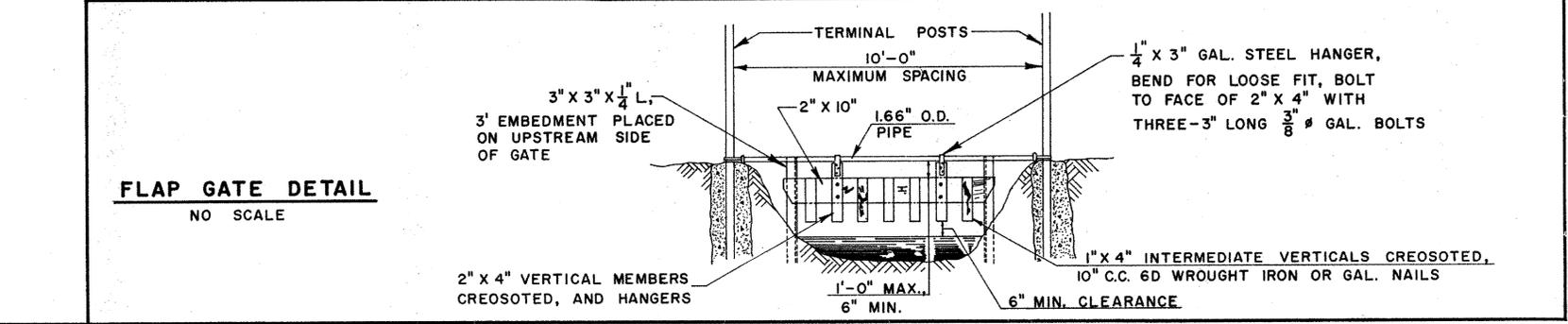
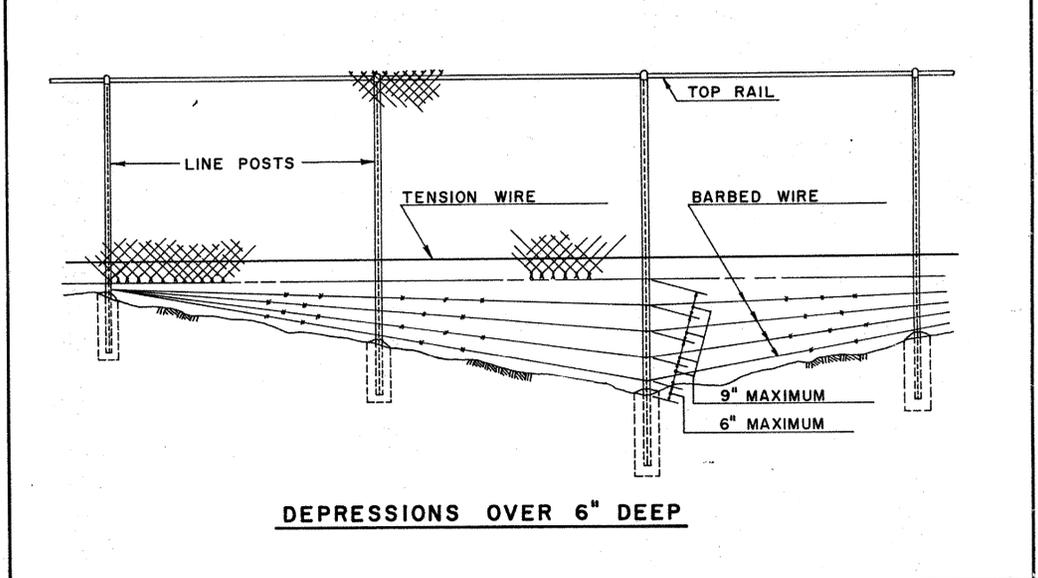
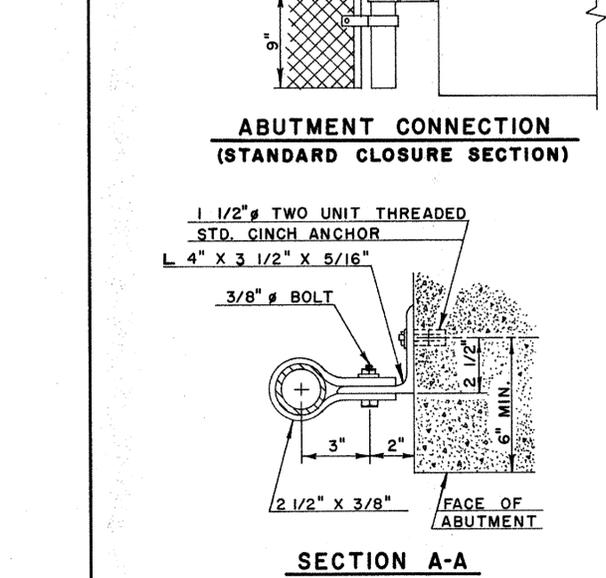
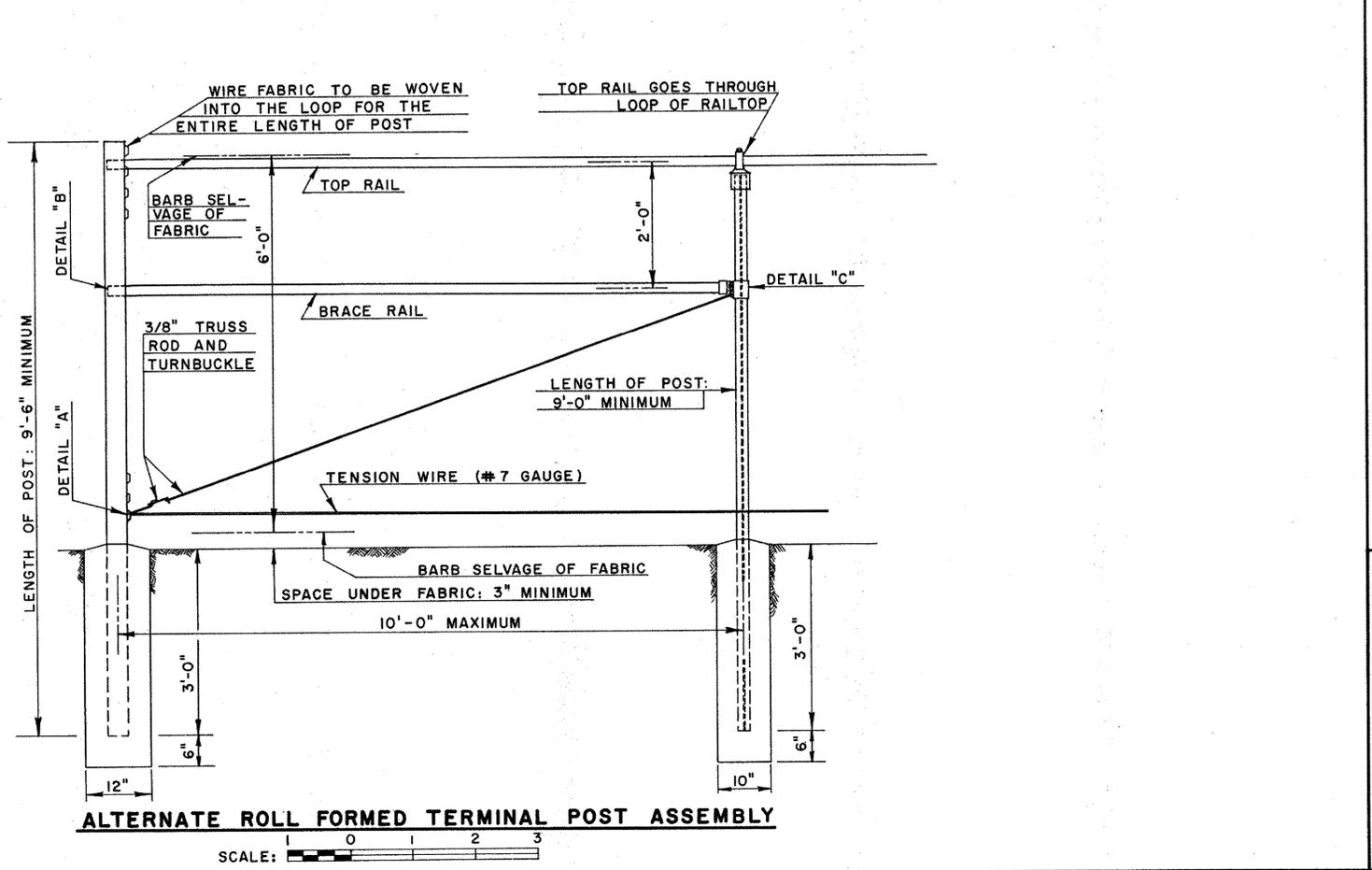
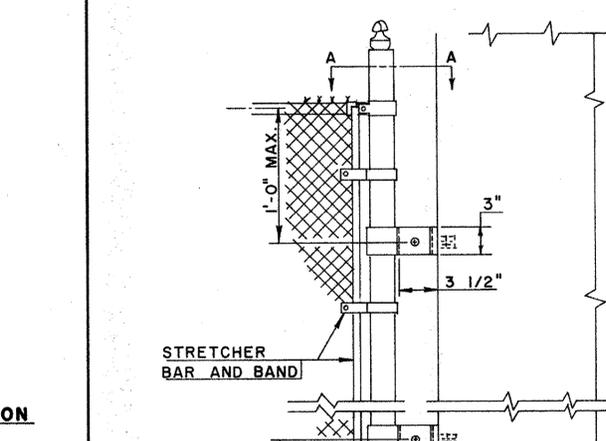
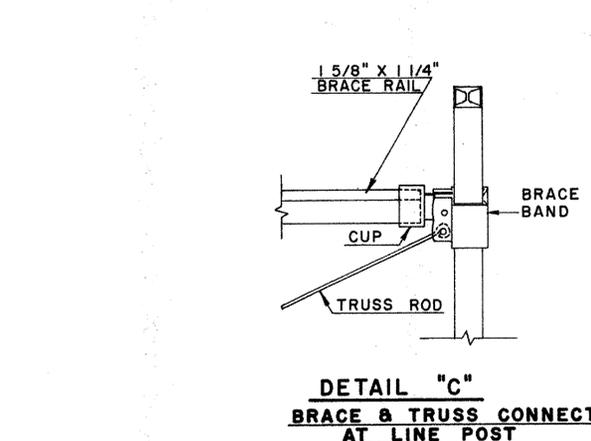
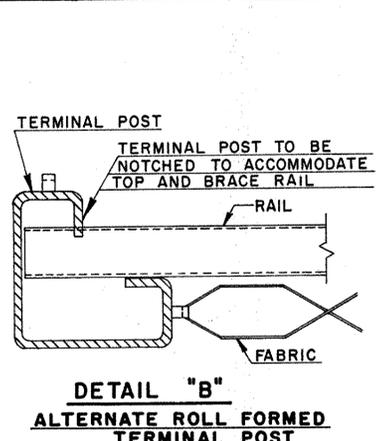
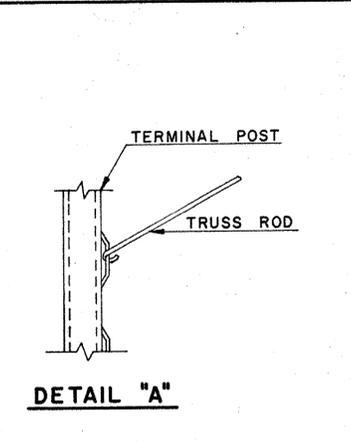
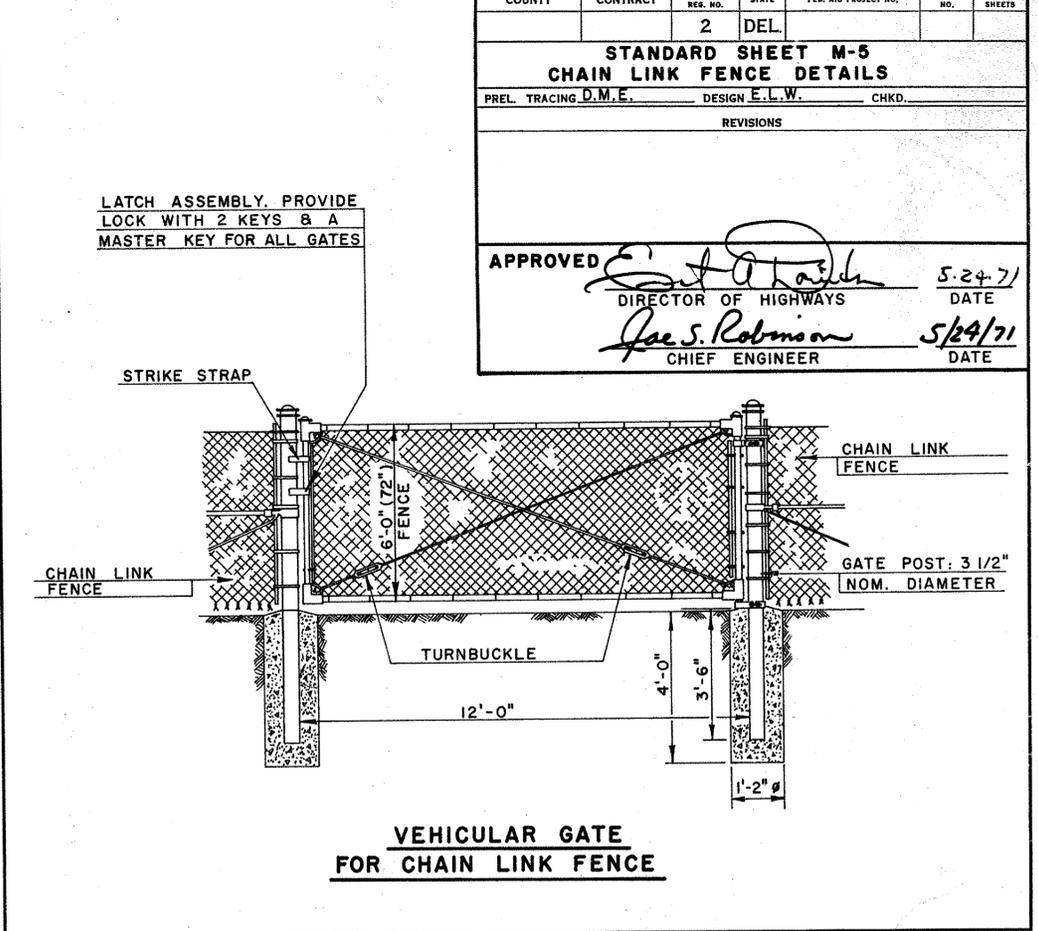
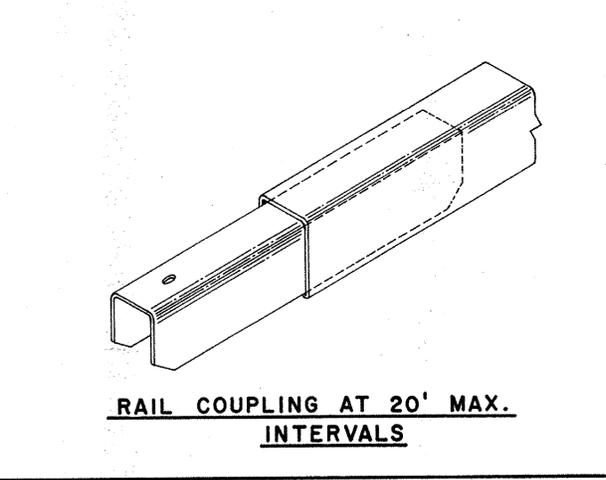
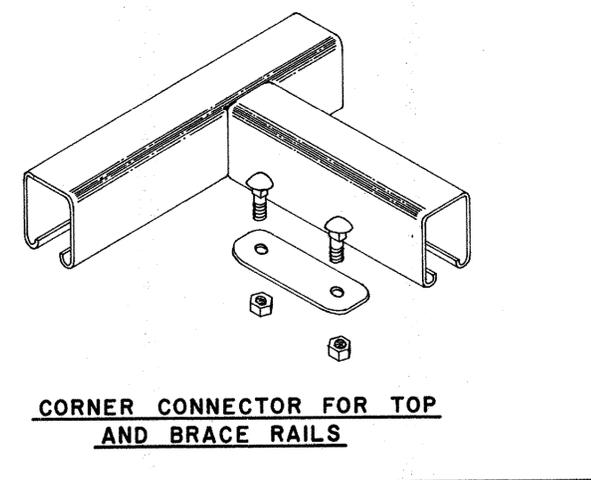
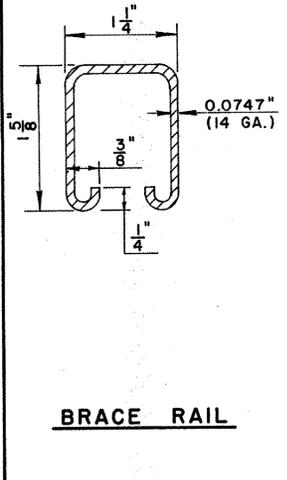
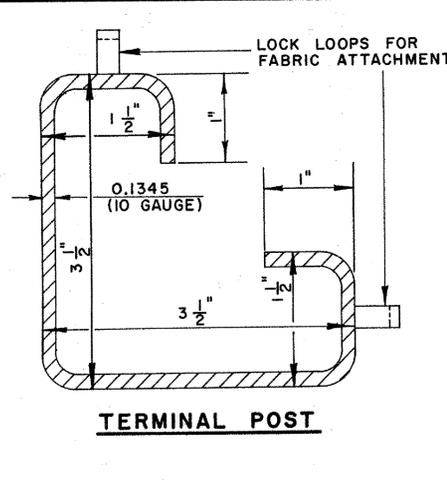


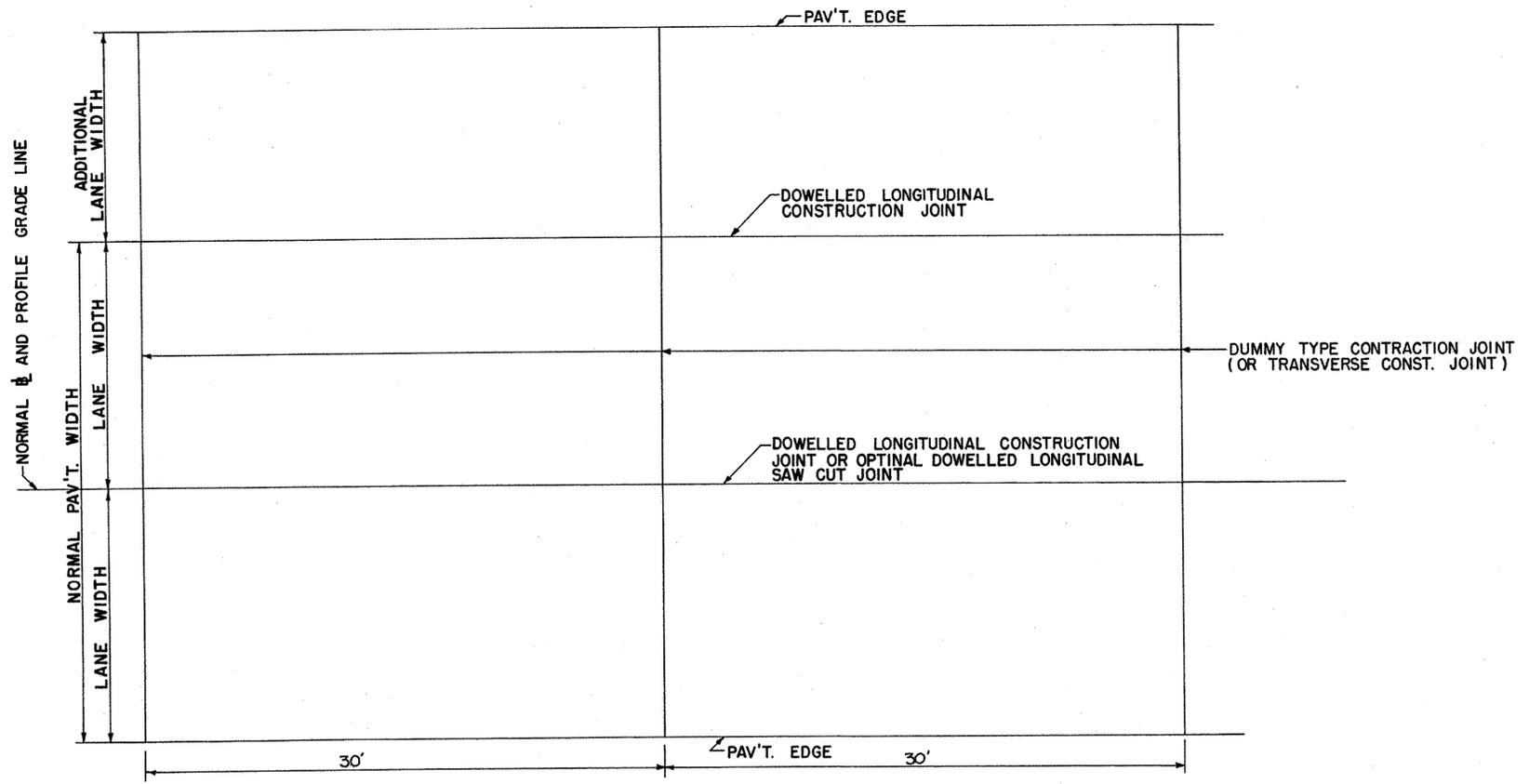


COUNTY	CONTRACT	F. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	2	DEL.				
<b>STANDARD SHEET M-5</b>						
<b>CHAIN LINK FENCE DETAILS</b>						
PREL. TRACING D.M.E.		DESIGN E.L.W.		CHKD.		
REVISIONS						
APPROVED <i>[Signature]</i>					5-24-71	DATE
DIRECTOR OF HIGHWAYS						
<i>[Signature]</i>					5/24/71	DATE
CHIEF ENGINEER						

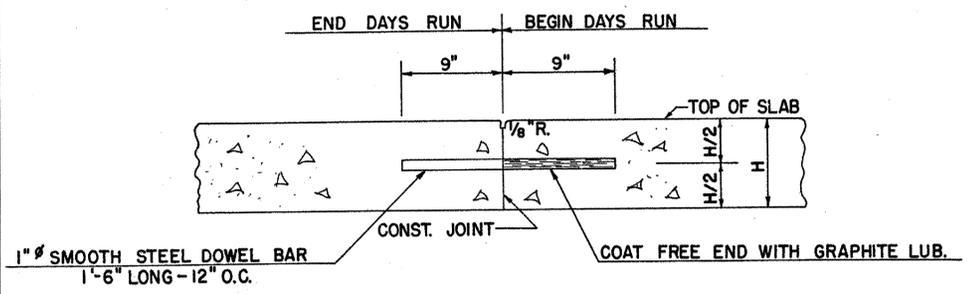




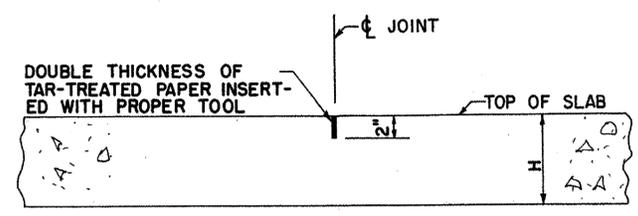
COUNTY	CONTRACT	F. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	2		DEL.			
<b>STANDARD SHEET P-2</b>						
<b>P.C.C. BASE COURSE WITH CRACK CONTROL</b>						
PREL. TRACING H.R.C.		DESIGN J.E.R.		CHKD. F.L.W.		
REVISIONS						
APPROVED <i>[Signature]</i> 6-22-70 DIRECTOR OF OPERATIONS DATE						
Dee S. Robinson 4/22/70 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

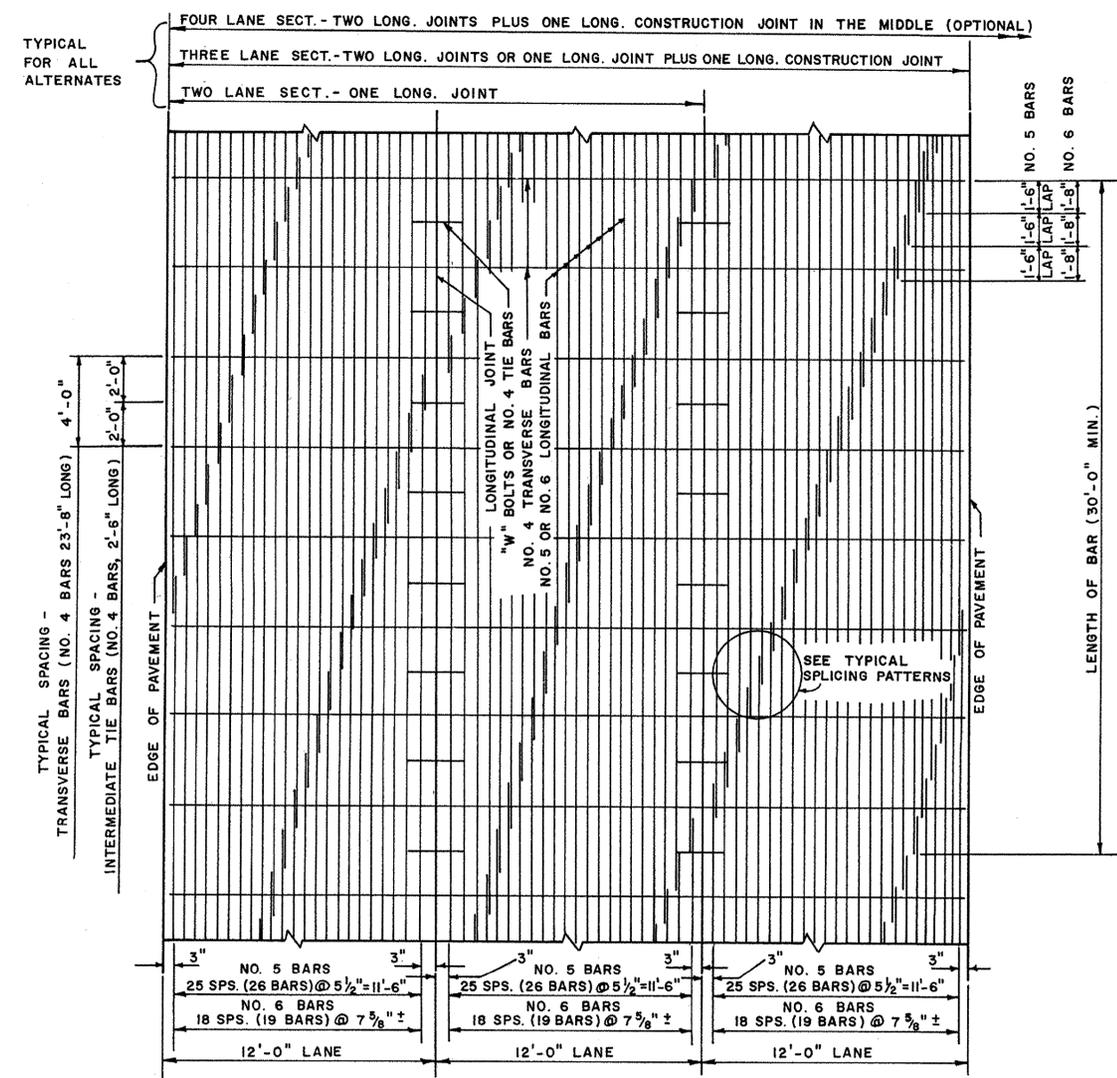


**DUMMY TYPE CONTRACTION JOINT**

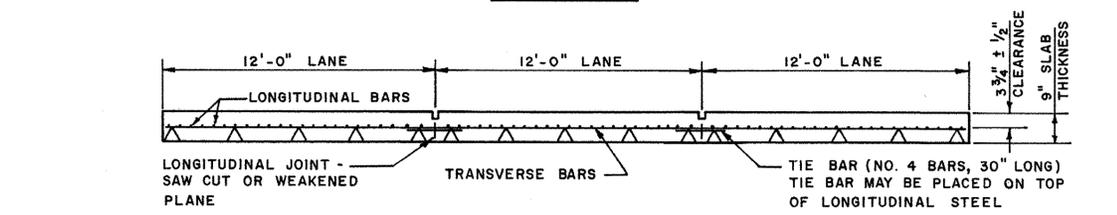
**NOTE:**  
SEE STANDARD SHEET P-1 FOR DETAILS OF DOWELLED LONGITUDINAL CONSTRUCTION JOINT & OPTIONAL DOWELLED LONGITUDINAL SAW CUT JOINT. USE OF SAW CUT JOINT MUST BE APPROVED BY DIRECTOR BASED ON MAINTENANCE OF TRAFFIC CONSIDERATIONS.

**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			
<b>STANDARD SHEET P-3</b>						
9" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT						
PREL. TRACING	J.T.B.	DESIGN	A.D.	CHKD.	A.D.	
REVISIONS						
APPROVED <i>R.P. [Signature]</i> 12-7-73 DIRECTOR OF HIGHWAYS DATE						
R.E. [Signature] 12/1/73 CHIEF ENGINEER DATE						

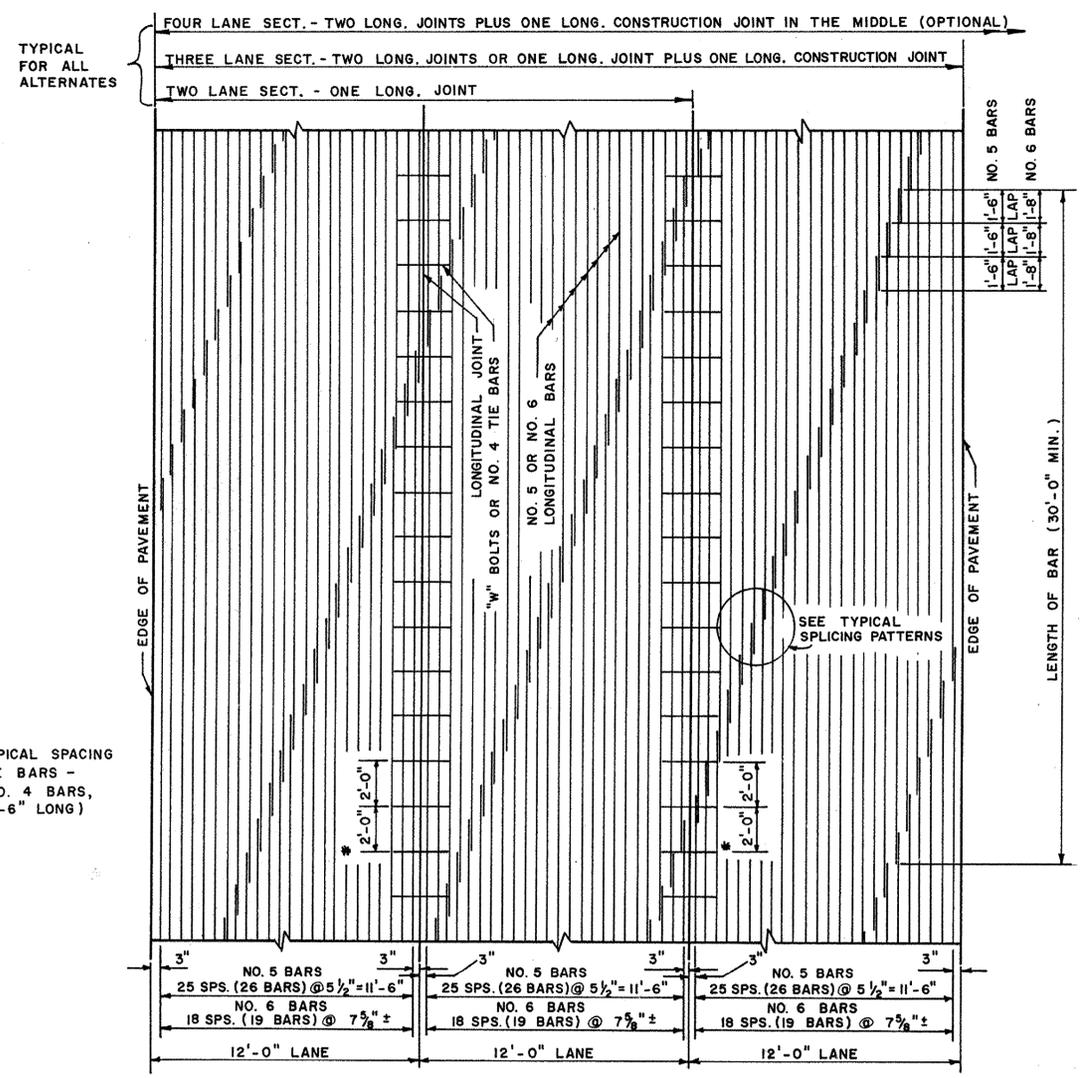
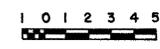


PLAN VIEW

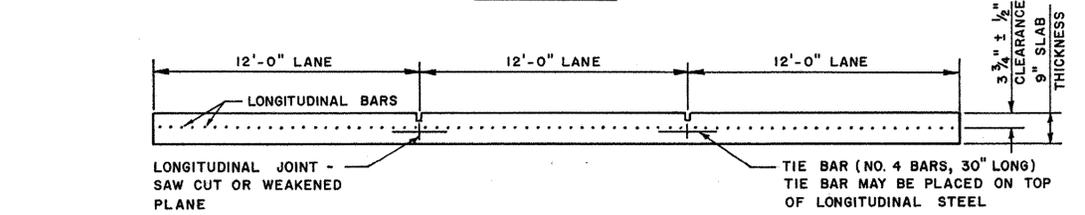


TRANSVERSE SECTION  
SHOWING NO. 5 BARS

**BAR REINFORCEMENT  
CONSTRUCTION METHOD 1-9**

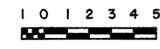


PLAN VIEW



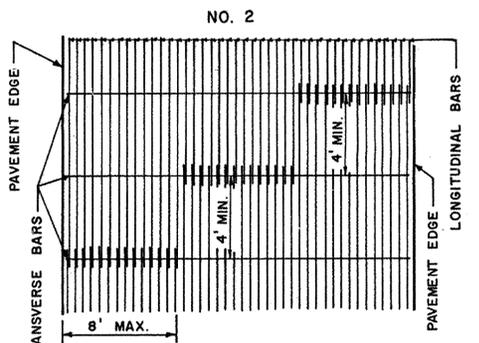
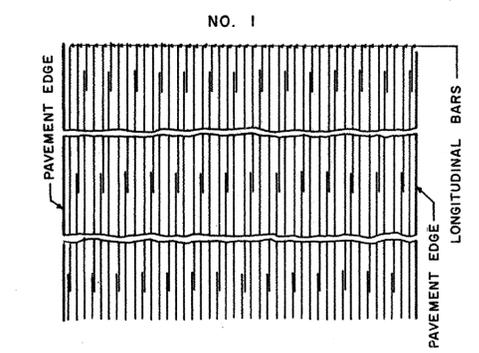
TRANSVERSE SECTION  
SHOWING NO. 5 BARS

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

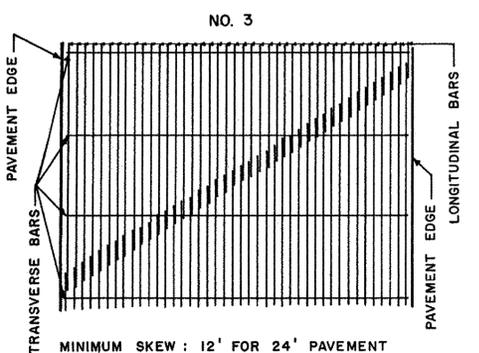


NOTE:  
THIS CONSTRUCTION METHOD WILL BE PERMITTED ONLY IF THE CONTRACTOR HAS EQUIPMENT DESIGNED SPECIFICALLY TO LOCATE THE STEEL AS REQUIRED.

**TYPICAL SPLICING PATTERNS**



TRANSVERSE BARS SHOWN ABOVE MAY OR MAY NOT BE USED. SEE METHOD 1-9 OR 1-9A. MINIMUM STAGGER OF SPLICES: 4'



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	F. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	2		DEL.			

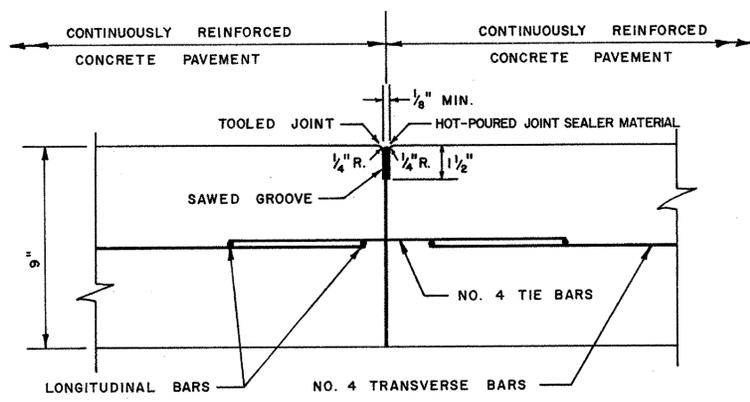
**STANDARD SHEET P-4**  
**DETAILS - 9" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT**

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

REVISIONS

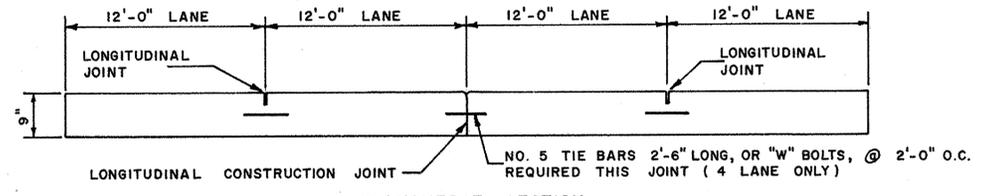
ADDED EMERGENCY SITUATION NOTE TO TRANSVERSE CONSTRUCTION JOINT DETAIL AND REVISED NOTE CONCERNING GREASING ON TERMINAL JOINT DETAIL. RTC 3/27/75  
 ADDED OR REVISED NOTES CONCERNING HOT-POURED JOINT SEALER. 10-7-75 RTC.

APPROVED *[Signature]* 12-7-73  
 DIRECTOR OF HIGHWAYS DATE  
*[Signature]* 12/1/73  
 CHIEF ENGINEER DATE

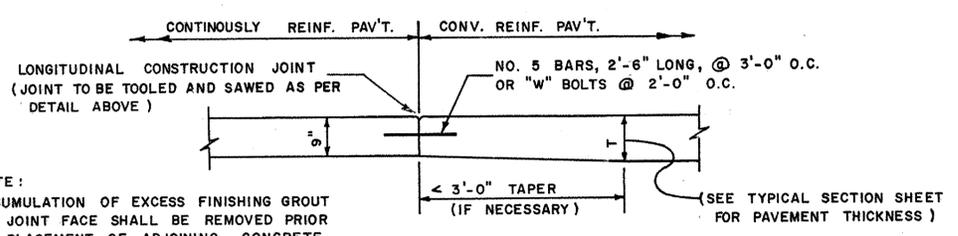


**LONGITUDINAL CONSTRUCTION JOINT**

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.

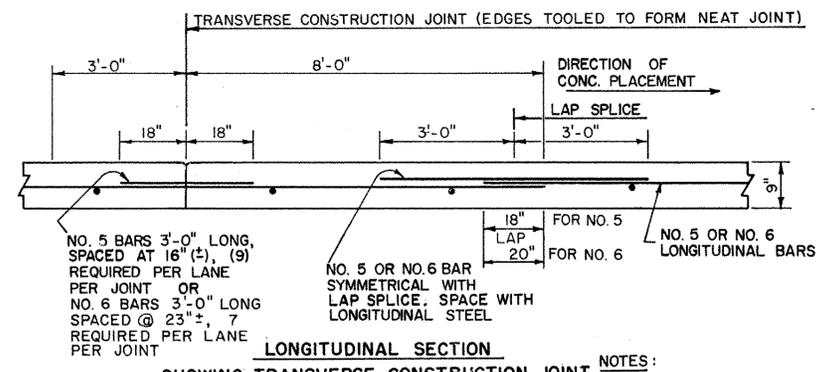


**TRANSVERSE SECTION  
(FOUR LANE ONLY)**



**SECTION A-A**

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

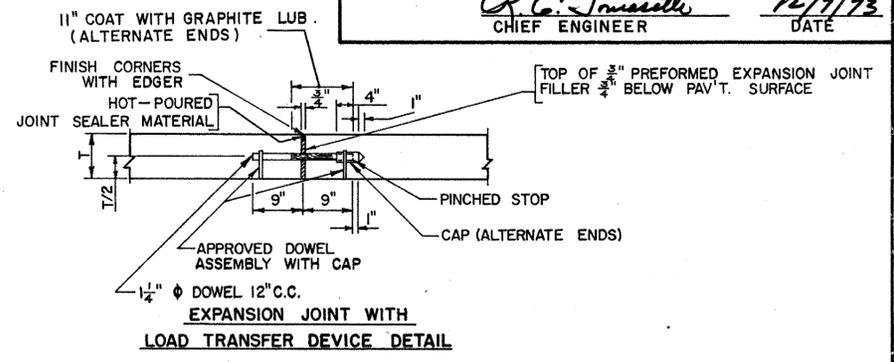


**LONGITUDINAL SECTION  
SHOWING TRANSVERSE CONSTRUCTION JOINT**

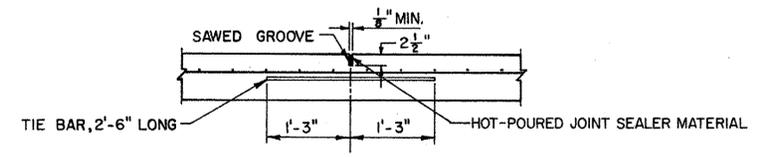
NOTES:  
 REFER TO SPECIAL PROVISIONS FOR DETAILS OF LONGITUDINAL JOINT CONSTRUCTION  
 VIBRATION WITH HAND MANIPULATED MECHANICAL VIBRATORS REQUIRED ADJACENT TO ALL TRANSVERSE CONSTRUCTION JOINTS

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

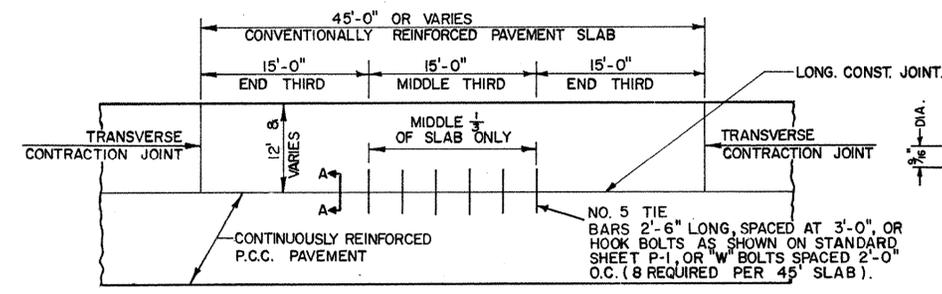
NOTES:  
 ALTERNATE METHODS OF PROVIDING REQUIRED TIE STEEL AREA WILL BE PERMITTED WHEN APPROVED IN WRITING BY THE ENGINEER  
 EXTRA BAR METHOD APPLIES ONLY TO LAPS FALLING WITHIN AN AREA FROM 8' BEYOND TO 3' BEHIND THE TRANSVERSE CONSTRUCTION JOINT. THIS METHOD IS FOR EMERGENCY SITUATIONS ONLY.



**EXPANSION JOINT WITH  
LOAD TRANSFER DEVICE DETAIL**

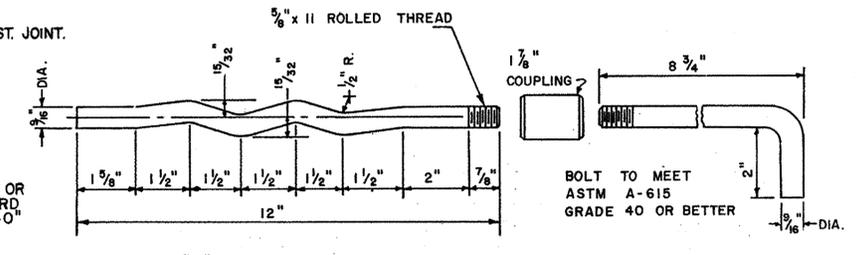


**LONGITUDINAL SAW CUT JOINT DETAIL**  
 REFER TO SPECIAL PROVISIONS FOR DETAILS ON WEAKENED PLANE JOINT AS ALTERNATE TO SAWING. TIE BAR MAY BE PLACED ON TOP OR BOTTOM OF LONGITUDINAL STEEL REINFORCEMENT.



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

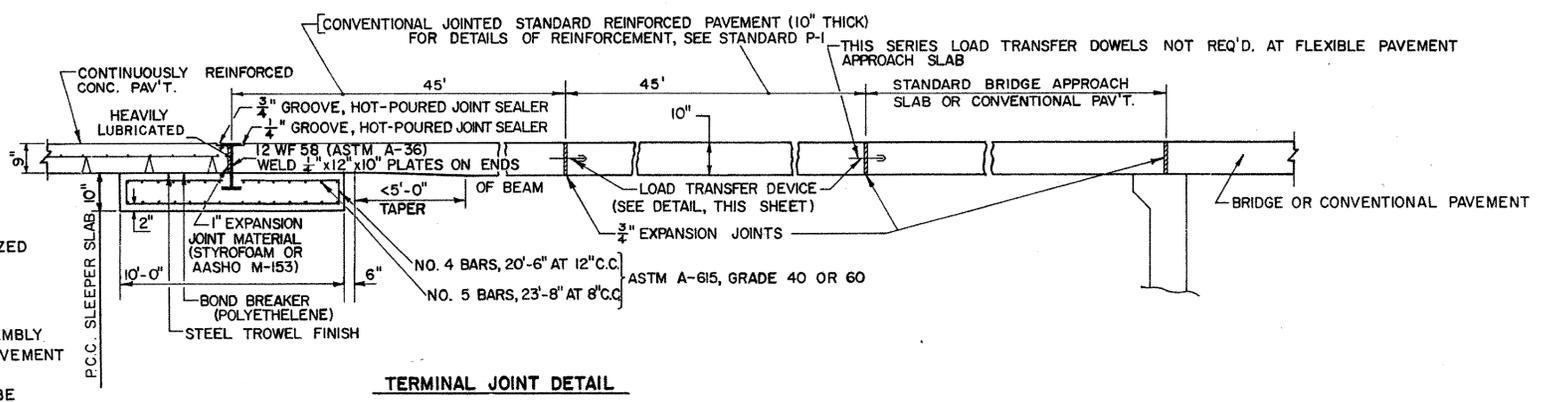
**PLAN VIEW**



**"W" BOLT DETAIL**

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.



**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.

**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

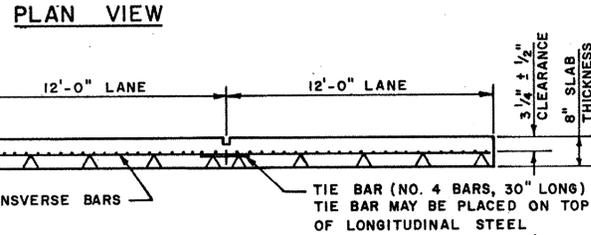
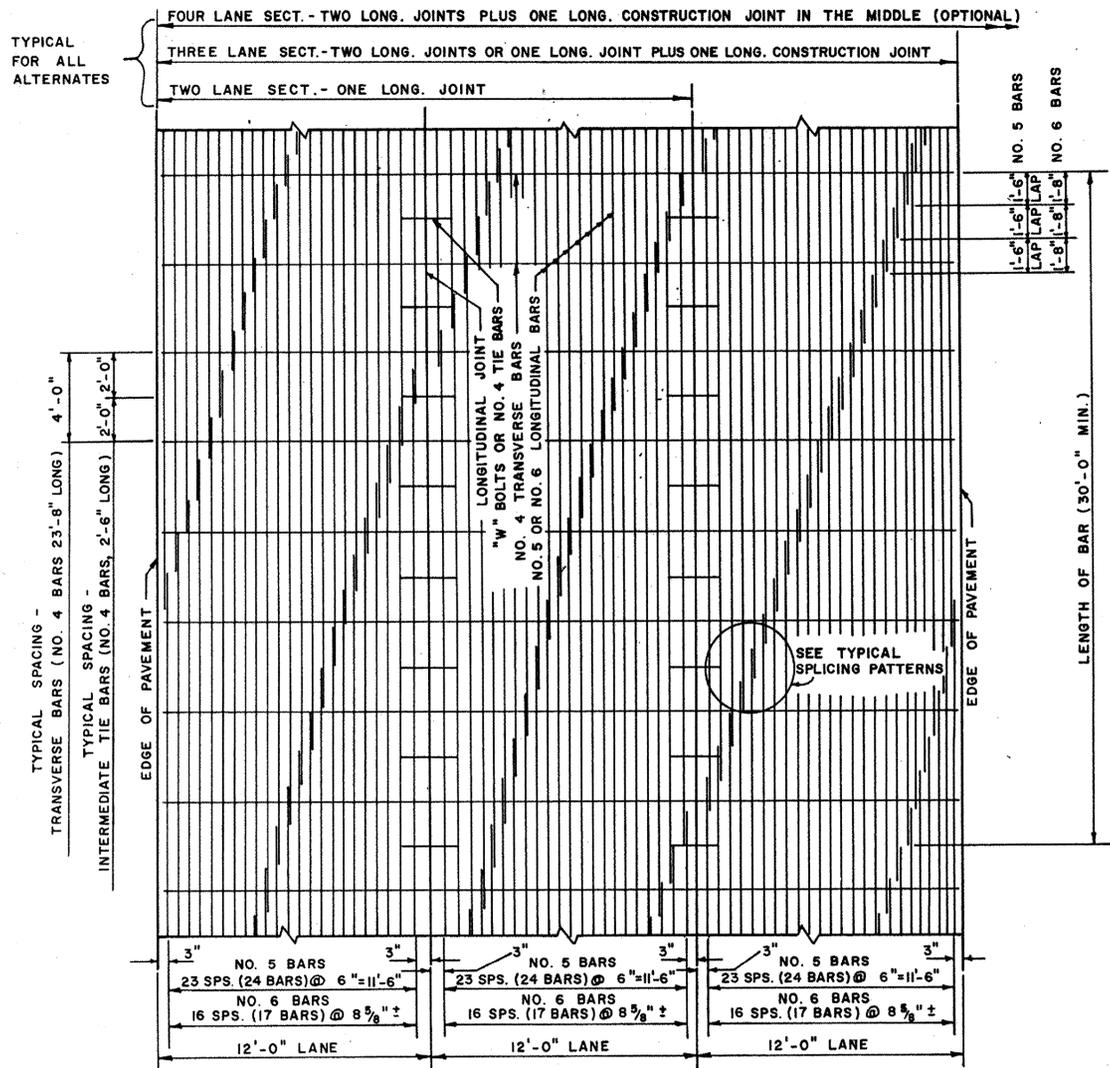
COUNTY	CONTRACT	P.R.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	2		DEL.			

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

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

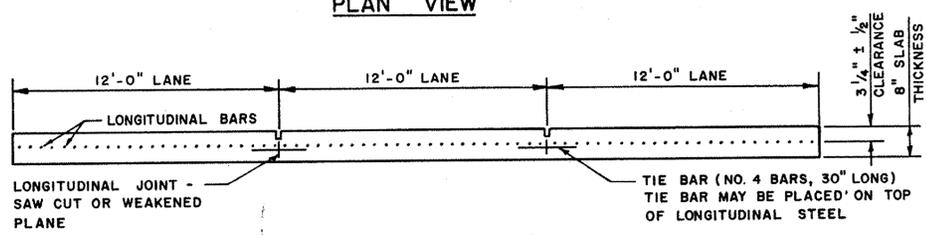
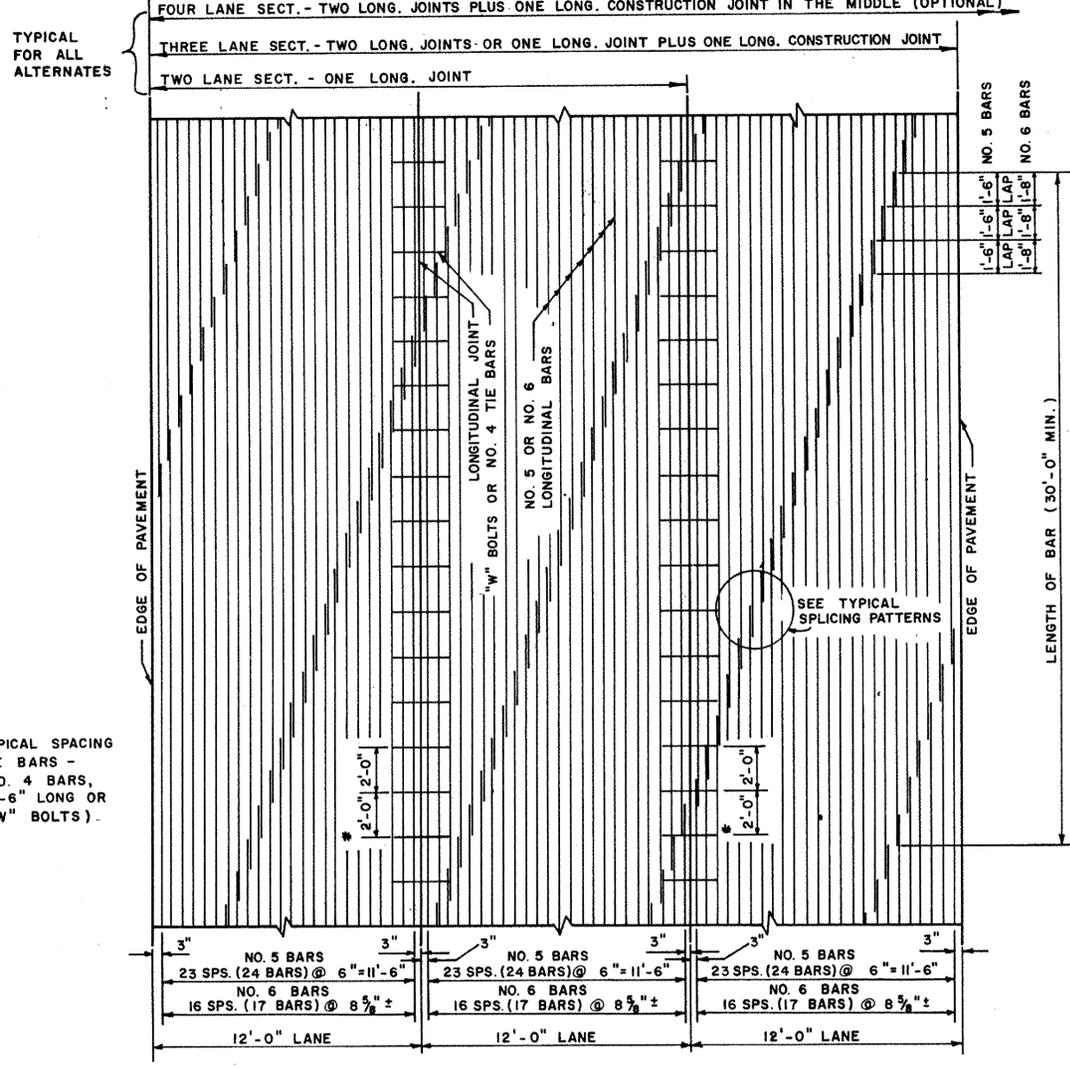
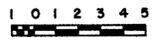
REVISIONS

APPROVED *[Signature]* 12-7-73 DATE  
 DIRECTOR OF HIGHWAYS  
*[Signature]* 12/7/73 DATE  
 CHIEF ENGINEER



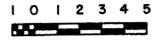
**TRANSVERSE SECTION**  
 SHOWING NO. 5 BARS

**BAR REINFORCEMENT**  
**CONSTRUCTION METHOD 1-8**



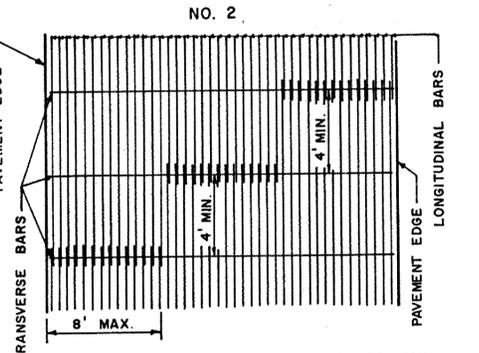
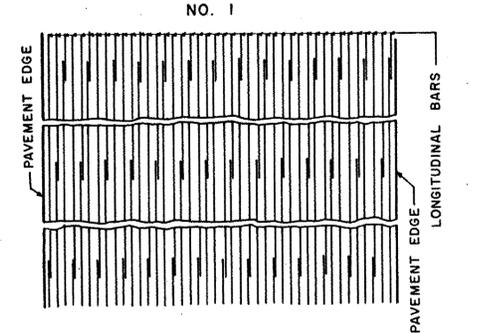
**TRANSVERSE SECTION**  
 SHOWING NO. 5 BARS

**BAR REINFORCEMENT**  
**CONSTRUCTION METHOD 1-8A**

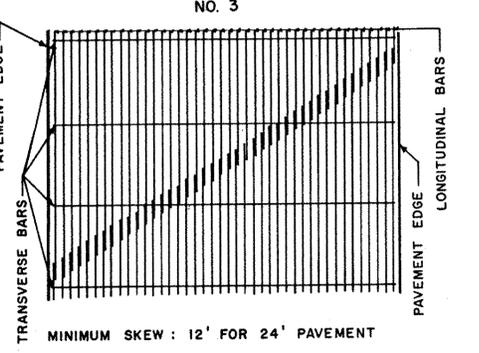


NOTE:  
 THIS CONSTRUCTION METHOD WILL BE PERMITTED ONLY IF THE CONTRACTOR HAS EQUIPMENT DESIGNED SPECIFICALLY TO LOCATE THE STEEL AS REQUIRED.

**TYPICAL SPLICING PATTERNS**



TRANSVERSE BARS SHOWN ABOVE MAY OR MAY NOT BE USED. SEE METHOD 1-8 OR 1-8A. MINIMUM STAGGER OF SPLICES: 4'

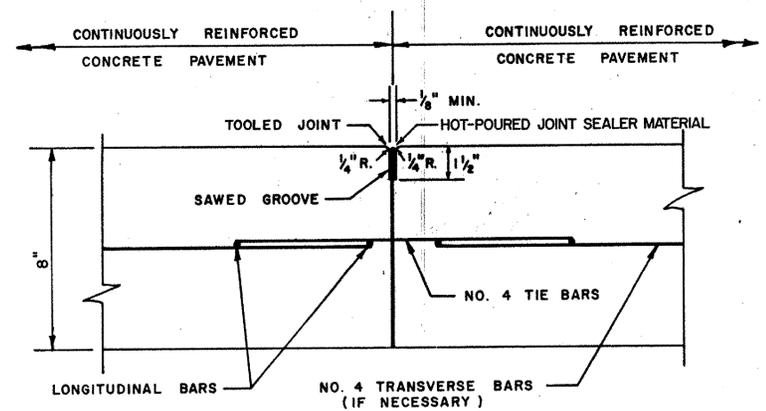


MINIMUM SKEW: 12' FOR 24' PAVEMENT

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.

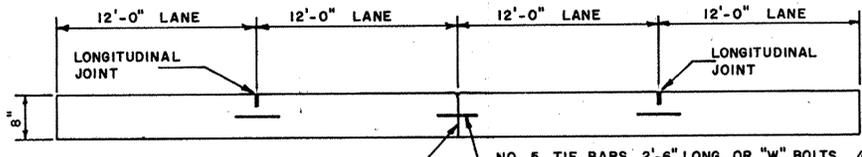
(NO SCALE)

COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	2	DEL.				
<b>STANDARD SHEET P-6</b>						
<b>DETAILS-8" CONTINUOUSLY REINFORCED P.C.C. PAVEMENT</b>						
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	<i>[Signature]</i>	12-7-73				
	DIRECTOR OF HIGHWAYS	DATE				
	<i>[Signature]</i>	12/1/73				
	CHIEF ENGINEER	DATE				

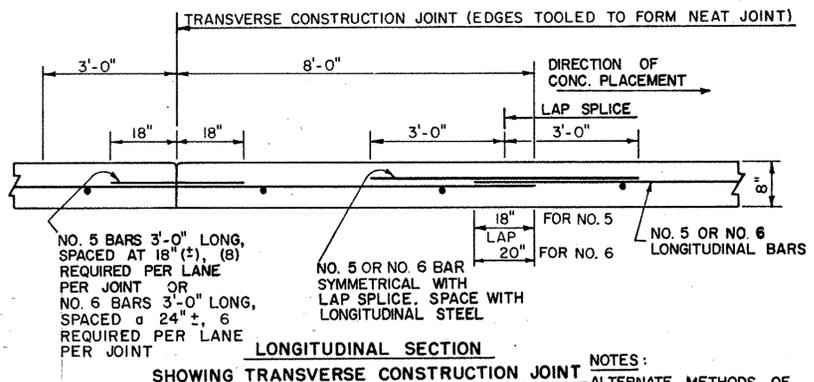


**LONGITUDINAL CONSTRUCTION JOINT**

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)**

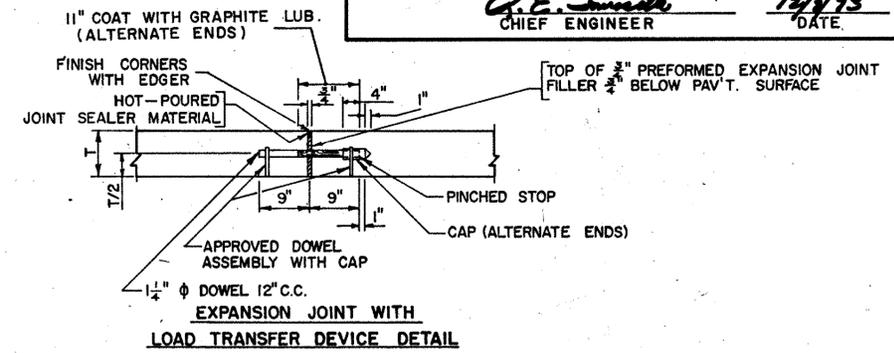


**LONGITUDINAL SECTION SHOWING TRANSVERSE CONSTRUCTION JOINT**

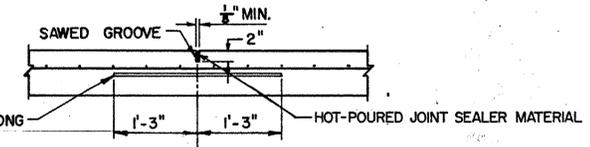
NOTES:  
REFER TO SPECIAL PROVISIONS FOR DETAILS OF LONGITUDINAL JOINT CONSTRUCTION  
VIBRATION WITH HAND MANIPULATED MECHANICAL VIBRATORS REQUIRED ADJACENT TO ALL TRANSVERSE CONSTRUCTION JOINTS

**EXTRA BAR METHOD**  
**BAR REINFORCEMENT**  
**CONSTRUCTION METHOD 1-8, 1-8A**

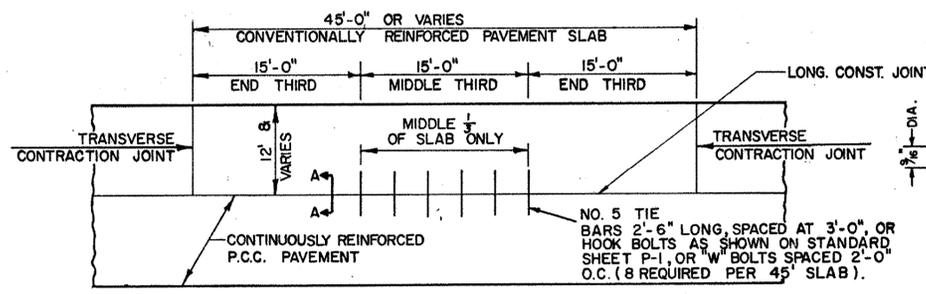
EXTRA BAR METHOD APPLIES ONLY TO LAPS FALLING WITHIN AN AREA FROM 8' BEYOND TO 3' BEHIND THE TRANSVERSE CONSTRUCTION JOINT. THIS METHOD IS FOR EMERGENCY SITUATIONS ONLY.



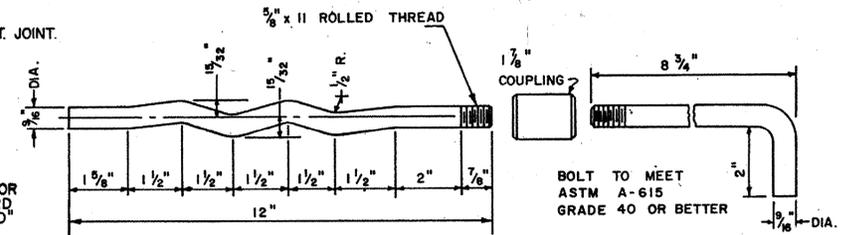
**EXPANSION JOINT WITH LOAD TRANSFER DEVICE DETAIL**



**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.

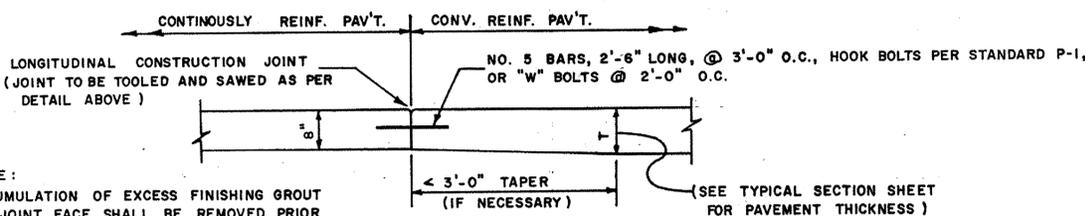


**ADJACENT CONVENTIONAL & CONTINUOUSLY REINFORCED PAVEMENTS (RAMP & MAINLINE CONNECTION)**  
**PLAN VIEW**



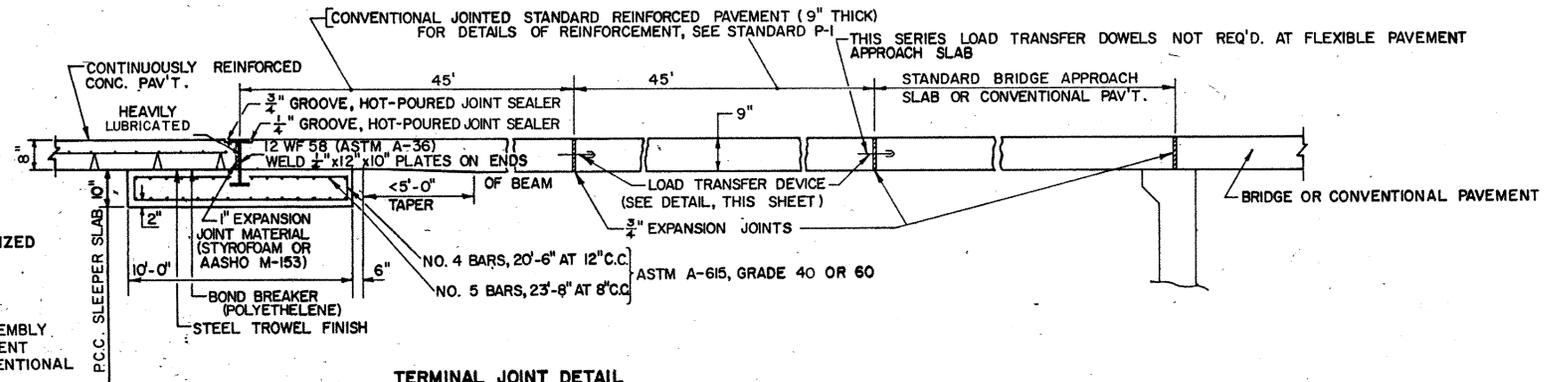
ASSEMBLED "W" BOLT SHALL HAVE A MINIMUM BREAKING LOAD OF 16,000 LBS.

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



**SECTION A-A**

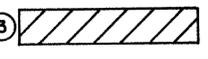
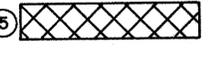
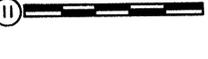
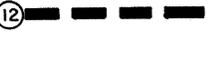
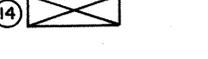
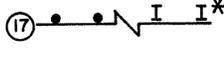
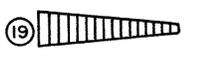
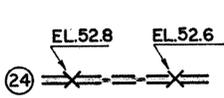
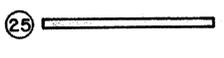
NOTE:  
ACCUMULATION OF EXCESS FINISHING GROUT AT JOINT FACE SHALL BE REMOVED PRIOR TO PLACEMENT OF ADJOINING CONCRETE PAVEMENT.



**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.

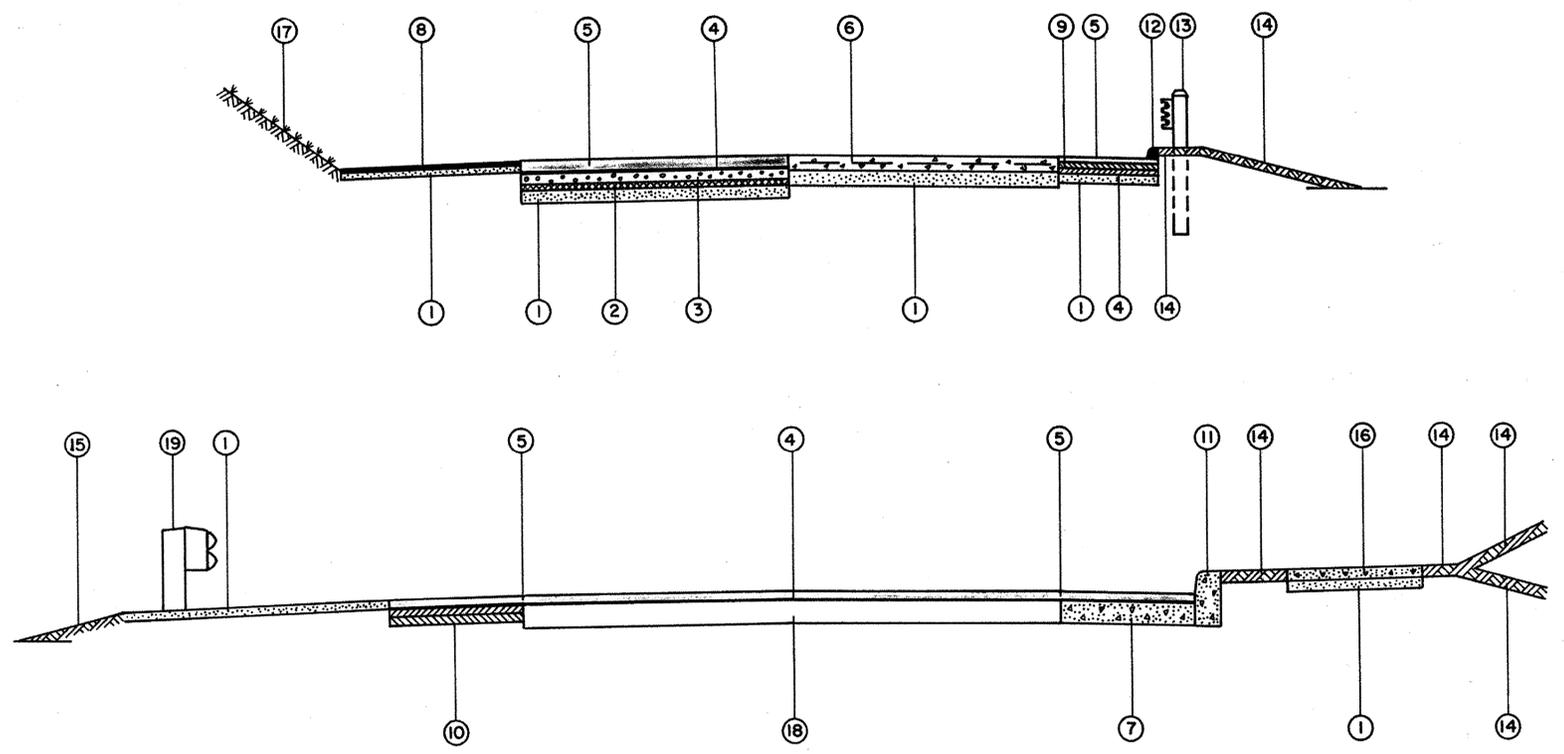
GENERAL NOTES:  
(1) SEE TYPICAL SECTION SHEETS FOR PAVEMENT CROWN/TRANSVERSE SLOPE AND POINT OF GRADE APPLICATION.  
(2) HOOK BOLTS MAY BE USED WHEN PLACING FORMED CONCRETE PAVEMENT.  
(3) DETAIL FOR HOOK BOLTS CAN BE FOUND ON STANDARD SHEET P-1.  
(4) "W" BOLTS SHALL BE MECHANICALLY INSERTED.  
(5)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

- |  |  |
|--|--|
| <p>①  * WIDENING (ANY TYPE)<br/>CEMENT CONCRETE PAVEMENT<br/>CEMENT CONCRETE SIDEWALK<br/>HOT MIX ON CEM. CONC. BASE COURSE OR ON<br/>CEM. CONC. BASE COURSE WITH CRACK CONT.</p> <p>②  * SYMBOLS NO. 1 &amp; NO. 2 APPLY, WHEN BOTH CEM.<br/>CONC. PAVEMENT &amp; CEM. CONC. BASE COURSE<br/>ARE REQUIRED ON SAME CONTRACT.</p> <p>③  BITUMINOUS SURFACE TREATMENT</p> <p>④  HOT MIX ON WATERBOUND MACADAM OR<br/>PENETRATION MACADAM.</p> <p>⑤  HOT MIX HOT-LAID ASPHALTIC CONCRETE ON<br/>COMPACTED SELECT BORROW.</p> <p>⑥  TAPER HOT MIX AT SIDE ROADS.</p> <p>⑦  PLANT MIX (WIDENING OR SHOULDERS)<br/>BANK RUN " " "</p> <p>⑧  SOIL STABILIZATION (CEMENT, ASPHALT, LIME,<br/>CALCIUM CHLORIDE, SODIUM CHLORIDE).</p> <p>⑨  CEMENT CONCRETE CURB</p> <p>⑩  INTEGRAL CURB &amp; GUTTER</p> <p>⑪  PARKWAY REFLECTING CURB</p> <p>⑫  ASPHALTIC CONCRETE CURB</p> <p>⑬  (OTHER) NOTE TYPE</p> <p>⑭  PATCHING</p> <p>⑮  BUILDING TO BE REMOVED<br/>BY OTHERS.</p> | <p>⑯  DEEP BEAM GUARD RAIL<br/>*(●-WOOD POSTS, I-STEEL POSTS)</p> <p>⑰  WIRE ROPE GUARD RAIL<br/>*(●-WOOD POSTS, I-STEEL POSTS)</p> <p>⑱  LOCATION &amp; NO. OF BORING</p> <p>⑲  JIGGLE BAR</p> <p>⑳  DRAINAGE WELL</p> <p>㉑  MANHOLE</p> <p>㉒  JUNCTION BOX</p> <p>㉓  CATCH BASIN</p> <p>㉔  SPECIAL DITCH WITH GIVEN<br/>ELEVATION</p> <p>㉕  PROPOSED PIPE</p> <p>㉖  RIP-RAP</p> |
|--|--|

RIGHT OF WAY SYMBOLS

- |                                     |   |
|-------------------------------------|---|
| PROPOSED OR NEW R/W                 | <u>PROP OR NEW R/W</u>                          |
| EXISTING R/W                        | -----   |
| PROPERTY LINE                       | ———P———   |
| CONSTRUCTION EASEMENT               | $\frac{+00}{0}$ CONST. EASEMENT $\frac{+00}{0}$ |
| LIMITS OF CONSTRUCTION              | --- LIMITS OF CONST. ---                        |
| TOWN (CITY) LIMITS                  | --- NAME TOWN (CITY) LIMITS ---                 |
| CONTROLLED ACCESS                   | <u>CONTROLLED ACCESS</u>                        |
| CONTROLLED ACCESS &<br>RIGHT OF WAY | <u>C.A. &amp; R/W</u>                           |

PLAN SYMBOLS



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

SECTION SYMBOLS

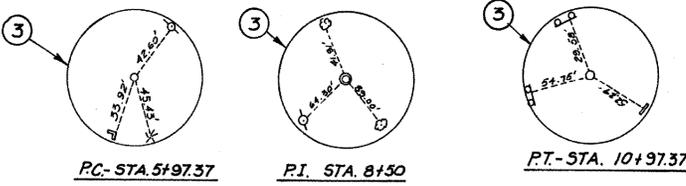
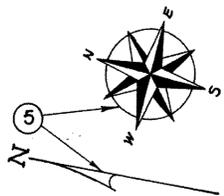
**ORDER OF WORK**

- 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

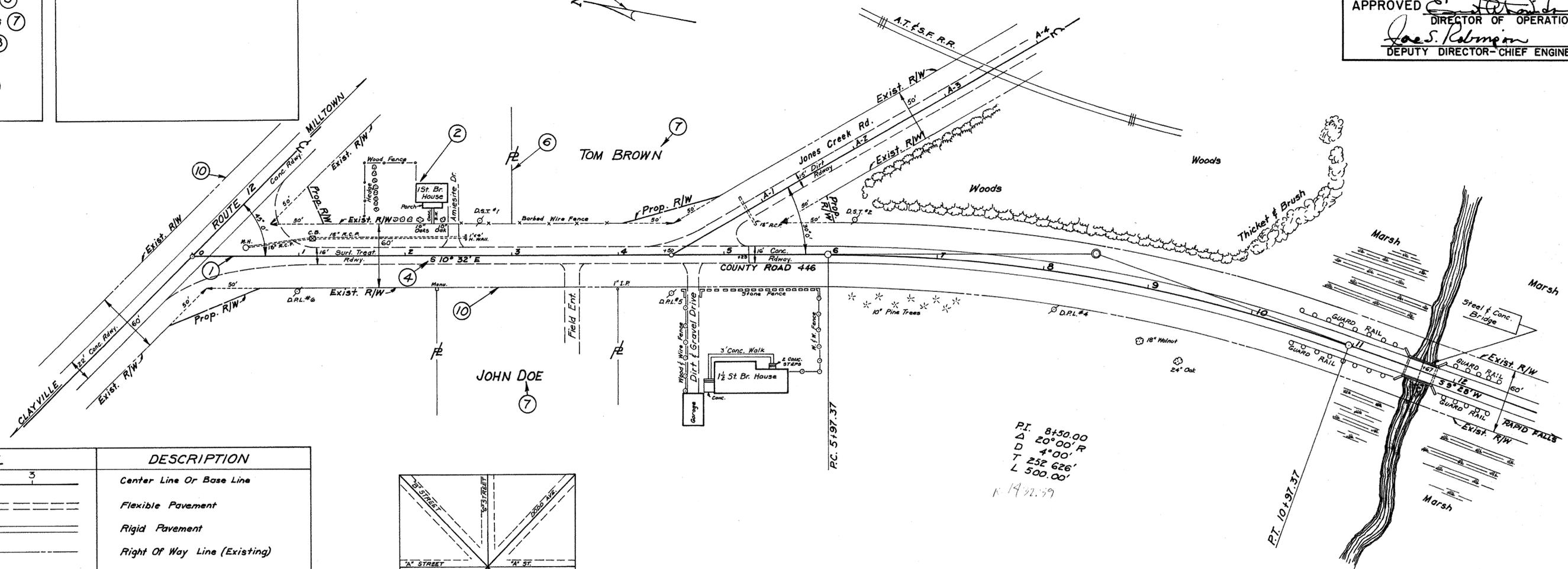
**GENERAL NOTES**

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.

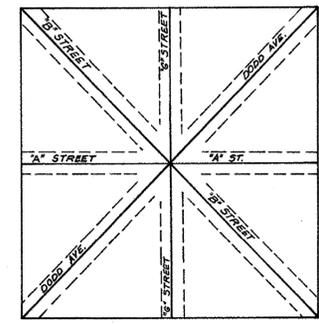
⑧ B.M.#1  
"X" IN CONC.  
S.W. 32' L. STA.  
2+29  
ELEV. 10.32



COUNTY	CONTRACT	P. R. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	DEL.			
<b>STANDARD SHEET S-2</b>						
<b>DRAWING SYMBOLS</b>						
PREL. TRACING <i>J. White</i>		DESIGN		CHKD. <i>E.L.W.</i>		
REVISIONS						
APPROVED <i>[Signature]</i>					6-22-70	DATE
DIRECTOR OF OPERATIONS					6/22/70	DATE
<i>Joe S. Robinson</i>						
DEPUTY DIRECTOR-CHIEF ENGINEER						

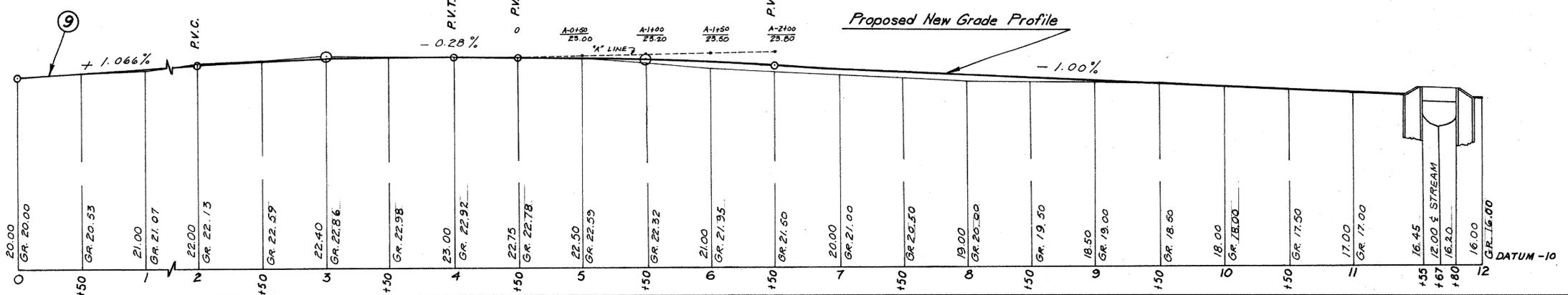


SYMBOL	DESCRIPTION
— 2 — 3 —	Center Line Or Base Line
— — — — —	Flexible Pavement
=====	Rigid Pavement
- - - - -	Right Of Way Line (Existing)
— C —	Center Line Of Intersecting Road
— P —	Property Line
— O — O — O — O — O — O —	Wood Fence
— O — O — O — O — O — O —	Guard Rail (O - Wood Posts, I - Steel Posts)
— X — X — X — X — X — X —	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



## SOILS CLASSIFICATION

COUNTY	CONTRACT	P. R. A. RES. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	2		DEL.			
STANDARD SHEET S-3						
SOILS CLASSIFICATION AND BORING DATA						
PREL. TRACING		DESIGN		CHKD.		E. L. W.
REVISIONS						
CORRECTION IN GROUP CLASSIFICATION - 7/20/70 J.T.B.						
APPROVED						
DIRECTOR OF OPERATIONS					DATE	4/10/70
DEPUTY DIRECTOR-CHIEF ENGINEER					DATE	4/10/70

GENERAL CLASSIFICATION	GRANULAR MATERIALS (35% OR LESS PASSING A NO. 200 SIEVE.)							SILT-CLAY MATERIALS (MORE THAN 35% PASSING A NO. 200 SIEVE.)						
	A-1		A-3	A-2				A-4	A-5	A-6	A-7*		A-8	
GROUP CLASSIFICATION	a	b		4	5	6	7				5	6		
STANDARD SYMBOL														
SIEVE ANALYSIS PERCENT PASSING														
NO. 10	50 MAX.	50 MAX.	51 MIN.	35 MAX.	35 MAX.	35 MAX.	35 MAX.	35 MIN.	36 MIN.	36 MIN.	36 MIN.	36 MIN.		
NO. 40	30 MAX.	25 MAX.	10 MAX.											
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)	(b)	(c)	(d)	(e)	(f)	(g)
				GROUND ELEV. 60.5		
25			1	13/12	6/6	
29	0'	A-1-a		16/	6/	
11	1 1/2'	GRAVEL & SAND				
30		18" RECOVERY				55.5
52	5'-		2	15/18	6/	
43	6 1/2'					
71						
53						

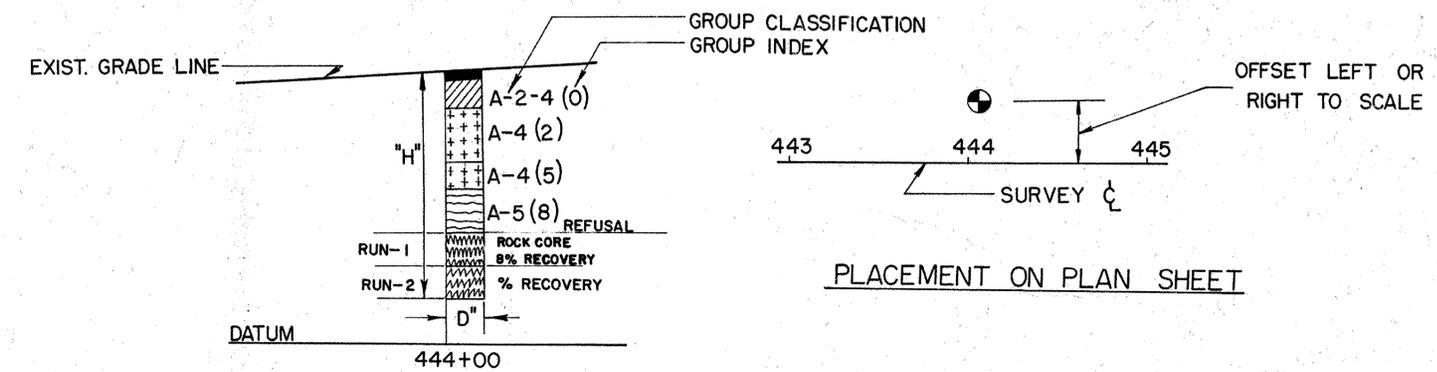
- (a) HAMMER BLOWS TO DRIVE CASING ONE (1) FOOT
- (b) SAMPLE DEPTH
- (c) CLASSIFICATION, DESCRIPTION & RECOVERY
- (d) SAMPLE NUMBER
- (e) BLOWS ON SAMPLE SPOON
- (f) PENETRATION OF SAMPLE SPOON
- (g) ELEVATIONS

### ROCK BORING DATA

(a)	(b)	(c)	(d)	(e)	(f)
RUN-1	60'-65'	DARK GRAY BANDED GNEISS	A	80 %	-45.5
RUN-2	65'-70'	BROKEN DARK GRAY BANDED GNEISS	B C D	60 %	

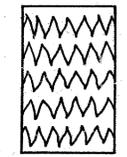
- (a) RUN NUMBER
- (b) SAMPLE DEPTH
- (c) CLASSIFICATION & DESCRIPTION
- (d) SAMPLE NUMBER
- (e) % RECOVERY
- (f) ELEVATION

### METHOD OF PLACING BORING DATA ON PLAN AND PROFILE SHEETS



### SCALE OF SYMBOLS TO BE USED ON PLAN

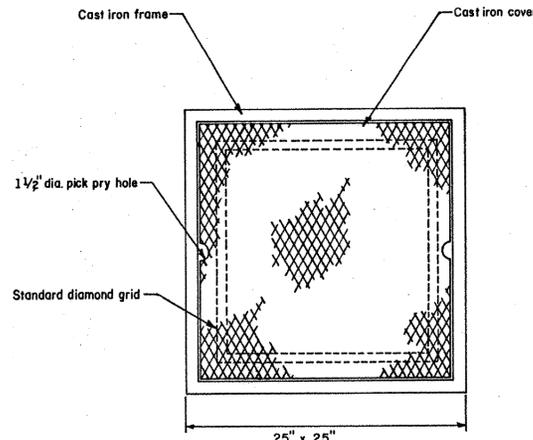
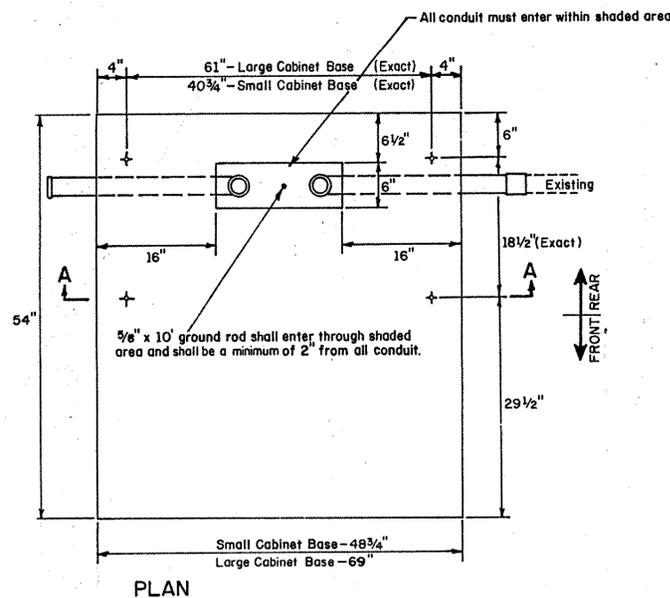
"H" OR VERTICAL SCALE - 1"=5'-0"  
"D" OR HORIZONTAL SCALE - "D"= 10' ON 1"=50'-0" SCALE



ROCK CLASSIFICATION

CABINET BASES, CONDUIT JUNCTION WELLS  
AND SIGN FOUNDATION

PREL. TRACING R.F.R.	11-23-77 DESIGN	CHKD.
RECOMMENDED	11-28-77	<i>R. E. Imasetti</i> CHIEF ENGINEER
APPROVED	11/28	1977 <i>R. D. Barwick</i> DIRECTOR OF HIGHWAYS
REVISIONS		
1. 4/24/79 Revised notes, small and large cabinet bases R.F.R.		



**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.

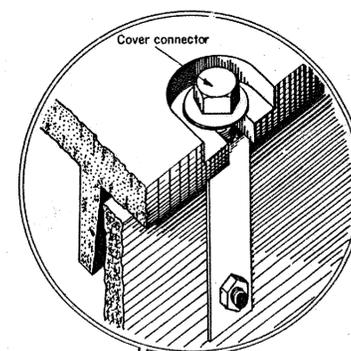
Type 4 conduit junction wells will be of bituminous fibre pipe with a cast iron cover. Hardware used to secure the cast iron cover will be of stainless steel.

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

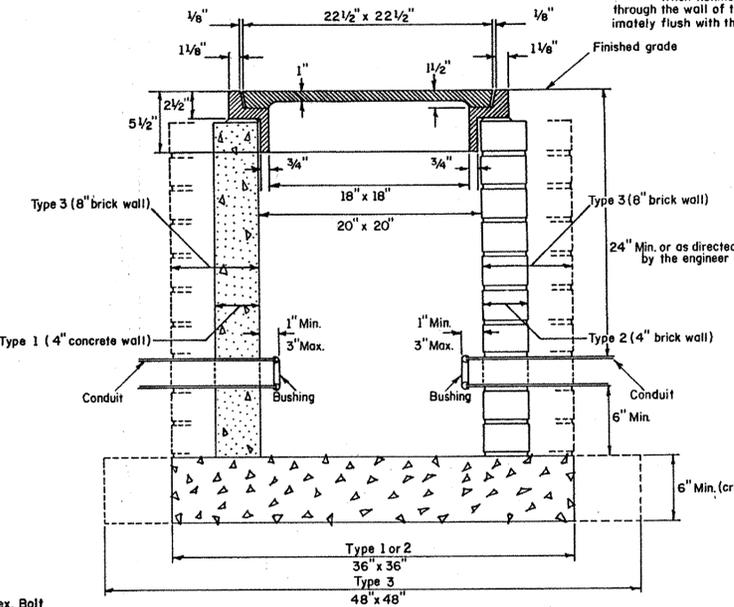
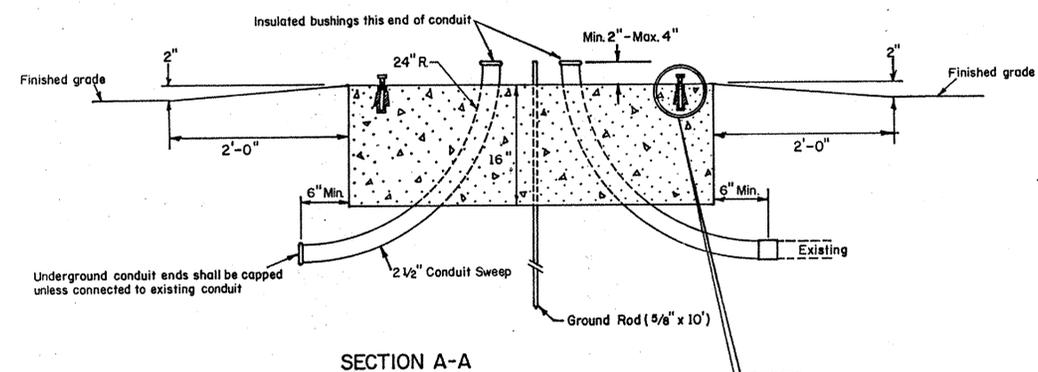


**NOTES:**

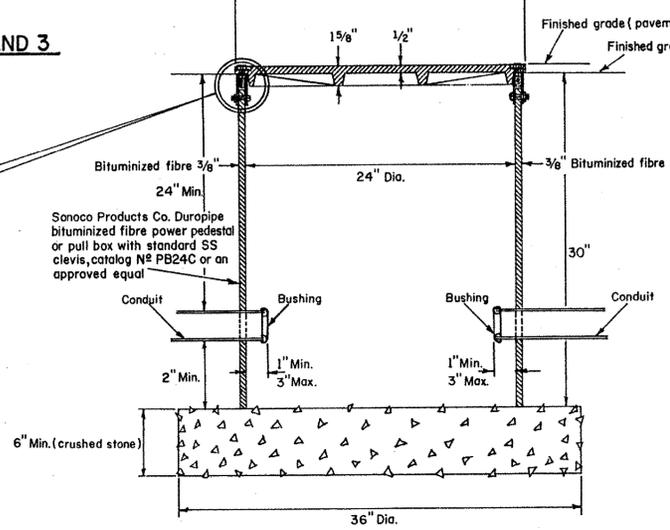
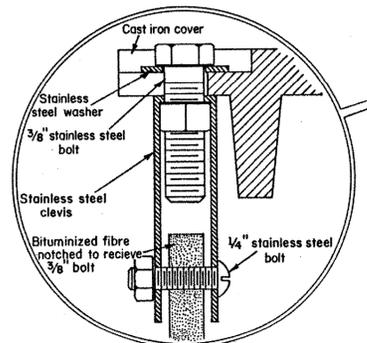
Concrete will conform to special provisions section 812, PORTLAND CEMENT CONCRETE.

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

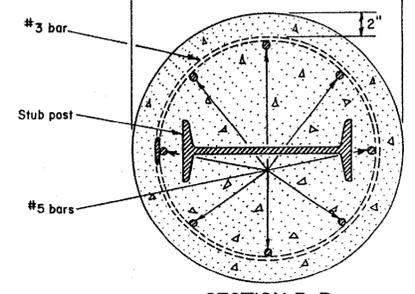
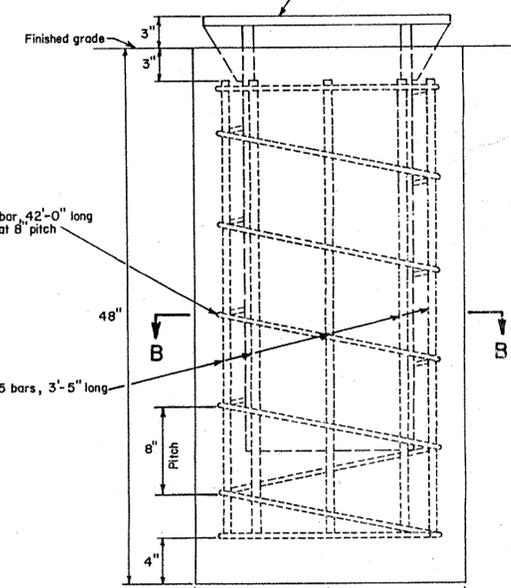
Stub post to be supplied by the Bureau of Traffic.



CONDUIT JUNCTION WELLS, TYPES 1, 2 AND 3



CONDUIT JUNCTION WELL, TYPE 4



SECTION B-B

SIGN FOUNDATION DETAIL

**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 2 1/2" conduit sweep in addition to all conduit sweeps shown on the signal plan. The spare 2 1/2" 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 metallic 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 with 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.

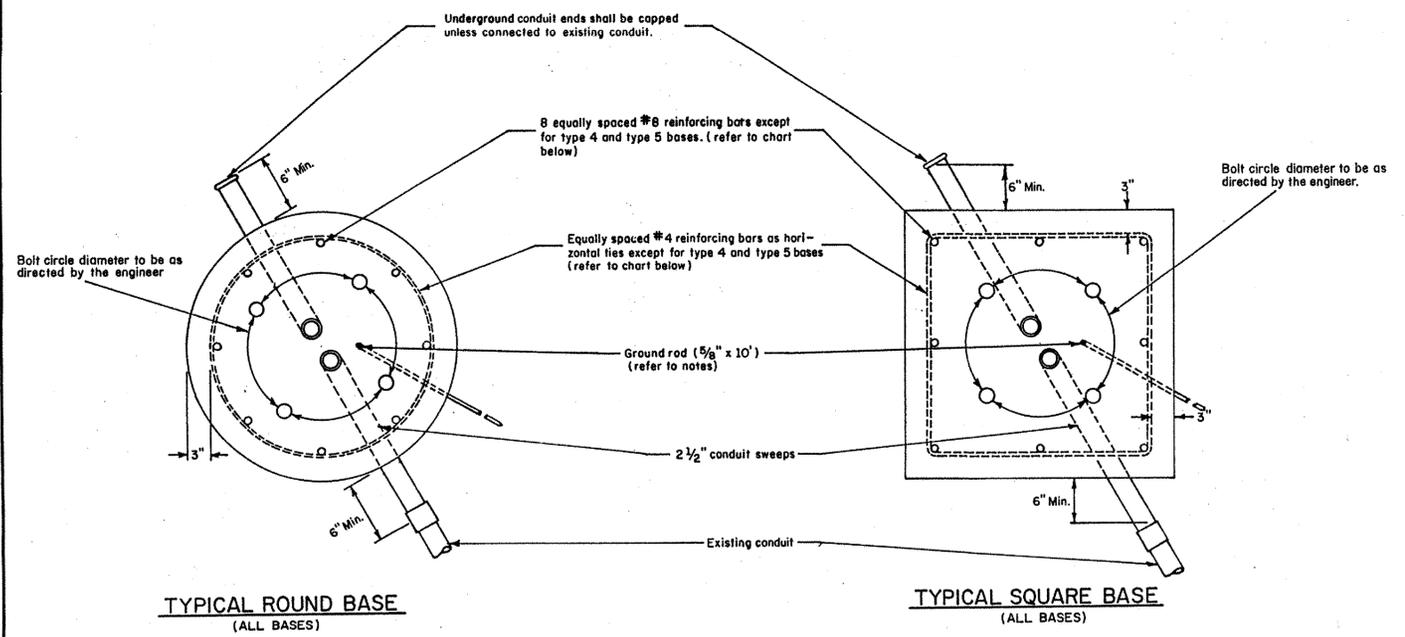
The cabinet base shall be oriented so that the rear of the cabinet will face the intersection or as directed by the engineer.

SMALL AND LARGE CABINET BASES

POLE BASES

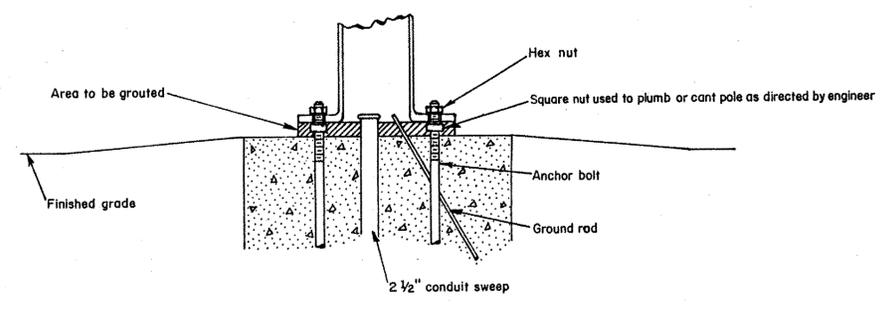
PREL. TRACING R.F.R.	11-15-77 DESIGN	CHKD.
RECOMMENDED	11-28	1977 <i>R.E. Tomasetti</i> CHIEF ENGINEER
APPROVED	11/28	1977 <i>R.D. Bannish</i> DIRECTOR OF HIGHWAYS

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.



TYPICAL ROUND BASE  
(ALL BASES)

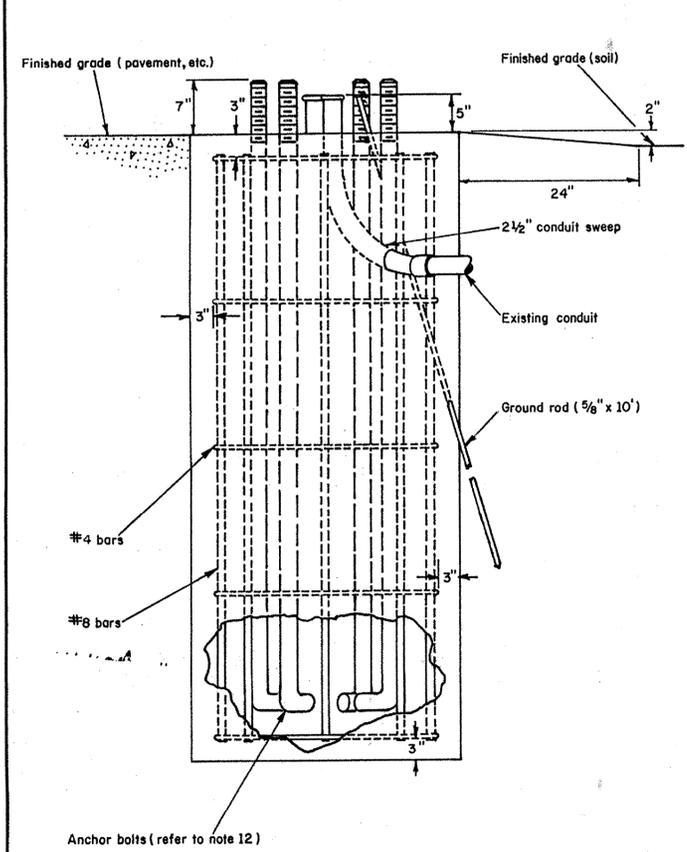
TYPICAL SQUARE BASE  
(ALL BASES)



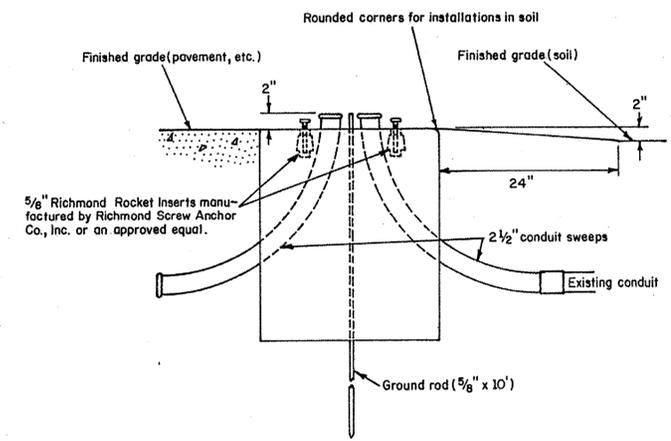
TYPICAL INSTALLATION OF STEEL POLE ON POLE BASES

NOTES:

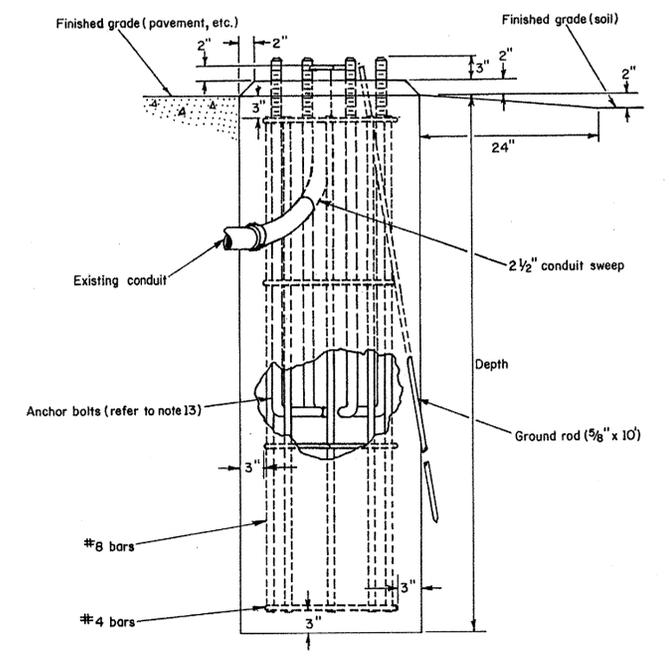
- When pole bases (except type 5 and type 6) are placed in sidewalk areas they will be constructed flush with the sidewalk. Type 5 and type 6 will be constructed with their top surface 2" above the sidewalk. At other locations the bases will be set as shown but, never below the adjacent pavement.
- Concrete will conform to special provisions section 812, PORTLAND CEMENT CONCRETE, with a 28 day strength of 3000 psi.
- Where conduit has previously been installed, the connection to the conduit in the base will be made before pouring concrete.
- All bases will contain two 2 1/2" 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 copped in the ground. An arrow shall be placed in the surface indicating where all conduits leave the base.
- 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.
- All conduits installed within a pole base will have insulated bushings on ends above the surface of the base.
- 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.
- In stable soil, forms below 12" from the surface are not required. All bases shall be edged and have a broom finish.
- 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.
- 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.
- Information about templates for setting anchor bolts will be furnished by the department.
- Anchor bolts for pole base types 1, 2, 2A, 2B, 3, 3A and 3B will be furnished by the department.
- 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 1 1/2" 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 1 1/4" 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.
- Anchor bolts, nuts and hex. bolts will be hot dipped galvanized in accordance with the latest A.S.T.M. specifications.



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



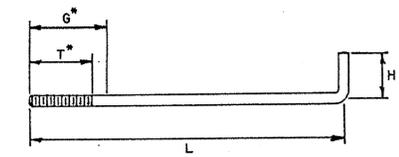
BASE TYPE 4 SECTION



TYPICAL SECTION, BASES TYPE 5 AND TYPE 6

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



\* G = Galvanized portion; T = Thread length

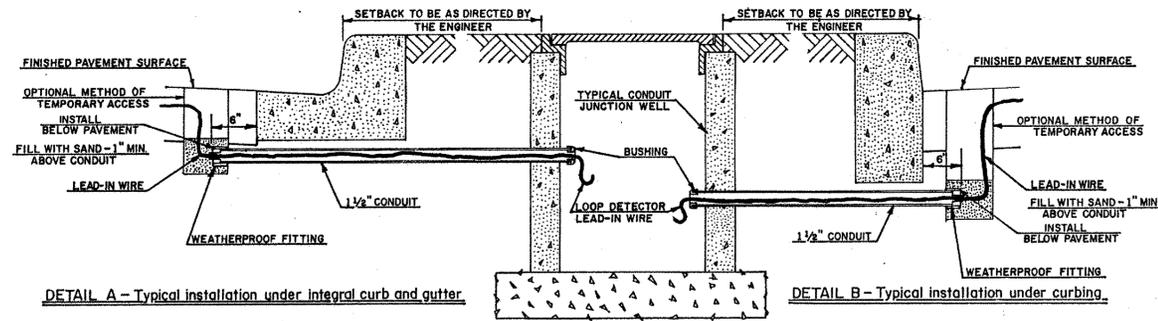
Nominal Bolt Size	L	H	T	G
1" x 40"	36"	4"	6"	8"
1 1/4" x 48"	42"	6"	8"	10"

ANCHOR BOLT DATA CHART AND DETAILS

LOOP DETECTORS AND MAGNETIC TRANSDUCER

PREL. TRACING R.F.R. 10-7-77 DESIGN CHKD.  
RECOMMENDED 10/11 1977 R.E. Jansette CHIEF ENGINEER  
APPROVED 10/13 1977 R.D. Bewick DIRECTOR OF HIGHWAYS

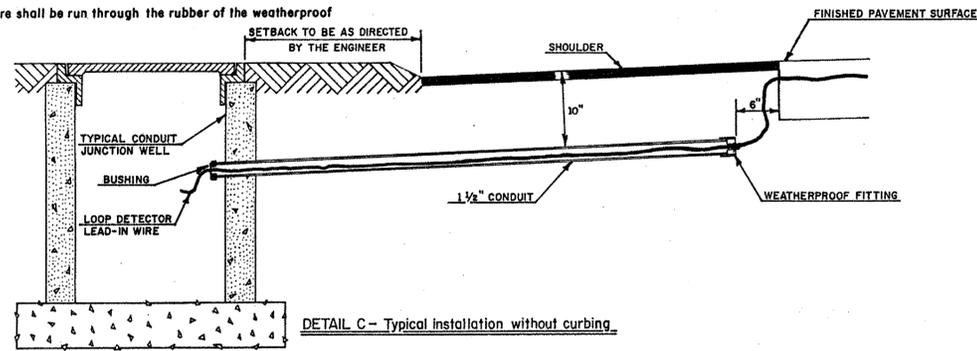
4/24/79 Added type 6 and 7 loops R.F.R. REVISIONS



DETAIL A - Typical installation under integral curb and gutter

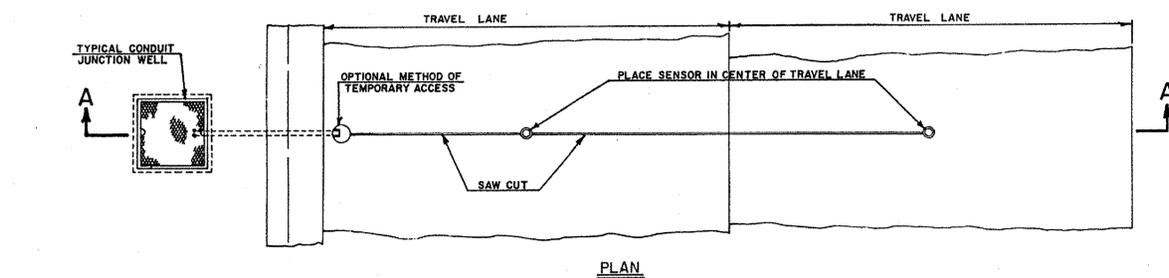
NOTES:

- The contractor shall be responsible for protecting the conduit against any possible damage in paving operations.
- The weatherproof fitting shall consist of a galvanized 1 1/2" coupling containing a steel threaded reducing bushing (1 1/2" to 3/4") and a 3/4" watertight connector for service entrance cable such as an APPLETON SEO-21 or it's approved equivalent.
- The lead-in wire shall be run through the rubber of the weatherproof fitting.

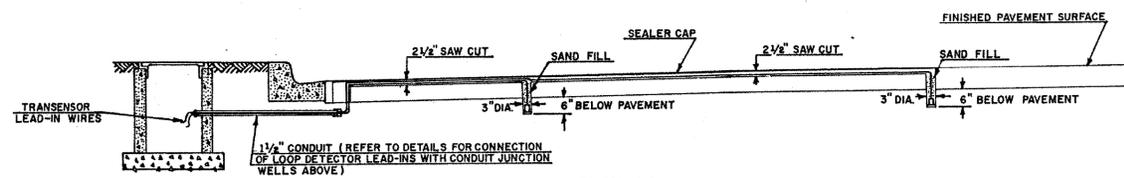


DETAIL C - Typical installation without curbing

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

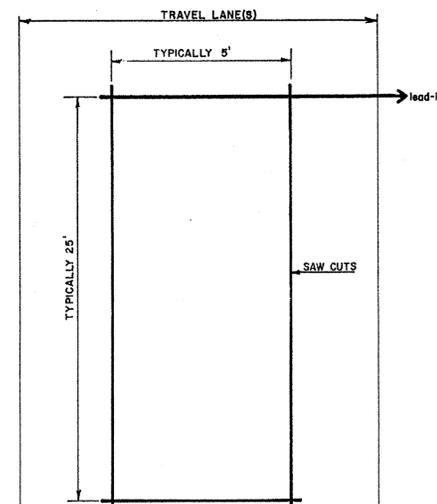


PLAN

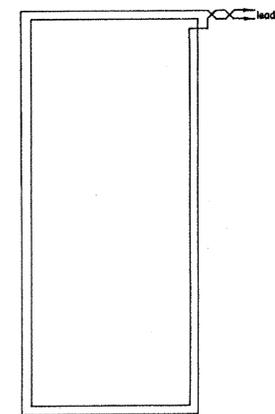


SECTION A-A

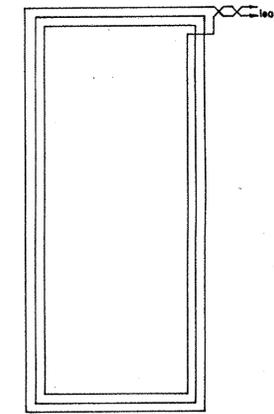
INSTALLATION OF MAGNETIC TRANSDUCER HEAD



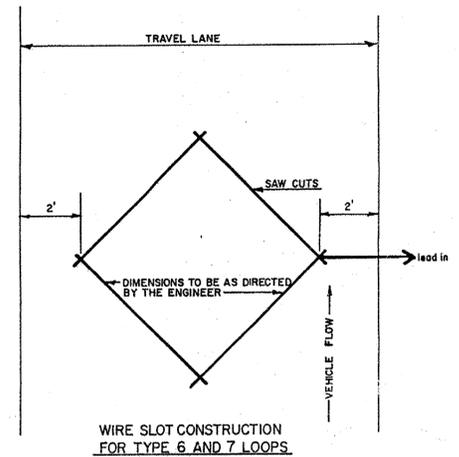
FOR TYPE 1 AND 2 LOOPS



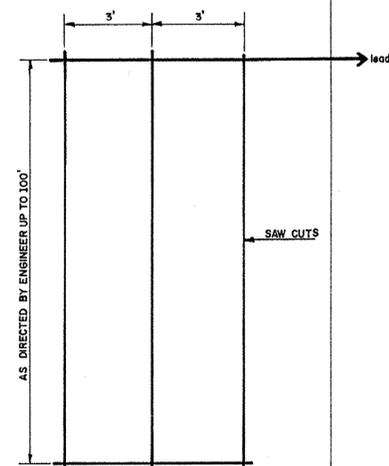
TYPE 1 LOOP



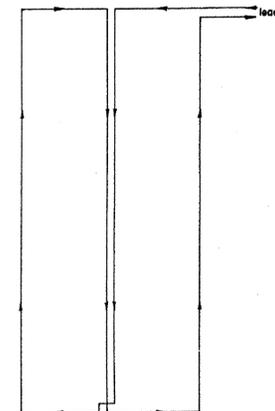
TYPE 2 LOOP



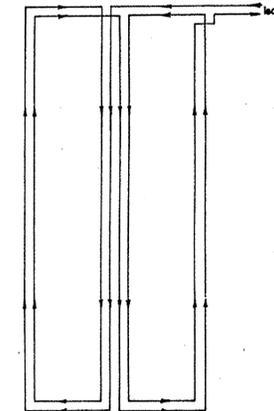
WIRE SLOT CONSTRUCTION FOR TYPE 6 AND 7 LOOPS



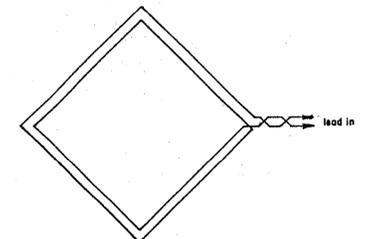
FOR TYPE 3 AND 4 LOOPS



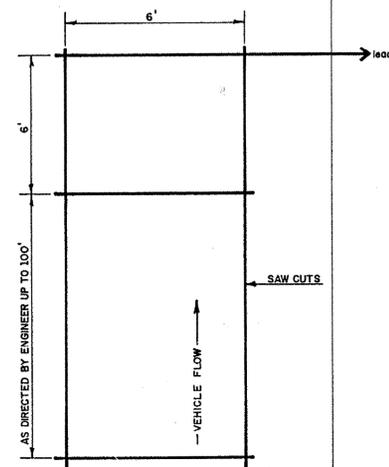
TYPE 3 LOOP



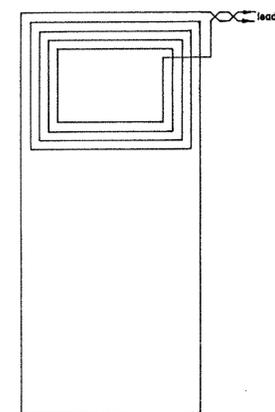
TYPE 4 LOOP



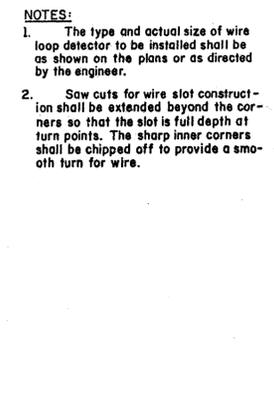
TYPE 6 LOOP



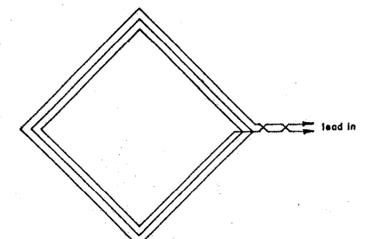
FOR TYPE 5 LOOP



TYPE 5 LOOP



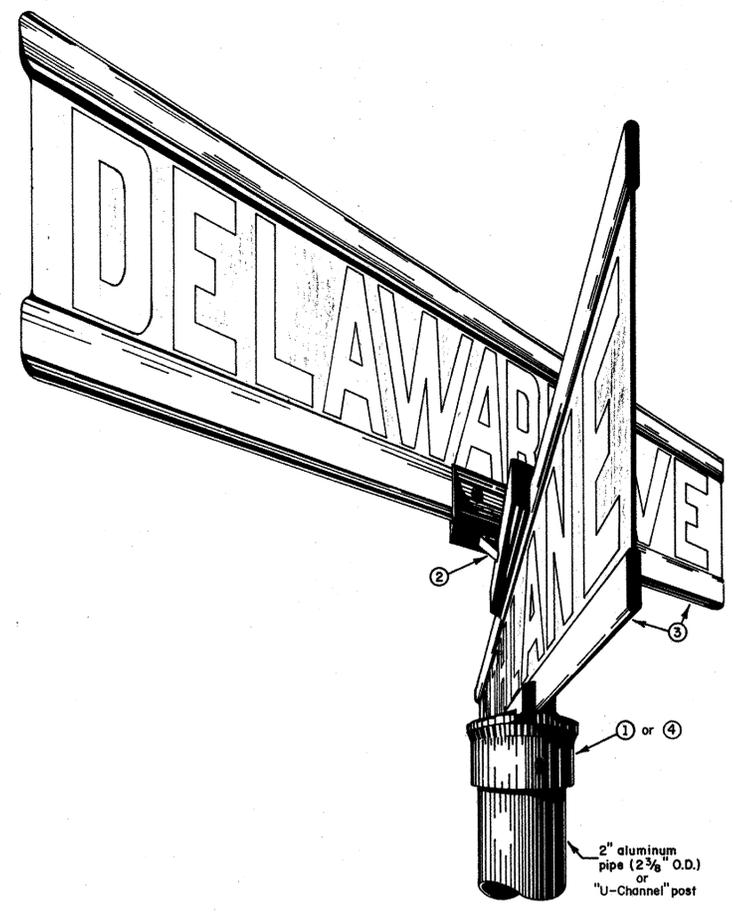
- NOTES:
- The type and actual size of wire loop detector to be installed shall be as shown on the plans or as directed by the engineer.
  - Saw cuts for wire slot construction shall be extended beyond the corners so that the slot is full depth at turn points. The sharp inner corners shall be chipped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



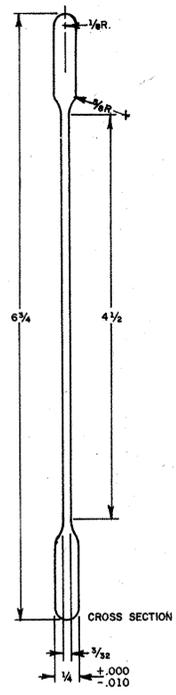
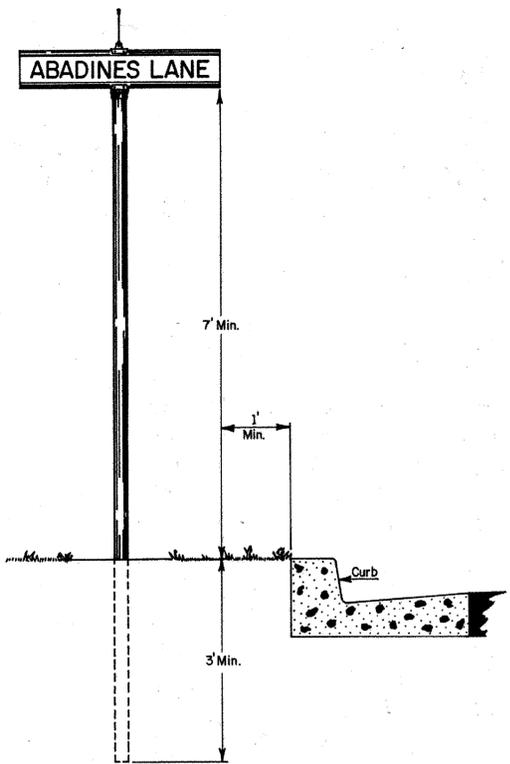
TYPE 7 LOOP

WIRE SLOT CONSTRUCTION

DETAILS FOR INSTALLING DETECTOR WIRE LOOPS

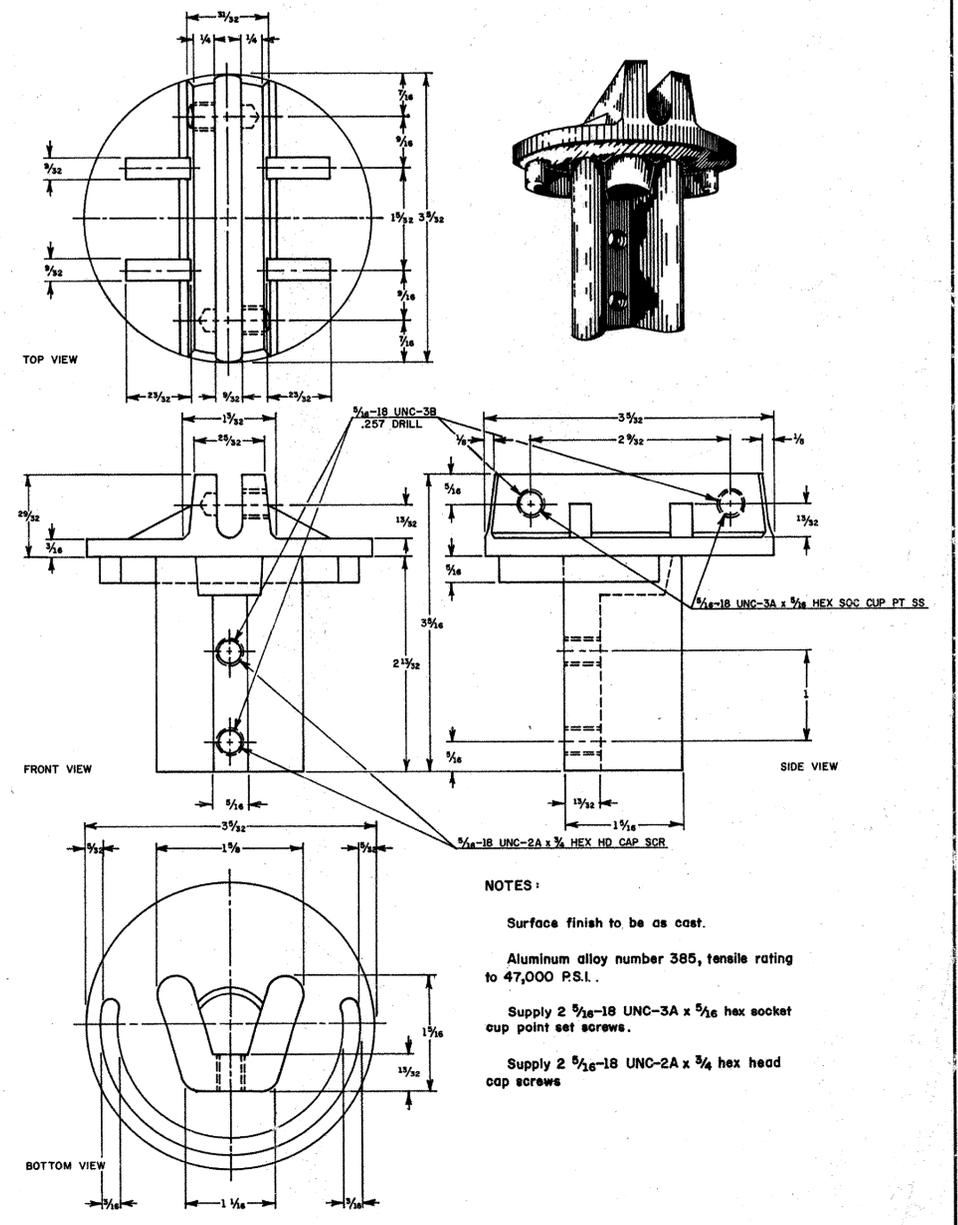


**STREET OR ROAD NAME SIGNS**  
Four way aluminum intersection sign having a 2" aluminum pipe post and a 4" silver reflectorized letters on a green background of reflectorized sheeting mounted on 6 3/4" aluminum sign panel blades.



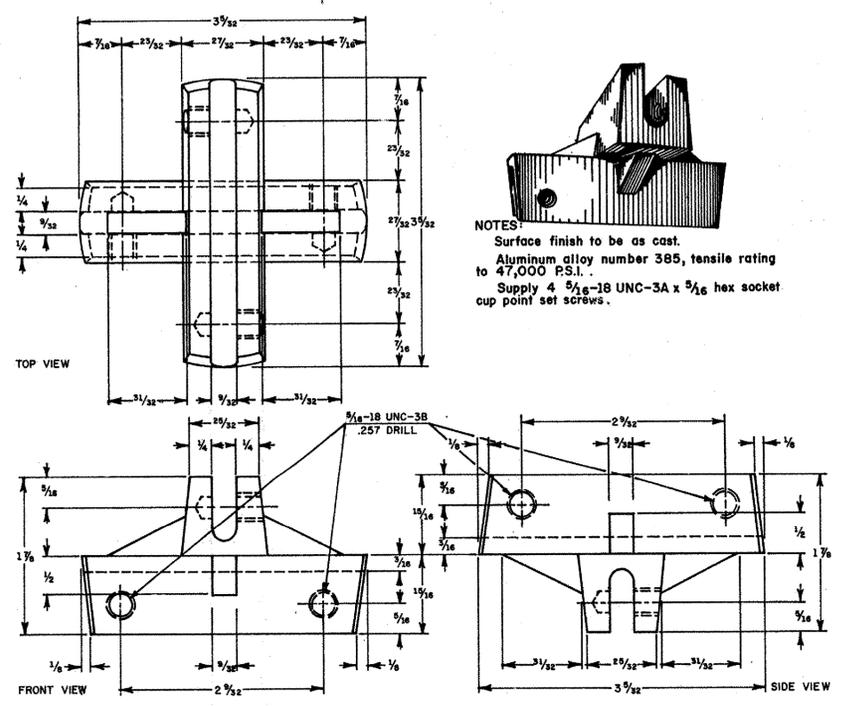
**NOTES:**  
Aluminum alloy number 6063-T6.  
All surfaces exposed

**SIGN PANEL<sup>®</sup> BLADE**

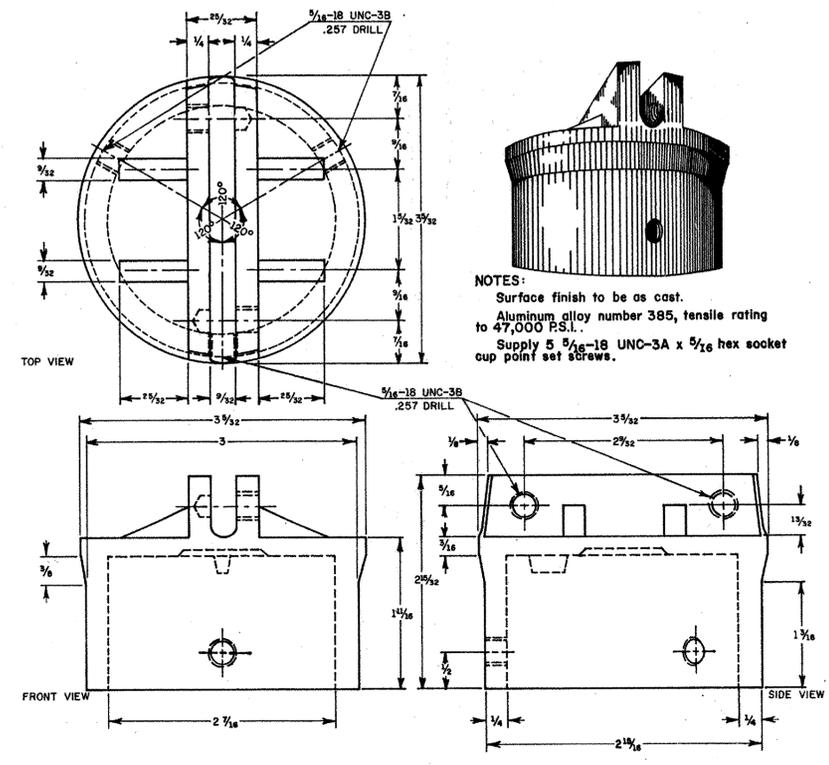


**NOTES:**  
Surface finish to be as cast.  
Aluminum alloy number 385, tensile rating to 47,000 P.S.I.  
Supply 2 5/16-18 UNC-3A x 5/16 hex socket cup point set screws.  
Supply 2 5/16-18 UNC-2A x 3/4 hex head cap screws

**SIGN TO "U-CHANNEL" POST<sup>®</sup> CONNECTOR**

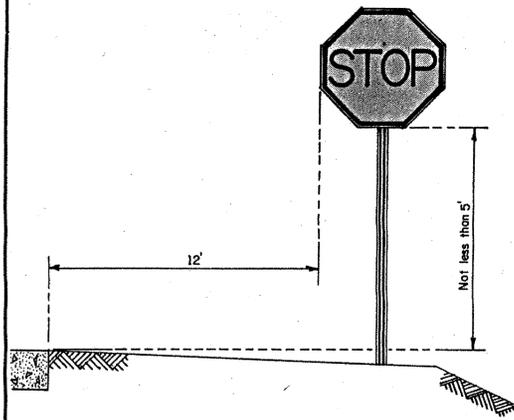


**SIGN TO SIGN<sup>®</sup> CONNECTOR**

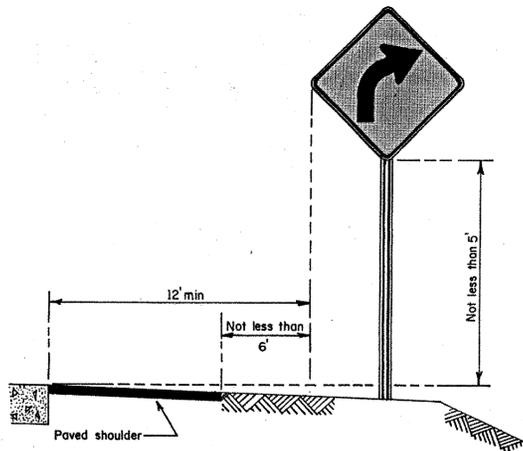


**SIGN TO POST<sup>®</sup> CONNECTOR**

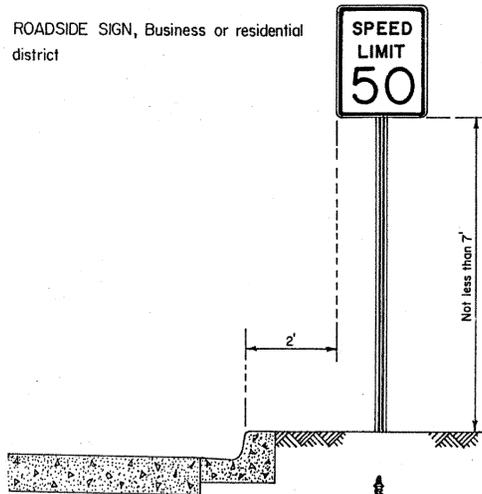
ROADSIDE SIGN, Rural district



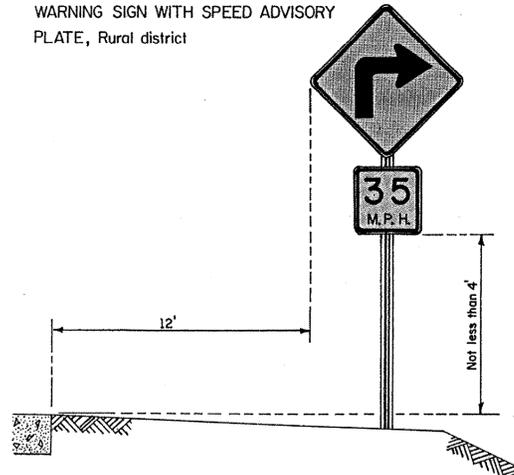
ROADSIDE SIGN, Rural district



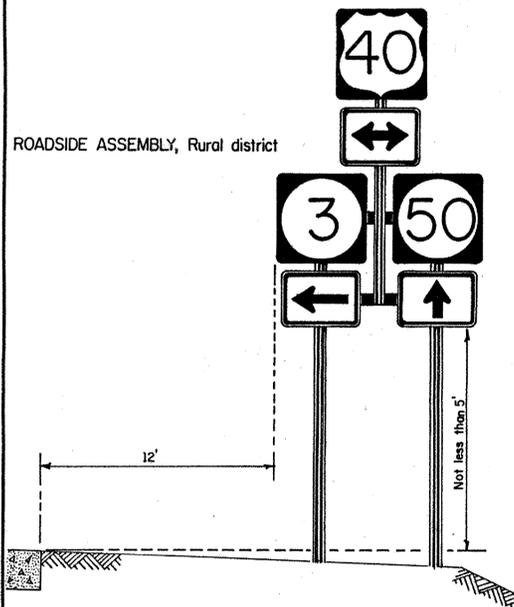
ROADSIDE SIGN, Business or residential district



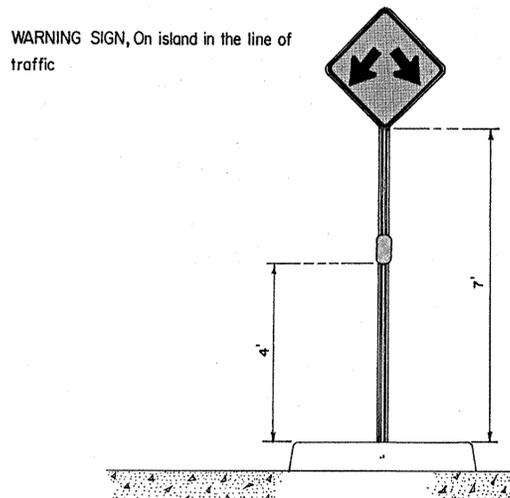
WARNING SIGN WITH SPEED ADVISORY PLATE, Rural district



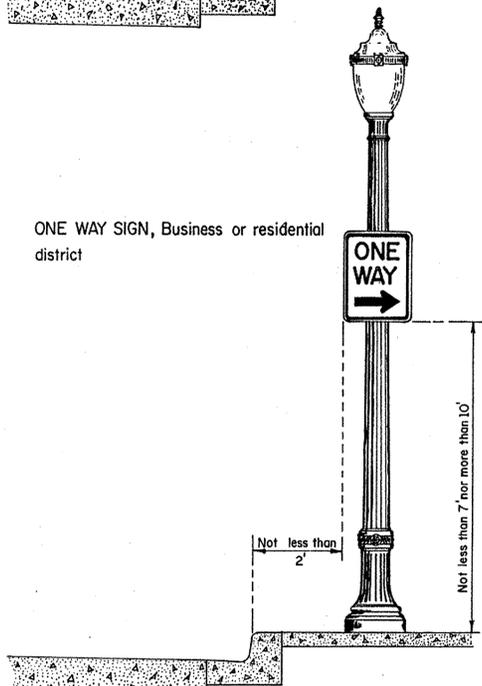
ROADSIDE ASSEMBLY, Rural district



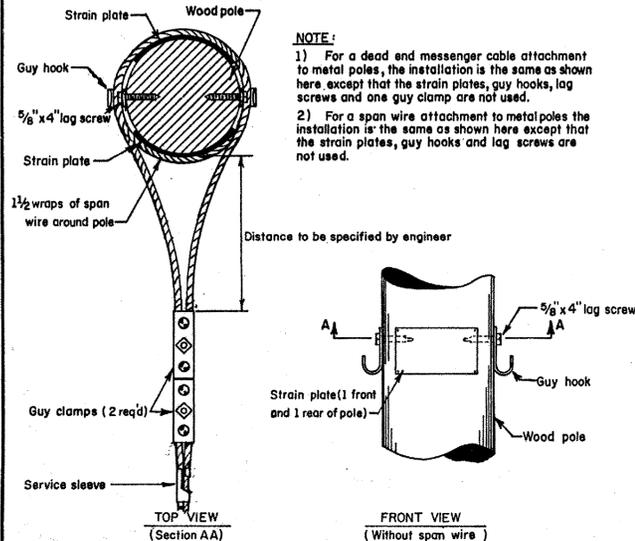
WARNING SIGN, On island in the line of traffic



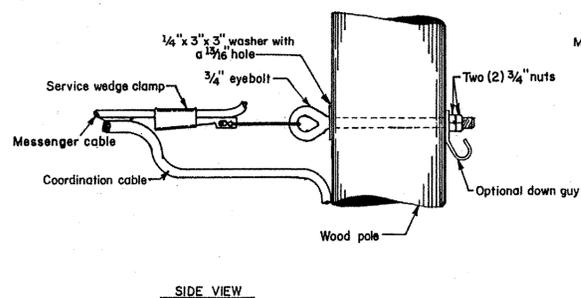
ONE WAY SIGN, Business or residential district



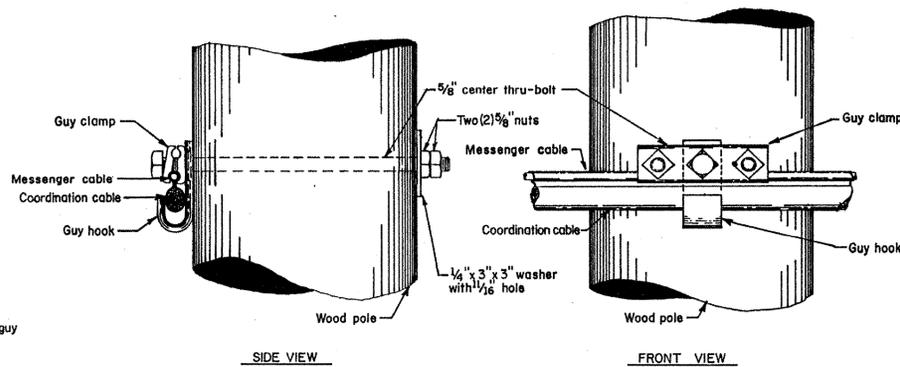
DEAD END MESSENGER CABLE ATTACHMENT (METAL POLES) OR SPAN WIRE ATTACHMENT (WOOD AND METAL POLES)



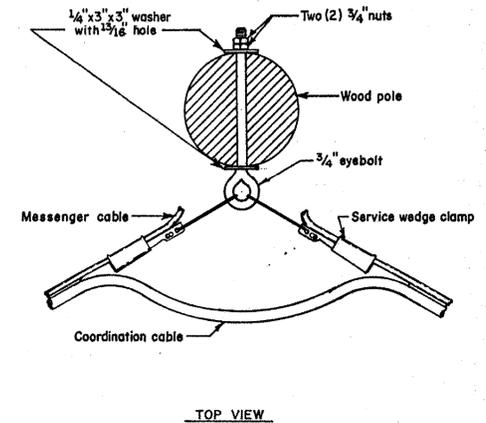
DEAD END MESSENGER CABLE ATTACHMENT (WOOD POLES)



STRAIGHT RUN INTERMEDIATE MESSENGER CABLE ATTACHMENT (WOOD POLES)



ANGULAR INTERMEDIATE MESSENGER CABLE ATTACHMENT (WOOD POLES)

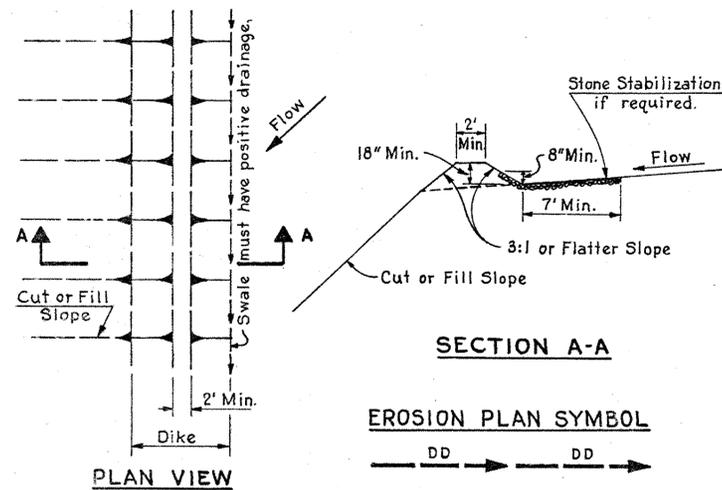


STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION			
STANDARD SHEET NUMBER T-5			
ROADSIDE SIGN PLACEMENT AND SPAN WIRE AND MESSENGER CABLE ATTACHMENTS			
PREL. TRACING R.F.R.	4/24/79 DESIGN	CHKD.	
RECOMMENDED	5/2	1979	R. E. Jansette CHIEF ENGINEER
APPROVED	5/2	1979	R. D. Berwick DIRECTOR OF HIGHWAY
REVISIONS			

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

**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.

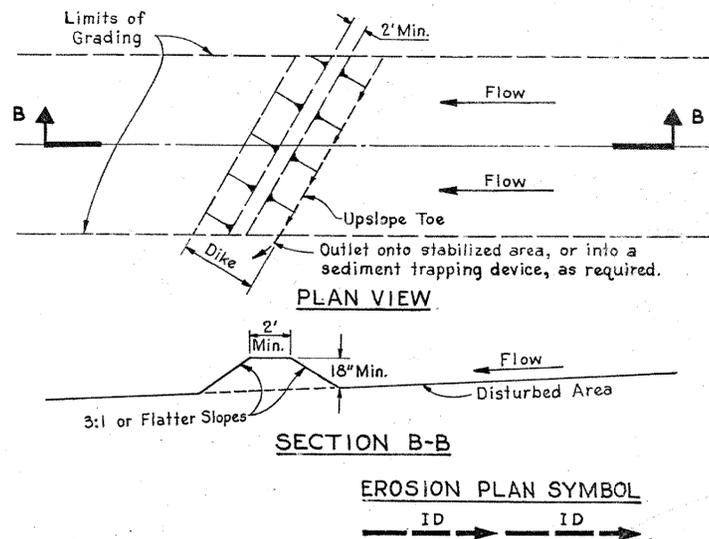


**NOTES:**

- All dikes shall be machine compacted.
- 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).
- 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 No 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.
- 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.
- Diversion dikes must be protected with Section 725, "Erosion Control, Seeding I" or Section 725, "Erosion Control, Seeding II" applied immediately after construction.
- 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.



**NOTES:**

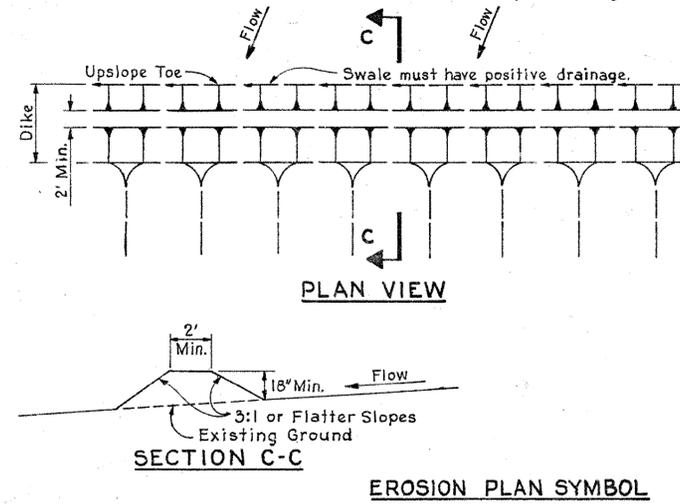
- All dikes shall be machine compacted.
- All interceptor dikes must have positive drainage to an outlet. The grade of the swale, formed at the upslope toe of the dike, shall be from 0.5% to 1.0%.
- The top width may be wider and side slopes may be flatter if desired to facilitate crossing by construction traffic. The area of the construction crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size No 103, which is placed in two separate layers each three inches thick. Each layer is compacted into the soil after placement.
- 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.
- 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.
- 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 No 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
- Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately after construction to protect the dike from erosion.
- 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.



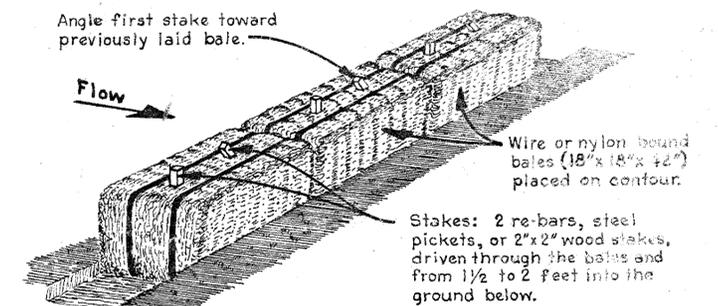
**NOTES:**

- All dikes shall be machine compacted.
- 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).
- 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.
- 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.
- The dikes must be located far enough away from the disturbed area to permit machine regrading and cleanup.
- Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately following construction to protect the dike.
- Periodic inspection and required maintenance shall be provided.

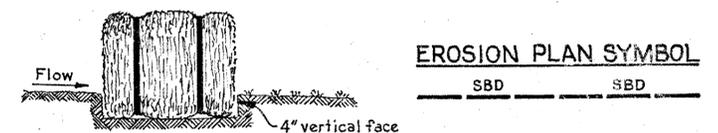
APPROVED: DATE:	STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION
DIRECTOR OF HIGHWAYS	STANDARD SHEET NUMBER EC-1 EROSION CONTROL DETAILS TEMPORARY DIKES
RECOMMENDED: DATE:	PREL. TRACING WJU DESIGN WJU CHKD. REVISIONS
DEPUTY DIRECTOR OF HIGHWAYS	

**TEMPORARY STRAW (or HAY) BALE DIKE**  
(DRAINAGE AREAS LESS THAN 1/2 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 (1/2) 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 of sheet erosion. 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**



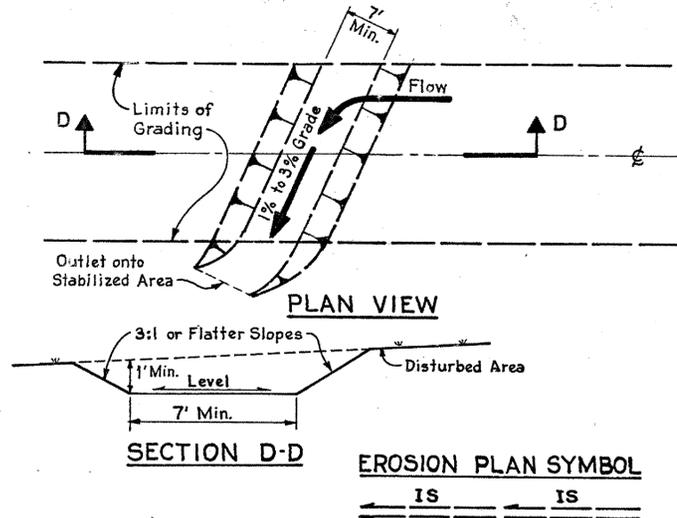
**EMBEDDING DETAIL**

**NOTES:**

- Bales shall be placed in a row with ends tightly abutting the adjacent bales.
- Each bale shall be embedded in the soil a minimum of 4".
- 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.
- Inspection shall be frequent and repair or replacement shall be made promptly as needed.
- 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.



### NOTES:

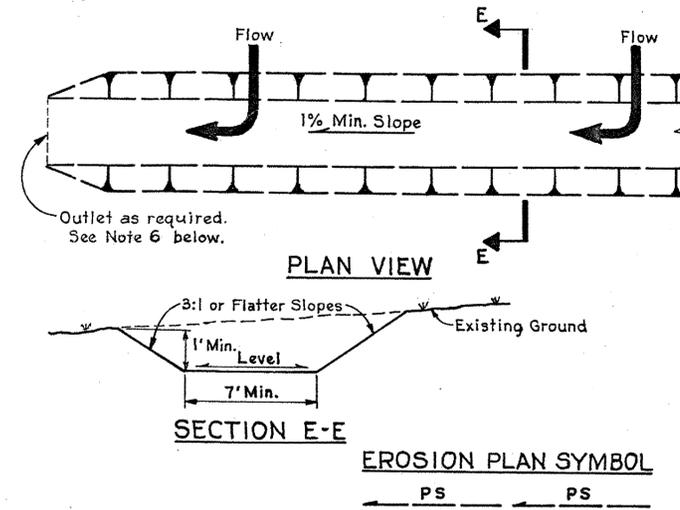
- All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.
- The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free 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.
- Interceptor swales shall have a minimum grade of one percent and the bottom of the swale shall be level.
- 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.
- 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.
- 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 No 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.
- 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 No 103, that is placed in two separate layers each three inches thick. Each layer is compacted into the soil after placement.
- 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.

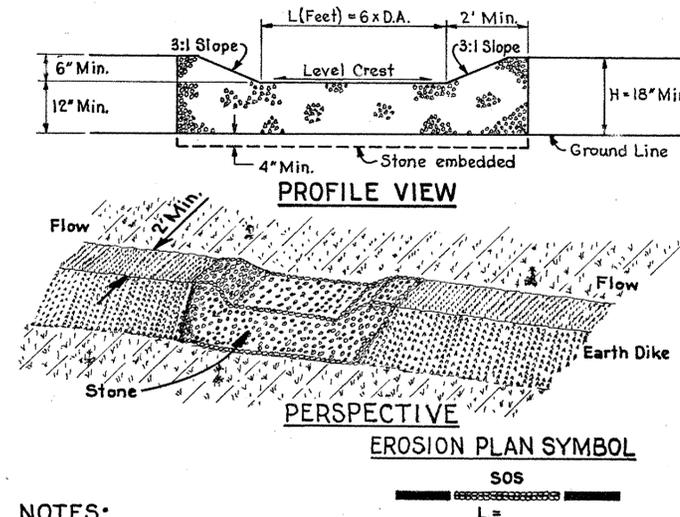


### NOTES:

- 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.
- 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.
- Perimeter swales shall have a minimum grade of one percent and the bottom of the swale shall be level.
- 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.
- 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 No 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.
- 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.



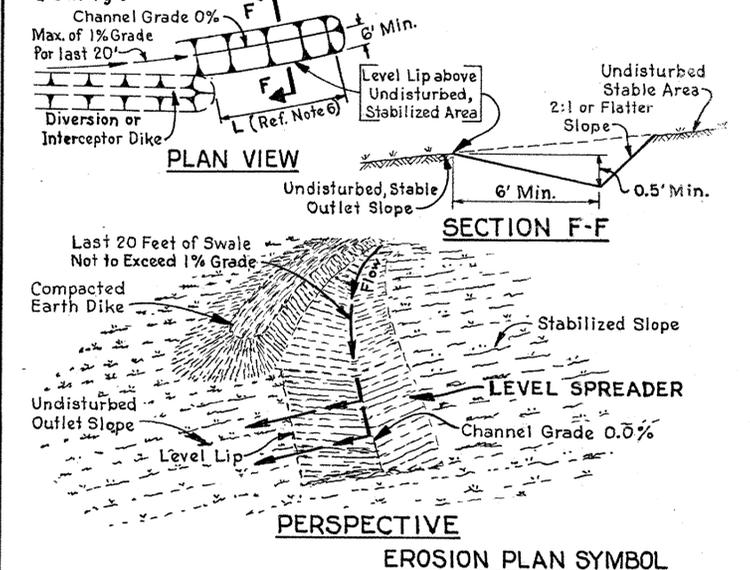
### NOTES:

- 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 No 103.
- 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.
- The stone outlet structure shall be embedded into the soil a minimum of four inches.
- 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.
- 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.
- 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:	STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION		
DIRECTOR OF HIGHWAYS	STANDARD SHEET NUMBER EC-2 EROSION CONTROL DETAILS TEMPORARY SWALES and OUTLET STRUCTURES		
RECOMMENDED: DATE:	PREL. TRACING WRJ	DESIGN WRJ	CHKD.
DEPUTY DIRECTOR OF HIGHWAYS	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 re-concentrated immediately below the point of discharge.



### NOTES:

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

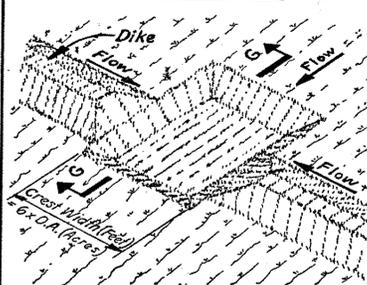
Design $Q_{10}$ (c.f.s.)	Maximum Length L (feet)
Up to 10	15
11 to 20	20
21 to 30	26
31 to 40	36
41 to 50	44
- Periodic inspection and required maintenance shall be provided.

## EARTH OUTLET SEDIMENT TRAPS

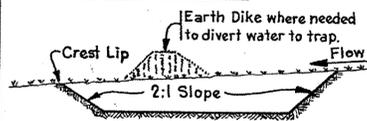
(DRAINAGE AREA: 5 ACRES OR LESS)

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

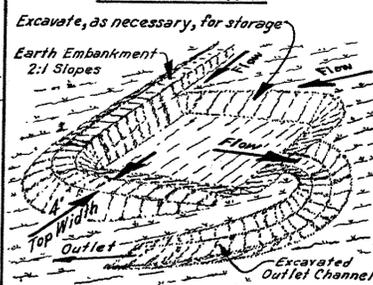


#### PERSPECTIVE

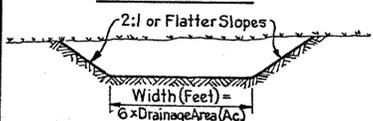


#### SECTION G-G

### EMBANKMENT EARTH OUTLET SEDIMENT TRAP



#### PERSPECTIVE



#### CROSS SECTION OUTLET CHANNEL

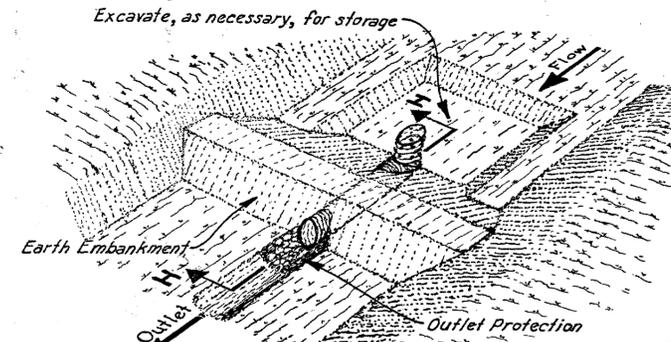
#### NOTES:

- The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
- 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.
- 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.
- 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.
- 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.
- The structure shall be inspected after each rain and repairs shall be made when required.
- Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
- The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

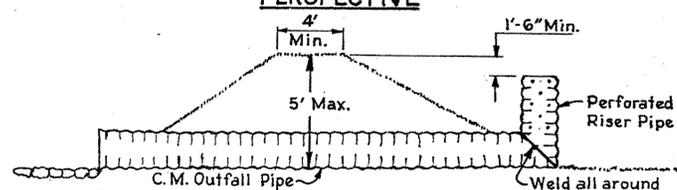
## PIPE OUTLET SEDIMENT TRAPS

(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:

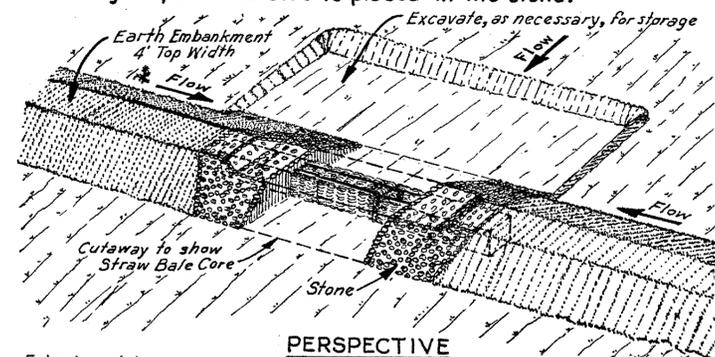
- The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
- The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
- The top of the embankment shall be at least 1 1/2 feet above the crest of the riser.
- The outfall pipe and perforated riser shall be made from corrugated metal. All pipe connections shall be watertight.
- The diameter of the riser shall be the same or larger than the diameter of the outfall pipe. At least the top 2/3 of the riser shall be perforated with 1/2 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
- 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.
- 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.
- Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
- The structure shall be inspected after each rain and repairs shall be made when required.
- Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to 1/2 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.
- The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

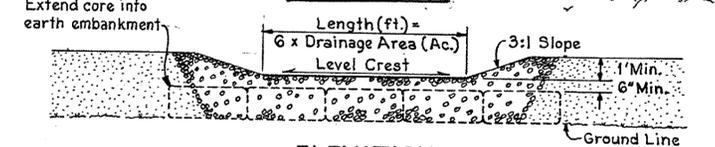
## STONE OUTLET SEDIMENT TRAPS

(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:

- The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
- 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.
- 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).
- 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.
- The crushed stone used to form the outlet shall meet Delaware Standard Gradation Size No. 103. Gravel meeting the above gradation requirement may be used if crushed stone is not available.
- 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.
- Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
- The structure shall be inspected after each rain and repairs shall be made when required.
- Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to 1/2 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.
- The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

APPROVED:	STATE OF DELAWARE
DATE:	DEPARTMENT OF TRANSPORTATION
DIRECTOR OF HIGHWAYS	STANDARD SHEET NUMBER EC-3
RECOMMENDED:	EROSION CONTROL DETAILS
DATE:	SEDIMENT TRAPS
DEPUTY DIRECTOR OF HIGHWAYS	PREL. TRACING WFO DESIGN WFO CHKD. 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.

- The drainage area for a sediment trap shall not exceed 5 acres.
- 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.
- 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:  $Volume (cu. ft.) = 0.4 \times surface\ area (sq. ft.) \times maximum\ depth (ft.)$ .
- 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.
- 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 separately. 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.
- 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.
- 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:
  - type of trap
  - size of outlet
  - trap dimensions
  - embankment height and depth of excavation
  - drainage area.

