

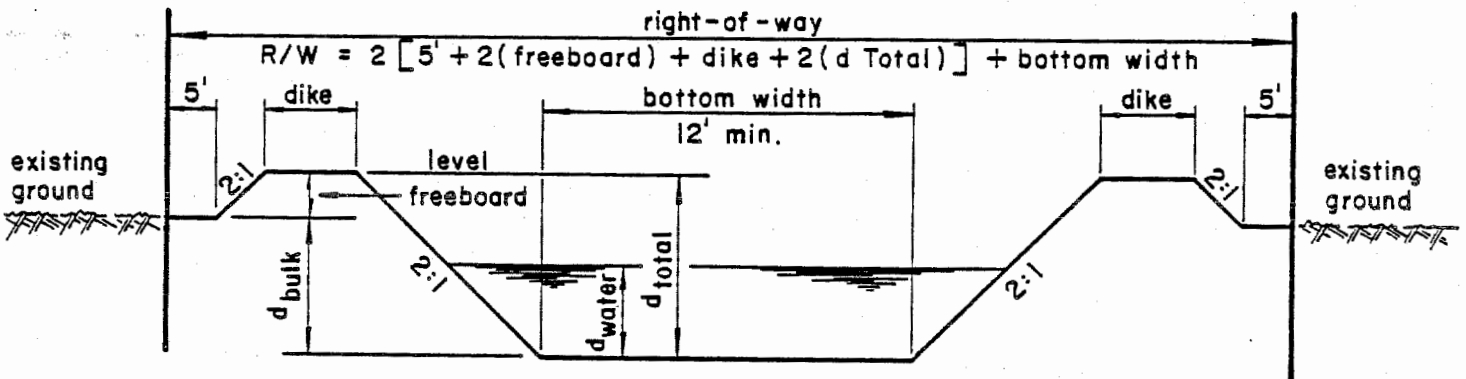
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT STANDARD PLATS

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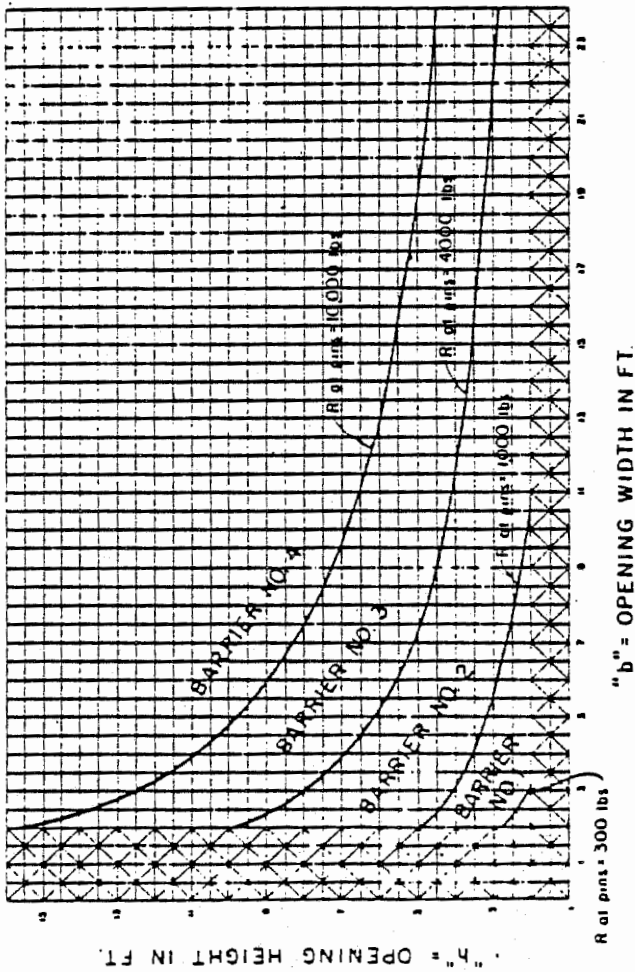
**SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
DESIGN CRITERIA**

- 1) Hydrology calculations shall adhere to the San Bernardino County Hydrology Manual.
- 2) Structural calculations shall adhere to the Los Angeles County Flood Control District Structural Design Manual and to the State of California Department of Transportation Bridge Planning and Design Manuals and the Standard Plans.
- 3) Basin structural design shall adhere to the Los Angeles County Flood Control District Design Manual for Debris Dams and Basins.
- 4) Hydraulic design shall adhere to the Los Angeles County Flood Control District Hydraulic Design Manual and to the State of California Department of Transportation Highway Design Manual. Lined drainage facilities shall be designed with a bulking factor of 50% increase in water depth when there are no facilities to remove debris. Closed conduit systems shall be designed with a surface backup system to handle a Q_{100} frequency storm, a bulking factor of 50% increase in Q_{100} and a debris basin system to remove debris. Culverts under roadways, except when connected to lined open channels, shall be designed in accordance with Caltrans Highway Design Manual.
- 5) Earth channel design shall adhere to the following:
 - a) Bulk depth
 - i) For graded earth channels, use $d_{bulk} = 1.5d_{water}$
 - ii) For natural drainage courses, compute d_{bulk} based upon $Q_{bulk} = 2 Q_{100}$
 - b) For total depth use $*d_{total} = d_{bulk} + \text{freeboard}$
 - * When " V " < 6 f.p.s. - use $d_{water} + 2'$ freeboard
 - 8 f.p.s. > " V " > 6 f.p.s. use $d_{bulk} + 2'$ freeboard " V " = velocity
 - " V " > 8 f.p.s. use $d_{bulk} + 3'$ freeboard
 - c) Dike width
 - When bottom width = 12' to 40' use dike width + 15'
 - bottom width = 40' or more use dike width = 18'



EARTH CHANNEL SECTION

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
	FILE NO.	
	S.P. 100	

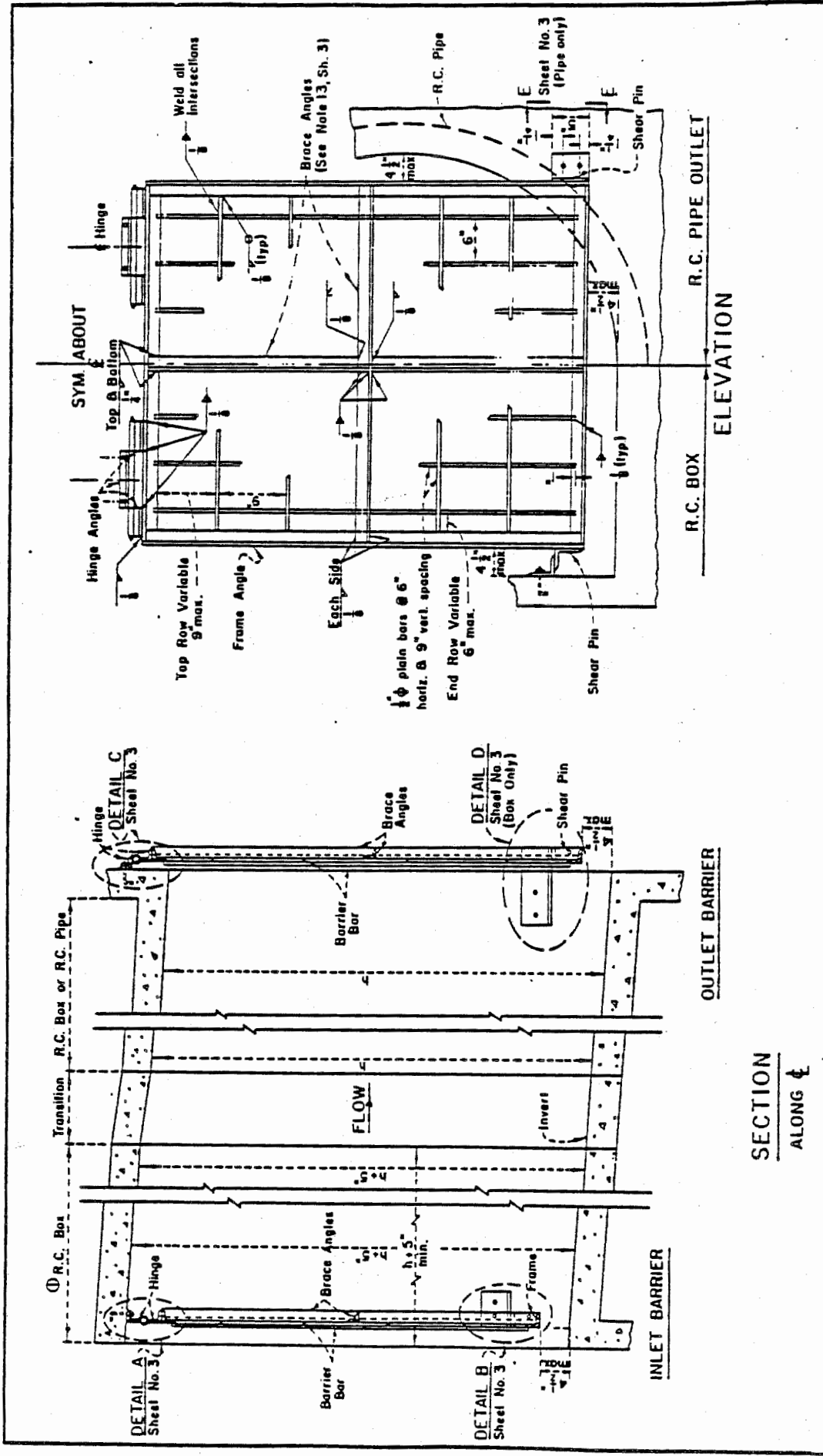


The curves represent reactions at the shear pins due to hydrostatic head on the debris-obstructed barriers. The height and width of the openings determines which barrier (see sheet 3), numbers 1, 2, or 3 between the curves, or number 4 beyond the curves, is to be used.

PROTECTION BARRIER

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT	
REVISIONS	DWR. BY K.J.K.
	DATE 11-18-85
	FILE NO. S.P.101-1

Note: Barrier number shall be specified on project drawings.



SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT	
REVISIONS	DWN. BY K.J.K.
	DATE 11-18-85
	FILE NO. S.P.101-2

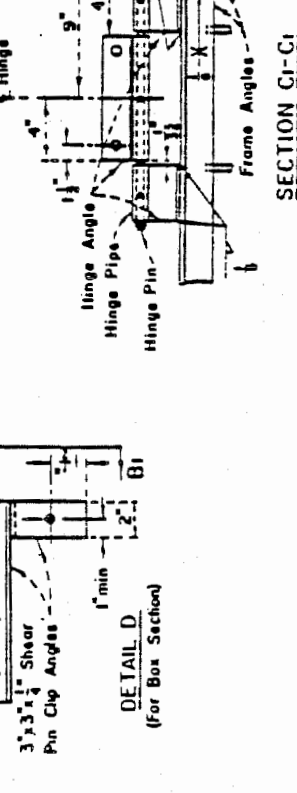
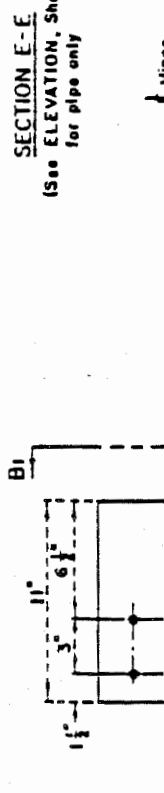
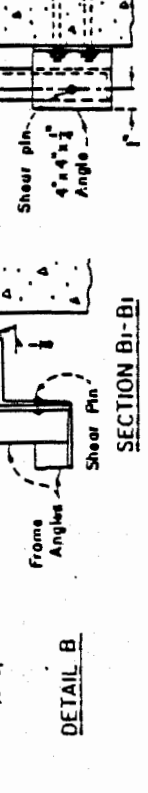
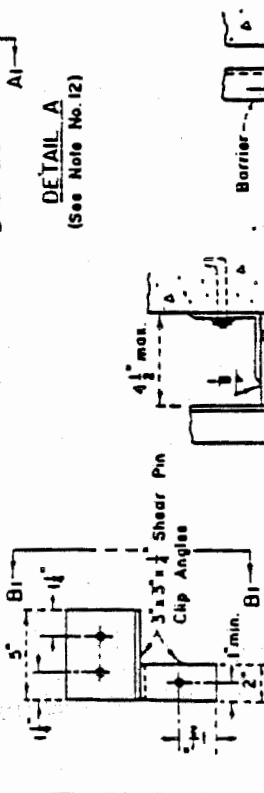
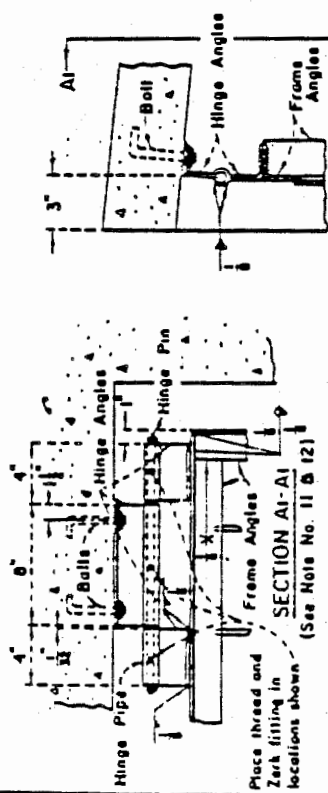
NOTE: For Protection Barrier member sizes, see Sheet 3.
 Structural Design Details of R.C. Box containing Inlet Barrier shall be delineated on the Project Drawings.

SECTION
ALONG 4-4

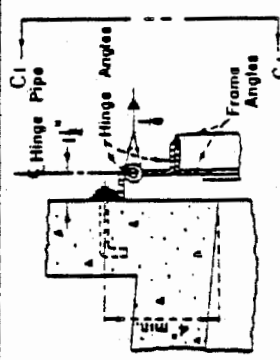
GENERAL NOTES:

- Angles connected with shear pins shall fit snugly and truly face to face.
- The shear pin holes shall be drilled so as to provide a tight fit with the shear pins in place.
- All shear pins shall be peened on both ends after installation.
- The aluminum shear pin material will be furnished by the District to the Contractor.
- All 5/8-inch diameter bolt holes shall be drilled on the gage lines of the angles.
- All bolts shall be 5/8-inch in diameter embedded a minimum of 4 inches into concrete or equivalent expansion bolts, and shall be furnished with hex nuts and metallic washers at least 3/32-inch thick.
- Frame, brace, and hinge angles shall have the outstanding legs facing in the direction of flow for both inlets and outlets, see Section sheet 2.
- Thread ends of hinge pin so that nuts and lock washers will be flush with the hinge angle. Damage threads beyond the nut face. Use bolt stock for pin.
- Galvanize all ferrous parts after fabrication.
- Cover all movable contact surfaces with a coat of waterproof grease prior to installation.
- For barriers 36 inches and less in width, use one hinge the full width of barrier.
- If the barrier width exceeds 12 feet, provide an additional hinge on the centerline of the barrier.
- For barriers exceeding 6 feet in height or width, use brace angles evenly spaced at a maximum of 6 feet on center.
- Shear pin material shall be commercially pure aluminum wire, alloy 1100, temper O.

Refer to part J of the specifications for additional requirements and material specifications



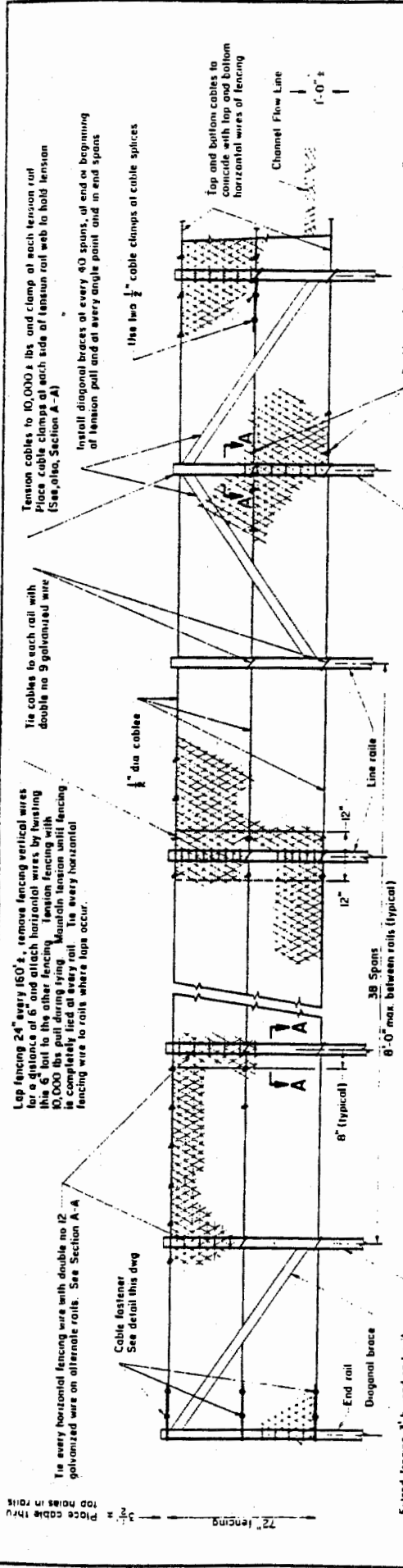
Barrier No.	Frame Angle	Brace Angle	Shear Pins	Inlet Hinge Angles		Outlet Hinge Angles	Hinge Pin
				Upper	Lower		
1	2"x2"x1/2"	2"x2"x1/2"	1"φ	2"x2"x1/2"	2"x2"x1/2"	2"x2"x1/2"	1"φ
2	3"x3"x1/2"	2"x2"x1/2"	1"φ	2"x2"x1/2"	2"x2"x1/2"	2"x2"x1/2"	1"φ
3	4"x4"x1/2"	2"x2"x1/2"	1"φ	3"x3"x1/2"	3"x3"x1/2"	3"x3"x1/2"	1"φ
4	5"x5"x1/2"	2"x2"x1/2"	1"φ	5"x5"x1/2"	5"x5"x1/2"	5"x5"x1/2"	1"φ



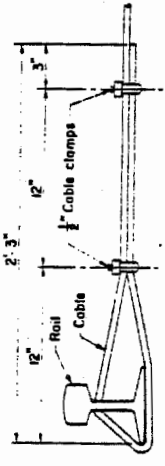
**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

REVISIONS	DRAWN BY	DATE
	K.J.K.	11-18-85

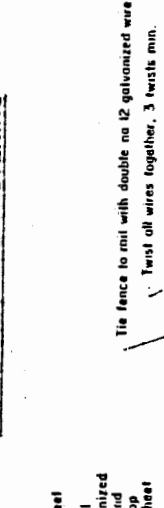
FILE NO. **S.P. 101-3**



DETAIL OF FENCING, FASTENING & BRACING



DETAIL OF CABLE FASTENING



SECTION A-A

(Typical Center & Bottom Cable)

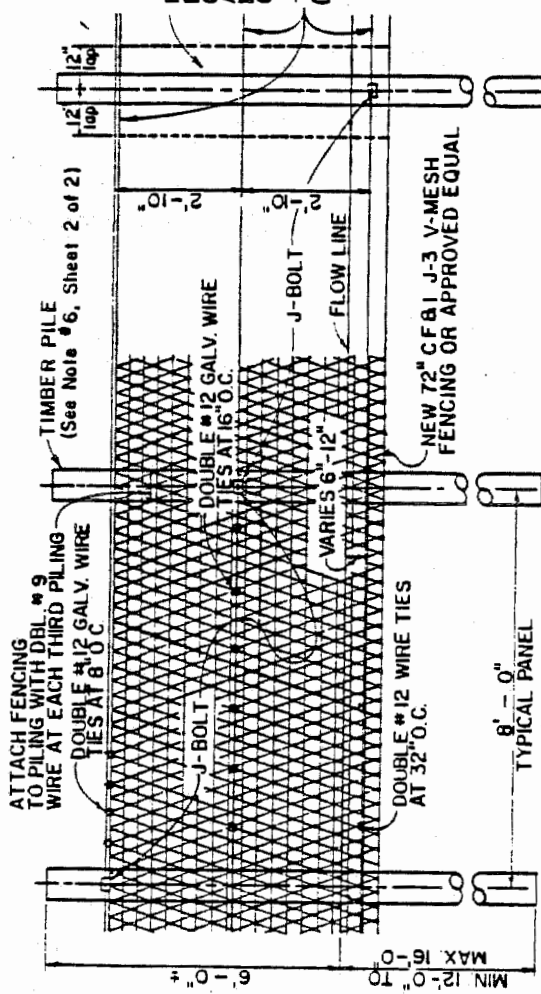
GENERAL NOTES:

1. The term "Engineer," where it appears hereon, shall be taken to mean the authorized representative of the District.
2. Used cable and rail may be used as approved by the Engineer. Used cable shall be 9/16" min dia
3. Diagonal braces on some cross section as rails. Weld braces to rails with a min of 9" of 3/8" fillet weld, symmetrically placed. Cut ends of braces to fit snugly against rails prior to welding
4. Rails shall be 15' foot minimum length, and 60 lbs minimum weight per yard
5. The term "fencing," where it appears hereon, shall be taken to mean new 72" Colorado Fuel & Iron, Type J-3, V-Mesh fence fabric, or an approved equivalent
6. All galvanized wire shall be annealed and of sufficient strength to provide a satisfactory connection

RAIL & WIRE REVETMENT
(WITH SHEET METAL BACKING)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT	
REVISIONS THIS PROGRAM IS AT DATE 8 DATE 2 2 1964 CHANGE NOTES ON SHEET 114 SHEET FILE # 40000 2 8-74 ALL SHEETS SHALL BE IN THE	OWN BY J. J. B.
DATE March 71	FILE NO. S.P. 114

TYPICAL SECTION



NOTE:
FOR GENERAL NOTES & ADDITIONAL
DETAILS SEE SHEET 2 OF 2.

REMOVE VERTICAL WIRES A
DISTANCE OF 6" AT EACH END
OF 12" FENCE LAP AND
ATTACH HORIZONTAL WIRES
BY TWISTING THIS 6" TAIL TO
OTHER FENCING.
TENSION CABLES
(See Note #1, Sheet 2 of 2)

DETAIL OF FENCE AND CABLE FASTENINGS

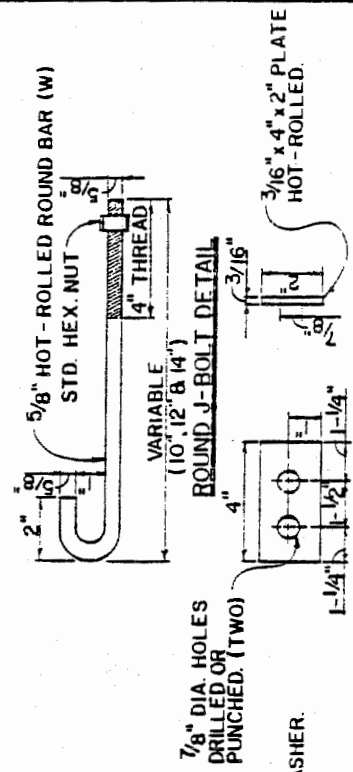


PLATE DETAIL



WASHER DETAIL

J-BOLT DETAIL

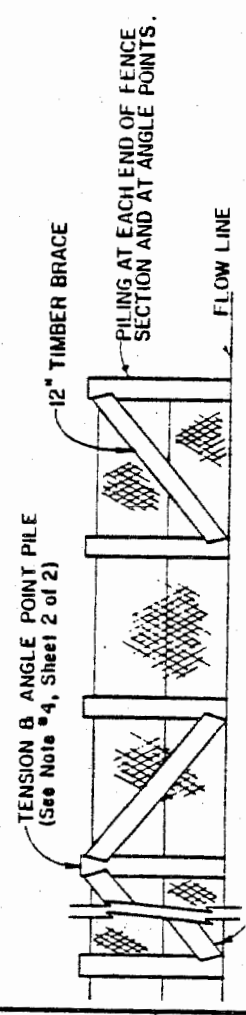
PLAN

WIRE FASTENER

END PILING DETAIL

BRACE DETAIL

PILING J-BOLT



TIMBER PILE FENCING

FENCING ON DRY SIDE

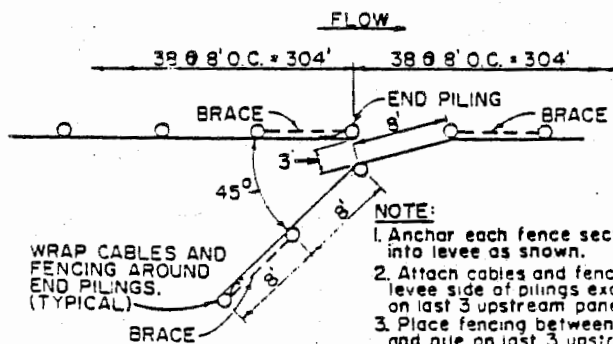
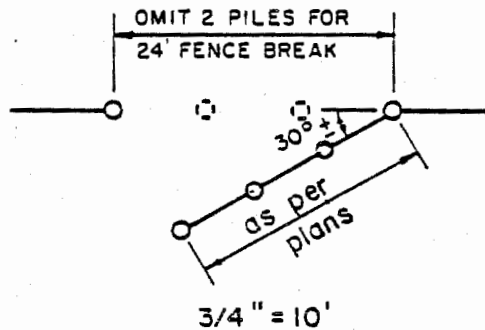
NO SCALE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		OWN BY	DATE
REVISIONS	FENCE NAME 10 24 6'	B. W.	6/10/69
	NOTES ADDED 8-30-71		
	REVISED 9-15-71		FILE NO
			SP 162
			(1 of 2)

GENERAL NOTES:

1. Tension cable to be new 1/2", or used 9/16", 6 x 7 hemp core center wire rope in good condition and free from broken wires.
2. Tension cables 10,000 + lbs. and clamp at each tension pile. Place cable clamps at each side of tension pile to hold tension.
3. Tension fencing with 10,000 + lbs. pull during tying. Maintain tension until fencing is completely tied at every pile. Tie every horizontal fencing wire to piles where laps occur.
4. Install diagonal braces at every 40 spans, at end or beginning of tension pull, and at every angle point and in end spans.
5. Use two 1/2" cable clamps at all cable splices.
6. Timber pile to conform to Specification on file in the Department of Transportation/Flood Control.
7. For rock bank protection see S. P. 202.

DETAIL OF FENCE BREAK AT ACCESS RAMP

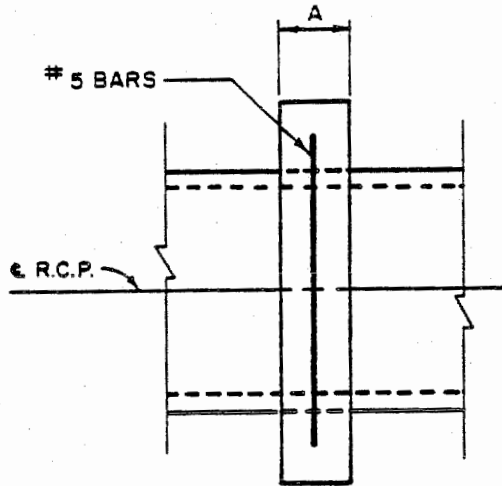


NOTE:
 1. Anchor each fence section into levee as shown.
 2. Attach cables and fencing on levee side of pilings except on last 3 upstream panels.
 3. Place fencing between cable and pile on last 3 upstream piles.

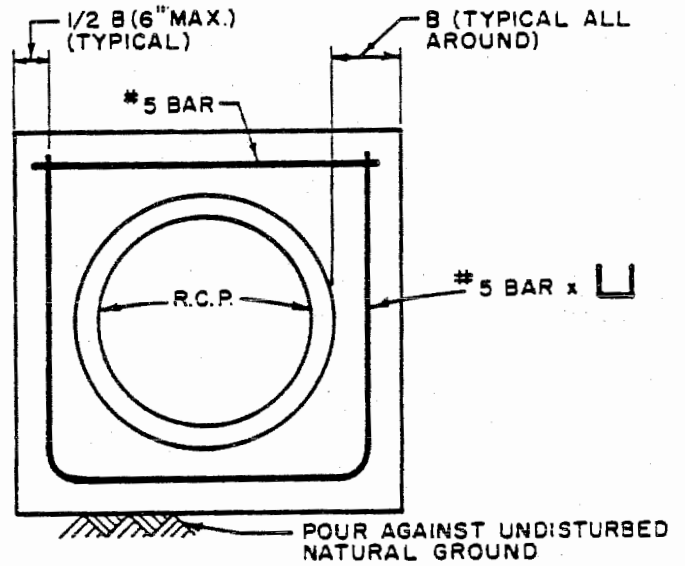
ANCHOR DETAIL

**SAN BERNARDINO COUNTY
 FLOOD CONTROL DISTRICT**

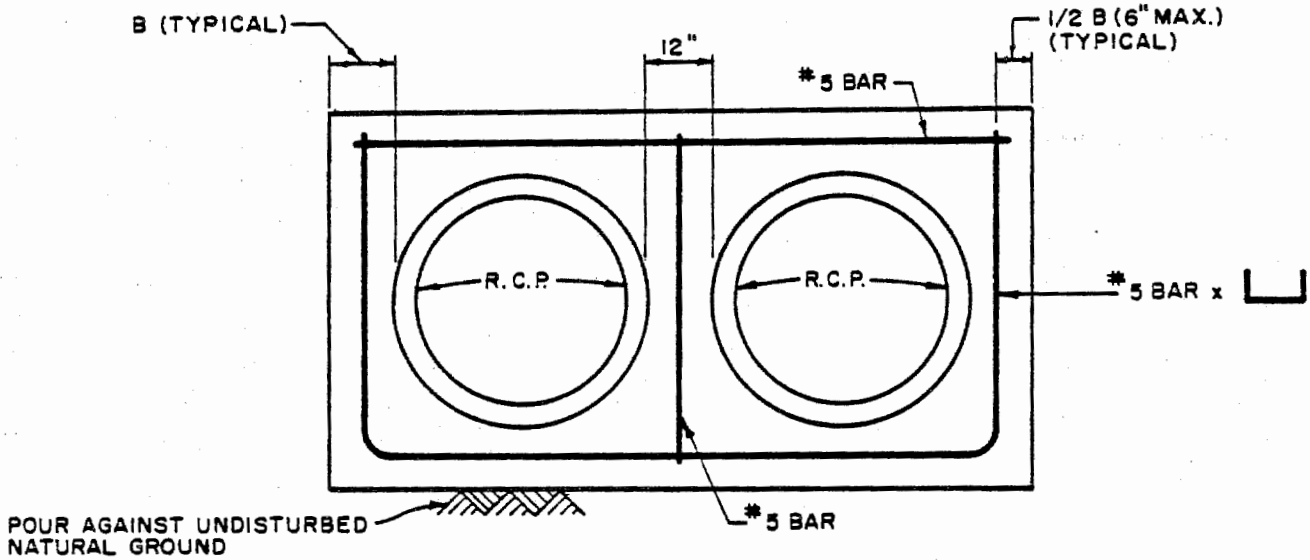
REVISIONS	DWN. BY	DATE
	R.L.H.	8-30-71
	FILE NO. S.P. 162 (2 of 2)	



TYPICAL ELEVATION



SINGLE DRAIN



DOUBLE DRAIN

NOTES:

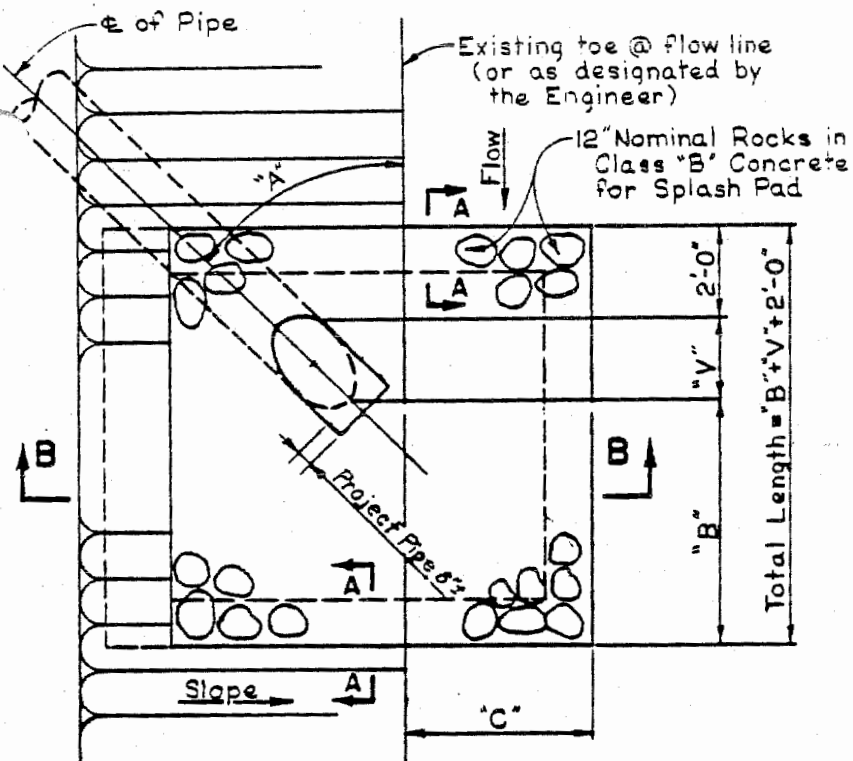
1. UNLESS OTHERWISE NOTED ON THE PLANS USE A=12", B=12"
2. SEE PLANS FOR COLLAR LOCATION AND SPACING

R.C.P. COLLAR DETAIL

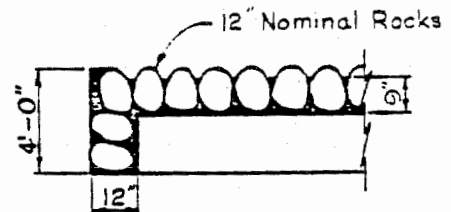
(Use Class "A" concrete, f'c = 3000 p.s.i.)

**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

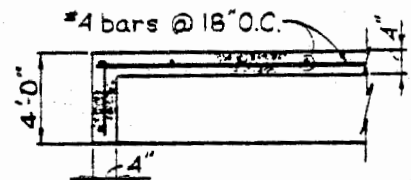
REVISIONS		DWN. BY	DATE
REVISED	3-4-70	R.L.H.	3-4-70
TITLE	3-9-70		
		FILE NO.	
		S.P. 167	



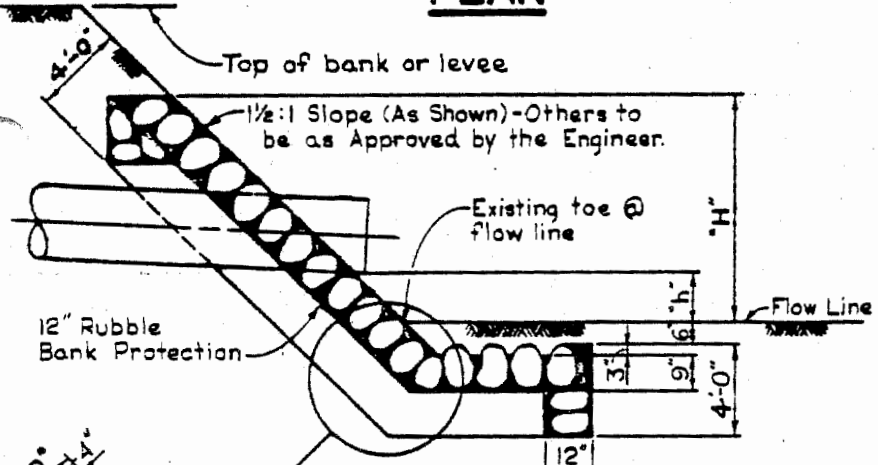
PLAN



SECTION A-A



ALTERNATE SECTION A-A
REINFORCED CONCRETE SLAB ON SLOPE IN LIEU OF RUBBLE



SECTION B-B



ALTERNATE

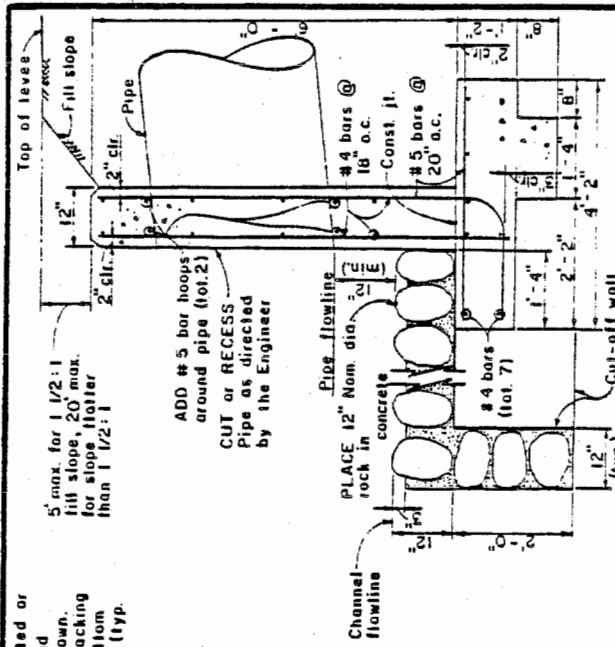
REINFORCED CONCRETE SLAB ON SLOPE IN LIEU OF RUBBLE

NOTES:

- "A" Varies 30° to 45°
- "B" Varies 5'-0" for 18" diameter pipe & smaller; 6'-0" to 36" diameter pipes.
- "C" Varies 4'-0" for 18" diameter pipe & smaller; 6'-0" to 36" diameter pipes, except for Channels not exceeding 10' width. Place pad across entire Channel width and place Rubble Bank Protection up opposite side to provide symmetrical section.
- "H" Minimum 5'-0" for Channels of 5'-0" depth or greater, otherwise to top of bank or levee
- "h" Shall be 12" unless noted. Pipe shall be placed at an approved location & elevation.
- "V" Varies with pipe size and Angle "A".

DETAILS OF PIPE THRU TRAPEZOIDAL EARTH CHANNEL (FOR 36" DIA. PIPE AND SMALLER)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
Proj. Pipe 11-1-65	C.B.	10/18/63
C.O. Wall Dim. 10-13-72		
	FILE NO.	
	S.P. 183-A	



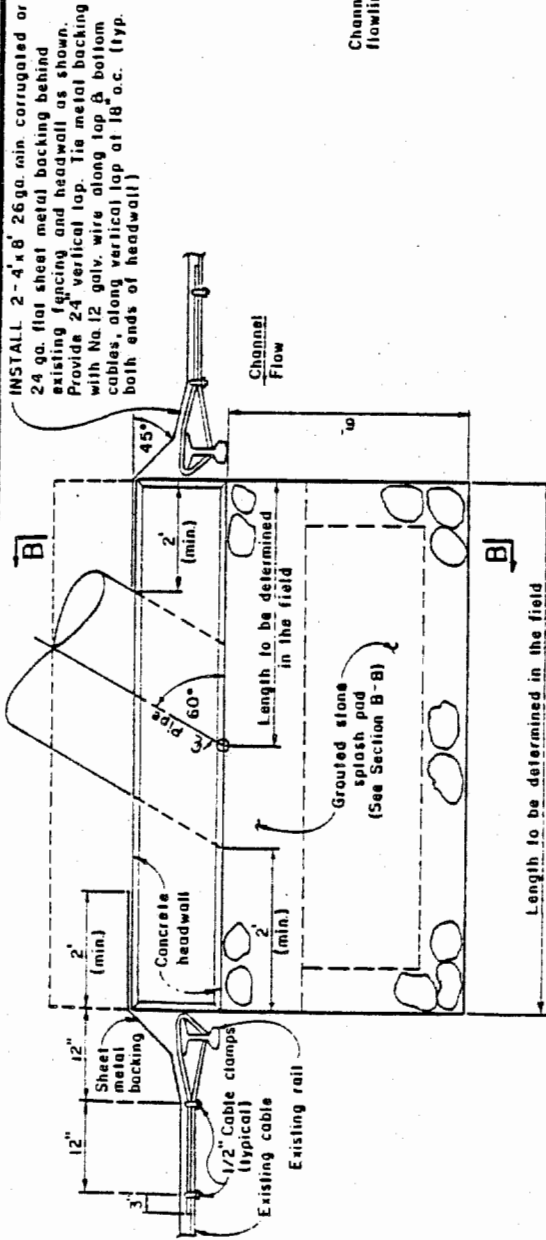
SECTION B-B

NOTES

1. In general, all construction materials and construction methods shall conform to the Standard Specifications of the State of California.
2. Headwall structure shall be of class A concrete, unless otherwise specified.
3. Headwall and pipe shall be placed at a location and elevation as approved by the Engineer.
4. Fence cables shall be cut and connected to existing rails as shown. Diagonal bracing shall be installed on each side of concrete headwall as shown. Existing sheet metal backing shall be removed from area where concrete headwall is to be constructed.

**SIDE INLET WITH HEADWALL
THRU R & W REVETMENT
(FOR 36" DIA. PIPE AND SMALLER)**

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT	
REVISIONS	DATE
	J. E. S. 6-6-75
S. P. 183-B	



ENLARGED PLAN

Tie every other horizontal fencing wire with double No. 12 galv. wire (typical both ends of headwall)

INSTALL 65 to 90 lbs. rail for a diagonal brace-WELD Both ends of brace to exist. rails (typical both ends of headwall)

CONSTRUCT Concrete headwall as shown (See details on this dr.w.g.)

CONSTRUCT Grouted stone splash pad as shown (See details on this dr.w.g.)

CONSTRUCT Headwall floating

Cut-off wall

CUT & REFASTEN Existing cables as shown without any loss of existing cable tension. (See details above - typical)

EXIST. rail (typical)

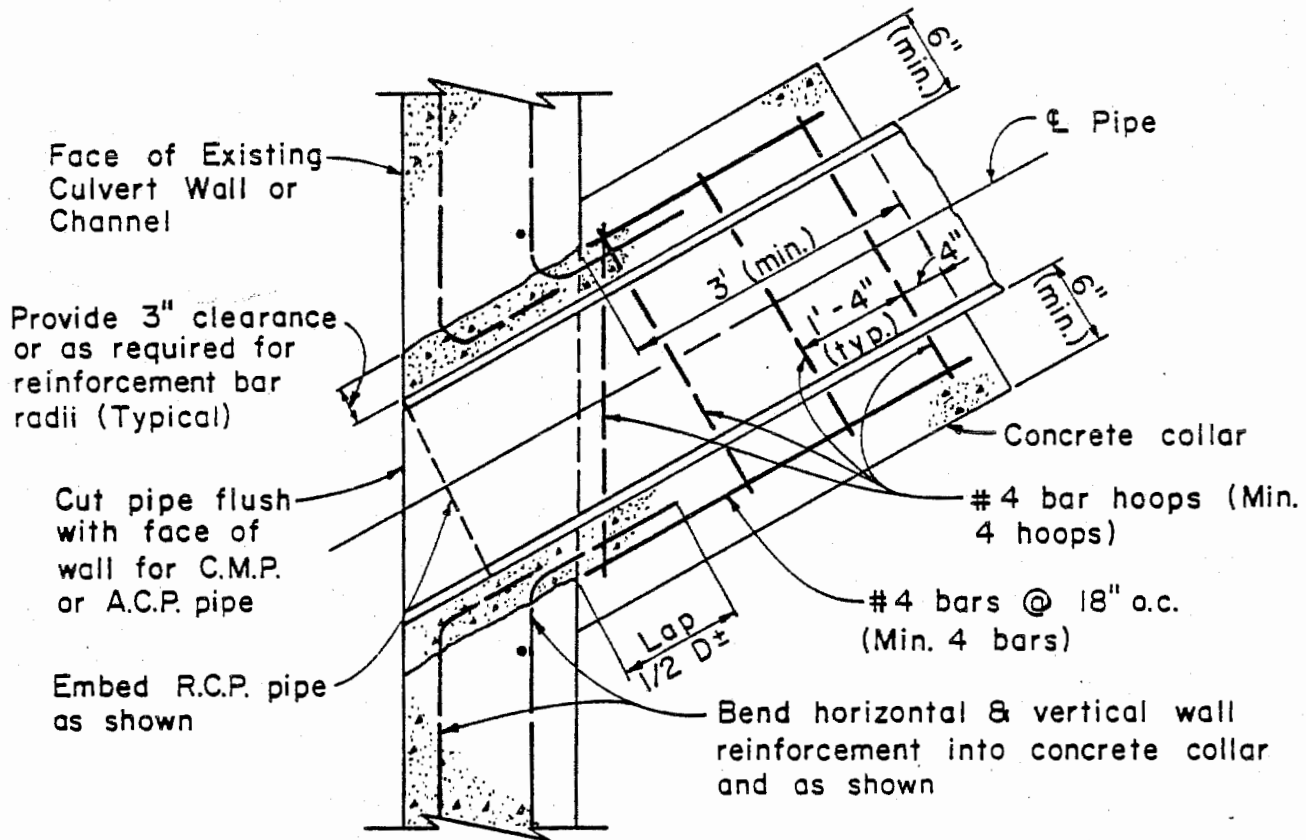
EXIST R & W revetment

Channel flowline

EXTEND Fencing 3' beyond rail, remove fencing vertical wires for a distance of 6" loop fencing around rail and twist the 6" rails five times lightly to their corresponding horizontal fencing wires. (typical both ends of headwall)

HEADWALL ELEVATION

S. P. 183-B



NOTES:

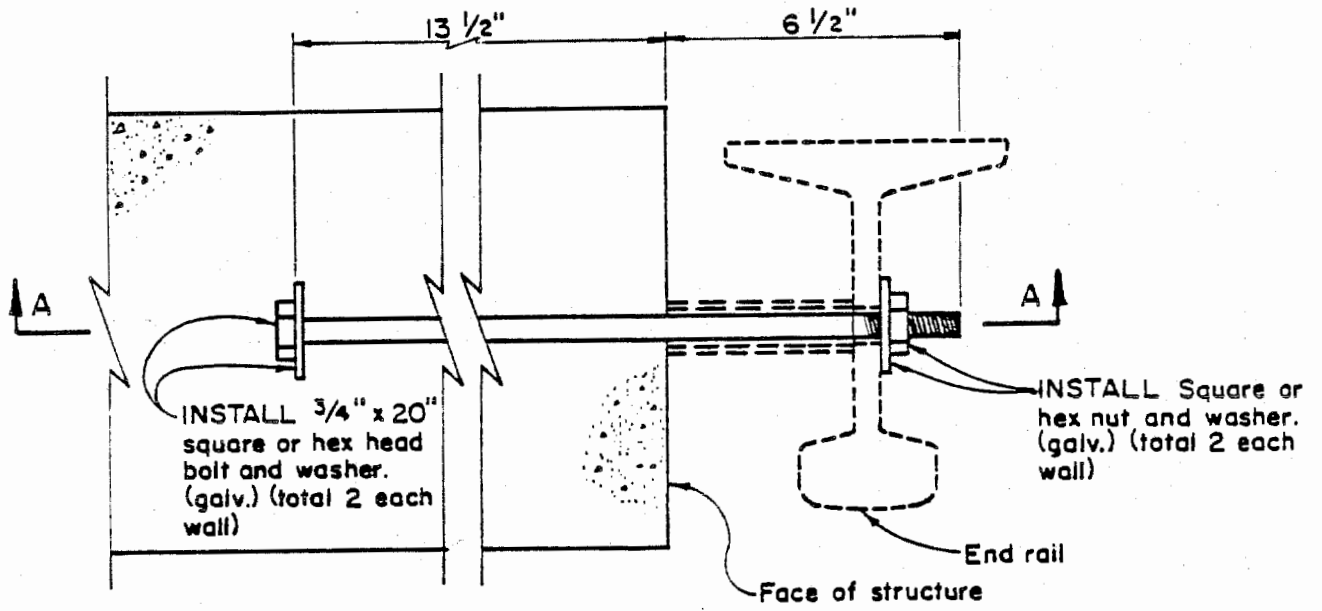
1. In general, all construction materials and construction methods shall conform to the Standard Specifications of the State of California.
2. "D" means inside diameter of side drain pipe.

SIDE DRAIN
INSTALLATION DETAIL

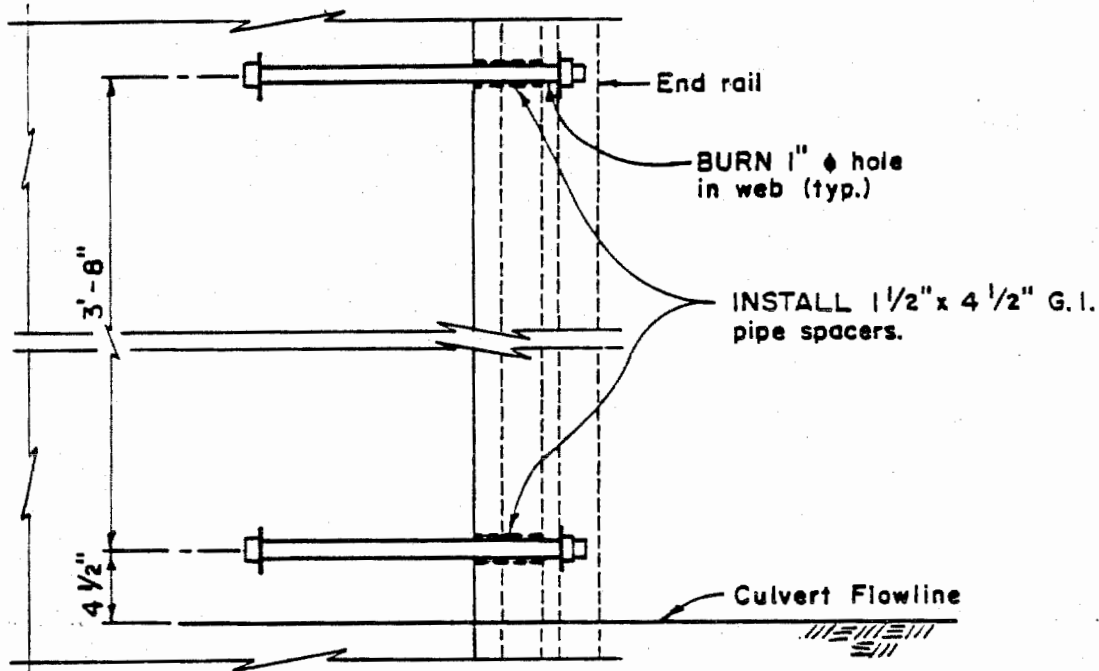
For Use With 24" I.D. Pipe or Smaller
Use Special Design For Larger Pipes

**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

REVISIONS	DWN. BY	DATE
	J.E.S.	8-27-75
	FILE NO.	
	S.P. 187 A	



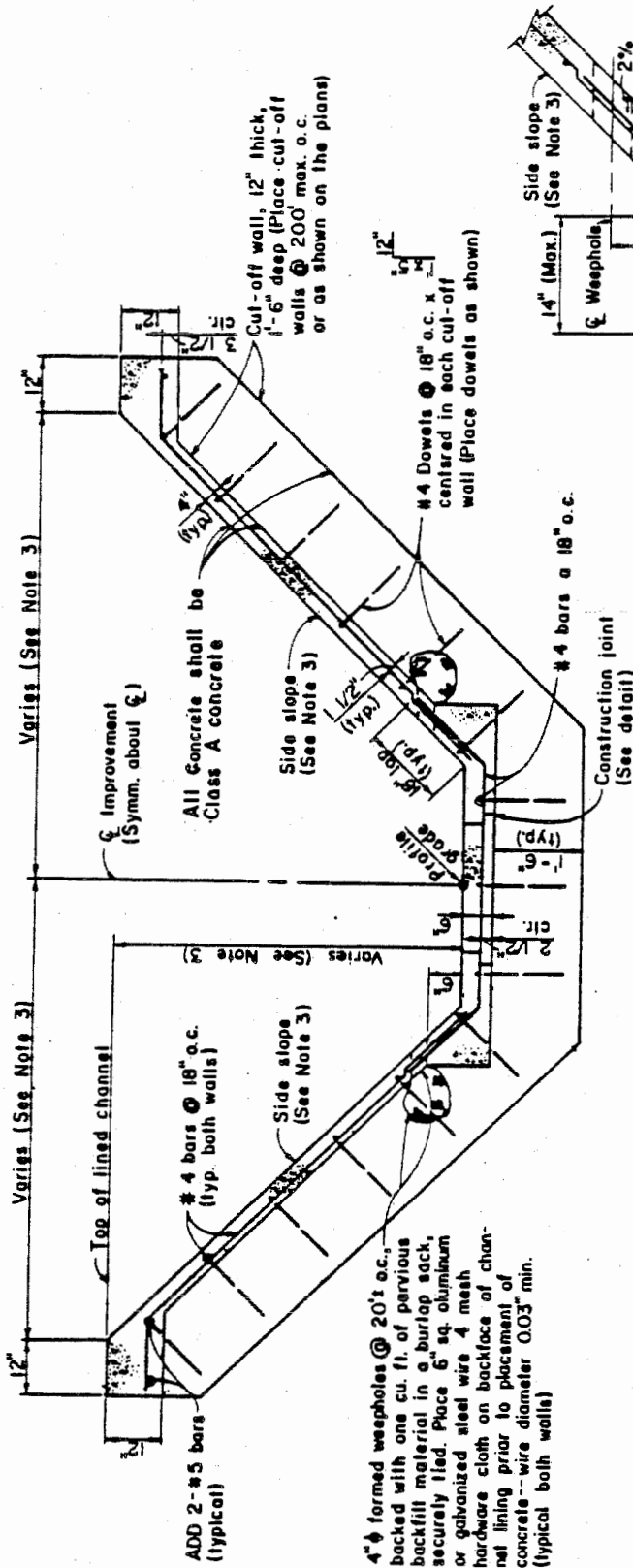
SECTIONAL PLAN
(BOLT DETAIL)



SECTION A-A

RAIL AND WIRE REVETMENT
RAIL ANCHOR DETAIL
(FOR INSTALLATION IN ENDS OF WALLS)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
	K.D.G.	9-28-72
	FILE NO.	
	S.P. 189 C	



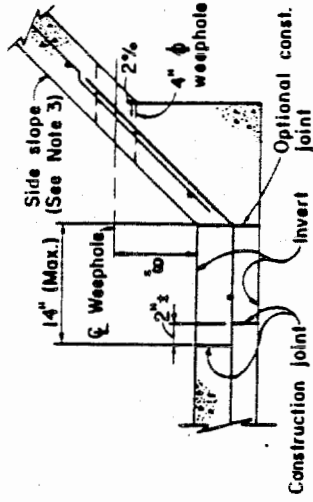
TYPICAL CHANNEL LINING DETAIL-CONCRETE PAVED

NO SCALE

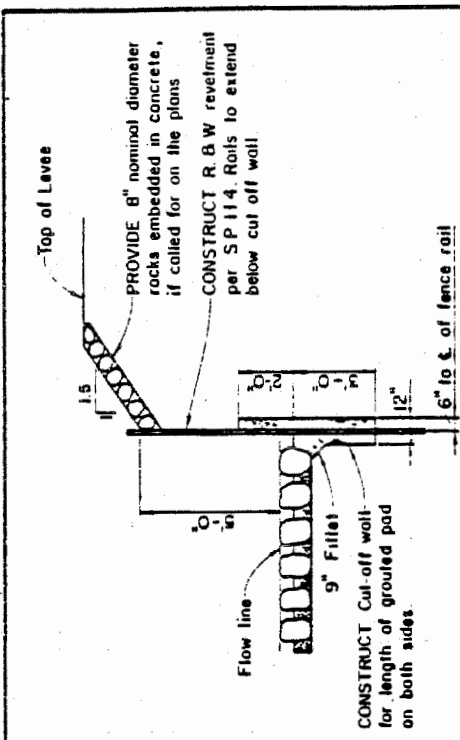
1. In general, all construction materials and construction methods shall conform to the Standard Specifications of the State of California.
2. See Special Provisions for additional data relative to channel lining.
3. For dimensions and side slopes, see Typical Channel Section on Plan and Profile drawings
4. Saw cut transverse weakened plane joints in the invert and side walls of the channel at 20' x O.C. The first and last joints shall be placed 20' from each cut-off wall. Joints shall be 1/4" maximum in width and to a depth of within 1/2" of the reinforcement.
5. The interval of weepholes shall be such that a weephole will be located 2' upstream of all cut-off walls and transverse weakened plane joints.
6. The reinforcement mat shall be supported in both directions at 4' maximum spacing or as directed by the Engineer.
7. Slope paved walls shall be placed by machine using traveling or slip form and shall be externally vibrated by use of a traveling vibrating screed or equivalent as approved by the Engineer. Surfaces of the channel lining shall be finished by a light brooming and shall be protected against scarring and damage.

CONSTRUCTION JOINT

NO SCALE



SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		OWN BY	DATE
REVISIONS		J.E.S.	5-27-75
REV. NOTES	11-5-75		FILE NO.
Rev. note 4	12-15-75		
Added note 5	6-14-77		SP. 192 E
Rev. note 7	3-19-84		

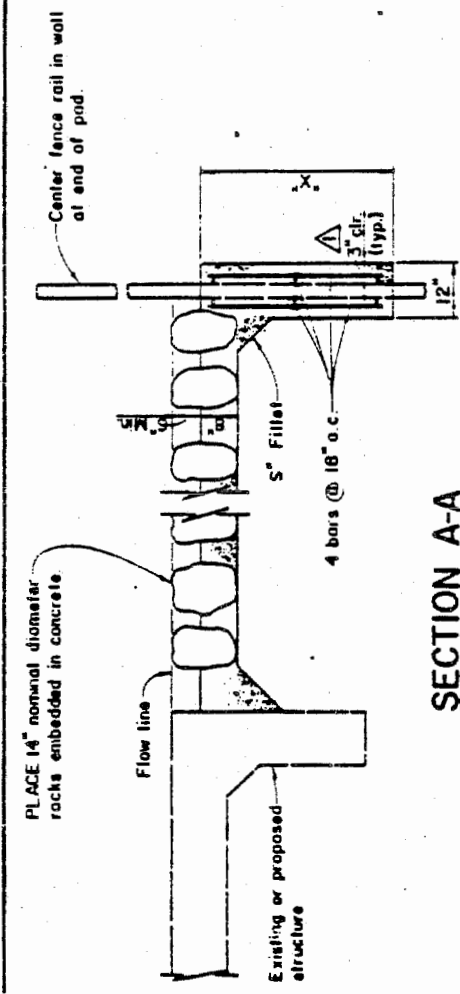


SECTION B-B

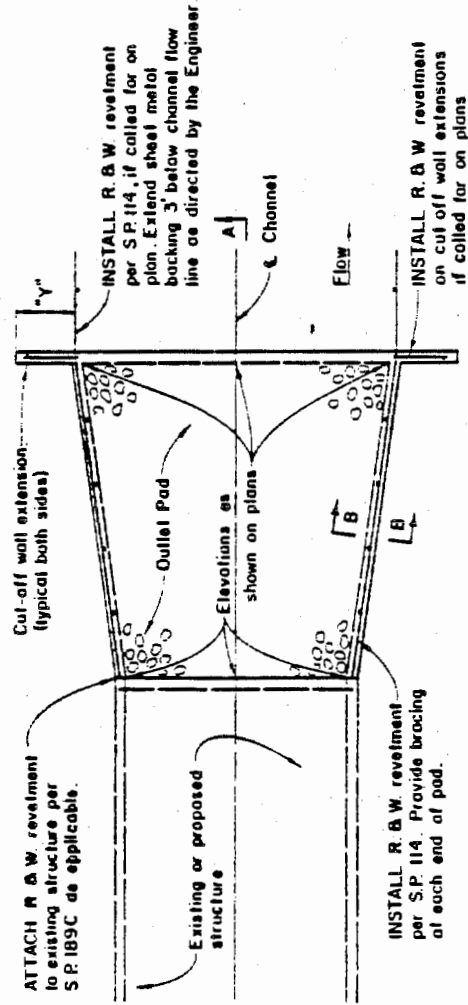
NOTES:

1. Dimensions of the Outlet Pad and dimensions "X" & "Y" to be as shown on the plans.
2. Concrete to be Class "B" concrete unless otherwise noted on the plans or as directed by the Engineer.
3. All reinforcing bars shall be grade 60.
4. Clean, roughen and remove scum and loose aggregate from the face of all existing concrete against which new concrete is to be poured. Wet surface and apply a coating of cement grout. Pour the new concrete against the grout before it sets.

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT	
REVISIONS	DWN BY DATE
A. Changed Dim	C B 10-3-66
FILE NO SP.196-A	



SECTION A-A



TYPICAL PLAN

GROUTED STONE OUTLET PAD DETAIL

FC1



BLACK ON WHITE
18"x18"
LINE 1 - 3"
LINES 2 & 3 - 1 1/2"
LINES 4 & 5 - 1"

FC2
(CR9)



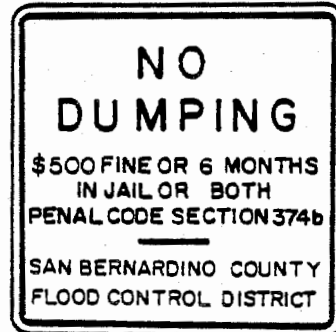
BLACK ON WHITE
18"x18"
LINES 1 & 2 - 3"
LINES 3 & 4 - 1 1/2"
LINES 5, 6 & 7 - 1"

FC3
(CR12)



RED ON WHITE
20"x20"
LINE 1 - 3"
LINES 2, 3 & 4 - 2"
LINES 5 & 6 - 1"

FC4



BLACK ON WHITE
18"x18"
LINES 1 & 2 - 2 1/2"
LINES 3, 4, 5, 6 & 7 - 1"

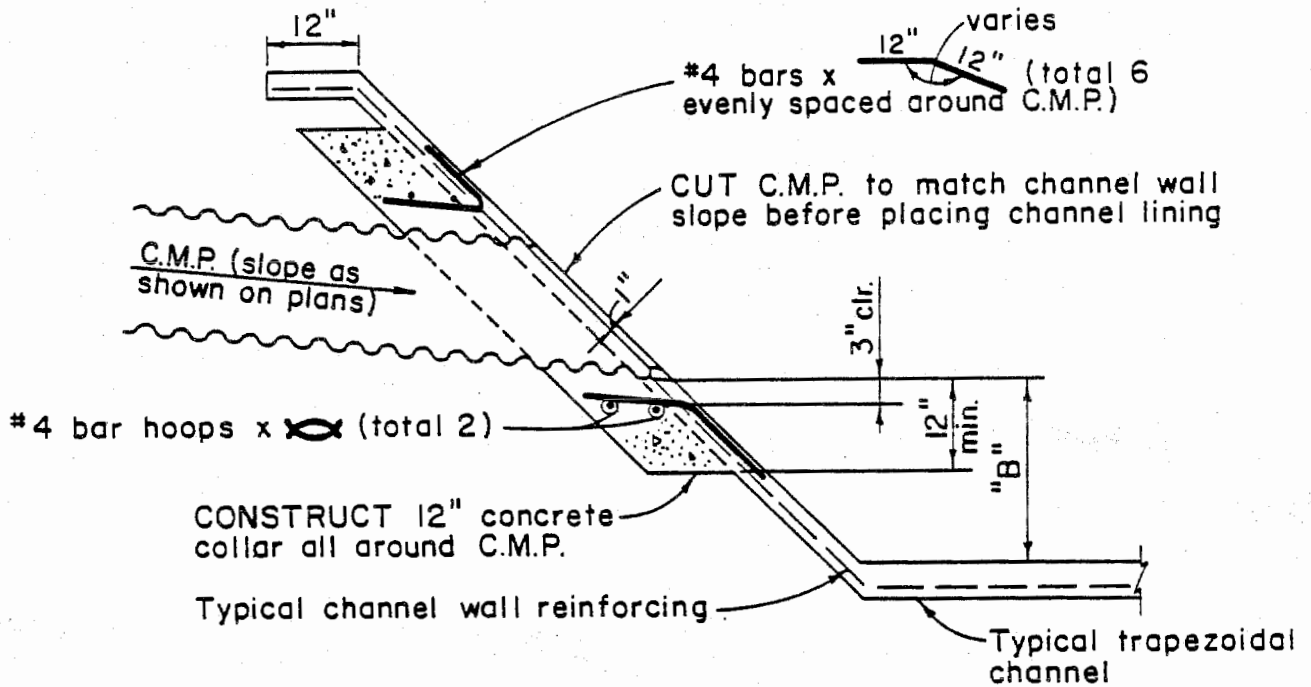
FC5



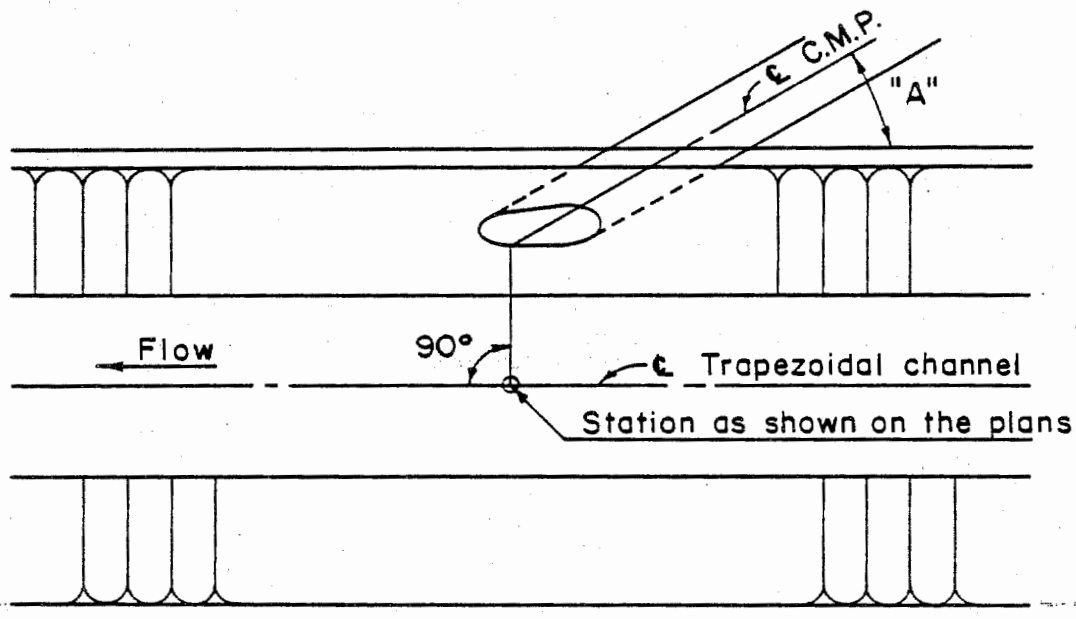
BLACK ON WHITE
6"x12"
LINES 1 & 2 - 3"

STANDARD ADVISORY SIGNS

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
REVISED FC2, 1-2-78	RWM	9/12/68
		FILE NO.
		S.P. 199



SECTION



PLAN

NOTE: Size and gage of C.M.P., angle "A" and dimension "B" to be as shown on the plans.

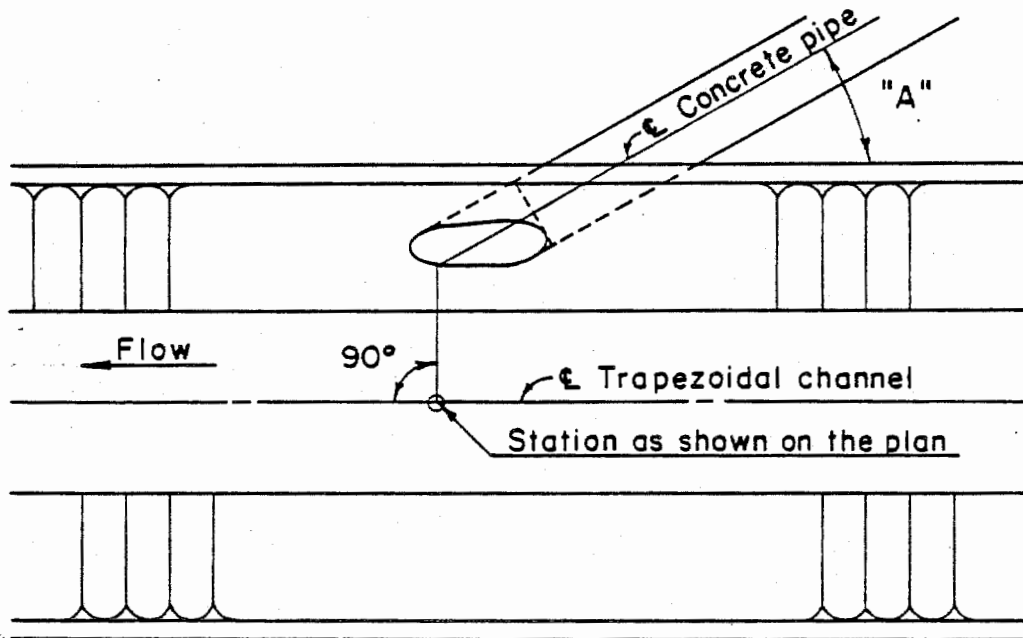
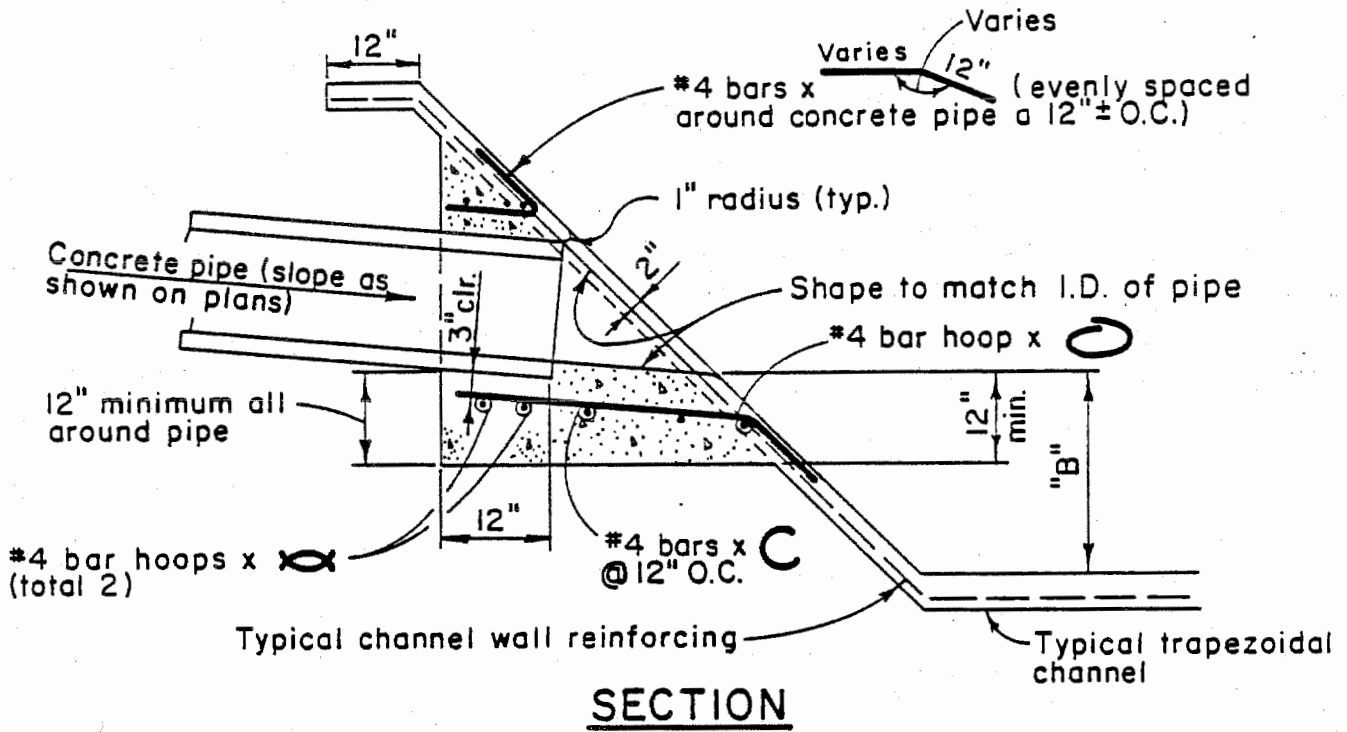
C.M.P. CONNECTION DETAIL

**ABM OR CONCRETE
LINED TRAPEZOIDAL CHANNEL**

NO SCALE

**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

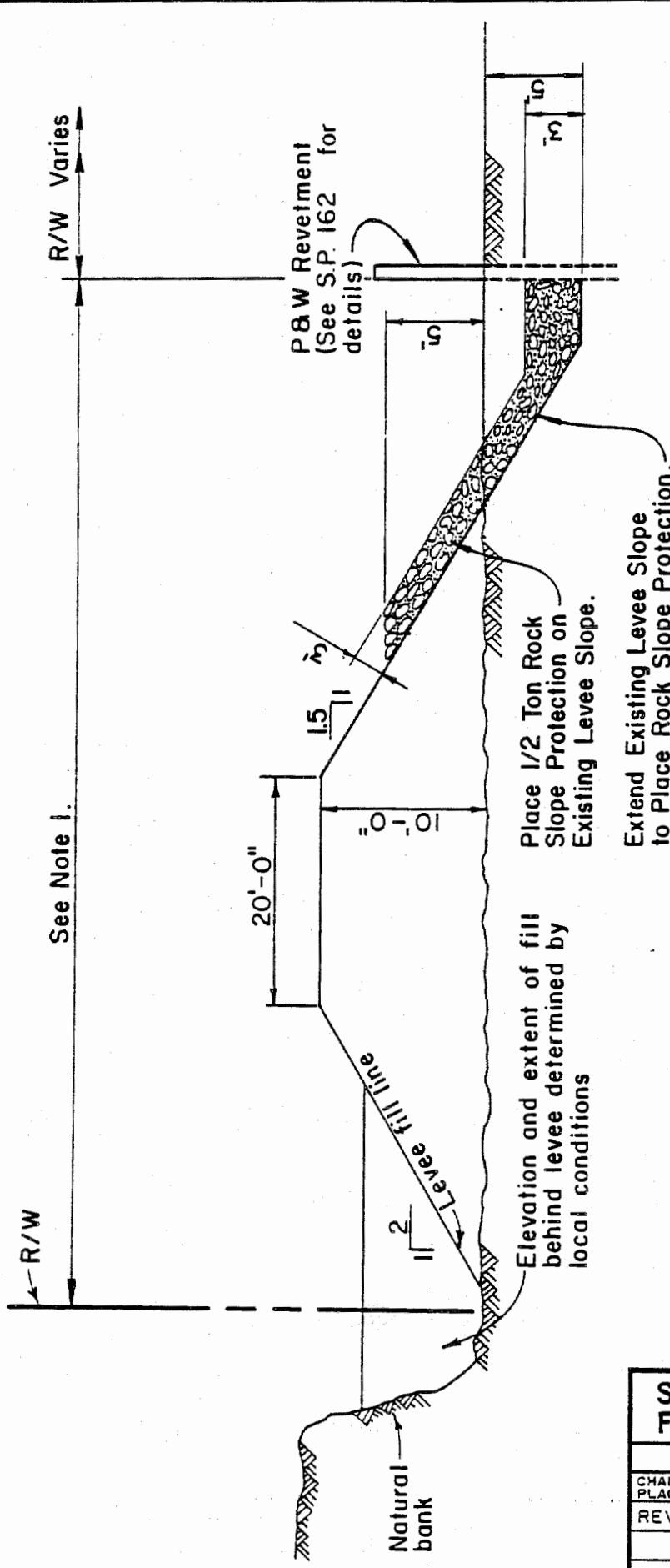
REVISIONS	DWN. BY	DATE
	R.L.H.	4-9-69
	FILE NO.	
	S.P. 200	



NOTE: Diameter of concrete pipe, angle "A" and dimension "B" to be as shown on the plans.

**CONCRETE PIPE
CONNECTION DETAIL**
ABM OR CONCRETE
LINED TRAPEZOIDAL CHANNEL
NO SCALE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
	R.L.H.	5-9-69
	FILE NO.	
	S.P. 200A	



NOTES

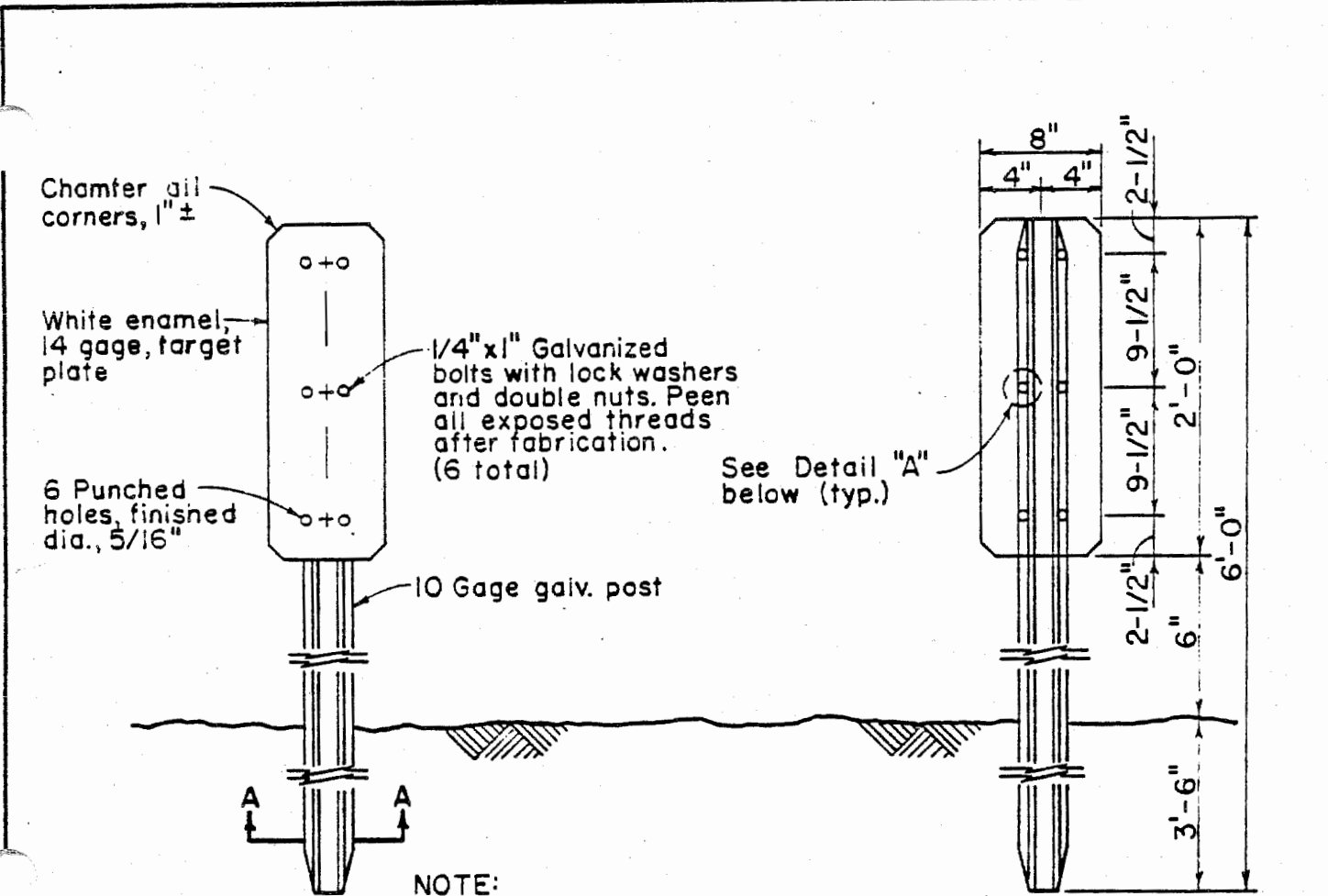
1. Set back line 100' from R/W on Santa Ana River and 75' on Mojave River
2. Rock not to be placed against wire

TYPICAL SECTION

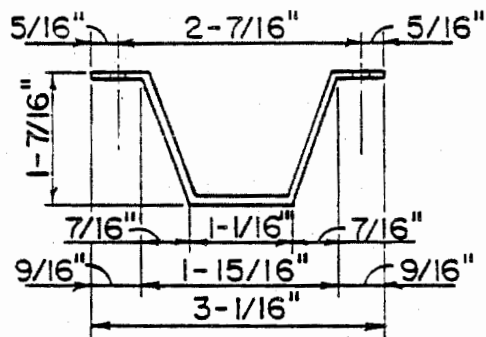
LEVEE WITH P&W REVETMENT AND ROCK FACING

NO SCALE

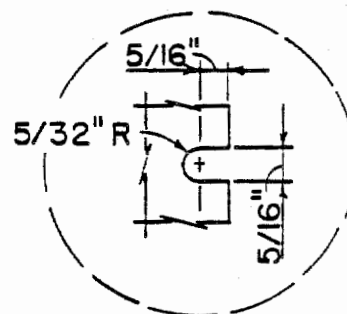
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
CHANGED ROCK PLACEMENT 7-9-71 C.B.	R.L.H.	4-23-69
REVISED 9-15-71	FILE NO.	
	S.P. 202 A	



- NOTE:**
 Information Required On Plate
 1. Name of owner.
 2. Telephone no.
 3. Type of installation with appropriate sign.
 4. Depth of installation from top of marker.



SECTION A-A



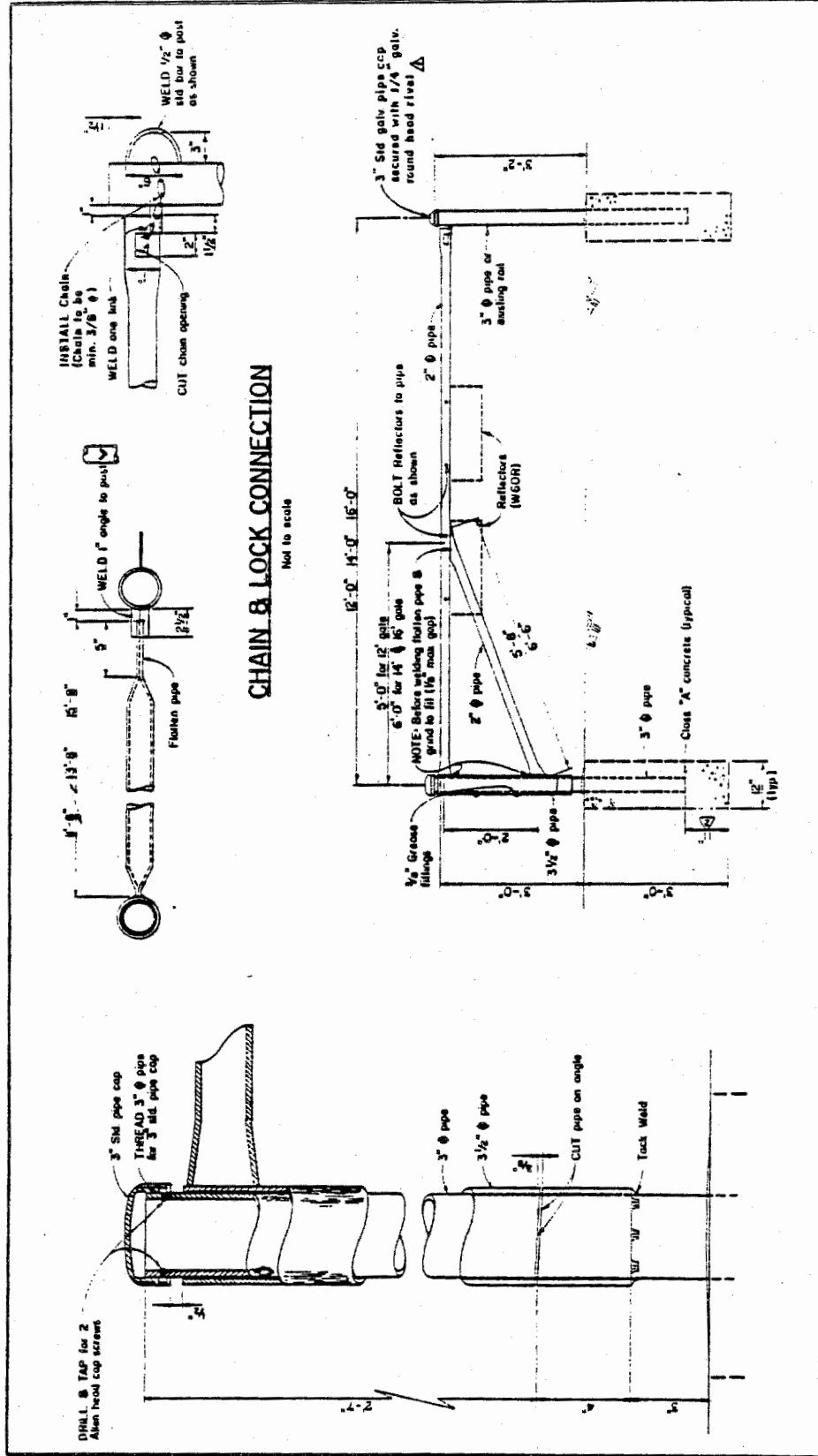
DETAIL "A"

UNDERGROUND UTILITY MARKER

NO SCALE

**SAN BERNARDINO COUNTY
 FLOOD CONTROL DISTRICT**

REVISIONS	DWN. BY	DATE
	B.W.	6/4/69
	FILE NO.	
	S.P. 204	



DRILL & TAP for 2
Allen head cap screws

3" Std pipe cap
THERMAD 3" pipe
for 3" std pipe cap

3" pipe
3 1/2" pipe
CUT pipe on angle
Tack Weld

15'-0" 15'-0" 15'-0"
Flatten pipe
WELD 1" angle to post
INSTALL Chain
(Chain to be
min. 3/8" phi)
WELD one link
CUT chain opening
WELD 1/2" phi
std bar to post
as shown

CHAIN & LOCK CONNECTION
Not to scale

12'-0" 14'-0" 16'-0"

3" Std galv pipe c/cp
secured with 1/4" galv.
round head rivet

3" phi pipe or
existing rail

2" phi pipe
BOLT Reflector to pipe
as shown

Reflector
(WGOR)

5'-0" for 12" gate
6'-0" for 14" & 16" gate
NOTE: Before welding flatten pipe &
grind to fit (1/8" max gap)

1/2" Graco
filling

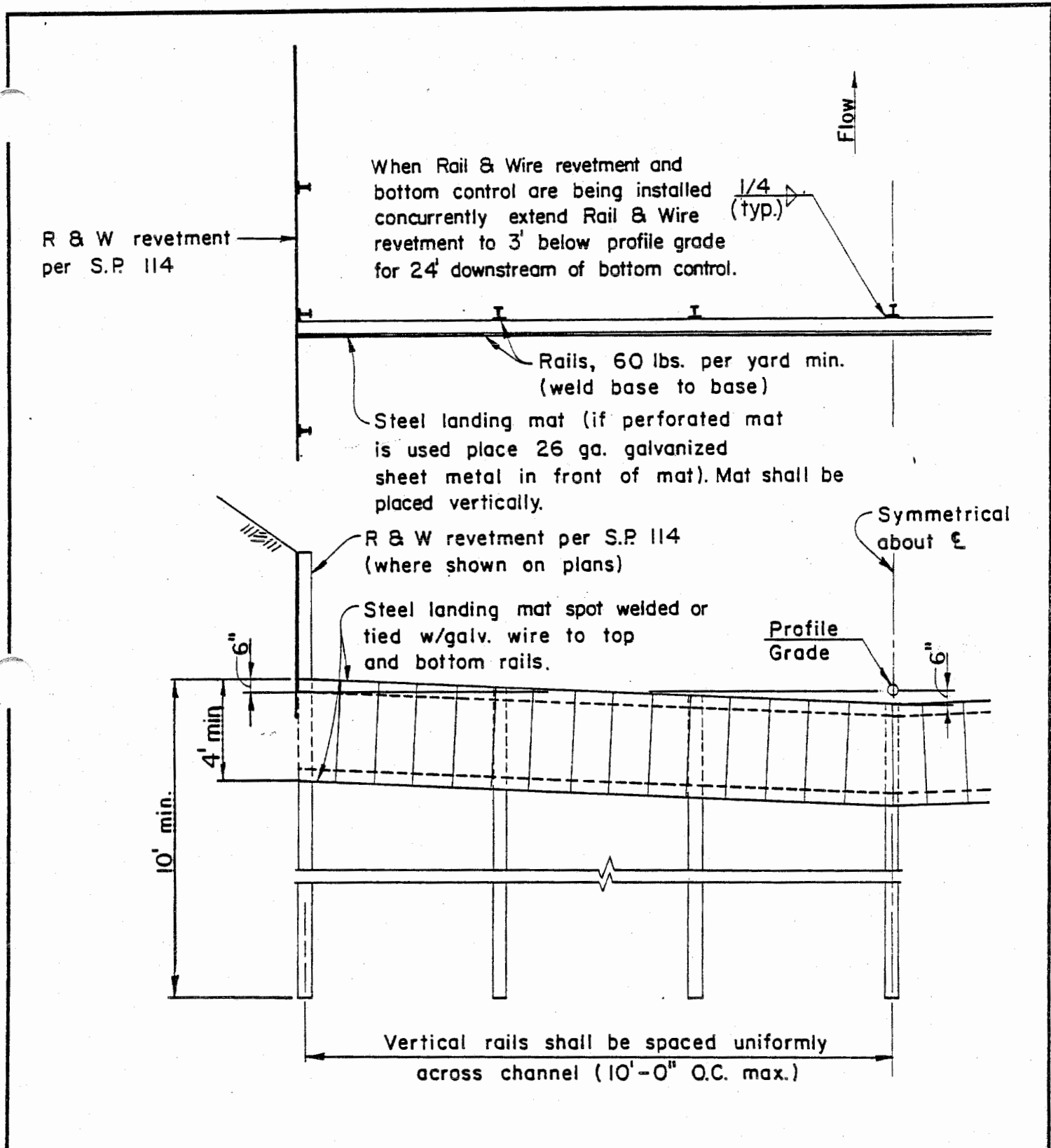
3 1/2" phi pipe
3" phi pipe
Class "A" concrete (typical)

**KEY & NOTCH GATE
CONNECTION TO COLUMN**
Not to scale

**PIPE GATE
HORIZONTAL OPENING**
Not to scale

NOTE:
All joints welded in shop (No field welds)
All pipe and fittings to be galvanized
Gate hinge to be placed on channel side when applicable.
Gate to open away from street when applicable.

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		DATE
REVISIONS	DRAWN BY	FILE NO
REVISED 3-29-74	K.D.G.	7-6-72
ADD NOTE B-11-73		
NEW REVISION B-1771		S.P. 209



BOTTOM CONTROL

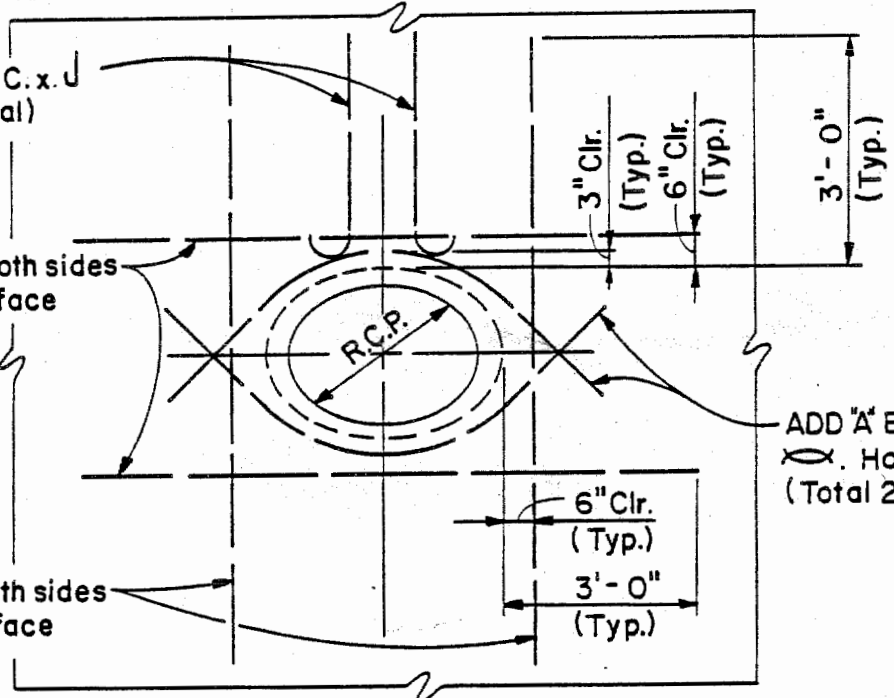
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
	D.D.E.	2-16-79
	FILE NO.	
	S.P. 215	

ADD "D" Bars @ 12" O.C. x J
each face (Min. 4 Total)

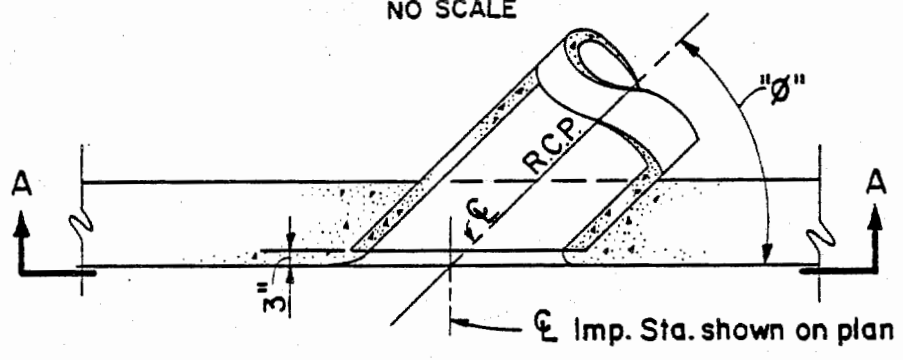
ADD "C" Bars (Typical both sides
of R.C.P.) 2 Bars each face
(Total 4)

ADD "B" Bars (Typical both sides
of R.C.P.) 2 Bars each face
(Total 4)

ADD "A" Bar hoop x
∅. Hoop each face
(Total 2)



SECTION A-A
NO SCALE



PLAN
NO SCALE

NOTES:

1. Unless Otherwise Noted On The Plans;

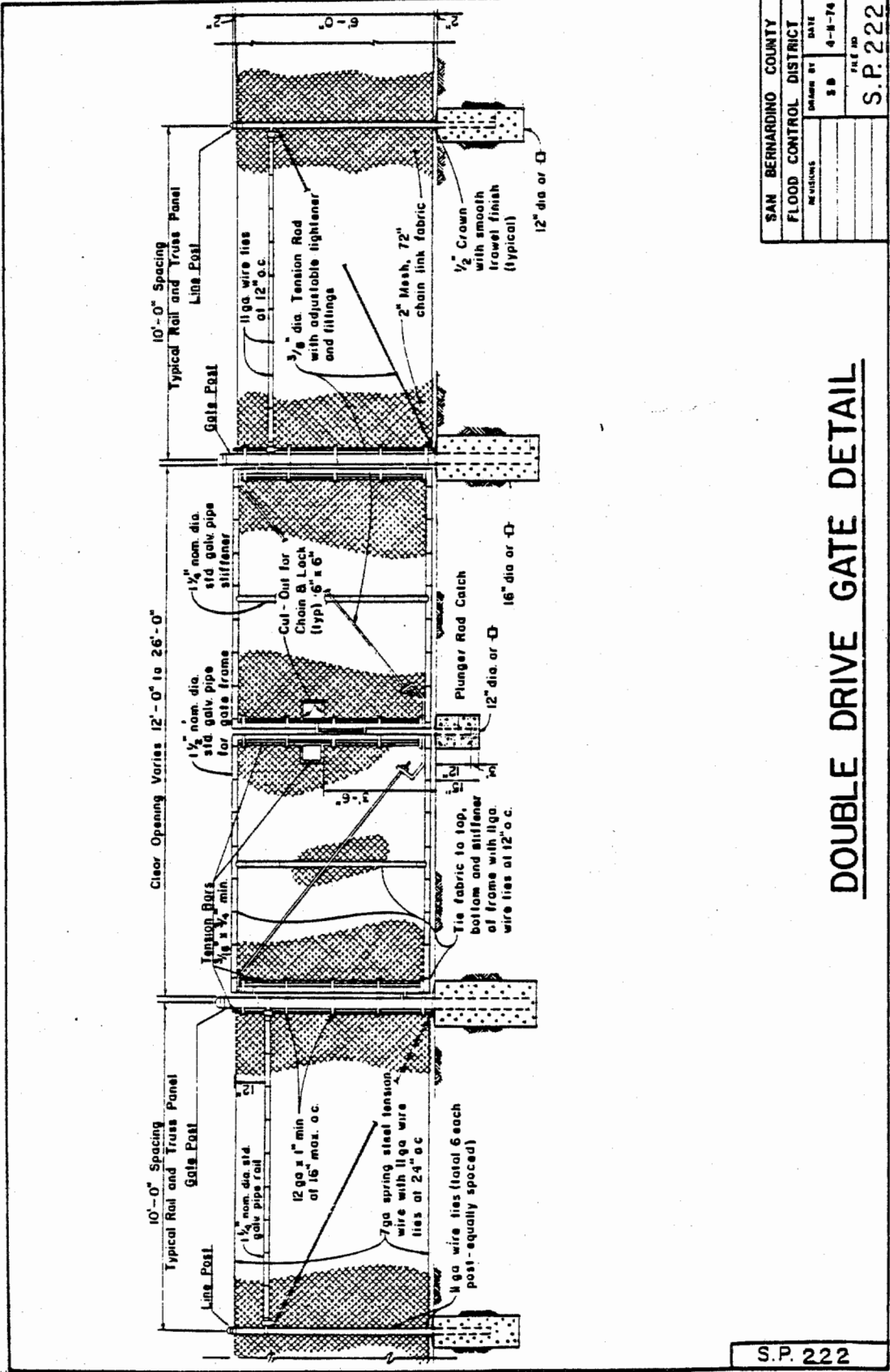
- "A" = #5 Bar Hoop
- "B" = #6 Bars
- "C" = #6 Bars
- "D" = #5 Bars

2. Unless Otherwise Noted On The Plans;

- ∅ = 60° For Pipes 30" and Smaller
- ∅ = 45° For Pipes Larger Than 30" But Smaller Than 54"
- ∅ = 30° For Pipes 54" and Larger

STANDARD R.C.P. CONNECTION
(VERTICAL WALL CHANNEL)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
REVISIONS	DWN. BY	DATE
	C.S.	11-3-80
	FILE NO. S.P. 220	



SAN BERNARDINO COUNTY	
FLOOD CONTROL DISTRICT	DATE
DESIGNED BY	6-11-74
REVISED	BB
FILE NO	
S.P. 222	

DOUBLE DRIVE GATE DETAIL

S.P. 222