THE STATE OF DELAWARE

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

STANDARDS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET INDEX

- REVISED -

6/30/78 R.F.R.
4/24/79 R.F.R.
12/18/79 R.F.R.
1/30/81 R.F.R.
5/1/81 R.F.R.
5/15/84 B.E.B.

INDEX ALPHANUMERIC NUMBERING SYSTEM EXAMPLE

Standard Heading (Guard Rail And Barriers)
Sheet Number
Revision Number (Where Shown)

G-7-1

GUARD RAIL AND BARRIERS

G-1 3-CABLE GUARD RAIL AND ATTACHMENTS FOR GUARD RAIL
G-2-9 STEEL BEAM GUARD RAIL WOOD AND STEEL POST DETAILS
G-3-5 GUARD RAIL PLACING AND ANCHORING
G-4-7 POSTS AND FASTENERS - GALVANIZED STEEL BEAM GUARD RAIL
G-5 RAIL ELEMENTS - GALVANIZED STEEL BEAM GUARD RAIL
G-6-6 CORRUGATED METAL DOWNSPOUTS
G-7-1 GUARD RAIL TO BARRIER CONNECTION DETAILS
G-8 PORTABLE PORTLAND CEMENT CONCRETE SAFETY BARRIER

CURB, GUTTER AND ENTRANCE

C-1 URBAN ENTRANCE DETAILS
C-2 CURB AND CROSSABLE TRAFFIC SEPARATORS
C-3 GUTTER, CUT-OFF WALL AND PERFORATED UNDERDRAIN
C-4 GUTTER, HOT-MIX CURB
C-5 WHEELCHAIR CURB RAMPS AND MEDIAN OPENINGS

HEADWALLS

H-1 STRAIGHT AND L TYPE HEADWALLS
H-2 45° STANDARD AND 45° R.R. TYPE CULVERT

SYMBOLS AND SOILS

S-1 DESIGN SYMBOLS
S-2 DRAWING SYMBOLS
S-3 SOILS CLASSIFICATION AND BORING DATA

TRAFFIC

T-1-1 CABINET BASES, CONDUIT JUNCTION WELLS AND SIGN FOUNDATION
T-2 POLE BASES
T-3-1 LOOP DETECTORS AND MAGNETIC TRANSENSOR
T-4 STREET OR ROAD NAME SIGNS
T-5 ROADSIDE SIGN PLACEMENT AND SPAN WIRE AND MESSENGER CABLE ATTACHMENTS

DRAINAGE

D-1-11 CASTINGS, STEPS, MONUMENT BOX DETAILS
D-2-4 PARKWAY CATCH BASINS
D-3-4 P.W.-BD-2 MODIFIED CATCH BASINS 1 AND 2
D-4 MEDIAN GRATE M-1
D-5 SAFETY END STRUCTURE
D-6-6 CATCH BASINS M.D. AND M.S.
D-7-5 CATCH BASINS A AND B, B JUNCTION BOX
D-8-6 CATCH BASINS A-A AND LAWN
D-9-7 CATCH BASINS J, J MODIFIED, S.D.-1A
D-10-6 CATCH BASIN DOUBLE S.D.-1A
D-11-8 CATCH BASINS S.D.-1 AND S.D.-2A
D-12-3 CATCH BASIN B-2, JUNCTION BOX A
D-13-1 JUNCTION BOX NO. 1 AND NO. 2
D-14-2 MANHOLES A, B, C, D, STANDARD
D-15 FLARED END SECTIONS - R.C.P. AND C.M.P.
D-16 PIPE BEDDING AND METHODS OF EROSION PROTECTION
D-17 MANHOLES W AND W-30
D-18-5 CATCH BASIN DOUBLE A
D-19-5 CATCH BASINS DOUBLE J AND DOUBLE J MODIFIED

MISCELLANEOUS

M-1 TREE PROTECTION
M-2 PORTLAND CEMENT CONCRETE STEPS
M-3 RIGHT-OF-WAY FENCE
M-4 CHAIN LINK FENCE
M-5 CHAIN LINK FENCE DETAILS

ENVIRONMENTAL

E-1 ENVIRONMENTAL CONTROL - TEMPORARY EROSION CONTROL DETAILS

PAVEMENT

P-1 REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT
P-2 P.C.C. BASE COURSE WITH CRACK CONTROL
P-3 9" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT
P-4 DETAILS - 9" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT
P-5 8" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT
P-6 DETAILS - 8" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT

COUNTY	CONTRACT	P. R. & REQ. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET C-1

URBAN ENTRANCE DETAILS

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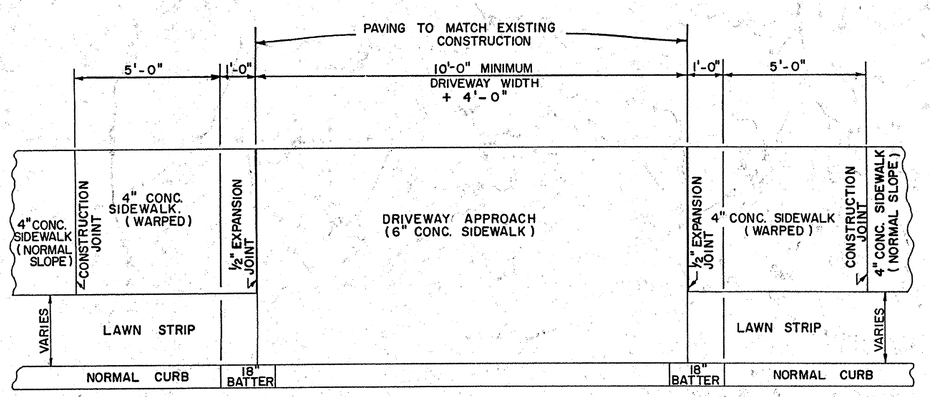
REVISIONS

DELETED ENTRANCE NOTES. 12-2-75 R.F.R.

APPROVED _____ 6-22-76
DIRECTOR OF OPERATIONS DATE

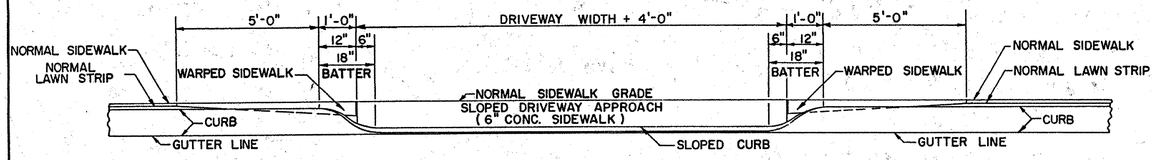
_____ 6/22/76
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

NOTE:
SEE CURRENT DEPARTMENT "POLICY & STANDARDS FOR ENTRANCES TO HIGHWAYS" FOR ADDITIONAL INFORMATION.



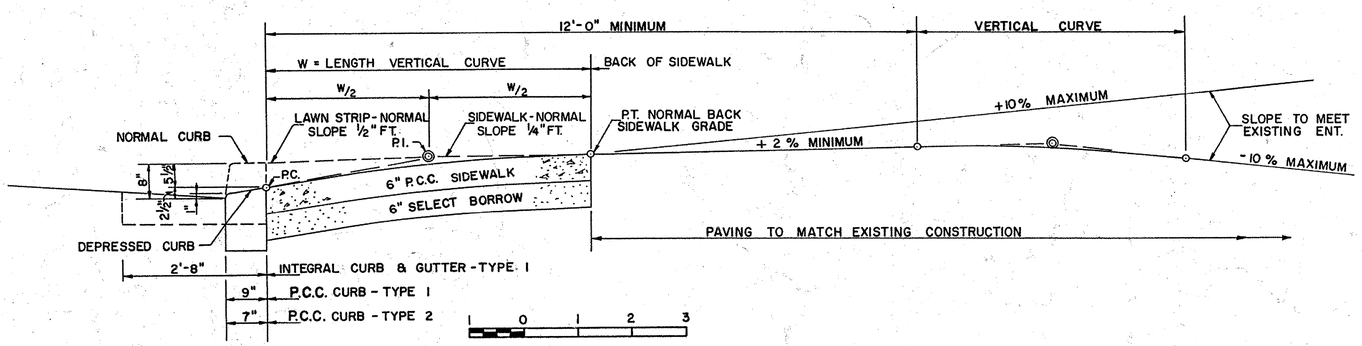
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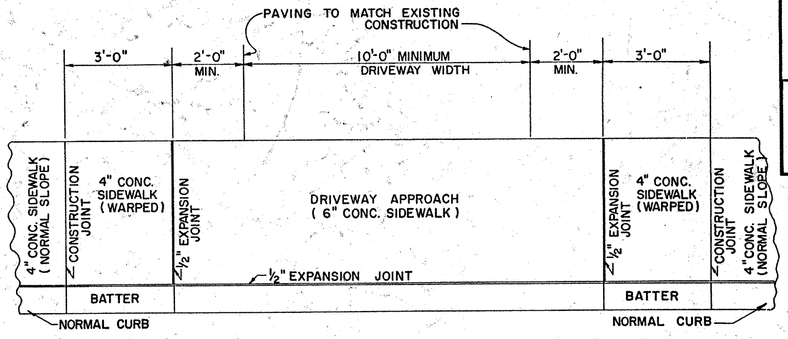
0 1 2 3 4 5



FRONT VIEW WITH LAWN STRIP

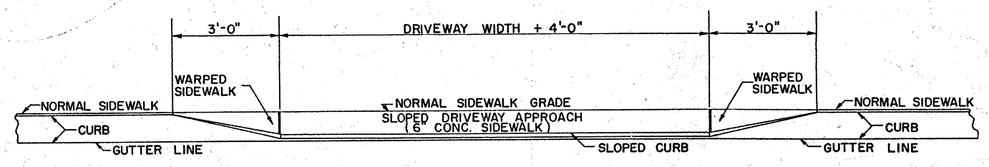
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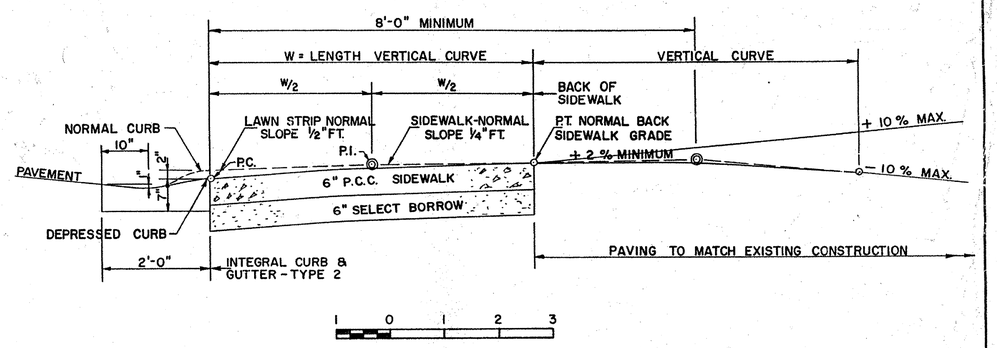
PLAN

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FRONT VIEW WITHOUT LAWN STRIP

0 1 2 3 4 5



DRIVEWAY PROFILES — SHOWING TYPICAL CONSTRUCTION

DIETZGEN Philadelphia 135 Imperial Tracing Cloth

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.		[redacted]	[redacted]

STANDARD SHEET C-2

CURB & CROSSABLE TRAFFIC SEPARATORS

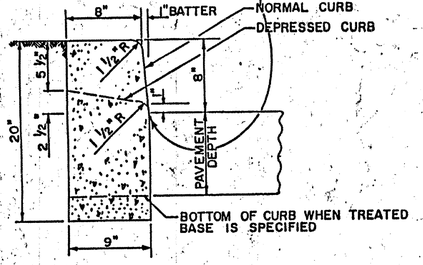
PREL. TRACING H.R.C. DESIGN J.E.R. CHKD. E.L.W.

REVISIONS

DELETED TYPE 1 HOT-MIX CURB. ADDED TYPE 3 INTEGRAL CURB & GUTTER AND TYPE 3 PARKWAY CURB. 10-29-70 J.T.B.
CORRECTED DIMENSION P.C.C. PARKWAY CURB TYPE 3. 6/25/71 Y.N.C.
ADDED CURB MODIFICATION AND NOTE 1/31/77 R.E.R

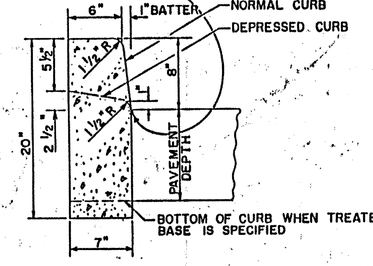
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DIRECTOR OF OPERATIONS DATE

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DEPUTY DIRECTOR-CHIEF ENGINEER DATE



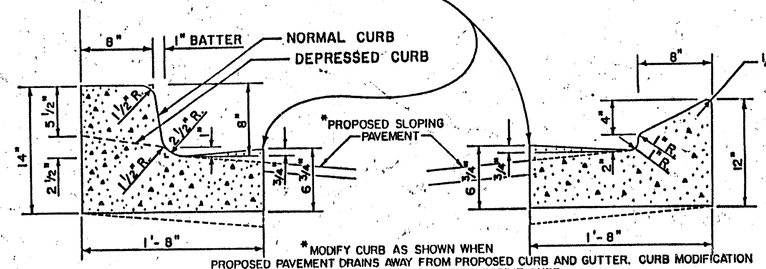
P.C.C. CURB
TYPE 1

IF CRACK IS VISIBLE ADJACENT TO CEMENT CONCRETE PAVEMENT. USE APPROVED JOINT FILLER.



P.C.C. CURB
TYPE 2

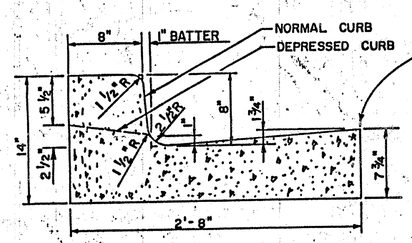
WHEN ADJACENT TO CEMENT CONCRETE PAVEMENT, APPLY APPROVED JOINT FILLER.



INTEGRAL P.C.C. CURB & GUTTER
TYPE 3

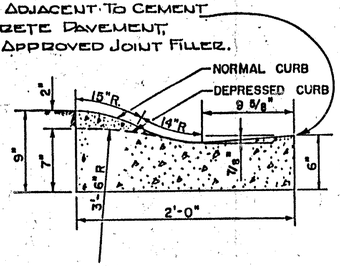
P.C.C. PARKWAY CURB
TYPE 3

*MODIFY CURB AS SHOWN WHEN PROPOSED PAVEMENT DRAINS AWAY FROM PROPOSED CURB AND GUTTER. CURB MODIFICATION TO BE INCLUDED IN UNIT PRICE BID FOR RESPECTIVE CURB.



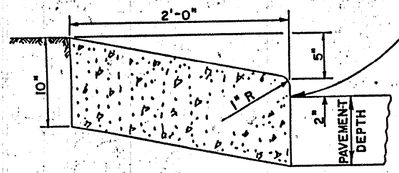
INTEGRAL P.C.C. CURB & GUTTER
TYPE 1

WHEN ADJACENT TO CEMENT CONCRETE PAVEMENT, APPLY APPROVED JOINT FILLER.

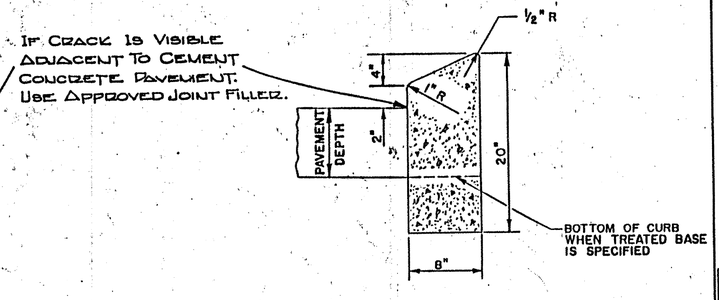


INTEGRAL P.C.C. CURB & GUTTER
TYPE 2

IF CRACK IS VISIBLE ADJACENT TO CEMENT CONCRETE PAVEMENT. USE APPROVED JOINT FILLER.



P.C.C. PARKWAY CURB
TYPE 1

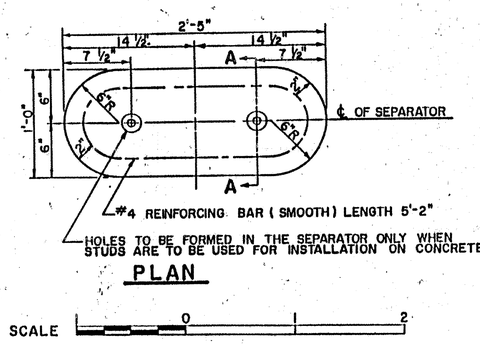


P.C.C. PARKWAY CURB
TYPE 2

SCALE
0 1 2 3

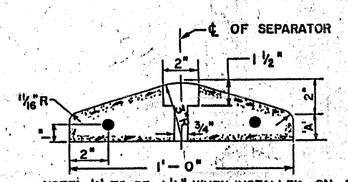
NOTE: COST OF JOINT FILLER & APPLICATION TO BE INCLUDED IN UNIT PRICE BID FOR CURBS.

CROSSABLE TRAFFIC SEPARATORS



PLAN

SCALE 0 2

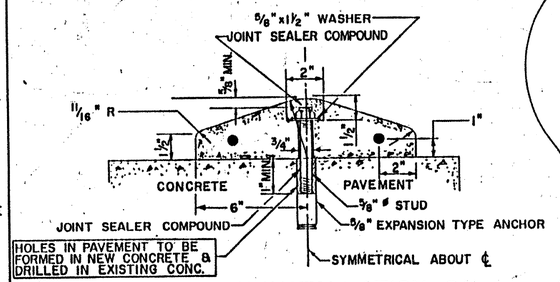


NOTE: 'A' TO BE 1 1/2" WHEN INSTALLED ON P.C.C. PAVEMENT.
'A' TO BE 3 1/2" WHEN INSTALLED ON HOT MIX ON CONC. BASE

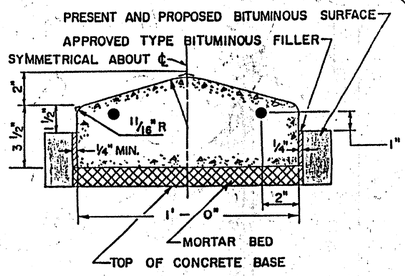
SECTION A-A

NOTE: THE SEPARATORS ARE TO BE PRECAST OF WHITE CEMENT CONCRETE

SCALE 0 1



METHOD OF INSTALLATION ON PORTLAND CEMENT CONC. PAVEMENT



METHOD OF INSTALLATION ON HOT-MIX, ON CONCRETE BASE

NOTE:
REINFORCING STEEL AND ALL OTHER ITEMS NECESSARY FOR THE CONSTRUCTION AND PLACEMENT OF THE SEPARATORS, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CROSSABLE TRAFFIC SEPARATORS.
THE SEPARATORS SHALL NOT BE PLACED UNTIL THE BITUMINOUS PAVEMENT HAS BEEN COMPACTED.
SAW PRESENT AND PROPOSED BITUMINOUS PAVEMENT TO DEPTH AS SHOWN.
PLACE MORTAR BED UNDER SEPARATOR TO INSURE A LEVEL SECTION AND THE PROPER HEIGHT AS SHOWN ABOVE.

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET C-3

GUTTER, CUT-OFF WALL, & PERFORATED UNDERDRAIN

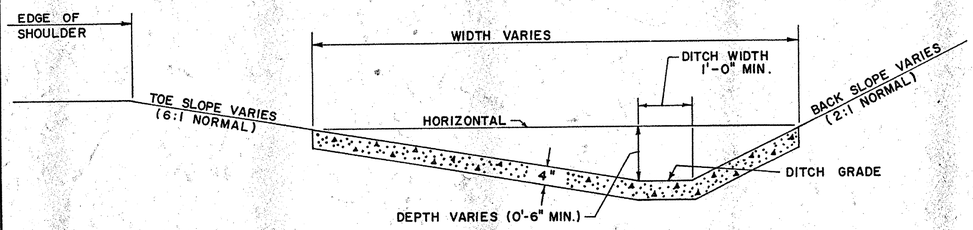
PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. E.L.W.

REVISIONS

REVISED GENERAL NOTES 5/11/76
REVISED BELOW PIPE DIMENSION UNDERDRAIN DETAIL 1-31-77 R.E.R.

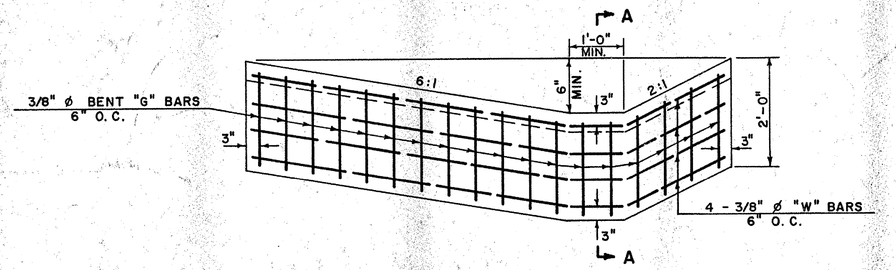
APPROVED _____ DIRECTOR OF OPERATIONS 6-22-70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE



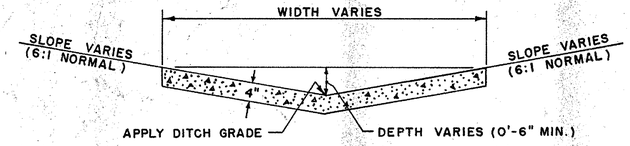
P.C.C. GUTTER- NORMAL SIDE DITCH

(DEPTH WILL BE 6" UNLESS OTHERWISE DIRECTED)



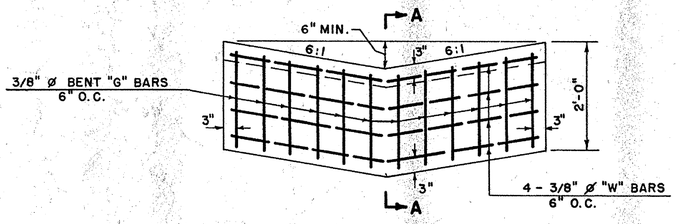
SECTION OF CUT-OFF WALL FOR ABOVE

SCALE 0 2 3



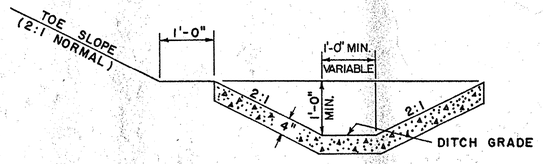
P.C.C. GUTTER- NORMAL MEDIAN STRIP

(DEPTH WILL BE 6" UNLESS OTHERWISE DIRECTED)

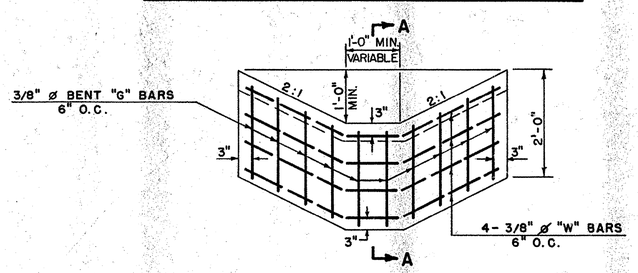


SECTION OF CUT-OFF WALL FOR ABOVE

SCALE 0 2 3

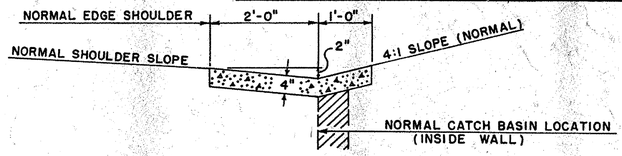


P.C.C. GUTTER- TOE OF SLOPE

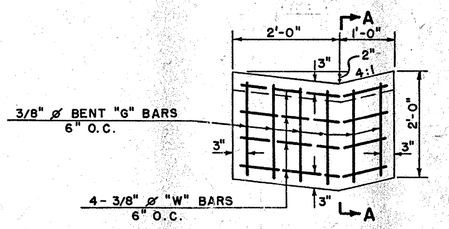


SECTION OF CUT-OFF WALL FOR ABOVE

SCALE 0 2 3

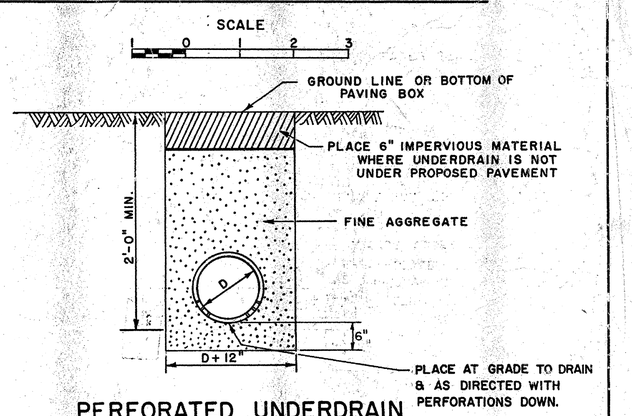


P.C.C. GUTTER- EDGE OF SHOULDER

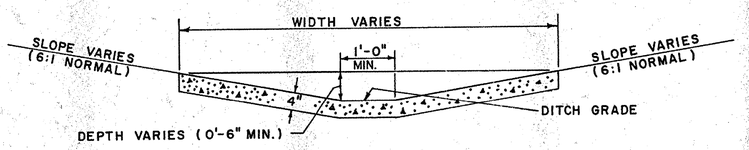


SECTION OF CUT-OFF WALL FOR ABOVE

SCALE 0 2 3

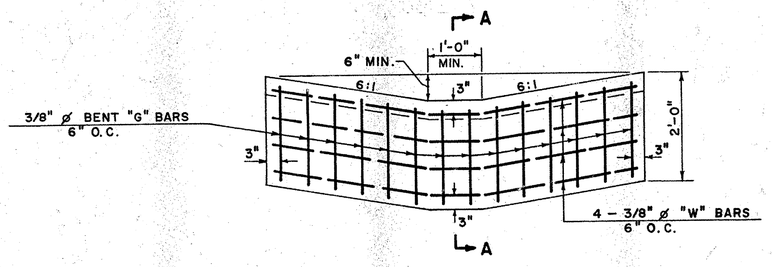


PERFORATED UNDERDRAIN TRENCH DETAIL



P.C.C. GUTTER- ALTERNATE MEDIAN STRIP

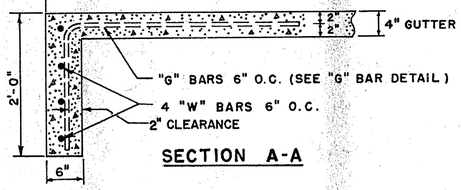
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SECTION OF CUT-OFF WALL FOR ABOVE

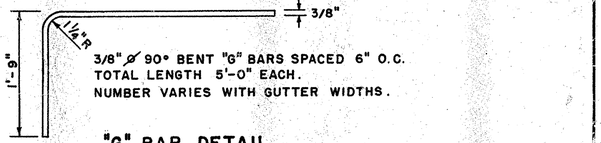
SCALE 0 2 3

CUT-OFF WALL



SECTION A-A

SCALE 0 2



"G" BAR DETAIL

GENERAL NOTES:

GENERAL PLAN OF CUT-OFF WALL IS TO BE ADAPTED TO ALL TYPES OF PORTLAND CEMENT CONCRETE GUTTER.
CUT-OFF WALL IS TO BE PLACED AT BEGINNING AND END OF EACH INSTALLATION
LENGTH OF "W" BARS WILL VARY WITH THE WIDTH OF GUTTER.
THE COST OF CUT-OFF WALL COMPLETE IN PLACE TO BE INCLUDED IN UNIT PRICE BID FOR GUTTER.

3 MILPRINT - IMPERIAL TRACING CLOTH

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET C-4
GUTTER, HOT-MIX CURB

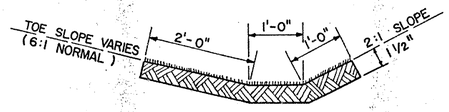
PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. E.L.W.

REVISIONS

ADDED HOT-MIX CURB. 10-30-70 J.T.B.
DELETED CONCRETE GUTTER TYPE 2. 11-7-70 E.L.W.
ADDED HOT-MIX CURB, TYPE 2. 10-7-75 R.F.R.
REVISED CURB TITLES 1-31-77 R.F.R.

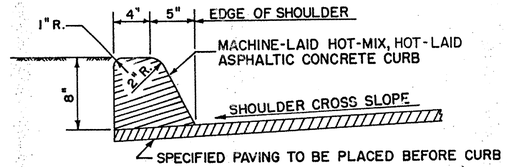
APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



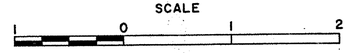
SOD GUTTER

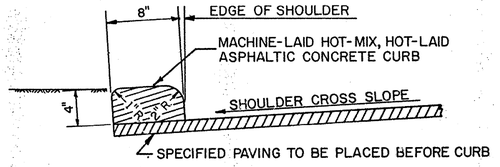
SCALE



HOT-MIX, HOT LAID
BITUMINOUS CONCRETE CURB
TYPE 1

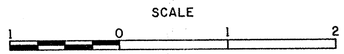
SCALE





HOT-MIX, HOT-LAID
BITUMINOUS CONCRETE CURB
TYPE 2

SCALE



CONTRACT	COUNTY	FEDERAL AID PROJECT Nº	SHEET Nº	TOTAL SHEETS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

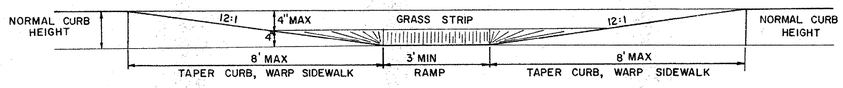
STANDARD SHEET NUMBER C-5-1

WHEELCHAIR CURB RAMPS AND MEDIAN OPENINGS

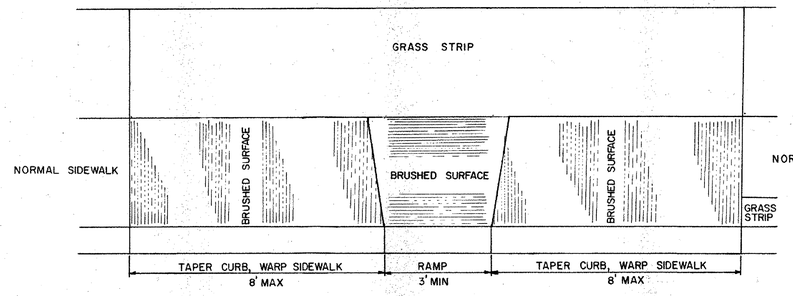
REVISIONS

APPROVED _____ DIRECTOR OF OPERATIONS 3/27/85 DATE

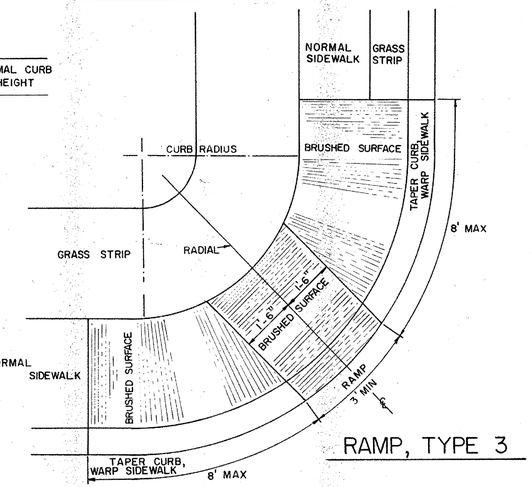
RECOMMENDED _____ DEPUTY DIRECTOR OF HIGHWAYS 3/19/85 DATE



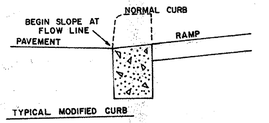
PROFILE - RAMPS, TYPE 2 & 3

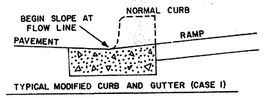


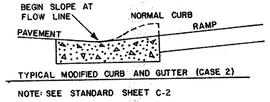
RAMP, TYPE 2



RAMP, TYPE 3







NOTE: SEE STANDARD SHEET C-2

CURB MODIFICATIONS FOR RAMPS

GENERAL NOTES

PAYMENT FOR RAMPS AND DEPRESSED CURB SHALL BE UNDER THE APPLICABLE SECTION 705 BID ITEM AND THE SECTION PERTAINING TO THE ADJOINING CURB RESPECTIVELY

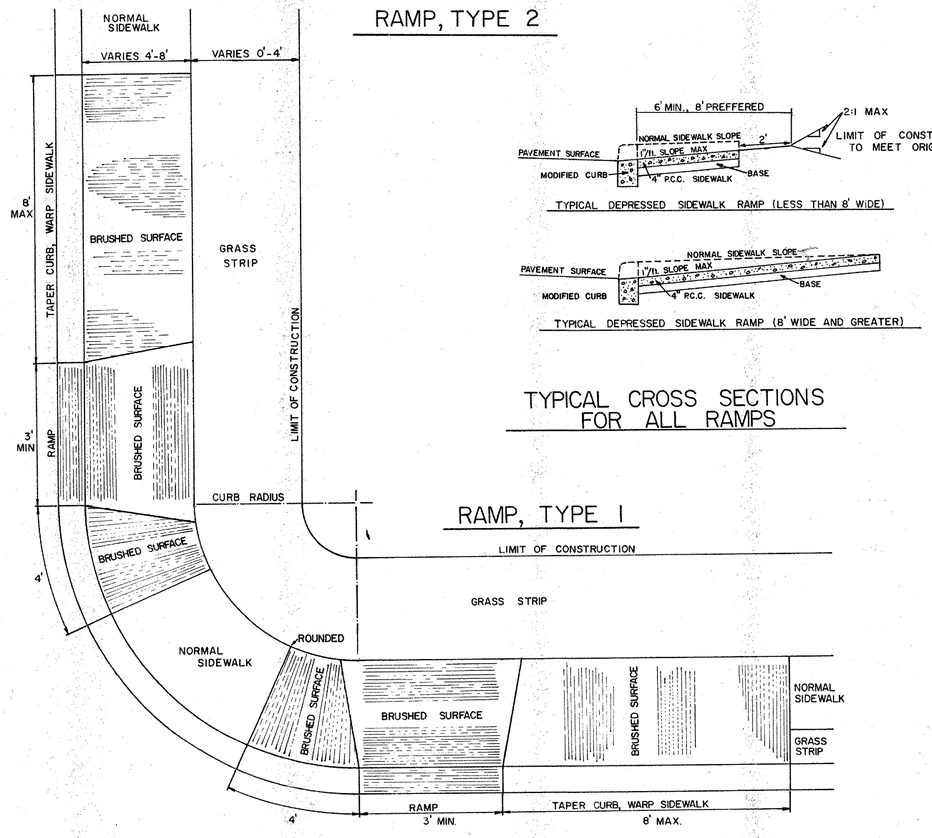
CURB RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF THE INTERSECTION, ISLANDS OR CROSSWALKS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER

SETTING CONCRETE TO BE BRUSHED WITH STREET BROOM IN THE DIRECTION SHOWN BY ARROWS TO CREATE A SKID RESISTANT SURFACE ON ALL RAMPS

THE SLOPE OF ALL CURB RAMPS SHALL BEGIN FLUSH WITH THE PAVEMENT OR GUTTER AT THE FLOW LINE

TRAFFIC ISLANDS SHALL BE FULLY DIVIDED OR RAMPED AT CROSSWALK LOCATIONS AS SHOWN. ISLANDS OF INSUFFICIENT WIDTH TO ACCOMODATE UP AND DOWN RAMPS AND A 4' LEVEL PLATFORM SHALL HAVE A 4' WIDE CROSSWALK FLUSH WITH THE ADJOINING PAVEMENT

THE BROOMED FINISHED SURFACE SHALL EXTEND ONE FOOT BEYOND THE WARPED SIDEWALK SECTIONS.

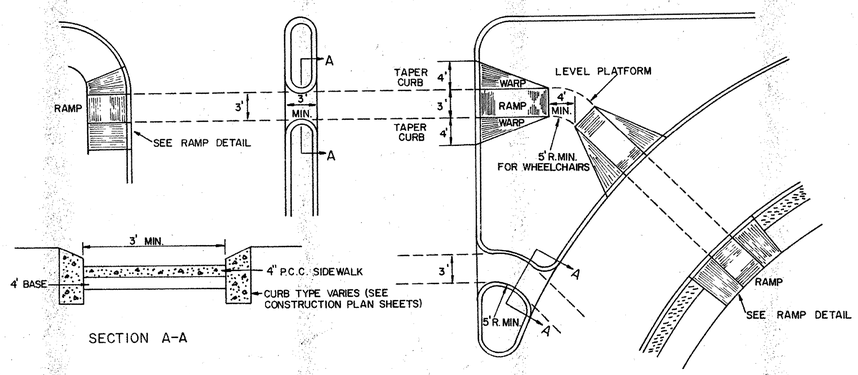


RAMP, TYPE 1

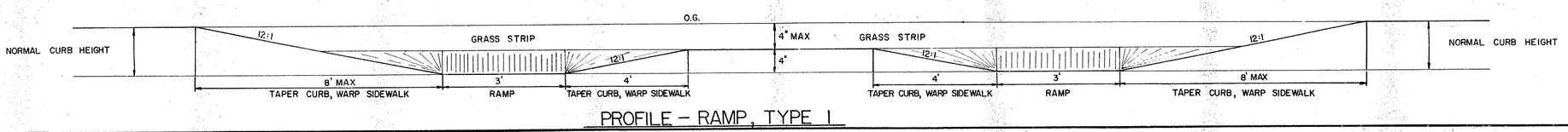
TYPICAL DEPRESSED SIDEWALK RAMP (LESS THAN 8' WIDE)

TYPICAL DEPRESSED SIDEWALK RAMP (8' WIDE AND GREATER)

TYPICAL CROSS SECTIONS FOR ALL RAMPS



MEDIAN OPENINGS



PROFILE - RAMP, TYPE 1

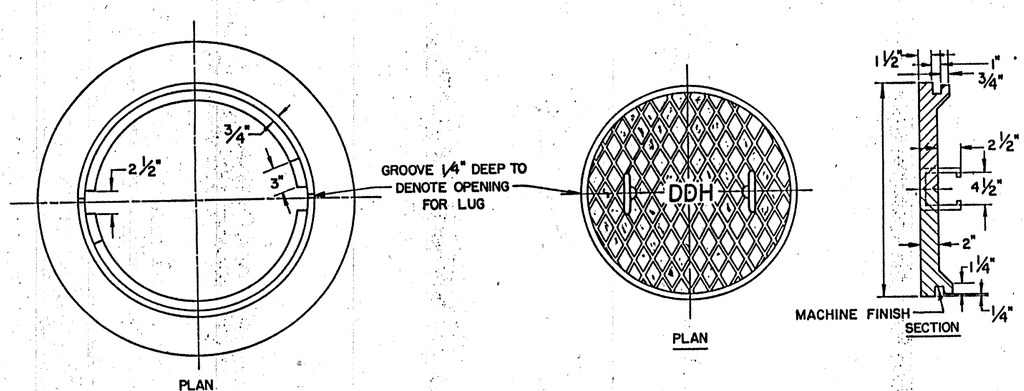
REVISIONS

DESIGN NUBEIL CHKD.

PREL. TRACING NUBEIL

55163

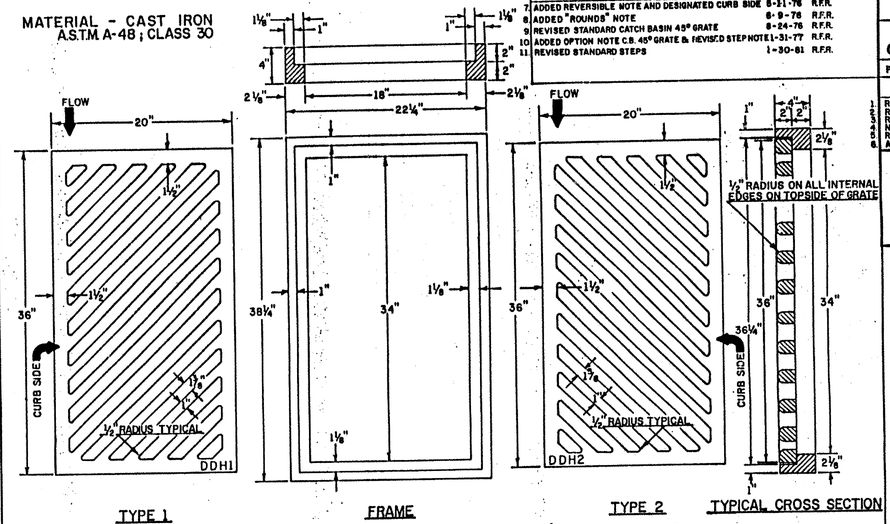
NOTE:
THE CONTACTING SURFACES ON ALL MANHOLE FRAMES AND COVERS USED IN ROADWAY OR SHOULDER AREAS ARE TO BE MACHINE FINISHED.



FRAME AND COVER FOR STANDARD MANHOLES

WT. FRAME AND COVER 470 LBS. (MIN.) 490 LBS. (MAX.)

MATERIAL - CAST IRON
A.S.T.M. A-48; CLASS 30



NOTE: BOTTOM OF GRATE TO BE FLAT AND TRUE

*THE LETTERS "DDH" AND THE NUMERALS "1" OR "2" TO BE ONE INCH AND RAISED ON TOP SIDE OF EACH GRATE LOCATED AS SHOWN



DETAIL OF IDENTIFICATION LETTERS (ONE SIDE ONLY)

STANDARD CATCH BASIN FRAME & 45° GRATE

*THE ABOVE MENTIONED LETTERS MAY BE ETHER RAISED OR DEPRESSED AT THE OPTION OF THE FOUNDRY

REVISIONS (Cont.)

7.	ADDED REVERSIBLE NOTE AND DESIGNATED CURB SIDE	8-21-76	R.F.R.
8.	ADDED "ROUNDS" NOTE	8-9-76	R.F.R.
9.	REVISED STANDARD CATCH BASIN 45° GRATE	8-24-76	R.F.R.
10.	ADDED OPTION NOTE C.B. 45° GRATE & REVISED STEP NOTE	1-31-77	R.F.R.
11.	REVISED STANDARD STEPS	1-30-81	R.F.R.

COUNTY	CONTRACT	P. R. & R. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-1-11
CASTINGS, STEPS, MONUMENT BOX DETAILS

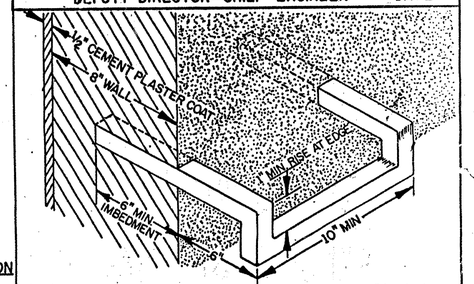
PREL. TRACING J.L.W.H.T.R. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

1	REVISED IMPRINT ON CASTINGS AND SEATING SURFACE REQUIREMENTS	12-22-70 JTB
2	REVISED OUTSIDE DIMENSION STANDARD C.B. FRAME	7-8-71 JTB
3	REVISED STANDARD CATCH BASIN GRATE	5-16-74 JTB
4	NOTE PROVIDING ALTERNATE STEP	10-25-74 RTC
5	REVISED STANDARD STEPS	12-2-75 RFR
6	ADDED DETAIL IDENTIFICATION LETTERS	5-11-76 RFR

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

Joe S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



Steps are required to be installed in each catch basin, manhole or type B junction box exceeding 48 inches in depth measured from the top of grate or cover elevation to the center line of the lowest pipe.

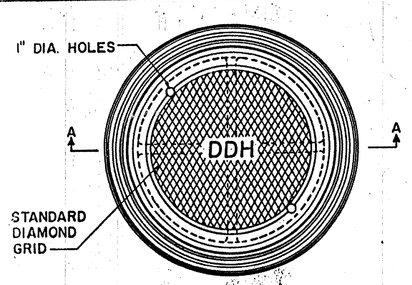
The top step shall be located no more than 30 inches below the top of grate or cover. The steps shall be aligned so as to form a continuous ladder and be spaced equally and vertically at 12 inch intervals unless other wise directed. The bottom step shall be no more than 23 inches nor less than 13 inches above the finished bottom of the unit except when structurally impractical

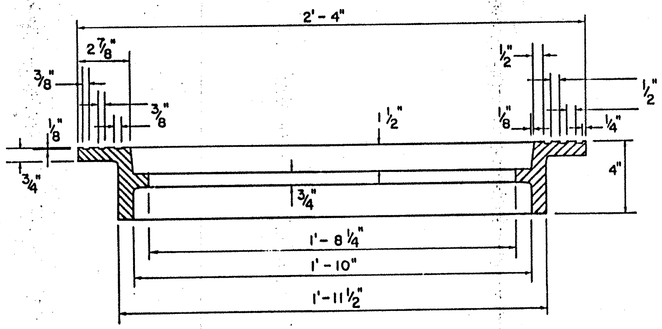
The steps shall be of grey iron castings conforming to AASHTO M105, class 30 B or carbon steel castings conforming to AASHTO M103 and be galvanized in accordance with AASHTO M111 or extruded aluminum conforming to ASTM B221, alloy 6061-T6 coated with zinc chromate primer as per Fed. Spec. TT-P-645. Aluminum steps shall in no way be permited to contact reinforcement or dissimilar metals.

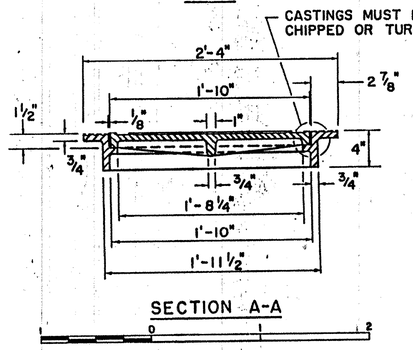
The minimum cross sectional dimension of the step shall be 0.75 inches

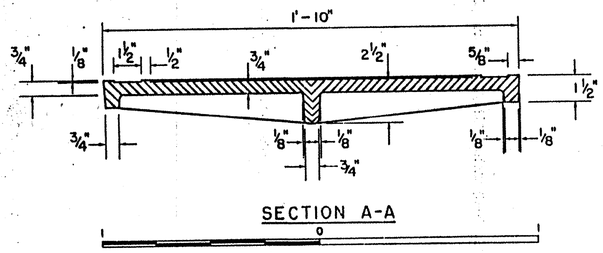
The dimensions and specifications herein shown or described are specifics or minimum standards and must be adhered to. The pictorial representation is for the purpose of displaying dimensions and does not constitute a standard in itself, however, all deviations must be submitted to the department, design section, for approval.

STANDARD STEPS



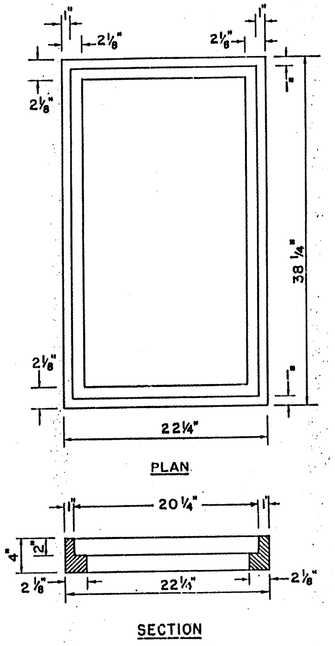


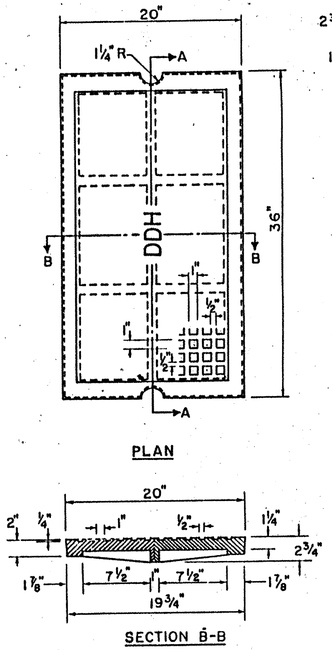


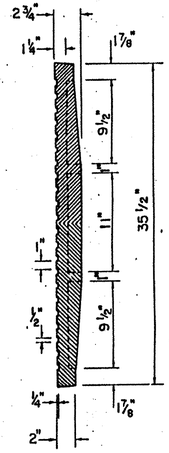


SIDEWALK FRAME AND COVER

WEIGHT 195 LBS



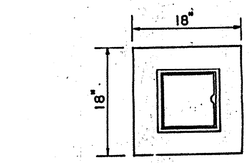


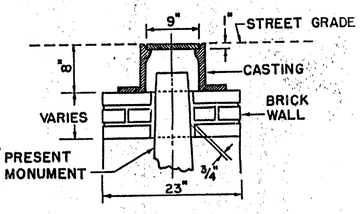


NOTE:
USE TO CONVERT B C.B. TO JUNCTION BOX

B JUNCTION BOX FRAME & COVER

WEIGHT 465 LBS MIN.- 485 LBS MAX.





NOTE:
BRICK MASONRY AND CASTING SHALL BE INCLUDED IN THE PRICE BID FOR "MONUMENT BOX".

MONUMENT BOX DETAIL

0 2

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-2-4

PARKWAY CATCH BASINS

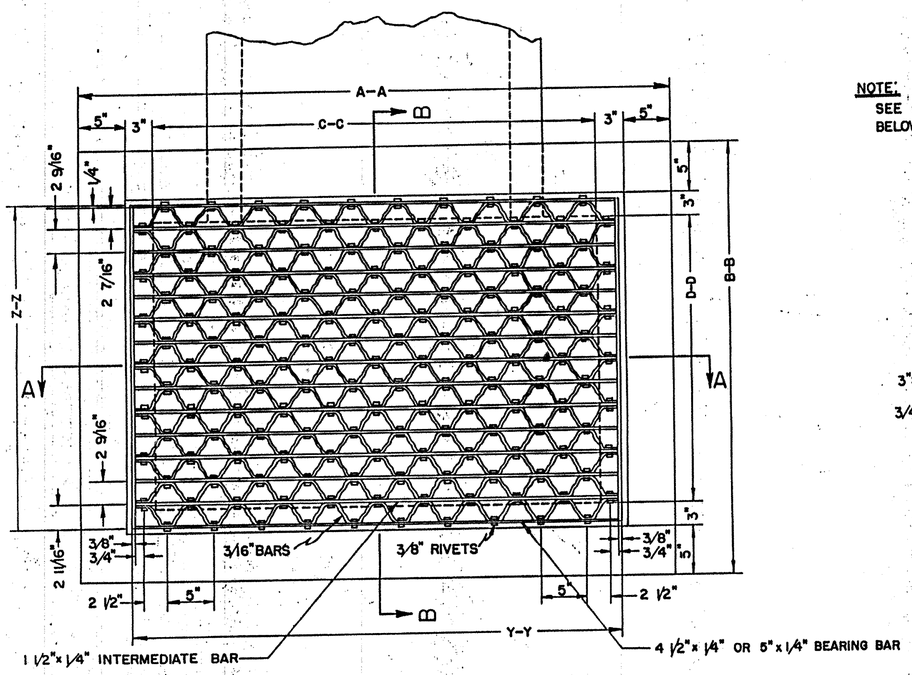
PREL. TRACING J. WHITE DESIGN E. L. W. CHKD. J. T. B.

REVISIONS

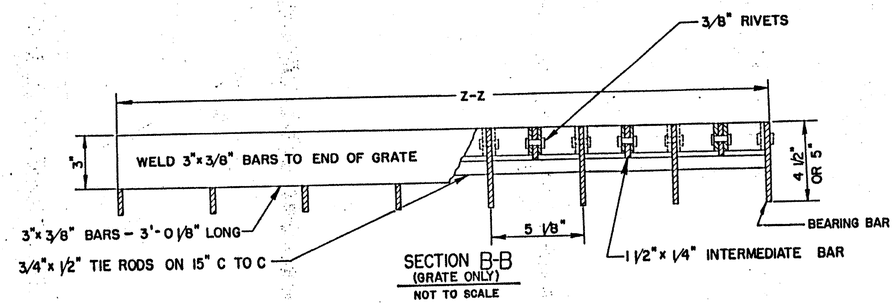
1. CLARIFIED GRATE AND BASIN DIMENSIONS AND ADDED NOTE TO GUTTER. 12-2-75 R.F.R.
2. REPLACED NOTE (6) 5-11-76 R.F.R.
3. ADDED NOTE (7) 1-31-77 R.F.R.
4. REVISED NOTE (5) ADDED NOTE (8) 1-30-81 R.F.R.

APPROVED _____ DIRECTOR OF OPERATIONS 6-22-70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE

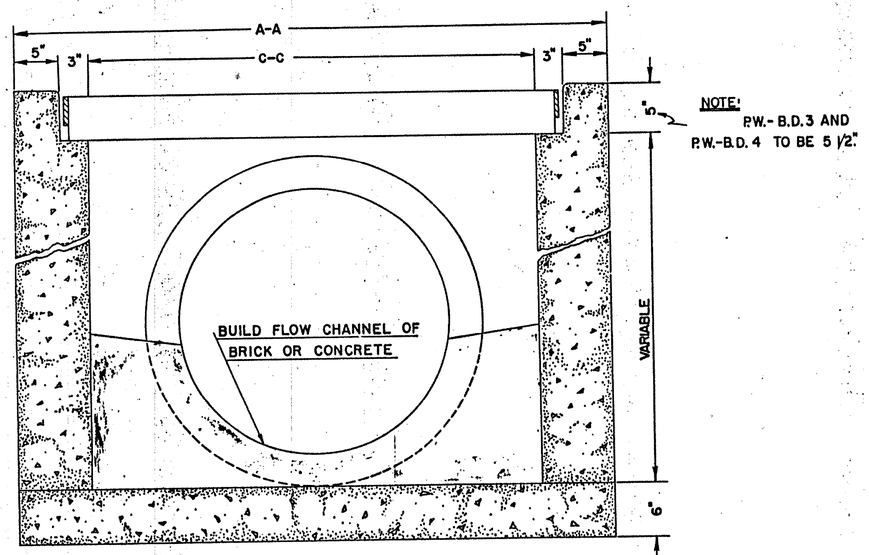


NOTE:
SEE CATCH BASIN AND GRATING DATA BELOW FOR SIZES.



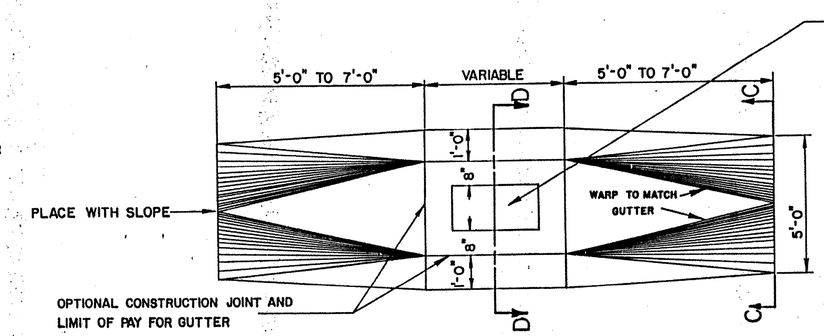
SECTION B-B
(GRATE ONLY)
NOT TO SCALE

PARKWAY CATCH BASINS
P.W.-B.D. 1
P.W.-B.D. 2
P.W.-B.D. 3
P.W.-B.D. 4

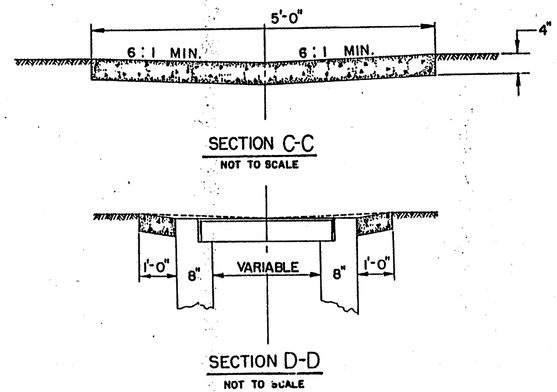


SECTION A-A
NOT TO SCALE

NOTE:
P.W.-B.D. 3 AND P.W.-B.D. 4 TO BE 5 1/2".



CONC. GUTTER TO BE USED WITH PARKWAY CATCH BASINS.
NOT TO SCALE



SECTION C-C
NOT TO SCALE

SECTION D-D
NOT TO SCALE

NOTES:

(1) GUTTER USED ONLY WHEN NOTED ON PLANS.

(2) P.W.-B.D. C. BASIN WALLS TO BE BRICK, CONCRETE, OR SOLID CONCRETE BLOCK, EXCEPT FOR UPPER 12" WHICH IS TO BE OF CEMENT CONCRETE MASONRY.

(3) COST OF CONCRETE MASONRY TO BE INCLUDED IN UNIT PRICE BID FOR STRUCTURE COMPLETE.

(4) GRATING INCLUDED IN UNIT PRICE BID FOR P.W.-B.D. CATCH BASIN GRATINGS TO BE GALVANIZED.

(5) PARGET BRICK OR BLOCK WITH 1/2" OF PORTLAND CEMENT MORTAR.

(6) P.C.C. GUTTER WILL BE PAID FOR UNDER SECTION 704, PORTLAND CEMENT CONCRETE GUTTER.

(7) CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCING AND OTHER PERTINENT INFORMATION FOR APPROVAL.

(8) STEPS ARE TO BE PLACED IN ALL CATCH BASINS & MANHOLE OVER 4' DEEP, SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN OR MANHOLE.

PARKWAY CATCH BASIN AND DRAIN GRATE DATA

NUMBER OF CATCH BASIN	LARGEST PIPE SIZE		CATCH BASIN DATA						GRATING DATA			
	A-A	B-B	WALL THICK.	A-A OUTSIDE	B-B OUTSIDE	C-C INSIDE	D-D INSIDE	BEARING BAR SIZES	Y-Y	Z-Z	GRATING AREA & WEIGHT
P.W.-B.D. 1	30"	15"	8"	4'-5 1/2"	3'-3 7/8"	3'-1 1/2"	1'-11 7/8"	4 1/2" x 1/4"	3'-6 1/4"	2'-4 7/16"	8.39 sq ft / 178 LBS.
P.W.-B.D. 2	36"	24"	8"	5'-3 1/4"	3'-11 1/2"	3'-11 1/4"	2'-7 1/2"	4 1/2" x 1/4"	4'-4 1/4"	3'-0 1/8"	13.11 sq ft / 273 LBS.
P.W.-B.D. 3	42"	24"	8"	5'-8 1/4"	3'-11 1/2"	4'-4 1/4"	2'-7 1/2"	5" x 1/4"	4'-9 1/4"	3'-0 1/8"	14.36 sq ft / 311 LBS.
P.W.-B.D. 4	48"	24"	8"	6'-1 1/4"	3'-11 1/2"	4'-9 1/4"	2'-7 1/2"	5" x 1/4"	5'-2 1/4"	3'-0 1/8"	15.62 sq ft / 336 LBS.

COUNTY	CONTRACT	P. R. A. SEQ. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

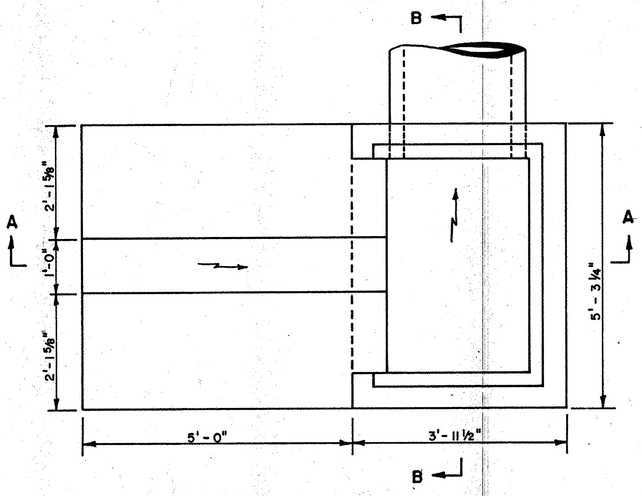
STANDARD SHEET D-3-4
P.W.-B.D.-2 MOD. CATCH BASINS 1 & 2

PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. Y.N.C.

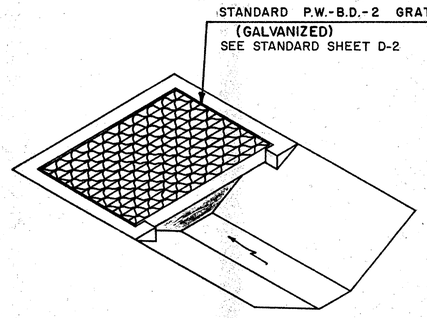
1. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-2, R.T.C.
2. REMOVED CUT-OFF WALL NOTE 5/11/76 -
3. ADDED PRECAST NOTES 1-31-77 R.F.R.
4. REVISED AND ADDED NOTES 1-30-81 R.F.R.

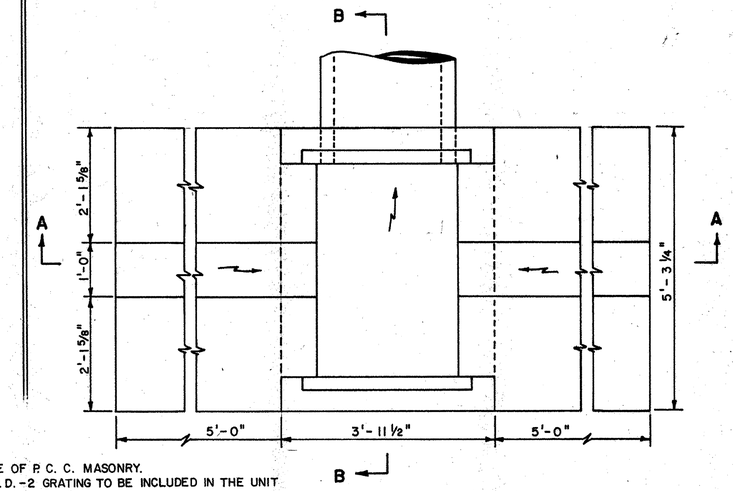
APPROVED [signature] 6-22-70
DIRECTOR OF OPERATIONS DATE

Joe S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

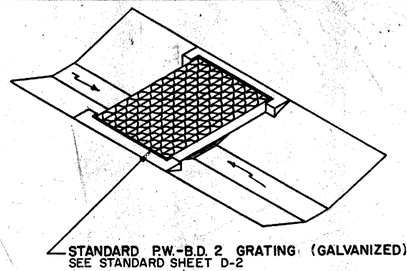


PLAN



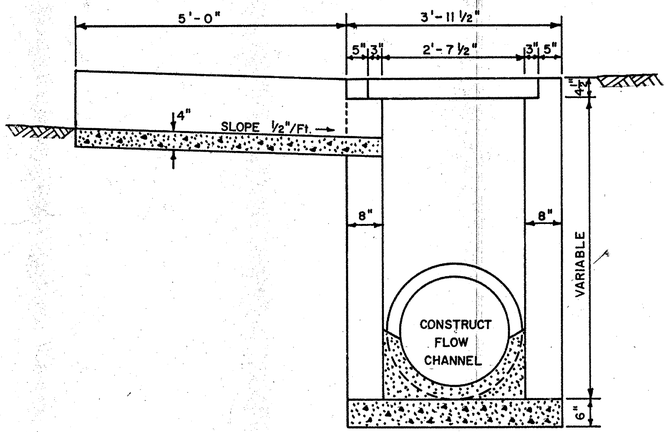


PLAN

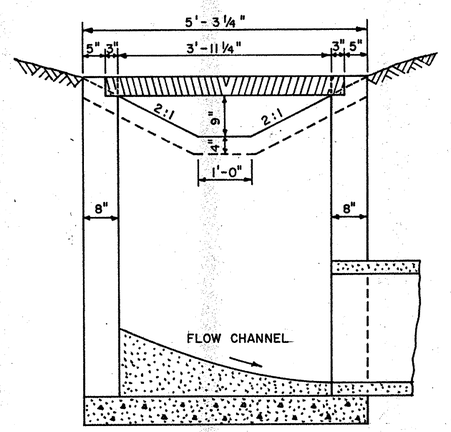


GENERAL NOTES:

1. TOP 12" OF THE CATCH BASIN TO BE OF P. C. C. MASONRY.
2. COST OF P. C. C. GUTTER AND P.W.-B.D.-2 GRATING TO BE INCLUDED IN THE UNIT PRICE BID FOR CATCH BASIN.
3. P.W.-B.D.-2 MODIFIED CATCH BASINS 1 & 2 TO BE USED ONLY 30' OR MORE FROM EDGE OF NEAREST RUNNING LANE.
4. STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST STEP TO BE INCLUDED IN COST OF CATCH BASIN.
5. PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.
6. CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.



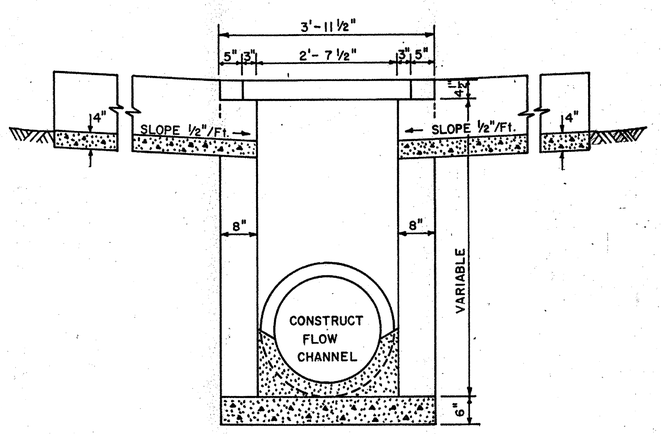
SECTION A-A



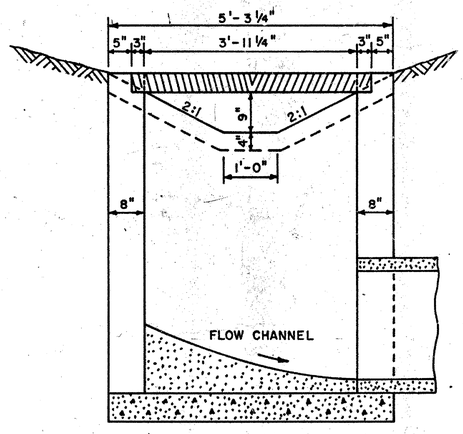
SECTION B-B

P.W.-B.D.-2 MODIFIED #1 CATCH BASIN

1 0 1 2 3



SECTION A-A



SECTION B-B

P.W.-B.D.-2 MODIFIED #2 CATCH BASIN

1 0 1 2 3

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-4

MEDIAN GRATE M-1

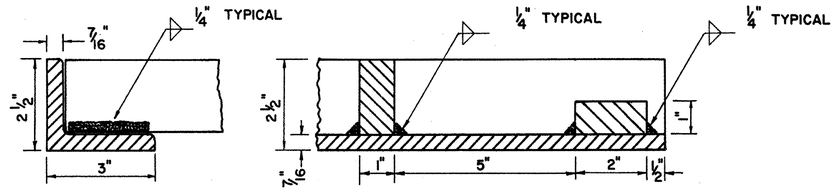
PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

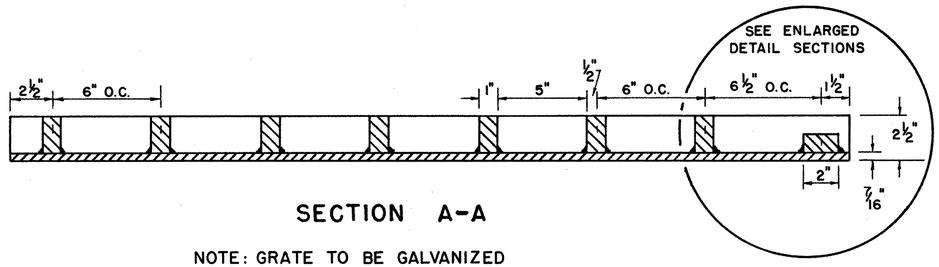
NOMENCLATURE CHANGES FOR A.I.S.C. SPECIFICATIONS, 3/31/71 —D.M.E.—

APPROVED _____ DIRECTOR OF OPERATIONS 6.22.70 DATE

Joe S. Robinson DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE

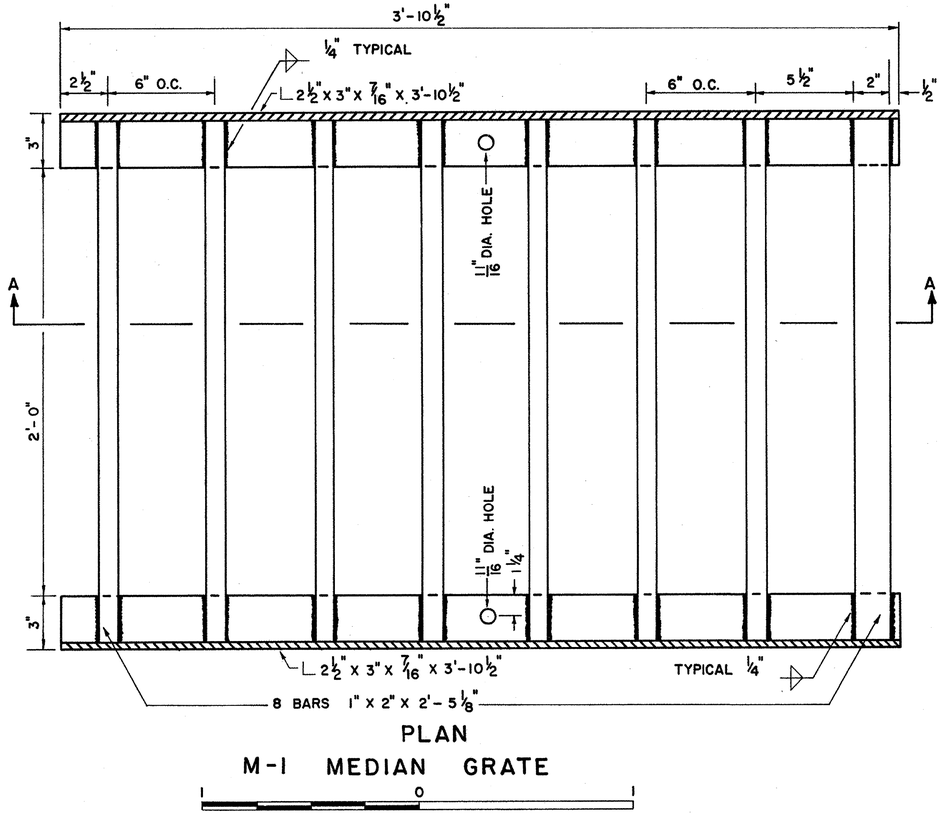


ENLARGED SECTIONS



SECTION A-A

NOTE: GRATE TO BE GALVANIZED



PLAN

M-1 MEDIAN GRATE

0

COUNTY	CONTRACT	P. S. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-5
SAFETY END STRUCTURE

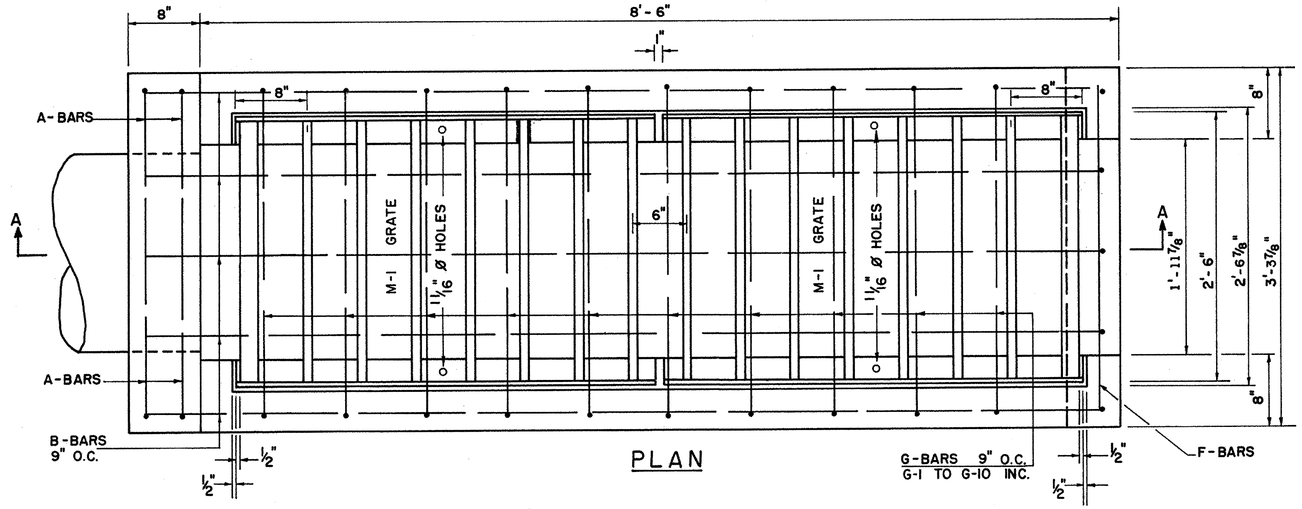
PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

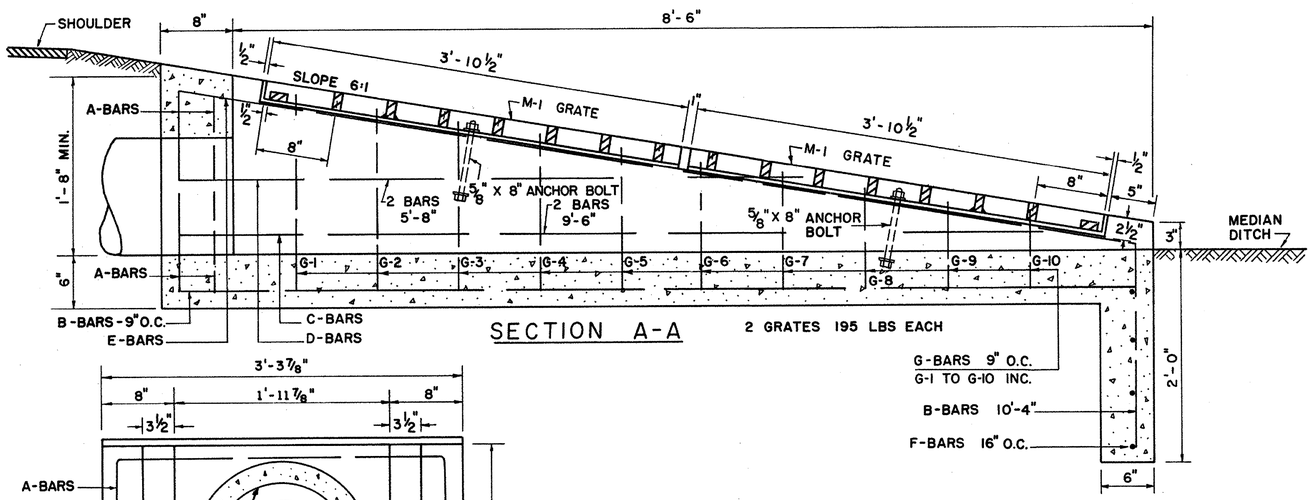
REVISIONS

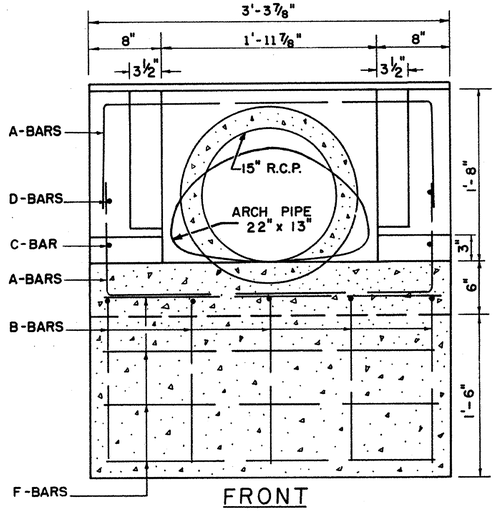
STANDARDIZED DIMENSIONS 12-2-75 R.F.R.

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE







SAFETY END STRUCTURE

1 0 1 2

TABLE OF REINFORCEMENT			
REINFORCEMENT	QTY.	LENGTH	TOTAL LENGTH
A-BARS (3'-0", 1'-3")	4	5'-6"	22'-0"
G-1 BAR (3'-0", 1'-10")	1	6'-8"	6'-8"
G-2 BAR (3'-0", 1'-8")	1	6'-4"	6'-4"
G-3 BAR (3'-0", 1'-7")	1	6'-2"	6'-2"
G-4 BAR (3'-0", 1'-5")	1	5'-10"	5'-10"
G-5 BAR (3'-0", 1'-4")	1	5'-8"	5'-8"
G-6 BAR (3'-0", 1'-2")	1	5'-4"	5'-4"
G-7 BAR (3'-0", 1'-1")	1	5'-2"	5'-2"
G-8 BAR (3'-0", 1'-0")	1	4'-10"	4'-10"
G-9 BAR (3'-0", 0'-10")	1	4'-8"	4'-8"
G-10 BAR (3'-0", 0'-8")	1	4'-4"	4'-4"
B-BARS (8'-10", 1'-9")	5	10'-4"	51'-8"
C-BARS (8'-11", 0'-9")	2	9'-8"	19'-4"
D-BARS STRAIGHT	2	5'-8"	11'-4"
E-BARS STRAIGHT	2	8'-10"	17'-8"
F-BARS STRAIGHT	4	3'-1"	12'-4"
* TOTAL LENGTH 189' 1/2" Ø BARS TOTAL WEIGHT 130 LBS ALL REINFORCING BARS TO BE 1/2" Ø			

* REINFORCING BAR LIST GIVEN FOR ESTIMATING PURPOSES ONLY. COST TO BE INCLUDED IN UNIT PRICE BID FOR STRUCTURE.

NOTE:

SAFETY END STRUCTURES TO BE USED AT EACH END OF CROSSOVER DRAINS.

END STRUCTURE SHALL BE PAID FOR AT A UNIT PRICE BID EACH IN PLACE, INCLUDING M-I GRATES AND REINFORCING STEEL.

THE MINIMUM SLOPE FOR PIPE UNDER CROSSOVERS SHALL BE 0.003.

SEE STANDARD SHEET D-4 FOR M-I GRATE.

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-6-6
CATCH BASIN M.D. & M.S.

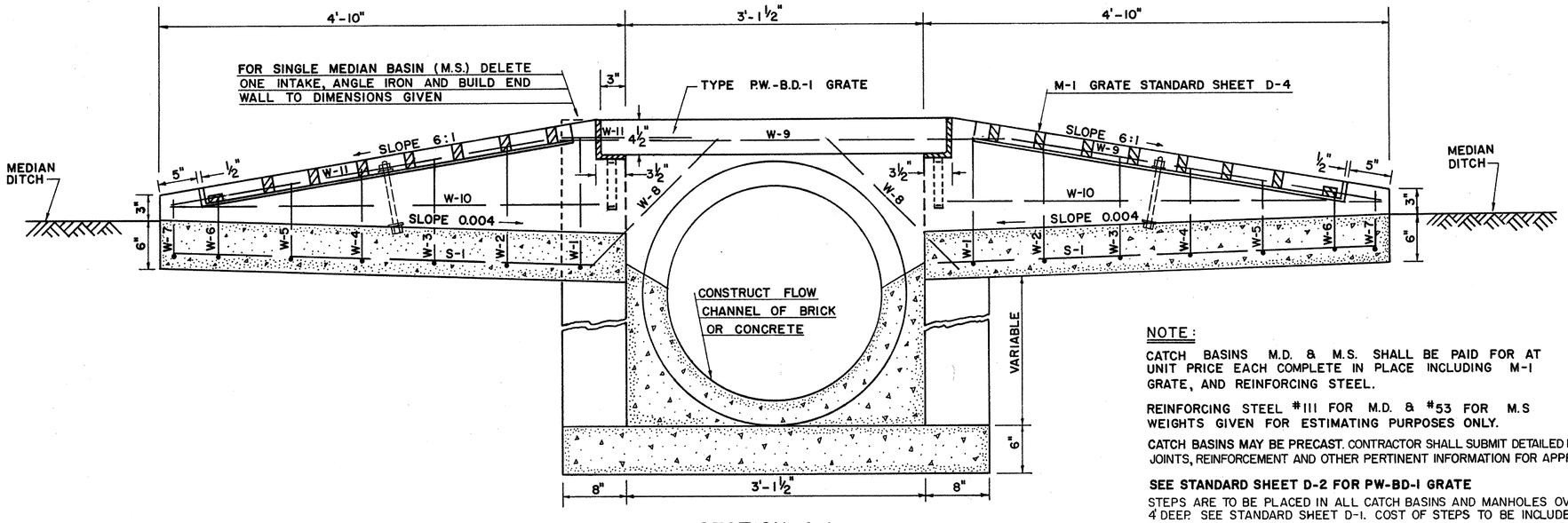
PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

1. 4/1/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
2. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-2, R.T.C.
3. STANDARDIZED DIMENSIONS 12-2-75 R.F.R.
4. REMOVED CUT-OFF WALL NOTE 5-11-76 R.F.R.
5. ADDED PRECAST NOTE 1-31-77 R.F.R.
6. ADDED STEP NOTE 1-30-81 R.F.R.

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS — DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER — DATE



SECTION A-A

M.D. & M.S. CATCH BASINS

NOTE:

CATCH BASINS M.D. & M.S. SHALL BE PAID FOR AT UNIT PRICE EACH COMPLETE IN PLACE INCLUDING M-I GRATE, AND REINFORCING STEEL.

REINFORCING STEEL #111 FOR M.D. & #53 FOR M.S WEIGHTS GIVEN FOR ESTIMATING PURPOSES ONLY.

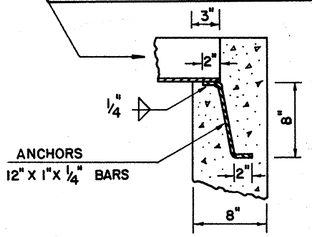
CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.

SEE STANDARD SHEET D-2 FOR PW-BD-I GRATE

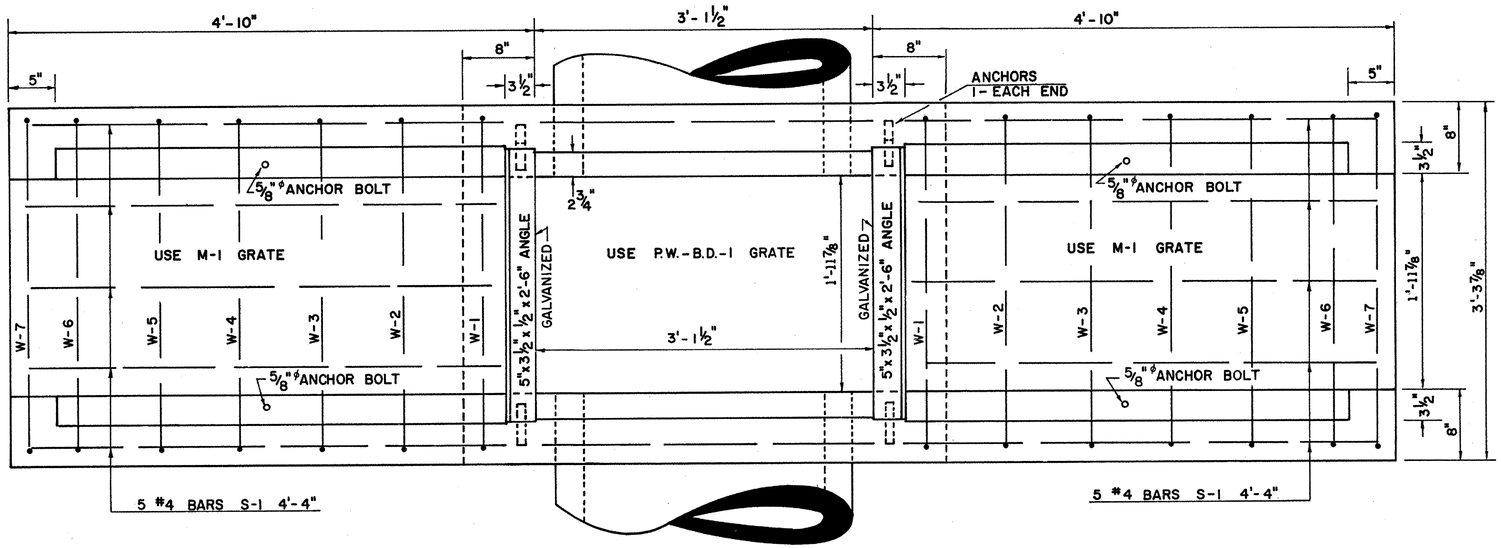
STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.

NOTE:

5"X3½"X½"X 2'-6" ANGLE (GALVANIZED)



ANCHOR DETAIL



PLAN

0 1 2

BAR SCHEDULE

STRAIGHT BARS – SIZE 4ϕ

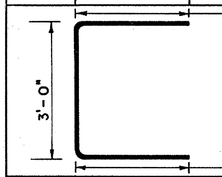
NO.	MARK	LENGTH	TOTAL LENGTH
10	S-1	4'-4"	43'-4"
2	W-11	6'-0"	12'-0" *
4	W-10	4'-4"	17'-4"
2	W-9	8'-2"	16'-4" *
4	W-8	2'-0"	8'-0"

* BEND THESE BARS IN FIELD

BAR SCHEDULE

BENT BARS – SIZE 4ϕ

MARK	BEND	TOTAL LENGTH
W-7	0'-7"	4'-2"
W-6	0'-8"	4'-4"
W-5	0'-10"	4'-8"
W-4	0'-11"	4'-10"
W-3	1'-1"	5'-2"
W-2	1'-3"	5'-6"
W-1	1'-4"	5'-8"



MARK	BEND	TOTAL LENGTH
W-1	1'-4"	5'-8"
W-2	1'-3"	5'-6"
W-3	1'-1"	5'-2"
W-4	0'-11"	4'-10"
W-5	0'-10"	4'-8"
W-6	0'-8"	4'-4"
W-7	0'-7"	4'-2"

M-D #111 M-S #52

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

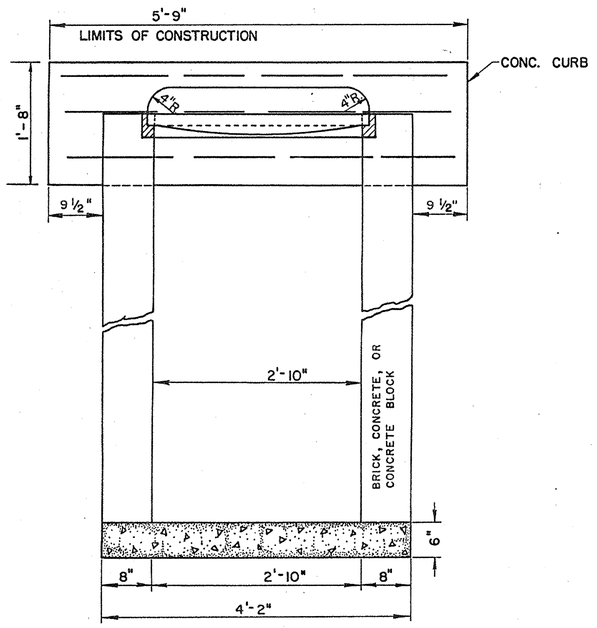
STANDARD SHEET D-7-5
CATCH BASINS A & B, B JUNCTION BOX

PREL. TRACING J.WHITE DESIGN E.L.W. CHKD. J.T.B.

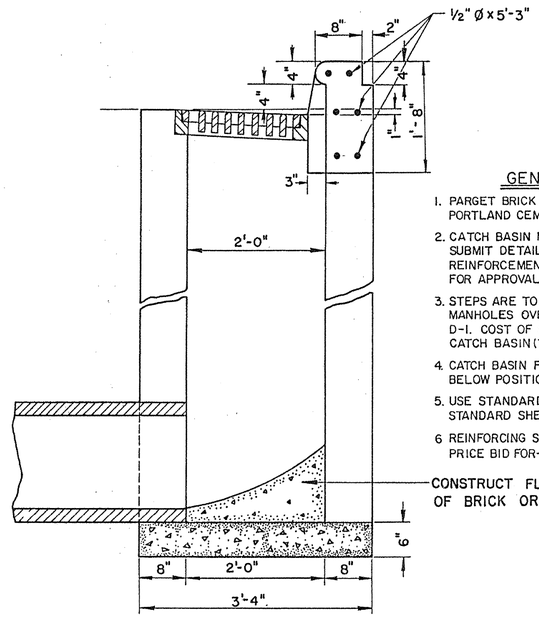
DELETED REQUIREMENT FOR TOP 12" OF P.C.C. MASONRY. 9-25-72 J.T.B.
10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.
STANDARDIZED DIMENSIONS & ADDED FRAME & GRATE NOTE 12-2-75 R.F.R.
ADDED PRECAST NOTE 1-31-77 R.F.R.
REVISED NOTES, ADDED STEP NOTE 1-30-81 R.F.R.

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



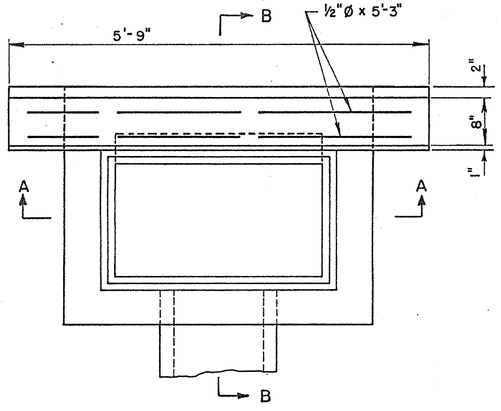
SECTION A-A



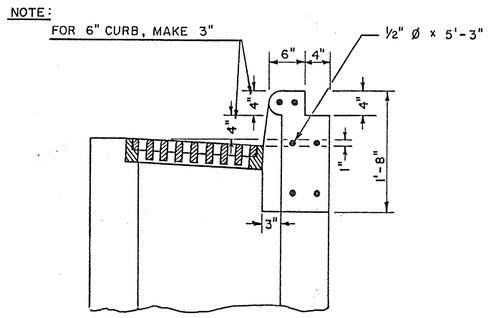
SECTION B-B

GENERAL NOTES

1. PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.
2. CATCH BASIN MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.
3. STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN (THIS ALSO REFERS TO B JUNCTION BOXES).
4. CATCH BASIN FRAME AND MAY BE DEPRESSED 1/2" BELOW POSITION SHOWN, WHEN DIRECTED.
5. USE STANDARD CATCH BASIN FRAME & GRATE SEE STANDARD SHEET D-1.
6. REINFORCING STEEL IS TO BE INCLUDED IN UNIT PRICE BID FOR- A CATCH BASIN.



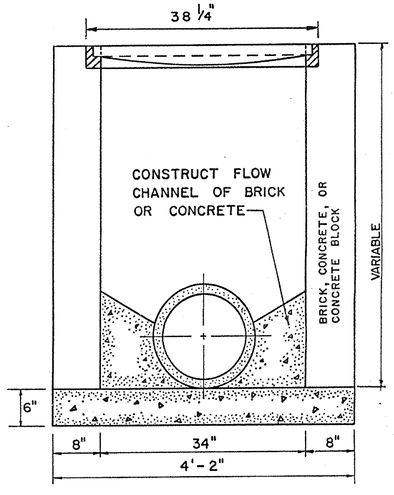
PLAN



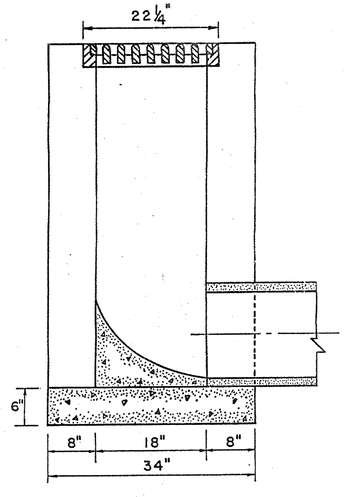
SECTION B-B

A CATCH BASIN

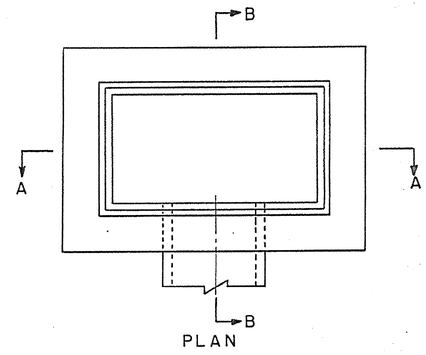
1 0 1 2



SECTION A-A



SECTION B-B



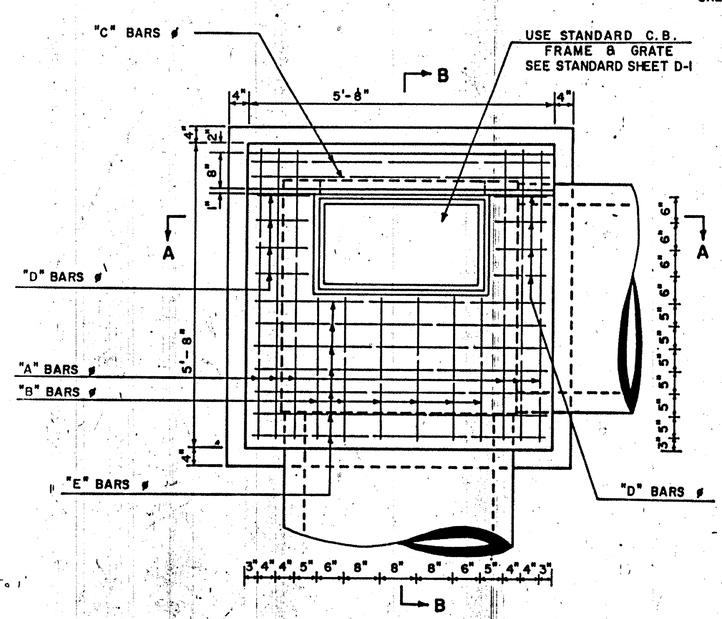
PLAN

B CATCH BASIN (as shown) OR B JUNCTION BOX*

1 0 1 2

* The cover shown on sheet D-1 is substituted for the grate. This is the only difference.

1. PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.
2. UPPER 12" OF STRUCTURE TO BE OF R.C.C. MASONRY.
3. CATCH BASIN MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.
4. STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.

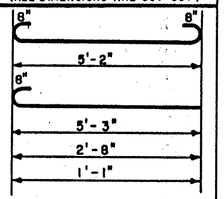


PLAN

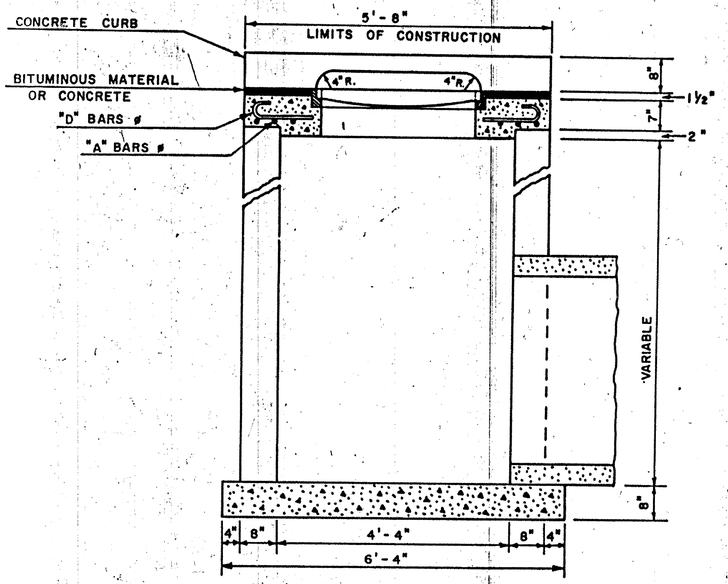
BILL OF MATERIALS

REINF. STEEL	NO.	SIZE	LENGTH	MARK
BENT BARS				
	7	5/8"ø	6'-6"	E
	6	5/8"ø	5'-11"	A
	6	5/8"ø	3'-4"	B
	8	5/8"ø	1'-9"	D
STRAIGHT BARS				
	6	5/8"ø	5'-4"	C

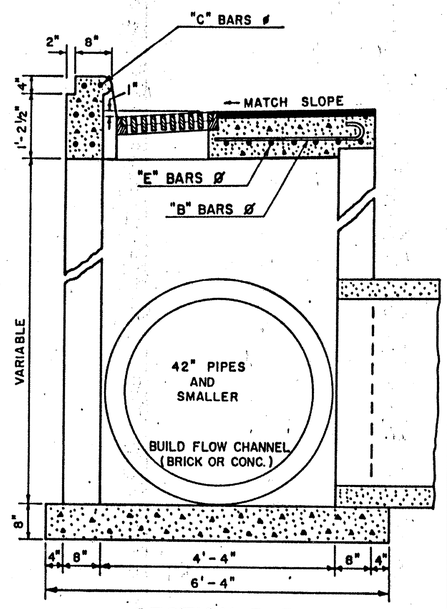
BENDING DIAGRAM (ALL DIMENSIONS ARE OUT-OUT)



NOTE: ALL REINFORCING STEEL TO BE INCLUDED IN UNIT PRICE BID FOR CATCH BASIN.



SECTION A-A

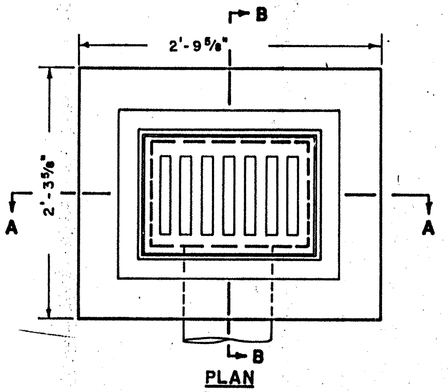


SECTION B-B

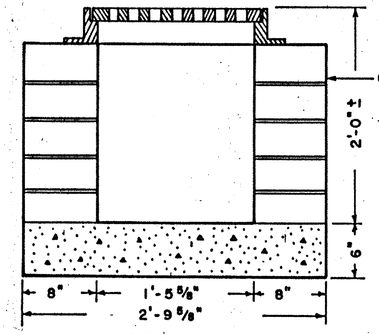
A-A CATCH BASIN

A-A CATCH BASIN FRAME AND GRATE MAY BE DEPRESSED 1/2" BELOW POSITION SHOWN, WHEN DIRECTED.

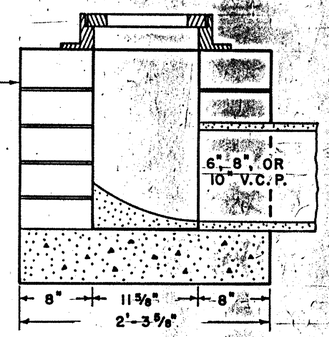
0 1 2 3



PLAN



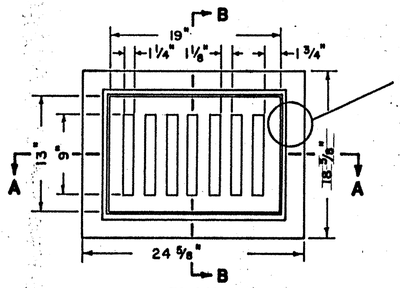
SECTION A-A



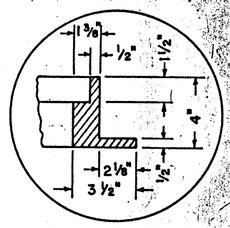
SECTION B-B

LAWN CATCH BASIN

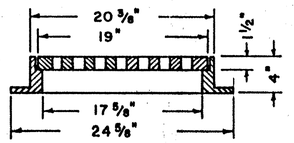
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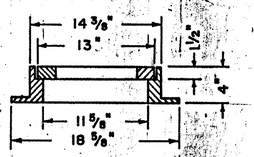
PLAN



DETAIL OF FRAME



SECTION A-A



SECTION B-B

FRAME AND GRATE

APPROX. WT. : FRAME & GRATE 160 LBS.

COUNTY	CONTRACT	P.R.S. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.		122	128

STANDARD SHEET D-8-6
CATCH BASINS A-A & LAWN

PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. Y.N.C.

REVISIONS

1. ADDED LAWN CATCH BASIN. 9-25-70 J.T.B.
2. NOTE ADDED CONSTRUCT OF BRICK OR CONC. 1-27-71 Y.N.C.
3. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.
4. ADDED FRAME & GRATE NOTE 12-2-75 R.F.R.
5. ADDED PRECAST NOTE 1-31-77 R.F.R.
6. ADDED STEP NOTE 1-30-81 R.F.R.

APPROVED Erik Ivar Bruun 6-23-70
DIRECTOR OF OPERATIONS DATE
Lee S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-9-7

CATCH BASINS J, J MOD., SD-1A

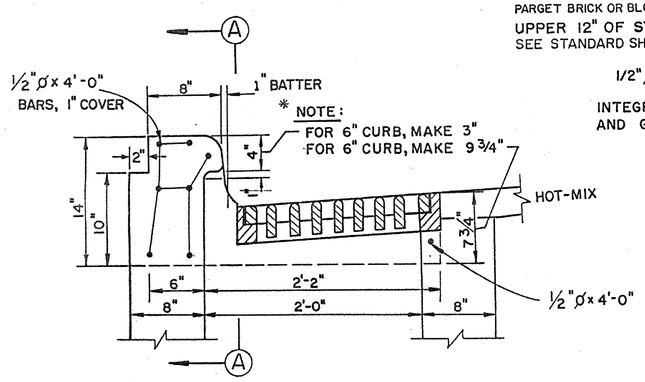
PREL. TRACING J. WHITE DESIGN E.L.W. CHKD. J.T.B.

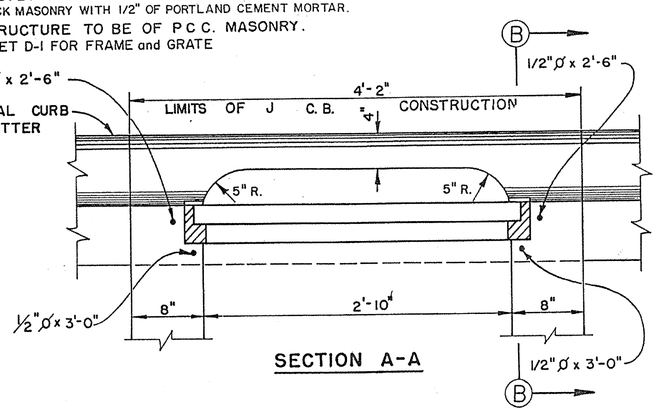
1 3/31/71 NOMENCLATURE CHANGES FOR A.I.S.C. SPEC - D.M.E.
2 5/12/73 ADDED FILLETS OF 5" R. TO SECTION A-A OF J CATCH BASIN - J.T.B.
3 10/25/74 NOTE REFERING TO STANDARD SHEET D-1 - R.T.C.
4 12/2/75 STANDARDIZED DIMENSIONS AND ADDED FRAME AND GRATE NOTE - R.F.R.
5 5/1/76 ADDED PAYMENT LIMIT DIMENSION - R.F.R.
6 ADDED PRECAST NOTE 1-31-77 R.F.R.
7 ADDED STEP NOTE 1-30-81 R.F.R.

APPROVED _____ 6-23-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR - CHIEF ENGINEER DATE

NOTE.
USE STANDARD C.B. FRAME & GRATE.
PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.
UPPER 12" OF STRUCTURE TO BE OF P.C.C. MASONRY.
SEE STANDARD SHEET D-1 FOR FRAME and GRATE

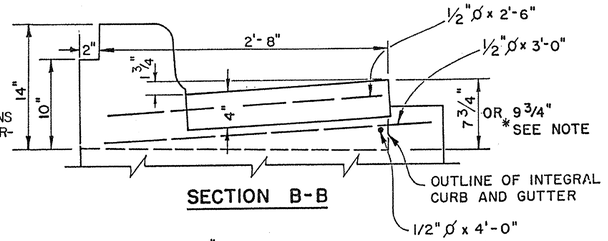




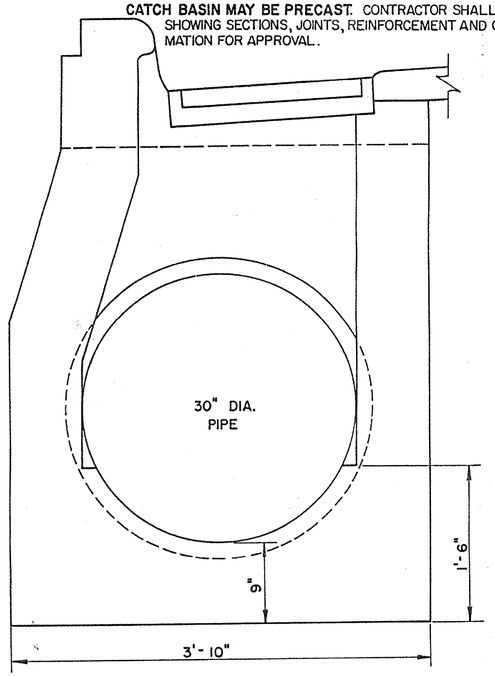
SECTION A-A

NOTE:
CATCH BASIN FRAME AND GRATING MAY BE SET 1/2" BELOW POSITION SHOWN, WHERE DIRECTED BY THE ENGINEER.
REINFORCING STEEL SHALL CONFORM TO SECTION 605.
PAYMENT IS TO BE INCLUDED IN UNIT PRICE BID FOR J CATCH BASINS.

CATCH BASIN MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.

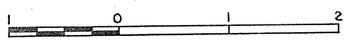


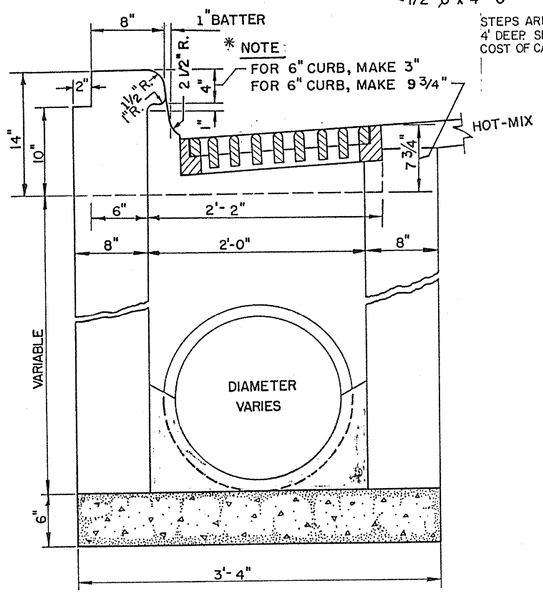
SECTION B-B



J MODIFIED CATCH BASIN (30" PIPE)

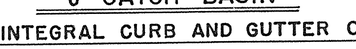
FOR INTEGRAL CURB AND GUTTER ONLY



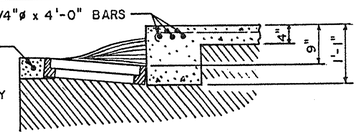


J CATCH BASIN

FOR INTEGRAL CURB AND GUTTER ONLY



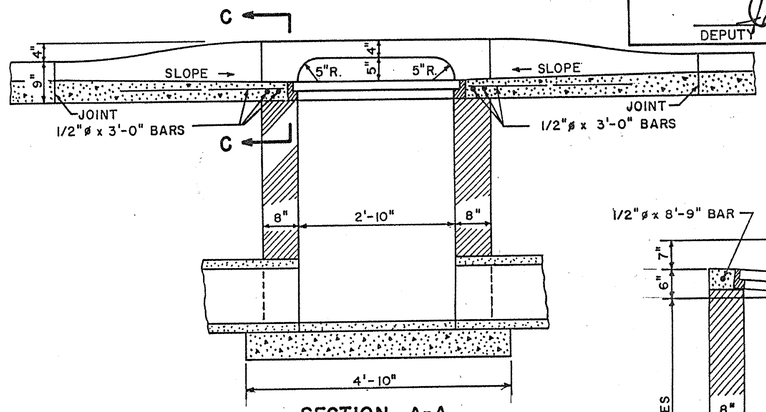
STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.



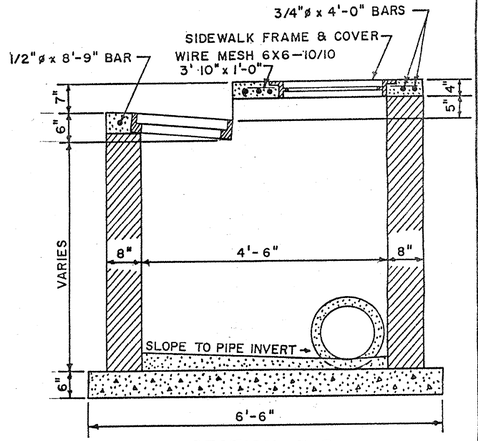
NOTE:
PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.

UPPER 12" OF STRUCTURE TO BE OF P.C.C. MASONRY.

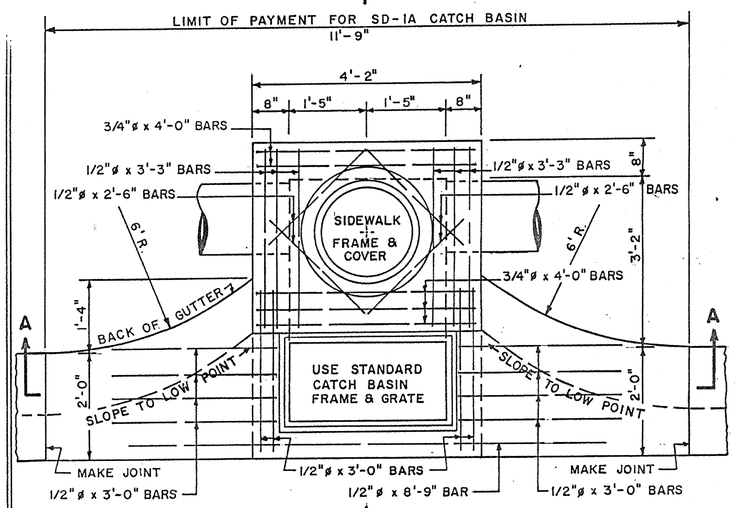
SECTION C-C



SECTION A-A



SECTION B-B



PLAN

TABLE OF REINFORCEMENT			
SIZE	LENGTH	QUANTITY	TOTAL LENGTH
1/2" ø	2'-6"	4	10'-0"
"	3'-0"	12	36'-0"
"	3'-3"	6	19'-6"
"	8'-9"	1	8'-9"
3/4" ø	4'-0"	5	20'-0"
WIRE MESH 6X6-10/10	3'-10" x 1'-0"	1	3'-10" x 1'-0"

NOTE.
BAR SCHEDULE FOR ESTIMATING PURPOSES ONLY.

Note: SEE STANDARD SHEET D-1 FOR FRAME and GRATE and SIDEWALK FRAME and COVER

CATCH BASIN FRAME AND GRATE MAY BE DEPRESSED 1/2" BELOW POSITION SHOWN, WHEN DIRECTED.

CATCH BASIN MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.

SD-1A CATCH BASIN

© KEUFFEL & ESSER CO. MYLAR

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-10-6

CATCH BASIN DOUBLE SD-1A

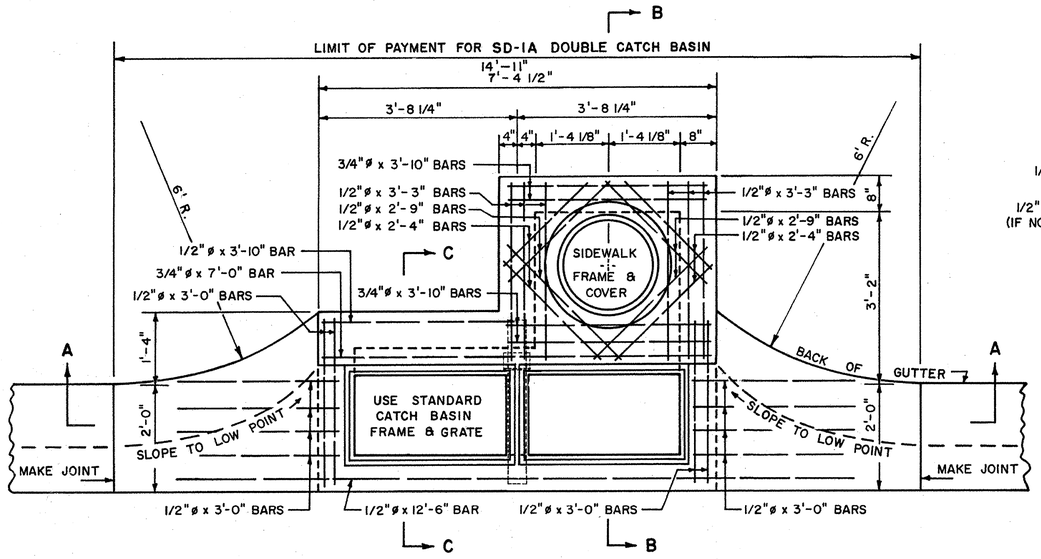
PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. Y.N.C.

REVISIONS

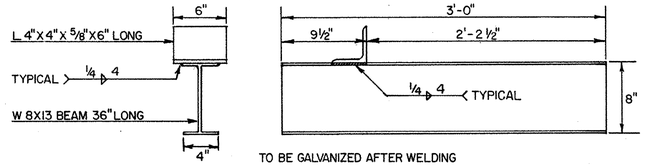
3/31/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.
12/2/75, STANDARDIZED DIMENSIONS & ADDED FRAME & GRATE NOTE - R.F.R.
5/11/76, ADDED PAYMENT LIMIT DIMENSION - R.F.R.
1/31/77, REVISED NOTES AND SUPPORT BEAM. REMOVED COLUMN SUPPORT. R.F.R.
1/30/81, ADDED STEP NOTE R.F.R.

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

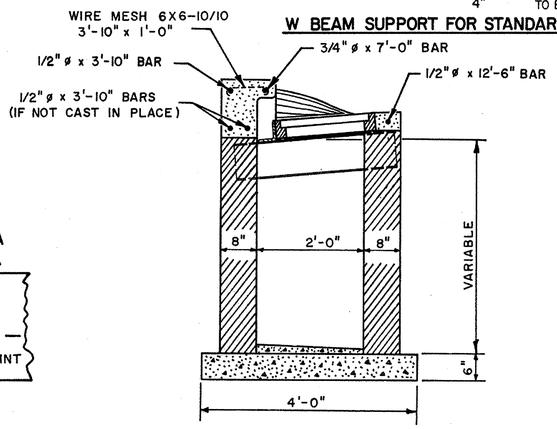


PLAN

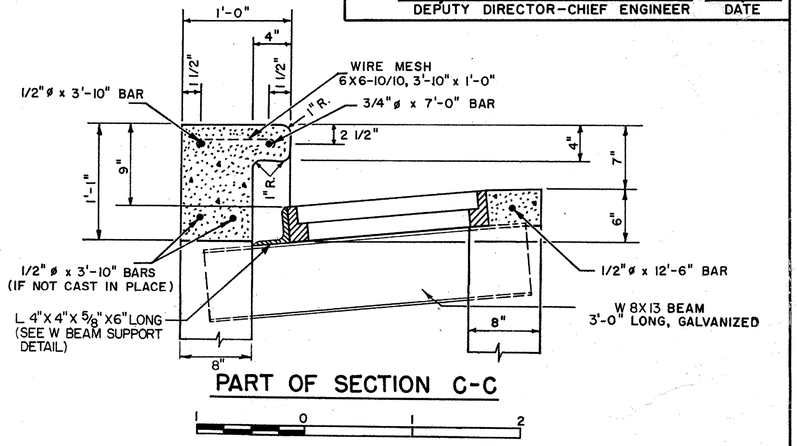


TO BE GALVANIZED AFTER WELDING

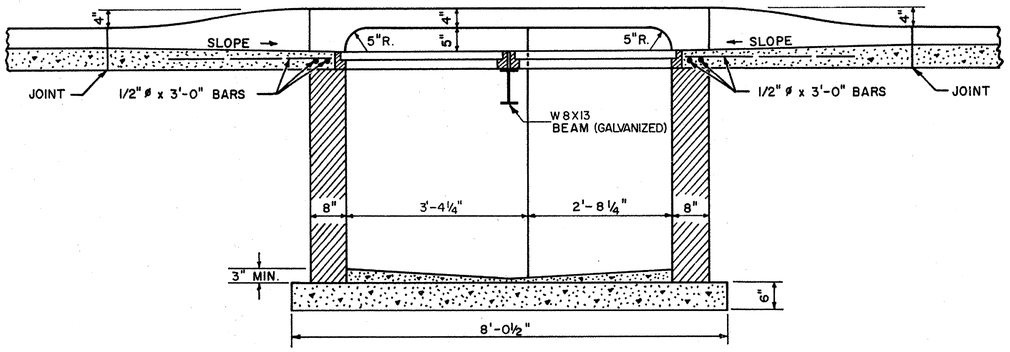
W BEAM SUPPORT FOR STANDARD CATCH BASIN FRAMES AND GRATES



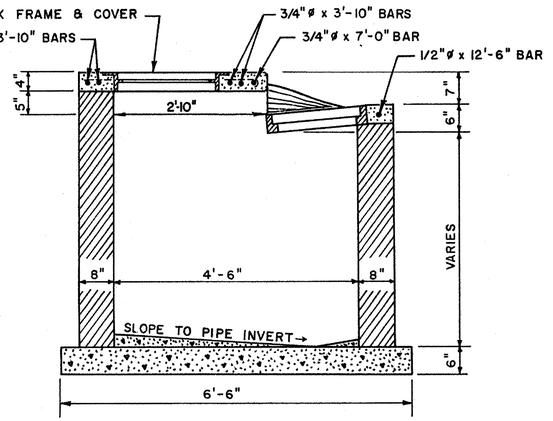
SECTION C-C



PART OF SECTION C-C



SECTION A-A



SECTION B-B

TABLE OF REINFORCEMENT			
SIZE	LENGTH	QUANTITY	TOTAL LENGTH
1/2" ø	12'-6"	1	12'-6"
"	3'-10"	1	3'-10"
"	3'-3"	6	19'-6"
"	3'-0"	12	36'-0"
"	2'-9"	4	11'-0"
"	2'-4"	4	9'-4"
3/4" ø	7'-0"	1	7'-0"
"	3'-10"	4	15'-4"
WIRE MESH 6X6-10/10	3'-10" x 1'-0"	2	7'-8" x 1'-0"

NOTE:
BAR SCHEDULE FOR ESTIMATING PURPOSES ONLY.

DOUBLE SD-1A CATCH BASIN

NOTES:

SLOPE CONCRETE FLOOR TO INVERT OF OUTLET PIPE.

PLACE W 8X13 BEAM, 3'-0" LONG, GALVANIZED, AS SUPPORT FOR STANDARD CATCH BASIN FRAME AND GRATE. COST TO BE INCLUDED IN UNIT PRICE BID FOR STRUCTURE.

PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.

UPPER 12" OF STRUCTURE TO BE OF P.C.C. MASONRY.

SEE STANDARD SHEET D-1 FOR FRAME and GRATE and SIDEWALK FRAME and COVER

CATCH BASIN FRAME AND GRATE MAY BE DEPRESSED ½" BELOW POSITION SHOWN, WHEN DIRECTED.

CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.

STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.

© MIL PRINT MYLAR

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-11-8

CATCH BASINS S.D.-1 & S.D.-2A

PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. Y.N.C.

REVISIONS

1. DELETED S.D.-2 CATCH BASIN - 7/21/70 - J.T.B.
2. DELETED WEEP HOLE IN S.D.-1 CATCH BASIN - 9/8/70 - J.T.B.
3. 3/6/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC. - D.M.E.
4. 10/25/74, NOTE REFERING TO STANDARD SHEET D-1, R.T.C.
5. 12/2/75, STANDARDIZED DIMENSIONS, ADDED FRAMES & GRATES NOTE & REMOVED S.D.-2A RESTRICTION NOTE. - R.F.R.
6. 5/11/76, CORRECTED PAYMENT LIMIT DIMENSIONS. - R.F.R.
7. 11/21/77 ADDED BEAM DETAIL, REV. ANGLE DIMENSIONS - R.F.R.
8. 7/30/81 REVISED NOTES - R.F.R.

APPROVED _____ DIRECTOR OF OPERATIONS 8-27-70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE

NOTE:

SEE STANDARD SHEET D-1 FOR FRAME and GRATE. APPLIES TO BOTH CATCH BASINS

CATCH BASIN FRAMES AND GRATES MAY BE DEPRESSED 1/2" BELOW POSITION SHOWN, WHEN DIRECTED.

CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.

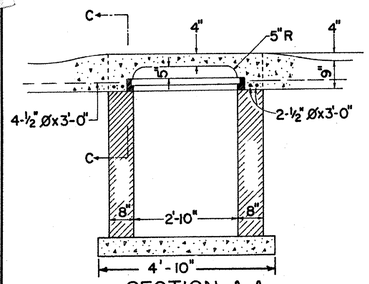
STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.

USE STANDARD C. B. FRAME & GRATE.

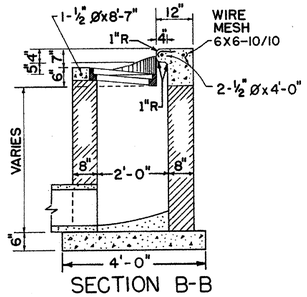
PLACE JOINT AT POINTS WHERE CATCH BASIN GUTTER BECOMES NORMAL GUTTER.

UPPER 12" OF STRUCTURE TO BE OF P.C.C. MASONRY.

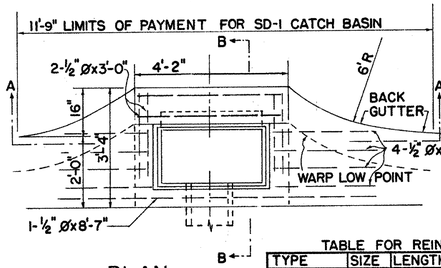
PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.



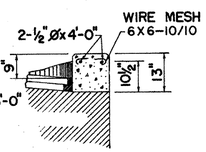
SECTION A-A



SECTION B-B



PLAN



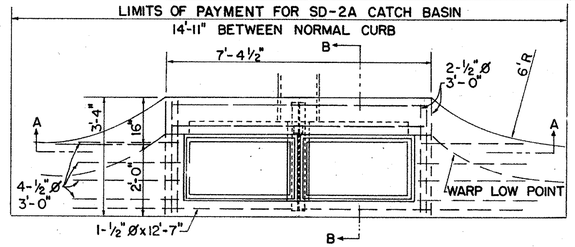
SECTION C-C

TABLE FOR REINFORCEMENT

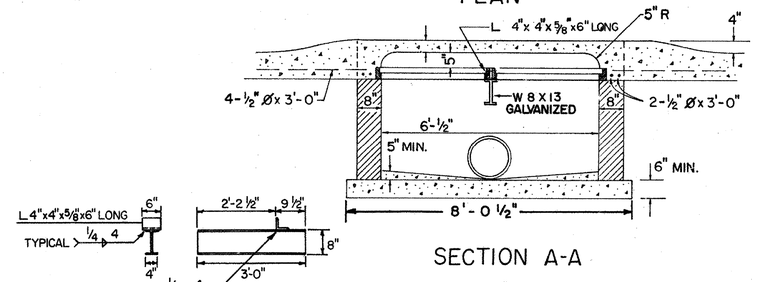
TYPE	SIZE	LENGTH	QTY.	TOTAL L'TH	WT. (LB)
ROUND BAR	½"	4'-0"	2	8'-0"	5.3
" "	½"	3'-0"	12	36'-0"	24.0
" "	½"	8'-7"	1	8'-7"	5.7
TOTAL	½"				35.0
WIRE MESH	6X6-10/10	4'-0" X 12"	1	4'-0" X 12"	

SD-1 CATCH BASIN

1 0 1 2 3 4



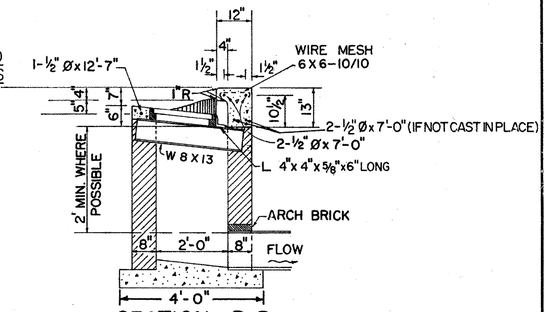
PLAN



SECTION A-A

TO BE GALVANIZED AFTER WELDING

W BEAM SUPPORT FOR STANDARD CATCH BASIN FRAMES AND GRATES



SECTION B-B

TABLE FOR REINFORCEMENT

TYPE	SIZE	LENGTH	QTY.	TOTAL L'TH	
ROUND BAR	½"	3'-0"	12	36'-0"	
" "	"	7'-0"	2	14'-0"	
" "	"	7'-0"	2	14'-0"	IF NOT CAST IN PLACE
" "	"	12'-7"	1	12'-7"	
WIRE MESH	6X6-10/10	7'-0" X 12"	1	7'-0" X 12"	

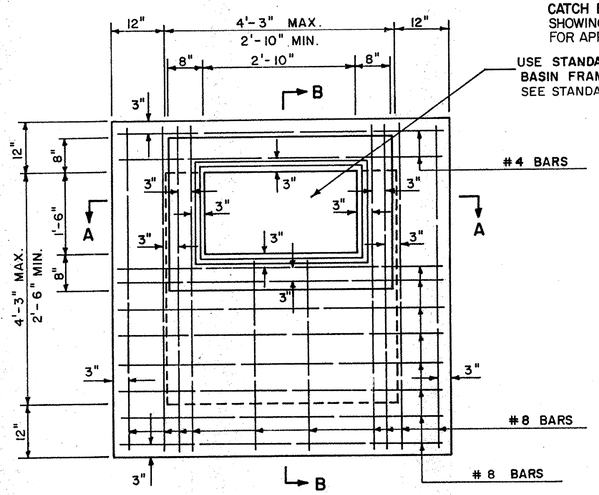
SD-2A CATCH BASIN

1 0 1 2 3

NOTE:
PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.
CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL

USE STANDARD CATCH BASIN FRAME & GRATE SEE STANDARD SHEET D-1

STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.



PLAN

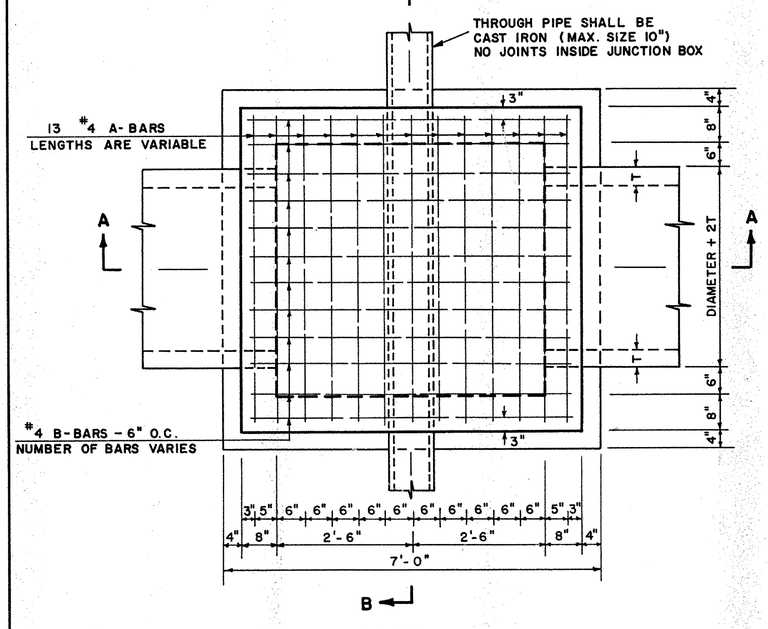
SECTION A-A SECTION B-B

B-2 CATCH BASIN

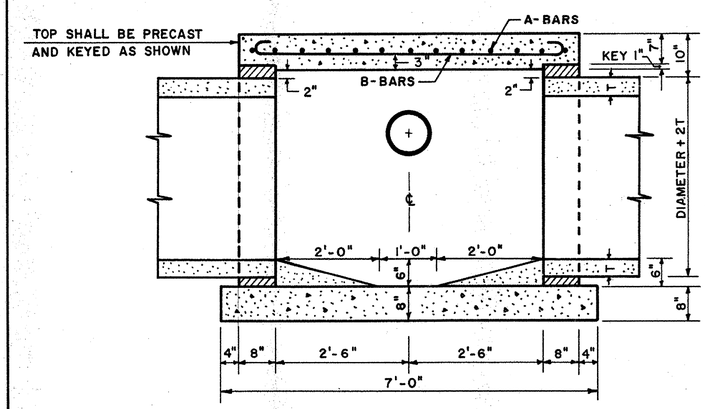
1 0 1 2 3

NOTE:
PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.
JUNCTION BOXES MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL

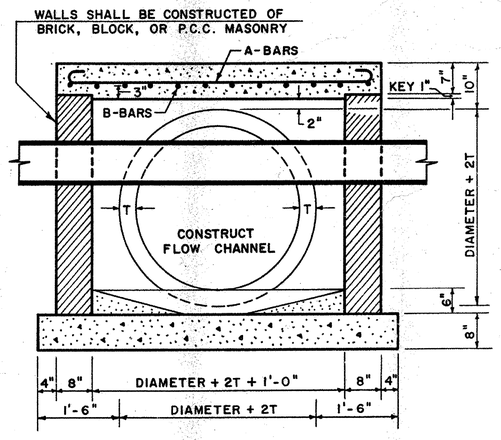
THROUGH PIPE SHALL BE CAST IRON (MAX. SIZE 10") NO JOINTS INSIDE JUNCTION BOX



PLAN



SECTION A-A

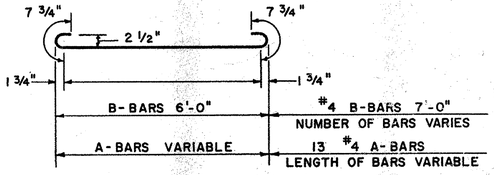


SECTION B-B

JUNCTION BOX A

1 0 1 2 3

BAR BENDING DIAGRAM



NOTES:
(1) THIS STRUCTURE IS TO USED WHERE UTILITY CONFLICT CANNOT BE AVOIDED AND UTILITY LINE 10"ϕ OR LESS.
(2) THE COST OF CAST IRON PIPE AND REINFORCING STEEL SHALL BE INCLUDED IN PRICE BID FOR STRUCTURE.

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-12-3
CATCH BASIN B-2, JUNCTION BOX A

PREL. TRACING J.T.B. DESIGN E.L.W. CHKD. Y.N.C.

REVISIONS
1. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.
2. 1/31/77, ADD PRECAST NOTES R.F.R.
3. 1/30/81, ADD STEP NOTE R.F.R.

APPROVED _____ DIRECTOR OF OPERATIONS 6-22-70 DATE

Jae S. Robinson DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE

COUNTY	CONTRACT	P.R.A. REF. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-13-1
JUNCTION BOX NO. 1 & NO. 2

PREL. TRACING J.W. DESIGN E.L.W. CHKD. Y.N.C.

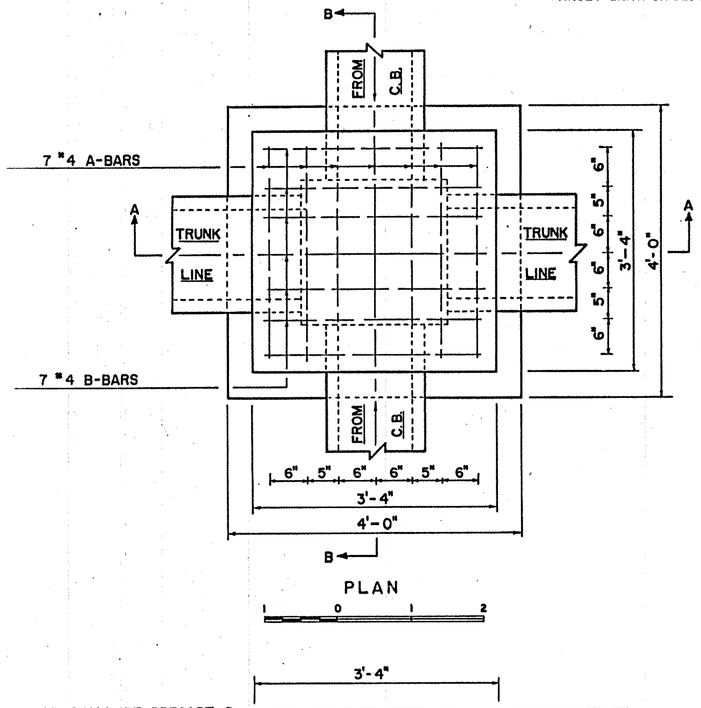
REVISIONS

1/31/77, ADD PRECAST NOTES R.F.R.
12/18/79, ADD UTILITY CONFLICT NOTES R.F.R.

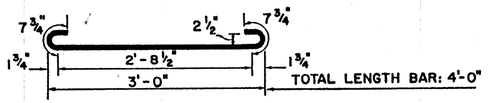
APPROVED _____ 6-27-78
DIRECTOR OF OPERATIONS DATE

_____ 6/22/78
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.



BAR BENDING DIAGRAM



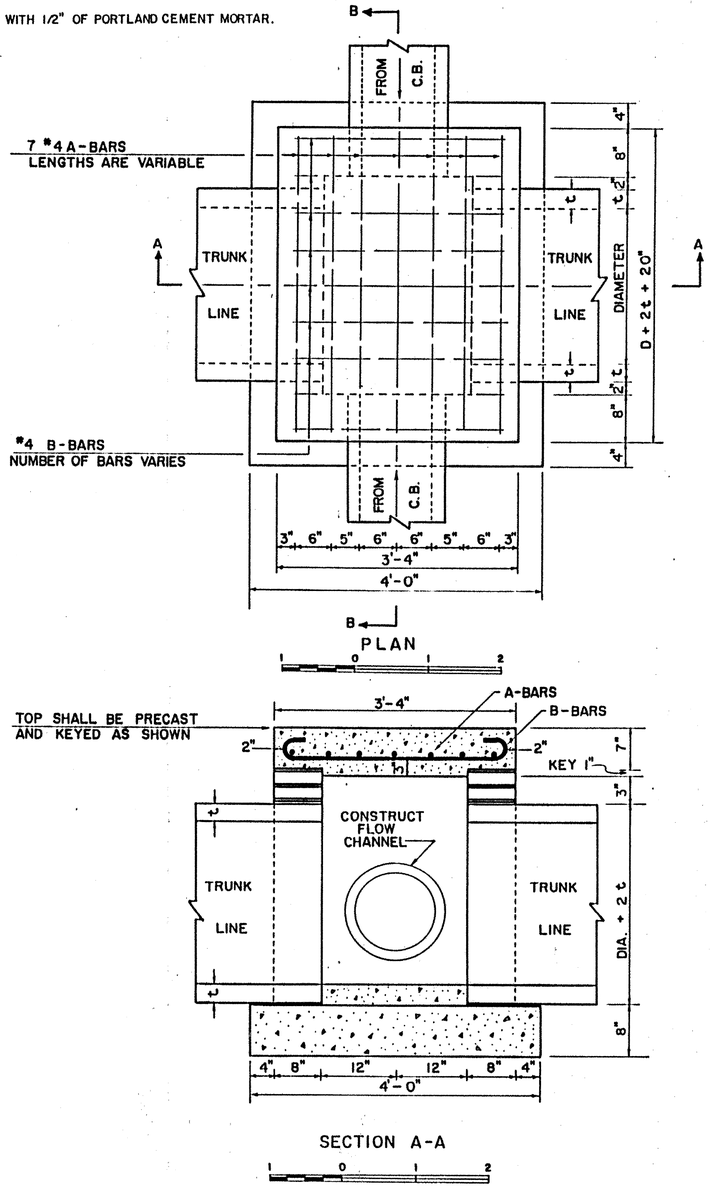
14 #4 BARS 4'-0" = 56'-0" WT. 38 LBS.

JUNCTION BOX NO. 1

THIS STRUCTURE TO BE USED FOR CONNECTIONS TO TRUNK LINES BETWEEN MANHOLES (MAXIMUM PIPE SIZE 18") AND NOT TO BE USED FOR UTILITY CONFLICTS

REINFORCING STEEL INCLUDED IN UNIT PRICE BID FOR STRUCTURE

JUNCTION BOXES MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER INFORMATION FOR APPROVAL.

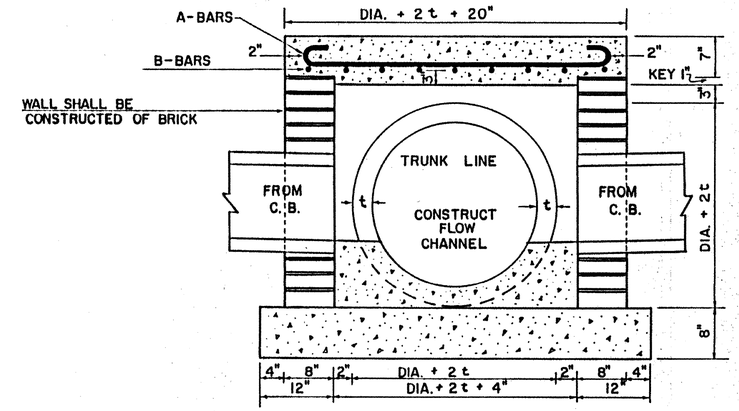


JUNCTION BOX NO. 2

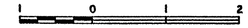
THIS STRUCTURE TO BE USED FOR CONNECTIONS TO TRUNK LINES BETWEEN MANHOLES (PIPE SIZES 21" THRU 48" INCLUSIVE) AND NOT TO BE USED FOR UTILITY CONFLICTS

REINFORCING STEEL INCLUDED IN UNIT PRICE BID FOR STRUCTURE

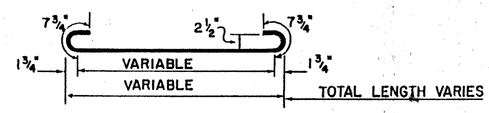
JUNCTION BOXES MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.



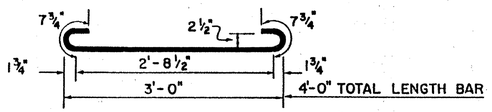
SECTION B-B



BAR BENDING DIAGRAM



7 - #4 A-BARS VARIABLE LENGTHS



#4 - B-BARS
NUMBER OF BARS VARIES

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-14-2
MANHOLES A, B, C, D, STANDARD

PREL. TRACING L.E.G. DESIGN E.L.W. CHKD. J.T.B.

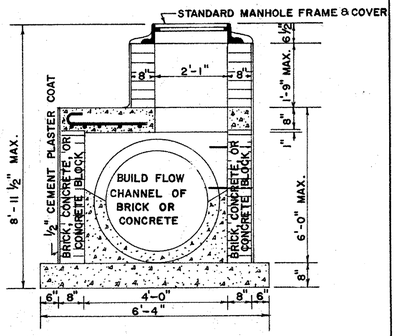
REVISIONS

1. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.
2. 1/30/81, ADDED STEP NOTE R.F.R.

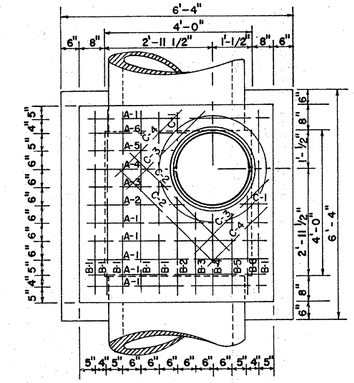
APPROVED _____ DIRECTOR OF HIGHWAYS 6.22.70 DATE

_____ ASSISTANT DIRECTOR / CHIEF ENGINEER 6/22/70 DATE

A MANHOLE



SECTION



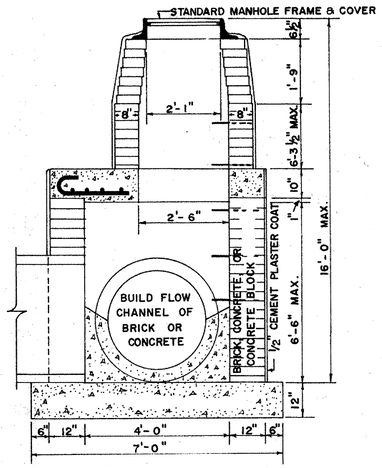
PLAN

BILL OF MATERIALS

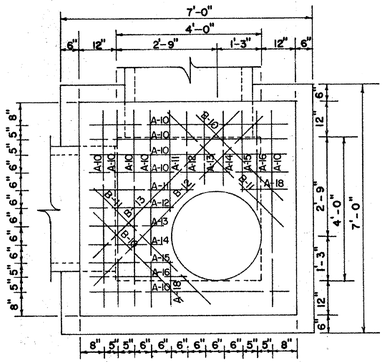
REINF. STEEL	BENT BARS NO.	SIZE	L'GTH.	MARK	BENDING DIAGRAM (ALL DIMENSIONS ARE OUT-OUT)
	6	5/8" ϕ	6'-2"	A-1	4'-10"
	6	5/8 ϕ	6'-2"	B-1	4'-10"
	1	5/8" ϕ	3'-5"	A-2	2'-9"
	1	5/8" ϕ	3'-0"	A-3	2'-4"
	1	5/8" ϕ	2'-11"	A-4	2'-3"
	1	5/8" ϕ	3'-0"	A-5	2'-4"
	1	5/8" ϕ	3'-5"	A-6	2'-9"
	1	5/8" ϕ	3'-5"	B-2	2'-9"
	1	5/8" ϕ	3'-0"	B-3	2'-4"
	1	5/8" ϕ	2'-11"	B-4	2'-3"
	1	5/8" ϕ	3'-0"	B-5	2'-4"
	1	5/8" ϕ	3'-5"	B-6	2'-9"
STRAIGHT BARS					
	2	5/8" ϕ	0'-10"	C-1	0'-10"
	2	5/8" ϕ	3'-10"	C-2	3'-10"
	2	5/8" ϕ	3'-0"	C-3	3'-0"
	2	5/8" ϕ	2'-4"	C-4	2'-4"

NOTE: ALL REINFORCING STEEL TO BE INCLUDED IN UNIT PRICE BID FOR MANHOLE.

B MANHOLE



SECTION



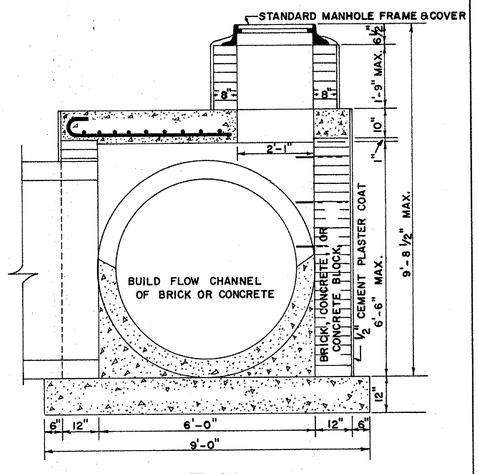
PLAN

BILL OF MATERIALS

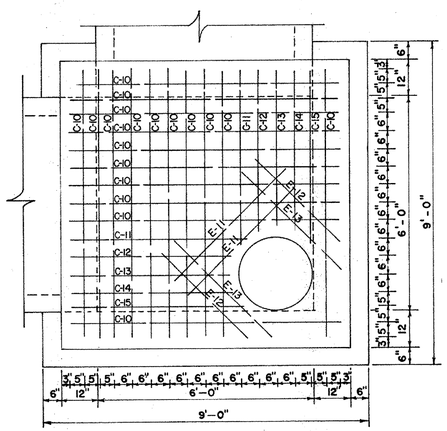
REINF. STEEL	BENT BARS NO.	SIZE	L'GTH.	MARK	BENDING DIAGRAM (ALL DIMENSIONS ARE OUT-OUT)
	10	3/4"ϕ	6'-10"	A-10	5'-6"
	2	3/4"ϕ	3'-6"	A-11	2'-10"
	2	3/4"ϕ	3'-0"	A-12	2'-4"
	2	3/4"ϕ	2'-9"	A-13	2'-1"
	2	3/4"ϕ	3'-0"	A-14	2'-4"
	2	3/4"ϕ	3'-6"	A-15	2'-10"
	2	3/4"ϕ	3'-6"	A-16	
STRAIGHT BARS					
	2	3/4" ϕ	1'-4"	A-18	
	2	3/4"ϕ	3'-6"	B-10	
	2	3/4"ϕ	4'-6"	B-11	
	1	3/4"ϕ	6'-9"	B-12	
	1	3/4"ϕ	5'-9"	B-13	

NOTE: ALL REINFORCING STEEL TO BE INCLUDED IN UNIT PRICE BID FOR MANHOLE.

C MANHOLE



SECTION



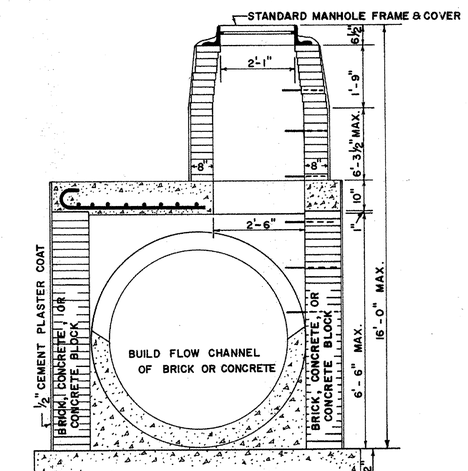
PLAN

BILL OF MATERIALS

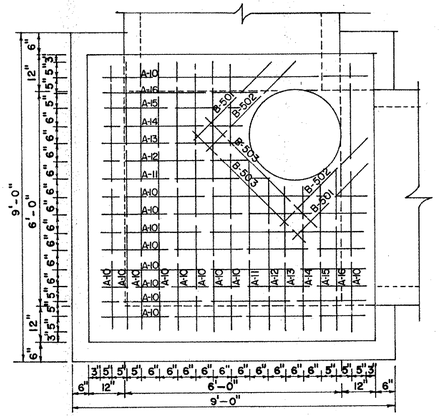
REINF. STEEL	BENT BARS NO.	SIZE	L'GTH.	MRK	BENDING DIAGRAM (ALL DIMENSIONS ARE OUT-OUT)
	20	3/4"ϕ	8'-10"	C-10	7'-6"
	2	3/4"ϕ	5'-8"	C-11	5'-0"
	2	3/4"ϕ	5'-3"	C-12	4'-7"
	2	3/4"ϕ	5'-2"	C-13	4'-6"
	2	3/4"ϕ	5'-3"	C-14	4'-7"
	2	3/4"ϕ	5'-8"	C-15	5'-0"
STRAIGHT BARS					
	2	3/4"ϕ	4'-4"	E-11	
	2	3/4"ϕ	3'-5"	E-12	
	2	3/4"ϕ	3'-10"	E-13	

NOTE: ALL REINFORCING STEEL TO BE INCLUDED IN UNIT PRICE BID FOR MANHOLE.

D MANHOLE



SECTION



PLAN

BILL OF MATERIALS

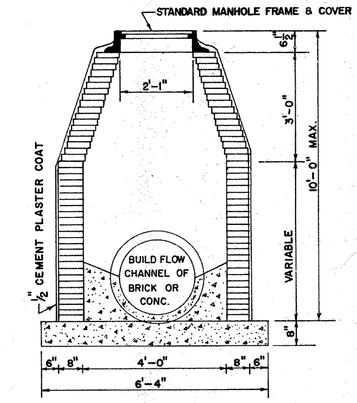
REINF. STEEL	BENT BARS NO.	SIZE	L'GTH.	MARK	BENDING DIAGRAM (ALL DIMENSIONS ARE OUT-OUT)
	18	3/4" ϕ	8'-10"	A-10	7'-6"
	2	3/4" ϕ	5'-6"	A-11	4'-10"
	2	3/4" ϕ	5'-0"	A-12	4'-4"
	2	3/4" ϕ	4'-9"	A-13	4'-1"
	2	3/4" ϕ	5'-8"	A-14	4'-4"
	2	3/4" ϕ	5'-0"	A-15	4'-10"
	2	3/4" ϕ	5'-6"	A-16	
STRAIGHT BARS					
	2	3/4" ϕ	3'-0"	B-501	3'-0"
	2	3/4" ϕ	3'-6"	B-502	3'-6"
	2	3/4" ϕ	4'-6"	B-503	4'-6"

NOTE: ALL REINFORCING STEEL TO BE INCLUDED IN UNIT PRICE BID FOR MANHOLE.

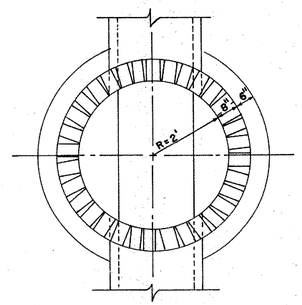
NOTE:
SEE STANDARD SHEET D-1 FOR MANHOLE FRAME and COVER. APPLIES TO ALL MANHOLES ON THIS SHEET.

STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF MANHOLES.

STANDARD MANHOLE



SECTION



PLAN

SCALE FOR ALL MANHOLES

1 0 1 2 3 4 5

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-15

FLARED END SECTIONS — R.C.P. & C.M.P.

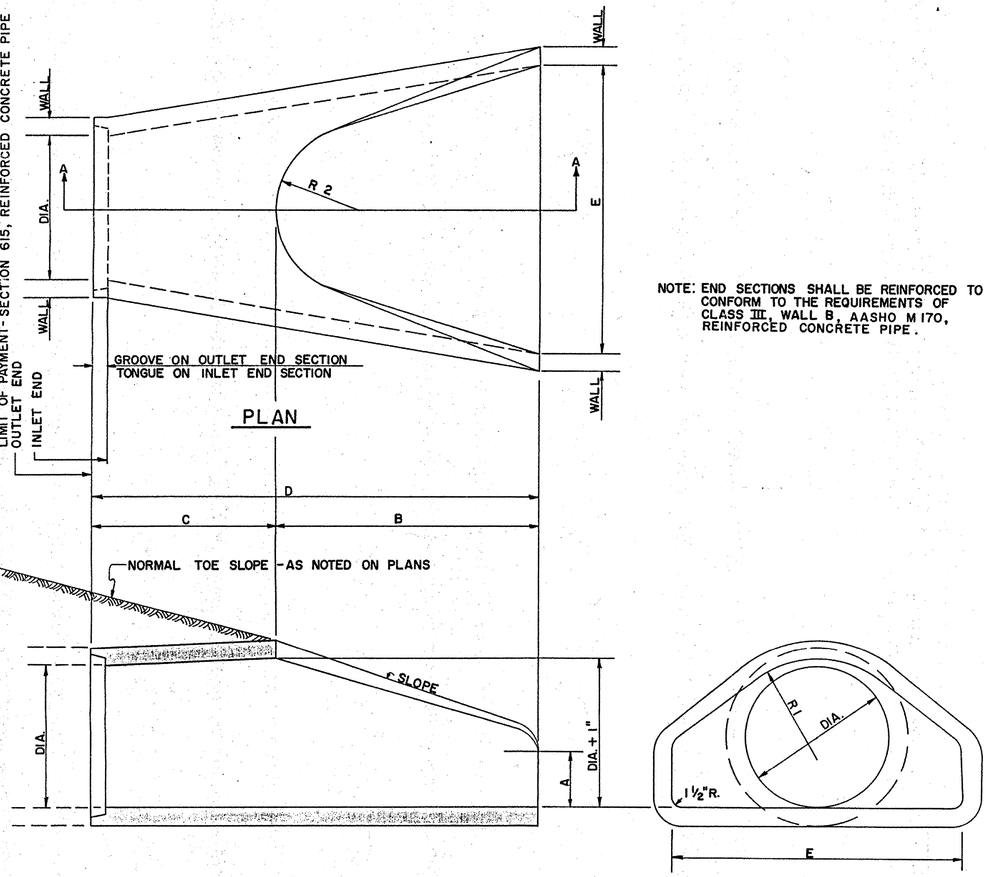
PREL. TRACING H.R.C. DESIGN J.F.R. CHKD. F.I.W.

REVISIONS

ADDED "AASHO M 170" TO "CLASS III, WALL B, ---"	1-28-71	J.T.B.
CHANGED "ITEM 26 ---" TO "SECTION 615, ---"	1-28-71	J.T.B.
ADDED FURTHER DIMENSIONS TO C.M.P. FLARED END SECT'N	7-27-71	J.T.B.
UPDATED ARCHED METAL PIPE RISE & SPAN DIMENSIONS	1-31-77	R.F.R.

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

Lae S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



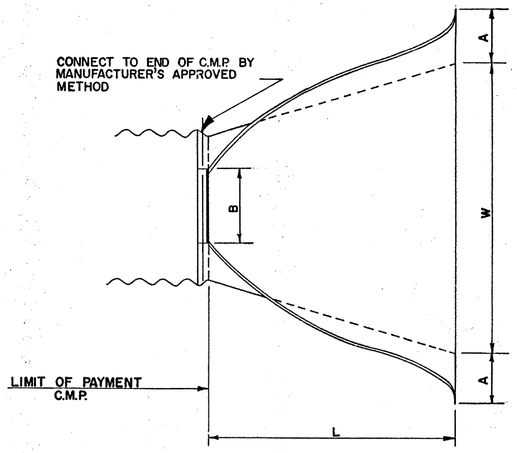
NOTE: END SECTIONS SHALL BE REINFORCED TO CONFORM TO THE REQUIREMENTS OF CLASS III, WALL B, AASHO M 170, REINFORCED CONCRETE PIPE.

SECTION A-A END VIEW

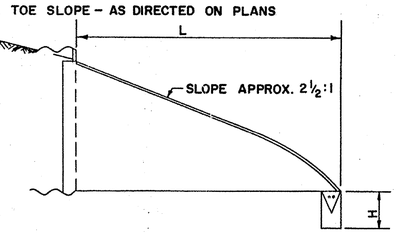
R.C.P. - STANDARD FLARED END SECTION

REINFORCED CONCRETE PIPE — STANDARD FLARED END SECTIONS
TABLE OF DIMENSIONS

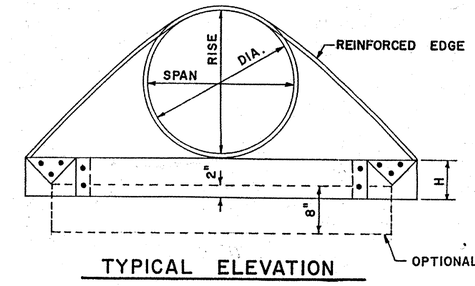
DIAMETER	WALL	SLOPE	A	B	C	D	E	R1	R2
12"	2"	3:1	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	10 1/8"	9"
15"	2 1/4"	3:1	6"	2'-3"	3'-10"	6'-1"	2'-6"	12 1/2"	11"
18"	2 1/2"	3:1	9"	2'-3"	3'-10"	6'-1"	3'-0"	15 1/2"	12"
21"	2 3/4"	3:1	9"	2'-11"	3'-2"	6'-1"	3'-6"	16 1/8"	13"
24"	3"	3:1	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	16 13/16"	14"
27"	3 1/4"	3:1	10 1/2"	4'-0"	2'-1 1/2"	6'-1 1/2"	4'-6"	18 9/16"	14 1/2"
30"	3 1/2"	3:1	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	18 1/2"	15"
33"	3 3/4"	3:1	1'-1 1/2"	4'-10 1/2"	3'-3 1/4"	8'-1 3/4"	5'-6"	23 3/4"	17 1/2"
36"	4"	3:1	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	24 5/16"	20"
42"	4 1/2"	3:1	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	27 1/2"	22"
48"	5"	3:1	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	28 1/2"	22"
54"	5 1/2"	2.4:1	2'-3"	5'-5"	2'-11"	8'-4"	7'-6"	33 1/8"	24"



TYPICAL PLAN



TYPICAL CROSS-SECTION



TYPICAL ELEVATION

GENERAL NOTES

1. All 3-Piece Bodies To Have 12 Gage Sides And 10 Ga. Center Panels. Width Of Center Panels To Be Greater Than 20 Per Cent Of The Pipe Periphery. Multiple Panel Bodies To Have Lap Seams Which Are To Be Tightly Joined By 3/8" Diam. Galvanized Rivets Or Bolts.
2. For 60" Thru 84" Sizes, Reinforced Edges To Be Supplemented With Galvanized Stiffener Angles. The Angles Will Be 2" x 2" x 1/4" For 60" Thru 72" Diameter And 2 1/2" x 2 1/2" x 1/4" For 78" And 84" Diameter. The Angles To Be Attached By 3/8" Diam. Galvanized Nuts And Bolts.
3. For The 79" x 49" And 85" x 54" Sizes, Reinforced Edge To Be Supplemented By 2" x 2" x 1/4" Galvanized Angles.
4. Angle Reinforcement Will Be Placed Under The Center Panel Seams On The 79" x 49" And 85" x 54" Sizes.
5. Galvanized Toe Plate To Be Available As An Accessory, When Specified.

C.M.P. - STANDARD FLARED END SECTION

ROUND METAL PIPE
TABLE OF DIMENSIONS

DIAMETER	GAGE (STEEL)	H ± 1"	L ± 1 1/2"	W ± 2"	A ± 1"	B (max.)
12"	16	6"	21"	24"	6"	6"
15"	16	6"	26"	30"	7"	8"
18"	16	6"	31"	36"	8"	10"
21"	16	6"	36"	42"	9"	12"
24"	16	6"	41"	48"	10"	13"
30"	14	8"	51"	60"	12"	16"
36"	14	9"	60"	72"	14"	19"
42"	12	11"	69"	84"	16"	22"
48"	12	12"	78"	90"	18"	27"
54"	12	12"	84"	102"	18"	30"
60"	12	12"	87"	114"	18"	33"
66"	12	12"	87"	120"	18"	36"
72"	12	12"	87"	126"	18"	39"
78"	12	12"	87"	132"	18"	42"
84"	12	12"	87"	138"	18"	45"

ARCHED METAL PIPE
TABLE OF DIMENSIONS

SPAN	RISE	GAGE (STEEL)	H ± 1"	L ± 1 1/2"	W ± 2"	A ± 1"	B (max.)
17"	13"	16	6"	19"	30"	7"	9"
21"	15"	16	6"	23"	36"	7"	10"
24"	18"	16	6"	28"	42"	8"	12"
28"	20"	16	6"	32"	48"	9"	14"
35"	24"	14	6"	39"	60"	10"	16"
42"	29"	14	8"	46"	75"	12"	18"
49"	33"	12	9"	53"	85"	13"	21"
57"	38"	12	12"	63"	90"	18"	26"
64"	43"	12	12"	70"	102"	18"	30"
71"	47"	12	12"	77"	114"	18"	33"
77"	52"	12	12"	77"	126"	18"	36"
83"	57"	12	12"	77"	138"	18"	39"

NOTE: ABOVE DETAILS AND DIMENSIONS ARE TO BE USED AS A GENERAL GUIDE. MINOR VARIATIONS, AS APPROVED BY THE ENGINEER, TO MEET INDIVIDUAL MANUFACTURER'S STANDARDS WILL BE ACCEPTABLE.

DIETZGEN Philadelphia 135 Imperial Tracing Cloth

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-16

PIPE BEDDING & METHODS OF EROSION PROTECTION

PREL. TRACING H.R.C. DESIGN JER CHKD. E. L. W.

REVISIONS

ONE GENERAL NOTE DELETED. 11-11-71 J.T.B.
REVISED DIMENSIONS ON CLASS A BEDDING 11-14-74 R.T.C.
REVISED EROSION PROTECTION DRAWINGS. 12/2/75 R.F.R.
UPDATED CLASS B & C BEDDING PAY ITEMS 5/11/76 R.F.R.

APPROVED _____ Director Of Operations — 6.22.70 Date

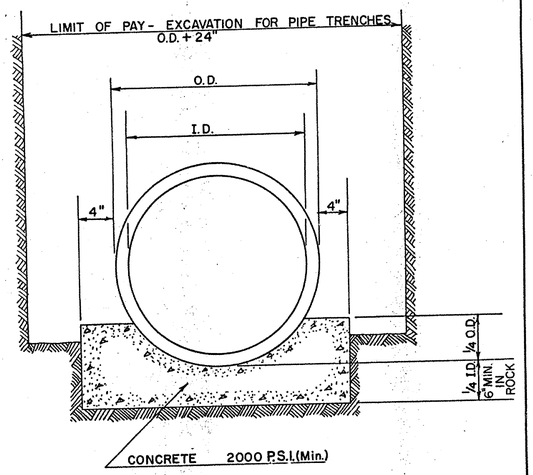
_____ Deputy Director - Chief Engineer — 6/22/70 Date

GENERAL NOTES:

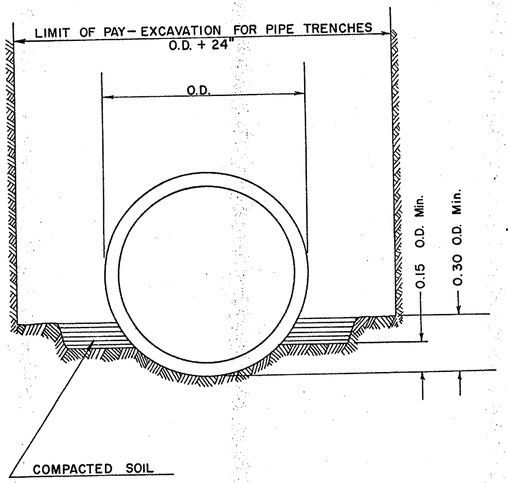
(1.) THESE ILLUSTRATIONS ARE GENERAL CASES ONLY, HOWEVER THE BASIC PRINCIPLES SHOWN ARE TO BE APPLIED TO SPECIFIC CASES.

(2.) EROSION PROTECTION SHALL BE CONSTRUCTED OF EITHER GROUTED RIP-RAP OR 6" PORTLAND CEMENT CONCRETE GUTTER. (SEE SPECIAL PROVISIONS)

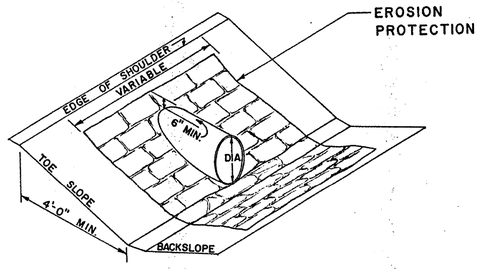
CLASS A BEDDING



CLASS B BEDDING

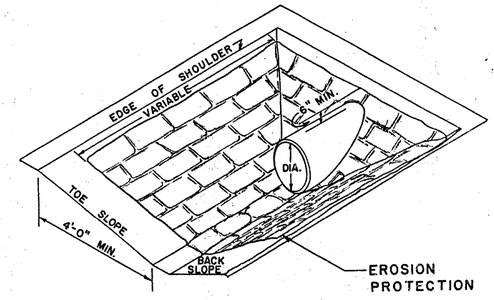


METHODS OF PLACING EROSION PROTECTION



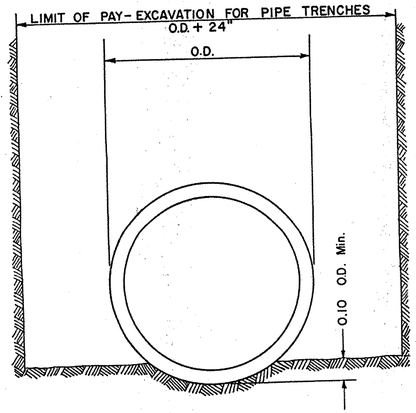
DIA. = VERTICAL SIZE OF PIPE CULVERT.

CASE I



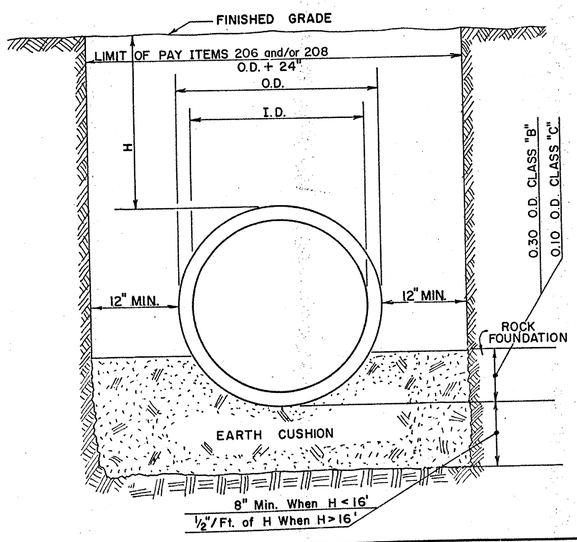
CASE II

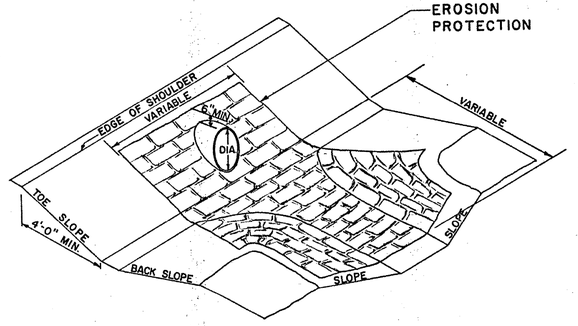
NORMAL TRENCH INSTALLATION (CLASS C BEDDING)



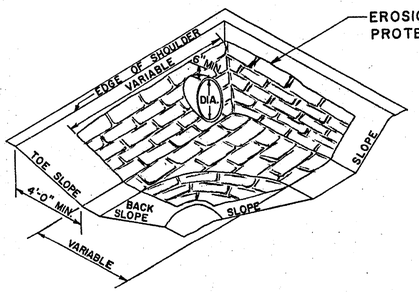
NOTE: USE CLASS "C" BEDDING UNLESS OTHERWISE INDICATED.

CLASS B & C BEDDING IN ROCK





CASE III



CASE IV

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-17

MANHOLES W & W-30

PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.

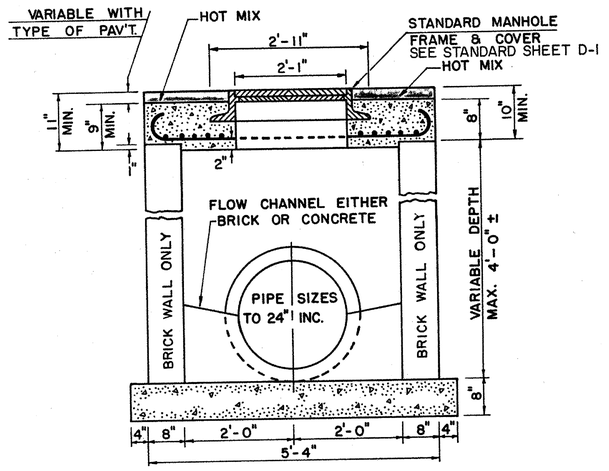
APPROVED _____ DIRECTOR OF OPERATIONS 6-29-70 DATE

Joe S. Robinson DEPUTY DIRECTOR-CHIEF ENGINEER 6/29/70 DATE

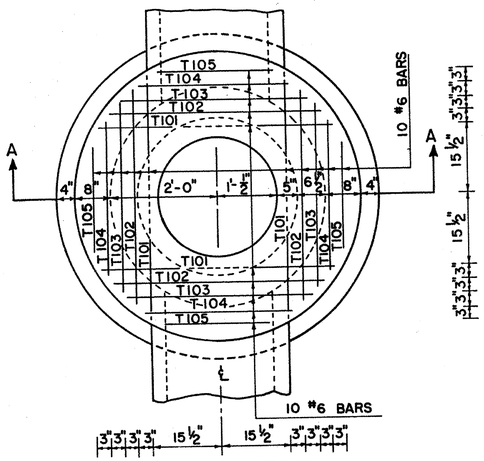
PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.

BILL OF MATERIALS

REINF. STEEL	BENT BARS NO.	SIZE	LENGTH	MARK	BENDING DIAGRAM ALL DIMENSIONS ARE OUT-OUT (8" 8")	
137 #	4	3/4" ø	5'-7"	T 101	4'-3"	5'-7" T101
	4	"	5'-2"	T 102	3'-10"	5'-2" T102
	4	"	4'-9"	T 103	3'-5"	4'-9" T103
	4	"	4'-0"	T 104	2'-8"	4'-0" T104
	4	"	3'-2"	T 105	1'-10"	3'-2" T105



SECTION A-A



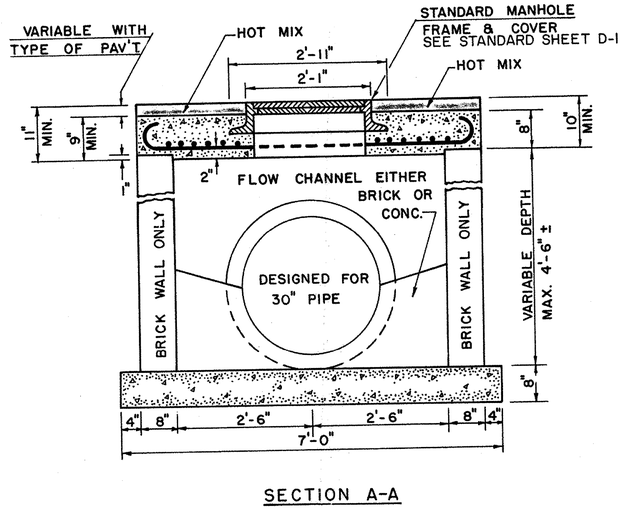
W MANHOLE

SHALLOW DEPTH ONLY

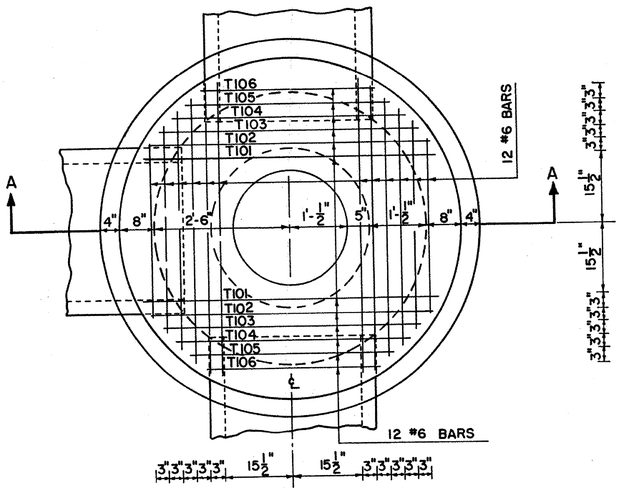
1 0 1 2 3

BILL OF MATERIALS

REINF. STEEL	BENT BARS NO.	SIZE	LENGTH	MARK	BENDING DIAGRAM ALL DIMENSIONS ARE OUT-OUT (8" 8")	
205 #	4	3/4" ø	6'-9"	T101	5'-5"	6'-9" T101
	4	"	6'-5"	T102	5'-1"	6'-5" T102
	4	"	6'-1"	T103	4'-9"	6'-1" T103
	4	"	5'-4"	T104	4'-0"	5'-4" T104
	4	"	5'-1"	T105	3'-9"	5'-1" T105
	4	"	4'-4"	T106	3'-0"	4'-4" T106



SECTION A-A



W-30 MANHOLE

SHALLOW DEPTH ONLY

1 0 1 2 3

COUNTY	CONTRACT	P. R. A. RES. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-18-5

CATCH BASIN DOUBLE A

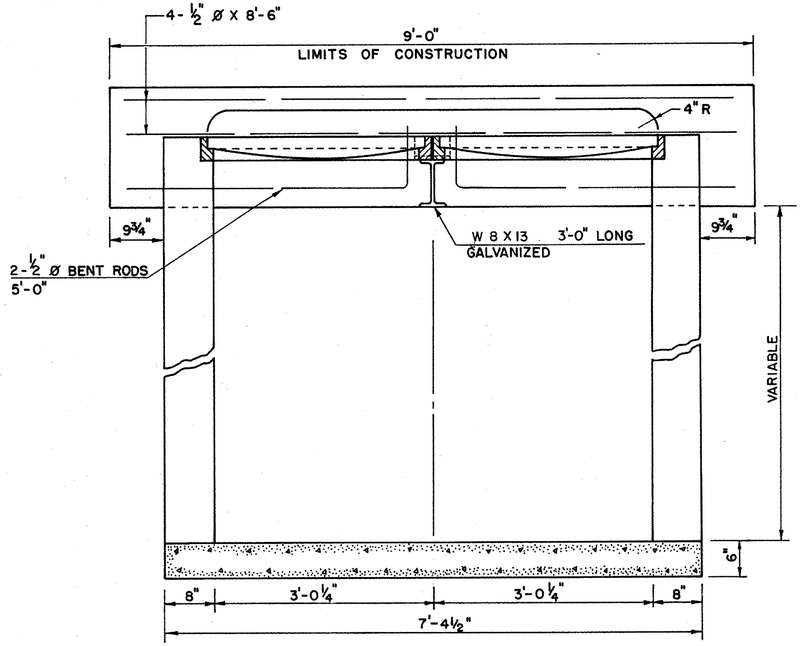
PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

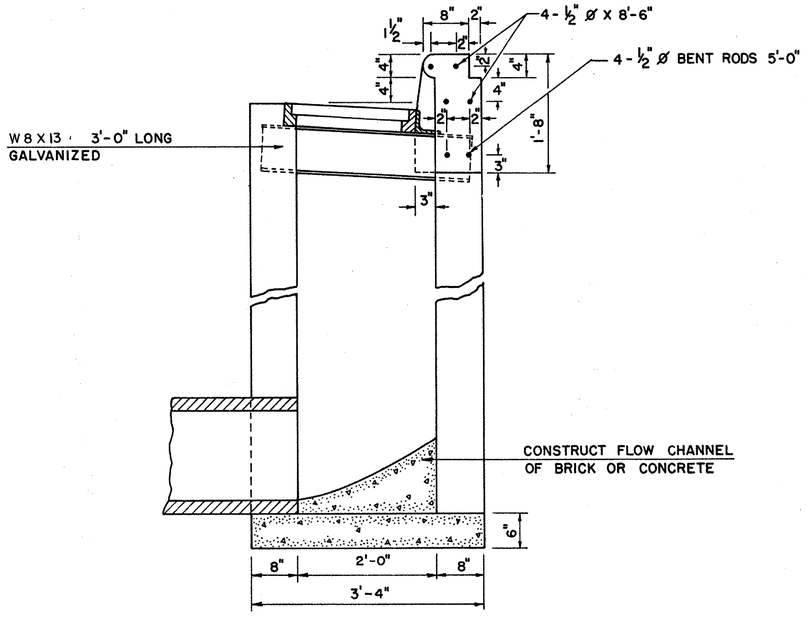
1. 3/31/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
2. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-1 R.T.C.
3. 12/2/75, STANDARDIZED DIMENSIONS & ADDED FRAME & GRATE NOTE. R.F.R.
4. 1/31/77 ADD PRECAST NOTE AND REVISE W BEAM RFR.
5. 1/30/81 REVISE NOTES R.F.R.

APPROVED _____ DIRECTOR OF OPERATIONS 7-27-70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 7/27/70 DATE

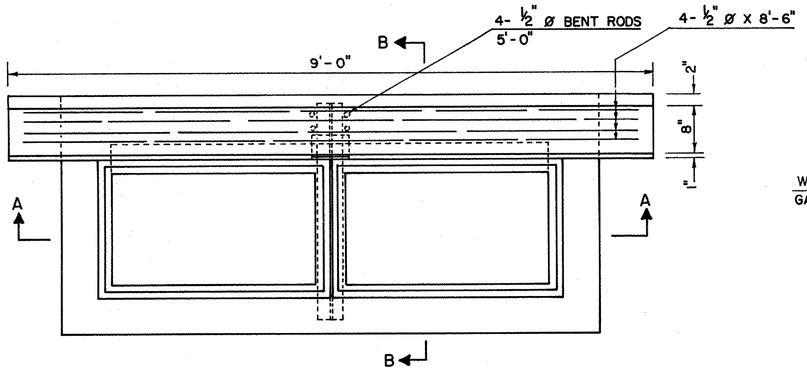


SECTION A-A

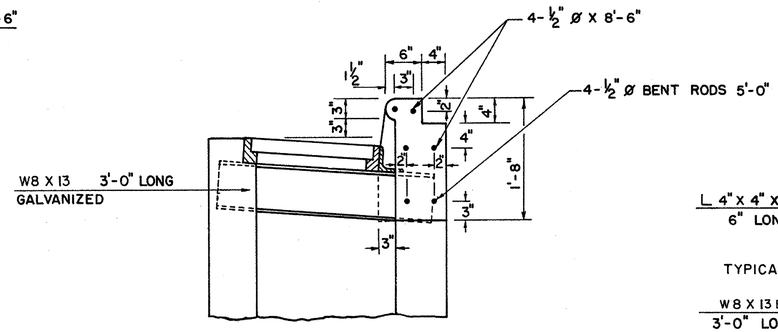


SECTION B-B

FOR USE WITH P.C.C. CURB TYPE 1

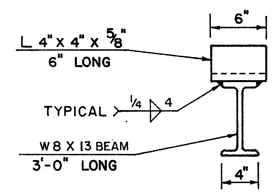


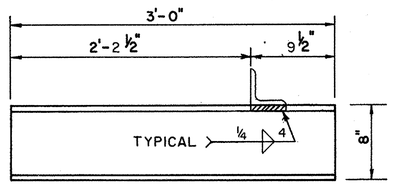
PLAN



SECTION B-B

FOR USE WITH P.C.C. CURB TYPE 2





TO BE GALVANIZED AFTER WELDING

W BEAM SUPPORT FOR STANDARD CATCH BASIN FRAMES AND GRATES

NOTES:

REINFORCING STEEL IS TO BE INCLUDED IN UNIT PRICE BID FOR DOUBLE A CATCH BASIN.

W BEAM AND ANGLE IRON ARE TO BE INCLUDED IN UNIT PRICE BID FOR DOUBLE A CATCH BASIN.

USE STANDARD CATCH BASIN FRAMES & GRATES. SEE STANDARD SHEET D-1

COST OF 9'-0" OF CURB IS TO BE INCLUDED IN UNIT PRICE BID FOR DOUBLE A CATCH BASIN.

CATCH BASIN FRAME AND GRATE MAY BE DEPRESSED ½" BELOW POSITION SHOWN, WHEN DIRECTED.

STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH.

CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCING AND OTHER PERTINENT INFORMATION FOR APPROVAL.

PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.

DOUBLE A CATCH BASIN

1 0 1 2

VAN DYKE PRINT MYLAR

COUNTY	CONTRACT	P. B. A. SEC. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET D-19-5

CATCH BASINS DOUBLE J & DOUBLE J MODIFIED

PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

1. 4/1/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
2. 10/25/74, NOTE REFERRING TO STANDARD SHEET D-1, R.T.C.
3. 12/2/75, STANDARDIZED DIMENSIONS & ADDED FRAME & GRATE NOTE. R.F.R.
4. 1/31/77, ADDED PRECAST NOTE AND REVISED W BEAM R.F.R.
5. 1/30/81 ADDED STEP NOTE R.F.R.

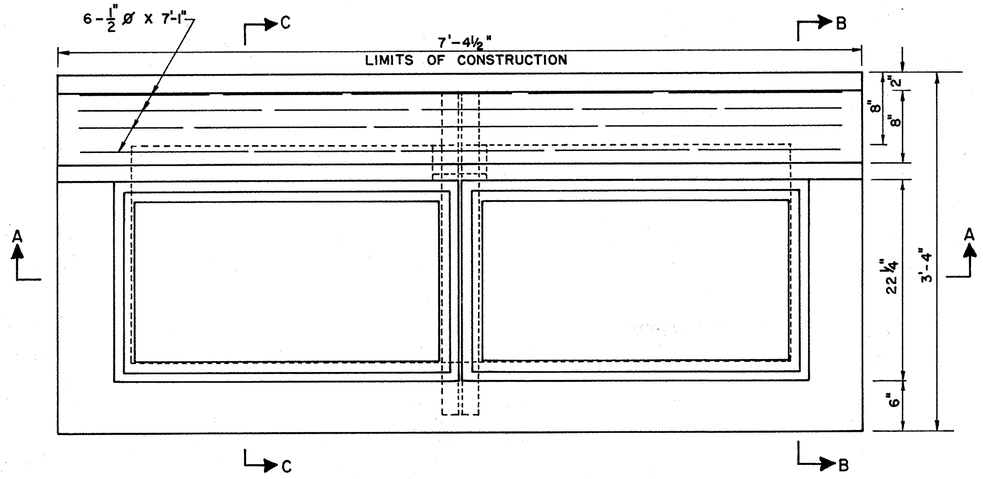
APPROVED _____ 7.27.20
DIRECTOR OF OPERATIONS DATE

Joe S. Robinson 7/27/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

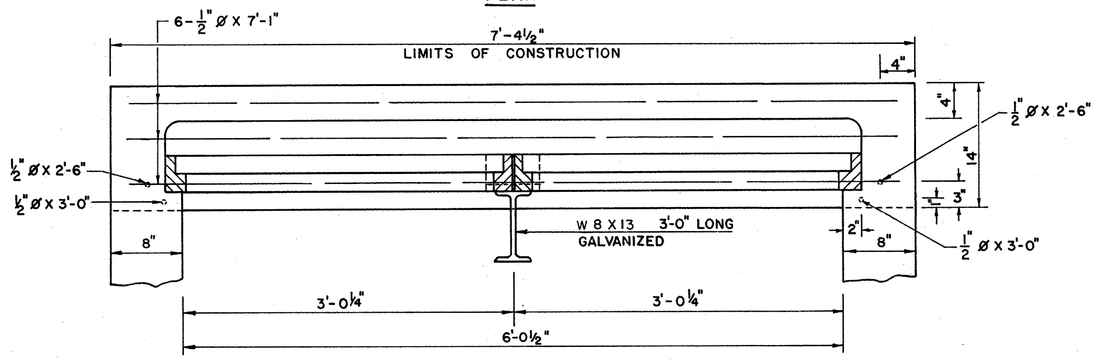
NOTE: CATCH BASINS MAY BE PRECAST. CONTRACTOR SHALL SUBMIT DETAILED PLANS SHOWING SECTIONS, JOINTS, REINFORCEMENT AND OTHER PERTINENT INFORMATION FOR APPROVAL.

STEPS ARE TO BE PLACED IN ALL CATCH BASINS AND MANHOLES OVER 4' DEEP. SEE STANDARD SHEET D-1. COST OF STEPS TO BE INCLUDED IN COST OF CATCH BASIN.

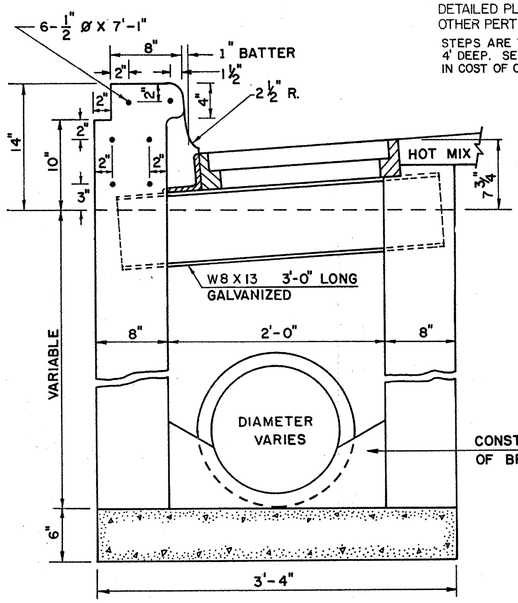
DOUBLE J CATCH BASIN FOR INTEGRAL CURB AND GUTTER ONLY



PLAN

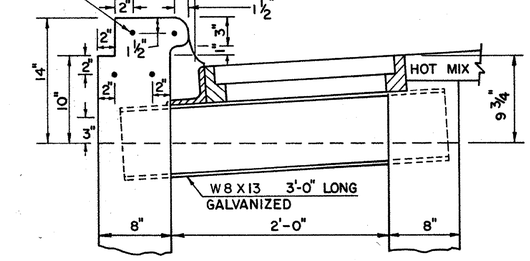


SECTION A-A

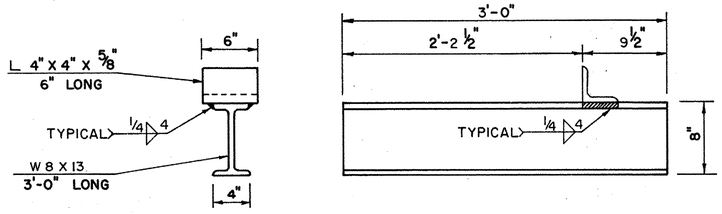


CONSTRUCT FLOW CHANNEL OF BRICK OR CONCRETE

SECTION C-C
FOR 8" CURB

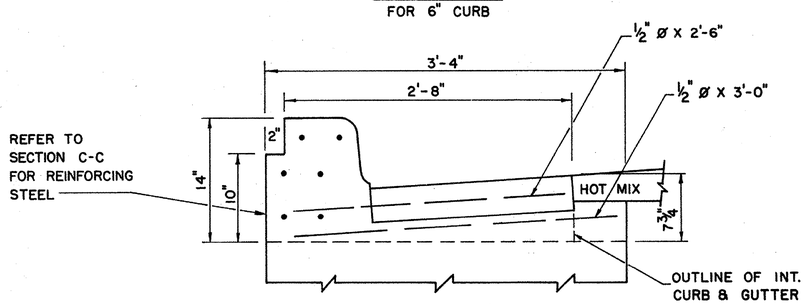


SECTION C-C
FOR 6" CURB



TO BE GALVANIZED AFTER WELDING

W BEAM SUPPORT FOR STANDARD CATCH BASIN FRAMES AND GRATES



SECTION B-B

NOTES:

REINFORCING STEEL IS TO BE INCLUDED IN UNIT PRICE BID FOR DOUBLE J CATCH BASIN.

W BEAM AND ANGLE IRON ARE TO BE INCLUDED IN UNIT PRICE BID FOR DOUBLE J CATCH BASIN.

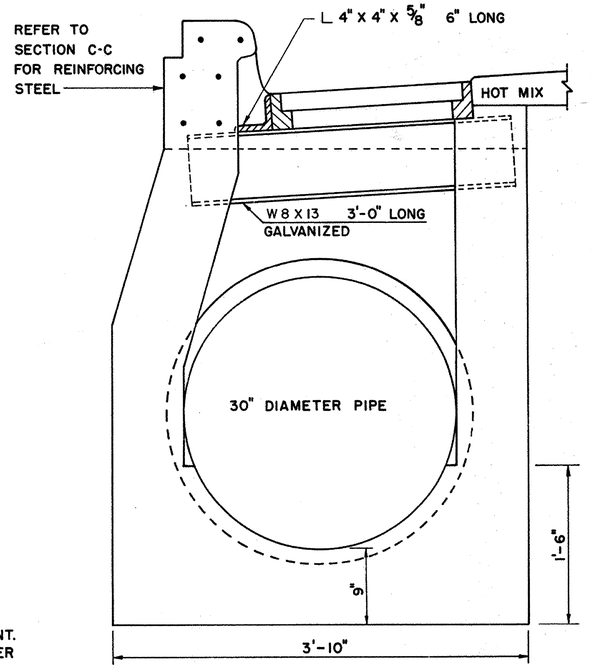
USE STANDARD CATCH BASIN FRAMES AND GRATES.
SEE STANDARD SHEET D-1

COST OF 7'-5" OF INTEGRAL CURB & GUTTER IS TO BE INCLUDED IN UNIT PRICE BID FOR DOUBLE J CATCH BASIN.

PARGET BRICK OR BLOCK MASONRY WITH 1/2" OF PORTLAND CEMENT MORTAR.

UPPER 12" OF STRUCTURE TO BE OF P.C.C. MASONRY.

CATCH BASIN FRAME AND GRATE MAY BE DEPRESSED ½" BELOW POSITION SHOWN, WHEN DIRECTED.



DOUBLE J MODIFIED
CATCH BASIN (30" PIPE)
FOR INTEGRAL CURB & GUTTER ONLY

DOUBLE J CATCH BASIN

1 0 1 2

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

ENVIRONMENTAL CONTROL
E-1 TEMPORARY EROSION CONTROL DETAILS

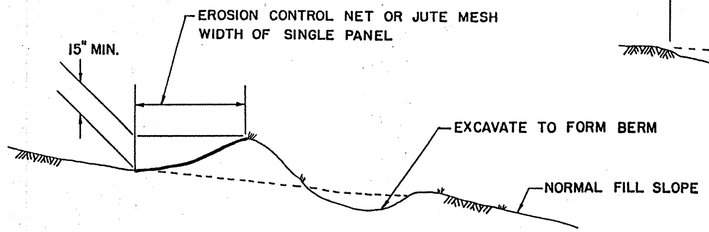
PREL. TRACING Y.N.C. DESIGN CHKD. E.L.W.

REVISIONS

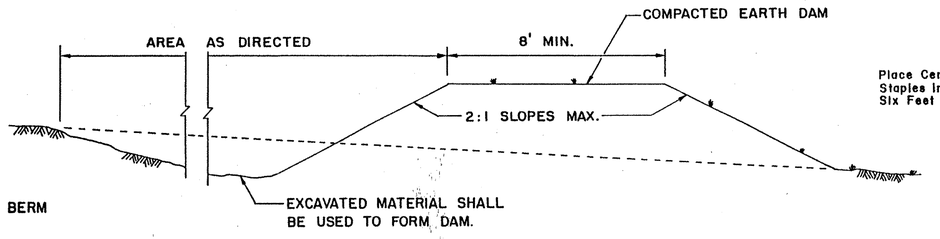
REVISED: DETAILS OF EXCELSIOR BLANKET ADDED. 7-6-71 J.T.B.

APPROVED _____ DIRECTOR OF OPERATIONS 12-7-70 DATE

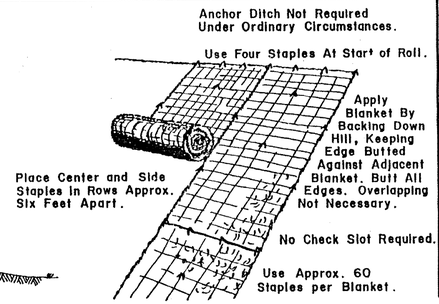
_____ DEPUTY DIRECTOR-CHIEF ENGINEER 12/7/70 DATE



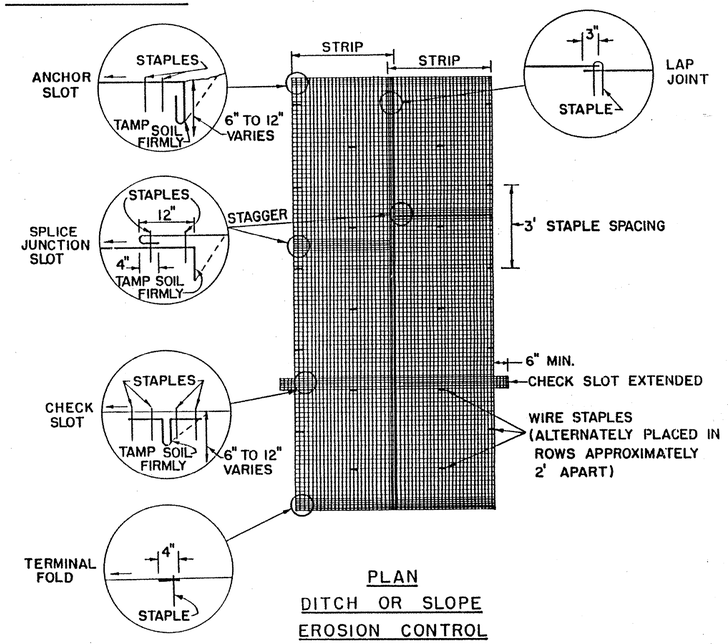
INTERCEPTING DITCH



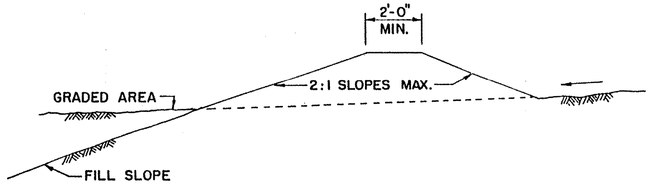
SEDIMENT BASIN



EXCELSIOR BLANKET

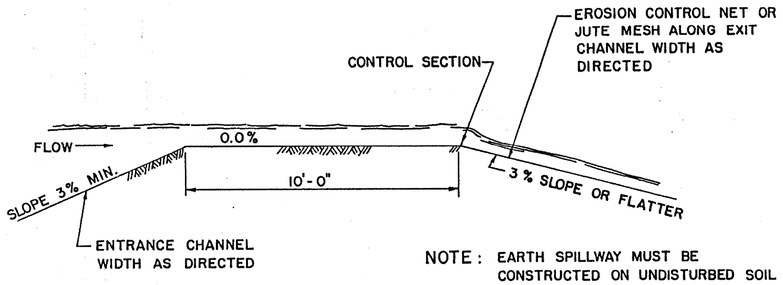


PLAN
DITCH OR SLOPE
EROSION CONTROL
NET OR JUTE MESH



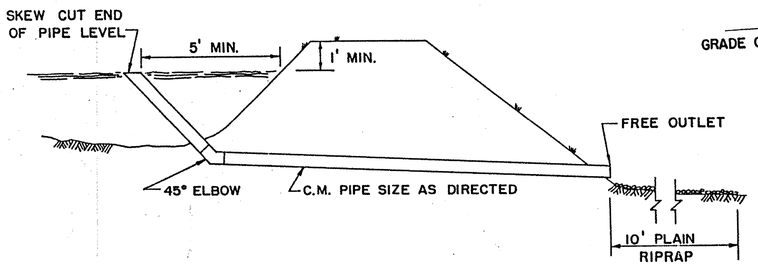
DIKE

NOTE:
1. DIKES MUST BE MACHINE COMPACTED
2. DIKES MUST HAVE A POSITIVE GRADE DRAINING TO A STABILIZED OUTLET.



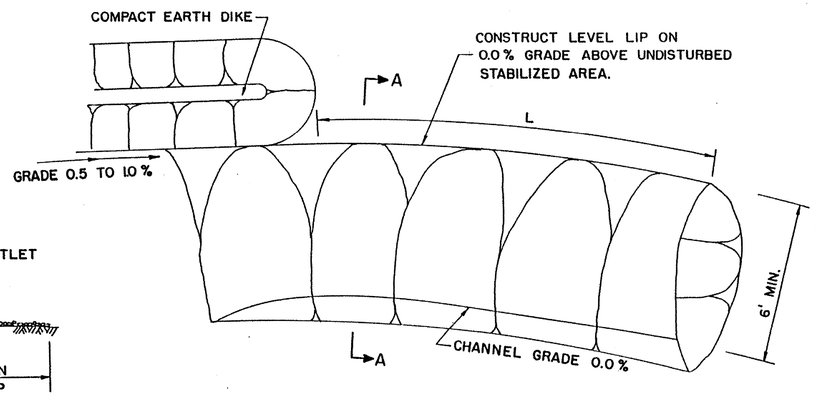
NOTE: EARTH SPILLWAY MUST BE CONSTRUCTED ON UNDISTURBED SOIL

EARTH SPILLWAY



DIKE WITH PIPE SPILLWAY

NOTE:
TOP OF RISER PIPE SHALL BE PERFORATED WITH 2 ROWS OF 1½" DIAMETER HOLES DRILLED IN A HORIZONTAL PLANE ON 10" CENTERS SPACED 8" VERTICALLY.

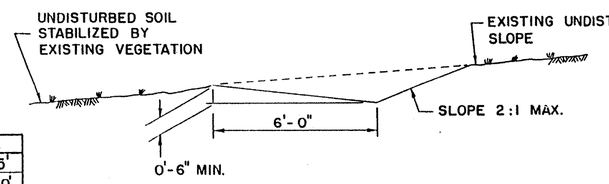


PLAN

NOTES:
1. LEVEL SPREADERS MUST BE CONSTRUCTED ON UNDISTURBED SOIL.
2. ENTRANCE MUST BE GRADED TO INSURE THE FLOW ENTERS DIRECTLY INTO THE 0.0% GRADED CHANNEL.

C.F.S.	L
0 TO 10	15'
11 TO 20	20'
21 TO 30	26'
31 TO 40	36'
41 TO 50	44'

LEVEL SPREADER



SECTION A-A

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		2	DEL.				

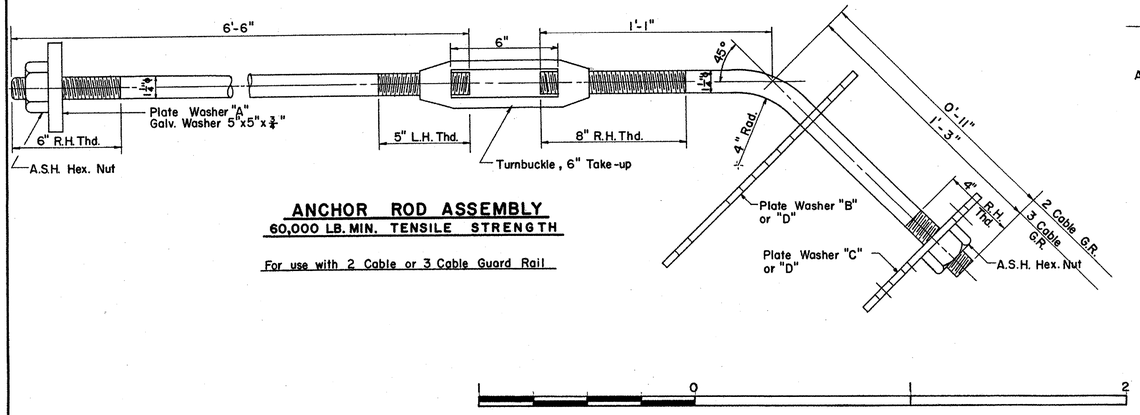
STANDARD SHEET G-1

3 CABLE GUARD RAIL & ATTACHMENTS FOR GUARD RAIL

REVISIONS:
CHANGED SECTION NUMBER FOR END POST ATTACHMENTS TO SECTION 717.
5-22-72 J.T.B.

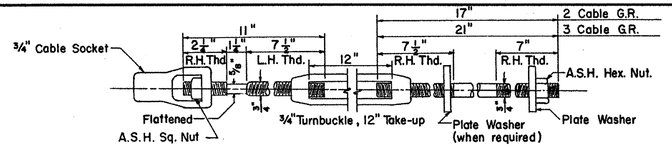
APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



ANCHOR ROD ASSEMBLY
60,000 LB. MIN. TENSILE STRENGTH

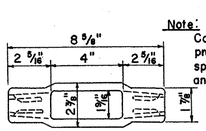
For use with 2 Cable or 3 Cable Guard Rail



CABLE END ANCHOR
25,000 LB. MIN. TENSILE STRENGTH

No Scale

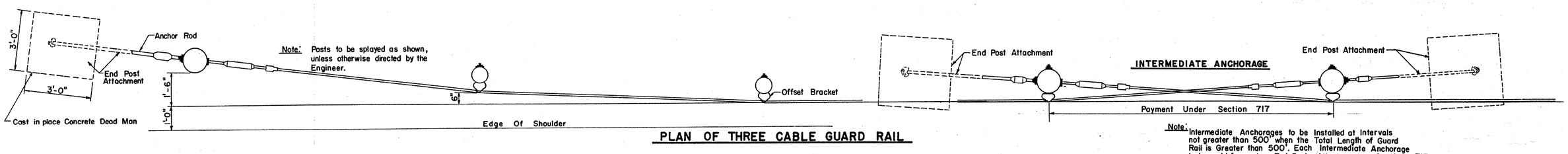
For use with 2 Cable or 3 Cable Guard Rail



Note: Cable splices may be used providing not more than one splice occurs in any one panel and no piece of cable is less than 50'-0" long.

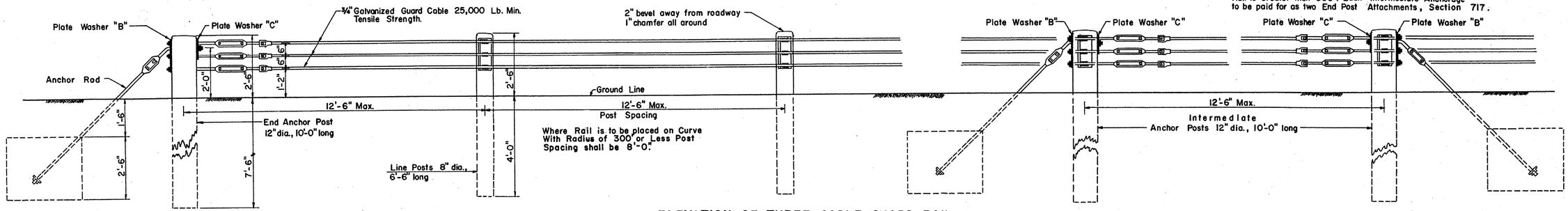
¾" CABLE SPLICE
25,000 LB. MIN. TENSILE STRENGTH

0 1 2



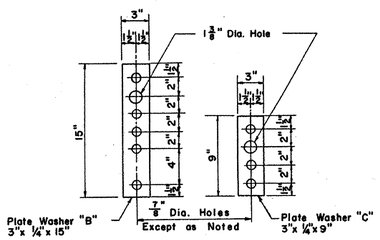
PLAN OF THREE CABLE GUARD RAIL

Note: Intermediate Anchorages to be installed at intervals not greater than 500' when the Total Length of Guard Rail is Greater than 500'. Each Intermediate Anchorage to be paid for as two End Post Attachments, Section 717.



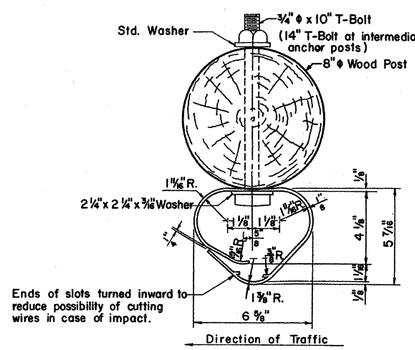
ELEVATION OF THREE CABLE GUARD RAIL

0 1 2 3 4

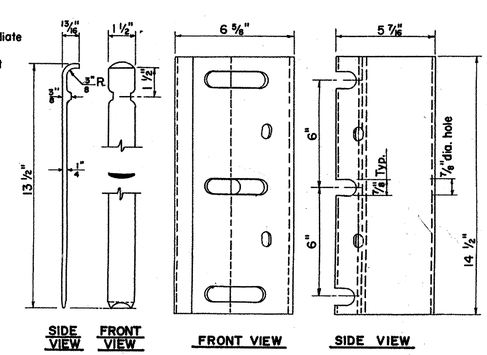


GALVANIZED STEEL PLATE WASHERS FOR 3 CABLE GUARD RAIL

0 1 2 3



PLAN OF OFFSET BRACKET AND POST ASSEMBLY



0 1 2

OFFSET ATTACHMENT FOR 3 CABLE GUARD RAIL

CHECKED
GRADE
BEARINGS
TIE POINTS
BENCH MARKS
EARTHWORK
DRAINAGE

REVISIONS

K & E CO. 17 8183
HRC

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET G-2-9

STEEL BEAM GUARDRAIL WOOD AND STEEL POST DETAILS

PREL. TRACING J. W. DESIGN CHKD. E. L. W.

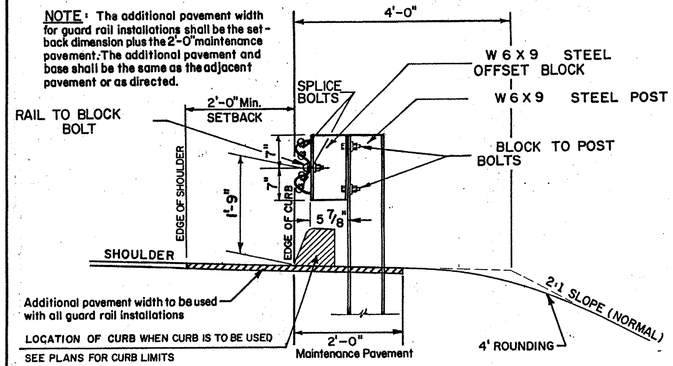
REVISIONS

1. CORRECTED DIMENSIONS ON SPLICE DETAIL 8-13-70 J.T.B.
2. 4/1/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
3. ADDED OFFSET BRACKET DIMENSION PREVIOUSLY OMITTED 9-17-71 J.T.B
4. ADDED NOTE REFERRING TO C-POST 6/8/74 R.T.C.

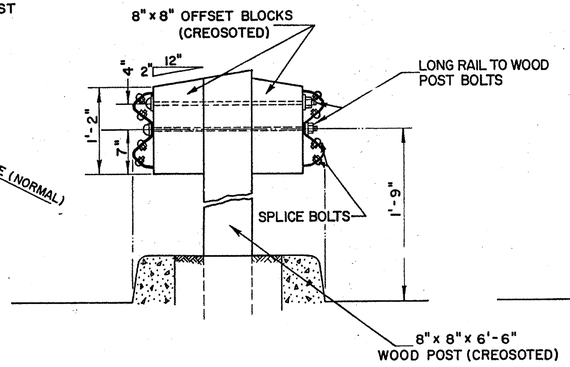
APPROVED _____ DIRECTOR OF OPERATIONS — DATE 6-25-74

_____ DEPUTY DIRECTOR-CHIEF ENGINEER — DATE 6/29/10

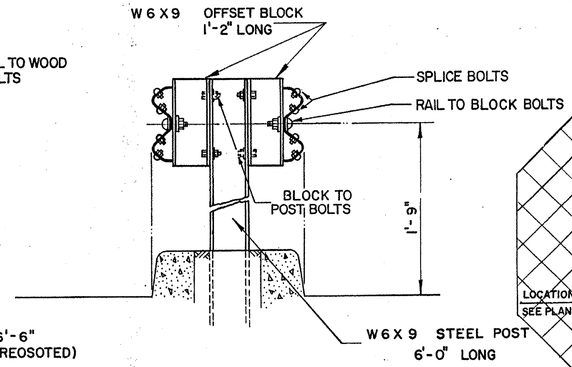
NOTE: The additional pavement width for guard rail installations shall be the set-back dimension plus the 2'-0" maintenance pavement. The additional pavement and base shall be the same as the adjacent pavement or as directed.



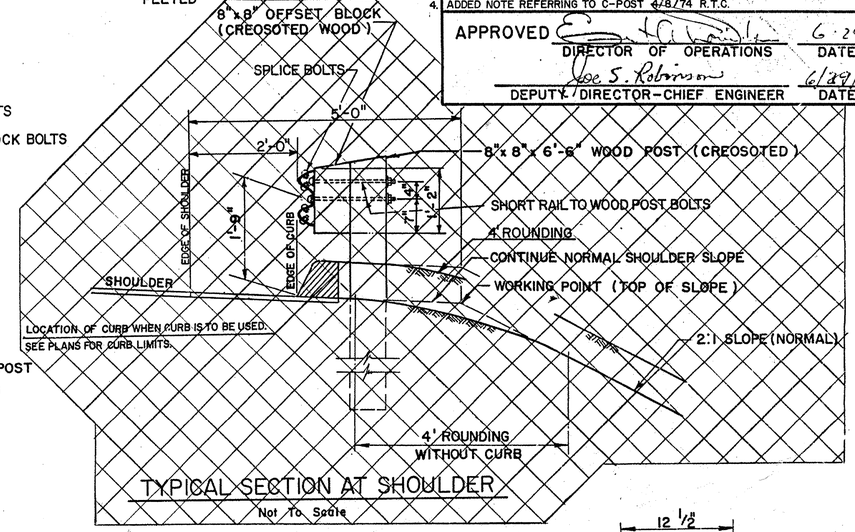
RURAL
TYPICAL SECTION AT SHOULDER
Not To Scale



MEDIAN BARRIER
WOOD POST
Not To Scale



MEDIAN BARRIER
STEEL POST
Not To Scale



TYPICAL SECTION AT SHOULDER
Not To Scale

NOTE: TRANSITION GUARDRAIL 1 FT. IN 37.5 FT. WHEN PASSING FROM CURBED SECTION TO SECTION WITH NO CURB.

SEE STANDARD SHEET G-4 FOR ALT. 6" C-STRONG POST DETAIL.

THREADS OF ALL BOLTS SHALL BE BURRED AFTER GUARDRAIL INSTALLATION IS COMPLETED

ALL WOOD POST DIMENSIONS ARE NOMINAL

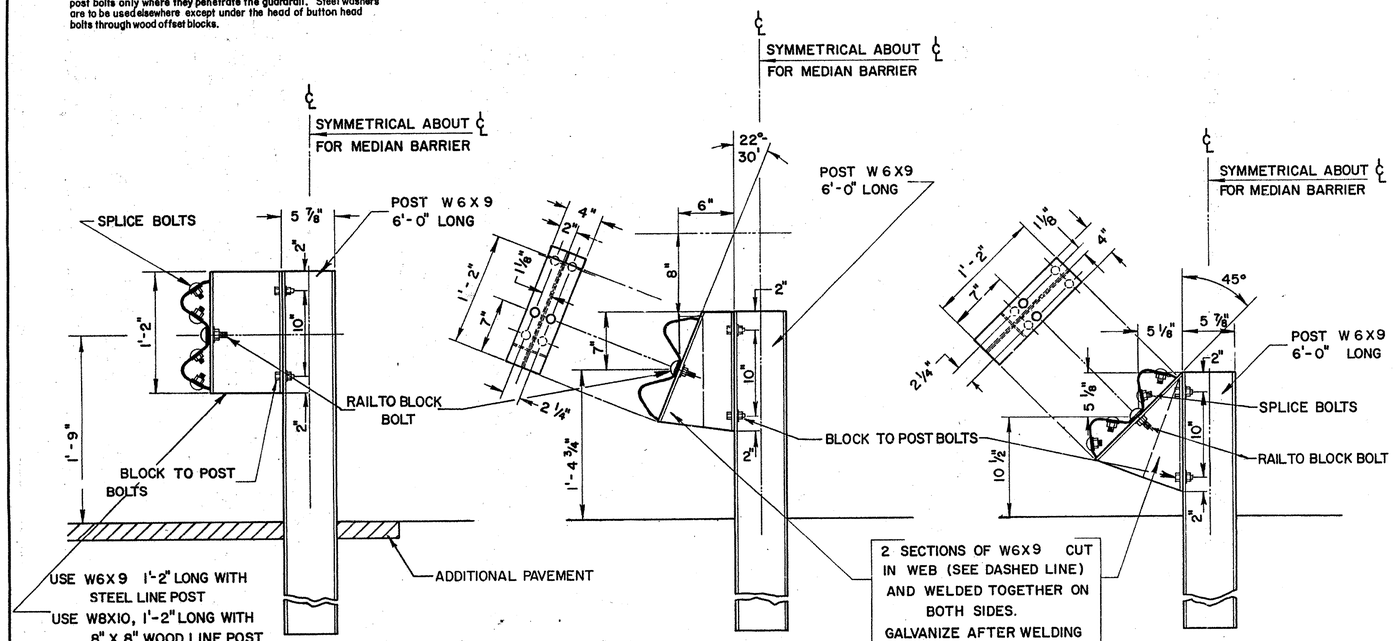
WASHER INSTALLATION NOTES:
(See standards sheet G-4 for washer details)

ONE "TYPE A" WASHER SHALL BE USED UNDER –
- The head on button head rail to block bolts
- The head on button head long rail to wood post bolts *
- The nut on button head long rail to wood post bolts *
- The head on button head short rail to wood post bolts *

ONE STEEL WASHER SHALL BE USED UNDER –
- The nut on button head rail to block bolts
- The head on block to steel post bolts
- The nut on block to steel post bolts
- The nut on button head long rail to wood post bolts *
- The nut on button head short rail to wood post bolts

STEEL WASHERS SHALL NOT BE USED ON SPLICE BOLTS

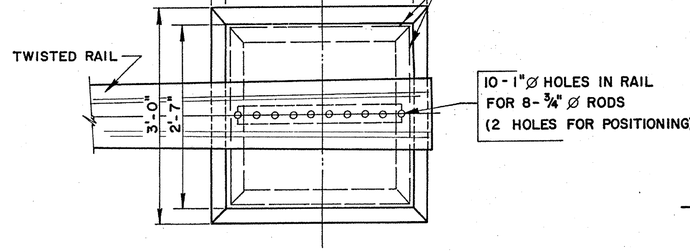
* "Type A" washers to be used on long or short rail to wood post bolts only where they penetrate the guardrail. Steel washers are to be used elsewhere except under the head of button head bolts through wood offset blocks.



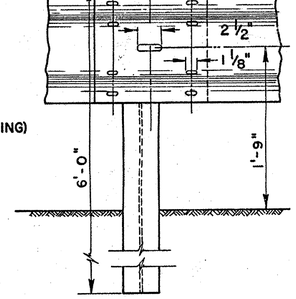
POST "A"
Not To Scale

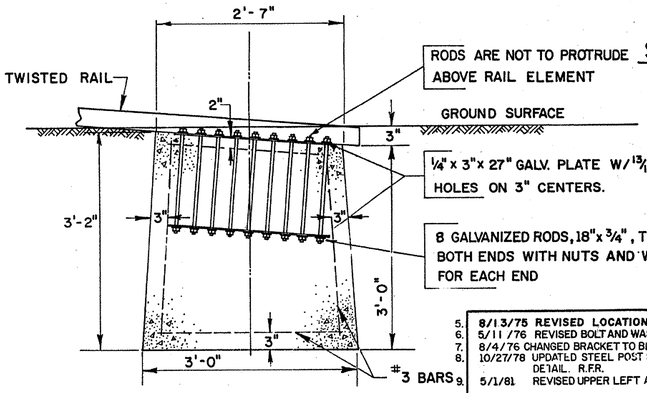
POST "B"
Not To Scale

POST "C"
Not To Scale



Top View (Single Barrier)





TYPE "A" ANCHOR BLOCK
SIDE VIEW (Single Rail & Median Barrier)

SPLICE DETAIL FOR STEEL POST

REVISIONS

5. 8/13/75 REVISED LOCATION OF CURB AND PLACEMENT OF GUARDRAIL RTC
6. 5/11/76 REVISED BOLT AND WASHER NOTES AND SHOULDER TO GUARDRAIL DIMENSION R.F.R.
7. 8/4/76 CHANGED BRACKET TO BLOCK R.F.R.
8. 10/27/78 UPDATED STEEL POST SIZES, REVISED ANCHOR BLOCK DETAIL AND WOOD POST DETAIL. R.F.R.
9. 5/1/81 REVISED UPPER LEFT AND DELETED UPPER RIGHT TYPICAL SECTION R.F.R.

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET G-3-5
GUARD RAIL PLACING AND ANCHORING

PREL. TRACING J. WHITE DESIGN E. L. W. CHKD. J. T. B.

REVISIONS
1. 4/1/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
2. 4/8/74, ADDED NOTE REFERRING TO C-POST. R.T.C.
3. 8/13/75, ADDED NOTE REFERRING TO NORMAL SIDE SLOPES & REV. SHOULDER OFFSETS R.T.C.

APPROVED *E. L. Peterson* 6-22-70
DIRECTOR OF OPERATIONS DATE

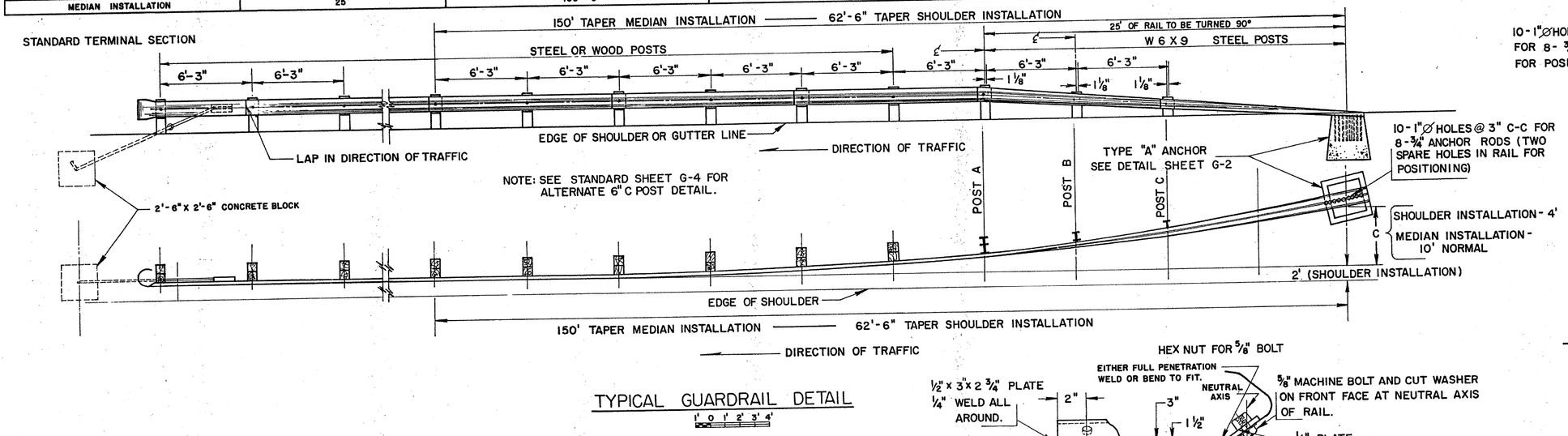
Lee S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

DISTANCE FROM BEGINING OF TAPER		6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00	106.25	112.50	118.75	125.00	131.25	137.50	143.75	150.00
END OFFSET	C=4	0.014	0.160	0.360	0.640	1.000	1.440	1.960	2.560	3.240	4.000														
	C=6	0.027	0.107	0.240	0.427	0.667	0.960	1.307	1.707	2.160	2.667	3.227	3.840	4.507	5.227	6.000									
	C=8	0.020	0.080	0.180	0.320	0.500	0.720	0.980	1.280	1.620	2.000	2.420	2.880	3.380	3.920	4.500	5.120	5.780	6.480	7.220	8.000				
	C=10	0.017	0.069	0.156	0.278	0.434	0.625	0.851	1.111	1.406	1.736	2.101	2.500	2.934	3.403	3.906	4.444	5.017	5.625	6.267	6.944	7.656	8.403	9.184	10.000

TABLE OF OFFSETS FROM TANGENT FOR PLACING GUARDRAIL TAPER

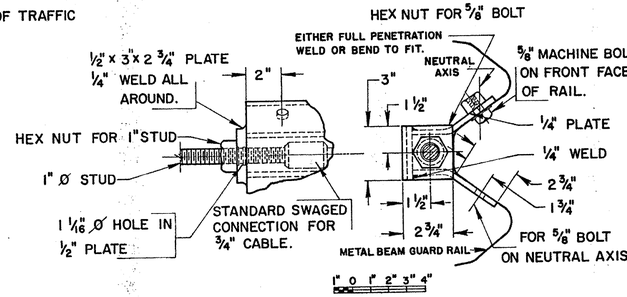
✳ NOT REQUIRED IF GUARD RAIL IS ANCHORED TO OBSTRUCTION UNLESS FILL CONDITIONS WARRANT.

	LENGTH OF TWIST	LENGTH OF TAPER (AND TWIST)	MINIMUM LENGTH OF TANGENT RAIL BEFORE OBSTRUCTION	MINIMUM LENGTH OF RAIL BEYOND OBSTRUCTION ✳
SHOULDER INSTALLATION	25'	62'-6"	50' (TO INCLUDE CONNECTION)	25' (TO INCLUDE CONNECTION)
MEDIAN INSTALLATION	25'	150'-0"	50' (TO INCLUDE CONNECTION)	25' (TO INCLUDE CONNECTION)

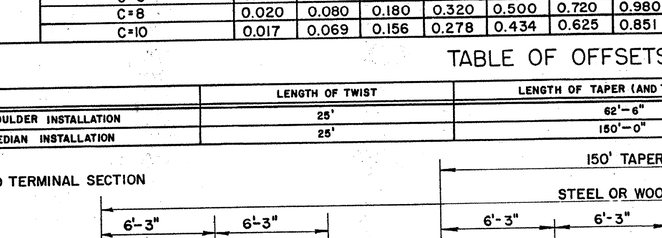


TYPICAL GUARDRAIL DETAIL

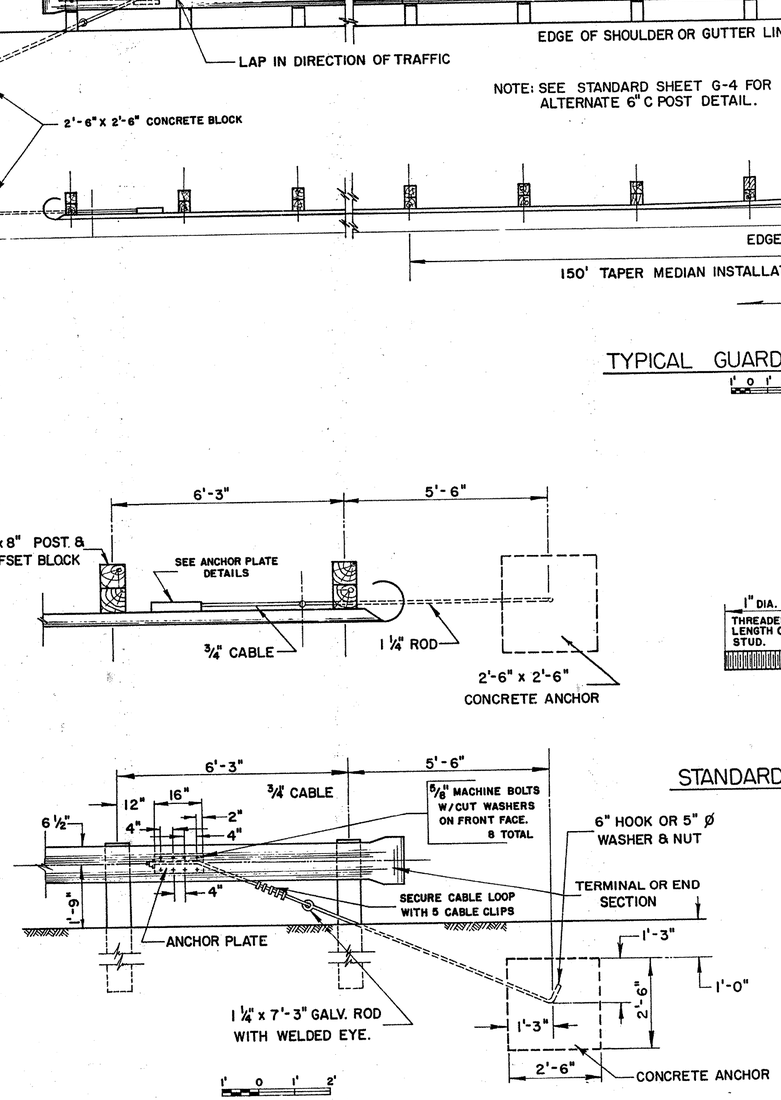
1' 0 1' 2' 3' 4'



ANCHOR PLATE DETAILS



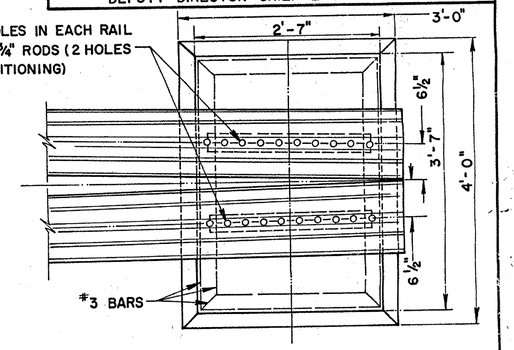
STANDARD SWAGE FITTING AND STUD

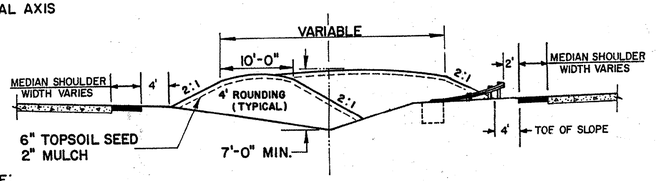


END ANCHOR DETAILS BLOCKED OUT "W" BEAM

ANCHOR BLOCK (MEDIAN BARRIER)
TO BE USED AT ALL MEDIAN BARRIER RAIL ENDS

1' 0 1' 2'

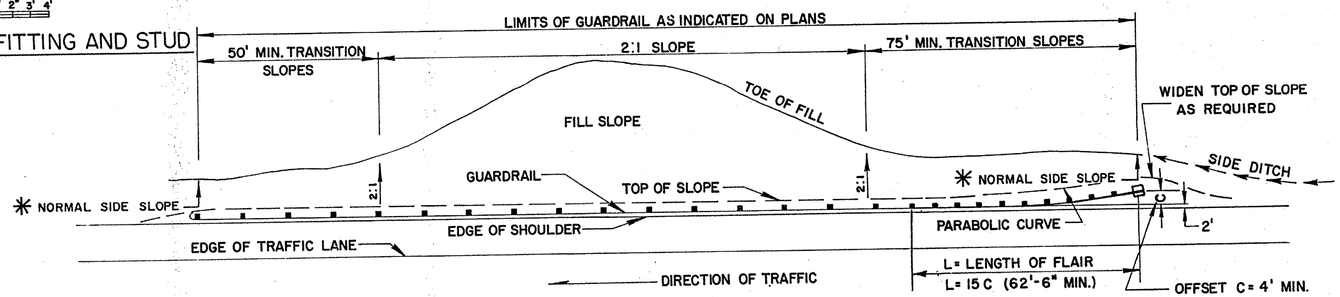




NOTE:
1. MATERIAL FOR MOUND NOT TO BE COMPACTED.
2. MOUND TO BE CONSTRUCTED FROM APPROVED EXCESS MATERIAL UNLESS OTHERWISE DIRECTED.
3. SKETCH SHOWN IS TYPICAL WHEN PROPOSED GRADE LINES OF PAVEMENT ARE IDENTICAL.
4. MOUNDS TO BE CONSTRUCTED ONLY WHERE CALLED FOR ON PLANS.

MEDIAN MOUNDS

10' 0 10' 20'



✳ NORMAL SIDE SLOPES TO BE 6:1 OR 4:1 AS GIVEN ON CONTRACT PLANS.

PLAN AT SHOULDER
NOT TO SCALE

REVISIONS
4. 5/11/76 REVISED MED. MOUND DETAILS, CLARIFIED LENGTH OF 90° RAIL TWIST AND ADDED NOTE ELIMINATING REQUIRED USE OF GUARD RAIL AFTER PARAPET WALL. - R.T.C.
5. 10/27/78 UPDATED STEEL POST SIZE AND ADDED CONNECTION NOTES TO TABLE R.F.R.

© CAL PRINT MYLAR

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET G-4-7

POSTS & FASTENERS - GALVANIZED STEEL BEAM GUARDRAIL

DET. TRACING J.T.B. DESIGN _____ CHKD. E.L.W.

REVISIONS

1. 4/1/71, NOMENCLATURE CHANGES FOR A.I.S.C. SPEC., D.M.E.
2. 10/10/74, ADDED 6"-C STRONG POST AS ALTERNATE FOR W 6 x 8.5 STEEL POST, R.T.C.
3. 1/30/76 ADDED NOTES CONCERNING GALVANIZING AND USE OF BO , R.T.C
4. 5/11/76 ADDED BURRING NOTE R.F.R.
5. 8/4/76 NOMENCLATURE CHANGES AND SHORT WOOD POST BOLT LENGTH REVISED R.F.R
6. 10/27/78 WOOD AND STEEL POSTS REVISED - STEEL POST SIZES UPDATED R.F.R
7. 5/15/84 ADDED REFLECTORIZED WASHER DETAIL B.E.B.

APPROVED _____ 8-1-84
DIRECTOR OF HIGHWAYS DATE

_____ 8/1/84
DEPUTY DIRECTOR - CHIEF ENGINEER DATE

FASTENERS INCLUDE BOLTS, NUTS, AND WASHERS. SOME OF THE NUT AND BOLT DRAWINGS INCLUDE A WASHER DETAIL; OTHERS DO NOT. THE SIGNIFICANCE OF THIS IS THAT A PARTICULAR WASHER MAY BE USED WITH MORE THAN ONE BOLT OR THAT A PARTICULAR BOLT MAY BE USED WITH MORE THAN ONE WASHER AND, TO AVOID EXCLUSIONS AND EXPLANATORY NOTES ON THE DRAWINGS, THE PARTS HAVE BEEN SEGREGATED.

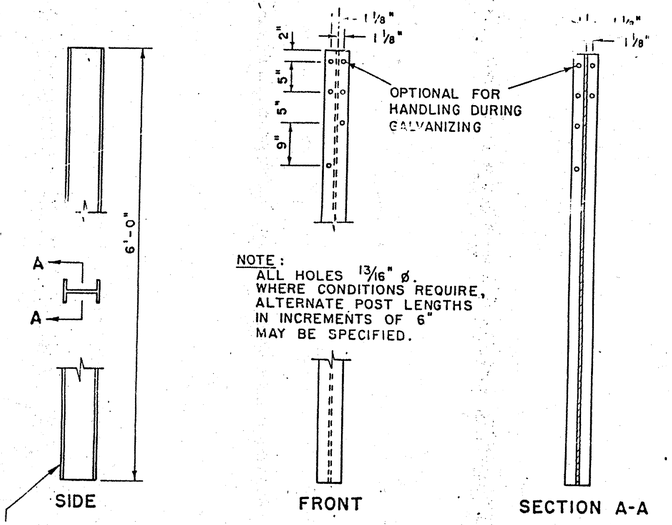
STEEL AND WOOD POSTS AND OFFSET BLOCKS ARE SHOWN FOR "W" BEAM GUARDRAIL AND "W" BEAM MEDIAN BARRIER SYSTEMS ONLY.

ALTERNATE 6"C-STRONG POST MAY BE USED IN PLACE OF W 6 x 9 STEEL POST IN ACCORDANCE WITH F.H.W.A-N 5040.2 APRIL 30, 1974. SEE DETAIL THIS SHEET 6"C-STRONG POST.

THE THREADS OF ALL BOLTS SHALL BE BURRED AFTER INSTALLATION OF THE GUARDRAIL HAS BEEN COMPLETED.

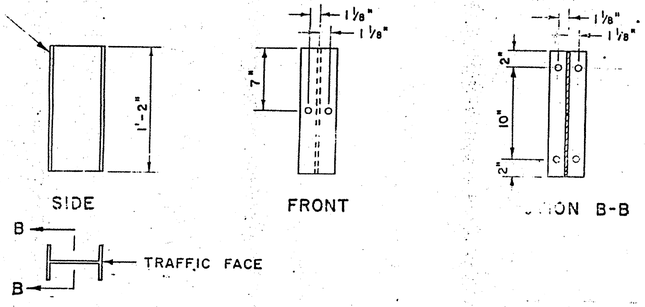
NO PUNCHING, DRILLING OR CUTTING OF GALVANIZED STEEL BEAM GUARDRAIL POST OR BLOCKS WILL BE PERMITTED AFTER GALVANIZING.

ALL WOOD POST DIMENSIONS ARE NOMINAL

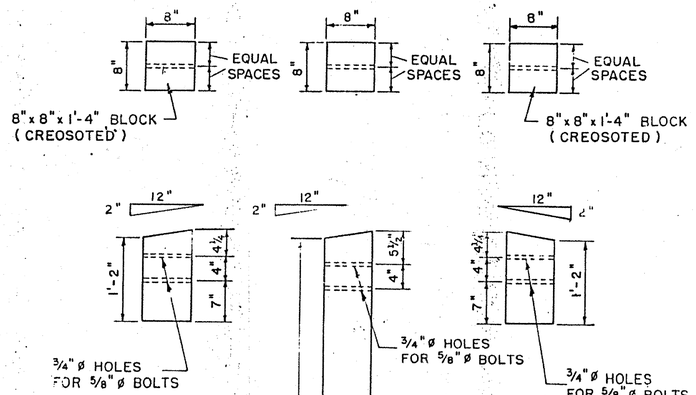


NOTE: ALL HOLES 13/16" ø. WHERE CONDITIONS REQUIRE, ALTERNATE POST LENGTHS IN INCREMENTS OF 6" MAY BE SPECIFIED.

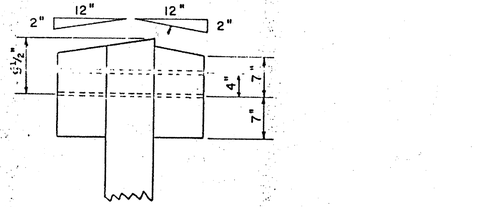
W6 x 9 GALVANIZED STEEL BEAM GUARDRAIL POST



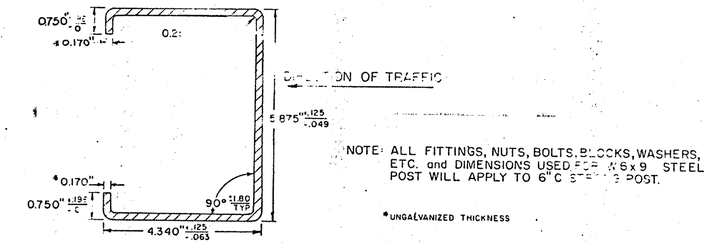
W6 X 9 GALVANIZED STEEL BEAM GUARDRAIL BLOCK



NOTE: WHERE SOIL CONDITIONS REQUIRE, ALTERNATE POST LENGTHS IN INCREMENTS OF 6" MAY BE SPECIFIED.



8"X8" WOOD POST AND BLOCK ASSEMBLY FOR GALVANIZED STEEL BEAM GUARDRAIL.

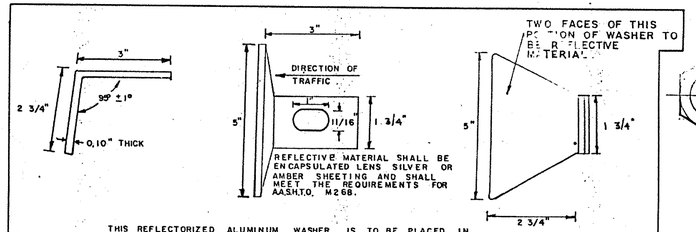


NOTE: ALL FITTINGS, NUTS, BOLTS, BLOCKS, WASHERS, ETC. and DIMENSIONS USED FOR W 6 x 9 STEEL POST WILL APPLY TO 6"C STRONG POST.

*UNGALVANIZED THICKNESS

GALVANIZED STEEL BEAM GUARDRAIL 6"-C-STRONG POST

MATERIAL - ASTM - A570 - WITH MECHANICAL PROPERTIES = TO A36
GALVANIZING - AASHTO - M111 (ASTM A123)



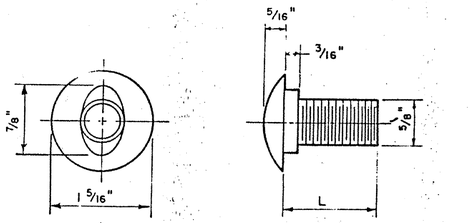
REFLECTIVE MATERIAL SHALL BE ENCAPSULATED LENS SILVER OR AMBER SHEETING AND SHALL MEET THE REQUIREMENTS FOR AASHTO. M268.

THIS REFLECTORIZED ALUMINUM WASHER IS TO BE PLACED IN VALLEY OF BEAM WHEN MOUNTING BEAM ONTO EACH FIFTH POST. WASHER SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052 - H32.

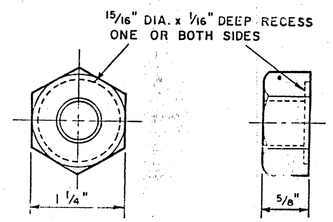
COST OF REFLECTORIZED WASHER TO BE INCIDENTAL TO SECTION 715 - GALVANIZED STEEL BEAM GUARDRAIL.

REFLECTORIZED WASHER

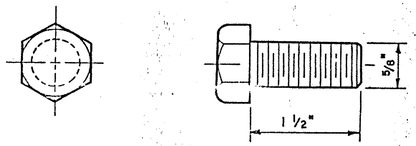
3/8" ø BUTTON HEAD BOLT



	L	THREAD LENGTH
SPLICE BOLTS, RAIL TO BLOCK BOLTS	1 1/4"	FULL LENGTH THREAD
SHORT RAIL TO WOOD POST BOLTS AND SHORT WOOD POST BOLTS	2"	1 1/2" MIN. THREAD LENGTH
	16"	2 1/2" MIN. THREAD LENGTH
LONG RAIL TO WOOD POST BOLTS AND LONG WOOD POST BOLTS.	24 1/2"	2" MIN. THREAD LENGTH



5/8" ø RECESS NUT

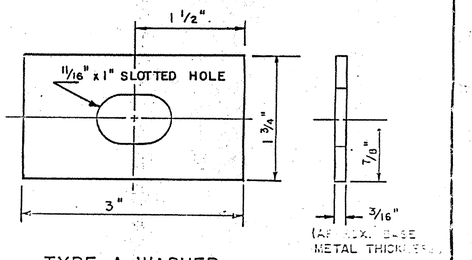


5/8" ø HEX BOLT

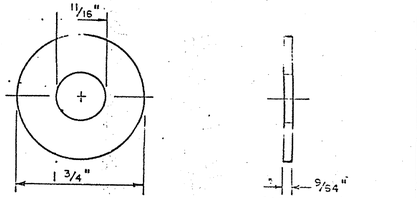
(BRACKET TO POST BOLTS)



5/8" ø HEX NUT



TYPE A WASHER



STEEL WASHER

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET G-5

RAIL ELEMENTS - GALVANIZED STEEL BEAM GUARDRAIL

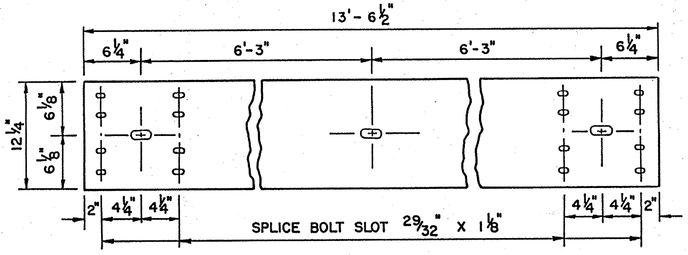
PREL. TRACING Y.N.C. DESIGN CHKD. E.L.W.

REVISIONS

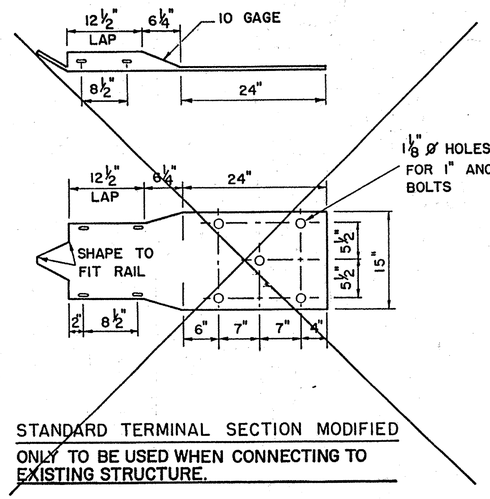
ADDED NOTES REFERRING TO GAGES. 10-27-71 J. T. B.
ADDED NOTE REFERRING TO C-POST 4/8/74 R.T.C.
ADDED STD. TERMINAL SECTION MODIFIED NOTE 3/12/76
ADDED BACK-UP PLATE NOTE. 5/1/76 R.F.R.
REVISED TERMINAL CONNECTOR NOTE & DELETED STD. TERMINAL SECTION MOD. 8/4/76 R.F.R.

APPROVED _____ DIRECTOR OF HIGHWAYS 8.19.70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 8/19/70 DATE

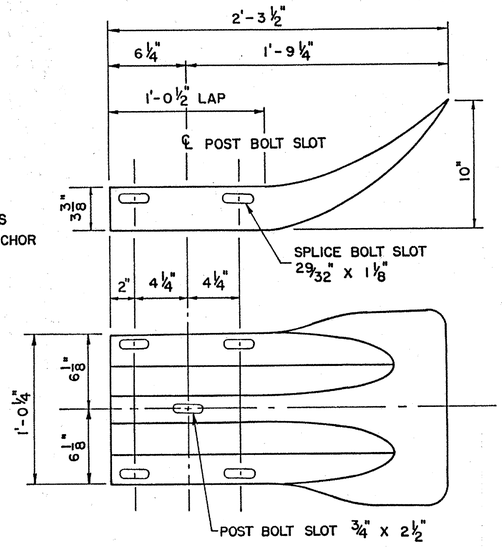


DETAIL TYPICAL RAIL SECTION



STANDARD TERMINAL SECTION MODIFIED

ONLY TO BE USED WHEN CONNECTING TO EXISTING STRUCTURE.



END SECTION (FLARED)

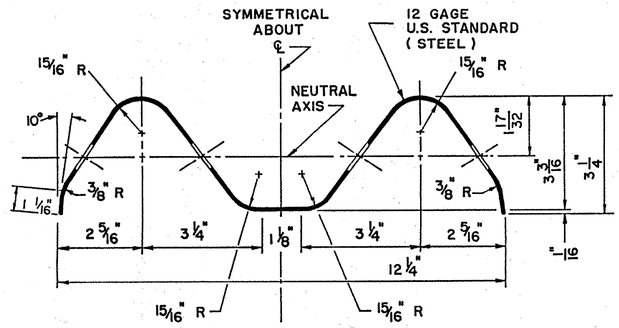
NOTE:

RAIL ELEMENTS INCLUDE THE BASIC RAIL ELEMENTS, SPLICES, AND SPECIAL RAIL SECTIONS SUCH AS TERMINALS FOR "W" BEAM GUARDRAIL AND "W" BEAM MEDIAN BARRIER SYSTEMS.

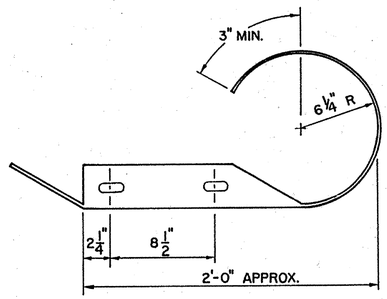
USE 12 GAGE UNLESS OTHERWISE SPECIFIED.

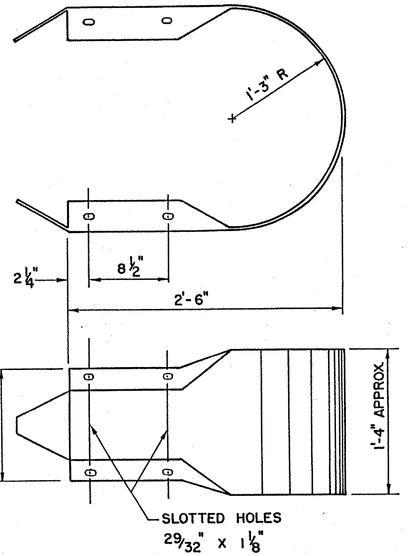
~~STANDARD TERMINAL SECTION MODIFIED TO BE 10 GAGE.~~

SEE STANDARD SHEET G-4 FOR ALTERNATE 6" C STRONG POST DETAIL.

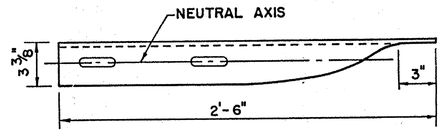


DETAIL RAIL ELEMENT

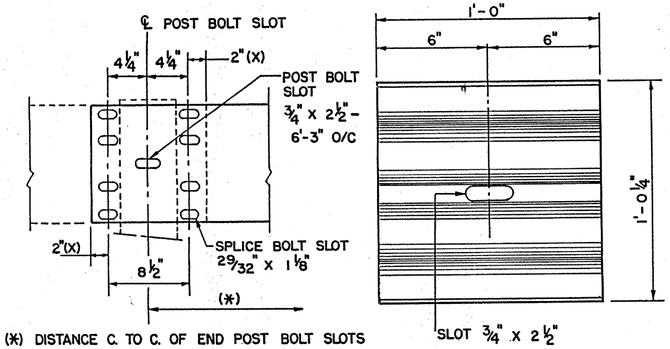




BUFFER END SECTION



(X) TOLERANCE $+1\frac{1}{4}" - \frac{1}{4}"$

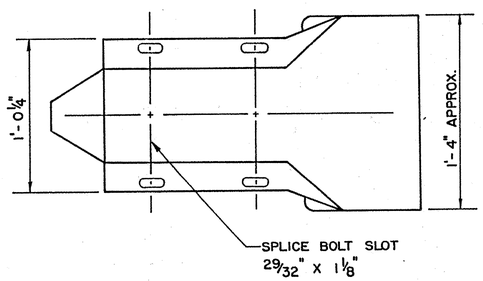


(*) DISTANCE C. TO C. OF END POST BOLT SLOTS 12'-6" OR 25'-0". DISTANCE C. TO C. OF INTERMEDIATE POST BOLT SLOT 6'-3" UNLESS OTHERWISE SPECIFIED.

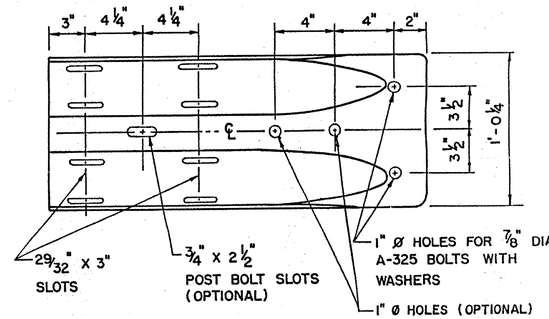
BEAM SPLICE

BACK-UP PLATE

BACK-UP PLATE SHALL BE PLACED BEHIND GUARDRAIL AT NON-SPLICE POSTS.



END SECTION (ROUNDED)



TERMINAL CONNECTOR

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET G-6-6
CORRUGATED METAL DOWNSPOUTS

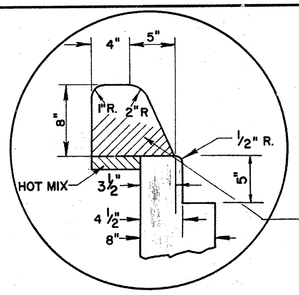
PREL. TRACING J.L. White DESIGN E. L. W. CHKD. J. T. B.

REVISIONS

1. CHANGED BASIN MEASUREMENT & PIPE LOCATION-Y.N.C. 7-20-70
2. CORRECTED DIMENSION ON INTAKE BASIN - J.T.B. 6-24-71
3. CORRECTED DIMENSIONS FOR DOWNSPOUT SPLASH APRON. 10-10-75 R.F.R.
4. CORRECTED DIMENSION, FACE OF CURB TO ROUNDING. 12-2-75 R.F.R.
5. REMOVED "TO BE PAID FOR..." NOTE.- R.T.C.- 5-11-76.
6. MINOR NOMENCLATURE CHANGES R.F.R. 10/27/78

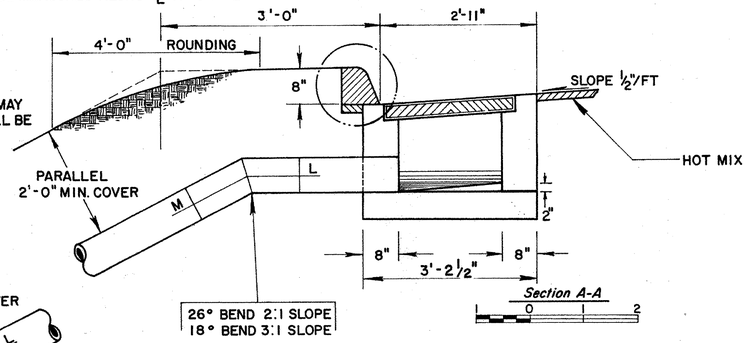
APPROVED _____ 6-23-70
DIRECTOR OF OPERATIONS — DATE

Jas S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER — DATE



NOTE:
C.M.P. INCLUDING ELBOW, TO BE PAID FOR BY LINEAR FOOT. LENGTH OF ELBOW TO BE MEASURED ALONG ℄ AXIS M-L AS SHOWN BELOW.

TYPE 2 HOT MIX CURB MAY BE USED. LOCATION WILL BE THE SAME.

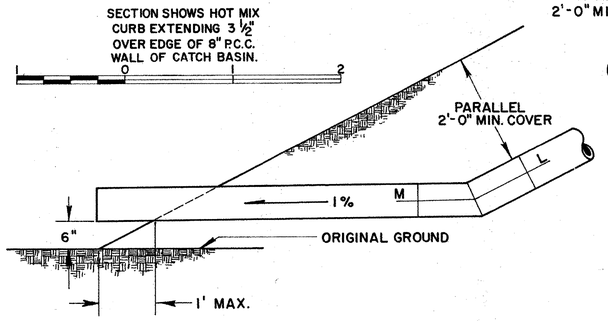


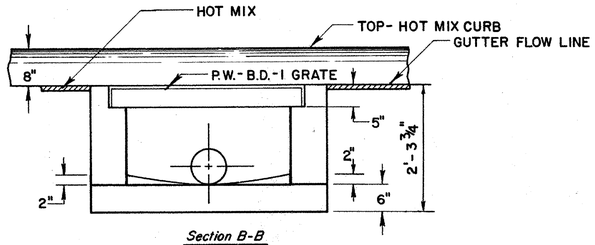
Section A-A

0 1 2

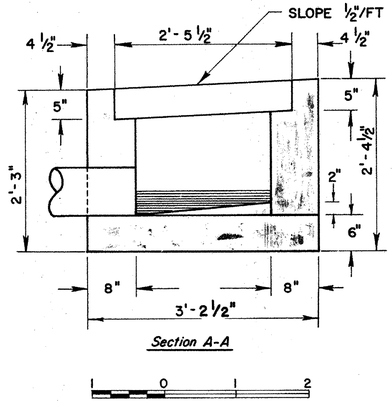
SECTION SHOWS HOT MIX CURB EXTENDING 3 1/2" OVER EDGE OF 8" P.C.C. WALL OF CATCH BASIN.

0 2



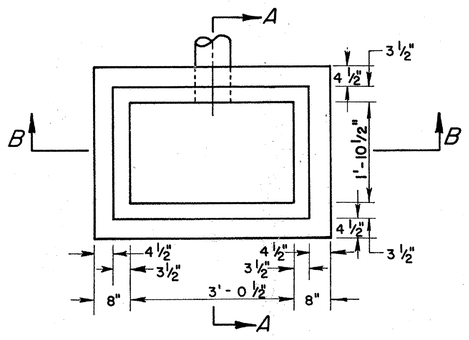


Section B-B



Section A-A

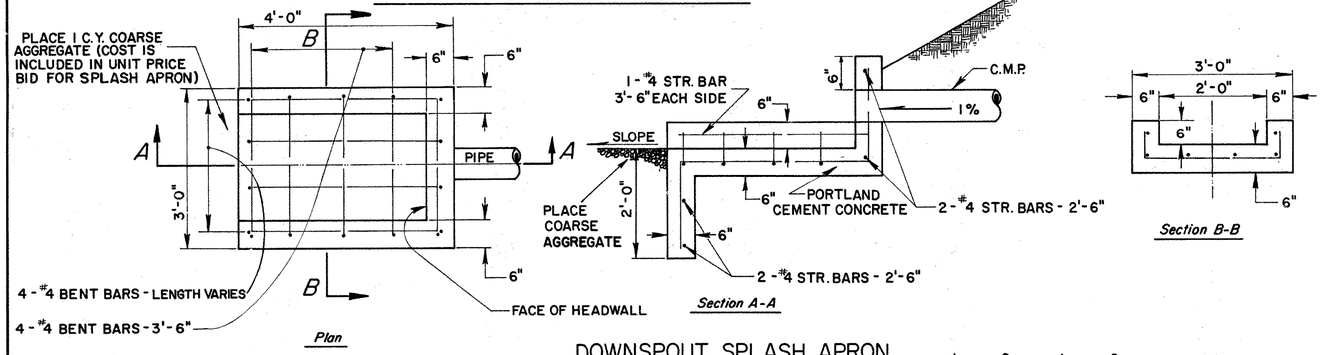
0 1 2



Plan

0 1 2

DETAIL OF INTAKE BASIN AND CORRUGATED METAL DOWNSPOUTS



Plan

Section A-A

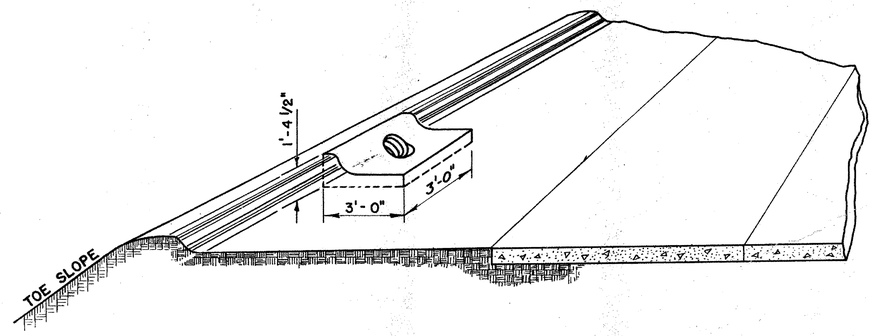
Section B-B

DOWNSPOUT SPLASH APRON

Construct if and where directed, to be paid for at the unit price bid for each splash apron.

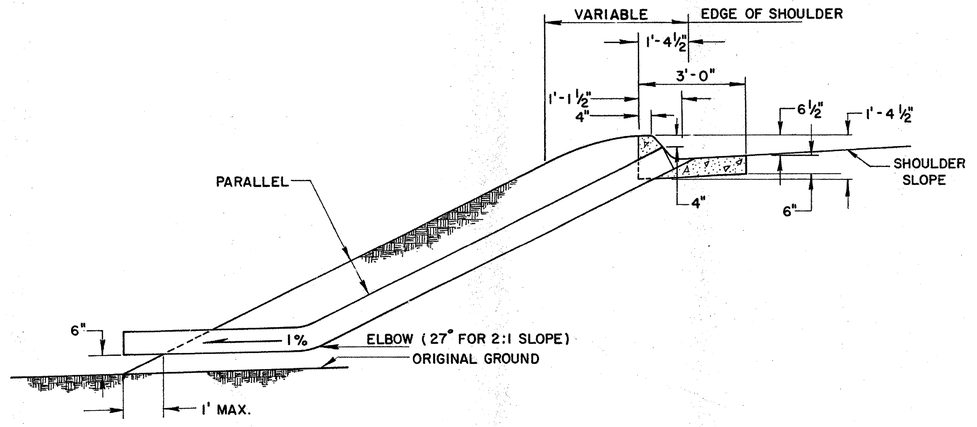
0 1 2

NOTE:
USE P.W.-B.D.-1 GRATE ON INTAKE BASIN.



P.C.C. INTAKE APRON

NOTE:
P. C. C. INTAKE APRON TO BE PAID FOR AT UNIT PRICE BID FOR EACH.



CORRUGATED METAL DOWNSPOUTS WITH P.C.C. INTAKE APRON

0 1 2 3 4

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER G-7-1

GUARDRAIL TO BARRIER CONNECTION DETAILS

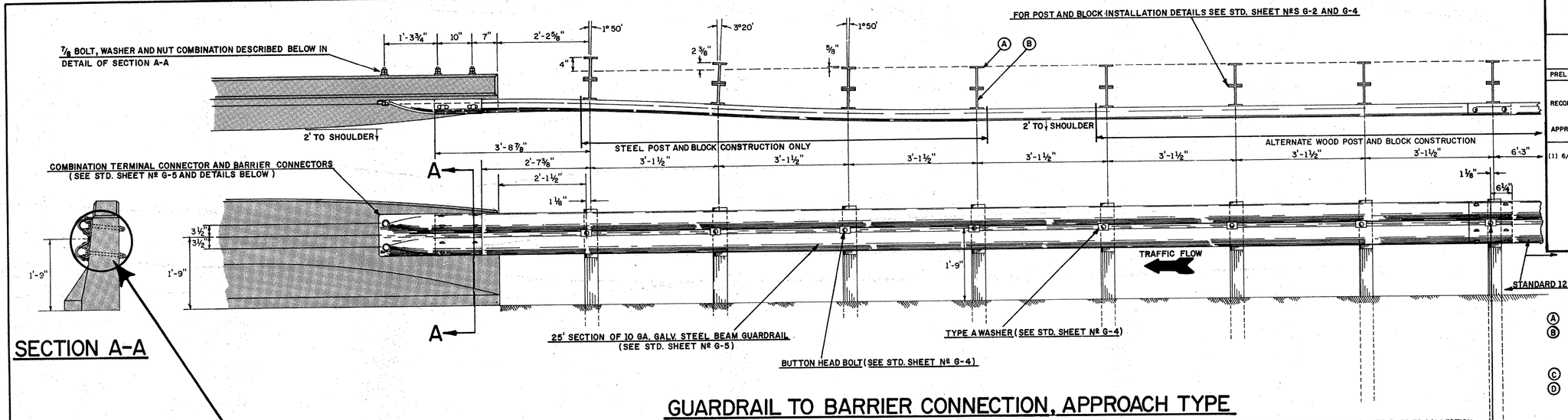
PREL. TRACING R.F.R. 7-29-76 DESIGN R.T.C. CHKD. R.T.C.

RECOMMENDED 8/6 19 76 R. E. Tomasetti CHIEF ENGINEER

APPROVED 8/9 19 76 R. A. Fisher DIRECTOR OF HIGHWAYS

REVISIONS

(1) 6/30/78 Revised connection and nomenclature R.F.R.

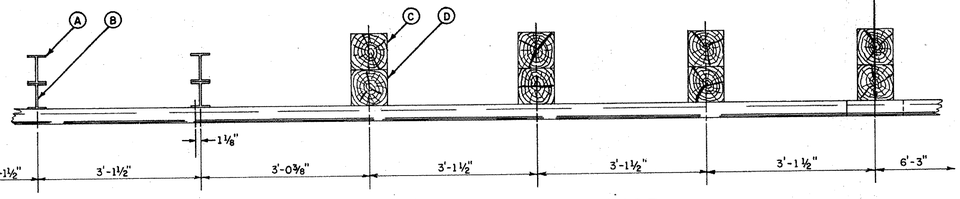


SECTION A-A

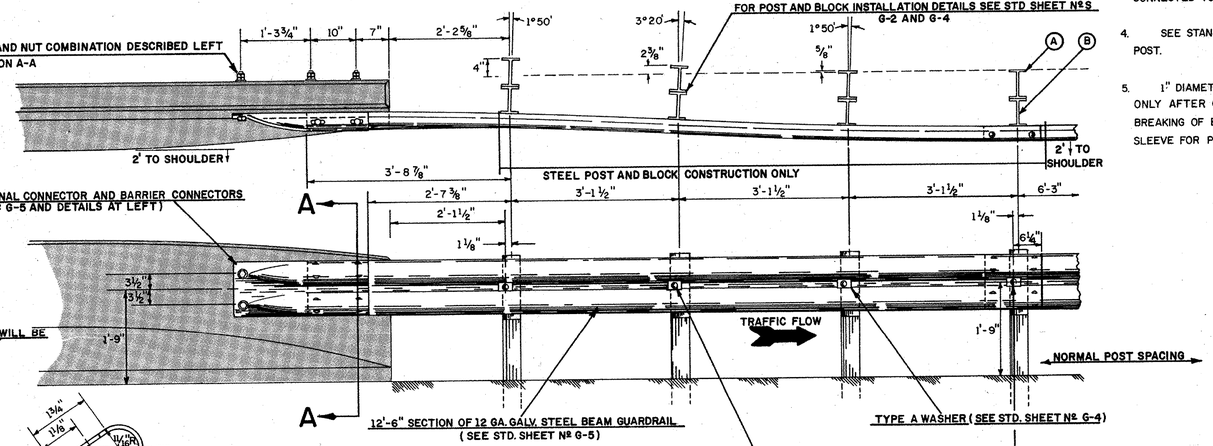
Ⓐ W6 X 9 GALV. STEEL POST - SEE STD. SHEET G-4 FOR SPECIFICATIONS
Ⓑ W6 X 9 GALV. STEEL BLOCK-SEE STD. SHEET G-4 FOR SPECIFICATIONS

Ⓒ 8"X 8" CREOSOTED WOOD POST-SEE STD. SHEET G-4 FOR SPECIFICATIONS
Ⓓ 8"X 8" CREOSOTED WOOD BLOCK-SEE STD. SHEET G-4 FOR SPECIFICATIONS

GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE

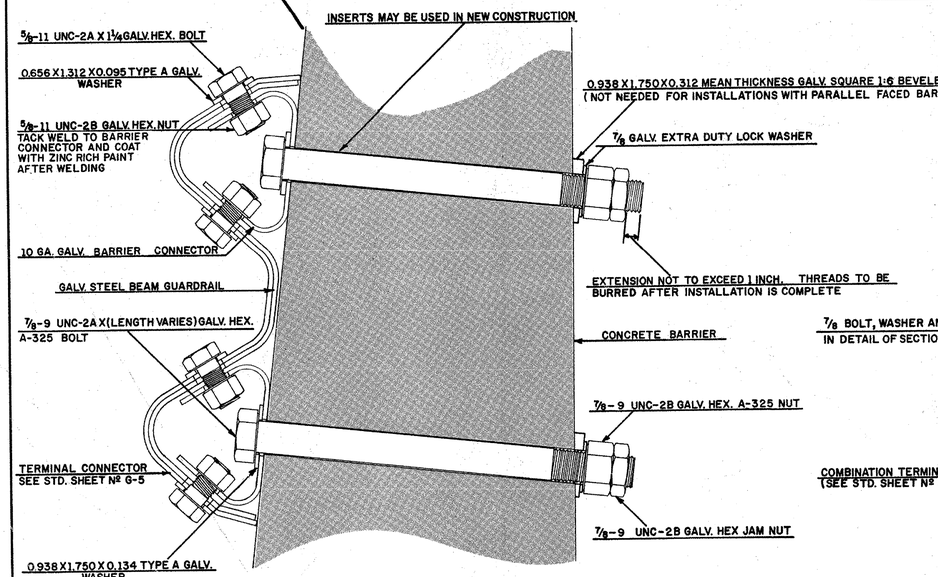


ALTERNATE WOOD POST METHOD

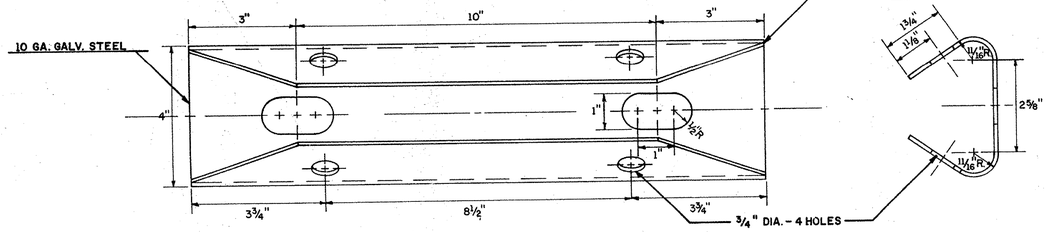


GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE

LIMIT OF PAYMENT FOR GUARDRAIL TO BARRIER CONNECTION EXIT TYPE



DETAIL OF SECTION A-A



BARRIER CONNECTOR

GENERAL NOTES

1. THE GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE, SHALL BE USED AT EACH END OF BARRIERS ON UNDIVIDED ROADS AND AT THE TRAFFIC APPROACH END OF BARRIERS ON DIVIDED ROADS.
2. THE GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE, SHALL BE USED ON THE TRAFFIC EXIT END ONLY OF BARRIERS ON DIVIDED ROADS.
3. THIS SHEET SHALL ALSO APPLY WHERE GUARDRAIL IS TO BE CONNECTED TO THE VERTICAL FACE OF EXISTING BARRIERS.
4. SEE STANDARD SHEET NUMBER G-4 FOR ALTERNATE 6"-C-STRONG POST.
5. 1" DIAMETER BOLT HOLES SHALL BE DRILLED THROUGH BARRIER ONLY AFTER CONCRETE IS COMPLETELY CURED. AVOID CUTTING OR BREAKING OF BAR REINFORCEMENT. USE 1" I. D. THINWALL GALVANIZED SLEEVE FOR PRE-FORMED HOLE ALTERNATE.

BRANDYWINE REPRODUCTION

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER G-8

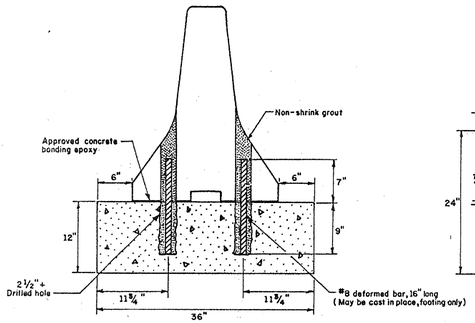
PORTABLE PORTLAND CEMENT CONCRETE SAFETY BARRIER

PREL. TRACING R.F.R. 12-14-76 DESIGN R.T.C. CHKD.

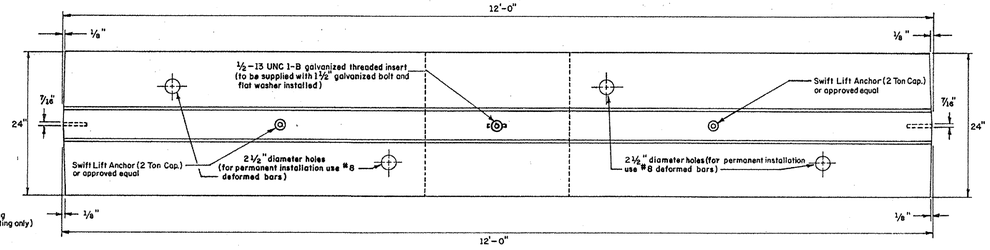
RECOMMENDED 10/11 19 77 R. E. Tinnetts CHIEF ENGINEER

APPROVED 10/13 19 77 R D Bennett ACTING DIRECTOR OF HIGHWAYS

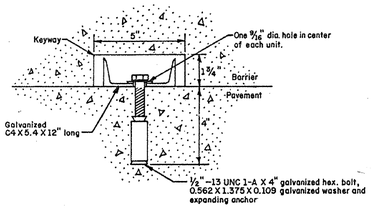
REVISIONS



P.C.C. SAFETY BARRIER FOOTING
(For permanent installation only)



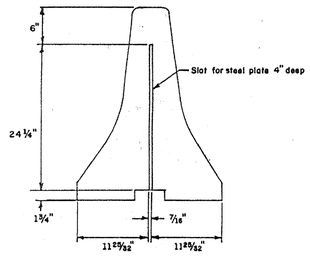
TOP VIEW



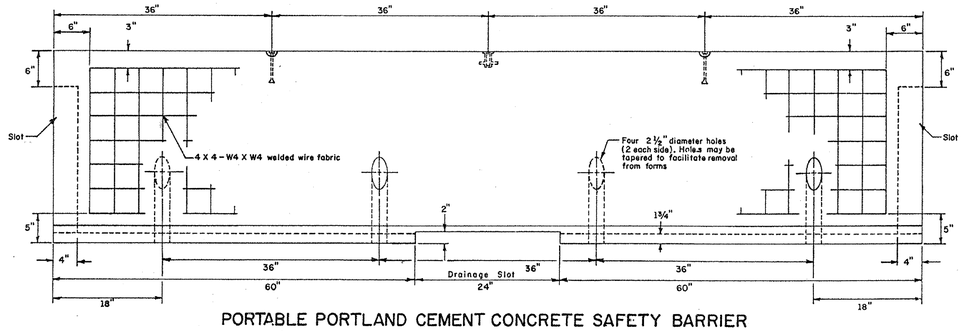
TEMPORARY INSTALLATION ON BRIDGE DECKS

Two channel sections shall be used for each barrier section. The bolt shall be placed 2'-0" from end of barrier, except as required to clear bridge expansion joints.

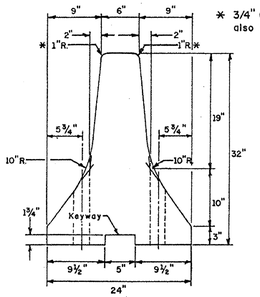
Hole is to be filled with non-shrink grout immediately upon removal of temporary barrier.



SLOT DIMENSIONS



PORTABLE PORTLAND CEMENT CONCRETE SAFETY BARRIER



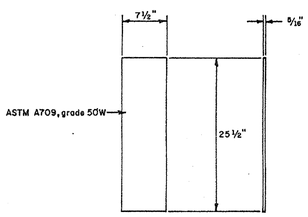
* ¾" Chamfer may also be used.

CROSS SECTION

LIFTING DEVICES SHALL BE SWIFT LIFT ANCHORS, (2 TON CAPACITY) AS MANUFACTURED BY SUPERIOR CONCRETE ACCESSORIES, INC. OR APPROVED EQUAL.

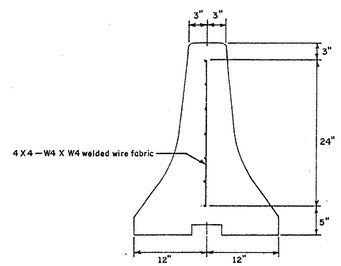
PORTLAND CEMENT CONCRETE MASONRY SHALL CONFORM TO SECTION 812, *PORTLAND CEMENT CONCRETE*, CLASS A (28 DAY STRENGTH 4000 P.S.I.).

THE PORTABLE PORTLAND CEMENT CONCRETE SAFETY BARRIER SHALL NOT BE USED AS A PERMANENT BARRIER ON BRIDGES.



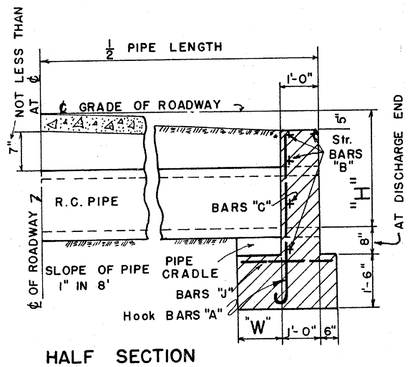
One steel plate shall be supplied with each safety barrier

STEEL CONNECTOR PLATE

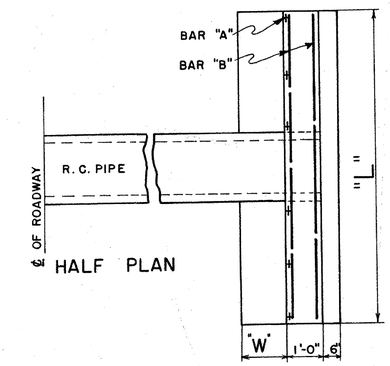


WIRE MESH LOCATION

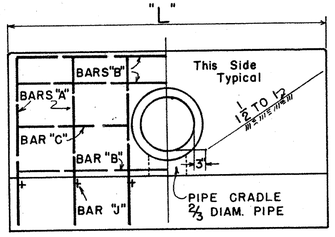
STRAIGHT TYPE HEADWALLS



HALF SECTION



HALF PLAN



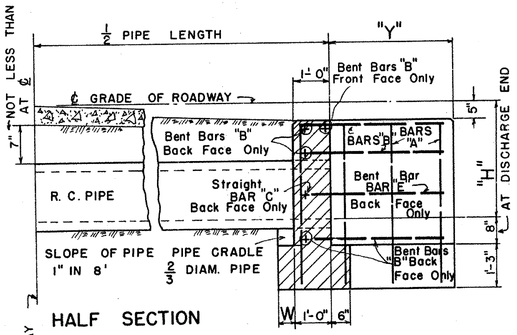
END ELEVATION

NOTE:
MINIMUM "H" CROWN GRADE TO DISCH. END
18" PIPE = 3.25'
24" PIPE = 3.75'
30" PIPE = 4.25'
36" PIPE = 4.75'

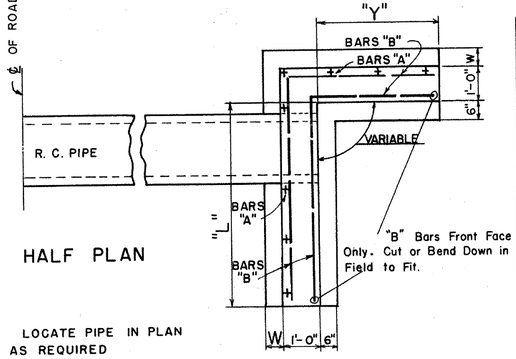
BILL OF MATERIALS NOTE

H	L	W	SPACING OF BARS "J"	QUANTITIES FOR TWO HEADWALLS ½" REINFORCING BARS BARS "A" NO.	BARS "A" LENGTH	BARS "A" TOTAL LENGTH	BARS "B" NO.	BARS "B" LENGTH	BARS "B" TOTAL LENGTH	BARS "C" NO.	BARS "C" LENGTH	BARS "C" TOTAL LENGTH	BARS "J" NO.	BARS "J" LENGTH	BARS "J" TOTAL LENGTH	TOTAL WEIGHT	CONCRETE C.U. YDS. WALLS PIPE SIZES 18"	24"	30"	36"	FOOTING
3.25	8'-9"	1'-3"	16"	16	5'-0"	80	8	8'-6"	68	4	3'-0"	12				107	2.20				2.67
3.50	9'-6"	1'-5"	14"	16	5'-6"	88	8	9'-0"	72	4	3'-6"	14				116	2.58				3.08
3.75	10'-3"	1'-6"	14"	16	5'-9"	92	8	10'-0"	80	4	3'-6"	14				124	2.98	2.90			3.42
4.00	11'-0"	1'-8"	16"	16	6'-0"	96	8	10'-6"	84	4	4'-0"	16	16	3'-0"	48	163	3.42	3.34			3.87
4.25	11'-9"	1'-9"	16"	16	6'-3"	100	8	11'-6"	92	4	4'-0"	16	16	3'-0"	48	171	3.87	3.80	3.70		4.24
4.50	12'-6"	1'-11"	14"	20	6'-6"	130	8	12'-0"	96	4	4'-6"	18	20	3'-0"	60	203	4.36	4.29	4.19		4.75
4.75	13'-3"	2'-0"	14"	20	6'-9"	135	8	13'-0"	104	4	4'-6"	18	20	3'-0"	60	212	4.88	4.81	4.71	4.58	5.15
5.00	14'-0"	2'-2"	16"	20	7'-0"	140	8	13'-6"	108	4	5'-0"	20	20	3'-6"	70	226	5.42	5.35	5.26	5.14	5.70
5.25	14'-9"	2'-3"	16"	20	7'-3"	145	10	14'-6"	145	4	5'-6"	22	20	3'-6"	70	255	5.99	5.93	5.83	5.71	6.15
5.50	15'-6"	2'-5"	14"	24	7'-6"	120	10	15'-0"	150	4	6'-0"	24	24	3'-6"	84	293	6.59	6.53	6.44	6.32	6.75
5.75	16'-3"	2'-6"	14"	24	7'-9"	186	10	16'-0"	160	4	6'-6"	26	24	3'-6"	84	305	7.22	7.15	7.07	6.95	7.22
6.00	17'-0"	2'-8"	16"	24	8'-0"	192	10	16'-6"	165	4	6'-6"	26	24	4'-0"	96	320	7.87	7.81	7.73	7.61	7.87

Note: All Bars Straight Except Hookbar "A"



HALF SECTION



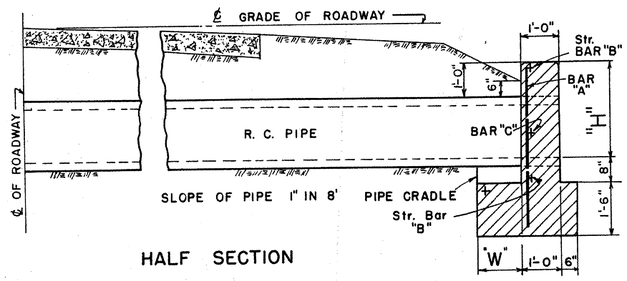
HALF PLAN

LOCATE PIPE IN PLAN AS REQUIRED

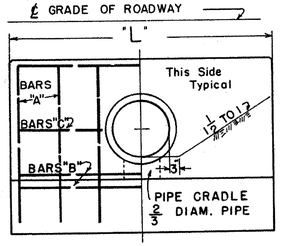
"L" TYPE HEADWALLS NOTE

H	L	Y	W	SPACING OF VERTICAL BARS	QUANTITIES FOR TWO HEADWALLS ½" REINFORCING BARS BARS "A" NO.	BARS "A" LENGTH	BARS "A" TOTAL LENGTH	BARS "B" NO.	BARS "B" LENGTH	BARS "B" TOTAL LENGTH	BARS "C" NO.	BARS "C" LENGTH	BARS "C" TOTAL LENGTH	BARS "E" NO.	BARS "E" LENGTH	BARS "E" TOTAL LENGTH	TOTAL WEIGHT	CONCRETE C.U. YDS. WALLS PIPE SIZES 15"&18"	24"	30"	36"	FOOTING
3.25	5'-8"	3'-5"	6"	16"	16	4'-6"	72	8	10'-6"	84	2	3'-6"	7	2	5'-0"	10	116	2.51				1.87
3.50	6'-0"	3'-9"	7"	15"	20	4'-9"	95	8	11'-0"	88	2	4'-0"	8	2	5'-6"	11	135	2.88				2.09
3.75	6'-5"	4'-2"	8"	15"	20	5'-0"	100	8	12'-0"	96	2	4'-0"	8	2	6'-0"	12	144	3.33	3.24			2.36
4.00	6'-9"	4'-6"	8"	16"	20	5'-3"	105	8	12'-6"	100	2	4'-0"	8	2	6'-0"	12	150	3.76	3.67			2.50
4.25	7'-2"	4'-11"	9"	16"	20	5'-6"	110	8	13'-6"	108	2	4'-6"	9	2	6'-6"	13	160	4.27	4.18	4.06		2.78
4.50	7'-6"	5'-3"	10"	16"	20	5'-9"	115	8	14'-0"	112	2	4'-6"	9	2	7'-0"	14	167	4.75	4.66	4.54		3.04
4.75	7'-11"	5'-8"	10"	14"	24	6'-0"	144	8	15'-0"	120	2	5'-0"	10	2	7'-6"	15	193	5.31	5.22	5.11	4.96	3.22
5.00	8'-3"	6'-0"	11"	14"	26	6'-3"	163	10	15'-6"	155	2	5'-6"	11	2	7'-6"	15	230	5.85	5.76	5.64	5.50	3.51
5.25	8'-8"	6'-5"	11"	14"	26	6'-6"	169	10	16'-6"	165	2	6'-0"	12	2	8'-0"	16	242	6.47	6.38	6.26	6.12	3.70
5.50	9'-0"	6'-9"	12"	14"	28	6'-9"	189	10	17'-0"	170	2	6'-6"	13	2	8'-6"	17	260	7.05	6.97	6.85	6.71	3.99
5.75	9'-5"	7'-2"	12"	14"	28	7'-0"	196	10	18'-0"	180	2	6'-6"	13	2	9'-0"	18	272	7.73	7.65	7.53	7.39	4.19
6.00	9'-9"	7'-6"	13"	14"	30	7'-3"	218	10	18'-6"	185	2	7'-0"	14	2	9'-0"	18	291	8.37	8.29	8.18	8.03	4.50

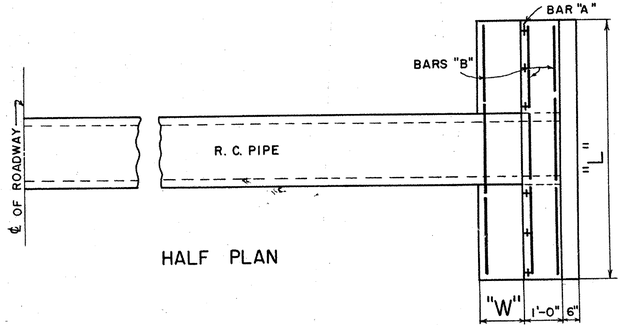
Note: Bars Are Bent or Straight As Shown On Section



HALF SECTION



END ELEVATION

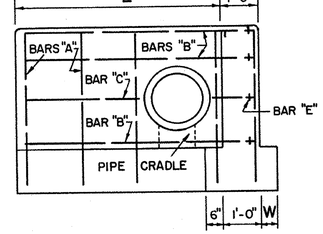


HALF PLAN

R.R. TYPE HEADWALLS NOTE

DIAMETER OF PIPE	H	L	W	SPACING OF VERTICAL BARS	QUANTITIES FOR 2 HEADWALLS ½" REINFORCING BARS BARS "A" NO.	BARS "A" LENGTH	BARS "A" TOTAL LENGTH	BARS "B" NO.	BARS "B" LENGTH	BARS "B" TOTAL LENGTH	BARS "C" NO.	BARS "C" LENGTH	BARS "C" TOTAL LENGTH	TOTAL WEIGHT	CONCRETE CU. YDS. WALLS	FOOTING	TOTAL
18"	2.75	7'-3"	1'-3"	13"	12	5'-0"	60	8	7'-0"	56	4	2'-6"	10	86	1.77	2.22	3.99
24"	3.25	9'-3"	1'-6"	12"	16	5'-6"	88	8	9'-0"	72	4	3'-0"	12	117	2.55	3.09	5.64
30"	3.83	11'-6"	1'-9"	12"	20	6'-0"	120	8	11'-0"	88	4	4'-0"	16	152	3.62	4.16	7.78
36"	4.33	13'-6"	2'-0"	11"	24	6'-6"	156	8	13'-0"	104	4	4'-6"	18	189	4.68	5.25	9.93

Note: All Straight Bars



END ELEVATION

NOTE:
MINIMUM "H" CROWN GRADE TO DISCHARGE END
18" PIPE = 3.25'
24" PIPE = 3.75'
30" PIPE = 4.25'
36" PIPE = 4.75'

SLOPE OF EARTH 1½" TO 1', KEEP FREE OF PIPE.

THE PLAN AND PROFILE OF THE CONTRACT SHOWS THE LOCATION AND TYPE OF WALLS REQUIRED.

EXISTING STRUCTURES SHALL BE REMOVED AS DIRECTED.

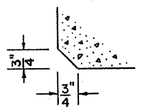
A SUITABLE FOUNDATION FOR HEADWALLS WILL BE REQUIRED. CARRY FOOTINGS TO SUFFICIENT DEPTH FOR FIRM MATERIAL AND FROST ACTION.

QUANTITIES IN BILL OF MATERIALS ARE FOR DIMENSIONS SHOWN ON THE SHEET.

NOTE MINIMUM "H" FOR VARIOUS PIPES.

THIS SHEET IS NOW STANDARD AND SUPERSEDES ALL PREVIOUS SHEETS.

UNLESS OTHERWISE SPECIFIED ALL BARS TO HAVE 1½" COVER.



UNLESS OTHERWISE SPECIFIED ALL CORNERS ARE TO BE FINISHED AS SHOWN IN ABOVE SKETCH.

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET H-1
STRAIGHT & L TYPE HEADWALLS
PREL. TRACING L.E.G. DESIGN CHKD. E.L.W.
REVISIONS

APPROVED Earl H. Daisley 6.22.70
DIRECTOR OF OPERATIONS DATE
Rae S. Robinson 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

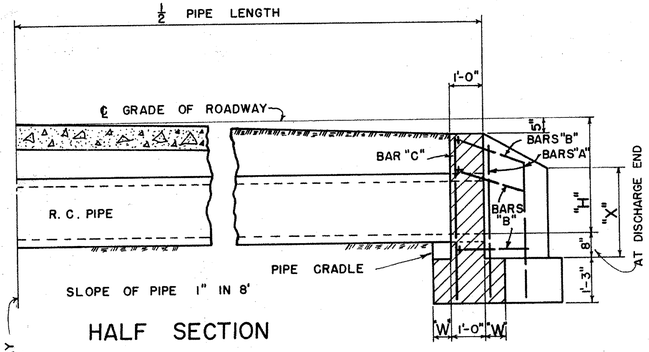
STANDARD SHEET H-2
45° STANDARD & 45° R. R. TYPE CULVERT

PREL. TRACING L.E.G. DESIGN CHKD. E.L.W.

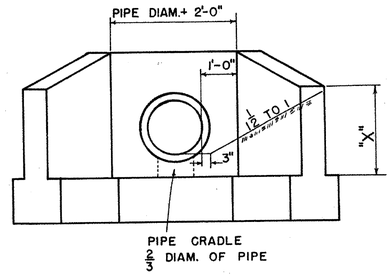
REVISIONS

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

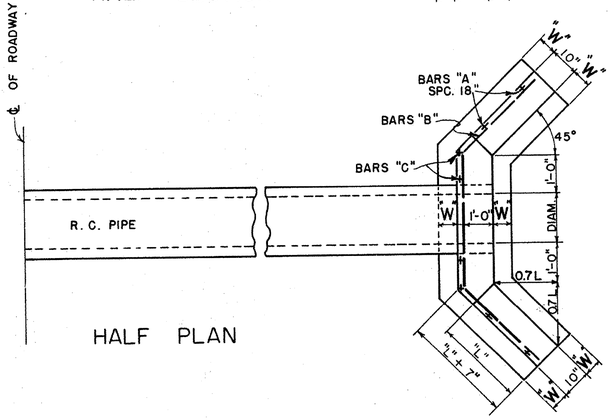
_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



HALF SECTION



END ELEVATION



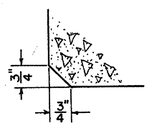
HALF PLAN

45° STANDARD CULVERT

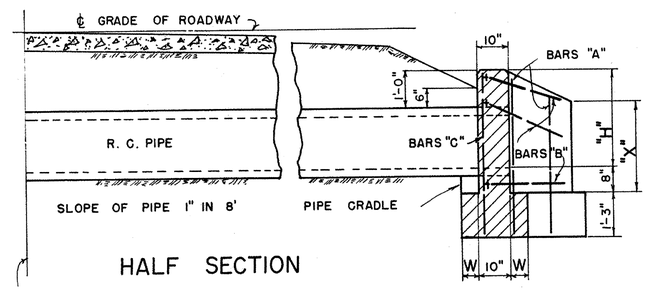
NOTE:
MINIMUM "H" ℄ GRADE ROADWAY TO DISCHARGE END
18" PIPE = 3.25'
24" PIPE = 3.75'
30" PIPE = 4.25'
36" PIPE = 4.75'

NOTE :
BARS "A" INCREASE BY 6" INTERVALS.
4 BARS OF EACH LENGTH REQUIRED

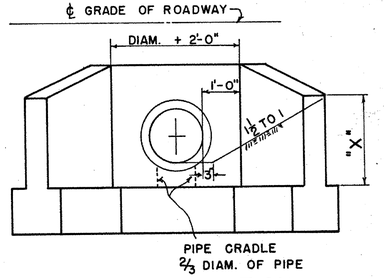
H	L	X	W	QUANTITIES FOR TWO HEADWALLS ½"ø REINFORCING RODS BARS "A" NO.	BARS "A" LENGTH	BARS "A" TOTAL LENGTH	BARS "B" 18" NO.	BARS "B" 18" LENGTH	BARS "B" 18" TOTAL LENGTH	BARS "B" 24" NO.	BARS "B" 24" LENGTH	BARS "B" 24" TOTAL LENGTH	BARS "B" 30" NO.	BARS "B" 30" LENGTH	BARS "B" 30" TOTAL LENGTH	BARS "B" 36" NO.	BARS "B" 36" LENGTH	BARS "B" 36" TOTAL LENGTH	BARS C NO.	BARS C LENGTH	BARS C TOTAL LENGTH	TOTAL WGT. POUNDS 18"	24"	30"	36"	CONCRETE CU. YDS. WALLS 18"	24"	30"	36"	WINGS 18"	24"	30"	36"	FOOTINGS 18"	24"	30"	36"
3.25	2'-6"	2'-6"	6"	8	3'-9":4'-3"	32	6	9'-6"	57										8	4'-6"	36	84				1.89				1.63						
3.50	2'-9"	2'-9	7"	8	4'-0":4'-6"	34	6	10'-0"	60										8	4'-9"	38	88				2.15				1.86						
3.75	3'-0"	3'-0"	8"	12	4'-0":5'-0"	54	6	10'-6"	63	6	11'-0"	66							8	5'-0"	40	105	107			2.42	2.48			2.12	2.23					
4.00	3'-3"	3'-0"	8"	12	4'-0":5'-0"	54	6	11'-0"	66	6	11'-6"	69							8	5'-3"	42	108	110			2.66	2.72			2.23	2.33					
4.25	3'-6"	3'-3"	9"	12	4'-6":5'-6"	60	6	11'-6"	69	6	12'-0"	72	6	12'-6"	75				8	5'-6"	44	116	118	120		2.96	3.03	3.08		2.49	2.61	2.72				
4.50	3'-9"	3'-6"	10"	12	4'-6":5'-6"	60	6	12'-0"	72	6	12'-6"	75	6	13'-0"	78				8	5'-9"	46	119	121	123		3.27	3.36	3.41		2.79	2.90	3.03				
4.75	4'-0"	3'-9"	10"	12	5'-0":6'-0"	66	6	12'-6"	75	6	13'-0"	78	6	13'-6"	81	6	14'-0"	84	8	6'-0"	48	126	128	130	132	3.60	3.69	3.76	3.80	2.89	3.01	3.14	3.26				
5.00	4'-3"	3'-9"	11"	16	4'-9":6'-3"	88	8	13'-0"	104	6	13'-6"	81	6	14'-0"	84	6	14'-6"	87	8	6'-3"	50	162	146	148	150	3.88	3.98	4.06	4.11	3.21	3.34	3.47	3.59				
5.25	4'-6"	4'-0"	11"	16	5'-0":6'-6"	92	8	13'-6"	108	8	14'-0"	112	6	14'-6"	87	6	15'-0"	90	8	6'-6"	52	168	171	154	156	4.23	4.34	4.43	4.48	3.34	3.46	3.59	3.72				
5.50	5'-0"	4'-0"	12"	16	5'-0":6'-6"	92	8	14'-6"	116	8	15'-0"	120	6	15'-6"	93	6	16'-0"	96	8	6'-9"	54	175	178	160	162	4.68	4.81	4.90	4.97	3.79	3.93	4.07	4.21				
5.75	5'-3"	4'-3"	12"	16	5'-6":7'-0"	100	8	15'-0"	120	8	15'-6"	124	8	16'-0"	128	6	16'-6"	99	8	7'-0"	56	184	187	190	170	5.08	5.20	5.31	5.39	3.91	4.05	4.19	4.33				
6.00	5'-6"	4'-3"	13"	16	5'-6": 7'-0"	100	8	15'-6"	124	8	16'-0"	128	8	16'-6"	132	6	17'-0"	102	8	7'-3"	58	188	191	194	174	5.40	5.53	5.66	5.75	4.29	4.44	4.58	4.73				



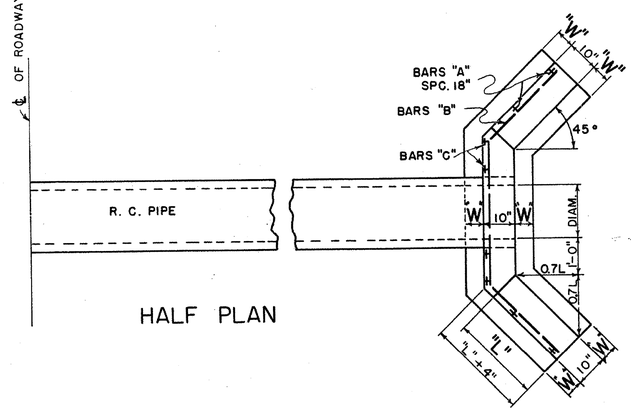
UNLESS OTHERWISE SPECIFIED
ALL CORNERS ARE TO BE FINISHED
AS SHOWN IN ABOVE SKETCH.



HALF SECTION



END ELEVATION



HALF PLAN

45° R. R. TYPE CULVERT

DIAMETER OF PIPE	H	L	X	W	QUANTITIES FOR TWO HEADWALLS ½"ø REINFORCING RODS BARS "A" NO.	BARS "A" LENGTH	BARS "A" TOTAL LENGTH	BARS "B" NO.	BARS "B" LENGTH	BARS "B" TOTAL LENGTH	BARS "C" NO.	BARS "C" LENGTH	BARS "C" TOTAL LENGTH	TOTAL WEIGHT	CONCRETE CU. YDS. WALLS	FOOTING	TOTAL
18"	2.75	2'-6"	2'-6"	6"	8	3'-6"	4'-0"	30	6	9'-6"	57	8	4'-6"	36	84	1.70	1.55	3.25
24"	3.25	2'-11"	2'-11"	8"	8	4'-0"	4'-6"	34	6	11'-0"	66	8	5'-0"	40	95	2.19	2.10	4.29
30"	3.83	3'-4"	3'-4"	9"	12	4'-0"	5'-0"	54	6	12'-0"	72	8	5'-6"	44	116	2.78	2.54	5.32
36"	4.33	3'-9"	3'-9"	10"	12	4'-6"	5'-6"	60	6	13'-6"	81	8	6'-0"	48	129	3.38	3.04	6.42

NOTE:
BARS "A" INCREASE BY 6" INTERVALS
4 OF EACH LENGTH REQUIRED.

THE PLAN AND PROFILE OF THE CONTRACT SHOWS THE LOCATION AND TYPE OF WALLS REQUIRED.
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QUANTITIES IN BILL OF MATERIALS ARE FOR DIMENSIONS SHOWN ON THE SHEET.
NOTE MINIMUM "H" FOR VARIOUS PIPES.
THIS SHEET IS NOW STANDARD AND SUPERSEDES ALL PREVIOUS SHEETS.

VAN DYKE MYLAR

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

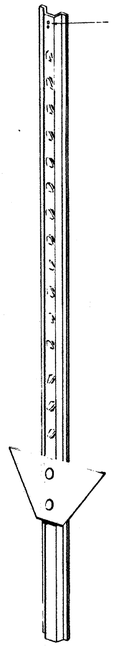
STANDARD SHEET M-1

PREL. TRACING V. L. D. DESIGN J. J. S. CHKD. E. L. W.

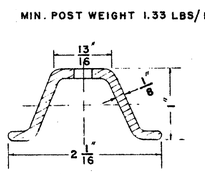
REVISIONS

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

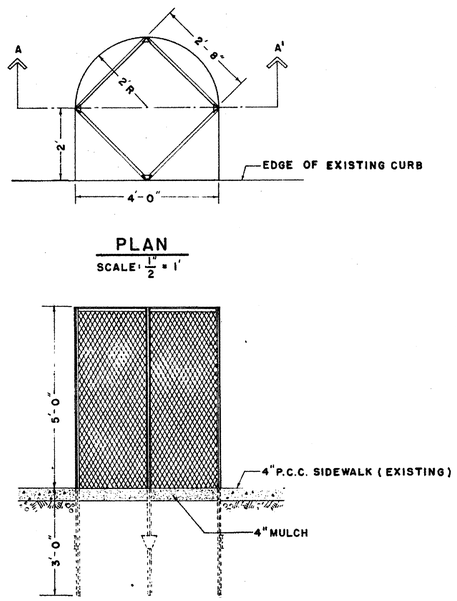
_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE



8' STEEL POST WITH LUGS SPACED 4" APART
NO SCALE

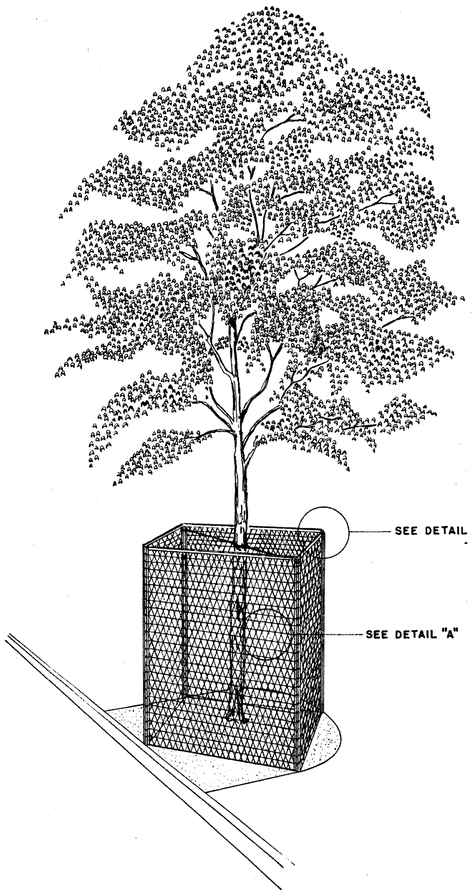


SECTION OF POST
SCALE : 1"= 1"

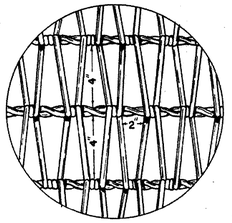


PLAN
SCALE: 1/2" = 1'

SECTION A-A'
SCALE: 1/2" = 1'



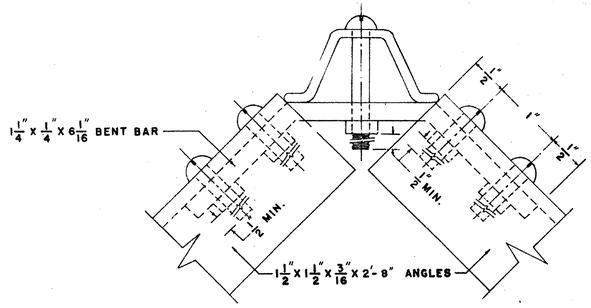
TREE PROTECTION



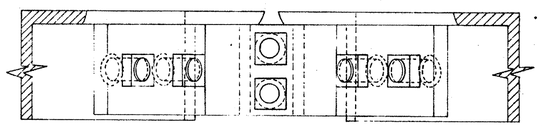
NOTE:
HORIZONTAL CABLES AND CROSS WIRES TO BE 12 1/2 GAUGE GALVANIZED

APPROX. FENCE FABRIC HT.= 56"

DETAIL "A"
NO SCALE



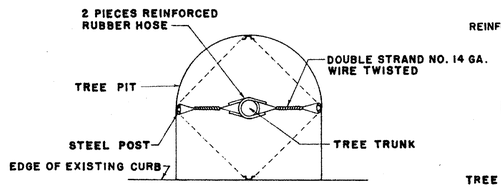
TOP VIEW

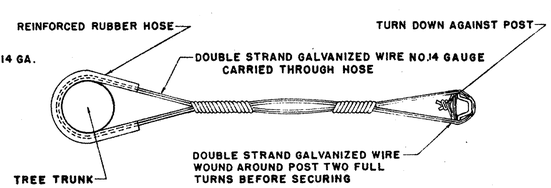


FRONT VIEW

DETAIL "B"
SCALE: 1"=1"

NOTE: SIZE OF ALL BOLTS TO BE 1/4" DIA. WITH NUTS
SIZE OF HOLES TO BE 5/16" DIA.
BOLTS TO PROJECT A MINIMUM OF 1/2" BEYOND NUTS WHEN SECURELY FASTENED
ALL BOLTS TO BE CHECKED AFTER NUTS HAVE BEEN SECURELY FASTENED





DETAIL SHOWING WIRES THROUGH RUBBER HOSE & METHODS OF FASTENING WIRES TO POSTS

NO SCALE

3 MILPRINT MYLAR

COUNTY	CONTRACT	P. B. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET M-2

PORTLAND CEMENT CONCRETE STEPS

PREL. TRACING H.R.C. DESIGN J.E.R. CHKD. E.L.W.

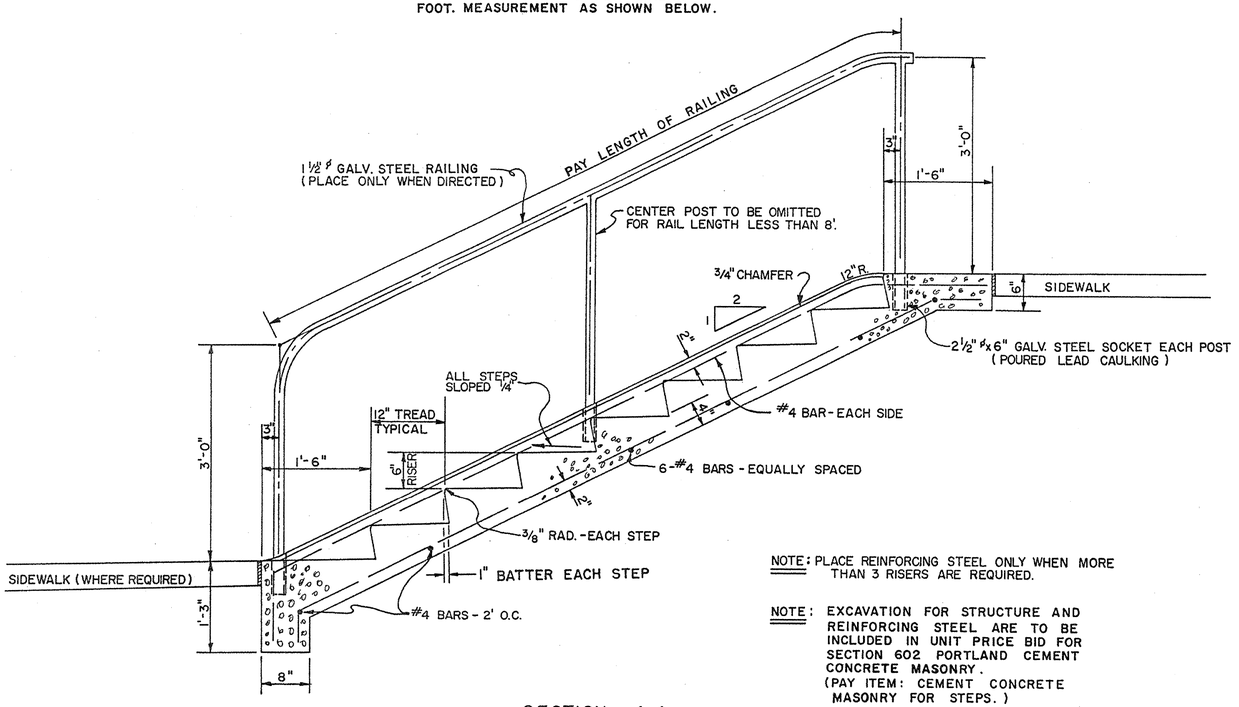
REVISIONS

CHANGED GALV. IRON RAILING TO GALV. STEEL RAILING. 1-16-73 J.T.B.

APPROVED _____ DIRECTOR OF OPERATIONS 6-22-70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE

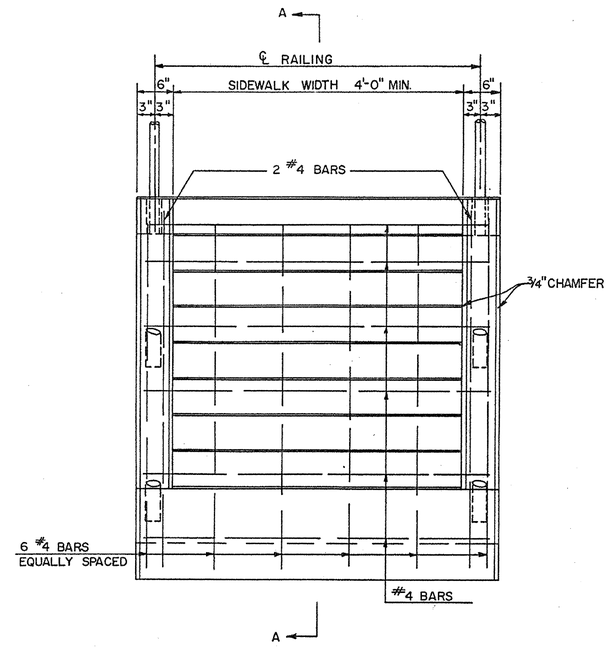
NOTE:
GALVANIZED STEEL RAILING TO BE PAID FOR AT UNIT PRICE BID PER LINEAR FOOT. MEASUREMENT AS SHOWN BELOW.



SECTION A-A

NOTE: PLACE REINFORCING STEEL ONLY WHEN MORE THAN 3 RISERS ARE REQUIRED.

NOTE: EXCAVATION FOR STRUCTURE AND REINFORCING STEEL ARE TO BE INCLUDED IN UNIT PRICE BID FOR SECTION 602 PORTLAND CEMENT CONCRETE MASONRY. (PAY ITEM: CEMENT CONCRETE MASONRY FOR STEPS.)



ELEVATION

PORT. CEM. CONC. STEPS

1 0 1 2 3

ESTIMATED QUANTITIES — PORT. CEM. CONC. STEPS

No. OF RISERS	RAILING LENGTH	SIDEWALK WIDTH 4'			SIDEWALK WIDTH 5'			SIDEWALK WIDTH 6'		
		P.C.C. MASONRY	REINF. STEEL (#4 BARS)		P.C.C. MASONRY	REINF. STEEL (#4 BARS)		P.C.C. MASONRY	REINF. STEEL (#4 BARS)	
	L.F.	(C.Y.)	LENGTH	WEIGHT (#)	(C.Y.)	LENGTH	WEIGHT (#)	(C.Y.)	LENGTH	WEIGHT (#)
2	—	.6	—	—	.7	—	—	.8	—	—
3	—	.7	—	—	.8	—	—	1.0	—	—
4	10'-0"	.8	63'-0"	42.0	1.0	73'-2"	48.9	1.2	83'-4"	55.7
5	12'-4"	1.0	76'-7"	51.2	1.1	89'-0"	59.5	1.3	101'-5"	67.7
6	14'-6"	1.1	84'-4"	56.3	1.3	97'-10"	65.4	1.5	111'-4"	74.4
7	16'-8"	1.2	97'-0"	65.0	1.4	112'-8"	75.3	1.7	128'-4"	85.7
8	19'-0"	1.4	104'-2"	69.6	1.6	120'-10"	80.7	1.9	137'-6"	91.9
9	21'-2"	1.5	118'-4"	79.0	1.7	137'-4"	91.7	2.0	156'-4"	104.4
10	23'-4"	1.6	131'-0"	87.5	1.9	152'-2"	101.6	2.2	173'-4"	115.8
11	25'-8"	1.8	138'-4"	92.4	2.1	160'-6"	107.2	2.4	182'-8"	122.0
12	27'-10"	1.9	150'-7"	100.6	2.2	174'-10"	116.8	2.6	199'-1"	133.0
13	30'-2"	2.0	160'-4"	107.1	2.4	186'-0"	124.2	2.8	211'-8"	141.4
14	32'-4"	2.1	172'-9"	115.4	2.5	200'-6"	133.9	3.0	228'-3"	152.5
15	34'-6"	2.3	179'-11"	120.2	2.7	208'-8"	139.4	3.1	237'-5"	158.6
16	36'-10"	2.4	192'-4"	128.4	2.8	223'-2"	149.1	3.3	254'-0"	169.7

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

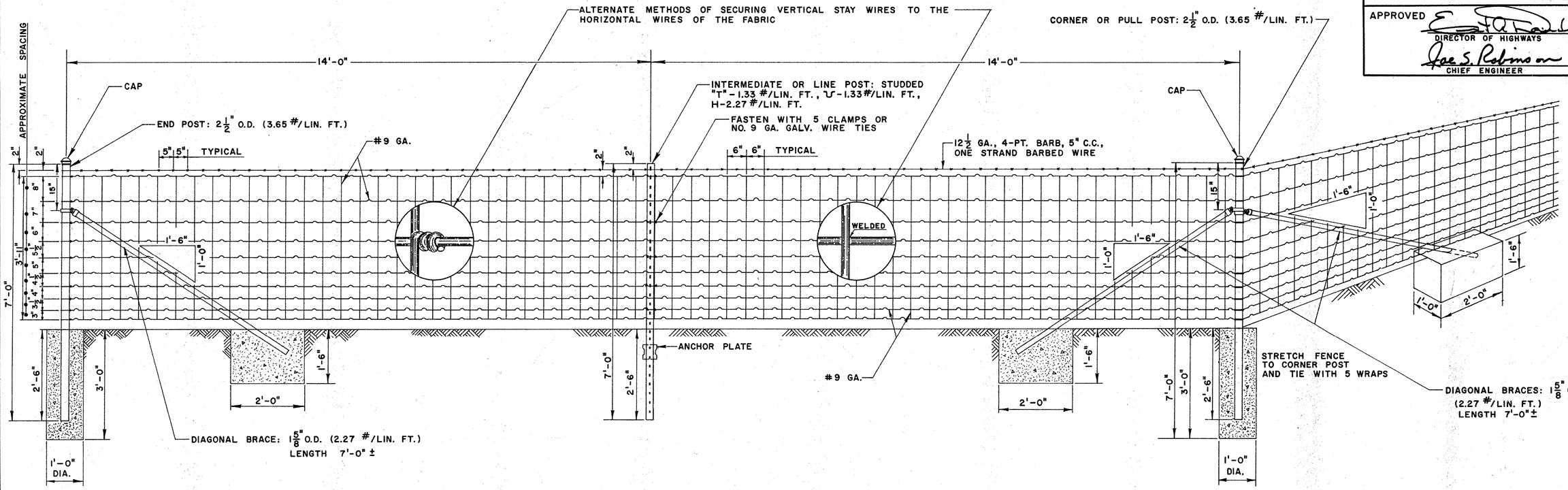
STANDARD SHEET M-3,
RIGHT-OF-WAY FENCE

PREL. TRACING D.M.E. DESIGN E.L.W. CHKD. J.J.S.

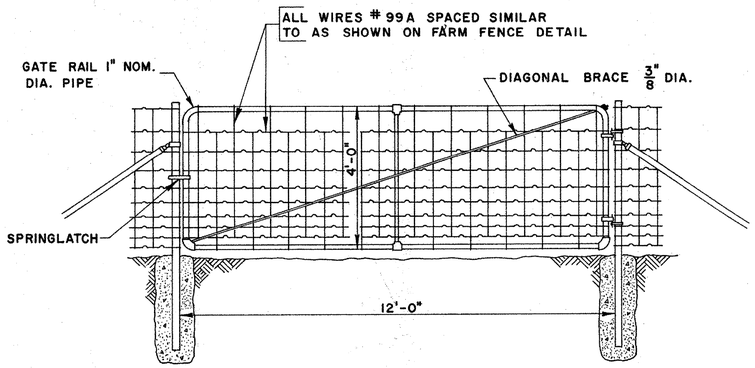
REVISIONS

APPROVED _____ DIRECTOR OF HIGHWAYS 4.22.71 DATE

_____ CHIEF ENGINEER 4/22/71 DATE

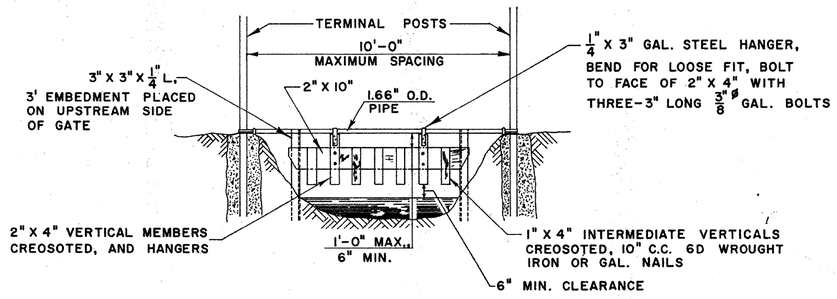


RIGHT-OF-WAY FENCE



VEHICULAR GATE FOR RIGHT-OF-WAY FENCE

1 0 1 2 3 4



FLAP GATE DETAIL

NO SCALE

COUNTY	CONTRACT	NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET M-4
CHAIN LINK FENCE

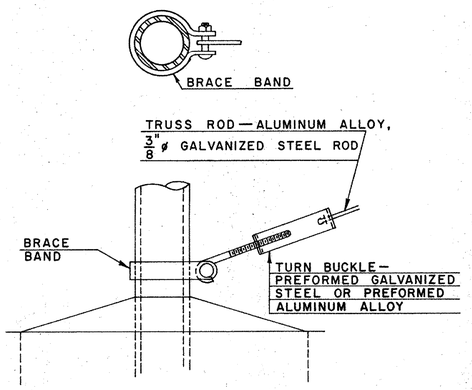
PREL. TRACING D.M.E. DESIGN E.L.W. CHKD.

REVISIONS

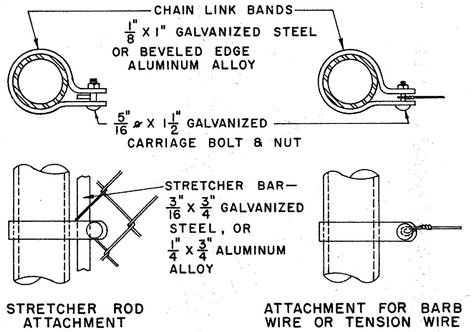
APPROVED

DIRECTOR OF HIGHWAYS — DATE 5-24-71

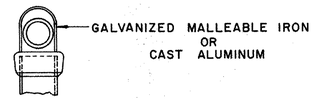
CHIEF ENGINEER — DATE 5/24/71



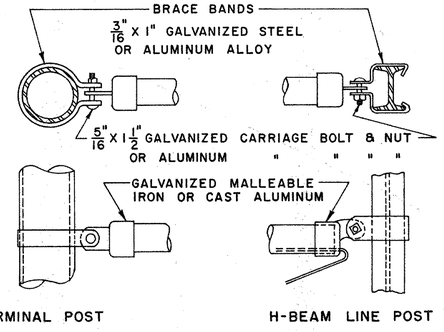
TRUSS BRACE ATTACHMENT FOR ROUND CONSTRUCTION



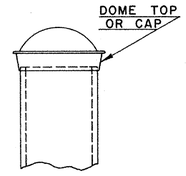
ROUND CONSTRUCTION TERMINAL POSTS



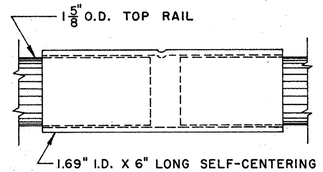
TOP RAIL ATTACHMENT FOR H-BEAM



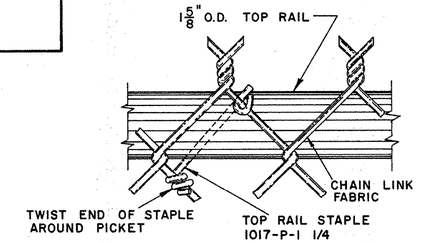
TOP OR BRACE RAIL ATTACHMENT FOR ROUND CONSTRUCTION



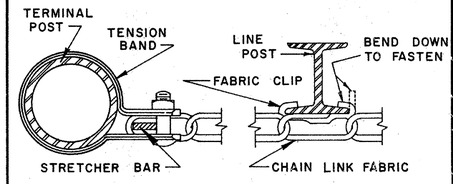
DOME TOP FOR END POSTS AND GATE POSTS



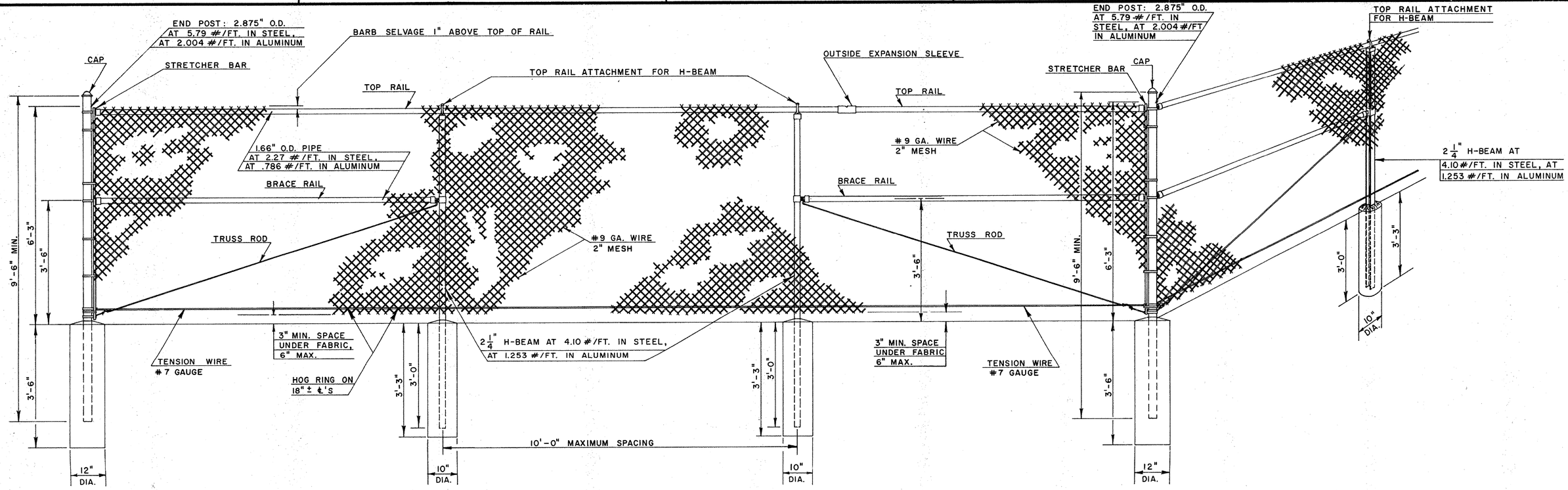
OUTSIDE EXPANSION SLEEVE OR APPROVED EQUAL JOINING ENDS OF PIECES OF TOP RAIL



ATTACHMENT OF FABRIC TO TOP RAIL



ATTACHMENT OF FABRIC TO H-BEAM LINE POST



CHAIN LINK FENCE

SCALE: 0 1 2 3

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

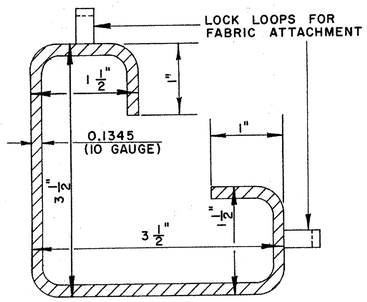
STANDARD SHEET M-5
CHAIN LINK FENCE DETAILS

PREL. TRACING D.M.E. DESIGN E.L.W. CHKD.

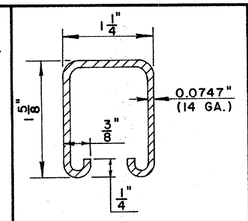
REVISIONS

APPROVED _____ 5-24-71
DIRECTOR OF HIGHWAYS DATE

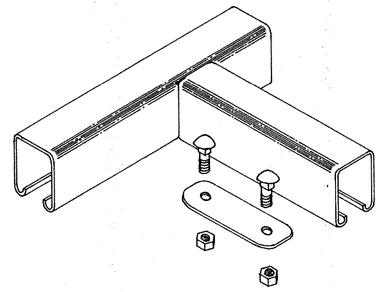
_____ 5/24/71
CHIEF ENGINEER DATE



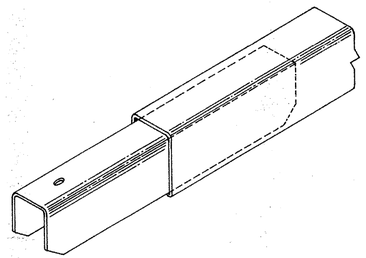
TERMINAL POST



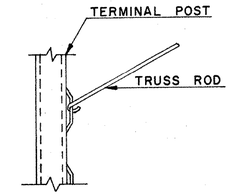
BRACE RAIL



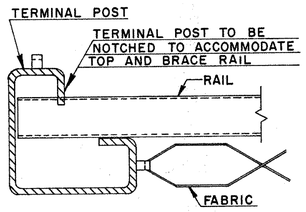
CORNER CONNECTOR FOR TOP AND BRACE RAILS



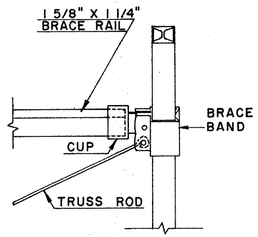
RAIL COUPLING AT 20' MAX. INTERVALS



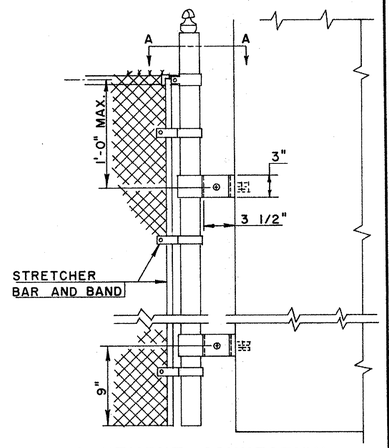
DETAIL "A"



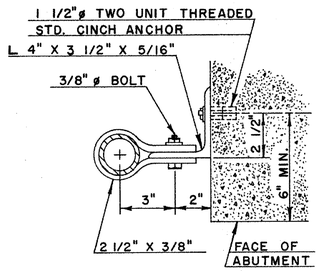
DETAIL "B"
ALTERNATE ROLL FORMED TERMINAL POST



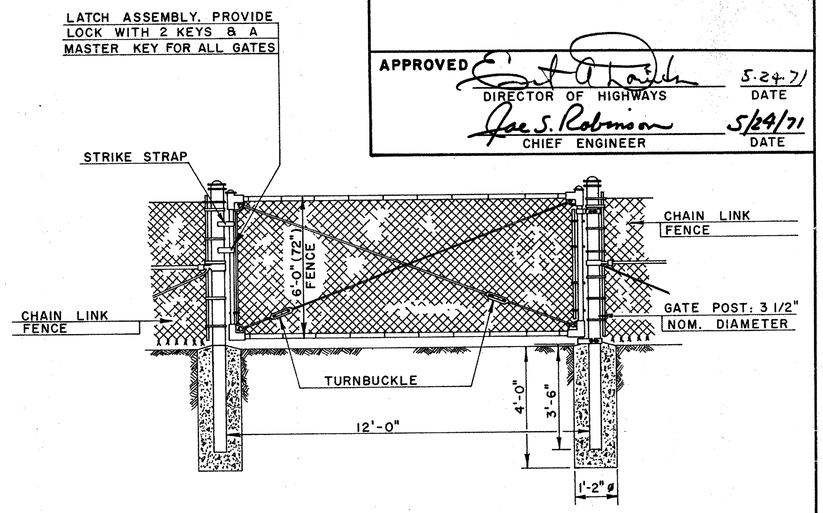
DETAIL "C"
BRACE & TRUSS CONNECTION AT LINE POST



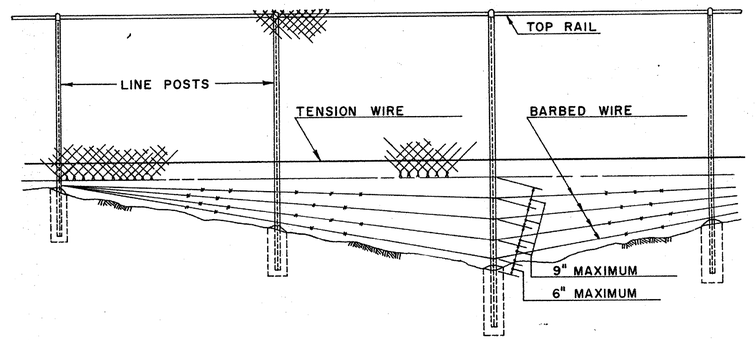
ABUTMENT CONNECTION
(STANDARD CLOSURE SECTION)



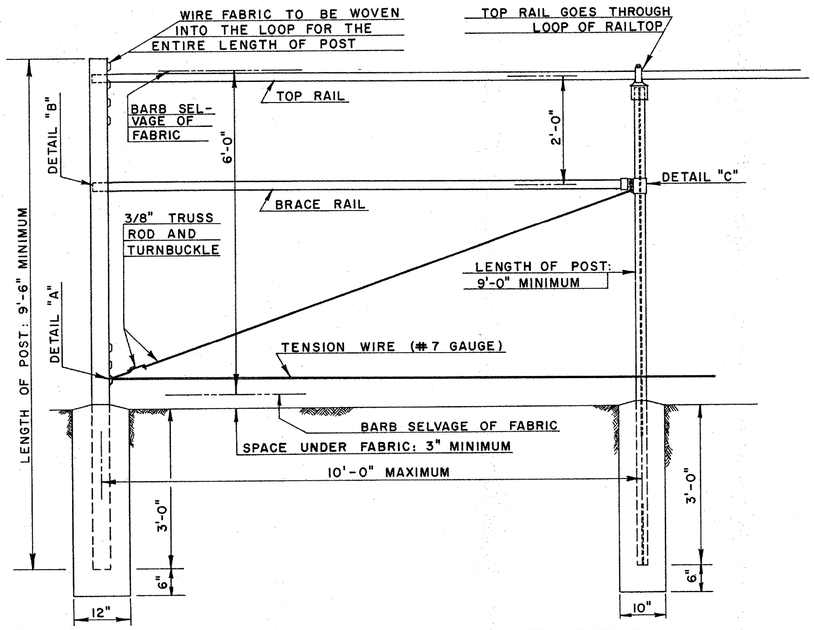
SECTION A-A



VEHICULAR GATE
FOR CHAIN LINK FENCE



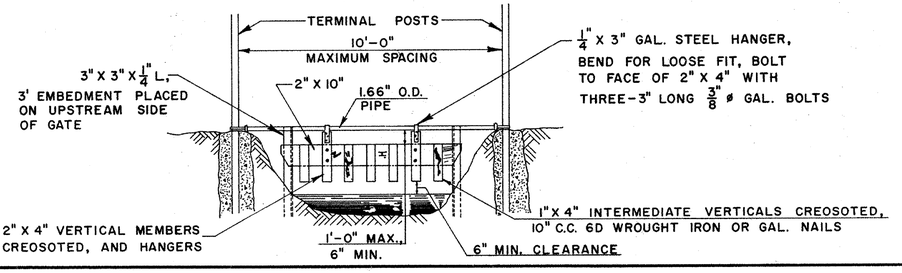
DEPRESSIONS OVER 6" DEEP



ALTERNATE ROLL FORMED TERMINAL POST ASSEMBLY

SCALE: 1 0 1 2 3

FLAP GATE DETAIL
NO SCALE



COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET P-1

REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT

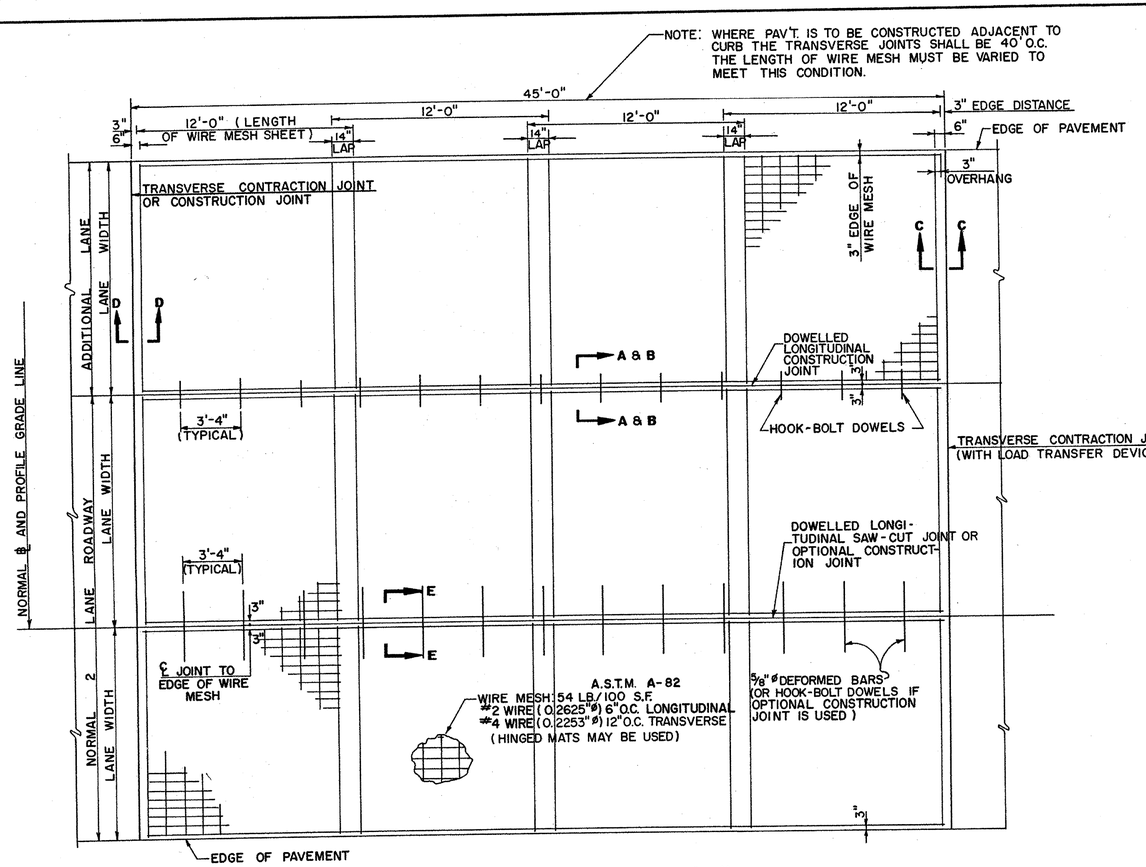
PREL. TRACING H.R.C. DESIGN J.E.R. CHKD. E.L.W.

REVISIONS

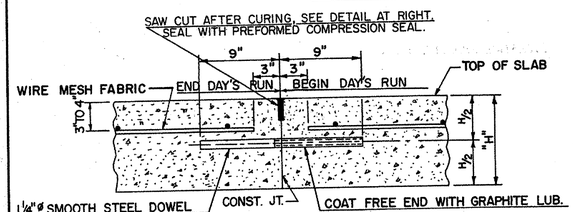
CORRECTED DIMENSION OF OVERLAP IN WIRE MESH. 2-17-72 J.T.B.
CORRECTED ASTM AND GRADE OF HOOK-BOLT DOWEL AND 1¼"
CONTRACTION JOINT DOWEL TO ASTM A306 GRADE 65. 7-19-72 J.T.B.
PREFORMED COMPRESSION SEAL REQUIRED IN TRANSVERSE JOINTS, SAW CUT AT TRANSVERSE CONSTRUCTION JOINTS, DIMENSION CHANGE ON LONGITUDINAL SAW CUT JOINT AND DETAIL MODIFYING TRANSVERSE SAW CUT JOINTS. 10-7-75 R.T.C.

APPROVED _____ DIRECTOR OF OPERATIONS. 6-22-70 DATE

_____ DEPUTY DIRECTOR-CHIEF ENGINEER 6/22/70 DATE



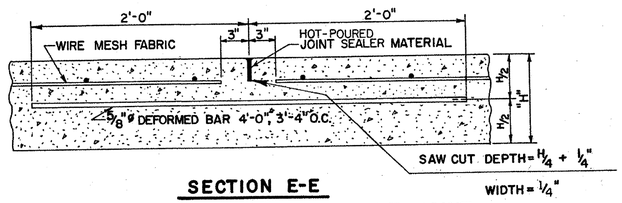
PLAN OF WIRE MESH & JOINTS FOR 45'-0" SLAB



SECTION D-D

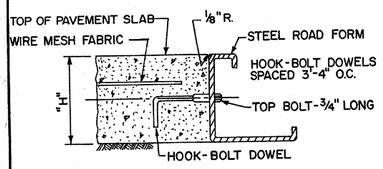
TRANSVERSE CONSTRUCTION JOINT

NOTES: 1. TO BE USED ONLY WHERE SPECIFIED AND AT THE END OF A DAY'S POUR.

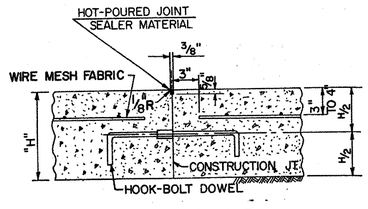


SECTION E-E

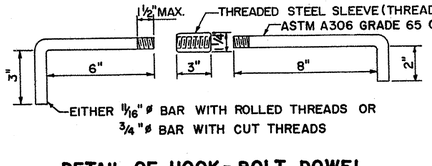
DOWELLED LONGITUDINAL SAW-CUT JOINT



SECTION A-A

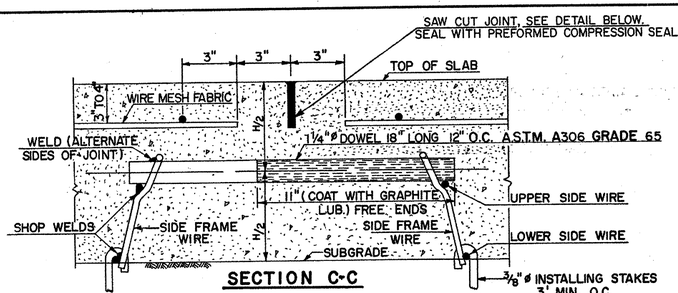


SECTION B-B



DETAIL OF HOOK-BOLT DOWEL

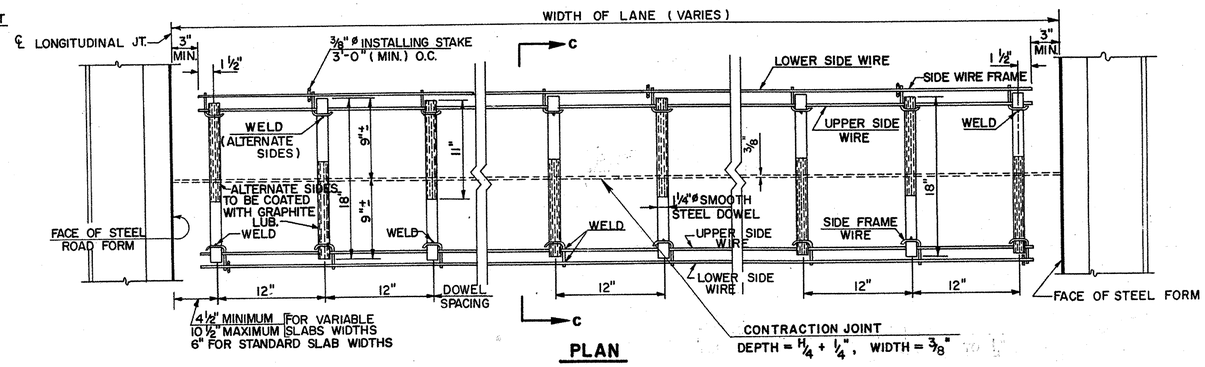
DOWELLED LONGITUDINAL CONSTRUCTION JOINT



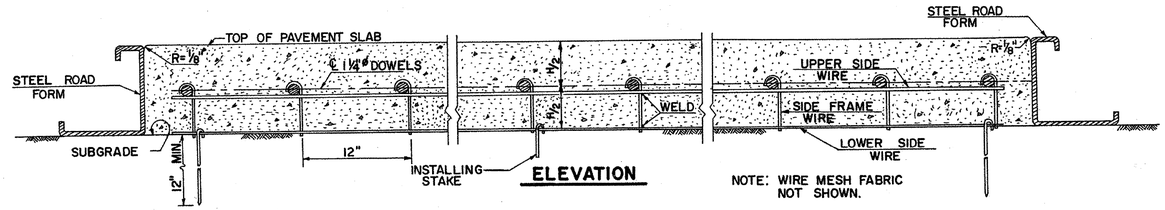
SECTION C-C

TRANSVERSE SAW CUT CONTRACTION JOINT

NOTES: 1. ALL WIRES IN SIDE FRAMES TO BE 5/16" DIAMETER. ASTM-A82 THE JUNCTION OF ALL WIRES SHALL BE WELDED.
2. TRANSVERSE CONTRACTION JOINTS SHALL BE SAWED AS SPECIFIED
3. FIELD ASSEMBLY OF LOAD TRANSFER DEVICE WILL NOT BE PERMITTED.



PLAN

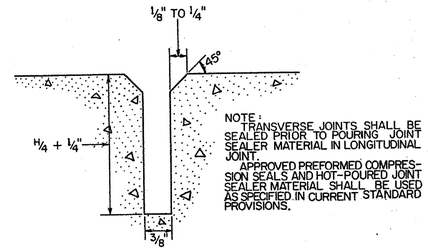


ELEVATION

NOTE: WIRE MESH FABRIC NOT SHOWN.

LOAD TRANSFER DEVICE

(TO BE USED AT CONTRACTION JOINTS)



NOTE: TRANSVERSE JOINTS SHALL BE SEALED PRIOR TO POURING JOINT SEALER MATERIAL IN LONGITUDINAL JOINT. APPROVED PREFORMED COMPRESSION SEALS AND HOT-POURED JOINT SEALER MATERIAL SHALL BE USED AS SPECIFIED IN CURRENT STANDARD PROVISIONS.

DETAIL OF TRANSVERSE SAW CUT JOINT

DIETZGEN Philadelphia 135 Imperial Tracing Cloth

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET P-2

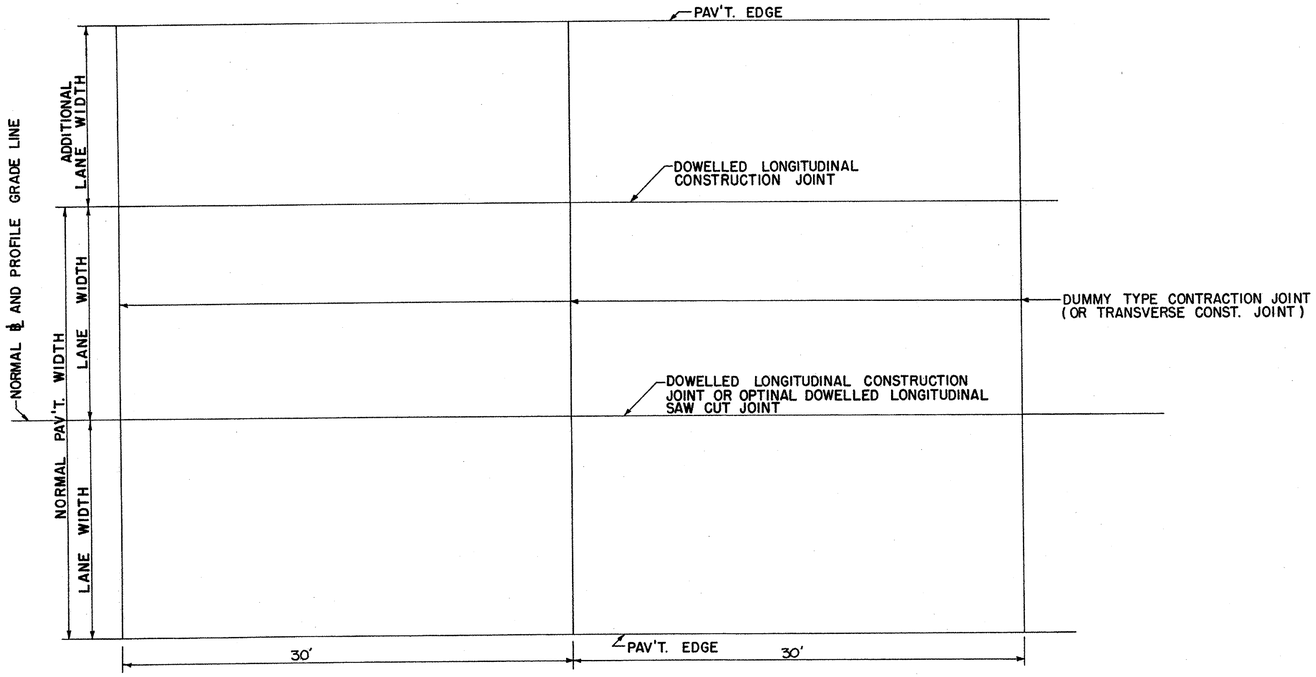
P.C.C. BASE COURSE WITH CRACK CONTROL

PREL. TRACING H.R.C. DESIGN J.E.R. CHKD. E.L.W.

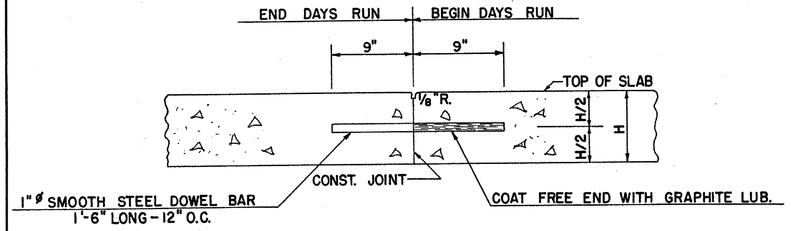
REVISIONS

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

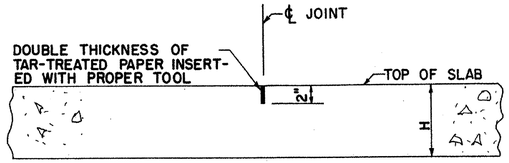


STANDARD JOINT SPACING
(P.C.C. BASE COURSE WITH CRACK CONTROL)



TRANSVERSE CONSTRUCTION JOINT

NOTE: TO BE USED ONLY WHERE SPECIFIED & AT END OF DAYS POUR



DUMMY TYPE CONTRACTION JOINT

NOTE:
SEE STANDARD SHEET P-1 FOR DETAILS OF DOWELLED LONGITUDINAL CONSTRUCTION JOINT & OPTIONAL DOWELLED LONGITUDINAL SAW CUT JOINT. USE OF SAW CUT JOINT MUST BE APPROVED BY DIRECTOR BASED ON MAINTENANCE OF TRAFFIC CONSIDERATIONS.

DIETZGEN Philadelphia 135 Imperial Tracing Cloth

STEEL REINFORCEMENT

(UNLESS OTHERWISE NOTED ALL DEFORMED BAR SHALL MEET THE FOLLOWING REQUIREMENTS)

NO. 4 BAR - ASTM A-615 GRADE 40 OR 60
NO. 5 BAR - ASTM A-615 GRADE 60
NO. 6 BAR - ASTM A-615 GRADE 60

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

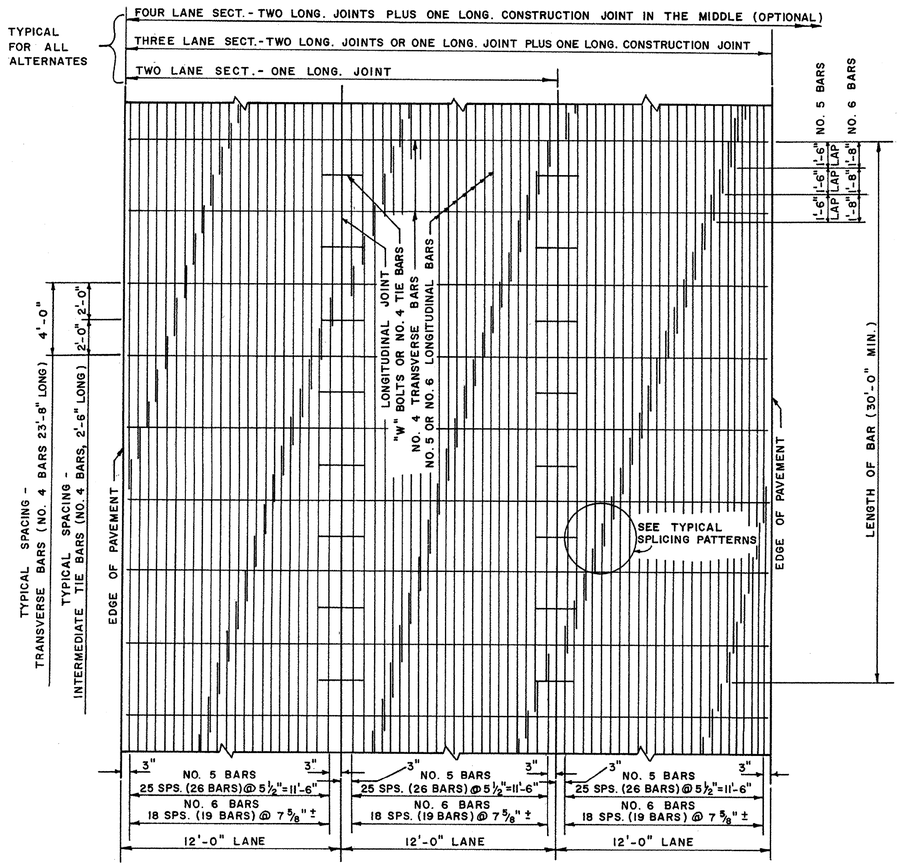
STANDARD SHEET P-3
9" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT

PREL. TRACING J. T. B. DESIGN A. D. CHKD. A. D.

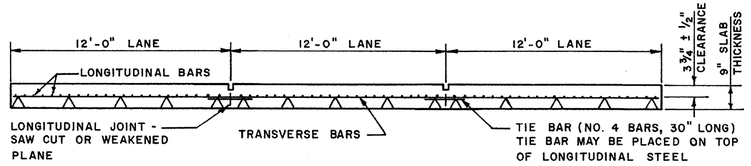
REVISIONS

APPROVED _____ DIRECTOR OF HIGHWAYS 12-7-73 DATE

_____ CHIEF ENGINEER 12/7/73 DATE



PLAN VIEW

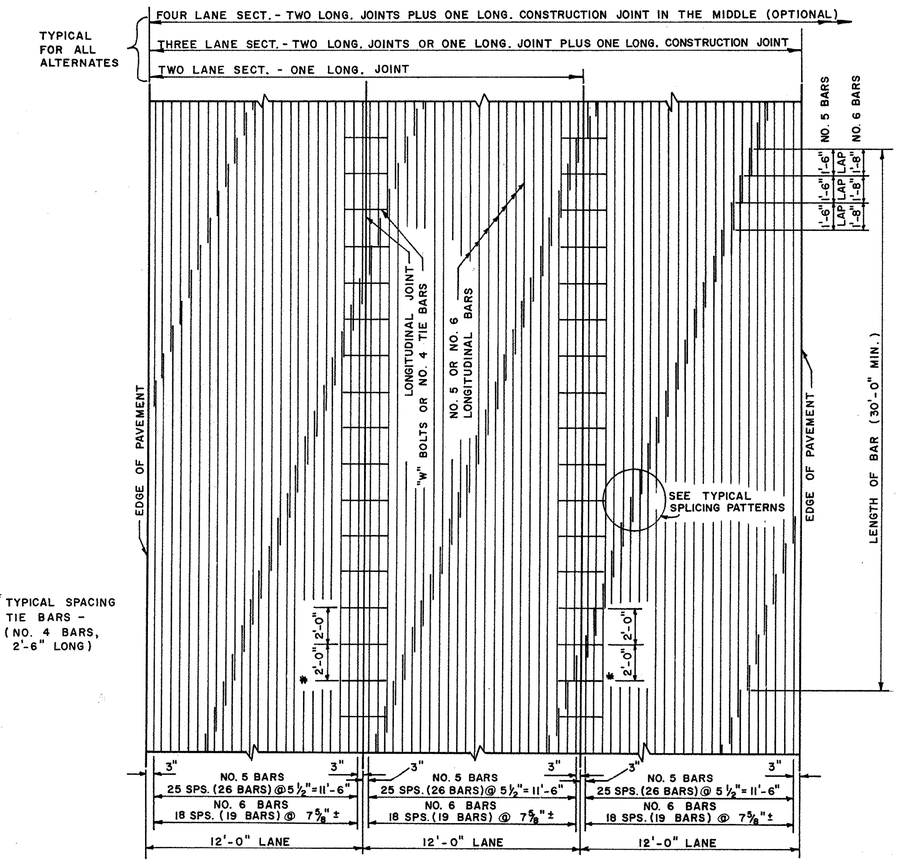


TRANSVERSE SECTION
SHOWING NO. 5 BARS

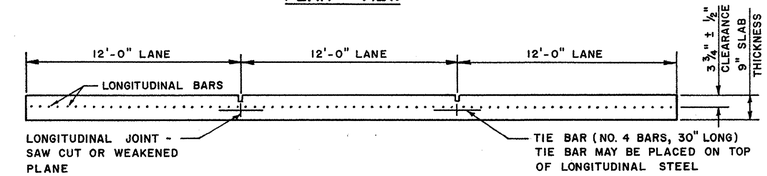
NOTE:
STEEL REINF. MUST BE PRE-SET.

BAR REINFORCEMENT
CONSTRUCTION METHOD I-9

1 0 1 2 3 4 5



PLAN VIEW



TRANSVERSE SECTION
SHOWING NO. 5 BARS

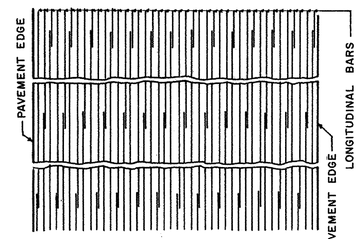
BAR REINFORCEMENT
CONSTRUCTION METHOD I-9A

1 0 1 2 3 4 5

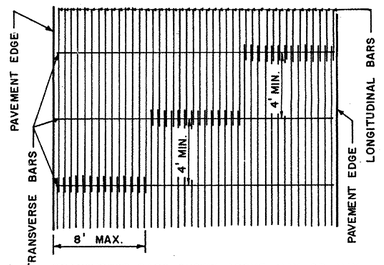
NOTE:
THIS CONSTRUCTION METHOD WILL BE PERMITTED ONLY IF THE CONTRACTOR HAS EQUIPMENT DESIGNED SPECIFICALLY TO LOCATE THE STEEL AS REQUIRED.

TYPICAL SPLICING PATTERNS

NO. 1

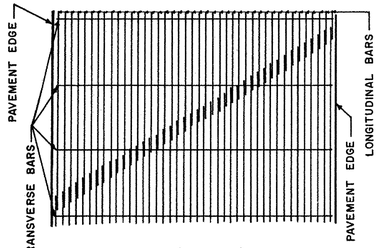


NO. 2



TRANSVERSE BARS SHOWN ABOVE MAY OR MAY NOT BE USED. SEE METHOD I-9 OR I-9A. MINIMUM STAGGER OF SPLICES : 4'

NO. 3



MINIMUM SKEW : 12' FOR 24' PAVEMENT

NOTE:
IN SPLICING PATTERNS NO. 1 AND NO. 2, MAXIMUM NUMBER OF LONGITUDINAL BARS SPLICED AT ONE LOCATION = 2/3 NUMBER PER TRAFFIC LANE (12'), MINIMUM STAGGER = 4'. CONTRACTOR MAY USE OTHER PATTERNS IF APPROVED IN WRITING BY THE ENGINEER.

(NO SCALE)

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET P-4

DETAILS - 9" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT

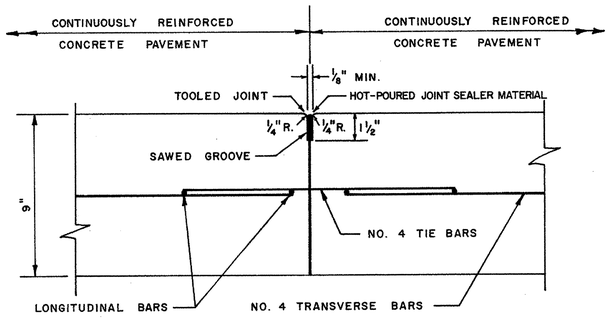
PREL. TRACING J.T.B. DESIGN A.D. CHKD. A.D.

REVISIONS

ADDED EMERGENCY SITUATION NOTE TO TRANSVERSE CONSTRUCTION JOINT DETAIL AND REVISED NOTE CONCERNING GREASING ON TERMINAL JOINT DETAIL. R.T.C. 3/27/75.
ADDED OR REVISED NOTES CONCERNING HOT-POURED JOINT SEALER. 10-7-75 R.T.C.

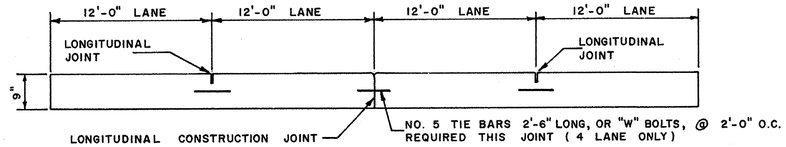
APPROVED *R. A. Haber* DIRECTOR OF HIGHWAYS — 12-7-73 DATE

R. E. Jaworski CHIEF ENGINEER — 12/7/73 DATE

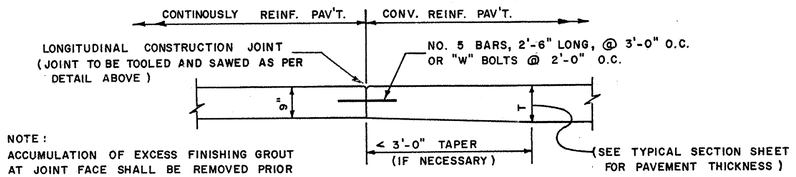


LONGITUDINAL CONSTRUCTION JOINT

NOTE :
NO. 5 TIE BARS, OR "W" BOLTS, AT 2'-0" ON CENTER REQUIRED AT MIDDLE LONGITUDINAL JOINT FOR 4 LANES (NO. 4 BARS AT ALL OTHER LOCATIONS EXCEPT TIES FOR RAMP CONNECTION).
ACCUMULATION OF EXCESS FINISHING GROUT AT JOINT FACE SHALL BE REMOVED PRIOR TO PLACEMENT OF ADJOINING CONCRETE PAVEMENT.

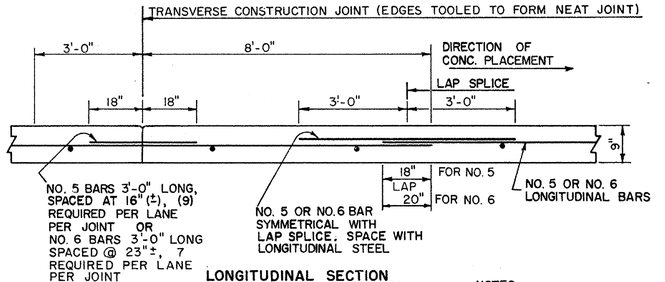


TRANSVERSE SECTION
(FOUR LANE ONLY)



NOTE :
ACCUMULATION OF EXCESS FINISHING GROUT AT JOINT FACE SHALL BE REMOVED PRIOR TO PLACEMENT OF ADJOINING CONCRETE PAVEMENT.

SECTION A-A



LONGITUDINAL SECTION SHOWING TRANSVERSE CONSTRUCTION JOINT

NOTES:
REFER TO SPECIAL PROVISIONS FOR DETAILS OF LONGITUDINAL JOINT CONSTRUCTION

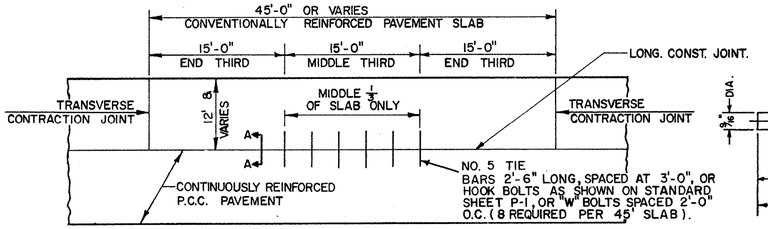
EXTRA BAR METHOD

BAR REINFORCEMENT
CONSTRUCTION METHOD 1-9, 1-9A

VIBRATION WITH HAND MANIPULATED MECHANICAL VIBRATORS REQUIRED ADJACENT TO ALL TRANSVERSE CONSTRUCTION JOINTS

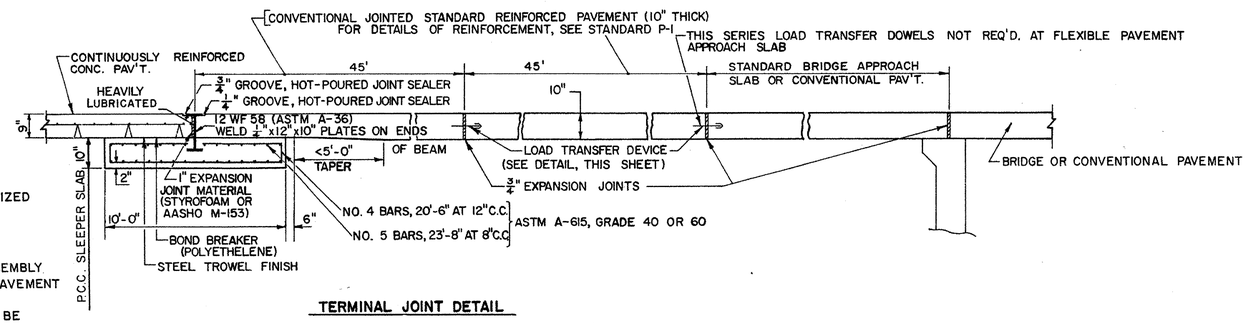
NOTES:
ALTERNATE METHODS OF PROVIDING REQUIRED TIE STEEL AREA WILL BE PERMITTED WHEN APPROVED IN WRITING BY THE ENGINEER

EXTRA BAR METHOD APPLIES ONLY TO LAPS FALLING WITHIN AN AREA FROM 8' BEYOND TO 3' BEHIND THE TRANSVERSE CONSTRUCTION JOINT. THIS METHOD IS FOR EMERGENCY SITUATIONS ONLY.



ADJACENT CONVENTIONAL & CONTINUOUSLY REINFORCED PAVEMENTS
(RAMP & MAINLINE CONNECTION)

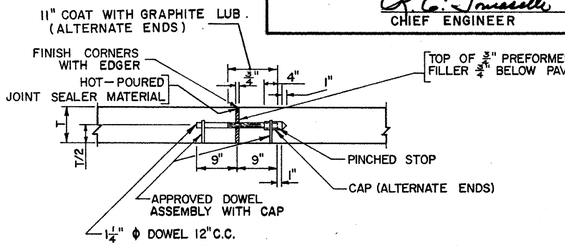
PLAN VIEW



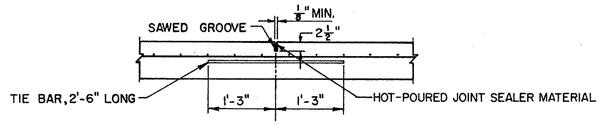
TERMINAL JOINT DETAIL

NOTES (TERMINAL JOINT DETAILS) :
AFTER ASSEMBLY, WF BEAM TO BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A-123 (BEAM TO BE FABRICATED TO MATCH PAVEMENT CROWN OR SLOPE).

ALL AREAS OF CONTACT BETWEEN THE WF BEAM ASSEMBLY AND ADJOINING CONTINUOUSLY REINFORCED CONCRETE PAVEMENT SHALL BE LUBRICATED WITH GRAPHITE OR GREASE. CONVENTIONAL JOINTED PAVEMENT SIDE SHALL NOT BE GREASED.

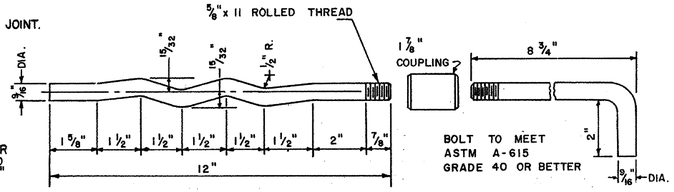


EXPANSION JOINT WITH LOAD TRANSFER DEVICE DETAIL



LONGITUDINAL SAW CUT JOINT DETAIL

REFER TO SPECIAL PROVISIONS FOR DETAILS ON WEAKENED PLANE JOINT AS ALTERNATE TO SAWING. TIE BAR MAY BE PLACED ON TOP OR BOTTOM OF LONGITUDINAL STEEL REINFORCEMENT.



ASSEMBLED "W" BOLT SHALL HAVE A MINIMUM BREAKING LOAD OF 16,000 LBS.

NOTE :
ALTERNATE "W" BOLT CONFIGURATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

"W" BOLT DETAIL

GENERAL NOTES:
(1) SEE TYPICAL SECTION SHEETS FOR PAVEMENT CROWN/TRANSVERSE SLOPE AND POINT OF GRADE APPLICATION.
(2) HOOK BOLTS MAY BE USED WHEN PLACING FORMED CONCRETE PAVEMENT.
(3) DETAIL FOR HOOK BOLTS CAN BE FOUND ON STANDARD SHEET P-1 .
(4) "W" BOLTS SHALL BE MECHANICALLY INSERTED .
(5) SAWED JOINTS SHALL BE SEALED WITH APPROVED HOT-POURED JOINT SEALER.

VAN DORN MYLAR

STEEL REINFORCEMENT

(UNLESS OTHERWISE NOTED ALL DEFORMED BAR SHALL MEET THE FOLLOWING REQUIREMENTS)

NO. 4 BAR - ASTM A-615 GRADE 40 OR 60
NO. 5 BAR - ASTM A-615 GRADE 60
NO. 6 BAR - ASTM A-615 GRADE 60

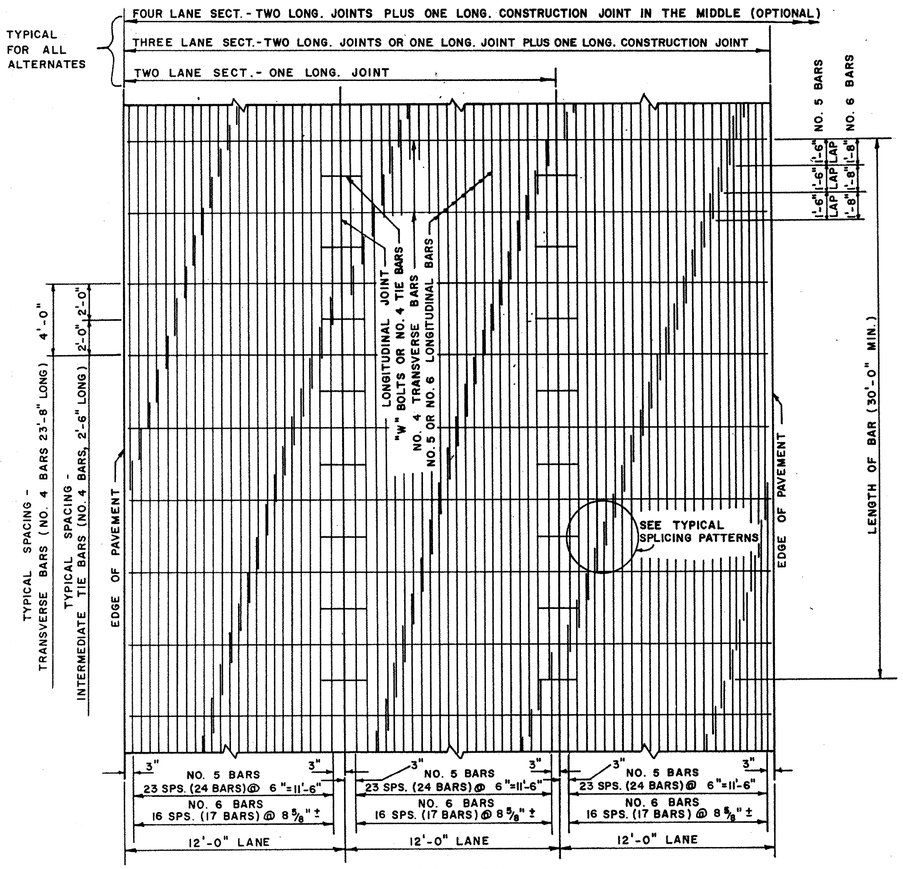
COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO: —	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET P-5
8" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT

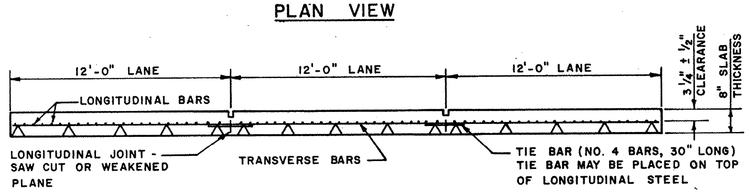
PREL. TRACING J.T.B. DESIGN A.D. CHKD. A.D.

REVISIONS

APPROVED R. R. Haber DIRECTOR OF HIGHWAYS 12-7-73 DATE
R. E. Imsantti CHIEF ENGINEER 12/7/73 DATE



PLAN VIEW

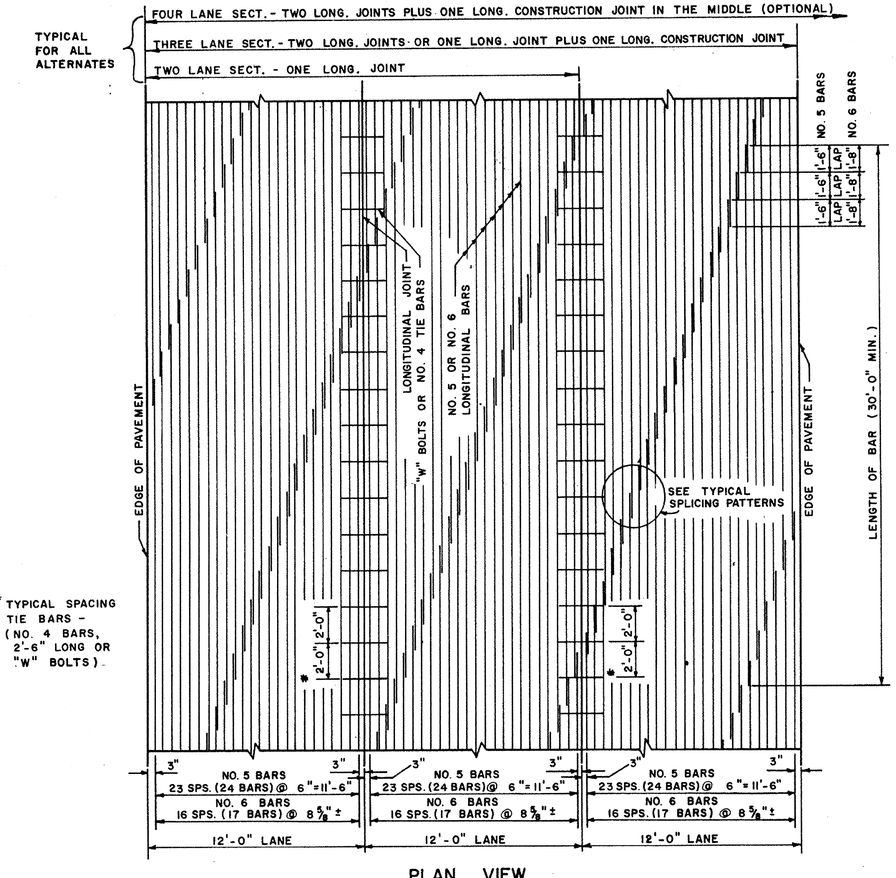


TRANSVERSE SECTION
SHOWING NO. 5 BARS

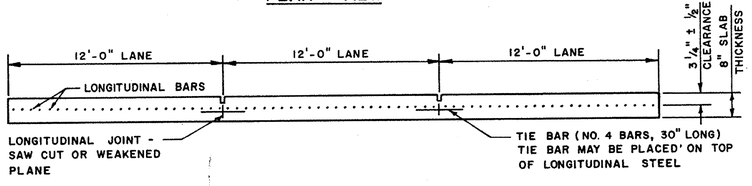
NOTE:
STEEL REINF. MUST BE PRE-SET.

BAR REINFORCEMENT
CONSTRUCTION METHOD I-8

1 0 1 2 3 4 5



PLAN VIEW



TRANSVERSE SECTION
SHOWING NO. 5 BARS

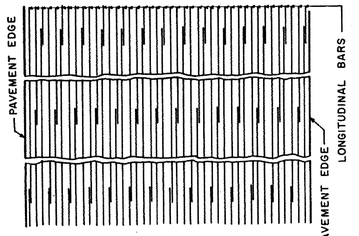
BAR REINFORCEMENT
CONSTRUCTION METHOD I-8A

1 0 1 2 3 4 5

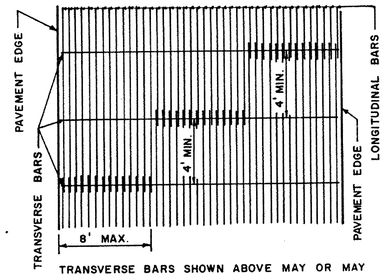
NOTE:
THIS CONSTRUCTION METHOD WILL BE PERMITTED ONLY IF THE CONTRACTOR HAS EQUIPMENT DESIGNED SPECIFICALLY TO LOCATE THE STEEL AS REQUIRED.

TYPICAL SPLICING PATTERNS

NO. 1

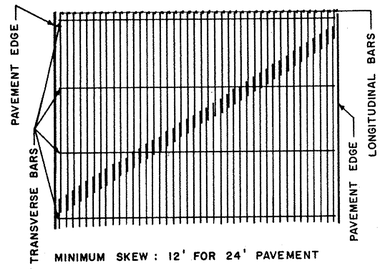


NO. 2



TRANSVERSE BARS SHOWN ABOVE MAY OR MAY NOT BE USED. SEE METHOD I-8 OR I-8A. MINIMUM STAGGER OF SPLICES: 4'

NO. 3



MINIMUM SKEW: 12' FOR 24' PAVEMENT

NOTE:
IN SPLICING PATTERNS NO. 1 AND NO. 2, MAXIMUM NUMBER OF LONGITUDINAL BARS SPLICED AT ONE LOCATION = 2/3 NUMBER PER TRAFFIC LANE (12'), MINIMUM STAGGER = 4'. CONTRACTOR MAY USE OTHER PATTERNS IF APPROVED IN WRITING BY THE ENGINEER.

(NO SCALE)

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET P-6

DETAILS - 8" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT

PREL. TRACING J.T.B. DESIGN A.D. CHKD. A.D.

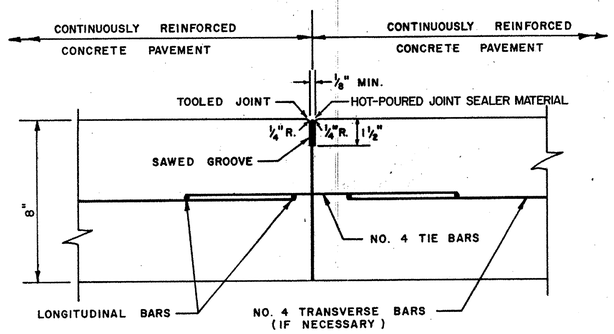
REVISIONS

ADDED EMERGENCY SITUATION NOTE TO TRANSVERSE CONSTRUCTION JOINT DETAIL AND REVISED NOTE CONCERNING GREASING ON TERMINAL JOINT DETAIL. RTC 3/27/75

ADDED OR REVISED NOTES CONCERNING HOT-POURED JOINT SEALER. 10-7-75 R.T.C.

APPROVED _____ DIRECTOR OF HIGHWAYS 12-7-73 DATE

_____ CHIEF ENGINEER 12/4/73 DATE

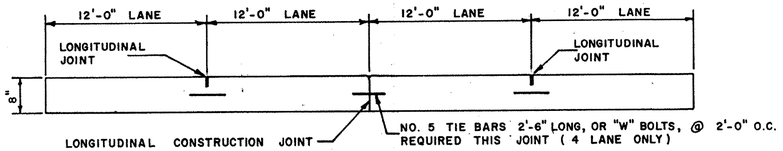


LONGITUDINAL CONSTRUCTION JOINT

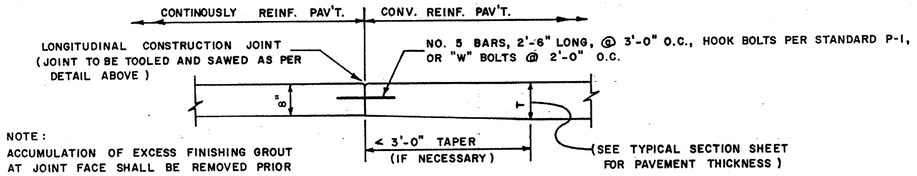
NOTE:

NO. 5 TIE BARS, OR "W" BOLTS, AT 2'-0" ON CENTER REQUIRED AT MIDDLE LONGITUDINAL JOINT FOR 4 LANES (NO. 4 BARS AT ALL OTHER LOCATIONS EXCEPT TIES FOR RAMP CONNECTION).

ACCUMULATION OF EXCESS FINISHING GROUT AT JOINT FACE SHALL BE REMOVED PRIOR TO PLACEMENT OF ADJOINING CONCRETE PAVEMENT.

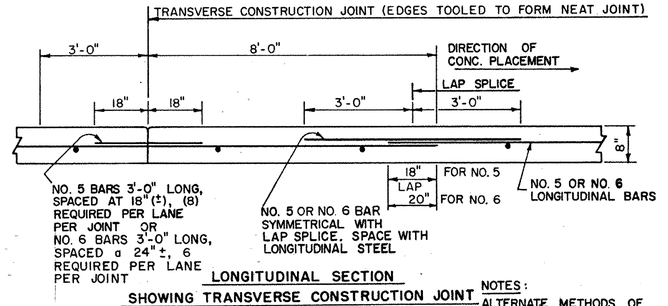


TRANSVERSE SECTION
(FOUR LANE ONLY)



NOTE:
ACCUMULATION OF EXCESS FINISHING GROUT AT JOINT FACE SHALL BE REMOVED PRIOR TO PLACEMENT OF ADJOINING CONCRETE PAVEMENT.

SECTION A-A



LONGITUDINAL SECTION SHOWING TRANSVERSE CONSTRUCTION JOINT

NOTES:

REFER TO SPECIAL PROVISIONS FOR DETAILS OF LONGITUDINAL JOINT CONSTRUCTION

EXTRA BAR METHOD

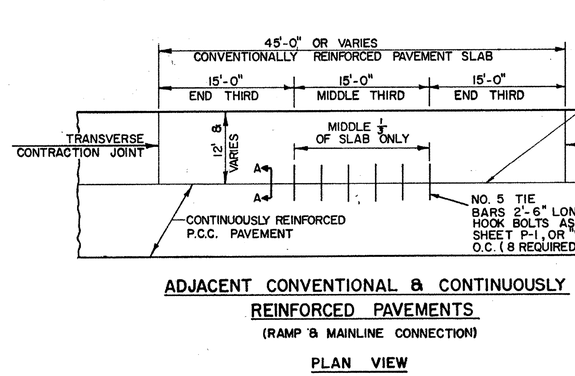
BAR REINFORCEMENT
CONSTRUCTION METHOD I-8, I-8A

VIBRATION WITH HAND MANIPULATED MECHANICAL VIBRATORS REQUIRED ADJACENT TO ALL TRANSVERSE CONSTRUCTION JOINTS

NOTES:

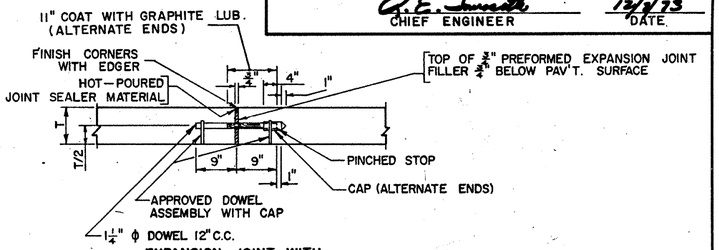
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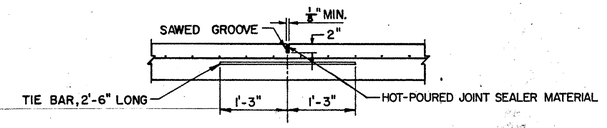


ADJACENT CONVENTIONAL & CONTINUOUSLY REINFORCED PAVEMENTS
(RAMP & MAINLINE CONNECTION)

PLAN VIEW

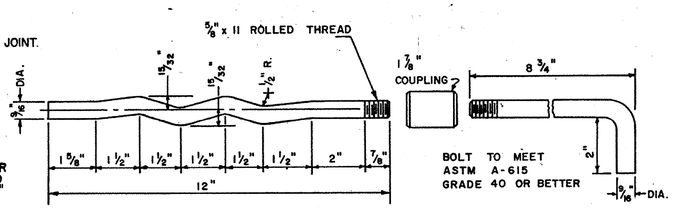


EXPANSION JOINT WITH LOAD TRANSFER DEVICE DETAIL



LONGITUDINAL SAW CUT JOINT DETAIL

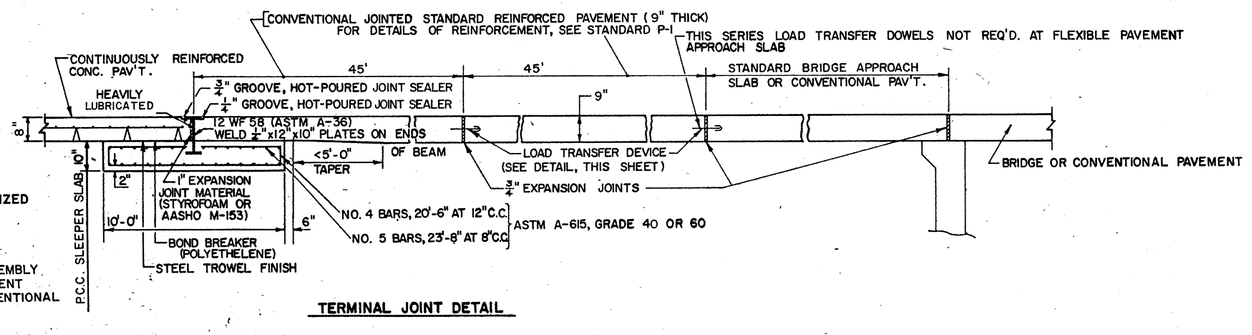
REFER TO SPECIAL PROVISIONS FOR DETAILS ON WEAKENED PLANE JOINT AS ALTERNATE TO SAWING. TIE BAR MAY BE PLACED ON TOP OR BOTTOM OF LONGITUDINAL STEEL REINFORCEMENT.



ASSEMBLED "W" BOLT SHALL HAVE A MINIMUM BREAKING LOAD OF 16,000 LBS.

"W" BOLT DETAIL

NOTE:
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TERMINAL JOINT DETAIL

NOTES (TERMINAL JOINT DETAILS):

AFTER ASSEMBLY, WF BEAM TO BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A-123 (BEAM TO BE FABRICATED TO MATCH PAVEMENT CROWN OR SLOPE).

ALL AREAS OF CONTACT BETWEEN THE WF BEAM ASSEMBLY AND ADJOINING CONTINUOUSLY REINFORCED CONCRETE PAVEMENT SHALL BE LUBRICATED WITH GRAPHITE OR GREASE. CONVENTIONAL JOINTED PAVEMENT SIDE SHALL NOT BE GREASED.

GENERAL NOTES:

(1) SEE TYPICAL SECTION SHEETS FOR PAVEMENT CROWN/TRANSVERSE SLOPE AND POINT OF GRADE APPLICATION.
(2) HOOK BOLTS MAY BE USED WHEN PLACING FORMED CONCRETE PAVEMENT.
(3) DETAIL FOR HOOK BOLTS CAN BE FOUND ON STANDARD SHEET P-1.
(4) "W" BOLTS SHALL BE MECHANICALLY INSERTED.
(5) SAWED JOINTS SHALL BE SEALED WITH APPROVED HOT-POURED JOINT SEALER.

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET S-1
DESIGN SYMBOLS

PREL. TRACING Y.N.C. DESIGN E.L.W. CHKD. J.T.B.

REVISIONS

APPROVED _____ 6-30-70
DIRECTOR OF OPERATIONS DATE

_____ 6/30/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

(1) * (2) * WIDENING (ANY TYPE)
CEMENT CONCRETE PAVEMENT
CEMENT CONCRETE SIDEWALK
HOT MIX ON CEM. CONC. BASE COURSE OR ON CEM. CONC. BASE COURSE WITH CRACK CONT.

*SYMBOLS NO. 1 & NO. 2 APPLY, WHEN BOTH CEM. CONC. PAVEMENT & CEM. CONC. BASE COURSE ARE REQUIRED ON SAME CONTRACT.

(3) BITUMINOUS SURFACE TREATMENT

(4) HOT MIX ON WATERBOUND MACADAM OR PENETRATION MACADAM.

(5) HOT MIX HOT-LAID ASPHALTIC CONCRETE ON COMPACTED SELECT BORROW.

(6) TAPER HOT MIX AT SIDE ROADS.

(7) PLANT MIX (WIDENING OR SHOULDERS)
BANK RUN " " "

(8) SOIL STABILIZATION (CEMENT, ASPHALT, LIME, CALCIUM CHLORIDE, SODIUM CHLORIDE).

(9) CEMENT CONCRETE CURB

(10) INTEGRAL CURB & GUTTER

(11) PARKWAY REFLECTING CURB

(12) ASPHALTIC CONCRETE CURB

(13) (OTHER) NOTE TYPE

(14) PATCHING

(15) (R) BUILDING TO BE REMOVED BY OTHERS.

(16) * DEEP BEAM GUARD RAIL
*(●-WOOD POSTS, I-STEEL POSTS)

(17) * WIRE ROPE GUARD RAIL
*(●-WOOD POSTS, I-STEEL POSTS)

(18) 745 LOCATION & NO. OF BORING

(19) JIGGLE BAR

(20) DRAINAGE WELL

(21) MANHOLE

(22) JUNCTION BOX

(23) CATCH BASIN

(24) EL.52.8 EL.52.6 SPECIAL DITCH WITH GIVEN ELEVATION

(25) PROPOSED PIPE

(26) RIP-RAP

RIGHT OF WAY SYMBOLS

PROPOSED OR NEW R/W — PROP. OR NEW R/W

EXISTING R/W

PROPERTY LINE — PL

CONSTRUCTION EASEMENT — +00 CONST. EASEMENT +00

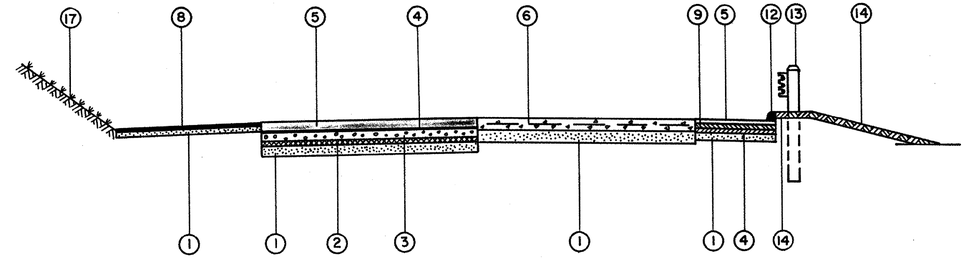
LIMITS OF CONSTRUCTION — LIMITS OF CONST.

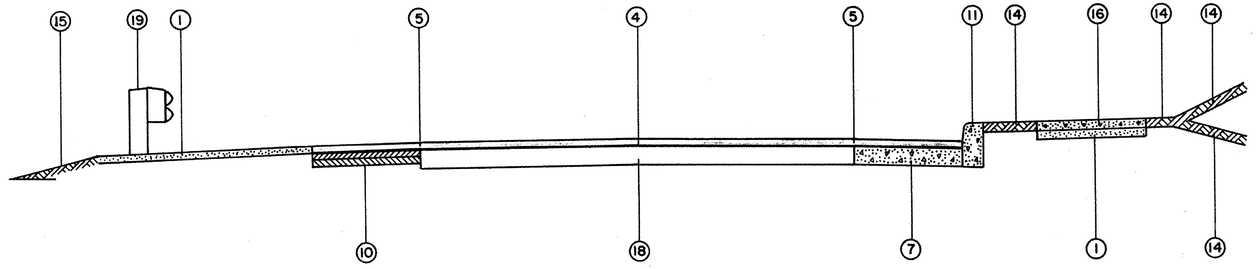
TOWN (CITY) LIMITS — NAME TOWN (CITY) LIMITS

CONTROLLED ACCESS — CONTROLLED ACCESS

CONTROLLED ACCESS & RIGHT OF WAY — C.A. & R/W

PLAN SYMBOLS





(1) SELECT BORROW
(2) QUARRY WASTE (SCREENINGS) OR CRUSHER RUN
(3) WATERBOUND MACADAM OR PENETRATION MACADAM
(4) TACK COAT
(5) HOT MIX HOT LAID ASPHALTIC CONCRETE
(6) REINFORCED CEMENT CONCRETE PAVEMENT
(7) CEM. CONC. PAVEMENT (WIDENING OR BASE COURSE)
(8) BITUMINOUS SURFACE TREATMENT
(9) PLANT MIX ASPHALTIC CONCRETE (BASE COURSE)
(10) BANK RUN ASPHALTIC CONCRETE
(11) CEMENT CONCRETE CURB
(12) ASPHALTIC CONCRETE CURB
(13) WIRE ROPE GUARD FENCE
(14) TOPSOIL, SEEDING & MULCHING
(15) SEEDING & MULCHING
(16) SIDEWALK
(17) SODDING
(18) EXISTING PAVEMENT (TYPE SHOULD BE NOTED)
(19) GALV. STEEL BEAM GUARD RAIL

SECTION SYMBOLS

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET S-2
DRAWING SYMBOLS

PREL. TRACING J. White DESIGN _____ CHKD. E. L. W.

REVISIONS

APPROVED _____ 6-22-70
DIRECTOR OF OPERATIONS — DATE

_____ 6/22/70
DEPUTY DIRECTOR-CHIEF ENGINEER — DATE

ORDER OF WORK

Line (1)
Detail (2)
Tie Points (3)
Bearings (4)
North Arrows (5)
Property Lines (6)
Property Owners (7)
Bench Marks (8)
Profile (9)
Right Of Way (10)

GENERAL NOTES

1. Tie Points & Bench Marks To Be Placed To The Top Of The Page & Directly Above Station Number.
2. Existing R/W Line Should Be On Reverse Side Of Plan Sheet And Dimensioned At Both Ends.
3. All Lettering Should Be Parallel To & If Possible, See Detail Below For Streets, Roads, Etc.
4. Profile To Show Intersecting Streets. See Profile Below.
5. Always Use Guide Lines. Make Printing Legible.
6. Property Owner Names Written In Pencil Only.

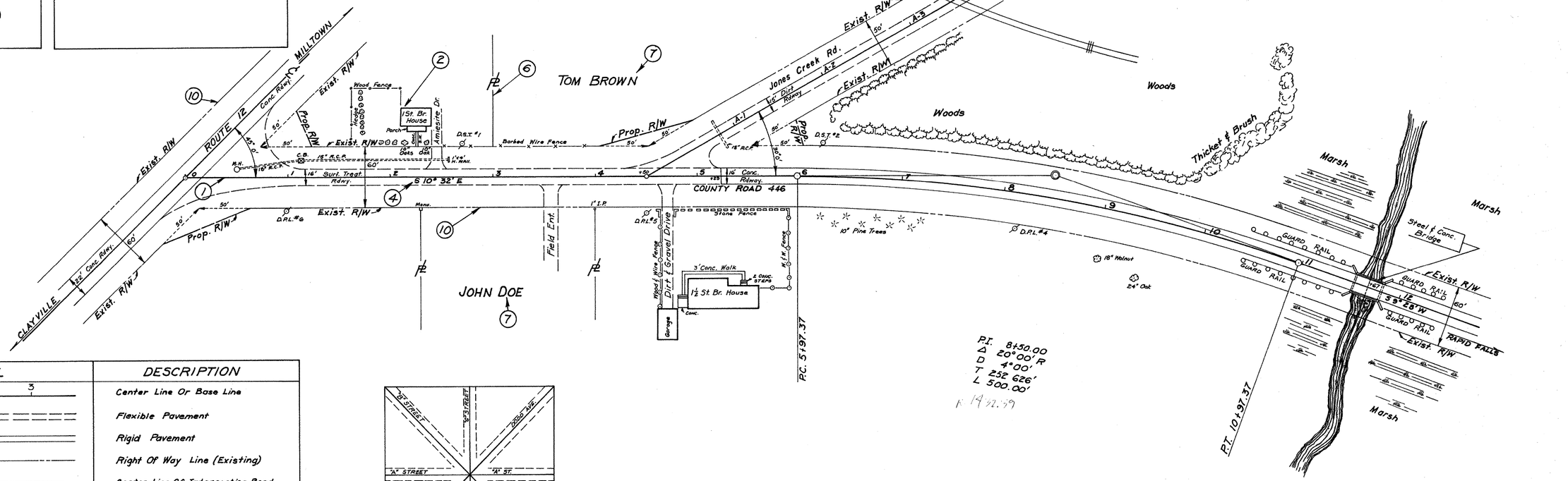
(8) B.M. #1 — "X" IN CONC. S.W. 32' L. STA. 2+29 — ELEV. 10.32

(3) P.C.- STA. 5+97.37 — Δ 33.92° D 45.50° T 252.626' L 500.00'

(3) P.I. STA. 8+50 — Δ 33.92° D 45.50° T 252.626' L 500.00'

(3) P.T.- STA. 10+97.37 — Δ 33.92° D 45.50° T 252.626' L 500.00'

(5) N



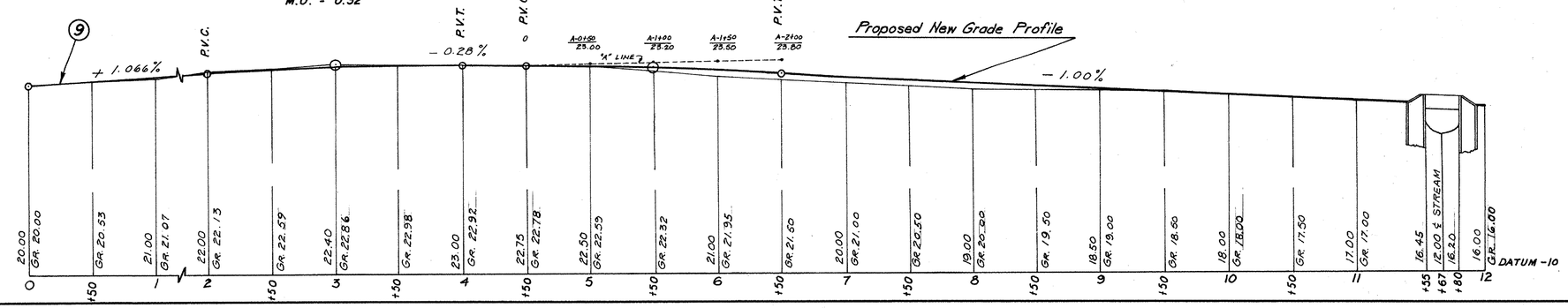
SYMBOL — DESCRIPTION

SYMBOL	DESCRIPTION
	Center Line Or Base Line
	Flexible Pavement
	Rigid Pavement
	Right Of Way Line (Existing)
℄	Center Line Of Intersecting Road
℘	Property Line
	Wood Fence
	Guard Rail (O-Wood Posts, I-Steel Posts)
	Wire Fence
	Right Of Way Line (Proposed)
	Stone Fence
	Hedge (Fence)
	Railroad
	Pipe
	Grass
	Marsh
	Deciduous Tree
	Evergreen Tree
	Woods
	Telephone Or Electric Utility Pole

LETTERING GUIDE

P.V.I. Sta. 3+00
Elev. = 23.20
V.C. = 200'
M.O. = 0.32

P.V.I. Sta. 5+50
Elev. = 22.50
V.C. = 200'
M.O. = 0.18



COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			

STANDARD SHEET S-3

SOILS CLASSIFICATION AND BORING DATA

PREL. TRACING J.WHITE DESIGN _____ CHKD. E.L.W.

REVISIONS

CORRECTION IN GROUP CLASSIFICATION — 7/20/70 J.T.B.

APPROVED _____ 4/15/71
DIRECTOR OF OPERATIONS DATE

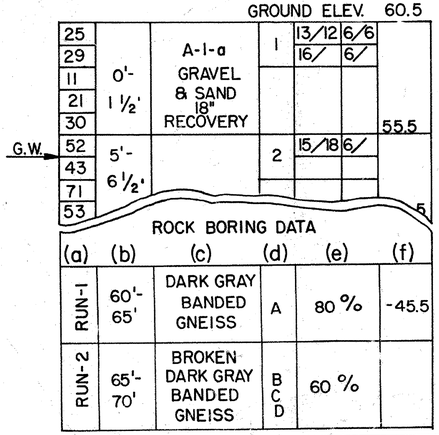
_____ 4/10/70
DEPUTY DIRECTOR-CHIEF ENGINEER DATE

SOILS CLASSIFICATION

GENERAL CLASSIFICATION	GRANULAR MATERIALS (35% OR LESS PASSING A NO. 200 SIEVE.)							SILT-CLAY MATERIALS (MORE THAN 35% PASSING A NO. 200 SIEVE.)					
GROUP CLASSIFICATION	A-1		A-3	A-2				A-4	A-5	A-6	A-7*		A-8
	a	b		4	5	6	7				5	6	
STANDARD SYMBOL	a	b		4	5	6	7				5	6	
SIEVE ANALYSIS PERCENT PASSING NO. 10	50 MAX.	50 MAX.	51 MIN.										
NO. 40	30 MAX.	25 MAX.	10 MAX.	35 MAX.	35 MAX.	35 MAX.	35 MAX.	35 MIN.	36 MIN.	36 MIN.	36 MIN.	36 MIN.	
NO. 200	15 MAX.												
CHARACTERISTICS OF FRACTION PASSING NO. 40 LIQUID LIMIT				40 MAX.	41 MIN.	40 MAX.	41 MIN.	40 MAX.	41 MIN.	40 MAX.	41 MIN.	41 MIN.	42-400
PLASTICITY INDEX	6 MAX.	6 MAX.	N.P.	10 MAX.	10 MAX.	11 MIN.	11 MIN.	10 MAX.	10 MAX.	11 MIN.	11 MIN.	11 MIN.	0-60
GROUP INDEX	0		0	0		4 MAX.		8 MAX.	12 MAX.	16 MAX.	20 MAX.		
GENERAL SUBGRADE RATING	EXCELLENT		GOOD	GOOD		FAIR		POOR	POOR	POOR	VERY POOR		UNSAT.
MATERIAL	WELL GRADED GRAVELS AND SANDS.		CLEAN SAND & GRAVELLY SAND.	POORLY GRADED, SILTY OR CLAYEY SANDS AND GRAVEL.				SILTY SOILS	ELASTIC SILTS	PLASTIC CLAYS	EXPANSIVE PLASTIC CLAYS		MUCK-PEAT

*P.I. OF A-7-5 ≤ L.L.-30
*P.I. OF A-7-6 > L.L.-30

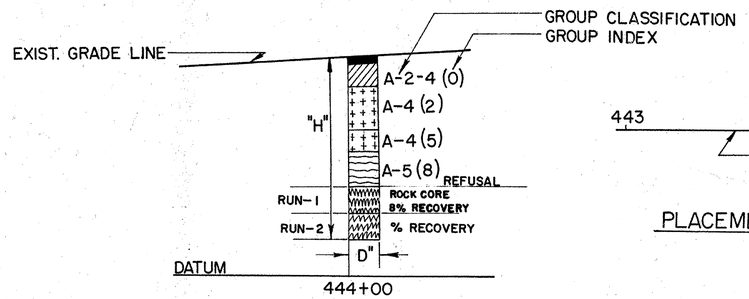
STRUCTURAL BORING DATA

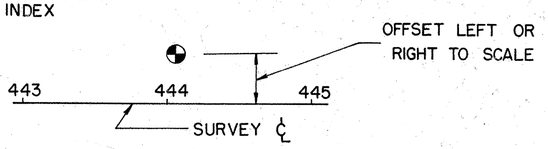


(a) HAMMER BLOWS TO DRIVE CASING ONE (1) FOOT
(b) SAMPLE DEPTH
(c) CLASSIFICATION, DESCRIPTION & RECOVERY
(d) SAMPLE NUMBER
(e) BLOWS ON SAMPLE SPOON
(f) PENETRATION OF SAMPLE SPOON
(g) ELEVATIONS

(a) RUN NUMBER
(b) SAMPLE DEPTH
(c) CLASSIFICATION & DESCRIPTION
(d) SAMPLE NUMBER
(e) % RECOVERY
(f) ELEVATION

METHOD OF PLACING BORING DATA ON PLAN AND PROFILE SHEETS

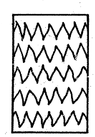




PLACEMENT ON PLAN SHEET

SCALE OF SYMBOLS TO BE USED ON PLAN

"H" OR VERTICAL SCALE - 1"=5'-0"
"D" OR HORIZONTAL SCALE - "D"= 10' ON 1"= 50'-0" SCALE



ROCK CLASSIFICATION

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER T-1-1

CABINET BASES, CONDUIT JUNCTION WELLS AND SIGN FOUNDATION

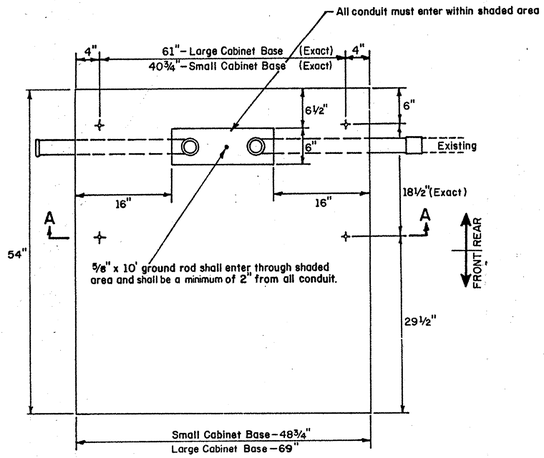
PREL. TRACING R.F.R. 11-23-77 DESIGN CHKD.

RECOMMENDED 11-28- 1977 R. E. Tomasetti CHIEF ENGINEER

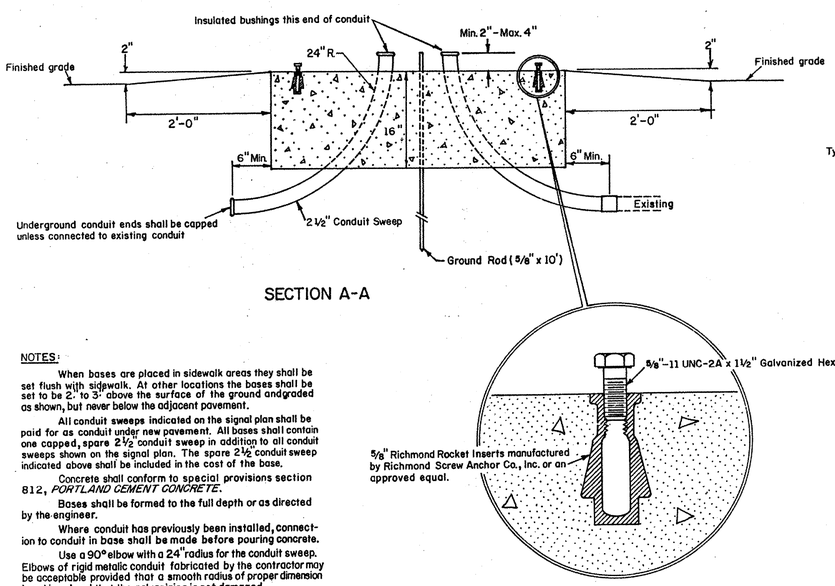
APPROVED 11/28 1977 R. D. Bowman DIRECTOR OF HIGHWAYS

REVISIONS

1. 4/24/79 Revised notes, small and large cabinet bases R.F.R.



PLAN



SECTION A-A

NOTES:

When bases are placed in sidewalk areas they shall be set flush with sidewalk. At other locations the bases shall be set to be 2" to 3" above the surface of the ground and graded as shown, but never below the adjacent pavement.

All conduit sweeps indicated on the signal plan shall be paid for as conduit under new pavement. All bases shall contain one capped, spare 2½ conduit sweep in addition to all conduit sweeps shown on the signal plan. The spare 2½ conduit sweep indicated above shall be included in the cost of the base.

Concrete shall conform to special provisions section 812, *PORTLAND CEMENT CONCRETE*.

Bases shall be formed to the full depth or as directed by the engineer.

Where conduit has previously been installed, connection to conduit in base shall be made before pouring concrete.

Use a 90° elbow with a 24" radius for the conduit sweep. Elbows of rigid metalic conduit fabricated by the contractor may be acceptable provided that a smooth radius of proper dimension is achieved and that the galvanizing is not damaged.

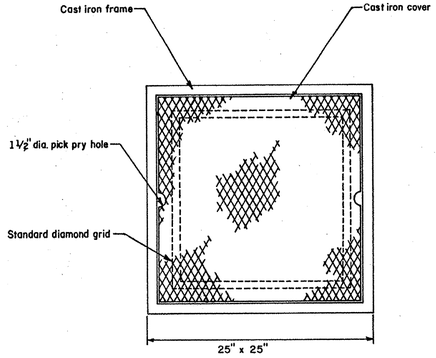
Copper coated ground rods (5/8" x 10' min.) shall be placed within all bases as shown or as directed by the engineer with a 6'-0" minimum of the rod in undisturbed soil.

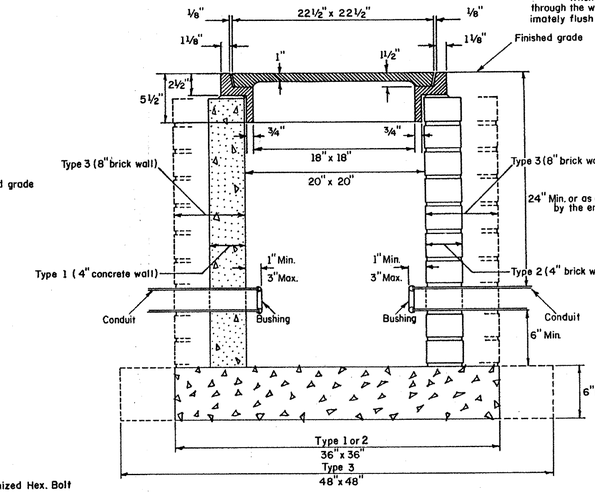
Concrete inserts and hex. bolts for the bases shall be supplied by the contractor and shall be included in the cost of the base. They shall be hot-dipped galvanized in accordance with the latest ASTM specifications.

All conduits shall have insulated bushings inside the control cabinet. An arrow shall be placed in the surface of the base indicating the location where each conduit leaves the base. Any conduit sweep not used shall be capped in the ground.

The cabinet base shall be oriented so that the rear of the cabinet will face the intersection or as directed by the engineer.

SMALL AND LARGE CABINET BASES





CONDUIT JUNCTION WELLS, TYPES 1, 2 AND 3

NOTES:

Type 1 conduit junction wells shall be precast concrete. At least one hole in precast well will be of a 5" diameter completely through the wall. Unused holes shall be plugged. Concrete shall conform to special provisions section 812, *PORTLAND CEMENT CONCRETE*.

Type 2 and type 3 conduit junction wells shall be brick and will conform to standard specifications section 614, *BRICK MASONRY*. Joints shall be concave type. Type 2 walls will be a nominal 4" thick. Type 3 walls will be a nominal 8" thick.

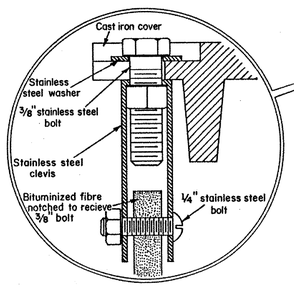
Type 4 conduit junction wells will be of bituminous fibre pipe with a cast iron cover. Hardware used to secure the cast iron cover will be of stainless steel.

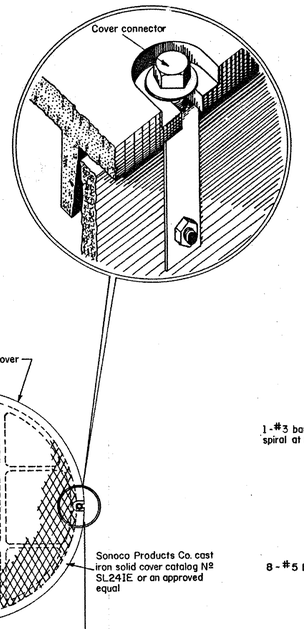
All conduit junction wells constructed within pavements, sidewalks, etc. will be constructed flush with the surface of same. Installations in unpaved areas will be constructed flush with the ground (except type 4 - refer to detail below) and graded to drain away from conduit junction well.

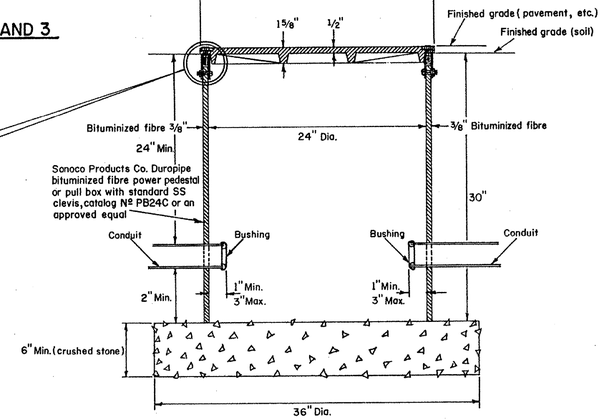
Cast iron frames and/or covers will conform to standard specifications section 711.05, *Castings*, and shall be included in unit price bid for conduit junction wells.

Conduit junction wells will be constructed to a depth that will insure a minimum of 6" from the bottom to the lowest conduit except type 4.

When nonmetalic conduit is used, it will be extended through the wall of the conduit junction well and end approximately flush with the inside wall surface.







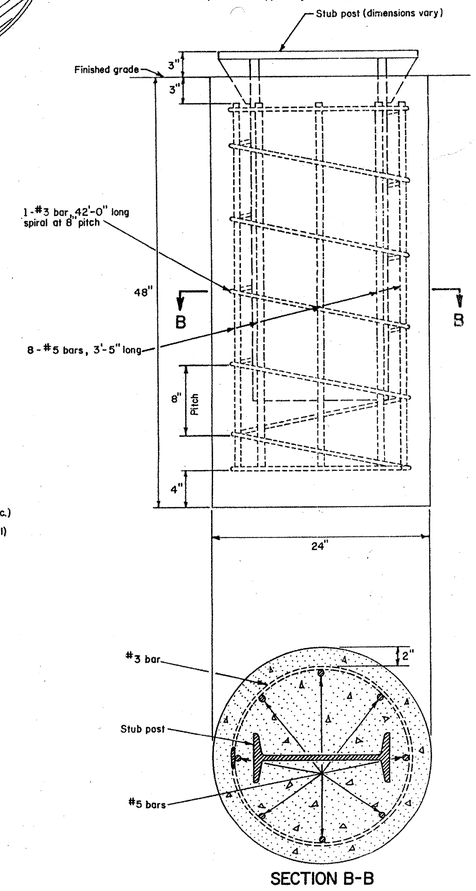
CONDUIT JUNCTION WELL, TYPE 4

NOTES:

Concrete will conform to special provisions section 812, *PORTLAND CEMENT CONCRETE*.

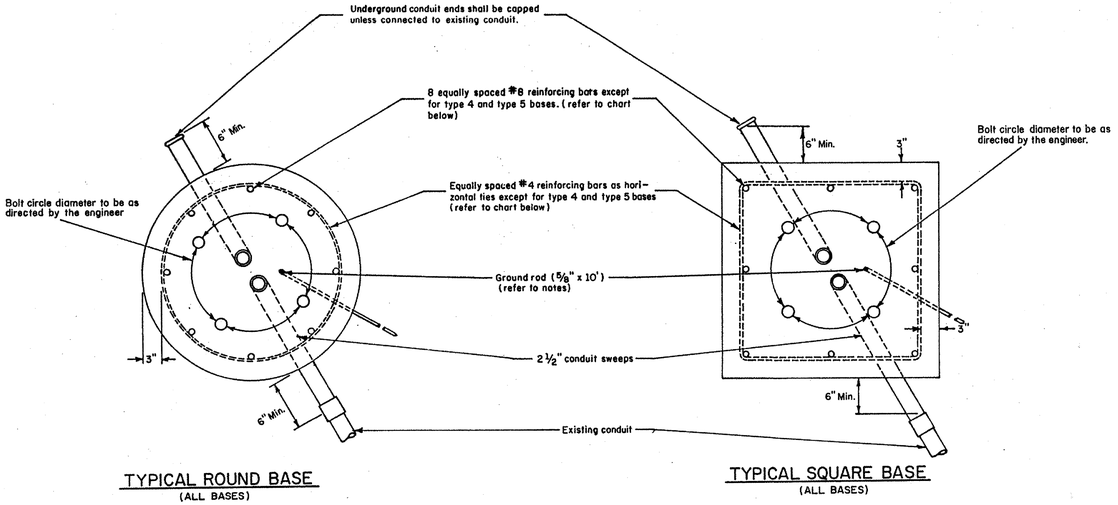
In stable soil, forms below 12" from finished grade will not be required

Stub post to be supplied by the Bureau of Traffic.



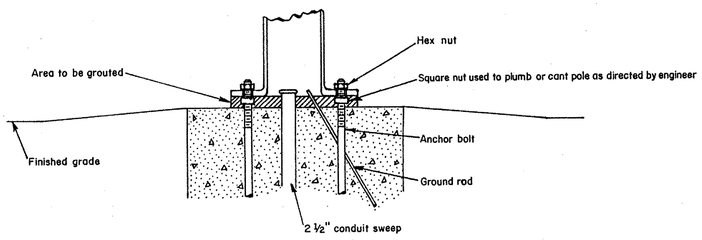
SECTION B-B

SIGN FOUNDATION DETAIL

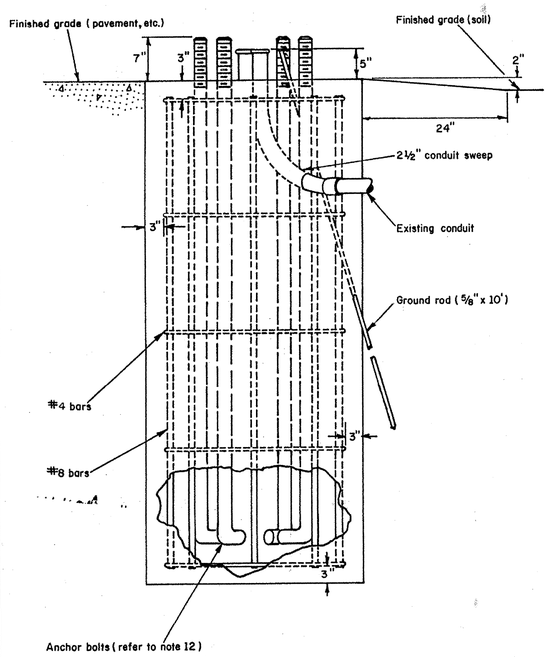


TYPICAL ROUND BASE
(ALL BASES)

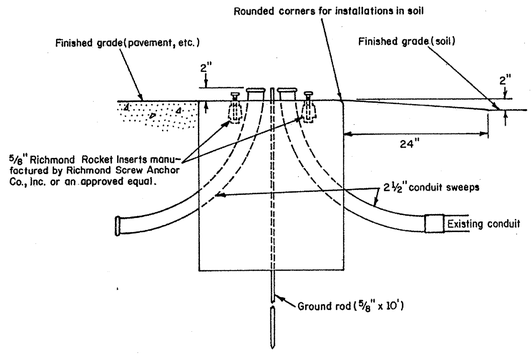
TYPICAL SQUARE BASE
(ALL BASES)



TYPICAL INSTALLATION OF STEEL POLE ON POLE BASES



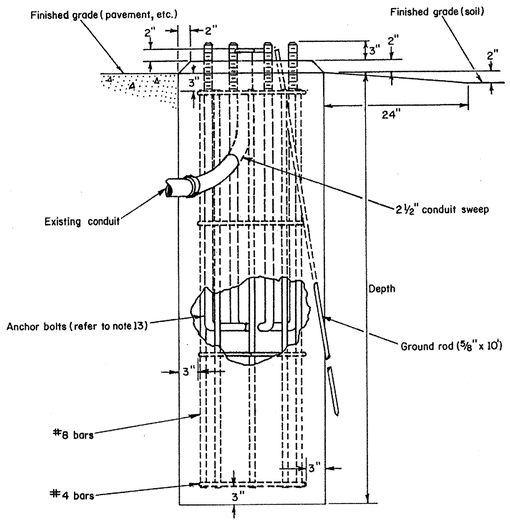
TYPICAL SECTION, BASE TYPES 1, 2, 2A, 2B, 3, 3A AND 3B



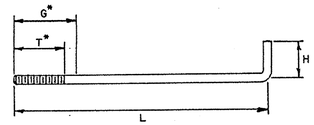
BASE TYPE 4 SECTION

Pole Base Type	Diameter	Depth	#4 Horizontal Reinforcing Tie Bars	#8 Vertical Reinforcing Bars
1	3'	7'	5	8
2	3'	10'	6	8
2A	4'	8'	5	8
2B	5'	7'	5	8
3	4'	10'	6	8
3A	5'	9'	6	8
3B	6'	7'	5	8
4	2'	2'-4"	none	none
5	3'	4'	none	none
6	2'	6'	4	8

POLE BASE DATA CHART



TYPICAL SECTION, BASES TYPE 5 AND TYPE 6



* G = Galvanized portion; T = Thread length

Nominal Bolt Size	L	H	T	G
1" x 40"	36"	4"	6"	8"
1¼" x 48"	42"	6"	8"	10"

ANCHOR BOLT DATA CHART AND DETAILS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER T-2

POLE BASES

PREL. TRACING R.F.R. 11-15-77 DESIGN _____ CHKD. _____

RECOMMENDED 11-28 19 77 R.E. Tomasetti
CHIEF ENGINEER

APPROVED 11/28 19 77 R.D. Bewley
DIRECTOR OF HIGHWAYS

REVISIONS
This sheet replaces former sheets T-7 and T-8 11-15-77 R.F.R.
Replaced note 8 1-20-78 R.F.R.

NOTES:

1. When pole bases (except type 5 and type 6) are placed in sidewalk areas they will be constructed flush with the sidewalk. Type 5 and type 6 will be constructed with their top surface 2" above the sidewalk. At other locations the bases will be set as shown but, never below the adjacent pavement.

2. Concrete will conform to special provisions section 812, *PORTLAND CEMENT CONCRETE*, with a 28 day strength of 3000 psi..

3. Where conduit has previously been installed, the connection to the conduit in the base will be made before pouring concrete.

4. All bases will contain two 2½" conduit sweeps which shall be included in the cost of the base. All bases may contain more than two conduit sweeps. All conduit sweeps over two shall be paid for as conduit under new pavement. Any sweep not used will be capped in the ground. An arrow shall be placed in the surface indicating where all conduits leave the base.

5. Use a 90° elbow with a 24" radius for conduit sweeps. Elbows manufactured by the contractor with a hydraulic bender may be acceptable provided that a smooth radius of proper dimension is achieved and that the galvanizing is not damaged.

6. All conduits installed within a pole base will have insulated bushings on ends above the surface of the base.

7. Typically round pole bases shall be used. The contractor may, at his discretion, use a square base but, at no additional cost to the department. If a square base is used, the side of the square will be the same dimension as the diameter of the type pole base specified on the plans.

8. In stable soil, forms below 12" from the surface are not required. All bases shall be edged and have a broom finish.

9. Copper coated ground rods (5/8" x 10' min.) shall be placed within all bases as shown or as directed by the engineer with a 6'-0" minimum of the rod in undisturbed earth. The top of the ground rod shall be within a 4" radius of the center and 2" from all conduit.

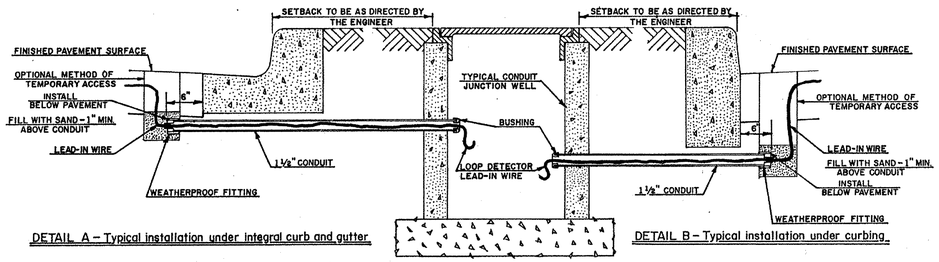
10. Reinforcing bars shall conform to A.S.T.M. A615, grade 60. Where horizontal bars and vertical bars intersect, they will be wired together, no welding will be accepted.

11. Information about templates for setting anchor bolts will be furnished by the department.

12. Anchor bolts for pole base types 1, 2, 2A, 2B, 3, 3A and 3B will be furnished by the department.

13. The anchor system for pole base types 4, 5 and 6 will be supplied by the contractor and included in the cost of the base. A type 4 base requires four 5/8" Richmond Rocket Inserts or an approved equal and four 5/8" x 1½" hex. head bolts. A type 5 base requires four 1" x 40" anchor bolts with nuts (refer to chart). A type 6 base requires four 1" x 40" or four 1¼" x 48" anchor bolts with nuts (refer to chart) as directed by the engineer. The anchor bolts for type 5 and 6 bases will have a minimum yielding stress of 55,000 psi..

14. Anchor bolts, nuts and hex. bolts will be hot dipped galvanized in accordance with the latest A.S.T.M. specifications.

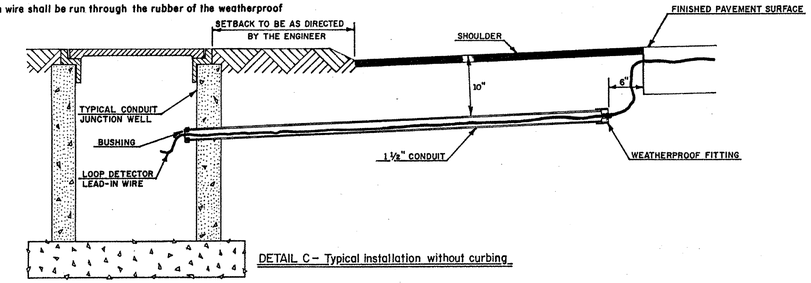


DETAIL A – Typical installation under integral curb and gutter

DETAIL B – Typical installation under curbing

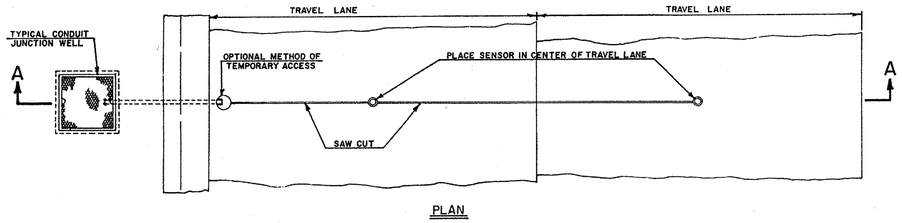
NOTES:

1. The contractor shall be responsible for protecting the conduit against any possible damage in paving operations.
2. The weatherproof fitting shall consist of a galvanized 1½" coupling containing a steel threaded reducing bushing (1½" to ¾") and a ¾" watertight connector for service entrance cable such as an APPLETON SEO-21 or it's approved equivalent.
3. The lead-in wire shall be run through the rubber of the weatherproof fitting.

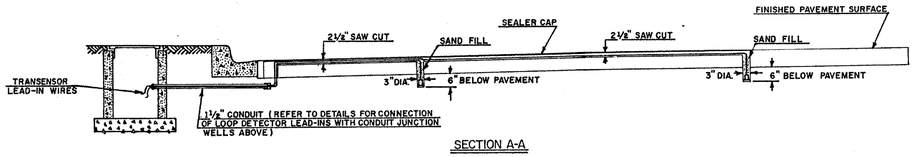


DETAIL C – Typical installation without curbing

DETAILS FOR CONNECTION OF LOOP DETECTOR LEAD-INS WITH CONDUIT JUNCTION WELLS

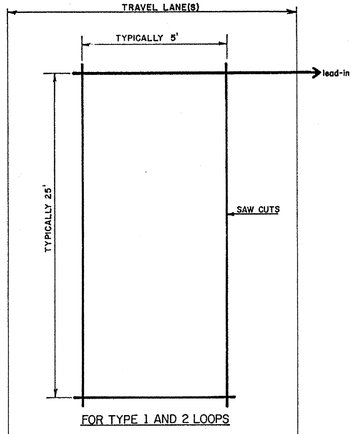


PLAN

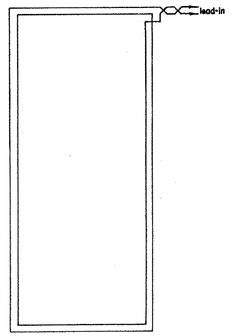


SECTION A-A

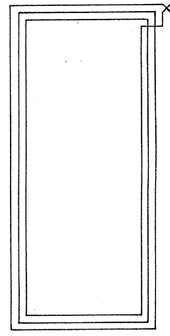
INSTALLATION OF MAGNETIC TRANSENSOR HEAD



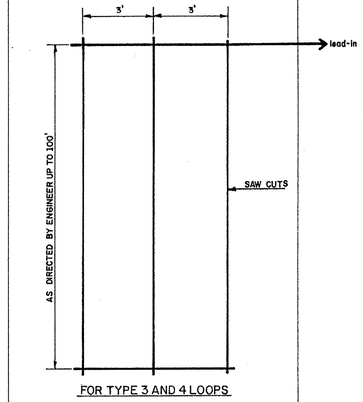
FOR TYPE 1 AND 2 LOOPS



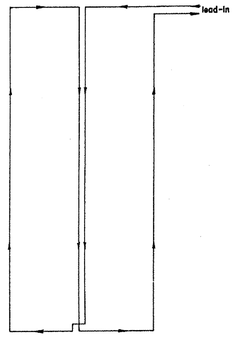
TYPE 1 LOOP



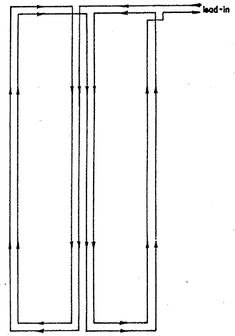
TYPE 2 LOOP



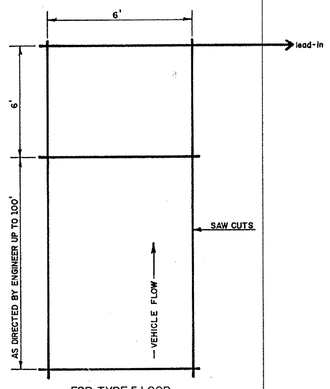
FOR TYPE 3 AND 4 LOOPS



TYPE 3 LOOP

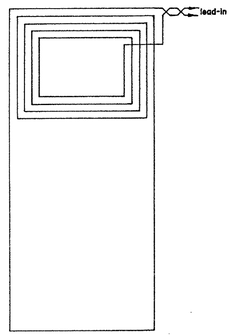


TYPE 4 LOOP



FOR TYPE 5 LOOP

WIRE SLOT CONSTRUCTION



TYPE 5 LOOP

NOTES:

1. The type and actual size of wire loop detector to be installed shall be as shown on the plans or as directed by the engineer.
2. Saw cuts for wire slot construction shall be extended beyond the corners so that the slot is full depth at turn points. The sharp inner corners shall be chipped off to provide a smooth turn for wire.

DETAILS FOR INSTALLING DETECTOR WIRE LOOPS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER T-3-1

LOOP DETECTORS AND MAGNETIC TRANSENSOR

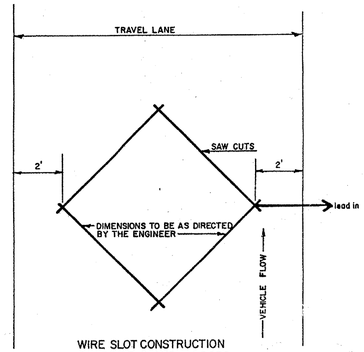
PREL. TRACING R.F.R. 10-7-77 DESIGN _____ CHKD.

RECOMMENDED 10/11, 19 77 R.E. Innsetta
CHIEF ENGINEER

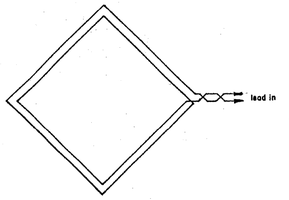
APPROVED 10/13, 19 77 R.D. Bevins
DIRECTOR OF HIGHWAYS

REVISIONS

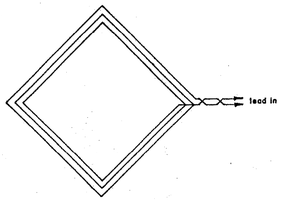
1. 4/24/79 Added type 6 and 7 loops R.F.R.



WIRE SLOT CONSTRUCTION FOR TYPE 6 AND 7 LOOPS



TYPE 6 LOOP



TYPE 7 LOOP

STATE OF DELAWARE
DEPARTMENT OF HIGHWAYS AND TRANSPORTATION

STANDARD SHEET NUMBER T-4

STREET OR ROAD NAME SIGNS

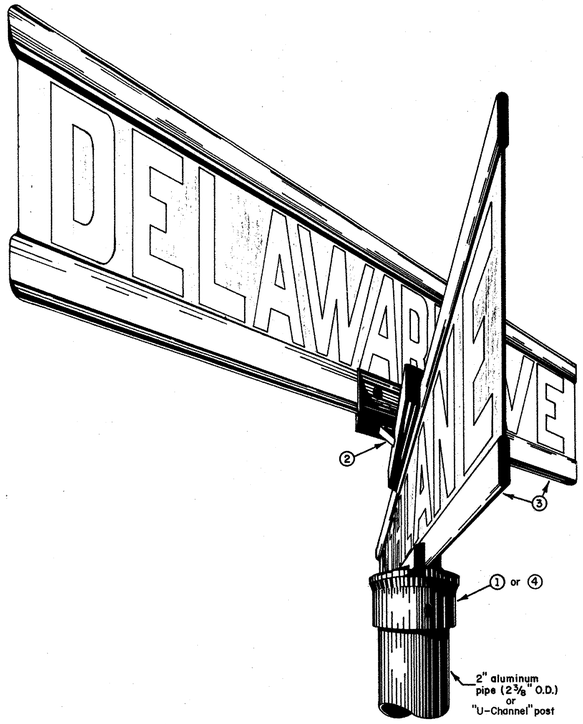
PREL. TRACING R.F.R. DESIGN R.T.C. CHKD. R.T.C.

RECOMMENDED 2/19 1976 R. E. Tousseth
CHIEF ENGINEER

APPROVED 2-19 1976 R. D. Taber
DIRECTOR OF HIGHWAYS

REVISIONS

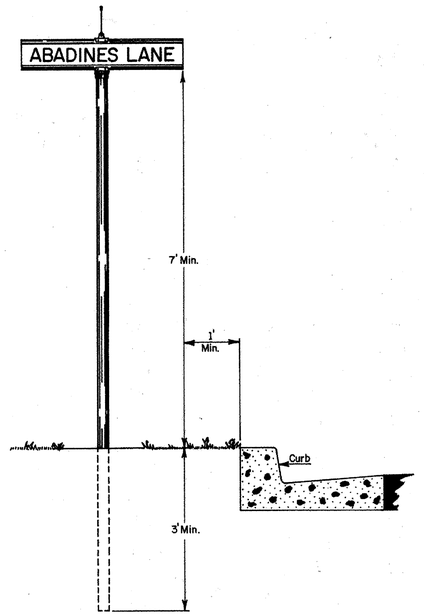
REMOVED 18"x18" FOOTING 11-23-77 R.F.R.



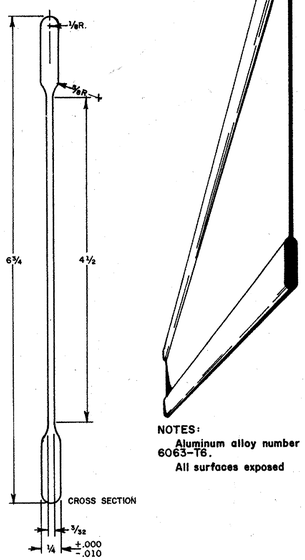
TYPICAL ASSEMBLY

STREET OR ROAD NAME SIGNS

Four way aluminum intersection sign having a 2"aluminum pipe post and a 4" silver reflectorized letters on a green background of reflectorized sheeting mounted on 6¾" aluminum sign panel blades.

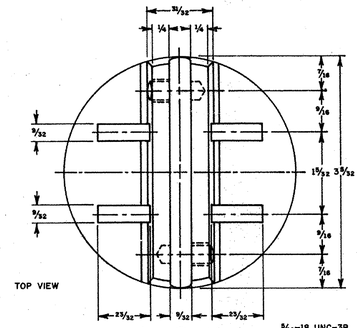


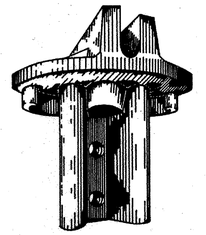
TYPICAL INSTALLATION

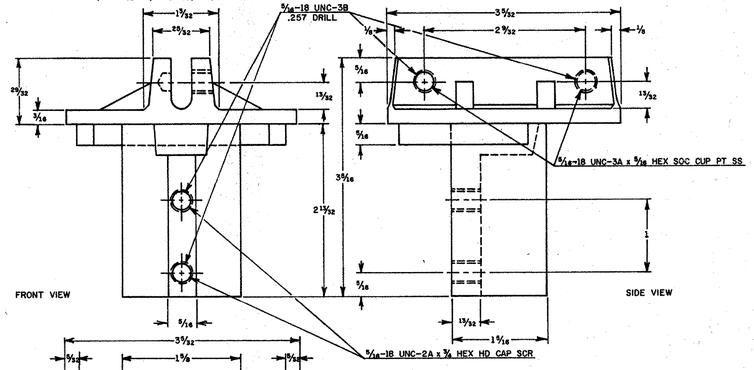


NOTES:
Aluminum alloy number 6063-T6.
All surfaces exposed

SIGN PANEL③ BLADE







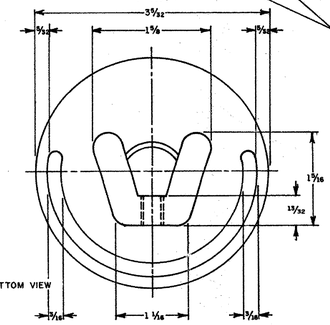
NOTES:

Surface finish to be as cast.

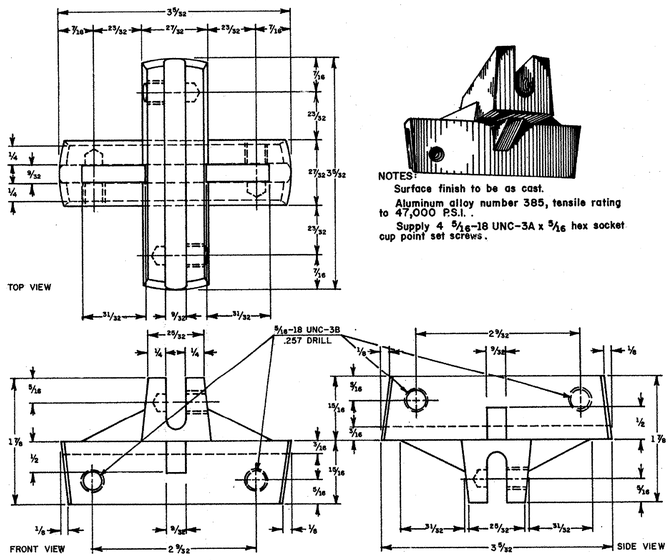
Aluminum alloy number 385, tensile rating to 47,000 P.S.I.

Supply 2 5/16-18 UNC-3A x 5/16 hex socket cup point set screws.

Supply 2 5/16-18 UNC-2A x ¾ hex head cap screws



SIGN TO "U-CHANNEL" POST④ CONNECTOR



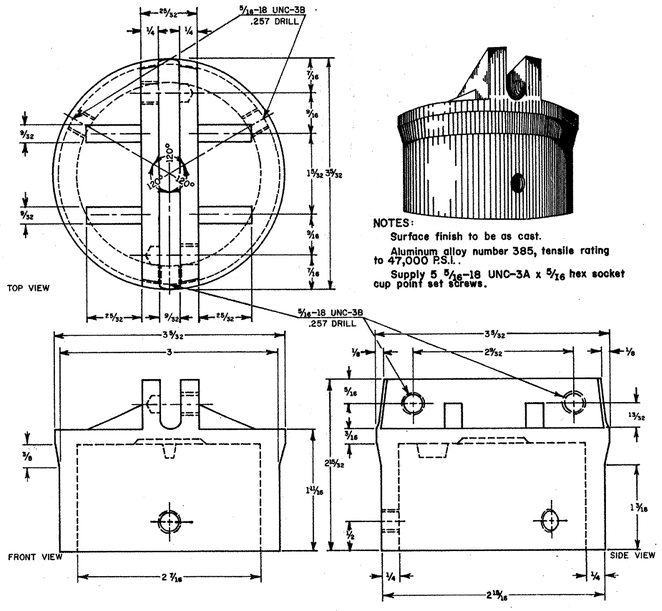
NOTES:

Surface finish to be as cast.

Aluminum alloy number 385, tensile rating to 47,000 P.S.I.

Supply 4 5/16-18 UNC-3A x 5/16 hex socket cup point set screws.

SIGN TO SIGN② CONNECTOR



NOTES:

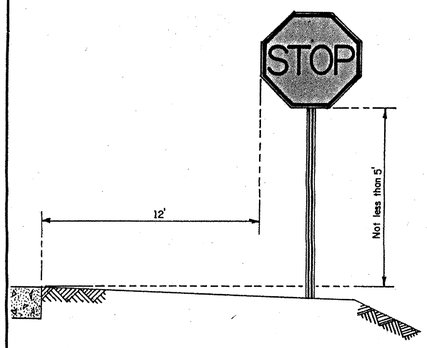
Surface finish to be as cast.

Aluminum alloy number 385, tensile rating to 47,000 P.S.I..

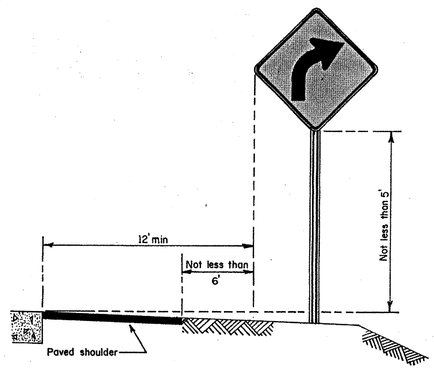
Supply 5 5/16-18 UNC-3A x 5/16 hex socket cup point set screws.

SIGN TO POST① CONNECTOR

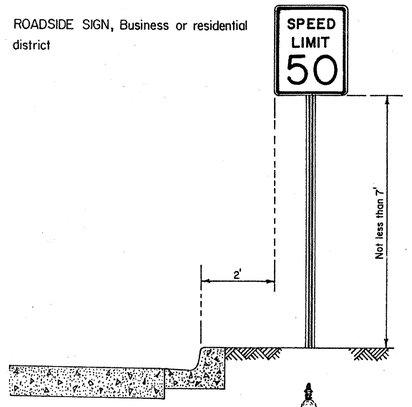
ROADSIDE SIGN, Rural district



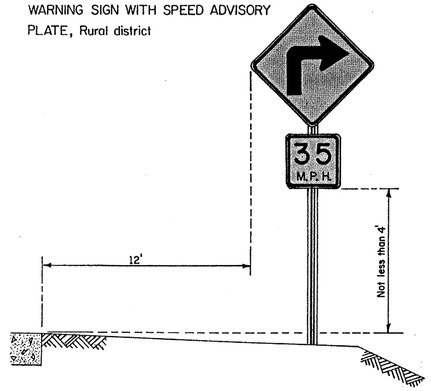
ROADSIDE SIGN, Rural district



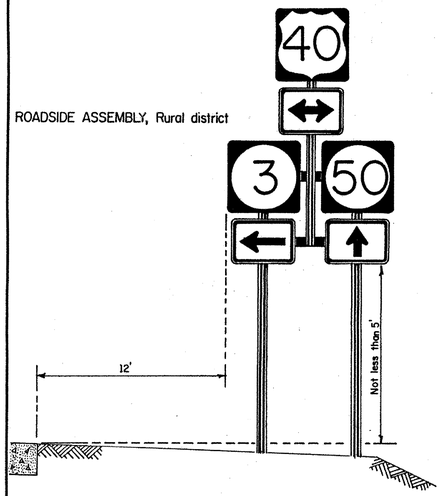
ROADSIDE SIGN, Business or residential district



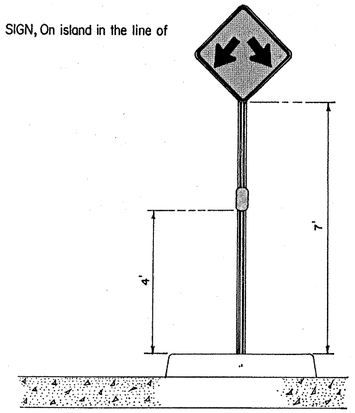
WARNING SIGN WITH SPEED ADVISORY PLATE, Rural district



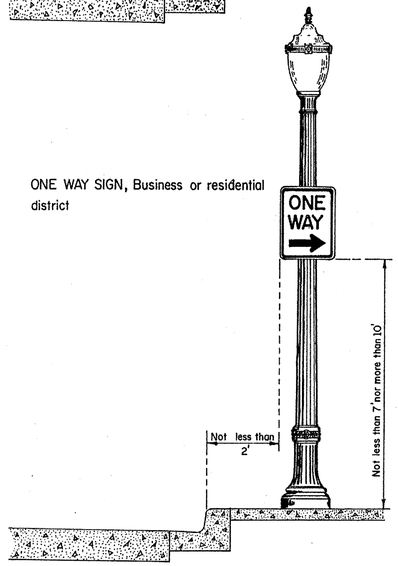
ROADSIDE ASSEMBLY, Rural district



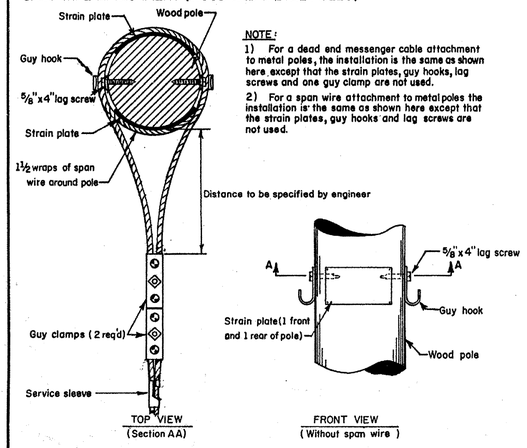
WARNING SIGN, On island in the line of traffic



ONE WAY SIGN, Business or residential district

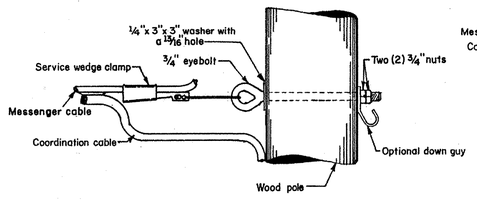


DEAD END MESSENGER CABLE ATTACHMENT (METAL POLES)
OR
SPAN WIRE ATTACHMENT (WOOD AND METAL POLES)

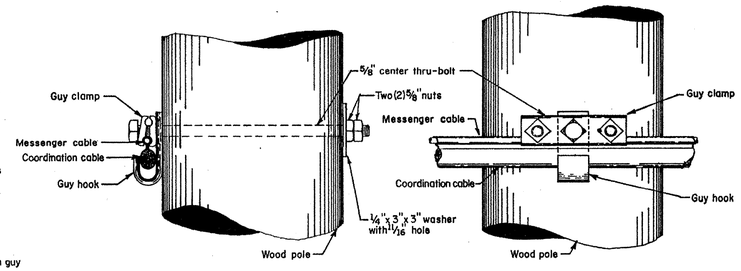


NOTE:
1) For a dead end messenger cable attachment to metal poles, the installation is the same as shown here except that the strain plates, guy hooks, lag screws and one guy clamp are not used.
2) For a span wire attachment to metal poles the installation is the same as shown here except that the strain plates, guy hooks and lag screws are not used.

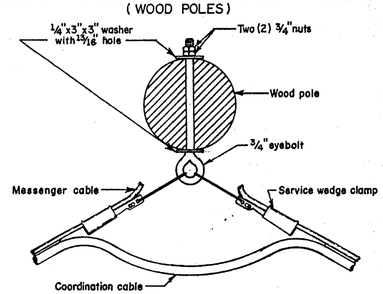
DEAD END MESSENGER CABLE ATTACHMENT (WOOD POLES)



STRAIGHT RUN INTERMEDIATE MESSENGER CABLE ATTACHMENT (WOOD POLES)



ANGULAR INTERMEDIATE MESSENGER CABLE ATTACHMENT
(WOOD POLES)



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER T-5

ROADSIDE SIGN PLACEMENT
AND
SPAN WIRE AND MESSENGER CABLE ATTACHMENTS

PREL. TRACING R.F.R. 4/24/79 DESIGN CHKD.

RECOMMENDED 5/2, 19 79 R. E. Tomasetti, CHIEF ENGINEER

APPROVED 5/2, 19 79 R. D. Bevin, DIRECTOR OF HIGHWAYS

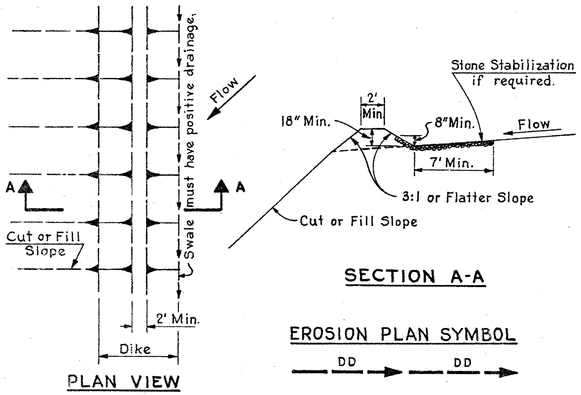
REVISIONS

NOTE:
The sign post size, weight and depth installed in the ground shall be as determined by the engineer.

DIETZGEN CO. 99206

TEMPORARY DIVERSION DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil with a general life expectancy of one year or less, constructed immediately above a cut or fill slope, that intercepts storm runoff from higher areas and diverts it away from exposed slopes to a stabilized outlet. Used to prevent excessive erosion until the permanent storm drainage features are installed and the slopes are stabilized.



EROSION PLAN SYMBOL

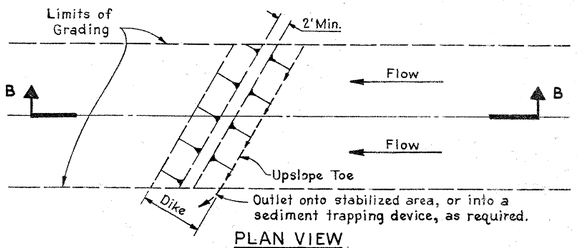
DD DD

NOTES:

1. All dikes shall be machine compacted.
2. The swale formed by the upslope toe of the dike must have positive drainage (minimum of 0.25% grade) to the outlet. This design does not apply when the grade of the swale is greater than 10% (maximum grade).
3. Where the slope of the swale is less than 2%, stabilization may not be required, but should be added if periodic inspection deems necessary. When the slope is from 2% to 5% the channel (flow area) should be stabilized; using Section 725, "Erosion Control, Excelsior Blanket, Net or Jute Mesh"; Section 725, "Chemical Erosion Control"; or "Stone Stabilization". Where the slope of the swale is greater than 5%; "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103 which is placed in a 3 inch thick layer and pressed into the soil, shall be used. The area to be stabilized by the stone shall be as shown by Section A-A above.
4. Runoff diverted from a protected or stabilized area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or unstable upland area shall be conveyed to a sediment trapping device such as a sediment trap or a sediment basin, or to an area that is protected by any of these practices.
5. Diversion dikes must be protected with Section 725, "Erosion Control, Seeding I" or Section 725, "Erosion Control, Seeding II" applied immediately after construction.
6. Periodic inspection and required maintenance shall be provided.

TEMPORARY INTERCEPTOR DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil or gravel, to remain for a period of usually less than one year, constructed across disturbed rights of way and similar sloping areas. Used to shorten the length of exposed slopes thereby reducing the potential for erosion by intercepting the storm runoff and diverting it to stabilized outlets until permanent stabilization of the slopes is established.



EROSION PLAN SYMBOL

ID ID

NOTES:

1. All dikes shall be machine compacted.
2. All interceptor dikes must have positive drainage to an outlet. The grade of the swale, formed at the upslope toe of the dike, shall be from 0.5% to 1.0%.
3. The top width may be wider and side slopes may be flatter if desired to facilitate crossing by construction traffic. The area of the construction crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, which is placed in two seperate layers each three inches thick. Each layer is compacted into the soil after placement.
4. The spacing of the interceptor dikes along the graded slope shall be as follows:

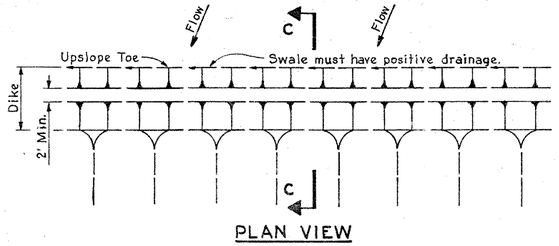
Maximum slope of area above dike	>10%	5 to 10%	< 5%
Distance between interceptor dikes	100 Feet	200 Feet	300 Feet

The field location may be adjusted as needed in order to utilize a stabilized safe outlet.

5. Interceptor dikes must have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin, when either the interceptor dike swale or the drainage area above the dike are not adequately stabilized.
6. When it is deemed necessary by the periodic inspections, the flow area of the swale shall be stabilized using "Stone Stabilization", which consist of a three inch thick layer of stone (Delaware Standard Gradation Size № 103) that is pressed into the soil. The area to be covered by the stone shall be as shown by Section A-A for Temporary Diversion Dikes
7. Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately after construction to protect the dike from erosion.
8. Periodic inspection and required maintenance shall be provided.

TEMPORARY PERIMETER DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil, life expectancy of one year or less, constructed at the perimeter of the site or disturbed area that is used to divert sediment laden storm runoff to an on-site trapping facility or to divert runoff from a stabilized upland area away from the construction area. These dikes shall remain in place until the construction site is permanently stabilized.



EROSION PLAN SYMBOL

PD PD

NOTES:

1. All dikes shall be machine compacted.
2. The grade of the swale formed at the upslope toe of the dike is dependent upon the topography, but must have positive drainage to an outlet. This design should not be used when the grade for the swale will be greater than 10% (maximum grade).
3. When the slope of the swale is less than 2%, stabilization may not be required; however, it should be added where periodic inspection deems necessary. When the slope is 2% or greater, stabilization shall be required. See Note 3 for Temporary Diversion Dike for details. The minimum area to be stabilized shall be the swale flow area.
4. Runoff diverted from a protected or stabilized area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment basin, sediment trap, or gravel outlet structure.
5. The dikes must be located far enough away from the disturbed area to permit machine regrading and cleanout.
6. Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately following construction to protect the dike.
7. Periodic inspection and required maintenance shall be provided.

APPROVED:
DATE:

DIRECTOR OF HIGHWAYS

RECOMMENDED:
DATE:

DEPUTY DIRECTOR OF HIGHWAYS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER EC-1

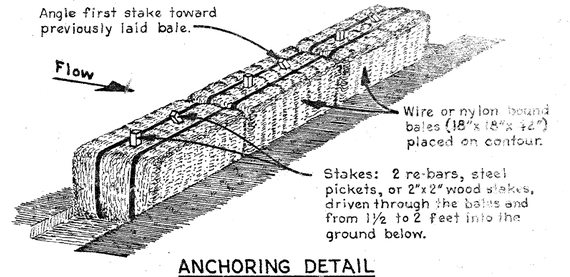
EROSION CONTROL DETAILS
TEMPORARY DIKES

PREL. TRACING WRJ DESIGN WRJ CHKD.

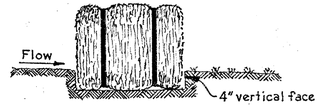
REVISIONS

TEMPORARY STRAW (or HAY) BALE DIKE
(DRAINAGE AREAS LESS THAN ½ ACRE)

A barrier installed across, or at the toe of a slope, that is used to intercept and detain small amounts of sediment from unprotected areas of less than one-half (½) acre. Straw bales must not be used on high sediment producing areas, above "high risk" areas, where water is concentrated in a channel, or where there is a possibility into sediment. They may be used where erosion would normally occur in the form of sheet erosion and where the length of the slope above the barrier is less than 100 feet.



ANCHORING DETAIL



EMBEDDING DETAIL

EROSION PLAN SYMBOL

SBD SBD

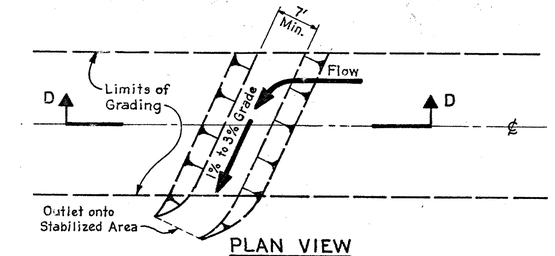
NOTES:

1. Bales shall be placed in a row with ends tightly abutting the adjacent bales.
2. Each bale shall be embedded in the soil a minimum of 4".
3. Bales shall be securely anchored in place by stakes or re-bars driven through the bales. The first stake in each bale shall be angled toward previously laid bale to force bales together.
4. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
5. Bales shall be removed when they have served their usefulness in order to prevent the blocking or impeding of storm flow or drainage.

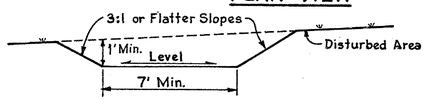
TEMPORARY INTERCEPTOR SWALE

(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary excavated drainageway located across disturbed areas or rights of way. Used to shorten the length of exposed slopes, thereby reducing the potential for erosion by intercepting the storm runoff and diverting it to a stabilized outlet or sediment trapping device. The swale shall remain in place until the disturbed areas are permanently stabilized.



PLAN VIEW



SECTION D-D

EROSION PLAN SYMBOL

IS — IS

NOTES:

1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.
2. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free of bank projections or other irregularities which will impede normal flow. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the swale. Fills shall be compacted to prevent unequal settlement that will cause damage in the completed swale.
3. Interceptor swales shall have a minimum grade of one percent and the bottom of the swale shall be level.
4. The spacing of the interceptor swales along the graded slope shall be as follows:

Maximum slope of area above swale	> 10%	5 to 10%	< 5%
Distance between interceptor swales	100 Feet	200 Feet	300 Feet

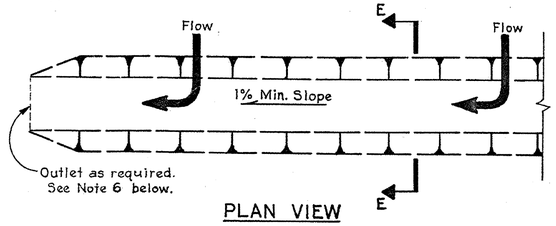
The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

5. Interceptor swales must have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin.
6. When it is deemed necessary by the periodic inspections, the flow area of the swale shall be stabilized using "Stone Stabilization", which consists of a three inch thick layer of stone (Delaware Standard Gradation Size № 103) that is pressed into the soil. The lining shall extend across the bottom and up both sides of the channel to a height of at least 8 inches vertically above the bottom.
7. At all points where several or more vehicle crossings per day will be made, the side slopes may be made flatter to allow construction traffic to cross. The entire swale area in the vicinity of the crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, that is placed in two seperate layers each three inches thick. Each layer is compacted into the soil after placement.
8. Periodic inspection and required maintenance shall be provided.

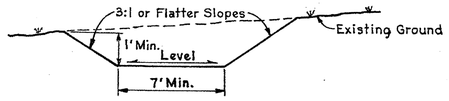
TEMPORARY PERIMETER SWALE

(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary excavated drainageway, located along the perimeter of the site or disturbed areas, that is used to prevent offsite storm runoff from entering the disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area. The swale shall remain in place until the disturbed area is permanently stabilized.



PLAN VIEW



SECTION E-E

EROSION PLAN SYMBOL

PS — PS

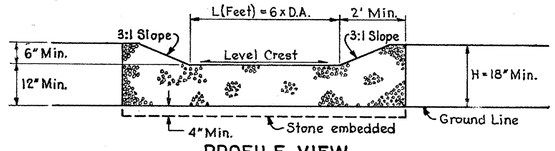
NOTES:

1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.
2. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free of bank projections or other irregularities which will impede normal flow. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the swale. Fills shall be compacted to prevent unequal settlement that will cause damage in the completed swale.
3. Perimeter swales shall have a minimum grade of one percent and the bottom of the swale shall be level.
4. Runoff diverted from a protected or stabilized upland area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment basin, sediment trap, or to an area that is protected by any of these practices.
5. Where the slope of the swale is less than 2%, stabilization may not be required, but should be added if deemed necessary by the periodic inspections. When the slope is from 2% to 5% the channel (flow area) should be stabilized with Section 725, "Erosion Control, Excelsior Blanket, Net or Jute Mesh"; Section 725, "Chemical Erosion Control"; or "Stone Stabilization". Where the slope of the swale is greater than 5%; "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103 which is placed in a 3 inch thick layer and then is pressed into the soil, shall be used. The lining shall extend across the bottom and up both sides of the channel to a height of at least 8" vertically above the bottom.
6. Periodic inspection and required maintenance shall be provided.

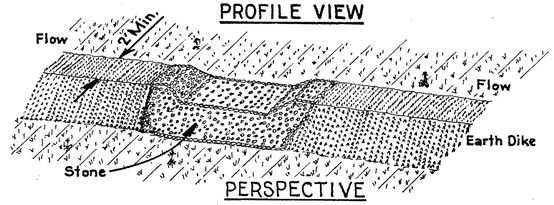
STONE OUTLET STRUCTURE

(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary crushed stone dike installed in conjunction with and as a part of a diversion dike, interceptor dike, or perimeter dike that is used to provide a protected outlet for the dike. They apply to any point of discharge where there is a need to dispose of runoff at a protected outlet or to diffuse concentrated flow for the duration of the period of construction. Stone outlet structures also allow the area behind the dike to dewater.



PROFILE VIEW



PERSPECTIVE

EROSION PLAN SYMBOL

SOS

L=

NOTES:

1. The stone shall be crushed stone. Gravel may be used only when crushed stone is not available. The stone shall meet Delaware Standard Gradation Size № 103.
2. The crest of the stone dike shall be at least six inches lower than the lowest elevation of the top of the earth dike. The crest shall be level.
3. The stone outlet structure shall be embedded into the soil a minimum of four inches.
4. The minimum length, in feet, of the crest of the stone outlet structure shall be equal to six times the number of acres of the contributing drainage area.
5. The stone outlet structure shall be inspected after each rain, and the stone shall be replaced when the structure ceases to function as intended due to silt accumulation among the stone, washout, construction traffic damage, etc.
6. When the drainage area above the structure is not stabilized, a sediment basin or a sediment trap must be used in conjunction with the stone outlet structure.

APPROVED:
DATE:

DIRECTOR OF HIGHWAYS

RECOMMENDED:
DATE:

DEPUTY DIRECTOR OF HIGHWAYS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER EC-2

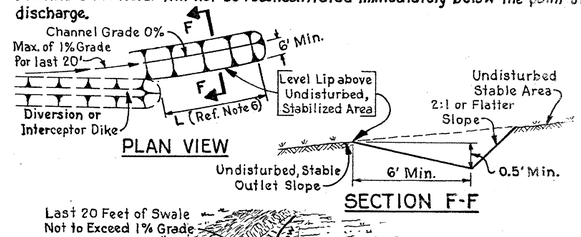
EROSION CONTROL DETAILS
TEMPORARY SWALES and OUTLET STRUCTURES

PREL. TRACING WRJ DESIGN WRJ CHK'D.

REVISIONS

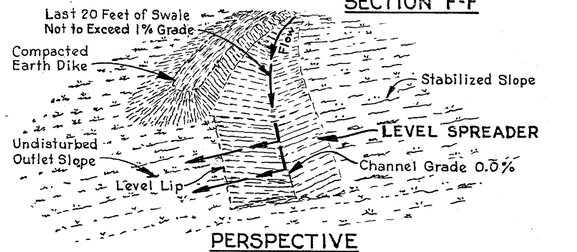
TEMPORARY LEVEL SPREADER

An outlet that is constructed at zero percent grade across the slope whereby concentrated runoff may be discharged at non-erosive velocities onto an undisturbed area that is stabilized by existing vegetation. Used to convert a concentrated flow of sediment-free storm runoff into sheet flow and to outlet it onto areas that are stabilized by existing vegetation in a manner that does not cause erosion. Should be used only in those situations where the spreader can be constructed on undisturbed soil, where the area directly below the level lip is stabilized by existing vegetation, where the drainage area above the spreader is stabilized by existing vegetation, and where the water will not be reconcentrated immediately below the point of discharge.



PLAN VIEW

SECTION F-F



PERSPECTIVE

EROSION PLAN SYMBOL

L=

NOTES:

1. Level spreaders shall be constructed under the direct supervision of the Engineer.
2. Construct level lip on zero percent grade to insure uniform spreading of sediment-free runoff (converting channel flow to sheet flow).
3. Level spreader shall be constructed on undisturbed soil (not on fill).
4. The entrance channel shall not exceed a 1% grade for at least 20 feet before entering the spreader.
5. Storm runoff converted to sheet flow shall outlet onto stabilized areas. Water shall not be reconcentrated immediately below the point of discharge.
6. Spreader length will be determined by estimating Q_{10} (10 year frequency storm flow) and selecting the appropriate length from table below:

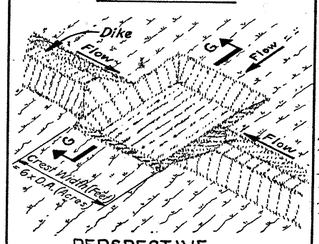
Design Q_{10} (c.f.s.)	Maximum Length L (feet)
Up to 10	15
11 to 20	20
21 to 30	26
31 to 40	36
41 to 50	44

7. Periodic inspection and required maintenance shall be provided.

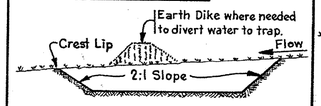
EARTH OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

An earth outlet sediment trap consists of a basin formed by excavation and/or embankment. The discharge point for the trap is over a crest or by an outlet channel that are cut into natural ground.

EXCAVATED EARTH OUTLET SEDIMENT TRAP

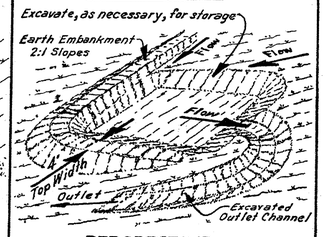


PERSPECTIVE

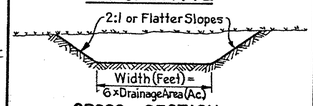


SECTION G-G

EMBANKMENT EARTH OUTLET SEDIMENT TRAP



PERSPECTIVE



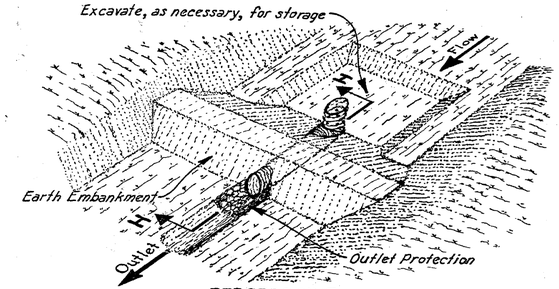
CROSS SECTION OUTLET CHANEL

NOTES:

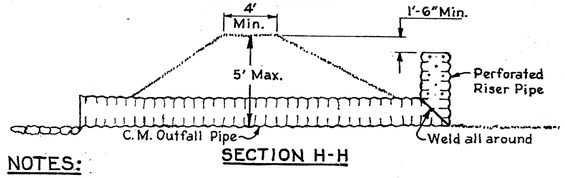
1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The crest of the earth outlet shall be level. The outlet width (feet) shall be equal to 6 times the drainage area (acres). If an embankment is used to form the sediment trap, the outlet crest shall be at least one foot below the top of the embankment. The outlet shall be free of any restrictions to flow.
4. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
5. Sediment shall be removed and the trap restored to its original dimensions, when the sediment has accumulated to one-half of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that it will not erode.
6. The structure shall be inspected after each rain and repairs shall be made when required.
7. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
8. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

PIPE OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A pipe outlet sediment trap consists of a basin formed by an embankment or by excavation and embankment. The outlet for the trap is a perforated riser pipe with an outfall pipe through the embankment.



PERSPECTIVE



SECTION H-H

NOTES:

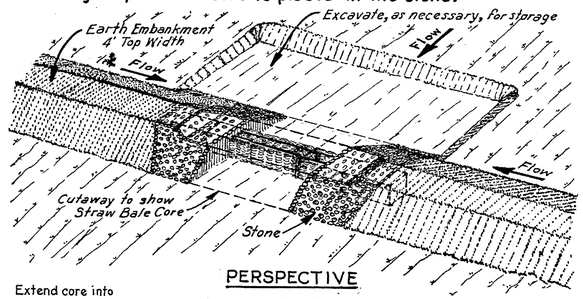
1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The top of the embankment shall be at least 1½ feet above the crest of the riser.
4. The outfall pipe and perforated riser shall be made from corrugated metal. All pipe connections shall be watertight.
5. The diameter of the riser shall be the same or larger than the diameter of the outfall pipe. At least the top ⅔ of the riser shall be perforated with ½ inch diameter holes spaced 8 inches vertically and 10 to 12 inches horizontally. Select the required diameter for the outfall pipe from the following table:

Maximum Drainage Area (acres)	1	2	3	4	5
Minimum Pipe Diameter (Inches)	12	18	21	24	30

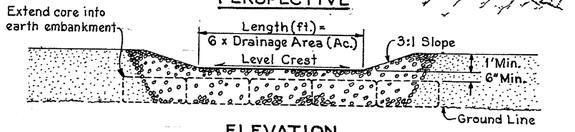
6. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
7. Fill material around the outfall pipe shall be hand compacted in 4-inch layers. A minimum of 2 feet of hand compacted backfill shall be placed before construction equipment will be permitted to operate or cross over the pipe.
8. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
9. The structure shall be inspected after each rain and repairs shall be made when required.
10. Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to ½ of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that erosion will not occur.
11. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

STONE OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A stone outlet sediment trap consists of a basin formed by an embankment or by excavation and embankment. The outlet for the trap is over a level stone section. The stone outlet for a sediment trap differs from that for a stone outlet structure because of the intentional ponding of water behind the stone. To provide for the ponding, a relatively impervious core is placed in the stone.



PERSPECTIVE



ELEVATION

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The crest of the stone outlet shall be level and at least 1 foot below the top of the embankment. The crest width (feet) of the outlet shall be equal to 6 times the drainage area (acres).
4. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments, used to form sediment traps, shall be 4 feet.
5. The crushed stone used to form the outlet shall meet Delaware Standard Gradation Size № 103. Gravel meeting the above gradation requirement may be used if crushed stone is not available.
6. The drawings above show straw bales being used to form the core. The bales shall be anchored in accordance with the details for Straw Bale Dike, shown on Standard Sheet Number EC-1. Other materials (timber, concrete block, etc.) may be used for the core. All core material must be firmly anchored to the ground. The core shall be covered by a minimum of 6 inches of stone.
7. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
8. The structure shall be inspected after each rain and repairs shall be made when required.
9. Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to ½ of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that erosion will not occur.
10. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

APPROVED:
DATE:

DIRECTOR OF HIGHWAYS

RECOMMENDED:
DATE:

DEPUTY DIRECTOR OF HIGHWAYS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER EC-3
EROSION CONTROL DETAILS
SEDIMENT TRAPS

PREL. TRACING WRJ DESIGN WRJ CHK'D.
REVISIONS

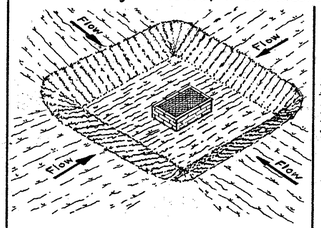
GENERAL NOTES FOR SEDIMENT TRAPS

A sediment trap is a temporary basin of limited capacity formed by excavation and/or embankment, that is used to intercept sediment laden storm runoff and to trap and retain the sediment in order to protect drainageways, properties and rights of way below the sediment trap from sedimentation. They are usually installed in a drainageway, at a storm drainage inlet, or at other points of discharge from a disturbed area.

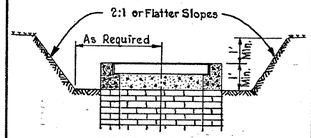
1. The drainage area for a sediment trap shall not exceed 5 acres.
2. The sediment trap should be located to obtain the maximum storage benefit from the terrain, for ease of cleanout of the trapped sediment and to minimize interference with construction activities.
3. The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 1,800 cubic feet per acre of drainage area. The volume of the trap shall be calculated using standard mathematical procedures. The volume of a natural basin may be approximated by the equation; Volume (cu. ft.) = 0.4 x surface area (sq. ft.) x maximum depth (ft.).
4. All embankments for sediment traps shall not exceed 5 feet in height, as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum top width of 4 feet.
5. There are 4 types of outlets for sediment traps. Each sediment trap is named according to the type of outlet that it has. Each of the types have different design criteria and are discussed seperately. The outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the trap and that erosion of the outlet does not occur.
6. A trap may have several different outlets with each outlet conveying part of the flow based on the criteria for each outlet type, and the combined outlet capacity shall be adequate to carry the total required flow. For example, a 12 foot earth outlet (adequate for 2 acres) and a 12 inch diameter pipe outlet (adequate for 1 acre) could be used for a three acre drainage area.
7. There is no standard symbol for a sediment trap. Each type shall be delineated on the Erosion Plan in such a manner that it will not be confused with any other features. Each trap in the plans shall be numbered consecutively and a summary table (on the same plan sheet) shall show the following information:
   a) type of trap
   b) size of outlet
   c) trap dimensions
   d) embankment height and depth of excavation
   e) drainage area.

STORM INLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A storm inlet sediment trap consist of a basin formed by excavation or by natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet wall. An inlet located in a median swale or a side ditch of the roadway might use the inlet opening as an outlet. A pavement inlet in a curbed section would require a temporary opening. The trap should be out of the roadway so as not to interfere with construction. Placing the trap back of the curb and diverting water from the roadway to the trap is one means of doing this.

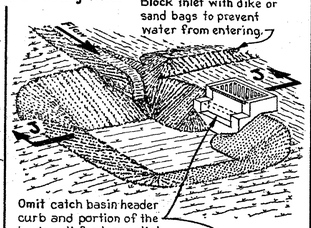


PERSPECTIVE

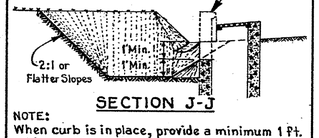


CROSS SECTION

MEDIAN DRAIN



PERSPECTIVE



SECTION J-J

NOTE:
When curb is in place, provide a minimum 1 ft. wide opening in the curb or use a sand bag dam to force water over the curb to the trap.

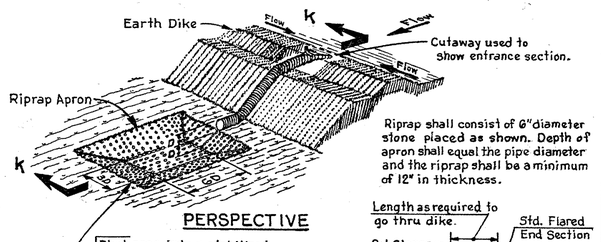
CURB DRAIN

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The outlet crest shall be at least 1 foot below the top of any embankment, or in the case of excavation, at least 1 foot below the ground adjacent to the trap.
4. The capacity of the outlet shall be based on the size of the catch basin outlet pipe. Select the allowable drainage area from the table in Note 5 under Pipe Outlet Sediment Traps on Standard Sheet Number EC-3.
5. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
6. The structure shall be inspected after each rain and repairs shall be made when required.
7. Sediment shall be removed and the trap restored to its original dimensions, when the sediment has accumulated to ½ the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that it will not erode.
8. Construction operations shall be carried out in such a manner that erosion and water polution are minimized.
9. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.
10. See also the General Notes for Sediment Traps on Standard Sheet EC-3.

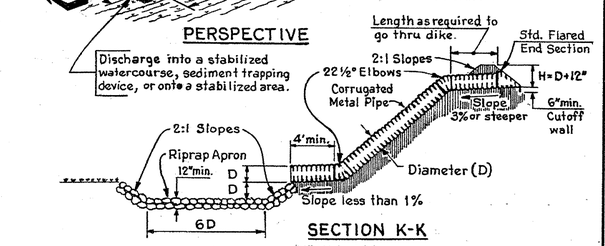
GRADE STABILIZATION STRUCTURE
RIGID PIPE SLOPE DRAINS
(DRAINAGE AREA: 5 ACRES OR LESS)

A rigid pipe with a prefabricated flared entrance section, temporarily placed to extend from the top to the bottom of a slope, used to convey surface runoff safely down the slope without causing erosion. Pipe slope drains are to be used whenever concentrated flows of surface runoff are to be conveyed down a cut or fill slope in order to prevent erosion.



Riprap shall consist of 6"diameter stone placed as shown. Depth of apron shall equal the pipe diameter and the riprap shall be a minimum of 12" in thickness.

PERSPECTIVE



SECTION K-K

EROSION PLAN SYMBOL

RPSD-Diameter Example: RPSD-12 = Rigid Pipe Slope Drain with 12" C.M. Pipe.

NOTES:

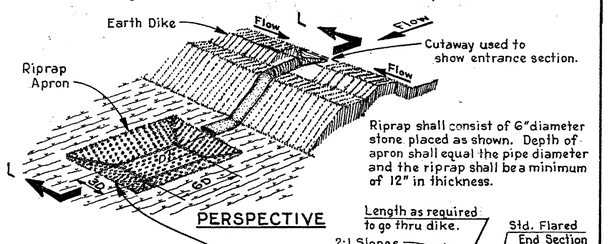
1. The entrance section and the inlet pipe shall have a slope of 3% or steeper.
2. The top of the earth dike over the inlet pipe and of all dikes carrying water to the slope drain shall be at least 1 foot higher at all points than the top of the inlet pipe.
3. The pipe shall be corrugated metal pipe with water tight connecting bands at all joints.
4. A riprap apron shall be provided at the outlet. The stone shall have a minimum dimension of 6" and shall be placed in a layer at least 12" in thickness, to the lines and grades shown by the drawing above.
5. The soil around and under the inlet pipe and entrance section shall be hand tamped in 4" lifts to the top of the earth dike.
6. Pipe slope drains are to be sized in accordance with the following table:

Maximum Drainage Area (acres)	0.5	1.5	2.5	3.5	5.0
Minimum Pipe Diameter (inches)	12	18	21	24	30

7. Follow-up inspection and any needed maintenance shall be performed after each storm.

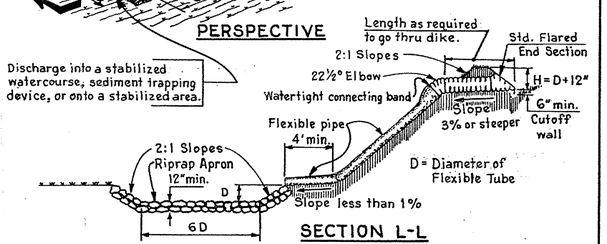
GRADE STABILIZATION STRUCTURE
FLEXIBLE PIPE SLOPE DRAINS
(DRAINAGE AREA: 5 ACRES OR LESS)

A flexible tubing with a rigid pipe and prefabricated flared entrance section, temporarily placed to extend from the top to the bottom of a slope, used to convey surface runoff safely down the slope without causing erosion. Pipe slope drains are to be used whenever concentrated flows of surface runoff are to be conveyed down a cut or fill slope in order to prevent erosion.



Riprap shall consist of 6"diameter stone placed as shown. Depth of apron shall equal the pipe diameter and the riprap shall be a minimum of 12" in thickness.

PERSPECTIVE



SECTION L-L

EROSION PLAN SYMBOL

FPSD-Diameter Example: FPSD-18 = Flexible Pipe Slope Drain with 18" C.M. Pipe inlet section and 18" dia. flexible tubing.

NOTES:

1. The entrance section and the inlet pipe shall have a slope of 3% or steeper.
2. The top of the earth dike over the inlet pipe and of all dikes carrying water to the slope drain shall be at least 1 foot higher at all points than the top of the inlet pipe.
3. The inlet pipe shall be corrugated metal pipe with water tight connecting bands at all joints.
4. The flexible tubing shall be the same diameter as the inlet pipe and shall be constructed of a durable material with hold-down grommets spaced 10' on centers.
5. The flexible tubing shall be securely fastened to the corrugated metal pipe with metal strapping or watertight connecting collars.
6. The flexible tubing shall be securely anchored to the slope by staking at the grommets provided.
7. A riprap apron shall be provided at the outlet. The stone shall have a minimum dimension of 6" and shall be placed in a layer at least 12" in thickness, to the lines and grades shown by the drawing above.
8. The soil around and under the inlet pipe and entrance section shall be hand tamped in 4" lifts to the top of the earth dike.
9. Pipe slope drains are to be sized in accordance with the following table:

Maximum Drainage Area (acres)	0.5	1.5	2.5	3.5	5.0
Minimum Pipe Diameter (inches)	12	18	21	24	30

10. Follow-up inspection and any needed maintenance shall be performed after each storm.

APPROVED:
DATE:

DIRECTOR OF HIGHWAYS

RECOMMENDED:
DATE:

DEPUTY DIRECTOR OF HIGHWAYS

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD SHEET NUMBER EC-4

EROSION CONTROL DETAILS
SEDIMENT TRAPS AND GRADE STABILIZATION STRUCTURES

PREL. TRACING WRJ DESIGN WRJ CHKD.

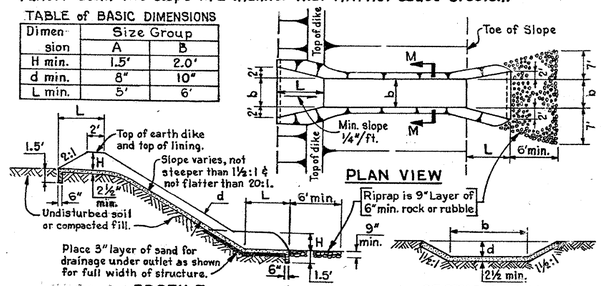
REVISIONS

GRADE STABILIZATION STRUCTURE
PAVED CHUTE OR FLUME
(DRAINAGE AREA: 36 ACRES OR LESS)

A temporary channel lined with bituminous concrete, Portland cement concrete, or comparable non-erodible material, placed to extend from the top of a slope to the bottom of a slope, that is used to convey concentrated flow of surface runoff down the slope in a manner that will not cause erosion.

TABLE of BASIC DIMENSIONS

Dimension	Size Group A	Size Group B
H min.	1.5'	2.0'
d min.	8"	10"
L min.	5'	6'



EROSION PLAN SYMBOL

PCF-Size Group, Bottom Width Example: PCF-A2 = Paved chute or flume, Size Group A with a 2 ft. bottom width (b). The selected size shall be shown on the erosion plan.

NOTES:

1. The structure shall be placed on undisturbed soil or on well compacted fill.
2. The cut or fill slope shall not be steeper than 1½:1 and shall not be flatter than 20:1.
3. The top of the earth dike at the entrance and of all dikes carrying water to the entrance shall not be lower at any point than the top of the lining at the entrance to the structure.
4. The lining at the entrance to the structure shall extend the distance H above the lining crest as shown in the drawing above.
5. The lining shall be placed beginning at the lower end and proceeding up the slope to the upper end. The lining shall be well compacted and free of voids and have a reasonably smooth surface finish.
6. The entrance floor at the upper end of the structure shall be sloped toward the outlet at a rate of ¼ to ½ inch per foot.
7. The cutoff walls at the entrance and discharge aprons shall be continuous with the lining.
8. The lining shall consist of Portland cement concrete, bituminous concrete, or comparable non-erodible material.
9. An energy dissipator of adequate design shall be used at the outlet to prevent erosion.
10. Chutes or flumes are divided into two size groups, which have basic dimensions as shown by the tabulation in the drawing above. Each size group has various bottom widths and allowable drainage areas as shown below:

Size	Bottom Width b, feet	Max. D.A. acres
A-2	2	5
A-4	4	8
A-6	6	11
A-8	8	14
A-10	10	18

Size	Bottom Width b, feet	Max. D.A. acres
B-4	4	14
B-6	6	20
B-8	8	25
B-10	10	31
B-12	12	36

If a minimum of 75% of the drainage area will have a good grass or woodland cover throughout the life of the structure, the drainage areas listed above may be increased by 50%. If a minimum of 75% of the drainage area will have a good mulch cover throughout the life of the structure, the drainage areas listed above may be increased by 25%. Structures of size group B shall have their outfall velocity checked for erosion potential downstream.