.	157 S.Y.	S.Y.	S.Y.			

Note: These quantities are for one pipe.

SODDING QUANTITIES

PIPE SIZE	INDEX 261			INDEX 270		
	2:1 SLOPE	4:1 SLOPE	6:1 SLOPE	2:1 SLOPE	4:1 SLOPE	6:1 SLOPE
12"				15.14 S.Y.	14.44 S.Y.	14.30 S.Y.
15"	14.77 S.Y.	17.18 S.Y.	22.55 S.Y.	15.57	14.84	14.70
18"	15.46	18.76	24.35	16.06	15.31	15.17
21"				16.33	15.56	15.41
24"	16.44	20.93	27.96	16.60	15.80	15.64
27"				16.91	16.08	15.92
30"	18.24 S.Y.	23.43 S.Y.	31.57 S.Y.	17.17	16.32	16.15
36"				17.53	16.63	16.45
42"				22.07	20.82	20.58
48"				22.40	21.10	20.85
54"				23.86	22.49	22.22
60"				24.79	23.39	23.12
66"				24.49	23.04	22.76
72"				25.26 S.Y.	23.77 S.Y.	23.48 S.Y.

Note: Quantity for 2:1 is for endwall with baffles.



STRAIGHT ENDWALLS

NOTE: All straight endwalls except index 250 will require sodding as shown in this drawing. Quantities for each particular case to be determined by the designer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH PAVEMENT & SODDING

	Names	Dates
Designed by		
Drawn by		
Checked by		

F.H.W.A. Approved: 7/7/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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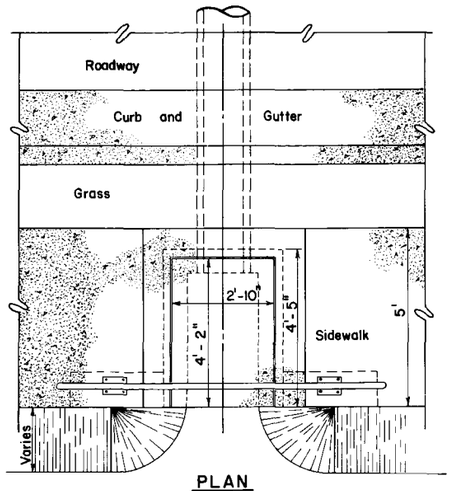
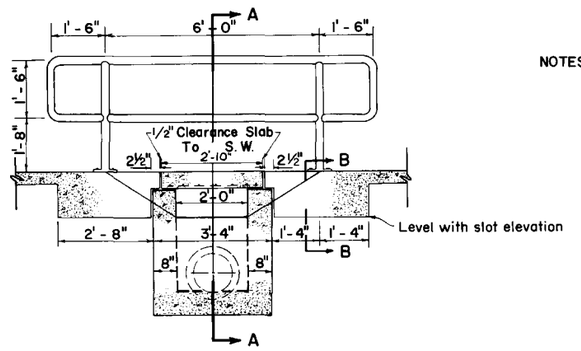
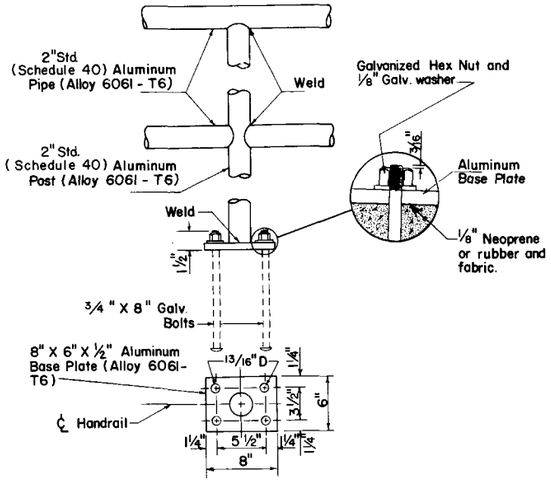


PLAN



FRONT ELEVATION



HANDRAIL DETAIL

NOTES: At the option of the contractor, Standard Rail Fittings may be used where welded connections are shown.

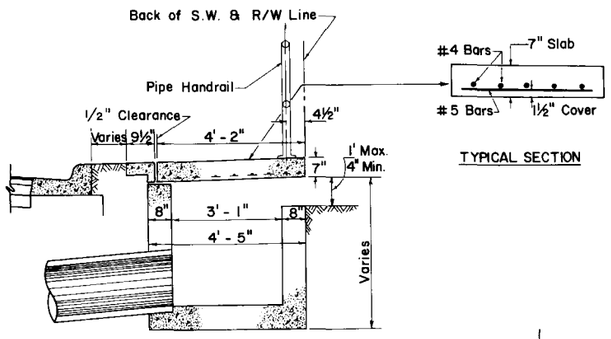
After the nuts have been tightened the anchor bolt threads shall be nicked or the nut shall be spot welded to the bolt.

Bolts, nuts and washers shall be hot dip galv. to conform to requirements of A.S.T.M. Spec. A-153. Steel Nicks and Welds shall be repaired in accordance with Section 562, Standard Specifications.

Aluminum Weld Filler Alloy 5556 or 4043.

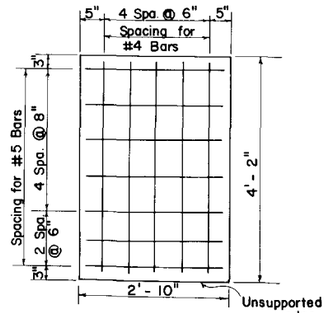
For additional Inlet Details see Index No. 232.

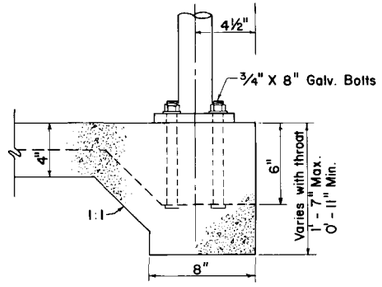
Grading back of sidewalk varies and shall be done as directed by the engineer.



SECTION A - A

TYPICAL SECTION

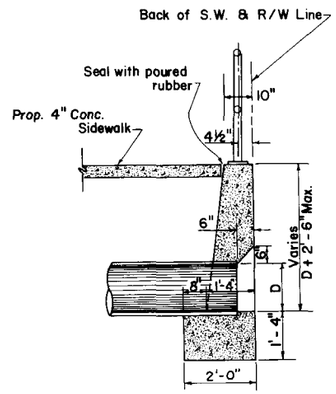




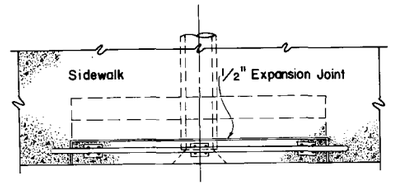
SECTION B - B

TYPE "C" MODIFIED INLET

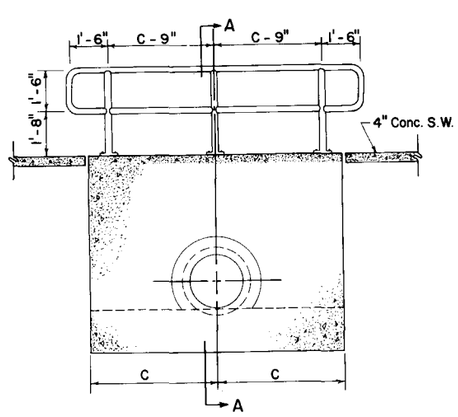
To be paid for as each



SECTION A - A



PLAN

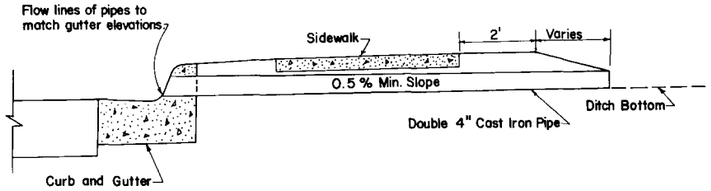


FRONT ELEVATION

SPECIAL ENDWALL

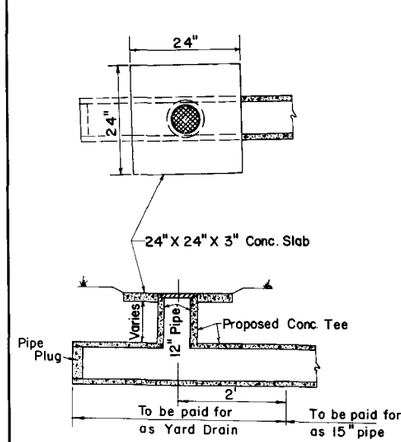
Pipe Size	"C" Value
15"	= 4'-9"
18"	= 5'-3"
24"	= 6'-3"
27"	= 6'-9"

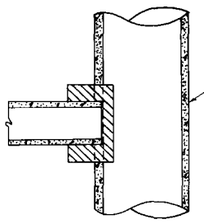
Maximum pipe size shall be 27".



METHOD OF DRAINING SHALLOW DITCHES BACK OF SIDEWALK

To be constructed at locations as directed by the engineer.





YARD DRAIN ITEM INCLUDES:

① 15"X15"X12" Conc. Tee 4' Long.

② One(1) Grate-Neenah No. R-4030, Phoenix No. P-1058, U.S. Foundry #5605 or equivalent.

③ 12" Conc. Pipe as necessary.

④ 0.04 Cu.Yds. Conc. for slab.

NOTE: Cost of plugs and collars to be included in Bid Price for 15" Conc. Pipe. For Collar and Plug Detail see Index No. 280.

DETAILS OF YARD DRAINS

Yard Drains may be constructed at the option of the property owner as shown on the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

BACK OF SIDEWALK DRAINAGE

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved: 5/1/75		

Approved By
Deputy Design Engineer, Roadways

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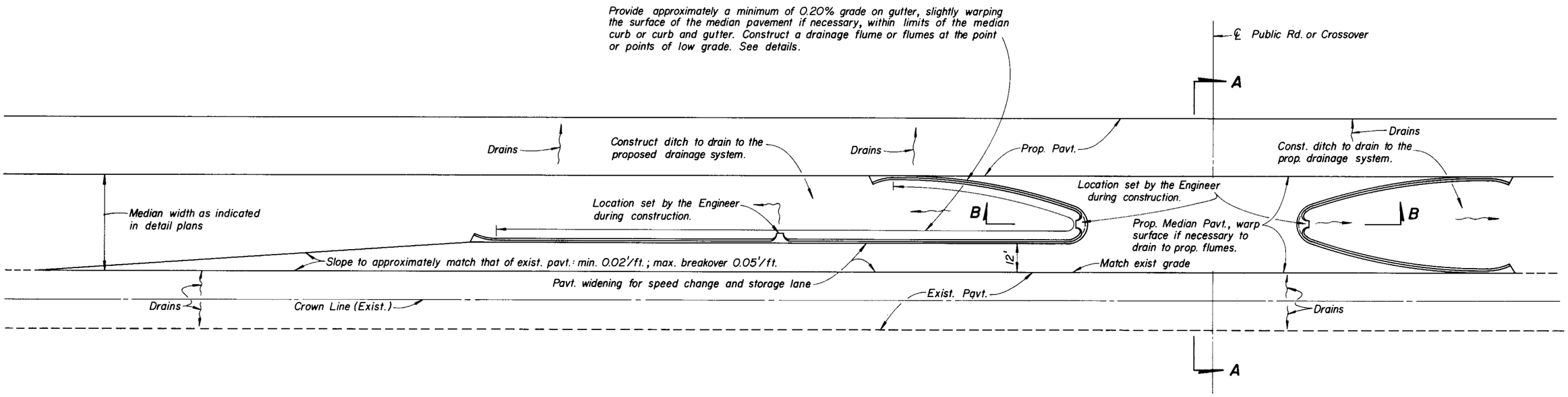
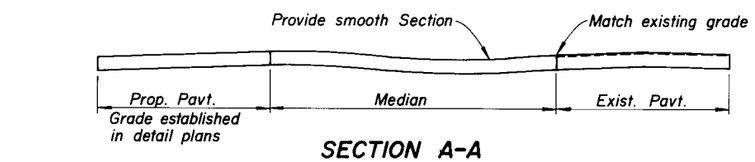
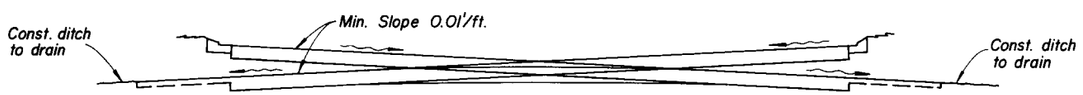


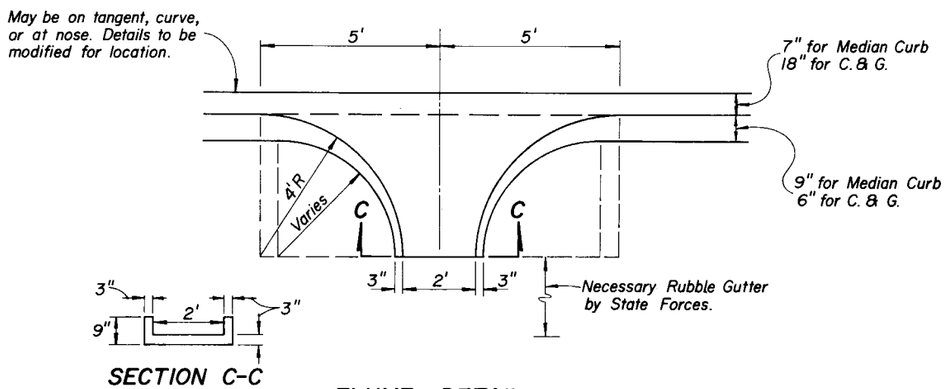


SECTION A-A



SECTION B-B

(May drain from any point as established by the Engineer)



SECTION C-C

FLUME DETAIL

GENERAL NOTES: *These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for superelevated sections of new 4-lane divided highways. Location of low point or points in gutters is to be set by the Engineer during construction and will establish locations of flumes. The number of flumes is to be maintained at a minimum. Plans for median openings to conform to detail plans. Layout above is illustration only. Cost of flumes to be included in the contract price for Median Curb or Curb and Gutter.*

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MEDIAN OPENING FLUME

	Names	Dates
Designed by	C.H.R.	3/59
Drawn by		
Checked by	C.D.D.	3/59
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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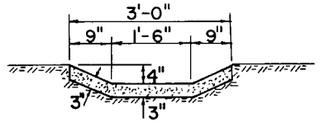
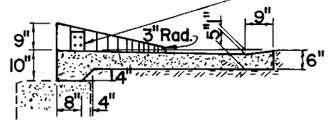
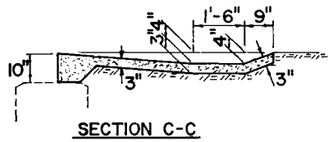


SECTION A-A

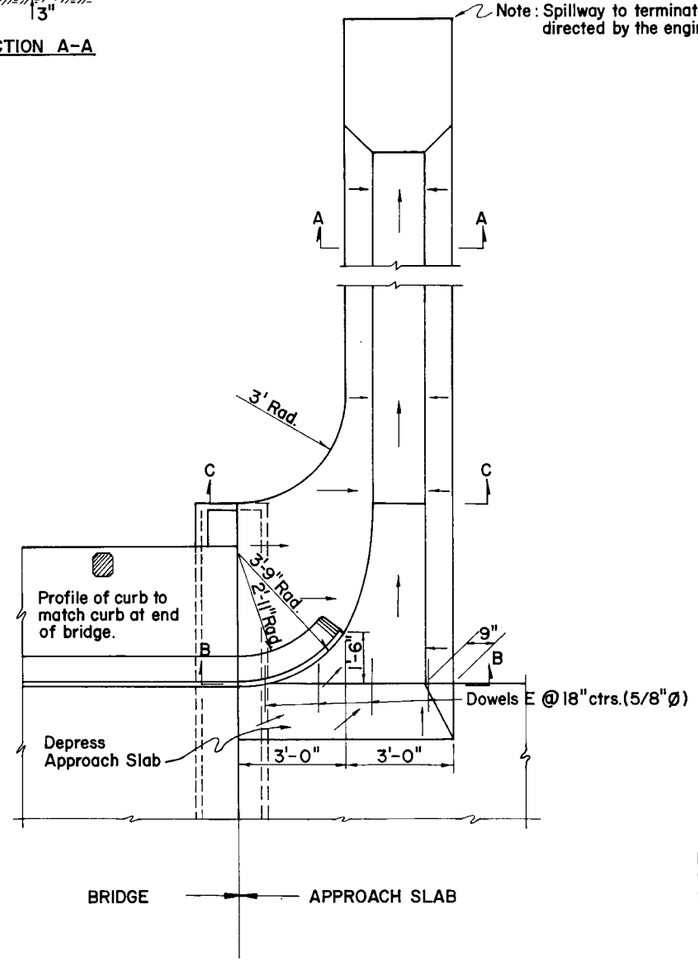
Note: Set reflector plates on right hand curb at bridge ends as shown. Plates to be furnished by D.O.T. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3" thick).



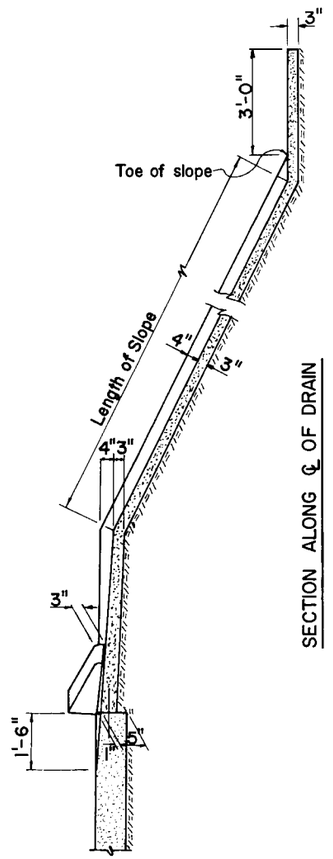
SECTION B-B



SECTION C-C



PLAN



SECTION ALONG ℄ OF DRAIN

Dowels to be included in the contract unit price for concrete ditch pavement (3" thick).

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete Ditch Pavement (3" Thick)	Sq. Yd.	* 10.87

*Quantity shown above includes pavement for 10 ft. " Length of Slope ". For each additional foot of slope length add 0.349 sq. yds.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE SPILLWAYS

BRIDGE END SPILLWAY

	Names	Dates
Designed by	C E S	12/51
Drawn by		
Checked by	H L F	12/51
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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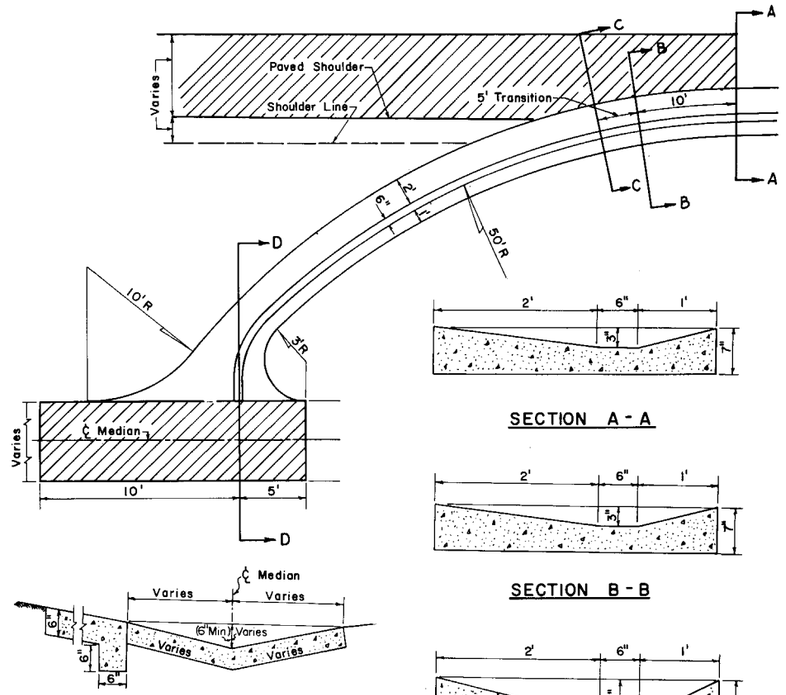

SECTION A - A

SECTION B - B

SECTION D - D

SECTION C - C

NOTES :

1. Spillway to be paid for as shoulder gutter.
2. If spillway empties into a shallow or median ditch, the detail should be modified as necessary.

DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER

(TO BE USED WHERE INLETS, PIPES & ENDWALLS ARE IMPRACTICAL)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE SPILLWAYS
SHOULDER GUTTER SPILLWAY

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved: 11/16/78		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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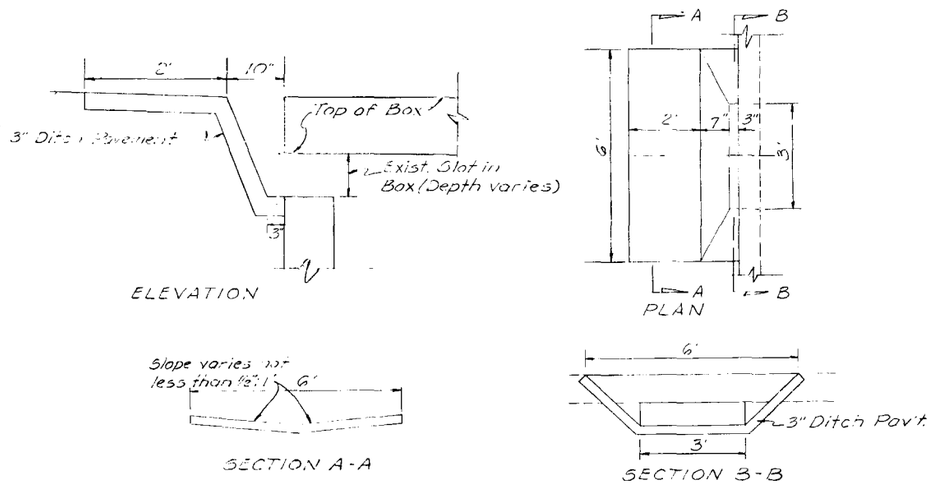
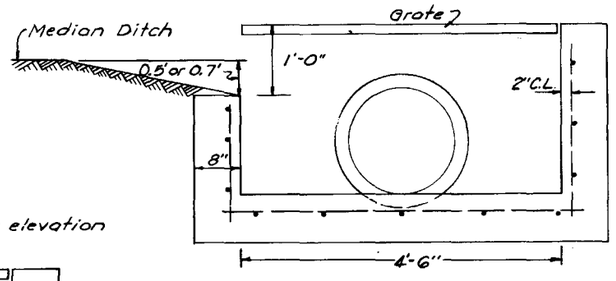
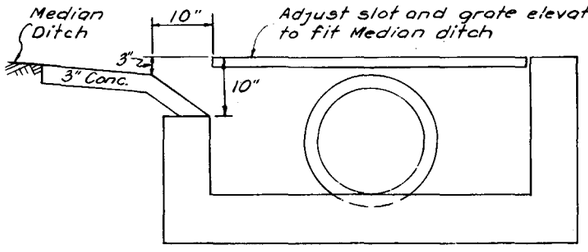


SAFETY MODIFICATION FOR OPENING IN BOX CULVERTS

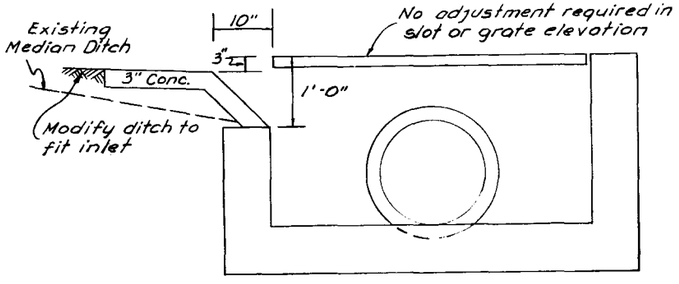


MEDIAN INLET DESIGN AS SHOWN ON THE PLANS



PROPOSED INLET MODIFICATION WHERE GRATE WAS SET 0.5' ABOVE THE DITCH

SAFETY MODIFICATION FOR MEDIAN INLETS



PROPOSED DITCH MODIFICATIONS WHERE GRATE WAS SET 0.3' ABOVE DITCH ELEV.

NOTE: These modifications will be made only on existing drainage structures.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SAFETY MODIFICATIONS FOR INLETS

	Names	Dates
Designed by	HAB	7/67
Drawn by	MJT	7/67
Checked by	DWS	7/67
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

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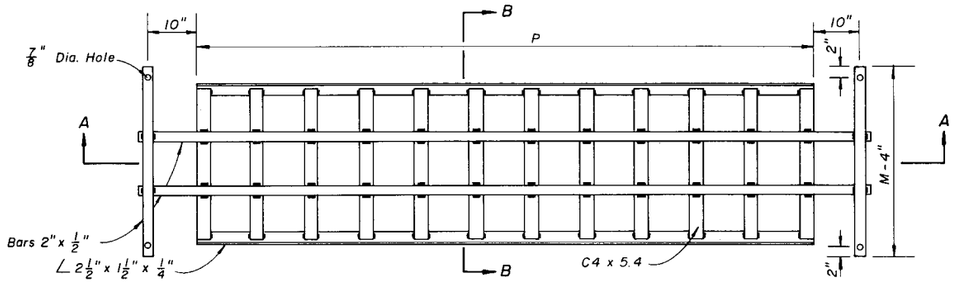
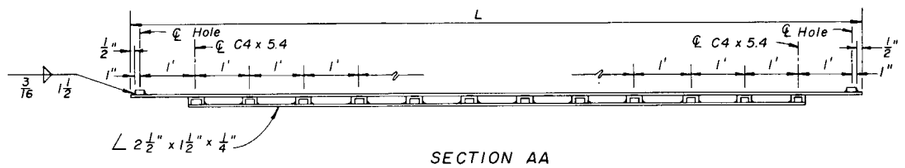
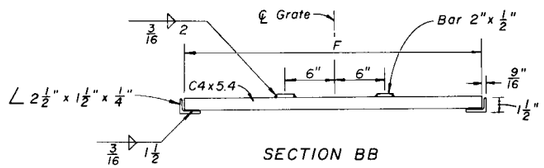


PLAN

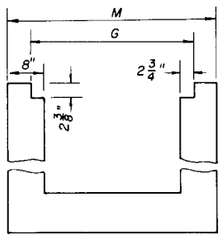


SECTION AA

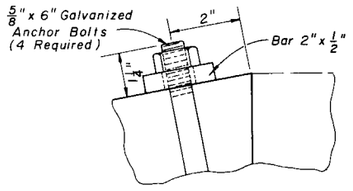


SECTION BB

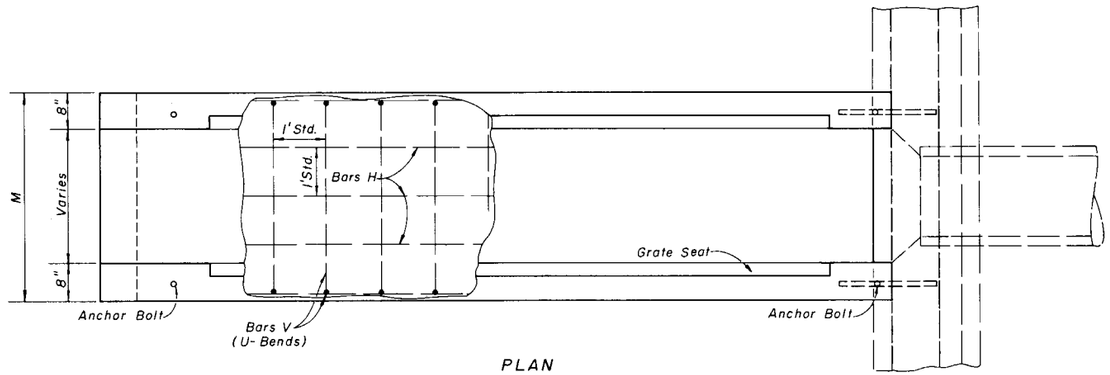
GRATE DETAIL



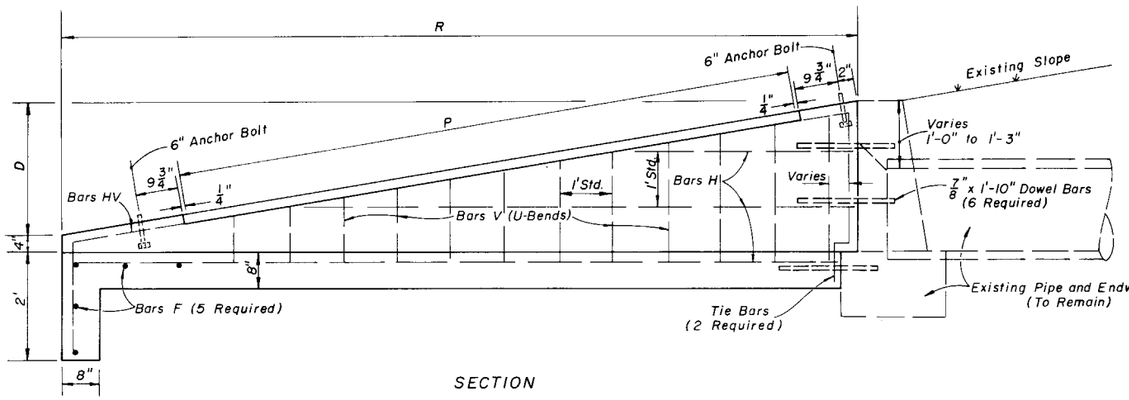
GRATE SEAT DETAIL



ANCHOR BOLT DETAIL



PLAN



SECTION

GENERAL NOTES

1. Cost of grate to be paid for as Endwall Grate per pound, tabulated quantity.
2. Cost of galvanized bolts and nuts to be included in bid price for Endwall Grate.
3. Grate to be ASTM A 588 weathering steel. If exposed to salt water (locations designated in plans) grate to be fabricated from ASTM A 572, Grade 50, then galvanized.
4. Reinforcing Steel: All bars are size #4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted. Square welded wire fabric (two cages max.) having an equivalent cross sectional area (0.20 sq. in.) may be substituted for bar reinforcement.
5. The cost of dowel bars and epoxy mortar to be included in the bid price for reinforcing steel.
6. Drill 1 3/4" holes 8" deep with a rotary drill in existing endwall for dowel bars. Holes shall be thoroughly cleaned prior to placing dowel bars and epoxy.
7. For use criteria see Index 261.
8. Channel section C3 x 6.0 may be substituted for C4 x 5.4 channel.

DIMENSIONS AND QUANTITIES PER GRATE

Slope	Pipe Size	Channels @ 5.4 Lbs./L.F			Bars @ 3.4 Lbs/L.F (2 ea.)			Angles @ 3.2 Lbs./L.F (2)		Total Weight - Lbs.
		Quantity	F	Lbs.	L	M-4"	Lbs.	P	Lbs.	
6:1	15"	10	2'-6 7/8"	139	11'-3"	3'-3"	99	9'-4"	60	298
	18"	12	2'-9 7/8"	183	13'-3"	3'-6"	114	11'-4"	73	370
	24"	15	3'-3 7/8"	269	16'-3"	4'-0"	138	14'-4"	92	499
	30"	18	3'-9 7/8"	372	19'-3"	4'-6"	162	17'-4"	111	645
4:1	15"	6	2'-6 7/8"	83	7'-3"	3'-3"	71	5'-4"	34	188
	18"	7	2'-9 7/8"	107	8'-3"	3'-6"	80	6'-4"	41	228
	24"	9	3'-3 7/8"	161	10'-3"	4'-0"	97	8'-4"	53	311
	30"	11	3'-9 7/8"	227	12'-3"	4'-6"	114	10'-4"	66	407

DIMENSIONS AND QUANTITES PER U-ENDWALL

Pipe Size	G	M	D	R	P	Class I Concrete - C.Y.	Reinforcing Steel - Lbs.
15"	2'-8 1/2"	3'-7"	2'-2"	13'-0"	9'-4"	2.12	167
18"	2'-11 1/2"	3'-10"	2'-5"	14'-6"	11'-4"	2.53	173
24"	3'-5 1/2"	4'-4"	2'-11"	17'-6"	14'-4"	3.48	238
30"	3'-11 1/2"	4'-10"	3'-5"	20'-6"	17'-4"	4.57	315
15"	2'-8 1/2"	3'-7"	2'-2"	8'-8"	5'-4"	1.44	120
18"	2'-11 1/2"	3'-10"	2'-5"	9'-8"	6'-4"	1.72	130
24"	3'-5 1/2"	4'-4"	2'-11"	11'-8"	8'-4"	2.36	167
30"	3'-11 1/2"	4'-10"	3'-5"	13'-8"	10'-4"	3.09	225

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SAFETY MODIFICATIONS FOR ENDWALLS

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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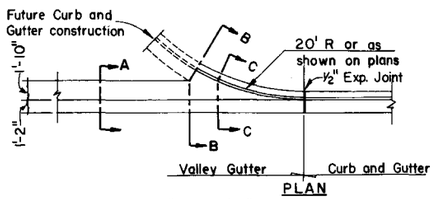
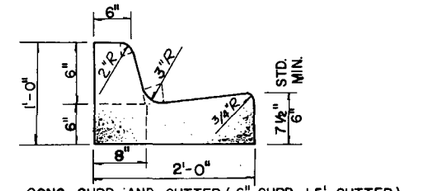
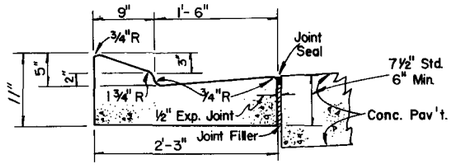




CONC. CURB AND GUTTER (6" CURB, 1.5' GUTTER)

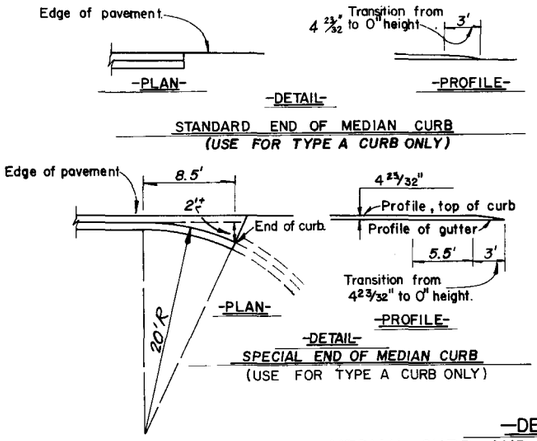
* Note "X": When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement and the thickness of the lip shall be 6", unless otherwise shown on plans.

TYPE F

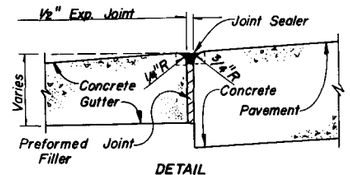


TYPE E

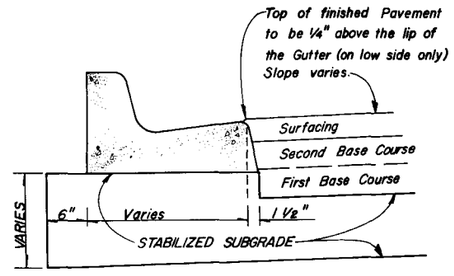
*See Note "X" above



-DETAIL-
-MEDIAN CURB AND GUTTER ENDINGS-

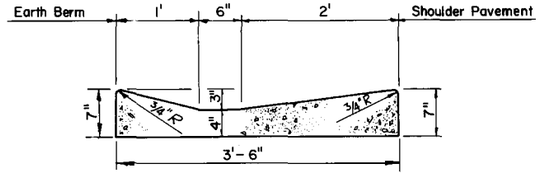


DETAIL
EXPANSION JOINT BETWEEN GUTTER AND CONCRETE PAVEMENT

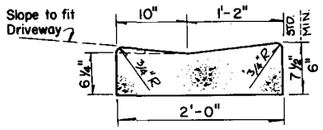


DETAIL
CONSTRUCTION OF CURB AND GUTTER ADJACENT TO FLEXIBLE PAVEMENT

Note: When Curb and Gutter, Shoulder Gutter, Valley Gutter and Drop Curb are constructed adjacent to flexable base, the Face at the lip of the gutter shall be sloped as shown in this detail.

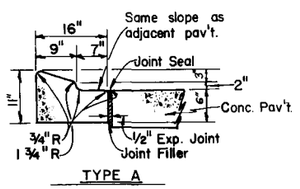


-DETAIL-
SHOULDER GUTTER

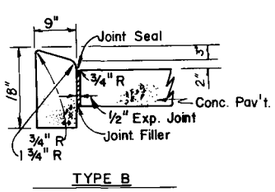


DETAIL
DROP CURB
*See note "X" above.

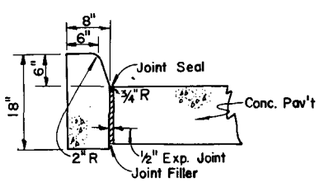
-CONCRETE CURB AND GUTTER DETAILS-



TYPE A



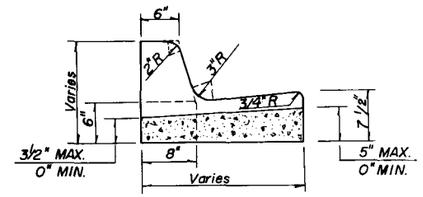
TYPE B



TYPE D

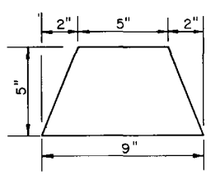
DETAILS OF CONCRETE CURB

Note: When Curb or Curb and Gutter is constructed adjacent to Flexable Pavement, the ½" Expansion Joint shown above will not be used.



DETAIL
CONTRACTION JOINT IN CURB OR CURB AND GUTTER. JOINTS 10' CENTER TO CENTER MAXIMUM

Note: Joint on Tangent sections and flat curves should match where Curb and Gutter is adjacent to P.C.C. Pavement.



DETAIL
ASPHALTIC CONCRETE CURB

GENERAL NOTES

1. *For Curb and Gutter and Traffic Separator provide ⅛"-¼" contraction joints at 10' centers.*
2. *All Curb and Gutter Details are shown for construction adjacent to Concrete Pavement, unless otherwise noted.*

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB & CURB AND GUTTER

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 7/7/75

Revision No.	Sheet No.	Index No.
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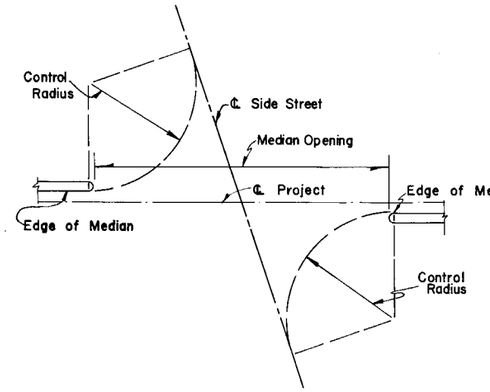
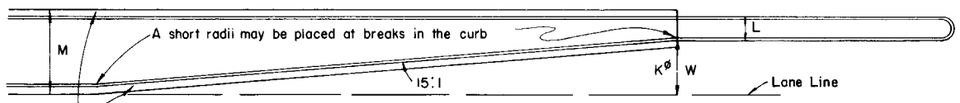
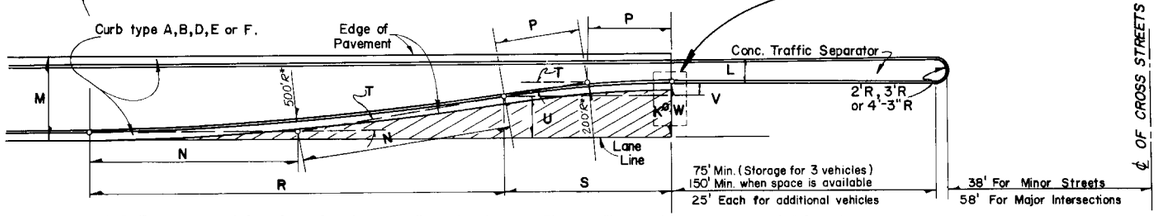


DESIGN VEHICLE	MEDIAN OPENING 90°	CONTROL RADIUS EDGE OF LANE
P	76	40'
SU	96	50'
WB-40&WB-50	146	75'

METHOD OF DETERMINING MEDIAN OPENINGS AT SKEWED SIDE STREETS



MEDIAN STORAGE LANE-ALT. I



* **Radii are measured from face of curb, regardless** of curb type. These radii are minimums recommended for urban construction. For rural primary construction, the radii are to be in conformity with the design speed of the highway where practicable.

ø Dimensions K and W are identical except when median curb is type D or curb and gutter type F. Dimension K is from lane line to the face of curb. Dimension W is from lane line to traffic separator.

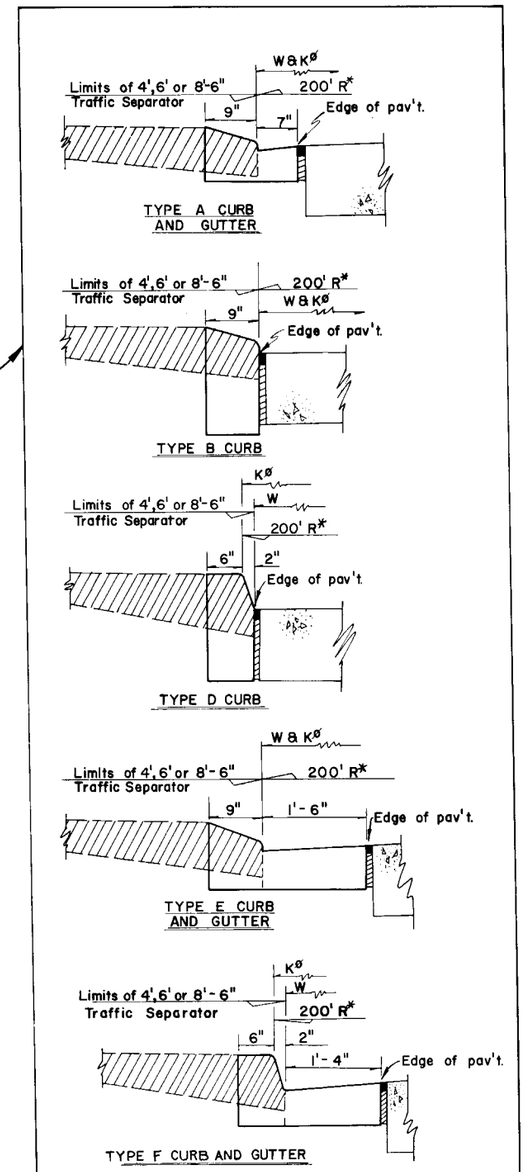
-DETAILS OF MEDIAN STORAGE LANE- ALT II

NOTE: HACHURED PORTION INDICATES AREA GIVEN IN TABLE BELOW

TABLE OF DIMENSIONS AND QUANTITIES FOR MEDIAN STORAGE LANES

L	M	CURB TYPE	N	P	R	S	T	U	V	Kø	W	AREA SQ.FT.
4'	15'-6"	A	43.12'	17.25'	85.60'	34.24'	09° 51' 25.3"	7.96'	2.95'	10'-11"	10'-11"	529.8
		B	45.50'	18.20'	90.26'	36.10'	10° 24' 00.1"	8.21'	3.29'	11'-6"	11'-6"	622.1
		D	45.50'	18.20'	90.26'	36.10'	10° 24' 00.1"	8.38'	3.12'	11'-8"	11'-6"	622.0
		E	39.09'	15.63'	77.68'	31.07'	08° 56' 16.7"	7.57'	2.43'	10'-0"	10'-0"	395.2
		F	39.84'	15.94'	79.18'	31.67'	09° 06' 42.8"	7.81'	2.36'	10'-4"	10'-2"	418.6
4'	17'-6"	A	47.14'	18.86'	93.44'	37.38'	10° 46' 16.8"	9.39'	3.52'	12'-11"	12'-11"	690.2
		B	49.34'	19.73'	97.72'	39.09'	11° 16' 15.0"	9.64'	3.86'	13'-6"	13'-6"	790.5
		D	49.34'	19.73'	97.72'	39.09'	11° 16' 15.0"	9.81'	3.69'	13'-8"	13'-6"	790.4
		E	43.46'	17.39'	86.28'	34.51'	09° 56' 10.9"	9.00'	3.00'	12'-0"	12'-0"	542.1
		F	44.15'	17.66'	87.63'	35.05'	10° 05' 35.7"	9.24'	2.93'	12'-4"	12'-2"	568.0
6'	17'-6"	A	43.12'	17.25'	85.60'	34.24'	09° 51' 25.3"	7.96'	2.95'	10'-11"	10'-11"	529.8
		B	45.50'	18.20'	90.26'	36.10'	10° 24' 00.1"	8.21'	3.29'	11'-6"	11'-6"	622.1
		D	45.50'	18.20'	90.26'	36.10'	10° 24' 00.1"	8.38'	3.12'	11'-8"	11'-6"	622.0
		E	39.09'	15.63'	77.68'	31.07'	08° 56' 16.7"	7.57'	2.43'	10'-0"	10'-0"	395.2
		F	39.84'	15.94'	79.18'	31.67'	09° 06' 42.8"	7.81'	2.36'	10'-4"	10'-2"	418.6
6'	19'-6"	A	47.14'	18.86'	93.44'	37.38'	10° 46' 16.8"	9.39'	3.52'	12'-11"	12'-11	690.2
		B	49.34'	19.73'	97.72'	39.09'	11° 16' 15.0"	9.64'	3.86'	13'-6"	13'-6"	790.5
		D	49.34'	19.73'	97.72'	39.09'	11° 16' 15.0"	9.81'	3.69'	13'-8"	13'-6"	790.4
		E	43.46'	17.39'	86.28'	34.51'	09° 56' 10.9"	9.00'	3.00'	12'-0"	12'-0"	542.1
		F	44.15'	17.66'	87.63'	35.05'	10° 05' 35.7"	9.24'	2.93'	12'-4"	12'-2"	568.0
8'-6"	22'-0"	A	47.14'	18.86'	93.44'	37.38'	10° 46' 16.8"	9.39'	3.52'	12'-11"	12'-11"	690.2
		B	49.34'	19.73'	97.72'	39.09'	10° 16' 15.0"	9.64'	3.86'	13'-6"	13'-6"	790.5
		D	49.34'	19.73'	97.72'	39.09'	10° 16' 15.0"	9.81'	3.69'	13'-8"	13'-6"	790.4
		E	43.46'	17.39'	86.28'	34.51'	09° 56' 10.9"	9.00'	3.00'	12'-0"	12'-0"	542.1
		F	44.15'	17.66'	87.63'	35.05'	10° 05' 35.7"	9.24'	2.93	12'-4"	12'-2"	568.0

Note: The table above is applicable only where median storage lanes occur on tangent construction.



-JUNCTURE DETAILS-
MEDIAN CURBS AND TRAFFIC SEPARATORS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MEDIAN STORAGE LANES

	Names	Dates
Designed by		
Drawn by	SHG	6/73
Checked by	AF	6/73
F.H.W.A. Approved: 7/7/75		

Approved By
Deputy Design Engineer, Roadways

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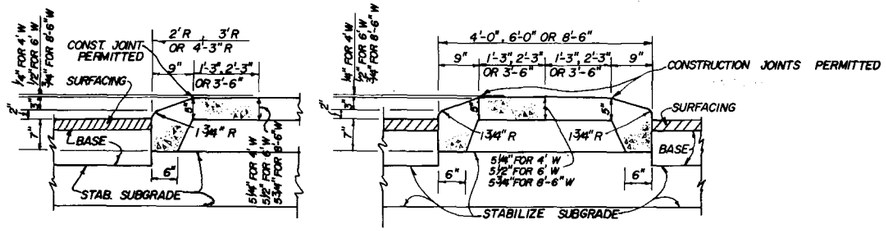
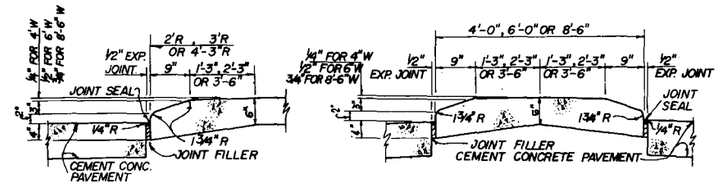


LONGITUDINAL SECTION

TRANSVERSE SECTION

DETAILS OF TYPE I CONCRETE TRAFFIC SEPARATOR

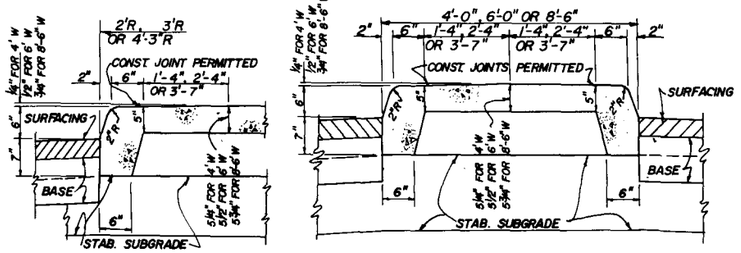
NOTE: STABILIZE FULL WIDTH OF TRAFFIC SEPARATOR.



LONGITUDINAL SECTION

TRANSVERSE SECTION

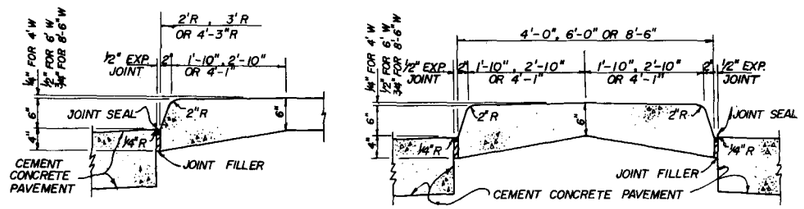
DETAILS OF TYPE II CONCRETE TRAFFIC SEPARATOR



LONGITUDINAL SECTION

TRANSVERSE SECTION

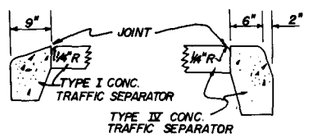
DETAILS OF TYPE IV CONCRETE TRAFFIC SEPARATOR



LONGITUDINAL SECTION

TRANSVERSE SECTION

DETAILS OF TYPE V CONCRETE TRAFFIC SEPARATOR



CONSTRUCTION JOINT DETAILS

NOTE: CONCRETE TRAFFIC SEPARATORS TYPE I AND TYPE IV ARE TO BE USED WHEN ADJACENT PAVEMENT IS FLEXIBLE.
CONCRETE TRAFFIC SEPARATORS TYPE II AND TYPE V ARE TO BE USED WHEN ADJACENT PAVEMENT IS CEMENT CONCRETE.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TRAFFIC SEPARATORS

	Names	Dates
Designed by		
Drawn by	SHG	6/73
Checked by	AF	6/73
F.H.W.A. Approved: 7/7/75		

Approved By: Deputy Design Engineer, Roadways

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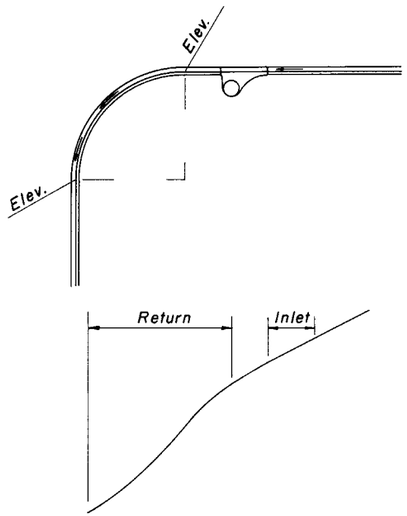

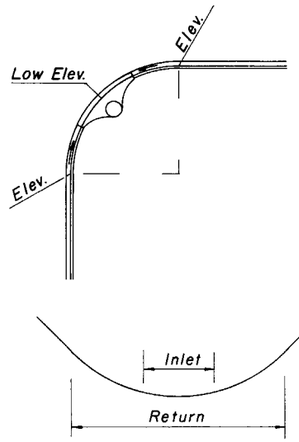

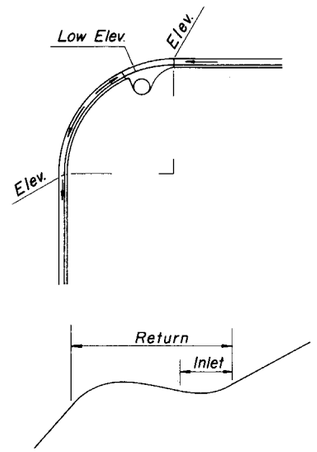

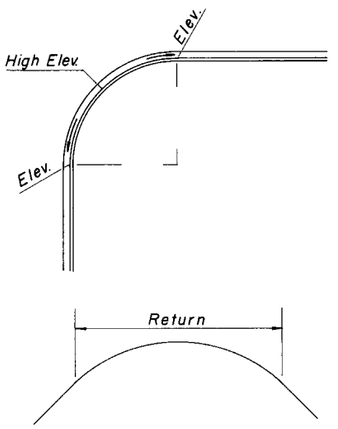

TYPICAL RETURN PROFILES

INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

NOTE :

1. On normal intersections, profiles need not be included in the plans as the above typicals adequately present the desired configuration.
2. For major intersections, where extreme grades are involved or where it is deemed necessary to included profiles in order to present adequate design data; return profiles may be included in the plans.
3. Inlet locations and low points should be located, as much as possible, to be compatible with pedestrian traffic and drop curb location.
4. A minimum 0.2 % grade should be maintained on all sag grades outside inlet limits.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB RETURN PROFILES

	Names	Dates
Designed by		
Drawn by		
Checked by		

F.H.W.A. Approved: 7/7/75

Approved By
E. C. Hallock
Deputy Design Engineer, Roadways

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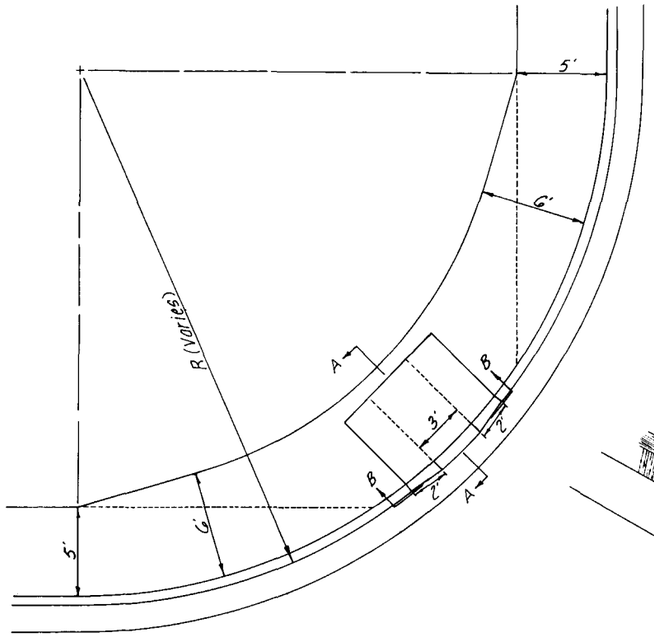
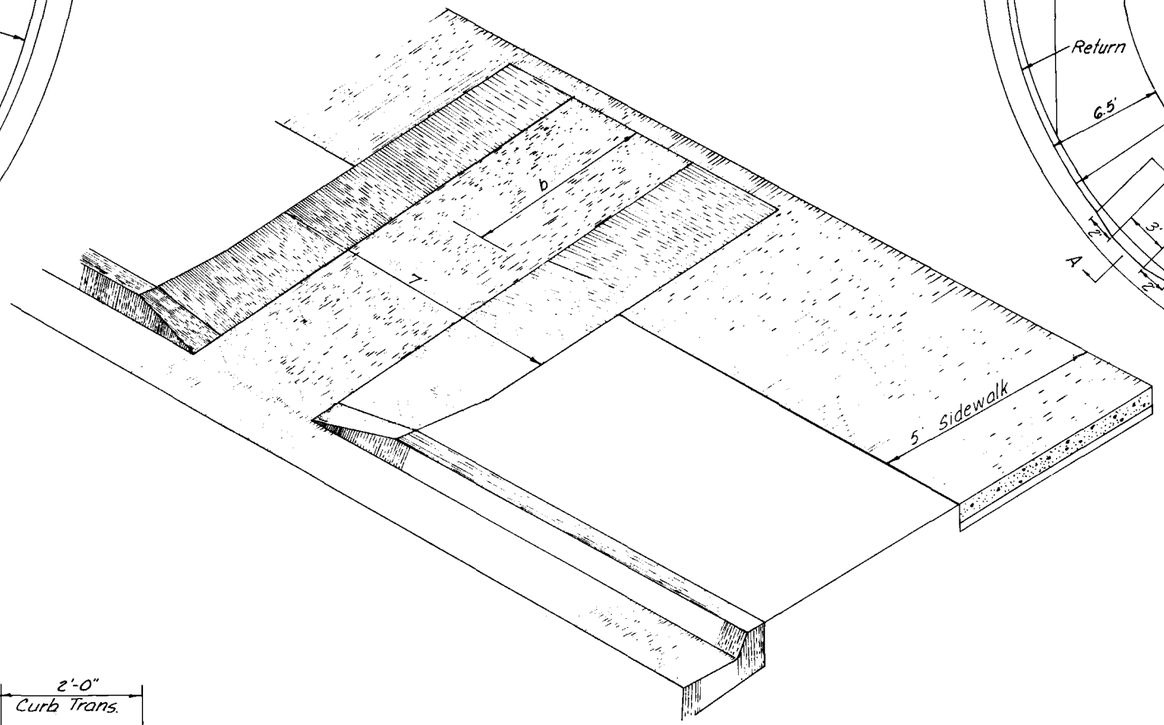
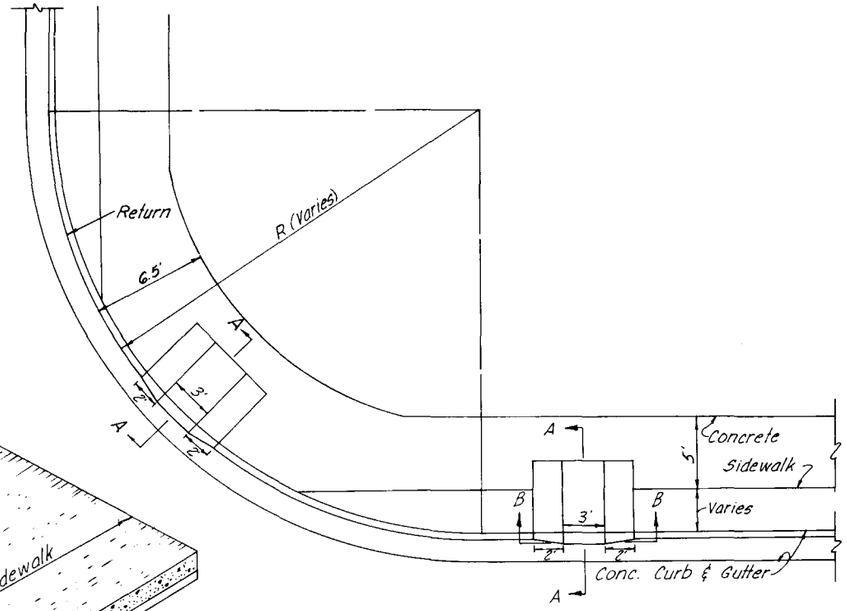
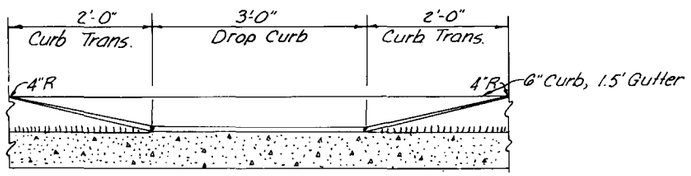


PLAN
SHOWING LOCATION TO
MATCH CROSS WALK





PLAN
SHOWING VARIOUS LOCATIONS
TO MATCH CROSS WALKS



Section B-B

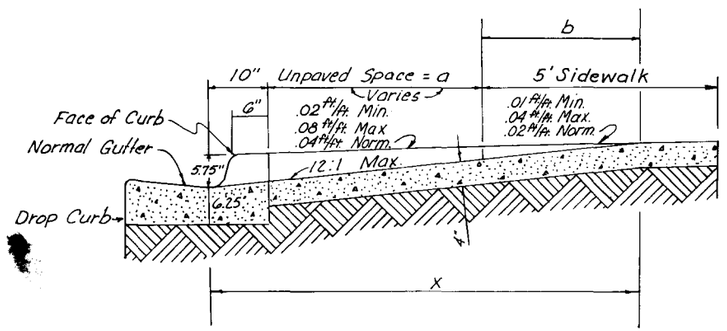
S.W.	a	S.W. + a + 10"	X	b
5'	0"	5.8	6.8	6.0
6'	0	6.8	6.8	6.0
7'	0	7.8	7.3	6.5
8'	0	8.8	7.3	6.5
5'	2.0	7.8	7.8	5.0
5'	2.5	8.3	8.1	4.8
5'	3.0	8.8	8.3	4.4
5'	3.5	9.3	8.4	4.1
5'	4.0	9.8	8.6	3.8
5'	4.5	10.3	8.7	3.4
5'	5.0	10.8	8.9	3.1

b = distance from front edge of sidewalk to back point of 12:1 slope.

b = X - (a + 10")

NOTES:

1. The ramp surface shall be tined finished in accordance with sub article 400-15-2.5 as modified. Approved hand methods may be used. Ramp shall not exceed a maximum slope of 12:1.
2. Curb cut ramps are to be located as shown on the plans.
3. Basis of payment: contract unit price per Sq. Yd. of Concrete Sidewalk.
4. Complete curb cut ramps are to be constructed at all locations shown on plans even when sidewalk is not constructed concurrently.



Section A-A

CURB CUT RAMP
FACILITY FOR PHYSICALLY HANDICAPPED

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB CUT RAMPS
PHYSICALLY HANDICAPPED

	Names	Dates
Designed by	H.L.G.	2/74
Drawn by		
Checked by	D.C.B.	2/74
F.H.W.A. Approved: 8/20/75		

Approved By
Deputy Design Engineer, Roadways

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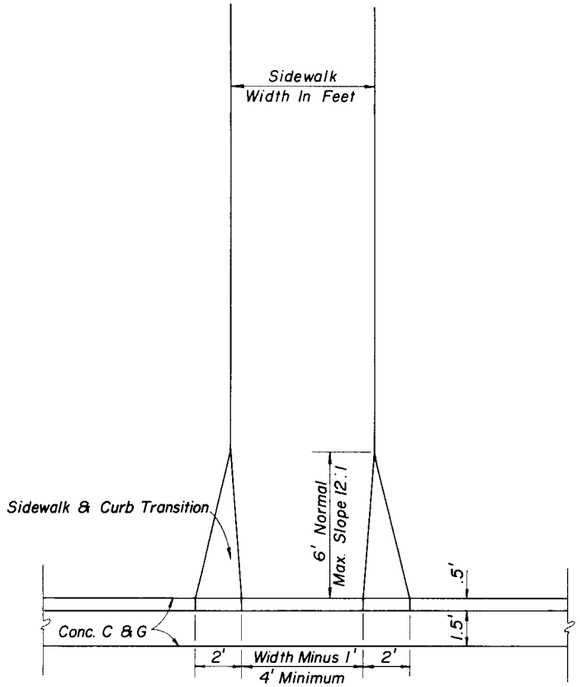
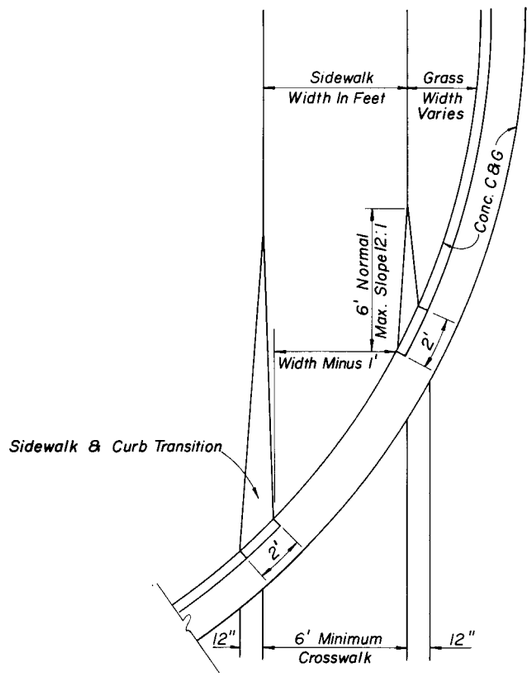
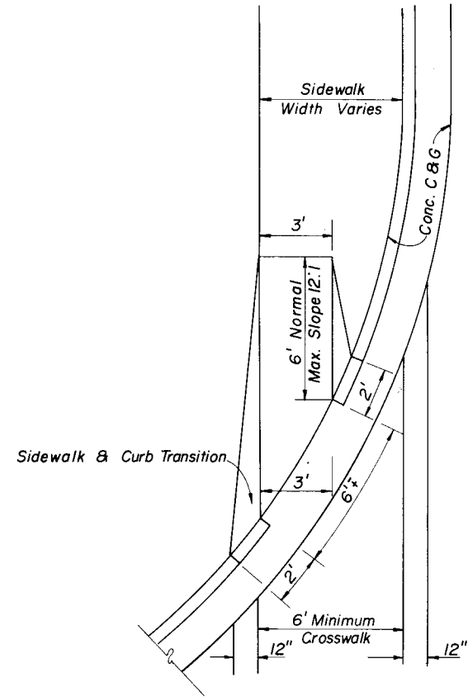


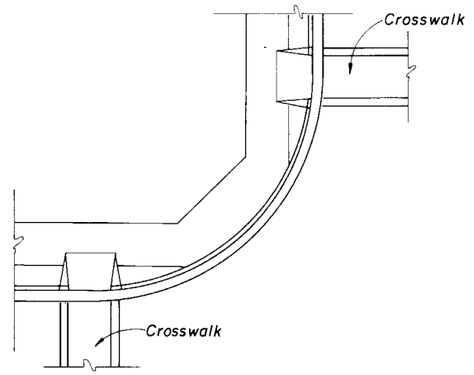
PLAN VIEW



PLAN VIEW

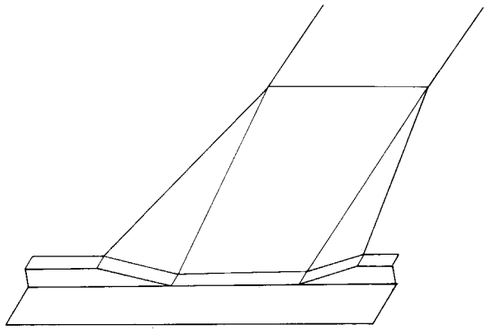


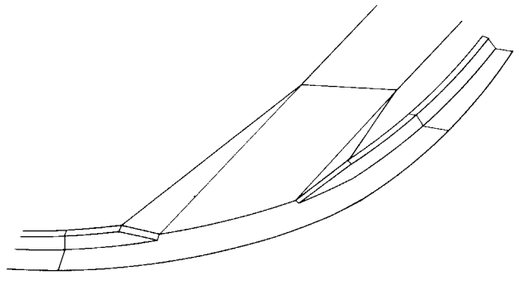
PLAN VIEW

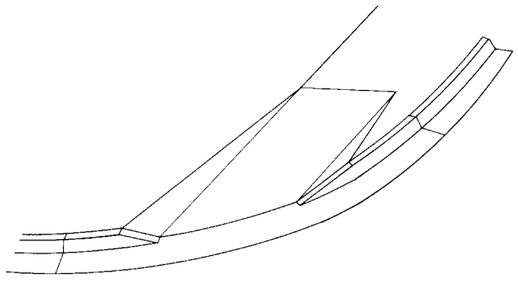


GENERAL NOTES

1. The ramp surface shall be tined finished in accordance with sub article 400-15-2.5 as modified. Approved hand methods may be used.
2. Curb cut ramps are to be located as shown on the plans.
3. Basis of payment to be the contract unit price per sq. yd. of Concrete Sidewalk.







THESE RAMPS TO BE USED ONLY WHERE SIDEWALK IS SIGNED AS A BIKE ROUTE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB CUT RAMPS

BIKEWAYS & PHYSICALLY HANDICAPPED

	Names	Dates
Designed by		
Drawn by		
Checked by		

F.H.W.A. Approved: 2/8/79

Approved By
Deputy Design Engineer, Roadways

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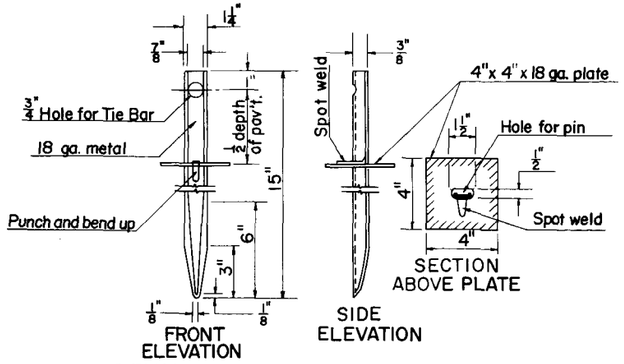
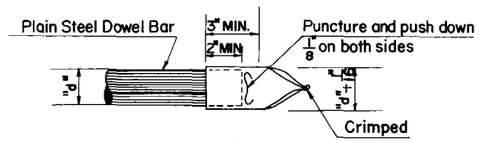
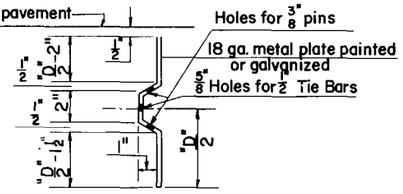


DETAIL OF CHAIR FOR TIE BARS

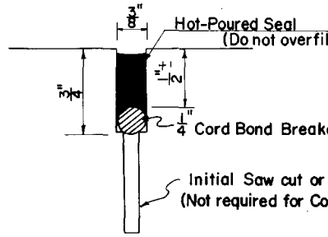
OTHER CHAIR OR SUPPORT MAY BE APPROVED BY THE ENGINEER



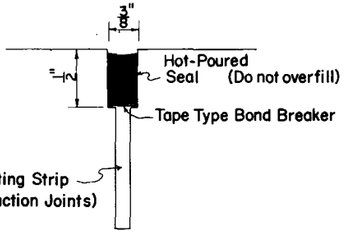
DETAIL OF METAL CAPS FOR DOWEL BARS



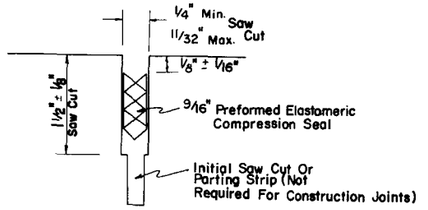
DETAIL OF DEFORMED METAL PLATE



HOT-POURED SEAL CORD TYPE BOND BREAKER

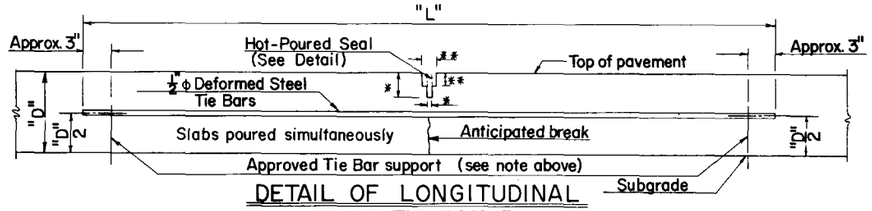


HOT-POURED SEAL TAPE TYPE BOND BREAKER



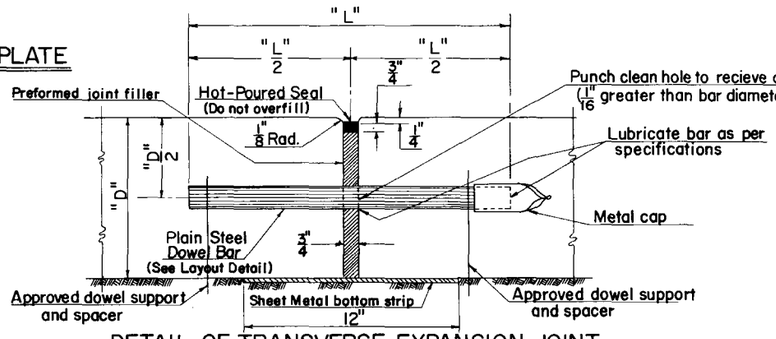
PREFORMED ELASTOMERIC COMPRESSION SEAL

JOINT SEALANT DETAILS



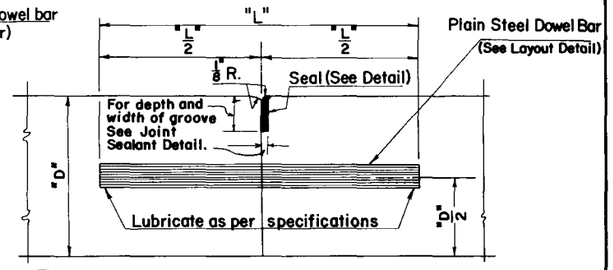
DETAIL OF LONGITUDINAL LANE-TIE JOINT

Note: Tie bars may be inserted in the plastic concrete by means approved by the Engineer.

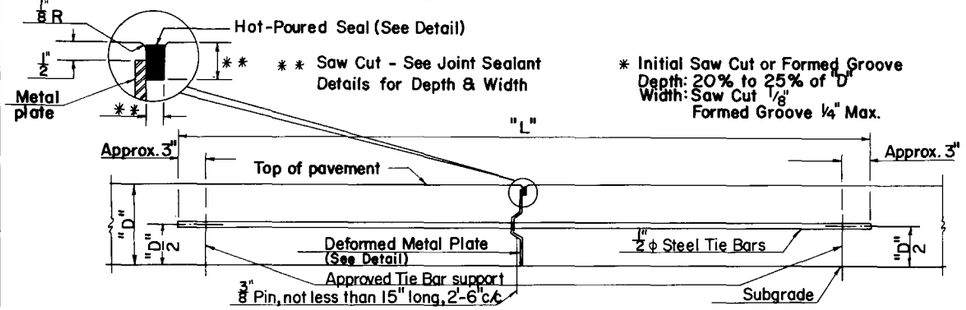


DETAIL OF TRANSVERSE EXPANSION JOINT

EXPANSION JOINTS TO BE PLACED AT JUNCTIONS WITH APPROACH SLAB, AT STREET INTERSECTIONS AND OTHER LOCATIONS INDICATED IN DETAIL PLANS.

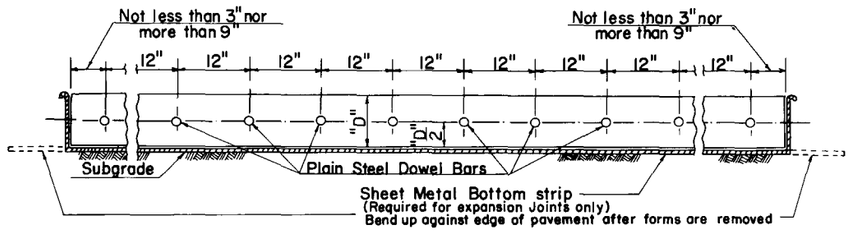


DETAIL OF BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK

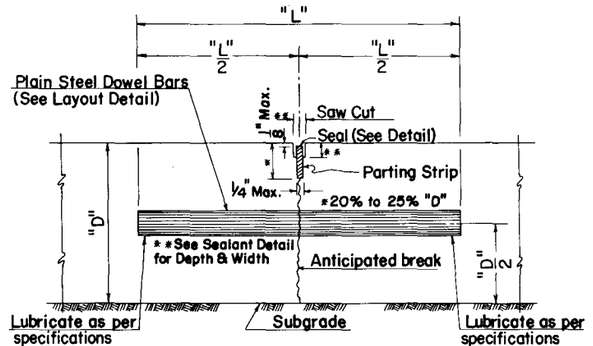


DETAIL OF LONGITUDINAL CONSTRUCTION JOINT

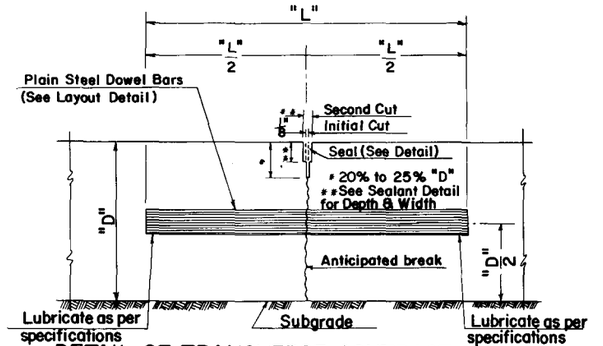
Note: Metal plate optional. Keyway may be formed by bolting shaped timber to the side form or by extrusion from slip-form paver. Alternate keyway shape and tie bar details may be approved by the Engineer. Keyway not required when the concrete pavement is placed on an Econocrete Base.



DOWEL BAR LAYOUT



DETAIL OF TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD



DETAIL OF TRANSVERSE CONTRACTION JOINT, SAWED METHOD

CONTRACTION JOINTS TO BE SPACED AT 20' INTERVALS. DOWELS REQUIRED ONLY AT FIRST FIVE JOINTS ADJACENT TO EXPANSION JOINTS OR END OF PAVEMENT EXCEPT AS OTHERWISE INDICATED IN DETAIL PLANS.

MAX. SPACING FOR ½" ϕ TIE BARS		
PAVEMENT THICKNESS ("D")	LENGTH OF BARS (inches)	SPACING OF BARS (inches)
6"	24"	47"
7"	24"	40"
8"	24"	35"
9"	24"	31"

DOWEL REQUIREMENTS		
PAVEMENT THICKNESS ("D")	DOWEL dia. (inches)	DOWEL LENGTH "L" (inches)
6"	¾"	18"
7"	1"	18"
8"	1"	18"
* 9"	1"	18"

* Provide 1⅛" Diam. dowels at Expansion joints and Butt Construction joints.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE PAVEMENT JOINTS

	Names	Dates
Designed by		
Drawn by	HW	8/57
Checked by	HEC	8/57
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

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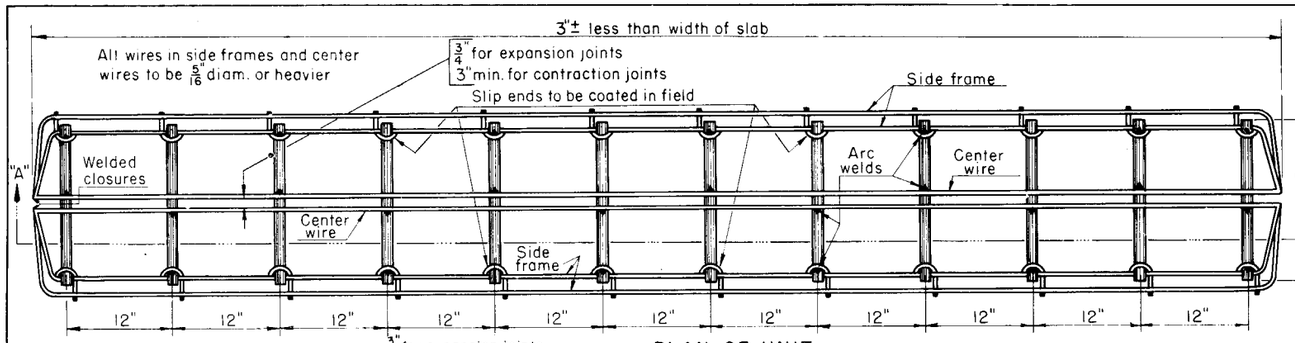
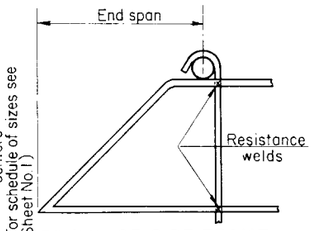
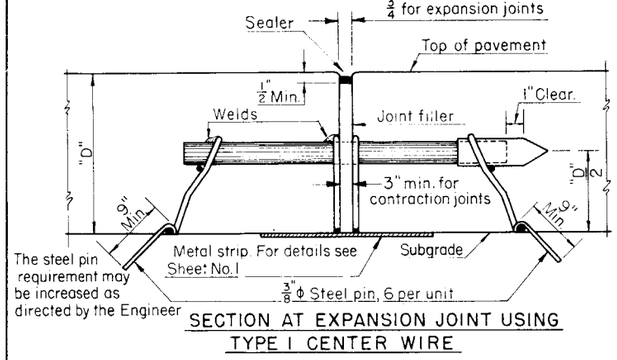


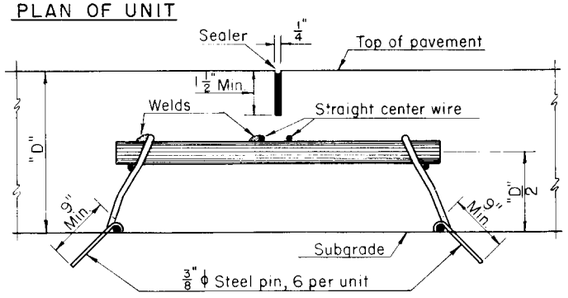
PLAN OF UNIT



DETAIL OF SIDE FRAME



SECTION AT EXPANSION JOINT USING TYPE 1 CENTER WIRE

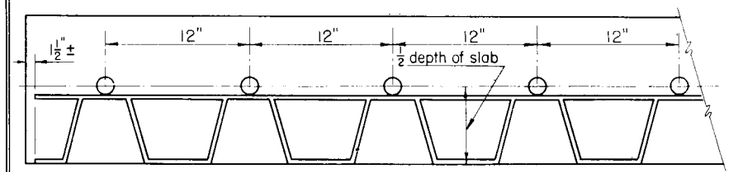


SECTION AT CONTRACTION OR BUTT JOINT USING TYPE 2 CENTER WIRE

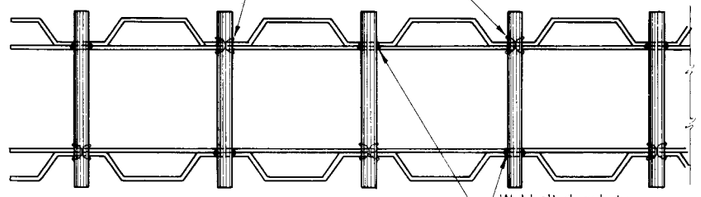
SECTION "A"-"A" SHOWING TYPE 1 CENTER WIRE

SECTION "A"-"A" SHOWING TYPE 2 CENTER WIRE

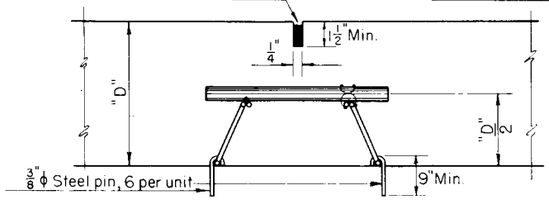
DETAILS OF BETHLEHEM DOWEL UNIT ALTERNATE



SIDE ELEVATION

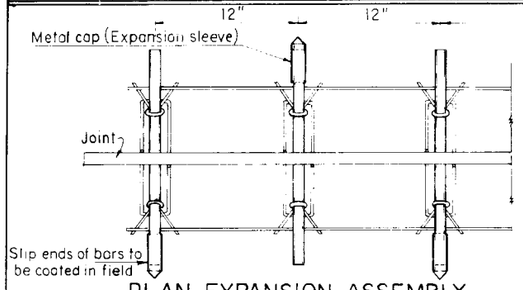


PLAN

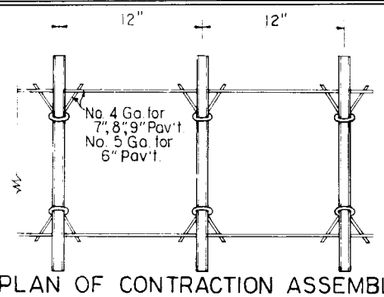


END ELEVATION

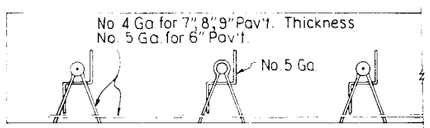
DETAIL OF CONTRACTION ASSEMBLY



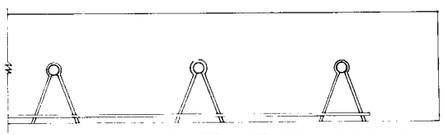
PLAN EXPANSION ASSEMBLY



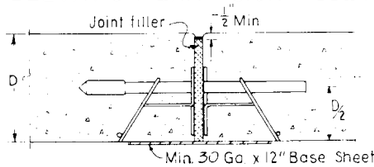
PLAN OF CONTRACTION ASSEMBLY



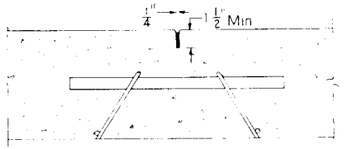
ELEVATION EXPANSION ASSEMBLY



ELEVATION CONTRACTION ASSEMBLY

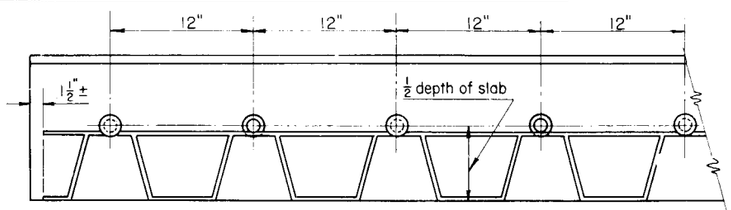


SECTION THRU EXPANSION JOINT ASSEMBLY



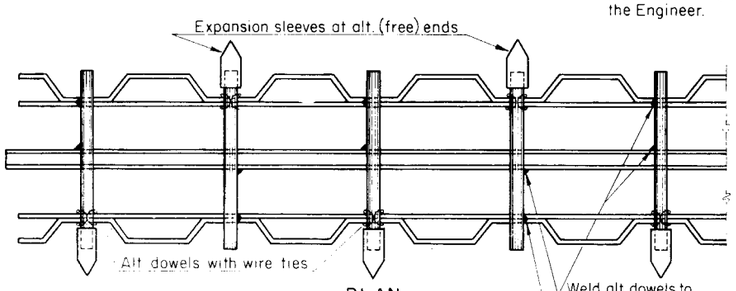
SECTION THRU CONTRACTION JOINT ASSEMBLY

EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY ALTERNATE
FLORIDA STEEL CORPORATION



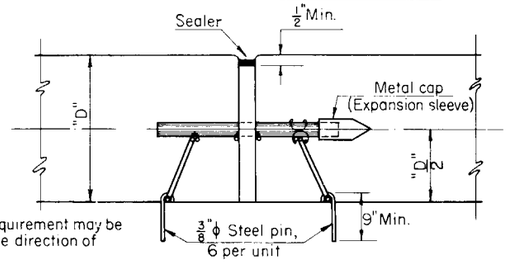
SIDE ELEVATION

The steel pin requirement may be increased at the direction of the Engineer.



PLAN

DETAIL OF EXPANSION ASSEMBLY



END ELEVATION

GENERAL NOTES

Any other dowel bar support or assembly (except a cantilever design) which meets the approval of the Engineer, may be used at the option of the Contractor.

For details not shown on this sheet refer to Sheet Nos. 1 & 3.

EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY ALTERNATE
VIRGINIA STEEL CO., INC.

ALL ASSEMBLY BARS 5/16" ϕ PLAIN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE PAVEMENT JOINTS

	Names	Dates
Designed by		
Drawn by	HW	8/57
Checked by	HEC	8/57
F.H.W.A. Approved		3/20/75

Approved By: J. C. Kucharek, Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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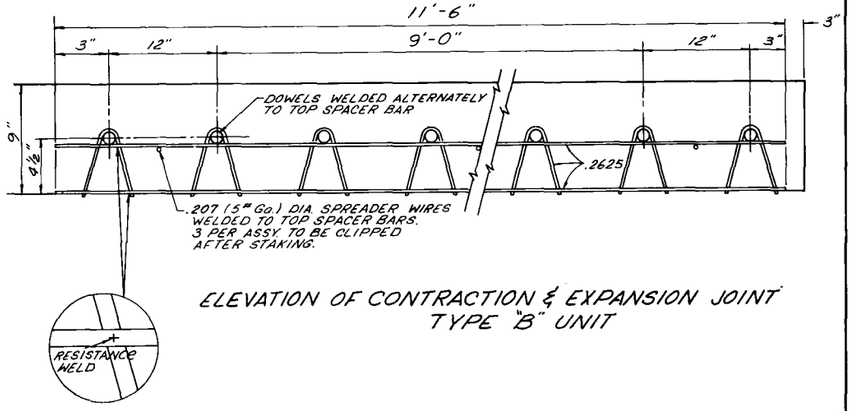
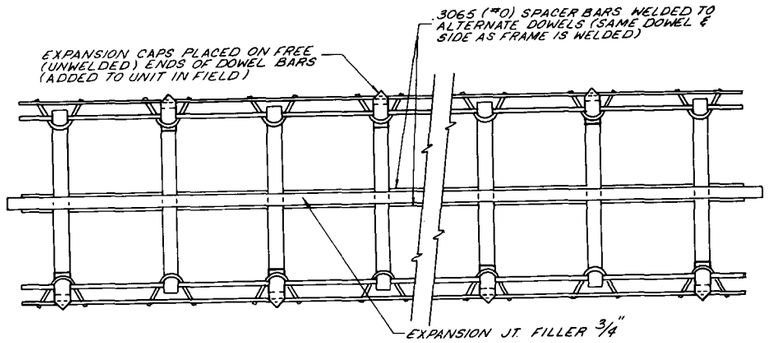
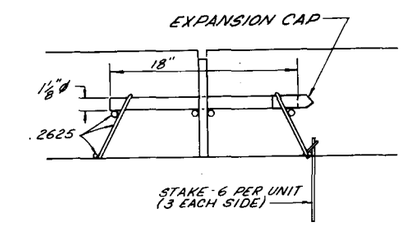


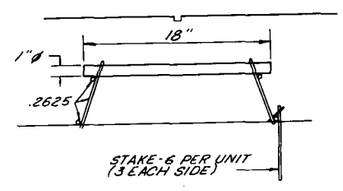
ELEVATION OF CONTRACTION & EXPANSION JOINT
TYPE "B" UNIT



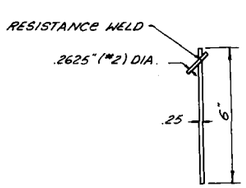
PLAN
TYPE "B" UNIT



SECTION THROUGH EXPANSION JOINT UNIT



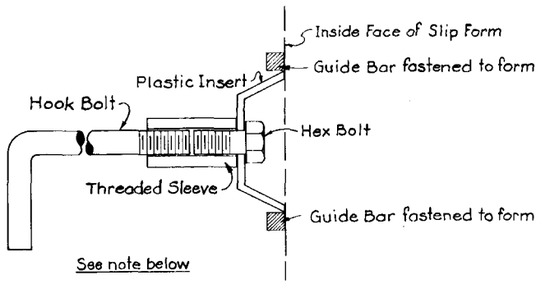
SECTION THROUGH CONTRACTION JOINT UNIT



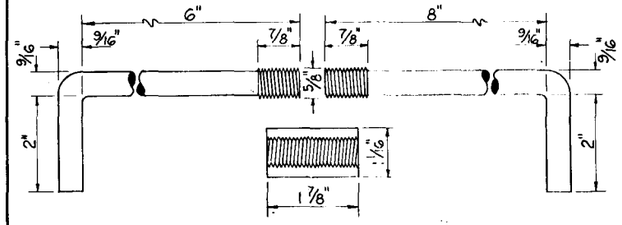
STAKE DETAIL

EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY
ALTERNATE

L.&L. STEEL COMPANY, INC.
Birmingham, Ala.

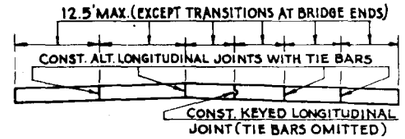


ALTERNATE KEYWAY AND TIE BAR

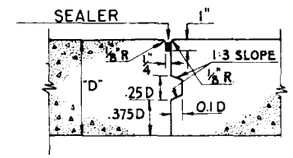


DETAIL FOR STEEL HOOK BOLT ASSEMBLY

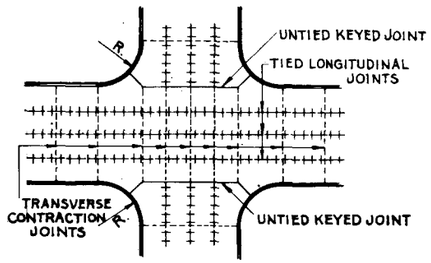
NOTE: After the concrete has set to the extent that the Keyway will retain its shape, the hex bolt and plastic insert shall be removed. The remaining portion of the hook bolt assembly shall be installed immediately prior to placing of concrete in the adjacent lane.



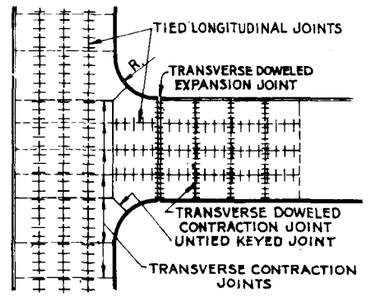
TYPICAL SECTION FOR
MULTI-LANE CONSTRUCTION



DETAIL OF KEYED JOINT



JOINT LAYOUT AT THRU
INTERSECTION



JOINT LAYOUT AT "T" OR
OFFSET INTERSECTION

GENERAL NOTES

1 LONGITUDINAL JOINTS WILL NOT BE REQUIRED FOR SINGLE LANE PAVEMENT 16' OR LESS IN WIDTH.
2. WHEN PAVEMENT WIDTH NECESSITATES FIVE OR MORE LONGITUDINAL JOINTS PROVIDE ONE OR MORE UNTIED BUT KEYED JOINTS, (NO JOINT SHALL BE TIED THAT IS MORE THAN TWO LANES FROM A FREE EDGE OR FREE JOINT.)
3 ARRANGEMENT OF LONGITUDINAL JOINTS NOT SHOWN ON TYPICAL SECTION TO BE AS DIRECTED BY THE ENGINEER.
4 ALL MANHOLES, METER BOXES AND OTHER PROJECTIONS INTO THE PAVEMENT SHALL BE BOXED-IN WITH ½" PREFORMED EXPANSION JOINT MATERIAL.

DETAIL OF JOINT ARRANGEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE PAVEMENT JOINTS

	Names	Dates
Designed by		
Drawn by	L M F	6/75
Checked by	S F A	6/75
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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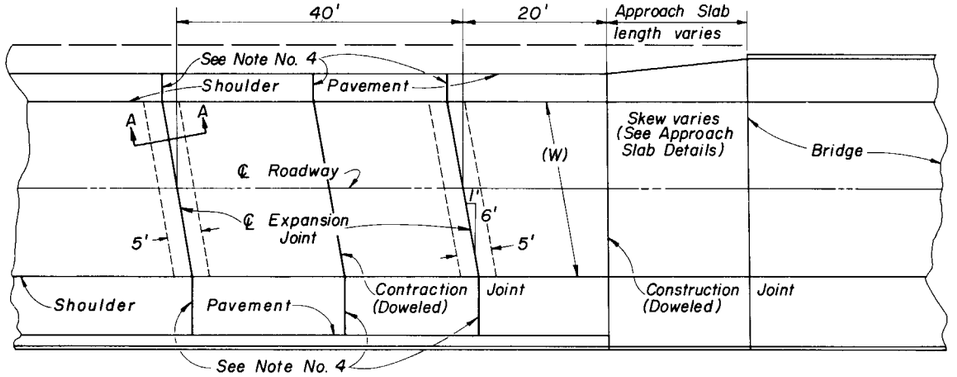
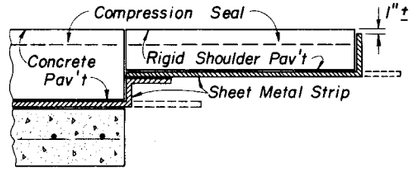
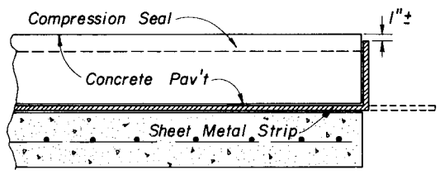


PLAN



DETAIL SHOWING RIGID SHOULDER PAVEMENT



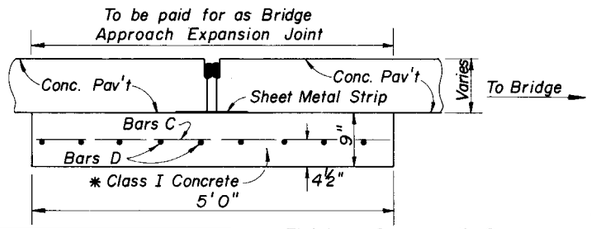
DETAIL SHOWING SHEET METAL STRIP

NOTE: Immediately prior to placing the seal, the joint shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be bent up against the pavement edge.

The sheet metal strip shall be a minimum 16 gage steel, 12" wide and shall be galvanized in in accordance with ASTM A-526, Coating Designation G90.

GENERAL NOTES

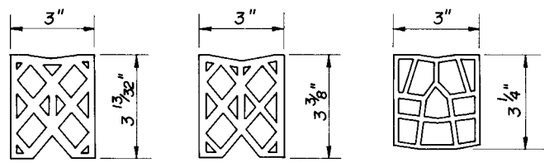
1. Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement.
2. For additional details see Index No. 305.
3. The ℄ of roadway and the ℄ of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the ℄ of the roadway pavement shall be determined.
4. When the shoulder pavement is constructed with either concrete or econocrete the expansion joints and contraction joints shall be continued across the shoulder pavement. See detail for construction in rigid shoulder pavement.



REINFORCING STEEL				
MK	Size	Spac.	No. Req.	Lgth.
C	5	6"	Varies	4'6"
D	5	6"	9	W-4"

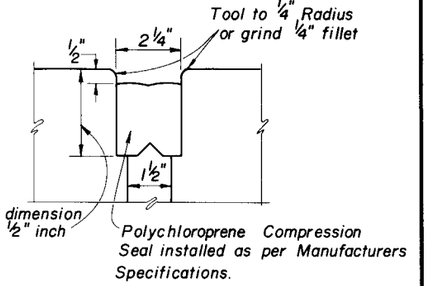
* Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

SECTION A-A THROUGH EXPANSION JOINT



SECTION THRU SEALS

Either of the three Seals shown may be used.



COMPRESSION SEAL DETAIL

NOTE: All contacting surfaces between the compression seal and Concrete shall be thoroughly coated with a lubricating adhesive.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

BRIDGE APPROACH EXPANSION JOINT CONCRETE PAVEMENT

	Names	Dates
Designed by		
Drawn by	LMF	6/75
Checked by	SFA	6/75
F.H.W.A. Approved: 8/16/77		

Approved By
Deputy Design Engineer, Roadways

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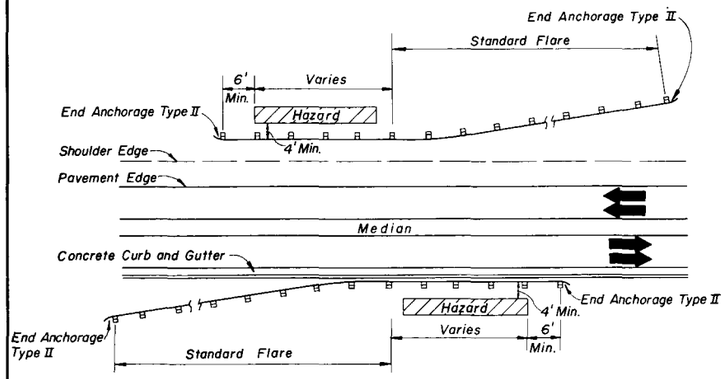
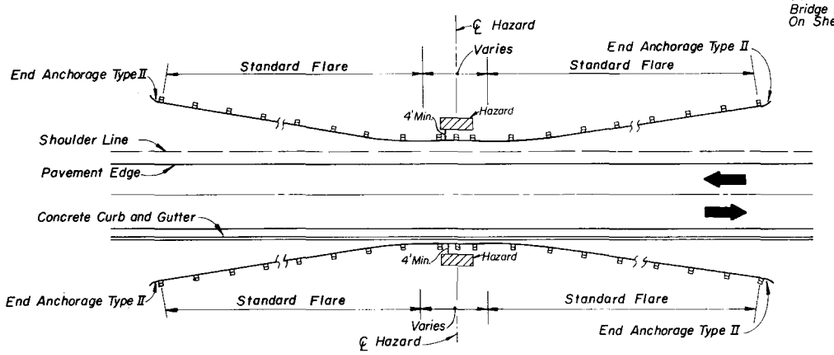


DETAIL B

GUARDRAIL INSTALLATION FOR ROADSIDE HAZARD (4 - LANE)

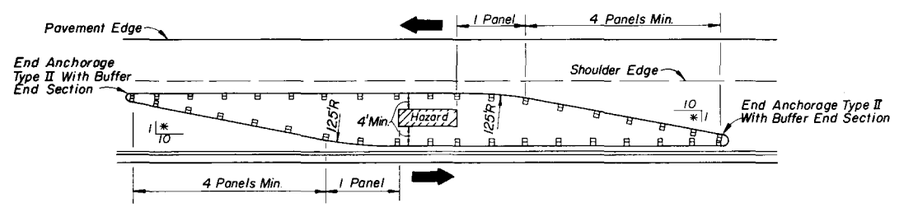
Note: See general notes Nos. 1,2,3,4,7, 11 and 12 on sheet No. 2.
See details J, K and L for guardrail offsets.
See detail P for standard flare.



DETAIL C

GUARDRAIL INSTALLATION FOR ROADSIDE HAZARD (2-LANE)

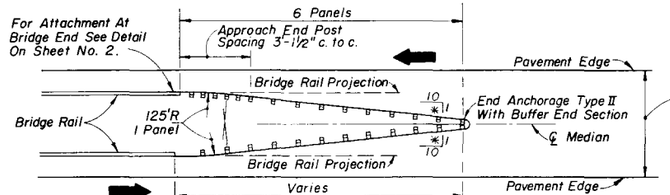
Note: See general notes Nos. 1, 2, 3, 4, 7, 11 and 12 on sheet No. 2.
See details J, K and L for guardrail offsets.
See detail P for standard flare.



DETAIL D

GUARDRAIL - MEDIAN INSTALLATION

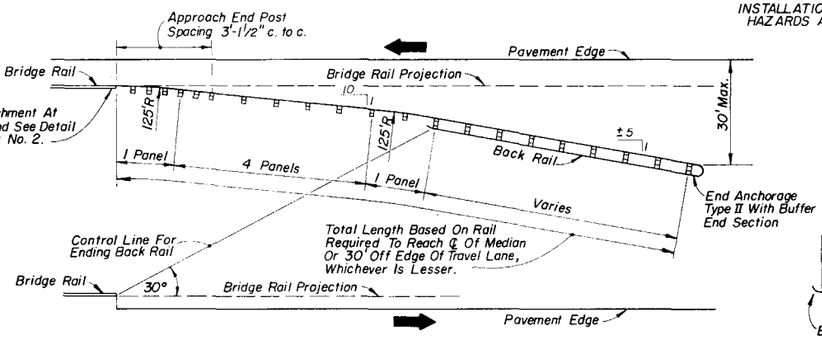
Note: See general notes Nos. 1, 2, 3, 4, 11 and 12 on sheet No. 2.
See details J, K and L for guardrail offsets.



DETAIL E

MINIMUM BRIDGE END GUARDRAIL INSTALLATION - NARROW MEDIAN (LESS THAN 30')

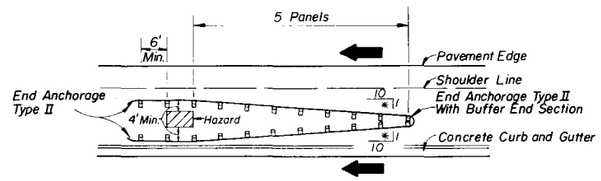
Note: See general notes Nos. 1, 2, and 3 on sheet No. 2.



DETAIL F

MINIMUM BRIDGE END GUARDRAIL INSTALLATION - WIDE MEDIAN (30' OR GREATER)

Note: See general notes Nos. 1, 3, and 4 on sheet No. 2.
Backrail is required for protection of off-bridge traffic where median edge of pav't for off-bridge traffic passes less than 30' from end anchorage. Backrail is not required where median width is 64' or greater. Payment for backrail is to be included in the total length of guardrail required, measured along both the front rail and along the backrail.



DETAIL G

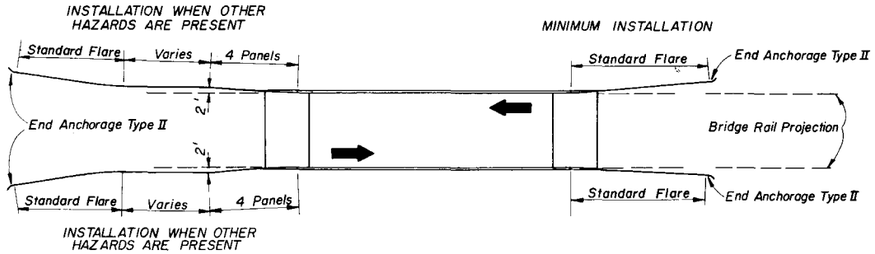
GUARDRAIL - HAZARD INSTALLATION

Note: See general notes Nos. 1, 2 and 3 on sheet No. 2.
See details J, K and L for guardrail offsets.

NOTES: For details D, E, F, and G only one end anchor is required on each double rail end of the installation and should be attached to and in line with the traffic apprach side.

*10:1 Maximum desireable, may be flatter or slightly steeper where other factors control length of installation.

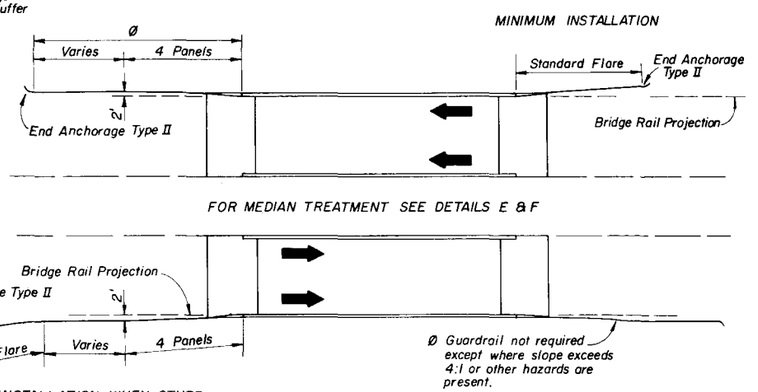
For details B and C the depth of hazard must be considered when determining the length of guardrail needed.



DETAIL H

GUARDRAIL INSTALLATION FOR BRIDGE ENDS (2-LANE)

Note: See general notes Nos. 1, 2, 3, 4 and 7 on sheet No. 2.
See sheet No. 2, detail N for attachment to bridge ends.
See detail P for standard flare.



DETAIL I

GUARDRAIL INSTALLATION FOR BRIDGE ENDS (4 LANE)

Note: See general notes Nos. 1, 2, 3, 4 and 7 on sheet No. 2.
See sheet No. 2, detail N for attachment to bridge ends.
See detail P for standard flare.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates
Designed by	HW	7/69
Drawn by		
Checked by	LMF	3/76
F.H.W.A. Approved: 11/16/78		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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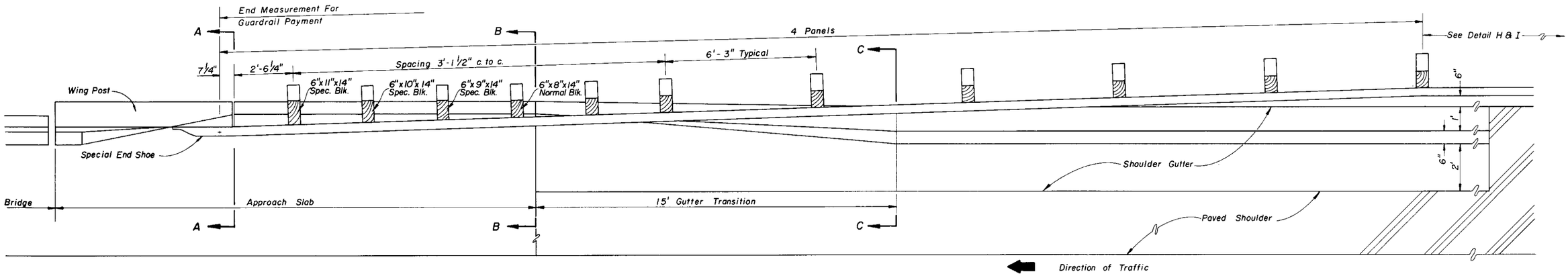
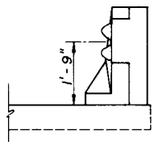
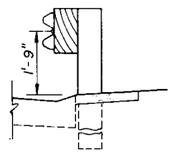
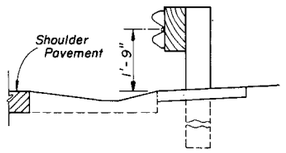




Section AA



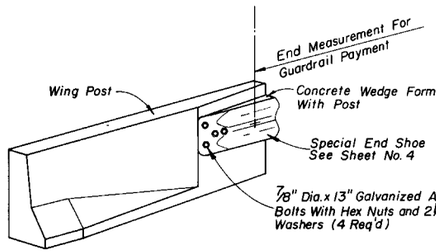
Section BB



Section CC

GUARDRAIL AND SHOULDER GUTTER TRANSITIONS AT BRIDGE APPROACHES (TRAILING END OPPOSITE HAND)

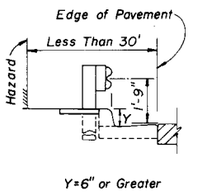
DETAIL J



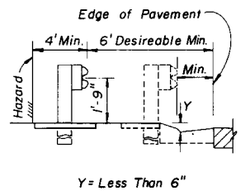
All component parts shall be included in the contract unit price for guardrail

GUARDRAIL ATTACHMENT AT BRIDGE ENDS

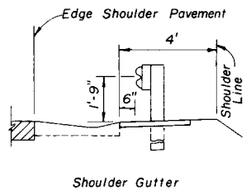
DETAIL N



Y=6" or Greater



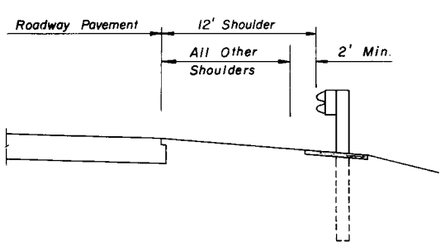
Y= Less Than 6"



Shoulder Gutter

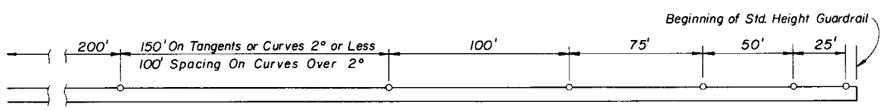
GUARDRAIL LOCATION AT CURB & GUTTER SECTIONS

DETAIL L



STANDARD GUARDRAIL LOCATION

DETAIL K



Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer.
For minimum installations (length 62.5') provide one reflector at each end and at approximate center.

REFLECTOR SPACING

DETAIL M

GENERAL NOTES

1. The illustrated limits for guardrail installation are standard requirements, one panel equals 12.5 ft..
2. Installations shown are typical. The intent is that 62.5 ft. of rail be available approaching earliest hazard.
3. Post spacing shall be 6.25 ft. except that a reduced spacing of 3'-1 1/2" shall be used at bridge anchorages (See detail J). At hazards, where the face of guardrail offset from hazard is less than 4 ft., a reduced spacing shall also be provided for the length of the hazard plus one panel of approach rail.
4. Straight rail sections may be used for all radii of 125 ft. or greater. For radii less than 125 ft. the rail must be fabricated to fit.
5. For specifications of materials refer to standard specifications.
6. Design load of rail equals 80,000 pounds in tension.
7. In addition to use at conventional roadside hazards, guardrail will be required where fill slopes exceed 4:1, except that where fill heights are less than 8 ft. guardrail may be omitted (regardless of fill slope) unless in the opinion of the Engineer its use is deemed necessary due to other roadside features.
8. Undressed timber will be permitted for 6"x 8"x 14" nominal treated timber block. A 5"x 8"x 14" nominal treated timber block or a 14" section of the steel post will be permitted as an alternate. The 14" alternate steel section shall be bolted to the alternate post with one 5/8"x 11/2" bolt on each side of block. Blocks used with Thrie Beam rail shall be 22" long. The bolt hole in timber blocks shall be located 7" (± 1/4") from the end and centered (± 1/4") in the block.
9. Where guardrail is constructed for street barricade no anchorage, offset blocks or terminal end panels will be required.
10. Where necessary to enlarge or add additional holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be coated with a zinc compound. No burning of holes will be permitted.
11. Guardrail to be installed at maximum practical distance from travel lane except at locations control by installation of non-mountable curb.
12. If desireable 4 ft. minimum offset between face of rail and hazard can not be provided, a 2 ft. offset may be used. A special detail should be prepared by the designer and forwarded to the Deputy Design Engineer, Roadway office for review and approval if minimum 2' offset can not be provided.
13. Amber reflectors shall be used adjacent to auxiliary lanes and within 250 ft. of intersections; at all other locations clear reflectors shall be used.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates
Designed by	HW	7/69
Drawn by		
Checked by	LMF	3/76
F.H.W.A. Approved:		11/16/78

Approved By
Deputy Design Engineer, Roadways

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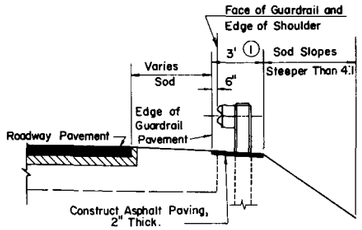
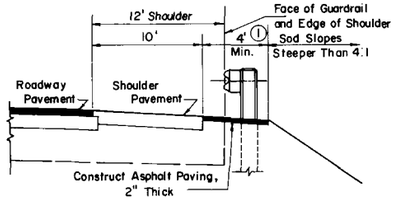
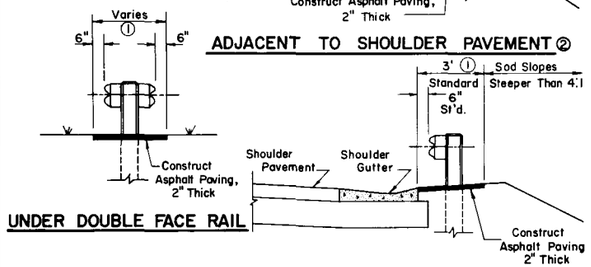


ADJACENT TO UNPAVED SHOULDER



ADJACENT TO SHOULDER PAVEMENT ②

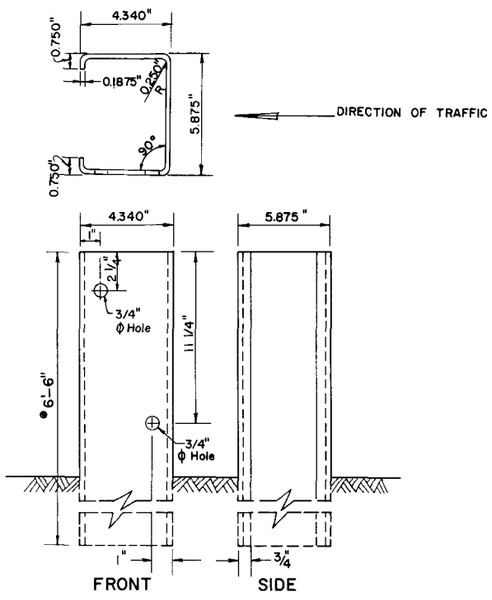


ADJACENT TO SHOULDER GUTTER ②

DETAIL OF GUARDRAIL PAVEMENT

NOTE: ① Soil Sterilization – Cost of soil sterilization to be included in the cost of Asphalt Paving. See Special Provisions.

② Where shoulder pavement and/or shoulder gutter is present adjacent to a standard flare end the guardrail pavement shall extend out to the shoulder pavement or gutter in front of the flare.

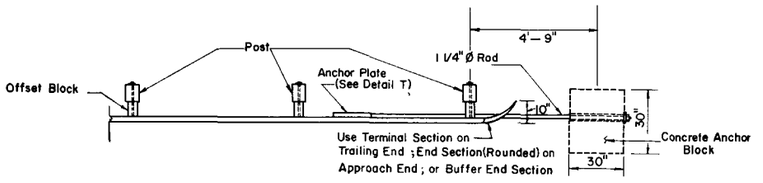


6"-"C" STEEL POST

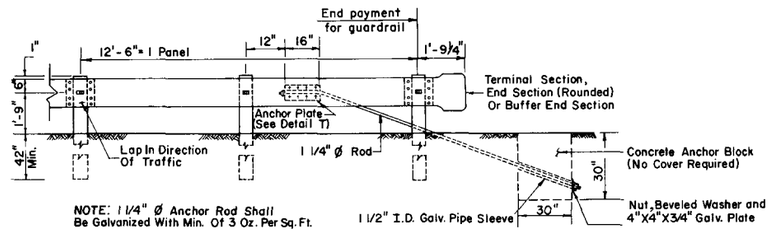
NOTES:

* Type "C" Steel Post placed back of slope break point in slopes steeper than 4:1 shall be 6'9" long unless otherwise noted.

See note 8, sheet 2.



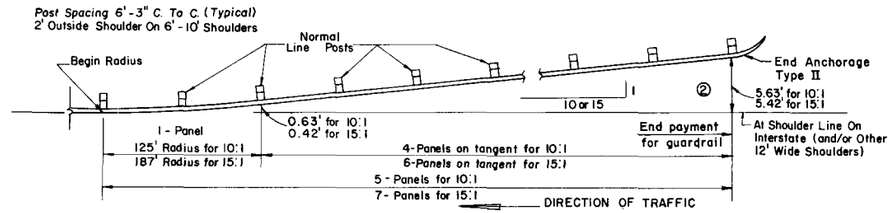
PLAN



ELEVATION

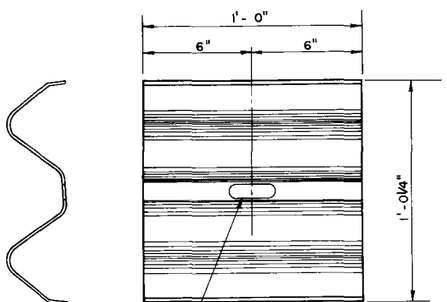
END ANCHORAGE TYPE II
DETAIL R

NOTE: The payment for the items of End Anchorage Assemblies Type II shall include furnishing and installing the Terminal and End Sections, Anchor Plates, Rods, Pipe Sleeves, Anchor Blocks, Plates and the necessary hardware.



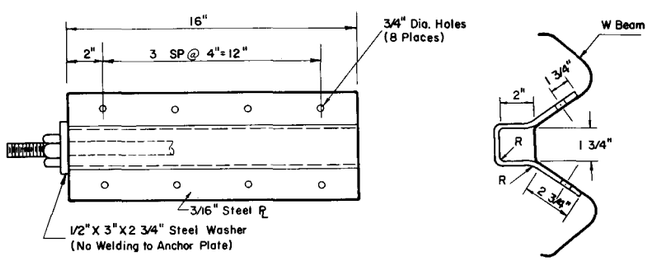
STANDARD FLARE
DETAIL P

Use 10:1 flare rate for design speeds under 50mph.
Use 15:1 flare rate for design speeds 50mph and higher.



BACK-UP PLATE

NOTE: This back-up plate is placed behind rail elements at intermediate (non-splice) posts with steel offset blocks only.



ONE-PIECE ANCHOR PLATE
(ALTERNATE)

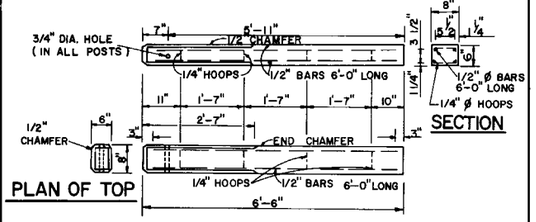
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

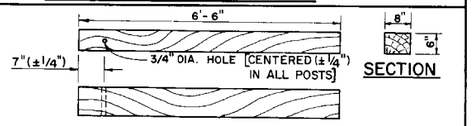
	Names	Dates
Designed by	HW	7/69
Drawn by		
Checked by	LMF	3/76
F.H.W.A. Approved: 11/16/78		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
80	3 of 5	400

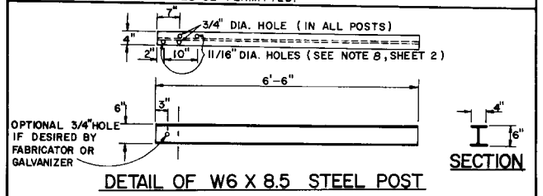


DETAIL OF CONCRETE POST



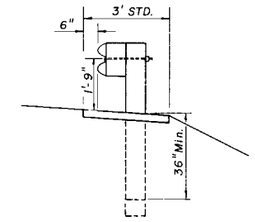
DETAIL OF WOOD POST

NOTES:
1. POSTS ARE TO BE DRILLED AND SHAPED PRIOR TO TREATMENT.
2. POSTS SHALL BE PENTACHLOROPHENOL TREATED SOUTHERN YELLOW PINE. CHROMATED COPPER ARSENATE IS ALSO AN ACCEPTABLE PRESERVATIVE.
3. UNDRESSED TIMBER WILL BE PERMITTED.

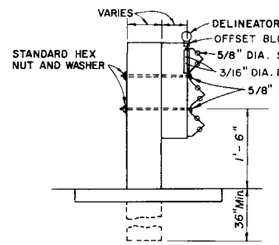


DETAIL OF W6 X 8.5 STEEL POST

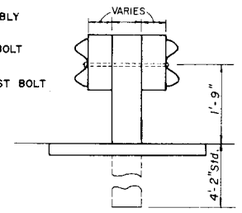
W6x9 STEEL POST MAY BE USED AS AN ALTERNATE.



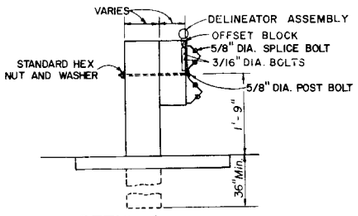
TYPICAL SECTION AT POST



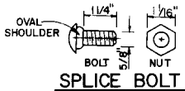
DETAIL AT POST
THRIE BEAM TYPE
GUARDRAIL



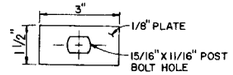
DETAIL OF DOUBLE FACED
GUARDRAIL INSTALLATION IN MEDIANS



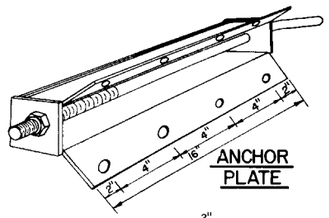
DETAIL AT POST
STANDARD BEAM TYPE
GUARDRAIL



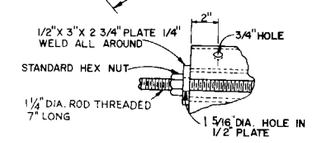
SPLICE BOLT
(8 REQUIRED)
NOTE: POST BOLT SIMILAR EXCEPT LENGTH
(1 REQUIRED)



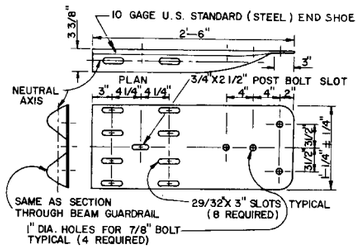
WASHER
(FOR POST BOLT ONLY)
NOTE: USE ONE WASHER AT EACH POST.



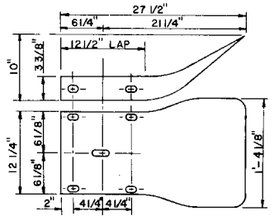
ANCHOR
PLATE



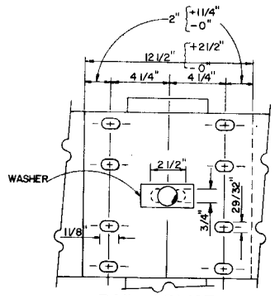
ANCHOR PLATE DETAILS
DETAIL T



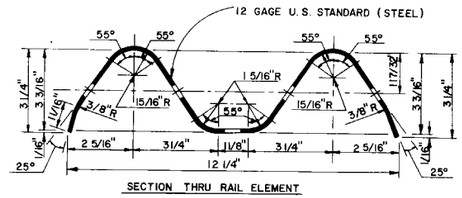
ELEVATION
SPECIAL END SHOE



TERMINAL SECTION
SAME AS SECTION THRU RAIL ELEMENT
USE ONLY ON TRAILING END



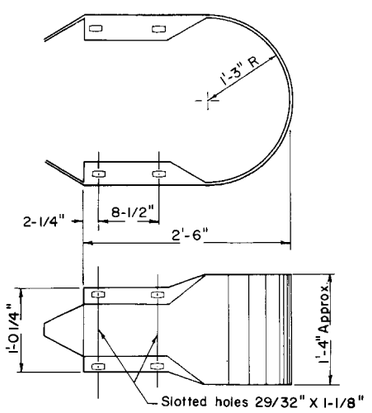
RAIL SPLICE
LAP IN DIRECTION OF TRAFFIC



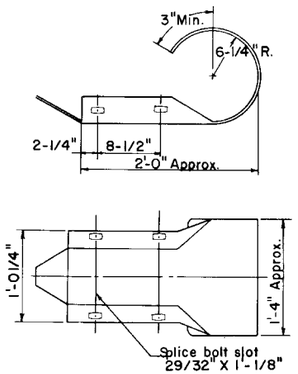
SECTION THRU RAIL ELEMENT

STANDARD BEAM TYPE GUARDRAIL

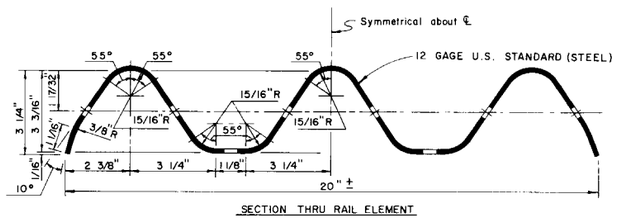
NOTE:
All end sections to be lapped in direction of traffic.



BUFFER END SECTION
to be used with double faced rail.



END SECTION (ROUNDED)

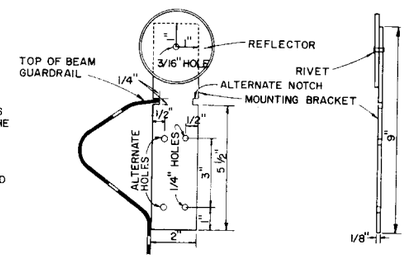


SECTION THRU RAIL ELEMENT

THRIE BEAM TYPE GUARDRAIL

NOTES:
1. THRIE BEAM GUARDRAIL SHALL BE PRIMARILY USED FOR MEDIAN INSTALLATIONS. IF DESIRED OR RECOMMENDED AT OTHER LOCATIONS, A SPECIAL DETAIL SHOULD BE PREPARED BY THE DESIGNER AND FOWARDED TO THE DEPUTY DESIGN ENGINEER, ROADWAY OFFICE FOR REVIEW AND APPROVAL PRIOR TO INCLUSION IN THE PLANS.
2. THE ANCHOR PLATE SHALL BE FASTENED TO THE LOWER PORTION OF THE THRIE BEAM (REFER TO DETAIL R, SHEET 3, FOR ADDITIONAL DETAILS).

NOTES:
1. GUARDRAIL DELINEATOR ASSEMBLY IS TO BE FASTENED TO THE TRAILING SIDE OF WOOD OFFSET BLOCKS WITH TWO 10 PENNY ALUMINUM OR GALVANIZED NAILS SO AS TO FIRMLY PLACE THE TOP EDGE OF GUARDRAIL INTO THE 1/4" NOTCH ON THE MOUNTING BRACKET. THE LOWER SIDE OF THE BRACKET SHALL CONTACT THE GUARDRAIL. WHEN METAL OFFSET BLOCKS ARE USED, FASTEN THE ASSEMBLY TO THE TRAILING SIDE OF THE WEB WITH TWO 3/16" DIAMETER ALUMINUM OR GALVANIZED NUTS AND BOLTS SO THAT THE BOTTOM OF THE REFLECTOR IS RESTING ON THE WEB AND THE SIDE OF THE MOUNTING BRACKET IS FLUSH WITH THE FLANGE NEXT TO THE RAIL.
2. WHEN DELINEATOR ASSEMBLY IS PLACED ON GUARDRAIL LOCATED LEFT OF ROADWAY, REFLECTOR WILL BE FASTENED TO REVERSE SIDE OF BRACKET.
3. REFLECTOR UNITS ARE AS SPECIFIED IN ARTICLE 993-6 OF THE 1977 FLORIDA D.O.T. STANDARD SPECIFICATIONS.
4. MOUNTING BRACKET SHALL BE MANUFACTURED FROM SHEET ALUMINUM, 6061-T6 ALLOY OR EQUAL, OR GALVANIZED STEEL AND MAY BE MANUFACTURED WITH THE ALTERNATE NOTCH AND ALTERNATE HOLES AS SHOWN IN THE DETAIL. ALL GALVANIZING TO BE DONE AFTER FABRICATION.
5. FOR DELINEATOR SPACING SEE, SHEET 2, DETAIL M.



GUARDRAIL DELINEATOR ASSEMBLY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates
Designed by	HW	7/69
Drawn by		
Checked by	LMF	3/76
F.H.W.A. Approved:		11/16/78

Approved By
Deputy Design Engineer, Roadways

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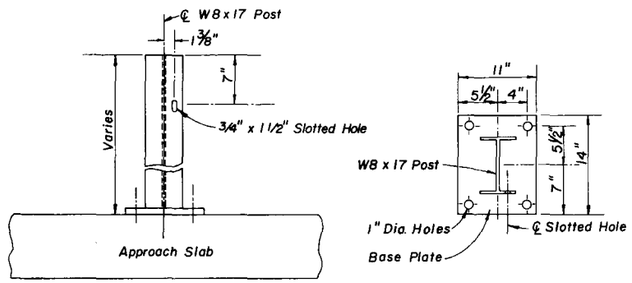
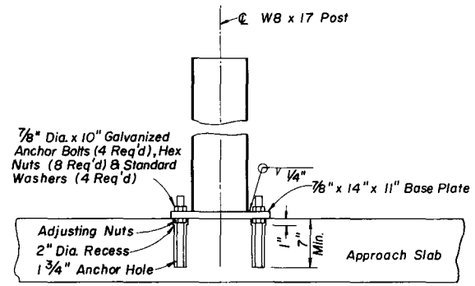


FRONT VIEW

TOP VIEW

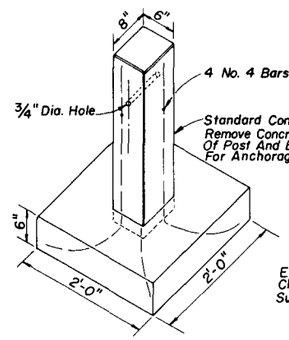


SIDE VIEW

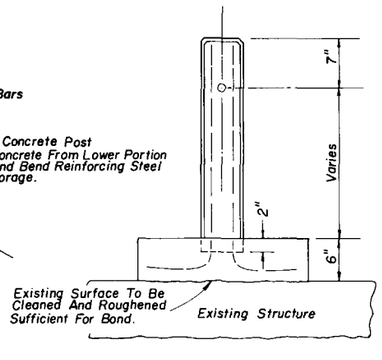
NOTES : (STEEL POST)

1. Either anchor bolts or concrete wedge anchors may be used. Anchor bolts are to be installed as detailed. Wedge anchors are to be installed in accordance with the manufacturers recommendations, assuming 3000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements : (a) tensile strength 125,000 psi (b) tensile load (approach slabs) 14,000 lbs. each ; (other structures) 8000 lbs. each (c) shear load (approach slabs) 15,000 lbs. each ; (other structures) 78,000 lbs. each (d) have an electroplated zinc coating, Type LS, applied in accordance with ASTM A-164. The coated bolts, nuts and washes shall be chromate treated after coating in a water solution containing 0.2% sodium dichromate (3 oz. per 10 gals.)
2. Anchor holes and recesses are to be drilled. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly clean before setting bolts or wedge anchors and dry when setting bolts. Bolts shall be set in epoxy mortar.
3. Posts are to be plumbed with adjusting nuts when bolts are used and plumbed with mortar seating when wedge anchors are used. All base plates to be grouted with neat finish.
4. Steel post and plate assembly to be galvanized. Any damaged galvanized areas to be metalized in accordance with Section 562 of the Standard Specifications.

STEEL GUARDRAIL POST MOUNTING TO EXISTING APPROACH SLAB

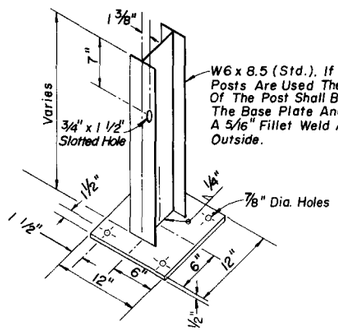


PROJECTION

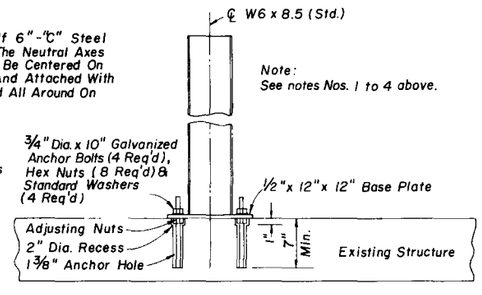


FRONT VIEW

CONCRETE POST



PROJECTION

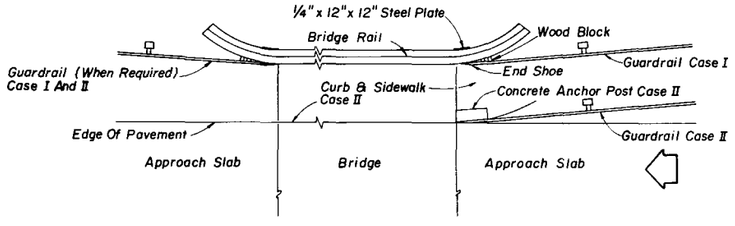


SIDE VIEW

STEEL POST

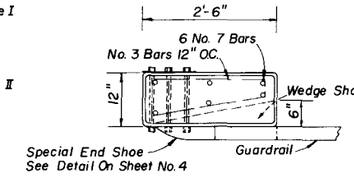
SPECIAL CONCRETE AND STEEL GUARDRAIL POSTS

FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECLUDES NORMAL POST INSTALLATION. WHEN WOOD POSTS ARE SELECTED AS ALTERNATES THE POST INSTALLATION FOR THE ABOVE CONDITIONS WILL BE STEEL.

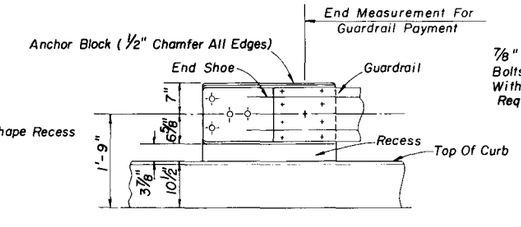


Note: The pentachloraphenol treated wood block and end shoe shall be mounted to the existing bridge rail and located to provide a 6" clearance from back of quardrail to the face of bridge rail.

TYPICAL GUARDRAIL INSTALLATION AT EXISTING BRIDGE ENDS



TOP VIEW

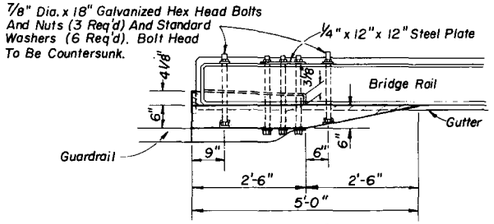


SIDE VIEW

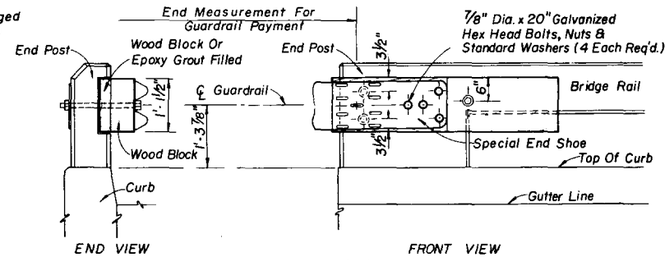
ANCHOR POST — CASE II

TYPICAL GUARDRAIL INSTALLATION AT EXISTING BRIDGE ENDS

CASE I - BRIDGE RAIL WITHOUT SIDEWALK
CASE II BRIDGE RAIL WITH SIDEWALK & CURB



TOP VIEW

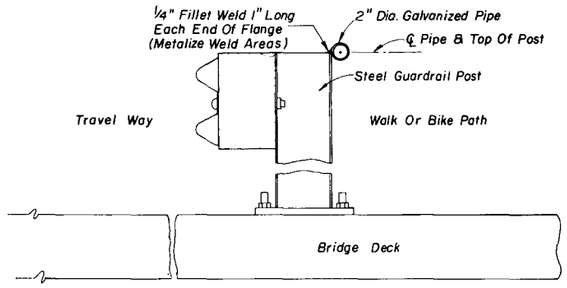


END VIEW FRONT VIEW

SPECIAL DETAIL "A"

GUARDRAIL ATTACHMENT AT END POST ON EXISTING BRIDGES

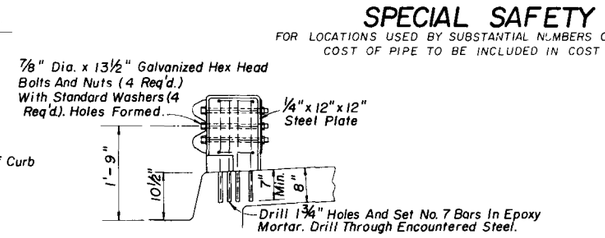
FOR APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES AND APPROACH ENDS OF ONE WAY BRIDGES. GUARDRAIL ON TRAILING ENDS OF ONE-WAY BRIDGES CAN BE MOUNTED DIRECTLY IN THE END POST RECESS.



SIDE VIEW

SPECIAL SAFETY PIPE RAIL

FOR LOCATIONS USED BY SUBSTANTIAL NUMBERS OF PEDESTRIANS, CYCLISTS OR FISHERMEN
COST OF PIPE TO BE INCLUDED IN COST OF GUARDRAIL



END VIEW

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates	Approved By
Designed by	HW	7/69	Deputy Design Engineer, Roadways
Drawn by			
Checked by	LMF	3/76	
F.H.W.A. Approved: 11/16/78			

Revision No.	Sheet No.	Index No.
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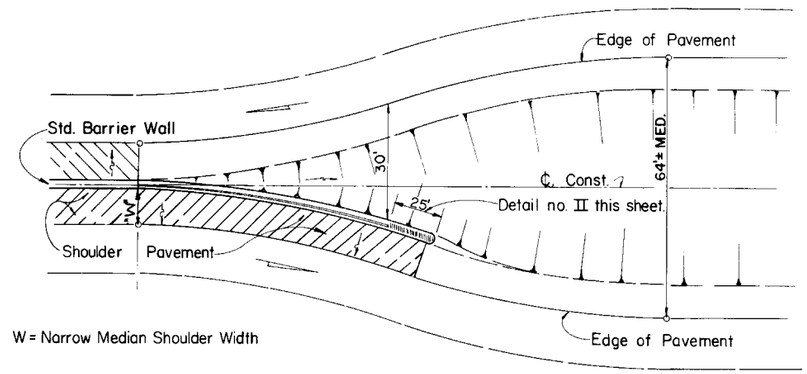
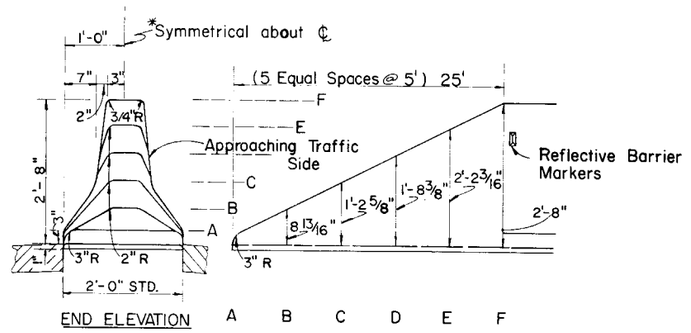


W = Narrow Median Shoulder Width

TERMINATION OF BARRIER WALL AT APPROACH TO WIDE MEDIAN SECTION

DETAIL A



CONCRETE MEDIAN BARRIER TERMINAL

(To be used only as a Temporary Barrier Terminal or where located 30' from edge of approach lane. See Detail A Lt.)

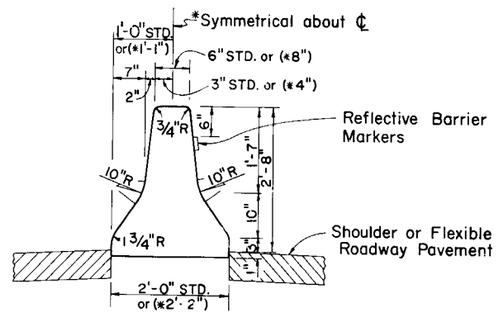
DETAIL II

BARRIER MARKER SPACING ON WALL		
Distance - Edge of travel lane to barrier wall.	Spacing	Number per side
1' to < 4'	40'	1
4' to < 8'	80'	1
> than 8'	none required	

Use Amber Markers only.

Use 10' spacing on Terminal ends.

Hold or clamp reflective barrier markers to wall until dry or set.



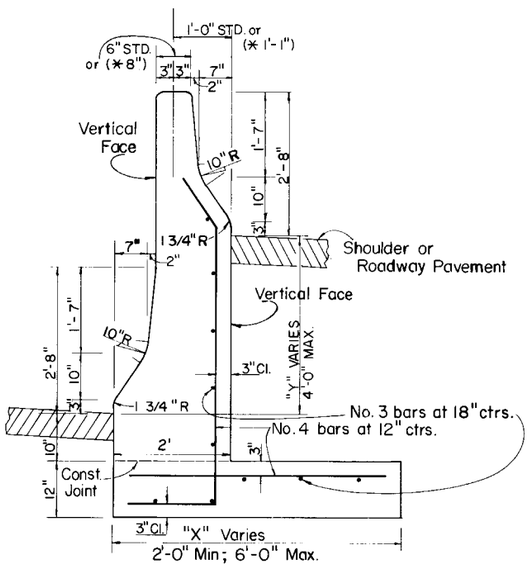
TYPICAL BARRIER WALL SECTION

NARROW MEDIAN INSTALLATION
ADJACENT TO PAVEMENT

*Use 8" top, 2'-2" base when 10" light poles are installed within barrier wall line.

For Concrete Median Barrier Wall details at Piers, Highway Lighting and Guardrail Connections, See Sheet 2.

For Median Barrier and 'Special' Barrier Wall Inlet details see Index No. 217.

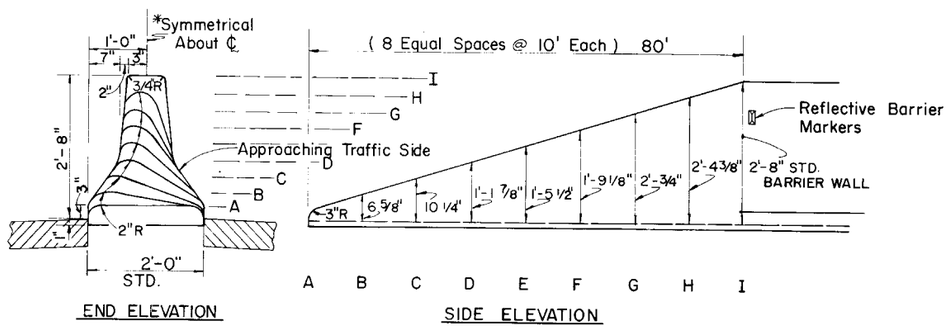


MEDIAN BARRIER WALL FOR SUPERELEVATED SECTION OR VARIABLE ROADWAY PROFILE GRADES

Note: Steel not required until height "Y" is 1'-0" or more and footing width "X" is 3'-0" or more. Cost of the steel and concrete footing to be included in the Contract unit price for Concrete Barrier Wall.

Height "Y"	0'-0"	0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Width "X"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"

TABLE OF DIMENSIONS FOR DIFFERENCE - HEIGHT "Y" AND BARRIER WALL FOOTING - WIDTH "X"



CONCRETE MEDIAN BARRIER TERMINAL

NARROW MEDIAN DESIGN SPEED **45** M.P.H. or LESS

DETAIL III

GENERAL NOTES :

1. Cost of installation of all conduits and utility accessories, reinforcing steel and reflective barrier markers shall be included in the contract unit price for Concrete Barrier Wall.
2. Terminal Barrier Notes for Design Speeds greater than 45 m.p.h. :
   a. Terminated in a wide median section outside recovery area of the approach traffic – See Detail A Lt.
   b. Terminated from a shielded location.
   c. Terminal protection by the use of an impact attenuator system.
   d. Terminated in conjunction with a suitably designed transition to another type median barrier that can be introduced more safely.
3. Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab to match an existing or proposed expansion joint.
4. Expansion joints in conduits shall be required only at the expansion joints in the wall.
5. When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.
6. Cast-in-place barrier wall normally will be a continuous pour without transverse contraction joints.
7. Cast-in-place sections with a length < 40' shall be joined to adjacent sections by doweling. See Detail 'B' on sheet 2.
8. Precast construction is allowed as a alternate to cast-in-place construction.
   a. Section lengths will not be < 20' in length.
   b. Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
   c. Reinforcement may be required for handling stresses.
   d. See detail 'C' on sheet 2 for transverse joint details.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE BARRIER WALL

	Names	Dates
Designed by		
Drawn by	A F	6/73
Checked by	L M F	7/73
F.H.W.A. Approved: 5/20/77		

Approved By _____ Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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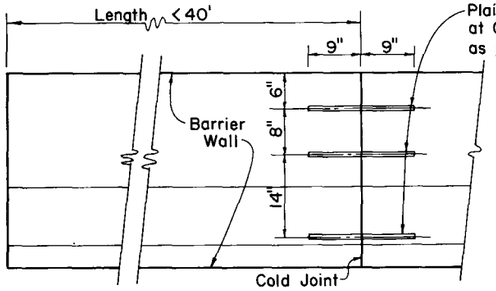
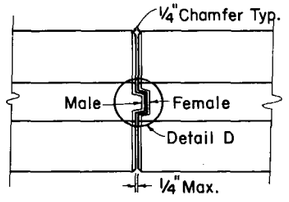
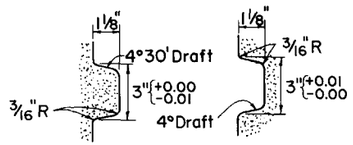


DOWELED TRANSVERSE CONSTRUCTION JOINT DETAIL B



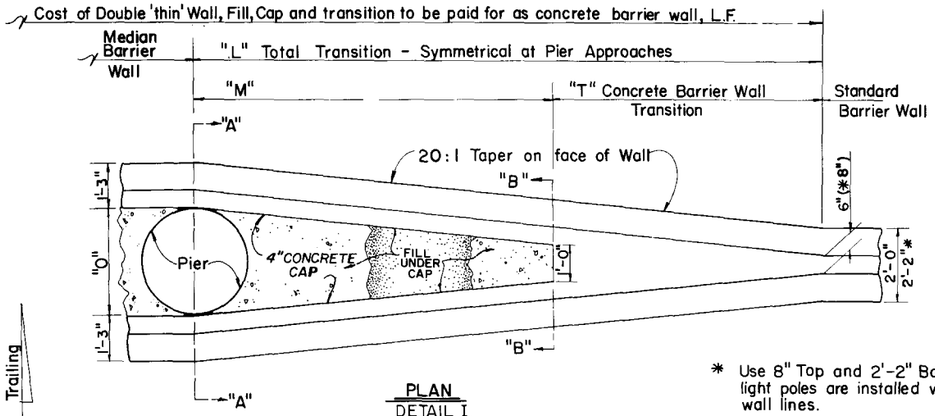
TOP VIEW

DETAIL C



DETAIL D

PRECAST BARRIER TRANSVERSE JOINTS

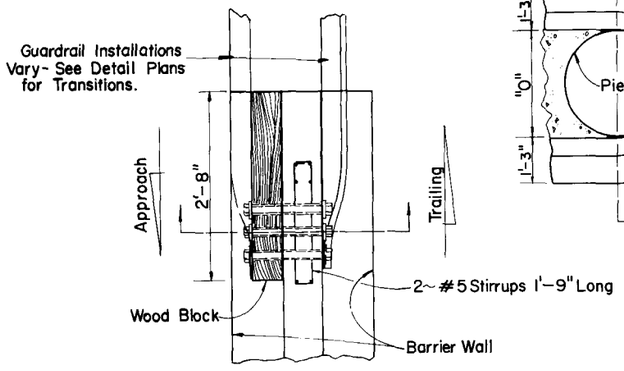


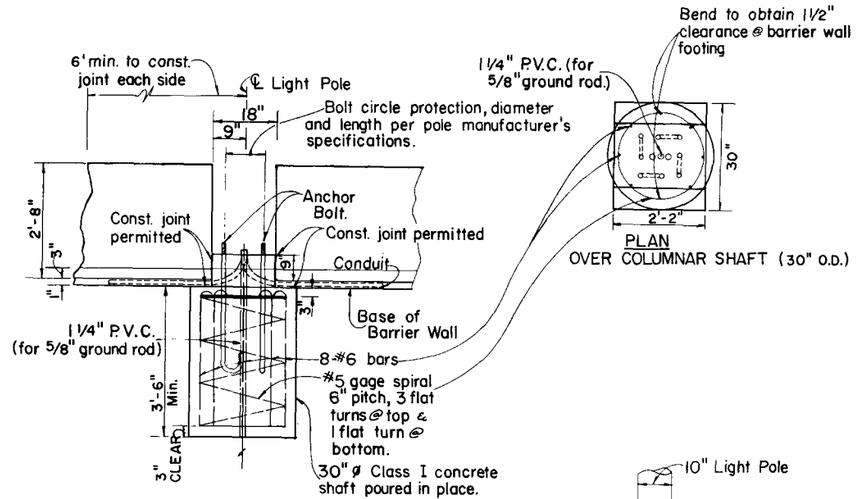
PLAN

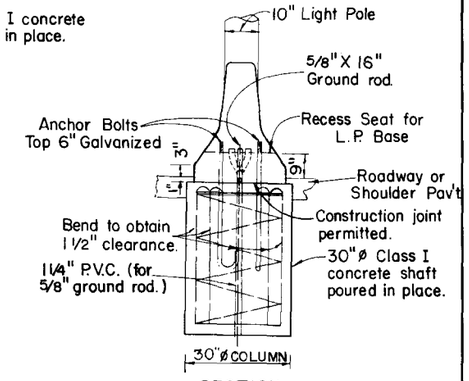
DETAIL I

* Use 8" Top and 2'-2" Base when 10" light poles are installed within barrier wall lines.

DIMENSIONS - DETAIL I				
"O" Varies 3' Shown	"L" Total Trans.	"M" Barrier Wall	"T" Std. to M. Trans.	WALL TYPE
3'	35.8'	20.8'	15.0'	STD., (6" Top, 2'-0" Base)
3'	34.2'	20.8'	13.4'	* (8" Top, 2'-2" Base)







SECTION

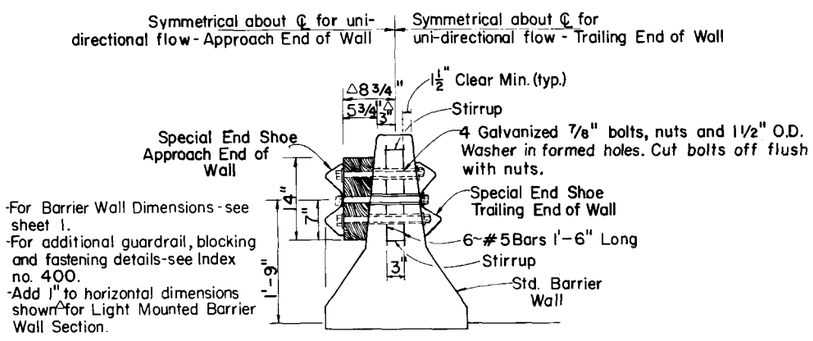
DETAIL OF 10" LIGHT POLE MOUNTING ON MEDIAN BARRIER WALL WITH 8" TOP, 2'-2" BASE

NOTES:

Bolt circle: 8" pole - 11 1/2", 10" pole - 15"

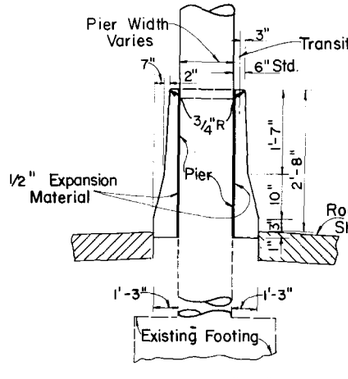
Refer to Highway Lighting Plans for size of Conduit

Payment for the 30" ø concrete column including reinforcing steel, anchor bolts and accessories shall be included in the contract unit price for Lighting Pole complete, Highway Lighting.

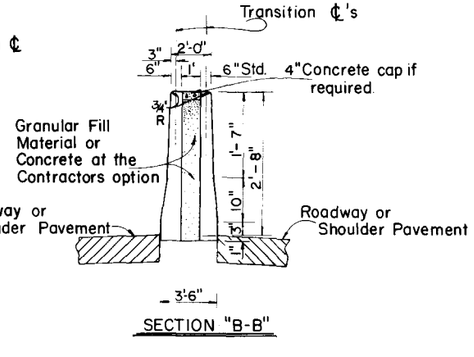


GUARDRAIL CONNECTION TO STD. CONCRETE BARRIER WALL

SECTION



SECTION "A-A"



SECTION "B-B"

CONCRETE MEDIAN BARRIER WALL

NOTE: Cost of Double 'thin' wall, Fill, Concrete Cap and Transitions are to be paid for under Concrete Barrier Wall ⊏ Roadway ⊐ per lin. ft. as indicated.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE BARRIER WALL

	Names	Dates
Designed by		
Drawn by	A F	6/73
Checked by	L M F	7/73
F.H.W.A. Approved:		10/8/78

Approved By: Deputy Design Engineer, Roadways

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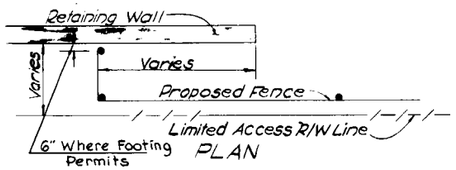
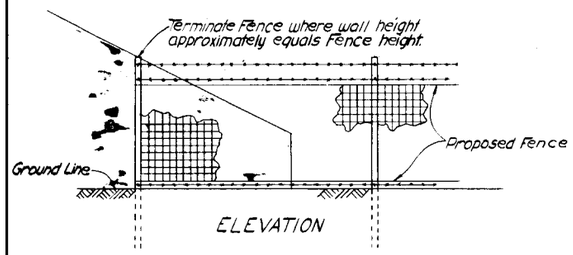
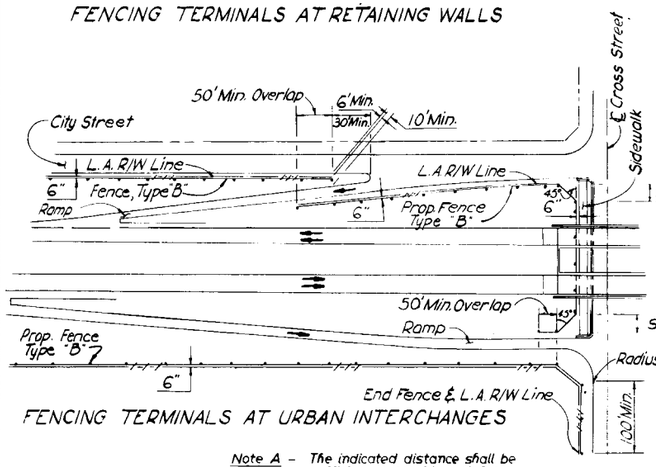




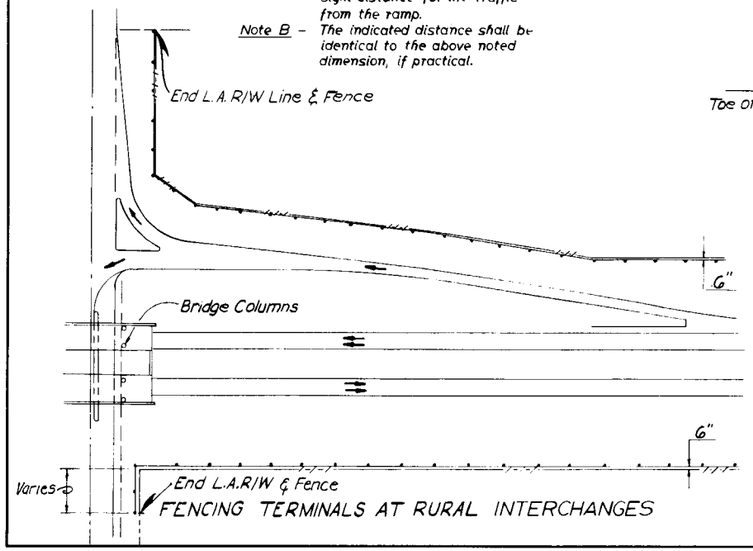
FENCING TERMINALS AT RETAINING WALLS



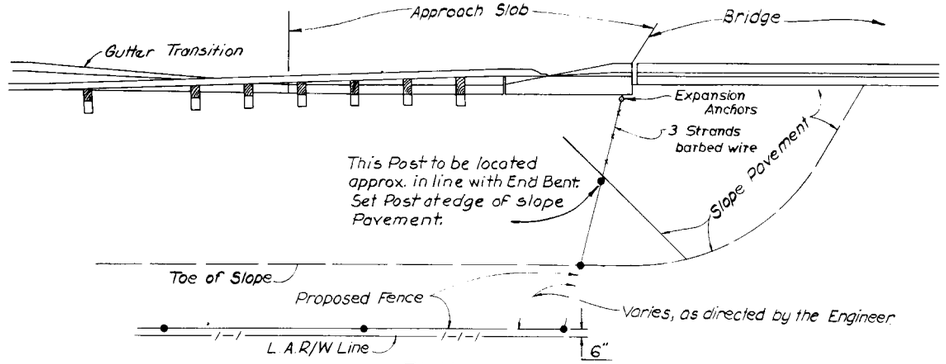
FENCING TERMINALS AT URBAN INTERCHANGES

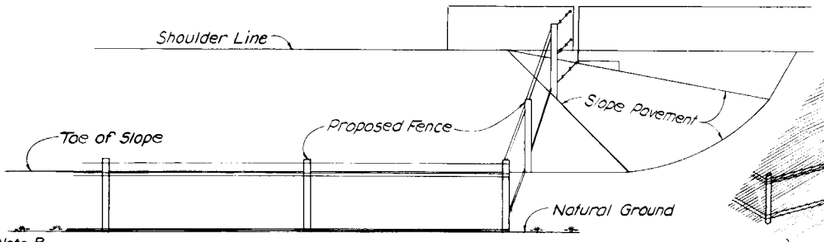
Note A – The indicated distance shall be sufficient to provide satisfactory sight distance for the traffic from the ramp.

Note B – The indicated distance shall be identical to the above noted dimension, if practical.



FENCING TERMINALS AT RURAL INTERCHANGES

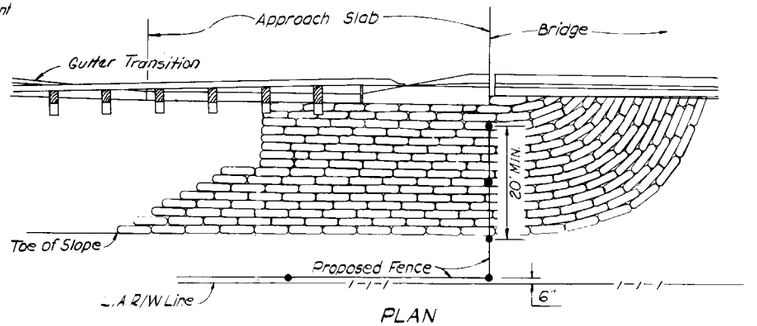


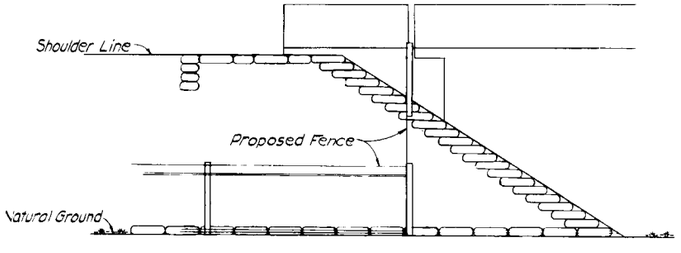


ELEVATION

FENCING TERMINALS AT BRIDGE ENDS

(ROADWAY)





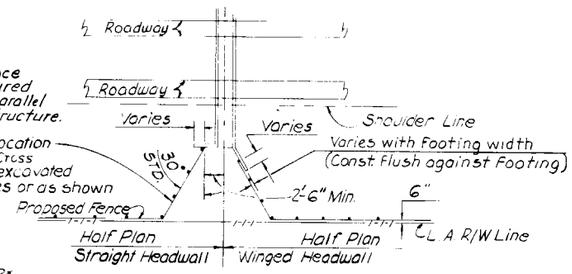
ELEVATION

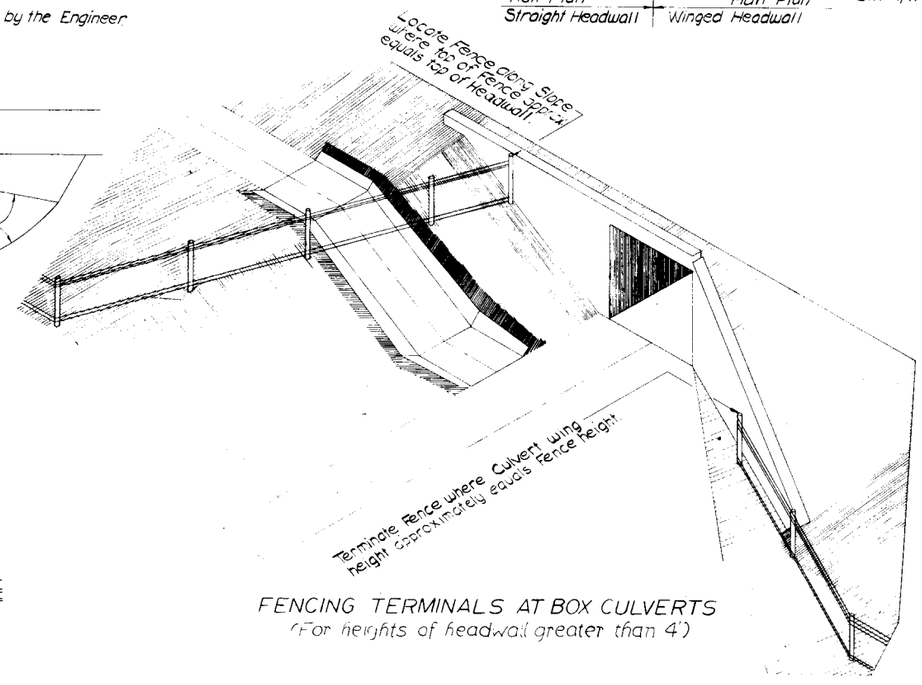
FENCING TERMINALS AT BRIDGE ENDS

(STREAM CROSSING)

Note:

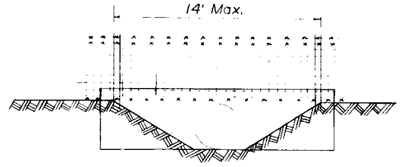
1. Angle of fence to be measured from a line parallel to the ℄ of Structure.
2. This Fence location to be used at Cross Drains with excavated outfall Ditches or as shown in plans.





FENCING TERMINALS AT BOX CULVERTS

(For heights of headwall greater than 4')



FENCING DETAIL AT CULVERT

(For heights of headwalls 4' or less.)

Note: When height of headwall is 4' or less (pipe culverts 36" or less) the fence shall not be tied to the headwall, but shall span the lateral ditch.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCE LOCATION

	Names	Dates
Designed by	HFW	2/65
Drawn by	HFW	2/65
Checked by	RLO	2/65
F.H.W.A. Approved:		6/18/74

Approved By
Deputy Design Engineer, Roadways

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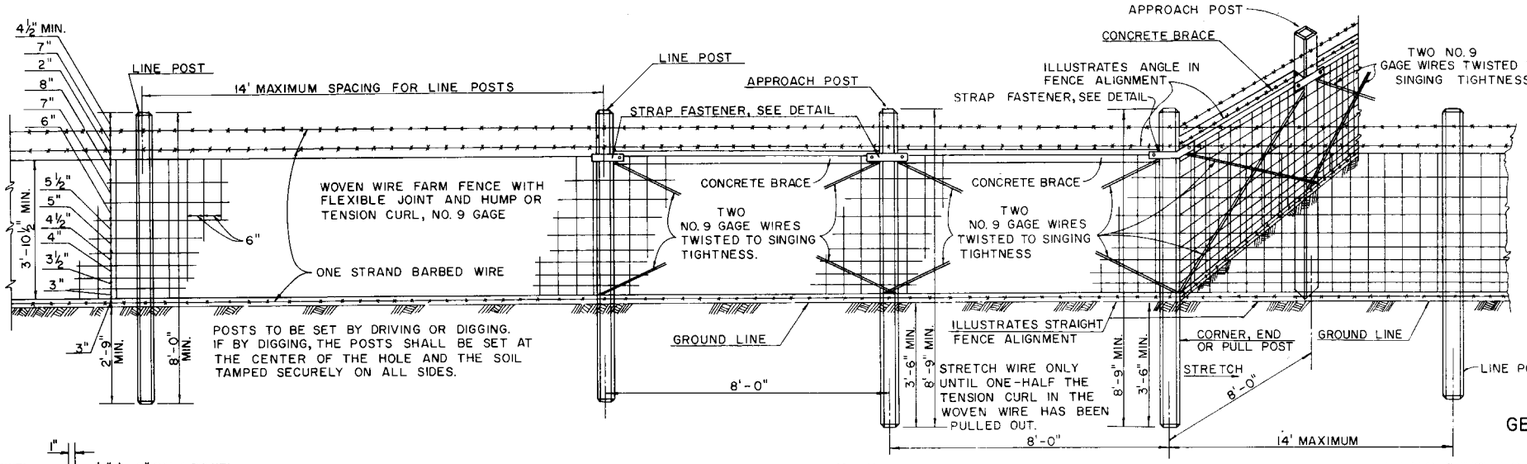
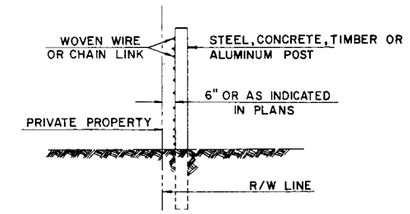
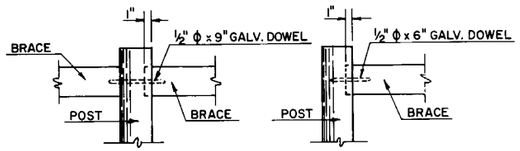


DETAILS OF TYPE "A" FENCE

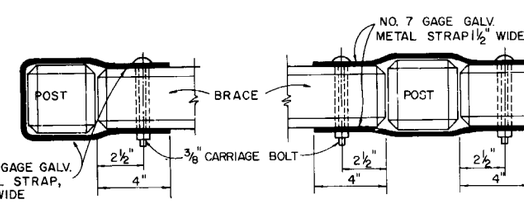
(ILLUSTRATED FOR CONC. POSTS AND BRACES)



SKETCH INDICATING FENCE LOCATION AT SECTIONS OF NO FRONTAGE ROADS. REFER TO DETAIL PLANS FOR LOCATIONS OF FENCING FOR PROJECTS WITH FRONTAGE ROADS.

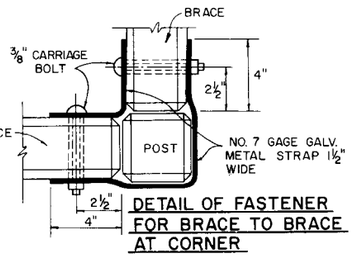


ALTERNATE TIMBER BRACING DETAILS

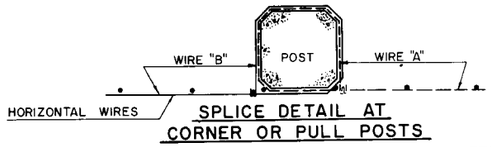


DETAIL OF FASTENER FOR BRACE AND POST

DETAIL OF FASTENER FOR BRACE TO BRACE ON LINE

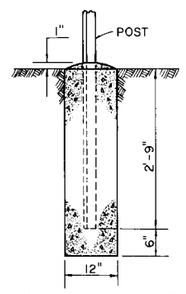


DETAIL OF FASTENER FOR BRACE TO BRACE AT CORNER



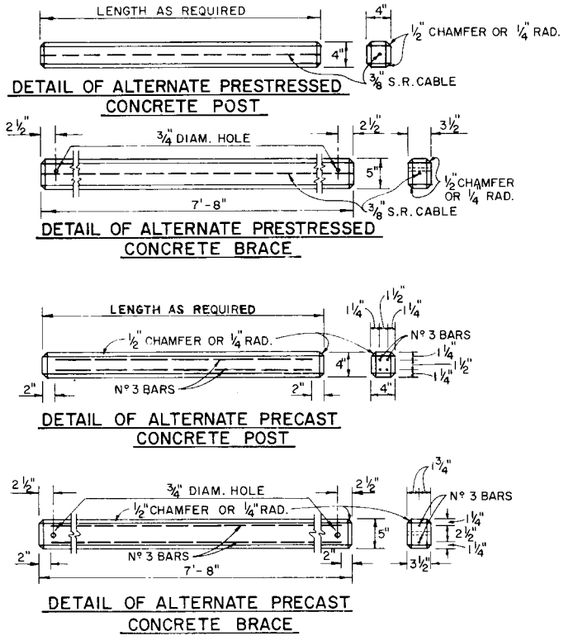
SPLICE DETAIL AT CORNER OR PULL POSTS

EACH HORIZONTAL WIRE TO BE WRAPPED COMPLETELY AROUND PULL POST AND TIED TO SAME WIRE. CONC. POST ILLUSTRATED. THIS METHOD ALSO APPLIES TO STEEL POST INSTALLATIONS AND TIMBER POST INSTALLATIONS.



DETAIL OF CONCRETE SETTING FOR ANGULAR STEEL POSTS

(PULL, CORNER, END AND APPROACH POSTS)



DETAIL OF ALTERNATE PRESTRESSED CONCRETE POST

DETAIL OF ALTERNATE PRESTRESSED CONCRETE BRACE

DETAIL OF ALTERNATE PRECAST CONCRETE POST

DETAIL OF ALTERNATE PRECAST CONCRETE BRACE

GENERAL NOTES (TYPE "A" FENCE)

1. THIS FENCE TO BE PROVIDED GENERALLY IN RURAL AREAS.
2. POSTS AND BRACES MAY BE EITHER STEEL, ALUMINUM, TIMBER OR CONCRETE.
3. STEEL POSTS AND BRACES SHALL BE STANDARD STEEL POSTS, GALVANIZED AT THE RATE OF 2 OZ. PER SQ. FT., TOGETHER WITH NECESSARY HARDWARE AND WIRE CLAMPS AND MEETING THE FOLLOWING REQUIREMENTS:
   (A) LINE POSTS: 8' LONG; 1.33 LBS. PER LIN. FT.; STUDDED, ANCHOR PLATE ATTACHED; WITH NECESSARY CLAMPS, ETC.
   (B) APPROACH POSTS: 2½" x 2½" x ¼" ANGLES, 8' LONG; FABRICATED FOR ATTACHING BRACE; WITH NECESSARY HARDWARE, CLAMPS, ETC.
   (C) PULL, END AND CORNER POSTS: 2½" x 2½" x ¼" ANGLES, 8' LONG, FABRICATED FOR ATTACHING BRACE; WITH NECESSARY HARDWARE, CLAMPS, ETC.
   (D) BRACES: 2" x 2" x ¼" ANGLES WITH NECESSARY HARDWARE AND FABRICATED FOR ATTACHING TO POST.
   (E) THE PULL, CORNER, APPROACH AND END POSTS ARE TO BE SET IN CONCRETE AS PER DETAIL. (ALSO SEE NOTE NO. 6)
4. ALL TIMBER POSTS, EXCEPT CORNER AND PULL POSTS ARE TO BE MINIMUM 4" DIAMETER. TIMBER CORNER AND PULL POSTS ARE TO BE MINIMUM 5" DIAMETER. BRACES ARE TO BE 4" MINIMUM DIAMETER. LENGTHS OF TIMBER POSTS TO BE AS INDICATED ABOVE FOR CONCRETE POSTS.
   (A) STAPLES FOR LINE POSTS TO BE 1¼" MINIMUM LENGTH, FOR APPROACH, CORNER AND PULL POSTS 1½" MINIMUM LENGTH. AT APPROACH, CORNER AND PULL POSTS, STAPLE EVERY LINE WIRE. AT LINE POSTS, STAPLE EVERY LINE WIRE IN TOP HALF AND ALTERNATE LINE WIRES IN BOTTOM HALF.
   (B) ADEQUATE CONNECTIONS BETWEEN TIMBER POSTS AND BRACES TO BE PROVIDED.
   (C) WIRE TO BE WRAPPED AROUND END POSTS AND CORNER POSTS (INSTALLED AS LINE POSTS) AT VERTICAL BREAKS OF 15° OR MORE.
5. LONGER POSTS THAN THOSE INDICATED ABOVE MAY BE REQUIRED BY THE PLANS OR FOR DEEPER INSTALLATIONS.
6. MATERIAL FOR CLASS I CONCRETE FOR FENCE FOOTINGS MAY BE MEASURED BY VOLUMETRIC AND/OR BY WEIGHT. SECTIONS 345-5.1, 345-10 AND 345-11 OF D.O.T. STANDARD SPECIFICATIONS WILL BE DELETED.
7. THE CONTRACTOR, AT HIS OPTION, MAY USE ANY SUITABLE PRECAST OR PRESTRESSED CONCRETE POST; HOWEVER, APPROVAL BY THE ENGINEER, OF POSTS NOT SHOWN ON THIS DRAWING, WILL BE REQUIRED PRIOR TO CONSTRUCTION OF THE FENCE.
8. FENCE SHALL BE INSTALLED WITH WIRE SIDE TO PRIVATE PROPERTY EXCEPT ON HORIZONTAL CURVES GREATER THAN 3° THE FENCE SHALL BE INSTALLED SO AS TO PULL AGAINST ALL POSTS.

(CONTINUED)

GENERAL NOTES (TYPE "A" FENCE) CONTINUED

9. FOR PAY PURPOSES ASSEMBLIES ARE DEFINED AS FOLLOWS: PULL OR END POST ASSEMBLIES SHALL CONSIST OF: ONE END OR PULL POST, ONE APPROACH POST, TWO BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE. CORNER POST ASSEMBLIES SHALL CONSIST OF: ONE CORNER POST, TWO APPROACH POSTS, FOUR BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE.
10. THE TYPE OF FENCE TO BE INSTALLED SHALL BE SHOWN ON PLANS. PULL POSTS SHALL BE INSTALLED AT APPROXIMATELY 330' CENTERS EXCEPT THAT THIS MAXIMUM INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES.
11. CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BREAKS IN FENCE OF 15° OR MORE.
12. A MAXIMUM LENGTH OF 1320' OF WIRE MAY BE INSTALLED AS A UNIT.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCE TYPE A

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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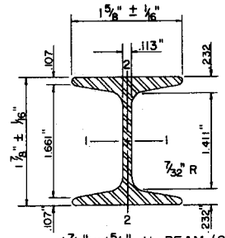
F.H.W.A. Approved: 9/3/76 — 80

ALTERNATE H-BEAM LINE POST FOR TYPE "B" FENCE

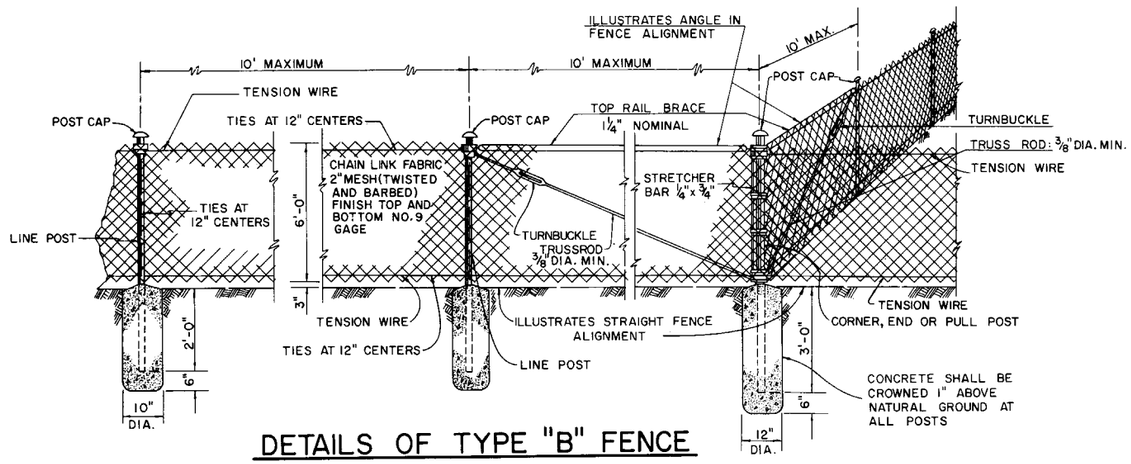


1 7/8" x 1 5/8" H-BEAM (STEEL) (ALUM)

AREA = .724" 0.91 # ±5%

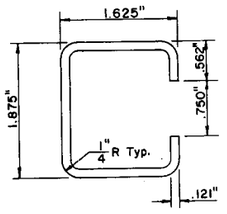
GALV. WT. PER. FT. = 2.72 # ± 5%

	-AXES- 1-1	2-2	-AXES- 1-1	2-2
MOMENT OF INERTIA	.428	.101	.428	.101
SECTION MODULUS	.456	.124	.456	.124
RAD. OF GYRATION	.779	.373	.779	.373
SURFACE AREA = .776" PER FT.			.776"	PER FT.
TENSILE STRENGTH PS.I.(MIN.)	80,000			30,000
YIELDING POINT P.S.I. (MIN.)	48,000			25,000



DETAILS OF TYPE "B" FENCE

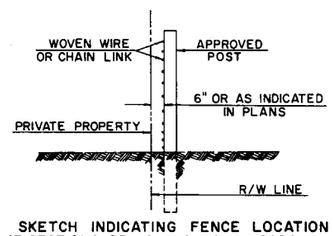
(ILLUSTRATED FOR STEEL TUBULAR POSTS)



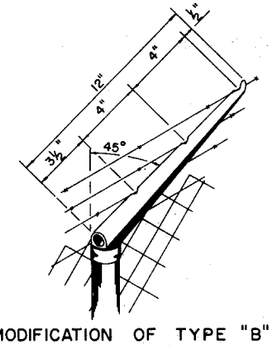
ALTERNATE "C" LINE POST FOR TYPE "B" FENCE

GALV. WT. PER. FT. = 2.34# ±5%

YIELDING POINT P.S.I. (MIN.) 45,000



SKETCH INDICATING FENCE LOCATION AT SECTIONS OF NO FRONTAGE ROADS. REFER TO DETAIL PLANS FOR LOCATIONS OF FENCING FOR PROJECTS WITH FRONTAGE ROADS.



MODIFICATION OF TYPE "B" FENCING SHOWING BARB WIRE AT ATTACHMENT.

GENERAL NOTES (TYPE "B" FENCE)

1. THIS FENCE TO BE PROVIDED GENERALLY IN URBAN AREAS.
2. LINE POSTS MAY BE ANY OF THE FOLLOWING:
   (A) GALVANIZED STEEL PIPE – 1½" NOMINAL; (B) ALUMINUM COATED STEEL PIPE – 1½" NOMINAL; (C) ALUMINUM ALLOY PIPE – 2" NOMINAL; (D) GALVANIZED STEEL H-BEAM – 1 7/8" x 1 5/8"; (E) ALUMINUM ALLOY H-BEAM – 1 7/8" x 1 5/8"; (F) GALV. STEEL "C" – 1 7/8" x 1 5/8".
3. CORNER, END OR PULL POSTS MAY BE ANY OF THE FOLLOWING:
   (A) GALVANIZED STEEL PIPE – 2" NOMINAL; (B) ALUMINUM COATED STEEL PIPE – 2" NOMINAL; (C) ALUMINUM ALLOY PIPE – 2½" NOMINAL.
   NOTE: OTHER STEEL OR ALUMINUM SHAPES FOR CORNER, END OR PULL POST ASSEMBLIES MAY BE USED IF APPROVED BY THE ENGINEER.
4. CHAIN LINK FABRIC, POSTS, RAILS, GATE FRAMES, EXPANSION SLEEVES, TIE WIRES, TENSION WIRES, AND ALL MISCELLANEOUS FITTINGS AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M-181-74 AND M-111 UNLESS OTHERWISE NOTED:
   (A) UNLESS OTHERWISE CALLED FOR IN THE PLANS OR SPECIAL PROVISIONS;
      (1) THE CHAIN LINK FABRIC WIRE SHALL BE NO.9 GAGE AND GALVANIZED AT RATE OF 2 OZ. PER SQ.FT..
      (2) THE TENSION WIRE SHALL BE EITHER NO.7 GAGE STEEL WIRE GALVANIZED AT THE RATE OF 2 OZ. PER SQ.FT. MIN. OR ALUMINUM WIRE OF ALLOY ALCLAD 5056-H38 OR EQUAL WITH A WIRE DIAMETER OF 0.1875 INCH OR LARGER, OR NO. 7 GAGE ALUMINUM COATED STEEL WIRE COATED AT THE RATE OF 0.4 OZ. PER SQ. FT. MIN..
      (3) TIE WIRE AND HOG RINGS SHALL BE NO. 9 GAGE (0.148 INCH) GALVANIZED OR ALUMINUM ALLOY.
   (B) THE CONTRACTOR MAY ELECT TO USE A COMBINATION OF ZINC-COATED STEEL FENCE MEMBERS, ALUMINUM COATED STEEL FENCE MEMBERS, AND ALUMINUM ALLOY FENCE MEMBERS; BUT IN GENERAL ONLY ONE COMBINATION OF MATERIALS WILL BE ALLOWED IN FENCE CONSTRUCTION.
5. SEE SECTION 966 OF D.O.T. STANDARD SPECIFICATIONS FOR OPTIONAL MATERIALS.
6. MATERIAL FOR CLASS I CONCRETE FOR FENCE FOOTINGS MAY BE MEASURED BY VOLUMETRIC AND/OR BY WEIGHT. SECTIONS 345-5.1, 345-10 AND 345-11 OF D.O.T. STANDARD SPECIFICATIONS WILL BE DELETED.
7. IN LOCATIONS OF FIRM WELL DRAINED SOIL, THE CONTRACTOR MAY ELECT TO INSTALL C LINE POSTS (ONLY) BY DRIVING THE POSTS TO A MINIMUM DEPTH OF THREE FEET IN LIEU OF USING CONCRETE FOOTINGS.

GENERAL NOTES (CONT.)

8. FOR PAY PURPOSES ASSEMBLIES ARE DEFINED AS FOLLOWS: PULL OR END POST ASSEMBLIES SHALL CONSIST OF ONE PULL OR END POST, ONE BRACE AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE. CORNER POST ASSEMBLIES SHALL CONSIST OF ONE CORNER POST, TWO BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE.
9. THE TYPE OF FENCE TO BE INSTALLED SHALL BE SHOWN ON PLANS. PULL POSTS SHALL BE USED AT BREAKS IN VERTICAL GRADES OF 15° OR MORE, OR AT APPROXIMATELY 330' CENTERS EXCEPT THAT THIS MAXIMUM INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES.
10. CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL BREAKS IN FENCE OF 15° OR MORE AND AS REQUIRED AT VERTICAL BREAKS OVER 15° AS DETERMINED BY THE ENGINEER.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCE TYPE B

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved: 9/3/76		

Approved By: Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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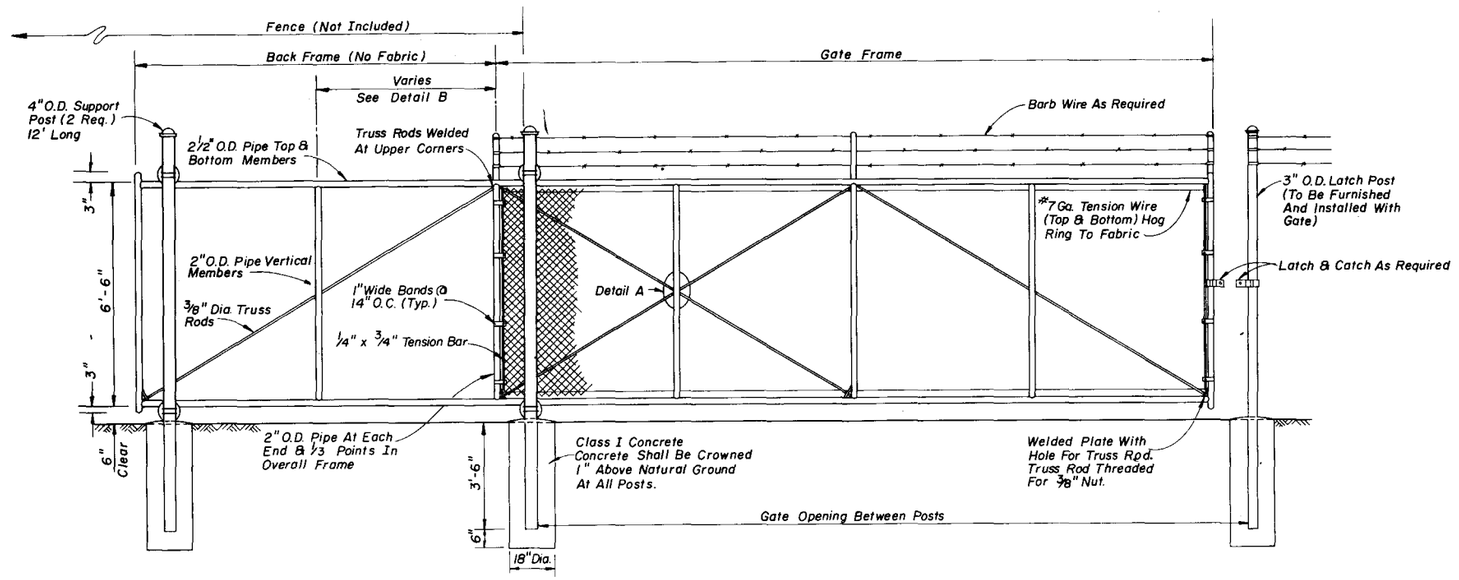
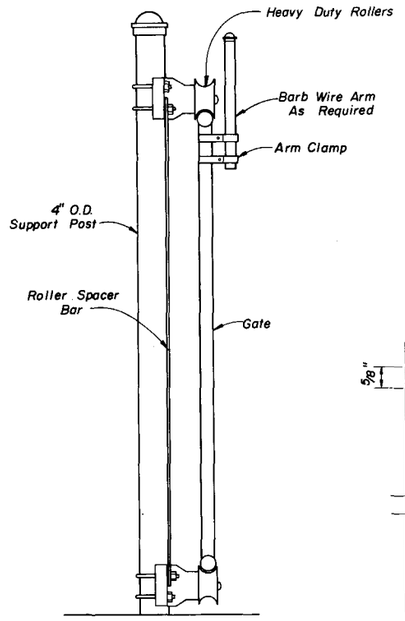


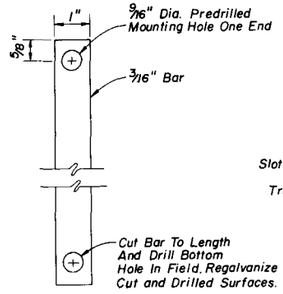
FRONT ELEVATION

GENERAL NOTES

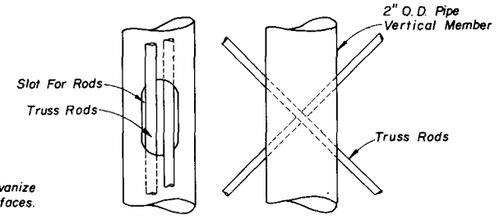
1. All fabric shall be #9 gage 2" mesh knuckled top & bottom selvages.
2. All gate components shall meet the galvanizing requirements specified in Index No. 452.
3. Cost of all gate components shall be included in the contract unit price for Cantilever Slide Gate.
4. The Contractor may substitute any equivalent cantilever slide gate approved by the Engineer.



SUPPORT POST DETAIL

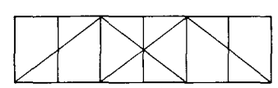


ROLLER SPACER BAR

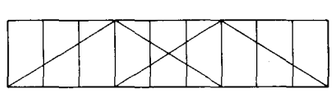


DETAIL A

GATE OPENING	GATE FRAME	BACK FRAME
12'	12'-3"	6'
16'	16'-3"	8'
20'	20'-3"	10'
24'	24'-3"	12'



TYPICAL FRAME - 12', 16', & 20' Opening



TYPICAL FRAME - 24' Opening

DETAIL B

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CANTILEVER SLIDE GATE TYPE B FENCE

	Names	Dates
Designed by		
Drawn by	HDD	9/78
Checked by	LMF	9/78
F.H.W.A. Approved: 10/26/78		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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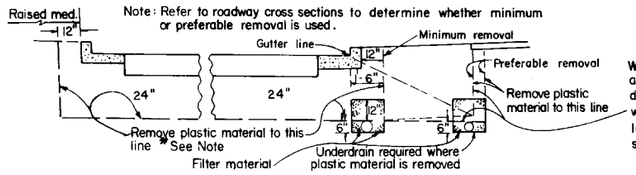
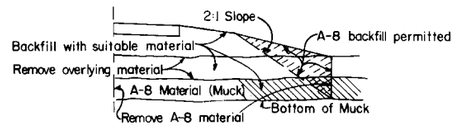


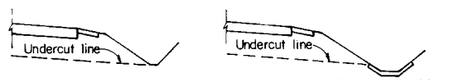
Where preferable method of removal governs and it is impossible to place the underdrain at the outer cut limit due to conflict with storm sewer mains, remove to these limits and place underdrain at location shown for minimum removal.

* NOTE: Where frequency of median breaks indicates that it is impractical to leave plastic material in the median, the designer may elect to indicate total removal of this material. If during construction it becomes apparent, due to normal required construction procedures, that it is impractical to leave the plastic material in the median, the project engineer may authorize total removal of this material after clearing this change thru the Asst. Dist. Engr.-Const.

HALF SECTION SHOWING REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN MUNICIPAL CONST.



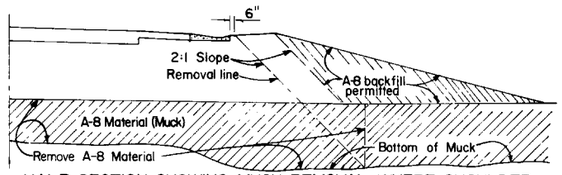
HALF SECTION SHOWING REMOVAL AND DISPOSAL OF A-8 MATERIAL IN RURAL CONSTRUCTION
(Outside Shoulders Only. Plans To Designate Median Treatment)



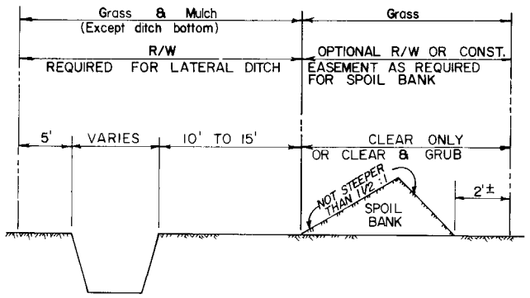
At locations where plastic material is being removed, the side ditches must be at least as deep as the undercut plane.

Where paved side ditches are used in areas of removal of plastic material, the top of the ditch pavement must be no higher than the undercut plane.

MISCELLANEOUS DETAILS



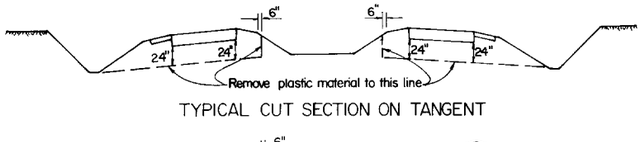
HALF SECTION SHOWING MUCK REMOVAL WHERE SHOULDER GUTTER IS CONSTRUCTED
(Outside Shoulders Only. Plans To Designate Median Treatment)



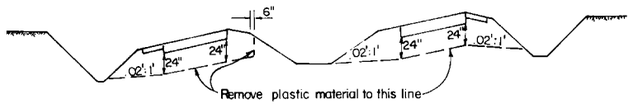
NOTE.

1. Where no spoil is anticipated or when a large ditch or Canal is involved and spoil is anticipated on both sides, R/W should be adjusted accordingly.
2. Clearing and Grubbing is to extend 200' beyond the end of the ditch if necessary.
3. The bottom width of Lateral Ditches is to be 2' wider than the span of the Structure they drain or as shown on Plans.
4. No Spoil Bank will be permitted within 300' of the ℄ of the Project, measured at right angles thereto. Waste materials in this section shall be either hauled and deposited in areas approved by the Engineer, or spread on adjacent areas to the depth designated by the Engineer.
5. All excavation from Lateral Ditches shall be wasted unless otherwise shown on Lateral Ditch Sheets.

TYPICAL SECTION
LATERAL DITCH SHOWING SPOIL BANK

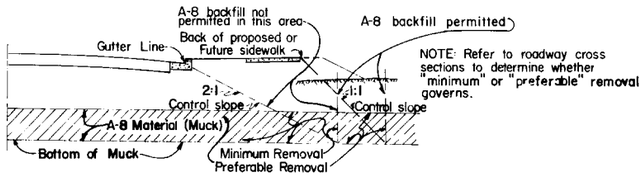


TYPICAL CUT SECTION ON TANGENT



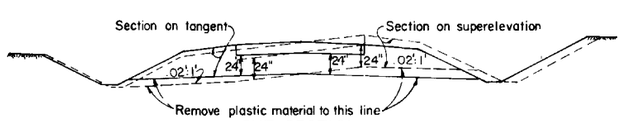
TYPICAL CUT SECTION ON SUPERELEVATION

TYPICAL SECTIONS FOR REMOVAL OF PLASTIC MATERIAL ON INTERSTATE AND PRIMARY SYSTEM HAVING DEPRESSED MEDIAN



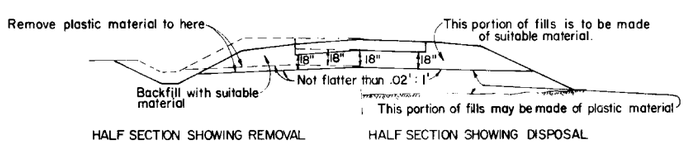
NOTE: Refer to roadway cross sections to determine whether "minimum" or "preferable" removal governs.

HALF SECTION SHOWING REMOVAL AND DISPOSAL OF A-8 MATERIAL IN MUNICIPAL CONSTRUCTION



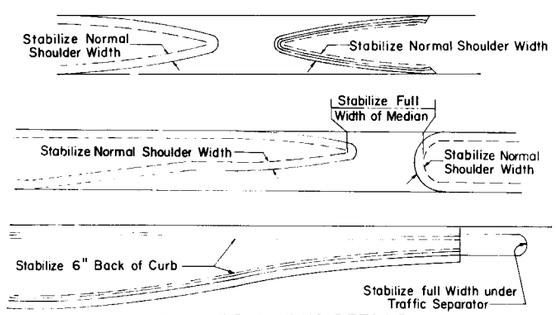
CUT SECTION

TYPICAL SECTION FOR REMOVAL OF PLASTIC MATERIAL ON MAJOR PRIMARY SYSTEM ROADS



HALF SECTION SHOWING REMOVAL HALF SECTION SHOWING DISPOSAL

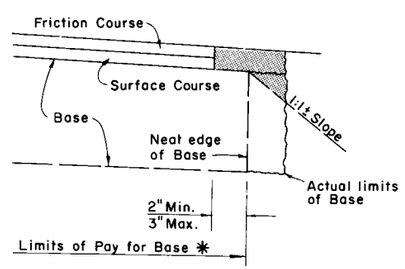
REMOVAL AND DISPOSAL OF PLASTIC MATERIAL FOR SECONDARY AND MINOR PRIMARY SYSTEM ROADS



MEDIAN STABILIZING DETAILS

GENERAL STABILIZING NOTES:

(1) When typical section has curb or curb and gutter in median stabilize 6" back of curb.
(2) When typical section has shoulder with no curb or curb and gutter in median stabilize to normal shoulder width.
(3) Stabilize entire area under all paved traffic islands.
(4) Stabilize full width under all traffic separators



DETAIL FOR REMOVAL OF EXCESS BASE MATERIAL

NOTES:
1. All surplus material in shaded area to be removed.
2. Payment for removal is included in the Base item.
3. * Area of base for payment will be calculated using the nominal width (3" Overhang).

GENERAL NOTES

1. Minimum grade on underdrain pipe shall be 0.2%.
2. Gradation of the filter material shall conform to standard specifications.
3. In rural projects, where underdrain is to be constructed beneath the proposed pavement, the grade of the underdrain is to be such that the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade.
4. All details shown on this sheet for the removal and disposal of unsuitable materials apply unless otherwise shown on the plans.
5. Where plastic material is undercut, backfill shall be made of suitable material.
6. The term "plastic material" used in this drawing in conjunction with removal of plastic material is defined as any material of the soils classifications of A-2-6, A-2-7, A-4, A-5, A-6 and A-7.
7. The normal depth of side ditches for Interstate and major Primary System roads shall be 3.5' below the shoulder point except in special cases.
8. On Primary and Interstate highways where plastic material is permitted for use in roadway fill, the material may be placed above the existing water level (at the time of Construction) to within 4' of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the Project rather than full depth for short distances.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

EXCAVATION, EMBANKMENT & GRADING

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved 7/7/75

Revision No.	Sheet No.	Index No.
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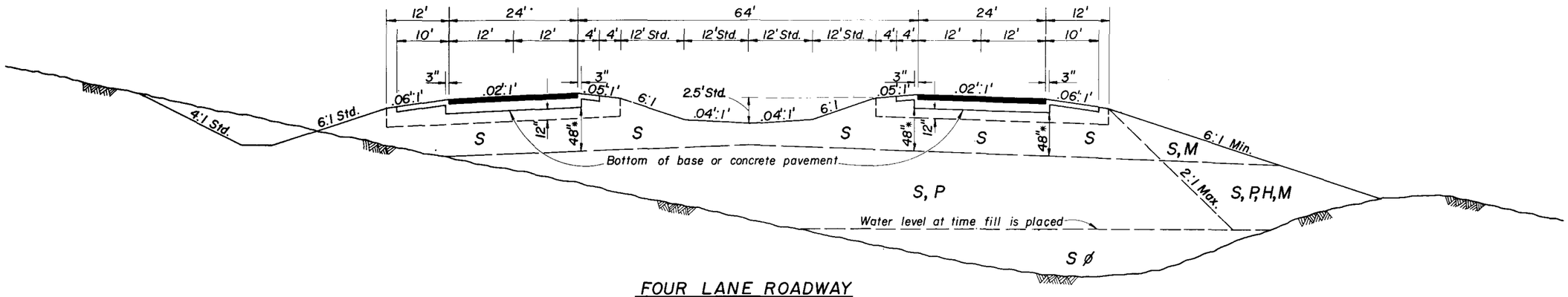
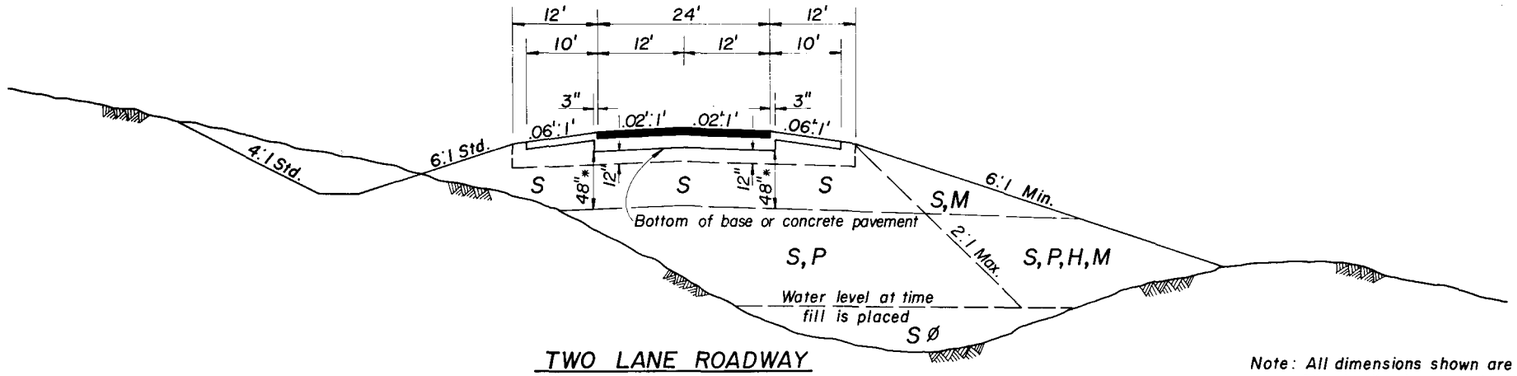


FOUR LANE ROADWAY



TWO LANE ROADWAY

Note: All dimensions shown are standard. The details shown on this Index drawing do not supersede the details shown on Index 500.

* When otherwise shown on plans this dimension may be reduced to 24".

SYMBOL	SOIL	CLASSIFICATION (AASHTO M-145)
S	Select	A-1, A-3, A-2-4
P	Plastic	A-2-5, A-3, A-2-7, A-4, A-5, A-6, A-7 (All with LL 50)
H	High Plastic	A-5 or A-7 (both with LL 50)
M	Muck	A-8

Symbols listed Left to Right in order of preference.

ø Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and therefor should be used in the embankment above water level existing at time of construction.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

EMBANKMENT UTILIZATION

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved: 4/23/74

Revision No.	Sheet No.	Index No.
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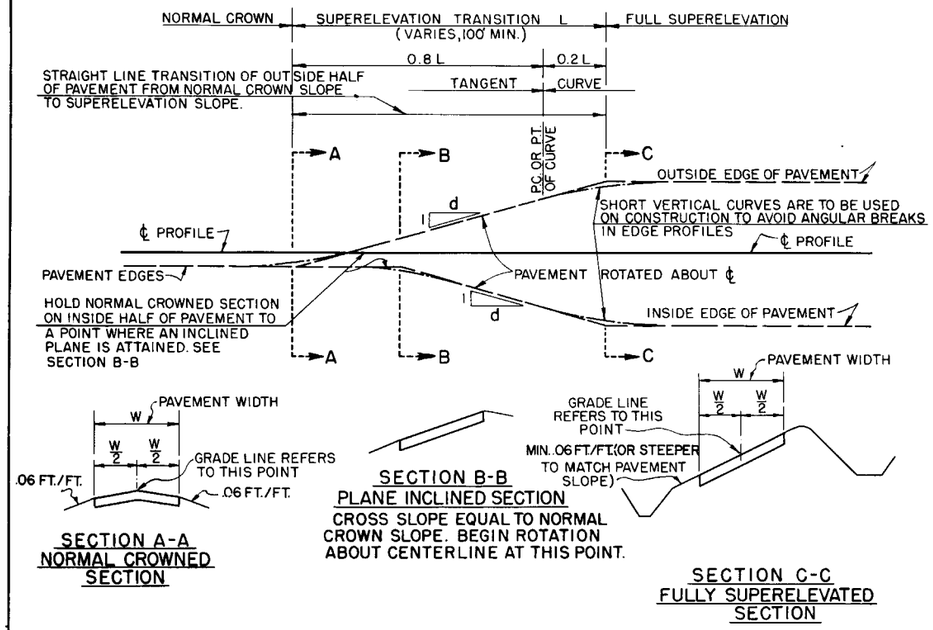
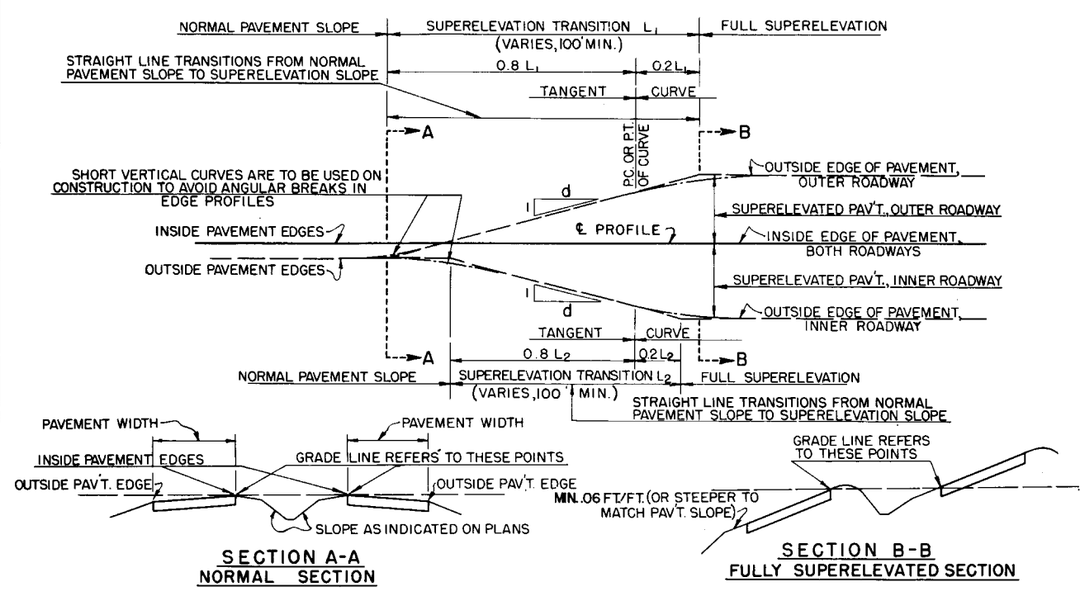


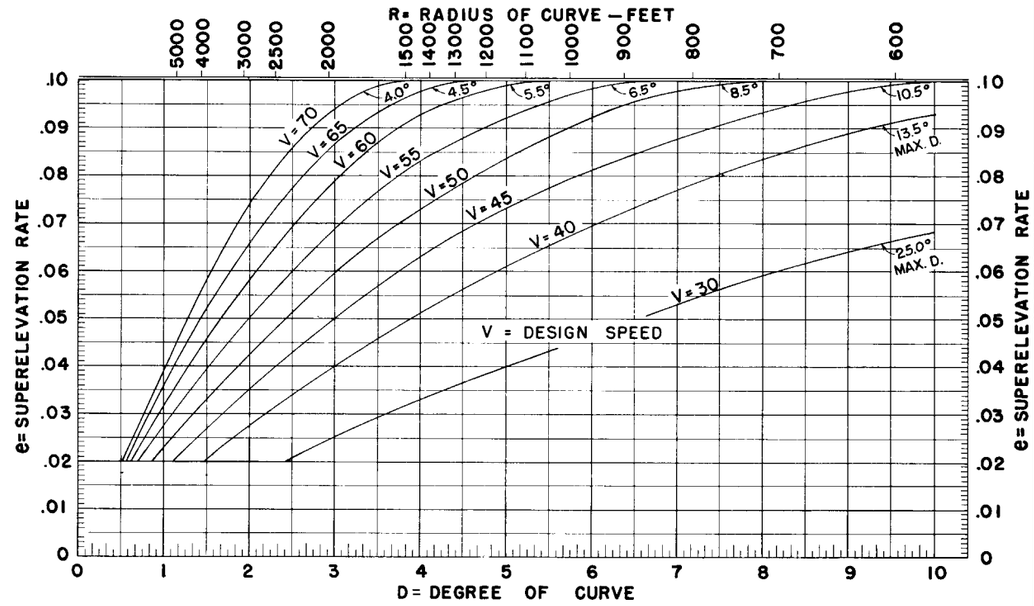
2-LANE OR 4-LANE PAVEMENT, NO MEDIAN



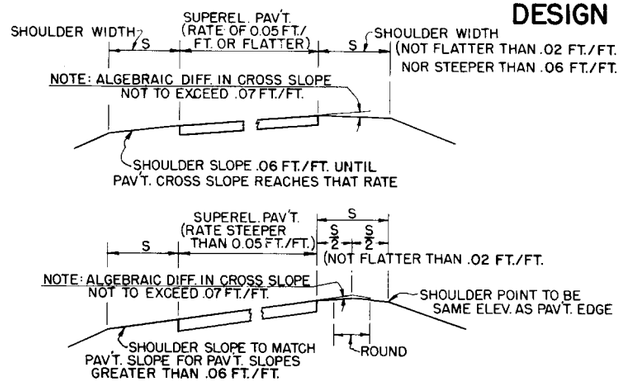
4-LANE PAVEMENT WITH MEDIAN

DETAIL OF TRANSITION FROM NORMAL CROWNED SECTION TO SUPERELEVATED SECTION

THESE TRANSITION DETAILS ARE TO APPLY IN ALL CASES, EXCEPT AT CURVES OF INSUFFICIENT LENGTH, INSUFFICIENT TANGENT LENGTH BETWEEN CURVES, P.C.C.'S OR P.R.C.'S, IN WHICH CASE THE DETAILS OF THE TRANSITIONS ARE TO BE INCLUDED IN THE DETAIL PLANS.



DESIGN SUPERELEVATION RATES $e_{MAX.} = 0.10$



DETAILS OF SHOULDER CONSTRUCTION WITH SUPERELEVATION

NOTES

SHOULDER ON HIGH SIDE A SHOULDER SLOPE OF .06 FT./FT. DOWNWARD FROM THE EDGE OF PAVEMENT WILL BE MAINTAINED UNTIL A 0.07 FT./FT. BREAK IN SLOPE AT THE PAVEMENT EDGE IS REACHED DUE TO SUPERELEVATION OF THE PAVEMENT. AS THE PAVEMENT SUPERELEVATION INCREASES, THE 0.07 FT./FT. BREAK IN SLOPE WILL BE MAINTAINED AND THE SHOULDER FLATTENED UNTIL THE SHOULDER SLOPE REACHES THE MINIMUM OF .02 FT./FT. DOWNWARD FROM THE EDGE OF PAVEMENT. ANY FURTHER INCREASE IN PAVEMENT SUPERELEVATION WILL NECESSITATE SLOPING THE INSIDE HALF OF THE SHOULDER TOWARD THE PAVEMENT AND THE OUTER HALF OUTWARD, BOTH AT .02 FT./FT.
THESE SLOPES WILL BE HELD WITH FURTHER INCREASE IN PAVEMENT SUPERELEVATION UNTIL THE MAXIMUM BREAK OF 0.07 FT./FT. AT THE PAVEMENT EDGE IS AGAIN REACHED. THIS MAXIMUM BREAK WILL THEN BE HELD AND SHOULDER SLOPES STEEPENED WITH ADDITIONAL SUPERELEVATION.

SHOULDER ON LOW SIDE MAINTAIN .06 FT./FT. DROP ACROSS INSIDE SHOULDER UNTIL PAVEMENT CROSS SLOPE REACHES .06 FT./FT. FOR PAVEMENT CROSS SLOPES GREATER THAN .06 FT./FT., SHOULDER TO HAVE SAME SLOPE AS PAVEMENT.

THESE DETAILS APPLY TO BOTH PAVED AND GRASSED SHOULDERS.

GENERAL NOTES FOR SUPERELEVATION

1. USE NORMAL SECTION WITH NO SUPERELEVATION FOR CURVES UP TO 0°-20' (0°-14' FOR DESIGN SPEEDS OF 70 MPH).
2. WHEN THE DEGREE OF CURVE IS 0°-21' OR GREATER (0°-15' FOR DESIGN SPEEDS OF 70 MPH) AND IS IN THE RANGE OF THE HORIZONTAL PORTION OF THE CURVE, SUPERELEVATE AT THE NORMAL CROSS SLOPE RATE OF .02 FT./FT. OR AS INDICATED BY THE CURVE FOR THE APPROVED DESIGN SPEED.
3. THE LENGTH OF SUPERELEVATION TRANSITION IS TO BE DETERMINED BY USING A RELATIVE SLOPE OF PAVEMENT EDGE TO PROFILE GRADE GIVEN IN THE TABLE BELOW, EXCEPT THAT THE MINIMUM LENGTH OF TRANSITION SHALL BE 100 FT.
4. FOR CURVES IN MUNICIPAL AREAS, SEE INDEX NO. 511.

SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS				
DESIGN SPEED, M.P.H.	45-50	55-60	65-70	
1 : d	1:200	1:225	1:250	2 Lane & 4 Lane
	1:160	1:180	1:200	6 Lane
	1:150	1:170	1:190	8 Lane

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPERELEVATION

	Names	Dates
Designed by		
Drawn by	H F W	5/65
Checked by	L M F	10/74
F.H.W.A. Approved:		7/7/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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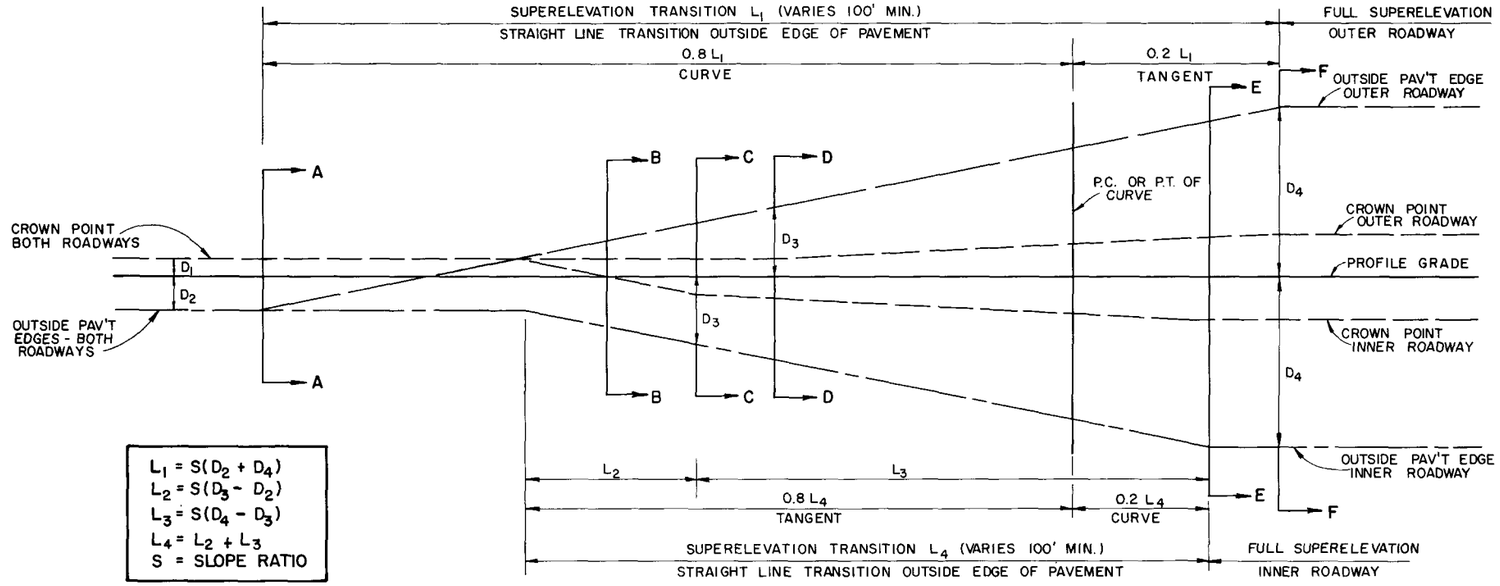
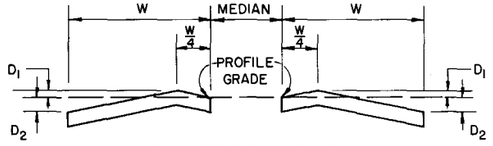
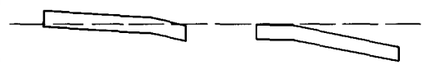




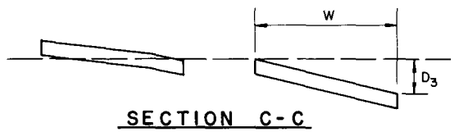
SECTION A-A

NORMAL CROWNED SECTION



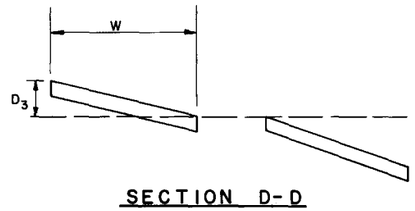
SECTION B-B

SUPERELEVATION SECTION LT. & RT.



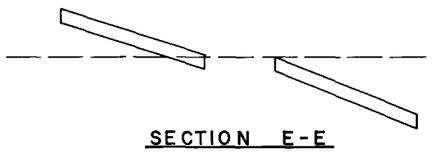
SECTION C-C

SUPERELEVATION SECTION LT.
PLANE INCLINED SECTION RT.



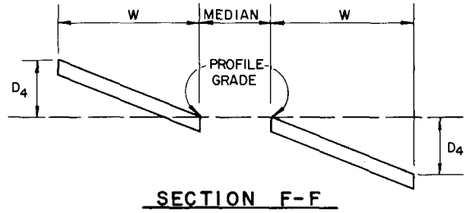
SECTION D-D

PLANE INCLINED SECTION LT.
SUPERELEVATION TRANSITION RT.



SECTION E-E

SUPERELEVATION TRANSITION LT.
FULL SUPERELEVATION RT.



SECTION F-F

FULL SUPERELEVATION LT. & RT.

SUPERELEVATION DETAILS

8 LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPERELEVATION

	Names	Dates
Designed by	WAL	8/77
Drawn by	LMF	8/77
Checked by	WAL	8/77
F.H.W.A. Approved: 11/2/77		

Approved By
Deputy Design Engineer, Roadways

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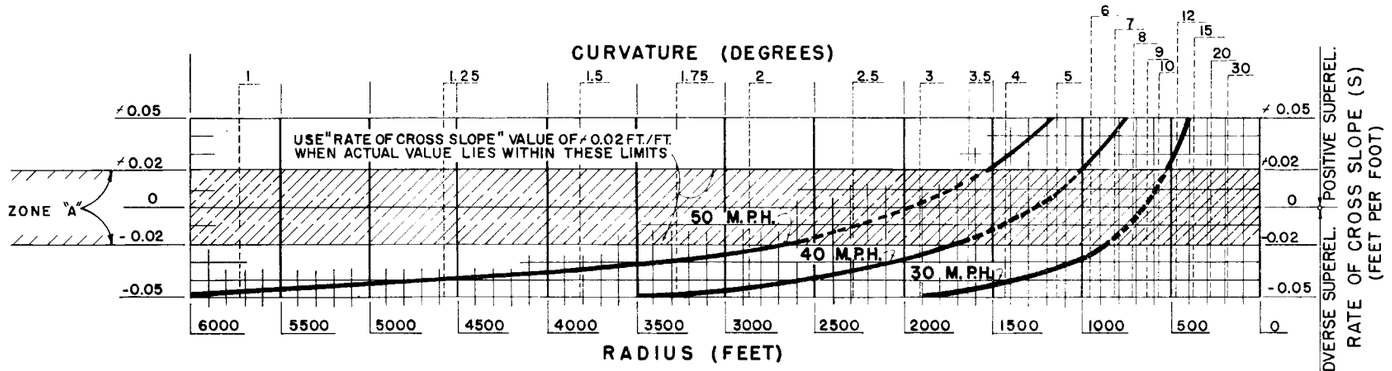
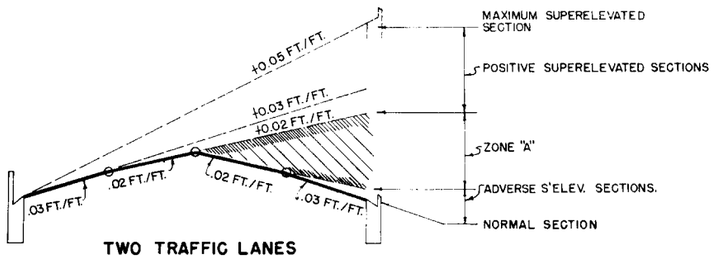


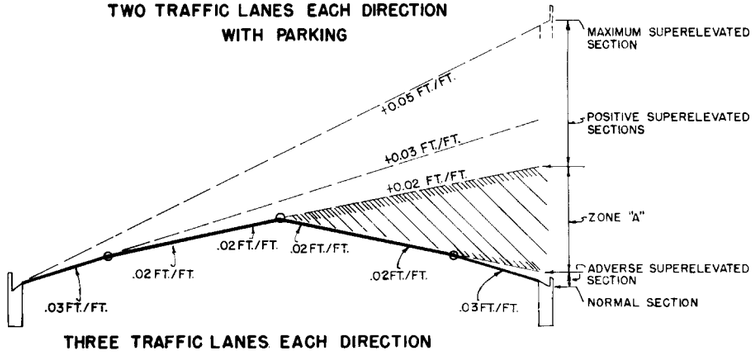
CHART SHOWING REMOVAL OF CROWN AND OR SUPERELEVATON NECESSARY FOR CURVATURE AT VARIOUS DESIGN SPEEDS

NOTE: WHEN THE ACTUAL SUPERELEVATION VALUE LIES WITHIN ZONE "A", USE A POSITIVE RATE OF .02 FT./FT. THE SUPERELEVATION RATES SHOWN ABOVE ARE TO BE USED FOR URBAN (CURB & GUTTER) CONSTRUCTION IN BUILT UP AREAS.

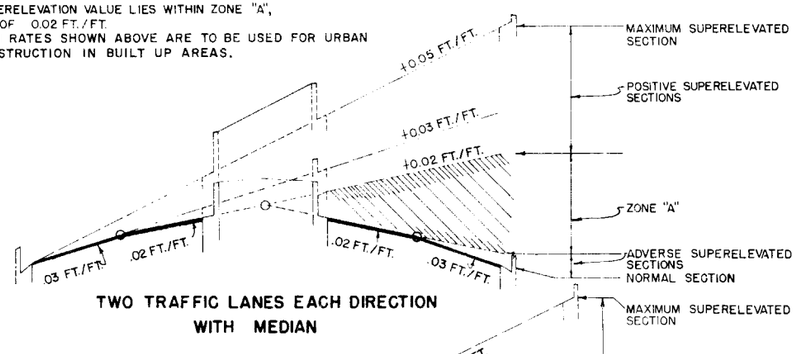


TWO TRAFFIC LANES EACH DIRECTION

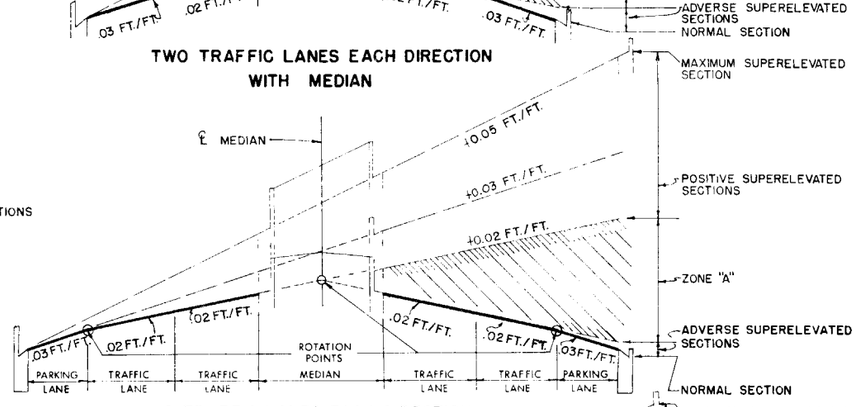
TWO TRAFFIC LANES EACH DIRECTION WITH PARKING



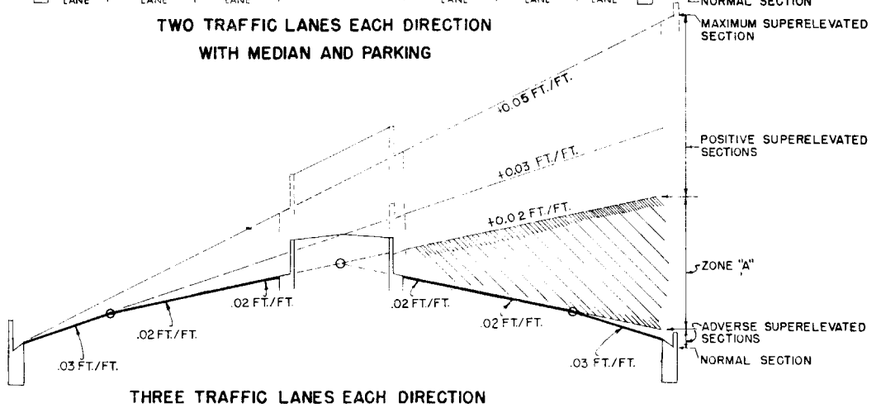
THREE TRAFFIC LANES EACH DIRECTION



TWO TRAFFIC LANES EACH DIRECTION WITH MEDIAN



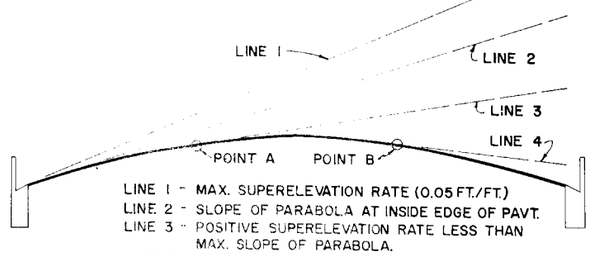
TWO TRAFFIC LANES EACH DIRECTION WITH MEDIAN AND PARKING



THREE TRAFFIC LANES EACH DIRECTION WITH MEDIAN

GENERAL NOTES FOR SUPERELEVATION

1. MAXIMUM RATE OF SUPERELEVATION (IN MUNICIPAL CONSTRUCTION) SHALL BE 0.05 FT./FT.
2. SUPERELEVATION SHALL BE OBTAINED BY ROTATING THE PLANE SUCCESSIVELY ABOUT THE BREAK POINTS OF THE SECTION UNTIL THE PLANE HAS ATTAINED A SLOPE EQUAL TO THAT REQUIRED BY THE CHART. SHOULD THE ROTATION TRAVERSE THE ENTIRE SECTION AND FURTHER SUPERELEVATION BE REQUIRED, THE REMAINING ROTATION OF THE PLANE SHALL BE ABOUT THE LOW EDGE OF THE INSIDE TRAVEL LANE.
   ADVERSE SUPERELEVATION OF SECTIONS WITH PARKING LANES. NO SUPERELEVATION WILL BE REQUIRED WHEN THE MAXIMUM ADVERSE SUPERELEVATION RATE IS GREATER THAN THE NORMAL SLOPE OF THE TRAFFIC LANE ADJACENT TO THE PARKING LANE.
3. WHEN POSITIVE SUPERELEVATION IS REQUIRED, THE SLOPE OF THE GUTTER ON THE HIGH SIDE SHALL BE A CONTINUATION OF THE SLOPE OF THE SUPERELEVATED PAVEMENT.
4. IN CONSTRUCTION, SHORT VERTICAL CURVES SHALL BE PLACED AT ALL ANGULAR PROFILE BREAKS WITHIN THE LIMITS OF THE SUPERELEVATION TRANSITION.
5. MINIMUM GUTTER GRADES WITHIN THE LIMITS OF THE SUPERELEVATION TRANSITION SHALL BE 0.2%.
6. THE VARIABLE SUPERELEVATION TRANSITION LENGTH "L" SHALL HAVE A MINIMUM VALUE OF 50 FEET FOR DESIGN SPEEDS UNDER 40 M.P.H. AND 75 FEET FOR DESIGN SPEEDS OF 40 M.P.H. OR GREATER.
7. MUNICIPAL SECTIONS HAVING LANE ARRANGEMENTS DIFFERENT FROM THOSE SHOWN, BUT COMPOSED OF A SERIES OF PLANES, SHALL BE SUPERELEVATED IN A SIMILAR MANNER.
8. FOR CURVES IN RURAL AREAS, SEE INDEX NO. 510.



LINE 1 - MAX. SUPERELEVATION RATE (0.05 FT./FT.)
LINE 2 - SLOPE OF PARABOLA AT INSIDE EDGE OF PAVT.
LINE 3 - POSITIVE SUPERELEVATION RATE LESS THAN MAX. SLOPE OF PARABOLA.
LINE 4 - ADVERSE SUPERELEVATION.

VALUES OBTAINED FROM THE CHART ARE ALSO APPLICABLE TO A PARABOLIC CROWN SECTION. WHEN THIS TYPE SECTION IS USED, SUPERELEVATION IS ESTABLISHED BY ROTATING A TANGENT ABOUT THE ARC OF THE PARABOLIC CROWN UNTIL THE DESIRED SLOPE IS ATTAINED (POINTS A & B ON SKETCH). THE NORMAL PARABOLIC CROWN WILL BE MAINTAINED OUTSIDE THE LIMITS OF THE PLANE THUS FORMED.

SUPERELEVATION OF PARABOLIC SECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPERELEVATION
MUNICIPAL CONSTRUCTION

	Name	Date
Designed by	W.L.B.	2/66
Drawn by	C.D.R.	1/67
Checked by	W.L.B.	1/67
F.H.W.A. Approved		5/20/77

Approved By
Deputy Design Engineer, Roadways

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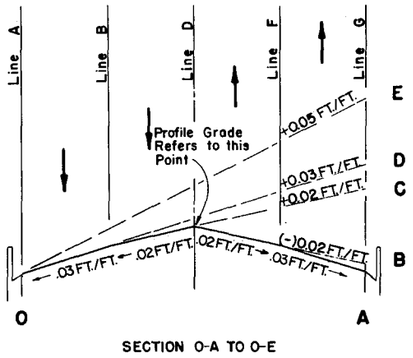
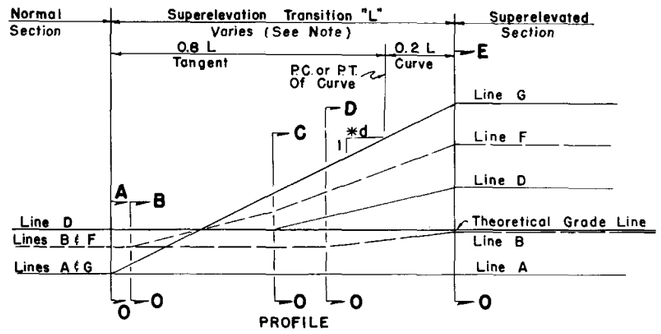


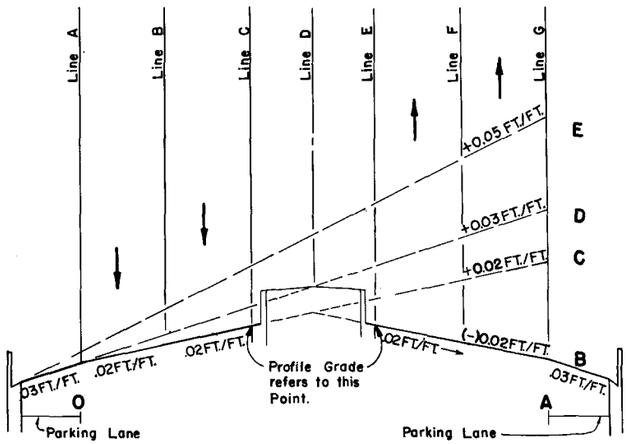
SECTION O-A TO O-E



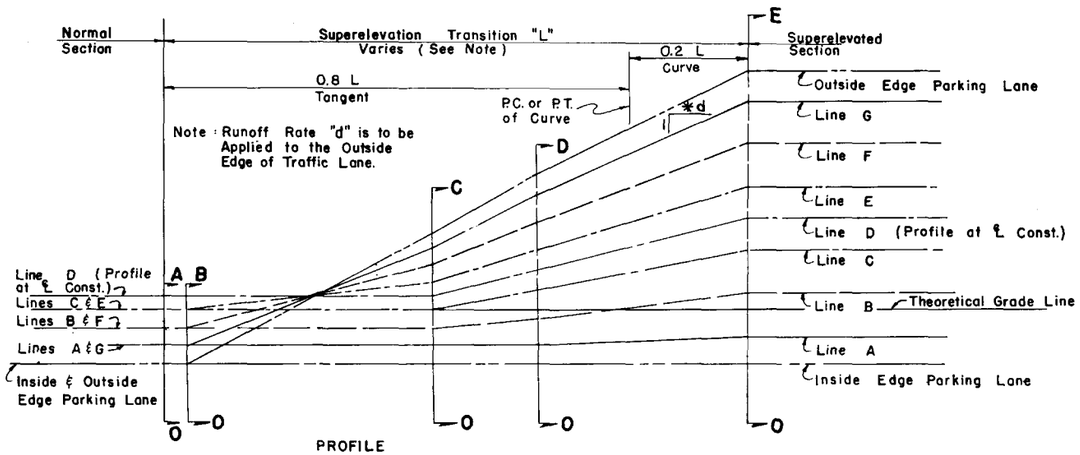
PROFILE

LINE	DESCRIPTION
A	INSIDE TRAFFIC LANE
B	INSIDE LANE LINE
C	INSIDE MEDIAN EDGE PAVEMENT
D	℄ CONSTRUCTION
E	OUTSIDE MEDIAN EDGE PAVEMENT
F	OUTSIDE LANE LINE
G	OUTSIDE TRAFFIC LANE

DETAIL OF SUPERELEVATION TRANSITION FOR TWO TRAFFIC LANES EACH DIRECTION



SECTION O-A TO O-E



PROFILE

*d (SLOPE RATIO)	
30 MPH	1 : 100
40 MPH	1 : 125
50 MPH	1 : 150

DETAIL OF SUPERELEVATION TRANSITION FOR TWO TRAFFIC LANES EACH DIRECTION WITH MEDIAN AND PARKING

D	R	V=30mph e	V=40mph e	V=50mph e
0° 15'	22918'	NC	NC	NC
0° 30'	11459'	NC	NC	NC
0° 45'	7639'	NC	NC	RC
1° 00'	5730'	NC	RC	RC
1° 30'	3820'	RC	RC	.024
2° 00'	2865'	RC	.022	.028
2° 30'	2292'	RC	.026	.031
3° 00'	1910'	.020	.029	.033
3° 30'	1637'	.023	.032	.036
4° 00'	1432'	.025	.033	.038
5° 00'	1146'	.028	.036	.043
6° 00'	955'	.031	.039	.047
7° 00'	819'	.032	.041	
8° 00'	716'	.034	.044	
9° 00'	637'	.035	.046	
10° 00'	573'	.037	.048	
11° 00'	521'	.038		
12° 00'	477'	.039		
13° 00'	441'	.040		
14° 00'	409'	.043		
16° 00'	358'	.045		
18° 00'	318'	.047		
20° 00'	286'	.050		

e Max.=0.05

The superelevation rates shown above are to be used for urban (curb & gutter) arterials in suburban areas where sufficient R/W may be acquired to make suitable connections.

NOTE : THE SECTIONS AND PROFILES SHOWN ON THIS SHEET ARE EXAMPLES OF THE SUPERELEVATION TRANSITIONS. SIMILAR SCHEMES SHOULD BE USED FOR ROADWAYS HAVING DIFFERENT SECTION DESIGNS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPERELEVATION
MUNICIPAL CONSTRUCTION

	Names	Dates
Designed by	WLB	2/66
Drawn by	CDR	1/67
Checked by	RLO	1/67
F.H.W.A.	Approved: 5/20/77	

Approved By
Deputy Design Engineer, Roadways

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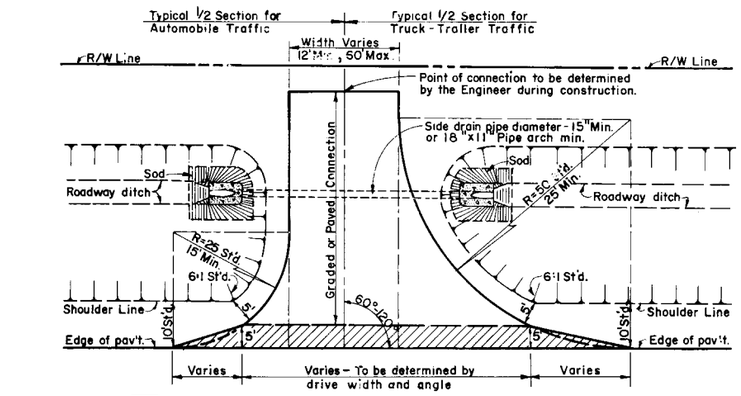
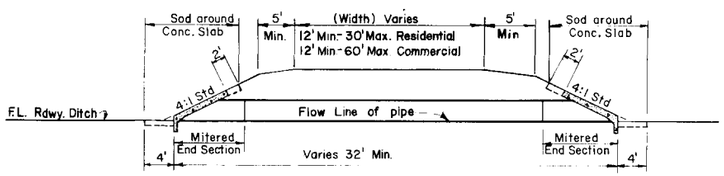
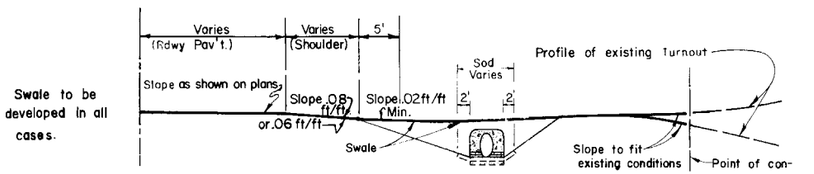


PLAN



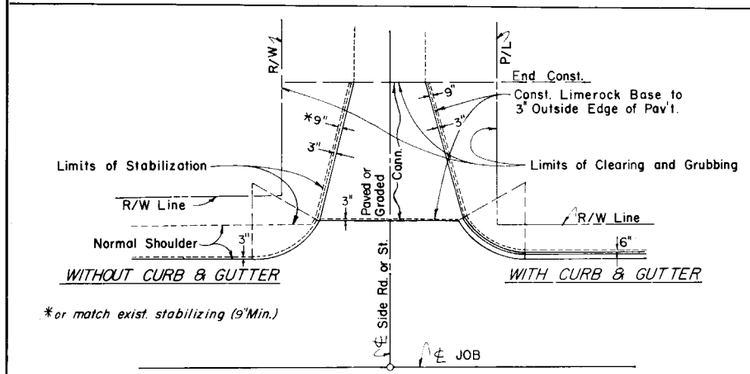
STANDARD SIDE DRAIN

NOTE: For details of Mitered End Section see Index No. 273.

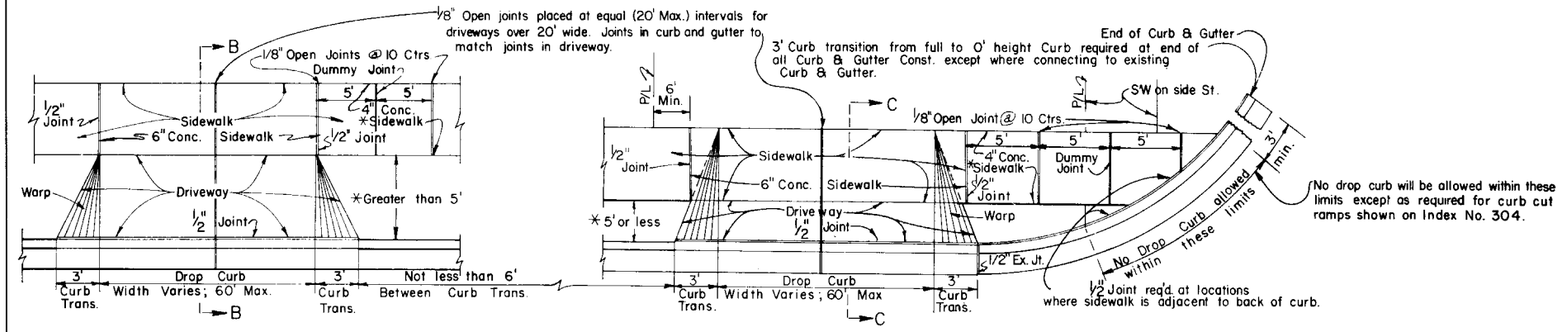


STANDARD PROFILE FOR TURNOUT

DETAILS OF TURNOUT CONSTRUCTION TO PRIVATE PROPERTY AND GRADED ROADS



LIMITS OF CLEARING & GRUBBING AND STABILIZING AT INTERSECTIONS

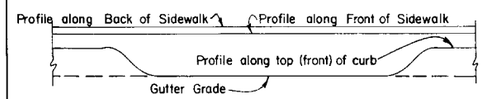


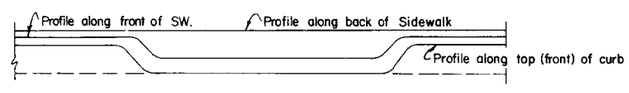
WHEN DISTANCE BETWEEN CURB & SIDEWALK IS GREATER THAN 5'

WHEN DISTANCE BETWEEN CURB & SIDEWALK IS 5' OR LESS

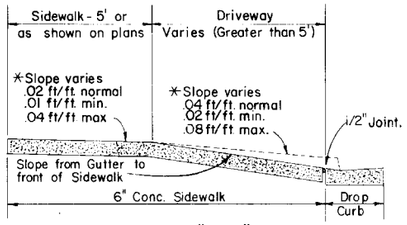
PLAN

NOTE: For Detail of Drop Curb See Index No. 300.

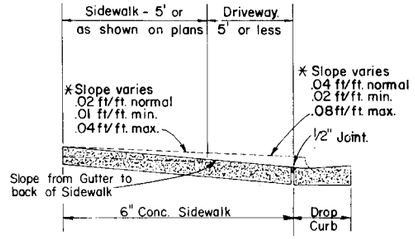




PROFILE



SECTION "B-B"



SECTION "C-C"

DETAIL OF SIDEWALK AND PAVED DRIVEWAY CONSTRUCTION

* Slopes can be adjusted within the ranges shown to improve ties to adjacent property and are to be transitioned to avoid distortion in sidewalk continuity.

GENERAL NOTES

1. No driveways, turnouts, or side drains are to be constructed without compensation for materials from the owner except for replacement of driveways, turnouts, and/or side drains existing at the time of beginning of const. of the project and if desired by the owner. All new or reconstructed driveways, turnouts, and side drains must conform to the size limits indicated above.
2. In a rural section where the abutting property owner desires installation of turnouts, the Department will construct or will allow the construction of a maximum of two 60' turnouts, to any business establishment or parcel of property, with a minimum of 25' of space between them.
3. In urban areas, at the request of the abutting property owner or his assignee, and to the extent that there is sufficient property, the Department will construct or will allow the construction of up to two entrances (drop curbs) of sixty feet each, maximum, separated by a minimum of six feet of curbing, but curbing shall be required around all corners.
4. In both urban and rural areas, wherever dual driveways are allowed, that portion of the Right-of-Way between the drives and outside the pavement limits of the highway shall be maintained as a "No-Parking-Area" and shall be suitably outlined by such fences, hedges, curbs, or other obstructions as are safe and effective.

GENERAL STABILIZING NOTES

1. No Stabilizing will be required for Paved Turnouts to Private Property.
2. Stable Material may be required for Unpaved Turnouts to Private Property as directed by the Engineer in accordance with Section 102-6 of the Standard Specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TURNOUTS

	Names	Dates
Designed by		
Drawn by		
Checked by		

Approved By: Deputy Design Engineer, Roadways

F.H.W.A. Approved: 12/6/76

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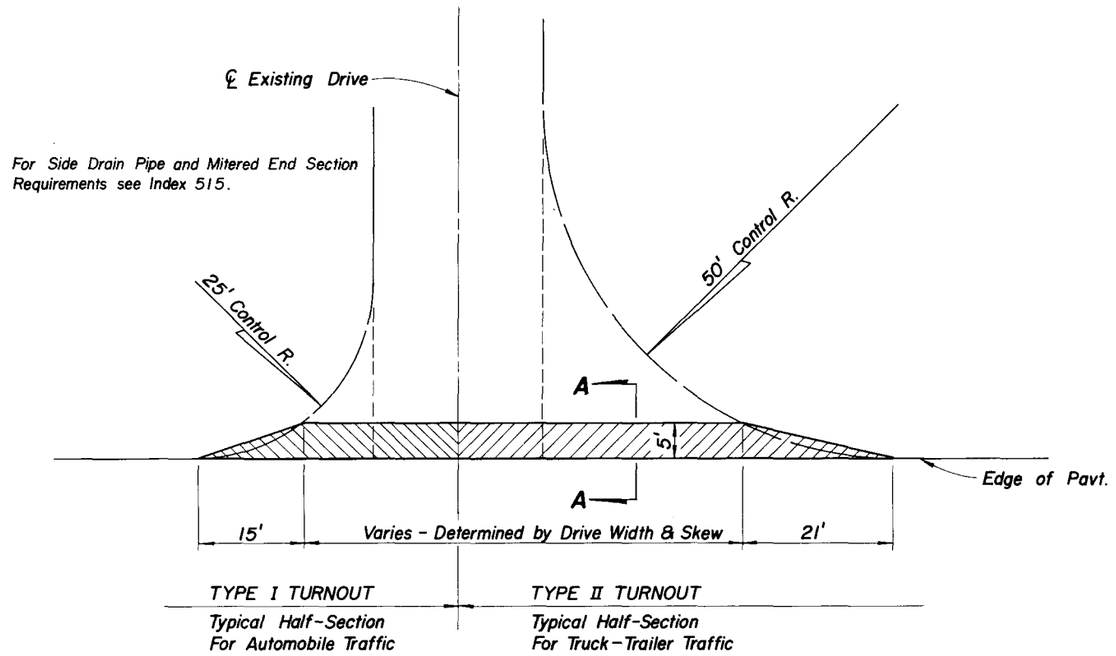
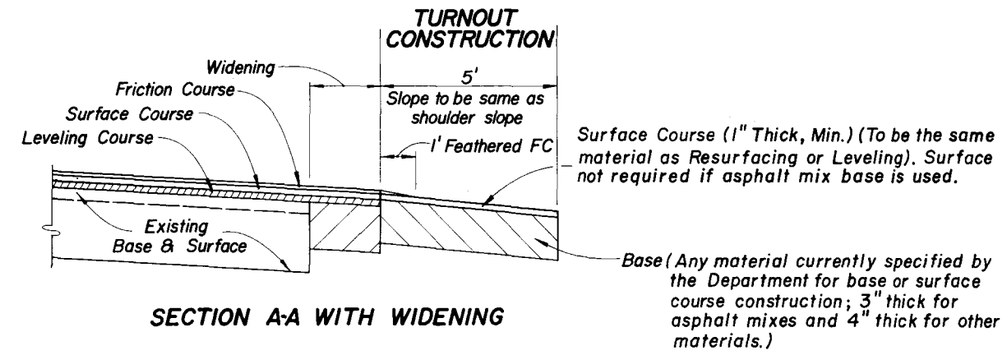
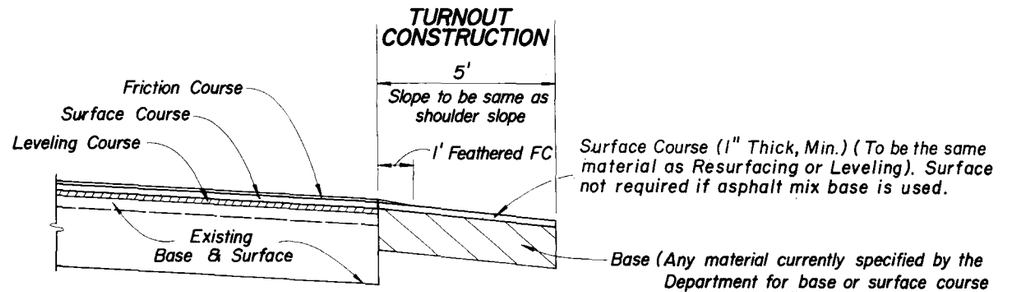


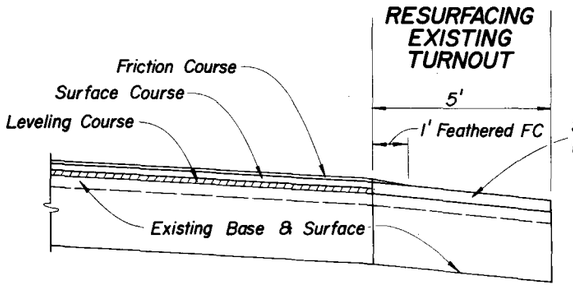


SECTION A-A WITH WIDENING



SECTION A-A

QUANTITIES FOR ONE TURNOUT (Sq.Yd.)				
Drive Width (Ft.)	Intersection			
	Normal		Skewed	
	Type I	Type II	Type I	Type II
12	26	51	31	60
14	27	52	33	61
16	28	53	34	63
18	29	54	35	64
20	31	55	37	65
22	32	56	38	67
24	33	57	39	68
26	34	58	40	69
28	35	59	42	70
30	36	61	43	72
32	37	62	44	73
34	38	63	46	74
36	39	64	47	76
38	41	65	48	77
40	42	66	49	78
42	43	67	51	79
44	44	68	52	81
46	45	69	53	82
48	46	71	55	83
50	47	72	56	85
52	48	73	57	86
54	49	74	58	87
56	51	75	60	88
58	52	76	61	90
60	53	77	62	91



SECTION A-A

GENERAL NOTES

1. Turnouts are to be constructed or resurfaced at locations as directed by the Engineer.
2. Turnout construction not required with paved shoulders.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation and base.
5. Payment for surface course to be included in roadway resurfacing pay item.
6. Payment for feathering friction course to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC-2 & FC-3 friction courses.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TURNOUTS
RESURFACING PROJECTS

	Names	Dates
Designed by	DCB	11/77
Drawn by	HKH	11/77
Checked by	JVG	11/77
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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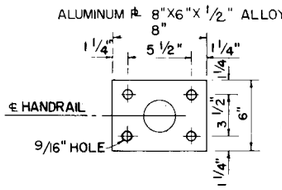
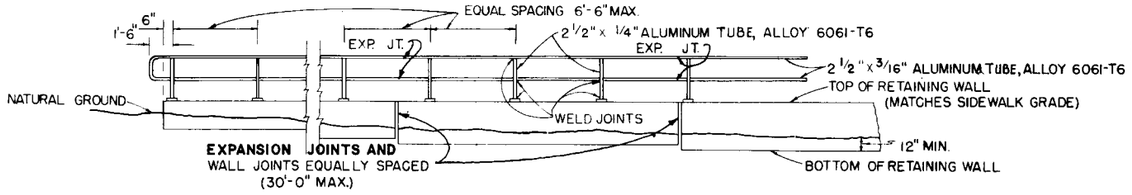
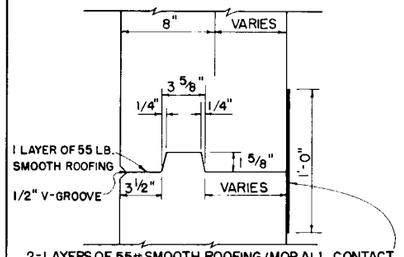


BASE PLATE



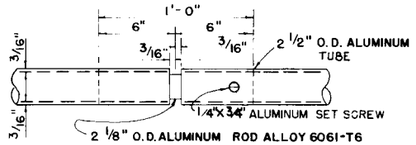
HANDRAIL ELEVATION



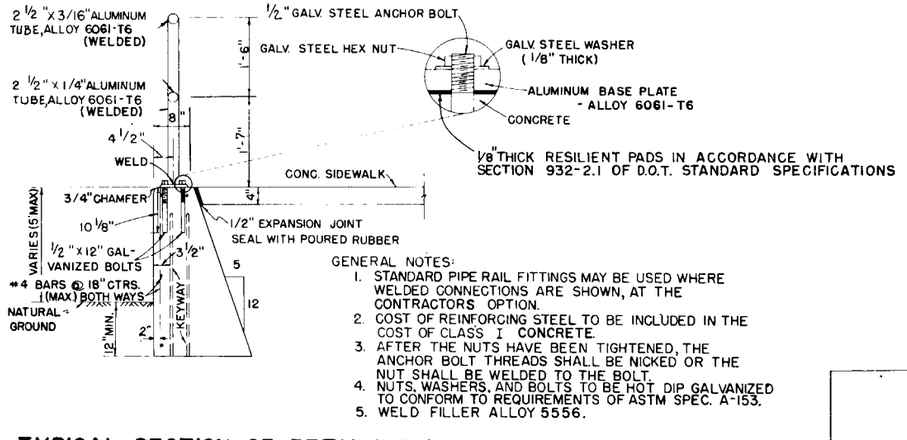
2-LAYERS OF 55# SMOOTH ROOFING (MOP ALL CONTACT SURFACES OF CONCRETE AND ROOFING WITH CUT-BACK ASPHALT. STOP ROOFING PAPER 6" BELOW TOP OF WALL.)

KEYWAY DETAIL

ALL WALL JOINTS TO BE EQUALLY SPACED WITH 30'-0" MAX. CENTERS. KEYWAY TO STOP 6" BELOW TOP OF WALL.



DETAIL OF EXPANSION JOINT FOR PIPE HANDRAIL

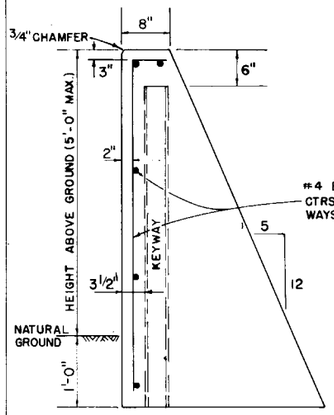


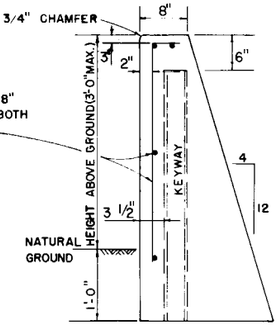
TYPICAL SECTION OF RETAINING WALL WITH PIPE HANDRAIL

GENERAL NOTES:

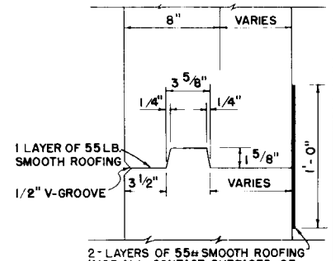
1. STANDARD PIPE RAIL FITTINGS MAY BE USED WHERE WELDED CONNECTIONS ARE SHOWN, AT THE CONTRACTORS OPTION.
2. COST OF REINFORCING STEEL TO BE INCLUDED IN THE COST OF CLASS I CONCRETE.
3. AFTER THE NUTS HAVE BEEN TIGHTENED, THE ANCHOR BOLT THREADS SHALL BE NICKED OR THE NUT SHALL BE WELDED TO THE BOLT.
4. NUTS, WASHERS, AND BOLTS TO BE HOT DIP GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM SPEC. A-153.
5. WELD FILLER ALLOY 5556.

DETAIL OF ALUMINUM PIPE HANDRAIL ON GRAVITY WALL





DETAIL OF GRAVITY WALL



2-LAYERS OF 55# SMOOTH ROOFING (MOP ALL CONTACT SURFACES OF CONCRETE AND ROOFING WITH CUT-BACK ASPHALT. STOP ROOFING PAPER 6" BELOW TOP OF WALL.

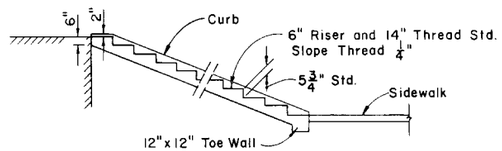
KEYWAY DETAIL

ALL WALL JOINTS TO BE EQUALLY SPACED WITH 30'-0" MAX. CENTERS. KEYWAY TO STOP 6" BELOW TOP OF WALL.

ESTIMATED QUANTITIES FOR WALL		
HEIGHT ABOVE GROUND	CUBIC YARDS CONCRETE	POUNDS STEEL
2'	.13	4
3'	.20	5
4'	.32	6
5'	.43	7

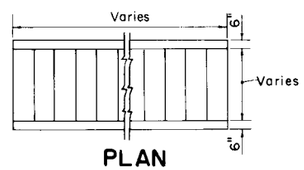
GENERAL NOTES:

1. COST OF REINFORCING STEEL TO BE INCLUDED IN THE COST OF CLASS I CONCRETE.
2. QUANTITIES SHOWN ARE FOR ONE LINEAR FOOT OF WALL.



SECTION

Note: Riser height and thread depth may vary to fit existing conditions as directed by the Engineer.



PLAN

DETAIL OF CONCRETE STEPS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

WALLS, HANDRAILS & STEPS

	Names	Dates
Designed by		
Drawn by	CDR	2/68
Checked by	RHC	2/68
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

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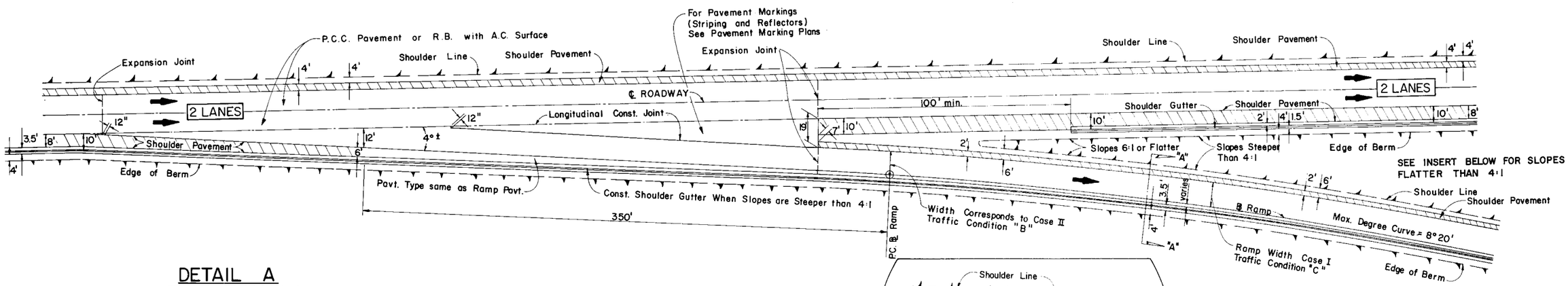
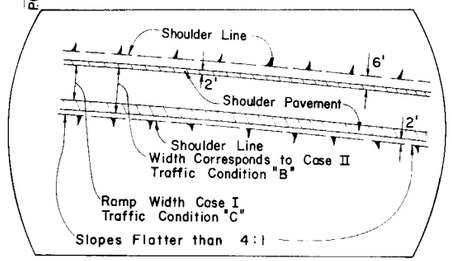
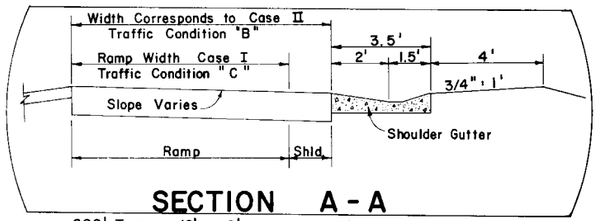
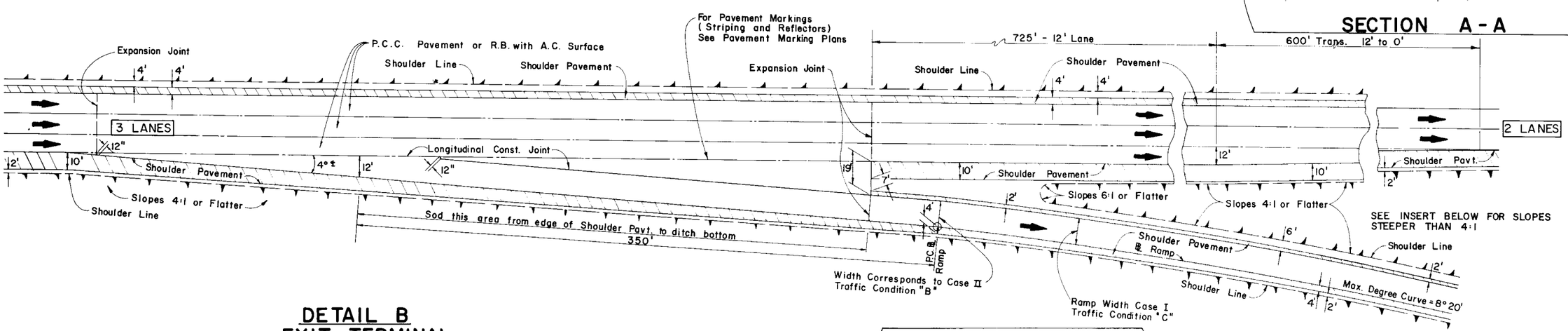


DETAIL A
EXIT TERMINAL
TWO THRU LANES

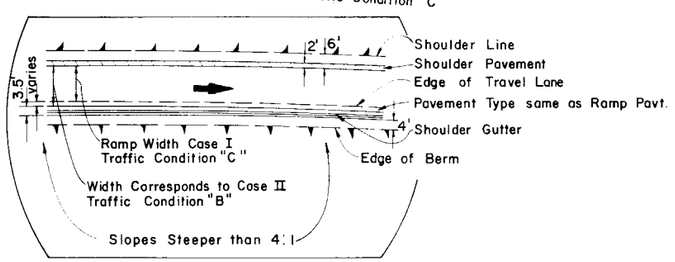




SECTION A-A



DETAIL B
EXIT TERMINAL
TWO THRU LANES
THREE APPROACH LANES



NOTES:
1. FOR GENERAL NOTES SEE SHEET NO. 2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAMP TERMINALS

	Names	Dates
Designed by	EHH	1/65
Drawn by	HFW	1/65
Checked by	RLO	6/67

Approved By
Deputy Design Engineer, Roadways

F.H.W.A. Approved: 7/18/75

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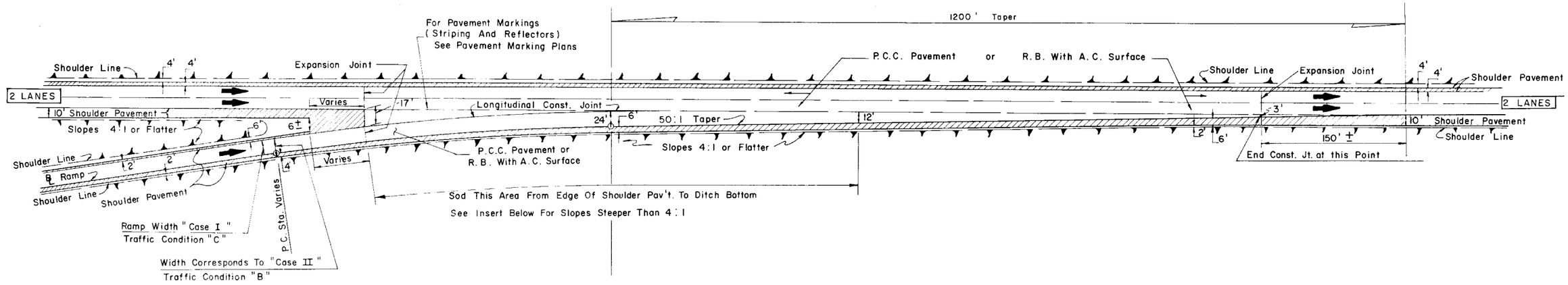
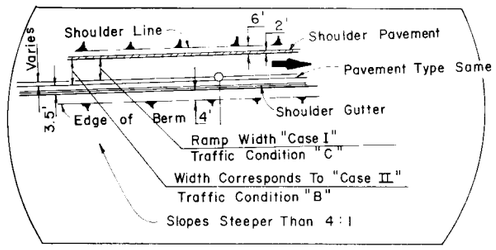
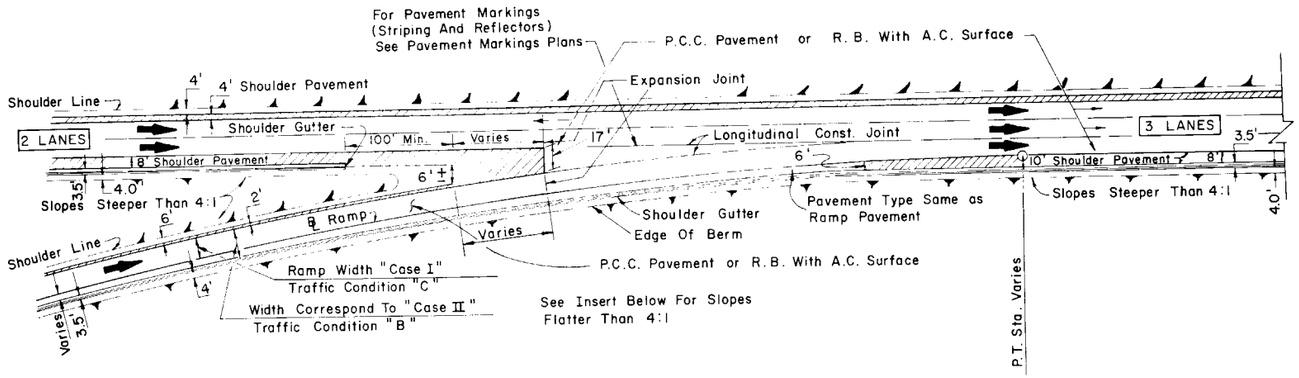
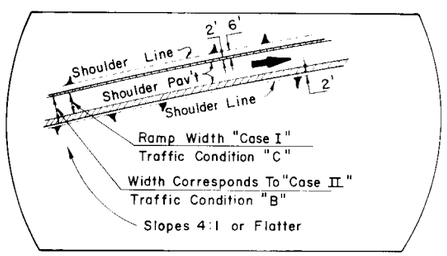




DETAIL C
ENTRANCE TERMINAL
TWO THRU LANES





DETAIL D
ENTRANCE TERMINAL
WITH ADDED LANE

GENERAL NOTES

1. The notes applying to P.C.C. Pavement are not applicable to R. B. A. C. Pavement.

2. (a.) P.C.C. Pavement Projects :
   Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.

   (b.) Flexible Base Projects :
   Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.

3. Exit and Entrance terminals as detailed shall not be used on ramps for which a speed of 50 M. P. H. or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to table J-8 & J-10 (1973 A·A·S·H·O·- Red Book).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAMP TERMINALS

	Names	Dates
Designed by	EHH	1/65
Drawn by	HFW	1/65
Checked by	RLO	6/67
F.H.W.A. Approved:		7/18/75

Approved By
Deputy Design Engineer, Roadways

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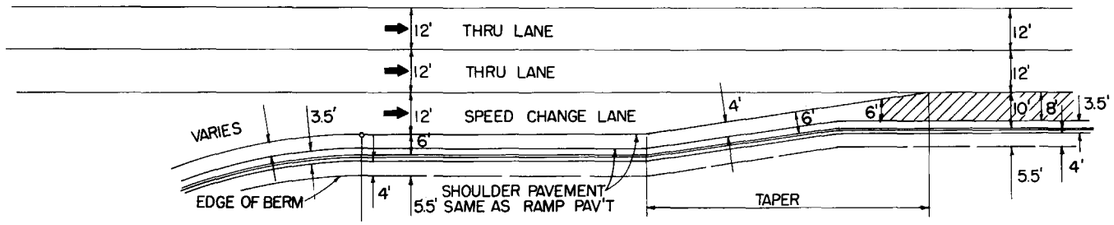
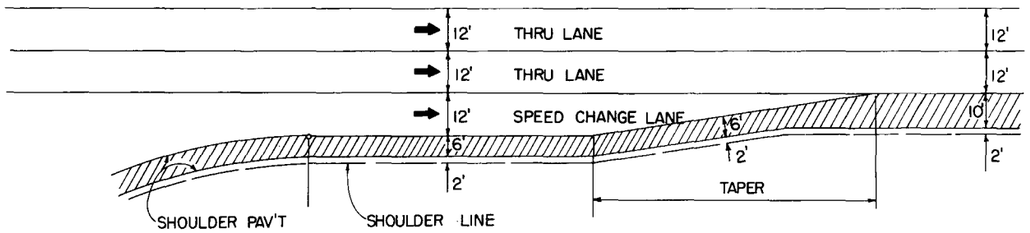
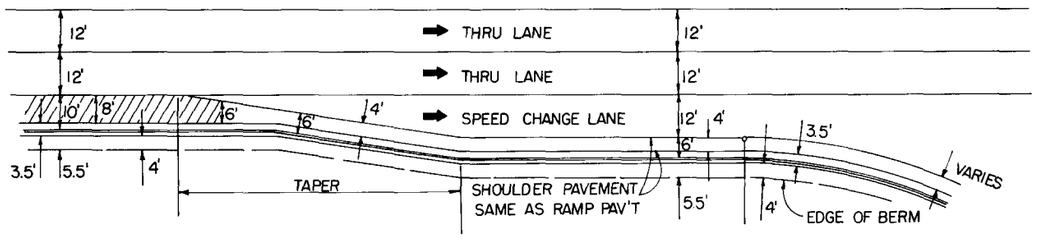
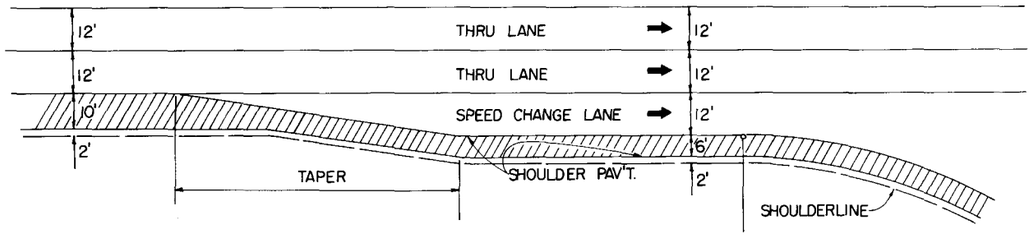






SKETCHES INDICATING SHOULDER TREATMENT AT SPEED CHANGE LANES WITH SHOULDER GUTTER



SKETCHES INDICATING SHOULDER TREATMENT AT SPEED CHANGE LANES WITHOUT SHOULDER GUTTER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAMP TERMINALS

	Names	Dates
Designed by	EHH	1/65
Drawn by	HFW	1/65
Checked by	RLO	6/67
F.H.W.A. Approved:		7/18/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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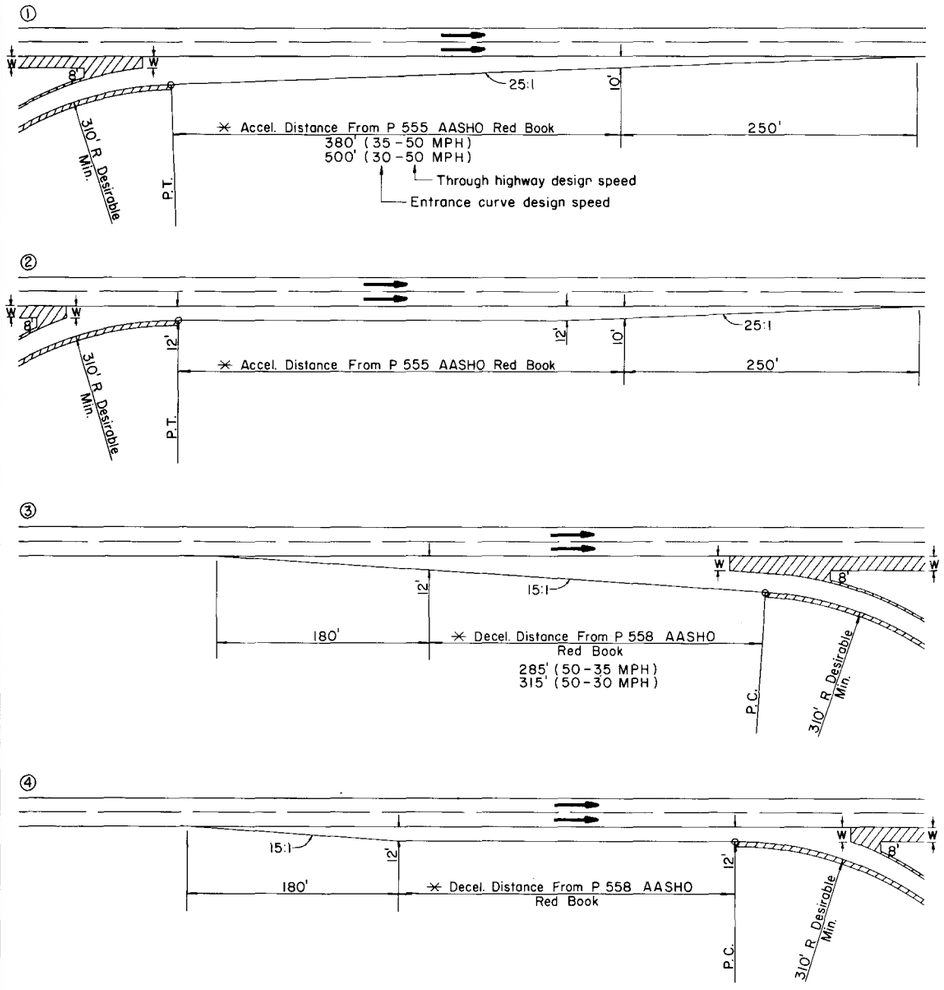
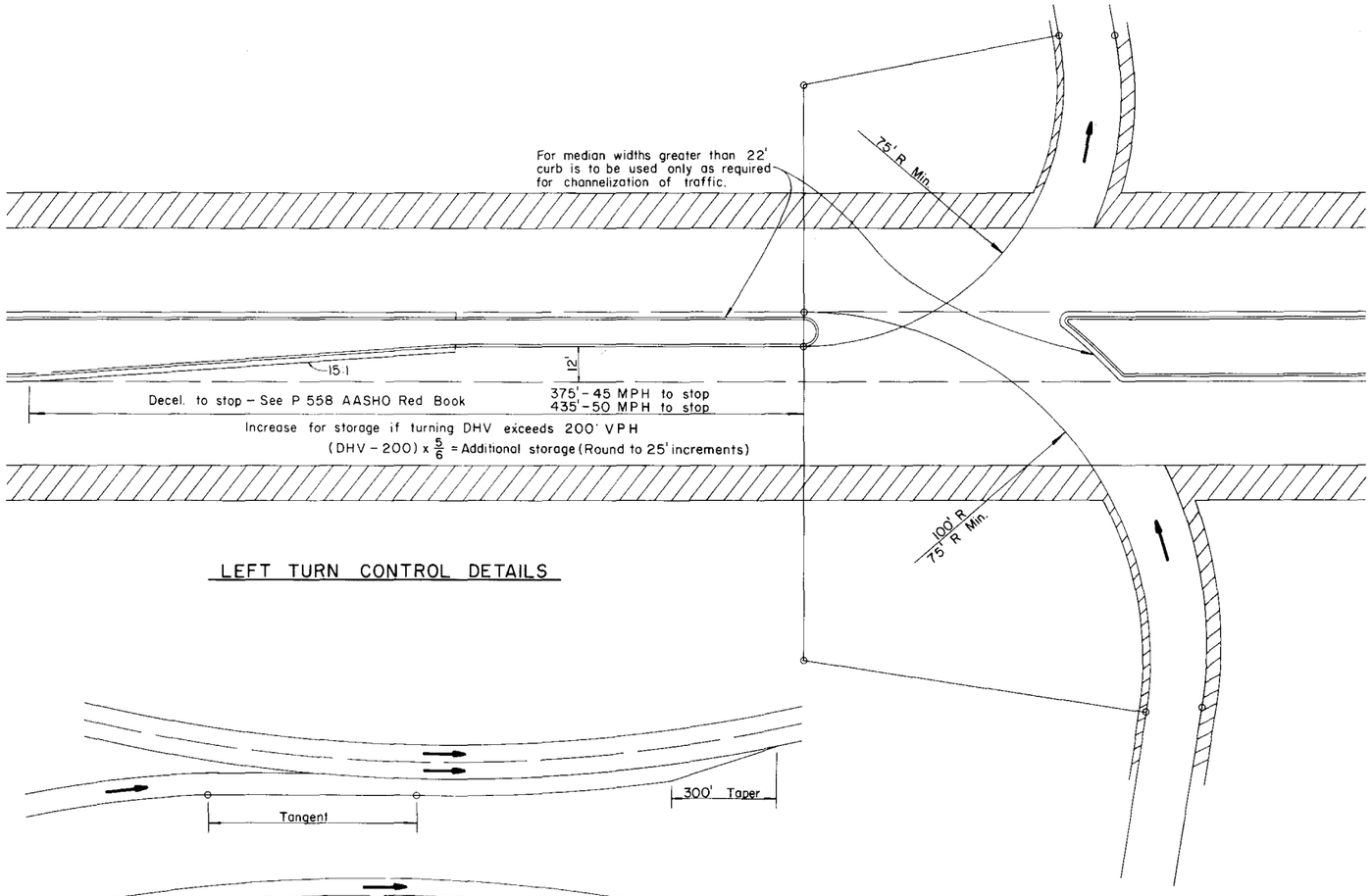


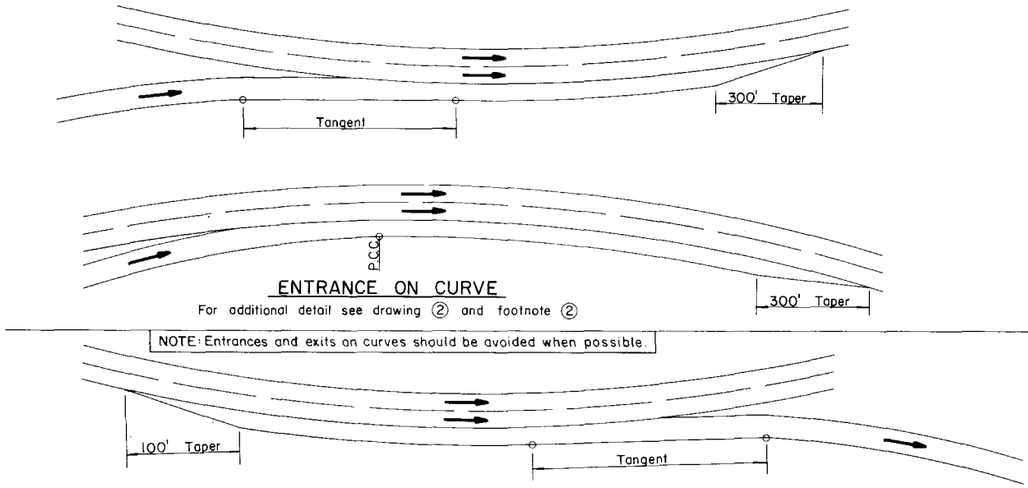
ENTRANCE AND EXIT RAMP TERMINAL DETAILS

To be used along the cross road at all rural type, unsignalized ramp terminals (Interstate and Expressway interchanges).

- W Normal shoulder pavement width
- ✳ Adjust for grades if greater than 2% (See P 556 AASHO Red Book).
- ① Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.
- ② Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.
- ③ Standard cross road exit terminal. To be used when roadway alignment is tangent.
- ④ Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of the thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.



LEFT TURN CONTROL DETAILS



ENTRANCE ON CURVE

For additional detail see drawing ② and footnote ②

EXIT ON CURVE

For additional detail see drawing ④ and footnote ④

The details shown on this sheet apply to the cross road design of rural type, unsignalized interchanges.

The details shown on this sheet apply to Cross Road Ramp Terminals ONLY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAMP TERMINALS

	Names	Dates
Designed by	EHH.	1/65
Drawn by	HFW	1/65
Checked by	RLO	6/67
F.H.W.A. Approved:		7/25/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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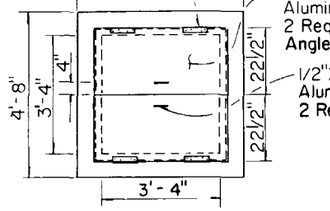
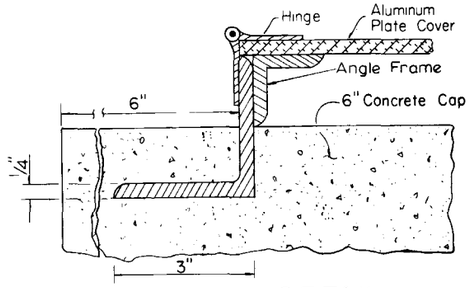
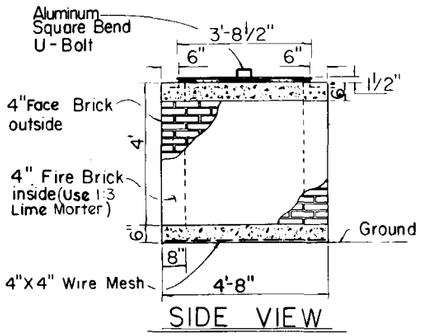


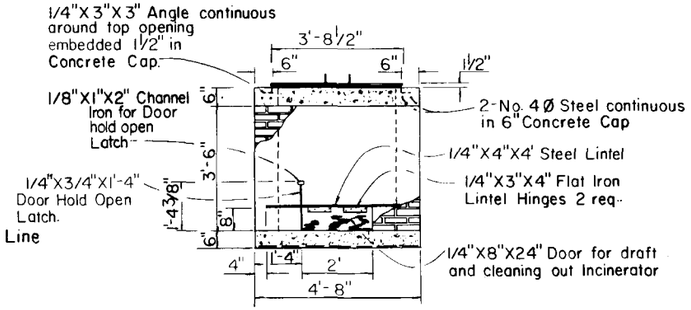
TOP VIEW



DETAIL 1/4"X3"X3"ANGLE

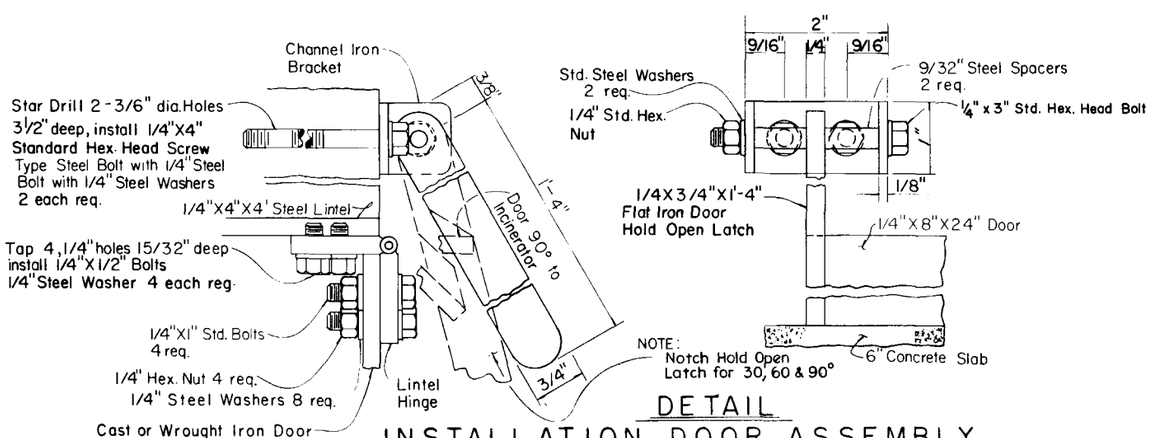


SIDE VIEW

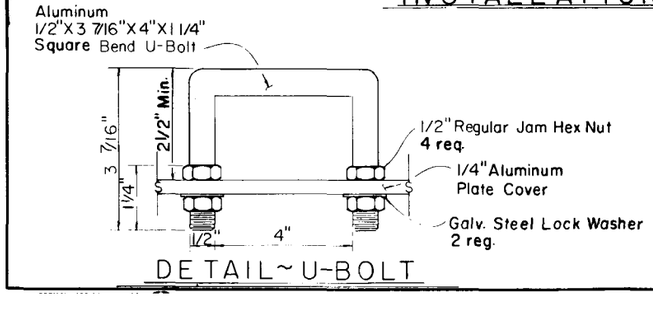


REAR VIEW

DETAIL ~ INCINERATOR

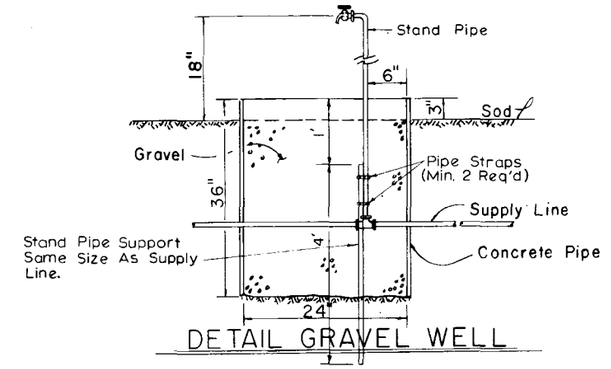


DETAIL
INSTALLATION DOOR ASSEMBLY

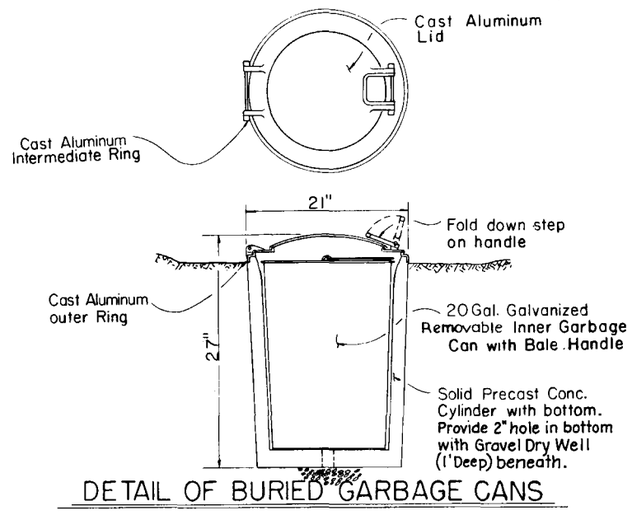


DETAIL~U-BOLT

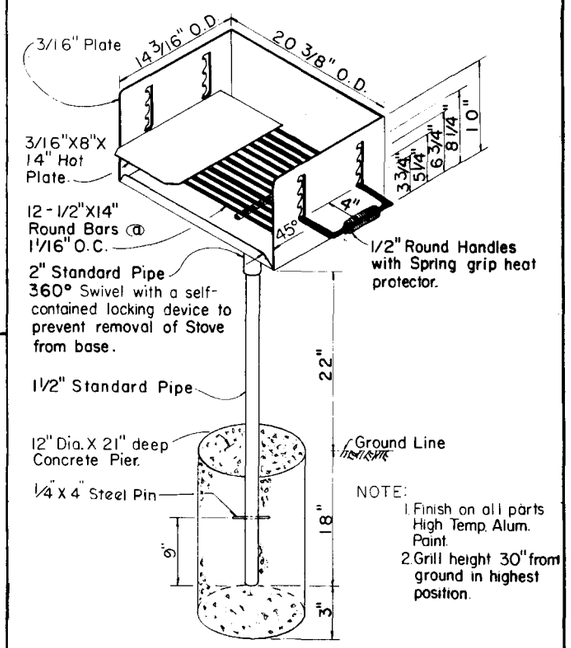
~INCINERATOR~



DETAIL GRAVEL WELL



DETAIL OF BURIED GARBAGE CANS



ADJUSTABLE CAMPSTOVE AND GRILL

GENERAL NOTES

1. For details of chain link fence at rest area locations see Index No. 452.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

REST AREA EQUIPMENT

	Names	Dates
Designed by		
Drawn by	HW	3/68
Checked by	RHC	6/68
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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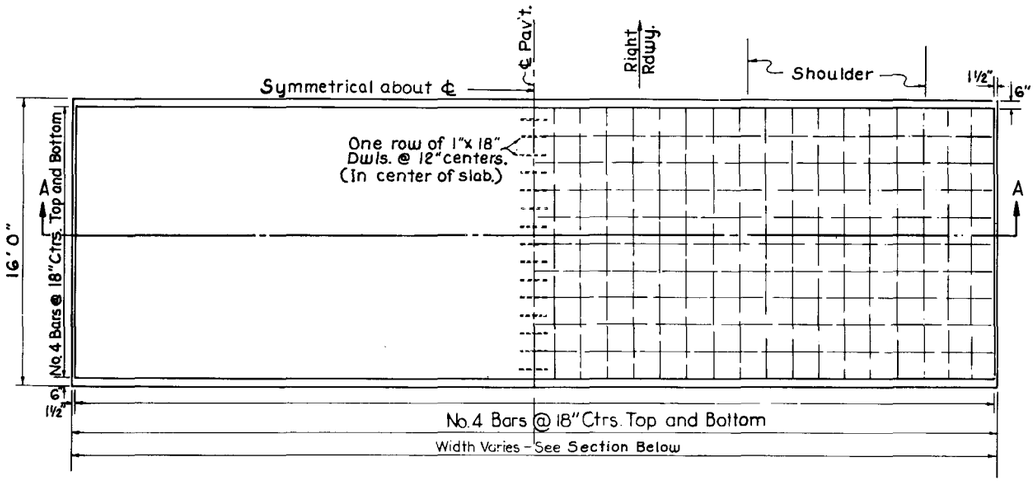
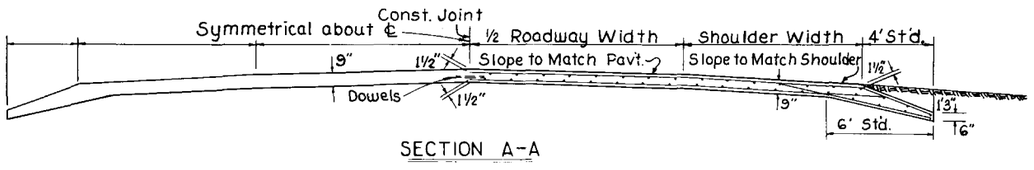


PLAN

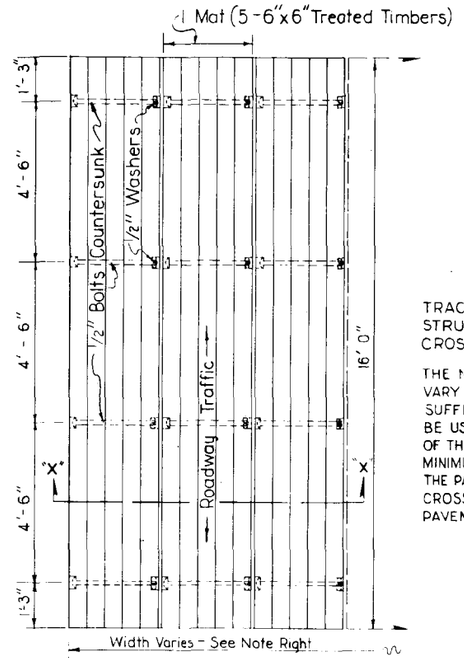


SECTION A-A

NOTE
CLASS I CONCRETE IS TO BE USED UNLESS OTHERWISE NOTED IN PLANS OR SPECIAL PROVISIONS

DETAIL OF TRACTOR CROSSING, TYPE "A"

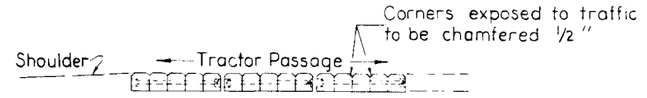
REINFORCED CONCRETE



PLAN

NOTE
TRACTOR CROSSING TO BE CONSTRUCTED TO MATCH PAVEMENT CROSS SLOPE.

THE NUMBER OF MATS REQUIRED WILL VARY WITH THE PAVEMENT WIDTH. A SUFFICIENT NUMBER OF MATS WILL BE USED SO THAT THE OVERALL WIDTH OF THE TRACTOR CROSSING WILL BE A MINIMUM OF ONE FOOT GREATER THAN THE PAVEMENT WIDTH. THE TRACTOR CROSSING WILL BE CENTERED ON THE PAVEMENT CENTERLINE.



SECTION X-X

DETAIL OF TRACTOR CROSSING, TYPE "B"

TREATED TIMBER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TRACTOR CROSSINGS

	Names	Dates
Designed by		
Drawn by	LH	1/61
Checked by	CDD	1/61
F.H.W.A. Approved:		3/20/75

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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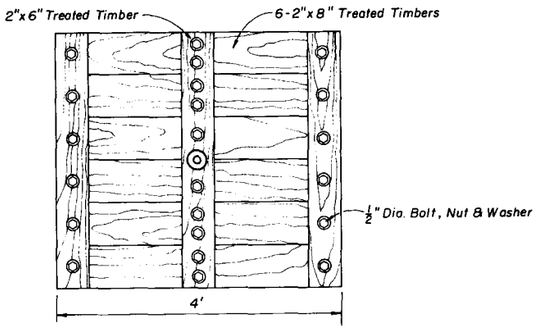
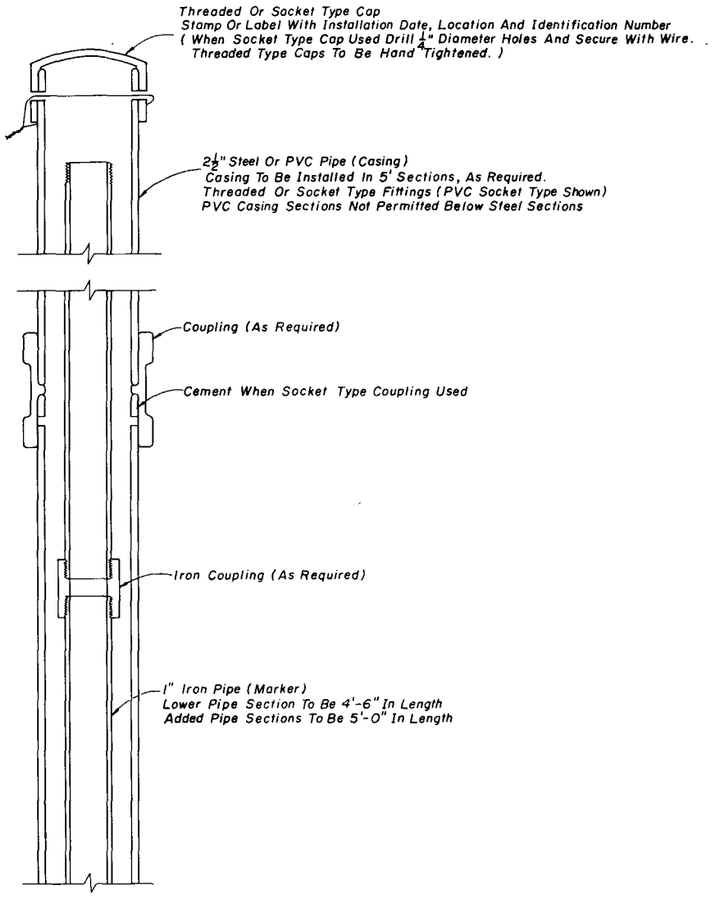
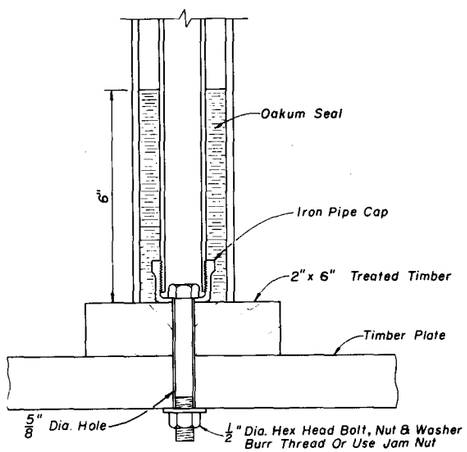
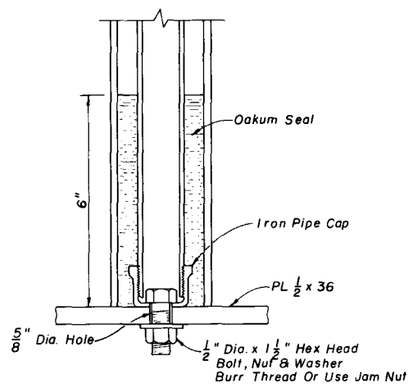


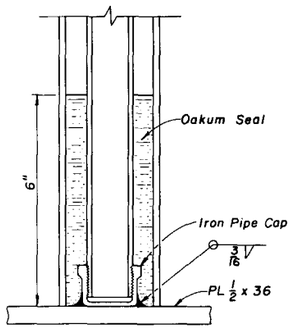
PLAN

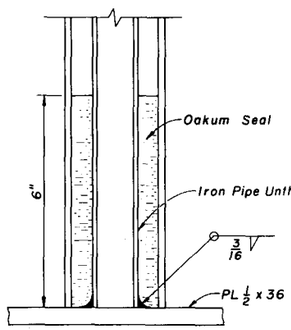
TIMBER PLATE



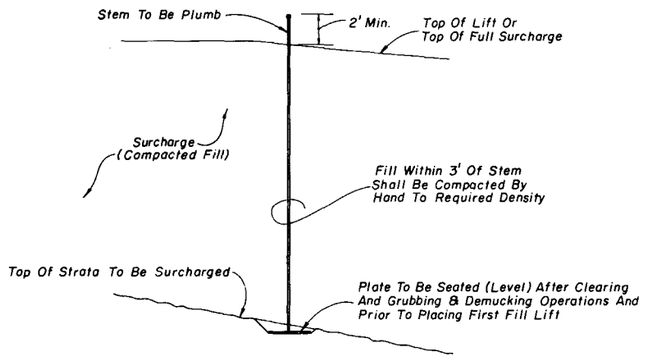








STEM AND PLATE OPTIONS



INSTALLATION

NOTES

1. Elevation of the top of each length of marker pipe shall be determined as soon as it is installed and also immediately before the next length of marker pipe is added.
2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SETTLEMENT PLATE

	Names	Dates
Designed by	JVG	10/79
Drawn by	HSD	10/79
Checked by	JBW	10/79
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

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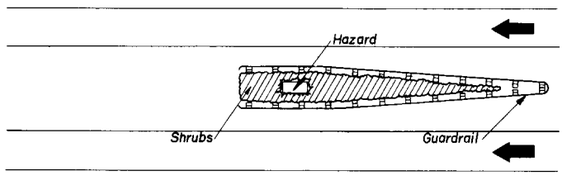
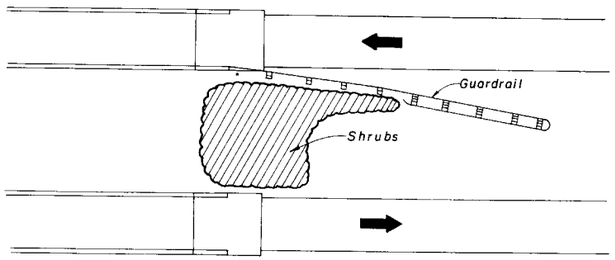


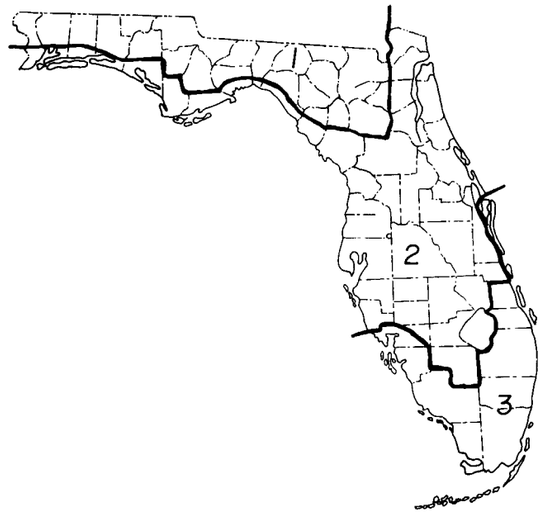
DETAIL A

MEDIAN HAZARD - ONE-WAY TRAFFIC



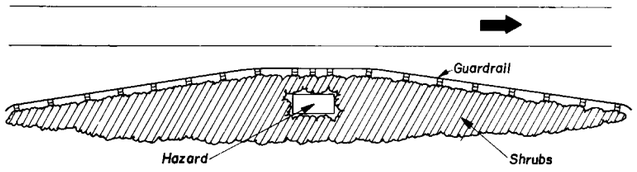
DETAIL C

BRIDGE END - WIDE MEDIAN



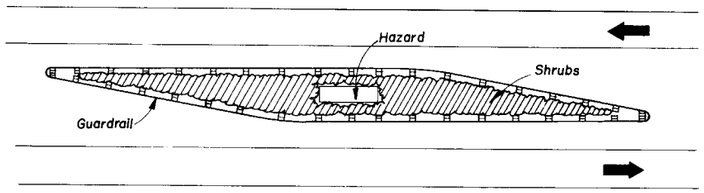
ZONE MAP

ZONE	SHRUB
1.	Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive
2.	Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive Jasmine Simplic Oleander
3.	Pampas Grass Russian Olive Natal Plum Jasmine Simplic Oleander Dwarf Oleander



DETAIL B

ROADSIDE HAZARD

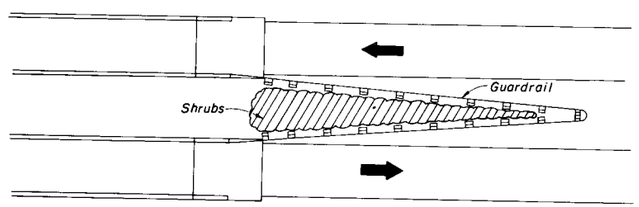


DETAIL D

MEDIAN HAZARD - TWO-WAY TRAFFIC

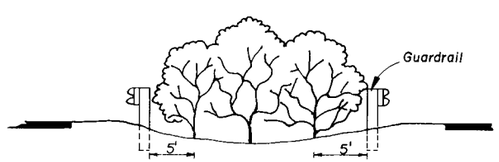
GENERAL NOTES

1. The purpose of shrubs in areas back of guardrail is to eliminate hand maintenance in those areas.
2. Shrubs are to be planted approximately 5' back from guardrail posts and hazards. Narrow plant areas are to have at least one row of shrubs, as directed by the Engineer.
3. Shrubs are to be planted approximately 5' on centers in rows with 5' spacings.
4. Shrubs are to be offset in successive rows to create a zig-zag pattern between any two rows.
5. Shrubs shall be specified in the plans by Landscape Material Master Pay Item List numbers.
6. Only one variety of shrub shall be planted within any given contiguous area and no shrub variety is to be repeated within a distance of one mile.
7. When guardrail paving is constructed in conjunction with shrub planting, soil sterilization shall be in accordance with Section 339 of the Standard Specifications.



DETAIL E

BRIDGE END - NARROW MEDIAN



CROSS SECTION

BACK TO BACK GUARDRAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SHRUBBERY

BACK OF GUARDRAIL APPLICATION

	Names	Dates
Designed by	G.L.H.	
Drawn by		
Checked by		
F.H.W.A. Approved		

Approved By
Deputy Design Engineer, Roadways

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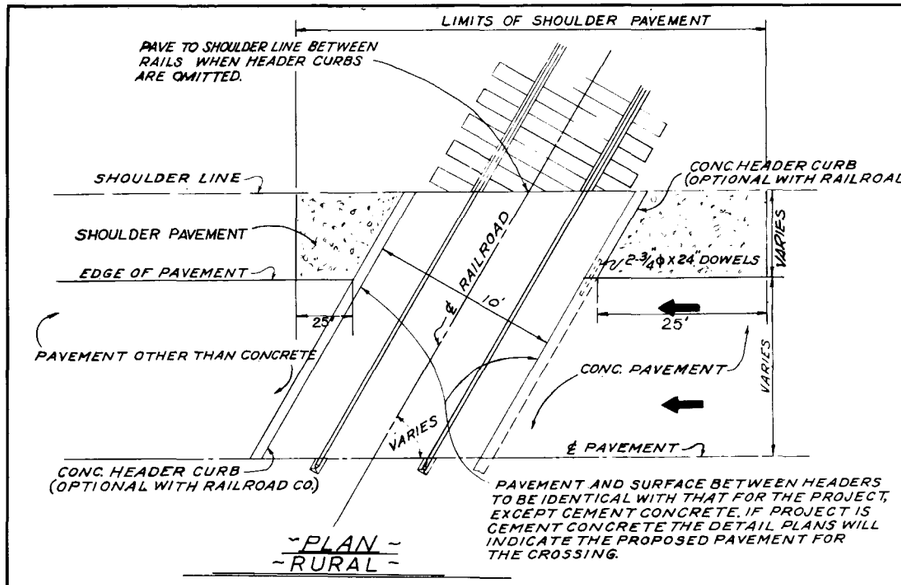
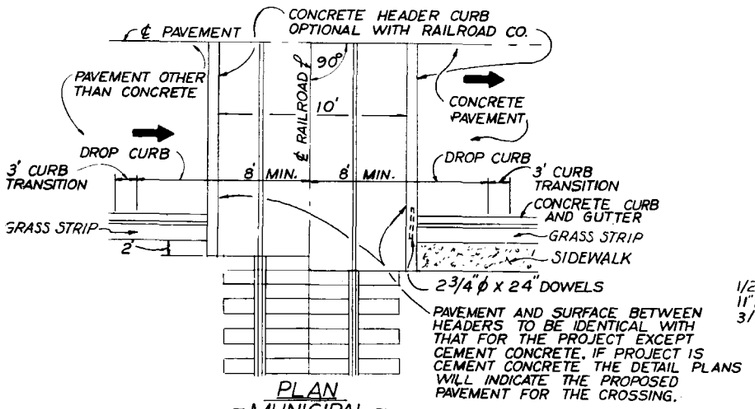
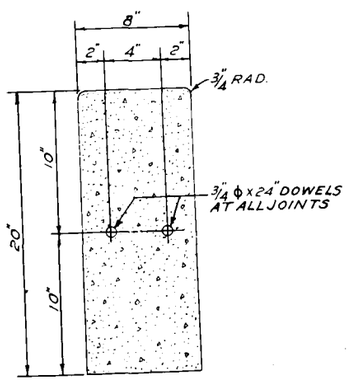


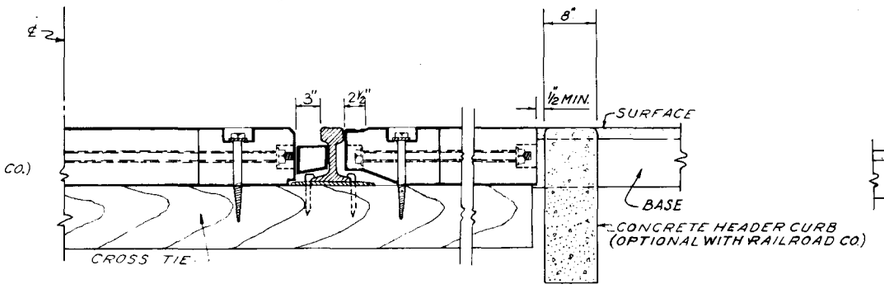
~PLAN~
~RURAL~



PLAN
~MUNICIPAL~

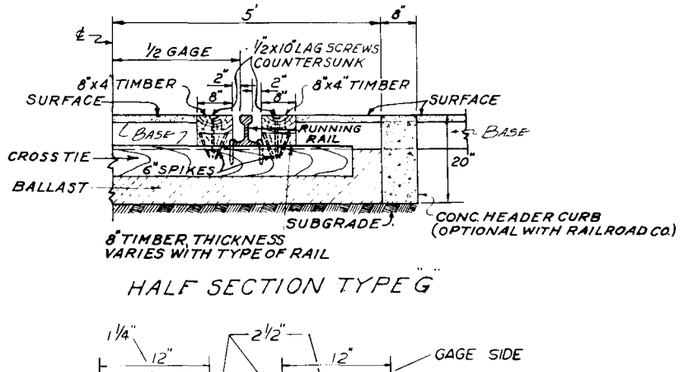


DETAIL OF HEADER CURB
(OPTIONAL WITH RAILROAD CO)



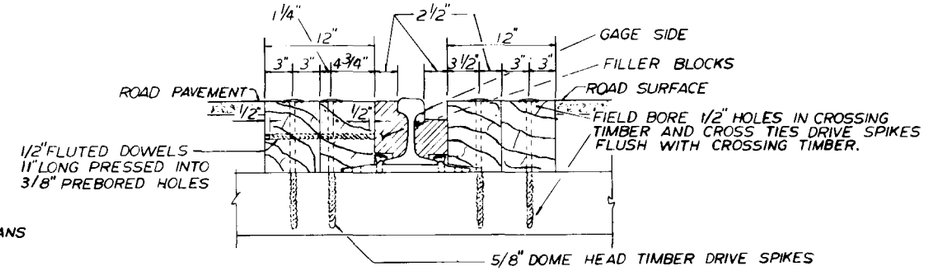
HALF SECTION TYPE "D"

NOTE: THIS TYPE OF CROSSING TO BE CONSTRUCTED ENTIRELY BY THE RAILROAD CO.

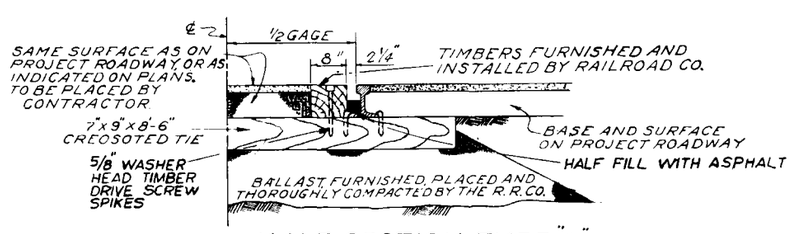


8" TIMBER THICKNESS VARIES WITH TYPE OF RAIL

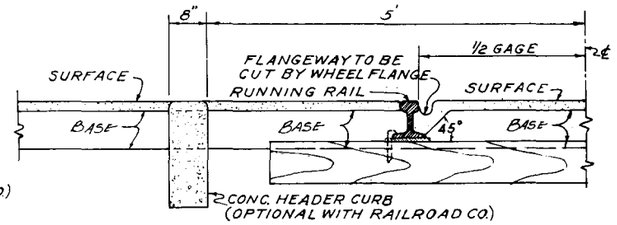
HALF SECTION TYPE "G"



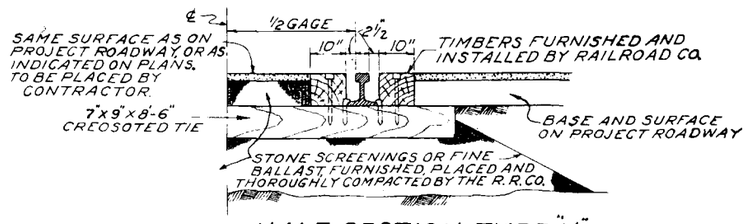
HALF SECTION TYPE "L"



HALF SECTION TYPE "S"



HALF SECTION TYPE "E"



HALF SECTION TYPE "H"

~ NOTES ~

1. THE CONTRACTOR WILL CONSTRUCT HEADER CURBS AT LOCATIONS REQUESTED BY THE RAILROAD COMPANY. AND CONSTRUCT PAVEMENT AS SHOWN FOR ALL CROSSINGS EXCEPT J AND K.
2. THE RAILROAD COMPANY WILL FURNISH AND INSTALL ALL MATERIAL WITHIN 5' OF ℄ OF TRACKS. EXCEPT PAVEMENT. FOR ALL CROSSINGS EXCEPT J AND K.
3. ALL RAILS WITHIN CROSSING SHALL BE LINED AND LEVELED TO ELEVATIONS SHOWN ON PLANS.
4. UNLESS OTHERWISE REQUESTED BY THE RAILROAD COMPANY: THE VARIOUS TYPES OF CROSSING WILL BE USED AS FOLLOWS:

APALACHICOLA NORTHERN R. R. CO.	TYPE "L"
ATLANTA AND ST. ANDREWS BAY RAILWAY CO.	L
FLORIDA EAST COAST RAILWAY CO.	G
ST. LOUIS ~ SAN FRANCISCO RAILWAY CO.	H
SEABOARD COAST LINE R. R. CO.	L
LOUISVILLE AND NASHVILLE R. R. CO.	L
SOUTHERN RAILWAY SYSTEM	
(a) GEORGIA SOUTHERN AND FLORIDA RAILWAY CO.	G
(b) LIVE OAK, PERRY AND SOUTH GEORGIA RAILWAY CO.	G
(c) ST. JOHNS RIVER TERMINAL CO.	G
(d) GEORGIA AND FLORIDA RAILWAY CO.	TYPE "G"

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE D,E,G,H,L & S

	Names	Dates
Designed by		
Drawn by	H W	8/69
Checked by	J K C	8/69
F. H. W. A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

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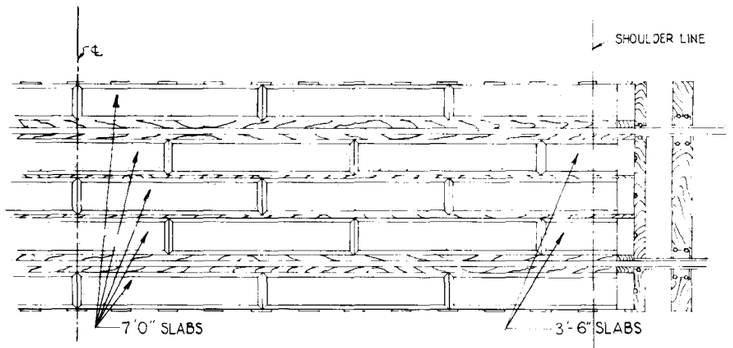
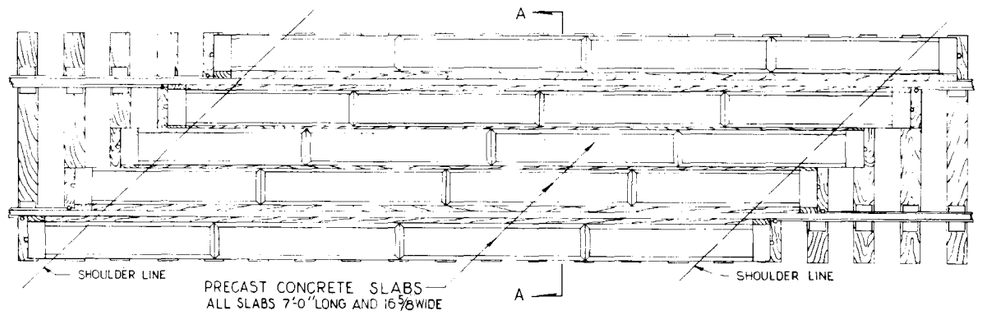
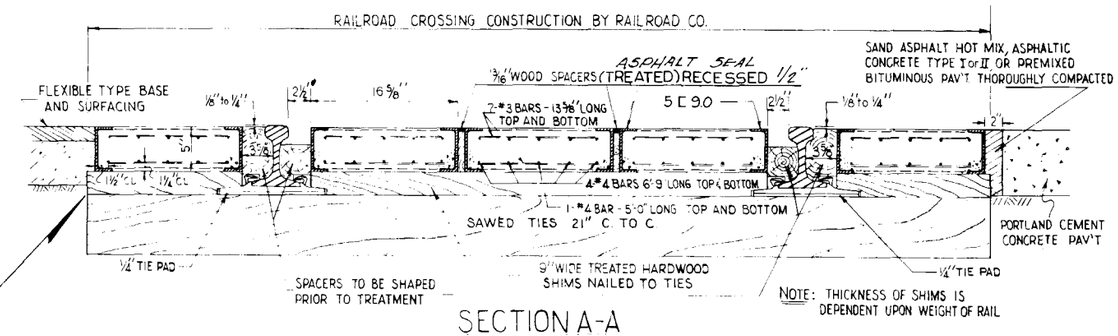


PLAN - 90° CROSSING

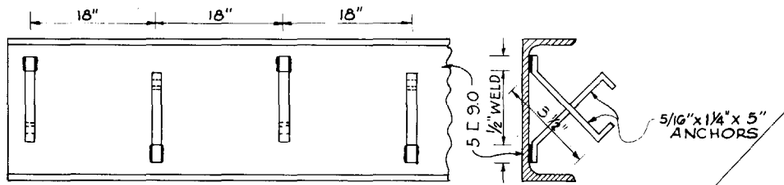


PLAN - SKEW CROSSING



NOTE: THICKNESS OF SHIMS IS DEPENDENT UPON WEIGHT OF RAIL

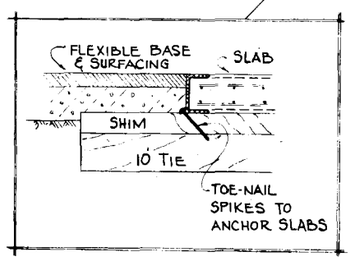
SECTION A-A



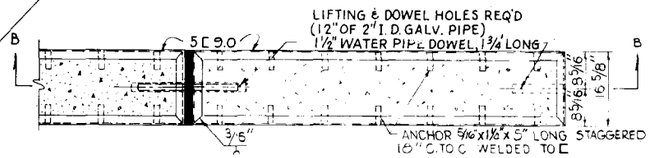
ELEVATION

SECTION

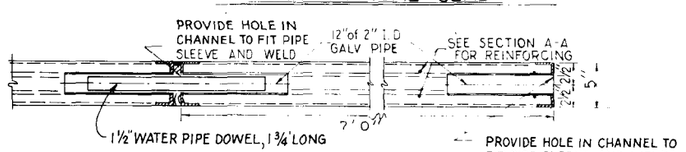
DETAIL OF 5/16" x 1 1/4" x 5" ANCHORS
ANCHORS STAGGERED 18" C. TO C.
TWO ANCHORS EACH END CHANNEL
NOTE: 1/2" x 5" STUDS MAY BE USED IN LIEU OF ANCHORS.



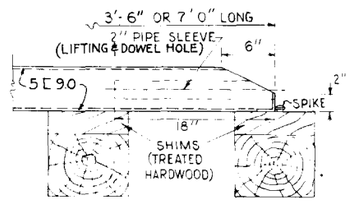
OPTIONAL DETAIL
WHEN 10' TIES ARE USED



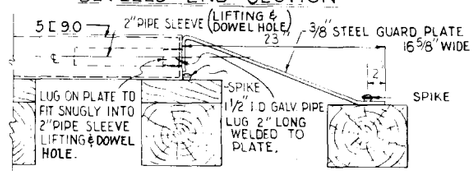
PLAN TYPICAL SLAB



SECTION B-B



BEVELED END SECTION



ALTERNATE END SECTION

~ NOTES ~

1. SPACERS ADJACENT TO RAIL TO BE DENSE STRUCTURAL 65 GRADE.
2. SPACERS BETWEEN SLABS TO BE No 1 COMMON GRADE.
3. ALL TIMBER TO BE SHAPED PRIOR TO TREATMENT.
4. CLASS I CONCRETE TO BE USED IN THE CONSTRUCTION OF THE PRECAST CONCRETE SLABS.
5. ALL TIMBER SHIMS AND SPACERS AND PRECAST CONCRETE SLABS WILL BE FURNISHED AND INSTALLED BY THE RAILROAD CO. THE TRACK SHALL BE CONDITIONED TRUE TO LINE AND GRADE BY THE RAILROAD CO. PRIOR TO INSTALLATION OF THE CROSSING ELEMENTS.
6. CONSTRUCTION OF THIS CROSSING REQUIRES A STABLE SUBGRADE FOR A MINIMUM OF 2' BELOW THE BOTTOM OF THE BALLAST. THE SUBGRADE SHALL BE CONSTRUCTED TO THE SAME REQUIREMENTS AS SPECIFIED FOR THE ADJOINING ROADWAY.

~ DETAILS OF RAILROAD CROSSING TYPE "J" ~

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE J

	Names	Dates
Designed by		
Drawn by	HW	8/69
Checked by	JKC	8/69
F.H.W.A. Approved: 3/20/75		

Approved By
Deputy Design Engineer, Roadways

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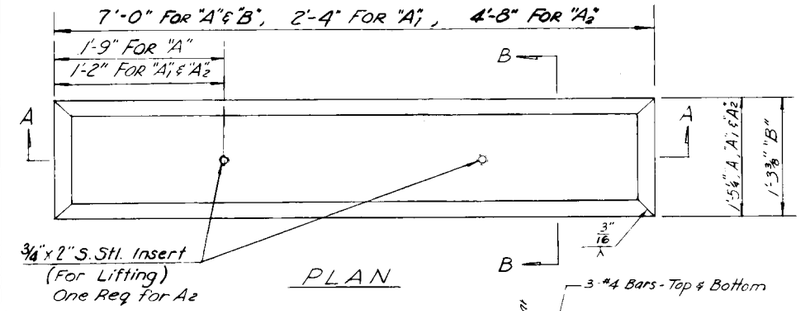
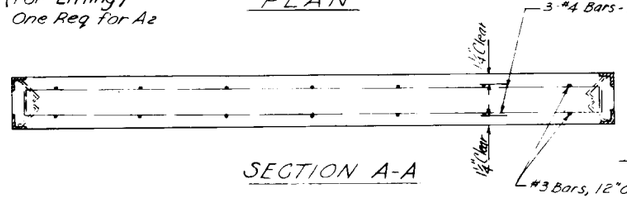
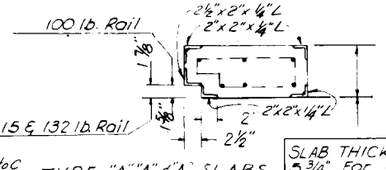
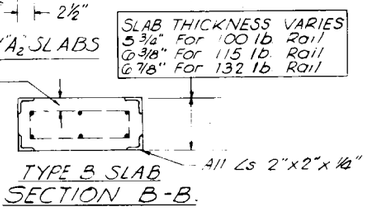
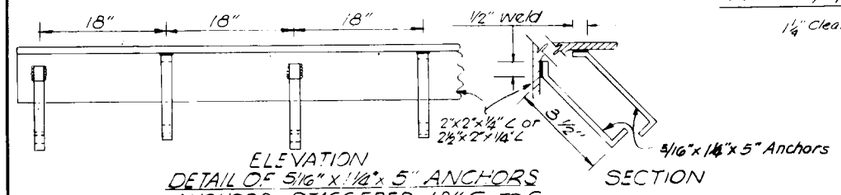


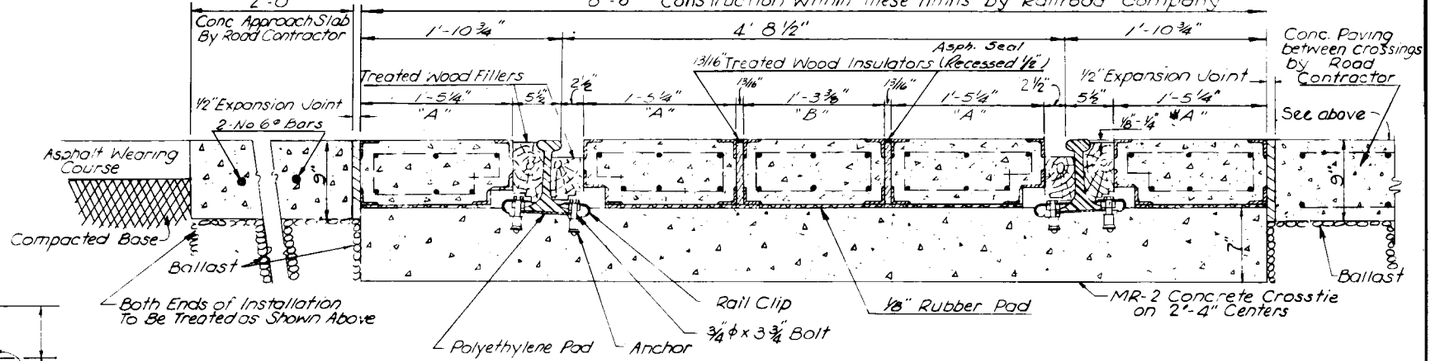


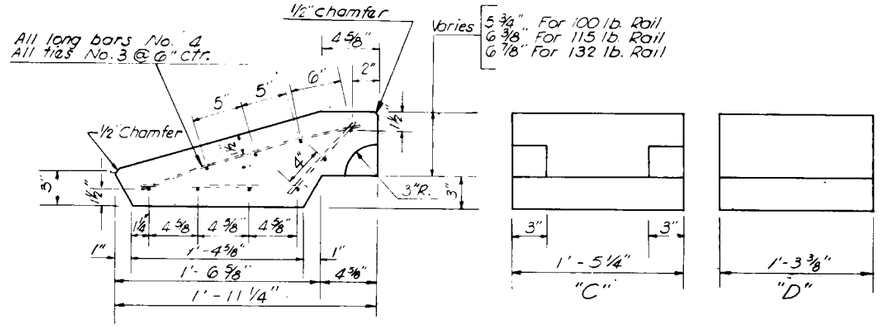


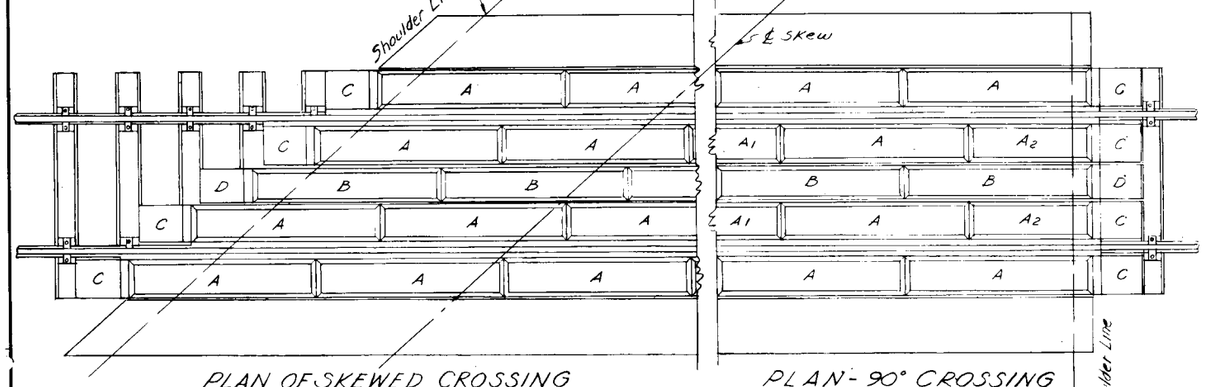
SLAB THICKNESS VARIES
5¾" For 100 lb Rail
6⅜" For 115 lb. Rail
6⅞" For 132 lb Rail

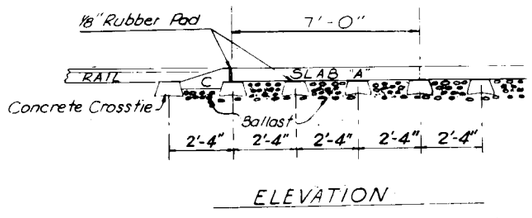


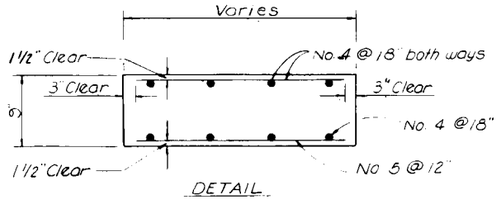












Reinforcing for Concrete Paving between Parallel Track Crossings
(Cost of Reinforcing to be included in cost of Class I Concrete, see note No. 6)

GENERAL NOTES

1. The furnishing and installing of concrete crossties together with any necessary reballasting, grade adjustment and track alignment shall be done by the Railroad Company without cost to the Contractor or to the Department.
2. All concrete slabs, rubber pads for tops of ties and wood filler blocks shall be furnished and installed by the Railroad Company.
3. Concrete Crossties shall be spaced on 28" centers by the Railroad Company.
4. Rubber pads shall be installed on concrete ties in field using contact cement.
5. Filler blocks shall be pressure treated pine or clear heart redwood and shall be shaped prior to treatment.
6. Class I concrete 9" thick to be used in construction, by road contractor, of Concrete Approach Slabs and for paving between crossings. (Cost of steel to be included in cost of Class I Concrete.)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE K

	Names	Dates
Designed by		
Drawn by	HW	8/69
Checked by	JKC	8/69
F.H.W.A. Approved: 3/20/75		

Approved By: Deputy Design Engineer, Roadways

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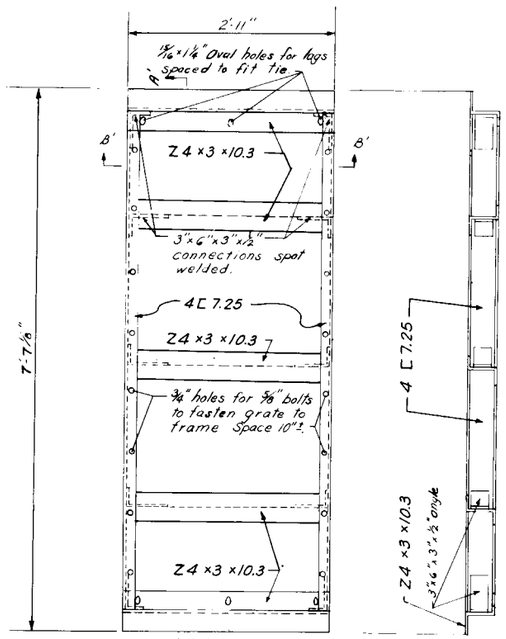
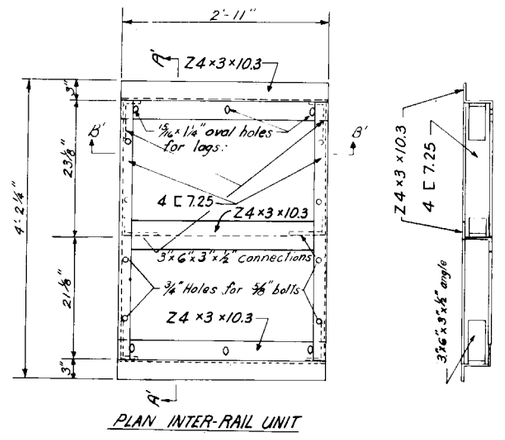
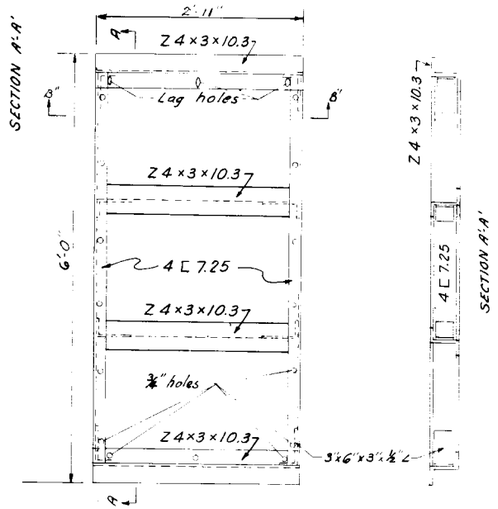


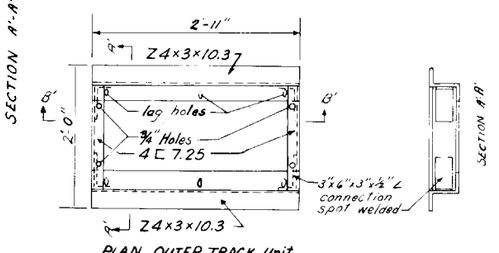
PLAN INTER-TRACK UNIT



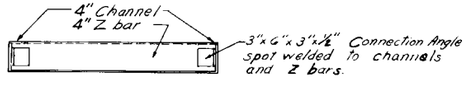
PLAN INTER-RAIL UNIT



PLAN ALTERNATE OUTER-TRACK UNIT



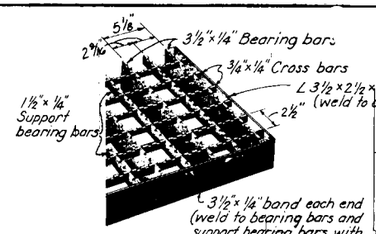
PLAN OUTER TRACK Unit



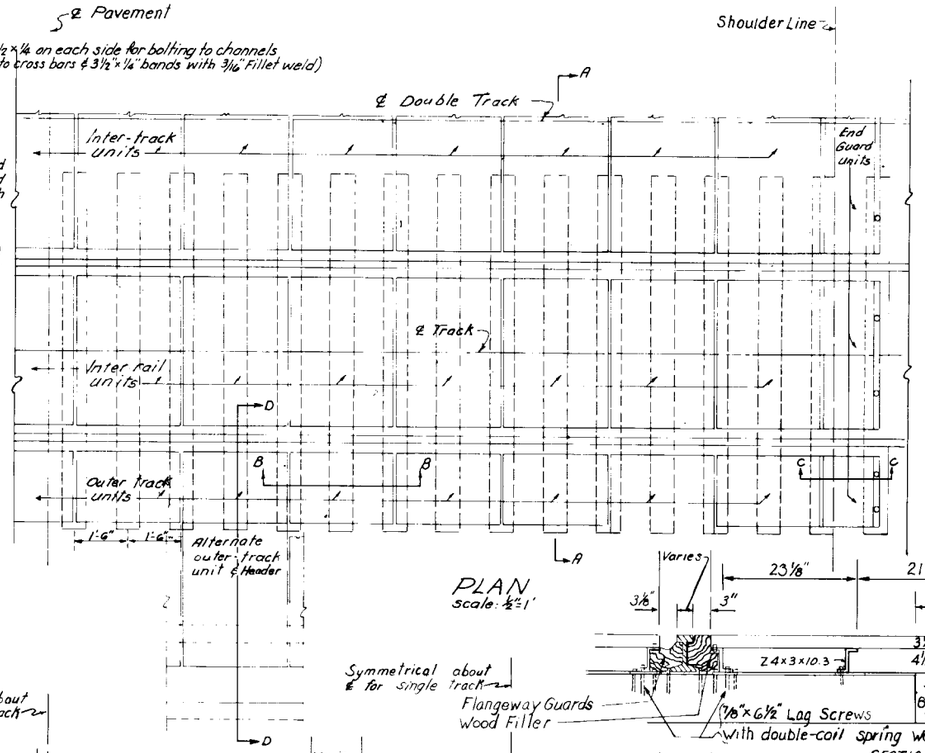
SECTION B'-B'

FRAME DETAILS

Scale: 1"=1'

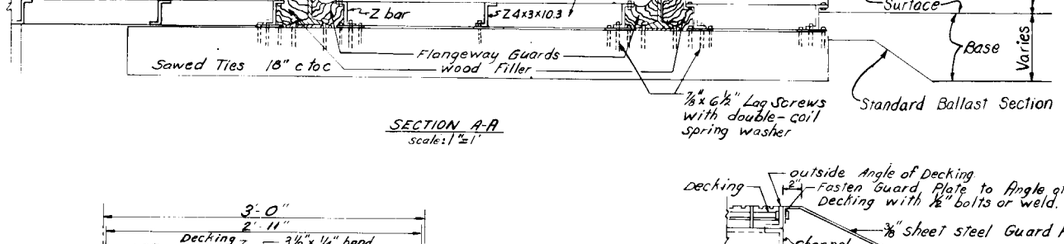


DECKING (14.81 LBS/S.F.)

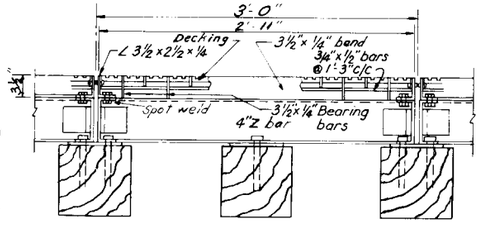


PLAN
Scale: ½"=1'

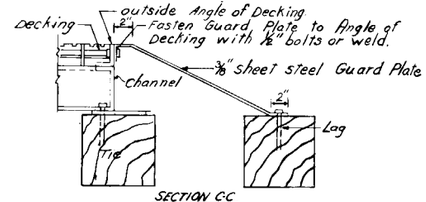
SECTION D-D
Scale 1"=1'



SECTION A-A
scale: 1"=1'



SECTION B-B
scale: 1½"=1'



SECTION C-C
scale 1½"=1'

GENERAL NOTES

1. This drawing is based on using 131# rail on a tangent section and Decking fabricated in sections to fit the corresponding sections of the supporting frame. The depth of the Z bars and channels may be varied to fit other rail sections.
2. The framework units are attached to ties by 7/8"x 6 1/2" lag screws, and to Headwall by 5/8" anchor bolts. Double-coil spring washers are used with lags to compensate for vertical motion.
3. The decking is attached to the framework with 5/8" bolts. The head of the bolt is to be spot welded to the underside of the channel flange.
4. Flangeway and outside filler timbers to be rabbetted to assure close fit prior to treatment.
5. Ties to be sawed and spaced 18" C to C.
6. Crossing of any angle can be equiped with units of either 45°, 67°30' or 90°.
7. Decking may be as shown or equal (Submit shop drawings for approval by the Engineer).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE M

	Names	Dates
Designed by		
Drawn by	HW	8/69
Checked by	JKC	8/69
F.H.W.A. Approved:		3/20/75

Approved By
Deputy Design Engineer, Roadways

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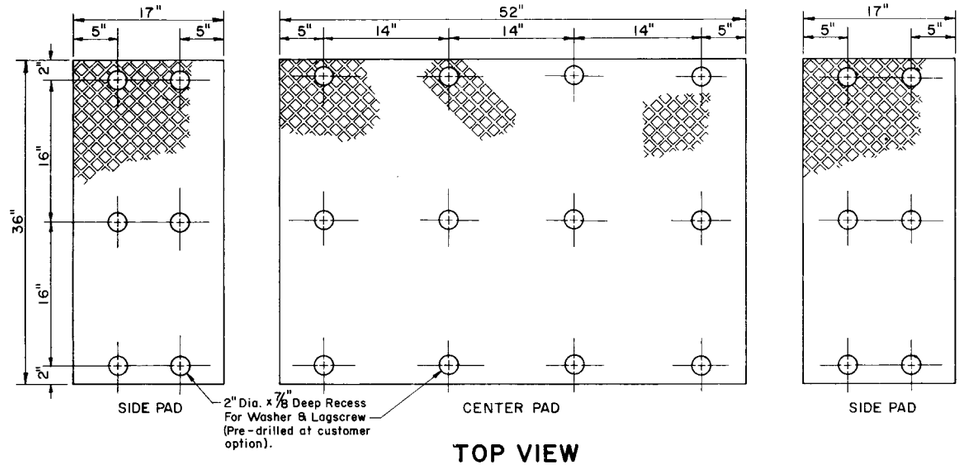
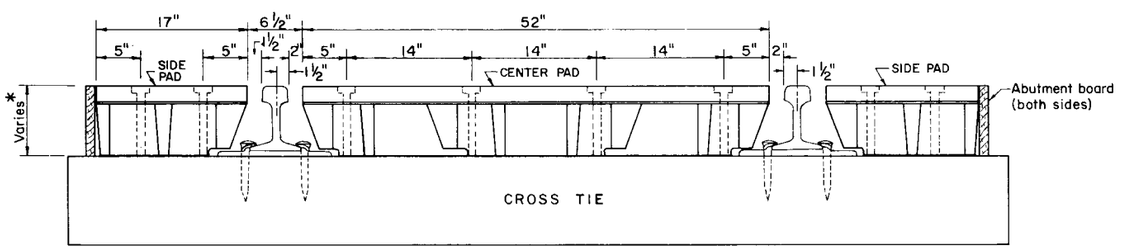
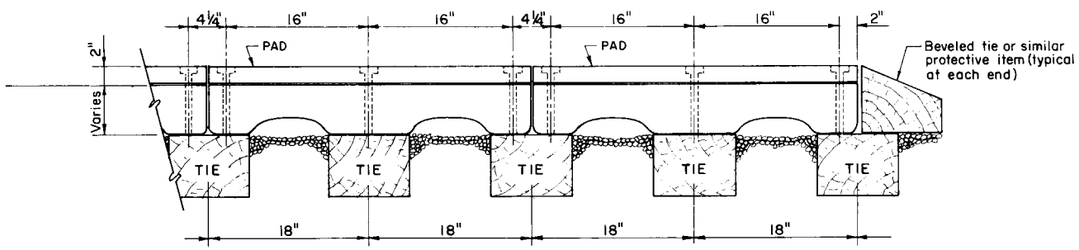


TOP VIEW



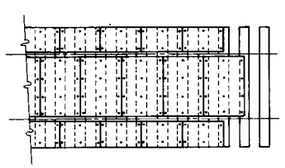
* O.A. Height 6 1/2" – Pads typical for 90 – 100 lb rails.
O.A. Height 7 3/8" – Pads typical for 110 – 130 lb rails.
O.A. Height 7 7/8" – Pads typical for 131, 133 or 136 lb rails.

SECTION



PARTIAL SECTION PARALLEL TO RAIL

CROSSING TYPE "P"
(POLYETHYLENE)

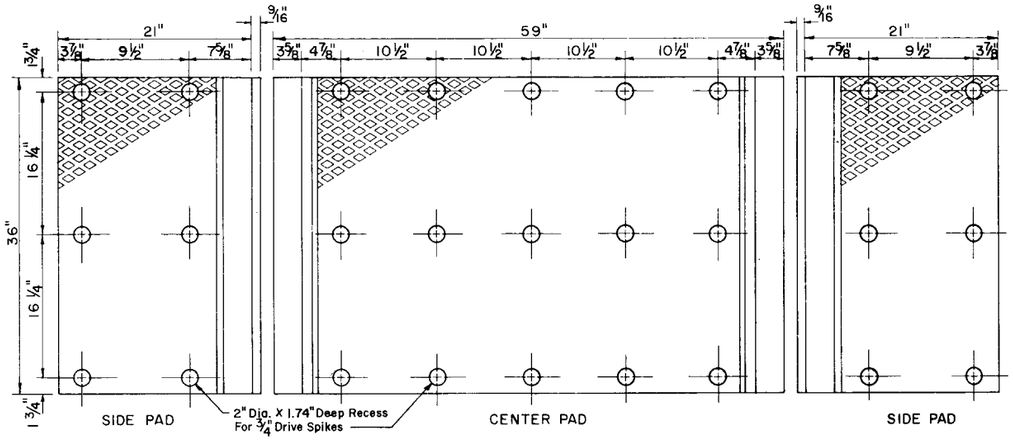


PARTIAL PLAN DEPICTING SUGGESTED PAD PLACEMENT

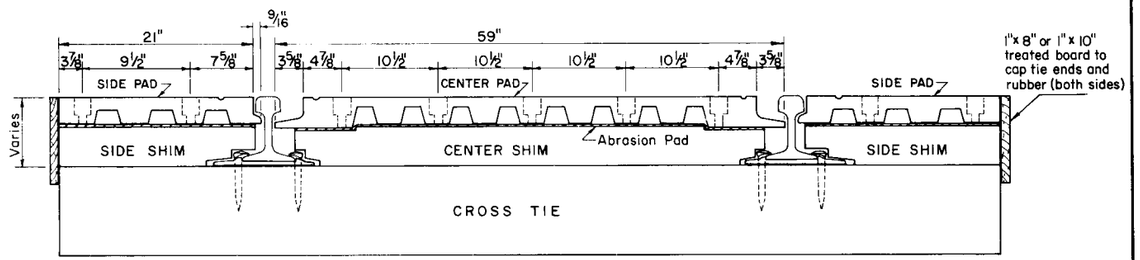
STOP ZONE	
Design Speed	Zone length-Distance from stop
45 MPH or less	250'
50 - 55	350'
60 - 65	500'
70	600'

GENERAL NOTES

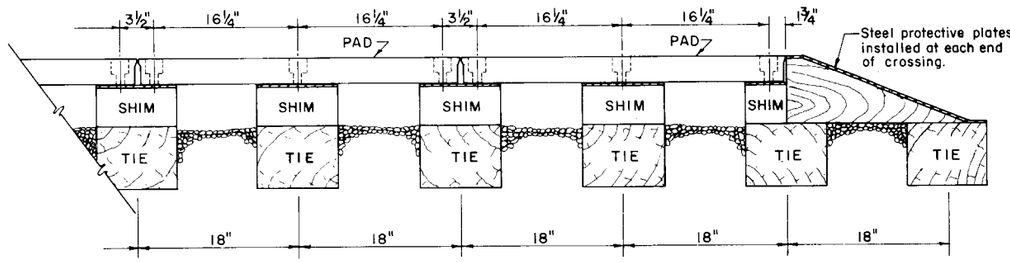
1. The crossings shown on this sheet are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.
2. Crossings on this sheet may be used for single track crossings within the zones in the chart unless engineering or safety considerations dictate othewise.
3. Details shown are for straight track installations. Materials are also available for curved track installations.
4. For additional details, materials required and installation procedures refer to the manufacturers specifications.



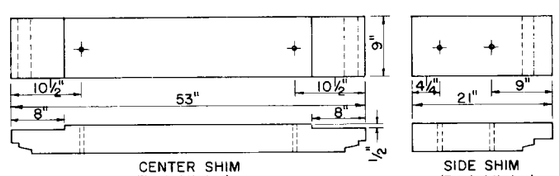
TOP VIEW



SECTION



PARTIAL SECTION PARALLEL TO RAIL



Shim thickness varies with height of rail.

CROSSING TYPE "R"
(RUBBER)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE P & R

	Names	Dates
Designed by		
Drawn by	LMF	11/75
Checked by	GSB	11/75
F.H.W.A.	Approved: 10/11/78	

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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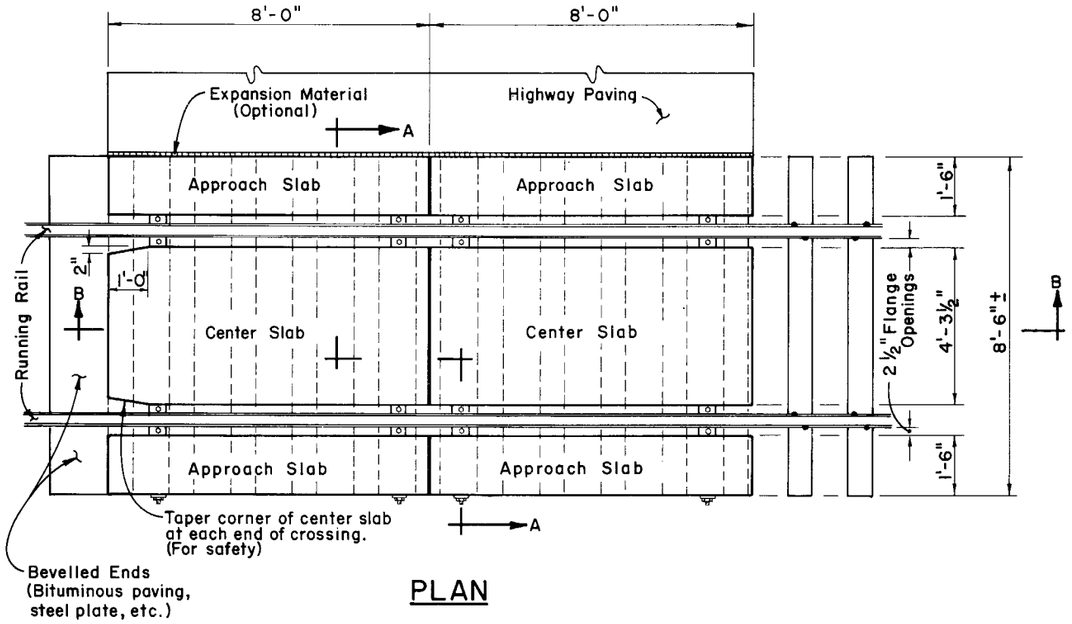
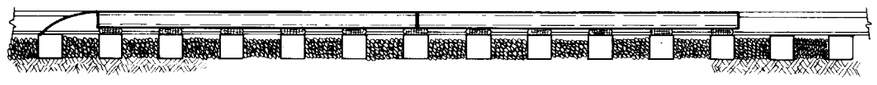
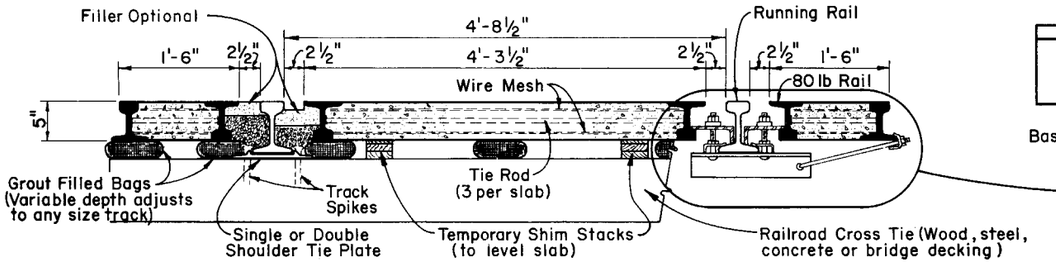


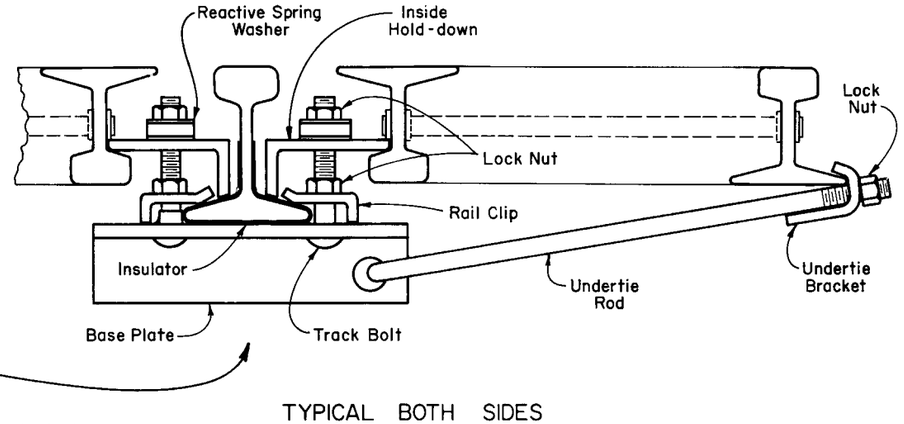
PLAN



SECTION B-B



SECTION A-A



TYPICAL BOTH SIDES

GENERAL NOTES

1. The reinforced concrete slabs are manufactured in 8'-0" sections, 5" in depth to fit all rail sections 5 1/4" in height or heavier. Slabs are interchangeable and relocateable.
2. Center slabs are one piece construction allowing for 2½" flange opening. 80 lb. rail is used to encase, armor and reinforce slabs and is held to gage with 3 tie rods per slab.
3. Slabs are installed by a "flotation" process, supported on non-shrinkable, non-metallic grout positioned on the ties. Slabs can be placed on wood ties, concrete ties, steel ties, bridge decks or any other type of track support. No re-spacing of ties is necessary.
4. Slabs are secured to "running rails" with specially designed hardware. Insulation is to be provided for crossings in signal territory.
5. Curved slabs are fabricated to fit curved track to 22 degrees (262.04' radius). Special slabs are available for Diamond Crossings, Turnouts, Multiple Tracks, Bridge Decks and Rapid Transit Systems.
6. For additional details, materials required and installation procedures refer to the manufacturers specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE T

	Names	Dates
Designed by		
Drawn by	L M F	2/77
Checked by	G S B	2/77
F.H.W.A. Approved:		5/3/77

Approved By
Deputy Design Engineer, Roadways

Revision No.	Sheet No.	Index No.
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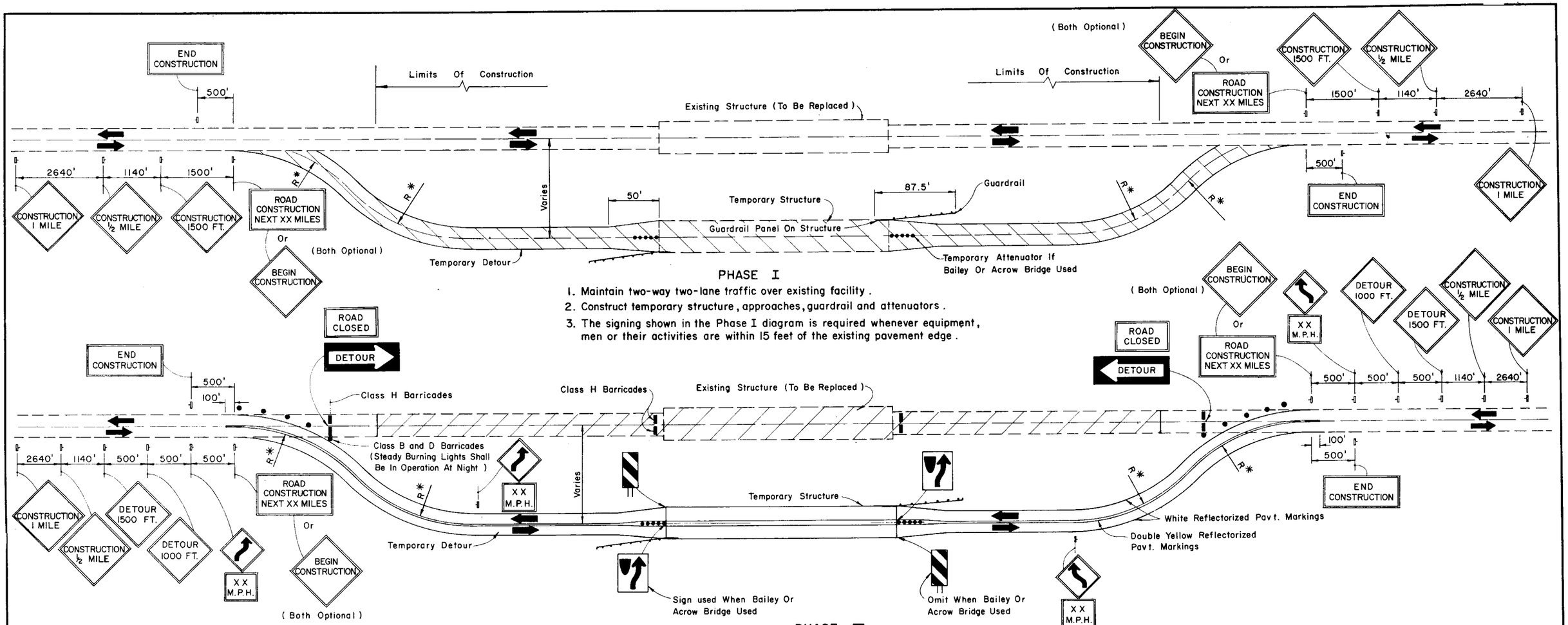

PHASE I

1. Maintain two-way two-lane traffic over existing facility.
2. Construct temporary structure, approaches, guardrail and attenuators.
3. The signing shown in the Phase I diagram is required whenever equipment, men or their activities are within 15 feet of the existing pavement edge.

PHASE II

1. Re-sign and mark as shown in Phase II plan.
2. Reroute traffic to detour and maintain two-way traffic on detour. Traffic control shall be in accordance with the MTCSP. Install class H barricades.
3. Construct proposed structure and reconstruct or resurface existing approaches.

PHASE III

1. Reroute traffic to existing alignment and maintain two-way traffic.
2. Remove all temporary construction items.

GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement markings, barricades and warning lights necessary for maintenance of traffic shall conform to the MTCSP.
2. The detour pavement should be constructed of width equal to the existing pavement, but lanes shall be not less than 10 feet in width. When one-way one-lane operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with the MTCSP. Minimum width for the detour shoulders is 6 feet.
3. Raised pavement markers shall be placed along the center of the detour pavement at 80 foot centers on the tangent roadway, at 40 foot centers on approaches to the curves and at 20 foot centers through the curves.
4. Existing signs and pavement markings that conflict with construction signings and markings shall be obliterated or removed.
5. Posted speed on the existing facility shall be decreased at the rate of 10 mph per 500 feet(minimum distance) until detour design speed is reached.
6. Method of attaching temporary guardrail to the detour structure to be approved by the Engineer.
7. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
8. Temporary attenuators shall be the inertial type indicated in Figure 7.3 of the MTCSP.

R*

TABLE FOR MINIMUM RADIUS FOR NORMAL CROSS SLOPES

POSTED SPEED	DETOUR DESIGN SPEED	MINIMUM RADIUS-R
M.P.H.	M.P.H.	FT.
55	45	1080
50	40	830
45	35	620
40	30	450

Superelevate When Smaller Radii Used

LEGEND

- Phase I
- Phase II
- MTCSP — Manual On Traffic Control And Safe Practices
- Denotes Direction Of Traffic And Does Not Reflect Pavement Markings

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRUCTURE REPLACEMENT
STANDARD TRAFFIC CONTROL PLAN
RURAL FACILITY

	Names	Dates
Designed by	KNM	8/79
Drawn by	SHM	8/79
Checked by	JVG	8/79
F.H.W.A. Approved:		9/11/79

Approved By: Deputy Design Engineer, Roadways

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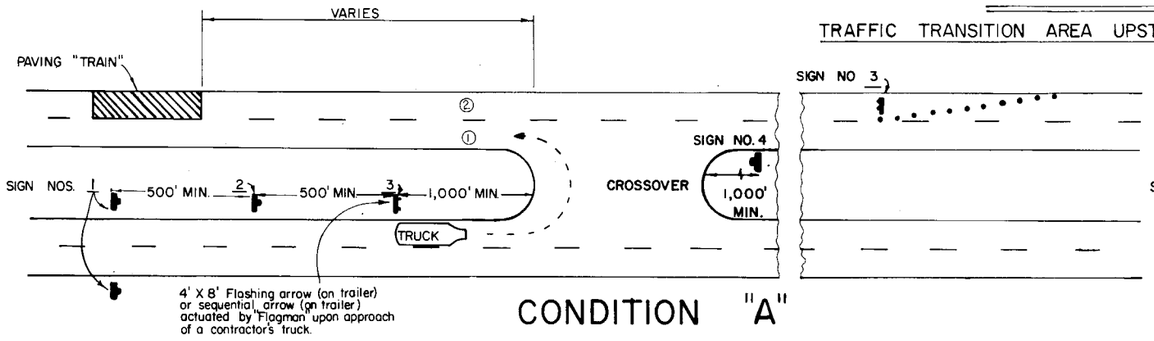
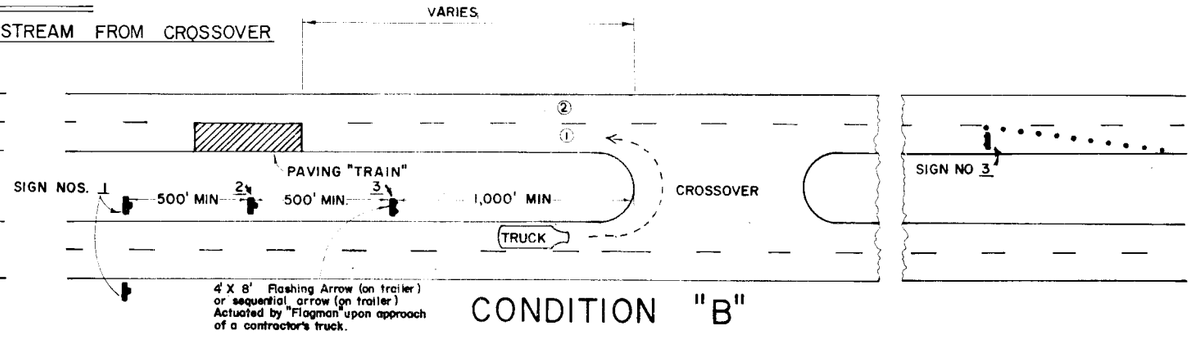
CASE I

TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSOVER

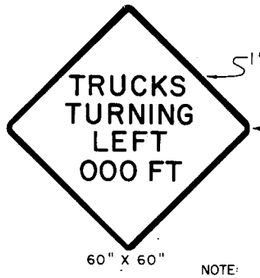


CONDITION "A"



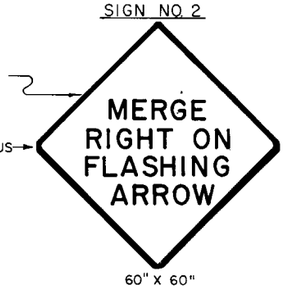
CONDITION "B"

SIGN NO. 1



60" X 60"

SIGN NO 2



60" X 60"

NOTE:
SIGNS SHALL HAVE ORANGE REFLECTIVE BACKGROUNDS WITH 6" SERIES 'D' BLACK OPAQUE LEGEND AND BORDER

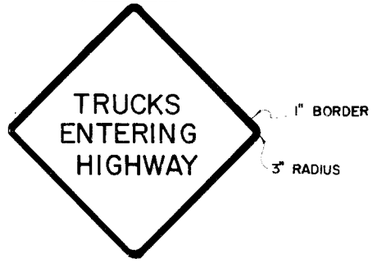
SIGN NO. 3

FOR DETAIL OF ARROW SEE MANUAL*

4'-0" X 8'-0"
FLASHING OR SEQUENTIAL ARROW

SIGN SHALL HAVE A BLACK BACKGROUND WITH AMBER LIGHTS

SIGN NO. 4



CONDITION (A)

WHEN THE PAVING "TRAIN" IS IN THE RIGHT LANE ②, THE U-TURNING TRUCK SHALL CAUTIOUSLY TURN INTO THE INSIDE LANE ① AND PROCEED TO THE FRONT OF THE TRAIN IN LANE ①

CONDITION (B)

WHEN THE PAVING "TRAIN" IS IN THE LEFT LANE ①, THE U-TURNING TRUCK SHALL TURN INTO LANE ① AND CAUTIOUSLY MERGE INTO LANE ②. AND PROCEED TO THE FRONT OF THE PAVING TRAIN.

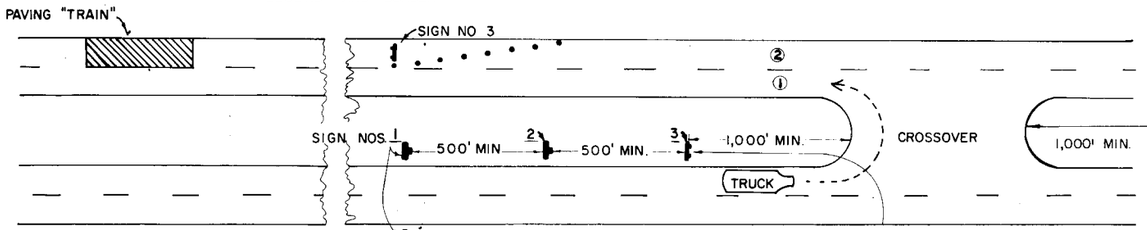
NOTES

(1) UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION AREA FOR CONDITION (A) OR (B) EXTEND THROUGH THE CROSSOVER AREA.

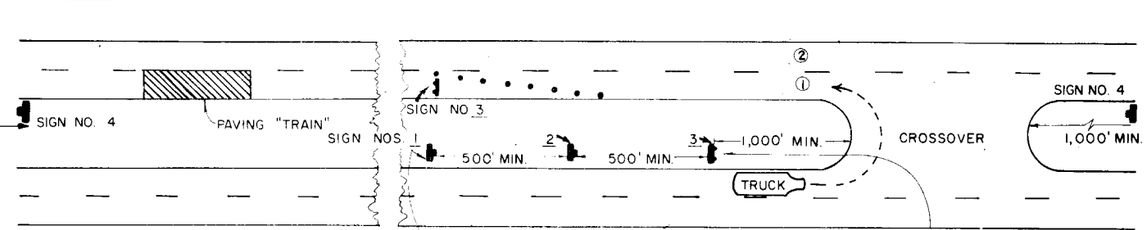
(2) FOR RESURFACING ON A THREE OR MORE LANE ROADWAY SEE THE "SPECIAL" PROVISIONS" FOR TRAFFIC CONTROLS.

CASE II

TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSOVER



CONDITION "A"



CONDITION "B"

NOTE: FOR LANE CLOSURE DETAILS SEE CASE XII, FIGURE 11.12 OF THE MANUAL.* THE FLASHING OR SEQUENTIAL ARROW WILL BE REQUIRED IN ADDITION TO THE SIGNS SHOWN IN THE MANUAL.*

* MANUAL ON TRAFFIC CONTROL DEVICES AND SAFE PRACTICES FOR STREET AND HIGHWAY CONSTRUCTION, MAINTENANCE AND UTILITY OPERATIONS ON THE STATE MAINTAINED SYSTEMS, BY FLORIDA DEPARTMENT OF TRANSPORTATION, 1978.

NOTES

(1) SIGNS NO 1, 2 & 4 SHALL BE EQUIPPED WITH A BARRICADE WARNING LIGHT (TYPE B HIGH INTENSITY).

(2) BARRICADE WARNING LIGHTS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ITE STANDARD FOR FLASHING AND STEADY BURN BARRICADE WARNING LIGHTS AS SHOWN IN THE MANUAL*

(3) WHERE CROSSOVERS DO NOT EXIST, CONTRACTOR WILL CONSTRUCT CROSSOVERS WHICH PROVIDE SUFFICIENT TURNING RADIUS FOR TRUCKS. THE COST OF CONSTRUCTION AND RESTORATION TO BE INCLUDED IN COST FOR "MAINTENANCE OF TRAFFIC", SEE INDEX NO. 631 FOR TEMPORARY CROSSOVER CONSTRUCTION DETAILS.

(4) DETAILS ON TRAFFIC CONTROLS FOR ROADWAY BEING PAVED ARE IN THE MANUAL.*

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TEMPORARY CROSSOVER

TRAFFIC CONTROL PLAN

RURAL

	Names	Dates
Designed by	G.W.	12/71
Drawn by		
Checked by	R.L.F.	9/78

F.H.W.A. Approved:

Approved By

Deputy Design Engineer, Roadways

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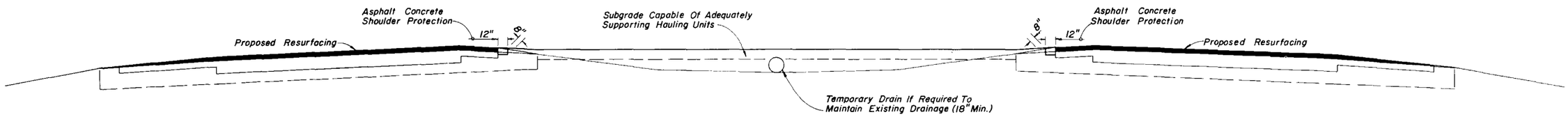

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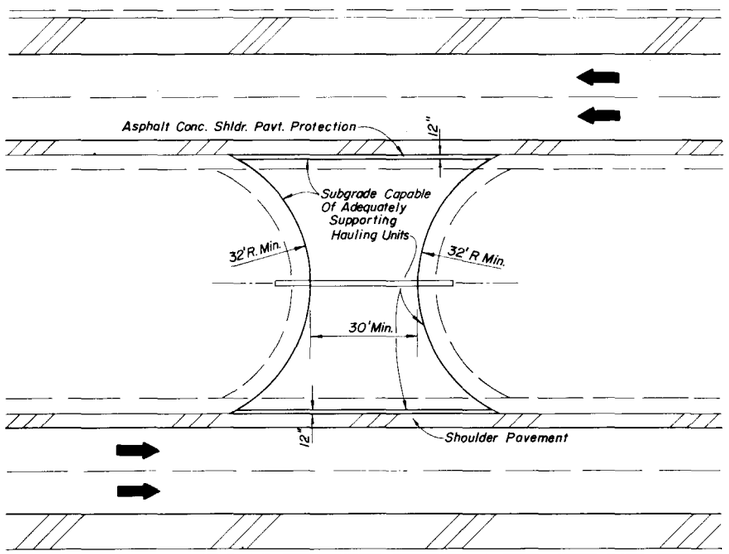

PLAN

NOTES :

1. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area restored to its original condition.
2. Cost of all construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price for maintenance of traffic.
3. Crossovers to be constructed where sight distance is adequate in both directions.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TEMPORARY CROSSOVER
CONSTRUCTION DETAILS
RURAL

	Names	Dates
Designed by		
Drawn by		
Checked by		

F.H.W.A. Approved:

Approved By
Deputy Design Engineer, Roadways

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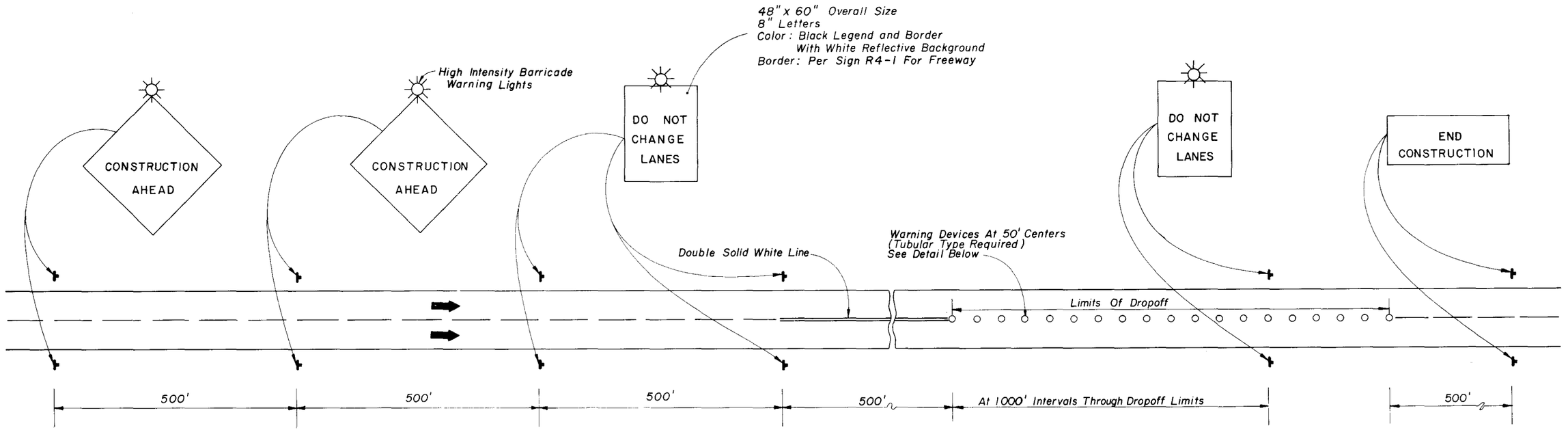
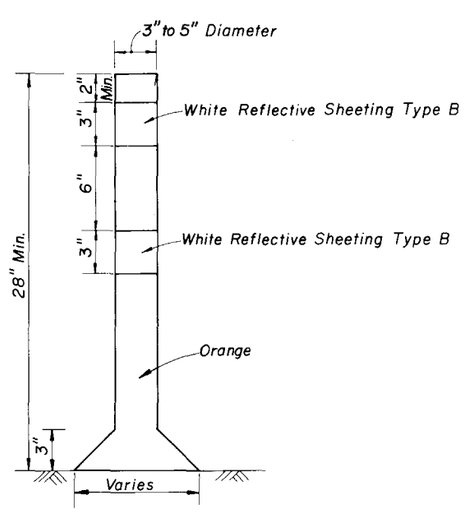
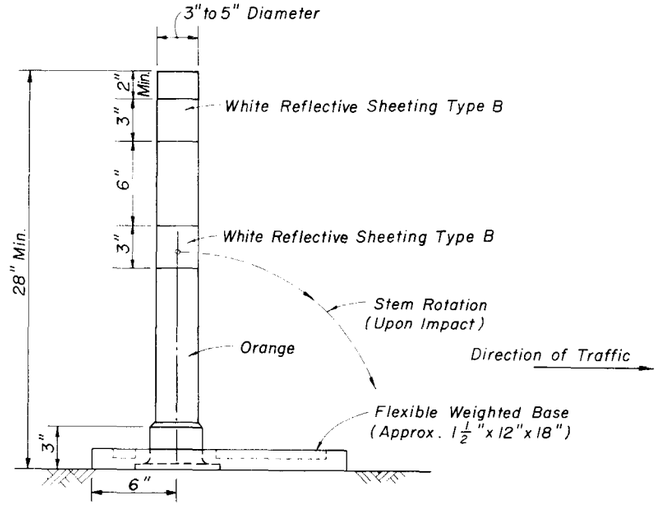
80	1 of 1	631







APPLICATION

This plan to be used when a dropoff in excess of $\frac{3}{4}$" exists between through lanes that are open to traffic during overnight work stoppage, inclement weather delays or shutdowns for emergencies.

DETAILS OF ALTERNATE WARNING DEVICES

1. Warning devices are to be made of materials that can withstand impact without damage to the device or the vehicle.
2. Warning devices are to be weighted or fastened to the pavement to prevent movement or tipping under wind loads. Prior to installing warning devices, the Contractor shall obtain Department approval of the method for weighting or fastening.
3. Warning devices other than those shown above may be used, but must have pre-construction approval by the Department.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RESURFACING WORK STOPPAGE THROUGH LANE TRAFFIC CONTROL

	Names	Dates
Designed by		
Drawn by		
Checked by		
F.H.W.A. Approved:		

Approved By
Deputy Design Engineer, Roadways

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